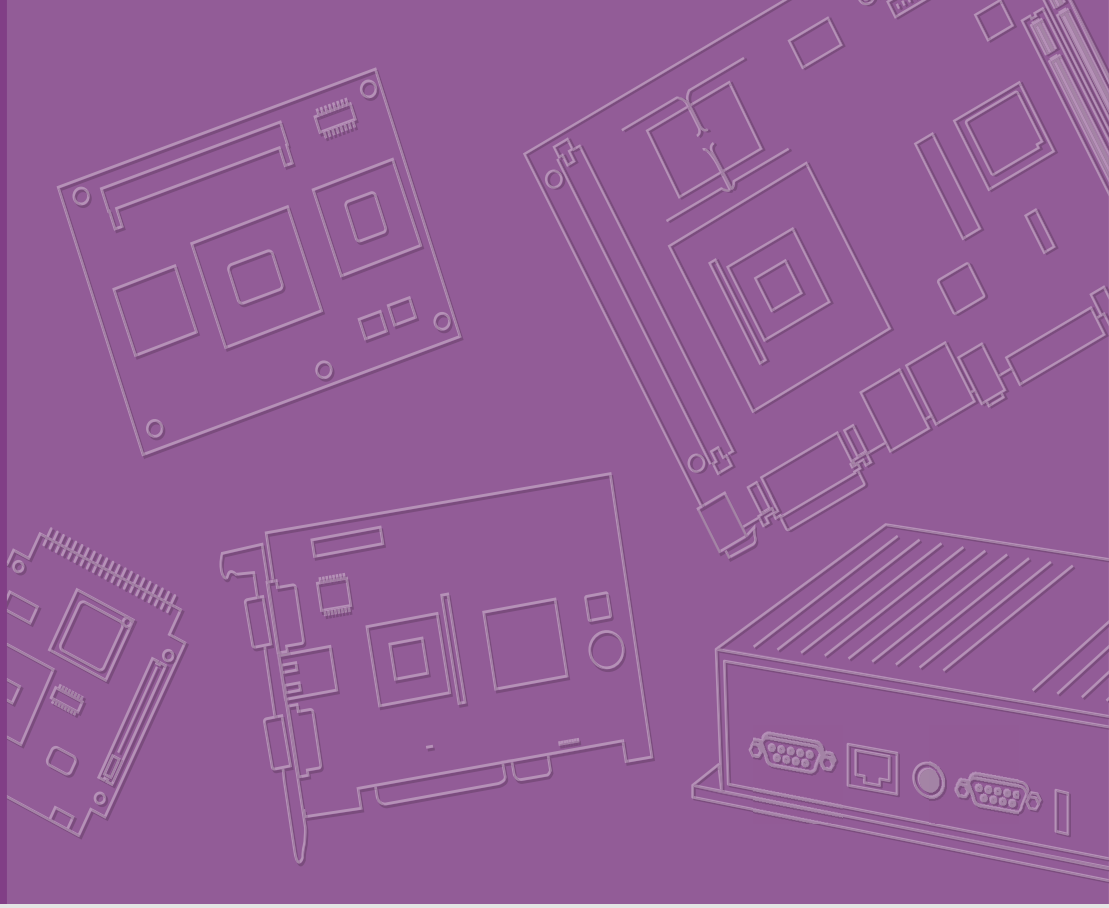


User Manual

MIO-2364

Intel® Core™ i3-N305 Processor, Intel® N-Series Processor, and Intel® Atom™ x7000E Series Processor
2.5" Pico-ITX SBC
(Code name: Alder Lake N)

ADVANTECH

Enabling an Intelligent Planet

Copyright

The documentation and the software included with this product are copyrighted 2024 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® is a trademark of Intel® Corporation.

AMI is a trademark of American Megatrends, Inc.

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

Microsoft Windows® and DirectX® 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:

http://www.advantech.com

http://www.advantech.com/eplatform

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

http://support.advantech.com/

This manual is for the MIO-2364.

Part No. 2006236400 Edition 1

February 2024

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.

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 manflatterer. Discard used batteries according to the manufacturer's instructions.*

Technical Support and Assistance

1. Visit the Advantech website at 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 you begin installing your card, please make sure that the following materials have been shipped:

- 1 x MIO-2364 SBC
- 1 x SATA Cable 30cm (P/N: 1700006291)
- 1 x SATA Power Cable 15cm (P/N: 1700027546-01)
- 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 Cables 20cm (P/N: 1700030404-01)
- 1 x AT Power Cable 12 cm (P/N: 1700019705-01)
- 1 x Active Cooler for 15W (P/N: 1970005708T001)
- 1 x Passive Heatsink for 12W/6W (P/N: 1970005779T001)
- 1 x Startup Manual (P/N: 2046236400)
- 4 x Screw Kits (P/N: 96662364000)
- 1 x DeviceOn Package

If any of these items are missing or damaged, contact your distributor or sales representative immediately.

Optional Accessories

Part number	Description
TBU	Heat spreader for the MIO-2364
1700034783-01	PoE/PD IN cable
1700034784-01	PoE/PD OUT cable

Contents

Chapter 1 General Information 1

1.1 Introduction 2
1.2 Specifications 2
Table 1.1: Specifications 2
1.3 Block Diagram 4

Chapter 2 Mechanical 5

2.1 Introduction 6
2.2 Board Layout: Dimensions 6
Figure 2.1 MIO-2364 Mechanical Drawing (Top Side) 6
Figure 2.2 MIO-2364 Mechanical Drawing (Bottom Side) 6
Figure 2.3 MIO-2364 Mechanical Drawing (Coastline) 7
Figure 2.4 MIO-2364 Mechanical Drawing (with Cooler) 7
Figure 2.5 MIO-2364 Mechanical Drawing (with Heatsink) 8
2.3 Quick Installation Guide 9
2.3.1 Cooler 9
2.3.2 Heatsink 10

Chapter 3 Installation 11

3.1 Jumpers & Switches 12
Table 3.1: Jumpers & Switches 12
3.2 Connectors 12
Table 3.2: Connectors 12
3.3 Locating Connectors 13
Figure 3.1 MIO-2364 Connector Locations (Top Side) 13
Figure 3.2 MIO-2364 Connector Locations (Bottom Side) 13
3.4 Setting Jumpers 14
3.4.1 Panel Voltage Selection Jumper: VDD1 14
Table 3.3: Panel Voltage Selection Jumper: VDD1 14
3.4.2 AT Mode / Load BIOS default: J1 14
Table 3.4: AT Mode / Load BIOS default: J1 14
3.5 Connectors (Internal) 15
3.5.1 Smart FAN Internal Connector: FAN 15
Table 3.5: Smart FAN Internal Connector: FAN 15
3.5.2 M.2 E-Key Connector: M2_1 15
Table 3.6: M.2 E-Key Connector: M2_1 15
3.5.3 I2C Internal Connector: CN3 17
Table 3.7: I2C Internal Connector: CN3 17
3.5.4 RTC Battery Connector: BAT1 17
Table 3.8: RTC battery Connector: BAT1 17
3.5.5 COM-Port Internal Connector 1: COM1 18
Table 3.9: COM-Port Internal Connector 1: COM1 18
3.5.6 COM-Port Internal Connector 2: COM2 18
Table 3.10: COM-Port Internal Connector 2: COM2 18
3.5.7 Front Panel Internal Connector: CN1 19
Table 3.11: Front Panel Internal Connector: CN1 19
3.5.8 GPIO Internal Connector: CN2 19
Table 3.12: GPIO Internal Connector: CN2 19
3.5.9 M.2 B-Key Connector: M2_B1 20
Table 3.13: M.2 B-Key Connector: M2_B1 20
3.5.10 LVDS Connector: LVDS1 22

Table 3.14: LVDS Connector: LVDS1 22
3.5.11 Panel Inverter Connector: BL1 23
Table 3.15: Panel Inverter Connector: BL1 23
3.5.12 Panel Inverter Connector: POE_PWR1 23
Table 3.16: Panel Inverter Connector: POE_PWR1 23
3.5.13 DC Power Input Connector (180D): CN4 24
Table 3.17: DC Power Input Connector (180D): CN4 24
3.5.14 DC Power Input Connector (90D): CN5 24
Table 3.18: DC Power Input Connector (90D): CN5 24
3.5.15 USB 2.0 Dual-Port Internal Connector: USB1 24
Table 3.19: USB 2.0 Dual-Port Internal Connector: USB1 24
3.6 Audio Internal Connector: AUDIO1 25
Table 3.20: Audio Internal Connector: AUDIO1 25

Chapter 4 AMI BIOS Setup 27

4.1 Entering Setup 29
4.1.1 Main Setup 29
4.1.2 Advanced BIOS Features Setup 30
4.1.3 Chipset Configuration 50
4.1.4 Security 61
4.1.5 Boot 62
4.1.6 Save & Exit 63

Appendix A System Assignments 65

A.1 System I/O Ports 66
Table A.1: System I/O Ports 66
A.2 1st MB Memory Map 66
Table A.2: 1st MB Memory Map 66
A.3 Interrupt Assignments 67
Table A.3: Interrupt Assignments 67

Chapter 1

General Information

This chapter gives background information on the MIO-2364.

Sections include:

- Introduction
- Specifications
- Block diagram

1.1 Introduction

MIO-2364 utilizes the 2.5" Pico-ITX SBC form factor (compact series, 100 x 72 mm) and is powered by Intel® Core™ i3-N305, Intel® N-series, or Intel® Atom™ x7000E Series processors. MIO-2364 offers embedded iManager 3.0, SUSI 4.0, and WISE-DeviceOn, created by Advantech, to monitor and control system operation effectively and remotely.

1.2 Specifications

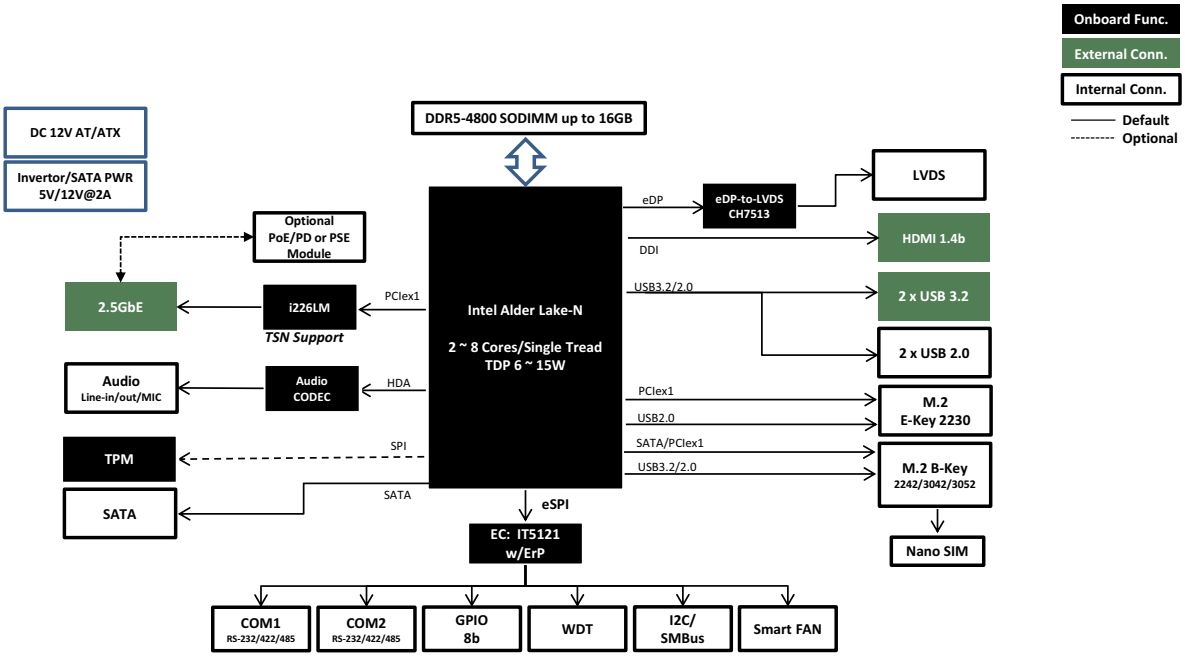
Table 1.1: Specifications

Platform	Processor	i3-N305	N97	x7211E
	Max. Frequency	3.80 GHz	3.60 GHz	3.20 GHz
	Cores/Threads	8/8	4/4	2/2
	LLC	6MB	6MB	6MB
	CPU TDP	15W	12W	6W
	Chipset	Intel® 300 Series Chipset (SoC Integrated)		
	BIOS	AMI EFI 256Mbit		
Memory	Technology	DDR5-4800		
	Max. Capacity	Up to 16GB		
	Channel/Socket	Single Channel / One Socket		
	ECC Support	No	No	No
Graphics	Controller	Intel® UHD Graphics		
	Max. Frequency	1.25 GHz	1.20 GHz	1.00 GHz
	Execution Units	32	24	16
	3D/HW Acceleration	DX12, OGL4.0, OCL1.2, HW Encode: HEVC/H265, AVC/H264, VP9, HW Decode: HEVC/H265, AVC/H264, VP9		
Display I/F	LCD	1 x LVDS, Dual Channel 18-/24-bit, up to 1920 x 1080		
	HDMI/DP	1 x HDMI 1.4b, up to 3840 x 2160 x 24bpp@20-30Hz		
	Multiple Displays	Dual simultaneous displays with LVDS + HDMI		
Ethernet	Controller	LAN: Intel® i226LM		
	Speed	2.5 GbE		
External I/O	Ethernet	1 x RJ-45 (optional PoE/PD, 802.3at), TSN support on x7211E only		
	VGA/HDMI/DP	-/1/-		
	USB 3.2 / USB 2.0	2/-		
Internal I/O	SATA	1 x SATA Gen III 6.0 Gbps		
	USB 2.0	2		
	Serial Bus	SMBus/I2C		
	COM Port	2 x RS-232/422/485		
	GPIO	8-bit general purpose input output I/O		
	Audio	Realtek ALC888s, Line-in/Line-out/MIC		
	Inverter	5V/12V, 2A		
	Smart Fan	12V, 0.3A (4-wire)		
	Front Panel Control	Power-On, Reset, Buzzer, SATA LED, Power LED, Case Open		

Table 1.1: Specifications				
Board Features	Watchdog Timer	0~6553 sec		
	TPM	fTPM support by Intel® Platform Trust Technology Discrete TPM 2.0 (*optional)		
	iManager 3.0	SW API for Hardware Monitor, Smart Fan Control, Brightness Control, I2C, GPIO, WDT		
Expansion	M.2 E-Key	1 x E-Key 2230 (PCIe x1, USB 2.0)		
	M.2 B-Key	1 x B-Key 2242/3042/3052 (SATA x1 or PCIe x1, USB 2.0 x1, USB 3.0 x1) w/ Nano-SIM		
Power	Supply Voltage	Vin: DC 12V +/- 10%; RTC Battery: Lithium 3V/ 210mAH		
	Connector	ATX 2-pin 180D, optional ATX 2-pin 90D		
	Power Management	AT, ATX		
	Max. Consumption	55.30W(12V)	43.50W(12V)	24.84W(12V)
	Idle Consumption	10.38W(12V)	8.32W(12V)	10.33W(12V)
Environment	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		
Certification	EMC	CE, FCC Class B		
Mechanical	Dimensions	100 x 72 mm (3.9" x 2.8")		
	Net Weight	75 g		

Note! *Support by request.*

1.3 Block Diagram



Chapter 2

Mechanical

This chapter provides mechanical information on the MIO-2364.

Sections include:

- Mechanical Drawings
- Assembly Drawings

2.1 Introduction

This chapter includes board dimensions, the standard thermal solution, and optional thermal solution along with assemby instructions.

