



# User Manual

## **ARK-2231R-S9A1E**

**ARK-2231R Rolling Stock  
Fanless Computer**

**ADVANTECH**

*Enabling an Intelligent Planet*

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# 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:

[http://www.advantech.com.tw/products/1-flnuyz/ark-2231r/mod\\_93058347-799f-4ffd-812e-701bbf617c3c](http://www.advantech.com.tw/products/1-flnuyz/ark-2231r/mod_93058347-799f-4ffd-812e-701bbf617c3c)

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

甲類警語：

警告使用者：這是甲類資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當對策。

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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.

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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.

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# Declaration of Conformity

## CE

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

## FCC Class B

Note: This equipment has been tested and found to comply with the limits for a Class 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 Tx/ EN50121-3-2(EMC)/ IEC61373 (Shock)

# Technical Support and Assistance

1. Visit the Advantech web site at [www.advantech.com/support](http://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

## 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](mailto: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-2231R-S9A1E unit
- 1 x Hard copy user manual (Simplified Chinese)
- 1 x GPS ANT active w/ 5M SMA cable
- 1 x 6 pin remote control plug block
- 2 x Wall mounting brackets

## Ordering Information

P/N	Description
ARK-2231R-S9A1E	Intel Atom E3845 DC 1.91 GHz

## Extension Layer

P/N	Description
AMK-R100E	Extra 8 x GbE PoE + removable 2.5" drive bay
AMK-R104E	Extra 8 x 10/100 Mbps PoE + removable 2.5" drive bay

## 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.



**Note!** Notes provide optional additional information.



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## 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  $-40^{\circ}\text{C}$  or above  $80^{\circ}\text{C}$ , it may damage the equipment. Operating temperature is  $-40^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .
8. The openings on the enclosure are for air convection. Protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
9. 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.
10. 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.
11. All cautions and warnings on the equipment should be noted.
12. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
13. Never pour any liquid into an opening. This may cause fire or electrical shock.
14. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
15. 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.
16. **CAUTION:** The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if battery is incorrectly replaced. Replace only with same or equivalent type recommended by the manufacture. Discard used batteries according to the manufacturers instructions.
17. **ATTENTION:** L'ordinateur est muni d'un circuit en temps réel de l'horloge alimentée 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.

18. 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.
19. 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.
20. 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.
21. 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

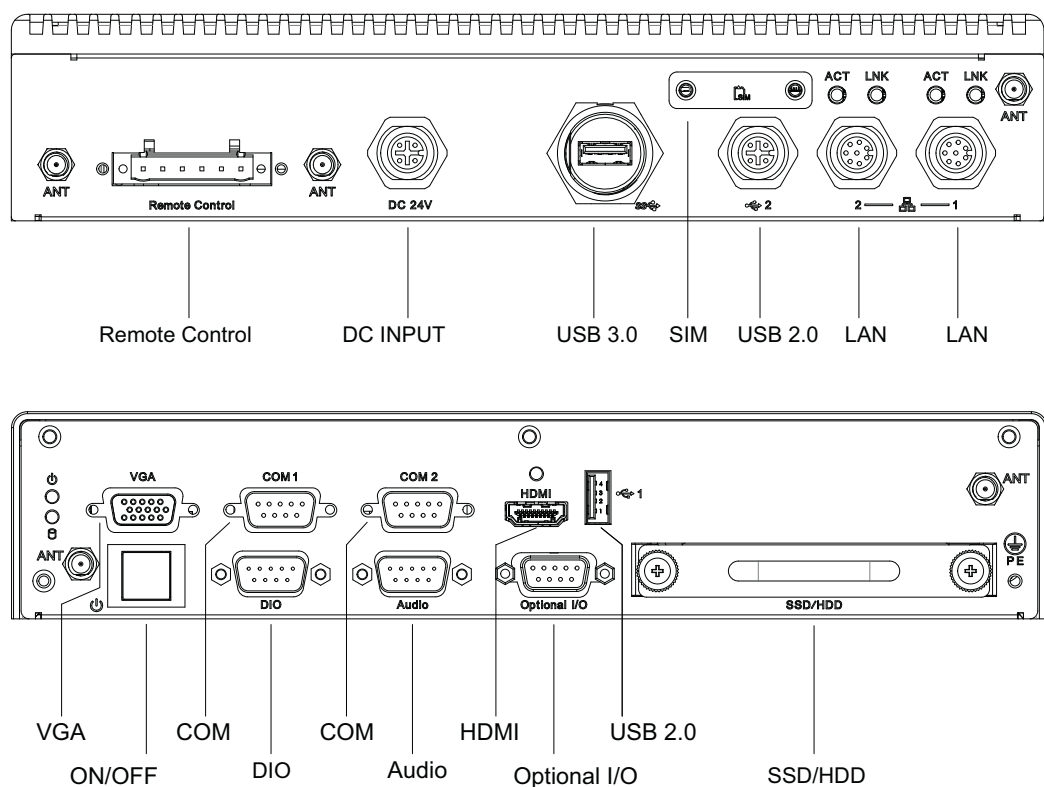
This chapter gives background information on ARK-2231R series.

## 1.1 Introduction

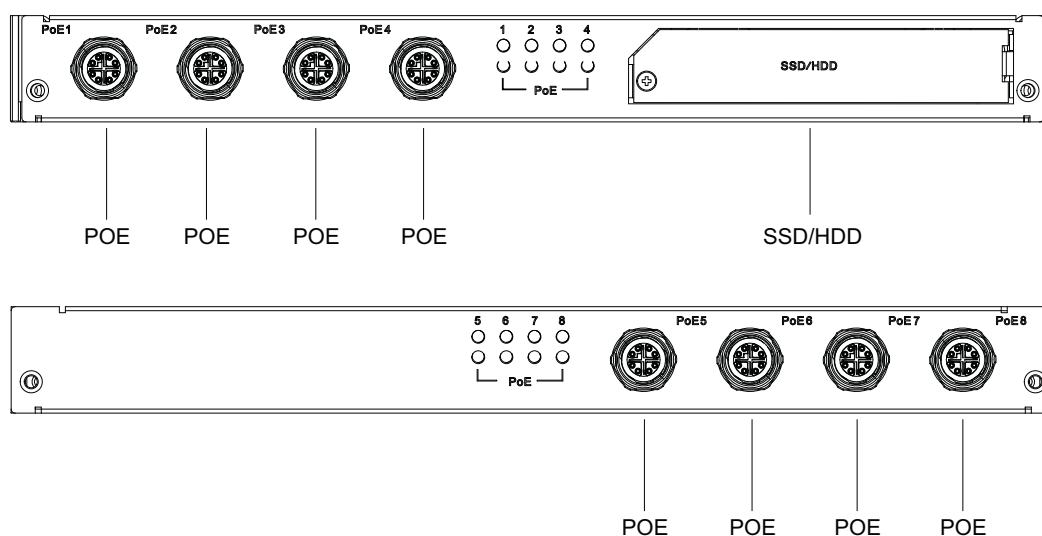
ARK-2231R is an industrial grade dual core mobile device for Rolling Stock computer and Rolling Stock NVR solutions.

ARK-2231R supports Full-HD NVR solutions and is fully integrated with certified hardware and intelligent management software. ARK-2231R has integrated Rolling Stock power (EN50155 S2/C1), conforms to Rolling Stock certifications (EN50155), and has specially-developed Rolling Stock software SDK and APIs for Rolling Stock applications. It also provides wireless communication (GPS/G-sensor/Wi-Fi/3G) for excellent connectivity, has high graphics capability (up to 1080p @120fps) for video previews, has great expansion capability and comes with integrated software for manageability and security.

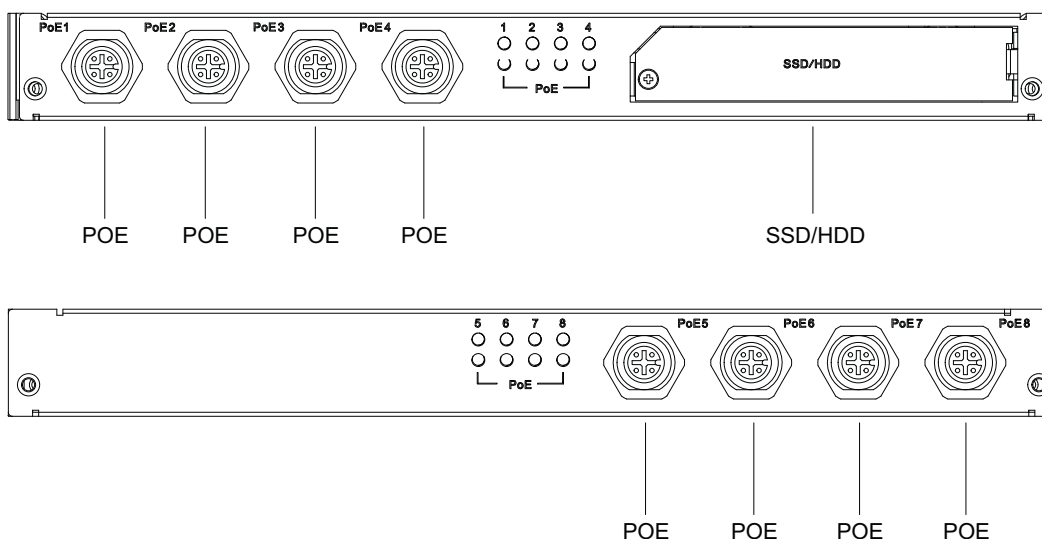
### ARK-2231R-S9A1E I/O Overview



## AMK-R100E I/O Overview



## AMK-R104E I/O Overview



## 1.2 Features

- Intel® Atom E3845 1.91 GHz SoC
- Extension layer with 8 PoE ports to support mainstream IP cameras
- Diverse communication abilities, ex. WWAN, WLAN
- Built-in GPS and G-Sensor for GIS application
- Intelligent rolling stock power design and passed EN50155 S2/C1 certification
- 24 Vdc\* Power Input w/isolation
- Maximum 3 storage: 2 x removable 2.5" drive bay(when build in 2nd Layer) & 1 x F/S mSATA
- Supports WISE-PaaS/RMM and embedded software APIs

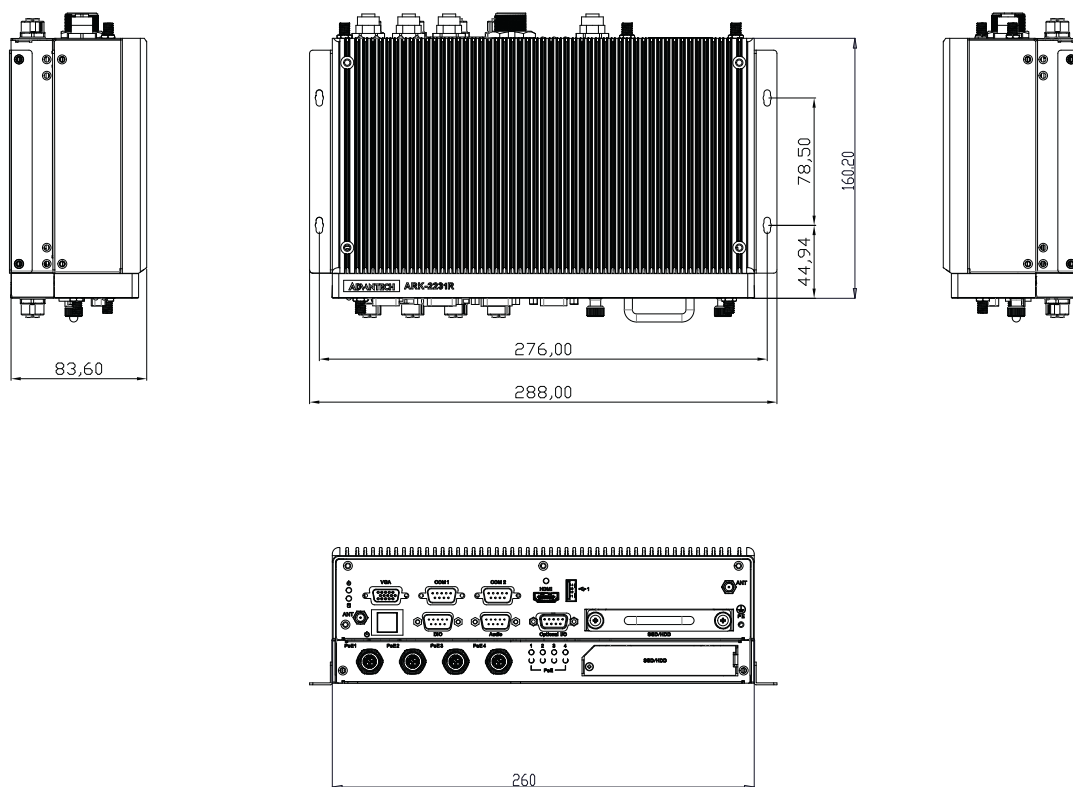
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## 1.3 Specifications

- **CPU:**
  - Intel Atom E3845 DC 1.91 GHz
- **Chipset:**
  - Intel Gen7 Graphics
- **BIOS:** AMI EFI 128 Mbit
- **System memory:**
  - 1 x 204pin SODIMM, DDR3L 1333 MHz, up to 8 GB
- **Storage:**
  - 2.5" drive bay: 1 x removable 2.5" drive bay (Max 9.5 mm height) + 1 x removable 2.5" drive bay (2nd Layer)
  - mSATA: 1x full size mSATA storage
- **Serial ports:**
  - 2 x RS-232/422/485 ports (support auto flow control, jumper selectable)
- **Universal serial bus (USB) port:** 2 x USB 2.0 & 1 x USB3.0
- **LAN port:** 2 x Giga LAN 10/100/1000 Mbps, supports wake on LAN
- **Power over Ethernet, POE (with 2nd Layer):** Supports 8 x GbE Mbps (Total MAX 60W)
  - 8 ports full-load, IEEE802.3 at Class 2
  - 4 ports full-load, IEEE802.3 at Class 3
- **LED:** Power LED, SSD LED
- **Graphic output:**
  - 1 x VGA, up to 2560 x1600 with 60 Hz
  - 1 x lockable HDMI connector, up to 1080p with 60Hz
- **Mini PCI express bus expansion slot:**
  - 1 x full size mini PCIe slot (SATA/PCIe/USB)
  - 1 x full size mini PCIe slot (PCIe/USB)
  - 1 x full size mini PCIe slots w/SIM holder (USB)
- **Watchdog timer:** 255-level timer interval, setup by software
- **RTC Battery:** 3.0 V @ 200 mAH lithium battery.
- **Digital I/O:** Provides one 8-bit DIO, D-sub 9-pin female connector.
- **Audio:**
  - Realtek ALC888S, High Definition Audio (HD), Line-in, Line out, Mic-in
- **GPS:** On board standalone GPS, supports GPS, GLONASS, GALILEO, BeiDou and QZSS signals
- **G-sensor:** On board high resolution G-Sensor, up to 13-bit resolution at ±16g
- **Power Requirement:**
  - Power type: ATX
  - Input voltage:  
Supports: 24 VDC\*
- **Dimensions: (W x H x D):**
  - 260 x 57 x160.2 mm (Single Layer)
  - 260x 83.6 x 160.2 mm (with 2nd Layer)
- **Enclosure:** Ruggedized aluminum housing.
- **Operating temperature:**
  - With extended temperature peripherals:-40 ~ 70 °C with 0.7m/s air flow
  - With standard temperature peripherals:0 ~ 45 °C with 0.7m/s air flow
- **Storage temperature:** -40 ~ 85° C







**Figure 1.2 ARK-2231R-S9A1E+AMK-R100E Dimensions**

# Chapter 2

## Hardware installation

This chapter introduces the installation of ARK-2231R-S9A1E Hardware.

