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Manual

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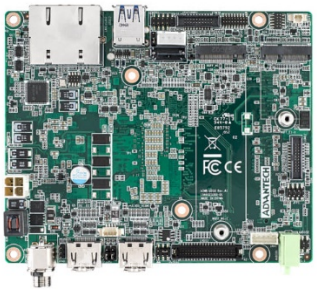
AIMB-U233

UTX Motherboard for 8th Gen. Intel®Core™ i3-8145UE / i5-8365UE / i7-8665UE Whiskey Lake processor, eDP (LVDS), 2x HDMI, 2x LAN, 2x USB3.2 Gen2 x1, 4x COM



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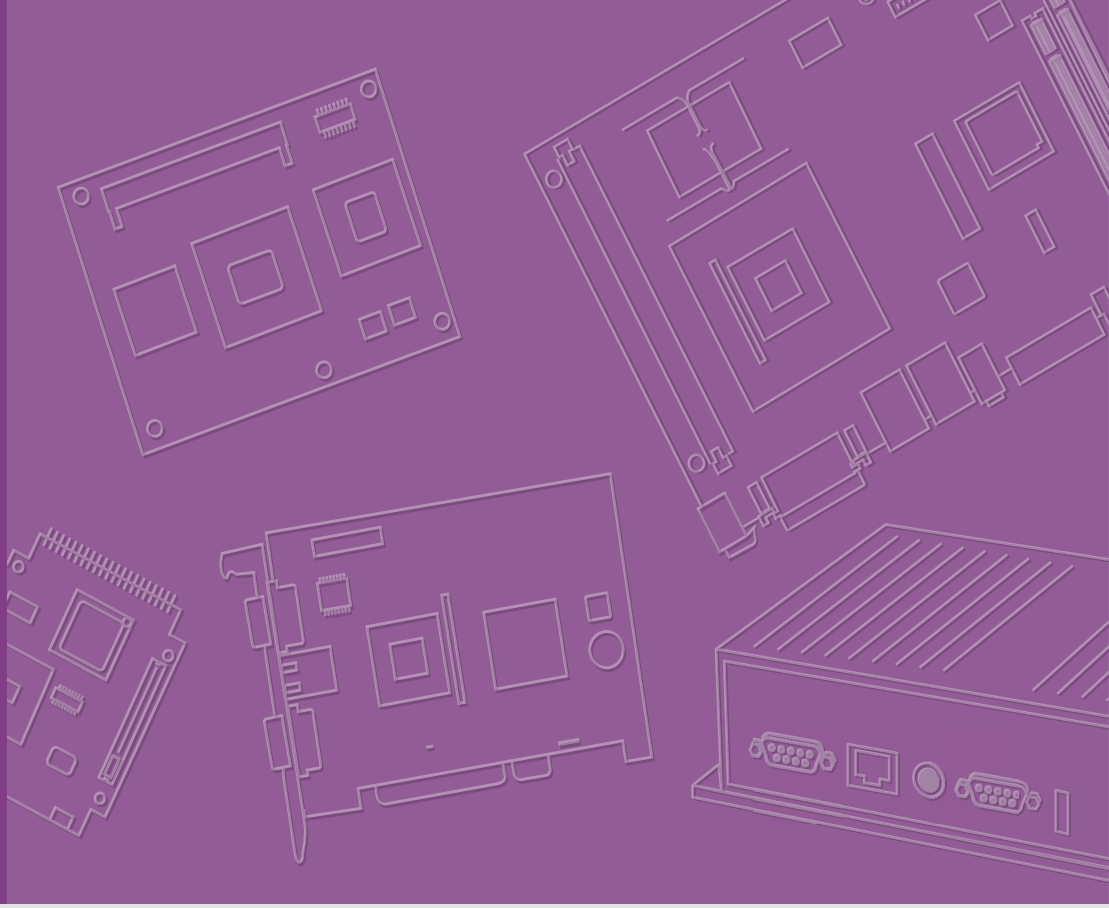

User Manual

AIMB-U233

Intel 8th Gen U Series CORE i3/ i5/i7 CPU, eDP (LVDS), 2 HDMI, 2 LAN, 2 USB3.2 Gen2 x1, 4 COM (RS-232/422/485), M.2 E-Key, M.2 B-Key, M.2 M-Key NVMe

ADVANTECH

Enabling an Intelligent Planet

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Advantech Customer Services

Every Advantech product is built with the most exact specifications to ensure reliable performance in the harsh and demanding conditions typical of industrial environments. Whether your new Advantech equipment is destined for a laboratory or factory floor, be assured that your product can provide the reliability and ease of operation for which the name Advantech is renowned.

Your satisfaction is our primary concern. A guide to Advantech's customer services is provided below. To ensure that you receive the full benefit of our services, please follow the instructions below.

Technical Support

We want you to get the maximum performance from your products. Should you encounter any technical difficulties, we are available to provide assistance. Answers to the most frequently asked questions are provided in the product documentation. These answers are typically a lot more detailed than the ones provided over the phone.

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In addition, free technical support from Advantech engineers is available every business day. We are always willing to give advice on application requirements or specific information regarding the installation and operation of any of our products.

Part No. 2006U23300 Edition 1

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Declaration of Conformity

FCC Class B

This device complies with the requirements in Part 15 of the FCC regulations.

Operation is subject to the following two conditions:

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

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Regulations. 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 device in a residential area is likely to cause harmful interference, in which case users are required to correct the interference at their own expense. The user is advised that any equipment changes or modifications not expressly approved by the party responsible for compliance would void compliance with the FCC regulations and, therefore, the user's authorization to operate the equipment.

Caution! *There is a risk of a new battery exploding if incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.*

Memory Compatibility

Category	Speed	Capacity	Vendor	ADVANTECH P/N	ECC	Result	Remark
DDR4	2666	16GB	Advantech	AQD-SD4U16N26-SE	N	PASS	Intel® 8th Gen Core™ Maximum DDR4-2400
DDR4	2666	8GB	Advantech	SQR-SD4N8G2K6SNBCB	N	PASS	
DDR4	2666	4GB	Advantech	SQR-SD4N4G2K6SNEFB	N	PASS	
DDR4	2400	4GB	Advantech	SQR-SD4N4G2K4SNEEB	N	PASS	
DDR4	2133	16GB	Advantech	AQD-SD4U16N21-SE	N	PASS	
DDR4	2133	8GB	Advantech	AQD-SD4U8GN21-SG	N	PASS	
DDR4	2400	16GB	Advantech	AQD-SD4U16N24-HE	N	PASS	
DDR4	3200	16GB	Advantech	96SD4-16G3200NN-MI	N	PASS	

Product Warranty (2 years)

Advantech warrants the original purchaser that its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products that have been repaired or altered by persons other than repair personnel authorized by Advantech, or products that have been subject to misuse, abuse, accident, or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, users will be billed according to the cost of replacement materials, service time, and freight. Please consult your dealer for more details.

If you believe your product is defective, please follow the steps listed below:

1. Collect all information about the problem encountered (for example, CPU speed, Advantech products used, other hardware and software used, etc.). Note anything abnormal and list any onscreen messages encountered when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any relevant information readily available.
3. If your product is diagnosed as defective, obtain a return merchandise authorization (RMA) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a completed Repair and Replacement Order Card, and proof of the purchase date (such as a photocopy of your sales receipt) in a shippable container. Products returned without a proof of purchase date are not eligible for our warranty service.
5. Write the RMA number clearly on the outside of the package and ship the product prepaid to your dealer.

Initial Inspection

Before installing the motherboard, please ensure that the following items are included in your shipment:

- 1x AIMB-U233Intel® 8th Gen Core™ i3-8145UE / i5-8365UE / i7-8665UE UTX Motherboard
- 1 x GPIO cable
- 2 x Serial Port Cable
- 3 x M.2 Screw
- 1 x Warranty Card
- 1 x On-Board CPU Cooler

If any of these items are missing or damaged, contact your distributor or sales representative immediately. All AIMB-U233 devices are mechanically and electrically inspected before shipment. Thus, your product should be free of marks and scratches and in perfect working order upon receipt. While unpacking AIMB-U233, check the product for signs of shipping damage (for example, a damaged box, scratches, dents, etc.). If the device is damaged or fails to meet the specifications, notify our service department or your local sales representative immediately. Please also notify the carrier. Retain the shipping carton and packing material for inspection by the carrier. After this inspection, we will make arrangements to repair or replace the unit.

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Chapter 1

General Information

1.1 Introduction

AIMB-U233 is the newest UTX small form factor motherboard equipped with Intel® 8th Gen Core™ i3-8145UE/i5-8365UE/i7-8665UE processors and DDR4 2400 MHz up to 16 GB. The palm-sized industrial motherboard measures 137 x 112mm and offers fast graphics and media performance to support triple display output via 2 x HDMI1.4b, eDP (or LVDS), and 2 x 10/100/1000 Mbps Ethernet ports offering high-speed networking.

AIMB-U233 offers high speed, multiple I/O connectivity and expansion, including 2 USB3.2 Gen2 x1, 4 x COMs (2 RS-232, 2 RS-232/422/485), 1 x SATAIII 6 x GB/s connector, and 3 x M.2 (1 x M.2 E-Key, 1 x M.2 B-Key, 1 x M.2 M-Key NVMe) expansion slots for easy integration, and an TPM2.0 security feature.

All the features described above are incorporated into a space-saving, power-efficient, and cost-effective UTX small form factor.

1.2 Features

- Supports Intel® 8th Gen Core™ i3-8145UE/i5-8365UE/i7-8665UE processors
- 1 x SO-DIMM Up to 16 GB DDR4 2400 MHz SDRAM
- Supports 1 x eDP (LVDS co-lay), 2 x HDMI, 3 Independent Displays
- Supports 2 x LAN, 2 x USB3.2 Gen2 x1 Type-A Ports, 4 COM Ports (RS-232/422/485, selected via BIOS)
- Supports 1 x M.2 E-Key, 1 x M.2 B-Key, 1 x M.2 M-Key NVMe
- Onboard TPM 2.0 support
- Supports Intel vPro (For i5 and i7 CPU)
- Supports RAID 0/1/5
- Palm size 137mm x 112 mm

1.3 Specifications

1.3.1 System

- **CPU:** Intel® 8th Gen Core™ i3-8145UE/i5-8365UE/i7-8665UE
- **BIOS:** 256 Mb SPI AMI BIOS
- **SATA hard disk drive interface:** One onboard SATA connectors with a data transmission rate of up to 6 Gb/s

1.3.2 Memory

- **RAM:** 1 x SO-DIMM DDR4 2400 MHz up to 16 GB

1.3.3 Input/Output

- **M.2 Expansions:** Supports 1 x M.2 E-Key (2230), 1 x M.2 B-Key (2242/3042), 1 x M.2 M-Key (2280 SATA or PCIe x4 NVME SSD)
- **Serial ports:** Four serial ports; COM1 & COM3 RS-232, COM2 RS-232/422/485 (Selected via BIOS) or COM4 RS-232/422/485 (Selected via BIOS)
- **USB port:** Supports 2 x USB3, 2 x Type-A Gen2 x1, 2 x USB2.0 internal pin header
- **GPIO connector:** One 16-bit general purpose input/output

1.3.4 Graphics

- **Controller:** Intel Gen 9 graphics engine

- **HDMI:** Supports up to 3840 x 2160 @ 30 Hz
- **LVDS:** Supports 24-bit dual channel and up to 1920 x 1200, colay eDP (LVDS is BOM optional)
- **eDP:** Supports up to 4096x2304@60 Hz, colay with LVDS
- **Triple display:** 2 HDMI + eDP (or LVDS)

1.3.5 Ethernet LAN

- Supports up to 2 10/100/1000 Mbps Ethernet port (s) via PCI Express x1 bus, which provides a data transmission rate of 500 MB/s
- **Controller:** LAN1: Intel Jacksonville: I219LM GbE PHY; LAN2: Intel Springville: I211AT GbE

1.3.6 Industrial Features

- **Watchdog timer:** Can generate a system reset. The watchdog timer is programmable, with each unit equal to one second or one minute (255 levels)

1.3.7 Mechanical and Environmental Specifications

- **Operating temperature:** 0~60 °C (32~140 °F) with air flow 0.7 m/s
- **Storage temperature:** -40 ~ 85 °C (-40 ~ 185 °F)
- **Humidity:** 5 ~ 95% non-condensing
- **Power supply voltage:** +12 V
- **Power consumption:**+12 V, Windows Idle mode: 6.236 W (i7-8665UE with 16 GB SO-DDR4-2666) Windows Max Load: 22.971 W (i7-8665UE with 16 GB SO-DDR4-2666)
- **Board size:** 112 x 137 mm (4.4" x 5.4")
- **Board weight:** 3.5 kg

1.4 Jumpers and Connectors

The AIMB-U233 motherboard is equipped with connectors for linking the board to external devices such as hard disk drives. The board also features several jumpers for configuring the system according to specific applications.

The function of each board jumper and connector is listed in the table below. The procedure for setting jumpers is explained in subsequent sections of this chapter. Instructions for connecting external devices to the motherboard are provided in Chapter 2.

Table 1.1: Connector / Header List:

	Description	Part Reference
1	SPI Pin Header	SPI1_CN1
2	ATX 12V power supply connector	ATX12V1
3	System Fan #1 connector	SYSFAN1
4	DC input Jack	DCIN1
5	IMVP8/9 PMBus KIT	JPMB1
6	HDMI #1	HDMI1
7	AT/ATX Mode selection	PSON1
8	LVDS VESA, JEIDA format selection pin header	JLVDS_VCON1
9	HDMI #2	HDMI2
10	VDD select for LVDS1 Panel	JLVDS1
11	Low Voltage Differential Signaling / EDP	LVDS_EDP1
12	Inverter power connector	INV1
13	HD Audio Interface (LINE-OUT)	AUDIO1
14	HD Audio Interface (MIC-IN)	AUDIO2
15	PWRBTN# / RESET# / HDD LED / PWR LED	JFP1
16	COM1 and COM2 Box Header	COM12
17	Serial ATA interface connector #1	SATA1
18	M.2 KEY-M connector	NGFF_M1
19	M.2 KEY-E connector	NGFF_E1
20	Serial ATA Power connector #1	SATAPWR1
21	Coin Battery wafer box	BAT1
22	Low pin count interface connector	LPC1
23	16-bits General Purpose I/O Pin Header	GPIO1
24	COM3 and COM4 Box Header	COM34
25	USB2.0 Front panel Header	USB34
26	COMS Mode selection	JCMOS1
27	USB3.1 GEN2 Stack connector	USB12
28	Dual port RJ45 Connector	LAN1+LAN2
29	M.2 KEY-B connector	NGFF_B1
30	Nano SIM Card holder	SIM1
31	DDR4 SO-DIMM Socket CH-A	DIMMA1
32	CPU FAN #1 connector	CPUFAN1

1.5 Board Layout: Jumper and Connector Locations

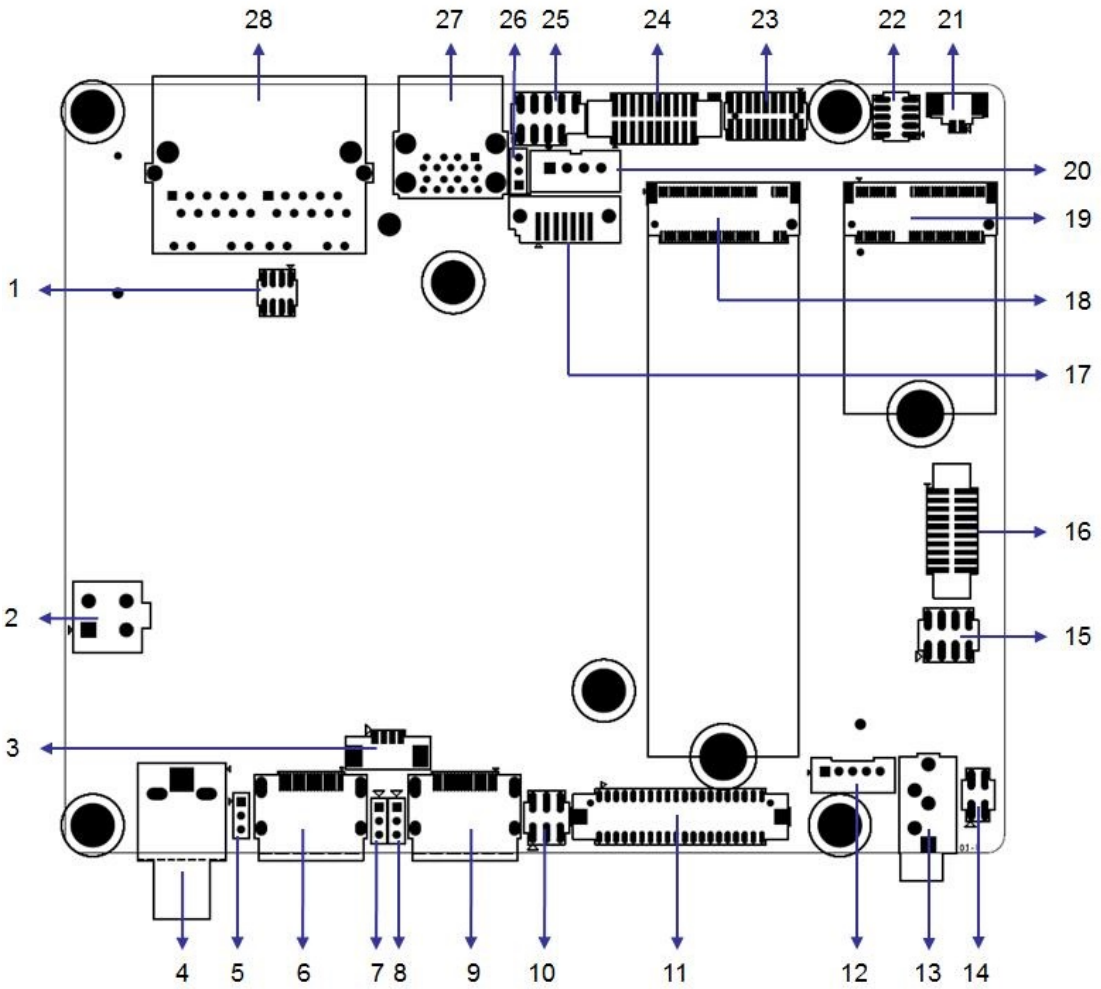


Figure 1.1 Jumper and Connector Locations

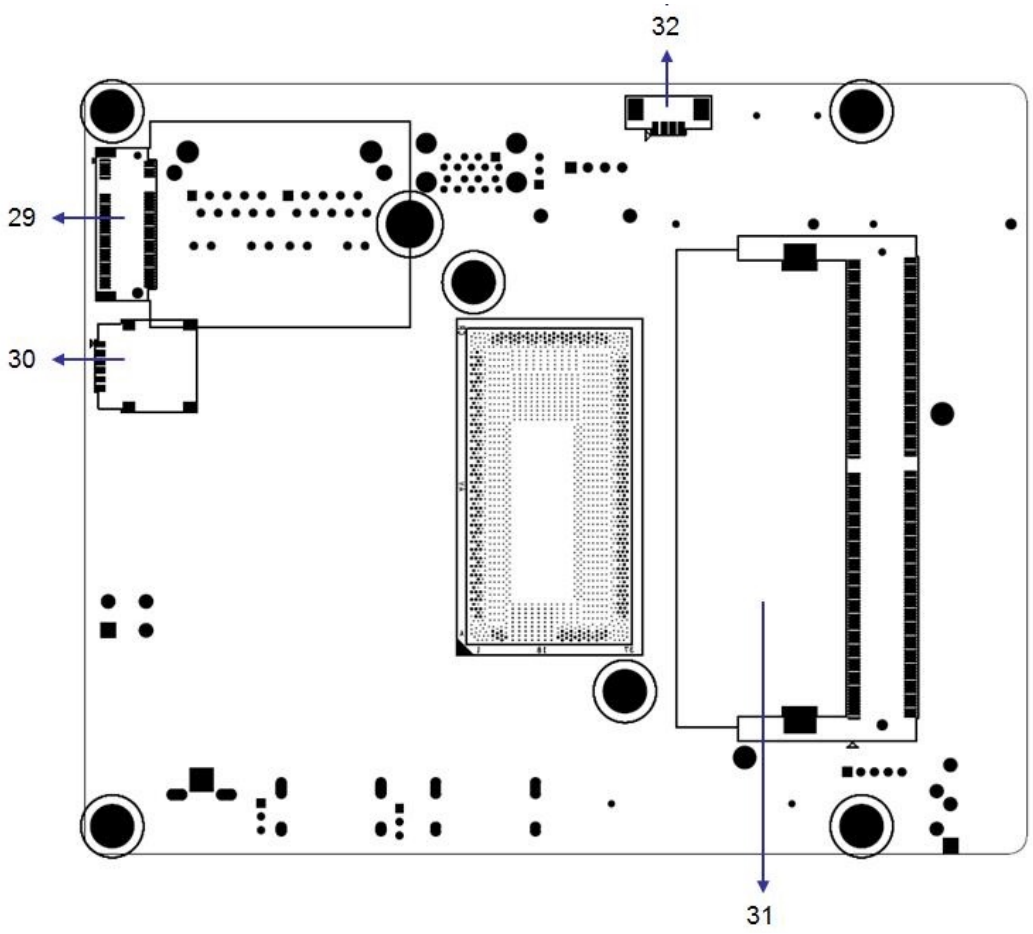


Figure 1.2 Jumper and Connector Locations

1.6 AIMB-U233 Board Diagram

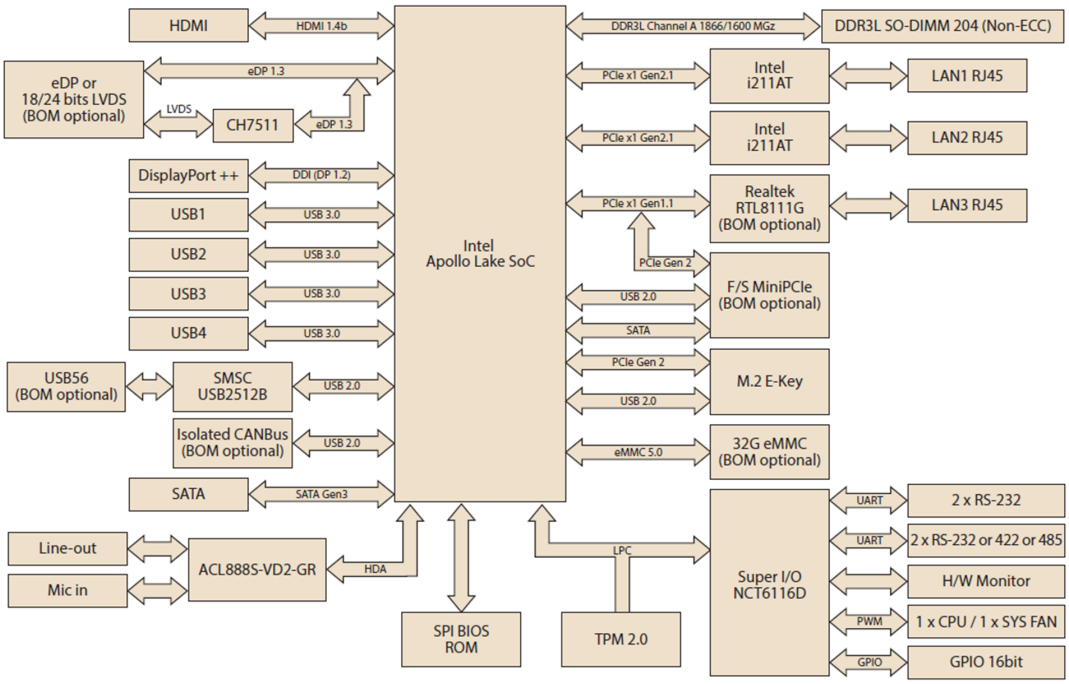


Figure 1.3 AIMB-U233 Board Diagram

1.7 Safety Precautions

Warning! *Always completely disconnect the power cord from the chassis when working with the hardware. Do not connect devices while the power is on. Sensitive electronic components can be damaged by sudden power surges. Only experienced electronics personnel should open the PC chassis.*

Caution! *Always ground yourself to remove any static charge before touching the motherboard. Modern electronic devices are very sensitive to electro-static discharges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when not in the chassis.*

Caution! *The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.*

Caution! *There is a danger of a new battery exploding if incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.*

1.8 Jumper Options

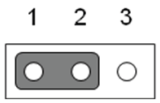
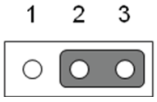
This section provides instructions on how to configure the motherboard by setting jumpers and also outlines the default motherboard settings and options for each jumper.

1.8.1 Setting Jumpers

The motherboard can be configured according to the application requirements with the setting of jumpers. A jumper is a metal bridge used to close an electrical circuit. Jumpers typically consist of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To “close” (or turn ON) a jumper, connect the pins with the clip. To “open” (or turn OFF) a jumper, simply remove the clip. Some jumpers comprise a set of three pins, labeled 1, 2, and 3. With these jumpers, simply connect either Pins 1 and 2, or Pins 2 and 3. A pair of needle-nose pliers may be necessary for setting jumpers.

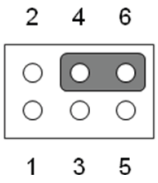
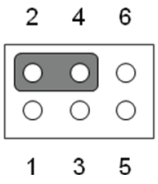
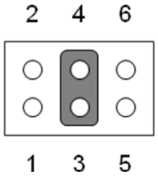
1.8.2 CMOS Mode Selection (JCOMS1)

Table 1.2: CMOS Mode Selection (JCOMS1)

Function	Jumper Setting
Normal (Default)	
Clear CMOS Data	

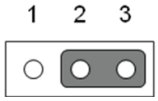
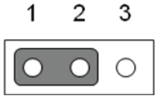
1.8.3 LVDS Panel Voltage Selection Header (JLVDS1)

Table 1.3: VDD select for LVDS1 Panel (JLVDS1)

Function	Jumper Setting
Jumper position for +3.3 V (Default)	
Jumper position for +5 V	
Jumper position for +12 V	

1.8.4 ATX/AT Mode Selection (PSON1)

Table 1.4: ATX/AT Mode selection (PSON1)

Function	Jumper Setting
AT Mode (Default)	
ATX Mode	

Chapter 2

Connecting Peripherals

2.1 Introduction

Most of the device connectors can be accessed from the top of the board during installation in the chassis. If the system is installed with several cards or the chassis is packed, partial removal of the card may be necessary to make all connections. Please refer to the Appendix if you need more detailed information regarding the connectors and pin definitions.

