

## AIMB-286EF

**Intel® Core™ i7/i5/i3/Pentium/  
Celeron LGA1151 Mini-ITX with  
DP++/HDMI/LVDS (or eDP), 2  
COM & 8 USB, 3 LAN, and  
PCIex16**

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- This device may not cause harmful interference.
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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 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 device in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense. The user is advised that any equipment changes or modifications not expressly approved by the party responsible for compliance would void the compliance to FCC regulations and therefore, the user's authority to operate the equipment.

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## CPU Compatibility

Processor Number	Max_TDP	Code Name	Cores/Threads	S-Spec	Lithography
i7-9700	65W	Coffee Lake-R	8C/8T	SRG13	14nm
i5-9500	65W	Coffee Lake-R	6C/6T	SRF4B	14nm
i3-9100	65W	Coffee Lake-R	4C/4T	SRCZV	14nm
i7-9700E	65W	Coffee Lake-R	8C/8T	QSJM	14nm
i5-9500E	65W	Coffee Lake-R	6C/6T	SRGQX	14nm
i3-9100E	65W	Coffee Lake-R	4C/4T	QSKA	14nm
i7-9700TE	35W	Coffee Lake-R	8C/8T	QSJN	14nm
i5-9500TE	35W	Coffee Lake-R	6C/6T	SRGQZ	14nm
i3-9100TE	35W	Coffee Lake-R	4C/4T	SRGR0	14nm

Processor Number	Max_TDP	Code Name	Cores/Threads	S-Spec	Lithography
i7-8700	65W	Coffee Lake	6C/12T	SR3QS	14nm
i5-8500	65W	Coffee Lake	6C/6T	SR3XE	14nm
i3-8100	65W	Coffee Lake	4C/4T	SR3N5	14nm
G5400	54W	Coffee Lake	2C/4T	SR3X9	14nm
G4900	54W	Coffee Lake	2C/2T	SR3W4	14nm
i7-8700T	35W	Coffee Lake	6C/12T	SR3WX	14nm
i5-8500T	35W	Coffee Lake	6C/6T	SR3XD	14nm
i3-8100T	35W	Coffee Lake	4C/4T	SR3X8	14nm
G5400T	35W	Coffee Lake	2C/4T	SR3XB	14nm
G4900T	35W	Coffee Lake	2C/2T	SR3YP	14nm

## Memory AVL

Category	Speed	Capacity	Vendor	Chip_PN	ADVANTECH P/N	ECC
DDR4	2666	16GB	Advantech	SEC 813 K4A8G08 5WB BCTD	AQD-SD4U16N26-SE	N
DDR4	2666	32GB	Advantech	SEC 837 K4A8G08 5WC BCTD	SQR-SD4N32G2K6SNME	N
DDR4	2666	8GB	Advantech	SEC 837 K4A8G08 5WC BCTD	SQR-SD4N8G2K6SNBCB	N
DDR4	2400	4GB	Advantech	SEC 819 K4A4G08 5WE BCRC	SQR-SD4N4G2K4SNEEB	N
DDR4	3200	16GB	Advantech	9CJ45 D9WSM	96SD4-16G3200NN-MI	N

Category	Speed	Capacity	Vendor	Chip_PN	ADVANTECH P/N	ECC
DDR4	2666	8GB	Advantech	SEC 737 K4A4G08 5WE BCTD	SQR-SD4N8G2K6SNEEB	N
DDR4	2400	16GB	Advantech	SEC 749 K4A8G08 5WB BCRC	SQR-SD4M16G2K4SNBB	N
DDR4	2400	4GB	Advantech	SEC 749 K4A4G08 5WE BCRC	SQR-SD4M4G2K4SNEEB	N
DDR4	2666	4GB	Advantech	SEC 807 K4A4G08 5WE BCTD	SQR-SD4N4G2K6SNEEB	N
DDR4	2133	16GB	Advantech	SEC 546 K4A8G08 5WB BCPB	AQD-SD4U16N21-SE	N
DDR4	2133	8GB	Advantech	SEC 552 BCPB K4A4G085WD	AQD-SD4U8GN21-SG	N
DDR4	2400	8GB	Advantech	H5AN8G8NAFR UHC 643V	SQR-SD4N-8G2K4HBC	N
DDR4	2400	16GB	Advantech	H5AN8G8NAFR UHC 643V	SQR-SD4N-16G2K4HBC	N
DDR4	2400	16GB	Advantech	H5AN8G8NAFR UHC 643V	AQD-SD4U16N24-HE	N

## Ordering Information

P/N	Chipset	SO-DIMM	DP1.2	LVDS/eDP	HDMI 1.4	GbE LAN	COM	SATAIII	USB3.0/USB2.0	M.2 B key	M.2 E key	PCIex 16	TPM
AIMB-286F-EFA1E	H310	1	1	1/(1)	1	3	2	3	4/4	1	1	1	(1)

\* ( ) is not populated when MP

## Initial Inspection

Before you begin installing your motherboard, please make sure that the following materials have been shipped:

- 1 x AIMB-286EF Intel Core™ i7/i5/i3 LGA1151 Mini-ITX motherboard
- 1 x SATA HDD cable
- 1-to-2 serial port cable, 22 cm
- 1 x ATX power cable (2\*10P to 1\*3P), 25cm
- 1 x SATA power cable
- 1 x I/O port bracket
- 1 x startup manual
- 1 x warranty card

If any of these items are missing or damaged, contact your distributor or sales representative immediately. We have carefully inspected the AIMB-286EF mechanically and electrically before shipment. It should be free of marks and scratches and in perfect working order upon receipt. As you unpack the AIMB-286EF, check it for signs of shipping damage. (For example, damaged box, scratches, dents, etc.) If it is damaged or it fails to meet the specifications, notify our service department or your local sales representative immediately. Also notify the carrier. Retain the shipping carton and packing material for inspection by the carrier. After inspection, we will make arrangements to repair or replace the unit.



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# Chapter 1

## General Information

## 1.1 Introduction

AIMB-286EF is designed with the Intel® H310 PCH for industrial applications that require both performance computing and enhanced power management capabilities. The motherboard supports Intel desktop Core i7/i5/i3/Pentium/Celeron processors, up to 12 MB SmartCache, and 1 DDR4 2666MHz SO-DIMM, up to 32 GB. Multiple I/O connectivity of 2 x serial ports, 4 USB 3.0 + 4 USB 2.0, 3 GbE LAN, 3 SATA III, 1 NGFF (M.2\_E key) and 1 x NGFF (M.2\_B Key) connector are also supported.

## 1.2 Features

- **I/O connectivity:** 2 x serial ports, 4 x USB 3.0, 4 x USB 2.0, 3 x SATAIII, 1 M.2 B key & 1 M.2 E key, 3 GbE LAN and 1 PCIe x 16.
- **Standard mini-ITX form factor with industrial features:** The AIMB-286EF is a full-featured Mini-ITX motherboard with balanced expandability and performance.
- **Wide selection of storage devices:** SATA HDD, M.2 (B key), customers benefit from the flexibility of using the most suitable storage device for larger capacity.
- **Optimized integrated graphics solution:** With Intel® Graphics flexible, it supports versatile display options and a 32/64 bit 3D graphics engine.

## 1.3 Specifications

### 1.3.1 System

- **CPU:** LGA1151 Intel desktop Core i7/i5/i3/Pentium/Celeron processors compliant
- **BIOS:** AMI EFI 128 Mbit SPI BIOS
- **System chipset:** Intel® H310
- **SATA hard disk drive interface:**
  - Three on-board SATA connector with data transmission rate up to 600 MB
  - One M.2 B key for storage with data transmission rate up to 600 MB

### 1.3.2 Memory

- **RAM:** 1 x 260-pins SODIMM socket support DDR4 2666MHz SDRAM, up to 32GB Max.

### 1.3.3 Input/Output

- **PCI bus:** 1 x PCIe x16 slot
- **Serial ports:** Two serial ports; COM1: RS-232, COM2: RS-232/422/485 (RS-422/485 supports by BOM option)
- **Keyboard and PS/2 mouse connector:** Supports one standard PS/2 keyboard, one standard PS/2 mouse
- **USB port:** Supports four USB 3.0 port with a transmission rate of up to 5Gbps and four USB 2.0 ports with transmission rates of up to 480 Mbps.

**Note!** *USB 3.0 for USB4 is only available when M.2 B key USB 3.0 is not in use; USB 3.0 for USB4 and M.2 B key USB 3.0 cannot be used concurrently.*



- **GPIO connector:** 16-bit general purpose Input/Output

### 1.3.4 Graphics

- **Controller:** Intel® HD graphics
- **Display memory:** 512 MB maximum shared memory with 2GB and above system memory installed
- **LVDS:** Supports dual channel 24-bit up to 1920 x 1200 @ 60Hz
- **HDMI1.4:** Supports max. resolution 4096 x 2160 @ 24Hz
- **Displayport1.2:** Supports DP++ up to 4096 x 2304 @ 60Hz
- **eDP:** Supports up to resolution 4096 x 2304 @ 60Hz (eDP is colay with LVDS, and support by BOM optional)

### 1.3.5 Ethernet LAN

- Supports three 10/100/1000 Mbps Ethernet port (s) via PCI Express x1 bus which provides 500 MB/s data transmission rate
- **Controller:** LAN1/2: Realtek RTL8111H; LAN3: Intel i211AT

### 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, Depending on CPU)
- **Storage temperature:** -40 ~ 85° C (-40 ~ 185° F)
- **Humidity:** 5 ~ 95% non-condensing
- **Power supply voltage:** +12V
- **Power consumption:**  
Intel Core i7-9700E 3.2GHz, 1pcs 32GB DDR4 2666MHz SDRAM, +12V @ 11.095A  
Measure the maximum current value which system under maximum load (CPU: Top speed, RAM & Graphic: Full loading)
- **Board size:** 170 mm x 170 mm (6.69" x 6.69")
- **Board weight:** 0.365 kg

## 1.4 Jumpers and Connectors

Connectors on the AIMB-286EF motherboard link it to devices such as hard disk drives and a keyboard. In addition, the board has a number of jumpers used to configure your system for your application.

The tables below list the function of each of the board jumpers and connectors. Later sections in this chapter give instructions on setting jumpers. Chapter 2 gives instructions for connecting external devices to your motherboard.

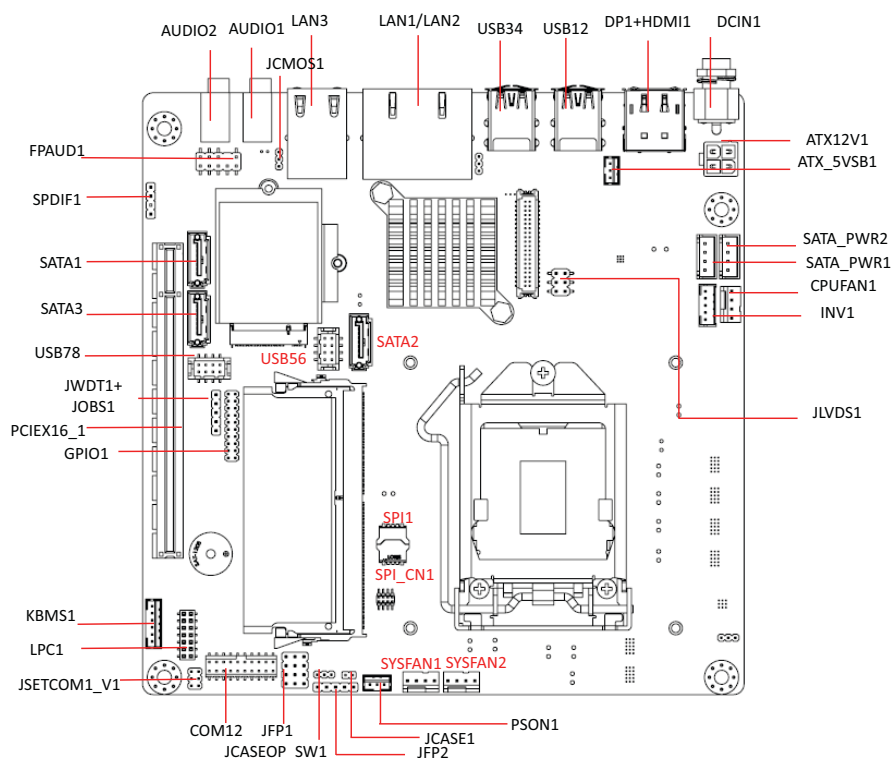
**Table 1.1: Connector and Header List**

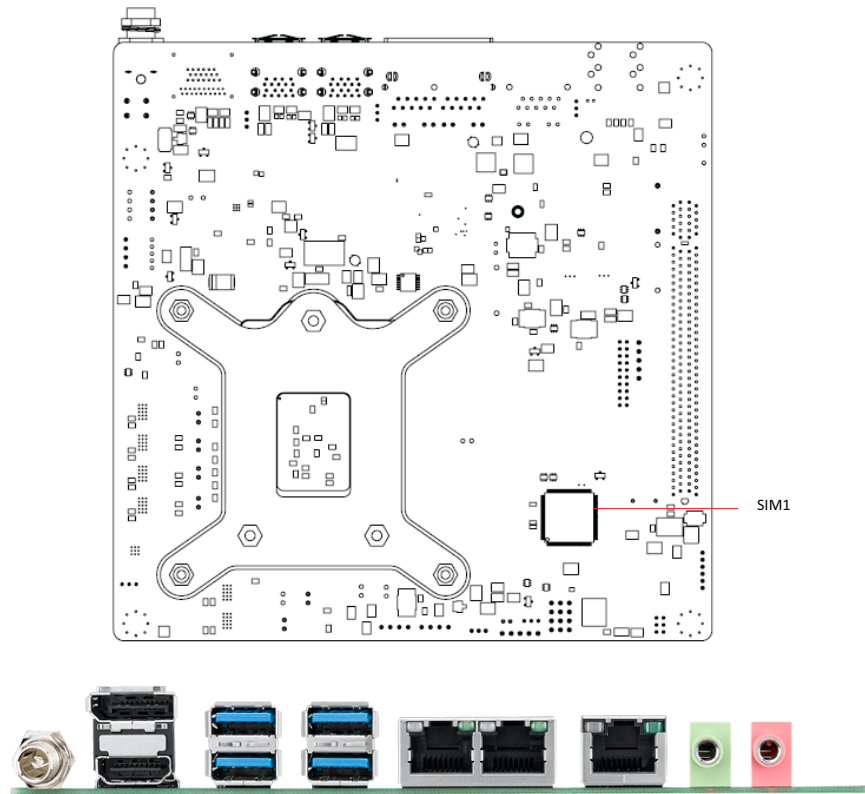
	<b>Description</b>	<b>Location Name</b>
1	DC Input Connector	DCIN1
2	Display Port	DP1
3	High Definition Multimedia Interface	HDMI1
4	ATX Power Supply (5VSB) Connector	ATX_5VSB1
5	USB 3.0 Stack Connector	USB12
6	USB 3.0 Stack Connector	USB34
7	RJ45 2 Ports	LAN12
8	Platform Controller Hub	PCH1
9	SATA Signal Connector	SATA1/2/3
10	RJ45 1 Port	LAN3
11	Battery Wafer Box	BAT1
12	HD Analog Audio Interface: Line-Out	AUDIO1
13	HD Analog Audio Interface: MIC	AUDIO2
14	Front HD Analog Audio Interface	FPAUD1
15	HD Digital Audio Interface	SPDIF1
16	PCI-E x 16 Slot	PCIEX16_1
17	NGFF M.2 E-Key Connector for 2230 Module	M2E1
18	NGFF M.2 B-Key Connector for 2242/3042 Module	M2B1
19	USB 2.0 Connector	USB56
20	USB 2.0 Connector	USB78
21	General Purpose I/O Pin Header	GPIO1
22	DDR4 SO-DIMM Socket	DIMMA1
23	PS/2 Keyboard and Mouse Connector	KBMS1
24	Low Pin Count Header	LPC1
25	COM 2 Port	COM12
26	Power LED and Keyboard Lock Pin Header	JFP2
27	Case-Open Detect Connector	JCASE1
28	SPI Programming Pin Header	SPI_CN1
29	SPI BIOS Flash Socket	SPI1
30	SYSTEM FAN Power Connector	SYSFAN1
31	SYSTEM FAN Power Connector	SYSFAN2
32	TI's SMBUS Programming for +Vcore/+VCCGT Controller	JSMB1
33	LGA1151 CPU Socket H4	CPU1
34	CPU FAN Power Connector	CPUFAN1
35	SATA Power Connector	SATA_PWR1/SATA_P-WR2
36	ATX 12V Power Supply Connector	ATX12V1
37	SIM Card Connector	SIM1
38	Buzzer	SP1
39	CPU Back Plate	CPU0_BACKPLATE1

**Table 1.2: Jumper List**

	Description	Location Name
1	LVDS VESA, JEIDA Format Selection Pin Header	JLVDS_VCON1
2	CMOS Clear Jumper	JCMOS1
3	Watchdog Timer Output and OBS Beep	JWDT1+JOBS1
4	COM1 RI# pin RI#/5V/12V Select	JSETCOM1_V1
5	Power Switch/HDD LED/SMBUS/Speaker Pin Header	JFP1
6	Case Open Selection Pin Header	JCASEOP_SW1
7	ATX/AT Mode Selection	PSON1
8	eDP/LVDS Panel Voltage Selection	JLVDS1

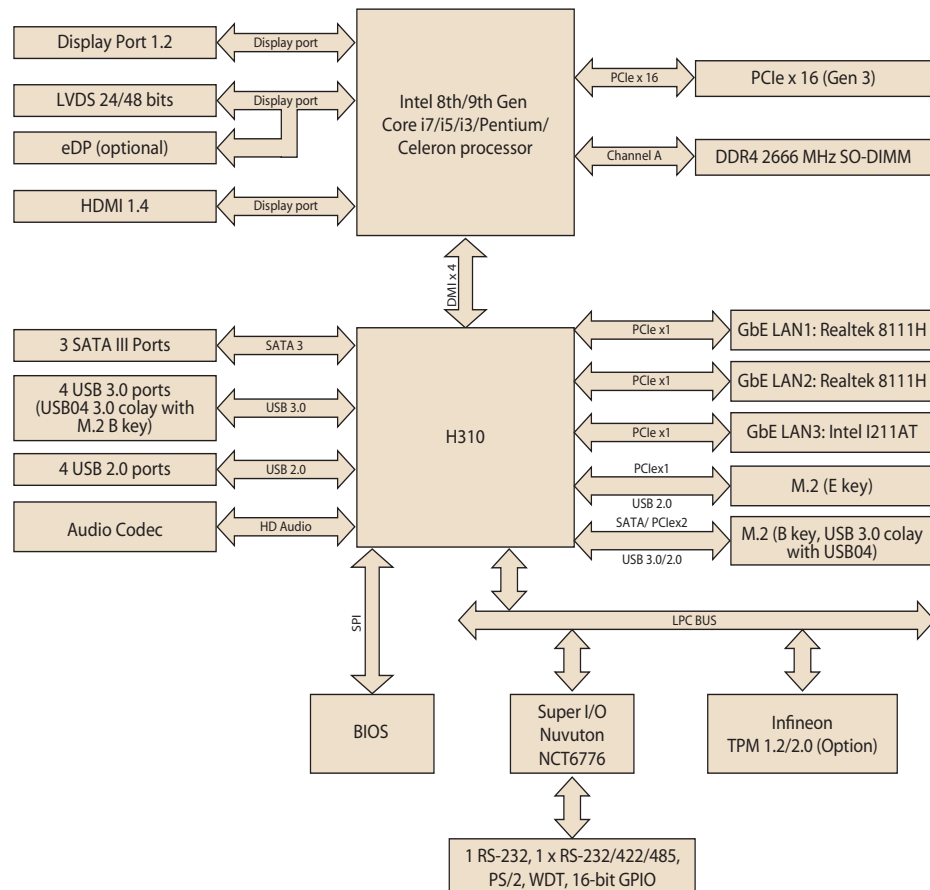
## 1.5 Board Layout: Jumper and Connector Locations

**Figure 1.1 Jumper and Connector Locations**



**Figure 1.2 I/O Connectors**

## 1.6 AIMB-286EF Board Diagram



**Figure 1.3 AIMB-286EF Board Diagram**

## 1.7 Safety Precautions

**Warning!** Always completely disconnect the power cord from chassis whenever you work with the hardware. Do not make connections 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 electrostatic 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 they are not in the chassis.



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



**Caution!** There is a danger of a new battery exploding if it is 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 Settings

This section provides instructions on how to configure your motherboard by setting the jumpers. It also includes the motherboards's default settings and your options for each jumper.

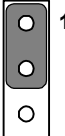
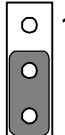
### 1.8.1 How to Set Jumpers

You can configure your motherboard to match the needs of your application by setting the jumpers. A jumper is a metal bridge that closes an electrical circuit. It consists 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, you connect the pins with the clip. To “open” (or turn OFF) a jumper, you remove the clip. Sometimes a jumper consists of a set of three pins, labeled 1, 2, and 3. In this case you connect either pins 1 and 2, or 2 and 3. A pair of needle-nose pliers may be useful when setting jumpers.

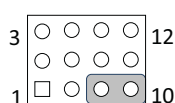
### 1.8.2 CMOS Clear (JCMOS1)

The AIMB-286EF motherboard contains a jumper that can erase CMOS data and reset the system BIOS information. Normally this jumper should be set with pins 1-2 closed. If you want to reset the CMOS data, set CMOS1 to 2-3 closed for just a few seconds, and then move the jumper back to 1-2 closed. This procedure will reset the CMOS to its default setting.

**Table 1.3: CMOS1**

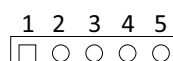
Function	Jumper Settings	
Keep CMOS data (Default)		1-2 closed
Clear CMOS data		2-3 closed

### 1.8.3 Power Switch/HDD LED/SMBUS/Speaker Pin Header (JFP1)

**Table 1.4: Power Switch/HDD LED/SMBUS/Speaker Pin Header (JFP1)**

Pin	Signal	Pin	Signal
1	+5V	2	HDDLED+
3	Power Button+	4	NC
5	HDDLED-	6	Power Button-
7	SPK_P3	8	SMB_DATA
9	System Reset+	10	SPK_P4
11	SMB_CLK	12	System Reset-

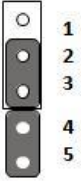
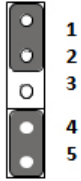
### 1.8.4 Power LED and Keyboard Lock Pin Header (JFP2)

**Table 1.5: Power LED and Keyboard Lock Pin Header (JFP2)**

Pin	Signal
1	LED Power
2	NC
3	GND
4	Keyboard LOCK#
5	GND



### 1.8.5 Watchdog Timer Output and OBS Beep (JWDT1+JOBS1)

**Table 1.6: Watchdog Timer Output and OBS Beep (JWDT1+JOBS1)**

Function	Jumper Setting
Watchdog Timer Output(2-3) (Default) OBS BEEP(4-5) (Default)	 (2 and 3)+(4 and 5)
Watchdog Timer Disable (1-2) OBS BEEP(4-5) (Default)	 (1 and 2)+(4 and 5)


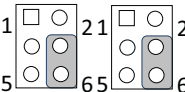

### 1.8.6 ATX/AT Mode Selection (PSON1)

**Table 1.7: ATX/AT Mode Selection (PSON1)**

Function	Jumper Setting
AT Mode	 1-2 closed
ATX Mode (Default)	 2-3 closed

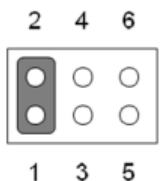
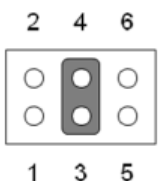
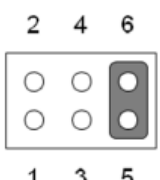
### 1.8.7 LVDS/eDP Panel Voltage Selection (JLVDS1)

**Table 1.8: LVDS/eDP Panel Voltage Selection (JLVDS1)**

Function	Jumper Setting
Jumper position for 5V	 JLVDS1 (2-4)
Jumper position for 3.3V (Default)	 JLVDS1 (4-6)
Jumper position for 12V	 JLVDS1 (3-4)

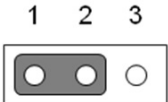
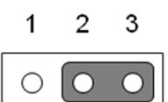
### 1.8.8 COM1 RI# Pin RI#/5V/12V Select (JSETCOM1\_V1)

**Table 1.9: COM1 RI# Pin RI#/5V/12V Select (JSETCOM1\_V1)**

Function	Jumper Setting
Jumper position for RI#(Default)	 <p>1 and 2</p>
Jumper position for 5V	 <p>3 and 4</p>
Jumper position for 12V	 <p>5 and 6</p>

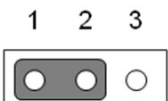

### 1.8.9 JCASEOP\_SW1: Case Open Selection Pin Header

**Table 1.10: JCASEOP\_SW1: Case Open Selection Pin Header**

Function	Jumper Setting
Normal Open	
Normal Close (Default)	

### 1.8.10 JLVDS\_VCON1: LVDS VESA, JEIDA Format Selection Pin Header

**Table 1.11: JLVDS\_VCON1: LVDS VESA, JEIDA Format Selection Pin Header**

Function	Jumper Setting
JEIDA mode (HI=+3.3V)	
VESA mode (Low=0V) (Default)	

## 1.9 System Memory

AIMB-286EF has one socket for a 260 pins DDR4 SO-DIMM. This socket uses a 1.2 V unbuffered double data rate synchronous DRAM (DDR SDRAM). DRAM is available in capacities of 4GB, 8GB, 16GB and 32GB. The socket can be filled in SODIMM of any size, giving a total memory size between 4GB, 8GB, 16GB, and up to max 32GB. AIMB-286EF does NOT support error checking and correction (ECC).

## 1.10 Memory Installation Procedures

To install SODIMM, first make sure the two handles of the SODIMM socket are in the “open” position, i.e., the handles lean outward. Slowly slide the SODIMM module along the plastic guides on both ends of the socket. Then firmly but gently (avoid pushing down too hard) press the SODIMM module well down into the socket, until you hear a click when the two handles have automatically locked the memory module into the correct position of the SODIMM socket. To remove the memory module, just push both handles outward, and the memory module will be ejected by the mechanism.

## 1.11 Cache Memory

The AIMB-286EF supports a CPU with one of the following built-in full speed last level caches:

12MB for Intel Core i7-8700/ i7-8700T/ i7-9700E/ i7-9700TE

9MB for Intel Core i5-8500/ i5-8500T/ i5-9500E/ i5-9500TE

6MB for Intel Core i3-8100/ i3-8100T/ i3-9100E/ i3-9100TE

4MB for Pentium G5400/ G5400T

2MB for Celeron G4900/ G4900T

The built-in second-level cache in the processor yields much higher performance than conventional external cache memories.

## 1.12 Processor Installation

The AIMB-286EF is designed to supported Intel 9th & 8th Gen LGA1151, Core i7/ Core i5/Core i3, Pentium, and Celeron processor



# Chapter 2

Connecting  
Peripherals

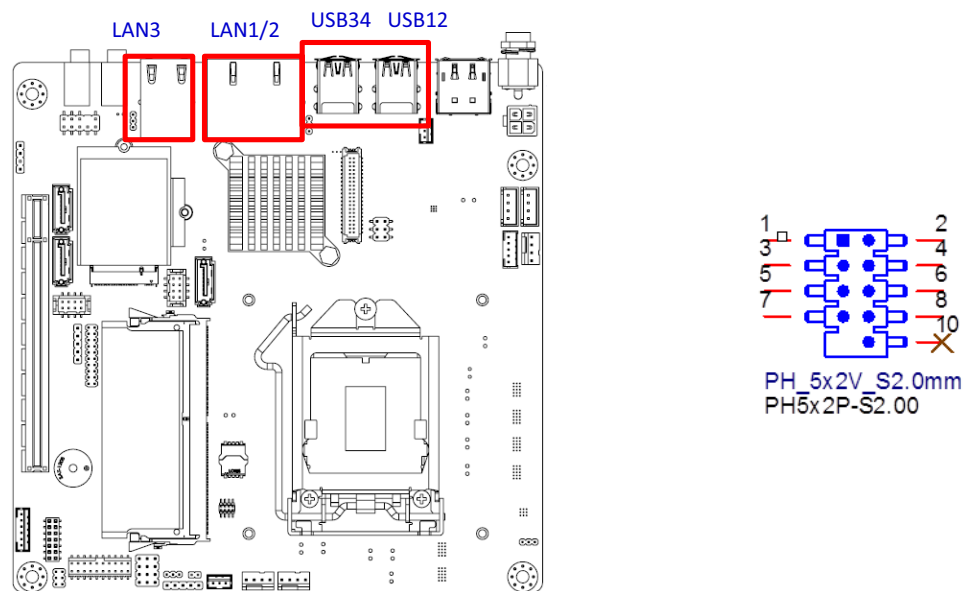
## 2.1 Introduction

You can access most of the connectors from the top of the board as it is being installed in the chassis. If you have a number of cards installed or have a packed chassis, you may need to partially remove the card to make all the connections.

## 2.2 LAN + USB Ports (LAN1/2/3, USB12, USB34)

The AIMB-286EF provides up to 8 USB ports. There are 4 x USB 3.0 on the rear side and 4 x USB 2.0 pin header on the board. The USB interface complies with the USB specification revision 2.0 that supports transmission rates of up to 480 Mbps, revision 3.0 that supports transmission rates of up to 5 Gbps, and is also fuse protected. Furthermore, the USB interface can be disabled in the system BIOS setup menu.

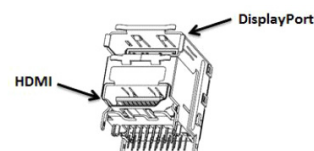
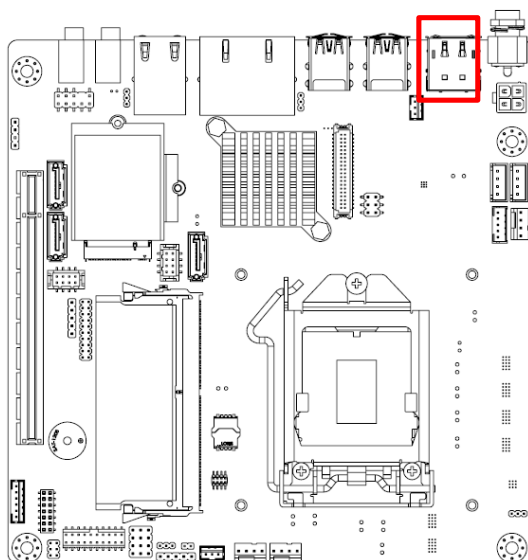
The AIMB-286EF is equipped with three high-performance 1000 Mbps Ethernet LAN adapter, which are supported by all major network operating systems. The RJ-45 jacks on the rear panel provides for convenient LAN connection.



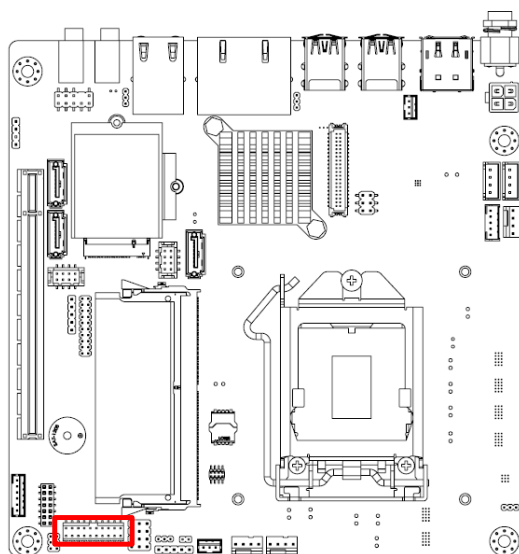
**Table 2.1: LAN LED Indicator**

LAN Mode	LAN Indicator	
LAN1/LAN2/LAN3 indicator	LED1 (Right)	Off for mal-link; Link (On) / Active (Flash)
	LED2 (Left)	100 Mbps (On) / 10 Mbps (Off); Color: Orange (10/100 Mbps)
	LED2 (Left)	1000 Mbps (On); Color: Green (1000 Mbps)

## 2.3 DP + HDMI Connector (DP1 + HDMI1)

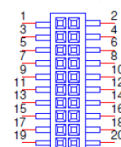


## 2.4 Serial Ports (COM1~COM2)



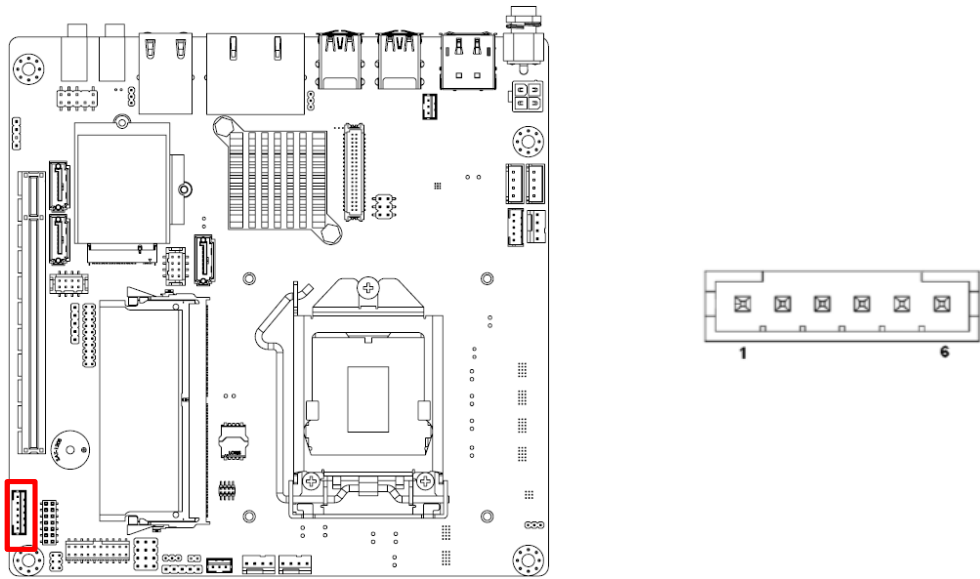
COM1/2

COM1/2



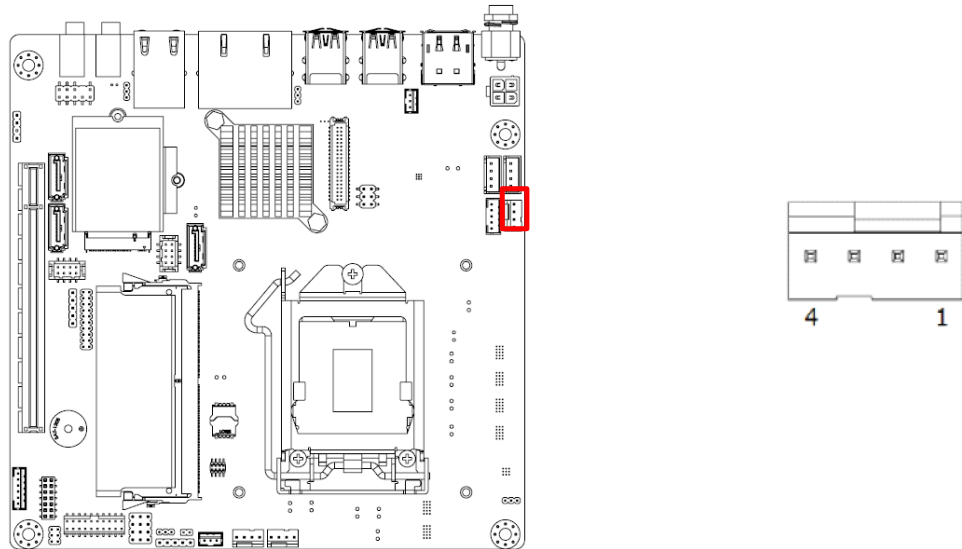
AIMB-286EF supports two serial ports, COM1 supports RS-232 function, COM2 supports RS-232/422/485 function (RS422/485 support via optional BOM). These ports can connect to serial devices, such as a mouse or a printer, or to a communications network. The IRQ and address ranges for these ports are fixed. However, if you want to disable the port or change these parameters later, you can do this in the system BIOS setup. Different devices implement the RS-232 standards in different ways. If you have problems with a serial device, be sure to check the pin assignments for the connector.

