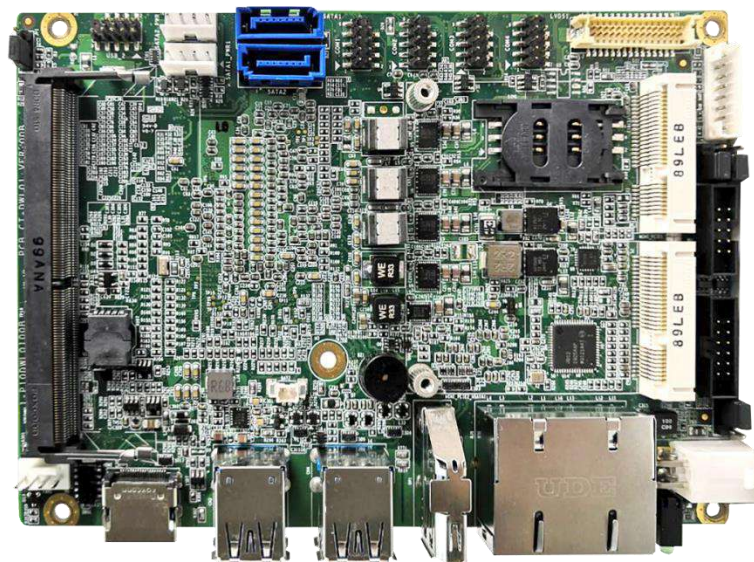


USER'S MANUAL



CT-DWL01

3.5" SBC Industrial Motherboard with 8th Gen. Intel®
Core™ Processor i3/i5/i7 &
Intel® Celeron® Processor

Table of Contents

Prefaces	04
Revision	04
Disclaimer	04
Copyright Notice	04
Trademarks Acknowledgment	04
Environmental Protection Announcement	04
Safety Precautions	05
Technical Support and Assistance	06
Conventions Used in this Manual	06
Chapter 1 Product Introductions	07
1.1 Product Description	08
1.2 Specifications	09
1.3 Available Models	10
Chapter 2 Mechanical Specifications	11
2.1 Switch and Connector Locations	12
2.2 Connector / Switch Definition	14
2.3 I/O Interface Descriptions	15
2.3.1 Clear CMOS.....	15
2.3.2 Panel PWR setting	15
2.3.3 Backlight PWR setting	16
2.3.4 Front Panel Header.....	17
2.3.5 AT/ATX setting	18
2.3.6 Panel control	19
2.3.7 USB3	20
2.3.8 USB	21
2.3.9 eDP	22
2.3.10 COM Port COM1	23
2.3.11 COM Port COM2	24
2.3.12 COM Port COM3	25
2.3.13 COM Port COM4	26
2.3.14 GPIO	27
2.3.15 SATA1	28
2.3.16 SATA2	29
2.3.17 SATA1_PWR1	30
2.3.18 SATA2_PWR1	31
2.3.19 USB2.0	32
2.3.20 DC12_IN	33
2.3.21 FAN PWR	34
2.3.22 HDMI	35
2.3.23 DP	36
2.3.24 RJ45	37
2.3.25 LVDS	38

Chapter 3	Features & Interfaces	39
3.1	Processor	40
3.2	BIOS	40
3.3	System Memory	40
3.4	Graphics	40
3.5	USB	40
3.6	Ethernet	40
3.7	SATA	40
3.8	Audio	40
3.9	Expansion	41
3.10	General Purpose Input Output	41
3.10.1	GPIO Configuration	41
3.11	Watchdog Timer	42
3.11.1	Board Design	42
3.11.2	Psuedo Code	42
Chapter 4	Driver Installation	43
Chapter 5	System BIOS	45
5.1	BIOS Introduction	46
5.2	Main Setup	47
5.3	Advanced Setup	48
5.3.1	CPU Configuration	49
5.3.2	PCH-FW Configuration	50
5.3.3	SATA and RST Configuration	51
5.3.4	RST (UEFI RAID) Configuration	52
5.3.5	Trusted Computing	54
5.3.6	ACPI Settings	55
5.3.7	Super IO Configuration	56
5.3.8	Hardware Monitor	61
5.3.9	Serial Port Console Redirection	63
5.3.10	Network Stack Configuration	64
5.3.11	CSM Configuration	65
5.3.12	USB Configuration	66
5.4	Chipset	67
5.4.1	System Agent (SA) Configuration	67
5.4.2	PCH-IO Configuration	70
5.5	Security	75
5.6	Boot	78
5.7	Save and Exit	79
Appendix	WDT & GPIO	80

Prefaces

Revision

Revision	Description	Date
1.0	Initial release	2020/10/12

Disclaimer

All specifications and information in this User's Manual are believed to be accurate and up to date. Premio Inc. does not guarantee that the contents herein are complete, true, accurate or non-misleading. The information in this document is subject to change without notice and does not represent a commitment on the part of Premio Inc.

Premio Inc. disclaims all warranties, express or implied, including, without limitation, those of merchantability, fitness for a particular purpose with respect to contents of this User's Manual. Users must take full responsibility for the application of the product.

Copyright Notice

All rights reserved. No part of this manual may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or information storage and retrieval systems, without the prior written permission of Premio Inc. Copyright © Premio Inc.

Trademarks Acknowledgment

Intel®, Celeron® and Pentium® are trademarks of Intel Corporation.

Windows® is registered trademark of Microsoft Corporation.

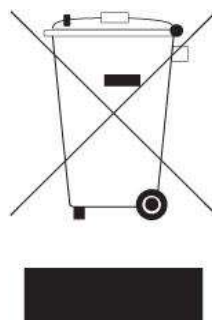
AMI is trademark of American Megatrend Inc.

IBM, XT, AT, PS/2 and Personal System/2 are trademarks of International Business Machines Corporation

All other products and trademarks mentioned in this manual are trademarks of their respective owners.

Environmental Protection Announcement

Do not dispose this electronic device into the trash while discarding. Please recycle to minimize pollution and ensure environment protection.



Safety Precautions

Before installing and using the equipment, please read the following precautions:

- Put this equipment on a reliable surface during installation. Dropping it or letting it fall could cause damage.
- The power outlet shall be installed near the equipment and shall be easily accessible.
- Turn off the system power and disconnect the power cord from its source before making any installation. Be sure both the system and the external devices are turned OFF. Sudden surge
- of power could ruin sensitive components. Make sure the equipment is properly grounded.
- When the power is connected, never open the equipment. The equipment should be opened only by qualified service personnel.
- Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
- Disconnect this equipment from the power before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
- Avoid the dusty, humidity and temperature extremes.
- Do not place heavy objects on the equipment.
- If the equipment is not used for long time, disconnect it from the power to avoid being damaged by transient over-voltage.
- The storage temperature shall be above -40°C and below 85°C .
- The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.
- If one of the following situation arises, get the equipment checked be service personnel:
 - The power cord or plug is damaged.
 - Liquid has penetrated into the equipment.
 - The equipment has been exposed to moisture.
 - The equipment does not work well or it cannot work according the user's manual.
 - The equipment has been dropped and damaged.
 - The equipment has obvious signs of breakage.

Technical Support and Assistance

1. Visit the Premio Inc website at premioinc.com where you can find the latest information about the product.
2. Contact your distributor, our technical support team or sales representative for technical support if you need additional assistance. Please have following information ready before you call:
 - Model 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

Conventions Used in this Manual

**WARNING**

This indication alerts operators to an operation that, if not strictly observed, may result in severe injury.

**CAUTION**

This indication alerts operators to an operation that, if not strictly observed, may result in safety hazards to personnel or damage to equipment.

**NOTE**

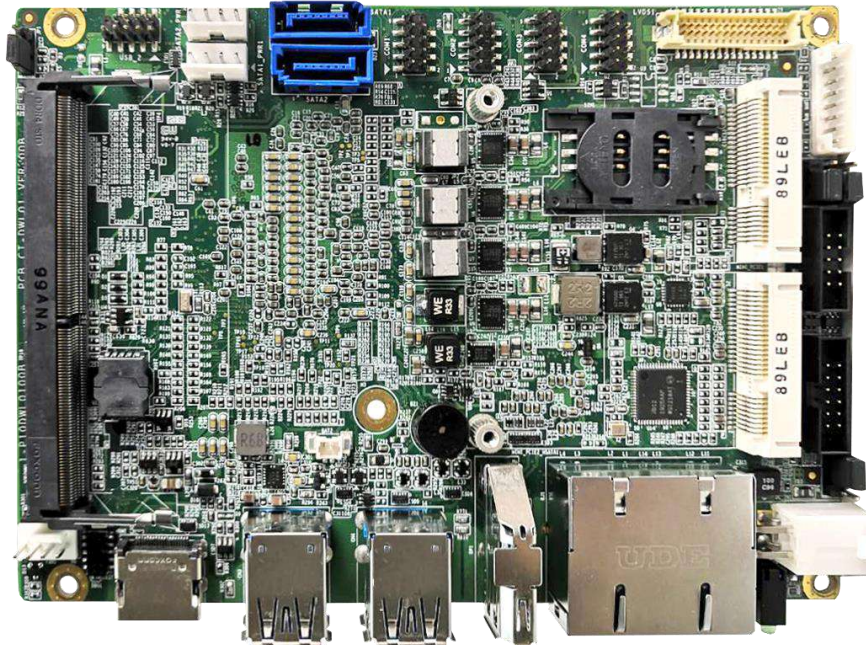
This indication provides additional information to complete a task easily.

Chapter 1

Product Introductions

1.1 Product Description

The CT-DWL01 is a single board computer in 3.5" SBC Industrial Motherboard with 8th Gen. Intel® Core™ Processor i3/i5/i7 & Intel® Celeron® Processor



- 1x 260-pin DDR4 2400 SO-DIMM. Max. up to 32GB
- Triple independent display supported by:
 - 1x DisplayPort support resolution 4096 x 1200
 - 1x Dual-channel, up to 24-bit LVDS optional 1x eDP via internal
 - 1x HDMI support resolution 1920 x 1200 (Optional)
- 1x Front Panel with Audio support by internal header
- 2x 4bit GPIO header
- 2x Mini PCI-e (Gen3) w/ SIM slot support
- 4x USB 3.2 Gen 2 (10Gbps), 4x RS-232/422/485 internal headers,
 - 2x USB 2.0 internal header
- 2x SATA 6.0Gb/s
- Watchdog timer 1~225sec. system reset
- TPM 2.0 Supported

1.2 Specifications

System

Processor

Support 8th Gen. Intel® WL-UE Processor (15W TDP)

- Intel® Core™ i7-8665UE Processor 8M Cache, up to 4.40 GHz
- Intel® Core™ i5-8365UE Processor 6M Cache, up to 4.10 GHz
- Intel® Core™ i3-8145UE Processor 4M Cache, up to 3.90 GHz
- Intel® Celeron® Processor 4305UE 2M Cache, 2.00 GHz

System Memory : SoC

LAN Chipset :

- GbE1: Intel® I219LM (Support Wake-on-LAN and PXE)
- GbE2: Intel® I210-IT (Support Wake-on-LAN and PXE)

Audio Codec : Realtek ALC888S HD Audio Codec

Memory : 1x 260-Pin DDR4 2400MHz SO-DIMM slot

Max. Size : 32GB

BIOS : AMI uEFI 256MB SPI flash

Watchdog : Software Programmable Supports 1~255 sec. System Reset

TPM : TPM 2.0 Through Infineon® SLB9665TT2.0 or Equivalent

Display

Chipset :

- Intel® UHD Graphics 620 for Core series
- Intel® UHD Graphics 610 for Celeron series

Interface :

- 1x DisplayPort support resolution 4096 x 1200
- 1x LVDS & 1x EDP internal connector
- 1x HDMI support resolution 1920 x 1200 (Optional)

Multiple Display : Triple Display (HDMI Optional)

Expansion

Mini PCI Express : 2x Mini PCI-e x1 (Gen3)

Rear I/O

LED : 1x Power LED, 1x HDD LED indicator

LAN : 2x RJ45

Display :

- 1x HDMI 1.4, 4096x2160 @30/24Hz
- 1x DisplayPort DP 1.2, 4096x2304 @60Hz

USB : 4x USB 3.2 Gen 2 (10 Gbps)

Internal I/O

Display :

- 1x LVDS Dual-channel, up to 24-bit (1920x1200)
- 1x eDP1.4 (4096x2306 @60Hz) (Optional)

COM : 4x RS-232/422/485 internal 2.0PH headers

USB : 2x USB 2.0 internal via a PH2.0 2x 10pin header

SATA : 2x SATA Gen3, w/2x 4pin SATA Power connector

Audio : 1x Front panel audio

DIO : 2x 4-bit DIO (4-in/4-out) via a PH2.0 2x 10pin header, (PIN1_VCC, PIN2_GND)

Others :

- 1x Front panel
- 1x 4-pin PWM smart fan
- 1x Debug Port
- 1x RTC battery by cable

Operating System

Windows : Microsoft® Windows® 10 64-bit (RS5 or above)

Linux : Linux Kernel 5.x (Fedora 30 or above / Ubuntu 19.04 or above)

Power

Power Connector : 4-pin CPU P4 connector

Power Input : AT/ATX 12V DC Input

Management : ACPI

Mechanical & Environment

Form Factor : 3.5" Embedded SBC

Dimension : 146 x 102mm

Operating Temp :

-40°C ~ 70°C, 95% (non-condensing), operating

Storage Temp :

-40°C ~ 85°C, 95% (non-condensing), Non-operating

Relative Humidity :

10% ~ 90% relative humidity, non-condensing

ORDERING INFORMATION

Packing List

- 1x Heat Sink
- 1x Front Panel Cable, 2x Buttons, 2x Audio, 2x LED Cable 300mm
- 1x COM Port Cable 300mm
- 1x SATA Y-Cable with SATA and SATA Power 100mm
- 1x USB 2.0 Y Cable to 2x USB2.0 Type-A Cable 300mm
- 1x Driver DVD
- 2x Screw for mini-PCI-e Card
- 4x Cooper Stud and screw for Heatsink

Ordering Information

CT-DWL01-8665UE : 3.5" SBC with Intel® Core™ i7-8665UE, DP, HDMI, 2x LAN, 4x USB

CT-DWL01-8365UE : 3.5" SBC with Intel® Core™ i5-8365UE, DP, HDMI, 2x LAN, 4x USB

CT-DWL01-8145UE : 3.5" SBC with Intel® Core™ i3-8145UE, DP, HDMI, 2x LAN, 4x USB

CT-DWL01-4305UE : 3.5" SBC with Intel® Celeron® 4305UE, DP, HDMI, 2x LAN, 4x USB

1.3 Available Models

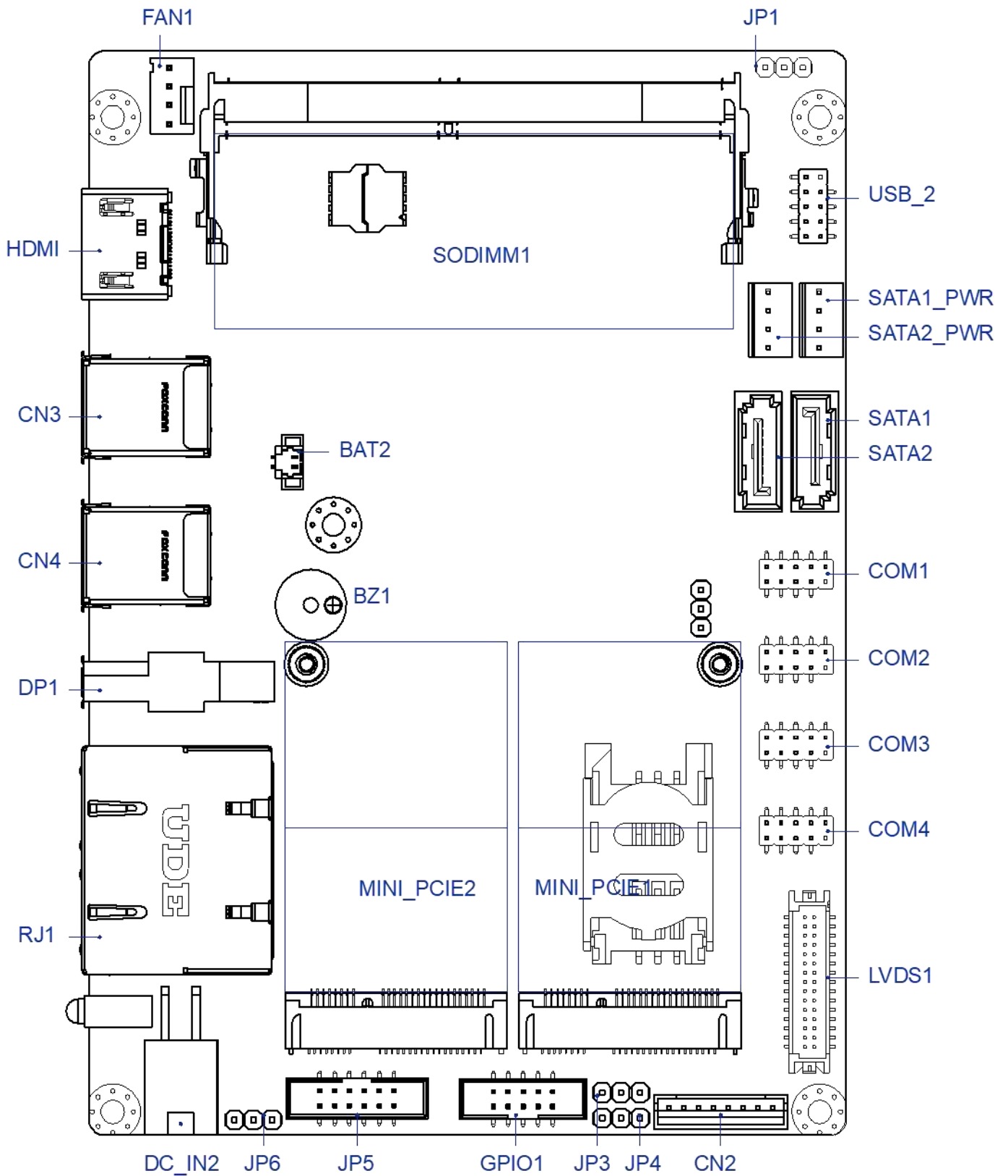
Ordering Information	DESCRIPTION
CT-DWL01-8665UE	3.5" SBC with Intel® Core™ i7-8665UE, DP, HDMI, 2x LAN, 4x USB
CT-DWL01-8365UE	3.5" SBC with Intel® Core™ i5-8365UE, DP, HDMI, 2x LAN, 4x USB
CT-DWL01-8145UE	3.5" SBC with Intel® Core™ i3-8145UE, DP, HDMI, 2x LAN, 4x USB
CT-DWL01-4305UE	3.5" SBC with Intel® Celeron® 4305UE, DP, HDMI, 2x LAN, 4x USB

Chapter 2

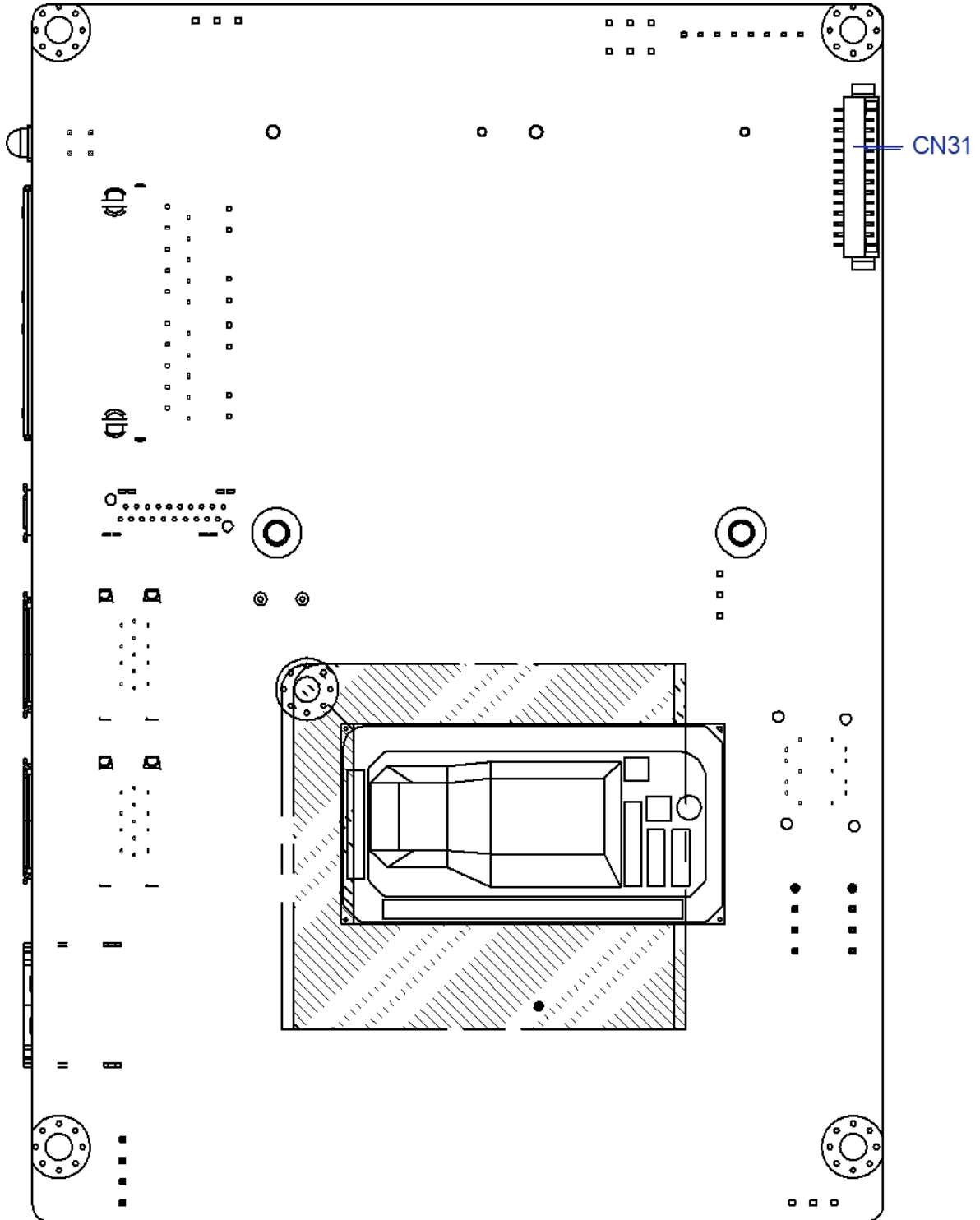
Mechanical Specifications

2.1 Switch and Connector Locations

2.1.1 Top View



2.1.2 Bottom View

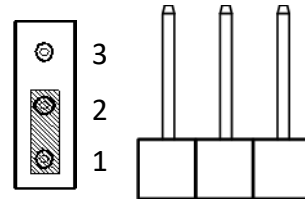
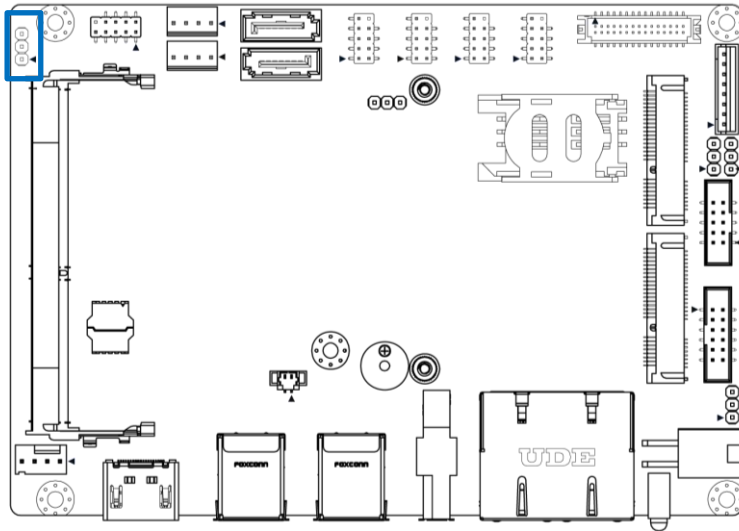


2.2 Connector / Switch Definition

Connector Location	Definition
JP1	Clear CMOS header
JP3	Panel PWR setting header
JP4	Backlight PWR setting header
JP5	Front Panel header
JP6	AT/ATX setting header
CN2	Panel Control
CN3	USB3.1 port
CN4	USB3.1 port
COM1	COM1 Serial Port header
COM2	COM2 Serial Port header
COM3	COM3 Serial Port header
COM4	COM4 Serial Port header
GPIO	4IN/4OUT GPIO header
SATA1	SATA Port 1 signal connector
SATA2	SATA Port 2 signal connector
SATA1_PWR	SATA Port 1 power connector
SATA2_PWR	SATA Port 2 power connector
LVDS1	LVDS connector
USB_2	USB 2.0 headers
MINI_PCIE1	Mini PCI Express slot 1 with SIM
MINI_PCIE2	Mini PCI Express slot 2 with mSATA
DC_IN2	4 PIN Power connector
FAN1	FAN Power connector
RJ45	LAN1/2 ports
HDMI	HDMI signal connector
DP1	DP signal connector
BAT2	Battery connector

2.3 I/O Interface Descriptions

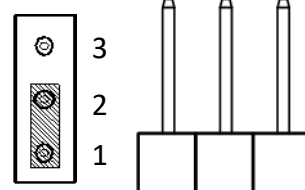
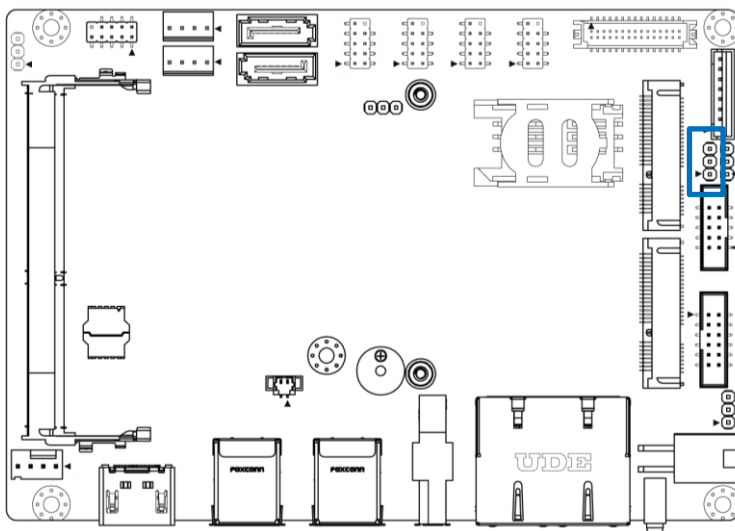
2.3.1 Clear CMOS



