RES-5000 USER Manual

Intel® Core™ i7 SoC IP67 Rugged Embedded System
Waterproof M12 Connectors, Fanless -40°C to 70°C Extended Temperature

Vecow

1.0.0 Edition 20240830

Record of Revision

Version	Date	Page	Description	Remark
1.00	2024/08/30	All	Official Release	

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Declaration of Conformity

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.

CE

The products described in this manual comply with all applicable European Union (CE) directives if it has a CE marking. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques.

Copyright and Trademarks

Order Information

Model Name	LAN		COM	USB 3.0	DP
	2.5G	1G			
RES-5000-1185G7E	1	1	2	2	2

Order Accessories

Part Number	Description
DDR4 32G	Certified DDR4 32GB 3200MHz RAM
DDR4 16G	Certified DDR4 16GB 3200MHz RAM
DDR4 8G	Certified DDR4 8GB 3200MHz RAM
DDR4 4G	Certified DDR4 4GB 3200MHz RAM
PWA-120W1	120W, 24V, 90V AC to 264V AC Power Adapter with 3-pin Terminal Block
M.2 Storage Module	M.2 Key B Storage Module
IP67 USB Cable	IP67 Rated USB Cable, 2M
IP67 DisplayPort Cable	IP67 Rated DisplayPort Cable, 2M
IP67 Ethernet Cable	IP67 Rated Ethernet Cable, M12 to RJ45, 2M
IP67 COM Cable	IP67 Rated COM Cable, M12 to DB9, 2M
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

The Vecow RES-5000, an IP67-certified rugged embedded system, is designed for extreme environments. Powered by Intel® Core™ i7-1185G7E processor, it offers exceptional CPU performance with up to 15W TDP. Enhanced with Intel® vPro, TSN, TCC, and TPM 2.0 technologies, the RES-5000 delivers robust manageability and performance for diverse edge AI applications.

The RES-5000 is equipped with reliable connectivity options, including dual X-code M12 LAN ports and dual A-coded M12 COM RS-232/422/485 ports, all within an IP67-rated enclosure, making it ideal for AI deployments in harsh conditions.

With power range of 9V to 55V, ignition power control for industrial-grade stability, and a fanless design capable of operating in temperatures from -40°C to 70°C, the RES-5000 is perfectly suited for applications in irrigation systems, smart factories, outdoor automation, and more.

1.2 Features

- Onboard Intel® Core™ i7-1185G7E processor delivers high power CPU productivity, up to 15W TDP
- High-reliable IP67 protection
- Rugged connections : 2 X-coded M12 LAN, 2 A-coded M12 COM RS-232/422/485, 2 USB3
- Intel® vPro, TSN, TCC, and TPM 2.0 supported
- DC 9V to 55V wide range power input, Ignition Power Control
- Fanless -40°C to 70°C Operating Temperature
- Optional supports waterproof antenna for 5G/WiFi/4G/LTE
- Optional VHub One-Stop AIoT Solution Service supports OpenVINO based AI accelerator and advanced Edge AI applications

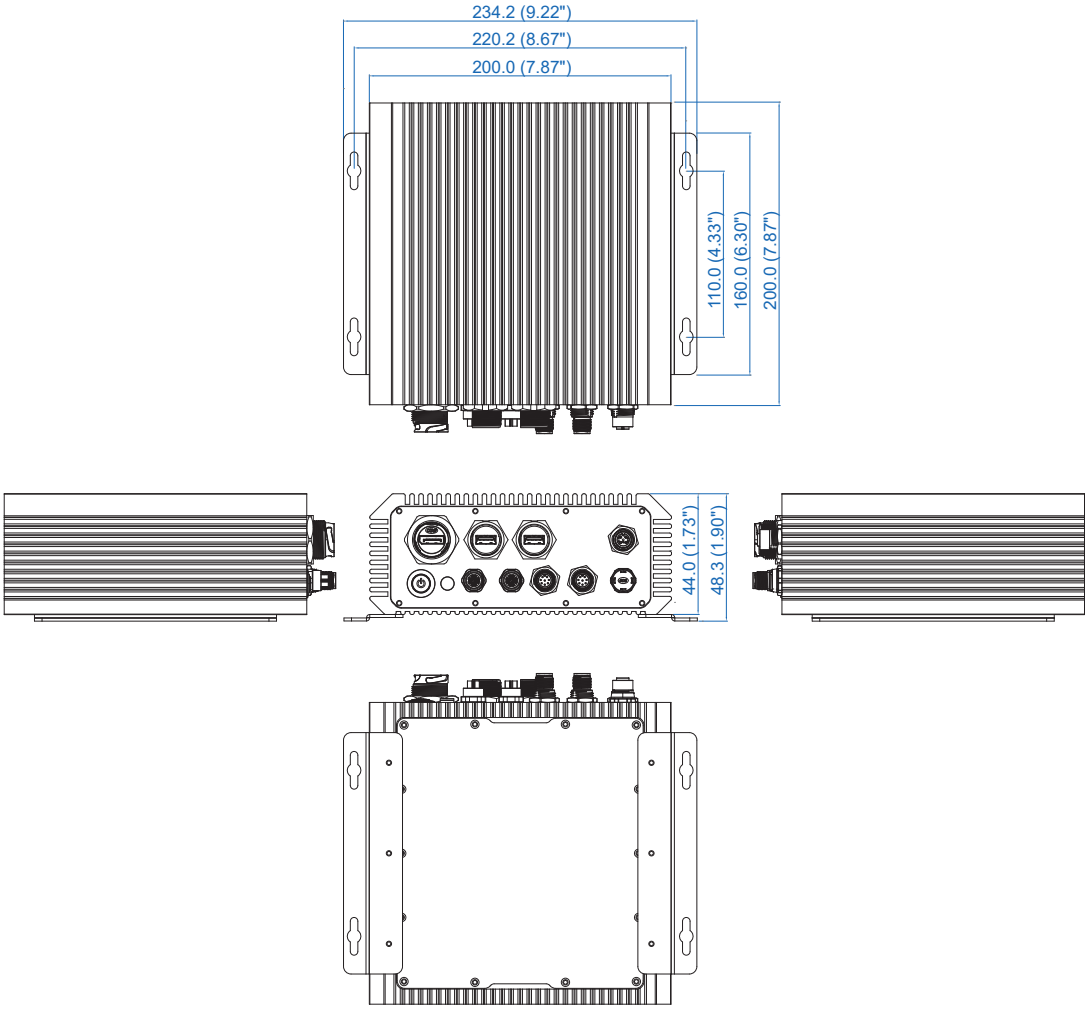
1.3 Product Specification

System	
Processor	Onboard Intel® Core™ i7-1185G7E Processor (Tiger Lake UP3)
Chipset	Intel® SoC
BIOS	AMI
SIO	IT8786E
Memory	1 DDR4 3200MHz SO-DIMM, up to 32GB
OS	Windows 11, Windows 10, Linux
I/O Interface	
Serial	2 COM RS-232/422/485, A-coded M12 Connector
USB	2 USB 3.1 Gen 2, IP67 Waterproof USB Type-A
LED	Power, HDD
Display	IP67 Waterproof DisplayPort : Up to 4096 x 2304 @60Hz
Storage	
SATA	1 SATA III (6Gbps)
M.2	1 M.2 Key B Socket (2260/2242, PCIex2)
Storage Device	• 1 Internal 2.5" SSD/HDD Bracket • 1 M.2 Key B Socket

Ethernet	
LAN 1	Intel® I219LM GigE LAN supports iAMT, X-coded M12 Connector
LAN 2	Intel® I225 2.5GigE LAN supports TSN, X-coded M12 Connector
Power	
Power Input	9V to 55V, DC-in
Power/IGN Interface	A-coded M12 4-pin Connector
Ignition Control	16-mode Ignition Control
Power Switch	IP67 Waterproof Power Button
Others	
TPM	Infineon SLB9670 supports TPM 2.0, SPI Interface
Watchdog Timer	Reset : 1 to 255 sec./min. per step
HW Monitor	Monitoring temperature, voltages. Auto throttling control when CPU overheats.
Mechanical	
Dimension (W x L x H)	200mm x 200mm x 80mm (7.87" x 7.87" x 3.32")
Weight	2.4kg (5.29lb)
Mounting	Wallmount by mounting bracket
Environment	
Operating Temperature	-40°C to 70°C (-40°F to 158°F)
Storage Temperature	-55°C to 85°C (-67°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 Mechanical Dimensions

Unit: mm (inch)



2

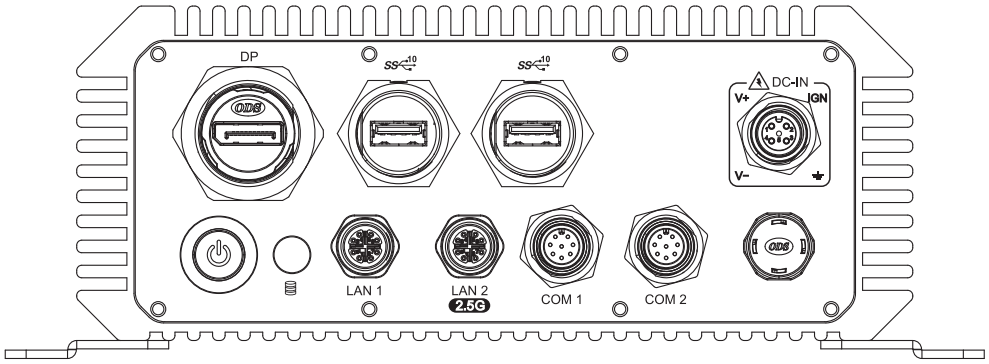
GETTING TO KNOW YOUR RES-5000

2.1 Packing List

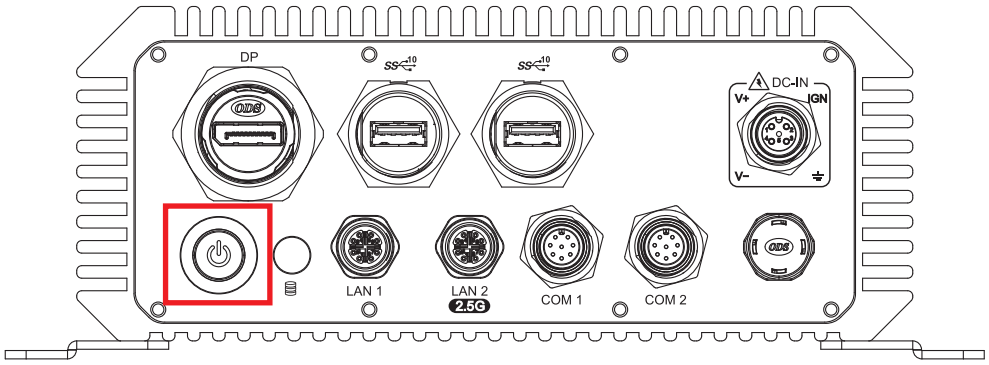
Item	Description	Qty
1	RES-5000 Rugged Embedded System (According to the configuration you order, the RES-5000 series may contain SSD/HDD and DDR4 SO-DIMM. Please verify these items if necessary.)	1

Item	Description	Outlook	Usage	P/N	Qty
1	Terminal block 3-pin (5.0mm)		DC	51-2411R03-S1E	1
2	Terminal block 2-pin(5.0mm)		IGN	51-2411R02-S1B	1
3	M12 DC Cable with IGN		DC/IGN	61-1CB0002-000	1
4	PH-M3x6L black		Fast Wall Mount to system	53-2450000-218	6
5	Wall Mount RES-5000		Wall Mount	62-00P1540-03A	2

2.2 Front Panel I/O Functions



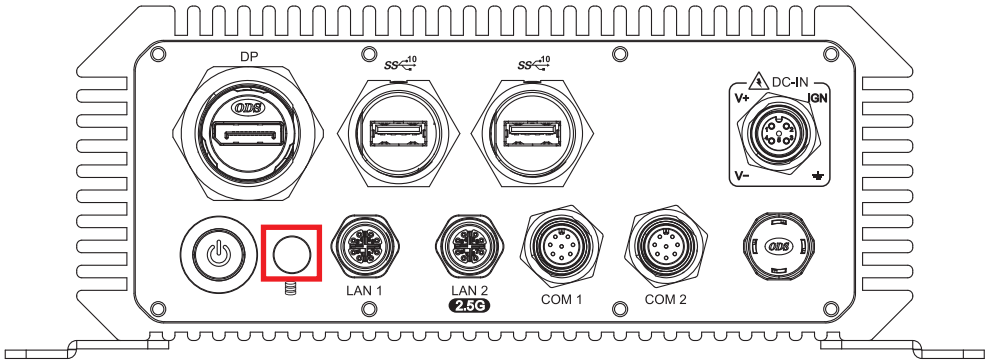
2.2.1 Power Button



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)

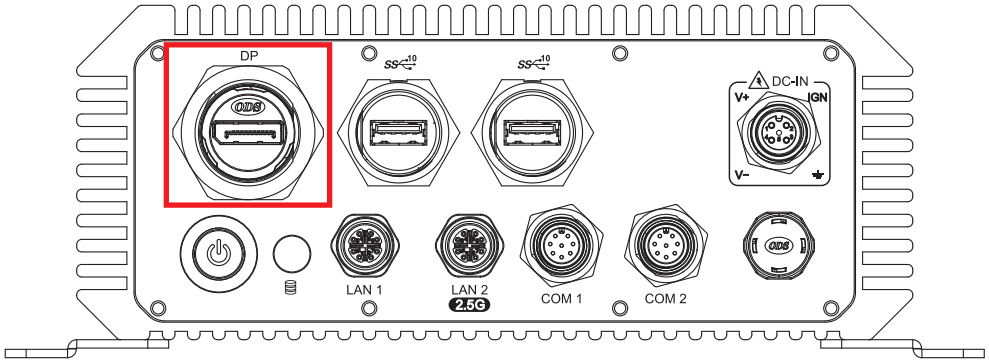
2.2.2 HDD LED Indicator



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.