2.2 LAN and USB Ports (LAN12, USB12/USB34)

AIMB-U233 provides 2 USB3.2 Gen2 x1 which are located on the rear side. The USB interface complies with the USB specification revision 3.2 that supports transmission rates of up to 10 Gbps and 2 x USB2.0 internal pin header that supports 480 Mbps.

The AIMB-U233 system is equipped with 2 high-performance 1000 Mbps Ethernet LAN adapters. All of them are supported by all major network operating systems. The RJ-45 jacks on the rear panel facilitate a convenient LAN connection.

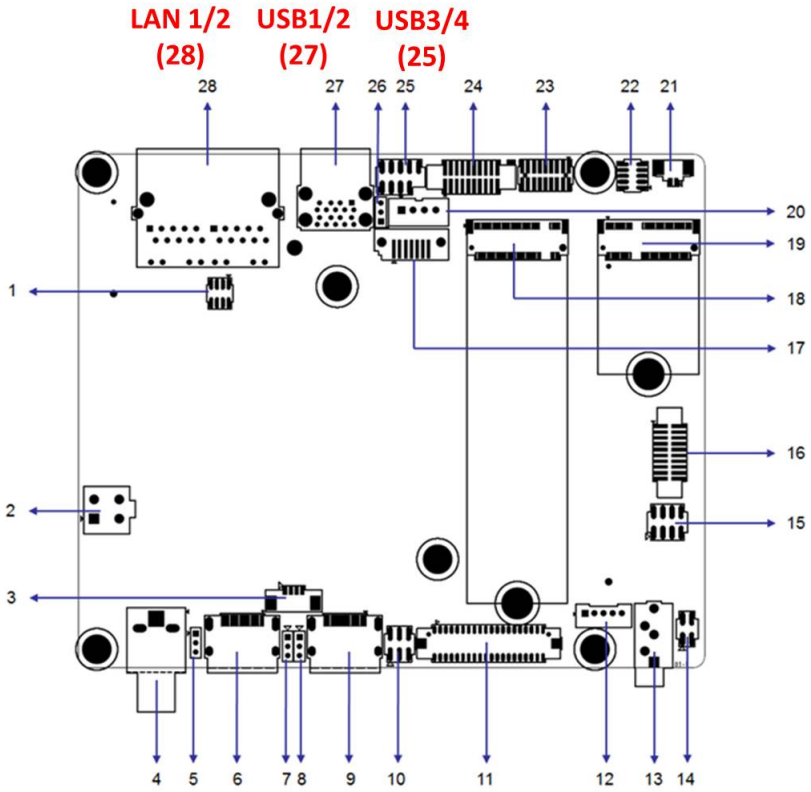
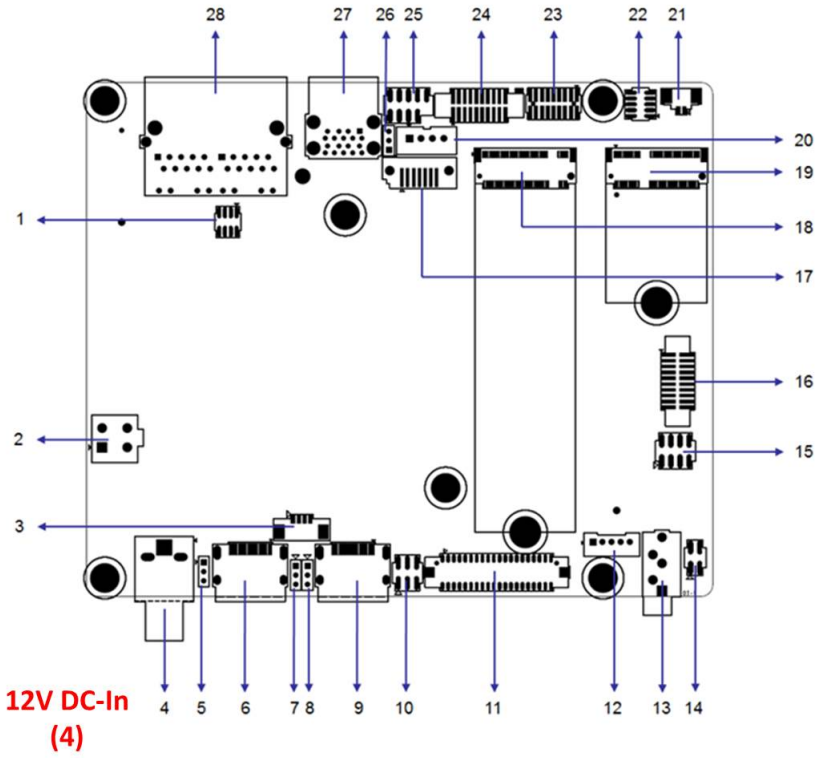


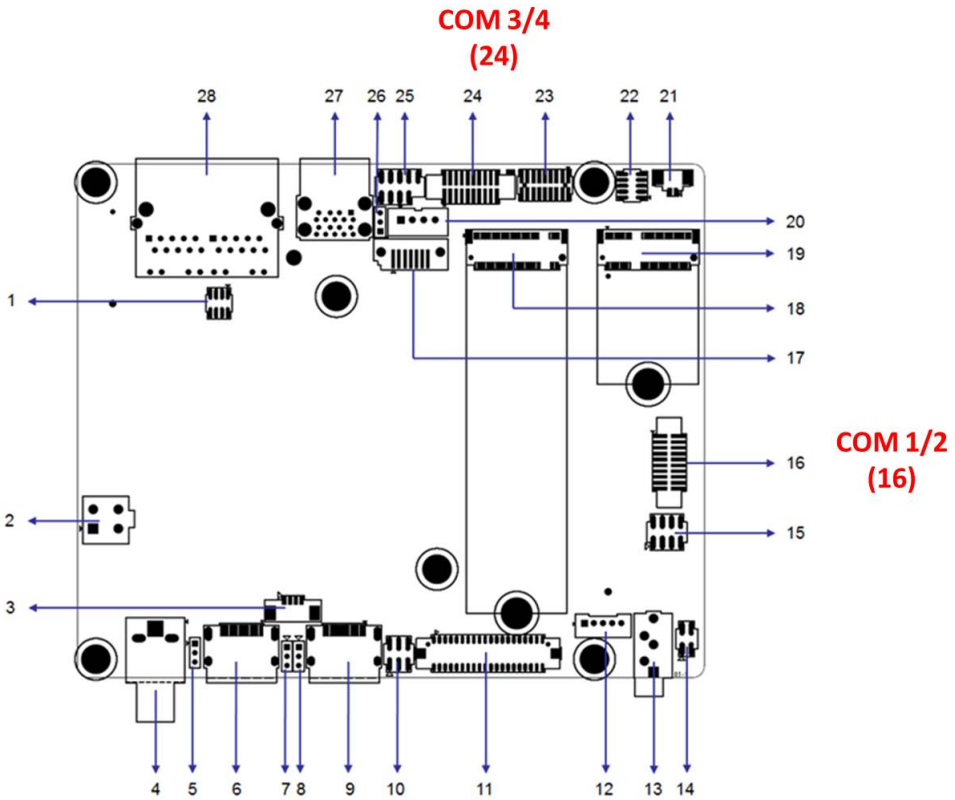
Table 2.1: LAN LED Indicators

LAN Mode	LAN Indicator
1 Gbps link on	LED1 Green on
100 Mbps link on	LED1 Orange on
Active	LED2 Green flashing

2.3 DC Input Connector (DCIN1)



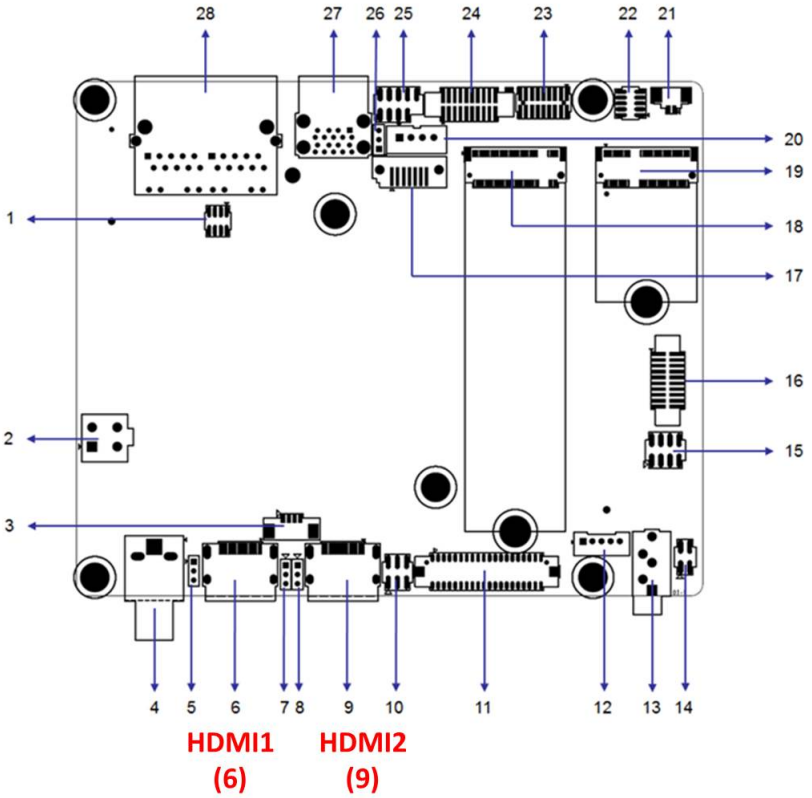
2.4 Serial Ports (COM1, COM2, COM3, COM4)



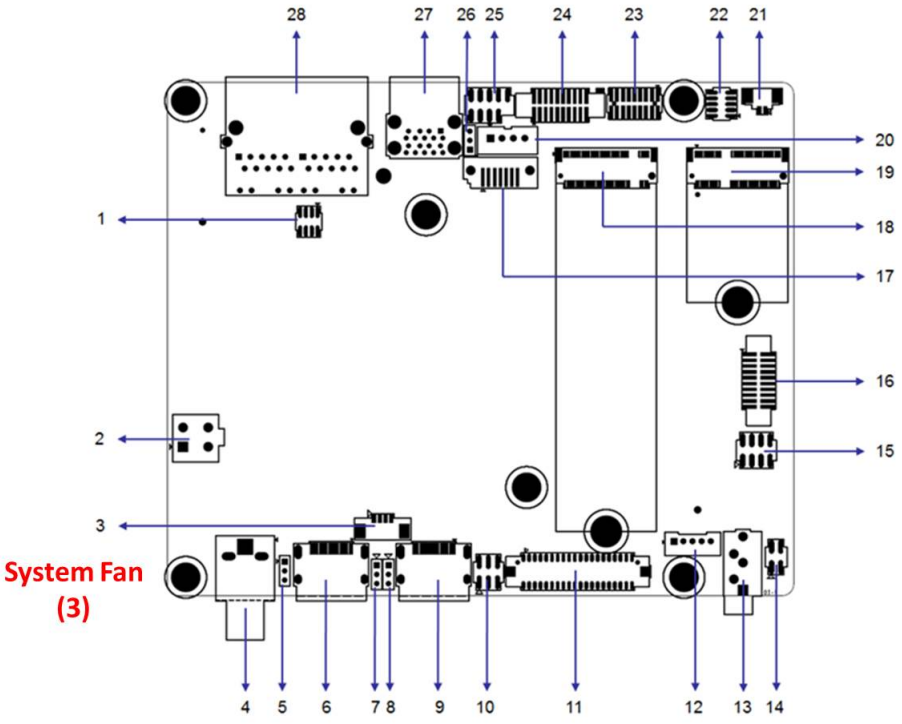
AIMB-U233 supports four serial ports. COM1 and COM3 are RS-232. COM2 is RS-232/422/485 Selected via BIOS) and COM4 is RS-232/422/485 (Selected via BIOS). The IRQ and address ranges for both ports are fixed. However, users can disable the

port or change the parameters via the system BIOS setup. Users who experience problems with a serial device are advised to check the connector pin assignments.

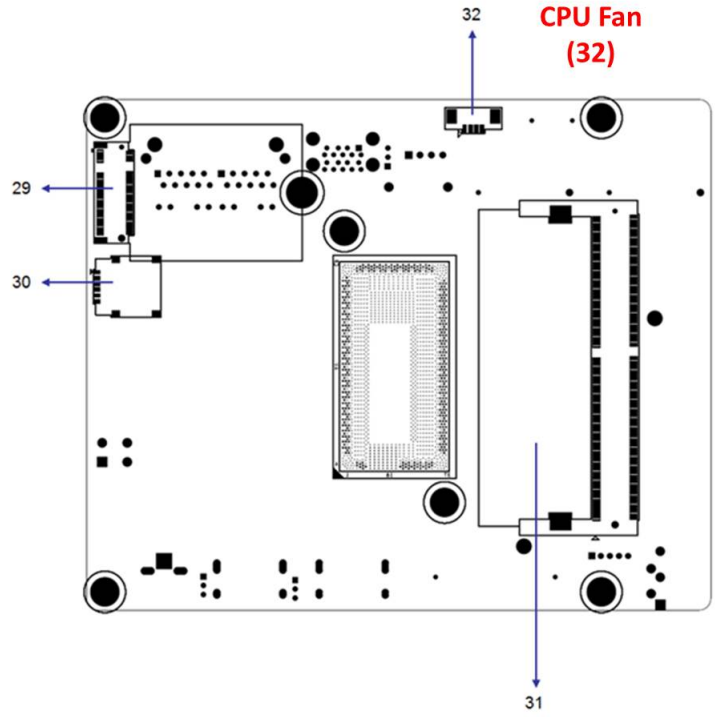
2.5 Display Port Connector (HDMI 1/2)



2.6 System Fan (SYSFAN1)

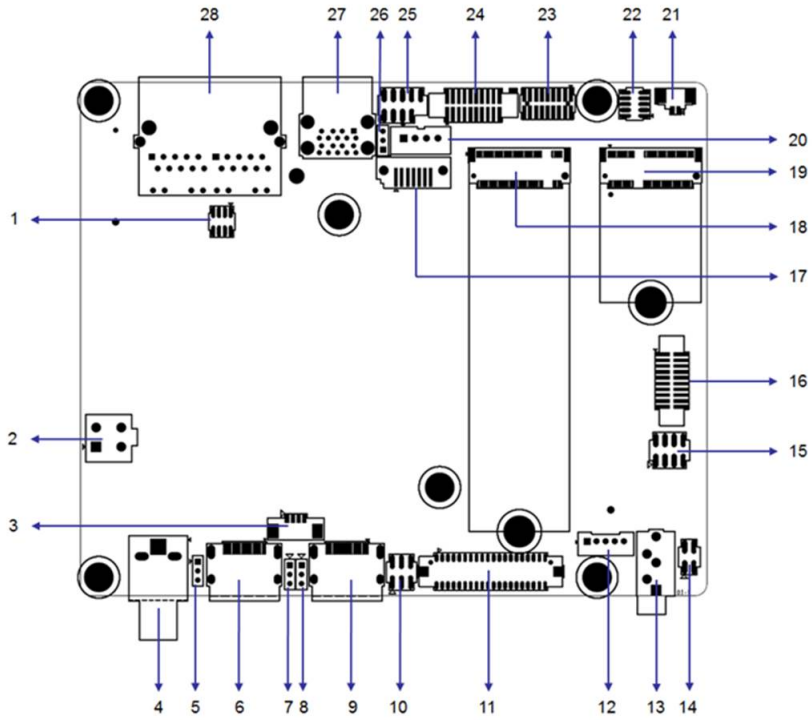


2.7 CPU FAN (CPUFAN1)



2.8 Front Panel Connectors (JFP1)

Several external switches are provided for monitoring and controlling the AIMB-U233.



2.8.1 ATX Soft Power Switch (JFP1/RESET)

For computer cases equipped with ATX power supply, users should connect the Power On/Off button on the computer case for convenient Power On/Off functionality.

2.8.2 Reset (JFP1/RESET)

Many computer cases offer the convenience of a specific reset button. Connect the wire for the reset button.

2.8.3 HDD LED (JFP1/HDDLED)

An LED can be linked to the connector to indicate when the HDD is active.

2.8.4 Power LED Header (JFP1/PWR_LED)

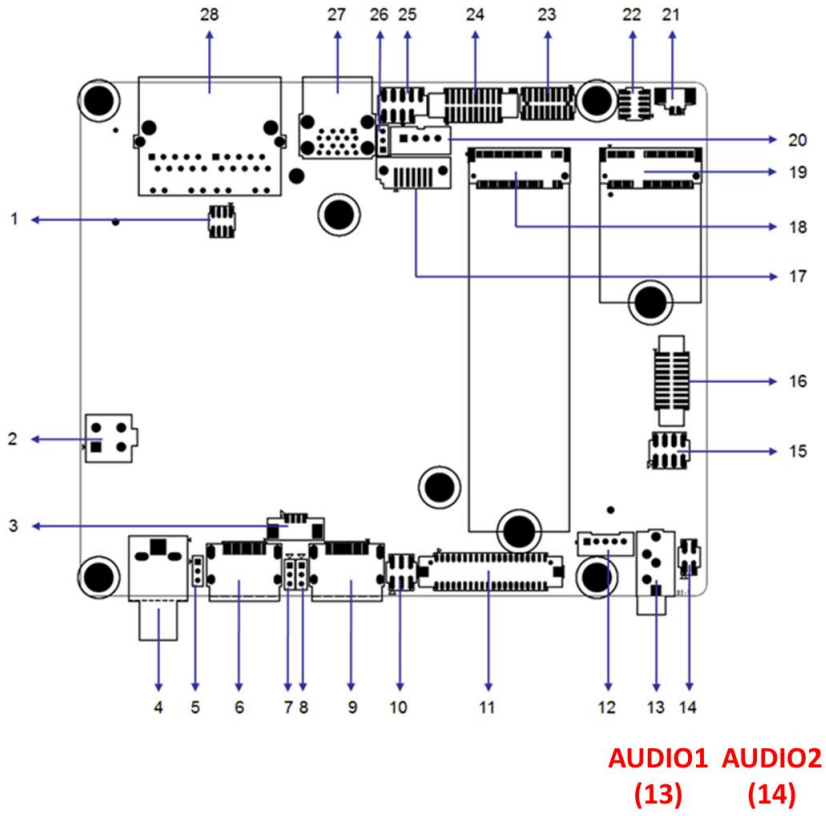
Refer to Appendix A for detailed information regarding the pin assignments.

Two power supply connection modes exist. The first is the ATX power mode, where the system is powered on/off by momentarily pressing the power button. The second is the AT power mode, where the system is powered on/off using the power supply switch. The status differences indicated by the power LED are listed in the following table:

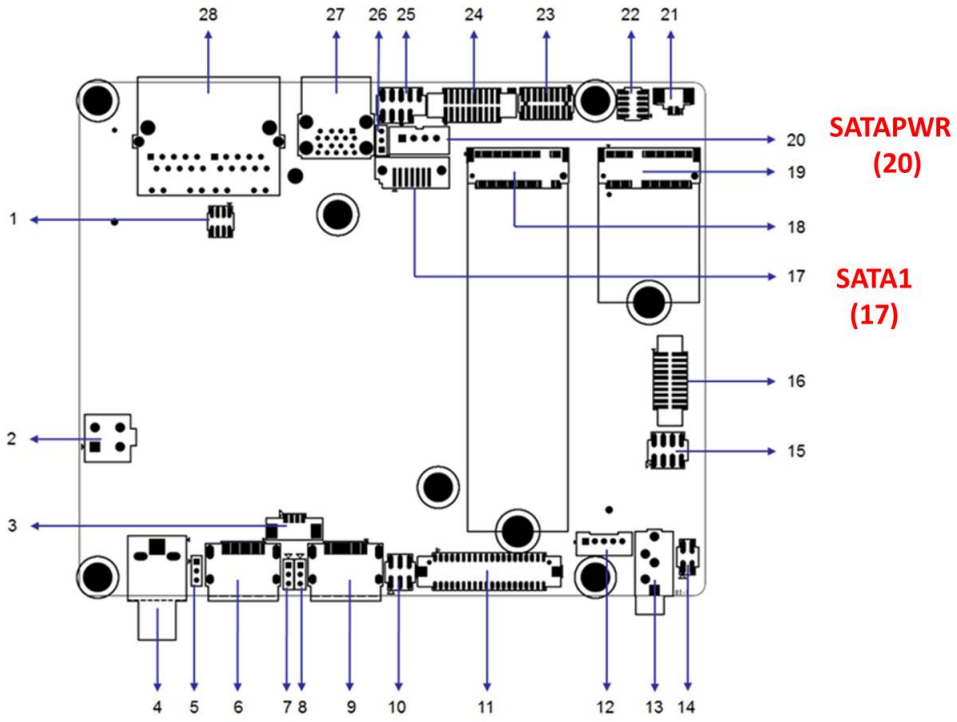
Table 2.2: ATX Power Supply LED Status

Power Mode	LED (ATX power mode) (On/off by momentarily pressing the power button)	LED (AT power mode) (Powered on/off using the power supply switch)
PSON1 jumper setting	Pins 2-3 closed	Pins 1-2 closed
System On	On	On
S3	Off	Off
S4	Off	Off
System Off	Off	Off

2.9 HD Audio Interface LINE-OUT / Mic-In (AUDIO1 / AUDIO2)



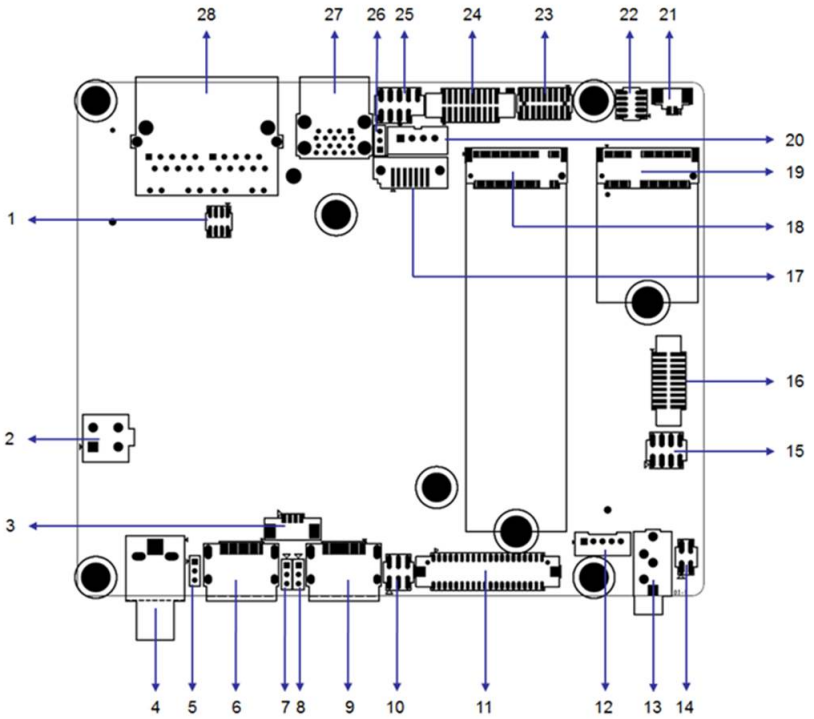
2.10 Serial ATA Interface (SATA1 and SATAPWR1)



AIMB-U233 features a high-performance Serial ATA interface (up to 6 Gb/S).

2.11 AT/ATX Mode Selection Connector (PSON1)

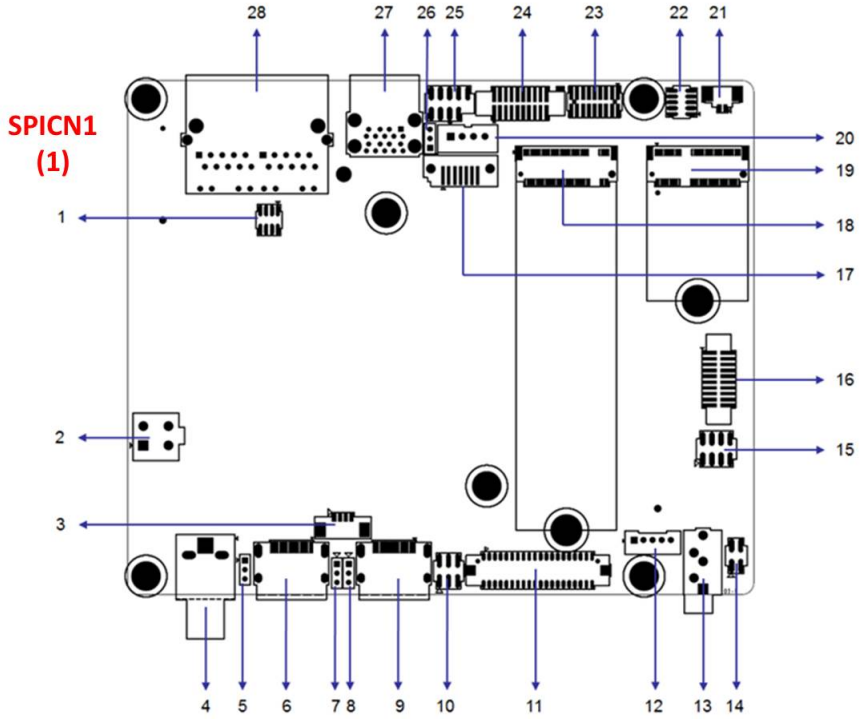
AIMB-U233 supports ATX/AT mode selection by jumper, the default setting is pin 2-3 ATX mode.



