



**User Manual**

# MIO-4370

12th/13th Gen. Intel<sup>®</sup> Core<sup>™</sup>  
Processor S-series (LGA1700) on 4"  
EPIC SBC

**ADVANTECH**

*Enabling an Intelligent Planet*

---

## Copyright

The documentation and the software included with this product are copyrighted 2023 by Advantech Co., Ltd. All rights are reserved. Advantech Co., Ltd. reserves the right to make improvements in the products described in this manual at any time without notice. No part of this manual may be reproduced, copied, translated, or transmitted in any form or by any means without the prior written permission of Advantech Co., Ltd. The information provided in this manual is intended to be accurate and reliable. However, Advantech Co., Ltd. assumes no responsibility for its use, nor for any infringements of the rights of third parties that may result from its use.

## Acknowledgments

Intel<sup>®</sup> is a trademark of Intel<sup>®</sup> Corporation.

AMI is a trademark of American Megatrends, Inc.

IBM, PC, PS/2, and VGA are trademarks of International Business Machines Corporation.

Microsoft Windows<sup>®</sup> and DirectX<sup>®</sup> are registered trademarks of Microsoft Corp.

All other product names or trademarks are properties of their respective owners.

For more information on this and other Advantech products, please visit our websites at:

<https://www.advantech.com>

For technical support and service, please visit our support website at:

<https://www.advantech.com/support>

This manual is for MIO-4370.

## Product Warranty (2 years)

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

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

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

If you believe your product to be defective, follow the steps outlined below.

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

---

# Declaration of Conformity

## CE

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This type of cable is available from Advantech. Please contact your local supplier for ordering information.

Test conditions for passing also include the equipment being operated within an industrial enclosure. In order to protect the product from damage caused by electrostatic discharge (ESD) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

## FCC Class B

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

## Technical Support and Assistance

1. Visit the Advantech website at [www.advantech.com/support](http://www.advantech.com/support) to obtain the latest product information.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before calling:
  - Product name and serial number
  - Description of your peripheral attachments
  - Description of your software (operating system, version, application software, etc.)
  - A complete description of the problem
  - The exact wording of any error messages

## Packing List

Before system installation, check that the items listed below are included and in good condition. If any item does not accord with the list, contact your dealer immediately.

- 1 x MIO-4370 SBC
- 1 x USB 2.0 Cable 20cm (P/N: 1700030406-01)
- 1 x Audio Cable 20cm (P/N: 1700019584-01)
- 2 x COM (RS-232/422/485) Cable 20cm (P/N: 1700030404-01)
- 1 x Startup Manual (P/N: 2046437000)
- 1 x Screw Kit (3 x M3x5L screws for M.2 module, 4 sets of screws and stand-off)
- 1 x Jumper Kit (10 x Jumpers)
- 1 x WISE-DeviceOn Package
- 1 x McAfee/Acronis Package

## Optional Accessories

- 1 x CPU Cooler (TDP=35W, 75(W) x 75(L) x 25(H)mm) (P/N: 1970004564T010)



# Contents

<b>Chapter 1</b>	<b>General Information .....</b>	<b>1</b>
1.1	Introduction .....	2
1.2	Specifications .....	2
	Table 1.1: Specifications .....	2
1.3	Block Diagram.....	4
<b>Chapter 2</b>	<b>Mechanical Specifications .....</b>	<b>5</b>
2.1	Introduction .....	6
2.2	Board Layout: Dimensions .....	6
	Figure 2.1 MIO-4370 Mechanical Diagram (Top Side) .....	6
	Figure 2.2 MIO-4370 Mechanical Diagram (Bottom Side).....	7
	Figure 2.3 MIO-4370 Mechanical Diagram (Coastline) .....	7
	Figure 2.4 MIO-4370 Mechanical Diagram (with Cooler) .....	7
2.3	Quick Installation Guide .....	8
	Figure 2.5 MIO-4370 Cooler Installation.....	8
<b>Chapter 3</b>	<b>Jumpers and Connectors .....</b>	<b>9</b>
3.1	Jumper and Connector List .....	10
	Table 3.1: Jumper and Connector List .....	10
3.2	Jumper and Connector Locations .....	11
	Figure 3.1 MIO-4370 Jumper & Connector Locations (Top Side) .	11
	Figure 3.2 MIO-4370 Jumper & Connector Locations (Bottom	11
	Side) .....	11
3.3	Jumpers .....	12
3.3.1	Setting Jumpers .....	12
3.3.2	AT Mode/Load BIOS Default: J1.....	12
	Table 3.2: AT Mode/Load BIOS Default: J1 .....	12
3.3.3	Panel Voltage Selection Jumper: VDD1 .....	13
	Table 3.3: Panel Voltage Selection Jumper: VDD1 .....	13
3.4	Connectors.....	13
3.4.1	DC Power Input Connector (180D): DCIN1 .....	13
	Table 3.4: DC Power Input Connector (180D): DCIN1 .....	13
3.4.2	AUDIO CABLE Connector: AUDIO1 .....	14
	Table 3.5: AUDIO CABLE Connector: AUDIO1 .....	14
3.4.3	eDP Connector: eDP1 .....	15
	Table 3.6: eDP Connector: eDP1 .....	15
3.4.4	COM Port Internal Connector 1: COM1 .....	17
	Table 3.7: COM Port Internal Connector 1: COM1.....	17
3.4.5	COM Port Internal Connector 2: COM2 .....	18
	Table 3.8: COM Port Internal Connector 2: COM2.....	18
3.4.6	Front Panel Internal Connector: CN1.....	19
	Table 3.9: Front Panel Internal Connector: CN1 .....	19
3.4.7	GPIO Connector: CN4 .....	20
	Table 3.10: GPIO Connector: CN4.....	20
3.4.8	CANBUS Connector: CANBUS1 .....	21
	Table 3.11: CANBUS Connector: CANBUS1 .....	21
3.4.9	USB2.0 Internal Connector: USB3.....	21
	Table 3.12: USB 2.0 internal Connector: USB3 .....	21
3.4.10	Smart FAN Connector: FAN1 .....	22
	Table 3.13: Smart FAN Connector: FAN1 .....	22

3.4.11	I2C_SMB_Connector: I2C_1 .....	22
	Table 3.14: I2C_SMB_Connector: I2C_1 .....	22
3.4.12	RTC Battery Connector: BAT1 .....	23
	Table 3.15: RTC Battery Connector: BAT1 .....	23
3.4.13	M.2 M-Key Connector: M2_M2/M2_M1 .....	23
	Table 3.16: M.2 M-Key Connector: M2_M2/M2_M1 .....	23
3.4.14	M.2 B-Key Connector (Co-Layout & BOM Option: M.2 B-Key Connector): M2_B1 .....	26
	Table 3.17: M.2 B-Key Connector (Co-Layout & BOM Option: M.2 B-Key Connector): M2_B1 .....	26
3.4.15	M.2 E-Key Connector .....	29
	Table 3.18: M.2 E-Key Connector .....	29

## **Chapter 4 AMI BIOS Setup..... 33**

4.1	Entering Setup .....	35
4.1.1	Main Setup .....	35
4.1.2	Advanced BIOS Features Setup .....	36
4.1.3	Chipset Configuration .....	59
4.1.4	Security .....	71
4.1.5	Boot .....	72
4.1.6	Save & Exit .....	73
4.1.7	MEBx .....	74

## **Chapter A System I/O Ports ..... 75**

A.1	System I/O Ports .....	76
	Table A.1: System I/O Ports .....	76
A.2	DMA Channel Assignments .....	77
	Table A.2: DMA Channel Assignments .....	77
A.3	1st MB Memory Map .....	77
	Table A.3: 1st MB Memory Map .....	77
A.4	Interrupt Assignments .....	77
	Table A.4: Interrupt Assignments .....	77



# Chapter 1

General Information

## 1.1 Introduction

MIO-4370 is powered by 12th and 13th Gen Intel® Core™ i9/i7/i5/i3 processors (LGA1700-socket type CPU and on-board PCH).

MIO-4370 provides scalable power and performance with a hybrid architecture design combining Performance-cores and Efficient-cores, and enhanced graphics with Xe architecture.

MIO-4370 offers embedded API, such as iManager 3.0, SUSI 4.0, and WISE-DeviceOn, created by Advantech to monitor and control system operation effectively and remotely.

Advantech has validated MIO-4370 with the embedded OS for Windows 10 LTSC and Ubuntu v22.04 LTS, which is ready for bundled shipment.

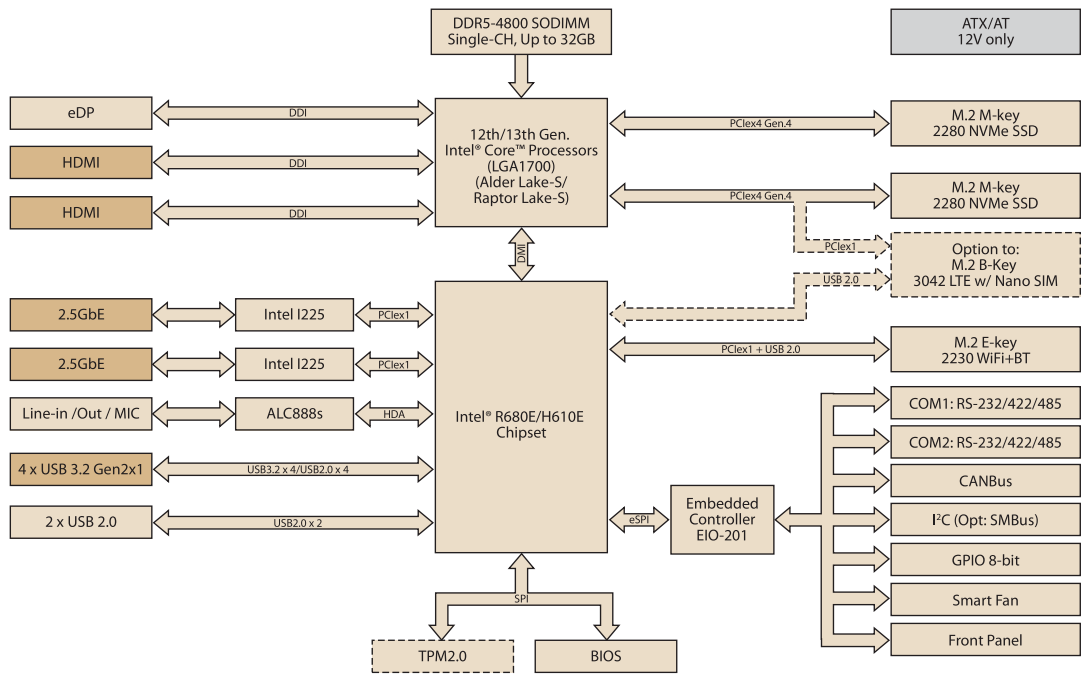
MIO-4370 also supports high-speed DDR5 memory & dual NVMe PCIe SSD storage, dual HDMI and eDP as displays, dual 2.5G Ethernet with TSN (Time-Sensitive Networking), and several embedded I/O interfaces within a compact 4-inch SBC.

## 1.2 Specifications

Table 1.1: Specifications					
<b>Platform</b>	Processor	i9-12900TE	i7-12700TE	i5-12500TE	i3-12100TE
	Max. Frequency	4.8 GHz	4.6 GHz	4.3 GHz	4.0 GHz
	Base Frequency	1.1 GHz	1.4 GHz	1.9 GHz	2.1 GHz
	Cores (P+E)/Threads	16C (8+8)/24T	12C (8+4)/20T	6C (6+0)/12T	4C (4+0)/8T
	LLC	30MB	25MB	18MB	12MB
	CPU TDP	35W	35W	35W	35W
	Chipset	R680E/H610E			
	BIOS	AMI UEFI 256Mbit			
<b>Memory</b>	Technology	DDR5-4800			
	Max. Capacity	Up to 32GB			
	Channel/Socket	Single Channel/1 x SODIMM Socket			
<b>Graphics</b>	Controller	Intel® UHD Graphics 770	Intel® UHD Graphics 770	Intel® UHD Graphics 770	Intel® UHD Graphics 730
	Max. Frequency	1.55 GHz	1.5 GHz	1.45 GHz	1.4 GHz
	Execution Unit	32	32	32	24
	3D/HW Acceleration	DX12, OGL4.5, OCL2.1 HW Encode: AVC/H264, JPEG, HEVC/H265, VP9 HW Decode: WMV9, AVC/H264, JPEG/MJPEG, HEVC/H265, VP9, AV1			
<b>Display I/F</b>	LCD	1 x eDP 1.4b, up to 5120 x 3200 @ 60Hz, 24bpp			
	HDMI/DP	2 x HDMI 1.2, up to 1920 x 1200 @ 60Hz, 24bpp			
	Multiple Displays	3 simultaneous displays via eDP + HDMI + HDMI			

Table 1.1: Specifications		
<b>Ethernet</b>	Controller	LAN1/LAN2: Intel® I225
	Speed	LAN1/LAN2: 2.5GbE
	TSN support	LAN1/LAN2: Yes
<b>External I/O</b>	Ethernet	2 x RJ-45
	HDMI	2
	USB	R680E: 4 x USB 3.2 Gen 2x1 (10Gbps) / H610E: 2 x USB 3.2 Gen 2x1 (10Gbps)+ 2 x USB 3.2 Gen 1x1 (5Gbps)
<b>Internal I/O</b>	USB	2 x USB 2.0
	COM Port	2 x RS-232/422/485, max. 1Mbps
	CANBus	1 x CAN2.0, max. 1Mbps
	Serial Bus	1 x I2C (BOM Default, optional to 1 x SMBus*)
	Audio	Realtek ALC888s, Line-in/Line-out/Mic
	GPIO	8-bit general purpose input output I/O
	Fan	12V, 2A (4-wire)
	Front Panel Control	Power-On, Reset, Buzzer, CaseOpen
<b>Board Feature</b>	Watchdog Timer	65536 level, 0~65535 sec
	TPM	R680E: Discrete TPM 2.0 H610E: fTPM support by Intel® Platform Trust Technology
	iManager 3.0	SW API for Hardware Monitor, Smart Fan Control, Brightness Control, I2C, GPIO, WDT
<b>Expansion</b>	M.2 E-Key	1 x E-Key 2230 (PCIe x1, USB 2.0)
	M.2 B-Key	R680E: 0 / H610E: 1 x B-Key 3042 (only USB 2.0 interface) with SIM slot
	M.2 M-Key	R680E: 2 x M-Key 2280 (PCIe Gen. 4 x4) / H610E: 1 x M-Key 2280 (PCIe Gen. 4 x4)
<b>Power</b>	Supply Voltage	Vin: DC 12V ± 10%; RTC Battery: Lithium 3V/220mAH
	Connector	ATX 2x2 pin 180D (Option to ATX 2x2 pin 90D)
	Power Management	AT, ATX
<b>Environment</b>	Temperature	Operating: Standard: 0 ~ 60 °C (32 ~ 140 °F) Storage: -40 ~ 85 °C (-40 ~ 185 °F)
	Humidity	Operating: 40 °C @ 95% relative humidity, non-condensing Storage: 60 °C @ 95% relative humidity, non-condensing
	Vibration Resistance	3.5 Grms
<b>Certification</b>	EMC	CE, FCC Class B
<b>Mechanical</b>	Dimensions	165 x 114 mm (6.5" x 4.5")
	Net Weight	320 g (w/o CPU & Cooler)
*Note: Support by request		

# 1.3 Block Diagram



# Chapter 2

Mechanical  
Specifications

## 2.1 Introduction

MIO-4370 is a multi-I/O SBC (Single Board Computer) designed with a 4-inch compact form factor. This chapter includes board dimensions and assembly instructions for the standard thermal solution.

