

User Manual

AIMB-288E

1U THIN Motherboard with 12th Gen Intel® Core™ Processor (LGA1700) and MXM GPU Integration



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Part No. 2006288E01 Printed in Taiwan Edition 2 January 2024

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This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference 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
i9-12900	65W	Alder Lake	8P+8E/24T	SRL4K
i9-12900E	65W	Alder Lake	8P+8E/24T	QYMF
i9-12900TE	35W	Alder Lake	8P+8E/24T	SRL6C
i7-12700	65W	Alder Lake	4P+8E/20T	SRL4Q
i7-12700E	65W	Alder Lake	8P+8E/24T	SRL6D
i7-12700TE	35W	Alder Lake	8P+8E/24T	SRL6E
i5-12500	65W	Alder Lake	6P+6E/12T	SRL5V
i5-12500E	65W	Alder Lake	6P+6E/12T	SRL6W
i5-12500TE	35W	Alder Lake	6P+6E/12T	SRL6V
i5-12400	65W	Alder Lake	6P+6E/12T	SRL5Y
i3-12100	60W	Alder Lake	4P+4E/8T	SRL62
i3-12100E	60W	Alder Lake	4P+4E/8T	SRL6U
i3-12100TE	35W	Alder Lake	4P+4E/8T	SRL6T
G7400E	46W	Alder Lake	2P+2E/4T	SRL6R
G7400TE	35W	Alder Lake	2P+2E/4T	SRL6S
G6900E	46W	Alder Lake	2P+2E/4T	SRL6Q
G6900TE	35W	Alder Lake	2P+2E/2T	SRL6P

Memory Compatibility

Category	Speed	Capacity	Vendor	Chip P/N	ADVANTECH P/N	ECC
DDR5	4800	32 GB	Advantech	IVA45 D8BNJ	SQR- SD5N32G4K8MNAB	N
DDR5	4800	16 GB	Advantech	2AA45 D8BNJ	SQR- SD5N16G4K8MNAB	N

M.2 SSD Compatibility

Dimension	Interface	Bandwidth Performance	Vendor Category	Vendor	Model	ADVANTECH P/N
2280	M.2 B+M Key	PCle v3.1	NVMe PCle SSD	Advantech	SQF-C8BV4-2TDEDC	SQF-C8BV4-2TDEDC
2242	M.2 M- Key	PCle v3.1	NVMe PCle SSD	Advantech	SQF-C4MV4-2TDEDC	SQF-C4MV4-2TDEDC
2280	M.2 B+M Key	SATA3	SSD	Advantech	SQF-SM8V4-1TCSBC	SQF-SM8V4-1TCSBC
2280	M.2 M- Key	PCle v3.0	NVMe PCIe SSD	WD	WDSN850500GBP- CleM.2SSD	N/A
2260	M.2 B+M Key	SATA3	SSD	Advantech	SQF-SM8V4-1K9GD- SCC	SQF-SM8V4-1K9GD- SCC
2280	M.2 B+M Key	SATA3	SSD	Advantech	SQF-S8BV4-2TDSDC	SQF-S8BV4-2TDSDC
2242	M.2 B+M Key	SATA3	SSD	Advantech	SQF-SM4Z2- 128GCSBE	SQF-SM4Z2- 128GCSBE
2242	M.2 B+M Key	SATA3	SSD	Advantech	SQF-SM4Z2- 128GCSBC	SQF-SM4Z2- 128GCSBC
2280	M.2 B+M Key	SATA3	SSD	Advantech	SQF-SM8Z4- 256GCSBE	SQF-SM8Z4- 256GCSBE
2280	M.2 M- Key	PCle v3.1	NVMe PCIe SSD	Advantech	SQF-C8MV4-2TCEDC	SQF-C8MV4-2TCEDC
3042	M.2 B- Key	USB 3.1 Gen1	4G LTE	Sierra Wireless	EM7455	N/A

Initial Inspection

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

- 1 x AIMB-288E Intel® Core ™ i9/i7/i5/i3 (LGA1700) THIN AI motherboard
- 1 x SATA HDD cable
- 1-to-2 serial port cables, 22cm
- 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-288E 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-288E, check it for signs of shipping damage. (For example, damaged box, scratches, dents, etc.) If it is damaged or it fails to meet the specifications, notify our service department or your local sales representative immediately. Also notify the carrier. Retain the shipping carton and packing material for inspection by the carrier. After inspection, we will make arrangements to repair or replace the unit.

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General Introduction

1.1 Introduction

AIMB-288E is designed to accommodate the Intel® H610E PCH and NVIDIA Quadro GPU to accelerate edge AI deployment. The motherboard supports desktop Intel® Core i9/i7/i5/i3/Pentium®/Celeron® processors, with up to 30MB SmartCache, and 2 x DDR5 4800MHz SODIMM, up to 64GB in two 262-pin SODIMM sockets. There is also multiple I/O connectivity with 2 x serial ports, 6 x USB 3.2 (Gen1), 2 x GbE LAN, 1 x SATA III, 1 x M.2 B-Key, and 1 x M.2 M-Key connector.

1.2 Features

- I/O connectivity: 2 x serial ports, 6 x USB 3.2 (Gen1), 1 x SATA III, 1 x M.2 B-Key & 1 x M.2 M-Key, 2 x GbE LAN.
- Industrial motherboard featuring NVIDIA Quadro GPU: The AIMB-288E leverages an ultra-slender design to deliver outstanding computing power and superior graphics performance for visual computing and edge intelligence.
- Wide selection of storage devices: SATA HDD, M.2 (B-Key and M-Key), customers benefit from the flexibility of the most suitable storage device for large capacity.
- Chipset for data processing: Discrete GPU through the MXM module, supporting NVIDIA® Quadro® Embedded T1000.

1.3 Specifications

1.3.1 System

- CPU: Desktop Intel® Core™ i9/i7/i5/i3/Pentium®/Celeron® (LGA1700) processor compliant
- BIOS: AMI EFI 256 Mbit SPI BIOS
- System chipset: Intel® H610E
- SATA hard disk drive interface:
 - One on-board SATA connector with a data transmission rate up to 600 MB/s
 - One M.2 M-Key slot (2280), supporting NVMe SSD
 - One M.2 B-Key slot (3042/2242), supporting 4G/LTE and storage

1.3.2 Memory

 RAM: 2 x 262-pin SODIMM socket supporting dual-channel DDR5 4800MHz SDRAM, up to 64 GB

1.3.3 Input/Output

- Serial ports: 2 x RS-232 serial ports (RS-422/485 support by BOM option)
- **USB port:** Supports up to 6 x USB 3.2 (Gen1) ports

1.3.4 Graphics

- Chipset for data processing: Intel® Iris® Xe graphics
- eDP 1.4: Supports max. resolution 3840 x 2160 @ 60Hz
- **DP 1.4:** Supports max. resolution 4096 x 2160 @ 60Hz

1.3.5 Ethernet LAN

- Supports dual 10/100/1000 Mbps Ethernet port(s) via PCI Express x1 bus which provides 500MB/s data transmission rates.
- Controller:
 - GbE LAN1: Intel® i219LM
 - GbE LAN2: Intel® i226V

1.3.6 Industrial Features

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

1.3.7 Mechanical and Environmental Specifications

- Operating temperature: 0 ~ 60°C (32 ~ 140°F, with 1U cooler).
- Storage temperature: -40 ~ 85°C (-40 ~ 185°F).
- Humidity: 5 ~ 95% non-condensing.
- Power supply voltage: +24V ~ +19V

Power consumption:

Intel® Core [™] i9-12900E 5.0GHz, 2 pcs 32GB DDR5 4800MHz SDRAM Typical: 104 W; Turbo: 135 W (CPU+T000 GPU). Measuring the maximum current value where the system is under maximum load (CPU: Top speed, RAM & Graphics: Full loading)

- Board size: 170 x 190 mm (6.69" x 7.48")
- Board weight: 0.365 kg

1.4 Jumpers and Connectors

Connectors on the AIMB-288E 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	Part Reference
1	Direct Current input connector	DCIN1
2	DisplayPort connector #1 / #2	DP12
3	RJ-45 #1 / #2	LAN12
4	USB 3.1 Gen1 Connector #1 / #2	USB12
5	USB 3.1 Gen1 Connector #3 / #4	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	USB56
10	Serial ATA interface connector #1	SATA1
11	Serial ATA interface power connector	SATAPWR1
12	Embedded DisplayPort connector	eDP1
13	EDP Backlight inverter power connector	INV1
14	NGFF M.2 M-Key connector for the 2280 module	M2M1
15	NGFF M.2 B-Key connector for the 3042 module	M2B1
16	MXM connector	MXM1
17	COM port pin header #1 / #2	COM12
18	DDR5 SODIMM socket A1 / B1	DIMMA1/B1
19	CPU FAN connector	CPUFAN1
20	System Fan #1 connector / System Fan #2 connector	SYSFAN1/2
21	SIM card socket	SIM1
22	LED port 80 connector	LED_P80
23	Voltage selection for the EDP1 connector	JEDP1
24	CMOS battery connector	BAT1
25	RTC reset pin header	JCMOS1
26	PWRBTN# / RESET# /HDD LED / SM bus	JFP1
27	Power LED pin header	JFP2
28	AT/ATX Mode selection	PSON1

1.5 Board Layout: Jumper and Connector Locations



Figure 1.1 Jumper and Connector Locations (Top Side)



Figure 1.2 Jumper and Connector Locations (Bottom Side)

1.6 AIMB-288E Board Diagram



Figure 1.3 AIMB-288E Board Diagram

1.7 **Safety Precautions**

Warning! Always completely disconnect the power cord from the chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges. Only experienced electronics personnel should open the PC chassis.



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



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

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

1.8 **Jumper Settings**

This section provides instructions on how to configure your motherboard by setting the jumpers. It also includes the 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 setting jumpers.

1.8.2 Clear CMOS (JCMOS1)

The AIMB-288E 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)	
Clear CMOS data	1 2 3 2-3

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) OBS BEEP(4-5) (Default)	1 2 3 4 5 2 3 4 5 (2 and 3) + (4 and 5)				
Watchdog Timer Disable (1-2) OBS BEEP(4-5) (Default)	1 2 3 4 5 (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				
ATX Mode (Default)				

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)	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$				
Jumper position for +5V	2 4 6 0 0 0 1 3 5				
Jumper position for +12V					

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

Table 1.6: COM1 RI# Pin RI# / 5V/12	V Select (JSETCOM1_V1)
Function	Jumper Setting
Jumper position for RI# (default)	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
Jumper position for +5V	
Jumper position for +12V	

1.9 System Memory

AIMB-288E has two sockets for a 262-pin DDR5 SODIMM. These sockets use a 1.2V unbuffered double data rate synchronous DRAM (DDR SDRAM). DRAM is available in capacities of 4 GB, 8 GB, 16 GB, and 32 GB. The sockets can take any combination with SODIMMs of any size, giving a total memory size between 4 GB, 8 GB, 16 GB, and up to a max of 64 GB. AIMB-288E does NOT support error checking and correction (ECC).

1.10 Memory Installation Procedures

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

1.11 Cache Memory

The AIMB-288E supports a CPU with one of the following built-in full-speed last level caches:

30MB for Intel® Core[™] i9-12900E/i9-12900TE, 25MB for Intel® Core[™] i7-12700E/ i7-12700TE, 18MB for Intel® Core[™] i5-12500E/i7-12500TE, 12MB for Intel® Core[™] i3-12100E/i7-12100TE, 2.5MB for Pentium® G7400E/G7400TE

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

1.12 Processor Installation

The AIMB-288E is designed to support 12th Gen Intel® Core™ i9/Core™ i7/ Core™ i5/Core™ i3, Pentium®, Celeron® (LGA1700) processors.