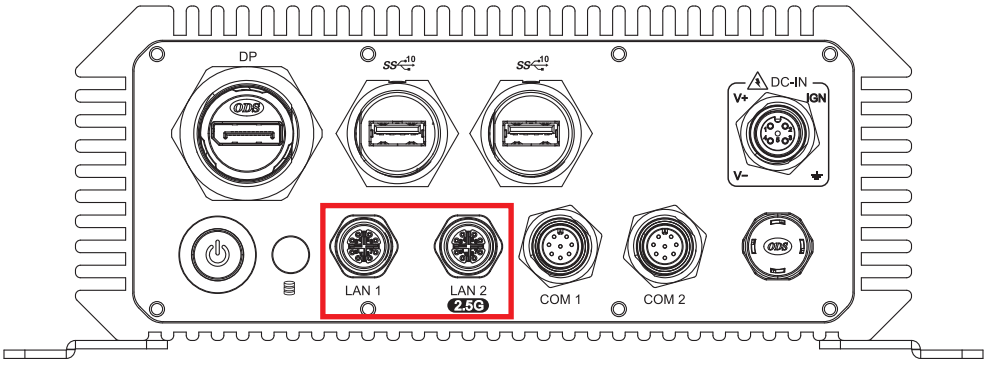
LED Color	Power Status	System Status
Orange	HDD	• On/Off : Storage status, function or not. • Twinkling : Data transferring.

2.2.3 Display port Connector



The Displayport connector on the front panel supports up to 4096 x 2304 pixels resolution at 60 Hz.

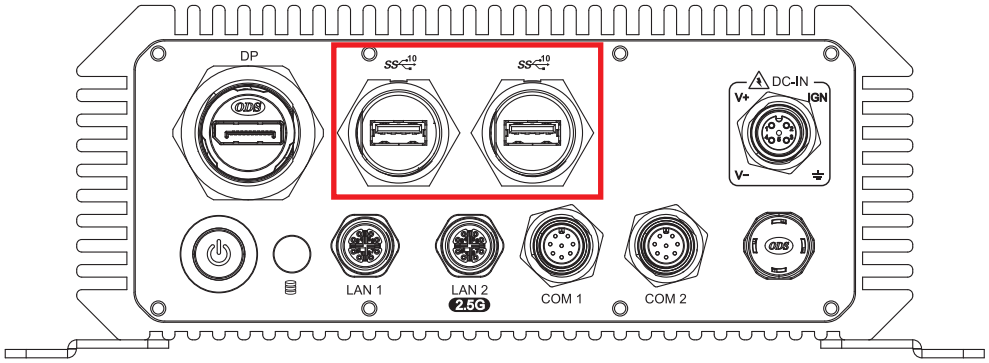
2.2.4 10/ 100/ 1000 /2500 Mbps Ethernet Port



There are 2 M12 jacks in the front side. Which LAN 1 is powered by Intel I219-LM Ethernet engine supporting 10/100/1000 Mbps and LAN 2 is powered by Intel i225-IT supporting 100/1000/2500 Mbps . When both LAN 1 and LAN 2 work in normal status, LAN1 iAMT 11.0 and LAN2 TSN 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:

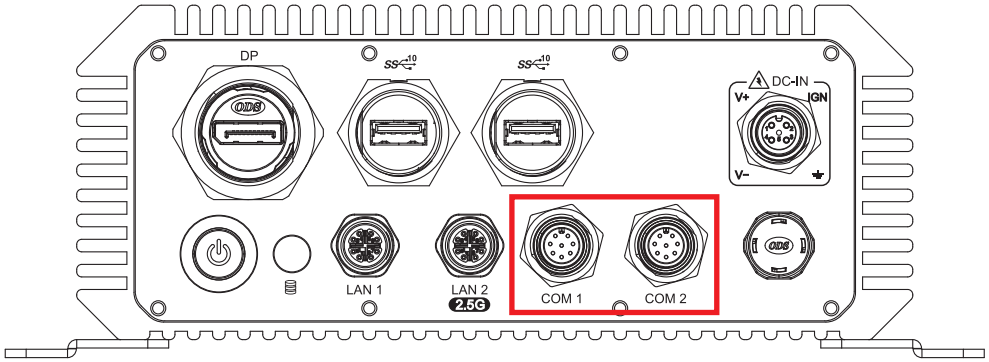
Pin No.	LAN1	LAN2
1	LAN0_MDI_1P	LAN1_MDI_1P
2	LAN0_MDI_1P	LAN1_MDI_1P
3	LAN0_MDI_2N	LAN1_MDI_2N
4	LAN0_MDI_2P	LAN1_MDI_2P
5	LAN0_MDI_4P	LAN1_MDI_4P
6	LAN0_MDI_4N	LAN1_MDI_4N
7	LAN0_MDI_3N	LAN1_MDI_3N
8	LAN0_MDI_3P	LAN1_MDI_3P

2.2.5 USB 3.2 Connector

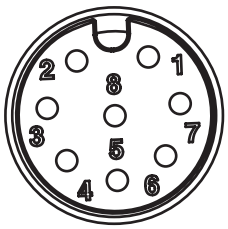


There are 2 USB 3.2 Gen2 connections available supporting up to 10GB per second data rate in the front side of RES-5000. They are also compliant with the requirements of SuperSpeed (SS), high speed (HS), full speed (FS) and low speed (LS)

2.2.6 Serial Port COM 1 and COM 2

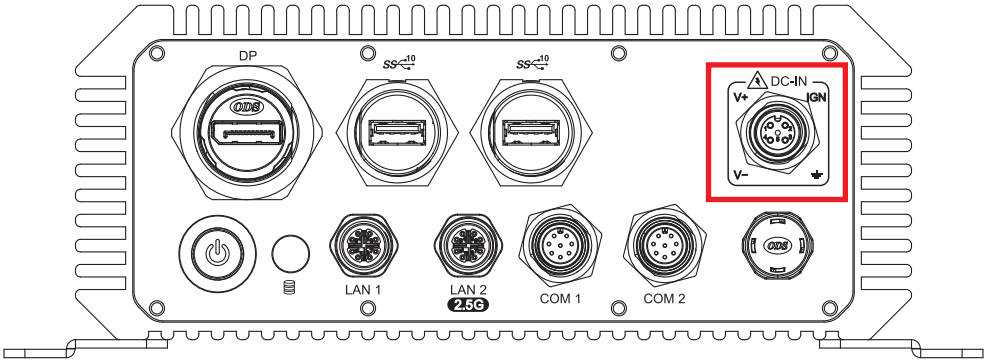


Serial port COM1 and COM2 can be configured for RS-232, RS-422, or RS-485 with auto flow control communication. The default definition of COM 1 and COM 2 is RS-232, if you want to change to RS-422 or RS-485, you can find the setting in BIOS.
The pin-outs of COM1 and COM2 are listed as follows:

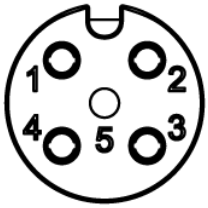


Serial Port	Pin No.	RS-232	RS-422 (5-wire)	RS-485 (3-wire)
COM1 COM2	1	DCD	TXD-	DATA-
	2	RXD	TXD+	DATA+
	3	TXD	RXD+	----------
	4	DTR	RXD-	----------
	5	DSR	----------	----------
	6	RTS	----------	----------
	7	CTS	----------	----------
	8	GND	GND	GND

2.2.7 DC In Connector



This system supports 9V to 55V DC power input by M12 DC Cable in the front side.



The pin-outs of DC-IN M12 are listed as follows:

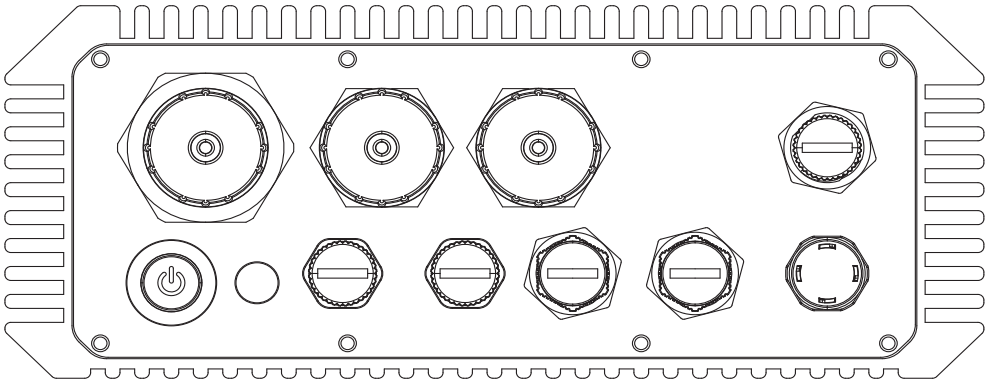
Pin No.	DC-IN	Pin No.	DC-IN
1	VIN	4	GND
2	IGN	5	NC
3	GND		

3

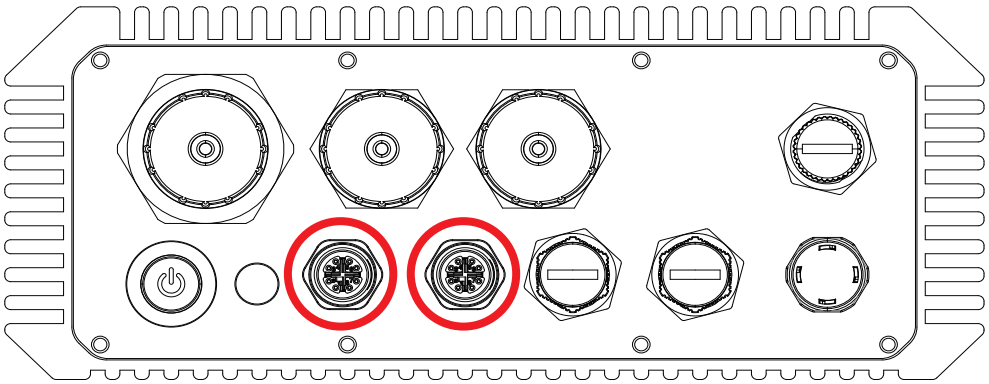
SYSTEM SETUP

3.1 How to Use Your RES-5000

Step 1 Remove waterproof cap.



Step 2 Confirm connector pin defined.(Example LAN)

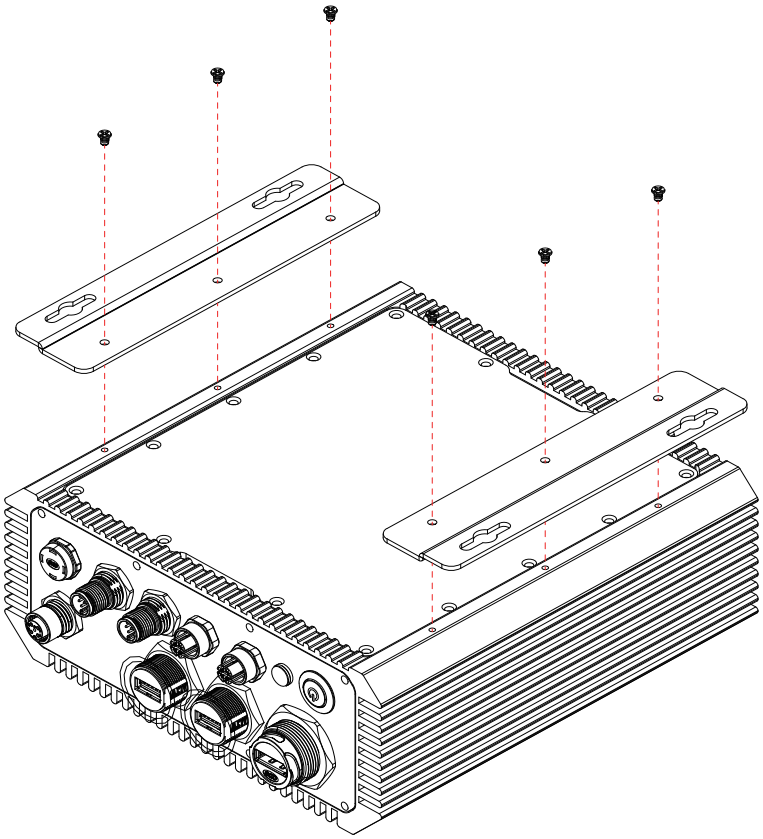


Step 3 Confirm wire.