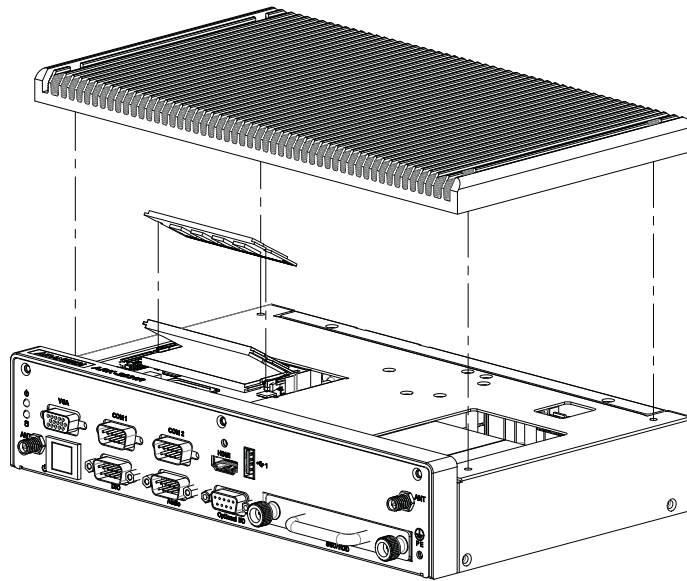
## 2.1 Overview of Hardware Installation & Upgrading

**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 Installing Memory

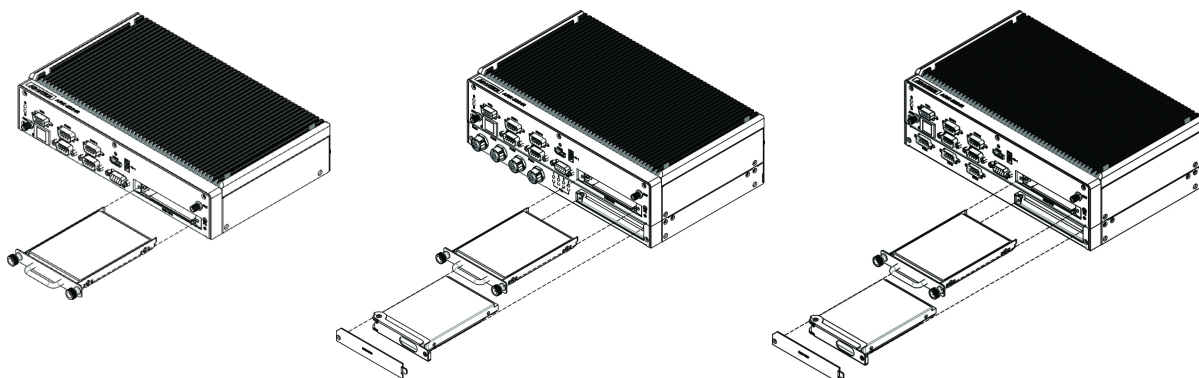
Remove 4 screws from top case to install memory on the top side of the board.



## 2.3 Installing storage

### 2.3.1 Installing 2.5" SSD or HDD

First Layer can support one SSD and the extension Layer can support another.

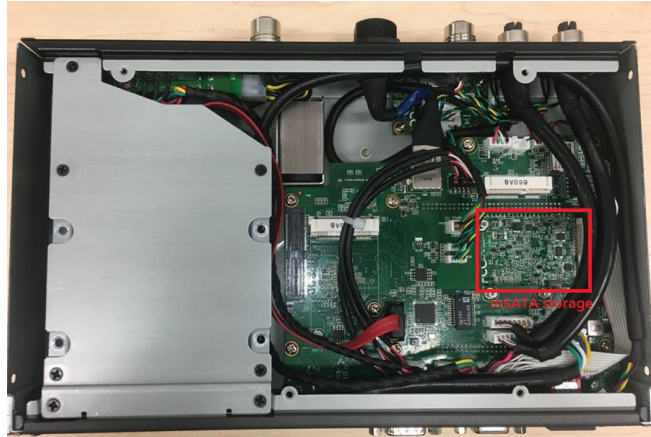


### 2.3.2 Installing mSATA Storage

1. Remove bottom cover 4 screws on the bottom side and 4 screws on both sides.



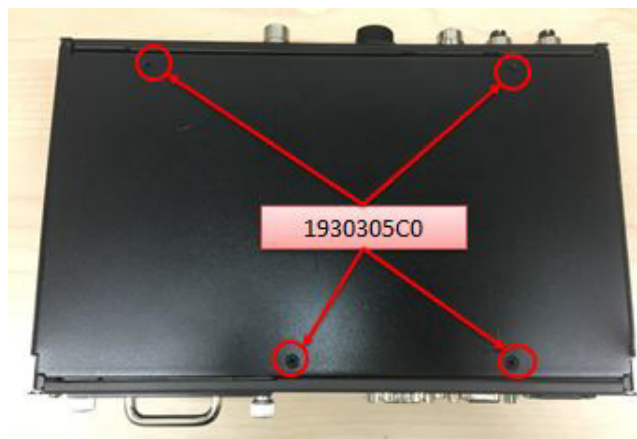
2. Insert a full size mSATA storage in the place marked.



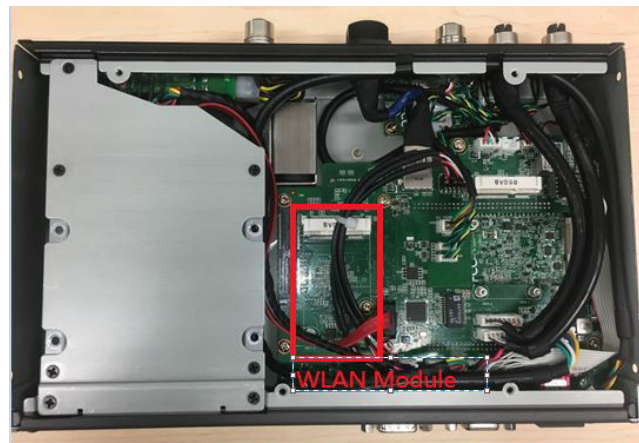
## 2.4 Installing Optional Modules

### 2.4.1 Installing WLAN module

1. Remove the bottom cover 4 screws and the 4 screws on both sides.

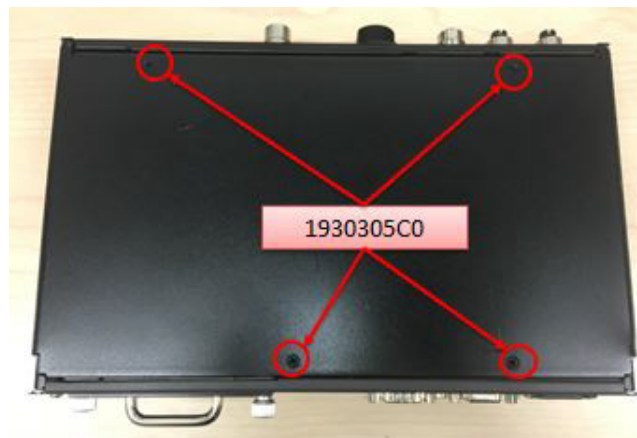


2. Insert the full size WLAN module in the place marked.



### 2.4.2 Installing WWAN module

1. Remove the bottom cover 4 screws and 4 screws on both sides.



2. Insert the full size WWAN module in the place marked.





# Chapter 3

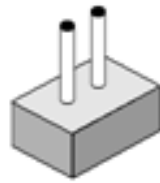
## Jumper and Switch Settings

This chapter explains how to set up ARK-2231R Series hardware, including instructions on setting jumpers and connecting peripherals, and how to set switches and read indicators.

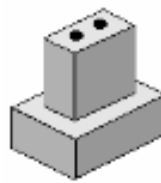
Be sure to read all the safety precautions before beginning the installation procedure.

## 3.1 Setting Jumpers and Switches

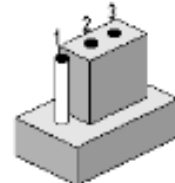
It is possible to configure the In-Vehicle Computing Box to match the needs of the application by resetting the jumpers. A jumper is the simplest kind of electrical switch. It consists of two metal pins and a small metal clip, often protected by a plastic cover that slides over the pins to connect them. 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.



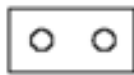
Open



Closed



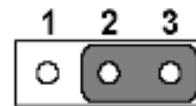
Closed 2-3



Open



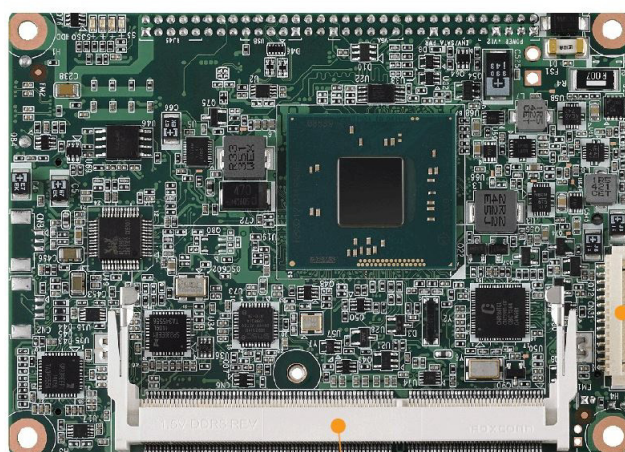
Closed



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.

### 3.1.1 Main Board



DDR3L SO-DIMM Socket

Figure 3.1 Top side of the mainboard



Figure 3.2 Bottom side of the mainboard

## 3.2 Jumper Lists

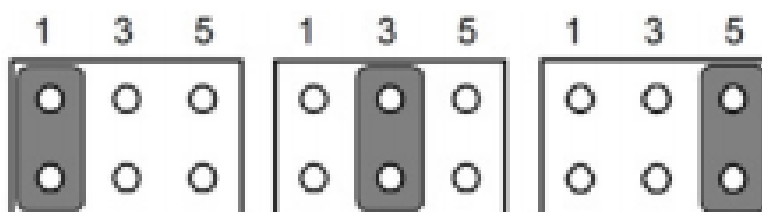
### 3.2.1 Main Board

Jumpers & Switches	
J1	LCD Power / Auto Power on
J2	mPCIe & mSATA selection
BH1	Clear CMOS

## 3.3 Jumper Settings

### 3.3.1 Main Board

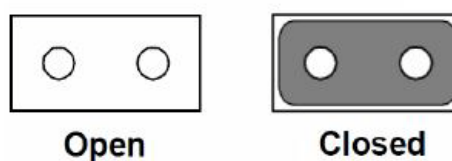
#### 3.3.1.1 Auto Power On Setting (J1)



**Table 3.1: LCD Power / Auto Power on (J1)**

Setting	Function
(1-2)	+5V
(3-4) default	+3.3V
(5-6) default	Auto Power On

#### 3.3.1.2 PCIe & mSATA Selection (J2)



**Table 3.2: mPCIe & mSATA Selection (J2)**

Setting	Function
(Open)	mSATA
(Closed) default	PCIe

Some of the mSATA or MiniPCIe modules can't be recognized correctly through the Auto Detect setting. We suggest to use mSATA or PCIe setting directly if you meet any compatibility problems.

### 3.3.1.3 Clear CMOS (BH1)

How to clear CMOS: (Follow these steps)

1. Turn off system power.
2. Unplug CR2032 battery cable on BH1.
3. Wait for 15secs, or short BH1 pin1-2.
4. Connect battery cable on BH1.
5. Turn on system power.



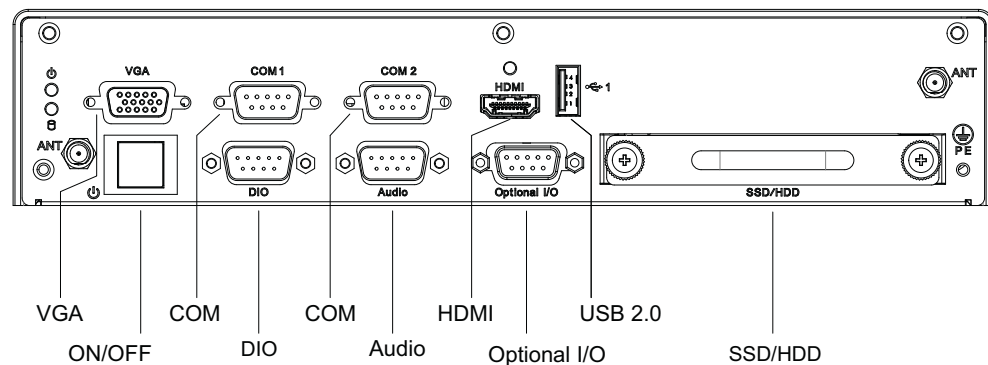
# Chapter 4

## Pin Assignments

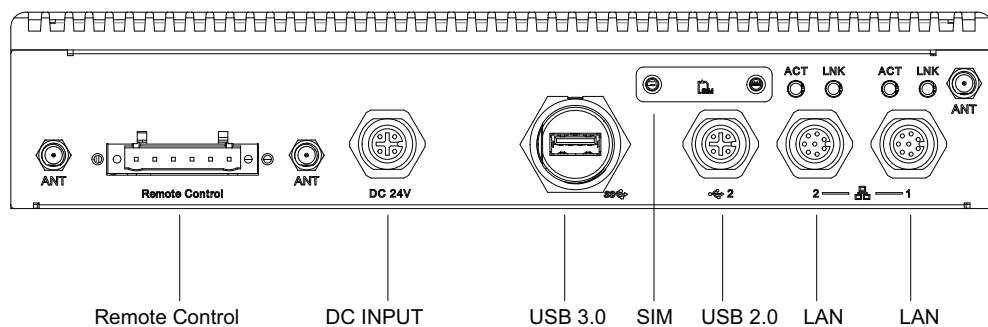
This chapter explains Pin Assignments of ARK-2231R Series.

