User Manual

AIMB-287

Intel® Core™ i9/i7/i5/i3/Pentium/
Celeron LGA1200 Mini-ITX with
Dual HDMI/eDP, 4 COM & 8 USB,
2 LAN, and M.2 E/M key

ADVANTECH

Enabling an Intelligent Planet

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

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Because of Advantech's high quality-control standards and rigorous testing, most customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced free of charge during the warranty period. For out-of-warranty repairs, customers will be billed according to the cost of replacement materials, service time, and freight. Please consult your dealer for more details.

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1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages displayed when the problem occurs.

2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.

3. If your product is diagnosed as defective, obtain a return merchandise authorization (RMA) number from your dealer. This allows us to process your return more quickly.

4. Carefully pack the defective product, a completed Repair and Replacement Order Card, and a proof of purchase date (such as a photocopy of your sales receipt) into a shippable container. Products returned without a proof of purchase date are not eligible for warranty service.

5. Write the RMA number clearly on the outside of the package and ship the package prepaid to your dealer.

A Message to the Customer

Advantech Customer Services

Each and every Advantech product is built to the most exacting specifications to ensure reliable performance in the harsh and demanding conditions typical of industrial environments. Whether your new Advantech equipment is destined for the laboratory or the factory floor, you can be assured that your product will provide the reliability and ease of operation for which the name Advantech has come to be known. Your satisfaction is our primary concern. Here is a guide to Advantech's customer services. To ensure you get the full benefit of our services, please follow the instructions below carefully.

Technical Support

We want you to get the maximum performance from your products. So if you run into technical difficulties, we are here to help. For the most frequently asked questions, you can easily find answers in your product documentation. These answers are normally a lot more detailed than the ones we can give over the phone.

So please consult this manual first. If you still cannot find the answer, gather all the information or questions that apply to your problem, and with the product close at hand, call your dealer. Our dealers are well trained and ready to give you the support you need to get the most from your Advantech products. In fact, most problems reported are minor and are able to be easily solved over the phone.

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

Declaration of Conformity

FCC Class B

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 in a residential installation. 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. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for assistance.

CPU Compatibility

Processor Number	Max_TDP	Code Name	Cores/Threads	S-Spec	Lithography
i9-10900E	65W	Comet Lake	10/20	SRJFD	14nm
i7-10700E	65W	Comet Lake	8/16	SRJFJ	14nm
i5-10500E	65W	Comet Lake	6/12	SRJFL	14nm
I3-10100E	65W	Comet Lake	4/8	SRH6E	14nm
G6400E	58W	Comet Lake	2/4	SRH6G	14nm
G5900E	58W	Comet Lake	2/2	SRH7T	14nm
i9-10900TE	35W	Comet Lake	10/20	SRJFC	14nm
i7-10700TE	35W	Comet Lake	8/16	SRJFG	14nm
i5-10500TE	35W	Comet Lake	6/12	SRH6D	14nm
I3-10100TE	35W	Comet Lake	4/8	SRH6F	14nm
G6400TE	35W	Comet Lake	2/4	SRH6H	14nm
G5900TE	35W	Comet Lake	2/2	SRH6J	14nm

Memory Compatibility

Category	Speed	Capacity	Vendor	Chip_PN	ADVANTECH P/N	ECC
DDR4	3200	16GB	Advantech	SEC001 K4A8G08 5WCBCWE	SQR-SD4N16G3K2SNCB	N
DDR4	2666	16GB	Advantech	SEC 928 K4A8G08 5WC BCTD	AQD-SD4U16N26-SE	N
DDR4	2666	32GB	Advantech	SEC 849 K4AAG08 5WM BCTD	SQR-SD4N32G2K6SNME	N
DDR4	2666	8GB	Advantech	SEC 837 K4A8G08 5WC BCTD	SQR-SD4N8G2K6SNBCB	N
DDR4	2666	4GB	Advantech	SEC 907 K4A4G08 5WF BCTD	SQR-SD4N4G2K6SNEFB	N
DDR4	2400	4GB	Advantech	SEC007 K4A4G08 5WFBCTD	SQR-SD4N4G2K4SNEFB	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	16GB	Advantech	H5AN8G8NCJ	AQD-SD4U16N24-HE	N

M.2 SSD Compatibility

Dimension	Interface	Bandwidth_Performance	Vendor	Model	ADVANTECH P/N
2280	M.2 Key M	PCIe v3.0	LITE-ON	CA3-8D512	96FD80-P512-LIS
2280	M.2 Key B+M	PCIe v3.0	Advantech	S1TR191176010 00002	SQF-CM8V4-960G-ECE

Ordering Information

P/N	Chipset	HDMI 2.0	eDP	HDMI 1.4	GbE LAN	COM	SATA III	USB2.0/3.0	M.2 Mkey	M.2 Ekey	TPM2.0	AMP
AIMB-287G2-00A1E	H420E	1	1	1	2	4	2	2/6	1	1	(1)	(1)
AIMB-287FL-00A1E	H420E	1	1	1	2	4	2	2/6	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-287 Intel Core™ i9/i7/i5/i3 LGA1200 Mini-ITX motherboard
- 1 x SATA HDD cable
- 1-to-2 serial port cables, 22 cm
- 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-287 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-287, 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.

Contents

Chapter 1

General Information

1.1 Introduction

AIMB-287 is designed with the Intel® H420E PCH for industrial applications that require both performance computing and enhanced power management capabilities. The motherboard supports Intel desktop Corei9/i7/i5/i3/Pentium/Celeron processors, up to 20 MB SmartCache, and 2 x DDR4 2933MHz SO-DIMM, up to 64 GB. Multiple I/O connectivity of 4 x serial ports, 6 x USB 3.0 + 2 USB 2.0, 2 x GbE LAN, 2 x SATA III, 1 x NGFF (M.2_E key) and 1 x NGFF (M.2_M Key) connector are also supported.

1.2 Features

- **I/O connectivity:** 4 x serial ports, 6 x USB 3.0, 2 x USB 2.0, 2 x SATAIII, 1 M.2 M key & 1 M.2 E key, 2 GbE LAN.
- **Standard mini-ITX form factor with industrial features:** The AIMB-287 is a full-featured Mini-ITX motherboard with balanced expandability and performance.
- **Wide selection of storage devices:** SATA HDD, M.2 (M 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:** LGA1200 Intel desktop Core i9/i7/i5/i3/Pentium/Celeron processors compliant.
- **BIOS:** AMI EFI 256 Mbit SPI BIOS.
- **System chipset:** Intel® H420E.
- **SATA hard disk drive interface:**
  - Three on-board SATA connector with data transmission rate up to 600 MB
  - One M.2 M key for storage with data transmission rates up to 1000 MB (PCIe interface SSD).

1.3.2 Memory

- **RAM:** 2 x 260-pins SODIMM socket support dual channel DDR4 2933MHz SDRAM, up to 64GB Max.

1.3.3 Input/Output

- **Serial ports:** Six serial ports; COM3/4: RS-232, COM1/2: RS-232/422/485 (RS-422/485 supports by BOM option).
- **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.
- **GPIO connector:** 8-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.
- ■ **eDP:** Supports max. resolution 4096 x 2160 @ 60Hz.
- ■ **HDMI1.4:** Supports max. resolution 4096 x 2160 @ 24Hz.
- ■ **HDMI2.0:** Supports max. resolution 4096 x 2304 @ 60Hz.

1.3.5 Ethernet LAN

- ■ Supports dual 10/100/1000 Mbps Ethernet port (s) via PCI Express x1 bus which provides 500 MB/s data transmission rates.
- ■ **Controller:**
  - – GbE LAN1: Intel i219LM
  - – GbE LAN2: 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:** +24V~+12V .
- ■ **Power consumption:**
  Intel Core i9-10900E 2.8GHz, 2pcs 32GB DDR4 3200MHz SDRAM, +12V @ 7.482A; +24V @3.72A .

  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-287 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 the 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		
	Description	**Location Name**
1	Direct Current input connector	DCIN1
2	ATX 12V power supply connector	ATX21V1
3	High-Definition Multimedia Interface connector	HDMI1~HDMI2
4	RJ45 #1/2	LAN12
5	USB 3.1 Gen2 Connector	USB12, USB34
6	HD Audio Interface (LINE-OUT)	AUDIO1
7	Front panel audio header	JFPAUD1
8	Amplifier connector	AMP1
9	USB 3.1 Gen1 pin header #5/ #6	USB0506
10	USB 2.0 pin header	USB78
11	NGFF M.2 M-Key connector for 2280 module	M2M1
12	NGFF M.2 E-Key connector for 2230 module	M2E1
13	Serial ATA interface connector #1~#2	SATA1~SATA2
14	Serial ATA interface power connector	SATAPWR1/2
15	Embedded DisplayPort connector	EDP1
16	Voltage selection for EDP1 connector	JEDP1
17	EDP Backlight inverter power connector	INV1
18	COM port pin header #1/#2	COM1 /2
19	COM port pin header #3/#4	COM3 / 4
20	COM1 RI# selection pin header	JSETCOM1_V1
21	CPU FAN connector	CPUFAN1
22	System Fan #1 connector /System Fan #2 connector	SYSFAN1/2
23	DDR4 SO-DIMM socket A1/ DDR4 SO-DIMM socket B1	DIMMA1/ DIMMB1
24	eSPI interface connector	ESPI1
25	8-bits General Purpose I/O pin header	GPIO1
26	CMOS battery connector	BAT1
27	RTC reset pin header	JCMOS1
28	Case Open connector	JCASE1
29	PWRBTN#/ RESET#/HDD LED/ SM bus/ Ext. Speaker header	JFP1
30	Power LED pin header	JFP2
31	Watchdog timer output and OBS beep	JWDT1+JOBS1
32	ATX supported 3-pin header on board	ATX_5VSB1
33	AT/ATX Mode selection	PSON1

1.5 Board Layout: Jumper and Connector Locations
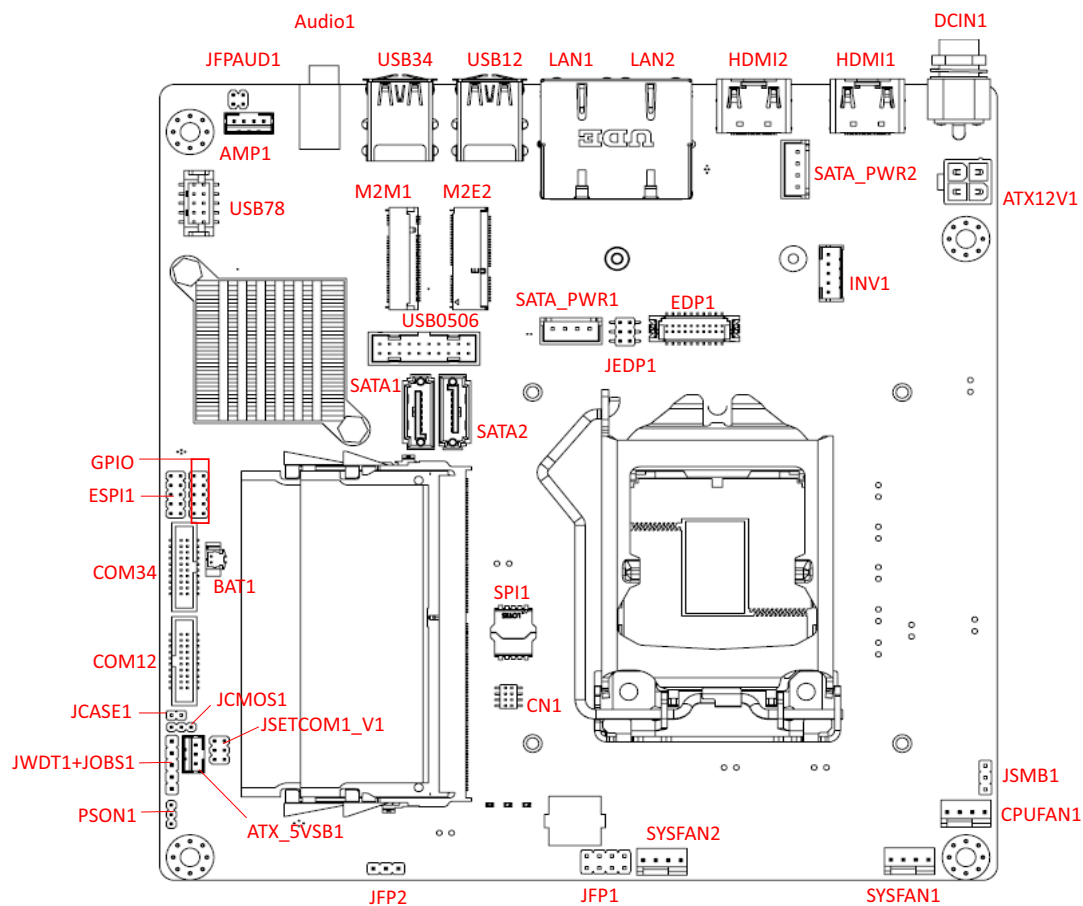
Figure 1.1 Jumper and Connector Location (Top Side)
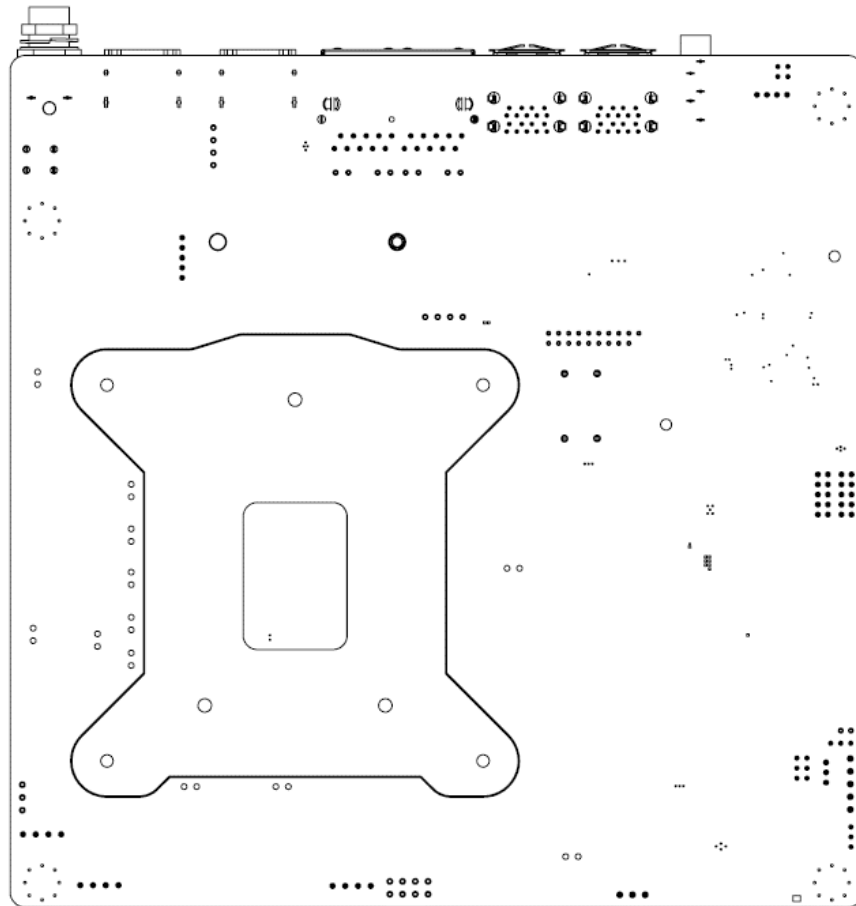
Figure 1.2 Jumper and Connector Location (Bottom Side)

1.6 AIMB-287 Board Diagram
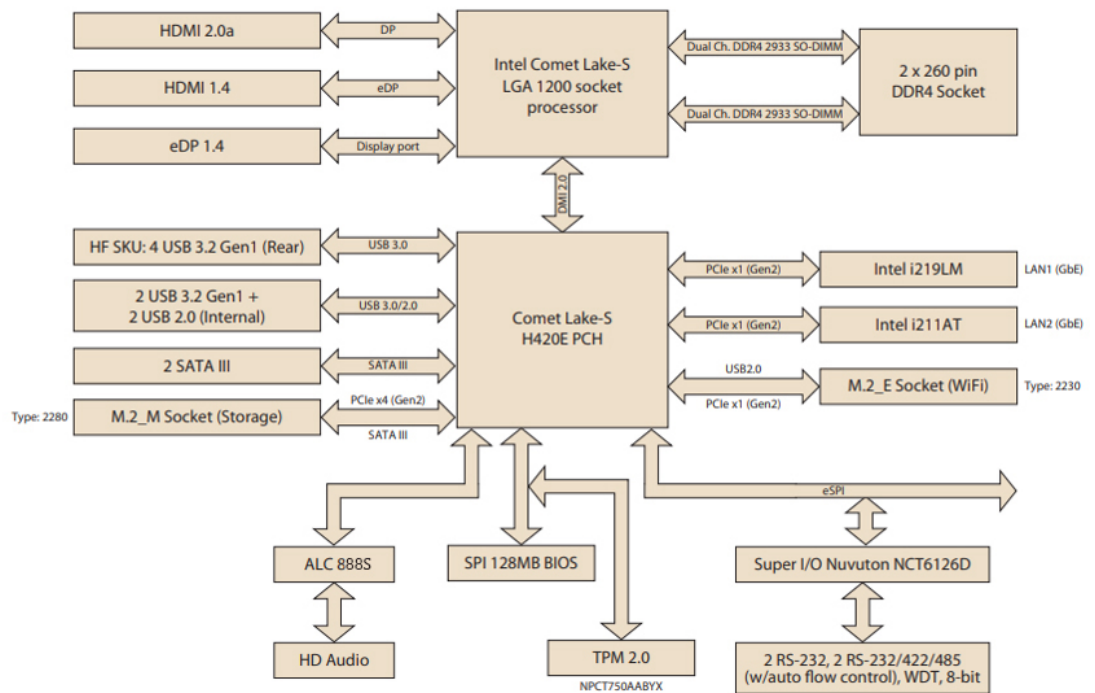
Figure 1.3 AIMB-287 Board Diagram

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 electro-static discharges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when 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 man-ufacturer. 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 motherboard's default settings and your options for each jumper.
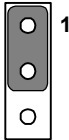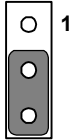
1.8.1 How to Set Jumpers

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 set-ting jumpers.

1.8.2 CMOS Clear (JCMOS1)
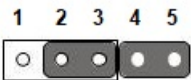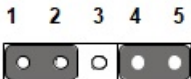
The AIMB-287 motherboard contains a jumper that can erase CMOS data and reset the system BIOS information. Normally this jumper should be set with pins 1-2 closed. If you want to reset the CMOS data, set CMOS1 to 2-3 closed for just a few seconds, and then move the jumper back to 1-2 closed. This procedure will reset the CMOS to its default setting.

Table 1.2: CMOS1		
Function	**Jumper Settings**	
Keep CMOS data (Default)		1-2 closed
Clear CMOS data		2-3 closed
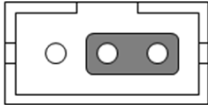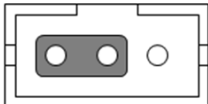
1.8.3 Watchdog Timer Output and OBS Beep (JWDT1+JOBS1)

Table 1.3: 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)
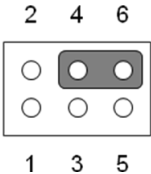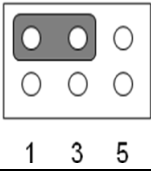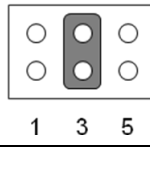
1.8.4 ATX/AT Mode Selection (PSON1)

Table 1.4: ATX/AT Mode Selection (PSON1)	
Function	**Jumper Setting**
AT Mode	1 2 3
ATX Mode (Default)	1 2 3
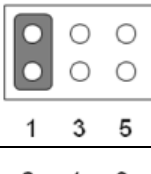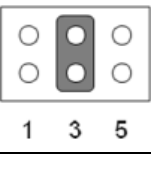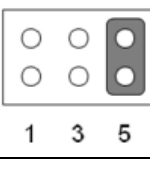
1.8.5 eDP Panel Voltage Selection (JLVDS1)

Table 1.5: eDP Panel Voltage Selection (JLVDS1)	
Function	**Jumper Setting**
Jumper position for +3.3V (Default)	
Jumper position for +5V	
Jumper position for +12V	

1.8.6 COM1 RI# Pin RI#/5V/12V Select (JSETCOM1_V1)

Table 1.6: COM1 RI# Pin RI#/5V/12V Select (JSETCOM1_V1)	
Function	**Jumper Setting**
Jumper position for RI# (Default)	
Jumper position for +5V	
Jumper position for +12V	

1.9 System Memory

AIMB-287 has two sockets for a 260-pin DDR4 SO-DIMM. These sockets use a 1.2 V unbuffered double data rate synchronous DRAM (DDR SDRAM). DRAM is available in capacities of 4GB, 8GB, 16GB and 32GB. The sockets can take any combination with SODIMMs of any size, giving a total memory size between 4GB, 8GB, 16GB, and up to max 64GB. AIMB-287 does NOT support error checking and correction (ECC).