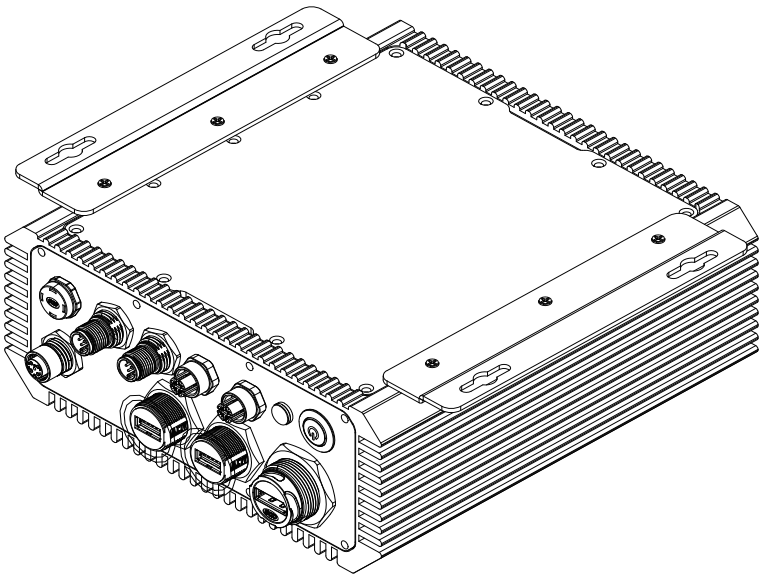
Step 4 Turn wire connector.

3.2 Mount Your RES-5000

Step 1 Fasten six PH-M3x6L screws.



Step 2 Finish.



4

BIOS SETUP

4.1 BIOS Settings

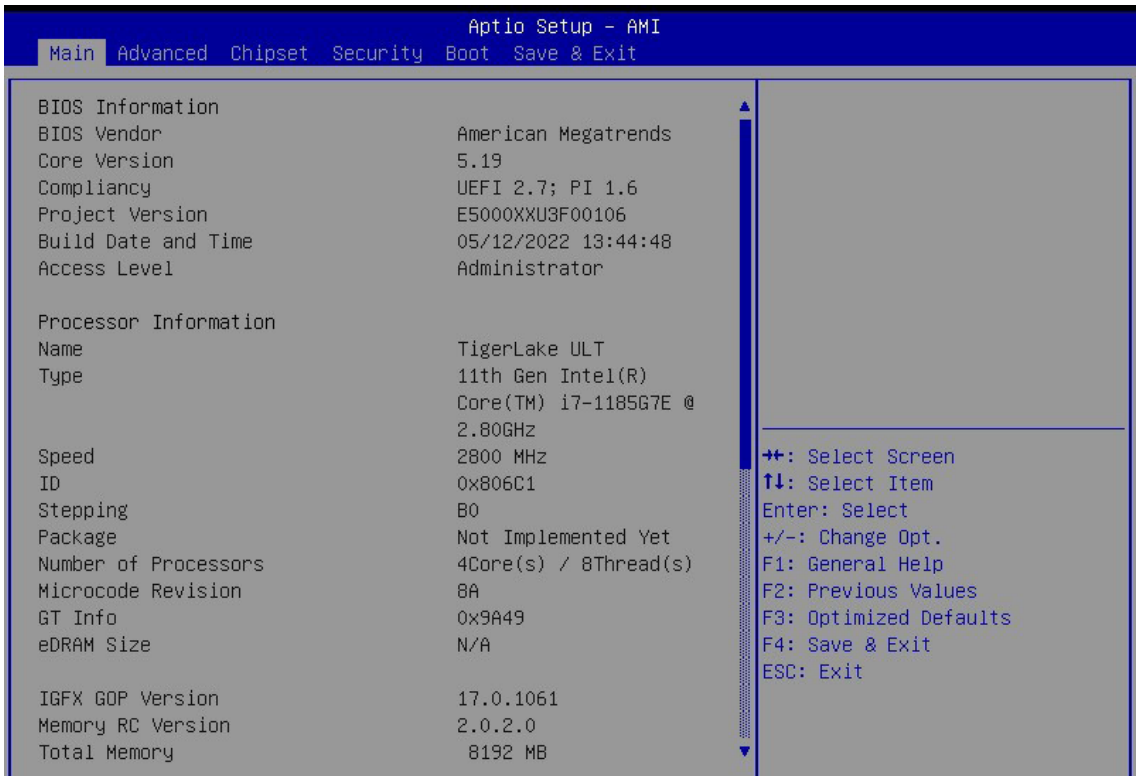


Figure 4-1 : Entering Setup Screen

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

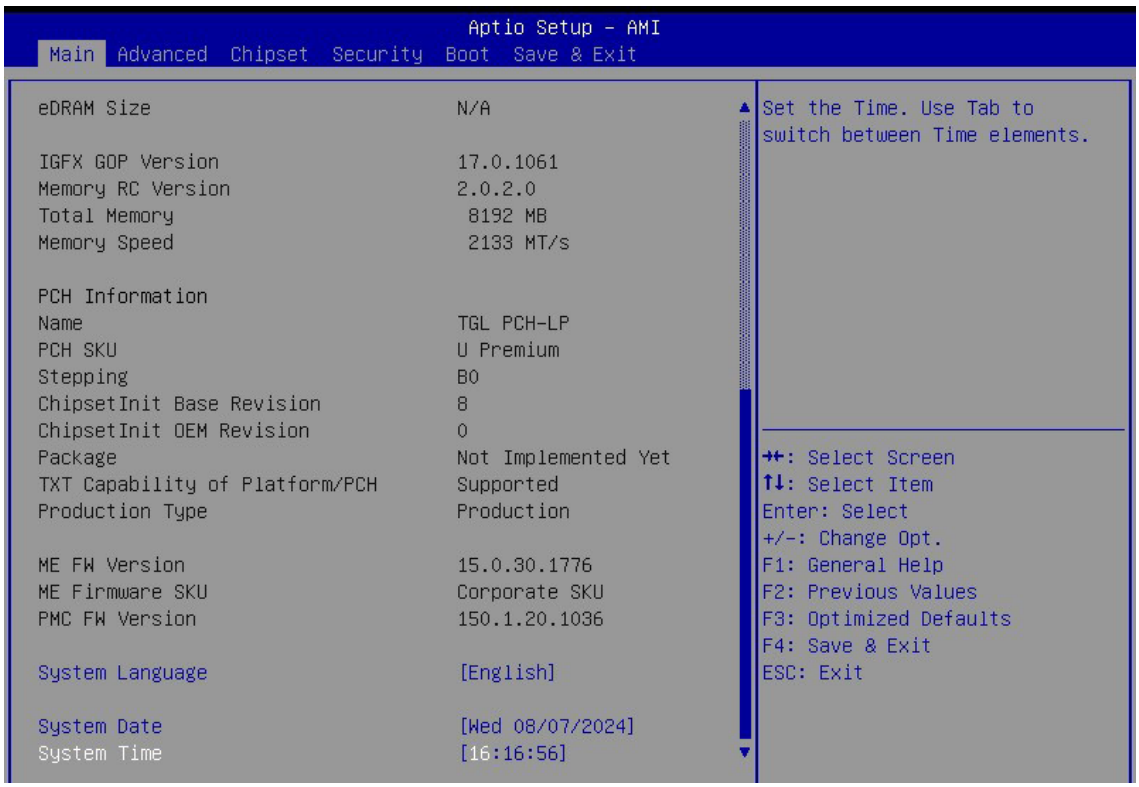


Figure 4-2 : BIOS Main Menu

The Main menu displays BIOS version and system information.

System Date

Set the Date. Use Tab to switch between Date elements.
Default Ranges:
Year: 1998-9999
Months: 1-12
Days: Dependent on month
Range of Years may vary.

System Time

Set the Time. Use Tab to switch between Time elements.

4.3 Advanced Functions

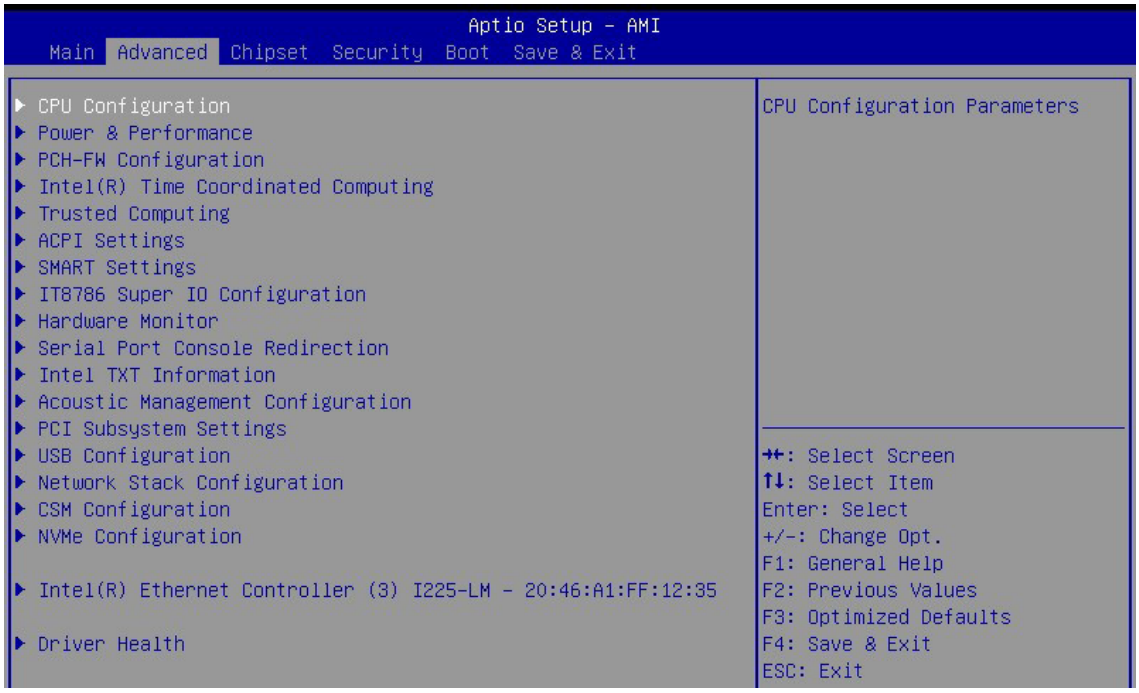


Figure 4-3 : BIOS Advanced Menu

Select advanced tab to enter advanced BIOS setup options such as CPU configuration, IT8786 Super IO configuration, and USB configuration.

4.3.1 CPU Configuration

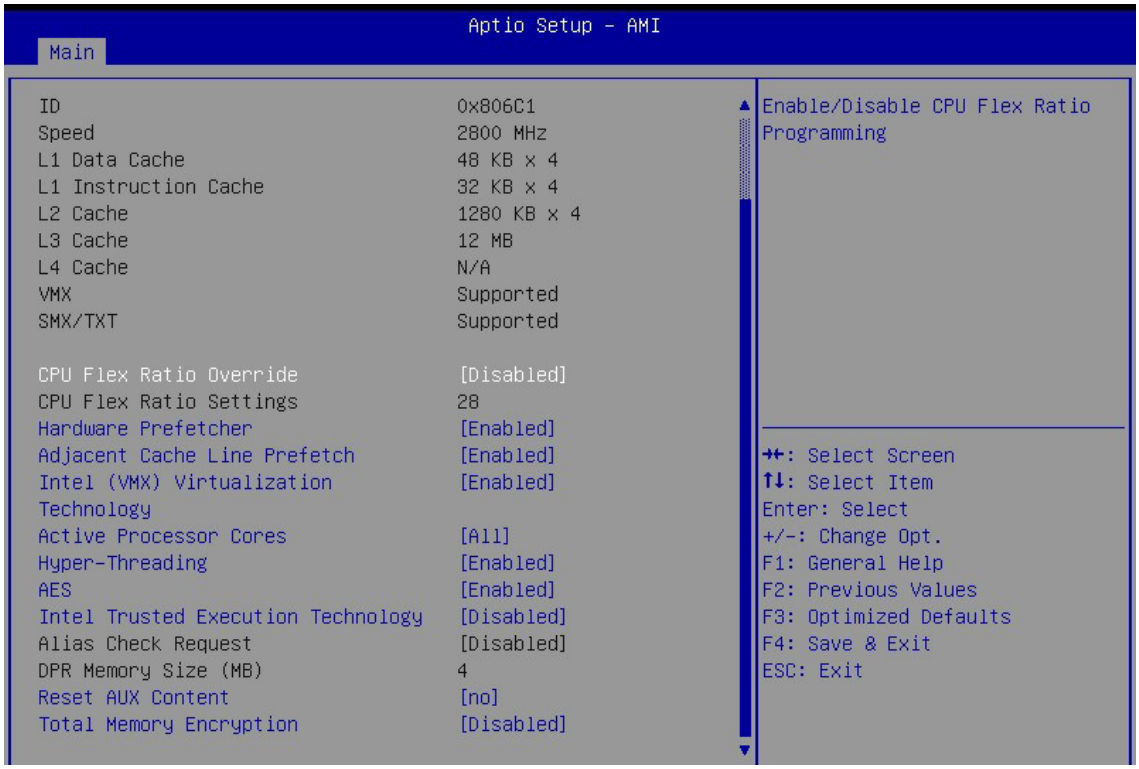


Figure 4-3-1 : CPU Configuration

CPU Flex Ratio Override

Enable/Disable CPU Flex Ratio Programming.

CPU Flex Ratio Settings

This value must be between Max Efficiency Ratio (LFM) and Maximum non-turbo ratio set by Hardware (HFM).

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 (R) Trusted Execution Technology.
Changed require a full power cycle to take effect.

Alias Check Request

Enables Txt Alias Checking capability.
Changes require full Txt capability before it will take effect. It is a one time only change, next reboot will be reset.