2.2 Board Layout: Dimensions

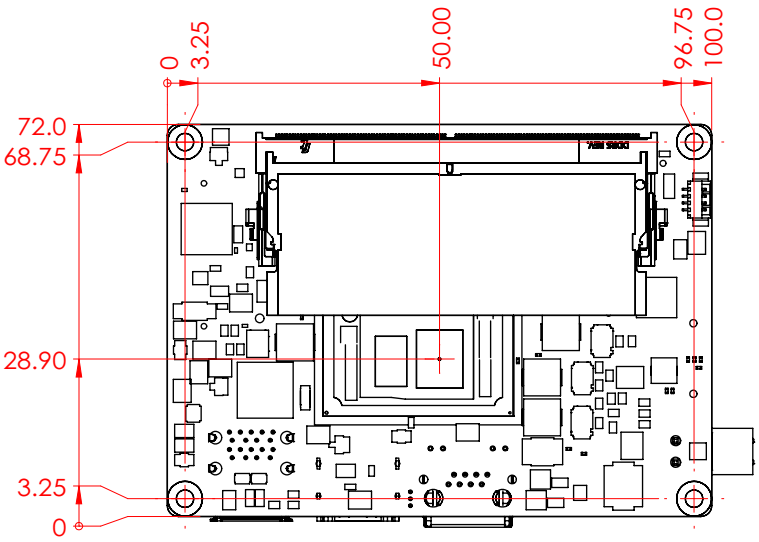


Figure 2.1 MIO-2364 Mechanical Drawing (Top Side)

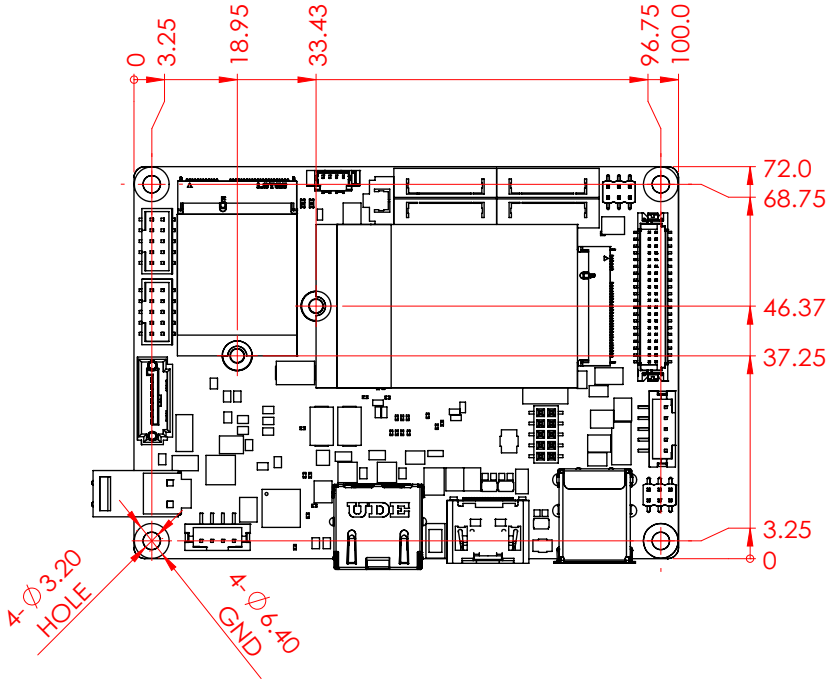


Figure 2.2 MIO-2364 Mechanical Drawing (Bottom Side)

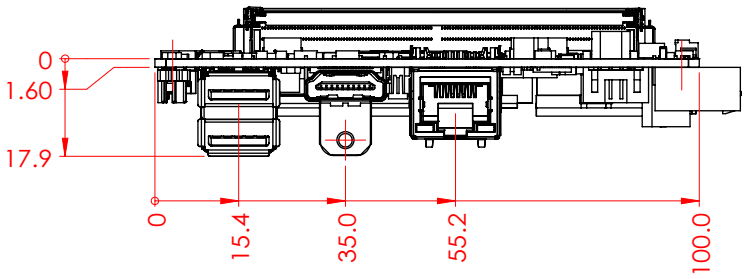


Figure 2.3 MIO-2364 Mechanical Drawing (Coastline)

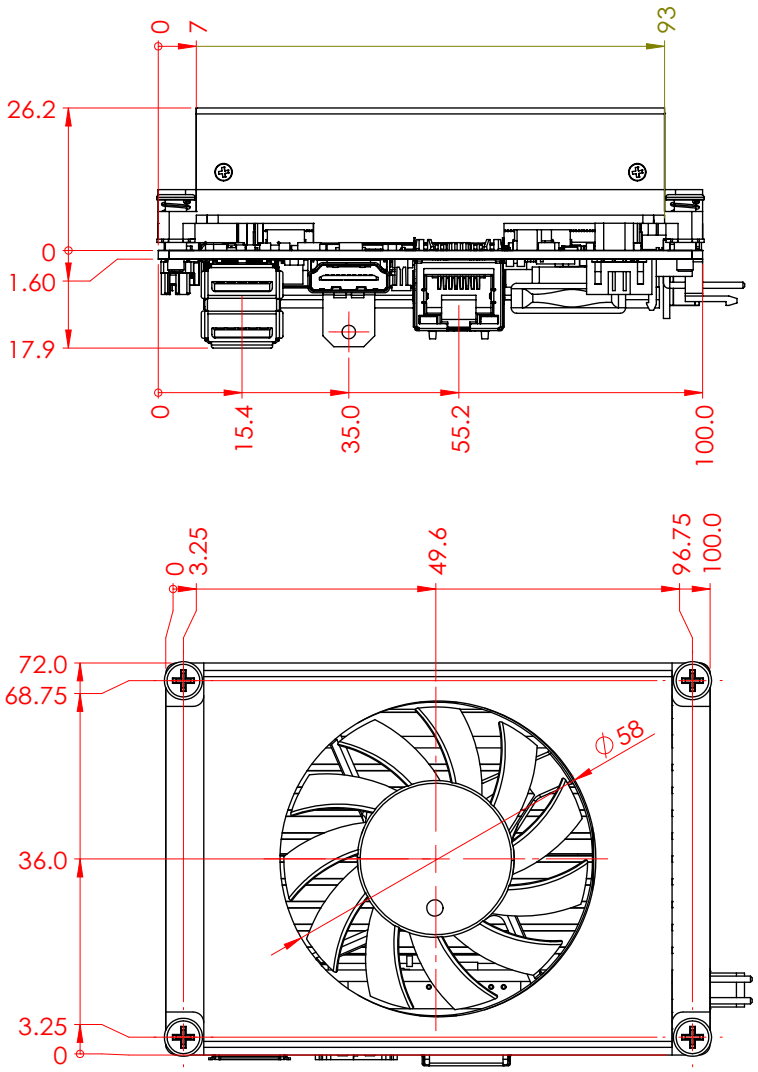


Figure 2.4 MIO-2364 Mechanical Drawing (with Cooler)

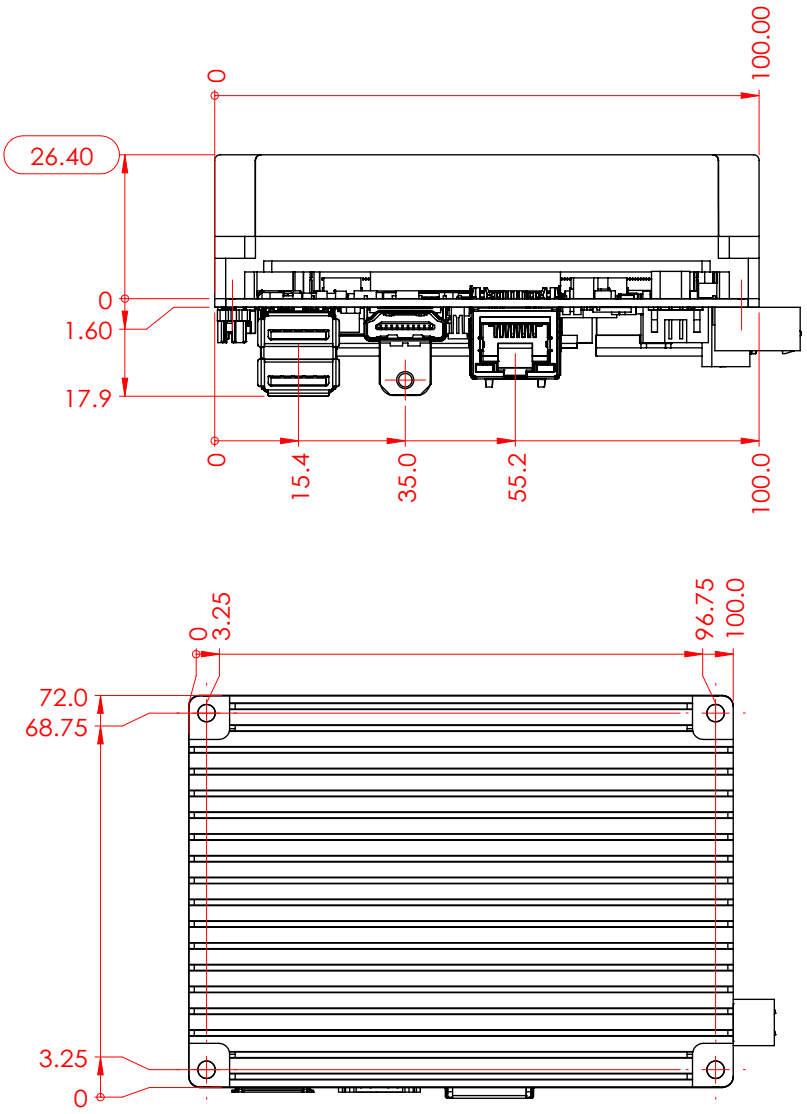


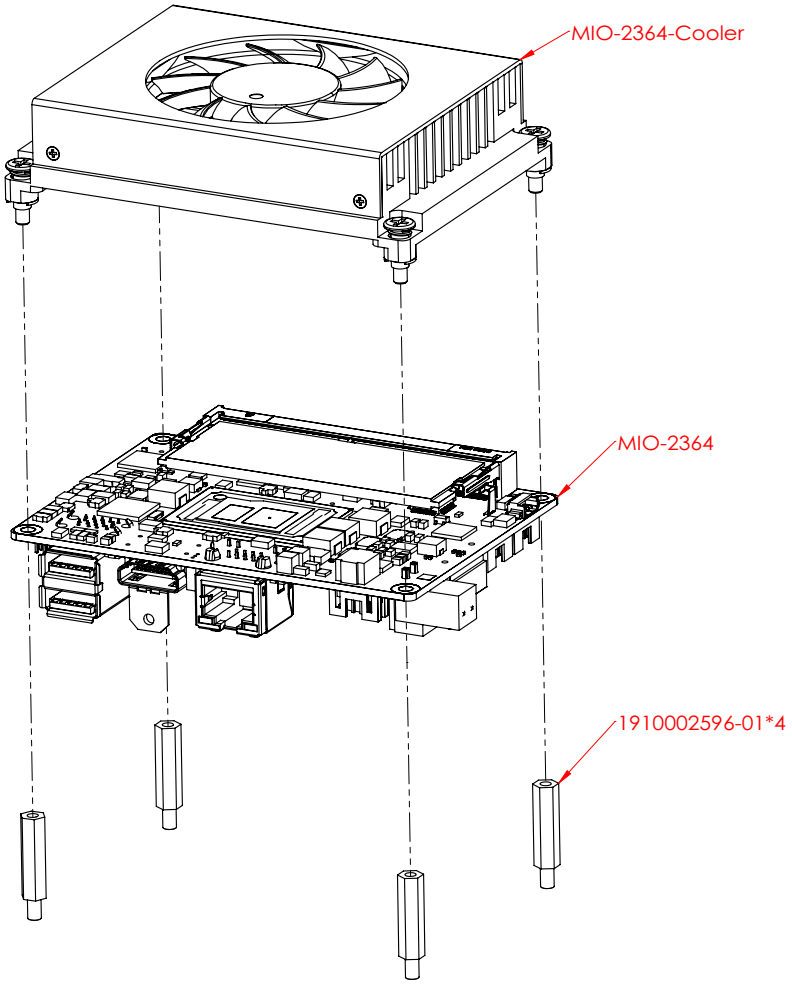
Figure 2.5 MIO-2364 Mechanical Drawing (with Heatsink)

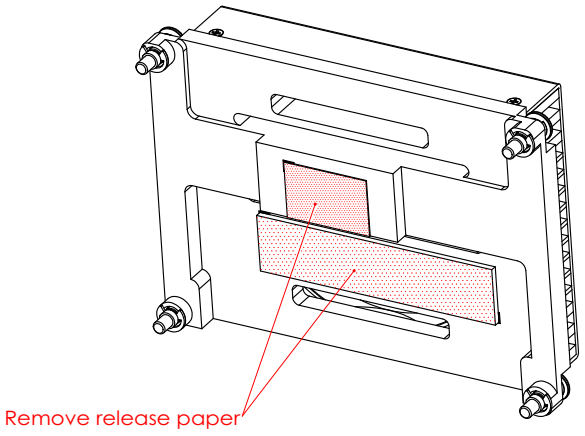
2.3 Quick Installation Guide

The MI/O compact form factor SBC is a new-generation SBC design with a variety of mechanical improvements. Here is the quick installation guide for our thermal design.

There is a heatsink in the white box inside the package. Please assemble it by following the diagrams below. Remember to remove the plastic on the thermal pad before you assemble the mechanical parts.

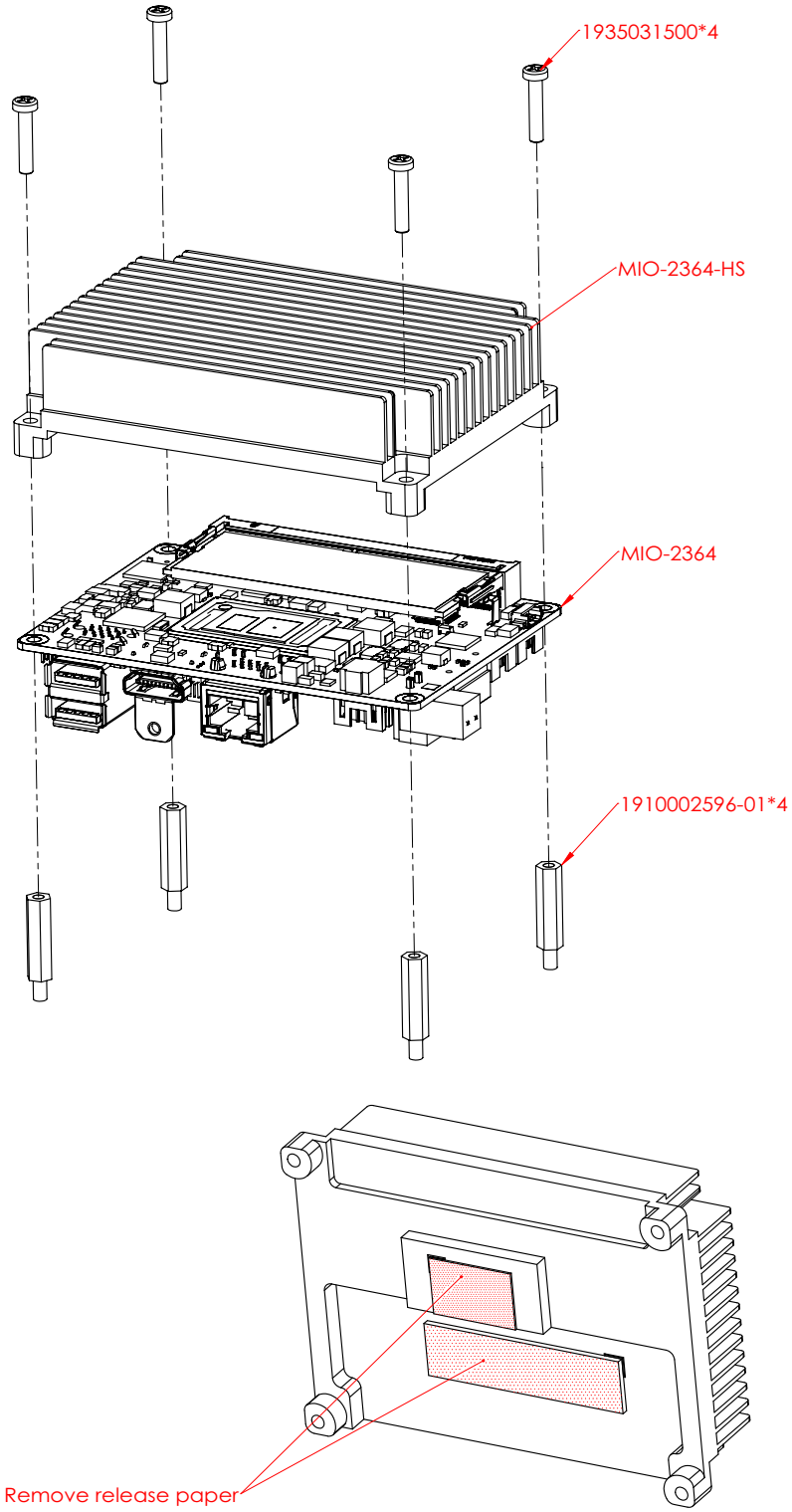
2.3.1 Cooler





COOLER -MIO-2364-Remove release paper

2.3.2 Heatsink



Heatsink -MIO-2364-Remove release paper

Chapter 3

Installation

This chapter explains the setup procedures of the MIO-2364 hardware, including instructions on setting jumpers and connecting peripherals, switches, and indicators. Be sure to read all safety precautions before you begin the installation procedure.

3.1 Jumpers & Switches

The MIO-2364 has a number of jumpers that allow you to configure your system to suit your application. The table below lists the functions of the various jumpers.

Table 3.1: Jumpers & Switches	
VDD1	Panel Voltage Selection
J1	AT Mode / Load BIOS Default

3.2 Connectors

Onboard connectors link the MIO-2364 to external devices such as hard disk drives, or a keyboard. The table below lists the function of each of the board's connectors.

