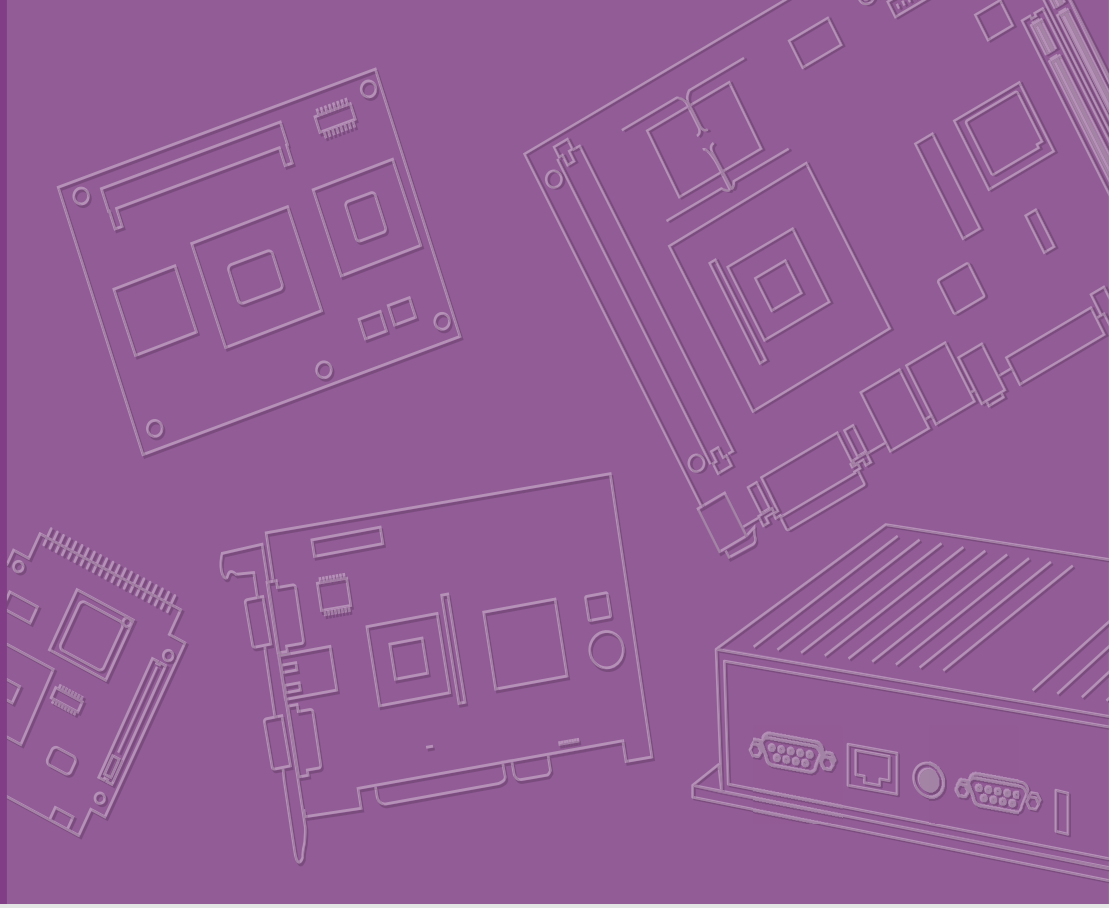

User Manual

MIO-2375

11th Gen Intel® Core™ i7/i5/i3/ Celeron® U-Series 2.5" Pico-ITX SBC

ADVANTECH

Enabling an Intelligent Planet

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Acknowledgments

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-2375.

Part No. 2006237500 Edition 1

May 2021

Product Warranty (2 years)

Advantech warrants to you, 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 which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which 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 of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time, and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

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 you get 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 fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Declaration of Conformity

CE

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

FCC Class B

Note: 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 instructions, 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 help.

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

Technical Support and Assistance

1. Visit the Advantech website at http://support.advantech.com where you can find the latest information about this product.
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 you call:
   - 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-2375 SBC
- 1 x SATA Cable 30 cm (11.8 in) (p/n: 1700006291)
- 1 x SATA Power Cable 35 cm (13.7 in) (p/n: 1700031583-01)
- 2 x USB 2.0 Cable 20 cm (7.87 in) (p/n: 1700030406-01)
- 1 x Audio Cable 20 cm (7.87 in) (p/n: 1700019584-01)
- 2 x COM RS-232/422/485 Cable 20 cm (7.87 in) (p/n: 1700030404-01)
- 1 x AT power cable 12 cm (4.72 in) (p/n: 1700019705-01)
- 1 x Cooler (Heatsink) (p/n: 1970004956T001)
- 1 x Startup manual (p/n: 2046237500)
- 4 x Stand-off (p/n: 1930000058)
- 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
1970004968N001	Heat spreader of MIO-2375

Contents

Chapter 1

General Information

This chapter details background information on the MIO-2375.

Sections include:

- Introduction
- Specifications
- Block diagrams

1.1 Introduction

Advantech's MIO-2375 is powered by 11th Gen Intel® Core™ U series processors, and features a 2.5" Pico-ITX SBC form factor (compact series, 100 x 72 mm/3.93 x 2.83 in). MIO-2375 is capable of using embedded iManager 3.0, SUSI 4.0, and WISE-DeviceOn to remotely monitor and control system operations.

MIO-2375 adopts the latest 64-bit, multi-core processors built on 10nm process technology to improve CPU processing, graphics, security, and I/O flexibility.

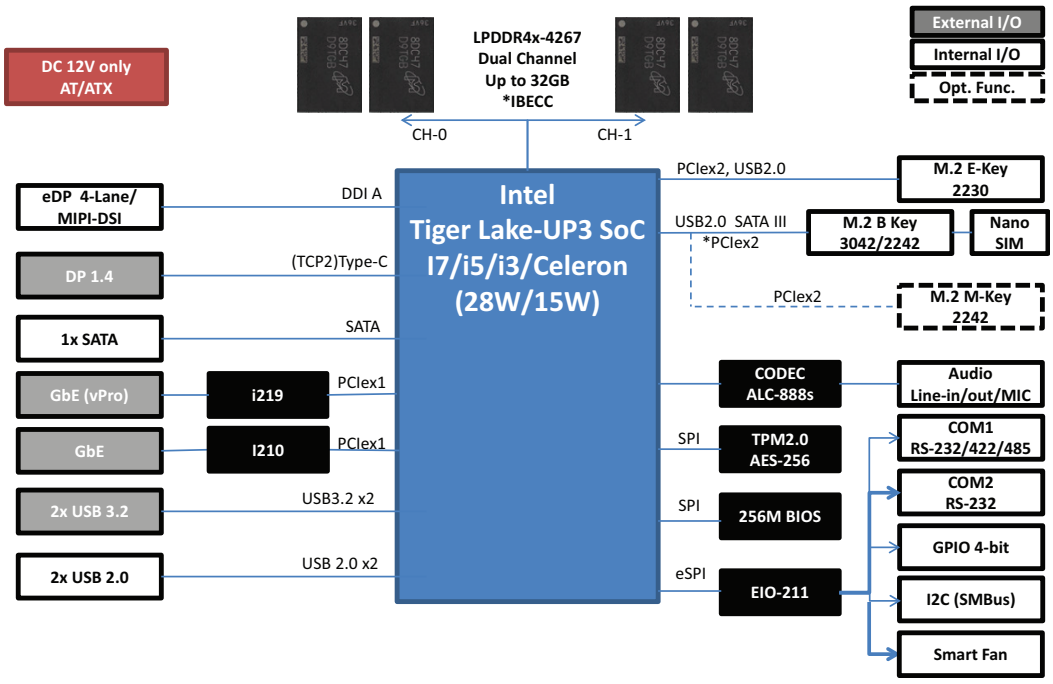
1.2 Specifications

Platform	**Processor**	**i7-1185G7E**	**i7-1185GRE**	**i5-1145G7E**	**i3-1115G4E**
	Max. Frequency	4.40 GHz	4.40 GHz	4.10 GHz	3.90 GHz
	Base Frequency	1.8 GHz	1.80 GHz	1.50 GHz	2.20 GHz
	Core/Tread	4/8	4/8	4/8	2/4
	LLC	12MB	12MB	8MB	6MB
	CPU TDP	15W	15W	15W	15W
	Chipset	Intel® 300 Series Chipset (SoC Integrated)			
	BIOS	AMI EFI 256Mbit			
Memory	Technology	LPDDR4x-4267			
	Max. Capacity	Up to 32GB			
	Channel/Socket	Single or Dual Channels/Onboard			
	ECC Support	No	Yes	No	No
Graphics	Controller	Integrated Intel® Iris® Xe Graphics			
	Max. Frequency	1.35 GHz	1.35 GHz	1.30 GHz	1.25 GHz
	Graphics Memory	TBU	TBU	TBU	TBU
	3D/HW Acceleration	DX12, OGL4.0, OCL1.2, HW Encode: H.265/HEVC, H.264, MPEG2, HW Decode: H.264			
Display I/F	LCD	eDP1.4 HBR3, up to 4096x2304x36bpp@60Hz; with DSC 7680x4320x30bpp@60 Hz Optional MIPI-DSI 2.5GHz, up to 3200x2000x24bpp@60Hz; with DSC 5120x3200x24bpp@60 Hz			
	HDMI/DP	1 x DP1.4 (DP++), up to 4096x2304x36bpp@60Hz; with DSC 7680x4320x30bpp@60 Hz			
	Multiple Display	Dual simultaneous displays by eDP/MIPI-DSI + DP			
External I/O	Ethernet	2 x RJ-45, LAN1: Intel 219LM, LAN2: Intel 210AT/IT			
	VGA/HDMI/DP	-/-/1			
	USB 3.2/USB 2.0	2/-			
	Power DC-Jack	Optional			

Internal I/O	SATA	1 x SATA GenIII 6.0 Gbps
	USB 2.0	2 x
	Serial Bus	I2C (support 400Kbit/s), *SMBus (optional)
	COM Port	1 x RS-232/422/485 (support 1Mbps), 1 x RS-232 (115.2kbps)
	GPIO	4-bit general purpose input output I/O
	Audio	Realtek ALC888s, Line-in/Line-out/MIC
	Inverter	12V
	Fan	4-wire smart fan
	Front Panel Control	Power-on, Reset, Buzzer, SATA LED, CaseOpen
Board Feature	Watchdog Timer	65536 level, 0~65535 sec
	TPM	TPM 2.0, Infineon SLB9670
	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, USB2.0)
	M.2 B-Key/M.2 M-Key	1 x B-Key 3042/2242 (1 x SATA , 1 x USB 2.0) w/ Nano-SIM Optional 1 x M-Key 2242 (PCIe x2 NVMe)
Power	Supply Voltage	Vin: DC 12V +/- 10%; RTC Battery: Lithium 3V/210mAH
	Connector	ATX 2pin 180D, optional DC-Jack
	Power Management	AT, ATX
	Max. Consumption	23.388 W
	Idle Consumption	9.029 W
Environment	Temperature	Operating: Standard: 0 ~ 60 °C (32 ~ 140 °F), Extend: -40 ~ 85 °C (-40 ~ 185 °F)
		Storage: -40 ~ 85 °C (-40 ~ 185 °F)
	Humidity	Operating: 40 °C (104 °F) @ 95% relative humidity, non-condensing
		Storage: 60 °C (140 °F) @ 95% relative humidity, non-condensing
	Vibration Resistance	3.5 Grms
Software	OS	Windows10, Linux 20.04, Yocto BSP
	Software & API	WISE-DeviceOn, Edge AI Suite, iManager 3.0
Certification	EMC	CE, FCC Class B
Mechanical	Dimensions	100 x 72 mm (3.93 x 2.83 in)
	Net Weight	80g (.17 lb)

*Note: Supported by request

1.3 Block Diagram



Chapter 2

Mechanical Specifications

This chapter details background information on the MIO-2375.

Sections include:

- Mechanical Diagrams
- Assembly Diagrams

2.1 Introduction

This MI/O compact form factor, next-generation SBC features a variety of mechanical improvements. The following is a quick installation guide for Advantech's thermal solution.

This chapter comprises assembly instructions for standard and optional thermal solutions as well as board dimension diagrams.

2.2 Board Layout: Dimensions

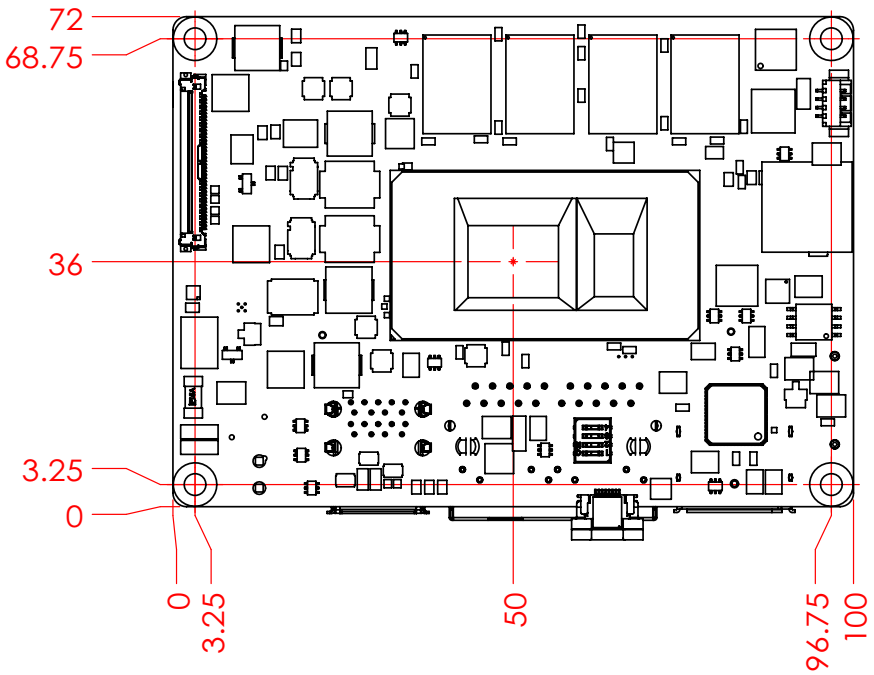


Figure 2.1 MIO-2375 Mechanical Diagram (Top Side)

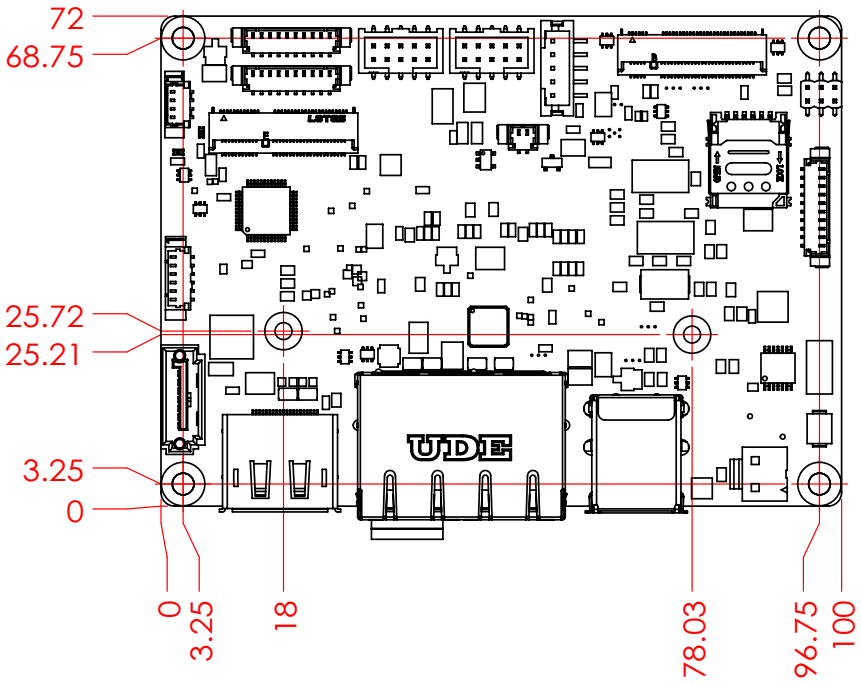


Figure 2.2 MIO-2375 Mechanical Diagram (Bottom Side)

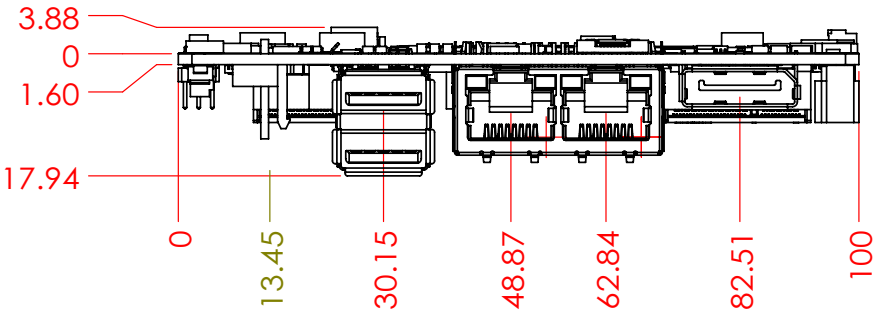


Figure 2.3 MIO-2375 Mechanical Diagram (Coastline)

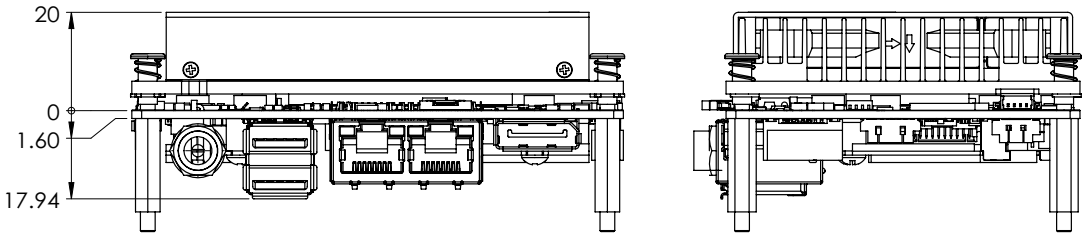


Figure 2.4 MIO-2375 Mechanical Diagram (with Cooler)

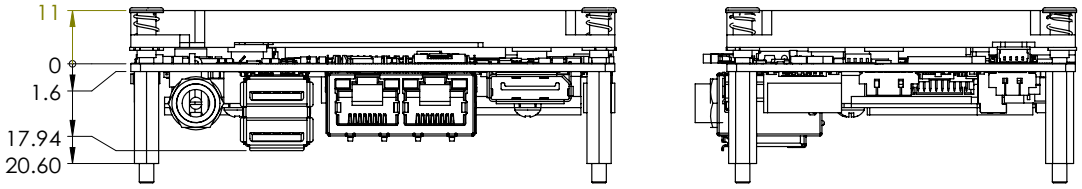
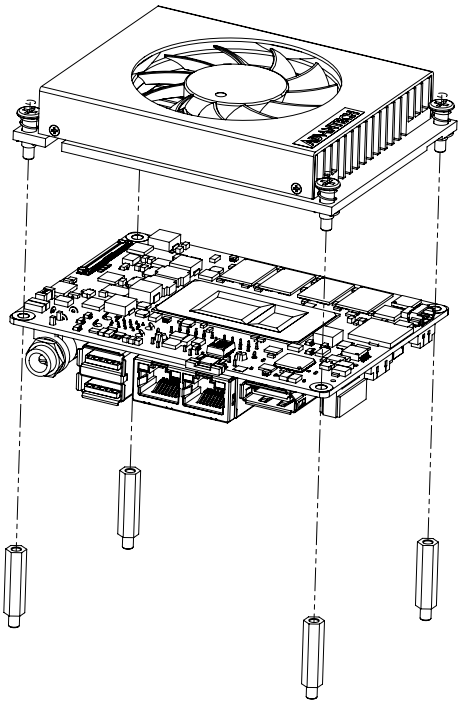


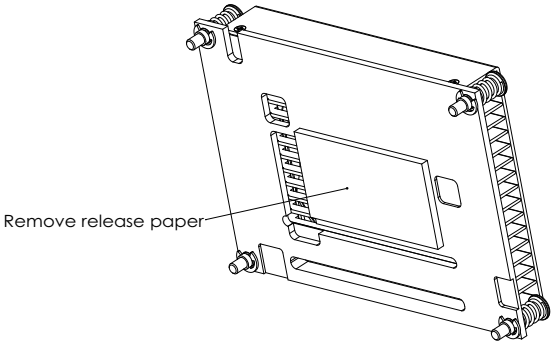
Figure 2.5 MIO-2375 Mechanical Diagram (with Heat Spreader)

2.3 Quick Installation Guide

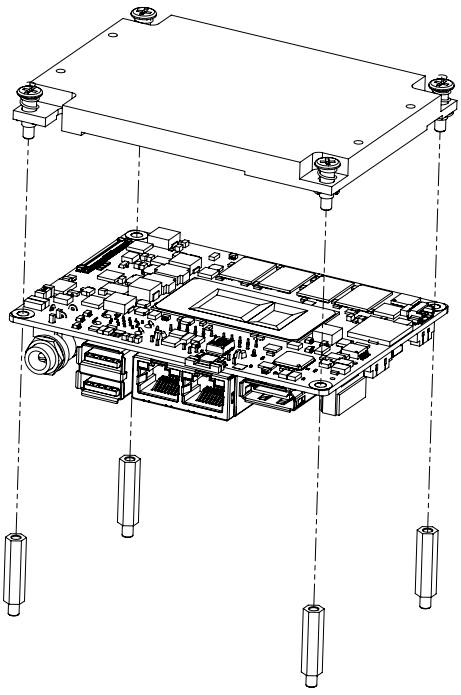
There is a Heatsink/Cooler (or optional heatspreader) in the white box inside the package. Use the following exploded diagram to assemble it.

