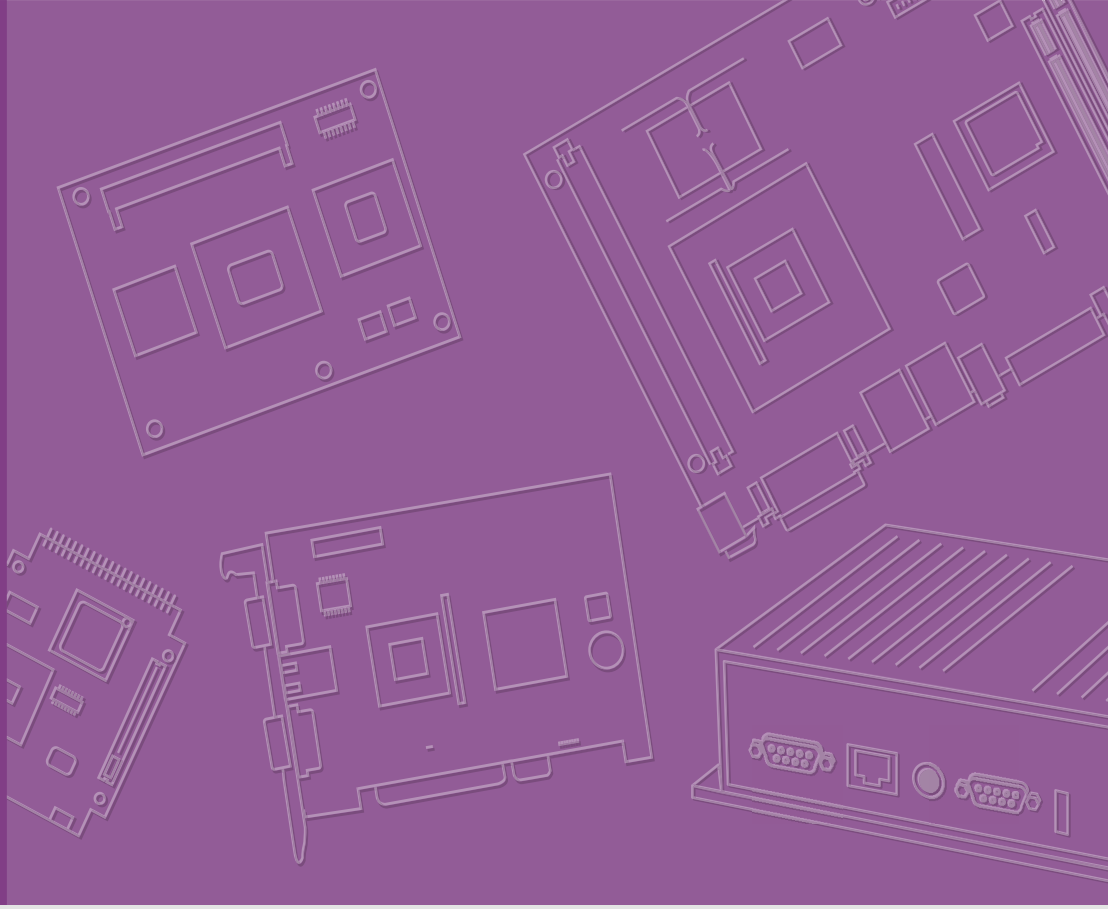


User Manual

SOM-6882

ADVANTECH

Enabling an Intelligent Planet

Copyright

Acknowledgements

Intel and Pentium are trademarks of Intel Corporation.

Microsoft Windows and MS-DOS are registered trademarks of Microsoft Corp.

All other product names or trademarks are properties of their respective owners.

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 merchandize 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.

Part No. 2006688200 Edition 1

Printed in Taiwan January 2020

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.

FM

This equipment has passed the FM certification. According to the National Fire Protection Association, work sites are classified into different classes, divisions and groups, based on hazard considerations. This equipment is compliant with the specifications of Class I, Division 2, Groups A, B, C and D indoor hazards.

Technical Support and Assistance

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

Warnings, Cautions, and Notes

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

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

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

Note! *Notes provide optional additional information.*

Document Feedback

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

Packing List

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

- SOM-6882 CPU module
- 1 x Heatspreader (1960093586N000)

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. DO NOT COVER THE OPENINGS.
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so 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 a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
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 -20° C (-4° F) OR ABOVE 60° C (140° 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.

The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).

DISCLAIMER: This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

Safety Precaution - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

- To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.
- Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.

CONTENTS

Chapter 1

General Information

This chapter gives background information on the SOM-6882 CPU Computer on Module.

Sections include:

- Introduction
- Functional Block Diagram
- Product Specification

1.1 Introduction

SOM-6882 series are equipped with 8th Generation Intel® Core™/ Celeron Product Family designed by 14nm process technology. This product supports DDR4 2400MT/s with 1.2V power design, up to 64GB capacity. SOM-6882 supports higher memory bandwidth, with i7-8665UE SKU upgrade to quad-core. Plus, SOM-6882 is able to support 8 x PCIex1 with Gen3 as well as PCIe x1, x2, x4 configurations through BIOS customization. SOM-6882 supports multiple-displays such as HDMI/Display Ports with 4K2K resolution and dual channel LVDS at 1920x1080 full HD resolution are also available.

Advantech iManager (SUSI4) supports a lot of embedded application requirements such as multi-level watchdog timer, voltage and temperature monitoring, thermal protection and mitigation through processor throttling, LCD backlight on/off and brightness control, embedded storage for customized information etc.

Advantech WISE-PaaS/RMM is provided for remote monitoring and controlling of devices and maintenance over the Internet. All Advantech COM Express modules integrate iManager and WISE-PaaS/DeviceOn as add-on value for customer's applications.

With extreme performance, embedded platform power consumption, and various extensions and I/O interfaces, SOM-6882 is suitable for compute, thermal, and graphic sensitive designs, and demanding I/O applications.

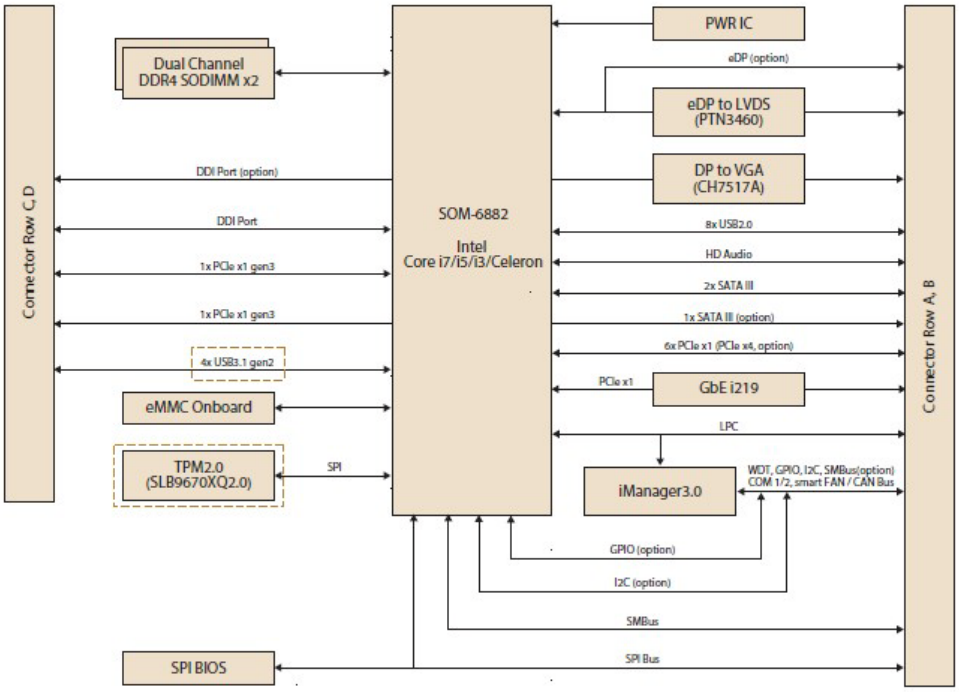
Acronyms

Term	Define
AC'97	Audio CODEC (Coder-Decoder)

ACPI	Advanced Configuration Power Interface – standard to implement power saving modes in PC-AT systems.
BIOS	Basic Input Output System – firmware in PC-AT system that is used to initialize system components before handing control over to the operating system.
CAN	Controller-area network (CAN or CAN-bus) is a vehicle bus standard designed to allow microcontrollers to communicate with each other within a vehicle without a host computer.
DDI	Digital Display Interface – containing Display Port, HDMI/DVI, and SDVO.
EAPI	Embedded Application Programmable Interface. Software interface for COM Express® specific industrial function: ■ System information ■ Watchdog timer ■ I2C Bus ■ Flat Panel brightness control ■ User storage area ■ GPIO
GbE	Gigabit Ethernet
GPIO	General purpose input output
HDA	Intel High Definition Audio (HD Audio) refers to the specification released by Intel in 2004 for delivering high definition audio that is capable of playing back more channels at higher quality than AC'97.
I2C	Inter Integrated Circuit – 2 wire (clock and data) signaling scheme allowing communication between integrated circuit, primarily used to read and load register values.
ME	Management Engine
PC-AT	"Personal Computer – Advanced Technology" – an IBM trademark term used to refer to Intel based personal computer in 1990s.
PEG	PCI Express Graphics
RTC	Real Time Clock – battery backed circuit in PC-AT systems that keeps system time and date as well as certain system setup parameters.
SPD	Serial Presence Detect – refers to serial EEPROM on DRAMs that has DRAM Module configuration information.
TPM	Trusted Platform Module, chip to enhance the security features of a computer system.
UEFI	Unified Extensible Firmware Interface
WDT	Watch Dog Timer

1.2 Functional Block Diagram

Block Diagram



1.3 Product Specification

1.3.1 Compliance

- PICMG COM.0 (COM Express) Revision 3.0
- Compact Size – 95 x 95mm
- Pin-out Type 6 compatible

1.3.2 Feature List

Feature Type	Connector Row	Feature	Type 6 Define		SOM-6882
			Max.	Min.	
Display	A-B	LVDS Channel A (18/24-bit)	1	0	1
	A-B	LVDS Channel B (18/24-bit)	1	0	1
	A-B	eDP (muxed on LVDS Channel A)	1	0	1
	A-B	VGA	1	0	1
Expansion	A-B	PCI Express x1	6	1	6
	A-B	LPC	1	1	1
Serial	A-B	SMBus	1	1	1
	A-B	I2C Bus	1	1	1
	A-B	Serial Port	2	0	2
	A-B	CAN Bus (muxed on SER1)	1	0	1

	A-B	LAN Port 0 (Gigabit Ethernet)	1	1	1
	A-B	SATA	4	1	3
	A-B	USB2.0	8	4	8
	A-B	USB Client	1	0	0
	A-B	HD Audio	1	0	1
	A-B	SPI Bus	2	1	1
	A-B	General Purpose I/O (GPIO)	8	8	8
	A-B	SDIO (muxed on GPIO)	1	0	0
	A-B	Express Card Support	2	1	2
	A-B	Watchdog Timer Output	1	0	1
	A-B	Speaker Out	1	1	1
I/O	A-B	External BIOS ROM Support	2	0	2
	A-B	Power Button Support	1	1	1
	A-B	Power Good	1	1	1
	A-B	VCC_5V_SBY Contacts	4	4	4
	A-B	Sleep	1	0	1
	A-B	Thermal Protection	1	0	1
	A-B	Lid Input	1	0	1
	A-B	Battery Low Alarm	1	0	1
	A-B	Suspend/Wake Signals	3	0	3
	A-B	Fan PWM / Tachometer	2	0	2
	A-B	Trusted Platform Modules	1	0	1
Display	C-D	Digital Display Interfaces 1 - 3	3	0	3
	C-D	PEG (PCI Express x16)	1	0	0
	C-D	PCI Express x1	2	0	2
I/O	C-D	USB3.0 (Gen2, 10Gbps)	4	0	4
	C-D	Rapid Shutdown	1	0	1

1.3.3 Processor System

CPU	Std. Freq.	Max. Turbo Freq.	Core	Cache (MB)	TDP(W)
i7-8665UE	1.7GHz	4.4GHz	4	8	15
i5-8365UE	1.6GHz	4.1GHz	4	6	15
i3-8145UE	2.2GHz	3.9GHz	2	4	15
Celeron 4305UE	2.0GHz	N/A	2	2	15

*TDP can be configured up to 25W or down to 12.5W.

1.3.4 Graphics / Audio

Gen 9 LP implements a high-performance and low-power HW acceleration for video decoding operations for multiple video codes.

The HW encode is exposed by the graphics driver using the following APIs:

- Intel Media SDK
- MFT (Media Foundation Transform) filters

Gen 9 LP supports full HW accelerated video encoding for AVC/MPEG2/HEVC/VP8/JPEG.

CPU	Graphic Core	Base Freq.	Max Freq.
i7-8665UE	Intel® UHD Graphics 620	300MHz	1.15GHz
i5-8365UE	Intel® UHD Graphics 620	300MHz	1.05GHz
i3-8145UE	Intel® UHD Graphics 620	300MHz	1.00GHz
Celeron 4305UE	Intel® UHD Graphics 610	350MHz	1.20GHz

1.3.5 Expansion Interface

1.3.5.1 PCIe x1

PCI Express x1: Support default 8 ports PCIe x1 compliant to PCIe Gen3 (8.0 GT/s) specification, configurable to PCIe x4 or PCIe x2. Several configurable combinations may need BIOS modifies.

Please contact to Advantech sales or FAE for more detail.

Type 6		Row A,B						Row C,D	
		P0	P1	P2	P3	P4	P5	P6	P7
Default	Config.	X1	X1	X1	X1	X1	X1	X1	X1
Option 1		X1	X1	X2		X1	X1	X2	
Option 2		X2		X2		X2		X2	
Option 3		X4				X4			

1.3.5.2 LPC

Support Low Pin Count (LPC) 1.1 specification, without DMA or bus mastering. Allow to connect Super I/O, embedded controller, or TPM. LPC clock is 25MHz.

1.3.6 Serial Bus

1.3.6.1 SMBus

Support SMBus 2.0 specification with Alert pin.

1.3.6.2 I2C Bus

Support I2C bus 8-bit and 10-bit address modes, at both 100KHz and 400KHz.

1.3.7 I/O

1.3.7.1 Gigabit Ethernet

Ethernet: Intel I219LM Gigabit LAN supports 10/100/1000 Mbps Speed.

1.3.7.2 SATA

Support up to 3 ports SATA Gen3 (6.0 Gb/s), backward compliant to SATA Gen2 (3.0 Gb/s) and Gen1 (1.5 Gb/s). Maximum data rate is 600 MB/s. Supports AHCI 1.3 mode.

1.3.7.3 USB3.0 (3.1 Gen2)/USB2.0

COM-Express supports USB3.0, but SOM-6882 supports 4 ports USB3.1 Gen2 (10 Gbps) and 8ports USB2.0 (480 Mbps) which are backward compatible to USB1.x. For USB3.1, supports LPM (U0, U1, U2, and U3) manageability to saving power.

Note! *To meet USB3.1 Gen2 performance, strongly recommend to use the certificated cable.*

1.3.7.4 USB3.1

Type 6	P0	P1	P2	P3
SoC	P0	P1	P2	P3
Type 6	OC_01		OC_23	
SoC USB_OC#	OC_0		OC_2	

1.3.7.5 USB2.0

Type 6	P0	P1	P2	P3
SoC	P0	P1	P2	P3
Type 6	OC_01		OC_23	
SoC USB_OC#	OC_0		OC_2	

1.3.7.6 SPI Bus

Support BIOS flash only. SPI clock can be 50MHz, 33MHz, or 20MHz, capacity up to 16MB.

1.3.7.7 GPIO

8 programmable general purpose Input or output (GPIO).

1.3.7.8 Watchdog

Support multi-level watchdog time-out output.

Provide 1-65535 level, from 100ms to 109.22 minutes interval.

1.3.7.9 Serial port

2 ports, 2-wire serial port (Tx/Rx) support 16550 UART compliance.

- Programmable FIFO or character mode
- 16-byte FIFO buffer on transmitter and receiver in FIFO mode
- Programmable serial-interface characteristics: 5, 6, 7, or 8-bit character
- Even, odd, or no parity bit selectable
- 1, 1.5, or 2 stop bit selectable
- Baud rate up to 115.2K

TPM

Support TPM 2.0 module by default.

Smart Fan

Support 2 Fan PWM control signal and 2 tachometer input for fan speed detection. Provide 1 on module with connector and the other to carrier board follow by PICMG COM Express R3.0 specification.

BIOS

BIOS chip is on module by default. Also allows user to place BIOS chip on carrier board with appropriate design and jumper setting on BIOS_DIS#[1:0].

BIOS_DIS0#	BIOS_DIS#1	Boot up destination/function
Open	Open	Boot from Module's SPI BIOS
Open	GND	SPI_CS0# to Carrier Board, SPI_CS1# to Module
GND	GND	SPI_CS0# to Module, SPI_CS1# to Carrier Board

Note! *If system COMS is cleared, strongly suggest to go BIOS setup menu and load default setting at the first time boot up*

1.3.8 Power Management

1.3.8.1 Power Supply

Supports both ATX and AT power modes. VSB is for suspend power and can be option if not require standby (suspend-to-RAM) support. RTC Battery may be option if keep time/date is not require.

- **VCC:** 8.5V – 20V
- **VSB:** 4.75V – 5.25V (Suspend power)
- **RTC Battery Power:** 2.0V – 3.3V

1.3.8.2 PWROK

Power OK from main power supply. A high value indicates that the power is good. This signal can be used to hold off Module startup to allow Carrier based FPGAs or other configurable devices time to be programmed.

1.3.8.3 Power Sequence

According to PICMG COM Express R3.0 specification.

1.3.8.4 Wake Event

Various wake-up events supporting allow user to apply into different scenario.

- **Wake-on-LAN(WOL):** Wake to S0 from S3/S4/S5
- **USB Wake:** Wake to S0 from S3/S4
- **PCIe Device Wake:** depends on user inquiry and may need customized BIOS
- **LPC Wake:** depends on user inquiry and may need customized BIOS

1.3.8.5 Advantech S5 ECO Mode (Deep Sleep Mode)

Advantech iManager provides additional feature to allow system enter a very low suspend power mode – S5 ECO mode. In this mode, Module will cut all power including suspend and active power into chipset and keep an on-module controller active. Therefore, only an under 50mW power will consume which means user's battery pack can last longer time. While this mode enable in BIOS, system (or module) only allow a power button to boot rather than others such as WOL.

1.3.9 Environment

1.3.9.1 Temperature

Operating: 0 ~ 60° C (32 ~ 140° F), with an active heat sink under 0.7m/s air flow chamber

Storage: -40 ~ 85° C (-40 ~ 185° F)

1.3.9.2 Humidity

Operating: 40° C @ 95% relative humidity, non-condensing

Storage: 60° C @ 95% relative humidity, non-condensing

1.3.9.3 Vibrations

IEC60068-2-64: Random vibration test under operation mode, 3.5Grms.

1.3.9.4 Drop Test (Shock)

Federal Standard 101 Method 5007 test procedure with standard packing.

1.3.9.5 EMC

CE EN55022 Class B and FCC Certifications: validate with standard development boards in Advantech chassis.

1.3.10 MTBF

Please refer Advantech SOM-6882 Series Reliability Prediction Report No: TBD. (Estimated date: 2020 Q1).

1.3.11 OS Support (duplicate with SW chapter)

The mission of Advantech Embedded Software Services is to "Enhance quality of life with Advantech platforms and Microsoft Windows embedded technology." We enable Windows Embedded software products on Advantech platforms to more effectively support the embedded computing community. Customers are freed from the hassle of dealing with multiple vendors (Hardware suppliers, System integrators, Embedded OS distributor) for projects. Our goal is to make Windows Embedded Software solutions easily and widely available to the embedded computing community.

To install the drivers, please connect to internet and browse the website http://support.advantech.com.tw to download the setup file.

1.3.12 Advantech iManager

Support APIs for GPIO, smart fan control, multi-stage watchdog timer and output, temperature sensor, hardware monitor, etc. Follow by PICMG EAPI 1.0 specification that provides backward compatibility.

1.3.13 Power Consumption

Power Consumption Table (Watt.)						
VCC=12V VSB=5V	**Active Power Domain**			**Suspend Power Domain**		**Mechanical off**
Power State	**S0 Max. Load**	**S0 Burn-in**	**S0 Idle**	**S5**	**S5 Deep Sleep**	**RTC (uA)**
SOM-6882C7-S7A1	59.721W	25.493W	4.204W	0.490 W	0.176W	4.82uA

Hardware Configurations:

1. **MB:** SOM-6882C7-S7A1 (PCB: A101-3)
2. **DRAM:** Total 32GB (ADVANTECH 16B 2Rx8 DDR4 2400 SO * 2pcs)
3. **Carrier board:** SOM-DB5830 A101-2

Test Condition:

1. **Test temperature:** room temperature (about 25°C)
2. **Test voltage:** rated voltage DC +12.0V
3. **Test loading:**
   - **Maximum load mode:** Running programs
   - **Idle mode:** DUT power management off and no running any program
4. **OS:** Windows 10 Enterprise

1.3.14 Performance

For reference performance or benchmark data that compare with other module, please refer to “Advantech COM Performance & Power Consumption Table”.

1.3.15 Selection Guide w/ P/N

P/N	CPU	Cores	Freq. (Base/ Turbo)	CPU TDP	LLC	DDR4 SODIMM	Giga LAN	PCIe x1	USB 2.0	USB 3.0	SATA 3.0	LPC	Power	Thermal Solution	Operating Temperature
SOM-6882C7-S7A1	CORE I7-8665UE	4	1.7 / 4.4	15W	8MB	non-ECC	1	8	4	4	2	YES	AT/ ATX	Passive	0 ~ 60 °C
SOM-6882C5-S6A1	CORE I5-8365UE	4	1.6 / 4.1	15W	6MB	non-ECC	1	8	4	4	2	YES	AT/ ATX	Passive	0 ~ 60 °C
SOM-6882C3-U2A1	CORE I3-8145UE	4	2.2 / 3.9	15W	4MB	non-ECC	1	8	4	4	2	YES	AT/ ATX	Passive	0 ~ 60 °C
SOM-6882CR-U0A1	CELERON 4305UE	2	2.0 / N/A	15W	2MB	non-ECC	1	8	4	4	2	YES	AT/ ATX	Passive	0 ~ 60 °C
SOM-6882C7X-S7A1	CORE I7-8665UE	4	1.7 / 4.4	15W	8MB	non-ECC	1	8	4	4	2	YES	AT/ ATX	Passive	-40 ~ 85 °C

1.3.16 Packing list

Part No.	Description	Quantity
-	SOM-6882 COM module	1
1960093586N000	Heatspreader	1

1.3.17 Development Board

Part No.	Description
SOM-DB5830-00A1	COMe R3.0 Devel. Board Type6 Rev. A1

1.3.18 Optional Accessory

Part No.	Description
1960048819N001	Semi-Cooler 95 x 95 x 33.5 mm with 12V Fan

1.3.19 Pin Description

Advantech provides useful checklists for schematic design and layout routing. In schematic checklist, it will specify detail about each pin electrical properties and how to connect for different user scenes. In layout checklist, it will specify the layout constrains and recommendations for trace length, impedance, and other necessary information during design.

Please contact your nearest Advantech branch office or call for getting the design documents and further advance supports.

Chapter 2

Mechanical Information

This chapter gives mechanical information on the SOM-6882 CPU Computer on Module.

Sections include:

- Board Information
- Mechanical Drawing
- Assembly Drawing

2.1 Board Information

The figures below indicate the main chips on SOM-6882 Computer-on-Module.

Please be aware on these positions while designing carrier boards to avoid mechanical issues and thermal solutions for the best thermal dispassion performance.

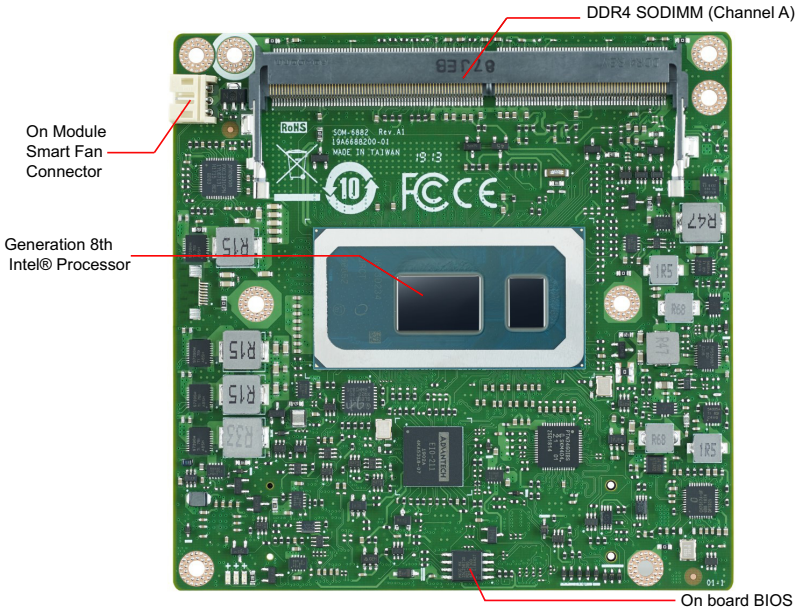


Figure 2.1 Board chips identify – Front

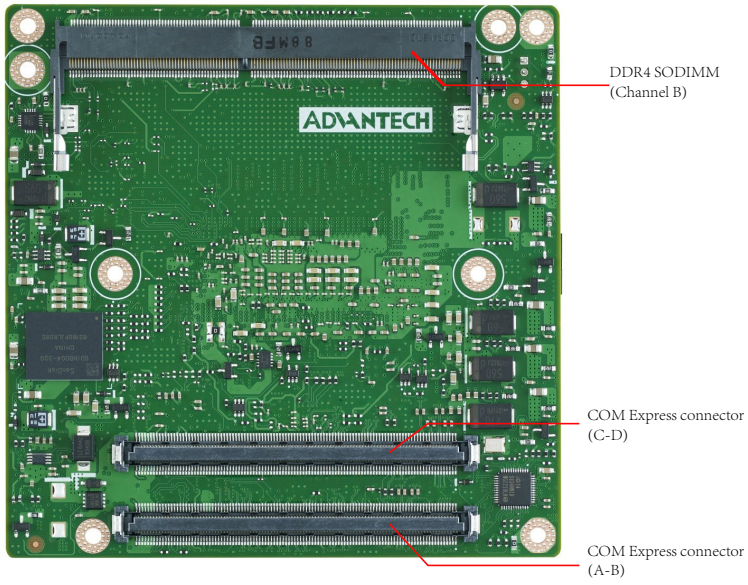
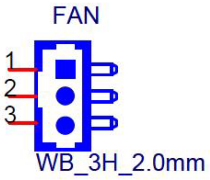


Figure 2.2 Board chips identify – Rear

2.1.1 Connector List

Table 2.1: FAN1 Fan	
FAN1	Fan
Description	Wafer 2.0mm 3P 90D(M)DIP 2001-WR-03-LF W/Lock
Pin	Pin Name
1	Fan Tacho-Input
2	Fan Out
3	GND



2.2 Mechanical Drawing

For more details about 2D/3D models, please look on Advantech's COM support service website http://com.advantech.com.