Table 3.2: Connectors		
No.	**Connector**	**Description**
1	U17	DDR5 SO-DIMM 9.2mm Slot
2	FAN1	Smart FAN Internal Connector
3	M2_1	M.2 E-Key Connector
4	CN3	EC_I2C Port
5	BAT1	RTC Battery Connector
6	COM1	COM Port Internal Connector 1
7	COM2	COM Port Internal Connector 2
8	CN1	Front Panel Internal Connector
9	CN2	GPIO Internal Connector
10	VDD1	Panel Voltage Selection Jumper
11	SIM1	NANO SIM
12	M2_B1	M.2 B-Key Connector
13	LVDS1	LVDS Panel Connector
14	BL1	Panel Inverter Connector
15	J1	AT Mode / Load BIOS default
16	USB2	USB 3.2 Internal Connector
17	HDMI1	HDMI Connector
18	LAN1	RJ-45 Connector
19	POE_PWR1	POE Power Connector
20	CN4	DC Power Input Connector (180D)
21	CN5	DC Power Input Connector (90D)
22	SATA1	SATA Connector
23	USB1	USB 2.0 Internal Connector
24	AUDIO1	Audio Internal Connector
25	ESPI1	ESPI Debug Port

3.3 Locating Connectors

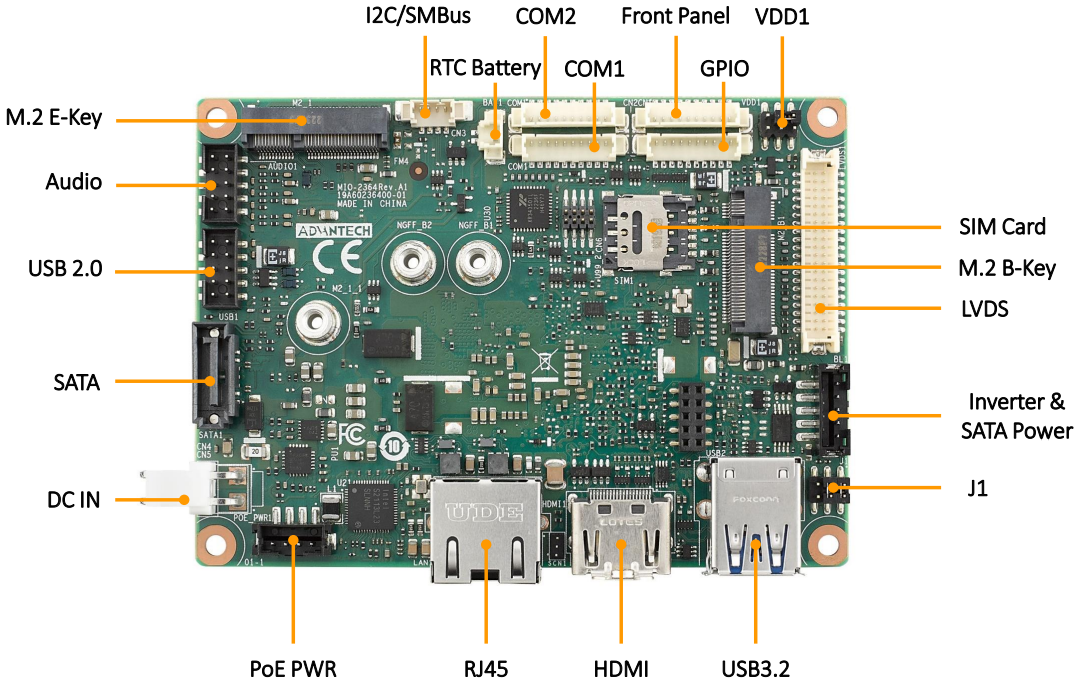


Figure 3.1 MIO-2364 Connector Locations (Top Side)

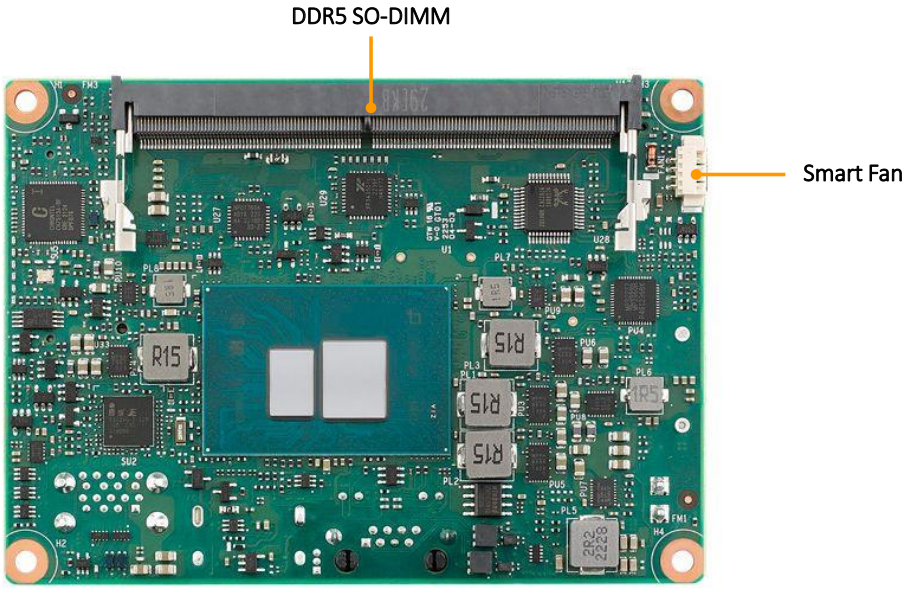
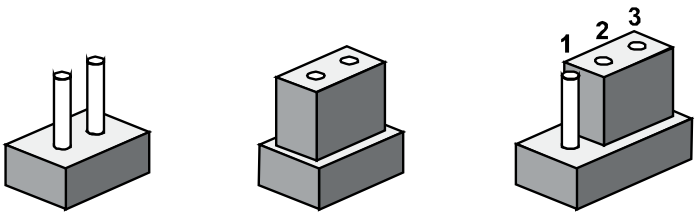


Figure 3.2 MIO-2364 Connector Locations (Bottom Side)

3.4 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:



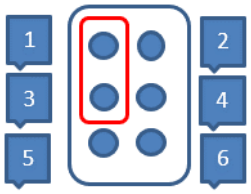
open **closed** **closed 2-3**

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 simply need a standard cable to make most connections.

3.4.1 Panel Voltage Selection Jumper: VDD1

Table 3.3: Panel Voltage Selection Jumper: VDD1

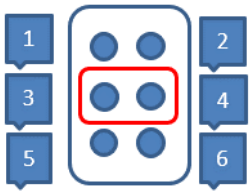
Jumper Short	Panel Voltage
1-3	+3.3V (Default)
3-5	+5V
3-4	+12V



3.4.2 AT Mode / Load BIOS default: J1

Table 3.4: AT Mode / Load BIOS default: J1

Jumper Short	Panel Function
1-2	AT_DET# (Default) 1-2 open: ATX mode 1-2 short: AT mode*
3-4	NORMAL_BIOS (Default)
5-6	LOAD_BIOS_Default: 5-6 open: Normal* 5-6 short: Load BIOS Default

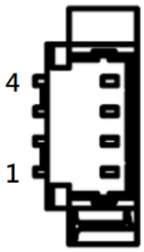


3.5 Connectors (Internal)

3.5.1 Smart FAN Internal Connector: FAN

Table 3.5: Smart FAN Internal Connector: FAN

Pin	Signal Pin Definition
1	GND
2	+V12
3	FAN_SPEED
4	FAN_V5_PWM

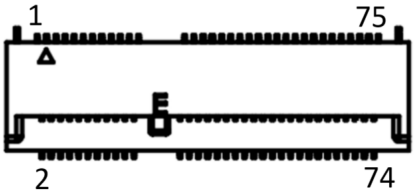


3.5.2 M.2 E-Key Connector: M2_1

Table 3.6: M.2 E-Key Connector: M2_1

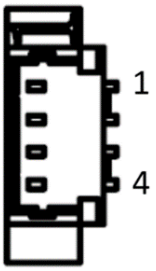
Pin	Signal Pin Definition
1	GND
2	+V3.3SB_M.2_E
3	USB8_z_P+
4	+V3.3SB_M.2_E
5	USB8_z_P-
6	NC
7	GND
8	NC
9	NC
10	NC
11	NC
12	NC
13	NC
14	NC
15	NC
16	NC
17	NC
18	GND
19	NC
20	NC
21	NC
22	NC
23	NC
32	NC

Table 3.6: M.2 E-Key Connector: M2_1	
33	GND
34	NC
35	PCIE_M2_z_TX4+
36	NC
37	PCIE_M2_z_TX4-
38	NC
39	GND
40	NC
41	PCIE_M2_RX4+
42	NC
43	PCIE_M2_RX4-
44	NC
45	GND
46	NC
47	CLK_M2E_z_PCIE+
48	NC
49	CLK_M2E_z_PCIE-
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



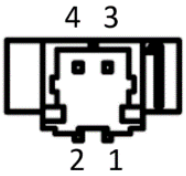
3.5.3 I2C Internal Connector: CN3

Table 3.7: I2C Internal Connector: CN3	
Pin	**Signal Pin Definition**
1	GND
2	EC_I2C0_z_DAT
3	EC_I2C0_z_CLK
4	+V33_I2CCONN



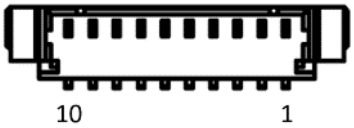
3.5.4 RTC Battery Connector: BAT1

Table 3.8: RTC battery Connector: BAT1	
Pin	**Signal Pin Definition**
1	+VBAT_b1
2	GND



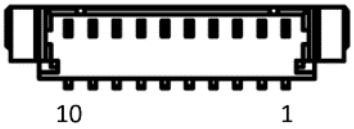
3.5.5 COM-Port Internal Connector 1: COM1

Table 3.9: COM-Port Internal Connector 1: COM1	
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



3.5.6 COM-Port Internal Connector 2: COM2

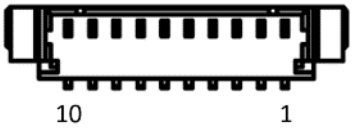
Table 3.10: COM-Port Internal Connector 2: COM2	
Pin	**Signal Pin Definition**
1	NC
2	COM2_RI#
3	COM2_DTR#
4	COM2_CTS#
5	COM2_TXD
6	COM2_RTS#
7	COM2_RXD
8	COM2_DSR#
9	COM2_DCD#
10	GND



3.5.7 Front Panel Internal Connector: CN1

Table 3.11: Front Panel Internal Connector: CN1

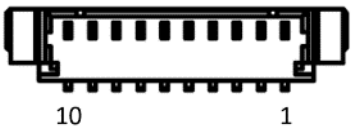
Pin	Signal Pin Definition
1	GND
2	BUZZER-
3	BUZZER+
4	NC
5	SATA_HDD_LED#
6	FP_a_PSIN#
7	FP_a_RST#
8	+V3.3
9	NC
10	+V5



3.5.8 GPIO Internal Connector: CN2

Table 3.12: GPIO Internal Connector: CN2

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

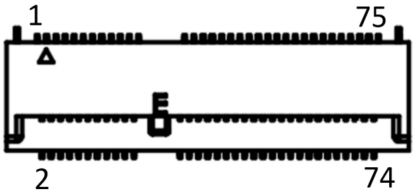


3.5.9 M.2 B-Key Connector: M2_B1

Table 3.13: M.2 B-Key Connector: M2_B1

Pin	Signal Pin Definition
1	M2B1_CFG3
2	+V3.3A_M.2_B
3	GND
4	+V3.3A_M.2_B
5	GND
6	M2B1_FULL_CARD_OFF#
7	USB_M2B1_P
8	M2B1_W_DISABLE1#
9	USB_M2B1_N
10	M2B1_LED1#
11	GND
20	M2B1_PCIE_DIS
21	M2B1_CFG0
22	M2B1_ANT_CFG
23	M2B1_WAKE_ON_WWAN#
24	M2B1_ANT_TUNER
25	M2B1_DPR
26	M2B1_W_DISABLE2#
27	GND
28	NC
29	M2B1_USB31_RX-
30	M2B1_UIM_RESET
31	M2B1_USB31_RX+
32	M2B1_UIM_CLK
33	GND
34	M2B1_UIM_DATA
35	M2B1_USB31_TX-
36	M2B1_UIM_PWR
37	M2B1_USB31_TX+
38	NC
39	GND
40	NC
41	MSATA_MPCIE_RX-
42	NC
43	MSATA_MPCIE_RX+
44	NC
45	GND
46	NC
47	MSATA_MPCIE_TX-
48	NC
49	MSATA_MPCIE_TX+
50	M2B1_PERST#
51	GND

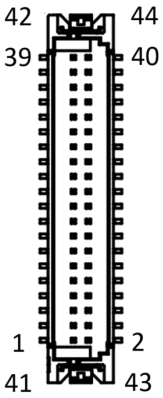
Table 3.13: M.2 B-Key Connector: M2_B1	
52	M2B1_a_CLKREQ#
53	CLK100M_a_M2B1-
54	M2B1_PCIEWAKE#
55	CLK100M_a_M2B1+
56	NC
57	GND
58	NC
59	NC
60	NC
61	NC
62	NC
63	NC
64	NC
65	NC
66	NC
67	M2B1_a_RESET#
68	M2B1_SUSCLK
69	M2B1_CFG1
70	+V3.3A_M.2_B
71	GND
72	+V3.3A_M.2_B
73	GND
74	+V3.3A_M.2_B
75	M2B1_CFG2
H1	NC
H2	NC
H3	GND
H4	GND



3.5.10 LVDS Connector: LVDS1

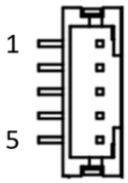
Table 3.14: LVDS Connector: LVDS1

Pin	Signal Pin Definition
1	+V_LCD
2	+V_LCD
3	GND
4	GND
5	+V_LCD
6	+V_LCD
7	LVDS1_0_D0-
8	LVDS1_1_D0-
9	LVDS1_0_D0+
10	LVDS1_1_D0+
11	GND
12	GND
13	LVDS1_0_D1-
14	LVDS1_1_D1-
15	LVDS1_0_D1+
16	LVDS1_1_D1+
17	GND
18	GND
19	LVDS1_0_D2-
20	LVDS1_1_D2-
21	LVDS1_0_D2+
22	LVDS1_1_D2+
23	GND
24	GND
25	LVDS1_0_CLK-
26	LVDS1_1_CLK-
27	LVDS1_0_CLK+
28	LVDS1_1_CLK+
29	GND
30	GND
31	LVDS0_DDCCLK_AUX+
32	LVDS0_DDCCLK_AUX-
33	GND
34	GND
35	LVDS1_0_D3-
36	LVDS1_1_D3-
37	LVDS1_0_D3+
38	LVDS1_1_D3+
39	NC
40	LVDS1_VCON
41	NC
42	NC
43	NC
44	NC



3.5.11 Panel Inverter Connector: BL1

Table 3.15: Panel Inverter Connector: BL1	
Pin	**Signal Pin Definition**
1	+V5_1_INVERTER_0
2	EC_LVDS1_z_PWM
3	LVDS1_z_ENABKL
4	GND
5	+V12_1_INVERTER_0

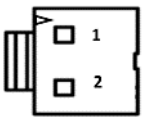


3.5.12 Panel Inverter Connector: POE_PWR1

Table 3.16: Panel Inverter Connector: POE_PWR1	
Pin	**Signal Pin Definition**
1	+V48_LAN2+
2	+V48_LAN2-
3	GND
4	+V12_A

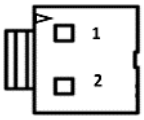
3.5.13 DC Power Input Connector (180D): CN4

Table 3.17: DC Power Input Connector (180D): CN4	
Pin	**Signal Pin Definition**
1	+V12_DCIN
2	GND



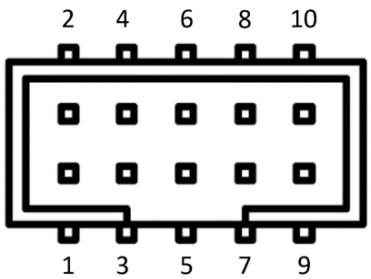
3.5.14 DC Power Input Connector (90D): CN5

Table 3.18: DC Power Input Connector (90D): CN5	
Pin	**Signal Pin Definition**
1	GND
2	+V12_DCIN



3.5.15 USB 2.0 Dual-Port Internal Connector: USB1

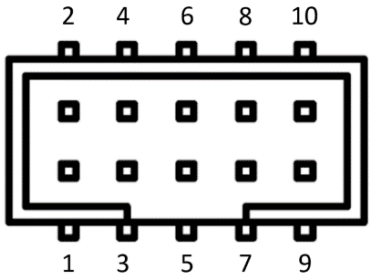
Table 3.19: USB 2.0 Dual-Port Internal Connector: USB1	
Pin	**Signal Pin Definition**
1	+V5SB_USB_UTC
2	+V5SB_USB_UTC
3	USB6_z_P-
4	USB7_z_P-
5	USB6_z_P+
6	USB7_z_P+
7	GND
8	GND
9	GND
10	NC



3.6 Audio Internal Connector: AUDIO1

Table 3.20: Audio Internal Connector: AUDIO1

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



Chapter 4

AMI BIOS Setup

AMIBIOS has been integrated into many motherboards for over a decade. 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-2364 BIOS setup screens.

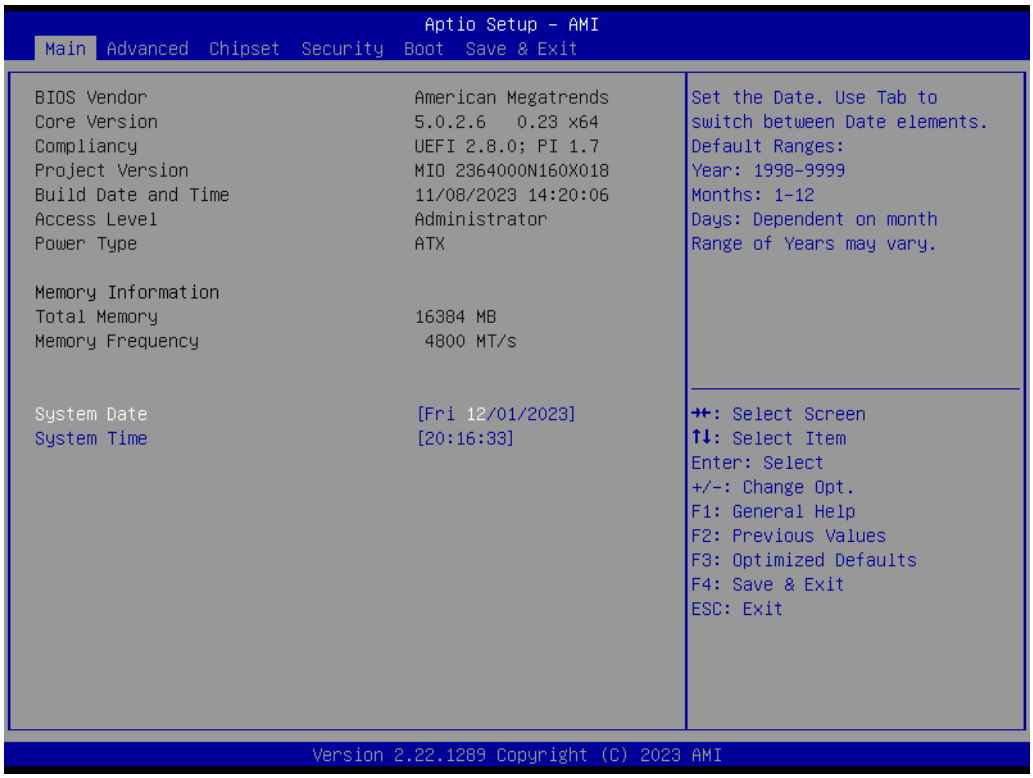
AMIBIOS ROM has a built-in setup program that allows users to modify the basic system configuration. This information is stored in battery-backed CMOS so it retains the setup information when the power is turned off.

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.