## 4.1 ARK-2231R I/O Connectors

### 4.1.1 ARK-2231R-S9A1E Front I/O View



### 4.1.2 ARK-2231R-S9A1E Rear I/O View



## 4.2 ARK-2231R I/O Pin Definition

### 4.2.1 VGA Connector

The ARK-2231R provides a high resolution VGA interface connected by a D-sub 15-pin connector to support a VGA CRT monitor. It supports display resolution of up to 2560 x 1600 with 60 Hz.

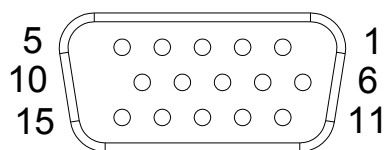


Figure 4.1 VGA Connector



**Table 4.1: VGA Connector Pin Assignments**

Pin	Signal Name	Pin	Signal Name
1	Red	2	Green
3	Blue	4	NC
5	GND	6	GND
7	GND	8	GND
9	NC	10	GND
11	NC	12	DDC Date
13	H-SYNC	14	V-SYNC
15	DDC Clock		

### 4.2.2 USB Connector

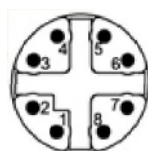
The ARK-2231R provides up to three USB interface connectors - 2 x USB 2.0 (one is M12 connector) & 1 x USB 3.0 (water proof connector), which give complete Plug & Play. The USB interface is compliant with USB UHCI, Rev. 2.0 & 3.0. The USB interface supports Plug and Play, which enables you to connect or disconnect a device whenever you want, without turning off the computer.

**Figure 4.2 USB M12 Connector****Table 4.2: USB Connector Pin Assignments**

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

### 4.2.3 Ethernet Connector

ARK-2231R provides two M12 LAN interface connectors, which are fully compliant with IEEE 802.3u 10/100/1000 Base-T CSMA/CD standards. LAN1 is equipped with Intel I218 GbE and LAN2 is equipped with Intel I210 GbE. The Ethernet ports use M12 connectors with LED indicators on the front side to show Active/Link status and Speed status.

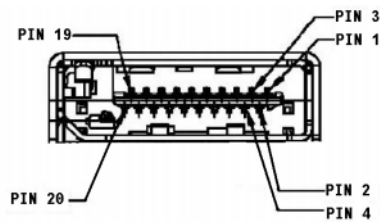
**Figure 4.3 8 Pin M12 Ethernet Connector**

**Table 4.3: Ethernet Connector Pin Assignments**

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-

#### 4.2.4 HDMI Connector

ARK-2231R provides 1 x lockable HDMI port which resolution can support up to 4K at 24 Hz.

**Figure 4.4 HDMI Connector****Table 4.4: 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

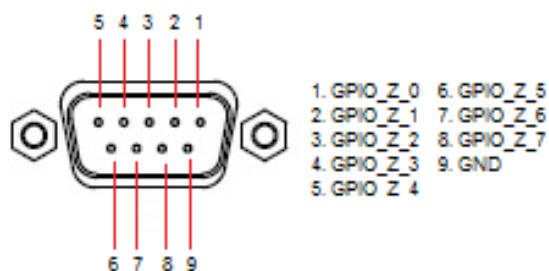
#### 4.2.5 DIO Connector

ARK-2231R provides one DSUB 9-pin female connectors, which offer Digital Input/ Output communication interface. If client wants to use DIO, please find the pin assignment as following.

- **Connector Type:** 9 Pin D-Sub connector (8-bit DIO)
- **Input Voltage:** 5 V tolerance at 25 Hz
- **Digital Input -Output Levels:**
  - Logic level 0: Close to GND
  - Logic level 1: +5 V

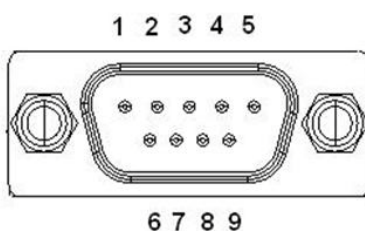
**Table 4.5: DIO Connector**

Pin	Signal Name	Pin	Signal Name
1	GPIO_0	2	GPIO_1
3	GPIO_2	4	GPIO_3
5	GPIO_4	6	GPIO_5
7	GPIO_6	8	GPIO_7
9	GND		

**Figure 4.5 DIO Connector**

#### 4.2.6 COM Connector

ARK-2231R provides two D-sub 9-pin connectors, which offers 2 x RS-232/422/485 serial communication ports.

**Figure 4.6 COM Port Connector****Table 4.6: COM Connector Pin Assignments**

	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

### 4.2.7 System Audio Connector

ARK-2231R offers stereo audio ports via D SUB connector of Line-out, Mic-in & Line-in. The audio chip controller is by Realtek ALC888, High Definition Audio.

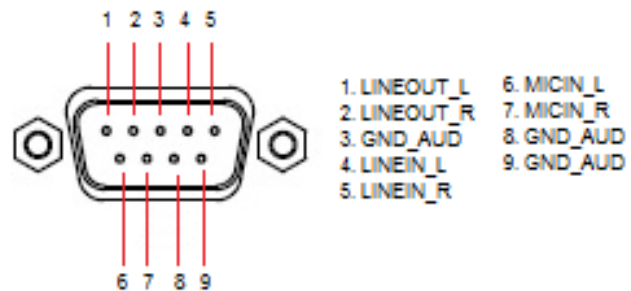


Figure 4.7 System Audio Connector

Table 4.7: Audio Connector Pin Assignments

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

### 4.2.8 Power On/Off Button

ARK-2231R comes with a Power On/Off button, that supports dual function of Soft Power -On/Off (Instant off or Delay 4 Second), and Suspend.

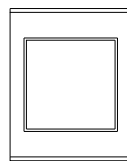


Figure 4.8 Power ON/OFF Button

### 4.2.9 LED Indicator

There are two LEDs on ARK-2231R front metal face plate for indicating system status: PWR LED is for power status; and SSD LED is for SSD flash disk status.

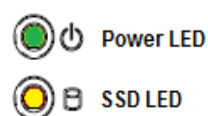


Figure 4.9 LED Indicator

### 4.2.10 Remote Control

ARK-2231R provides one set remote control signal for customer extend power, reset, HDD LED and System LED.

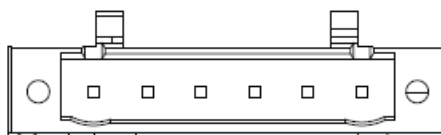


Figure 4.10 Remote Control

Table 4.8: Remote Control Pin Definition

Pin	Signal Name
1	Power LED +5V
2	HDD LED +5V
3	HDD LED Active
4	PWR_SW
5	RST_SW
6	GND

### 4.2.11 External SIM Slot

ARK-2231R provides one external SIM slot, which connects to MiniPCle slot (CN16).



Figure 4.11 External SIM Slot

### 4.2.12 Power Input

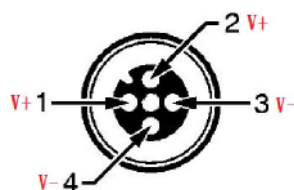


Figure 4.12 Power Input

Table 4.9: DC Input PIN definition

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



# Chapter 5

## BIOS settings

This chapter introduces how to set BIOS configuration data.

# 5.1 Introduction

AMIBIOS has been integrated into many motherboards for over a decade. With the AMIBIOS Setup program, you can modify BIOS settings and control the various system features. This chapter describes the basic navigation of the ARK-2231R BIOS setup screens.

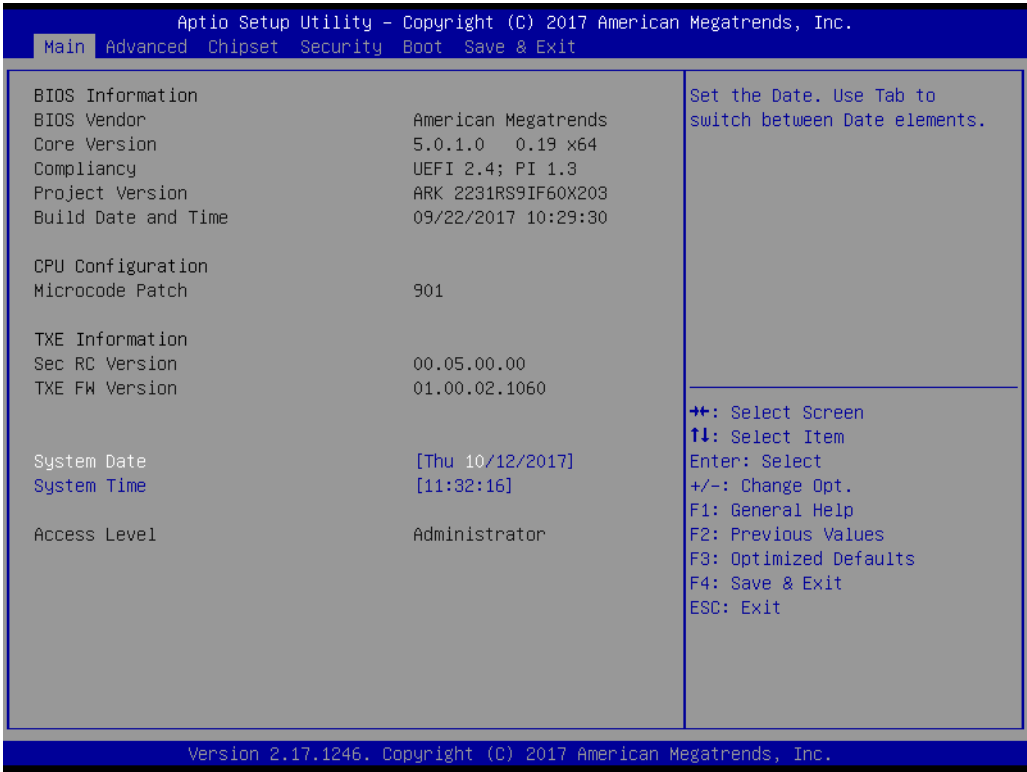


Figure 5.1 Setup program initial screen

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

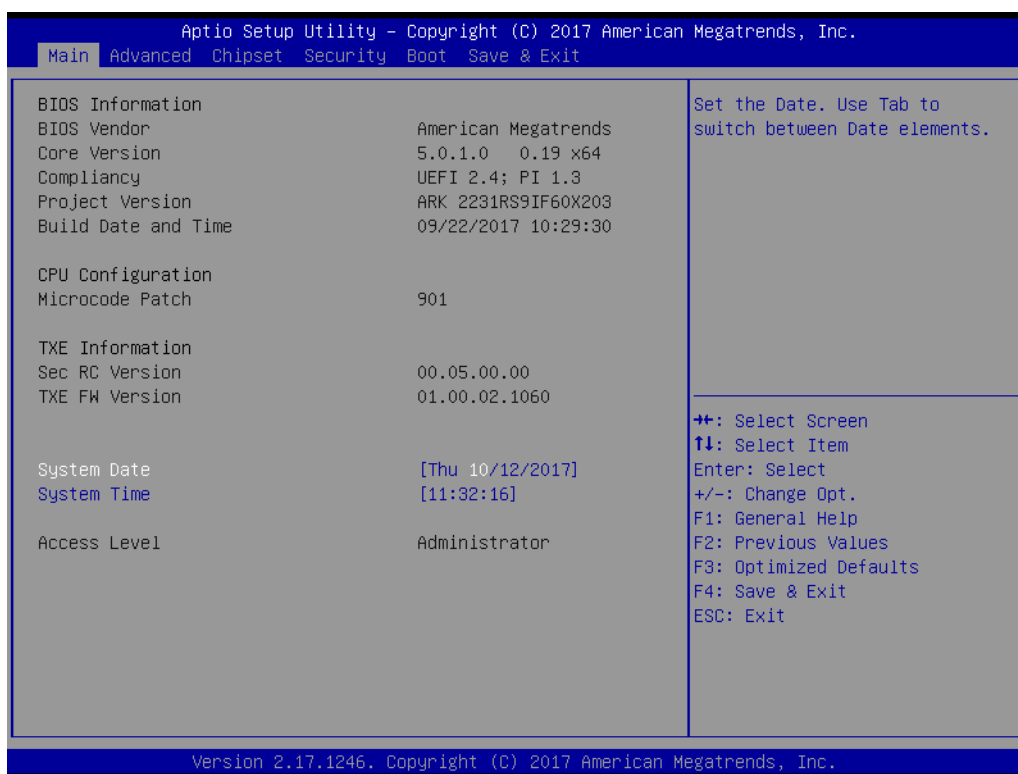


## 5.2 Entering Setup

Turn on the computer and then press <F2> or <DEL> to enter the Setup menu.

### 5.2.1 Main Setup

When you first enter the BIOS Setup Utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. There are two Main Setup options. They are described in this section. The Main BIOS Setup screen is shown below.



**Figure 5.2 Main setup screen**

The Main BIOS setup screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured; options in blue can. The right frame displays the key legend.

