

User Manual

ARK-2250R

Railway Fanless System

ADVANTECH

Enabling an Intelligent Planet

Attention!

This package contains a hard-copy user manual in Chinese for China CCC certification purpose, Please download the latest English user manual and drivers on website:

https://www.advantech.com/products/1-flnuyz/ark-2250r/mod_3418c5e4-14af-4909-b587-5344077435e3

Please disregard the printed Chinese copy of the user manual if the product is not to be sold and/or installed in China.

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Product Warranty (2 years)

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

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

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandise authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Declaration of Conformity

CE

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

FCC Class A

Note: 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 not installed and used in accordance with the instruction manual, 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.

EN50155

This product has passed the EN50155 test which is an international standard covering electronic equipment used on rolling stock for railway applications. The standard covers aspects of this electronic equipment, including temperature, humidity, shock, vibration, and other parameters. Test criteria: EN50155 OT4/ EN50121-3-2(EMC)/ EN50121-4(EMC)/ IEC61373 (Vibration&Shock)

Technical Support and Assistance

1. Visit the Advantech web site at www.advantech.com/support where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
 - Product name and serial number
 - Description of your peripheral attachments
 - Description of your software (operating system, version, application software, etc.)
 - A complete description of the problem
 - The exact wording of any error messages

Warnings, Cautions and Notes

Warning! *Warnings indicate conditions, which if not observed, can cause personal injury!*



Caution! Cautions are included to help you avoid damaging hardware or losing data e.g. There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.



Note! Notes provide optional additional information.



Document Feedback

To assist us in making improvements to this manual, we would welcome comments and constructive criticism. Please send all such - in writing to: support@advan-tech.com

Packing List

Before setting up the system, check that the items listed below are included and in good condition. If any item does not accord with the table, please contact your dealer immediately.

- 1 x ARK-2250R unit
- 1 x 5M SMA cable
- 1 x 6 pin remote control block
- 2 x Mounting brackets

Ordering Information

P/N	Description
ARK-2250R-U0A1E	Intel Core i7-6822EQ 2.0GHz, Dual HDMI output
ARK-2250R-S9A1E	Intel Core i5-6442EQ 1.9GHz, Dual HDMI output

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. Do not leave this equipment in an environment unconditioned where the storage temperature under -40°C or above 85°C , it may damage the equipment. Operating temperature is -40°C to 70°C .
8. Please install this equipment in cabinet of train only.
9. Except LAN ports, rest of I/O ports are designed for setting purpose, the extended cable doesn't longer than 3M.
10. The openings on the enclosure are for air convection. Protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
11. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet. Cable of Power source should be shielded.
12. Position the power cord so that people cannot step on it. Do not place anything over the power cord. The voltage and current rating of the cord should be greater than the voltage and current rating marked on the product.
13. All cautions and warnings on the equipment should be noted.
14. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
15. Never pour any liquid into an opening. This may cause fire or electrical shock.
16. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
17. If one of the following situations arises, get the equipment checked by service personnel:
 - The power cord or plug is damaged.
 - Liquid has penetrated into the equipment.
 - The equipment has been exposed to moisture.
 - The equipment does not work well, or you cannot get it to work according to the user's manual.
 - The equipment has been dropped and damaged.
 - The equipment has obvious signs of breakage.
18. **CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER, DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.**
19. By means of a power cord connected to a socket-outlet with earthing connection
20. Power to this equipment should be supplied by an approved power adapter or DC power source with an output meets ES1 and rating of 24VDC, 7.5A. For further assistance, please contact Advantech
The ITE is not intended to be installed and used in a home, school or public area accessible to the general population, and safety instructions state that thumb-screws should be tightened with a tool after both initial installation and subsequent access to the panel.
ATTENTION: L'ordinateur est muni d'un circuit en temps réel de l'horloge ali-

mentée par batterie. Il ya un danger d'explosion si la pile est remplacée de façon incorrecte. Remplacez uniquement par un type identique ou équivalent recommandé par le fabricant. Jetez les piles usagées selon les instructions du fabricant.

CAUTION: Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges.

ATTENTION: débranchez toujours complètement le cordon d'alimentation de votre châssis chaque fois que vous travaillez avec le matériel. Ne faites pas de connexions pendant que l'appareil est sous tension. Les composants électroniques sensibles peuvent être endommagés par des surtensions soudaines.

CAUTION: Always ground yourself to remove any static charge before touching the motherboard, backplane, or add-on cards. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not in the chassis.

ATTENTION: Toujours mettre à la terre pour éliminer toute charge statique avant de toucher la carte mère, le fond de panier ou les cartes d'extension. Les appareils électroniques modernes sont très sensibles aux charges électriques statiques. Par mesure de sécurité, utilisez un bracelet antistatique à tout moment. Placez tous les composants électroniques sur un support antistatique surface ou dans un sac antistatique lorsqu'ils ne sont pas dans le châssis.

CAUTION: Any unverified component could cause unexpected damage. To ensure the correct installation, please always use the components (ex. screws) provided with the accessory box.

ATTENTION: Tout composant non vérifiée pourrait causer des dommages inattendu. Pour garantir une installation correcte, s'il vous plaît utilisez toujours les composants(vis ex.) fournies avec la boîte d'accessories.

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Chapter 1

General Introduction

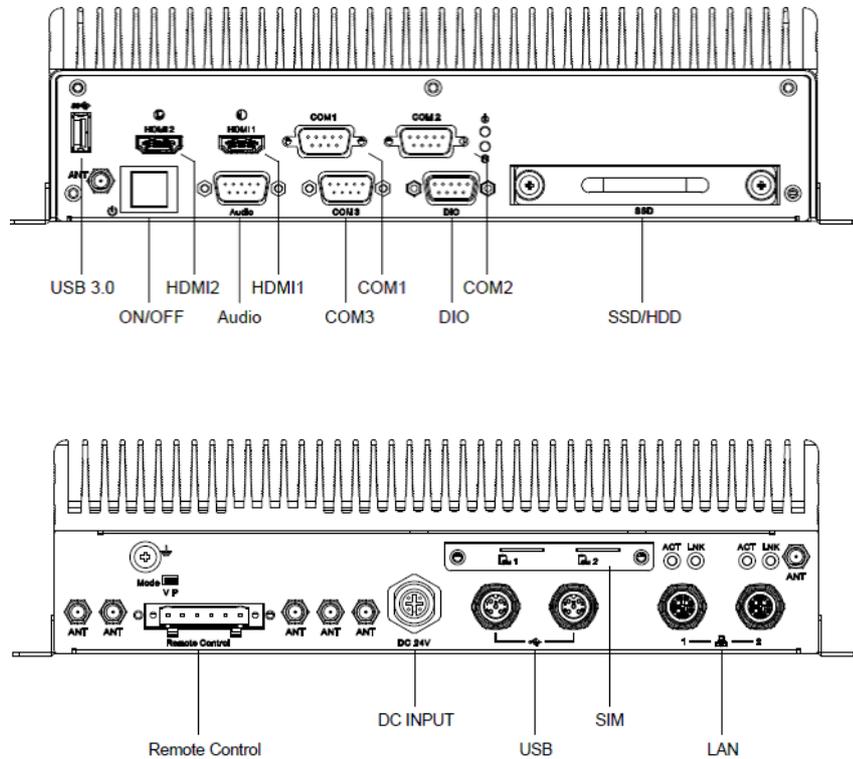
This chapter gives background information on ARK-2250R series.

1.1 Introduction

ARK-2250R is an rugged grade quad core mobile device for Rolling Stock computer and Rolling Stock NVR solutions.

ARK-2250R supports Full-HD NVR solutions and is fully integrated with certified hardware and intelligent management software. ARK-2250R has integrated railway power (EN50155 S2C1), conforms to specific certifications (EN50155, EN50121-3-2, EN50121-4, IEC61373 shock/vibration proof), and has specially-developed software SDK and APIs for mobile applications. It also provides diverse communication for excellent connectivity, it has great expansion capability and comes with integrated software for manageability and security.

ARK-2250R-S9A1E & ARK-2250R-U0A1E I/O Overview



1.2 Features

- Intel® Core i5-6442EQ 1.9GHz / Core i7-6822EQ 2.0 GHz
- Diversity Communication Abilities
- Intelligent Power Ignition Management
- 24Vdc Power Input w/isolation
- Dual storage: 1 x removable 2.5" drive bay & 1 x F/S mSATA
- Supports WISE-PaaS/RMM and Embedded Software APIs

1.3 Hardware Specifications

- **CPU:** Intel® Core i5-6442EQ 1.9GHz / Core i7-6822EQ 2.0 GHz
- **System Chipset:** Intel® QM170
- **BIOS:** AMI uEFI 64 Mbit Flash BIOS
- **System memory:** 2 x DDR4 SO-DIMM sockets, support DDR4 2133 MHz up to 32 GB (Max. 16GB per each SO-DIMM socket)
- **Graphics Controller:** Intel® Gen 9
- **Storage:**
 - 2.5" SATA: 1 x removable 2.5" drive bay (Max 9.5 mm height)
 - mSATA: 1 x full size mSATA storage
- **Watchdog Timer:** Supported by Advantech SUSI API
- **I/O Interface:**
 - COM: 3 x RS-232/422/485
 - USB: 1 x USB 3.0, 2x USB 2.0 M12 A-coded
 - Audio: 1 x Line-in / Line-Out / Mic-in
- **Ethernet:** 2 x Giga LAN 10/100/1000 Mbps M12 X-coded
- **Digital I/O:** 8bit programmable
- **LED indicator:** 1 x Power LED, 1xStorage LED
- **Display output:**
 - 2 x lockable HDMI, up to 2K @ 60 Hz
- **Power Requirement:**
 - Power type: ATX
 - Intelligent Vehicle Power Ignition Management: Selectable boot-up & shut-down voltage, on/off delay time
 - Input voltage: 24 VDC
 - Isolation: 1.5KV
- **Expansion slot:**
 - 1 x full size mini PCIe slot, support SATA/USB2.0/USB3.0/PCIe with accessible SIM socket, supports Mini SIM (25 x 15 x 0.76mm)
 - 1 x full size mini PCIe slot, support USB2.0/USB3.0/PCIe with accessible SIM socket, supports Mini SIM (25 x 15 x 0.76mm)
 - 1 x M.2 2230 E Key, support USB2.0/PCIe
- **Enclosure:** Ruggedized aluminum housing.
- **Vibration / Shock:** With mSATA/SSD: IEC 61373
- **Certifications:**
 - EMC: CE/FCC, CCC, BSMI
 - Safety: UL, CCC, BSMI, EN50155

Chapter 2

Hardware installation

This chapter introduces the installation of ARK-2250R Hardware.

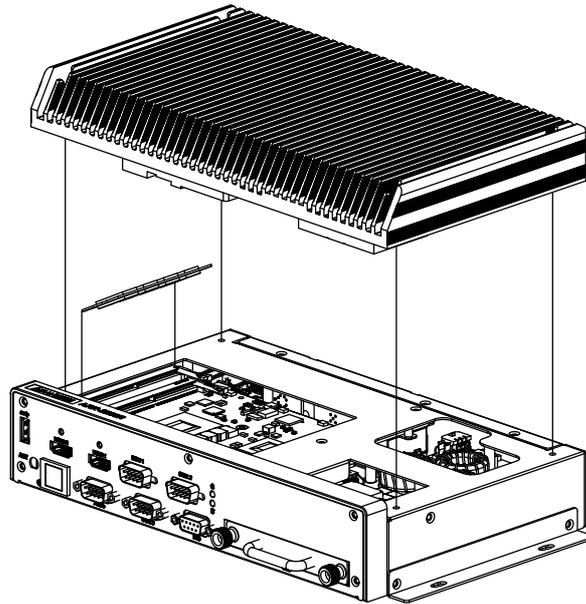
2.1 Overview of Hardware Installation & Upgrading

Warning! Do not remove the ruggedized aluminum covers until verifying that no power is flowing within the computer. Power must be switched off and the power cord must be unplugged. Take care in order to avoid injury or damage to the equipment.



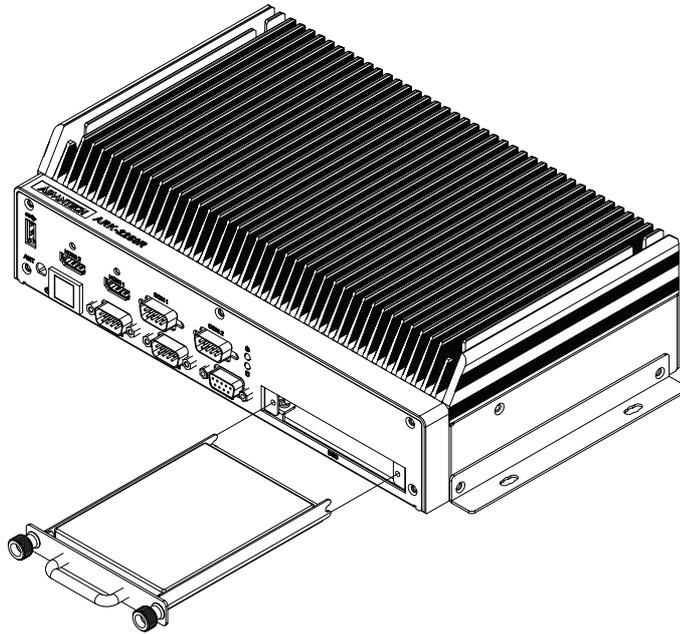
2.2 Memory installation

Remove 4 screws from top case to install memory on the top side of the board.



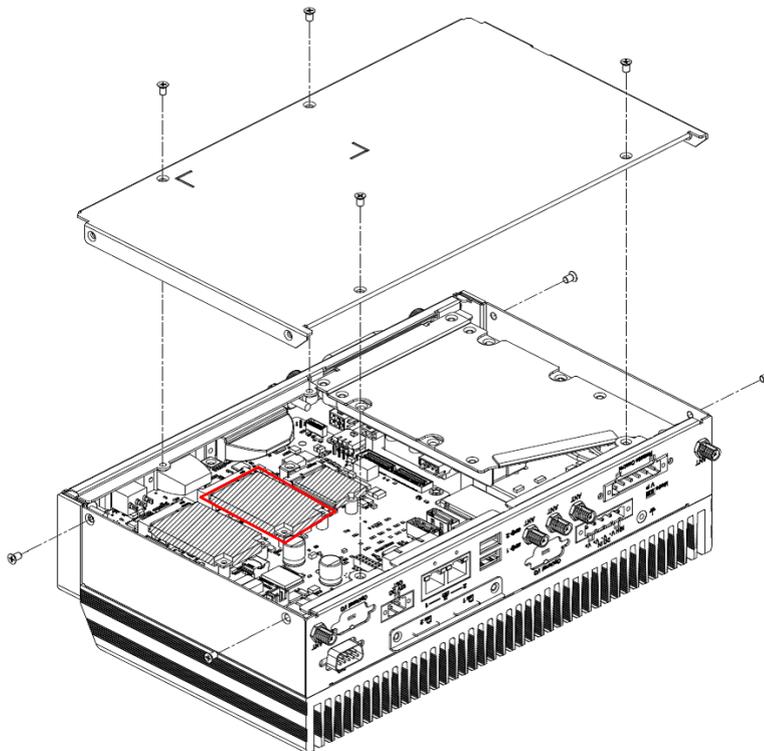
2.3 Storage installation

2.3.1 2.5" SATA drive installation



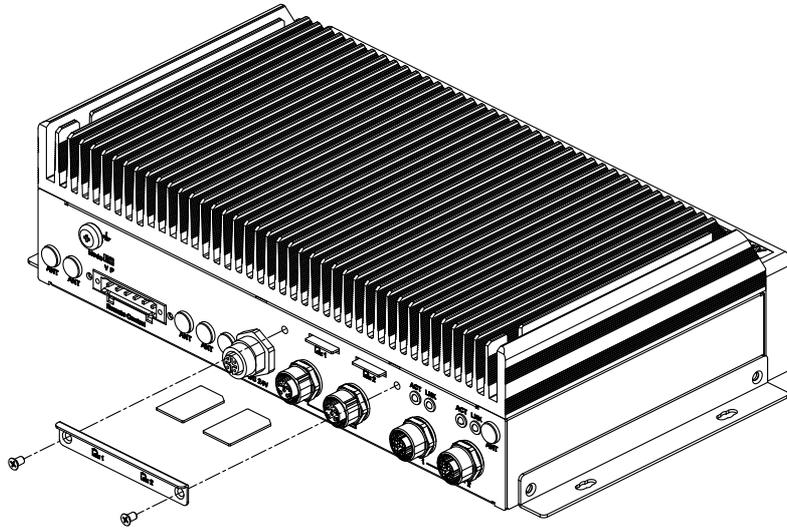
2.3.2 mSATA Installation

1. Remove bottom cover 4 screws on the bottom side and 4 screws on both sides.
2. Insert a full size mSATA storage in the place marked.



