User Manual

ARK-3405

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

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

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

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

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.

2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.

3. If your product is diagnosed as defective, obtain an RMA (return merchandise authorization) number from your dealer. This allows us to process your return more quickly.

4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.

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

Declaration of Conformity

FCC Class A

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

Technical Support and Assistance

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

Warnings, Cautions and Notes

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

Caution! *Cautions are included to help you avoid damaging hardware or losing data. e.g.*

There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Note! *Notes provide optional additional information.*

Packing List

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

- 1 x ARK-3405 unit
- 1 x Registration and 2 years Warranty card
- 1 x China RoHS
- 1 x 4 Pin Plug-in connector
- 2 x LAN clips bracket
- 2 x HDD Thermal grease pad

Ordering Information

Model Number	Description
ARK-3405R-S6A1E	Intel Celeron N3160 Fanless Embedded BOX PC with 2x PCI

Optional Accessories

Part Number	Description
AMO-R019E	AMO-R019, 2x PCIex1 riser card
AMO-R020E	AMO-R020, 1x PCI + 1x PCIex1 riser card
96PSA-A84W12P4	AC to DC Adaptor, DC12V/7A, 84W, 0~40C
1702002600	Power Cord, 3-Pin 183cm, USA type
1702002605	Power Cord, 3-Pin 183cm, EU type
1702031801	Power Cord, 3-Pin 183cm, UK type
1700000237	Power Cord, 3-Pin 183cm, PSE type

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. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

Contents

Chapter 1

General Introduction

This chapter gives background information on ARK-3405 series.

1.1 Introduction

ARK-3405 is an intelligent, fanless embedded system powered by Intel® Celeron N3160 processor with multiple I/O interface and a wide range power design with two slot PCIx1 card expansions.

ARK-3405 Celeron N3160 CPU performance has over 240% increase compared with ARK-3403 and over 200% graphics increase.

ARK-3405 supports independent triple displays: HDMI, VGA and DVI-D. It also offers 6 x COMs, 2 x GbE, 3 x USB 3.0, 3 x USB 2.0 and 1 internal USB 2.0, 2 x Mini-PCIe with 1 SIM holder, 1 x SD slot, and 2 x 2.5" SATA III storage devices.

Rugged & Multifunctional Design

ARK-3405 adopts an advanced thermal design for HDD and power enhancement. All models are fanless, and highlight various quality features including wide-input power supplies from 9V to 36V, wide temperature range from -10 ~ 55° C, diverse expandability options and structural strengthening. Compared with ARK-3403, ARK-3405 provides richer I/O interface.

Various Expansion Support

ARK-3405 is a flexible model which can work in different environments and applications with multiple I/O and high performance. It can support three kinds of riser cards: 2 x PCI, 2 x PCIe x1 and 1 PCIx1 + 1 PCIex1. It also has board-to-board design and more I/O ports in a coast line without cables.

Built in Intelligent Management Tools - Advantech iManager & SUSIAccess

Advantech iManager 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. iManager offers a boot up guarantee in critical, low temperature environments so systems can automatically recover when voltages dip. iManager makes the whole system more reliable and more intelligent. ARK-3405 also supports Advantech's own SUSIAccess, which 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® Celeron Processor N3160, 1.6GHz (up to 2.24 GHz under turbo boost)
- ■ **System Chipset:** Intel® Celeron N3160
- ■ **BIOS:** AMI 64-Mbit SPI Flash BIOS
- ■ **System Memory:** DDR3L 1600MHz up to 8GB
- ■ **Watchdog Timer:** Single chip Watchdog 255-level interval timer, setup by software
- ■ **I/O Interface:** 2 x RS232, 2 x RS232/422/485,COM 4 w/ power supply (5V/12V by jumper setting)
- ■ **USB:** 3 x USB 3.0, 3 x USB 2.0 and 1 internal USB 2.0
- ■ **Audio:** High Definition Audio (HD), Line out, Mic-in
- ■ **Storage:** 2 x 2.5" removable HDD drive bays (12.5mm height)
- ■ **Expansion Interface:** 2 x Full-size MiniPCIe slot, one with SIM holder
- ■ **Software API:** Advantech iManager and SUSIAccess - Remote Device Management technology

1.2.2 Display

- ■ **Controller:** Intel® HD Graphics 400
- ■ **Resolution:**
  - VGA: Up to 1920 x 1200 @ 60Hz (does not support hot-plug)
  - DVI-D: 1920 x 1200 @ 60Hz
  - HDMI: Supports HDMI 1.4b, 3840x2160 @ 30 Hz, 2560x1600 @ 60 Hz
- ■ **Triple Displays:**
  - DVI-D + HDMI + VGA

1.2.3 Ethernet

- ■ **Chipset:**
  - LAN1 Intel® I210-IT
  - LAN2 Intel® I210-IT
- ■ **Speed:** 10/100/1000 Mbps
- ■ **Interface:** 2 x RJ45

1.3 Chipset

1.3.1 Functional Specification

1.3.1.1 Processor

Processor	Supports BGA processor (up to 9W): ■ Intel® Celeron N3160 1.6GHz with 2M L2 cache
Memory	Supports DDR3L 1600MHz up to 8 GB 1 x 204-pin SODIMM socket type

1.3.1.2 Chipset

Internal Graphics Features	■ DirectX 11 and OpenGL 4.2 ■ Display Port 1.1a, HDMI 1.4b ■ Supports HDCP 1.4 ■ Intel® Display Power saving technology
Video Accelerator	■ HW accelerated Media Decode: H.265/HEVC @ level 5, H.264 @ Level 5.1, MPEG-2, MVC, VC-1, WMV9, JPEG, VP8 ■ HW accelerated Media Encode: H.264 @ Level 5.1, MVC, JPEG
SATA Interface	■ Supports several optional sections of Serial ATA III ■ Supports SATA transfers to 750 Mbytes/sec. ■ Integrated AHCI controller
USB Interface	■ xHCI Host Controller, supporting SuperSpeed USB 3.0 ports ■ Two EHCI Host Controllers, supporting HighSpeed USB 2.0 ports ■ Supports wake-up from sleeping states S3–S4 ■ Maximum 500mA for each USB port
Power Management	■ Supports ACPI 4.0a ■ ACPI-defined power states (processor driven C states) ■ ACPI Power Management Timer ■ SMI# generation
BIOS	■ AMI 64-Mbit EFI Flash BIOS via SPI

1.3.1.3 Others

Serial ports	**SIO NCT6106 supports:** ■ Up to 6 serial ports. ■ Supports IRQ Sharing among serial ports under Microsoft Windows OS ■ COM1, COM2: RS-232 ■ COM3, COM4: RS-232/422/485 ■ COM5, COM6: RS-232 support by cable and bracket (Optional by project support)
Ethernet	**Intel I-210IT chip supports:** ■ Supports 10/100/1000 Mbps. ■ LAN Connectors: Phone Jack RJ45 8P 90D(F)
Audio	**Audio Codec: Realtek ALC892:** ■ Compliant with HD Audio specifications ■ Supports 16/20/24-bit DAC and 16/20/24-bit ADC resolution ■ Supports: Speak-out, Mic-in ■ Audio Connectors: Ear Phone Jack * 2
Battery backup	BATTERY 3V/210 mAh with WIRE x 1

1.3.2 SUSI 4.0

iManager	
Sequence control	Supported
DIO	8-bit programmable DIO
Watchdog timer	Multi-level WDT (set by Advantech iManager) Programmable 1-255 sec / min
Hardware monitor	CPU Temperature / input Current / input Voltage
System information	Running HR / Boot record

1.4 Mechanical Specifications

1.4.1 Dimensions

142.8 [5.63] x 198 [7.79] x 215 [8.46] (Unit: mm [Inch])
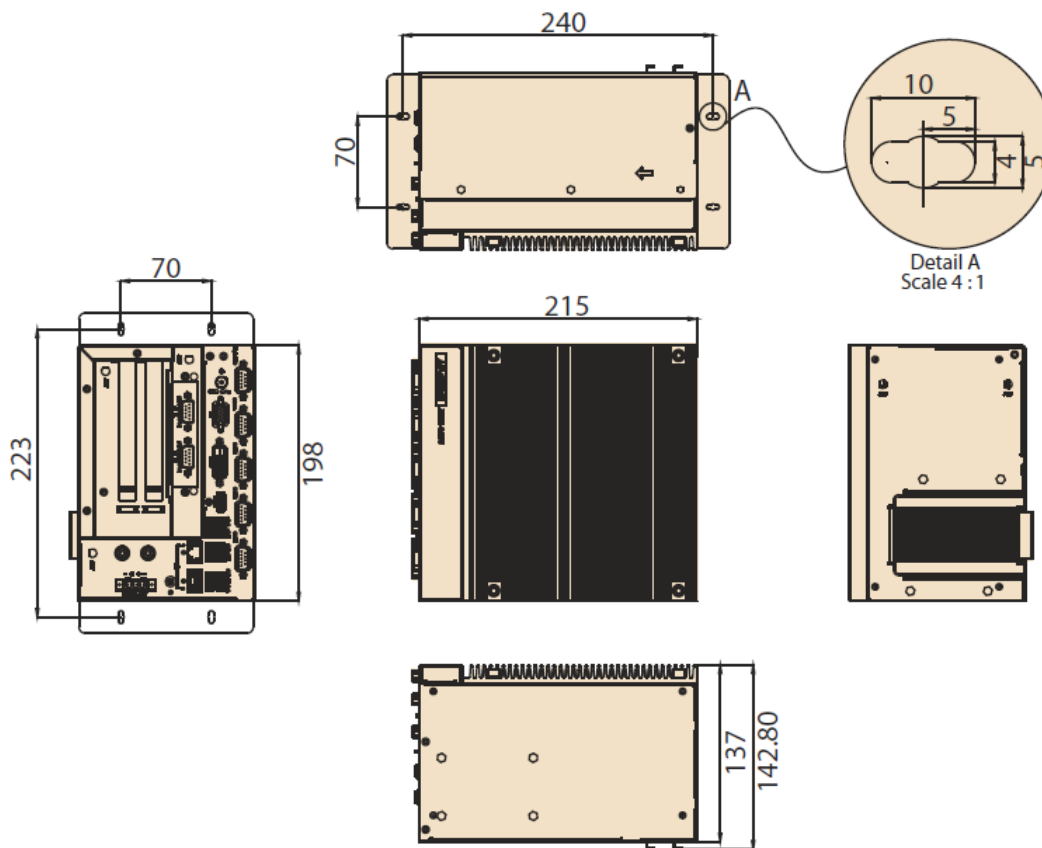
Figure 1.1 ARK-3405 Mechanical dimension drawing

1.4.2 Weight

3.16 kg (6.97 lb)

1.5 Power Requirement

1.5.1 System Power

■ **Minimum power input:**
   – ARK-3405: 9V - 36V (7.6 - 1.9A)

1.5.2 RTC Battery

■ Lithium 3 V/210 mAH

1.6 Environment Specification

1.6.1 Operating Temperature

- **With Industrial Grade SSD/Cfast: -10 ~ 55 °C (-14 ~ 131 °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

- For system equipped with SSD: 3Grms, IEC 60068-2-64, random, 5 ~ 500 Hz

1.6.5 Shock during Operation

- For system equipped with SSD: 30Grms, IEC 60068-2-27

1.6.6 Safety

- CB, UL, CCC, BSMI

1.6.7 EMC

- CE, FCC, CCC, BSMI

Chapter 2

Hardware
Configuration

2.1 Introduction

The following sections show the internal jumpers setting and the external connectors pin assignment for application.

2.2 Jumpers

2.2.1 Jumper Description

You may configure ARK-3405 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.

open   **closed**   **closed 2-3**
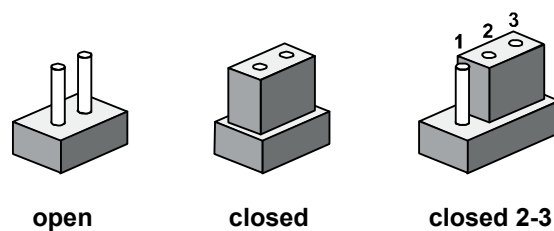
The jumper settings are schematically depicted in this manual as follows.

open   **closed**   **closed 2-3**
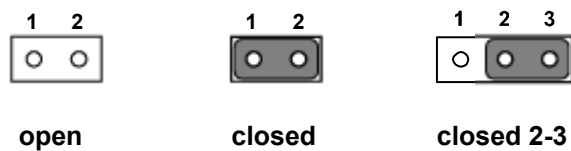
A pair of needle-nose pliers may be helpful when working with jumpers. If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes. Generally, you simply need a standard cable to make most connections.