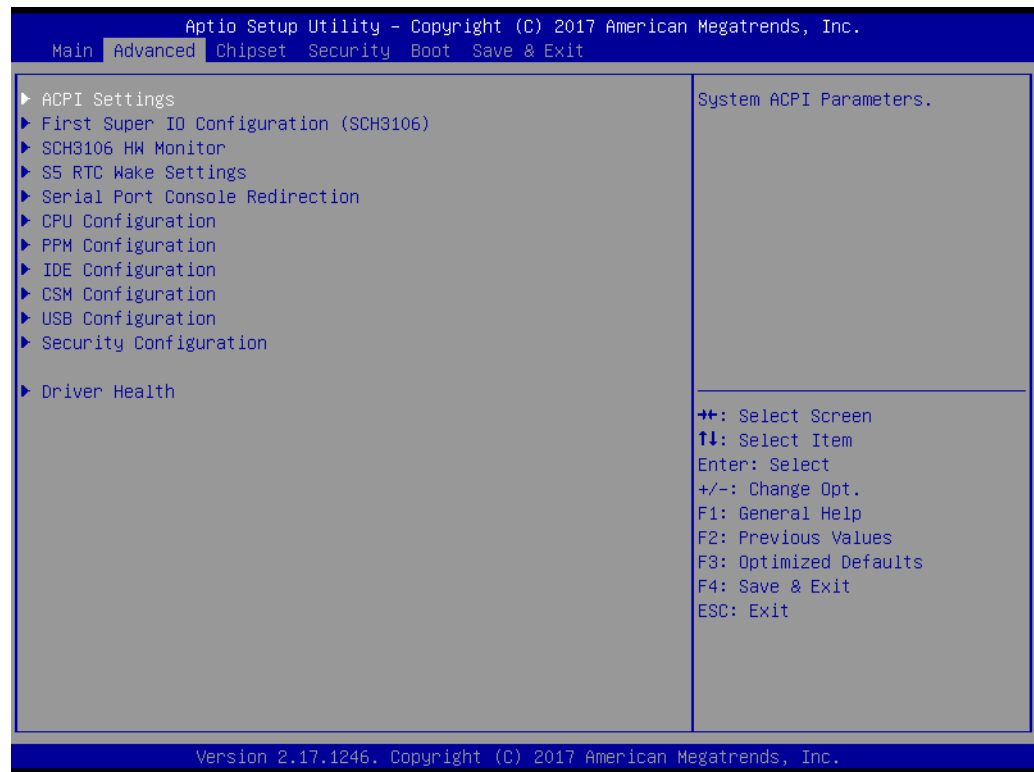
Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

#### ■ System Time / System Date

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

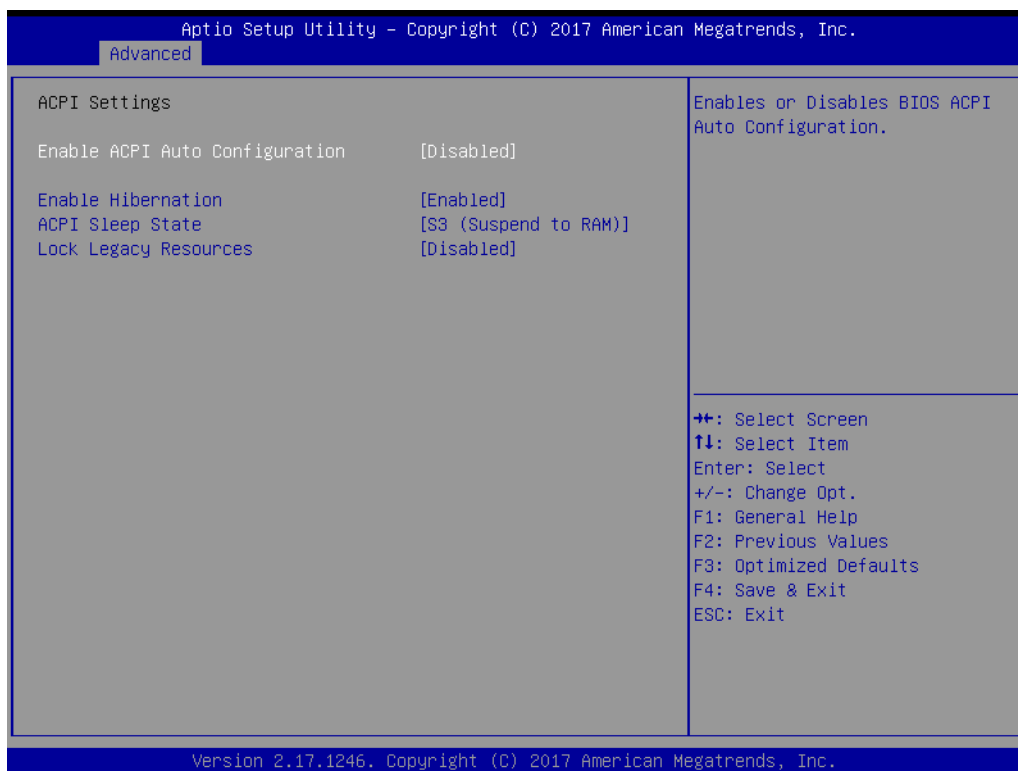
## 5.2.2 Advanced BIOS Features Setup

Select the Advanced tab from the ARK-2231R setup screen to enter the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen, such as CPU Configuration, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screens are shown below. The sub menus are described on the following pages.



**Figure 5.3 Advanced BIOS features setup screen**

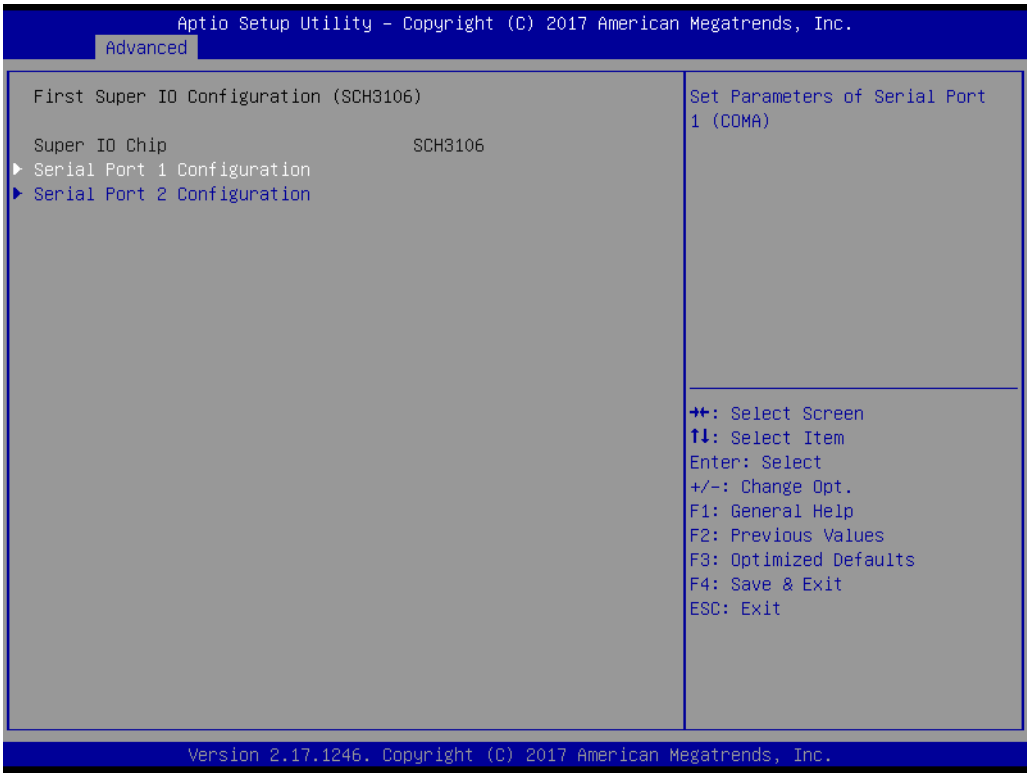
### 5.2.2.1 ACPI Settings

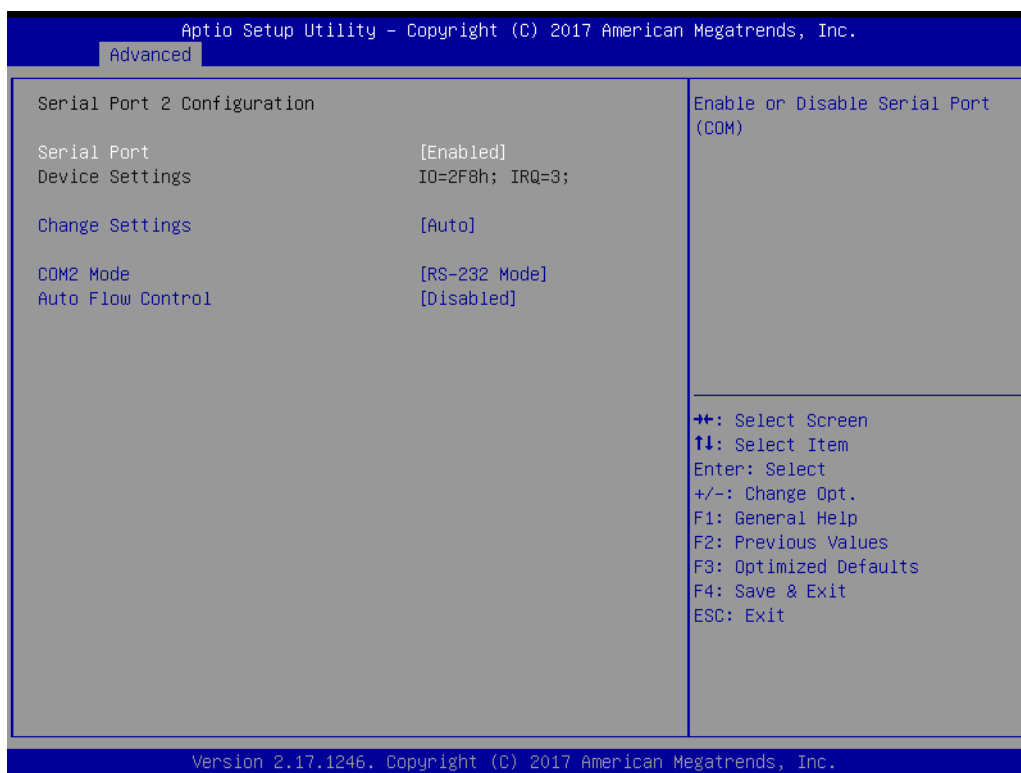


**Figure 5.4 ACPI Setting**

- **Enable ACPI Auto Configuration**  
This item allows users to enable or disable BIOS ACPI auto configuration.
- **Enable Hibernation**  
This item allows users to enable or disable hibernation.
- **ACPI Sleep State**  
This item allows users to set the ACPI sleep state.
- **Lock Legacy Resources**  
This item allows users to lock legacy devices' resources.

5.2.2.2 Super IO Configuration





**Figure 5.5 Super IO Configuration**

- **Serial Port 1 Configuration**  
This item allows users to configure serial port 1.
- **Serial Port 2 Configuration**  
This item allows users to configure serial port 2.

5.2.2.3 H/W Monitor

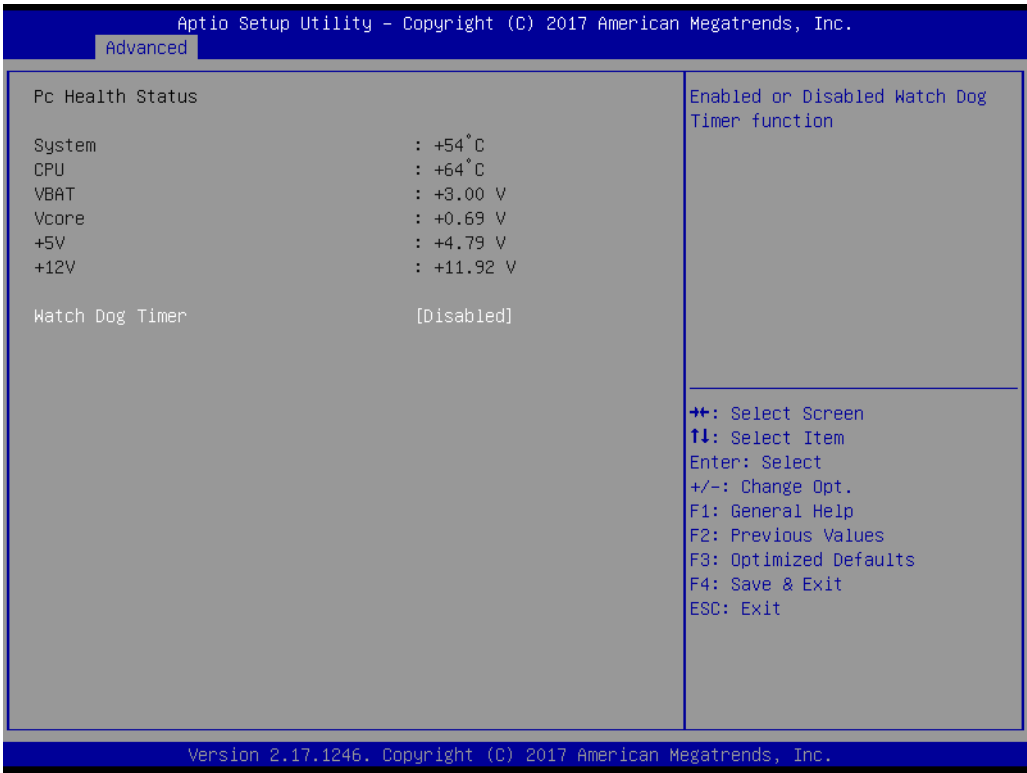


Figure 5.6 H/W Monitor

- **Watch Dog Timer**  
Enable or disable Watch Dog Timer function.

