



User Manual

ARK-2250

Fanless Embedded Box PC

ADVANTECH

Enabling an Intelligent Planet

Attention!

Please note:

This package contains a hard-copy user manual in Chinese for China CCC certification purposes, and there is an English user manual included as a PDF file on the website. Please disregard the Chinese hard copy user manual if the product is not to be sold and/or installed in China.

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5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Declaration of Conformity

FCC Class B

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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.*



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.*



Packing List

Before installation, please ensure the following items have been shipped:

- 1 x ARK-2250 unit
- 1 x Registration and 2 years warranty card
- 1 x China RoHS
- 1 x 2-pole Phoenix to DC jack power cable
- 1 x Utility CD
- 1 x Simplified Chinese manual

Ordering Information

Model Number	Description
ARK-2250L-U6A1E	ARK-2250L Intel Core i7-6600U 2.6GHz system
ARK-2250L-U3A1E	ARK-2250L Intel Core i3-6100U 2.3GHz system

Optional Accessories

For ARK-2250

Part Number	Description
96PSA-A60W12W6	AC-to-DC Adapter, DC12V/5A 60W with lockable DC jack
MOS-1120Y-0201E	Isolated RS-232, 2-Ch, DB9
MOS-1120Y-1401E	Non-Isolated RS-232, DB37, 4-Ch
MOS-1121Y-0201E	Isolated RS-422/485, 2-Ch, DB9
MOS-1121Y-1401E	Non-Isolated RS-422/485, DB37, 4-Ch
MOS-2120-Z1101E	Giga LAN Ethernet module, 1-Ch
MOS-2220-X1101E	Parallel LPT module, 1-Ch, USB I/F
MOS-1130Y-0201E	Isolated CANBus, 2-Ch, DB9, PCIe I/F
MOS-2230-Z1201E	CANBus module, 2-Ch, USB I/F
MOS-1110Y-0101E	Isolated 16 DI/8 DO, 1-Ch, DB37, PCIe I/F
MIOE-PWR2-00A1E	9~36V DC-in power module
96PSA-A65W19P2-1	AC-to-DC Adapter, DC19V/3.42A 65W (for MIOe-PWR2)
AMO-2201E	4x RS232/422/485+ removable 2.5" drive (2nd layer)
AMO-2203E	2x isolated CAN-Bus (2nd layer)
AMO-2204E	3x GbE + iDoor (2nd layer, this iDoor support USB I/F only)

Safety Instructions

1. Please read these safety instructions carefully.
2. Please keep this User's Manual for later reference.
3. Please disconnect this equipment from AC outlet before cleaning. Use a damp cloth. Don't use liquid or sprayed detergent for cleaning. Use moisture sheet or clothe for cleaning.
4. For pluggable equipment, the socket-outlet shall near the equipment and shall be easily accessible.
5. Please keep this equipment from humidity.
6. Lay this equipment on a reliable surface when install. A drop or fall could cause injury.
7. The openings on the enclosure are for air convection hence protecting the equipment from overheating. **DO NOT COVER THE OPENINGS.**
8. Make sure the voltage of the power source when connecting the equipment to the power outlet.
9. Place the power cord such a way that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for long time, disconnect the equipment from mains to avoid being damaged by transient over-voltage.
12. Never pour any liquid into ventilation openings; this could cause fire or electrical shock.
13. Never open the equipment. For safety reasons, only qualified service personnel should open the equipment.
14. 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.
15. Do not leave this equipment in an environment where the storage temperature may go below -40° C (-40° F) or above 85° C (185° F). This could damage the equipment. the equipment should be in a controlled environment.
16. 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.
17. The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).
18. **RESTRICTED ACCESS AREA:** The equipment should only be installed in a Restricted Access Area.
19. **DISCLAIMER:** This set of instructions is given according to IEC 704-1. Advan-tech disclaims all responsibility for the accuracy of any statements contained herein.

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Chapter 1

General Introduction

This chapter gives background information on ARK-2250 series.

1.1 Introduction

ARK-2250 is an intelligent, modular and fanless embedded system. A fully modular design, ARK-2250 supports easy I/O switching with optional iDoor modules, wide range power board and MIOe board expansions. ARK-2250 is targeted at factory automation, machine automation, kiosks, and self-service applications.

Rugged & Multifunctional Design

ARK-2250 embedded box PC is powered by an Intel 6th gen core i3/i7 processor. The compact size system provides a selection of I/O ports: 2 x USB 3.0, 4 x USB 2.0, 2 x GbE, 4 x COM, 2 x mPCIe and 1 x 2.5" HDD. The default power input is 12V DC in, and it also supports an optional wide range 9~36V power module with wide temperature operation of -20 to 60C. ARK-2250 passes worldwide certification including CE/FCC, CB, UL, CCC and BSMI.

Multiple Display Support

ARK-2250 supports up to 3 display types: VGA, HDMI as the default display, and with an expansion display module, it can provide DP, HDMI, DVI-D as the 3rd optional display port. The graphic engine is DirectX 11.3, OpenGL 4.4, and OpenCL 2.1 Full AVC/VC1/MPEG2 HW Decode.

Built in Intelligent Management Tools - WISE-PaSS/RMM

Advantech WISE-PaSS/RMM provides a valuable suite of programmable APIs such as multi-level watchdog, hardware monitor, system restore, and other user-friendly interface. iManager is an intelligent self-management cross platform tool that monitors system status for problems and takes action if anything is abnormal. It offers a boot up guarantee in critical, low temperature environments so systems can automatically recover when voltages dip. WISE-PaSS/RMM makes the whole system more reliable and more intelligent. ARK-2250L provides easy remote management so users can monitor, configure, and control a large number of terminals to make maintenance and system recovery simpler.

1.2 Product Features

1.2.1 General

- **CPU:**
Intel 6th gen core i7-6600U processor 2.6GHz
Intel 6th gen core i3-6100U processor 2.3GHz
- **BIOS:** AMI UEFI 128Mbit
- **System Memory:** 1x DDR3L 1600MHz up to 16 GB
- **Watchdog Timer:** Single chip Watchdog 255-level interval timer, setup by software
- **I/O Interface:** 4 x RS232/422/485
- **USB:** 2 x USB 2.0, 4 x USB 3.0 compliant ports
- **Audio:** High Definition Audio (HD), Line out, Mic-in
- **Storage:** 1 x mSATA and 1 x high capacity 2.5" SATA HDD (up to 12.5mm height)
- **Expansion Interface:**
 - Supports 2 x MiniPCle (1 with SIM holder)
 - Supports 1 x iDoor expansion (by 1st layer)
 - Supports 1 x ARK Plus expansion (by 2nd layer)

1.2.2 Display

- **Controller:** Intel® HD Graphics 520
- **Resolution:**
 - VGA: Supports up to 1920 x 1200
 - HDMI: Supports up to 4096 x 2160 @ 24Hz
- **Dual Display:** VGA+HDMI
- **Triple Display:** VGA+HDMI+3rd optional display

1.2.3 Ethernet

- **Chipset:**
 - LAN1 Intel i219
 - LAN2 Intel i210
- **Speed:** 1000 Mbps
- **Interface:** 2 x RJ45
- **Standard:** Compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3x, IEEE 802.3y, IEEE 802.ab.

1.3 Chipset

1.3.1 Functional Specification

1.3.1.1 Processor

Processor	Intel 6th gen core i7-6600U processor 2.6GHz Intel 6th gen core i3-6100U processor 2.3GHz
Memory	Supports DDR3L 1600MHz up to 16GB 1 x 204-pin SODIMM socket type

1.3.1.2 Chipset

Internal Graphics Features	<ul style="list-style-type: none">■ DirectX 11.3, OpenGL 4.4■ Display Ports VGA + HDMI, HDMI 1.4a
Video Accelerator	<ul style="list-style-type: none">■ H/W accelerated video decode■ Video decoder: AVC/VC1/MPEG2 HW Decode■ Supports DVD, Blu-ray, and HD video
SATA Interface	<ul style="list-style-type: none">■ Supports several optional sections of Serial ATA II: Extensions to Serial ATA 1.0 Specification, Revision 1.0■ Supports SATA transfers to 300 Mbytes/sec.■ Supports mSATA socket
USB Interface	<ul style="list-style-type: none">■ USB host interface with support for 1 USB 3.0 and 4 USB 2.0 ports■ All ports are High-Speed, Full-Speed, and Low-Speed capable■ Supports legacy keyboard/mouse software
BIOS	<ul style="list-style-type: none">■ UEFI 128Mbit

1.3.1.3 Others

Serial ports	<ul style="list-style-type: none">■ COM1 ~ COM4: Supports RS-232/422/485 and change mode under BIOS setting <p>** COM1 ~ COM4 RS-485 supports auto-flow control.</p> <p>COM connector: D-SUB CON. 9P</p>
Ethernet	<p>LAN1 Intel i219, LAN2 Intel i210</p> <ul style="list-style-type: none">■ Compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3x, IEEE 802.3y, IEEE 802.ab.■ Supports 10/100/1000 Mbps. <p>LAN Connectors: Phone Jack RJ45 8P 90D(F)</p>
Audio	<p>Audio Codec: Realtek ALC888S:</p> <ul style="list-style-type: none">■ Compliant with HD Audio specifications■ Supports 16/20/24-bit DAC and 16/20/24-bit ADC resolution■ Supports: Line-out, Mic-in <p>Audio Connectors: Ear Phone Jack * 2</p>
Battery backup	<ul style="list-style-type: none">■ BATTERY 3V/210 mAh with WIRE x 1

1.3.2 WISE-PaSS/RMM

Sequence control	Supported
Watchdog timer	Multi Level WDT Programmable 1-255 sec / min
Hardware monitor	CPU Temperature / input Current / input Voltage
Power saving	Deep sleep S5 mode
System information	Running HR / Boot record

1.4 Mechanical Specifications

1.4.1 Dimensions

260[10.24] x 54[2.13] x 140.2[5.52] Unit: mm [Inch]

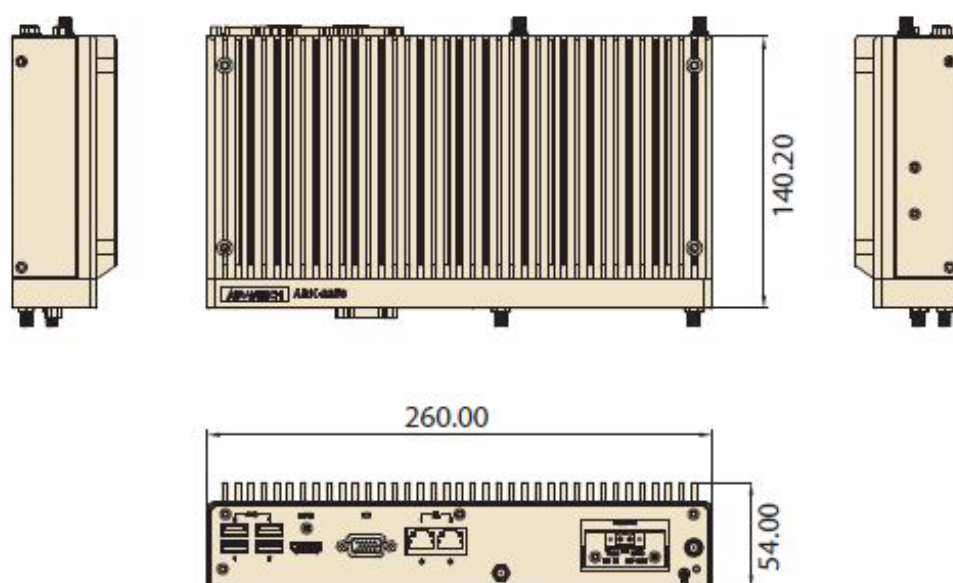


Figure 1.1 ARK-2250 Mechanical dimension drawing

1.4.2 Weight

2.3 kg (5.06 lb)

1.5 Power Requirement

1.5.1 System Power

- **Minimum power input:**
 - ARK-2250: DC 12V, 5A

1.5.2 RTC Battery

- Lithium 3 V/210 mAH

1.6 Environment Specification

1.6.1 Operating Temperature

- With Industrial Grade SSD/mSATA: -20 ~ 60° C (-4~140° F), with air flow, speed=0.7 m/sec
- With 2.5-inch hard disk 0 to 40° C (32~104° F), with air flow, speed=0.7 m/sec

1.6.2 Relative Humidity

- 95% @ 40° C (non-condensing)

1.6.3 Storage Temperature

- -40 ~ 85° C (-40 ~ 185° F)

1.6.4 Vibration during Operation

- When the system is equipped with SSD/mSATA: 3Grms, IEC 60068-2-64, random, 5 ~ 500 Hz, 1hr/axis, x,y,z 3 axes.

1.6.5 Shock during Operation

- When the system is equipped with SSD/mSATA: 30G, IEC 60068-2-27, half sine, 11 ms duration.

1.6.6 Safety

- UL, CB, CCC, BSMI

1.6.7 EMC

- CE, FCC, CCC, BSMI

Chapter 2

H/W Installation

This chapter introduces external IO and the installation of ARK-2250 hardware.

