RES-3000 USER Manual

8th Gen Intel® Core™ i7/i5/i3 SoC IP67 Rugged Embedded System
High Performance, Fanless -30°C to 70°C Extended Temperature

Vecow

1.5.0 Edition 20230529

Record of Revision

Version	Date	Page	Description	Remark
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FCC This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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Order Information

Model Name	Processor	GigE LAN	COM	USB 2.0
RES-3000-8665U	Intel® Core™ i7-8665UE			
RES-3000-8365U	Intel® Core™ i5-8365UE	2	2	2
RES-3000-8145U	Intel® Core™ i3-8145UE			
RES-3000-4305U	Intel® Celeron® 4305UE			

Order Accessories

Part Number	Description
DDR4 32G	Certified DDR4 32GB 2666MHz RAM
DDR4 16G	Certified DDR4 16GB 2666/2400/2133MHz RAM
DDR4 8G	Certified DDR4 8GB 2666/2400/2133MHz RAM
DDR4 4G	Certified DDR4 4GB 2666/2400/2133MHz RAM
2.5" SATA HDD	Certified 2.5" SATA HDD
2.5" SATA SSD	Certified 2.5" SATA SSD
mSATA SSD	Certified mSATA SSD
IP67 Rated DVI Cable	IP67 Rated DVI-D Cable, 200 cm
IP67 Rated Ethernet Cable	IP67 Rated M12 to RJ45 Ethernet Cable, 200 cm
IP67 Rated COM Cable	IP67 Rated M12 to COM Cable, 200 cm
PWA-120W	120W, 24V, 90V AC to 264V AC Power Adapter with 3-pin Terminal Block

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GENERAL INTRODUCTION

1.1 Overview

RES-3000 is an IP67 certified rugged Ultra-compact Fanless Embedded Box PC. Powered by 8th generation Intel® Core™ i7/i5/i3 processor (Whiskey Lake), DDR4 2400MHz up to 32GB memory, RES-3000 supports up to 40% greater productivity than former generation solutions; Advanced Intel® UHD Graphics 620 graphics engine supports DirectX 12, OpenGL 4.5 and OpenCL 2.1 API; DVI-D display interface supports 1080p full HD resolution. Multiple Gen 3 PCIe (8GT/s), SATA III (6Gbps) and GigE (1Gbps) LAN make high-speed data conveying possible. Vecow RES-3000 Series Ultra-compact Fanless Embedded System delivers you outstanding Power-Efficient Performance for demanding workloads.

Featured with 2 independent rugged X-coded M12 GigE LANs support iAMT 11.0, 2 M12 COM RS-232/422/485, 1 M12 2-port USB 2.0, 1 IP67 waterproof DVI-D connector, 1 mSATA socket and 1 internal 2.5" SSD/HDD bracket, smart remote manageability, 9V to 48V wide range power input with M12 power connector, fanless -30°C to 70°C extended operating temperature, all-in-one IP67 compliant designs, RES-3000 is your trusted embedded engine for strict environmental requirements.

Vecow RES-3000 IP67 Certified Ultra-compact Fanless Embedded System delivers outstanding performance, compact integrated functions, smart manageability and rugged reliability for Smart Manufacturing, Rolling Stock, Environment Monitoring, Wayside Surveillance, Logging & Mining and any performance driven IIoT/Industry 4.0 applications in harsh environments.

1.2 Features

- Compact & slim design, IP67 protection
- Fanless, -30°C to 70°C Operating Temperature
- 8th Generation Intel® Core™ i7/i5/i3 U-series Processor (Whiskey Lake)
- DDR4 2400MHz memory, up to 32GB
- Intel® UHD Graphics 620 supports DirectX 12, OpenGL 4.5 and OpenCL 2.1
- IP67 waterproof DVI-D display interfaces supports 1080p full HD display
- Dual X-coded M12 GigE LAN, iAMT 12.0 supported
- 2 M12 COM RS-232/422/485, 1 M12 for 2-port USB
- 9V to 48V DC Power Input, M12 waterproof connector
- Optional supports TPM 2.0
- One-stop customized Design and Manufacturing Services

1.3 Product Specification

System	
Processor	Intel® Core™ i7/i5/i3/Celeron® U-series Processor (Whiskey Lake)
Chipset	Intel® SoC (Cannon Lake)
BIOS	AMI
SIO	IT8786E
Memory	1 DDR4 2400MHz SO-DIMM, up to 32GB
I/O Interface	
Serial	2 COM RS-232/422/485, A-coded M12 Connector
USB	1 supports 2-port USB 2.0, A-coded M12 Connector
LED	Power, HDD
Graphics	
Graphics Processor	Intel® UHD Graphics 620
Interface	IP67 Waterproof DVI-D Connector, up to 1920 x 1200 @60Hz
Storage	
SATA	1 SATA III (6Gbps)
mSATA	1 SATA III (Mini PCIe Type, 6Gbps)
Storage Device	• 1 mSATA Socket • 1 Internal 2.5" SSD/HDD Bracket

Ethernet	
LAN 1	Intel® I219LM GigE LAN supports iAMT 12.0, X-coded M12 Connector
LAN 2	Intel® I210 GigE LAN, X-coded M12 Connector
Power	
Power Input	9V to 48V, DC-in
Power Interface	A-coded M12 Connector
Power Switch	IP67 Waterproof Power Button
Others	
TPM	Optional Infineon SLB9665 supports TPM 2.0
Watchdog Timer	Reset : 1 to 255 sec./min. per step
Smart Management	Wake on LAN, PXE supported
HW Monitor	Monitoring temperature, voltages. Auto throttling control when CPU overheats.
Software Support	
OS	Windows 10, Linux
Mechanical	
Dimensions (WxDxH)	250mm x 180mm x 44mm (9.8" x 7.1" x 1.7")
Weight	2.3 kg (5.07 lb)
Mounting	• Wallmount by mounting bracket • VESA Mount
Environment	
Operating Temperature	-30°C to 70°C (-22°F to 158°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	5% to 95% Humidity, non-condensing
Relative Humidity	95% at 70°C
Shock	• IEC 60068-2-27 • SSD : 50G @ Wallmount, Half-sine, 11ms
Vibration	• IEC 60068-2-64 • SSD : 5Grms, 5Hz to 500Hz, 3 Axis
EMC	CE, FCC, EN50155, EN50121-3-2

1.4 Supported CPU List

Processor No.	Cores	TDP	Cache	Max. Frequency	ECC Memory
Intel® Core™ i7-8665UE	4	15W	8M	Up to 4.4 GHz	N
Intel® Core™ i5-8365UE	4	15W	6M	Up to 4.1 GHz	N
Intel® Core™ i3-8145UE	2	15W	4M	Up to 3.9 GHz	N
Intel® Celeron® 4305UE	2	15W	2M	Up to 2.0 GHz	N

1.5 Mechanical Dimensions

Unit: mm (inch)
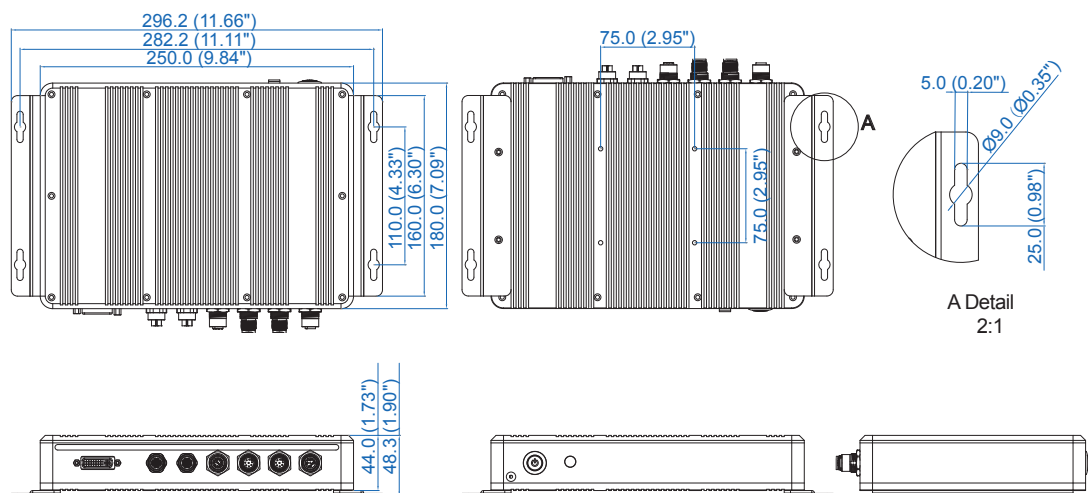
2

GETTING TO KNOW YOUR RES-3000

2.1 Packing List

Item	Description	Qty
1	RES-3000 Rugged Embedded System	1
2	Wall Mount Kit	2
3	PHILLIPS F#6-32 screws for wall mount kit	4
4	M12 to USB cable (2M Length)	1
5	M12 to DC terminal block cable (2M Length)	1

2.2 Front Panel I/O Functions

2.2.1 Power Button
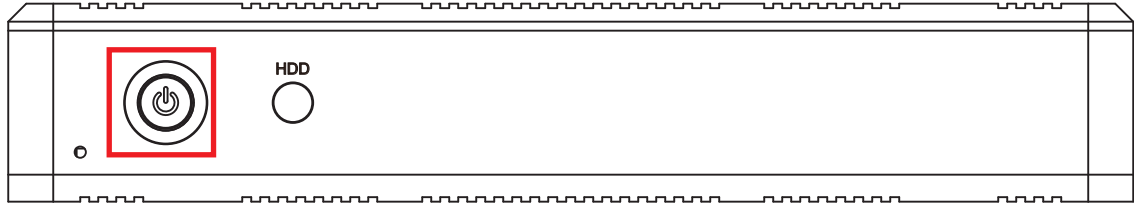
The power button is a non-latched switch. In case of system halts, you can press and hold the power button for 4 seconds to compulsorily shut down the system. Please note that a 4 seconds interval is kept by the system between two on/off operations (i.e. once turning off the system, you shall wait for 4 seconds to initiate another power-on operation).

LED Color	Power Status	System Status
Blue	Power	System power status (on/off)

2.2.2 HDD LED Indicator
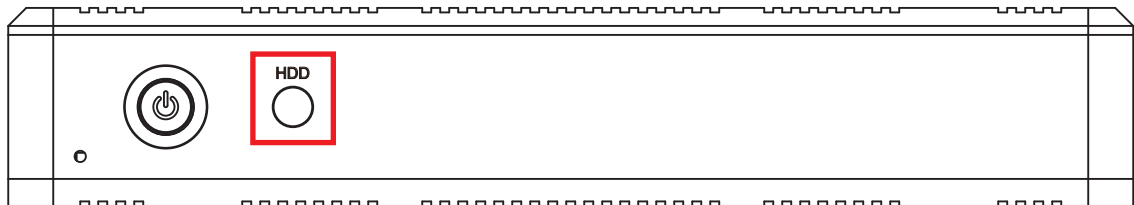
Orange-HDD LED: A hard disk LED. If the LED is on, it indicates that the system's storage is functional. If it is off, it indicates that the system's storage is not functional. If it is flashing, it indicates data access activities are in progress.

LED Color	Power Status	System Status
Orange	HDD	• On/Off : Storage status, function or not. • Twinkling : Data transferring.

2.3 Rear Panel I/O and Functions

In Vecow's RES-3000, all I/O connectors are located on the Rear panel. Most of the general connections to the computer device, such as DVI-D, M12 jack for LAN,USB2.0,COM port and DC-IN , are placed on the Rear panel.

2.3.1 DVI Connector
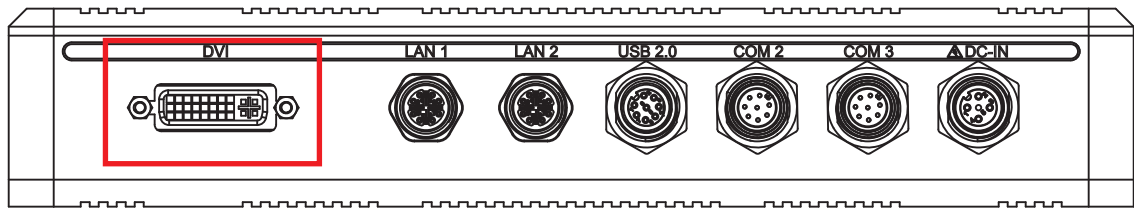
The DVI connector on the rear panel supports only DVI-D display. This connector can either output DVI signal. The DVI output mode supports up to 1920 x 1200 resolution and output mode supports up to 1920 x 1200 resolution. The DVI is automatically selected according to the display device connected. You will need a DVI-D cable when connecting to a display device.

2.3.2 10/ 100/ 1000 Mbps Ethernet Port
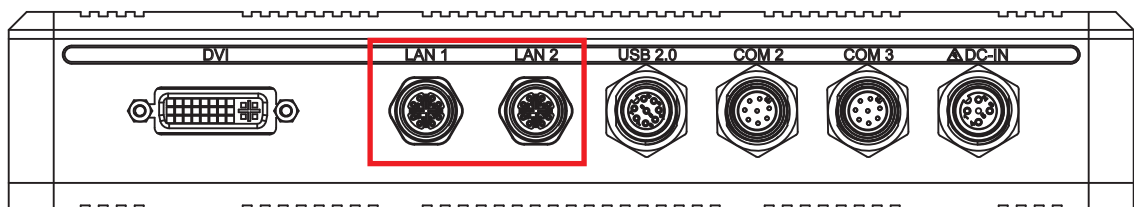
There are 2 M12 jacks supporting 10/ 100/1000 Mbps Ethernet connections in the rear side. LAN 1 is powered by Intel I219 Ethernet engine; LAN 2 is powered by Intel i210 Ethernet Phy. When both LAN 1 and LAN 2 work in normal status, iAMT 11.0 function is enabled. Using suitable M12 LAN cable, you can connect the system to a computer, or to any other devices with Ethernet connection, for example, a hub or a switch. Moreover, both of LAN 1 and LAN 2 supports Wake on LAN and Pre-boot functions. The pin-outs of LAN 1 and LAN 2 are listed as follows:
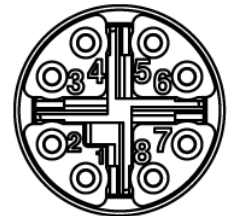
Pin No.	LAN1	LAN2
1	LAN0_MDI_1P	LAN1_MDI_1P
2	LAN0_MDI_1P	LAN1_MDI_1P
3	LAN0_MDI_2N	LAN1_MDI_2N
4	LAN0_MDI_2P	LAN1_MDI_2P
5	LAN0_MDI_4P	LAN1_MDI_4P
6	LAN0_MDI_4N	LAN1_MDI_4N
7	LAN0_MDI_3N	LAN1_MDI_3N
8	LAN0_MDI_3P	LAN1_MDI_3P

2.3.3 USB 2.0
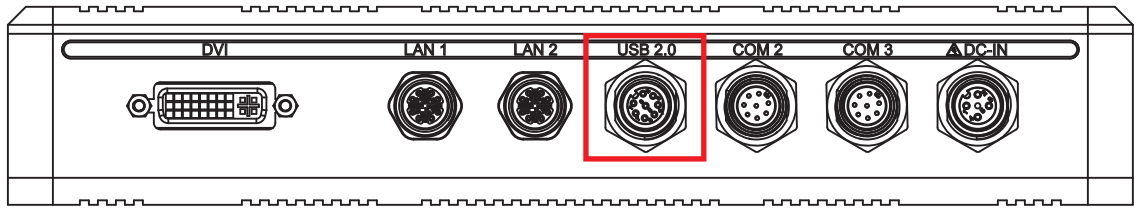
There are 2 USB 2.0 connections available supporting up to 480MB per second data rate.
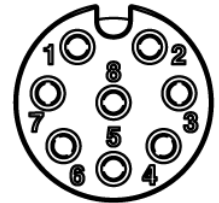
The pin-outs of USB2.0 are listed as follows:

Pin No.	USB2.0	Pin No.	USB2.0
1	USB_1D-	5	USB_2D-
2	USB_1D+	6	USB_2D+
3	USB_VCC	7	USB_VCC
4	USB_GND	8	USB_GND

2.3.4 Serial Port COM 2 and COM 3
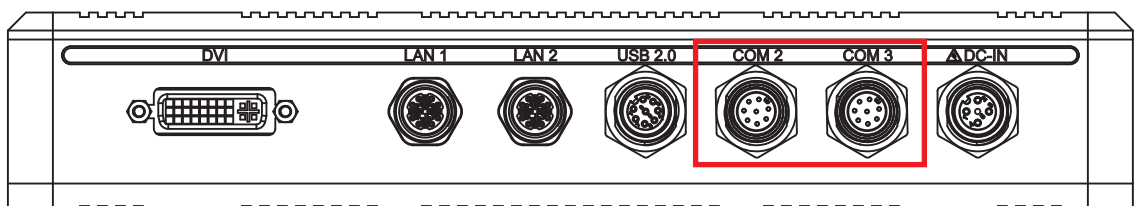
Serial port COM2and COM3 can be configured for RS-232, RS-422, or RS-485 with auto flow control communication. The default definition of COM 1 and COM 2 is RS-232, if you want to change to RS-422 or RS-485, you can find the setting in BIOS.