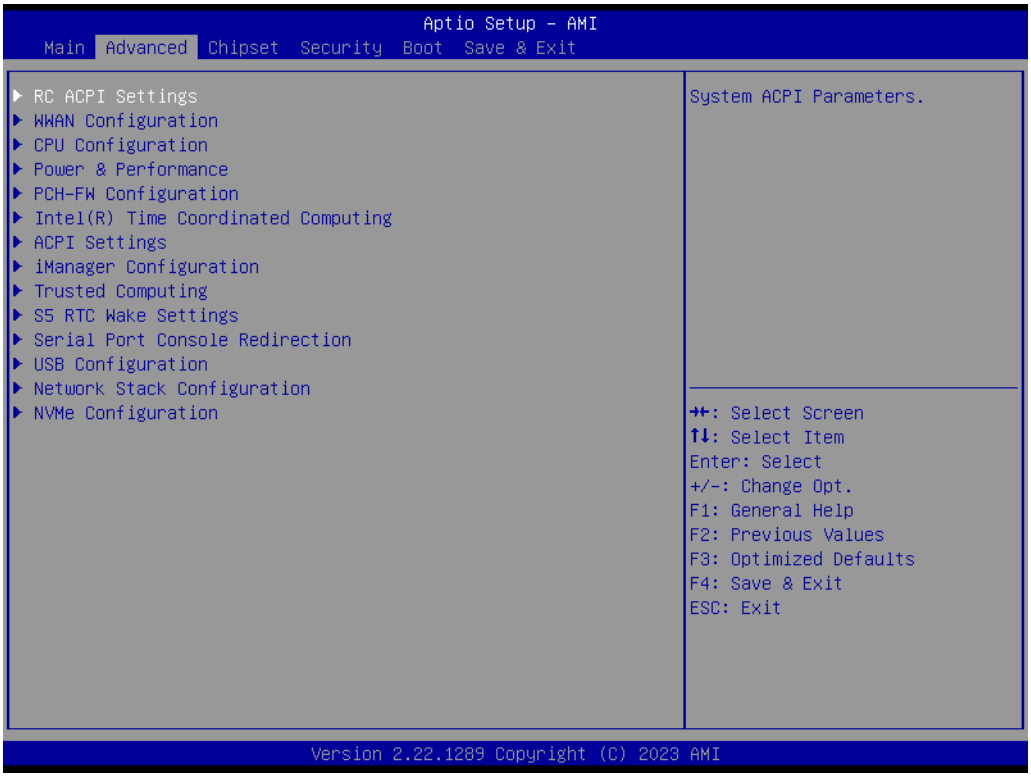
Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

- **System Time / System Date**

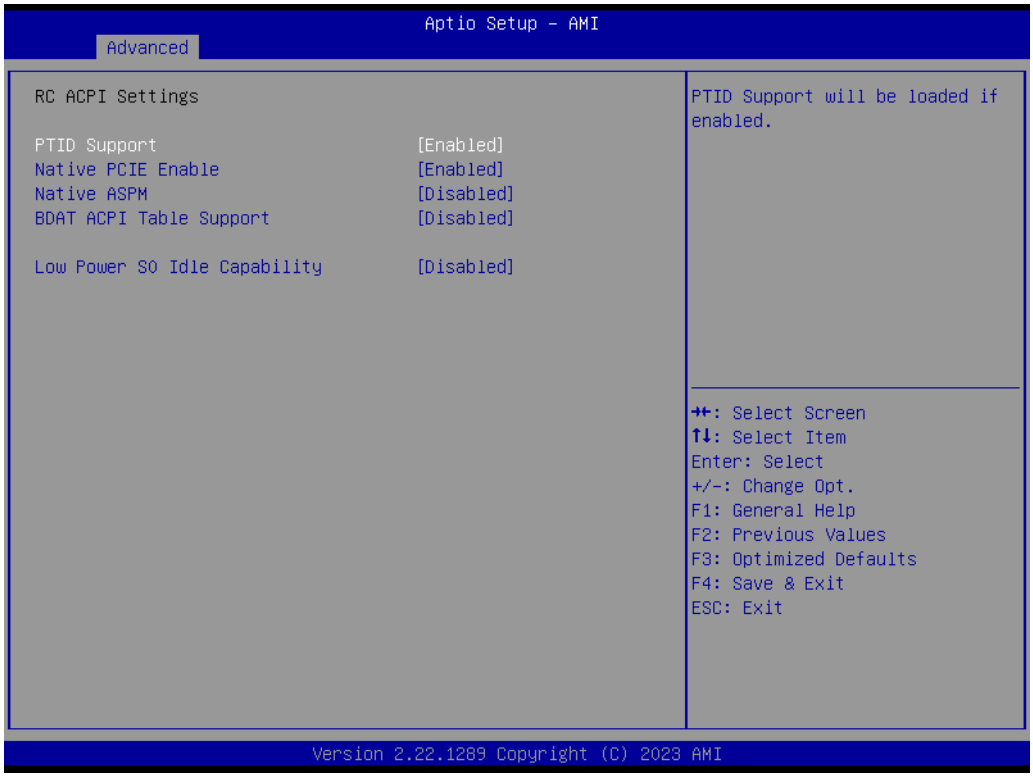
Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time must be entered in HH:MM:SS format.

4.1.2 Advanced BIOS Features Setup

Select the Advanced tab from the MIO-2364 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

Determines if it is enabled to load the PTID table.

Native PCIE Enable

Enable/Disable PCIE Native Control reported in the ACPI Table.

Native ASPM

Choose if the ASPM feature is controlled by the OS or BIOS.

BDAT ACPI Table Support

Determines if it is enabled to support BDAT ACPI Table.

Low Power S0 Idle Capability

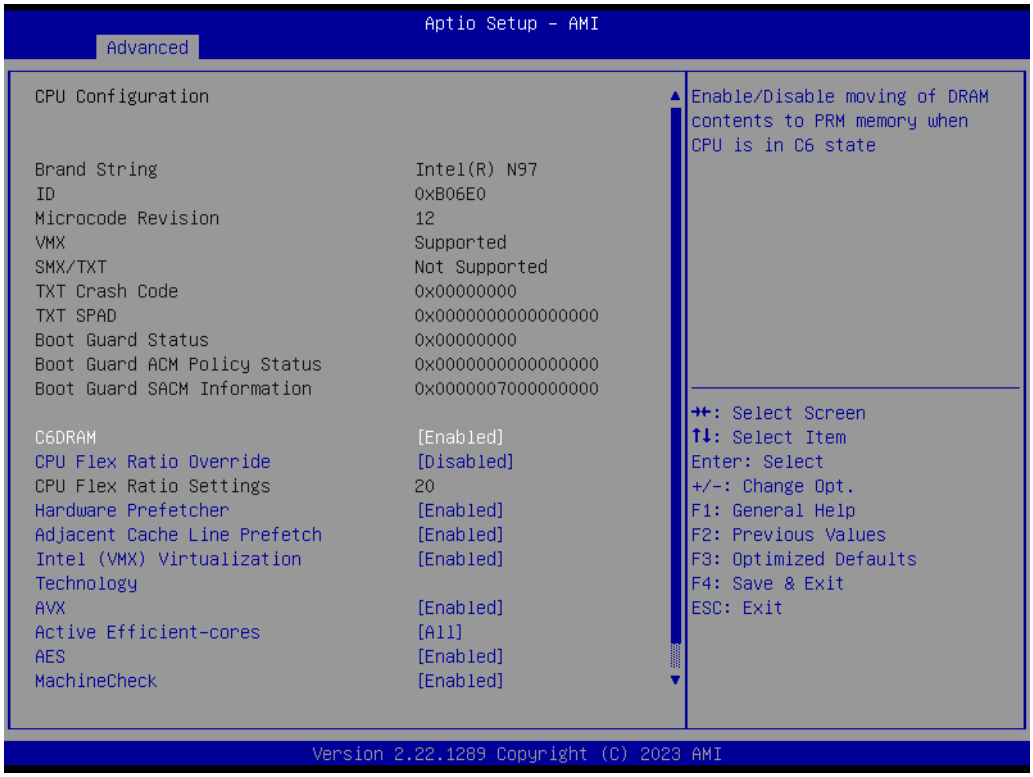
Enable/Disable ACPI Low Power S0 Idle capability under the OS.

4.1.2.2 WWAN Configuration

WWAN Device

Select the M.2 WWAN Device options to enable 5G-M80 (MediaTek) modems.

4.1.2.3 CPU Configuration



C6DRAM

Enable/Disable the moving of DRAM contents to PRM memory when the CPU is in the 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 Efficient-cores

Number of E-cores to enable in each processor package.

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.

4.1.2.4 Power & Performance

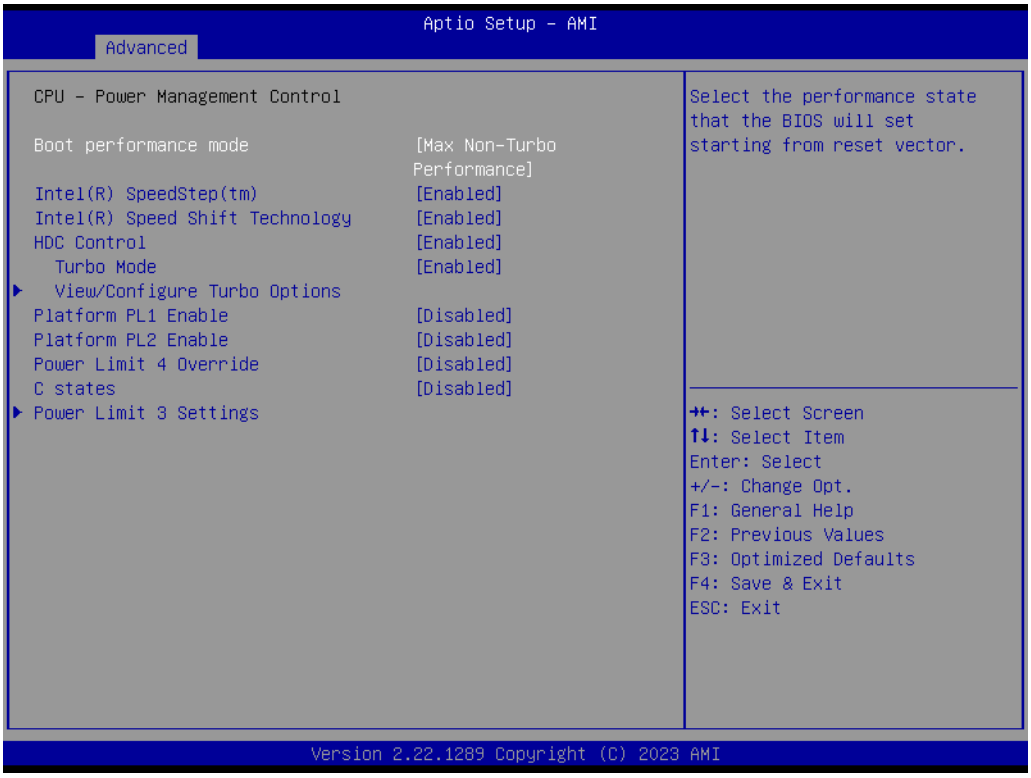
CPU – Power Management Control

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 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.

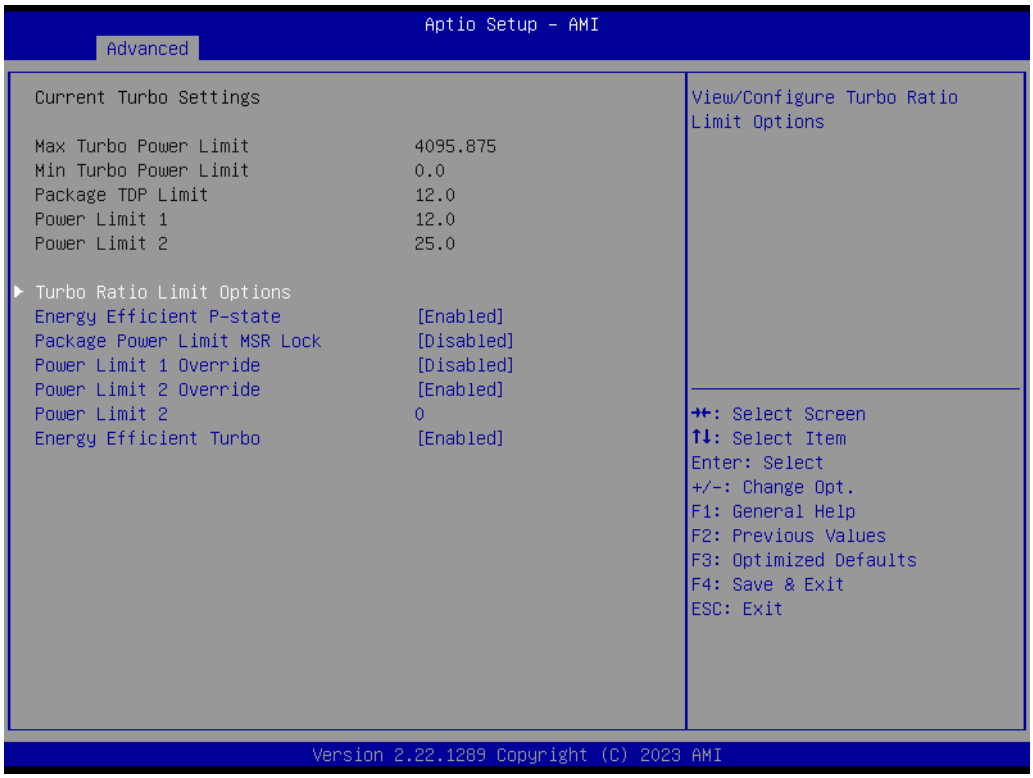
C states

Enable/Disable CPU Power Management.

Power Limit 3 Settings

Power Limit 3 settings.

■ View/Configure Turbo Options



Turbo Ratio Limit Option

View/Configure Turbo Ratio Limit 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.

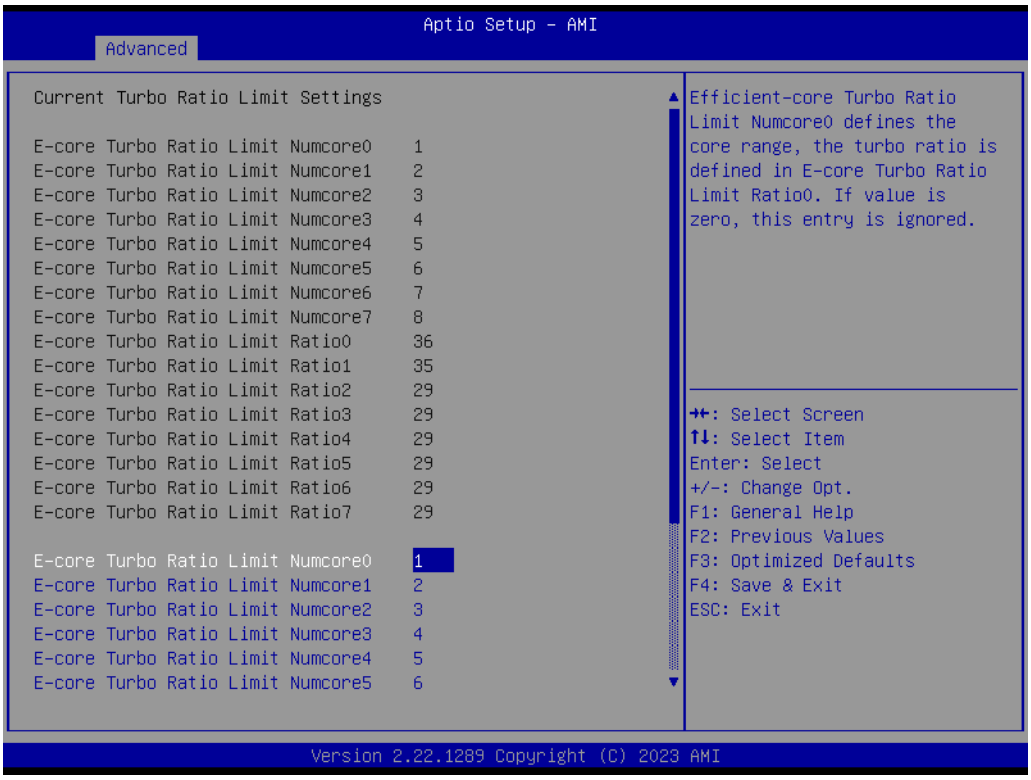
Power Limit 2

Power Limit 2 value in milliwatts; BIOS will round to the nearest 1/8W when programming.

Energy Efficient Turbo

Enable/Disable the Energy Efficient Turbo feature.

Config TDP Configurations



E-core Turbo Ratio Limit Numcore x

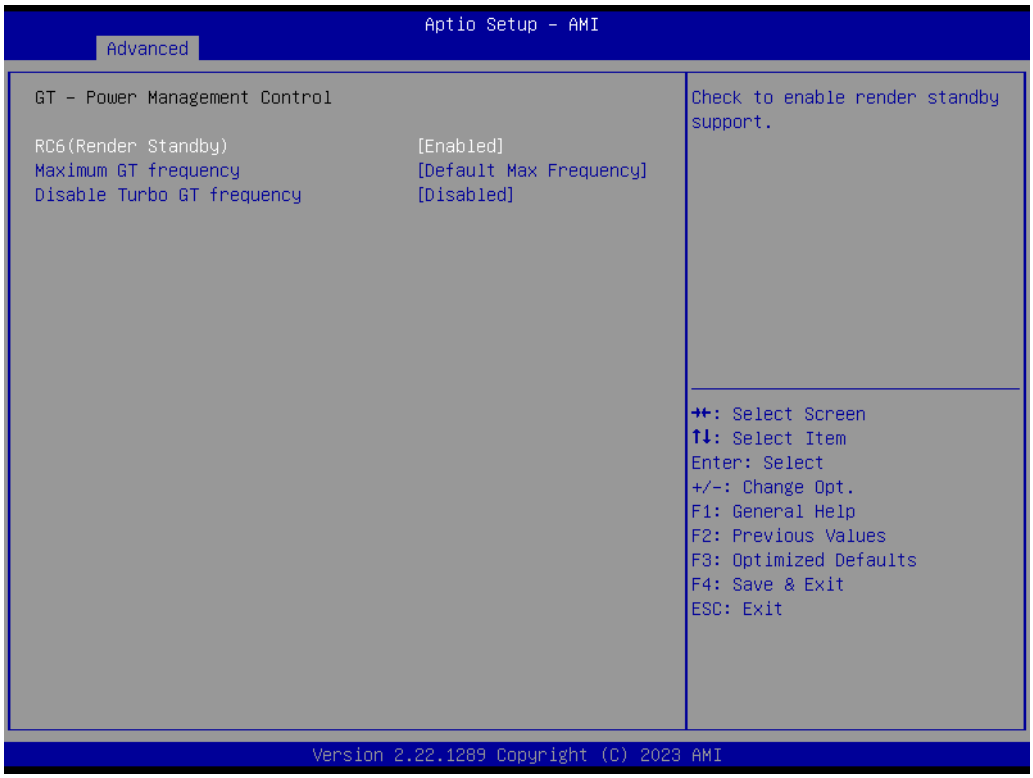
Efficient-core Turbo Ratio Limit Numcore x defines the core range.