## 2.2 Board Layout: Dimensions

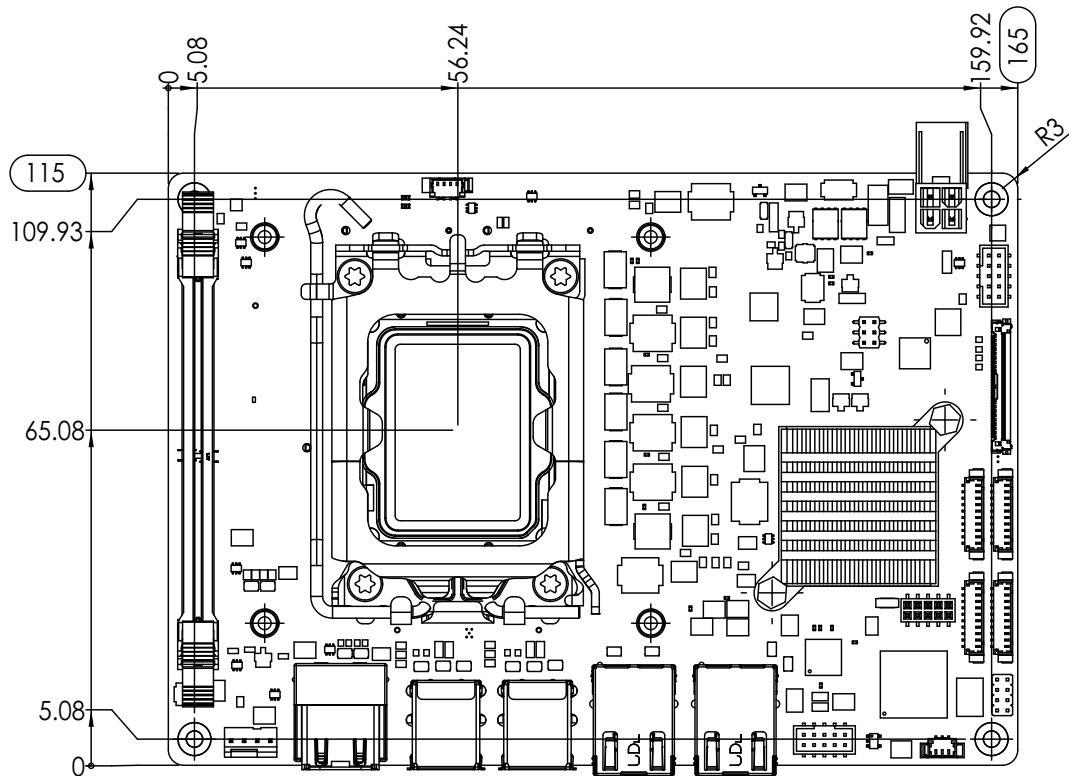


Figure 2.1 MIO-4370 Mechanical Diagram (Top Side)

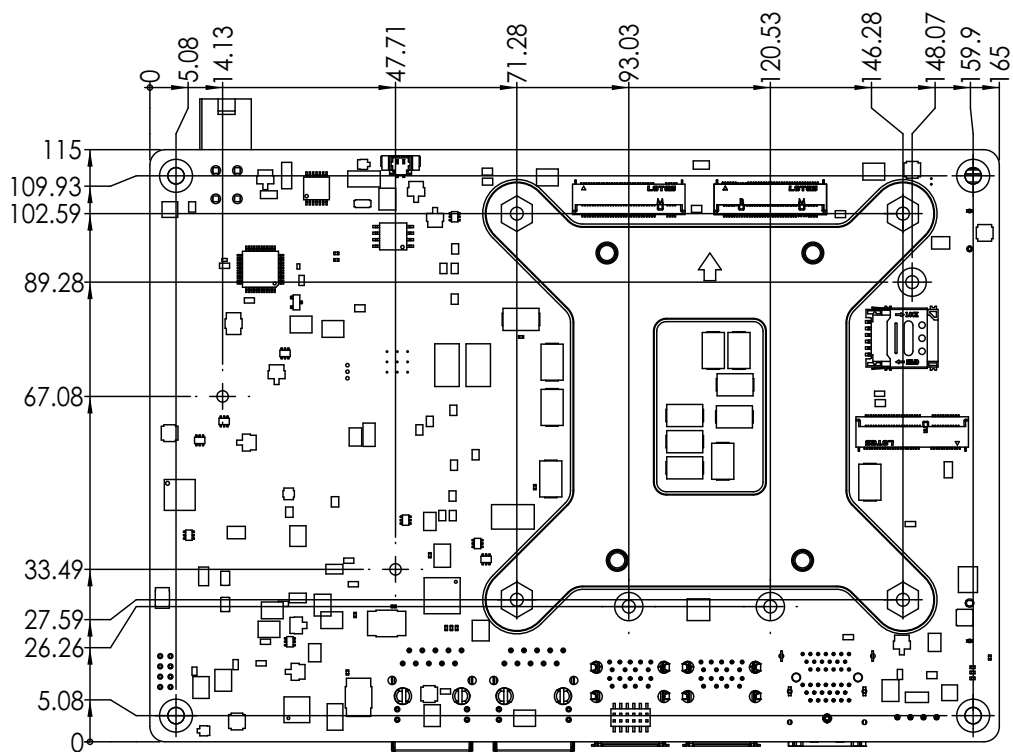


Figure 2.2 MIO-4370 Mechanical Diagram (Bottom Side)

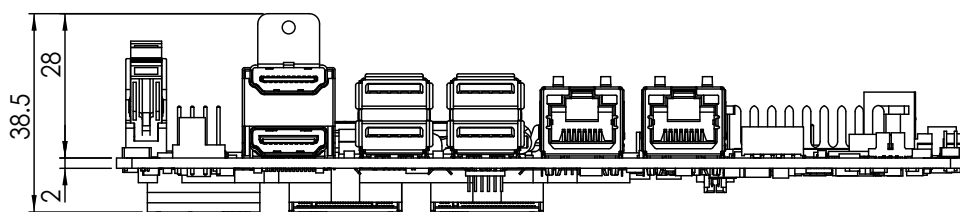


Figure 2.3 MIO-4370 Mechanical Diagram (Coastline)

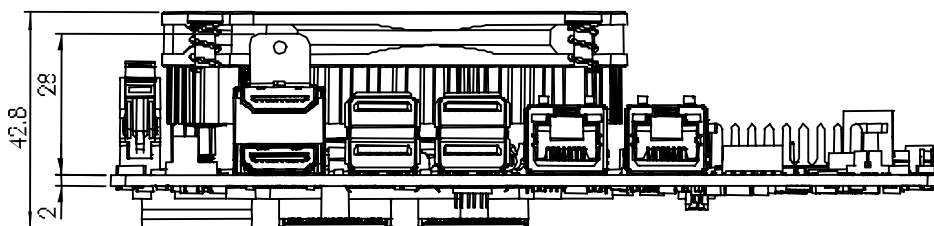


Figure 2.4 MIO-4370 Mechanical Diagram (with Cooler)

## 2.3 Quick Installation Guide

This section introduces installation of the cooler, which is the optional accessory and is not included in the default package under standard P/Ns.

Please assemble the CPU Cooler according to the following diagram.

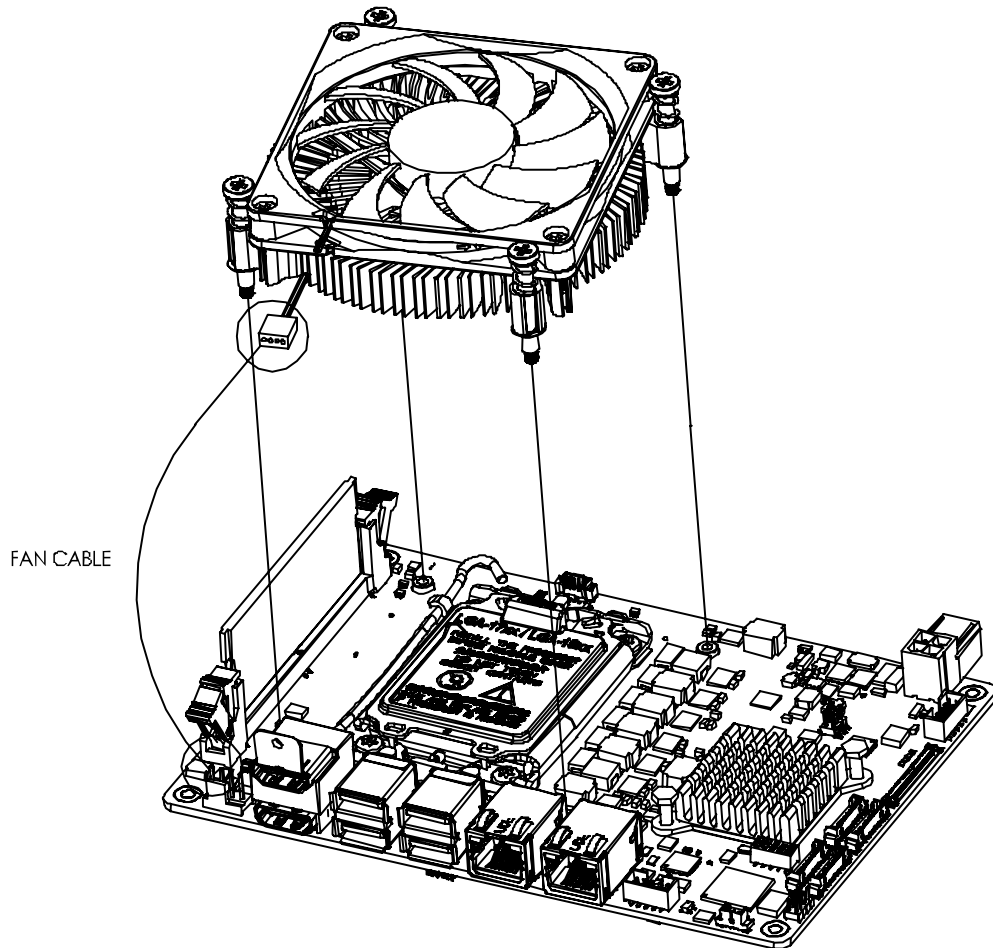


Figure 2.5 MIO-4370 Cooler Installation



# Chapter 3

Jumpers and  
Connectors

## 3.1 Jumper and Connector List

Table 3.1: Jumper and Connector List		
No.	Location	Description
3.3.2	J1	AT Mode/Load BIOS Default
3.3.3	VDD1	Panel Voltage Selection Jumper
3.4.1	DCIN1	DC Power Input Connector (180D)
3.4.2	AUDIO1	AUDIO CABLE Connector
3.4.3	eDP1	eDP Connector
3.4.4	COM1	COM Port Internal Connector 1
3.4.5	COM2	COM Port Internal Connector 2
3.4.6	CN1	Front Panel Internal Connector
3.4.7	CN4	GPIO Connector
3.4.8	CANBUS1	CANBus Connector
3.4.9	USB3	USB 2.0 Internal Connector
	LAN1	LAN Connector 1
	LAN2	LAN Connector 2
	USB1	USB 3.2 Connector 1
	USB2	USB 3.2 Connector 2
	HDMI1	Dual HDMI Connector
3.4.10	FAN1	Smart FAN Connector
	DIMMA1	DDR5 SODIMM
3.4.11	I2C_1	I2C_SMB_Connector
3.4.12	BAT1	RTC Battery Connector
3.4.13	M2_M2	M.2 M-Key Connector
3.4.13 (3.4.14)	M2_M1 (M2_B1)	M.2 M-Key Connector (Co-Layout & BOM option:M.2 B-Key Connector)
3.4-15	SIM1	NANO SIM (Co-Layout & BOM option)

## 3.2 Jumper and Connector Locations

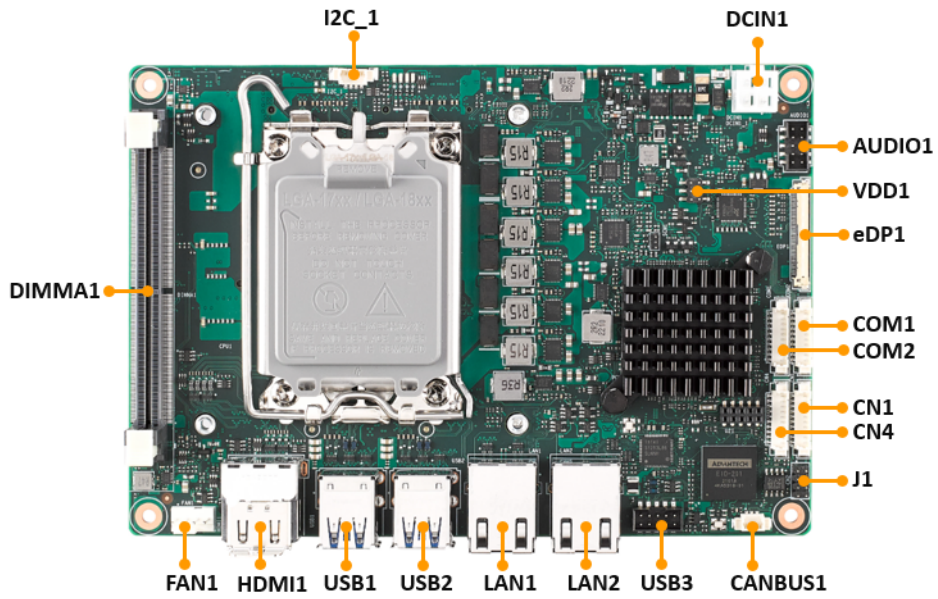


Figure 3.1 MIO-4370 Jumper & Connector Locations (Top Side)

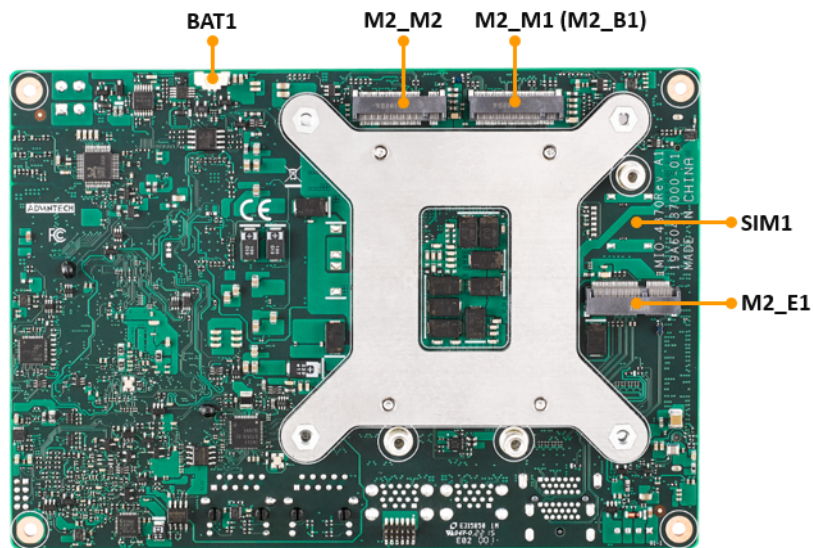
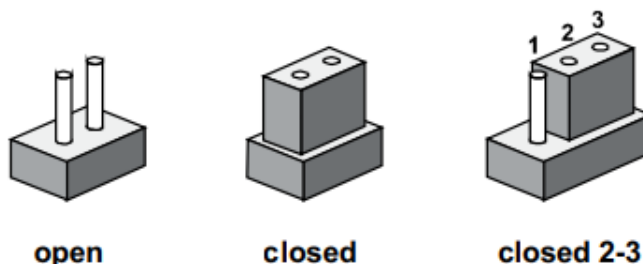


Figure 3.2 MIO-4370 Jumper & Connector Locations (Bottom Side)

## 3.3 Jumpers

### 3.3.1 Setting Jumpers

You may configure your card to match the needs of your application by setting jumpers. A jumper is a metal bridge used to close an electric 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” a jumper, you connect the pins with the clip. To “open” a jumper, you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2, and 3. In this case you would connect either pins 1 and 2, or 2 and 3. The jumper settings are schematically depicted in this manual as follows:

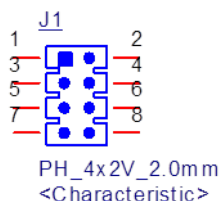


A pair of needle-nose pliers may be helpful when working with jumpers. If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes. Generally, you will only need a standard cable to make most connections.