1.10 Memory Installation Procedures

To install SODIMMs, 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-287 supports a CPU with one of the following built-in full speed last level caches:

20MB for Inter Core i9-10900E/i9-10900TE

16MB for Inter Core i7-10700E/i7-10700TE

12MB for Inter Core i5-10500E/i7-10500TE

6MB for Inter Core i3-10100E/i7-10100TE

6MB for Inter Core i3-10100E/i7-10100TE

4MB Pentium G6400E/G6400TE

2MB Celeron G5900E/G5900TE

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

1.12 Processor Installation

The AIMB-287 is designed to supported Intel 10th Gen LGA1200, Core i9/Core i7/ Core i5/Core i3, Pentium, 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 DC Input Connector (DCIN1)
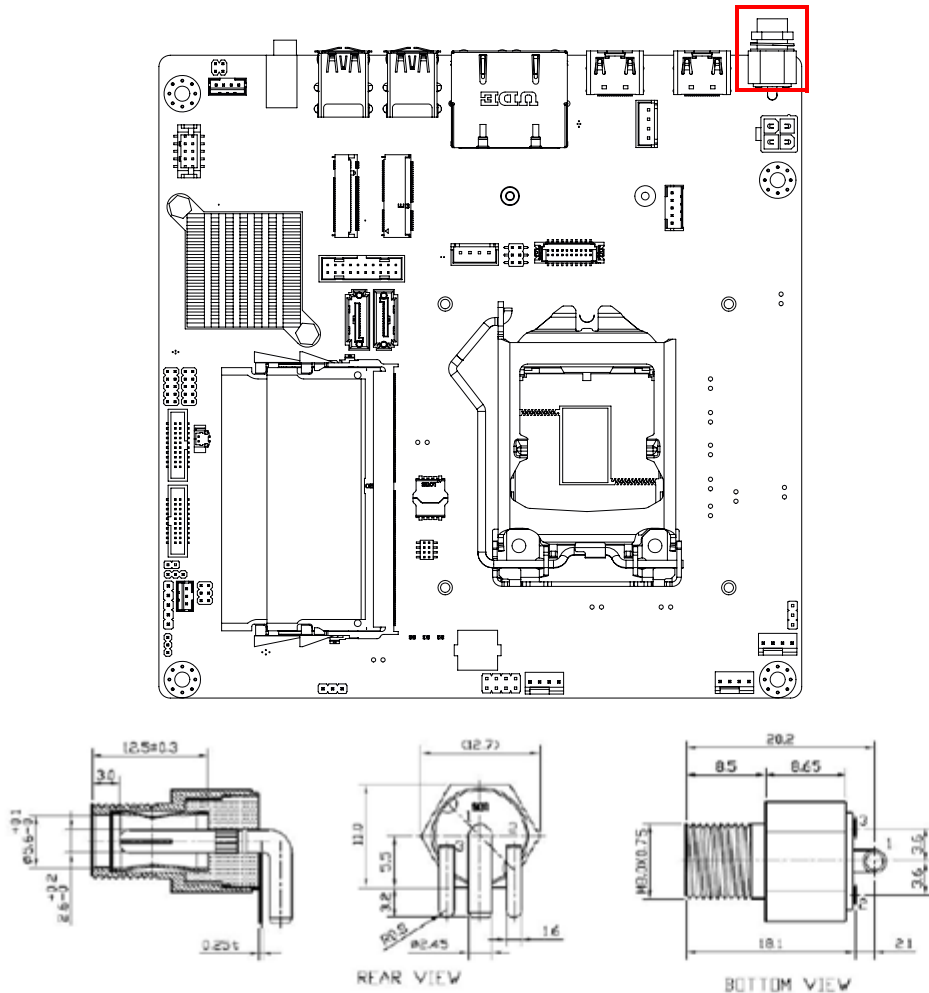
Pin	Signal Pin Definition
1	Power input (Only +12V~24V)
2	GND
3	GND

2.3   Definition Multimedia Interface (HDMI1/2)
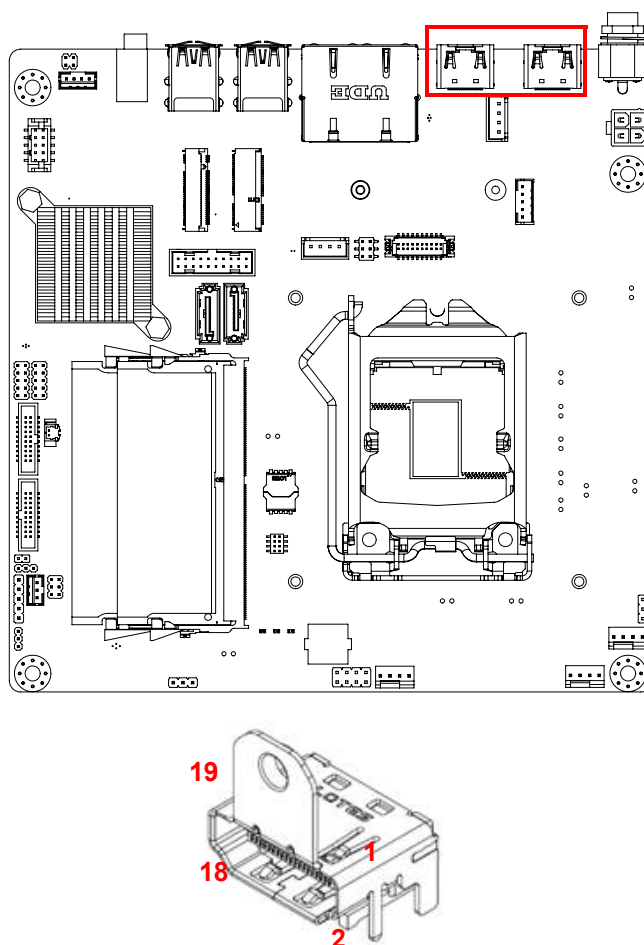
Pin	Signal Pin Definition	Pin	Signal Pin Definition
1	HDMI_D2+	11	GND
2	GND	12	HDMI_CLK-
3	HDMI_D2-	13	NA
4	HDMI_D1+	14	NA
5	GND	15	HDMI_SCL
6	HDMI_D1-	16	HDMI_SDA
7	HDMI_D0+	17	GND
8	GND	18	+5V
9	HDMI_D0-	19	HMDI_HPD
10	HDMI_CLK+	20	

2.4 LAN1/2(RJ45)
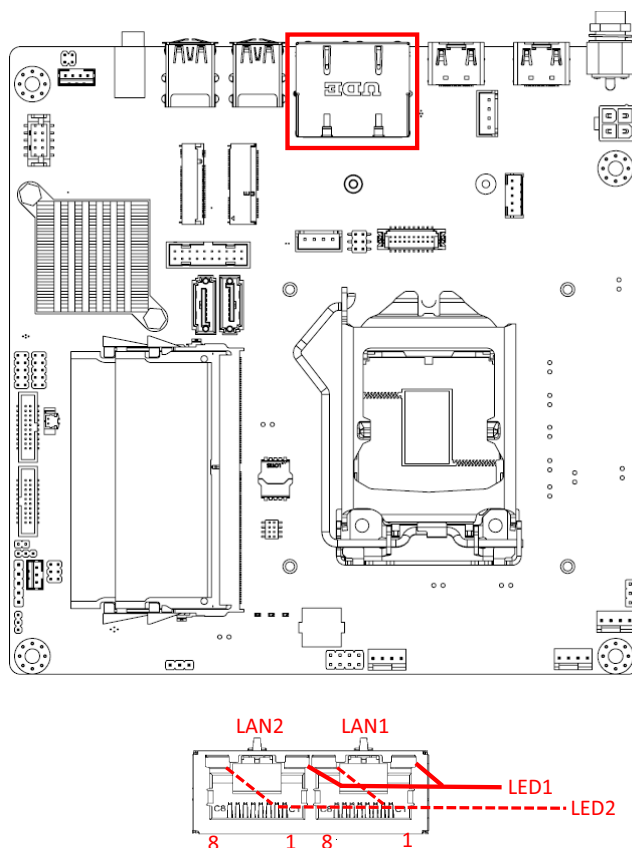
Pin	Signal Pin Definition
LAN1/2_1	MDI0+
LAN1/2_2	MDI0-
LAN1/2_3	MDI1+
LAN1/2_4	MDI2+
LAN1/2_5	MDI2-
LAN1/2_6	MDI1-
LAN1/2_7	MDI3+
LAN1/2_8	MDI3-
LAN1/2_LED1	off for mal-link; Link (On)/Active (Flash)
LAN1/2_LED2	100 Mbps (On)/10 Mbps (Off); Color: Orange (10/100 Mbps)
LAN1/2_LED2	1000 Mbps (On); Color: Green (1000 Mbps)

2.5 USB 3.0 Stack Connector (USB12, USB34)
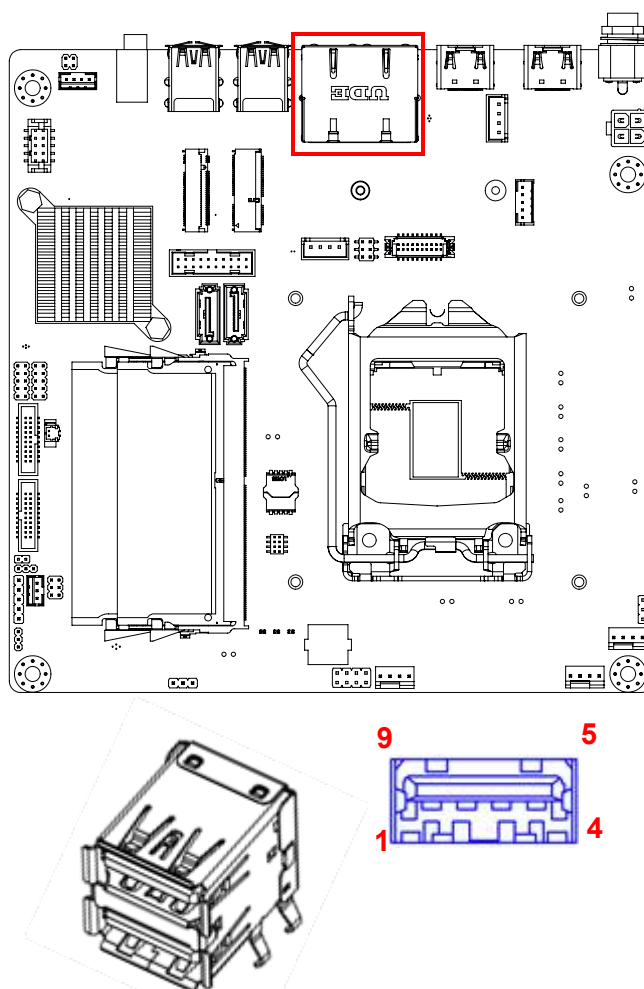
Pin	Signal Pin Definition
USB12/34_1	VBUS
USB12/34_2	D1-
USB12/34_3	D1+
USB12/34_4	GND
USB12/34_5	RX1-
USB12/34_6	RX1+
USB12/34_7	GND
USB12/34_8	TX1-
USB12/34_9	TX1+

2.6 HD Analog Audio Interface (Audio1)
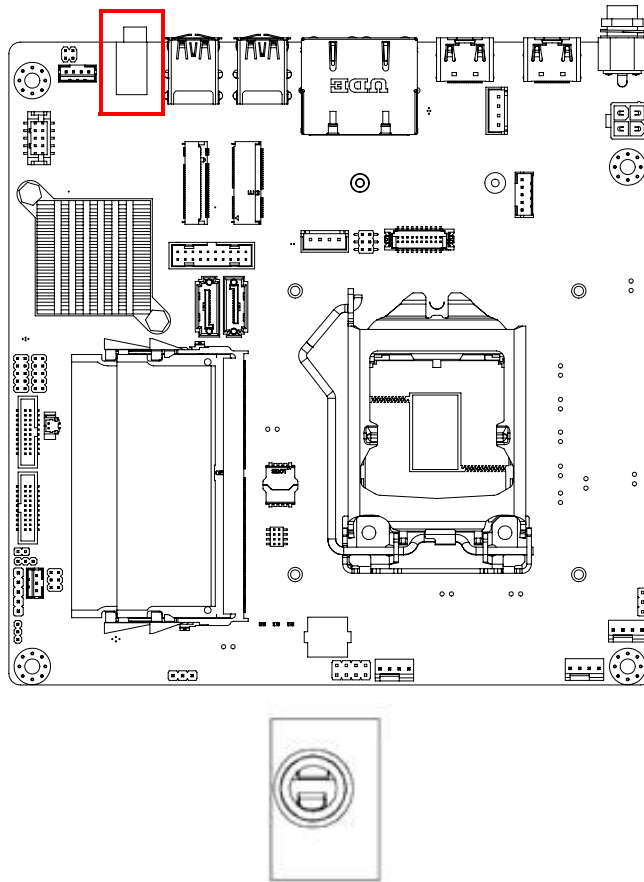
Pin	Signal Pin Definition
1	LINE OUT - L
2	LINE OUT - R

2.7 Front Panel Audio Header (JFPUD1)
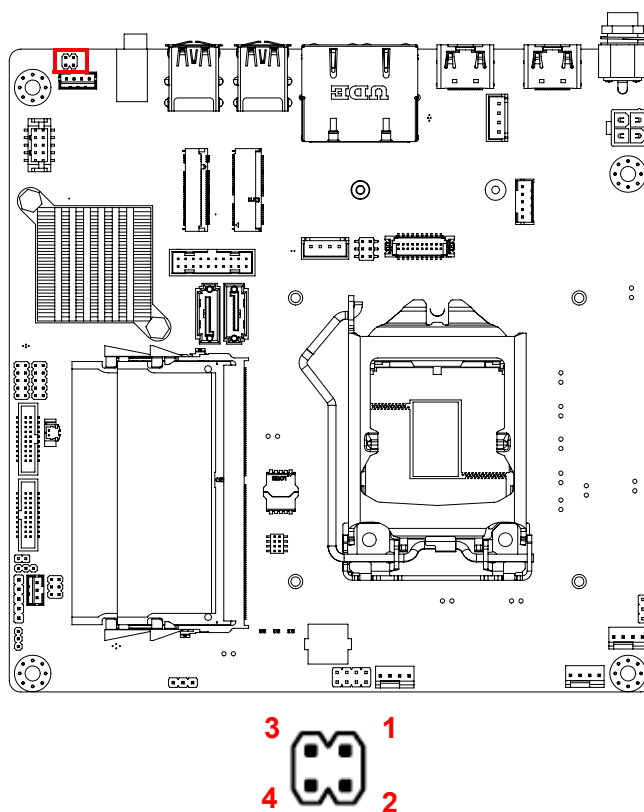
Pin	Signal Pin Definition
1	AGND
2	MIC-L
3	Jack Detect
4	MIC-R

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2.8 Amplifier Connector (AMP1)
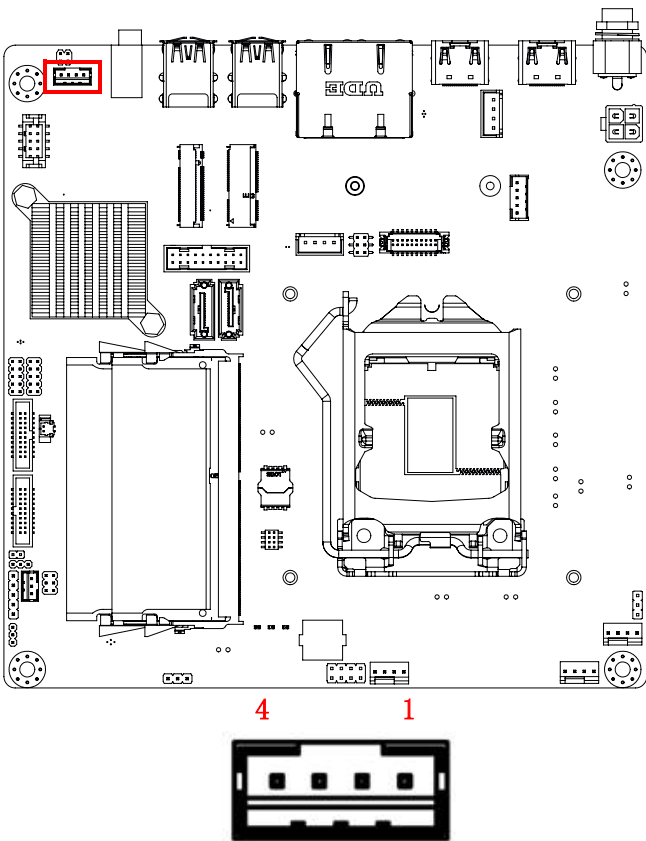
Pin	Signal Pin Definition
1	R+
2	R-
3	L-
4	L+

2.9 USB 2.0 Pin Header (USB78)
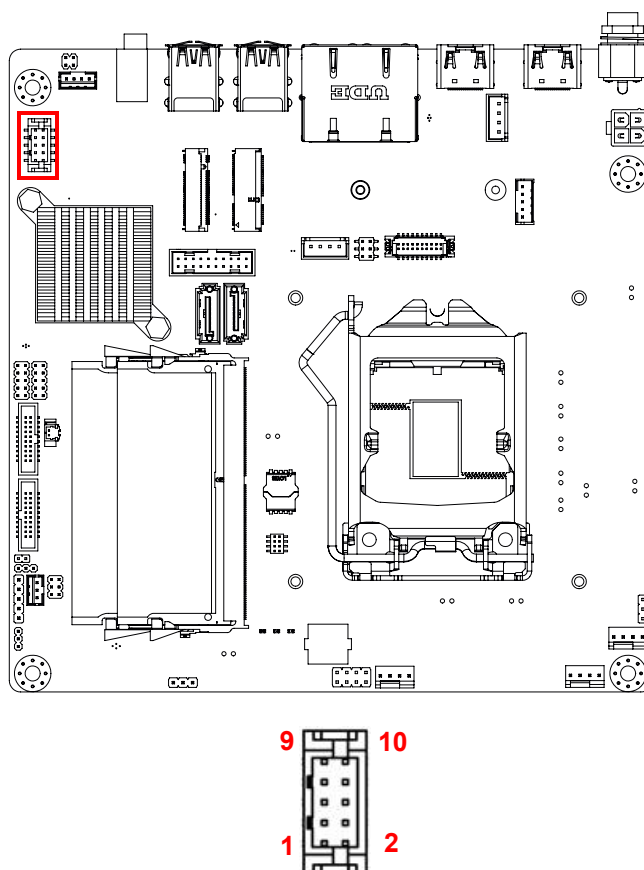
Pin	Signal Pin Definition	Pin	Signal Pin Definition
1	VBUS	2	VBUS
3	D1+	4	D2+
5	D1-	6	D2-
7	GND	8	GND
9	NC	10	NC

2.10 NGFF M.2 M-Key Connector for 2280 Module (M2M1)
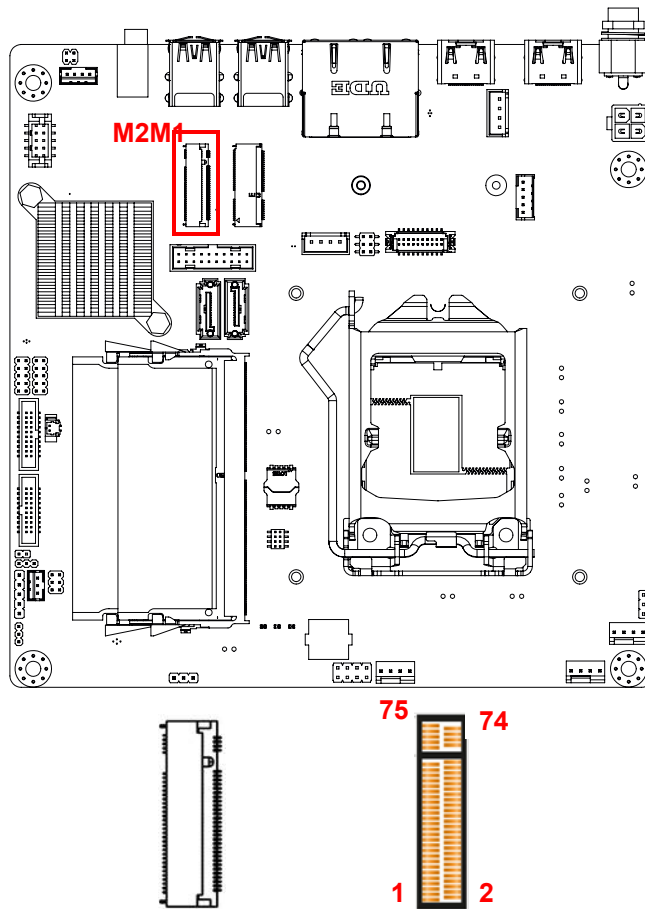
Pin	Signal	Pin	Signal
1	GND	2	+3.3V
3	GND	4	+3.3V
5	PCIE_RX3-	6	NC
7	PCIE_RX3+	8	NC
9	GND	10	NC
11	PCIE_TX3-	12	+3.3V
13	PCIE_TX3+	14	+3.3V
15	GND	16	+3.3V
17	PCIE_RX2-	18	+3.3V
19	PCIE_RX2+	20	NC
21	GND	22	NC
23	PCIE_TX2-	24	NC
25	PCIE_TX2+	26	NC
27	GND	28	NC
29	PCIE_RX1-	30	NC
31	PCIE_RX1+	32	NC
33	GND	34	NC
35	PCIE_TX2-	36	NC
37	PCIE_TX2+	38	DEVSLP

39	GND	40	NC
41	PCIE_RX0+ / SATA_RX+	42	NC
43	PCIE_RX0- / SATA_RX-	44	NC
45	GND	46	NC
47	PCIE_TX0- / SATA_TX-	48	NC
49	PCIE_TX0+ / SATA_TX+	50	PLTRST#
51	GND	52	CLKREQ#
53	PCIE_CLK-	54	PCIEWAKE#
55	PCIE_CLK+	56	NC
57	GND	58	NC
	KEY		KEY
67	NC	68	SUSCLK
69	SATA/PCIE DETECT	70	+3.3V
71	GND	72	+3.3V
73	GND	74	+3.3V
75	GND		