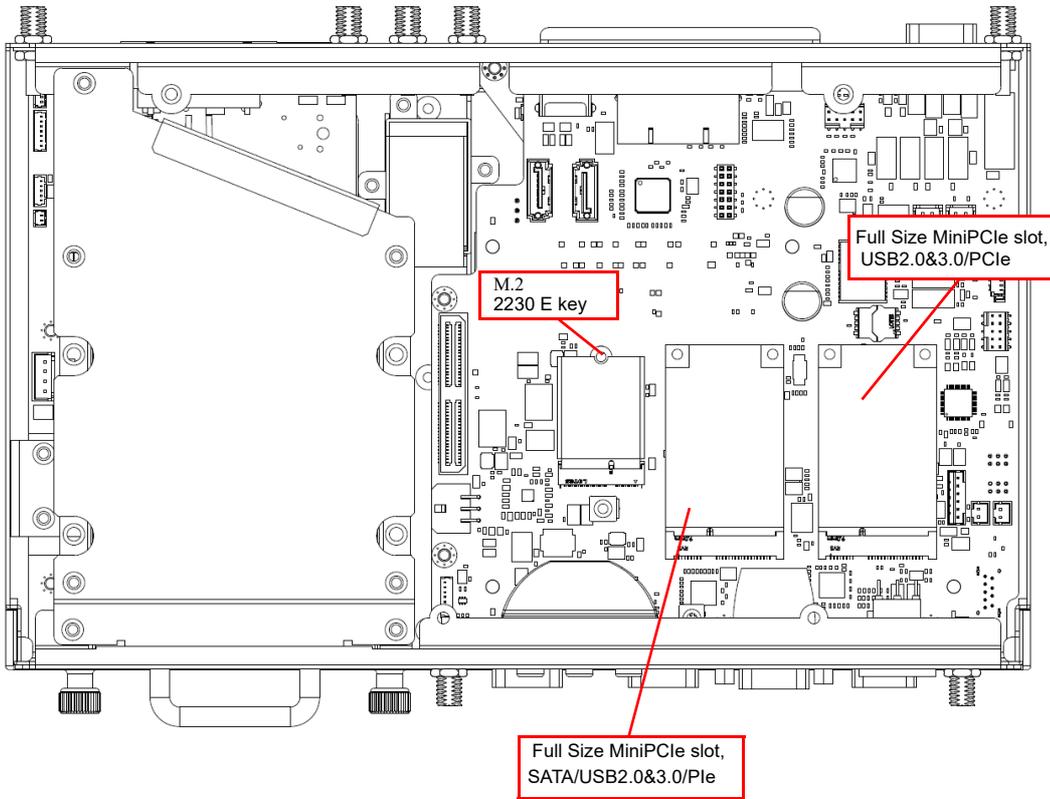
2.3.3 Mini SIM Installation

1. Remove the 2 screws on back side
2. Insert a mini SIM card



2.4 Optional MiniPCle and M.2 Module Installation

Insert suitable modules on MiniPCle or M.2 slots.



Chapter 3

BIOS settings

This chapter explains the BIOS configuration processes.

3.1 BIOS Introduction

ARK-2250R BIOS has been stored into a flash ROM which is inserted into a BIOS socket on the board. With the BIOS Setup program, users can modify BIOS settings and control various system features. This chapter describes the basic navigation of the ARK-2250R BIOS setup screens. Advantech will have revisions for product optimization so customers can re-flash the latest BIOS through the AFU utility. Please contact Advantech sales or FAE for more details.

3.2 Entering Setup

To enter the BIOS setup screens, follow the steps below: 1. Power on the system. 2. Press the Delete or Esc key on your keyboard when you see the following text prompt: Press Delete or Esc to enter setup. 3. After you press the Delete key, the main BIOS setup menu displays. You can access the other BIOS function settings.

3.2.1 Main Setup

When users first enter the BIOS Setup Utility, they will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. The Main BIOS Setup screen is shown below.



Figure 3.1 Main setup screen

Feature	Option	Description
System Language	English	Choose the BIOS language
System Date	mm/dd/yyyy	Set the system date. Use Tab to switch between Date elements. Use + / - or numbers to change the value.
System Time	hh:mm:ss	Set the system time. Use Tab to switch between Date elements. Use + / - or numbers to change the value.

3.2.2 Advanced BIOS Setup

Select the Advanced tab from the **ARK-2250R** setup screen to enter the Advanced BIOS Setup screen. Users can select any item in the left frame of the screen, such as CPU Configuration, to go to the sub menu for that item. Users can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screens are shown below. The sub menus are described on the following pages.

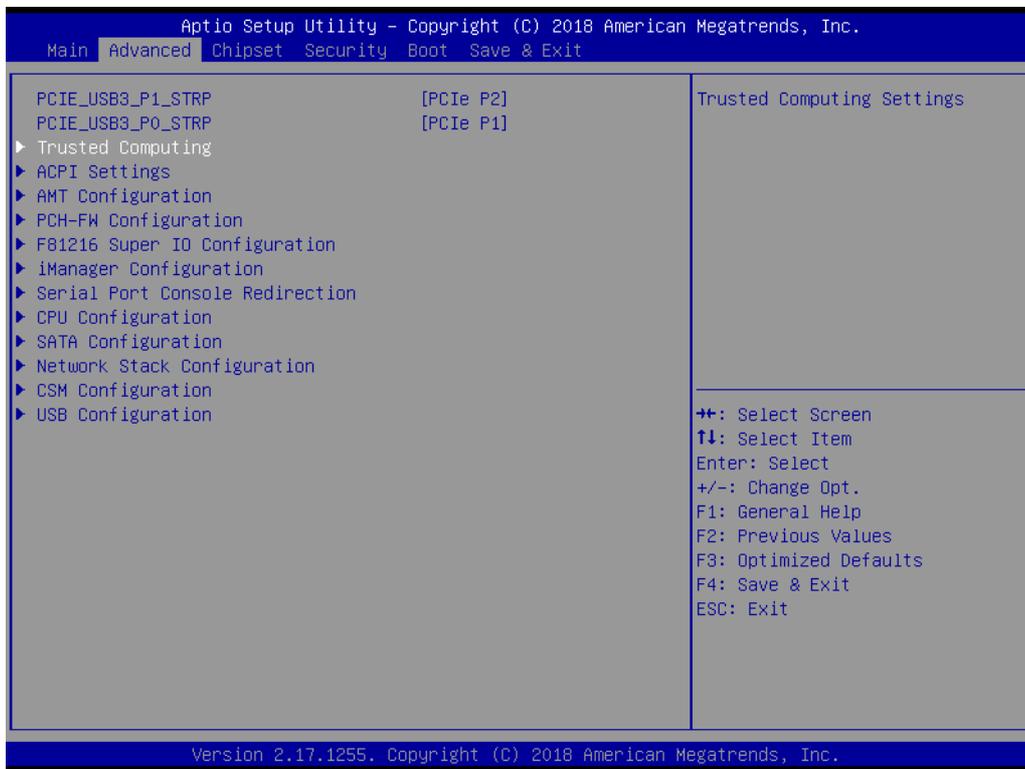
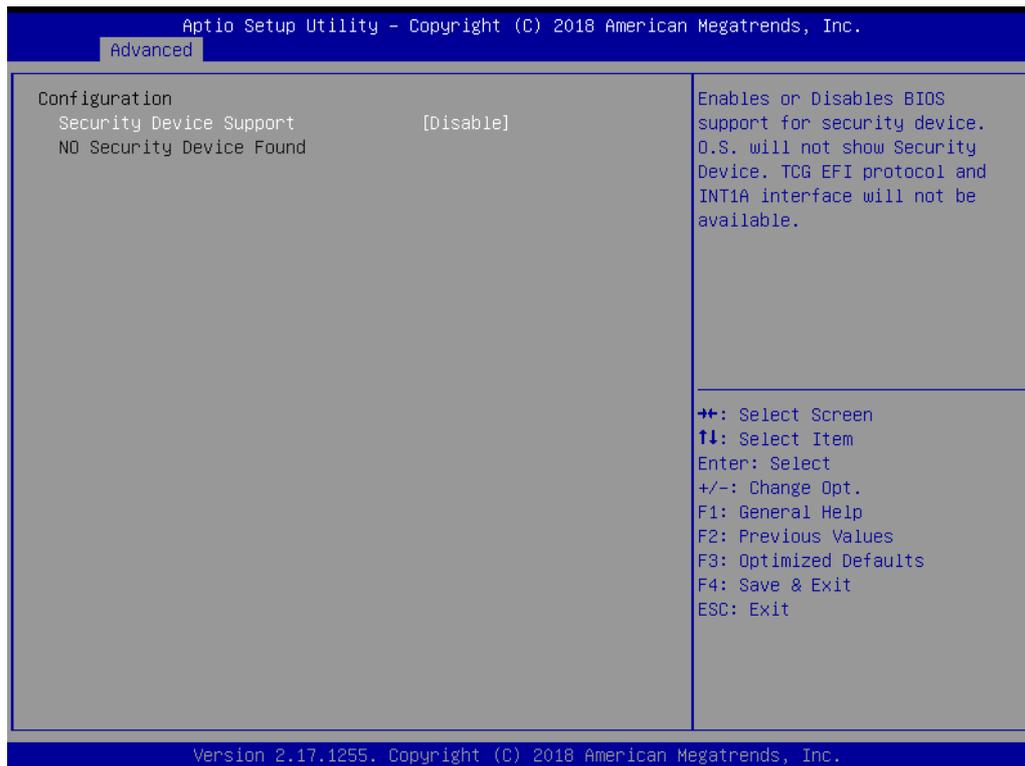


Figure 3.2 Advanced BIOS setup screen

Feature	Option	Description
PCIE_USB3_P1_STRP	PCie P2 USB3 P8	PCIE/USB3 Combe Port 1 Strap
PCIE_USB3_P0_STRP	PCie P1 USB3 P7	PCIE/USB3 Combe Port 0 Strap

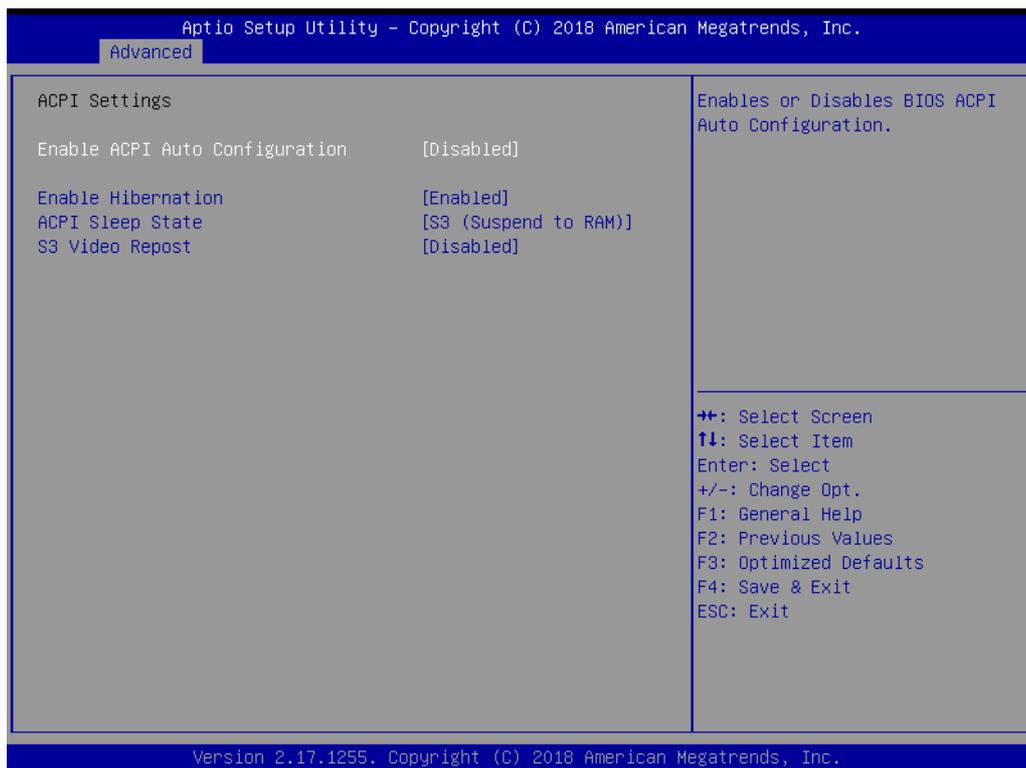
3.2.2.1 Trusted Computing



Trusted Computing is a technology developed and promoted by the Trusted Computing Group. With Trusted Computing, the computer will consistently behave in expected ways, and those behaviors will be enforced by computer hardware and software. Enforcing this behavior is achieved by loading the hardware with a unique encryption key inaccessible to the rest of the system.

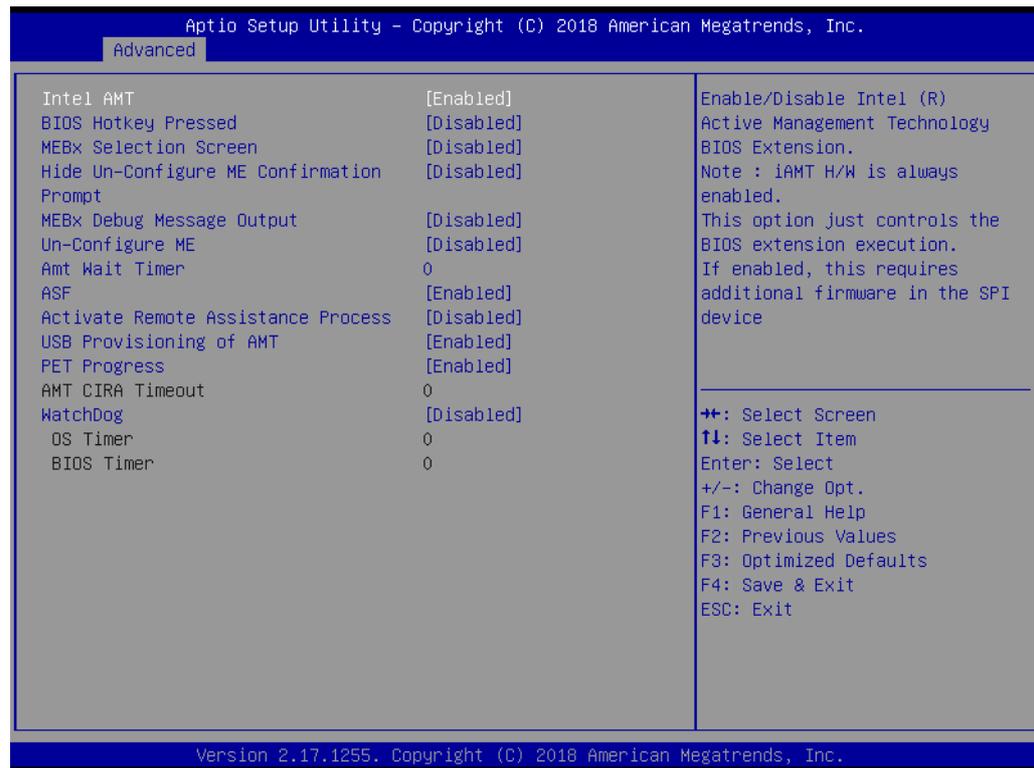
Feature	Option	Description
Security Device Support	Disabled Enabled	Enables or disables the BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not available

3.2.2.2 ACPI Settings



Feature	Option	Description
Enable ACPI Auto Configuration	Disable Enable	Enables or disables BIOS ACPI auto configuration. If this feature is enabled as auto, no more options can be configured.
Enable Hibernation	Disable Enable	Enable or disable system's ability to hibernate (operating system S4 sleep state). Needs OS support for this feature.
ACPI Sleep State	Suspend Disabled S3 (Suspend to RAM)	Select the state used for ACPI system sleep/suspend.
S3 Video Repost	Disable Enable	Enables or disables video BIOS screen when resume from S3 state.

