



User Manual

EPC-S101

**Slim Type Embedded Barebone
System with Intel N3000 & X5-
E8000 3.5" SBC**

ADVANTECH

Enabling an Intelligent Planet

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Product Warranty (2 years)

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

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

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

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

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

Declaration of Conformity

CE

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

FCC Class 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. 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.*



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:
 - a. The power cord or plug is damaged.
 - b. Liquid has penetrated into the equipment.
 - c. The equipment has been exposed to moisture.
 - d. The equipment does not work well or you cannot get it to work according to user manual.
 - e. The equipment has been dropped and damaged.
 - f. The equipment has obvious signs of breakage.
15. Do not leave this equipment in an environment where the storage temperature may go below -20°C (-4°F) or above 60°C (140°F). This could damage the equipment. The equipment should be in a controlled environment.
16. This product is intended to be supplied by an UL certified power supply which specifications are comply to user scenario and environment, if power unit is not provided.
17. **CAUTION:** The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if battery is incorrectly replaced. Replace only with same or equivalent type recommended by the manufacture. Discard used batteries according to the manufacturer's instructions.
18. **CAUTION:** Always completely disconnect the power cord from your chassis whenever you work with the hardware including cable connections, jumper setting changes, and add-on card insertion/remove. Sensitive electronic components can be damaged by sudden power surges.
19. **CAUTION:** Always ground yourself to remove any static charge before touching the motherboard, backplane, or add-on cards. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding

wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not in the chassis.

20. **CAUTION:** Any unverified component could cause unexpected damage. To ensure the correct installation, please always use the components (ex. screws) provided with the accessory box.
21. **RESTRICTED ACCESS AREA:** The equipment should only be installed in a Restricted Access Area.
22. The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).
23. **DISCLAIMER:** This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

Ordering Information

Part Number	Intel CPU	RAM	VGA	HDMI	GbE	USB 3.0	USB 2.0	RS-232	RS-232/422/485	Audio	MiniPCle	mSATA	Operating Temperature	Thermal Solution
EPC-S101CQ-S6A1	Intel Celeron N3160	2GB	1	1	2	2	4	2	2	Line in Line out Mic in	Full size (PCIe, USB2.0)	Full size (PCIe, USB2.0)	0~50° C	Passive
EPC-S101CD-S6A1	Intel Celeron N3060													
EPC-S101AQ-S0A1	Intel Atom X5-E8000													

Packing List

Part Number	Description
	1 x EPC-S101
	1 x Startup Manual
2190000902	1 x Warranty Card
968EMLRMP1	1 x RMM package
1700026499-01	1 x M cable SATA 22P/SATA 7P+1*4P-2.5 10cm
1700009001	1 x A Cable JACK/1*2P-5.0 4.5CM C=R B
1990019498N020	1 x Thermal-Pad 59x19.5x1.5 XR-HL K=1.2 TP Apus-
1990027162N010	1 x Thermal Pad 19.5X19.5X1.5 XR-HL K=1.2
1935020530	4 x Screw M2x5L R/S D=3.5 H=1.3 (1+) ST Ni
1930004607	4x Screw M3x4L S/S D=4.8 H=1 (2+) ST BZn

Optional Accessories

Part Number	Description
96PSA-A60W12P2-1	1 x DC power 12V/5A 60W, 0 ~ 40° C, w/ Phoenix Jack type power connector
1702002600-01	1 x Power cable 3-pin 183 cm, USA type
1700018704	1 x Power cable 3-pin 180 cm, UK type
1700018705	1 x Power cable 3-pin 183 cm, Europe type
1700000237-01	1 x Power cable 3-pin 183 cm, PSE type
1960074451N001	1 x Mount BKT 432C for EPC-S
1960018849T031	1 x Din-rail Bracket for ARK-2120

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Chapter 1

General Information

1.1 Overview

EPC-S101 is a thin design and multi-function bare-bone chassis for space-limited solutions. EPC-S101 measures only 188 x 39 x 150 mm, less than 1U height. This slim, fanless system provides 6 USB ports, 4 COM ports (RS-232/422/485), 2 gigabit Ethernet ports, 1 HDMI, 1 VGA, 8-bit Digital I/O port, and audio jack w/ Mic in, line out and line out ports ready for use. Moreover, EPC-S101 is reserved with 2.5" SATA SSD room with SATA power, mSATA, and full-size mini-PCIe with SIM holder for multiple expansions. For mounting purposes, EPC-S101 supports wall mount, VESA mount, and din rail mounting to cope with different application circumstances.

With condensed system size, various IO ports and flexible mounting methods, EPC-S101 is suitable for retail, commercial kiosk and signage, environmental monitoring, and HMI device implementation. The system is small but versatile and strong, making it suitable for different fields of work and tasks.

1.2 Product Feature

1.2.1 Processor System

CPU: Intel® Celeron® N3160/N3060, Intel® Atom™ X5-E8000 SoC			
CPU	Intel Celeron N3160	Intel Celeron N3060	Intel Atom x5-E8000
Base Frequency	1.60 GHz	1.60 GHz	1.04 GHz
Burst Frequency	2.24 GHz	2.48 GHz	2.00 GHz
# of Cores	4	2	4
# of Threads	4	2	4
L2 Cache	2 MB	2 MB	2 MB
TDP	6 W	6 W	5W

- **System Memory:** Single Channel DDR3L-1600 2GB (Configurable up to 8GB)

- **Graphics:** Intel SoC integrated Graphics Controller
 - 3D: DX11.1, OpenGL 4.2, OpenCL 1.2
 - HW Decode: HEVC (H.265)@L5, H.264@L5.2, VP8, MPEG2, MVC, VC-1, WMV9, JPEG/MJPEG
 - HW Encode: H.264@L5.1, MVC, JPEG/MJPEG
 - Supports dual simultaneous display content

CPU	Intel Celeron N3160	Intel Celeron N3060	Intel Atom x5-E8000
Graphics Core	Intel HD Graphics 400	Intel HD Graphics 400	Intel HD Graphics
Base Frequency	320 MHz	320 MHz	320 MHz
Burst Frequency	640 MHz	600 MHz	-
Execution Units	12	12	12

- **BIOS:** AMI UEFI BIOS at 64 Mb

1.2.2 I/O and Function

- **Front I/O Connector**
 - **Ethernet 1:** RTL8111E GbE compliant to 802.3ab, 802.3u
 - **Ethernet 2:** RTL8111E GbE compliant to 802.3ab, 802.3u
 - **VGA:** Up to 1920 x 1200 resolution
 - **HDMI:** HDMI 1.4b up to 2560 x 1600 @ 60 Hz
 - **USB:** 2 x USB3.0, 2 x USB2.0
 - **LED Indicator:** Power, SATA Act#

- **Rear I/O Connector**
 - **COM1/2:** RS-232, I/O pin ESD protection: air gap ± 15 kV, contact ± 8 kV
 - **COM3/4:** RS-232/422/485, I/O pin ESD protection: air gap ± 15 kV, contact ± 8 kV
 - **DIO:** 8-bit GPIO
 - **USB:** 2 x USB2.0
 - **Audio:** Line-in, Line-out, MIC, ALC892
 - **Power Switch:** AT power switch

- **Expansion Socket**
 - **miniPCIe:** Full size mini-PCI w/ SIM holder, PCIe Gen2 (5.0 GT/s) & USB2.0
 - **mSATA:** Full size mSATA, SATA Gen3 (6.0 Gb/s) & USB2.0, optional miniPCIe

- **Storage:** Optional support 2.5" SATA SSD (Gen3 6.0 Gb/s)
 - SATA Power: 5V / 12V

- **Antenna:** Two reserved antenna holes on both front side and rear sides.

- **Watchdog Timer:** Single chip Watchdog 255-level interval timer, setup by software.

1.2.3 Power Specification

- **Power Type:** AT
- **Power Input Requirement:** 12V +/- 10%
- **Power Connector Type:** 2-pole Phoenix DC Plug-in
- **RTC Battery:** Build-in Lithium coin battery 3V, 210mAh

1.2.4 Environment

- **Temperature**
 - **Operating:** 0 ~ 50° C (32 ~ 122° F) w/ 0.7m/s airflow
 - **Storage:** -40 ~ 85° C (-40~185° F)
- **Humidity:**
 - **Operating:** 40° C @ 95% relevant humidity, non-condensing
 - **Storage:** 60° C @ 95% relevant humidity, non-condensing
- **Vibration:** With mSATA/SSD: 3 Grms, IEC 60068-2-64, random, 5 ~ 500 Hz, 1 hr/3-axis
- **Shock:** With mSATA/SSD: 30G, IEC 60068-2-27, half sine, 11 ms duration
- **EMC:** CE/FCC Class B

- **Safety:** CB, UL, CCC, BSMI

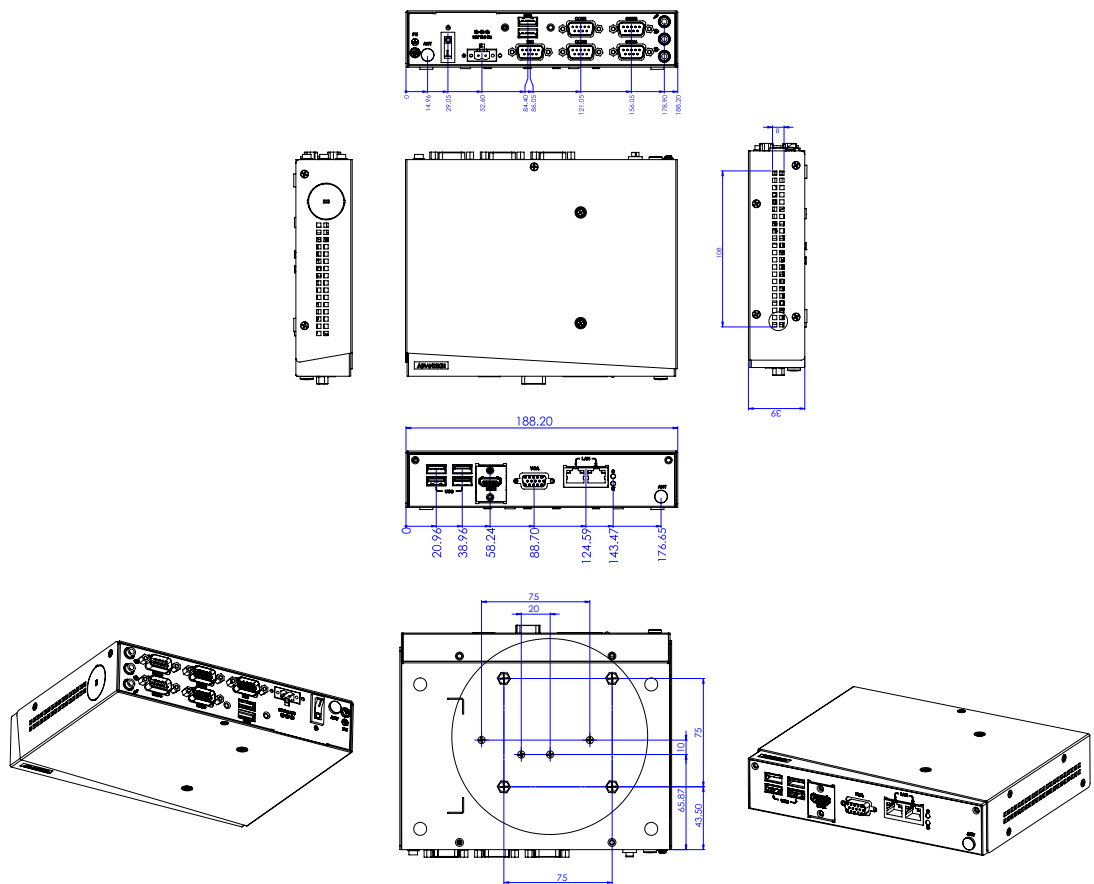
1.2.5 Mechanical

- **Dimensions:** 188 x 39 x 150 mm
- **Weight:** 950g

1.2.6 Software Support

- **OS Support:** Windows 7/8.1/10, WES7, Linux, VxWorks (optional by request)
- **Software API:** Advantech iManager and WISE- PaaS/RMM - Remote Device Management technology