#### 5.2.2.4 S5 RTC Wake Settings

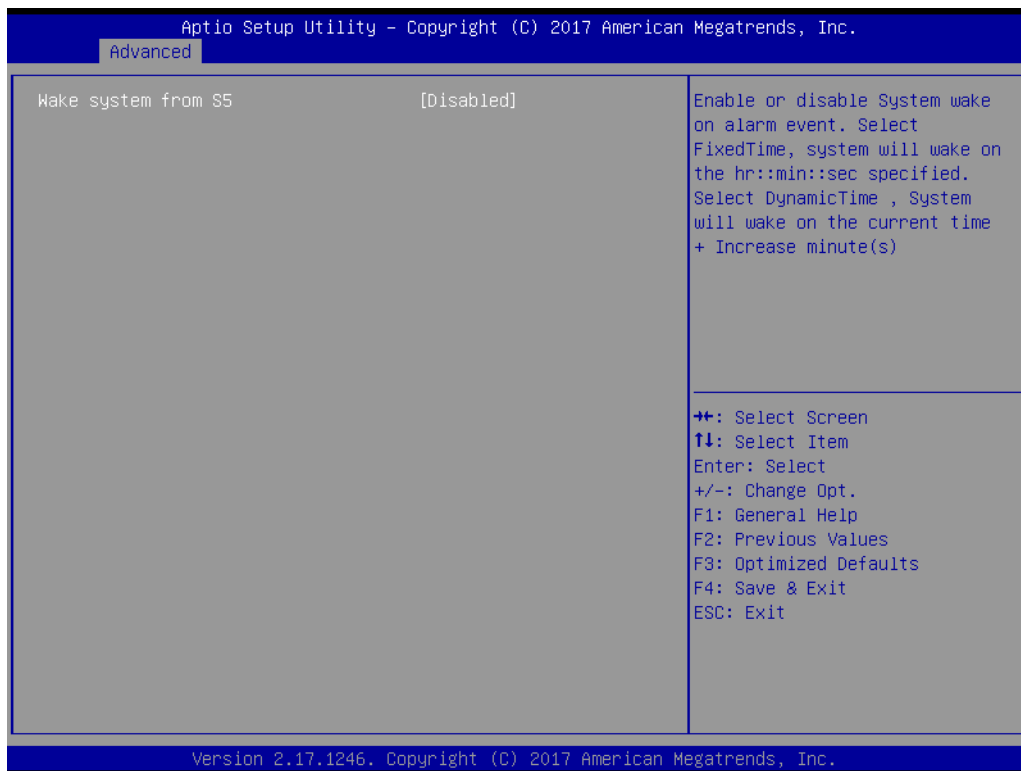


Figure 5.7 S5 RTC Wake Settings

- **Wake system from S5**  
Enable or disable system wake on alarm event.

### 5.2.2.5 Serial Port Console Redirection

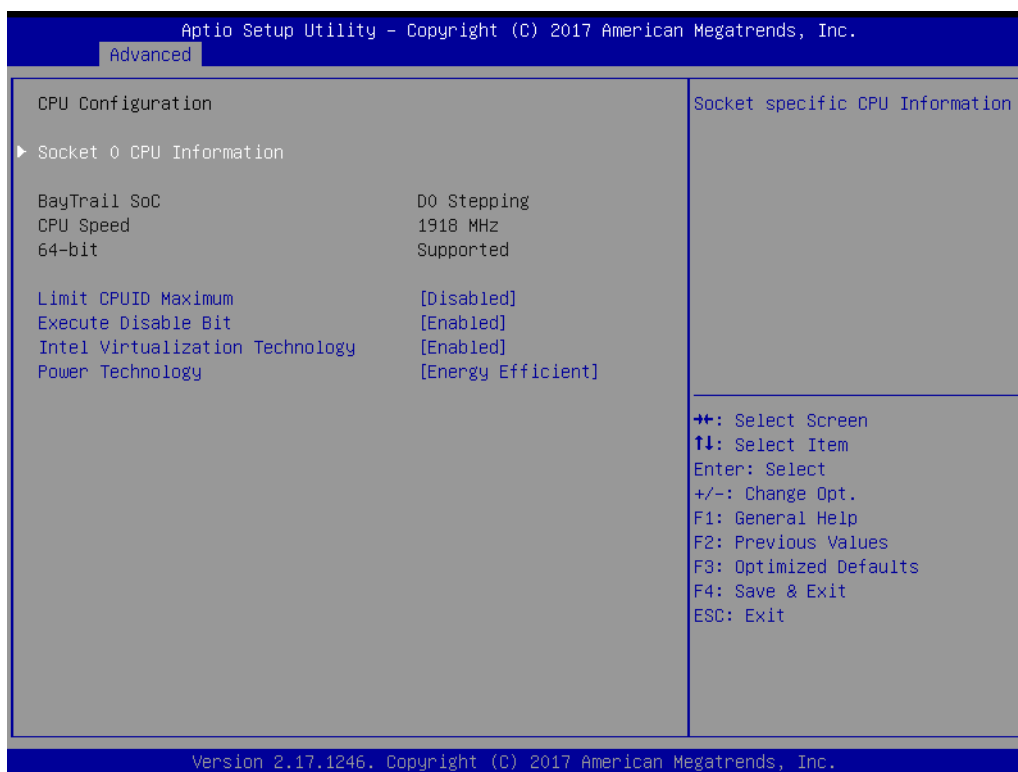


**Figure 5.8 Serial Port Console Redirection**

- **Console Redirection**  
This item allows users to enable or disable console redirection for Microsoft Windows Emergency Management Services (EMS).
- **Console Redirection**  
This item allows users to configuration console redirection detail settings.



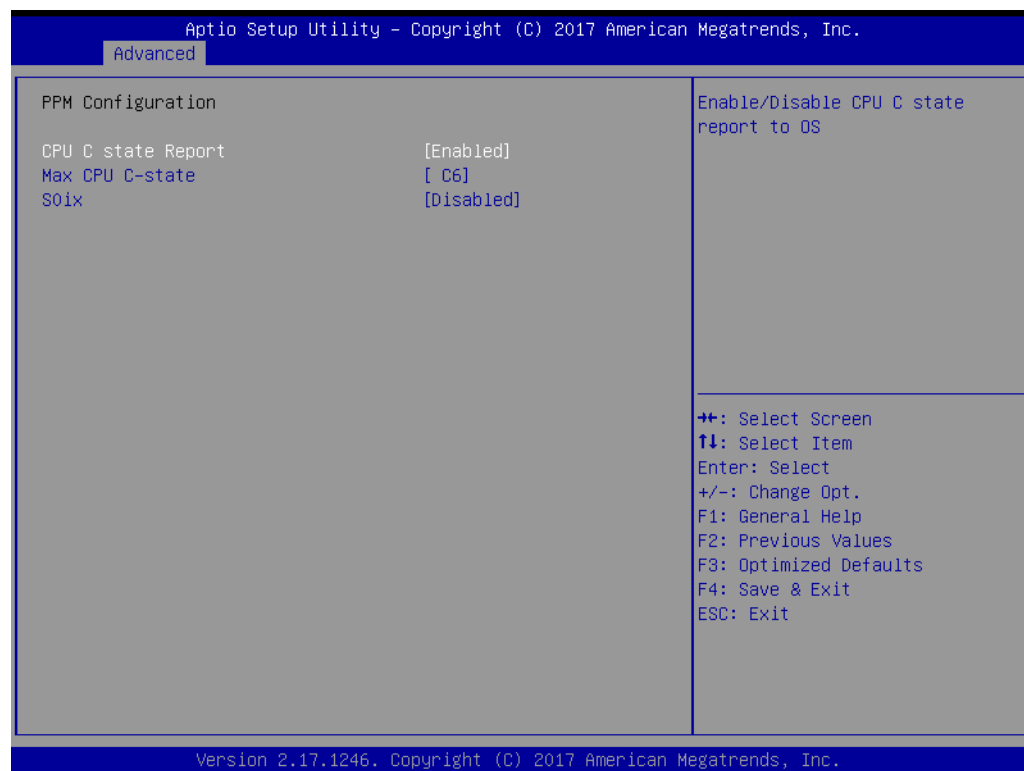
### 5.2.2.6 CPU Configuration



**Figure 5.9 CPU Configuration Setting**

- **Limit CPUID Maximum**  
Disabled for Windows XP.
- **Execute Disable Bit**  
XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Windows Server 2003 SP1, Windows XP SP2, SuSE Linux 9.2, RedHat Enterprise 3 Update 3.)
- **Intel® Virtualization Technology**  
When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
- **Power Technology**  
Enables power management features.

### 5.2.2.7 PPM Configuration



**Figure 5.10 PPM Configuration**

- **CPU C state Report**  
Enable/Disable CPU C state report to OS.
- **Max CPU C-state**  
This option controls Max C states that the processor will support.
- **S0ix**  
Enable/Disable CPU S0ix state.

### 5.2.2.8 IDE Configuration

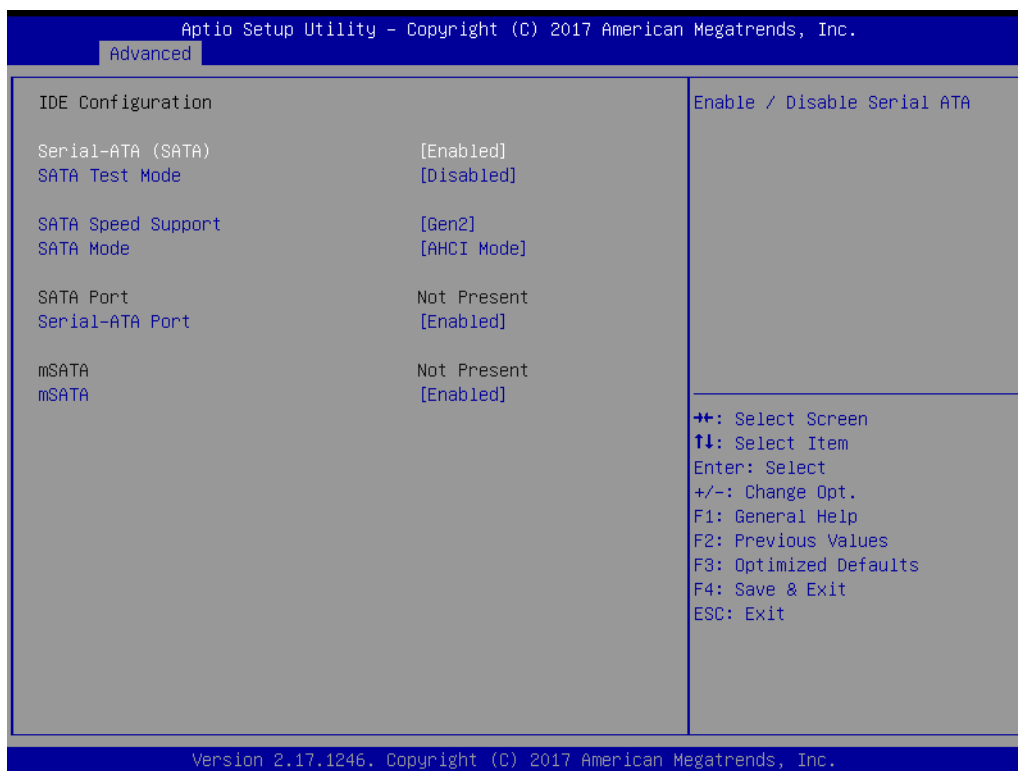


Figure 5.11 IDE Configuration

- **Serial-ATA (SATA)**  
Enable / Disable Serial ATA.
- **SATA Test Mode**  
Test Mode Enable / Disable.
- **SATA Speed Support**  
SATA Speed Supports Gen1 or Gen2.
- **SATA Mode**  
Select IDE / AHCI.
- **Serial-ATA Port**  
Enable / Disable Serial ATA Port 0.
- **mSATA**  
Enable / Disable Serial ATA Port 1.

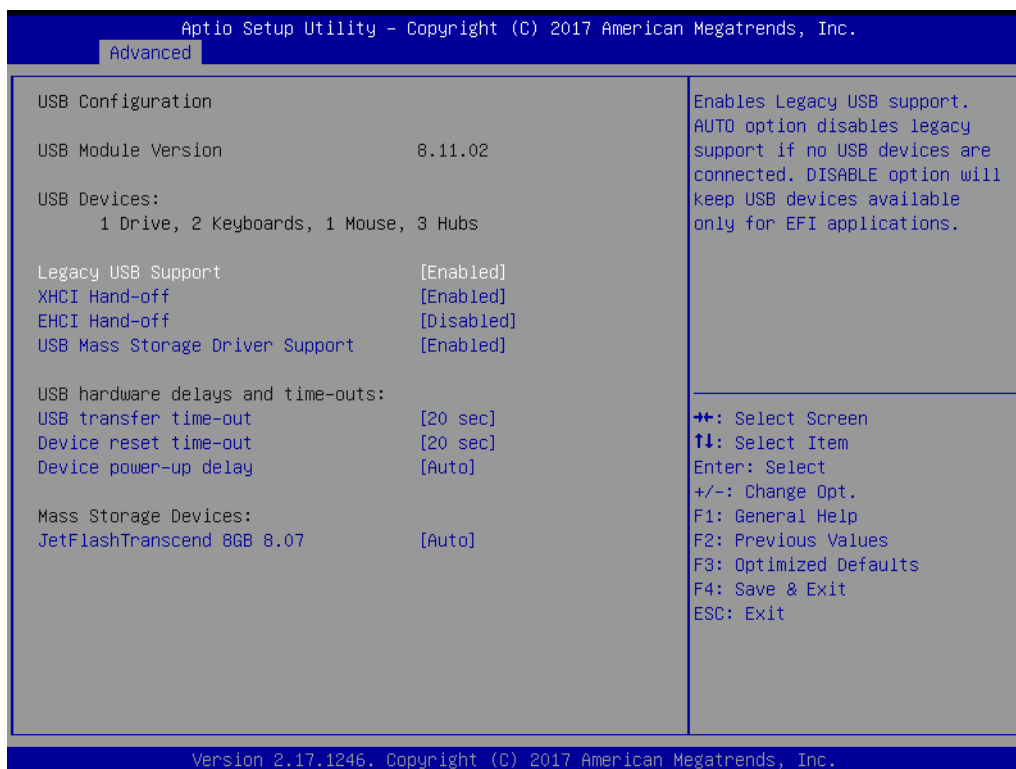
### 5.2.2.9 CSM Configuration



Figure 5.12 CSM Configuration

- **CSM Support**  
Enable/Disable CSM support.
- **GateA20 Active**  
Upon Request - GA20 can be disabled using BIOS services otherwise GA20 cannot be disabled; this option is useful when any RT code is executed above 1 MB.
- **Option ROM Messages**  
Set display mode for Option ROM.
- **OS Selection**  
OS Selection.
- **Boot option filter**  
This option controls Legacy/UEFI ROM priority.
- **Network**  
Controls the execution of UEFI and Legacy PXE OpROM.
- **Storage**  
Controls the execution of UEFI and Legacy Storage OpROM.
- **Video**  
Controls the execution of UEFI and Legacy Video OpROM.
- **Other PCI devices**  
Determines OpROM execution policy for devices other than networks, storage, or video.