2.2.2 Jumper List

Table 2.1: Jumper List of Main Board	
J1	Auto Power On Setting
CN38	COM4 RS232/422/485 with power supply Setting

2.2.3 Jumper Locations
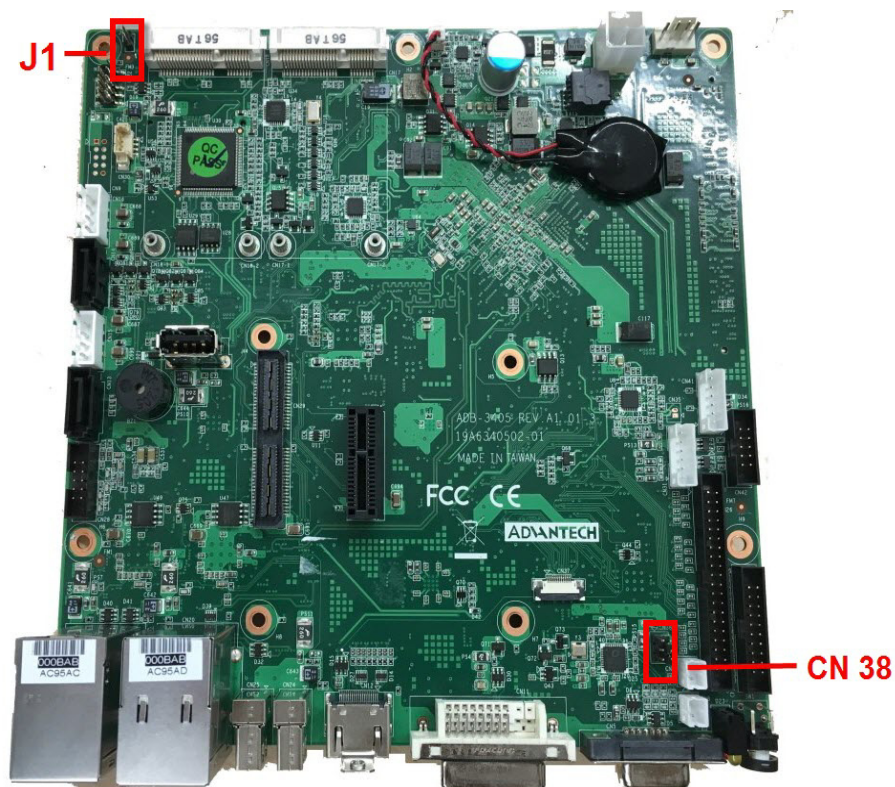
Figure 2.1 Jumper Layout

2.2.4 Jumper Settings

On Motherboard

2.2.4.1 Auto Power On Setting (J1)

J1	Auto Power On Setting
Part Number	1653002101
Footprint	HD_2x1P_79_D
Description	PIN HEADER 2*1P 180D(M)SQUARE 2.0mm
Setting	Function
NC	Power Button for Power On (Default)
(1-2)	Auto Power On

2.2.4.2 COM4 RS232/422/485 with power supply Setting (CN38)

CN38	COM4 RS232 with power supply Setting
Part Number	1653003201
Footprint	HD_3x2P_79
Description	PIN HEADER 3*2P 180D(M) 2.0mm SMD SOUARE PIN
Setting	Function
(1-2)	Normal (Default)
(3-5)	+V12
(4-6)	+V5
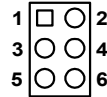
AMO-R018 (PCI Expansion Card)
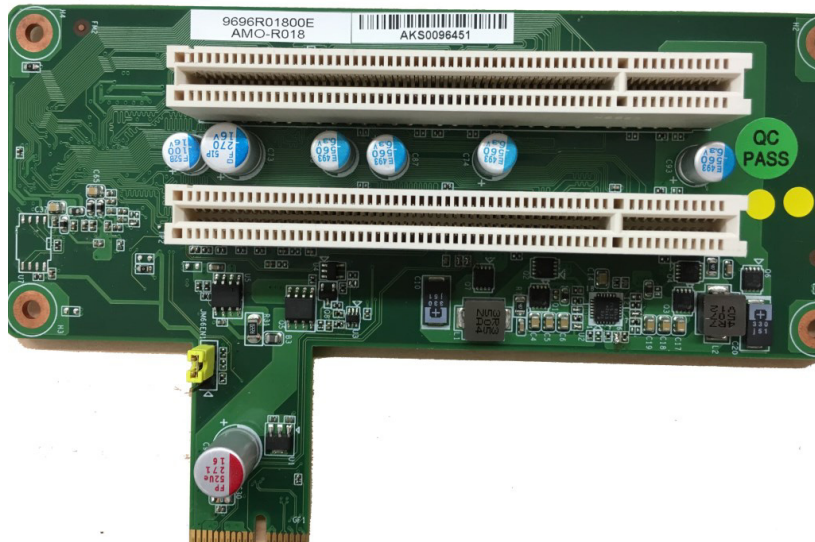
Figure 2.2 Jumper Layout of Riser Card

2.2.4.3 PCI CLK SELECT setting (JM66EN1) on AMO-R018

JM66EN1	PCI CLK SELECT
Part Number	1653003100
Footprint	HD_3x1P_100_D
Description	PIN HEADER 3x1P 2.54mm 180D(M)
Setting	Function
(1-2)	66MHz
(2-3)	33MHz (Default)
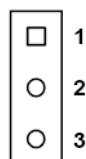
2.3 Connectors

2.3.1 ARK-3405 External I/O Locations

ARK-3405 Front IO Panel
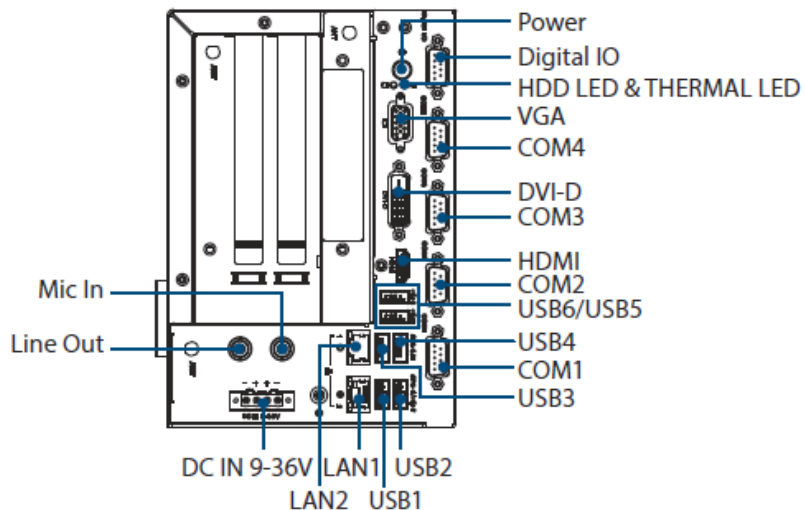
Figure 2.3 ARK-3405 Front IO connector drawing

ARK-3405 Rear IO Panel
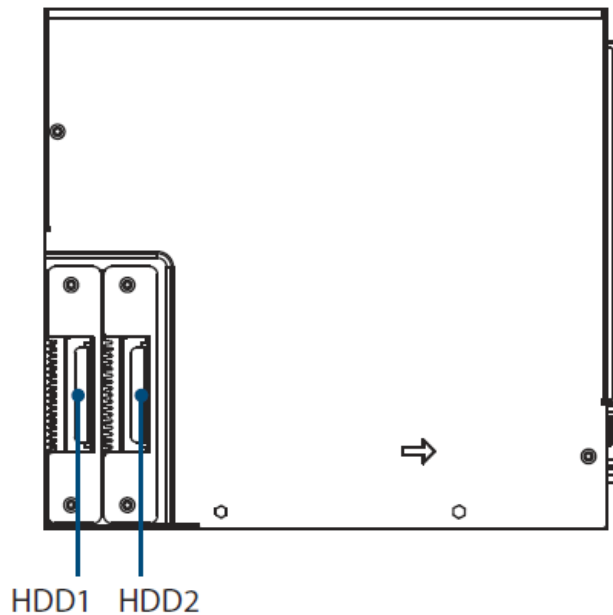
Figure 2.4 ARK-3405 Rear IO connector drawing

2.3.2 ARK-3405 External I/O connectors

2.3.2.1 Audio Connector

ARK-3405 offers stereo audio ports by two phone jack connectors of Line_Out, Mic_In. The audio chip is controlled by ALC892.
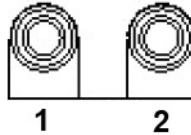
Figure 2.5 Audio connector

Table 2.2: Audio Connector Pin Assignments	
Pin	Audio Signal Name
1	Line out
2	Mic in

2.3.2.2 USB2.0 Connector

ARK-3405 provides three USB2.0 interface connectors, which give complete Plug & Play and hot swapping for up to 127 external devices. The USB interface complies with USB UHCI, Rev. 2.0 compliant. The USB interface can be disabled in the system BIOS setup. Please refer to Table. 2.4 for its pin assignments. The USB 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.
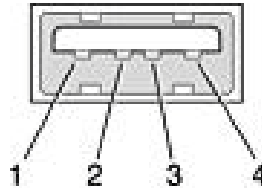
Figure 2.6 USB2.0 connector

Table 2.3: USB 2.0 Connector			
Pin	Signal Name	Pin	Signal Name
1	+5V	2	USB_data-
3	USB_data+	4	GND

2.3.2.3 COM Connector

ARK-3405 provides up to eight D-sub 9-pin connectors, which offers RS-232/422/485 serial communication interface ports. Default setting is RS-232, if you want to use RS-422/485, please refer to the jumper setting pages. The BIOS setting of RS-232/422/485 can be found in Chapter 3.1.2.3.

The RS-422/485 mode of ARK-3405 COM3~COM4 can be supported via BIOS setting.

The setting is under Advanced BIOS Features Setup -> Super IO Configuration.

1 2 3 4 5

6 7 8 9
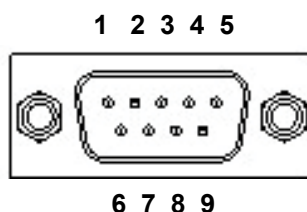
Figure 2.7 COM connector

Table 2.4: 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

2.3.2.4 DIO Connector

ARK-3405 provides one DSUB 9-pin female connector, which offers 8-bit digital input/output communication without isolation. Detailed pin assignments below.
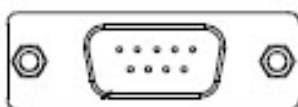
Figure 2.8 DIO Connector

Table 2.5: DIO Connector Pin Assignments	
Pin	**Signal Name**
1	Port0 D0
2	Port0 D1
3	Port0 D2
4	Port0 D3
5	Port0 D4
6	Port0 D5
7	Port0 D6

Table 2.5: DIO Connector Pin Assignments	
8	Port0 D7
9	GND

2.3.2.5 Power On/Off Button

ARK-3405 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 2.9 Power ON/OFF Button

2.3.2.6 LED Indicators

There are two LEDs on the front panel that indicate system status: The thermal LED is for system thermal alarm status; and HDD LED is for HDD status.
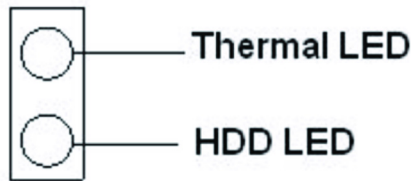
Figure 2.10 LED Indicators

2.3.2.7 VGA Connector

An integrated, provides a high resolution VGA interface connected by a D-sub 15-pin connector to support a VGA CRT monitor, supports display resolutions of up to 1920 x 1200.
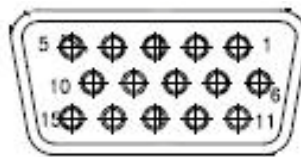
Figure 2.11 VGA connector

Table 2.6: 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	DDAT

13	H-SYNC	14	V-SYNC
15	DCLK		

2.3.2.8 Digital Visual Interface Connector (DVI-D)

ARK-3405 offers a Digital Visual Interface connector by a D-sub 24-pin female DVI-D connector; it's only for digital video signal. This interface supports high-speed, high resolution digital displays, with resolutions of up to 1920 x 1200.
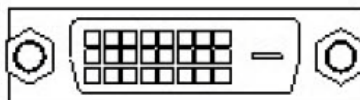
Figure 2.12 DVI-D Connector

Table 2.7: DVI-D Connector pin assignments			
Pin	**Signal Name**	**Pin**	**Signal Name**
1	TMDS Data 2-	2	TMDS Data 2+
3	TMDS Data 2/4 shield	4	TMDS Data 4-
5	TMDS Data 4+	6	DDC clock
7	DDC data	8	Analog vertical sync
9	TMDS Data 1-	10	TMDS Data 1+
11	TMDS Data 1/3 shield	12	TMDS Data 3-
13	TMDS Data 3+	14	+5V
15	GND	16	Hot plug detect
17	TMDS Data 0-	18	TMDS Data 0+
19	TMDS Data 0/5 shield	20	TMDS Data 5-
21	TMDS Data 5+	22	TMDS clock shield
23	TMDS clock+	24	TMDS clock-

2.3.2.9 HDMI Connector

An integrated, 19-pin receptacle connector HDMI Type A Interface is provided. The HDMI link supports resolutions up to 2560 x 1600 @ 60Hz; 3840 x 2160 @ 30Hz.
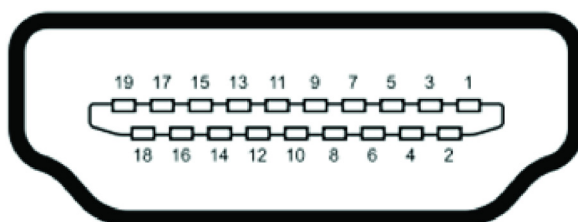
Figure 2.13 HDMI receptacle connector

Table 2.8: HDMI Connector pin assignments			
Pin	**Signal Name**	**Pin**	**Signal Name**
1	TMDS Data 2+	2	TMDS Data 2 shield
3	TMDS Data 2-	4	TMDS Data 1+
5	TMDS Data 1 shield	6	TMDS Data 1-
7	TMDS Data 0+	8	TMDS Data 0 shield
9	TMDS Data 0-	10	TMDS clock+
11	TMDS clock shield	12	TMDS clock-

Table 2.8: HDMI Connector pin assignments			
13	CEC	14	Reserved
15	SCL	16	SDA
17	DDC/CEC Ground	18	+5V
19	Hot Plug Detect		

2.3.2.10 USB3.0 Connector

The USB port USB port 2, 3, 4 of ARK-3405 supports USB3.0 interface, which gives 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. 2.10 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).
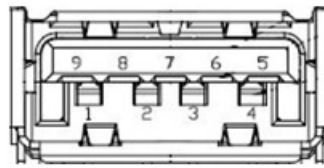
Figure 2.14 USB3.0 Connector

Table 2.9: 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+	10	+5V
11	USB_data-	12	USB_data+
13	GND		

2.3.2.11 Ethernet Connector (LAN)

ARK-3405 is equipped with 2 Ethernet controllers that are fully compliant with IEEE 802.3u 10/100/1000 Mbps CSMA/CD standards. 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).
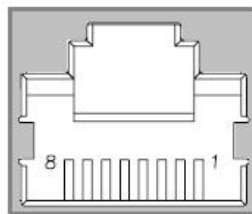
Figure 2.15 Ethernet connector

Table 2.10: Ethernet Connector Pin Assignments	
Pin	**10/100/1000BaseT Signal Name**
1	TX+(10/100),BI_DA+(GHz)
2	TX-(10/100),BI_DA-(GHz)
3	RX+(10/100),BI_DB+(GHz)