### 3.3.2 AT Mode/Load BIOS Default: J1

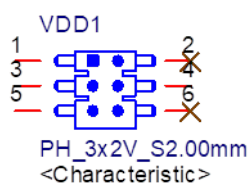
**Table 3.2: AT Mode/Load BIOS Default: J1**

Jumper Short	Panel Function
1-2	AT_DET# Open: ATX mode Short: AT mode (Default)
3-4	NORMAL_BIOS Open: Normal (Default) Short:
5-6	LOAD_BIOS_Default setting: Open: Normal (Default) Short: Load BIOS Default
7-8	Top Swap: Open: Normal (Default) Short: Top Swap function



### 3.3.3 Panel Voltage Selection Jumper: VDD1

Table 3.3: Panel Voltage Selection Jumper: VDD1	
Jumper Short	Panel Voltage
1-3	+3.3V (Default)
3-5	+5V
3-4	+12V

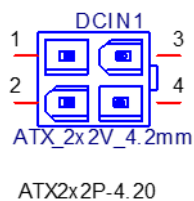


## 3.4 Connectors

### 3.4.1 DC Power Input Connector (180D): DCIN1

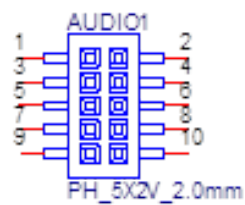
Table 3.4: DC Power Input Connector (180D): DCIN1	
ADV P/N	1655004584-01
Mfr./MPN	Jih Vei Electronics / 24W4310-04S10-01T-3.3-R
Pin	Signal Pin Definition
1	GND
2	GND
3	+V24_V12_DC_IN
4	+V24_V12_DC_IN

ATX PWR CONN. 2x2P 4.2mm 180D(M) DIP 24W4310-04S



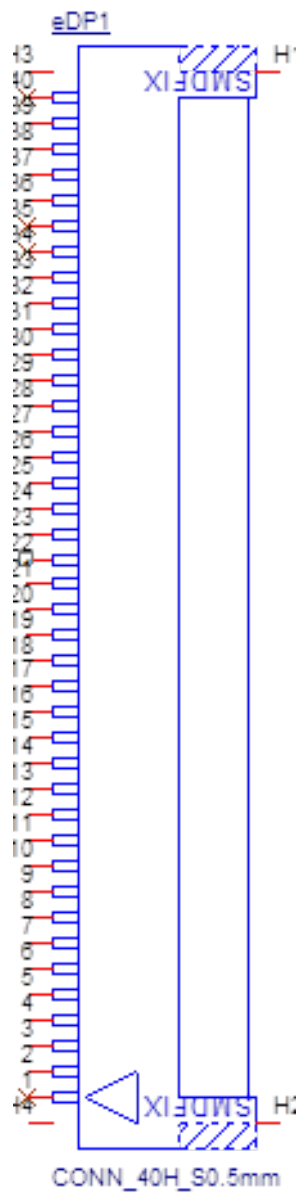
### 3.4.2 AUDIO CABLE Connector: AUDIO1

Table 3.5: AUDIO CABLE Connector: AUDIO1	
ADV P/N	1653008214-01
Mfr./MPN	Pinrex Technology / 52C-90-10GBE0
Pin	Signal Pin Definition
1	LOUTR
2	LINR
3	AUD_CONN_GND
4	AUD_CONN_GND
5	LOUTL
6	LINL
7	AUD_CONN_GND
8	FRONT_JD
9	MIC1R
10	MIC1L



### 3.4.3 eDP Connector: eDP1

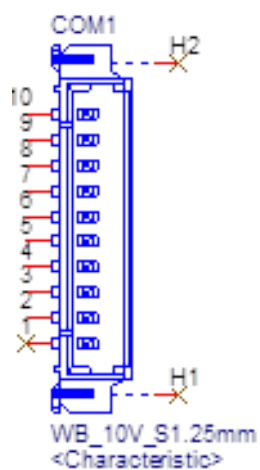
Table 3.6: eDP Connector: eDP1	
<b>ADV P/N</b>	<b>1655005384-01</b>
<b>Mfr./MPN</b>	<b>Hirose Electronics / KN38A-40S-0.5H</b>
<b>Pin</b>	<b>Signal Pin Definition</b>
1	NC
2	GND
3	eDP_z_TX3-
4	eDP_z_TX3+
5	GND
6	eDP_z_TX2-
7	eDP_z_TX2+
8	GND
9	eDP_z_TX1-
10	eDP_z_TX1+
11	GND
12	eDP_z_TX0-
13	eDP_z_TX0+
14	GND
15	eDP_z_AUX+
16	eDP_z_AUX-
17	GND
18	+V_LCD
19	+V_LCD
20	+V_LCD
21	+V_LCD
22	NC
23	GND
24	GND
25	GND
26	GND
27	eDP_HPD
28	GND
29	GND
30	GND
31	GND
32	eDP0_z_ENABKL
33	EC_eDP0_z_PWM
34	NC
35	NC
36	+V12
37	+V12
38	+V12
39	+V12
40	NC





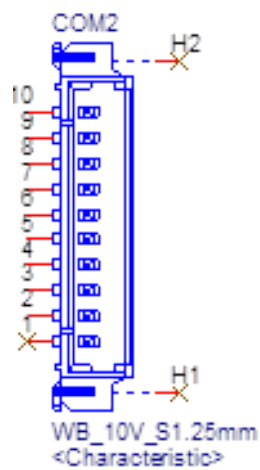
### 3.4.4 COM Port Internal Connector 1: COM1

Table 3.7: COM Port Internal Connector 1: COM1	
ADV P/N	1653007728-02
Mfr./MPN	Aces Electronics / 50273-0107N-002
Pin	Signal Pin Definition
1	NC
2	COM1_RI#
3	COM1_DTR#
4	COM1_CTS#
5	COM1_TXD
6	COM1_RTS#
7	COM1_RXD
8	COM1_DSR#
9	COM1_DCD#
10	GND



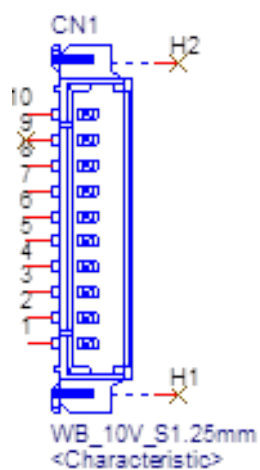
### 3.4.5 COM Port Internal Connector 2: COM2

Table 3.8: COM Port Internal Connector 2: COM2	
ADV P/N	1653007728-02
Mfr./MPN	Aces Electronics / 50273-0107N-002
Pin	Signal Pin Definition
1	NC
2	COM2_RI#
3	COM2_DTR#
4	COM2_CTS#
5	COM2_TXD
6	COM2_RTS#
7	COM2_RXD
8	COM2_DSR#
9	COM2_DCD#
10	GND



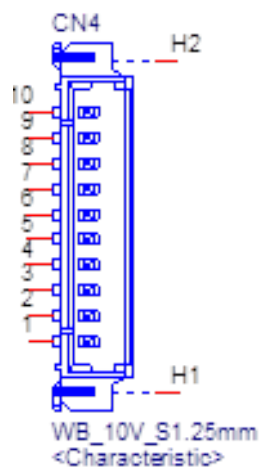
### 3.4.6 Front Panel Internal Connector: CN1

Table 3.9: Front Panel Internal Connector: CN1	
ADV P/N	1653007728-02
Mfr./MPN	Aces Electronics / 50273-0107N-002
Pin	Signal Pin Definition
1	GND
2	BUZZER-
3	BUZZER+
4	RDC_CASEOPEN
5	NC
6	FP_a_PSIN#
7	FP_a_RST#
8	+V3.3
9	NC
10	+V5



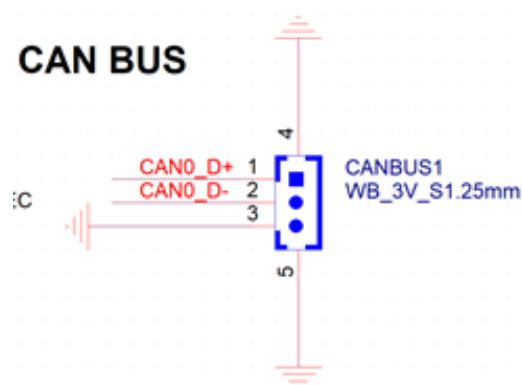
### 3.4.7 GPIO Connector: CN4

Table 3.10: GPIO Connector: CN4	
ADV P/N	1653007728-02
Mfr./MPN	Aces Electronics / 50273-0107N-002
Pin	Signal Pin Definition
1	GND
2	EC_P1_GPIO7
3	EC_P1_GPIO2
4	EC_P1_GPIO6
5	EC_P1_GPIO1
6	EC_P1_GPIO5
7	EC_P1_GPIO0
8	EC_P1_GPIO4
9	+V5_P1_GPIO
10	EC_P1_GPIO3



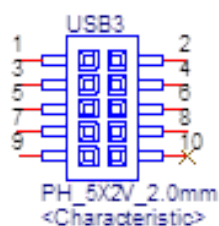
### 3.4.8 CANBUS Connector: CANBUS1

Table 3.11: CANBUS Connector: CANBUS1	
ADV P/N	1654903500
Mfr./MPN	Aces Electronics / 85205-03001
Pin	Signal Pin Definition
1	CAN0_D+
2	CAN0_D-
3	GND



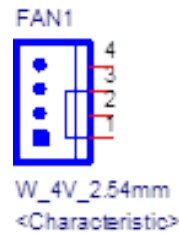
### 3.4.9 USB2.0 Internal Connector: USB3

Table 3.12: USB 2.0 internal Connector: USB3	
ADV P/N	1653008214-01
Mfr./MPN	Pinrex Technology / 52C-90-10GBE0
Pin	Signal Pin Definition
1	+V5SB_USB_UTC
2	+V5SB_USB_UTC
3	USB8_z_P-
4	USB9_z_P-
5	USB8_z_P+
6	USB9_z_P+
7	GND
8	GND
9	GND
10	NC



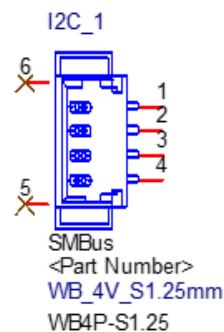
### 3.4.10 Smart FAN Connector: FAN1

Table 3.13: Smart FAN Connector: FAN1	
ADV P/N	1655004347
Mfr./MPN	Pinrex Technology / 744-81-04TWR030
Pin	Signal Pin Definition
1	GND
2	+V12
3	FAN_SPEED
4	FAN_V5_PWM



### 3.4.11 I2C\_SMB\_Connector: I2C\_1

Table 3.14: I2C_SMB_Connector: I2C_1	
ADV P/N	1655904020
Mfr./MPN	Aces Electronics / 85205-04001
Pin	Signal Pin Definition
1	GND
2	EC_I2C0_z_DAT
3	EC_I2C0_z_CLK
4	+V3.3



### 3.4.12 RTC Battery Connector: BAT1

Table 3.15: RTC Battery Connector: BAT1	
ADV P/N	1653009030-01
Mfr./MPN	Aces Electronics / 50273-0027N-002
Pin	Signal Pin Definition
1	+VBAT_a1
2	GND



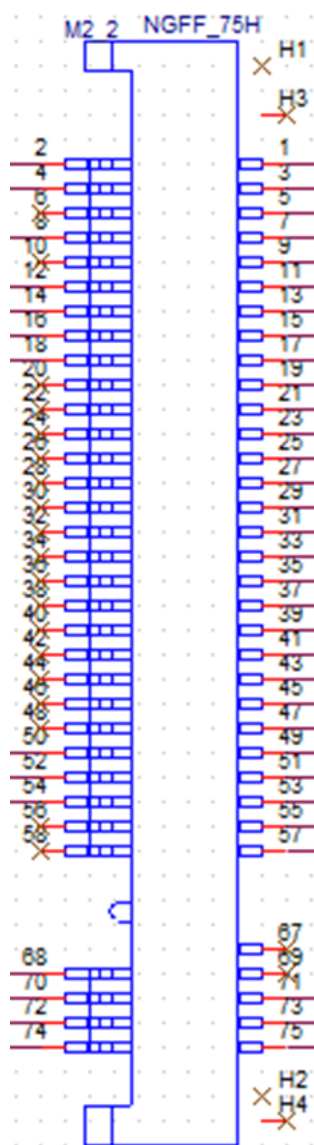
### 3.4.13 M.2 M-Key Connector: M2\_M2/M2\_M1

Table 3.16: M.2 M-Key Connector: M2_M2/M2_M1	
ADV P/N	1654015463-01 / 1654014529-01
Mfr./MPN	LOTES CO. / APCI0036-P003BC / APCI0556-P001A
Pin	Signal Pin Definition
1	GND
2	+V3.3_M.2_1
3	GND
4	+V3.3_M.2_1
5	PCIE_CPUM2_3_RX-
6	NC
7	PCIE_CPUM2_3_RX+
8	M.2_PLN#
9	GND
10	NC
11	PCIE_CPUM2_3_TX-
12	+V3.3_M.2_1
13	PCIE_CPUM2_3_TX+
14	+V3.3_M.2_1
15	GND
16	+V3.3_M.2_1
17	PCIE_CPUM2_2_RX-
18	+V3.3_M.2_1
19	PCIE_CPUM2_2_RX+
20	NC
21	GND
22	NC
23	PCIE_CPUM2_2_TX-
24	NC
25	PCIE_CPUM2_2_TX+
26	NC

**Table 3.16: M.2 M-Key Connector: M2\_M2/M2\_M1**

27	GND
28	NC
29	PCIE_CPUM2_1_RX-
30	NC
31	PCIE_CPUM2_1_RX+
32	NC
33	GND
34	NC
35	PCIE_CPUM2_1_TX-
36	NC
37	PCIE_CPUM2_1_TX+
38	NC
39	GND
40	NC
41	PCIE_CPUM2_0_RX-
42	NC
43	PCIE_CPUM2_0_RX+
44	NC
45	GND
46	NC
47	PCIE_CPUM2_0_TX-
48	NC
49	PCIE_CPUM2_0_TX+
50	PLTRST_MKEY_BUFFER#
51	GND
52	CLK2_M2MB_a_PCIE_REQ#
53	CK_100M_a_MKEY_N
54	M.2_PCIE_WAKE#
55	CK_100M_a_MKEY_P
56	NC
57	GND
58	NC
67	NC
68	NC
69	NC
70	+V3.3_M.2_1
71	GND
72	+V3.3_M.2_1
73	GND
74	+V3.3_M.2_1
75	GND
H1	NC
H2	NC
H3	NC
H4	NC



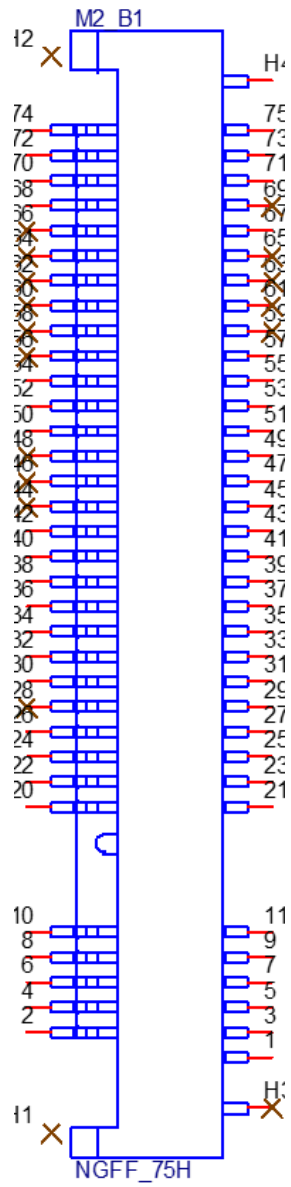


### 3.4.14 M.2 B-Key Connector (Co-Layout & BOM Option: M.2 B-Key Connector): M2\_B1

Table 3.17: M.2 B-Key Connector (Co-Layout & BOM Option: M.2 B-Key Connector): M2_B1	
ADV P/N	1654014529-01
Mfr./MPN	LOTES CO. / APCI0556-P001A
Pin	Signal Pin Definition
1	+V3.3_M.2_1
2	+V3.3_M.2_1
3	GND
4	+V3.3_M.2_1
5	GND
6	M2B1_FULL_CARD_OFF#
7	USB_M2B1_P
8	M2B1_W_DISABLE1#
9	USB_M2B1_N
10	NC
11	NC
12	NC
13	NC
14	NC
15	NC
16	NC
17	NC
18	NC
19	NC
20	NC
21	+V3.3_M.2_1
22	NC
23	NC
24	NC
25	+V1.8SB_PCH
26	M2B1_W_DISABLE2#
27	GND
28	NC
29	NC
30	M2B1_UIM_RESET
31	NC
32	M2B1_UIM_CLK
33	GND
34	M2B1_UIM_DATA
35	NC
36	M2B1_UIM_PWR
37	NC
38	M2B1_DEVSLP#
39	NC

**Table 3.17: M.2 B-Key Connector (Co-Layout & BOM Option: M.2 B-Key Connector): M2\_B1**

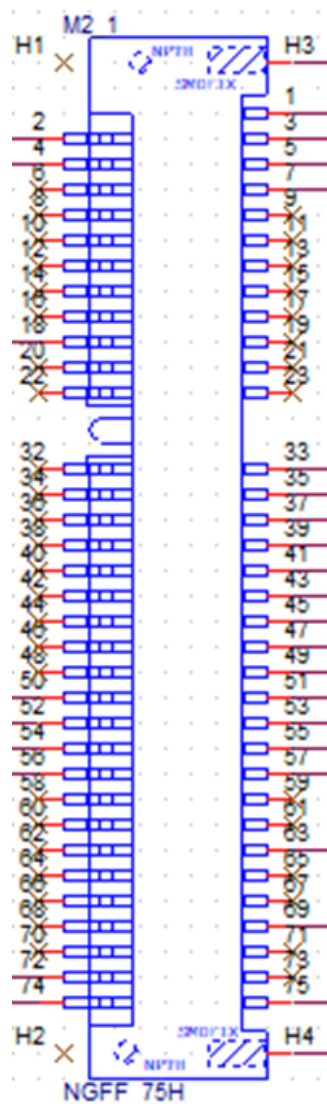
40	NC
41	NC
42	NC
43	NC
44	NC
45	GND
46	NC
47	NC
48	NC
49	NC
50	PLTRST_M2M1_BUFFER#
51	GND
52	CLK1_M2M1_a_PCIE_REQ#
53	NC
54	M2M1_PCIE_WAKE#
55	NC
56	NC
57	GND
58	NC
59	NC
60	NC
61	NC
62	NC
63	NC
64	NC
65	NC
66	NC
67	M2B1_a_RESET#
68	NC
69	NC
70	+V3.3_M.2_1
71	GND
72	+V3.3_M.2_1
73	GND
74	+V3.3_M.2_1
75	+V3.3_M.2_1
H1	GND
H2	GND
H3	GND
H4	GND



## 3.4.15 M.2 E-Key Connector

Table 3.18: M.2 E-Key Connector	
ADV P/N	1654012663-01
Mfr./MPN	LOTES CO. / APCI0163-P001A
Pin	Signal Pin Definition
1	GND
2	+V3.3SB_M.2_E
3	USB6_z_P+
4	+V3.3SB_M.2_E
5	USB6_z_P-
6	NC
7	GND
8	NC
9	NC
10	NC
11	NC
12	NC
13	NC
14	NC
15	NC
16	NC
17	NC
18	GND
19	NC
20	NC
21	NC
22	NC
23	NC
32	NC
33	GND
34	NC
35	PCIE_M2_z_TX7+
36	NC
37	PCIE_M2_z_TX7-
38	NC
39	GND
40	NC
41	PCIE_M2_RX11+
42	NC
43	PCIE_M2_RX11-
44	NC
45	GND
46	NC
47	CLK_M2E_z_PCIE+
48	NC
49	CLK_M2E_z_PCIE-

Table 3.18: M.2 E-Key Connector	
50	SUSCLK_z_EKEY
51	GND
52	PLTRST_BUFFER#
53	PCIE_a_CLKREQ2#
54	BT_DISABLE#
55	PCIE_WAKE#
56	WIFI_DISABLE#
57	GND
58	NC
59	NC
60	NC
61	NC
62	NC
63	GND
64	NC
65	NC
66	NC
67	NC
68	NC
69	GND
70	NC
71	NC
72	+V3.3SB_M.2_E
73	NC
74	+V3.3SB_M.2_E
75	GND
H1	NC
H2	NC
H3	GND
H4	GND







# Chapter 4

AMI BIOS Setup

AMIBIOS has been integrated into a plethora of motherboards for decades. With the AMIBIOS Setup program, you can modify BIOS settings and control the various system features. This chapter describes the basic navigation of the MIO-4370 BIOS setup screens.