1.3 Mechanical Specification



Chapter 2

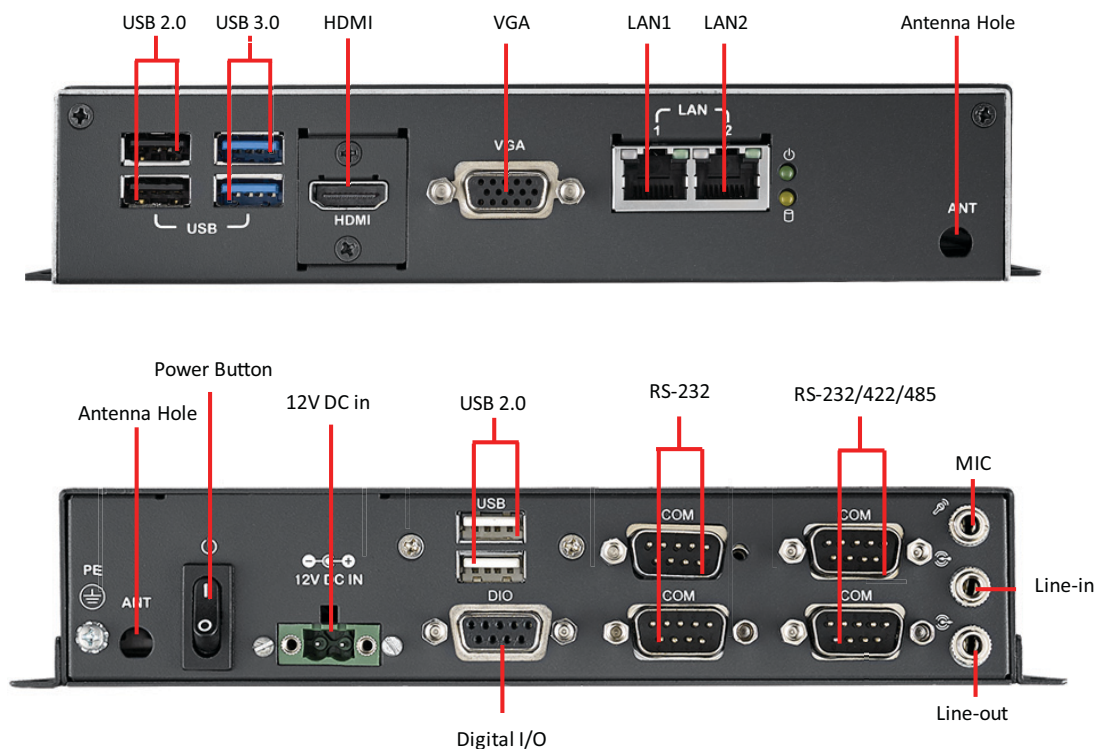
Hardware
Configuration

2.1 Introduction

The following section shows the external and internal connectors pin assignment for application.

2.2 Connectors

2.2.1 Front and Rear I/O Connectors



2.2.1.1 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 and compact flash disk status.

2.2.1.2 HDMI Connector

An integrated, 19-pin receptacle connector HDMI Type A Interface is provided. The HDMI link supports resolutions up to 1920 x 1200 @ 60 Hz.

2.2.1.3 VGA Connector

EPC-S101 provides an integrated 15-pin female VGA digital video interface, which supports up to 1920 x 1200 @ 60 Hz. Please refer to Table 2.10 for its pin assignments.

2.2.1.4 USB2.0 Connector

EPC-S101 provides two 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 2.2 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. (Supports power on/off switch in suspend mode - by customized BIOS request.)

2.2.1.5 USB3.0 Connector

EPC-S101 supports six USB 3.0 interfaces. The USB interface complies with USB UHCI, Rev. 3.0 standards. Please refer to Table 2.9 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.

2.2.1.6 Ethernet Connector (LAN)

EPC-S101 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).

2.2.1.7 Power On/Off Switch

EPC-S101 has a Power On/Off button (Rocker RC type).

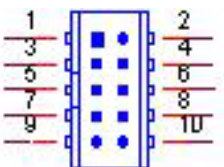
2.2.1.8 Power connector:

4-pole Phoenix DC power connector

2.2.1.9 Digital IO connector:

EPC-S101 has a DIO connector, and pin assignments as shown below:

CN8	GPIO
Part Number	1653004099
Footprint	HD_5x2P_79_23N685B-10M10
Description	BOX HEADER 5x2P 2.00mm 180D(M) SMD 23N685B-10M10
Pin	Pin Name
1	+5V
2	GPIO4
3	GPIO0
4	GPIO5
5	GPIO1
6	GPIO6
7	GPIO2
8	GPIO7
9	GPIO3
10	GND



2.2.1.10 COM port 1~4:

ITE_IT8760E supports up to 4 serial ports.

Supports IRQ Sharing among serial ports under Microsoft Windows OS

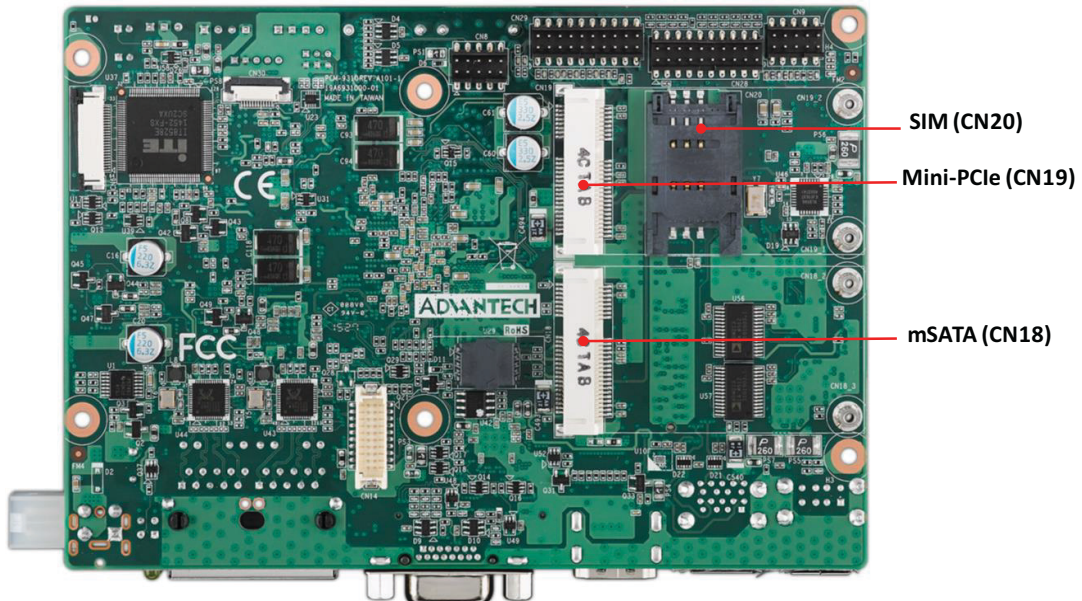
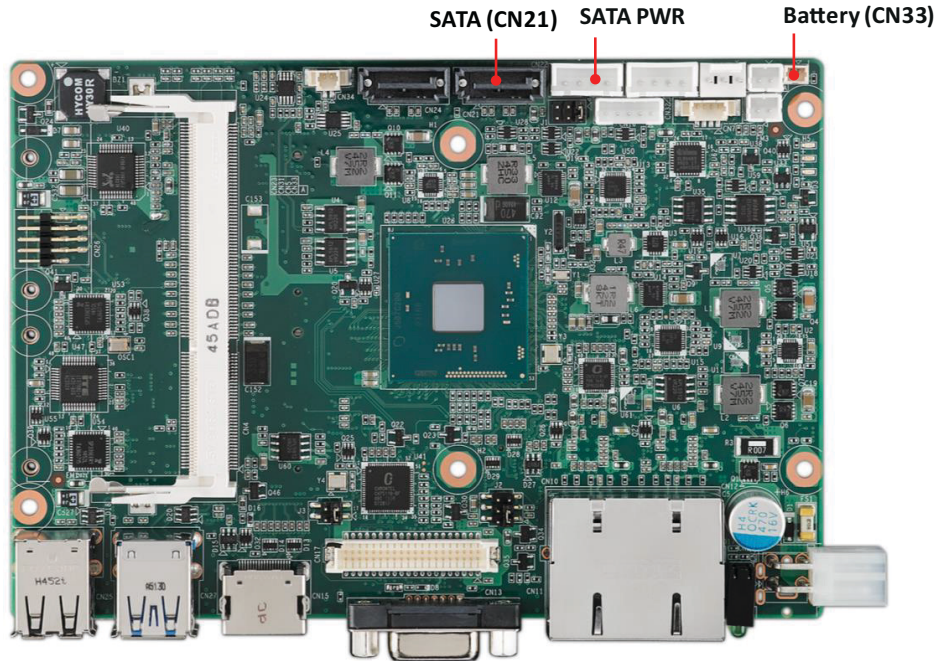
- **Serial Port 1 Configuration**
Set Parameters of Serial Port 1 (COMA).
- **Serial Port 2 Configuration**
Set Parameters of Serial Port 2 (COMB).
- **Serial Port 3 Configuration**
Set Parameters of Serial Port 3 (COMC).
- **Serial Port 4 Configuration**
Set Parameters of Serial Port 4 (COMD).

2.2.1.11 Audio x 1 set

ALC892-CG supports (Line out, Line-in, Mic-in)

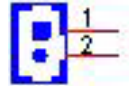
2.2.2 Internal Connectors

2.2.2.1 Connector Location



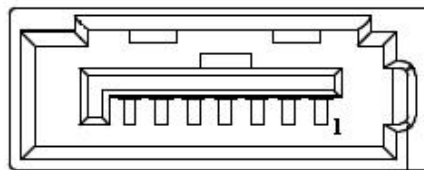
2.2.2.2 Battery (CN33)

CN33	Battery
Part Number	1655902032
Footprint	WHL2V-125
Description	WAFER BOX 2P 1.25mm 180D(M) DIP 53047-0210
Pin	Pin Name
1	+3V
2	GND



2.2.2.3 SATA (CN21)

CN21	SATA
Part Number	1654011616-01
Footprint	SATA_7P_WATF-07DBN6SB1U
Description	
Pin	Pin Name
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

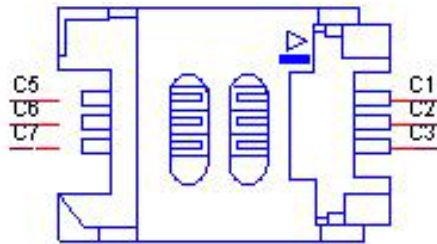


2.2.2.4 Mini PCIE (CN19)

CN19		Mini PCIE	
Part Number	00A00000770		
Footprint	MINIPCIE_HALF_PICO_ITX		
Description			
Pin	Pin Name		
27	GND		
28	+1.5V		
29	GND		
30	SMB_CLK		
31	PETn0		
32	SMB_DAT		
33	PETp0		
34	GND		
35	GND		
36	USB D-		
37	GND		
38	USB D+		
39	+3.3VSB		
40	GND		
41	+3.3VSB		
42	NC		
43	SEL		
44	NC		
45	NC		
46	NC		
47	NC		
48	+1.5V		
49	NC		
50	GND		
51	NC		
52	+3.3VSB		

2.2.2.5 SIM (CN20)

CN20	SIM
Part Number	1654010809-01
Footprint	SIM_6P_5210622-SINR03
Description	SIM card conn. 6p 2.54mm 90D(F) SMD 5210622-SINR
Pin	Pin Name
C1	UIM_PWR
C2	UIM_RESET
C3	UIM_CLK
C5	GND
C6	UIM_VPP
C7	UIM_DATA