### 5.2.2.10 USB Configuration



**Figure 5.13 USB Configuration**

- **Legacy USB Support**  
Enables support for legacy USB. 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 OS without XHCI hand-off support. The XHCI ownership change should be claimed by the XHCI driver.
- **EHCI Hand-Off**  
This is a workaround for OS without EHCI hand-off support. The EHCI ownership change should be claimed by EHCI driver.
- **USB Mass Storage Driver Support**  
This item allows you to enable or disable the USB mass storage device 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 100 ms, for a hub port the delay is taken from hub descriptor.

### 5.2.2.11 Security Configuration

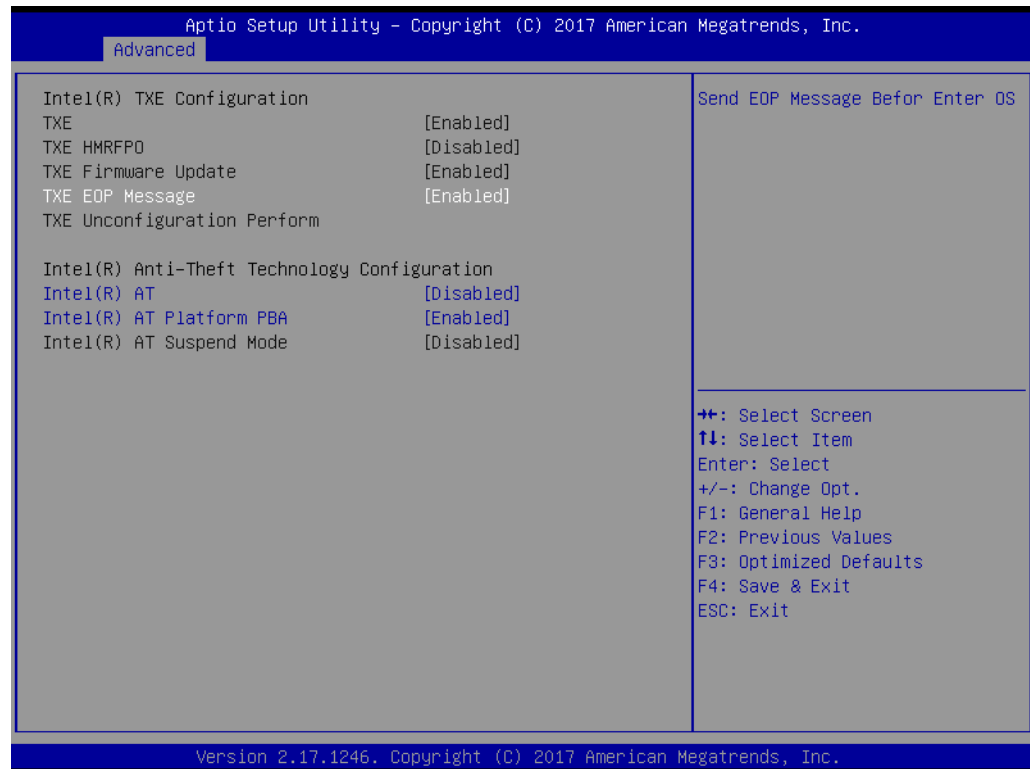
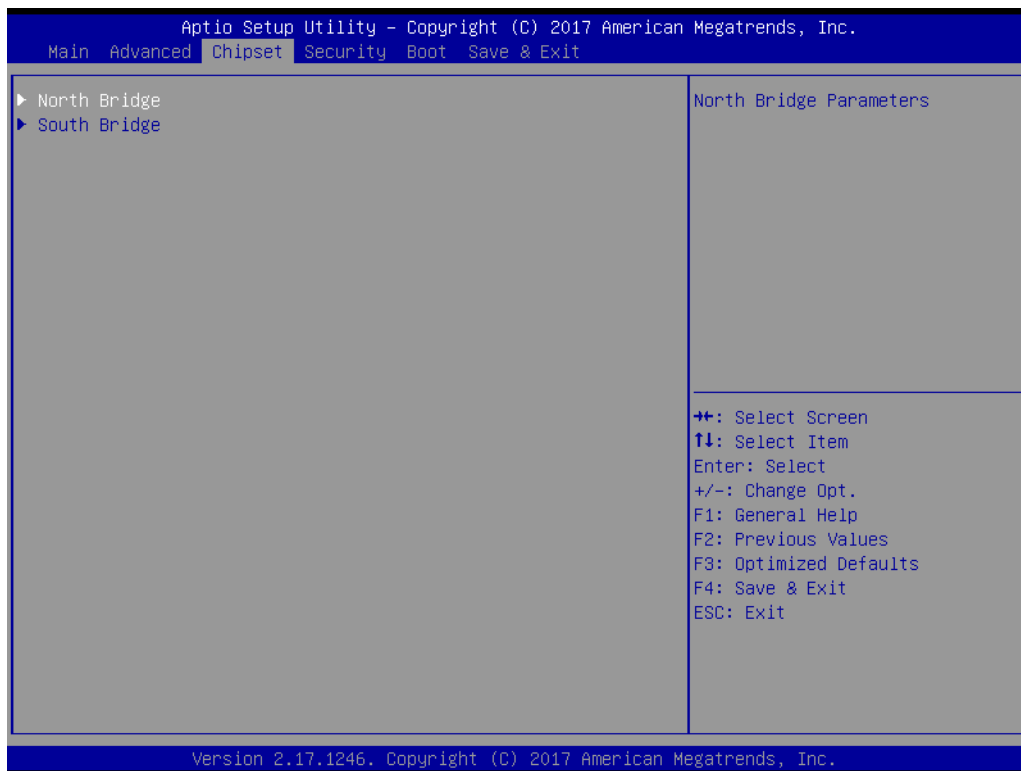


Figure 5.14 Security Configuration

- **TXE**
- **TXE HMRFPD Disable**
- **TXE Firmware Update**
- **TXE EOP Message**  
Send EOP Message before entering the OS.
- **TXE Unconfiguration Perform**  
Revert TXE settings to factory defaults.
- **Intel(R) AT**  
Enable/Disable BIOS AT code from running.
- **Intel(R) AT Platform PBA**  
Enable/Disable BIOS AT code from running.

### 5.2.3 Chipset

Select the Chipset tab from the ARK-2231R 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.



**Figure 5.15 Chipset Setup**

### 5.2.3.1 North Bridge

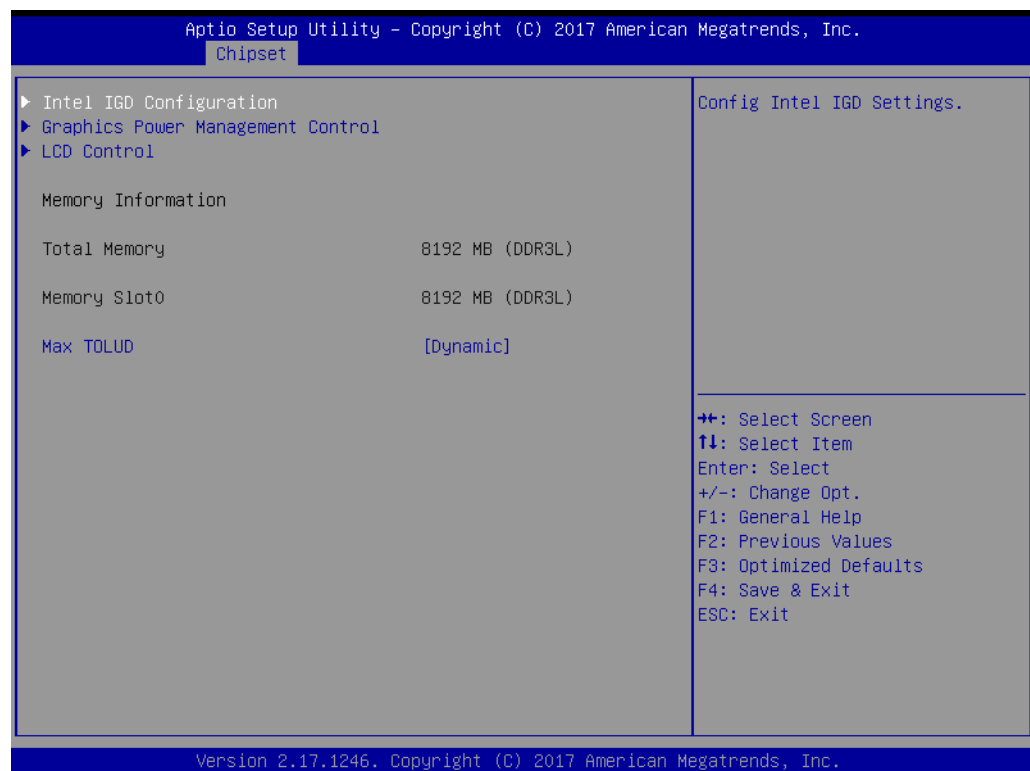
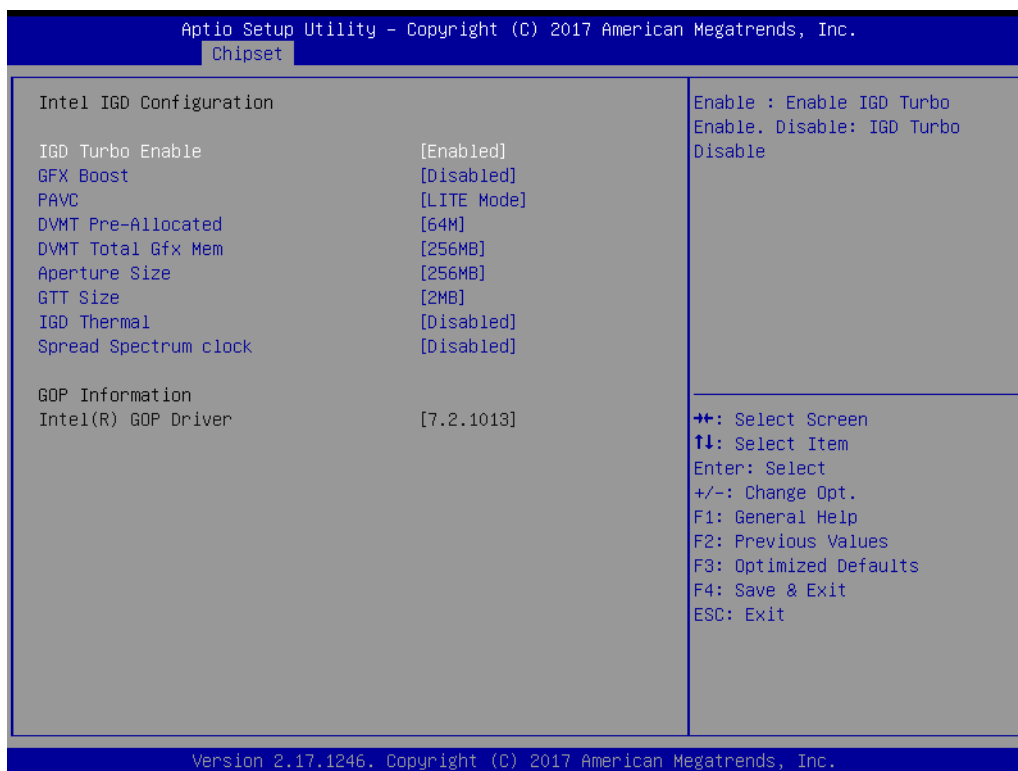


Figure 5.16 North Bridge

- **Intel IGD Configuration**  
Config Intel IGD settings.
- **Graphics Power Management Control**  
Graphics Power Management Control options.
- **LCD Control**  
LCD Control.
- **Max TOLUD**  
Maximum value of TOLUD.



### 5.2.3.2 Intel IGD Configuration



**Figure 5.17 Intel IGD Configuration**

- **Intel IGD Configuration**  
Config Intel IGD settings.
- **IGD Turbo Enable**  
Enable: Enable IGD Turbo Enable. Disable: IGD Turbo Disable
- **GFX Boost**  
Enable/Disable GFX boost.
- **PAVC**  
Enable/Disable protected audio video control.
- **DVMT Pre-Allocated**  
Select DVMT 5.0 Pre-Allocated (Fixed) graphics memory size used by the Internal graphics device.
- **DVMT Total Gfx Mem**  
Select DVMT 5.0 total graphic memory size used by the internal graphics device.
- **Aperture Size**  
Select the aperture size.
- **GTT Size**  
Select the GTT size.
- **IGD Thermal**  
Enable/Disable IGD thermal.
- **Spread Spectrum clock**  
Enable/Disable spread spectrum clock.