AMI BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration. This information is stored in battery-backed CMOS so it retains the Setup information when the power is turned off.

## 4.1 Entering Setup

Turn on the computer and check for the patch code. If there is a number assigned to the patch code, it means that the BIOS supports your CPU. If there is no number assigned to the patch code, please contact an Advantech application engineer to obtain an up-to-date patch code file. This will ensure that your CPU's system status is valid. After ensuring that you have a number assigned to the patch code, press <DEL> and you will immediately be allowed to enter Setup.

### 4.1.1 Main Setup

When you first enter the BIOS Setup Utility, you will encounter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. There are two Main Setup options. They are described in this section. The Main BIOS Setup screen is shown below.



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

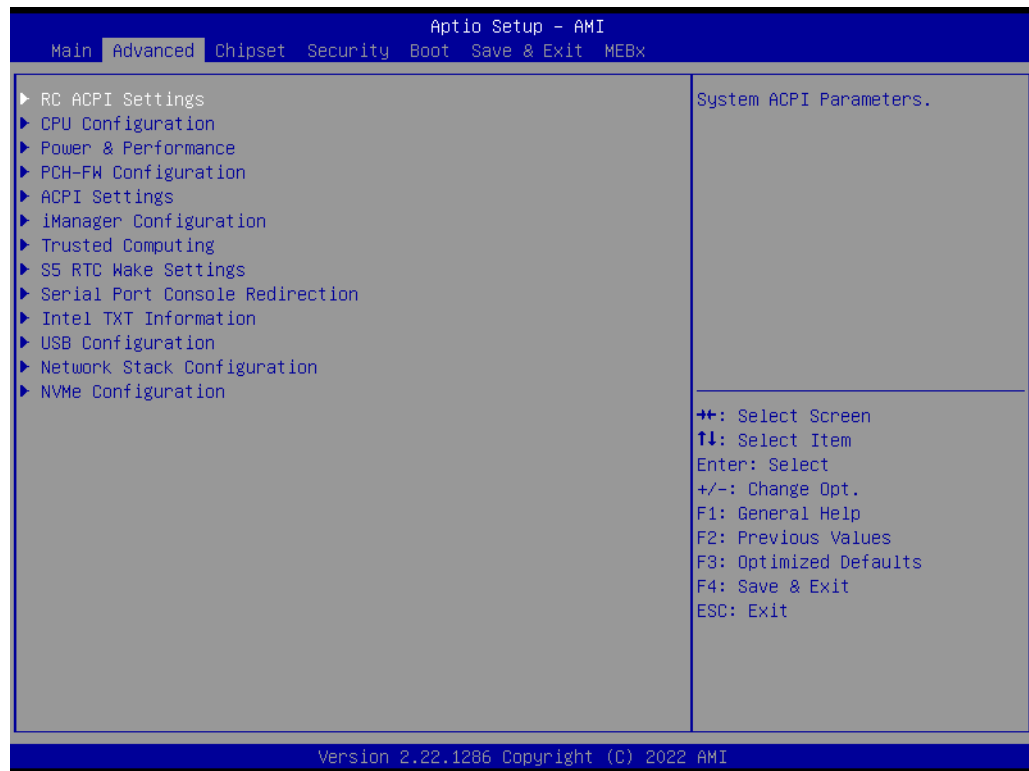
Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

#### ■ System Time / System Date

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

## 4.1.2 Advanced BIOS Features Setup

Select the Advanced tab from the MIO-4370 setup screen to enter the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen, such as CPU Configuration, to go to the sub-menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screen is shown below. The sub-menus are described on the following pages.

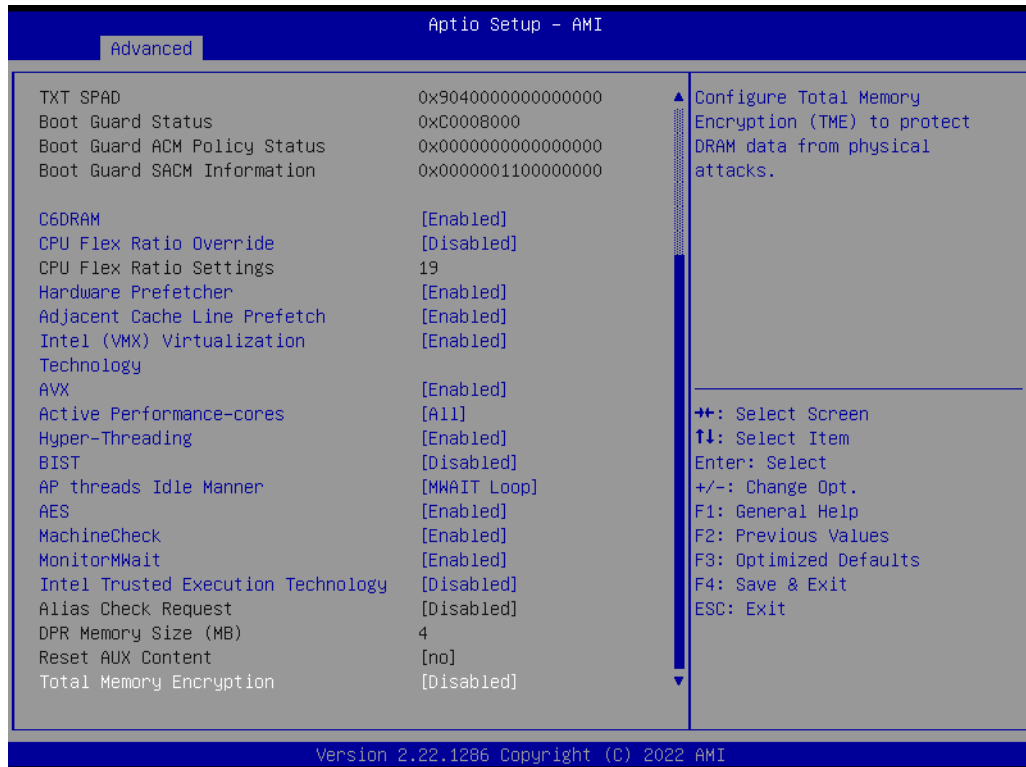


### 4.1.2.1 RC ACPI Settings



- **PTID Support**  
If Enabled, determines whether to load the PTID Table.
- **Native PCIE Enable**  
Enable/Disable PCIE Native Control reported in the ACPI Table.
- **Native ASPM**  
Choose whether the ASPM feature is controlled by the OS or BIOS.
- **BDAT ACPI Table Support**  
If Enabled, determines whether to support the BDAT ACPI Table.

### 4.1.2.2 CPU Configuration



- **C6DRAM**  
Enable/Disable moving the DRAM contents to PRM memory when the CPU is in C6 state.
- **CPU Flex Ratio Override**  
Enable/Disable CPU Flex Ratio Programming.
- **Hardware Prefetcher**  
This item allows users to enable or disable the hardware prefetcher feature.
- **Adjacent Cache Line Prefetch**  
This item allows users to enable or disable the adjacent cache line prefetch feature.
- **Intel (VMX) Virtualization Technology**  
When Enabled, a VMM can utilize the additional hardware capability provided by Vanderpool Technology.
- **AVX**  
Enable/Disable the AVX 2/3 Instructions.
- **Active Performance cores**  
Number of P-cores to enable in each processor package.
- **Hyper-Threading**  
This item allows users to Enable/Disable Hyper-Threading Technology.
- **BIST**  
Enable/Disable BIST (Built-In Self Test) on reset.
- **AP threads Idle Manner**  
AP threads Idle Manner for waiting signal to run.
- **AES**  
Enable/Disable AES (Advanced Encryption Standard).
- **MachineCheck**  
Enable/Disable Machine Check.

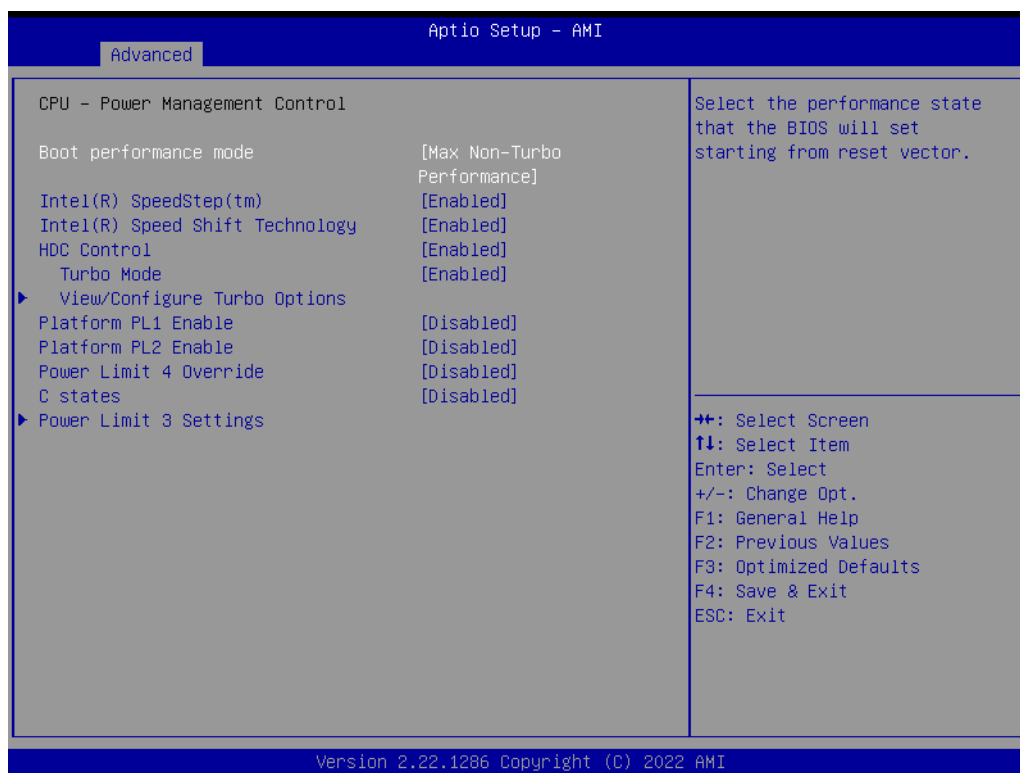
- **MonitorMWait**  
Enable/Disable MonitorMWait.
- **Intel Trusted Execution Technology**  
Enables utilization of additional hardware capability provided by Intel® Trusted Execution Technology.
- **Total Memory Encryption**  
Configure Total Memory Encryption (TME) to protect DRAM data from physical attacks.

#### 4.1.2.3 Power & Performance



- **CPU – Power Management Control**  
CPU – Power Management Control Options.
- **GT – Power Management Control**  
GT – Power Management Control Options.

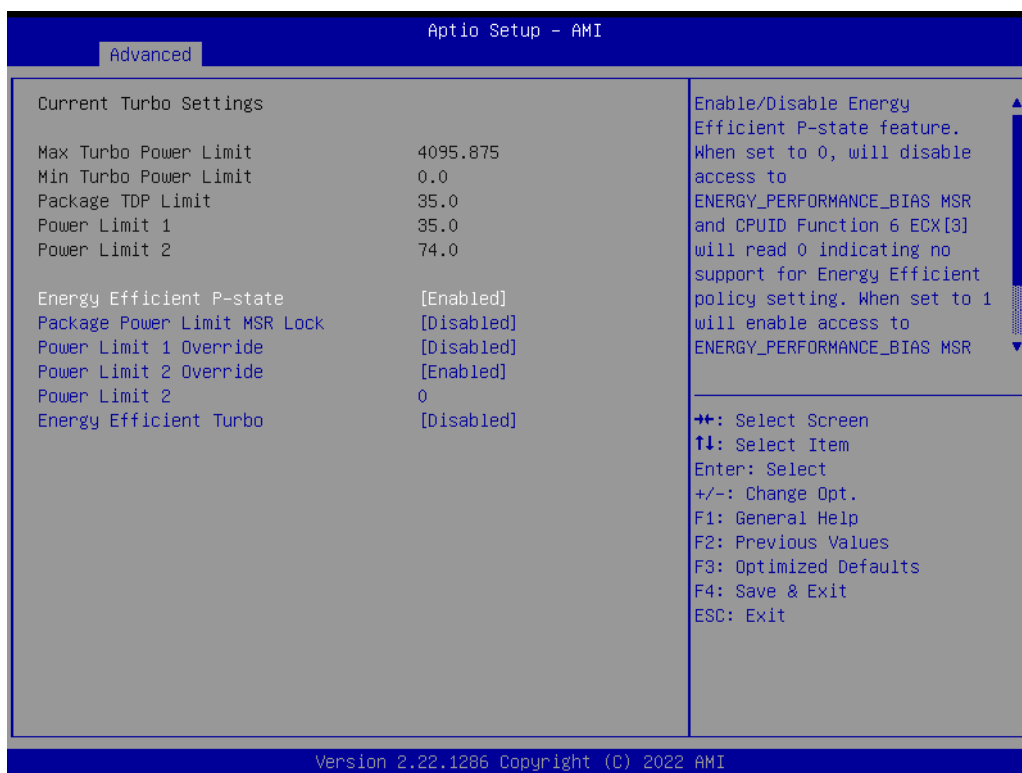
- **CPU - Power Management Control**



- **Boot performance mode**  
Select the performance state that the BIOS will set to before OS handoff.
- **Intel® SpeedStep™**  
Allows more than two frequency ranges to be supported.
- **Intel® Speed Shift Technology**  
Enable/Disable Intel® Speed Shift Technology support.
- **HDC Control**  
Enable/Disable Intel HDC.
- **Turbo Mode**  
Enable/Disable processor turbo mode.
- **View/Configure Turbo Options**  
View and Configure Turbo Options.
- **Platform PL1 Enable**  
Enable/Disable Platform Power Limit 1 programming.
- **Platform PL2 Enable**  
Enable/Disable Platform Power Limit 1 programming.
- **Power Limit 4 Override**  
Enable/Disable Power Limit 4 override.
- **C states**  
Enable/Disable CPU Power Management.
- **PowerLimit 3 Settings**  
Power Limit 3 Settings.

### View/Configure Turbo Options





- **Energy Efficient P-state**  
Enable/Disable Energy Efficient P-state feature.
- **Package Power Limit MSR Lock**  
Enable/Disable locking of Package Power Limit settings.
- **Power Limit 1 Override**  
Enable/Disable Power Limit 1 override.
- **Power Limit 2 Override**  
Enable/Disable Power Limit 2 override.
- **Power Limit 2**  
Power Limit 2 value in milliwatts.
- **Energy Efficient Turbo**  
Enable/Disable Energy Efficient Turbo feature.