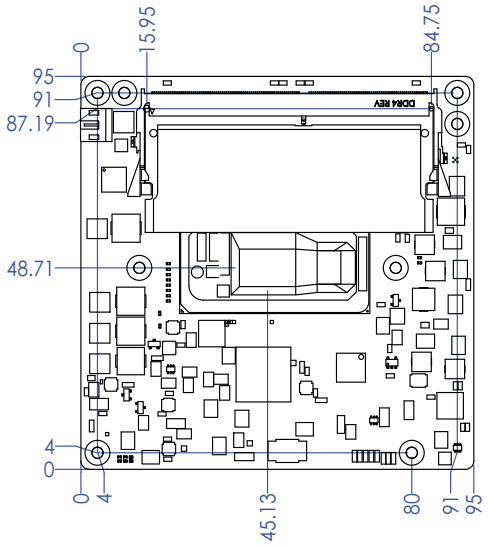


Figure 2.3 Board Mechanical Drawing - Front

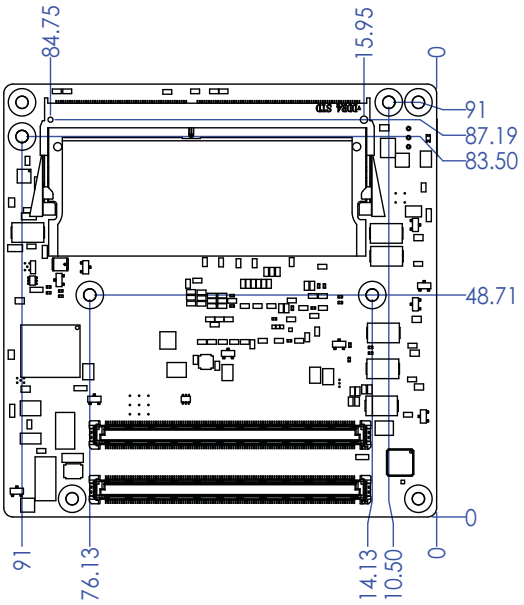


Figure 2.4 Board Mechanical Drawing – Rear

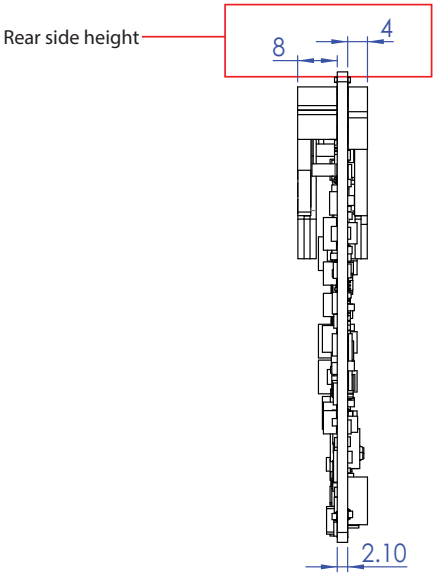


Figure 2.5 Board Mechanical Drawing – Side

2.3 Assembly Drawing

These figures demonstrate the assembly order from thermal module, COM module to carrier board.

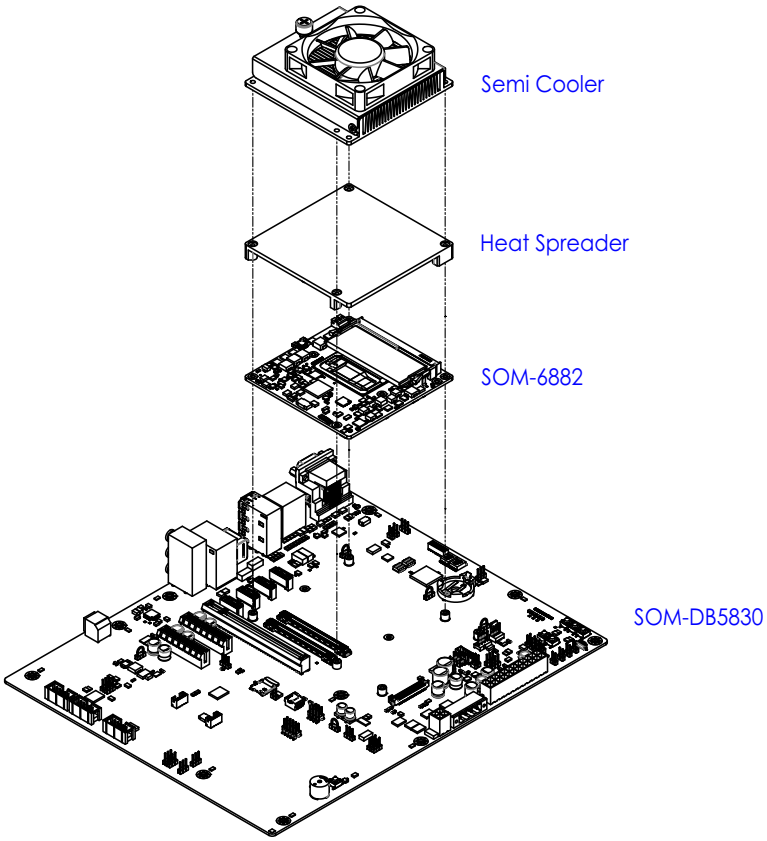


Figure 2.6 Assembly Drawing

There are 4 reserved screw holes for SOM-6882 to be pre-assembled with heat spreader.

Please consider the CPU and chip height tolerance when designing your thermal solution.

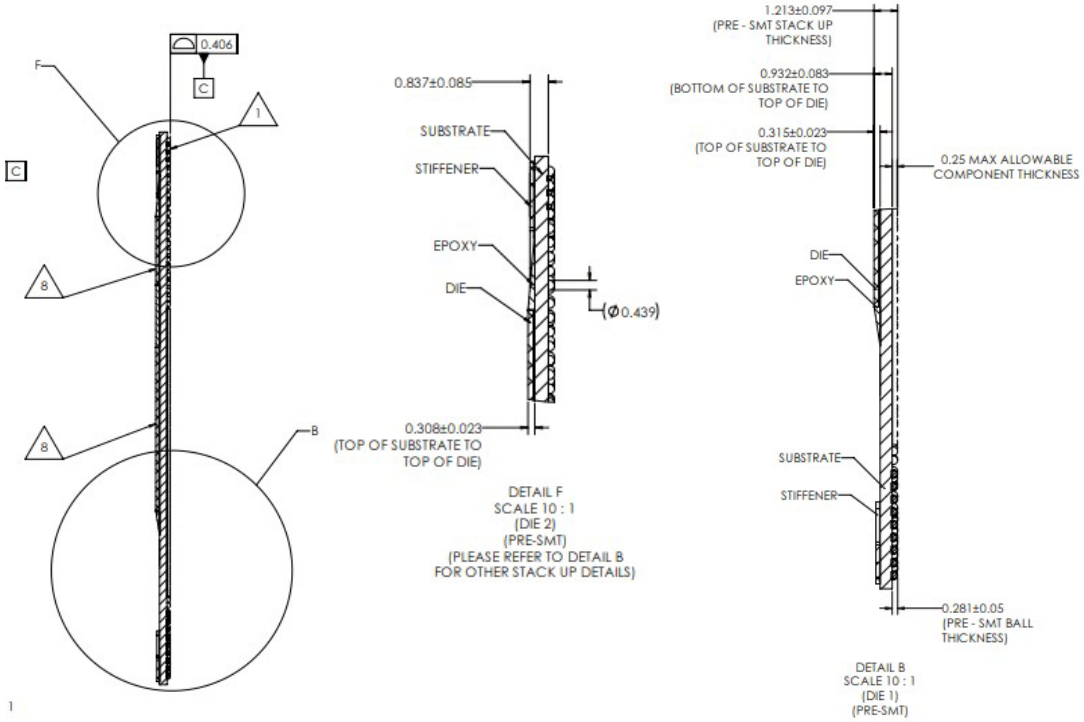


Figure 2.7 WHL-U 4C + GT2 Height and Tolerance

(For all other SKUs please contact Advantech sales or FAE for more details).

Chapter 3

AMI BIOS

This chapter gives BIOS setup information for the SOM-6882 CPU computer-on module.

Sections include:

- Introduction
- Entering Setup
- Hot/Operation Key
- Exit BIOS Setup Utility

3.1 Introduction

With the AMI BIOS Setup Utility, users can modify BIOS settings and control various system features. This chapter describes the basic navigation of the BIOS Setup Utility.

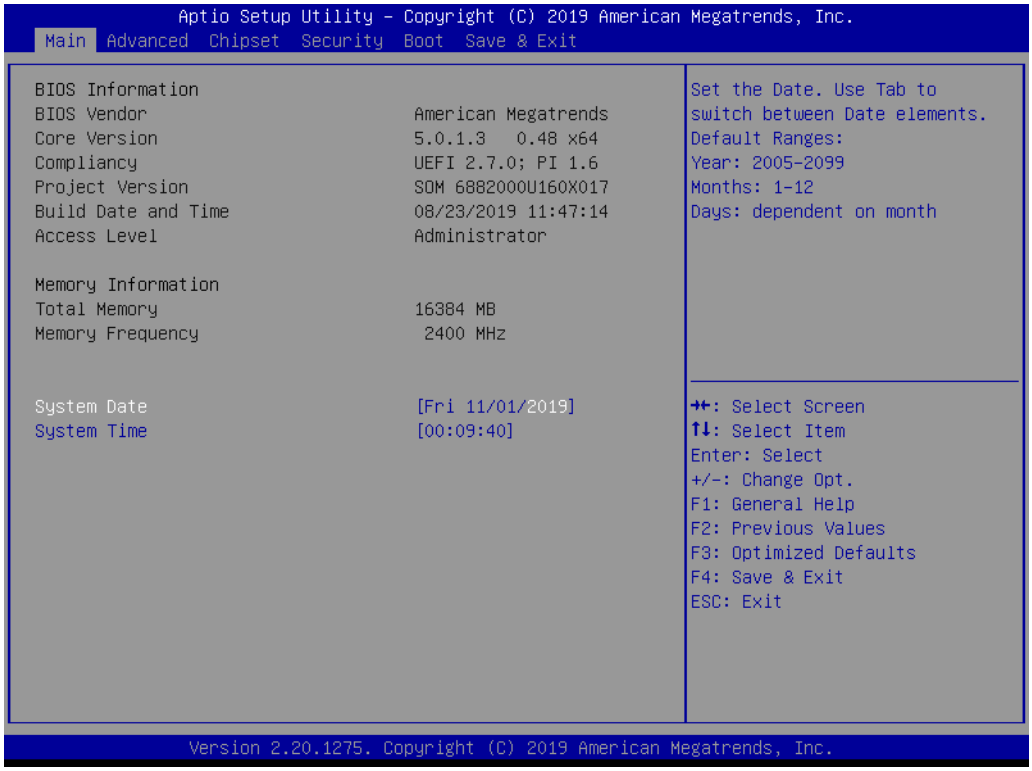


Figure 3.1 Setup program initial screen

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

3.2 Entering Setup

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

3.3 Main Setup

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

Figure 3.2 Main setup screen

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

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

- **System 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.

3.4 Advanced BIOS Features Setup

Select the Advanced tab from the SOM-6882 setup screen to enter the Advanced BIOS Setup screen. Users can select any item in the left frame of the screen, such as CPU Configuration, to go to the sub menu for that item. Users can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screens are shown below. The sub menus are described on the following pages.

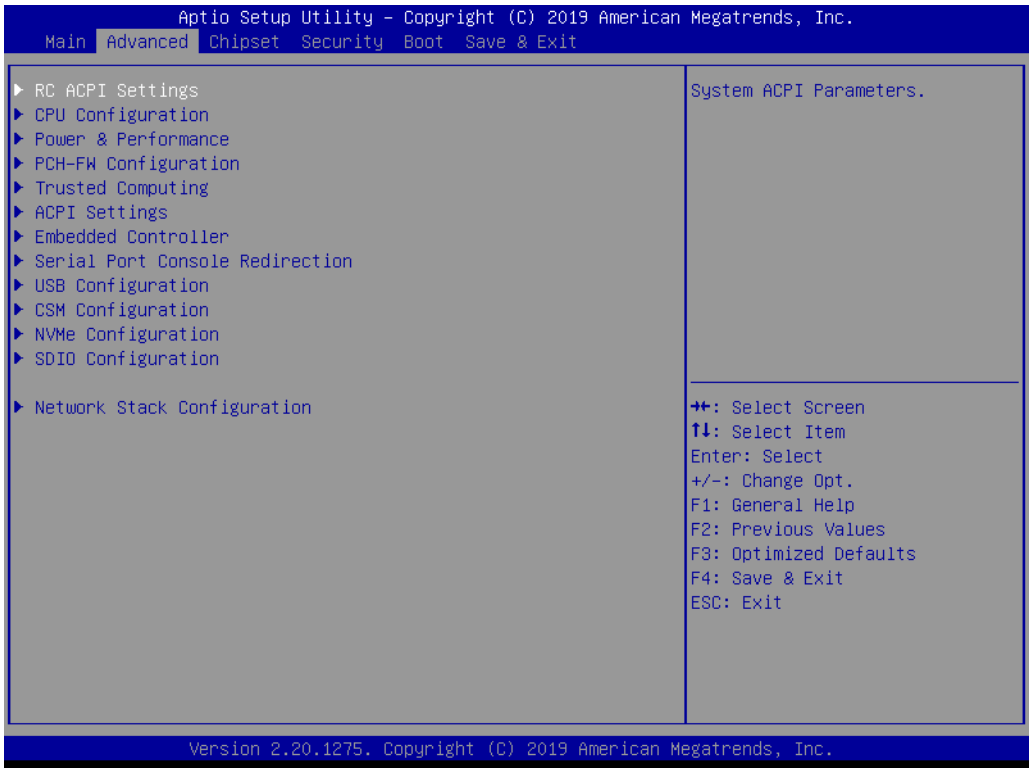


Figure 3.3 Advanced BIOS features setup screen

3.4.1 RC ACPI Settings

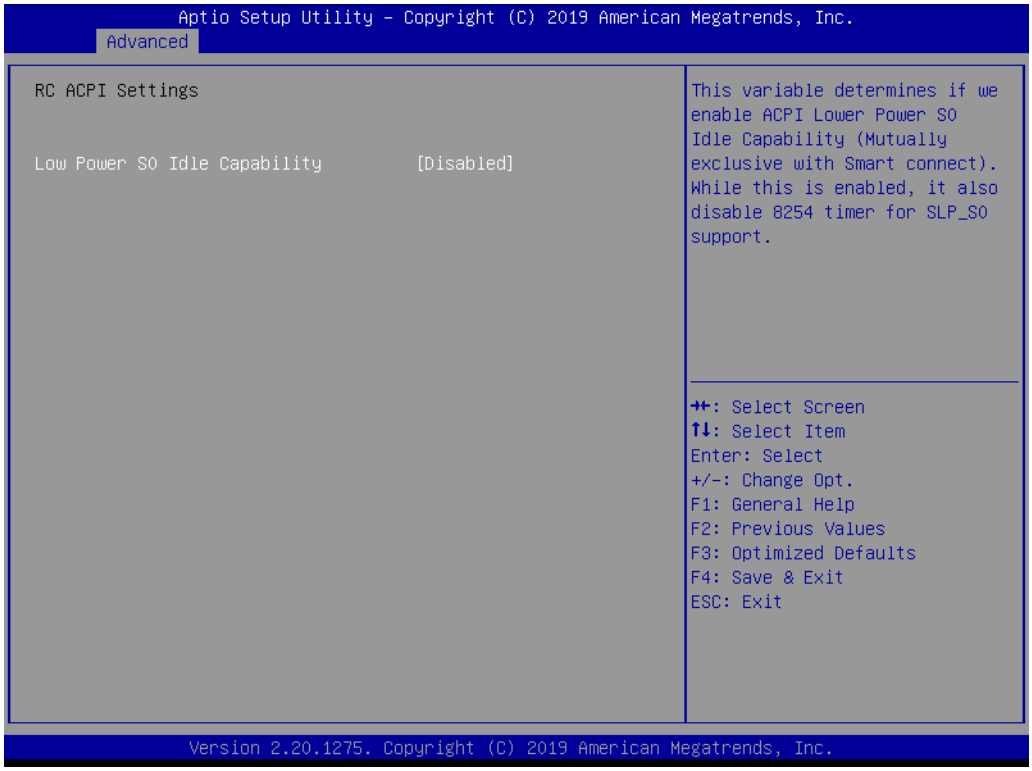


Figure 3.4 RC ACPI Settings

3.4.2 CPU Configuration

Figure 3.5 Figure 3.5 CPU Configuration_1

- **Intel (VMX) Virtualization Technology**
- **Active Processor Core**

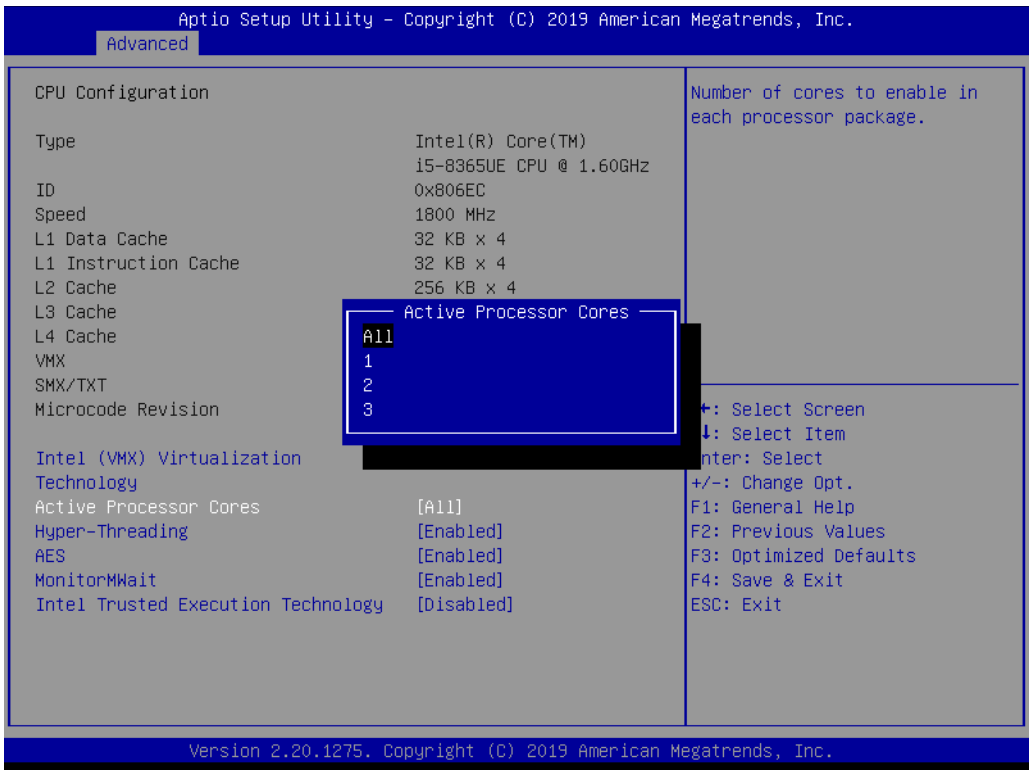


Figure 3.6 Active Processor Core Setting

- **Hyper-Threading**
- **AES**
- **MonitorMWait**
- **Intel Trusted Execution Technology**

3.4.3 Power & Performance

Figure 3.7 Power & Performance

- **CPU- Power Management Control**
- **GT- Power Management Control**

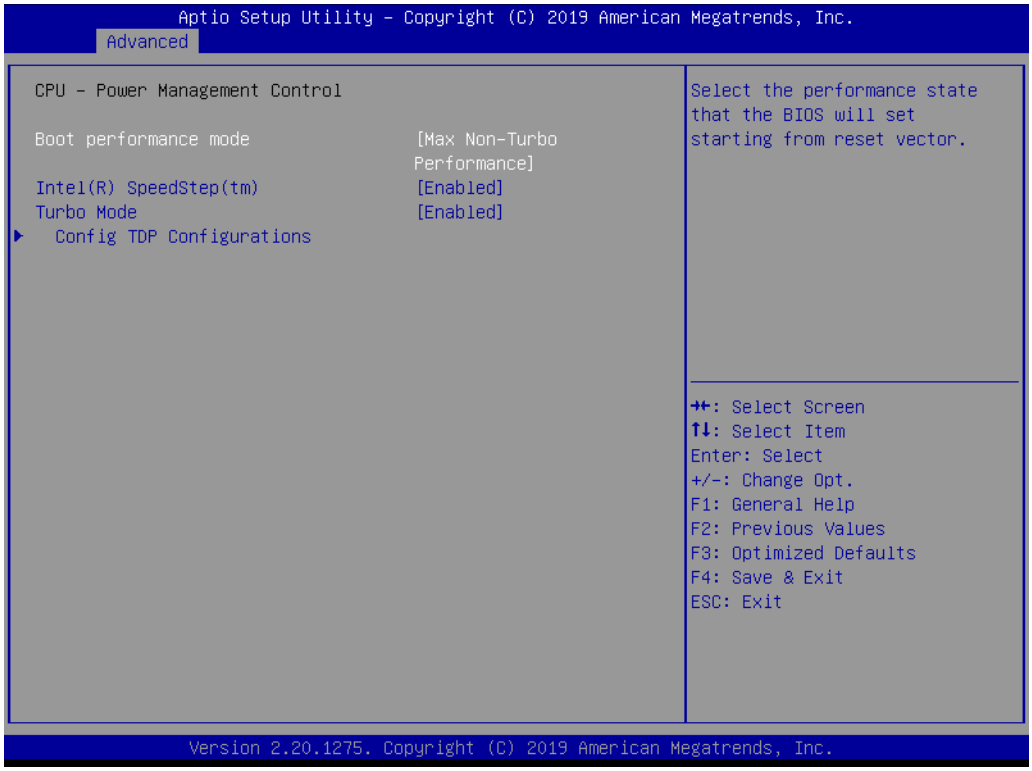


Figure 3.8 CPU- Power Management Control

- **Boot performance mode**
- **Intel® SpeedStep™**
- **Turbo Mode**
- **Config TDP Configurations**