## 2.5 PS/2 Keyboard and Mouse Connector (KBMS1)



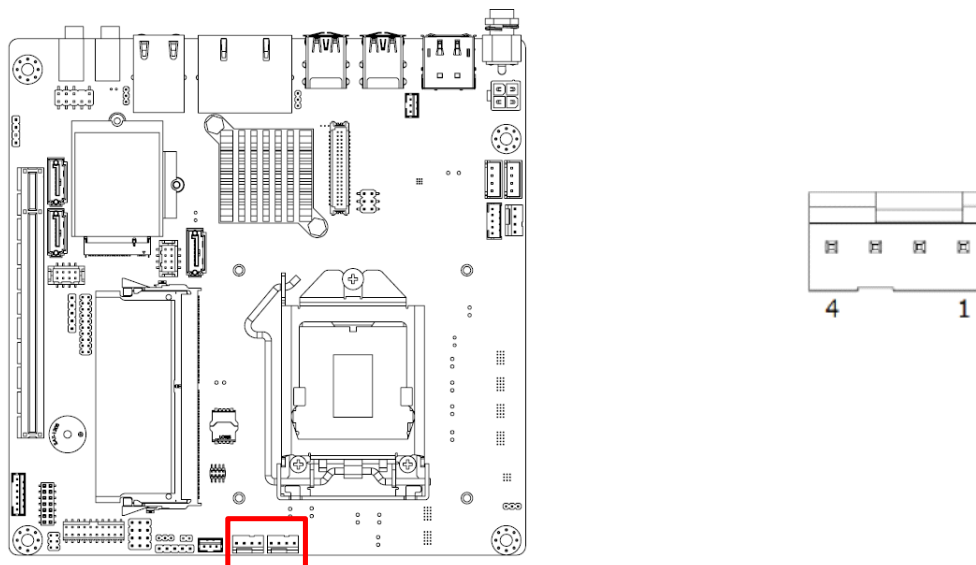
On board 6-pin wafer box connector, supports one standard PS/2 keyboard, one standard PS/2 mouse.

## 2.6 CPU Fan Connector (CPU\_FAN1)



If a fan is used, this connector supports cooling fans of 500 mA (6 W) or less.

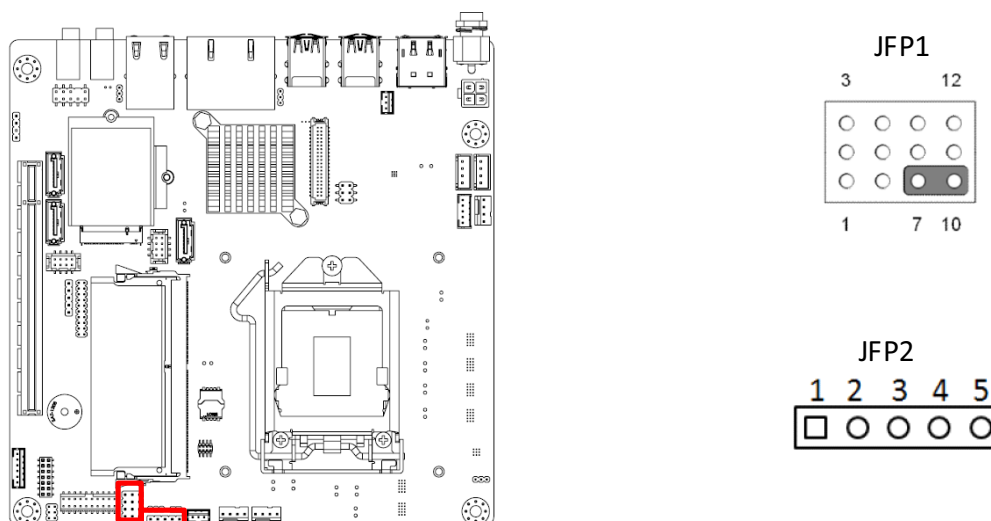
## 2.7 System FAN Connector (SYSFAN1/2)



If a fan is used, this connector supports cooling fans of 500 mA (6 W) or less.

## 2.8 Power Switch/HDD LED/SMBUS/Speaker Pin Header (JFP1) & Power LED and Keyboard Lock Pin Header (JFP2)

There are several headers for monitoring and controlling the AIMB-286EF.



### 2.8.1 ATX Soft Power Switch (JFP1/PWR\_SW)

If your computer case is equipped with an ATX power supply, you should connect the power on/off button on your computer case to (JFP1/ PWR\_SW), for convenient power on and off.

### 2.8.2 Reset (JFP1/RESET)

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

### 2.8.3 HDD LED (JFP1/HDDLED)

You can connect an LED to connector (JFP1/HDDLED) to indicate when the HDD is active.

### 2.8.4 External Speaker (JFP1/SPEAKER)

JFP1/SPEAKER is a 4-pin connector for an external speaker. If there is no external speaker, the AIMB-286EF provides an onboard buzzer as an alternative. To enable the buzzer, set pins 7 & 10 as closed.

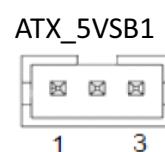
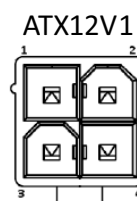
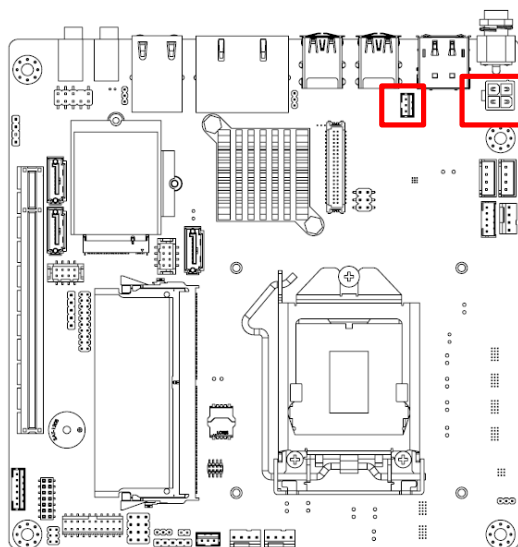
### 2.8.5 Power LED and Keyboard Lock Connector (JFP2/PWR\_LED & KEY LOCK)

(JFP2/PWR\_LED & KEY LOCK) is a 5-pin connector for the power on LED and Key Lock function. Refer to Appendix B for detailed information on the pin assignments. The Power LED cable should be connected to pin 1-3. The key lock button cable should be connected to pin 4-5. There are 3 modes for the power supply connection. The first is "ATX power mode"; the system turns on/off by a momentary power button. The second is "AT Power Mode"; the system turns on/off via the power supply switch. The third is another "AT Power Mode" which makes use of the front panel power switch. The power LED status is indicated in the following table:

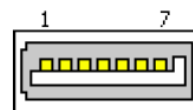
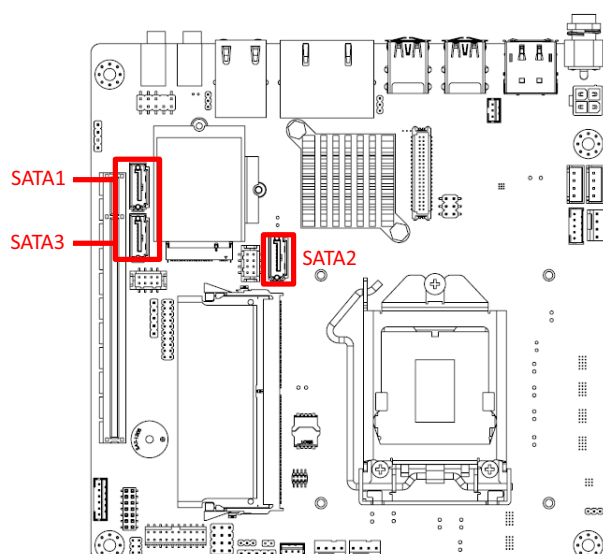
**Table 2.2: ATX Power Supply LED Status (No Support for AT Power)**

Power Mode	LED (ATX Power Mode) (On/off by momentary button)	LED (AT power Mode) (On/off by switching power supply)	LED (AT power Mode) (On/off by front panel switch)
PSON1 (on back plane) jumper setting	pins 2-3 closed	pins 1-2 closed	Connect pins 1 & 2 to panel switch via cable
System On	On	On	On
System Off	Off ( Windows 7) Slow Flashes (Window 8)	Off	Off
System Suspend (S3)	Fast Flashes	NA	NA
System Suspend (S4)	Slow Flashes	NA	NA

## 2.9 ATX 12V Power Supply Connector (ATX12V1) & ATX Power Supply Connector (ATX\_5VSB1)

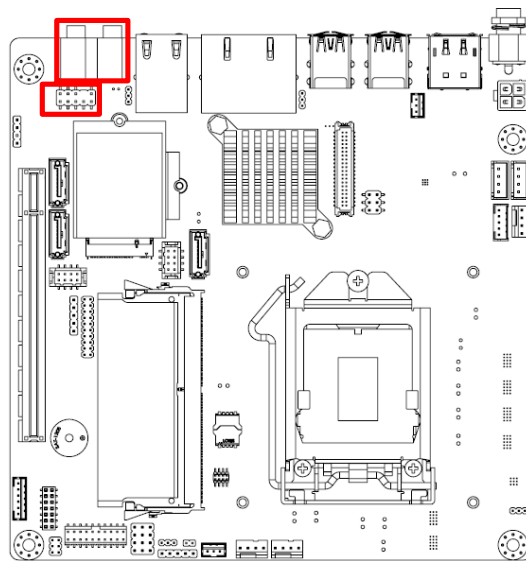


## 2.10 SATA Signal Connector (SATA1/2/3)

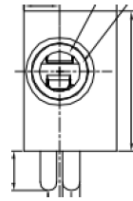


AIMB-286EF features a high performance Serial ATA III interface (up to 600 MB/s) which eases hard drive cabling with thin, space-saving cables.

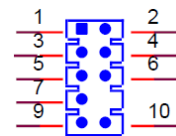
## 2.11 HD Analog Audio Interface (AUDIO1/2, FPAUD1)



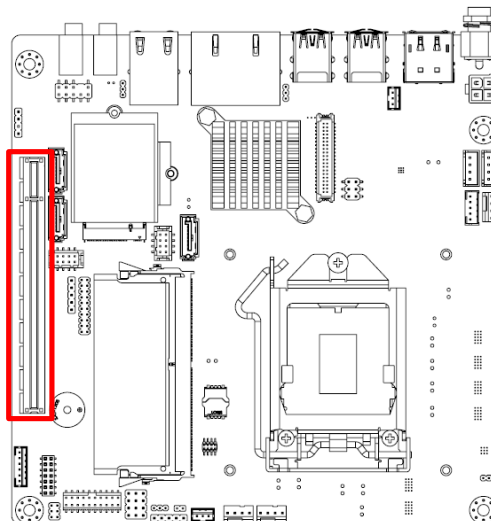
AUDIO1/2



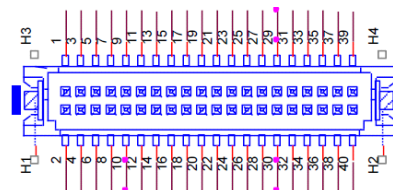
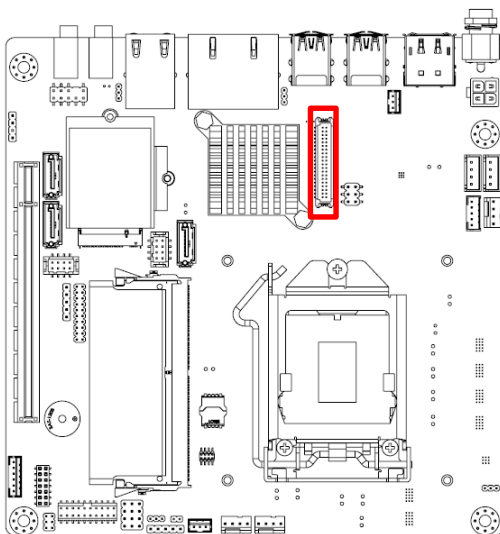
FPAUD1



## 2.12 PCI-E X16 Slot (PCIEX16\_1)

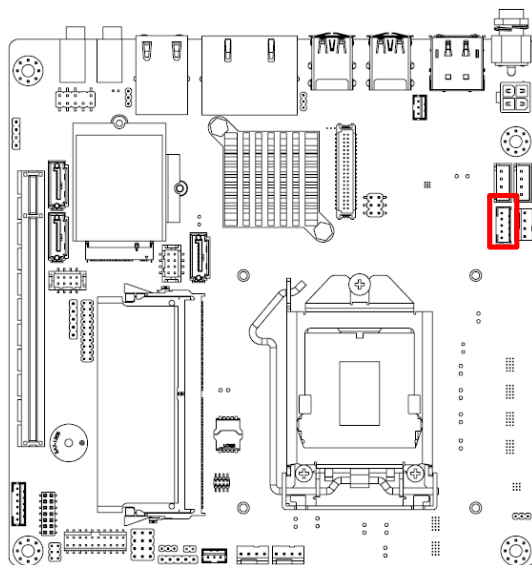


## 2.13 eDP/LVDS Panel Connector (LVDS\_EDP1)(eDP support by BOM optional)



**LVDS1**  
Pin 3: GND  
Panel connected

## 2.14 LVDS/eDP Backlight Inverter Power Connector (INV1)



### Note!



#### ■ Signal Description

##### Signal

VR

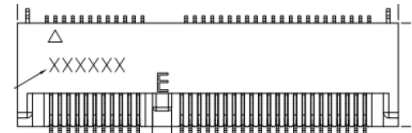
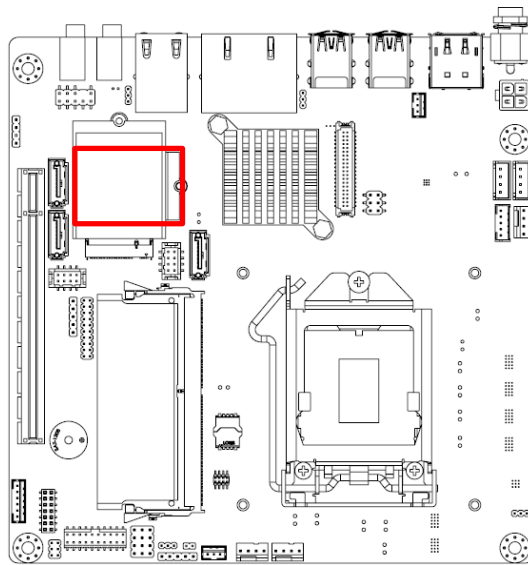
ENBKL

##### Signal Description

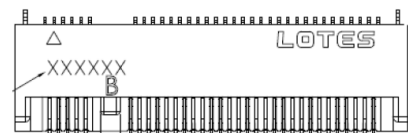
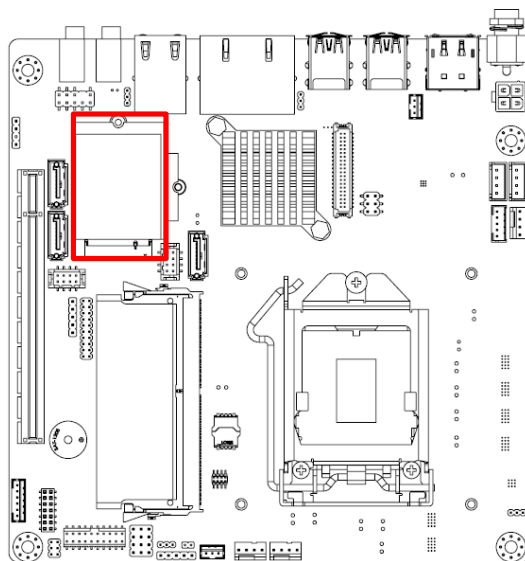
Vadj=0.75 V (Recommended: 4.7 K $\Omega$ , >1/16 W)

LCD backlight ON/OFF control signal)

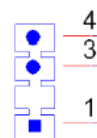
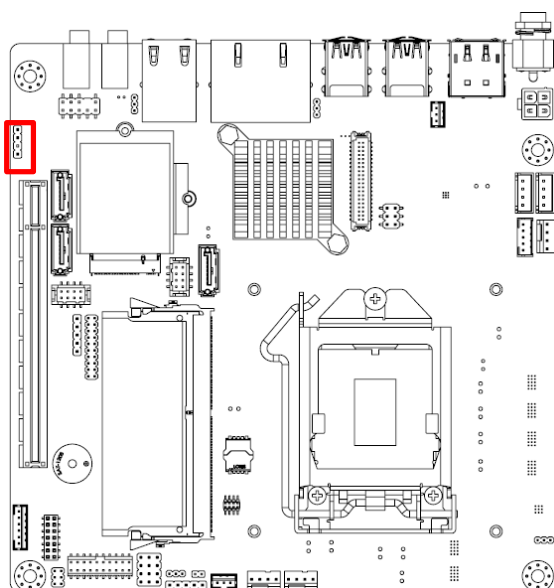
## 2.15 NGFF M.2 E-Key Connector for 2230 Module (M2E1)



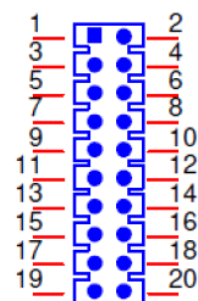
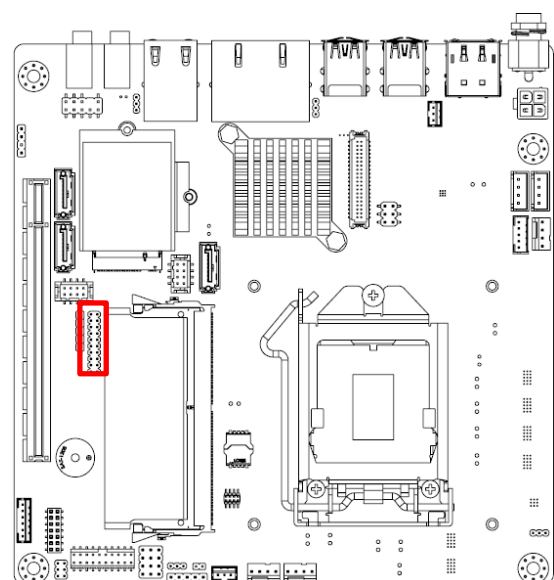
## 2.16 NGFF M.2 B-Key Connector for 2242/3042 Module (M2B1)



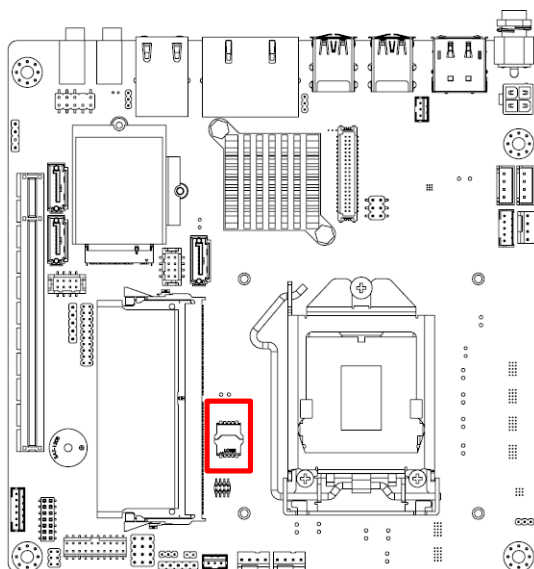
## 2.17 HD Digital Audio Interface (SPDIF1)



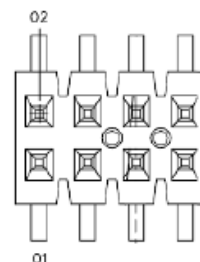
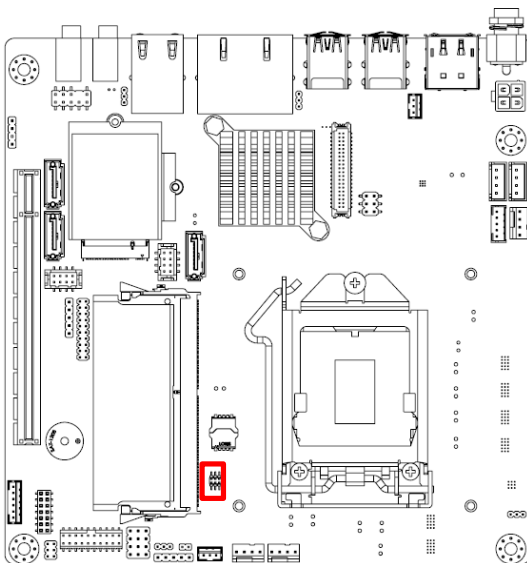
## 2.18 General Purpose I/O Pin Header (GPIO1)



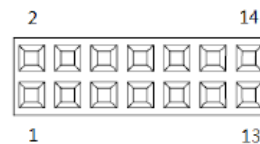
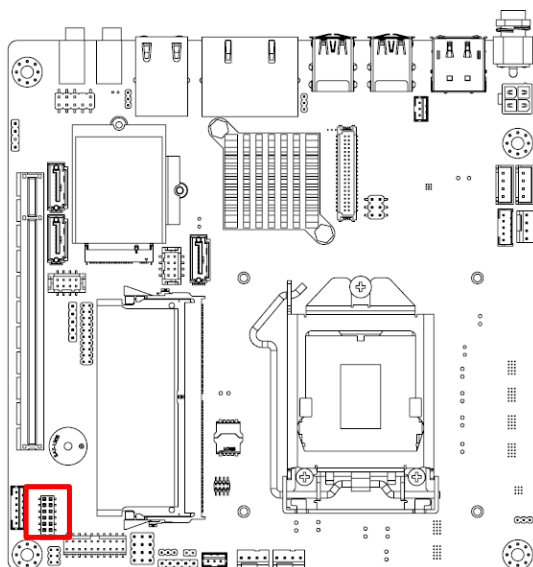
## 2.19 SPI BIOS Flash Socket (SPI1)



## 2.20 SPI Programming Pin Header (SPI\_CN1)

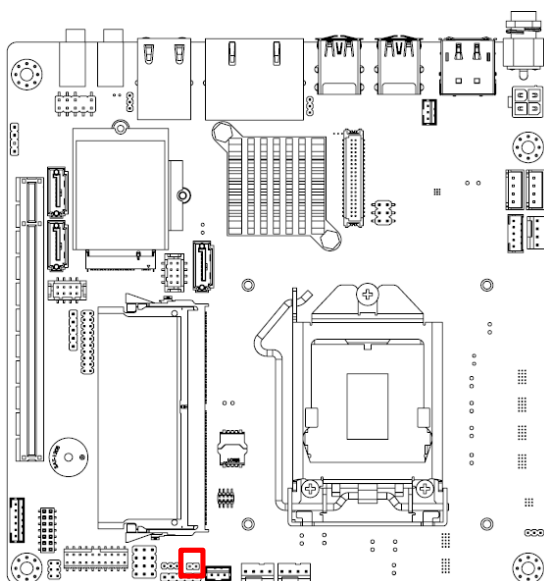


## 2.21 Low Pin Count Header (LPC1)

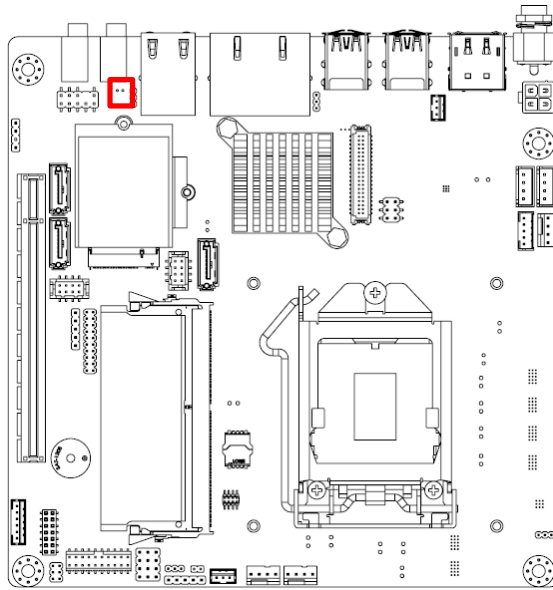


## 2.22 Case-Open Detect Connector (JCASE1)

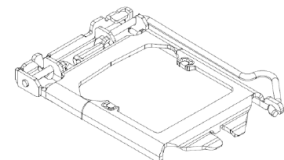
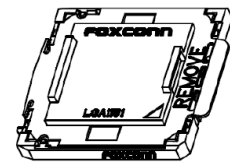
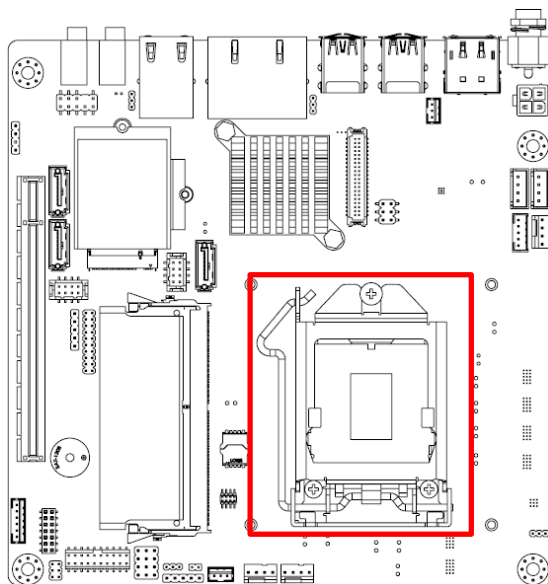
The SPI flash card pin header may be used to flash BIOS if the AIMB-286EF cannot power on.



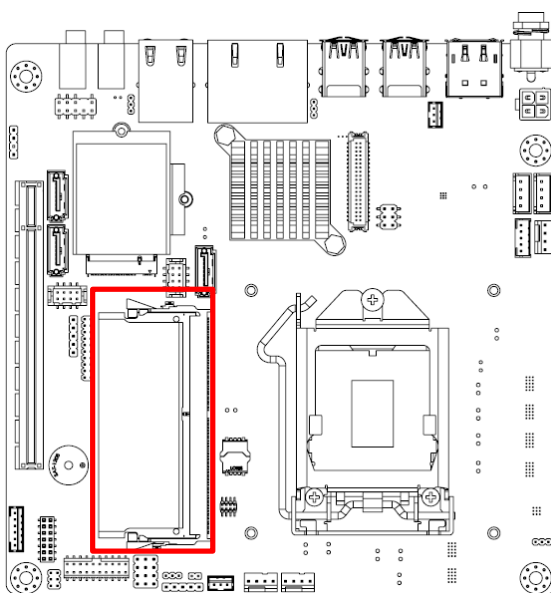
## 2.23 Battery Wafer Box (BAT1)



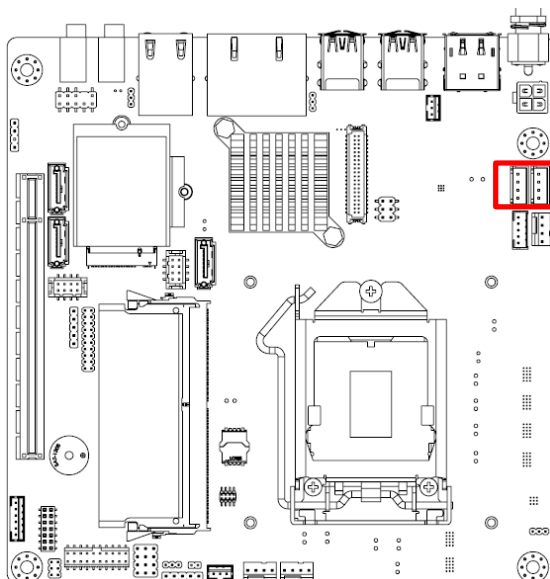
## 2.24 CPU Socket (CPU1)



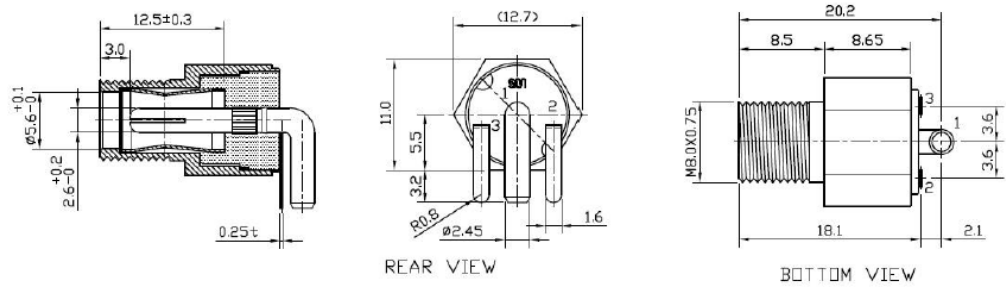
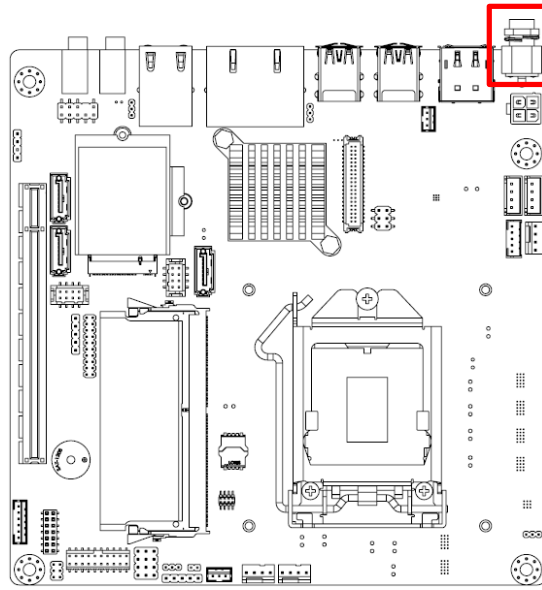
## 2.25 DDR4 SO-DIMM Socket (DIMMA1)



## 2.26 SATA Power Connector (SATA\_PWR1/2)



## 2.27 DC Input Connector (DCIN1)



# Chapter 3

## BIOS Operation

## 3.1 Introduction

With the AMI BIOS Setup program, you can modify BIOS settings and control the special features of your computer. The Setup program uses a number of menus for making changes and turning special features on or off. This chapter describes the basic navigation of the AIMB-286EF setup screens.

## 3.2 BIOS Setup

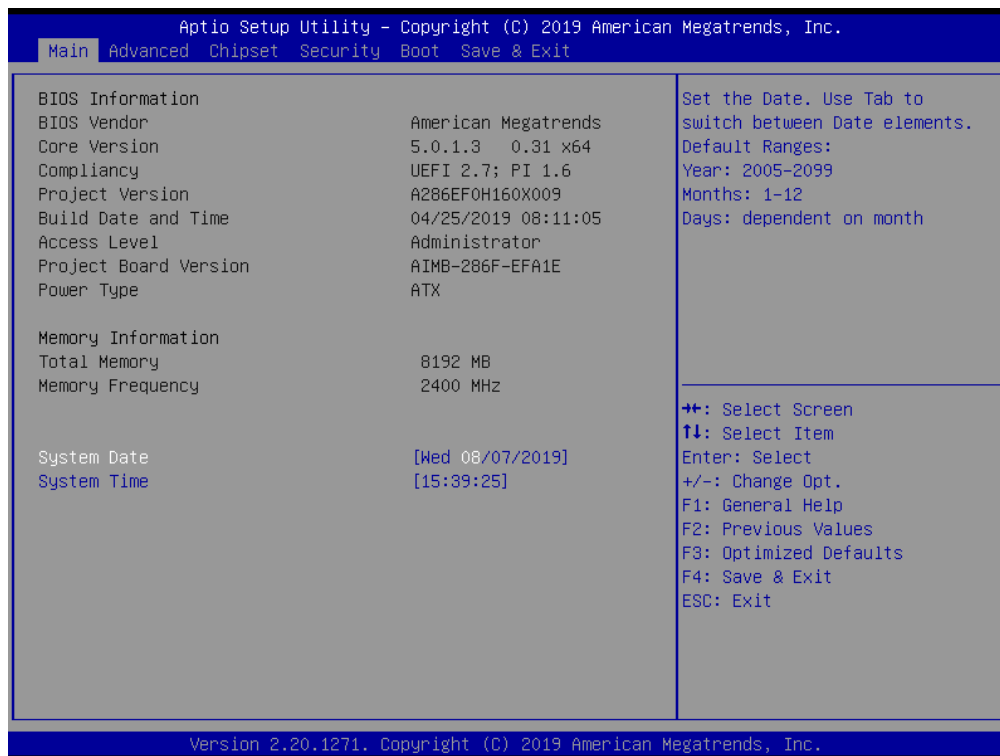
The AIMB-286EF Series system has AMI BIOS built in, with a CMOS SETUP utility that allows users to configure required settings or to activate certain system features. The CMOS SETUP saves the configuration in the CMOS RAM of the motherboard. When the power is turned off, the battery on the board supplies the necessary power to preserve the CMOS RAM.

When the power is turned on, press the <Del> button during the BIOS POST (Power-On Self Test) to access the CMOS SETUP screen.

Control Keys	
< ↑ >< ↓ >< ← >< → >	Move to select item
<Enter>	Select item
<Esc>	Main Menu - Quit and not save changes into CMOS Sub Menu - Exit current page and return to 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 AMI BIOS CMOS Setup Utility, the Main Menu will appear on the screen. Use arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.



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.

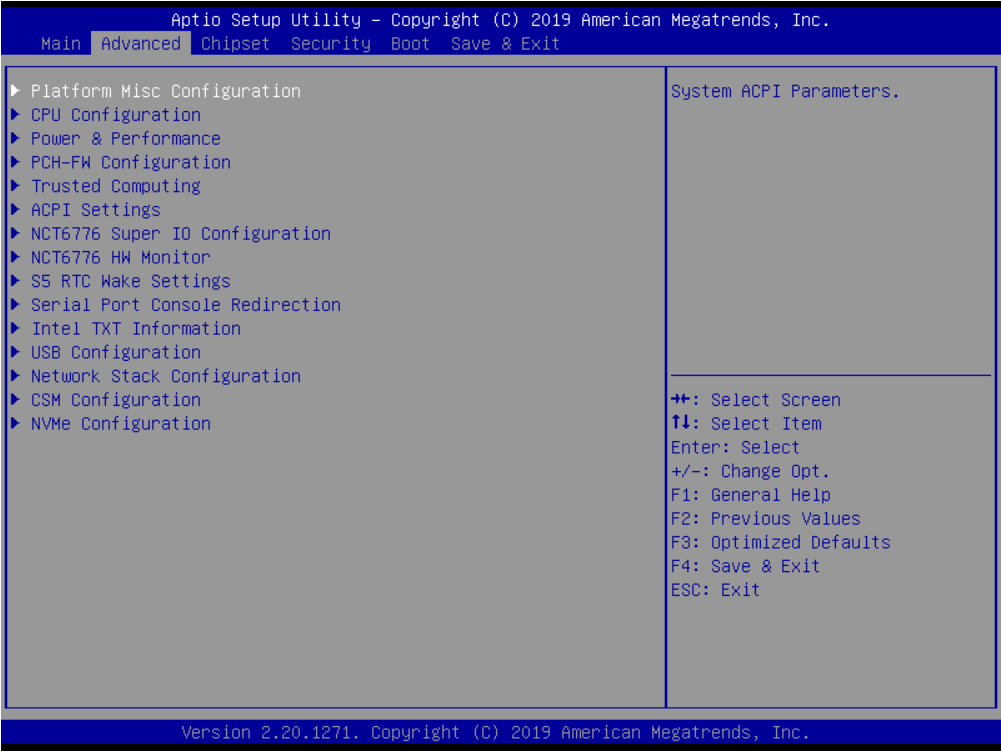
#### ■ System time / System date

Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard.