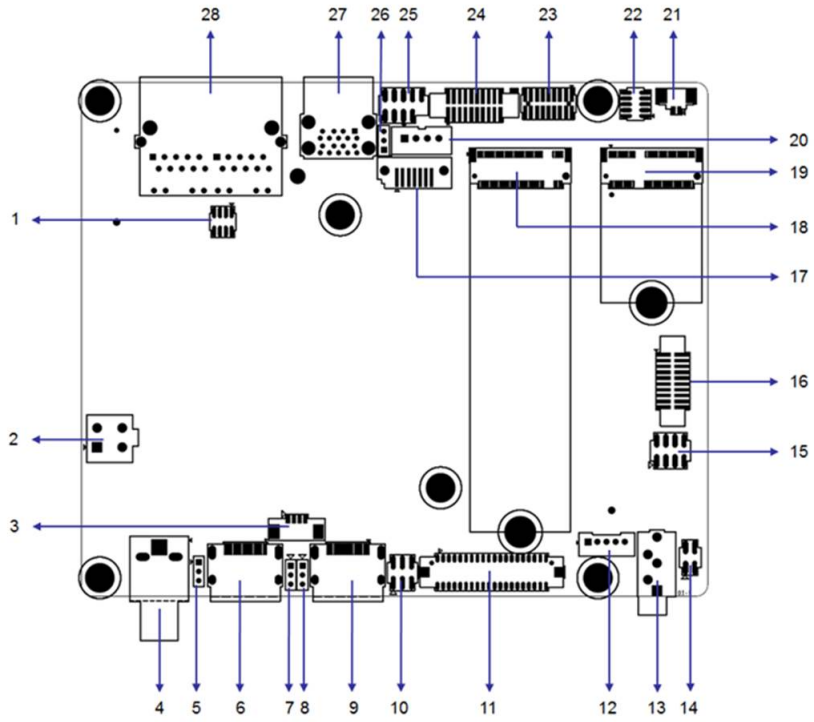
PSON1
(7)

2.12 SPI Flash Connector (SPI_CN1)

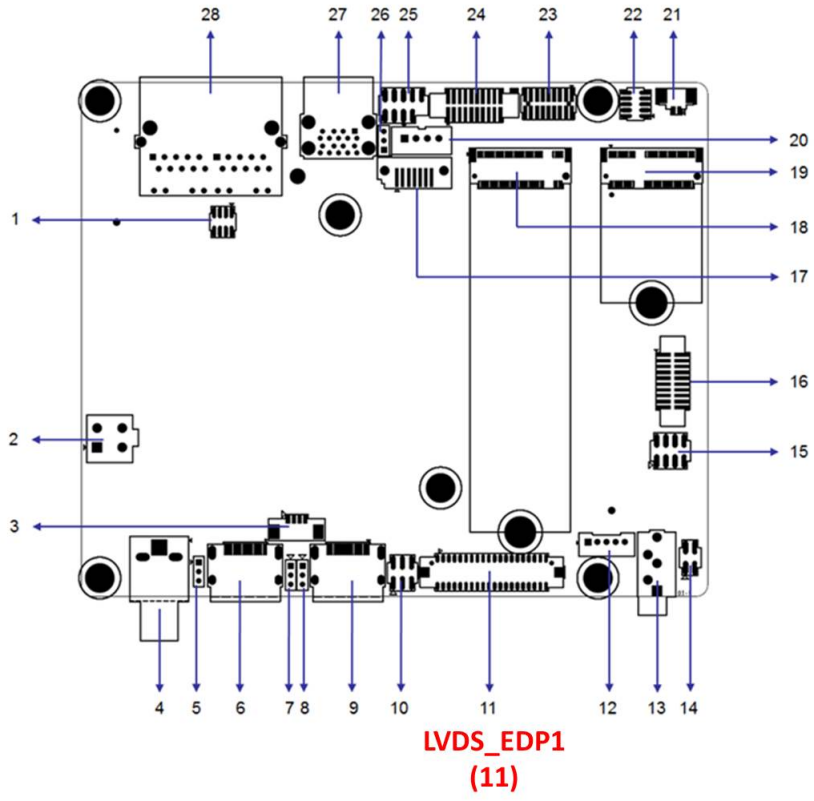
The SPI flash card pin header may be used to flash the BIOS.



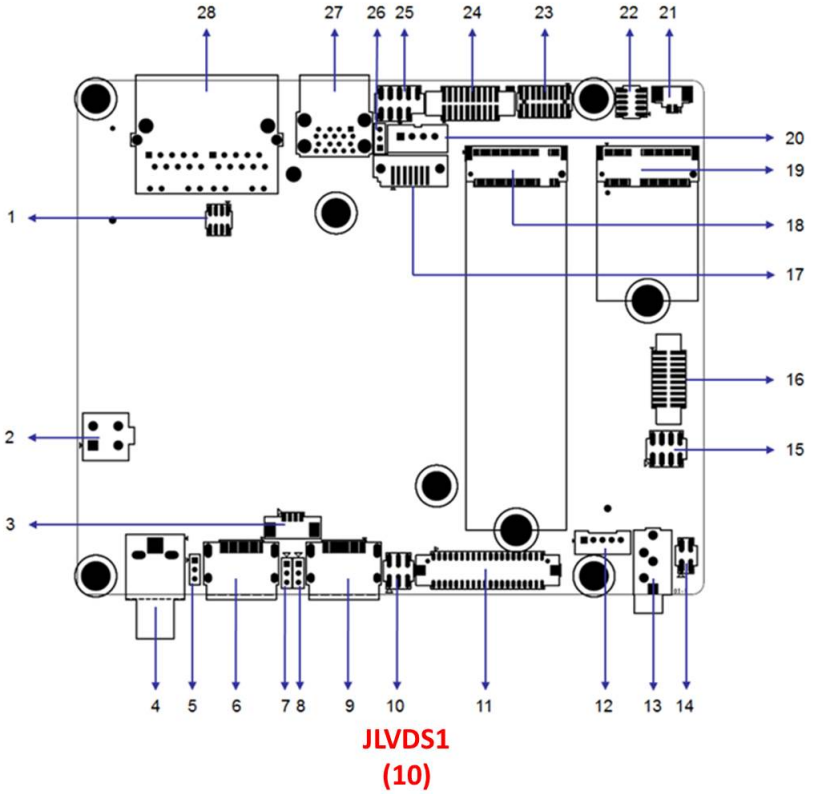
2.13 Backlight Inverter Power Connector (INV1)



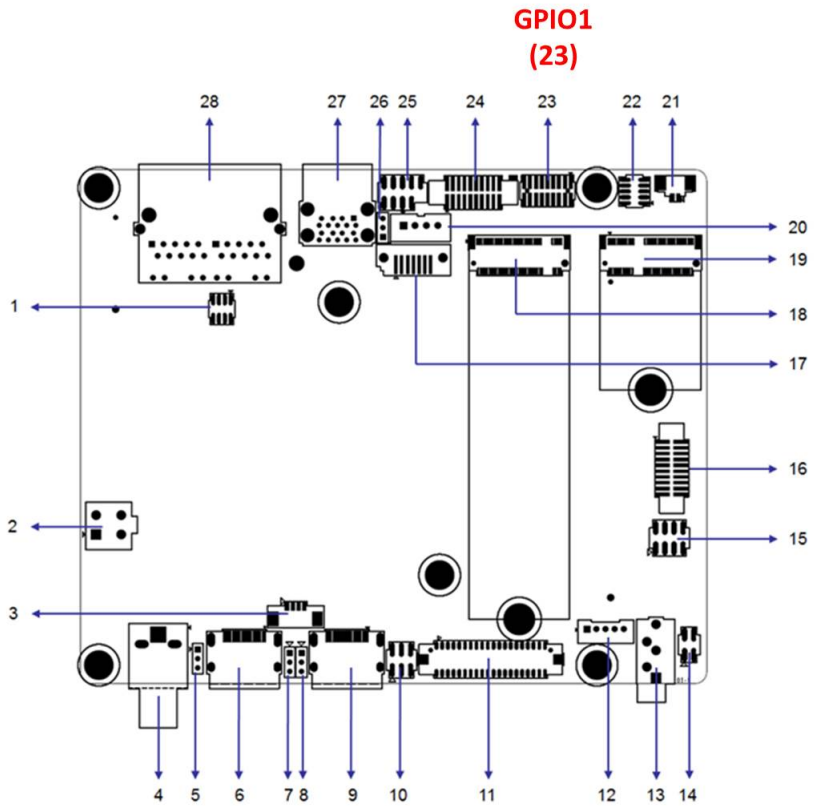
2.14 LVDS / eDP Panel Connector (LVDS_EDP1), BOM Options



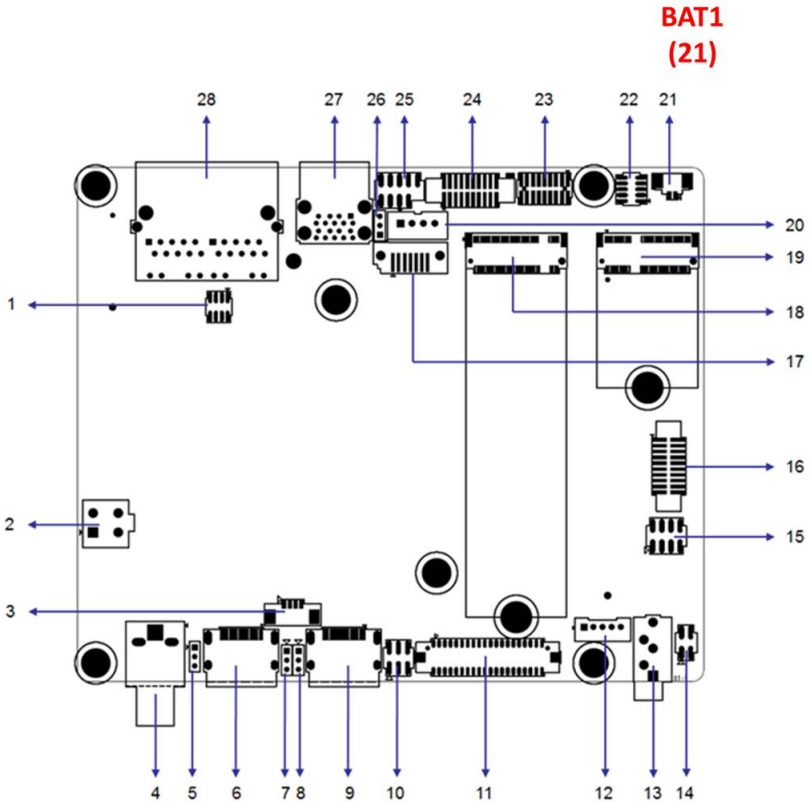
2.15 LVDS Panel Voltage Selection Header (JLVDS1)



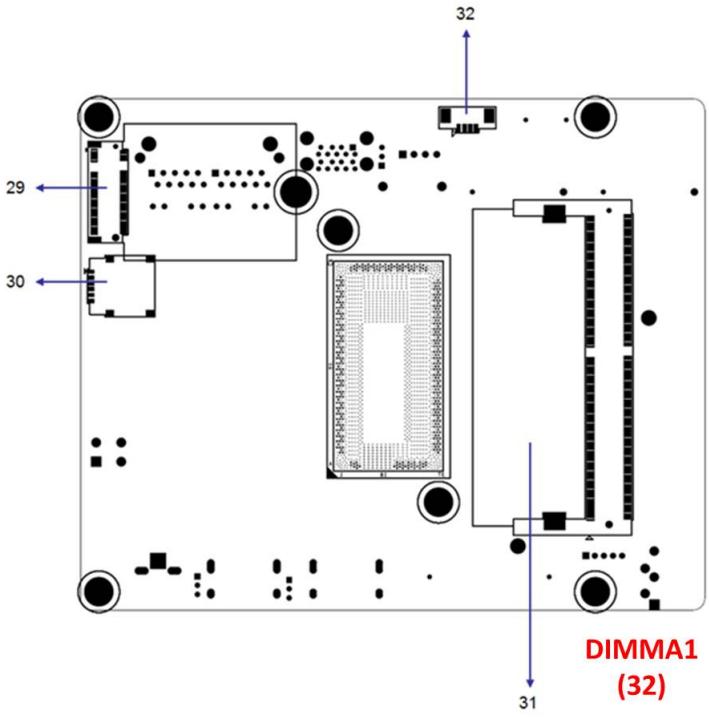
2.16 General Purpose I/O Connector (GPIO1)



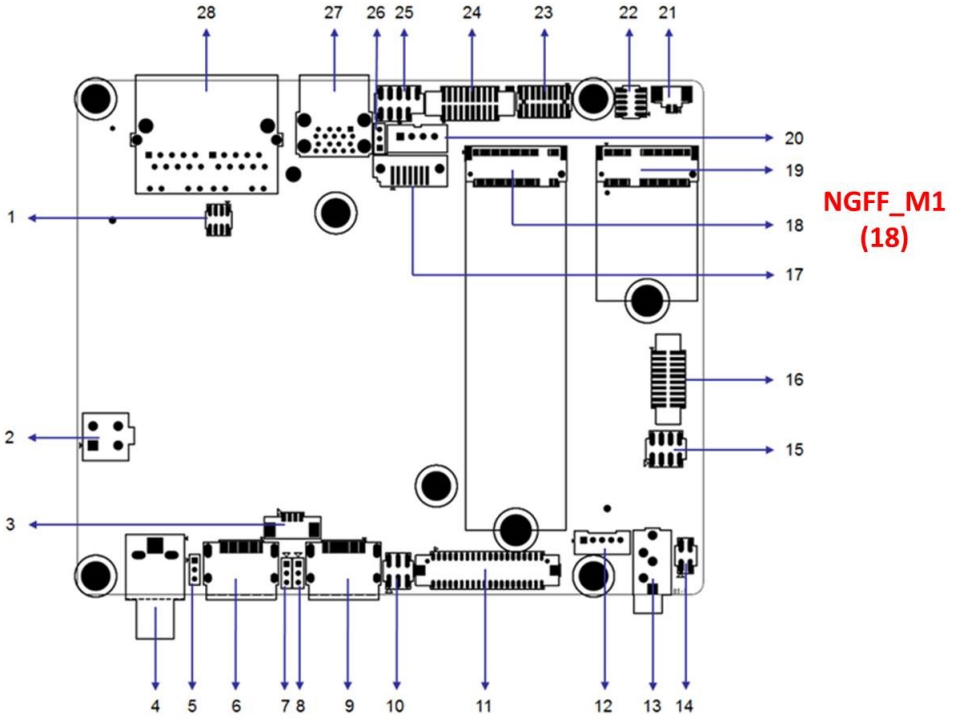
2.17 CMOS Battery Connector (BAT1)



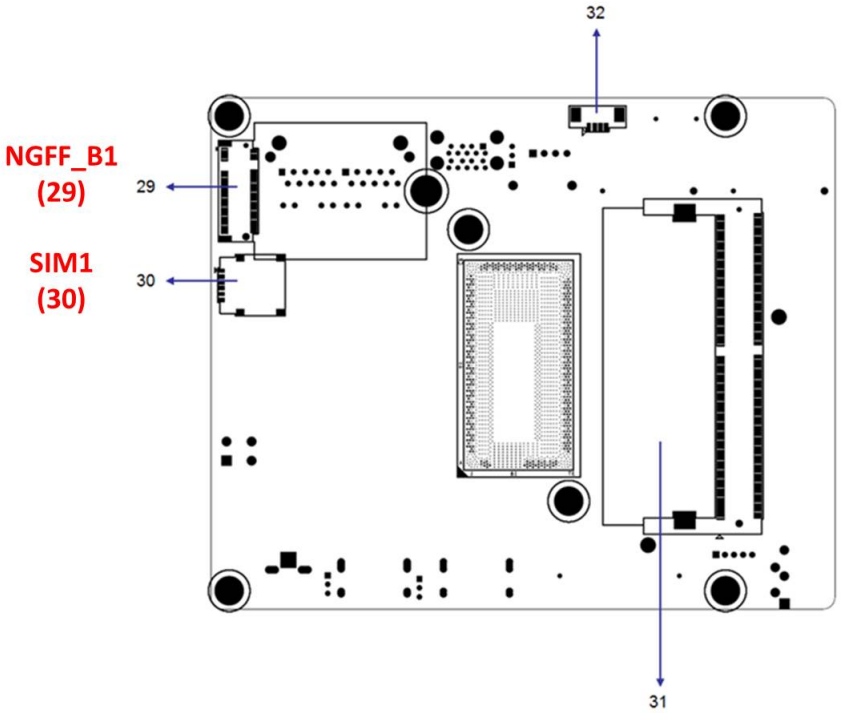
2.18 DDR4 SODIMM (DIMMA1)



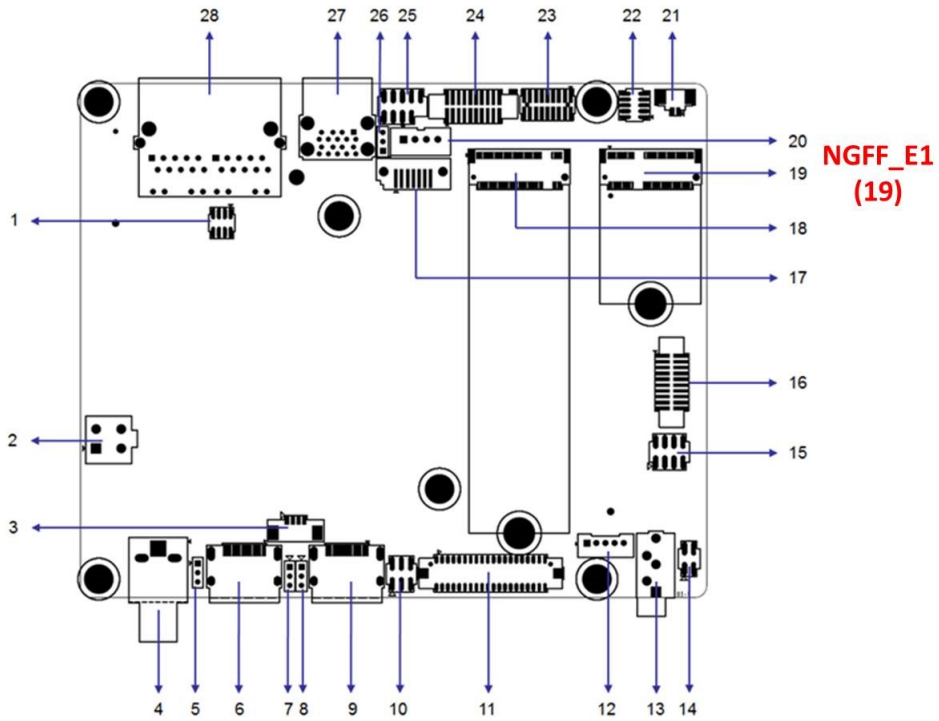
2.19 M.2 M-Key (NGFF_M1)



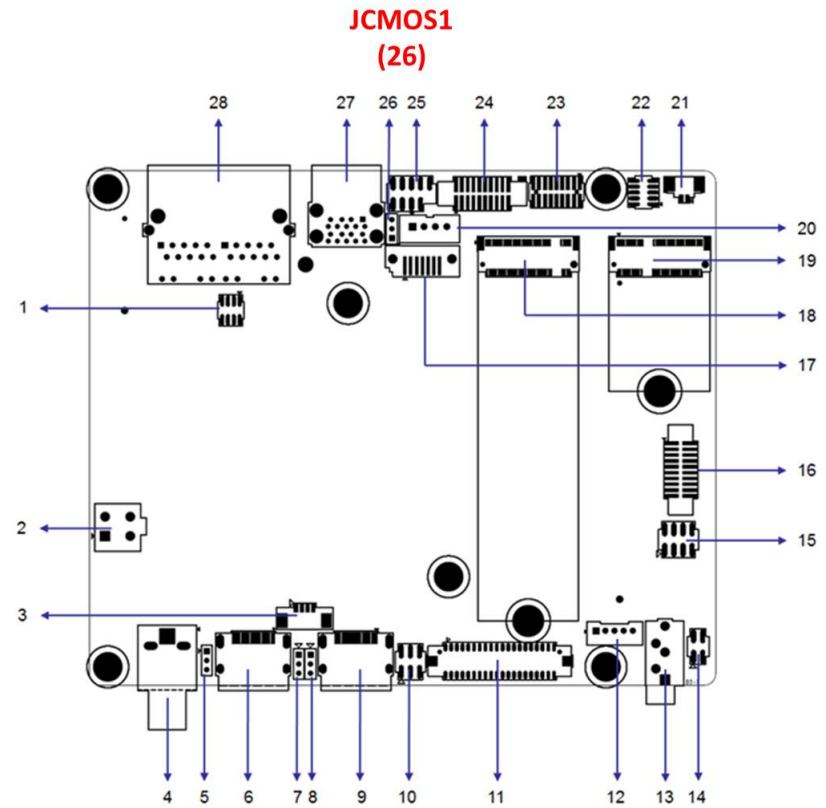
2.20 M.2 B-Key and SIM slot (NGFF_B1 / SIM1)



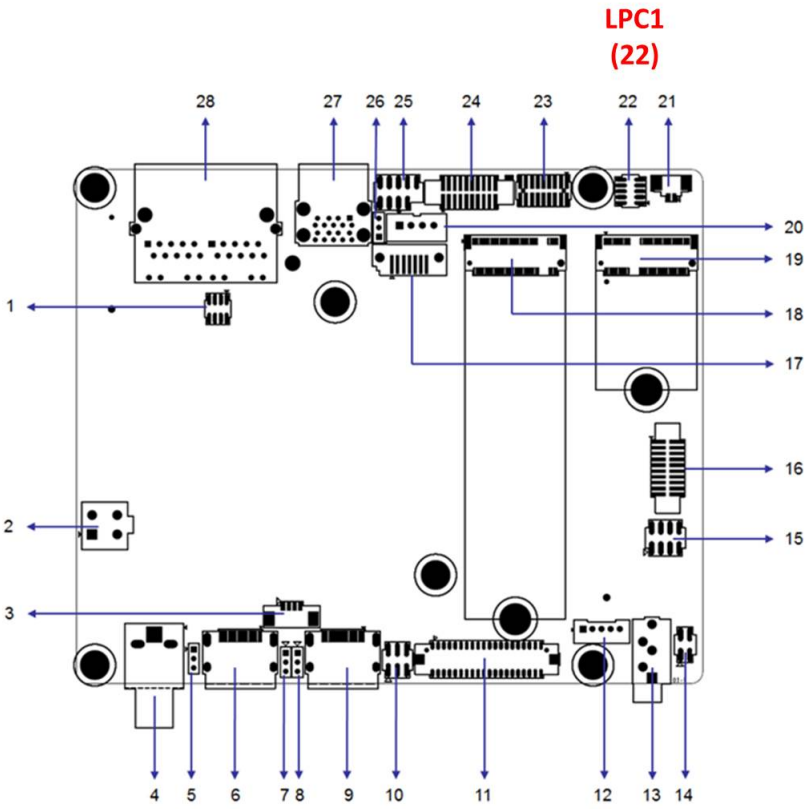
2.21 M.2 E-Key (NGFF_E1)



2.22 CMOS Clear Pin Header (JCMOS1)



2.23 Low Pin Count Header (LPC1)



Chapter 3

BIOS Operation

3.1 Introduction

With the AMI BIOS Setup program, users can modify the BIOS settings and control the special system features. The Setup program comprises several menus with options for adjusting or turning special features on or off. This chapter describes the basic navigation of the AIMB-U233 BIOS setup menu pages.

3.2 BIOS Setup

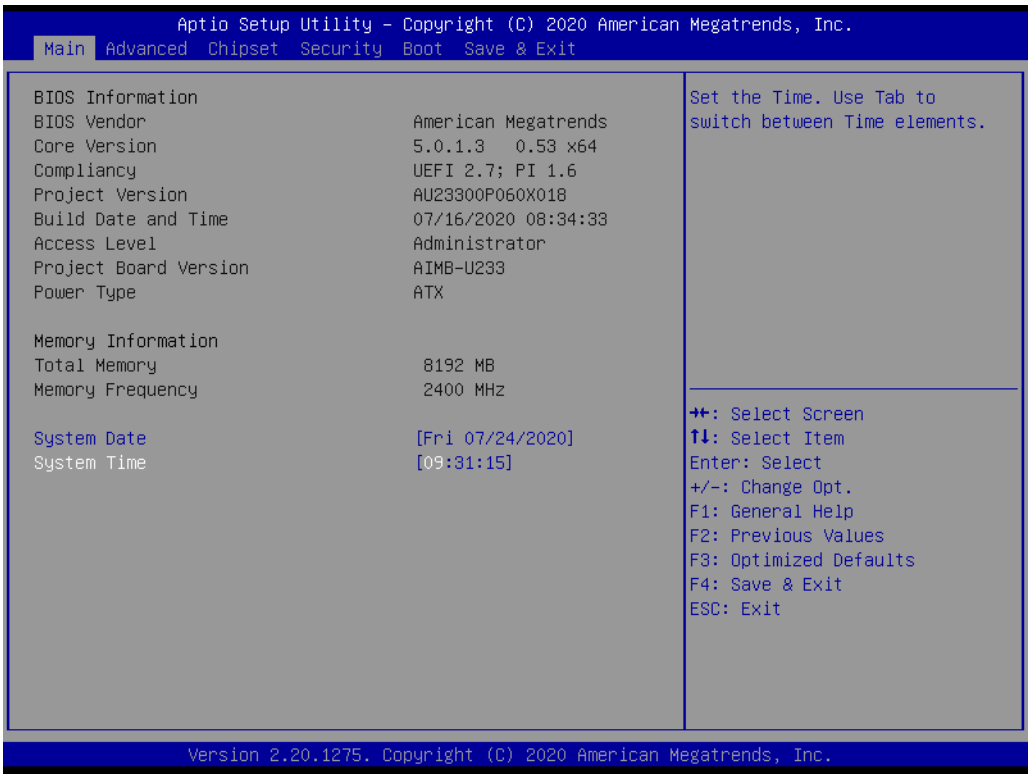
The AIMB-U233 Series is equipped with built-in AMI BIOS and a CMOS Setup Utility that allows users to configure specific settings or activate certain system features.

The CMOS Setup Utility saves the configuration in the CMOS RAM of the mother-board. When the system power is turned off, the battery on the board supplies the necessary power to preserve the CMOS RAM. When the power is turned on, press the <Del> button during the BIOS power-on self-test (POST) to access the CMOS Setup Utility screen.