JP1

Pin	Signal
1	NC
2	RTCST#
3	GND

2.3.2 Panel Power setting

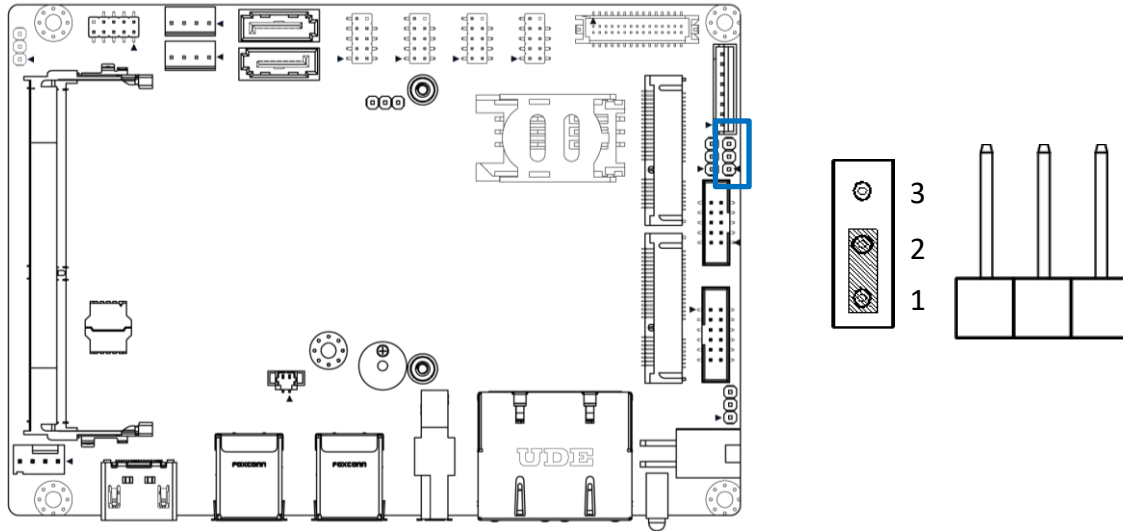


JP3

Pin	Signal
1	+V3.3
2	P3P5V
3	+V5

2.3 I/O Interface Descriptions

2.3.3 Backlight Power setting

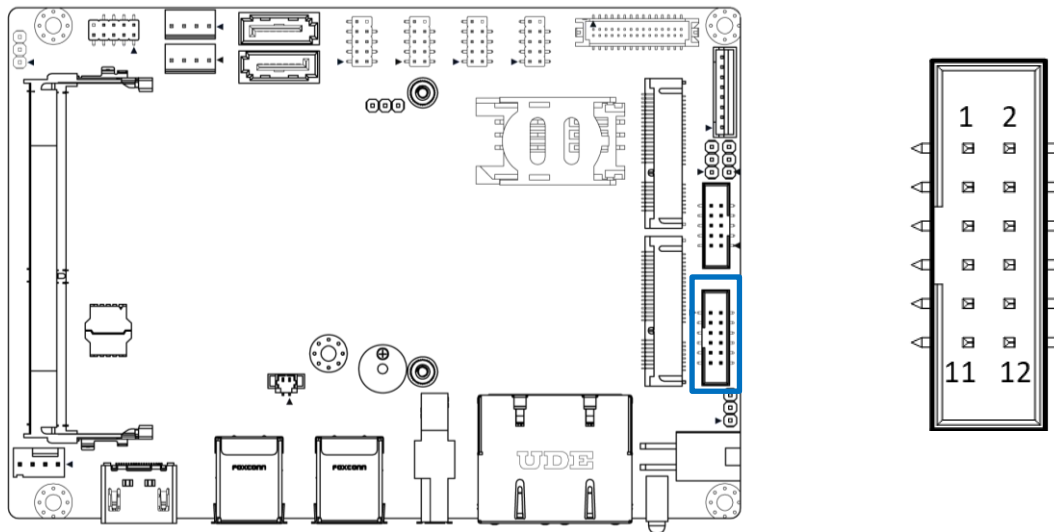


JP4

Pin	Signal
1	+V12
2	P5P12V
3	+V5

2.3 I/O Interface Descriptions

2.3.4 Front Panel Header

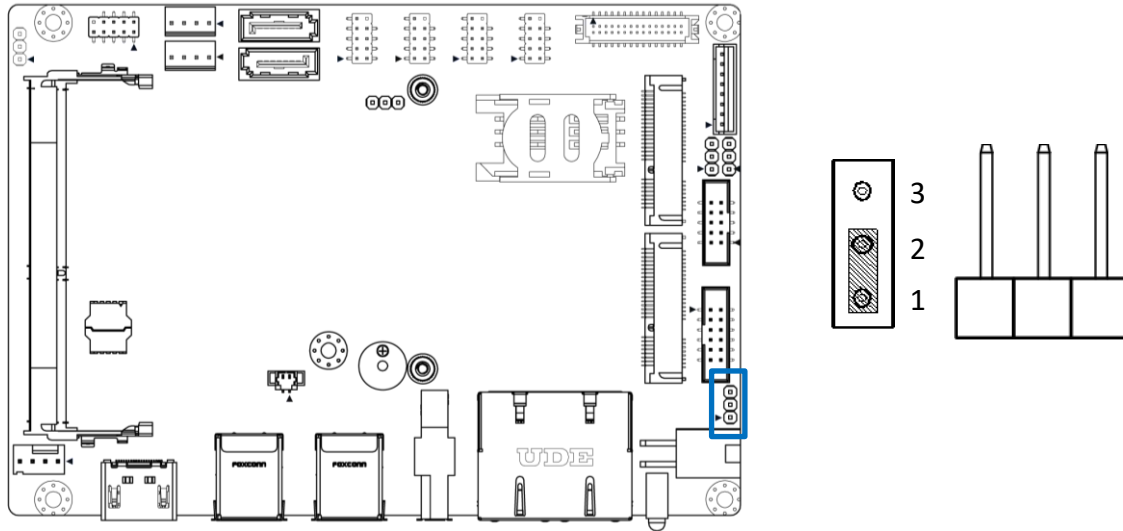


JP5

Pin	Signal	Pin	Signal
1	Power(3.3V)	2	SATA_LED#
3	Power(3.3V)	4	GND
5	LOUT_R	6	RESET_BUTTON_N
7	LOUT_L	8	PS_ON_BUTTON_N
9	MICIN1_R	10	GND
11	MICIN1_L	12	AGND_HD

2.3 I/O Interface Descriptions

2.3.5 AT/ATX setting

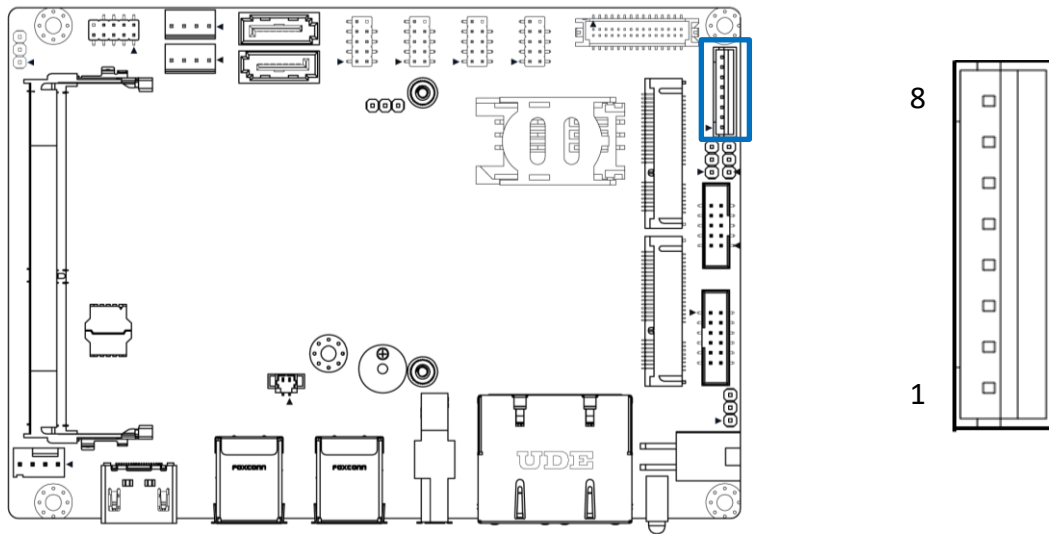


JP6

Pin	Signal
1	NC
2	AT MODE
3	PS_ON_BUTTON_N

2.3 I/O Interface Descriptions

2.3.6 Panel control

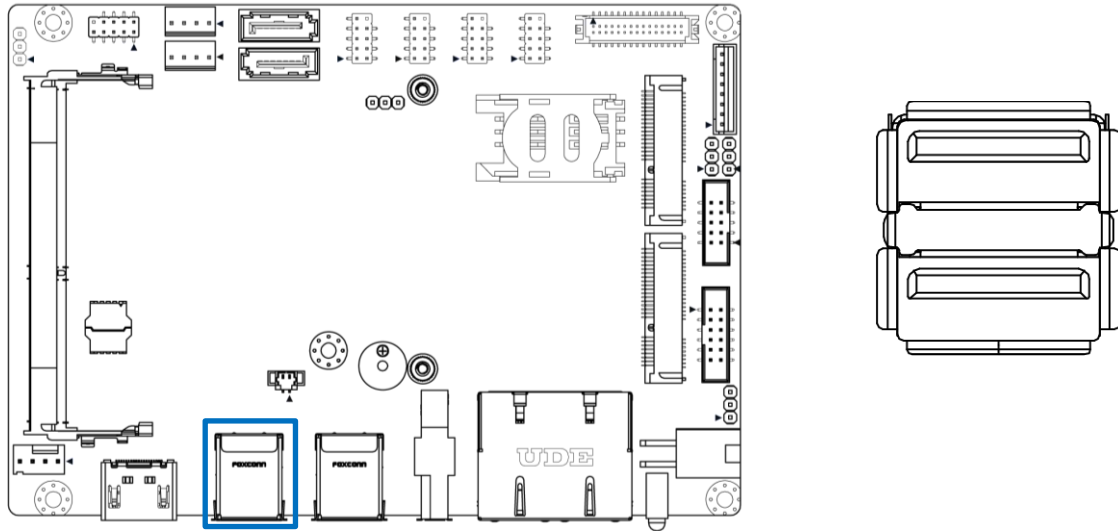


CN2

Pin	Signal	Pin	Signal
1	LVDS_BKLTEN	2	LBKLT_CTRL
3	BLPWR	4	BLPWR
5	GND	6	GND
7	CH7511_BLUP	8	CH7511_BLDN

2.3 I/O Interface Descriptions

2.3.7 USB3

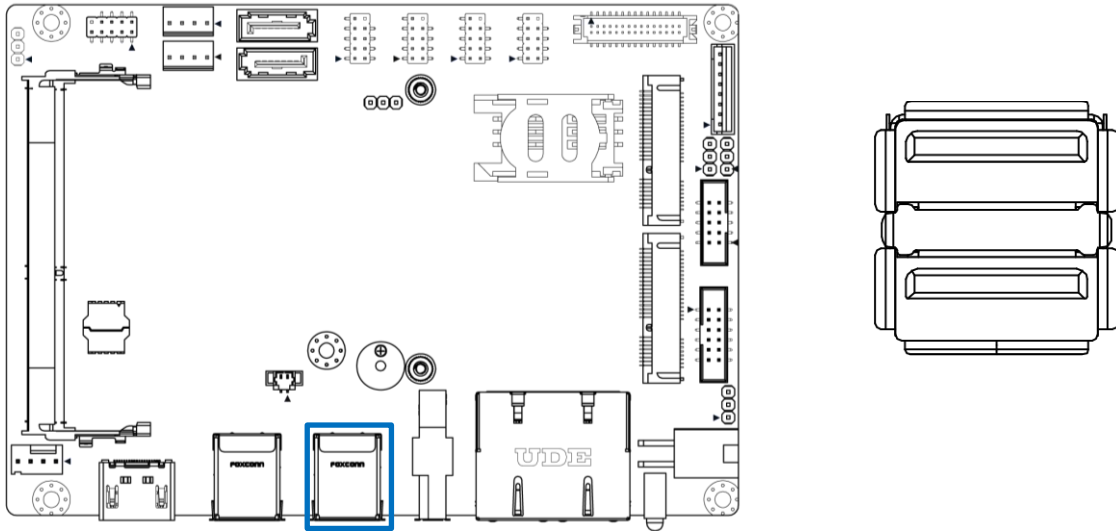


CN3

Pin	Signal	Pin	Signal
1	USBVCC0	10	USBVCC0
2	USB2-2N_CONN	11	USB2-1N_CONN
3	USB2-2P_CONN	12	USB2-1P_CONN
4	GND	13	GND
5	USB3-RN2_CONN	14	USB3-RN1_CONN
6	USB3-RP2_CONN	15	USB3-RP1_CONN
7	GND	16	GND
8	USB3-TN2_CONN	17	USB3-TN1_CONN
9	USB3-TP2_CONN	18	USB3-TP1_CONN

2.3 I/O Interface Descriptions

2.3.8 USB

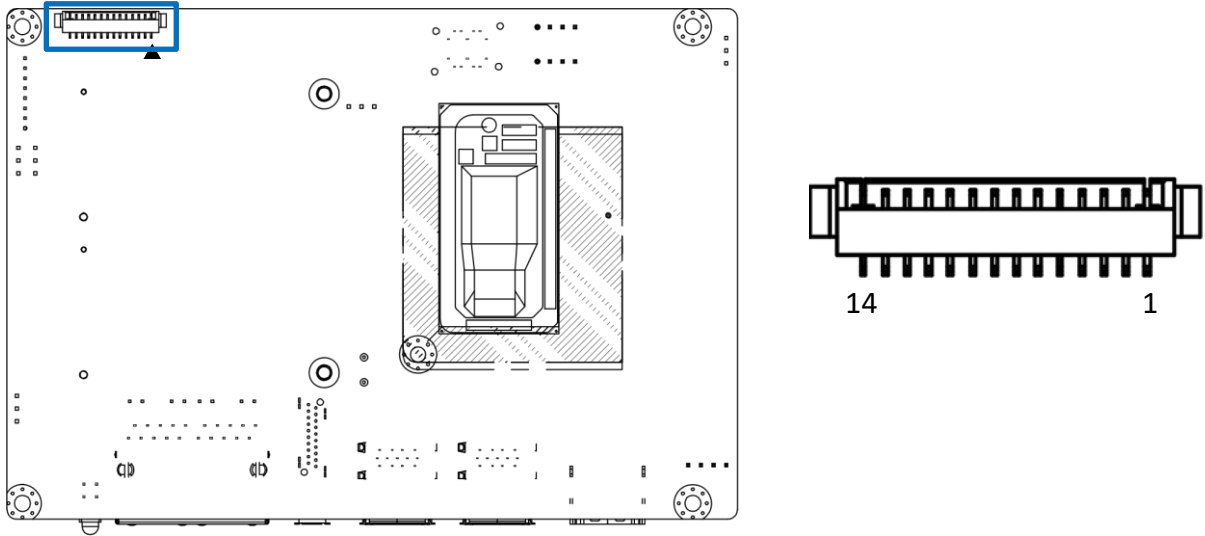


CN4

Pin	Signal	Pin	Signal
1	USBVCC0	10	USBVCC1
2	USB2-2N_CONN	11	USB2-3N_CONN
3	USB2-2P_CONN	12	USB2-3P_CONN
4	GND	13	GND
5	USB3-RN2_CONN	14	USB3-RN3_CONN
6	USB3-RP2_CONN	15	USB3-RP3_CONN
7	GND	16	GND
8	USB3-TN2_CONN	17	USB3-TN3_CONN
9	USB3-TP2_CONN	18	USB3-TP3_CONN

2.3 I/O Interface Descriptions

2.3.9 eDP (Optional)

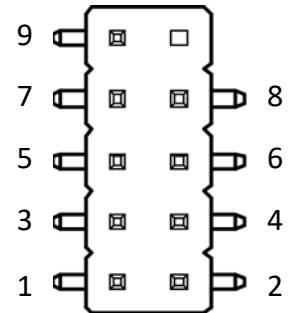
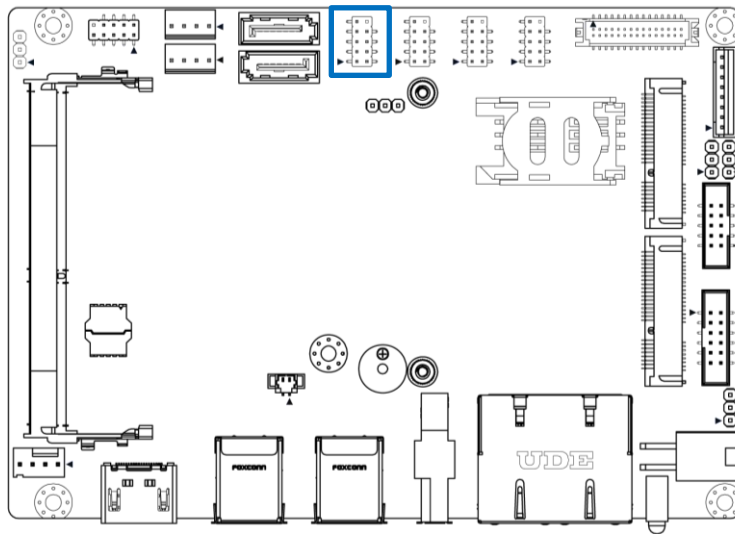


CN31

Pin	Signal
1	EDP_TXP1
2	EDP_TXN1
3	GND
4	EDP_TXP0
5	EDP_TXN0
6	GND
7	EDP_AUX-P
8	EDP_AUX-N
9	GND
10	PNLPWR
11	PNLPWR
12	EDP_HPD
13	GND
14	GND

2.3 I/O Interface Descriptions

2.3.10 COM Port

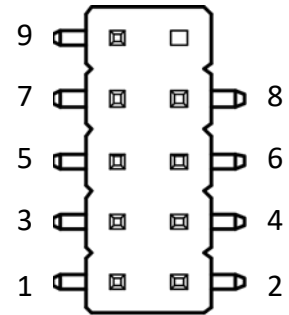
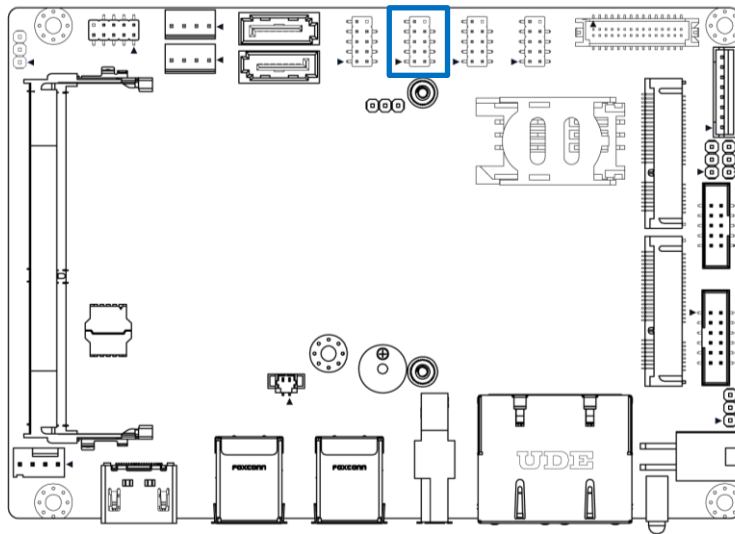


COM1

Pin	Signal	Pin	Signal
1	CM1_DCD	2	CM1_DSR
3	CM1_RXD	4	CM1_RTS
5	CM1_TXD	6	CM1_CTS
7	CM1_DTR	8	CM1_RI
9	GND	10	NC

2.3 I/O Interface Descriptions

2.3.11 COM Port

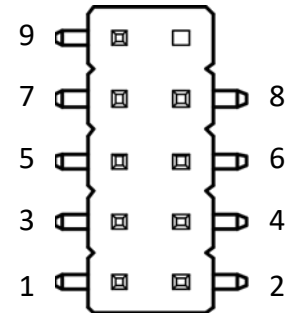
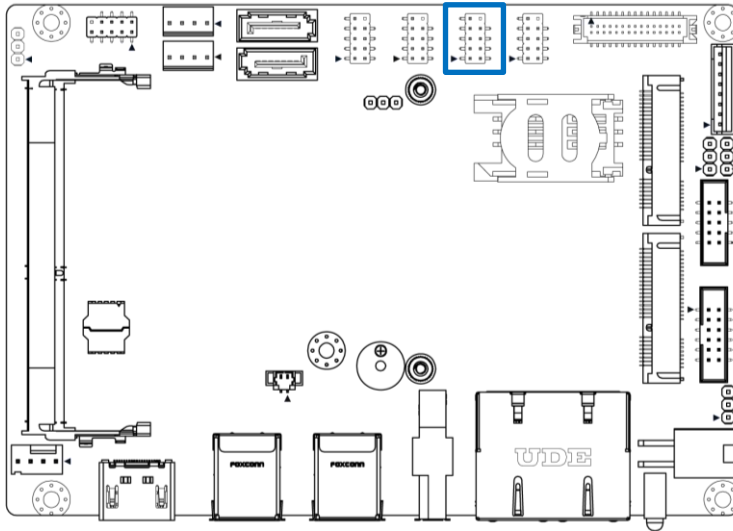


COM2

Pin	Signal	Pin	Signal
1	CM2_DCD	2	CM2_DSR
3	CM2_RXD	4	CM2_RTS
5	CM2_TXD	6	CM2_CTS
7	CM2_DTR	8	CM2_RI
9	GND	10	NC

2.3 I/O Interface Descriptions

2.3.12 COM Port

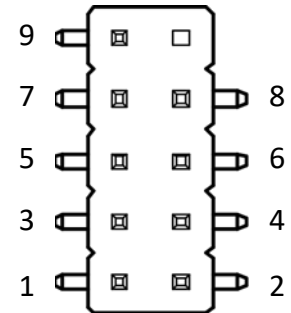
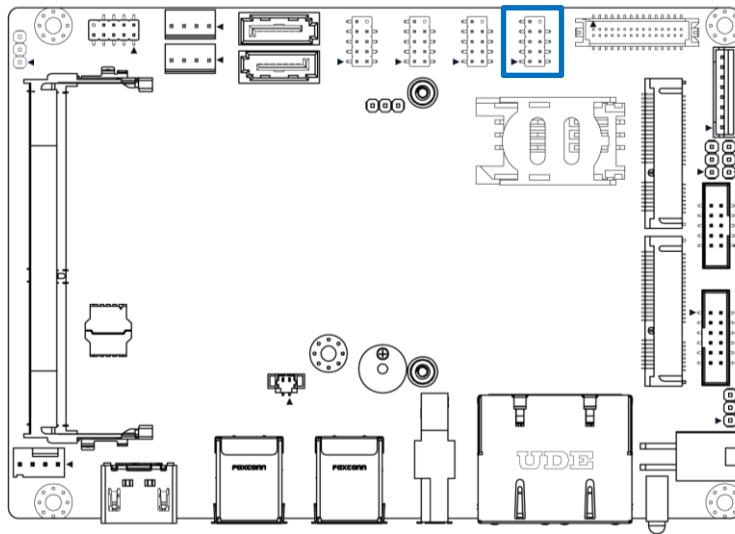


COM3

Pin	Signal	Pin	Signal
1	CM3_DCD	2	CM3_DSR
3	CM3_RXD	4	CM3_RTS
5	CM3_TXD	6	CM3_CTS
7	CM3_DTR	8	CM3_RI
9	GND	10	NC

2.3 I/O Interface Descriptions

2.3.13 COM Port

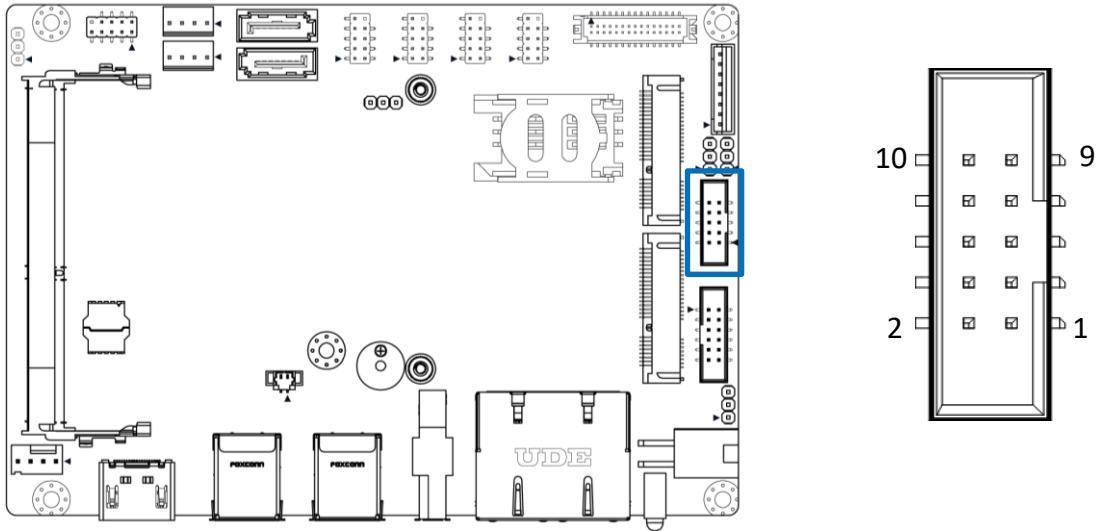


COM4

Pin	Signal	Pin	Signal
1	CM4_DCD	2	CM4_DSR
3	CM4_RXD	4	CM4_RTS
5	CM4_TXD	6	CM4_CTS
7	CM4_DTR	8	CM4_RI
9	GND	10	NC