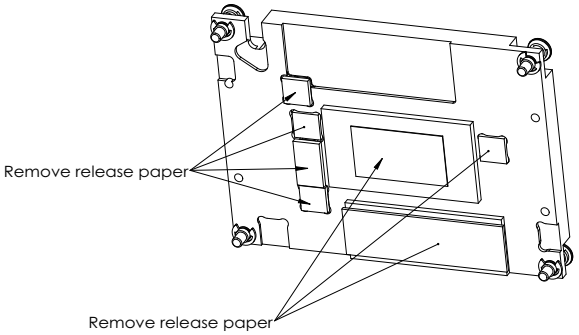
2.3.1 Cooler





2.3.2 Heatspreader (Optional)





Chapter 3

Installation

This chapter details setup procedures for MIO-2375 hardware — including instructions on setting jumpers and connecting peripherals, as well as switches and indicators. Be sure to read all the safety precautions before installation.

3.1 Jumpers and Switches

The MIO-2375 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 and Switches	
SW1	Auto Power on Setting
VDD1	LCD Power

3.2 Connectors

Onboard connectors link MIO-2375 to external devices such as hard disk drives or keyboards. The table below lists the function of each of the board's connectors.

Table 3.2: Connectors	
Label	**Function**
CN1	Front Panel
CN2	GPIO
CN3	I2C
CN4	FAN
CN5	DC Power in
Battery1	RTC Battery
EDP1	eDP
BL1	Inverter Power Output
DP1	DP++
USB1	USB 2.0+3.2
USB3	Internal USB
M2_1	M.2 E-key
M2_2	M.2 B/M-key
SIM1	NANO SIM
LAN1	RJ45_2x1_W/XFMR&LED
SATA1	SATA_7V
Audio1	Audio
COM1	COM1
COM2	COM2

3.3 Locating Connectors

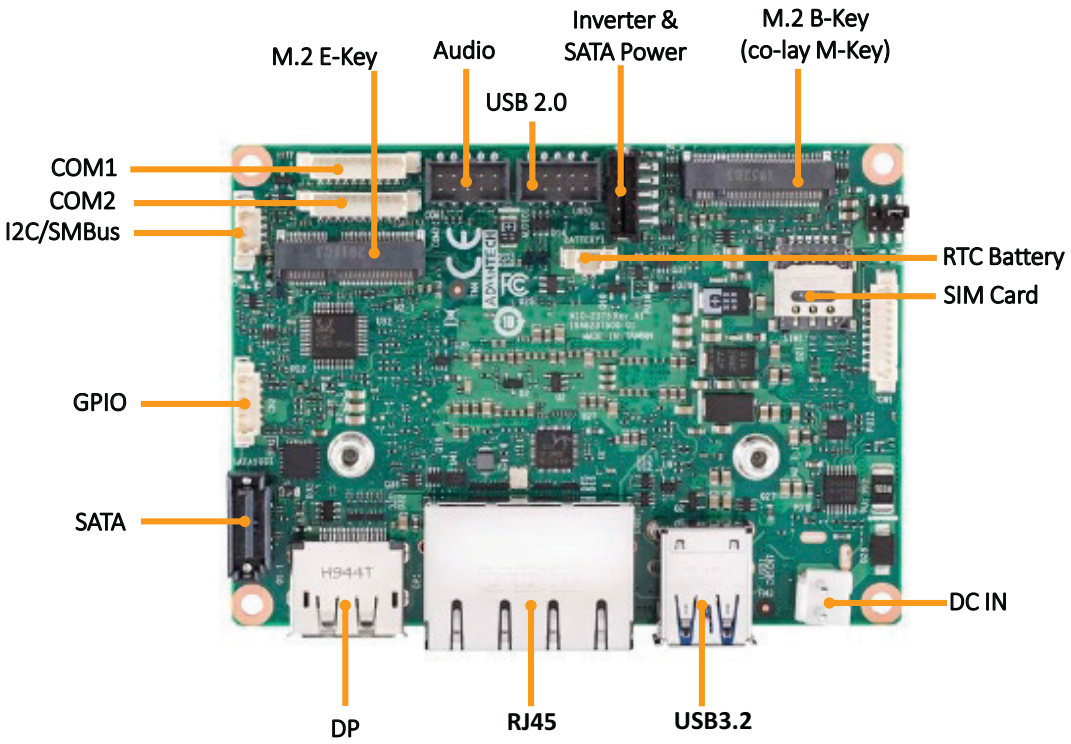


Figure 3.1 MIO-2375 Connector Locations (Top Side)

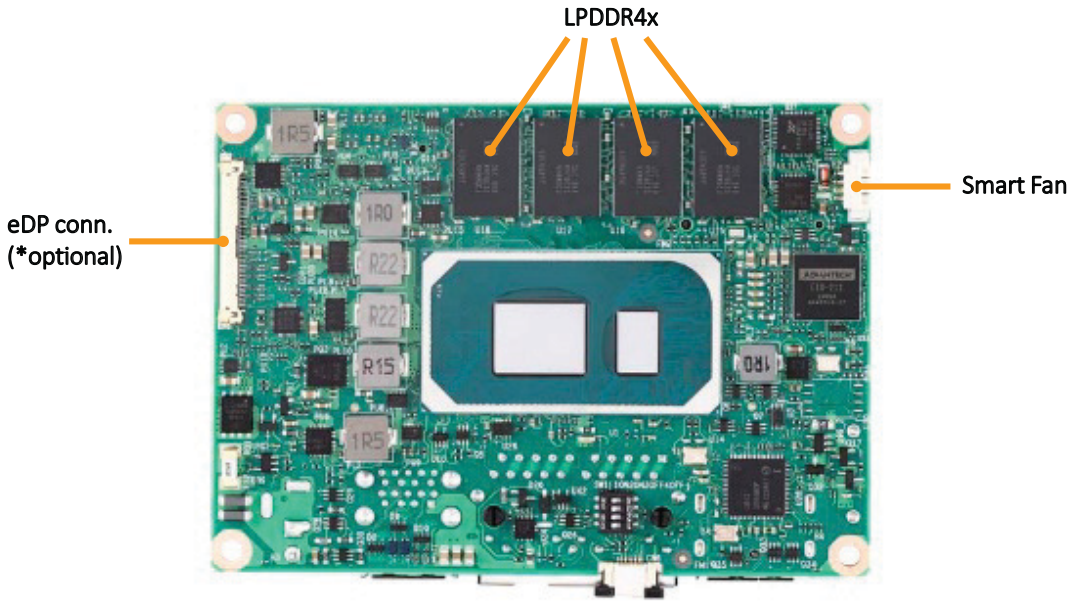
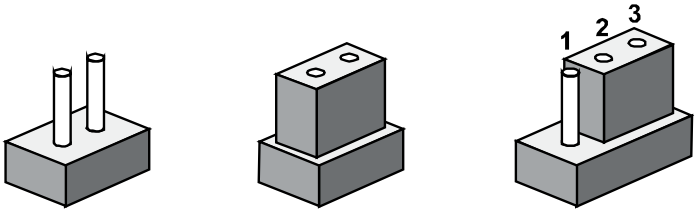


Figure 3.2 MIO-2375 Connector Locations (Bottom Side)

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 Auto Power On Setting (SW1)

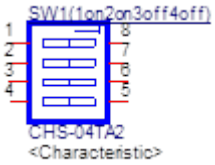


Table 3.3: Auto Power On Setting (SW1)	
Part Number	1600000084
Footprint	SW_4x2P_50_260x220
Description	SLIDE SW CHS-04TA(29) SMD 8P 6.6x5.4x2.4mm
Setting	**Function**
(1-8)* on	AT mode
(1-8) off	ATX mode
(3-6) on	Clear CMOS
(3-6)*off	Normal (Keep CMOS)
(2-7)(4-5)	Test Only

Load BIOS Default

Step 1: Power OFF

Step 2: Dip switch to position 3 to 6, then power on

Step 3: BIOS load default (do not clear time & clear CMOS)ŁAPop out to remind the user to shut down and switch the DIP switch from 6 to 3

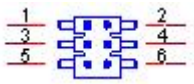
Step 4: Power on

Clear CMOS

Remove battery (battery 1)

The system stops for 3 seconds, show checksum error, time setting clear.

3.4.2 LCD Power Setting (VDD1)



Part Number	1653003260
Footprint	HD_3x2P_79
Description	PIN HEADER 3x2P 2.0mm 180D(M) SMD 21N22050
Setting	**Function**
(1-3)*	+3.3V
(3-5)	+5V
(3-4)	+12V

3.4.3 Front Panel (CN1)

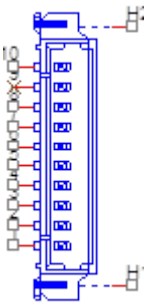


Table 3.4: Front Panel (CN1)	
Part Number	1653007728-01
Footprint	WF_10P_49_BOX_53398-1071
Description	Wafer 1x10P/1.25mm/PA/M/VA/WH/Sn/H4.7mm/WO
Pin	**Pin Name**
1	GND
2	BUZZER-
3	BUZZER+
4	RDC_CASEOPEN
5	SATA_EXT_LED#
6	PSIN#
7	RST#
8	HD LED +3.3V
9	NC
10	Power LED +5V

3.4.4 GPIO (CN2)

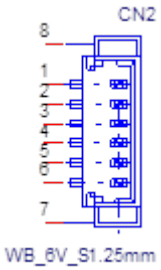


Table 3.5: GPIO (CN2)	
Part Number	1654906601
Footprint	WHL6VS-125-85205
Description	WAFER 6x1P 1.25mm 180D(M) SMD 85205-06001
Pin	**Pin Name**
1	P1_GPIO0
2	P1_GPIO1
3	P1_GPIO2
4	P1_GPIO3
5	GND
6	+5V

3.4.5 I²C (CN3)

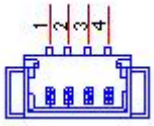


Table 3.6: I²C (CN3)	
Part Number	1655904020
Footprint	FPC4V-125M
Description	WAFER 4P 1.25mm 180D(M) SMD 85205-04001
Pin	**Pin Name**
1	GND
2	I2C_DAT
3	I2C_CLK
4	+V5_I2C

3.4.6 FAN (CN4)

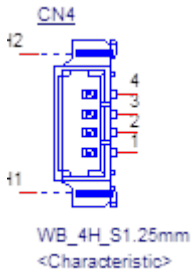


Table 3.7: FAN (CN4)	
Part Number	1654904503
Footprint	WF_4P_49_BOX_RA
Description	WAFER BOX 4x1P 1.25mm 90D(M) SMD 85204-04001
Pin	**Pin Name**
1	GND
2	+V12_FAN
3	FAN_SPEED
4	FAN_PWM

3.4.7 DC Power in (CN5)

Table 3.8: DC Power in (CN5)	
Part Number	1655003962
Footprint	WF_2P_156_D_A3963WV2
Description	WAFER 3P 1.25mm 90D(M) SMD 85205-03001
Pin	**Pin Name**
2	+12V
1	GND

3.4.8 RTC Battery (Battery1)

Table 3.9: RTC Battery (Battery1)	
Part Number	1655005427-01
Footprint	WF_2P_49_53398-0271
Description	WAFER 2P 1.25mm 180D(M) SMD 53398-0271
Pin	**Pin Name**
1	GND
2	VBAT

3.4.9 eDP (EDP1)

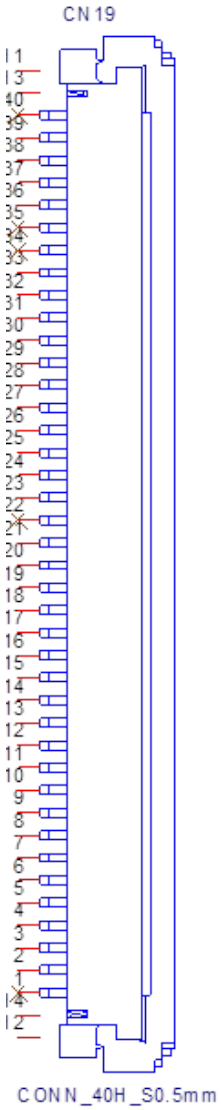


Table 3.10: eDP (EDP1)	
Part Number	1655005384-01
Footprint	CONN_40P_KN38A-40S-0-5H
Description	LVDS Conn. 40P 0.5mm 90D(F) SMD KN38A-40S-0.5H
Pin	**Pin Name**
1	NC
2	GND
3	eDP_TX3-
4	eDP_TX3+
5	GND
6	eDP_TX2-
7	eDP_TX2+
8	GND
9	eDP_TX1-
10	eDP_TX1+
11	GND
12	eDP_TX0-
13	eDP_TX0+-
14	GND
15	eDP_AUX+
16	eDP_AUX-
17	GND
18	+12V or +5V or +3.3V
19	+12V or +5V or +3.3V
20	+12V or +5V or +3.3V
21	+12V or +5V or +3.3V
22	NC
23	GND
24	GND
25	GND
26	GND
27	eDP_HDP
28	GND
29	GND
30	GND
31	GND
32	ENABKL
33	PWM
34	DSI_Detect
35	NC
36	eDP Inverter 12V or 5V
37	eDP Inverter 12V or 5V
38	eDP Inverter 12V or 5V
39	eDP Inverter 12V or 5V
40	NC

3.4.10 Inverter Power Output (BL1)

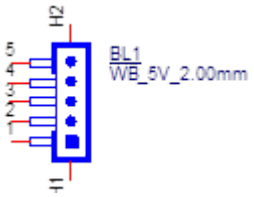


Table 3.11: Inverter Power Output (BL1)	
Part Number	1653007905-01
Footprint	WF_5P_79_BOX_50310-0057N-001
Description	Wafer 1X5P/2.0mm/VA/Sn/BK/S/H6.5/C+R
Pin	**Pin Name**
1	+5V
2	VBR
3	ENABKL
4	GND
5	+12V

3.4.11 DP++ (DP1)

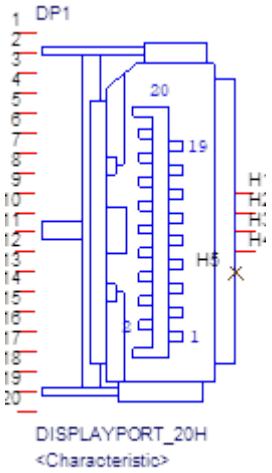


Table 3.12: DP++ (DP1)	
Part Number	1654010437
Footprint	DPCON_20P_3VD51203-H7JJ-7H
Description	Displayport Conn. 20P 0.5mm 90D(F) SMD 3VD51203-

3.4.12 USB3.2_13H (USB1)

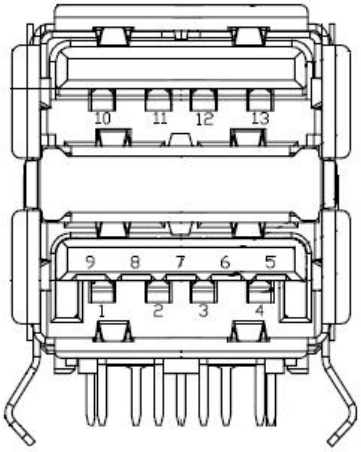


Table 3.13: USB3.2_13H (USB1)	
Part Number	1654013480-01
Footprint	USB_9X2P_USB5-18F5-BNR0-10
Description	USB 3.1 2x9P/2.0mm/PA66/(F)/RA/G30u/D/BU/H15.69

3.4.13 Internal USB (USB 3)

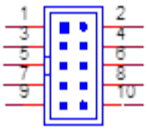


Table 3.14: Internal USB (USB3)	
Part Number	1653007480-01
Footprint	HD_5X2P_79_BOX_H245
Description	BOXH 2x5P/2.0mm/LCP/M/VA/G10u/S/BK/H4.83/W
Pin	**Pin Name**
1	+5V
2	+5V
3	A_D-
4	B_D-
5	A_D+
6	B_D+
7	GND
8	GND
9	GND
10	NC

3.4.14 M.2 E key (M2_1)

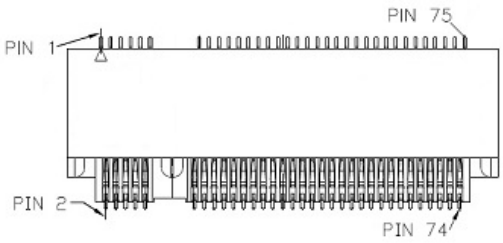


Table 3.15: M.2 E key (M2_1)	
Part Number	1654012663-01
Footprint	NGFF_75P_APCI0163-P001A
Description	NGFF 75P/0.5mm/(F)/LCP/RA/GFL/S/BK/H8.5mm/E-key
Pin	**Pin Name**
1	GND
2	+3.3VSB
3	USB_D+
4	+3.3VSB
5	USB_D-
7	GND
8	NC
10	NC
12	NC
14	NC
18	GND
33	GND
35	PETp0
37	PETn0
39	GND
41	PERp0
43	PERn0
45	GND
47	REFCLK+
49	REFCLK-
50	SUSCLK
51	GND
52	RESET#
53	CLKREQ#
54	BT_DISABLE#
55	PCIE_WAKE#
56	W_DISABLE#
57	GND
59	PET1p0
61	PET1n0
63	GND
65	PER1p0