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
1	GND
2	19V ~ 24V
3	19V ~ 24V
4	GND

2.3 DisplayPort Connector #1 / #2 (DP12)



Pin	Signal	Pin	Signal
1	D0+	2	GND
3	D0-	4	D1+
5	GND	6	D1-
7	D2+	8	GND
9	D2-	10	D3+
11	GND	12	D3-
13	DP_AUX_E#	14	GND
15	AUX+	16	GND
17	AUX-	18	HPD
19	GND	20	+3.3V

2.4 LAN1/2 (RJ-45)



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

2.5 USB 3.1 Gen1 1/2/3/4 (USB12/34)



Pin	Signal	Pin	Signal
1	VBUS	10	VBUS
2	D1-	11	D2-
3	D1+	12	D2+
4	GND	13	GND
5	RX1-	14	RX2-
6	RX1+	15	RX2+
7	GND	16	GND
8	TX1-	17	TX2-
9	TX1+	18	TX2+



Pin	Signal	Pin	Signal	
1	VBUS	10	VBUS	
2	D1-	11	D2-	
3	D1+	12	D2+	
4	GND	13	GND	
5	RX1-	14	RX2-	
6	RX1+	15	RX2+	
7	GND	16	GND	
8	TX1-	17	TX2-	
9	TX1+	18	TX2+	

2.6 HD Audio Interface (Line-Out) (Audio1)



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

2.7 Front Panel Audio Header (JFPAUD1)



Pin	Signal	Pin	Signal
1	MIC-L	2	MIC-R
3	AGND	4	Jack Detect

2.8 Amplifier Connector (AMP1)



Pin	Signal	
1	R+	
2	R-	
3	L-	
4	L+	

2.9 USB 3.1 Gen1 5/6 (USB56)



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			

2.10 Serial ATA Interface Connector #1 (SATA1)



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

2.11 Serial ATA Interface Power Connector (SATAPWR1)



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

2.12 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	

2.13 EDP Backlight Inverter Power Connector (INV1)



Pin	Signal
1	+V12
2	GND
3	Enable backlight
4	Brightness control
5	+V5

2.14 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_RX-	6	NC
7	PCIE_RX+	8	NC
9	GND	10	NC
11	PCIE_TX-	12	+3.3V
13	PCIE_TX+	14	+3.3V
15	GND	16	+3.3V
17	PCIE_RX-	18	+3.3V
19	PCIE_RX+	20	NC
21	GND	22	NC
23	PCIE_TX-	24	NC
25	PCIE_TX+	26	NC
27	GND	28	NC
29	PCIE_RX-	30	NC
31	PCIE_RX+	32	NC
33	GND	34	NC
35	PCIE_TX-	36	NC
37	PCIE_TX+	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		

2.15 NGFF M.2 B-Key Connector for 3042 Module (M2B1)



Pin	Signal	Pin	Signal
1	CFG3	2	+3.3V
3	GND	4	+3.3V
5	GND	6	FULL_CARD_OFF#
7	USB_D+	8	W_DISABLE1#
9	USB_D-	10	LED1#
11	GND		KEY
	KEY	20	NC
21	CFG0	22	NC
23	WAKE_WWAN#	24	NC
25	DPR	26	W_DISABLE2#
27	GND	28	NC
29	USB3_RX-	30	UIM_RESET
31	USB3_RX+	32	UIM_CLK
33	GND	34	UIM_DATA
35	USB3_TX-	36	UIM_PWR
37	USB3_TX+	38	DEVSLP
39	GND	40	NC
41	PCIERX- / SATARX+	42	NC
43	PCIERX+/SATARX-	44	NC
45	GND	46	NC
47	PCIE_CLK-	48	NC
49	PCIE_CLK+	50	PLTRST#
51	GND	52	CLKREQ#

53	PCIE_CLKREQ#	54	PCIE_WAKE#	
55	PCIE_WAKE#	56	NC	
57	GND	58	NC	
59	LAA_TXEN	60	NC	
61	NC	62	WLAN_TXEN	
63	NC	64	NC	
65	NC	66	SIMDET	
67	RESET#	68	SUSCLK	
69	CFG1	70	+3.3V	
71	GND	72	+3.3V	
73	GND	74	+3.3V	
75	CFG2			

2.16 MXM Connector (MXM1)



Pin	Signal	Pin	Signal
E1	+12V	E2	+12V
E3	GND	E4	GND
1	+5V	2	PRESENT#
3	+5V	4	PCIE_WAKE#
5	+5V	6	MXM_PWRGD
7	+5V	8	NC
9	+5V	10	NC
11	GND	12	GND
13	GND	14	NC
15	GND	16	NC
17	GND	18	MXM_PWR_LEVEL
19	NC	20	MXM_TH_OVERT#
21	NC	22	MXM_TH_ALERT#
23	NC	24	NC
25	NC	26	NC
27	NC	28	NC
29	NC	30	NC
31	NC	32	SMB_DAT
33	NC	34	SMB_CLK
35	NC	36	GND
37	GND	38	NC
39	NC	40	NC
41	NC	42	NC
43			

NC 44 NC 45 NC 46 GND 47 GND 48 PCIE_TX0- 49 PCIE_RX0- 50 PCIE_TX0+ 51 PCIE_RX0+ 52 GND 53 GND 54 PCIE_TX1-	
45 NC 46 GND 47 GND 48 PCIE_TX0- 49 PCIE_RX0- 50 PCIE_TX0+ 51 PCIE_RX0+ 52 GND 53 GND 54 PCIE_TX1-	
47 GND 48 PCIE_TX0- 49 PCIE_RX0- 50 PCIE_TX0+ 51 PCIE_RX0+ 52 GND 53 GND 54 PCIE_TX1-	
49 PCIE_RX0- 50 PCIE_TX0+ 51 PCIE_RX0+ 52 GND 53 GND 54 PCIE_TX1-	
51 PCIE_RX0+ 52 GND 53 GND 54 PCIE_TX1-	
53 GND 54 PCIE_TX1-	
55 PCIE_RX1- 56 PCIE_TX1+	
57 PCIE_RX1+ 58 GND	
59 GND 60 PCIE_TX2-	
61 PCIE_RX2- 62 PCIE_TX2+	
63 PCIE_RX2+ 64 GND	
65 GND 66 PCIE_TX3-	
67 PCIE_RX3- 68 PCIE_TX3+	
69 PCIE_RX3+ 70 GND	
71 GND 72 PCIE_TX4-	
73 PCIE_RX4- 74 PCIE_TX4+	
75 PCIE_RX4+ 76 GND	
77 GND 78 PCIE_TX5-	
79 PCIE_RX5- 80 PCIE_TX5+	
81 PCIE_RX5+ 82 GND	
83 GND 84 PCIE_TX6-	
85 PCIE_RX6- 86 PCIE_TX6+	
87 PCIE_RX6+ 88 GND	
89 GND 90 PCIE_TX7-	
91 PCIE_RX7- 92 PCIE_TX7+	
93 PCIE_RX7+ 94 GND	
95 GND 96 PCIE_TX8-	
97 PCIE_RX8- 98 PCIE_TX8+	
99 PCIE_RX8+ 100 GND	
101 GND 102 PCIE_TX9-	
103 PCIE_RX9- 104 PCIE_TX9+	
105 PCIE_RX9+ 106 GND	
107 GND 108 PCIE_TX10-	
109 PCIE_RX10- 110 PCIE_TX10+	
111 PCIE_RX10+ 112 GND	
113 GND 114 PCIE_TX11-	
115 PCIE_RX11- 116 PCIE_TX11+	
117 PCIE_RX11+ 118 GND	
119 GND 120 PCIE_TX12-	
121 PCIE_RX12- 122 PCIE_TX12+	
123 PCIE_RX12+ 124 GND	
125 GND KEY	
KEY 134 GND	
133 GND 136 PCIE_TX13-	
135 PCIE_RX13- 138 PCIE_TX13+	
137 PCIE_RX13+ 140 GND	
137 PCIE_RX13+ 140 GND 139 GND 142 PCIE_TX14-	

143	PCIE_RX14+	146	GND
145	GND	148	PCIE_TX15-
147	PCIE_RX15-	150	PCIE_TX15+
149	PCIE_RX15+	152	GND
151	GND	154	MXM_CLKREQ#
153	PCIE_CLK-	156	MXM_RST#
155	PCIE_CLK+	158	NC
157	GND	160	NC
159	NC	162	NC
161	NC	164	NC
163	NC	166	GND
165	NC	168	NC
167	NC	170	NC
169	NC	172	NC
171	NC	174	GND
173	GND	176	NC
175	NC	178	NC
177	NC	180	GND
179	GND	182	NC
181	NC	184	NC
183	NC	186	GND
185	GND	188	NC
187	NC	190	NC
189	NC	192	GND
191	GND	194	NC
193	NC	196	NC
195	NC	198	GND
197	GND	200	NC
199	NC	202	NC
201	NC	204	GND
203	GND	206	NC
205	NC	208	NC
207	NC	210	GND
209	GND	212	NC
211	NC	214	NC
213	NC	216	GND
215	GND	218	NC
217	NC	220	NC
219	NC	222	GND
221	GND	224	NC
223	NC	226	NC
225	NC	228	GND
227	NC	230	NC
229	NC	232	NC
231	NC	234	NC
233	NC	236	NC
235	NC	238	NC
237	NC	240	+3.3V

239	NC	242	+3.3V
241	NC	244	GND
243	NC	246	NC
245	NC	248	NC
247	NC	250	GND
249	NC	252	NC
251	GND	254	NC
253	NC	256	GND
255	NC	258	NC
257	GND	260	NC
259	NC	262	GND
261	NC	264	NC
263	GND	266	NC
265	NC	268	GND
267	NC	270	NC
269	GND	272	NC
271	NC	274	NC
273	NC	276	NC
275	GND	278	+3.3V
277	NC	280	+3.3V
279	NC		
281	MXM_PRSNT#		

2.17 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

2.18 DDR5 SODIMM Socket A1 / B1 (DIMMA1/B1)



Please see JEDEC STANDARD

2.19 CPU FAN Connector (CPUFAN1)



Pin	Signal	
1	GND	
2	VCC	
3	FAN SPEED	
4	PWM	

2.20 System Fan #1 Connector / System Fan #2 Connector (SYSFAN1/2)



Pin	Signal
1	GND
2	VCC
3	FAN SPEED
4	PWM

2.21 SIM Card Socket (SIM1)



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

2.22 LED Port 80 Connector (LED_P80)



Pin	Signal	
1	GND	
2	LED_A	
3	LED_B	
4	LED_C	
5	LED_D	
6	LED_E	
7	LED_F	
8	LED_G	
9	DGH0#	
10	DGL0#	

2.23 Voltage Selection for EDP1 Connector (JEDP1)



Pin	Signal	Pin	Signal	
1	NC	2	+V5	
3	+V12	4	+VDD_EDP	
5	NC	6	+V3.3	

2.24 CMOS Battery Connector (BAT1)



Pin	Signal
1	+VBAT
2	GND

2.25 RTC Reset Pin Header (JCMOS1)



Pin	Signal
1	N.C.
2	RTC RESET#
3	GND

2.26 PWRBTN# / RESET# / HDD LED / SM Bus (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

2.27 Power LED Pin Header (JFP2)



Pin	Signal
1	PWR_LED+
2	N.C.
3	PWR_LED-

2.28 AT/ATX Mode Selection (PSON1)



Pin	Signal
1	VCCAT
2	+3.3V
3	VCCATX



BIOS Operation

3.1 Introduction

With the AMI BIOS setup program, you can modify BIOS settings and control 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-288E 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 button during the BIOS POST (Power-On Self Test) to access the CMOS SETUP screen.



AIMB-288E, when used with VEGA-X110, has an independent BIOS apart from the Nvidia GPUs.



BIOS-1 (A288000H160VXXX.BIN) configures the AIMB-288E System Fan2 to "Smart Fan" mode as the default.