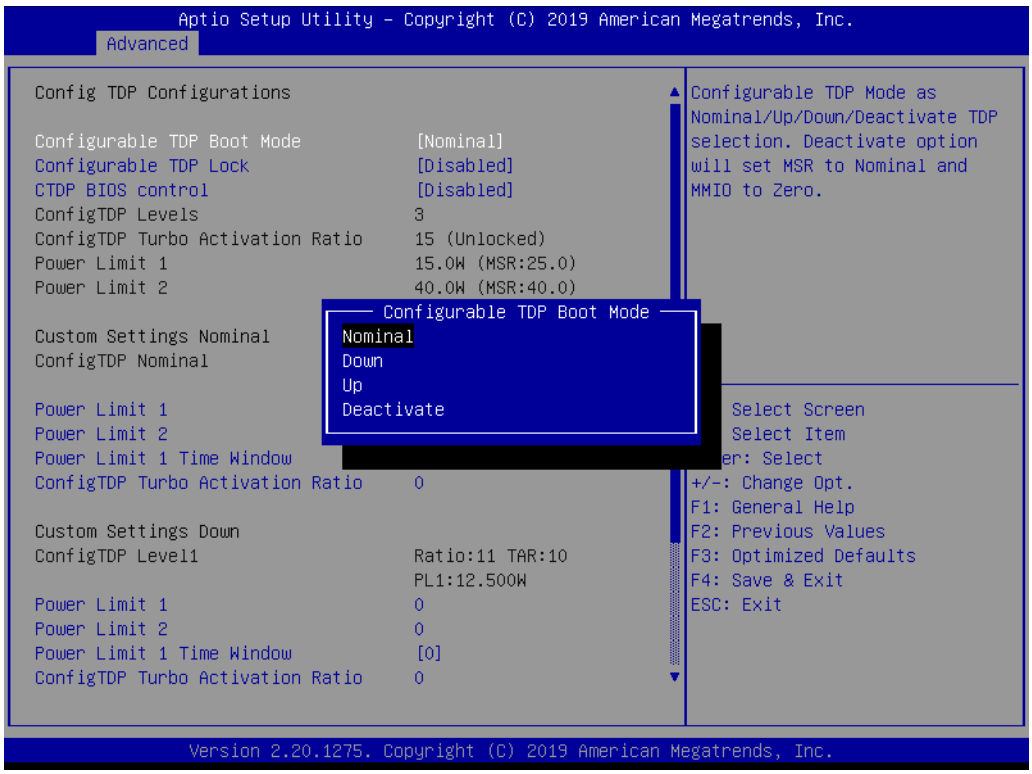


Figure 3.9 Configurable TDP Boot mode

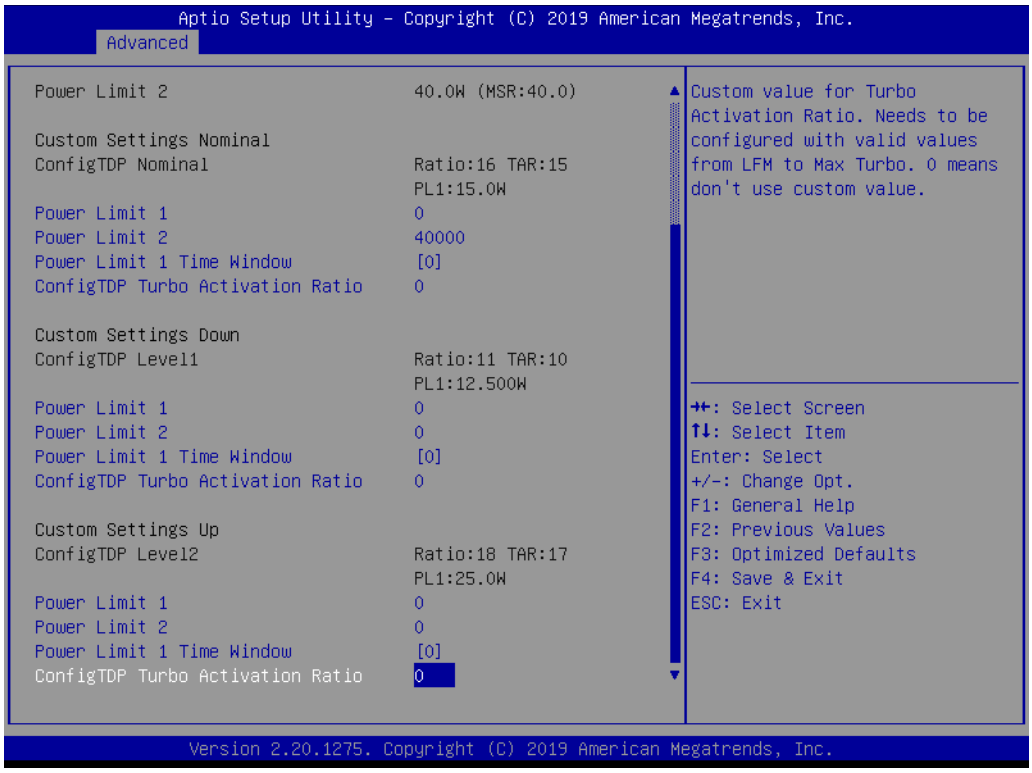


Figure 3.10 Config TDP Turbo Activation Ratio

GT- Power Management Control

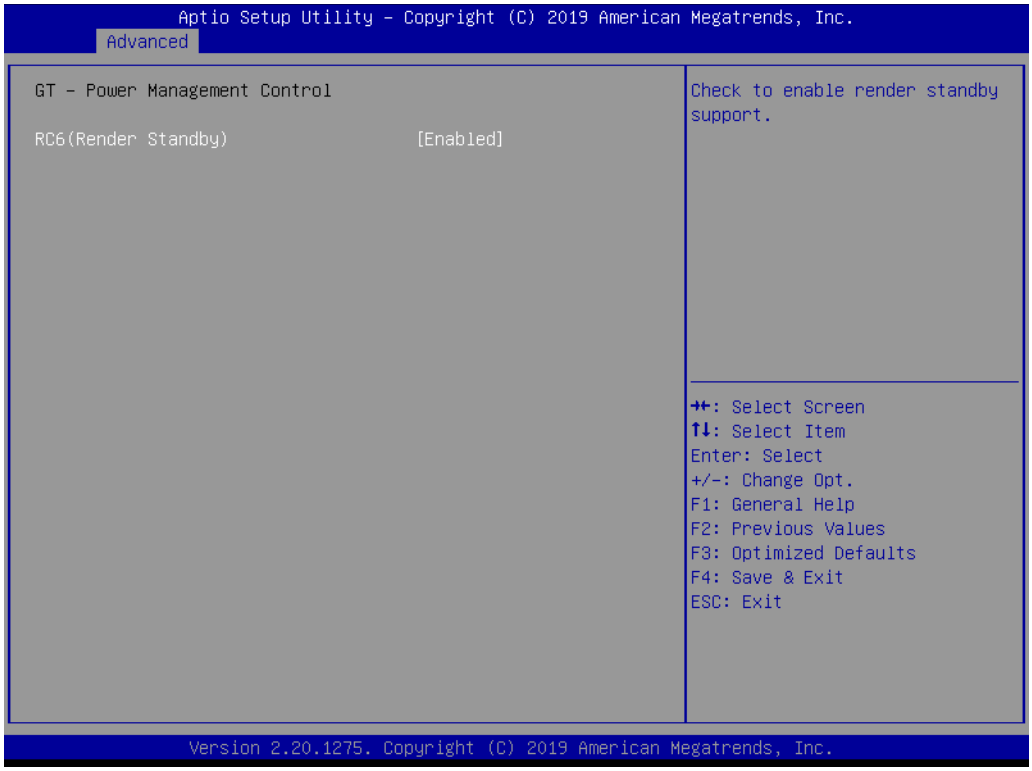


Figure 3.11 GT- Power Management Control

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

3.4.4 PCH-FW Configuration

Figure 3.12 PCH-FW Configuration

- **ME Firmware**
  Version
  Mode
  SKU
  Status 1
  Status 2
- **ME State**
- **ME Unconfig on RTC Clear**
- **Firmware Update Configuration**

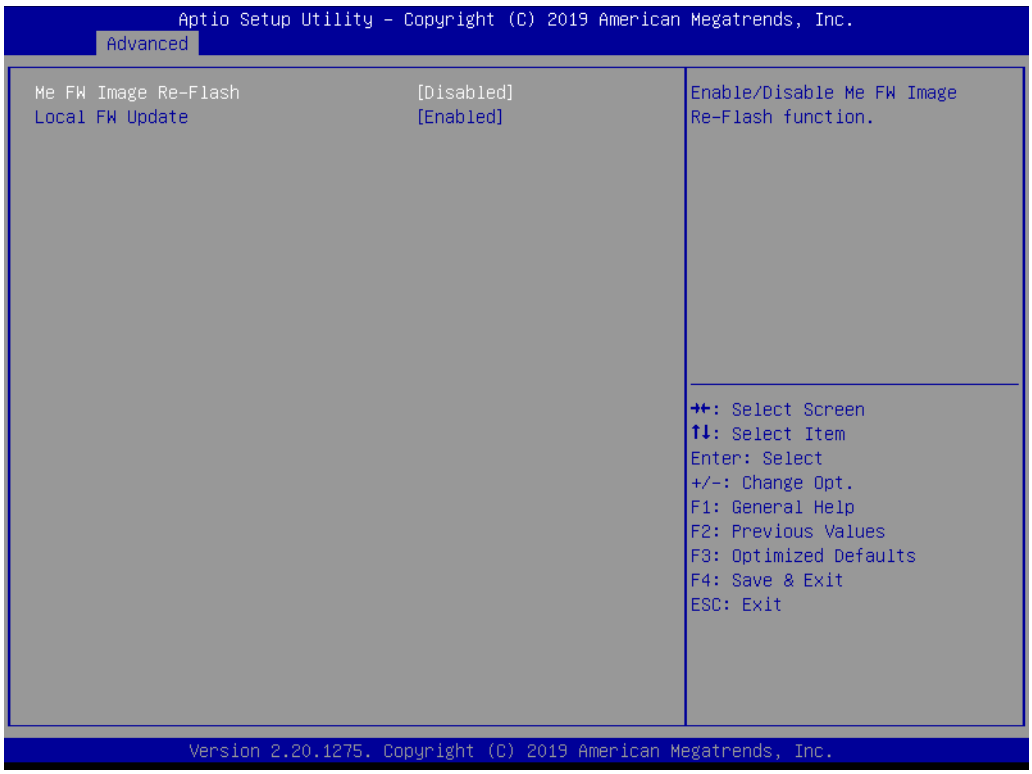


Figure 3.13 Firmware Update Configuration

3.4.5 Trusted Computing

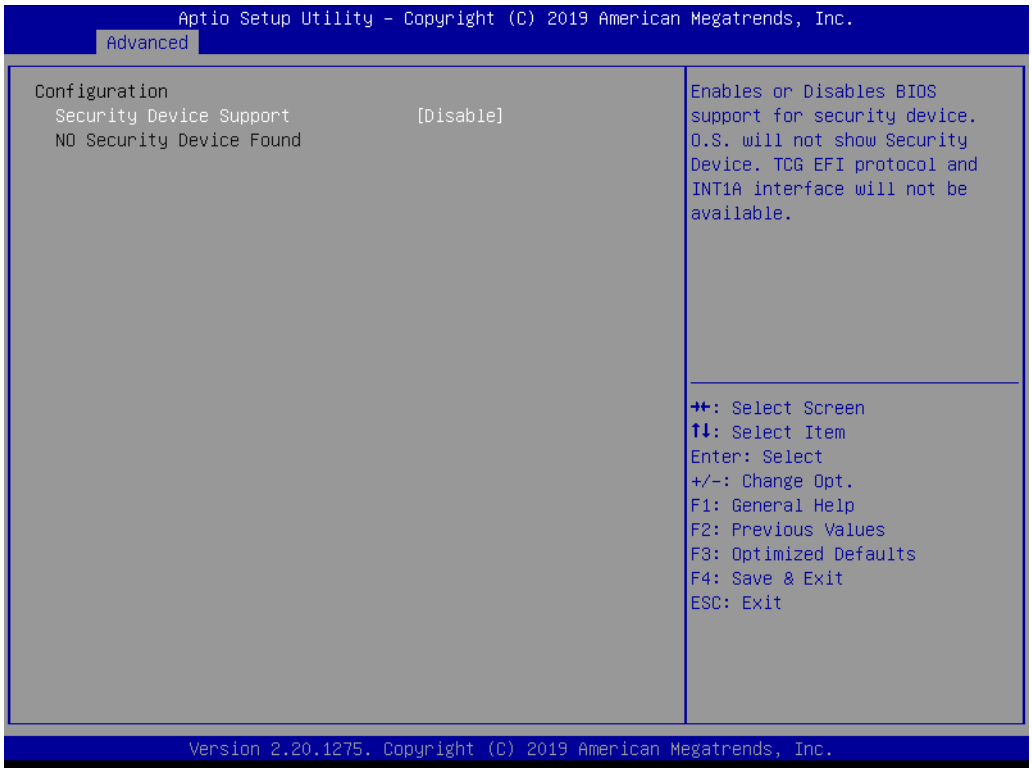


Figure 3.14 Trusted Computing

3.4.6 ACPI Settings

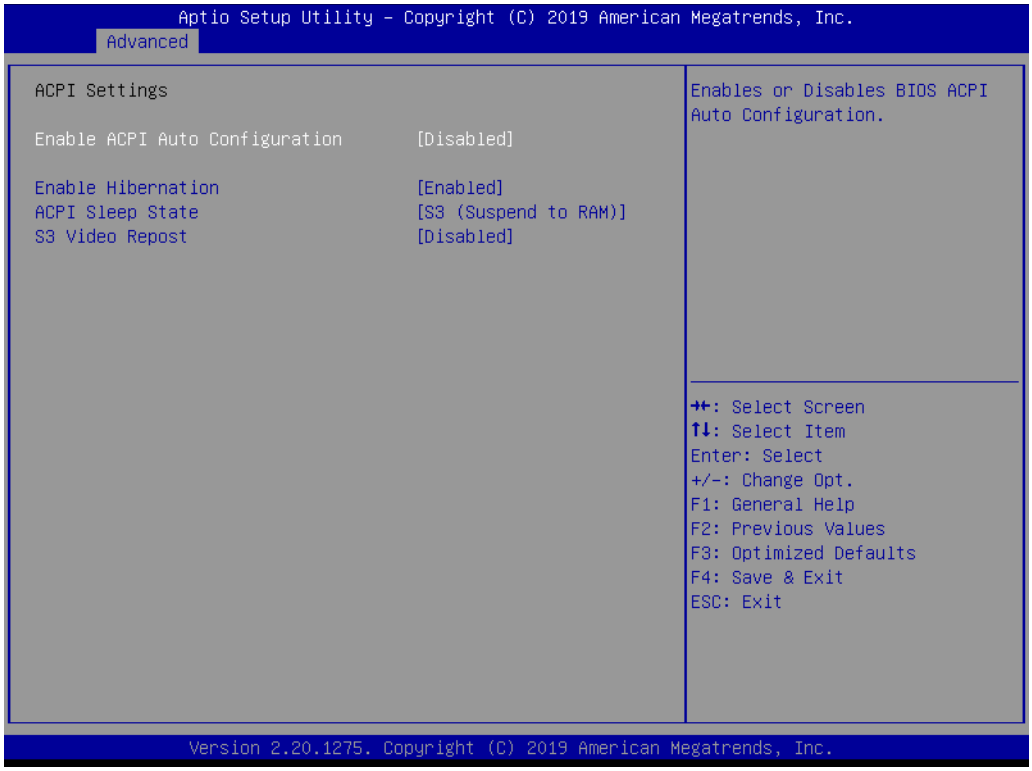


Figure 3.15 ACPI Settings

- **Enable ACPI Auto Configuration**
- **Enable Hibernation**
- **ACPI Sleep State**
- **S3 Video Repost**

3.4.7 Embedded Controller

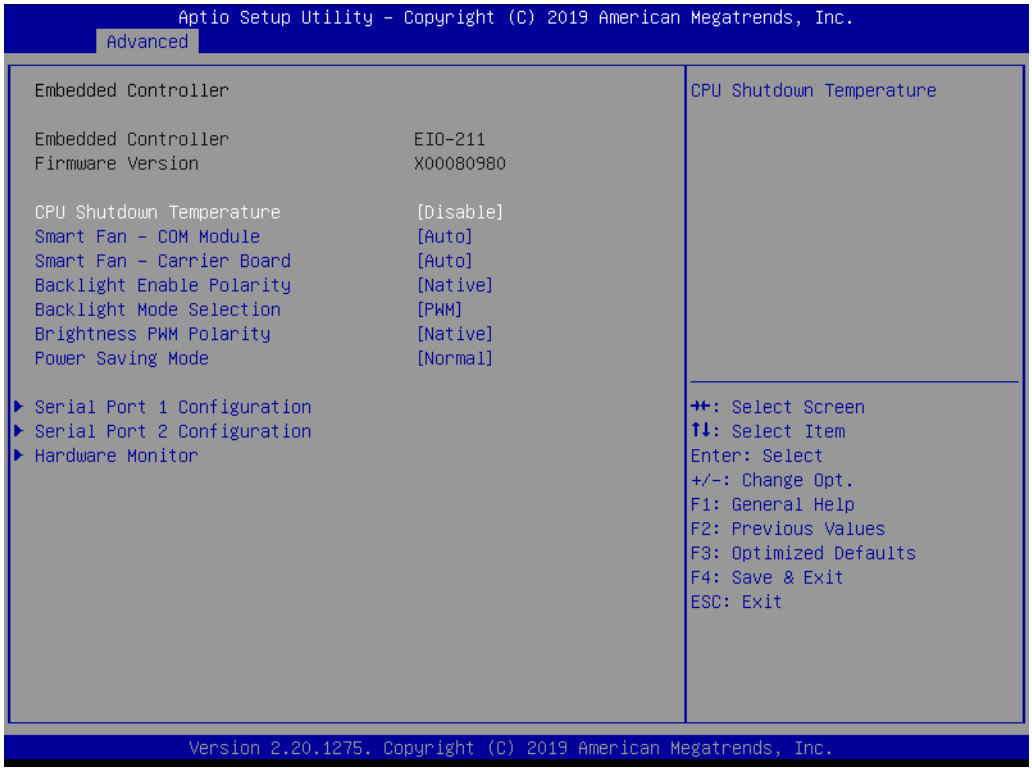


Figure 3.16 Embedded Controller

- **CPU Shutdown Temperature**
- **Smart Fan – COM Module**
- **Smart Fan – Carrier Board.**
- **Backlight Enable Polarity**
- **Brightness Mode Selection**
- **Brightness PWM Polarity**
- **Power Saving Mode**
- **Serial Port 1 Configuration**
- **Serial Port 2 Configuration**
- **Hardware Monitor**