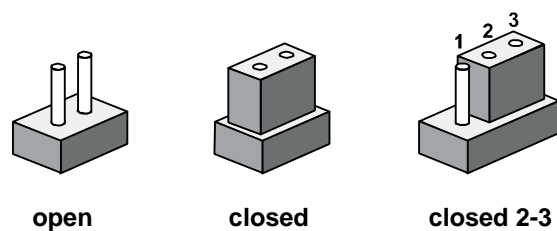
2.1 Introduction

The following sections show the internal jumpers settings and the external connector pin assignments for application.

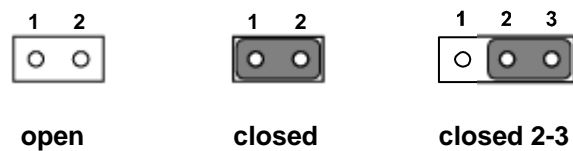
2.2 Jumpers

2.2.1 Jumper Description

You may configure ARK-2250 to match the needs of your application by setting jumpers. A jumper is a metal bridge used to close an electric circuit. 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, you connect the pins with the clip. To open a jumper, you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2 and 3. In this case you would connect either pins 1 and 2, or 2 and 3.



The jumper settings are schematically depicted in this manual as follows.



A pair of needle-nose pliers may be helpful when working with jumpers. If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes. Generally, you simply need a standard cable to make most connections.

2.2.2 Jumper List

Table 2.1: Jumper setting

J1	Auto Power On Setting
SW2	RTC Reset

2.2.3 Jumper Location

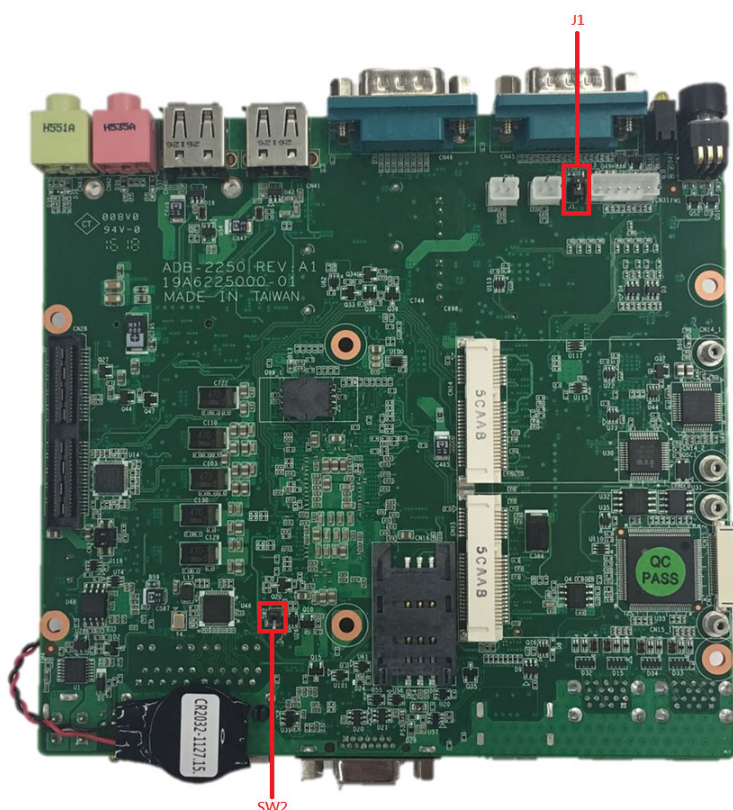


Figure 2.1 Jumper Layout

2.2.4 Jumper Setting

On the Motherboard

J1	Auto Power On Setting
Part Number	1653002101
Footprint	HD_2x1P_79_D
Description	PIN HEADER 2*1P 180D(M)SQUARE 2.0mm DIP W/O Pb
Setting	Function
NL	Power On by power button (default)
(1-2)*	Auto Power On



SW2	RTC Reset
Part Number	1600000071
Footprint	SW_3P_CJS-1201TA1
Description	CJS-1201TA1
Setting	Function
1*	Normal (Default)
3	RTC Reset

2.3 Connectors

2.3.1 ARK-2250 External I/O

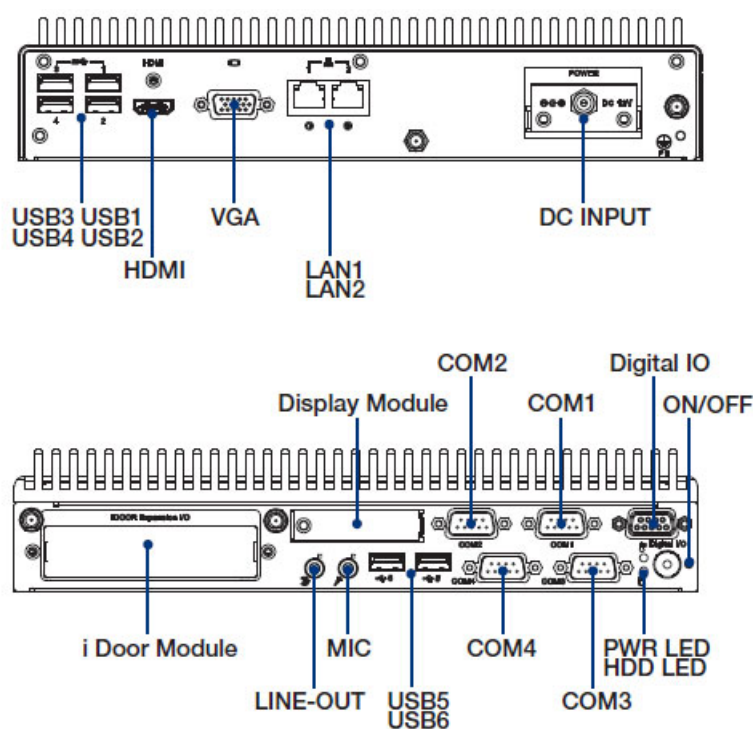


Figure 2.2 ARK-2250 IO

2.3.1.1 Power On/Off Button

ARK-2250 has a Power On/Off button with LED indicators on the front side that show On status (Green LED) and Off/Suspend status (Orange LED). The Power button supports dual functions: Soft Power -On/Off (Instant off or Delay 4 Seconds then off) and Suspend.



Figure 2.3 Power On/Off Button

2.3.1.2 LED Indicators

There are two LEDs on the front panel that indicate system status: The Power LED is for system power status; and HDD LED is for HDD and compact flash disk status.



Figure 2.4 LED

2.3.1.3 HDMI Connector

An integrated 19-pin receptacle connector HDMI 1.4a interface is provided. The HDMI link supports resolutions up to 4096 x 2160 @ 24 Hz.

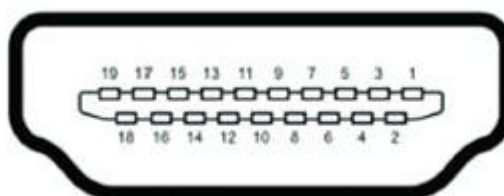


Figure 2.5 HDMI Connector

RS-232		RS-422		RS-485	
Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
1	TMDS Data 2+	2	TMDS Data 2 shield	1	TMDS Data 2 shield
3	TMDS Data 2-	4	TMDS Data 1+	3	TMDS Data 1+
5	TMDS Data 1 shield	6	TMDS Data 1-	5	TMDS Data 1-
7	TMDS Data 0+	8	TMDS Data 0 shield	7	TMDS Data 0 shield
9	TMDS Data 0-	10	TMDS clock+	9	TMDS clock+
11	TMDS clock shield	12	TMDS clock-	11	TMDS clock-
13	CEC	14	Reserved	13	Reserved
15	SCL	16	SDA	15	SDA
17	DDC/CEC Ground	18	+5V	17	+5V
19	Hot Plug Detect			19	

2.3.1.4 VGA Connector

The ARK-2250 provides a high resolution VGA interface connected by a D-sub 15-pin connector to support a VGA CRT monitor. It supports display resolutions of up to 1920 x 1200 @ 60Hz (No hotplug support)

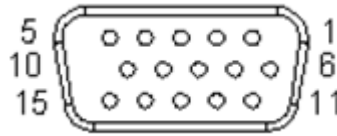


Figure 2.6 VGA Connector

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	DDAT
13	H-SYNC	14	V-SYNC
15	DCLK		

2.3.1.5 USB 3.0 Connector

The USB port USB port 1, 2, 3, 4 of ARK-2250 supports USB3.0 interface, which provide complete Plug & Play and hot swapping for up to 127 external devices. The USB interface complies with USB UHCI, Rev. 3.0. Please refer to Table. 2.7 for its pin assignments. USB 3.0 connectors contain legacy pins to interface to USB 2.0 devices, and a new set of pins for USB 3.0 connectivity (both sets reside in the same connector).

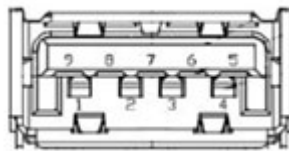


Figure 2.7 USB 3.0 Connector

Pin	Signal name	Pin	Signal name
1	+5V	2	USB_data-
3	USB_data+	4	GND
5	SSRX-	6	SSRX+
7	GND	8	SSTX-
9	SSTX+		

Note! When users OS is Windows 7, please install USB 3.0 driver from Intel website. <https://downloadcenter.intel.com/download/25476/windows-7-usb-3-0-creator-utility>



2.3.1.6 USB 2.0 Connector

ARK-2250 provides two USB interface connectors. The USB 5, 6 connectors are used to connect any device that conforms to the USB interface. Most digital devices conform to this standard. The USB interface supports Plug and Play.

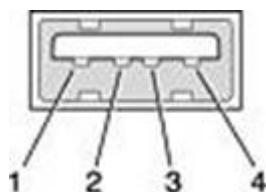


Figure 2.8 USB 2.0 Connector

Pin	Signal name	Pin	Signal name
1	VCC	2	USB_data-
3	USB_data+	4	GND

2.3.1.7 Ethernet Connector (LAN)

ARK-2250 is equipped with two Ethernet controllers that are fully compliant with IEEE 802.3u 10/100/1000 Mbps CSMA/CD standards. LAN1, LAN2 are all equipped with Intel i219/i210 Ethernet controller. The Ethernet port provides a standard RJ-45 jack connector with LED indicators on the front side to show its Active/Link status (Green LED) and Speed status (Yellow LED).

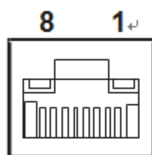


Figure 2.9 Ethernet Connector (LAN)

Pin	10/100/1000 BaseT Signal Name
1	TX+
2	TX-
3	RX+
4	MDI2+
5	MDI2-
6	RX-
7	MDI3+
8	MDI3-

2.3.1.8 Audio Connector

ARK-2250 offers stereo audio ports by two phone jack connectors of Line_Out, Mic_In. The audio chip is controlled by ALC888S, and it's compliant with Azalea standard.

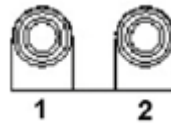
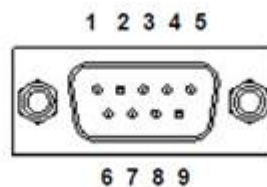


Figure 2.10 Audio Connector

Pin	Audio Signal Name
1	Line out
2	Mic in

2.3.1.9 COM Connector

ARK-2250 provides four D-sub 9-pin connectors, which offers RS232/422/485 serial communication interface ports. Default setting is RS-232, if you want to use RS-422/485, you can find the BIOS manual to change setting.



	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

Note! NC represents "No Connection".