BIOS-2 (A288000H260VXXX.BIN) configures the AIMB-288E System Fan2 to "Manual" mode at full speed.

BIOS-1 (A288000H160VXXX):

1. Supports Advantech T1000/A2000/A500 smart fan control (Fan controlled by AIMB-288E System Fan2).

BIOS-2(A288000H260VXXX):

- 1. Supports VEGA-X110 (Fan controlled by AIMB-288E System Fan2).
- 2. Supports Advantech VEGA-X110 (Fan controlled by VEGA-X110).
- 3. Supports other MXM since SIO does not show GPU temperature. Please connect the MXM Fan to AIMB-288E System Fan2.

Control Keys	
$<\uparrow><\downarrow><\leftarrow><\rightarrow>$	Move to select item
<enter></enter>	Select item
<esc></esc>	Main Menu: Quit without saving changes to the CMOS Sub-Menu: Exit the current page and return to the Main Menu
<page +="" up=""></page>	Increase the numeric value or make changes
<page -="" down=""></page>	Decrease the numeric value or make changes
<f1></f1>	General help, for the Setup sub-menu
<f2></f2>	Loads previous values
<f3></f3>	Loads optimized defaults
<f4></f4>	Save and Exit
3.2.1 Main Menu

Press to enter the AMI BIOS CMOS Setup Utility. The Main Menu will appear on the screen. Use the arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.

Main Advanced Chipset Secur	Aptio Setup - AMI ity Boot Save & Exit			
BIOS Information BIOS Vendor Core Version Compliancy Project Version Build Date and Time Access Level Project Board Version Power Type	American Megatrends 5.0.2.5 0.10 x64 UEFI 2.8; PI 1.7 A288000H160X055 10/04/2022 15:54:45 Administrator AIMB-288E ATX	Set the Date. Use Tab to switch between Date elements. Default Ranges: Year: 1998–9999 Months: 1–12 Days: Dependent on month Range of Years may vary.		
Memory Information Total Memory Memory Frequency System Date System Time	16384 MB 4800 MT/s [Wed 11/09/2022] [23:54:11]	++: Select Screen 14: 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 legend.

Above the 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-288E 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 sub-menus are described in the following pages.

Main Advanced Chipset Securit	Aptio Setup – AMI y Boot Save & Exit	
 CPU Configuration Power & Performance PCH-FW Configuration Trusted Computing ACPI Settings NCT6126D Super ID Configuration NCT6126D HW Monitor S5 RTC Wake Settings Serial Port Console Redirection USB Configuration NtWe Configuration NTIS Auth Configuration Driver Health 		CPU Configuration Parameters ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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Chapter 3 BIOS Operation

3.2.2.1 CPU Configuration

Advanced \rightarrow CPU Configuration

CPU Configuration Displays the E-core Information Efficient-core Information Performance-core Information ID 0x90672 Brand String 12th Gen Intel(R) Core(TH) 19-12900TE Core(TH) 19-12900TE Microcode Revision 1E VMX Supported SMX/TXT Supported SMX/TXT Supported Dots Guard Status 0x00000000000000000000000000000000000	Aptio Setup - AMI Advanced			
 Efficient-core Information Performance-core Information ID 0x90672 Brand String 12th Gen Intel(R) Core(TM) 19-12900TE Microcode Revision 1E VMX Supported SMX/TXT Supported SMX/TXT 0x0000000000000000000000000000000000	CPU Configuration		Displays the E-core Information	
ID0x90672Brand String12th Gen Intel(R) Core(TM) 19-12900TEMicrocode Revision1EVMXSupportedSMX/TXTSupportedSMX/TXTSupportedTXT Crash Code0x00000000TXT SPAD0x00000000000000000000000000000000000	▶ Efficient-core Information			
ID0x90672Brand String12th Gen Intel(R) Core(TM) 19-12900TEMicrocode Revision1EVMXSupportedSMX/TXTSupportedSMX/TXTSupportedTXT Crash Code0x00000000000000000000000000000000000	Performance-core information			
Brand String12th Gen Intel(R) Core(TM) 19-12900TEMicrocode Revision1EVMXSupportedSMX/TXTSupportedTXT Crash Code0x00000000000000000000000000000000000	ID	0×90672		
Core(TM) 19-12900TEMicrocode Revision1EVMXSupportedSMX/TXTSupportedTXT Crash Code0x00000000000000000000000000000000000	Brand String	12th Gen Intel(R)		
VHXSupportedSHX/TXTSupportedTXT Crash Code0x00000000TXT SPAD0x00000000000000000000000000000000000	Microcode Revision	Core(TM) 19-12900TE 1F		
SMX/TXTSupportedTXT Crash Code0x00000000TXT SPAD0x00000000000000000000000000000000000	VMX	Supported		
TXT Crash Code0x00000000TXT SPAD0x00000000000000000000000000000000000	SMX/TXT	Supported		
TXT SPAD0x00000000000000000000000000000000000	TXT Crash Code	0×0000000		
Boot Guard StatusOx00000000H: Select ScheenBoot Guard ACM Policy Status0x00000000000000000000000000000000000	TXT SPAD	0x0000000000000000	the Colort Concer	
Boot Guard SACM InformationOx000001000000000Enter: SelectC6DRAM[Enabled]F1: General HelpCPU Flex Ratio Override[Disabled]F2: Previous ValuesCPU Flex Ratio Settings11F3: Optimized DefaultsHardware Prefetcher[Enabled]F4: Save & ExitAdjacent Cache Line Prefetch[Enabled]ESC: ExitIntel (VMX) Virtualization[Enabled]	Boot Guard ACM Policy Status	0x00000000	11. Select Item	
C6DRAM[Enabled]+/-: Change Opt.C6DRAM[Enabled]F1: General HelpCPU Flex Ratio Override[Disabled]F2: Previous ValuesCPU Flex Ratio Settings11F3: Optimized DefaultsHardware Prefetcher[Enabled]F4: Save & ExitAdjacent Cache Line Prefetch[Enabled]ESC: ExitIntel (VMX) Virtualization[Enabled]Technology	Boot Guard SACM Information	0x000000100000000	Enter: Select	
C6DRAM[Enabled]F1: General HelpCPU Flex Ratio Override[Disabled]F2: Previous ValuesCPU Flex Ratio Settings11F3: Optimized DefaultsHardware Prefetcher[Enabled]F4: Save & ExitAdjacent Cache Line Prefetch[Enabled]ESC: ExitIntel (VMX) Virtualization[Enabled]ESC: Exit			+/-: Change Opt.	
CPU Flex Ratio Override[Disabled]F2: Previous ValuesCPU Flex Ratio Settings11F3: Optimized DefaultsHardware Prefetcher[Enabled]F4: Save & ExitAdjacent Cache Line Prefetch[Enabled]ESC: ExitIntel (VMX) Virtualization[Enabled]ESC: Exit	C6DRAM	[Enabled]	F1: General Help	
CPU Flex Ratio Settings 11 F3: Optimized Defaults Hardware Prefetcher [Enabled] F4: Save & Exit Adjacent Cache Line Prefetch [Enabled] ESC: Exit Intel (VMX) Virtualization [Enabled] F3: Optimized Defaults Technology F4: Save & Exit F4: Save & Exit	CPU Flex Ratio Override	[Disabled]	F2: Previous Values	
Hardware Prefetcher [Enabled] F4: Save & Exit Adjacent Cache Line Prefetch [Enabled] ESC: Exit Intel (VMX) Virtualization [Enabled] Technology	CPU Flex Ratio Settings	11	F3: Optimized Defaults	
Intel (VMX) Virtualization [Enabled] Technology	Adjacent Cache Line Roofetch	[Enabled]	F4: Save & EXIT	
Technology	Intel (VMX) Virtualization	[Enabled]		
	Technology	[Chabica]		
PECI [Enabled]	PECI	[Enabled]	▼	
Version 2 22 1284 Convergent (C) 2022 AMT				

Efficient-core Information

 $\mathsf{Advanced} \to \mathsf{CPU} \ \mathsf{Configuration} \to \mathsf{Efficient}\text{-}\mathsf{core} \ \mathsf{Information}$

Advanced	Aptio Setup — AMI	
Efficient-core Information		
Frequency L1 Data Cache L1 Instruction Cache L2 Cache L3 Cache L4 Cache	1100 MHz 32 KB × 8 64 KB × 8 2048 KB × 2 30 MB N/A	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
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Performance-core Information

Advanced \rightarrow CPU Configuration \rightarrow Performance-core Information

Advanced	Aptio Setup — AMI	
Performance-core Information		
Frequency L1 Data Cache L1 Instruction Cache L2 Cache L3 Cache L4 Cache	1100 MHz 48 KB x 8 32 KB x 8 1280 KB x 8 30 MB N/A	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
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CPU SMM Enhancement

Advanced \rightarrow CPU SMM Enhancement



3.2.2.2 Power & Performance

Advanced \rightarrow Power & Performance

Advanced	aptio Setup – AMI	
Power & Performance ▶ CPU – Power Management Control ▶ GT – Power Management Control	CPU – Power Management Control Options	
	++: Select Screen 14: 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

 $\mathsf{Advanced} \to \mathsf{Power} \And \mathsf{Performance} \to \mathsf{CPU} - \mathsf{Power} \And \mathsf{Management} \And \mathsf{Control}$

Advanced	Aptio Setup – AMI	
CPU – Power Management Control		Select the performance state
Boot performance mode Intel(R) SpeedStep(tm) Race To Halt (RTH) Intel(R) Speed Shift Technology Per Core P State OS control mode HwP Autonomous Per Core P State HwP Autonomous EPP Grouping EPB override over PECI HwP Lock HDC Control	[Turbo Penformance] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Disabled] [Enabled] [Enabled] [Enabled]	starting from reset vector.
Turbo Mode View/Configure Turbo Options CPU VR Settings C states Enhanced C-states C-State Auto Demotion C-State Un-demotion Package C-State Demotion Package C-State Un-demotion CState Pre-Wake IO MWAIT Redirection Package C State Limit C6/C7 Short Latency Control(MSR 0x60	[Enabled] [Enabled] [C1] [C1] [Enabled] [Enabled] [Enabled] [Disabled] [Auto] B)	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
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Advanced	Aptio Setup – AMI	
C states Enhanced C-states	[Enabled] [Enabled]	CPU Lock Configuration
C-State Auto Demotion	[01]	
C-State Un-demotion	[C1]	
Package C-State Demotion	[Enabled]	
Package C-State Un-demotion	[Enabled]	
CState Pre-Wake	[Enabled]	
IO MWAIT Redirection	[Disabled]	
Package C State Limit	[Auto]	
C6/C7 Short Latency Control(MSR 0x60	B)	
Time Unit	[1024 ns]	
Latency	0	
C6/C7 Long Latency Control(MSR 0x60C)	
Time Unit	[1024 ns]	↔: Select Screen
Latency	0	↑↓: Select Item
Thermal Monitor	[Enabled]	Enter: Select
Interrupt Redirection Mode	[Fixed Priority]	+/-: Change Opt.
Selection		F1: General Help
Timed MWAIT	[Disabled]	F2: Previous Values
Custom P-state Table		F3: Optimized Defaults
Energy Performance Gain	[Disabled]	F4: Save & Exit
EPG DIMM Idd3N	26	ESC: Exit
EPG DIMM Idd3P	11	
CPU Lock Configuration		
Dual Tau Boost	[Disabled]	•
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Current Turbo Settings

Advanced \rightarrow Power & Performance \rightarrow CPU – Power Management Control \rightarrow View/ Configure Turbo Ratio