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.

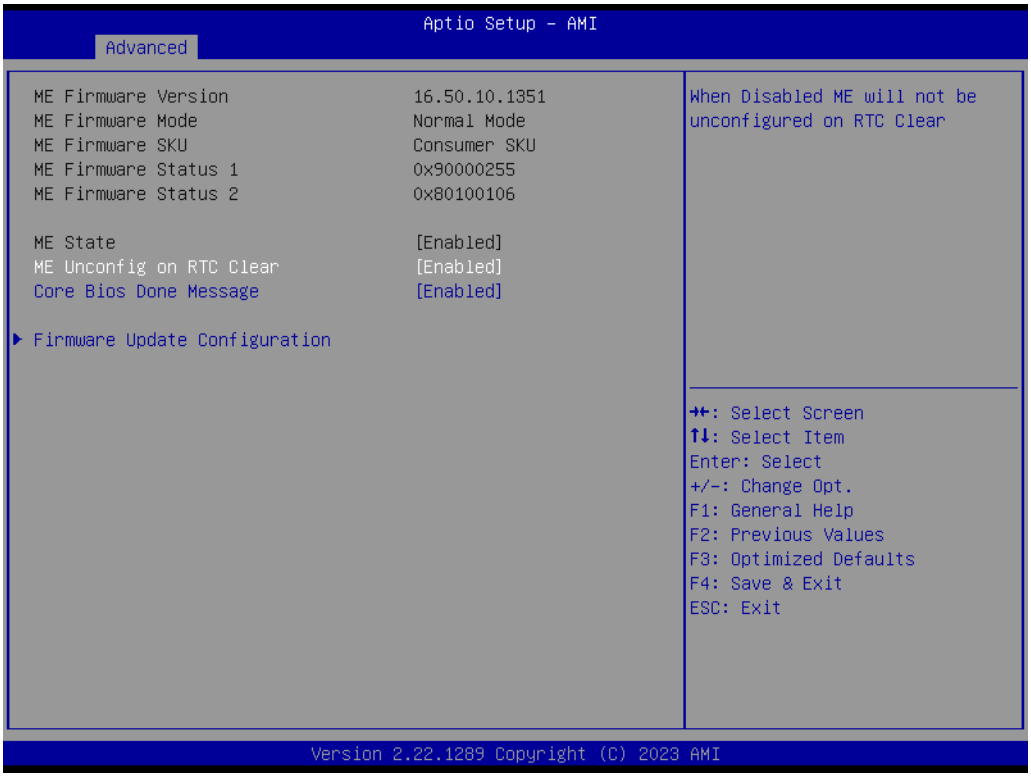
Maximum GT frequency

Maximum GT frequency limited by user.

Disable Turbo GT frequency

Enabled/Disable Turbo GT frequency.

4.1.2.5 PCH-FW Configuration



ME State

When disabled, ME will be put into Temporarily Disabled Mode.

ME Unconfig on RTC Clear

When disabled, ME will not be unconfigured on RTC Clear.

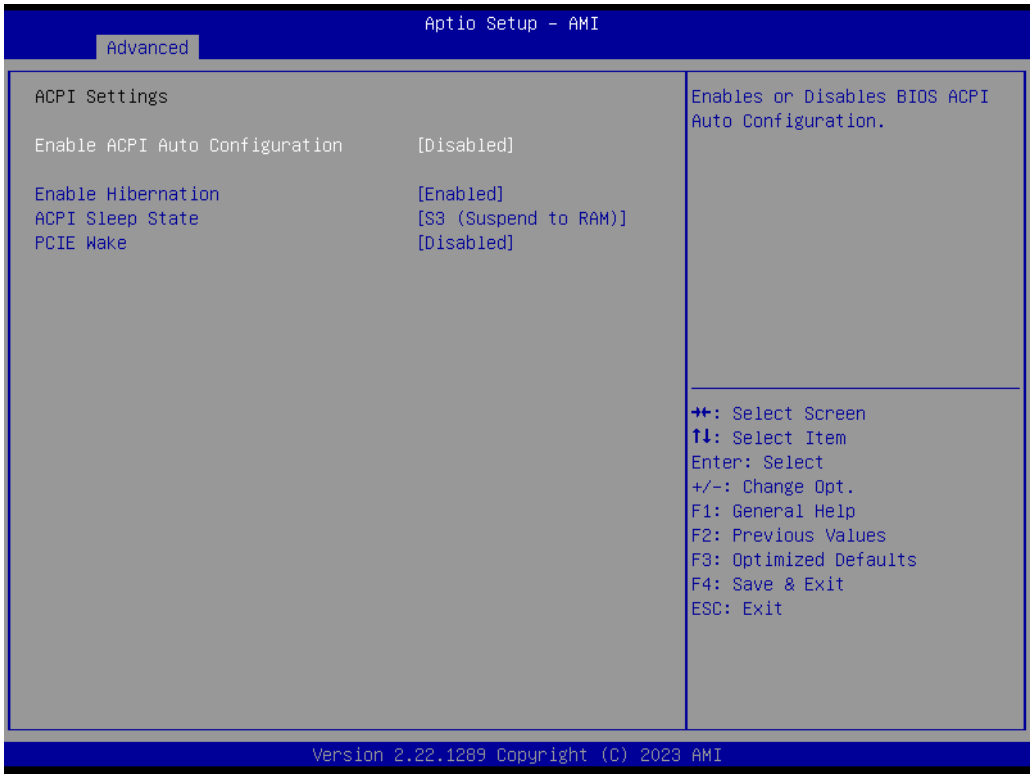
Core BIOS Done Message

Enable/Disable Core BIOS Done message sent to ME.

Firmware Update Configuration

Configure Management Engine Technology parameters.

4.1.2.6 ACPI Settings



Enable ACPI Auto Configuration

Enable/Disable BIOS ACPI auto configuration.

Enable Hibernation

Enable/Disable the ability to hibernate (OS/S4 Sleep State). This option may not be available with some OS.

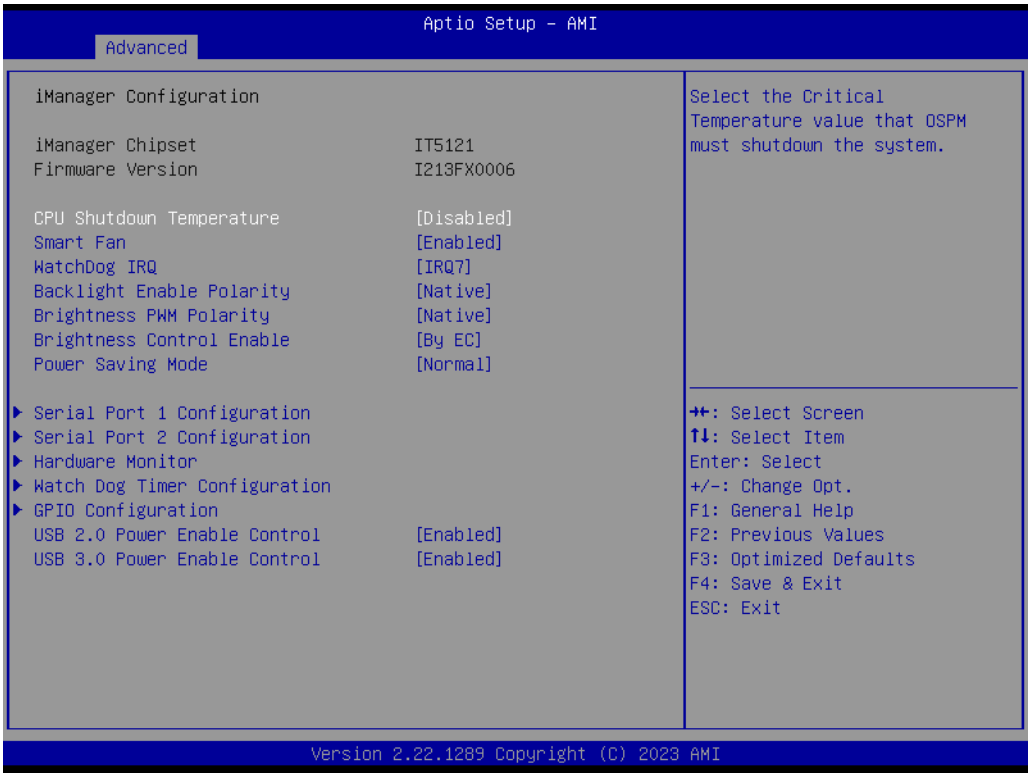
ACPI Sleep State

Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.

PCIE Wake

Enable/Disable PCIE to wake the system from S5.

4.1.2.7 iManager Configuration



CPU Shutdown Temperature

Select the Critical Temperature value at which OSPM must shut down the system.

Smart Fan

Control the iManager Smart Fan function.

Watchdog IRQ

Select IRQ Number eBrain WatchDog.

Backlight Enable Polarity

Switch Backlight Enable Polarity to Native or Invert.

Brightness PWM Polarity

Backlight Control Brightness PWM Polarity for Native or Invert.

Brightness Control Enable

Choose to control the LVDS brightness value by EC or User Override during the POST stage.

Power Saving Mode

Enable/Disable power saving mode.

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.

GPIO Configuration

GPIO Configuration Settings.

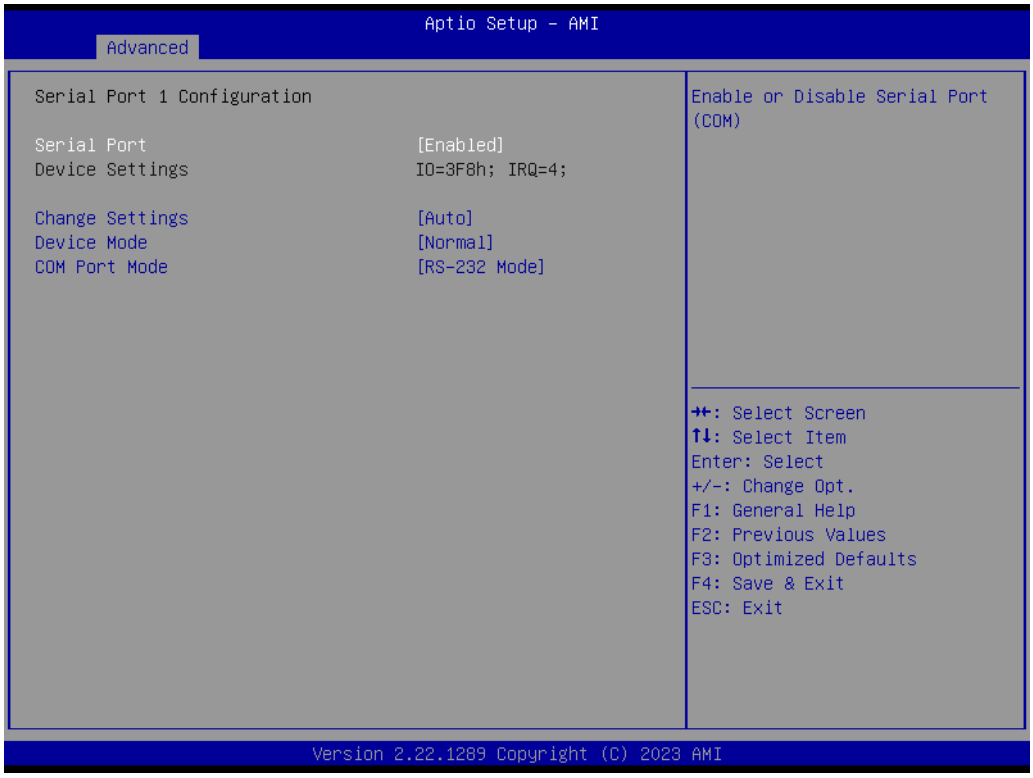
USB 2.0 Power Enable Control

Enable/Disable power off USB 2.0 port in S4/S5.

USB 3.0 Power Enable Control

Enable/Disable power off USB 3.0 port in S4/S5.

Serial Port 1 Configuration



Serial Port

Enable or disable Serial Port (COM).

Change Settings

Select optimal settings for a Super IO device.

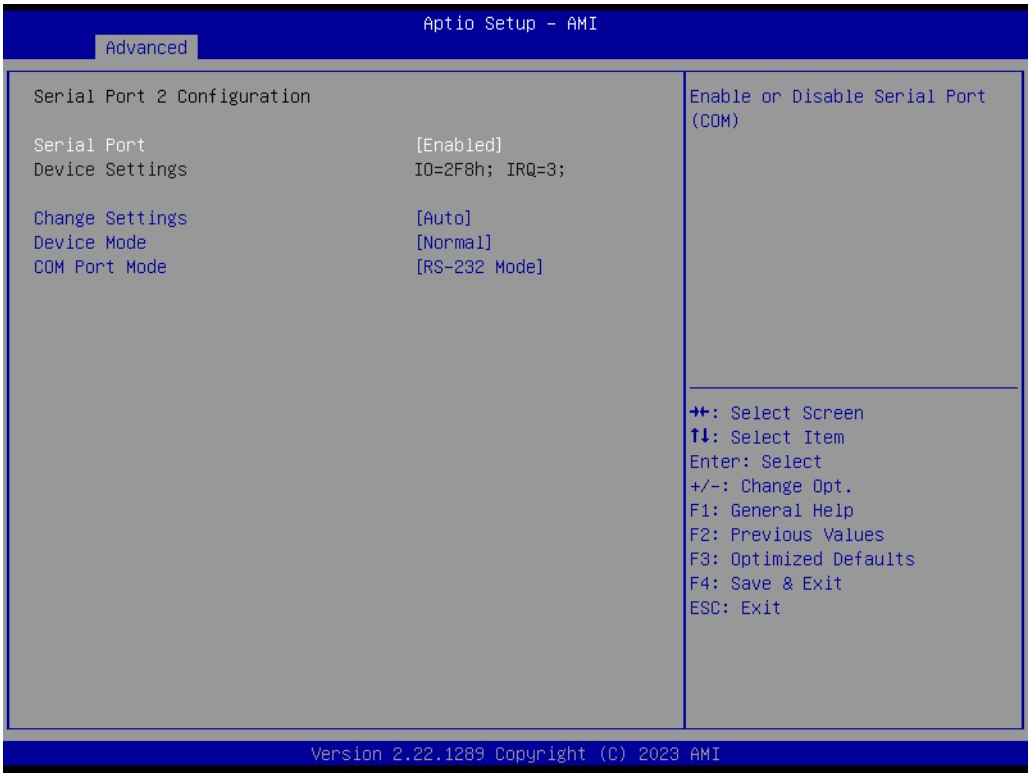
Device Mode

If you use a baud rate above 115200, please select High Speed.

COM Mode

COM port mode select.

Serial Port 2 Configuration



Serial Port

Enable/Disable Serial Port (COM).

Change Settings

Select optimal settings for a Super IO device.

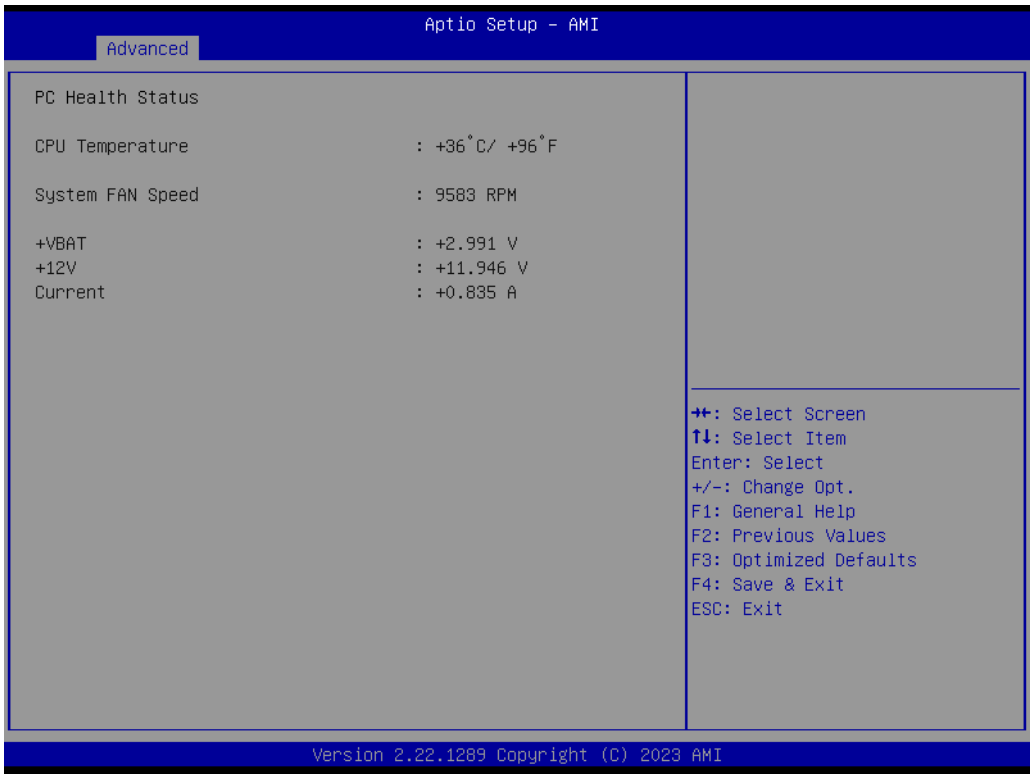
Device Mode

If you use a baud rate above 115200, please select High Speed.