The pin-outs of COM2 and COM3 are listed as follows:
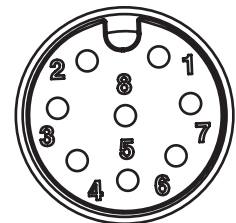
Serial Port	Pin No.	RS-232	RS-422 (5-wire)	RS-422 (9-wire)	RS-485 (3-wire)
COM2 COM3	1	DCD	TXD-	TXD-	DATA-
	2	RXD	TXD+	TXD+	DATA+
	3	TXD	RXD+	RXD+	-----------
	4	DTR	RXD-	RXD-	-----------
	5	DSR	-----------	RTS-	-----------
	6	RTS	-----------	RTS+	-----------
	7	CTS	-----------	CTS+	-----------
	8	GND	GND	GND	GND

2.3.5 DC JACK
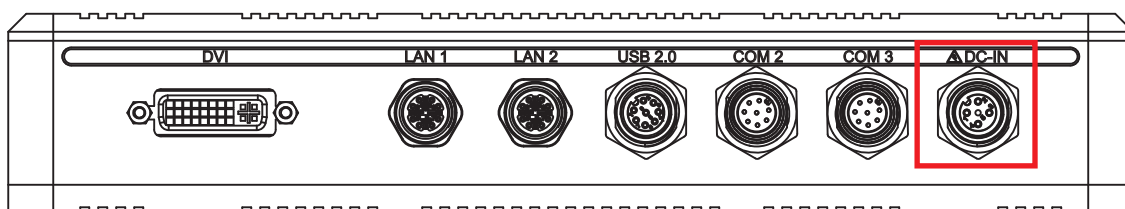
This system supports 9V to 48V DC power input by M12 DC Cable in the rear side.
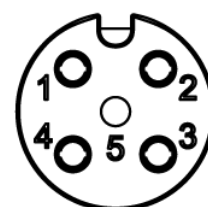
The pin-outs of DC-IN jack are listed as follows:

Pin No.	DC-IN	Pin No.	USB2.0
1	VIN	4	GND
2	VIN	5	NC
3	GND		

3

SYSTEM SETUP

3.1 How to Use Your RES-3000

3.1.1 M12 A code/X code

Step 1 Remove M12 cover. (Example DC-IN)

Step 2 Confirm M12 connector pin defined.

Step 3   Confirm wire.

Step 4   Turn wire connector.

Step 5   Locked.

3.1.2 DVI

Step 1 Remove DVI cover.

Step 2 Confirm DVI connector pin defined.

Step 3 Confirm wire.

Step 4 Turn wire connector.

Step 5 Locked.

Reminder: To ensure IP67 protection, we strongly discourage users from opening the chassis of RES-3000. After reassembly, RES-3000 will no longer be IP67 compliant unless the system goes through another Air Compressor Test.

3.2 Mount Your RES-3000

3.2.1 Wall Mount

Step 1 Fasten four PHILLIPS #6-32 screws.

296.2 (11.66")
282.2 (11.11")
250.0 (9.84")

110.0 (4.33")
160.0 (6.30")
180.0 (7.09")

44.0 (1.73")
48.3 (1.90")
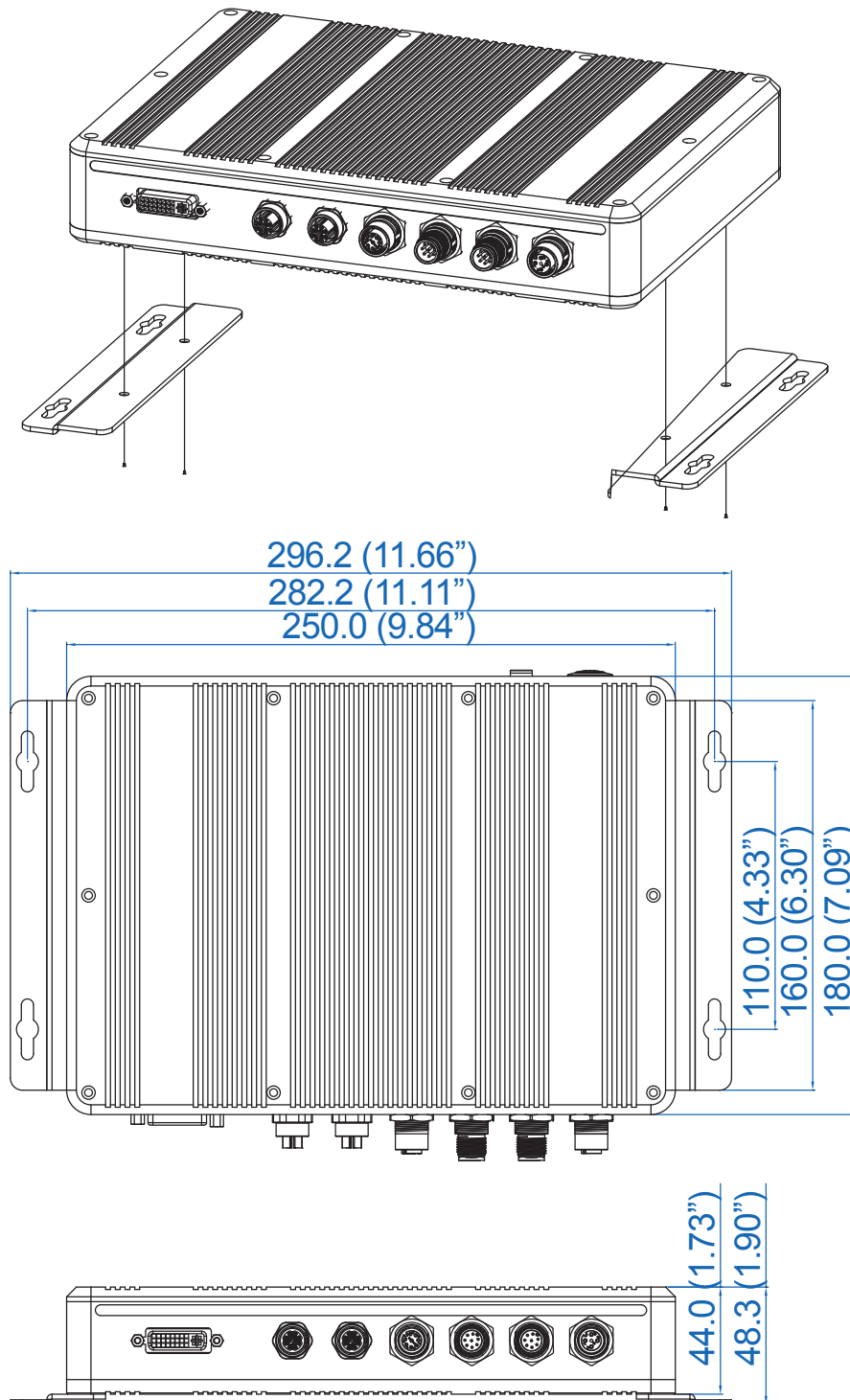
3.2.2 VESA Mount (75x75 mm)

75.0 (2.95")

75.0 (2.95")
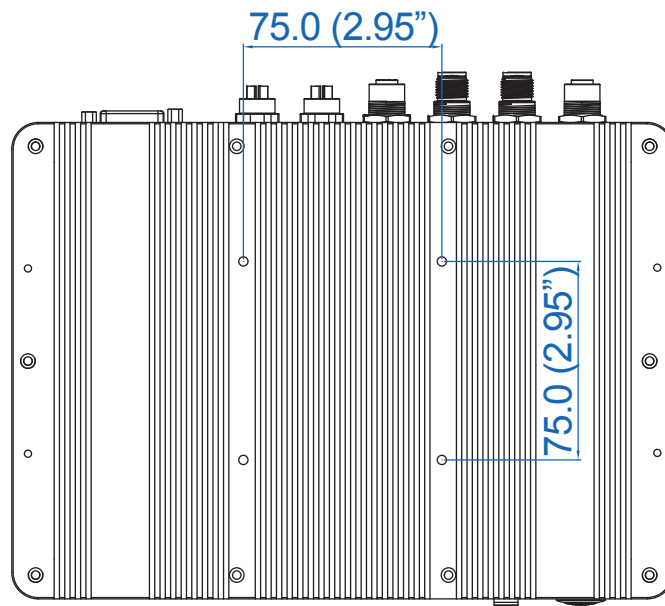
4

BIOS SETUP

4.1 BIOS Settings

```
         Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
       Main   Advanced  Chipset  Security  Boot  Save & Exit

       BIOS Information                                         ▲
       BIOS Vendor                    American Megatrends
       Core Version                   5.13
       Compliancy                     UEFI 2.7; PI 1.6
       Project Version                E3000XXPUF00003
       Build Date and Time            09/05/2019 14:41:20
       Access Level                   Administrator

       Processor Information
       Name                           WhiskeyLake ULT
       Type                           Intel(R) Core(TM)
                                      i7-8665UE CPU @ 1.70GHz
       Speed                          2000 MHz
       ID                             0x806EC                   ──→: Select Screen
       Stepping                       V0                        ↑↓: Select Item
       Package                        BGA1528                   Enter: Select
       Number of Processors           4Core(s) / 8Thread(s)     +/-: Change Opt.
       Microcode Revision             B8                        F1: General Help
       GT Info                        GT2 (0x3EA0)              F2: Previous Values
                                                                F3: Optimized Defaults
       IGFX VBIOS Version             1026                      F4: Save & Exit
       IGFX GOP Version               N/A                       ESC: Exit
       Memory RC Version              0.7.1.108
       Total Memory                    8192 MB
       Memory Frequency                2400 MHz                 ▼
```

Figure 4-1 : Entering Setup Screen

BIOS provides an interface for users to check and change system configuration. The BIOS setup program is accessed by pressing the <Del> key when POST display output is shown.

4.2 Main

```
            Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
     Main  Advanced  Chipset  Security  Boot  Save & Exit

     Microcode Revision           B8                      ▲  Choose the system default
     GT Info                      GT2 (0x3EA0)               language

     IGFX VBIOS Version           1026
     IGFX GOP Version             N/A
     Memory RC Version            0.7.1.108
     Total Memory                  8192 MB
     Memory Frequency              2400 MHz

     PCH Information
     Name                         CNL PCH-LP
     PCH SKU                      (U) Premium  SKU
     Stepping                     D0
     ChipsetInit Base Revision    20                         →←: Select Screen
     ChipsetInit OEM Revision     0                          ↑↓: Select Item
     TXT Capability of Platform/PCH   Supported              Enter: Select
     Production Type              Production                 +/-: Change Opt.
                                                             F1: General Help
     ME FW Version                12.0.35.1427               F2: Previous Values
     ME Firmware SKU              Corporate SKU              F3: Optimized Defaults
                                                             F4: Save & Exit
     System Language              [English]                  ESC: Exit

     System Date                  [Fri 09/06/2019]
     System Time                  [15:48:50]              ▼
```

Figure 4-2 : BIOS Main Menu

The main menu displays BIOS version and system information. There are two options on the main menu, system date and system time.

System Date

Set the date. Use tab to switch between date elements.

System Time

Set the time. Use tab to switch between time elements.

4.3 Advanced Functions

```
            Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
     Main  Advanced  Chipset  Security  Boot  Save & Exit

     ► CPU Configuration                                    CPU Configuration Parameters
     ► Power & Performance
     ► PCH-FW Configuration
     ► Trusted Computing
     ► ACPI Settings
     ► SMART Settings
     ► IT8786 Super IO Configuration
     ► Hardware Monitor
     ► Serial Port Console Redirection
     ► Intel TXT Information
     ► Acoustic Management Configuration
     ► PCI Subsystem Settings
     ► USB Configuration                                    →←: Select Screen
     ► CSM Configuration                                    ↑↓: Select Item
     ► NVMe Configuration                                   Enter: Select
     ► Network Stack Configuration                          +/-: Change Opt.
```

Figure 4-3 : BIOS Advanced Menu

Select advanced tab to enter advanced BIOS setup options such as CPU configuration, SATA configuration, and USB configuration.

4.3.1 CPU Configuration

```
                  Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
        Advanced

 CPU Configuration                                                   To turn on/off the MLC
                                                                     streamer prefetcher.
 Type                                     Intel(R) Core(TM)
                                          i7-8665UE CPU @ 1.70GHz
 ID                                       0x806EC
 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
                                                                     ───────────────────────
                                                                     ──: Select Screen
 Hardware Prefetcher                      [Enabled]                  ↑↓: Select Item
 Adjacent Cache Line Prefetch             [Enabled]                  Enter: Select
 Intel (VMX) Virtualization               [Enabled]                  +/-: Change Opt.
 Technology                                                          F1: General Help
 Active Processor Cores                   [All]                      F2: Previous Values
 Hyper-Threading                          [Enabled]                  F3: Optimized Defaults
 AES                                      [Enabled]                  F4: Save & Exit
 Intel Trusted Execution Technology       [Disabled]                 ESC: Exit

```

Figure 4-3-1 : CPU Configuration

Hardware Prefetcher

To turn on/off the MLC streamer prefetcher.

Adjacent Cache Line Prefetch

To turn on/off prefetching of adjacent cache lines.

Intel (VMX) Virtualization Technology

When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

Active Processor Cores

Number of cores to enable in each processor package.

Hyper-threading

Enabled or Disabled Hyper-Threading Technology.

AES

Enable/disable AES (Advanced Encryption Standard)

Intel Trusted Execution Technology

Enables utilization of additional hardware capabilities provided by Intel Trusted Execution Technology.

Changed require a full power cycle to take effect.

4.3.2 Power & Performance

```
          Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
     Advanced

  Power & Performance                                    CPU - Power Management Control
                                                         Options
  ▶ CPU - Power Management Control
  ▶ GT - Power Management Control
```
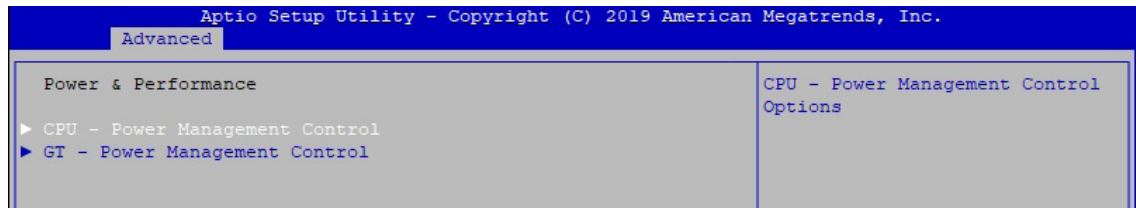
Figure 4-3-2 : Power & Performance

4.3.2.1 CPU - Power Management Control

```
          Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
     Advanced

  CPU - Power Management Control                         Select the performance state
                                                         that the BIOS will set
  Boot performance mode            [Max Non-Turbo        starting from reset vector.
                                    Performance]
  Intel(R) SpeedStep(tm)           [Enabled]
  Intel(R) Speed Shift Technology  [Enabled]
  Turbo Mode                       [Disabled]
  C states                         [Enabled]
    Enhanced C-states              [Enabled]
  Configurable TDP Boot Mode       [Nominal]
```

Figure 4-3-2-1 : CPU - Power Management Control

Boot performance mode

Select the performance state that the BIOS will set starting from reset vector.