2.11 NGFF M.2 E-Key Connector for 2230 Module (M2E1)
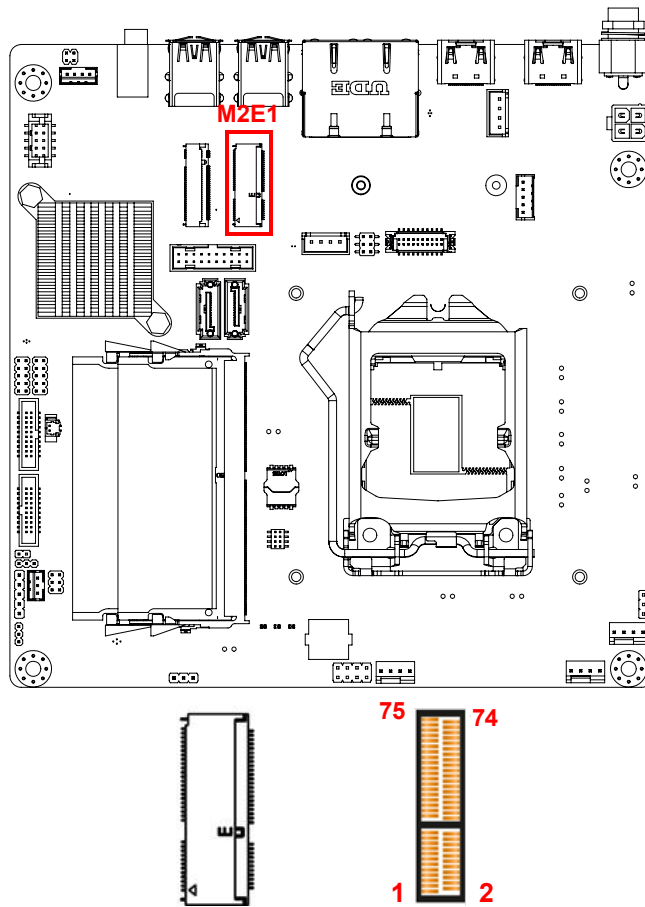
Pin	Signal	Pin	Signal
1	GND	2	+3.3V
3	USB_D+	4	+3.3V
5	USB_D-	6	WLAN_LED#
7	GND	8	BT_I2S_SCLK
9	CNV_WGR_D1-	10	BT_I2S_BCLK
11	CNV_WGR_D1+	12	BT_I2S_SDO
13	GND	14	BT_I2S_SDI
15	CNV_WGR_D0-	16	BT_LED#
17	CNV_WGR_D0+	18	GND
19	GND	20	BT_UART_WAKE#
21	CNV_WGR_CLK-	22	CNV_BRI_RSP
23	CNV_WGR_CLK+		KEY
	KEY	32	CNV_RGI_DT
33	GND	34	CNV_RGI_RSP
35	PCIE_TX+	36	CNV_BRI_DT
37	PCIE_TX-	38	CL_RST#
39	GND	40	CL_DAT
41	PCIE_RX+	42	CL_CLK
43	PCIE_RX-	44	CNV_GNSS_BLANKING

45	GND	46	CNV_MFUART2_TXD
47	PCIE_CLK+	48	CNV_MFUART2_RXD
49	PCIE_CLK-	50	SUSCLK
51	GND	52	PLTRST#
53	PCIE_CLKREQ#	54	BT_DISABLE#
55	PCIE_WAKE#	56	WIFI_DISABLE#
57	GND	58	NC
59	CNV_WT_D1-	60	NC
61	CNV_WT_D1+	62	NC
63	GND	64	REFCLK_38.4M
65	CNV_WT_D0-	66	PLTRST#
67	CNV_WT_D0+	68	NC
69	GND	70	PCIE_WAKE#
71	CNV_WT_CLK-	72	+3.3V
73	CNV_WT_CLK+	74	+3.3V
75	GND		

2.12 Serial ATA Interface Power Connector (SATAPWR1/2)
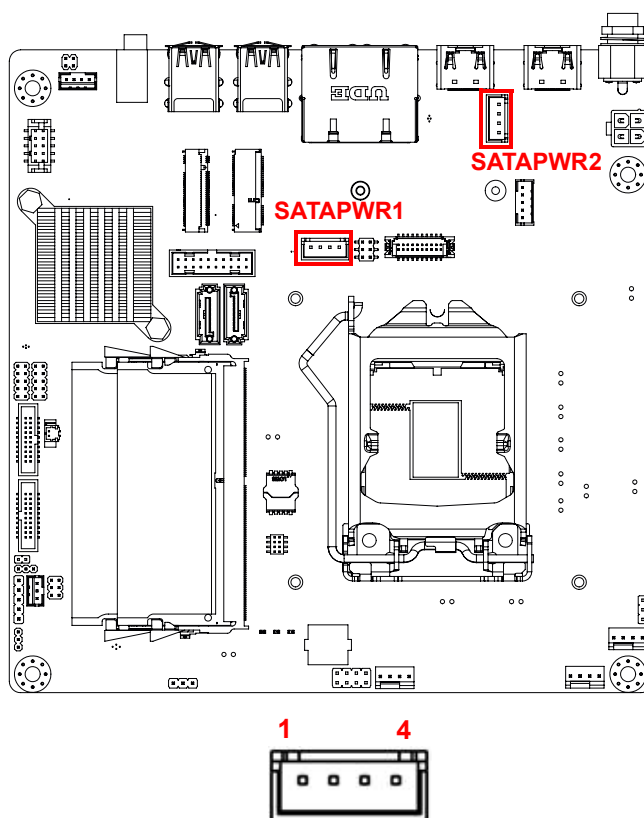
Pin	Signal
1	+5V
2	GND
3	GND
4	+12V

2.13 Voltage Selection for EDP1 Connector (JEDP1)
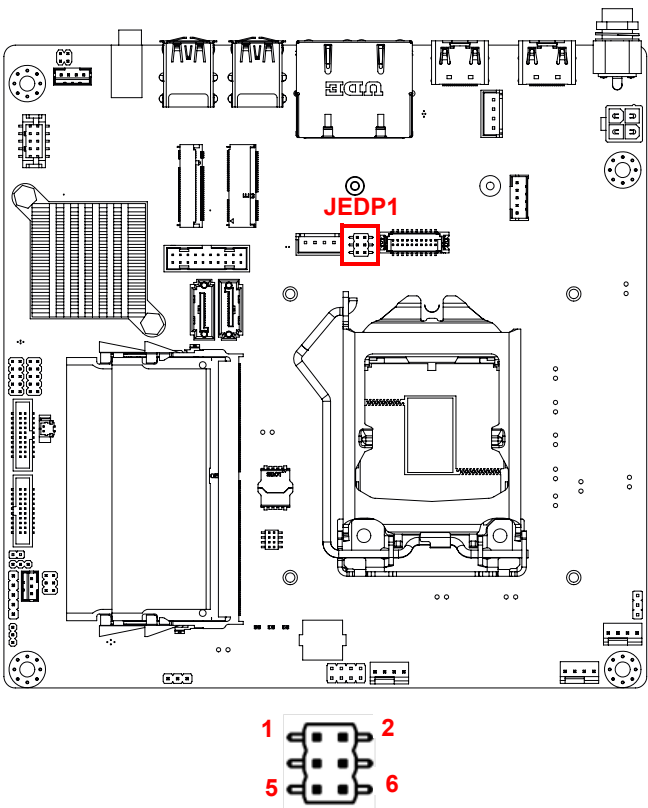
Pin	Signal	Pin	Signal
1	NC	2	+V5
3	+V12	4	+VDD_EDP
5	NC	6	+V3.3

2.14 Embedded DisplayPort Connector (EDP1)
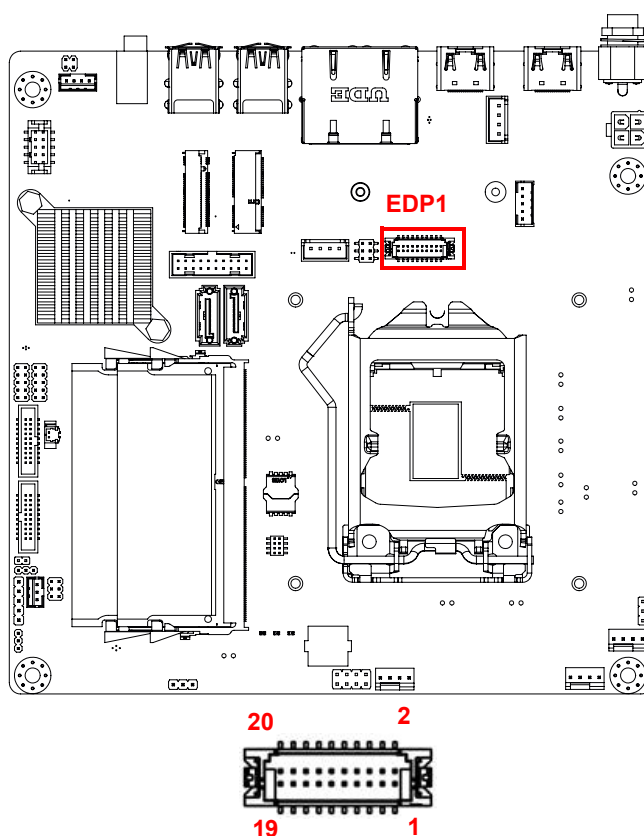
Pin	Signal	Pin	Signal
1	GND	2	GND
3	TX0-	4	TX3-
5	TX0+	6	TX3+
7	GND	8	NC
9	TX1-	10	GND
11	TX1+	12	AUX-
13	GND	14	AUX+
15	TX2-	16	GND
17	TX2+	18	HPD
19	+VDD_EDP	20	+VDD_EDP

2.15 EDP Backlight Inverter Power Connector (INV1)
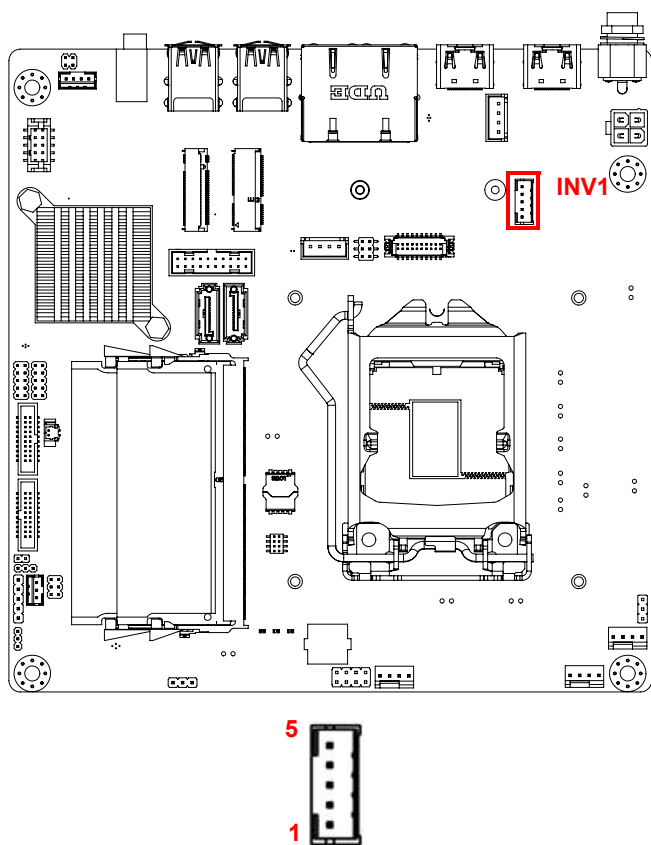
Pin	Signal
1	+V12
2	GND
3	Enable backlight
4	Brightness control
5	+V5

2.16 ATX 12V Power Supply Connector (ATX12V1)
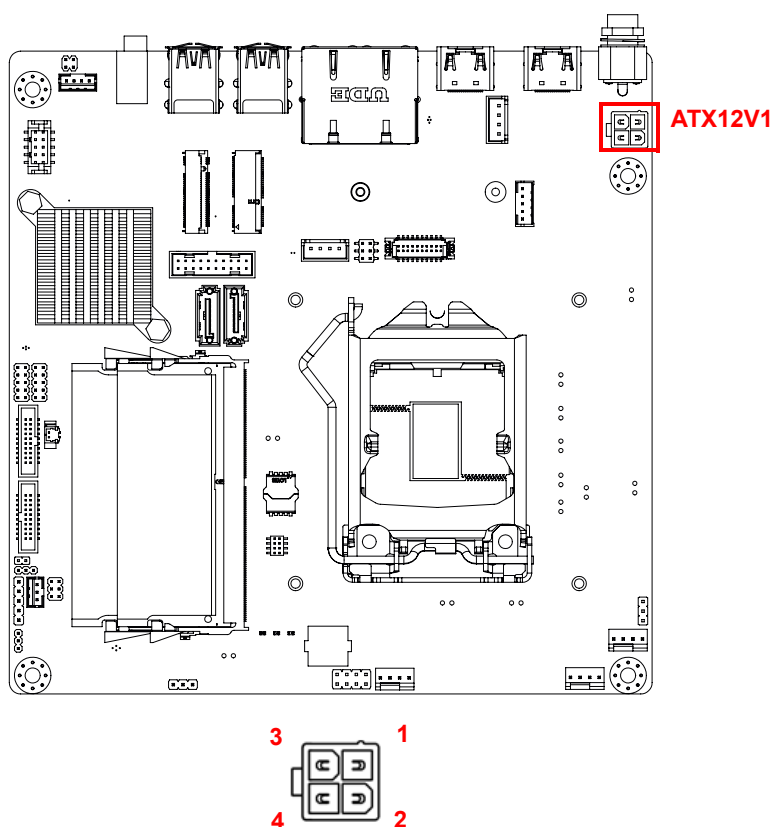
Pin	Signal
1	GND
2	GND
3	12V ~ 24V
4	12V ~ 24V

2.17 USB 3.1 Gen1 #5/ #6 (USB0506)
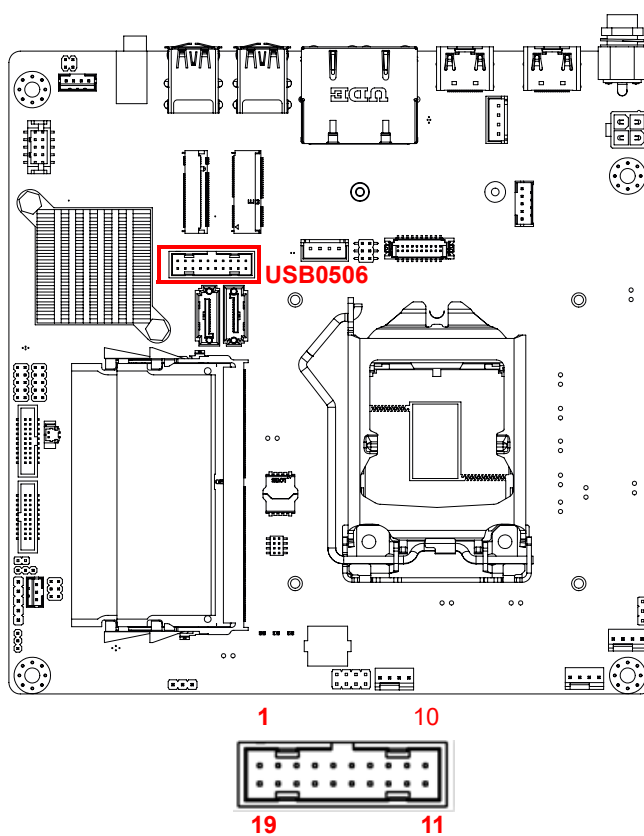
Pin	Signal	Pin	Signal
1	VBUS	11	D2+
2	RX1-	12	D2-
3	RX1+	13	GND
4	GND	14	TX2+
5	TX1-	15	TX2-
6	TX1+	16	GND
7	GND	17	RX2+
8	D1-	18	RX2-
9	D1+	19	VBUS
10	NC		

2.18 Serial ATA Interface Connector #1~#2 (SATA1~SATA2)
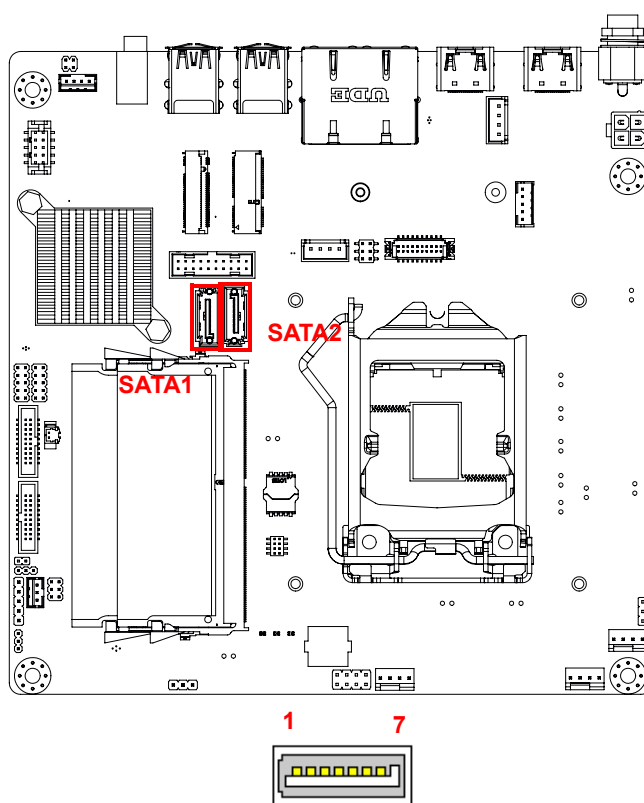
Pin	Signal
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

2.19 eSPI Interface Connector (ESPI1)
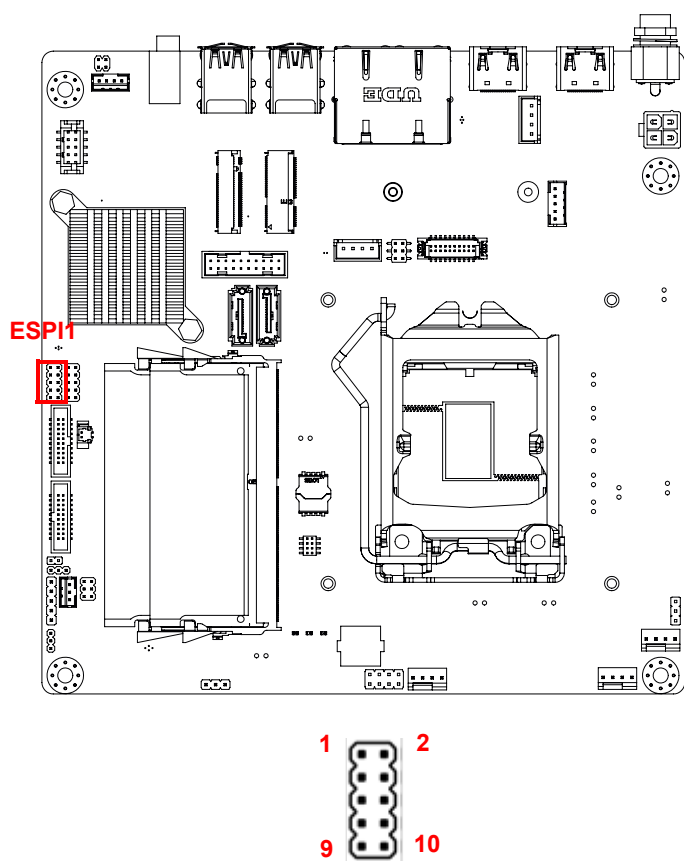
Pin	Signal	Pin	Signal
1	ESPI_IO1	2	ESPI_CLK
3	ESPI_IO0	4	ESPI_RST#
5	+V3.3	6	ESPI_CS0#
7	GND	8	ESPI_IO3
9	+V3.3_DUAL	10	ESPI_IO2

2.20 8-bit General Purpose I/O Pin Header (GPIO1)
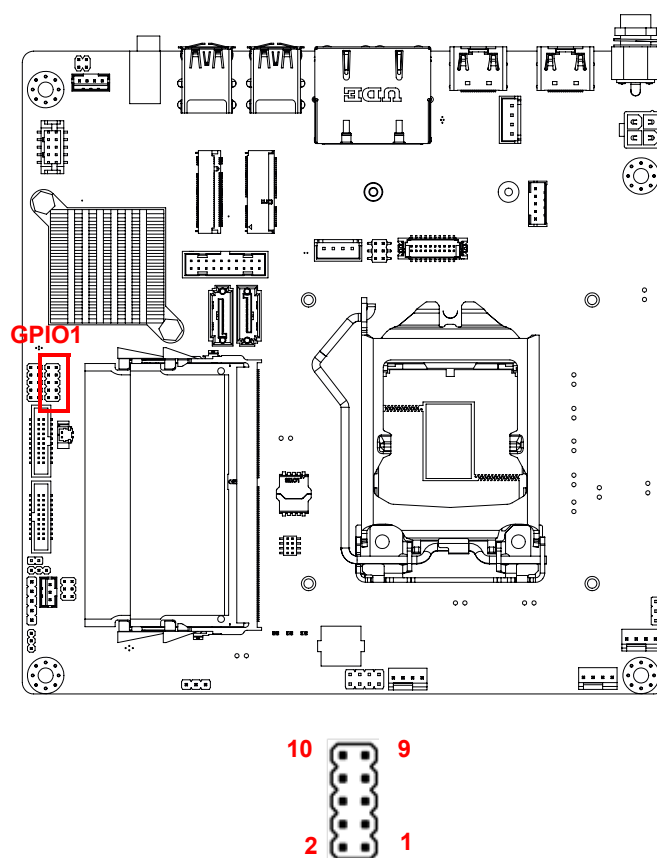
Pin	Signal	Pin	Signal
1	GPIO0	2	GPIO4
3	GPIO1	4	GPIO5
5	GPIO2	6	GPIO6
7	GPIO3	8	GPIO7
9	+V5_DUAL	10	GND

2.21 COM Port Pin Header #1/#2 (COM12)
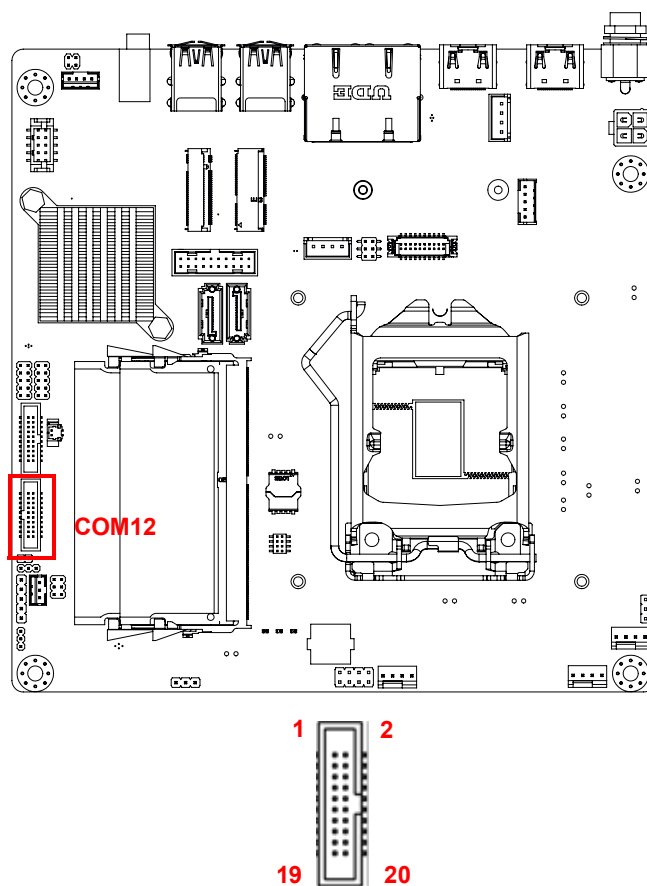
Pin	Signal	Pin	Signal
1	COM1_DCD#	2	COM1_DSR#
3	COM1_SIN	4	COM1_RTS#
5	COM1_SOUT	6	COM1_CTS#
7	COM1_DDTR#	8	COM1_RI#
9	GND	10	GND
11	COM2_DCD#	2	COM2_DSR#
13	COM2_SIN	4	COM2_RTS#
15	COM2_SOUT	6	COM2_CTS#
17	COM2_DDTR#	8	COM2_RI#
19	GND	20	GND