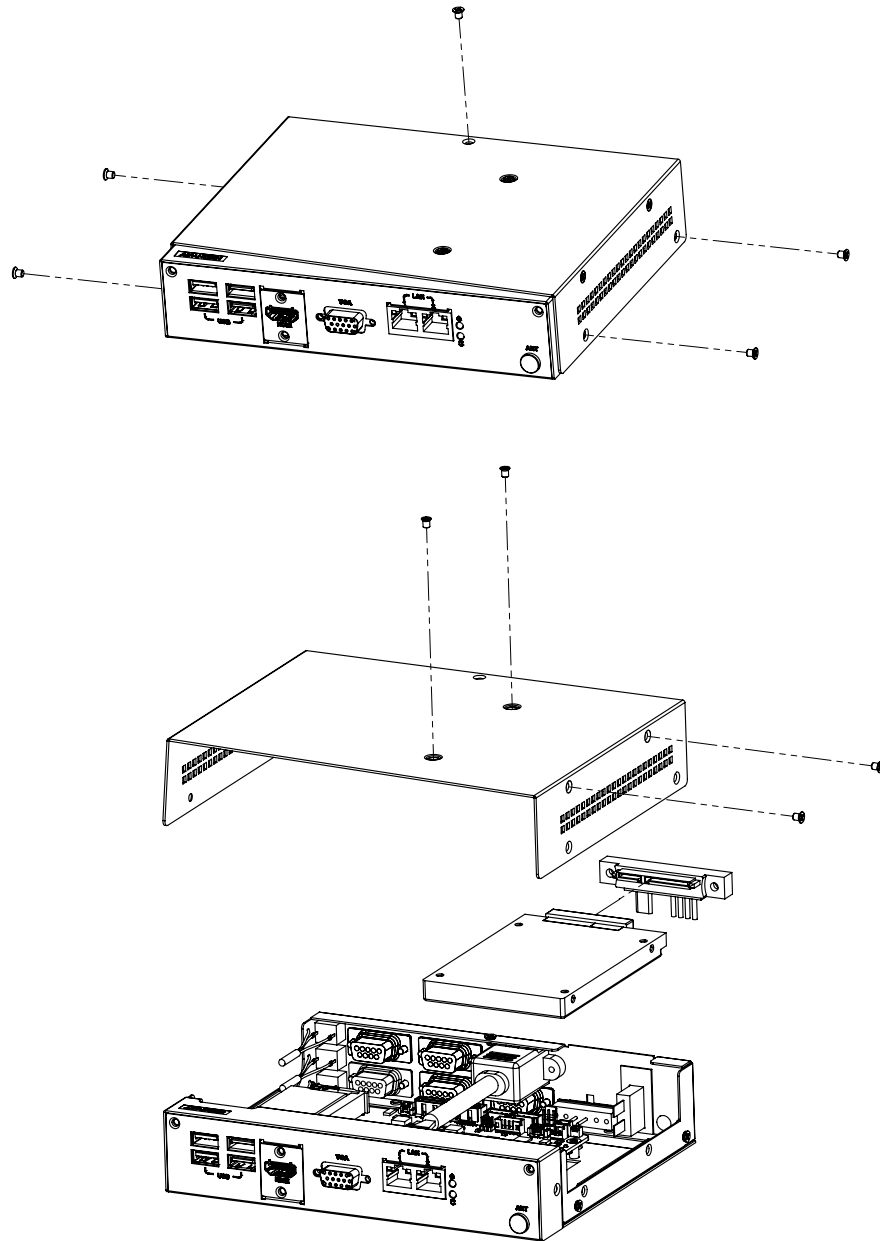
2.2.2.6 mSATA (CN18)

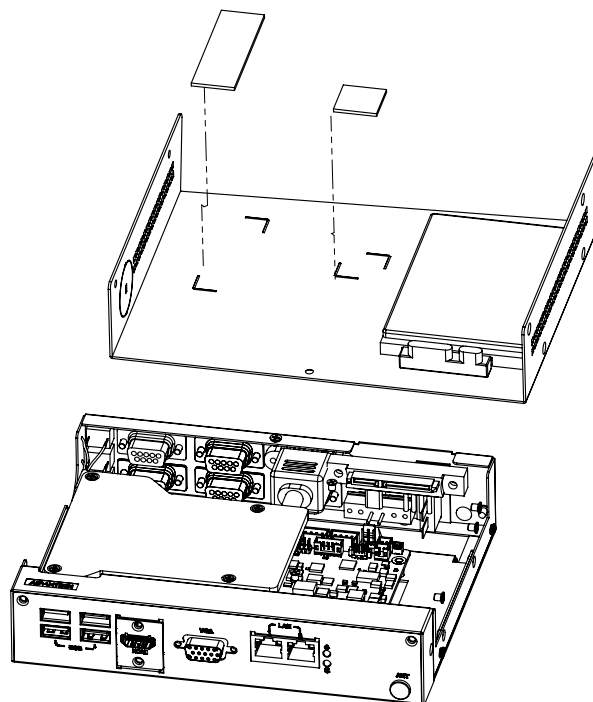
CN18	Mini PCIE
Part Number	00A00000770
Footprint	MINIPCIE_HALF_PICO_ITX
Description	
Pin	Pin Name
27	GND
28	+1.5V
29	GND
30	SMB_CLK
31	PETn0
32	SMB_DAT
33	PETp0
34	GND
35	GND
36	USB D-
37	GND
38	USB D+
39	+3.3VSB
40	GND
41	+3.3VSB
42	NC
43	SEL
44	NC
45	NC
46	NC
47	NC
48	+1.5V
49	NC
50	GND
51	NC
52	+3.3VSB

2.3 Installation

2.3.1 2.5" SSD Installation

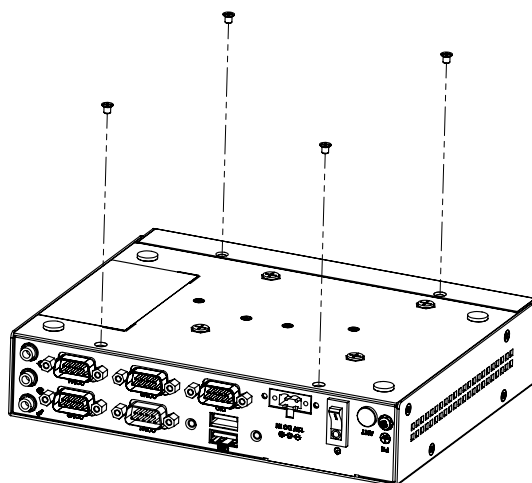
1. Unscrew five screws to remove the top case.
2. Connect the HDD with the HDD cable.
3. Remove the four nylon snap rivets. Screw the HDD with four screws (M3x4L) on the top case.
4. Before screwing back the top cover, replace the thermal pad with substitutes on the inner side of the top cover.

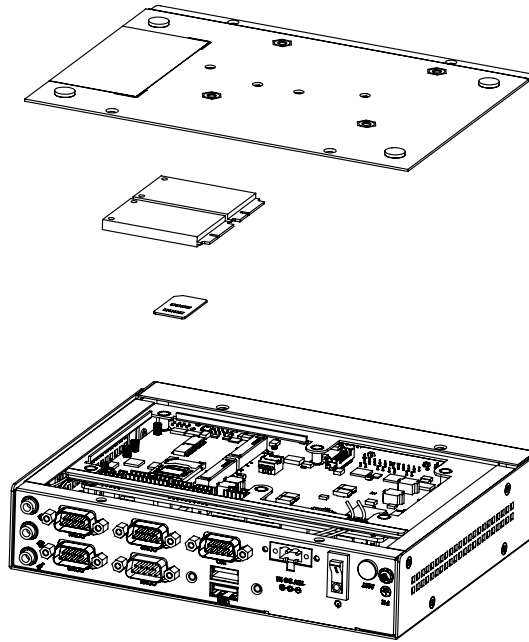




2.3.2 mSATA/Mini PCIe/SIM module Installation (Option)

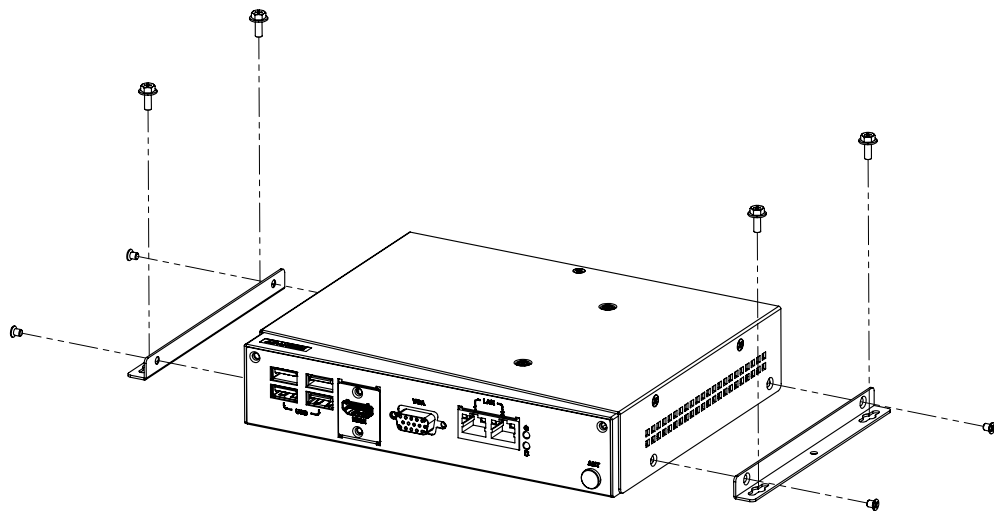
1. Unscrew four screws (M3x4L) to remove the bottom cover.
2. Install the SIM card, mSATA or Mini PCIe module. Screw the mSATA or Mini PCIe cards with M2X5L screws.





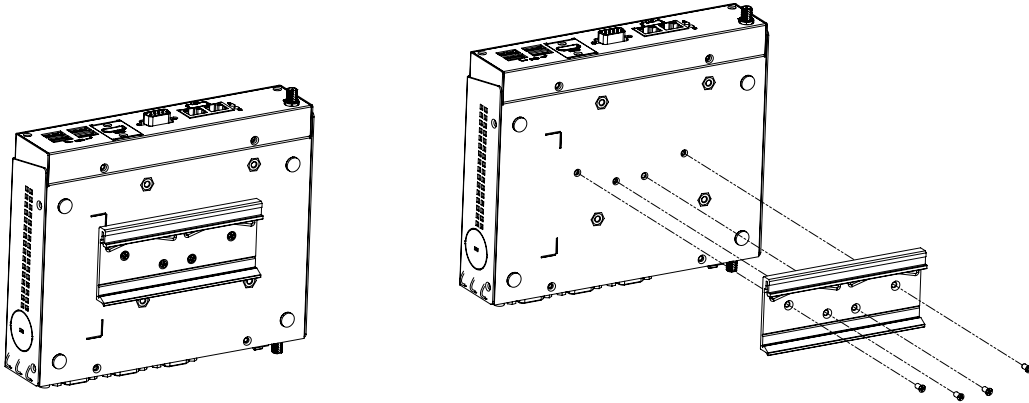
2.3.3 Wall Mount Bracket Installation (Option)

1. Loosen four side screws of the top case (M3x4L) and screw back with the wall mount bracket.
2. Screw down the four wall mount screws (M3x8L) to the table.



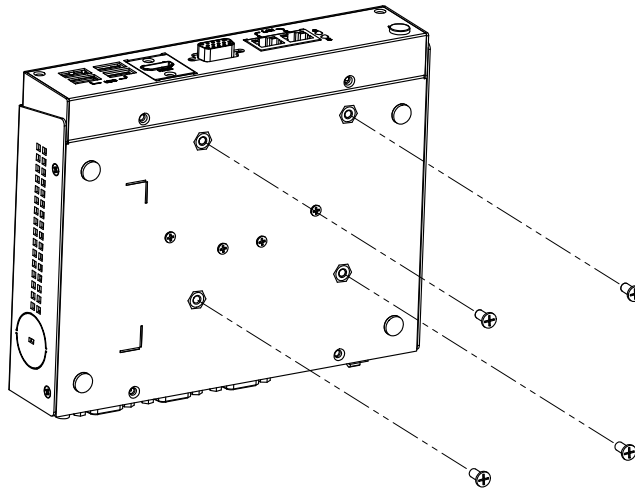
2.3.4 Din Rail Bracket Installation (Option)

1. Loosen the four din rail screws (M3x4L) on the back case.
2. Screw back the din rail bracket with the din rail screws.



2.3.5 VESA Mount Installation (Option)

1. Unscrew the four VESA Mount screws (M4x8L).
2. Screw back the VESA Mount screws with your mounting surface.



Chapter 3

BIOS Settings

With the AMIBIOS Setup program, you can modify BIOS settings and control the various system features. This chapter describes the basic navigation of the EPC-S101 BIOS setup screens.



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

3.1 Entering Setup

Turn on the computer and check for the patch code. If there is a number assigned to the patch code, it means that the BIOS supports your CPU. If there is no number assigned to the patch code, please contact an Advantech application engineer to obtain an up-to-date patch code file. This will ensure that your CPU's system status is valid. After ensuring that you have a number assigned to the patch code, press and you will immediately be allowed to enter Setup.

3.1.1 Main Setup

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



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.