Table 3.15: M.2 E key (M2_1)	
67	PER1n0
69	GND
72	+3.3VSB
74	+3.3VSB
75	GND

3.4.15 M.2 B/M key (M2_2)

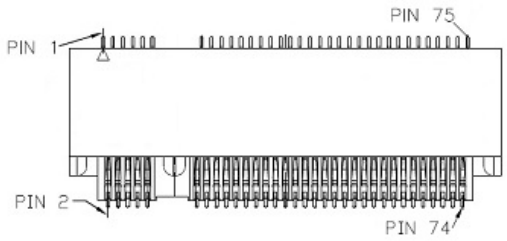


Table 3.16: M.2 B/M key (M2_2)		
Part Number	1654012087-02/1654012187-02	
Footprint	NGFF_75P_APCI0161-P001A	
Description	NGFF 75P/0.5mm/(F)/LCP/RA/GFL/S/BK/H8.50/B-key	
Pin	**B key Pin Nam**	**M key Pin Name**
1	NC	GND
2	+3.3VSB	+3.3VSB
3	GND	GND
4	+3.3VSB	+3.3VSB
5	GND	PCIe_RX4-
6	POWER_OFF#	NC
7	USB7_P+	PCIe_RX4+
8	WWAN_DISABLE#	NC
9	USB7_P-	GND
10	NC	NC
11	GND	PCIe_TX4-
12	Key	+3.3VSB
13	Key	PCIe_TX4+
14	Key	+3.3VSB
15	Key	GND
16	Key	+3.3VSB
17	Key	PCIe_RX3-
18	Key	+3.3VSB
19	Key	PCIe_RX3+
20	NC	NC
21	GND	GND
22	NC	NC
23	NC	PCIe_TX3-
24	GNSS_DISABLE#	NC
25	NC	PCIe_TX3+

Table 3.16: M.2 B/M key (M2_2)		
26	NC	NC
27	GND	GND
28	NC	NC
29	PCIe_RX1-	PCIe_RX2-
30	UIM_RESET	NC
31	PCIe_RX1+	PCIe_RX2+
32	UIM_CLK	NC
33	GND	GND
34	UIM_DATA	NC
35	PCIe_TX1-	PCIe_TX2-
36	+VUIM_PWR	+VUIM_PWR
37	PCIe_TX1+	PCIe_TX2+
38	NC	NC
39	GND	GND
40	NC	NC
41	SATA_RX+	PCIe_RX1+
42	NC	NC
43	SATA_RX-	PCIe_RX1-
44	NC	NC
45	GND	GND
46	NC	NC
47	SATA_TX-	PCIe_TX1-
48	NC	NC
49	SATA_TX+	PCIe_TX1+
50	NC	PLTRST#
51	GND	GND
52	CLK _REQ#	CLK _REQ#
53	CLK _PCIE-	CLK _PCIE-
54	PCIE_WAKE#	PCIE_WAKE#
55	CLK _PCIE+	CLK _PCIE+
56	NC	NC
57	GND	GND
58	NC	NC
59	NC	Key
60	NC	Key
61	NC	Key
62	NC	Key
63	NC	Key
64	NC	Key
65	NC	Key
66	SIM_KEYB_DET	Key
67	PLTRST_BKEY #	NC
68	SUSCLK	SUSCLK
69	M2_SSD_PEDET	M2_SSD_PEDET
70	+3.3VSB	+3.3VSB
71	GND	GND
72	+3.3VSB	+3.3VSB

Table 3.16: M.2 B/M key (M2_2)		
73	GND	GND
74	+3.3VSB	+3.3VSB
75	GND	GND

3.4.16 NANO SIM(SIM1)

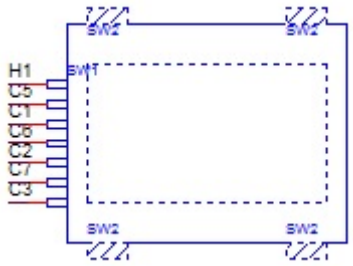


Table 3.17: NANO SIM(SIM1)	
Part Number	1654013260-01
Footprint	SIM_6P_N010615-SINR00
Description	Nano SIM Card 6P/1.27mm/(F)/LCP/RA/GFL/S/BK/H1.5
Pin	**Pin Name**
C1	+VUIM_PWR
C2	UIM_RESET
C3	UIM_CLK
C5	GND
C6	+VUIM_VPP
C7	UIM_DATA

3.4.17 RJ45_2x1_W/XFMR&LED (LAN1)

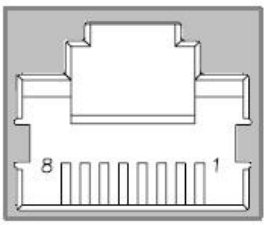


Table 3.18: RJ45_2x1_W/XFMR&LED (LAN1)	
Part Number	1654014593-01
Footprint	RJ45_28P_RB2-ZZ-0069
Description	RJ45 1x2 28P/PA6T/G-30u"/RA/D/BK/G,O;Y

3.4.18 SATA_7V (SATA1)

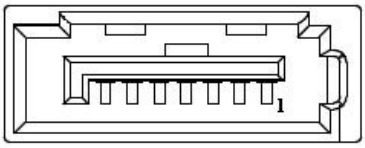


Table 3.19: SATA_7V (SATA1)	
Part Number	1654013615-01
Footprint	SATA_7P_WATF-07DBN6SB1U
Description	SATA 7P/1.27mm/LCP/F/VA/G15u/S/BK/H8.41/W

3.4.19 Audio (Audio1)

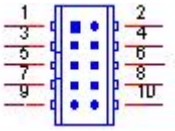


Table 3.20: Audio (Audio1)	
Part Number	1653007480-01
Footprint	HD_5X2P_79_BOX_H245
Description	BOXH 2x5P/2.0mm/LCP/M/VA/G10u/S/BK/H4.83/W
Pin	**Pin Name**
1	LOUTR
2	LINR
3	GND
4	GND
5	LOUTL
6	LINL
7	GND
8	FRONT-JD
9	MIC1R
10	MIC1L

3.4.20 COM1 (COM1)

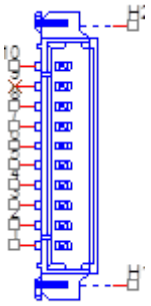


Table 3.21: COM1 (COM1)	
Part Number	1653007728-01
Footprint	WF_10P_49_BOX_53398-1071
Description	Wafer 1x10P/1.25mm/PA/M/VA/WH/Sn/H4.7mm/WO
Pin	**Pin Name**
1	NC
2	COM_RI#
3	COM_DTR#
4	COM_CTS#
5	COM_TXD
6	COM_RTS#
7	COM_RXD
8	COM_DSR#
9	COM_DCD#
10	GND

3.4.21 COM2 (COM2)

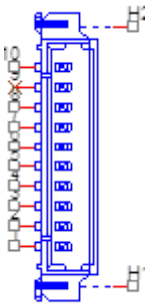


Table 3.22: COM2 (COM2)	
Part Number	1653007728-01
Footprint	WF_10P_49_BOX_53398-1071
Description	Wafer 1x10P/1.25mm/PA/M/VA/WH/Sn/H4.7mm/WO
Pin	**Pin Name**
1	NC
2	COM_RI#

Table 3.22: COM2 (COM2)	
3	COM_DTR#
4	COM_CTS#
5	COM_TXD
6	COM_RTS#
7	COM_RXD
8	COM_DSR#
9	COM_DCD#
10	GND

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-2375 BIOS setup screens.

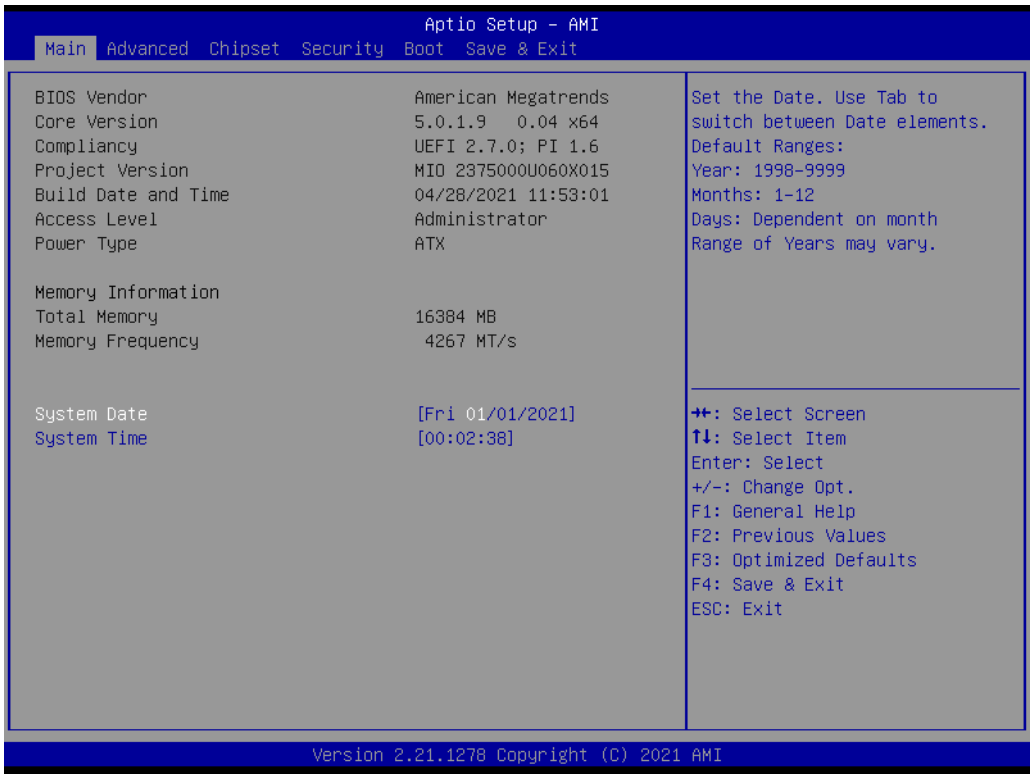
AMI's BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration. This information is stored in battery-backed CMOS so it retains the Setup information when the power is turned off.

4.1 Entering the 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.

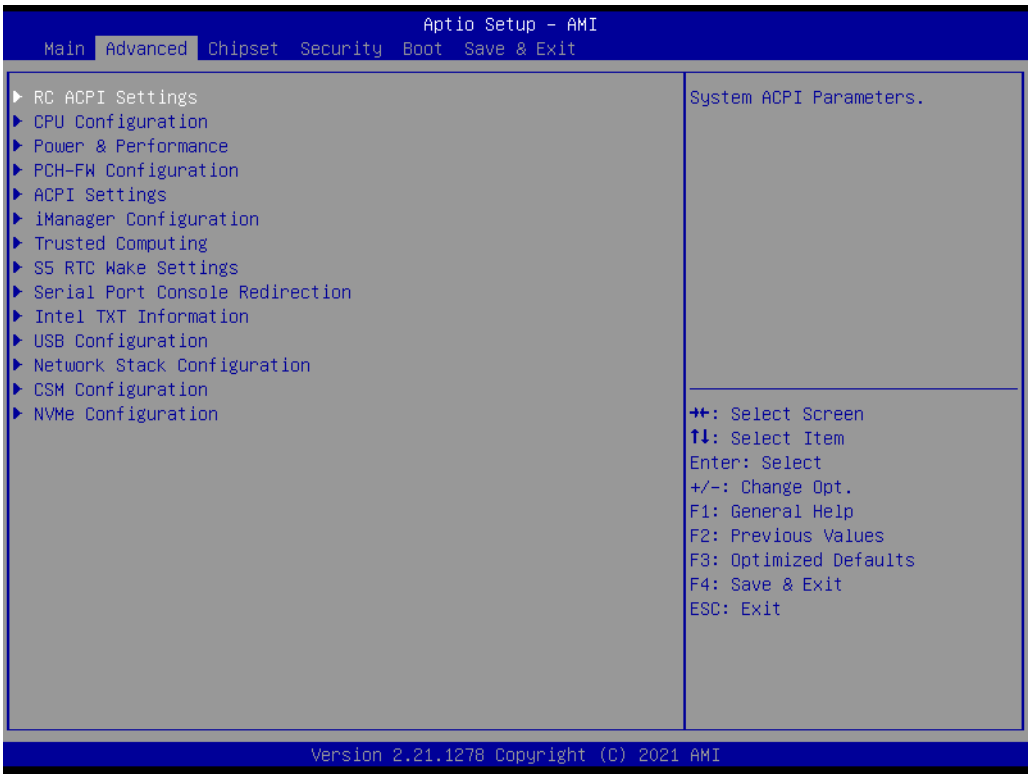
Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

- **System time / System date**

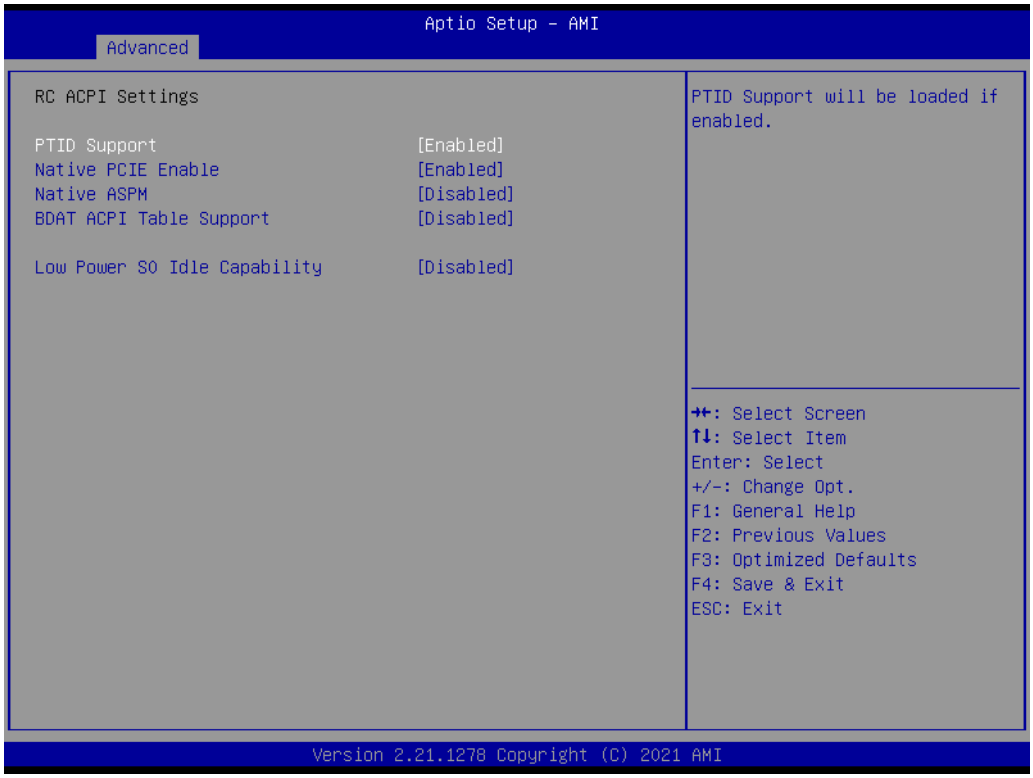
Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time must be entered in HH:MM:SS format.

4.1.2 Advanced BIOS Features Setup

Select the Advanced tab from the MIO-2375 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

Enable to load PTID Table.

Native PCIE Enable

Enable/Disable PCIE Native Control reported in ACPI Table.

Native ASPM

Choose ASPM feature controlled by OS or BIOS.

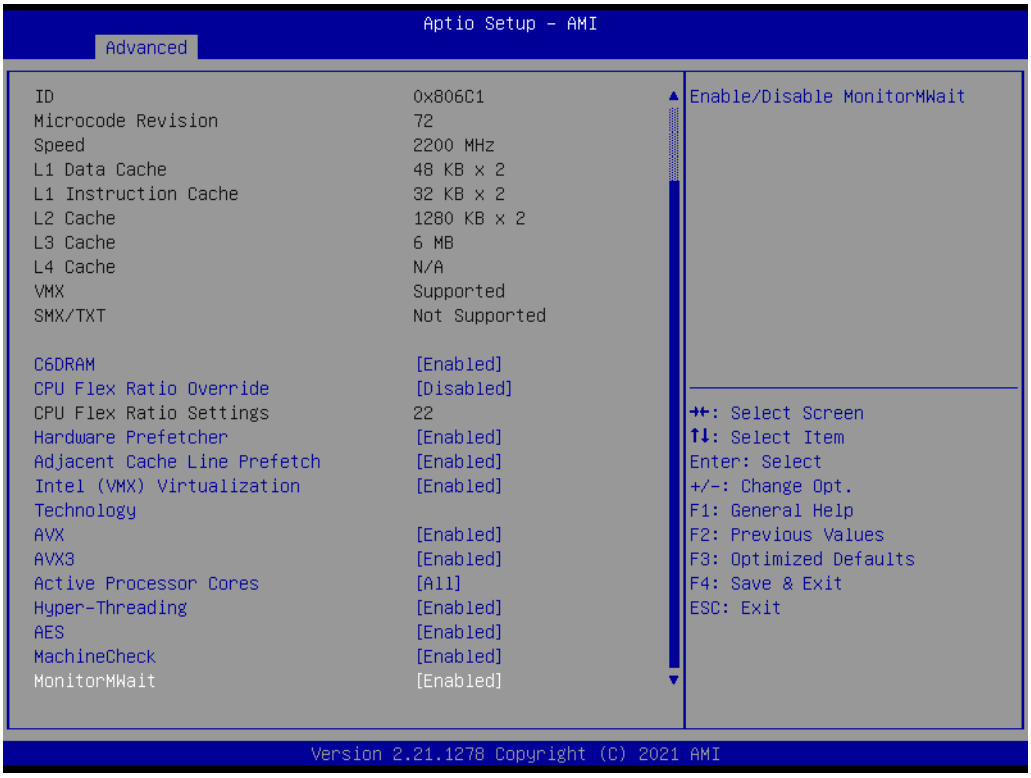
BDAT ACPI Table Support

Enable to support BDAT ACPI Table.

Low Power S0 Idle Capability

Enable/Disable ACPI Low Power S0 Idle Capability under OS.

4.1.2.2 CPU Configuration



C6DRAM

Enable/Disable moving of DRAM contents to PRM memory when 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.

AVX3

Enable/Disable the AVX 3 Instructions.

Active Processor Cores

This item allows users to set how many processor cores should be active.

Hyper-Threading

Enable/Disable Hyper-Threading Technology.

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.