Corresponding COM cable DB9 Conn. pin assignment (PN: 1700031130-01)
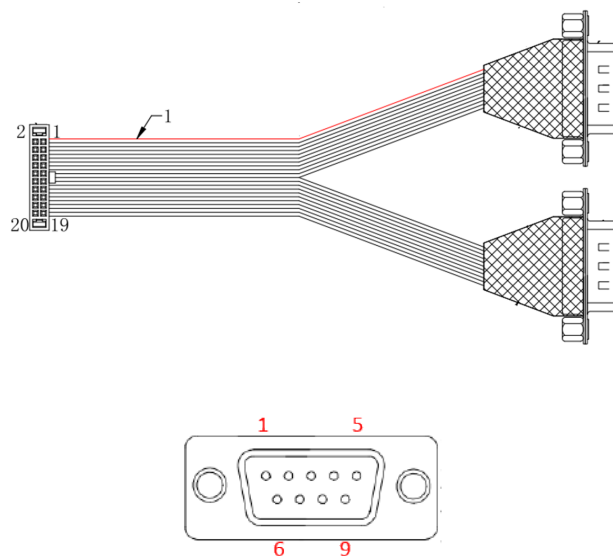
Pin	RS-232 Signal	RS-422** Signal	RS-485** Signal
1	DCD#	DCD+	-
2	SIN	RX-	-
3	SOUT	TX+	D+
4	DTR#	DTR+	-
5	GND	GND	GND
6	DSR#	RX+	-
7	RTS#	TX-	D-
8	CTS#	DCD-	-
9	RI#	DTR-	-

Note! * : There is a cable marked in RED on COM#1 (TPN/MOQ required)

**: COM1/2 BOM option RS422/495, default RS232

2.22 COM Port Pin Header #3/#4 (COM34)
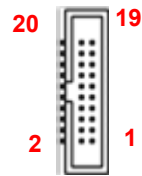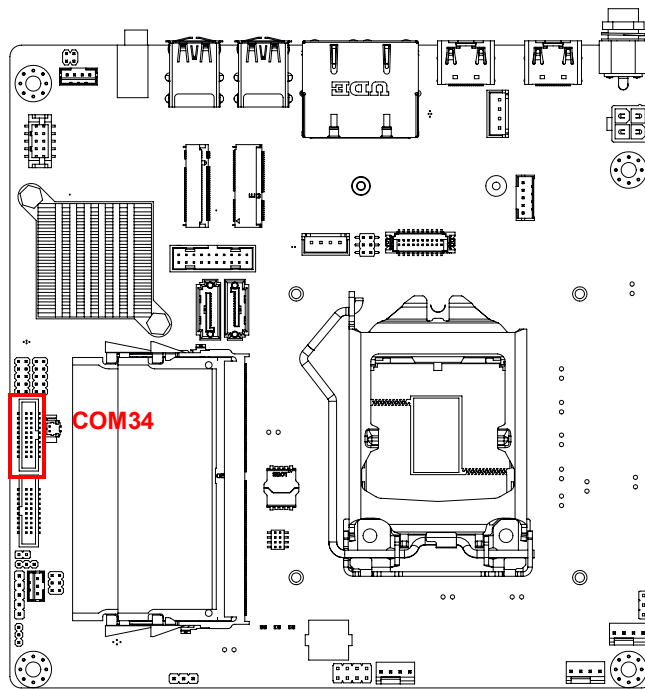
Pin	Signal	Pin	Signal
1	COM3_DCD#	2	COM3_DSR#
3	COM3_SIN	4	COM3_RTS#
5	COM3_SOUT	6	COM3_CTS#
7	COM3_DDTR#	8	COM3_RI#
9	GND	10	GND
11	COM4_DCD#	2	COM4_DSR#
13	COM4_SIN	4	COM4_RTS#
15	COM4_SOUT	6	COM4_CTS#
17	COM4_DDTR#	8	COM4_RI#
19	GND	20	GND

Corresponding COM cable DB9 Conn. pin assignment (PN: 1700031130-01)
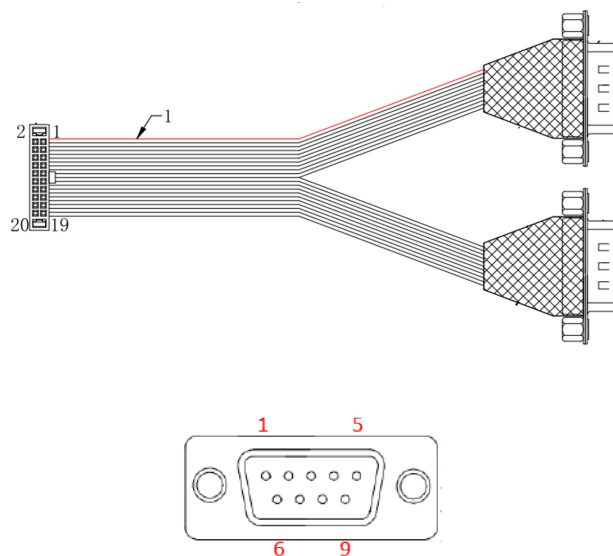
Pin	RS-232 Signal
1	DCD#
2	SIN
3	SOUT
4	DTR#
5	GND
6	DSR#
7	RTS#
8	CTS#
9	RI#

Note!   * : There is a cable marked in RED on COM#3

2.23 Case Open Connector (JCASE1)

JCASE1
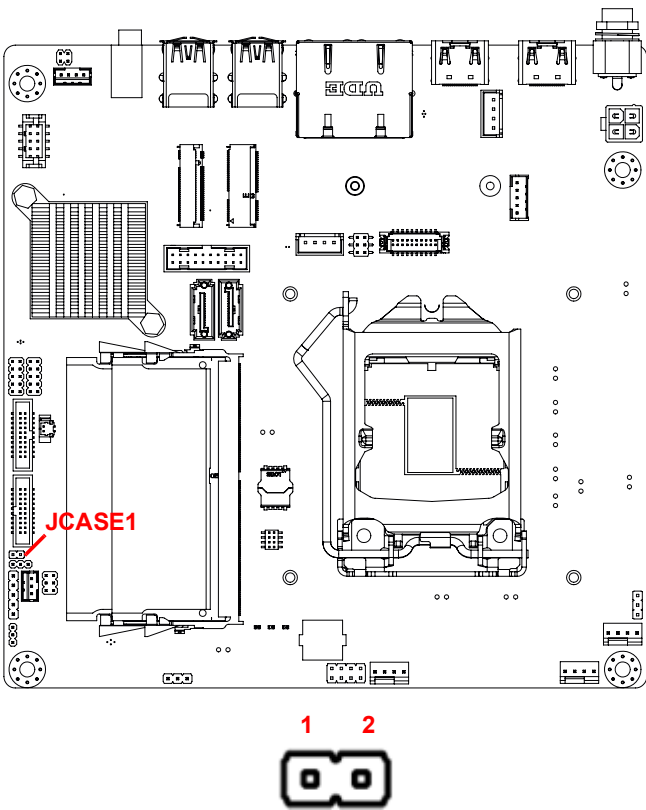
Pin	Signal
1	CASEOPEN#
2	GND

2.24 CMOS clear (JCMOS1)

JCMOS1
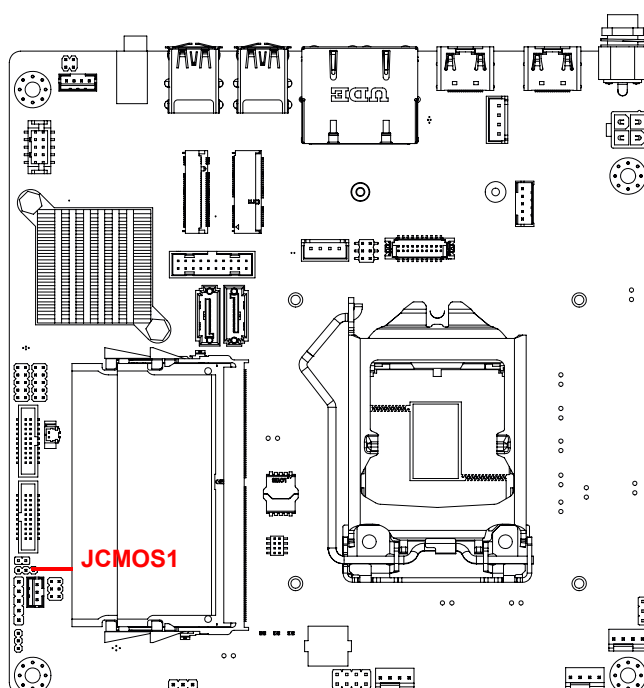
Function	Jumper Setting
Keep CMOS Data (Default)	1 2 3 — pins 1,2 shorted
Clear CMOS Data	1 2 3 — pins 2,3 shorted

2.25 Watchdog Timer Output and OBS Beep (JWDT1+ JOBS1)
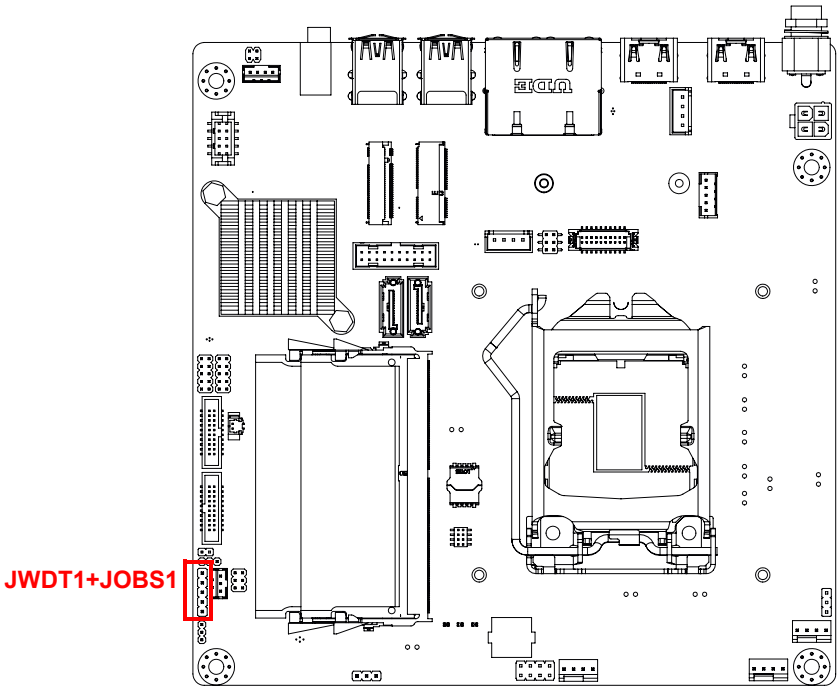
Function	Jumper Setting
Watchdog Timer Output (2-3) (Default) OBS BEEP(4-5) (Default)	

2.26 ATX Supported 3-pin Header on Board (ATX_5VSB1)
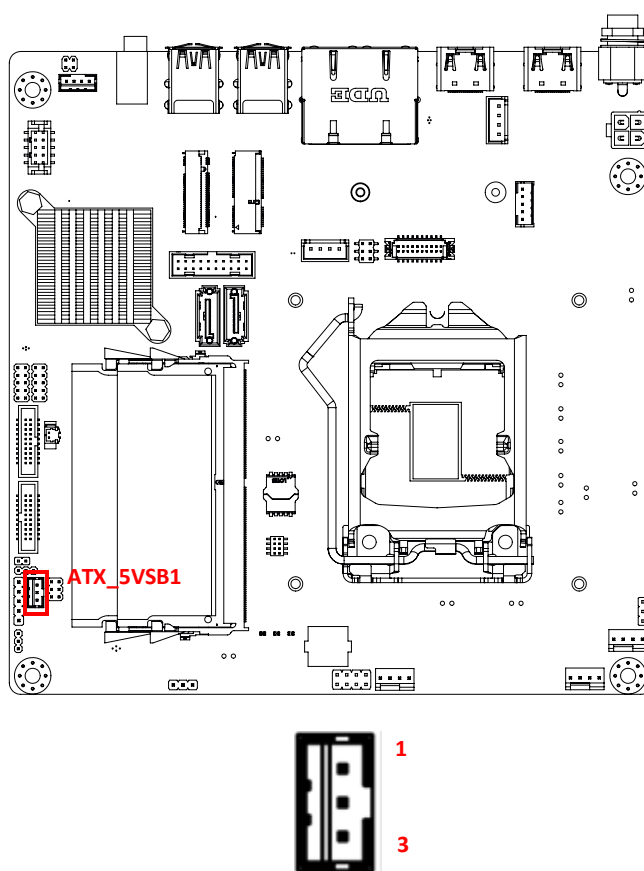
Pin	Signal
1	+V5SB
2	GND
3	PS_ON#

2.27 COM1_RI# Pin RI# / 5V / 12V Selection (JSETCOM1_V1)

JSETCOM1_V1
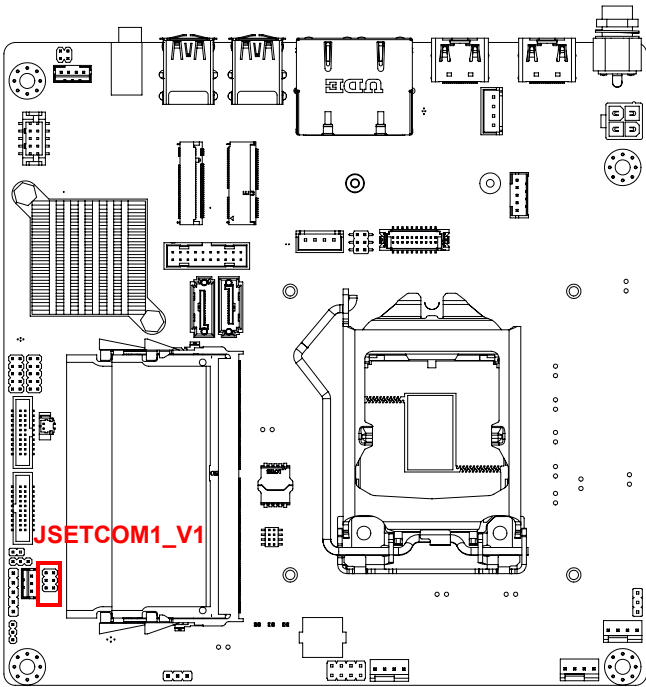
Function	Setting
Jumper position for RI# (Default)	
Jumper position for +5V	
Jumper position for +12V	

2.28 AT/ATX Mode Selection (PSON1)

PSON1

Pin	Signal
1	VCCAT
2	+3.3V_DUAL
3	VCCATX

2.29 Power LED Pin Header (JFP2)
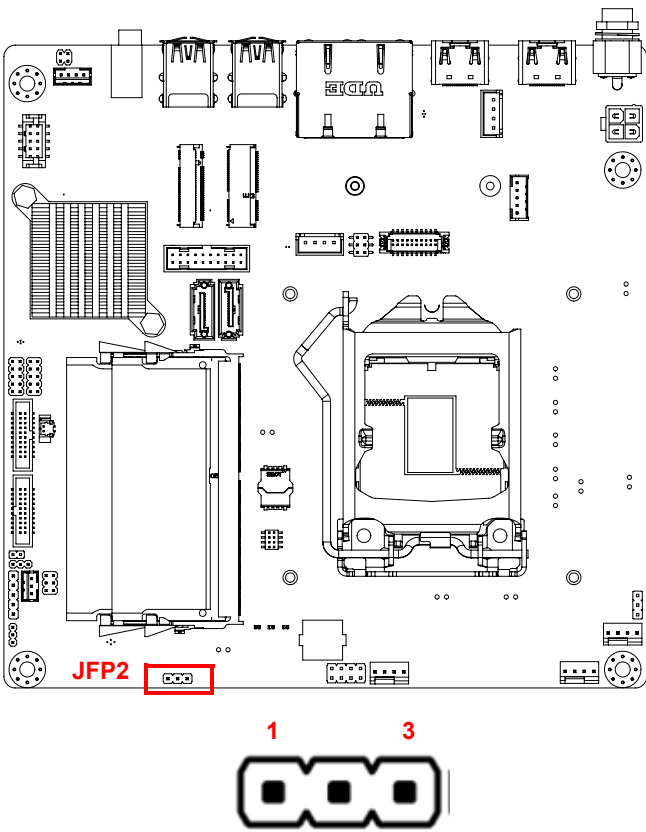
Pin	Signal
1	PWR_LED+
2	N.C.
3	PWR_LED-

2.30 SPI Programming Pin Header (CN1)
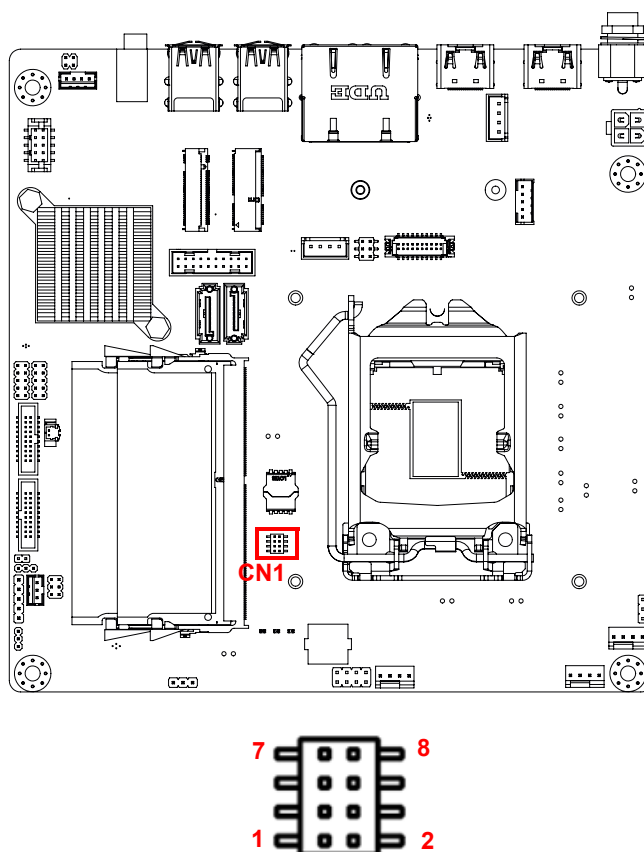
Pin	Signal	Pin	Signal
1	CS#	2	+3.3V
3	MISO	4	NA
5	NA	6	SCK
7	GND	8	MOSI

2.31 SPI BIOS Flash Socket (SPI1)
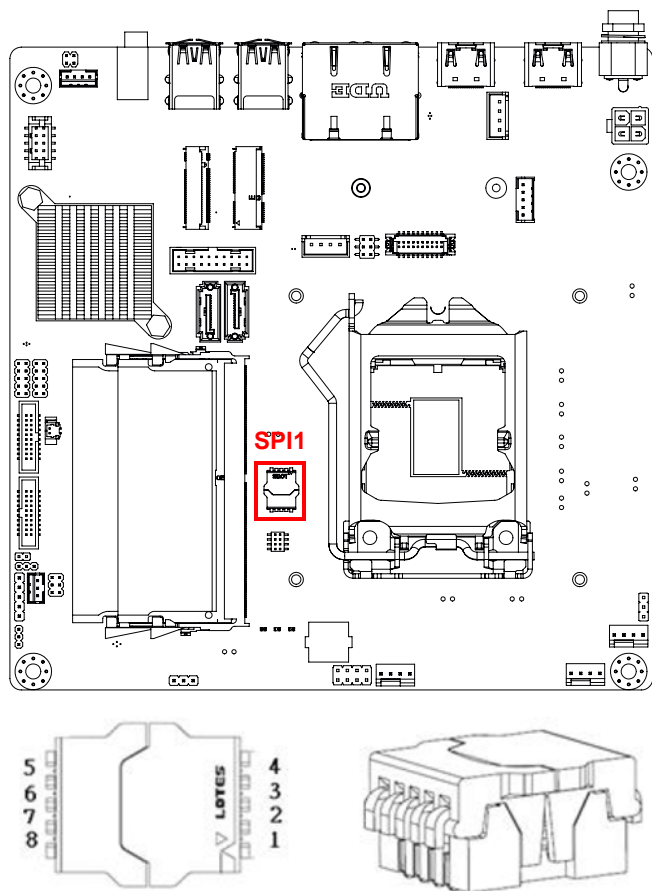
Pin	Signal	Pin	Signal
1	CS#	2	MISO
3	WP# / io2	4	GND
5	MOSI	6	SCK
7	HOLD# / io3	8	+3.3V

2.32 PWRBTN#/ RESET#/HDD LED/ SM bus/ Ext. Speaker Header (JFP1)
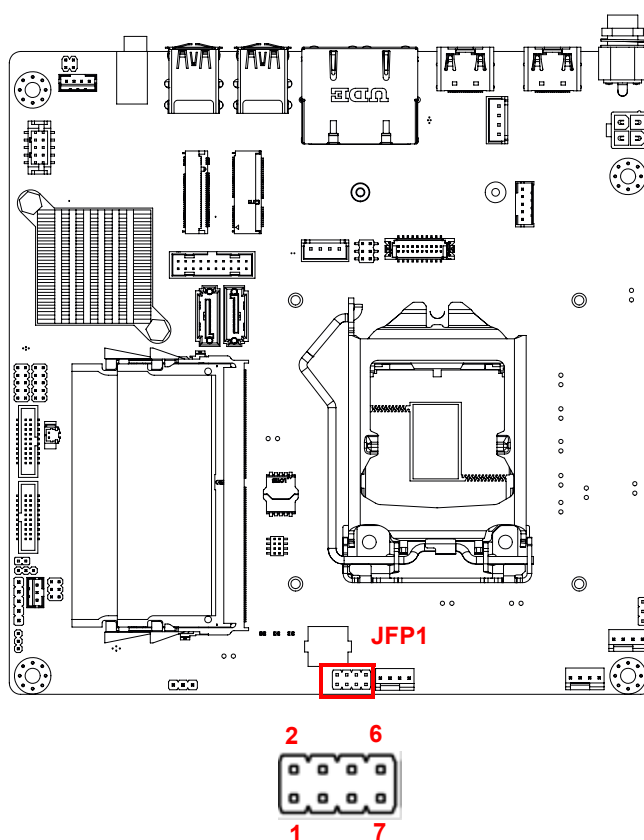
Pin	Signal	Pin	Signal
1	HDD_LED+	2	PWRBTN#
3	HDD_LED-	4	GND
5	SMB_DAT	6	SYS_RESET#
7	SMB_CLK	8	GND