2.3.1.10 GPIO Connector

ARK-2250 provides 8 bit GPIO, please refer to the pin definition

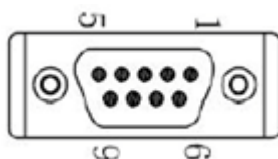


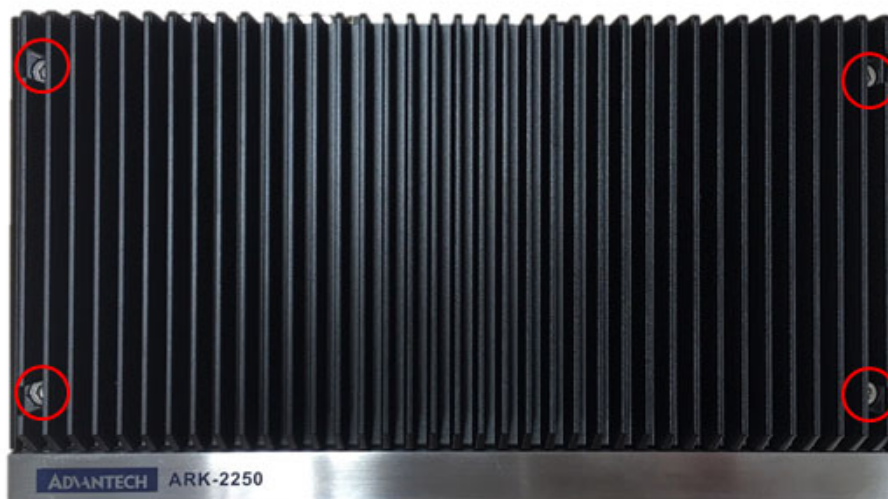
Figure 2.11 GPIO Connector

Pin	Signal
1	DIO bit 0
2	DIO bit 1
3	DIO bit 2
4	DIO bit 3
5	DIO bit 4
6	DIO bit 5
7	DIO bit 6
8	DIO bit 7
9	GND

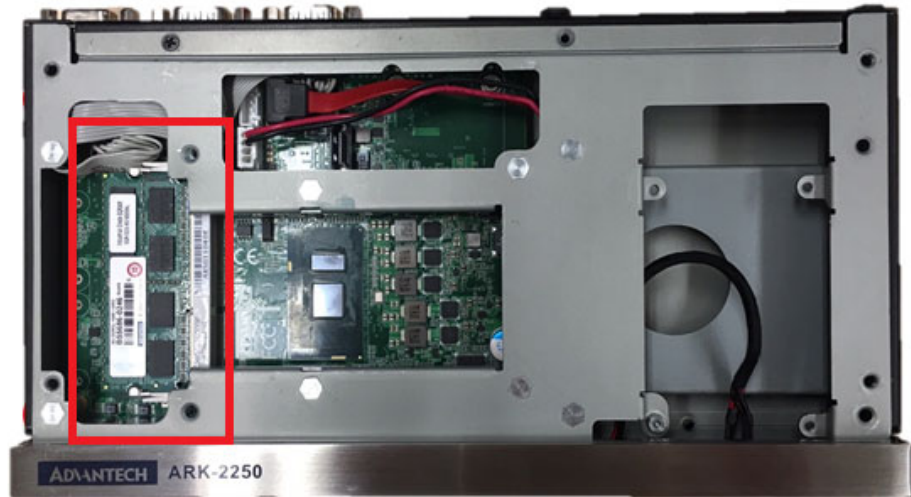
2.4 Installation

2.4.1 Memory Installation

1. Unscrew the 4 screws on the top cover. (Please use the tool in the accessory box.)



2. Remove the top cover and install the memory into the memory socket.



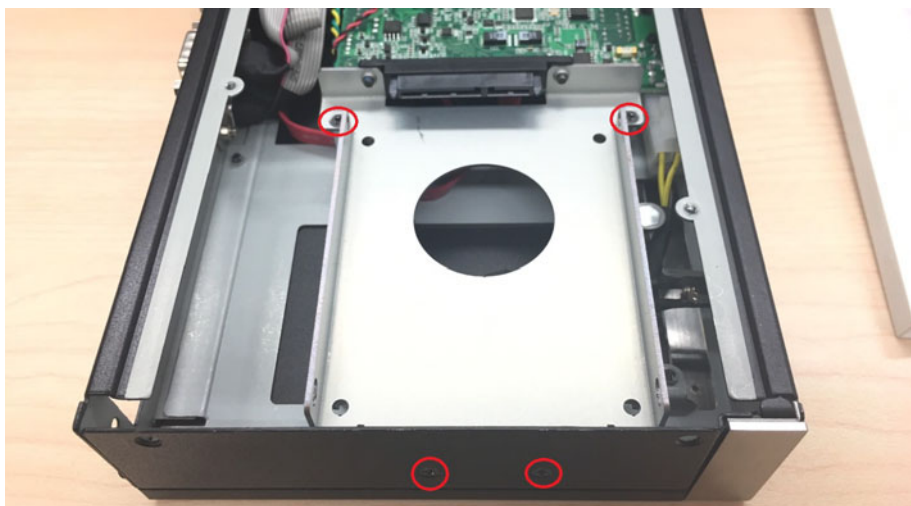
3. Replace the top cover.

2.4.2 HDD/SSD Installation

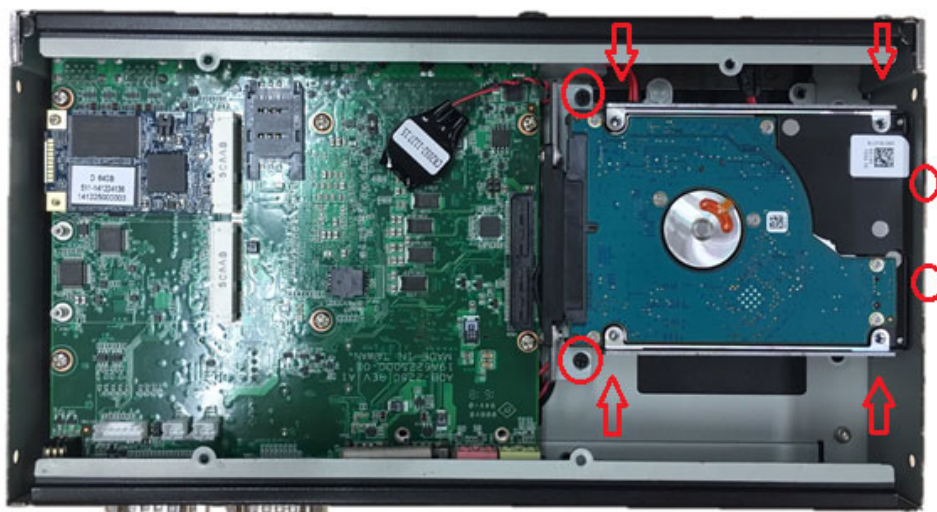
1. Unscrew the 4 screws on the bottom cover, and the 4 screws on both sides of ARK-2250.



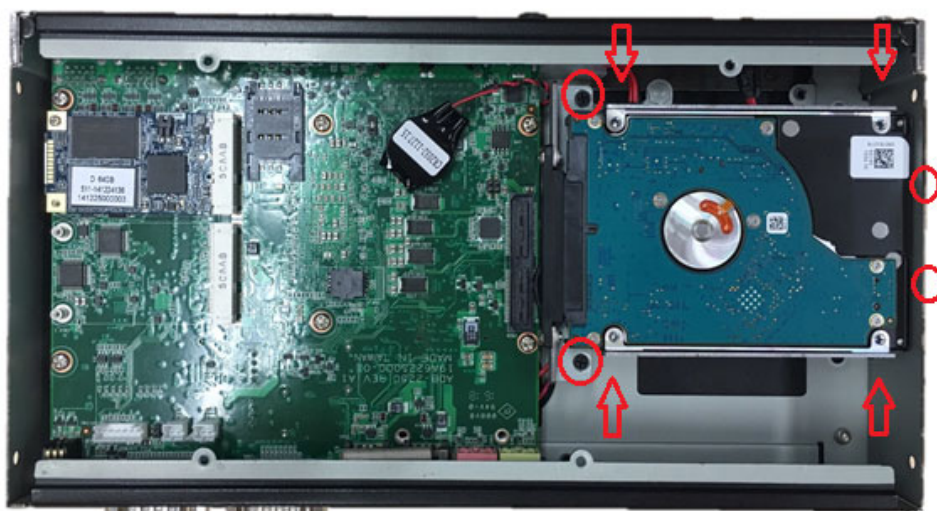
2. Unscrew the 4 screws on the HDD bay.



3. Install the HDD/SSD into the HDD bay, and fix the HDD onto the bracket.



4. Fix the 4 screws back onto the HDD bay.



5. Replace the bottom cover and fix the 8 screws back onto the system.

2.4.3 mSATA Installation

1. Unscrew the 4 screws on the bottom cover, and the 4 screws on both sides of ARK-2250.



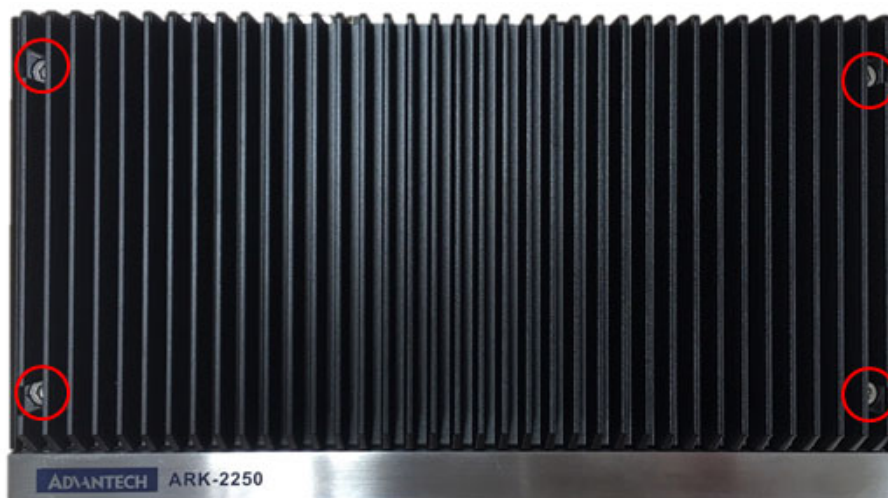
2. Put the mSATA module onto the mSATA slot (CN15), and fasten the 2 screws back on the mSATA module.



3. Replace the bottom cover and fasten the 8 screws back onto the system.

2.4.4 Power Module (MIOe-PWR2) Installation (Option)

1. Remove the 4 screws on the top cover. (Please use the tool in the accessory box.)



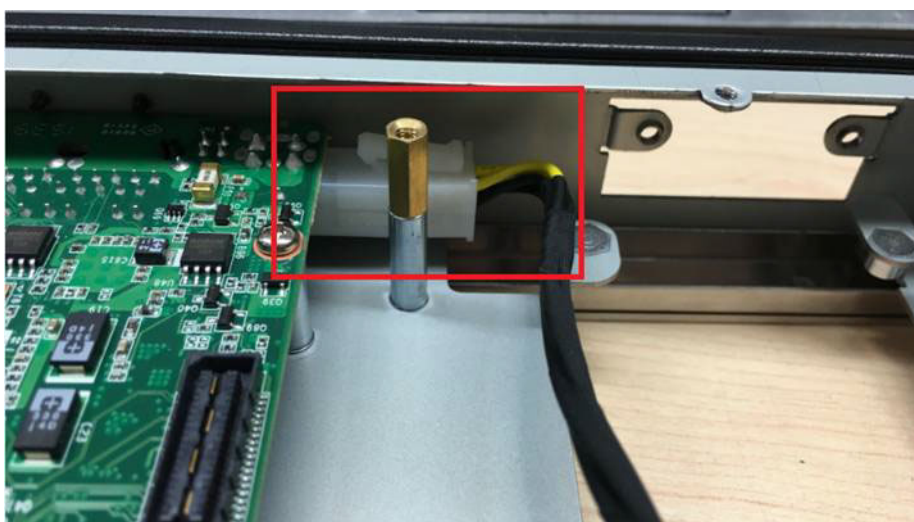
2. Remove the 2 screws on the power bracket for the original DC jack on the front panel.



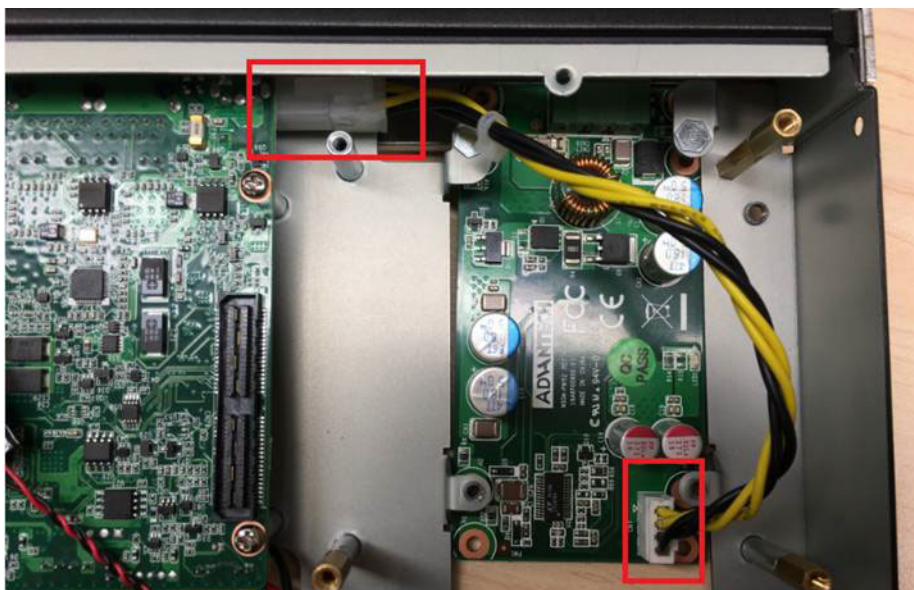
3. Unscrew the 4 screws on the bottom cover and on both sides of ARK-2250.



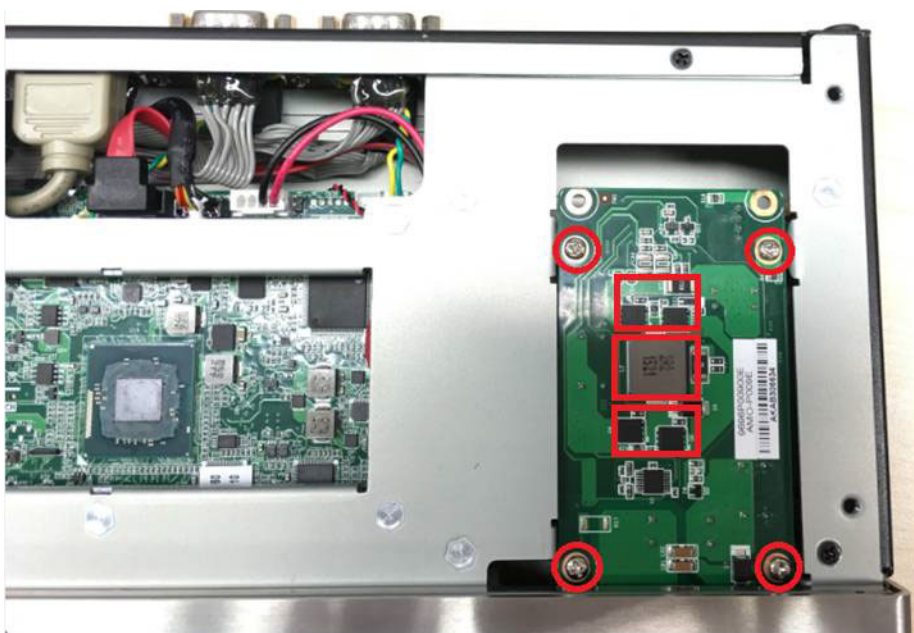
4. Remove the original internal power cable from the M/B.