Advanced	Aptio Setup — AMI		
Current Turbo Settings		View/Configure Turbo Ratio	
Max Turbo Power Limit Min Turbo Power Limit Package TDP Limit Power Limit 1 Power Limit 2	4095.875 0.0 35.0 35.0 100.0	Limit options	
 Turbo Ratio Limit Options Energy Efficient P-state Package Power Limit MSR Lock Power Limit 1 Override Rower Limit 2 Override 	[Enabled] [Disabled] [Disabled] [Enabled]		
Power Limit 2 Energy Efficient Turbo	100000 [Disabled]	++: Select Screen †↓: Select Item Enter: Select +/-: Change Opt. E1: Ceneral Hein	
		F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	
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Chapter 3 BIOS Operation

Turbo Ratio Limit Options

Advanced \rightarrow Power & Performance \rightarrow CPU – Power Management Control \rightarrow View/ Configure Turbo Ratio \rightarrow Turbo Ratio Limit Options

Advanced	Aptio Setup – AMI		
Current Turbo Ratio Limit Settings		Performance-core Turbo Ratio	
P-core Turbo Ratio Limit Numcore0 P-core Turbo Ratio Limit Numcore1 P-core Turbo Ratio Limit Numcore2 P-core Turbo Ratio Limit Numcore3	1 2 3 4	core range, the turbo ratio is defined in Turbo Ratio Limit Ratio0. If value is zero, this entry is ignored.	
P-core Turbo Ratio Limit Numcore4 P-core Turbo Ratio Limit Numcore5 P-core Turbo Ratio Limit Numcore6 P-core Turbo Ratio Limit Numcore7 P-core Turbo Ratio Limit Ratio0	5 6 7 8 48		
P-core Turbo Ratio Limit Ratio1 P-core Turbo Ratio Limit Ratio2 P-core Turbo Ratio Limit Ratio3 P-core Turbo Ratio Limit Ratio4 P-core Turbo Ratio Limit Ratio5	48 45 45 42 42	++: Select Screen †↓: Select Item Enter: Select	
P-core Turbo Ratio Limit Ratios P-core Turbo Ratio Limit Ratio7 E-core Turbo Ratio Limit Numcore0 E-core Turbo Ratio Limit Numcore1 E-core Turbo Ratio Limit Numcore2	39 1 2 3	 F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit 	
E-core Turbo Ratio Limit Numcore3 E-core Turbo Ratio Limit Numcore4 E-core Turbo Ratio Limit Numcore5 E-core Turbo Ratio Limit Numcore6	4 5 6 7	ESC: Exit	
Version 2.22.1284 Copyright (C) 2022 AMI			
	Aptio Setup – AMI		

Advanced		Aptio Setup – AMI	
E-core Turbo Ratio Limit E-core Turbo Ratio Limit	Numcore7 Ratio0 Ratio1 Ratio2 Ratio3 Ratio4 Ratio5 Ratio6 Ratio7	8 • • • • • • • • • • • • • • • • • • •	Performance-core Turbo Ratio Limit Ratio6 defines the turbo ratio (max is 85 in normal mode and 120 in core extension mode), the core range is defined in Turbo Ratio Limit Numcore6.
P-core Turbo Ratio Limit P-core Turbo Ratio Limit	Numcore0 Numcore1 Numcore3 Numcore3 Numcore5 Numcore6 Numcore7 Ratio0 Ratio1 Ratio1 Ratio2 Ratio3 Ratio4 Ratio5	1 2 3 4 5 6 7 7 8 4 8 48 48 48 48 45 45 45 42 42	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
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CPU VR Settings

Advanced \rightarrow Power & Performance \rightarrow CPU – Power Management Control \rightarrow CPU VR Settings



Acoustic Noise Settings

Advanced \rightarrow Power & Performance \rightarrow CPU – Power Management Control \rightarrow CPU VR Settings \rightarrow Acoustic Noise Settings

Advanced	Aptio Setup – AMI	
Acoustic Noise Settings		Enabling this option will help
Acoustic Noise Mitigation	[Disabled]	certain SKUs when the CPU is
Pre Wake Time	0	in deeper C state
Ramp Up Time	0	
Ramp Down Time	0	
IA VR Domain		
Disable Fast PKG C State Ramp for	[FALSE]	
IA Domain		
Slow Slew Rate for IA Domain	[Fast/2]	
GT VR Domain	(Feat of)	
Disable Fast PKG C State Ramp for	[FALSE]	++: Select Screen
GI DUMAIN Slow Slow Poto for CT Demain	[Foot /2]	Feter: Select Item
SIDW SIEW RALE FOR GI DUMAIN	[FaSt/2]	Enter: Select
		F1: Ceneral Heln
		E2: Previous Values
		E3: Ontimized Defaults
		F4: Save & Exit
		ESC: Exit
Version	2.22.1284 Copyright (C) 202	22 AM1

Core/IA VR Settings

Advanced \rightarrow Power & Performance \rightarrow CPU – Power Management Control \rightarrow CPU VR Settings \rightarrow Core/IA Settings

Advanced	Aptio Setup – AMI	
Core∕IA VR Domain		▲ VR Config Enable
VR Config Enable Current AC Loadline Current DC Loadline Current Psil Threshold Current Psil Threshold Current Psil Threshold Current Imon Slope Current Imon Offset Current VR Current Limit Current VR Current Limit Current Tdc Current Limit Current Voltage Limit AC Loadline DC Loadline PS Current Threshold1 PS Current Threshold2 PS Current Threshold3 PS3 Enable PS4 Enable IMON Slope IMON Offset IMON Prefix VR Current Limit VR Voltage Limit	[Enabled] 170 170 80 20 4 0 1 616 808 1740 0 0 80 20 4 [Enabled] [Enabled] 0 0 1 [+] 0 0 0	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Ve	rsion 2.22.1284 Copyright	(C) 2022 AMI

Advanced	Aptio Setup – AMI	
Current Psi1 Threshold Current Psi2 Threshold Current Psi3 Threshold Current Imon Slope Current Imon Offset Current VR Current Limit Current Voltage Limit AC Loadline DC Loadline PS Current Threshold1 PS Current Threshold2	80 20 4 0 1 616 808 1740 0 0 80 20	▲ Enable/Disable IRMS – Current root mean square
PS Current InPesholds PS3 Enable PS4 Enable IMON Slope IMON Offset IMON Prefix VR Current Limit VR Voltage Limit TDC Enable TDC Current Limit TDC Time Window TDC Lock IRMS	4 [Enabled] [Enabled] 0 [+] 0 0 [Enabled] 0 [1 sec] [Disabled] [Disabled]	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
	Version 2.22.1284 Copyright (C) 2022 AMI

GT VR Settings

Advanced \rightarrow Power & Performance \rightarrow CPU – Power Management Control \rightarrow CPU VR Settings \rightarrow GT VR Settings

Advanced	Aptio Setup – AMI	
GT Domain		▲ VR Config Enable
VR Config Enable Current AC Loadline Current DC Loadline Current Psi1 Threshold Current Psi2 Threshold Current Psi3 Threshold Current Imon Slope Current Imon Offset Current VR Current Limit Current VOLtage Limit AC Loadline DC Loadline PS Current Threshold1 PS Current Threshold2 PS Current Threshold3 PS3 Enable PS4 Enable IMON Slope IMON Offset IMON Prefix VR Current Limit VR Voltage Limit	[Enabled] 400 400 80 20 4 0 1 120 160 1519 0 0 80 20 4 [Enabled] [Enabled] [Enabled] 0 0 [+] 0 0	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
	Version 2.22.1284 Copyright (C) 20	022 AMI

	Aptio Setup – AMI	
Advanced		
Advanced Current DC Loadline Current Psi1 Threshold Current Psi2 Threshold Current Psi3 Threshold Current Imon Slope Current Imon Offset Current VR Current Limit Current VR Current Limit Current Voltage Limit AC Loadline DC Loadline PS Current Threshold1 PS Current Threshold2 PS Current Threshold3 PS3 Enable PS4 Enable IMON Slope IMON Offset IMON Offset IMON Offset IMON Prefix VR Current Limit VR Voltage Limit TDC Enable TDC Current Limit TDC Time Window TDC Lock	Aptio Setup - AMI 400 80 20 4 0 1 120 160 1519 0 0 0 80 20 4 [Enabled] 0 [Enabled] 0 1 Enabled] 0 1 1 1 20 1 1 1 20 1 20 1 1 1 20 1 20 1 1 1 20 1 20 1 1 1 20 1 20 1 20 1 20 1 20 1 20 1 20 1 20 1 20 1 20 1 20 20 20 20 20 20 20 20 20 20	 TDC Lock ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
	Version 2.22.1284 Convright (C)	2022 AMT

RFI Settings

Advanced \rightarrow Power & Performance \rightarrow CPU – Power Management Control \rightarrow CPU VR Settings \rightarrow RFI Settings

Advanced	Aptio Setup — AMI	
RFI Domain RFI Current Frequency RFI Frequency FIVR Spread Spectrum RFI Spread Spectrum	139.200MHz O [Enabled] [1.5%]	Set desired RFI frequency, in increments of 100KHz. (For a frequency of 100.6MHz, enter 1006.)
		<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
	Version 2.22.1284 Copyright (C) 2	022 AMI

Custom P-state Table

Advanced \rightarrow Power & Performance \rightarrow CPU – Power Management Control \rightarrow Custom P-state Table

Apt i Advanced	io Setup – AMI
Custom P-state Table	Sets the number of custom
Number of P states 0	P-states. At least 2 states must be present.
	++: Select Screen
	14: Select Item Enter: Select
	+/-: Change Opt. F1: General Help
	F2: Previous Values F3: Ontimized Defaults
	F4: Save & Exit ESC: Exit
Version 2.22.12	284 Copyright (C) 2022 AMI

CPU Lock Configuration

Advanced \rightarrow Power & Performance \rightarrow CPU – Power Management Control \rightarrow CPU Lock Configuration

Advanced	Aptio Setup – AMI	
CFG Lock Overclocking Lock	[Enabled] [Enabled]	Configure MSR 0xE2[15], CFG Lock bit
		<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version	2.22.1284 Copyright (C) 202	2 AMI

GT – Power Management Control

Advanced \rightarrow Power & Performance \rightarrow GT – Power Management Control

Advanced	Aptio Setup — AMI	
GT – Power Management Control		Check to enable render standby support.
RC6(Render Standby) Maximum GT frequency Disable Turbo GT frequency	[Enabled] [Default Max Frequency] [Disabled]	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2	.22.1284 Copyright (C) 2022	AMI

3.2.2.3 PCH-FW Configuration

Advanced \rightarrow PCH-FW Configuration

Advanced	Aptio Setup – AMI	
ME Firmware Version ME Firmware Mode ME Firmware SKU ME Firmware Status 1 ME Firmware Status 2 ME Firmware Status 3	16.0.15.1735 Normal Mode Consumer SKU 0×90000255 0×38850106 0×0000020	When Disabled ME will not be unconfigured on RTC Clear
ME Firmware Status 4 ME Firmware Status 5 ME Firmware Status 6	0x00004000 0x0000000 0x00400002	
ME State ME Unconfig on RTC Clear Comms Hub Support JHI Support	[Enabled] [Enabled] [Disabled] [Disabled]	+: Select Screen
Core Bios Done Message Firmware Update Configuration	[Enabled]	t↓: Select Item Enter: Select +/-: Change Opt.
 PTT Configuration FIPS Configuration ME Debug Configuration Anti-Rollback SVN Configuration OEM Key Revocation Configuration 		F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Extend CSME Measurement to TPM-PCR	[Disabled]	
Version 2	2.22.1284 Copyright (C) 2022	AMI

Firmware Update Configuration

Advanced \rightarrow PCH-FW Configuration \rightarrow Firmware Update Configuration

Advanced	Aptio Setup – AMI	
Ме FW Image Re-Flash FW Update	[Disabled] [Enabled]	Enable/Disable Me FW Image Re-Flash function. ++: Select Screen 14: Select Item Enter: Select
		 +/-: Change Upt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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PTT Configuration