Serial Port 1 Configuration

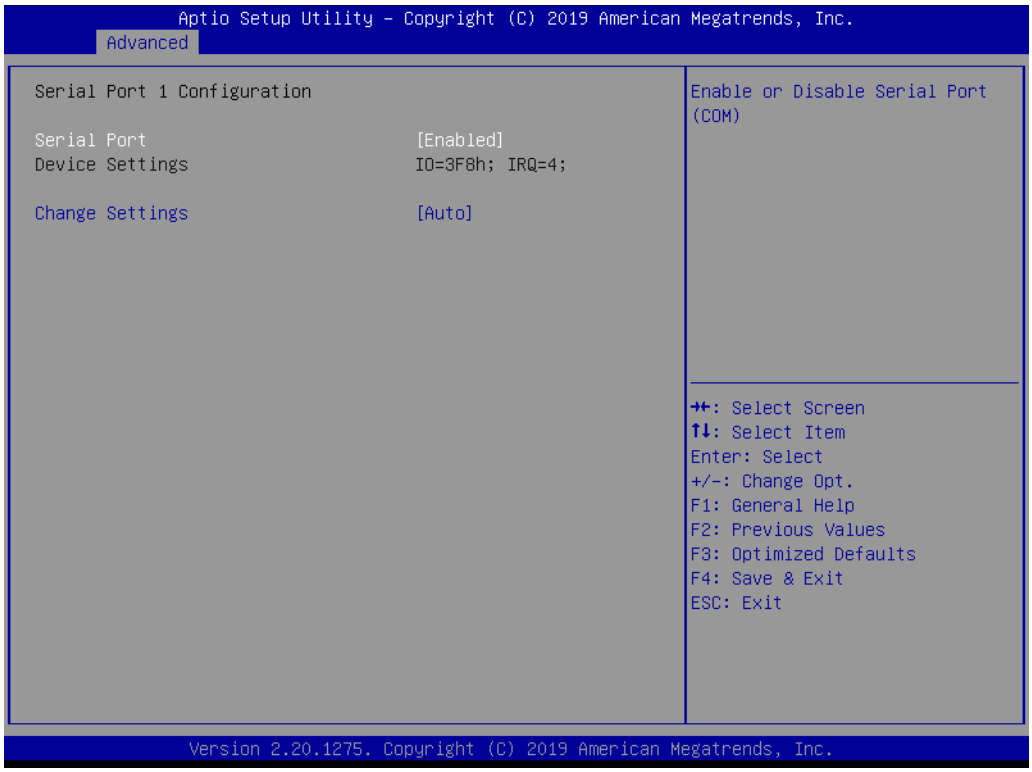


Figure 3.17 Serial Port 1 Configurations

- **Serial Port**
- **Change Settings**

Serial Port 2 Configuration

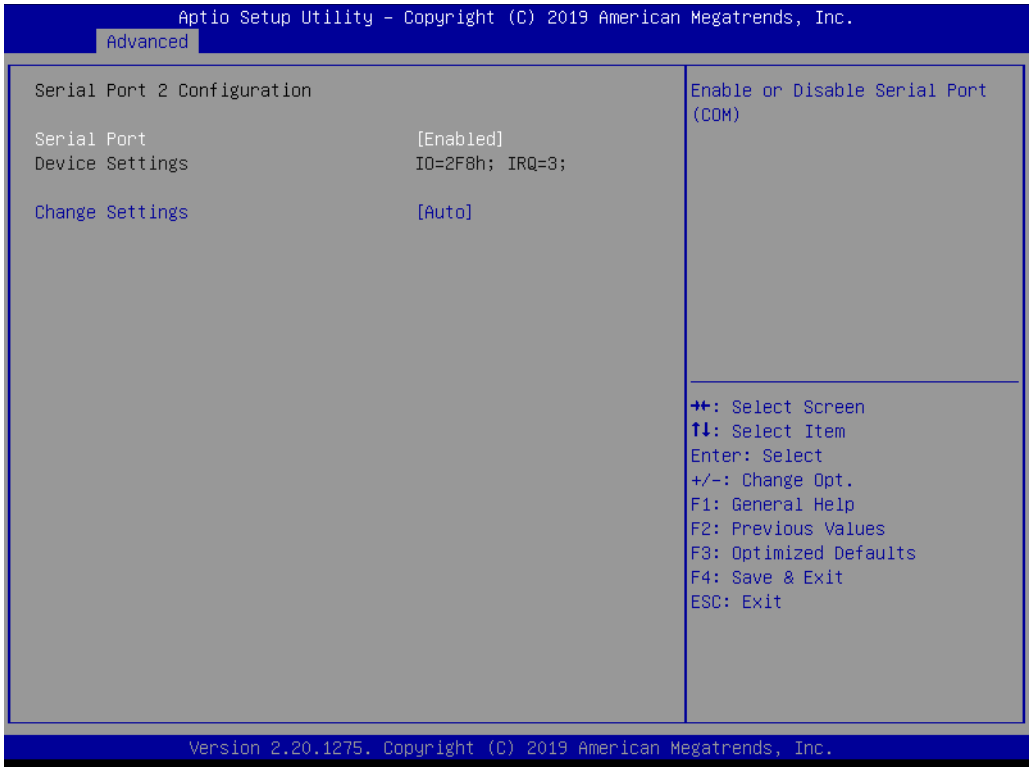


Figure 3.18 Serial Port 2 Configurations

- **Serial Port**
- **Change Settings**

Hardware Monitor

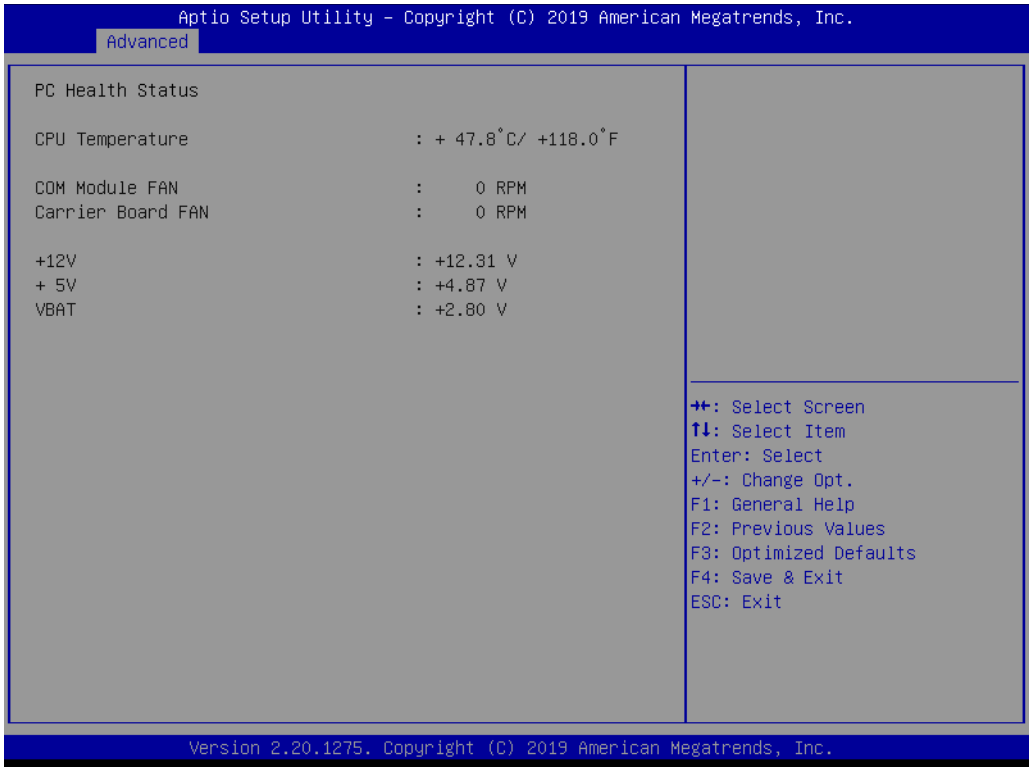


Figure 3.19 Hardware Monitor

3.4.8 Serial Port Console Redirection

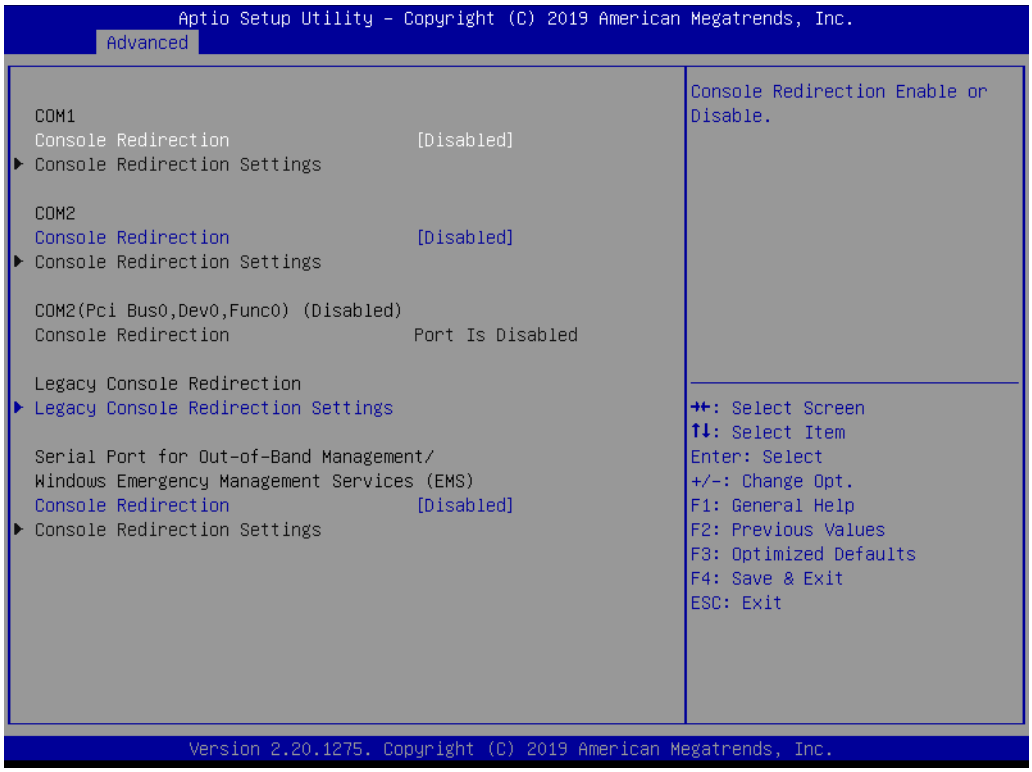


Figure 3.20 Serial Port Console Redirection

COM1 Console Redirection

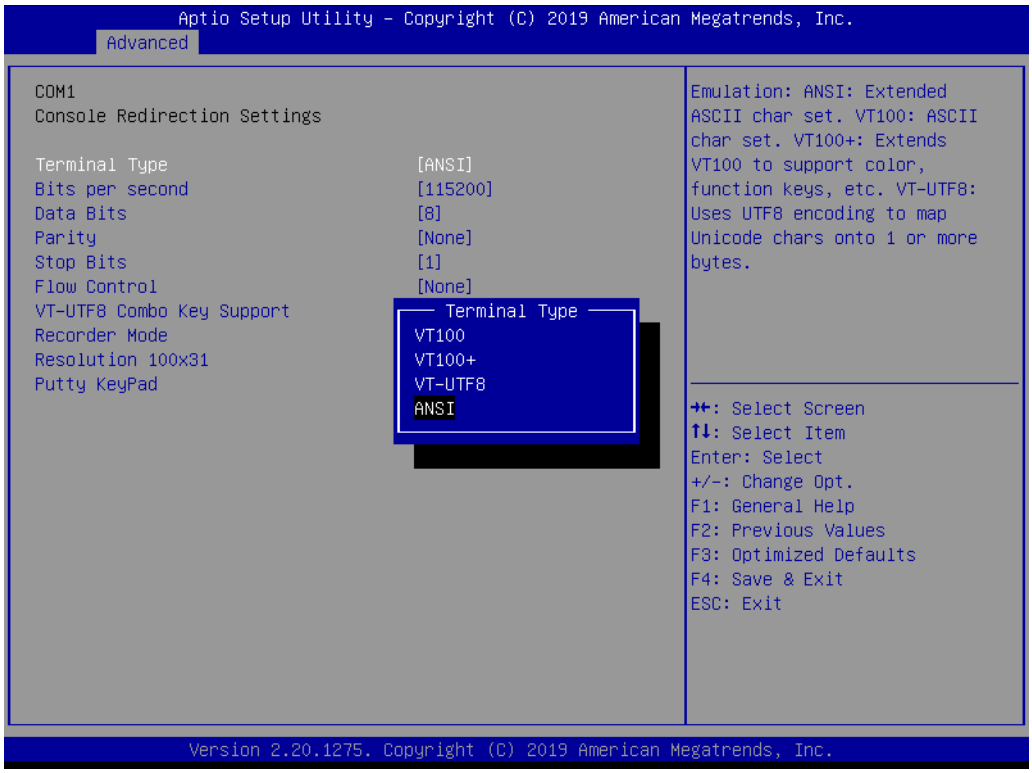


Figure 3.21 Terminal Type Setting

Figure 3.22 Terminal Type Setting

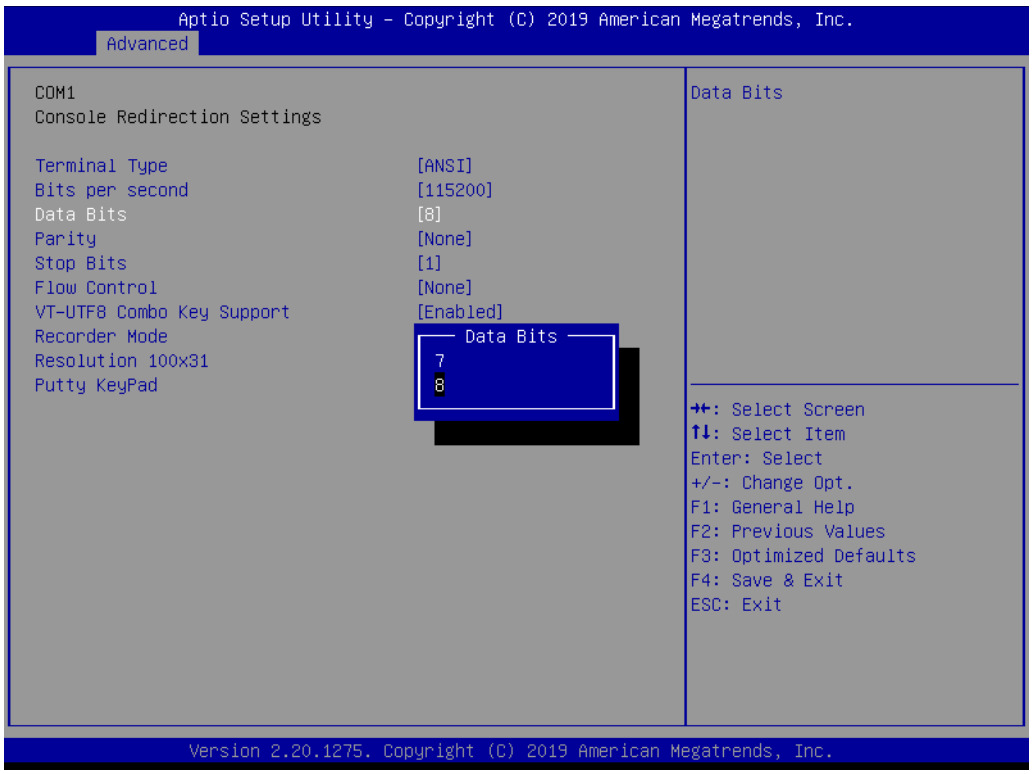


Figure 3.23 Data Bits Setting

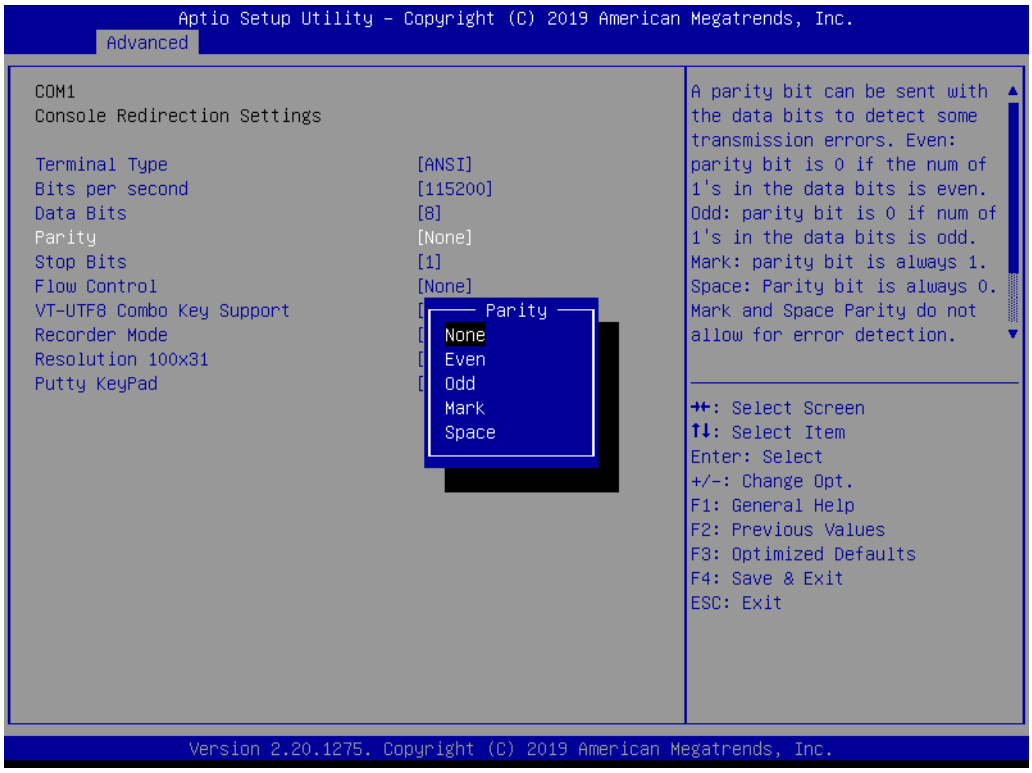


Figure 3.24 Parity Setting

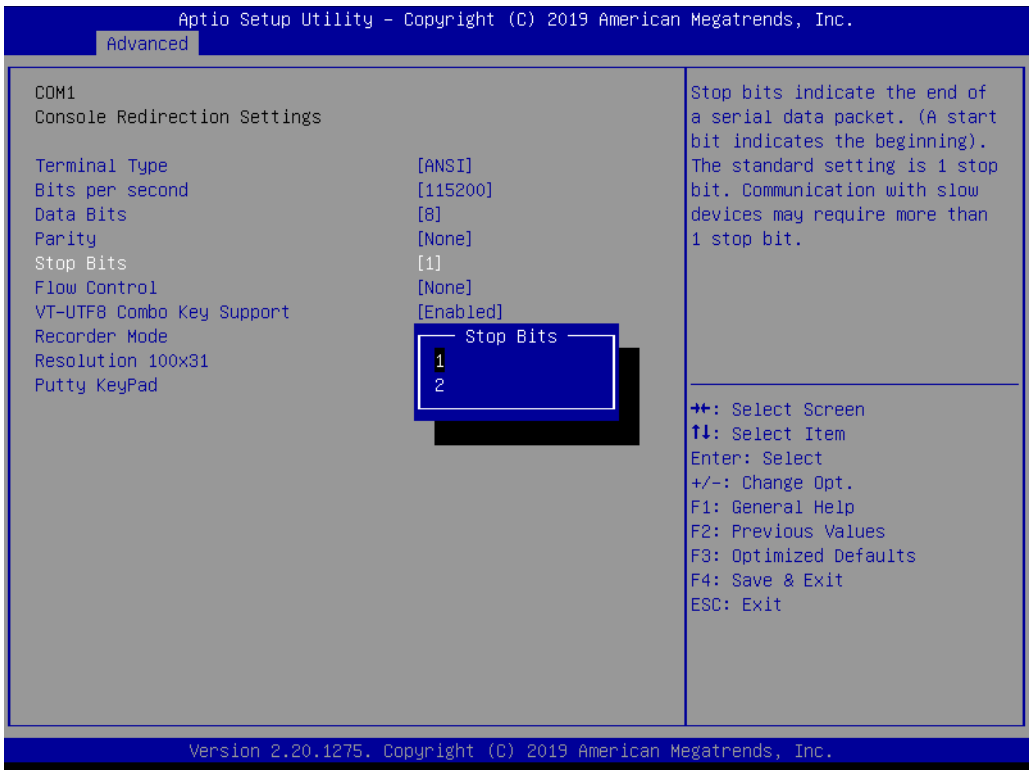


Figure 3.25 Stop Bits Setting

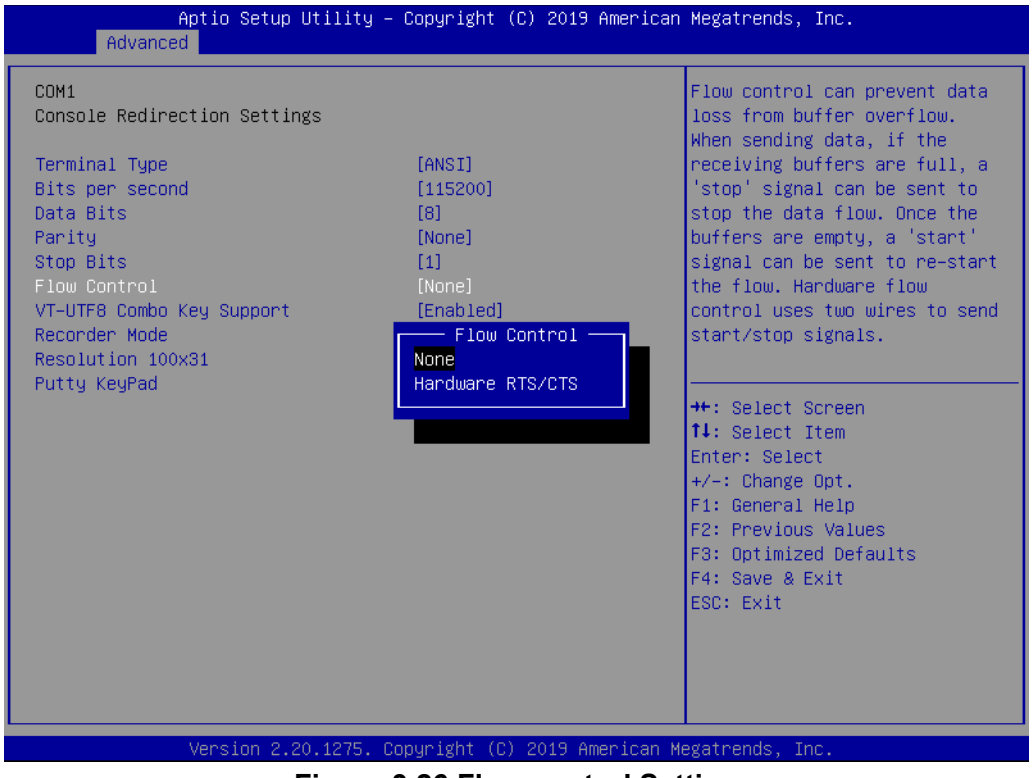


Figure 3.26 Flow control Setting

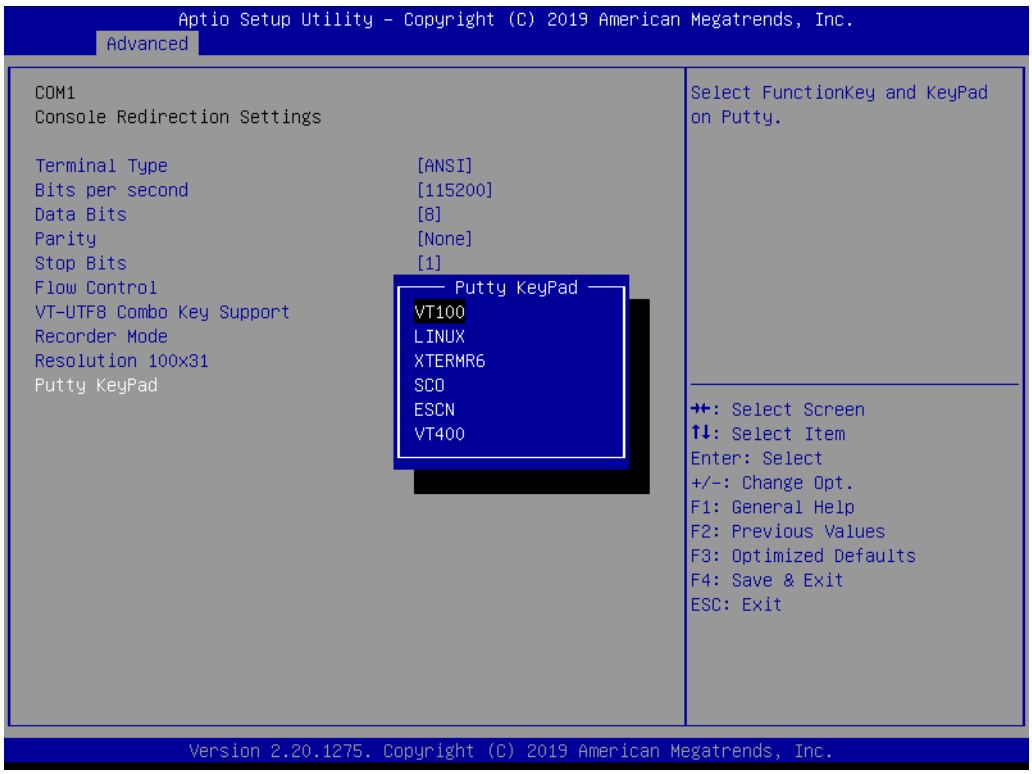


Figure 3.27 Putty KeyPad Setting

- **COM2 Console Redirection**
- **COM3 Console Redirection**
- **COM4 Console Redirection**
- **Legacy Console Redirection Settings**
- **Console Redirection**

3.4.9 USB Configuration

Figure 3.28 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**
- **USB mass storage driver support**
- **USB transfer time-out**