Control Keys	
< ↑ >< ↓ >< ← >< → >	Move select item
<Enter>	Select item
<Esc>	Main Menu - Quit without saving changes to the CMOS Sub Menu - Exit current page and return to the Main Menu
<Page Up/+>	Increase the numeric value or make changes
<Page Down/->	Decrease the numeric value or make changes
<F1>	General help, for Setup Sub Menu
<F2>	Item help
<F5>	Load previous values
<F7>	Load setup defaults
<F10>	Save all CMOS changes

3.2.1 Main Menu

Press <Del> to enter the AMI BIOS CMOS Setup Utility and the Main Menu will appear on the screen. Use the arrow keys to select items and press <Enter> to access the submenu.

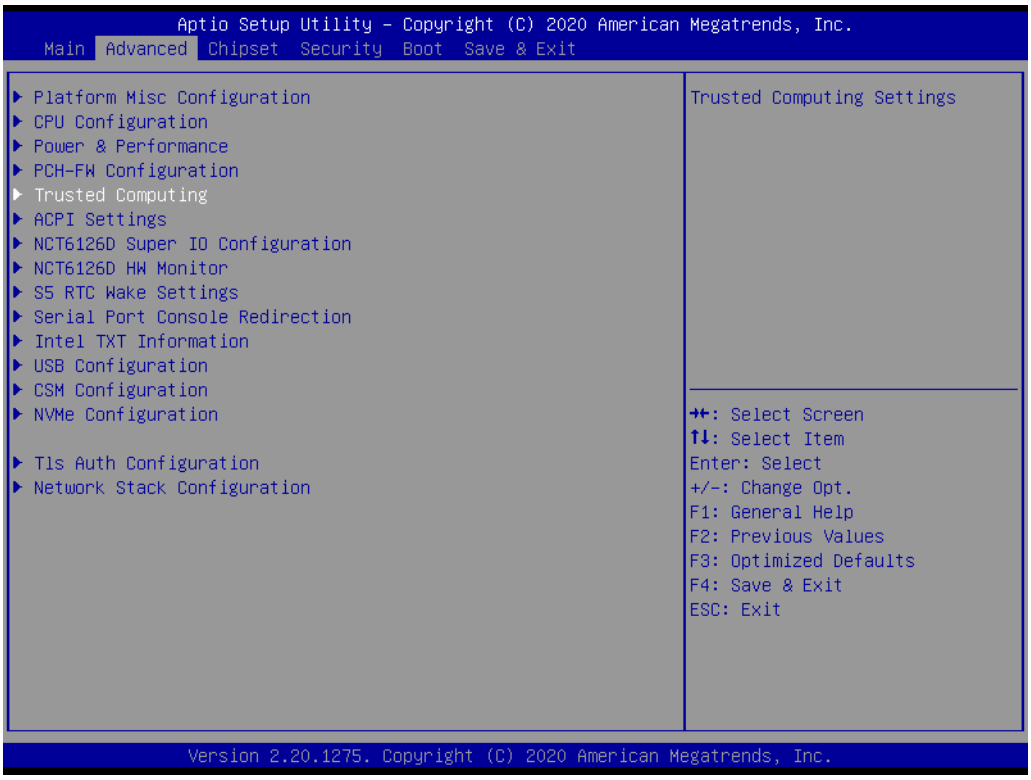


The Main BIOS setup screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured; options in blue can. The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

- **System Time/System Date**

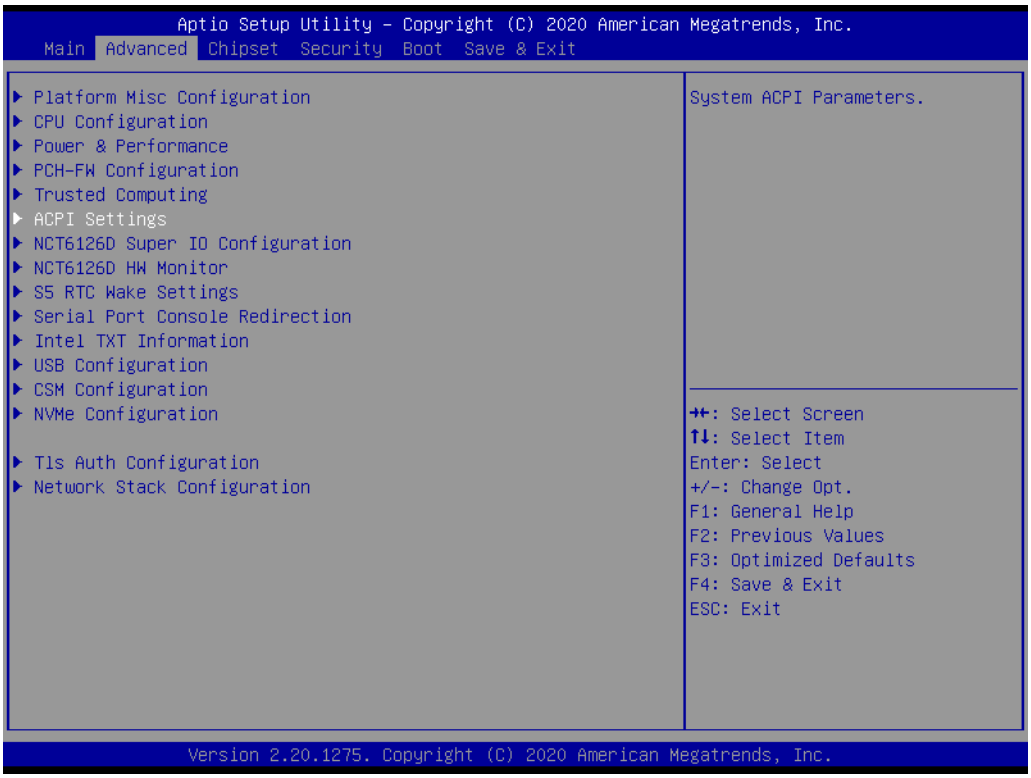
  Use this option to change the system time and date. Highlight the System Time or System Date using the <Arrow> keys. Enter new values via the keyboard. Press the <Tab> or <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time must be entered in HH:MM:SS format.

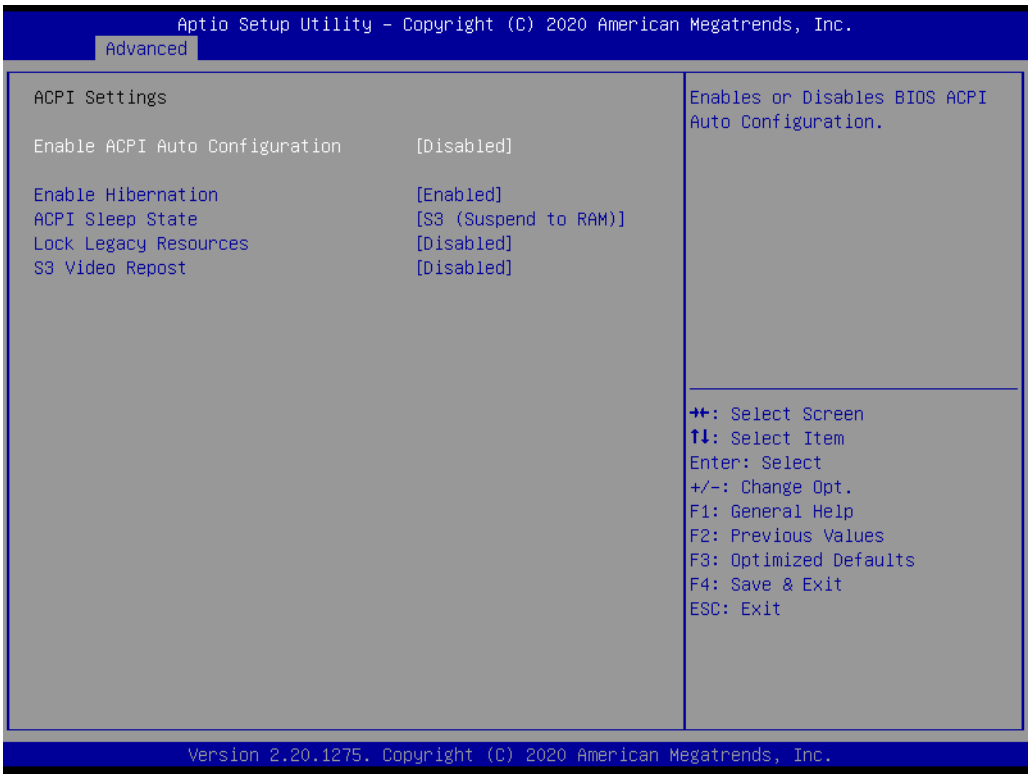
3.2.1.1 Trusted Computing



- **Security Device Support**
  Enable or Disable BIOS support for security device.

3.2.1.2 ACPI Settings

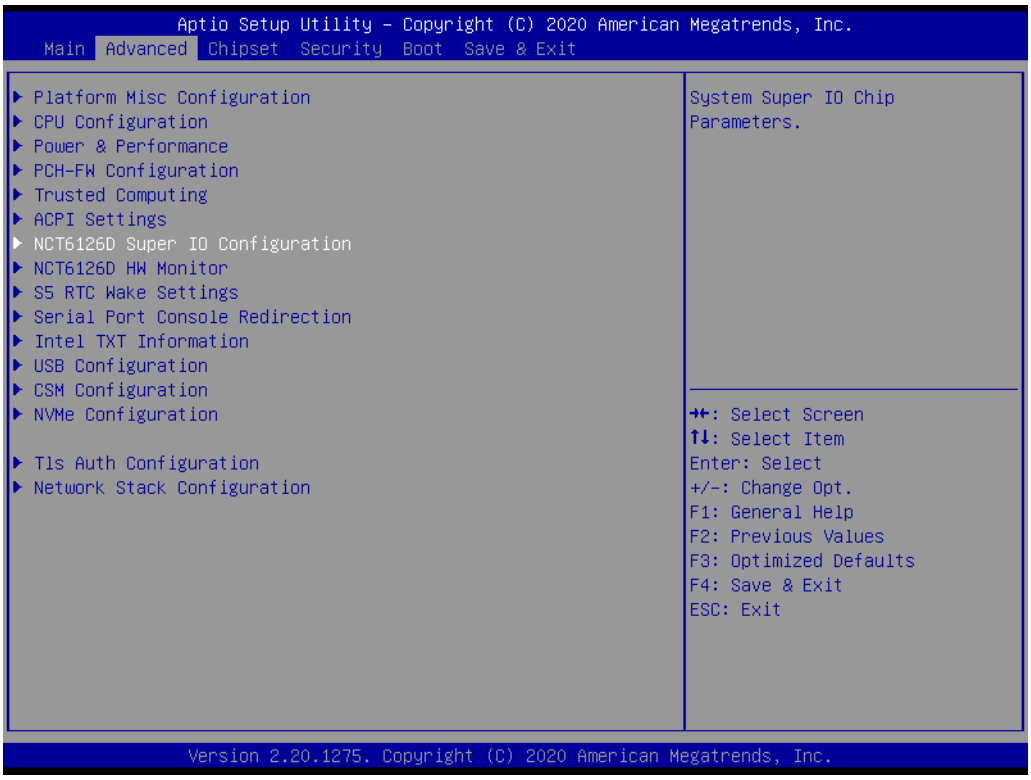


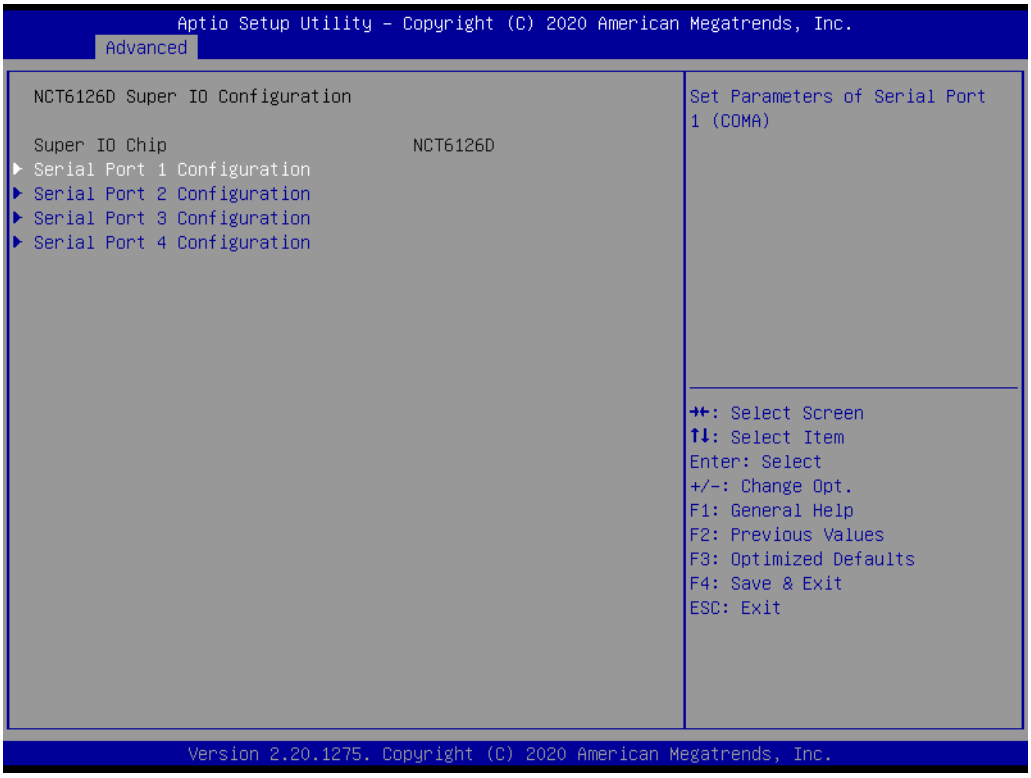


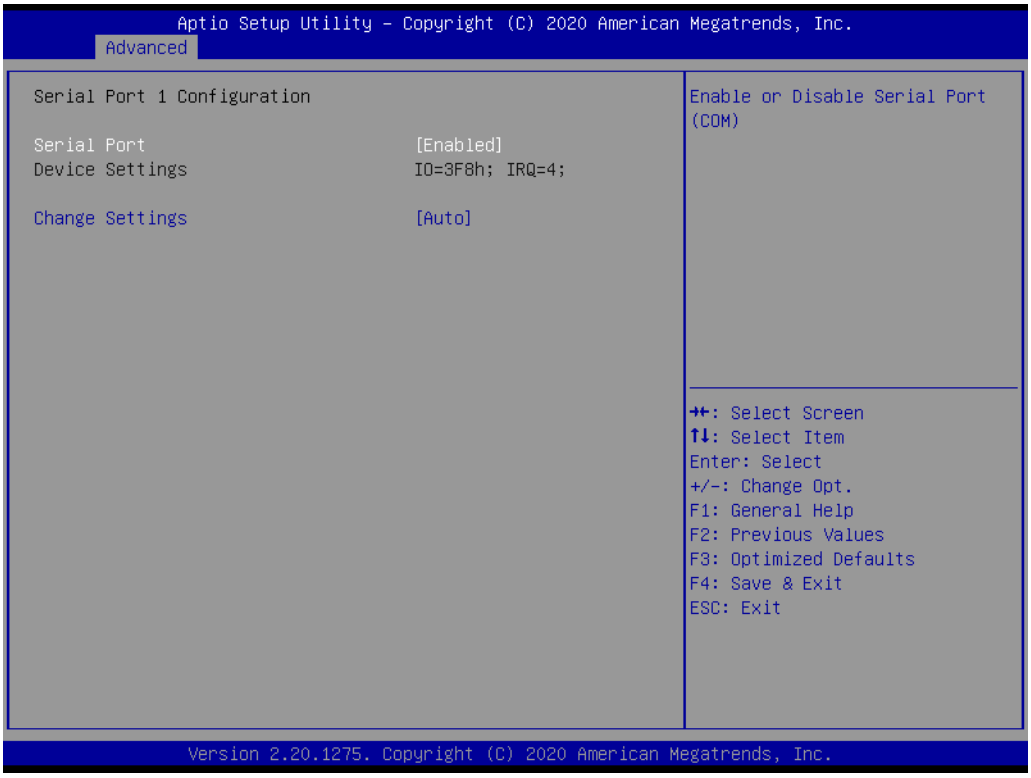
- **Enable ACPI Auto Configuration**
  Enable or Disable ACPI Auto Configuration.
- **Enable Hibernation**
  This item allows users to Enable or Disable hibernation.

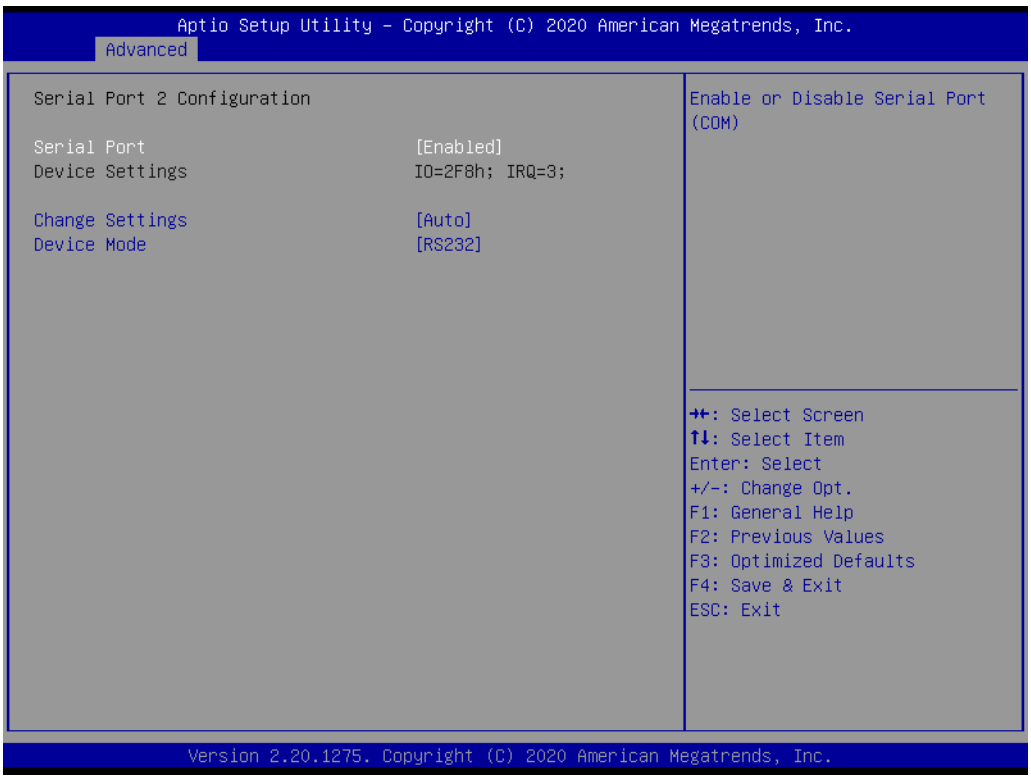
- **ACPI Sleep State**
  This item allows users to set the ACPI sleep state.
- **Lock Legacy Resources**
  This item allows users to lock legacy device resources.

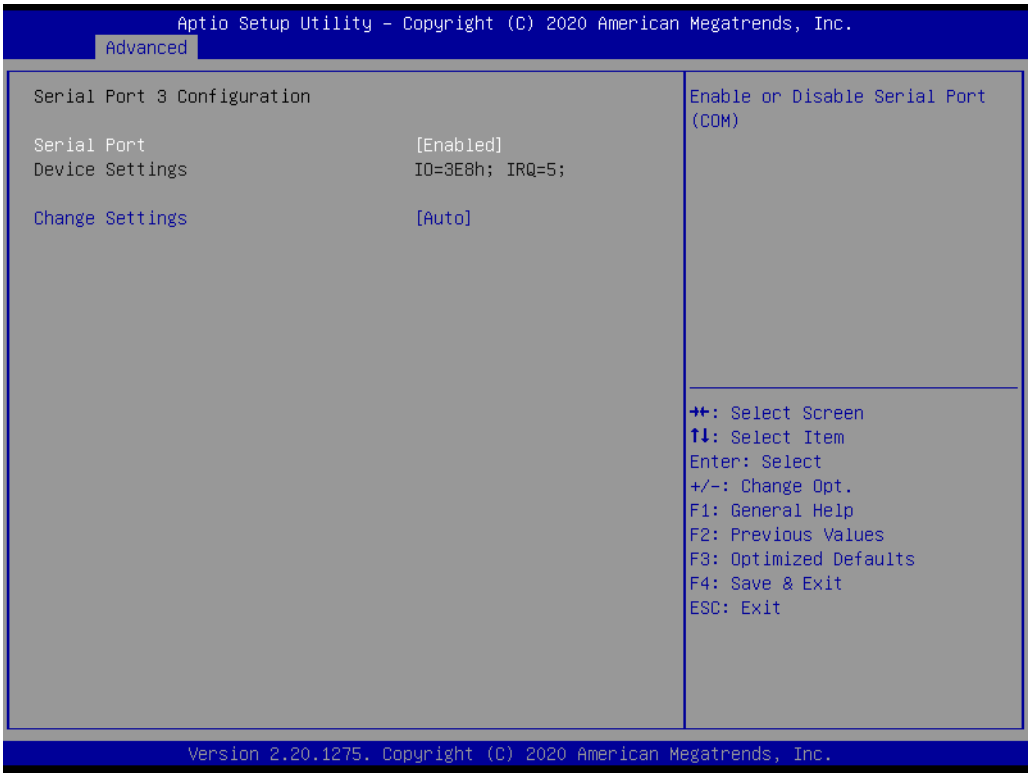
3.2.1.3 Super I/O Configuration

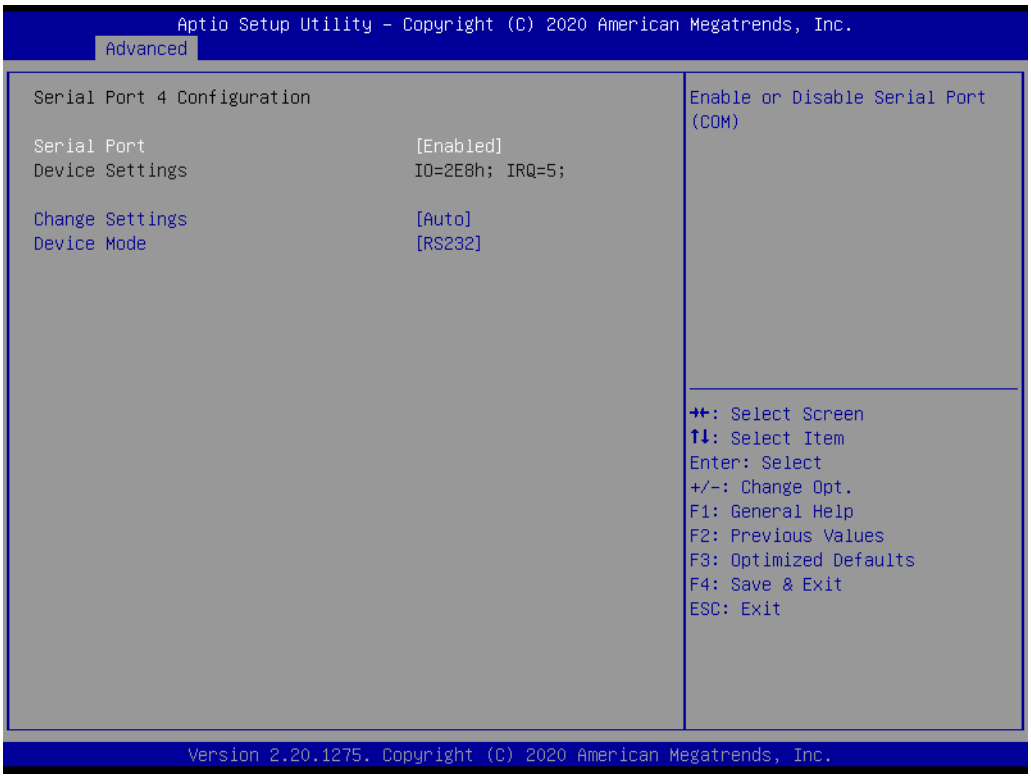





Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc.
Advanced
Serial Port 1 Configuration
Serial Port [Enabled]
Device Settings IO=3F8h; IRQ=4;
Change Settings [Auto]
Enable or Disable Serial Port (COM)
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.20.1275. Copyright (C) 2020 American Megatrends, Inc.


Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc.
Advanced
Serial Port 2 Configuration
Serial Port [Enabled]
Device Settings IO=2F8h; IRQ=3;
Change Settings [Auto]
Device Mode [RS232]
Enable or Disable Serial Port (COM)
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.20.1275. Copyright (C) 2020 American Megatrends, Inc.