DPR Memory Size (MB)

Reserve DPR memory size (0-255) MB

Reset AUX Content

Reset TPM Aux content. Txt may not functional after AUX content gets reset.

Total Memory Encryption

Configure Total Memory Encryption (TME) to protect DRAM data from physical attacks. Either the IBECC or the TME can be enabled.

4.3.2 Power & Performance

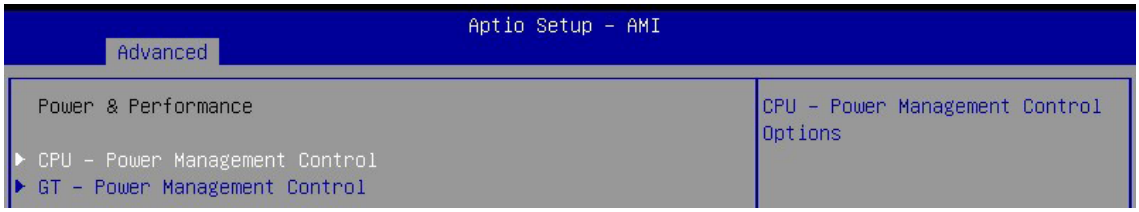


Figure 4-3-2 : Power & Performance

4.3.2.1 CPU - Power Management Control

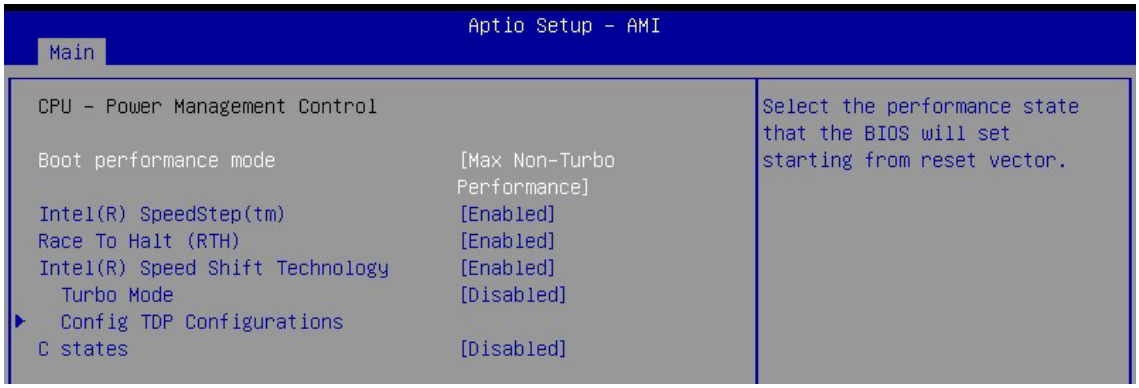


Figure 4-3-2-1 : CPU - Power Management Control

Boot performance mode

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

Intel (R) SpeedStep (tm)

Allow more than two frequency ranges to be supported.

Race To Halt (RTH)

Enable/Disable Race To Halt feature. RTH will dynamically increase CPU frequency in order to enter pkg C-State faster to reduce overall power. (RTH is controlled through MSR 1FC bit 20)

Intel (R) Speed Shift Technology

Enable/Disable Intel(R) Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.

Turbo Mode

Enable/Disable processor Turbo Mode (requires EMTTM enabled too). AUTO means enabled.

Config TDP Configurations

Config TDP Configurations.

C states

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

4.3.2.2 GT – Power Management Control

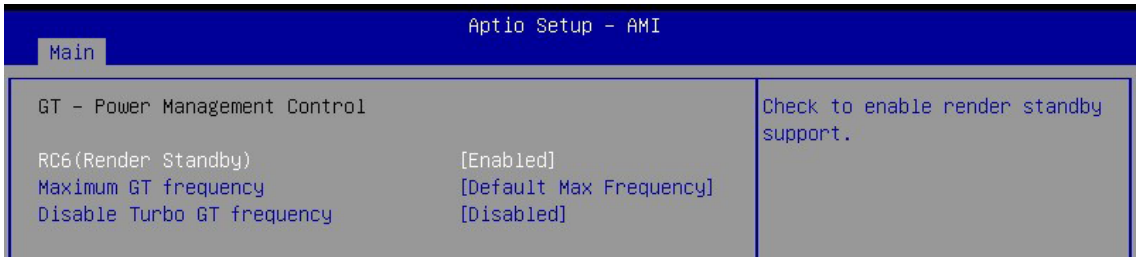


Figure 4-3-2-2 : GT – Power Management Control

RC6 (Render Standby)

Check to enable render standby support.

Maximum GT frequency

Maximum GT frequency limited by the user. Choose between 100MHz (RPN) and 1350MHz (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

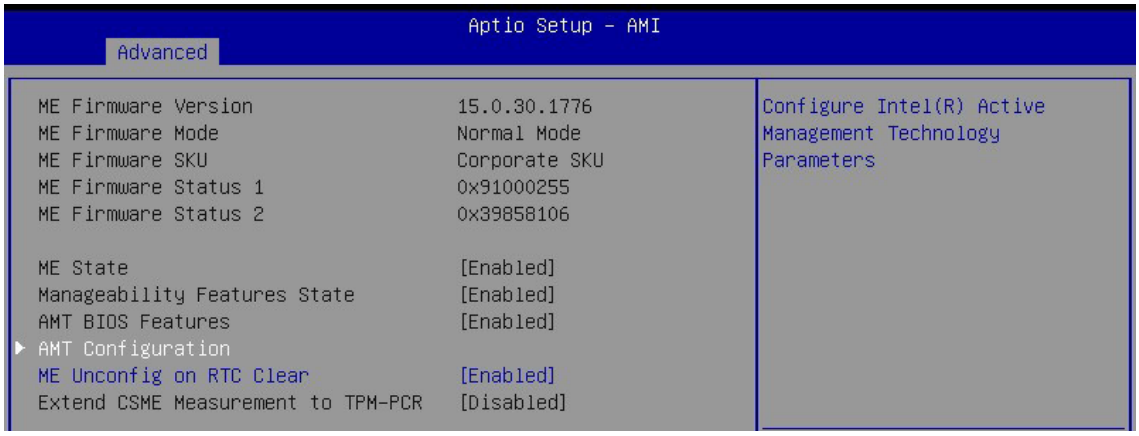


Figure 4-3-3 : PCH-FW Settings

ME State

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

Manageability Features State

Enable/Disable Intel(R) Manageability features.
NOTE: This option disables/enables Manageability Features support in FW. To disable support platform must be in an unprovisioned state first.

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 (R) Active Management Technology Parameters.

ME Unconfig on RTC Clear

When Disabled ME will not be unconfigured on RTC clear.

Extend CSME Measurement to TPM-PCR

Enable/Disable Extend CSME Measurement to TPM-PCR[0] and AMT Config to TPM-PCR[1].

4.3.4 Intel® Time Coordinated Computing (Intel® TCC)

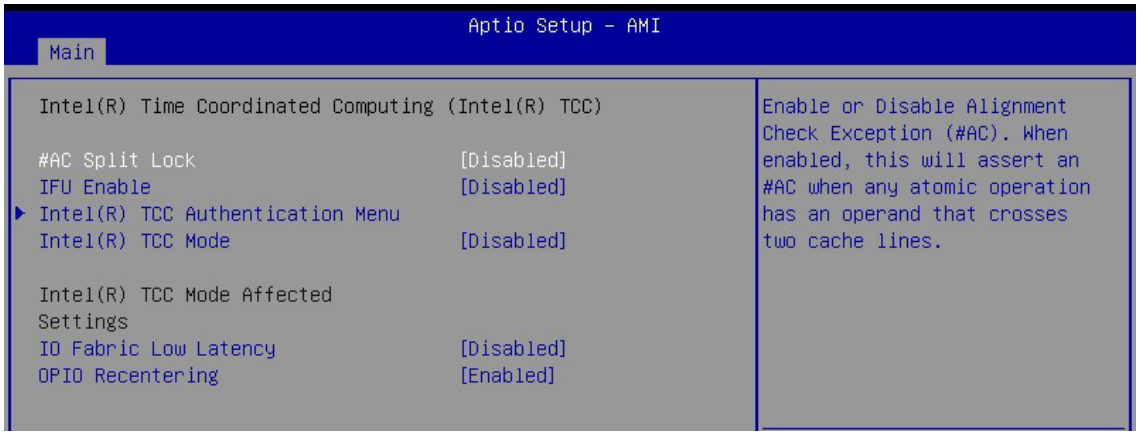


Figure 4-3-4 : Intel(R) Time Coordinated Computing (Intel(R) TCC)

#AC Split Lock

Enable or Disable Alignment Check Exception (#AC). When enabled, this will assert an #AC when any atomic operation has an operand that crosses two cache lines.

IFU Enable

Enable or Disable Instruction Fetch Unit(IFU). When enabled, Instructions will be prefetch to the cache.

Intel (R) TCC Authentication Menu

Intel (R) TCC Authentication Menu options.

Intel (R) TCC Mode

Enable or Disable Intel (R) TCC Mode. When enabled, this will modify system settings to improve real-time performance. The full list of settings and their current state are displayed below when Intel (R) TCC mode is enabled.

IO Fabric Low Latency

Enable or Disable IO Fabric Low Latency. This will turn off some power management in the PCH IO fabrics. This option provides the most aggressive IO Fabric performance setting. S3 state is NOT supported.

OPIO Recentering

Enable or Disable Opio Recentering to improve Pcie latency.

4.3.5 Trusted Computing

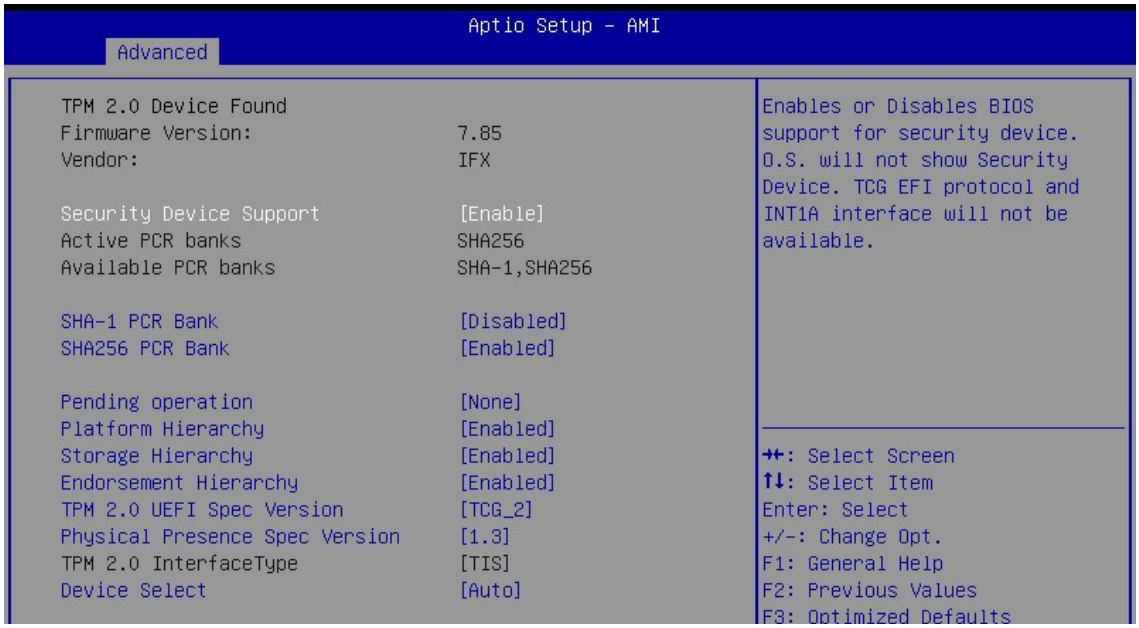


Figure 4-3-5 : Trusted Computing

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

4.3.6 ACPI Settings

Figure 4-3-6 : ACPI Settings

Enable Hibernation

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

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.

4.3.7 SMART Settings

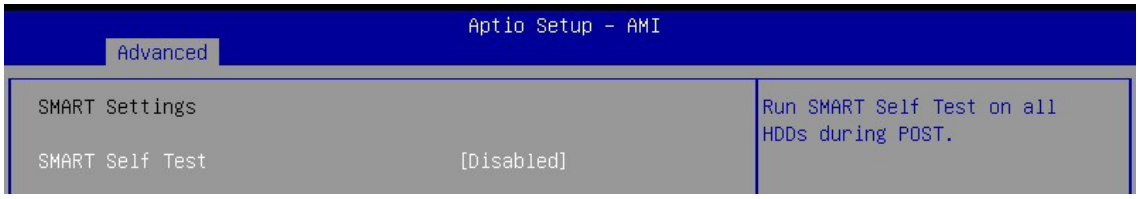


Figure 4-3-7 : SMART Settings

SMART Self Test

Run SMART self-test on all HDDs during POST.