2.3 I/O Interface Descriptions

2.3.14 GPIO

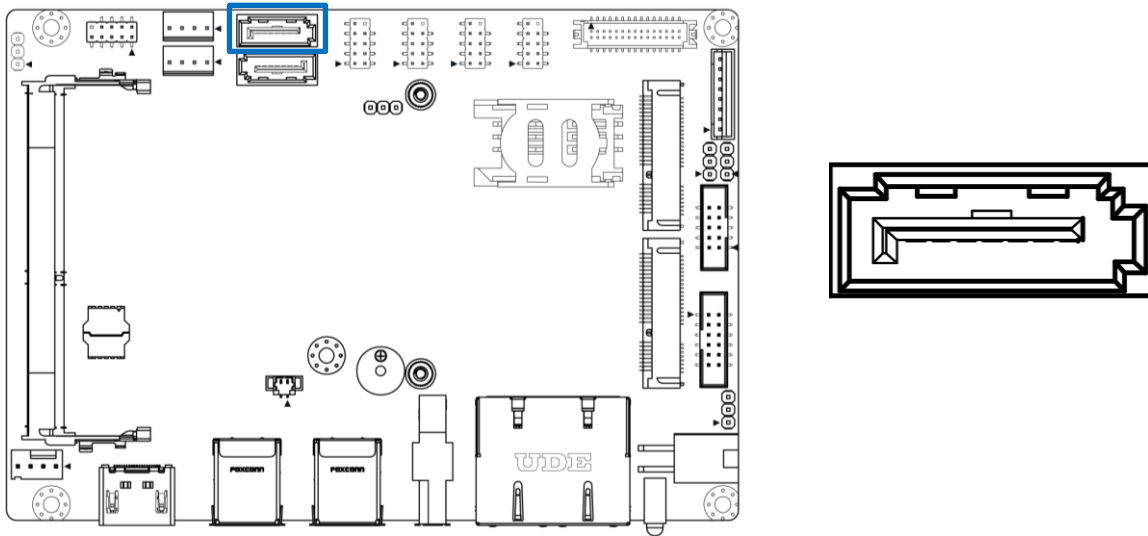


GPIO1

Pin	GPIO	Default Configuration
1		VCC5
2		GND
3	DIO_PH_INT0	GPI0
4	DIO_PH_OUT0	GPO0
5	DIO_PH_INT1	GPI1
6	DIO_PH_OUT1	GPO1
7	DIO_PH_INT2	GPI2
8	DIO_PH_OUT2	GPO2
9	DIO_PH_IN3	GPII3
10	DIO_PH_OUT3	GPO3

2.3 I/O Interface Descriptions

2.3.15 SATA

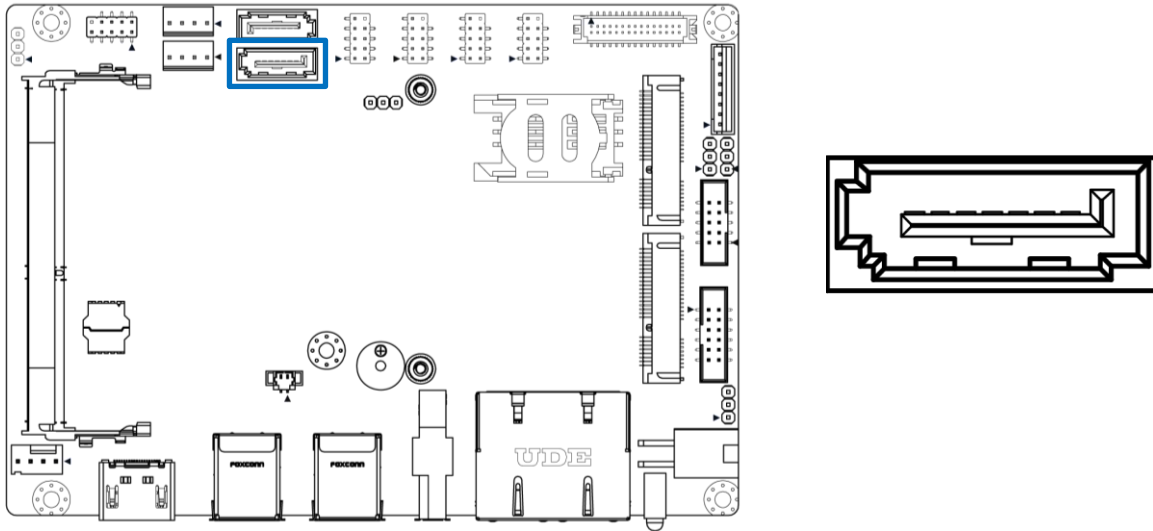


SATA1

Pin	Signal
1	GND
2	SATA_TX0_C_DC_DP
3	SATA_TX0_C_DC_DN
4	GND
5	SATA_RX0_DC_DN
6	SATA_RX0_DC_DP
7	GND

2.3 I/O Interface Descriptions

2.3.16 SATA

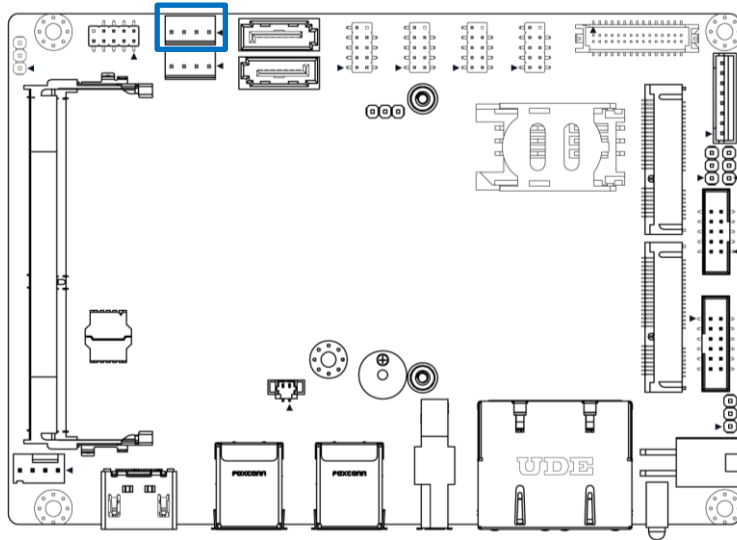


SATA2

Pin	Signal
1	GND
2	SATA_TX1_C_DC_DP
3	SATA_TX1_C_DC_DN
4	GND
5	SATA_RX1_DC_DN
6	SATA_RX1_DC_DP
7	GND

2.3 I/O Interface Descriptions

2.3.17 SATA Power

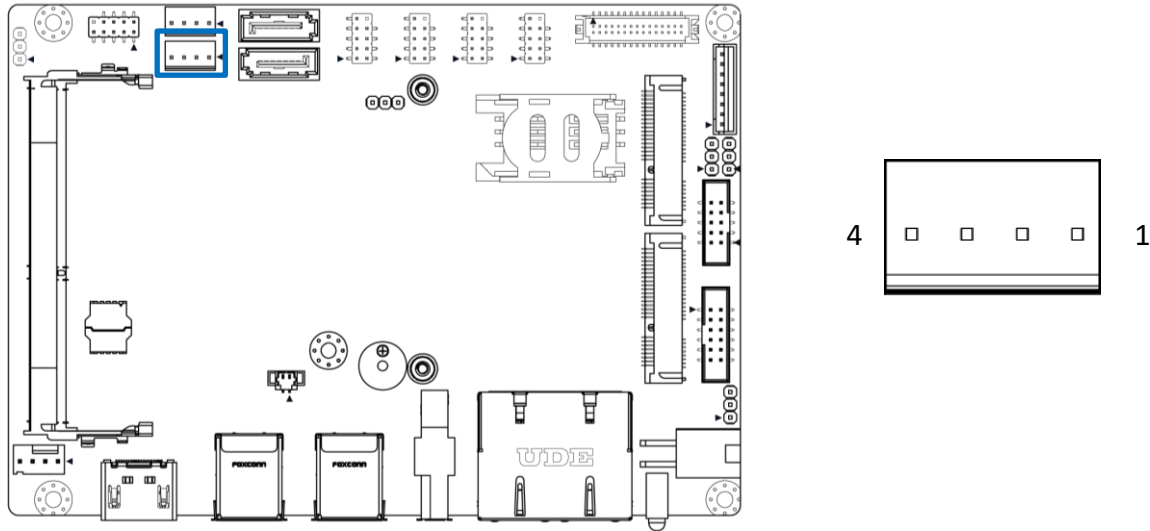


SATA1_PWR1

Pin	Signal
1	+V5
2	GND
3	GND
4	+V12

2.3 I/O Interface Descriptions

2.3.18 SATA Power

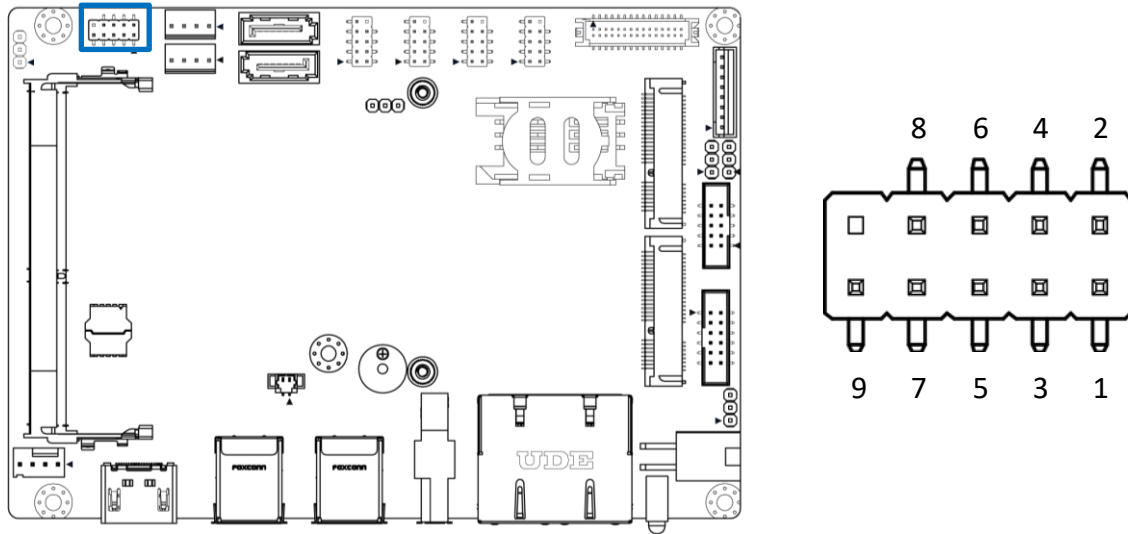


SATA2_PWR1

Pin	Signal
1	+V5
2	GND
3	GND
4	+V12

2.3 I/O Interface Descriptions

2.3.19 USB2.0

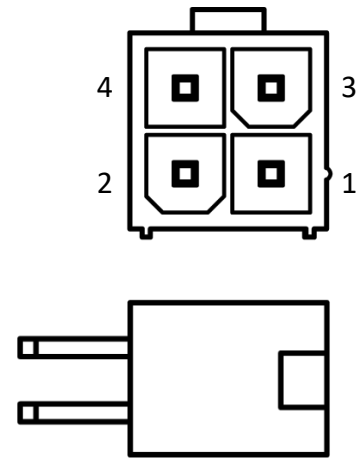
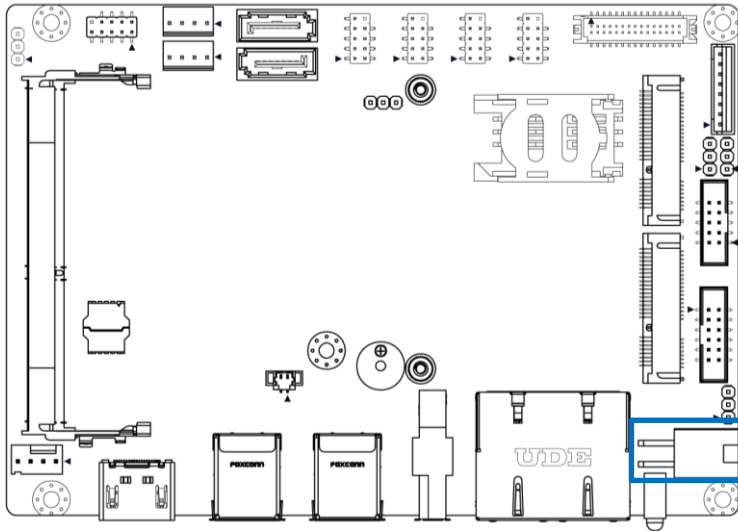


USB_2

Pin	Signal	Pin	Signal
1	USBVCC2	2	USBVCC2
3	USB2-5N_CONN	4	USB2-6N_CONN
5	USB2-5P_CONN	6	USB2-6P_CONN
7	GND	8	GND
9	NC		

2.3 I/O Interface Descriptions

2.3.20 DC12_IN

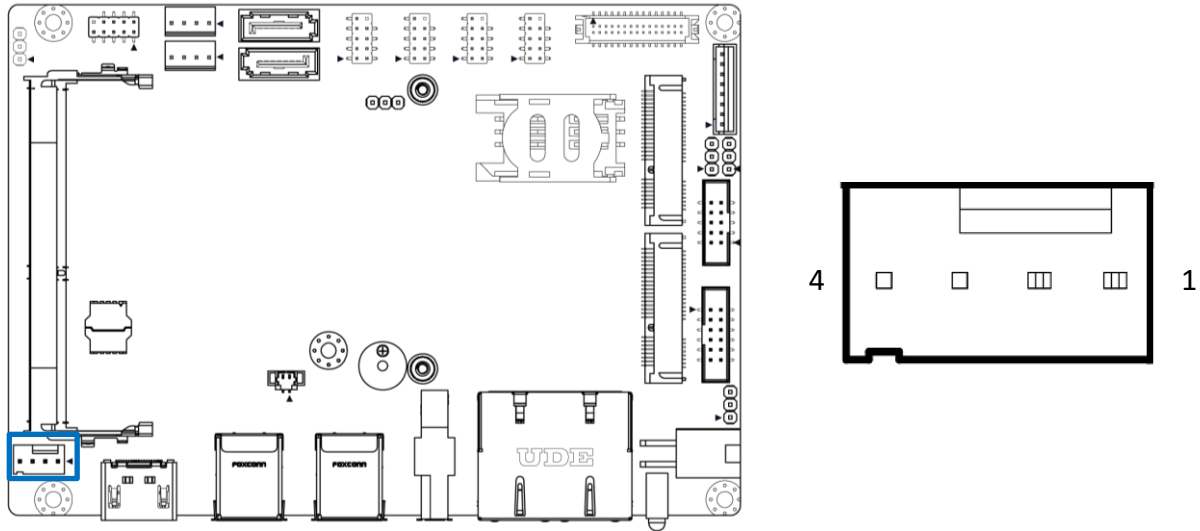


DC_IN2

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

2.3 I/O Interface Descriptions

2.3.21 FAN Power

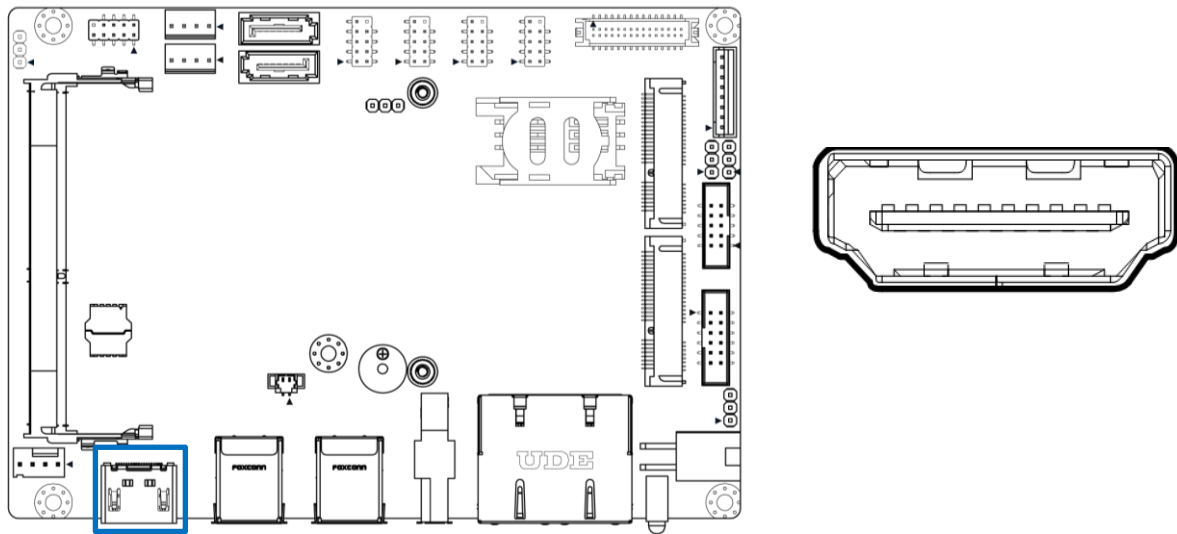


FAN1

Pin	Signal
1	GND
2	+12V
3	FAN_SENSE
4	FAN_CONTROL

2.3 I/O Interface Descriptions

2.3.22 HDMI

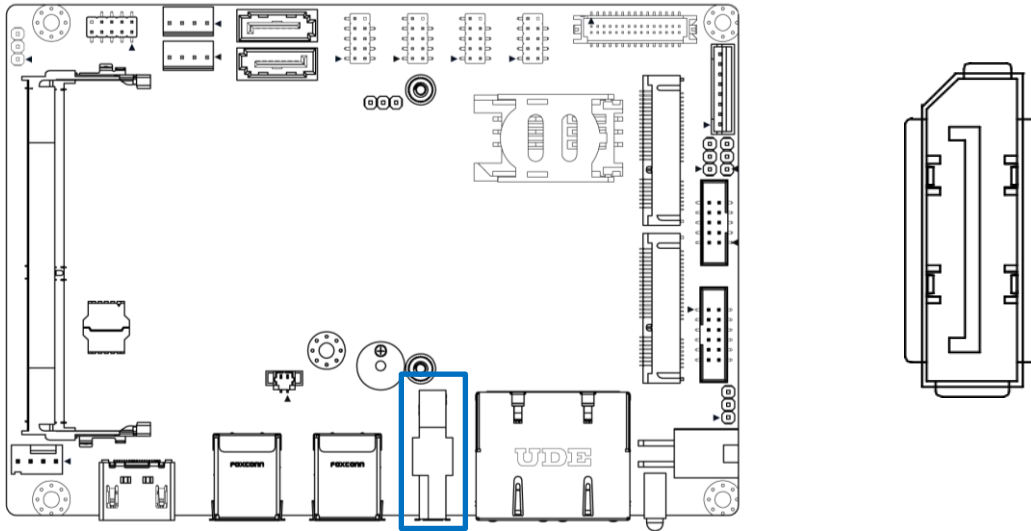


HDMI

Pin	Signal	Pin	Signal
1	HDMI_TX2+_C	2	GND
3	GND	4	HDMI_TXC-_C
5	HDMI_TX2-_C	6	NC
7	HDMI_TX1+_C	8	NC
9	GND	10	HDMI_SCL
11	HDMI_TX1-_C	12	HDMI_SDA
13	HDMI_TX0+_C	14	GND
15	GND	16	VCC5_HDMI
17	HDMI_TX0-_C	18	HDMI_HPD_CON
19	HDMI_TXC+_C	20	

2.3 I/O Interface Descriptions

2.3.23 DP

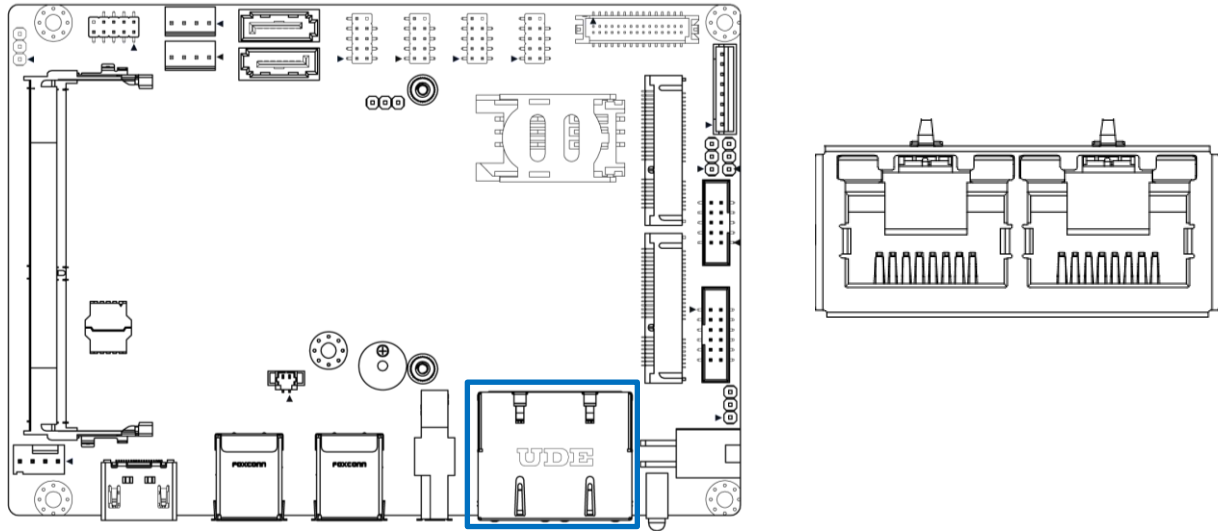


DP1

Pin	Signal
1	ML_LANE0+
2	GND
3	ML_LANE0-
4	ML_LANE1+
5	GND
6	ML_LANE1-
7	ML_LANE2+
8	GND
9	ML_LANE2-
10	ML_LANE3+
11	GND
12	ML_LANE3-
13	GND
14	GND
15	AUX CH+
16	GND
17	AUX CH-
18	HPD
19	DP_PWR Return

2.3 I/O Interface Descriptions

2.3.24 RJ45

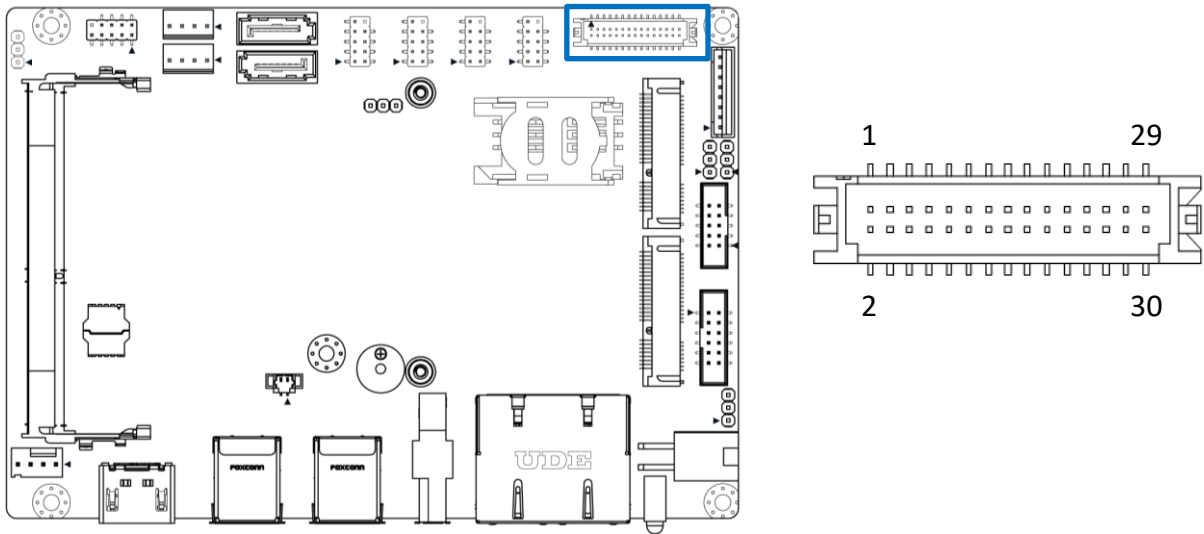


RJ1

Pin	Signal	Pin	Signal
1	R1 GBE1_MDIOP	11	R1 GBE2_MDIOP
2	R2 GBE1_MDION	12	R2 GBE2_MDION
3	R3 GBE1_MDI1P	13	R3 GBE2_MDI1P
4	R4 GBE1_MDI1N	14	R4 GBE2_MDI1N
5	R5 GBE0_CT	15	R5 GBE0_CT
6	R6 GBE0_CT	16	R6 GBE0_CT
7	R7 GBE1_MDI2P	17	R7 GBE2_MDI2P
8	R8 GBE1_MDI2N	18	R8 GBE2_MDI2N
9	R9 GBE1_MDI3P	19	R9 GBE2_MDI3P
10	R10 GBE1_MDI3N	20	R10 GBE2_MDI3N
L1_1	L1 LINK100J	L1_2	L1 LINK100J
L2_!	L2 LINK1000J	L2_2	L2 LINK1000J
L3_1	L3 GBE_ACTJ	L3_2	L3 GBE_ACTJ
L4_1	L4 P3V3	L4_2	L4 P3V3

2.3 I/O Interface Descriptions

2.3.25 LVDS (Optional)



LVDS1

Pin	Signal	Pin	Signal
1	LB_DATA-N3	2	LB_DATA-P3
3	LB_CLK-N	4	LB_CLK-P
5	LB_DATA-N2	6	LB_DATA-P2
7	LB_DATA-N1	8	LB_DATA-P1
9	LB_DATA-N0	10	LB_DATA-P0
11	MIICSDA	12	MIICSL
13	GND	14	GND
15	GND	16	GND
17	LA_DATA-P3	18	LA_DATA-N3
19	LA_CLK-P	20	LA_CLK-N
21	LA_DATA-P2	22	LA_DATA-N2
23	LA_DATA-P1	24	LA_DATA-N1
25	LA_DATA-P0	26	LA_DATA-N0
27	PNLPWR	28	PNLPWR
29	PNLPWR	30	PNLPWR

Chapter 3

Features & Interface

3.1 Processor

3.5" SBC Industrial Motherboard with 8th Gen. Intel® Core™ Processor i3/i5/i7 & Intel® Celeron® Processor

3.2 BIOS

AMI uEFI 256MB SPI flash

3.3 System Memory

1x 260-Pin DDR4 2400MHz SO-DIMM slot

3.5 USB

- 4x USB 3.2 Gen 2 (10 Gbps)
- 2x USB 2.0 internal 2.0PH headers

3.6 Ethernet

- GbE1: Intel® I219LM (Support Wake-on-LAN and PXE)
- GbE2: Intel® I210-IT (Support Wake-on-LAN and PXE)

3.7 SATA

2x SATA Gen3, w/2x 4pin SATA Power connector

3.8 Audio

Realtek ALC888S HD Audio Codec

3.9 Expansion

Mini PCI Express : 2x Mini PCIe x1 (Gen3)

Signal	I/O	Description
GPO[0:3]	O	General purpose output pins. Upon a hardware reset, these outputs should be low.
GPI[0:3]	I	General purpose input pins. Pulled high internally on the Module.

3.10 General Purpose Input Output

3.10.1 GPIO Configuration

Board Design

Pin#	GPIO#	Default Configuration
1	—	VCC3
2	—	GND
3	DIO_PH_OUT0	GPO0
4	DIO_PH_IN0	GPI0
5	DIO_PH_OUT1	GPO1
6	DIO_PH_IN1	GPI1
7	DIO_PH_OUT2	GPO2
8	DIO_PH_IN2	GPI2
9	DIO_PH_OUT3	GPO3
10	DIO_PH_IN3	GPI3

Notes:
1. Output pin default setting is "HIGH"

The GPIO function is provided by a Fintek F81866 AD-I, and it can be accessed through its GPIO index/data port. The index port is the base address +0 and the data port is the base address +1. To access the GPIO register, write index to the index port, and then read/write from/to data port. The configuration on the CT-DBT0x is described as below.