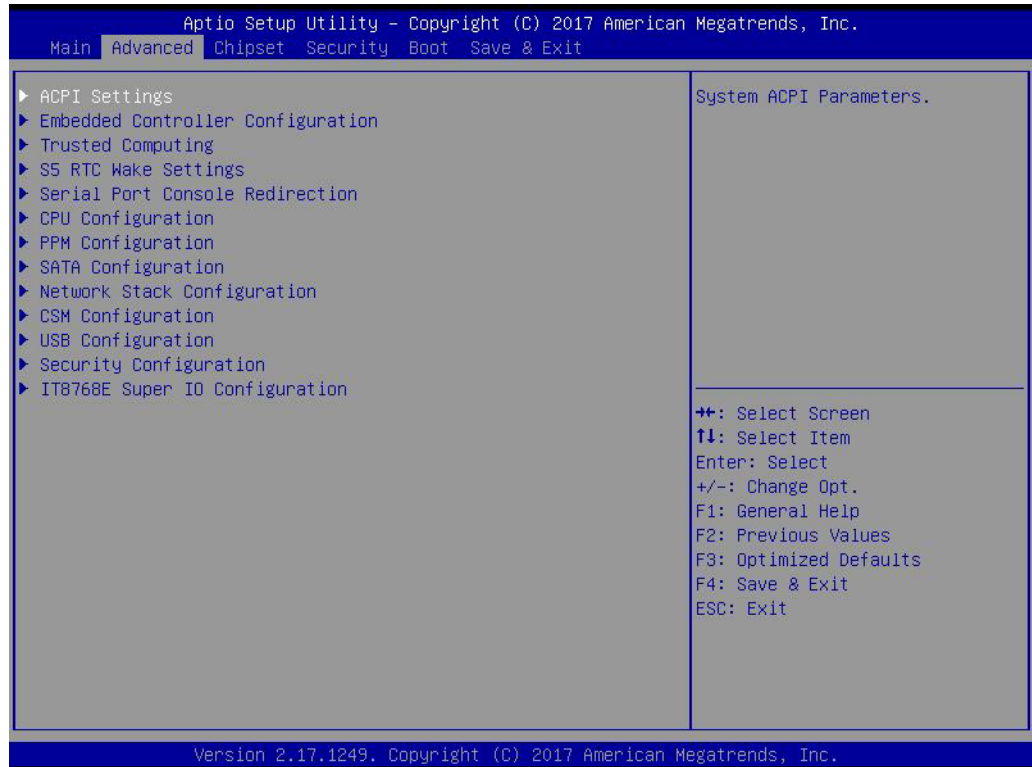
■ System time / System date

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.

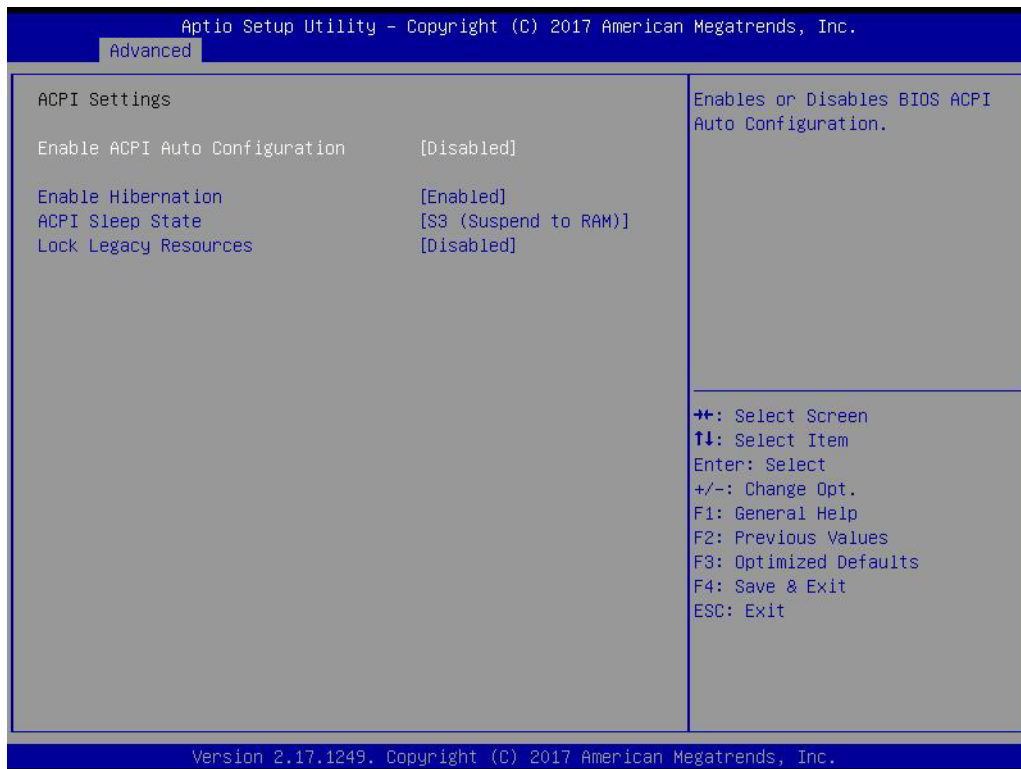
Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time must be entered in HH:MM:SS format.

3.1.2 Advanced BIOS Features Setup

Select the Advanced tab from the EPC-S101 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 screen is shown below. The sub menus are described on the following pages.

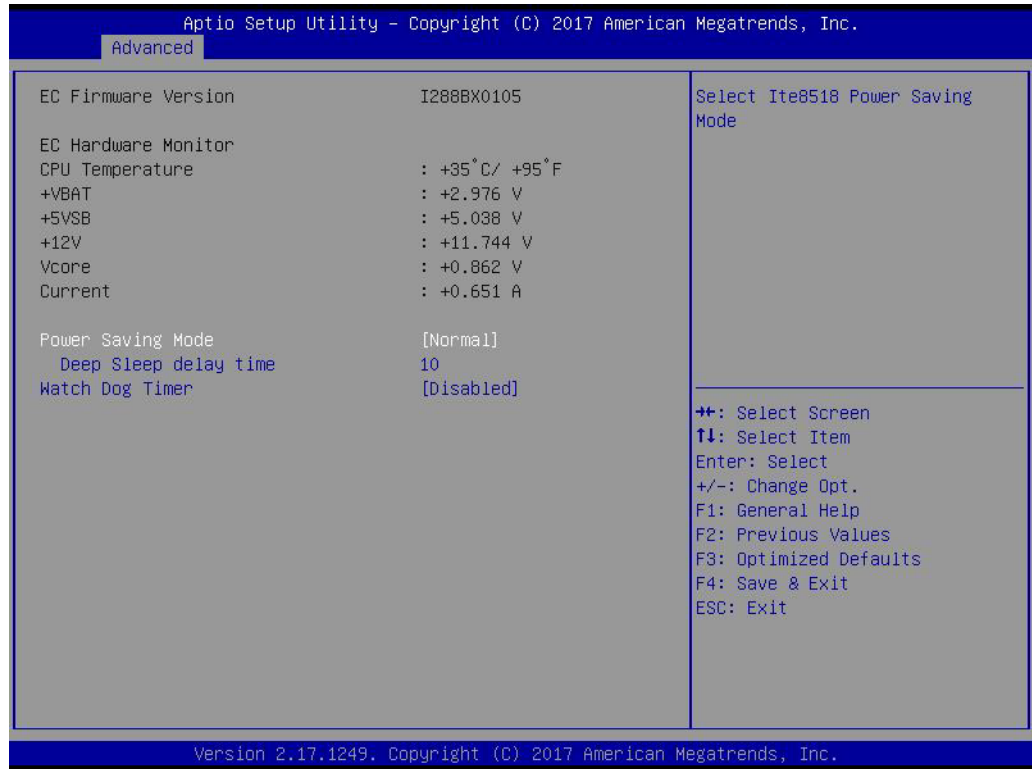


3.1.2.1 ACPI Settings



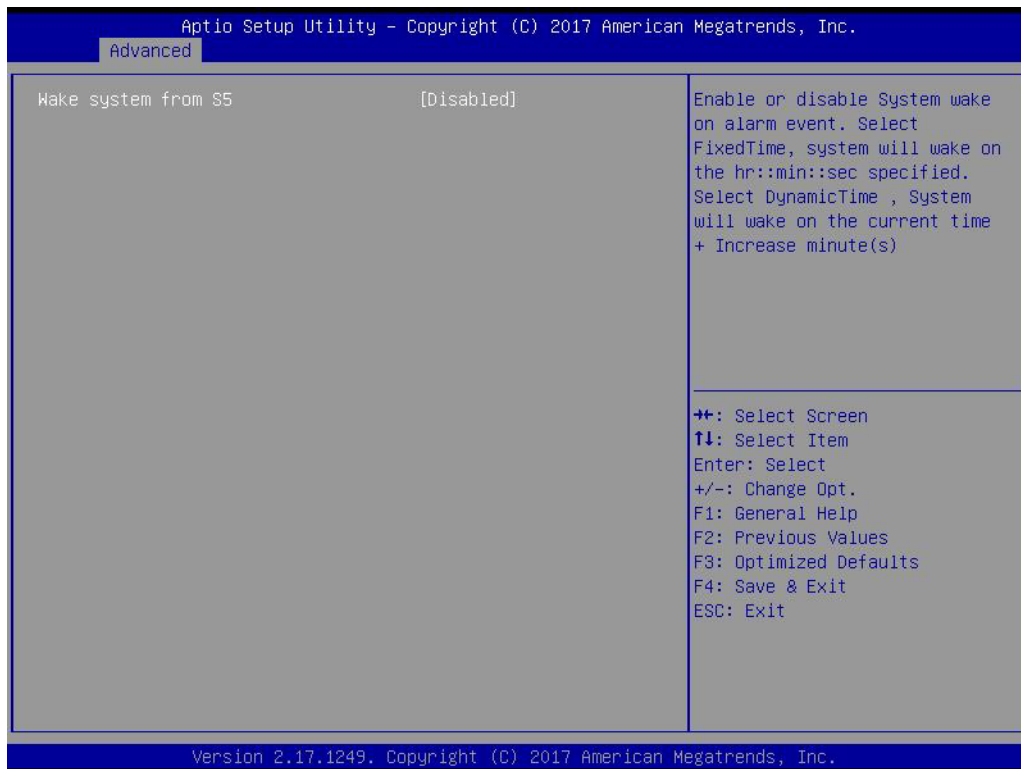
- **Enable ACPI Auto Configuration**
Enable or disable BIOS ACPI auto configuration.
- **Enable Hibernation**
Enable or disable System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS.
- **ACPI Sleep State**
Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.
- **Lock Legacy Resources**
Enable or disable Lock of Legacy Resources

3.1.2.2 Embedded Controller Configuration



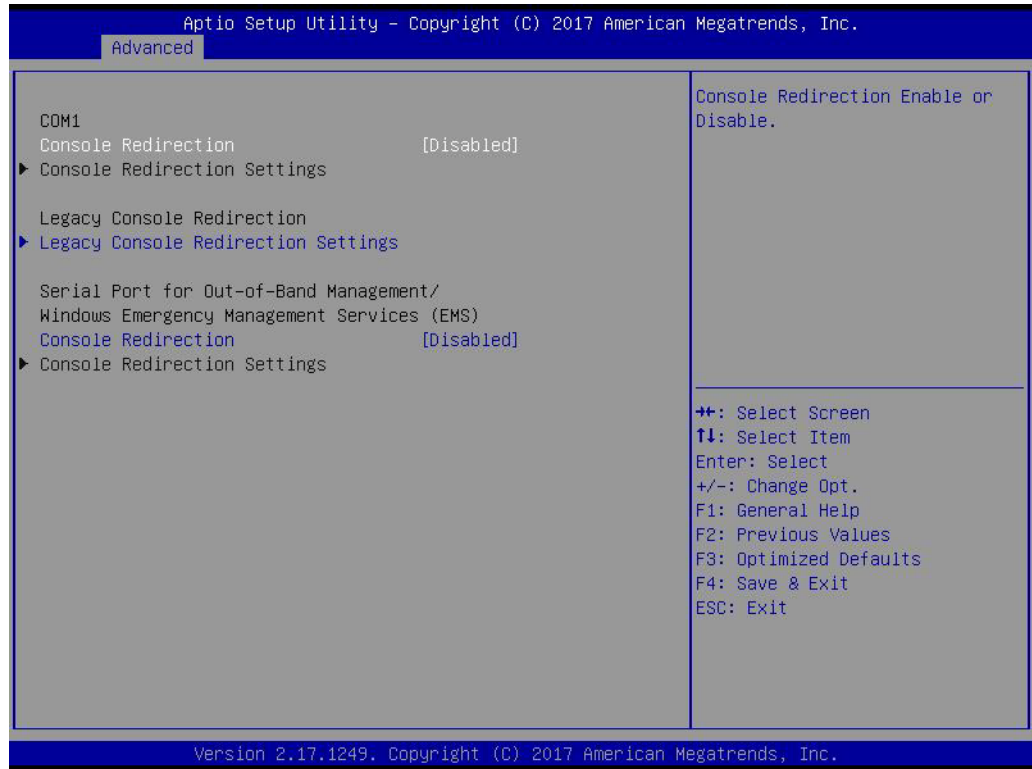
- **EC Hardware Monitor**
This page displays all information about system Temperature/Voltage/Current.
- **Power Saving Mode**
This item allows users to set board's power saving mode when off.
- **Watch Dog Timer**
This item allows users to select EC watchdog timer.

3.1.2.3 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.