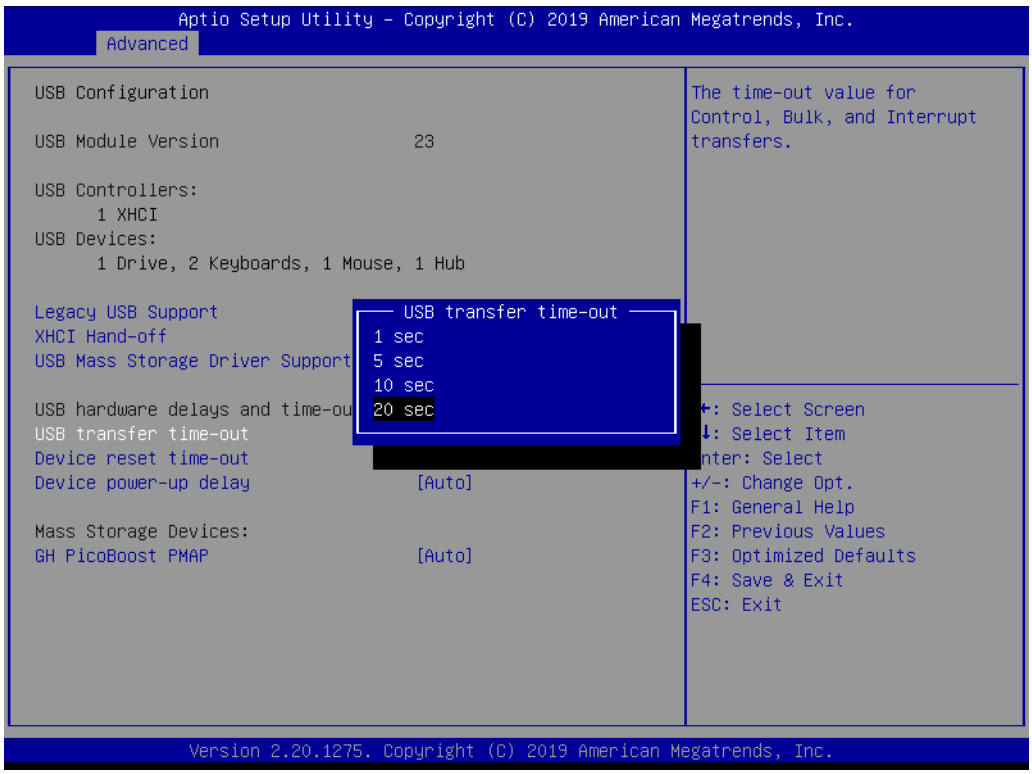


Figure 3.29 USB transfer time-out setting

- **Device reset time-out**
- **Device power-up delay**

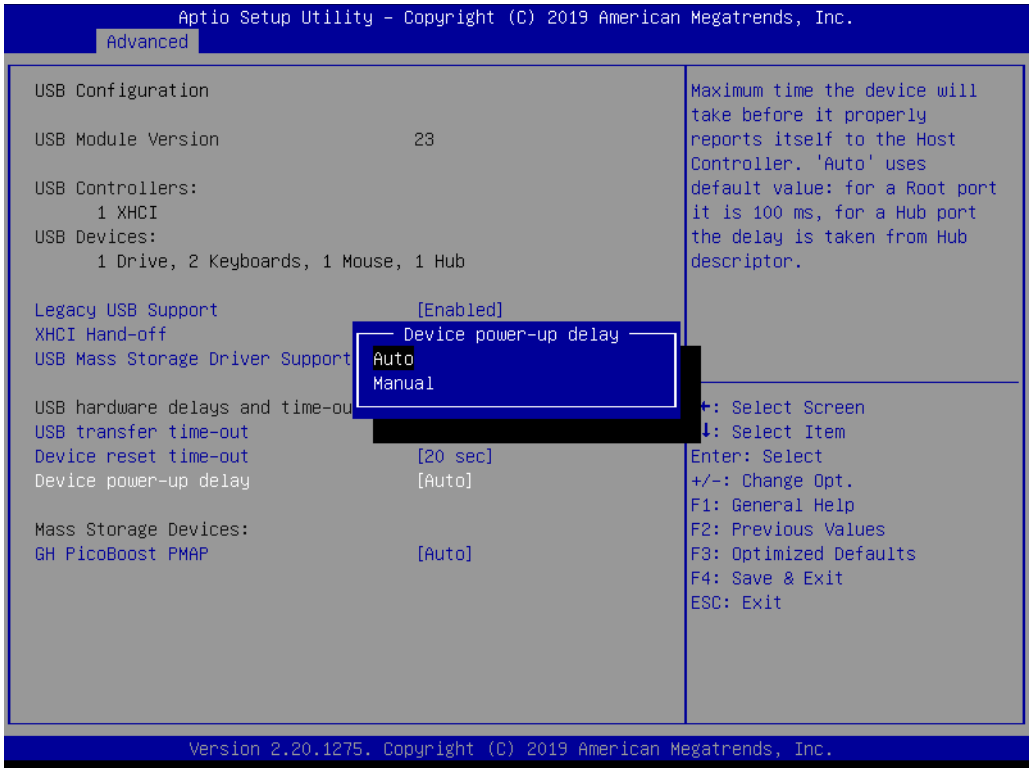


Figure 3.30 Device power-up delay setting

3.4.10 CSM Configuration

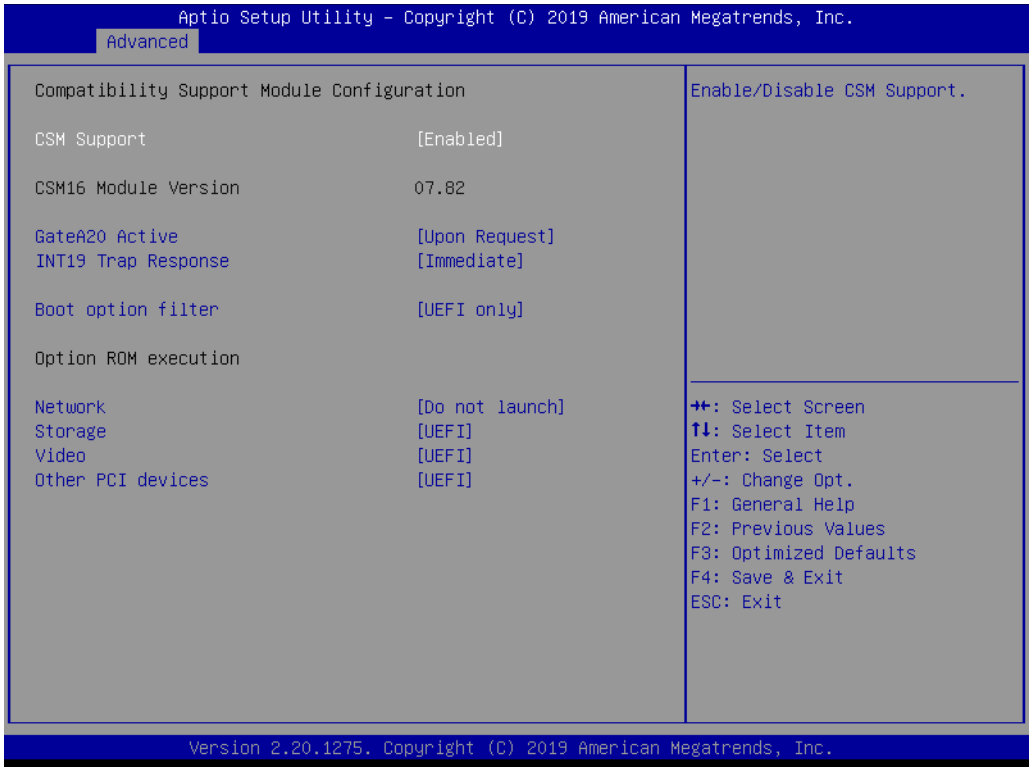


Figure 3.31 CSM Configuration

- **CSM Support**
- **GateA20 Active**

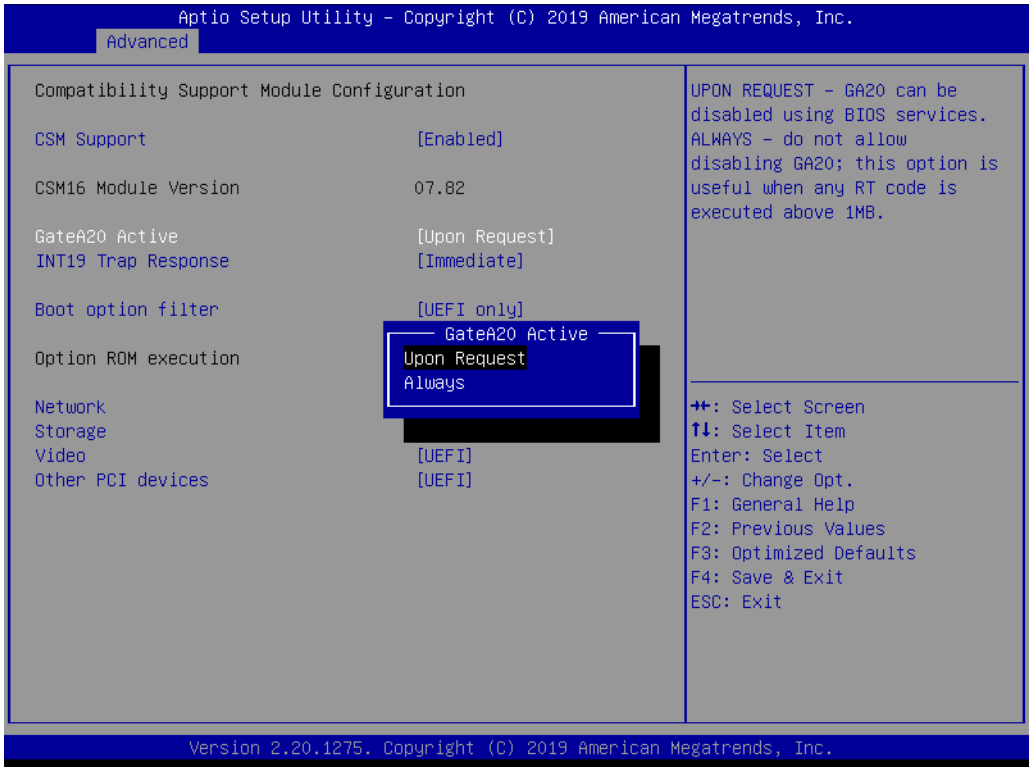


Figure 3.32 GateA20 Active Setting

- **INT19 Trap Response**

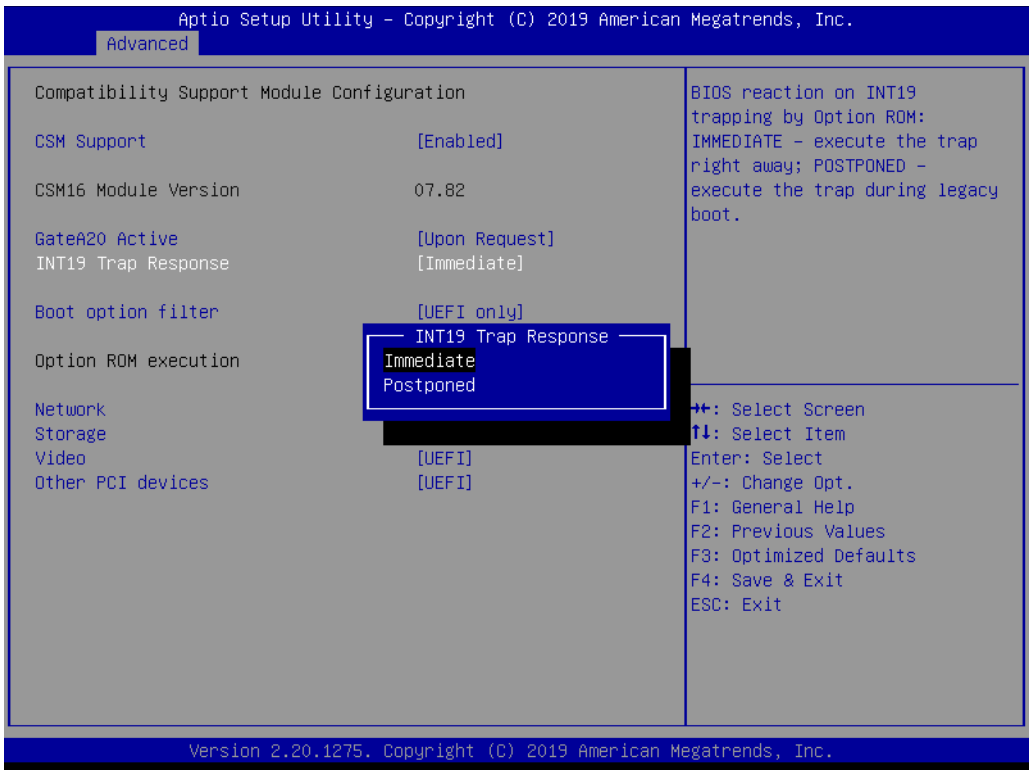


Figure 3.33 INT19 Trap Response Setting

- **Boot option filter**

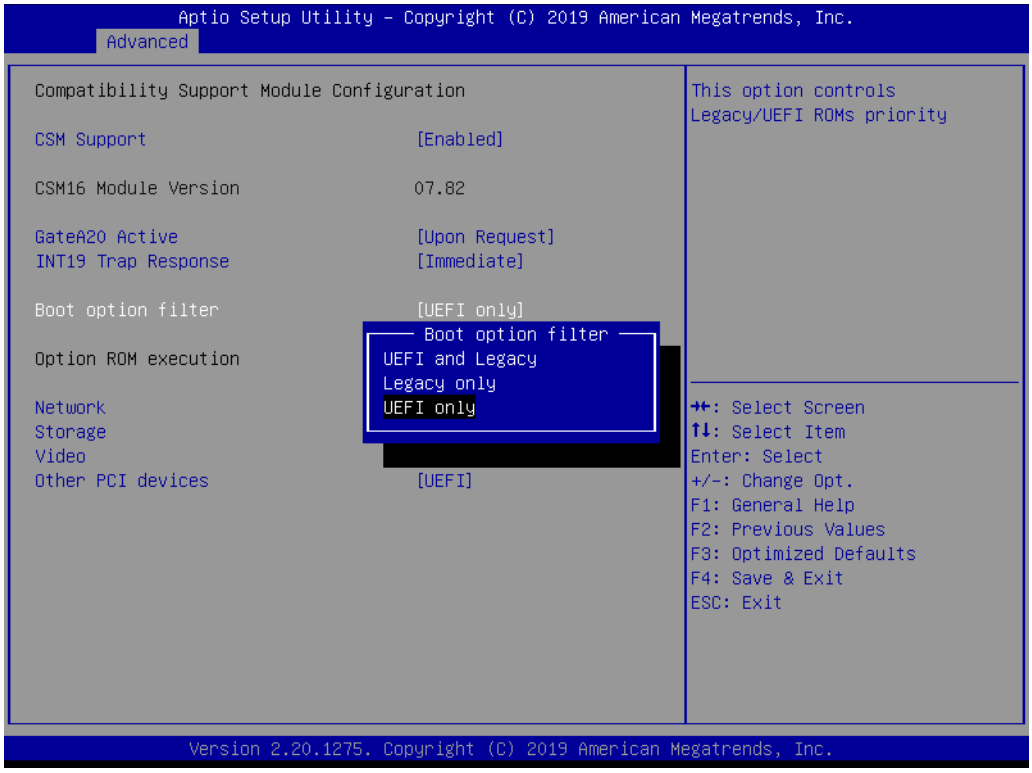


Figure 3.34 Boot option filter setting

- **Network**
- **Storage**

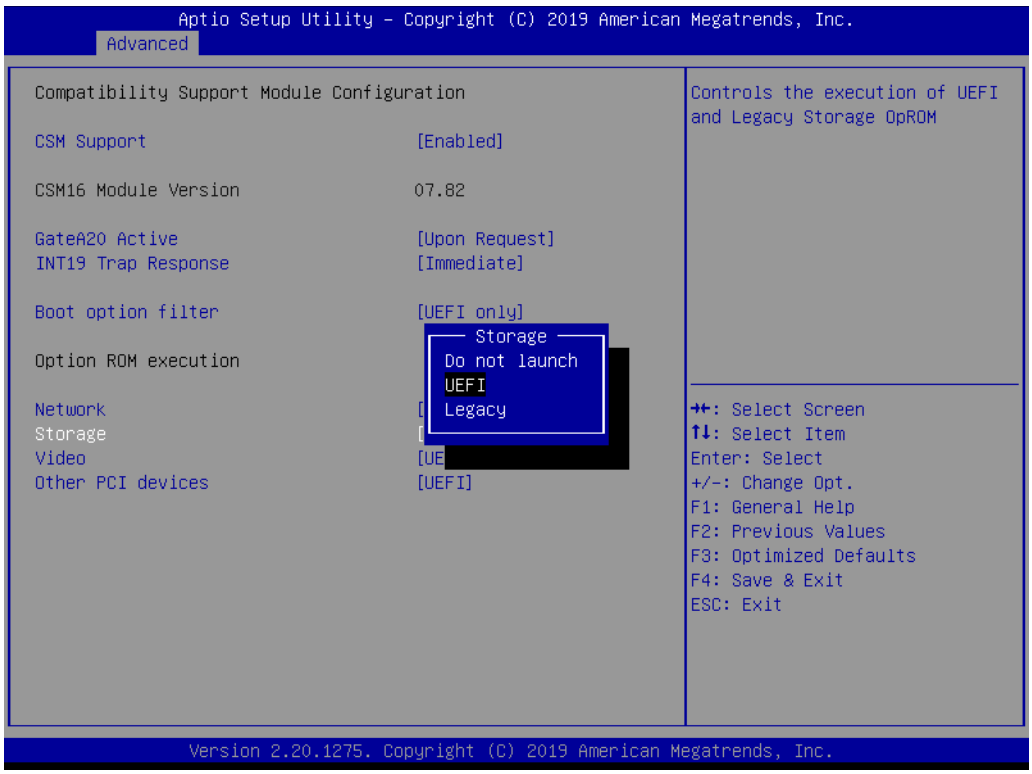


Figure 3.35 Storage setting

- **Video**
- **Other PCI devices**

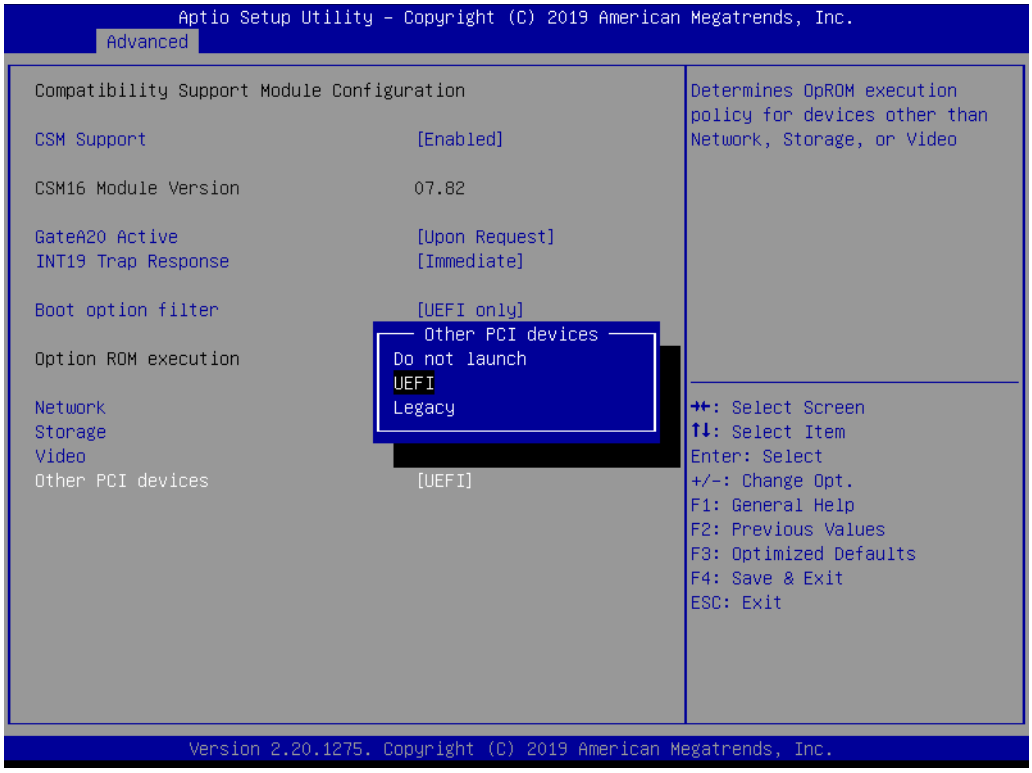


Figure 3.36 Other PCI setting

3.4.11 NVMe Configuration

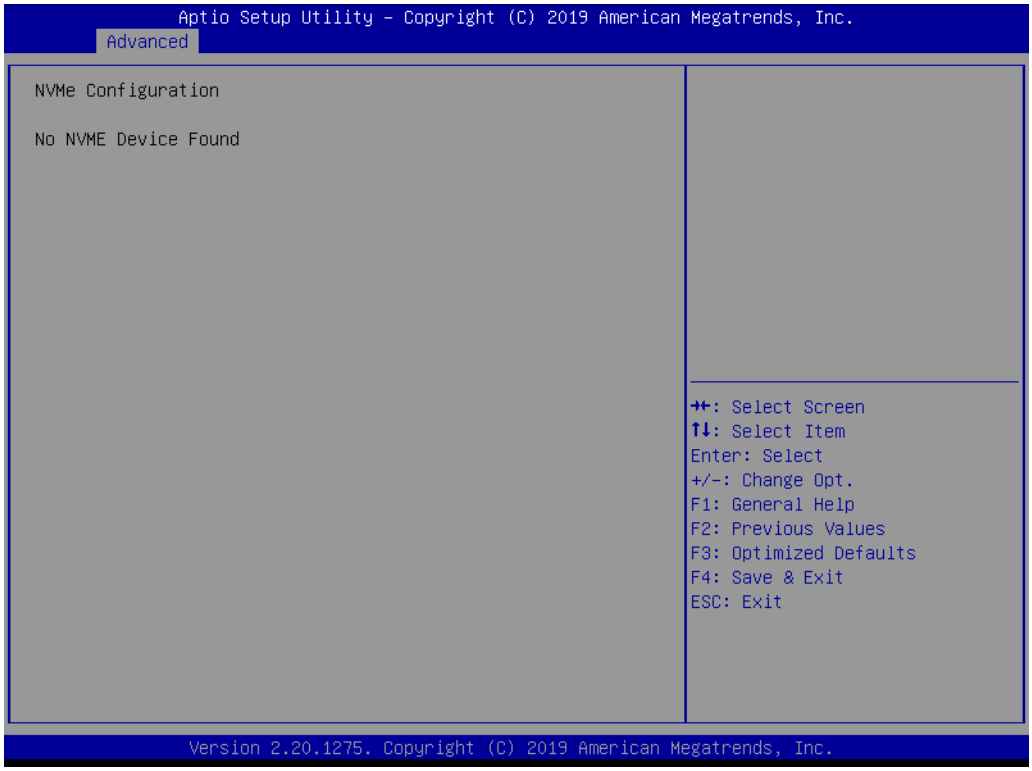


Figure 3.37 NVMe Configuration

3.4.12 SDIO Configuration

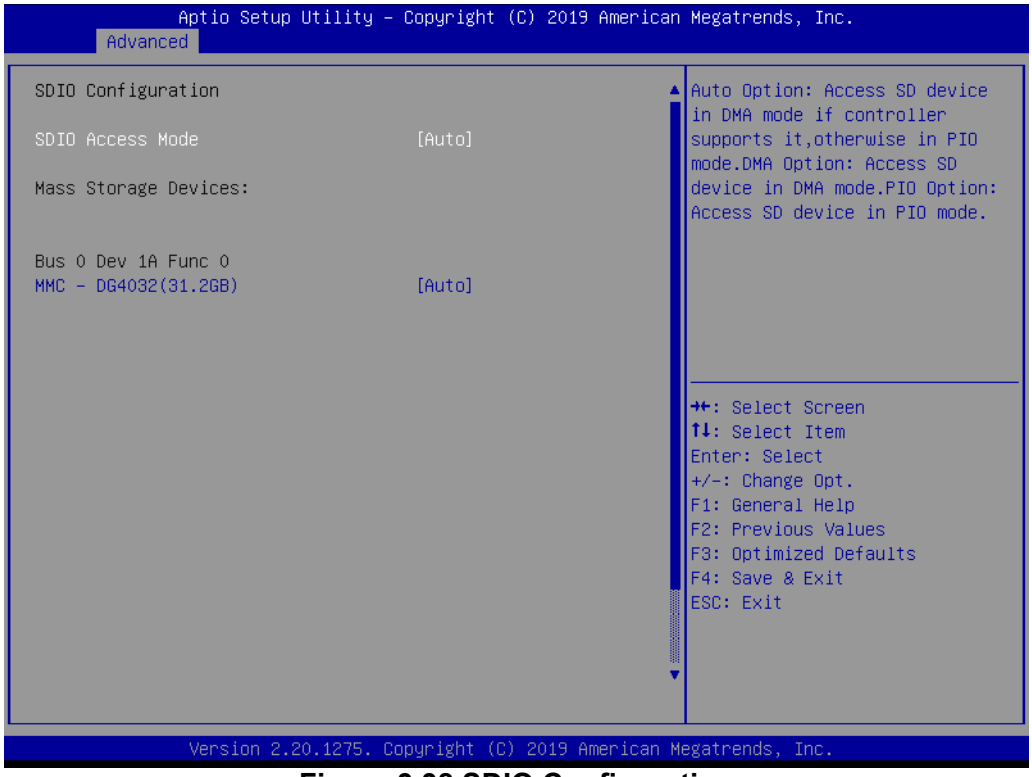


Figure 3.38 SDIO Configuration

SDIO Access Mode

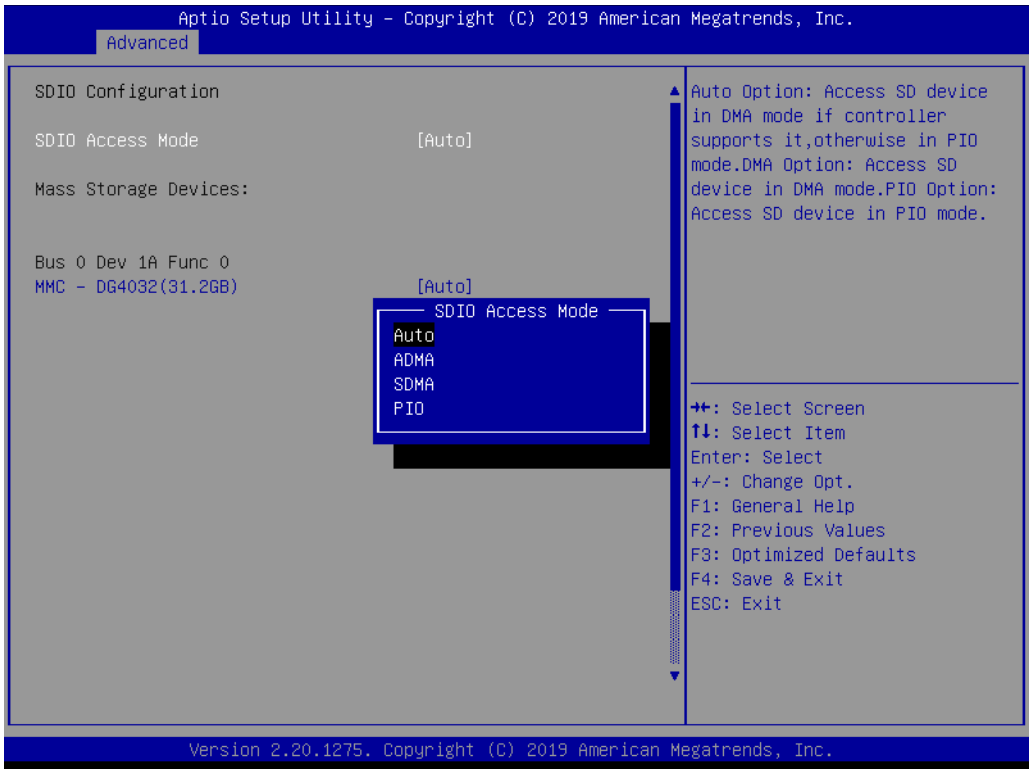


Figure 3.39 SDIO Access Mode Setting

MMC-DG4032

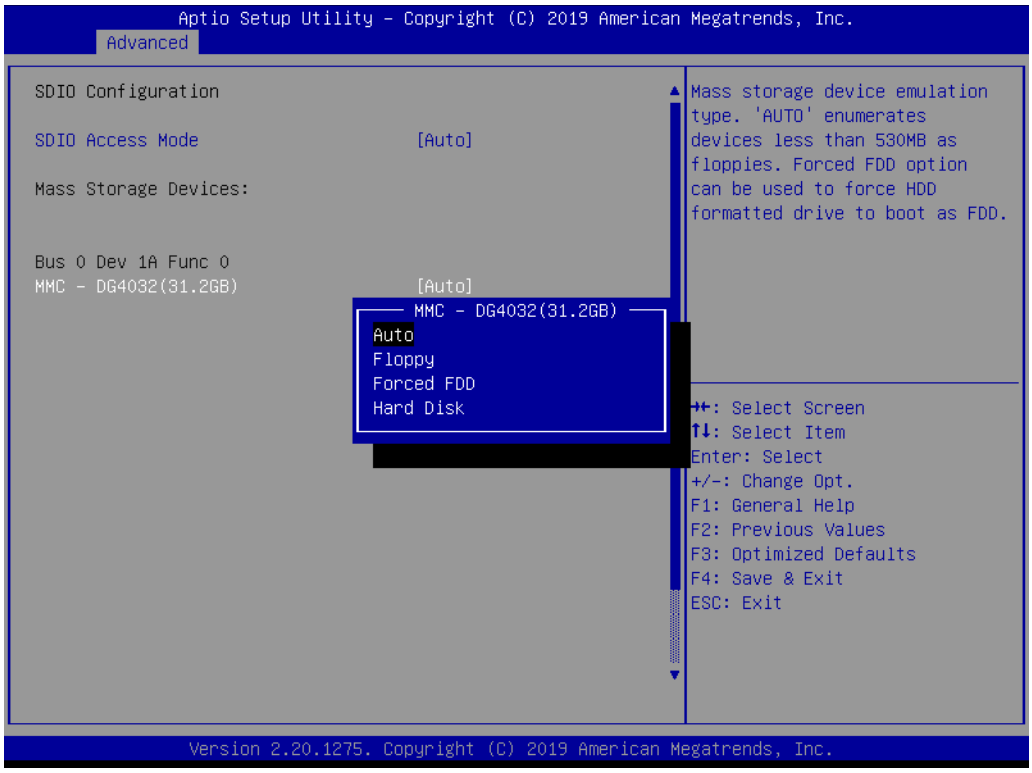


Figure 3.40 MMC-DG4032 Setting

3.4.13 Network Stack Configuration

Figure 3.41 Network Stack Configuration

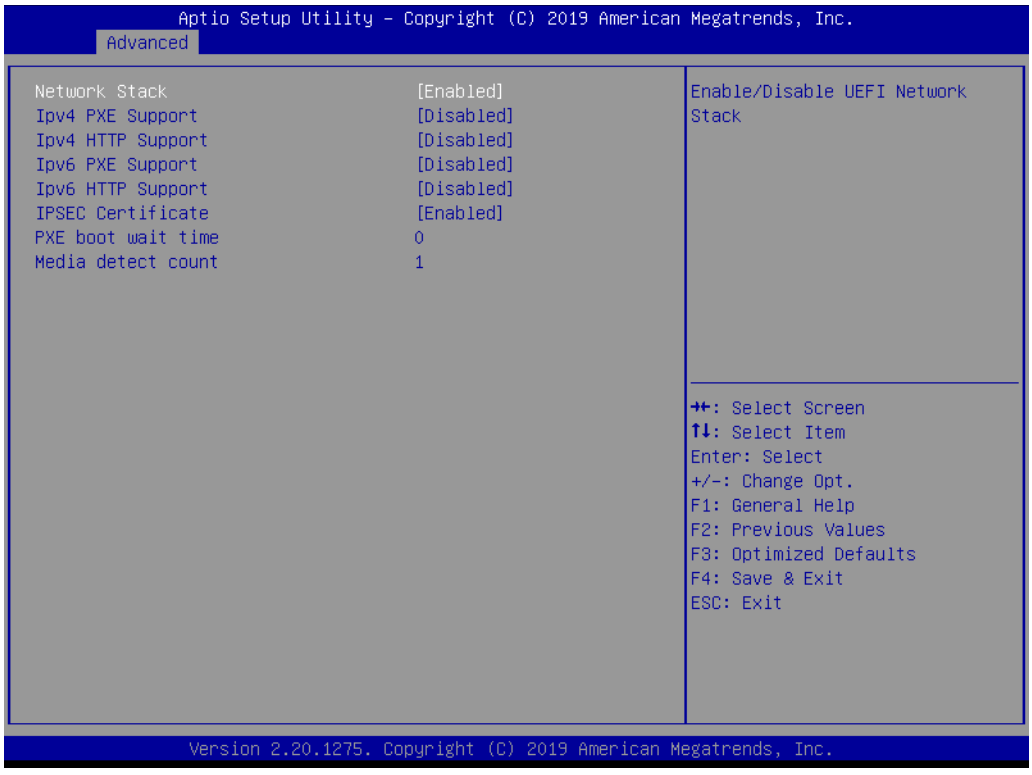


Figure 3.42 Network Stack Configuration Setting

3.5 Chipset Setup

Select the chipset tab from the SOM-6882 setup screen to enter the chipset BIOS Setup screen. You can display a chipset BIOS setup option by highlighting it using the <Arrow> keys. All Plug and Play BIOS setup options are described in this section. The Plug and Play BIOS Setup screen is shown below.