### Power Limit 3 Settings



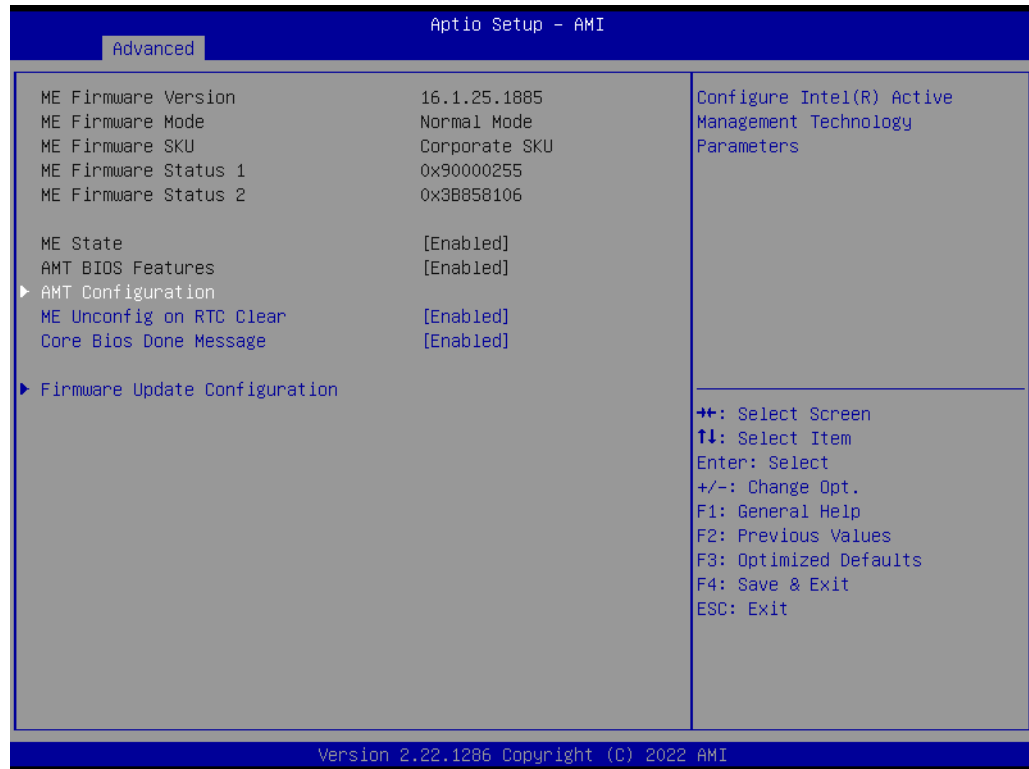
- **Power Limit 3 Override**  
Enable/Disable Power Limit 3 override.

- **GT - Power Management Control**



- **RC6 (Render Standby)**  
Check to enable render standby support.
- **Maximum GT frequency**  
Maximum GT frequency limited by user.
- **Disable Turbo GT frequency**  
Enable/Disable Turbo GT frequency.

#### 4.1.2.4 PCH-FW Configuration



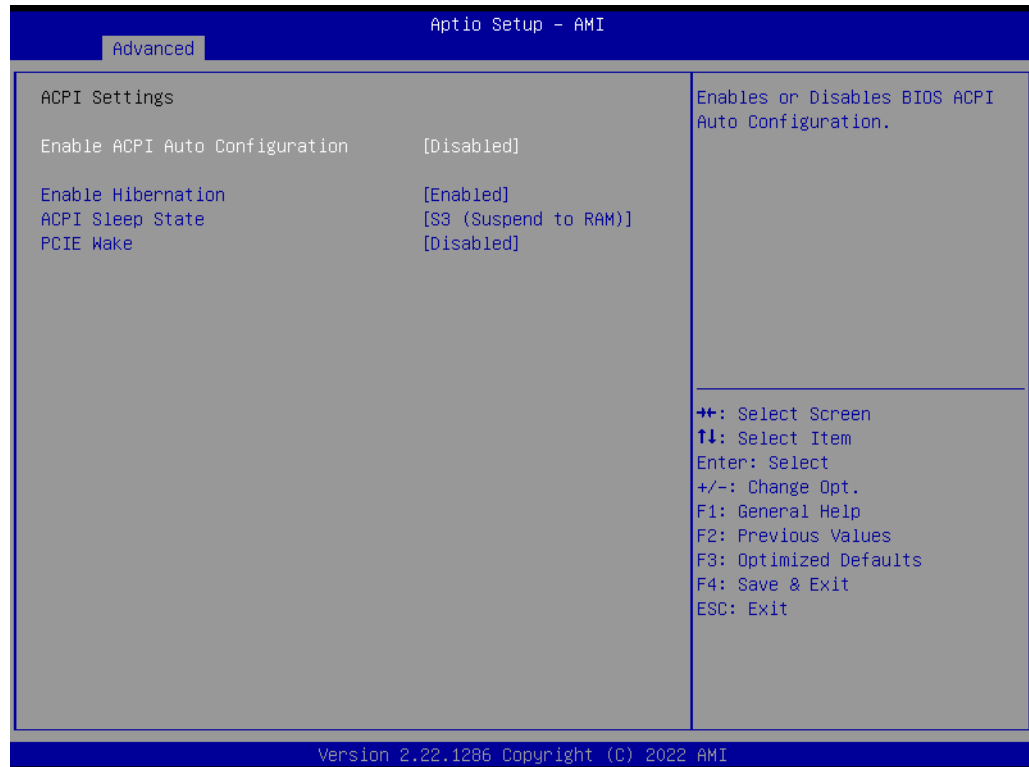
- **ME State**  
When Disabled ME will put ME into Temporarily Disabled Mode.
- **AMT BIOS Features**  
When Disabled, ME will not be unconfigured on RTC Clear.
- **AMT Configuration**  
Configure Intel® Active Management Technology Parameters.
- **ME Unconfig on RTC Clear**  
When Disabled, ME will not be unconfigured on RTC Clear.
- **Core BIOS Done Message**  
Enable/Disable Core BIOS Done message sent to ME.
- **Firmware Update Configuration**  
Configure Management Engine Technology Parameters.

## ■ AMT Configuration



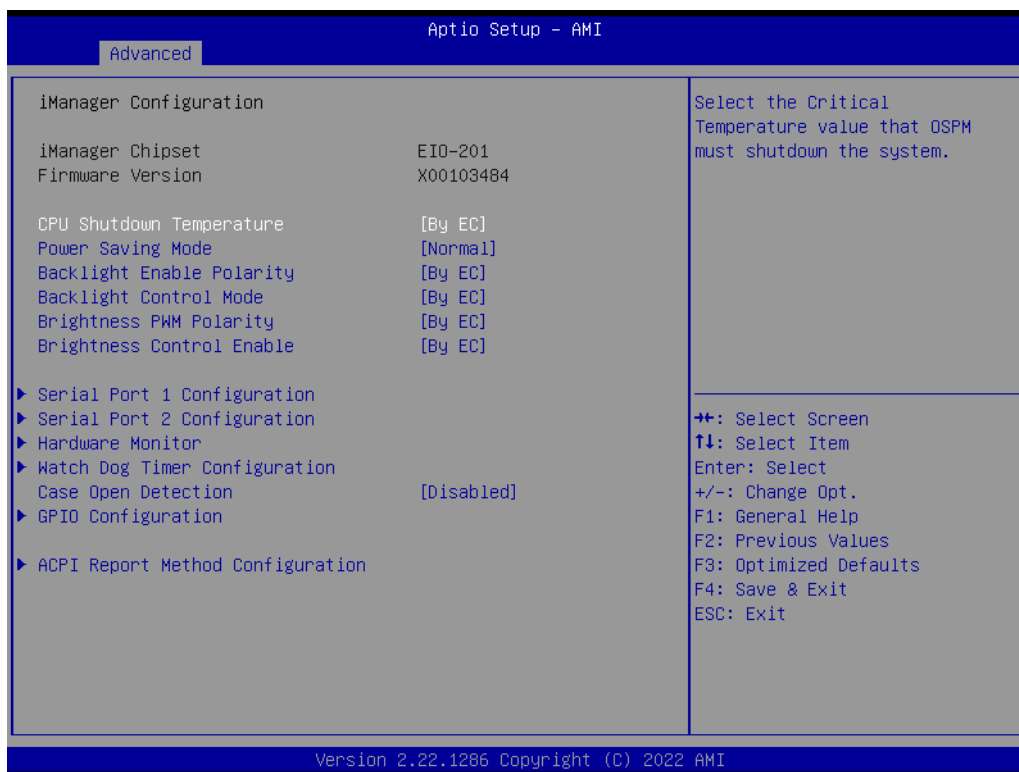
- **USB Provision of AMT**  
Enable/Disable of AMT BIOS Provisioning.
- **Active Remote Assistance Process**  
Trigger CIRA boot.
- **Unconfigure ME**  
Unconfigure ME and reset the MEBx password to default on the next boot.

### 4.1.2.5 ACPI Settings



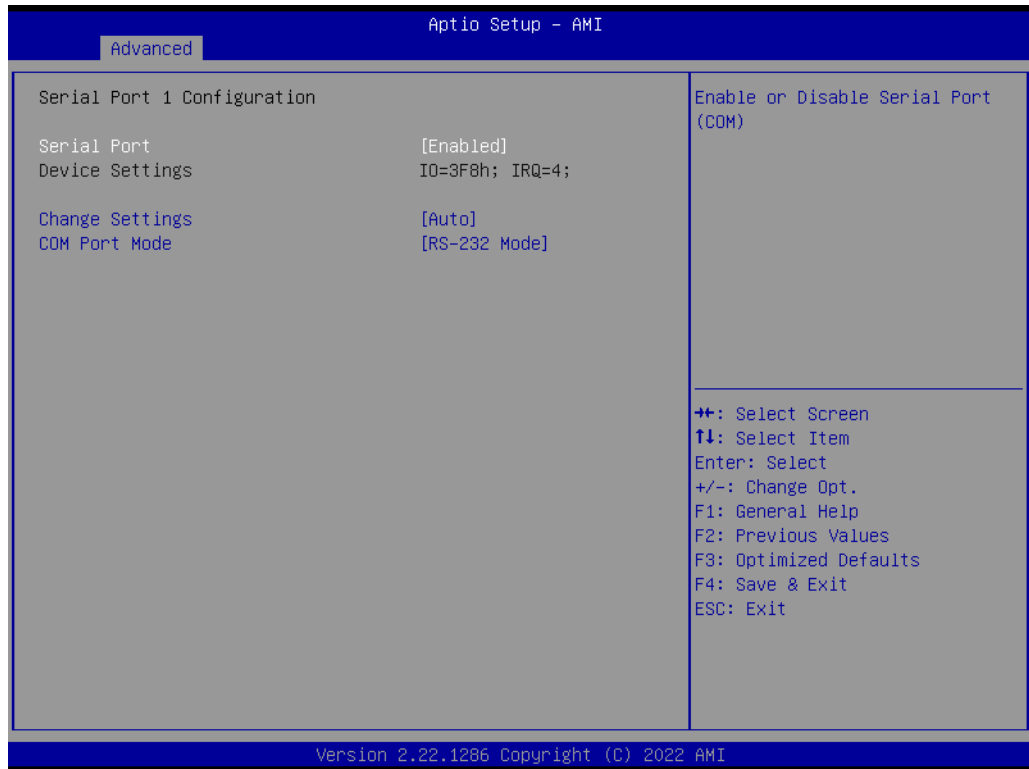
- **Enable ACPI Auto Configuration**  
Enable or disable BIOS ACPI auto configuration.
- **Enable Hibernation**  
Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some OS.
- **ACPI Sleep State**  
Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.
- **PCIe Wake**  
Enable or disable PCIe to wake the system from S5.

### 4.1.2.6 iManager Configuration



- **CPU Shutdown Temperature**  
Enable/Disable CPU Shutdown Temperature.
- **Power Saving Mode**  
Enable/Disable power saving mode.
- **Backlight Enable Polarity**  
Switch Backlight Enable Polarity for Native or Invert.
- **Backlight Control Mode**  
Switch Backlight Control to PWM or DC mode.
- **Brightness PWM Polarity**  
Backlight Control Brightness PWM Polarity for Native or Invert.
- **Brightness Control Enable**  
Choose to control LVDS brightness value by EC or User override during POST stage.
- **Serial Port 1 Configuration**  
Set Parameters of Serial Port 1.
- **Serial Port 2 Configuration**  
Set Parameters of Serial Port 2.
- **Hardware Monitor**  
Monitor hardware status.
- **Watch Dog Timer Configuration**  
Watch Dog Timer Configuration Page.
- **Case Open Detection**  
Enable or Disable Case Open Detect Function.
- **GPIO Configuration**  
GPIO Configuration Settings.
- **ACPI Report Method Configuration**  
Select ACPI Reporting Method for EC Devices.

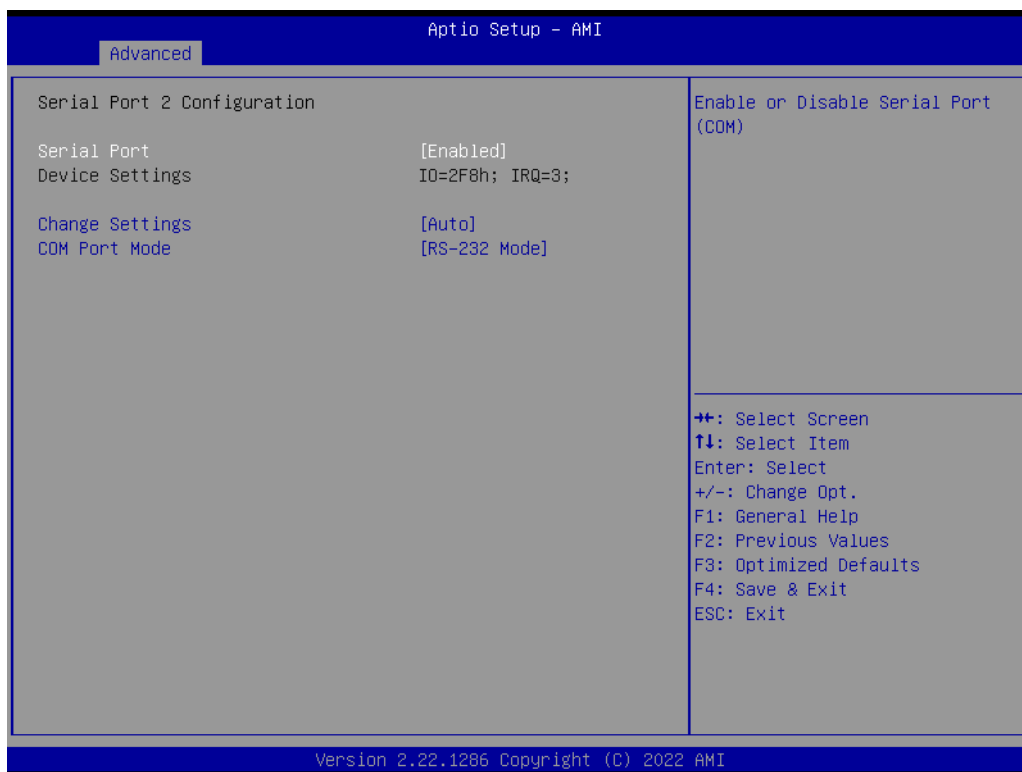
## ■ Serial Port 1 Configuration



- **Serial Port**  
Enable or Disable Serial Port (COM).
- **Change Settings**  
Select an optimal setting for Super IO device.
- **COM Port Mode**  
COM Port Mode Select.

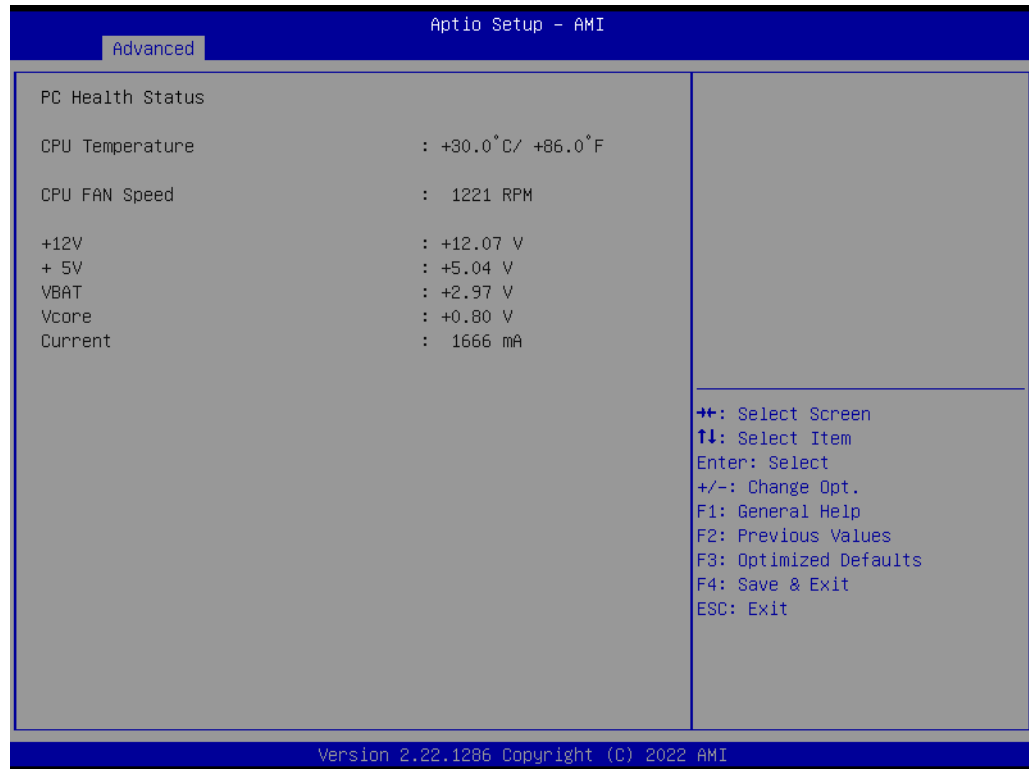


## ■ Serial Port 2 Configuration



- **Serial Port**  
Enable or Disable Serial Port (COM).
- **Change Settings**  
Select an optimal setting for Super IO device.
- **COM Port Mode**  
COM Port Mode Select.