3.1.2.4 Serial Port Console Redirection



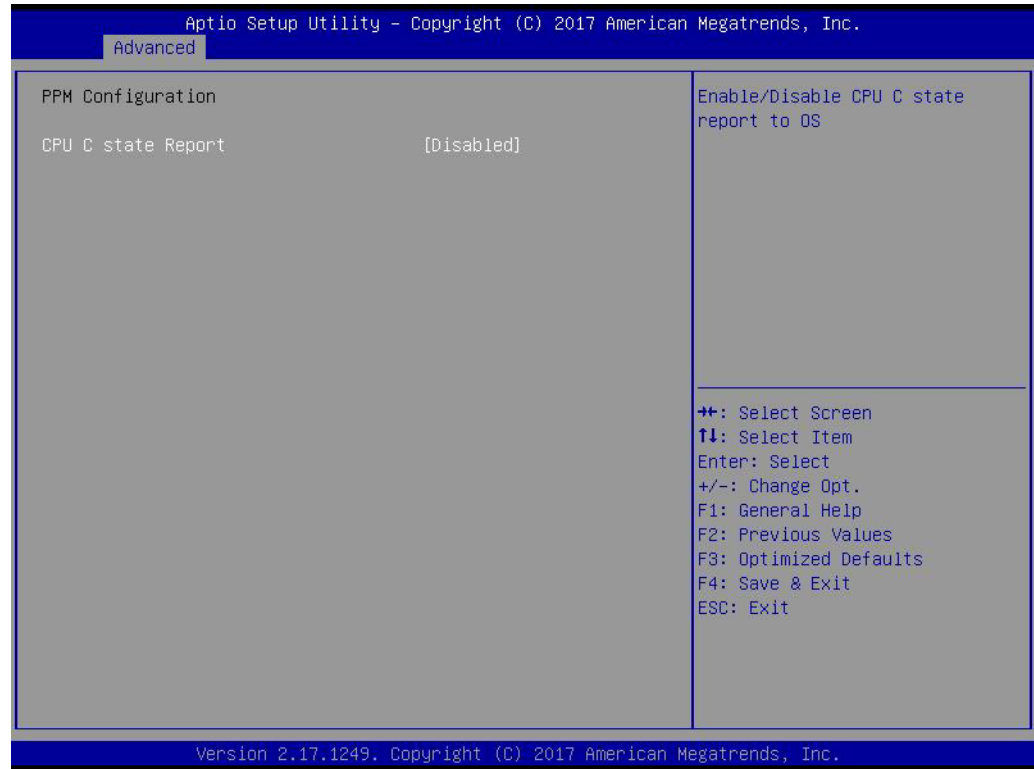
- **Console Redirection**
This item allows users to enable or disable console redirection for Microsoft Windows Emergency Management Services (EMS).
- **Console Redirection**
This item allows users to configuration console redirection detail settings.

3.1.2.5 CPU Configuration



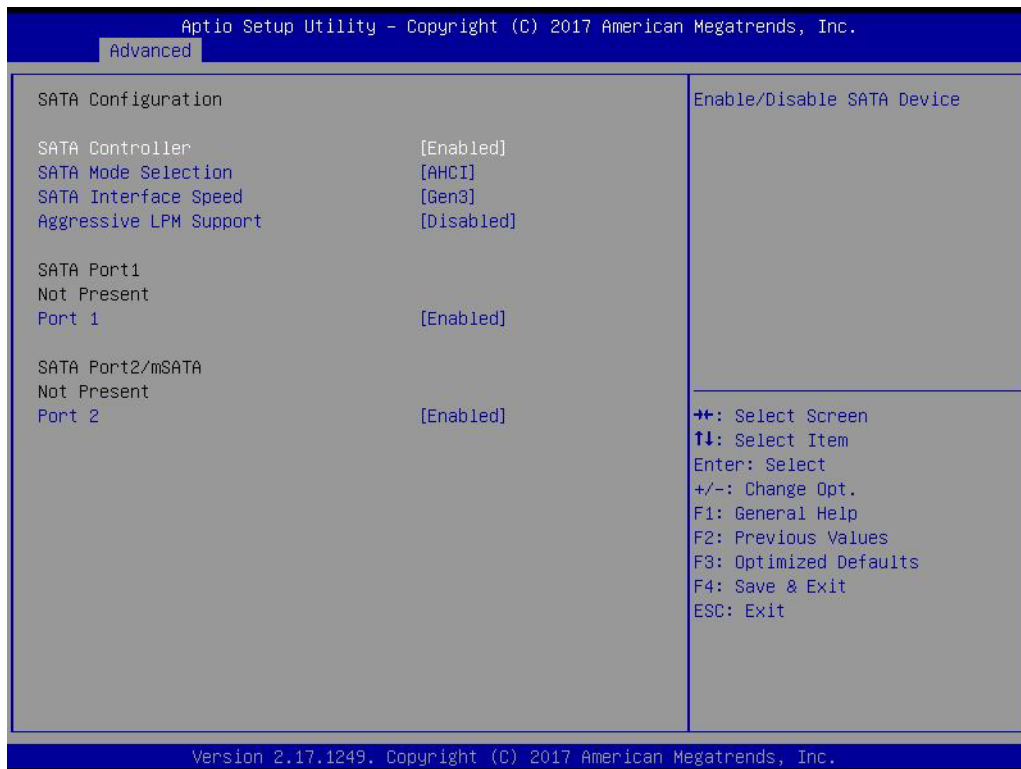
- **Limit CPUID Maximum**
Disabled for Windows XP.
- **Intel Virtualization Technology**
When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
- **Power Technology**
Enables power management features.

3.1.2.6 PPM Configuration



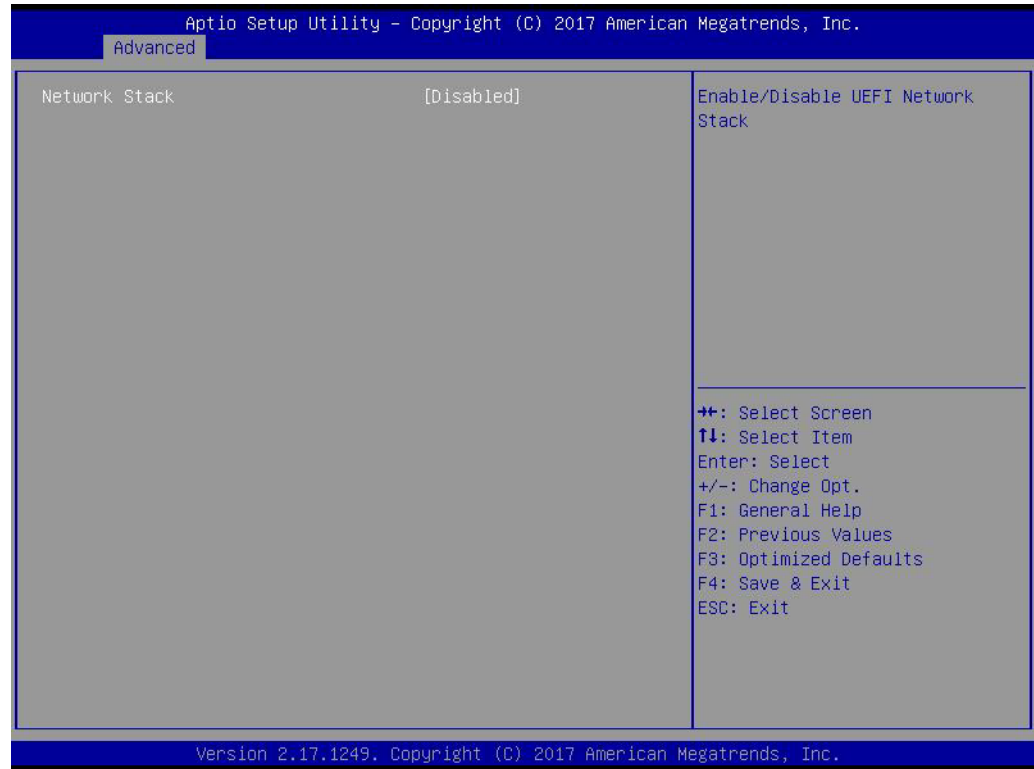
- **CPU C state Report**
Enable/Disable CPU C state report to OS.
- **Max CPU C-state**
This option controls Max C state that the processor will support.

3.1.2.7 SATA Configuration



- **SATA Controller**
Enable / Disable SATA Device.
- **SATA Mode Selection**
Determine how SATA controller operate.
- **SATA Interface Speed**
SATA Interface Speed Support Gen1, Gen2 or Gen3.
- **Aggressive LPM Support**
Enables PCH to aggressively enter link power state.
- **Port 1 / Port 2**
Enable / disable Serial ATA Port 1 / Port 2.

3.1.2.8 Network Stack Configuration



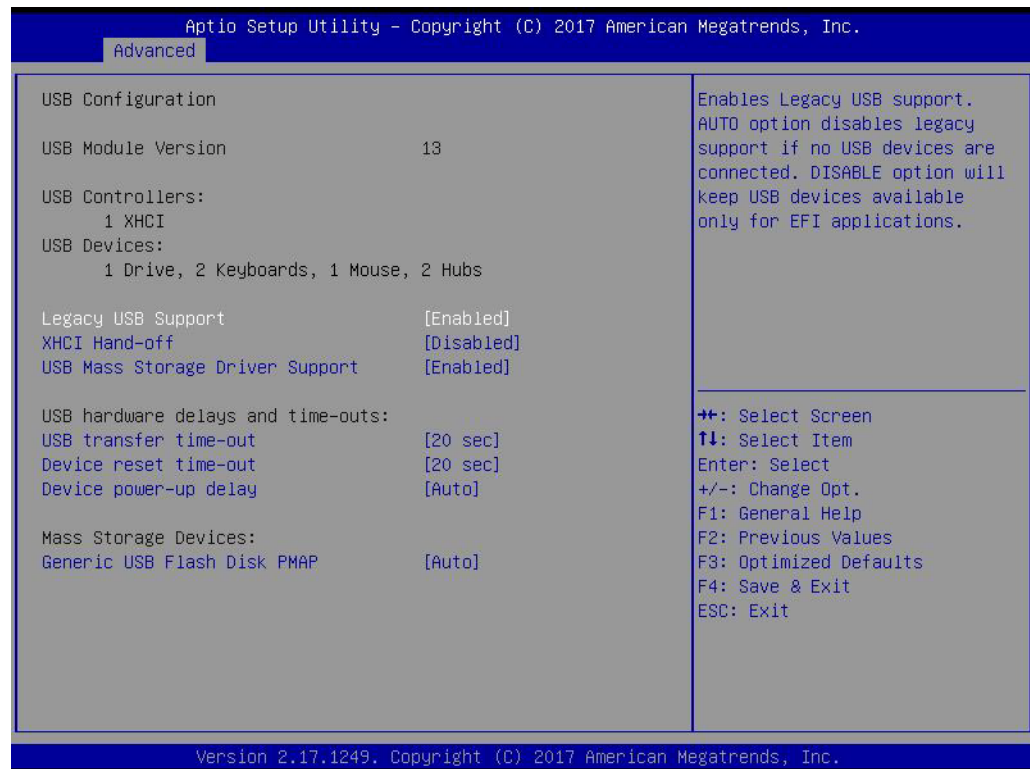
- **Network Stack**
Enable/Disable UEFI Network Stack.

3.1.2.9 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.
- **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.

3.1.2.10 USB Configuration



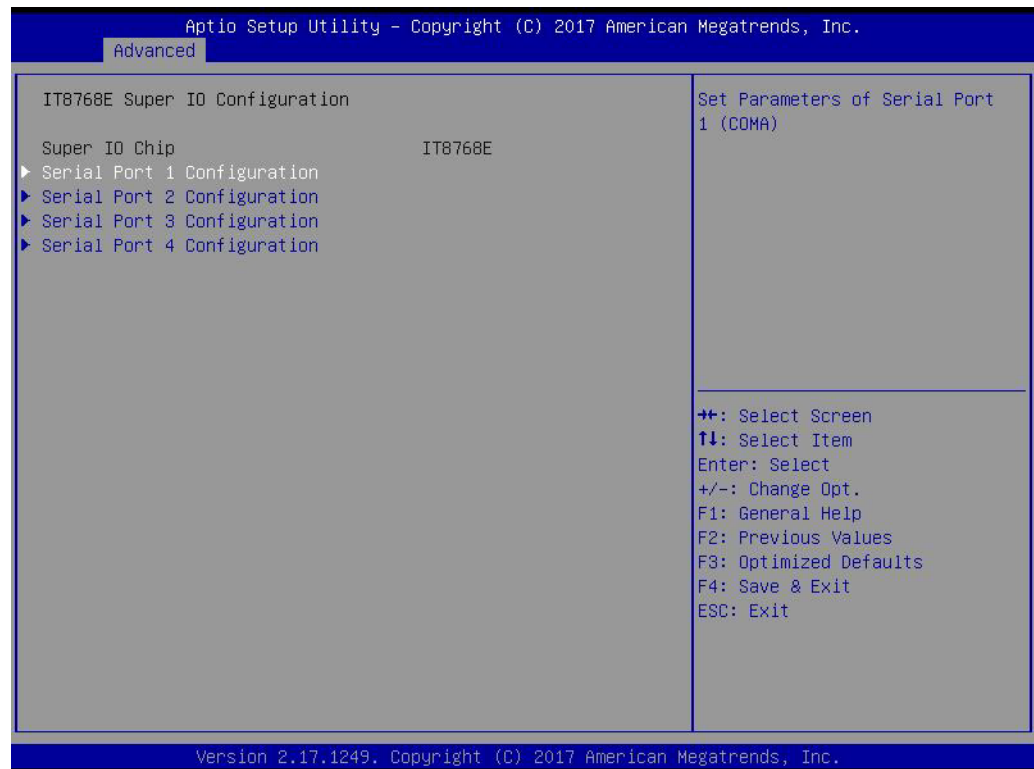
- **Legacy USB Support**
Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
- **XHCI Hand-off**
This is a workaround for OS without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
- **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 a default value: for a Root port it is 100 ms, for a Hub port the delay is taken from Hub descriptor.