4.3.8 IT8786 Super IO Configuration

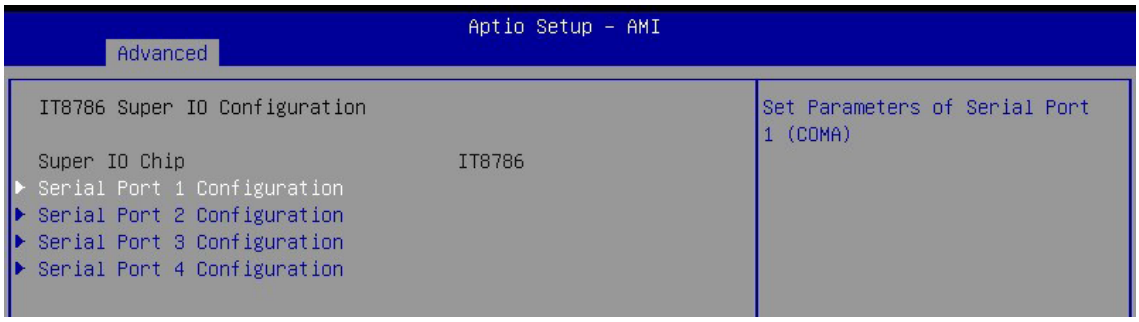


Figure 4-3-8 : Super IO Settings

4.3.8.1 Serial Port (X) Configuration

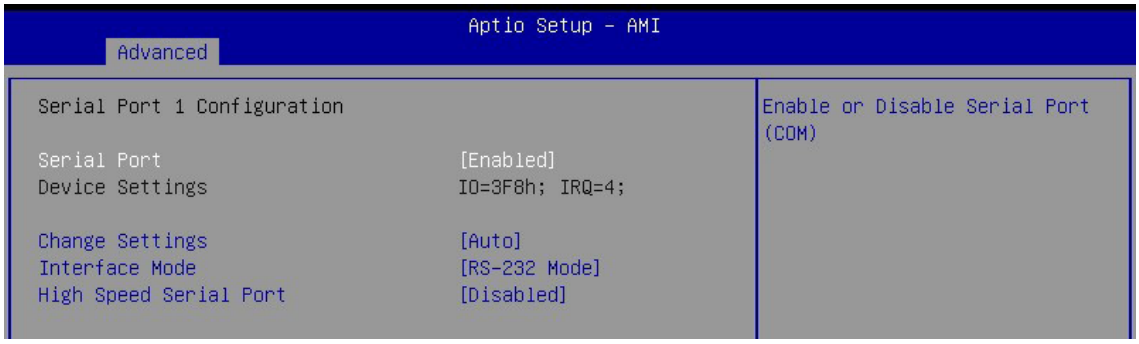


Figure 4-3-8-1 : Serial Port (X) Configuration

Serial Port

Enable or Disable Serial Port (COM).

Change Settings

Select an optimal settings for Super IO Device.

Interface Mode

Serial Port Mode Selection; RS-232; RS-422; RS-485; Loop Back;

High Speed Serial Port (Only Serial Port 1)

Enable or disable High Speed Serial Port. Note!!! A device driver is required on OS for high speed serial port function.

4.3.9 Hardware Monitor

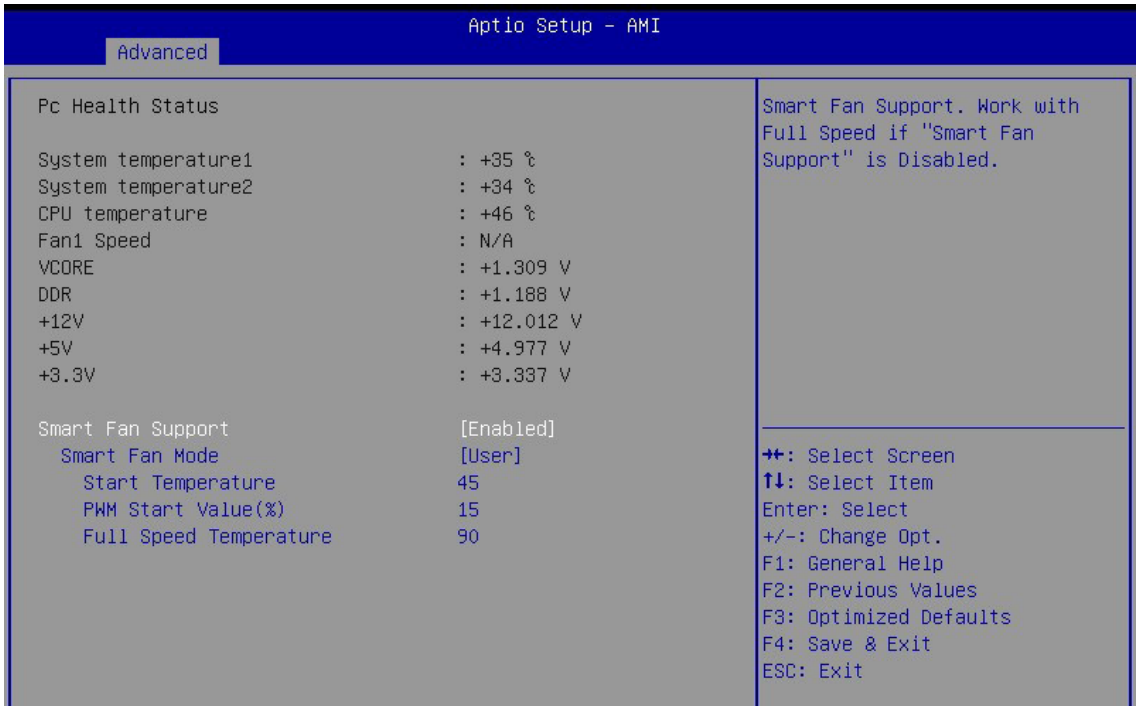


Figure 4-3-9 : Hardware Monitor and Settings

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)

4.3.10 Serial Port Console Redirection

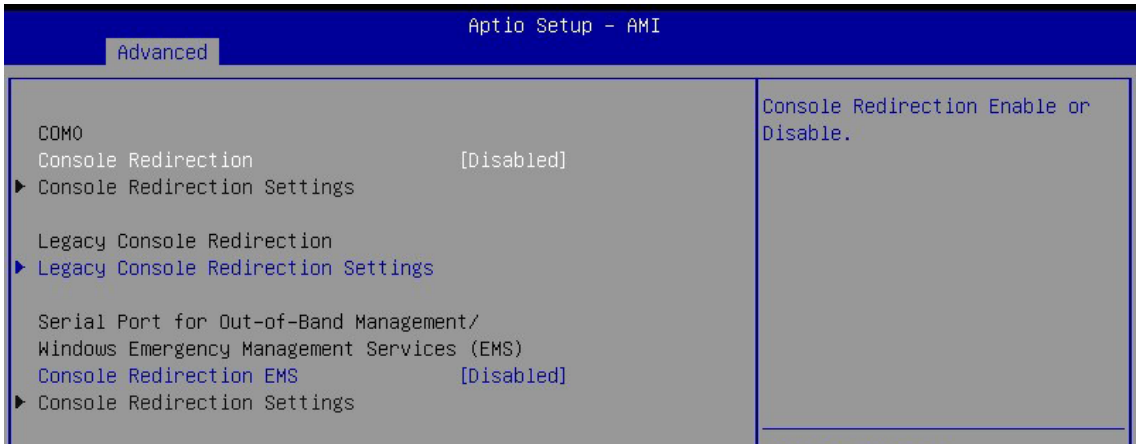


Figure 4-3-10 : Serial Port Console Redirection Settings

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.

4.3.11 Intel TXT Information

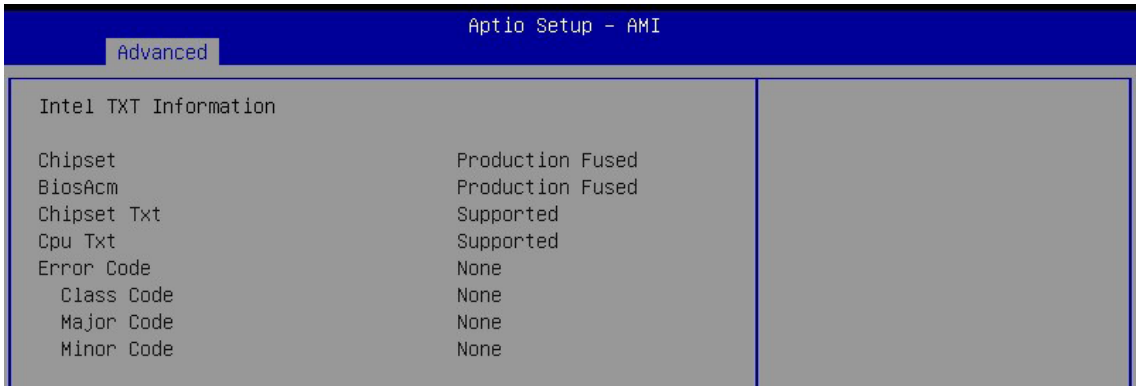


Figure 4-3-11 : Intel TXT Information

Display Intel TXT information.

4.3.12 Acoustic Management Configuration

Figure 4-3-12 : Acoustic Management Settings

Acoustic Management Configuration

Option to enable or disable automatic acoustic management.

4.3.13 PCI Subsystem Settings

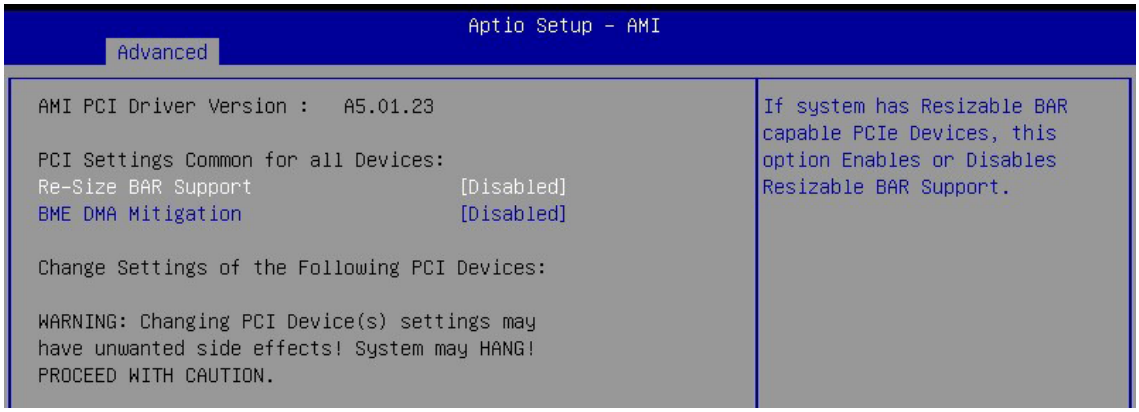


Figure 4-3-13 : PCI Subsystem Settings

Re-Size BAR Support

If system has Resizable BAR capable PCIe Devices, this option Enables or Disables Resizable BAR Support.

BME DMA Mitigation

Re-enable Bus Master Attribute disabled during Pci enumeration for PCI Bridges after SMM Locked.

4.3.14 USB Configuration

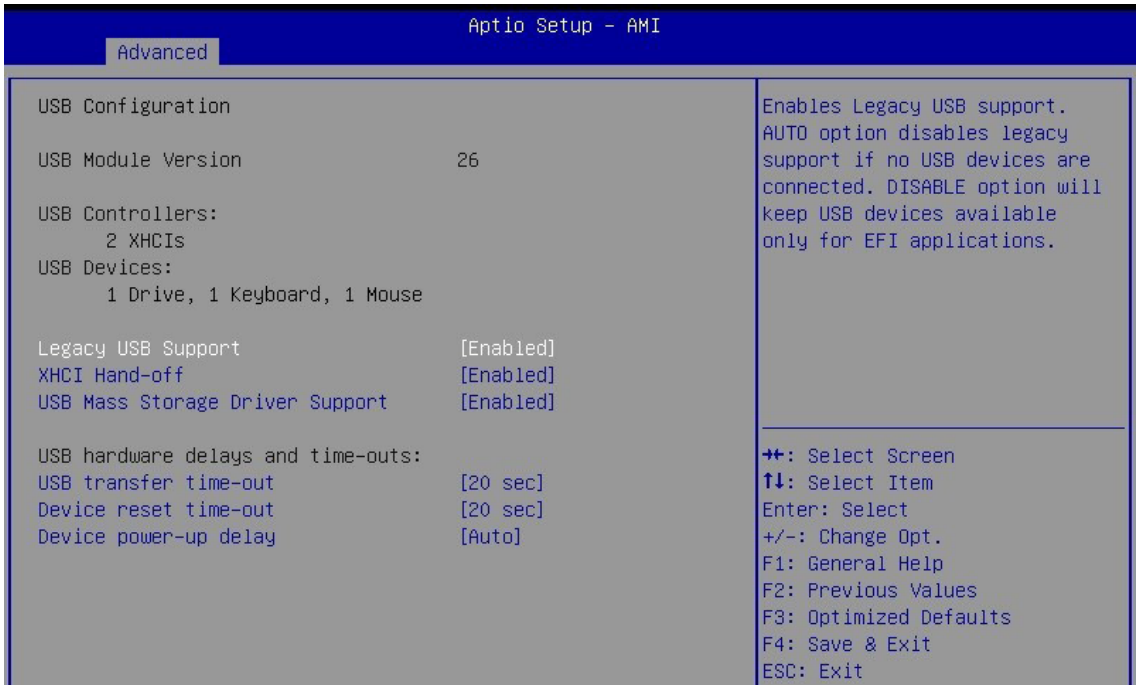


Figure 4-3-14 : USB Settings

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.

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.