5. Link the MIOe-PWR2 internal power cable from M/B to the power board.



6. Turn to the top side, and fasten the 4 screws for the power board, and tape 3 thermal pads on the red marks.



7. Screw the new power bracket for MIOe-PWR2 on the front panel.



8. Replace the bottom cover and the 8 screws back onto the system.
9. Replace the top cover and the 4 screws.

2.4.5 iDoor Module Installation (Option)

Please refer to iDoor modules support on datasheet.

2.4.6 2nd Layer MIOe Module Installation (Option)

Please refer to ARK-Plus module support on datasheet.

Chapter 3

BIOS Settings

3.1 BIOS Setup

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-2250 BIOS setup screens.

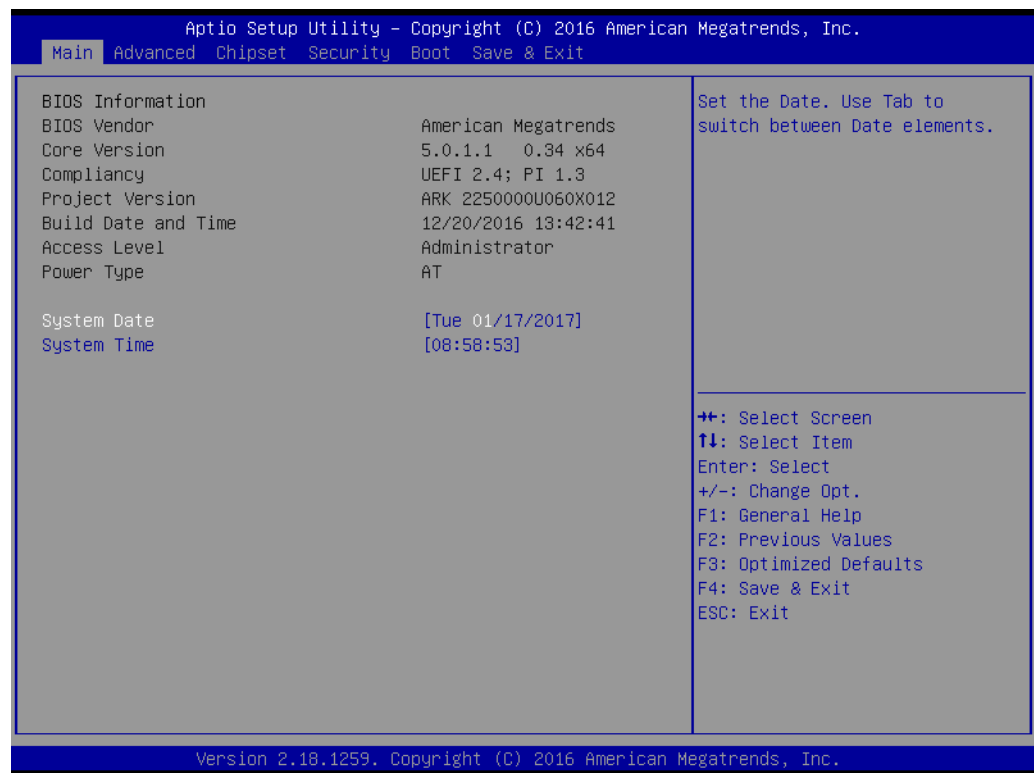


Figure 3.1 Setup program initial screen

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

3.2 Entering Setup

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

3.2.1 Main Setup

When users first enter the BIOS Setup Utility, users will enter the Main setup screen. Users 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 3.2 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 date / System time

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.

3.2.2 Advanced BIOS Features Setup

Select the Advanced tab from the ARK-2250 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.

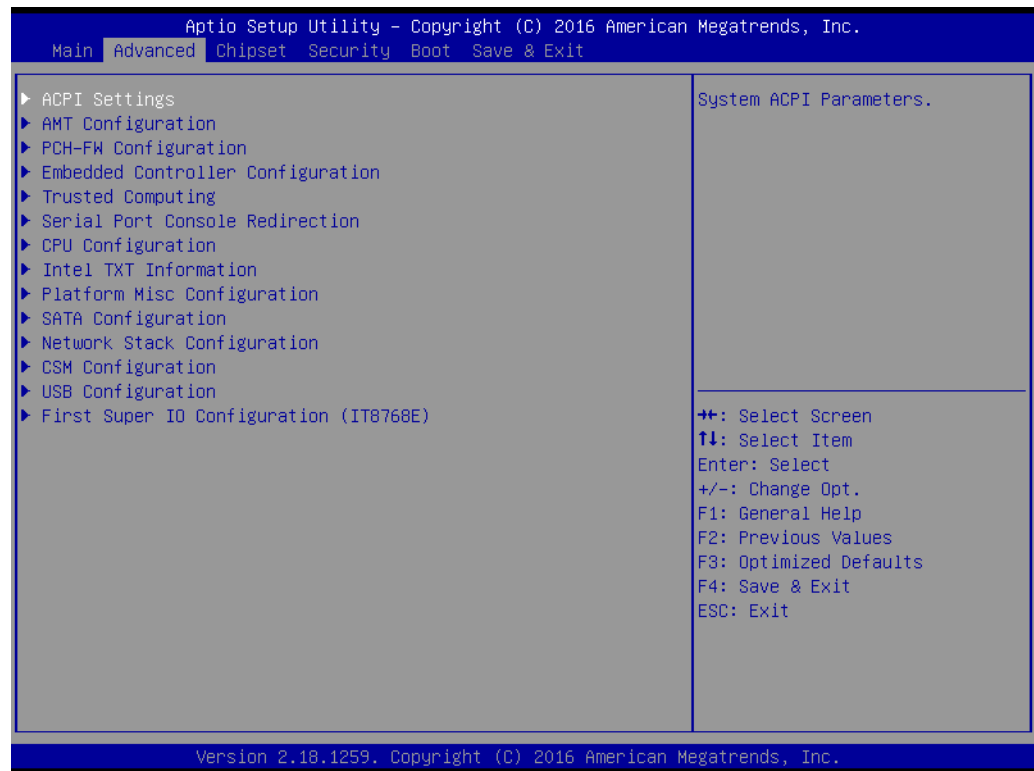


Figure 3.3 Advanced BIOS features setup screen

3.2.2.1 ACPI Settings

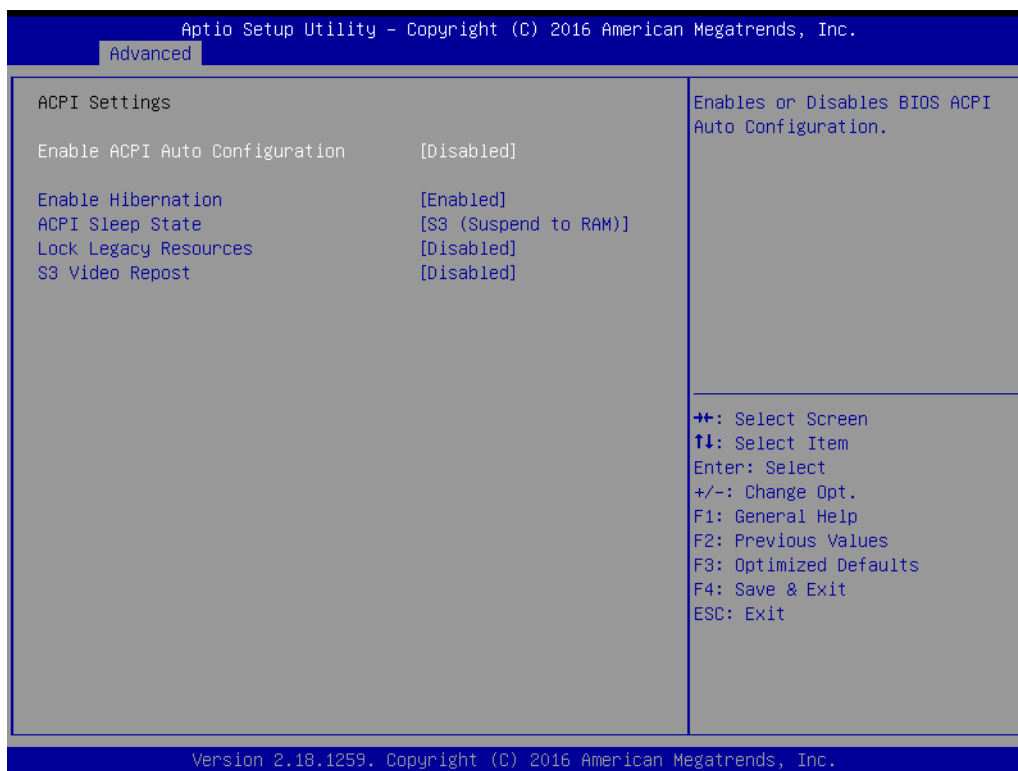
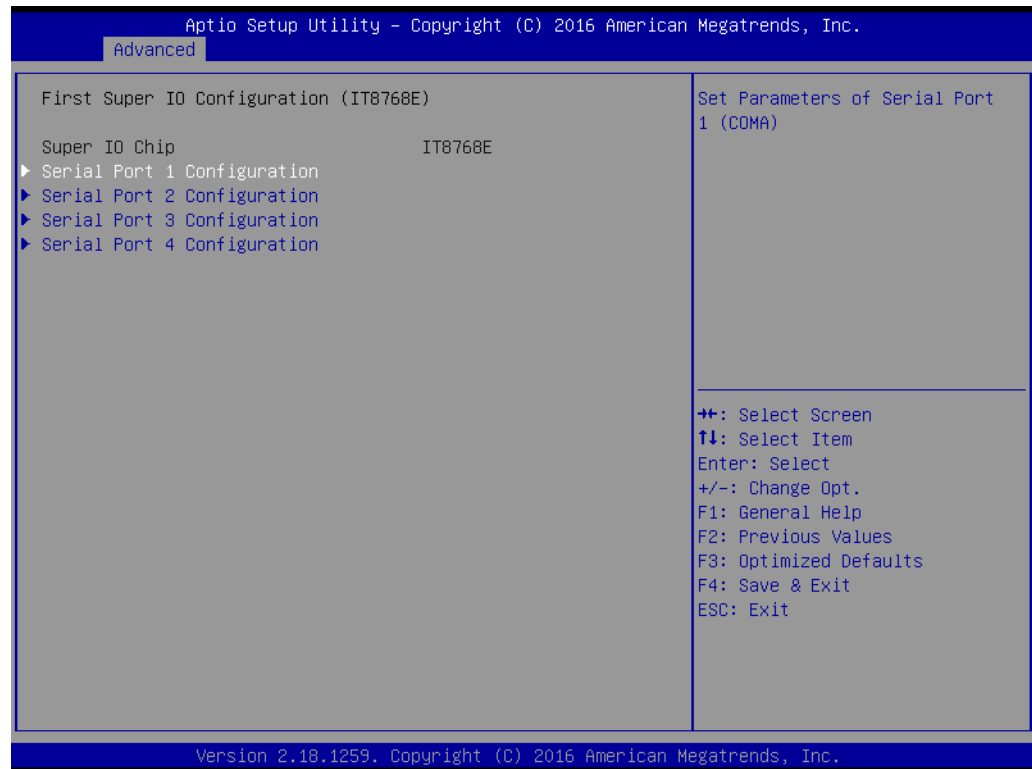