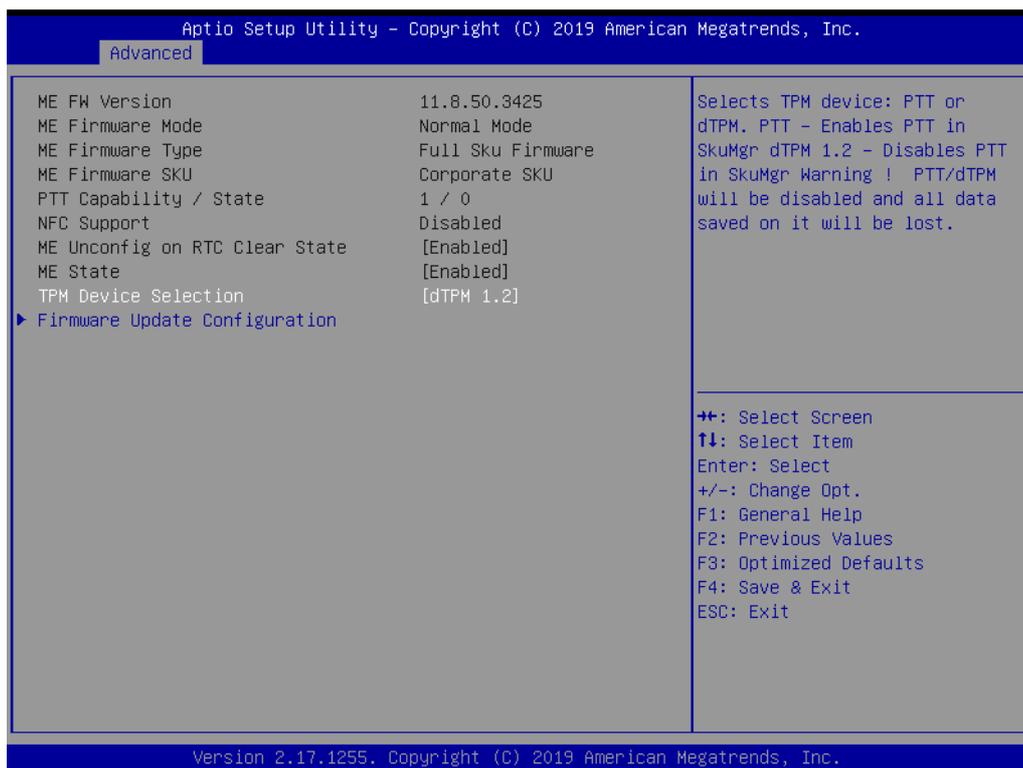
3.2.2.3 AMT Configuration



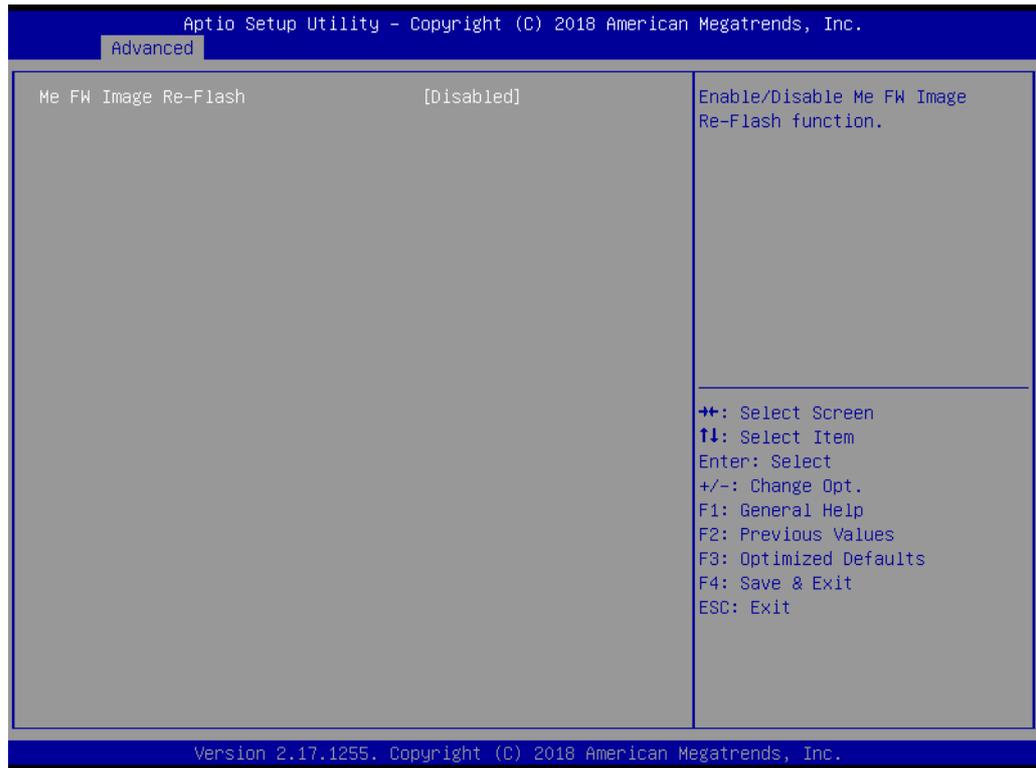
Feature	Option	Description
Intel AMT	Disable Enable	Enable/Disable Intel® Active Management Technology BIOS Extension. Note: iAMT H/W is always enabled. This option just controls the BIOS extension execution. If enabled, this requires additional firmware in the SPI device.
BIOS Hotkey Pressed	Disable Enable	Enable/Disable BIOS hotkey press. Enable this feature will show hotkey prompt at booting up screen
MEBx Selection Screen	Disable Enable	Enable/Disable MEBx selection screen at booting up. This feature allows to enter ME configuration screens OR initiate a remote connection.
Hide Un-Configure ME Confirmation Prompt	Disable Enable	Hide Un-Configure ME without password Confirmation Prompt
MEBx Debug Message Output	Disable Enable	Enable MEBx debug message output. This feature is for debug purpose only.
Un-Configure ME	Disable Enable	Use this item to enable/disable un-configure ME without password.
AMT Wait Timer	0 ~ 65535	Set timer to wait before sending ASF_GET_BOOT_OPTOINS
ASF	Disable Enable	Use this item to enable/disable Alert Specification Format.
Activate Remote Assistance Process	Disable Enable	Use this item to enable/disable trigger CIRA (Client Initiated Remote Access) boot.
USB Provisioning of AMT	Disable Enable	Enable/Disable of AMT USB Provisioning

PET Progress	Disable Enable	User can Enable/Disable PET Events progress to receive PET events or not
AMT CIRA Timeout	0 ~ 65535	Note: To set this option, you need to enable "Activate Remote Assistance Process"
WatchDog	Disable Enable	Enable/Disable Watchdog Timer
OS Timer	0 ~ 65535	Set the WatchDog timer for OS
BIOS Timer	0 ~ 65535	Set the WatchDog timer for BIOS

3.2.2.4 PCH-FW Configuration



Feature	Option	Description
TPM Device Selection	dTPM 1.2 PTT	Select TPM device: 'PTT' - Enables PTT and disables dTPM in SkuMgr. 'dTPM 1.2' - Enables dTPM 1.2 and disables PTT in SkuMgr. Warning: If you enable PTT, dTPM will be disabled and all data saved on it will be lost. Likewise, if you enable dTPM, PTT will be disabled and all data saved on it will be lost.
Firmware Update Configuration	<Sub Menu>	Configure Management Engine Technology Parameters



Feature	Option	Description
ME FW Image Re-Flash	Disable Enable	Enable/Disable ME FW Image Re-Flash function

3.2.2.5 F81216 Super IO Configuration



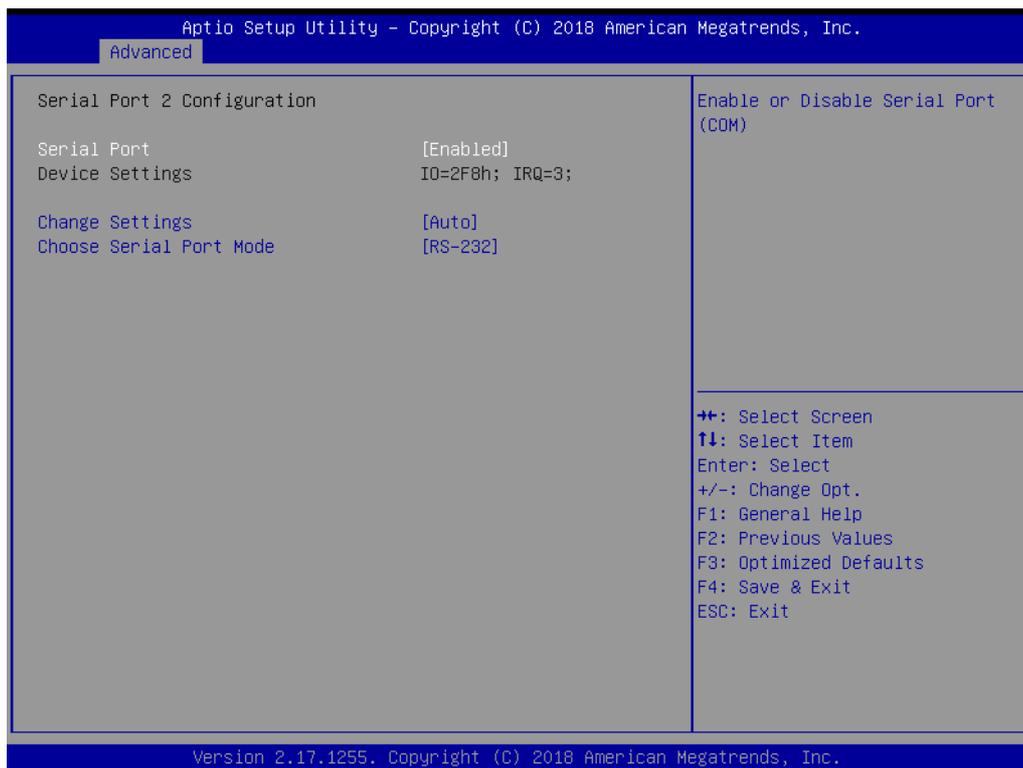
Feature	Option	Description
Serial Port 1 Configuration	<Sub Menu>	Set Parameters of Serial Port 1 (COMA)
Serial Port 2 Configuration	<Sub Menu>	Set Parameters of Serial Port 2 (COMB)
Serial Port 3 Configuration	<Sub Menu>	Set Parameters of Serial Port 3 (COMC)

■ Serial Port 1 Configuration



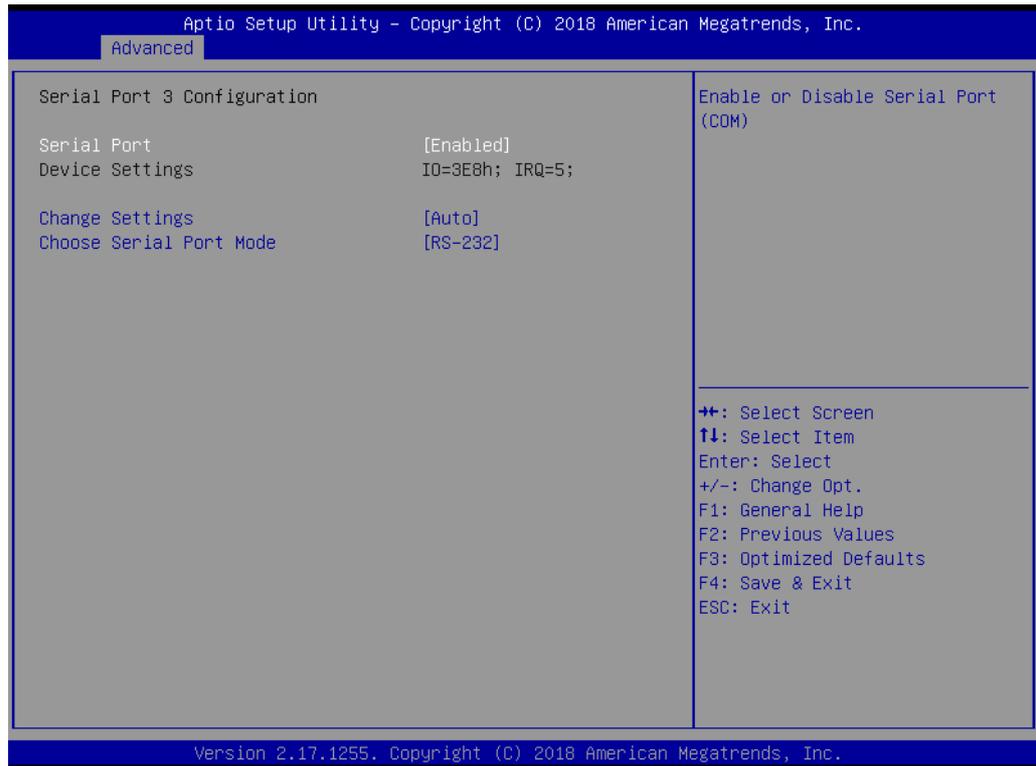
Feature	Option	Description
Serial Port	Disable Enable	Enable or Disable Serial Port (COM)
Device Settings	No option	The current settings
Change Settings	Auto IO=3F8h; IRQ=4; IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;	Select an optimal setting for Super IO device
Choose Serial Port Mode	RS-232 RS-485 RS-422	Change the Serial Port Mode

Serial Port 2 Configuration



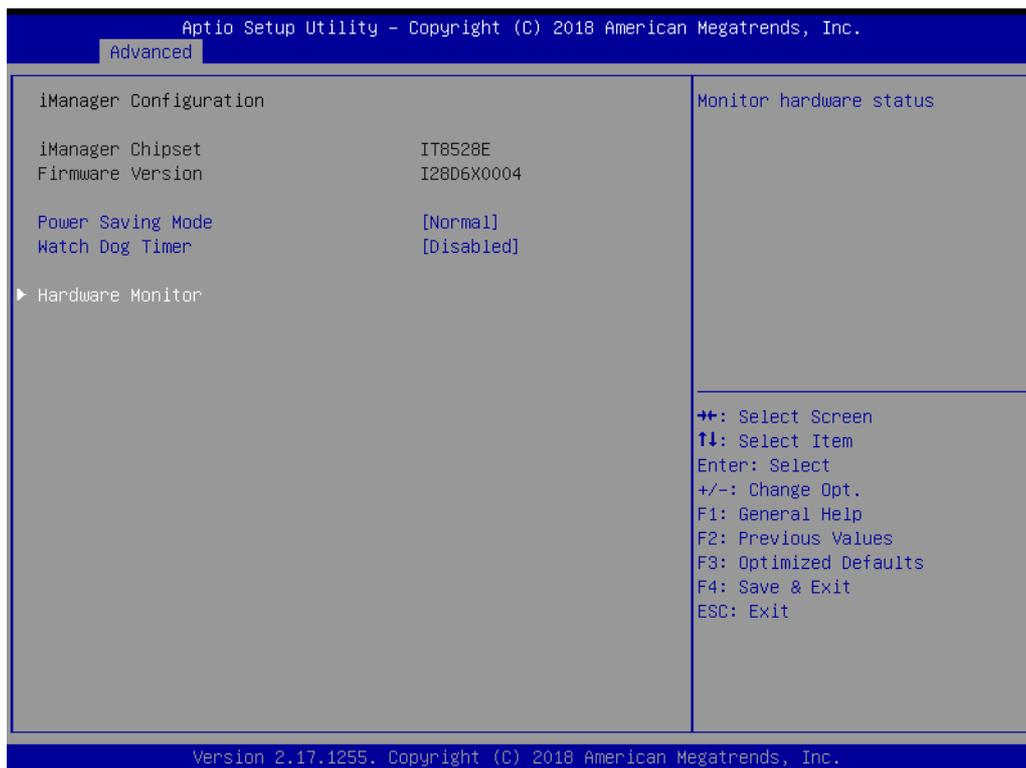
Feature	Option	Description
Serial Port	Disable Enable	Enable or Disable Serial Port (COM)
Device Settings	No option	The current settings
Change Settings	Auto IO=3F8h; IRQ=4; IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;	Select an optimal setting for Super IO device
Choose Serial Port Mode	RS-232 RS-485 RS-422	Change the Serial Port Mode

■ Serial Port 3 Configuration



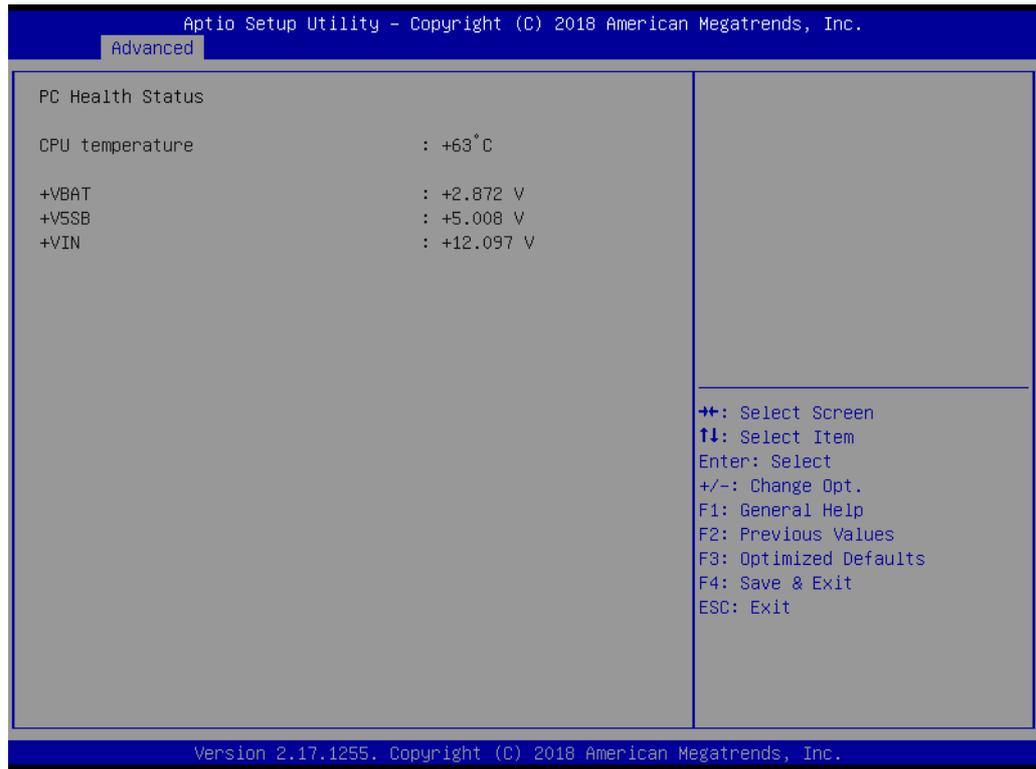
Feature	Option	Description
Serial Port	Disable Enable	Enable or Disable Serial Port (COM)
Device Settings	No option	The current settings
Change Settings	Auto IO=3F8h; IRQ=4; IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;	Select an optimal setting for Super IO device
Choose Serial Port Mode	RS-232 RS-485 RS-422	Change the Serial Port Mode