4.1.2.3 Power & Performance

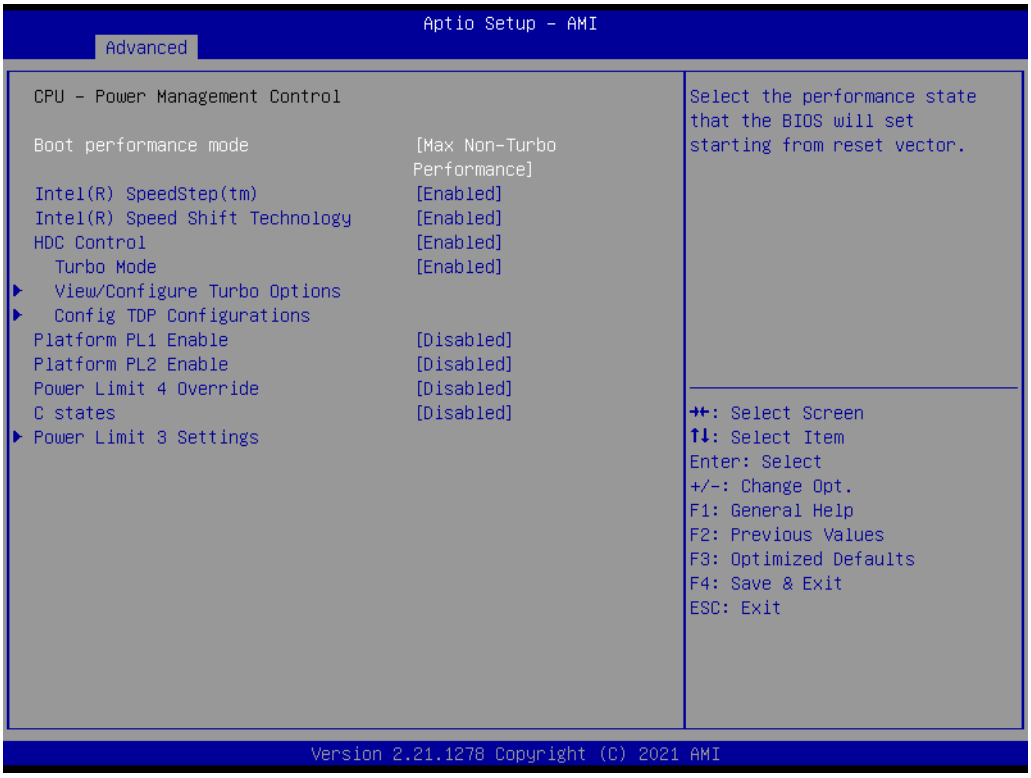
CPU – Power Management Control

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 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.

Config TDP Configuration

Config TDP Configuraitons.

CPU VR Setting

CPU CR Settings.

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.

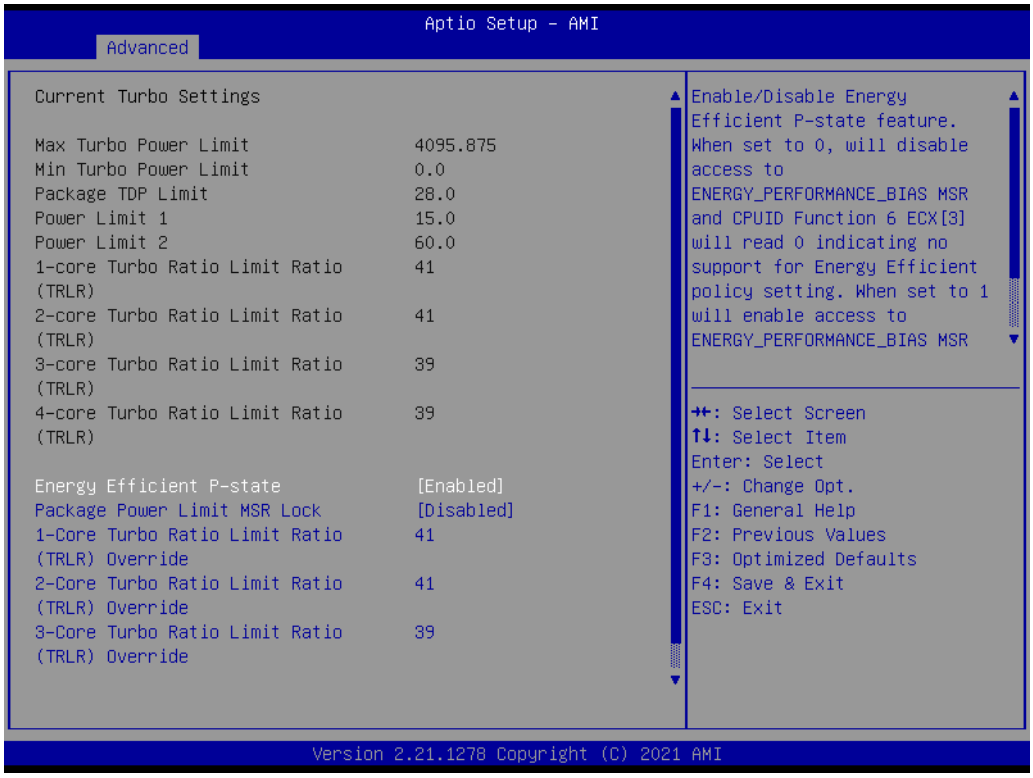
PowerLimit 3 Settings

Power Limit 3 Settings.

CPU Lock Configuration

CPU Lock Configuration.

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.

1-Core Turbo Ratio Limit Ratio (TRLR) Override

1-Core Turbo Ratio Limit Ratio (TRLR).

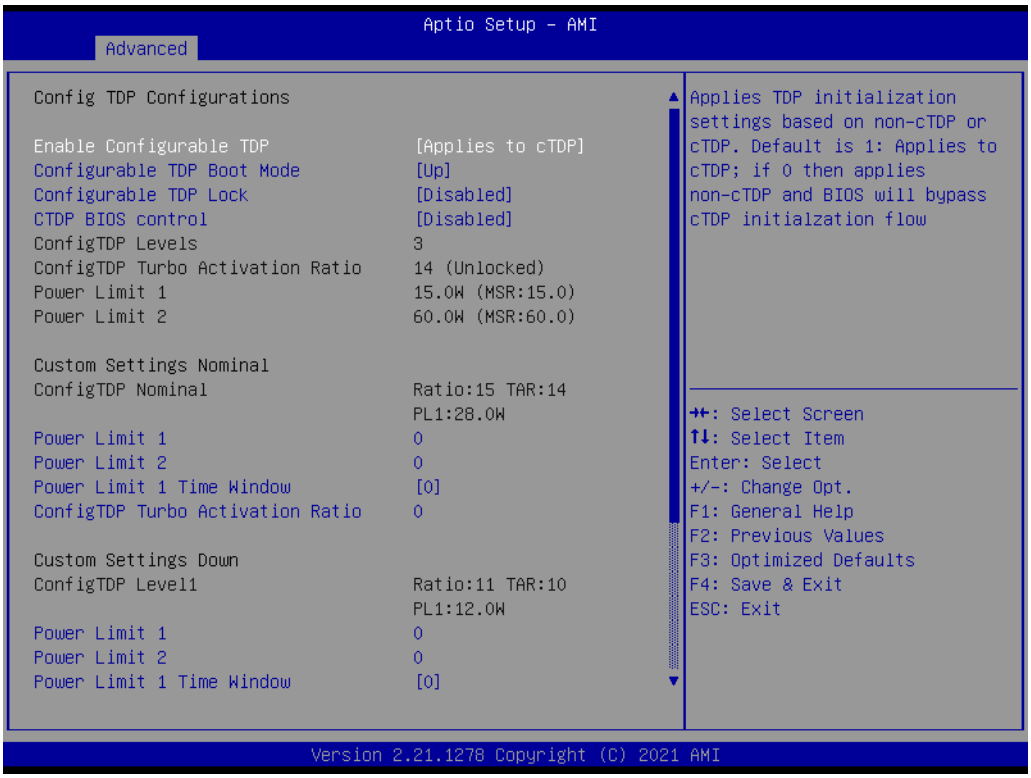
2-Core Turbo Ratio Limit Ratio (TRLR) Override

2-Core Turbo Ratio Limit Ratio (TRLR).

Energy Efficient Turbo

Enable/Disable Energy Efficient Turbo feature.

Config TDP Configurations



Enable Configurable TDP

Applies TDP initialization settings based on non-cTDP or cTDP.

Configurable TDP Boot Mode

Configurable TDP Mode as Nominal/Up/Down/Deactivate TDP selection.

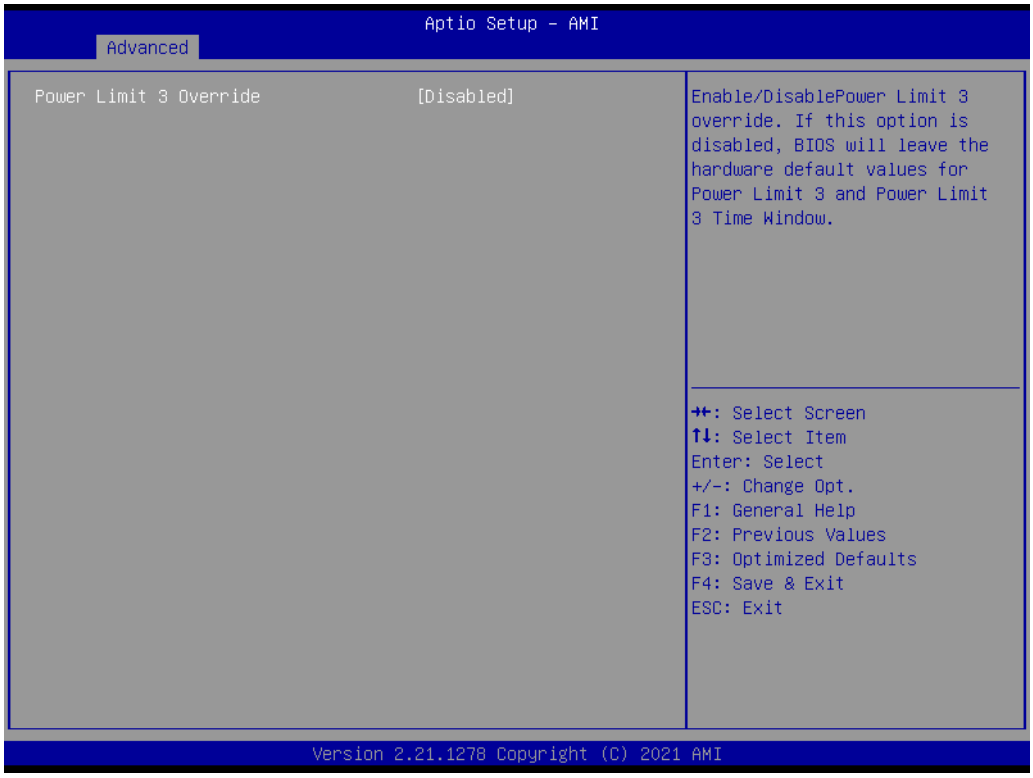
Configurable TDP Lock

Configurable TDP Mode Lock sets the Lock bit.

CTDP BIOS control

Enables CTDP control via runtime ACPI BIOS method.

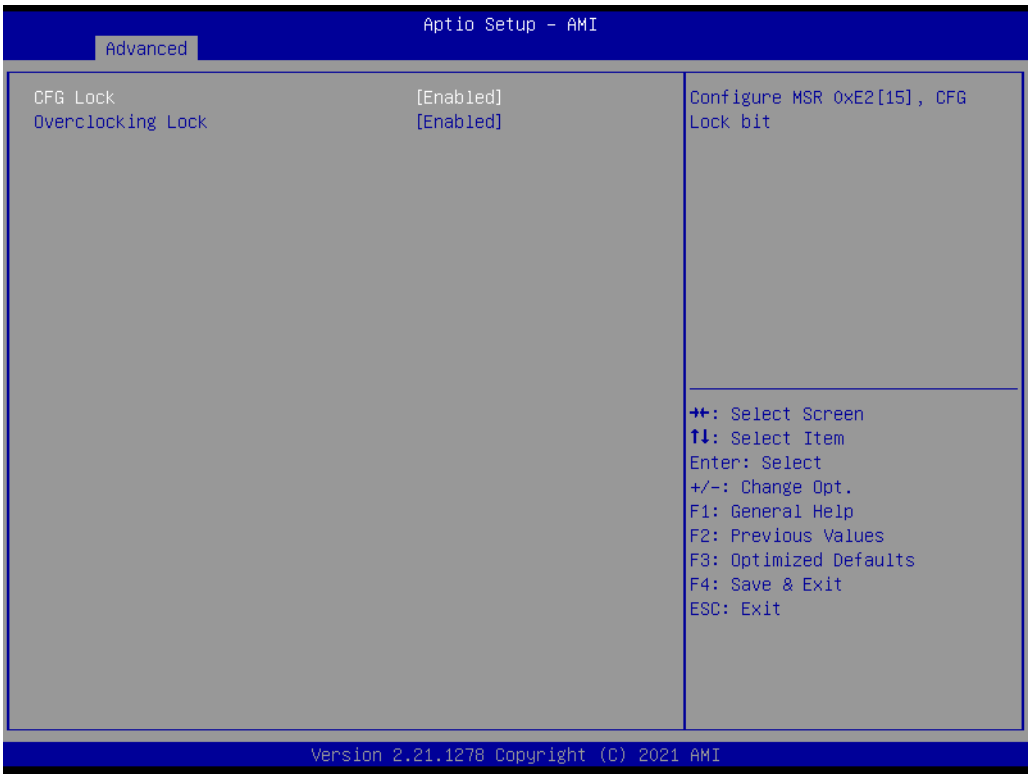
Power Limit 3 Settings



Power Limit 3 Override

Enable/Disable Power Limit 3 override.

CPU Lock Configuration



CFG Lock

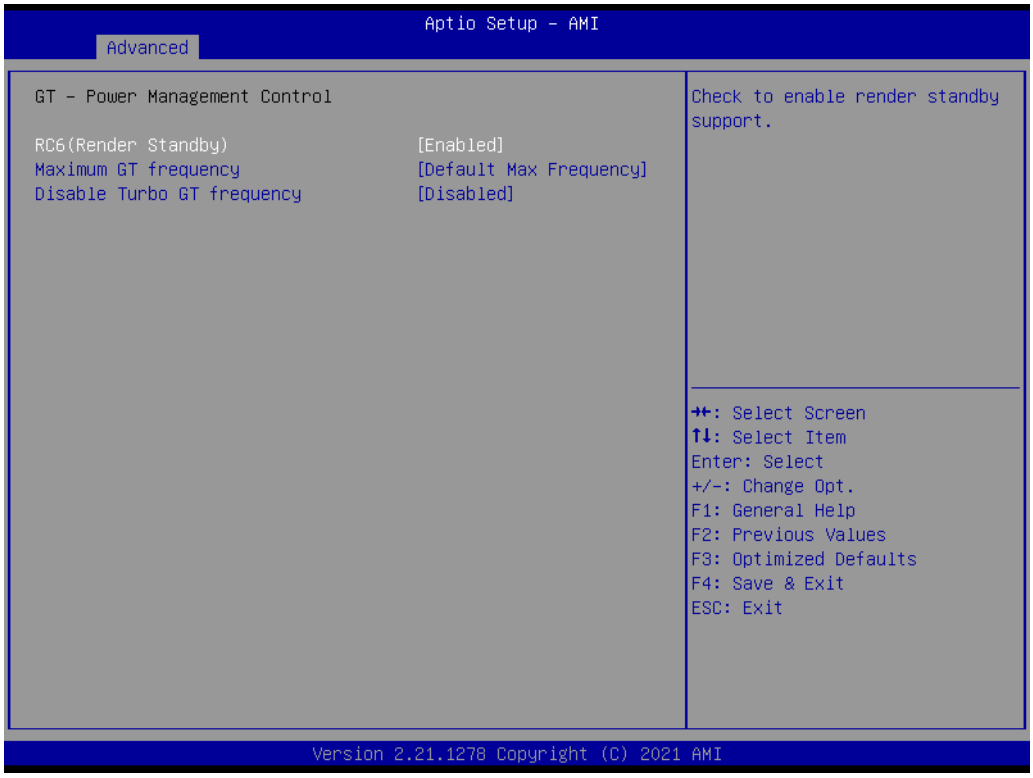
Configure MSR 0xE2[15], CFG Lock bit.

Overclocking Lock

Enable/Disable Overclocking Lock (BIT 20) in FLEX_RATIO(194) MSR.

.

GT - Power Management Control



RC6(Render Standby)

Check to enable render standby support.

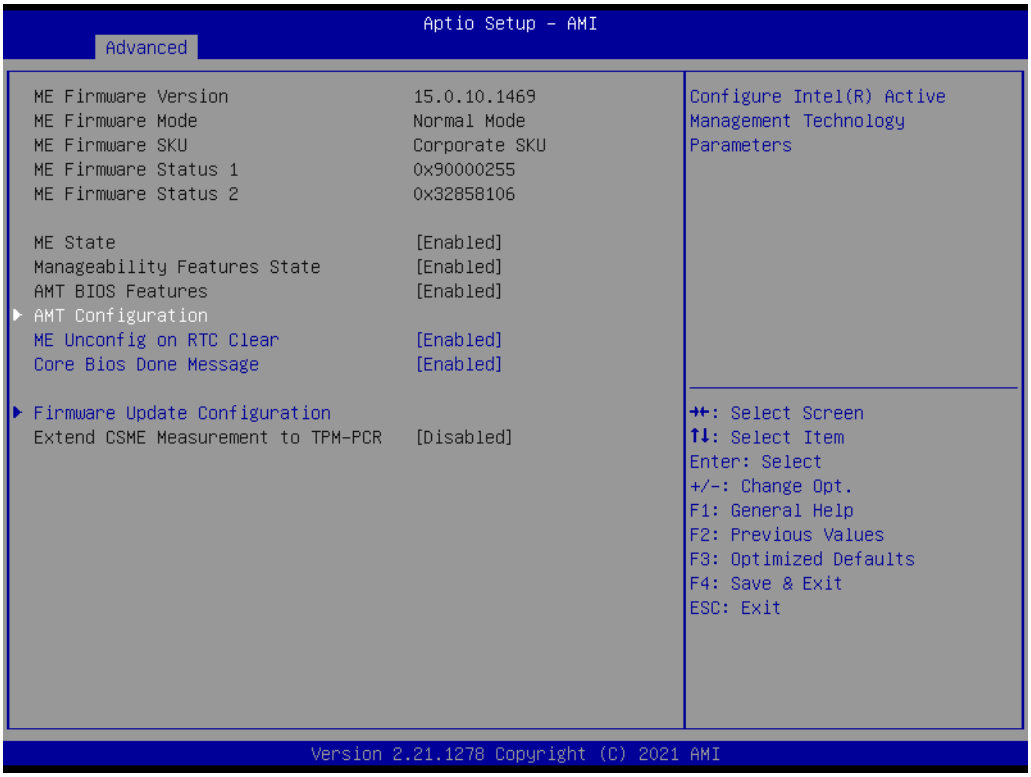
Maximum GT Frequency

Maximum GT frequency limited by user.

Disable Turbo GT Frequency

Enabled/Disabled Turbo GT frequency.