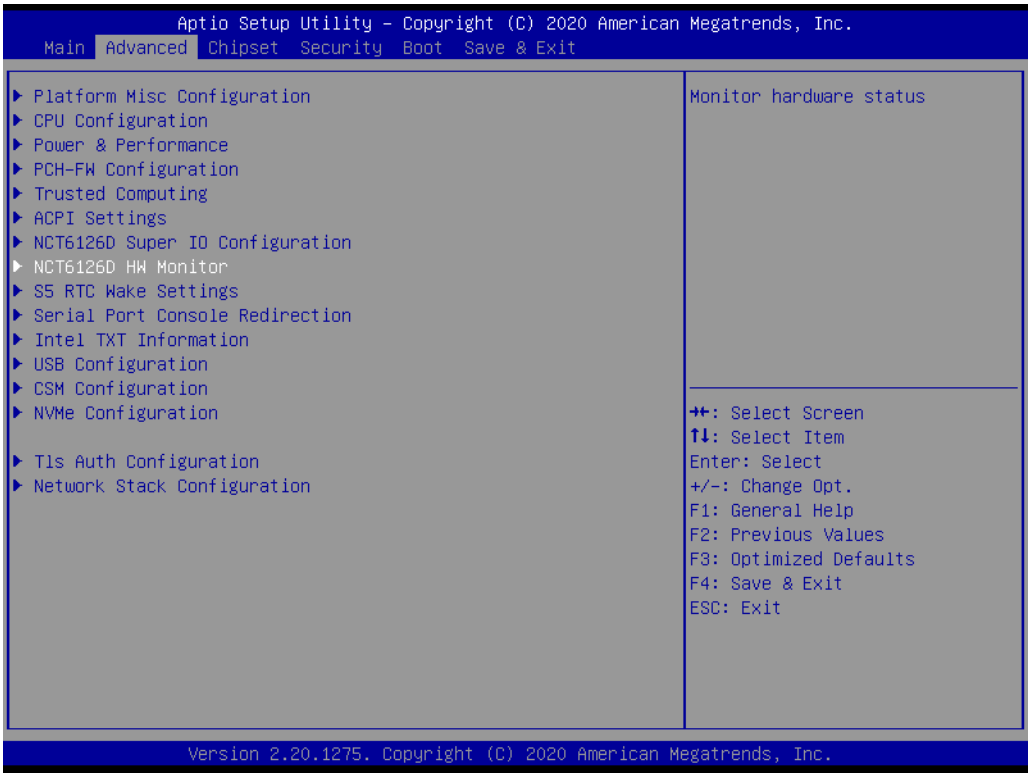


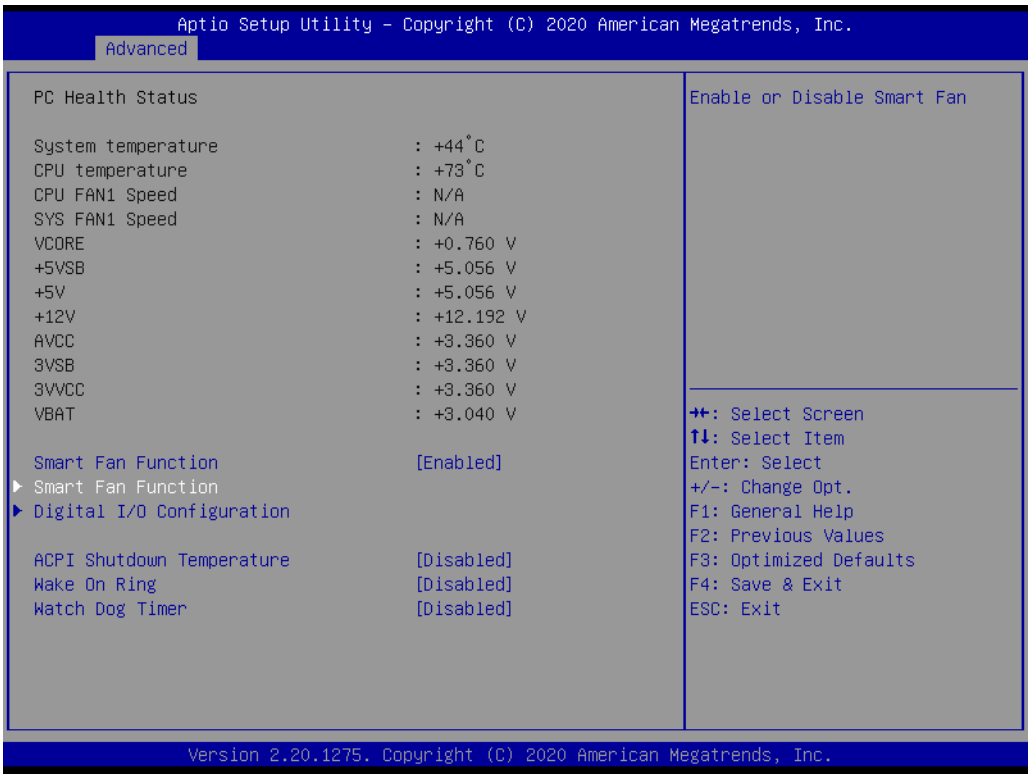


- **Serial Ports 1/2/3/4**
  This item allows users to Enable or Disable serial ports 1/2/3/4.
- **Change Settings**
  This item allows users to change the serial port 1/2/3/4 setting.

3.2.1.4 Hardware Monitor

This page shows the AIMB-U233 PC health status.

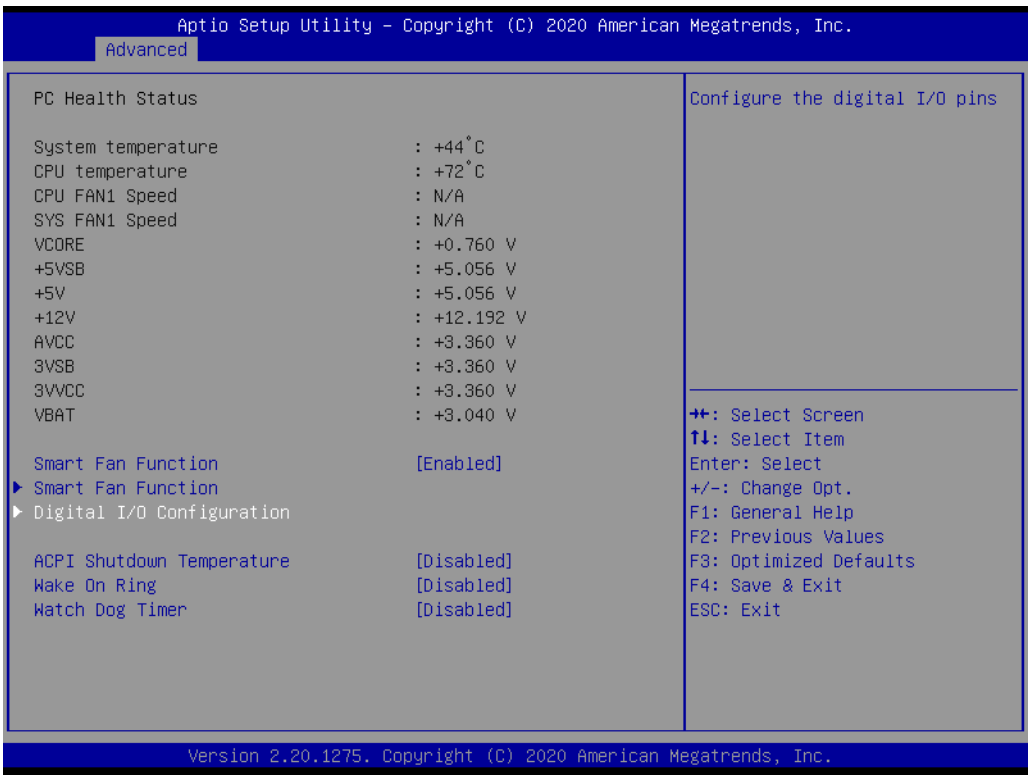


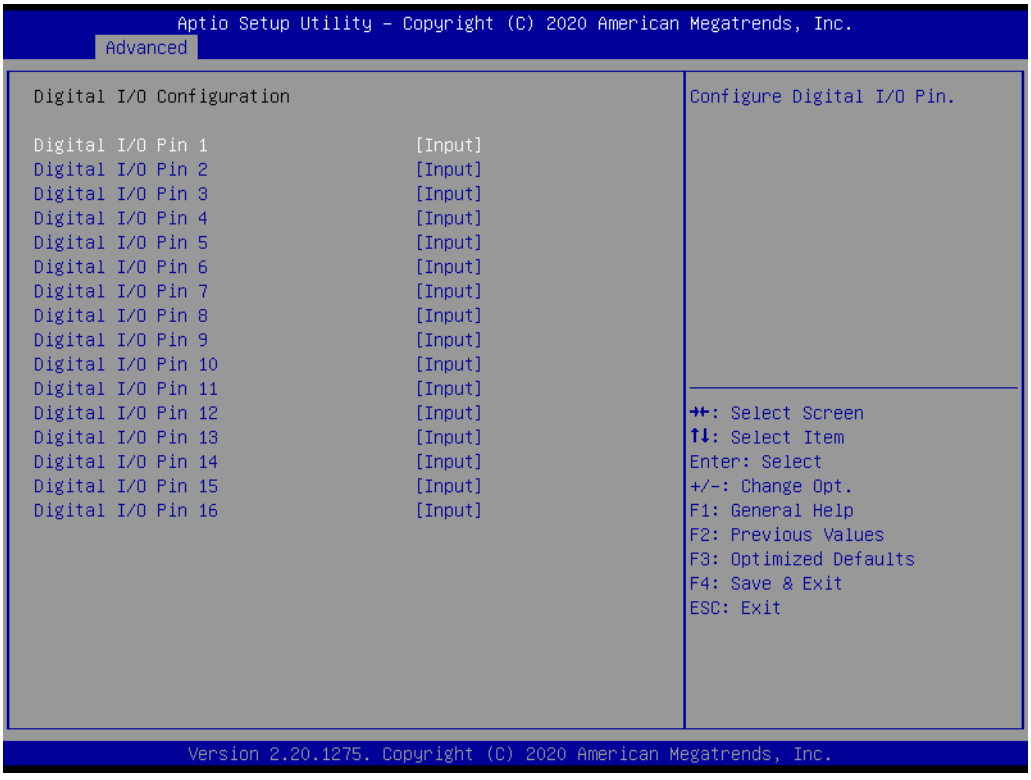


- **Wake On Ring**
  This item allows users to Enable or Disable Wake On Ring functionality.
- **ACPI Shutdown Temperature**
  This item allows users to set the CPU temperature threshold at which the system automatically shuts down to prevent the CPU from overheating.

- **Watchdog Timer**
  This item allows users to Enable or Disable the Watchdog timer.

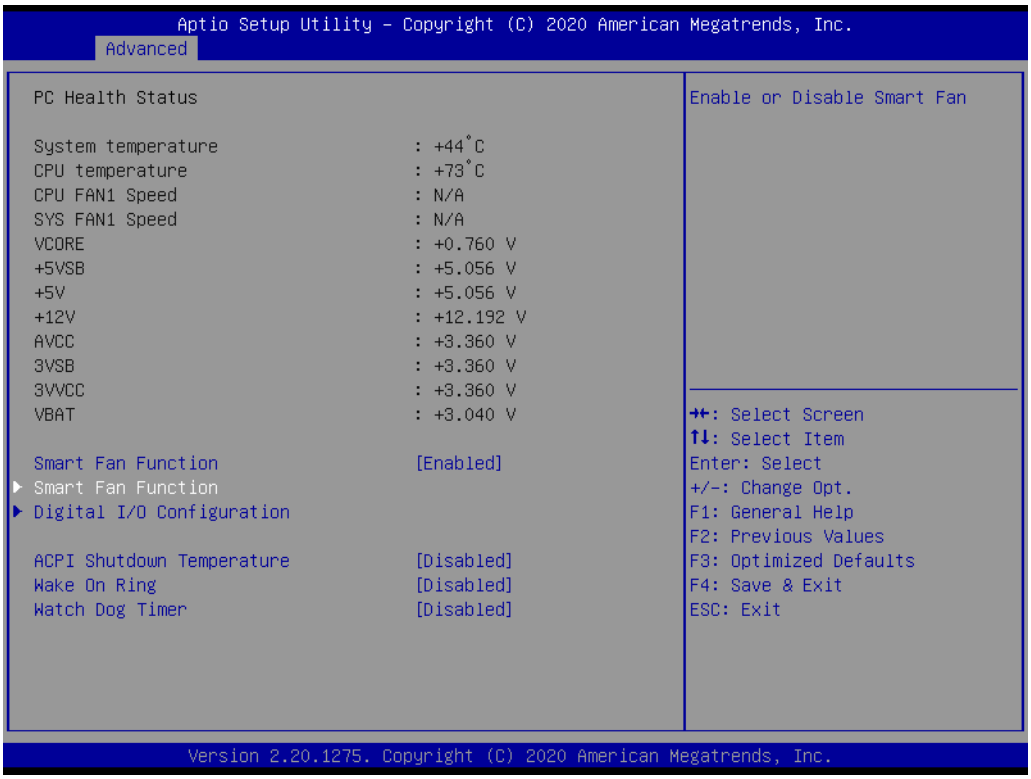
3.2.1.5 Digital I/O Configuration

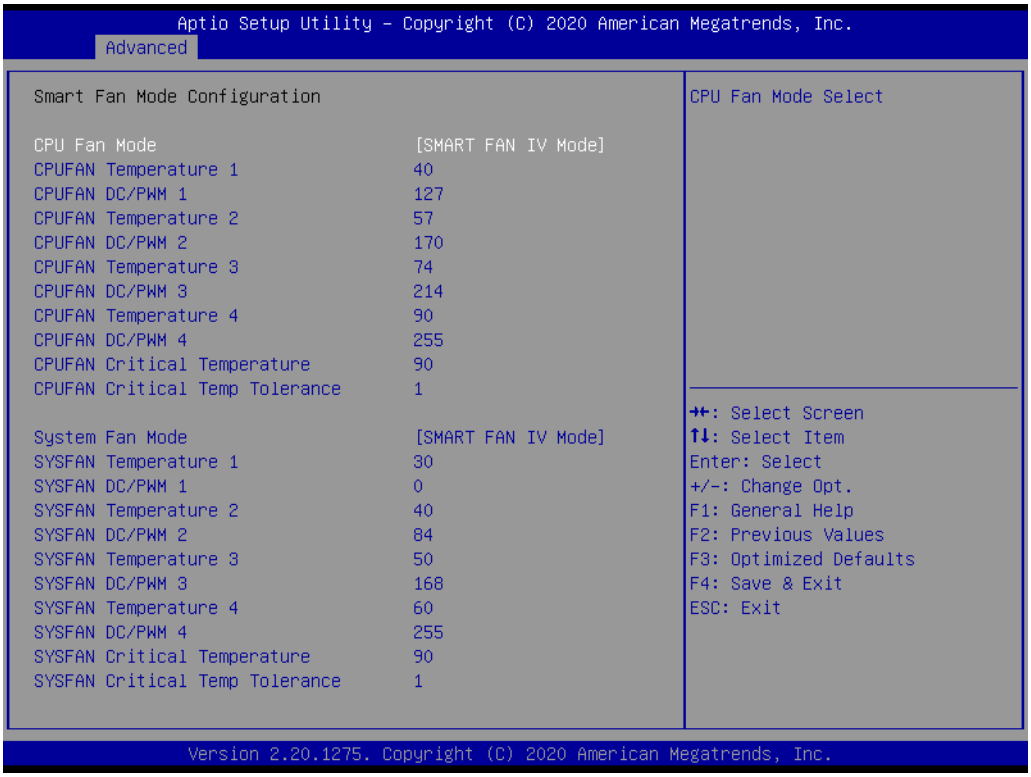




- **Digital I/O Configuration**
  This item will allow users to set up Digital I/O 1~16 to “input” or “output”.

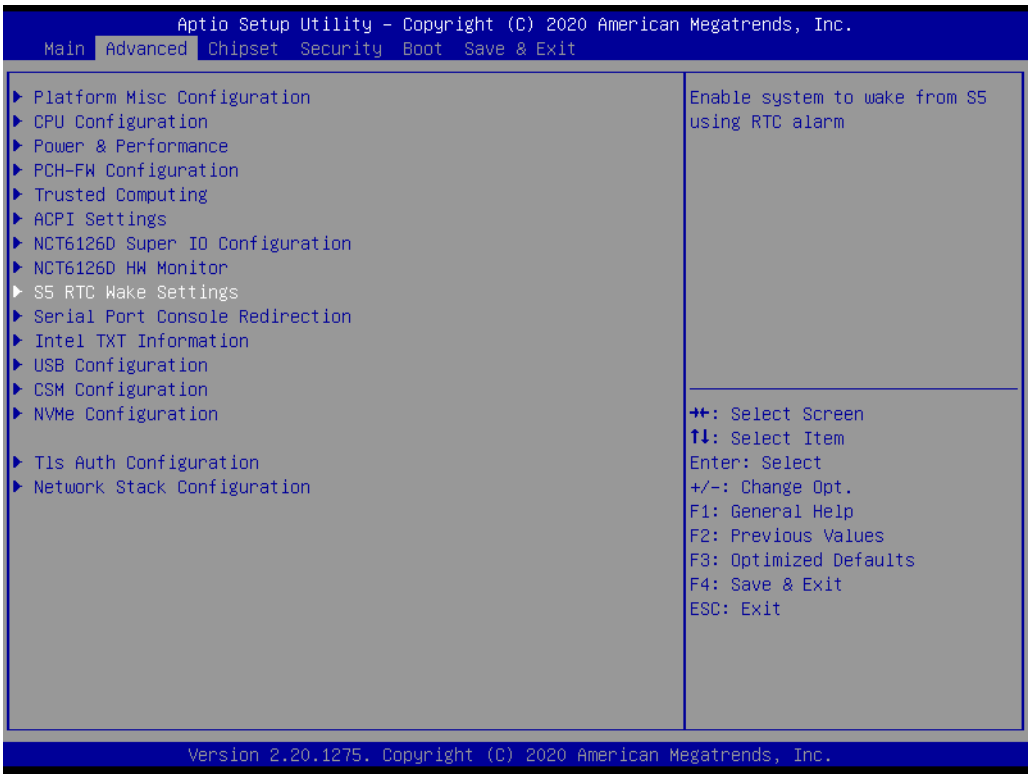
3.2.1.6 Smart Settings

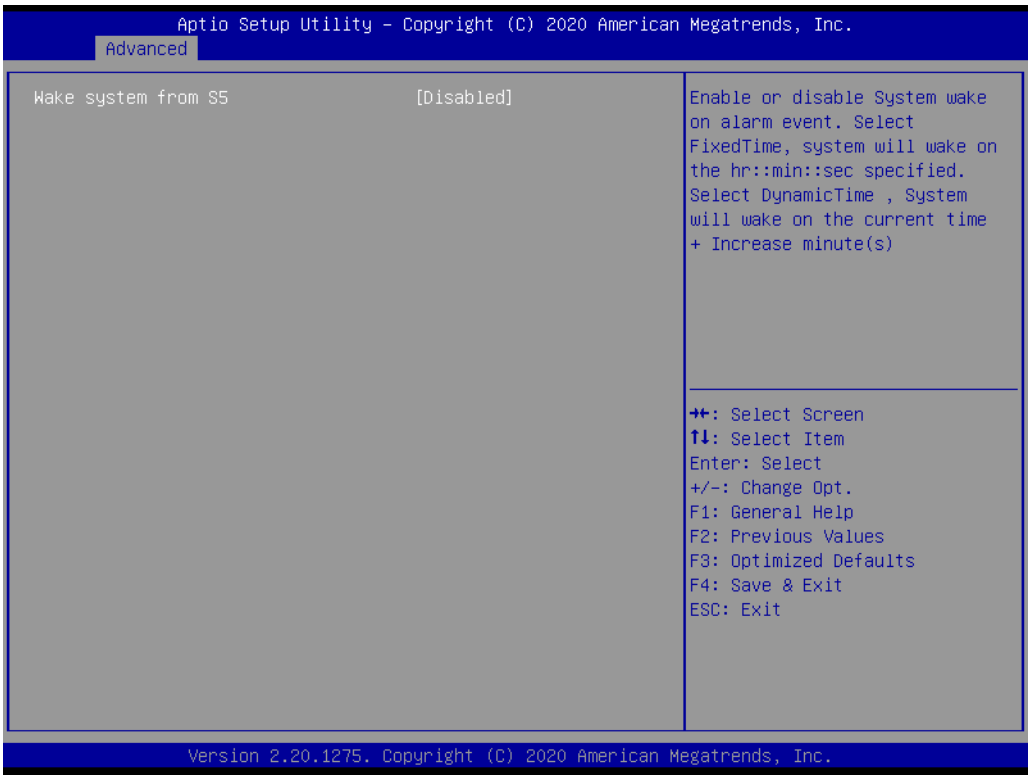




- **Smart Fan Settings**
  Users are allowed to Enable/Disable smart fan and they can also configure smart fan.

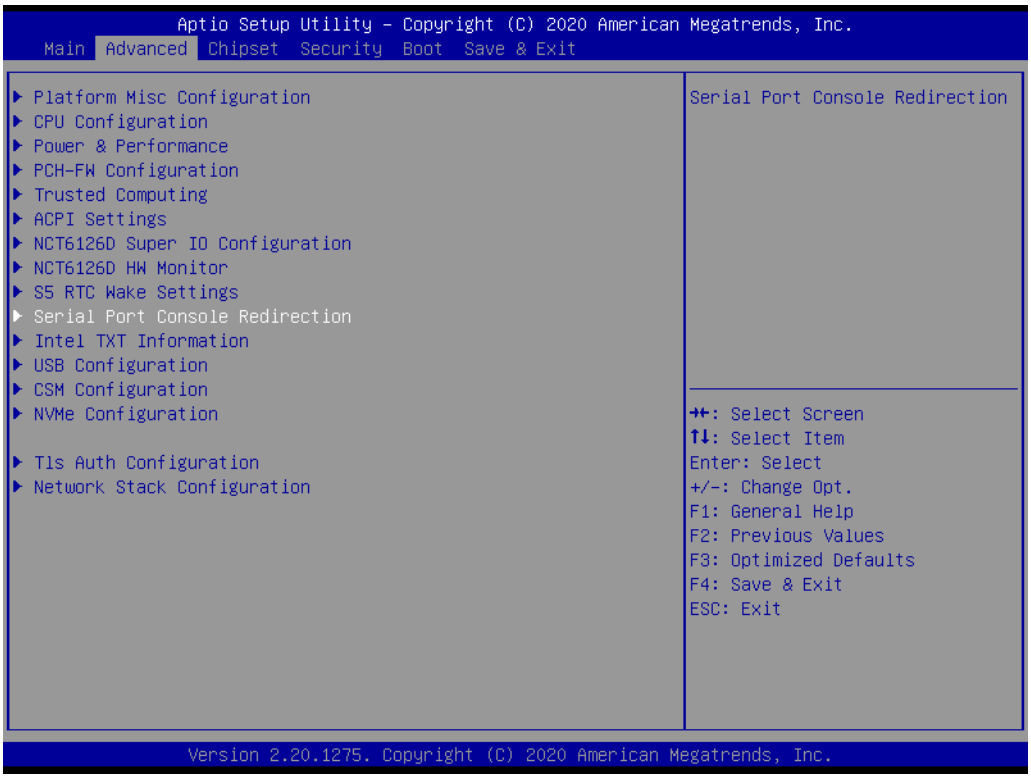
3.2.1.7 S5 RTC Wake Settings

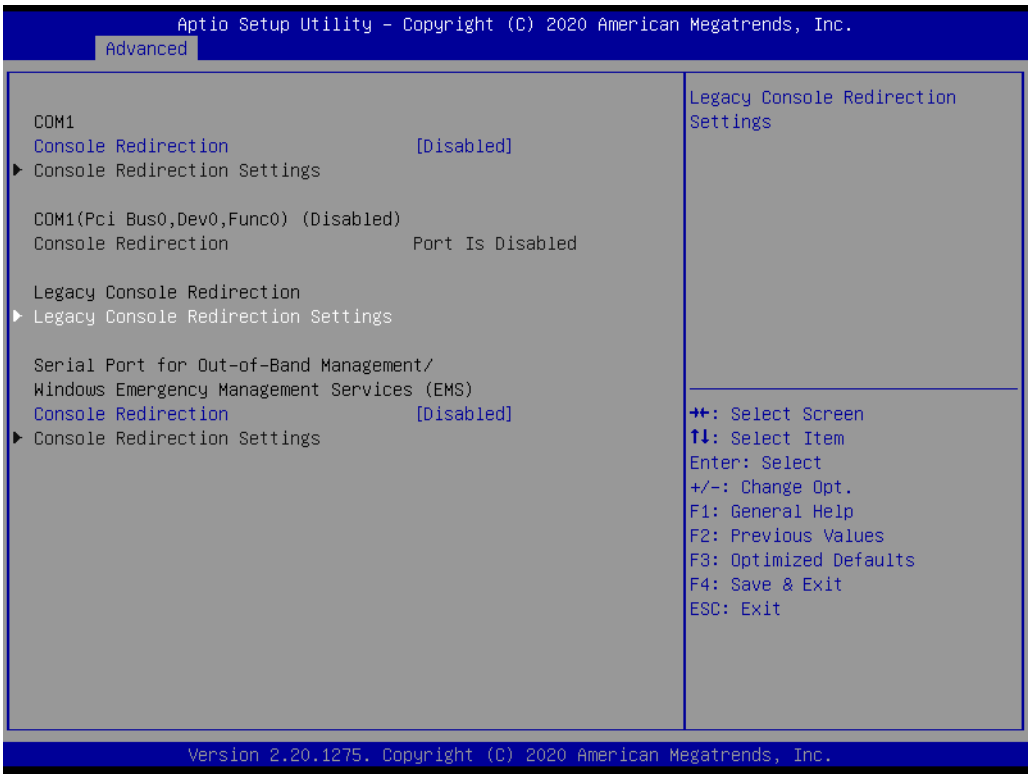




- **Wake System From S5**
  Enable or Disable system wake on alarm event.