2.33 System Fan #1 Connector /System Fan #2 Connector (SYSFAN1/2)
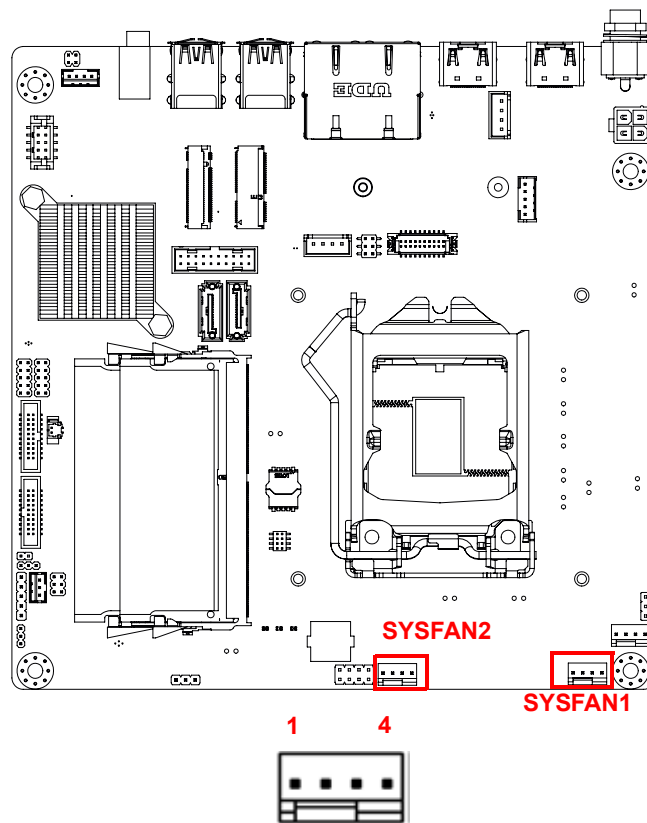
Pin	Signal
1	GND
2	VCC
3	FAN SPEED
4	PWM

2.34 CPU FAN Connector (CPUFAN1)
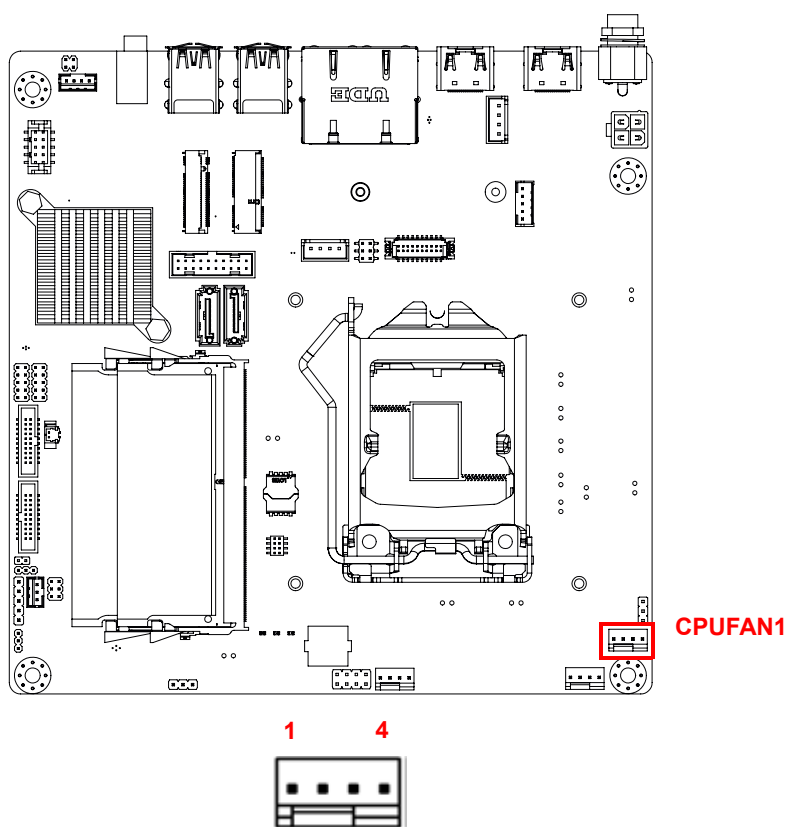
Pin	Signal
1	GND
2	VCC
3	FAN SPEED
4	PWM

2.35 CMOS Battery Connector (BAT1)
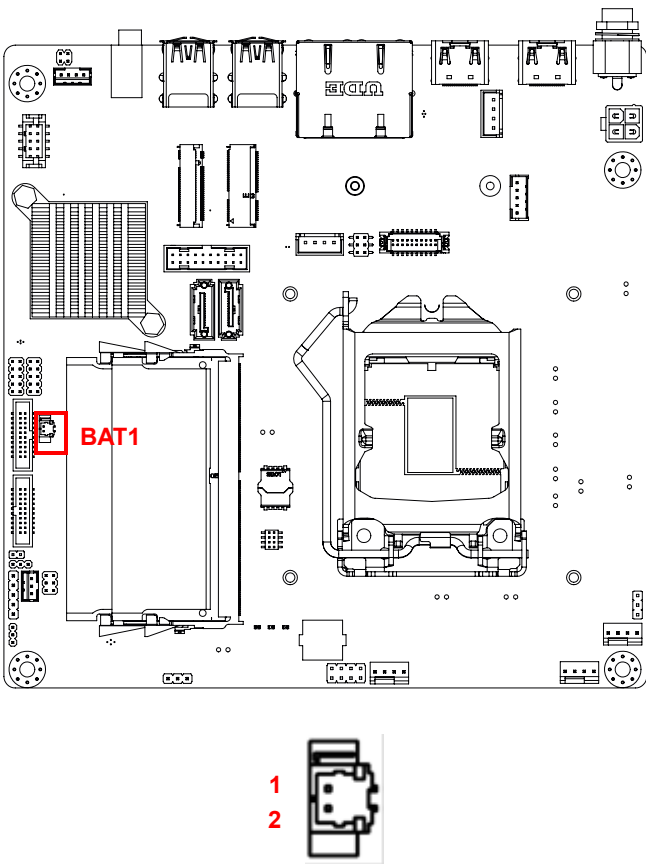
Pin	Signal
1	+VBAT
2	GND

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-286 setup screens.

3.2 BIOS Setup

The AIMB-286 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 without saving changes to the CMOS Sub Menu - Exit current page and return to the Main Menu
<Page Up/+>	Increase the numeric value or make changes
<Page Down/->	Decrease the numeric value or make changes
<F1>	General help, for Setup Sub Menu
<F2>	Item help
<F5>	Loads previous values
<F7>	Loads setup defaults
<F10>	Saves 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.

```
                              Aptio Setup – AMI
    Main  Advanced  Chipset  Security  Boot  Save & Exit

    BIOS Information                                   Set the Date. Use Tab to
    BIOS Vendor                American Megatrends     switch between Date elements.
    Core Version               5.0.1.7   0.40 x64      Default Ranges:
    Compliancy                 UEFI 2.7; PI 1.6        Year: 1998-9999
    Project Version            A287000H160X026         Months: 1-12
    Build Date and Time        12/14/2020 14:38:20     Days: Dependent on month
    Access Level               Administrator           Range of Years may vary.
    Project Board Version      AIMB-287
    Power Type                 ATX

    Memory Information
    Total Memory               8192 MB
    Memory Frequency           2400 MHz

    System Date                [Sat 01/16/2021]        ↔: Select Screen
    System Time                [00:45:16]              ↑↓: Select Item
                                                       Enter: Select
                                                       +/-: Change Opt.
                                                       F1: General Help
                                                       F2: Previous Values
                                                       F3: Optimized Defaults
                                                       F4: Save & Exit
                                                       ESC: Exit


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```

The Main BIOS setup screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured; options in blue can. The right frame displays the key legend.

Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

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

3.2.2 Advanced BIOS Features

Select the Advanced tab from the AIMB-286 setup menu to enter the Advanced BIOS setup page. Users can select any item in the left frame of the screen, such as CPU configuration. Select an Advanced BIOS setup option by highlighting the text using the <Arrow> keys. All Advanced BIOS setup options are described in this section. The Advanced BIOS setup menu screen is shown below. The submenus are described in the following pages.

```
                            Aptio Setup - AMI
        Main  Advanced  Chipset  Security  Boot  Save & Exit

    ▶ Platform Misc Configuration                    System ACPI Parameters.
    ▶ CPU Configuration
    ▶ Power & Performance
    ▶ PCH-FW Configuration
    ▶ Trusted Computing
    ▶ ACPI Settings
    ▶ NCT6126D Super IO Configuration
    ▶ NCT6126D HW Monitor
    ▶ S5 RTC Wake Settings
    ▶ Serial Port Console Redirection
    ▶ Intel TXT Information
    ▶ USB Configuration
    ▶ Network Stack Configuration
    ▶ CSM Configuration
    ▶ NVMe Configuration
                                                    →←: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F3: Optimized Defaults
                                                    F4: Save & Exit
                                                    ESC: Exit



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```

3.2.2.1 Platform Misc Configuration

```
                              Aptio Setup – AMI
        Advanced

 Platform Misc Configuration                            Bit – PCIe Native * control
                                                         0 – ~ Hot Plug
 Native PCIE Enable              [Enabled]               1 – SHPC Native Hot Plug
 Native ASPM                     [Auto]                 control
                                                         2 – ~ Power Management Events
                                                         3 – PCIe Advanced Error
                                                        Reporting control
                                                         4 – PCIe Capability Structure
                                                        control
                                                         5 – Latency Tolerance
                                                        Reporting control
                                                        _____

                                                        ↔: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/–: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit



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```

■ **Native PCIE Enable [Enable]**
■ **Native ASPM [Auto]**

3.2.2.2 CPU Configuration

Advance → CPU Configuration

```
                            Aptio Setup - AMI
        Advanced

CPU Configuration                                       Enable/Disable CPU Flex Ratio
                                                        Programming
Type                         Intel(R) Core(TM)
                             i7-10700E CPU @ 2.90GHz
ID                           0xA0654
Speed                        2900 MHz
Microcode Revision           C6
L1 Data Cache                32 KB x 8
L1 Instruction Cache         32 KB x 8
L2 Cache                     256 KB x 8
L3 Cache                     16 MB
L4 Cache                     N/A
VMX                          Supported
SMX/TXT                      Supported                  ++: Select Screen
                                                        ↑↓: Select Item
CPU Flex Ratio Override      [Disabled]                 Enter: Select
CPU Flex Ratio Settings      29                         +/-: Change Opt.
Intel (VMX) Virtualization   [Enabled]                  F1: General Help
Technology                                              F2: Previous Values
Active Processor Cores       [All]                      F3: Optimized Defaults
Hyper-Threading              [Enabled]                  F4: Save & Exit
Intel Trusted Execution Technology  [Disabled]          ESC: Exit
Alias Check Request          [Disabled]
DPR Memory Size (MB)         4



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```

- ■ **CPU Flex Ratio Override [Disabled]**
- ■ **Intel (VMX) Virtualization [Enabled]**
- ■ **PECI [Enabled]**
- ■ **Active Processor Cores [All]**
- ■ **BIST [Disabled]**
- ■ **AES [Enabled]**

3.2.2.3 **Power & Performance**

Advance → Power & Performance

```
                              Aptio Setup - AMI
     Advanced

   Power & Performance                                 CPU - Power Management Control
                                                       Options
 ▶ CPU - Power Management Control
 ▶ GT - Power Management Control



                                                       ──────────────────────────
                                                       →←: Select Screen
                                                       ↑↓: Select Item
                                                       Enter: Select
                                                       +/-: Change Opt.
                                                       F1: General Help
                                                       F2: Previous Values
                                                       F3: Optimized Defaults
                                                       F4: Save & Exit
                                                       ESC: Exit



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```

CPU - Power Management Control

Advance → Power & Performance→ CPU - Power Management Control

```
                        Aptio Setup - AMI
      Advanced

   CPU - Power Management Control                           ▲  Select the performance state
                                                               that the BIOS will set
   Boot performance mode           [Max Non-Turbo               starting from reset vector.
                                   Performance]
   Intel(R) SpeedStep(tm)          [Enabled]
   Race To Halt (RTH)              [Enabled]
   Intel(R) Speed Shift Technology [Enabled]
   HDC Control                     [Enabled]
   Turbo Mode                      [Enabled]
 ▶   View/Configure Turbo Options
   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]     ┃→←: Select Screen
     Package C-State Un-demotion   [Disabled]     ┃↑↓: Select Item
   CState Pre-Wake                 [Enabled]      ┃Enter: Select
   IO MWAIT Redirection            [Disabled]     ┃+/-: Change Opt.
   Package C State Limit           [Auto]         ┃F1: General Help
   C3 Latency Control(MSR 0x60A)                  ┃F2: Previous Values
   Time Unit                       [1024 ns]      ┃F3: Optimized Defaults
   Latency                         78             ┃F4: Save & Exit
   C6/C7 Short Latency Control(MSR 0x60B)         ┃ESC: Exit
   Time Unit                       [1024 ns]
   Latency                         118          ▼

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```

- ■ **Boot Performance Mode [Max Non-Turbo Performance]**
- ■ **Intel® SpeedStep (tm) [Enabled]**
- ■ **Race To Halt (RTH) [Enabled]**
- ■ **Intel (R) Speed Shift Technology [Enabled]**
- ■ **HDC Control [Enabled]**
- ■ **Turbo Mode [Enabled]**
- ■ **C states [Enabled]**
- ■ **Enhanced C-states [Enabled]**
- ■ **C-state Auto Demotion [C1 and C3]**
- ■ **C-state Un- demotion [C1 and C3]**
- ■ **Package C-state Un-demotion [Disabled]**
- ■ **Package C-state Demotion [Disabled]**
- ■ **CState Pre-Wake [Enabled]**
- ■ **IO MWAIT Redirection [Disabled]**
- ■ **Package C-state Limit [C7]**
- ■ **Time Unit [1024 ns]**

GT - Power Management Control

Advance →Power & Performance →GT - Power Management Control

```
                          Aptio Setup - AMI
      Advanced

   GT - Power Management Control                          Check to enable render standby
                                                          support.
   RC6(Render Standby)             [Enabled]
   Maximum GT frequency            [Default Max Frequency]
   Disable Turbo GT frequency      [Disabled]




                                                          ↔: Select Screen
                                                          ↑↓: Select Item
                                                          Enter: Select
                                                          +/-: Change Opt.
                                                          F1: General Help
                                                          F2: Previous Values
                                                          F3: Optimized Defaults
                                                          F4: Save & Exit
                                                          ESC: Exit




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```

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

```
                                    Aptio Setup - AMI
        Advanced

     ME Firmware Version            14.0.45.1389           When Disabled ME will be put
     ME Firmware Mode               Normal Mode            into ME Temporarily Disabled
     ME Firmware SKU                Consumer SKU           Mode.
     ME Firmware Status 1           0x90000255
     ME Firmware Status 2           0x3B850106

     ME State                       [Enabled]

     ▶ Firmware Update Configuration

                                                           ↔: Select Screen
                                                           ↑↓: Select Item
                                                           Enter: Select
                                                           +/-: Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F3: Optimized Defaults
                                                           F4: Save & Exit
                                                           ESC: Exit




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```

■ **ME State [Enabled]**

3.2.2.4 Trusted Computing

Advance →Trusted Computing

```
                            Aptio Setup - AMI
       Advanced

 TPM 2.0 Device Found                              Enables or Disables BIOS
 Firmware Version:            500.14               support for security device.
 Vendor:                     INTC                 O.S. will not show Security
                                                  Device. TCG EFI protocol and
 Security Device Support      [Enable]            INT1A interface will not be
 Active PCR banks            SHA-1,SHA256         available.
 Available PCR banks         SHA-1,SHA256

 SHA-1 PCR Bank               [Enabled]
 SHA256 PCR Bank              [Enabled]

 Pending operation            [None]
 Platform Hierarchy           [Enabled]
 Storage Hierarchy            [Enabled]           ↔: Select Screen
 Endorsement Hierarchy        [Enabled]           ↑↓: Select Item
 TPM 2.0 UEFI Spec Version    [TCG_2]             Enter: Select
 Physical Presence Spec Version [1.3]             +/-: Change Opt.
 TPM 2.0 InterfaceType        [CRB]               F1: General Help
 Device Select                [Auto]              F2: Previous Values
                                                  F3: Optimized Defaults
                                                  F4: Save & Exit
                                                  ESC: Exit



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```

- ■ **Security Device Support [Enabled]**
- ■ **SHA-1 PCR Bank [Enabled]**
- ■ **SHA256 PCR Bank [Enabled]**
- ■ **Pending operation [None]**
- ■ **Platform Hierarchy [Enabled]**
- ■ **Storage Hierarchy [Enabled]**
- ■ **Endorsement Hierarchy [Enabled]**
- ■ **TPM2.0 UEFI Spec Version [TCG_2]**
- ■ **Physical Presence Spec Version [1.3]**
- ■ **TPM 20 Interface Type [TIS]**

3.2.2.5 ACPI Settings

Advance →ACPI Settings
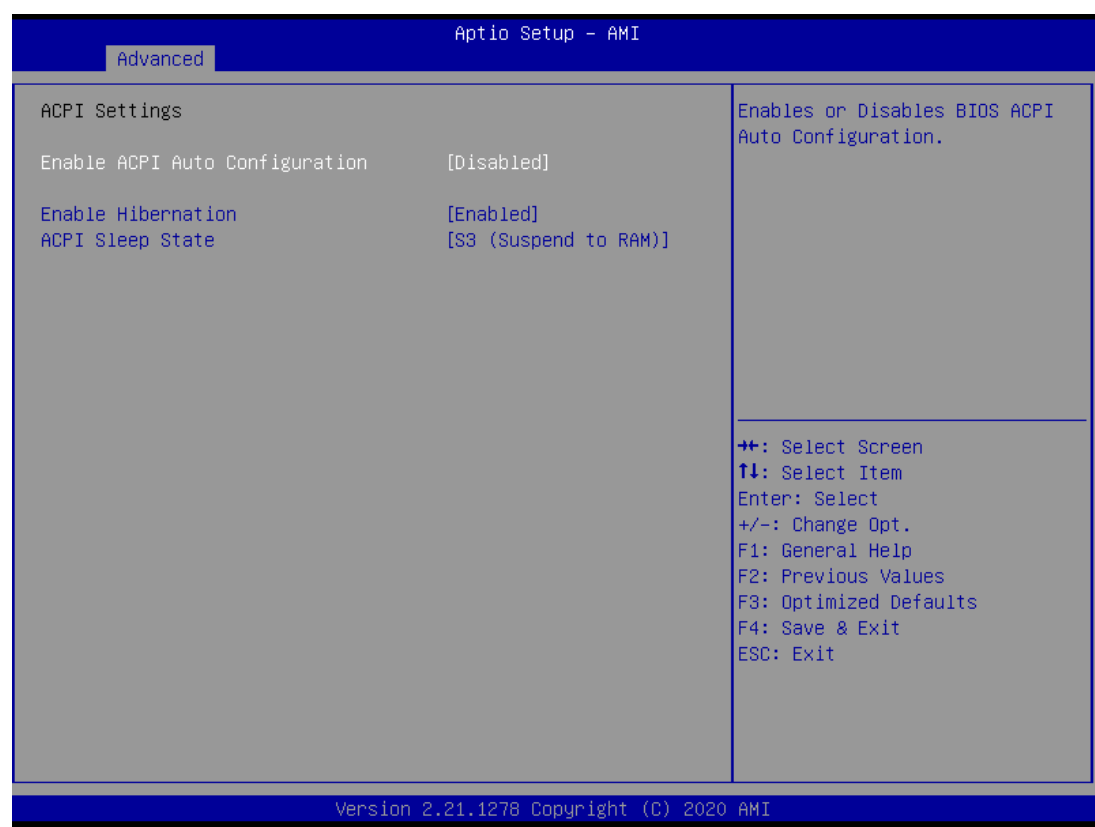
```
                              Aptio Setup – AMI
       Advanced

   ACPI Settings                                       Enables or Disables BIOS ACPI
                                                       Auto Configuration.
   Enable ACPI Auto Configuration      [Disabled]

   Enable Hibernation                  [Enabled]
   ACPI Sleep State                    [S3 (Suspend to RAM)]



                                                       ←→: Select Screen
                                                       ↑↓: Select Item
                                                       Enter: Select
                                                       +/-: Change Opt.
                                                       F1: General Help
                                                       F2: Previous Values
                                                       F3: Optimized Defaults
                                                       F4: Save & Exit
                                                       ESC: Exit




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```

- **Enable ACPI Auto Configuration [Disabled]**
- **Enable Hibernation [Enabled]**
- **ACPI Sleep State [S3 (Suspend to RAM)]**

3.2.2.6 NCT6126D Super I/O Configuration

Advance →NCT6126D Super I/O Configuration

```
                            Aptio Setup - AMI
        Advanced

      NCT6126D Super IO Configuration                           Set Parameters of Serial Port
                                                                1 (COMA)
      Super IO Chip                        NCT6126D
   ▶ Serial Port 1 Configuration
   ▶ Serial Port 2 Configuration
   ▶ Serial Port 3 Configuration
   ▶ Serial Port 4 Configuration




                                                                →←: Select Screen
                                                                ↑↓: Select Item
                                                                Enter: Select
                                                                +/-: Change Opt.
                                                                F1: General Help
                                                                F2: Previous Values
                                                                F3: Optimized Defaults
                                                                F4: Save & Exit
                                                                ESC: Exit




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```

Serial Port 1 Configuration

```
                              Aptio Setup - AMI
      Advanced

   Serial Port 1 Configuration                         Enable or Disable Serial Port
                                                       (COM)
   Serial Port                    [Enabled]
   Device Settings                IO=3F8h; IRQ=4;