4.1.2.4 PCH-FW Configuration



ME State

When Disabled ME will enter Temporarily Disabled Mode.

ME Unconfig on RTC Clear

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

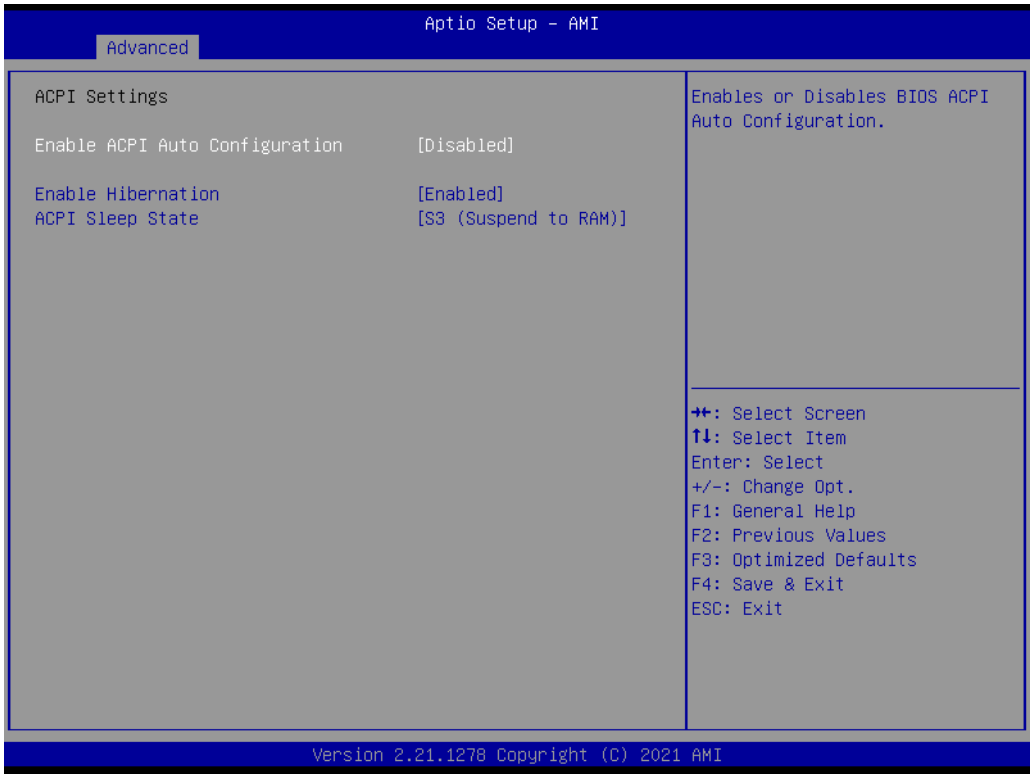
Core BIOS Done Message

Enable/Disable Core BIOS Done message sent to ME.

Firmware Update Configuration

Configure Management Engine Technology Parameters.

4.1.2.5 ACPI Settings



Enable ACPI Auto Configuration

Enable or disable BIOS ACPI auto configuration.

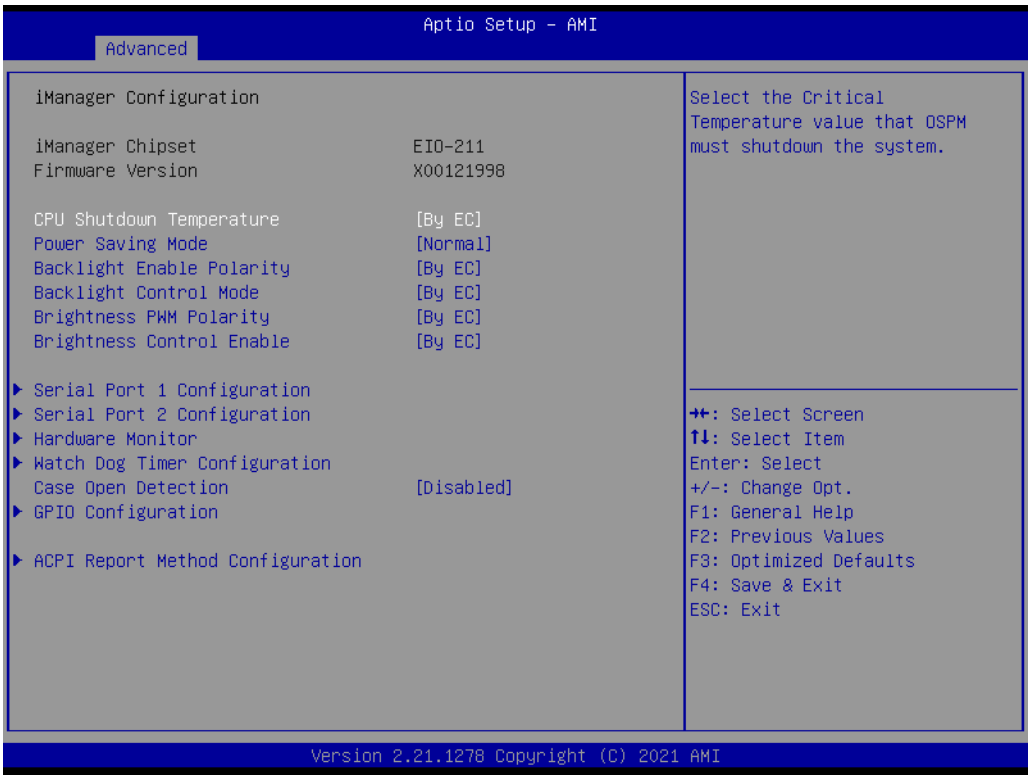
Enable Hibernation

Enables or Disables system ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS.

ACPI Sleep State

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

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.

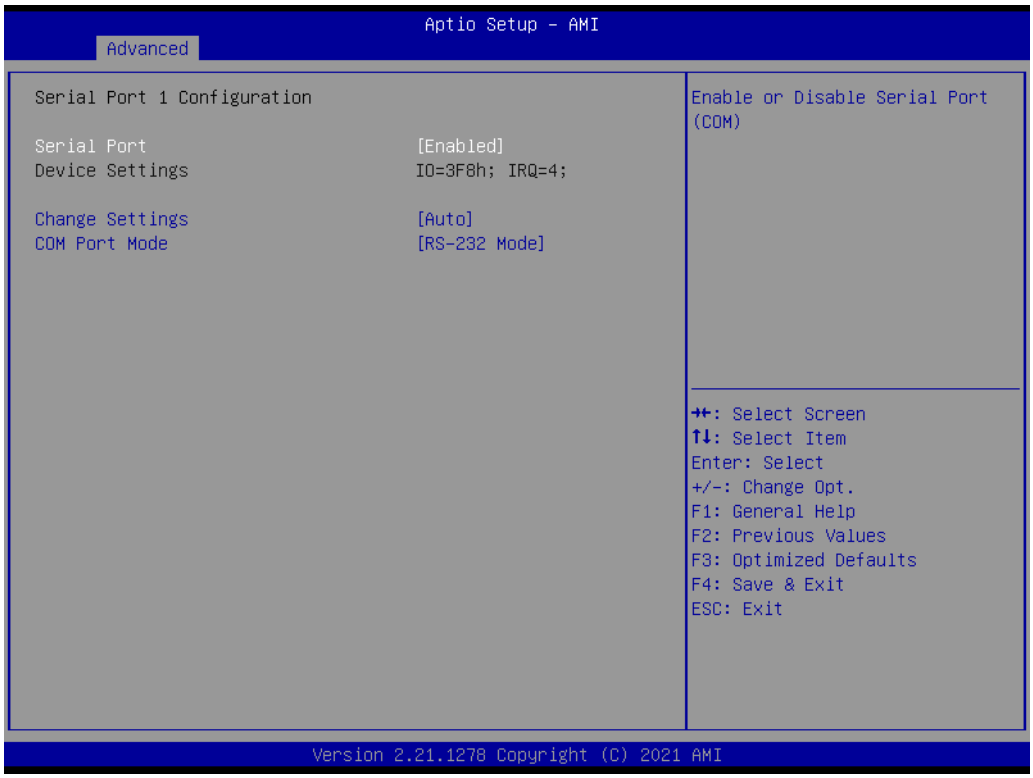
GPIO Configuration

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).

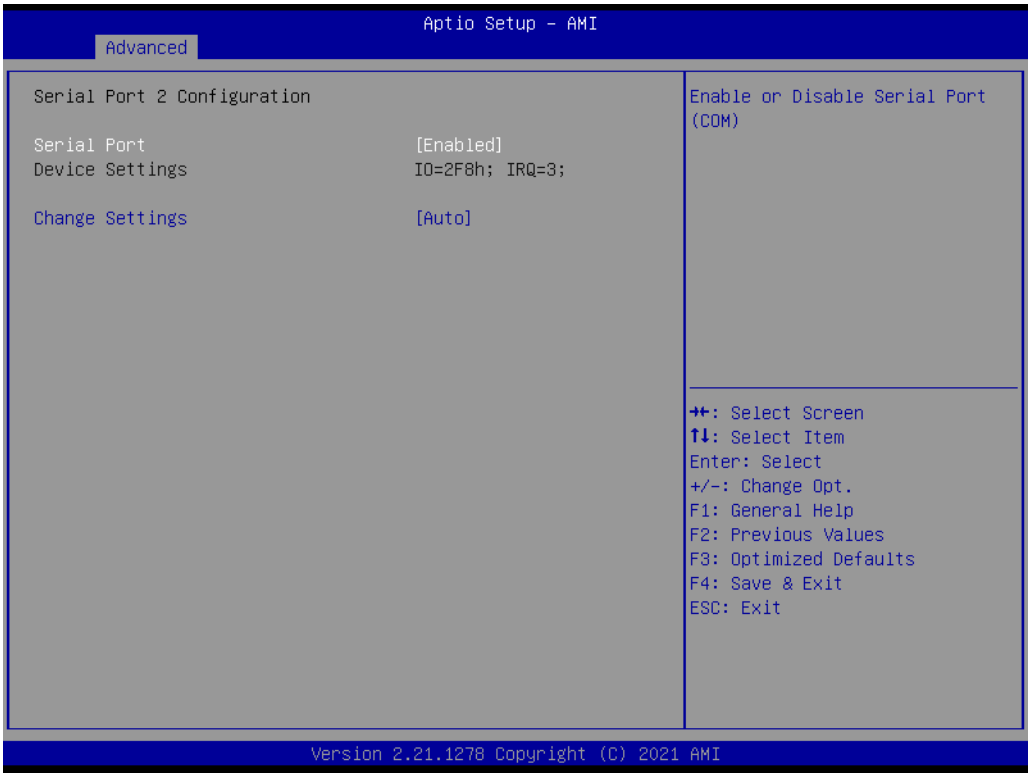
Change Settings

Select an optimal settings for Super IO device.

COM Port Mode

COM Port Mode Select.

Serial Port 2 Configuration



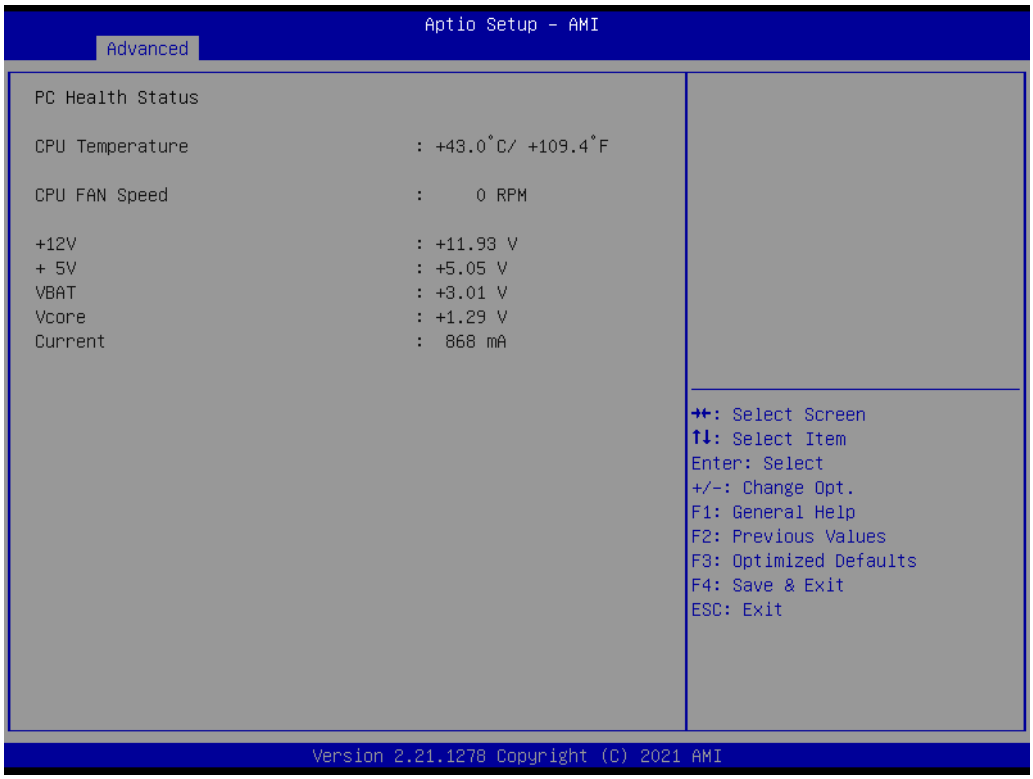
Serial Port

Enable or Disable Serial Port (COM).

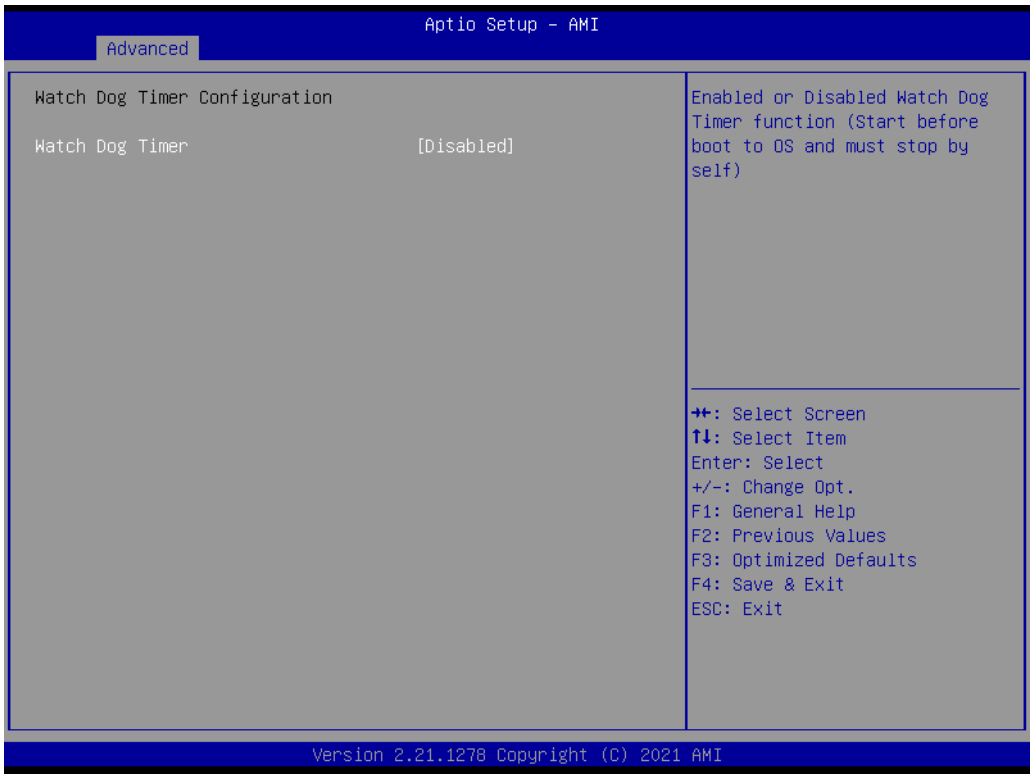
Change Settings

Select optimal settings for Super IO device.

Hardware Monitor



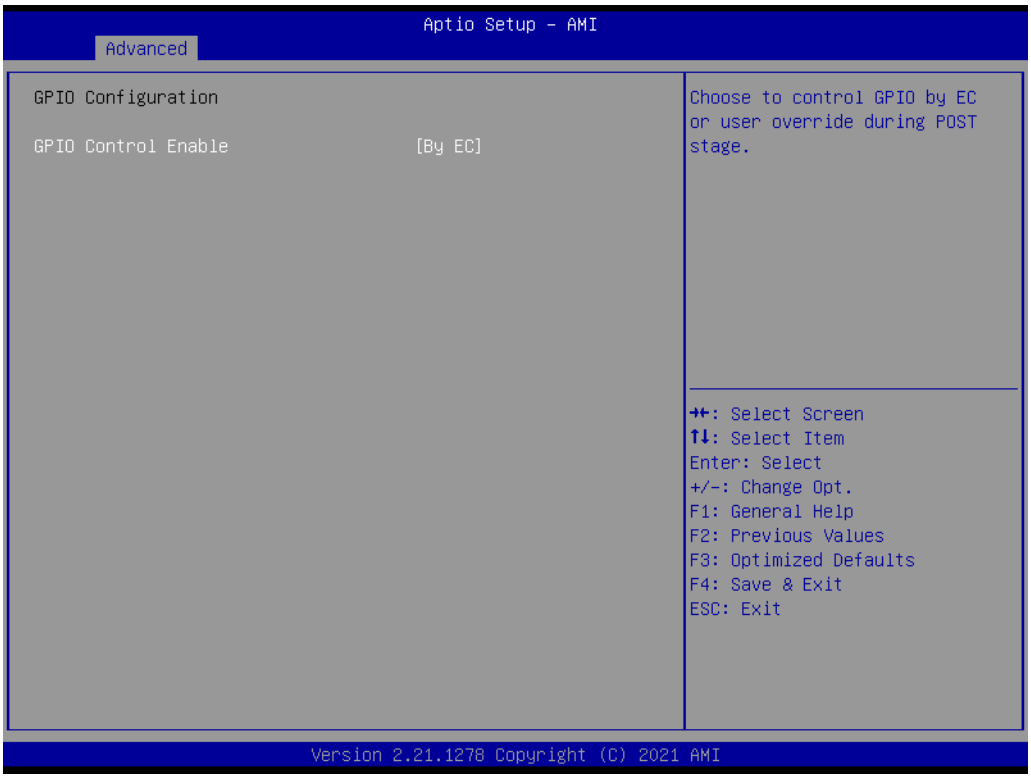
Watchdog Timer Configuration



Watch Dog Timer

Enable or Disable Watch Dog Timer Function.