Index Port	0xA00
Data Port	0xA01

Registers Description

GPIO Input / Output Select

- GPIO8x Configuration Registers
(Index port=0xA00, Data port=0xA01, Offset=0x88)

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
GPO3	GPO2	GPO1	GPO0	GPI3	GPI2	GPI1	GPI0

Note.

Bit X = 0 means Input Mode
Bit X = 1 means Output Mode

GPIO Output Data Select

- GPIO Output Data Register
(Index port=0xA00, Data port=0xA01, Offset=0x89)

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
GPO3	GPO2	GPO1	GPO0	GPI3	GPI2	GPI1	GPI0

Note.

Bit X = 0 outputs 0 when in output mode
Bit X = 1 outputs 1 when in output mode

3.11 Watchdog Timer

3.11.1 Board Design

The Watchdog Timer (WDT) is implemented by Fintek F81866AD-I.

Register	Address
WDT Base Address	0xA10

3.11.2 Psuedo Code

- Set WDT Time Unit (Second Unit)

```
Step1: ByteData = ReadIOByte(0xA15)           //Read current setting
Step2: ByteData = ByteData & 0xF7           //Set time unit to "second"
Step3: WriteIOByte(0xA15, ByteData)         //Write back
```

- Set WDT Timer Value

```
Step1: WriteIOByte(0xA16, Time)             //Set watch dog time value
```

- Enable WDT

```
Step1: ByteData = ReadIOByte(0xA15)         //Read current setting
Step2: ByteData = ByteData | 0x20           //Enable WDT
Step3: WriteIOByte(0xA15, ByteData)         //Write back
```

Chapter 4

Driver Installation

The drivers for the CT-DWL01 can be found on the driver DVD included with the system.

Install the following drivers in the order listed.

1. Chipset
2. Graphics
3. Audio
4. LAN
5. USB 3.0
6. Intel Serial IO
7. Intel Sideband Fabric Device (Intel MBI)
8. Intel Trusted Execution Engine (Intel TXE)

Chapter 5

System BIOS

5.1 BIOS Introduction

The BIOS provides an interface to modify the configuration. When the battery is removed, all the parameters will be reset.

BIOS Setup

Power on the embedded system and by pressing immediately allows you to enter the setup screens. If the message disappears before you respond and you still wish to enter the Setup, restart the system by turning it OFF and ON or pressing the RESET button.

You may also restart the system by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.

Control Keys	
<→> <←>	Select Screen
<↑> <↓>	Select Item
<Enter>	Select
<Page Up/+>	Increases the numeric value or makes changes
<Page Down/->	Decreases the numeric value or makes changes
<F1>	General Help
<F2>	Previous Value
<F3>	Load Optimized Defaults
<F4>	Save Configuration and Exit
<Tab>	Select Setup Fields
<Esc>	Exit BIOS Setup

Main Setup

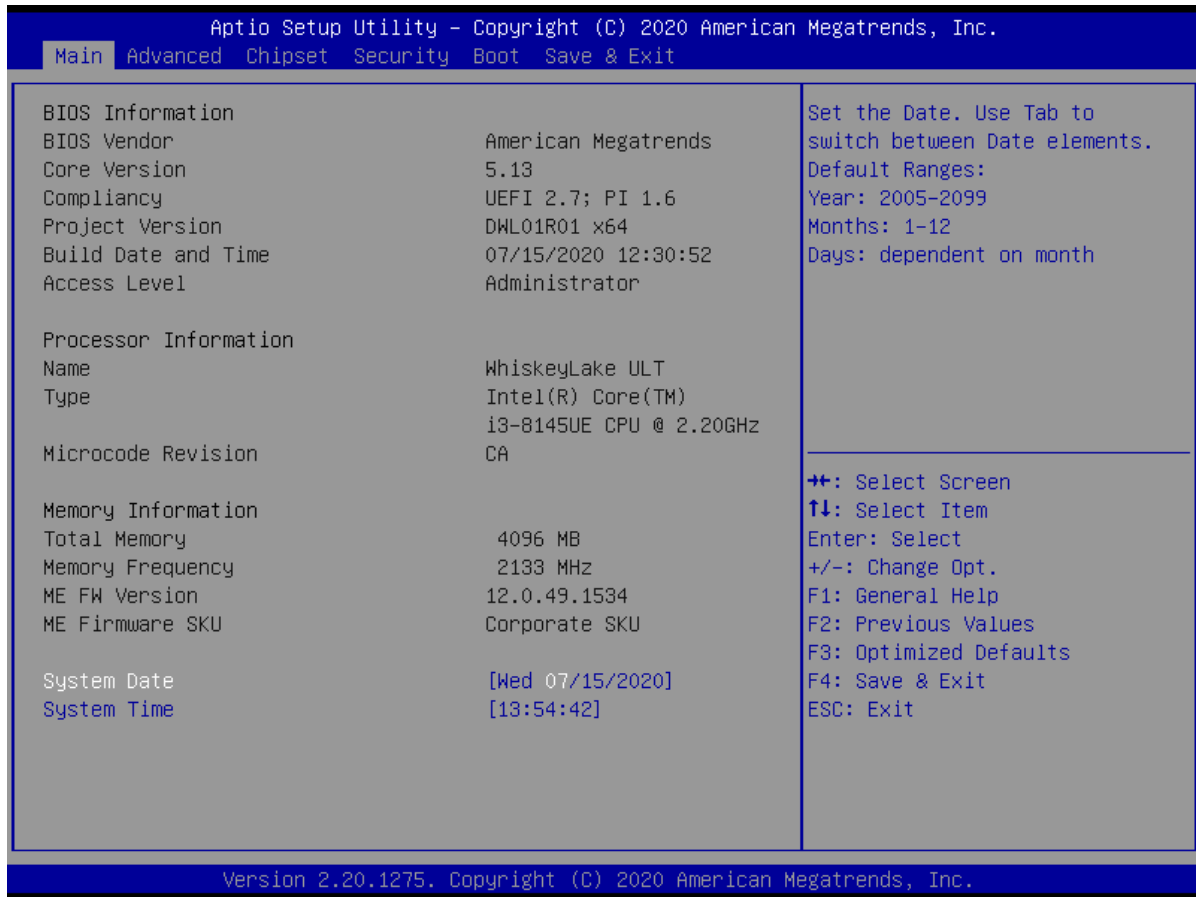
The main menu lists the setup functions you can make changes to. You can use the arrow keys (↑↓) to select the item. The on-line description of the highlighted setup function is displayed at the bottom of the screen.

General Help <F1>

The BIOS setup program provides a General Help screen. You can call up this screen from any menu by simply pressing <F1>. The Help screen lists the appropriate keys to use and the possible selections for the highlighted item. Press <Esc> to exit the Help screen.

5.2 Main Setup

Press to enter BIOS CMOS Setup Utility. The Main setup screen is showed as following when the setup utility is entered. System Date/Time is set up in the Main Menu.



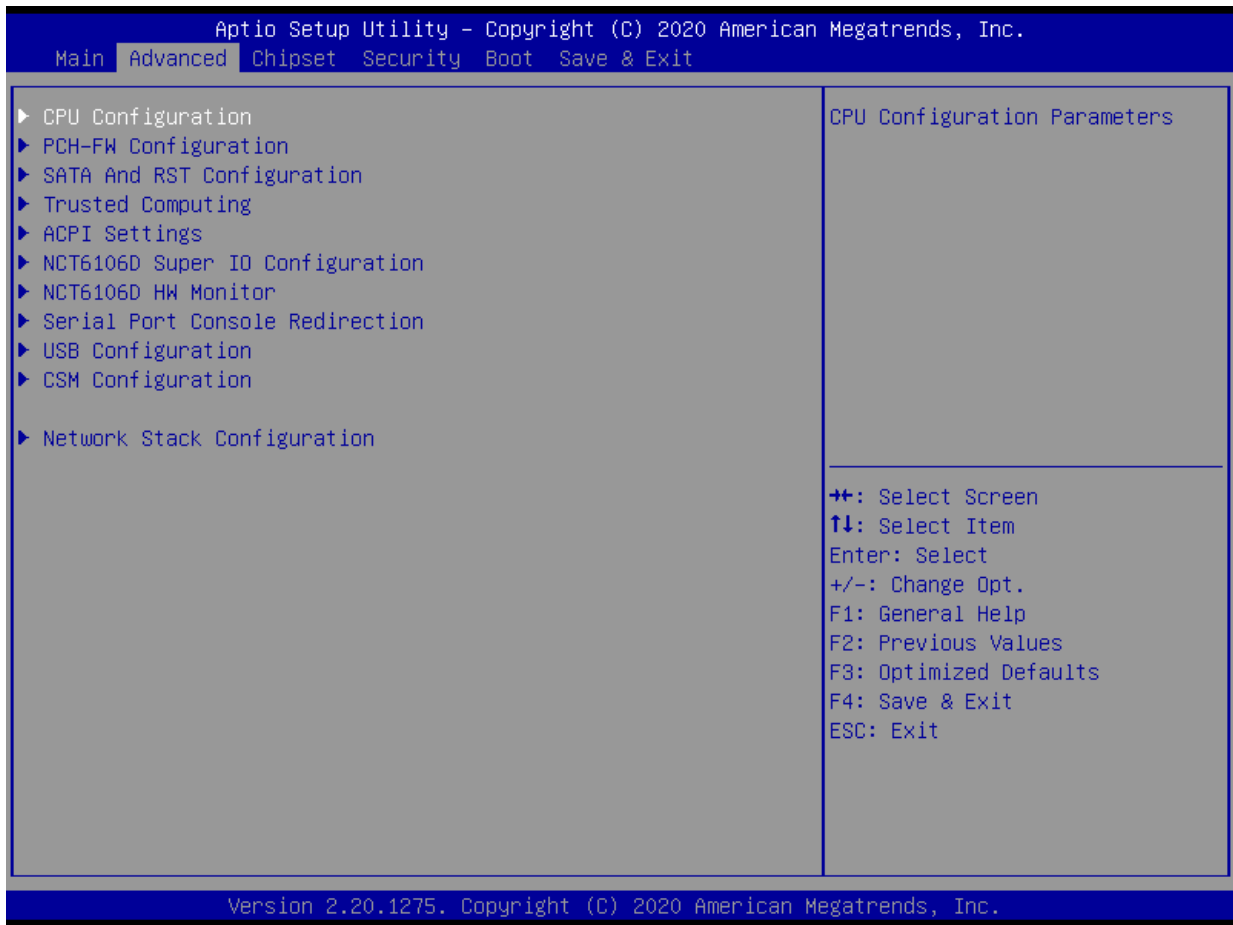
■ System Date

Set the system date. Please use <Tab> to switch between data elements.

■ System Time

Set the system time. Please use <Tab> to switch between time elements.

5.3 Advanced Setup



5.3.1 CPU Configuration

Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.

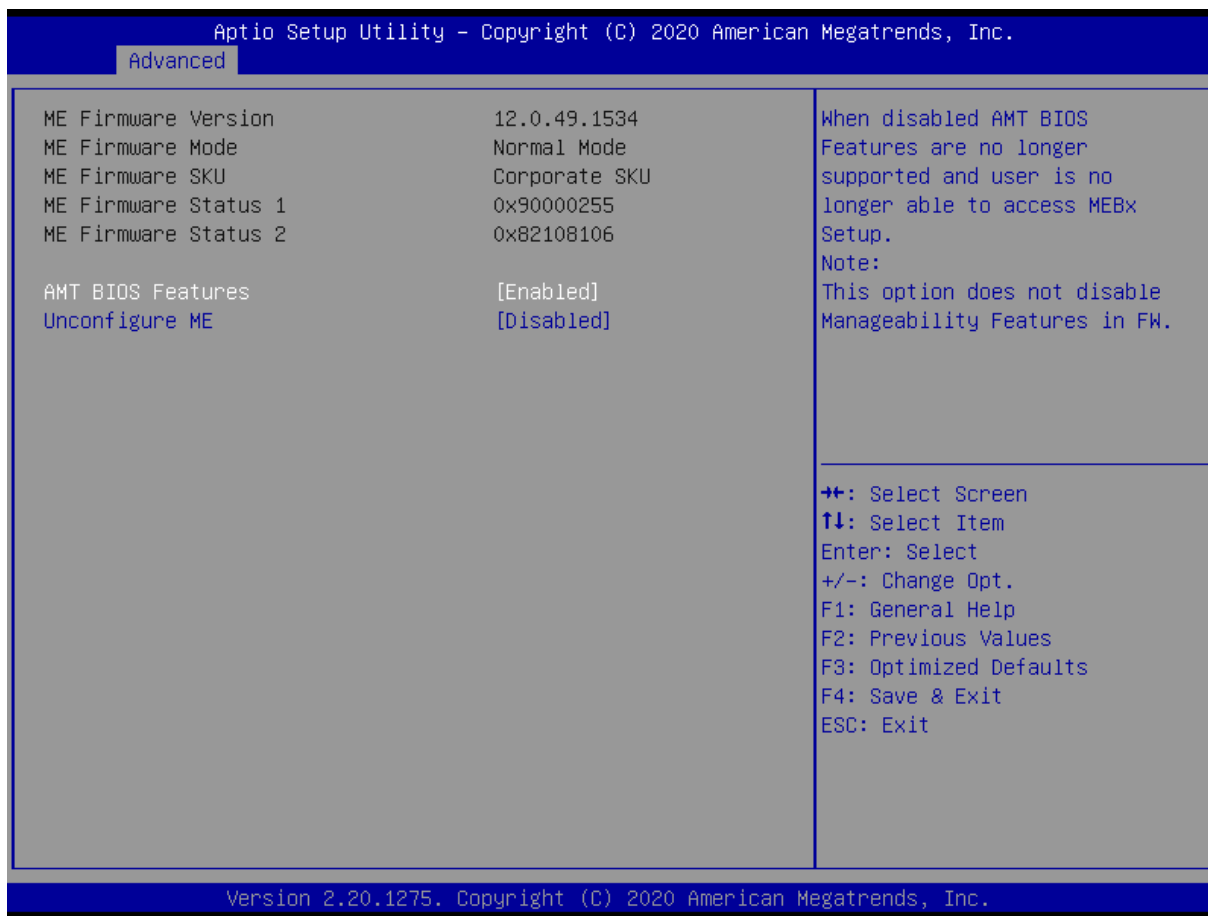
Advanced

CPU Configuration		When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Type	Intel(R) Core(TM) i7-8665UE CPU @ 1.70GHz	
ID	0x806EC	++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Speed	2000 MHz	
L1 Data Cache	32 KB x 4	
L1 Instruction Cache	32 KB x 4	
L2 Cache	256 KB x 4	
L3 Cache	8 MB	
L4 Cache	N/A	
VMX	Supported	
SMX/TXT	Supported	
Intel (VMX) Virtualization Technology	[Enabled]	
Active Processor Cores	[All]	
Hyper-Threading	[Enabled]	
Intel(R) SpeedStep(tm) Turbo Mode	[Enabled]	
C states	[Enabled]	

Version 2.20.1275. Copyright (C) 2020 American Megatrends, Inc.

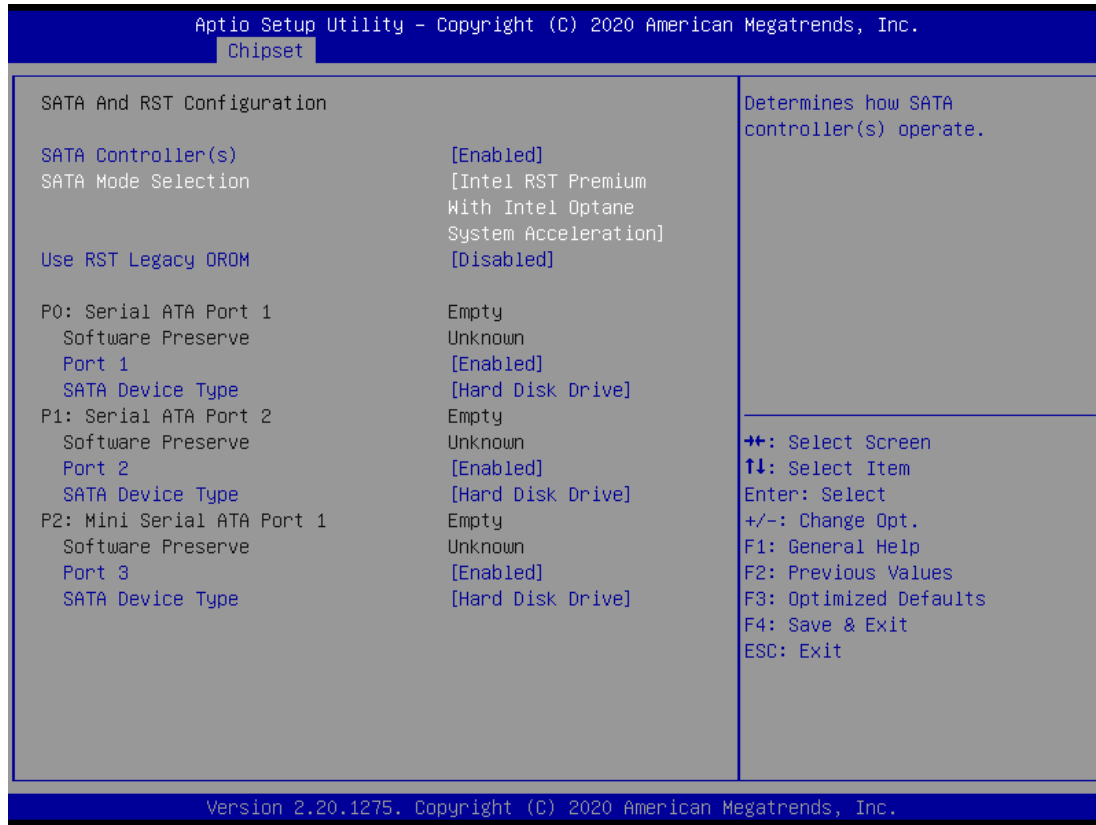
Item	Options	Description
Intel (VMX) Virtualization Technology	Disabled, Enabled[Default]	When enabled, a VMM can utilize the additional hardware capabilities provided by Virtualization Technology.
Active Processor Cores	All[Default] 1 2 3	Number of cores to enable in each processor package.
Hyper-Threading	Disabled, Enabled[Default]	Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology).
Intel SpeedStep	Disabled, Enabled[Default]	This item allows you to enable or disable the Intel SpeedStep.
Turbo Mode	Disabled, Enabled[Default]	This item allows you to enable or disable the Turbo Mode.
C states	Disabled, Enabled[Default]	Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.

5.3.2 PCH-FW Configuration



Item	Options	Description
AMT BIOS Features	Disabled, Enabled[Default]	When disabled AMT BIOS Features are no longer supported and user is no longer able to access MEBx Setup. Note:This option does not disable Manageability Features in FW.
Unconfigure ME	Disabled[Default] , Enabled	OEMFlag Bit 15: Unconfigure ME with resetting MEBx password to default.

5.3.3 SATA and RST Configuration

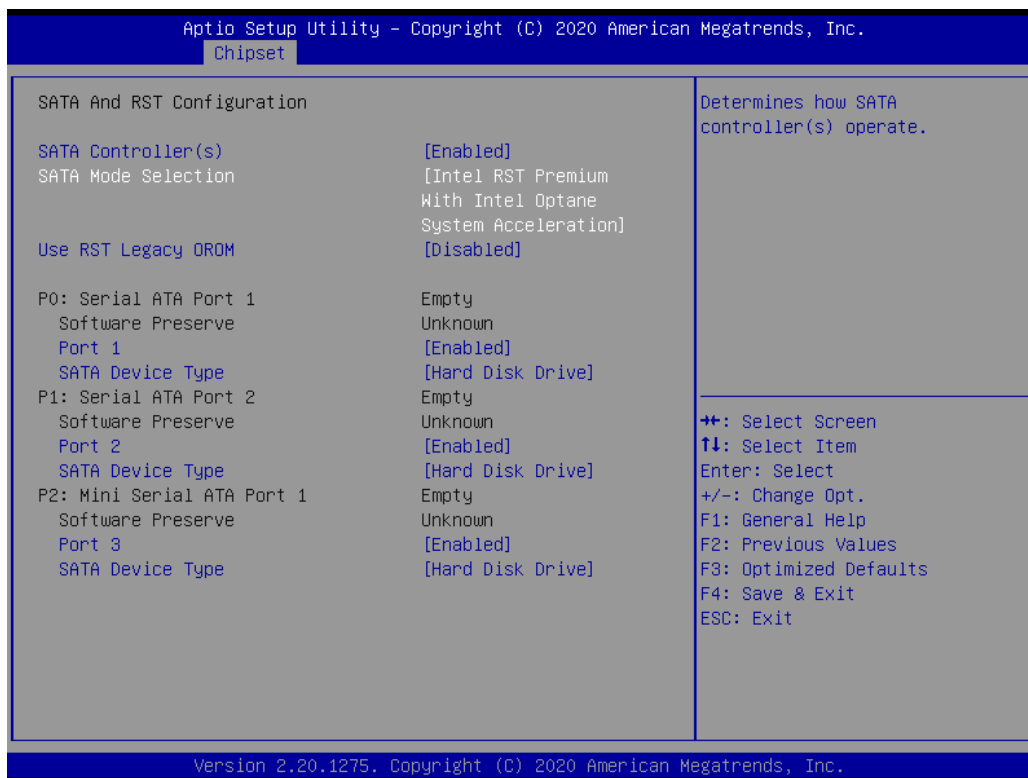


Item	Options	Description
SATA Controller(s)	Disabled, Enabled[Default]	Enable/Disable SATA Device.
SATA Mode Selection	AHCI[Default] , Intel RST Premium With Intel Optane System Acceleration	Determines how SATA controller(s) operate.
Use RST Legacy OROM	Disabled[Default] , Enabled	Use RST Legacy OROM when CSM is Enabled. Note: When you see the POST screen, Please press <CTRL-I> to into Legacy RAID setting interface.
Port1	Disabled, Enabled[Default]	Enable/Disable SATA Port.
SATA Device Type	Hard Disk Drive Solid State Drive[Default]	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.
Port2	Disabled, Enabled[Default]	Enable/Disable SATA Port.
SATA Device Type	Hard Disk Drive Solid State Drive[Default]	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.
Port3	Disabled, Enabled[Default]	Enable/Disable SATA Port.
SATA Device Type	Hard Disk Drive Solid State Drive[Default]	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.

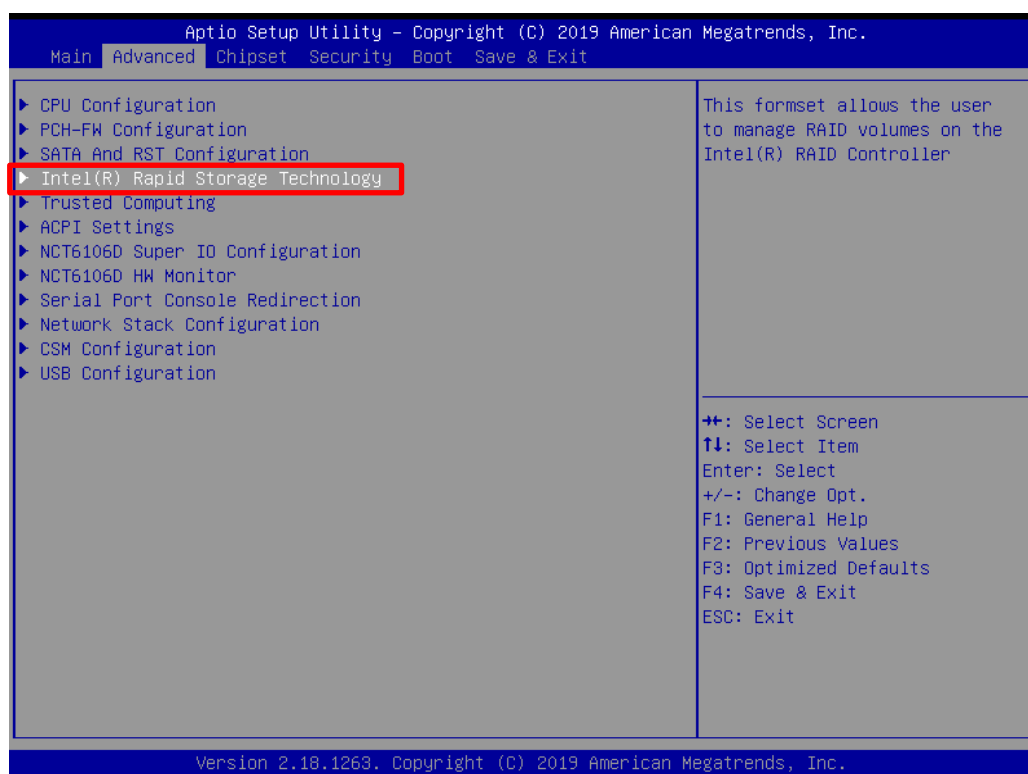
5.3.4 RST (UEFI RAID) Configuration

How to set the UEFI RAID:

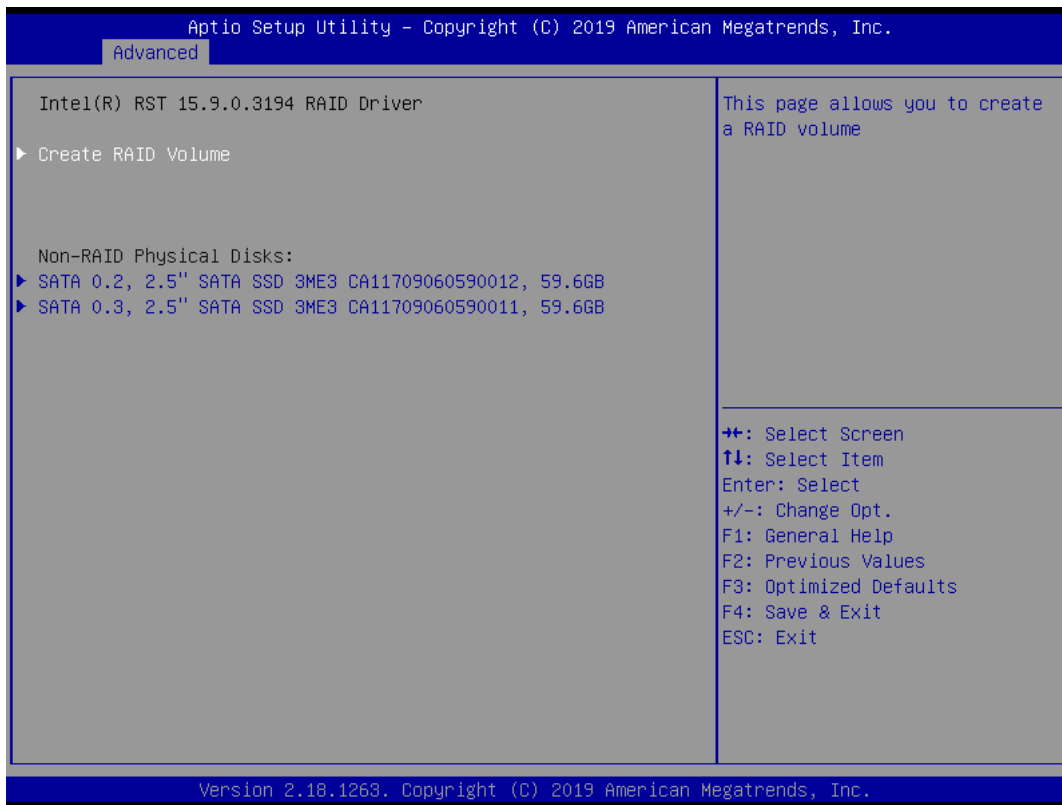
1. When set to “Intel RST Premium With Intel Optane System Acceleration“, please save change reset system.