3.1.2.11 Security Configuration



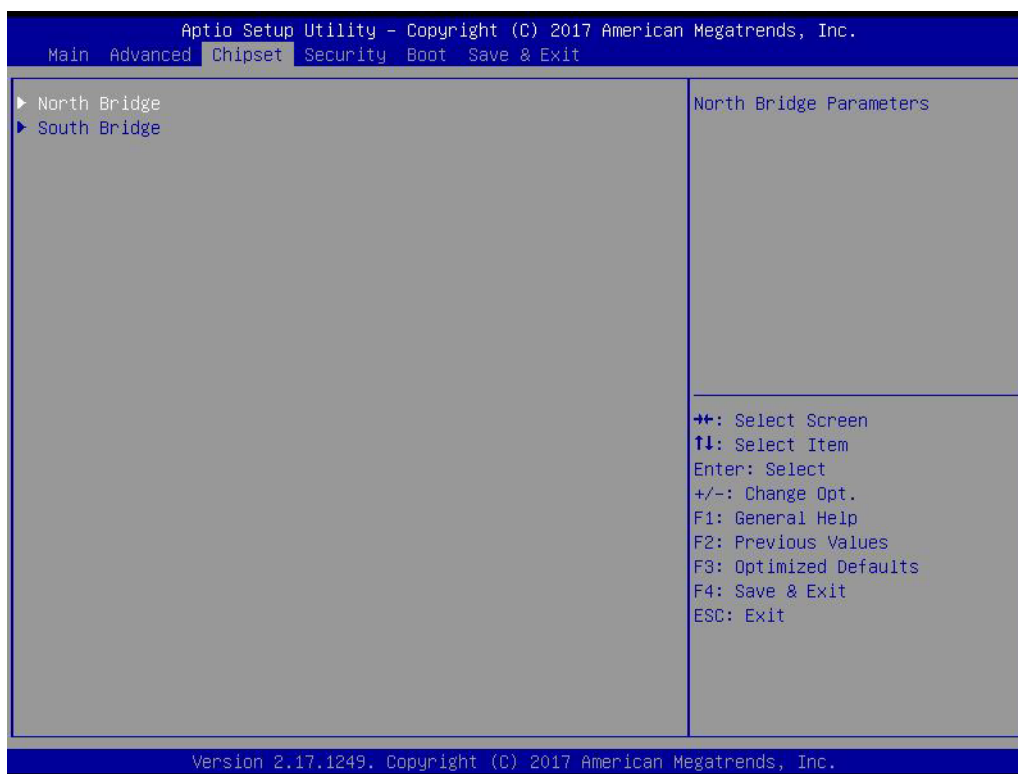
- **TXE HMRFP0 Disable**
Host ME Region Flash Protection Override.

3.1.2.12 IT8768E Super I/O Configuration



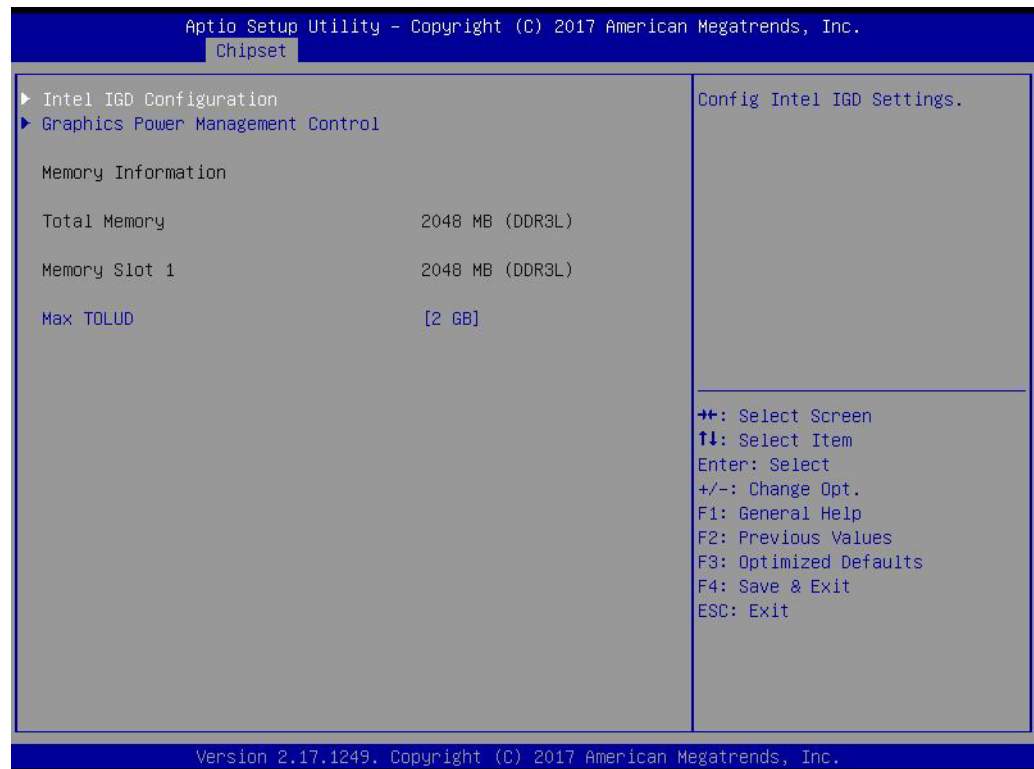
- **Serial Port 1 Configuration**
Set Parameters of Serial Port 1
- **Serial Port 2 Configuration**
Set Parameters of Serial Port 2
- **Serial Port 3 Configuration**
Set Parameters of Serial Port 3
- **Serial Port 4 Configuration**
Set Parameters of Serial Port 4

3.1.3 Chipset Configuration



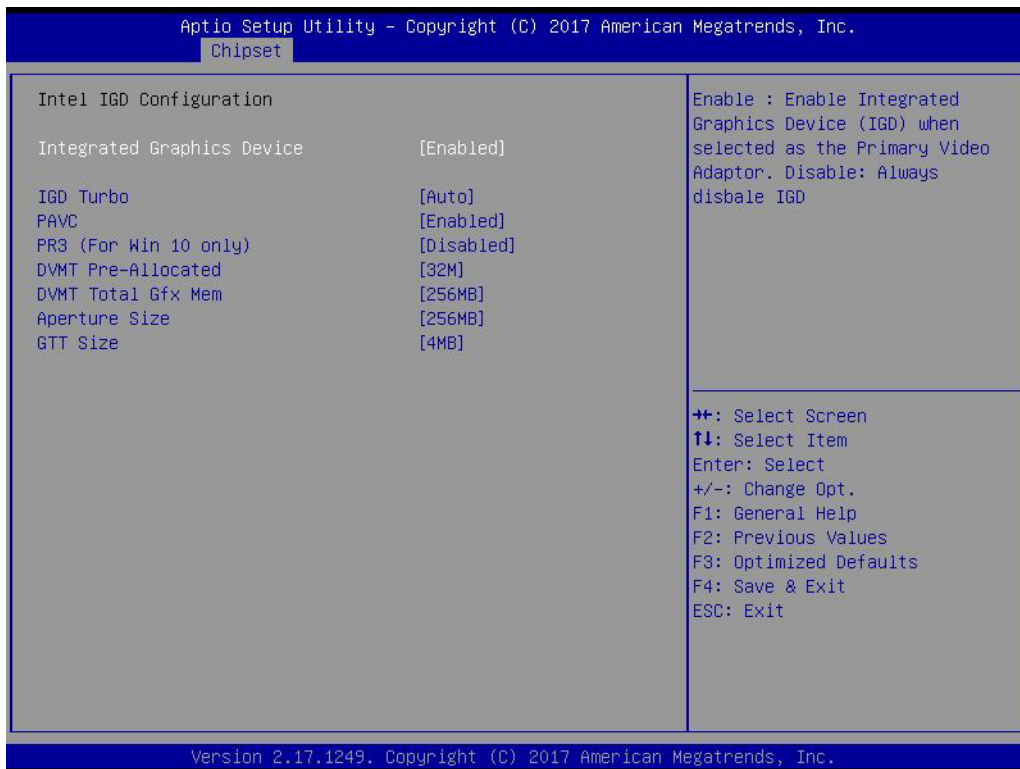
- **North Bridge**
Details for North Bridge items.
- **South Bridge**
Details for South Bridge items.

3.1.3.1 North Bridge



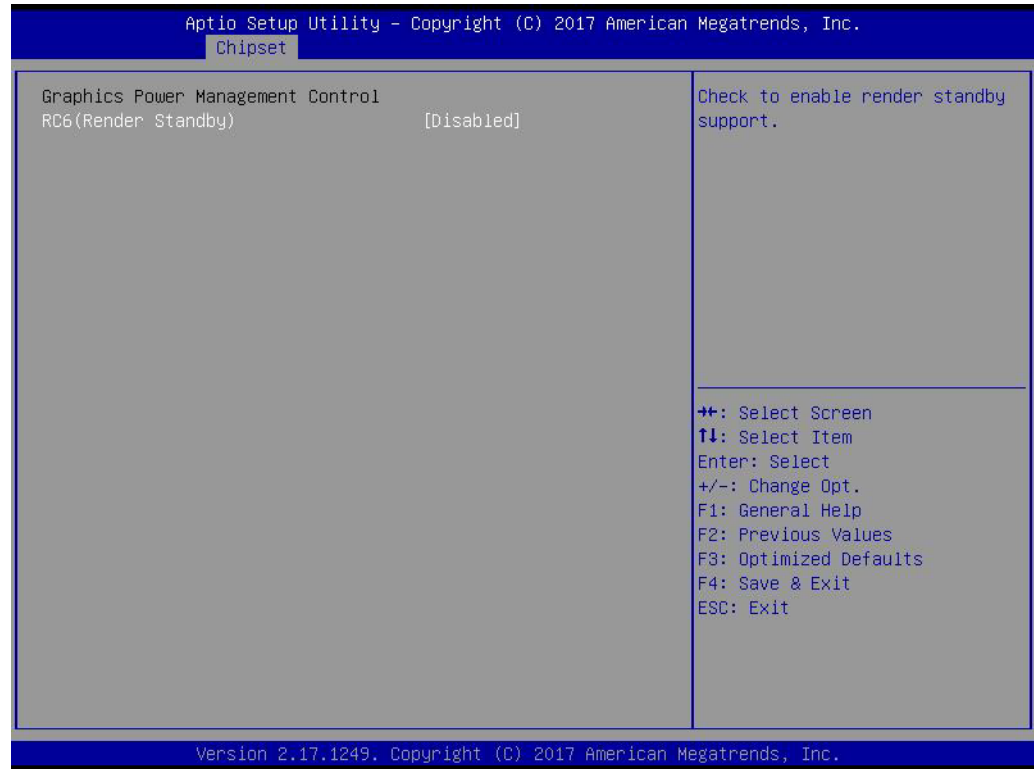
- **Intel IGD Configuration**
Config Intel IGD Settings.
- **Graphics Power Management Control**
Graphics Power Management Control Options.
- **Max TOLUD**
Maximum Value of TOLUD.