GPIO Configuration



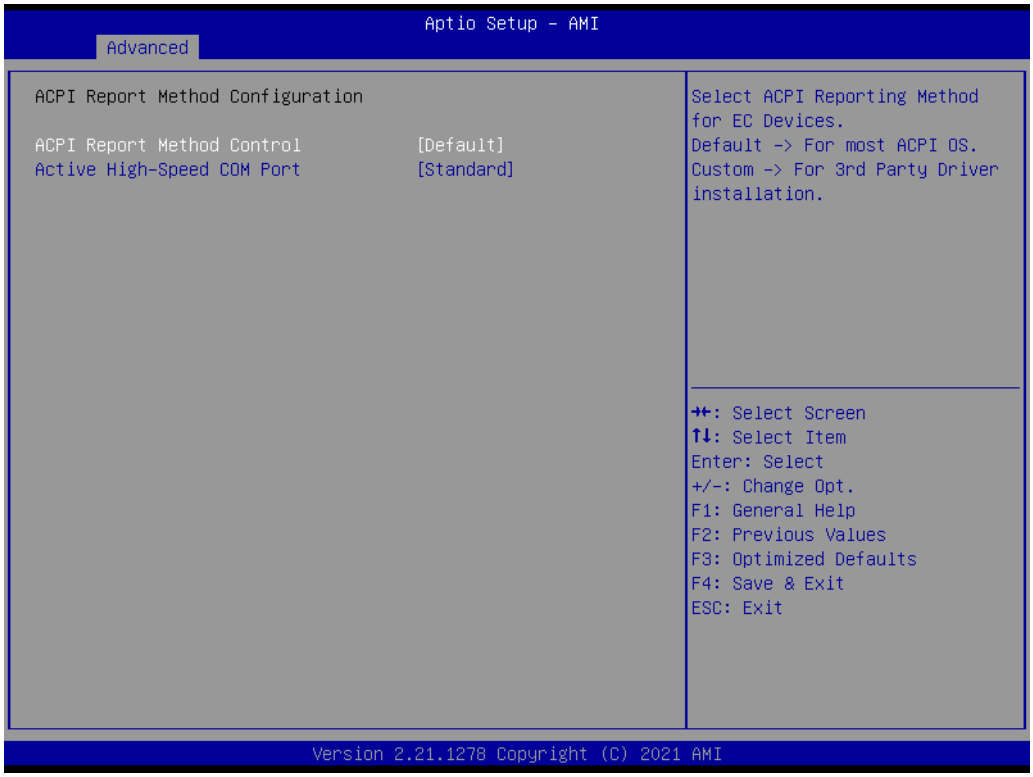
GPIO Control Enable

Choose to control GPIO by EC or user override during POST stage.

GPIO0/1/2/3

Configure GPIO0/1/2/3.

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 SMBus

Select ACPI Reporting Method for EC SMBus.

ACPI Report Method for GPIO

Select ACPI Reporting Method for EC GPIO.

4.1.2.7 Trusted Computing

Security Device Support

Enable or disable BIOS support for security device.

SHA-1 PCR Bank

Enable or Disable SHA-1 PCR Bank.

SHA256 PCR Bank

Enable or Disable SHA256 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.

TPM 2.0 UEFI Spec Version

Select the TCG2 Spec Version Support.

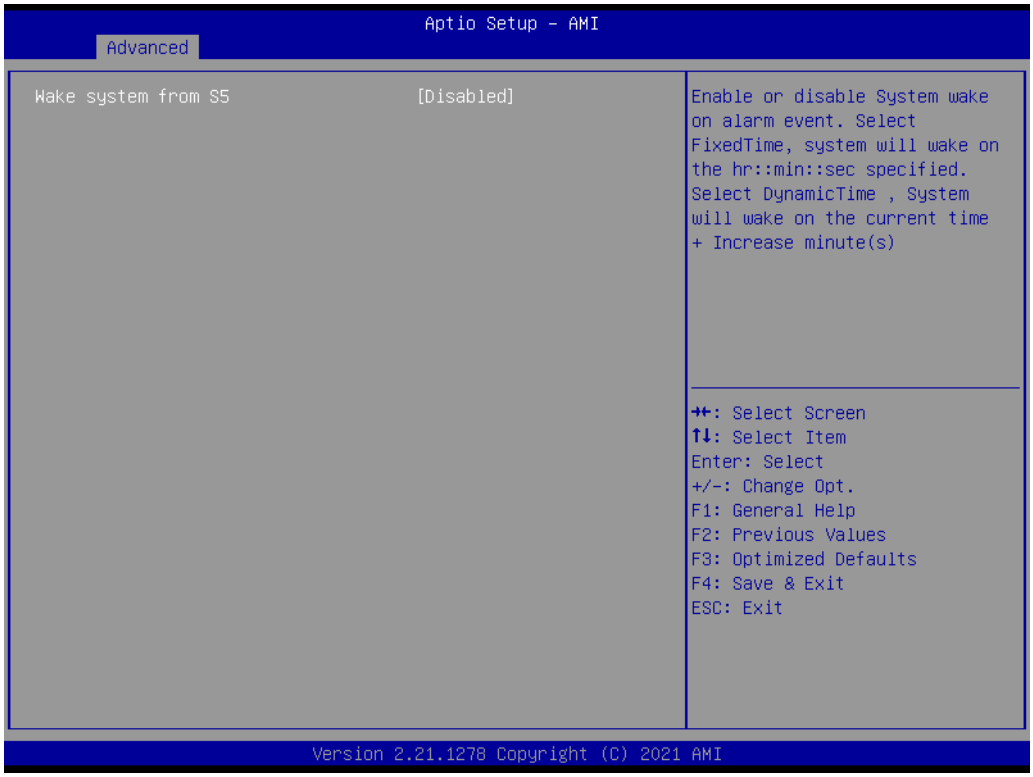
Physical Presence Spec Version

Select to Tell O.S. 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.

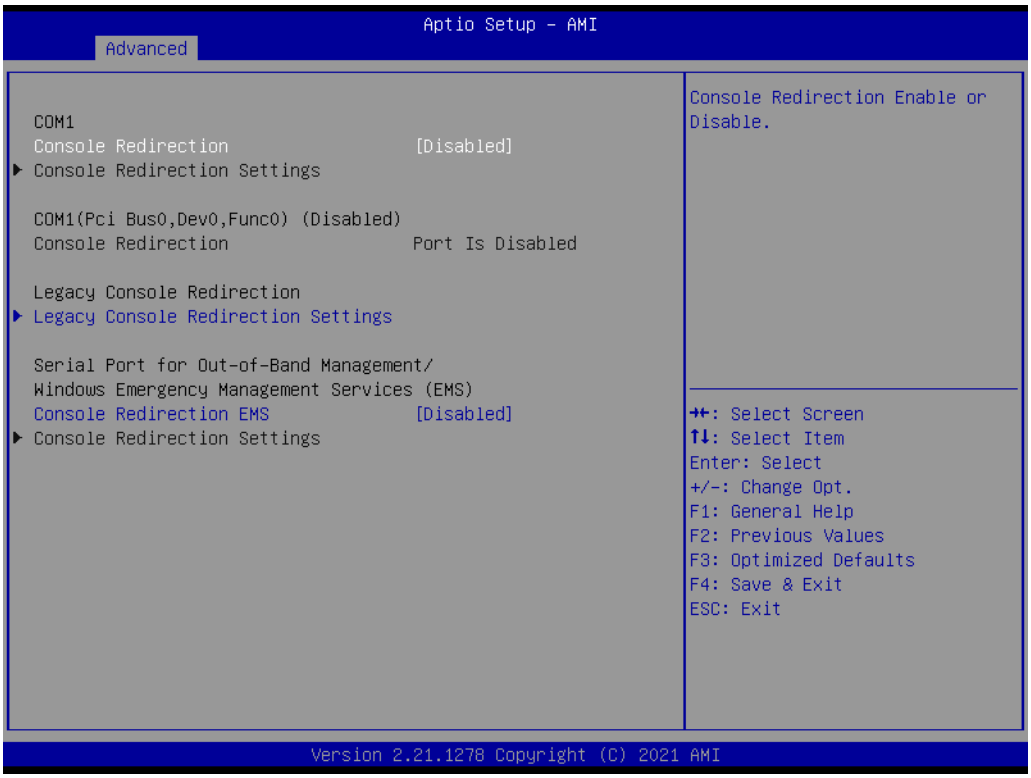
4.1.2.8 S5 RTC Wake Settings



Wake system from S5

Enable or disable System wake on alarm event. Select FixedTime, system will wake on the hr::min::sec specified.

4.1.2.9 Serial Port Console Redirection



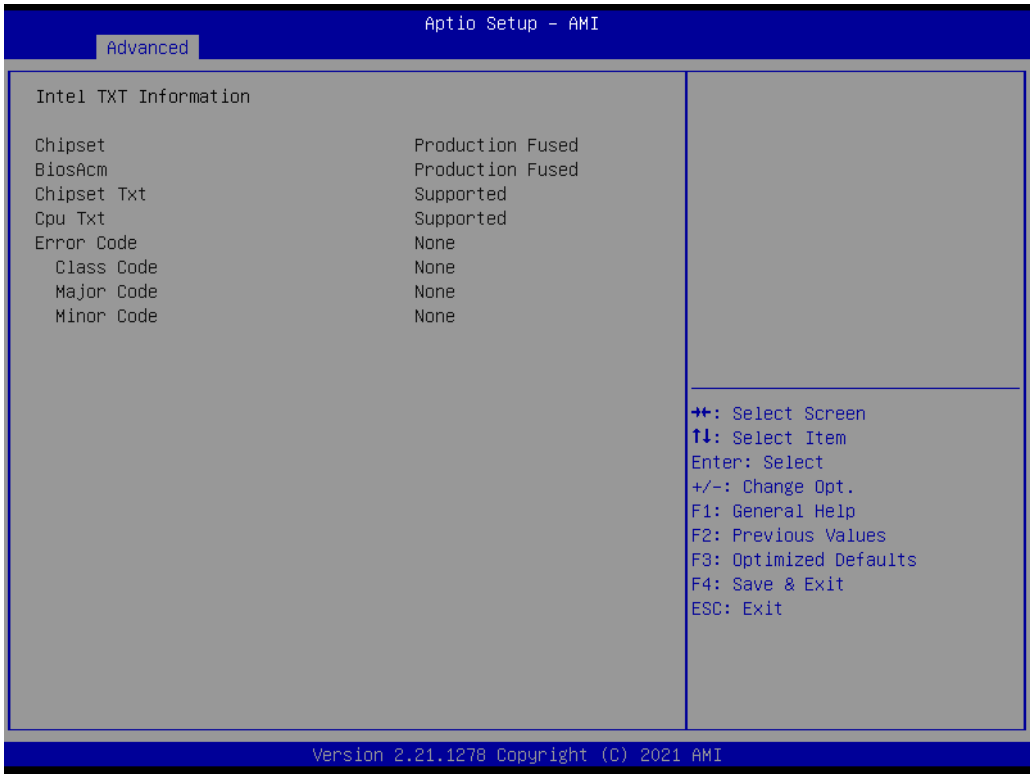
Console Redirection

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.

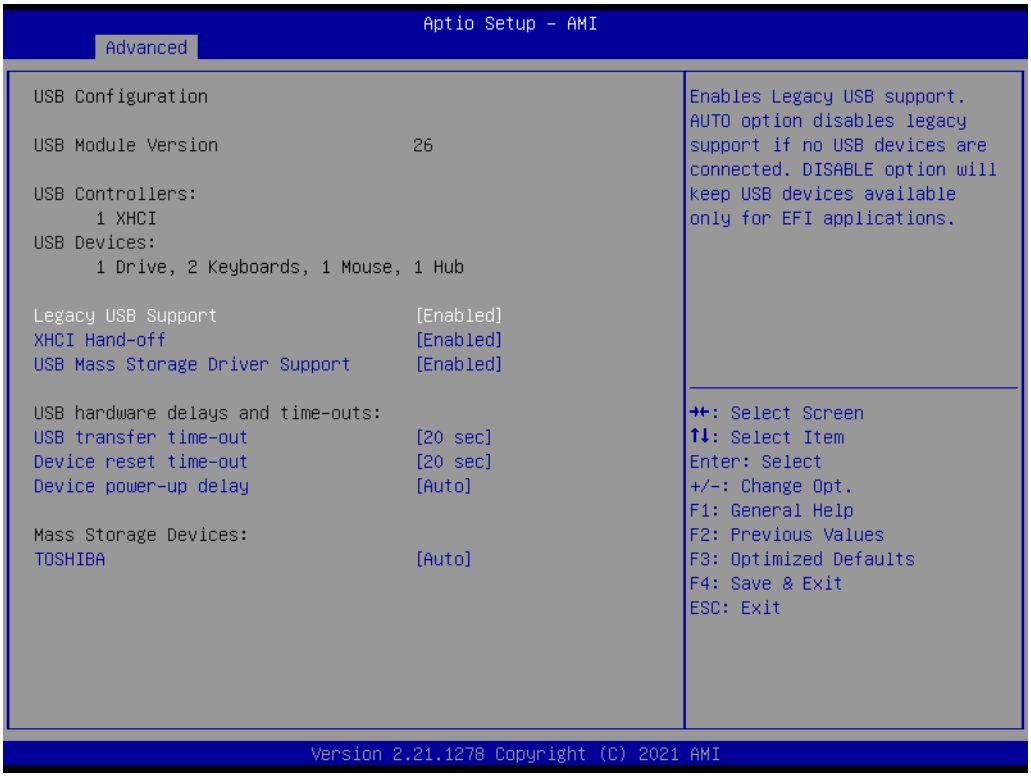
4.1.2.10 Intel TXT Information



Intel TXT Information

Display Intel TXT information.

4.1.2.11 USB Configuration



Legacy USB Support

Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.

XHCI Hand-off

This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by 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.

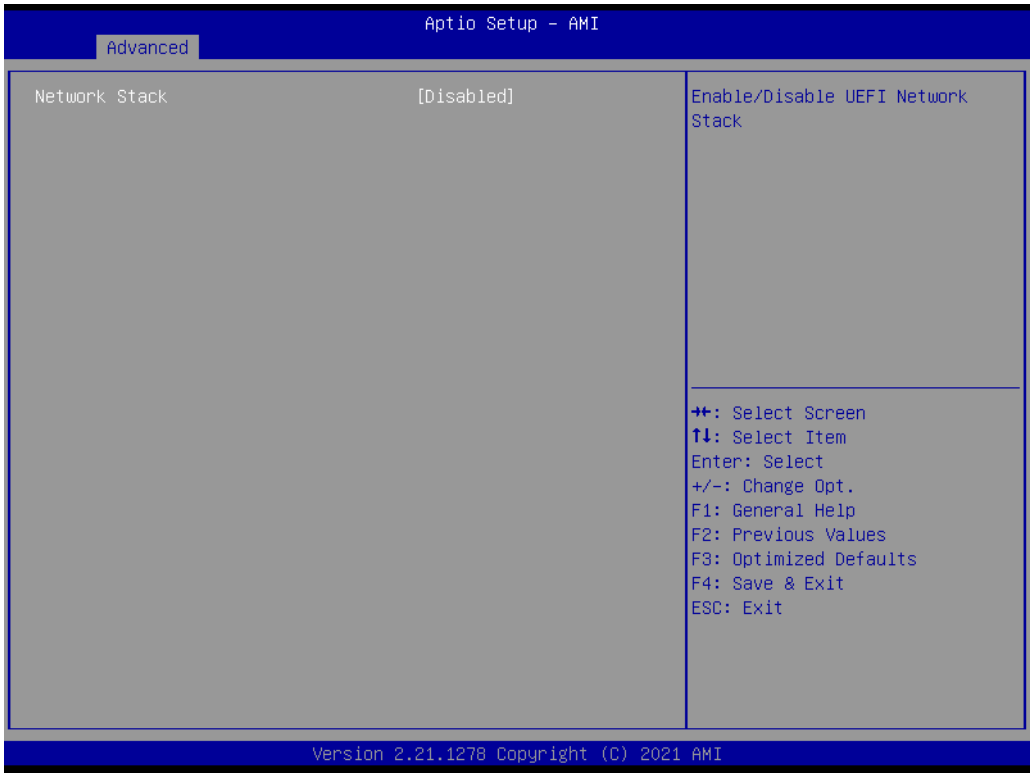
Device reset time-out

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 default value: for a Root port it is 100 ms, for a Hub port the delay is taken from Hub descriptor.

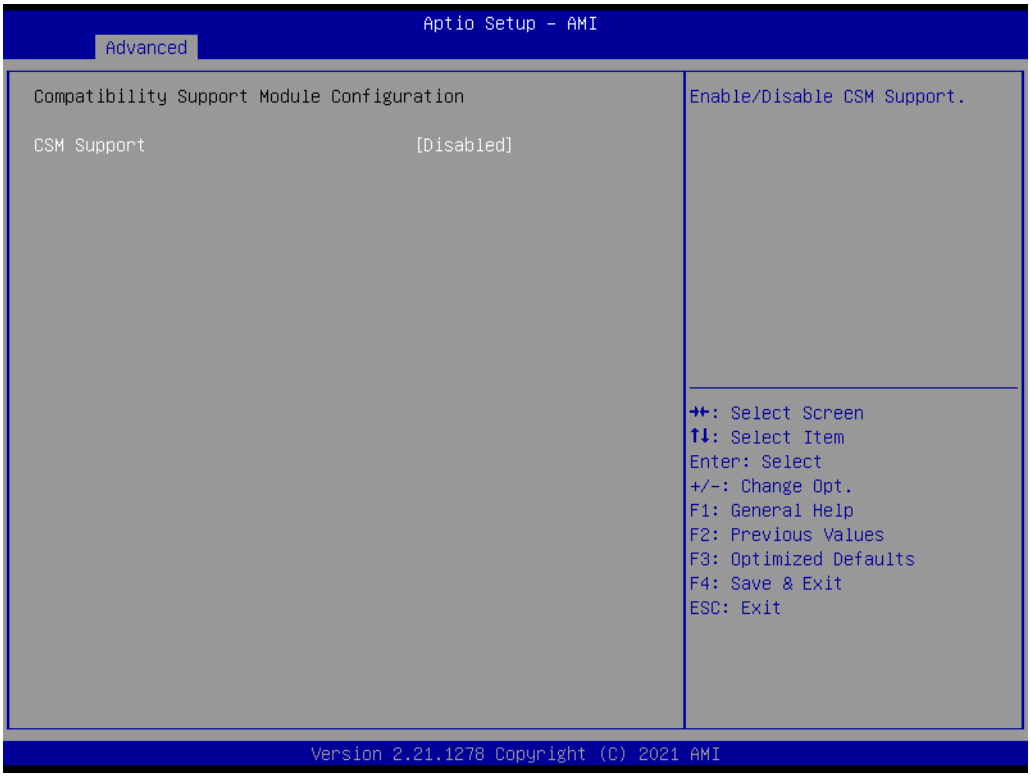
4.1.2.12 Network Stack Configuration



Network Stack

Enable/Disable UEFI Network Stack.

4.1.2.13 CSM Configuration



CSM Support

Enable/Disable CSM Support.

GateA20 Active

UPON REQUEST - GA20 can be disabled using BIOS services. ALWAYS - do not allow disabling GA20; this option is useful when any RT code is executed above 1MB.

INT19 Trap Response

BIOS reaction on INT19 trapping by Option ROM: IMMEDIATE - execute the trap right away; POSTPONED - execute the trap during legacy boot.

Boot option filter

This option controls Legacy/UEFI ROMs priority.

Network

Controls the execution of UEFI and Legacy PXE OpROM.

Storage

Controls the execution of UEFI and Legacy Storage OpROM.