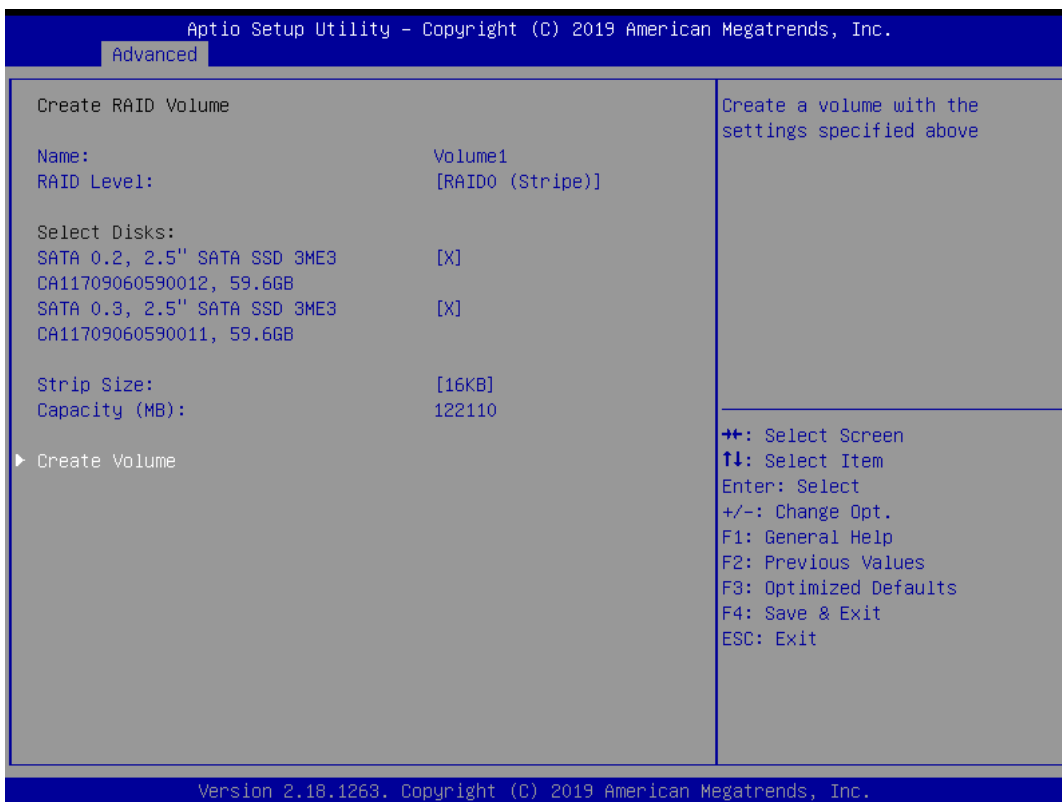
2. After reboot the system, please into BIOS utility and then will see “Intel (R) Rapid Storage Technology”



3. Into Intel(R) Rapid Storage Technology, and start create RAID volume.

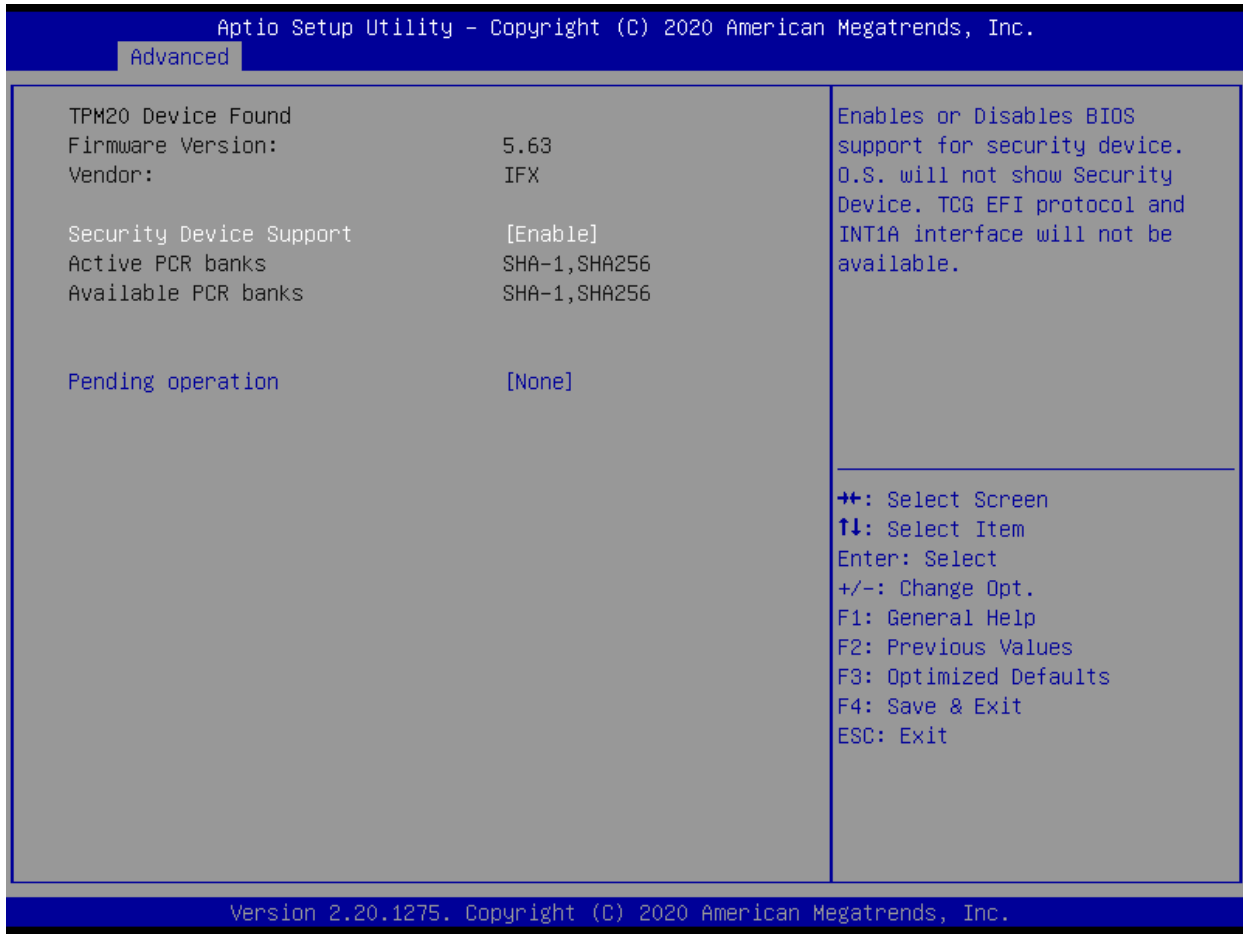


4. Start Create the RAID



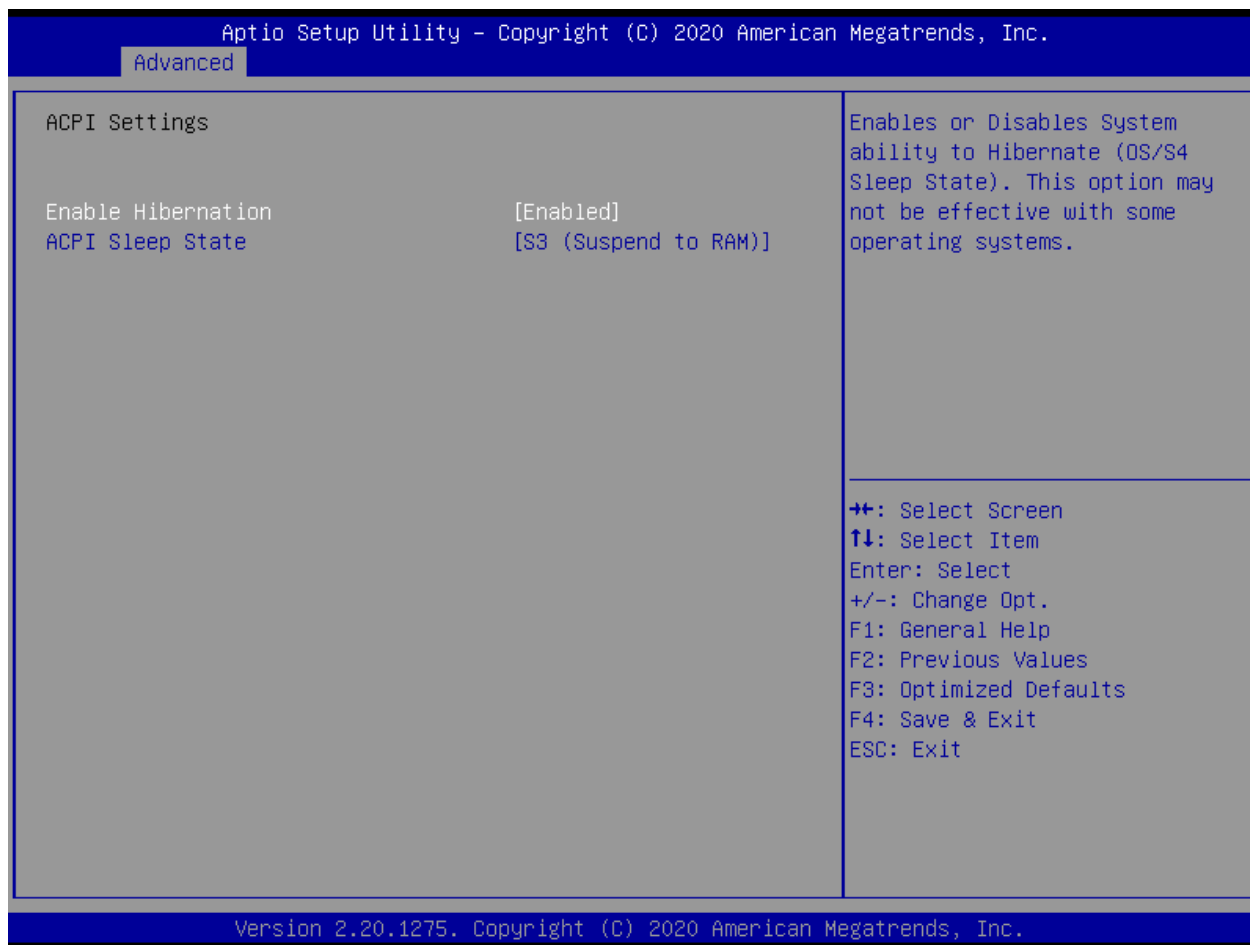
- Select Disk that you want to do the RAID
- Select [x]; No-Select []

5.3.5 Trusted Computing



Item	Options	Description
Security Device Support	Enabled, Disabled [Default] ,	Enable/Disable BIOS support for security device. O.S. will not show Security Device.TCG EFI protocol and INT1A interface will not be available.
Pending operation	None [Default] , TPM Clear	Schedule an Operation for the Security Device. NOTE: Your Computer will reboot during restart in order to change State of Security Device.

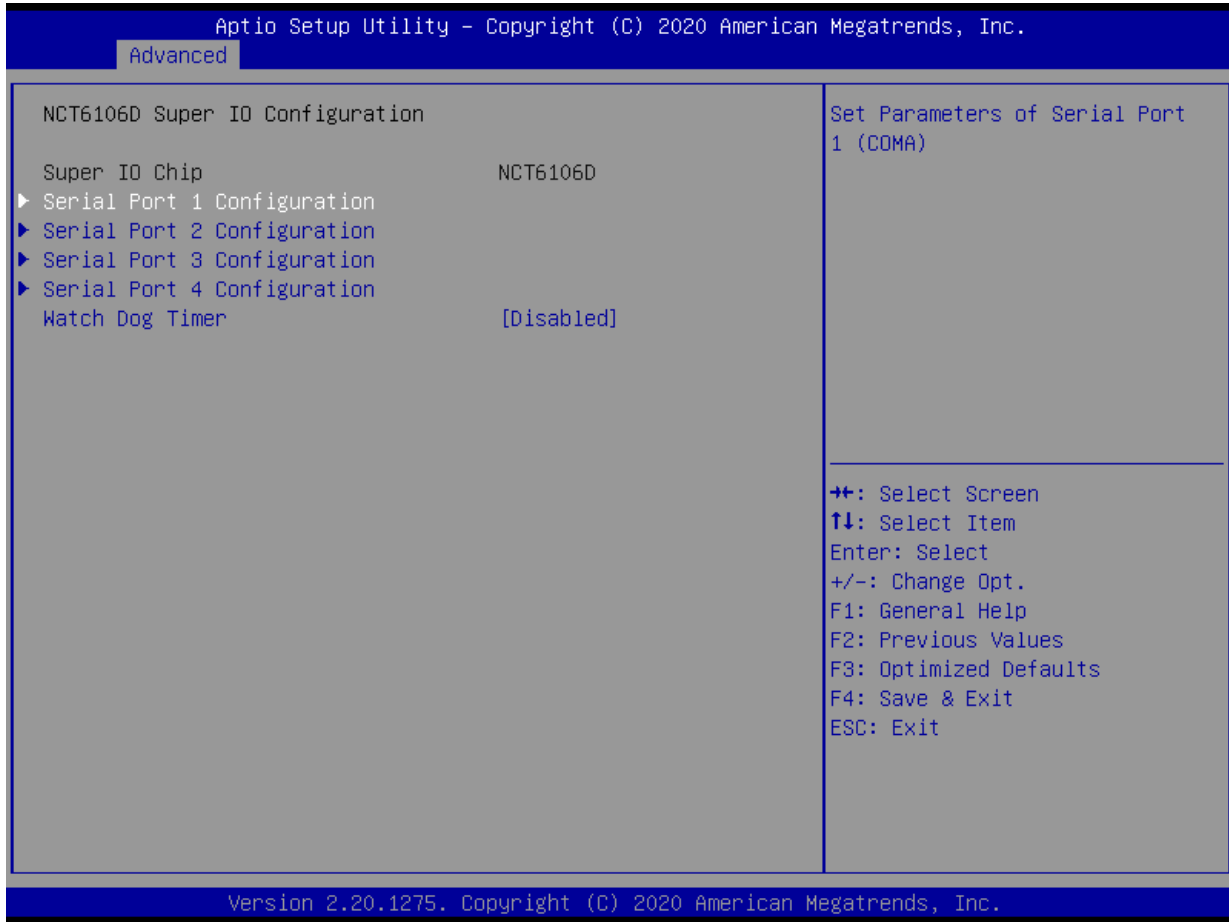
5.3.6 ACPI Settings



Item	Options	Description
Enable Hibernation	Disabled , Enabled [Default] ,	Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some operating systems.
ACPI Sleep State	Suspend Disabled, S3 (Suspend to RAM) [Default]	Select the highest ACPI sleep state the system will enter when the SUSPEDN button is pressed.

5.3.7 Super IO Configuration

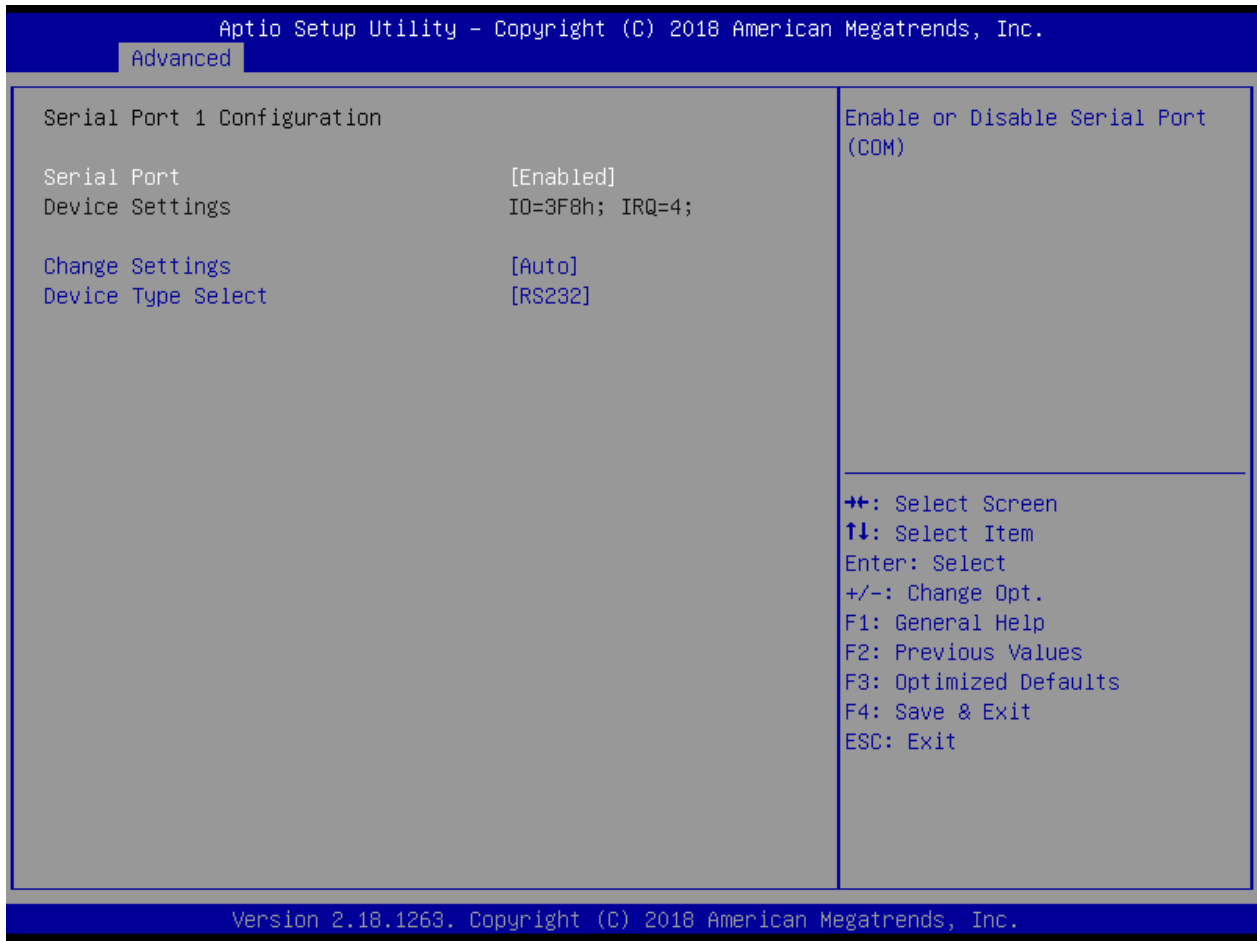
This setting allows you to select options for the Super IO Configuration, and change the value of the selected option.



Item	Description
Serial Port 1 Configuration	Set Parameters of Serial Port 1 (COMA).
Serial Port 2 Configuration	Set Parameters of Serial Port 2 (COMB).
Serial Port 3 Configuration	Set Parameters of Serial Port 3 (COMC).
Serial Port 4 Configuration	Set Parameters of Serial Port 3 (COMD).

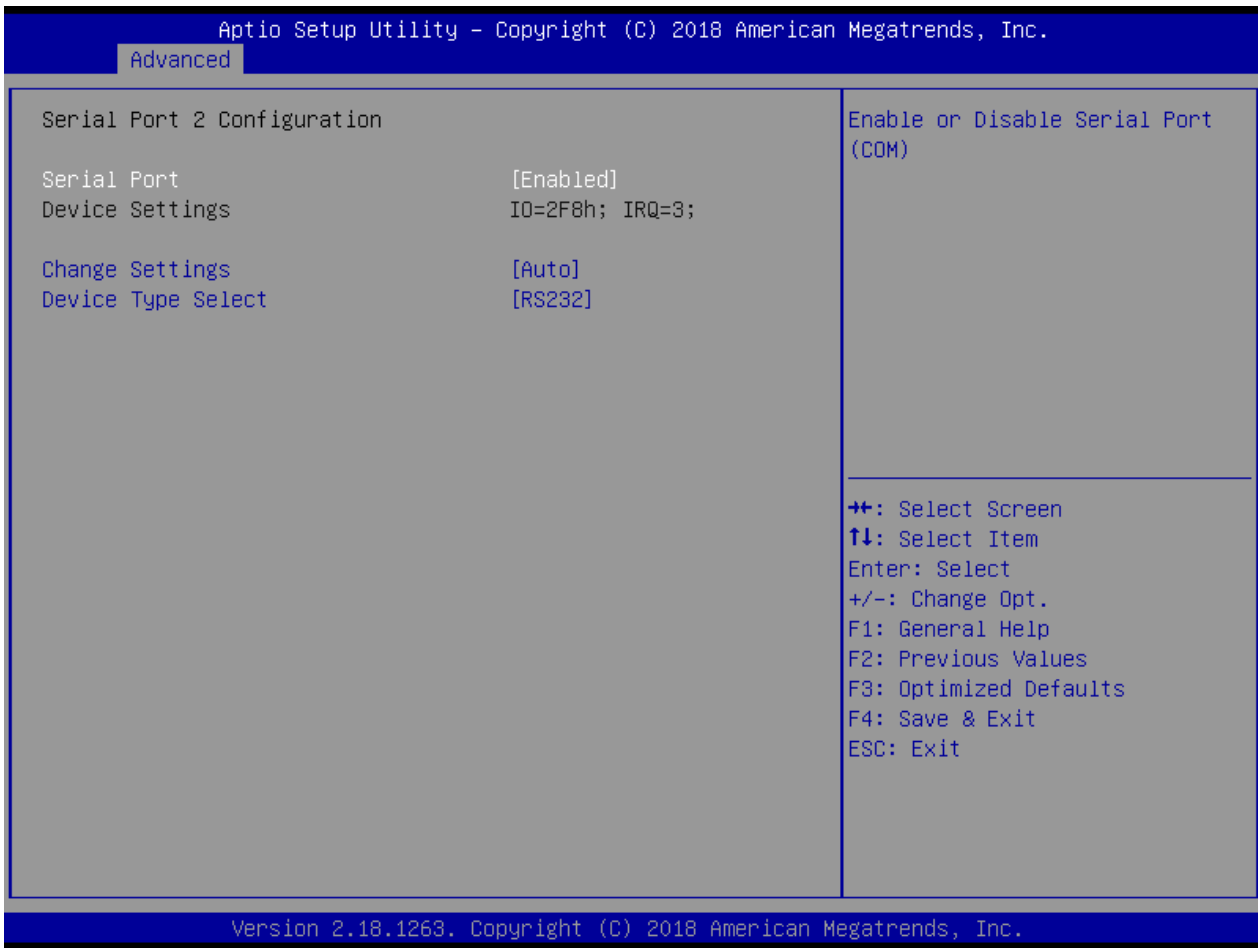
Item	Options	Description
Watch Dog Timer	Disabled [Default], Enabled	Enabled or Disabled Watch Dog Timer function.
Watch Dog Timer Count Mode	Second Mode[Default], Minute Mode	Select Second Mode or Minute Mode.
Watch Dog Timer Time out Value	20~255(Second)[Default], 1~255(Minute)	Watch Dog Timer Time out Value.