3.2.1.8 Serial Port Console Redirection

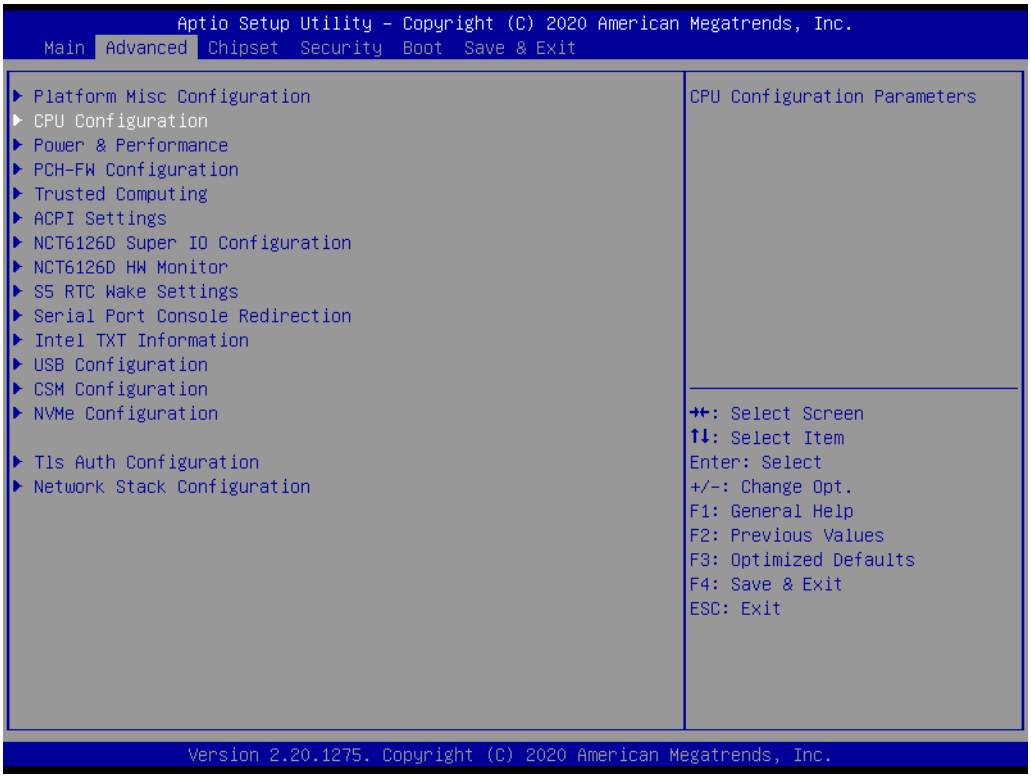


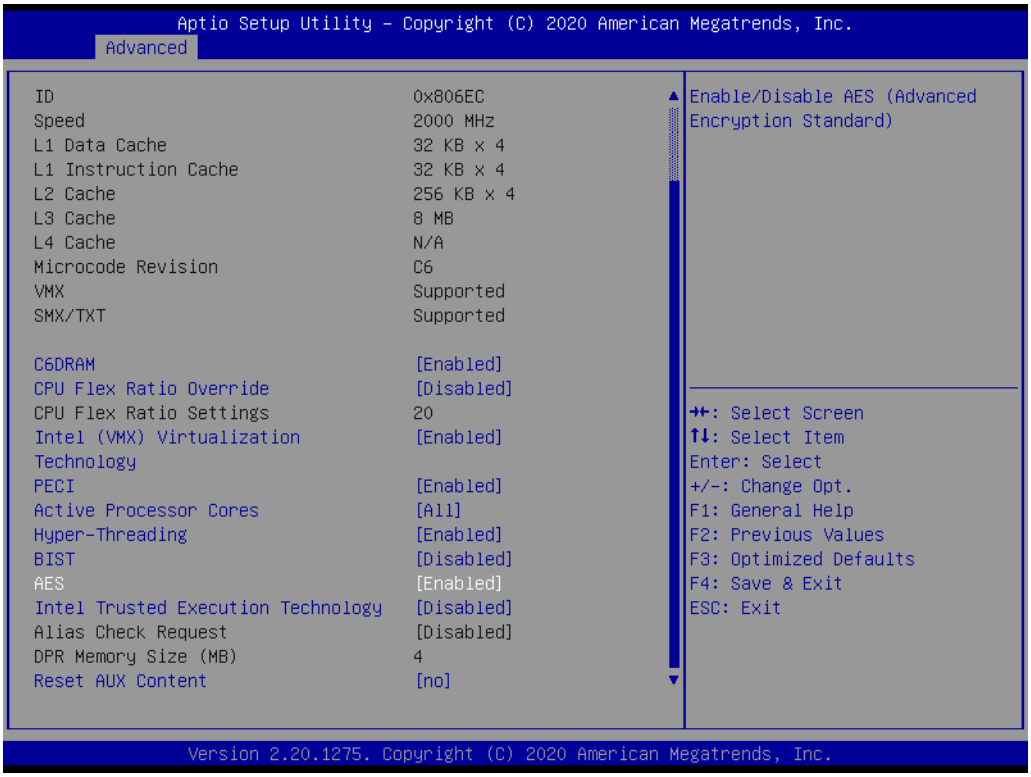


- **Console Redirection**
  This item allows users to Enable or Disable console redirection.

3.2.1.9 CPU Configuration

This page shows CPU Information.



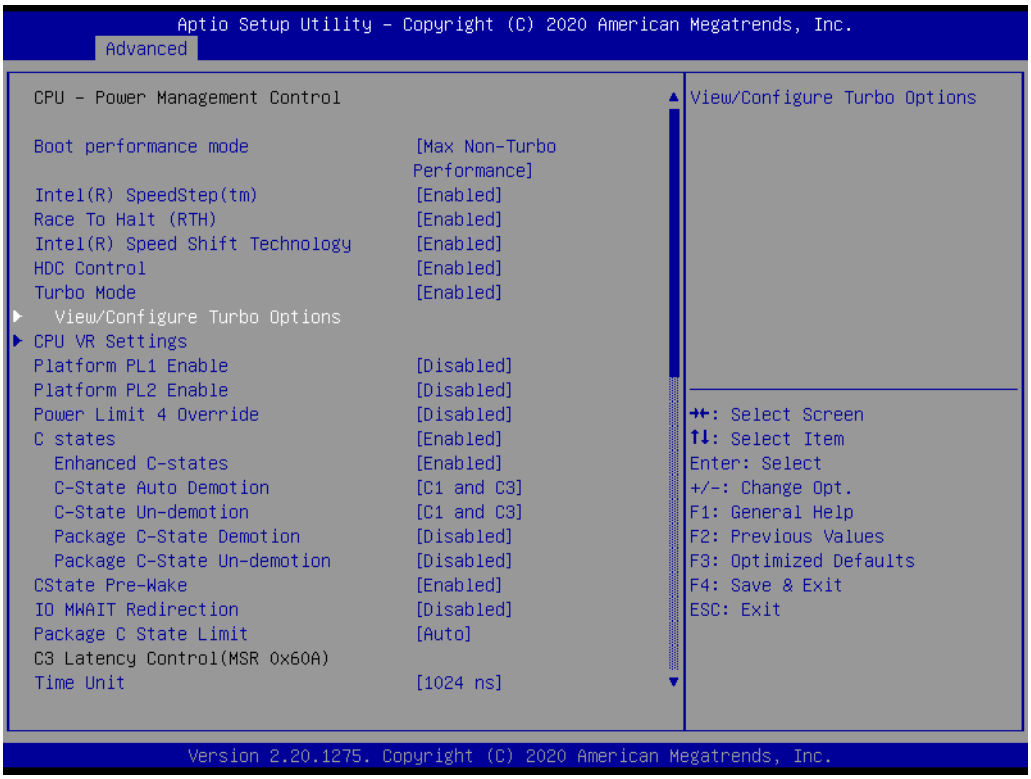


- **Active Processor Cores**
  Number of cores to enable in each processor package.
- **Intel Virtualization Technology**

When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

- **PECI**
  Enable or Disable PECI.
- **Hyper-Threading**
  Hyper-Threading Setting.
- **BIST**
  Enable or Disable AES.
- **AES**
  Enable/disable Monitor Mwait.
- **Intel Trusted Execution Technology**
  Intel Trusted Execution Technology Setting.

CPU Power Management Configuration

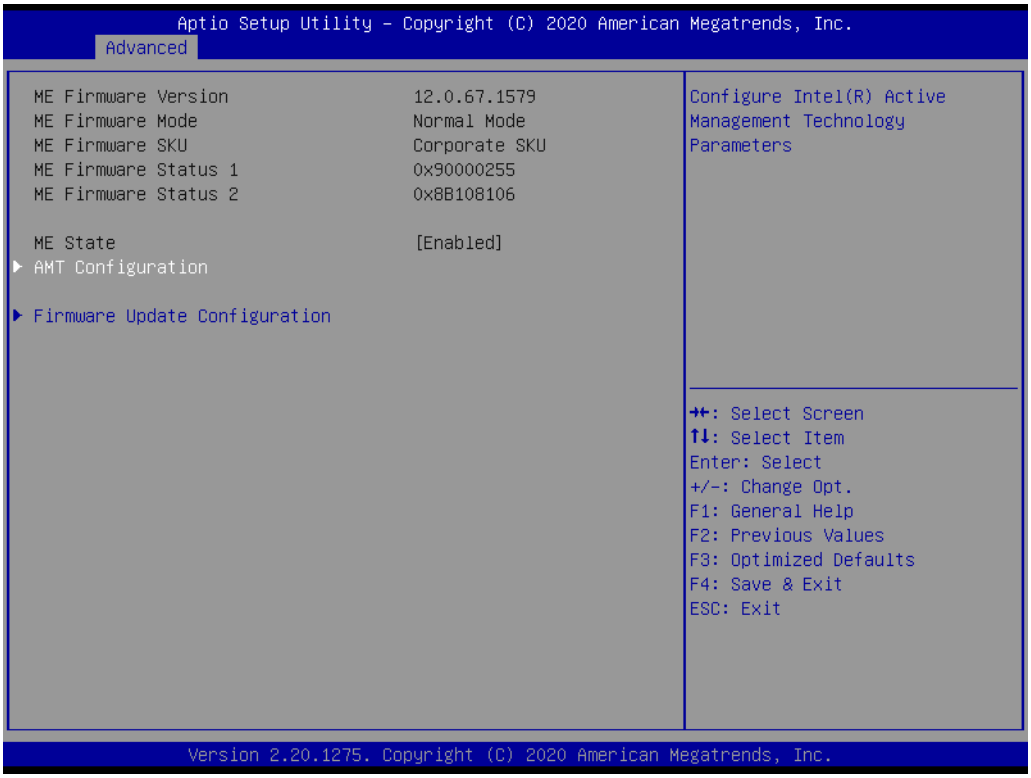


- **Boot performance mode**
  Boot performance mode settings.
- **Intel SpeedStep / Race to Halt / Speed Shift / HDC Control / Turbo Mode**
- **C-States**
  Enabled or Disabled Enhanced C-State.
  C-State Auto Demotion.
  C-State Un-Demotion.
  Package C-State Demotion.
  Package C-State Un-Demotion.
- **CState Pre-Wake**
  Enabled or disabled.
- **IO MWAIT Redirection**

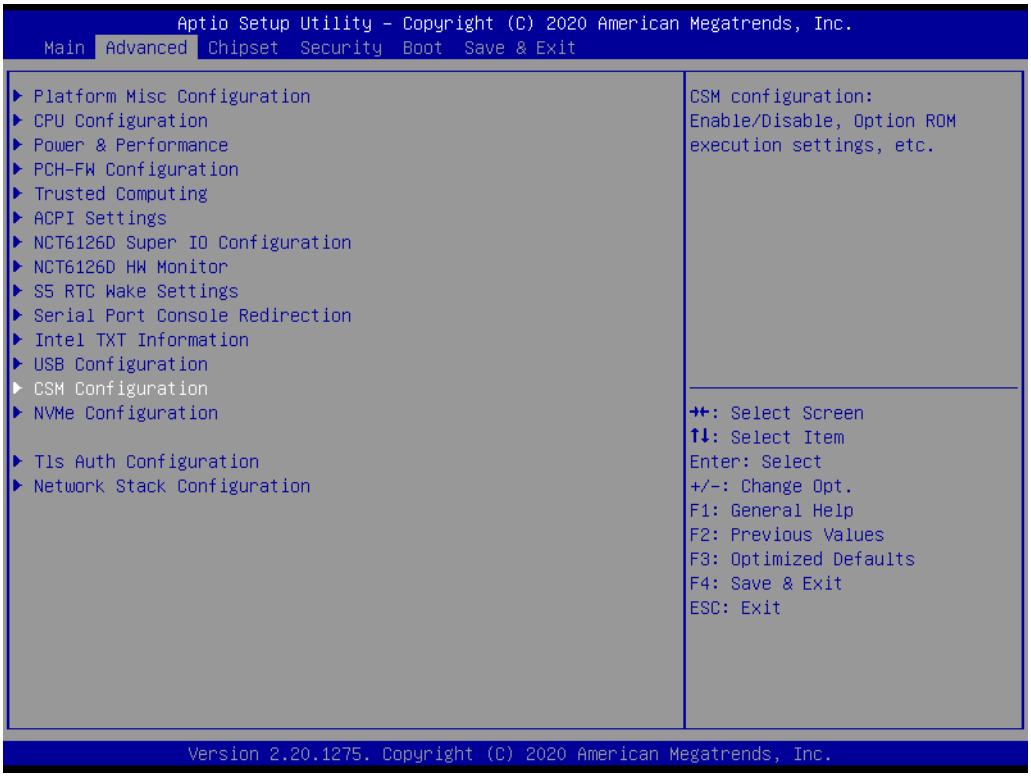
Enabled or disabled.

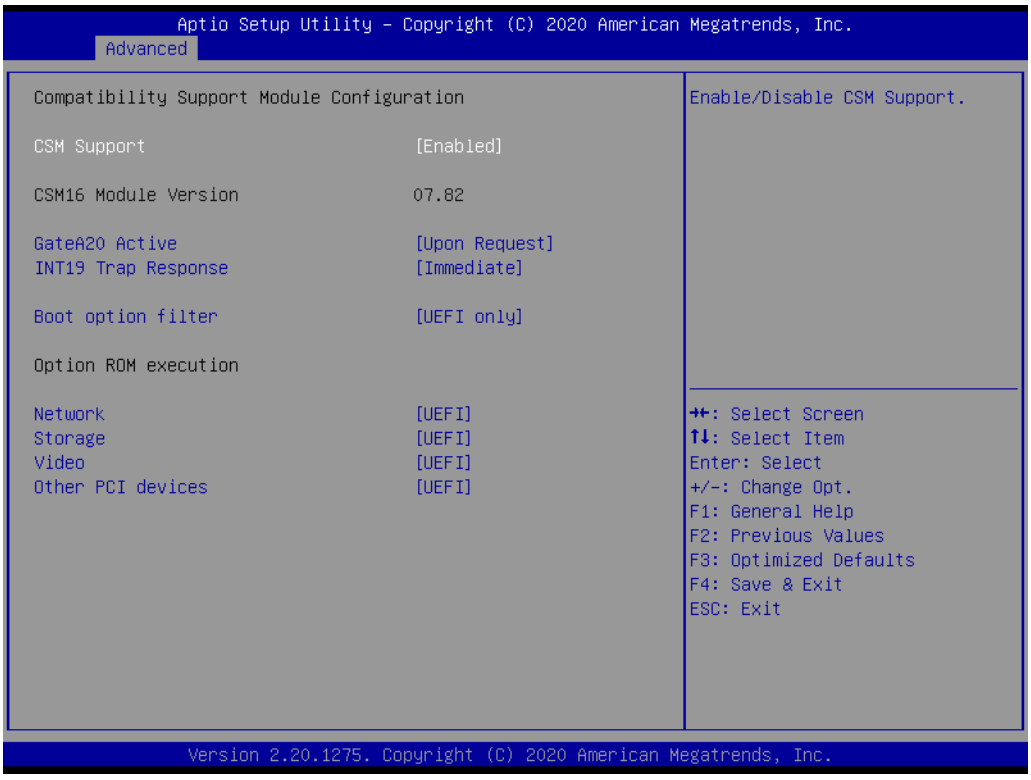
- **Package C State Limit**
  Package C State Limit Setting.
- **Platform PL1**
  Enable/Disable Platform PL1.
- **Platform PL2**
  Enable/Disable Platform PL1.
- **Power Limit 4 Override**

3.2.1.10 AMT Configuration



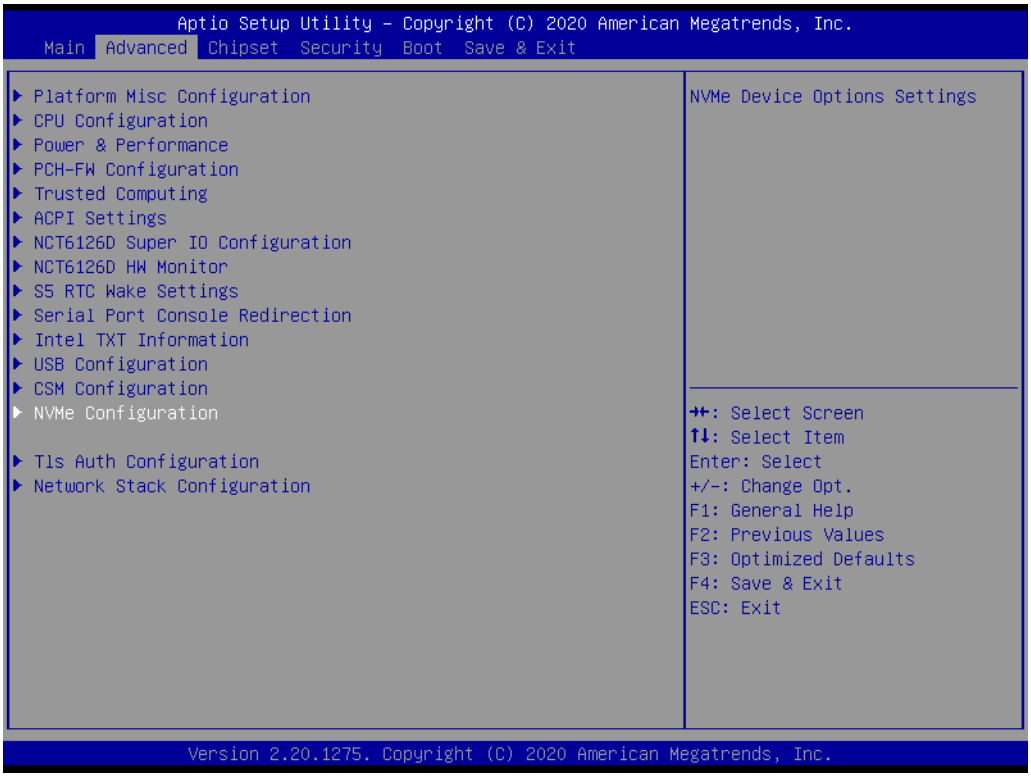
3.2.1.11 CSM Configuration



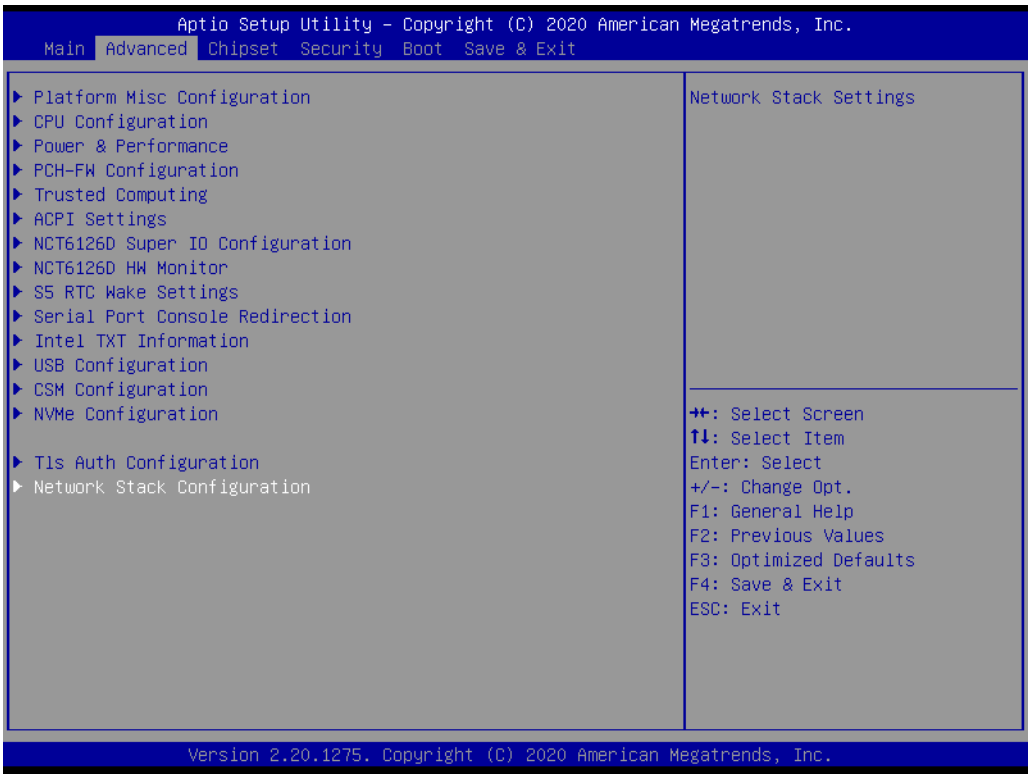


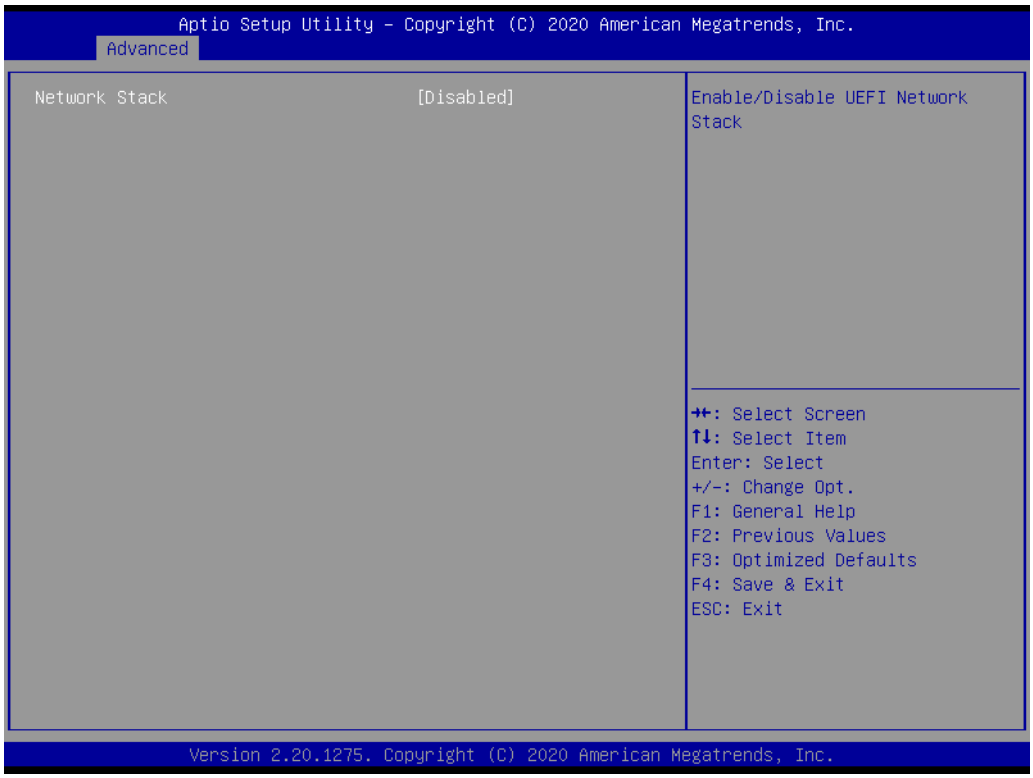
- **CSM Support**
  Enable or Disable CSM Support.