Figure 3.4 ACPI Setting

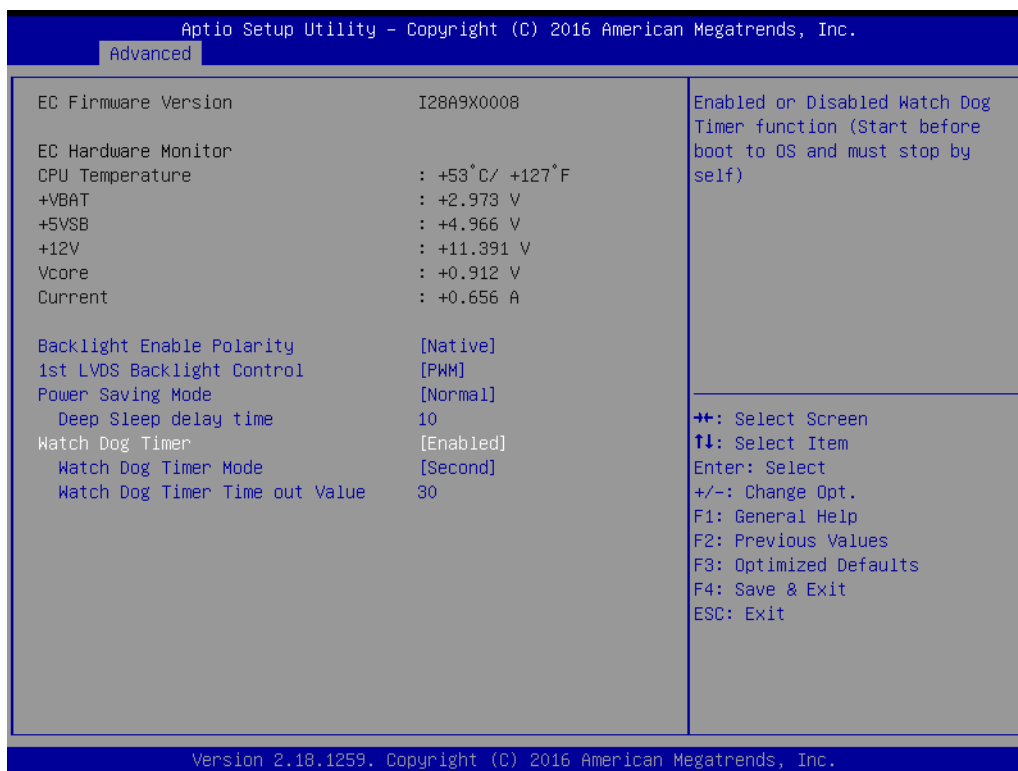
- **Enable ACPI Auto Configuration**
This item allows users to enable or disable BIOS ACPI auto configuration.
- **Enable Hibernation**
This item allows users to enable or disable hibernation.
- **ACPI Sleep State**
This item allows users to set the ACPI sleep state.
- **Lock Legacy Resources**
This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

3.2.2.2 Super I/O Configuration



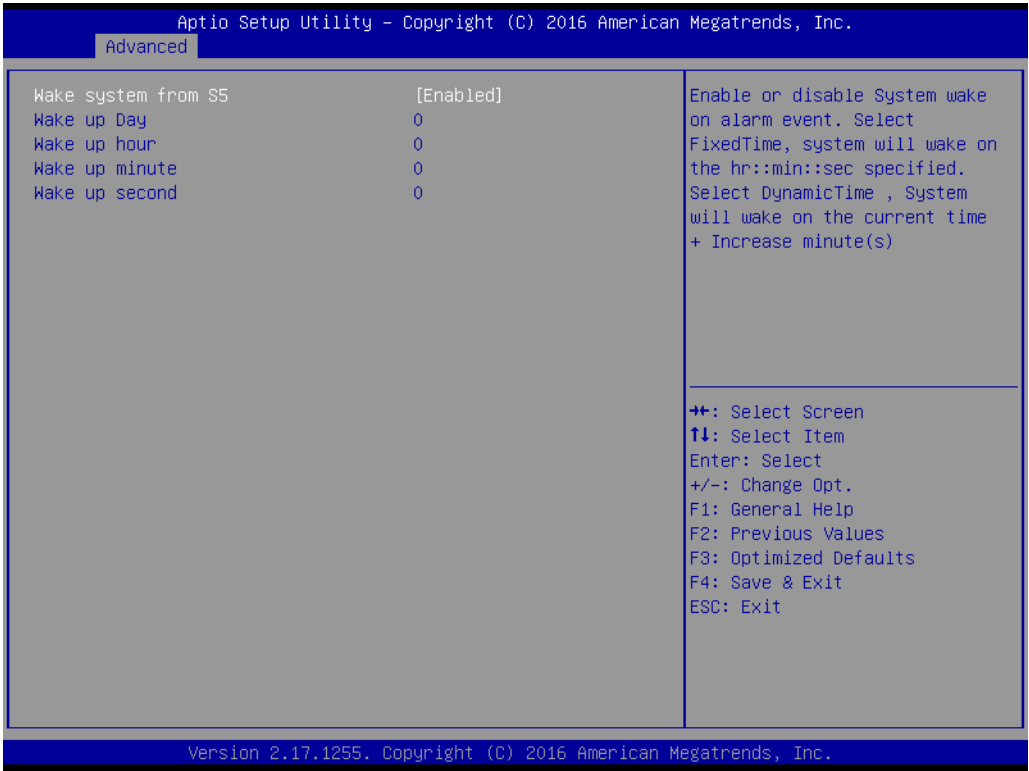
- **Serial Port 1 Configuration**
Set Parameters of Serial Port 1 (COMA).
- **Serial Port 2 Configuration**
Set Parameters of Serial Port 2 (COMB).
- **Serial Port 3 Configuration**
Set Parameters of Serial Port 3 (COMC).
- **Serial Port 4 Configuration**
Set Parameters of Serial Port 4 (COMD).

3.2.2.3 Embedded Controller Configuration



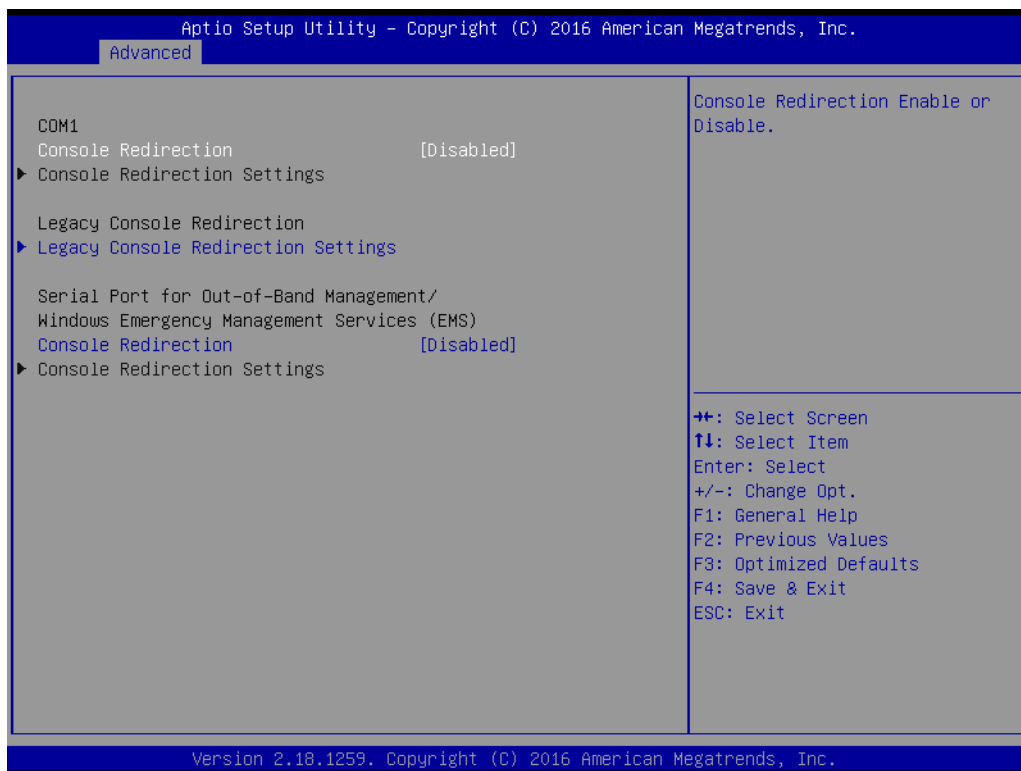
- **EC Hardware Monitor**
This page display all information about system Temperature/Voltage/Current.
- **EC Power Saving Mode**
This item allows users to set board's power saving mode when off.
- **EC Watch Dog Function**
This item allows users to select EC watchdog timer.

3.2.2.4 S5 RTC Wake Settings



- **Wake system from S5**
Enable or disable System wake on alarm event. Select FixedTime, system will wake on the hr:min:sec specified.

3.2.2.5 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.

3.2.2.6 CPU Configuration

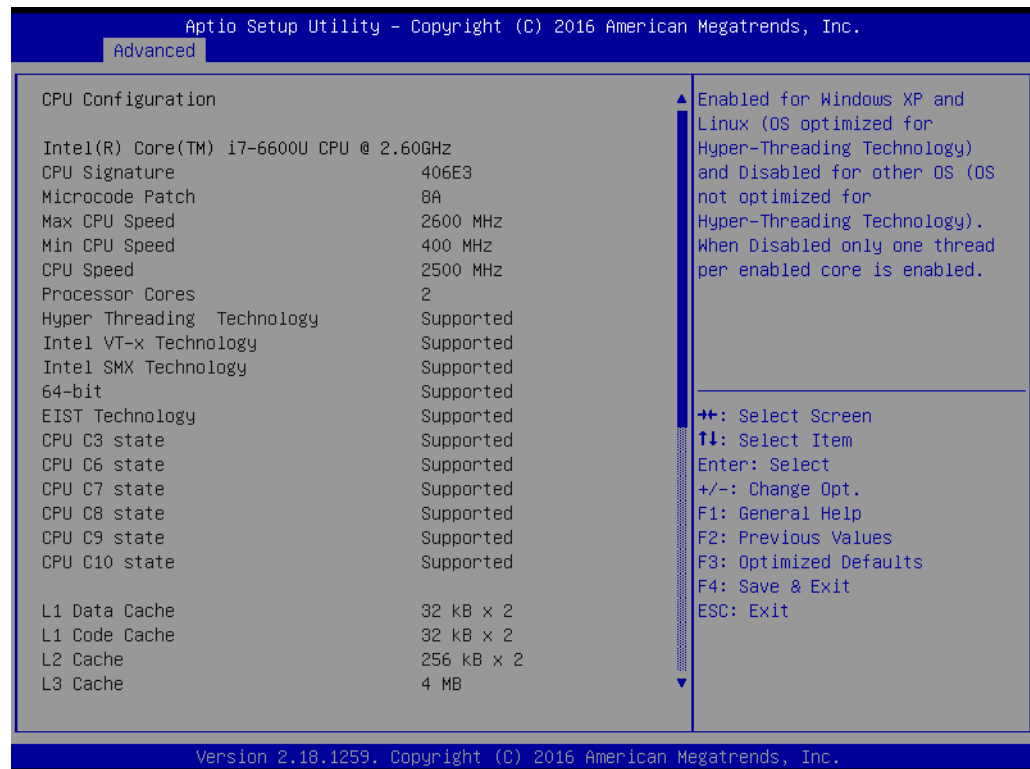
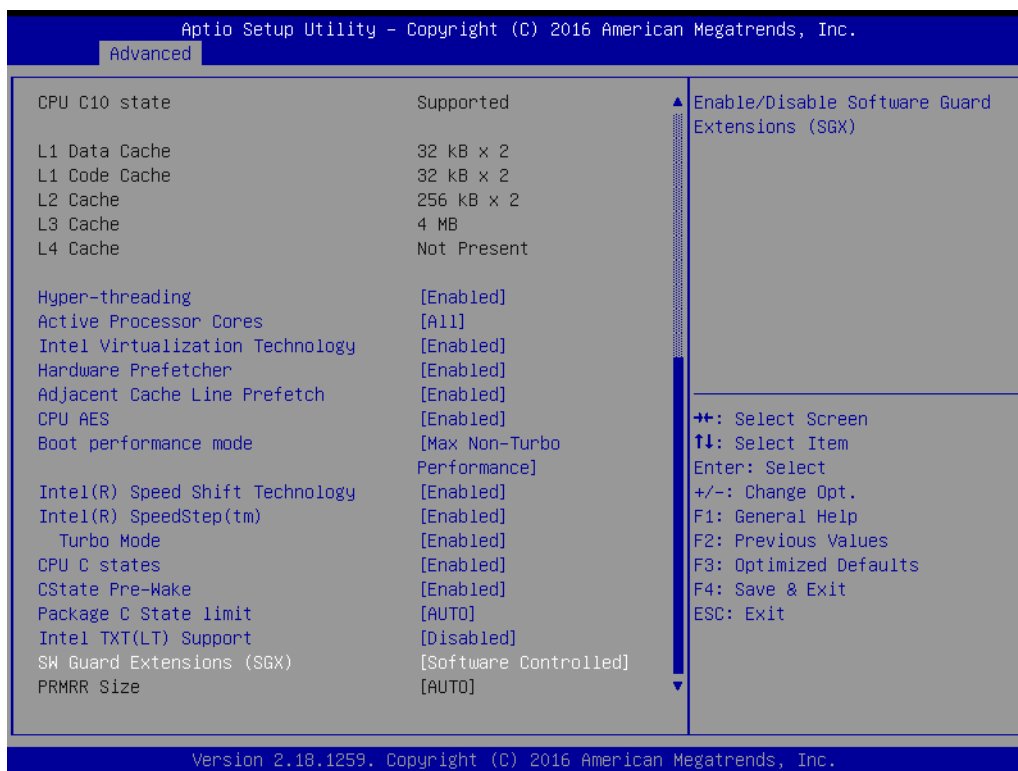