Intel® SpeedStep™

Allow more than two frequency ranges to be supported.

Intel® Speed shift Technology

Enable/Disable Intel® Speed shift Technology support. Enabling will expose the CPPCv2 interface to allow for hardware controlled P-states.

Turbo Mode

Enable/Disable processor Turbo Mode (requires Intel Speed Step or Intel Speed Shift to be available and enabled).

C states

Enable or disable CPU Power management. Allows CPU to go to C states when it's no 100% utilized.

Enhanced C-states

Enable/disable C1E. When enabled, CPU will switch to minimum speed when all cores enter C-State.

Configurable TDP Boot Mode

Configurable TDP Mode as Nominal/Up/Down/Deactivate TDP selection. Deactivate option will set MSR to Nominal and MMIO to Zero. Configurable TDP allows operation in situation where extra cooling is available or situations where a cooler and quieter mode of operation is desired.

4.3.2.2 GT – Power Management Control

```
            Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
    Advanced

  GT - Power Management Control                              Check to enable render standby
                                                             support.
  RC6(Render Standby)                [Enabled]
  Maximum GT frequency               [Default Max Frequency]
  Disable Turbo GT frequency         [Disabled]
```
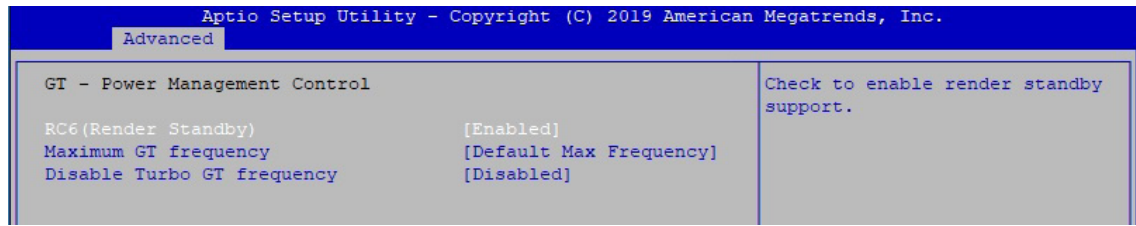
Figure 4-3-2-2 : GT – Power Management Control

RC6 (Render Standby)

Check to enable render standby support.

Maximum GT frequency

Maximum GT frequency limited by the user. Choose between 300MHz (RPN) and 1150MHz (RP0). Value beyond the range will be clipped to min/max supported by SKU.

Disable Turbo GT frequency

Enabled : Disables Turbo GT frequency. Disabled : GT frequency is not limited.

4.3.3 PCH-FW Configuration

```
            Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
    Advanced

  ME Firmware Version         12.0.35.1427               When Disabled ME will be put
  ME Firmware Mode            Normal Mode                into ME Temporarily Disabled
  ME Firmware SKU             Corporate SKU              Mode.
  ME Firmware Status 1        0x90000255
  ME Firmware Status 2        0x8910810E

  ME State                    [Enabled]
  AMT BIOS Features           [Enabled]
▶ AMT Configuration
  ME Unconfig on RTC Clear    [Enabled]


                                                          ↑  Select Screen
```

Figure 4-3-3 : PCH-FW Settings

ME State

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

AMT BIOS Features

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.

AMT Configuration

Configure Intel Active Management Technology Parameters.

ME Unconfig on RTC Clear

Disabling this option will cause ME not be unconfigured on RTC clear.

4.3.4 Trusted Computing
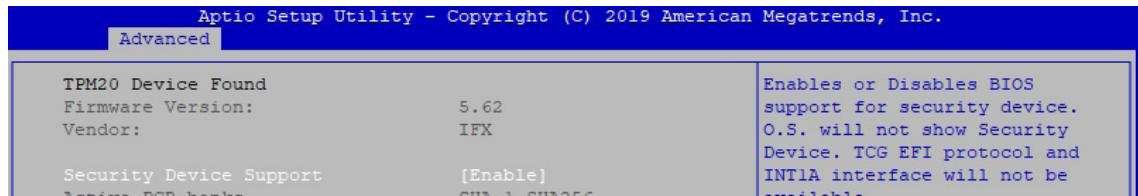
Figure 4-3-4 : Trusted Computing

Control the TPM device status and display related information if TPM chip is present.

4.3.5 ACPI Settings
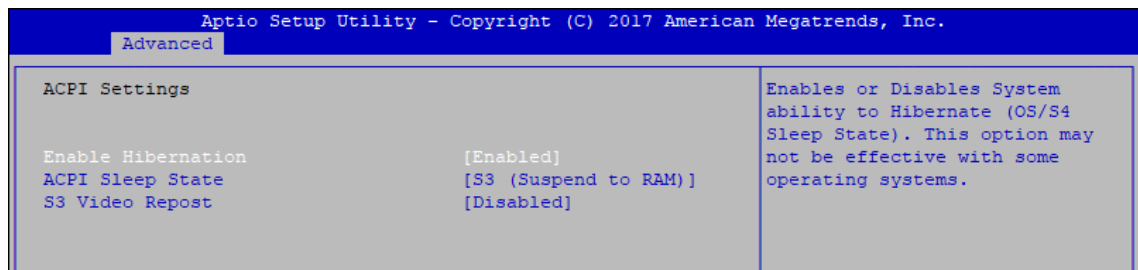
Figure 4-3-5 : ACPI Settings

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.

S3 Video Repost

Enable or disable S3 Video Repost.

4.3.6 SMART Settings
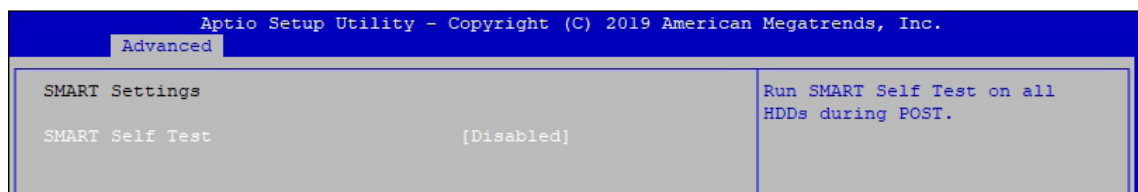
Figure 4-3-6 : SMART Settings

SMART Self Test

Run SMART self-test on all HDDs during POST.

4.3.7 IT8786 Super IO Configuration

```
            Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
     Advanced

     IT8786 Super IO Configuration                           Set Parameters of Serial Port
                                                             1 (COM1)
     Super IO Chip                      IT8786
   ▶ Serial Port 1 Configuration
   ▶ Serial Port 2 Configuration
   ▶ Serial Port 3 Configuration
   ▶ Serial Port 4 Configuration



                                                             →←: Select Screen
                                                             ↑↓: Select Item
                                                             Enter: Select
                                                             +/-: Change Opt.
                                                             F1: General Help
                                                             F2: Previous Values
                                                             F3: Optimized Defaults
                                                             F4: Save & Exit
                                                             ESC: Exit




            Version 2.20.1271. Copyright (C) 2019 American Megatrends, Inc.
```

Figure 4-3-7 : Super IO Settings

Serial Port 1 Configuration
Set parameters of serial port 1 (COM1).
Serial Port 2 Configuration
Set parameters of serial port 2 (COM2).
Serial Port 3 Configuration
Set parameters of serial port 3 (COM3).
Serial Port 4 Configuration
Set parameters of serial port 4 (COM4).

4.3.8 Hardware Monitor

```
            Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
    Advanced

Pc Health Status                                            Smart Fan Support. Work with
                                                            Full Speed if "Smart Fan
System temperature1               : +45 □                   Support" is Disabled.
System temperature2               : +45 □
CPU temperature                   : +36 □
System Fan1 Speed                 : 3835 RPM
VCORE                             : +0.768 V
DDR                               : +1.212 V
+12V                              : +12.168 V
+5V                               : +5.040 V
+3.3V                             : +3.344 V

Smart Fan Support                 [Enable]
  Smart Fan Mode                  [User]                    →←: Select Screen
    Start Temperature             45                        ↑↓: Select Item
    PWM Start Value(%)            15                        Enter: Select
    Full Speed Temperature        90                        +/-: Change Opt.
                                                            F1: General Help
                                                            F2: Previous Values
                                                            F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit



            Version 2.20.1271. Copyright (C) 2019 American Megatrends, Inc.
```

Figure 4-3-8 : Hardware Monitor and Settings

The IT8786 SIO features an enhanced hardware monitor providing thermal, fan speed, and system voltages' status monitoring.

Smart Fan Support

Smart Fan Support. Work with Full Speed if "Smart Fan Support" is Disabled.

Smart Fan Mode

Default : Using the default smart fan table.
User : Setting parameters by user.

Start Temperature

Temperature Limit value of Fan Start (Degree C).
(Range : 10-80)

PWM Start Value (%)

Default PWM Value of Fan.
(Range : 15%-100%)

Full Speed Temperature

Temperature Limit value of Fan Full Speed (Degree C).
(Range : 50-90)

4.3.9 Serial Port Console Redirection

```
                Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
          Advanced

                                                               Console Redirection Enable or
   COM0                                                         Disable.
   Console Redirection                    [Disabled]
 ▶ Console Redirection Settings

   Legacy Console Redirection
 ▶ Legacy Console Redirection Settings

   Serial Port for Out-of-Band Management/
   Windows Emergency Management Services (EMS)
   Console Redirection                    [Disabled]
 ▶ Console Redirection Settings
                                                               →←: Select Screen
                                                               ↑↓: Select Item
                                                               Enter: Select
```

Figure 4-3-9 : Serial Port Console Redirection Settings

Console Redirection

Console redirection enable or disable.

Console Redirection Settings

The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

Legacy Console Redirection Settings

Legacy Console Redirection Settings.

Serial Port for Out-of-Band Management/Windows Emergency Management Services (EMS)

Console Redirection Enable or Disable.

4.3.10 Intel TXT Information

```
                Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
          Advanced

   Intel TXT Information

   Chipset                                Production Fused
   BiosAcm                                Production Fused
   Cpu Txt                                Supported
   Error Code                             None
     Class Code                           None
     Major Code                           None
     Minor Code                           None
```
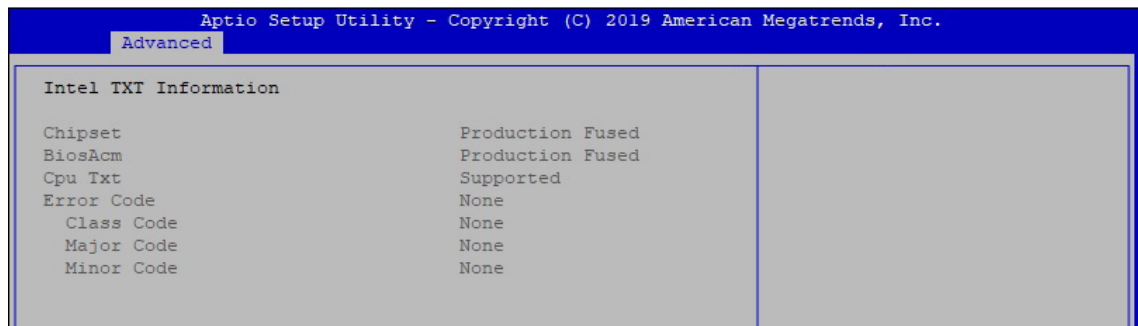
Figure 4-3-10 : Intel TXT Information

Display Intel TXT information.

4.3.11 Acoustic Management Configuration

Figure 4-3-11 : Acoustic Management Settings

Acoustic Management Configuration

Option to enable or disable automatic acoustic management.

4.3.12 PCI Subsystem Settings

Figure 4-3-12 : PCI Subsystem Settings

Above 4G Decoding

Globally Enables or Disables 64bit capable Devices to be Decoded in Above 4G Address Space (Only if System Supports 64 bit PCI Decoding).

4.3.13 USB Configuration

```
                Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
       Advanced

  USB Configuration                                              Enables Legacy USB support.
                                                                 AUTO option disables legacy
  USB Module Version              23                             support if no USB devices are
                                                                 connected. DISABLE option will
  USB Controllers:                                               keep USB devices available
      1 XHCI                                                     only for EFI applications.
  USB Devices:
      1 Keyboard, 1 Mouse

  Legacy USB Support              [Enabled]
  XHCI Hand-off                   [Enabled]
  USB Mass Storage Driver Support [Enabled]
  Port 60/64 Emulation            [Disabled]
                                                                 ─────────────────────────────
  USB hardware delays and time-outs:                            →←: Select Screen
  USB transfer time-out           [20 sec]                      ↑↓: Select Item
  Device reset time-out           [20 sec]                      Enter: Select
  Device power-up delay           [Auto]                        +/-: Change Opt.
                                                                 F1: General Help
                                                                 F2: Previous Values
                                                                 F3: Optimized Defaults
                                                                 F4: Save & Exit
                                                                 ESC: Exit
```
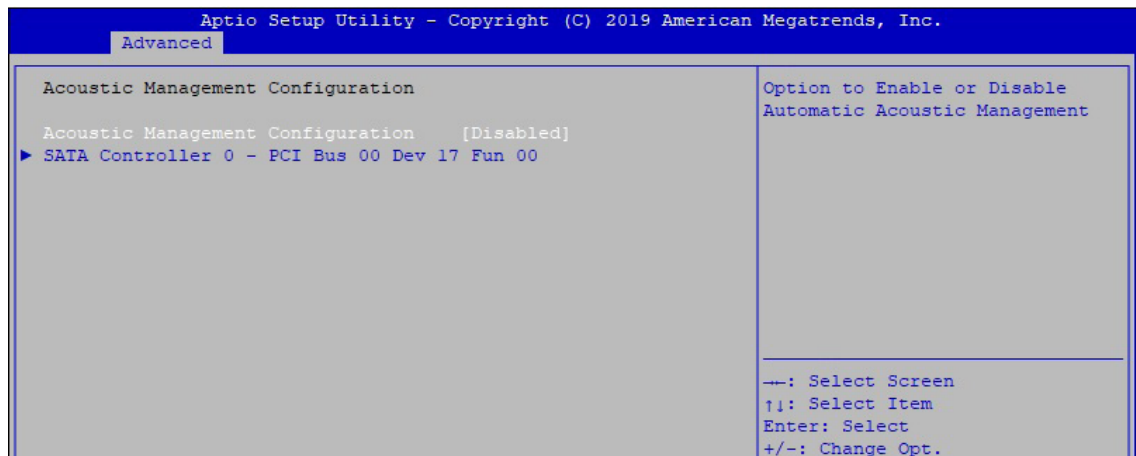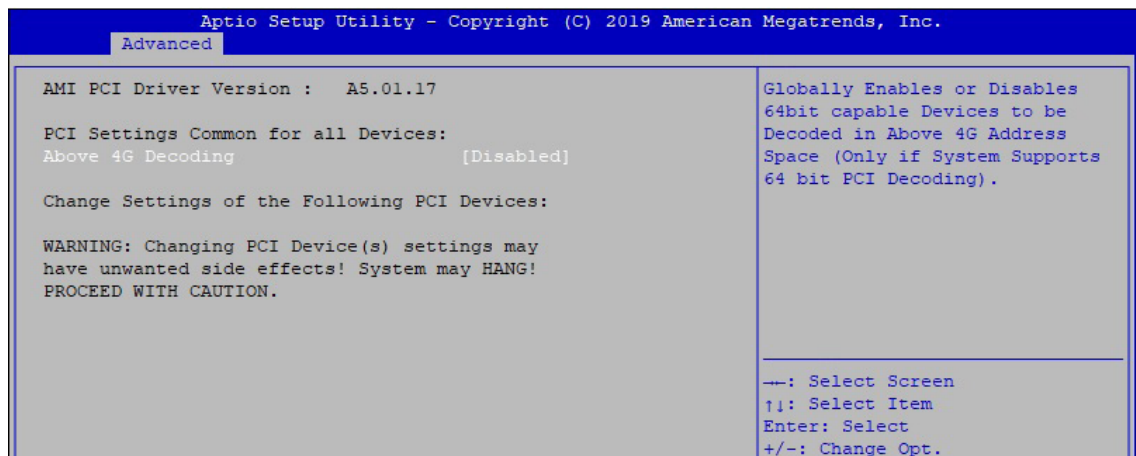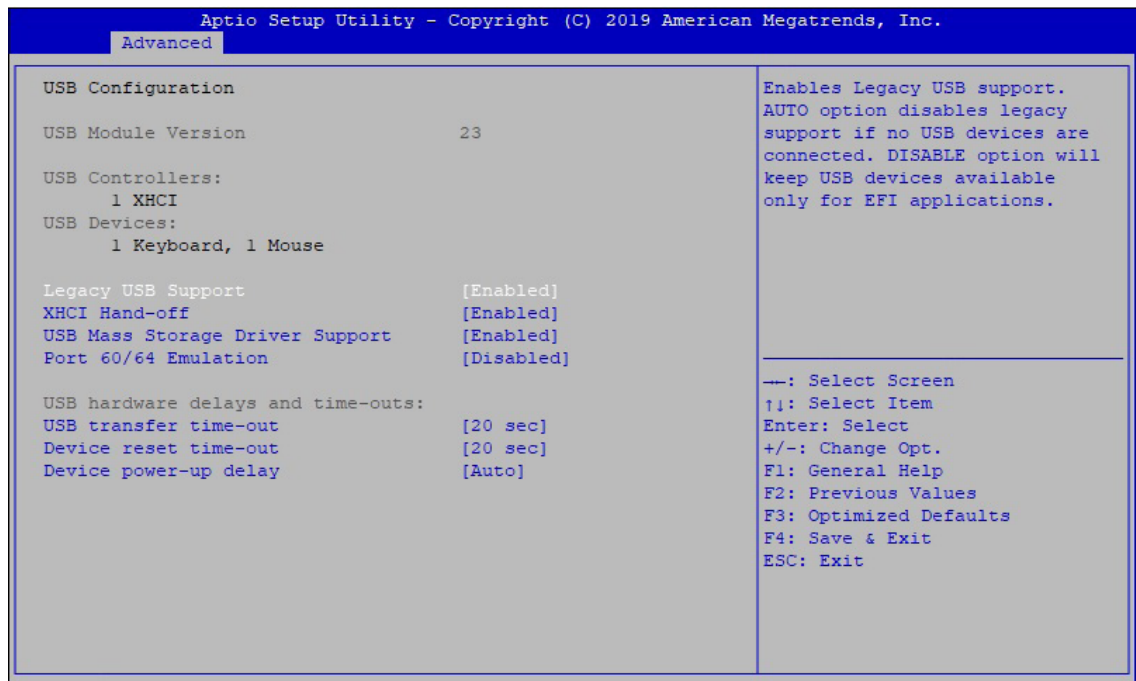
Figure 4-3-13 : USB Settings