3.2.2.6 iManager Configuration

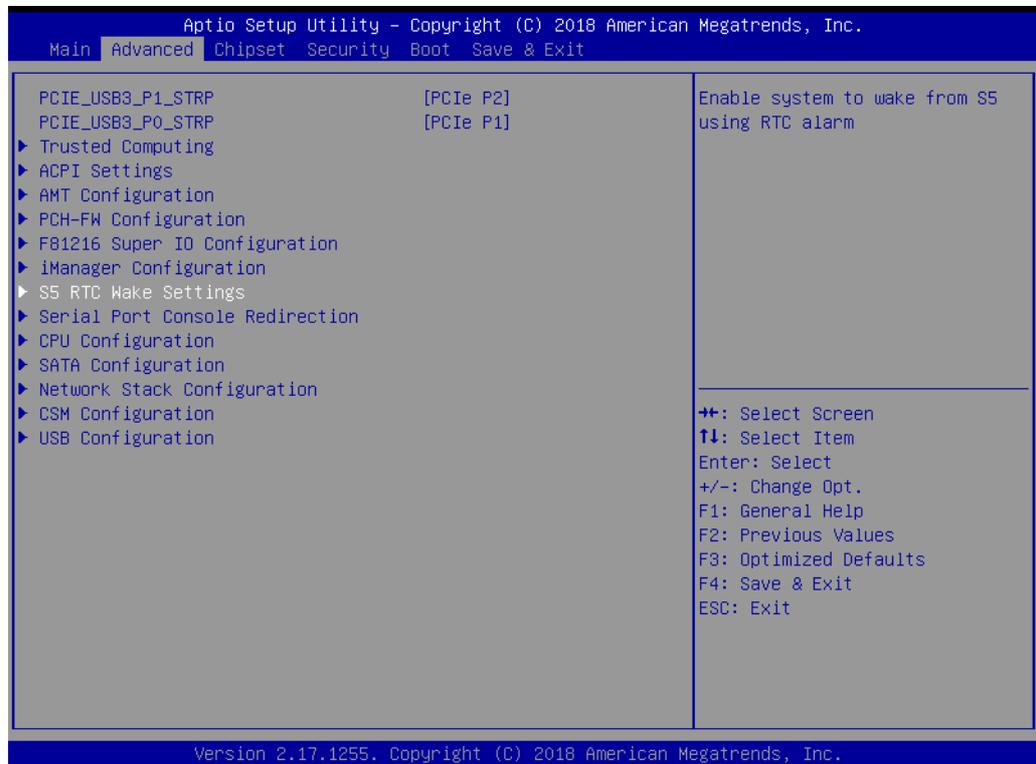


Feature	Option	Description
Power Saving Mode	Normal Deep Sleep	Select Power Saving mode as Normal or Deep Sleep
Watch Dog Timer	Enabled Disabled	Enabled or Disabled Watch Dog Timer function

■ Hardware Monitor

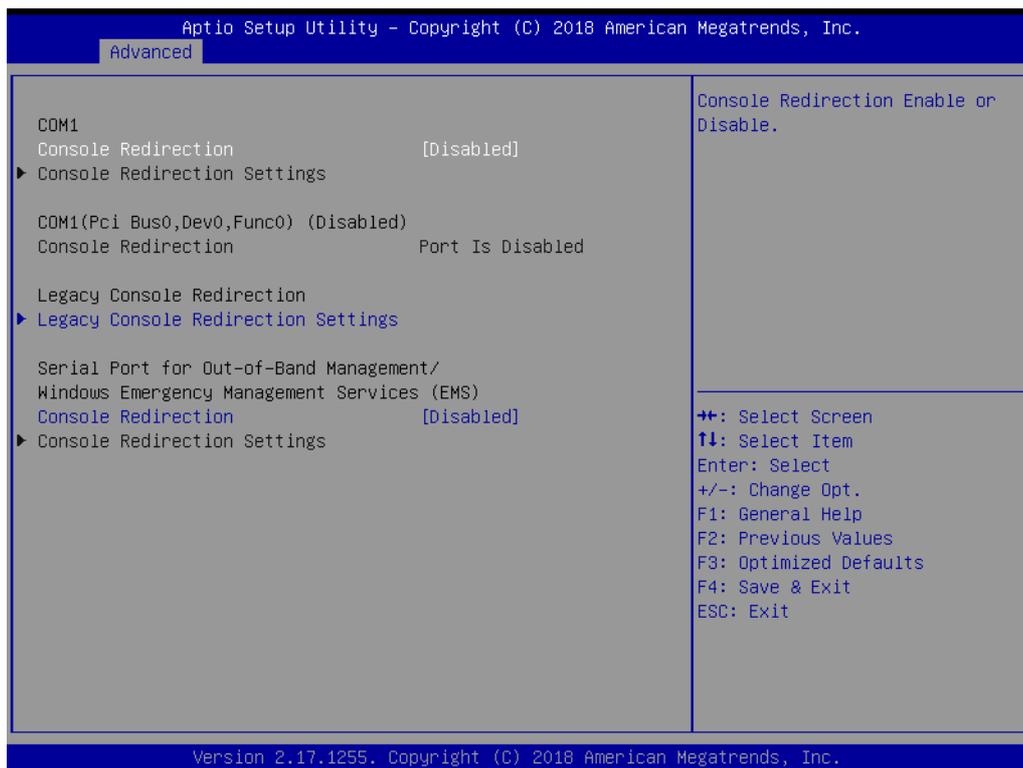


3.2.2.7 S5 RTC Wake Settings



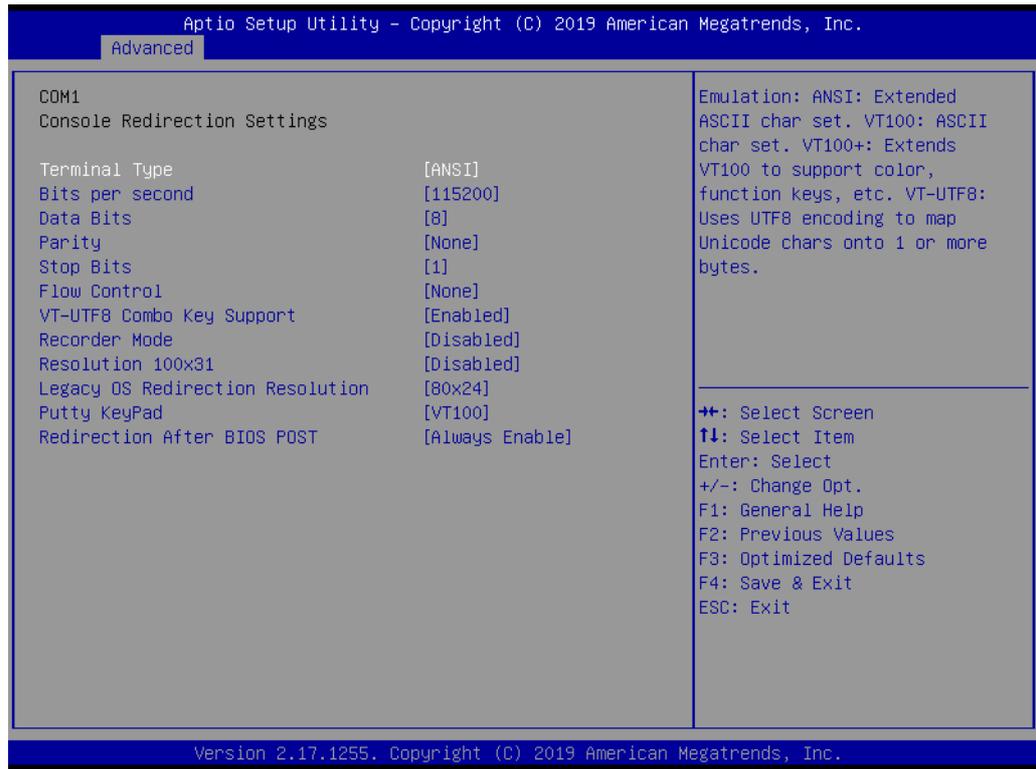
Feature	Option	Description
Wake system from S5	Enabled Disabled	Enable or disable System wake on alarm event.

3.2.2.8 Serial Port Console Redirection



Feature	Option	Description
Console Redirection	Disable Enable	Console Redirection Enable or Disable
Console Redirection Settings	<Sub Menu>	
Legacy Console Redirection Settings	<Sub Menu>	Legacy Console Redirection Settings
Serial Port for Out-of-Band Management / Windows Emergency Management Services (EMS)	Disable Enable	Console Redirection Enable or Disable
Console Redirection Settings	<Sub Menu>	

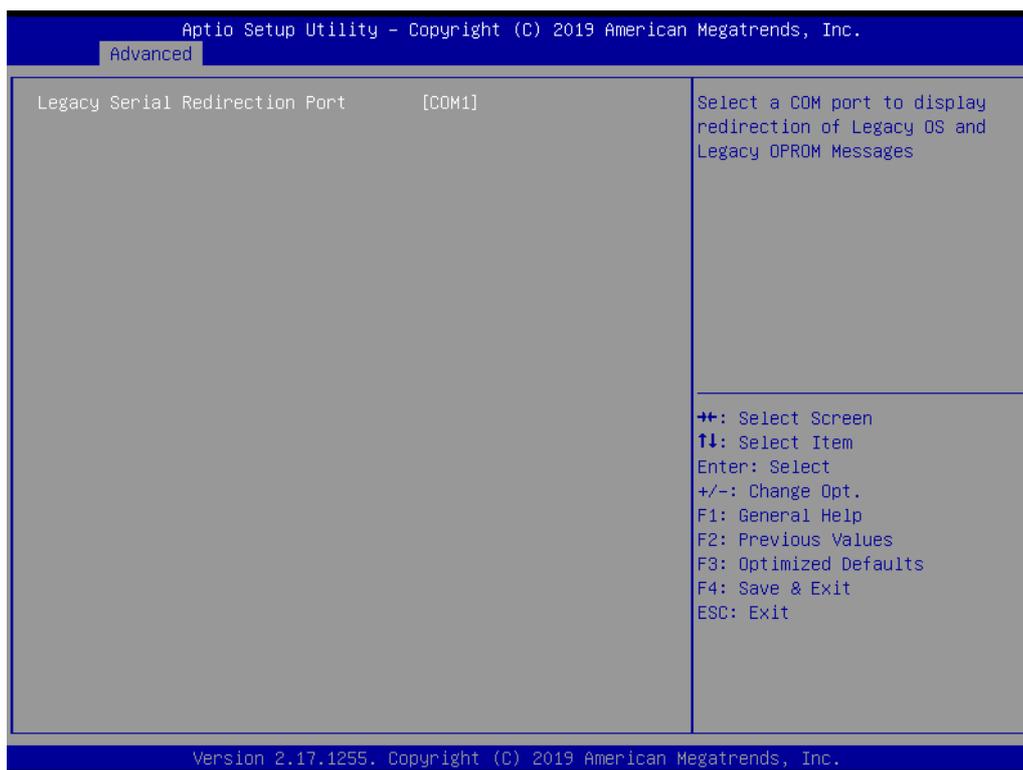
■ Console Redirection Settings



Feature	Option	Description
Terminal Type	VT100 VT100+ VT-UTF8 ANS	Emulation: ANSI: Extnded ASCII char set VT100: ASCII char set VT100+:Extends VT100 to support color, function keys
Bits per second	9600 19200 38400 57600 115200	Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds
Data Bits	7 8	Data Bits
Parity	None Even Odd Mark Space	A parity bit can be sent with the data bits to detect some transmission errors.
Stop Bits	1 2	Stop bits indicate the end of a serial data packet
Flow Control	None Hardware RTS/CTS	Folw control can prevent data loss from buffer overflow.
VT-UTF8 Combo Key Support	Disabled Enabled	Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals

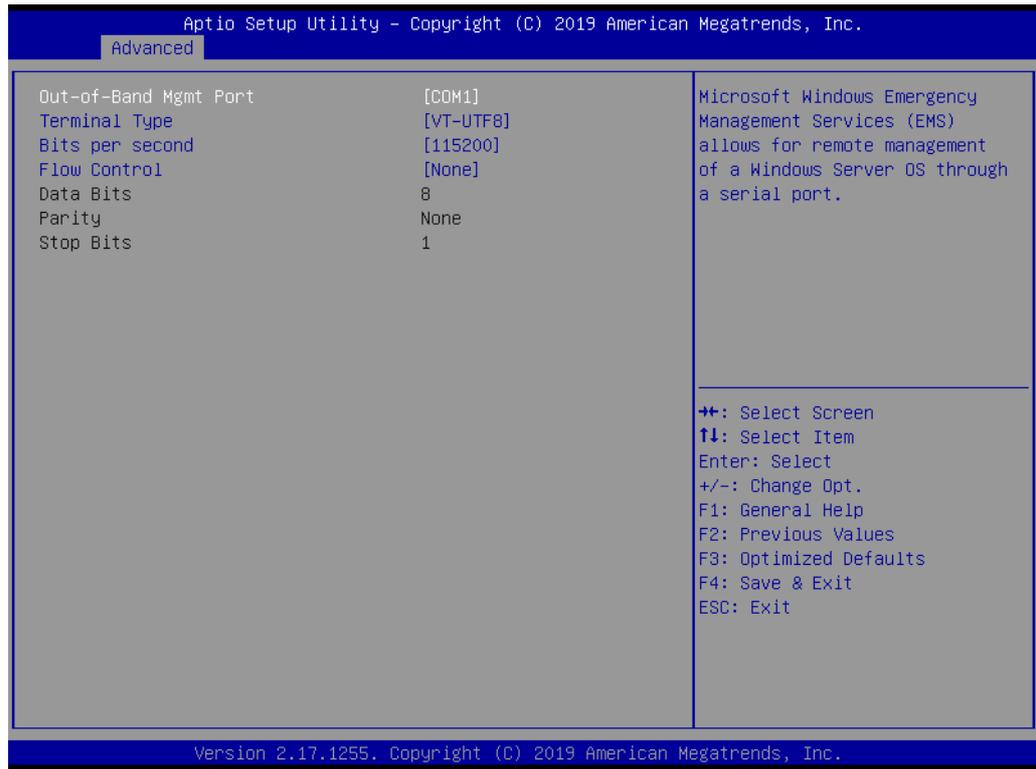
Recorder Mode	Disabled Enabled	With this mode enabled only text will be sent. This is to capture Terminal data
Resolution 100x31	With this mode enabled only text will be sent.	Enables or disables extended terminal resolution
Legacy OS Redirection Resolution	80x24 80x25	On Legacy OS, the Number of Rows and Columns supported redirection
Putty KeyPad	VT100 LINUX XTERMR6 SCO ESCN VT400	Select FunctionKey and KeyPad on Putty
Redirection After BIOS POST	Always Enable BootLoader	The Settings specify if BootLoader is selected then Legacy console redirection is disabled before booting to Legacy OS.