Figure 3.5 Intel Fast Flash Standby

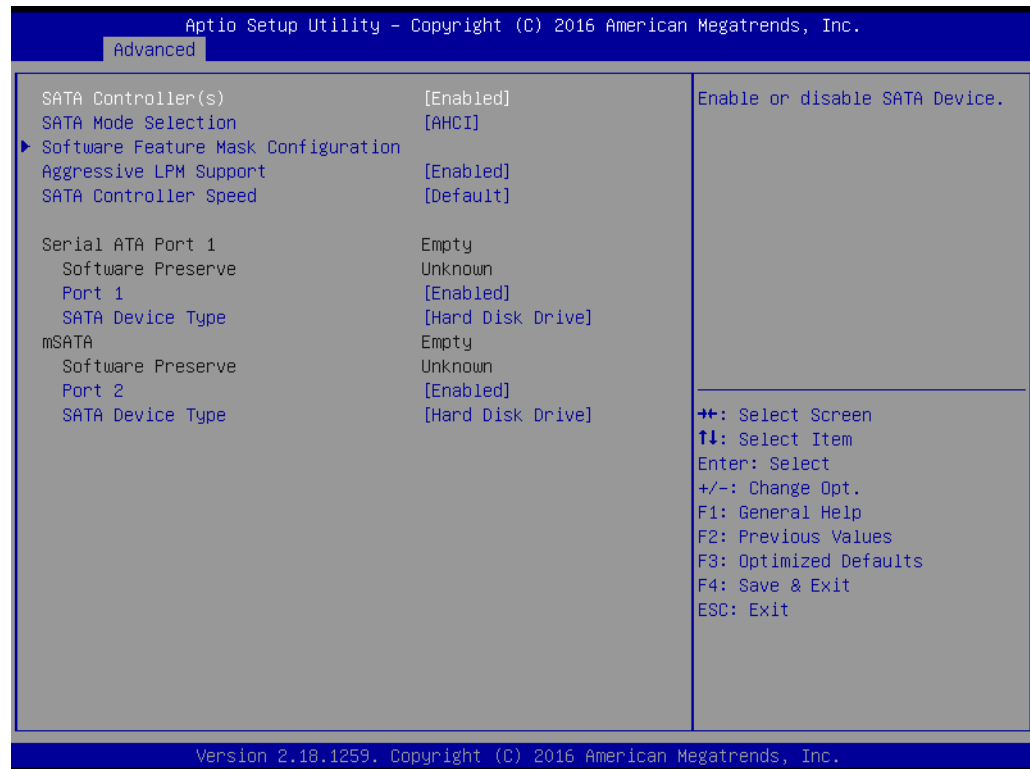
- **Limit CPUID Maximum**
Disabled for Windows XP.
- **Execute Disable Bit**
XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Windows Server 2003 SP1, Windows XP SP2, SuSE Linux 9.2, RedHat Enterprise 3 Update 3.)
- **Hardware Prefetcher**
Enable mid level cache(L2) streamer prefetcher.
- **Adjacent Cache Line Prefetch**
Enable mid level cache(L2) prefetching of adjacent cache lines.
- **Intel Virtualization Technology**
When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
- **Power Technology**
Enables power management features.

3.2.2.7 PPM Configuration



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

3.2.2.8 IDE Configuration



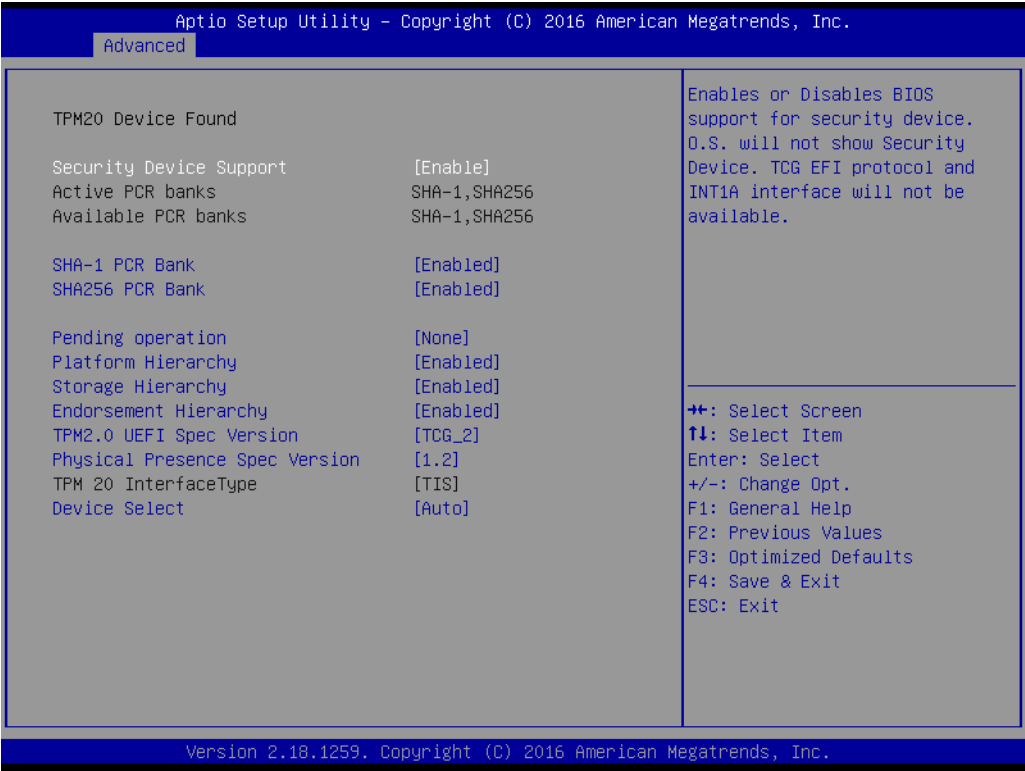
- **Serial-ATA (SATA)**
Enable / Disable Serial ATA.
- **SATA Speed Support**
SATA Speed Support Gen1 or Gen2.
- **SATA Mode**
Select IDE / AHCI.
- **Serial-ATA Port 0 / Port1**
Enable / Disable Serial ATA Port0 / Port1.
- **SATA Port 0 / Port1 HotPlug**
Enable / Disable SATA Port0 / Port1 hotplug function.

3.2.2.9 CSM Configuration



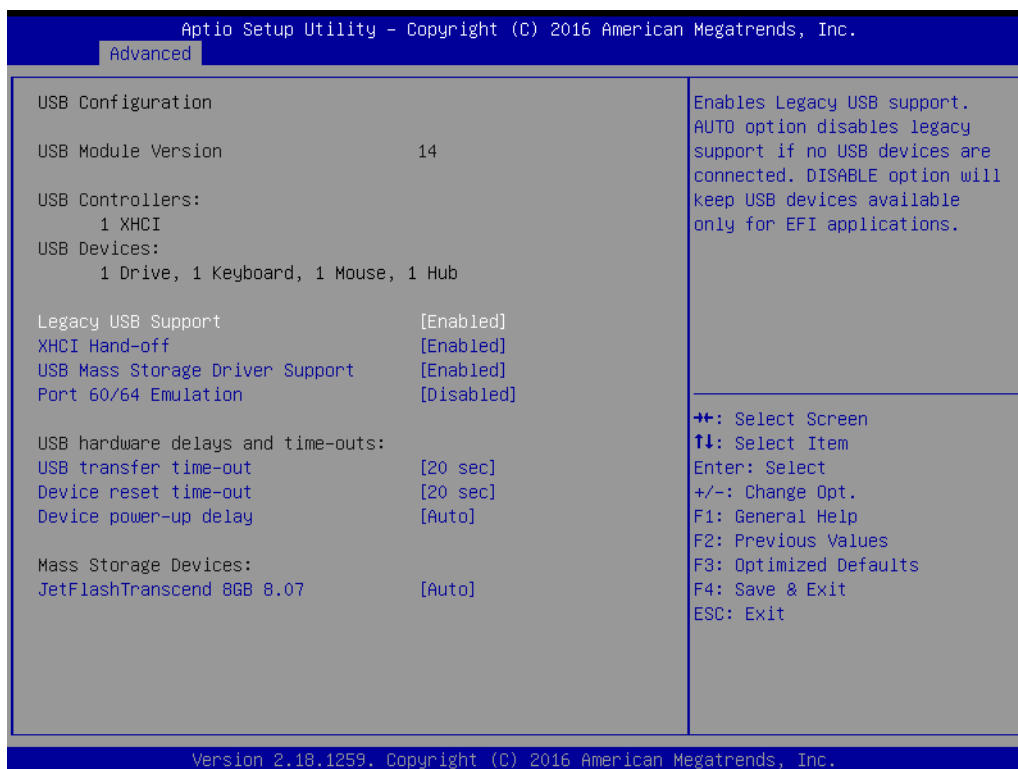
- **CSM Support**
Enable/Disable CSM Support.
- **GateA20 Active**
- UPON REQUEST - GA20 can be disabled using BIOS services. We suggest you do not disable GA20 as this option is useful when any RT code is executed above 1MB.
- **Option ROM Messages**
Set display mode for Option ROM.
- **INT19 Trap Response**
BIOS reaction on INT19 trapping by Option ROM: IMMEDIATE - execute the trap right away; POSTPONED - execute the trap during legacy boot.
- **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 Network, Storage, or Video.

3.2.2.10 Trusted Computing



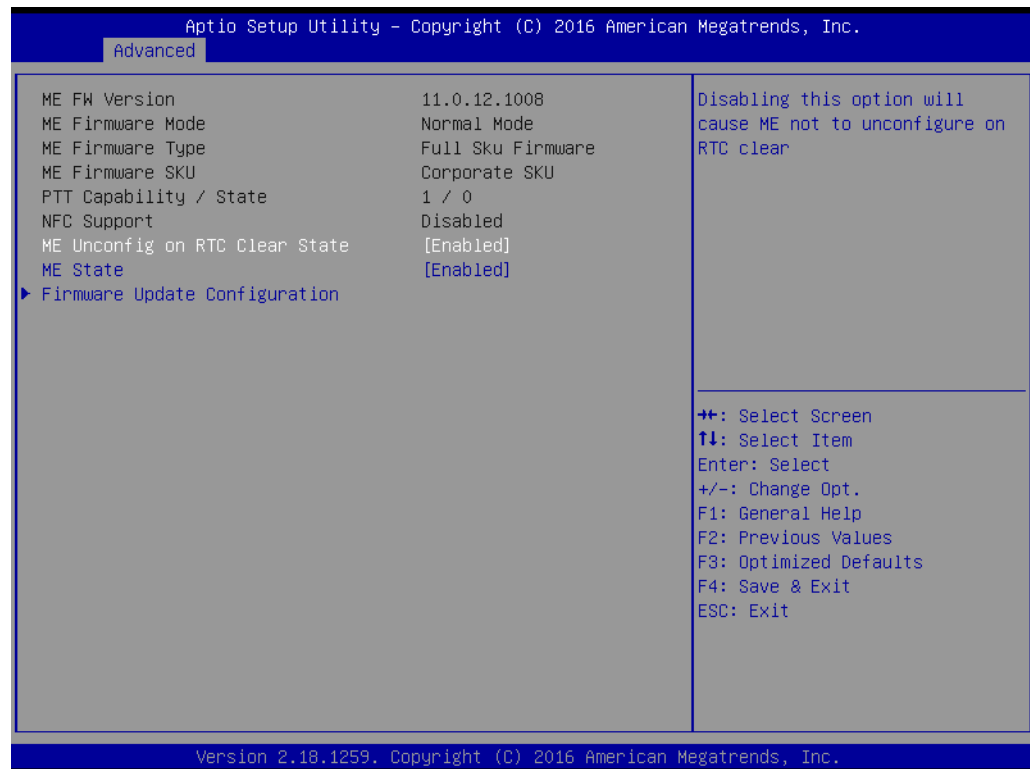
- **Trusted Computing**
Enables or Disables BIOS support for security devices. OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

3.2.2.11 USB Configuration



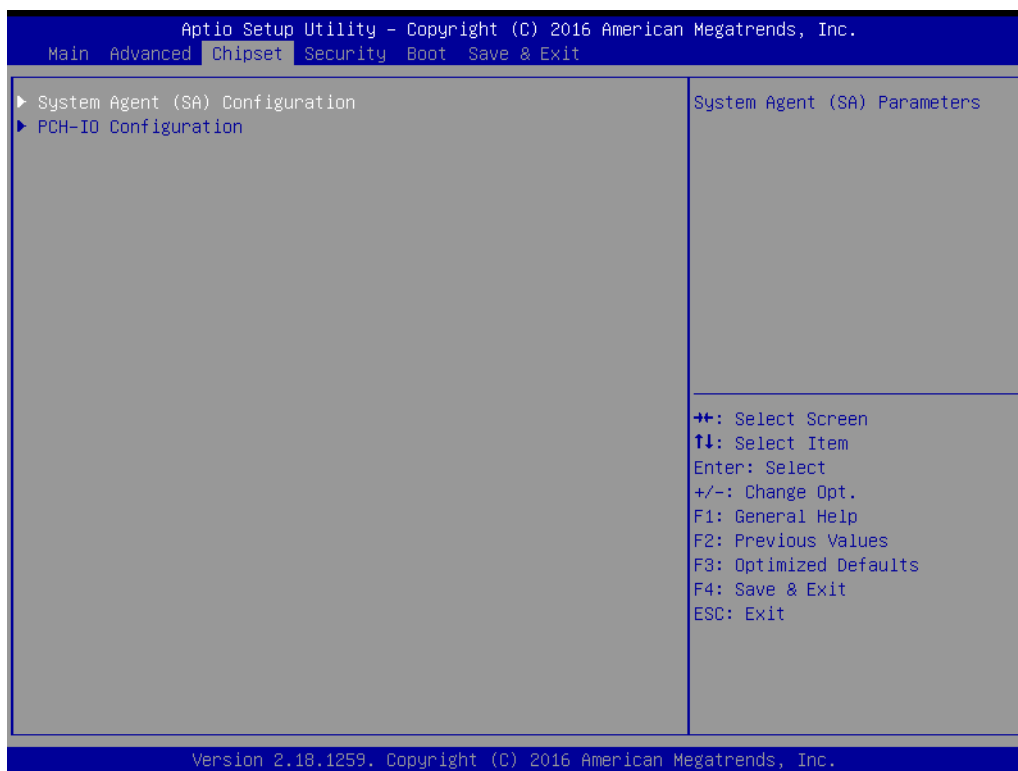
- **Legacy USB Support**
Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
- **XHCI Hand-off**
This is a workaround for OS without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
- **EHCI Hand-Off**
This is a workaround for OS without EHCI hand-off support. The EHCI ownership change should claim by EHCI driver.
- **USB Mass Storage Driver Support**
Enable/Disable USB Mass Storage Driver Support.
- **USB transfer time-out**
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.