Table 2.10: Ethernet Connector Pin Assignments	
4	BI_DC+(GHz)
5	BI_DC-(GHz)
6	RX-(10/100),BI_DB-(GHz)
7	BI_DD+(GHz)
8	BI_DD-(GHz)

2.3.2.12 Power Input Connector

ARK-3405 comes with a four-pin header that carries 9 ~ 36 VDC external power input.
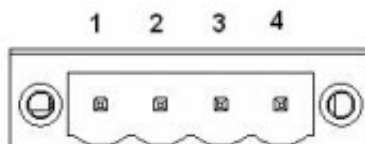
Figure 2.16 Power Input Connector

Table 2.11: Power connector pin assignments	
Pin	**Signal Name**
1	GND
2	+9 ~ 36 V_{DC}
3	+9 ~ 36 V_{DC}
4	GND

2.4 Installation

2.4.1 Memory Installation

1. Unscrew the 4 screws on the top, and remove the top cover.

2. Install the memory into the system.
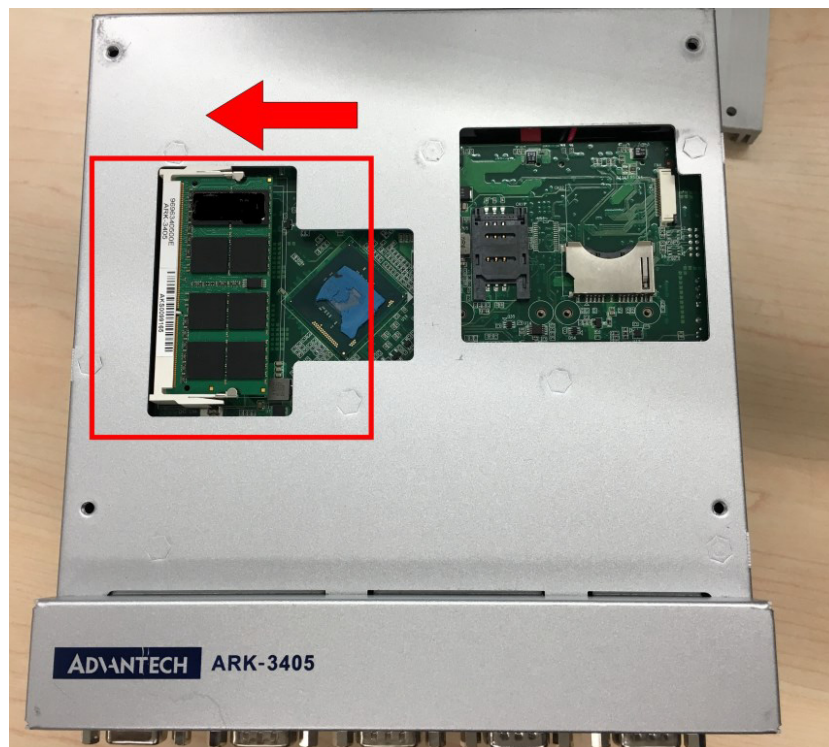
3. Replace the top cover and screw in the 4 screws.

2.4.2 HDD/SSD Installation

1. Unscrew 4 screws on the rear side of the system.

2. Pull out the drawer and insert a HDD/SSD.
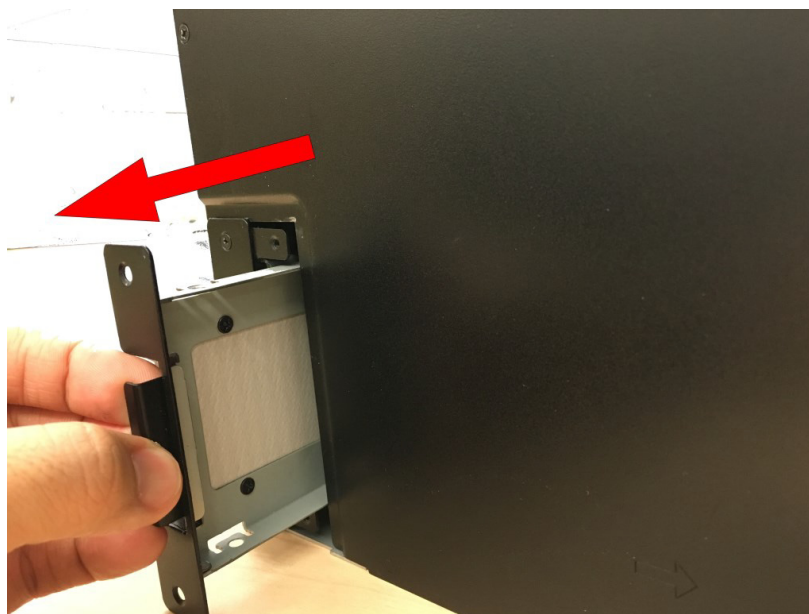
3. Screw 4 screws on rear side of the drawer.
4. Put the drawer with a HDD/SSD back into the system.
5. Screw the side cover back on.

2.4.3 MiniPCIe module

1. Unscrew 6 screws on the chassis and remove it.
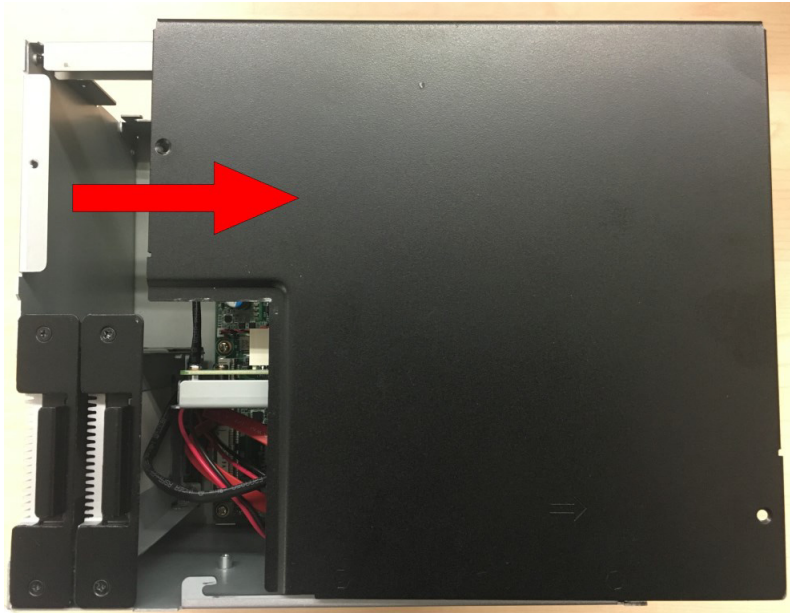
2. Unscrew 2 screws on the front bezel.
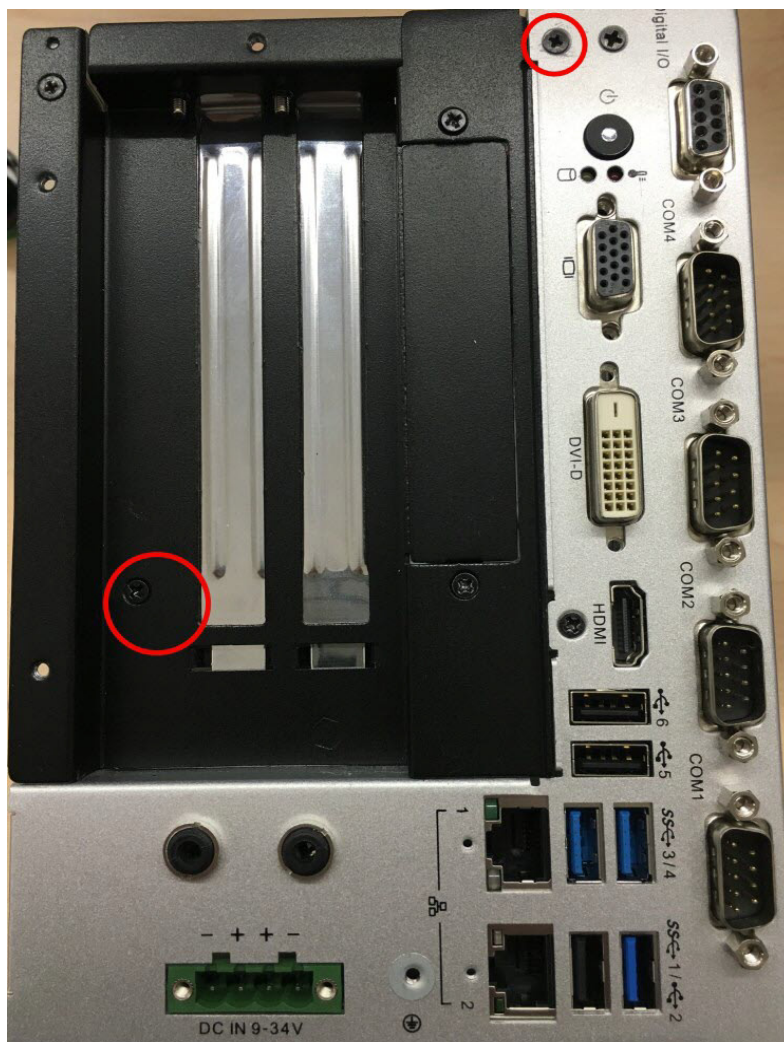
3. Unscrew the screw on the motherboard and remove the front bezel with riser card.
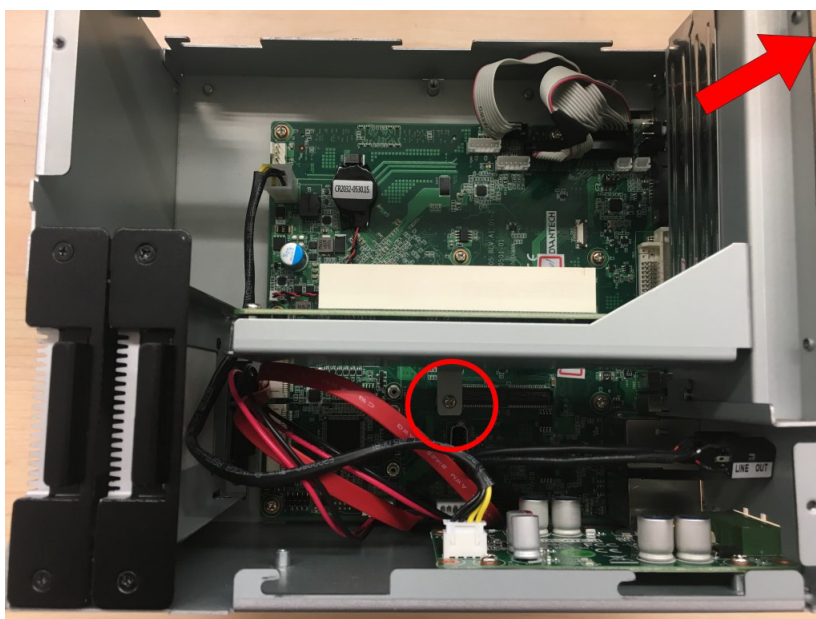
4. Put the miniPCIe module into the mini PCIe slot and replace the screws.
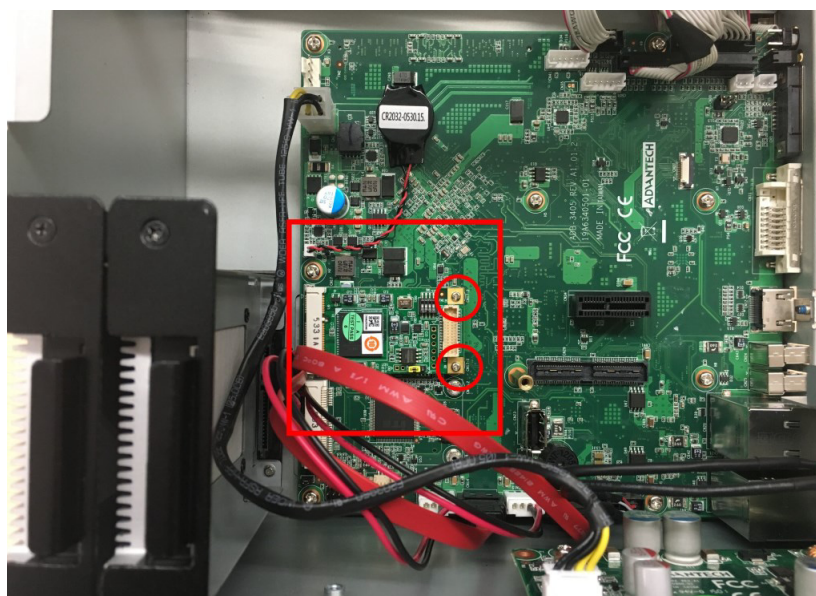
5. Screw the front bezel with riser card back into system.
6. Replace chassis and screws.