   Change Settings                [Auto]
   RS485 Auto Flow Control Function [Disabled]


                                                       ↦↤: Select Screen
                                                       ↑↓: Select Item
                                                       Enter: Select
                                                       +/-: Change Opt.
                                                       F1: General Help
                                                       F2: Previous Values
                                                       F3: Optimized Defaults
                                                       F4: Save & Exit
                                                       ESC: Exit




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```

- **Serial Port [Enabled]**
- **Device Settings: I/O=3F8h; IRQ =4**
- **Change Settings [Auto]**
  To select an optimal setting for serial port 1.
- **RS485 Auto Flow Control Function [Disabled]**

Serial Port 2 Configuration
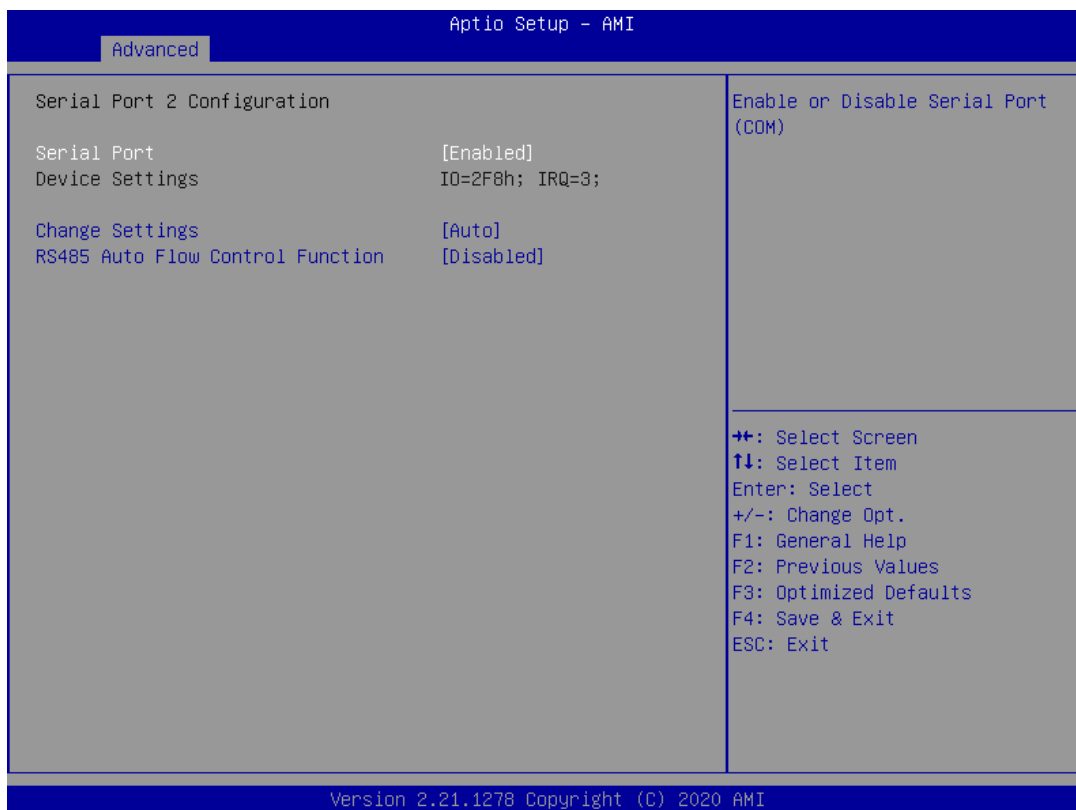
```
                            Aptio Setup - AMI
    Advanced

Serial Port 2 Configuration                          Enable or Disable Serial Port
                                                     (COM)
Serial Port                       [Enabled]
Device Settings                   IO=2F8h; IRQ=3;

Change Settings                   [Auto]
RS485 Auto Flow Control Function  [Disabled]

                                                     ↔: Select Screen
                                                     ↑↓: Select Item
                                                     Enter: Select
                                                     +/-: Change Opt.
                                                     F1: General Help
                                                     F2: Previous Values
                                                     F3: Optimized Defaults
                                                     F4: Save & Exit
                                                     ESC: Exit



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```

- ■ **Serial Port [Enabled]**
- ■ **Device Settings: I/O=2F8h; IRQ =3**
- ■ **Change Settings [Auto]**
  To select an optimal setting for serial port 2.
- ■ **RS485 Auto Flow Control Function [Disabled]**

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Serial Port 3 Configuration

```
                              Aptio Setup - AMI
      Advanced

Serial Port 3 Configuration                              Enable or Disable Serial Port
                                                         (COM)
Serial Port                         [Enabled]
Device Settings                     IO=3E8h; IRQ=5;

Change Settings                     [Auto]



                                                         ↔: Select Screen
                                                         ↑↓: Select Item
                                                         Enter: Select
                                                         +/-: Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F3: Optimized Defaults
                                                         F4: Save & Exit
                                                         ESC: Exit



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```
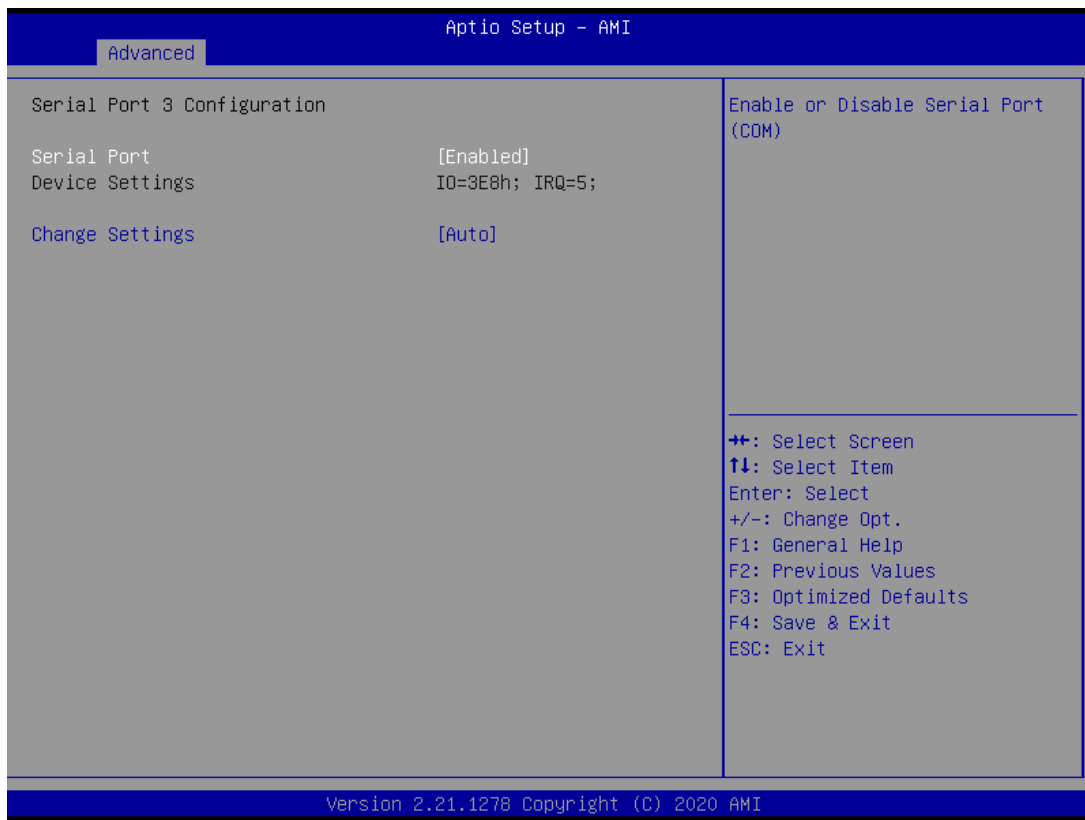
- **Serial Port [Enabled]**
- **Device Settings: I/O=3E8h; IRQ =5**
- **Change Settings [Auto]**

Serial Port 4 Configuration

```
                              Aptio Setup - AMI
      Advanced

 Serial Port 4 Configuration                        Enable or Disable Serial Port
                                                     (COM)
 Serial Port                        [Enabled]
 Device Settings                    IO=2E8h; IRQ=7;

 Change Settings                    [Auto]




                                                    ↔: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F3: Optimized Defaults
                                                    F4: Save & Exit
                                                    ESC: Exit


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```
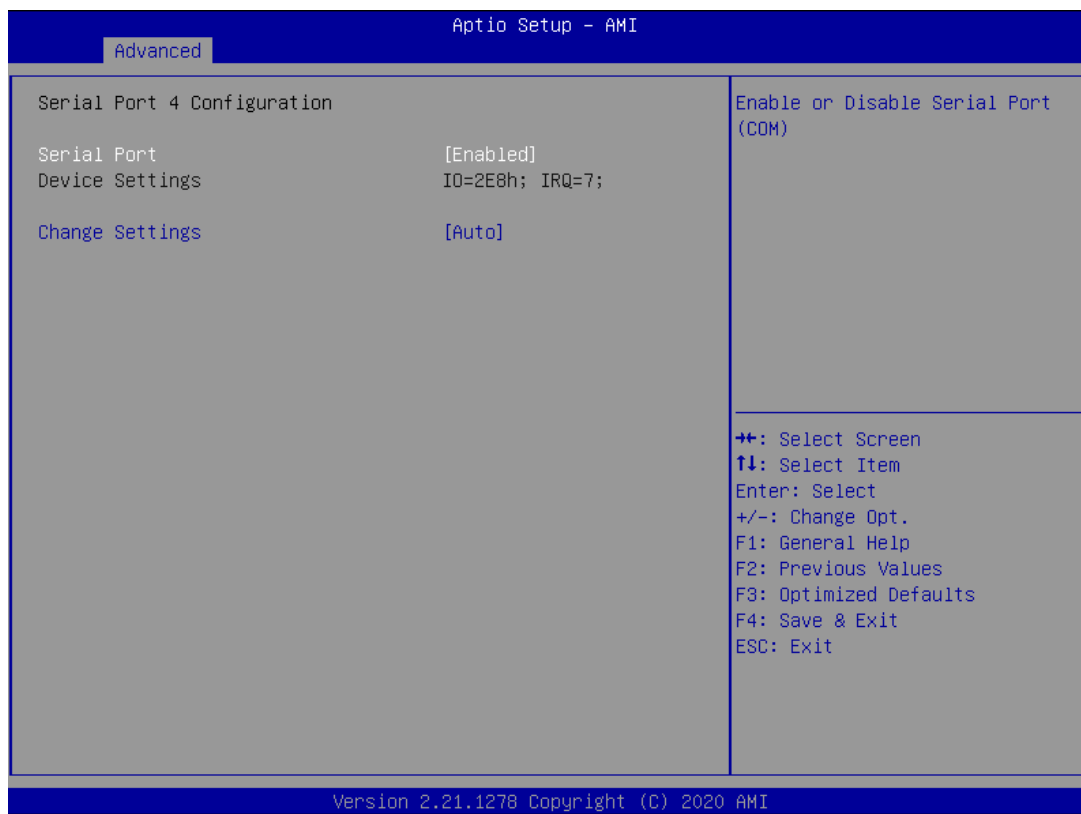
- **Serial Port [Enabled]**
- **Device Settings: I/O=3E8h; IRQ =5**
- **Change Settings [Auto]**

3.2.2.7 NCT6126D HW Monitor

Advance →NCT6126D HW Monitor

```
                           Aptio Setup - AMI
        Advanced

  PC Health Status                                      Enable or Disable Smart Fan

  System temperature              : +28°C
  CPU temperature                 : +28°C
  CPU FAN1 Speed                  : 2268 RPM
  SYS FAN1 Speed                  : N/A
  SYS FAN2 Speed                  : N/A
  VCORE                           : +0.952 V
  +5VSB                           : +5.088 V
  +5V                             : +4.939 V
  +12V                            : +11.712 V
  AVCC                            : +3.328 V
  3VSB                            : +3.328 V
  3VVCC                           : +3.328 V
  VBAT                            : +3.024 V         →←: Select Screen
                                                     ↑↓: Select Item
  Smart Fan Function                [Enabled]        Enter: Select
▶ Smart Fan Function                                 +/-: Change Opt.
▶ Digital I/O Configuration                          F1: General Help
                                                     F2: Previous Values
  CPU Warning Temperature           [Disabled]       F3: Optimized Defaults
  ACPI Shutdown Temperature         [Disabled]       F4: Save & Exit
  Case Open Warning                 [Disabled]       ESC: Exit
  Wake On Ring                      [Disabled]
  Watch Dog Timer                   [Disabled]


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```

- **CPU Warning Temperature [Disabled]**
  Use this to set the CPU warning temperature threshold. When the system reaches the warning temperature, the speaker will beep.
- **ACPI Shutdown Temperature [Disabled]**
  Use this to set the ACPI shutdown temperature threshold. When the system reaches the shutdown temperature, it will be automatically shut down by ACPI OS to protect the system from overheating damage.
- **Case Open Warning [Disabled]**
- **Wake On Ring [Disabled]**
- **Watch Dog Timer [Disabled]**

```
                              Aptio Setup - AMI
          Advanced

CPUFAN Critical Temp Tolerance      1                    ▲  Input Tolerance of Critical
                                                            Temperature (Range:0 - 7)
SYSFAN1 Mode                        [SMART FAN IV Mode]
SYSFAN1 Temperature 1               30
SYSFAN1 DC/PWM 1                     0
SYSFAN1 Temperature 2               40
SYSFAN1 DC/PWM 2                     84
SYSFAN1 Temperature 3               50
SYSFAN1 DC/PWM 3                     168
SYSFAN1 Temperature 4               60
SYSFAN1 DC/PWM 4                     255
SYSFAN1 Critical Temperature        90
SYSFAN1 Critical Temp Tolerance     1
                                                           ++: Select Screen
SYSFAN2 Mode                        [SMART FAN IV Mode]    ↑↓: Select Item
SYSFAN2 Temperature 1               30                     Enter: Select
SYSFAN2 DC/PWM 1                     0                      +/-: Change Opt.
SYSFAN2 Temperature 2               40                     F1: General Help
SYSFAN2 DC/PWM 2                     84                     F2: Previous Values
SYSFAN2 Temperature 3               50                     F3: Optimized Defaults
SYSFAN2 DC/PWM 3                     168                    F4: Save & Exit
SYSFAN2 Temperature 4               60                     ESC: Exit
SYSFAN2 DC/PWM 4                     255
SYSFAN2 Critical Temperature        90
SYSFAN2 Critical Temp Tolerance     1                    ▼

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```

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.

Digital I/O Configuration

Advance →NCT6126D HW Monitor →Digital I/O Configuration

```
                         Aptio Setup – AMI
        Advanced

  Digital I/O Configuration                        Configure Digital I/O Pin.

  Digital I/O Pin 1              [Input]
  Digital I/O Pin 2              [Input]
  Digital I/O Pin 3              [Input]
  Digital I/O Pin 4              [Input]
  Digital I/O Pin 5              [Input]
  Digital I/O Pin 6              [Input]
  Digital I/O Pin 7              [Input]
  Digital I/O Pin 8              [Input]

                                                   ➔←: Select Screen
                                                   ↑↓: Select Item
                                                   Enter: Select
                                                   +/-: Change Opt.
                                                   F1: General Help
                                                   F2: Previous Values
                                                   F3: Optimized Defaults
                                                   F4: Save & Exit
                                                   ESC: Exit



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```

■ **Digital I/O Pin 1 - 16 [Input]**

3.2.2.8 S5 RTC Wake Settings

Advance →S5 RTC Wake Settings

The item allows you enable or disable system wake up on alarm event.

```
                            Aptio Setup - AMI
    Advanced

  Wake system from S5              [Disabled]          Enable or disable System wake
                                                       on alarm event. Select
                                                       FixedTime, system will wake on
                                                       the hr::min::sec specified.
                                                       Select DynamicTime , System
                                                       will wake on the current time
                                                       + Increase minute(s)



                                                       →←: Select Screen
                                                       ↑↓: Select Item
                                                       Enter: Select
                                                       +/-: Change Opt.
                                                       F1: General Help
                                                       F2: Previous Values
                                                       F3: Optimized Defaults
                                                       F4: Save & Exit
                                                       ESC: Exit

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```

■ **Wake system from S5 [Disabled]**

3.2.2.9 Serial Port Console Redirection

Advance →Serial Port Console Redirection

■ **Console Redirection [Disabled]**

```
                              Aptio Setup - AMI
        Advanced

Legacy Console Redirection Settings                    Select a COM port to display
                                                       redirection of Legacy OS and
Redirection COM Port              [COM1]               Legacy OPROM Messages
Resolution                        [80x24]
Redirect After POST               [Always Enable]




                                                       →←: Select Screen
                                                       ↑↓: Select Item
                                                       Enter: Select
                                                       +/-: Change Opt.
                                                       F1: General Help
                                                       F2: Previous Values
                                                       F3: Optimized Defaults
                                                       F4: Save & Exit
                                                       ESC: Exit




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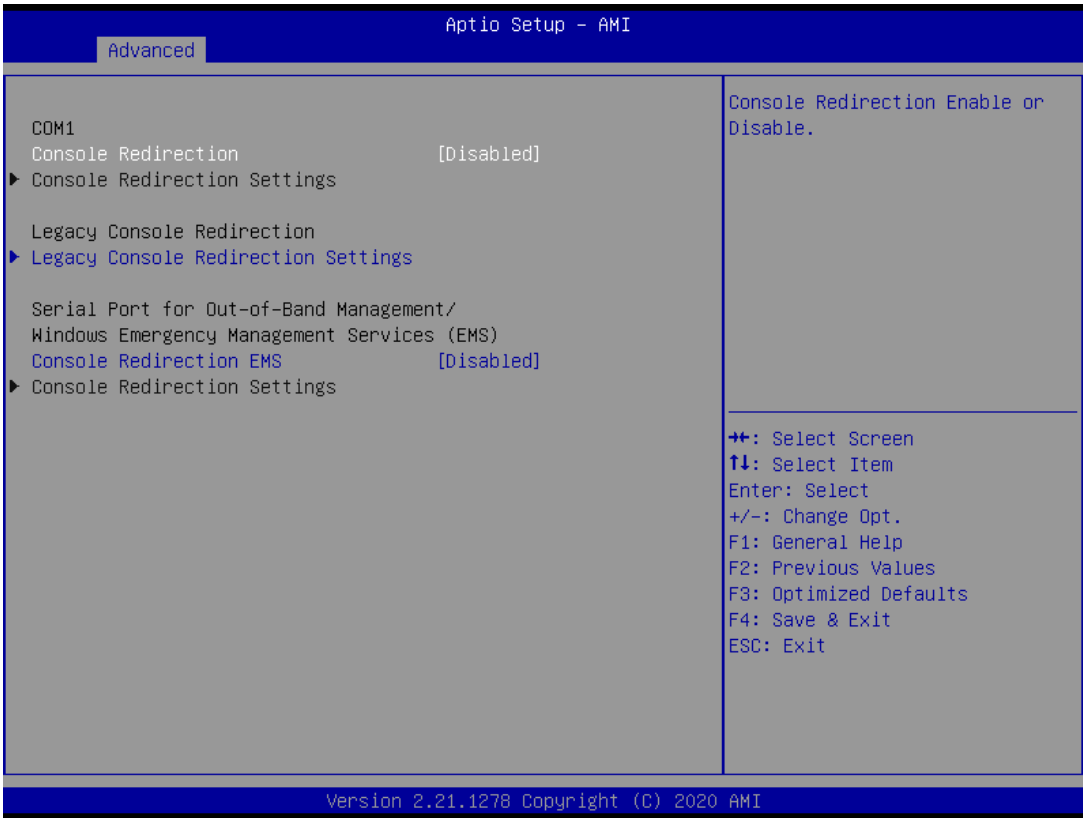
- **Redirection COM Port [COM1]**
- **Resolution [80x24]**
- **Redirect After POST [Always Enable]**

3.2.2.10 Intel TXT Information

Advance → Intel TXT Information

```
                          Aptio Setup - AMI
      Advanced

 Intel TXT Information

 Chipset                     Production Fused
 BiosAcm                     Production Fused
 Chipset Txt                 Supported
 Cpu Txt                     Supported
 Error Code                  None
   Class Code                None
   Major Code                None
   Minor Code                None




                                           →←: Select Screen
                                           ↑↓: Select Item
                                           Enter: Select
                                           +/-: Change Opt.
                                           F1: General Help
                                           F2: Previous Values
                                           F3: Optimized Defaults
                                           F4: Save & Exit
                                           ESC: Exit




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```

3.2.2.11 USB Configuration

Advance →USB Configuration

```
                           Aptio Setup - AMI
      Advanced

 USB Configuration                                    Enables Legacy USB support.
                                                      AUTO option disables legacy
 USB Module Version              24                   support if no USB devices are
                                                      connected. DISABLE option will
 USB Controllers:                                     keep USB devices available
      1 XHCI                                          only for EFI applications.
 USB Devices:
      1 Drive, 1 Keyboard, 1 Mouse

 Legacy USB Support             [Enabled]
 XHCI Hand-off                  [Enabled]
 USB Mass Storage Driver Support [Enabled]

 USB hardware delays and time-outs:                   →←: Select Screen
 USB transfer time-out          [20 sec]              ↑↓: Select Item
 Device reset time-out          [20 sec]              Enter: Select
 Device power-up delay          [Auto]                +/-: Change Opt.
                                                      F1: General Help
 Mass Storage Devices:                                F2: Previous Values
 SanDisk                        [Auto]                F3: Optimized Defaults
                                                      F4: Save & Exit
 USB PWR OFF Configuration 1    [Disabled]            ESC: Exit
 USB PWR OFF Configuration 2    [Disabled]
 USB PWR OFF Configuration 3    [Disabled]
 USB PWR OFF Configuration 4    [Disabled]


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```

- **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]**
- **SanDisk [Auto]**

3.2.2.12 Network Stack Configuration

Advance →Network Stack Configuration

```
                          Aptio Setup - AMI
      Advanced

 Network Stack              [Disabled]              Enable/Disable UEFI Network
                                                    Stack




                                                    ↔: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F3: Optimized Defaults
                                                    F4: Save & Exit
                                                    ESC: Exit



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```
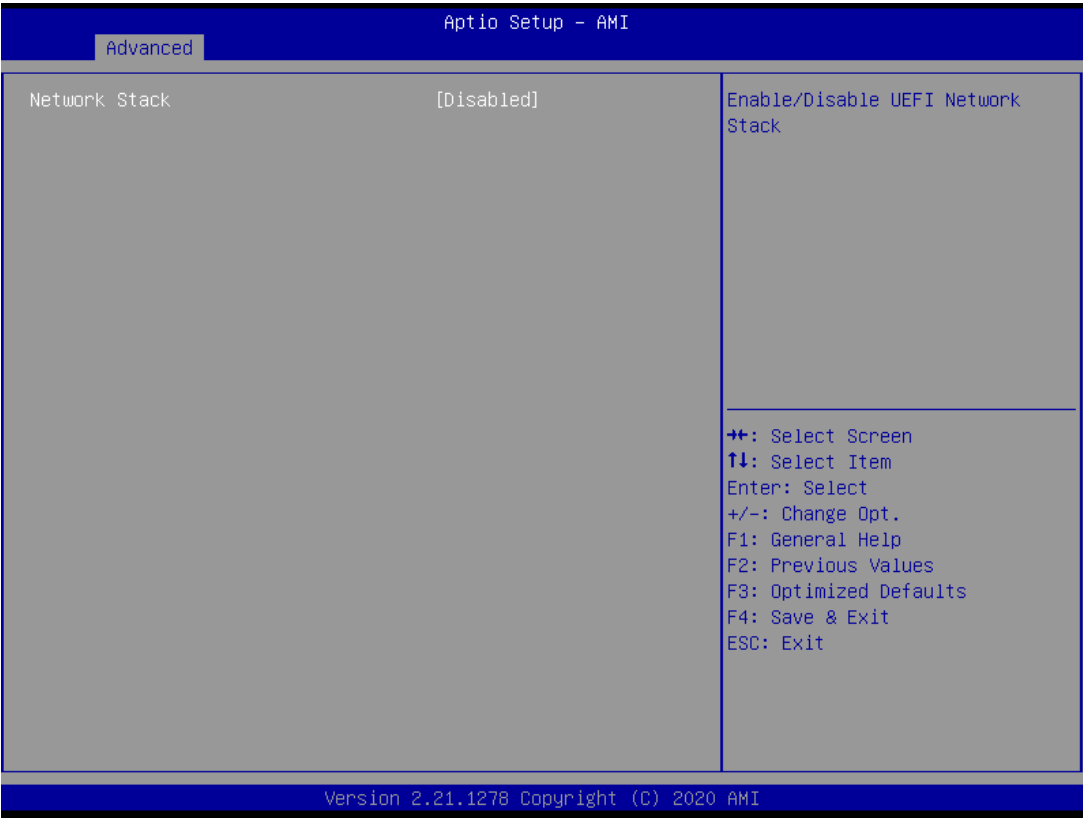
■ **Network Stack [Disabled]**

3.2.2.13 CSM Configuration

Advance →CSM Configuration

```
                           Aptio Setup - AMI
     Advanced

 Compatibility Support Module Configuration              Enable/Disable CSM Support.