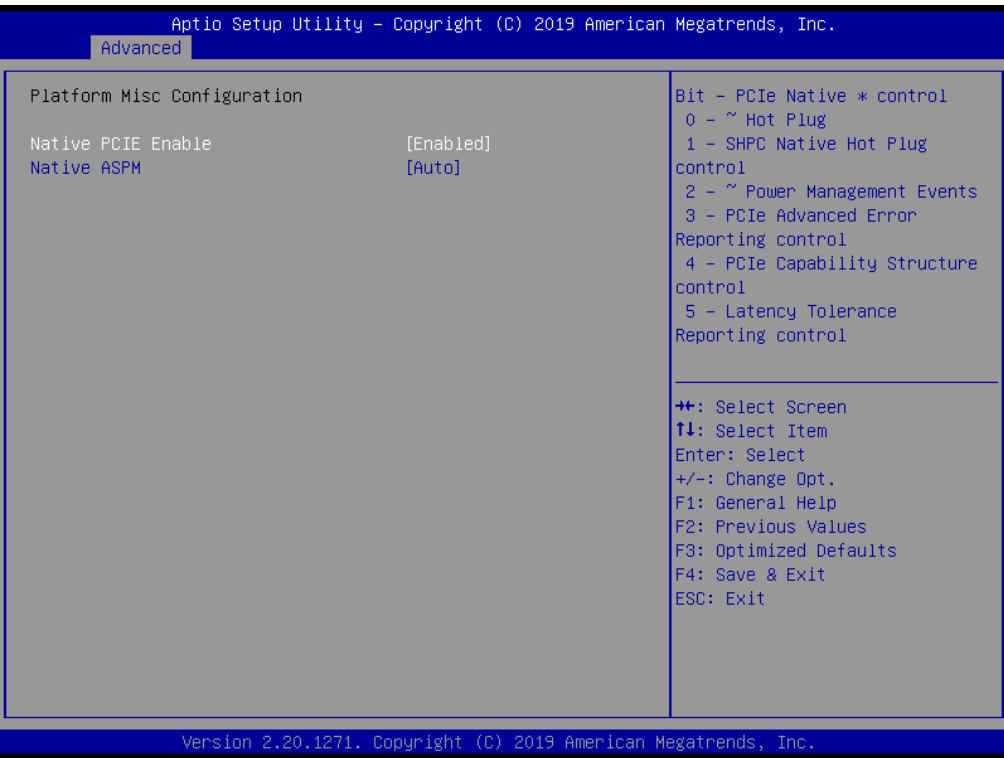
Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time must be entered in HH:MM:SS format.

### 3.2.2 Advanced BIOS Features

Select the Advanced tab from the AIMB-286EF setup screen to enter the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen, such as CPU Configuration, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screen is shown below. The sub menus are described on the following pages.

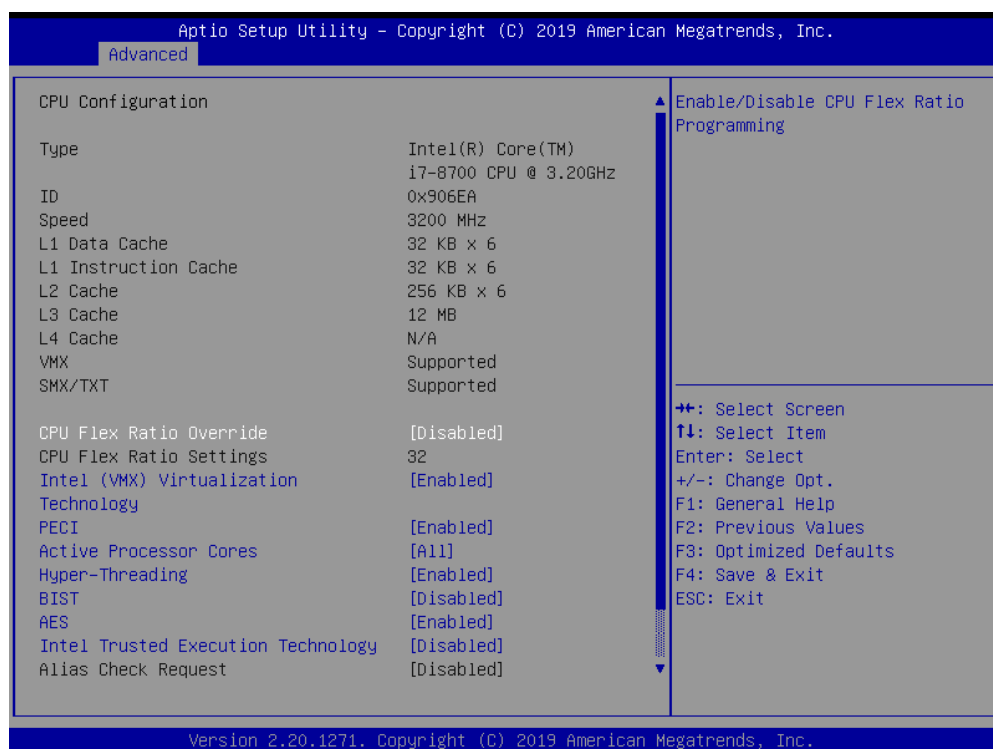
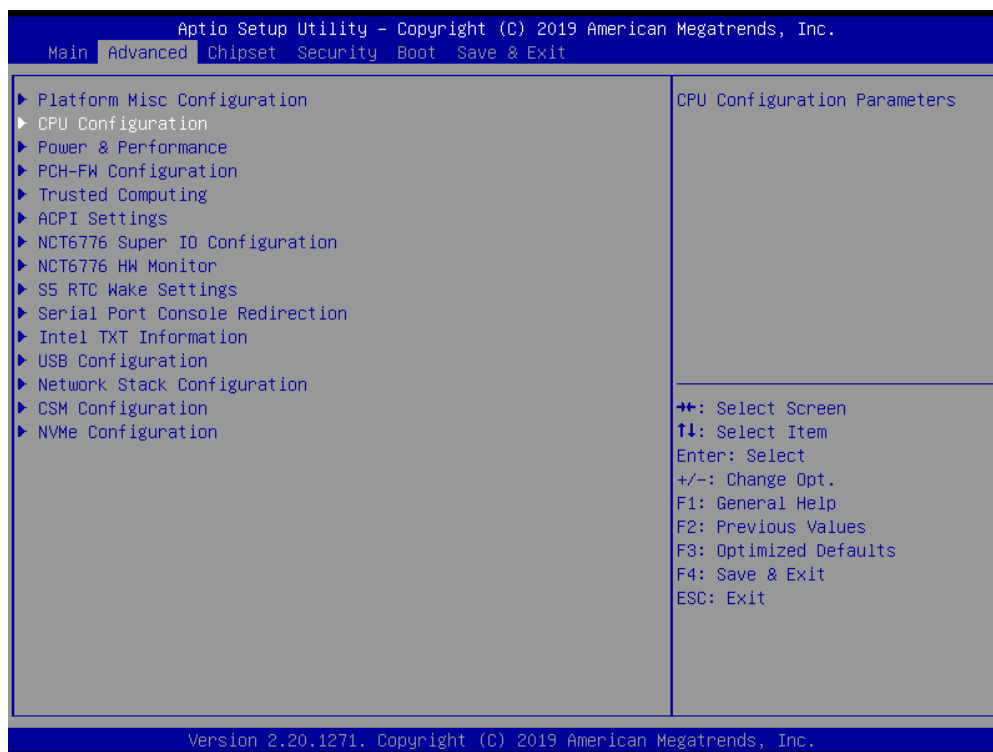


#### 3.2.2.1 Platform Misc Configuration



- **Native PCIE Enable**[Enabled]
- **Native ASPM** [Auto]

### 3.2.2.2 CPU Configuration



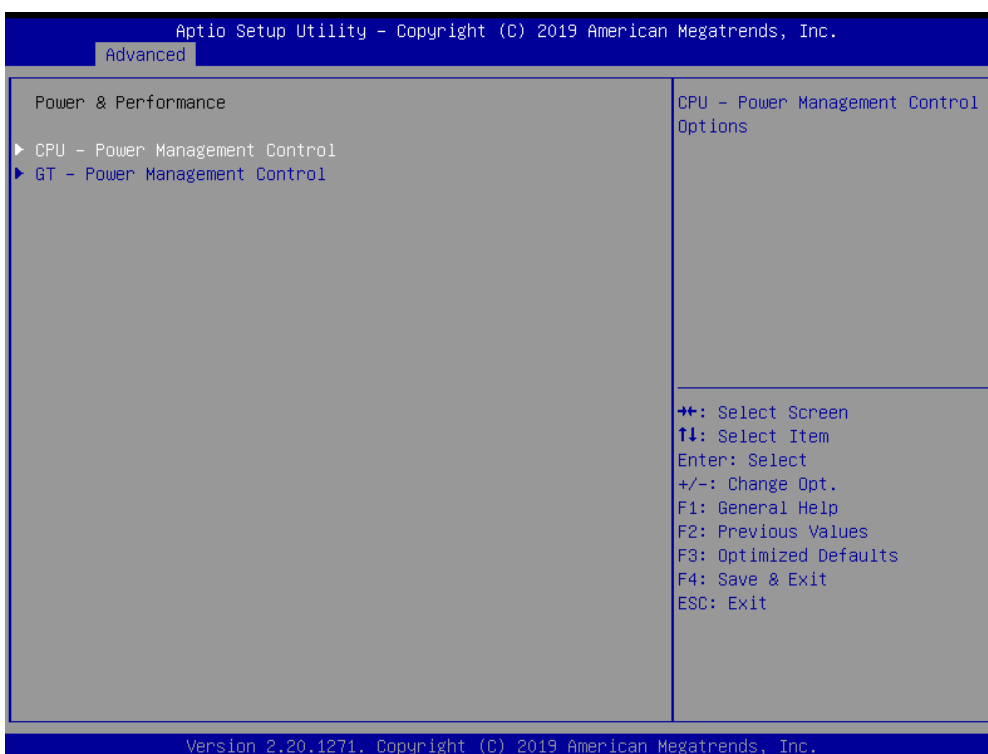
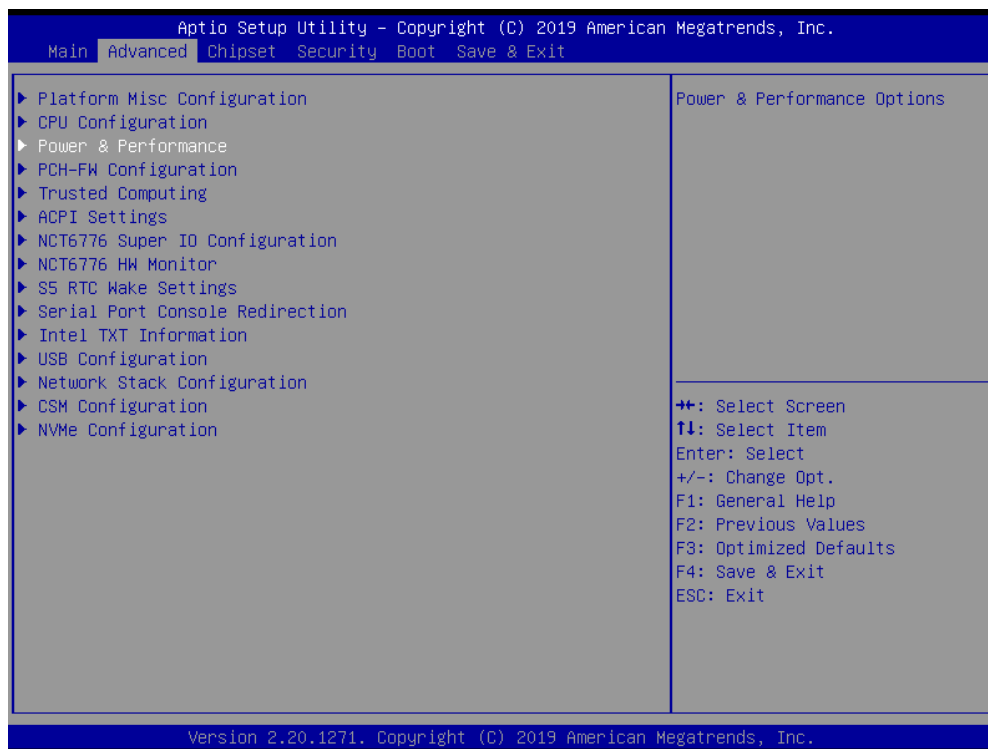
- CPU Flex Ratio Override [Disabled]
- Intel (VMX) Virtualization [Enabled]
- PECI [Enabled]
- Active Processor Cores [All]
- BIST [Disabled]
- AES [Enabled]
- Intel Trusted Execution Technology [Disabled]
- Alias Check Request [Disabled]

## CPU SMM Enhancement

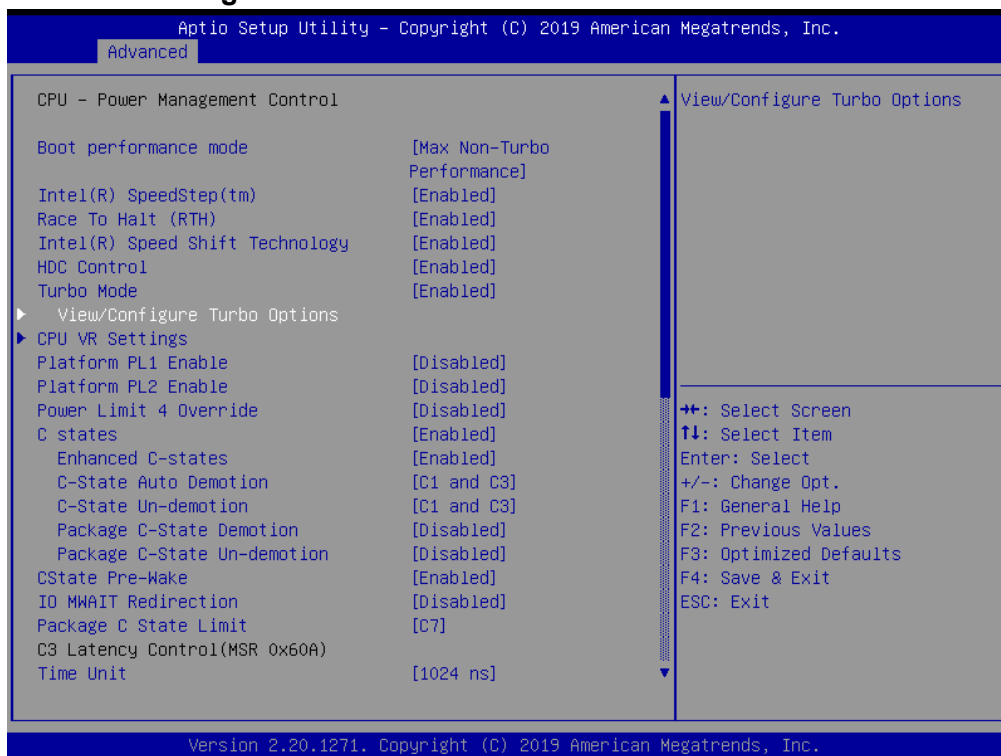


- **SMM Use Delay Indication [Enabled]**
- **SMM Use Block Indication [Enabled]**

### 3.2.2.3 Power & Performance



## CPU - Power Management Control



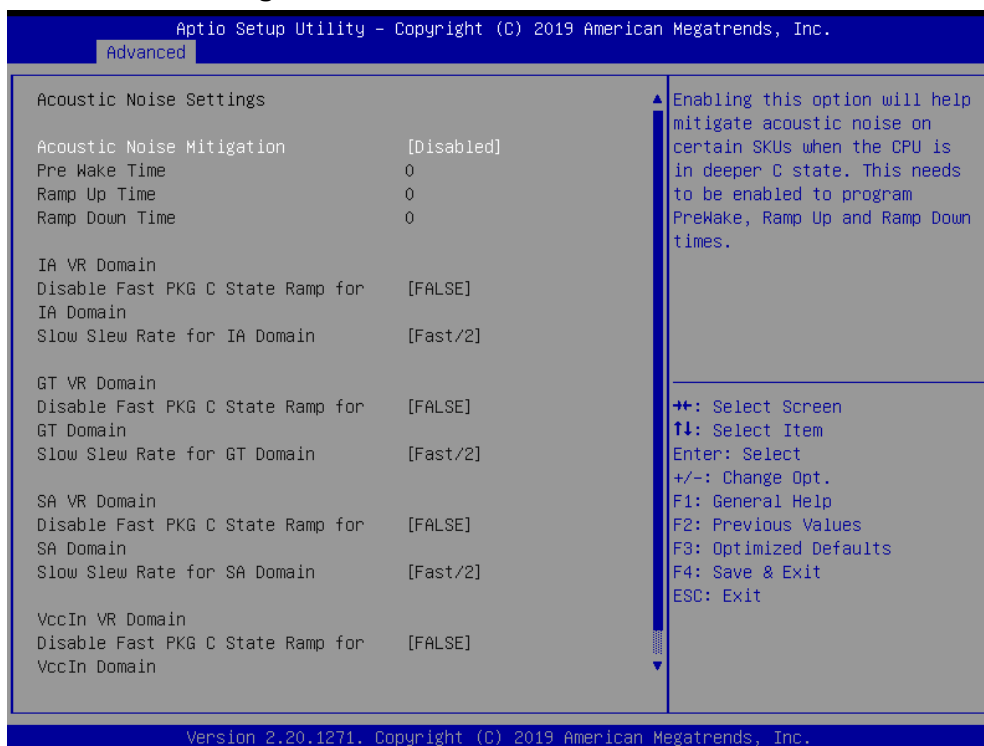
- Boot Performance Mode [Max Non-Turbo Performance]
- Intel® SpeedStep™ [Enabled]
- Race To Halt (RTH) [Enabled]
- Intel®Speed Shift Technology [Enabled]
- HDC Control [Enabled]
- Turbo Mode [Enabled]
- Platform PL1 Enable [Disabled]
- Platform PL2 Enable [Disabled]
- Power Limit 4 Override [Disabled]
- C States [Enabled]
- Enhanced C-States [Enabled]
- C-state Auto Demotion [C1 and C3]
- C-state Un-Demotion [C1 and C3]
- Package C-State Demotion [Disabled]
- Package C-State Un-Demotion [Disabled]
- CState Pre-Wake [Enabled]
- IO MWAIT Redirection [Disabled]
- Package C-State Limit [C7]
- Time Unit [1024 ns]

## CPU VR Settings



- Intersil VR Command [Disabled]

## Acoustic Noise Settings



- Acoustic Noise Mitigation [Disabled]
- Disable Fast PKG C State Ramp for IA Domain [FALSE]
- Slow Slew Rate for IA Domain [Fast/2]
- Disable Fast PKG C State Ramp for GT Domain [FALSE]
- Slow Slew Rate for GT Domain [Fast/2]
- Disable Fast PKG C State Ramp for SA Domain [FALSE]

- **Slow Slew Rate for SA Domain [Fast/2]**
- **Disable Fast PKG C State Ramp for VccIn Domain [FALSE]**

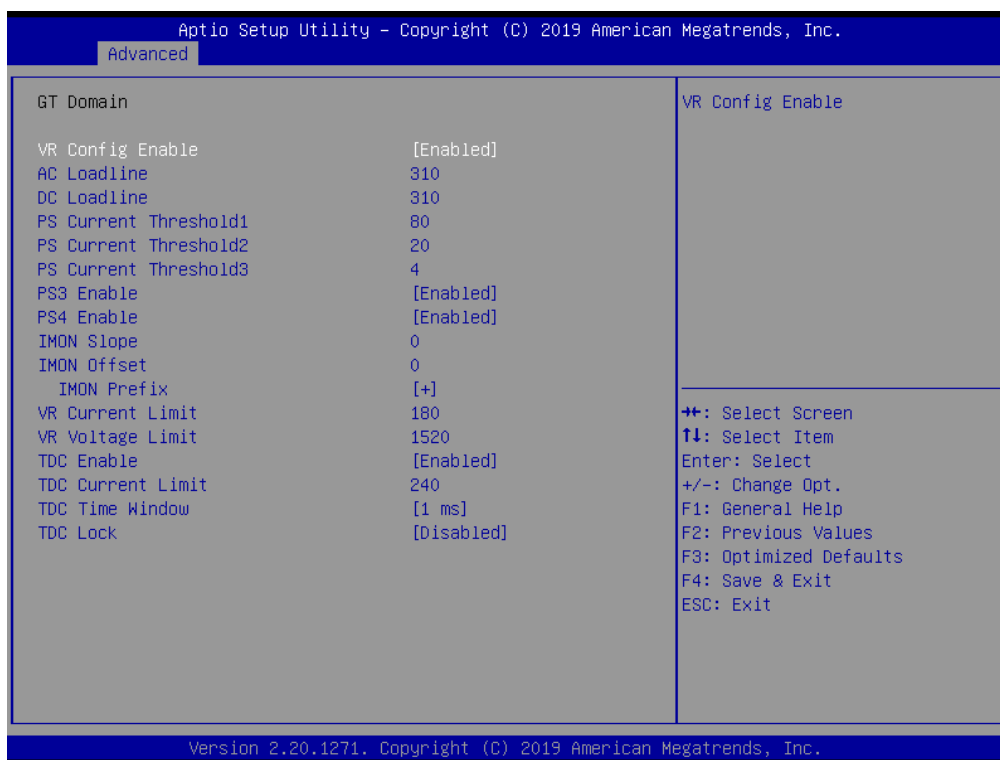
### Core/IA VR Settings

Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.	
Advanced	
CPU VR Settings	Core/IA VR Settings
PSYS Slope	0
PSYS Offset	0
PSYS PMax Power	0
▶ Acoustic Noise Settings	
▶ Core/IA VR Settings	
▶ GT VR Settings	
Intersil VR Command	[Disabled]
++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	
Version 2.20.1271. Copyright (C) 2019 American Megatrends, Inc.	

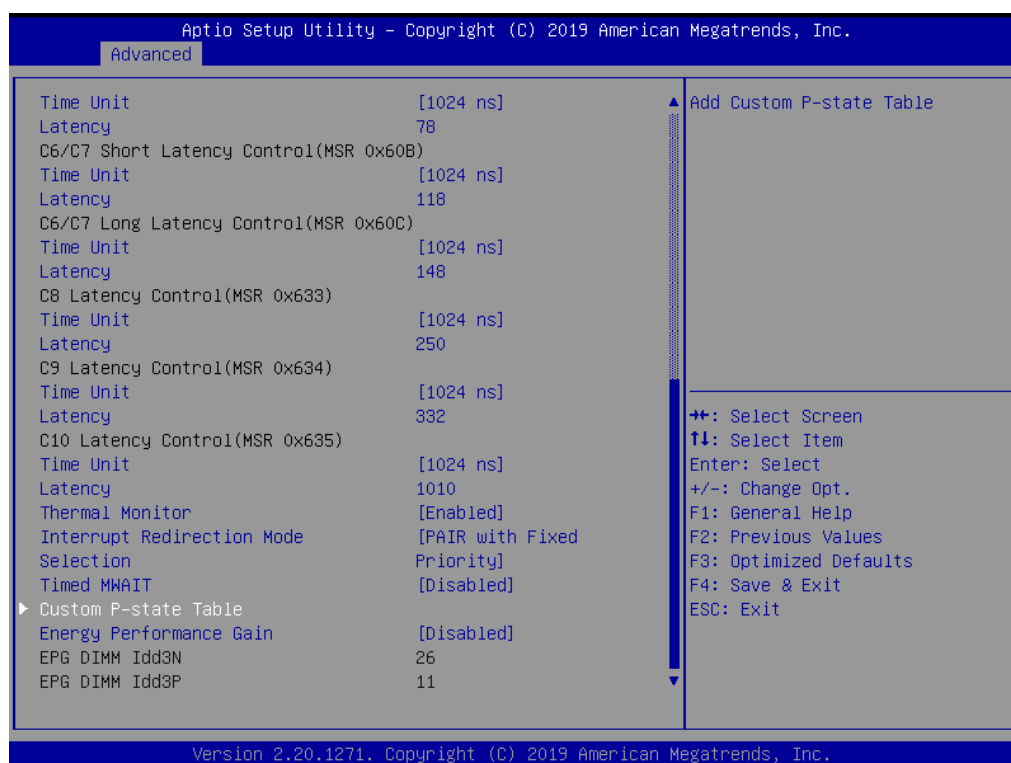
Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.	
Advanced	
Core/IA VR Domain	VR Config Enable
VR Config Enable	[Enabled]
AC Loadline	210
DC Loadline	210
PS Current Threshold1	80
PS Current Threshold2	20
PS Current Threshold3	4
PS3 Enable	[Enabled]
PS4 Enable	[Enabled]
IMON Slope	0
IMON Offset	0
IMON Prefix	[+]
VR Current Limit	532
VR Voltage Limit	1520
TDC Enable	[Enabled]
TDC Current Limit	728
TDC Time Window	[1 ms]
TDC Lock	[Disabled]
++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	
Version 2.20.1271. Copyright (C) 2019 American Megatrends, Inc.	

- **VR Config Enable [Enabled]**
- **PS3 Enable [Enabled]**
- **PS4 Enable [Enabled]**
- **TDC Enable [Enabled]**
- **TDC Time Window [1 ms]**
- **TDC Lock [Disabled]**

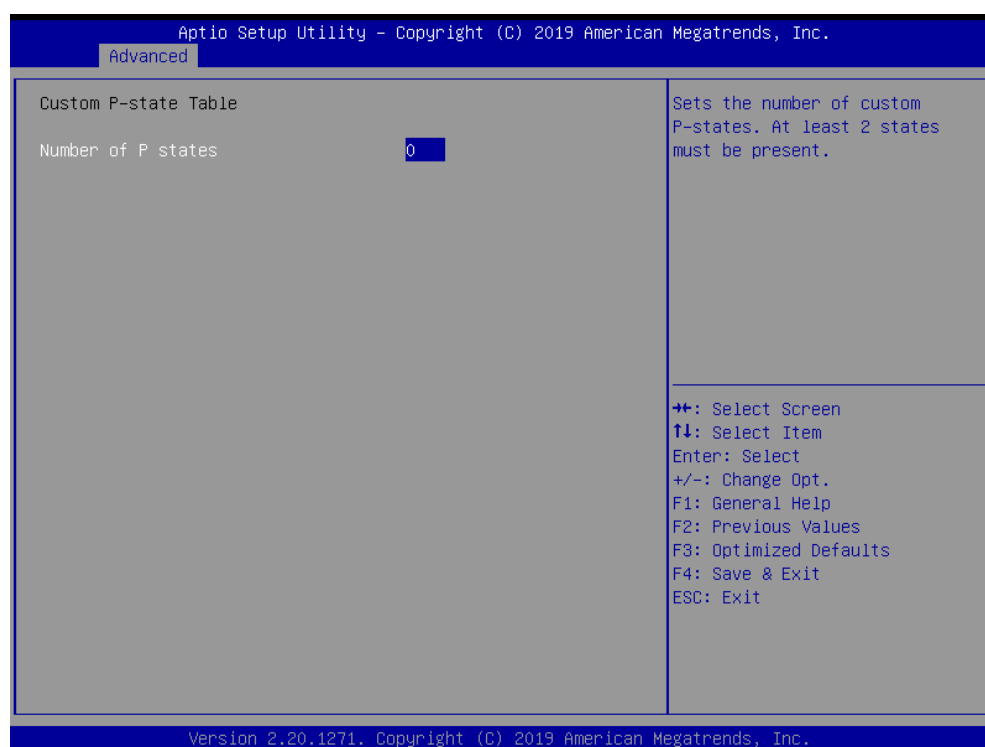
## GT VR Settings



- **VR Config Enable [Enabled]**
- **PS3 Enable [Enabled]**
- **PS4 Enable [Enabled]**
- **TDC Enable [Enabled]**
- **TDC Time Window [1 ms]**
- **TDC Lock [Disabled]**



## Custom P-State Table





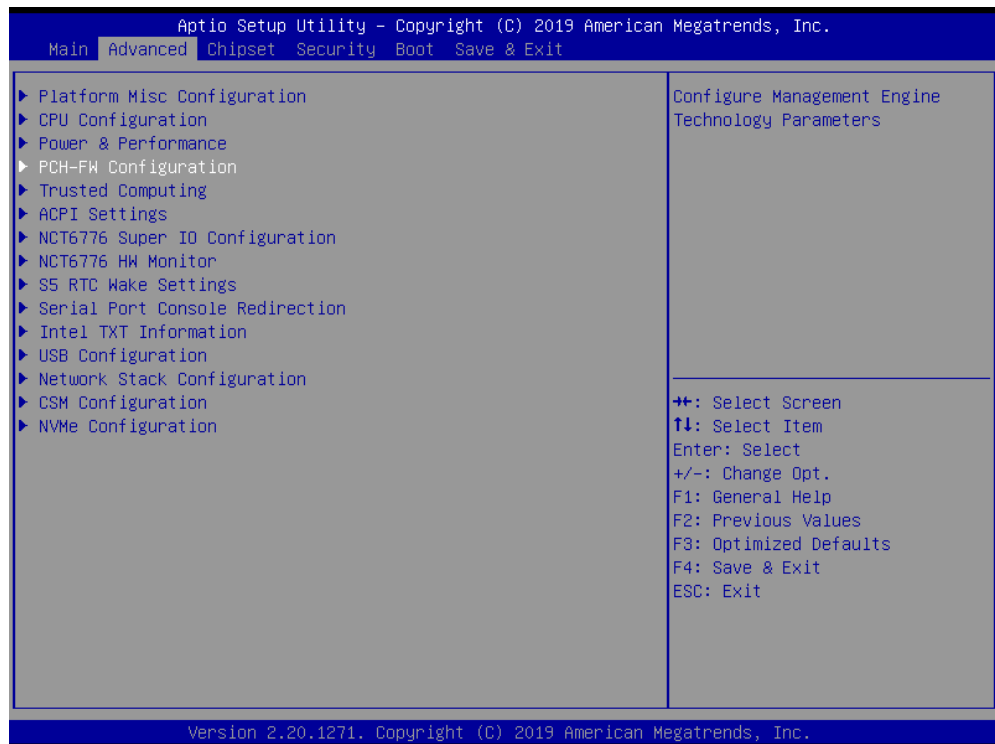
#### ■ Power Limit 3 Override [Disabled]

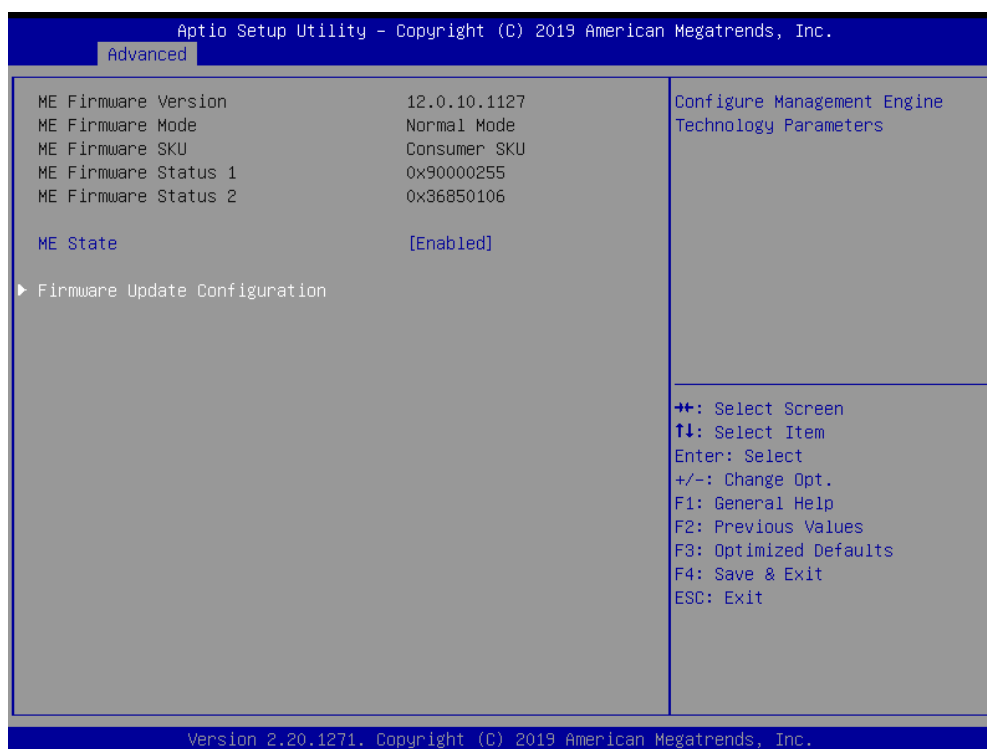




- **RC6 (Render Standby) [Enabled]**
- **Maximum GT Frequency [Default Max Frequency]**
- **Disable Turbo GT Frequency [Disabled]**

### 3.2.2.4 PCH-FW Configuration



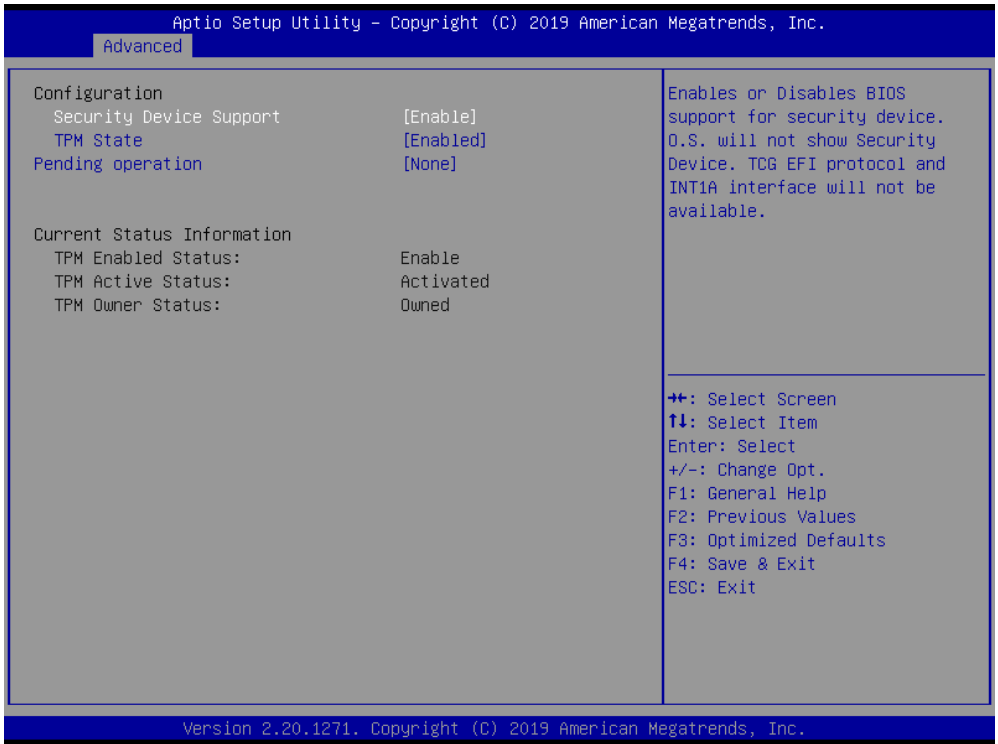
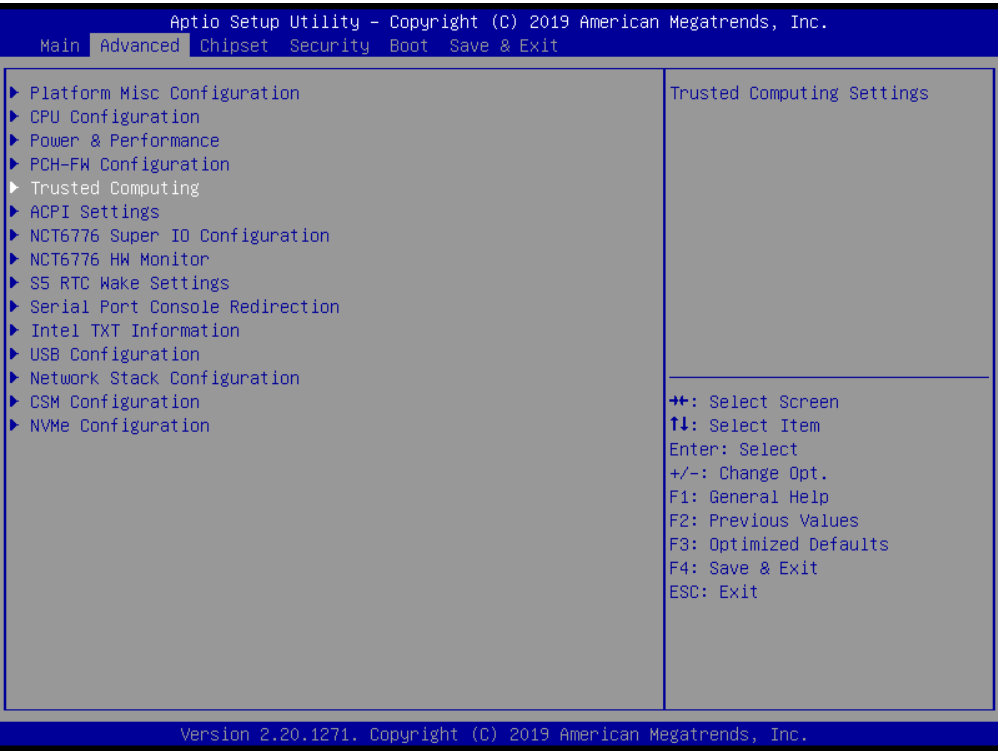