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.

Port 60/64 Emulation

Enables I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OS's.

USB transfer time-out

The 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 100ms, for a hub port the delay is taken from hub descriptor.

4.3.14 CSM Configuration
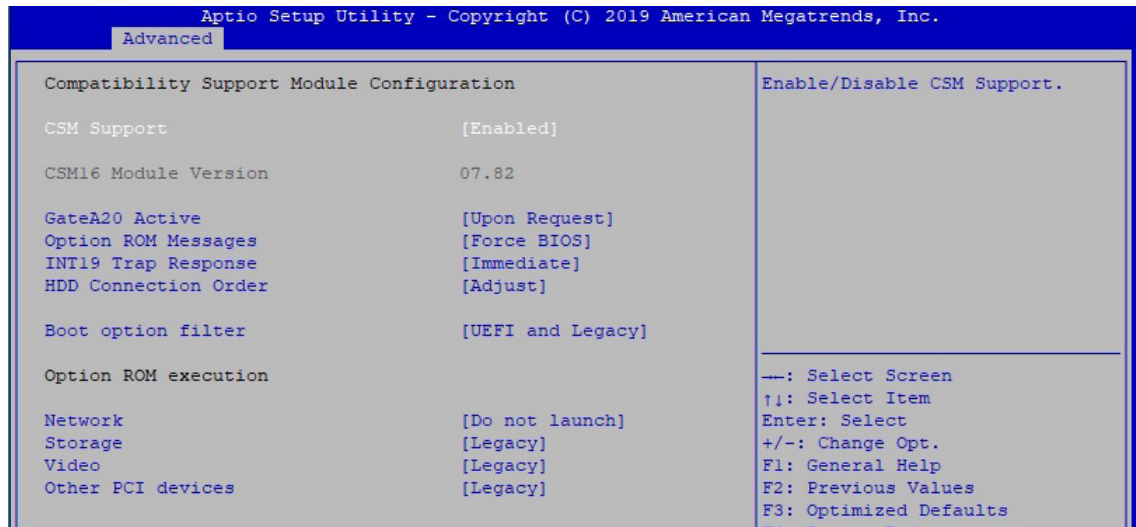
Figure 4-3-14 : CSM Settings

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.

Option ROM Messages

Set display mode for option ROM.

INT19 Trap Response

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

HDD Connection Order

Some OS require HDD handles to be adjusted, i.e. OS is installed on drive 80h.

Boot option filter

This option controls Legacy/UEFI ROM's 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.

4.3.15 NVMe Configuration
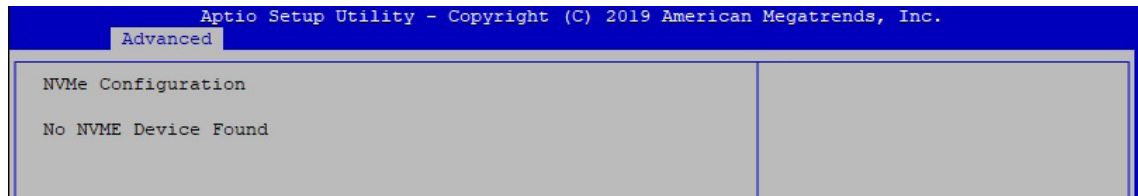
Figure 4-3-15 : NVMe Configuration

Display NVMe Controller and Drive information.

4.3.16 Network Stack Configuration
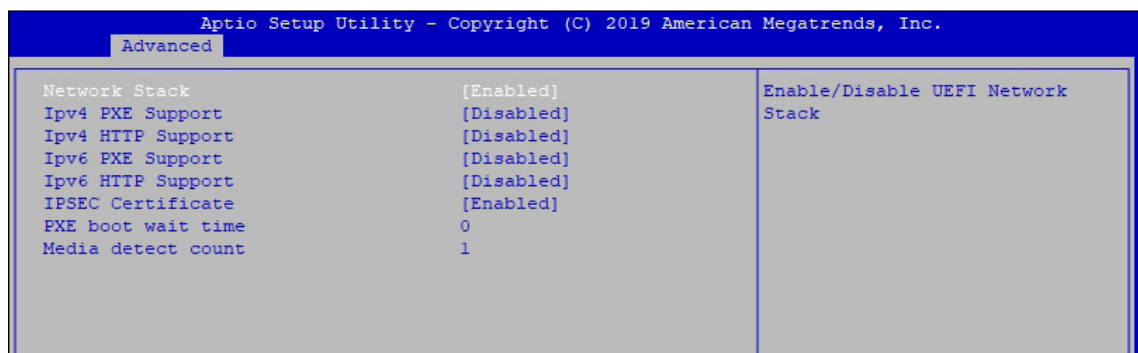
Figure 4-3-16 : Network Stack Configuration

Network Stack

Enable/disable UEFI Network Stack.

Ipv4 PXE Support

Enable/disable IPv4 PXE boot support.

Ipv4 HTTP Support

Enable/disable IPv4 HTTP boot support.

Ipv6 PXE Support

Enable/disable IPv6 PXE boot support.

Ipv6 HTTP Support

Enable/disable IPv6 HTTP boot support.

IPSEC Certificate

Support to Enable/disable IPSEC certificate for Ikev.

PXE boot wait time

Wait time to press EEEEESC key to abort the PXE boot.

Media detect count

Number of times presence of media will be checked.

4.4 Chipset Functions

```
              Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
        Main  Advanced  Chipset  Security  Boot  Save & Exit

      ► System Agent (SA) Configuration                  System Agent (SA) Parameters
      ► PCH-IO Configuration
      ► LVDS Configuration
```
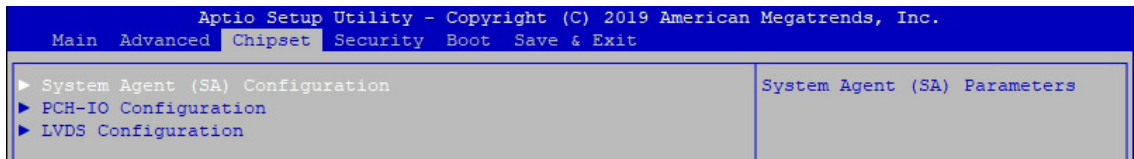
Figure 4-4 : BIOS Chipset Menu

System Agent (SA) Configuration
System Agent (SA) Parameters.
PCH-IO Configuration
PCH Parameters.
LVDS Configuration
LVDS Configuration.

4.4.1 System Agent (SA) Configuration

```
              Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
                    Chipset

      System Agent (SA) Configuration                    Memory Configuration Parameters

      SA PCIe Code Version              7.0.97.64
      VT-d                              Supported

      ► Memory Configuration
      ► Graphics Configuration

      VT-d                              [Enabled]
      Above 4GB MMIO BIOS assignment    [Disabled]
```
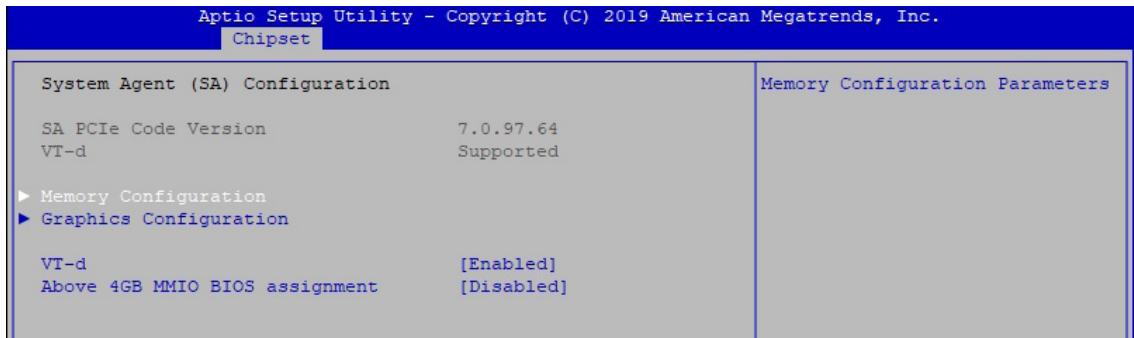
Figure 4-4-1 : System Agent Settings

VT-d

VT-d capability.
Above 4GB MMIO BIOS assignment

Enable/disable above 4GB MemoryMappedIO BIOS assignment. This is disabled automatically when aperture size is set to 2048MB.

4.4.1.1 Memory Configuration

```
              Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
                    Chipset

      Memory Configuration

      Memory RC Version                 0.7.1.108
      Memory Frequency                   2400 MHz
      Memory Timings (tCL-tRCD-tRP-tRAS) 17-17-17-39

      Channel 0 Slot 0                  Populated & Enabled
          Size                          8192 MB (DDR4)
          Number of Ranks               1
          Manufacturer                  Kingston
```
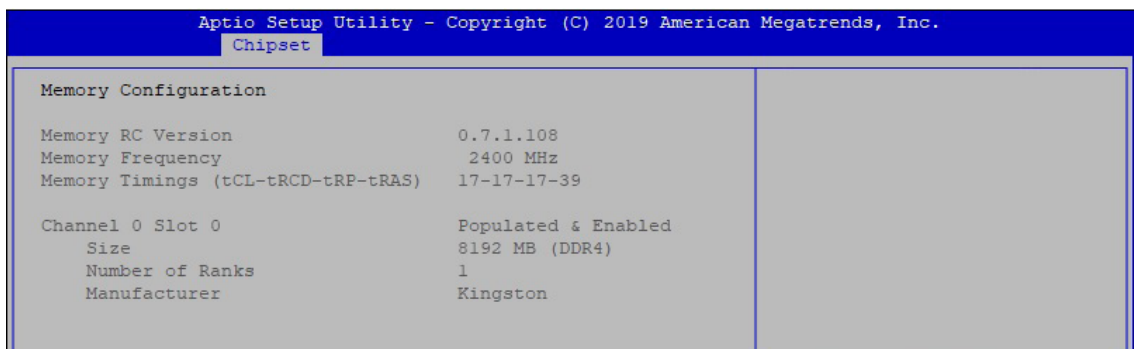
Figure 4-4-1-1 : Memory Information
Display memory information.

4.4.1.2 Graphics Configuration
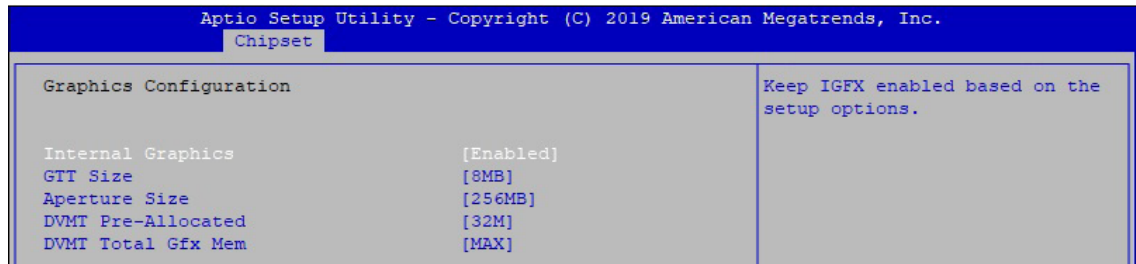
Figure 4-4-1-2 : Graphics Settings

Internal Graphics

Keep IGFX enabled based on the setup options.

GTT Size

Select the GTT size.

Aperture Size

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.

DVMT Pre-Allocated

Select DVMT 5.0 pre-allocated (fixed) graphics memory size used by the internal graphics device.

DVMT Total Gfx Mem

Select DVMT5.0 total graphic memory size used by the internal graphics device.

4.4.2 PCH-IO Configuration
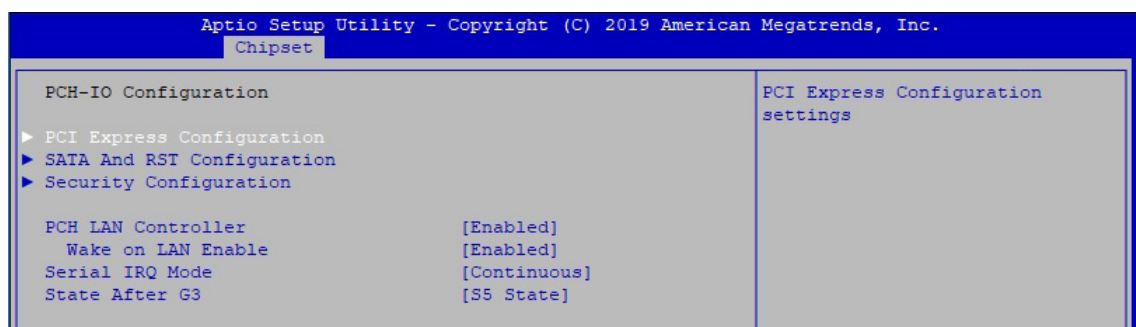
Figure 4-4-2 : PCH-IO Settings

PCH LAN Controller

Enable or disable onboard NIC.

Wake on LAN Enable

Enable or disable integrated LAN to wake the system.

Serial IRQ Mode

Configure serial IRQ mode.

State After G3

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

4.4.2.1 PCI Express Configuration

```
               Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
                  Chipset

  PCI Express Configuration                                    The control of Active State
                                                               Power Management of the DMI
  DMI Link ASPM Control                  [Auto]                Link.
  Native PCIE Enable                     [Enabled]
  PCIE Port assigned to LAN              13

  ▶ SUMIT B (PCIe x4)
  ▶ SUMIT B (PCIe x1)
  ▶ SUMIT A (PCIe x1)
    Intel (R) Ethernet Controller        Reserved for ethernet
    I219 LAN
  ▶ Intel (R) Ethernet Controller I210 LAN
  ▶ mPCIe slot with SIM
    mPCIe/mSATA slot                     Lane configured as    →←: Select Screen
                                         USB/SATA              ↑↓: Select Item
                                                               Enter: Select
                                                               +/-: Change Opt.
                                                               F1: General Help
                                                               F2: Previous Values
                                                               F3: Optimized Defaults
                                                               F4: Save & Exit
                                                               ESC: Exit
```

Figure 4-4-2-1 : PCI Express Configuration

DMI Link ASPM Control

The control of Active State Power Management of the DMI Link.