2.4.4 Riser Card Installation

1. Unscrew 6 screws on the chassis and remove it.
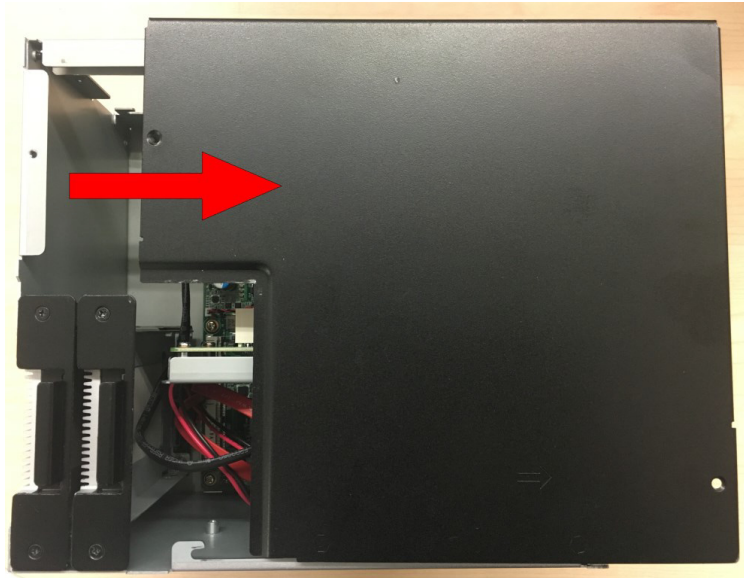
2. Unscrew 2 screws on the front bezel.
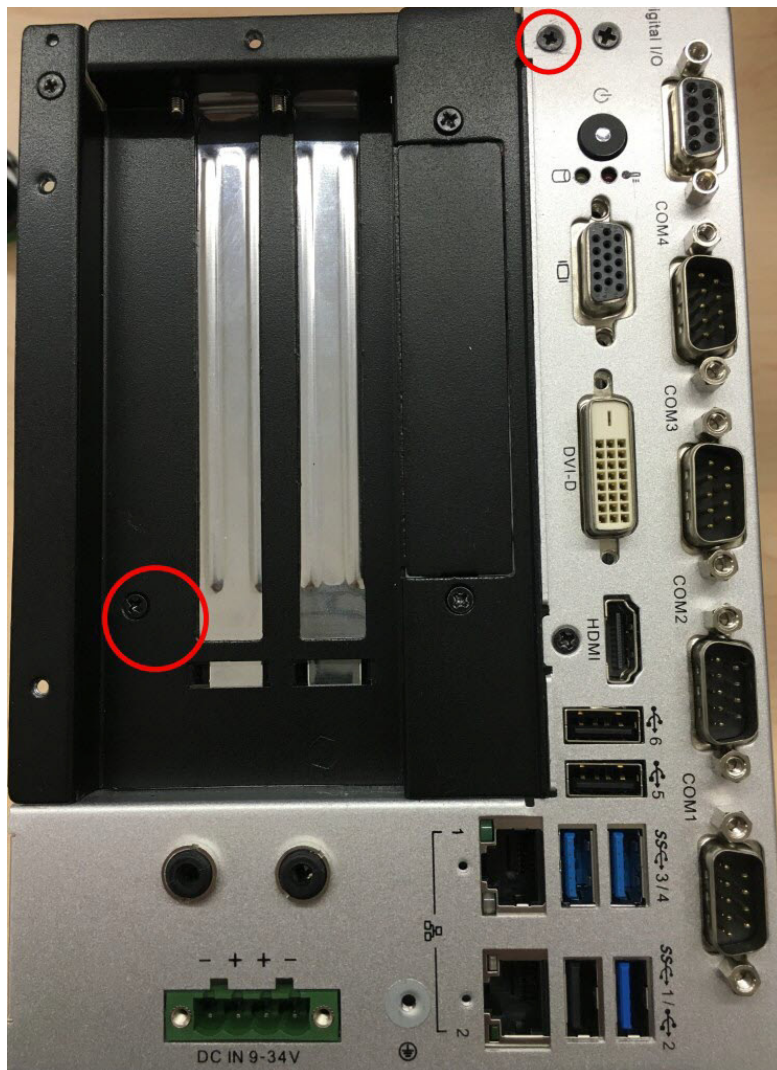
3. Remove the screw on the mother board and remove front bezel with riser card.

4. Unscrew 4 screws on the bracket and take off the riser card off.
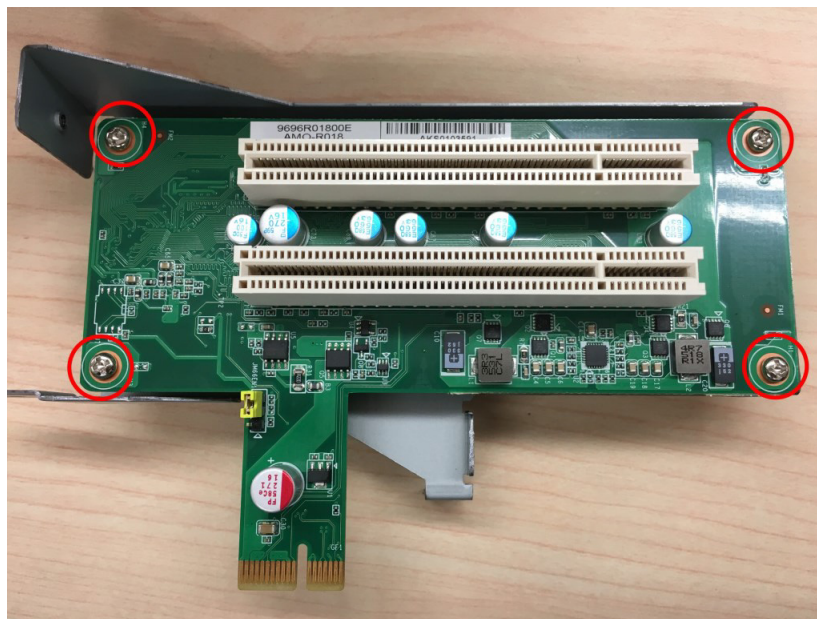
5. Place another riser card on the bracket and fix it with screws.
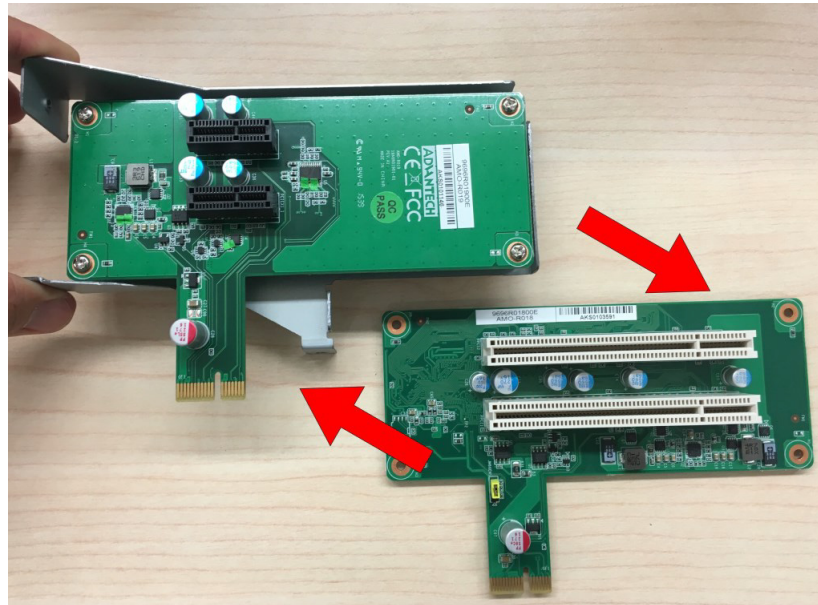
6. Fix front bezel and riser card back into the system.
7. Replace chassis and screws.

2.4.5 SD Card Installation

1. Unscrew the 4 screws on the top, and remove the top cover.

2.   Insert the SD card into the system.
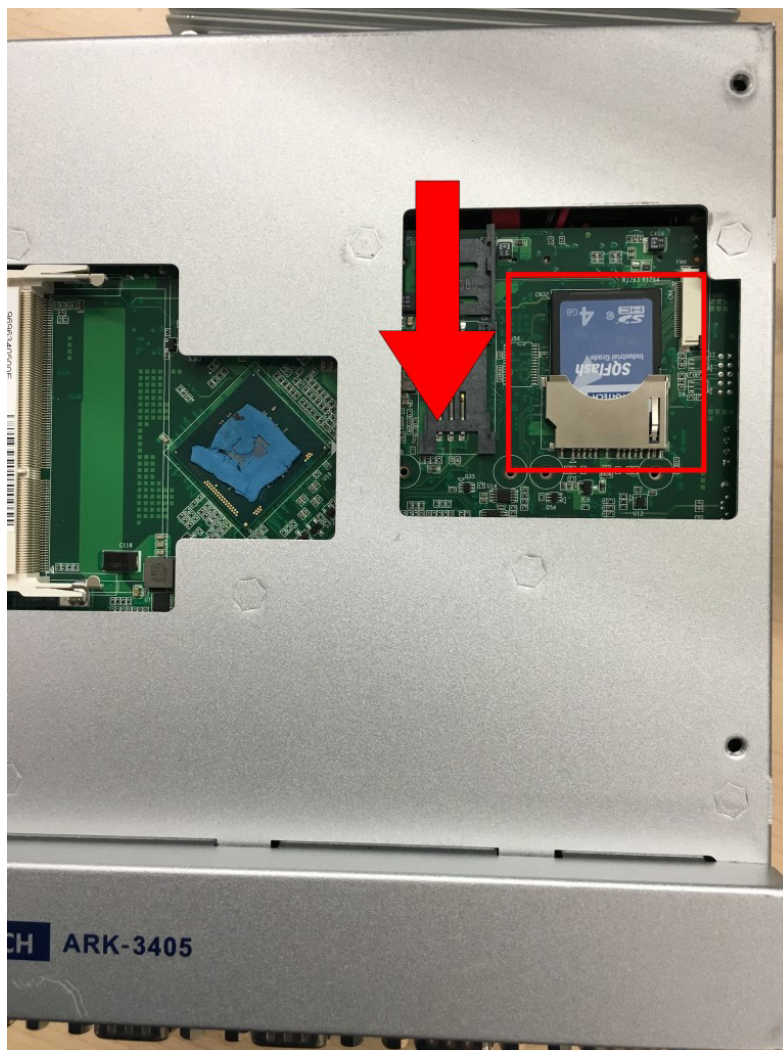
3. Replace the top cover and screws.

2.4.6 LAN Clip Installation

1.   Put the clip inside the gap between connector and LAN port.

2.   Fix clip on LAN port.

2.4.7 SIM Installation

1. Remove screws and top cover.
2. Insert the SIM card.

3. Replace the top cover.
4. Unscrew 6 screws on the chassis and remove it.
5. Unscrew 2 screws on the front bezel.
6. Unscrew 1 screw on mother board and remove front bezel with riser card.
7. Install WWAN module in CN17 and replace screws.
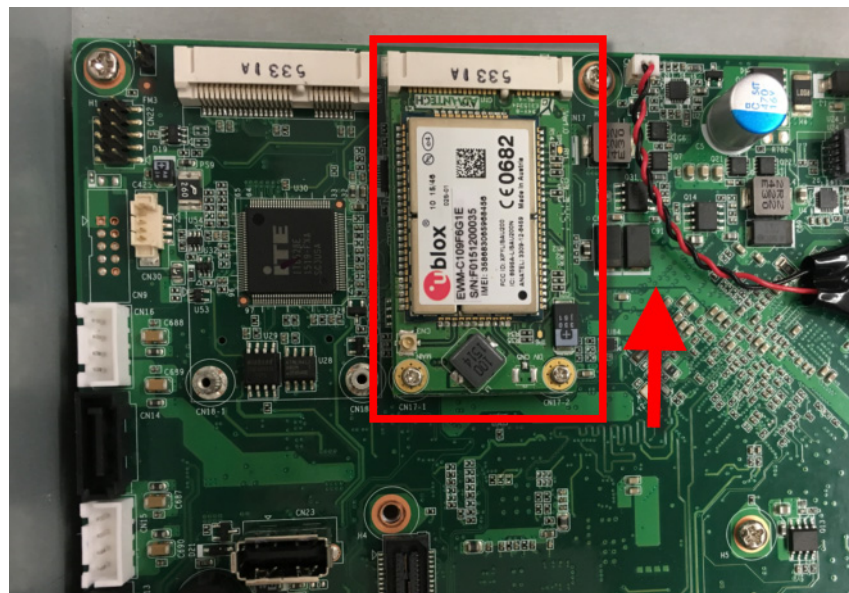
8. Screw front bezel and riser card back into the system.
9. Replace chassis and screws.

Chapter   **3**

BIOS Settings

With the AMIBIOS Setup program, users can modify BIOS settings and control various system features. This chapter describes the basic navigation of the ARK-3405 BIOS setup screens.

```
                 Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
  Main  Advanced  Chipset  Security  Boot  Save & Exit

  BIOS Information                                        Choose the system default
  BIOS Vendor                     American Megatrends     language
  Core Version                    5.0.1.1   0.28 x64
  Compliancy                      UEFI 2.4; PI 1.3
  Project Version                 34050000060X016
  Build Date and Time             03/01/2016 10:42:59
  Access Level                    Administrator

  CPU Configuration
  Microcode Patch                 35E

  Memory Information
  Total Memory                    2048 MB (DDR3L)
                                                          →←: Select Screen
  GOP Information                                         ↑↓: Select Item
  Intel(R) GOP Driver             [N/A]                   Enter: Select
                                                          +/-: Change Opt.
  TXE Information                                         F1: General Help
  Sec RC Version                  00.05.00.00             F2: Previous Values
  TXE FW Version                  02.00.02.2092           F3: Optimized Defaults
                                                          F4: Save & Exit
  System Language                 [English]               ESC: Exit

  System Date                     [Tue 03/01/2016]
  System Time                     [11:41:21]


                 Version 2.17.1249. Copyright (C) 2016 American Megatrends, Inc.
```

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.

3.1 Entering Setup

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

3.1.1 Main Setup

When users first enter the BIOS Setup Utility, they 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.

```
              Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
        Main  Advanced  Chipset  Security  Boot  Save & Exit

        BIOS Information                                        Choose the system default
        BIOS Vendor                    American Megatrends      language
        Core Version                   5.0.1.1   0.28 x64
        Compliancy                     UEFI 2.4; PI 1.3
        Project Version                34050000060X016
        Build Date and Time            03/01/2016 10:42:59
        Access Level                   Administrator

        CPU Configuration
        Microcode Patch                35E

        Memory Information
        Total Memory                   2048 MB (DDR3L)

        GOP Information                                         ++: Select Screen
        Intel(R) GOP Driver            [N/A]                    ↑↓: Select Item
                                                                Enter: Select
        TXE Information                                         +/-: Change Opt.
        Sec RC Version                 00.05.00.00              F1: General Help
        TXE FW Version                 02.00.02.2092            F2: Previous Values
                                                                F3: Optimized Defaults
        System Language                [English]                F4: Save & Exit
                                                                ESC: Exit
        System Date                    [Tue 03/01/2016]
        System Time                    [11:41:21]



              Version 2.17.1249. Copyright (C) 2016 American Megatrends, Inc.
```

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.