Advanced \rightarrow PCH-FW Configuration \rightarrow PTT Configuration



FIPS Configuration

Advanced \rightarrow PCH-FW Configuration \rightarrow FIPS Configuration

Advanced	Aptio Setup — AMI	
FIPS Mode Select Current FIPS mode Crypto driver FIPS version	[Disabled] Current mode unavailable Version unavailable	FIPS Mode configuration ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 3	2.22.1284 Copyright (C) 2022	AMI

ME Debug Configuration

 $\mathsf{Advanced} \to \mathsf{PCH}\text{-}\mathsf{FW} \ \mathsf{Configuration} \to \mathsf{ME} \ \mathsf{Debug} \ \mathsf{Configuration}$

Advanced	Aptio Setup – AMI	
HECI Timeouts Force ME DID Init Status CPU Replaced Polling Disable HECI Message check Disable MBP HOB Skip HECI2 Interface Communication KT Device End Of Post Message DOI3 Setting for HECI Disable MCTP Broadcast Cycle SMBIOS type 130 OEM capabilities	[Enabled] [Disabled] [Disabled] [Disabled] [Disabled] [Enabled] [Send in DXE] [Disabled] [Disabled]	Enable/Disable HECI Send/Receive Timeouts.
		<pre>++: Select Screen f4: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2	2.22.1284 Copyright (C) 2022	AMI

SMBIOS Type 130 OEM Capabilities

Advanced \rightarrow PCH-FW Configuration \rightarrow ME Debug Configuration \rightarrow SMBIOS Type 130 OEM Capabilities

Advanced	Aptio Setup – AMI	
BIOS Reflash Capability State BIOS Boot to Setup Capability State BIOS Pause Before Booting Capability State BIOS Secure Boot Capability Exposure to FW State	[Enabled] [Enabled] [Disabled] [Enabled]	Change BIOS Reflash Capability State
		++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Versio	n 2.22.1284 Copyright (C) 2	2022 AMI

Anti-Rollback SVN Configuration

Advanced \rightarrow PCH-FW Configuration \rightarrow Anti-Rollback SVN Configuration

Advanced	Aptio Setup — AMI	
Minimal Allowed Anti-Rollback Executing Anti-Rollback SVN Automatic HW-Enforced Anti-Rollback SVN Set HW-Enforced Anti-Rollback Current SVN	SVN 0 2 [Disabled] for [Disabled]	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Ver	sion 2.22.1284 Copyright (C) 2022	AMI

OEM Key Revocation Configuration

Advanced \rightarrow PCH-FW Configuration \rightarrow OEM Key Revocation Configuration

Advanced	Aptio Setup – AMI	
Automatic OEM Key Revocation Invoke OEM Key Revocation	[Disabled] [Disabled]	When enabled, BIOS will automatically send HECI command to revoke OEM keys.
		<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version	n 2.22.1284 Convright (C) 2	2022 AMT

3.2.2.4 Trusted Computing Settings

 $\mathsf{Advanced} \to \mathsf{Trusted} \ \mathsf{Computing}$

Advanced	Aptio Setup — AMI	
FIPS Mode Select Current FIPS mode Crypto driver FIPS version	[Disabled] Current mode unavailable Version unavailable	FIPS Mode configuration ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2	.22.1284 Copyright (C) 2022	AMI

3.2.2.5 ACPI Settings

$\mathsf{Advanced} \to \mathsf{ACPI} \ \mathsf{Settings}$

Advanced	Aptio Setup – AMI	
HECI Timeouts Force ME DID Init Status CPU Replaced Polling Disable HECI Message check Disable MBP HOB Skip HECI2 Interface Communication KT Device End Of Post Message DOI3 Setting for HECI Disable MCTP Broadcast Cycle SHBIOS type 130 OEM capabilities	[Enabled] [Disabled] [Disabled] [Disabled] [Disabled] [Enabled] [Send in DXE] [Disabled] [Disabled]	Enable/Disable HECI Send/Receive Timeouts.
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3.2.2.6 NCT6126D Super IO configuration

Advanced \rightarrow NCT6126D Super IO Configuration

Advanced	Aptio Setup – AMI	
NCT6126D Super IO Configuration		Set Parameters of Serial Port
Super IO Chip ▶ Serial Port 1 Configuration ▶ Serial Port 2 Configuration	hip NCT6126D t 1 Configuration t 2 Configuration	
		<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version :	2.22.1284 Copyright (C) 2022	AMI

Serial Port 1 Configuration

Advanced \rightarrow NCT6126D Super IO Configuration \rightarrow Serial Port 1 Configuration

Advanced	Aptio Setup — AMI	
Serial Port 1 Configuration		Enable or Disable Serial Port
Serial Port Device Settings	[Enabled] IO=3F8h; IRQ=4;	(COM)
Change Settings RS485 Auto Flow Control Function	(Auto) [Disabled]	
		++: Select Screen ++: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
	2.00.4004.000001014.60.000	

Serial Port 2 Configuration

Advanced \rightarrow NCT6126D Super IO Configuration \rightarrow Serial Port 2 Configuration

Advanced	Aptio Setup - AMI	
Serial Port 2 Configuration		Enable or Disable Serial Port
Serial Port Device Settings	[Enabled] IO=2F8h; IRQ=3;	(COM)
Change Settings RS485 Auto Flow Control Function	[Auto] [Disabled]	
		<pre>++: Select Screen tl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version	2.22.1284 Copyright (C) 2022	2 AMI

3.2.2.7 NCT6126D HW Monitor

Advanced \rightarrow NCT6126D HW Monitor

Advanced	Aptio Setup - AMI	
PC Health Status		Enable or Disable Smart Fan
System temperature Cpu Temperature MXM temperature CPU FAN Speed SYS FAN1 Speed SYS FAN2 Speed VCORE +5VSB +5VSB +5V +12V	: +35 °C : +44 °C : +37 °C : 0 RPM : 986 RPM : 0 RPM : 0 RPM : +0.888 V : +5.056 V : +5.000 V : +12.000 V	
AVCC 3VSB 3VVCC VBAT	: +3.312 V : +3.312 V : +3.328 V : +3.024 V	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt.
Smart Fan Function Mart Fan Function		F1: General Help F2: Previous Values F3: Optimized Defaults
CPU Warning Temperature ACPI Shutdown Temperature Wake On Ring Watch Dog Timer	[Disabled] [Disabled] [Disabled] [Disabled]	F4: Save & Exit ESC: Exit
	Version 2.22.1284 Copyright (C) 2023	2 AMI

Smart Fan Function

Advanced \rightarrow NCT6126D HW Monitor \rightarrow Smart Fan Function

Advanced	Aptio Setup – AMI	
Smart Fan Mode Configuration		CPU Fan Mode Select
CPU Fan Mode	[SMART FAN IV Mode]	
CPUFAN Temperature 1	25	
CPUFAN DC/PWH 1	80	
CPUFAN Temperature 2	50	
CPUFAN DC/PWH 2	130	
CPUFAN Temperature 3	70	
CPUFAN DC/PWM 3	200	
CPUFAN Temperature 4	85	
CPUFAN DC/PWM 4	255	
CPUFAN Critical Temperature	90	
CPUFAN Critical Temp Tolerance	1	
		++: Select Screen
System Fan1 Mode	[SMART FAN IV Mode]	14: Select Item
SYSFAN1 Temperature 1	30	Enter: Select
SYSFAN1 DC/PWM 1	0	+/-: Change Opt.
SYSFAN1 Temperature 2	40	F1: General Help
SYSFAN1 DC/PWM 2	84	F2: Previous Values
SYSFAN1 Temperature 3	50	F3: Optimized Defaults
SYSFAN1 DC/PWM 3	168	F4: Save & Exit
SYSFAN1 Temperature 4	60	ESC: Exit
SYSFAN1 DC/PWM 4	255	
SYSFAN1 Critical Temperature	90	
SYSFAN1 Critical Temp Tolerance	1	×
Version	2.22.1284 Copyright (C) 2	2022 AMI

	Aptio Setup – AMI	
Advanced		
CPUFAN Critical Temp Tolerance	1	Input Tolerance of Critical Temperature (Range:0 – 7)
System Fan1 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
System Fan2 Mode	[SMART FAN IV Mode]	t∔: 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	

3.2.2.8 S5 RTC Wake Settings

Advanced \rightarrow S5 RTC Wake Settings

Advanced	Aptio Setup – AMI	
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)
		<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Ve	ersion 2.22.1284 Copyright (C) 2022 AMI

3.2.2.9 Serial Port Console Redirection

Advanced → Serial Port Console Redirection

Advanced	Aptio Setup – AMI	
COM1 Console Redirection ► Console Redirection Settings	[Disabled]	Console Redirection Enable or Disable.
CDM1(Pci Bus0,Dev0,Func0) (Disabled) Console Redirection Legacy Console Redirection ► Legacy Console Redirection Settings	Port Is Disabled	
Serial Port for Out-of-Band Managemen Windows Emergency Management Service: Console Redirection EMS	nt∕ s (EMS) [Disabled]	++: Select Screen
 Console Redirection Settings 		<pre>tl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
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Legacy Console Redirection Settings

Advanced \rightarrow Serial Port Console Redirection \rightarrow Legacy Console Redirection Settings



Chapter 3 BIOS Operation

3.2.2.10 USB Configuration

Advanced \rightarrow USB Configuration

Advanced	Aptio Setup – AMI	
USB Configuration		Enables Legacy USB support.
USB Module Version	28	support if no USB devices are connected, DISABLE option will
USB Controllers: 2 XHCIs		keep USB devices available only for EFI applications.
USB Devices: 1 Drive, 1 Keyboard		
Legacy USB Support	[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.
Here all and a second second		F1: General Help
Mass Storage Devices:	[Auto]	F2: Previous Values
Generic-Multi-card 1.00	(HUCO)	Ed: Save & Evit
USB PWR OFF Configuration 1	[Disabled]	ESC: Exit
USB PWR OFF Configuration 2	[Disabled]	
USB PWR OFF Configuration 3	[Disabled]	

3.2.2.11 Network Stack Configuration

 $\mathsf{Advanced} \to \mathsf{Network} \ \mathsf{Stack} \ \mathsf{Configuration}$

Advanced	Aptio Setup - AMI	
Network Stack	[Disabled]	Enable/Disable UEFI Network Stack ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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3.2.2.12 NVMe Configuration

Advanced \rightarrow NVMe Configuration



3.2.2.13 TLS Auth Configuration

Advanced \rightarrow TLS Auth Configuration



3.2.2.14 Driver Health

Advanced \rightarrow Driver Health

Aptio Setup – AMI Advanced	
▶ Enroll Cert	Press <enter> to enroll cert.</enter>
▶ Delete Cert	
	++: Select Screen
	Enter: Select +/-: Change Opt. F1: General Helm
	F2: Previous Values F3: Optimized Defaults F4: Save & Exit
	ESC: Exit
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3.2.3 Chipset Configuration Settings

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



3.2.3.1 System Agent (SA) Configuration

 $Chipset \rightarrow System Agent \ (SA) \ Configuration$

Chipset	Aptio Setup – AMI	
System Agent (SA) Configuration		Memory Configuration Parameters
VT-d	Supported	
 Memory Configuration Graphics Configuration DHI/OPI Configuration PCI Express Configuration 		
VT-d Control Iommu Pre-boot Behavior Above 4GB MMIO BIOS assignment	[Enabled] [Disable IOMMU] [Enabled]	
		++: Select Screen
		Enter: Select
		+/-: Change Opt. E1: General Help
		F2: Previous Values
		F3: Optimized Defaults
		ESC: Exit
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Memory Configuration

 $Chipset \rightarrow System \, Agent \, (SA) \, Configuration \rightarrow Memory \, Configuration$

Chipset	Aptio Setup – AMI	
Memory Configuration		
Memory RC Version Memory Frequency DIMHA1 DIMHB1 Size Number of Ranks Manufacturer	0.0.3.128 4800 MT/s Not Populated / Disabled Populated & Enabled 16384 MB (DDR5) 1 Advantech Co Ltd	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Versio	n 2.22.1284 Copyright (C) 2022	AMI