3.2.1.12 NVMe Configuration

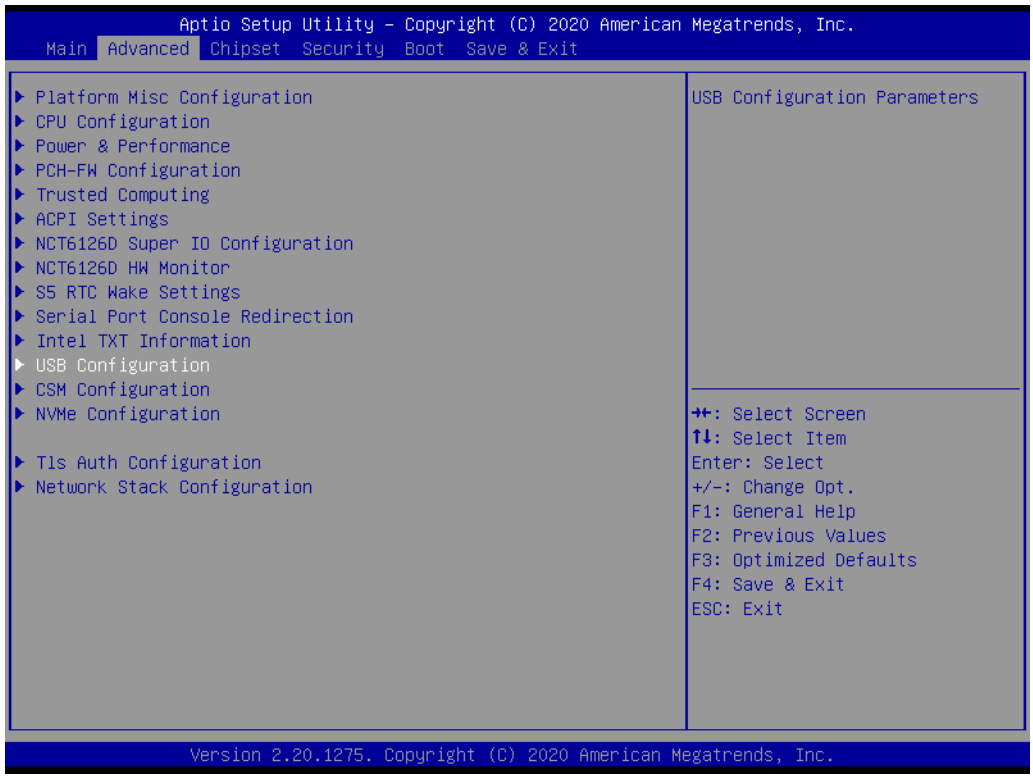


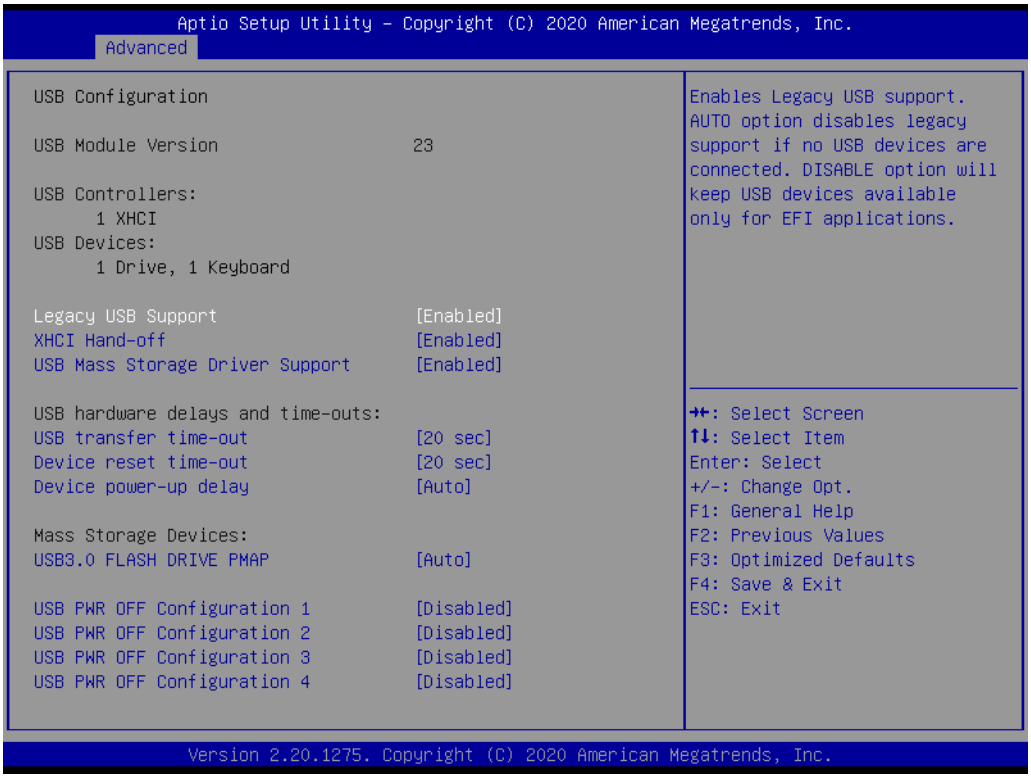
3.2.1.13 Network Stack Configuration





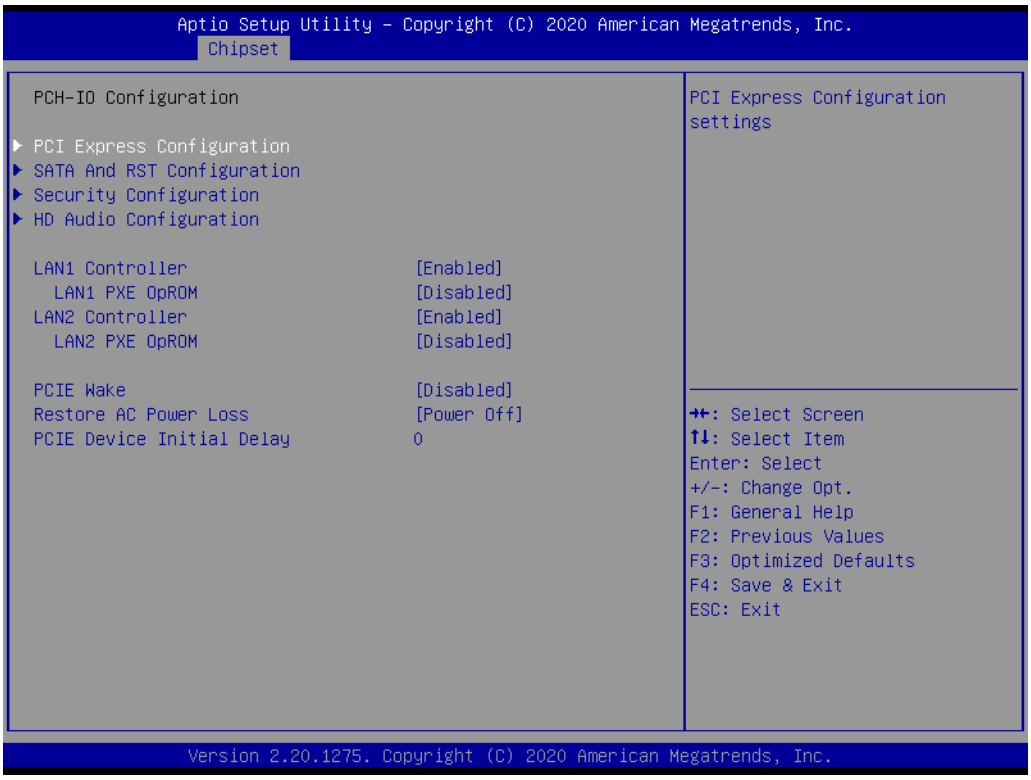
3.2.1.14 USB Configuration

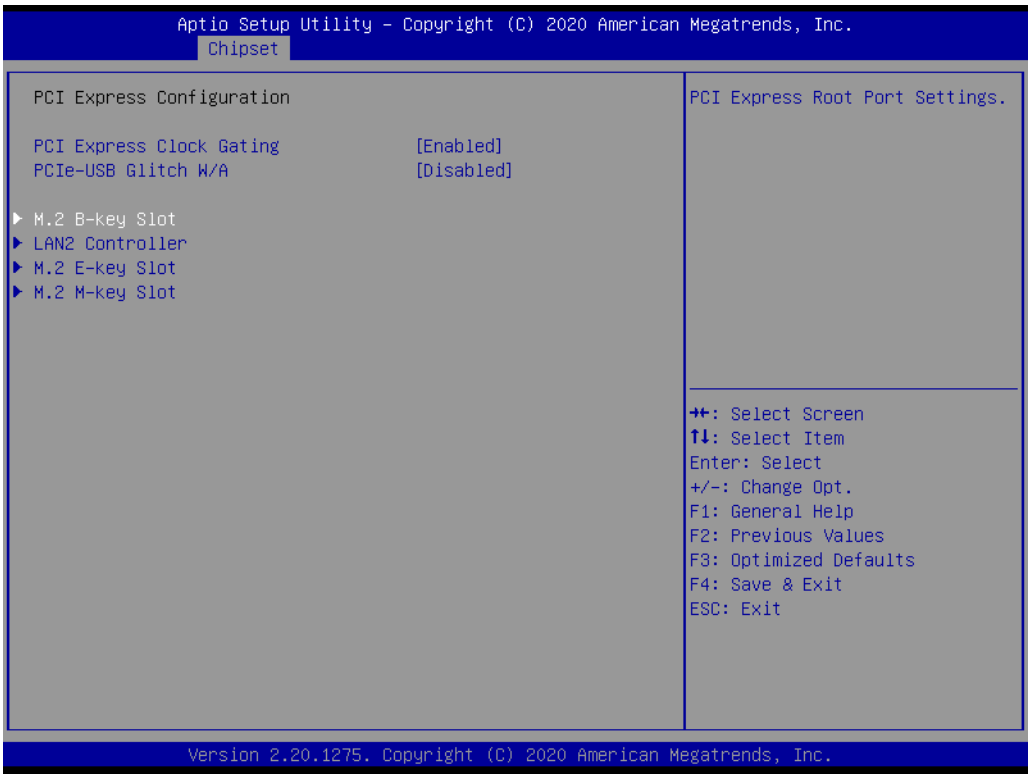




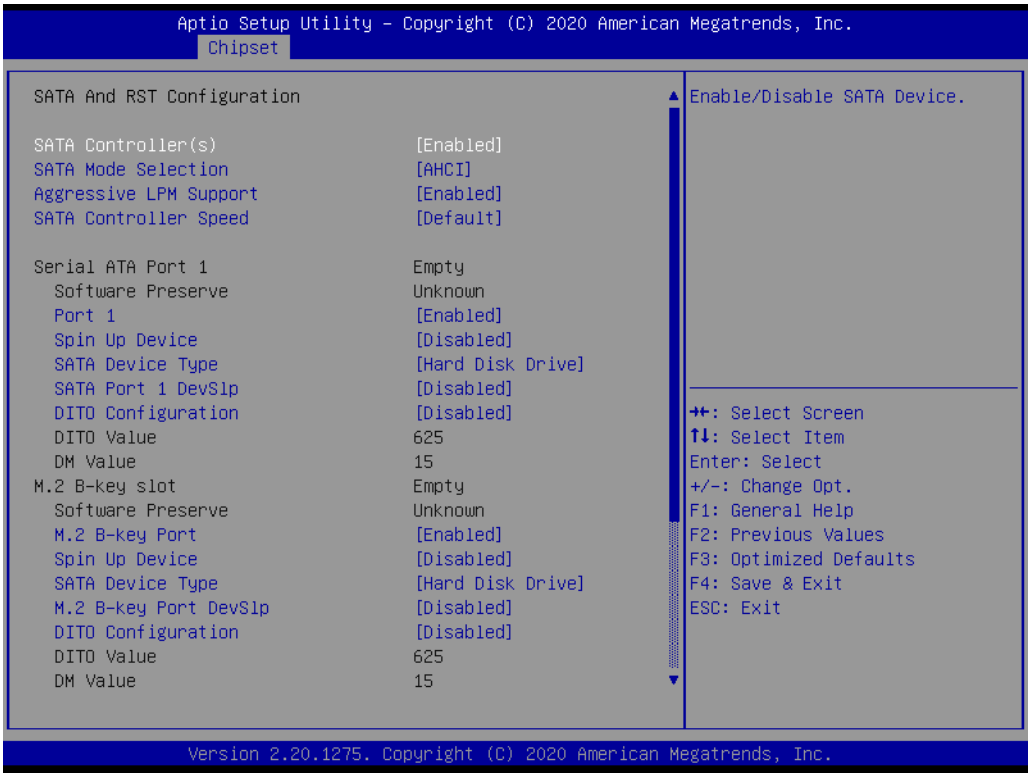
- **Legacy USB Support**
  Enables support for legacy USB. Auto option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
- **XHCI Hands Off**
  This is a workaround for OS without XHCI hand-off support. The XHCI ownership change should claim by XHCI driver.
- **USB Mass Storage Driver Support**
  This item allows users to Enable or Disable USB Mass Storage Driver.
- **USB Transfer Time-Out**
  Time-out value for control, bulk, and interrupt transfers.
- **Device Reset Time-Out**
  USB mass storage device start unit command time-out.
- **Device Power-Up Delay**
  Maximum time the device will take before it properly report itself to the host controller. ‘Auto’ uses default value: for a Root port it is 100 ms, for a Hub port the delay is taken from Hub descriptor.
- **Mass Storage Device**
  Mass storage device emulation type. 'AUTO' enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type.
- **USB PWR Configuration (USB Power On/Off Control)**

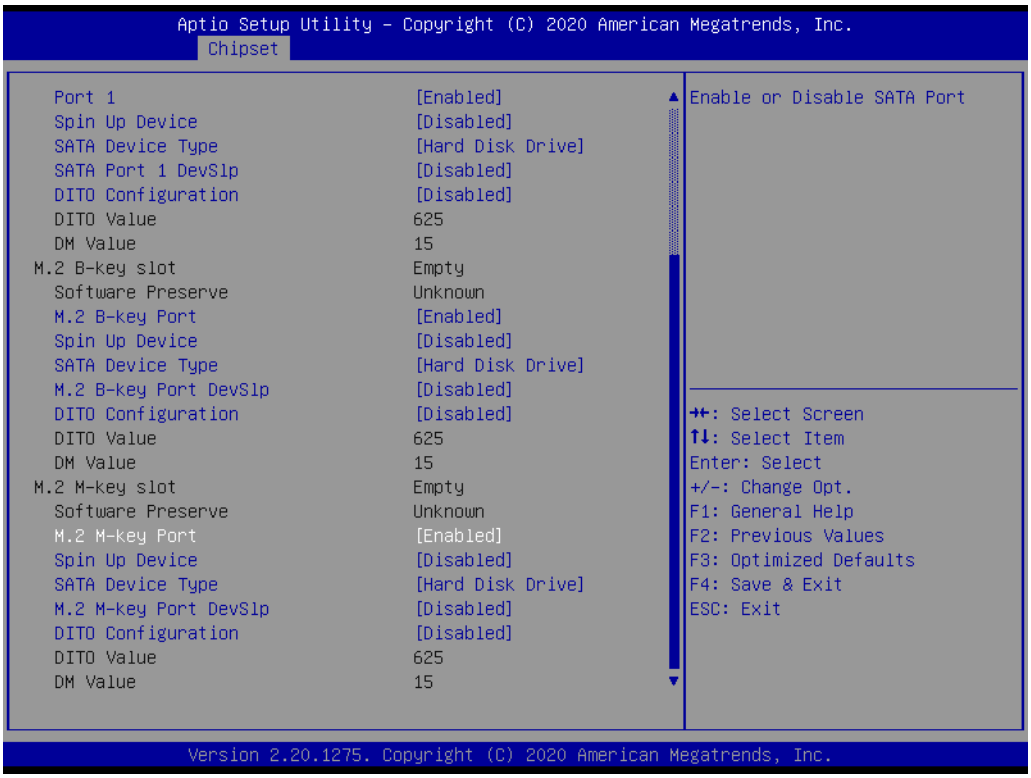
3.2.1.15 PCI Express Configuration





3.2.1.16 SATA And RST Configuration



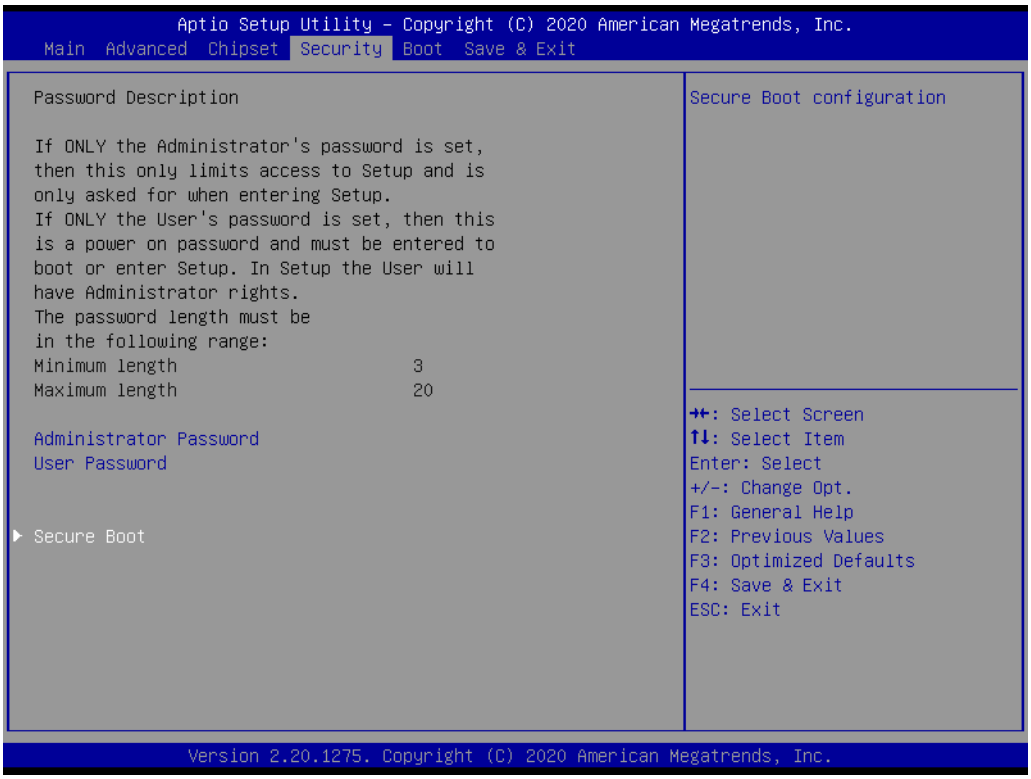


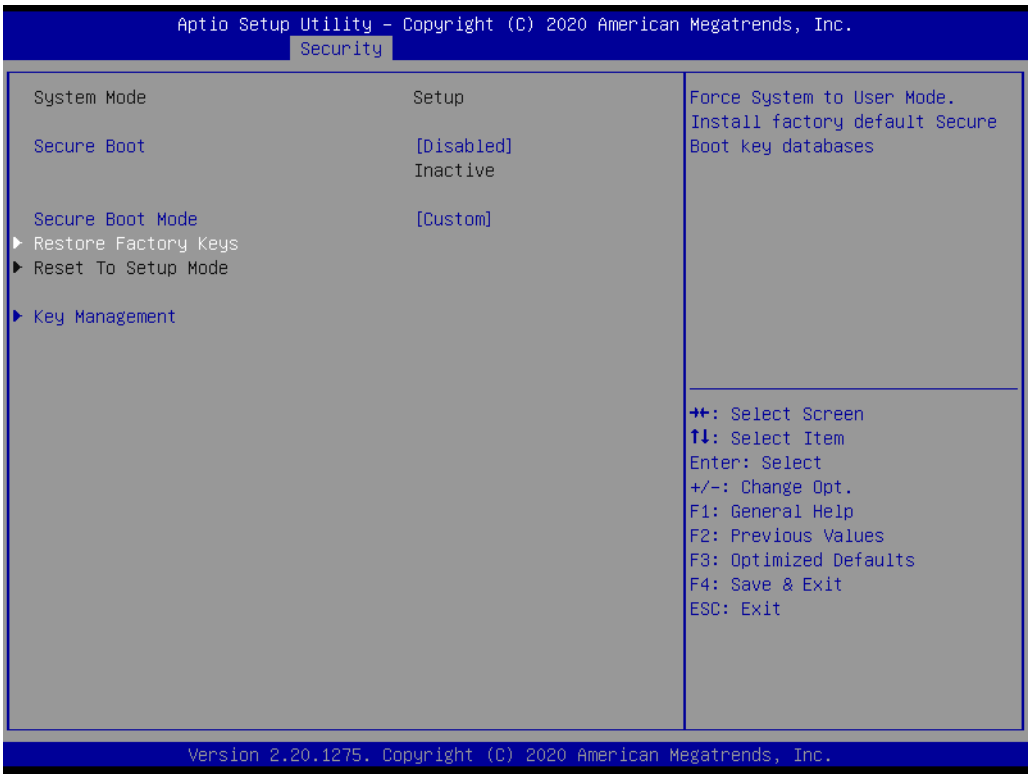
- **SATA Configuration**
  SATA port / SATA mode / RAID Settings.

3.2.2 Security

This page provides information of the Security on AIMB-U233.

3.2.2.1 Secure Boot

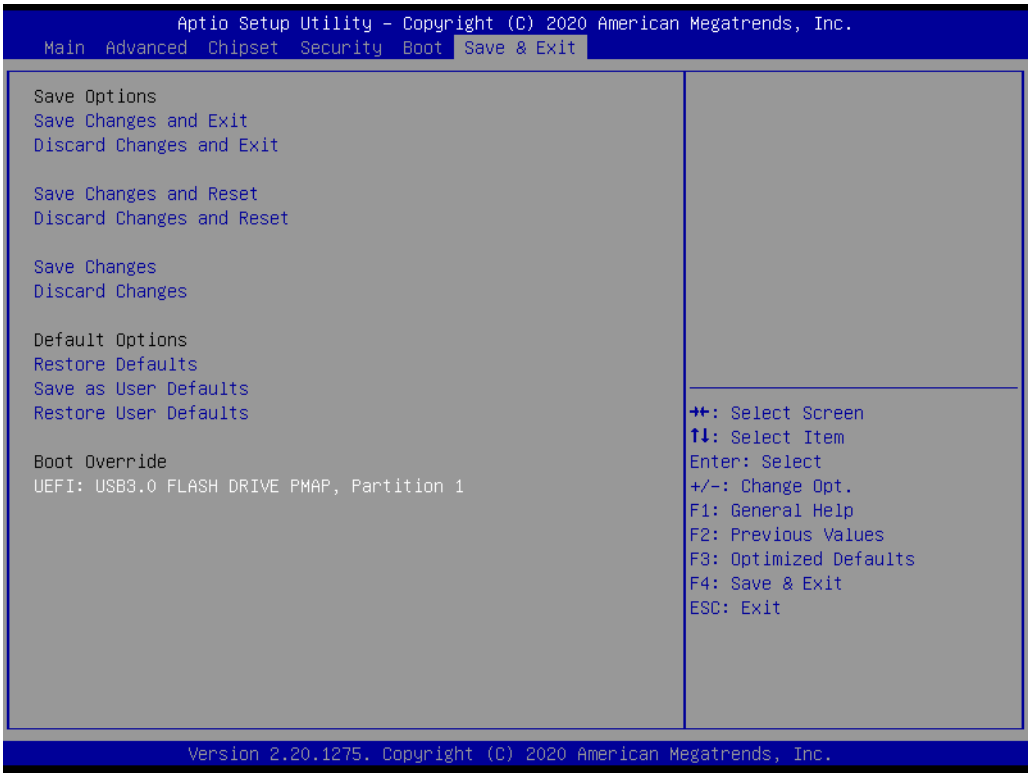




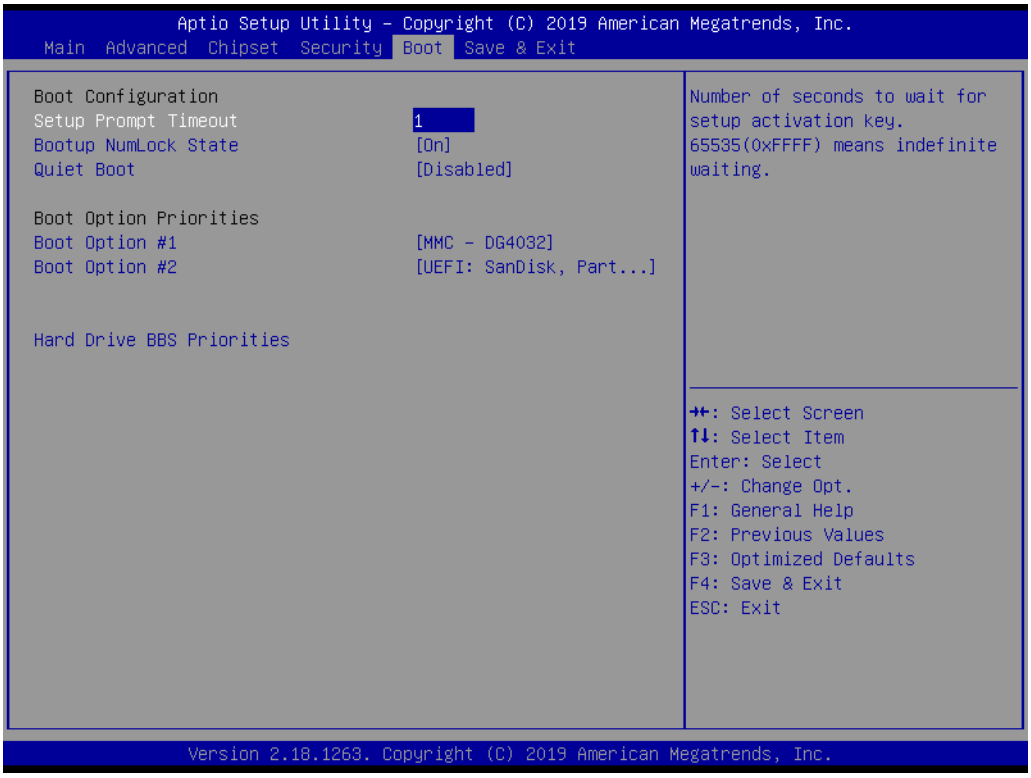
- **Secure Boot**
  Enabled / Disabled.

- **Secure Boot Mode**
  Secure Boot Mode Custom Setting.
- **Restore Factory Key / Restore to Setup mode**
- **Key Management**

3.2.3 Save & Exit



3.2.4 Boot



- **Bootup NumLock State**
  Select the keyboard Numlock state.
- **Quiet Boot**
  Enables or Disables Quiet Boot option.

Chapter 4

Software and Service Introduction

4.1 Introduction

The mission of Advantech Embedded Software Services is to “enhance user quality of life with Advantech platforms and Microsoft® Windows® embedded technology.” We equip Advantech platforms with Windows® embedded software products to more effectively support the embedded computing community. This eliminates the hassle of dealing with multiple vendors (hardware suppliers, system integrators, and embedded OS distributors) for specific projects. Our aim is to make Windows® embedded software solutions widely available to the embedded computing community.

4.2 Value-Added Software Services

Software API: An interface that defines the ways in which an application program may request services from libraries and/or operating systems. This software provides not only the underlying drivers required, but also a rich set of user-friendly, intelligent, and integrated interfaces that speed development, enhance security, and offer add-on value for Advantech platforms. Furthermore, this software serves as a catalyst between developers and solutions, making Advantech embedded platforms easier and simpler to adopt and operate with customer applications.

4.2.1 Software API

4.2.1.1 Control

GPIO

General purpose input/output is a flexible parallel interface that allows various custom connections. This interface also enables users to monitor the level of signal input or set the output status to switch the device on or off. Our API also provides programmable GPIO, enabling developers to dynamically set the GPIO input or output status.

SMBus

SMBus is a system management bus defined by Intel Corporation in 1995. This interface is used in personal computers and servers for low-speed system management communications. The SMBus API allows developers to interface with an embedded system environment and transfer serial messages using SMBus protocols, facilitating multiple simultaneous device control.

4.2.1.2 Display

Brightness Control

The Brightness Control API allows developers to access embedded devices and easily control brightness.

Backlight

The Backlight API allows developers to control the backlight (screen) in embedded devices.

4.2.1.3 Monitor

Watchdog

A watchdog timer is a device that performs a specific operation after a specified period of time when a malfunction occurs and the system cannot recover on its own. A watchdog timer can be programmed to perform a warm booting (system restart) after a certain number of seconds.

Hardware Monitor

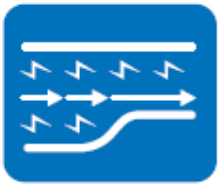
The Hardware Monitor API is a system health supervision API that inspects certain condition indices, such as fan speed, temperature, and voltage.

4.2.1.4 Power Saving

CPU Speed

This feature uses Intel SpeedStep® Technology to reduce the system power consumption. The system automatically adjusts the CPU speed according to the system load.

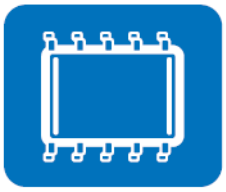
System Throttling



This refers to a series of methods for reducing system power consumption by lowering the clock frequency. This API allows users to adjust the clock frequency from 87.5% to 12.5%.

4.2.2 Software Utility

BIOS Flash



The BIOS Flash utility allows customers to update the flash ROM BIOS version, or backup the current BIOS by copying the configuration from the flash chip to a file on the users' disk. The BIOS Flash utility also features a command line version and API for rapid implementation in customized applications.

Embedded Security ID

Embedded applications are the most important responsibilities for system integrators because they contain valuable intellectual property, design knowledge, and innovations, and are easily copied. This Embedded Security ID utility offers reliable security functions that allow users to secure application data within embedded BIOS.

Monitoring

The Monitoring API is a utility that allows users to monitor the system health indicators, such as voltage, CPU and system temperature, and fan speed. These system values are crucial. If critical errors occur and are not solved immediately, permanent damage to the device may result.