3.1.2 Advanced BIOS Features Setup

Select the Advanced tab from the ARK-3405 setup screen to enter the Advanced BIOS Setup screen. Users can select any item in the left frame of the screen, such as CPU Configuration, to go to the sub menu for that item. Users can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screens are shown below. The sub menus are described on the following pages.
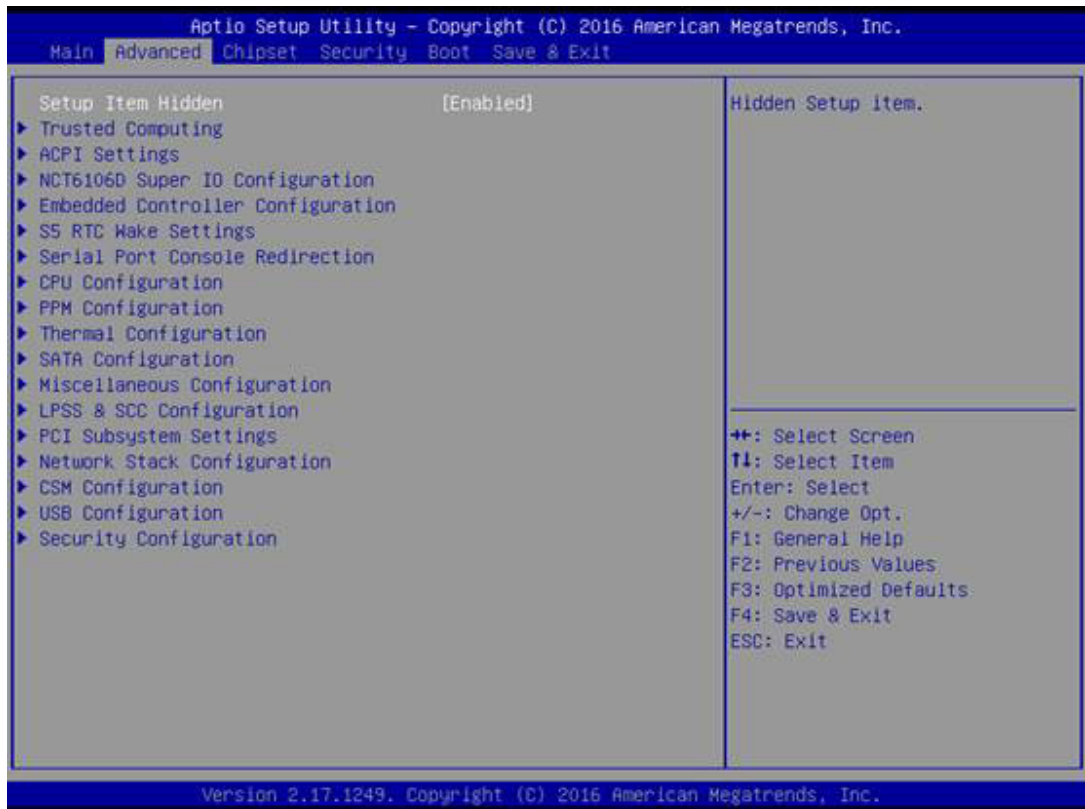
3.1.2.1 Trusted Computing

■ **Security Device Support**
Enables or Disables BIOS support for security device. OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

3.1.2.2 ACPI Settings
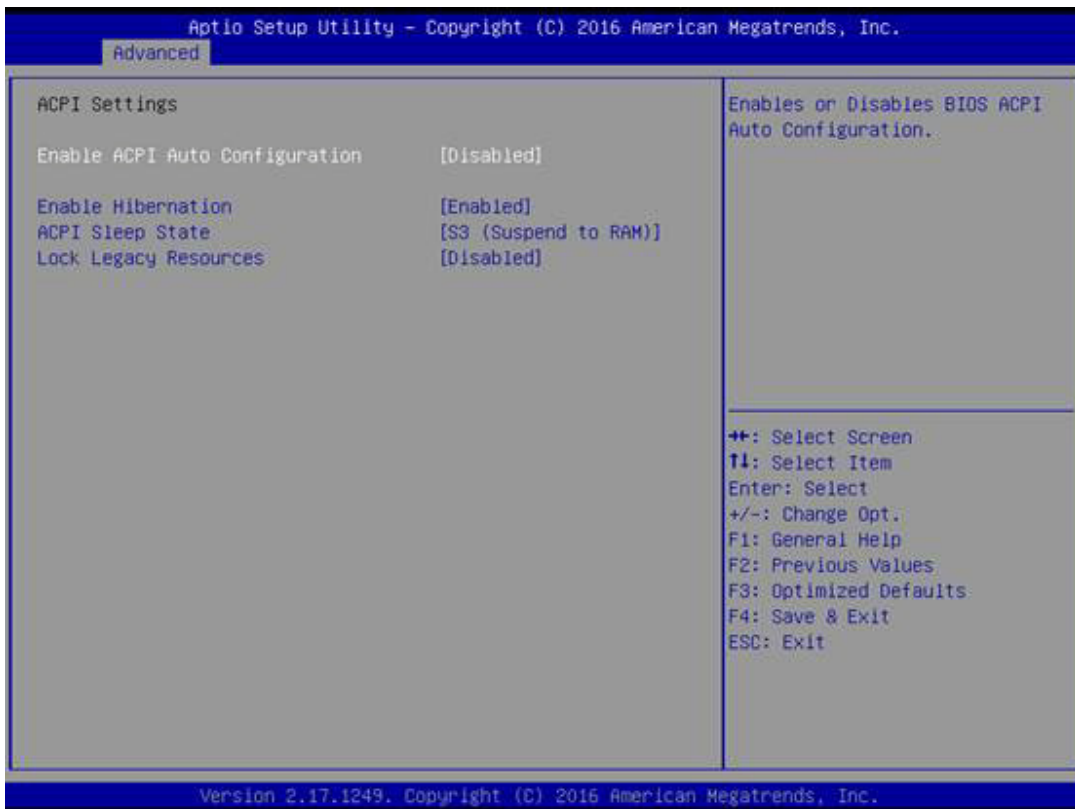
■ **Enable ACPI Auto Configuration**

Enable or disable BIOS ACPI auto configuration.

■ **Enable Hibernation**

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

■ **ACPI Sleep State**

Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.

■ **Lock Legacy Resources**

Enables or Disables Lock of Legacy Resources

3.1.2.3 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)

3.1.2.4 H/W Monitor


```
Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
Advanced

EC Firmware Version           I286CX0009              Select Ite8518 Power Saving
                                                      Mode
EC Hardware Monitor
CPU temperature             : +42°C
+VBAT                       : +2.970 V
+5VSB                       : +5.008 V
+12V                        : +12.097 V
Vcore                       : +0.891 V
Current                     : +0.707 A

Power Saving Mode             [Normal]
Watch Dog Timer               [Disabled]

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

         Version 2.17.1249. Copyright (C) 2016 American Megatrends, Inc.
```

■ **PC Health Status**
This page display all information about system Temperature/Voltage.

■ **Power Saving Mode**
Select Ite8518 Power Saving Mode.

■ **Watchdog Timer**
Select Watch Dog Timer Mode.

3.1.2.5 S5 RTC Wake Settings

■ **Wake system with Fixed Time**

Enable or disable System wake on alarm event. Select FixedTime, system will wake on the hr:min:sec specified. Select Dynamic Time and the system will wake on the current time + Increase minute(s)

3.1.2.6 Serial Port Console Redirection

```
         Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
   Advanced

 COM1                                                    Legacy Console Redirection
 Console Redirection              Port Is Disabled       Settings

 Legacy Console Redirection
 Legacy Console Redirection Settings

 Serial Port for Out-of-Band Management/
 Windows Emergency Management Services (EMS)
 Console Redirection              [Disabled]
 Console Redirection Settings

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

         Version 2.17.1249. Copyright (C) 2016 American Megatrends, Inc.
```

■ **Console Redirection**
  Console Redirection Enable or Disable.
■ **Legacy Console Redirection Settings**

3.1.2.7 CPU Configuration

```
                  Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
      Advanced

      CPU Configuration                                            Socket specific CPU Information

    ▶ Socket 0 CPU Information
    ▶ CPU Thermal Configuration

      CPU Speed                         1600 MHz
      64-bit                            Supported

      Limit CPUID Maximum               [Disabled]
      Bi-directional PROCHOT            [Enabled]
      Intel Virtualization Technology   [Enabled]
      Power Technology                  [Energy Efficient]

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

                  Version 2.17.1249. Copyright (C) 2016 American Megatrends, Inc.
```

■ **Socket 0 CPU Information**

Socket specific CPU Information.

■ **CPU Thermal Configuration**

CPU Thermal Configuration options.

■ **Limit CPUID Maximum**

Disabled for Windows XP

■ **Bi-directional PROCHOT**

When a processor thermal sensor trips (either core), the PROCHOT# will be driven. If bi-direction is enabled, external agents can drive PROCHOT# to throttle the processor.

■ **Intel Virtualization Technology**

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

■ **Power Technology**

Enable the power management features.

3.1.2.8 PPM Configuration

```
              Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
     Advanced

 PPM Configuration                                     Enable/Disable CPU C state
                                                       report to OS
 EIST                             [Enabled]
 CPU C state Report               [Enabled]
 Max CPU C-state                  [ C7]




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



              Version 2.17.1249. Copyright (C) 2016 American Megatrends, Inc.
```

■ **EIST**
Enable/Disable Intel SpeedStep.

■ **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.

3.1.2.9 Thermal Configuration
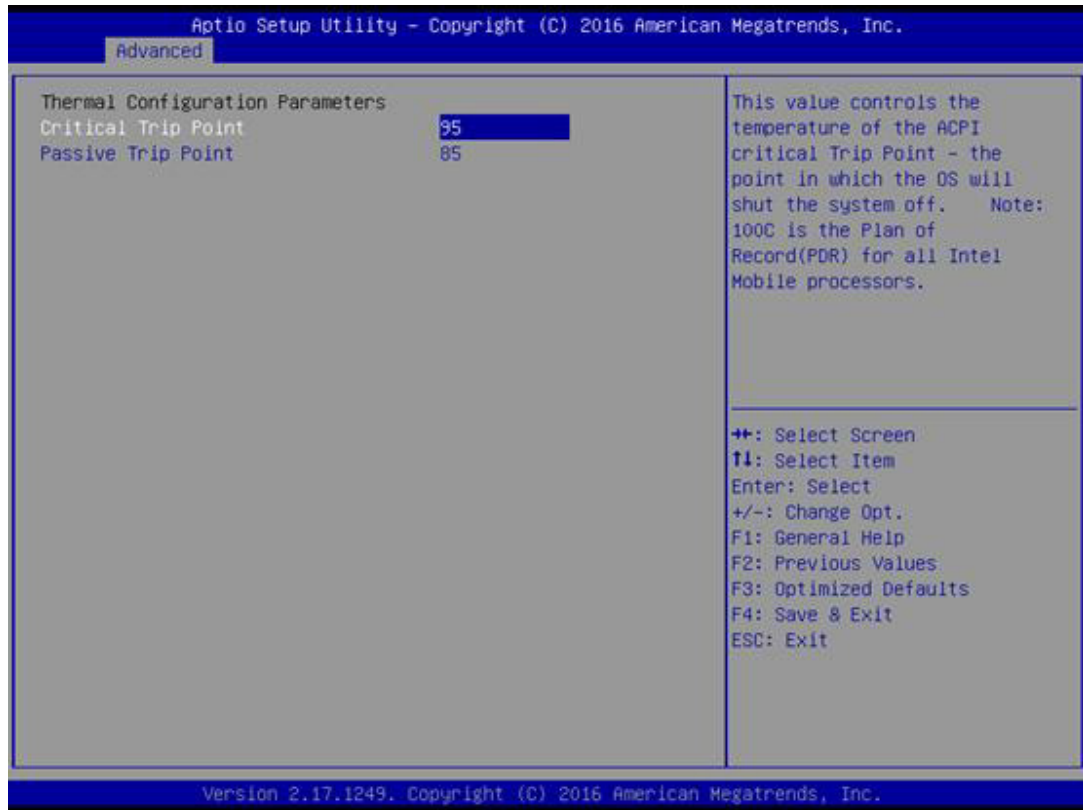
■ **Critical Trip Point**

This value controls the temperature of the ACPI critical Trip Point - the point in which the OS will shut the system off.   Note: 100C is the Plan of Record (PDR) for all Intel Mobile processors.

■ **Passive Trip Point**

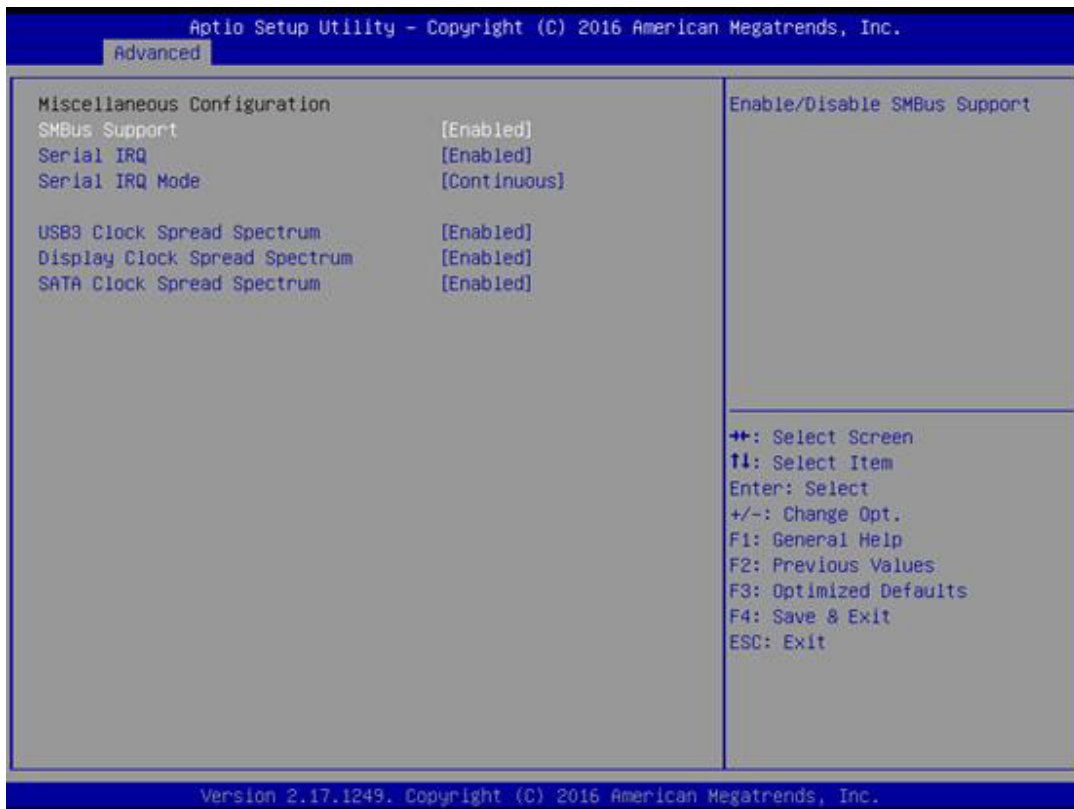This value controls the temperature of the ACPI critical Trip Point - the point in which the OS will begin throttling the processor.