■ **ME State [Enabled]**



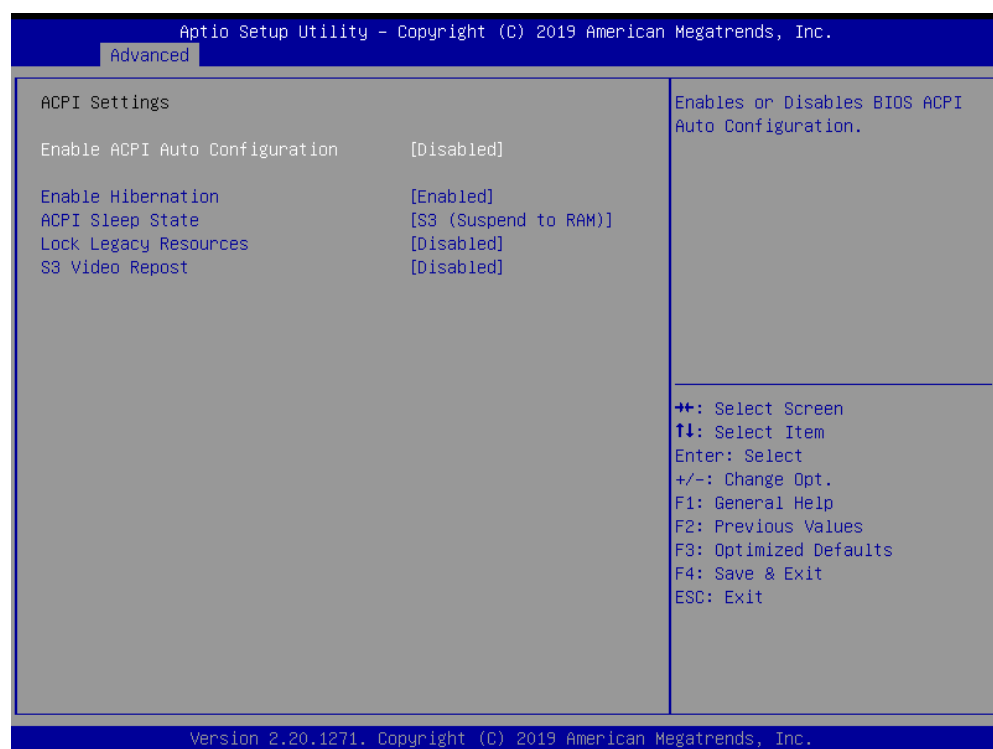
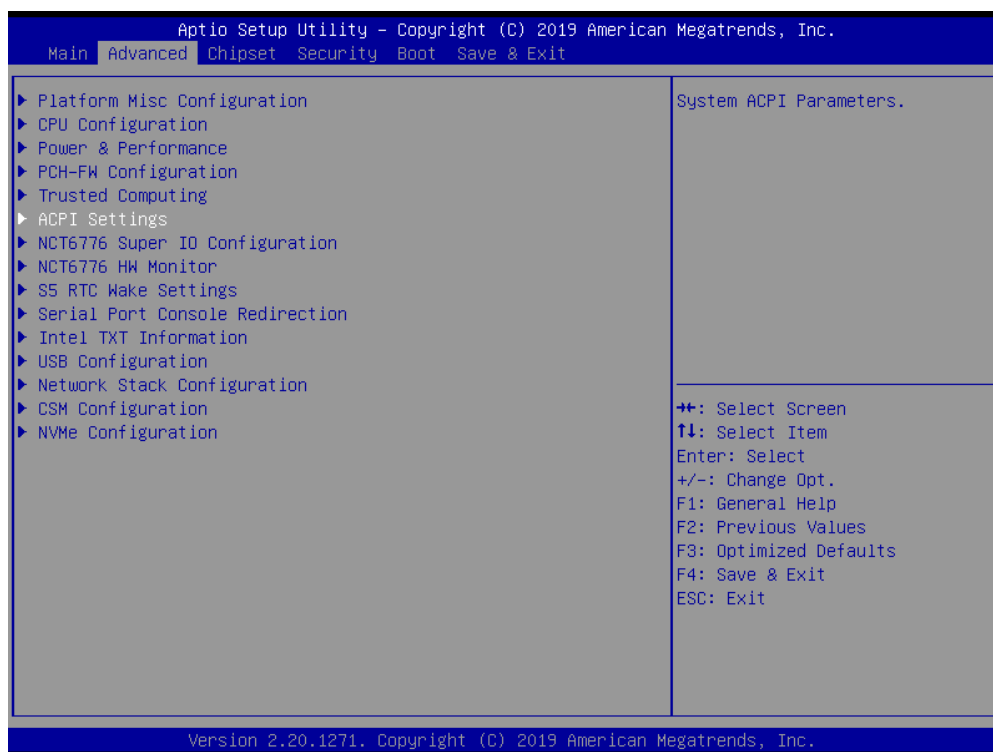
- **Me FW Image Re-Flash [Disabled]**
- **Local FW Update [Enabled]**

3.2.2.5 Trusted Computing



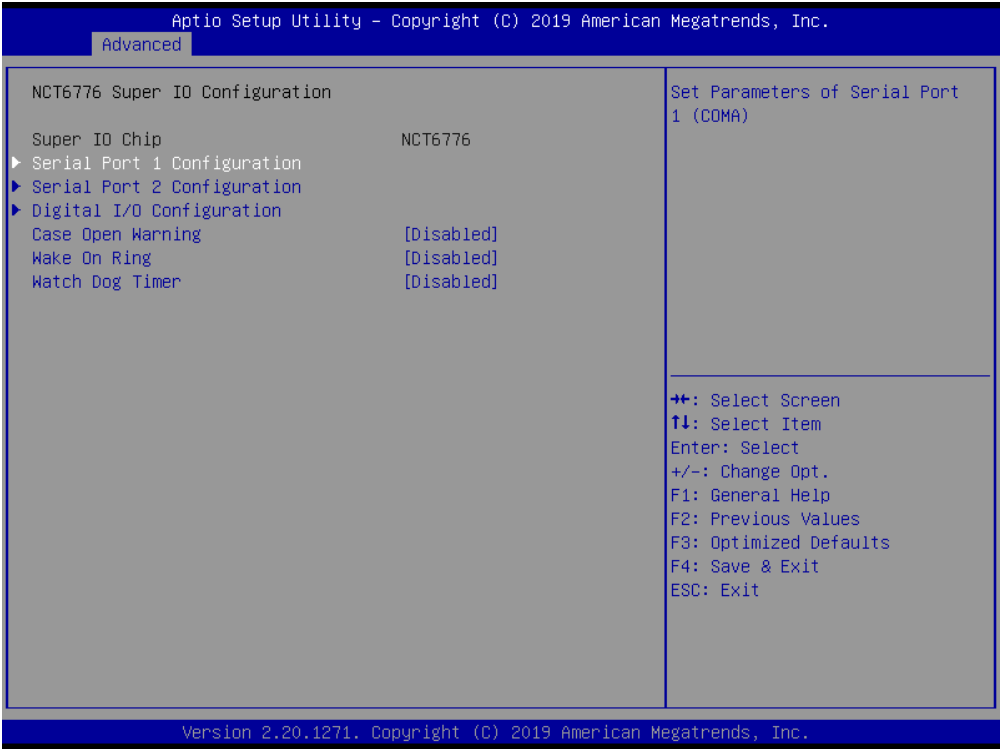
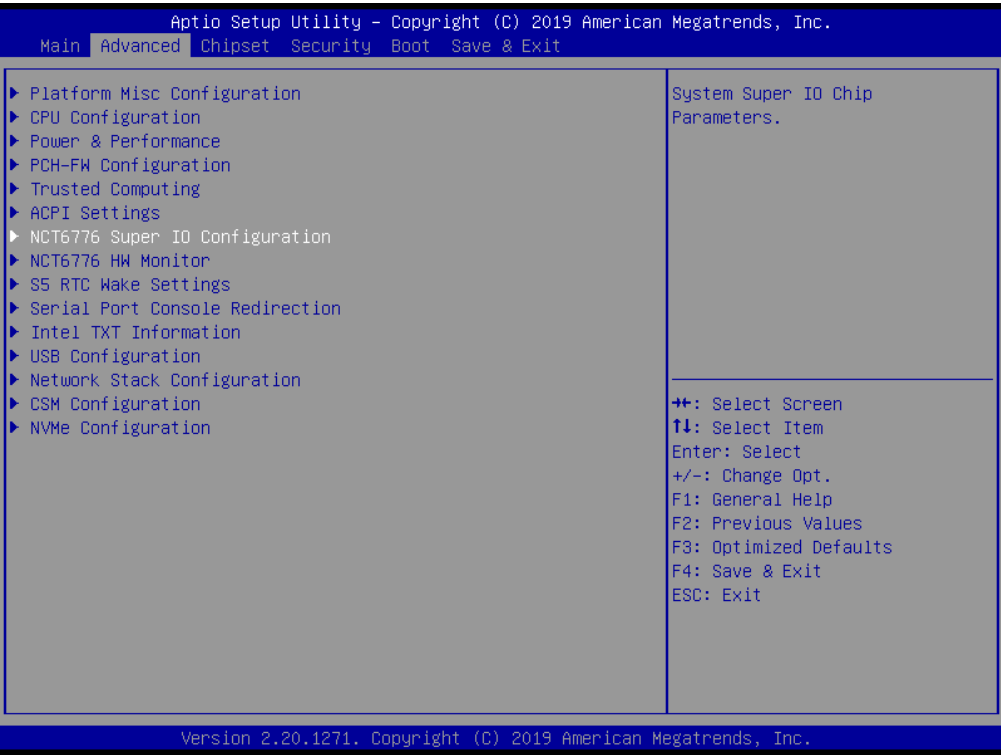
- Security Device Support [Enabled]
- TPM State [Enabled]
- Pending Operation [None]

### 3.2.2.6 ACPI Settings

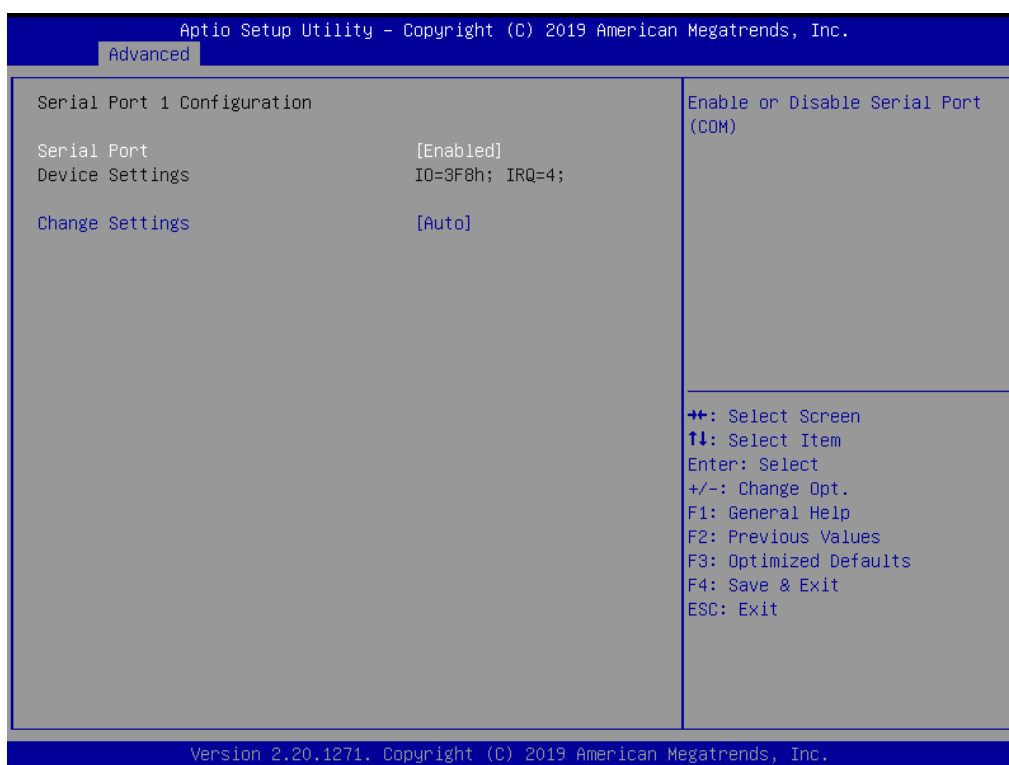


- **Enable ACPI Auto Configuration [Disabled]**
- **Enable Hibernation [Enabled]**
- **ACPI Sleep State [S3 (Suspend to RAM)]**
- **Lock Legacy Resource [Disabled]**
- **S3 Video Repost [Disabled]**

3.2.2.7 NCT6776 Super I/O Configuration

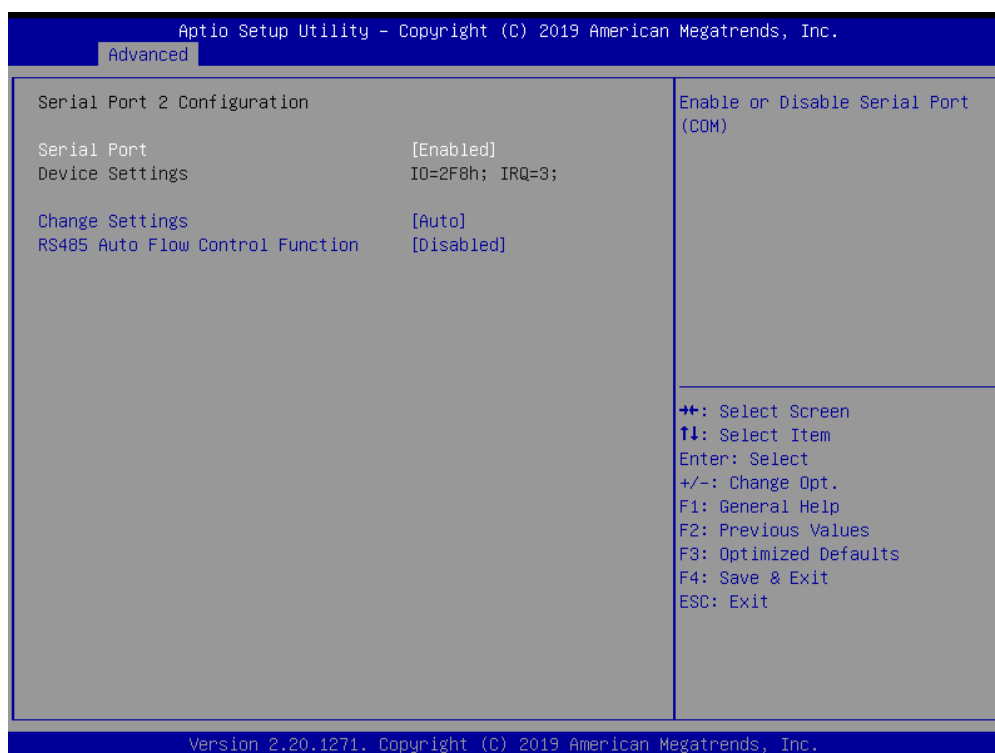


- Super I/O Chip NCT6776**
- **Case Open Warning [Disabled]**
  - **Wake On Ring [Disabled]**
  - **Watch Dog Timer [Disabled]**



### Serial Port 1 Configuration

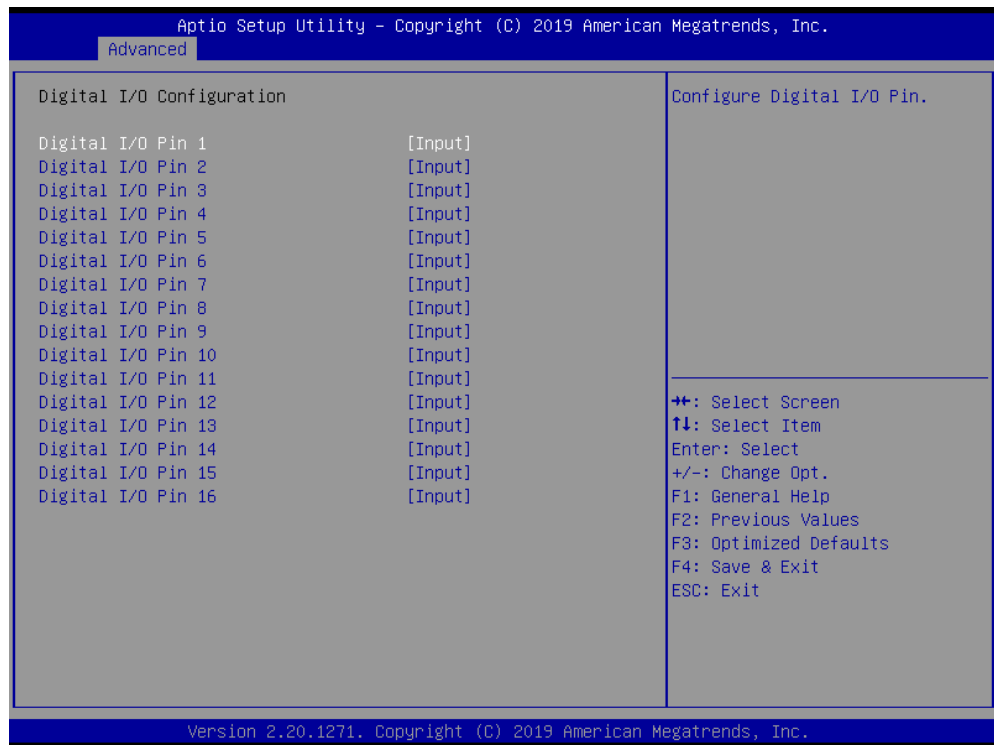
- **Serial Port [Enabled]**
  - Device Settings: I/O=3F8h; IRQ =4
  - Change Settings [Auto]  
To select an optimal setting for serial port 1



### Serial Port 2 Configuration

- **Serial Port [Enabled]**
- **Device Settings: IO=2F8h; IRQ =3**

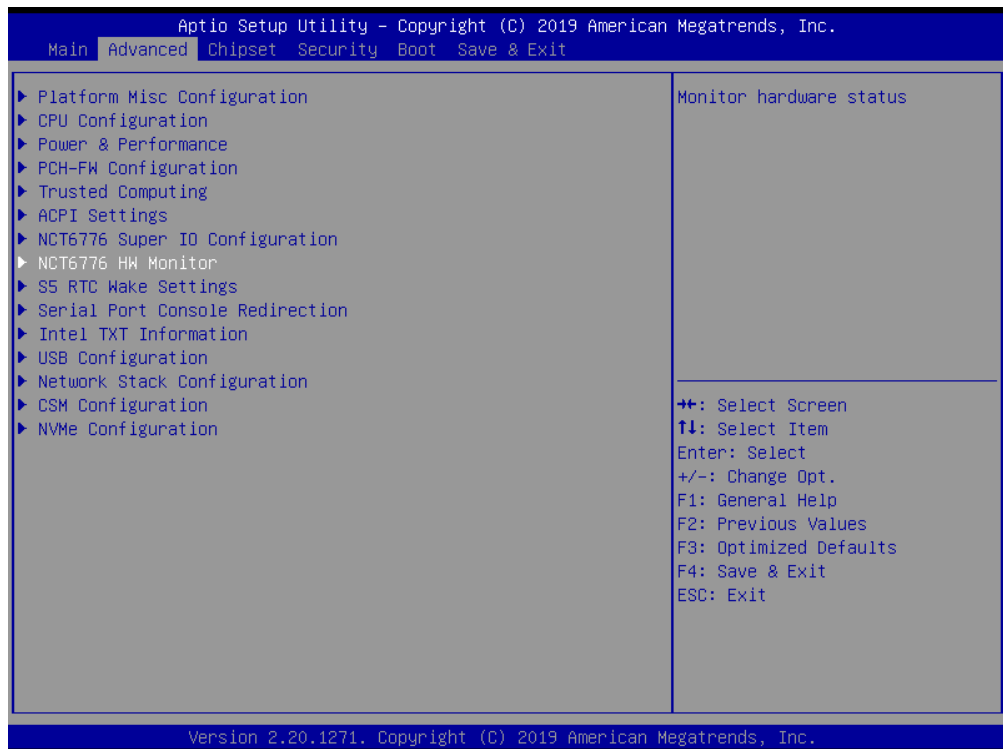
- **Change Setting [Auto]**  
To select an optimal setting for serial port 2.
- **RS485 Auto Flow Control Function [Disabled]**



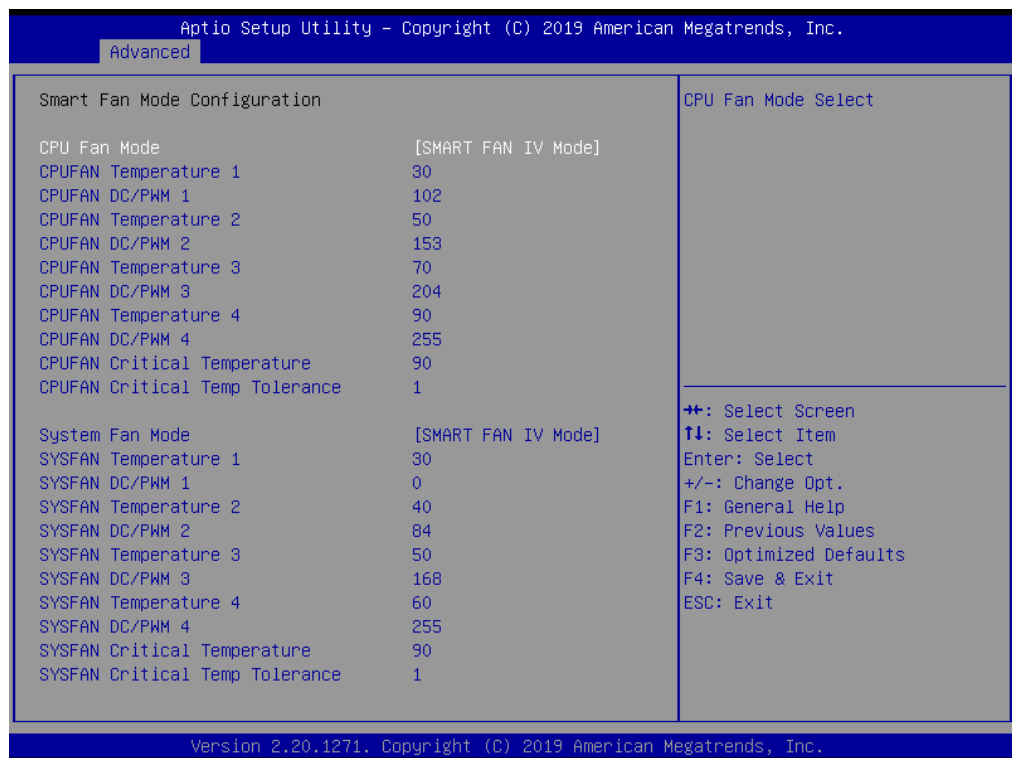
### Digital I/O Configuration

- **Digital I/O Pin 1 - 16 [Input]**

### 3.2.2.8 NCT6776 HW Monitor







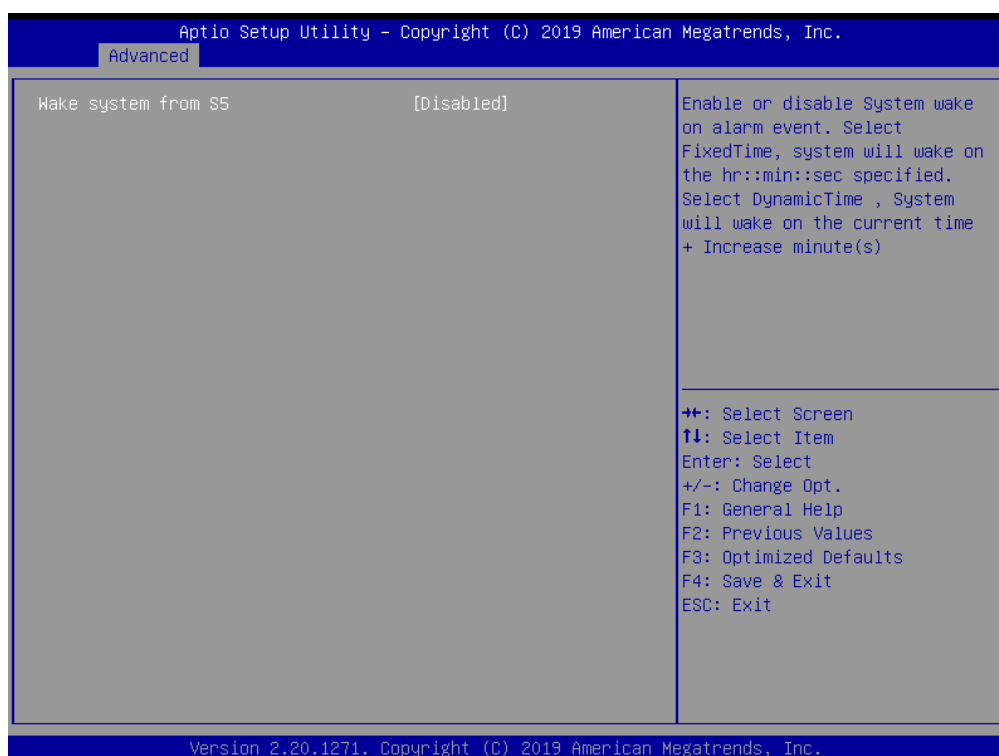
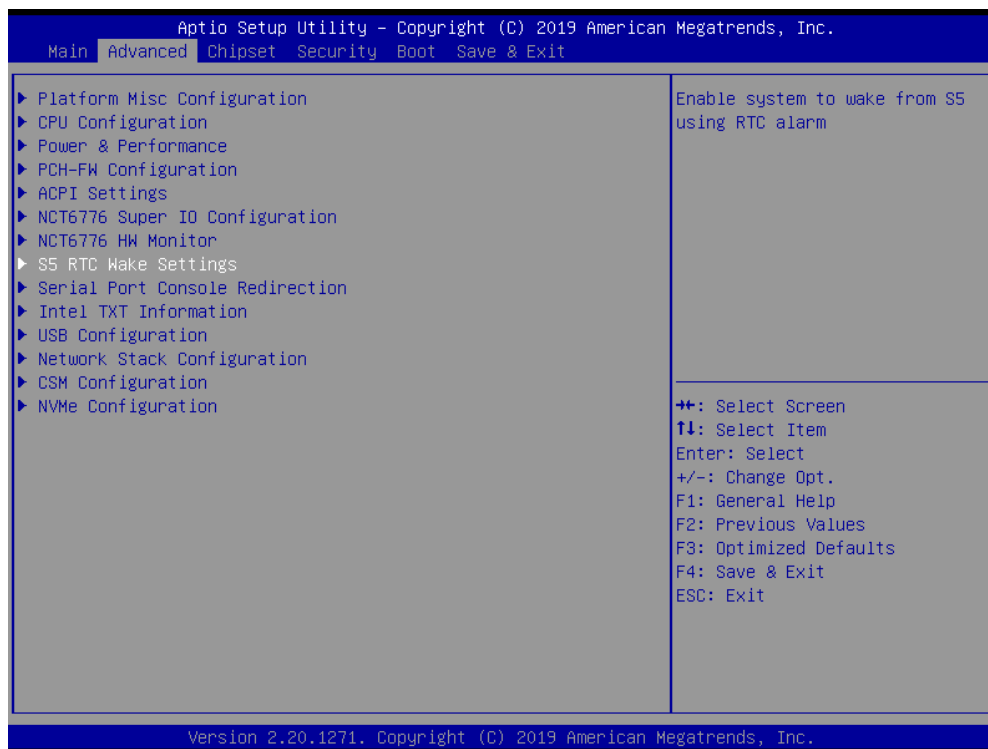
### Smart Fan Mode Configuration

- **CPU FAN Mode [SMART FAN IV Mode]**  
The item shows you CPU temperature and fan speed (PWM) information
- **SYSFAN Mode [SMART FAN IV Mode]**  
The item shows you system temperature and fan speed (PWM) information

### Serial Port 3 Configuration

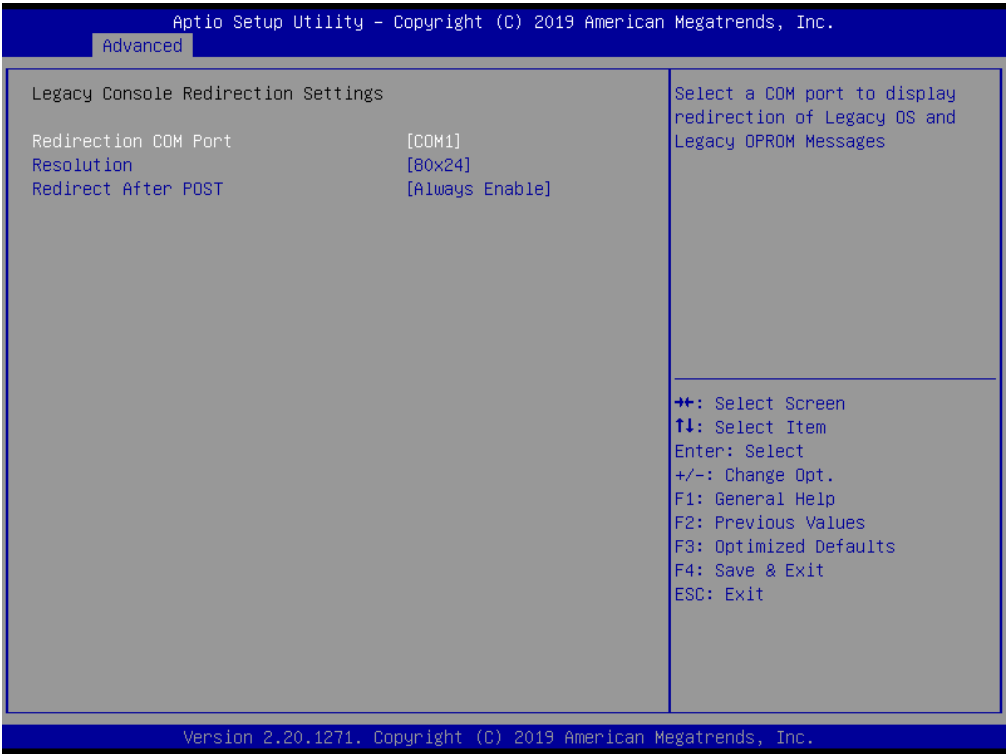
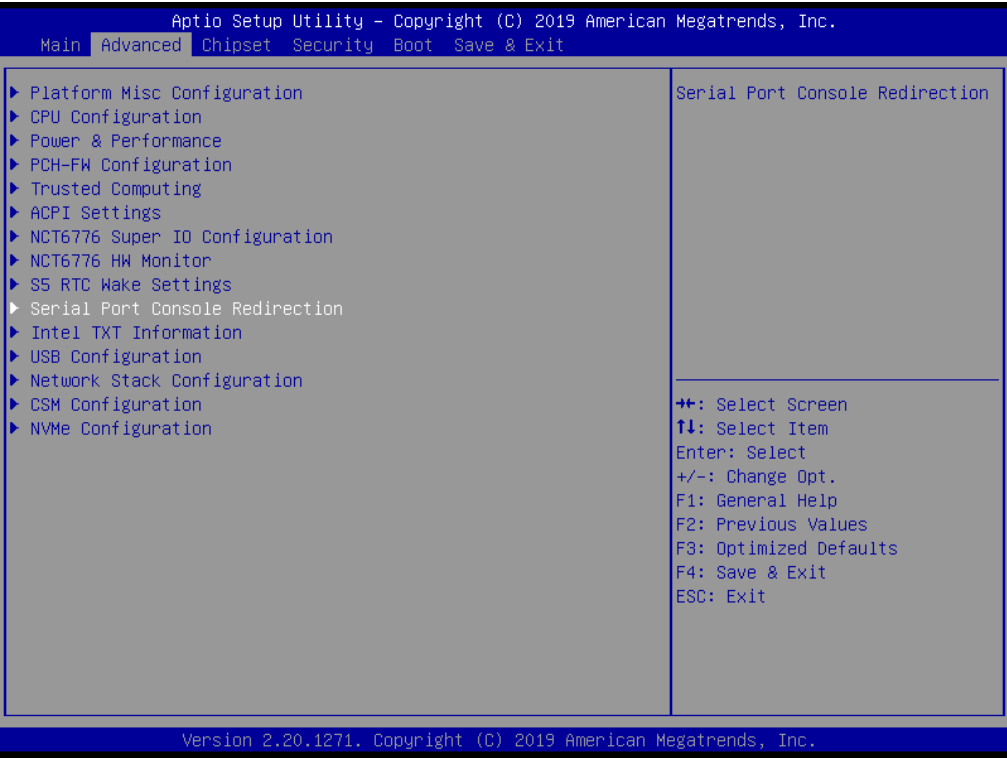
- **Serial Port [Enabled]**  
Device Settings: IO=240h; IRQ =5
- **Change Setting [Auto]**  
To select an optimal setting for serial port 2
- **RS-485 Auto Flow Control Function [Disable ]**