Native PCIE Enable

PCI Express Native Support Enable/Disable. This feature is available in vista and beyond Windows OS.

PCI Express device settings

BIOS options for PCI Express device setting.

4.4.2.2 SATA And RST Configuration

```
              Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
                 Chipset

   SATA And RST Configuration                                      Enable/Disable SATA Device.

   SATA Controller(s)                   [Enabled]
   SATA Mode Selection                  [AHCI]
 ▶ Software Feature Mask Configuration
   Aggressive LPM Support               [Enabled]

   Serial ATA Port 0                    Phison SSB064G (64.0GB)
     Software Preserve                  SUPPORTED
     Port 0                             [Enabled]
     Hot Plug                           [Disabled]
     Spin Up Device                     [Enabled]
     SATA Device Type                   [Hard Disk Drive]                ──────────────────────────
   Serial ATA Port 1                    Empty                      ←→: Select Screen
     Software Preserve                  Unknown                    ↑↓: Select Item
     Port 1                             [Enabled]                  Enter: Select
     Hot Plug                           [Disabled]                 +/-: Change Opt.
     Spin Up Device                     [Enabled]                  F1: General Help
     SATA Device Type                   [Hard Disk Drive]          F2: Previous Values
   Serial ATA Port 2                    Empty                      F3: Optimized Defaults
     Software Preserve                  Unknown                    F4: Save & Exit
     Port 2                             [Enabled]                  ESC: Exit
     Hot Plug                           [Disabled]
     Spin Up Device                     [Enabled]
     SATA Device Type                   [Hard Disk Drive]
```
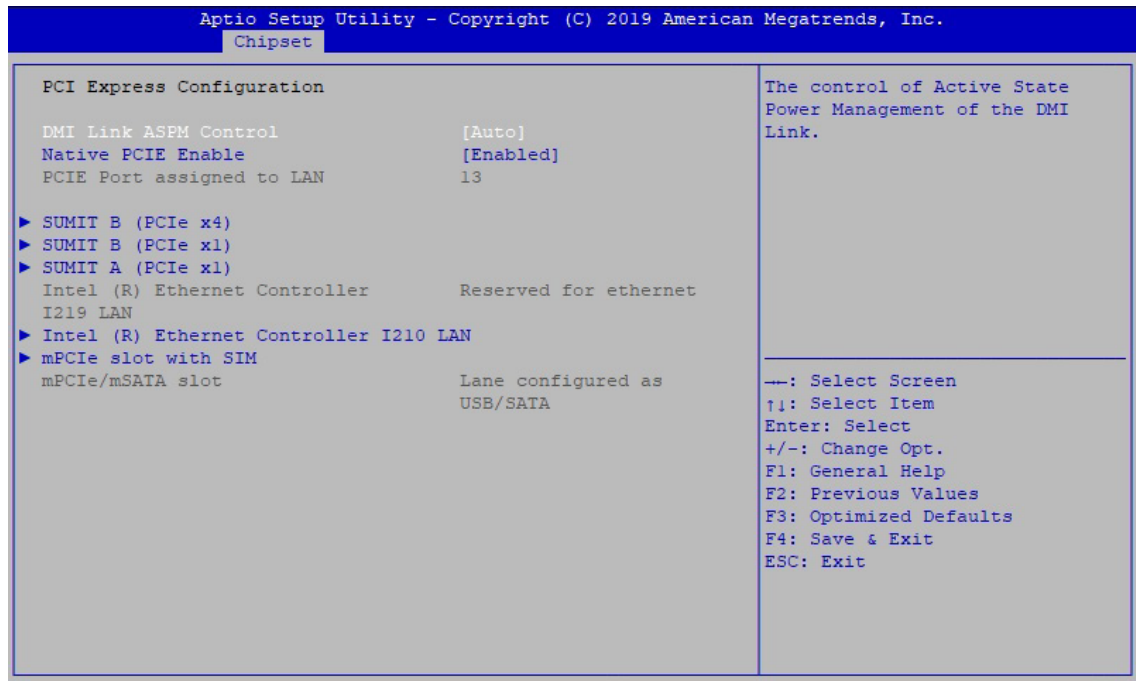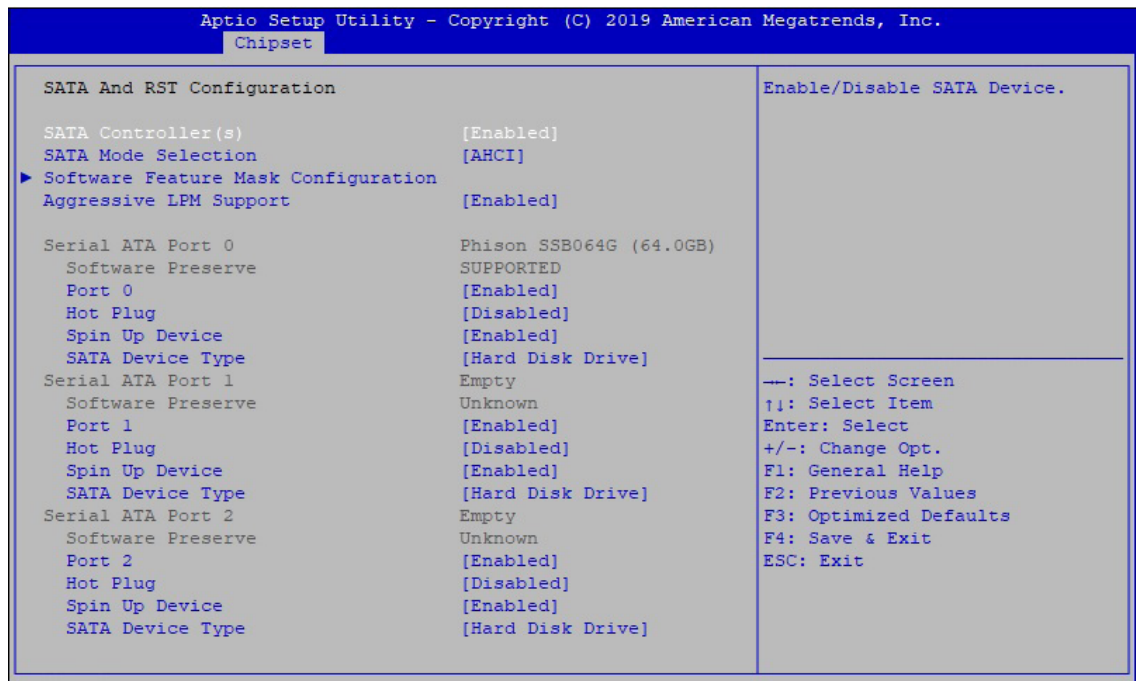
Figure 4-4-2-2 : SATA Devices Settings

SATA Controller(s)

Enable or disable SATA Device.

SATA Mode Selection

Determines how SATA controllers operate.

Software Feature Mask Configuration

RST Legacy OPROM/RST UEFI driver will refer to the SWFM configuration to enable/disable the storage features.

Aggressive LPM Support

Enable PCH to aggressively enter link power state.

Options for each SATA port.

Port n

Enable or disable SATA port.

Hot Plug

Designates this port as Hot Pluggable.

Spin Up Device

On an edge detect from 0 to 1, the PCH starts a COMRESET initialization sequence to the device.

SATA Device Type

Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.
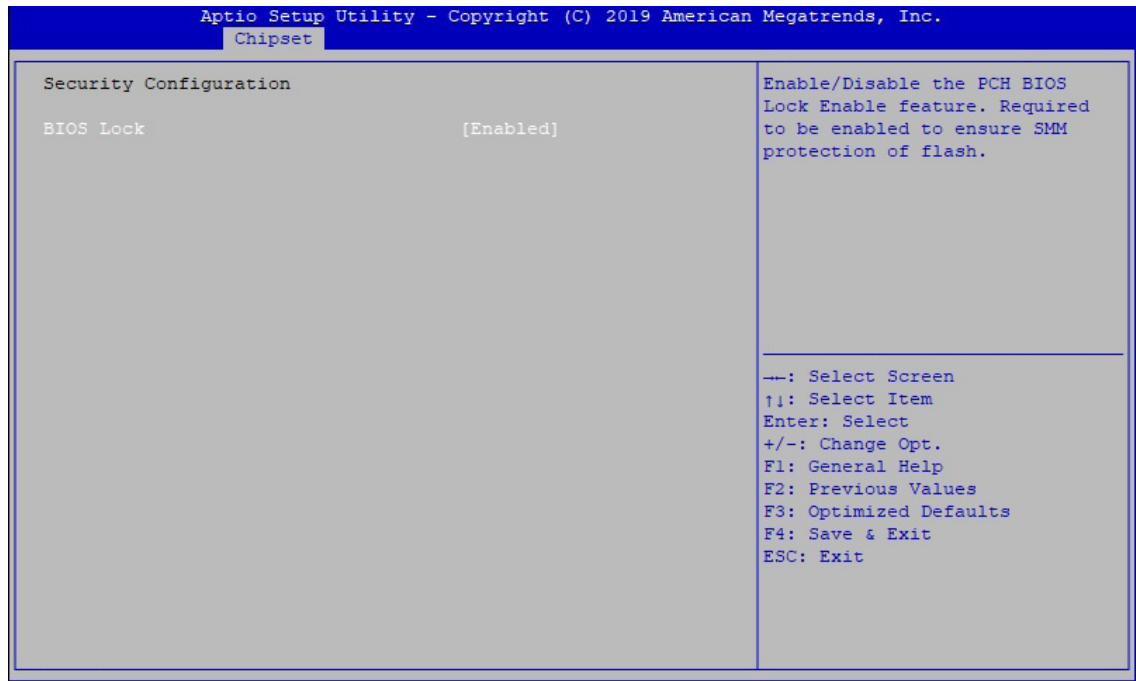
4.4.2.3 BIOS Security Configuration of PCH-IO

```
              Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
                 Chipset

  Security Configuration                                    Enable/Disable the PCH BIOS
                                                            Lock Enable feature. Required
  BIOS Lock                             [Enabled]           to be enabled to ensure SMM
                                                            protection of flash.




                                                            →←: Select Screen
                                                            ↑↓: Select Item
                                                            Enter: Select
                                                            +/-: Change Opt.
                                                            F1: General Help
                                                            F2: Previous Values
                                                            F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit


```

Figure 4-4-2-3 : BIOS Security Settings

BIOS Lock

Enable/disable the PCH BIOS lock enable (BLE bit) feature.

4.4.3 LVDS Configuration

```
              Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
                 Chipset

  LCD Resolution Control                                    Select LCD Panel Resolution
  LCD Panel Type                        [1024x768  LVDS]




                            ┌──── LCD Panel Type ────┐
                            │ 800x600   LVDS         │
                            │ 1024x600  LVDS         │
                            │ 1024x768  LVDS         │
                            │ 1280x800  LVDS         │
                            │ 1280x1024 LVDS         │
                            │ 1366x768  LVDS         │      →←: Select Screen
                            │ 1600x1200 LVDS         │      ↑↓: Select Item
                            │ 1920x1080 LVDS         │      Enter: Select
                            └────────────────────────┘      +/-: Change Opt.
                                                            F1: General Help
                                                            F2: Previous Values
                                                            F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit

```
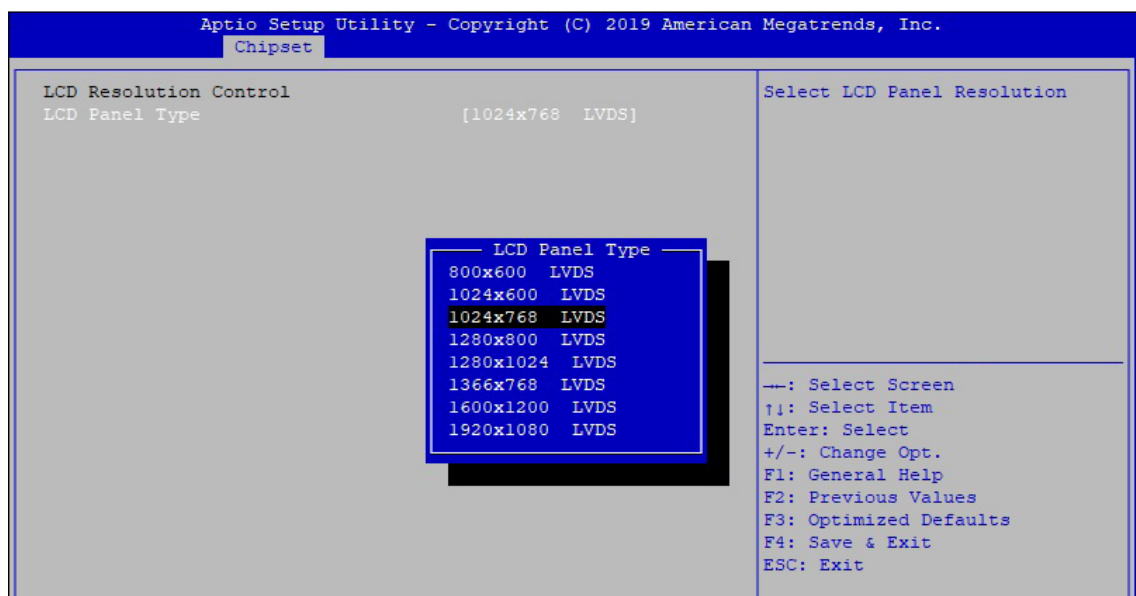
Figure 4-4-3 : LVDS Panel Settings

The LVDS Configuration option will be present if LVDS panel is connected on system.

LCD Panel Type
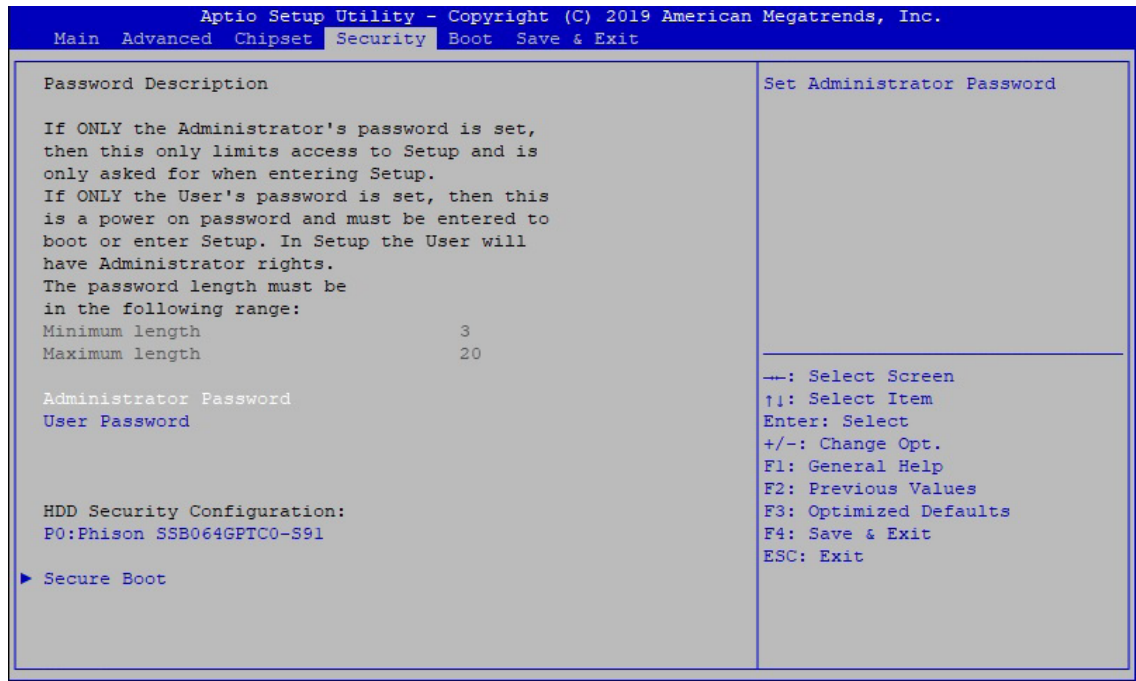
Select LCD Panel Resolution.