## ■ Hardware Monitor

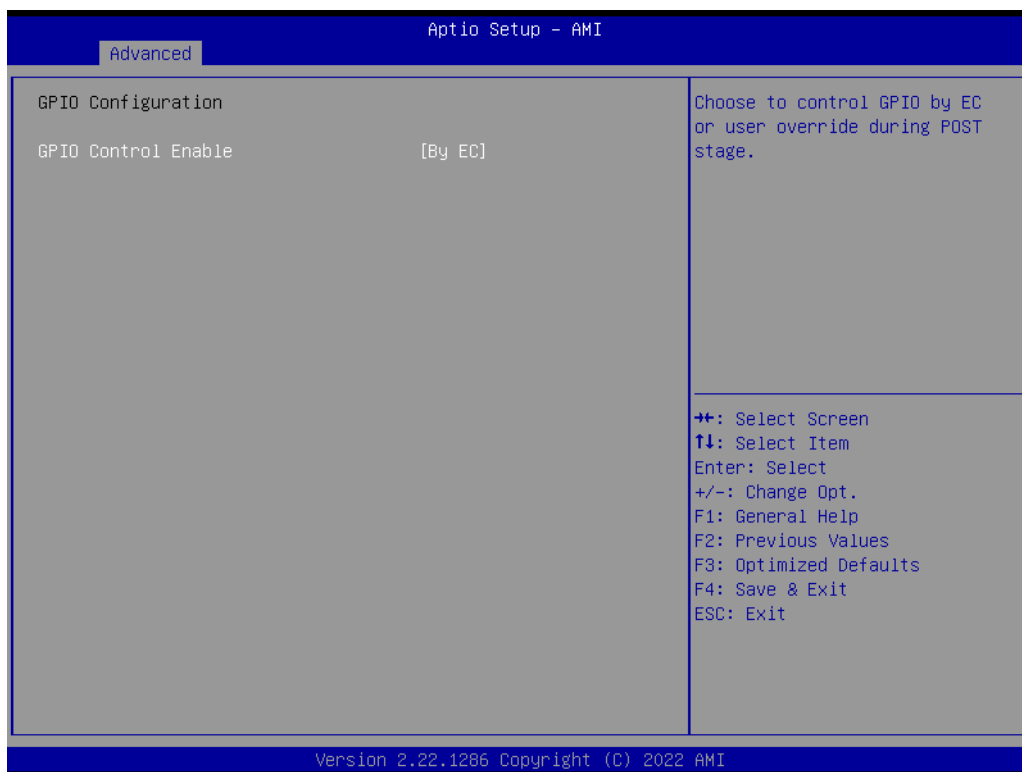


## ■ Watch Dog Timer Configuration



- **Watch Dog Timer**  
Enable or Disable the Watch Dog Timer Function.

## ■ GPIO Configuration



- **GPIO Control Enable**  
Choose to control GPIO by EC or user override during POST stage.
- **GPIO0/1/2/3/4/5/6/7**  
Configure GPIO0/1/2/3/4/5/6/7.

## ■ ACPI Report Method Configuration



- **ACPI Report Method Control**  
Select ACPI Reporting Method for EC Devices.
- **Active High-Speed COM Port**  
Select to Enable High-Speed COM Port or Standard COM Port.
- **ACPI Report Method for I2C Bus**  
Select ACPI Reporting Method for EC I2C Bus.
- **ACPI Report Method for CAN Bus**  
Select ACPI Reporting Method for EC CAN Bus.
- **ACPI Report Method for GPIO**  
Select ACPI Reporting Method for EC GPIO.

## 4.1.2.7 Trusted Computing



- **TPM Device Selection**  
Select TPM Device: fTPM or dTPM.
- **Security Device Support**  
Enable or disable BIOS support for a security device.
- **SHA256 PCR Bank**  
Enable or Disable SHA256 PCR Bank.
- **SHA384 PCR Bank**  
Enable or Disable SHA384 PCR Bank.
- **Pending operation**  
Schedule an Operation for the Security Device.
- **Platform Hierarchy**  
Enable or Disable Platform Hierarchy.
- **Storage Hierarchy**  
Enable or Disable Storage Hierarchy.
- **Endorsement Hierarchy**  
Enable or Disable Endorsement Hierarchy.
- **Physical Presence Spec Version**  
Select to direct the OS to support PPI Spec Version 1.2 or 1.3.
- **Device Select**  
TPM 1.2 will restrict support to TPM 1.2 devices, TPM 2.0 will restrict support to TPM 2.0 devices.

#### 4.1.2.8 S5 RTC Wake Settings



- **Wake system from S5**  
Enable or disable System wake on alarm event. Select FixedTime, and the system will wake on the hr:min:sec specified.

### 4.1.2.9 Serial Port Console Redirection



- **Console Redirection**  
This item allows users to configure console redirection detail settings.
- **Console Redirection EMS**  
This item allows users to enable or disable console redirection for Microsoft Windows Emergency Management Services (EMS).

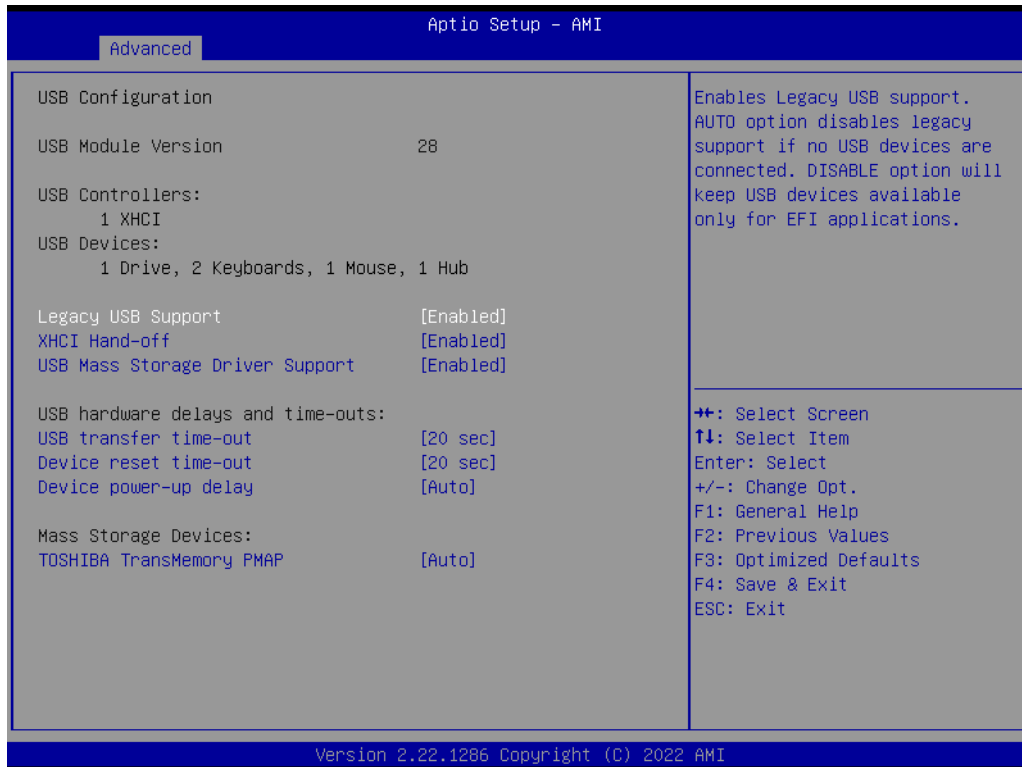
#### 4.1.2.10 Intel TXT Information



- **Intel TXT Information**  
Displays Intel TXT information.

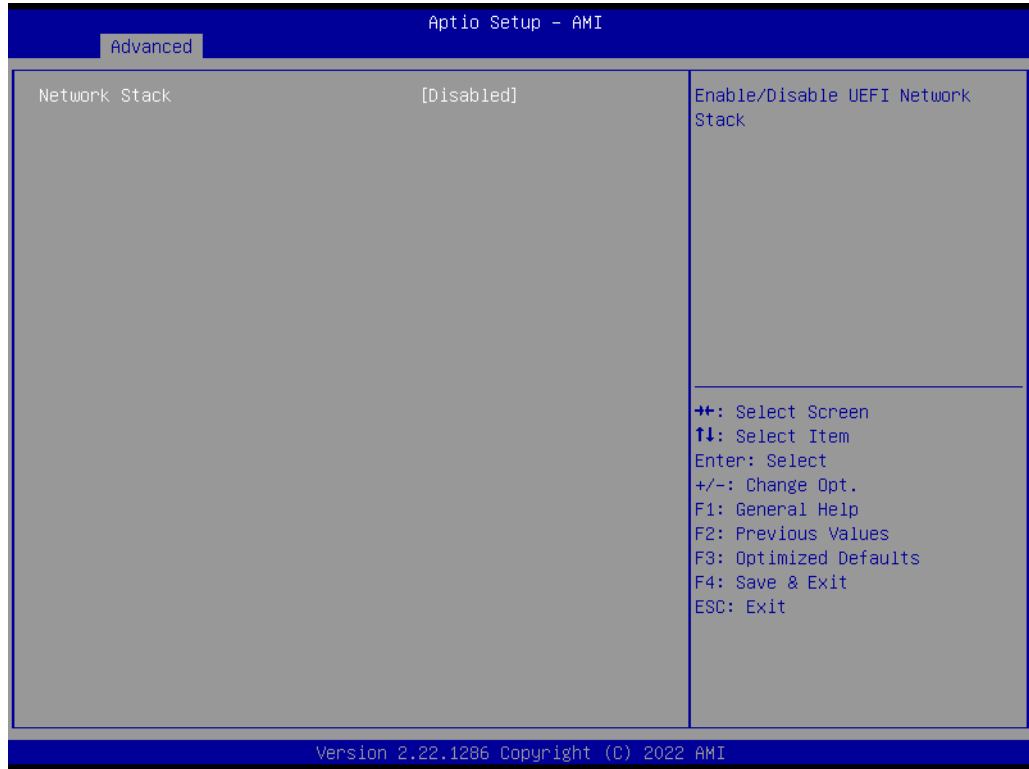


### 4.1.2.11 USB Configuration



- **Legacy USB Support**  
Enables Legacy USB support. The Auto option disables legacy support if no USB devices are connected. The Disabled option will keep USB devices available only for EFI applications.
- **XHCI Hand-off**  
This is a workaround for OS without XHCI hand-off support. The XHCI ownership change should be claimed by the XHCI driver.
- **USB Mass Storage Driver Support**  
Enable/Disable USB Mass Storage Driver Support.
- **USB transfer time-out**  
Time-out value for control, bulk, and interrupt transfers.
- **Device reset time-out**  
USB mass storage device start unit command time-out.
- **Device power-up delay**  
Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses the default value: for a Root port it is 100 ms, for a Hub port the delay is taken from the Hub descriptor.

### 4.1.2.12 Network Stack Configuration



- **Network Stack**  
Enable/Disable UEFI Network Stack.

### 4.1.2.13 NVMe Configuration

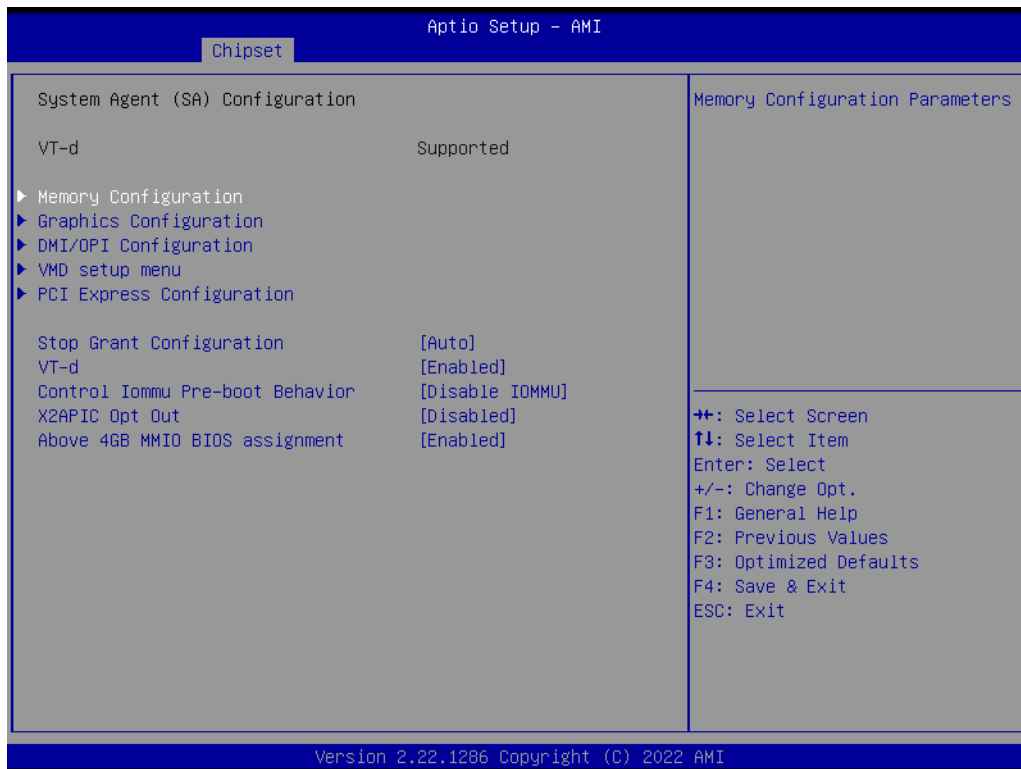


### 4.1.3 Chipset Configuration

Select the Chipset tab from the MIO-4370 setup screen to enter the Chipset BIOS Setup screen. You can display a Chipset BIOS Setup option by highlighting it using the <Arrow> keys. All Plug and Play BIOS Setup options are described in this section. The Plug and Play BIOS Setup screen is shown below.