Serial Port 1 Configuration



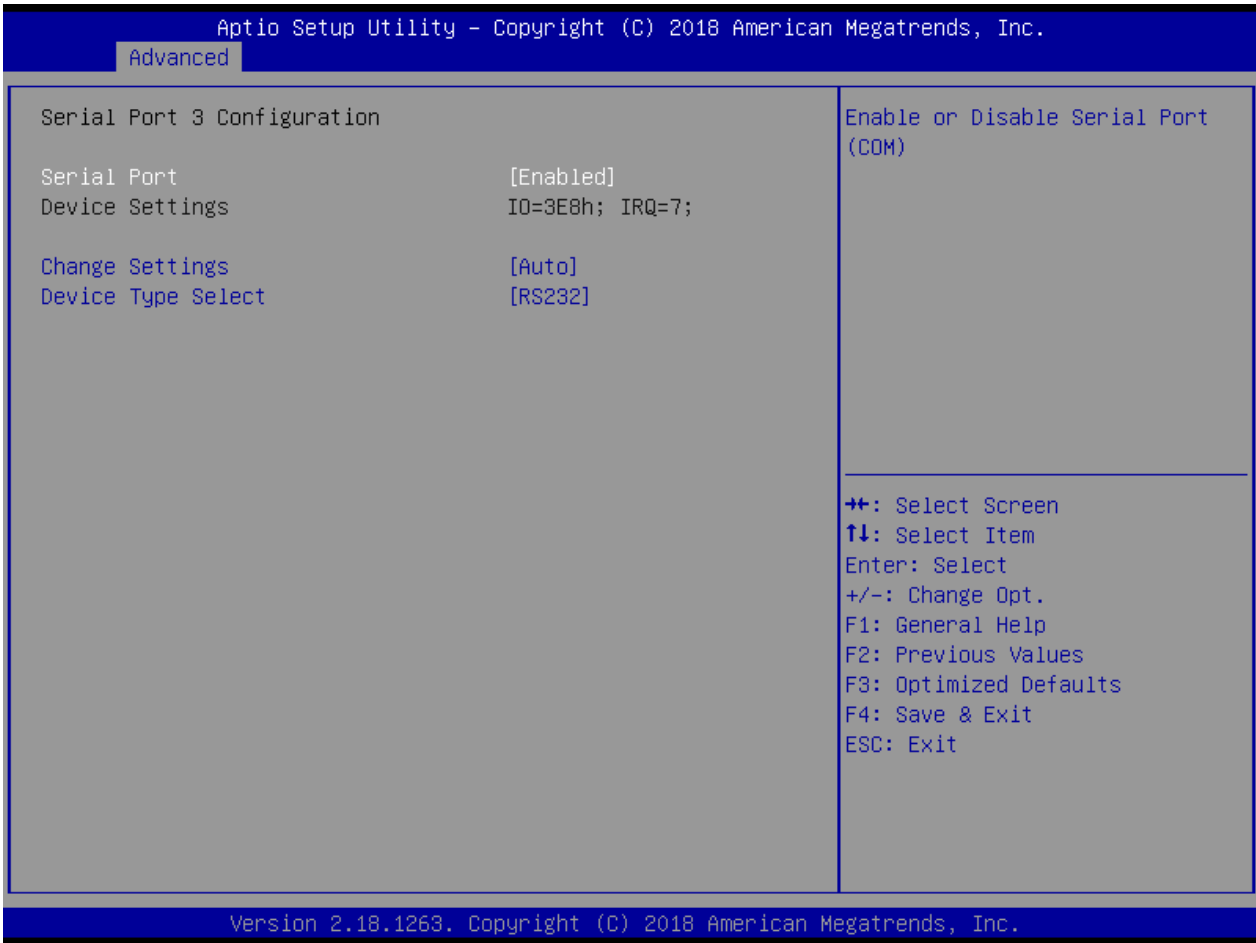
Item	Options	Description
Serial Port	Disabled, Enabled[Default]	Enable or Disable Serial Port (COM).
Change Settings	Auto[Default], IO=3F8h; IRQ=4; , IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; , IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12;; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12;; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;	This item allows you to change the address & IRQ settings of the specified serial port.
Device Type Select	UART 232[Default], UART 422, UART 485	Set the Serial Port to RS232 & RS422 & RS485

Serial Port 2 Configuration



Item	Options	Description
Serial Port	Disabled, Enabled [Default]	Enable or Disable Serial Port (COM).
Change Settings	Auto [Default] , IO=2F8h; IRQ=3; , IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; , IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12;; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12;; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;	This item allows you to change the address & IRQ settings of the specified serial port.
Device Type Select	UART 232 [Default] , UART 422, UART 485	Set the Serial Port to RS232 & RS422 & RS485

Serial Port 3 Configuration



Item	Options	Description
Serial Port	Disabled, Enabled[Default]	Enable or Disable Serial Port (COM).
Change Settings	Auto[Default], IO=3E8h; IRQ=7; , IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; , IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;; IO=2F0h; IRQ=3,4,5,6,7,9,10,11,12;; IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12;	This item allows you to change the address & IRQ settings of the specified serial port.
Device Type Select	UART 232[Default], UART 422, UART 485	Set the Serial Port to RS232 & RS422 & RS485

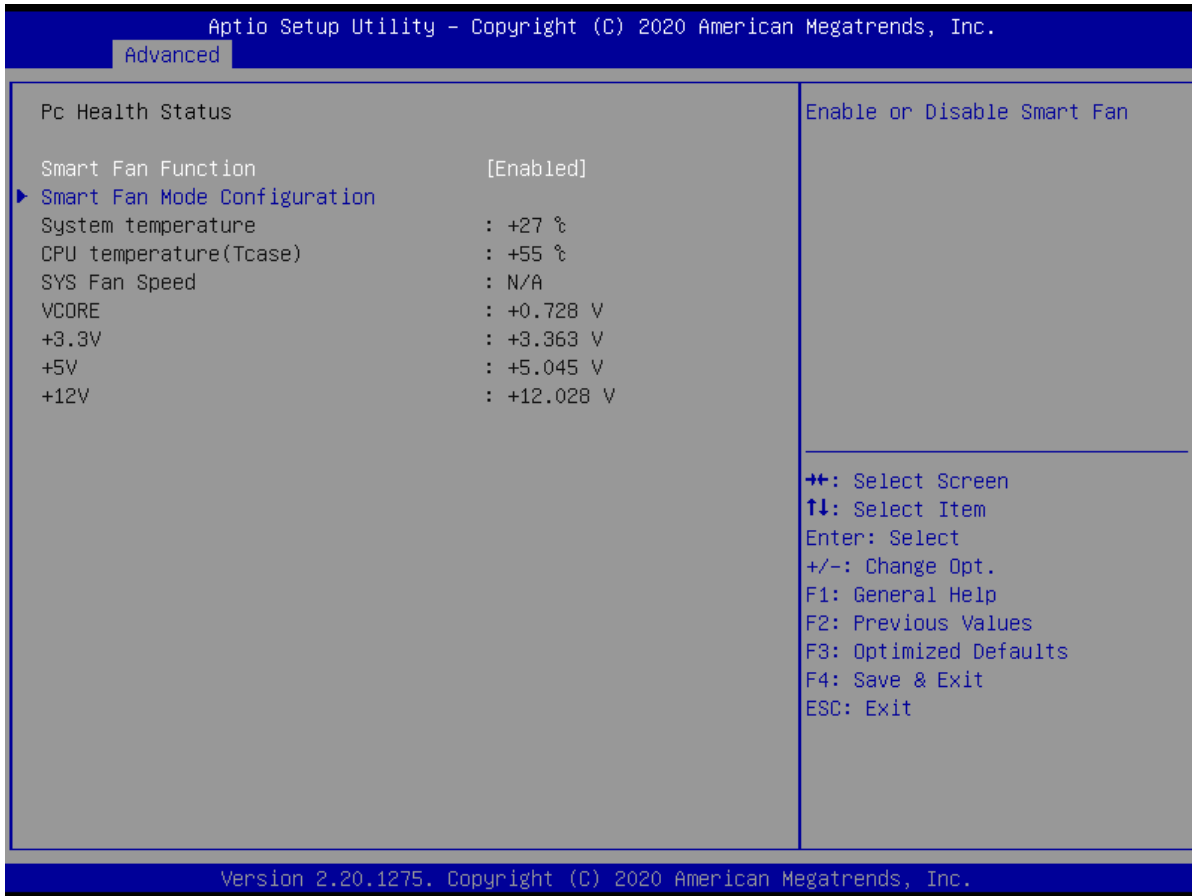
Serial Port 4 Configuration



Item	Options	Description
Serial Port	Disabled, Enabled[Default]	Enable or Disable Serial Port (COM).
Change Settings	Auto[Default], IO=2E8h; IRQ=7; , IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; , IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;; IO=2F0h; IRQ=3,4,5,6,7,9,10,11,12;; IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12;	This item allows you to change the address & IRQ settings of the specified serial port.
Device Type Select	UART 232[Default], UART 422, UART 485	Set the Serial Port to RS232 & RS422 & RS485

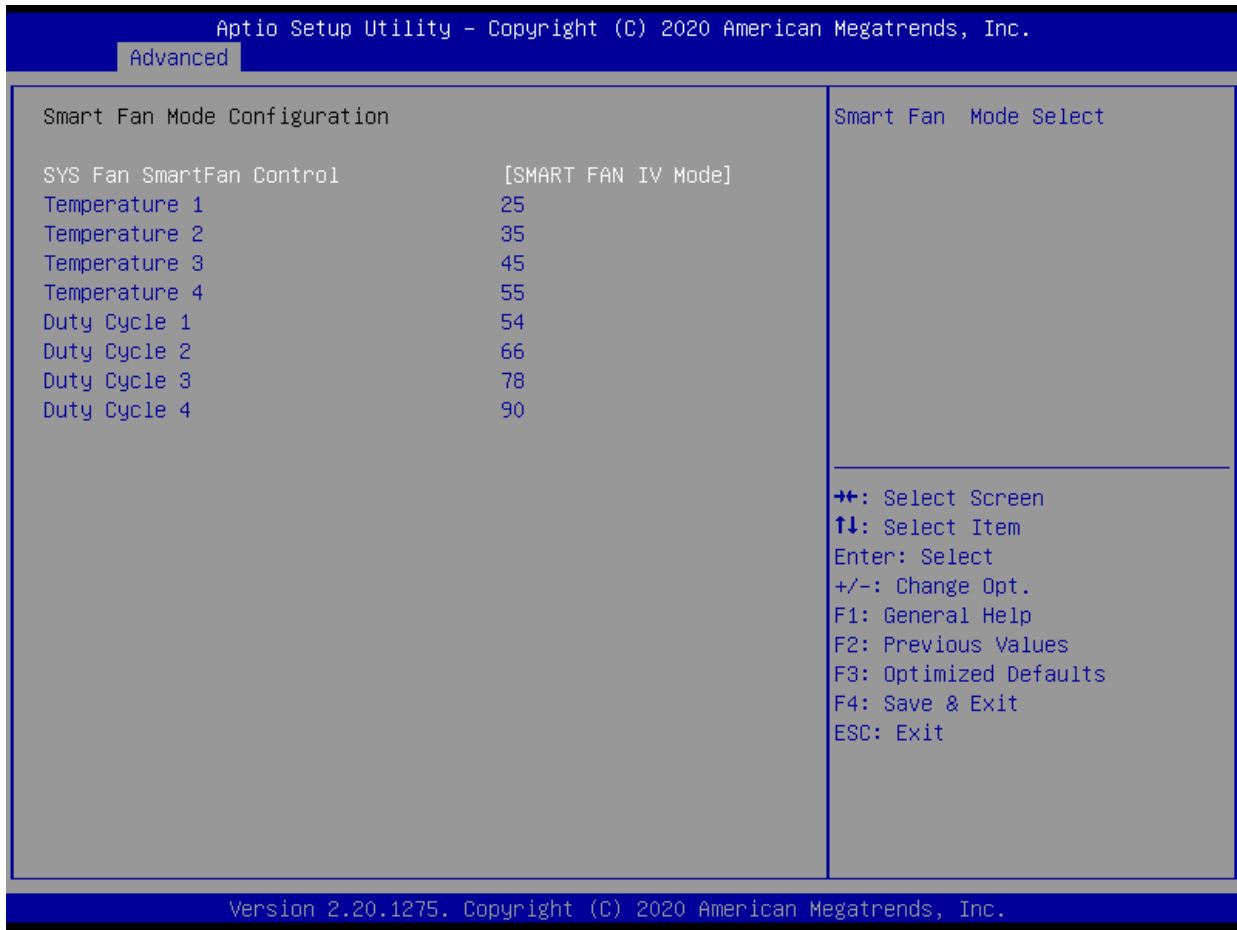
5.3.8 Hardware Monitor

These items display the current status of all monitored hardware devices/ components such as voltages and temperatures.



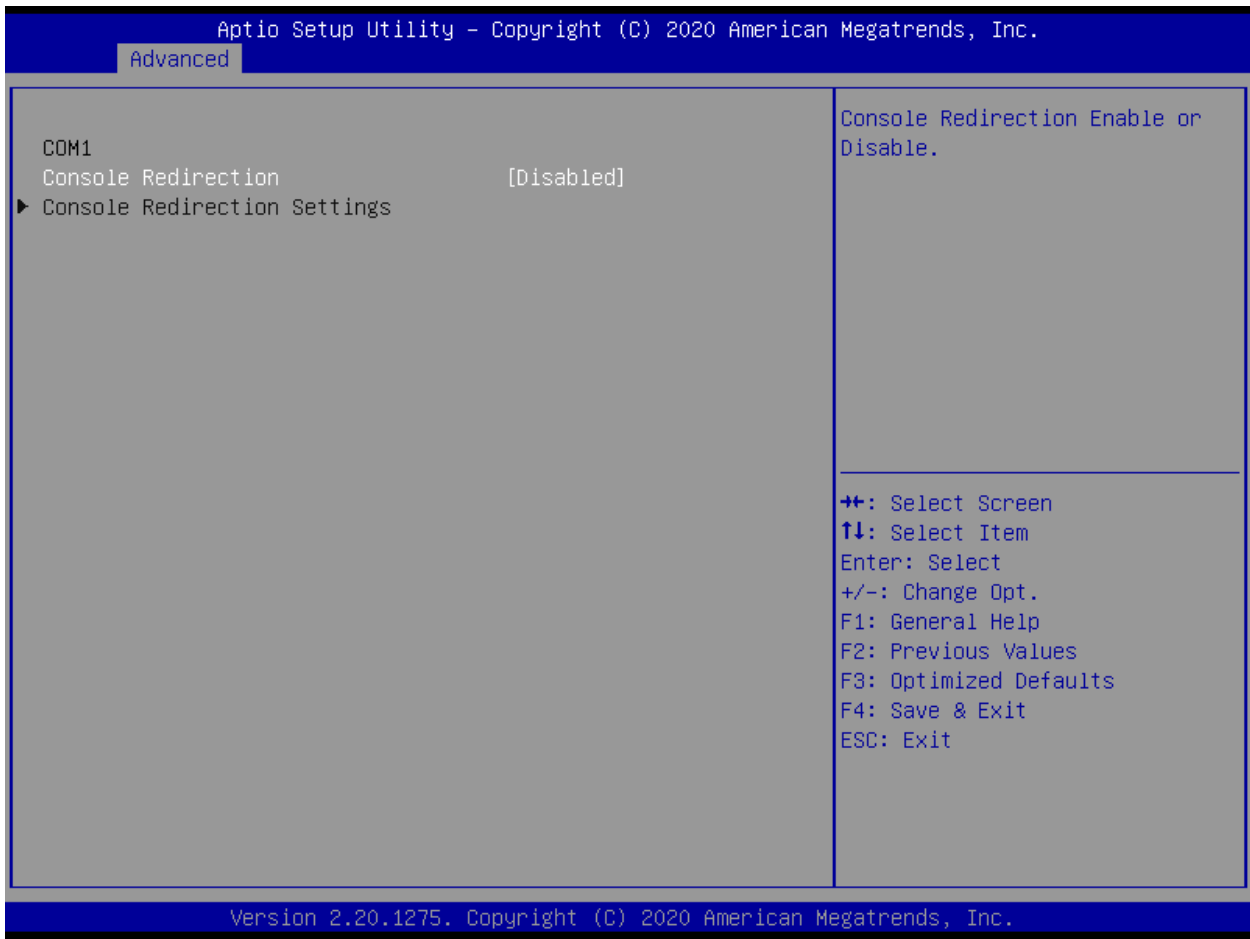
Item	Options	Description
Smart Fan Function	Disabled[Default], Enabled	Enabled or Disable Smart Fan

Smart Fan Mode Configuration



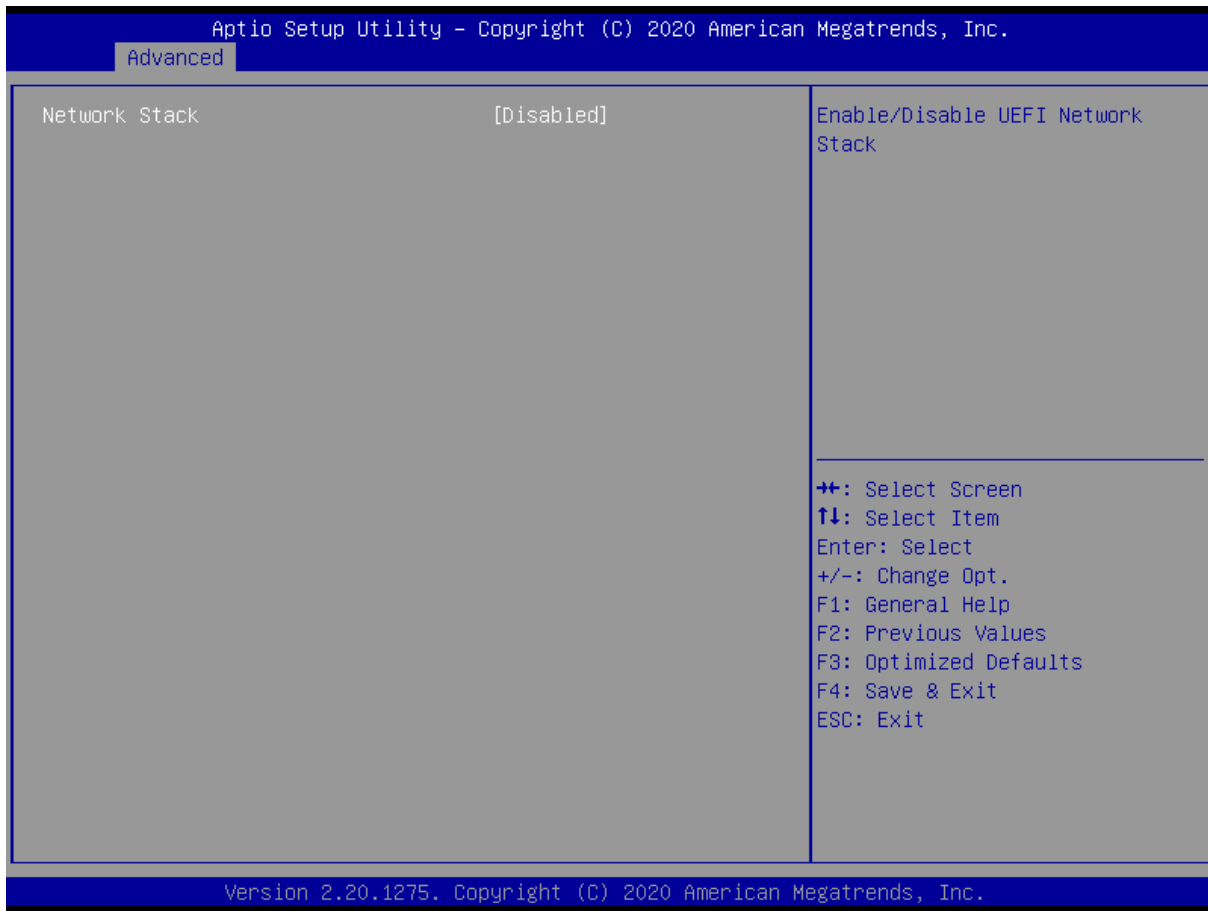
Item	Options	Description
SYS Fan SmartFan Control	Manual Mode[, Thermal Cruise Mode, SMART FAN IV Mode[Default],	Smart Fan Mode Select
Temperature 1~4	1~100	Auto fan speed control. SMART FAN IV
Duty Cycle 1~4	20~100	Auto fan speed control. SMART FAN IV

5.3.9 Serial Port Console Redirection



Item	Options	Description
Console Redirection	Disabled[Default], Enabled	These items allows you to enable or disable COM1 console redirection

5.3.10 Network Stack Configuration



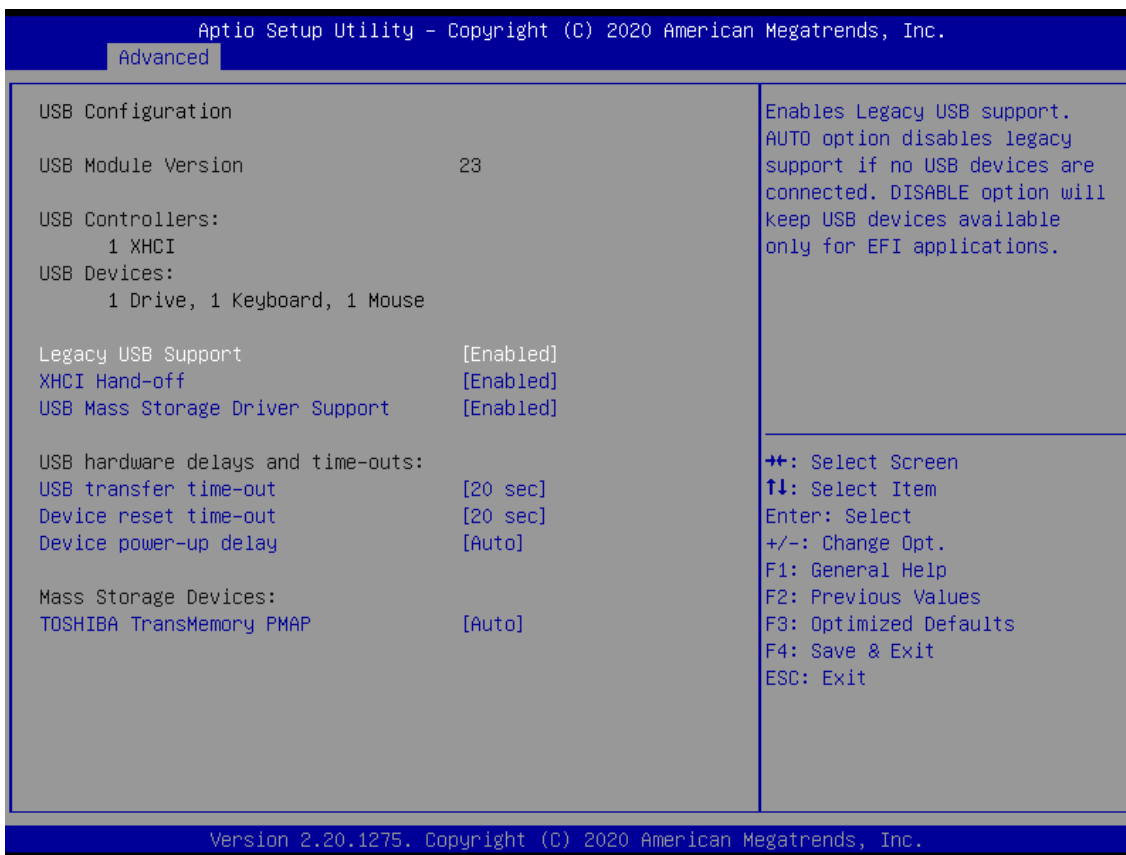
Item	Options	Description
Network Stack	Disabled[Default] , Enabled	Enable/Disable UEFI Network Stack.

5.3.11 CSM Configuration



Item	Options	Description
CSM Support	Disabled, Enabled[Default]	This item allows users to enable or disable for "CSM Support".
GateA20 Active	Upon Request[Default] , Always	This item allows users to set Upon Request or Always for "GateA20 Active".
Option ROM Messages	Force BIOS[Default] , Keep Current	This item allows users to set Force BIOS or Keep Current for "Option ROM Messages".
INT19 Trap Response	Immediate[Default] , Immediate	This item allows users to set the BIOS reaction to INT19 trapping by Option ROM: "Immediate" - execute the trap right away; "postponed" - execute the trap during legacy boot.
Boot option filter	UEFI and Legacy[Default] , Legacy only, UEFI only	This item allows users to select which type of operating system to boot by option. This item is configurable only when CSM Support is set to Enabled.
Network PXE	Do not launch[Default] , UEFI, Legacy	Controls the execution of UEFI and Legacy Video OpROM.
Storage	Do not launch, UEFI, Legacy[Default]	Controls the execution of UEFI and Legacy Storage OpROM.
Video	Do not launch, UEFI, Legacy[Default]	Controls the execution of UEFI and Legacy Video OpROM.
Other PCI devices	Do not launch, UEFI[Default] , Legacy	Determines OpROM execution policy for devices other than Network, Storage, or Video.

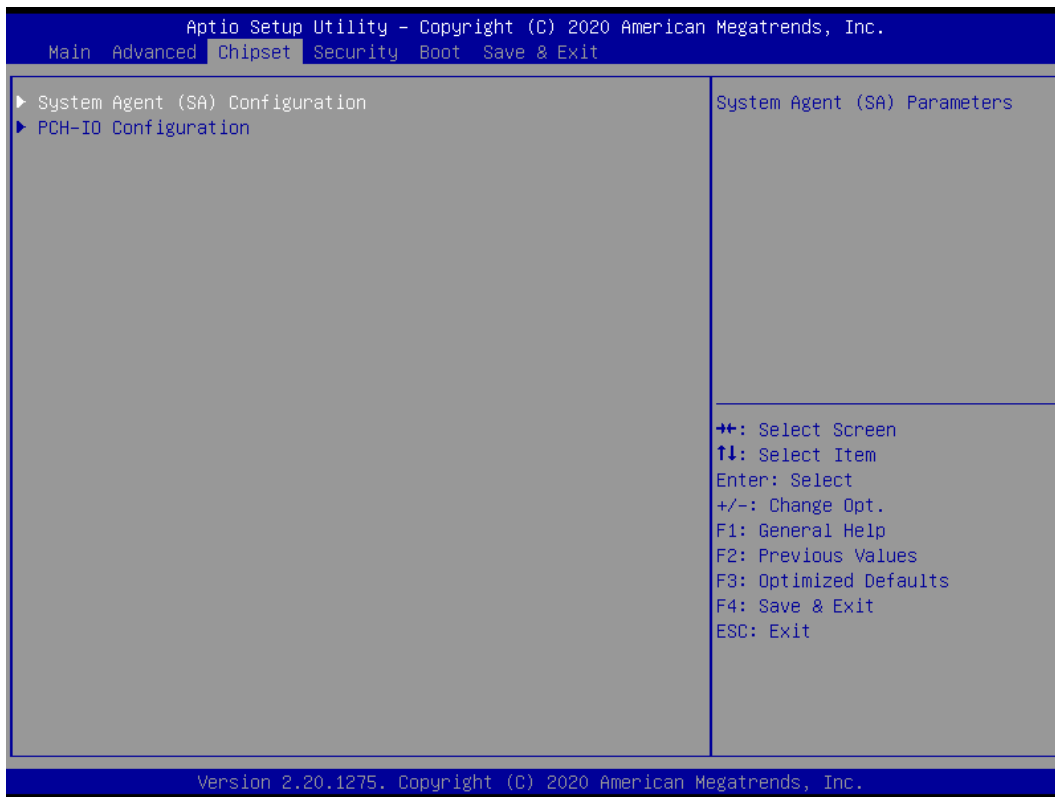
5.3.12 USB Configuration



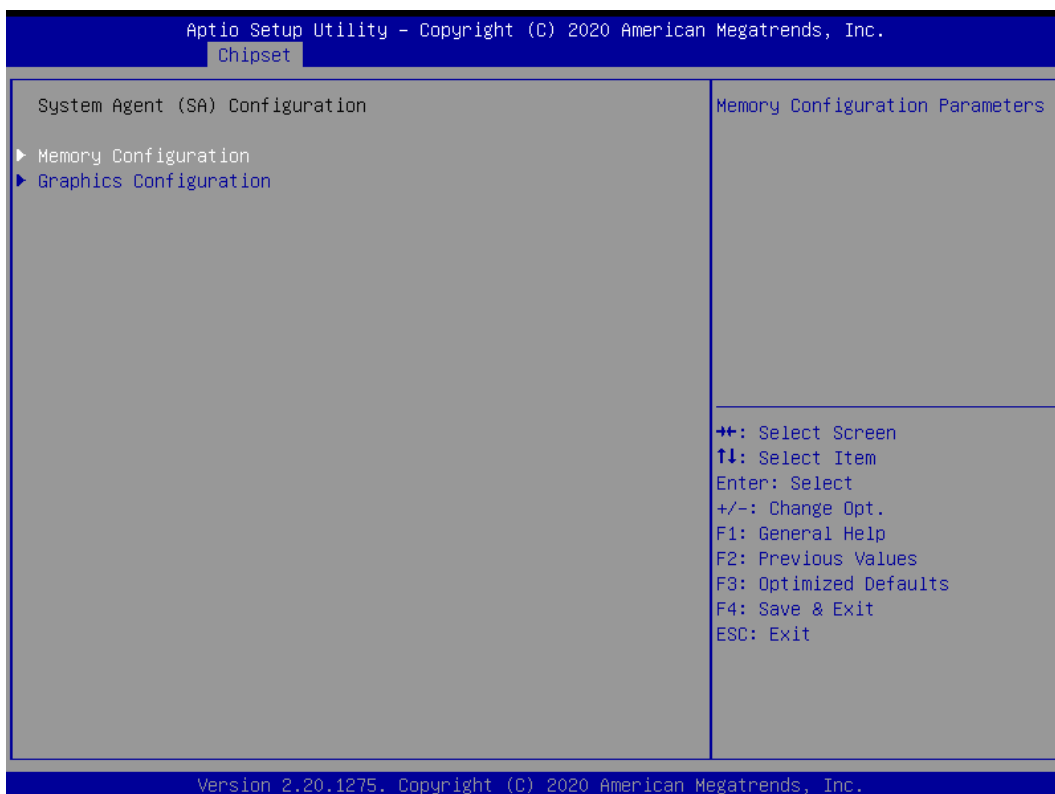
Item	Options	Description
Legacy USB Support	Enabled[Default] Disabled Auto	Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
XHCI Hand-off	Enabled[Default] Disabled	This is a workaround for OSeW without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Enabled[Default] Disabled	Enable/Disable USB Mass Storage Driver Support.
USB transfer time-out	1 sec , 5 sec , 10 sec , 20 sec[Default]	The time-out value for Control, Bulk, and Interrupt transfers.
Device reset time-out	10 sec , 20 sec[Default] , 30 sec, 40 sec	USB mass storage device Start Unit command time-out.
Device power-up delay	Auto[Default] Manual	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 100ms, for a Hub port the delay is taken form Hub descriptor.