■ Legacy Console Redirection Settings



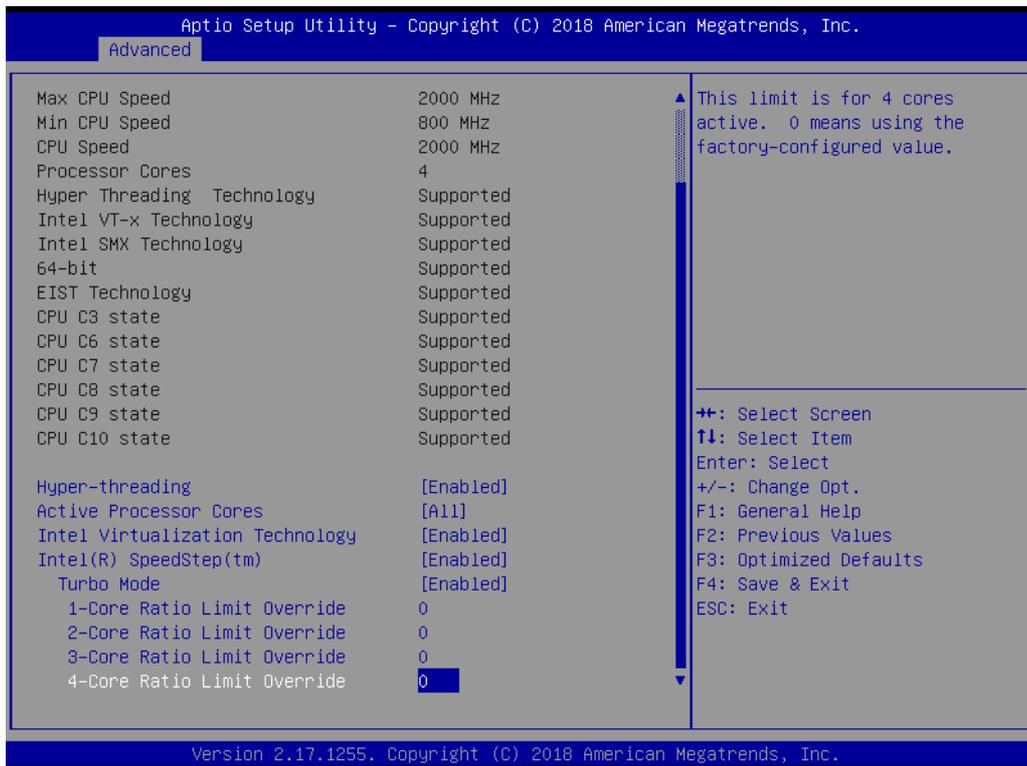
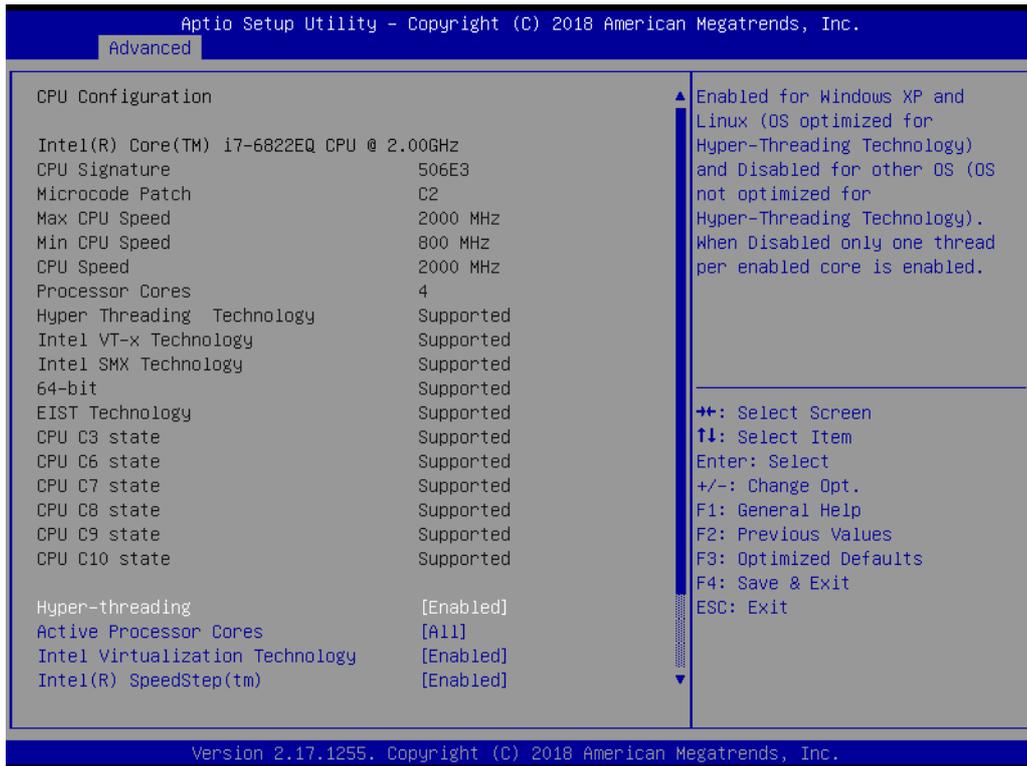
Feature	Option	Description
Legacy Serial Redirection Port	COM1 COM1(Pci Bus0,Dev0,Func0)(Disabled)	Select a COM port to display redirection of Legacy OS and Legacy OPRM Messages

■ Console Redirection Settings



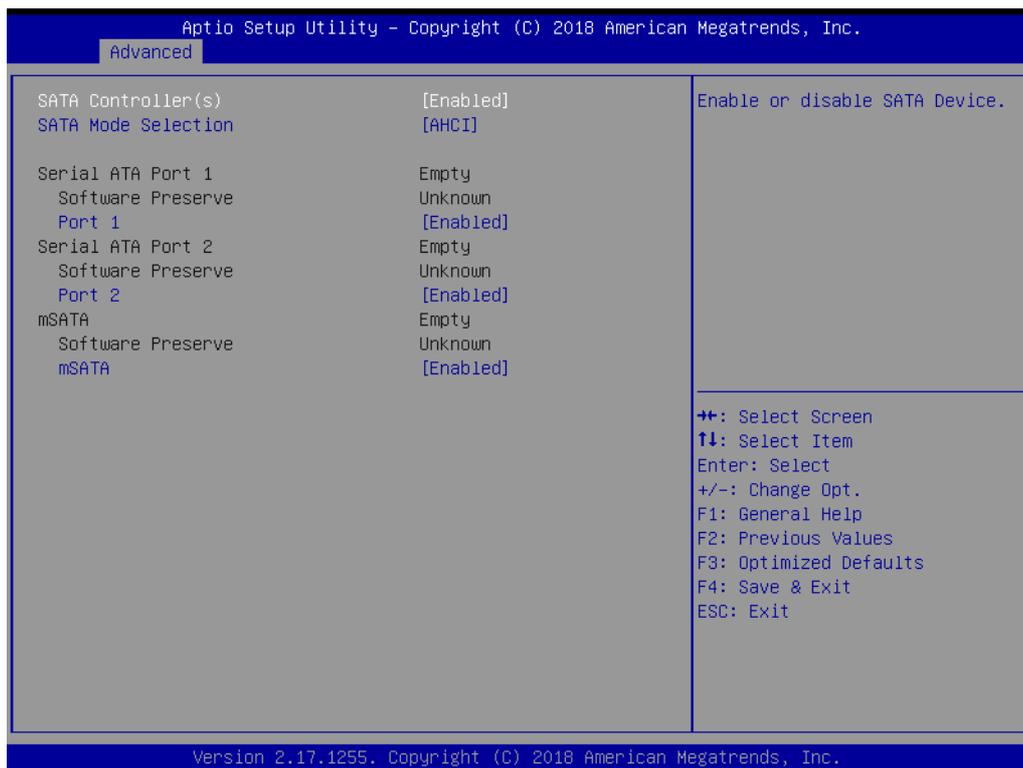
Feature	Option	Description
Out-of-Band Mgmt Port	COM1 COM1(Pci Bus0,Dev0,Func0)(Disabled)	Microsoft Windows Emergency Management Services(EMS) allows for remote management of a Windows Server OS through a serial port
Terminal Type	VT100 VT100+ VT-UTF8 ANSI	VT-UTF8 is the preferred terminal type for out-of-band management.
Bits per second	9600 19200 57600 115200	Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds
Flow Control	None Hardware RTS/CTS Software Xon/Xoff	Flow control can prevent data loss from buffer overflow.

3.2.2.9 CPU Configuration



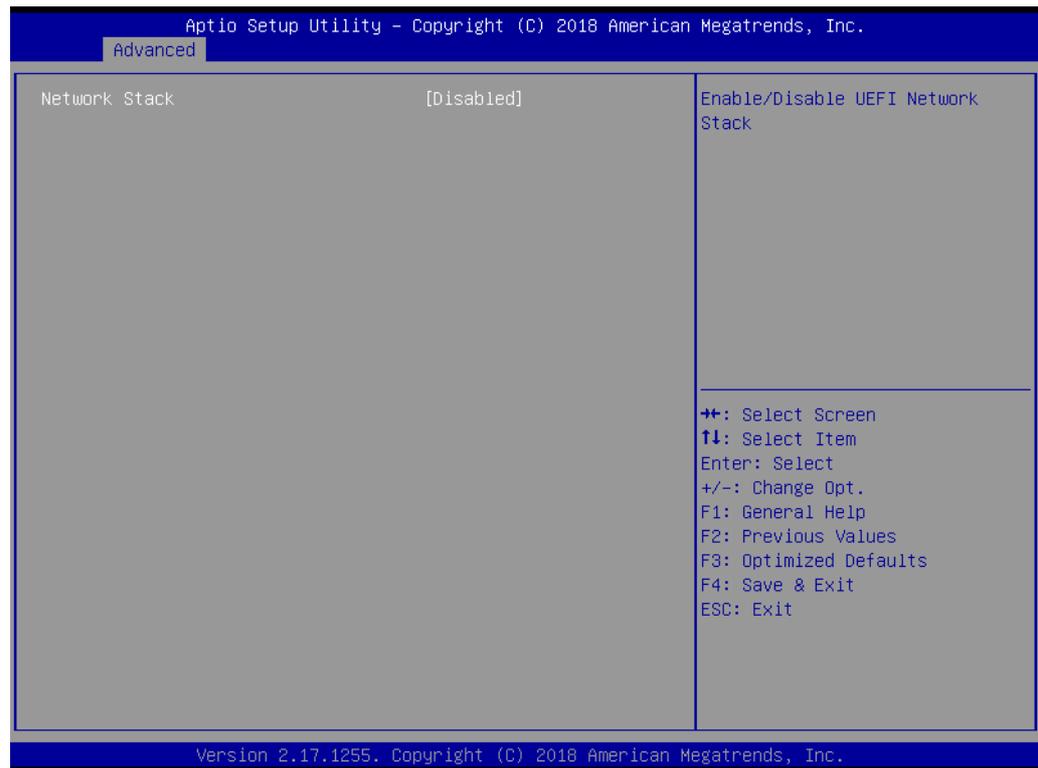
Feature	Option	Description
Hyper-threading	Disable Enable	Enabled or Disable Intel® Hyper-Threading function
Active Processor Cores	All 1 2 3	Set active cores number in processor.
Intel Virtualization Technology	Disable Enable	When enabled, a VMM (Virtual Machine Manager) can utilize the additional hardware capabilities provided by Vander-pool Technology.
Intel® Speed Step™	Disable Enable	Enables or Disable Intel SpeedStep function. Allows the system to dynamically adjust processor voltage and core frequency, decreasing average power consumption and heat production.
Turbo Mode	Disable Enable	Enables or Disables Intel® Turbo Boost Technology. This can accelerate processor and graphics performance for peak loads, automatically allowing processor cores to run faster than the rated operating frequency if they're operating below power, current, and temperature specification limits.

3.2.2.10 SATA Configuration



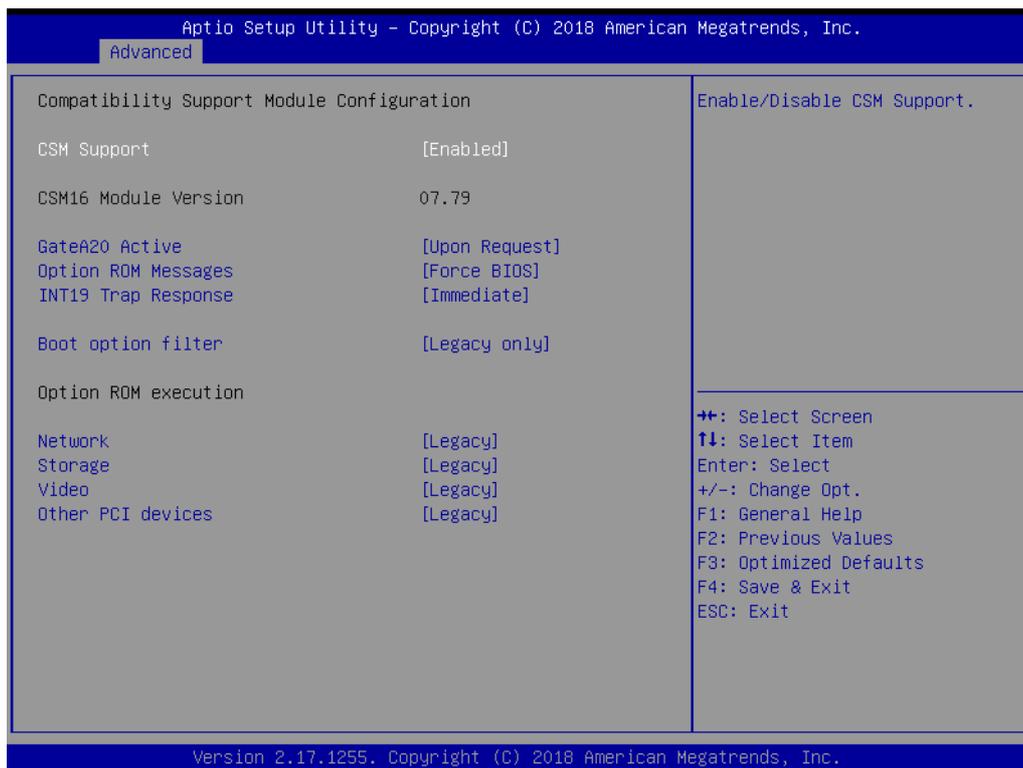
Feature	Option	Description
SATA Controller (s)	Disable Enable	Enable or disable SATA Device
SATA Mode Selection	AHCI RAID	Determines how SATA controller(s) operate
Serial ATA Port 1	Disable Enable	Enable or disable SATA port
Serial ATA Port 2	Disable Enable	Enable or disable SATA port
mSATA	Disable Enable	Enable or disable SATA port

3.2.2.11 Network Stack Configuration



Feature	Option	Description
Network Stack	Disable Enable	Enable or disable the UEFI network stack

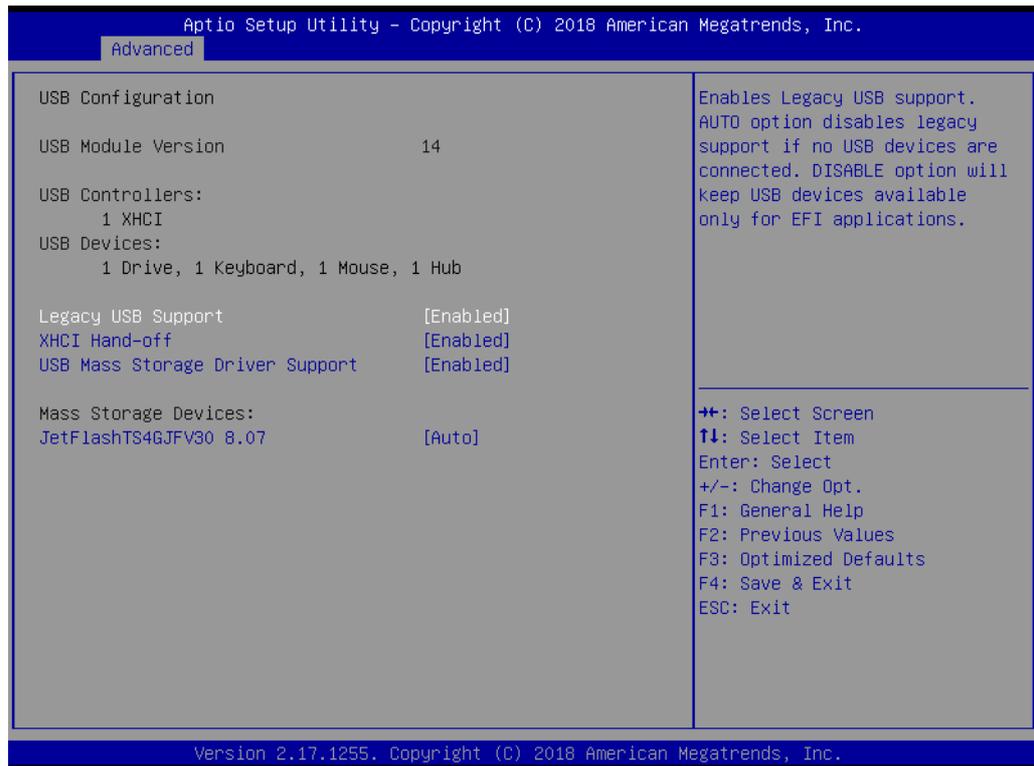
3.2.2.12 CSM Configuration



Feature	Option	Description
CSM Support	Disable Enable	Enable/Disable CSM support
Gate A20 Active	Upon Request Always	'Upon Request' - Gate A20 can be disabled with BIOS services. 'Always' - Gate A20 cannot be disabled. Note: This feature is useful if runtime code above 1MB is executed.
Option ROM Messages	Force BIOS Keep Current	Set display mode for Option ROM
INT19 Trap Response	Immediate Postponed	Set BIOS reaction on INT19 trapping by option ROM: 'Immediate' - Executes the trap right away. 'Postponed' - Executes the trap during legacy boot.
Boot option filter	UEFI and Legacy Legacy only UEFI only	This option controls Legacy/UEFI ROMS priority When you use Win10 IoT image, please choose 'UEFI only'
Network	Do not launch UEFI Legacy	Controls the execution of UEFI and Legacy PXE OpROM When you use Win10 IoT image, please choose 'UEFI'
Storage	Do not launch UEFI Legacy	Controls the execution of UEFI and Legacy Storage OpROM When you use Win10 IoT image, please choose 'UEFI'

Video	Do not launch UEFI Legacy	Controls the execution of UEFI and Legacy Video OpROM When you use Win10 IoT image, please choose 'UEFI'
Other PCI devices	Do not launch UEFI Legacy	Determines OpROM execution policy for devices other than Network, Storage, or Video When you use Win10 IoT image, please choose 'UEFI'