Graphics Configuration

Chipset \rightarrow System Agent (SA) Configuration \rightarrow Graphics Configuration

Aptio Setup - AMI Chipset		
Graphics Configuration		Graphics turbo IMON current values supported (14–31)
Graphics Turbo IMON Current Skip Scaning of External Gfx Card	<mark>31</mark> [Disabled]	
Primary Display External Gfx Card Primary Display Co Internal Graphics GTT Size Aperture Size PSMI SUPPORT DVMT Pre-Allocated Intel Graphics Pei Display Peim VDD Enable Configure GT for use RC1p Support PAVP Enable Cdynmax Clamping Enable Cd Clock Frequency LCD Control	[IGFX] onfiguration [Enabled] [0HB] [256MB] [Disabled] [Colsabled] [Enabled] [Enabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Max CdClock freq based on Reference C1k]	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version :	2.22.1284 Copyright (C) 202	2 AMI

External Gfx Card Primary Display Configuration

Chipset \rightarrow System Agent (SA) Configuration \rightarrow Graphics Configuration \rightarrow External Gfx Card Primary Display Configuration



Chapter 3 BIOS Operation

LCD Control

Chipset	Aptio Setup – AMI	
LCD Control Backlight Signal Control Backlight Control PWM	[Рим] 100	Switch Backlight Signal to PWM or LINEAR
Backlight PWM Frequency Control	[23.3 KH2]	
		++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values
		F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version	2.22.1284 Copyright (C) 202	2 AMI

DMI/OPI Configuration

Chipset \rightarrow System Agent (SA) Configuration \rightarrow DMI/OPI Configuration

Chipset	Aptio Setup – AMI	
DMI/OPI Configuration		Set DMI Speed Gen1/Gen2/Gen3
DMI	X4 Gen4	
OHI Max Link Speed CDR Relock for CPU DMI DMI ASPM DMI Gen3 L1 Exit Latency New FOM for CPU DMI ▶ DMI Advanced Menu	[Gen4] [Disabled] [ASPM L1] 4 [Disabled]	++: Select Screen fl: Select Item Enter: Select +/-: Change Opt.
		F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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DMI Advanced Menu

Chipset \rightarrow System Agent (SA) Configuration \rightarrow DMI/OPI Configuration \rightarrow DMI Advanced Menu

Chipset	Aptio Setup – AM	I
DMI Advanced Menu		DMI Gen4 EQ Mode
DMI Gen4 EQ Mode DMI Gen4 RTCO Cpre Lane0 DMI Gen4 RTCO Cpost Lane0 DMI Gen4 RTCO Cpost Lane1 DMI Gen4 RTCO Cpost Lane1 DMI Gen4 RTCO Cpost Lane2 DMI Gen4 RTCO Cpre Lane2 DMI Gen4 RTCO Cpost Lane3 DMI Gen4 RTCO Cpost Lane3 DMI Gen4 RTCO Cpost Lane4 DMI Gen4 RTCO Cpost Lane5 DMI Gen4 RTCO Cpost Lane5 DMI Gen4 RTCO Cpost Lane5 DMI Gen4 RTCO Cpost Lane6 DMI Gen4 RTCO Cpost Lane6 DMI Gen4 RTCO Cpost Lane7 DMI Gen4 RTCO Cpost Lane7 DMI Gen3 RTCO Cpost Lane7 DMI Gen3 RTCO Cpost Lane0 DMI Gen3 RTCO Cpost Lane0 DMI Gen3 RTCO Cpost Lane1 DMI Gen3 RTCO Cpost Lane1 DMI Gen3 RTCO Cpost Lane1 DMI Gen3 RTCO Cpost Lane1	[Fixed EQ] 14 7 14 7 14 7 14 7 14 7 14 7 14 7 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>

Aptio Setup - AMI Chipset DMI Gen4 RTCO Cpost Lane3 7 DMI Gen3 Lane Transmitter DMI Gen4 RTCO Cpre Lane4 14 Pre/Post-Cursor Coefficient DMI Gen4 RTCO Cpost Lane4 values. 7 DMI Gen4 RTCO Cpre Lane5 14 DMI Gen4 RTCO Cpost Lane5 7 DMI Gen4 RTCO Cpre Lane6 14 DMI Gen4 RTCO Cpost Lane6 7 DMI Gen4 RTCO Cpost Lane7 14 DMI Gen4 RTCO Cpre Lane7 7 DMI Gen3 RTCO Cpre Lane0 3 DMI Gen3 RTCO Cpost Lane0 3 DMI Gen3 RTCO Core Lanei DMI Gen3 RTCO Coost Lanei 3 3 DMI Gen3 RTCO Cpre Lane2 DMI Gen3 RTCO Cpost Lane2 DMI Gen3 RTCO Cpost Lane2 DMI Gen3 RTCO Cpre Lane3 ++: Select Screen †4: Select Item 3 3 з Enter: Select +/-: Change Opt. F1: General Help DMI Gen3 RTCO Cpost Lane3 3 3 DMI Gen3 RTCO Cpre Lane4 DMI Gen3 RTCO Cpost Lane4 3 F2: Previous Values DMI Gen3 RTCO Cpre Lane5 з F3: Optimized Defaults DMI Gen3 RTCO Cpost Lane5 F4: Save & Exit 3 ESC: Exit DMI Gen3 RTCO Cpre Lane6 3 DMI Gen3 RTCO Cpost Lane6 3 DMI Gen3 RTCO Cpre Lane7 3 Version 2.22.1284 Copyright (C) 2022 AMI

PCI Express Configuration

Chipset \rightarrow System Agent (SA) Configuration \rightarrow PCI Express Configuration

Chipset	Aptio Setup – AMI	
PCI Express Configuration		Enable/Disable PCIE Resizable
PCIE Resizable BAR Support ▶ MXM 3.1 (3D) Controller		pmk suppurk
		<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
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MXM 3.1 (3D) Controller

Chipset \rightarrow System Agent (SA) Configuration \rightarrow PCI Express Configuration \rightarrow MXM 3.1 (3D) Controller

Chipset	Aptio Setup — AMI		
Chipset Connection Type PCI Express Clock Gating PCI Express Power Gating ASPM L1 Substates Gen3 Eq Phase3 Method Gen4 Eq Phase3 Method ACS PTM	<pre>[Slot] ▲ [Enabled] [Disabled] [Disabled] [Disabled] [Hardware] [Hardware] [Enabled] [Enabled]</pre>	Built-In: a built-in device is connected to this rootport. SlotImplemented bit will be clear. Slot: this rootport connects to user-accessible slot. SlotImplemented bit will be set.	
DPC FOM Scoreboard Control Policy Multi-VC EDPC URR FER NFER	[Disabled] [Auto] [Disabled] [Enabled] [Disabled] [Disabled] [Disabled]	↔: Select Screen 1↓: Select Item Enter: Select	
CER CTO SEFE SENFE SECE PME SCI Advanced Error Reporting PCIe Speed Enable ClockReg Messaging	[Disabled] [Disabled] [Disabled] [Disabled] [Enabled] [Enabled] [Auto] [Disabled]	 +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit 	
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Chipset	Aptio Setup – AMI	
Transmitter Half Swing	[Disabled]	Downstream Port Transmitter
P2P Support	[Disphled]	" rreset
CPU PCIE Func0 Link Disable	[Disabled]	
SA PCIe LTR Configuration		
LTR	[Enabled]	
Snoop Latency Override	(Auto)	
Non Snoop Latency Override	[Auto]	
Force LTR Override	[Disabled]	
LTR Lock	[Disabled]	
CPU PCIe Gen3 HWEQ Config		++: Select Screen
UPTP	7	14: Select Item
DPTP	7	Enter: Select
		+/-: Change Opt.
CPU PCIe Gen4 HWEQ Config		F1: General Help
UPTP	7	F2: Previous Values
DPTP	5	F3: Optimized Defaults
		F4: Save & Exit
CPU PCIe Gen5 HWEQ Config		ESC: Exit
UPTP	5	
DPTP	7	
		• •
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3.2.3.2 PCH-I/O Configuration

 $Chipset \rightarrow PCH-IO \ Configuration$

Chipset	Aptio Setup – AMI	
PCH-IO Configuration > PCI Express Configuration > SATA Configuration > Security Configuration > HD Audio Configuration		PCI Express Configuration settings
LAN1 Controller LAN1 PXE OpROM LAN2 Controller LAN2 PXE OpROM	[Enabled] [Disabled] [Enabled] [Disabled]	
PCIE Wake ErP Support Restore AC Power Loss PCIE Device Initial Delay Legacy IO Low Latency Flash Protection Range Registers (FPRR) SPD Write Disable	[Disabled] [Disabled] [Power Off] 0 [Disabled] [Disabled] [TRUE]	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
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ErP Support Note

Chipset \rightarrow PCH-IO Configuration \rightarrow ErP Support

Chipset	Aptio Setup – AMI	
PCH-IO Configuration PCI Express Configuration SATA Configuration Security Configuration HD Audio Configuration		When Erp enables, wake up event not supported. Please refer to user manual for more details.
LANI Controller LANI PXE OpROM LAN2 Controller LAN2 PXE OpROM	(Enabled) [Disabled] [Enabled] [Disabled]	
PCIE Wake EnP Support Restore AC Power Loss PCIE Device Initial Delay Legacy IO Low Latency Flash Protection Range Registers (FPRR) SPU White Disable	[Disabled] [Disabled] [Power Off] 0 [Disabled] [Disabled]	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
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When ErP is enabled, restore AC power loss & the below features are not supported. [USB: S3/S4]

[PCIE Wake] Connect to PCIe slots depending on add-on card driver behavior. [RTC: S5]

[WOR: S5]

[WOL: depends on LAN chip and driver behavior (GBE)]

Supports S3/S4/S5 (with I219 & I226)

PCI Express Configuration

Chipset \rightarrow PCH-IO Configuration \rightarrow PCI Express Configuration

Chipset	Aptio Setup – AMI	
PCI Express Configuration		The control of Active State
DHI Link ASPM Control PCIe function swap ▶ PCIe EQ settings	(L1) [Enabled]	Power Management of the DMI Link.
 M.2 B-Key RENESAS(PCIE to USB) LAN2 M.2 M-Key 		
		++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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PCIe EQ Settings

 $Chipset \rightarrow PCH-IO\ Configuration \rightarrow PCI\ Express\ Configuration \rightarrow PCIe\ EQ\ Settings$



M.2 B-Key

Chipset \rightarrow PCH-IO Configuration \rightarrow PCI Express Configuration \rightarrow M.2 B-Key

Chipset	Aptio Setup – AM)	
M.2 B-Key Connection Type ASPM L1 Substates L1 Low ACS PTM DPC EDPC URR FER NFER CER SEFE SENFE SECE PME SCI Advanced Error Reporting PCIE Speed Transmitter Half Swing Detect Timeout Extra Bus Reserved Reserved Memory Reserved I/O	[Enabled] [Slot] [Disabled] [Disabled] [Enabled] [Enabled] [Enabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Enabled] [Enabled] [Enabled] [Auto] [Disabled] [Disabled] [Enabled] [Auto] [Disabled] [Auto] [Disabled] [Auto] [Disabled] [Auto] [Disabled] [Auto] [Disabled] [Auto] [Disabled] [Auto] [Disabled] [Auto] [Disabled] [Auto] [Disabled] [Auto] [Disabled] [Disabled] [Auto] [Disabled] [Disabled] [Auto] [Disabled] [Disabled] [Auto] [Disabled] [D	 ▲ Control the PCI Express Root Port. ++: Select Screen +1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