### 3.2.2.9 S5 RTC Wake Settings



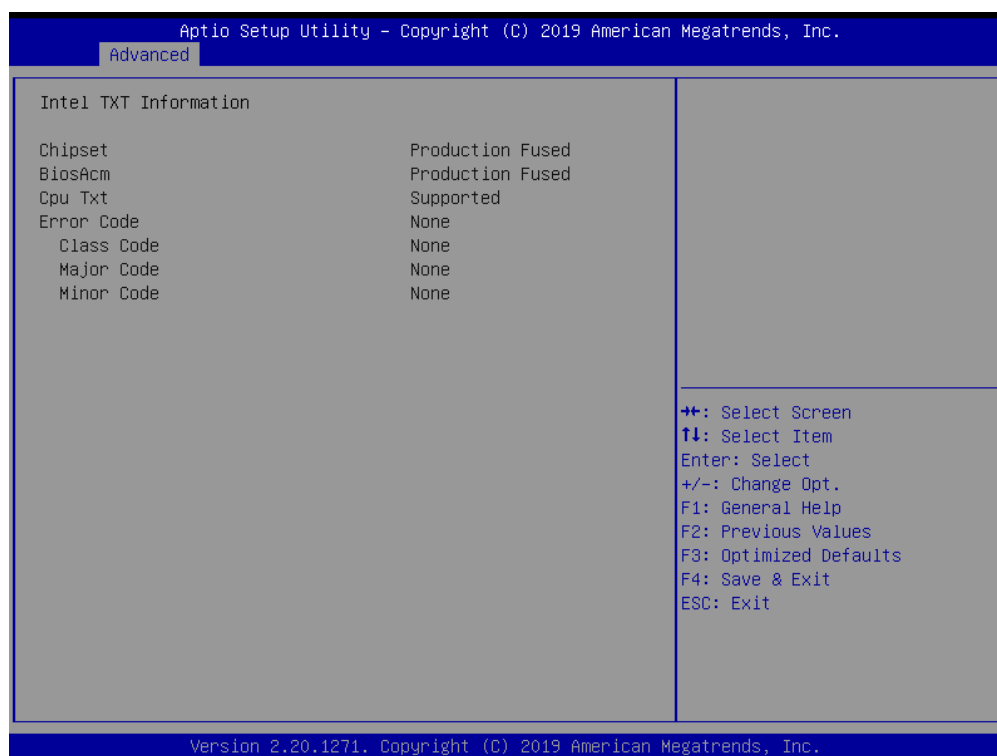
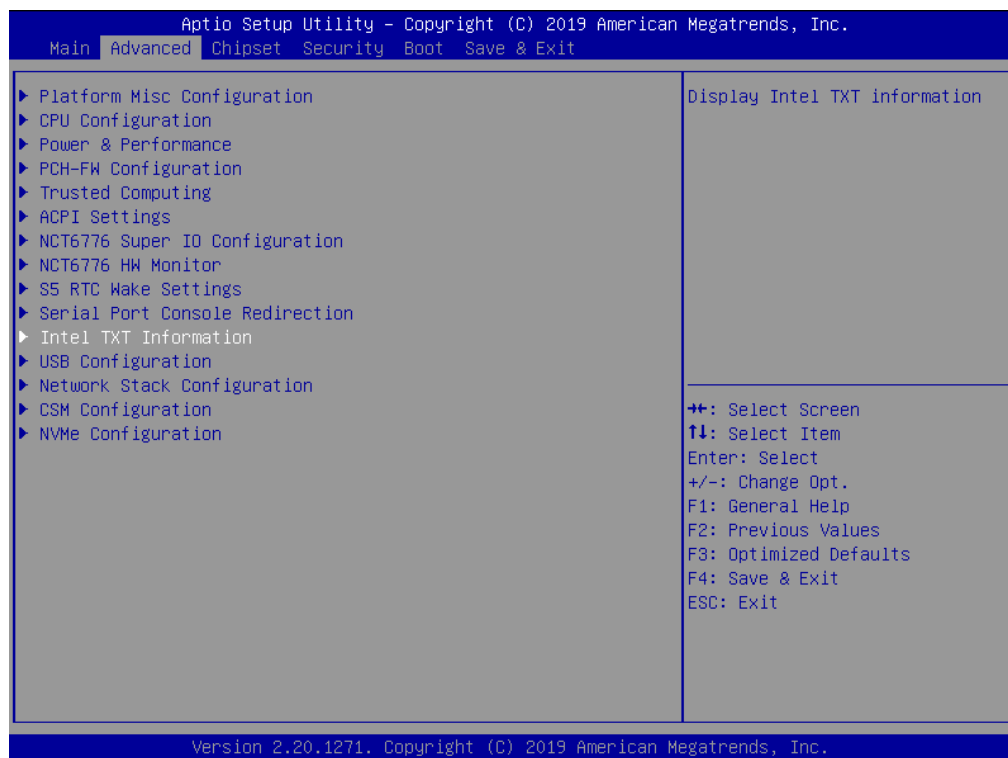
#### ■ Wake System from S5 [Disabled]

3.2.2.10 Serial Port Console Redirection

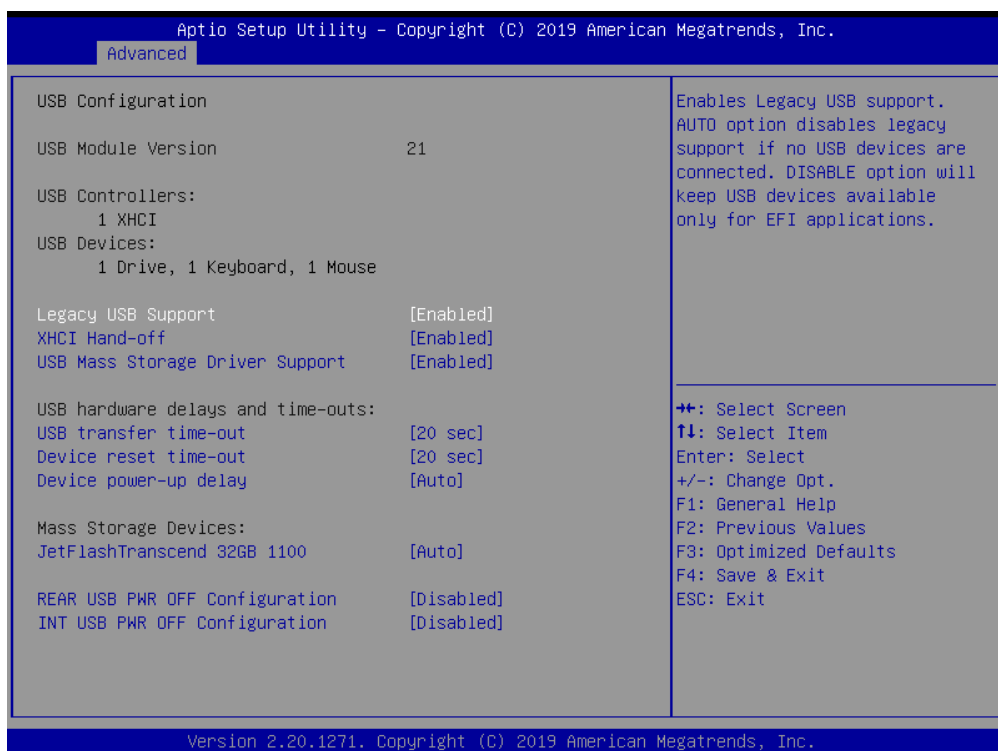
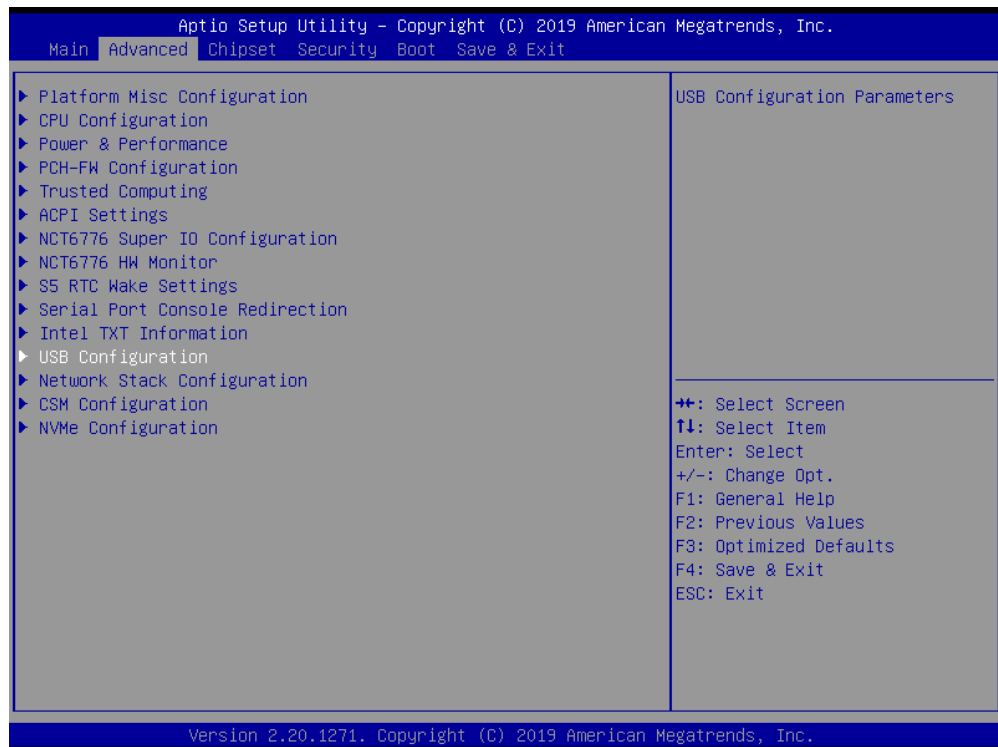


- **Redirection COM Port [COM1]**
- **Resolution [80x24]**
- **Redirect After Post [Always Enable]**

## 3.2.2.11 Intel TXT Information



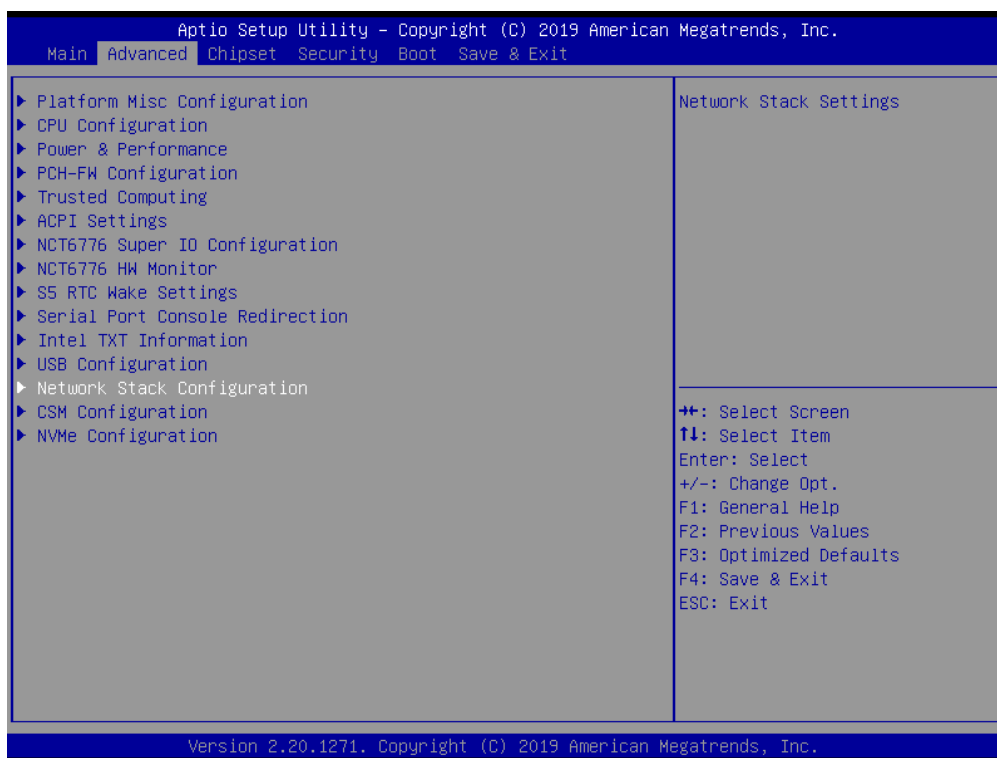
### 3.2.2.12 USB Configuration



- **Legacy USB Support [Enabled]**
- **XHCI Hand-Off [Enabled]**
- **USB Mass Storage Driver Support [Enabled]**
- **USB Transfer Time-Out [20 sec]**
- **Device Reset Time-Out [20 sec]**
- **Device Power-Up Delay [Auto]**
- **JetFlashTranscend 32GB 1100 [Auto]**
- **REAR USB PWR OFF Configuration [Disabled]**

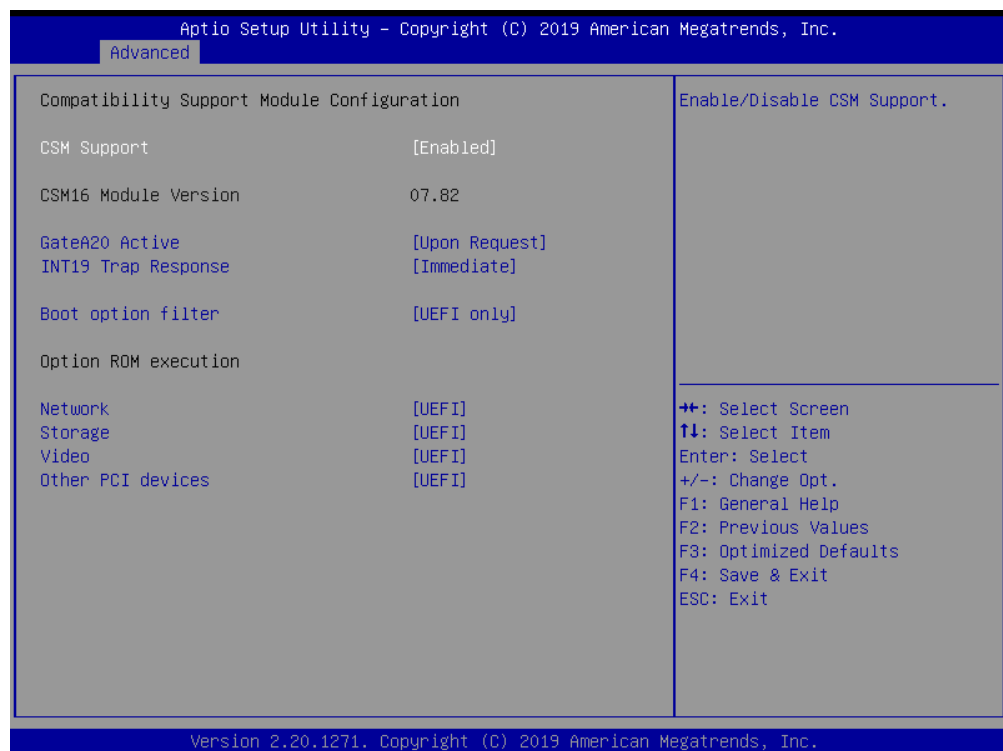
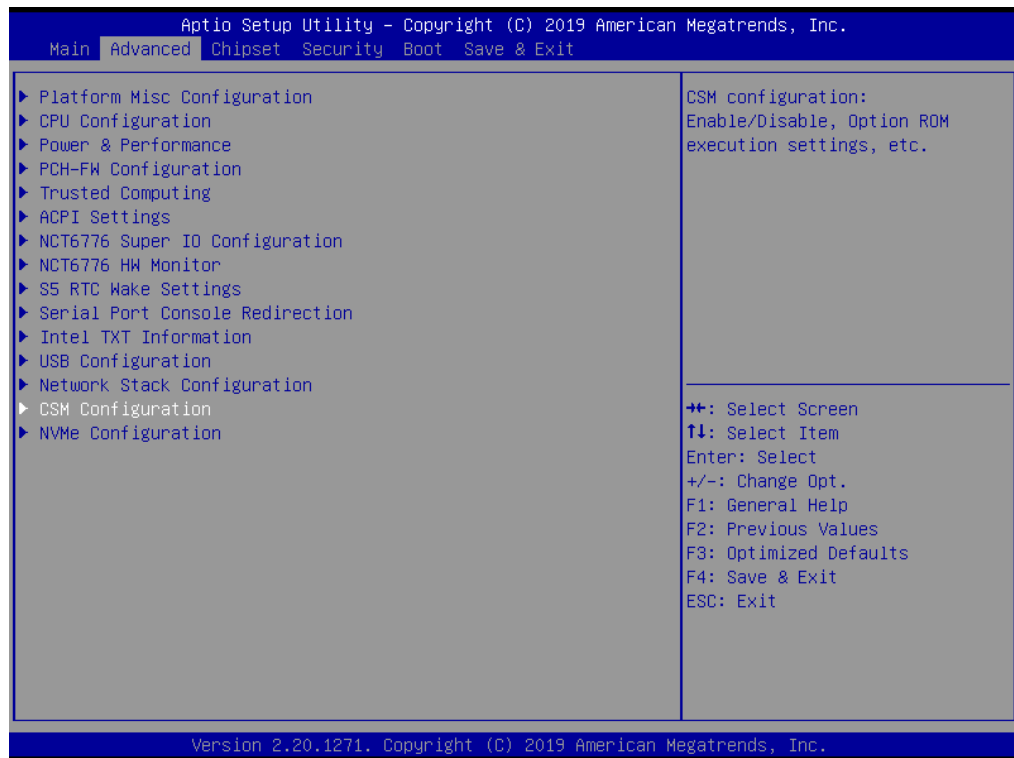
## ■ INT USB PWR OFF Configuration [Disabled]

### 3.2.2.13 Network Stack Configuration



## ■ Network Stack [Disabled]

### 3.2.2.14 CSM Configuration



- **CSM Support [Enabled]**
- **GateA20 Active [Upon Request]**
- **INT19 Trap Response [Immediate]**
- **Boot Option Filter [UEFI only]**
- **Network [UEFI]**
- **Storage [UEFI]**
- **Video [UEFI]**

## ■ Other PCI device [UEFI]

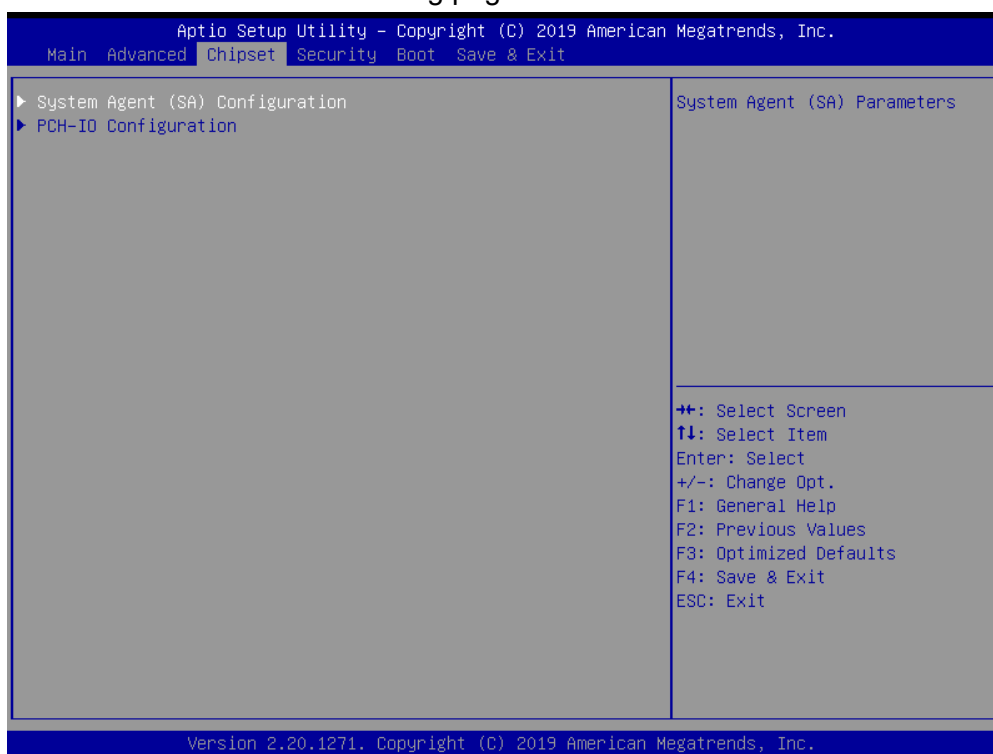
**Note!** *If your HDD or other boot device is installed as Legacy mode, it may cause blue screen situation. There are 2 ways to solve this:*



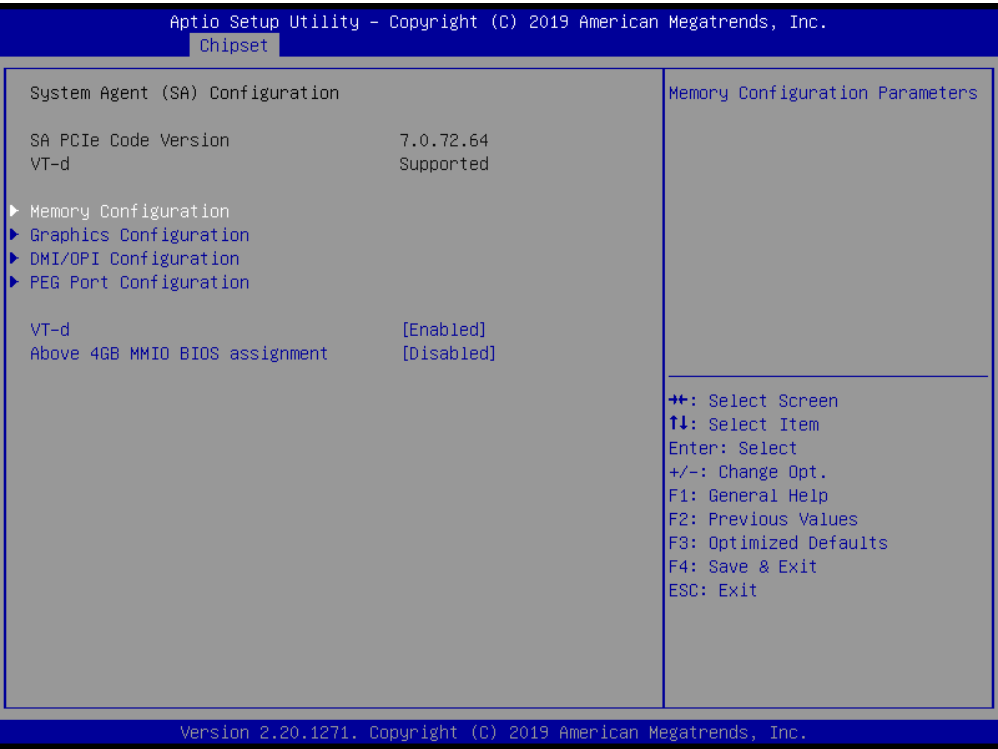
1. Re-install your OS as UEFI Mode
2. Change all of settings above as "Legacy"
  - \* Boot option filter-> Legacy Only
  - \* Network -> Legacy
  - \* Storage -> Legacy
  - \* Video -> Legacy
  - \* Other PCI devices -> Legacy

## 3.3 Chipset Configuration Setting

Select the chipset tab from the BIOS setup screen to enter the Chipset Setup screen. Users can select any item in the left frame of the screen, such as PCI express Configuration, to go to the sub menu for that item. Users can display a Chipset Setup option by highlighting it using the <Arrow> keys. All Chipset Setup options are described in this section. The Chipset Setup screens are shown below. The sub menus are described on the following pages.

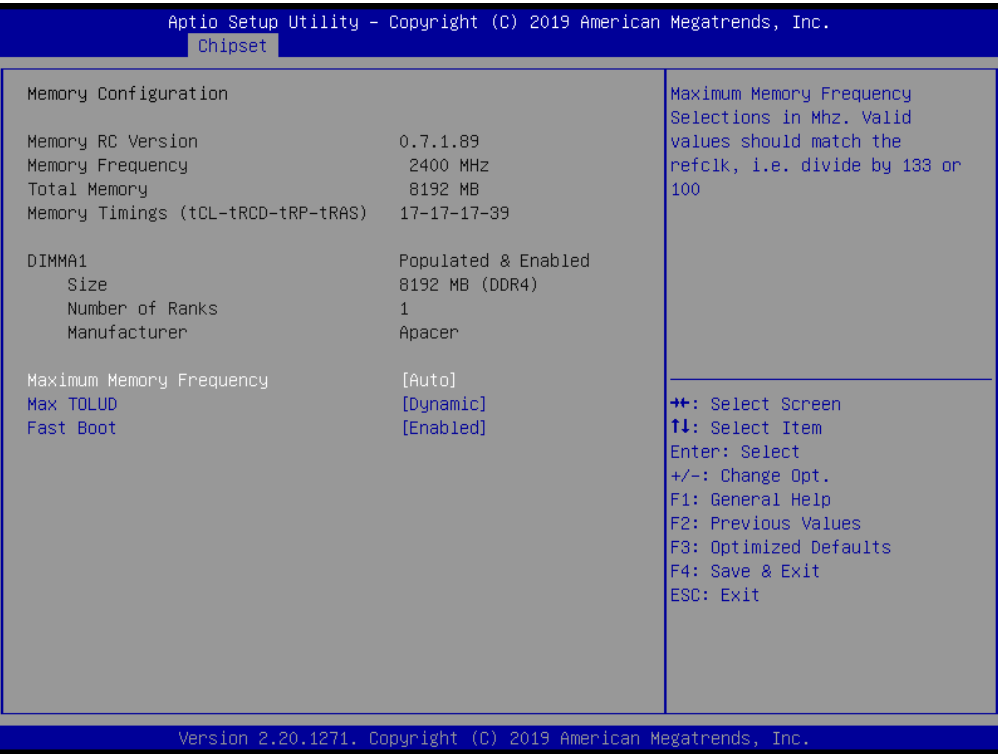


### 3.3.1 System Agent (SA) Configuration



- **VT-d [Enabled]**
- **Above 4GB MMIO BIOS assignment [Disabled]**

#### 3.3.1.1 Memory Configuration

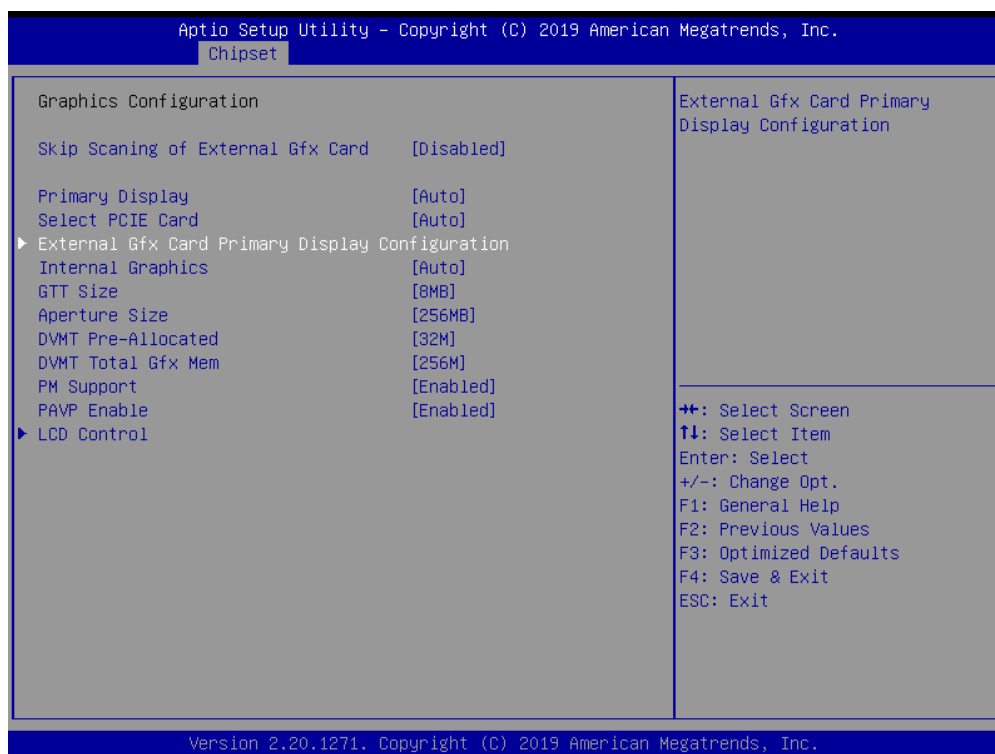


The item shows you memory specification included RC version, Frequency, size and voltage information etc.

- **Maximum Memory Frequency [ Auto ]**

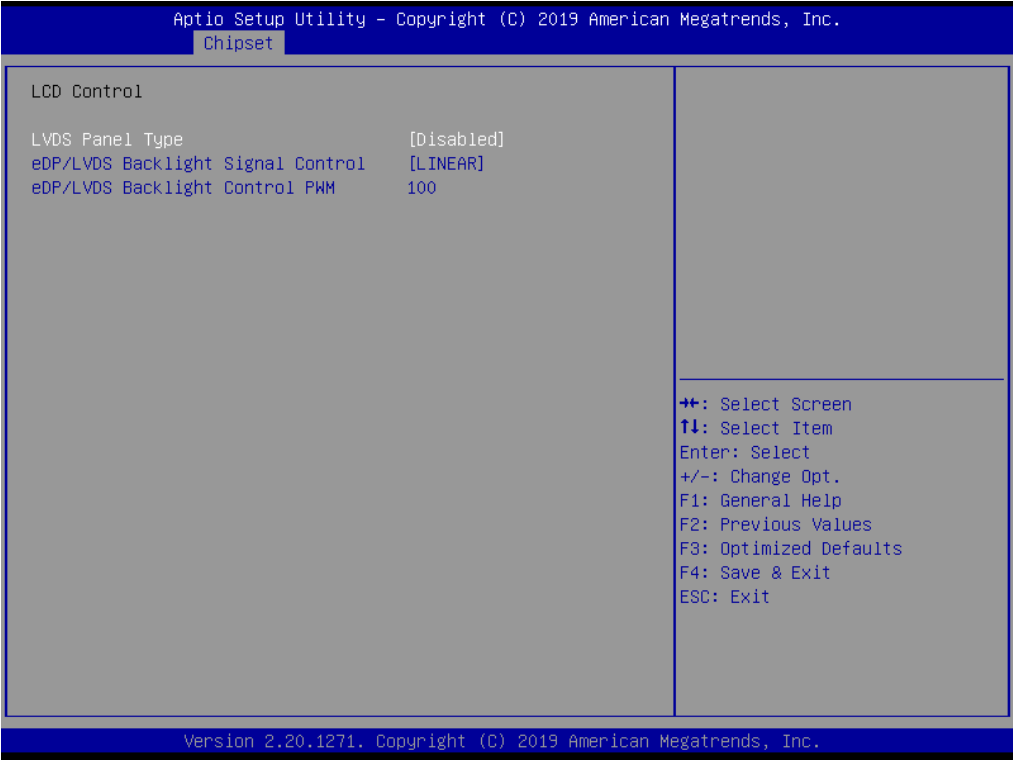
- **Max TOLUD [Dynamic]**  
Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller.
- **Fast Boot [Enabled]**  
Enable or disable Fast Boot support.