5.4 Chipset

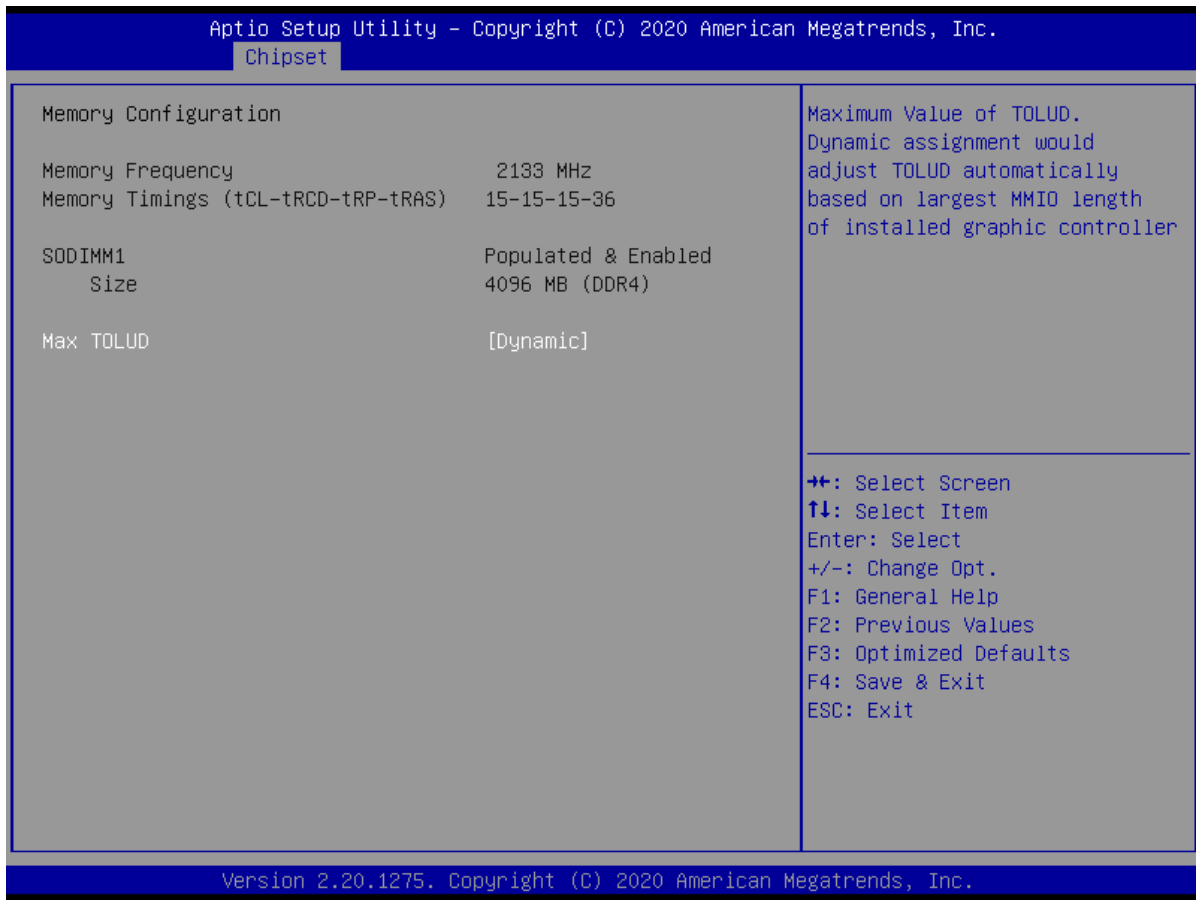
This section allows you to configure and improve your system and allows you to set up some system features according to your preference.



5.4.1 System Agent (SA) Configuration

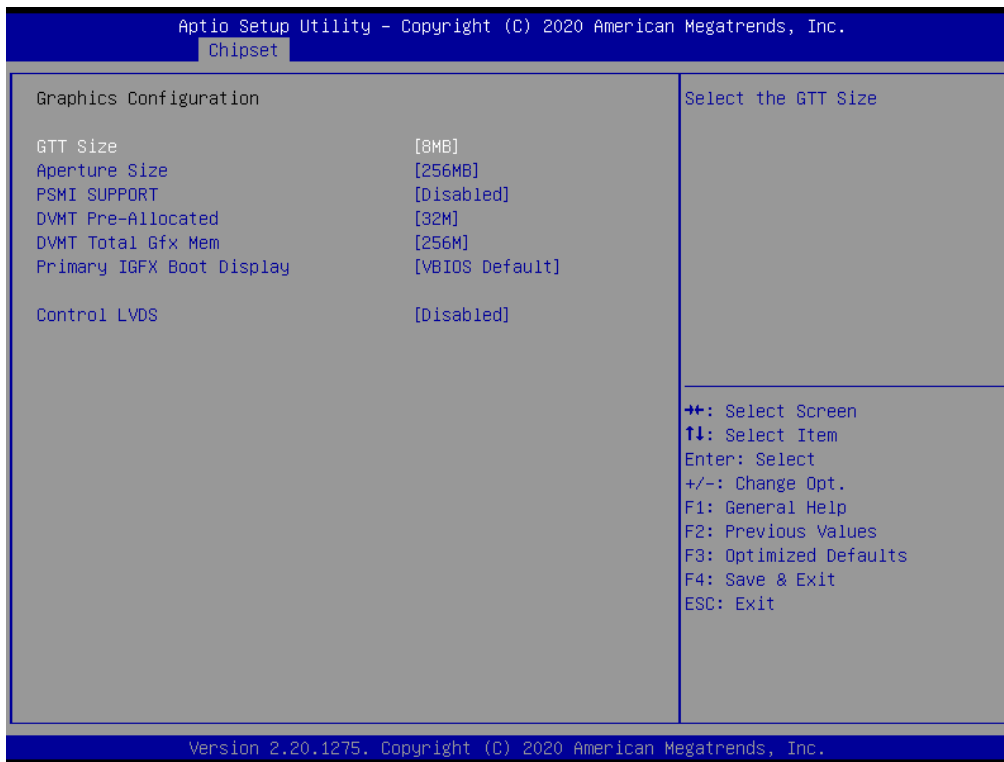


Memory Configuration



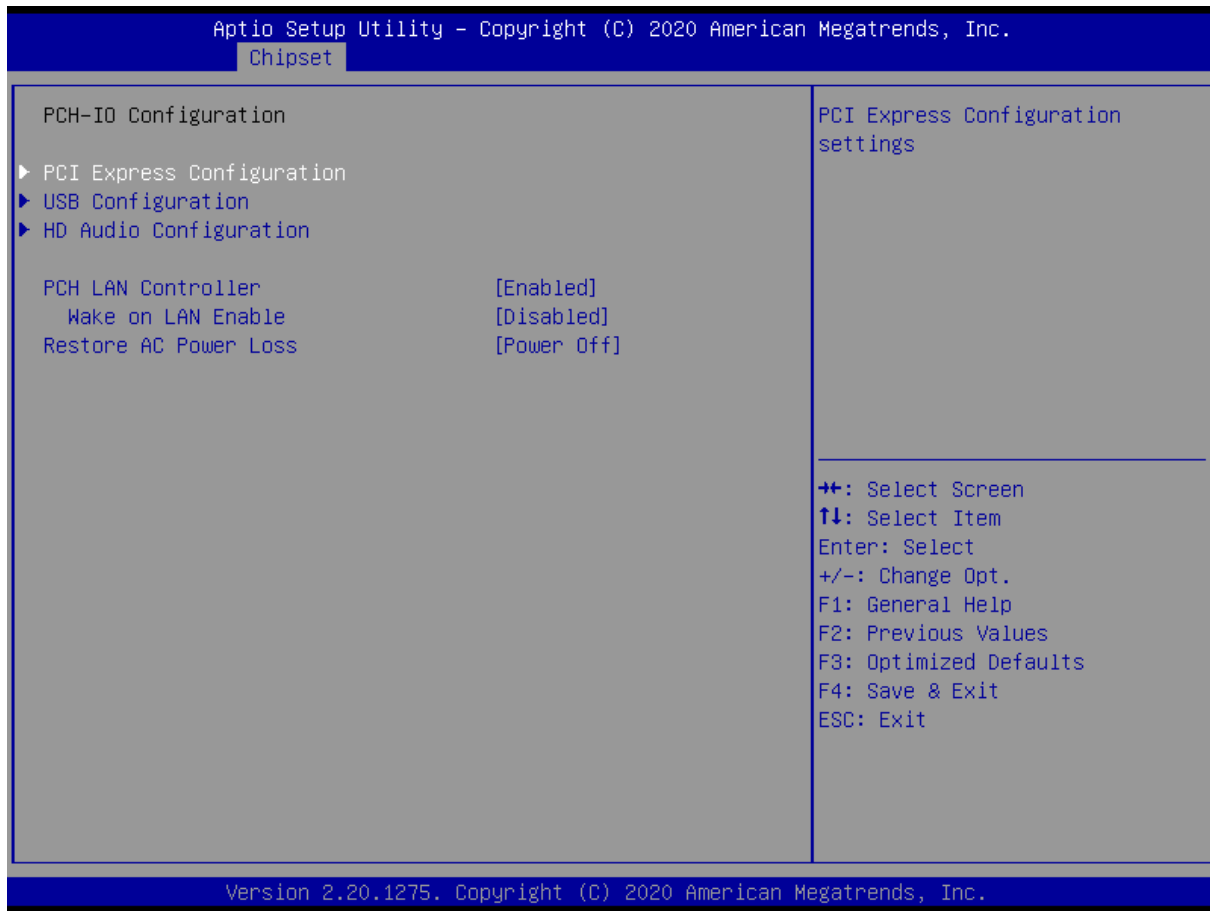
Item	Options	Description
Max TOLUD	Dynamic[Default], 1GB, 1.25GB, 1.5 GB, 1.75 GB, 2 GB, 2.25 GB, 2.5 GB, 2.75 GB, 3 GB, 3.25 GB, 3.5 GB	Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller

Graphic Configuration



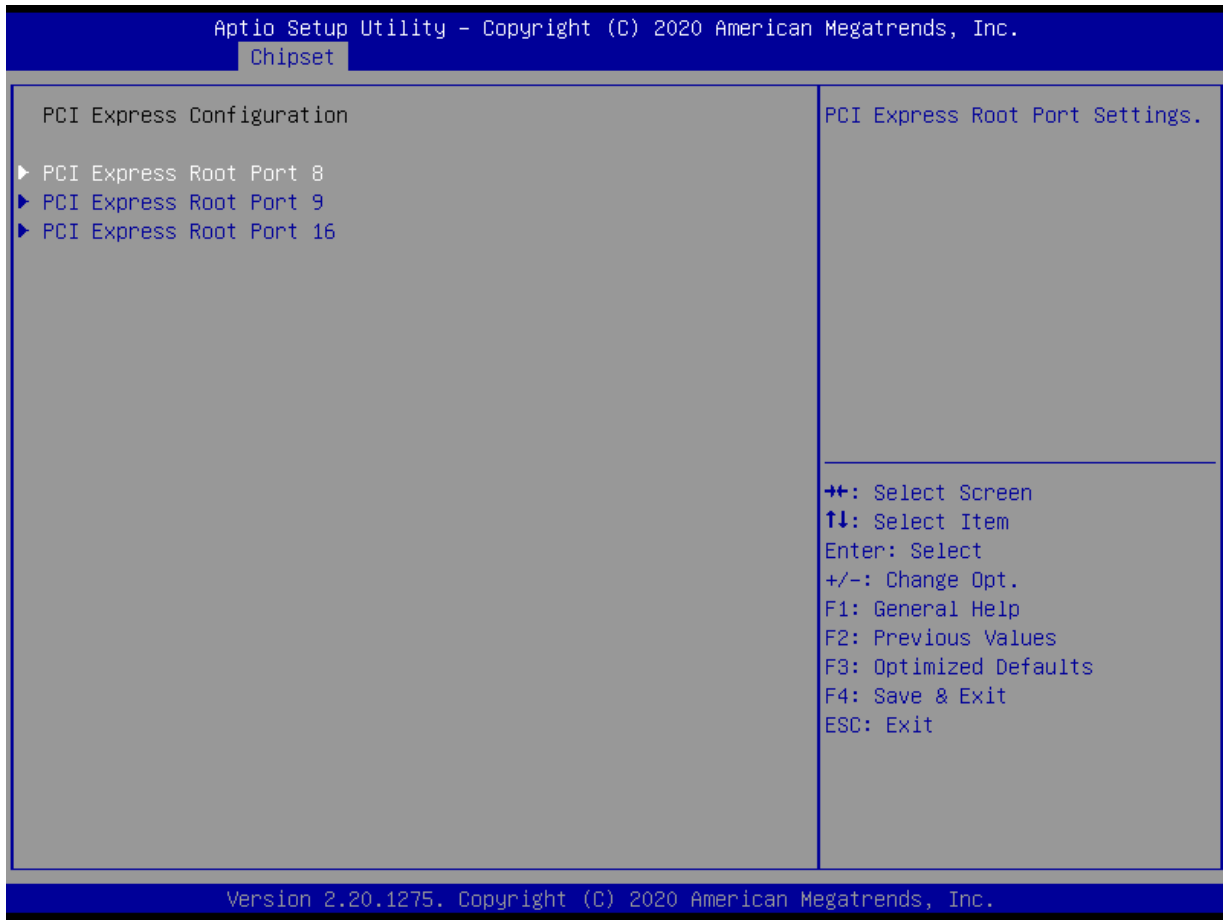
Item	Options	Description
GTT Size	2MB, 4MB, 8MB[Default]	Select the GTT Size .
Aperture Size	128MB, 256MB[Default] , 512MB, 1024MB, 2048MB	Select the Aperture Size. Note : Above 4GB MMIO BIOS assignment is automatically enabled when selecting 2048MB aperture. To use this feature, please disable CSM Support.
PSMI SUPPORT	Disabled [Default] , Enabled	PSMI Enable/Disable.
DVMT Pre-Allocated	32M [Default] , 64M,4M,8M, 12M,16M, 20M, 24M, 28M,32M/F7, 36M, 40M,44M, 48M,52M,56M,60M	Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.
DVMT Total Gfx Mem	128M, 256M[Default] , MAX	Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device.
Primary IGFX Boot Display	VBIOS Default[Default] , DP, LCD, HDMI	Select the Video Device which will be activated during POST. This has no effect if external graphics present. Secondary boot display selection will appear based on your selection.VGA modes will be supported only on primary display
Control LVDS	Disabled[Default] , Enabled	Enabled/Disabled LVDS

5.4.2 PCH-IO Configuration

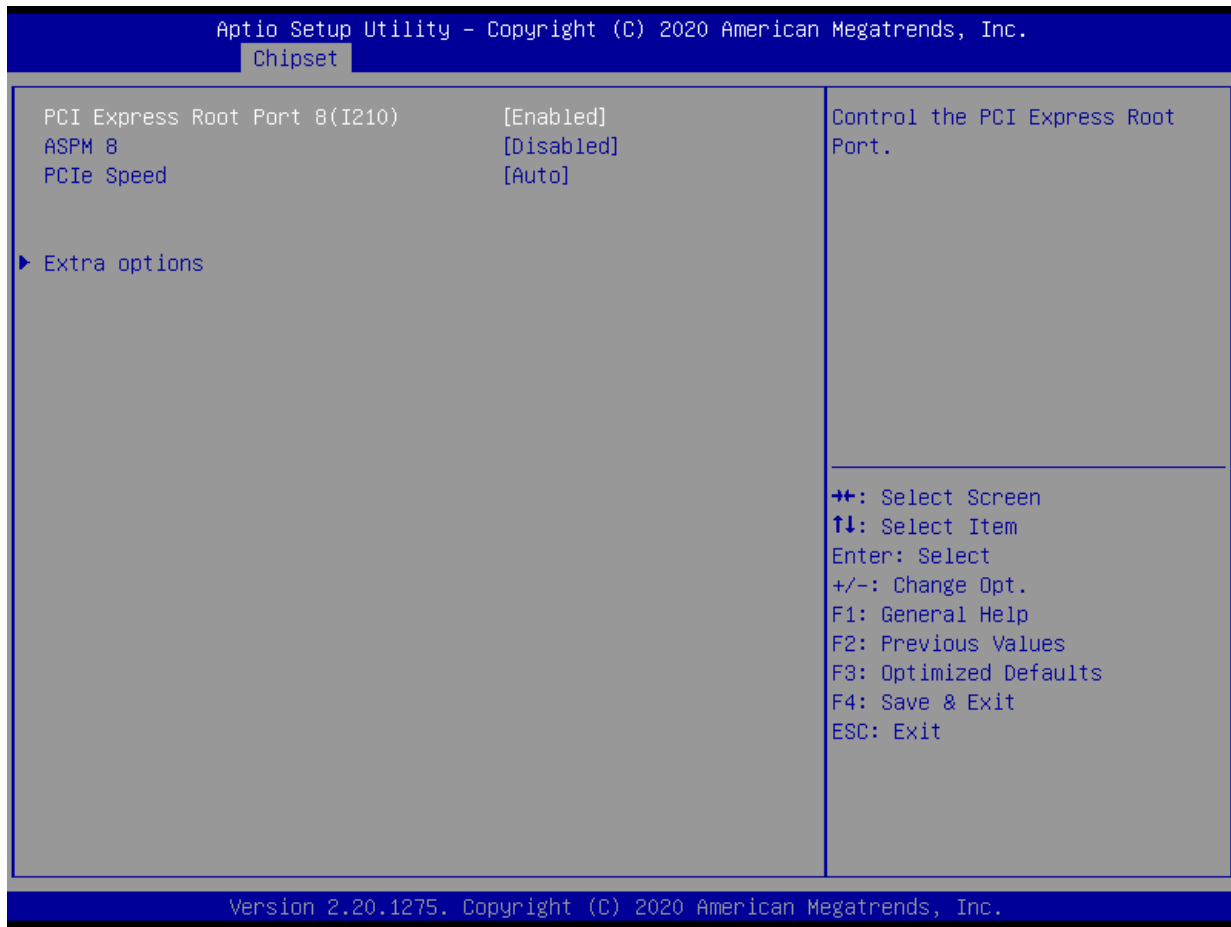


Item	Options	Description
PCH LAN Controller	Enabled [Default] , Disabled	Enable/Disable onboard NIC.
Wake on LAN Enable	Enabled, Disabled [Default]	Enable/Disable integrated LAN to wake the system.
Restore AC Power Loss	Power On, Power Off [Default] , Lase State	Specify what state to go to when power is re-applied after a power failure (G3 state).

■ PCI Express Configuration

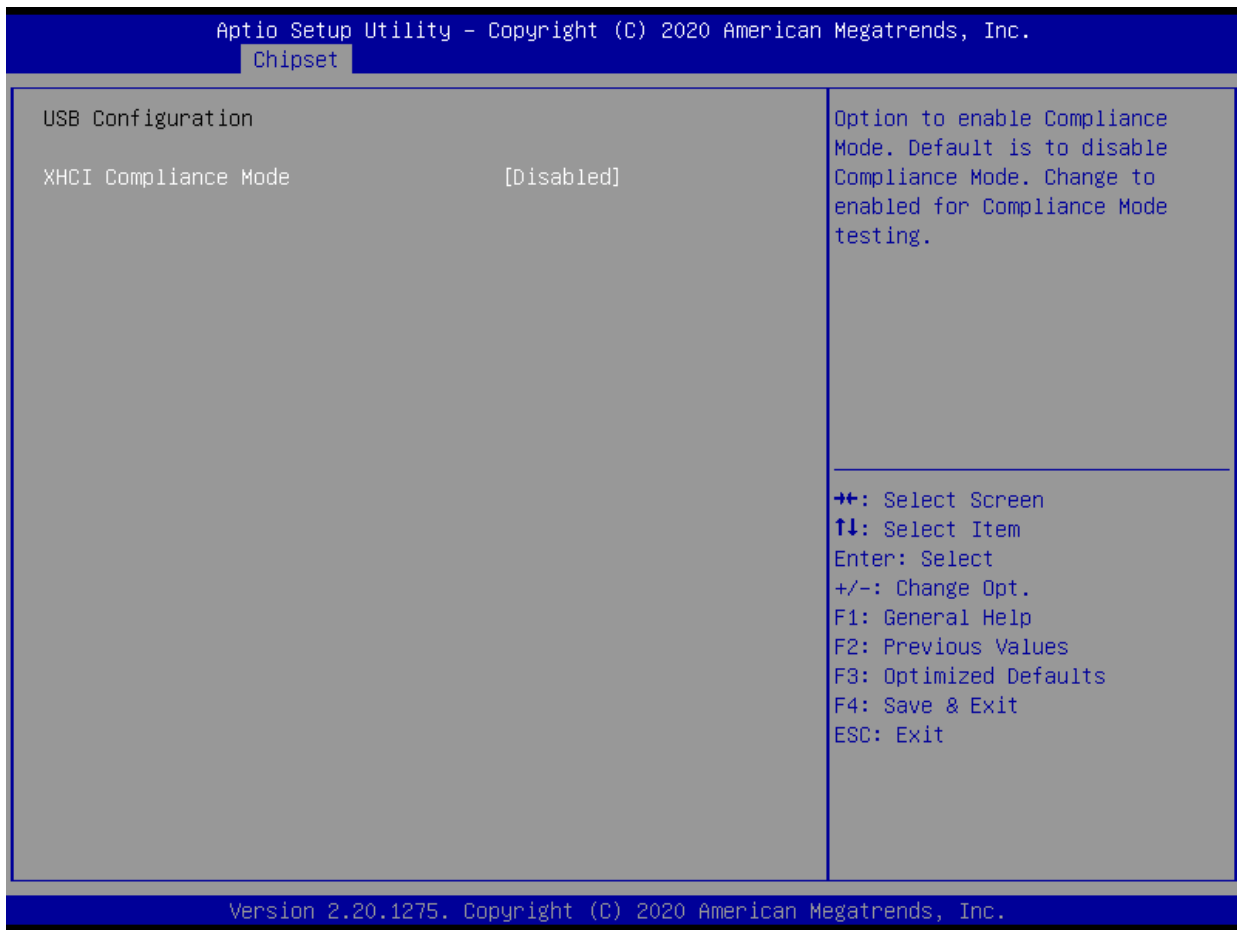


■ PCI Express Root Port 8 / 9 / 16



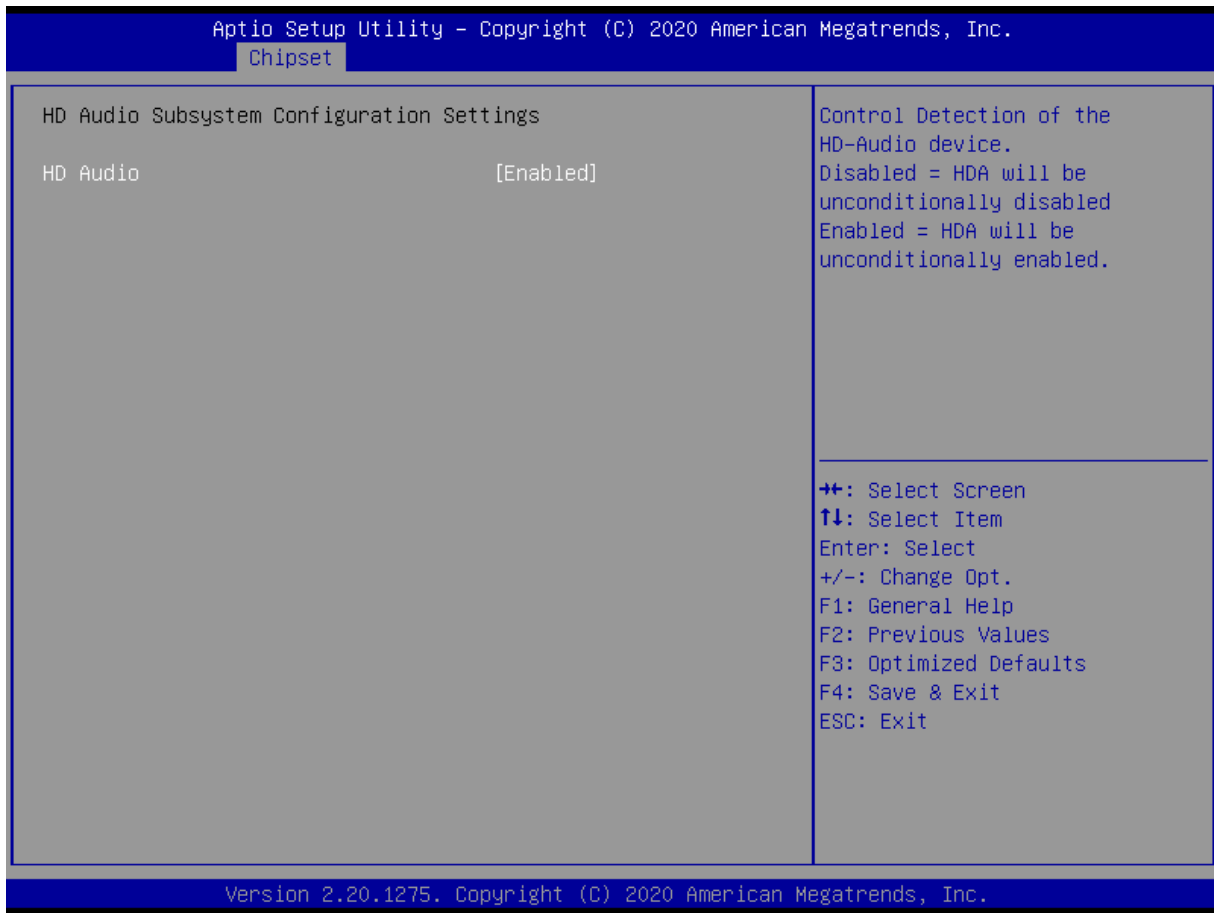
Item	Options	Description
PCI Express Root Port 8 / 9 / 16	Disabled [Default] , Enabled	Control the PCI Express Root Port.
ASPM	Disabled [Default] , L0s, L1, L0sL1, Auto	Set the ASPM Level: Force L0s - Force all links to L0s State, AUTO - BIOS auto configure, DISABLE - Disables ASPM,
PCIe Speed	Auto [Default] , Gen1, Gen2, Gen3	Configure PCIe speed.
Detect Non-Compliance Device	Disabled [Default] , Enabled	Detect Non-Compliance PCI Express Device. If enable, it will take more time at POST time.