4.3.15 Network Stack Configuration

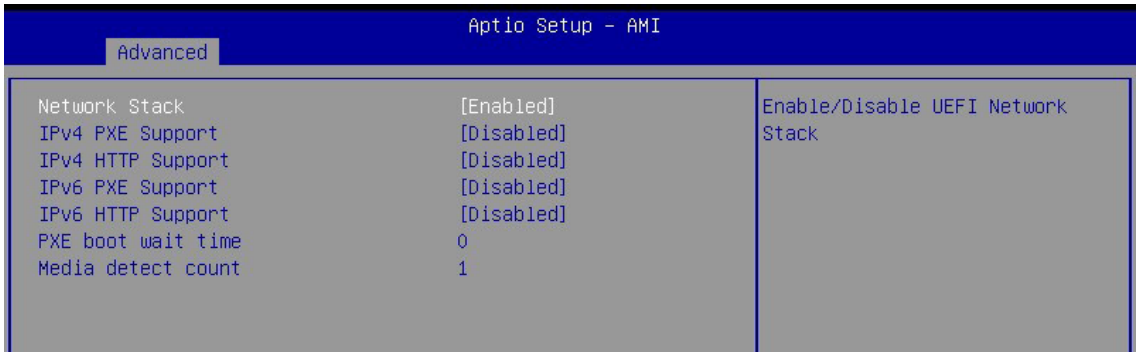


Figure 4-3-15 : Network Stack Configuration

Network Stack

Enable/disable UEFI Network Stack.

Ipv4 PXE Support

Enable/Disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.

Ipv4 HTTP Support

Enable/Disable IPv4 HTTP boot support. If disabled, IPv4 HTTP boot support will not be available.

Ipv6 PXE Support

Enable/Disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.

Ipv6 HTTP Support

Enable/Disable IPv6 HTTP boot support. If disabled, IPv6 HTTP boot support will not be available.

PXE boot wait time

Wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value.

Media detect count

Number of times the presence of media will be checked. Use either +/- or numeric keys to set the value.

4.3.16 CSM Configuration

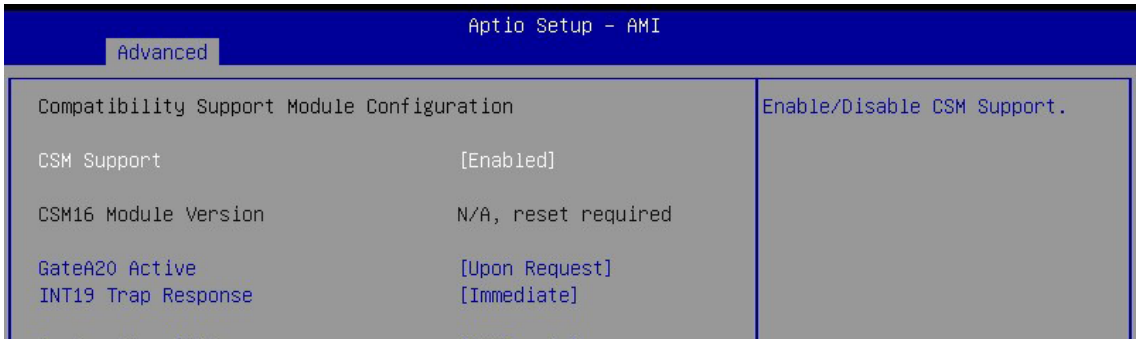


Figure 4-3-16 : CSM Configuration

CSM Support

Enable/Disable CSM Support.

GateA20 Active

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

INT19 Trap Response

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

Boot option filter

This option controls Legacy/UEFI ROMs priority.

Network

Controls the execution of UEFI and Legacy Network 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.

4.3.17 NVMe Configuration

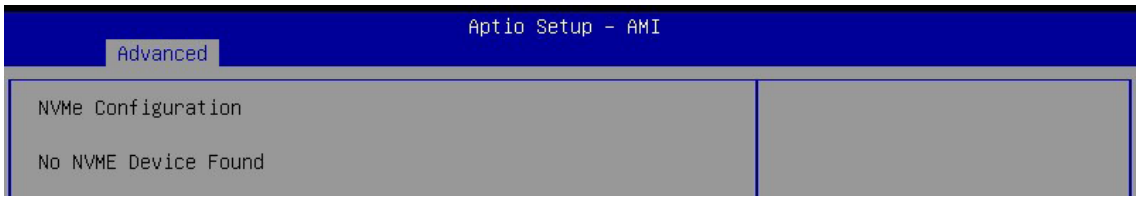


Figure 4-3-17 : NVMe Configuration

Display NVMe Controller and Drive information.

4.4 Chipset Functions

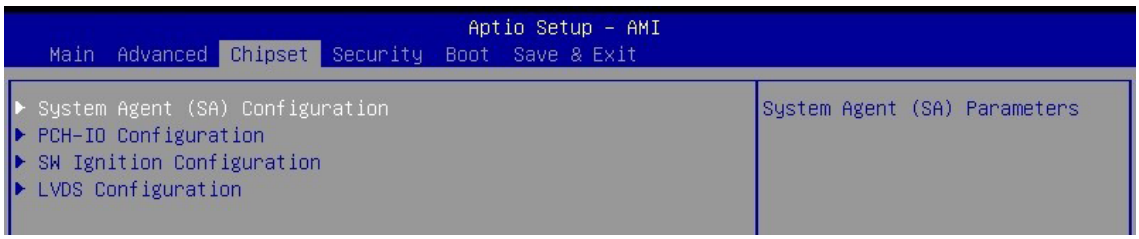


Figure 4-4 : BIOS Chipset Menu

Select Chipset tab to enter chipset BIOS setup options, such as System Agent (SA) Configuration, PCH-IO Configuration, and SW Ignition Configuration.

4.4.1 System Agent (SA) Configuration

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

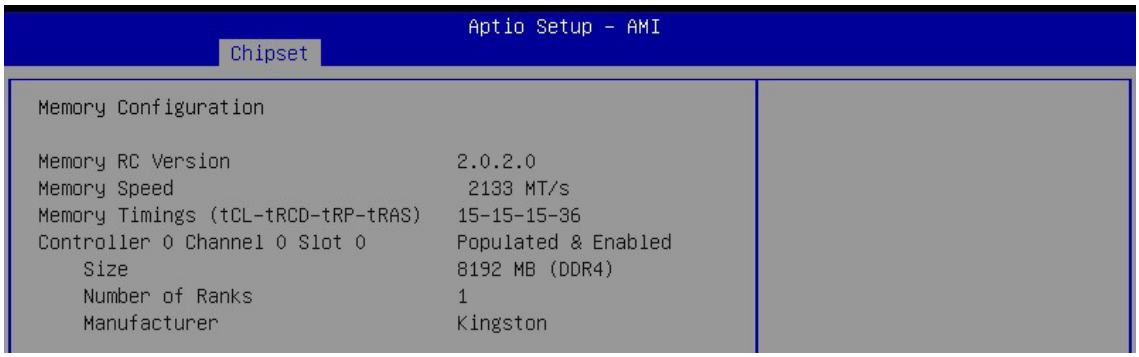


Figure 4-4-1-1 : Memory Information

Display Memory information and configuration.

4.4.1.2 Graphics Configuration

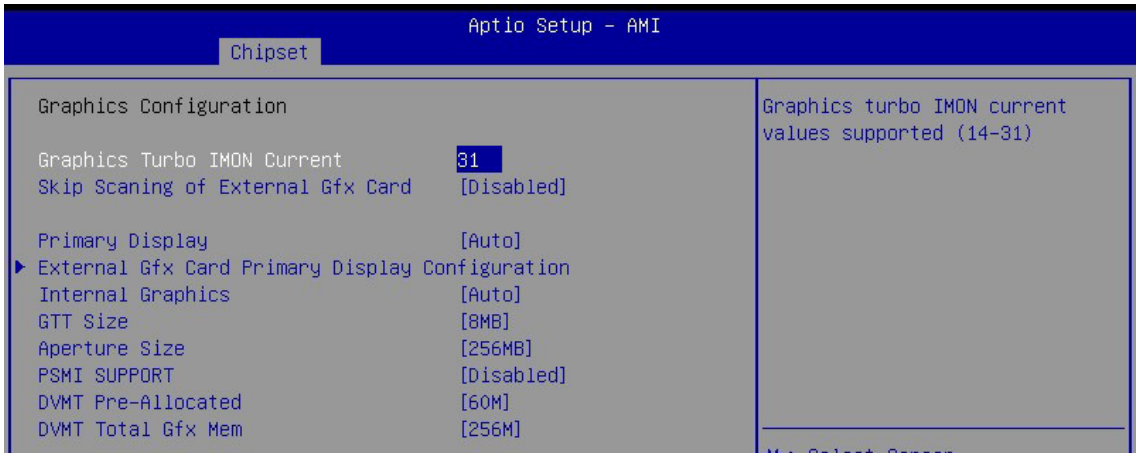


Figure 4-4-1-2 : Graphics Settings

Graphics Turbo IMON Current

Graphics turbo IMON current values supported (14-31).

Skip Scaning of External Gfx Card

If Enable, it will not scan for External Gfx Card on PEG and PCH PCIE Ports.

Primary Display

Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select HG for Hybrid Gfx.

External Gfx Card Primary Display Configuration

External Gfx Card Primary Display Configuration.

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.

PSMI SUPPORT

PSMI Enable/Disable.

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.

4.4.1.3 VMD setup menu

Figure 4-4-1-3 : VMD setup menu

Enable VMD controller

Enable/Disable to VMD controller.

Enable VMD Global Mapping

Enable/Disable to VMD Global Mapping.

4.4.1.4 PCI Express Configuration

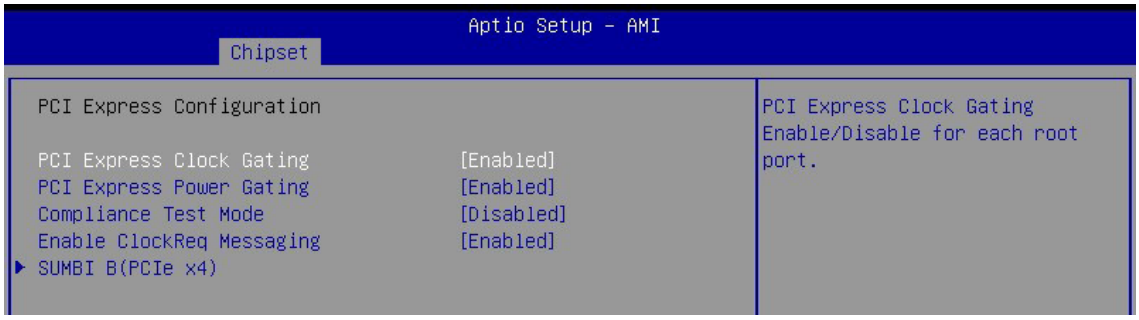


Figure 4-4-1-4 : PCI Express Configuration

PCI Express Clock Gating

PCI Express Clock Gating Enable/Disable for each root port.

PCI Express Power Gating

PCI Express Power Gating Enable/Disable for each root port.

Compliance Test Mode

Enable when using Compliance Load Board.

Enable ClockReq Messaging

Enable or Disable ClockReq Messaging.

PCI Express Configuration (SA)

PCI Express Root Port settings.

4.4.2 PCH-IO Configuration

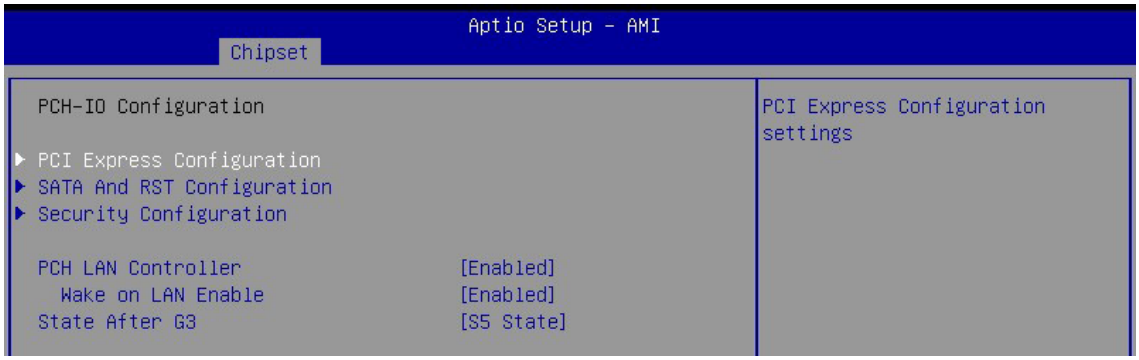


Figure 4-4-2 : PCH-IO Configuration

PCH LAN Controller

Enable/Disable onboard NIC.

Wake on LAN Enable

Enable/Disable integrated LAN to wake the system.