### 3.3.1.2 Graphics Configuration



- **Skip Scanning of External Gfx Card [disabled]**
- **Primary Display [Auto]**  
Select which of IGFX/PEG/PCI Graphics device should be Primary Display
- **Select PCIE Card [Auto]**
- **Internal Graphics [Auto]**  
Keep IGD enabled based on the setup options.
- **GTT size [8MB]**
- **Aperture Size [256MB]**
- **DVMT Pre-Allocated [32M]**  
Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.
- **DVMT Total Gfx Mem [256M]**  
Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device.
- **PM Support [Enabled]**
- **PAVP [Enabled]**

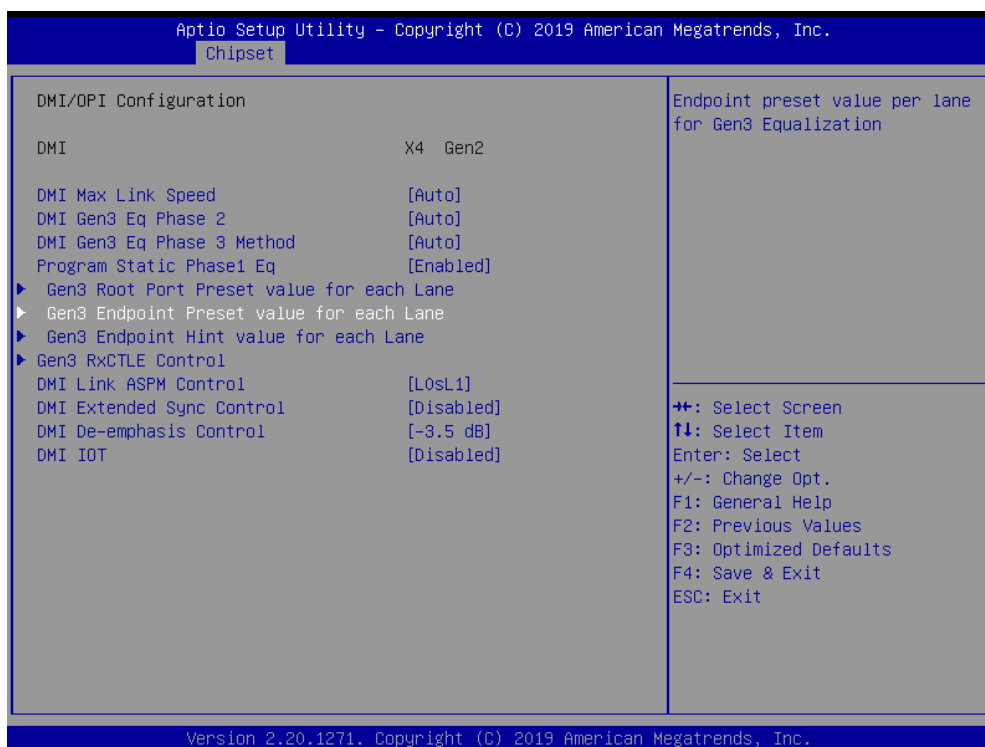
LCD Control



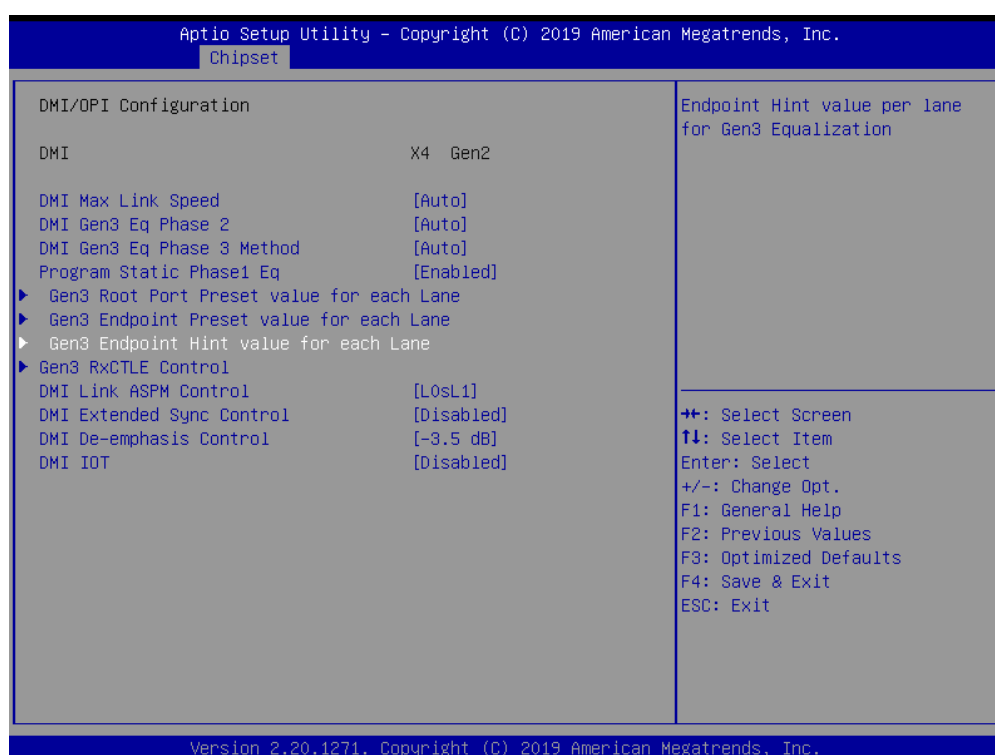
- **LVDS Panel Type [Disabled]**
- **eDP/LVDS Backlight Signal Control [LINEAR]**

3.3.1.3 DMI Configuration



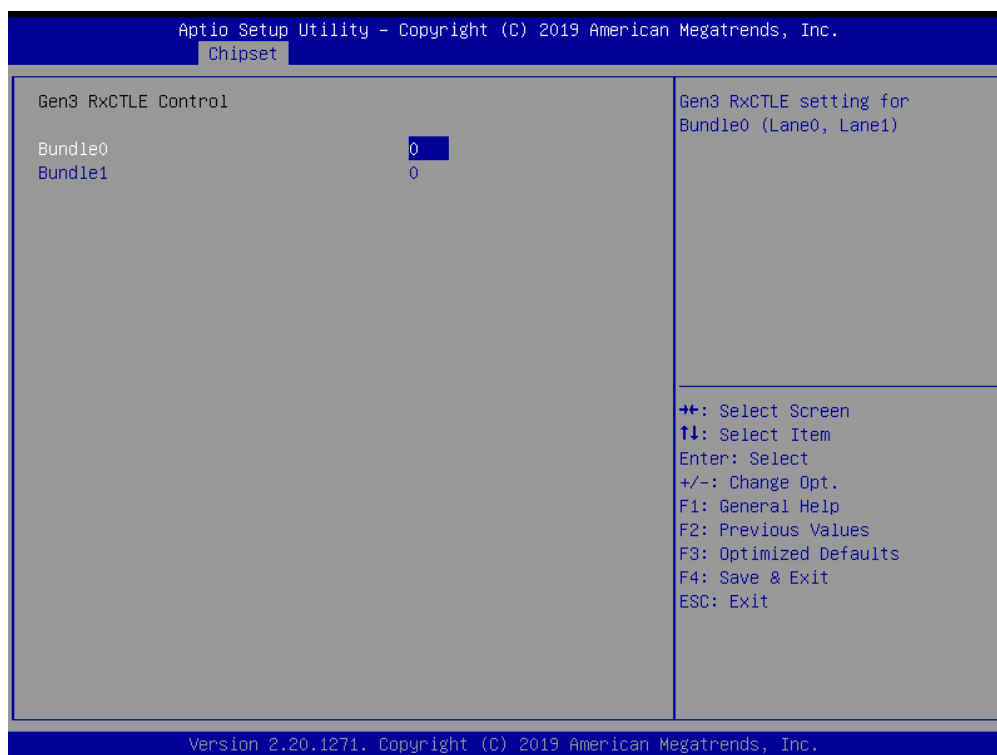


- **DMI Max Link Speed [Auto]**
- **DMI Gen3 Eq Phase 2 [Auto]**
- **DMI Gen3 Eq Phase 3 Method [Auto]**
- **Program Static Phase1 Eq [Enabled]**
- **DMI Link ASPM Control [L0sL1]**
- **DMI Extended Sync Control [Disabled]**
- **DMI De-emphasis Control [-3.5 dB]**
- **DMI IOT [Disabled]**

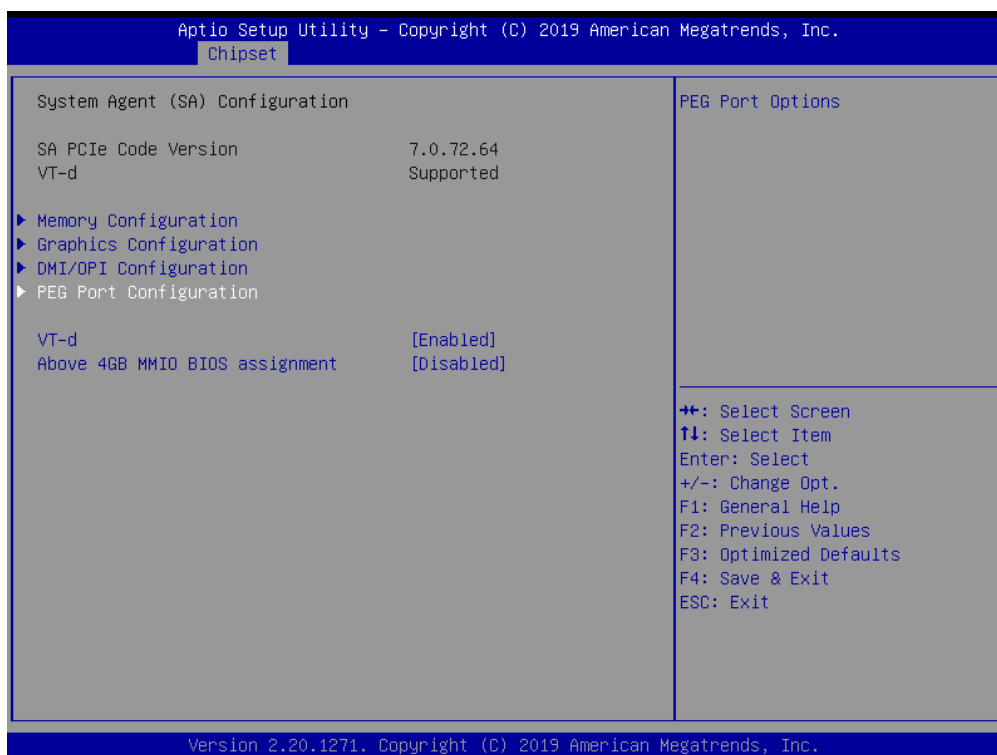


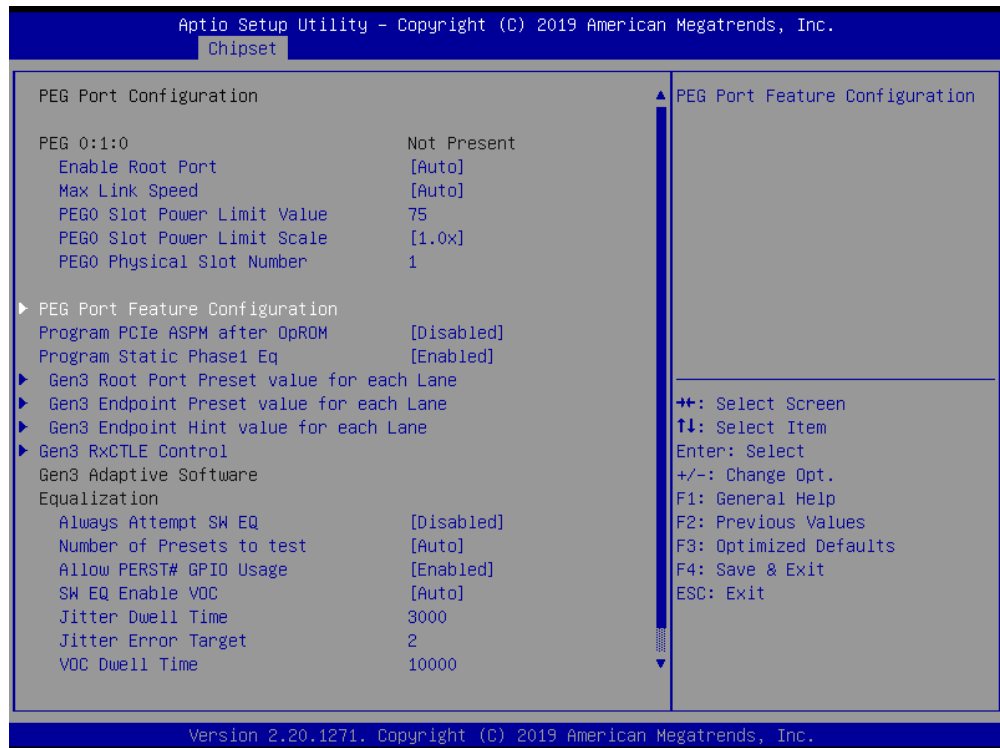
Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.	
Chipset	
Gen3 Endpoint Hint value for each Lane	Value for Lane 0
Lane 0	2
Lane 1	2
Lane 2	2
Lane 3	2
++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	
Version 2.20.1271. Copyright (C) 2019 American Megatrends, Inc.	

Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.	
Chipset	
DMI/OPI Configuration	Gen3 RxCTLE Control per Bundle
DMI	X4 Gen2
DMI Max Link Speed	[Auto]
DMI Gen3 Eq Phase 2	[Auto]
DMI Gen3 Eq Phase 3 Method	[Auto]
Program Static Phase1 Eq	[Enabled]
▶ Gen3 Root Port Preset value for each Lane	
▶ Gen3 Endpoint Preset value for each Lane	
▶ Gen3 Endpoint Hint value for each Lane	
▶ Gen3 RxCTLE Control	
DMI Link ASPM Control	[LoSL1]
DMI Extended Sync Control	[Disabled]
DMI De-emphasis Control	[-3.5 dB]
DMI IOT	[Disabled]
++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	
Version 2.20.1271. Copyright (C) 2019 American Megatrends, Inc.	

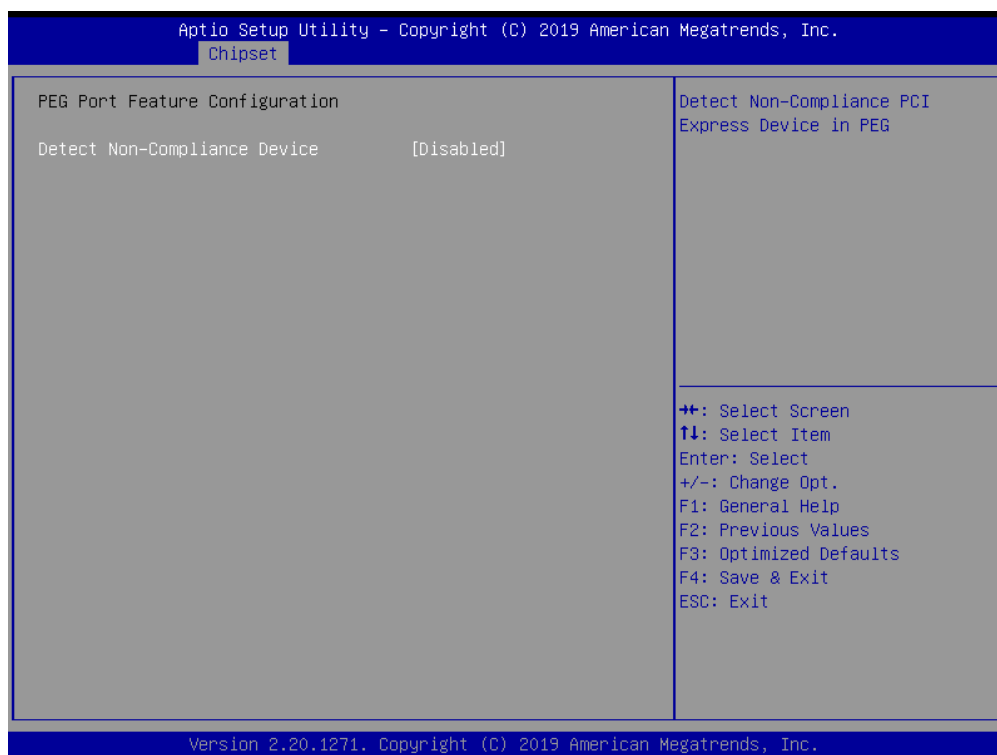


#### 3.3.1.4 PEG Port Configuration

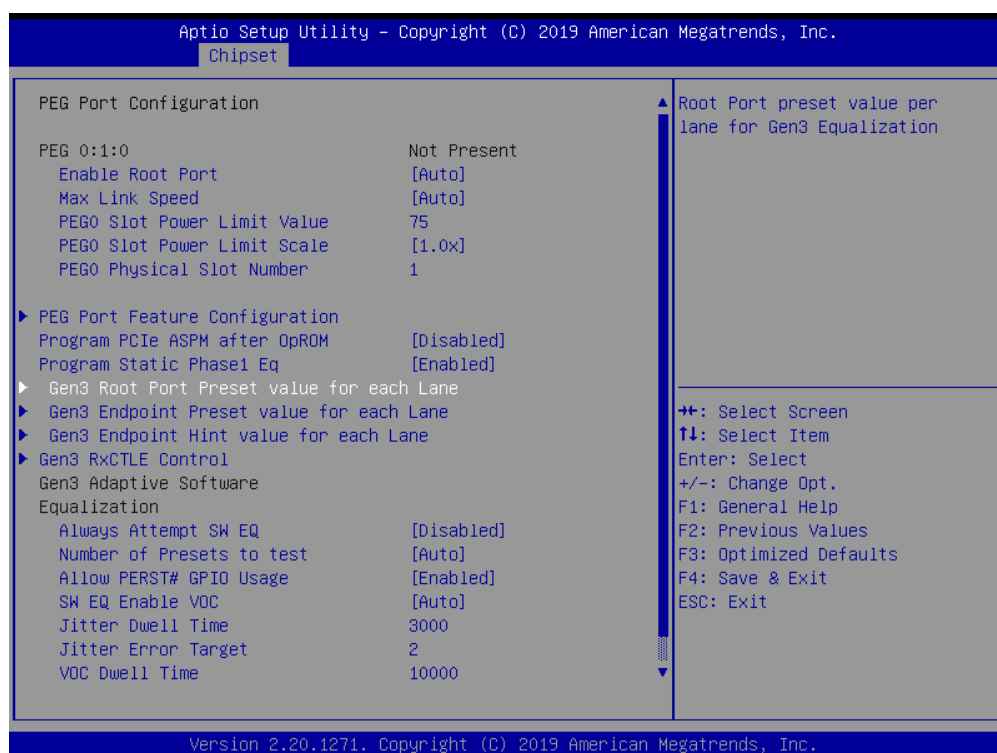


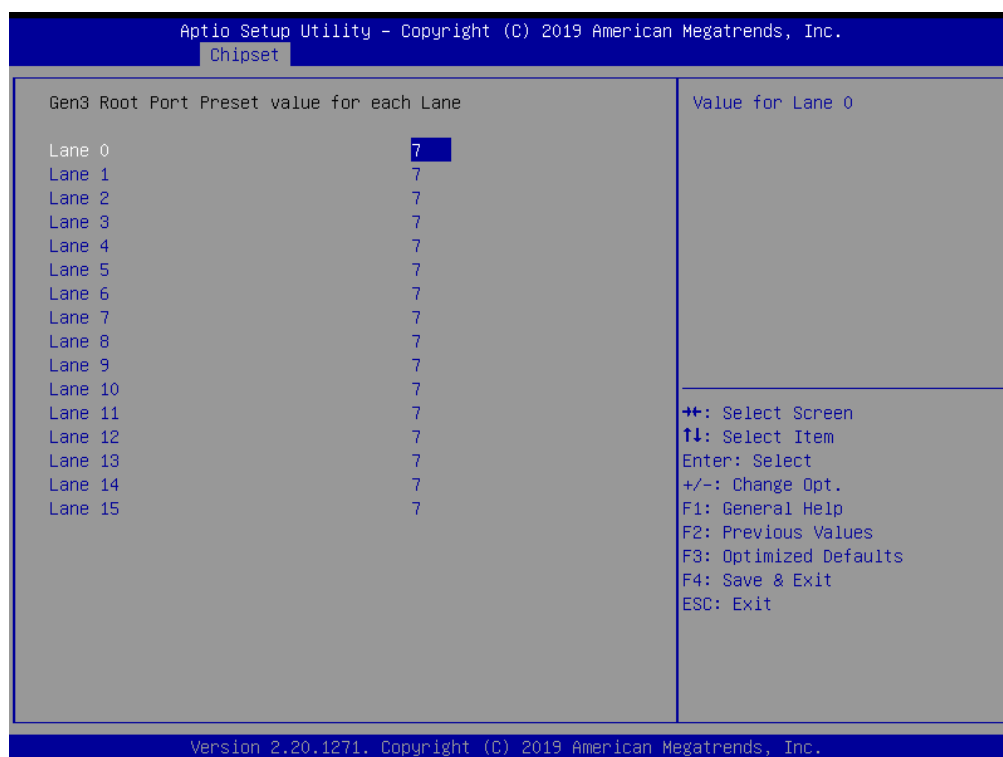


- **Enable Root Port [Auto]**
- **Max Link Speed [Auto]**
- **PEG0 Slot Power Limit Scale [1.0x]**
- **Program PCIe ASPM after OpROM [Disabled]**  
Enabled: PCIe ASPM will be programmed after OpROM.  
Disabled: PCIe ASPM will be programmed before OpROM.
- **Program Static Phase1 Eq [Enabled]**
- **Always Attempt SW EQ [Disabled]**
- **Number of Presets to test [Auto]**
- **Allow PERST# GPIO Usage [Enabled]**
- **SW EQ Enable VOC [Auto]**

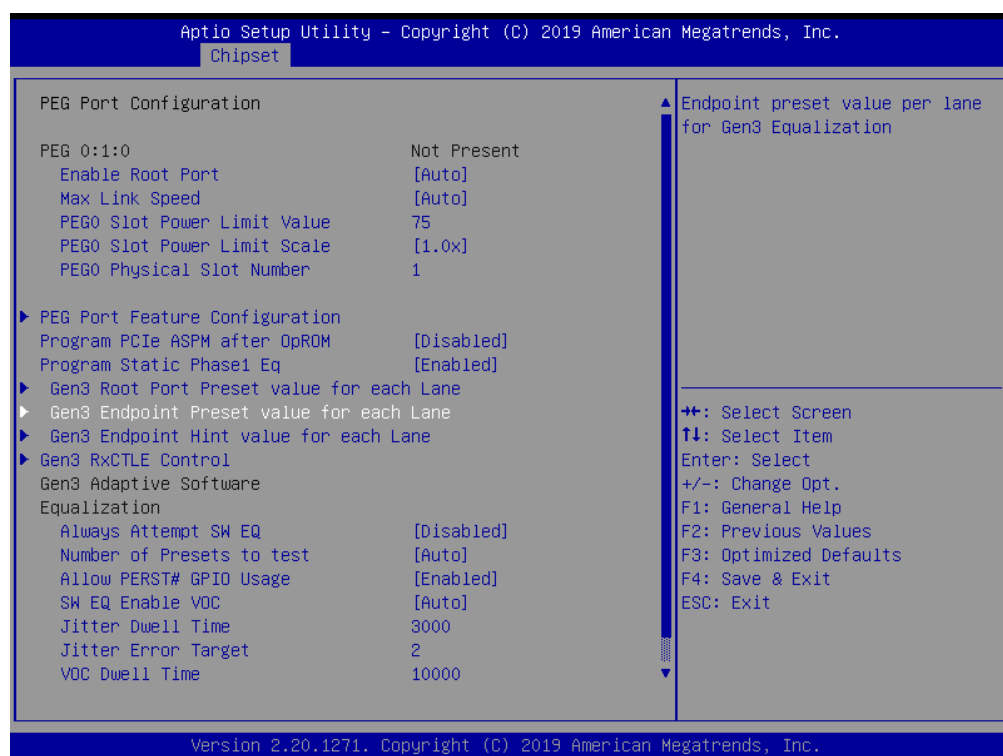


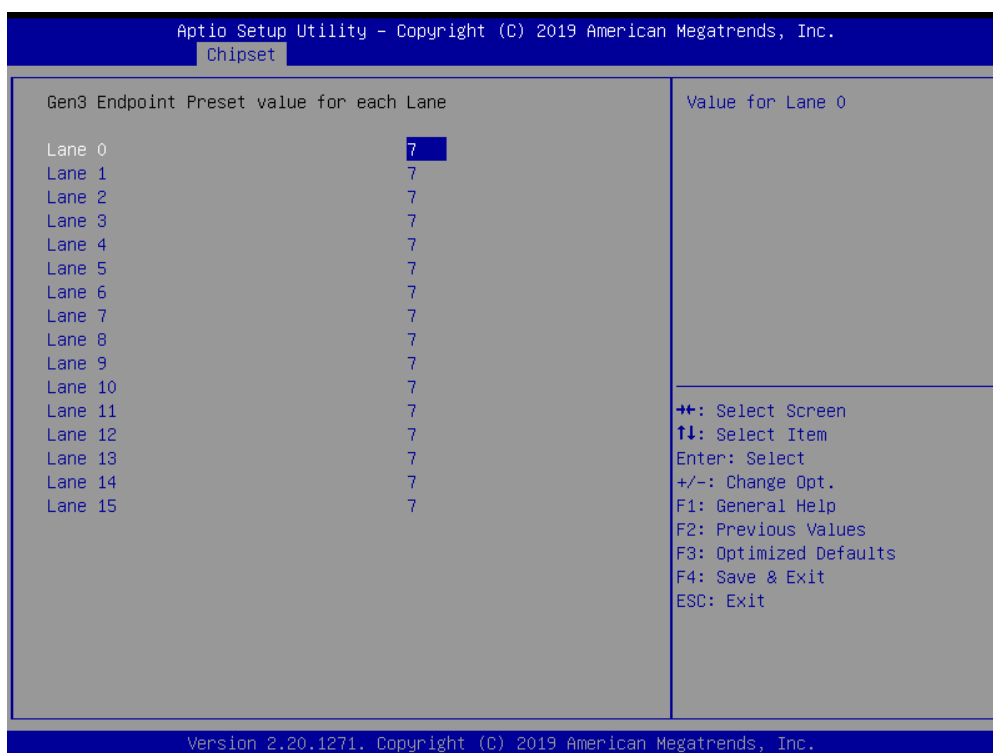
#### ■ Detect Non-Compliance Device [Disabled]



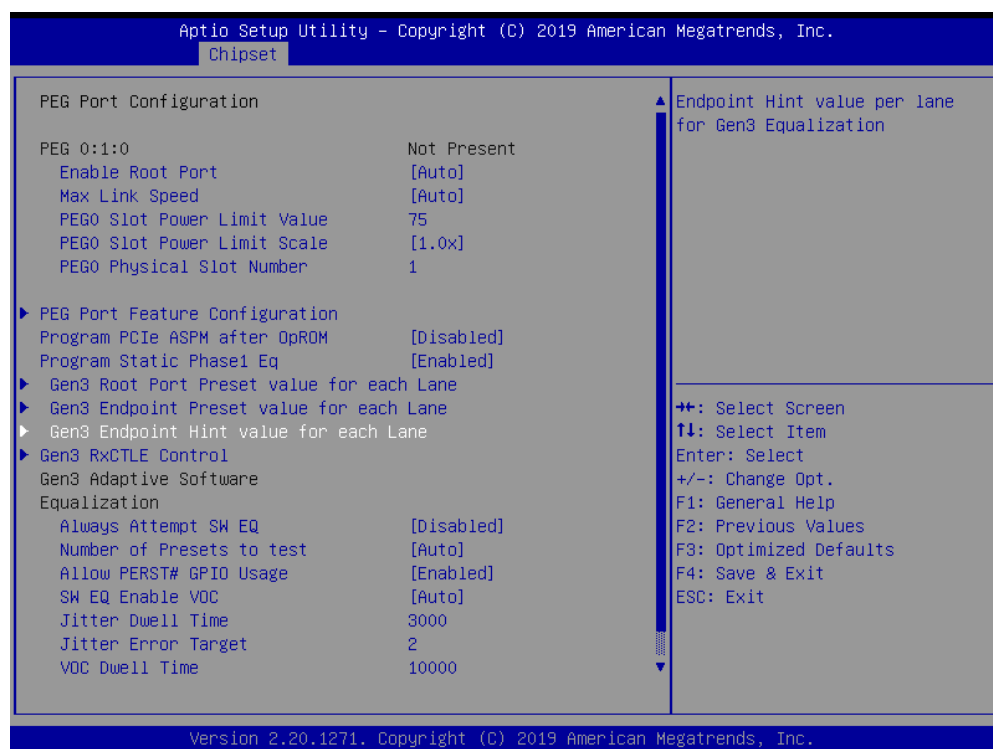


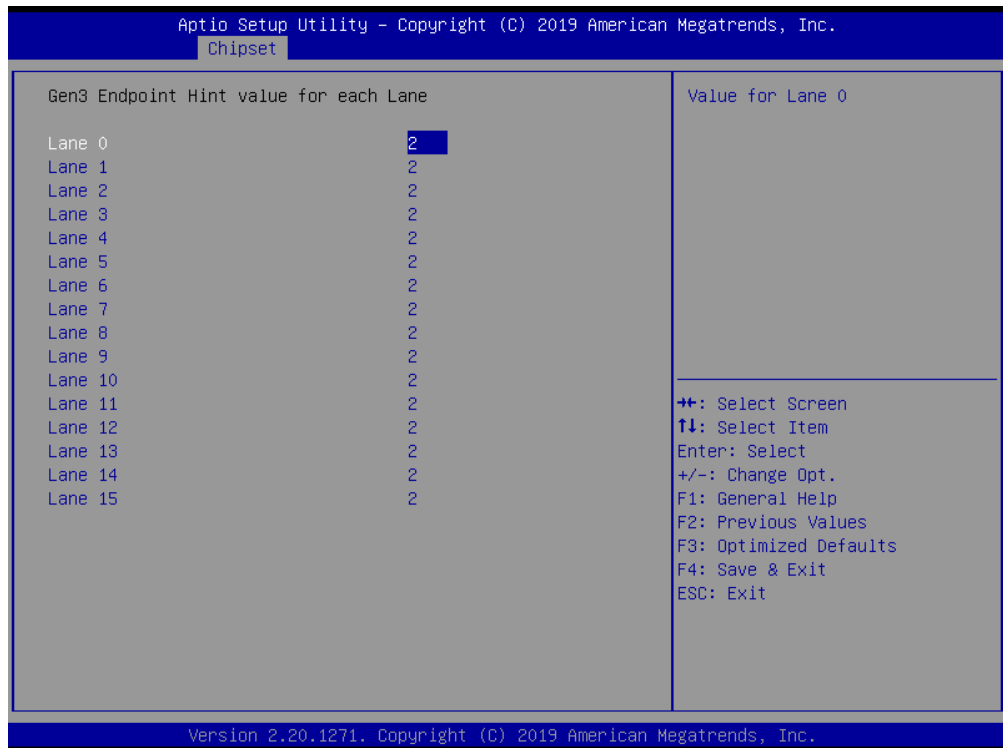
- **Gen3 Root Port Preset Value for each Lane**  
 Root Port Preset Value Per lane for Gen3 Equalization



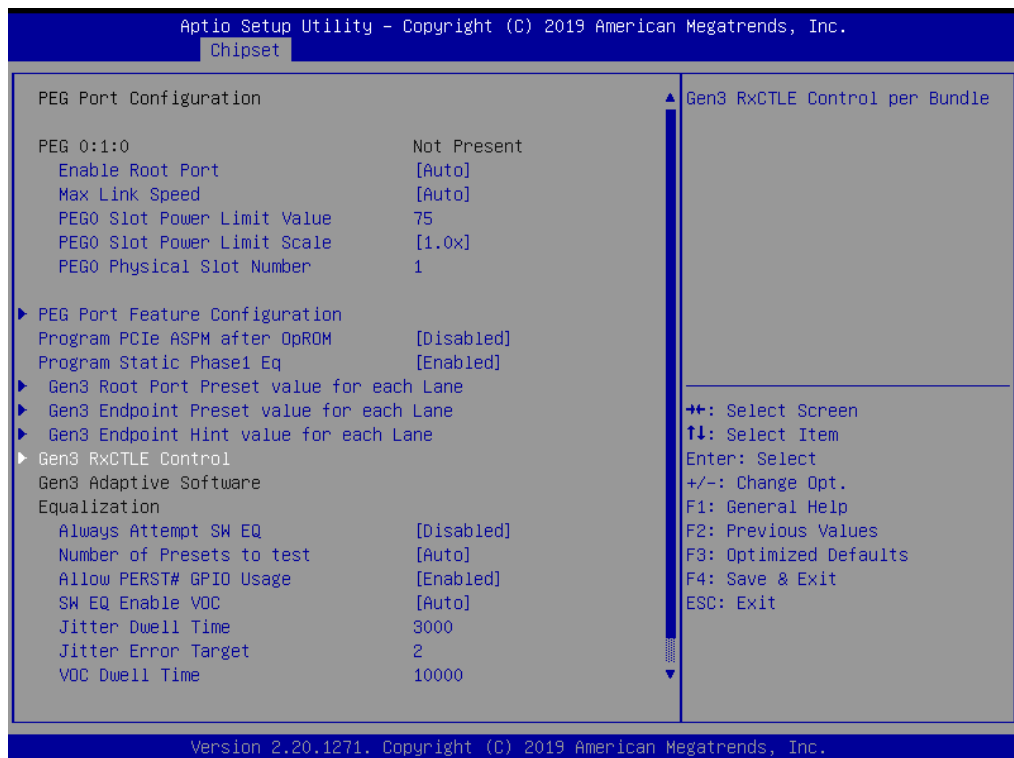


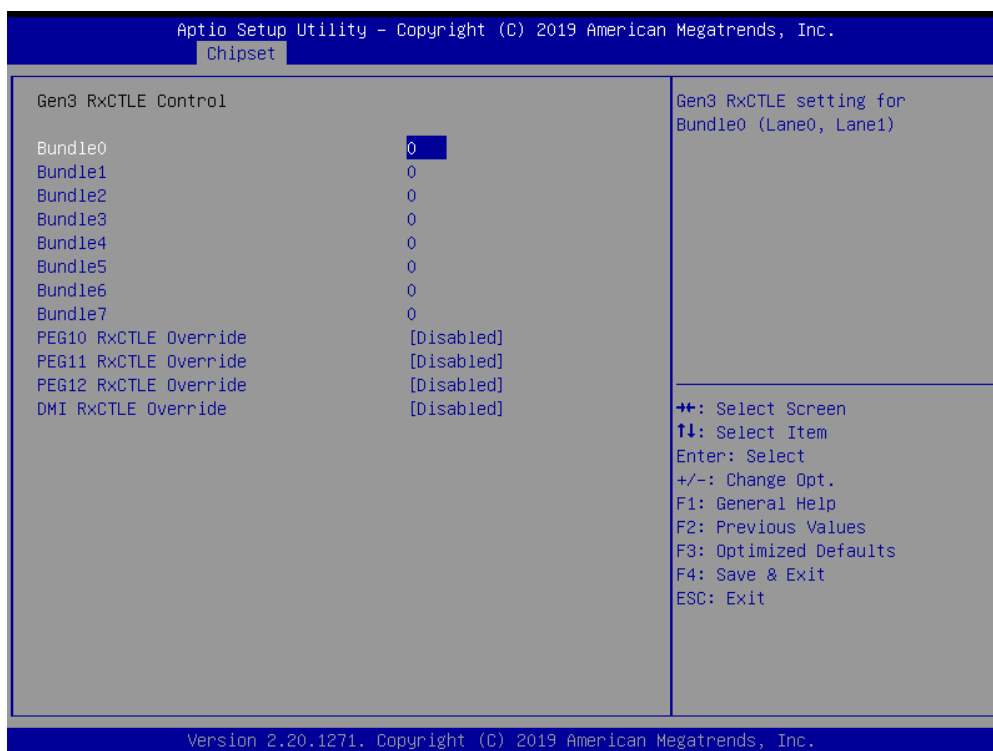
- **Gen3 Endpoint Preset Value each Lane**  
 Endpoint Preset Value Per lane for Gen3 Equalization.





- **Gen3 Endpoint Hint Value each Lane**  
Endpoint Hint Value Per lane for Gen3 Equalization.