 CSM Support                        [Disabled]




                                                         →←: Select Screen
                                                         ↑↓: Select Item
                                                         Enter: Select
                                                         +/-: Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F3: Optimized Defaults
                                                         F4: Save & Exit
                                                         ESC: Exit


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```
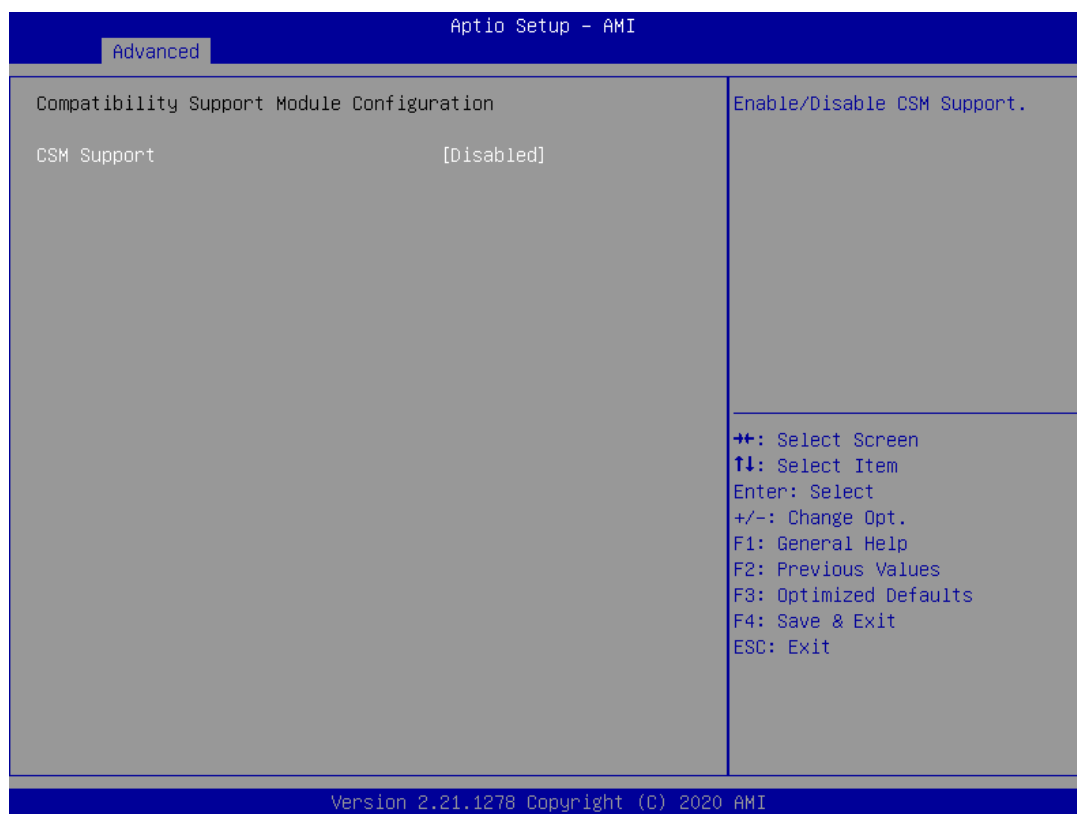
■ **CSM Support [Disabled]**

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

1. Re-install your OS in 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

3.2.2.14 NVMe Configuration

Advance →NVMe Configuration

```
                              Aptio Setup - AMI
     Advanced

 NVMe Configuration

 No NVME Device Found



                                              →←: Select Screen
                                              ↑↓: Select Item
                                              Enter: Select
                                              +/-: Change Opt.
                                              F1: General Help
                                              F2: Previous Values
                                              F3: Optimized Defaults
                                              F4: Save & Exit
                                              ESC: Exit




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```
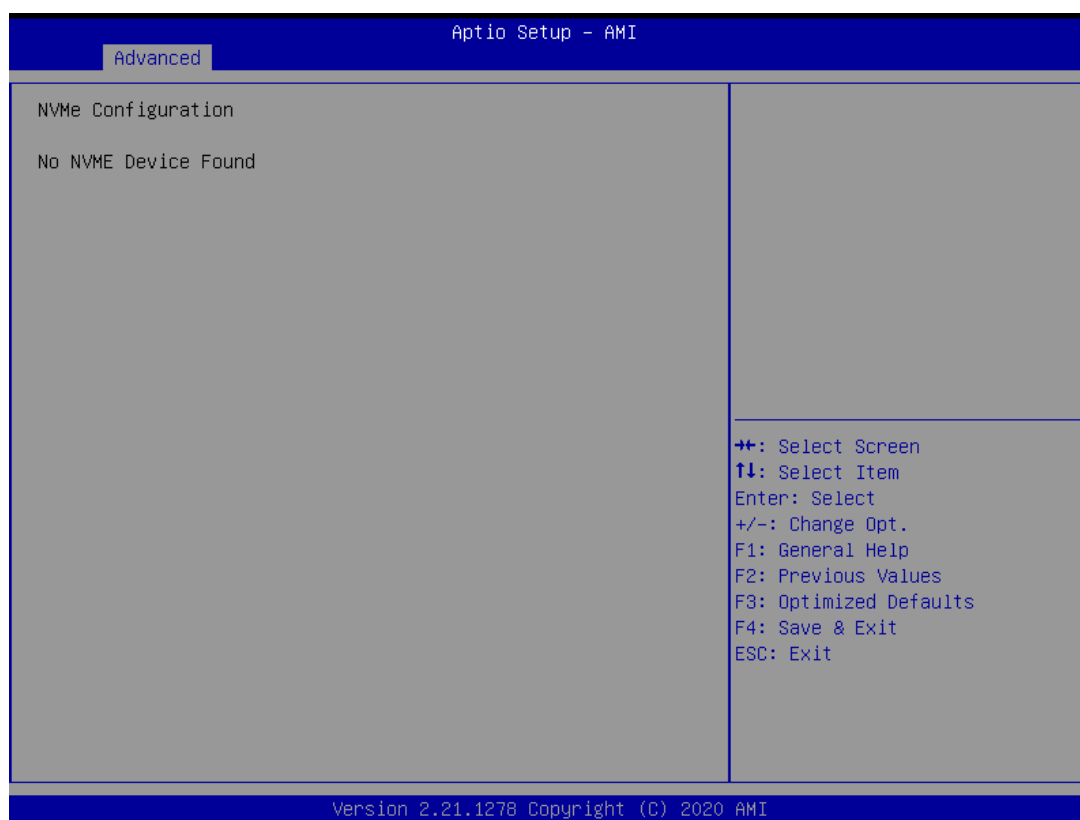
3.2.3 Chipset Configuration Setting

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.

```
                              Aptio Setup - AMI
      Main  Advanced  Chipset  Security  Boot  Save & Exit

  ▶ System Agent (SA) Configuration          System Agent (SA) Parameters
  ▶ PCH-IO Configuration




                                             ←→: Select Screen
                                             ↑↓: Select Item
                                             Enter: Select
                                             +/-: Change Opt.
                                             F1: General Help
                                             F2: Previous Values
                                             F3: Optimized Defaults
                                             F4: Save & Exit
                                             ESC: Exit



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```
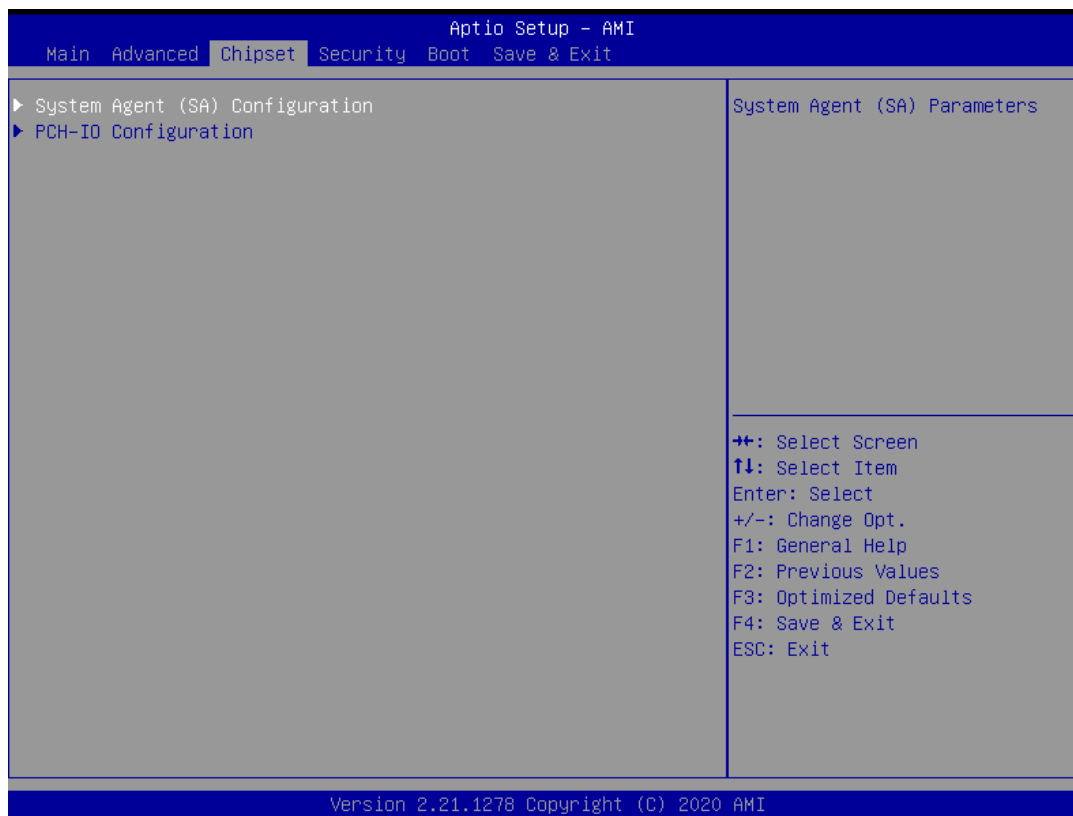
3.2.3.1 System Agent (SA) Configuration

Chipset →System Agent (SA) Configuration

```
                            Aptio Setup - AMI
            Chipset

System Agent (SA) Configuration                         Memory Configuration Parameters

VT-d                            Supported

▶ Memory Configuration
▶ Graphics Configuration

VT-d                            [Enabled]
Above 4GB MMIO BIOS assignment  [Disabled]
DMA Control Guarantee           [Enabled]

                                                        ↔: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit

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```

■ **VT-d [Enabled]**

Memory Configuration

```
                         Aptio Setup - AMI
        Chipset

Memory Configuration                                    Maximum Memory Frequency
                                                        Selections in Mhz. Valid
Memory RC Version            0.0.0.82                   values should match the
Memory Frequency              2400 MHz                  refclk, i.e. divide by 133 or
Memory Timings (tCL-tRCD-tRP-tRAS)   17-17-17-39        100

DIMMA1                       Not Populated / Disabled
DIMMB1                       Populated & Enabled
   Size                      8192 MB (DDR4)
   Number of Ranks           1
   Manufacturer              Apacer Technology

Maximum Memory Frequency     [Auto]
Max TOLUD                    [Dynamic]                  →←: Select Screen
Train On Warm boot           [Disabled]                 ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit



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```

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

■ **Maximum Memory Frequency (Auto)**

■ **Max TOLUD (Dynamic)**
Allows you to set the 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.

Graphics Configuration

Chipset →System Agent (SA) Configuration →Graphics Configuration

```
                            Aptio Setup - AMI
         Chipset

 Graphics Configuration                                    Select the GTT Size


 GTT Size                              [8MB]
 Aperture Size                         [256MB]
 DVMT Pre-Allocated                    [32M]
 DVMT Total Gfx Mem                    [256M]
 PM Support                            [Enabled]
 PAVP Enable                           [Enabled]
▶ LCD Control

                                                          ➜←: Select Screen
                                                          ↑↓: Select Item
                                                          Enter: Select
                                                          +/-: Change Opt.
                                                          F1: General Help
                                                          F2: Previous Values
                                                          F3: Optimized Defaults
                                                          F4: Save & Exit
                                                          ESC: Exit




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```
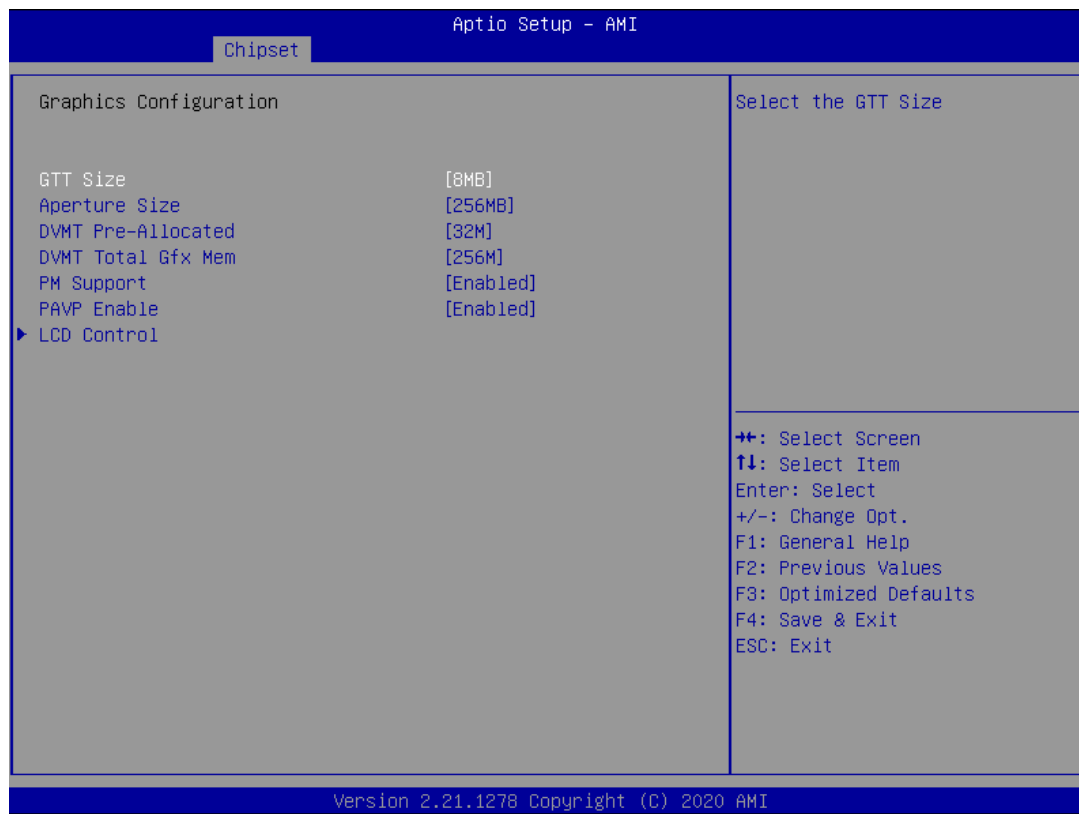
- **Skip Scanning of External Gfx Card [disabled]**
- **Primary Display [Auto]**
  Select which of IGFX/PEG/PCI Graphics device should be Primary Display
- **Select PCIE Card [Auto]**
- **Internal Graphics [Auto]|**
  Keep IGD enabled based on the setup options.
- **GTT size [8MB]**
- **Aperture Size [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

Chipset→ System Agent (SA) Configuration→ Graphics Configuration→ LCD Control

```
                        Aptio Setup - AMI
          Chipset

LCD Control                                      Input expect PWM Output
                                                 Value(Range:0 - 100%)
EDP Brightness PWM Output          100
Backlight PWM Frequency Control    [23.3 KHz]





                                                 →←: Select Screen
                                                 ↑↓: Select Item
                                                 Enter: Select
                                                 +/-: Change Opt.
                                                 F1: General Help
                                                 F2: Previous Values
                                                 F3: Optimized Defaults
                                                 F4: Save & Exit
                                                 ESC: Exit



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```

■ **EDP Brightness PWM Output [100]**
■ **Backlight PWM Frequency Control [23.3 KHz]**

3.2.3.2 PCH-I/O Configuration

Chipset →PCH-I/O Configuration

```
                              Aptio Setup - AMI
          Chipset

   PCH-IO Configuration                                    PCI Express Configuration
                                                           settings
 ▶ PCI Express Configuration
 ▶ SATA And RST Configuration
 ▶ Security Configuration
 ▶ HD Audio Configuration

   LAN1 Controller              [Enabled]
     LAN1 PXE OpROM             [Disabled]
   LAN2 Controller              [Enabled]
     LAN2 PXE OpROM             [Disabled]

   PCIE Wake                    [Disabled]
   Restore AC Power Loss        [Power Off]             ▶←: Select Screen
   PCIE Device Initial Delay    0                       ↑↓: Select Item
   Flash Protection Range Registers  [Enabled]          Enter: Select
   (FPRR)                                                +/-: Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F3: Optimized Defaults
                                                         F4: Save & Exit
                                                         ESC: Exit




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```

PCI Express Configuration

Chipset →PCH-I/O Configuration →PCI Express Configuration

```
                              Aptio Setup - AMI
          Chipset

  PCI Express Configuration                                   PCI Express Clock Gating
                                                              Enable/Disable for each root
  PCI Express Clock Gating          [Enabled]                 port.
  PCIe-USB Glitch W/A               [Disabled]

▶ M.2 M-key slot
▶ LAN2 Controller
▶ M.2 E-key slot



                                                              ++: Select Screen
                                                              ↑↓: Select Item
                                                              Enter: Select
                                                              +/-: Change Opt.
                                                              F1: General Help
                                                              F2: Previous Values
                                                              F3: Optimized Defaults
                                                              F4: Save & Exit
                                                              ESC: Exit



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```

■ **PCI Express Clock Gating [Enable]**
■ **PCIe-USB Glitch W/A [Disable]**

M.2 M-key Slot

Chipset →PCH-I/O Configuration →M.2 M-key Slot

```
                              Aptio Setup - AMI
         Chipset

 M.2 M-key slot                   [Enabled]         Control the PCI Express Root
 ASPM 4                           [Auto]            Port.
 L1 Substates                     [L1.1 & L1.2]
   Advanced Error Reporting       [Enabled]
 PCIe Speed                       [Auto]



 ▶ Extra options


                                                    →←: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F3: Optimized Defaults
                                                    F4: Save & Exit
                                                    ESC: Exit



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```

- ■ **M.2 M-Key slot [Enable]**
- ■ **ASPM 4 [Auto]**
- ■ **L1 Substates [L1.1 & L1.2]**
- ■ **PCIe Speed [Auto]**

Extra options

Chipset →PCH-I/O Configuration → M.2 M-key Slot →Extra options
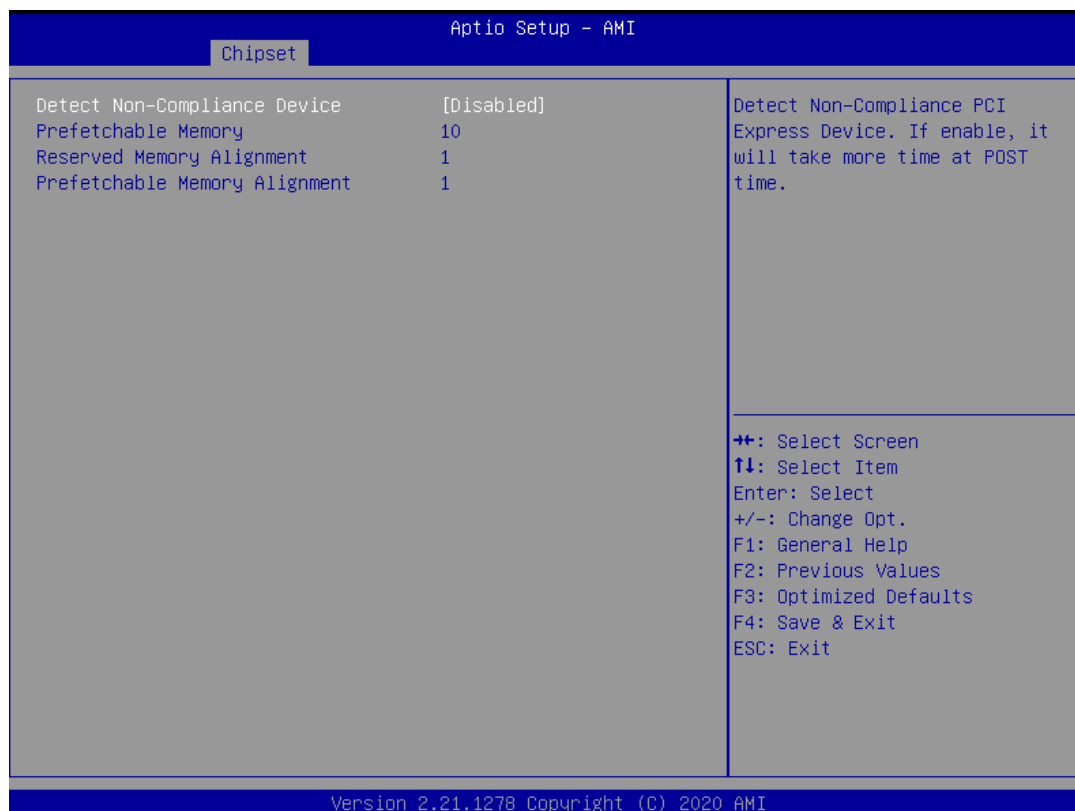
```
                              Aptio Setup - AMI
         Chipset

 Detect Non-Compliance Device      [Disabled]         Detect Non-Compliance PCI
 Prefetchable Memory               10                 Express Device. If enable, it
 Reserved Memory Alignment         1                  will take more time at POST
 Prefetchable Memory Alignment     1                  time.