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Chipset	Aptio Setup – AMI	
EDPC	[Enabled]	A Peer Memory Write
URR	[Disabled]	Enable/Disable
FER	[Disabled]	
NFER	(Disabled)	
CER	[Disabled]	
SEFE	[Disabled]	
SENFE	[Disabled]	
SECE	(Disabled)	
PME SCI	[Enabled]	
Advanced Error Reporting	[Enabled]	
PCIe Speed	[Auto]	
Transmitter Half Swing	[Disabled]	
Detect Timeout	0	
Extra Bus Reserved	0	++: Select Screen
Reserved Memory	10	t↓: Select Item
Reserved I/O	4	Enter: Select
		+/-: Change Opt.
PCH PCIe LTR Configuration		F1: General Help
LTR	[Enabled]	F2: Previous Values
Snoop Latency Override	[Auto]	F3: Optimized Defaults
Non Snoop Latency Override	[Auto]	F4: Save & Exit
Fonce LTR Overnide	[Disabled]	ESC: Exit
170 Look	(Dischied)	
LIR LOCK	(Disabled)	
Peer Memory write Enable	[D1Sabled]	•
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RENESAS (PCIE to USB)

Chipset \rightarrow PCH-IO Configuration \rightarrow PCI Express Configuration \rightarrow RENESAS (PCIE to USB)

Chipset	Aptio Setup – AMI	
RENESAS(PCIE to USB) Connection Type ASPM L1 Substates L1 Low ACS PTM DPC EDPC URR FER NFER	[Enabled] [Slot] [Disabled] [Disabled] [Enabled] [Enabled] [Disabled] [Disabled] [Disabled] [Disabled]	▲ Control the PCI Express Root Port.
SEFE SENFE SECE PME SCI Advanced Error Reporting PCIe Speed Transmitter Half Swing Detect Timeout Extra Bus Reserved Reserved Memory Reserved I/O	[Disabled] [Disabled] [Disabled] [Enabled] [Enabled] [Auto] [Disabled] 0 0 10 4	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>

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Aptio Setup - AMI		
Chipset		
EDPC	[Enabled]	▲ Peer Memory Write
URR	[Disabled]	Enable/Disable
FER	[Disabled]	
NFER	[Disabled]	
CER	[Disabled]	
SEFE	[Disabled]	
SENFE	[Disabled]	
SECE	[Disabled]	
PME SCI	[Enabled]	
Advanced Error Reporting	[Enabled]	
PCIe Speed	[Auto]	
Transmitter Half Swing	[Disabled]	
Detect Timeout	0	
Extra Bus Reserved	0	++: Select Screen
Reserved Memory	10	14: Select Item
Reserved I/O	4	Enter: Select
		+/-: Change Opt.
PCH PCIe LTR Configuration		F1: General Help
LTR	[Enabled]	F2: Previous Values
Snoop Latency Override	[Auto]	F3: Optimized Defaults
Non Snoop Latency Override	[Auto]	F4: Save & Exit
Force LTR Override	[Disabled]	ESC: Exit
LTR Lock	[Disabled]	
Peer Memory Write Enable		•
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Chapter 3 BIOS Operation

LAN2

$\label{eq:chipset} \text{Chipset} \rightarrow \text{PCH-IO Configuration} \rightarrow \text{PCI Express Configuration} \rightarrow \text{LAN2}$

LAN2 [Enabled] Control the PCI Express Root Connection Type [Slot] Port. ASPH [Disabled] Port. L1 Substates [Disabled] Port. L1 Low [Enabled] Port. ACS [Enabled] Port. PTM [Enabled] Port. DPC [Disabled] Port. URR [Disabled] Port. VRR [Disabled] Port. VRR [Disabled] Port. VRR [Disabled] Port. VRR [Disabled] Port. SEFE [Disabled] Port.	Chipset	Aptio Setup — AMI	
SECE [Disabled] Enter: Select PME SCI [Enabled] +/-: Change Opt. Advanced Error Reporting [Enabled] F1: General Help PCIe Speed [Auto] F2: Previous Values Transmitter Half Swing [Disabled] F3: Optimized Defaults Detect Timeout 0 F4: Save & Exit Extra Bus Reserved 0 ESC: Exit Reserved Memory 10 Reserved I/0	LAN2 Connection Type ASPM L1 Substates L1 Low ACS PTM DPC EDPC URR FER NFER CER SEFE SENFE SEDE PME SCI Advanced Error Reporting PCIe Speed Transmitter Half Swing Detect Timeout Extra Bus Reserved Reserved Hemory Reserved I/O	[Enabled] [Slot] [Disabled] [Disabled] [Enabled] [Enabled] [Enabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Enabled] [Enabled] [Auto] [Disabled] [Disabled] [Auto] [Disabled] [Auto] [Disabled] [Auto] [Disabled] [Auto] [Disabled] [Disabled] [Auto] [Disabled] [Control the PCI Express Root Port. ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

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Chipset	Aptio Setup – AMI	
EDPC	[Enabled]	A Peer Memory Moite
LIPP	[Dicabled]	Enable/Disable
FER	[Disabled]	
NEED	[Disabled]	
CER	[Disabled]	
SEEF	[Disabled]	
SENEE	[Disabled]	
SECE	[Disabled]	
PMF_SCT	[Enabled]	
Advanced Ecrop Reporting	[Enabled]	
PCIe Speed	[Auto]	
Transmitter Half Swing	[Disabled]	
Detect Timeout	0	
Extra Bus Reserved	0	++: Select Screen
Reserved Memory	10	14: Select Item
Reserved I/O	4	Enter: Select
		+/-: Change Opt.
PCH PCIe LTR Configuration		F1: General Help
LTR	[Enabled]	F2: Previous Values
Snoop Latency Override	[Auto]	F3: Optimized Defaults
Non Snoop Latency Override	[Auto]	F4: Save & Exit
Force LTR Override	[Disabled]	ESC: Exit
LTR Lock	[Disabled]	
Peer Memory Write Enable	[Disabled]	
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M.2 M-Key

 $Chipset \rightarrow PCH\text{-IO Configuration} \rightarrow PCI \text{ Express Configuration} \rightarrow M.2 \text{ M-Key}$

Chipset	Aptio Setup – AMI	
H.2 M-Key Connection Type ASPM L1 Substates L1 Low ACS PTM DPC EDPC URR FER NFER	[Enabled] [Slot] [Disabled] [Disabled] [Enabled] [Enabled] [Disabled] [Disabled] [Disabled] [Disabled]	▲ Control the PCI Express Root Port.
CER SEFE SENFE SECE PHE SCI Advanced Error Reporting PCIe Speed Transmitter Half Swing Detect Timeout Extra Bus Reserved Reserved Memory Reserved I/O	[Disabled] [Disabled] [Disabled] [Enabled] [Enabled] [Auto] [Disabled] 0 0 10 4	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>

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Chipset	Aptio Setup – AMI	
EDPC	[Enabled]	A Peer Memory Write
URR	[Disabled]	Enable/Disable
FFR	[Disabled]	
NEER	[Disabled]	
CER	[Disabled]	
SEFE	[Disabled]	
SENFE	[Disabled]	
SECE	[Disabled]	
PME SCI	[Enabled]	
Advanced Error Reporting	[Enabled]	
PCIe Speed	[Auto]	
Transmitter Half Swing	[Disabled]	
Detect Timeout	0	
Extra Bus Reserved	0	++: Select Screen
Reserved Memory	10	14: Select Item
Reserved I/O	4	Enter: Select
		+/-: Change Opt.
PCH PCIe LTR Configuration		F1: General Help
LTR	[Enabled]	F2: Previous Values
Snoop Latency Override	[Auto]	F3: Optimized Defaults
Non Snoop Latency Override	[Auto]	F4: Save & Exit
Force LTR Override	[Disabled]	ESC: Exit
LTR Lock	[Disabled]	
Peer Memory Write Enable		Ŧ
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SATA Configuration

 $\label{eq:chipset} \text{Chipset} \rightarrow \text{PCH-IO} \ \text{Configuration} \rightarrow \text{SATA} \ \text{Configuration}$