3.1.3.2 Intel IGD Configuration



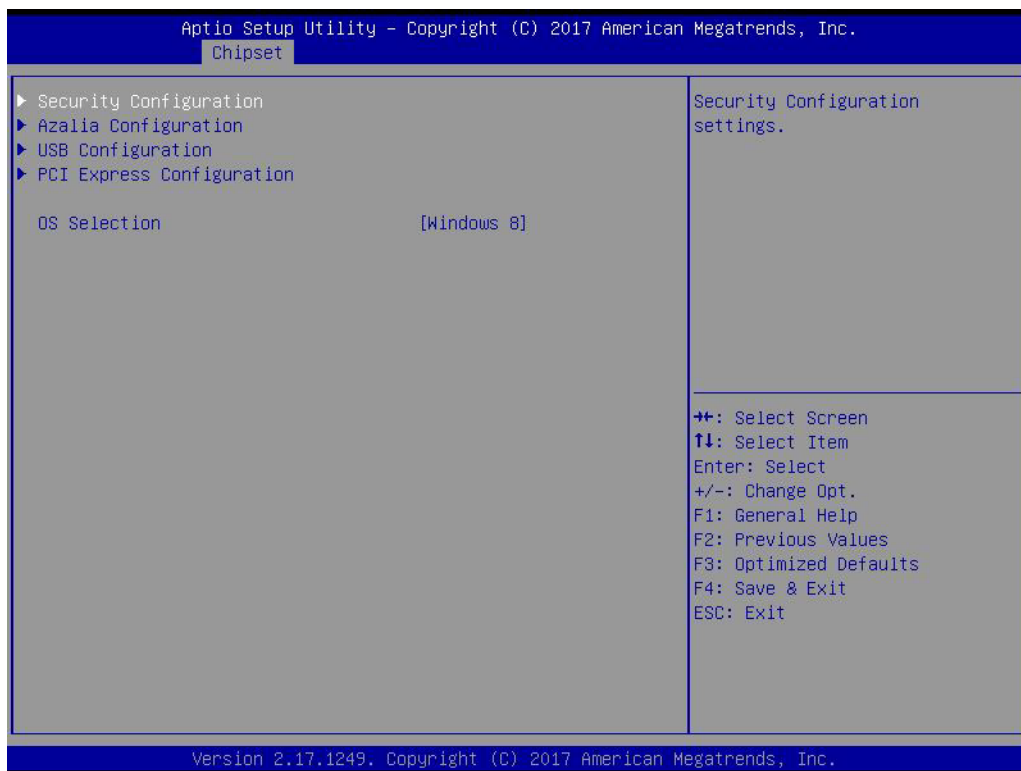
- **Integrated Graphics Device**
Enable: Enable Integrated Graphics Device (IGD) when selected as the Primary Video Adaptor. Disable: Always disable IGD.
- **IGD Turbo**
Select the IGD Turbo feature, if Auto selected, IGD Turbo will only be enabled when SOC stepping is B0 or above.
- **PAVC**
Enable/Disable 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

3.1.3.3 Graphics Power Management Control



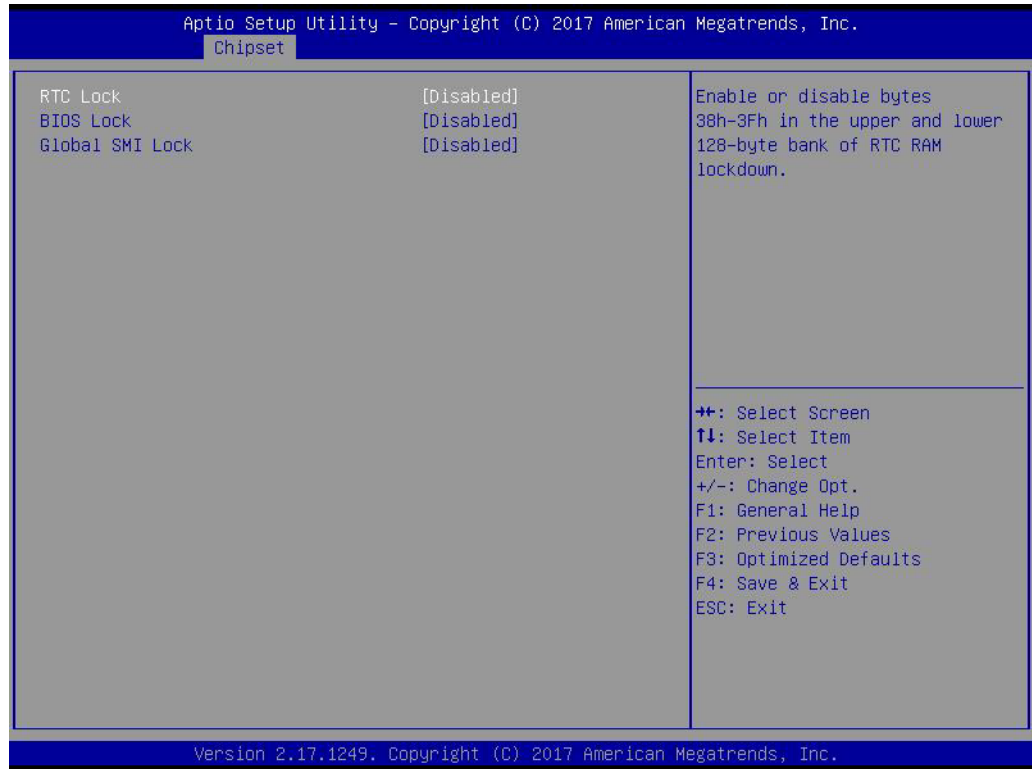
- **RC6 Render Standby)**
Check to enable render standby support.

3.1.3.4 South Bridge



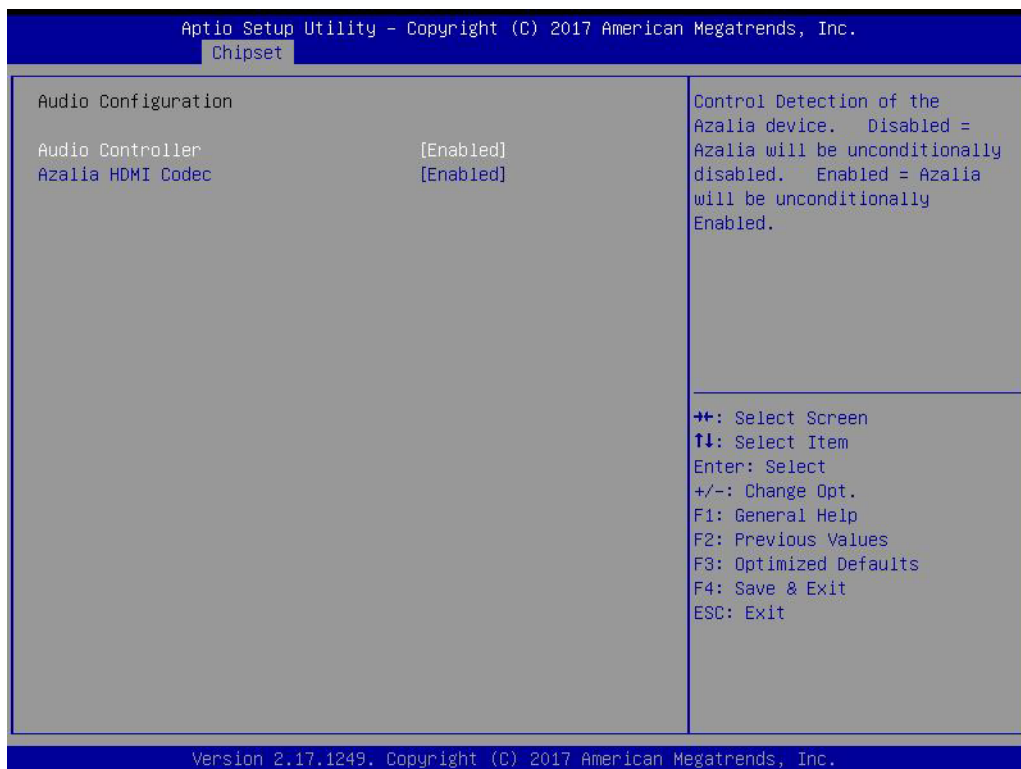
- **Security Configuration**
Security Configuration settings.
- **Azalia Configuration**
Azalia HD Audio Options.
- **USB Configuration**
USB Configuration Settings.
- **PCI Express Configuration**
PCI Express Configuration settings.
- **OS Selection**
Select target OS.
Windows 8: For UEFI OS (Windows 8 and above.).
Windows 7: For Legacy OS.

3.1.3.5 Security Configuration



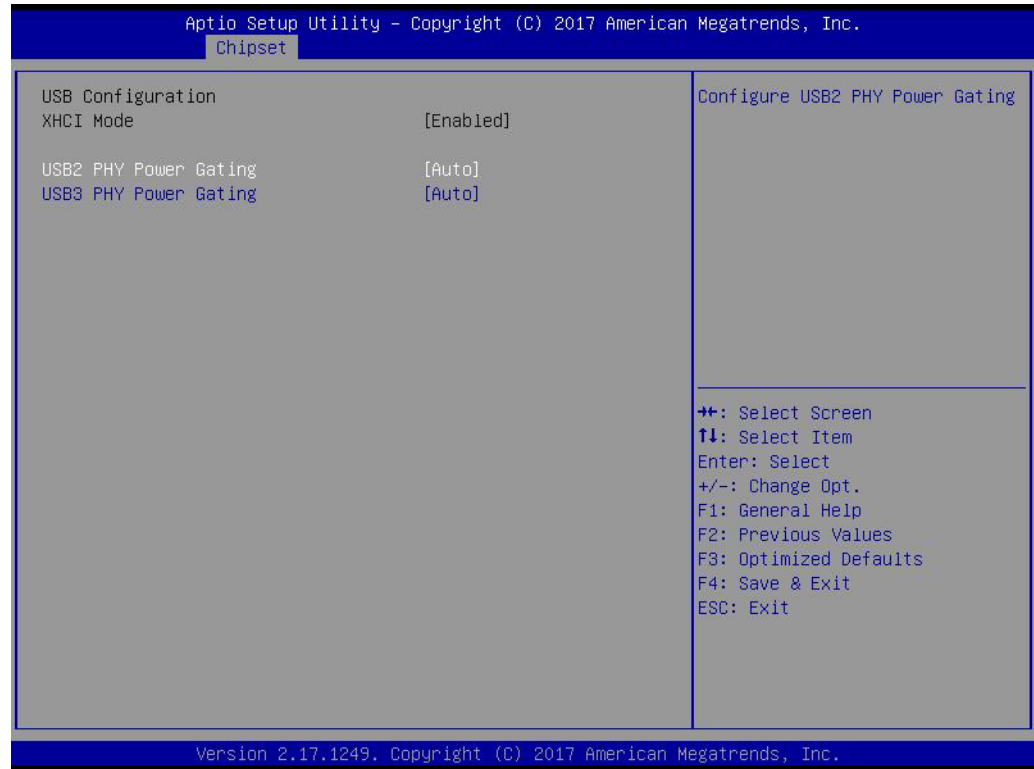
- **RTC Lock**
Enable or disable bytes 38h-3Fh in the upper and lower 128-byte bank of RTC RAM lockdown.
- **BIOS Lock**
Enable/Disable the BIOS Lock Enable feature.
- **Global SMI Lock**
Enable or Disable SMI Lock.

3.1.3.6 Azalia Configuration



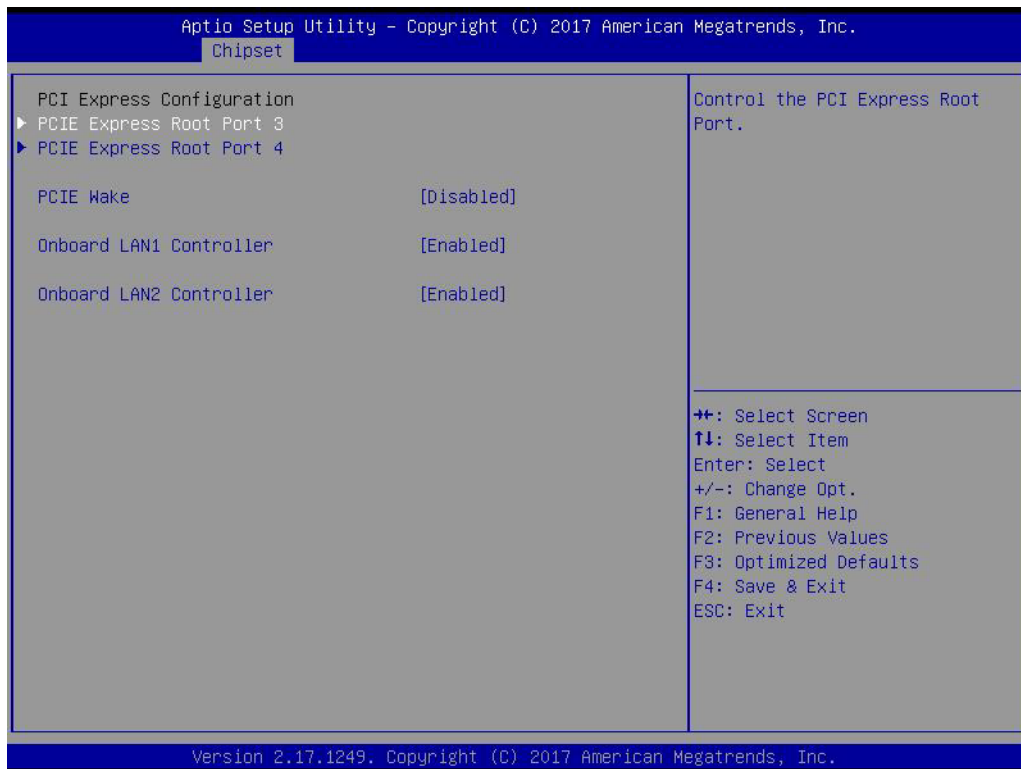
- **Audio Controller**
Control Detection of the Azalia device. Disabled = Azalia will be unconditionally disabled. Enabled = Azalia will be unconditionally Enabled.
- **Azalia HDMI Codec**
Enable/Disable internal HDMI codec for Azalia