3.2.3 Security Configuration



- **TXE**
- **TXE HMRFPD Disable**
- **TXE Firmware Update**
- **TXE EOP Message**
Send EOP message before entering OS
- **TXE Unconfiguration Perform**
Revert TXE settings to factory defaults

3.2.3.1 Chipset Configuration



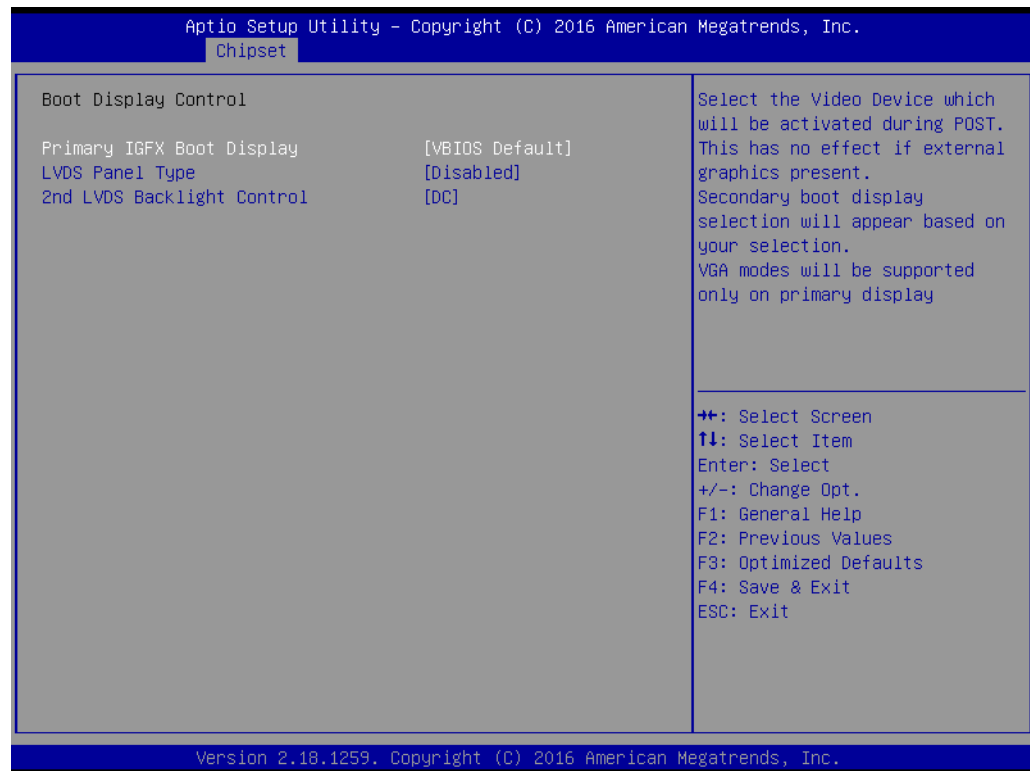
- **North Bridge**
Details for North Bridge items.
- **South Bridge**
Details for South Bridge items.

3.2.3.2 North Bridge



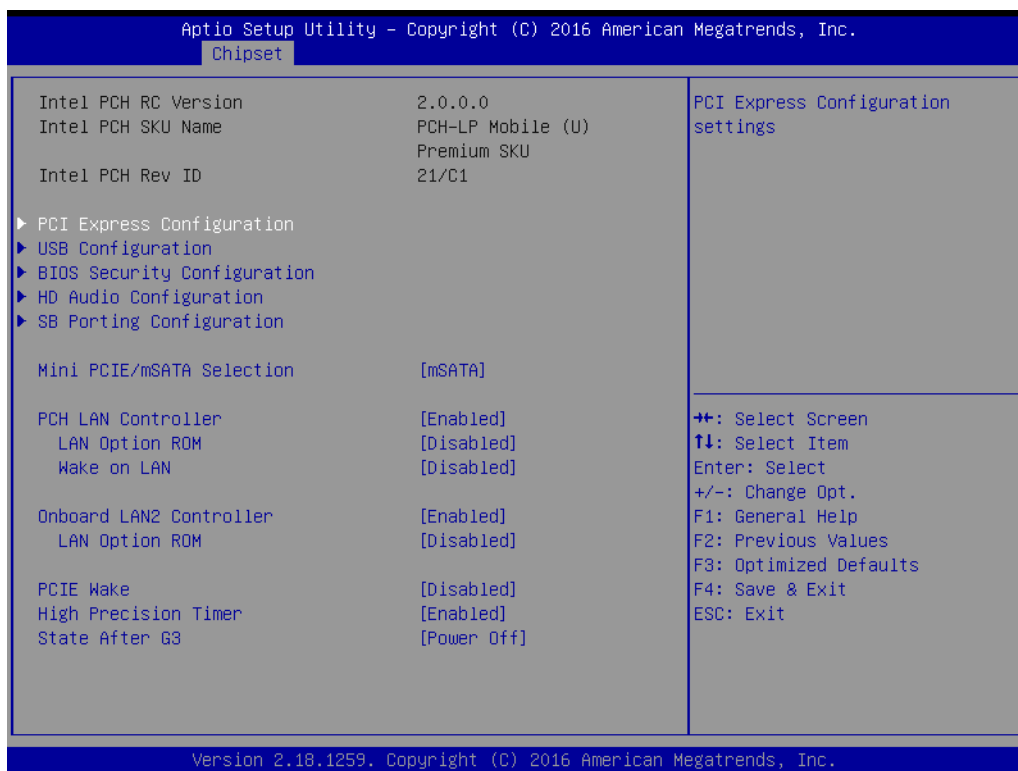
- **Intel IGD Configuration**
Config Intel IGD settings.
- **Max TOLUD**
Maximum value of TOLUD.

3.2.3.3 Intel IGD Configuration



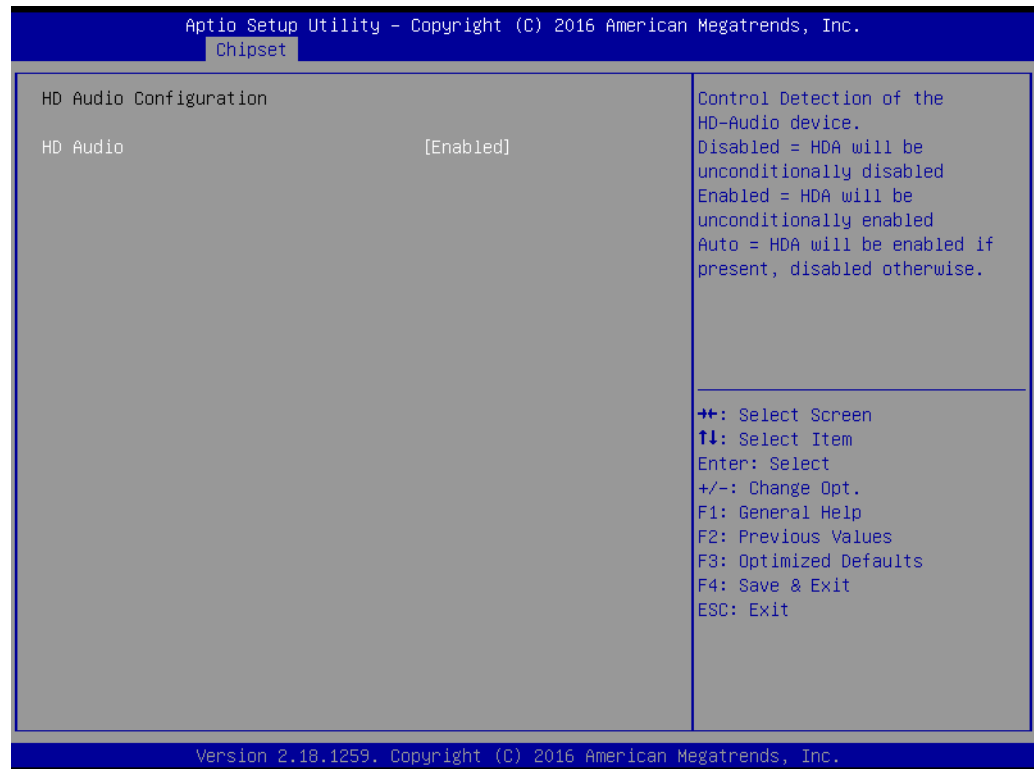
- **Primary IGFX Boot Display**
Select the Video Device which will be activated during POST. This has no effect if external graphics are present. Secondary boot display selection will appear based on your selection. VGA modes will be supported only on primary display.
- **DVMT Pre-Allocated**
Select 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.
- **DOP CG**
Enable/Disable DOP clock gating.
- **GTT Size**
Select the GTT Size.
- **IGD Thermal**
Enable/Disable IGD Thermal.
- **Spread Spectrum clock**
Enable/Disable Spread Spectrum clock.

3.2.3.4 South Bridge



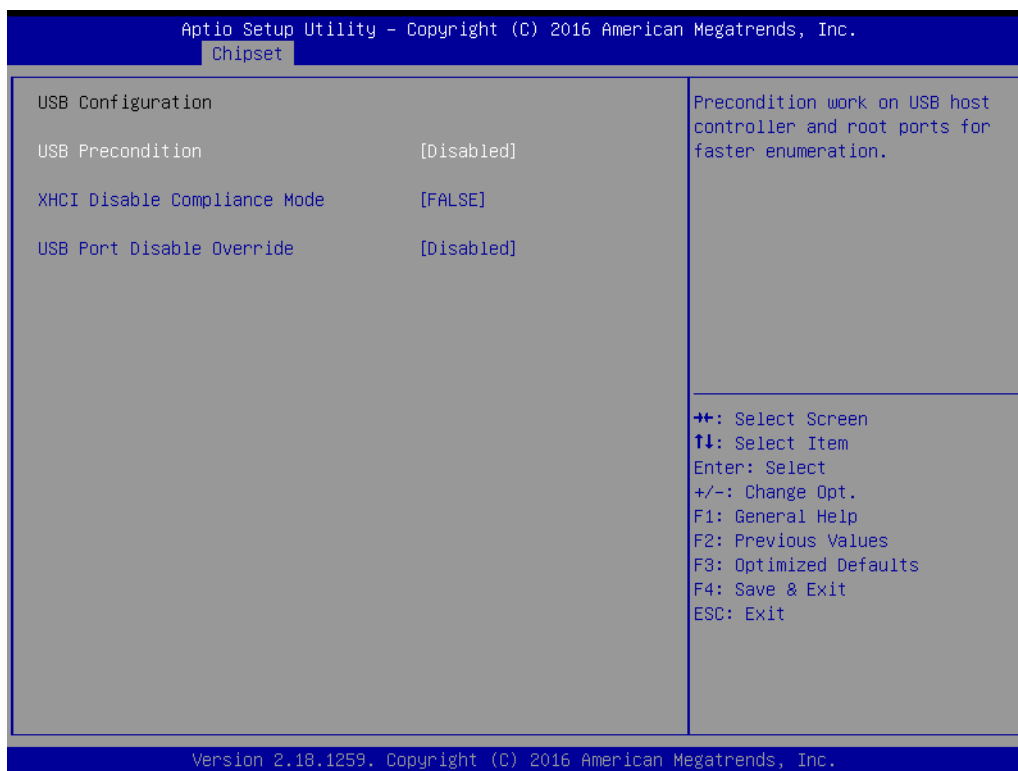
- **Azalia HD Audio**
Azalia HD Audio options.
- **USB Configuration**
USB Configuration Settings.
- **PCI Express Configuration**
PCI Express Configuration settings.
- **High Precision Timer**
Enables or disables the high precision timer.
- **LAN1 Controller**
Enable or Disable the LAN1.
- **LAN2 Controller**
Enable or Disable the LAN2.
- **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 a 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.