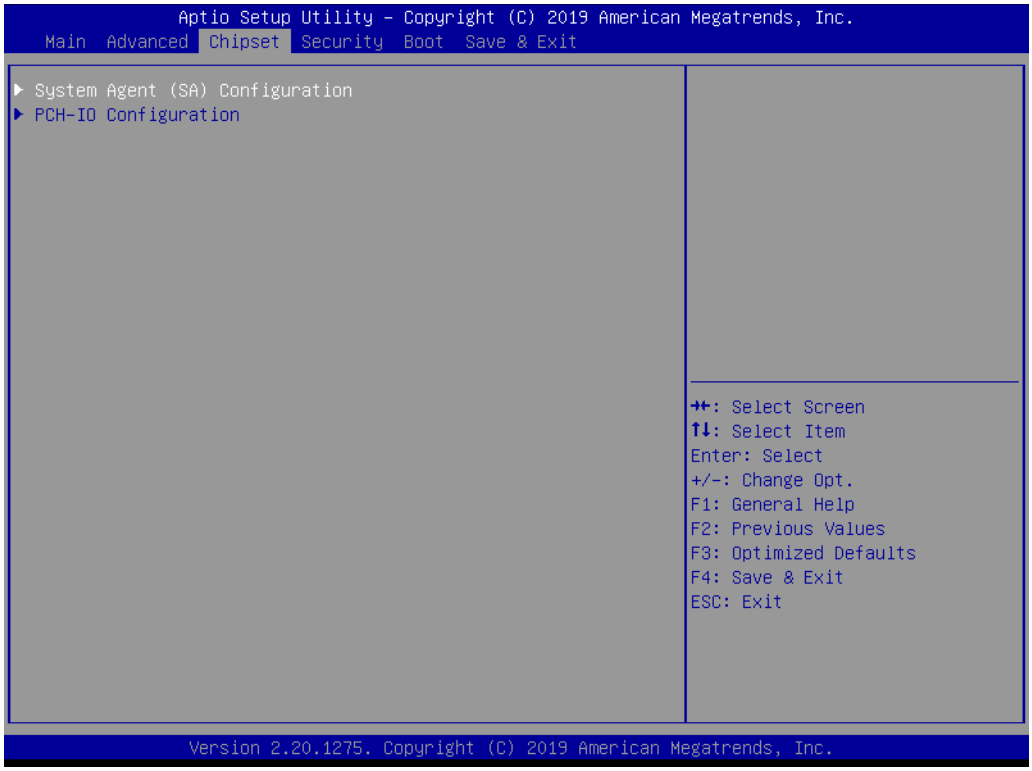


Figure 3.43 Chipset Setup

- **System Agent (SA) Configuration**
- **PCH-IO Configuration**

3.5.1 System Agent (SA) Configuration

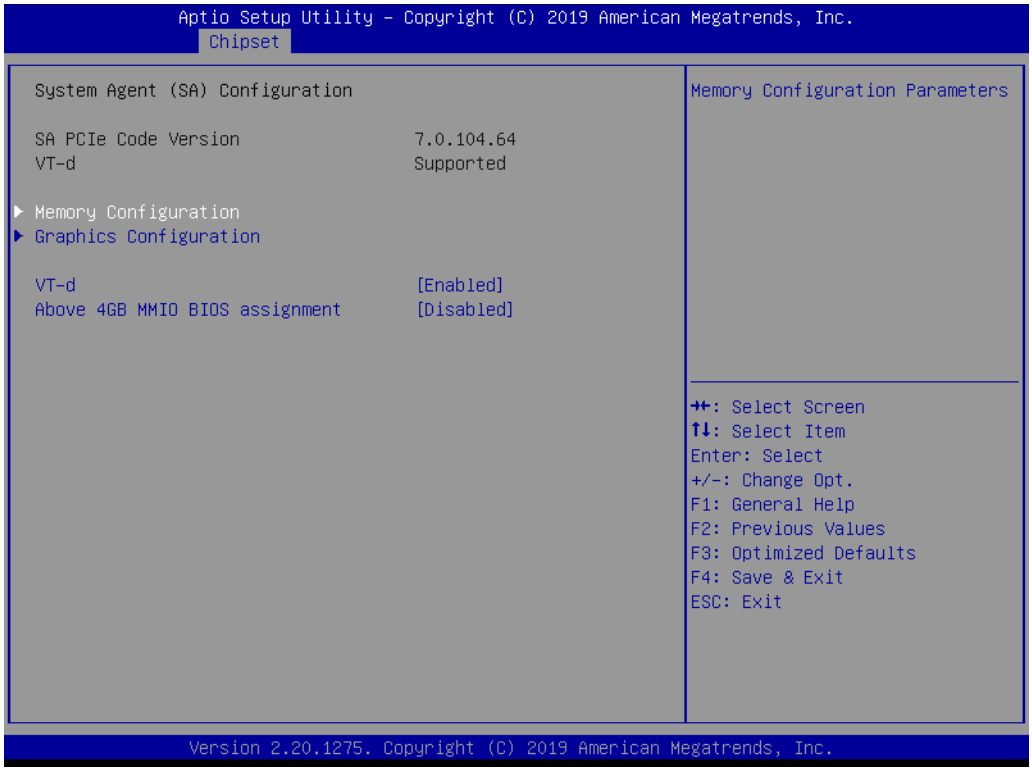


Figure 3.44 System Agent (SA) Configuration

- **Memory Configuration**
- **Graphics Configuration**
- **VT-d**

Memory Configuration

Figure 3.45 Memory Configuration

Graphics Configuration

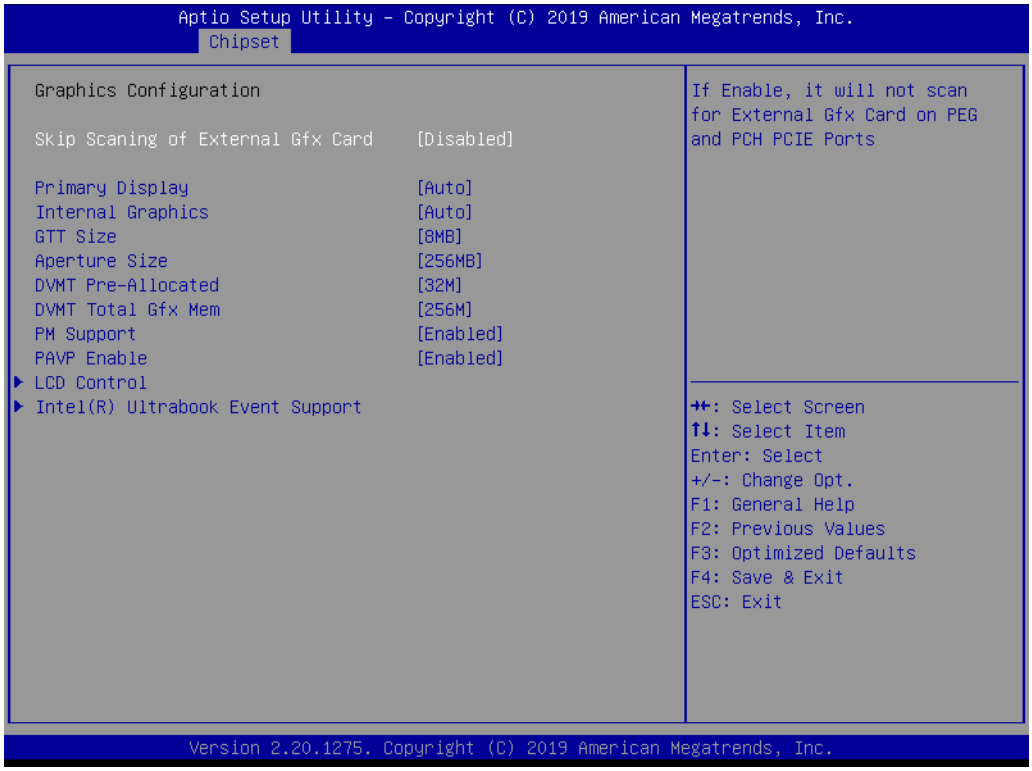


Figure 3.46 Graphics Configuration

Primary Display

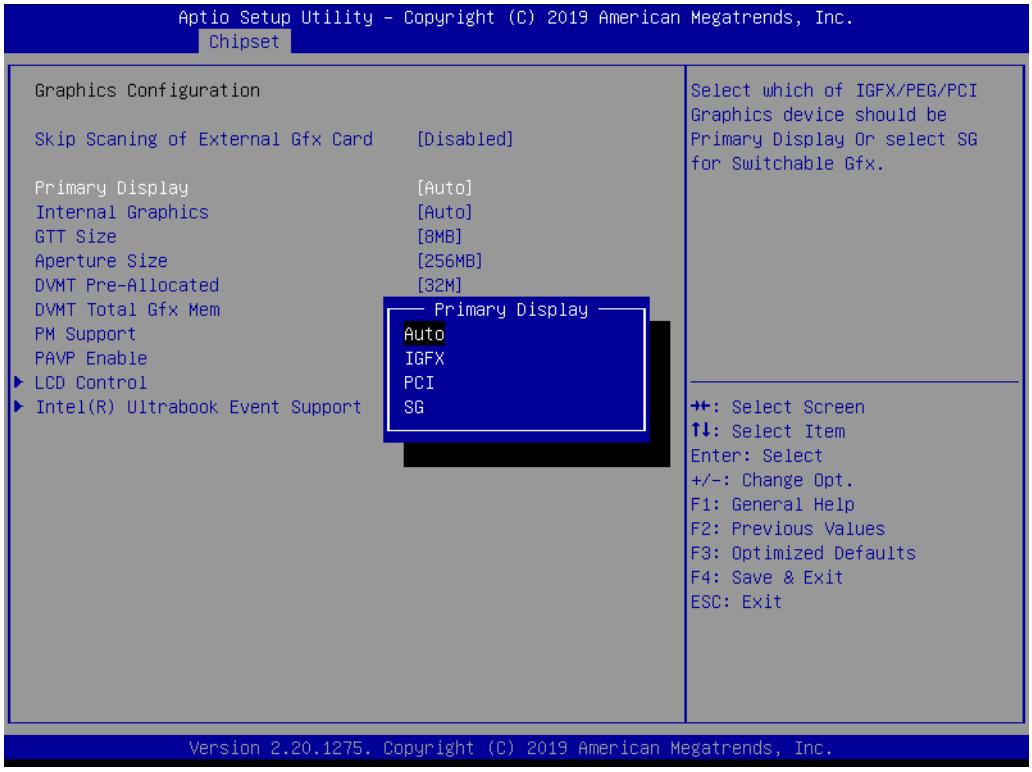


Figure 3.47 Primary Display

Internal Graphics

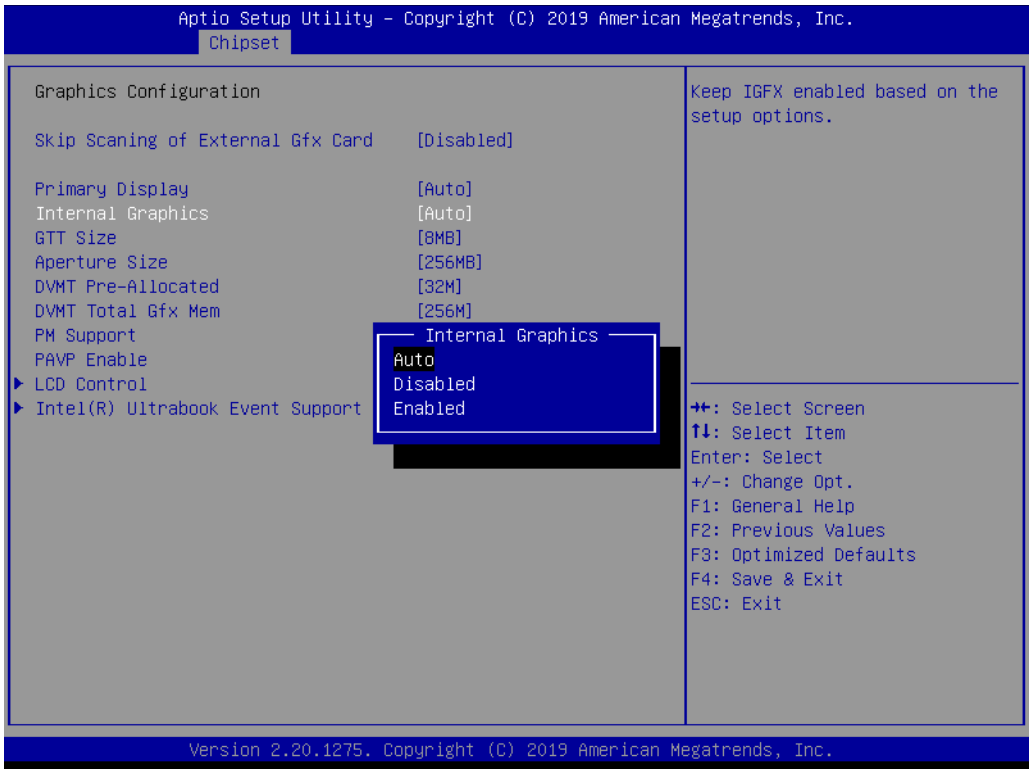


Figure 3.48 Internal Graphics setting

GTT Size

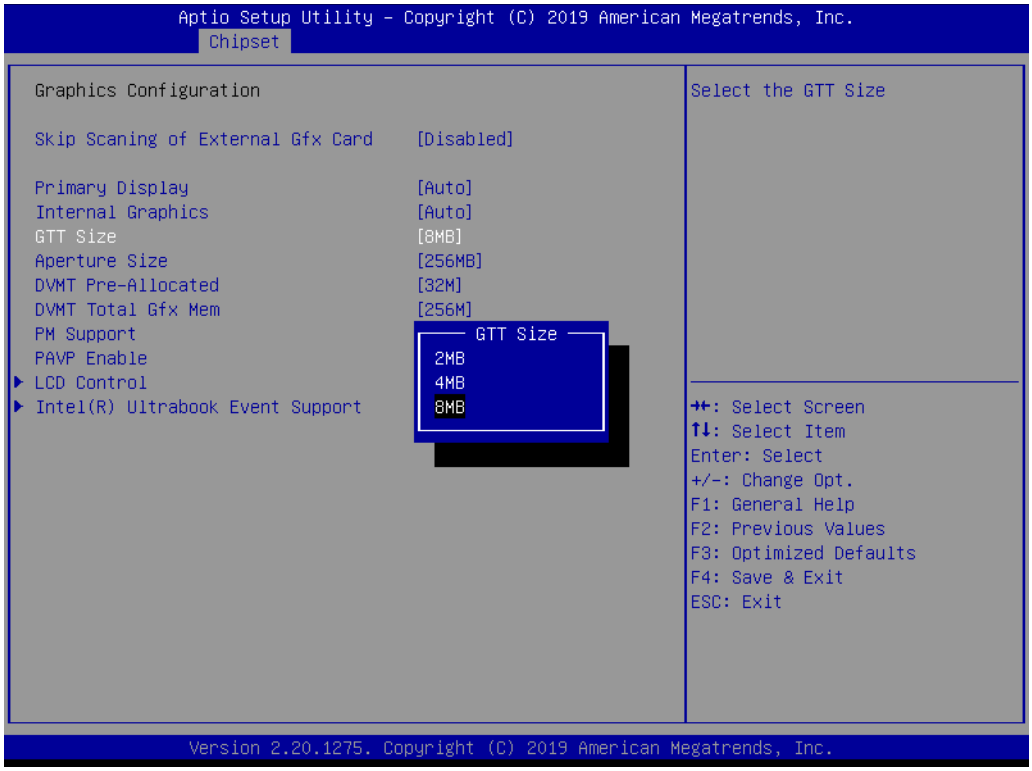


Figure 3.49 GTT Size setting

Aperture Size

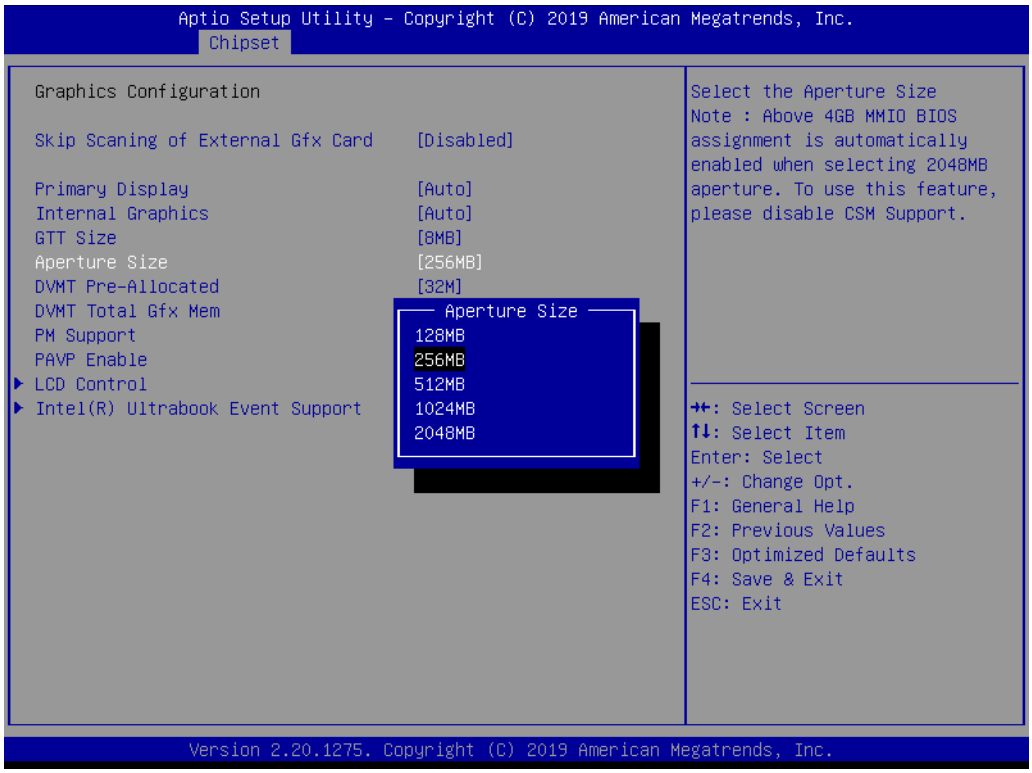


Figure 3.50 Aperture Size setting

DVMT Pre-Allocated

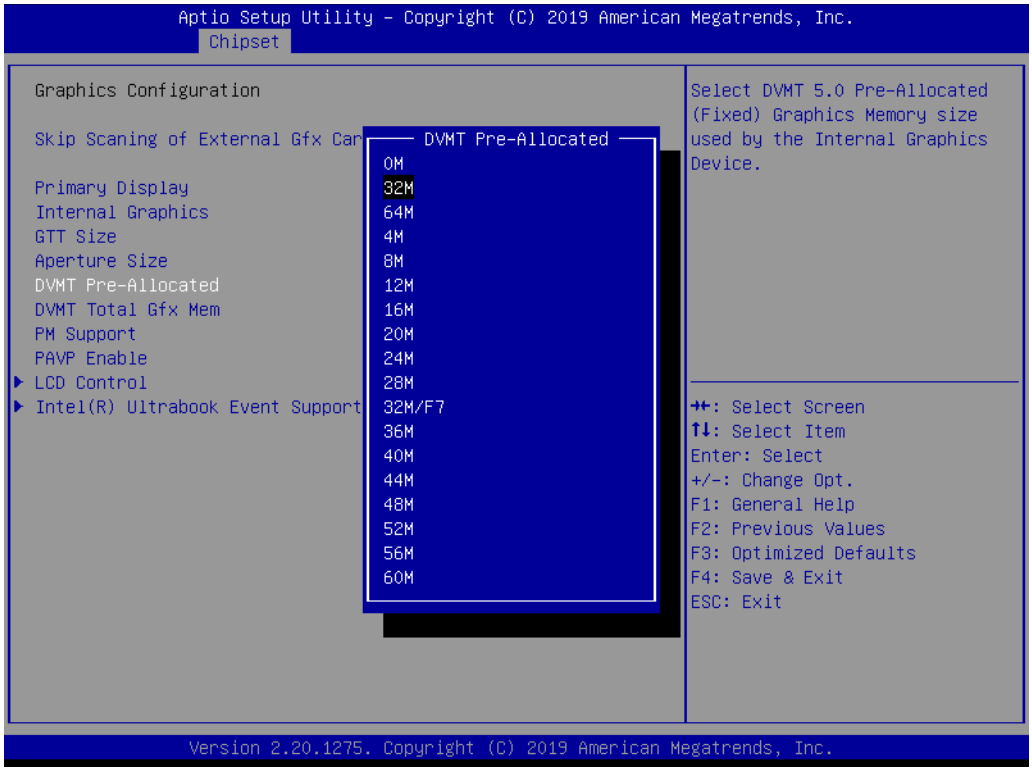


Figure 3.51 DVMT Pre-Allocated setting

DVMT Total Gfx Mem

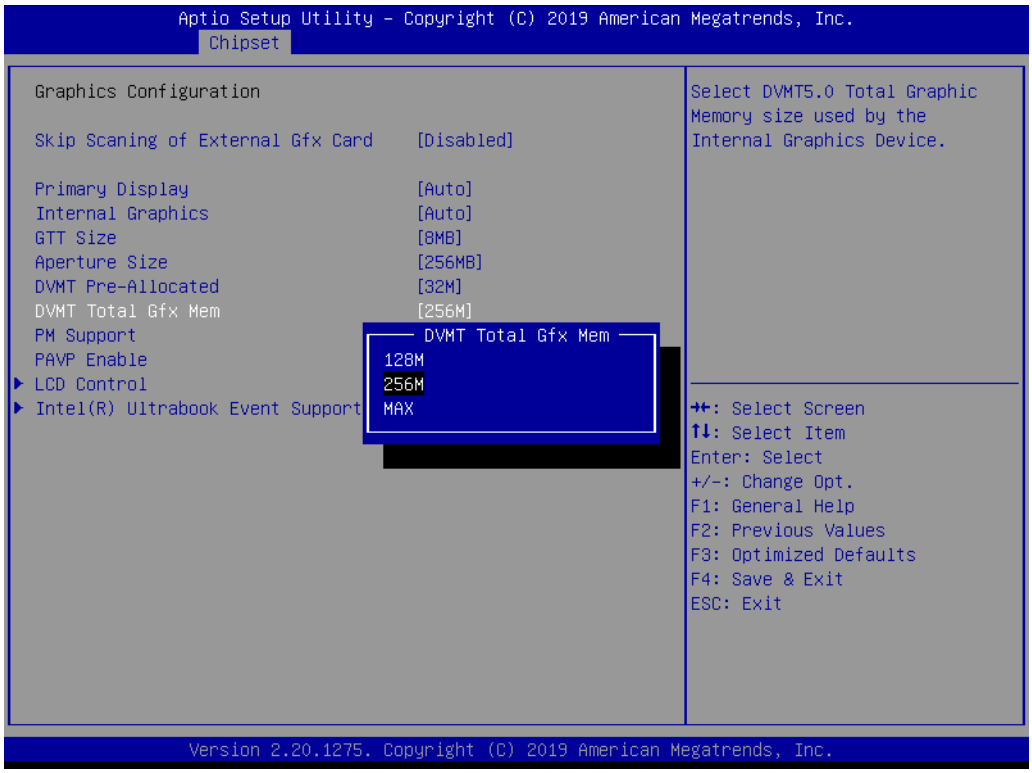


Figure 3.52 DVMT Total Gfx Mem setting

PM Support

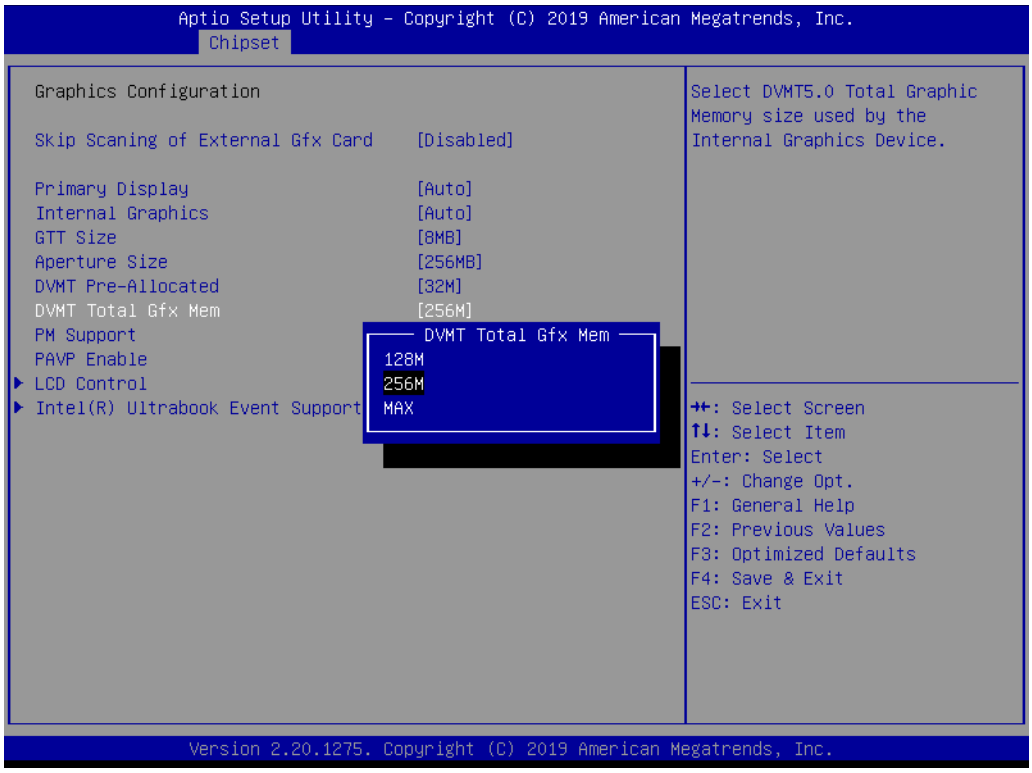


Figure 3.53 PM Support setting

- **PAVP Enable**
  PAVP Enable
  LCD Control

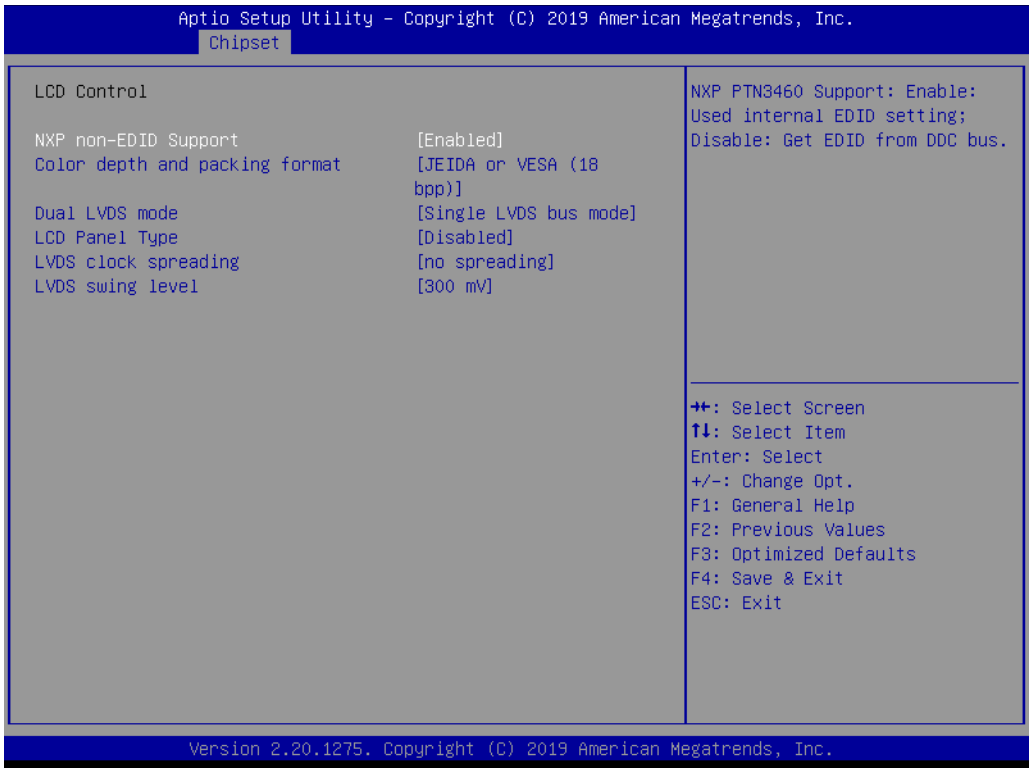


Figure 3.54 LCD Control setting

- **NXP non-EDID Support**
- **Color depth and packing format**

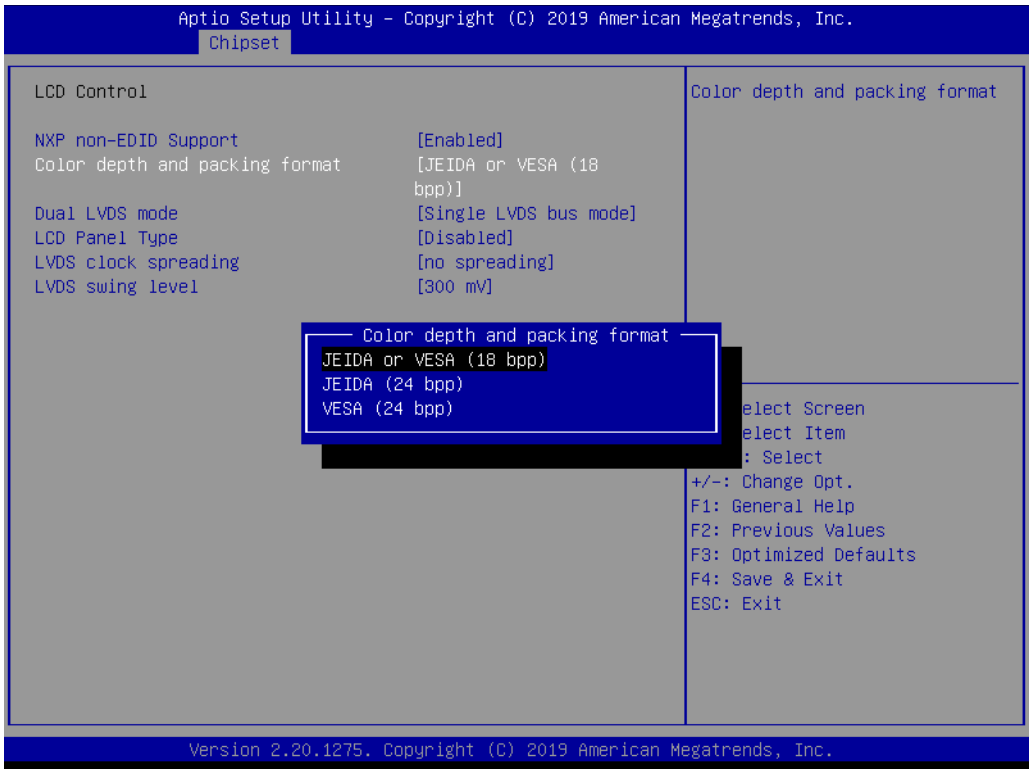


Figure 3.55 Color depth and packing format setting

Dual LVDS mode

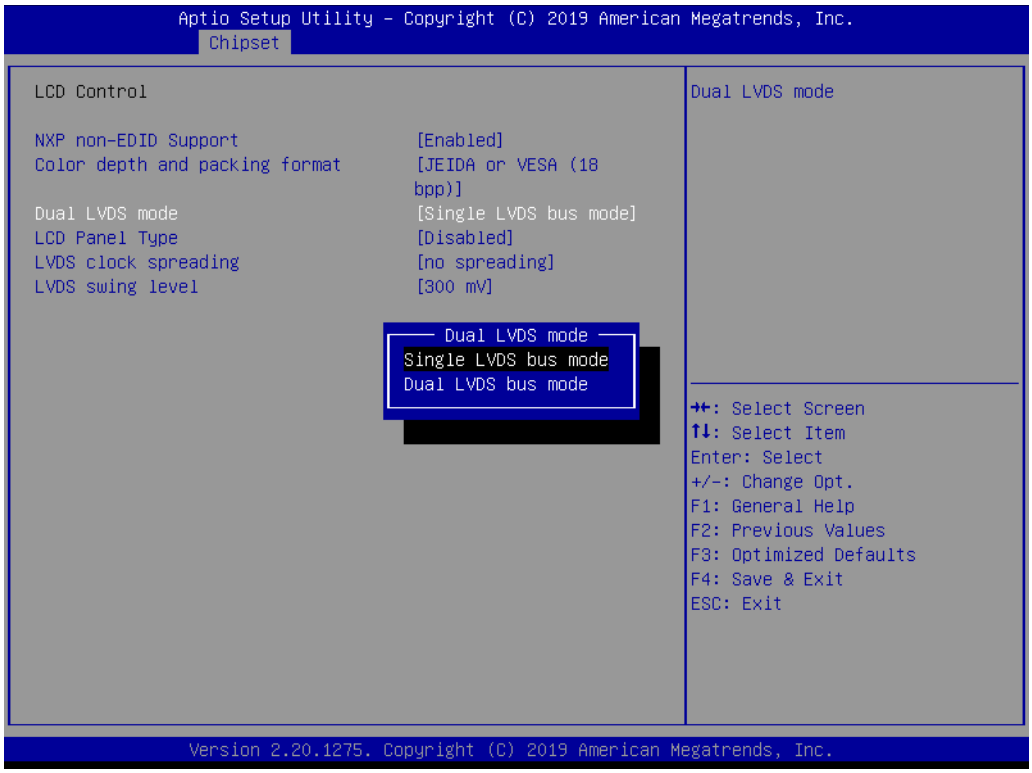


Figure 3.56 Dual LVDS mode setting

LCD Panel Type

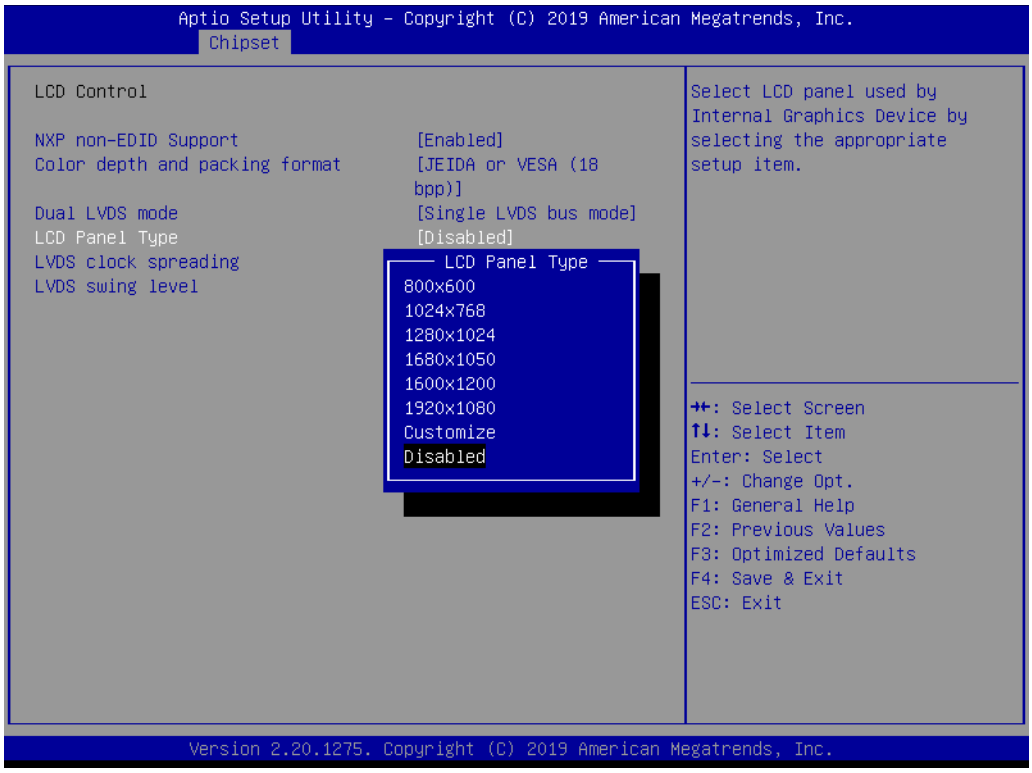


Figure 3.57 LCD Panel Type

LVDS clock spreading

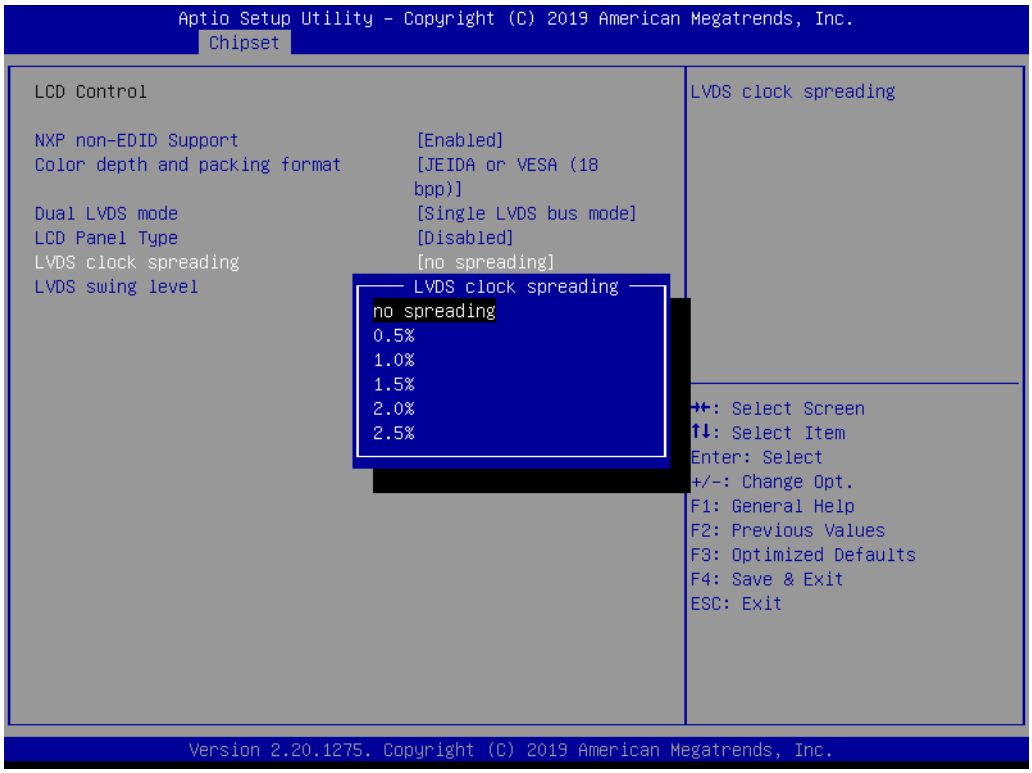


Figure 3.58 LVDS clock spreading setting

LVDS swing level

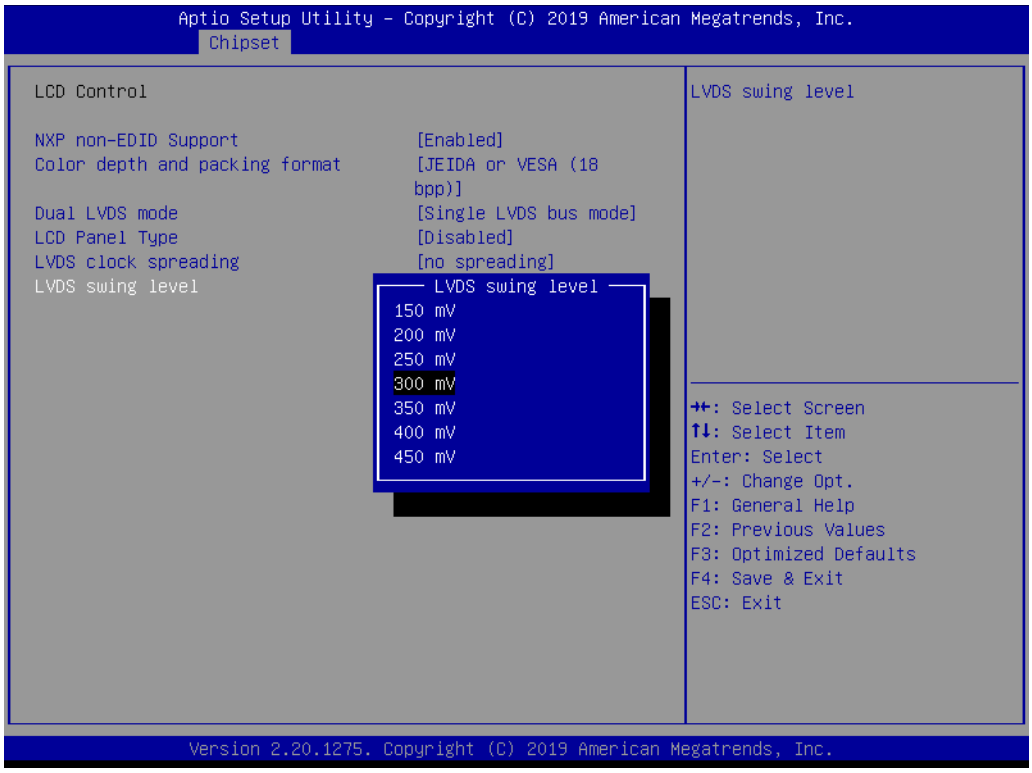


Figure 3.59 LVDS swing level setting

Intel® Ultrabook Event Support

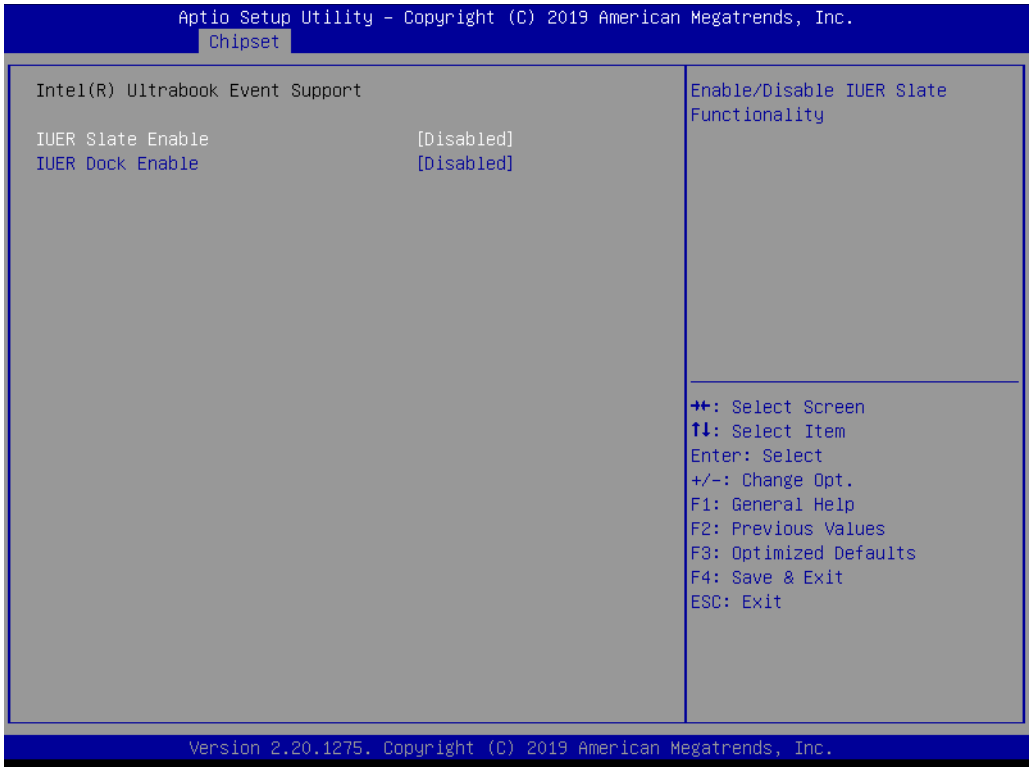


Figure 3.60 Intel® Ultrabook Event Support setting

3.5.2 PCH-IO Configuration

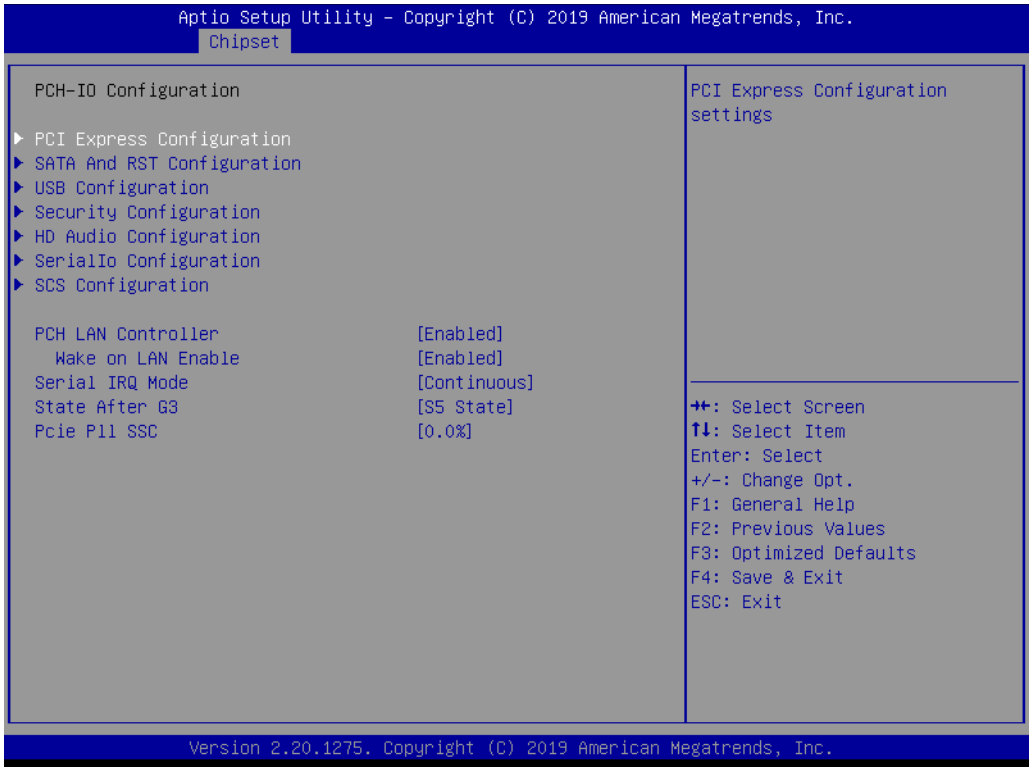