3.1.3.7 USB Configuration



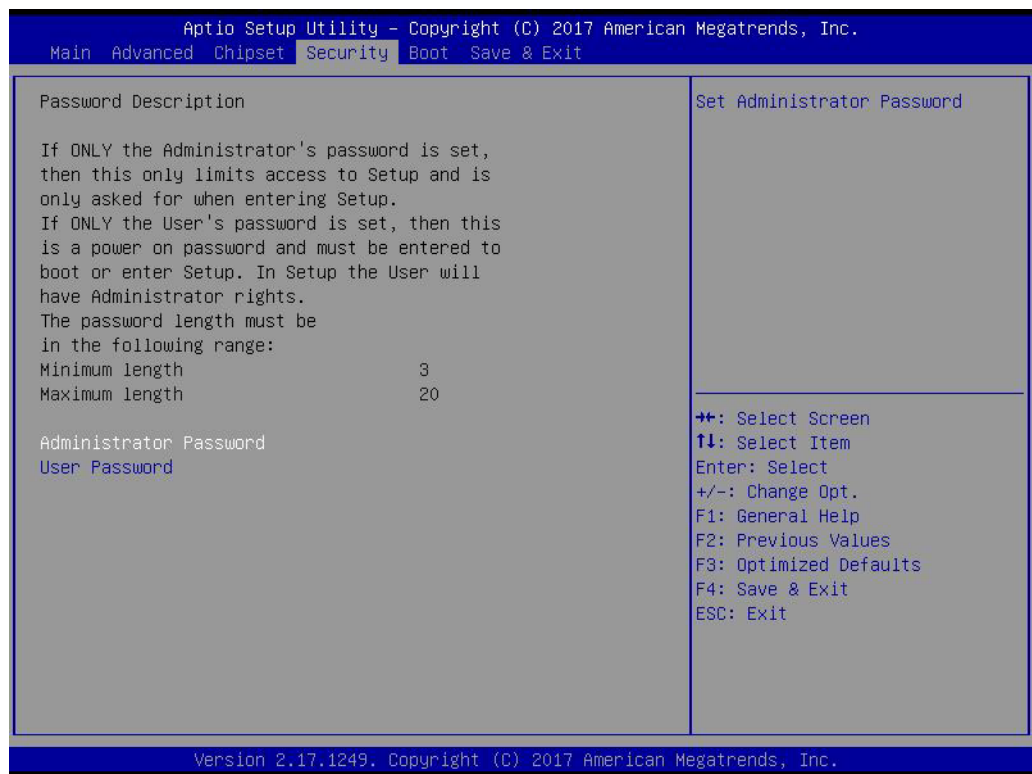
- **USB2 PHY Power Gating**
Configure USB2 PHY Power Gating.
- **USB3 PHY Power Gating**
Configure USB3 PHY Power Gating.

3.1.3.8 PCI Express Configuration



- **PCI Express Port 3 / Port 4**
Control the PCI Express root port.
- **PCI Express Wake**
Enable / disable PCI Express to wake the system from S5.
- **Onboard LAN1/LAN2 Controller**
Select to Enable / Disable onboard LAN1/LAN2 controller.
- **LAN Option ROM**
Enabled / Disabled onboard LAN's PXE option ROM.

3.1.4 Security

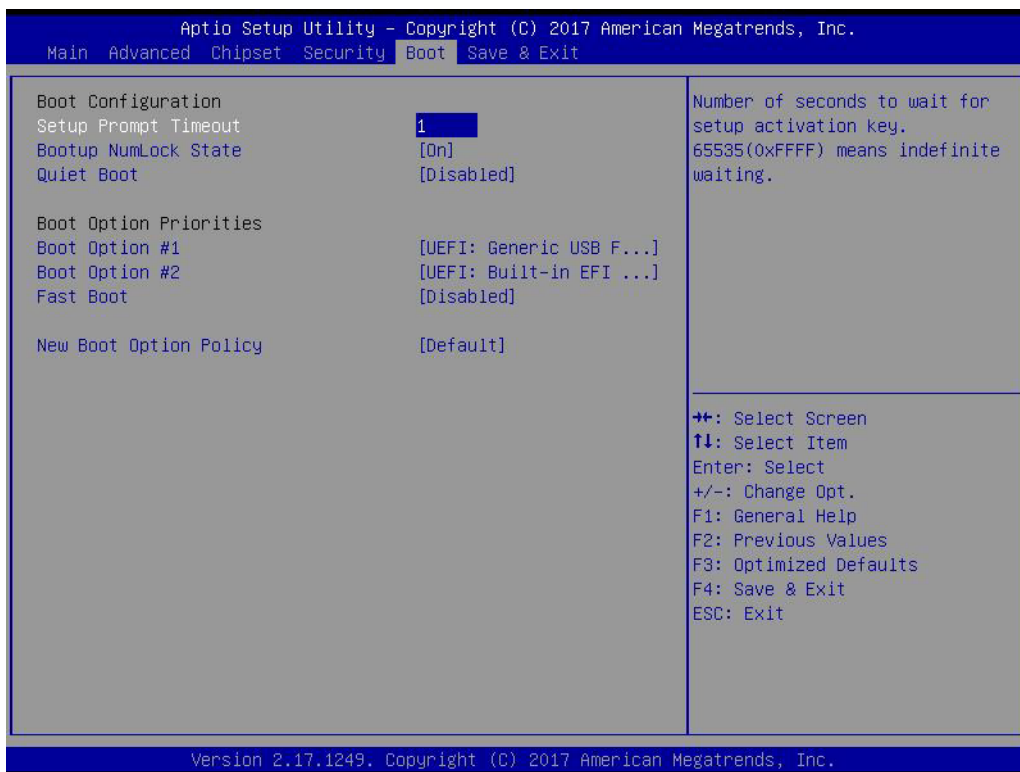


Select Security Setup from the MIO-5251 main BIOS setup menu. All Security Setup options, such as password protection and virus protection are described in this section. To access the sub menu for the following items, select the item and press <Enter>:

- **Change Administrator / User Password**

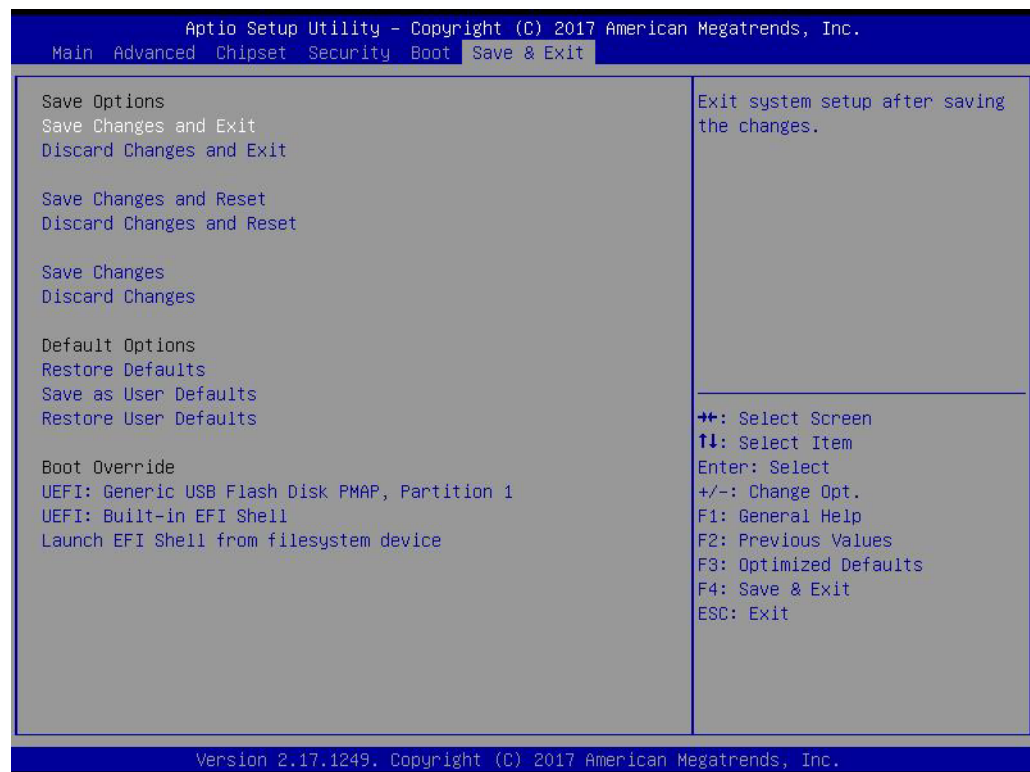
Select this option and press <ENTER> to access the sub menu, and then type in the password.

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.
- **Boot Option #1**
Sets the system boot order.
- **Fast Boot**
Enables or disables Fast Boot with initialization of a minimal set of devices required to launch the active boot option. Has no effect for BBS boot options.
- **New Boot Option Policy**
Controls the placement of newly detected UEFI boot options.

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.

3.1.7 System I/O Ports

Addr. Range (Hex) Device

20 – 2D Interrupt Controller
 2E – 2F Motherboard resources
 30 – 3D Interrupt Controller
 40 – 43 System timer
 4E – 4F Motherboard resources
 50 – 53 System timer
 60 – 67 Motherboard resources
 70 – 7F System CMOS/real time clock
 80 – 92 Motherboard resources
 A0 – AD Interrupt Controller
 B0 – BD Interrupt Controller
 272 – 273 Motherboard resources
 290 – 29F Embedded Controller resources
 2E8 – 2EF COM4
 2F8 – 2FF COM2
 3B0 – 3DF Intel® HD Graphics
 3E8 – 3EF COM3
 3F8 – 3FF COM1
 400 – 47F Motherboard resources
 4D0 – 4D1 Interrupt Controller
 500 – 57F Motherboard resources

3.1.8 1st MB memory map

Addr. Range (Hex) Device

A0000h - BFFFFh Intel® HD Graphics
 A0000h - BFFFFh PCI Bus
 C0000h - DFFFFh PCI Bus
 E0000h - FFFFFh PCI Bus
 90400000 – 905FFFFFF Intel® Trusted Execution Engine Interface
 E0000000 - FEFFFFFF System resources

3.1.9 Interrupt Assignments

Interrupt#	Interrupt source
-------------------	-------------------------

	NMI Parity error detected
--	---------------------------

IRQ0	System timer
------	--------------

IRQ1	Using SERIRQ, keyboard emulation
------	----------------------------------

IRQ2	Slave controller INTR output
------	------------------------------

IRQ3	Communications Port (COM2)
------	----------------------------

IRQ4	Communications Port (COM1)
------	----------------------------

IRQ5	Communications Port (COM3) / iManager WatchDog IRQ
------	--

IRQ6	Available
------	-----------

IRQ7	Communications Port (COM4)
------	----------------------------

IRQ8	Internal RTC or HPET
------	----------------------

IRQ9	Microsoft ACPI-Compliant System
------	---------------------------------

IRQ10	Available
-------	-----------

IRQ11	Available
-------	-----------

IRQ12	Available
-------	-----------

IRQ13	Numeric data processor
-------	------------------------

IRQ14	SATA controller
-------	-----------------

IRQ15	SATA controller
-------	-----------------

Appendix **A**

Appendix A
Programming GPIO

A.1 GPIO Register

GPIO Byte Mapping	H/W Pin Name
BIT0	GPO0
BIT1	GPO1
BIT2	GPO2
BIT3	GPO3
BIT4	GPI0
BIT5	GPI1
BIT6	GPI2
BIT7	GPI3

Note:

For details, please refer to Software API user manual below.

Link:

http://ess-wiki.advantech.com.tw/view/SW_Service/API/SUSI4.0_USER_MANUAL

Appendix **B**

Watchdog Timer

B.1 Programming the Watchdog Timer

Trigger Event	Note
IRQ	(BIOS setting default disable)**
NMI	N/A
SCI	Power button event
Power Off	Support
H/W Restart	Support
External WDT	N/A

** WDT new driver support automatically selects available IRQ.

For details, please refer to Software API User Manual

Link:

http://ess-wiki.advantech.com.tw/view/SW_Service/API/SUSI4.0_USER_MANUAL

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