4.5 Security

```
              Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
       Main  Advanced  Chipset  Security  Boot  Save & Exit

    Password Description                                      Set Administrator Password

    If ONLY the Administrator's password is set,
    then this only limits access to Setup and is
    only asked for when entering Setup.
    If ONLY the User's password is set, then this
    is a power on password and must be entered to
    boot or enter Setup. In Setup the User will
    have Administrator rights.
    The password length must be
    in the following range:
    Minimum length                    3
    Maximum length                    20
                                                             →←: Select Screen
                                                             ↑↓: Select Item
    Administrator Password                                   Enter: Select
    User Password                                            +/-: Change Opt.
                                                             F1: General Help
                                                             F2: Previous Values
                                                             F3: Optimized Defaults
    HDD Security Configuration:                              F4: Save & Exit
    P0:Phison SSB064GPTC0-S91                                ESC: Exit

    ► Secure Boot
```

Figure 4-5 : BIOS Security Menu

Administrator Password

Set administrator password.

User Password

Set user password.

Secure Boot

Secure Boot configuration.

4.5.1 HDD Security Configuration
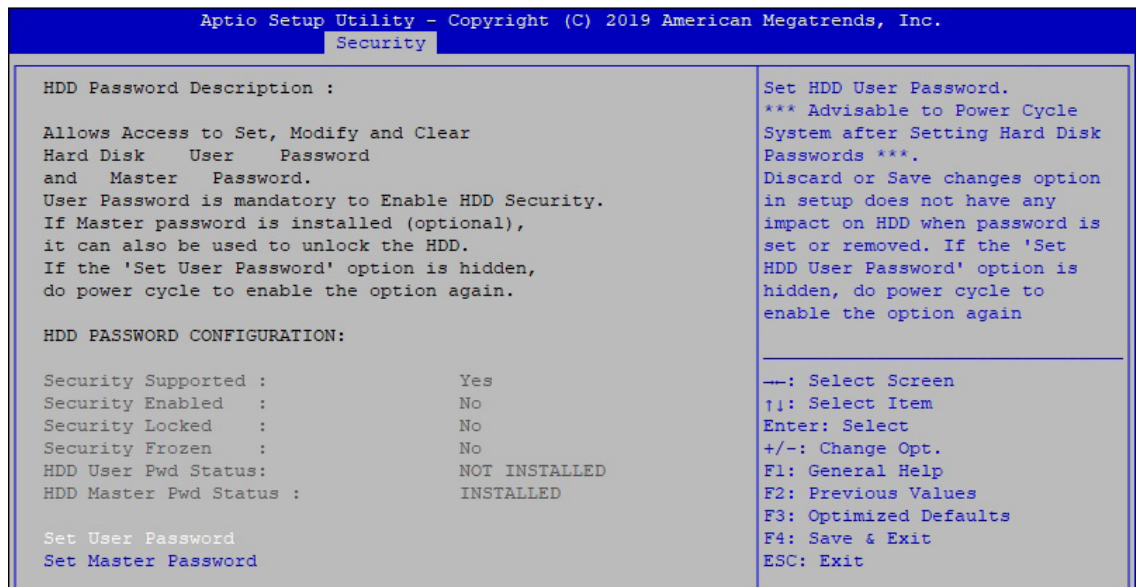
Figure 4-5-1 : HDD Security Settings

Set User Password

Set HDD user password.

*** Advisable to power cycle system after setting hard disk passwords ***.

Discard or save changes option in setup does not have any impact on HDD when password is set or removed. If the 'Set HDD User Password' option is gray, do power cycle to enable the option again.
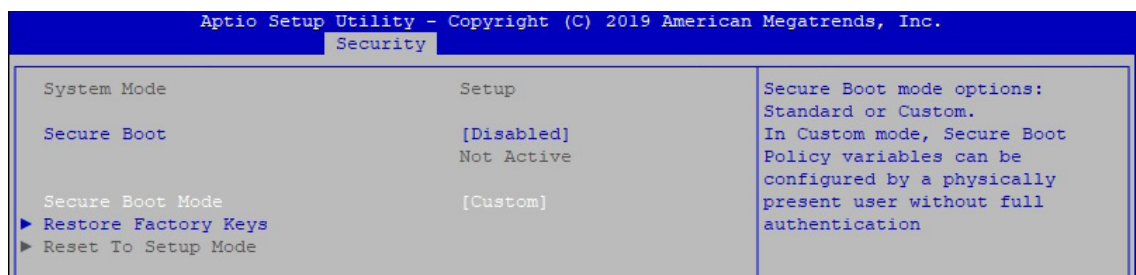
4.5.2 Security Boot

Figure 4-5-2 : Security Boot Settings

Secure Boot

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

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

Enables expert users to modify Secure Boot Policy variables without full authentication.

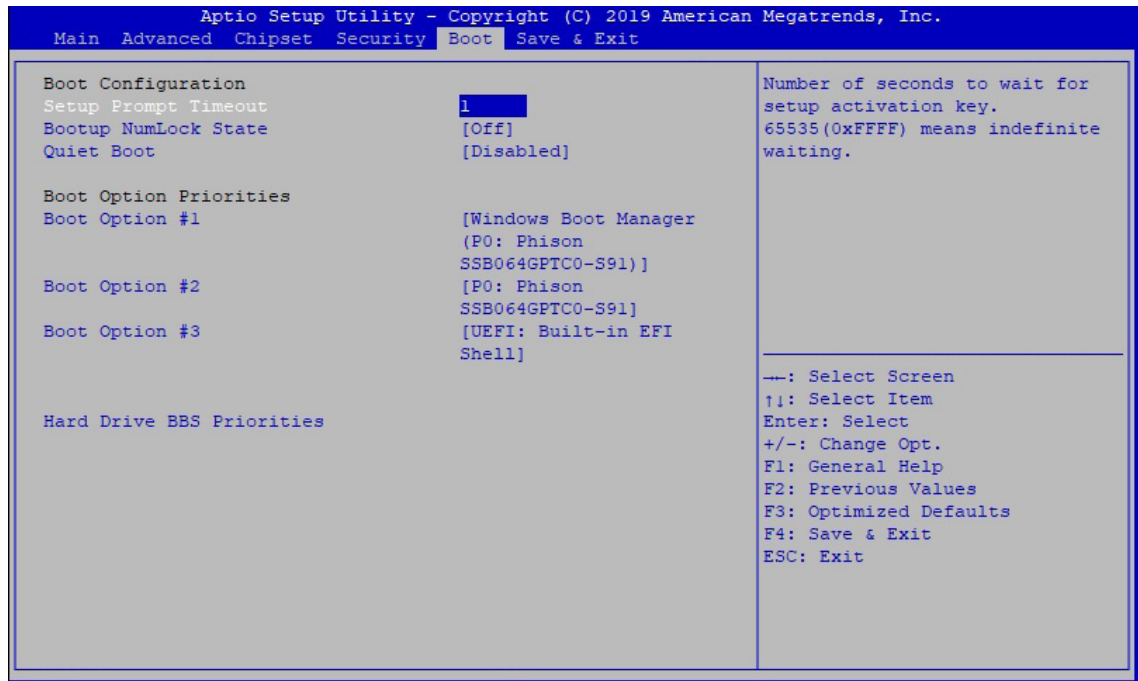## 4.6 Boot

```
              Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
     Main  Advanced  Chipset  Security  Boot  Save & Exit

     Boot Configuration                                         Number of seconds to wait for
     Setup Prompt Timeout            1                          setup activation key.
     Bootup NumLock State            [Off]                      65535(0xFFFF) means indefinite
     Quiet Boot                      [Disabled]                 waiting.

     Boot Option Priorities
     Boot Option #1                  [Windows Boot Manager
                                     (P0: Phison
                                     SSB064GPTC0-S91)]
     Boot Option #2                  [P0: Phison
                                     SSB064GPTC0-S91]
     Boot Option #3                  [UEFI: Built-in EFI
                                     Shell]
                                                                →←: Select Screen
                                                                ↑↓: Select Item
     Hard Drive BBS Priorities                                  Enter: Select
                                                                +/-: Change Opt.
                                                                F1: General Help
                                                                F2: Previous Values
                                                                F3: Optimized Defaults
                                                                F4: Save & Exit
                                                                ESC: Exit



```

Figure 4-6 : BIOS Boot Menu

Setup Prompt Timeout

Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

Bootup NumLock State

Select the keyboard NumLock state.

Quiet Boot

Enables or disables quiet boot option.

Boot Option #x

Sets the system boot order.

Hard Drive BBS Priorities

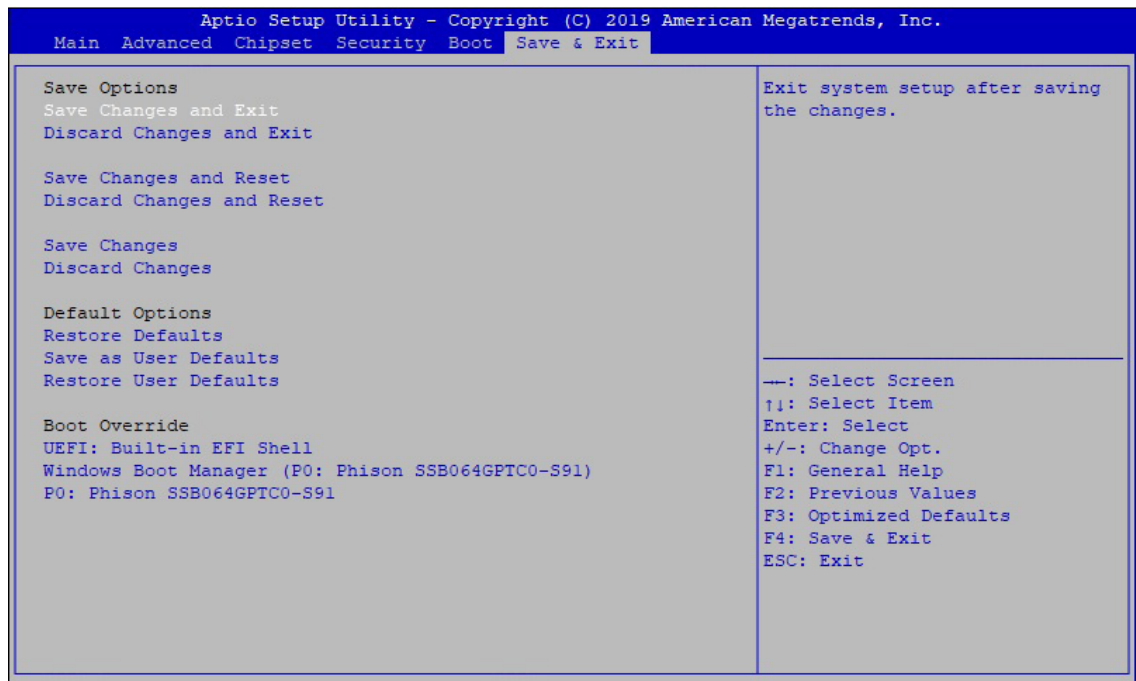Set the order of the legacy devices in this group.

4.7 Save & Exit

```
           Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
     Main  Advanced  Chipset  Security  Boot  Save & Exit

    Save Options                                              Exit system setup after saving
    Save Changes and Exit                                     the changes.
    Discard Changes and Exit

    Save Changes and Reset
    Discard Changes and Reset

    Save Changes
    Discard Changes

    Default Options
    Restore Defaults
    Save as User Defaults                                     ──: Select Screen
    Restore User Defaults                                     ↑↓: Select Item
                                                              Enter: Select
    Boot Override                                             +/-: Change Opt.
    UEFI: Built-in EFI Shell                                  F1: General Help
    Windows Boot Manager (P0: Phison SSB064GPTC0-S91)         F2: Previous Values
    P0: Phison SSB064GPTC0-S91                                F3: Optimized Defaults
                                                              F4: Save & Exit
                                                              ESC: Exit
```

Figure 4-7 : Save & Exit Menu

Save Changes and Exit

Exit system setup after saving the changes.

Discard Changes and Exit

Exit system setup without saving any changes.

Save Changes and Reset

Reset the system after saving the changes.

Discard Changes and Reset

Reset system setup without saving any changes.

Save Changes

Save changes done so far to any of the setup options.

Discard Changes

Discard changes done so far to any of the setup options.

Default Options :

Restore Defaults

Restore/load default values for all the setup options.

Save as User Defaults

Save the changes done so far as user defaults.

Restore User Defaults

Restore the user defaults to all the setup options.

A

APPENDIX A : Watchdog Function

A.1   Function Description

The RES-3000 offers a watchdog timer.

A.2   Software Package Contain

Distribution folder include x32 and x64 versions, use batch file for installation.
There are included as fallowed :
Win7_32.bat :
Installation for 32-bit driver
Win7_64.bat :
Windows update package which driver required
(need to restart), and Installation for 64-bit driver
Win8_32.bat, Win8_64.bat :
Installation for driver, and guideline to Framework 3.5
distribution for sample
Win10_32.bat, and Win10_64.bat :
Installation for driver, and installation to Framework 3.5
distribution for sample
Uninstall_32.bat, and Uninstall_64.bat :
Uninstallation for driver
Run batch file as Administrator.
Support Windows 7 above.
Make sure Windows version before installation.
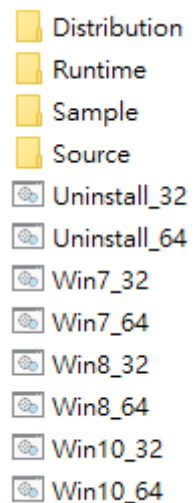
Runtime folder include head file for software developer or System Integration.
Sample folder include sample program, driver library, and API library.
Source folder include sample program source code that compile on Visual Studio 2008.

A.3 Sample

Sample folder include x32 and x64 versions, as shown below :
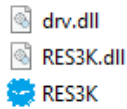
Sample RES3K.exe, as shown below :
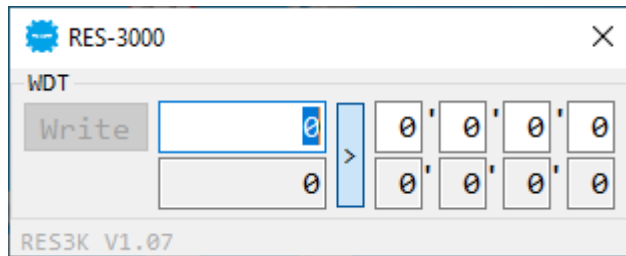
WDT group :
  Write button :
    Set WDT when WDT setup text is valid.
  Stop button :
    Cancel WDT and counting.
    Use after Write button action.
  WDT setup text :
    User setting, WDT value, unit : second.
    Use for Write button activate.
  WDT counting text (read only) :
    WDT counting by program timer after set WDT.
    Shown after Write button action.
  WDT setup day format texts (user setting) :
    User setting, WDT value, format : day'hour'minute'second.
  WDT counting day format text (read only) :
    WDT counting, format : day'hour'minute'second.

B

APPENDIX B : Software Functions

B.1 Driver API Guide

In Runtime folder, on RES3K.h :

_DLL_IMPORT_ definition is used on LoadLibrary API for RES3K.dll.
RES3K_EXPORTS definition is used on RES3K.dll building.