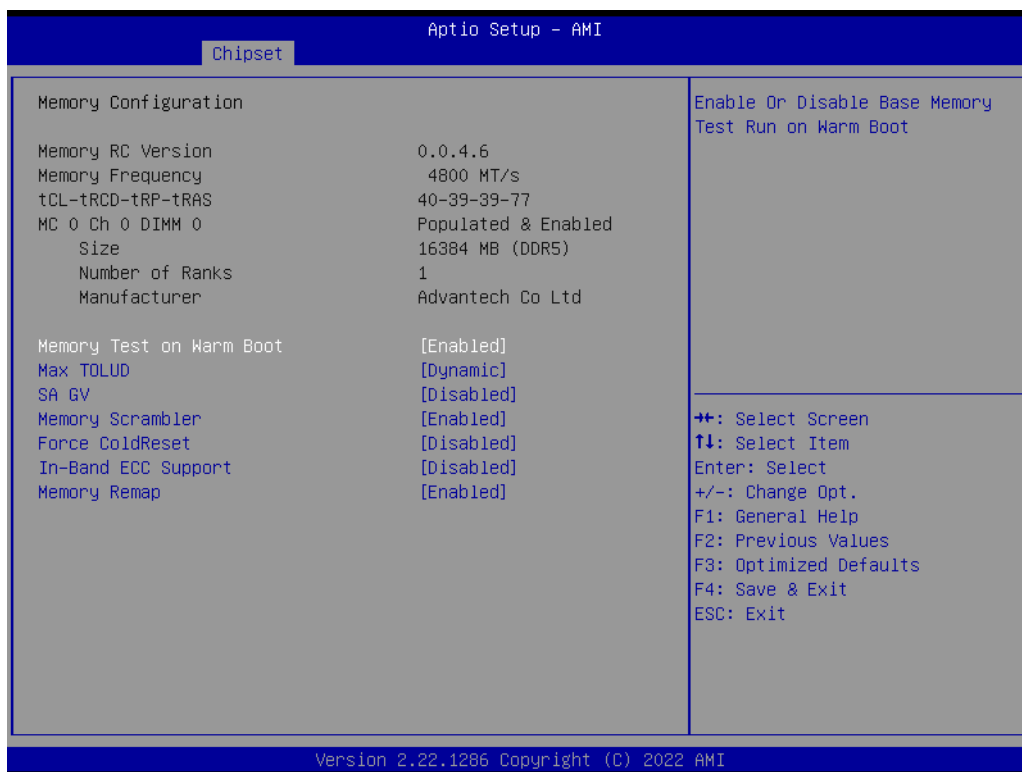


### 4.1.3.1 System Agent (SA) Configuration



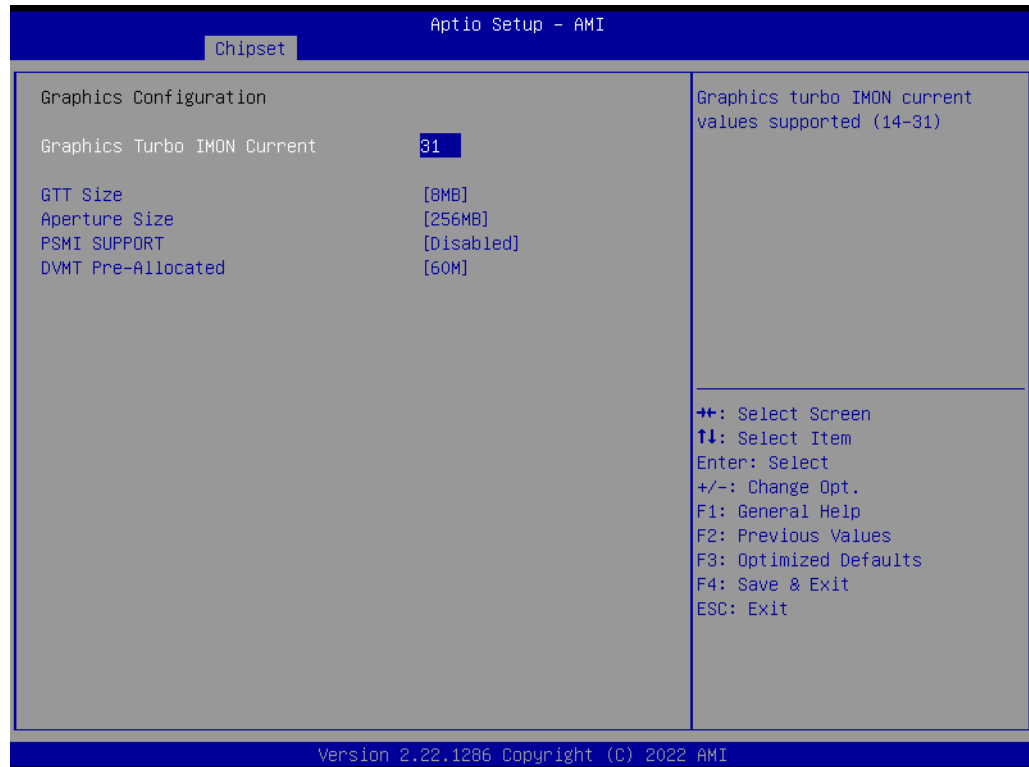
- **Memory Configuration**  
Memory Configuration Parameters.
- **Graphics Configuration**  
Graphics Configuration Parameters.
- **DMI/OPI Configuration**  
Control various DMI functions.
- **VMD setup menu**  
VMD Configuration settings.
- **PCI Express Configuration**  
PCI Express Configuration Settings.
- **Stop Grant Configuration**  
Automatic/Manual stop grant configuration.
- **VT-d**  
VT-D capability.
- **Control Iommu Pre-boot Behavior**  
Enable IOMMU in the Pre-boot environment.
- **X2APIC Opt Out**  
Enable/Disable X2APIC Opt Out Bit.
- **Above 4GB MMIO BIOS assignment**  
Enable/Disable above 4GB Memory Mapped IO BIOS assignment.

## ■ Memory Configuration



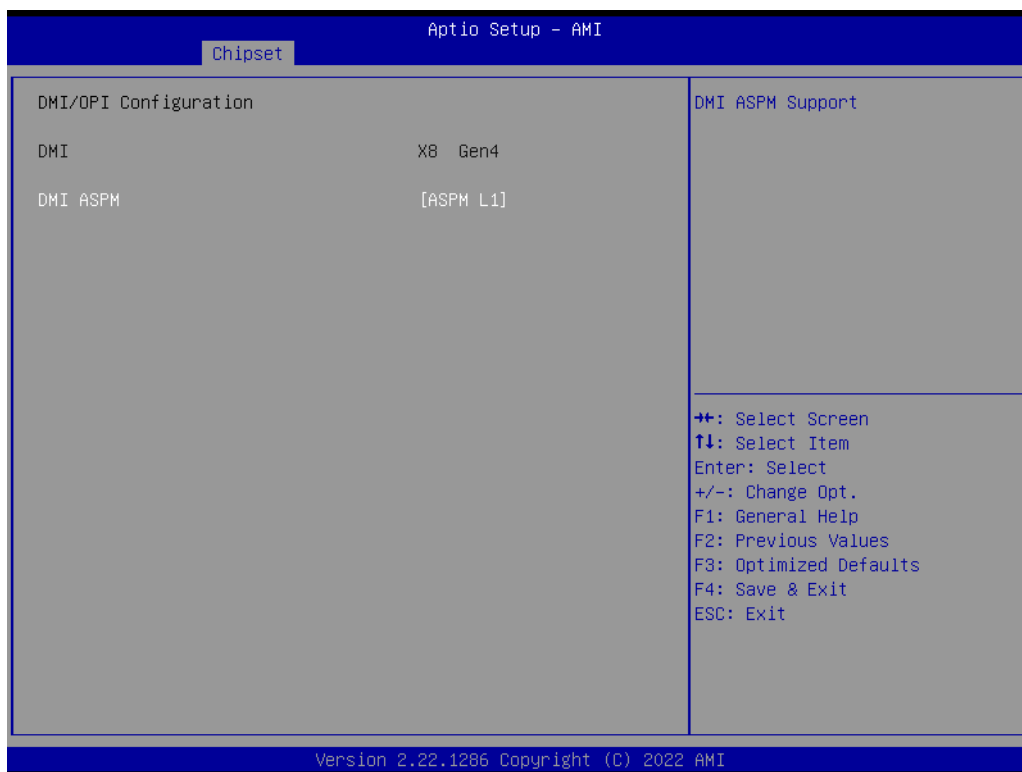
- **Memory Test on Warm Boot**  
Enable/Disable Base Memory Test Run on Warm Boot.
- **Max TOLUD**  
Maximum Value of TOLUD.
- **SA GV**  
System Agent Geyserville.
- **Memory Scrambler**  
Enable/Disable Memory Scrambler support.
- **Force ColdReset**  
Force ColdReset OR Choose MrcColdBoot mode.
- **In-Band ECC Support**  
Enable/Disable In-Band ECC.
- **Memory Remap**  
Enable/Disable Memory Remap above 4GB.

## ■ Graphics Configuration



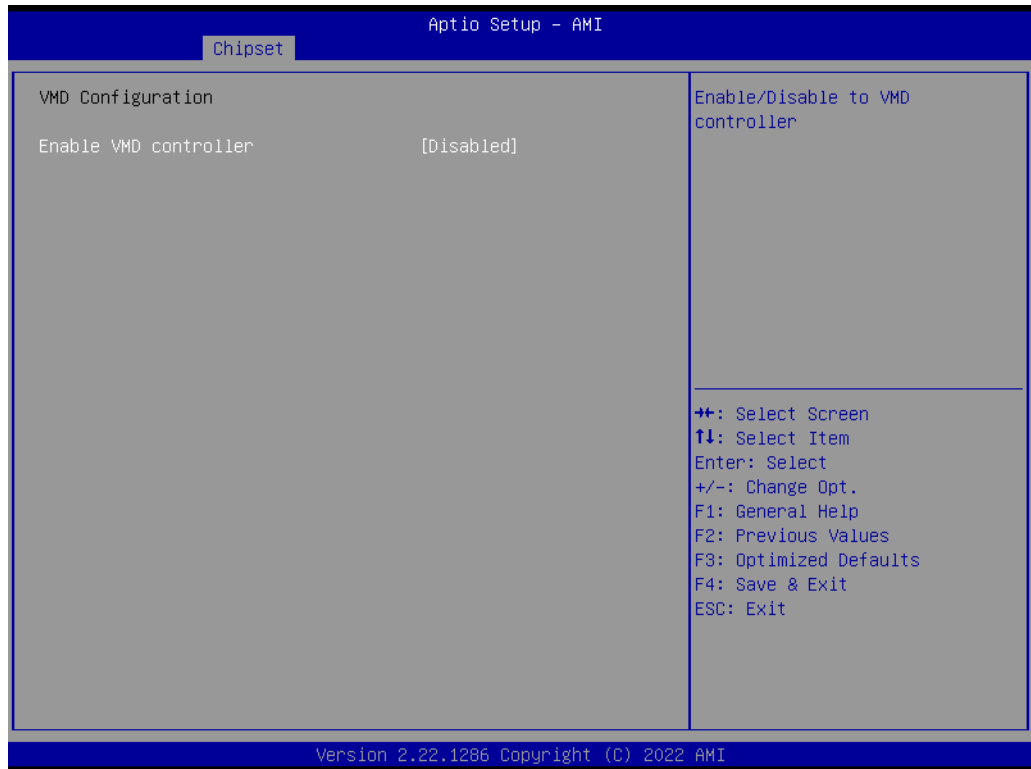
- **Graphics Turbo IMON Current**  
Graphics turbo IMON current values supported.
- **GTT Size**  
Select the GTT Size.
- **Aperture Size**  
Select the Aperture Size.
- **PSMI Support**  
Enable/Disable PSMI.
- **DVMT Pre-Allocated**  
Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.

## ■ DMI/OPI Configuration



- **DMI ASPM**  
DMI ASPM Support.

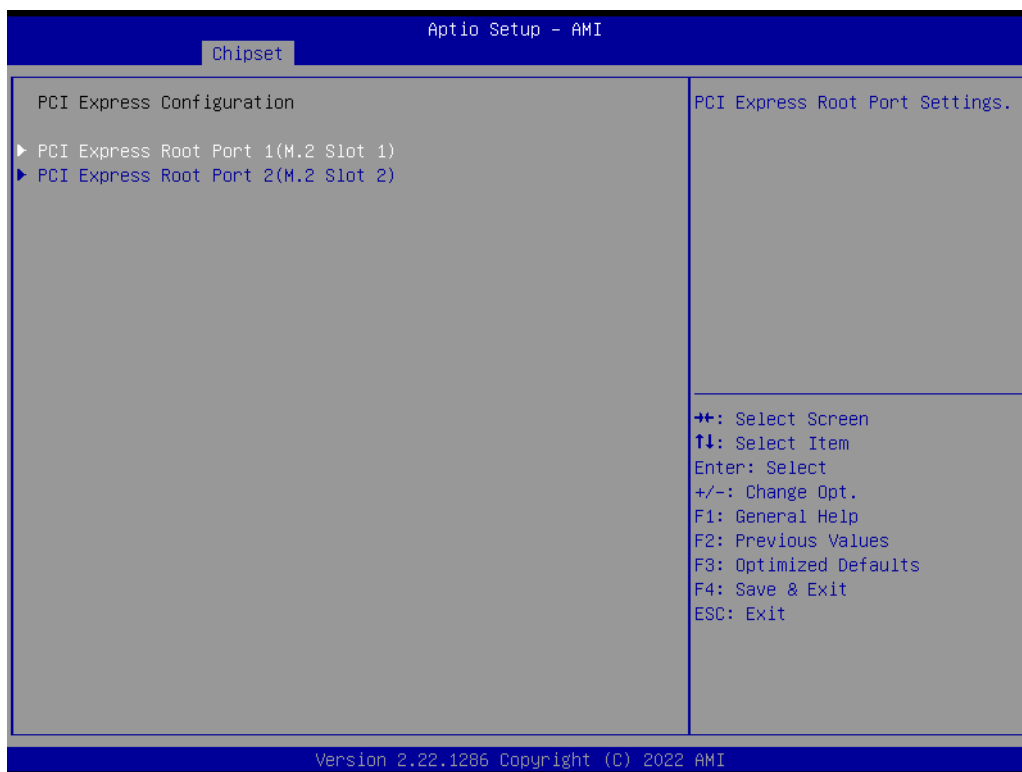
## ■ VMD Setup Menu



- **Enable VMD Controller**  
Enable/Disable VMD Controller.

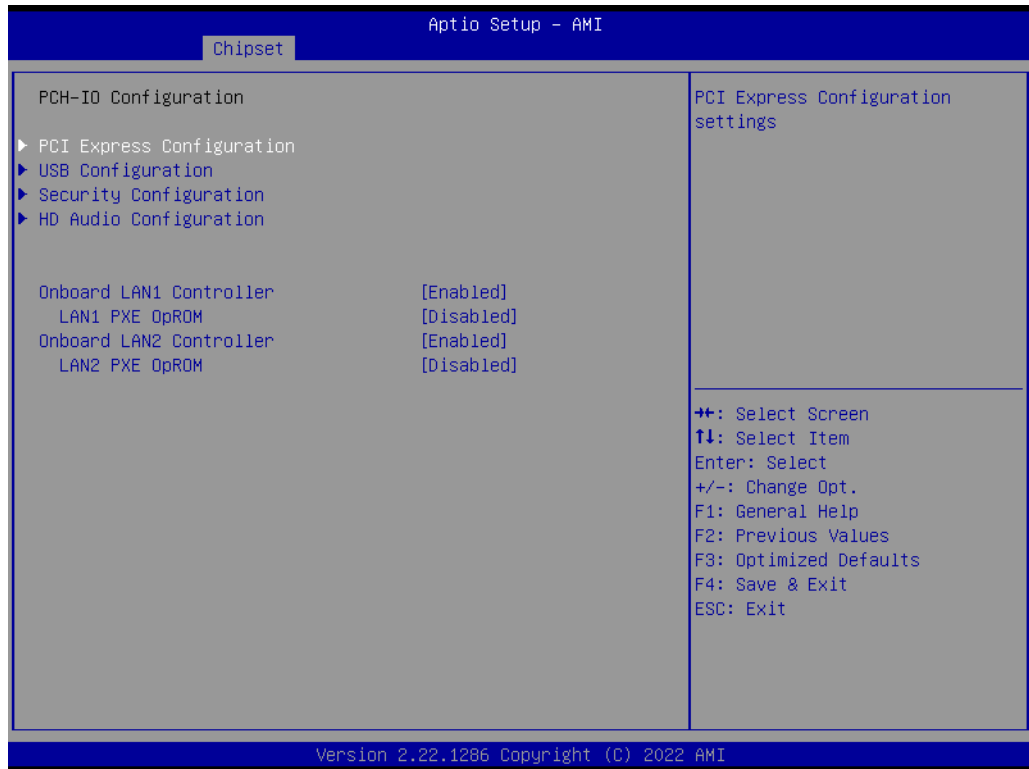


## ■ PCI Express Configuration



- **PCI Express Root Port 1/2**  
PCI Express Port 1/2 Settings.

### 4.1.3.2 PCH-IO Configuration



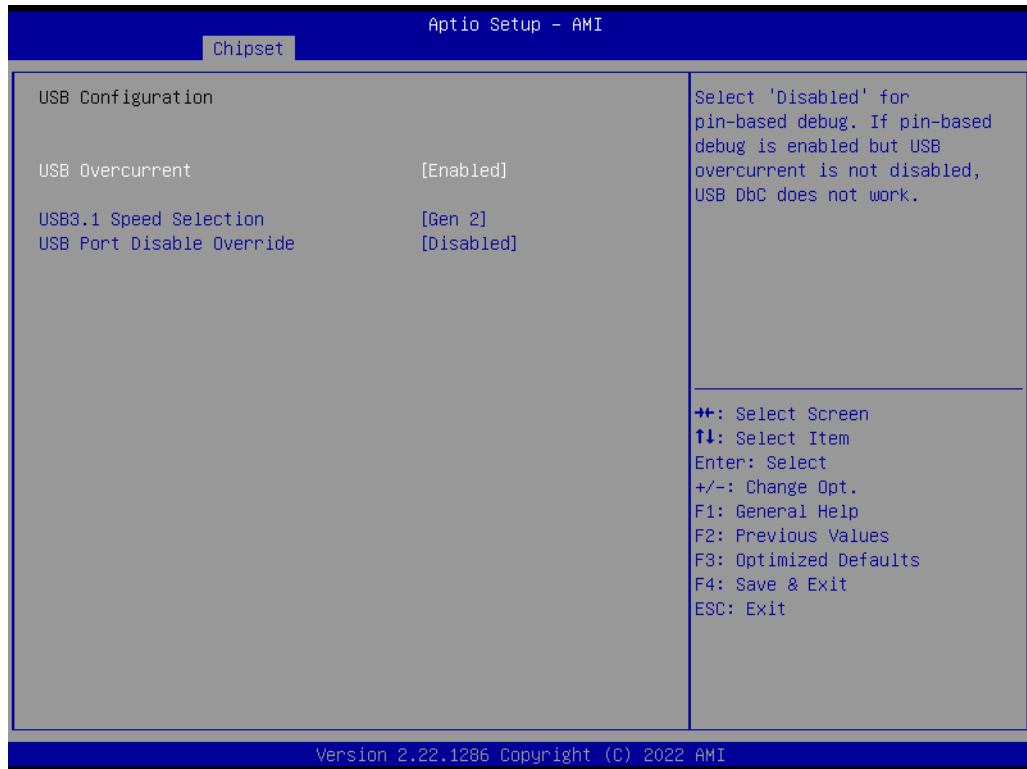
- **PCI Express Configuration**  
PCI Express Configuration Settings.
- **USB Configuration**  
USB Configuration Settings.
- **Security Configuration**  
Security Configuration Settings.
- **HD Audio Configuration**  
HD Audio Subsystem Configuration Settings.
- **Onboard LAN1 Controller**  
Select to Enable or Disable onboard LAN1 Controller.
- **LAN1 PXE ROM**  
Enable or disable boot option for LAN1 Controller.
- **Onboard LAN2 Controller**  
Select to Enable or Disable onboard LAN2 Controller.
- **LAN2 PXE ROM**  
Enable or disable boot option for LAN2 Controller.
- **Restore AC Power Loss**  
Specify what state to go to when power is re-applied after a power failure (G3 state).