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 (PCH-IO)

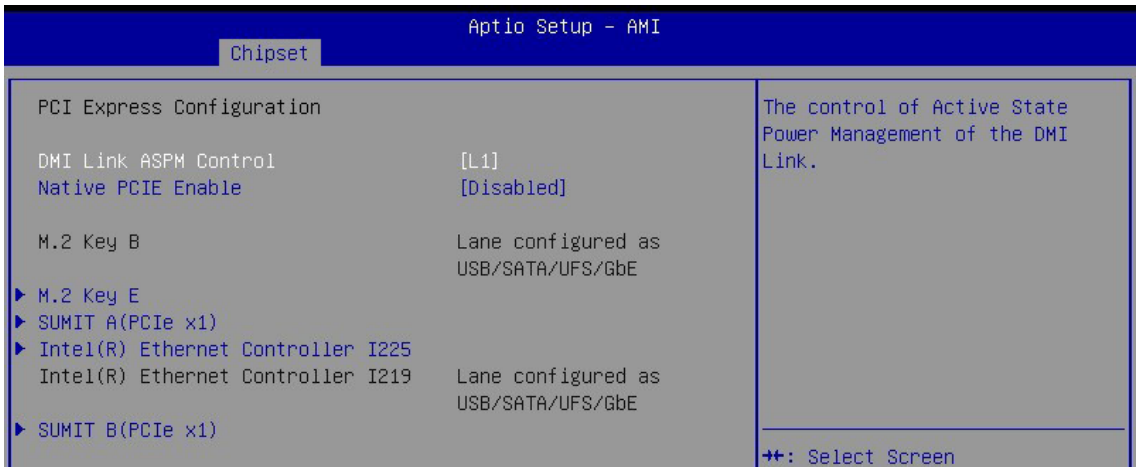


Figure 4-4-2-1 : PCI Express Configuration (PCH-IO)

DMI Link ASPM Control

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

Native PCIE Enable

Bit - PCIe Native * control
0 - ~ Hot Plug
1 - SHPC Native Hot Plug control
2 - ~ Power Management Events
3 - PCIe Advanced Error Reporting control
4 - PCIe Capability Structure control
5 - Latency Tolerance Reporting control

PCI Express Root Port (PCH-IO)

PCI Express Root Port Setting.

4.4.2.2 SATA And RST Configuration

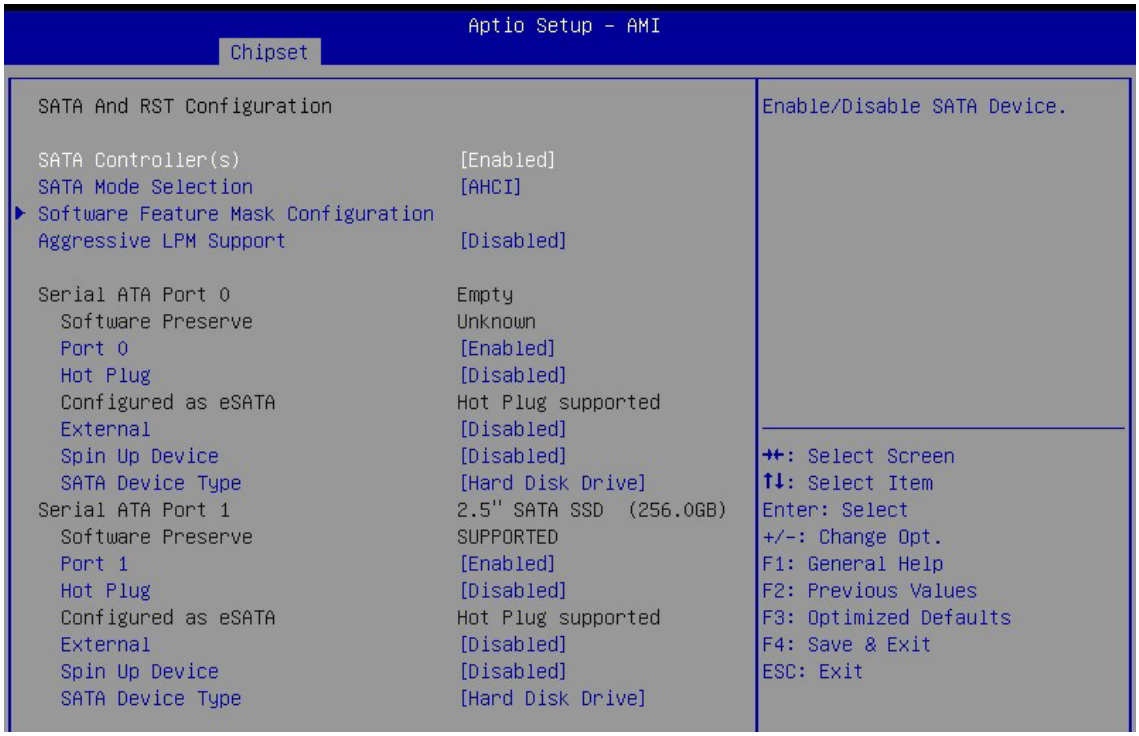


Figure 4-4-2-2 : SATA And RST Configuration

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.

Port (x)

Enable or Disable SATA Port.

Hot Plug

Designates this port as Hot Pluggable.

External

Marks this port as external.

Spin Up Device

If enabled for any of ports Staggerred Spin Up will be performed and only the drives which have this option enabled will spin up at boot. Otherwise all drives spin up at boot.

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

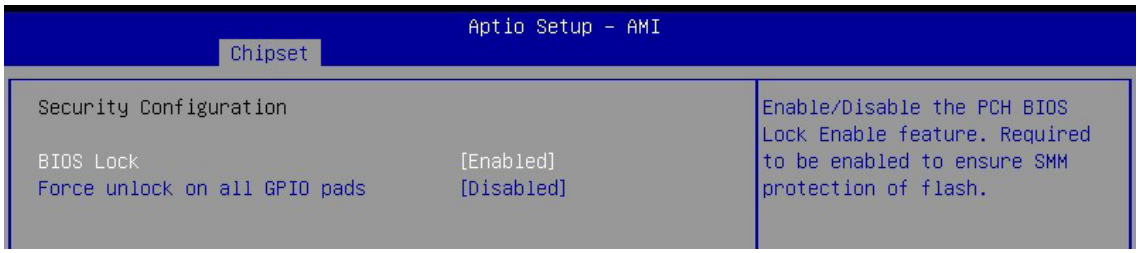


Figure 4-4-2-3 : BIOS Security Settings

BIOS Lock

Enable/Disable the PCH BIOS Lock Enable feature. Required to be enabled to ensure SMM protection of flash.

Force unlock on all GPIO pads

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

4.4.3 SW Ignition Configuration

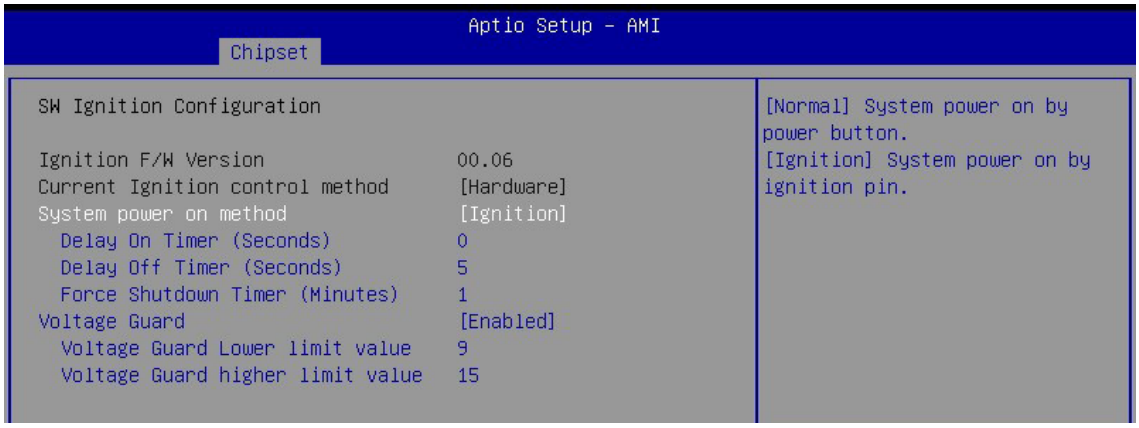


Figure 4-4-3 : SW Ignition Configuration

System power on method

[Normal] System power on by power button. [Ignition] System power on by ignition pin.

Delay On Timer (Seconds)

The delay time after user trigger ignition on signal (Seconds).

Delay Off Timer (Seconds)

The delay time after user trigger ignition off signal (Seconds).

Force Shutdown Timer (Minutes)

Used to force cut off system power when OS unable gracefully shutdown system successfully.

Voltage Guard

Voltage Guard enable or disable, only effect on Ignition mode.

Voltage Guard Lower limit value

Voltage Guard lower limit value setting. Range: 9v ~ 40v.

Voltage Guard higher limit value

Voltage Guard Higher limit value setting. Range: 15v ~ 55v.

4.4.4 LVDS Configuration

Figure 4-4-4 : LVDS Panel Settings

LCD Panel Type

Select LCD Panel Resolution.

4.5 Security

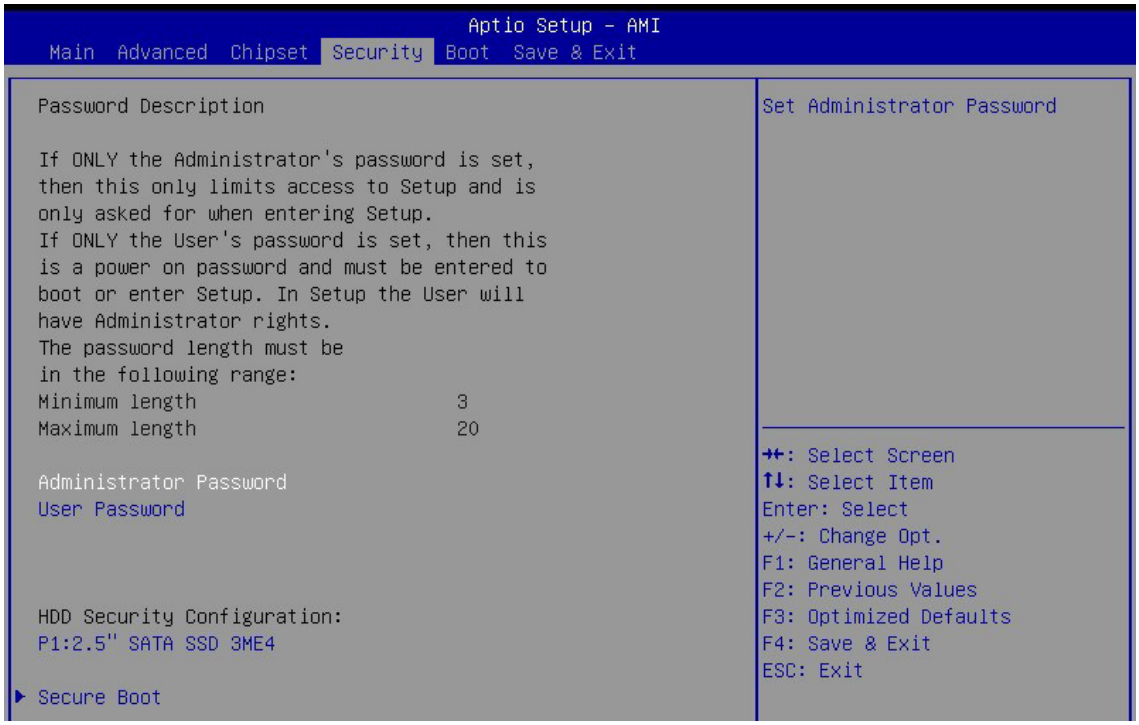


Figure 4-5 : BIOS Security Menu

Administrator Password

Set administrator password.

User Password

Set user password.

4.5.1 HDD Security Configuration

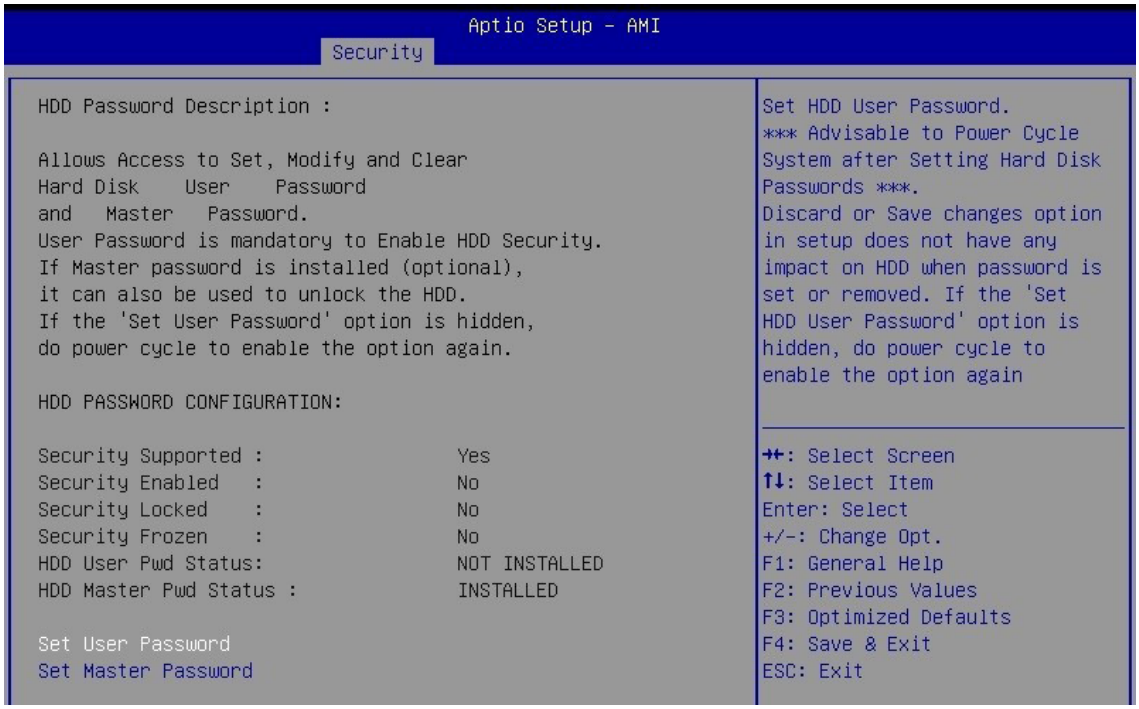


Figure 4-5-1 : HDD Security Settings

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 hidden, do power cycle to enable the option again.