                                                      →←: Select Screen
                                                      ↑↓: Select Item
                                                      Enter: Select
                                                      +/-: Change Opt.
                                                      F1: General Help
                                                      F2: Previous Values
                                                      F3: Optimized Defaults
                                                      F4: Save & Exit
                                                      ESC: Exit




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```

- ■ **Detect Non-Compliance Device   [Disable]**
- ■ **Prefetechable Memory   10**
- ■ **Reserved Memory Alignment   1**
- ■ **Prefetechable memory Alignment   1**

LAN2 Controller

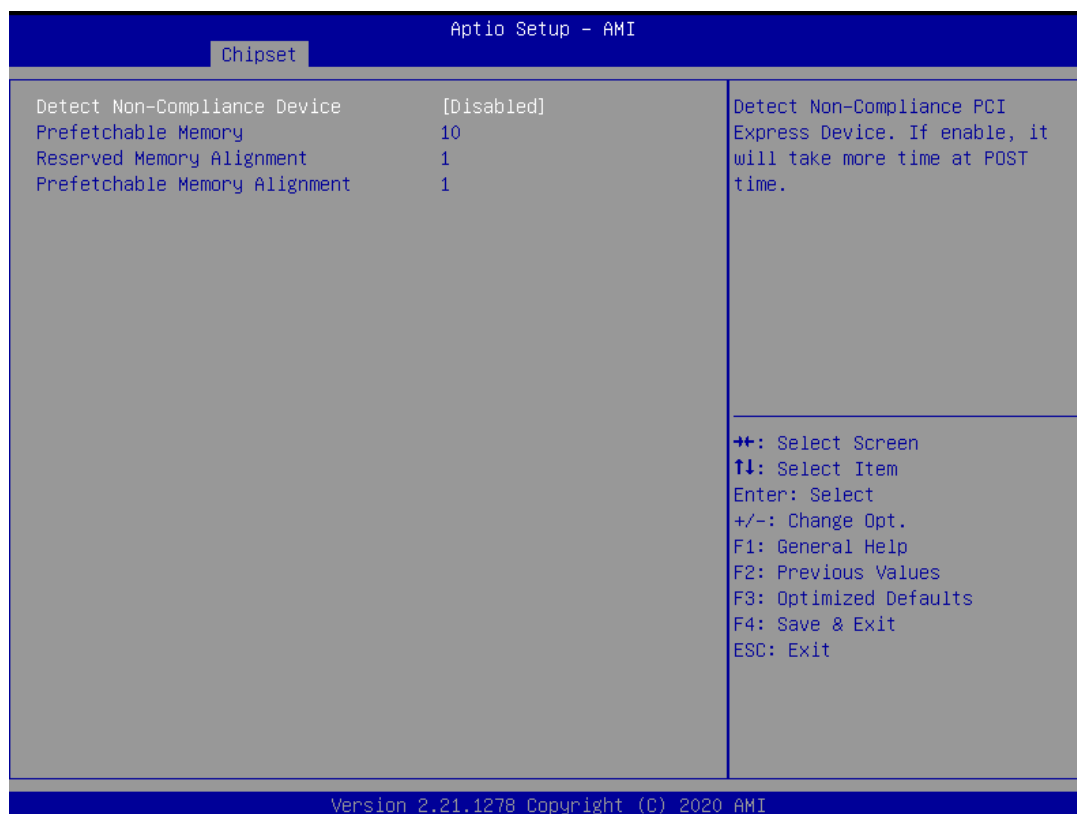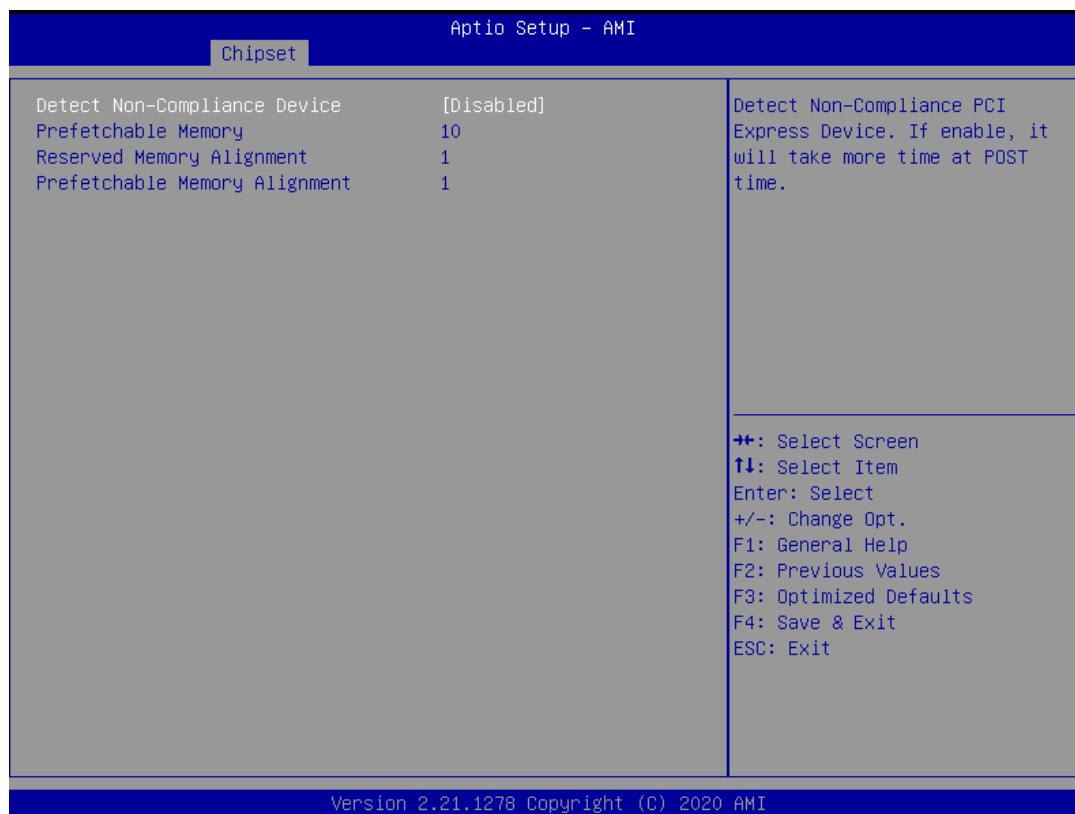Chipset →PCH-I/O Configuration→LAN2 Controller

```
                              Aptio Setup - AMI
        Chipset

  LAN2 Controller                 [Enabled]              Control the PCI Express Root
  ASPM 10                         [Auto]                 Port.
  L1 Substates                    [L1.1 & L1.2]
   Advanced Error Reporting       [Enabled]
  PCIe Speed                      [Auto]


  ▶ Extra options


                                                         ←→: Select Screen
                                                         ↑↓: Select Item
                                                         Enter: Select
                                                         +/-: Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F3: Optimized Defaults
                                                         F4: Save & Exit
                                                         ESC: Exit



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```

- ■ **LAN2 Controller [Enable]**
- ■ **ASPM 10 [Auto]**
- ■ **L1 Substates [L1.1 & L1.2]**
- ■ **PCIe Speed [Auto]**

Extra options

Chipset→PCH-I/O Configuration→LAN2 Controller→Extra options

```
                              Aptio Setup - AMI
          Chipset

Detect Non-Compliance Device        [Disabled]          Detect Non-Compliance PCI
Prefetchable Memory                 10                   Express Device. If enable, it
Reserved Memory Alignment           1                    will take more time at POST
Prefetchable Memory Alignment       1                    time.




                                                        ──────────────────────────
                                                        →←: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit




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```

- **Detect Non-Compliance Device   [Disable]**
- **Prefetechable Memory   10**
- **Reserved Memory Alignment   1**
- **Prefetechable memory Alignment   1**

M.2 E-key Slot

Chipset →PCH-I/O Configuration→M.2 E-key Slot

```
                              Aptio Setup - AMI
        Chipset

 M.2 E-key slot                 [Enabled]              Control the PCI Express Root
 ASPM 11                        [Auto]                 Port.
 L1 Substates                   [L1.1 & L1.2]
   Advanced Error Reporting     [Enabled]
 PCIe Speed                     [Auto]



 ▶ Extra options



                                                       →←: Select Screen
                                                       ↑↓: Select Item
                                                       Enter: Select
                                                       +/-: Change Opt.
                                                       F1: General Help
                                                       F2: Previous Values
                                                       F3: Optimized Defaults
                                                       F4: Save & Exit
                                                       ESC: Exit




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```

- **M.2 E-Key slot [Enable]**
- **ASPM 11 [Auto]**
- **L1 Substates [L1.1 & L1.2]**
- **PCIe Speed [Auto]**

Extra options

Chipset →PCH-I/O Configuration →M.2 E-key Slot →Extra options

```
                              Aptio Setup - AMI
           Chipset

Detect Non-Compliance Device      [Disabled]        Detect Non-Compliance PCI
Prefetchable Memory               10                Express Device. If enable, it
Reserved Memory Alignment         1                 will take more time at POST
Prefetchable Memory Alignment     1                 time.




                                                    →←: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F3: Optimized Defaults
                                                    F4: Save & Exit
                                                    ESC: Exit




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```

- **Detect Non-Compliance Device   [Disable]**
- **Prefetechable Memory   10**
- **Reserved Memory Alignment   1**
- **Prefetechable memory Alignment   1**

SATA and RST Configuration

Chipset →PCH-I/O Configuration →SATA and RST Configuration

```
                         Aptio Setup - AMI
            Chipset

SATA And RST Configuration                            ▲  Enable/Disable SATA Device.

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

M.2 M-key slot (SATA)         Empty
  Software Preserve           Unknown
  Port 0                      [Enabled]
  Spin Up Device              [Disabled]
  SATA Device Type            [Hard Disk Drive]
  SATA Port 0 DevSlp          [Disabled]
  DITO Configuration          [Disabled]          ▲▼: Select Screen
  DITO Value                  625                  ↑↓: Select Item
  DM Value                    15                   Enter: Select
Serial ATA Port 1             Empty                +/-: Change Opt.
  Software Preserve           Unknown              F1: General Help
  Port 1                      [Enabled]            F2: Previous Values
  Spin Up Device              [Disabled]           F3: Optimized Defaults
  SATA Device Type            [Hard Disk Drive]    F4: Save & Exit
  SATA Port 1 DevSlp          [Disabled]           ESC: Exit
  DITO Configuration          [Disabled]
  DITO Value                  625
  DM Value                    15                ▼

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```

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

M.2 M-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]**

Serial ATA Port 2 (SATA)

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

Security Configuration

Chipset →PCH-I/O Configuration →Security Configuration

```
                          Aptio Setup - AMI
          Chipset

Security Configuration                                   Enable will lock bytes 38h-3Fh
                                                         in the lower/upper 128-byte
RTC Memory Lock                   [Enabled]              bank of RTC RAM
BIOS Lock                         [Enabled]




                                                         →←: Select Screen
                                                         ↑↓: Select Item
                                                         Enter: Select
                                                         +/-: Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F3: Optimized Defaults
                                                         F4: Save & Exit
                                                         ESC: Exit



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```

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

HD Audio Configuration

Chipset →PCH-I/O Configuration→ HD Audio Configuration

```
                           Aptio Setup - AMI
      ┌──────────┐
      │ Chipset  │
      └──────────┘
  HD Audio Subsystem Configuration Settings      Control Detection of the
                                                 HD-Audio device.
  HD Audio                        [Enabled]      Disabled = HDA will be
                                                 unconditionally disabled
                                                 Enabled = HDA will be
                                                 unconditionally enabled.



                                                 ──────────────────────────
                                                 ↔: Select Screen
                                                 ↑↓: Select Item
                                                 Enter: Select
                                                 +/-: Change Opt.
                                                 F1: General Help
                                                 F2: Previous Values
                                                 F3: Optimized Defaults
                                                 F4: Save & Exit
                                                 ESC: Exit



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```

■ **HD Audio [Enabled]**

3.2.4 Security

```
                          Aptio Setup - AMI
     Main  Advanced  Chipset  Security  Boot  Save & Exit

  Password Description                          Set Administrator Password

  If ONLY the Administrator's password is set,
  then this only limits access to Setup and is
  only asked for when entering Setup.
  If ONLY the User's password is set, then this
  is a power on password and must be entered to
  boot or enter Setup. In Setup the User will
  have Administrator rights.
  The password length must be
  in the following range:
  Minimum length                 3
  Maximum length                 20             →←: Select Screen
                                                ↑↓: Select Item
  Administrator Password                        Enter: Select
  User Password                                 +/-: Change Opt.
                                                F1: General Help
                                                F2: Previous Values
                                                F3: Optimized Defaults
  HDD Security Configuration:                   F4: Save & Exit
  P2:SQF-S25M2-32G-SBE                          ESC: Exit

▶ Secure Boot


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```

■ **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.

3.2.5 Boot Setting
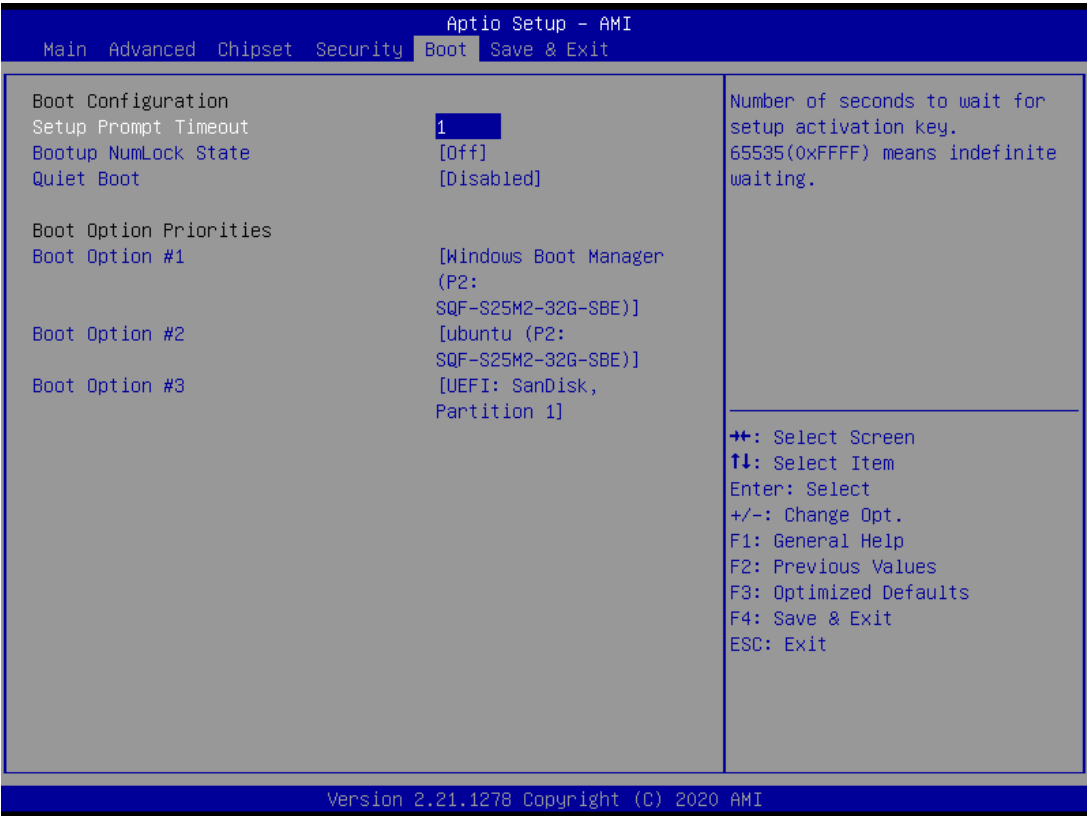
■ **Setup Prompt Timeout**
  User the <+> and <-> keys to adjust the number of seconds to wait for setup activation key.

■ **Bootup NumLock State [Off]**
  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.

3.2.6 Save & Exit Configuration

```
                          Aptio Setup - AMI
      Main  Advanced  Chipset  Security  Boot  Save & Exit

     Save Options
     Save Changes and Exit
     Discard Changes and Exit

     Save Changes and Reset
     Discard Changes and Reset

     Save Changes
     Discard Changes

     Default Options
     Restore Defaults
     Save as User Defaults            ────────────────────────
     Restore User Defaults
                                      →←: Select Screen
                                      ↑↓: Select Item
     Boot Override                    Enter: Select
     Windows Boot Manager (P2: SQF-S25M2-32G-SBE)   +/-: Change Opt.
     ubuntu (P2: SQF-S25M2-32G-SBE)   F1: General Help
     UEFI: SanDisk, Partition 1       F2: Previous Values
                                      F3: Optimized Defaults
                                      F4: Save & Exit
                                      ESC: Exit

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```

■ **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 of all system configuration parameters.
1. Select **Save Changes and Exit** from the Save & Exit menu and press <Enter>. The following message appears: Save Configuration Changes and Exit Now?
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 **Discard Changes and Exit** from the Save & Exit menu and press <Enter>. The following message appears: Discard Changes and Exit setup now? [Ok] or [Cancel]
2. Select Ok to discard changes and exit.

■ **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.
1. Select **Save Changes and Reset** from the Save & Exit menu and press <Enter>. The following message appears: Save Configuration Changes and Exit Now? [Ok] or [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. Selec**t Discard Changes and Reset** from the Save & Exit menu and press <Enter>. The following message appears: Discard Changes and exit setup

Now? [Ok] or [Cancel]

2. Select Ok to discard changes and reset.

■ **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.

■ **Boot Override**

Shows the boot device types on the system.

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. Provides not only the underlying drivers required but also a rich set of user-friendly, intelligent and integrated interfaces, which speeds development, enhances security and offers add-on value for Advantech platforms. It plays the role of catalyst between developer and solution, and makes Advantech embedded platforms easier and simpler to adopt and operate with customer applications.

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 provide 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
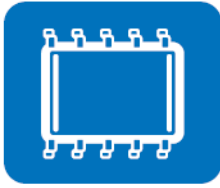
The BIOS Flash utility allows customers to update the flash ROM BIOS version, or use it to back up current BIOS by copying it from the flash chip to a file on customers' disk. The BIOS Flash utility also provides a command line version and an API for fast implementation into customized applications.

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 this makes it vulnerable! 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 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-287 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

VGA Setup

6.1 Introduction

The 8th Gen Intel Core i processors are embedded with an integrated graphics controller.You need to install the VGA 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 VGA 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-287_Graphic_Win10 (64-bit)" folder and click "setup.exe" to complete the installation of the drivers for Windows 10.

Solution : Win 10(64bit) Driver for AIMB-287

Download File	Released Date	Download Site	
AIMB-287_Audio_Win10(64bit).zip	2021-1-30	Primary	Secondary
AIMB-287_Chipset_Win10(64bit).zip	2021-1-30	Primary	Secondary
AIMB-287_Graphic_Win10(64bit).zip	2021-1-30	Primary	Secondary
AIMB-287_Intel ME_AMT_Win10(64bit).zip	2021-1-30	Primary	Secondary
AIMB-287_Intel_LAN_Win10(64bit).zip	2021-1-30	Primary	Secondary
AIMB-287_Serial IO_Win10(64bit).zip	2021-1-30	Primary	Secondary

Chapter 7

LAN Configuration

7.1 Introduction

The AIMB-287 has two Gigabit Ethernet LANs via dedicated PCI Express x1 lanes Intel i211AT and I219LM (Phi) 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-287's Intel i211AT and Intel i219LM 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 (Intel i219LM&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.

> **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.

Solution : Win 10(64bit) Driver for AIMB-287

Download File	Released Date	Download Site	
AIMB-287_Audio_Win10(64bit).zip	2021-1-30	Primary	Secondary
AIMB-287_Chipset_Win10(64bit).zip	2021-1-30	Primary	Secondary
AIMB-287_Graphic_Win10(64bit).zip	2021-1-30	Primary	Secondary
AIMB-287_Intel ME_AMT_Win10(64bit).zip	2021-1-30	Primary	Secondary
AIMB-287_Intel_LAN_Win10(64bit).zip	2021-1-30	Primary	Secondary
AIMB-287_Serial IO_Win10(64bit).zip	2021-1-30	Primary	Secondary

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