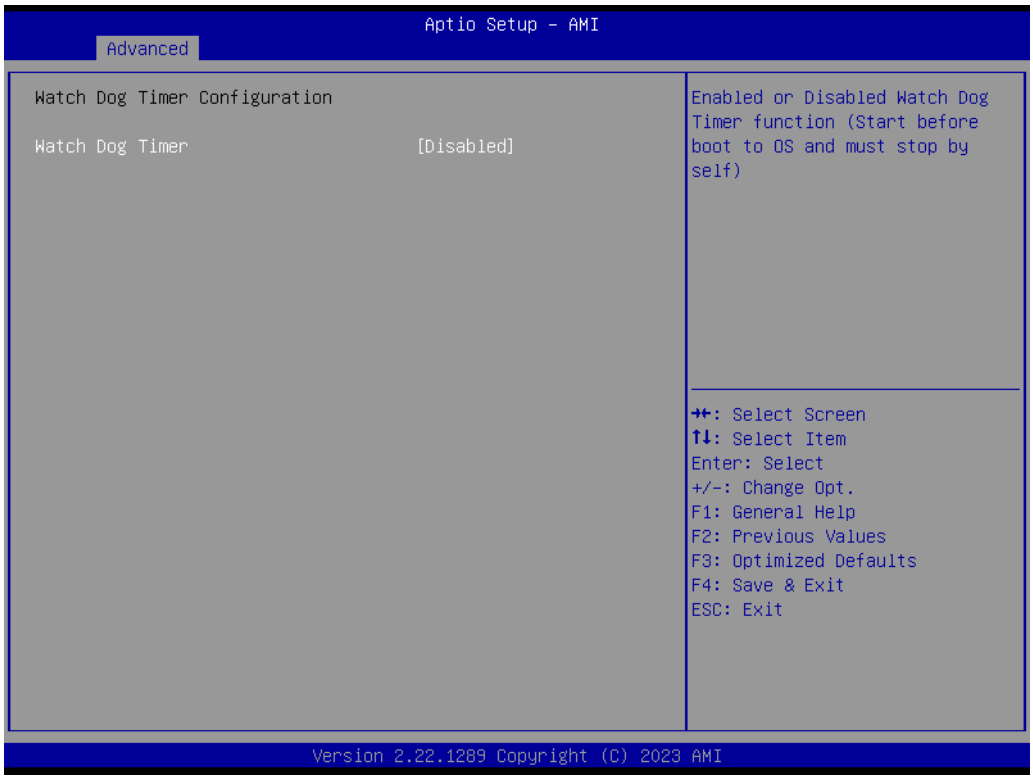
COM Mode

COM port mode select.

Hardware Monitor



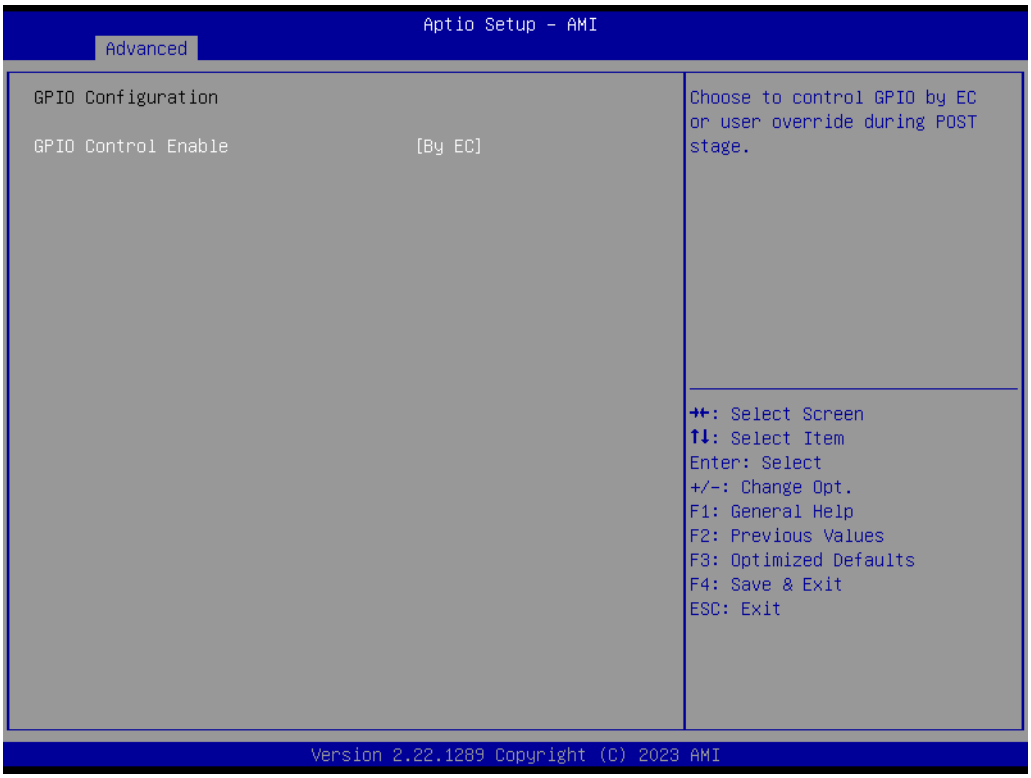
Watch Dog Timer Configuration



Watch Dog Timer

Enable/Disable the Watch Dog Timer Function.

GPIO Configuration



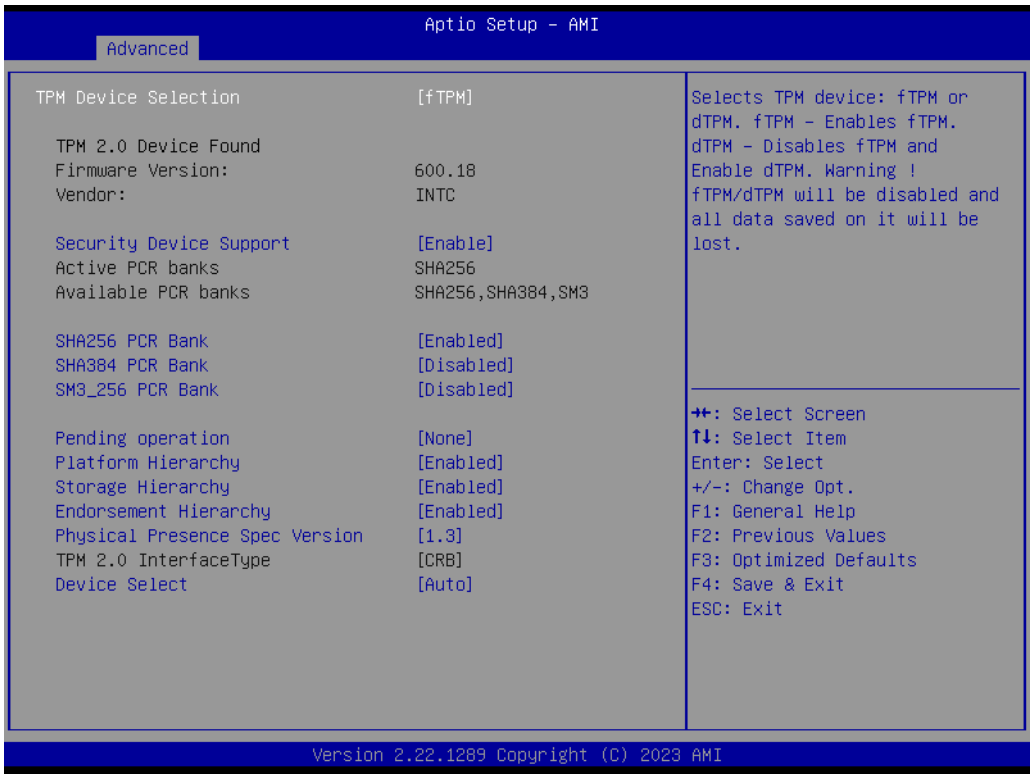
GPIO Control Enable

Choose to control GPIO by EC or User Override during the POST stage.

GPIO0/1/2/3/4/5/6/7

Configure GPIO0/1/2/3/4/5/6/7.

4.1.2.8 Trusted Computing



TPM Device Selection

Select TPM device: fTPM or dTPM.

Security Device Support

Enable/Disable BIOS support for a security device.

SHA-1 PCR Bank

Enable/Disable SHA-1 PCR Bank.

SHA256 PCR Bank

Enable/Disable SHA256 PCR Bank.

SHA384 PCR Bank

Enable/Disable SHA384 PCR Bank.

Pending operation

Schedule an operation for the security device.

Platform Hierarchy

Enable/Disable Platform Hierarchy.

Storage Hierarchy

Enable/Disable Storage Hierarchy.

Endorsement Hierarchy

Enable/Disable Endorsement Hierarchy.

TPM 2.0 UEFI Spec Version

Select the TCG2 Spec Version support.

Physical Presence Spec Version

Select to instruct the OS to support PPI Spec Version 1.2 or 1.3.

Device Select

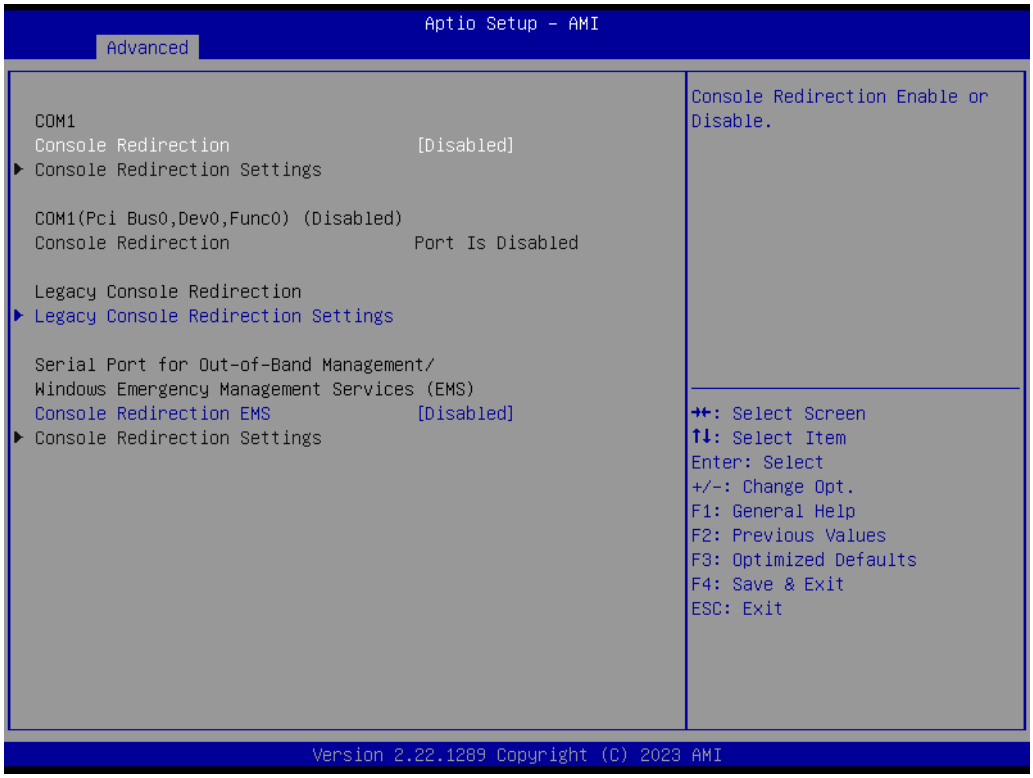
TPM 1.2 will restrict support to TPM 1.2 devices. TPM 2.0 will restrict support to TPM 2.0 devices.

4.1.2.9 S5 RTC Wake Settings

Wake system from S5

Enable/Disable system wake on alarm event. Select FixedTime for the system to wake on the hr:min:sec specified.

4.1.2.10 Serial Port Console Redirection



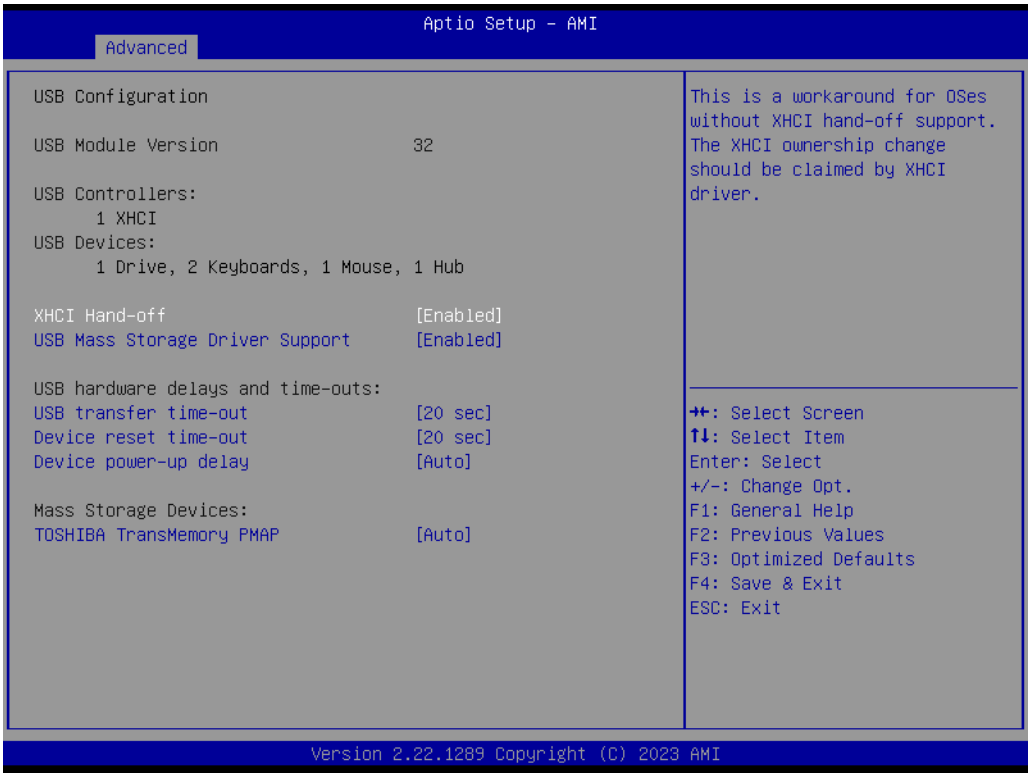
Console Redirection

This item allows users to enable or disable console redirection for Microsoft Windows Emergency Management Services (EMS).

Console Redirection

This item allows users to configure console redirection detail settings.

4.1.2.11 USB Configuration



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.

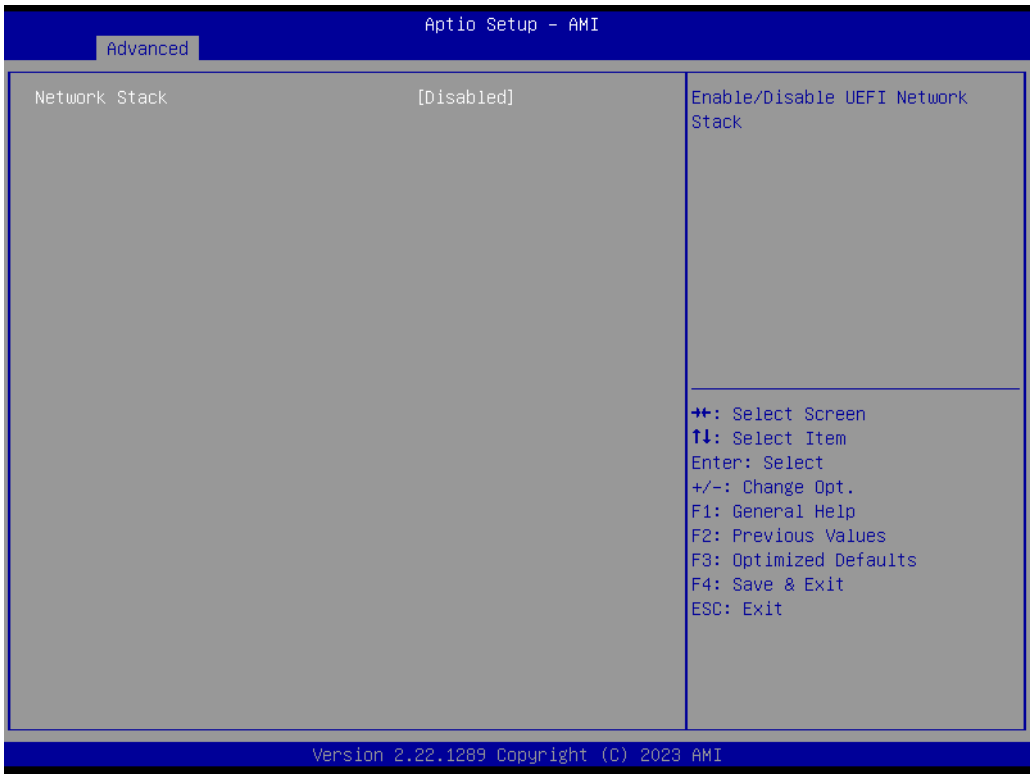
Device reset time-out

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.