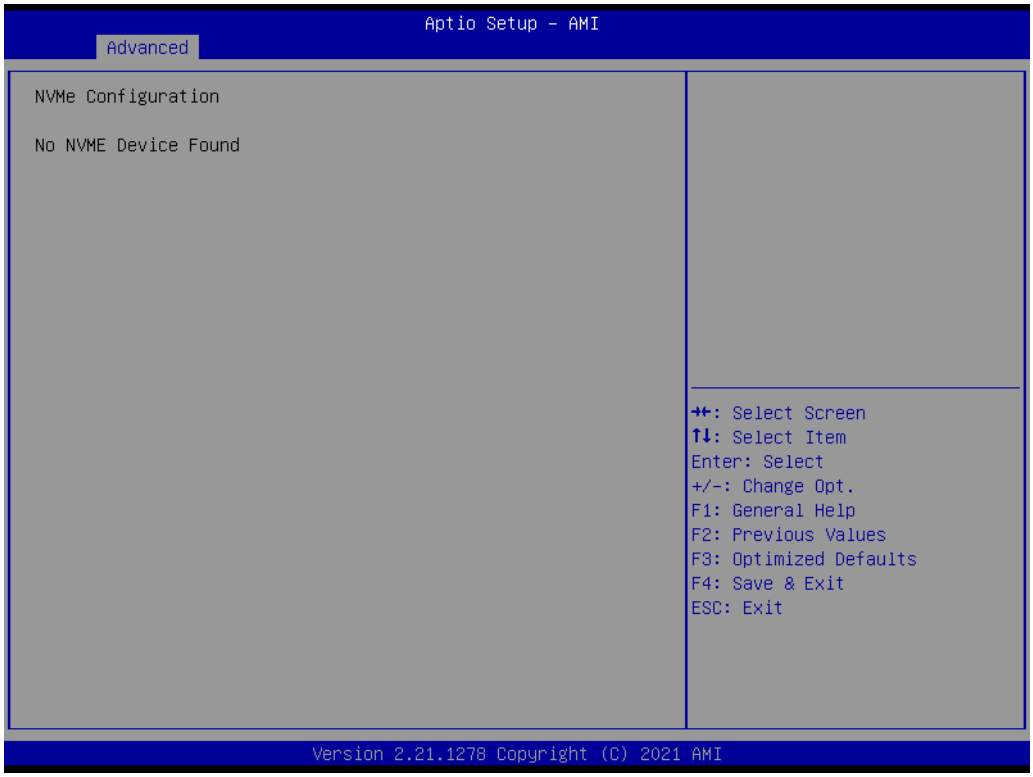
Video

Controls the execution of UEFI and Legacy Video OpROM.

Other PCI devices

Determines OpROM execution policy for devices other than Network, Storage, or Video.

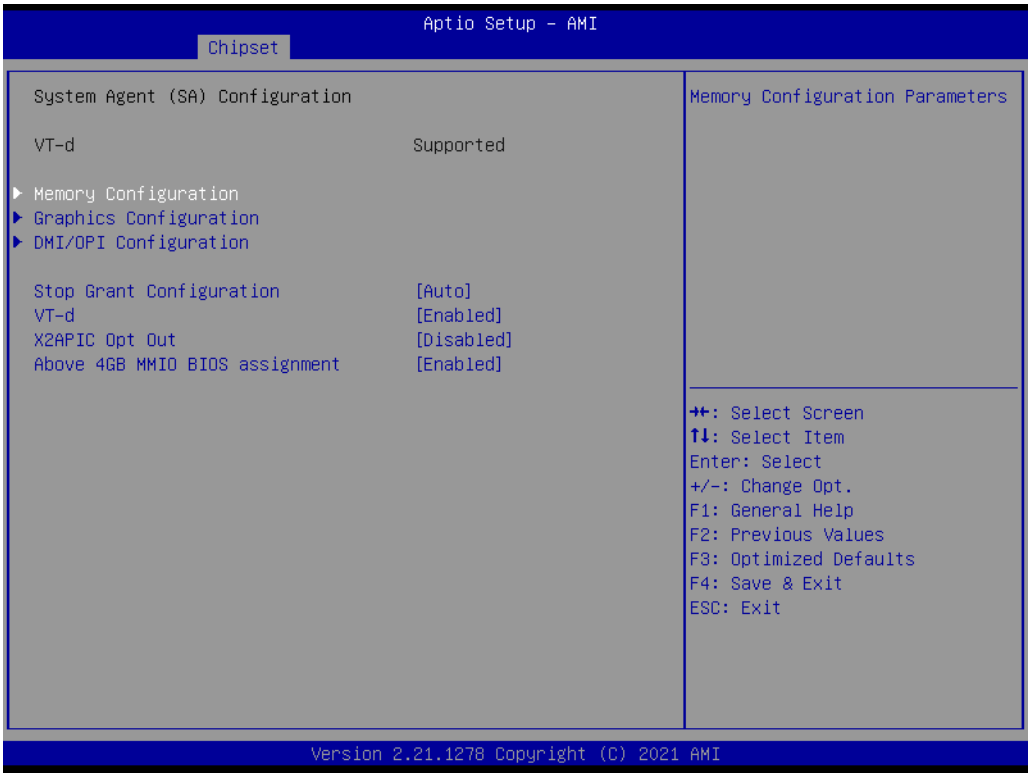
4.1.2.14 NVMe Configuration



4.1.3 Chipset Configuration

Select the Chipset tab from the MIO-2375 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.

Stop Grant Configuration

Automatic/Manual stop grant configuration.

VT-d

VT-D capability.

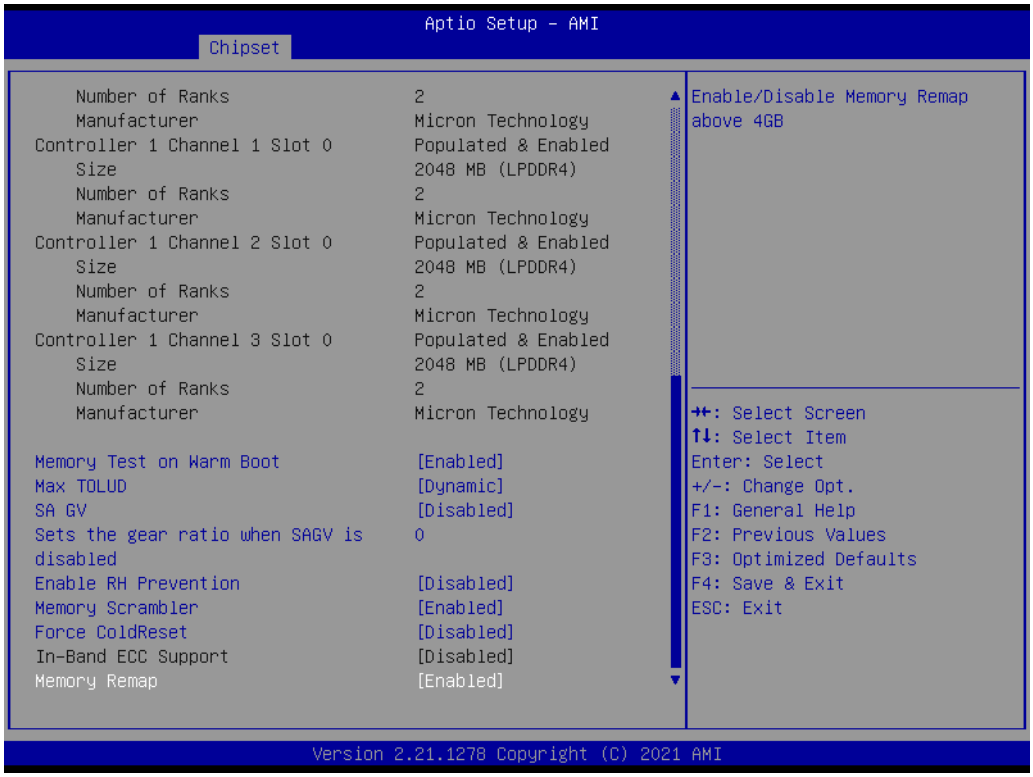
X2APIC Opt Out

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.

Enable RH Prevention

Actively prevent Row Hammer.

Memory Scrambler

Enable/Disable Memory Scrambler support.

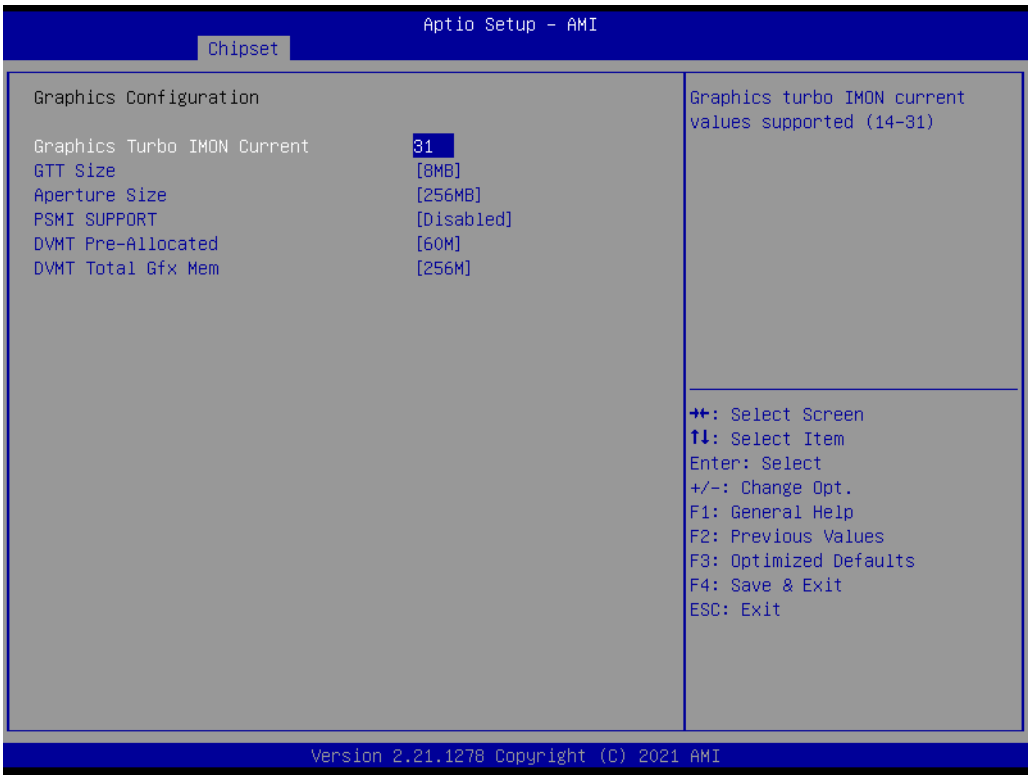
Force ColdReset

Force ColdReset or Choose MrcColdBoot mode.

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.

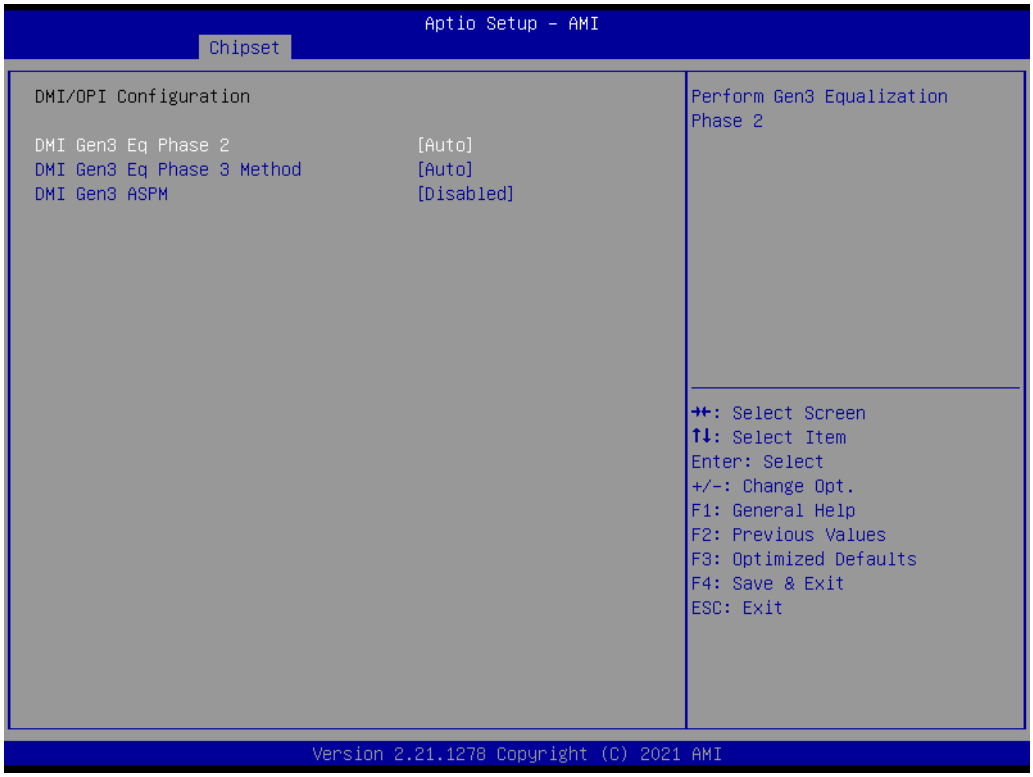
DVMT Pre-Allocated

Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.

DVMT Total Gfx Mem

Select DVMT 5.0 Total Graphic Memory size used by the Internal Graphics Device.

DMI/OPI Configuration



DMI Gen3 Eq Phase 2

Perform Gen3 Equalization Phase 2.

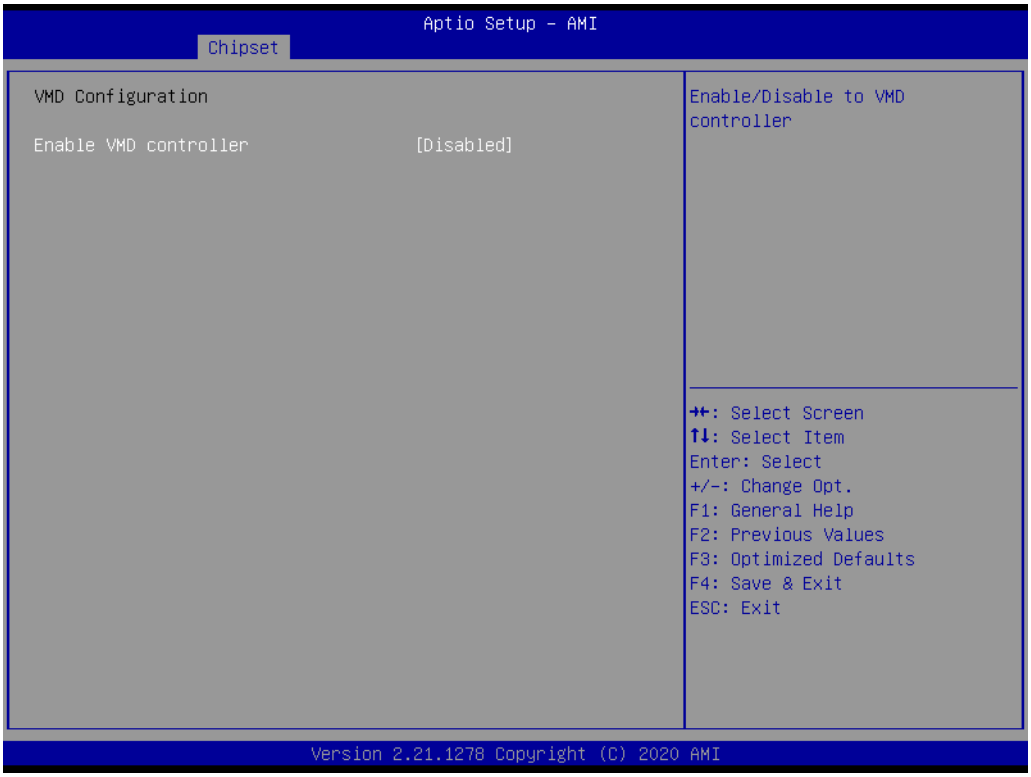
DMI Gen3 Eq Phase 3 Method

Select Method for Gen3 Equalization Phase 3.

DMI Gen3 ASPM

DMI Gen3 ASPM Support.

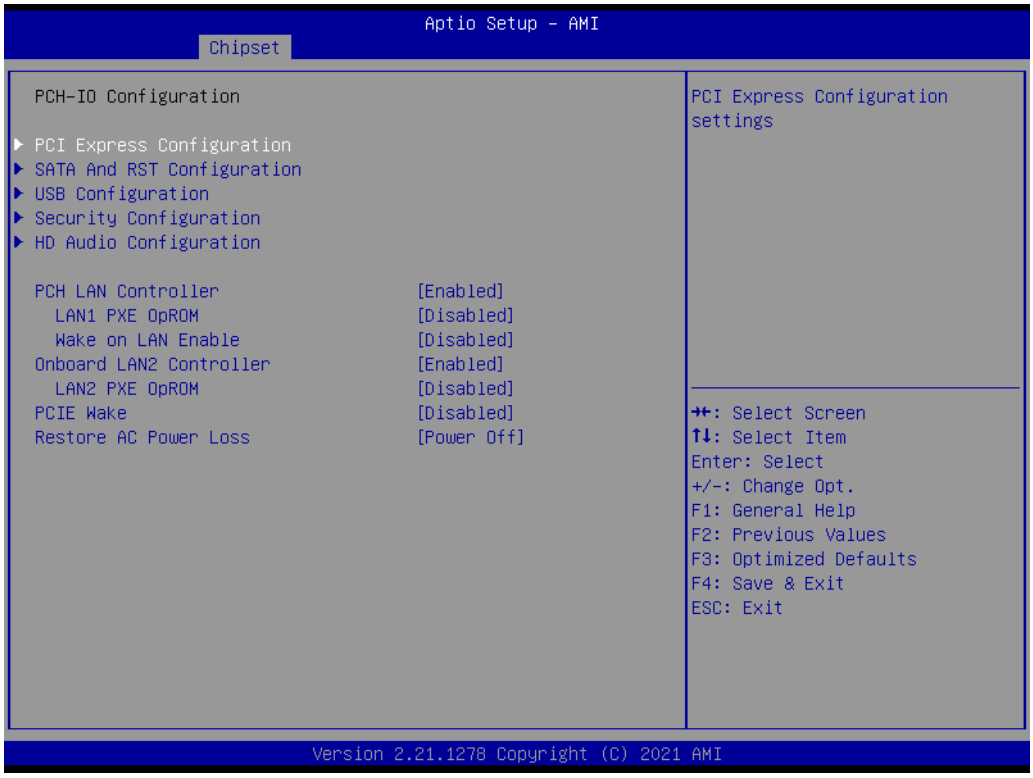
VMD Setup Menu



Enable VMD controller

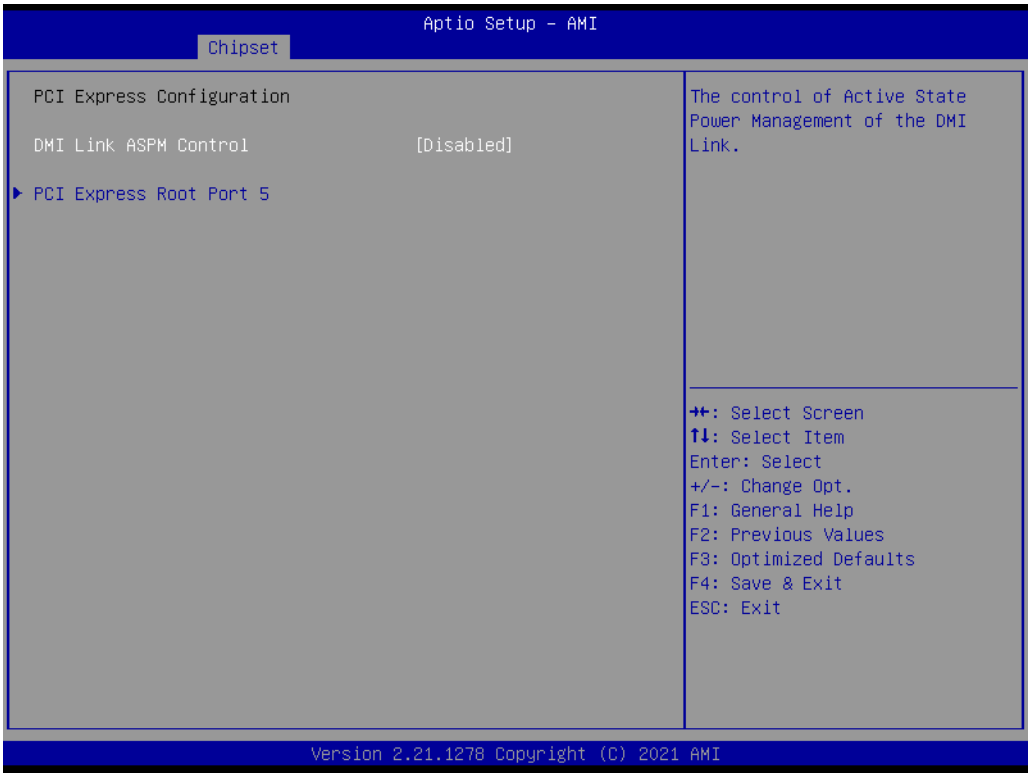
Enable/Disable to VMD controller.