## ■ PCI Express Configuration



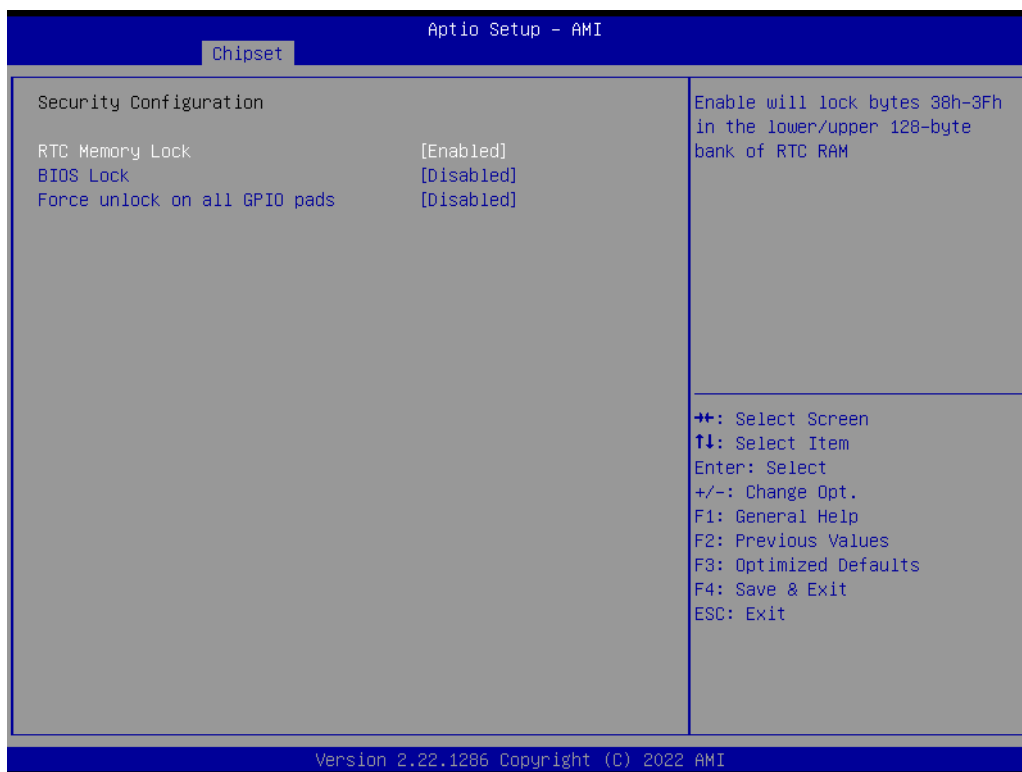
- **DMI Link ASPM Control**  
This item controls Active State Power Management of the DMI Link.
- **PCI Express Root Port 3**  
PCI Express Port 3 Settings.

## ■ USB Configuration



- **USB Overcurrent**  
Select 'Enabled' if Overcurrent functionality is used.
- **USB3.1 Speed Selection**  
USB 3.1 Speed selection; GEN1 or GEN2.
- **USB Port Disable Override**  
Selectively Enable/Disable the corresponding USB Port from reporting a Device Connection to the Controller.

## ■ Security Configuration



- **RTC Memory Lock**  
Enable will lock bytes 38h-3Fh in the lower/upper 128-byte bank of RTC RAM.
- **BIOS Lock**  
Enable or Disable the PCH BIOS Lock Enable feature.
- **Force unlock on all GPIO pads**  
If Enabled BIOS will force all GPIO pads to be in the unlock state.

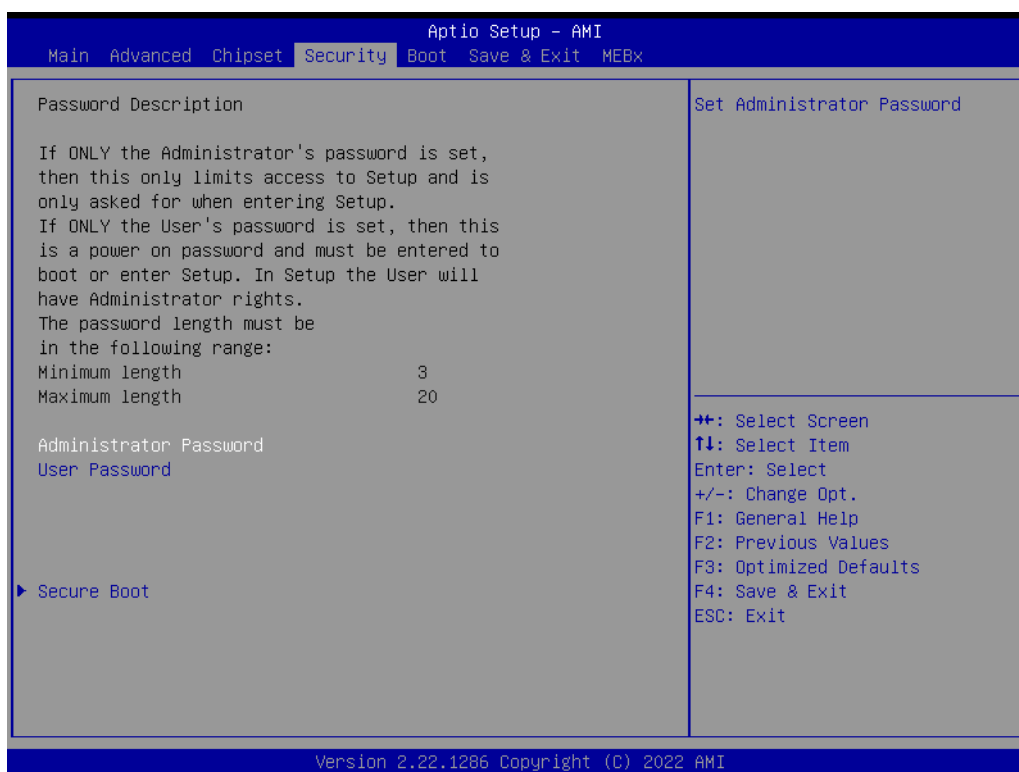
## ■ HD Audio Configuration



### – HD Audio

Control Detection of the HD-Audio device. Disabled = HDA will be unconditionally disabled. Enabled = HDA will be unconditionally Enabled.

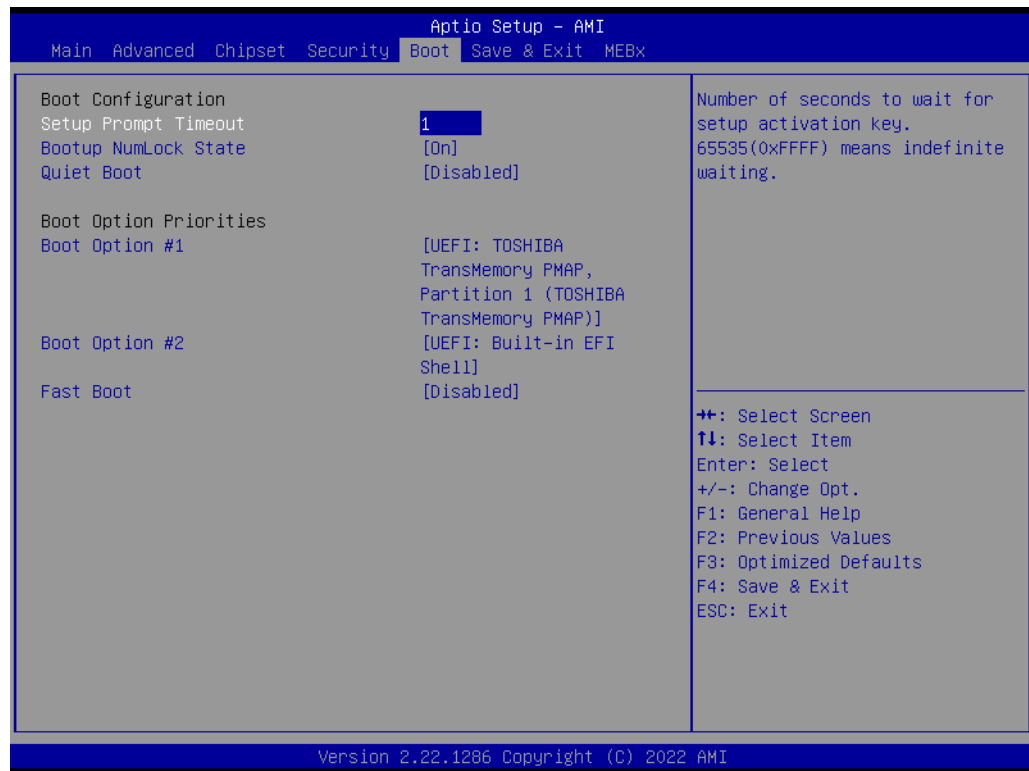
## 4.1.4 Security



Select Security Setup from the MIO-4370 Setup main BIOS setup menu. All Security Setup options, such as password protection and virus protection are described in this section. To access the sub-menu for the following items, select the item and press <Enter>:

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

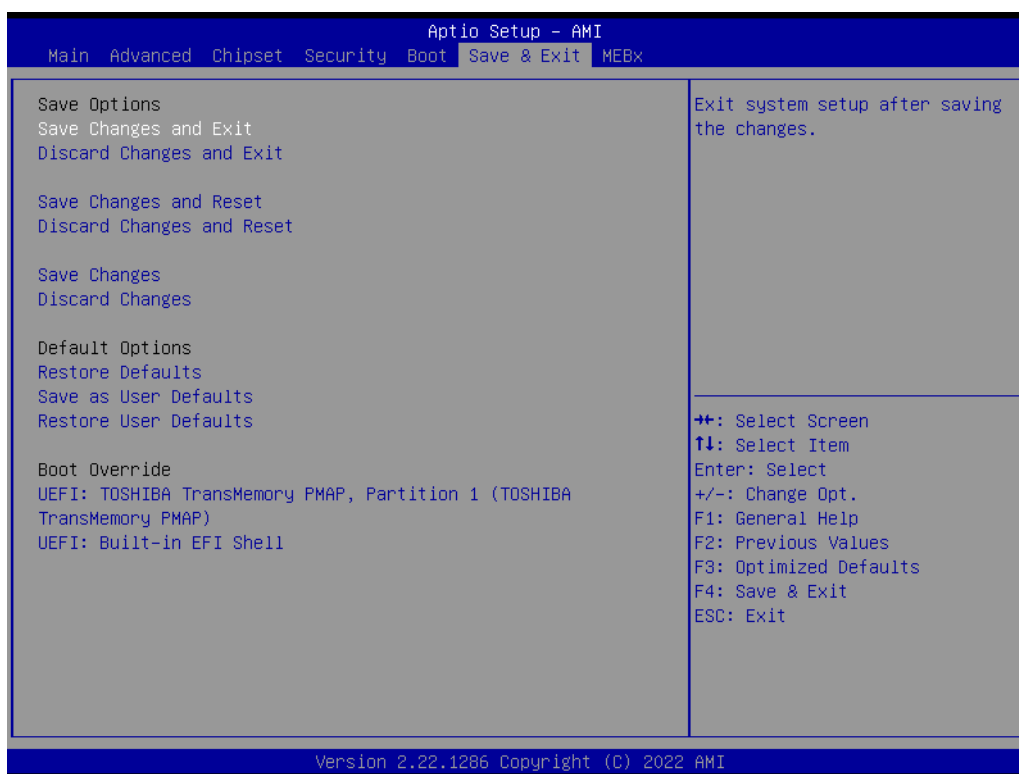
## 4.1.5 Boot



- **Setup Prompt Timeout**  
Number of seconds that the firmware will wait before initiating the original default boot selection. A value of 0 indicates that the default boot selection is to be initiated immediately on boot. A value of 65535(0xFFFF) indicates that firmware will wait for user input before booting. This means the default boot selection is not automatically started by the firmware.
- **Bootup NumLock State**  
Select the keyboard NumLock state.
- **Quiet Boot**  
Enables or disables Quiet Boot option.
- **Boot Option #1**  
Sets the system boot order.
- **Fast Boot**  
Enables or disables boot with initialization of a minimal set of devices required to launch the active boot option. Has no effect for BBS boot options.



## 4.1.6 Save & Exit



- **Save Changes and Exit**  
This item allows you to exit system setup after saving the changes.
- **Discard Changes and Exit**  
This item allows you to exit system setup without saving any changes.
- **Save Changes and Reset**  
This item allows you to reset the system after saving the changes.
- **Discard Changes and Reset**  
This item allows you to reset system setup without saving any changes.
- **Save Changes**  
This item allows you to save changes done so far to any of the options.
- **Discard Changes**  
This item allows you to discard changes done so far to any of the options.
- **Restore Defaults**  
This item allows you to restore/load default values for all the options.
- **Save as User Defaults**  
This item allows you to save the changes done so far as user defaults.
- **Restore User Defaults**  
This item allows you to restore the user defaults to all the options.
- **Boot Override**  
Boot device select can override your boot priority.

## 4.1.7 MEBx



- **MEBx**  
MEBx Login. For all other iAMT Configurations and Settings.

# Appendix **A**

System I/O Ports

## A.1 System I/O Ports

**Table A.1: System I/O Ports**

<b>Addr. Range (Hex)</b>	<b>Device</b>
00h-1Fh	DMA Controller
20h-2Dh	Interrupt Controller
2Eh-2Fh	Motherboard resources
30h-3Dh	Interrupt Controller
40h-43h	Timer/Counter
4Eh-4Fh	Motherboard resources
50h-53h	Timer/Counter
60h-6Fh	8042 (keyboard controller) / NMI Controller / Microcontroller
70h-7Fh	Real-time Controller
80h-8Fh	Debug Port /Reserved
90h-9Fh	Debug Port / Reset Generator
A0h-ADh	Interrupt Controller
B0h-B1h	Interrupt Controller
B4h-BDh	Power Management
200h-27Fh	CANBus Controller
280h-28Fh	I2C Controller
290h-29Fh	EC Index port and Data port
2A0h-2BFh	GPIO Controller
2C0h-2DFh	SMBus Controller
2F0h-2F7h	EC/PMC Controller
2F8h-2FFh	Communications Port (COM2)
300h-37Fh	CANBus Controller
3F8h-3FFh	Communications Port (COM1)
480h-4CFh	Motherboard resources
4D0h-4D1h	Interrupt Controller
680h-69Fh	Motherboard resources
A00h-AFFh	Motherboard resources
164Eh-164Fh	Motherboard resources
1800h-18FFh	Motherboard resources
CF9h-CF9h	Reset Generator

## A.2 DMA Channel Assignments

**Table A.2: DMA Channel Assignments**

Channel	Function
0	Available
1	Available
2	Available
3	Available
4	Direct memory access controller
5	Available
6	Available
7	Available

## A.3 1st MB Memory Map

**Table A.3: 1st MB Memory Map**

Addr. Range (Hex)	Device
E0000h - FFFFFh	System board
D0000h - DFFFFh	PCI bus
C0000h - CFFFFh	System board
A0000h - BFFFFh	PCI bus
A0000h - BFFFFh	Intel® HD Graphics
00000h - 9FFFFh	System board

## A.4 Interrupt Assignments

**Table A.4: Interrupt Assignments**

Interrupt#	Interrupt Source
NMI	Parity error detected
IRQ0	System timer
IRQ1	Using SERIRQ, keyboard emulation
IRQ2	Interrupt from controller 2 (cascade)
IRQ3	Communications port (COM2)
IRQ4	Communications port (COM1)
IRQ5	EC watch dog
IRQ6	CANBus controller
IRQ7	Available
IRQ8	System CMOS / real-time clock
IRQ9	Microsoft ACPI-compliant system
IRQ10	Available
IRQ11	Display controller
IRQ12	Available
IRQ13	Numeric data processor
IRQ14	GPIO controller
IRQ15	Reserved

**ADVANTECH**

*Enabling an Intelligent Planet*

**[www.advantech.com](http://www.advantech.com)**

Please verify specifications before quoting. This guide is intended for reference purposes only.

All product specifications are subject to change without notice.

No part of this publication may be reproduced in any form or by any means, such as electronically, by photocopying, recording, or otherwise, without prior written permission from the publisher.

All brand and product names are trademarks or registered trademarks of their respective companies.

©Advantech Co., Ltd. 2023