	Aptio Setup – AMI	
Chipset		
SATA Configuration		▲ Enable/Disable SATA Device.
SATA Controller(s)	[Enabled]	
SATA Mode Selection	[AHCI]	
Aggressive LPM Support	[Enabled]	
SATA Controller Speed	[Default]	
Internal SATA	Empty	
Software Preserve	Unknown	
Port 4	[Enabled]	
External	[Disabled]	
Spin Up Device	[Disabled]	
SATA Device Type	[Hard Disk Drive]	
Topology	[Unknown]	++: Select Screen
SATA Port 4 DevS1p	[Disabled]	T4: Select Item
DITU Configuration	[U1Sab1ed]	Enter: Select
DM Value	15	F1: General Heln
M.2 M-Keu	Emotu	F2: Previous Values
Software Preserve	Unknown	F3: Optimized Defaults
Port 5	[Enabled]	F4: Save & Exit
External	[Disabled]	ESC: Exit
Spin Up Device	[Disabled]	
SATA Device Type	[Hard Disk Drive]	
Topology	[Unknown]	•
	ersion 2.22.1284 Converight (C)	2022 ANT
Chineat	Aptio Setup – AMI	
Chipset	Aptio Setup – AMI	
Chipset DITO Configuration	Aptio Setup - AMI [Disabled]	Enable/Disable DITO
Chipset DITO Configuration DITO Value	Aptio Setup - AMI [Disabled] 625	Enable/Disable DITO Configuration
Chipset DITO Configuration DITO Value DM Value	Aptio Setup - AMI [Disabled] 625 15	Enable/Disable DITO Configuration
Chipset DITO Configuration DITO Value DM Value M.2 M-Key Software Preserve	Aptio Setup - AMI [Disabled] 625 15 Empty Unknown	▲ Enable/Disable DITO Configuration
Chipset DITO Configuration DITO Value DM Value M.2 M-Key Software Preserve Port 5	Aptio Setup - AMI [Disabled] 625 15 Empty Unknown [Enabled]	▲ Enable/Disable DITO Configuration
Chipset DITO Configuration DITO Value DM Value M.2 M-Key Software Preserve Port 5 External	Aptio Setup - AMI [Disabled] 625 15 Empty Unknown [Enabled] [Disabled]	Enable/Disable DITO Configuration
Chipset DITO Configuration DITO Value DM Value M.2 M-Key Software Preserve Port 5 External Spin Up Device	Aptio Setup - AMI [Disabled] 625 15 Empty Unknown [Enabled] [Disabled] [Disabled]	Enable/Disable DITO Configuration
Chipset DITO Configuration DITO Value DM Value M.2 M-Key Software Preserve Port 5 External Spin Up Device SATA Device Type	Aptio Setup - AMI [Disabled] 625 15 Empty Unknown [Enabled] [Disabled] [Disabled] [Hard Disk Drive]	Enable/Disable DITO Configuration
Chipset DITO Configuration DITO Value DM Value M.2 M-Key Software Preserve Port 5 External Spin Up Device SATA Device Type Topology	Aptio Setup - AMI [Disabled] 625 15 Empty Unknown [Enabled] [Disabled] [Disabled] [Hard Disk Drive] [Unknown]	Enable/Disable DITO Configuration
Chipset DITO Configuration DITO Value DM Value M.2 M-Key Software Preserve Port 5 External Spin Up Device SATA Device Type Topology SATA Port 5 DevS1p	Aptio Setup - AMI [Disabled] 625 15 Empty Unknown [Enabled] [Disabled] [Disabled] [Hard Disk Drive] [Unknown] [Disabled]	Enable/Disable DITO Configuration
Chipset DITO Configuration DITO Value DM Value M.2 M-Key Software Preserve Port 5 External Spin Up Device SATA Device Type Topology SATA Port 5 DevSlp DITO Configuration	Aptio Setup - AMI [Disabled] 625 15 Empty Unknown [Enabled] [Disabled] [Disabled] [Hard Disk Drive] [Unknown] [Disabled] [Disabled] [Disabled]	Enable/Disable DITO Configuration
Chipset DITO Configuration DITO Value DM Value M.2 M-Key Software Preserve Port 5 External Spin Up Device SATA Device Type Topology SATA Port 5 DevSlp DITO Configuration DITO Value	Aptio Setup - AMI [Disabled] 625 15 Empty Unknown [Enabled] [Disabled] [Disabled] [Hard Disk Drive] [Unknown] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled]	Enable/Disable DITO Configuration
Chipset DITO Configuration DITO Value DM Value M.2 M-Key Software Preserve Port 5 External Spin Up Device SATA Device Type Topology SATA Port 5 DevSlp DITO Configuration DITO Value DM Value DM Value	Aptio Setup - AMI [Disabled] 625 15 Empty Unknown [Enabled] [Disabled] [Disabled] [Unknown] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] Emptu	Enable/Disable DITO Configuration ++: Select Screen ++: Select Screen
Chipset DITO Configuration DITO Value DM Value M.2 M-Key Software Preserve Port 5 External Spin Up Device SATA Device Type Topology SATA Port 5 DevSlp DITO Configuration DITO Value DM Value M.2 B-Key Software Preserve	Aptio Setup - AMI [Disabled] 625 15 Empty Unknown [Enabled] [Disabled] [Disabled] [Unknown] [Disabled] [Disabled] [Disabled] [Disabled] 625 15 Empty Unknown	 Enable/Disable DITO Configuration ++: Select Screen ++: Select Item Enter: Select
Chipset DITO Configuration DITO Value DH Value M.2 H-Key Software Preserve Port 5 External Spin Up Device SATA Device Type Topology SATA Port 5 DevSlp DITO Configuration DITO Value DH Value M.2 B-Key Software Preserve Port 6	Aptio Setup - AMI [Disabled] 625 15 Empty Unknown [Enabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] 625 15 Empty Unknown [Enabled]	 Enable/Disable DITO Configuration ++: Select Screen ++: Select Item Enter: Select +/-: Change Opt.
Chipset DITO Configuration DITO Value DH Value M.2 H-Key Software Preserve Port 5 External Spin Up Device SATA Device Type Topology SATA Port 5 DevSlp DITO Configuration DITO Value DH Value DH Value M.2 B-Key Software Preserve Port 6 External	Aptio Setup - AMI [Disabled] 625 15 Empty Unknown [Enabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] 625 15 Empty Unknown [Enabled] [Disabled] [Disabled] [Disabled]	 Enable/Disable DITO Configuration **: Select Screen **: Select Item Enter: Select */-: Change Opt. F1: General Help
Chipset DITO Configuration DITO Value DH Value M.2 H-Key Software Preserve Port 5 External Spin Up Device SATA Device Type Topology SATA Port 5 DevSlp DITO Configuration DITO Value DH Value M.2 B-Key Software Preserve Port 6 External Spin Up Device	Aptio Setup - AMI [Disabled] 625 15 Empty Unknown [Enabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] 625 15 Empty Unknown [Enabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled]	 Enable/Disable DITO Configuration **: Select Screen **: Select Item Enter: Select */-: Change Opt. F1: General Help F2: Previous Values
Chipset DITO Configuration DITO Value DM Value M.2 M-Key Software Preserve Port 5 External Spin Up Device SATA Device Type Topology SATA Port 5 DevSlp DITO Configuration DITO Value DM Value M.2 B-Key Software Preserve Port 6 External Spin Up Device SATA Device Type	Aptio Setup - AMI [Disabled] 625 15 Empty Unknown [Enabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] 625 15 Empty Unknown [Enabled] [Disabled]	 Enable/Disable DITO Configuration **: Select Screen **: Select Item Enter: Select */-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults
Chipset DITO Configuration DITO Value DM Value M.2 M-Key Software Preserve Port 5 External Spin Up Device SATA Device Type Topology SATA Port 5 DevSlp DITO Configuration DITO Value DM Value M.2 B-Key Software Preserve Port 6 External Spin Up Device SATA Device Type Topology	Aptio Setup - AMI [Disabled] 625 15 Empty Unknown [Enabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] 625 15 Empty Unknown [Enabled] [Disabled]	 Enable/Disable DITO Configuration **: Select Screen **: Select Item Enter: Select */-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Chipset DITO Configuration DITO Value DM Value M.2 M-Key Software Preserve Port 5 External Spin Up Device SATA Device Type Topology SATA Port 5 DevSlp DITO Configuration DITO Value DM Value M.2 B-Key Software Preserve Port 6 External Spin Up Device SATA Device Type Topology SATA Port 6 DevSlp	Aptio Setup - AMI [Disabled] 625 15 Empty Unknown [Enabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] 625 15 Empty Unknown [Enabled] [Disabled]	 Enable/Disable DITO Configuration **: Select Screen **: Select Item Enter: Select Item Enter: Select */-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Chipset DITO Configuration DITO Value DM Value M.2 M-Key Software Preserve Port 5 External Spin Up Device SATA Device Type Topology SATA Port 5 DevSlp DITO Configuration DITO Value DM Value M.2 B-Key Software Preserve Port 6 External Spin Up Device SATA Device Type Topology SATA Port 6 DevSlp DITO Configuration	Aptio Setup - AMI [Disabled] 625 15 Empty Unknown [Enabled] [Disabled]	 Enable/Disable DITO Configuration **: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Chipset DITO Configuration DITO Value DM Value M.2 M-Key Software Preserve Port 5 External Spin Up Device SATA Device Type Topology SATA Port 5 DevSlp DITO Configuration DITO Value DM Value M.2 B-Key Software Preserve Port 6 External Spin Up Device SATA Device Type Topology SATA Port 6 DevSlp DITO Configuration DITO Value DM Value	Aptio Setup - AMI [Disabled] 625 15 Empty Unknown [Enabled] [Disabled]	 Enable/Disable DITO Configuration **: Select Screen 11: Select Item Enter: Select */-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Chipset DITO Configuration DITO Value DM Value M.2 M-Key Software Preserve Port 5 External Spin Up Device SATA Device Type Topology SATA Port 5 DevSlp DITO Configuration DITO Value DM Value M.2 B-Key Software Preserve Port 6 External Spin Up Device SATA Device Type Topology SATA Port 6 DevSlp DITO Configuration DITO Value DM Value Not 6 DevSlp DITO Configuration DITO Value DM Value	Aptio Setup - AMI [Disabled] 625 15 Empty Unknown [Enabled] [Disabled]	 Enable/Disable DITO Configuration **: Select Screen **: Select Screen **: Select Item Enter: Select */-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
DITO Configuration DITO Value DH Value M. 2 M-Key Software Preserve Port 5 External Spin Up Device SATA Device Type Topology SATA Port 5 DevSlp DITO Configuration DITO Value DH Value M. 2 B-Key Software Preserve Port 6 External Spin Up Device SATA Device Type Topology SATA Port 6 DevSlp DITO Configuration DITO Value DH Value M. 2 B-Key Software Preserve Port 6 External Spin Up Device SATA Device Type Topology SATA Port 6 DevSlp DITO Configuration DITO Value DH Value	Aptio Setup - AMI [Disabled] 625 15 Empty Unknown [Enabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] 625 15 Empty Unknown [Enabled] [Disabled]	 Enable/Disable DITO Configuration **: Select Screen **: Select Item Enter: Select */-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

Security Configuration

Chipset \rightarrow PCH-IO Configuration \rightarrow Security Configuration



HD Audio Subsystem Configuration Settings

Chipset \rightarrow PCH-IO Configuration \rightarrow HD Audio Subsystem Configuration Settings



3.2.4 Security

Main Advanced Chipset Sec	Aptio Setup – AMI curity Boot Save & Exit	
Password Description		Set Administrator Password
If ONLY the Administrator's p then this only limits access only asked for when entering If ONLY the User's password is is a power on password and m boot or enter Setup. In Setup have Administrator rights. The password length must be in the following range: Minimum length	assword is set, to Setup and is Setup. is set, then this ist be entered to the User will	
Maximum length	20	++: Select Screen
User Password		Enter: Select Ttem Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
		ESC: Exit
	ersion 2.22.1284 Copyright (C) 2022	AMI

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.

Secure Boot

Security \rightarrow Secure Boot

	Aptio Setup - AMI Security	
System Mode	Setup	Secure Boot feature is Active
Secure Boot	[Enabled] Inactive	Platform Key(PK) is enrolled and the System is in User mode.
Secure Boot Mode > Restore Factory Keys > Reset To Setup Mode	[Standard]	platform reset
 Key Management 		
		<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
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3.2.5 Boot Settings



Setup Prompt Timeout

User the <+> and <-> keys to adjust the number of seconds to wait for the setup activation key.

Bootup NumLock State [Off]

Set the power to the On or Off 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 <mark>Save & Exit</mark>	
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	Exit system setup after saving the changes.
Save as User Defaults Restore User Defaults Boot Overnide UEFI: Generic-Multi-Card 1.00, Partition 1 (Generic-Multi-Card 1.00)	<pre>++: Select Screen f1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
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Save Changes and Exit

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

Saves all current settings as a user default.

Restore User Default

Restores all settings to user default values.

Boot Override

Shows the boot device types on the system.



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. It provides the underlying drivers required and also brings a rich set of user-friendly, intelligent and integrated interfaces to speed development, enhance security, and offer add-on value to Advantech platforms. It plays the role of catalyst between developer and solution, and makes Advantech embedded platforms easier and simpler to adopt and operate within 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 the device on/off. Our API also provides 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 with an 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



4.2.1.3 Monitor

Watchdog



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.

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.

The Backlight API allows a developer to control the backlight

(screen) on/off in embedded devices.

4.2.1.4 Power Saving

CPU Speed



System Throttling



Intel® SpeedStep® BIOS technology is used 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



Embedded Security ID



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

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! The Embedded Security ID utility provides reliable security functions for customers to secure their application data within the embedded BIOS.

Monitoring



Monitoring is a utility for customers to monitor aspects of 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.



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-288E 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*.



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



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)



VGA Setup

6.1 Introduction

The AIMB-288E is embedded with an integrated Nvidia T1000 MXM GPU card. You need to install the T1000 driver to enable the function.

Optimized integrated graphics solution: the Intel® Flexible Display Interface 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 T1000 Driver Installation



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 the website to your computer. Navigate to the "AIMB-288E_Graphic_Win10 (64-bit)" folder and click "setup.exe" to complete the installation of the drivers for Windows 10.

Win10 driver for AIMB-288E	
2022-12-05 Driver Document No.1-5031909771	
Related Product: AIMB-288E	
Solution:	
Win10 driver for AIMB-288E	^
Win10 driver for AIMB-288E	
AIMB-288E_Chipset_Win10(32_64bit) 2022-11-29	Download
AIMB-288E_Graphic_Win10(64bit) 2022-11-29	Download
AIMB-288E_LAN_Win10(64bit) 2022-11-30	Download
AIMB-288E_ME_Win10(64bit) 2022-11-30	Download
AIMB-288E_Audio1Win10(64bit) 2022-11-30	Download



LAN Configuration

7.1 Introduction

The AIMB-288E has two Gigabit Ethernet LANs via dedicated PCI Express x1 lanes. Intel® i226V and I219LM (Phy) both 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-288E's Intel® i226V 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.

Windows® 10 Driver Setup (Intel® i219LM & 7.4 Intel® i226V)

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

Ν	ote!

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.

Win10 driver for AIMB-288E

2022-12-05 Driver Document No.1-5031909771
Related Product: NIMB-288E
Solution:
Win10 driver for AIMB-288E
Win10 driver for AIMB-288E
AIMB-288E_Chipset_Win10(32_64bit) Download
AIMB-288E_Graphic_Win10(64bit) Download
AIMB-288E_LAN_Win10(64bit) 2022-11-30 Download
AIMB-288E_ME_Win10(64bit) 2022-11-30 Download
AIMB-288E_Audio1Win10(64bit) Download



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