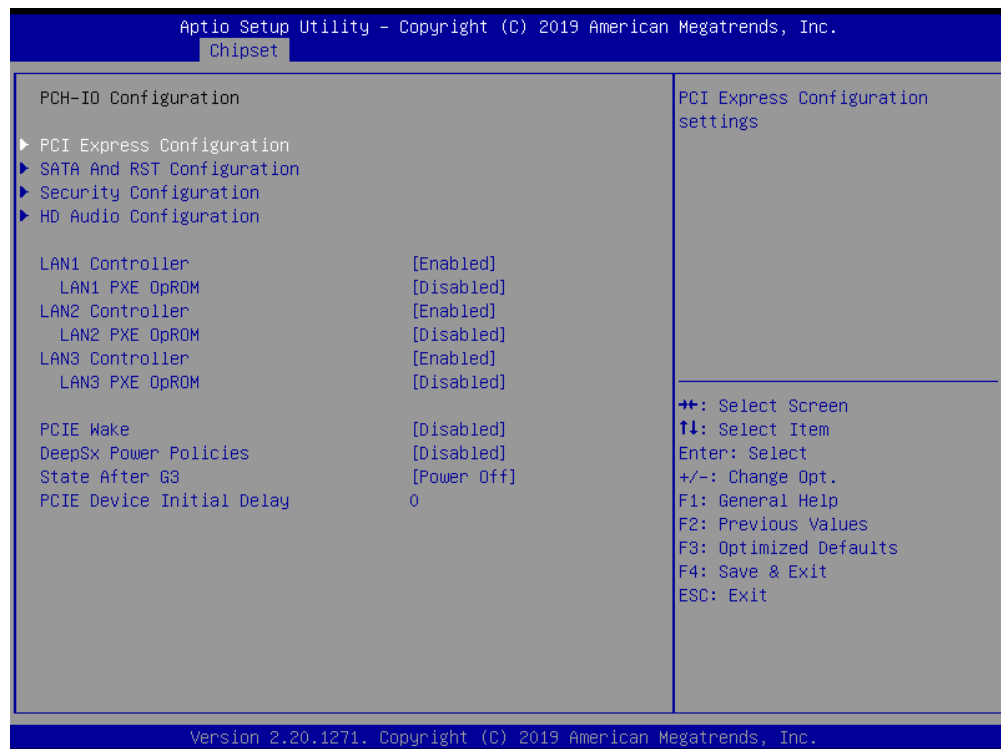


- **PEG10 RxCTLE Override [Disabled]**
- **PEG11 RxCTLE Override [Disabled]**
- **PEG12 RxCTLE Override [Disabled]**
- **DMI RxCTLE Override [Disabled]**

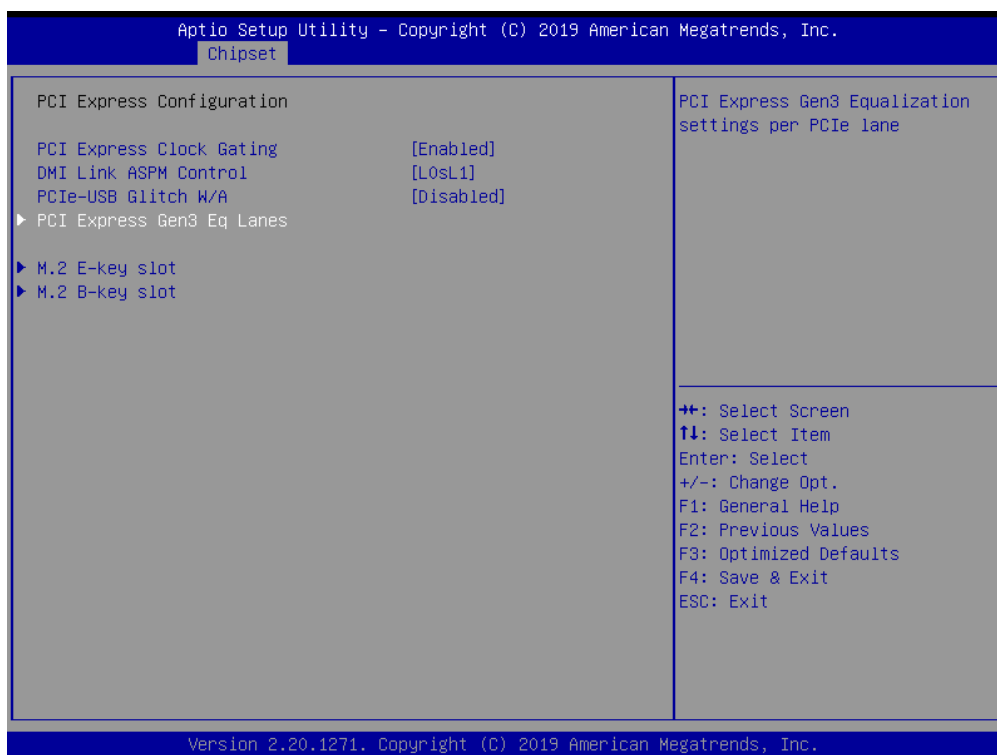
### 3.3.2 PCH-IO Configuration



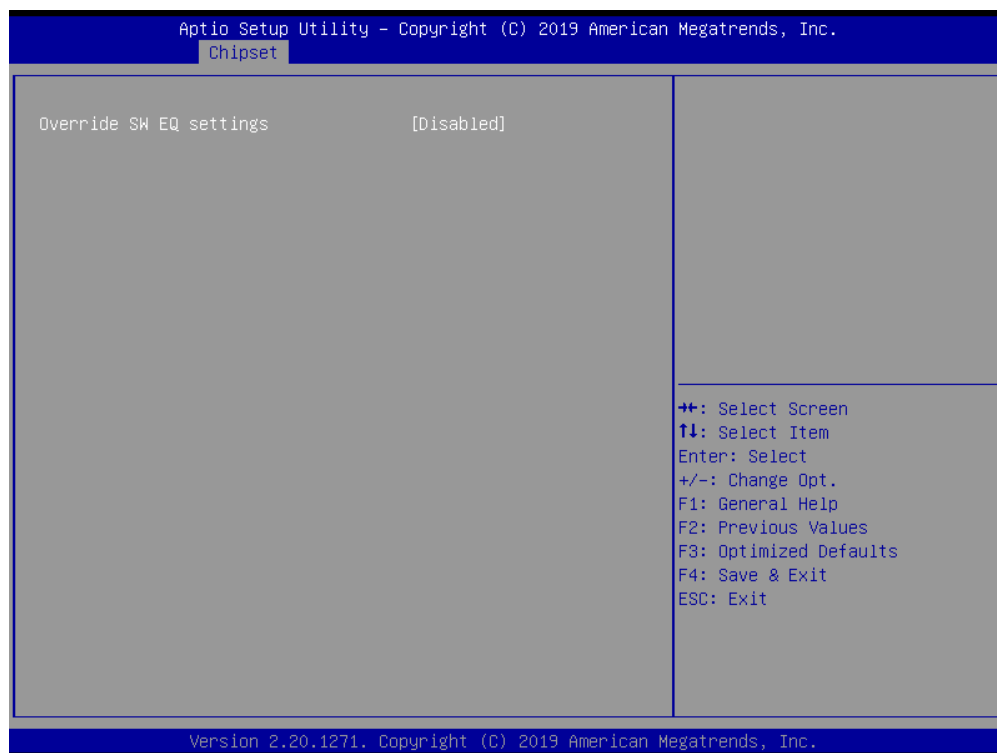
### 3.3.2.1 PCI Express Configuration



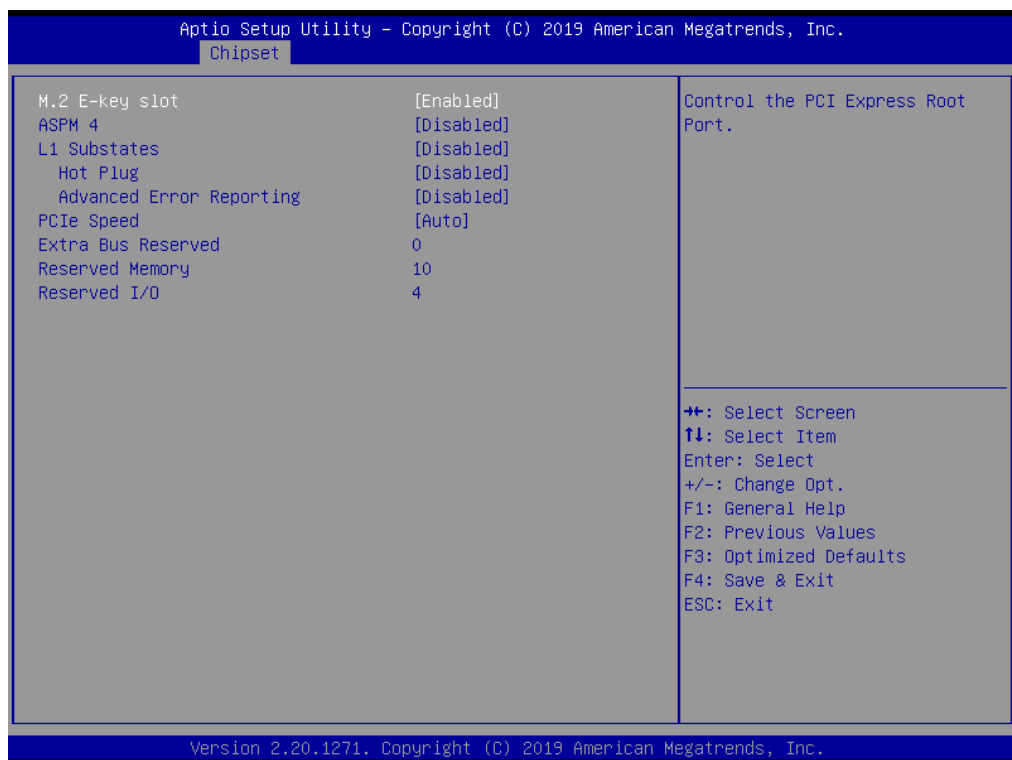
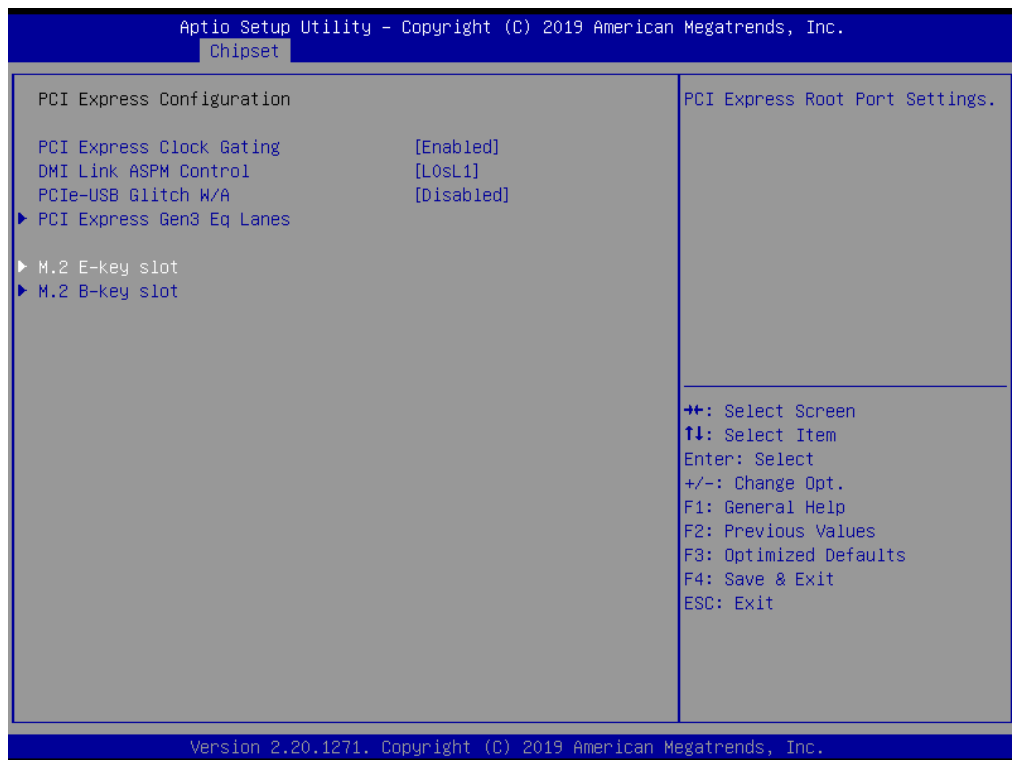
- **PCI Express Configuration**
- **SATA And RST Configuration**
- **Security Configuration**
- **HD Audio Configuration**
- **LAN1 Controller [Enabled]**  
Enable or disable the LAN1 controller.
- **LAN1 PXE OpROM [Disabled]**  
Enable or disable the LAN1 controller.
- **LAN 2 controller [Enabled]**  
Enable or disable the LAN2 controller.
- **LAN2 PXE OpROM [Disabled]**  
Enable or disable the LAN2 controller.
- **LAN3 controller [Enabled]**  
Enable or disable the LAN3 controller.
- **LAN3 PXE OpROM [Disabled]**  
Enable or disable the LAN3 controller.
- **PCIE Wake [Disabled]**  
Enable or disable PCIE to wake the system from S5.
- **DeepSx Power Policies [Disabled]**
- **State After G3 [Power Off]**  
This item allows users to select off, on and last state.



- **PCI Express Clock Gating [Enabled]**  
Enable or Disable PCI Express clock gating for each port.
- **DMI Link ASPM Control [L0sL1]**
- **PCIe-USB Glitch W/A [Disabled]**  
PCIe-USB Glitch W/A for bad USB device(s) connected behind PCIE/PEG Port

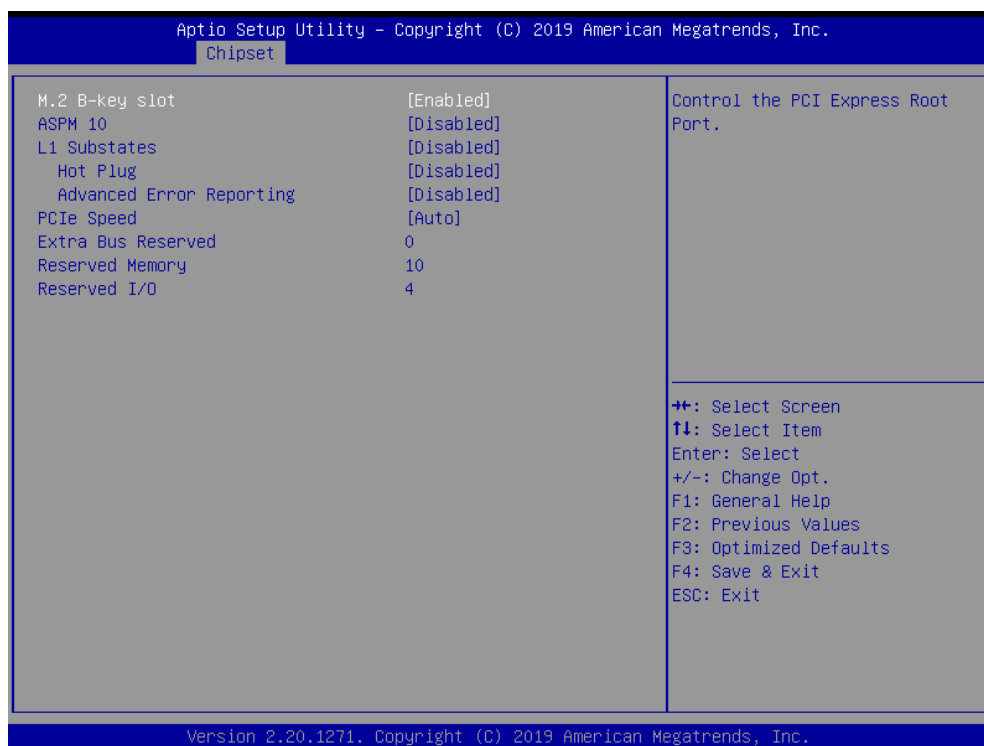
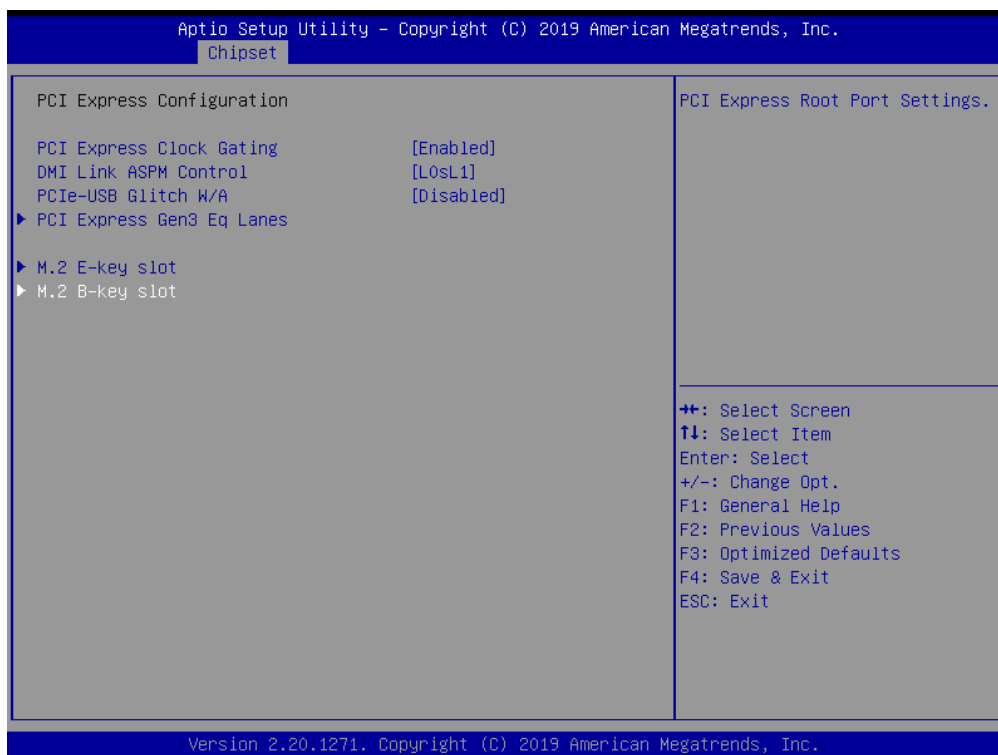


- **Override SW EQ Settings [Disabled]**



## M.2 E-key slot

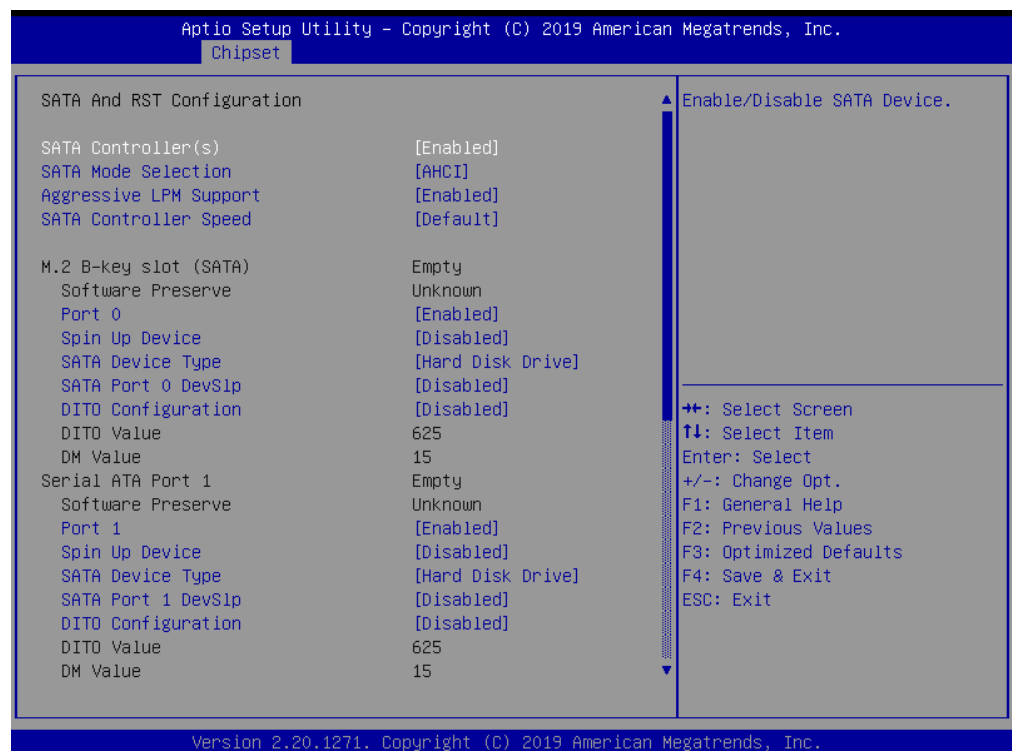
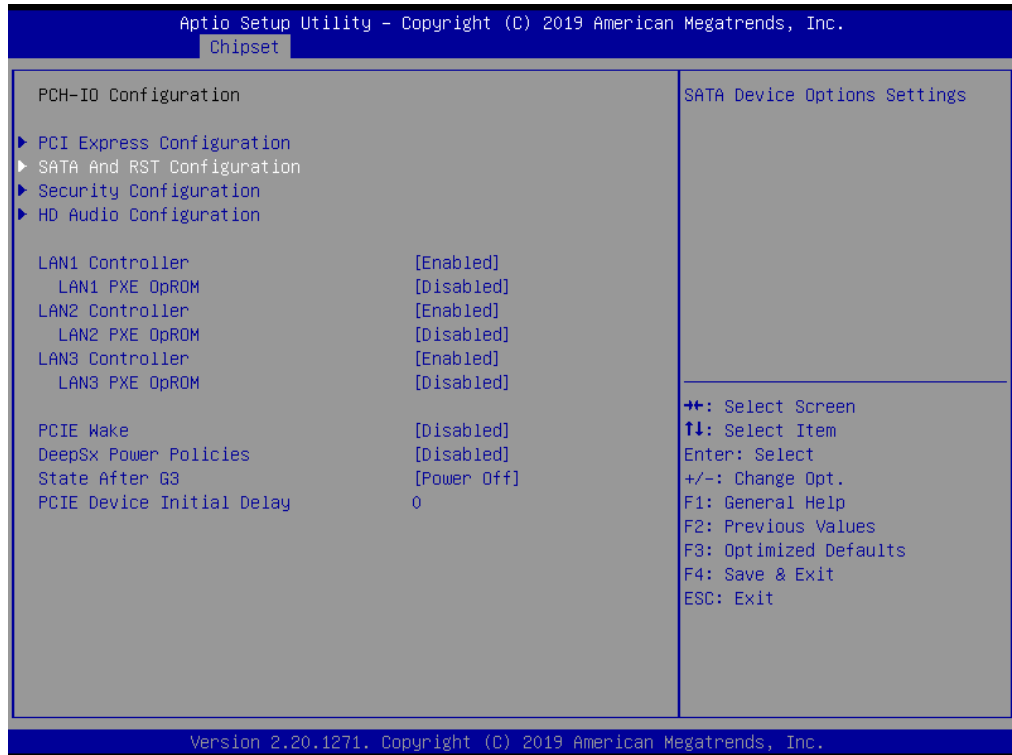
- **M.2 E-Key slot [ Enabled ]**  
Control the M.2 E-Key Root Port.
- **ASPM 4 [Disabled]**  
Set the ASPM Level: Force L0s - Force all links to L0s State : AUTO - BIOS auto configure: DISABLE - Disables ASPM
- **L1 Substates [Disabled]**
- **Hot Plug [Disabled]**
- **Advanced Errors Reporting [Disabled]**
- **PCIE Speed [Auto]**



### M.2 B-key slot

- **M.2 B-Key slot [Enabled]**  
Control the M.2 B-Key Root Port.
- **ASPM 10 [Disabled]**  
Set the ASPM Level: Force L0s - Force all links to L0s State : AUTO - BIOS auto configure: DISABLE - Disables ASPM
- **L1 Substates [Disabled]**
- **Hot Plug [Disabled]**
- **Advanced Errors Reporting [Disabled ]**
- **PCIE Speed [Auto]**

### 3.3.2.2 SATA and RST Configuration



- **SATA Controller(s) [Enabled]**
- **SATA Mode Selection [AHCI]**
- **Aggressive LPM Support [Enabled]**
- **SATA Controller Speed [Default]**

#### M.2 B-key slot (SATA)

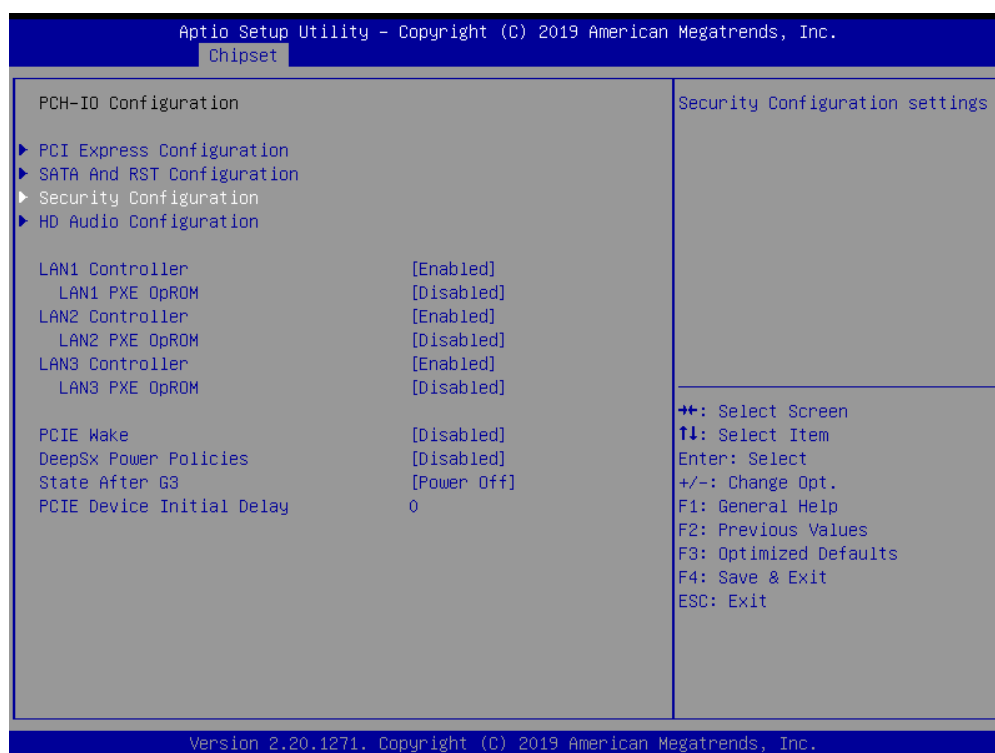
- **Port 0 [Enabled]**
- **Spin Up Device [Disabled]**

- SATA Device Type [Hard Disk Drive]
- SATA Port 0 DevS1p [Disabled]
- DIT0 Configuration [Disabled]

#### Serial ATA Port 1 (SATA)

- Port 1 [Enabled]
- Spin Up Device [Disabled]
- SATA Device Type [Hard Disk Drive]
- SATA Port 1 DevS1p [Disabled]
- DIT0 Configuration [Disabled]

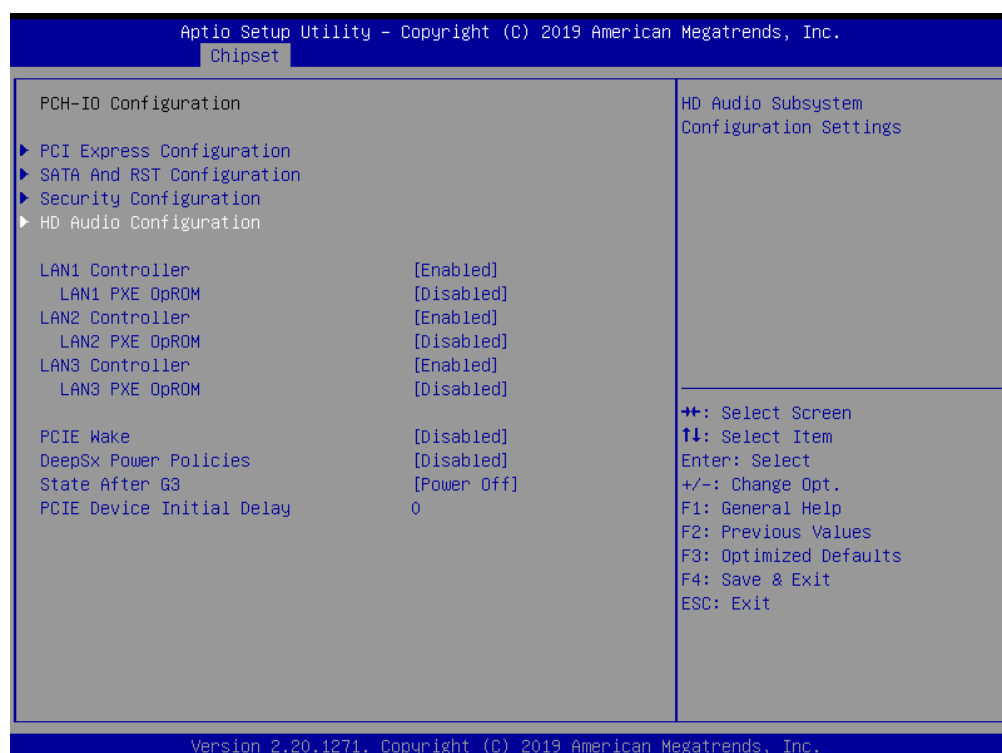
### 3.3.2.3 Security Configuration

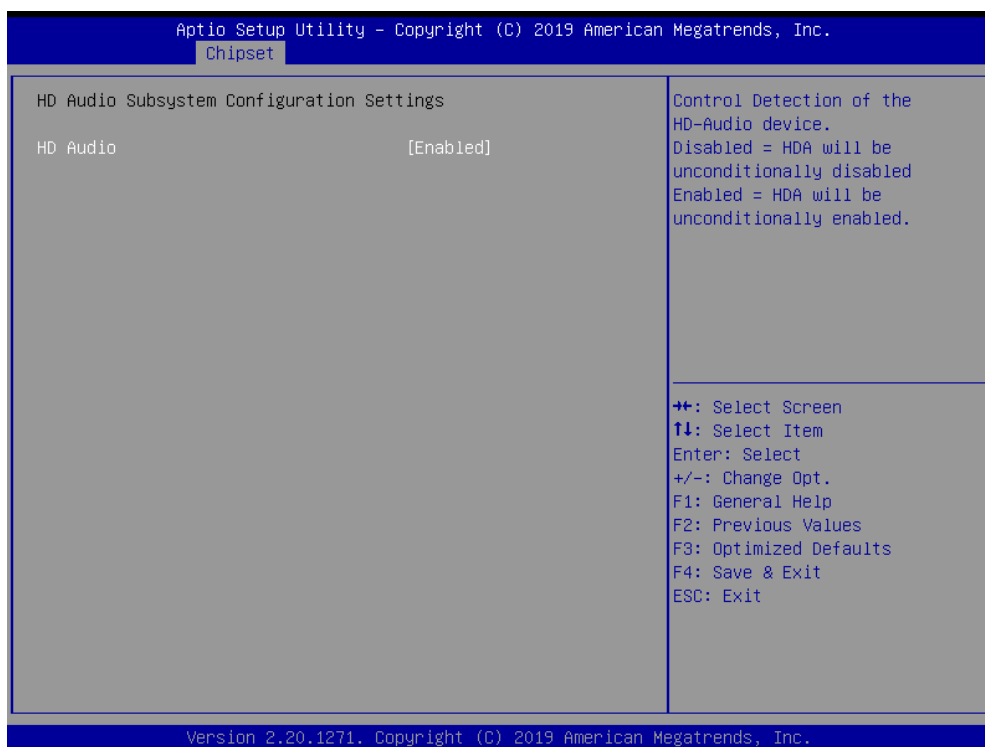




- **RTC Memory Lock [Enabled]**
- **BIOS Lock [Enabled]**

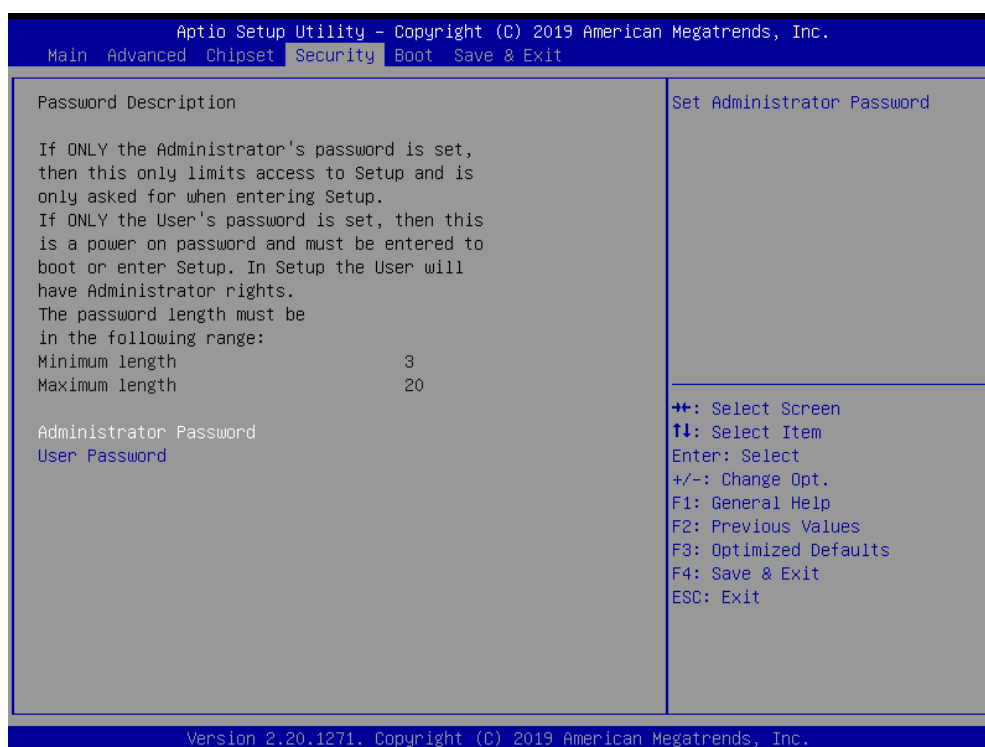
### 3.3.2.4 HD Audio Configuration





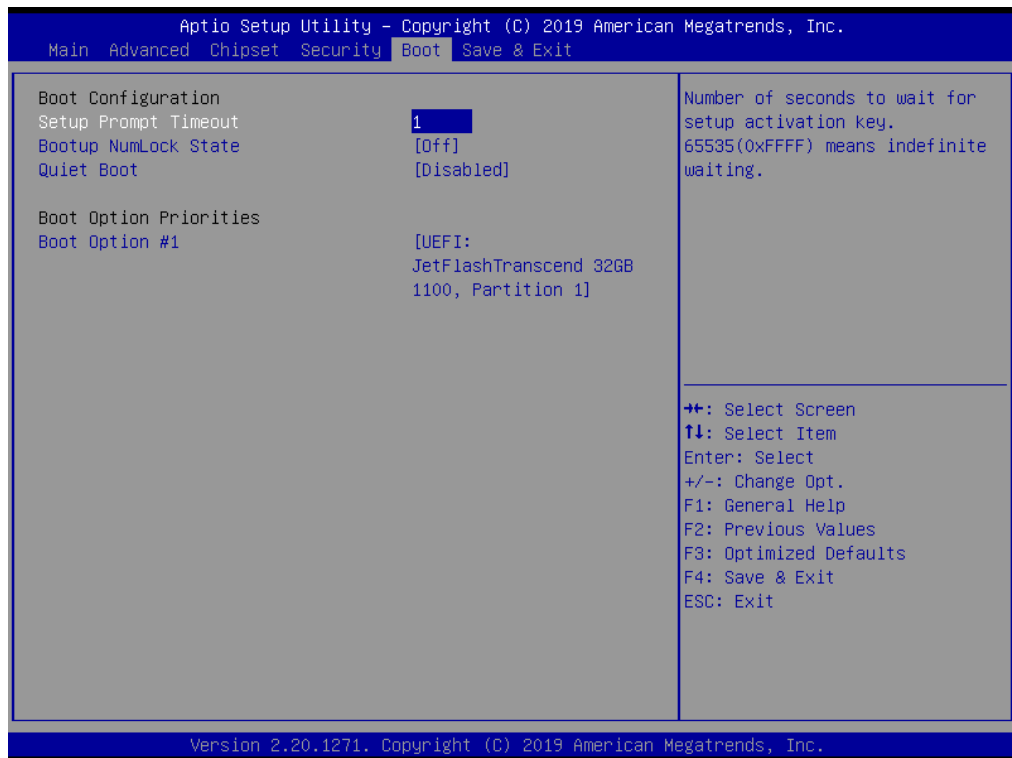
- **HD Audio [Enabled]**

## 3.4 Security



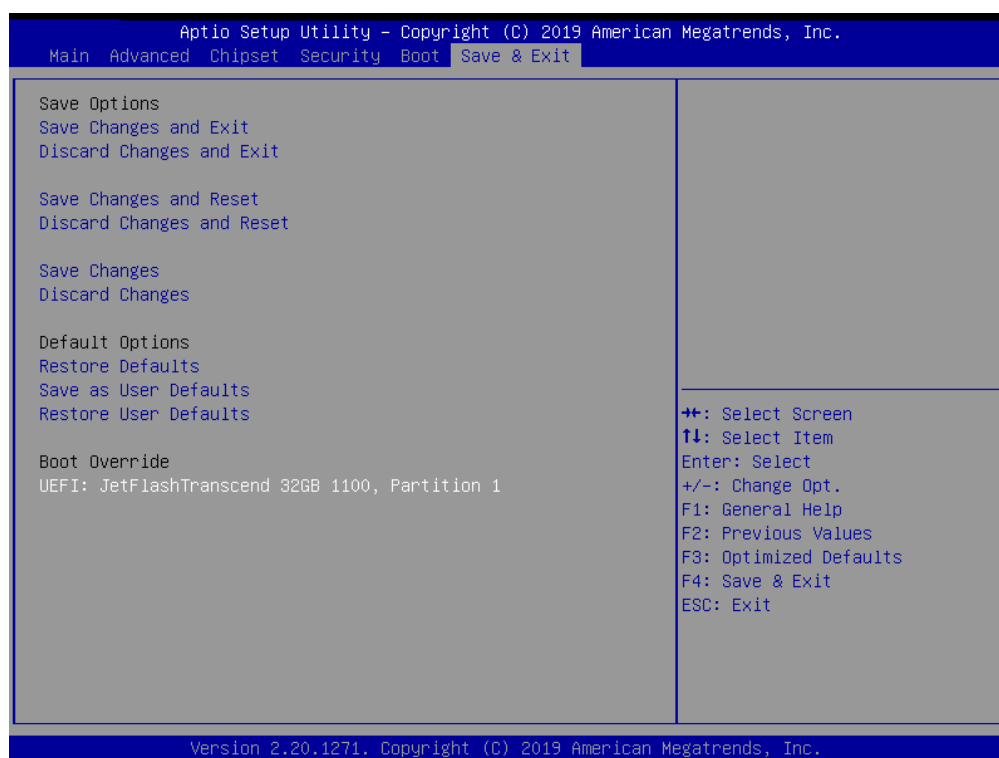
- **Administrator Password**  
Select this option and press <ENTER> to access the sub menu, and then type in the password. Set the Administrator password.
- **User Password**  
Select this option and press <ENTER> to access the sub menu, and then type in the password. Set the User Password.

## 3.5 Boot Setting



- **Setup Prompt Timeout**  
User the <+> and <-> keys to adjust the number of seconds to wait for setup activation key.
- **Bootup NumLock State [On]**  
On or Off power on state for the NumLock
- **Quiet Boot [Disabled]**  
If this option is set to disabled, the BIOS displays normal POST messages. If enabled, an OEM logo is shown instead of POST messages

## 3.6 Save & Exit Configuration



### ■ Save Changes and Exit

When users have completed system configuration, select this option to save changes, exit BIOS setup menu and reboot the computer to take effect all system configuration parameters.