3.2.3.5 Azalia HD Audio



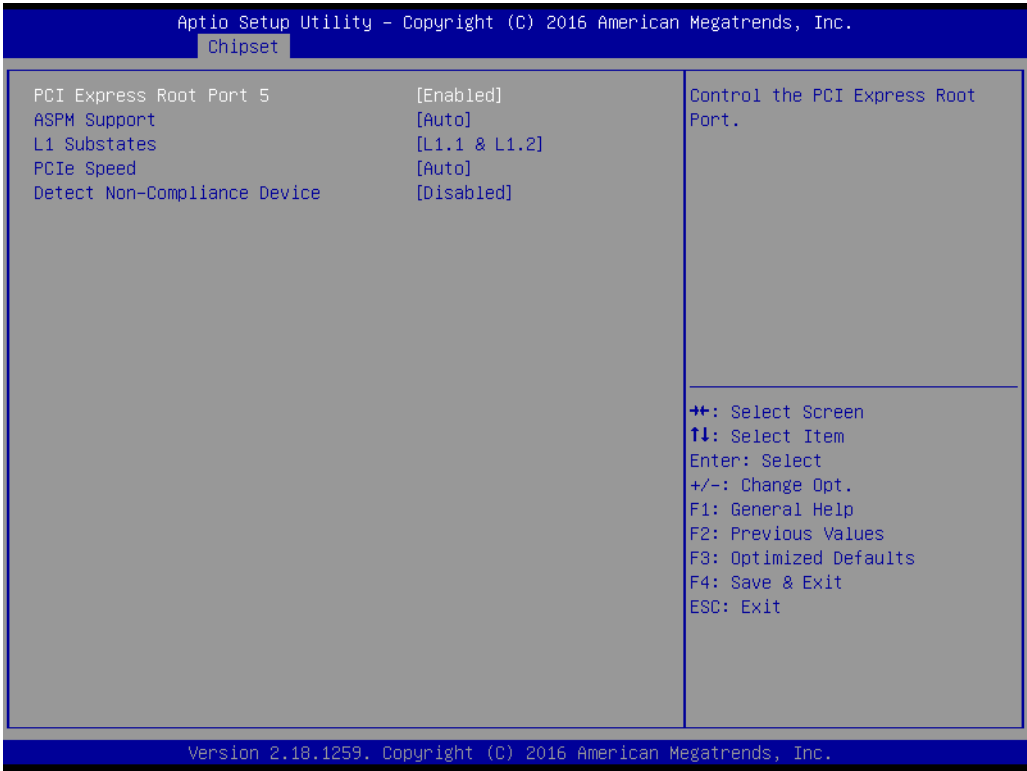
- **Audio Controller**
Control Detection of the Azalia device. Disabled = Azalia will be unconditionally disabled. Enabled = Azalia will be unconditionally Enabled. Auto = Azalia will be enabled if present disabled otherwise.
- **Azalia HDMI Codec**
Enable/Disable internal HDMI codec for Azalia
- **HDMI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

3.2.3.6 USB Configuration



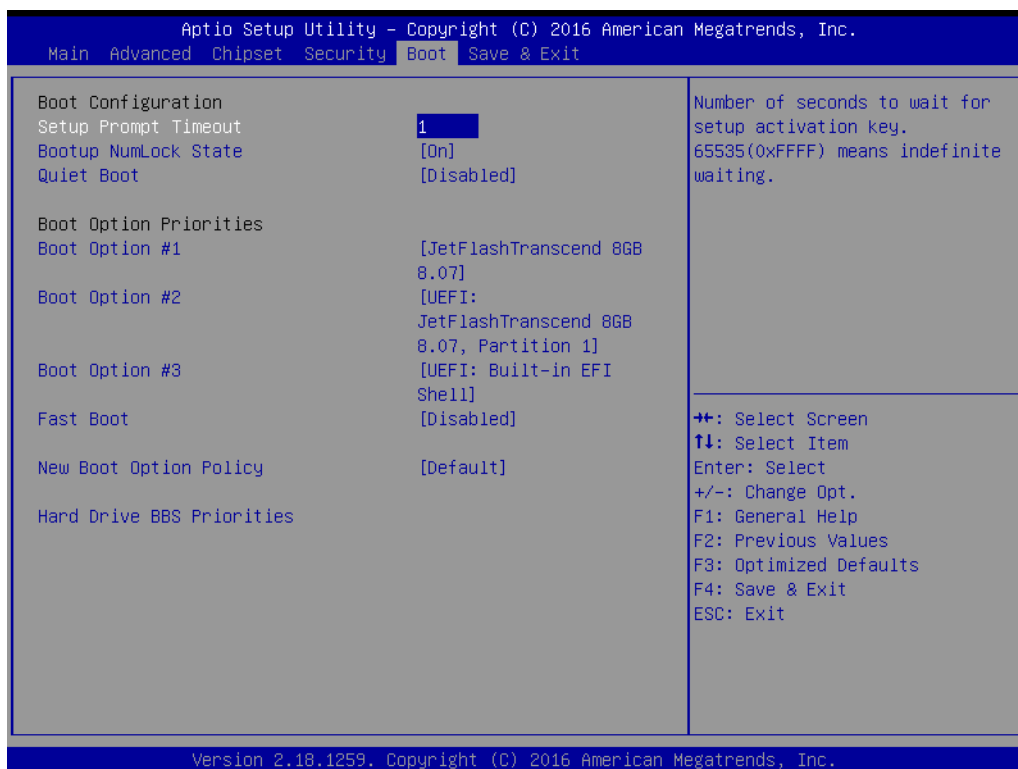
- **OS Selection**
OS Selection to choose Windows 8.X / Windows 7.
- **XHCI Mode**
Mode of operation of xHCI controller.
- **USB 2.0(EHCI) Support**
Control the USB EHCI (USB 2.0) functions. One EHCI controller must always be enabled.
- **USB Per Port Control**
Control each of the USB ports (1~4). Enable: Enable USB per port; Disable: Use USB port X settings.

3.2.3.7 PCI Express Configuration



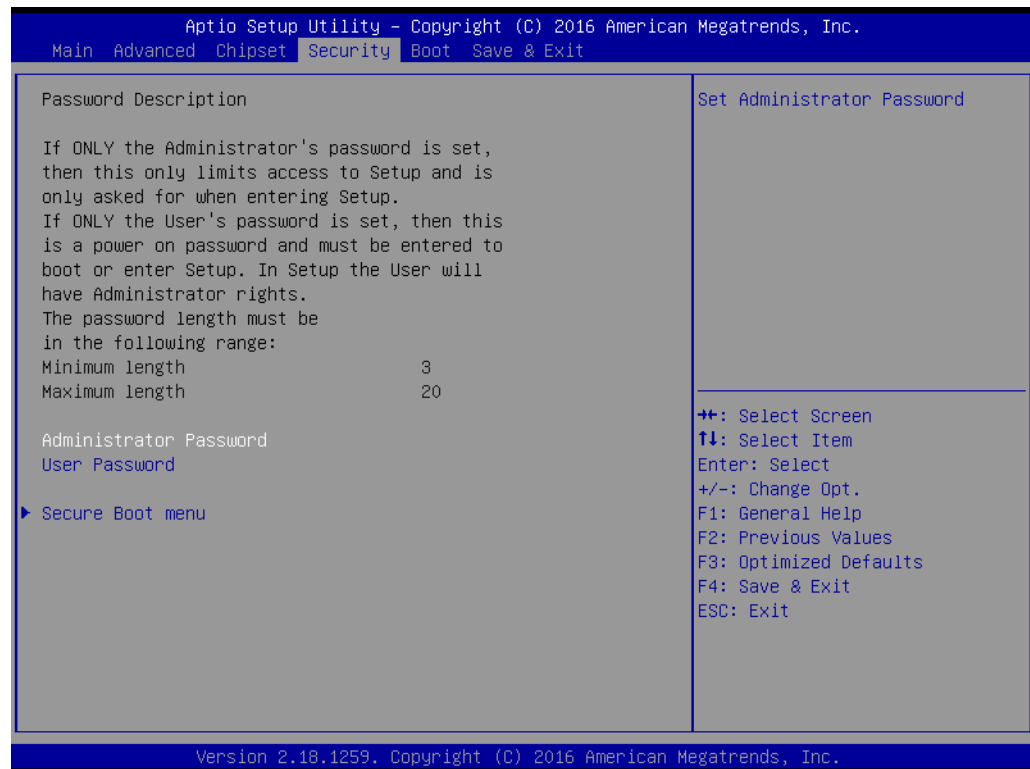
- **PCI Express Port0 / Port2**
Enable or Disable the PCI Express Port0 / Port 2 in the chipset.
- **PCIe Speed**
Configure PCIe Port Speed.

3.2.4 Boot Settings



- **Setup Prompt Timeout**
Number of seconds that the firmware will wait before initiating the original default boot selection. A value of 0 indicates that the default boot selection is to be initiated immediately on boot. A value of 65535 (0xFFFF) indicates that firmware will wait for user input before booting. This means the default boot selection is not automatically started by the firmware.
- **Bootup NumLock State**
Select the keyboard NumLock state.
- **Quiet Boot**
Enables or disables Quiet Boot option.
- **Boot Option #1**
Sets the system boot order.

3.2.5 Security Setup

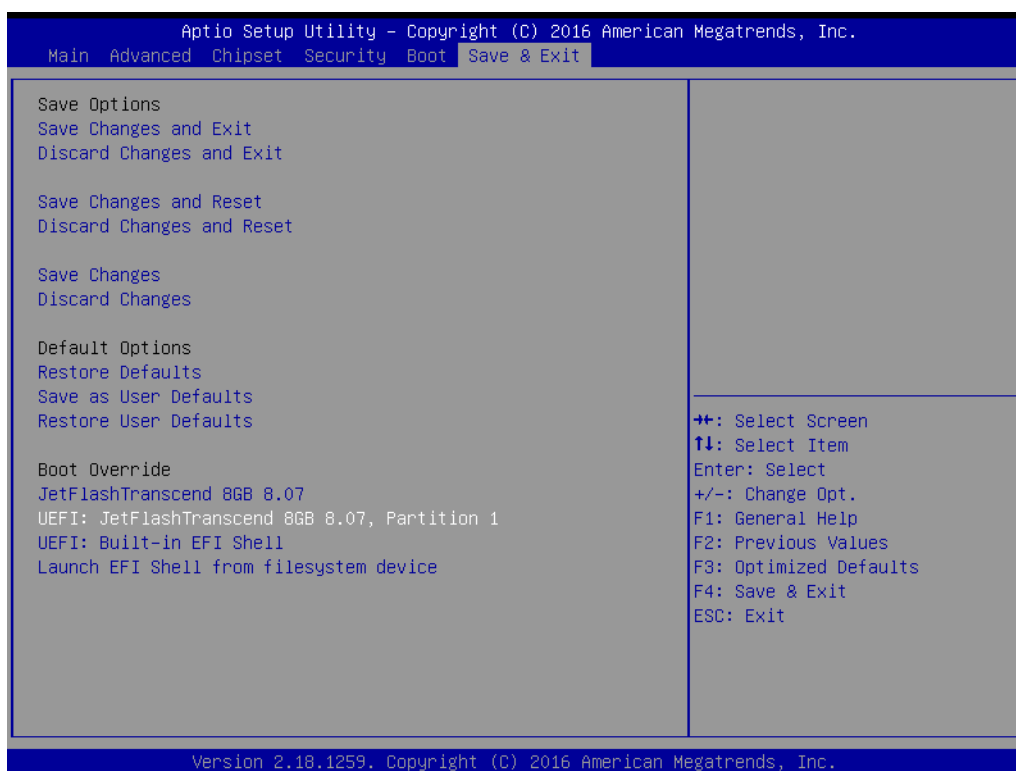


Select Security Setup from the ARK-2250 Setup main BIOS setup menu. All Security Setup options, such as password protection is described in this section. To access the sub menu for the following items, select the item and press <Enter>:

■ **Change Administrator / User Password**

Select this option and press <ENTER> to access the sub menu, and then type in the password.

3.2.6 Save & Exit



- **Save Changes and Exit**
This item allows you to exit system setup after saving the changes.
- **Discard Changes and Exit**
This item allows you to exit system setup without saving any changes.
- **Save Changes and Reset**
This item allows you to reset the system after saving the changes.
- **Discard Changes and Reset**
This item allows you to rest system setup without saving any changes.
- **Save Changes**
This item allows you to save changes done so far to any of the options.
- **Discard Changes**
This item allows you to discard changes done so far to any of the options.
- **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**
This item allows you to restore the user defaults to all the options.
- **Boot Override**
Boot device select can override your boot priority.

Appendix **A**

Watchdog Timer
Sample Code

A.1 EC Watchdog Timer sample code

```
EC_Command_Port = 0x29Ah
EC_Data_Port = 0x299h
Write EC HW ram = 0x89
Watch dog event flag = 0x57
Watchdog reset delay time = 0x5E
Reset event = 0x04
Start WDT function = 0x28

=====
.model small
.486p
.stack 256
.data
.code
org 100h
.STARTup

mov dx, EC_Command_Port
mov al,89h          ; Write EC HW ram.
out dx,al

mov dx, EC_Command_Port
mov al, 5Fh         ; Watchdog reset delay time low byte (5Eh is high byte) index.
out dx,al

mov dx, EC_Data_Port
mov al, 30h         ;Set 3 seconds delay time.
out dx,al

mov dx, EC_Command_Port
mov al,89h          ; Write EC HW ram.
out dx,al

mov dx, EC_Command_Port
mov al, 57h         ; Watch dog event flag.
out dx,al

mov dx, EC_Data_Port
mov al, 04h         ; Reset event.
out dx,al

mov dx, EC_Command_Port
mov al,28h          ; start WDT function.
out dx,al

.exit
END
```




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