BOOL Initial (BYTE Isolate_Type, BYTE DIO_NPN)
Initial machine for DIO, watchdog timer, and POE
Isolate_Type : DIO type
1 : Isolated DIO;
0 : Non-Isolated DIO
DIO_NPN : DI/DO type
1 : PNP (Source) mode for European rule;
0 : NPN (Sink) mode for Japanese rule
Return :
TRUE (1) : Success;
FALSE (0) : Fail (Driver not exists, or initial error (version is too old, or machine not match))

BOOL GetWDT (DWORD *WDT)
Get watchdog timer setup
WDT : watchdog timer setup
Unit : second. (Range : 0 ~ 65535 sec, 1093 ~ 65535 min (=65580 ~ 3932100 sec))
Return :
TRUE (1) : Success;
FALSE (0) : Fail (Initial error, or call by pointer error, or hardware problem)

BOOL SetWDT (DWORD WDT)
Set watchdog timer setup
WDT : watchdog timer setup
Unit : second. (Range : 1 ~ 65535 sec, 1093 ~ 65535 min (=65580 ~ 3932100 sec))
Return :
TRUE (1) : Success;
FALSE (0) : Fail (Initial error, or setup 0 error, or hardware problem)

BOOL CancelWDT ()
Cancel watchdog timer
Return :
TRUE (1) : Success;
FALSE (0) : Fail (Initial error, or hardware problem)

C

APPENDIX C : RAID Functions

C.1 SATA Mode for RAID

Please select SATA Device to RAID mode on BIOS menu.
Advanced → SATA Configuration → SATA Mode Selection

Main	Advanced	Chipset	Boot	Security	Save & Exit
					Item Specific Help
SATA Controller(s)		[Enabled]			
SATA Model Selection		[AHCI]			

C.2 OS Installation

The system is featured with three SATA, include two internal SATA, 1 mSATA
You can select one of SATA ports for OS installation
We used internal SATA for Windows 10 OS installation as an example.

C.3 To Install All Device Drivers of the System

The instructions are as follows :
1. To install Chipset driver
2. To install VGA driver
3. To install ME driver (if available)
4. To install Network driver
5. To install Audio driver

C.4 To Install "Intel Rapid Storage Technology" Software

You can get the latest information and the software directly from Intel website.
http://www.intel.com/p/en_US/support/highlights/chpsts/imsm
The RAID environment has been done if you completed the steps above.

C.5 To Insert SATA HDD for RAID 1

Please notice, you can use three SATA ports for SATA storage devices.

C.6 To Create RAID Volume on "Rapid Storage Technology" Software

The system is featured with three SATA HDD's for RAID volume, so there are two options to choose on this page. Let's take RAID 1 as an example, select "RAID 1".
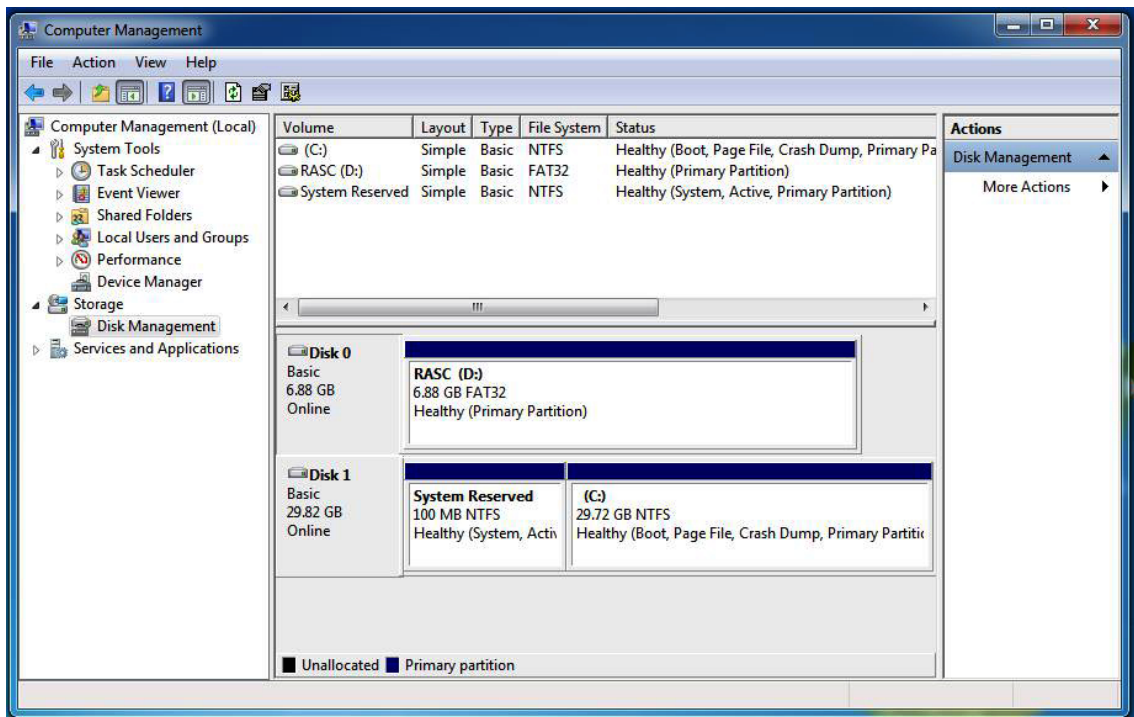
C.7 Disk Management : Partition the Disk

After RAID 1 volume created, you can see the figure of SATA device allocation.

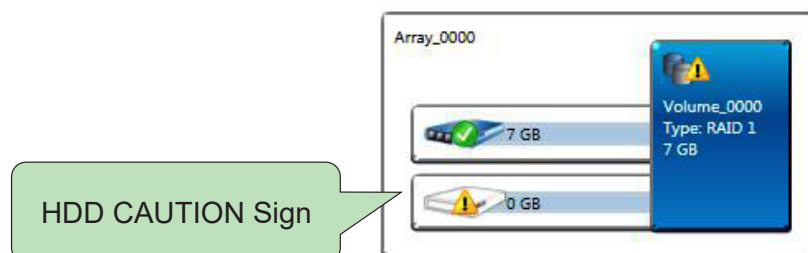You will find "Volume_0000" in SATA device at BIOS menu.
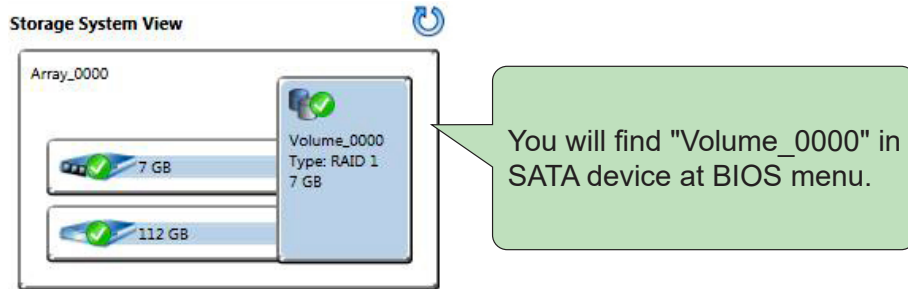
To start Disk Management tool and select "Initialize Disk".
Then add "Logical Device" for Windows access.

C.8 If One SATA HDD on RAID Volume is Out-of-use

After RAID 1 volume created, you can see the figure of SATA device allocation.

HDD CAUTION Sign

C.9 Recovery and Auto Re-build When Use the SAME RAID HDD
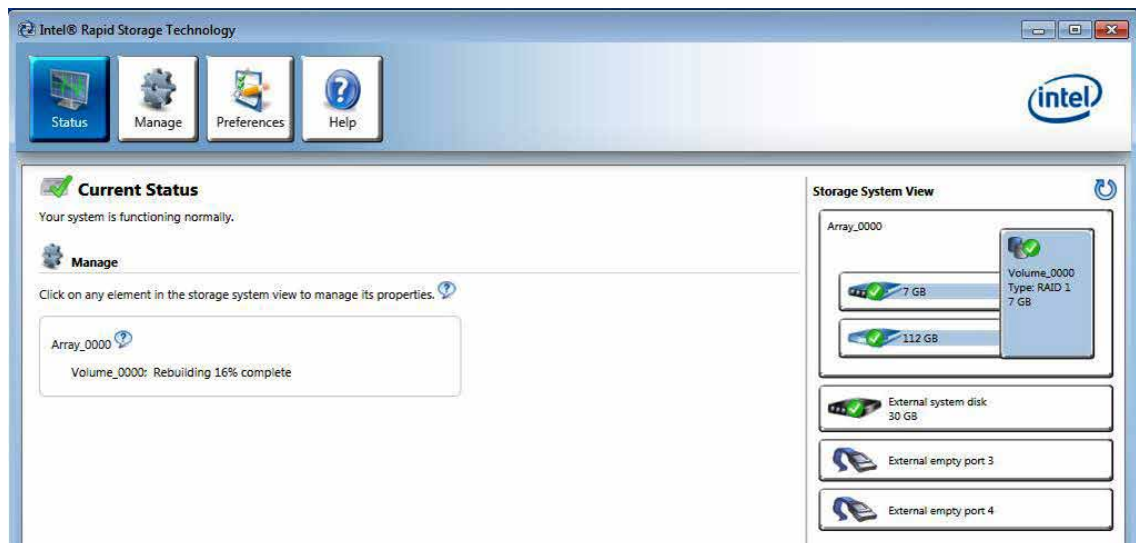
C.10 Recovery and Auto Re-build When Use DIFFERENT RAID HDD

There is a warning will pop-up to ask you if the disk is not a member of original RAID volume.

If you press "Rebuild", it will replace the broken SATA HDD to the last one SATA HDD of RAID volume.

D

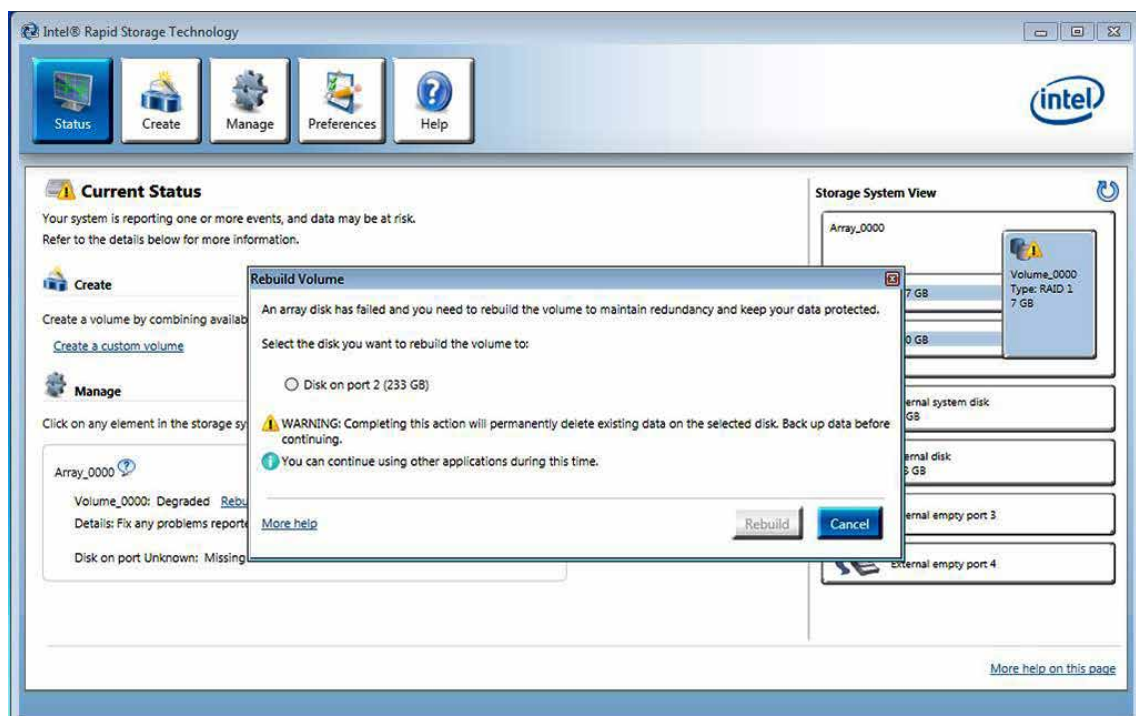## APPENDIX D : Power Consumption

Testing Board	RES-3000
RAM	8GB * 1
USB-1 (USB 3.0)	USB 3.0 Loopback Plug
USB-2 (USB 3.0)	USB 3.0 Loopback Plug
USB-3 (USB 3.0)	USB 3.0 Loopback Plug
USB-4 (USB 3.0)	USB 3.0 Loopback Plug
USB-5 (USB 2.0)	USB Mouse HP G1K28AA
USB-6 (USB 2.0)	USB Keyboard AOPEN CMS-730
USB-7 (USB 2.0)	Transcend JetFlash V60 USB 2.0 4GB
USB-8 (USB 2.0)	Kingston DataTraveler SE9 USB 2.0 8GB
SATA 0	Innodisk 3MG2-P DGS25-64GD81BC1QC 64GB
SATA 1	Transcend SSD370 TS64GSSD370 64GB
mPCIe 1	UMX-100
mPCIe 2	UMX-100
FAN	SUNON PF40281B1-Q000-S99
LAN1 (i219)	1.0 Gbps
LAN2 (i210)	1.0 Gbps
Graphics Output	DVI
Power Plan	Balance (Windows10 Power plan)
Power Source	Chroma 62006P-100-25

D.1 Intel® Core™ i7-8665UE 1.70GHz (8M Cache, up to 4.40GHz)

CPU	Power Input	Standby Mode		Power on and boot to Win 10 (64-bit)			
				Sleep Mode		idle status CPU usage less 3%	
		Max Current	Max Consumption	Max Current	Max Consumption	Max Current	Max Consumption
Core™ i7-8665UE	9V	0.425A	03.83W	0.497A	04.47W	1.382A	12.43W
	12V	0.325A	03.90W	0.378A	04.53W	1.155A	13.86W
	24V	0.189A	04.53W	0.215A	05.16W	0.522A	12.52W
	48V	0.122A	05.85W	0.132A	06.33W	0.324A	15.53W

CPU	Power Input	Power on and boot to Win10 (64-bit)			
		Run 100% CPU usage with 2D		Run 100% CPU usage with 3D	
		Max Current	Max Consumption	Max Current	Max Consumption
Core™ i7-8665UE	9V	2.240A	20.16W	4.270A	38.43W
	12V	1.678A	20.13W	3.300A	39.60W
	24V	0.836A	20.07W	1.645A	39.48W
	48V	0.455A	21.85W	0.847A	40.64W

** If more help is needed, please contact Vecow technical support.

D.2 Intel® Core™ i5-8365UE 1.60GHz (6M Cache, up to 4.10GHz)

| CPU | Power Input | Standby Mode | | Power on and boot to Win 10 (64-bit) | | | |
| | | | | Sleep Mode | | idle status CPU usage less 3% | |
		Max Current	Max Consumption	Max Current	Max Consumption	Max Current	Max Consumption
Core™ i5-8365UE	9V	0.415A	03.73W	0.485A	04.37W	1.465A	13.19W
	12V	0.318A	03.81W	0.370A	04.44W	1.082A	12.98W
	24V	0.188A	04.51W	0.214A	05.14W	0.577A	13.84W
	48V	0.121A	05.82W	0.134A	06.45W	0.306A	14.70W

| CPU | Power Input | Power on and boot to Win10 (64-bit) | | | |
| | | Run 100% CPU usage with 2D | | Run 100% CPU usage with 3D | |
		Max Current	Max Consumption	Max Current	Max Consumption
Core™ i5-8365UE	9V	2.137A	19.23W	3.744A	33.70W
	12V	1.646A	19.76W	2.832A	33.99W
	24V	0.802A	19.24W	1.395A	33.49W
	48V	0.436A	20.93W	0.725A	34.81W

D.3 Intel® Core™ i3-8145UE 2.20GHz (4M Cache, up to 3.90GHz)

CPU	Power Input	Standby Mode		Power on and boot to Win 10 (64-bit)			
				Sleep Mode		idle status CPU usage less 3%	
		Max Current	Max Consumption	Max Current	Max Consumption	Max Current	Max Consumption
Core™ i3-8145UE	9V	0.416A	03.74W	0.485A	04.37W	1.429A	12.86W
	12V	0.317A	03.80W	0.368A	04.42W	1.054A	12.65W
	24V	0.185A	04.44W	0.211A	05.05W	0.543A	13.03W
	48V	0.120A	05.76W	0.133A	06.37W	0.334A	16.05W

CPU	Power Input	Power on and boot to Win10 (64-bit)			
		Run 100% CPU usage with 2D		Run 100% CPU usage with 3D	
		Max Current	Max Consumption	Max Current	Max Consumption
Core™ i3-8145UE	9V	2.040A	18.36W	3.601A	32.41W
	12V	1.578A	18.93W	2.666A	31.99W
	24V	0.787A	18.88W	1.348A	32.35W
	48V	0.414A	19.86W	0.698A	33.49W