■ USB Configuration



Item	Options	Description
XHCI Disable Compliance mode	Disabled [Default] , Enabled	Option to enable Compliance Mode. Default is to disable Compliance Mode. Change to enabled for Compliance Mode testing.

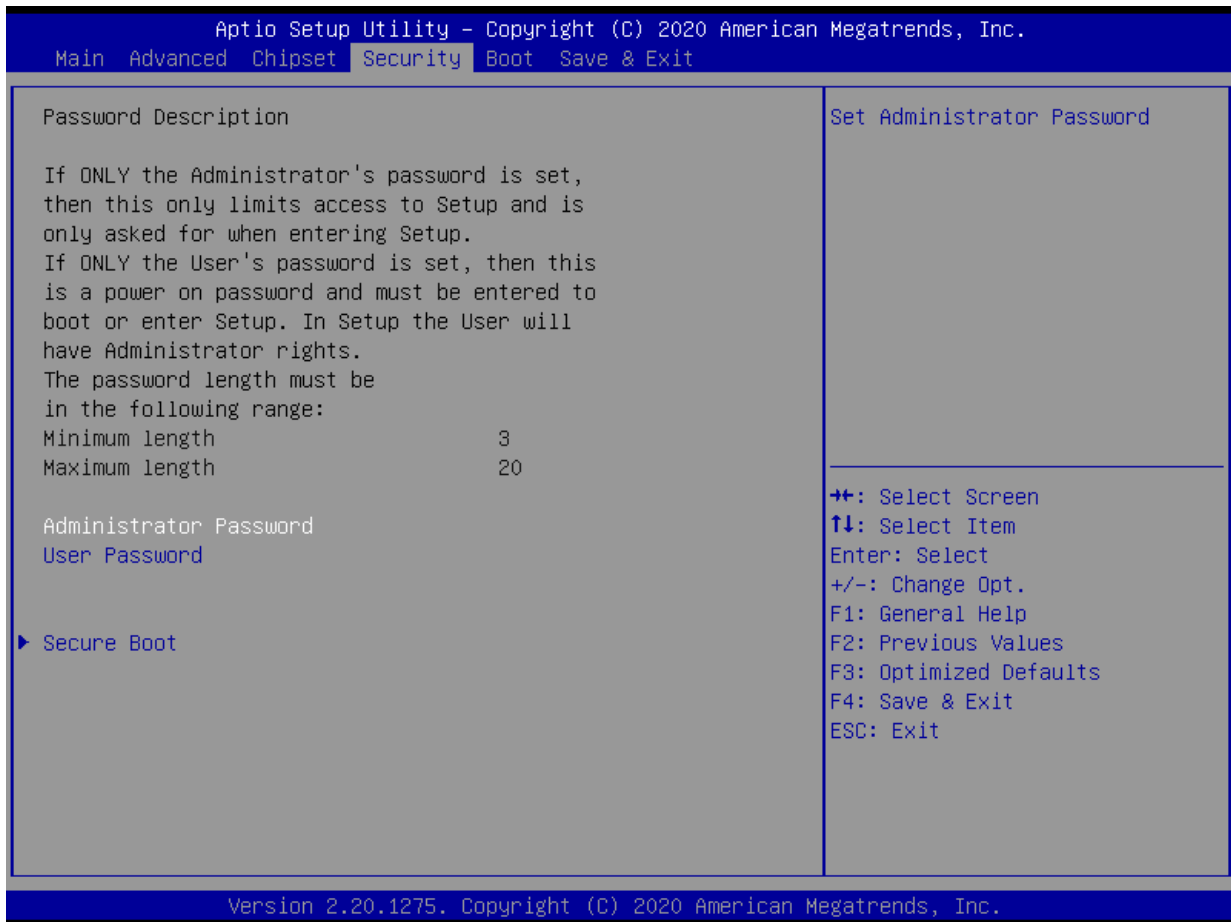
■ HD Audio Configuration



Item	Options	Description
HD Audio	Disabled, Enabled [Default]	Control Detection of the HD-Audio device. Disabled = HDA will be unconditionally disabled Enabled = HDA will be unconditionally enabled.

5.5 Security

Security menu allow users to change administrator password and user password settings.



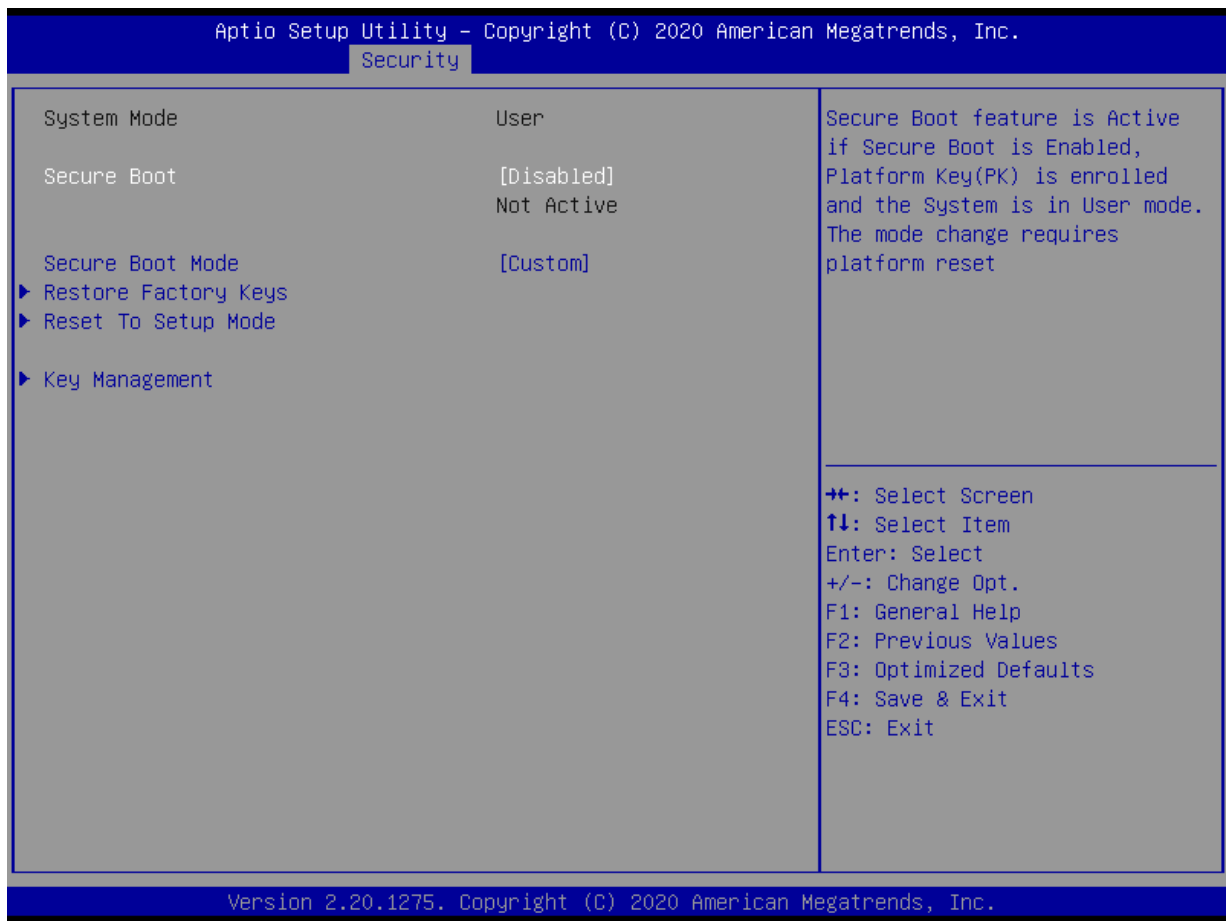
■ Administrator Password

This item allows you to set Administrator Password.

■ User Password

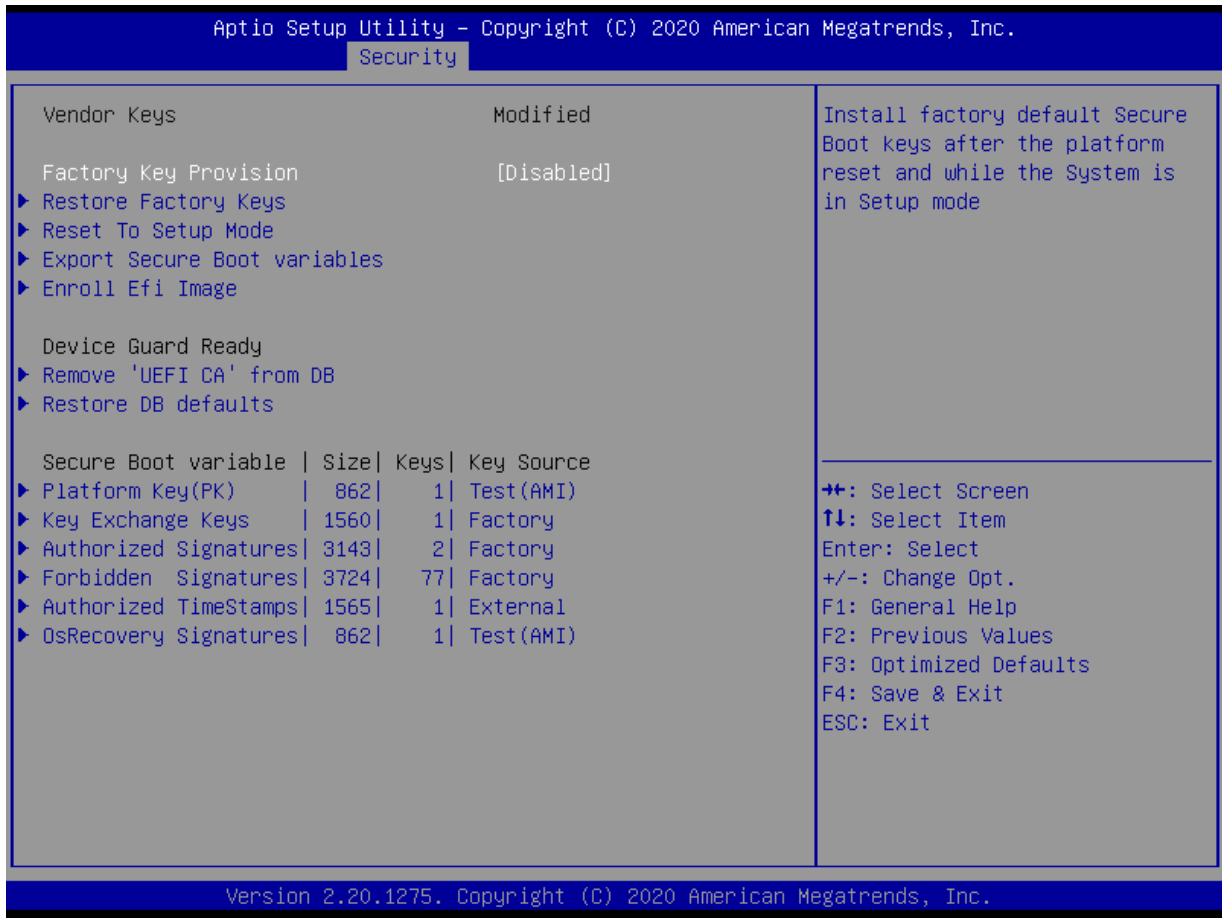
This item allows you to set User Password.

Security Boot



Item	Options	Description
Secure Boot	Disabled [Default] , Enabled	Secure Boot feature is Active if Secure Boot is Enabled, Platform Key(PK) is enrolled and the System is in User mode. The mode change requires platform reset
Secure Boot Mode	Standard, Custom [Default]	Secure Boot mode options: Standard or Custom. In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication

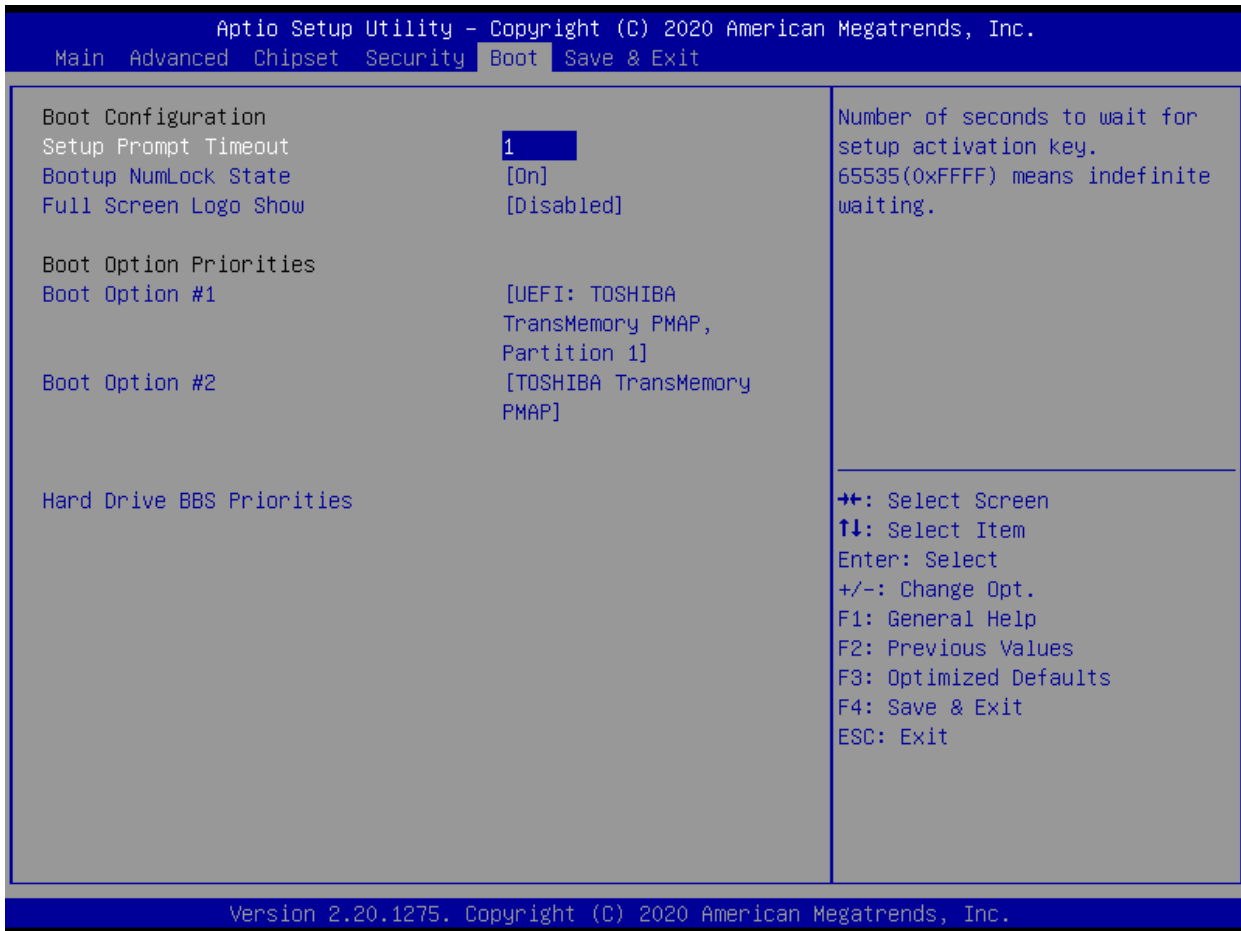
Key Management



Item	Options	Description
Factory Key Provision	Disabled [Default] , Enabled	Install factory default Secure Boot keys after the platform reset and while the System is in Setup mode

5.6 Boot

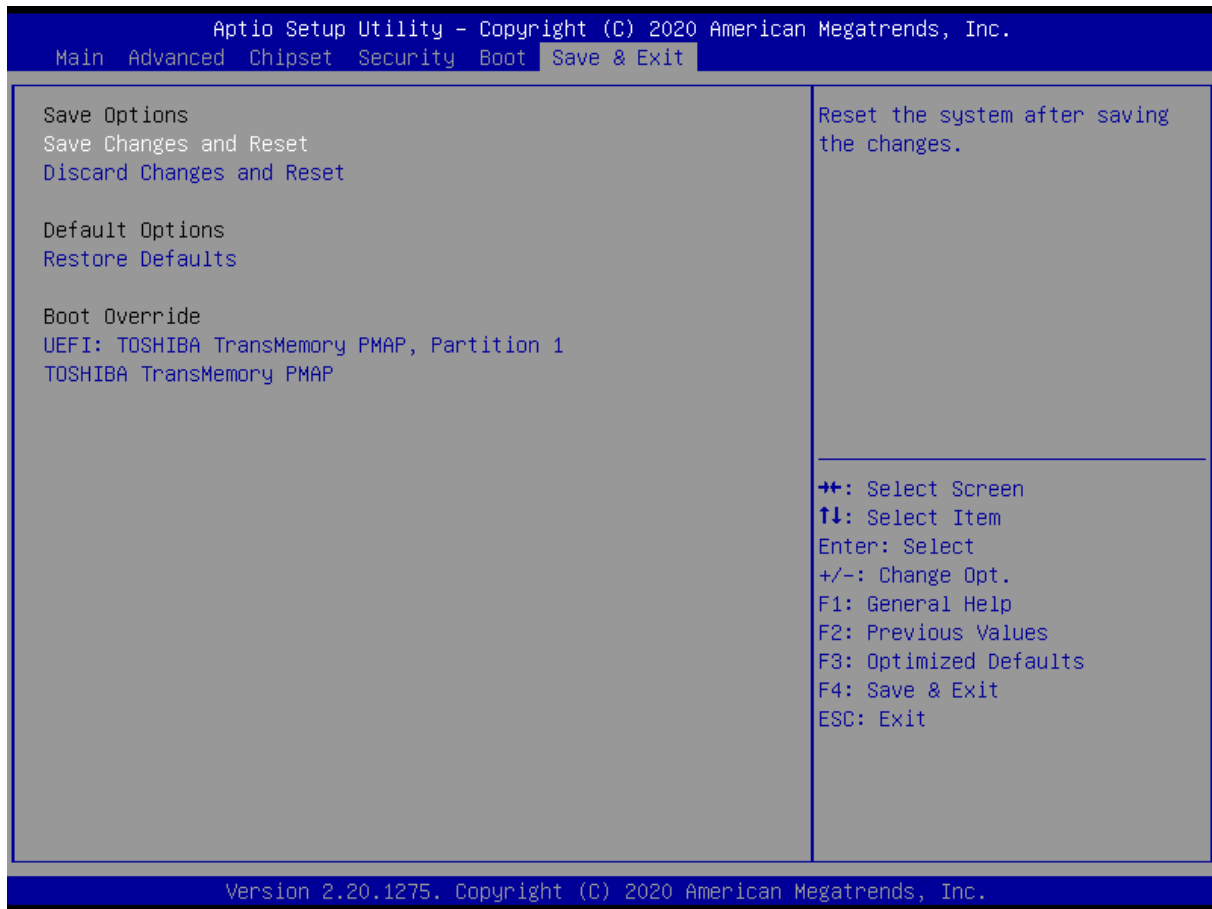
This menu allows you to setup the system boot options.



Item	Options	Description
Setup Prompt Timeout	1[Default]	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
Bootup NumLock State	On[Default], Off	Select the Keyboard NumLock state.
Full Screen Logo Show	Disabled[Default], Enabled	Enables or disables Full Screen Logo Show option.
Boot Option #1		Set the system boot order.

5.7 Save & Exit

This setting allows users to configure the boot settings.



■ Save Changes and Reset

This item allows user to reset the system after saving the changes. This item allows user to reset the system after saving the changes.

■ Discard Changes and Reset

This item allows user to reset the system without saving any changes.

■ Restore Defaults

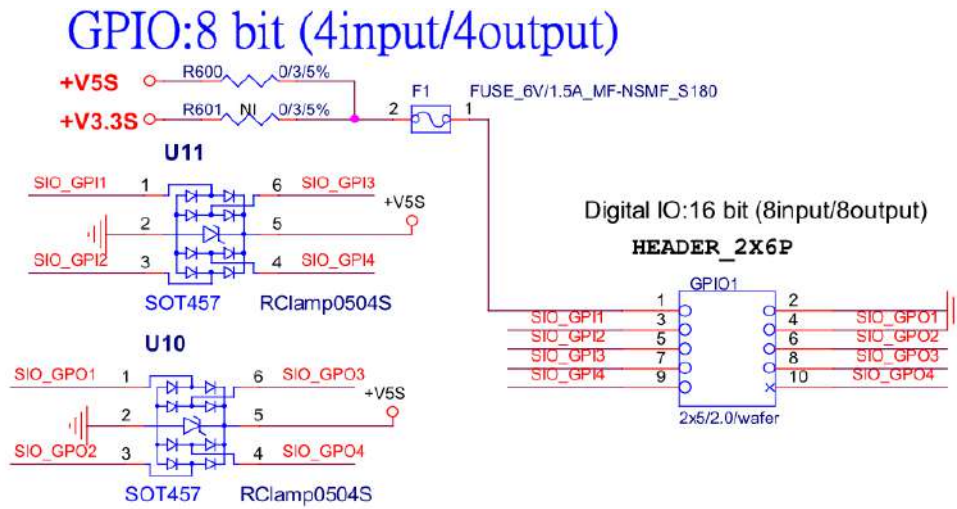
Use this item to restore /load default values for all the setup options.

Appendix

WDT & GPIO

This appendix provides the sample codes of WDT (Watch Dog Timer) and GPIO (General Purpose Input/ Output).

GPIO Sample Code



GPIO Setting

PIN#	GPIO#	Default Configuration
10	SIO_GPO4	DIO Output4
9	SIO_GPI	DIO Input4
8	SIO_GPO 3	DIO Output3
7	SIO_GPI 3	DIO Input3
6	SIO_GPO 2	DIO Output2
5	SIO_GPI 2	DIO Input2
4	SIO_GPO 1	DIO Output1
3	SIO_GPI1	DIO Input1
2	GND	GND
1	+5V	+5V

The GPIO function is provided by Nuvoton NCT6106D, and it can be accessed through its GPIO index/data port. To access the GPIO register, write index to the index port, and then read/write from/to data port. The configuration on the RCO-6000 is described as below.

Pseudo Code

```
#define AddrPort 0x2e
#define DataPort 0x2f
#define SIO_UnLock_Value    0x87
#define SIO_Lock_Value      0xaa
#define SIO_LDN_GPIO        0x07
#define GPIO_Port           0xF1

//Enter_Config
WriteByte (AddrPort, SIO_UnLock_Value);
WriteByte (AddrPort, SIO_UnLock_Value);

WriteByte (AddrPort, 0x07);
WriteByte (DataPort, SIO_LDN_GPIO);

//Set OUT1~OUT4Value
WriteByte (AddrPort, GPIO_Port);
WriteByte (DataPort, 0x00); //set OUT1~OUT8 value, OUT1=Bit0, OUT2=Bit1
```

```
#define GPIO_Port    0xF1
```

```
//Enter_Config
```

```
WriteByte (AddrPort, SIO_UnLock_Value);
```

```
WriteByte (AddrPort, SIO_UnLock_Value);
```

```
WriteByte (AddrPort, 0x07);
```

```
WriteByte (DataPort, SIO_LDN_GPIO);
```

```
//Set OUT1~OUT4Value
```

```
WriteByte (AddrPort, GPIO_Port);
```

```
WriteByte (DataPort, 0x00);    //set OUT1~OUT8 value, OUT1=Bit0, OUT2=Bit1
```

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
				OUT4	OUT3	OUT2	OUT1

```
// Read In1~In4 value
```

```
WriteByte (AddrPort, 0xED);
```

```
Data= ReadByte (DataPort);    //Read In1~In8 value
```

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
				IN4	IN3	IN2	IN1

```
// close config mode
```

```
WriteByte (AddrPort, SIO_Lock_Value);
```

WDT Sample Code:

```

#define AddrPort    0x2e
#define DataPort    0x2f
#define SIO_UnLock_Value    0x87
#define SIO_Lock_Value    0xaa
#define WATCHDOG_LDN    0x08

#define GPIO_Port    0xF1

//Enter_Config
WriteByte (AddrPort, SIO_UnLock_Value);
WriteByte (AddrPort, SIO_UnLock_Value);

//Enter WATCHDOG LDN
WriteByte (AddrPort, 0x07);
WriteByte (DataPort, WATCHDOG_LDN);

//Set count mode
WriteByte (AddrPort, 0xf0);
buf2 = ReadByte (DataPort) & 0xf4; //clear "Select Watchdog Timer I count mode
buf2 |= 0x02; //Enable the Watchdog Timer I output low pulse to the KBRST# pin
// buf2 |= 0x08; //Bit3 = (1:Minute Mode/0:Second Mode)
WriteByte (DataPort, buf2); //Write back

//Set watch dog time value
WriteByte (AddrPort, 0xf1)
WriteByte (DataPort, Time) //Set watch dog time value

// close config mode
WriteByte (AddrPort, 0xaa);

```