4.1.3.2 PCH-IO Configuration



PCI Express Configuration
PCI Express Configuration Settings.
SATA And RST Configuration
SATA Device Options Settings.
USB Configuration
USB Configuration Settings.
Security Configuration
Security Configuration Settings.
Serial IO Configuration
Serial IO Configuration Settings.
LAN1 PXE ROM
Enable or Disable onboard LAN's PXE option ROM.
Wake on LAN Enable
Enable or Disable Integrated LAN to wake the system from S5.
LAN2 PXE ROM
Enable or Disable onboard LAN's PXE option ROM.
PCIE Wake
Enable or Disable PCIE to wake the system from S5.
Restore AC Power Loss
Specify what state to go to when power is re-applied after a power failure (G3 state).

PCI Express Configuration



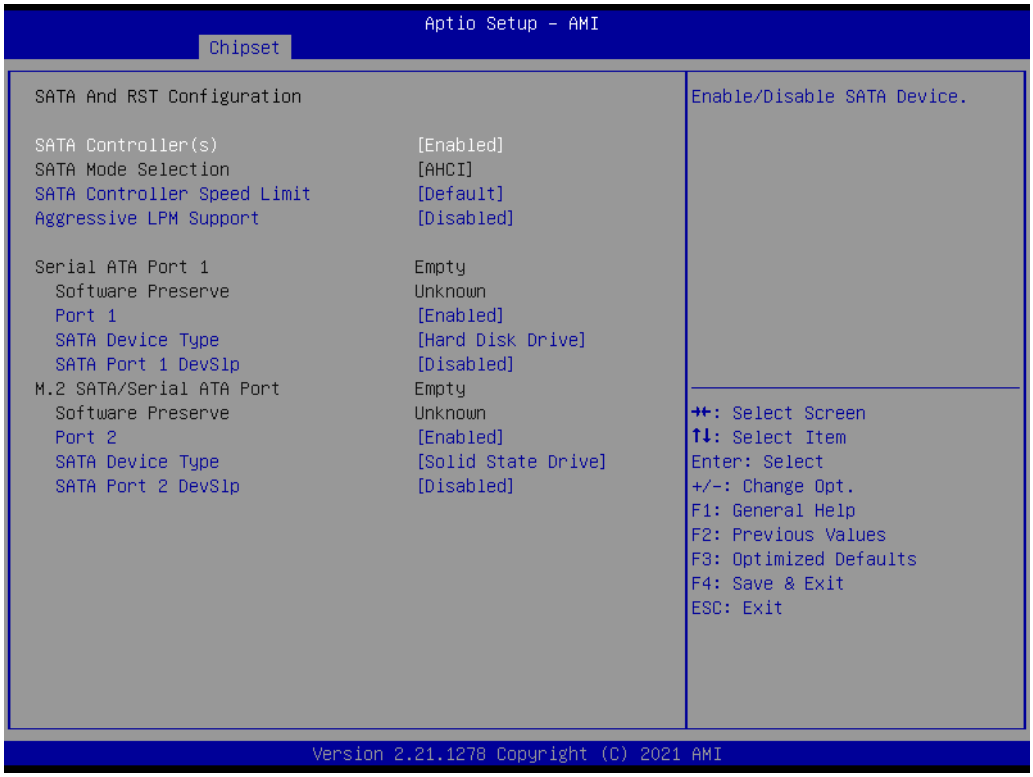
DMI Link ASPM Control

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

PCI Express Root Port 5

PCI Express Port 5 Settings.

SATA and RST Configuration



SATA Controller(s)

Enable/Disable SATA Device.

SATA Mode Selection

Determine how SATA controller operates.

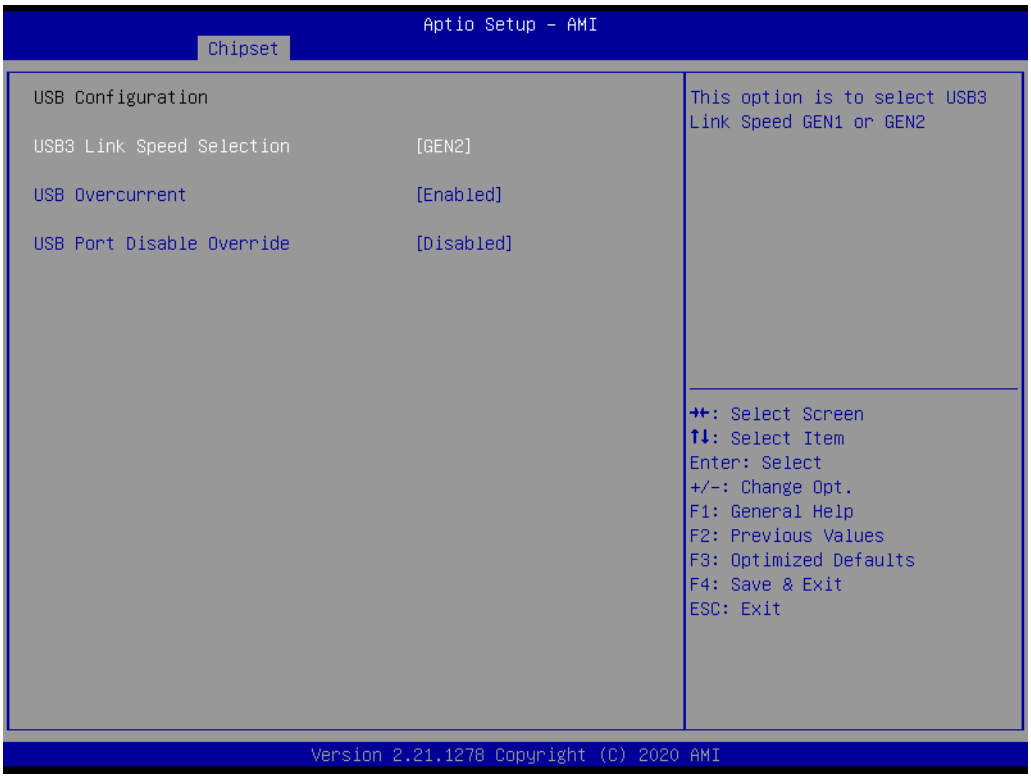
SATA Controller Speed Limit

Indicates the maximum speed the SATA controller can support.

Aggressive LPM Support

Enabled PCH to aggressively enter link power state.

USB Configuration



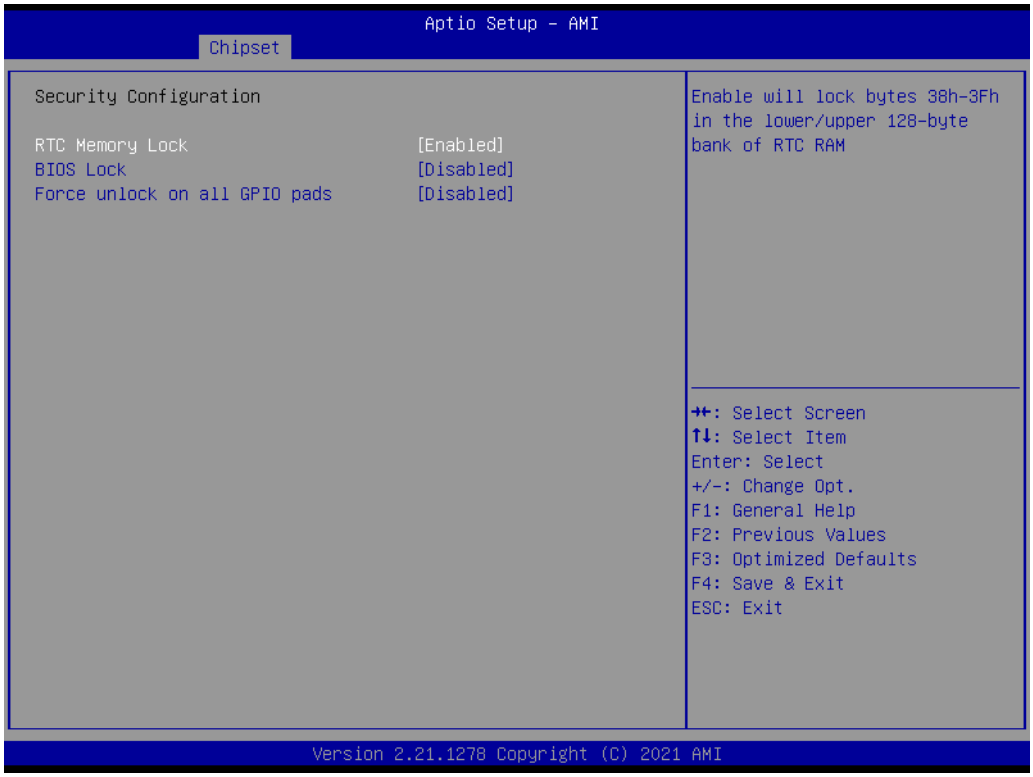
USB3 Link Speed Selection

This item enables users to select USB 3 Link Speed 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

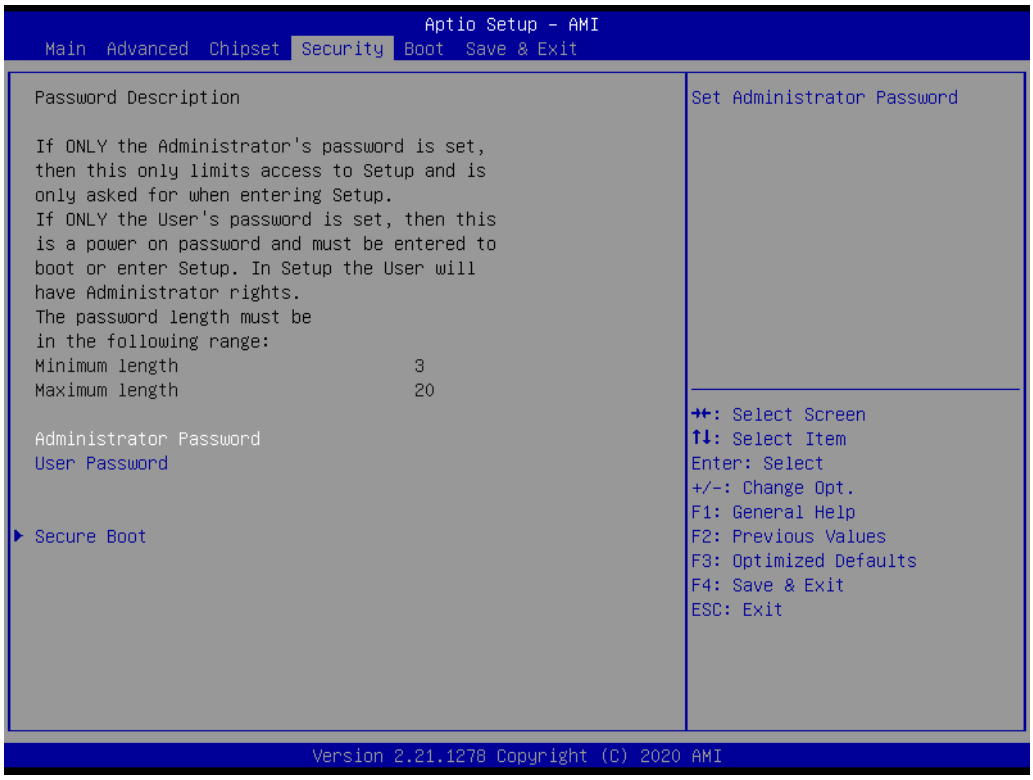
If Enabled BIOS will force all GPIO pads to be in unlock state.

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-2375 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>:

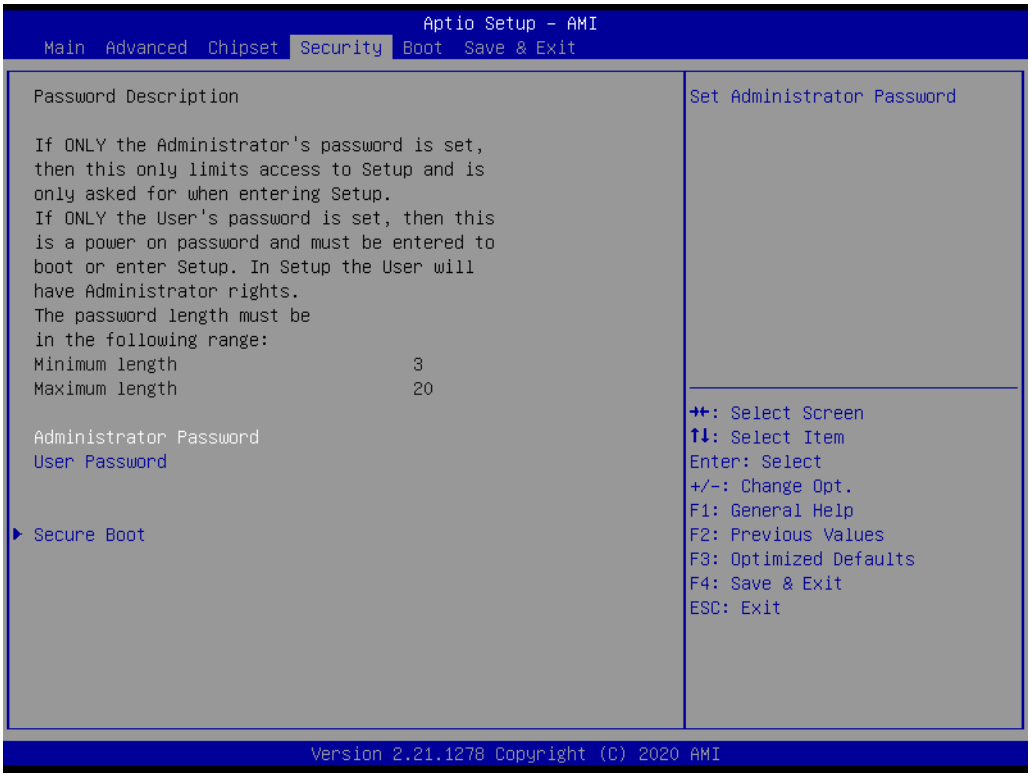
Change Administrator / User Password

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

Set 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

Enables or disables Quiet Boot option.

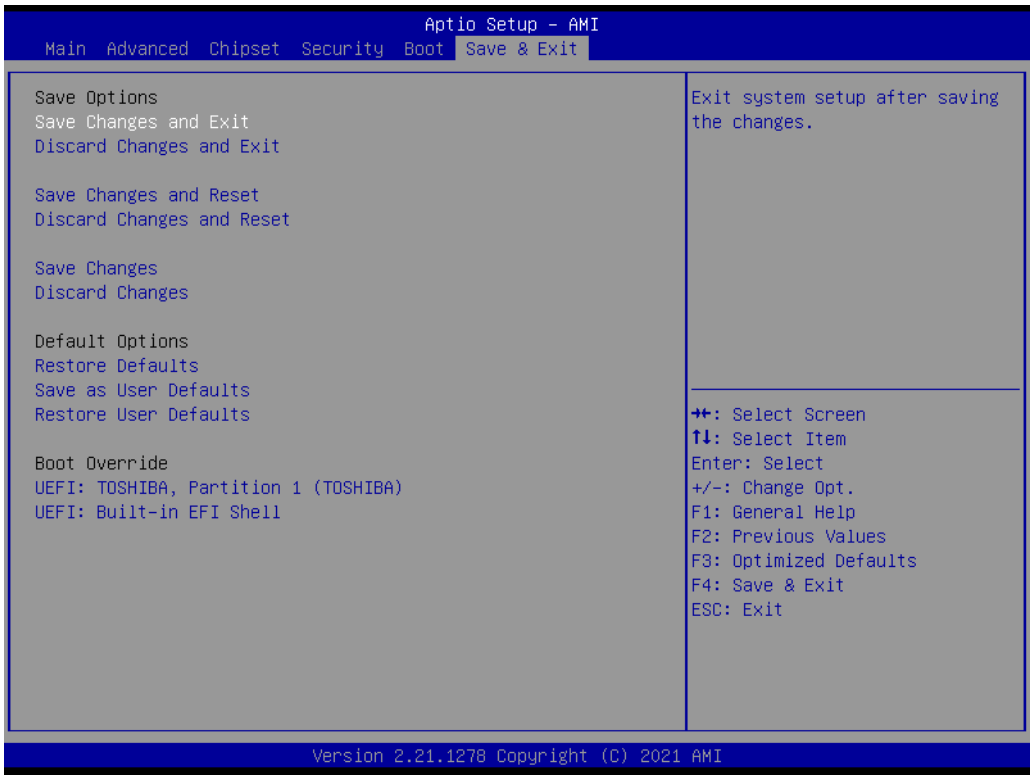
Boot Option #1

Sets the system boot order.

Fast Boot

Enables or disables boot with initialization of a minimal set of devices required to launch 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 made to any of the options.

Discard Changes

This item allows you to discard changes made 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 made 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 details the following information.
Sections include:

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

A.1 System I/O Ports

Table A.1: System I/O Ports

Addr. Range (Hex)	Device
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
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)
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 Graphic
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

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