3.1.2.10 SATA Configuration

- ■ **STTA Controller**
  Enable/Disable SATA Device.
- ■ **SATA Mode Selection**
  Determines how SATA controller operate.
- ■ **SATA Interface Speed**
  Select SATA Interface Speed, CHV A1 always with Gen1 Speed.

3.1.2.11 Miscellaneous Configuration

```
                Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
    Advanced

   Miscellaneous Configuration                                    Enable/Disable SMBus Support
   SMBus Support                        [Enabled]
   Serial IRQ                           [Enabled]
   Serial IRQ Mode                      [Continuous]

   USB3 Clock Spread Spectrum           [Enabled]
   Display Clock Spread Spectrum        [Enabled]
   SATA Clock Spread Spectrum           [Enabled]



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


                Version 2.17.1249. Copyright (C) 2016 American Megatrends, Inc.
```

- **SMBus Support**

  Enable/Disable SMBus Support.

- **Serial IRQ**

  Enable/Disable SIRQ Logic.

- **Serial IRQ Mode**

  Configure Serial IRQ Mode.

- **USB3 Clock Spread Spectrum**

  Enable USB3 Clock Spread Spectrum feature.

- **Display Clock Spread Spectrum**

  Enable DISPLAY Clock Spread Spectrum feature.

- **SATA Clock Spread Spectrum**

  Enable SATA Clock Spread Spectrum feature.

3.1.2.12 LPSS & SCC Configuration

- **SCC SD Card Support (D18:F0)**

  SCC SD Card Support Enable\Disable.

  Choose PCI Mode if system running under Win 7 OS;

  Choose ACPI Mode if system running under Win 8.1 and Win 10 OS.

- **LPSS with GPIO Devices Support**

  Enable/Disable GPIO ACPI Devices Support, disable it will disable all LPSS devices.
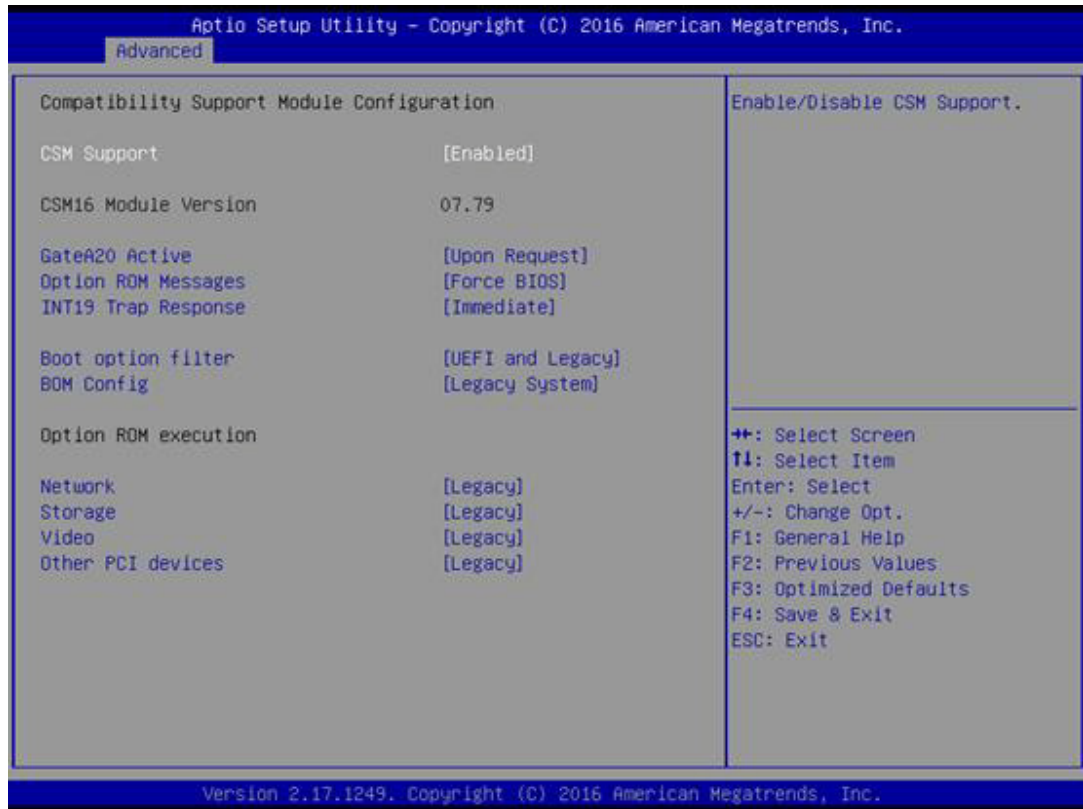
3.1.2.13 PCI Subsystem Settings
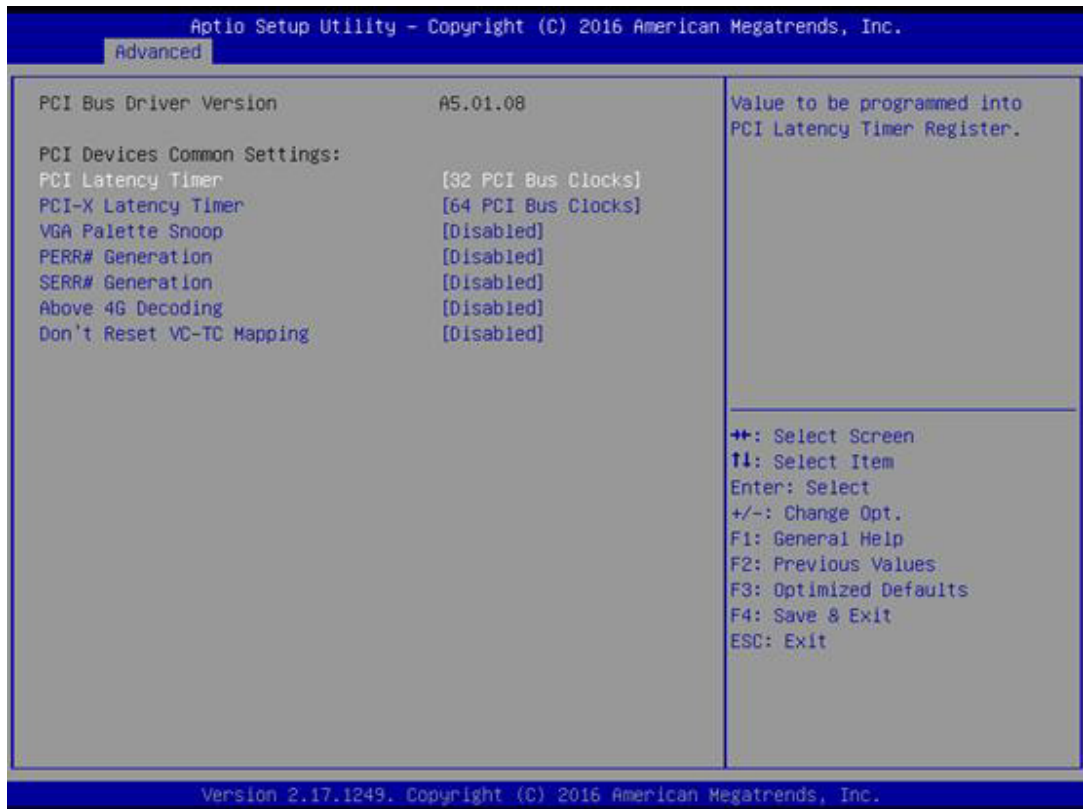
- ■ **PCI Latency Timer / PCI-X Latency Timer**

  Value to be programmed into PCI Latency Timer Register.

- ■ **VGA Palette Snoop**

  Enables or Disables VGA Palette Registers Snooping.

- ■ **PERR# Generation / SERR# Generation**

  Enables or Disables PCI Device to Generate PERR# / SERR#.

- ■ **Above 4G Decoding**

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

- ■ **Don't Reset VC-TC Mapping**

  If system has Virtual Channels, Software can reset Traffic Class mapping through the Virtual Channels to it's default state. Setting this option to Enabled will not modify VC Resources.

3.1.2.14 Network Stack Configuration


```
         Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
   Advanced

 Network Stack                    [Disabled]              Enable/Disable UEFI Network
                                                          Stack







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



         Version 2.17.1249. Copyright (C) 2016 American Megatrends, Inc.
```

■ **Network Stack**
    Enable/Disable UEFI Network Stack.

3.1.2.15 CSM Configuration

- **CSM Support**

  Enable/Disable CSM Support.

- **GateA20 Active**

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

- **Option ROM Messages**

  Sets the 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 ROMs 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

3.1.2.16 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 OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.

■ **EHCI Hand-Off**

This is a workaround for OSes 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.