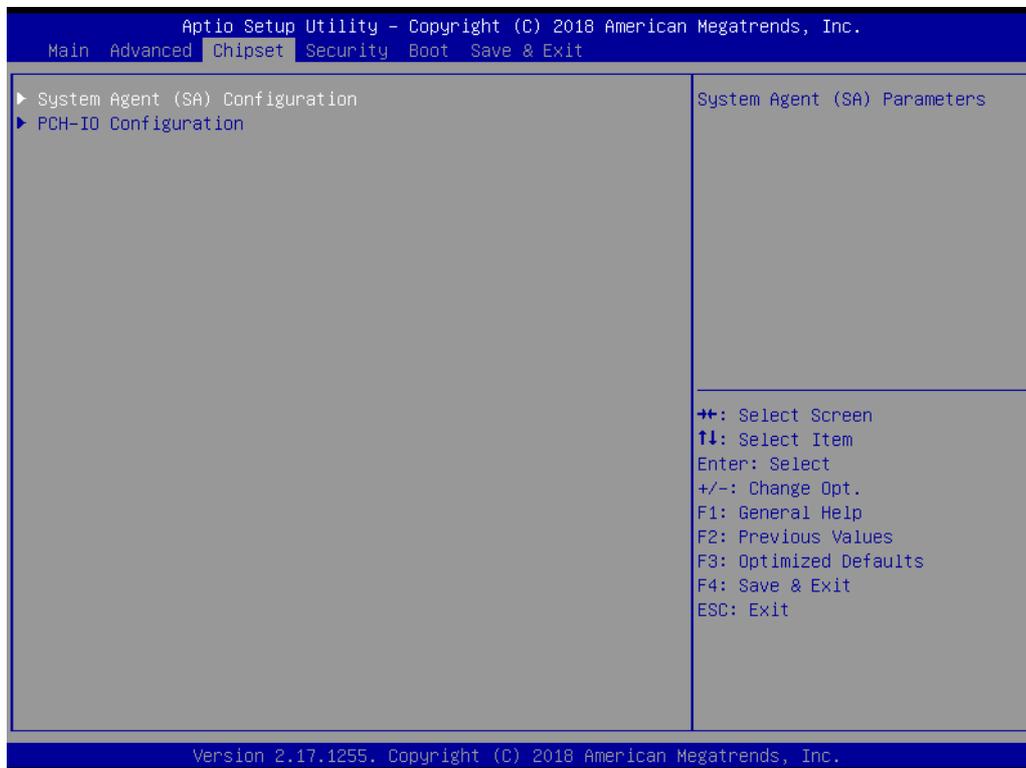
3.2.2.13 USB Configuration



Feature	Option	Description
Legacy USB Support	Disable	Disable this feature to keep USB devices available for EFI applications and BIOS setup only. Select 'Auto' to disable legacy support if no USB devices are connected.
	Enable	
	Auto	
XHCI Hand-off	Disable	This feature is a workaround for operating system without xHCI hand-off support. Note: If this feature is enabled, the xHCI ownership change should be claimed by the xHCI operating system driver.
	Enable	
USB Mass Storage Driver Support	Disable Enable	Enable/Disable USB Mass Storage Driver Support

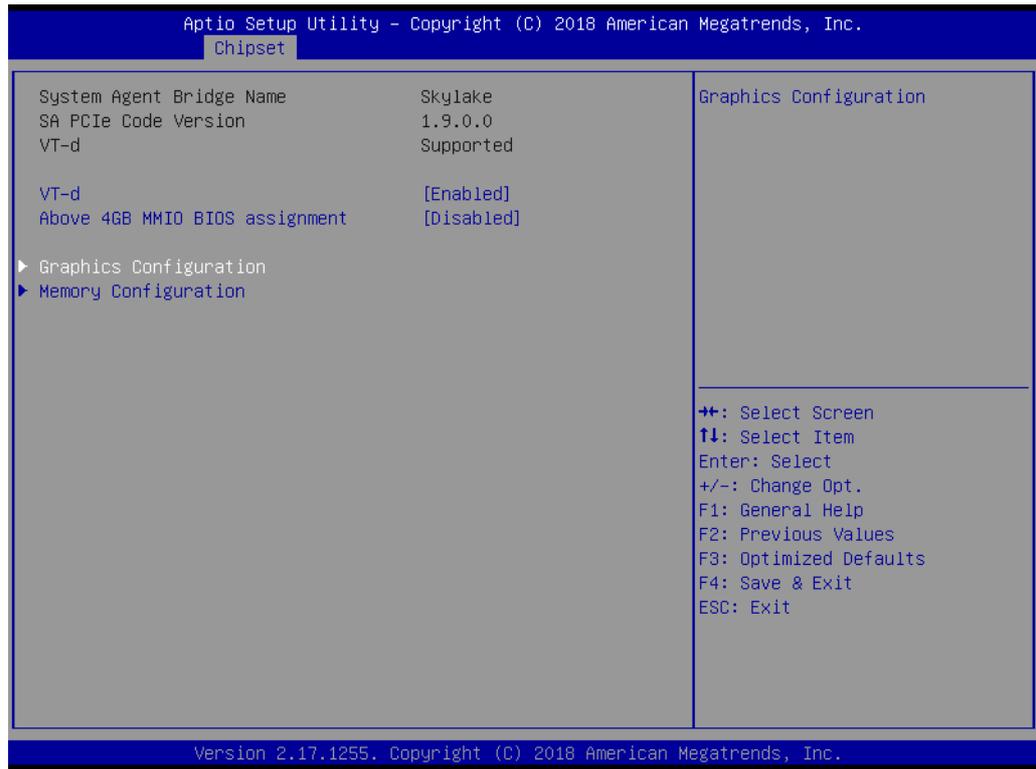
3.2.3 Chipset

Select the **Chipset** tab from the **ARK-2250R** setup screen to enter the Chipset BIOS Setup screen. You can display a Chipset BIOS Setup option by highlighting it using the <Arrow> keys. All Plug and Play BIOS Setup options are described in this section. The Plug and Play BIOS Setup screen is shown below.



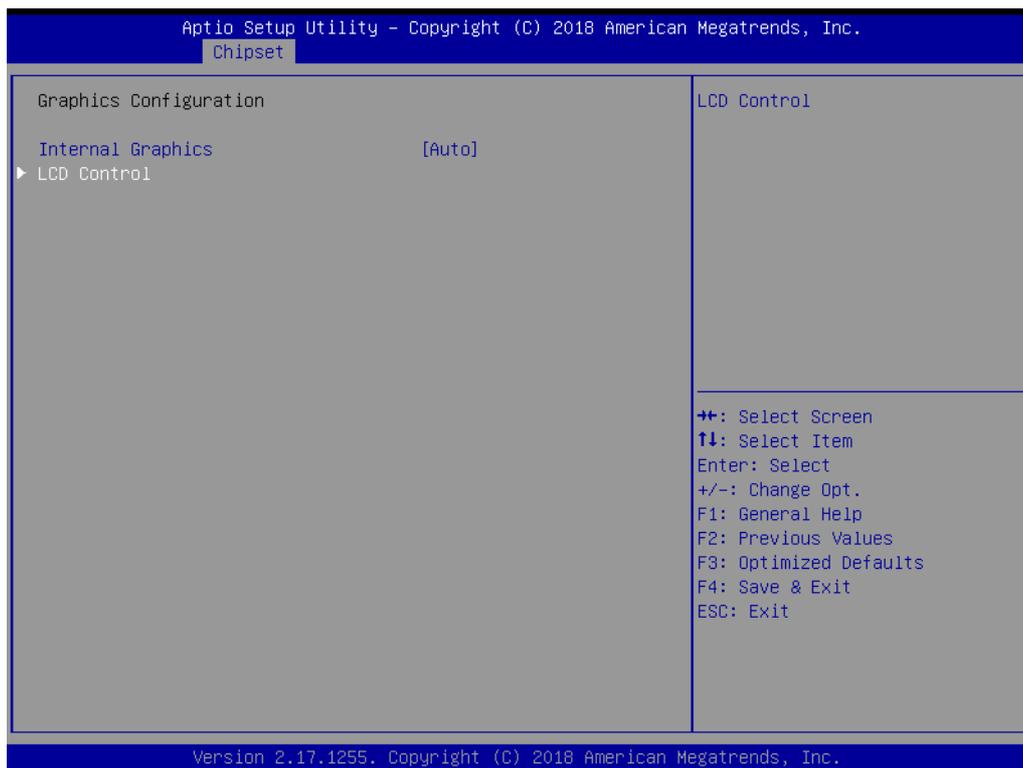
Feature	Option	Description
System Agent (SA) Configuration	<Sub Menu>	Config System Agent Parameters
PCH-IO Configuration	<Sub Menu>	Config PCH Parameters

3.2.3.1 System Agent & PCH Configuration



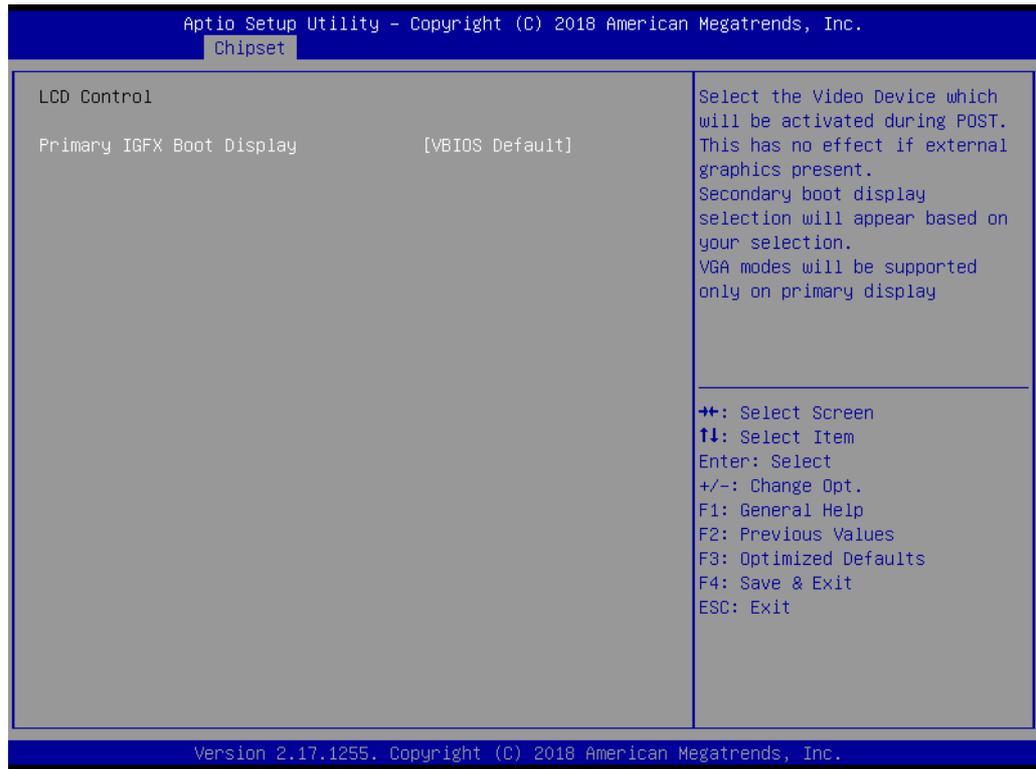
Feature	Option	Description
VT-d	Disable Enable	Enable/Disable VT-d (Intel® Virtualization Technology for Directed I/O)
Above 4GB MMIO BIOS assignment	Disable Enable	Enable/Disable above 4GB Memory-Mapped IO BIOS assignment This is disabled automatically when Aperture Size is set to 2048MB.

■ Graphics Configuration



Feature	Option	Description
Internal Graphics	Auto	Keep IGFX enabled based on the setup options
	Disabled	
	Enabled	

■ LCD Control



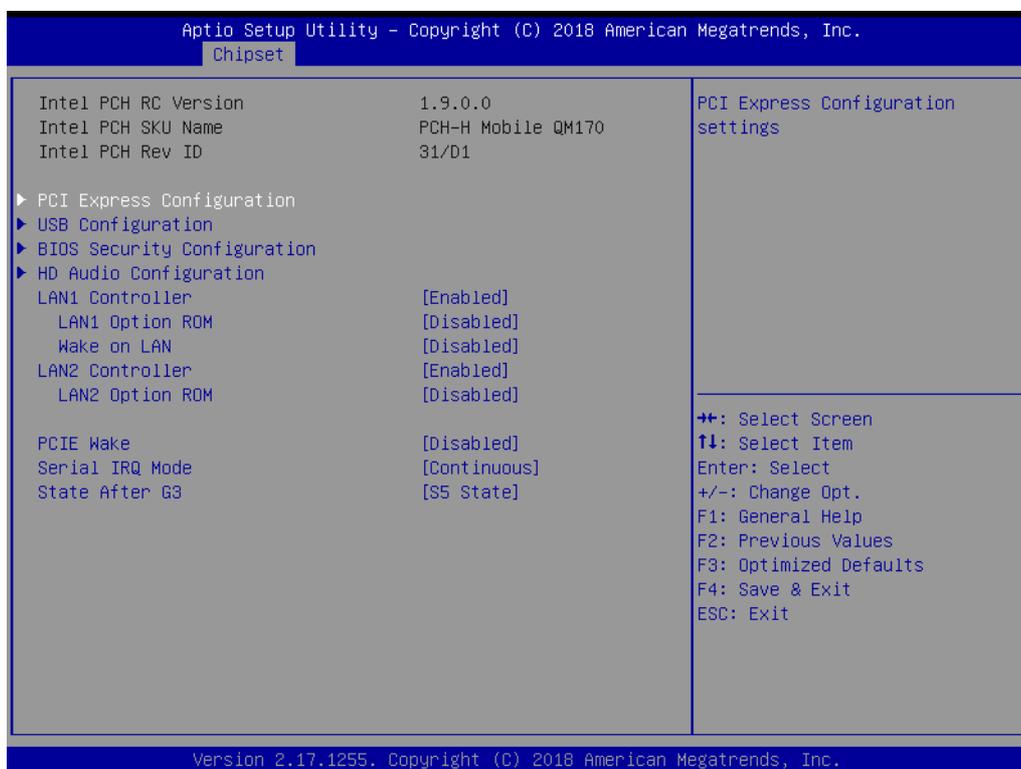
Feature	Option	Description
Primary IGFX Boot Display	VBIOS Default CRT(VGA) HDMI1(DDI1) HDMI2(DDI2)	Select the Video Device which will be activated during POST.