E

APPENDIX E : Supported Memory & Storage List

E.1 Test Item

Testing Board	RES-3000
Memory Test	MemTest86 V8.2
BurnIn Test	BurnInTest Pro V8.1 (build 1025)

Channel	Memory Test	Burn-in Test	Flash BIOS	Remove Battery	Sleep	Hibernate	Reset	CPU-Z
*1(DIMM 1)	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

E.2 Supported Non-ECC Memory List

Brand	Info	Test Temp.(Celsius)
innodisk 4GB DDR4-2400 SODIMM	M4S0-4GSSN5SJ-H03	25ºC
innodisk 16GB DDR4-2400 SODIMM	M4S0-AGS1OCSJ-H03	25ºC
innodisk 4GB DDR4-2666 SODIMM	M4S0-4GSSNCIK-H03	25ºC
innodisk 4GB DDR4-2666 SODIMM	M4S0-4GSSN5IK-H03	25ºC
innodisk 8GB DDR4-2666 SODIMM	M4S0-8GS1N5IK-H03	25ºC
innodisk 8GB DDR4-2666 SODIMM	M4S0-8GS1NCIK-H03	25ºC
innodisk 8GB DDR4-2666 SODIMM	M4S0-8GSSOCIK-H03	25ºC
innodisk 16GB DDR4-2666 SODIMM	M4S0-AGS1OCIK-H03	25ºC
innodisk 16GB DDR4-2666 SODIMM	M4S0-AGS1O5IK-H03	25ºC
SL-Link 16GB DDR4-2666 SODIMM	J4AGSH1G8QHFC	25ºC
SL-Link 32GB DDR4-2666 SODIMM	J4BGSS2G8QHXI	25ºC

E.3 Supported Storage List

Type	Brand	Model	Capacity
mSATA	Intel	Intel-310 SSDMAEMC080G2	80GB
	Kingston	SUV500MS	120GB
SATA SSD	Transcend	SSD370 TS64GSSD370	64GB
	innodisk	3MG2-P DGS25-64GD81BC1QC	64GB
	Kingston	SA400S371120G	120GB
	Intel	SSD E 5400s SSDSC2KR120H6	120GB
	MEMXPRO	M3A MI3MA1212802WN	128GB
	FORESEE	S903S128G	128GB
	FORESEE	S903S256G	256GB
	LITE-ON	K8-L1256	256GB
	LITE-ON	K8-L1512	512GB

F

APPENDIX F : Install Win11 (BIOS TPM Setting)

Step 1 Click on "Advanced", then click on "PCH-FW Configuration"

```
         Aptio Setup Utility - Copyright (C) 2022 American Megatrends, Inc.
    Main  Advanced  Chipset   Security  Boot  Save & Exit

 ▶ CPU Configuration                                    Configure Management Engine
 ▶ Power & Performance                                  Technology Parameters
 ▶ PCH-FW Configuration
 ▶ Trusted Computing
 ▶ ACPI Settings
 ▶ SMART Settings
 ▶ IT8786 Super IO Configuration
 ▶ Hardware Monitor
 ▶ Serial Port Console Redirection
 ▶ Intel TXT Information
 ▶ Acoustic Management Configuration
 ▶ PCI Subsystem Settings
 ▶ Network Stack Configuration
 ▶ CSM Configuration                                    →←: Select Screen
 ▶ USB Configuration                                    ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt
```
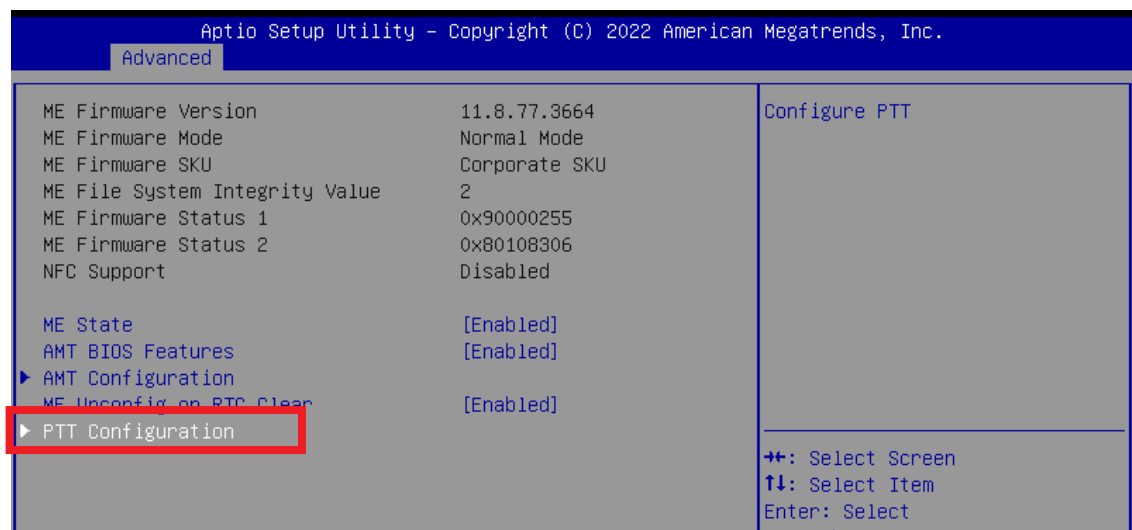
Step 2 Click on "PTT Configuration"

```
         Aptio Setup Utility - Copyright (C) 2022 American Megatrends, Inc.
      Advanced

  ME Firmware Version           11.8.77.3664            Configure PTT
  ME Firmware Mode              Normal Mode
  ME Firmware SKU               Corporate SKU
  ME File System Integrity Value  2
  ME Firmware Status 1          0x90000255
  ME Firmware Status 2          0x80108306
  NFC Support                   Disabled

  ME State                      [Enabled]
  AMT BIOS Features             [Enabled]
 ▶ AMT Configuration
  ME Unconfig on RTC Clear      [Enabled]
 ▶ PTT Configuration
                                                        →←: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt
```

Step 3 Click on "dTPM" (TPM Device Selection)
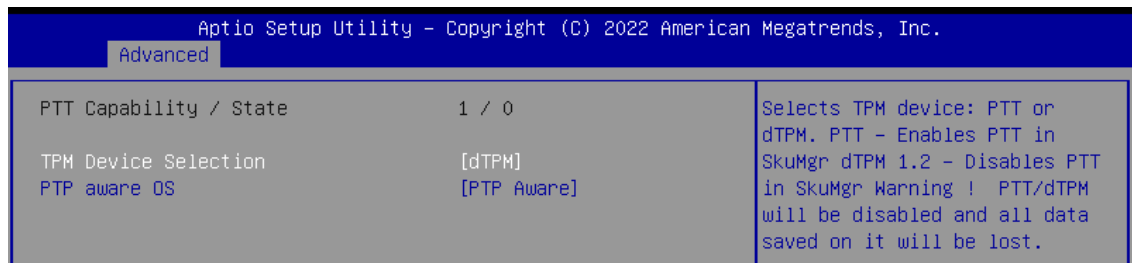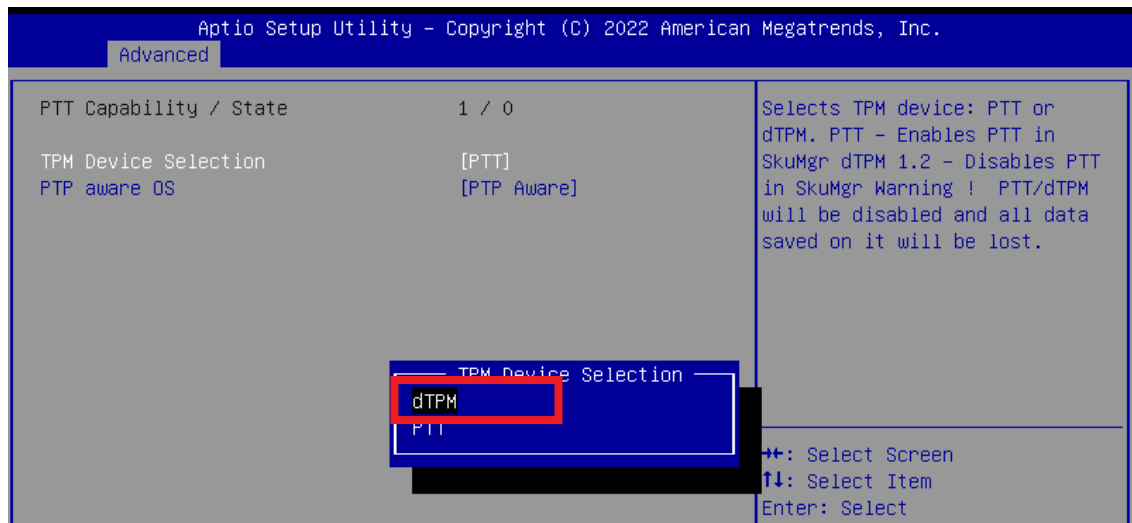
Step 4 Please save the BIOS settings by pressing F4. Please press Enter when the pop-up window which asks "Save configuration and exit?" appears. The computer will then restart.

Step 5 Click on "Trusted Computing"

```
         Aptio Setup Utility - Copyright (C) 2022 American Megatrends, Inc.
     Main  Advanced  Chipset  Security  Boot  Save & Exit

   ▶ CPU Configuration                                    Trusted Computing Settings
   ▶ Power & Performance
   ▶ PCH-FW Configuration
   ▶ Trusted Computing
   ▶ ACPI Settings
   ▶ SMART Settings
   ▶ IT8786 Super IO Configuration
   ▶ Hardware Monitor
   ▶ Serial Port Console Redirection
   ▶ Intel TXT Information
   ▶ Acoustic Management Configuration
   ▶ AMI Graphic Output Protocol Policy
   ▶ PCI Subsystem Settings
   ▶ Network Stack Configuration                          →←: Select Screen
   ▶ CSM Configuration                                    ↑↓: Select Item
   ▶ USB Configuration                                    Enter: Select
```
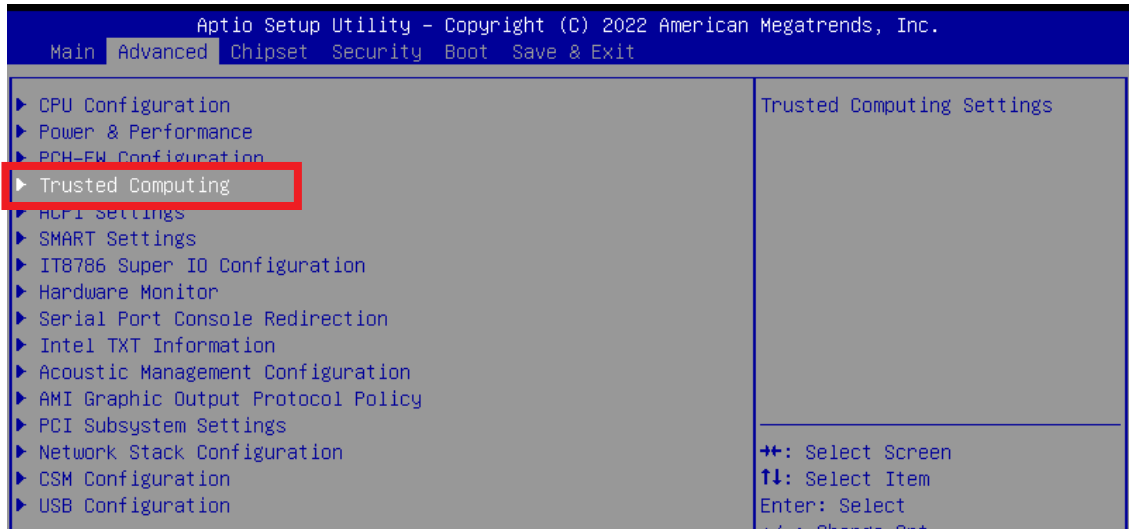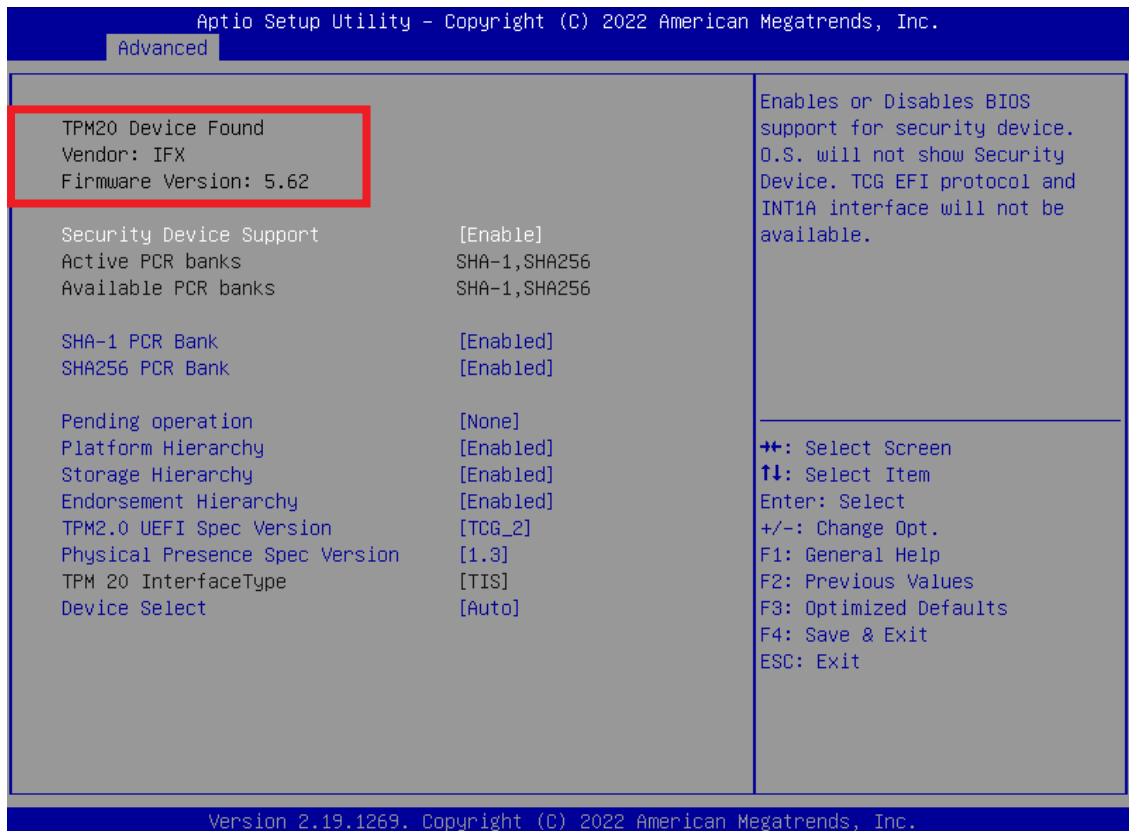
Step 6 If the window shows "TPM2.0 Device Found Firmware Version:5.62", then the setting is completed.

```
         Aptio Setup Utility - Copyright (C) 2022 American Megatrends, Inc.
     Advanced

                                                           Enables or Disables BIOS
     TPM20 Device Found                                    support for security device.
     Vendor: IFX                                           O.S. will not show Security
     Firmware Version: 5.62                                Device. TCG EFI protocol and
                                                           INT1A interface will not be
                                                           available.
     Security Device Support        [Enable]
     Active PCR banks               SHA-1,SHA256
     Available PCR banks            SHA-1,SHA256

     SHA-1 PCR Bank                 [Enabled]
     SHA256 PCR Bank                [Enabled]

     Pending operation              [None]
     Platform Hierarchy             [Enabled]               →←: Select Screen
     Storage Hierarchy              [Enabled]               ↑↓: Select Item
     Endorsement Hierarchy          [Enabled]               Enter: Select
     TPM2.0 UEFI Spec Version       [TCG_2]                 +/-: Change Opt.
     Physical Presence Spec Version [1.3]                   F1: General Help
     TPM 20 InterfaceType           [TIS]                   F2: Previous Values
     Device Select                  [Auto]                  F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit

         Version 2.19.1269. Copyright (C) 2022 American Megatrends, Inc.
```

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