3.1.2.17 Security Configuration
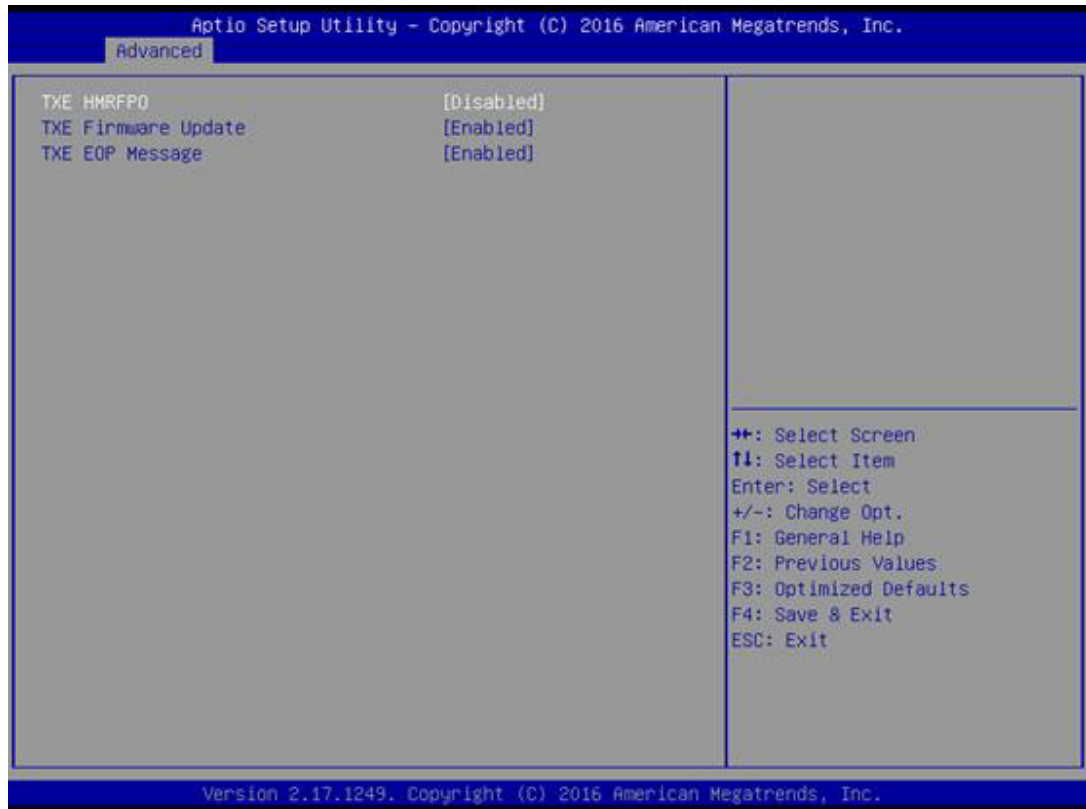
- ■ **TXE HMRFPO**
- ■ **TXE Firmware Update**
- ■ **TXE EOP Message**
  Send EOP message before entering OS.
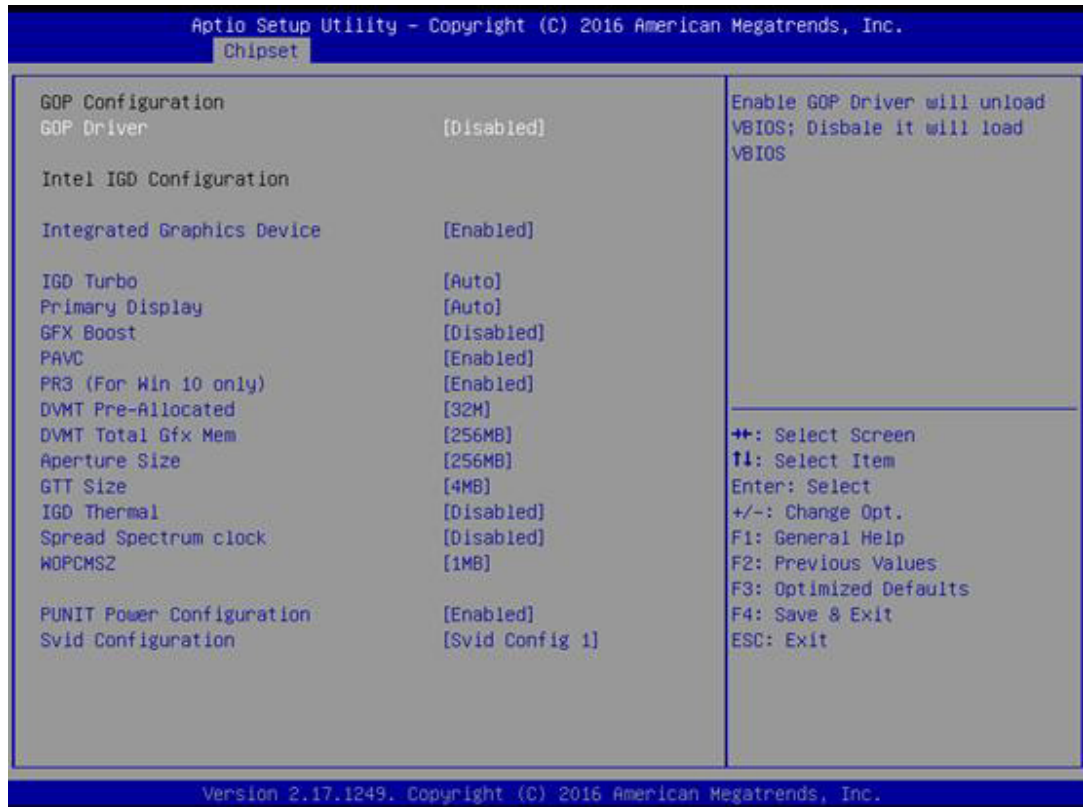
3.1.3 Chipset Configuration
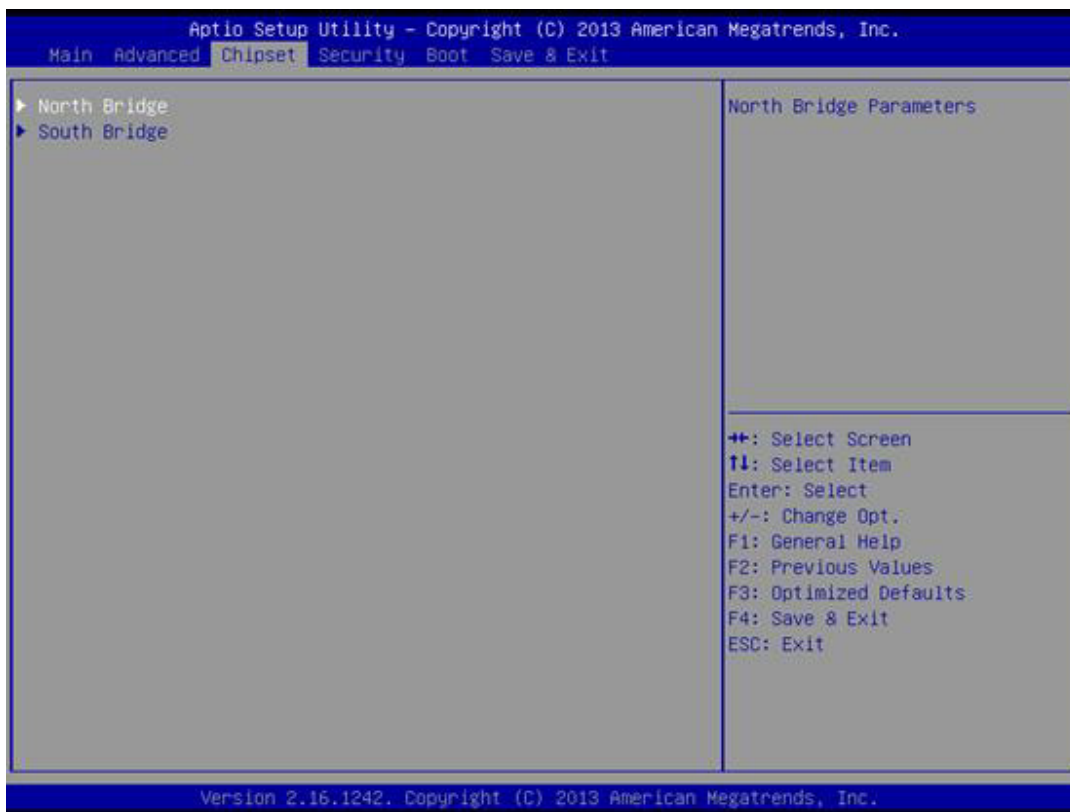
- ■ **North Bridge / South Bridge**
- ■ **North / South Bridge Parameters.**

3.1.3.1 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.

- ■ **Intel IGD Configuration**

- – **GOP Driver**
  Enable GOP Driver will unload VBIOS; Disable it will load VBIOS.
- – **Integrated Graphics Device**
  Enable: Enable Integrated Graphics Device (IGD) when selected as the Primary Video Adaptor. Disable: Always disable IGD.
- – **IGD Turbo**
  Select the IGD Turbo feature, if Auto selected, IGD Turbo will only be enabled when SOC steeping is B0 or above.
- – **Primary Display**
  Select which of IGD/PCI Graphics device should be Primary Display.
- – **GFX Boost**
  Enable/Disable GFX Boost.
- – **PAVC**
  Enable/Disable Protected Audio Video Control.

– **PR3 (For Win 10 only)**

Enable/Disable PR3 (For Win 10 only).

– **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.

– **WOPCMSZ**

Select a size for WOPCMSZ.

– **PUNIT Power Configuration**

Enable or disable PUNIT Power configuration.

– **Svid Configuration**

Choose the right SVID Config.

■ **Graphics Power Management Control**

```
             Aptio Setup Utility – Copyright (C) 2016 American Megatrends, Inc.
               Chipset

 Graphics Power Management Control                          Check to enable render standby
 RC6(Render Standby)                [Enabled]               support.
 Power Meter Lock                   [Enabled]




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


             Version 2.17.1249. Copyright (C) 2016 American Megatrends, Inc.
```

- **RC6(Render Standby)**

Check to enable render standby support.

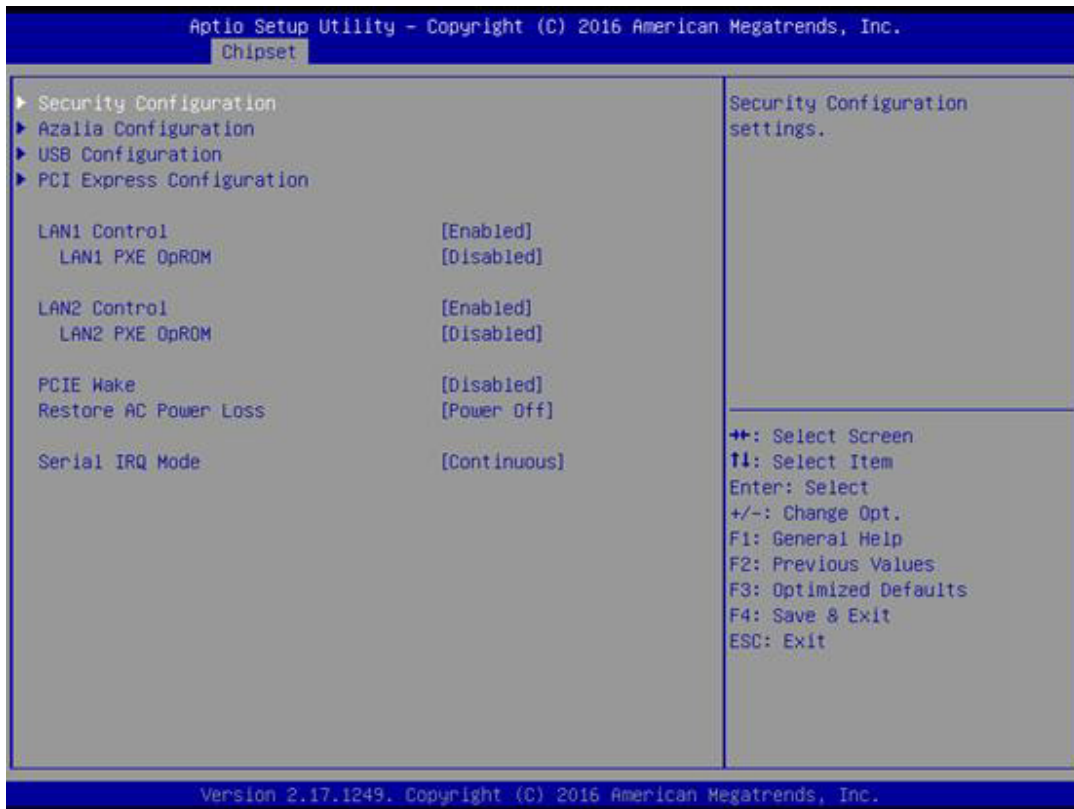- **Power Meter Lock**

Enable/Disable Power Meter Lock.

■ **LCD Control**

- **Primary IGFX Boot Display**

Select the Video Device which will be activated during POST.\nThis has no effect if external graphics present.\nSecondary boot display selection will appear based on your selection.\nVGA modes will be supported only on primary display

3.1.3.2 South Bridge

- **Security Configuration**
  Security Configuration settings.
- **Azalia Configuration**
  Azalia HD Audio Options.
- **USB Configuration**
  USB Configuration Settings.
- **PCI Express Configuration**
  PCI Express Configuration settings
- **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 a power failure.
- **Serial IRQ Mode**
  Configure Serial IRQ Mode.

■ **Security Configuration**

– **RTC Lock**

Enable or disable bytes 38h-3Fh in the upper and lower 128-byte bank of RTC RAM lockdown.
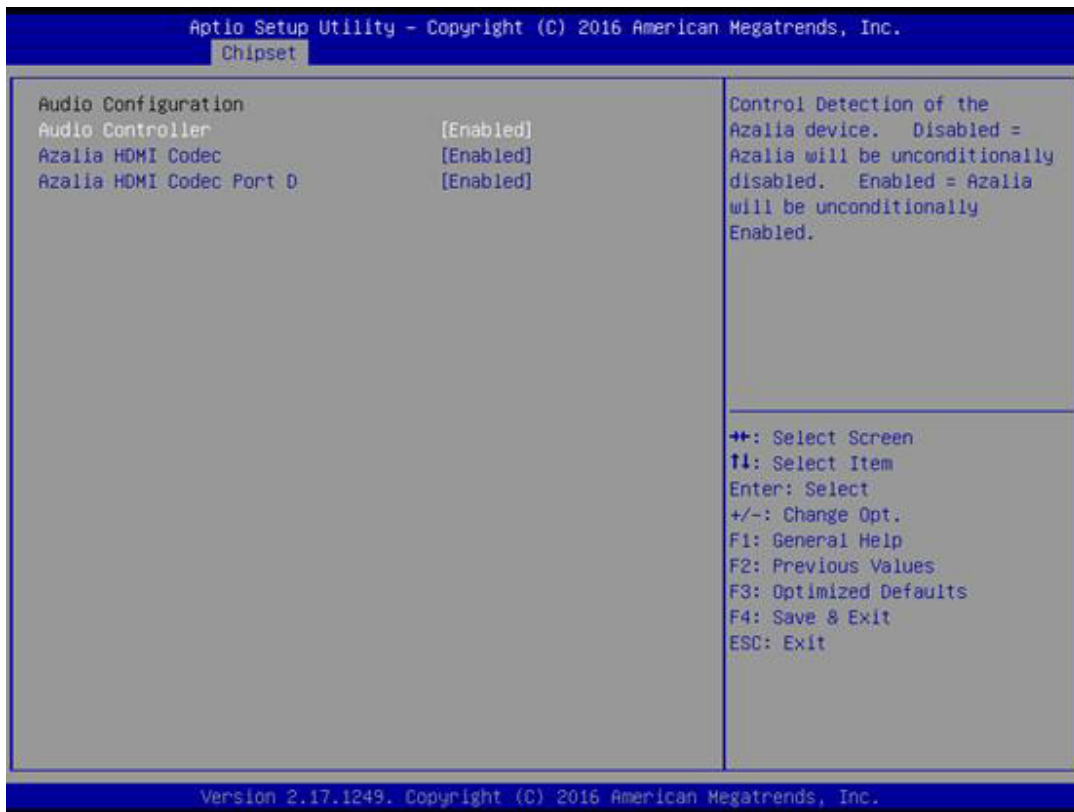
– **BIOS Lock**

Enable/Disable the BIOS Lock Enable feature.

– **Global SMI Lock**

Enable or Disable SMI lock.

■ **Azalia HD Audio**

– **Audio Controller**

Control Detection of the Azalia device.   Disabled = Azalia will be unconditionally disabled.   Enabled = Azalia will be unconditionally Enabled.
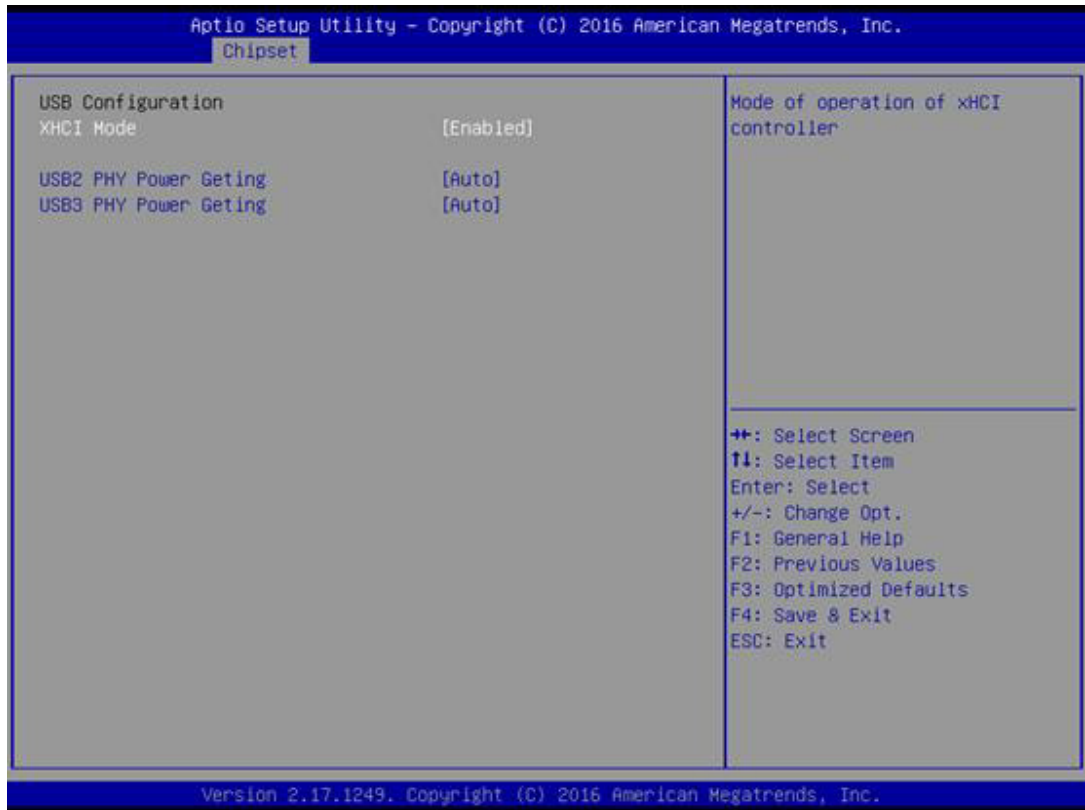
– **Azalia HDMI Codec**

Enable/Disable internal HDMI codec for Azalia

– **HDMI Port D**

Enable/Disable internal HDMI Port codec for Azalia.