■ Memory Configuration

This page shows memory information

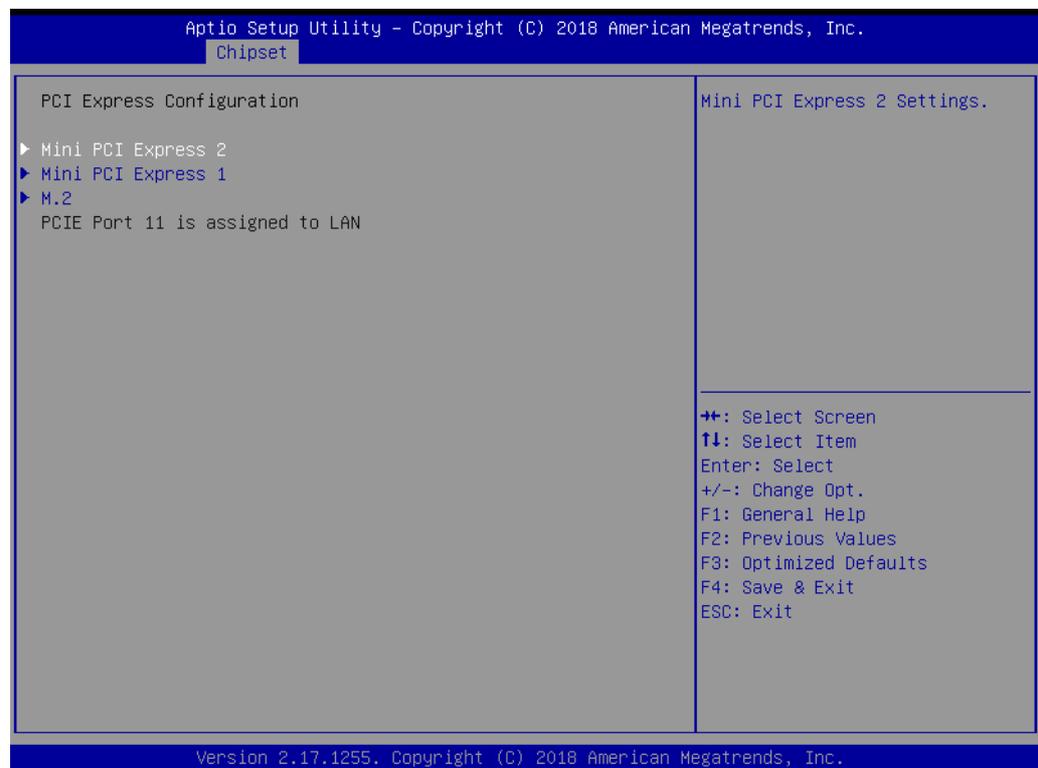


3.2.3.2 PCH-IO Configuration

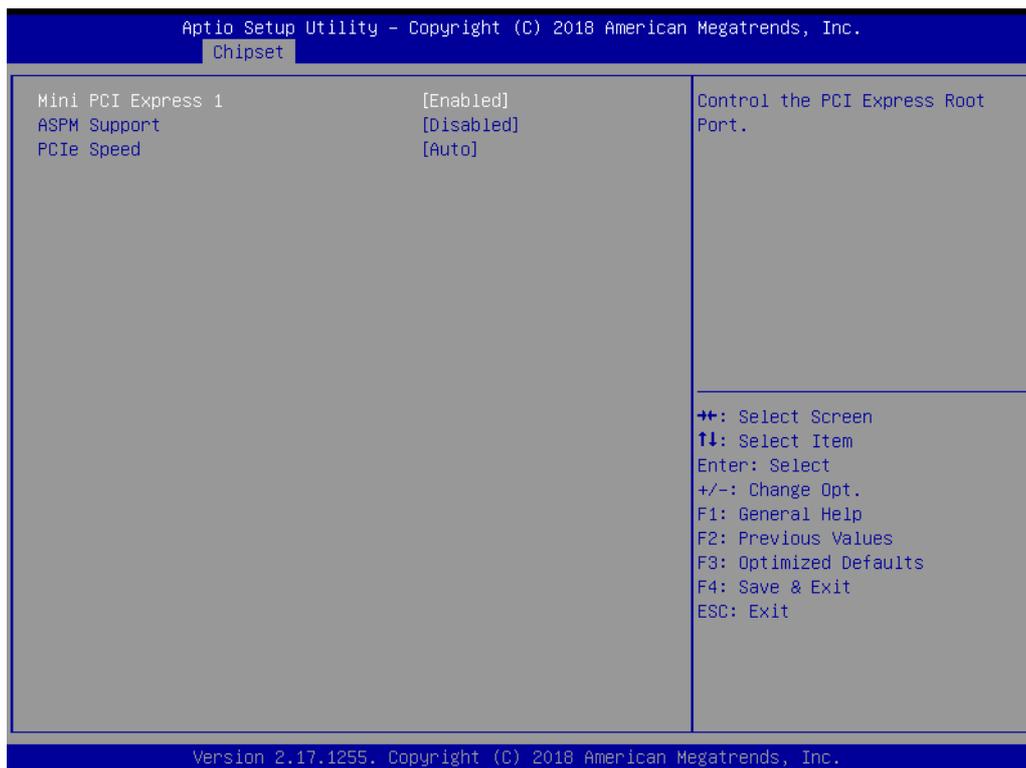


Feature	Option	Description
PCI Express Configuration	<Sub Menu>	PCI Express Configuration settings
USB Configuration	<Sub Menu>	USB Configuration settings
BIOS Security Configuration	<Sub Menu>	BIOS Security Configuration settings
HD Audio Configuration	<Sub Menu>	HD Audio Subsystem Configuration settings
LAN1 Controller	Enabled Disabled	Enable or disable onboard NIC
LAN1 Option ROM	Enabled Disabled	Enable or disable LAN1 Boot Options for Legacy Network Devices
Wake on LAN	Enabled Disabled	Enable or disable integrated LAN to wake the system
LAN2 Controller	Enabled Disabled	Control the PCI Express Root Port
LAN2 Option ROM	Enabled Disabled	Enable or disable LAN2 Boot Options for Legacy Network Devices
PCIE Wake	Enabled Disabled	Enable or disable PCIe to wake the system from S5
Serial IRQ Mode	Quiet Continuous	Configure Serial IRQ Mode
State After G3	S0 State S5 State	Specify what state to to when power is re-applied after a power failure

■ PCI Express Configuration

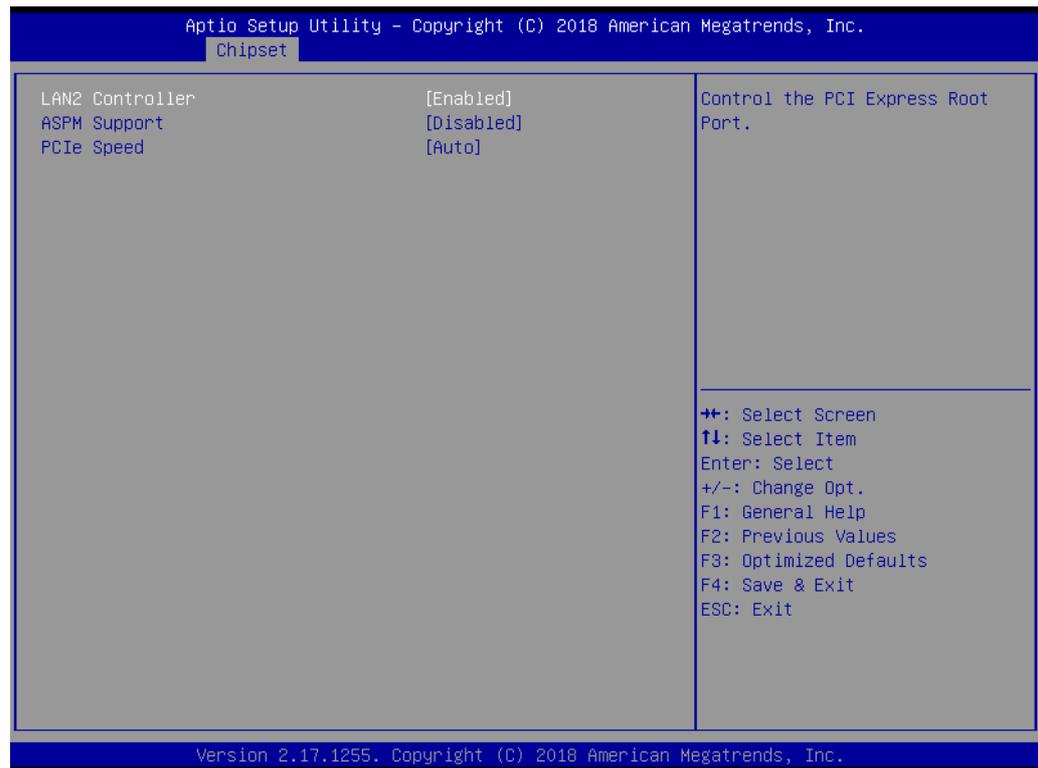


■ Mini PCI Express 1



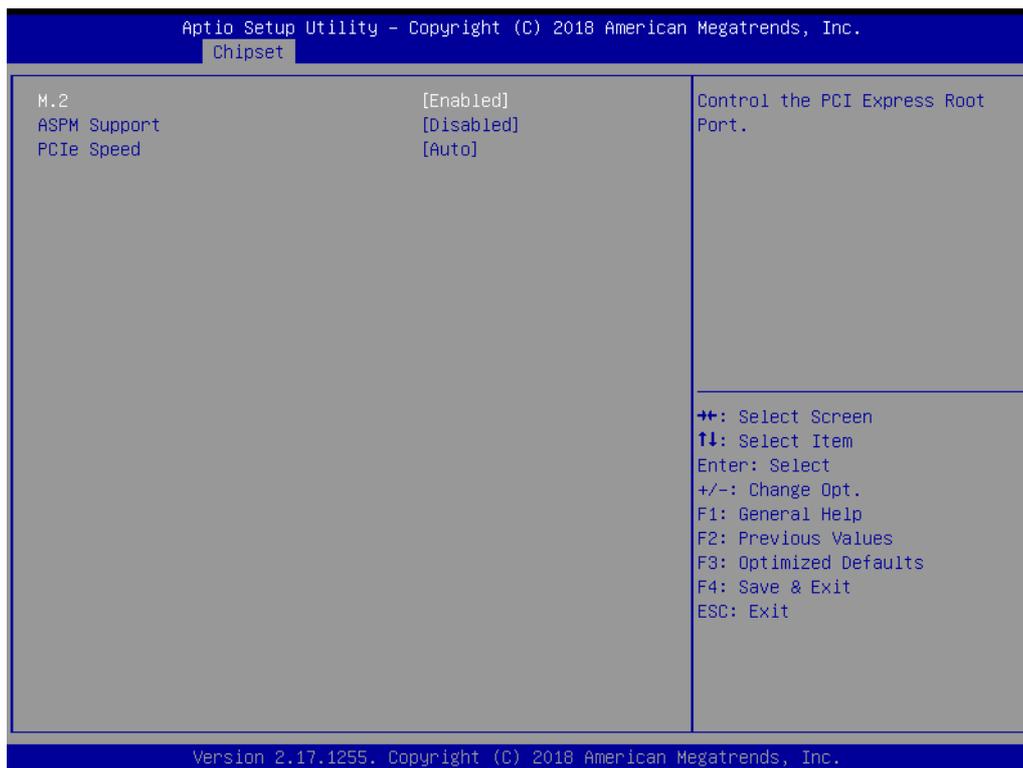
Feature	Option	Description
Mini PCI Express Root Port 1~2	Disabled Enabled	Control the PCI Express Root Port
ASPM Support	Disabled L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s - Force all links to L0s State Auto - BIOS auto configure Disable - Disable ASPM
PCIe Speed	Auto Gen1 Gen2 Gen3	Select PCI Express port speed

■ Mini PCI Express 2



Feature	Option	Description
LAN2 Controller	Disabled Enabled	Control the PCI Express Root Port
ASPM Support	Disabled L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s - Force all links to L0s State Auto - BIOS auto configure Disable - Disable ASPM
PCIe Speed	Auto Gen1 Gen2 Gen3	Select PCI Express port speed

■ **M.2**



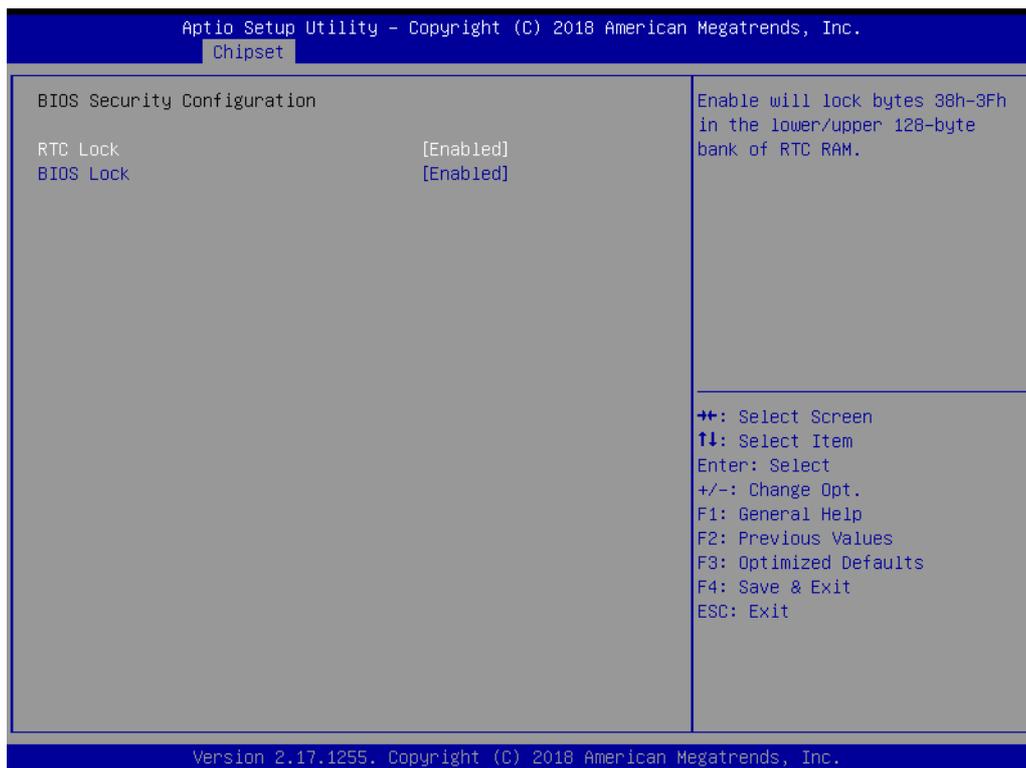
Feature	Option	Description
M.2	Disabled Enabled	Control the PCI Express Root Port
ASPM Support	Disabled L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s - Force all links to L0s State Auto - BIOS auto configure Disable - Disable ASPM
PCIe Speed	Auto Gen1 Gen2 Gen3	Select PCI Express port speed

■ USB Configuration



Feature	Option	Description
XHCI Disable Compliance Mode	FALSE	Options to disable Compliance Mode. Default is FALSE to not disable Compliance Mode. Set TRUE to disable Compliance Mode.
	TRUE	

■ BIOS Security Configuration



Feature	Option	Description
RTC Lock	Disabled	Enable will lock bytes 38h-3Fh in the lower/upper 128-byte bank of RTC RAM
	Enabled	
BIOS Lock	Disabled	Enable/Disable the PCH BIOS Lock
	Enabled	Enable(BLE bit) feature

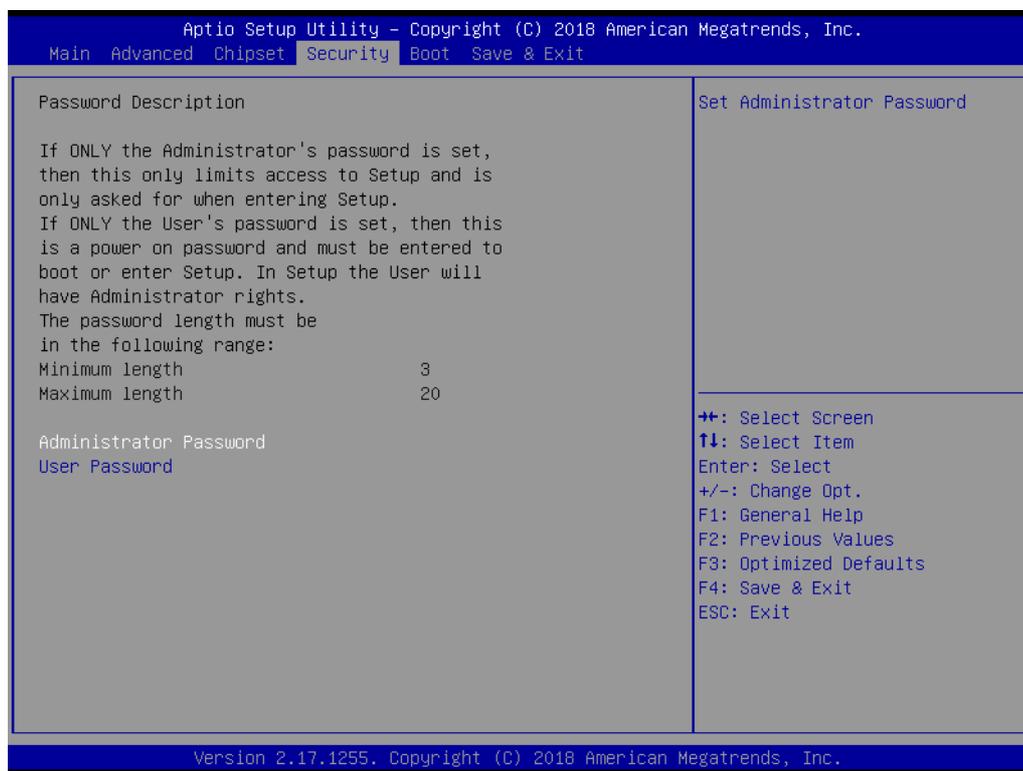
■ HD Audio Configuration



Feature	Option	Description
HD Audio	Disabled	Control Detection of the HD-Audio device. Disabled = HDA will be unconditionally disabled.
	Enabled	Enabled = HDA will be unconditionally enabled
	Auto	Auto = HDA will be enabled if present, disabled otherwise.

3.2.4 Security

Select **Security** tab from the **ARK-2250R** main BIOS setup menu. All security setup options, such as password protection are described in this section. To access the sub menu for the following items, select the item and press <Enter>:



Change Administrator / User Password: Select this option and press **Enter** to access the sub menu, and then type in the password.