Figure 3.61 PCH-IO Configuration

- **PCI Express Configuration**
- **SATA And RST Configuration**
- **USB Configuration**
- **Security Configuration**
- **HD Audio Configuration**
- **Serial IO Configuration**
- **SCS Configuration**

PCH LAN Controller
Wake on LAN Enable
Serial IRQ Mode
State After G3
PCie Pll SSC

- **PCI Express Configuration**

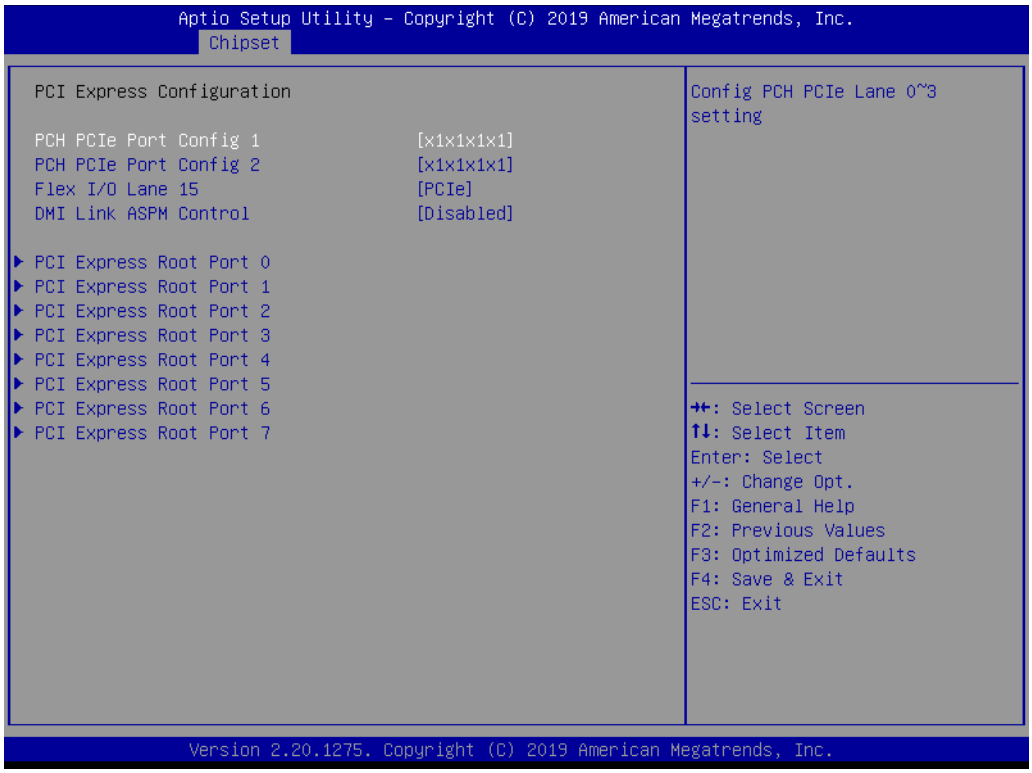


Figure 3.62 PCI Express Configuration

- **PCI Express Root Port 0**
  PCI Express Root Port 0 settings
- **PCI Express Root Port 1**
  PCI Express Root Port 1 settings.
- **PCI Express Root Port 2**
  PCI Express Root Port 2 settings.
- **PCI Express Root Port 3**
  PCI Express Root Port 3 settings
- **PCI Express Root Port 4**
  PCI Express Root Port 4 settings
- **PCI Express Root Port 5**
  PCI Express Root Port 2 settings.
- **PCI Express Root Port 6**
  PCI Express Root Port 3 settings.
- **PCI Express Root Port 7**
  PCI Express Root Port 4 settings.

- **PCI Express Root Port 0 Configuration**

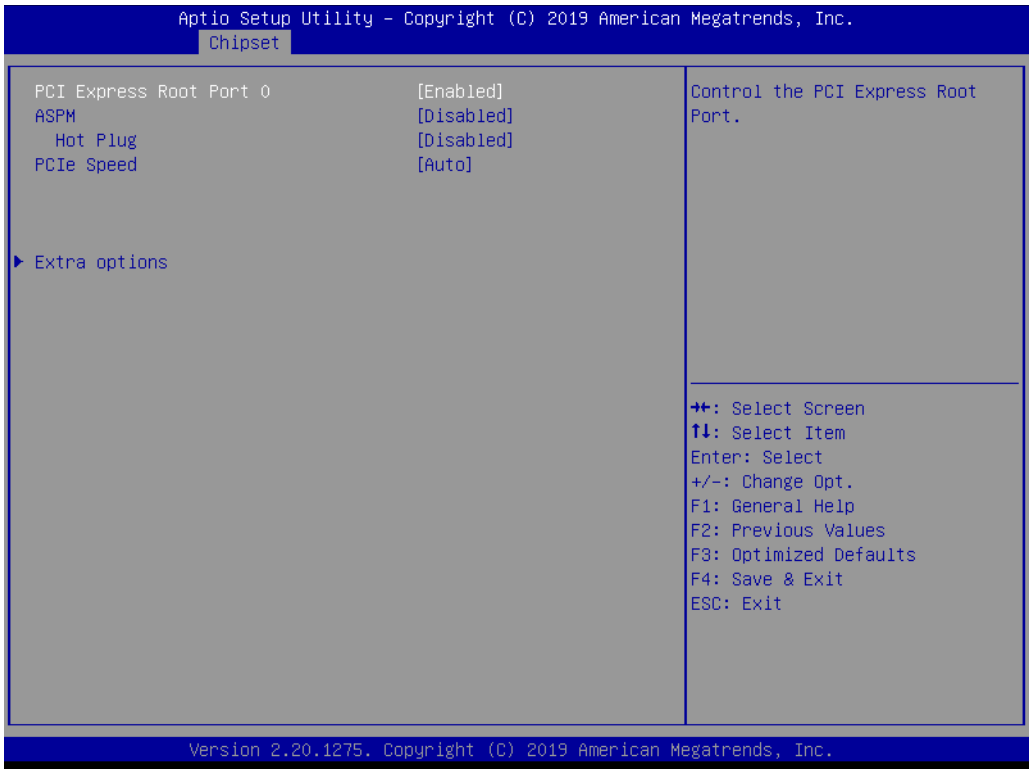


Figure 3.63 PCI Express Root Port 0 Configuration

- **PCI Express Root Port 0**
- **ASPM.**
  Hot Plug
- **PCIe Speed**

- **SATA And RST Configuration**

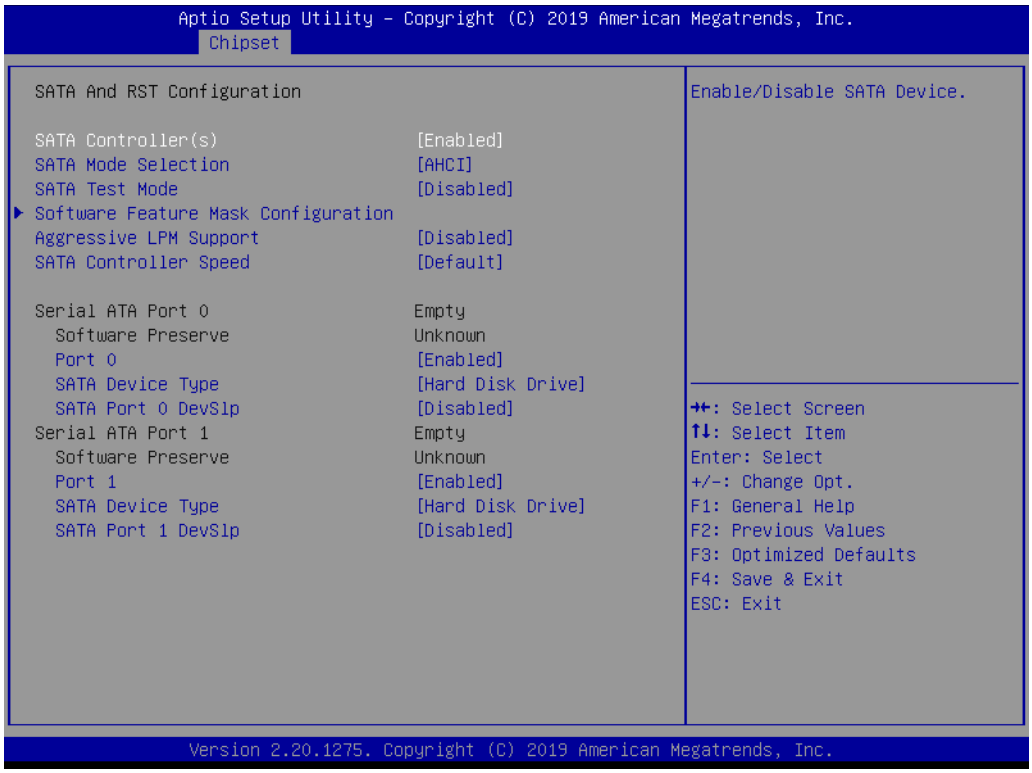


Figure 3.64 SATA And RST Configuration

- **SATA Controller(s)**
  Enable/Disable SATA Device.
- **SATA Mode Selection**
  Determines how SATA controller(s) operate.
- **Software Feature Mask Configuration**
  Enable/Disable SATA Device
- **Aggressive LPM Support**
- **SATA Controller Speed**
  Indicates the maximum speed the SATA controller can support.
- **Port 0**
  Enable or Disable SATA port.
  SATA Device Type
  SATA Port 0 DevSlp
- **Port 1**
  Enable or Disable SATA port.
  SATA Device Type
  SATA Port 0 DevSlp

USB Configuration

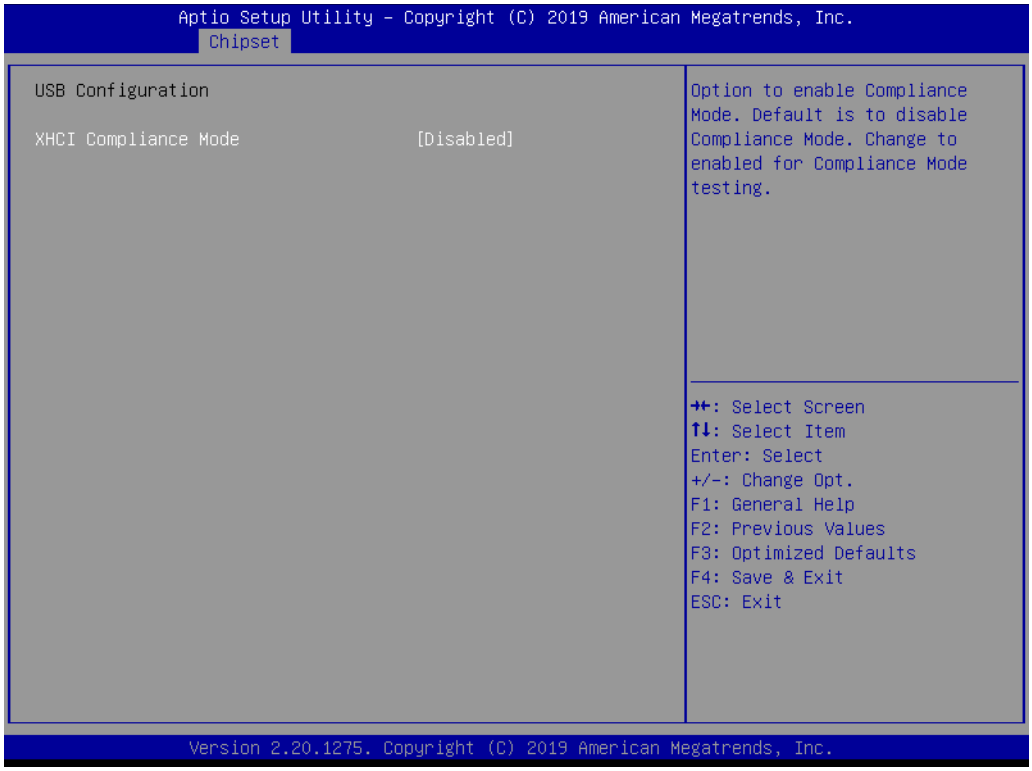


Figure 3.65 USB Configuration

- **XHCI Disable Compliance Mode**
  Options to disable Compliance Mode. Default is False which does not disable Compliance Mode. Set to TRUE to disable Compliance Mode.