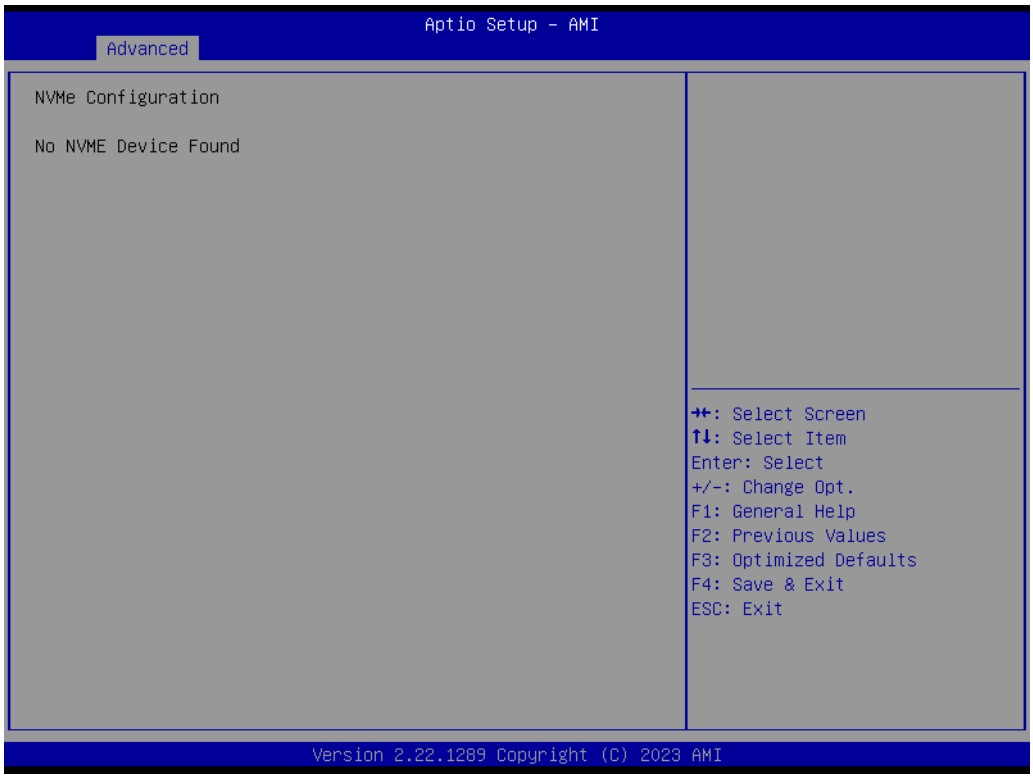
4.1.2.12 Network Stack Configuration



Network Stack

Enable/Disable UEFI Network Stack.

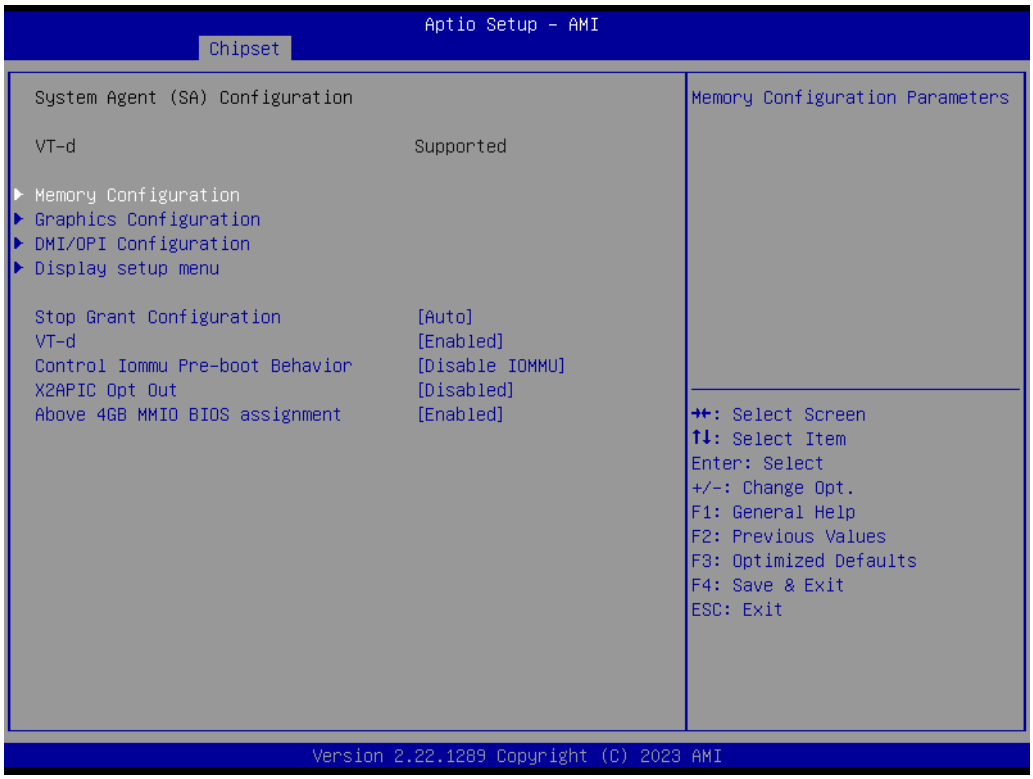
4.1.2.13 NVMe Configuration



4.1.3 Chipset Configuration

Select the Chipset tab from the MIO-2364 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.

Display setup menu

Display configuration settings.

Stop Grant Configuration

Automatic/Manual stop grant configuration.

VT-d

VT-D capability.

Control Iommu Pre-boot Behavior

Enable IOMMU in Pre-boot environment.

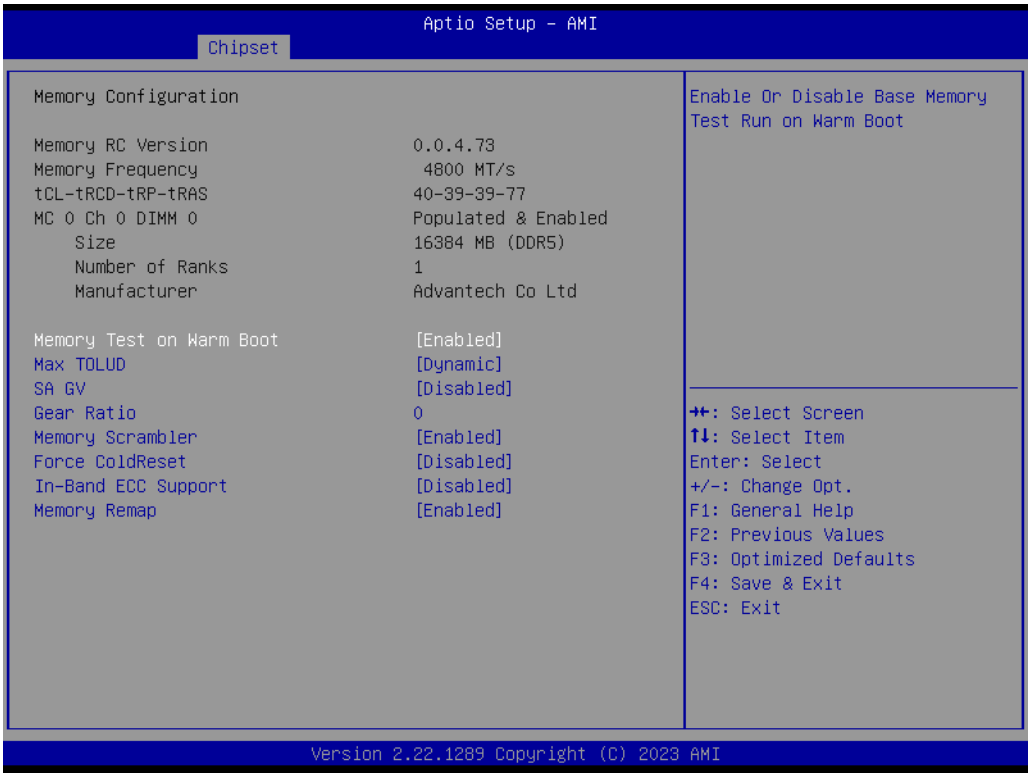
X2APIC Opt Out

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.

Gear Ratio

Gear ratio when SAGV is disabled.

Memory Scrambler

Enable/Disable Memory Scrambler support.

Force ColdReset

Force ColdReset OR Choose MrcColdBoot mode.

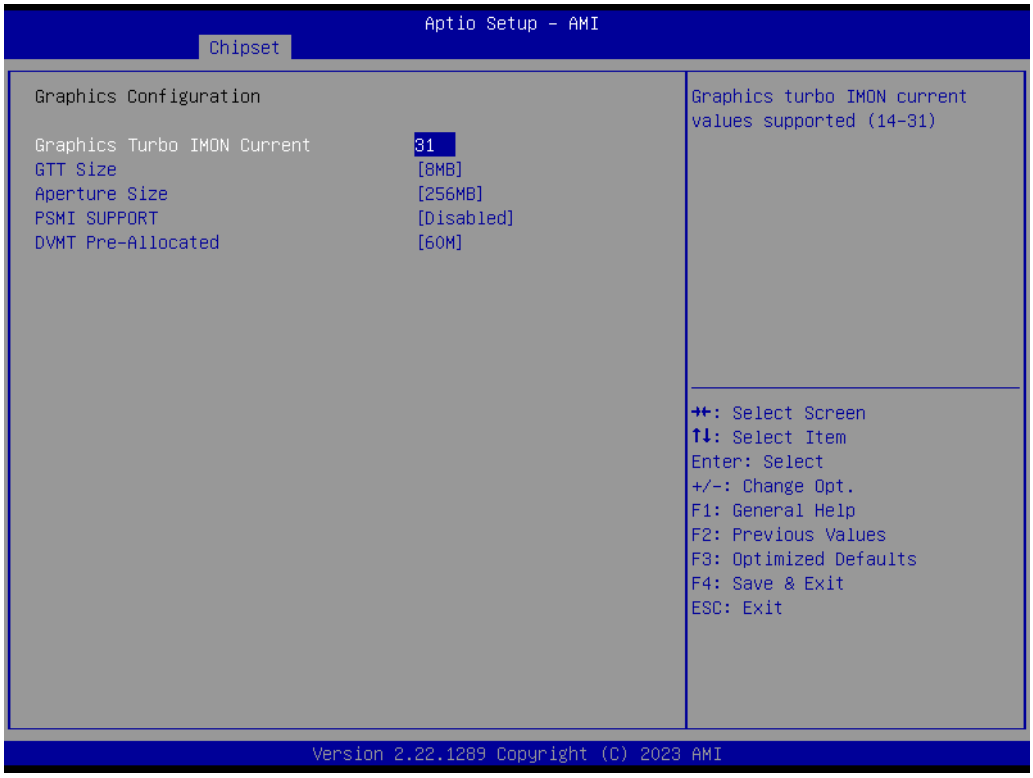
In-Band ECC Support

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.

LVDS

LVDS Panel Type

This allows the user to select the LVDS panel resolution type.

DMI/OPI Configuration

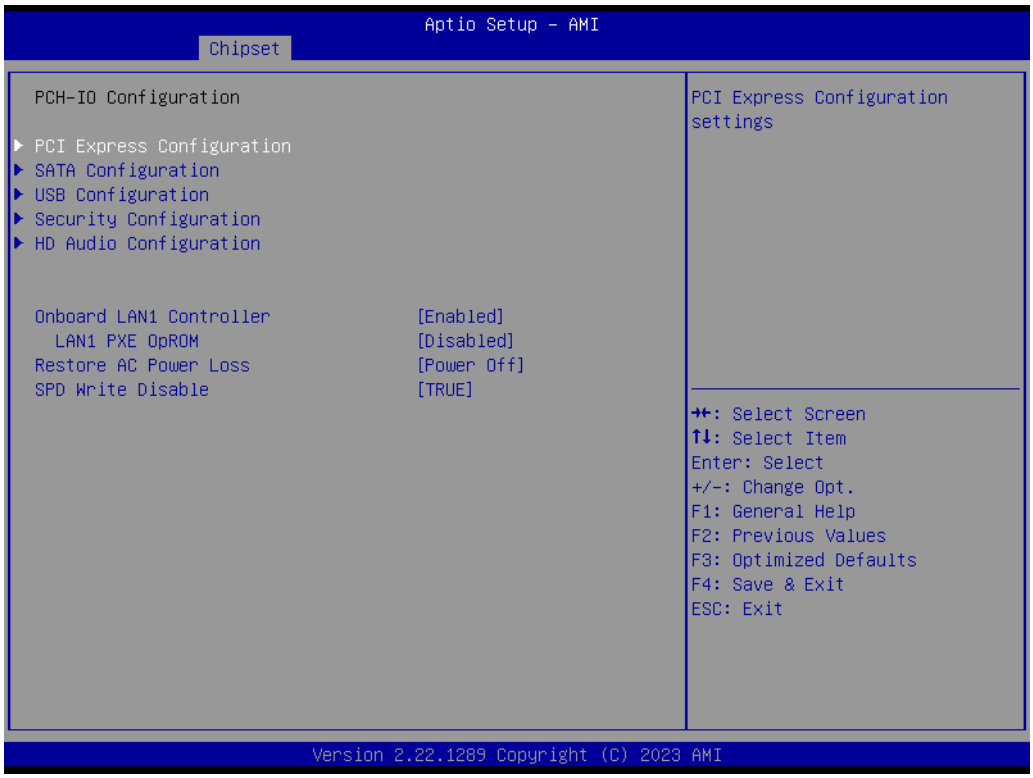
DMI Gen3 ASPM

DMI Gen3 ASPM Support.

DMI ASPM

DMI ASPM Support.

4.1.3.2 PCH-IO Configuration



PCI Express Configuration

PCI Express configuration settings.

SATA Configuration

SATA device options settings.

USB Configuration

USB configuration settings.

Security Configuration

Security configuration settings.

HD Audio Configuration

HD Audio subsystem configuration settings.

Onboard LAN1 Controller

Enable/Disable onboard LAN1 controller.

LAN1 PXE ROM

Enable/Disable onboard LAN1's PXE option ROM.

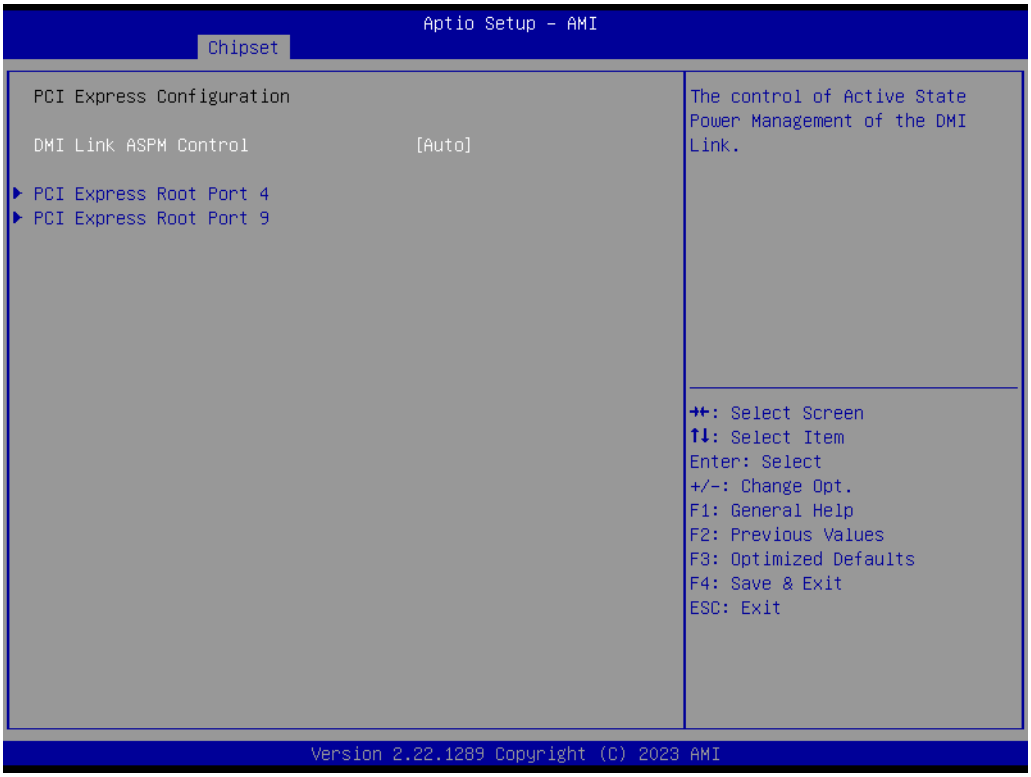
Restore AC Power Loss

Specify what state to go to when power is re-applied after a power failure (G3 state).

SPD Write Disable

Enable/Disable SPD Write Disable.

PCI Express Configuration



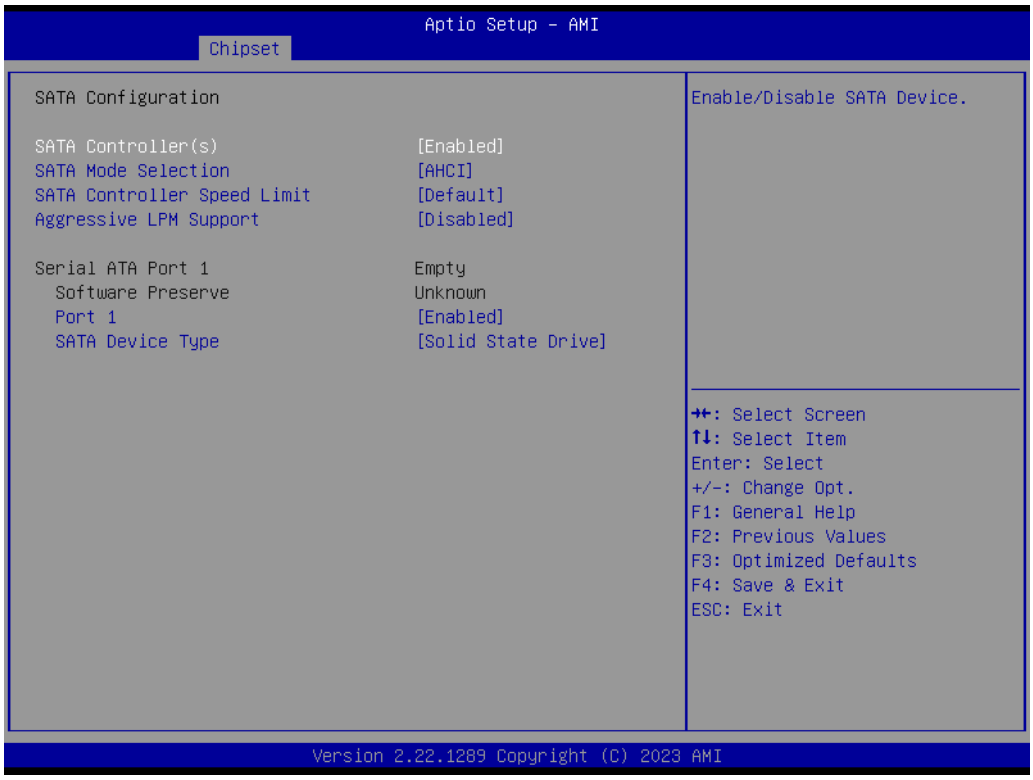
DMI Link ASPM Control

This item controls Active State Power Management of the DMI Link.