5.2.3.3 Graphics Power Management Control

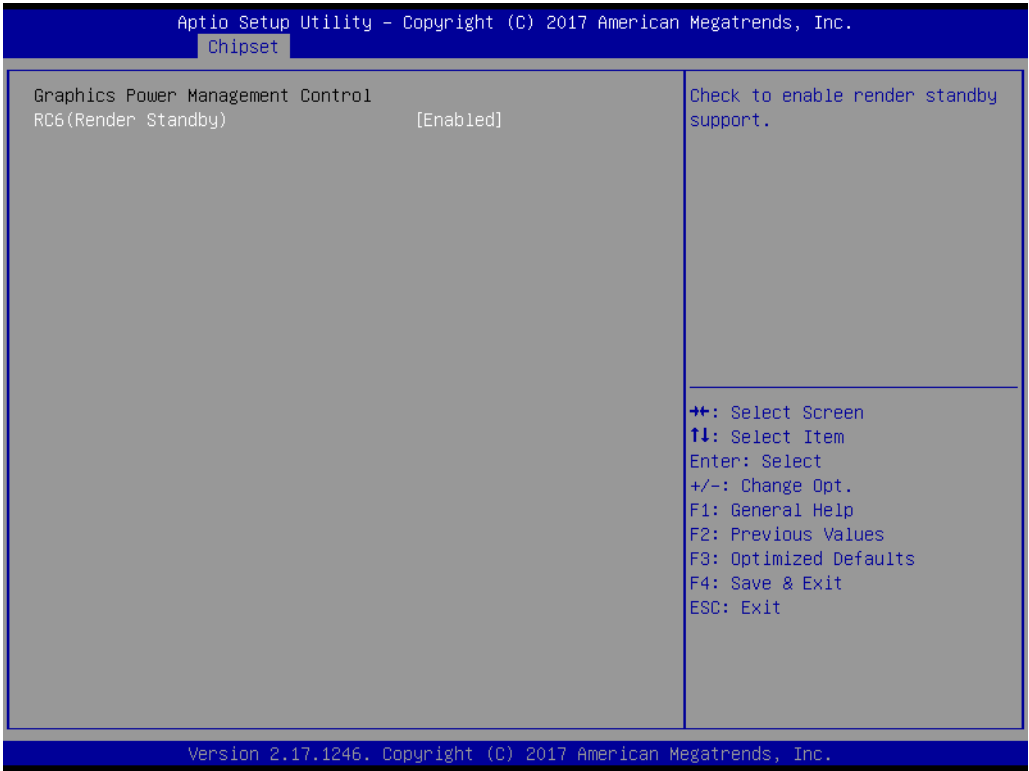
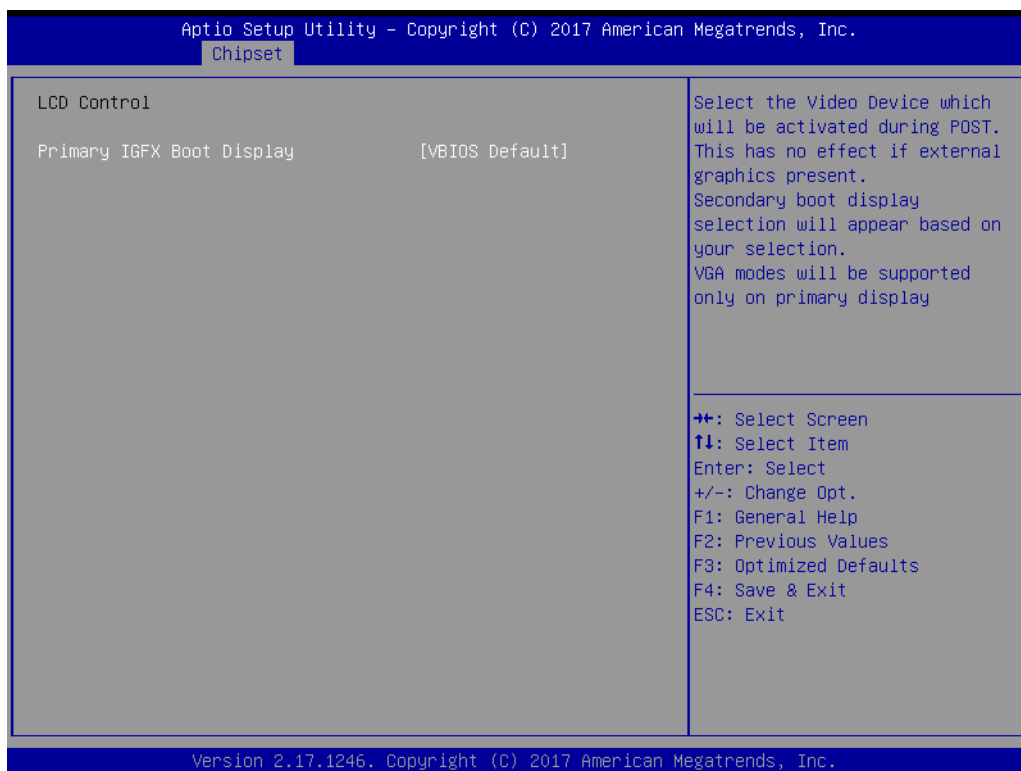


Figure 5.18 Graphics Power Management Control

- **RC6 (Render Standby)**  
Check to enable render standby support.

#### 5.2.3.4 LCD Control



**Figure 5.19 LCD Control**

##### ■ Primary IGFX Boot Display

Select the video device which will be activated during POST. This has no effect if external graphics are present. Secondary boot display selection will appear based on your selection. VGA modes will be supported only on the primary display.

### 5.2.3.5 South Bridge

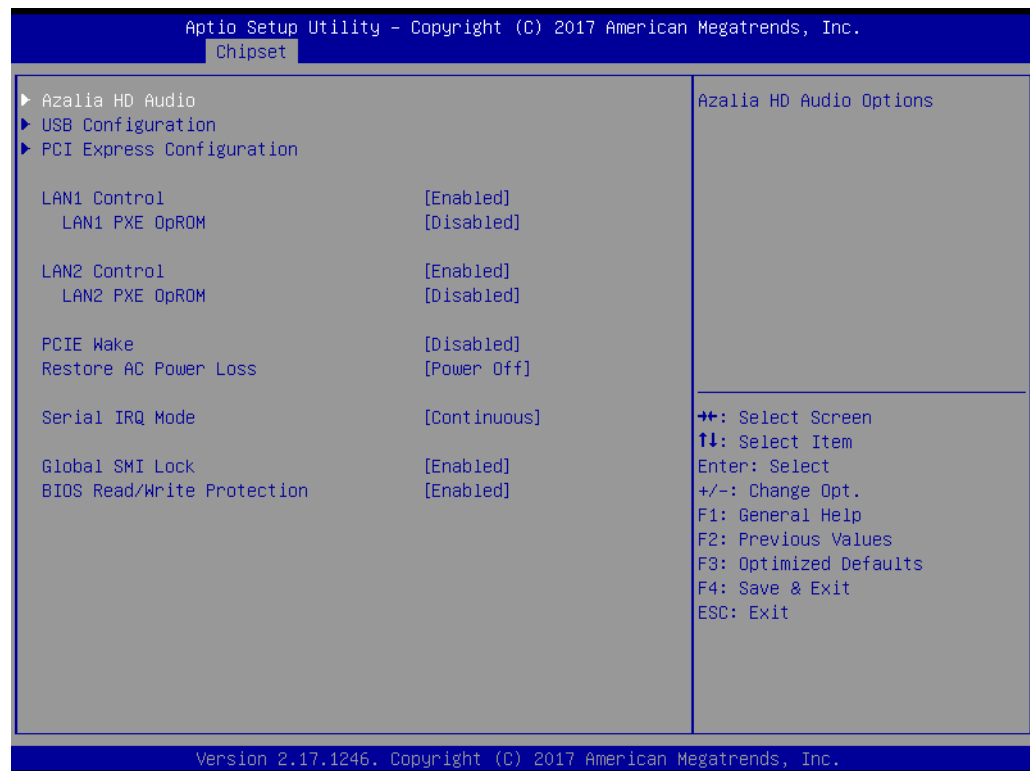
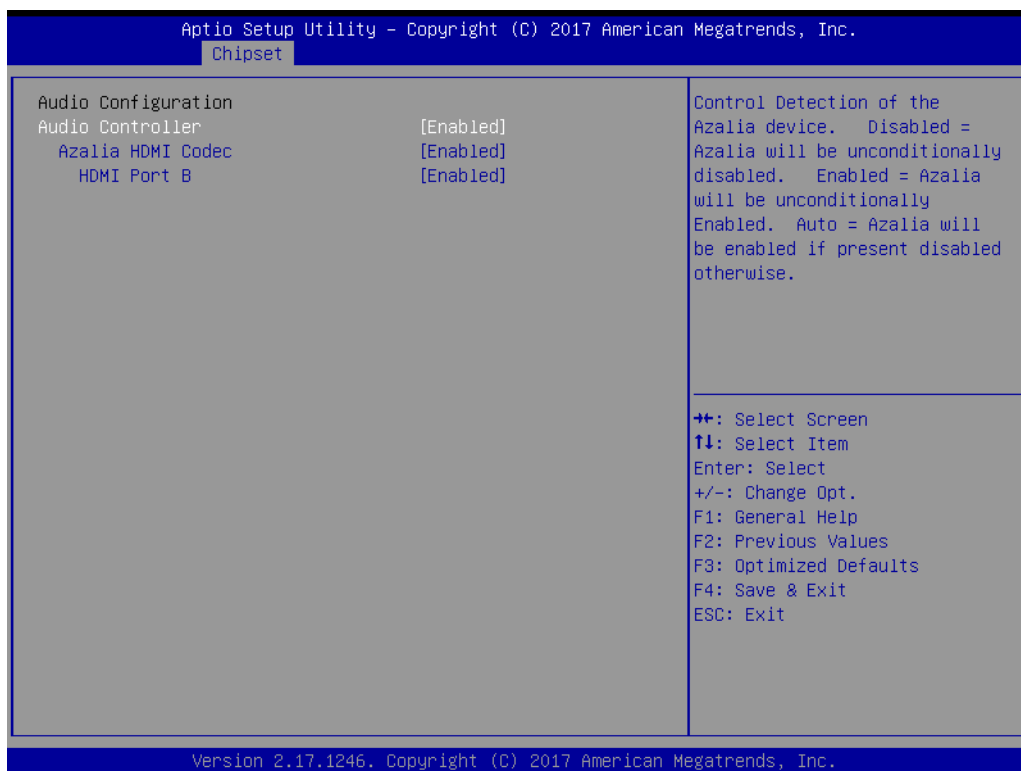


Figure 5.20 South Bridge

- **LAN1 Control**  
Enable or disable the LAN1.
- **LAN1 PXE OpROM**  
Enable or disable boot option for LAN1 controller.
- **LAN2 Control**  
Enable or disable the LAN2.
- **LAN2 PXE OpROM**  
Enable or disable boot option for LAN2 controller.
- **PCIE Wake**  
Enable or disable PCIE to wake the system from S5.
- **Restore AC Power Loss**  
Select AC power state when power is re-applied after power failure.
- **Serial IRQ Mode**  
Configure serial IRQ mode.
- **Global SMI Lock**  
Enable or disable SMI lock.
- **BIOS Read/Write Protection**  
Enable or disable BIOS SPI region read/write protect.

### 5.2.3.6 Azalia HD Audio



**Figure 5.21 Azalia HD Audio**

- **Audio Controller**  
Control Detection of the Azalia device.  
Disabled = Azalia will be unconditionally disabled.  
Enabled = Azalia will be unconditionally Enabled.  
Auto = Azalia will be enabled if present, disabled otherwise.
- **Azalia HDMI Codec**  
Enable/Disable internal HDMI codec for Azalia.
- **HDMI Port B**  
Enable/Disable HDMI Port B.

### 5.2.3.7 USB Configuration

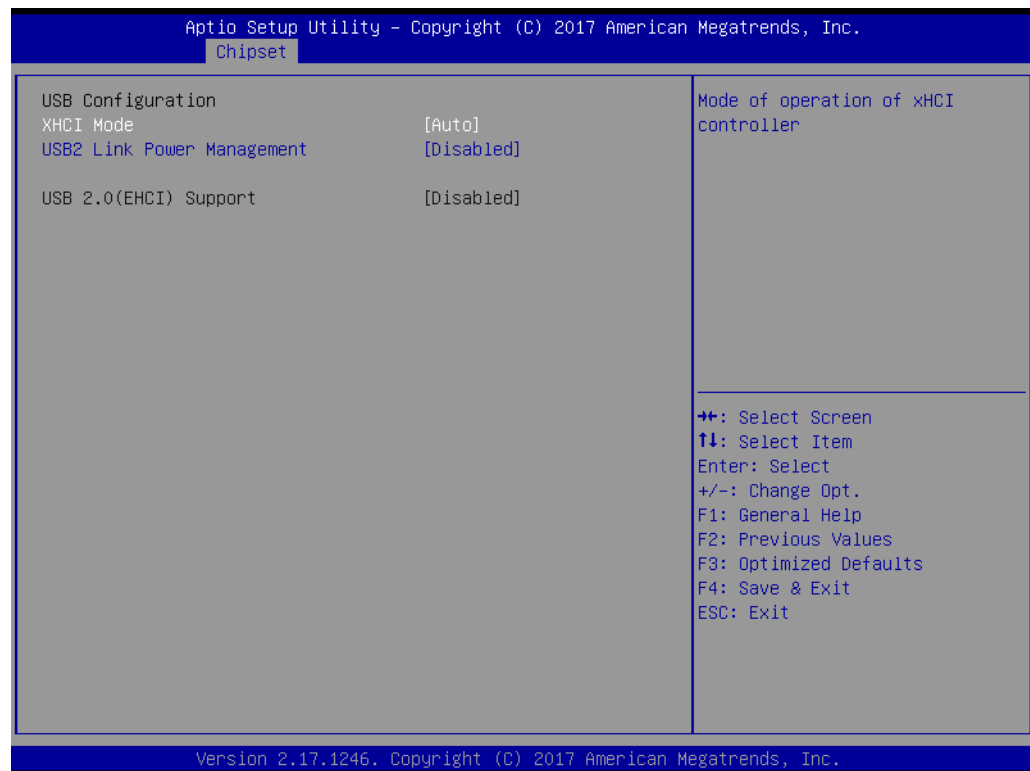
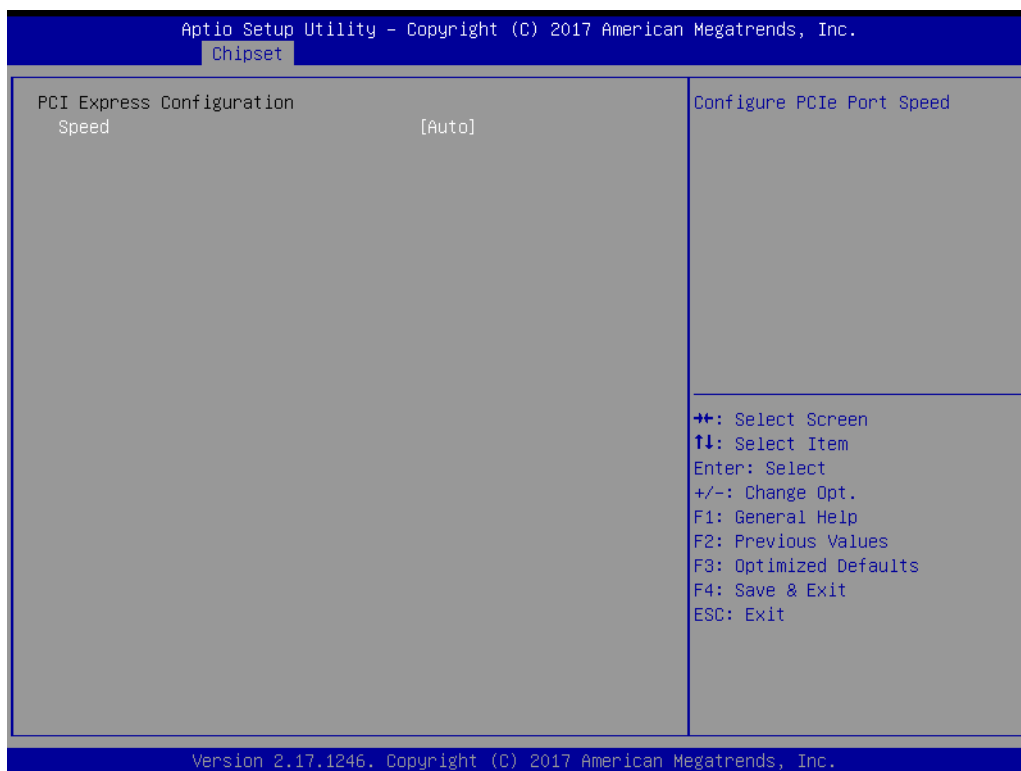


Figure 5.22 USB Configuration

- **XHCI Mode**  
Mode of operation of xHCI controller.
- **USB2 Link Power Management**  
Enable/Disable USB2 Link Power Management.
- **USB 2.0 (EHCI) Support**  
Controls the USB EHCI (USB 2.0) functions. One EHCI controller must always be enabled.