Chapter 5

Chipset Software Installation Utility

5.1 Before Installation

Before installing the enhanced display drivers and utility software, please read the instructions provided in this chapter carefully. The drivers for AIMB-U233 are provided on the Advantech support website: http://support.advantech.com/Support/. This driver will guide and link users to the utilities and drivers required for Microsoft Windows-based systems. Software updates can be accessed from Microsoft* software service packs.

Note! *The files on the website are compressed. Do not attempt to install the drivers by copying the files manually. The Setup program provided must be used to install the drivers.*

Please note, for most display drivers the relevant software application must be installed on the system before enhanced display drivers can be installed. In addition, for many of the installation procedures, user familiarity with both the relevant software applications and operating system commands is assumed. Thus, users are advised to review relevant operating system commands and pertinent sections of the application software user manual before attempting installation.

5.2 Introduction

The Intel® Chipset Software Installation (CSI) utility installs the Microsoft Windows INF files that specify the chipset component configuration on the OS. This is essential to enable the following features and functionality:

- Core PCI PnP services
- Serial ATA interface support
- USB support
- Identification of Intel® chipset components in the device manager

Note! *This utility is used for the following versions of Windows, and it has to be installed before installing all the other drivers:*

- *Windows 10 (64 bit)*

Chapter 6

Graphics Setup

6.1 Introduction

To benefit from the Intel® 8th Gen Core™ i3-8145UE / i5-8365UE / i7-8665UE integrated graphics controller, users must install the graphics driver.

6.2 Windows 10

Note! *Before installing this driver, ensure the CSI utility is installed on the system. See Chapter 5 for information regarding installing the CSI utility.*

Download the driver from website on your computer. Navigate to the “Graphics” folder and click “setup.exe” to complete the installation of the drivers for Windows 10.

Win 10(64bit) Driver for AIMB-U233

Solution :

Download File	Released Date	Download Site
AIMB-U233_Chipset_Win10(64bit).zip	2020-07-30	Primary Secondary
AIMB-U223_Graphic_Win10(64bit).zip	2020-07-30	Primary Secondary
AIMB-U223_Intel LAN_Win10(64bit).zip	2020-07-30	Primary Secondary
AIMB-U223_Intel ME_Win10(64bit).zip	2020-07-30	Primary Secondary
AIMB-U223_Audio_Win10(64bit).zip	2020-07-31	Primary Secondary
AIMB-U233_Intel RAID AHCI_Win10(64bit).zip	2020-08-04	Primary Secondary

Chapter 7

LAN Configuration

7.1 Introduction

The AIMB-U233 system features 2 Gigabit Ethernet LANs via dedicated PCI Express x1 lanes (LAN1: Intel Jacksonville: I219LM GbE PHY; LAN2: Intel Springville: I211AT GbE).

7.2 Features

- Integrated 10/100/1000 Mbps transceiver
- Wake-on-LAN (WOL) support
- PCI Express X1 host interface

7.3 Installation

Note! *Before installing LAN drivers, ensure the CSI utility is installed on the system. See Chapter 5 for information regarding installing the CSI utility.*

The Intel Jacksonville: I219LM GbE PHY and Intel Springville: I211AT GbE Gigabit integrated controllers support all major network operating systems. However, the installation procedure varies between systems. Please follow the driver setup procedure instructions specific to the operating system installed.

7.4 Windows 10 Driver Setup

Download the driver from website on your computer. Navigate to the LAN drivers folder and click “setup.exe” to complete the installation of the drivers.

Win 10(64bit) Driver for AIMB-U233

Solution :

Download File	Released Date	Download Site	
AIMB-U233_Chipset_Win10(64bit).zip	2020-07-30	Primary	Secondary
AIMB-U223_Graphic_Win10(64bit).zip	2020-07-30	Primary	Secondary
AIMB-U223_Intel LAN_Win10(64bit).zip	2020-07-30	Primary	Secondary
AIMB-U223_Intel ME_Win10(64bit).zip	2020-07-30	Primary	Secondary
AIMB-U223_Audio_Win10(64bit).zip	2020-07-31	Primary	Secondary
AIMB-U233_Intel RAID AHCI_Win10(64bit).zip	2020-08-04	Primary	Secondary

Appendix A

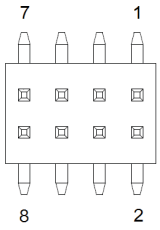
Pin Assignments

A.1 Pin Assignments

Connector and Header List:

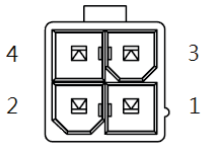
	Description	Part Reference
1	SPI Pin Header	SPI1_CN1
2	ATX 12V power supply connector	ATX12V1
3	System Fan #1 connector	SYSFAN1
4	DC input Jack	DCIN1
5	IMVP8/9 PMBus KIT	JPMB1
6	HDMI #1	HDMI1
7	AT/ATX Mode selection	PSON1
8	LVDS VESA, JEIDA format selection pin header	JLVDS_VCON1
9	HDMI #2	HDMI2
10	VDD select for LVDS1 Panel	JLVDS1
11	Low Voltage Differential Signaling / EDP	LVDS_EDP1
12	Inverter power connector	INV1
13	HD Audio Interface (LINE-OUT)	AUDIO1
14	HD Audio Interface (MIC-IN)	AUDIO2
15	PWRBTN# / RESET# / HDD LED / PWR LED	JFP1
16	COM1 and COM2 Box Header	COM12
17	Serial ATA interface connector #1	SATA1
18	M.2 KEY-M connector	NGFF_M1
19	M.2 KEY-E connector	NGFF_E1
20	Serial ATA Power connector #1	SATAPWR1
21	Coin Battery wafer box	BAT1
22	Low pin count interface connector	LPC1
23	16-bits General Purpose I/O Pin Header	GPIO1
24	COM3 and COM4 Box Header	COM34
25	USB2.0 Front panel Header	USB34
26	COMS Mode selection	JCMOS1
27	USB3.1 GEN2 Stack connector	USB12
28	Dual port RJ45 Connector	LAN1+LAN2
29	M.2 KEY-B connector	NGFF_B1
30	Nano SIM Card holder	SIM1
31	DDR4 SO-DIMM Socket CH-A	DIMMA1
32	CPU FAN #1 connector	CPUFAN1

A.1.1 SPI Pin Header (SPI1_CN1)



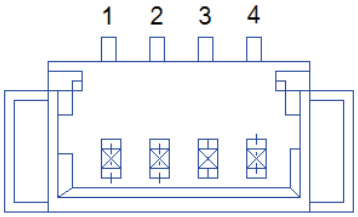
Pin	Signal	Pin	Signal
1	SPI_CS0#	2	SPI_PWR
3	SPI_MISO	4	NC
5	NC	6	SPI_CLK
7	GND	8	SPI_MOSI

A.1.2 ATX 12V power supply connector (ATX12V1)



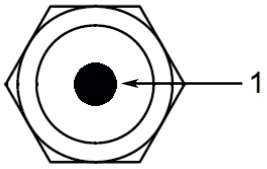
Pin	Signal
1	GND
2	GND
3	+12V
4	+12V

A.1.3 System Fan #1 connector (SYSFAN1)



Pin	Signal
1	GND
2	SYSTEM FAN1 VCC
3	SYSTEM FAN1 SPEED
4	SYSTEM FAN1 PWM

A.1.4 DC input Jack (DCIN1)

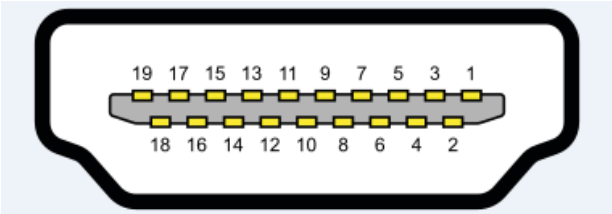


Pin	Signal
1	VCC (Center)
2	GND

A.1.5 IMVP8/9 PMBus KIT (JPMB1)

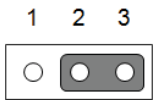
Pin	Signal
1	Advantech Define
2	Advantech Define
3	Advantech Define

A.1.6 HDMI #1 (HDMI1)



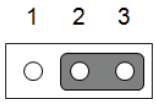
Pin	Signal	Pin	Signal
1	TMDS Data2+	2	GND
3	TMDS Data2-	4	TMDS Data1+
5	GND	6	TMDS Data1-
7	TMDS Data0+	8	GND
9	TMDS Data0-	10	TMDS Clock+
11	GND	12	TMDS Clock-
13	NC	14	NC
15	SCL	16	SDA
17	GND	18	+5V Power
19	Hot Plug Detect		

A.1.7 AT/ATX Mode selection (PSON1)



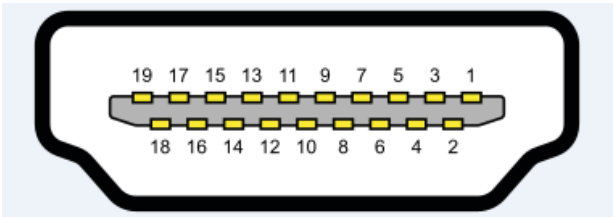
Pin	Signal
1	AT
2	+3.3V
3	ATX

A.1.8 LVDS VESA, JEIDA format selection pin header (JLVDS_VCON1)



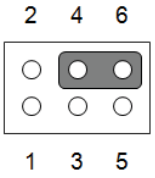
Pin	Signal
1	+3.3V
2	Advantech define
3	GND

A.1.9 HDMI #2 (HDMI2)



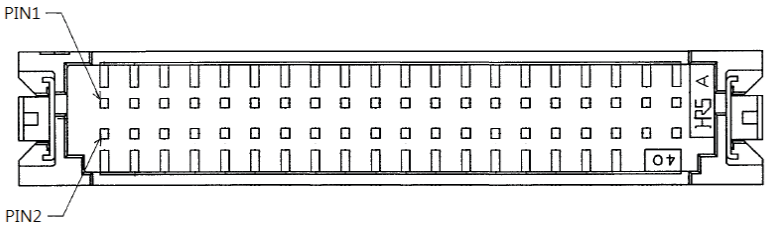
Pin	Signal	Pin	Signal
1	TMDS Data2+	2	GND
3	TMDS Data2-	4	TMDS Data1+
5	GND	6	TMDS Data1-
7	TMDS Data0+	8	GND
9	TMDS Data0-	10	TMDS Clock+
11	GND	12	TMDS Clock-
13	NC	14	NC
15	SCL	16	SDA
17	GND	18	+5V Power
19	Hot Plug Detect		

A.1.10 VDD select for LVDS1 Panel (JLVDS1)



Pin	Signal	Pin	Signal
1	NC	2	+5V
3	+12V	4	VDD
5	NC	6	+3.3V

A.1.11 Low Voltage Differential Signaling / EDP (LVDS_EDP1)



LVDS

Pin	Signal	Pin	Signal
1	VDD	2	VDD
3	LVDS DETECT#	4	GND
5	VDD	6	VDD
7	LVDS_OD0-	8	LVDS_ED0-
9	LVDS_OD0+	10	LVDS_ED0+
11	GND	12	GND
13	LVDS_OD1-	14	LVDS_ED1-
15	LVDS_OD1+	16	LVDS_ED1+
17	GND	18	GND
19	LVDS_OD2-	20	LVDS_ED2-
21	LVDS_OD2+	22	LVDS_ED2+
23	GND	24	GND
25	LVDS_OCK-	26	LVDS_ECK-
27	LVDS_OCK+	28	LVDS_ECK+
29	GND	30	GND
31	N.C	32	N.C
33	GND	34	GND
35	LVDS_OD3-	36	LVDS_ED3-
37	LVDS_OD3+	38	LVDS_ED3+
39	LVDS ENBKL	40	LVDS VCON

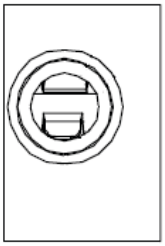
EDP

Pin	Signal	Pin	Signal
1	VDD	2	VDD
3	LVDS DETECT#	4	GND
5	VDD	6	VDD
7	EDP_TX2-	8	N.C
9	EDP_TX2+	10	N.C
11	GND	12	GND
13	EDP_TX1-	14	N.C
15	EDP_TX1+	16	N.C
17	GND	18	GND
19	EDP_TX0-	20	N.C
21	EDP_TX0+	22	N.C
23	GND	24	GND
25	EDP_TX3-	26	N.C
27	EDP_TX3+	28	N.C
29	GND	30	GND
31	EDP_AUX+	32	EDP_AUX-
33	GND	34	EDP_HPD
35	N.C	36	N.C
37	N.C	38	N.C
39	N.C	40	GND

A.1.12 Inverter power connector (INV1)

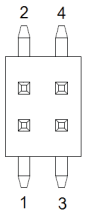
Pin	Signal
1	+12V
2	GND
3	BKL EN
4	BKL CTRL
5	+5V

A.1.13 HD Audio Interface (LINE-OUT) (AUDIO1)



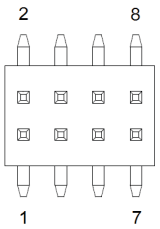
Pin	Signal
1	LINE OUT - L
2	LINE OUT - R

A.1.14 HD Audio Interface (MIC-IN) (AUDIO2)



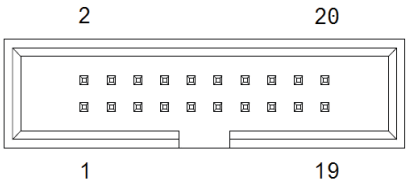
Pin	Signal
1	MIC IN - L
2	MIC IN - R
3	GND
4	Jack Detection

A.1.15 PWRBTN# / RESET# / HDD LED / PWR LED Header (JFP1)



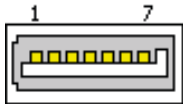
Pin	Signal	Pin	Signal
1	HDD LED+	2	PWRBTN+
3	HDD LED-	4	PWRBTN-
5	PWR LED+	6	RESET+
7	PWR LED-	8	RESET-

A.1.16 COM1 and COM2 Box Header (COM12)



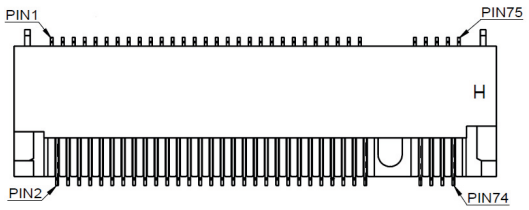
Pin	Signal	Pin	Signal
1	DCD# [1]	2	DSR# [1]
3	RXD [1]	4	RST# [1]
5	TXD [1]	6	CTS# [1]
7	DTR# [1]	8	RI# [1]
9	GND	10	GND
11	DCD# [2]	12	DSR# [2]
13	RXD [2]	14	RST# [2]
15	TXD [2]	16	CTS# [2]
17	DTR# [2]	18	RI# [2]
19	GND	20	GND

A.1.17 Serial ATA interface connector #1 (SATA1)



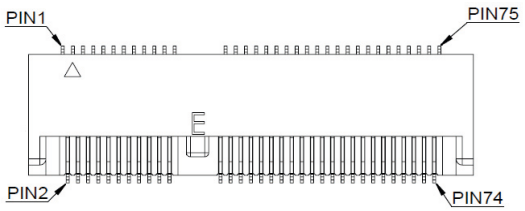
Pin	Signal
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

A.1.18 KEY-M connector (NGFF_M1)



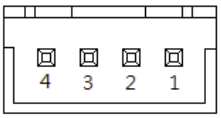
Pin	Signal	Pin	Signal
1	GND	2	+3.3V
3	GND	4	+3.3V
5	PERn3	6	NC
7	PERp3	8	NC
9	GND	10	NC
11	PETn3	12	+3.3V
13	PETp3	14	+3.3V
15	GND	16	+3.3V
17	PERn2	18	+3.3V
19	PERp2	20	NC
21	GND	22	NC
23	PETn2	24	NC
25	PETp2	26	NC
27	GND	28	NC
29	PERn1	30	NC
31	PERp1	32	NC
33	GND	34	NC
35	PETn1	36	NC
37	PETp1	38	DEVSLP
39	GND	40	NC
41	PERn0 / SATA-B+	42	NC
43	PERp0 / SATA-B-	44	NC
45	GND	46	NC
47	PETn0 / SATA-A-	48	NC
49	PETp0 / SATA-A+	50	PERST#
51	GND	52	CLKREQ#
53	REFCLKn	54	PEWAKE#
55	REFCLKp	56	NC
57	GND	58	NC
59	Connector Key	60	Connector Key
61	Connector Key	62	Connector Key
63	Connector Key	64	Connector Key
65	Connector Key	66	Connector Key
67	NC	68	SUSCLK
69	PEDET	70	+3.3V
71	GND	72	+3.3V
73	GND	74	+3.3V
75	GND		

A.1.19 M.2 KEY-E connector (NGFF_E1)



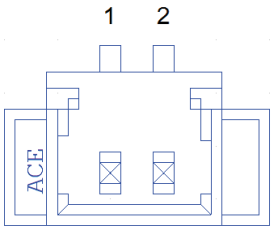
Pin	Signal	Pin	Signal
1	GND	2	+3.3V
3	USB_D+	4	+3.3V
5	USB_D-	6	WiFi_LED#
7	GND	8	I2S SCLK
9	SDIO CLK	10	I2S BCLK
11	SDIO CMD	12	I2S SDO
13	SDIO DATA0	14	I2S SDI
15	SDIO DATA1	16	BT_LED#
17	SDIO DATA2	18	GND
19	SDIO DATA3	20	UART WAKE#
21	SDIO WAKE#	22	UART RXD
23	SDIO RESET#	24	Connector Key
25	Connector Key	26	Connector Key
27	Connector Key	28	Connector Key
29	Connector Key	30	Connector Key
31	Connector Key	32	UART TXD
33	GND	34	UART CTS
35	PETp0	36	UART RTS
37	PETn0	38	CL_RST#
39	GND	40	CL_DAT
41	PERp0	42	CL_CLK
43	PERn0	44	COEX3
45	GND	46	COEX2
47	REFCLKp0	48	COEX1
49	REFCLKn0	50	SUSCLK
51	GND	52	PERST0#
53	CLKREQ0#	54	W_DISABLE2#
55	PEWAKE0#	56	W_DISABLE1#
57	GND	58	NC
59	PETp1	60	NC
61	PETn1	62	NC
63	GND	64	RESERVED
65	PERp1	66	PERST1#
67	PERn1	68	CLKREQ1#
69	GND	70	PEWAKE1#
71	REFCLKp1	72	+3.3V
73	REFCLKn1	74	+3.3V
75	GND		

A.1.20 Serial ATA Power connector #1 (SATAPWR1)



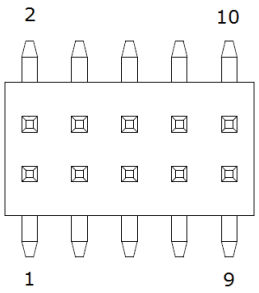
Pin	Signal
1	+5V
2	GND
3	GND
4	+12V

A.1.21 Coin Battery wafer box (BAT1)



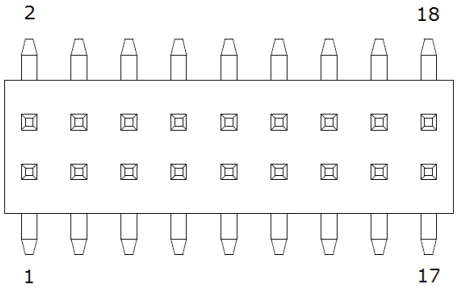
Pin	Signal
1	+VBAT
2	GND

A.1.22 Low pin count interface connector (LPC1)



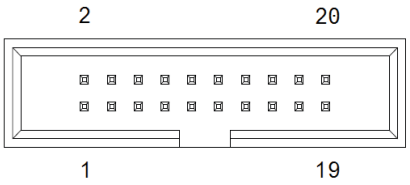
Pin	Signal	Pin	Signal
1	LPC CLK	2	LPC AD1
3	LPC RESET#	4	LPC AD0
5	LPC FRAME#	6	+3.3V
7	LPC AD3	8	GND
9	LPC AD2	10	NC

A.1.23 16-bits General Purpose I/O Pin Header (GPIO1)



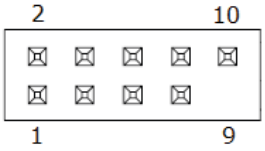
Pin	Signal	Pin	Signal
1	GPIO0	2	GPIO8
3	GPIO1	4	GPIO9
5	GPIO2	6	GPIO10
7	GPIO3	8	GPIO11
9	GPIO4	10	GPIO12
11	GPIO5	12	GPIO13
13	GPIO6	14	GPIO14
15	GPIO7	16	GPIO15
17	+5V AUX	18	GND

A.1.24 COM3 and COM4 Box Header (COM34)



Pin	Signal	Pin	Signal
1	DCD# [3]	2	DSR# [3]
3	RXD [3]	4	RST# [3]
5	TXD [3]	6	CTS# [3]
7	DTR# [3]	8	RI# [3]
9	GND	10	GND
11	DCD# [4]	12	DSR# [4]
13	RXD [4]	14	RST# [4]
15	TXD [4]	16	CTS# [4]
17	DTR# [4]	18	RI# [4]
19	GND	20	GND

A.1.25 USB2.0 Front panel Header (USB34)

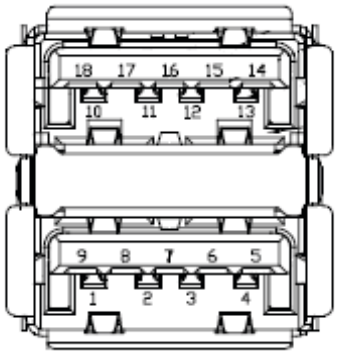


Pin	Signal	Pin	Signal
1	VBUS #3	2	VBUS #4
3	D- [3]	4	D- [4]
5	D+ [3]	6	D+ [4]
7	GND	8	GND
		10	GND

A.1.26 COMS Mode selection (JCMOS1)

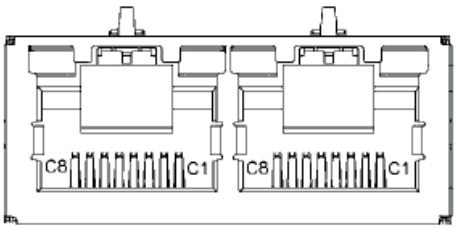
Pin	Signal
1	VBAT
2	RTC
3	GND

A.1.27 USB3.1 GEN2 Stack connector (USB12)



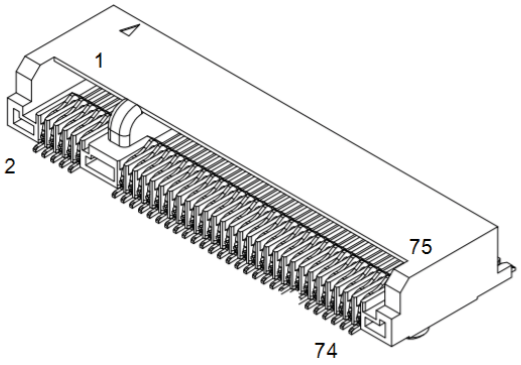
Pin	Signal	Pin	Signal
1	VBUS #1	2	D- [1]
3	D+ [1]	4	GND
5	RX- [1]	6	RX+ [1]
7	GND	8	TX- [1]
9	TX+ [1]	10	VBUS #2
11	D- [2]	12	D+ [2]
13	GND	14	RX- [2]
15	RX+ [2]	16	GND
17	TX- [2]	18	TX+ [2]

A.1.28 Dual port RJ45 Connector (LAN1+LAN2)



Pin	Signal
C1	MDI0+
C2	MDI0-
C3	MDI1+
C4	MDI1-
C5	MDI2+
C6	MDI2-
C7	MDI3+
C8	MDI3-

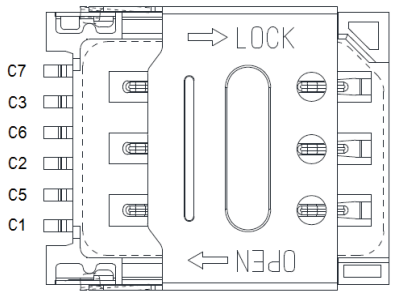
A.1.29 M.2 KEY-B (NGFF_B1)



Pin	Signal	Pin	Signal
1	CONFIG_3	2	+3.3V
3	GND	4	+3.3V
5	GND	6	FULL_CARD_POWER_OFF#
7	USB_D+	8	W_DISABLE1#
9	USB_D-	10	LED1#
11	GND	12	Connector Key
13	Connector Key	14	Connector Key
15	Connector Key	16	Connector Key
17	Connector Key	18	Connector Key
19	Connector Key	20	NC
21	CONFIG_0	22	NC
23	WAKE_ON_WWAN#	24	NC
25	DPR	26	W_DISABLE2#
27	GND	28	NC
29	PERn1 / USB3.1-Rx-	30	UIM - RESET
31	PERp1 / USB3.1-Rx+	32	UIM - CLK
33	GND	34	UIM - DATA
35	PETn1 / USB3.1-Tx-	36	UIM - PWR
37	PETp1 / USB3.1-Tx+	38	NC
39	GND	40	NC
41	PERn0 / SATA-RX+	42	NC
43	PERp0 / SATA-RX-	44	NC
45	GND	46	NC
47	PETn0 / SATA-TX-	48	NC
49	PETp0 / SATA-TX+	50	PERST#
51	GND	52	CLKREQ#
53	REFCLKn	54	PEWAKE#
55	REFCLKp	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	NC
67	RESET#	68	SUSCLK(32kHz)

69	CONFIG_1	70	+3.3V
71	GND	72	+3.3V
73	GND	74	+3.3V
75	CONFIG_2		

A.1.30 SIM Card holder (SIM1)

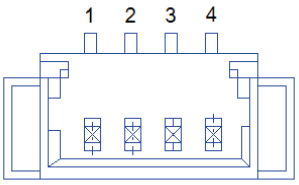


Pin	Signal
C1	SIM PWR
C2	SIM RESET
C3	SIM CLK
C5	GND
C6	SIM VPP
C7	SIM DATA

A.1.31 DDR4 SO-DIMM Socket CH-A (DIMMA1)

Please see JEDEC STANDARD.

A.1.32 CPU FAN #1 connector (CPUFAN1)



Pin	Signal
1	GND
2	CPU FAN VCC
3	CPU FAN SPEED
4	CPU FAN PWM

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