Set Master Password

Set HDD Master 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 Master option' is hidden, user might have entered setup with user HDD Security privilege(expected) or else do power cycle to enable the option again.

4.5.2 Security Boot

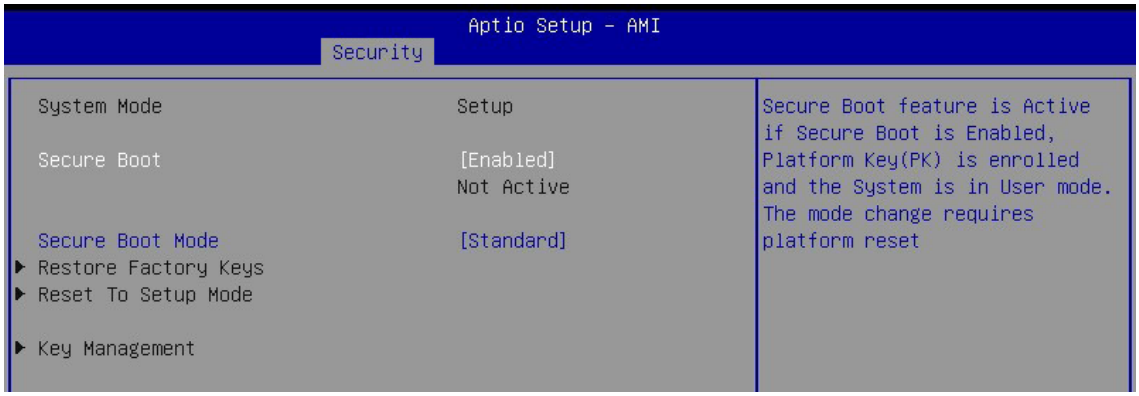


Figure 4-5-2 : Security Boot Settings

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.

Restore Factory Keys

Force System to User Mode. Install factory default Secure Boot key databases.

Reset To Setup Mode

Delete all Secure Boot key databases from NVRAM.

Key Management

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

4.6 Boot Function

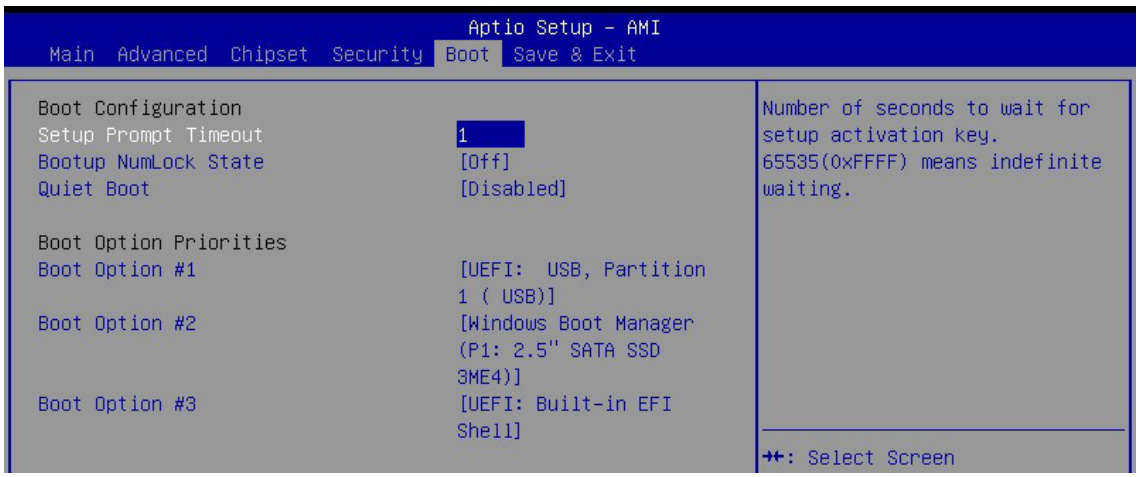


Figure 4-6 : BIOS Boot Menu

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 Priorities

Sets the system boot order.

4.7 Save & Exit

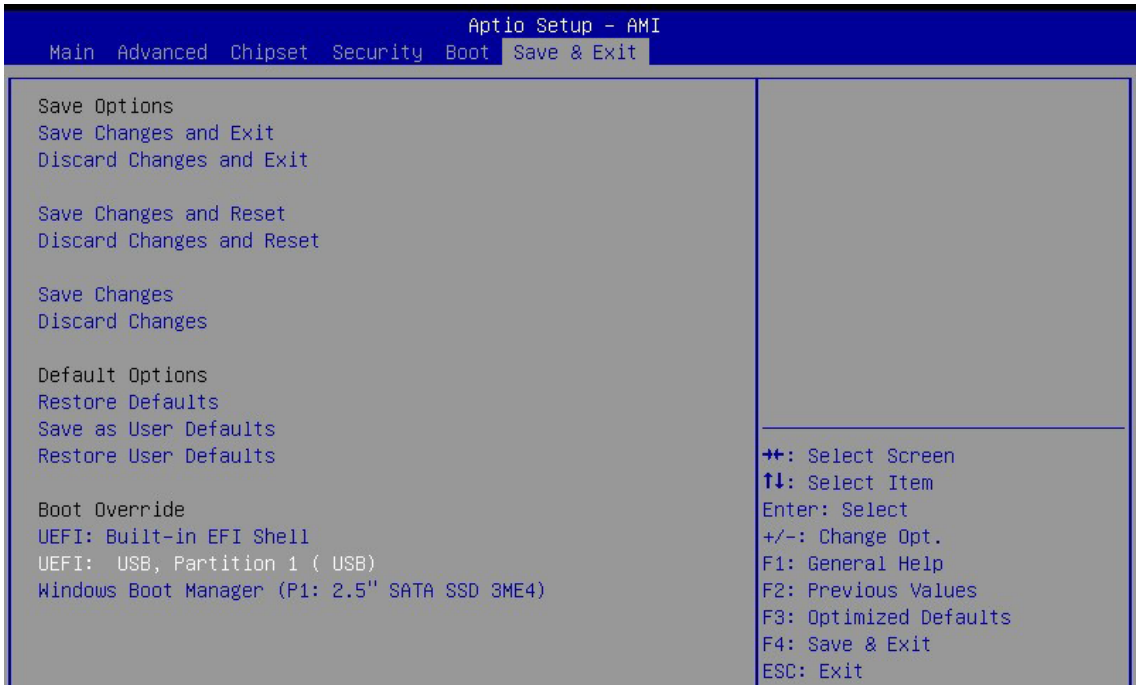


Figure 4-7 : Save & Exit Menu

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.

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.

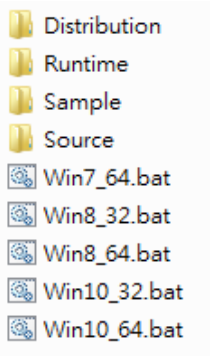
APPENDIX A : Watchdog Function

A.1 Software Package contain

· Distribution folder include x32 and x64 versions, use batch file for installation.
There are included as fallowed:
Win10_32.bat, and Win10_64.bat:
Installation for driver, and
Uninstall_32.bat, and Uninstall_64.bat:
Uninstallation for driver
Run batch file as Administrator.

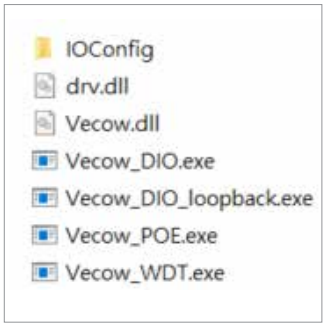
Make sure Windows version before installation.

· Header folder include head file for software developer or System Integration.
· Manual folder include API description.
· Sample folder include sample program, driver library, and API library for Windows/Linux
· Source folder include sample program source code that compile on Visual Studio 2008/Ubuntu18.04.

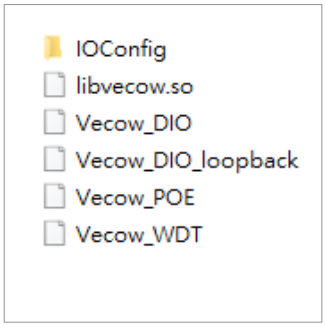


A.2 Sample

Execute demo tool.



Windows



Linux

Sample, as shown below :

```
WDT sample version : v1.0.0509.0608
Load Vecow.dll at least v1.8.1409.0608
Vecow.dll Version : v1.8.1409.0608
Config : IO port  I - Isolated DIO
         IO port II - Non-Isolated DIO(GPIO)

Set WDT timer seconds (1~3932100) :
```

Vecow_WDT

B

APPENDIX B : Software Functions

B.1 Driver API Guide

In Header folder, Vecow.h and VecowLinux.h contain usabled API for Windows/Linux.

BOOL get_WDT(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 set_WDT(DWORD WDT)

Set 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 setup 0, or hardware problem).

BOOL cancel_WDT()

Cancel watchdog timer.

Return:

TRUE (1): Success.

FALSE (0): Fail (Initial error or hardware problem).

FALSE (0): Fail (Driver not exists, or version is too old, or out of range error).

BOOL config_COMPORT(BYTE *PORT_NUM)

Set COMPORT configuration.

• PORT_NUM: Usable COMPORT number.
Range: 1~6.

Return:

TRUE (1): Success.

FALSE (0): Fail (Initial error, or setup 0, or hardware problem).

BOOL set_COMPORT_mode(BYTE port, BYTE mode, BYTE term)

Set COMPORT mode.

• port: which port set.
Range: 1~6.

• mode: Usable COMPORT number.
0: RS232 mode; 1: RS422-5Wire mode.
2: RS422-9Wire mode; 4: RS485 mode.
4: Loopback mode.
• term: Termination enable for RS422/RS485 mode.
1: Enable; 0: Disable.
Return:
TRUE (1): Success.
FALSE (0): Fail (Initial error or hardware problem).

BOOL get_COMPORT_mode(BYTE port, BYTE *mode, BYTE term)
Get COMPORT mode.
• port: which port get.
Range: 1~6.
• mode: Usable COMPORT number.
0: RS232 mode; 1: RS422-5Wire mode.
2: RS422-9Wire mode; 4: RS485 mode.
4: Loopback mode.
• term: Termination enable for RS422/RS485 mode.
1: Enable; 0: Disable.
Return:
TRUE (1): Success.
FALSE (0): Fail (Initial error or hardware problem).

APPENDIX C : Power Consumption

Testing Board	RES-5000
RAM	32GB * 1
USB-1 : (USB 2.0)	USB Micsoft Wired Keyboard 600
USB-2 : (USB 2.0)	USB Mouse HP G1K28AA
SATA 0	Transcend SATA SSD420 128GB
LAN 1 (i219)	1.0 Gbps
LAN 2 (i225)	1.0 Gbps
Graphics Output	DP
Power Plan	Balance (Windows10 Power plan)
Power Source	Chroma 62006P-100-25

C.1 Intel® Core™ i7-1185G7E 2.8GHz (12M Cache, up to 4.40 GHz)

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™ i7-1185G7E	9V	0.380A	03.42W	0.399A	03.59W	1.870A	16.83W
	12V	0.328A	03.94W	0.317A	03.81W	1.575A	18.90W
	24V	0.167A	04.00W	0.207A	04.96W	0.779A	18.69W
	55V	0.116A	06.36W	0.144A	07.93W	0.409A	22.50W

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™ i7-1185G7E	9V	3.345A	30.10W	3.863A	34.77W
	12V	2.452A	29.42W	2.429A	29.15W
	24V	1.269A	30.46W	1.320A	31.68W
	55V	0.617A	33.91W	0.634A	34.88W

D

APPENDIX D : Supported Memory & Storage List

D.1 Test Item

Testing Board	RES-5000
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

D.2 Supported Non-ECC Memory List

Brand	Info	Test Temp.(Celsius)
innodisk 32G DDR4-3200 SO-DIMM	M4S0-BGS2OCEM-H03	25ºC
innodisk 32G DDR4-3200 SO-DIMM	M4S0-BGS2O5EM-H03	25ºC
innodisk 16G DDR4-3200 SO-DIMM	M4S0-AGS1O5EM-H03	25ºC
SL-Link 16GB DDR4-3200 SODIMM	J4AGSH1G8TMFC	25ºC
SL-Link 32GB DDR4-3200 SODIMM	J4BGSH2G8TMFC	25ºC
SL-Link 8GB DDR4-3200 SODIMM	J4AGSH1G8TMEC	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

D.3 Supported Storage List

Type	Brand	Model	Capacity
M.2 SSD	innodisk	M.2 (P42) 3TE6	256GB
SATA SSD	Transcend	SSD370 TS64GSSD370	64GB
	innodisk	3MG2-P DGS25-64GD81BC1QC	64GB
		3TE7 DES25-B56DK1GC3QL-H03	256GB
	Kingston	SA400S371120G	120GB
		SUV400S37	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

Vecow

For further support information, please visit www.vecow.com