### 5.2.3.8 PCI Express Configuration



**Figure 5.23 PCI Express Configuration**

- **Speed**  
Configures PCIe port speed.

## 5.2.4 Security

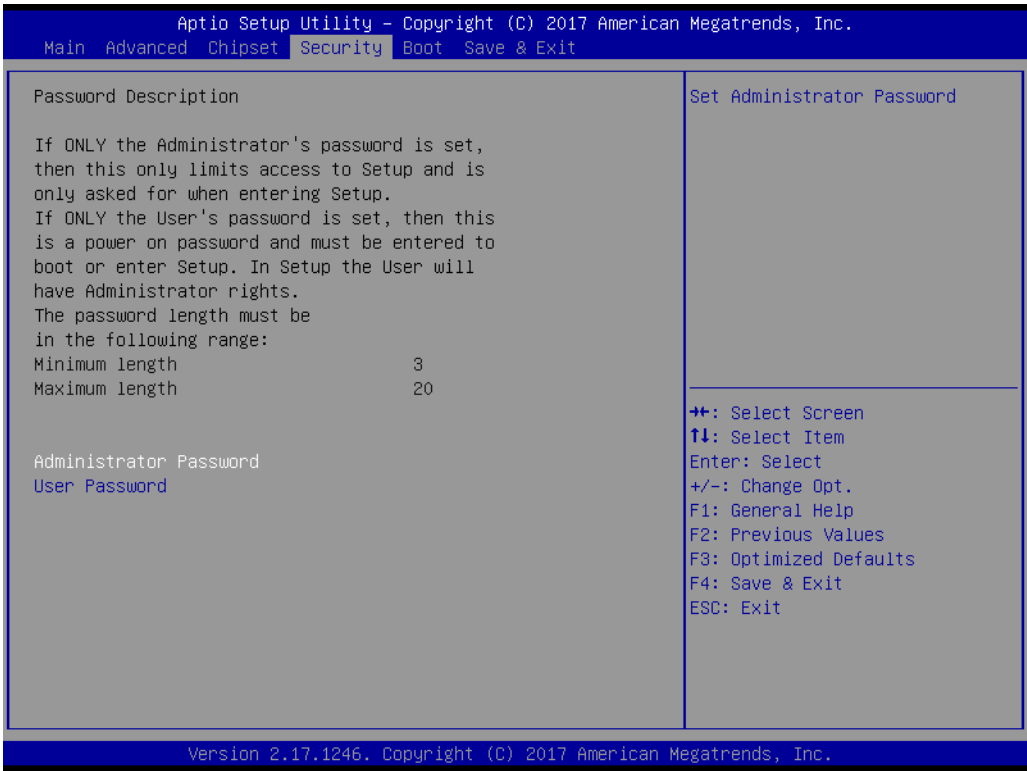


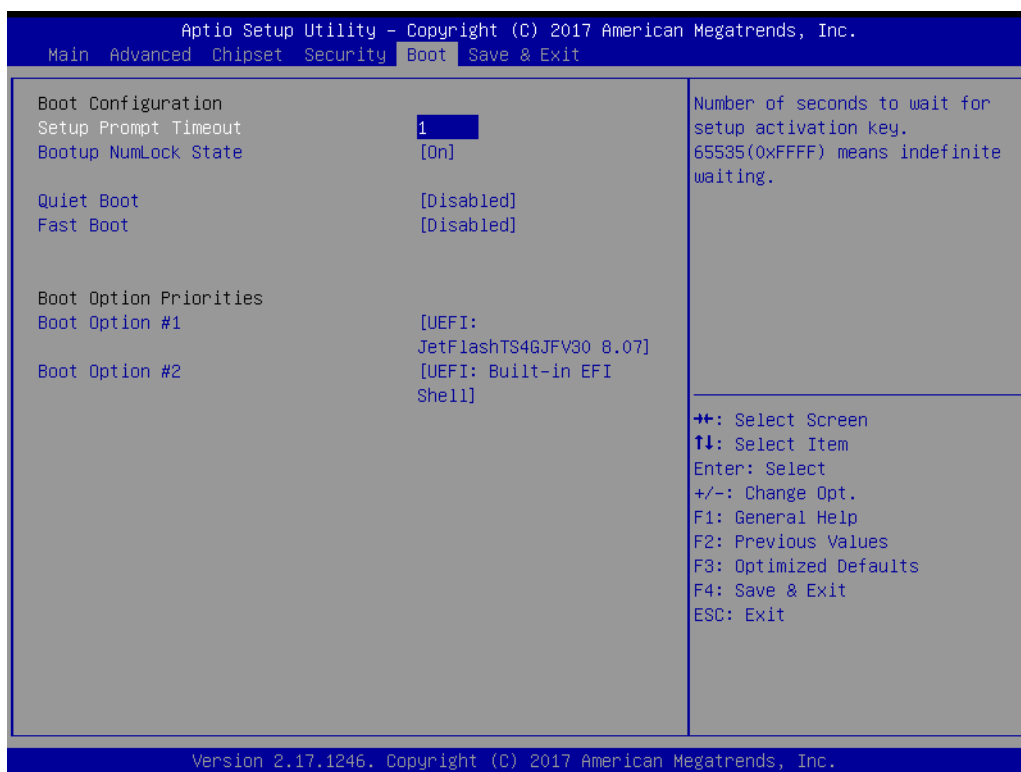
Figure 5.24 Security

Select Security Setup from the MIO-3260 Setup main BIOS setup menu. All Security Setup options, such as password protection and virus protection, are described in this section. To access the sub menu for the following items, select the item and press <Enter>.

■ **Change Administrator / User Password**



## 5.2.5 Boot Settings



**Figure 5.25 Boot Setup Utility**

- **Setup Prompt Timeout**  
This item allows users to select the number of seconds to wait for setup activation key.
- **Bootup NumLock State**  
Select the Power-on state for Numlock.
- **Quiet Boot**  
If this option is set to Disabled, the BIOS displays normal POST messages. If Enabled, an OEM Logo is shown instead of POST messages.
- **Boot Option #1**  
This item allows users to set the system boot order.

## 5.2.6 Save & Exit

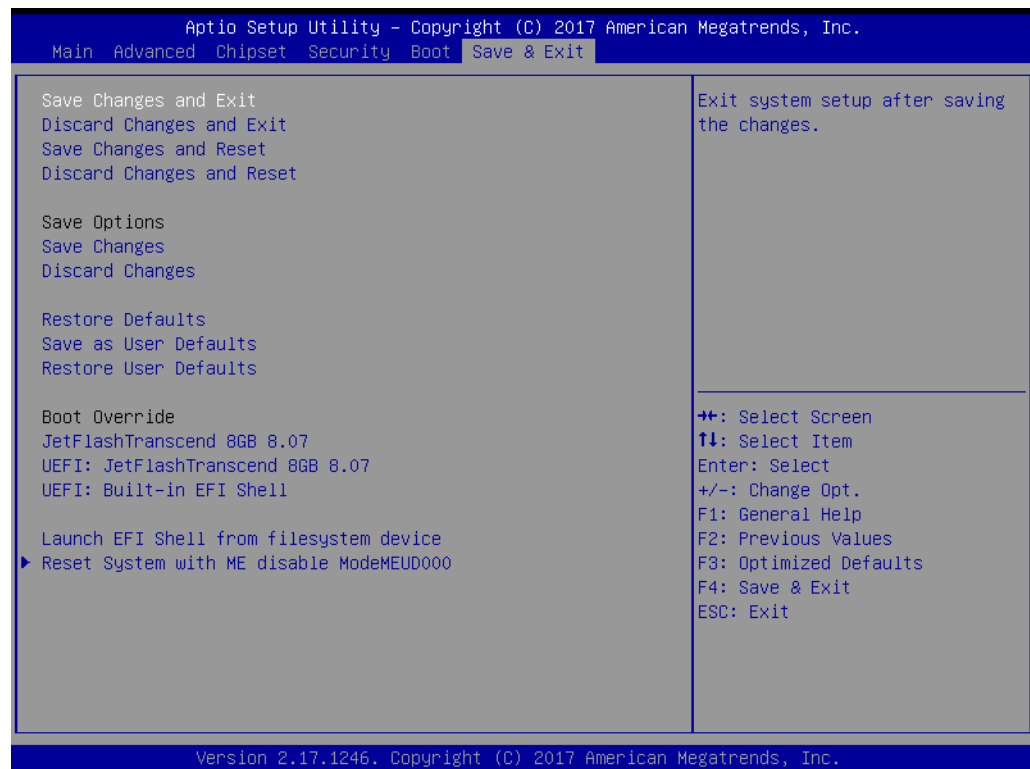


Figure 5.26 Save & Exit

- **Save Changes and Exit**  
When users have completed system configuration, select this option to save changes, exit BIOS setup menu and reboot the computer if necessary to take effect of all system configuration parameters.
- **Discard Changes and Exit**  
Select this option to quit Setup without making any permanent changes to the system configuration.
- **Save Changes and Reset**  
When users have completed system configuration, select this option to save changes, exit BIOS setup menu and reboot the computer to take effect of all system configuration parameters.
- **Discard Changes and Reset**  
Select this option to quit Setup without making any permanent changes to the system configuration and reboot the computer.
- **Save Changes**  
When users have completed system configuration, select this option to save changes without exiting BIOS setup menu.
- **Discard Changes**  
Select this option to discard any current changes and load previous system configuration.
- **Restore Defaults**  
This item allows you to restore/load default values for all the options.
- **Save as User Defaults**  
This item allows you to save the changes done so far as user defaults.

- **Restore User Defaults**  
Users can select this option to restore user defaults.
- **Boot Override**  
This item allows users to choose boot device.



# Appendix **A**

WDT Sample Code

## A.1 Watchdog Timer Sample Code

```
Watchdog function:
;The SCH3114 Runtime base I/O address is A00h
;Setting WatchDog time value location at offset 66h
;If set value "0", it is mean disable WatchDog function.
Superio_GPIO_Port = A00h
mov dx,Superio_GPIO_Port + 66h
mov al,00h
out dx,al
.model small
.486p
.stack 256
.data
SCH3114_IO EQU A00h
.code
org 100h
.STARTup
;=====
;47H
;enable WDT function bit [0]=0Ch
;=====
mov dx,SCH3114_IO + 47h
mov al,0Ch
out dx,al
;=====
;65H
;bit [1:0]=Reserved
;bit [6:2]Reserve=00000
;bit [7] WDT time-out Value Units Select
;Minutes=0 (default) Seconds=1
;=====
mov dx,SCH3114_IO + 65h ;
mov al,080h
out dx,al
;=====
;66H
;WDT timer time-out value
;bit[7:0]=0~255
;=====
mov dx,SCH3114_IO + 66h
mov al,01h
out dx,al
;=====
;bit[0] status bit R/W
;WD timeout occurred =1
;WD timer counting = 0
```

```
;=====
mov dx,SCH3114_IO + 68h
mov al,01h
out dx,al
.EXIT
END
```





# Appendix **B**

## Software

## B.1 Intel® TXE Driver Installation

For Windows 7, the Windows update KB2685811 must be installed before TXE driver installation.

Notice: For more information about KB2685811, please download the relevant update information from the official Microsoft website, or access the following link: <http://www.microsoft.com/en-us/download/details.aspx?id=38423>

### **Note!**



- We strongly recommend using the FITC tool provided with this kit.
- Please ensure to use Intel® TXE FW and system tools from the same kit. Combining different versions may cause unexpected issues.
- Please use the SPI Flash parts that adhere to the specifications outlined in the Bay Trail Platform SoC SPI Flash Compatibility Requirements document (IBL# 514482, Section 3)
- Please note that the Intel® TXE driver for Android OS is provided as part of the Android-based UEFI BIOS OS image.
- The FPT, TXE Info, and TXE manufacturing tools do not support Windows\* 7. Users are required to run TXE manufacturing tools in an EFI Shell or WinPE environment.
- Regarding the Windows® 7 OS: The Intel® TXE driver uses KMDF (WDF) 1.11, which is built into Windows® 8 and 8.1. However, Windows® 7 is not equipped with this driver. Users should install the Kernel-Mode Driver Framework (KMDF), Version 1.1. Otherwise, a yellow bang will appear on the Intel® TXE device following installation. Please adhere to the instructions provided in the following link: <http://www.microsoft.com/en-us/download/details.aspx?id=38423>
- The Sample Signer reference code does not provide adequate security. Users must add substantial functionalities and modify the software to protect their private key. Intel assumes no liability for lost or stolen private key data and/or systems, nor for any other damage resulting thereof.
- The VCN value has been increased to "8". Consequently, a full FW upgrade from Intel® TXE FW 1.1.0.1089 is possible; however, a downgrade from Intel® TXE FW 1.1.0.1113 to an earlier kit is not possible.

**Caution!** Before OS installation, the selected OS should be specified and match the OS employed by the BIOS (refer to Figure 3.8).







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