1. Select Exit Saving Changes from the Exit menu and press <Enter>. The following message appears: Save Configuration Changes and Exit Now? [Ok] [Cancel]
2. Select Ok or cancel.

### ■ Discard Changes and Exit

Select this option to quit Setup without making any permanent changes to the system configuration.

1. Select Exit Discarding Changes from the Exit menu and press <Enter>. The following message appears: Discard Changes and Exit Setup Now? [Ok] [Cancel]
2. Select Ok to discard changes and exit. Discard Changes Select Discard Changes from the Exit menu and press <Enter>.

### ■ Save Changes and Reset

When users have completed system configuration, select this option to save changes, exit BIOS setup menu and reboot the computer to take effect all system configuration parameters.

1. Select Exit Saving Changes from the Exit menu and press <Enter>. The following message appears: Save Configuration Changes and Exit Now? [Ok] [Cancel]
2. Select Ok or cancel.

### ■ Discard Changes and Reset

Select this option to quit Setup without making any permanent changes to the system configuration.

- 
1. Select Reset Discarding Changes from the Exit menu and press <Enter>. The following message appears: Discard Changes and Exit Setup Now? [Ok] [Cancel]
  2. Select Ok to discard changes and reset. Discard Changes Select Discard Changes from the Exit menu and press <Enter>.

■ **Restore Default**

The BIOS automatically configures all setup items to optimal settings when users select this option. Defaults are designed for maximum system performance, but may not work best for all computer applications. In particular, do not use the Defaults if the user's computer is experiencing system configuration problems. Select Restore Defaults from the Exit menu and press <Enter>.

■ **Save as User Default**

Save the all current settings as a user default.

■ **Restore User Default**

Restore all settings to user default values.

# Chapter 4

Software Introduction  
& Service

## 4.1 Introduction

The mission of Advantech Embedded Software Services is to "Enhance quality of life with Advantech platforms and Microsoft® Windows® embedded technology." We enable Windows® Embedded software products on Advantech platforms to more effectively support the embedded computing community. Customers are freed from the hassle of dealing with multiple vendors (hardware suppliers, system integrators, embedded OS distributors) for projects. Our goal is to make Windows® Embedded Software solutions easily and widely available to the embedded computing community.

## 4.2 Value-Added Software Services

Software API: An interface that defines the ways by which an application program may request services from libraries and/or operating systems.

### 4.2.1 Software API

#### 4.2.1.1 Control

##### GP I/O



General Purpose Input/Output is a flexible parallel interface that allows a variety of custom connections. It allows users to monitor the level of signal input or set the output status to switch on/off the device. Our API also provides a Programmable GPIO, which allows developers to dynamically set the GPIO input or output status.

##### SMBus



SMBus is the System Management Bus defined by Intel Corporation in 1995. It is used in personal computers and servers for low-speed system management communications. The SMBus API allows a developer to interface a embedded system environment and transfer serial messages using the SMBus protocols, allowing multiple simultaneous device control.

#### 4.2.1.2 Display

##### Brightness Control



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

### Backlight



The Backlight API allows a developer to control the backlight (screen) on/off in embedded devices.

#### 4.2.1.3 Monitor

### Watchdog



A watchdog timer (WDT) is a device that performs a specific operation after a certain period of time if something goes wrong and the system does not recover on its own. A watchdog timer can be programmed to perform a warm boot (restarting the system) after a certain number of seconds.

### Hardware Monitor



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

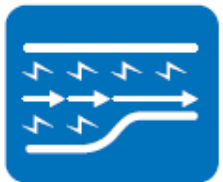
#### 4.2.1.4 Power Saving

### CPU Speed



Makes use of Intel SpeedStep BIOS technology to save power consumption. The system will automatically adjust the CPU speed depending on the system loading.

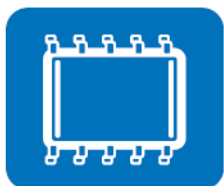
### System Throttling



Refers to a series of methods for reducing power consumption in computers by lowering the clock frequency. This API allows the user to adjust the clock 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 use it to back up current BIOS by copying it from the flash chip to a file on customers' disk. The BIOS Flash utility also provides a command line version and an API for fast implementation into customized applications.

---

### **Embedded Security ID**



The embedded application is the most important property of a system integrator. It contains valuable intellectual property, design knowledge and innovation, but it is easy to copy! Embedded Security ID utility provides reliable security functions for customers to secure their application data within the embedded BIOS.

### **Monitoring**



The Monitoring is a utility for customer to monitor the system health, like voltage, CPU and system temperature and fan speed. These items are important to a device. If the critical errors occur and are not solved immediately, permanent damage may be caused.

# Chapter 5

Chipset Software  
Installation Utility

## 5.1 Before You Begin

To facilitate the installation of the enhanced display drivers and utility software, read the instructions in this chapter carefully. The drivers for the AIMB-286EF are located on the Advantech support website: <http://support.advantech.com/Support/>. The drivers on the support website will guide and link you to the utilities and drivers under a Windows system. Updates are provided via Service Packs from Microsoft\*.

**Note!** *The driver files on the website are compressed. Do not attempt to install the drivers by copying the files manually. You must download the files and decompress them first. Also, please use the supplied SETUP program to install the drivers.*



Before you begin, it is important to note that most display drivers need to have the relevant software application already installed in the system prior to installing the enhanced display drivers. In addition, many of the installation procedures assume that you are familiar with both the relevant software applications and operating system commands. Review the relevant operating system commands and the pertinent sections of your application software's user manual before performing the installation.

## 5.2 Introduction

The Intel® Chipset Software Installation (CSI) utility installs the Windows INF files that outline to the operating system how the chipset components will be configured. This is needed for the proper functioning of the following features:

- 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

## Graphic Setup

## 6.1 Introduction

The 8th/9th Gen Intel Core i processors are embedded with an integrated graphics controller. You need to install the graphic driver to enable the function.

Optimized integrated graphic solution: Intel Graphics Flexible supports versatile display options and a 32-bit 3D graphics engine. Dual independent displays include enhanced display modes for widescreen flat panels for, extended, twin, clone and dual display modes, and optimized 3D support delivers an intensive and realistic visual experience.

## 6.2 Windows 10 Graphic Driver Installation

**Note!** *Before installing this driver, make sure the CSI utility has been installed in your system. See Chapter 5 for information on installing the CSI utility.*



Download the driver from website on your computer. Navigate to the "AIMB-286EF\_Graphic\_Win10(64bit)" folder and click "setup.exe" to complete the installation of the drivers for Windows 10.

Win 10(64bit) Driver for AIMB-286EF

Solution : Win 10(64bit) Driver for AIMB-286EF

Download File	Released Date	Download Site	
AIMB-286EF_Chipset_Win10(64bit).zip	2019-10-03	Primary	Secondary
AIMB-286EF_Graphic_Win10(64bit).zip	2019-10-03	Primary	Secondary
AIMB-286EF_Intel LAN_Win10(64bit).zip	2019-10-03	Primary	Secondary
AIMB-286EF_Intel ME_Win10(64bit).zip	2019-10-03	Primary	Secondary
AIMB-286EF_Others_Win10(64bit).zip	2019-10-03	Primary	Secondary
AIMB-286EF_Realtek LAN_Win10(64bit).zip	2019-10-03	Primary	Secondary
AIMB-286EF_Audio_Win10(64bit).zip	2019-10-03	Primary	Secondary

# Chapter 7

## LAN Configuration

## 7.1 Introduction

The AIMB-286EF has three Gigabit Ethernet LANs via dedicated PCI Express x1 lanes (Realtek 8111H (LAN1/2) and Intel i211AT (LAN3)) that offer bandwidth of up to 500 MB/sec, eliminating the bottleneck of network data flow and incorporating Gigabit Ethernet at 1000 Mbps.

## 7.2 Features

- Integrated 10/100/1000 Mbps transceiver
- 10/100/1000 Mbps triple-speed MAC
- High-speed RISC core with 24-KB cache
- On-chip voltage regulation
- Wake-on-LAN (WOL) support
- PCI Express X1 host interface

## 7.3 Installation

**Note!** Before installing this driver, make sure the CSI utility has been installed in your system. See Chapter 5 for information on installing the CSI utility.



The AIMB-286EF's Realtek 8111H (LAN1/2) and Intel i211AT (LAN3) Gigabit integrated controllers support all major network operating systems. However, the installation procedure varies from system to system. Please find and use the section that provides the driver setup procedure for the OS you are using.

## 7.4 Windows® 10 Driver Setup (Realtek 8111H & Intel i211AT)

Download the driver from support website on your computer and decompressed the file. Select the "Autorun" then navigate to the directory for your OS.

Win 10(64bit) Driver for AIMB-286EF

Solution : Win 10(64bit) Driver for AIMB-286EF

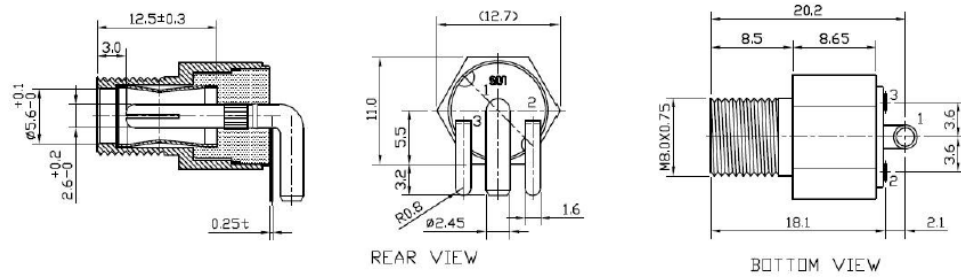
Download File	Released Date	Download Site	
AIMB-286EF_Chipset_Win10(64bit).zip	2019-10-03	Primary	Secondary
AIMB-286EF_Graphic_Win10(64bit).zip	2019-10-03	Primary	Secondary
AIMB-286EF_Intel LAN_Win10(64bit).zip	2019-10-03	Primary	Secondary
AIMB-286EF_Intel ME_Win10(64bit).zip	2019-10-03	Primary	Secondary
AIMB-286EF_Others_Win10(64bit).zip	2019-10-03	Primary	Secondary
AIMB-286EF_Realtek LAN_Win10(64bit).zip	2019-10-03	Primary	Secondary
AIMB-286EF_Audio_Win10(64bit).zip	2019-10-03	Primary	Secondary

# Appendix **A**

## I/O Pin Assignments

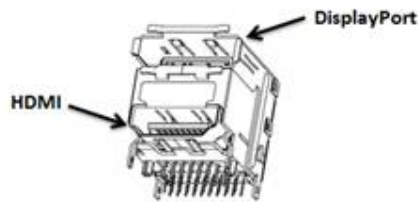
## A.1 Connector and Header List Description

### A.1.1 DC Input Phoenix Connector (DCIN1)



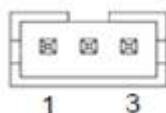
Pin	Signal Pin Definition
1	Power input (Only +12V)
2	GND
3	GND

### A.1.2 Definition Multimedia Interface (DP1+HDMI2)



Pin	Signal Pin Definition	Pin	Signal Pin Definition
1	HDMI1_Z_D2+	A1	DP1_0+
2	GND	A2	GND
3	HDMI1_Z_D2-	A3	DP1_0-
4	HDMI1_Z_D1+	A4	DP1_1+
5	GND	A5	GND
6	HDMI1_Z_D1-	A6	DP1_1-
7	HDMI1_Z_D0+	A7	DP1_2+
8	GND	A8	GND
9	HDMI1_Z_D0-	A9	DP1_2-
10	HDMI1_Z_CLK+	A10	DP1_3+
11	GND	A11	GND
12	HDMI1_Z_CLK-	A12	DP1_3-
13	x	A13	DP1_AUX_EN#
14	x	A14	GND
15	HDMI1_SCL	A15	DP1_AUX+
16	HDMI1_SDA	A16	GND
17	GND	A17	DP1_AUX-
18	+V5_HDMI	A18	DP1_HPD
19	HDMI1_HPD	A19	GND
		A20	+V3.3_DP1

### A.1.3 ATX Power Supply (5VSB) Connector (ATX\_5VSB1)



Pin	Signal Pin Definition
1	+V5SB
2	GND
3	PS_ON#

### A.1.4 USB 3.0 Stack Connector (USB312)



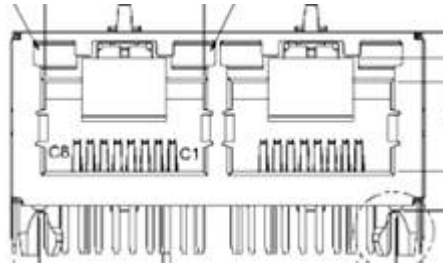
Pin	Signal Pin Definition	Pin	Signal Pin Definition
1	+5V	11	+5V
2	USB_D1-	12	USB_D2-
3	USB_D1+	13	USB_D2+
4	GND	14	GND
5	USB31X1_z_RX-	15	USB31X2_z_RX-
6	USB31X1_z_RX+	16	USB31X2_z_RX+
7	GND	17	GND
8	USB31X1_z_TX-	18	USB31X2_z_TX-

### A.1.5 USB 3.0 Stack Connector (USB334)



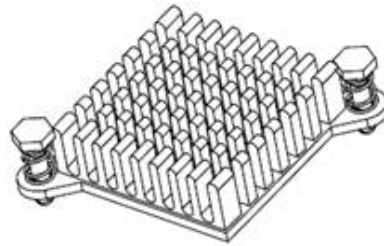
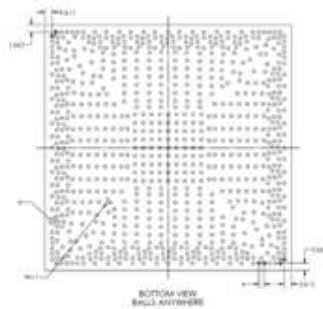
Pin	Signal Pin Definition	Pin	Signal Pin Definition
1	+5V	11	+5V
2	USB_D3-	12	USB_D4-
3	USB_D3+	13	USB_D4+
4	GND	14	GND
5	USB31X3_z_RX-	15	USB31X4_z_RX-
6	USB31X3_z_RX+	16	USB31X4_z_RX+
7	GND	17	GND
8	USB31X3_z_TX-	18	USB31X4_z_TX-

## A.1.6 RJ45 2 Port (LAN12)

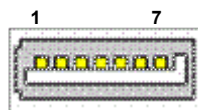


Pin	Signal Pin Definition	Pin	Signal Pin Definition
B1	LAN1_MDI0+	A1	LAN2_MDI0+
B2	LAN1_MDI0-	A2	LAN2_MDI0-
B3	LAN1_MDI1+	A3	LAN2_MDI1+
B4	LAN1_MDI1-	A4	LAN2_MDI1-
B5	LAN1_CONN	A5	LAN2_CONN
B6	LAN1_CT	A6	LAN2_CT
B7	LAN1_MDI2+	A7	LAN2_MDI2+
B8	LAN1_MDI2-	A8	LAN2_MDI2-
B9	LAN1_MDI3+	A9	LAN2_MDI3+
B10	LAN1_MDI3-	A10	LAN2_MDI3-
B11	LAN1_LED0_ACT#_R	A11	LAN2_LED0_ACT#_R
B12	+V3.3_DUAL	A12	+V3.3_DUAL
B13	LAN1_LED1_1G#_R	A13	LAN2_LED1_1G#_R
B14	LAN1_LED2_100M#_R	A14	LAN2_LED2_100M#_R

## A.1.7 Platform Controller Hub (PCH1)

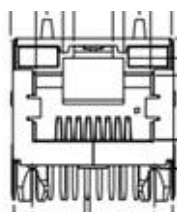


### A.1.8 SATA Signal Connector (SATA1/SATA2/SATA3)



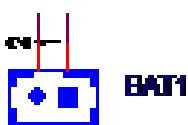
Pin	Signal Pin Definition
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

### A.1.9 RJ45 1 Port (LAN3)



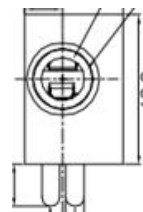
Pin	Signal Pin Definition
1	LAN3_MDIO+
2	LAN3_MDIO-
3	LAN3_MDIO1+
4	LAN3_MDIO1-
5	LAN3_CONN
6	LAN3_CT
7	LAN3_MDIO2+
8	LAN3_MDIO2-
9	LAN3_MDIO3+
10	LAN3_MDIO3-
11	LAN3_LED0_ACT#_R
12	+V3.3_LAN3_R
13	LAN3_LED1_1G#_R
14	LAN3_LED2_100M#_R

### A.1.10 Battery Wafer Box (BAT1)



Pin	Signal Pin Definition
1	VBAT
2	GND

**A.1.11 HD Analog Audio Interface (AUDIO1)**



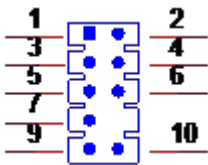
Pin	Signal Pin Definition
1	LINE-OUT

**A.1.12 HD Analog Audio Interface (AUDIO2)**



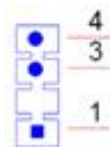
Pin	Signal Pin Definition
1	MIC

**A.1.13 Front HD Analog Audio Interface (FPAUD1)**



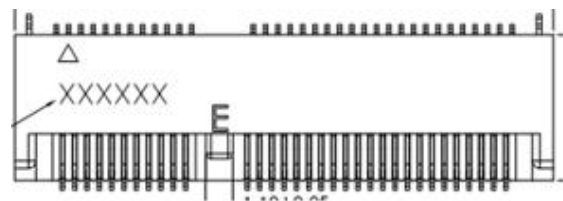
Pin	Signal Pin Definition	Pin	Signal Pin Definition
1	MIC IN L	2	GND
3	MIC IN R	4	FPAUD_DETECT#
5	LINE OUT R	6	SENSE R1
7	SENSE	8	KEY
9	LINE OUT L	10	SENSE R2

**A.1.14 HD Digital Audio Interface (SPDIF1)**



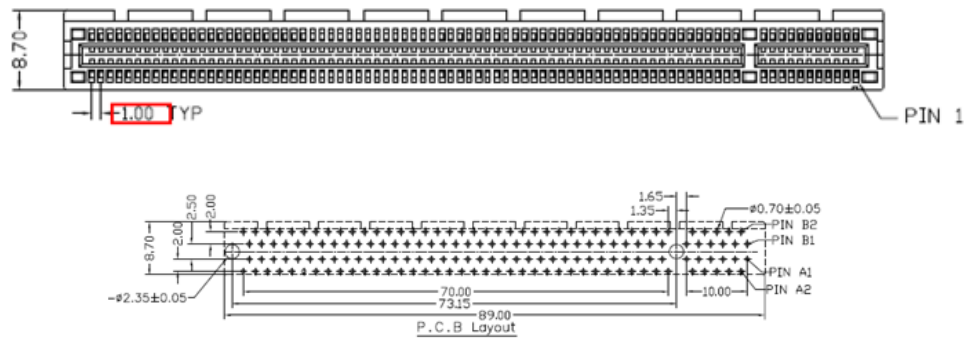
Pin	Signal Pin Definition
1	+5V
2	SPDIF OUT
3	GND

### A.1.15 NGFF M.2 E-Key Connector for 2230 Module (M2E1)



Pin	Signal Pin Definition <sup>6</sup>	Pin	Signal Pin Definition
1	GND	2	+3.3V
3	USB_D+	4	+3.3V
5	USB_D-	6	LED1# (I)(OD)
7	GND	8	PCM_CLK/I2S SCK (O/I)(0/1.8V)
9	CNV_WR_z_D1-	10	PCM_SYNC/I2S WS (io)(0/1.8V)
11	CNV_WR_z_D1+	12	PCM_IN/I2S SD_IN (I)(0/1.8V)
13	GND	14	PCM_OUT/I2S SD_OUT (O)(0/1.8V)
15	CNV_WR_z_D0-	16	LED2# (I)(OD)
17	CNV_WR_z_D0+	18	GND
19	GND	20	UART WAKE# (I)(0/3.3V)
21	CNV_WR_z_CLK-	22	UART RXD (I)(0/1.8V)
23	CNV_WR_z_CLK+	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	CNV_RGI_DT
33	GND	34	CNV_RGI_RSP
35	PETp0	36	CNV_BRI_DT
37	PETn0	38	PCH_CLINK_RST#
39	GND	40	PCH_CLINK_DATA
41	PERp0	42	PCH_CLINK_CLK
43	PERn0	44	CNV_GNSS_BLANKING
45	GND	46	CNV_MFUART2_TXD
47	REFCLKp0	48	CNV_MFUART2_RXD
49	REFCLKn0	50	SUSCLK(32kHz) (O)(0/3.3V)
51	GND	52	PERST0# (O)(0/3.3V)
53	CLKREQ0#	54	W_DISABLE2# (O)(0/3.3V)
55	PEWAKE0#	56	W_DISABLE1# (O)(0/3.3V)
57	GND	58	RESERVED
59	RESERVED/PETp1	60	RESERVED
61	RESERVED/PETn1	62	RESERVED
63	GND	64	M.2_38P4M_REFCLK
65	RESERVED/PERp1	66	RESERVED
67	RESERVED/PERn1	68	RESERVED
69	GND	70	PCIE_WAKE#
71	RESERVED/REFCLKp1	72	+3.3V
73	RESERVED/REFCLKn1	74	+3.3V
75	GND		

## A.1.16 PCI-E x16 Slot (PCIEX16\_1)



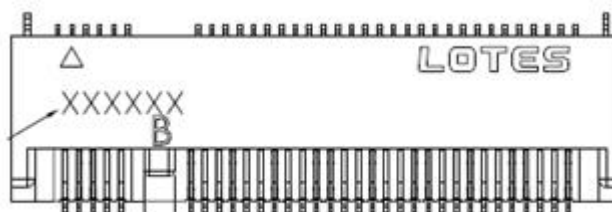
Pin	Signal Pin Definition	Pin	Signal Pin Definition
B1	+12V	A1	PRSNT1#
B2	+12V	A2	+12V
B3	+12V	A3	+12V
B4	GND	A4	GND
B5	SMB_CLK	A5	Reserved
B6	SMB_DATA	A6	Reserved
B7	GND	A7	Reserved
B8	+3.3V	A8	Reserved
B9	Reserved	A9	+3.3V
B10	+3.3VAUX	A10	+3.3V
B11	WAKE#	A11	PWRGD
B12	Reserved	A12	GND
B13	GND	A13	REFCLK+
B14	TX0+	A14	REFCLK-
B15	TX0-	A15	GND
B16	GND	A16	RX0+
B17	Reserved	A17	RX0-
B18	DETECT#	A18	GND
B19	TX1+	A19	CONFIG1
B20	TX1-	A20	GND
B21	GND	A21	RX1+
B22	GND	A22	RX1-
B23	TX2+	A23	GND
B24	TX2-	A24	GND
B25	GND	A25	RX2+
B26	GND	A26	RX2-
B27	TX3+	A27	GND

B28	TX3-	A28	GND
B29	GND	A29	RX3+
B30	Reserved	A30	RX3-
B31	Reserved	A31	GND
B32	GND	A32	Reserved
B33	TX4+	A33	Reserved
B34	TX4-	A34	GND
B35	GND	A35	RX4+
B36	GND	A36	RX4-
B37	TX5+	A37	GND
B38	TX5-	A38	GND
B39	GND	A39	RX5+
B40	GND	A40	RX5-
B41	TX6+	A41	GND
B42	TX6-	A42	GND
B43	GND	A43	RX6+
B44	GND	A44	RX6-
B45	TX7+	A45	GND
B46	TX7-	A46	GND
B47	GND	A47	RX7+
B48	Reserved	A48	RX7-
B49	GND	A49	GND
B50	TX8+	A50	Reserved
B51	TX8-	A51	GND
B52	GND	A52	RX8+
B53	GND	A53	RX8-
B54	TX9+	A54	GND
B55	TX9-	A55	GND
B56	GND	A56	RX9+
B57	GND	A57	RX9-
B58	TX10+	A58	GND
B59	TX10-	A59	GND
B60	GND	A60	RX10+
B61	GND	A61	RX10-
B62	TX11+	A62	GND
B63	TX11-	A63	GND
B64	GND	A64	RX11+
B65	GND	A65	RX11-

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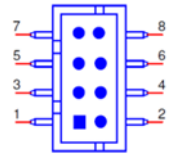
B66	TX12+	A66	GND
B67	TX12-	A67	GND
B68	GND	A68	RX12+
B69	GND	A69	RX12-
B70	TX13+	A70	GND
B71	TX13-	A71	GND
B72	GND	A72	RX13+
B73	GND	A73	RX13-
B74	TX14+	A74	GND
B75	TX14-	A75	GND
B76	GND	A76	RX14+
B77	GND	A77	RX14-
B78	TX15+	A78	GND
B79	TX15-	A79	GND
B80	GND	A80	RX15+
B81	Reserved	A81	RX15-
B82	Reserved	A82	GND

### A.1.17 NGFF M.2 B-Key Connector for 2242/3042 Module (M2B1)



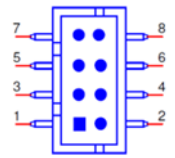
Pin	Signal Pin Definition <sup>6</sup>	Pin	Signal Pin Definition
1	CONFIG_3	2	+3.3V
3	GND	4	+3.3V
5	GND	6	FULL_CARD_POWER_OFF#
7	USB_D+	8	W_DISABLE1#
9	USB_D-	10	LED
11	GND	12	Connector KEY
13	Connector KEY	14	Connector KEY
15	Connector KEY	16	Connector KEY
17	Connector KEY	18	Connector KEY
19	Connector KEY	20	N/C
21	CONFIG_0	22	N/C
23	PCIE_WAKE#	24	N/C
25	DPR	26	M.2_GNSS_DISABLE#
27	GND	28	N/C
29	PERn1/USB3.0-Rx-/SSIC-RxN	30	UIM-RESET (I)
31	PERp1/USB3.0-Rx+/SSIC-RxP	32	UIM-CLK (I)
33	GND	34	UIM-DATA (io)
35	PETn1/USB3.0-Tx-/SSIC-TxN	36	UIM-PWR (I)
37	PETp1/USB3.0-Tx+/SSIC-TxP	38	SATA_DEVSLP (O)
39	GND	40	M.2_ISH_SCL
41	PERn0/SATA-B+	42	M.2_ISH_SDA
43	PERp0/SATA-B-	44	N/C
45	GND	46	N/C
47	PETn0/SATA-A-	48	N/C
49	PETp0/SATA-A+	50	PERST#
51	GND	52	CLKREQ#
53	REFCLKn	54	PEWAKE#
55	REFCLKp	56	N/C
57	GND	58	N/C
59	N/C	60	N/C
61	N/C	62	N/C
63	N/C	64	N/C
65	N/C	66	N/C
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.1.18 USB 2.0 Pin Header (USB56)



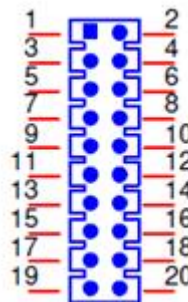
Pin	Signal Pin Definition	Pin	Signal Pin Definition
1	+5V	2	+5V
3	USB_D5-	4	USB_D6-
5	USB_D5+	6	USB_D6+
7	GND	8	GND

### A.1.19 USB 2.0 Pin Header (USB78)



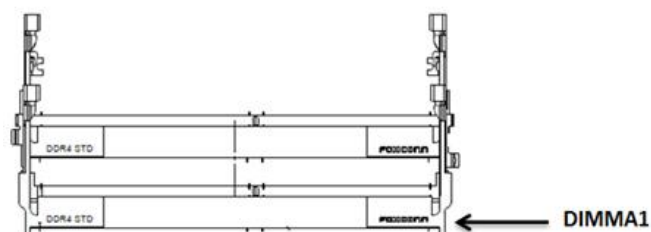
Pin	Signal Pin Definition	Pin	Signal Pin Definition
1	+5V	2	+5V
3	USB_D7-	4	USB_D8-
5	USB_D7+	6	USB_D8+
7	GND	8	GND

### A.1.20 General Purpose I/O Pin Header (GPIO1)



Pin	Signal Pin Definition	Pin	Signal Pin Definition
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	+5VSB	18	GND
19	+5VSB	20	GND

### A.1.21 DDR4 SO-DIMM Socket (DIMMA1)

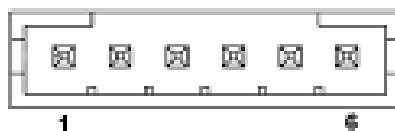


Please see JEDEC STANDARD Pin Definition

### A.1.22 Buzzer (SP1)



### A.1.23 PS/2 Keyboard and Mouse Connector (KBMS1)



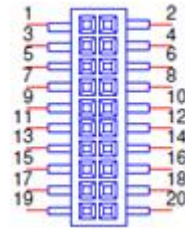
Pin	Signal Pin Definition
1	KB CLK
2	KB DATA
3	MS CLK
4	GND
5	+5V
6	MS DATA

### A.1.24 Low Pin Count Header (LPC1)



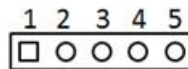
Pin	Signal Pin Definition	Pin	Signal Pin Definition
1	CLK (24MHz)	2	AD1
3	RESET#	4	AD0
5	FRAME#	6	+3.3V
7	AD3	8	GND
9	AD2	10	SMB_CLK
11	SERIRQ	12	SMB_DATA
13	+5VSB	14	+5V

### A.1.25 COM 2 Port (COM12)



Pin	Signal Pin Definition	Pin	Signal Pin Definition
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.1.26 Power LED and Keyboard Lock Pin Header (JFP2)



Pin	Signal Pin Definition
1	LED Power
2	N/C
3	GND
4	Keyboard LOCK#
5	GND

### A.1.27 Case-Open Detect Connector (JCASE1)



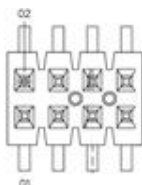
Pin	Signal Pin Definition
1	Case Open
2	GND

**A.1.28 SYSTEM FAN Power Connector (SYSFAN1)**

Pin	Signal Pin Definition
1	GND
2	SYSTEM FAN VCC
3	SYSTEM FAN SPEED
4	SYSTEM FAN PWM

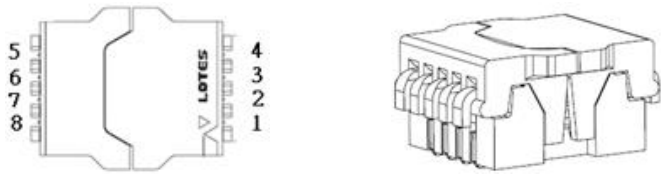
**A.1.29 SYSTEM FAN Power Connector (SYSFAN2)**

Pin	Signal Pin Definition
1	GND
2	SYSTEM FAN VCC
3	SYSTEM FAN SPEED
4	SYSTEM FAN PWM

**A.1.30 SPI Programming Pin Header (SPI\_CN1)**

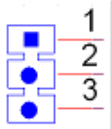
Pin	Signal Pin Definition	Pin	Signal Pin Definition
1	CS#	2	+3.3V
3	MISO	4	X
5	X	6	SCK
7	GND	8	MOSI

**A.1.31 SPI BIOS Flash Socket (SPI1)**



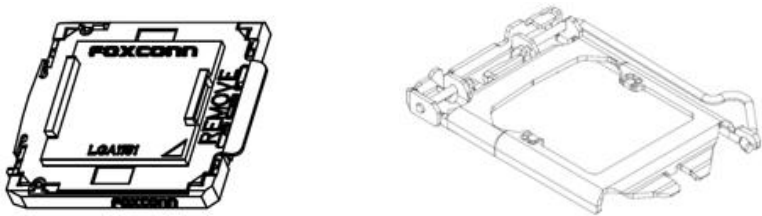
Pin	Signal Pin Definition	Pin	Signal Pin Definition
1	CS#	5	MOSI
2	MISO	6	SCK
3	WP# /IO2	7	HOLD# / IO3
4	GND	8	+3.3V

**A.1.32 SMBUS Programming for +Vcore/+VCCGT Controller (JSMB1)**

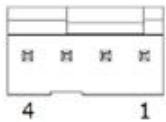


Pin	Signal Pin Definition
1	TPS53655_SMB_CLK
2	TPS53655_SMB_Dio
4	GND

**A.1.33 LGA1151 CPU Socket H4 (CPU1)**



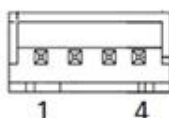
**A.1.34 CPU FAN Power Connector (CPUFAN1)**



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

**A.1.35 LVDS Backlight Inverter Power Connector (INV1)**

Pin	Signal Pin Definition
1	+12V
2	GND
3	BKL_EN
4	BKL_CTRL
5	+5V

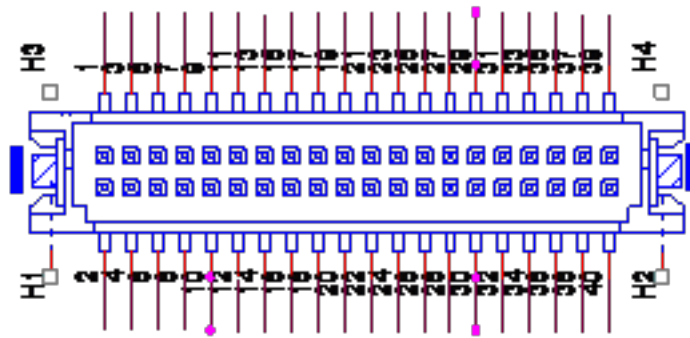
**A.1.36 SATA Power Connector (SATA\_PWR2)**

Pin	Signal Pin Definition
1	+V5
2	GND
3	GND
4	+V12

**A.1.37 SATA Power Connector(SATA\_PWR1)**

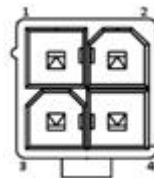
Pin	Signal Pin Definition
1	+V5
2	GND
3	GND
4	+V12

### A.1.38 eDP/LVDS Panel Connector (LVDS\_EDP1)



Pin	Signal Pin Definition	Pin	Signal Pin Definition
1	VDD	2	VDD
3	LVDS_DET#	4	GND
5	VDD	6	VDD
7	A0N(EDP_CPU_TXN2)	8	A4N
9	A0P(EDP_CPU_TXP2)	10	A4P
11	GND	12	GND
13	A1N	14	A5N
15	A1P	16	A5P
17	GND	18	GND
19	A2N	20	A6N
21	A2P	22	A6P
23	GND	24	GND
25	CLK1N(EDP_CPU_TXN3)	26	CLK2N
27	CLK1P(EDP_CPU_TXP3)	28	CLK2P
29	GND	30	GND
31	SCD	32	SDD
33	GND	34	GND(EDP_CH7511_HPD)
35	A3N	36	A7N
37	A3P	38	A7P
39	ENBKL	40	VCON

### A.1.39 ATX 12V Power Supply Connector (ATX12V1)



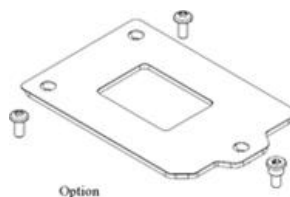
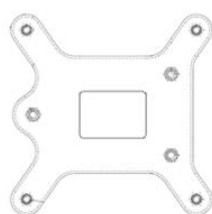
Pin	Signal Pin Definition
1	GND
2	GND
3	+12V
4	+12V

#### A.1.40 SIM Card Connector (SIM1)



Pin	Signal Pin Definition
C1	UIM_PWR
C2	UIM_RESET
C3	UIM_CLK
C5	GND
C6	UIM_VPP
C7	UIM_DATA

#### A.1.41 CPU Back Plate (CPU0\_BACKPLATE1)





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