■ **USB Configuration**

```
              Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
                Chipset

 USB Configuration                                        Mode of operation of xHCI
 XHCI Mode                      [Enabled]                 controller

 USB2 PHY Power Geting          [Auto]
 USB3 PHY Power Geting          [Auto]




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



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```

– **XHCI Mode**

Mode of operation of xHCI controller

– **USB2 PHY Power Gating**

Configure USB2 PHY Power Gating.

– **USB3 PHY Power Gating**

Configure USB3 PHY Power Gating.

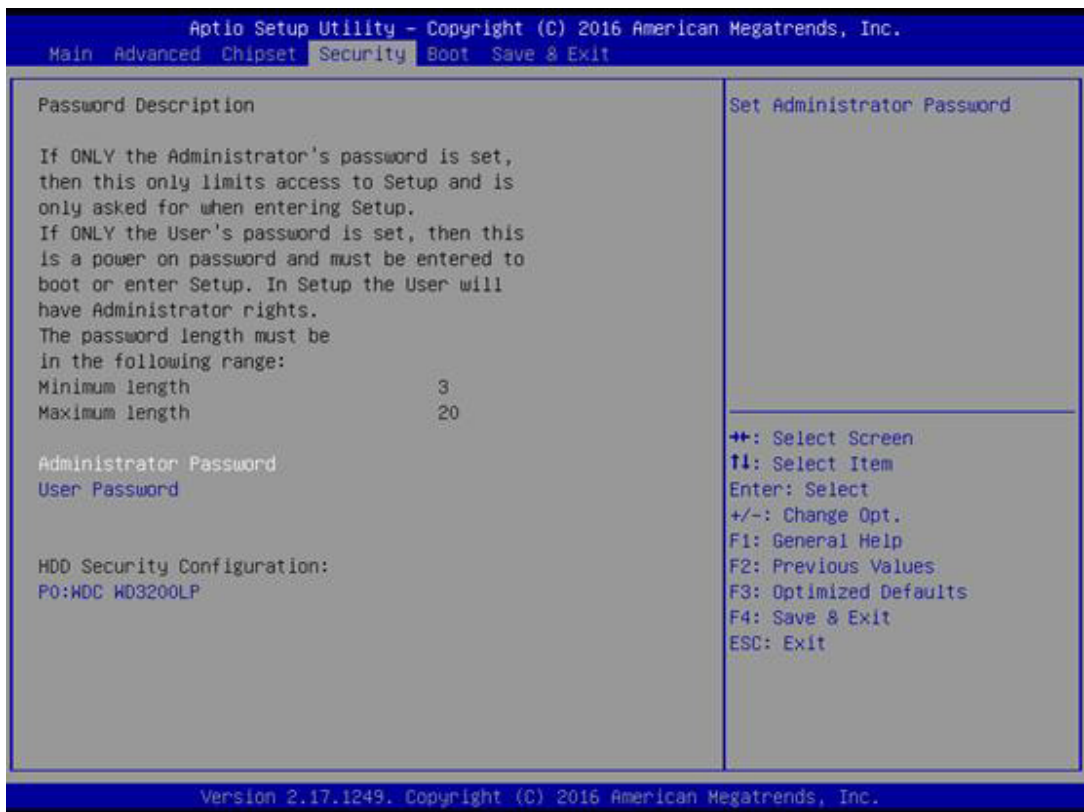■ **PCI Express Configuration**
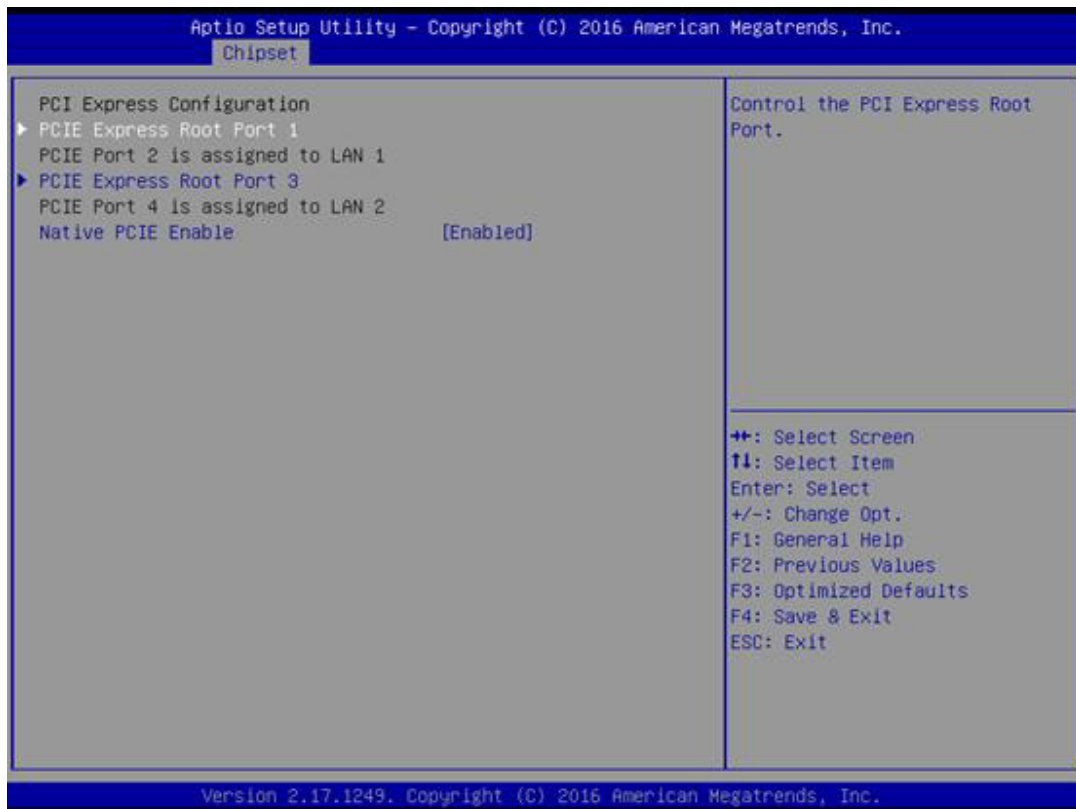
   – **PCI Express Port 1 / 3**

Control the PCI Express Root Port.

   – **Native PCIE Enable**

   – PCI Express Native Support Enable/Disable. This feature is only available in Vista.

3.1.4 Security

Select Security Setup from the ARK-3405 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: Select this option and press <ENTER> to access the sub menu, and then type in the password.

3.1.5 Boot
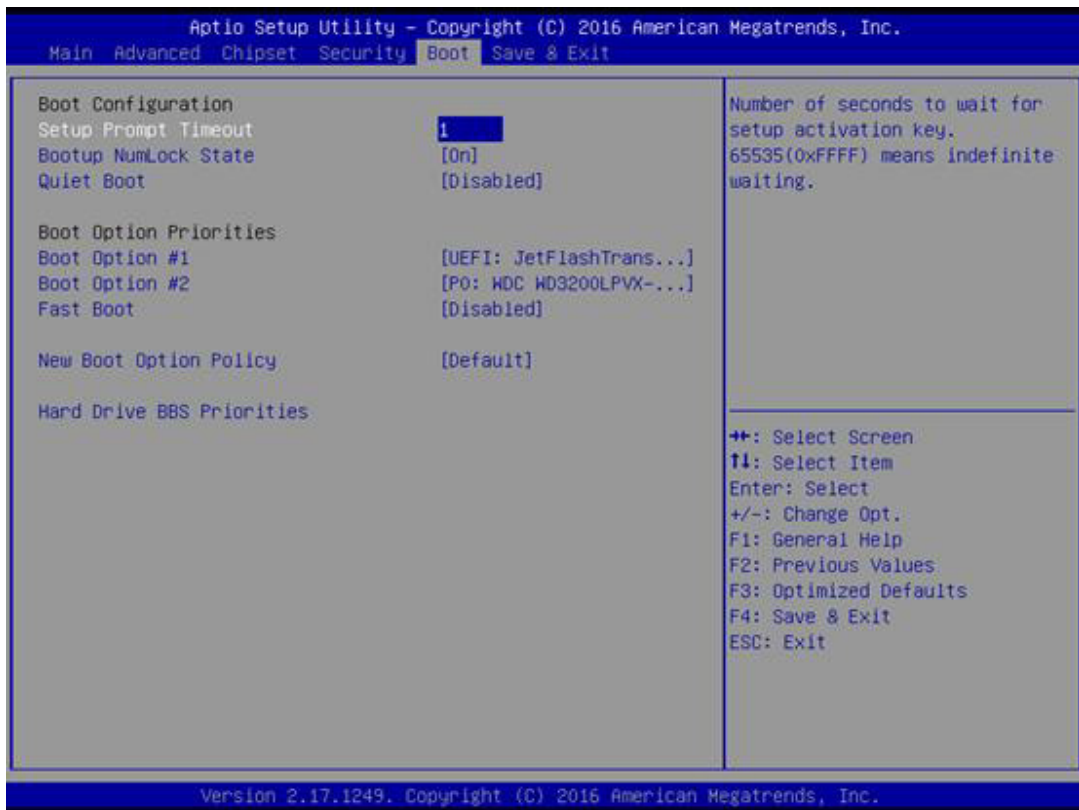
■ **Setup Prompt Timeout**
Number of seconds that the firmware will wait before initiating the original default boot selection. A value of 0 indicates that the default boot selection is to be initiated immediately on boot. A value of 65535(0xFFFF) indicates that firmware will wait for user input before 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

■ **Fast Boot**
Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.

■ **Boot Option #1**
Sets the system boot order

3.1.6 Save & Exit
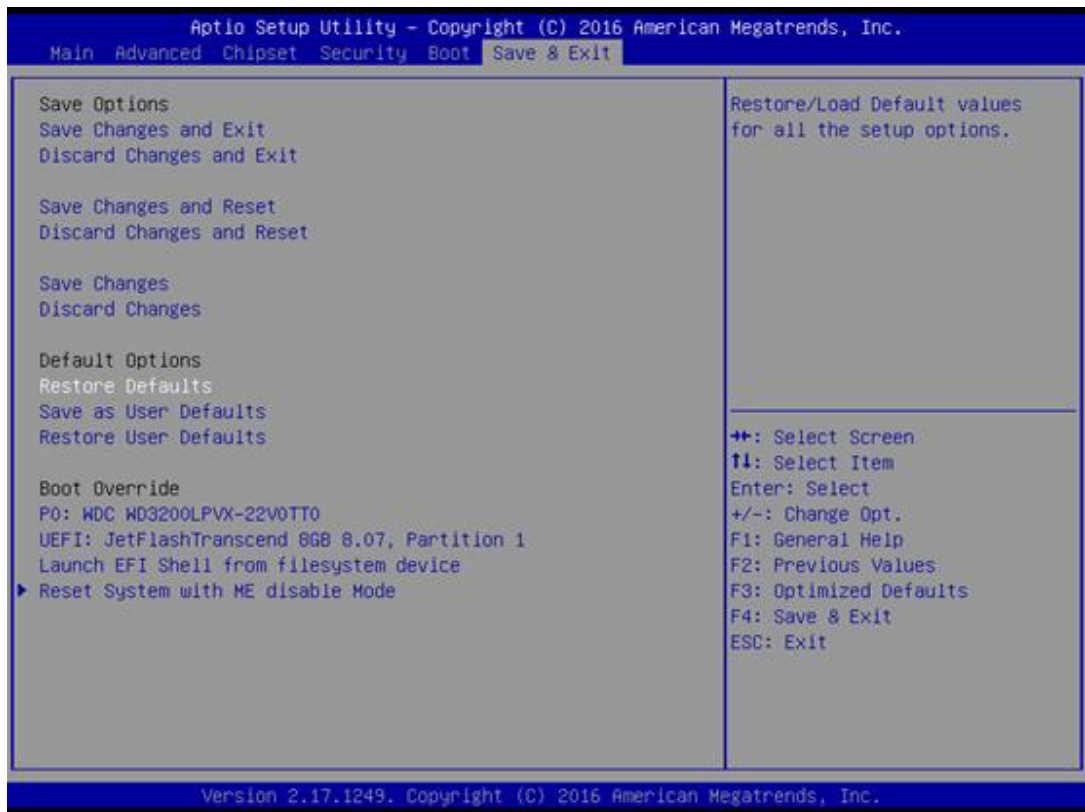
- **Save Changes and Exit**

  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
```

Appendix B

**USB 3.0 Drivers
Installation Instruction**

B.1 USB 3.0 Drivers Installation Instruction

For customers using Windows 7 OS, they need to install drivers to active the USB 3.0 function. Please download driver installation instructions from the Intel website. (https://downloadcenter.intel.com/download/25476/Windows-7-USB-3-0-Creator-Utility)

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