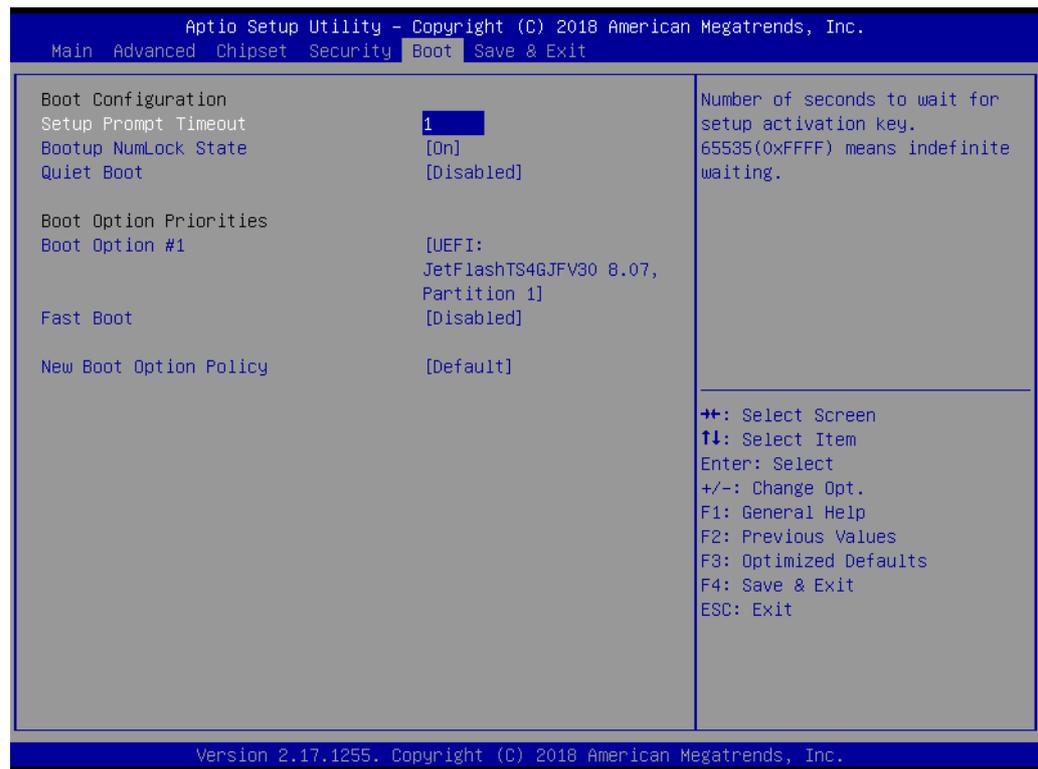
The password length is Minimum 3 digits and maximum 20 digits.

If you set "Administrator Password" only, it will require a password only when entering the BIOS setup.

If you set "User Password" only, it will require a password every boot-up. However, if the Administrator password is not set, using "User Password" to enter the BIOS setup will permit all access privileges.

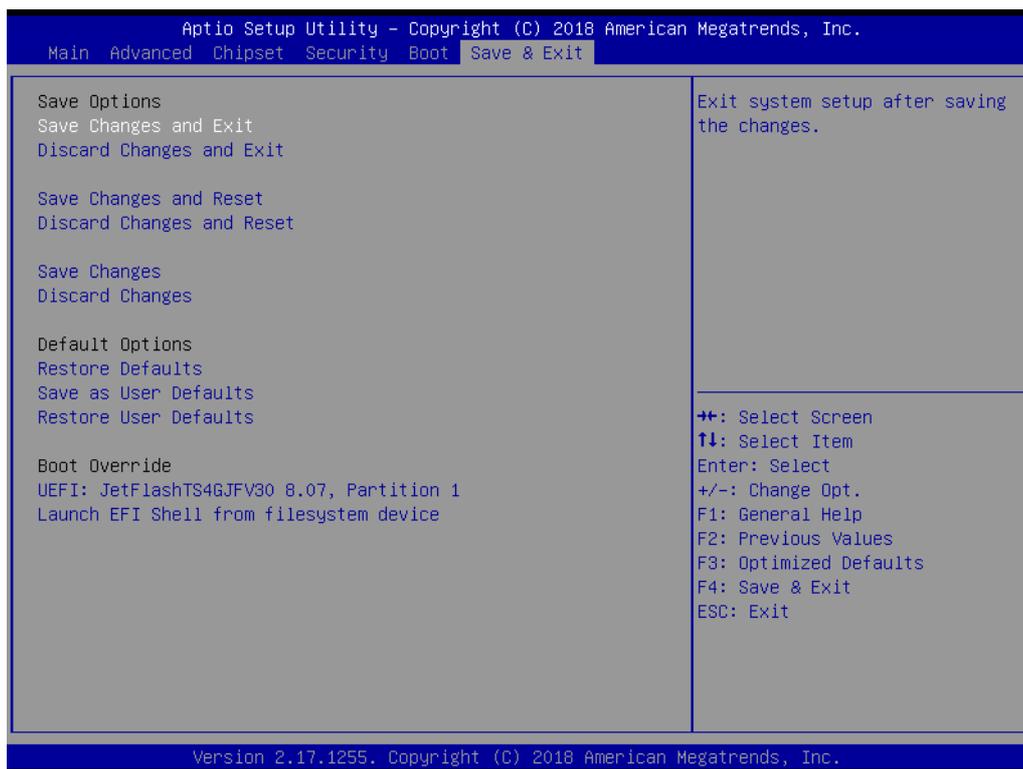
If you set both passwords, it will require a password every boot-up. To boot into the OS, you can use either password. To enter BIOS setup, "Administrator Password" gives all privileges to access all items, while "User Password" only gives partial privileges.

3.2.5 Boot Settings



Feature	Option	Description
Setup Prompt Timeout	1~65535	Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.
Bootup NumLock State	On Off	Select the keyboard Numlock state
Quiet Boot	Disabled Enabled	Enables or disables Quiet Boot option
Fast Boot	Disabled Enabled	Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options
New Boot Option Policy	Default Place First Place Last	Controls the placement of newly detected UEFI boot options

3.2.6 Save & Exit



Feature	Option	Description
Save Changes and Exit	Yes No	Exit system setup after saving the changes
Discard Changes and Exit	Yes No	Exit system setup without saving any changes
Save Changes and Reset	Yes No	Reset the system after saving the changes
Discard Changes and Reset	Yes No	Reset system setup without saving any changes
Save Changes	Yes No	Save Changes done so far to any of the setup options
Discard Changes	Yes No	Discard changes done so far to any of the setup options
Restore Defaults	Yes No	Restore/Load Default values for all the setup options
Save as User Defaults	Yes No	Save the changes done so far as User Defaults
Restore User Defaults	Yes No	Restore the User Defaults to all the setup options.
<Bootable device list>		The bootable devices are displayed in the list. Select one of the devices to boot. It only changes on this boot, and will not change the default boot sequence
Launch EFI Shell from filesystem device		Attempts to Launch EFI Shell application (Shell.efi) from one of the available filesystem devices

Chapter 4

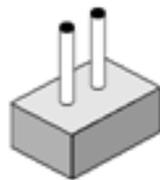
Jumper and Switch Settings

This chapter explains how to set up ARK-2250R Series hardware, including instructions on setting jumpers and connecting peripherals, and how to set switches and read indicators.

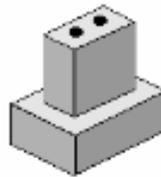
Be sure to read all the safety precautions before beginning the installation procedure.

4.1 Setting Jumpers and Switches

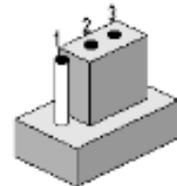
It is possible to configure the In-Vehicle Computing Box to match the needs of the application by resetting the jumpers. A jumper is the simplest kind of electrical switch. It consists of two metal pins and a small metal clip, often protected by a plastic cover that slides over the pins to connect them. To "close" a jumper, connect the pins with the clip. To "open" a jumper, remove the clip. Sometimes a jumper has three pins, labeled 1, 2, and 3. In this case, connect either pins 1 and 2, or pins 2 and 3.



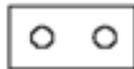
Open



Closed



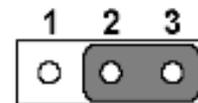
Closed 2-3



Open



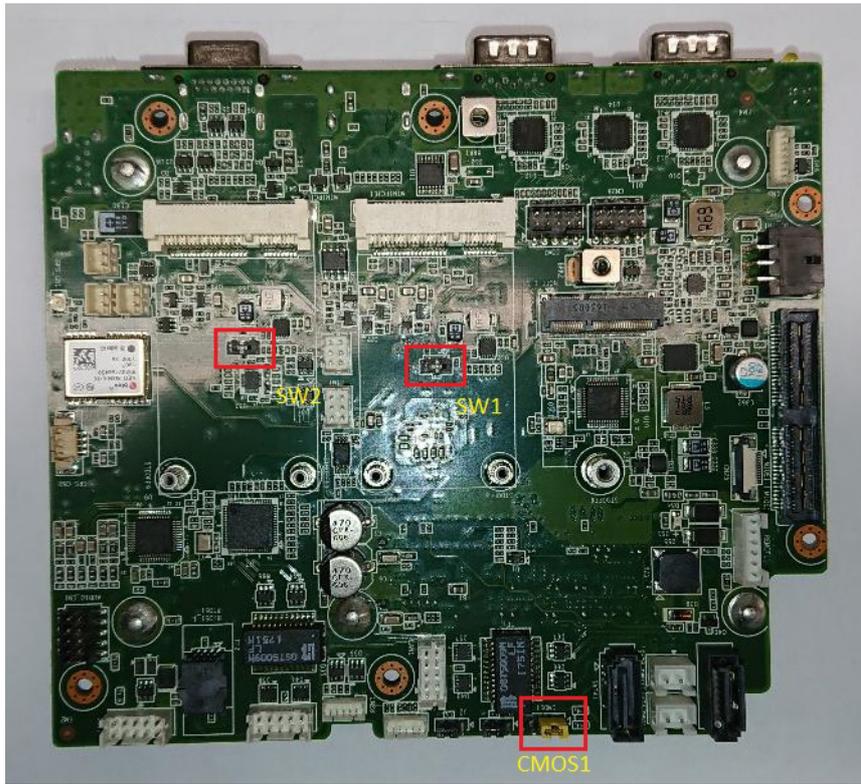
Closed



Closed 2-3

A pair of needle-nose pliers may be helpful when working with jumpers. If there are any doubts about the best hardware configuration for the application, contact the local distributor or sales representative before making any changes. An arrow is used on the motherboard to indicate the first pin of each jumper.

4.2 Jumper location



4.3 Jumper List

4.3.1 I/O Board

Jumpers & Switches

CMOS1	Clear CMOS
SW1	mPCIe Slot#1 Power Supply
SW2	mPCIe Slot#2 Power Supply

4.4 Jumper Setting

4.4.1 Clear CMOS (CMOS1)

1-2	Normal (Default)
2-3	Clear CMOS

4.4.2 MiniPCIe Slot1 Power Setting (SW1)

Pin	Voltage
1	3.3V (Default)
2	N/A
3	3.8V

4.4.3 MiniPCIe Slot2 Power Setting (SW2)

Pin	Voltage
1	3.3V (Default)
2	N/A
3	3.8V

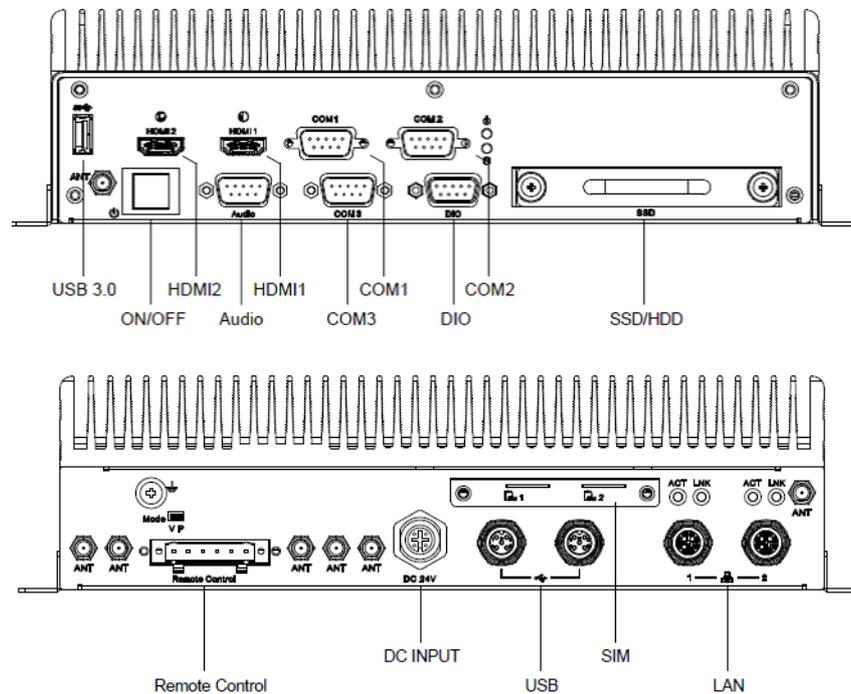
Chapter 5

Pin Assignments

This chapter explains Pin Assignments of ARK-2250R Series.

5.1 I/O Connector Location

5.1.1 ARK-2250R-S9A1E & ARK-2250R-U0A1E Front I/O View



5.2 I/O Connector Pin-Definition

5.2.1 HDMI

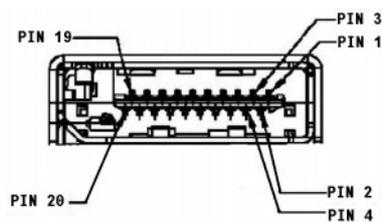
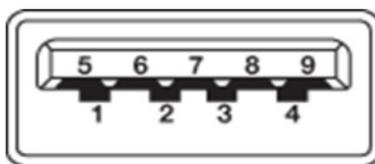


Table 5.1: HDMI / Display Port Connector Pin Assignments

Pin	Signal Name	Pin	Signal Name
1	TMDS_Data2+/ DP_Data0+	2	GND
3	TMDS_Data2-/ DP_Data0-	4	TMDS_Data1+/ DP_Data1+
5	GND	6	TMDS_Data1-/ DP_Data1-
7	TMDS_Data0+/ DP_Data2+	8	GND
9	TMDS_Data0-/ DP_Data2-	10	TMDS_Clock+/ DP_Data3+
11	GND	12	TMDS_Clock-/ DP_Data3-
13	NC	14	NC
15	SCL/ AUX_CH+	16	SDA/ GND
17	DDC GND/ AUX_CH-	18	+5V/ Hot plug detect
19	Hot plug detect/ Return	20	DP_PWR

5.2.2 USB



Pin	Signal Name
1	VBUS
2	USB Data-
3	USB Data+
4	GND
5	StdA_SSRX-
6	StdA_SSRX+
7	GND_DRAIN
8	StdA_SSTX-
9	StdA_SSTX+



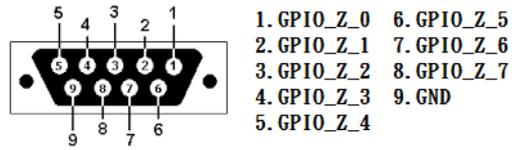
Pin	Signal Name	Pin	Signal Name
1	+5V	2	GND
3	Data+	4	Data-

5.2.3 Ethernet



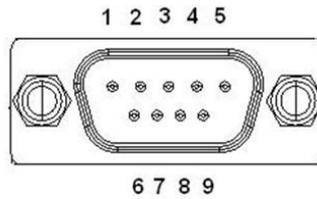
Pin	Signal Name	Pin	Signal Name
1	LAN_M0+	5	LAN_M0-
2	LAN_M1+	6	LAN_M1-
3	LAN_M3+	7	LAN_M3-
4	LAN_M2+	8	LAN_M2-

5.2.4 DIO



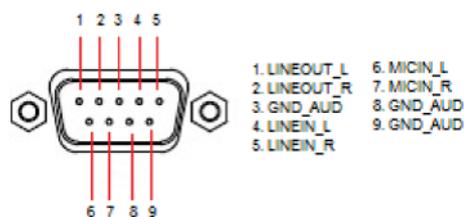
Pin	Signal Name	Pin	Signal Name
1	GPIO_Z_0	6	GPIO_Z_5
2	GPIO_Z_1	7	GPIO_Z_6
3	GPIO_Z_2	8	GPIO_Z_7
4	GPIO_Z_3	9	GND
5	GPIO_Z_4		

5.2.5 COM



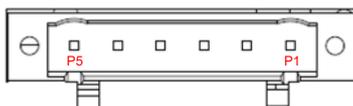
	RS-232	RS-422	RS-485
Pin	Signal Name	Signal Name	Signal Name
1	DCD	Tx-	DATA-
2	RxD	Tx+	DATA+
3	TxD	Rx+	NC
4	DTR	Rx-	NC
5	GND	GND	GND
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC

5.2.6 Audio



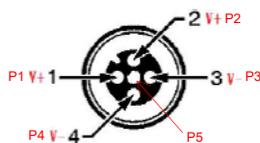
Pin	Signal Name	Pin	Signal Name
1	LINEOUT_L	6	MICIN_L
2	LINEOUT_R	7	MICIN_R
3	GND_AUD	8	GND_AUD
4	LINEIN_L	9	GND_AUD
5	LINEIN_R		

5.2.7 Remote Control



Pin	Signal Name
1	Power LED +5V
2	HDD LED +5V
3	HDD LED Active
4	Power Button
5	Reset Switch
6	GND

5.2.8 DC Input



Pin	Signal Name
1	V+
2	V+
3	V-
4	V-
5	Ignition

5.2.9 External SIM Slots

ARK-2250R provides two external SIM slots, which connects to MiniPCle slot1 & MiniPCle slot2.



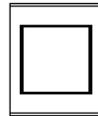
5.2.10 LED Indicator

There are two LEDs on front metal face plate for indicating system status: PWR LED is for power status; and SSD LED is for SSD flash disk status.



5.2.11 Power On/Off Button

ARK-2250R comes with a Power On/Off button, that supports dual function of Soft Power -On/Off (Instant off or Delay 4 Second), and Suspend.



5.2.12 Power Input Mode

ARK-2250R provides two power input modes. P mode means that follow standard PC booting process, V mode means that support vehicle ignition management by vehicle ACC/IGN signal.



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