PCI Express Root Port 4/9

PCI Express Port 4/9 Settings.

SATA Configuration



SATA Controller(s)

Enable/Disable SATA device.

SATA Mode Selection

Determine how the SATA controller operates.

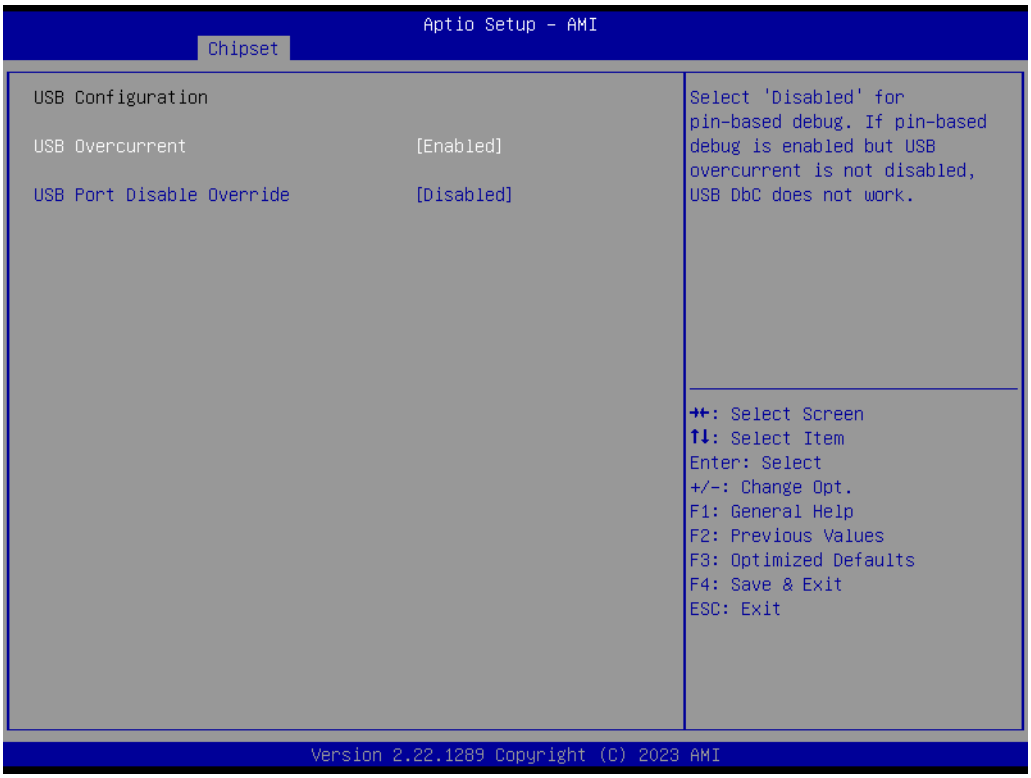
SATA Controller Speed Limit

Indicates the maximum speed the SATA controller can support.

Aggressive LPM Support

Enables PCH to aggressively enter link power state.

USB Configuration



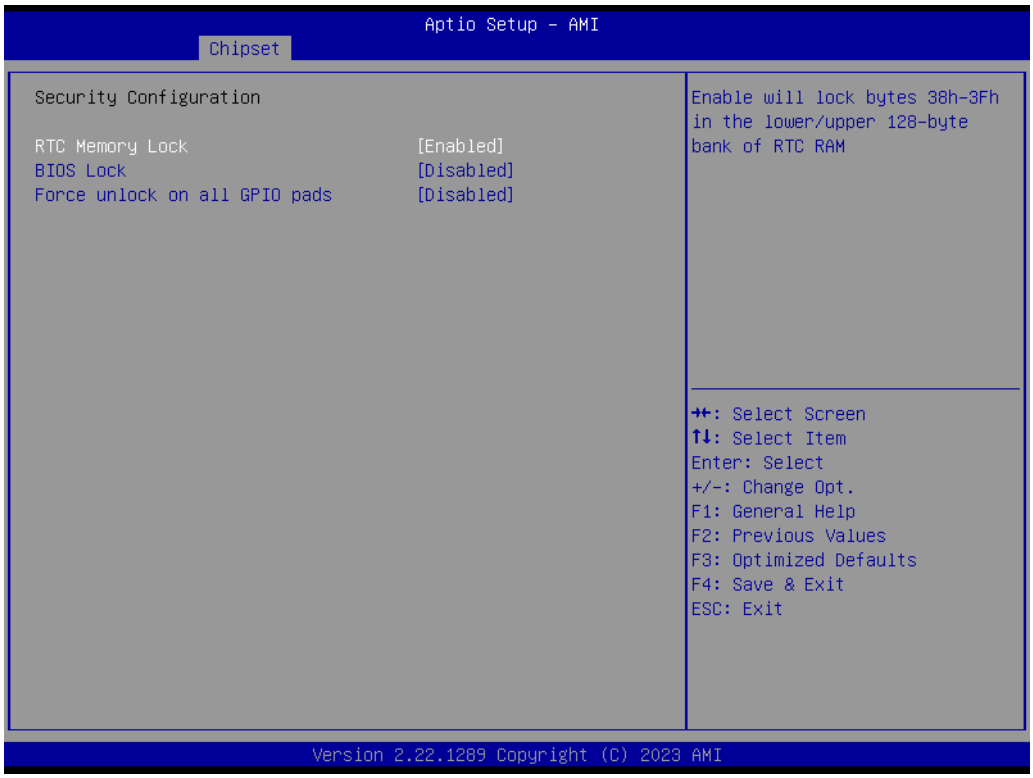
USB Overcurrent

Select “Disabled” for pin-based debug.

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.

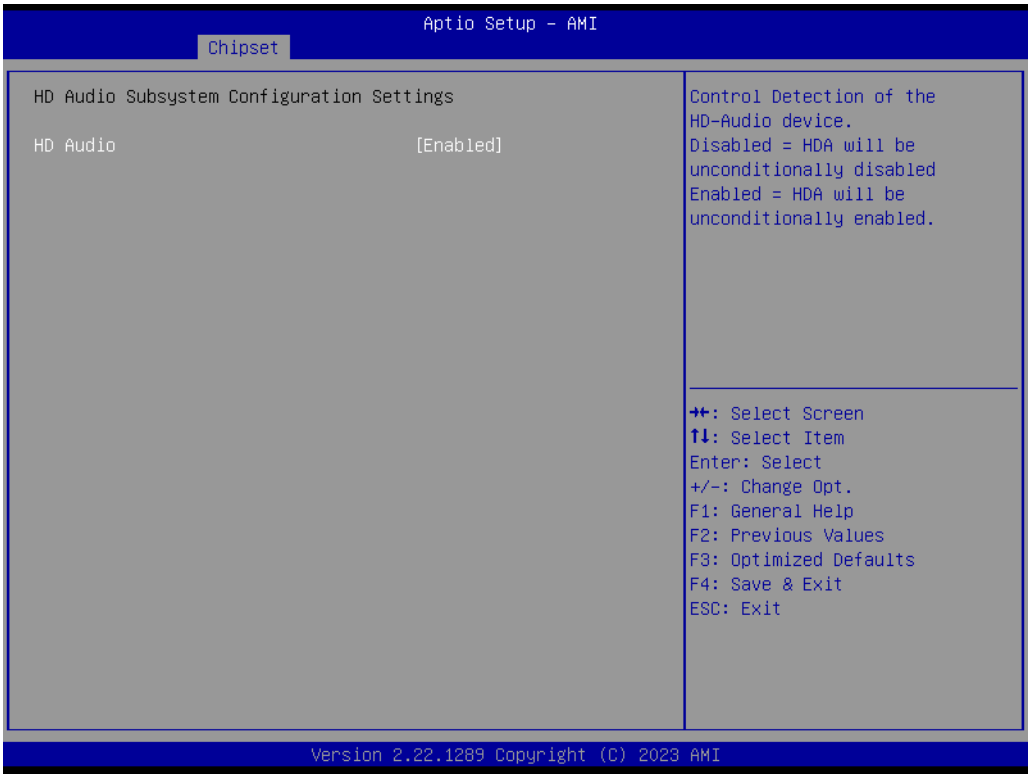
BIOS Lock

Enable/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.

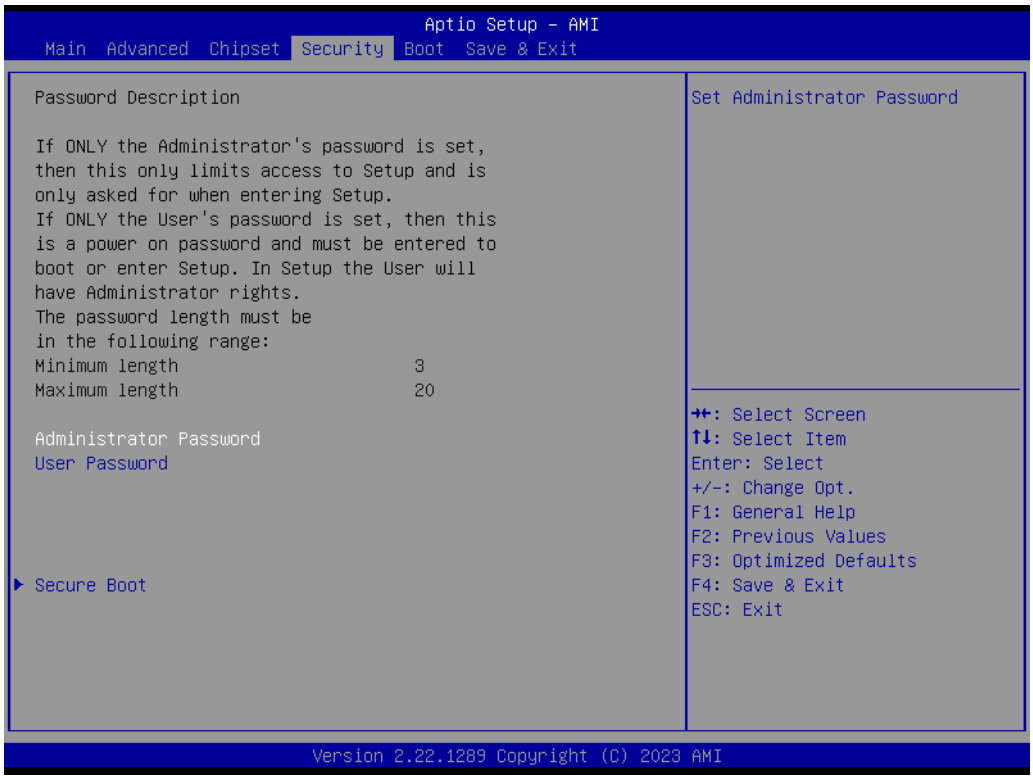
HD Audio Configuration



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-2364 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>.

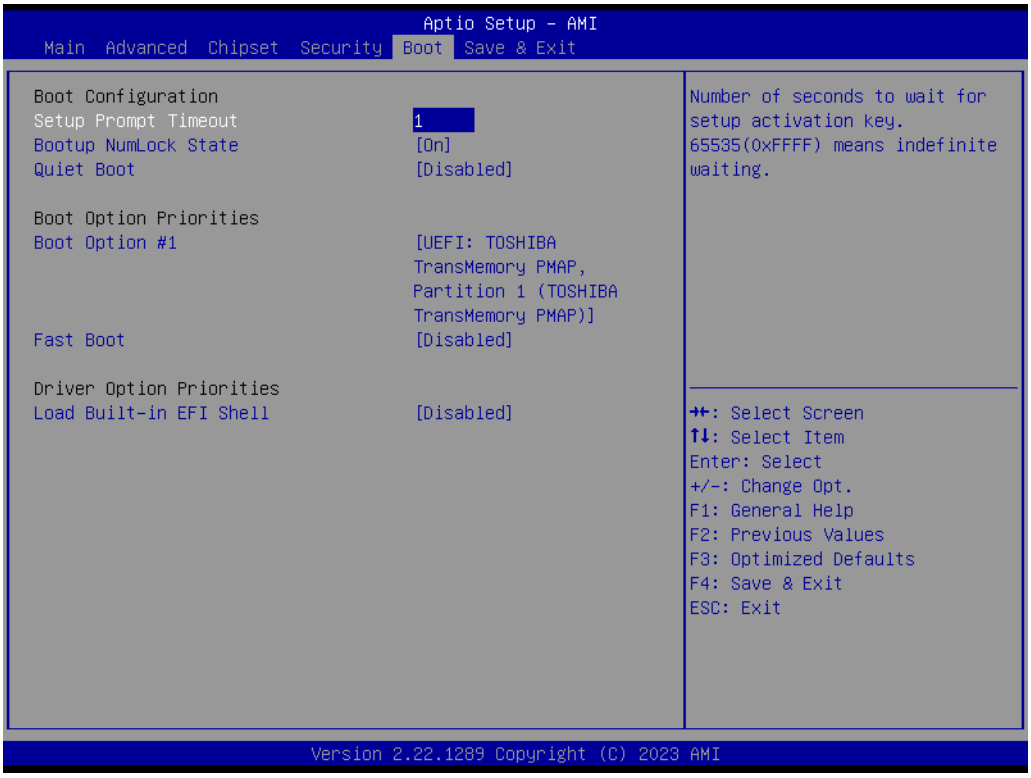
Change Administrator / User Password

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

Secure Boot

Secure Boot Configurations.

4.1.5 Boot



Setup Prompt Timeout

This is the 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

Enable/Disable the Quiet Boot option.

Boot Option #1

Sets the system boot order.

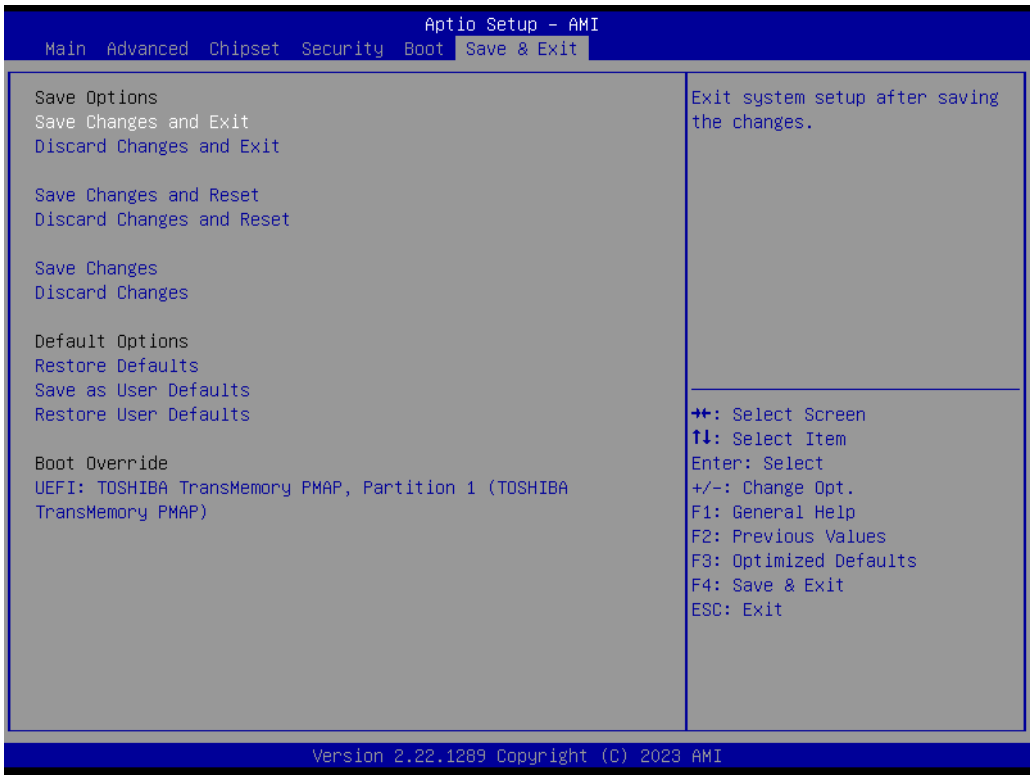
Fast Boot

Enable/Disable boot with initialization of a minimal set of devices required to launch the active boot option. It has no effect on BBS boot options.

Load Built-in EFI Shell

Load/Unload the internal built-in EFI shell image inside the BIOS. (The built-in EFI shell will still be loaded if no bootable device is found).

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 the 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.

Appendix A

System Assignments

This appendix contains information of a detailed nature. Sections include:

- System I/O Ports
- 1st MB Memory Map
- Interrupt Assignments

A.1 System I/O Ports

Table A.1: System I/O Ports

Addr. Range (Hex)	Device
20h-2Dh	Programmable Interrupt Controller
2Eh–2Fh	Motherboard Resources
30h-3Dh	Programmable Interrupt Controller
40h-43h	System Timer/Counter
4Eh–4Fh	Motherboard Resources
50h-53h	System 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	Programmable Interrupt Controller
B0h-B1h	Programmable Interrupt Controller
B4h-BDh	Power Management
29Ch-29Dh	Motherboard Resources
2F8h-2FFh	Communications Port (COM2)
3F8h-3FFh	Communications Port (COM1)
4D0h-4D1h	Programmable Interrupt Controller
680h-69Fh	Motherboard Resources
164Eh-164Fh	Motherboard Resources
1854h-1857h	Motherboard Resources
2000h-69Fh	Motherboard Resources
CF9h-CF9h	Reset Generator

A.2 1st MB Memory Map

Table A.2: 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.3 Interrupt Assignments

Table A.3: 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	Available
IRQ6	Reserved
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

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, electronic, photocopying, recording or otherwise, without prior written permission of the publisher.

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

© Advantech Co., Ltd. 2024