- Security Configuration

Figure 3.66 Security Configuration setting

HD Audio Configuration

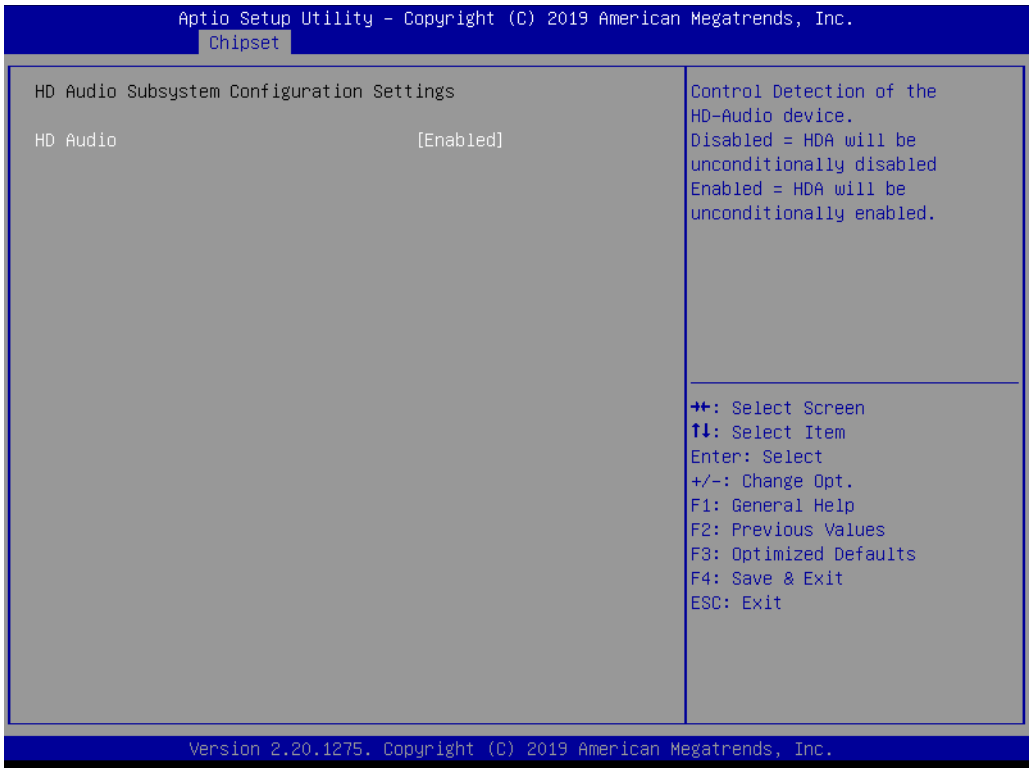


Figure 3.67 HD Audio Configuration

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

Security Configuration

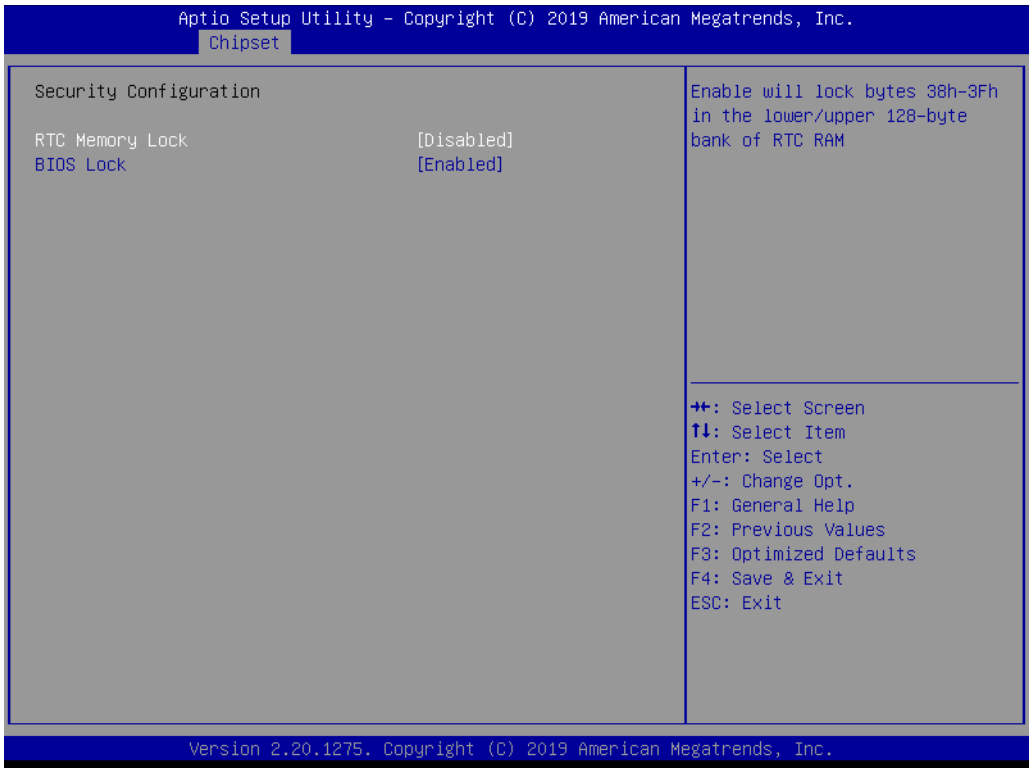


Figure 3.68 Security Configuration setting

- **RTC Memory Lock**
- **BIOS Lock**

Serial IO Configuration

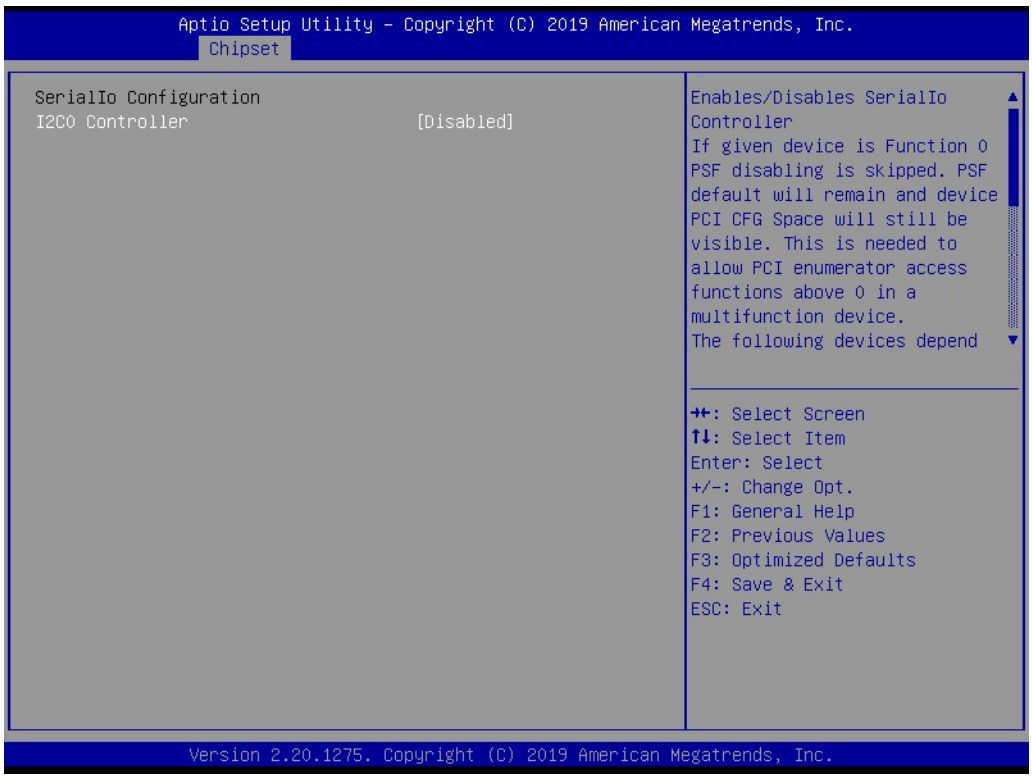


Figure 3.69 Serial IO Configuration setting

SCS Configuration

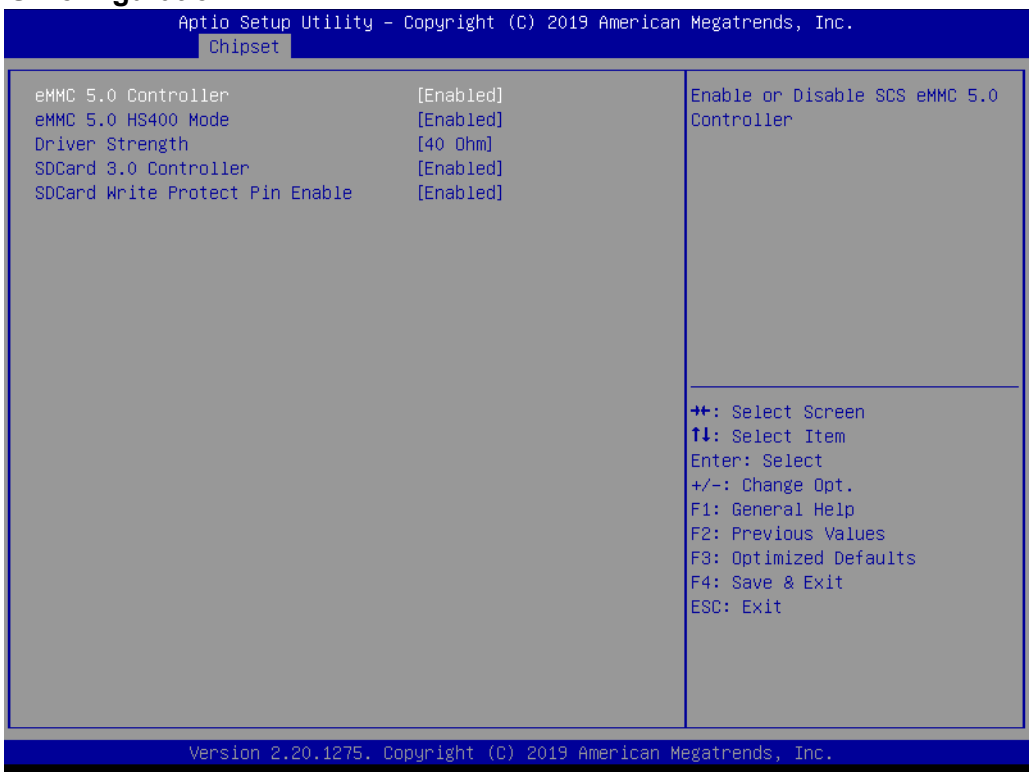


Figure 3.70 SCS Configuration setting

- **eMMC 5.0 Controller**
- **eMMC 5.0 HS400 Mode**
- **Driver Strength**
- **SDCard 3.0 Controller**
- **SDCard Write Protect Pin Enable**

3.5.3 Security Setting

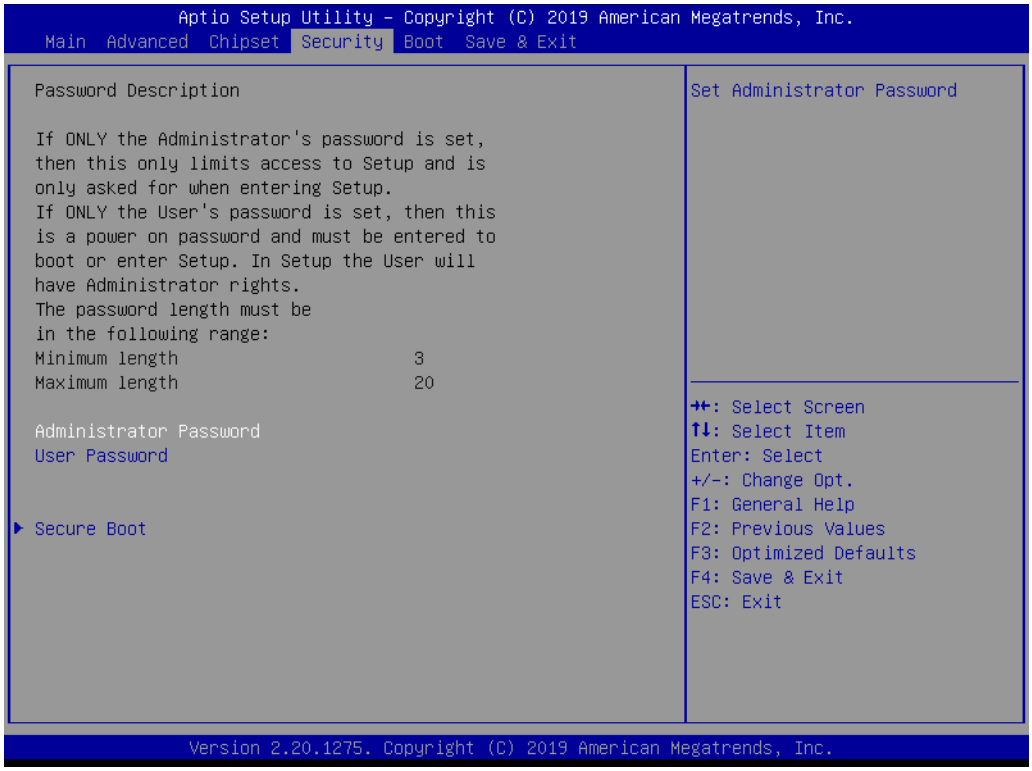


Figure 3.71 Security Setup

Select Security Setup from the SOM-6898 main BIOS setup menu. All Security Setup options, such as password protection is described in this section. To access the sub menu for the following items, select the item and press <Enter>:

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

3.5.4 Boot Settings

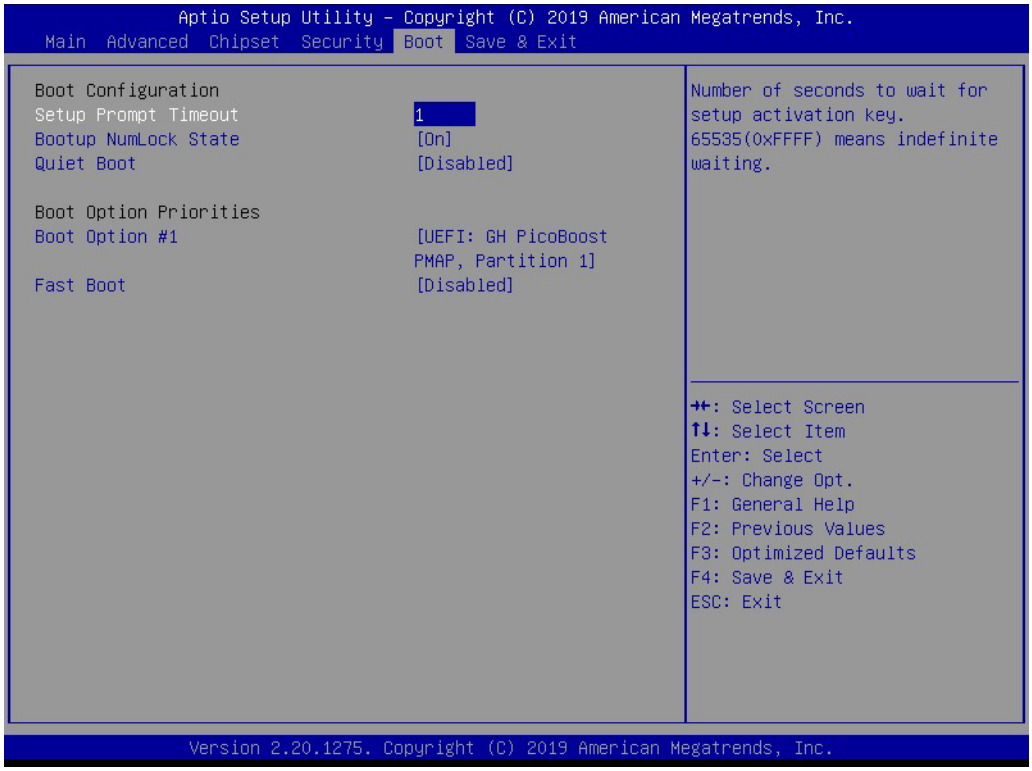


Figure 3.72 Security Setup

- **Setup Prompt Timeout**
- **Bootup NumLock State**
- **Quiet Boot**
  Boot option#1
- **Fast Boot**

3.5.5 Save & Exit

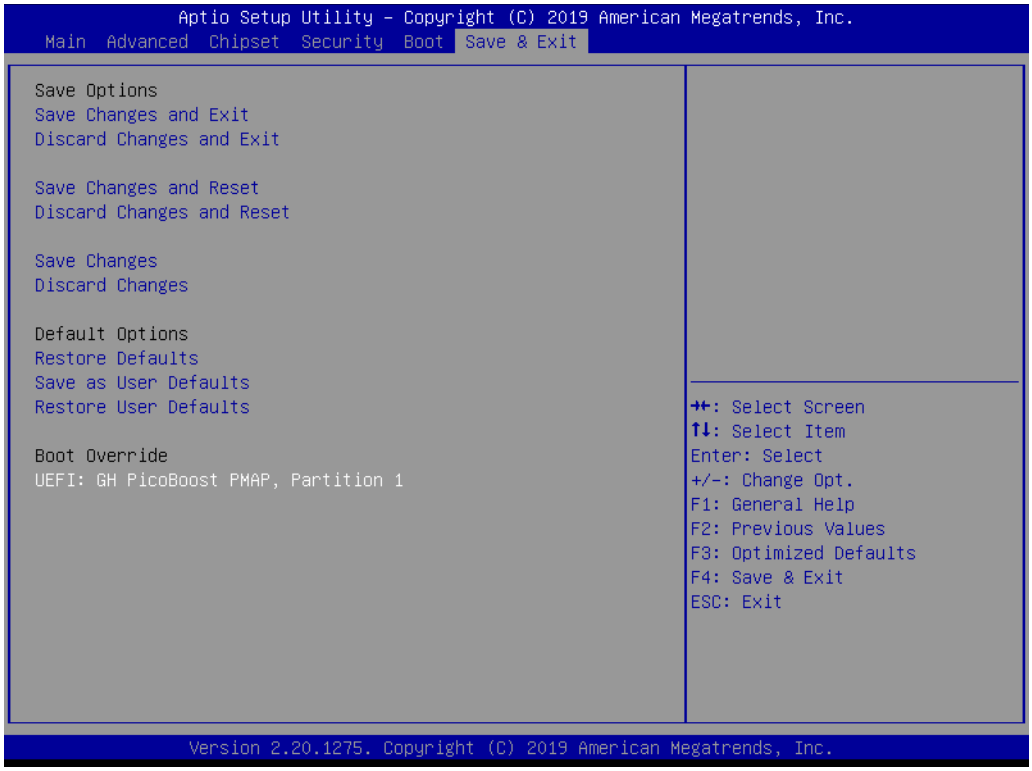


Figure 3.73 Security Setup

- **Save Changes and Exit**
- **Discard Changes and Exit**
- **Save Changes and Reset**
- **Discard Changes and Reset**
- **Save Changes**
- **Discard Changes**
- **Restore Defaults**
- **Save User Defaults**
- **Restore User Defaults**

Chapter 4

S/W Introduction & Installation

- S/W Introduction
- Driver Installation
- Advantech iManager

4.1 S/W Introduction

The mission of Advantech Embedded Software Services is to "Enhance quality of life with Advantech platforms and Microsoft Windows embedded technology" We enable Windows Embedded software products on Advantech platforms to more effectively support the embedded computing community. Customers are freed from the hassle of dealing with multiple vendors (Hardware suppliers, System integrators, Embedded OS distributor) for projects. Our goal is to make Windows Embedded Software solutions easily and widely available to the embedded computing community.

4.2 Driver Installation

The Intel Chipset Software Installation (CSI) utility installs the Windows INF files that outline to the operating system how the chipset components will be configured.

4.2.1 Windows Driver Setup

SOM-6882 supports Windows* 10 Enterprise. To install the drivers on a windows-based operation system, please connect to internet and browse the website http://support.advantech.com.tw and download the drivers that you want to install and follow Driver Setup instructions to complete the installation

4.2.2 Other OS

SOM-6882 supports Linux:

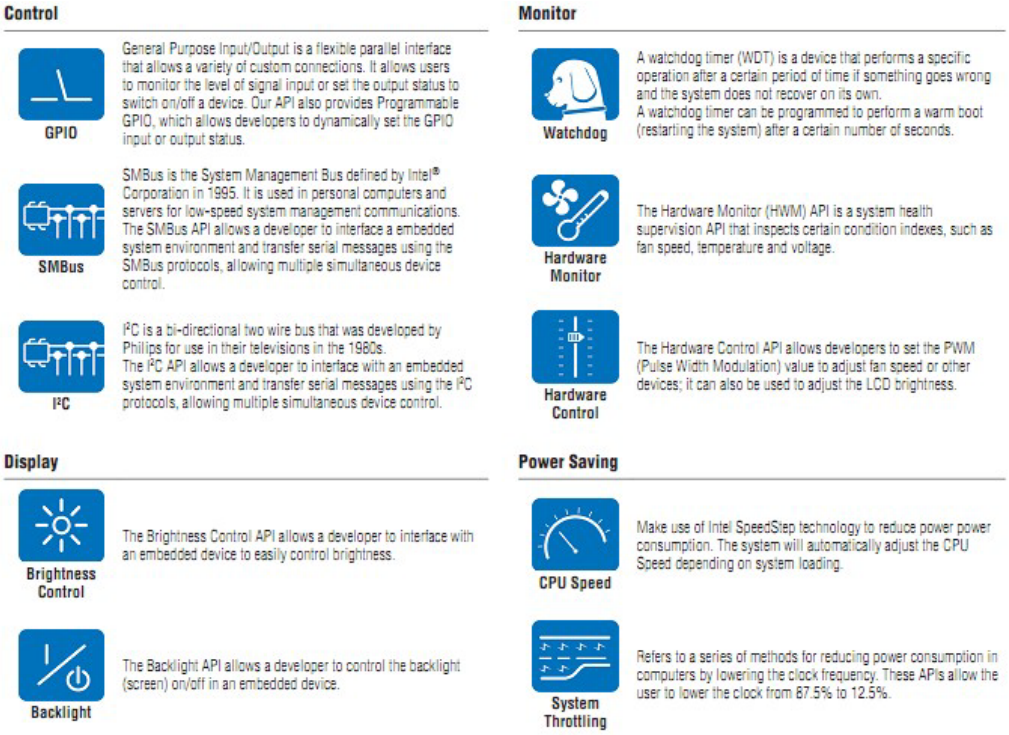
Ubuntu

Wind River VxWorks* 7.0

4.3 Advantech iManager

Advantech's platforms come equipped with iManager, a micro controller that provides embedded features for system integrators. Embedded features have been moved from the OS/BIOS level to the board level, to increase reliability and simplify integration.

iManager runs whether the operating system is running or not; it can count the boot times and running hours of the device, monitor device health, and provide an advanced watchdog to handle errors just as they happen. iManager also comes with a secure & encrypted EEPROM for storing important security key or other customer define information. All the embedded functions are configured through API and provide corresponding utilities to demonstrate. These APIs comply with PICMG EAPI (Embedded Application Programmable Interface) specification and unify in the same structures. It makes these embedded features easier to integrate, speed up developing schedule, and provide the customer's software continuity while upgrade hardware. More details of how to use the APIs and utilities, please refer to Advantech iManager 2.0 Software API User Manual



Appendix A

Pin Assignment

This appendix gives you the information about the hardware pin assignment of the SOM-6882 CPU System on Module.

Sections include:

- SOM-6882 Type 6 Pin Assignment

A.1 SOM-6882 Type 6 Pin Assignment

This section gives SOM-6882 pin assignment on COM Express connector which compliant with COMR.0 R3.0 Type 6 pin-out definitions. More details about how to use these pins and get design reference. Please contact to Advantech for design guide, checklist, reference schematic, and other hardware/software supports.

SOM-6882 Row A,B			
A1	GND (FIXED)	B1	GND (FIXED)
A2	GBE0_MDI3-	B2	GBE0_ACT#
A3	GBE0_MDI3+	B3	LPC_FRAME#
A4	GBE0_LINK100#	B4	LPC_AD0
A5	GBE0_LINK1000#	B5	LPC_AD1
A6	GBE0_MDI2-	B6	LPC_AD2
A7	GBE0_MDI2+	B7	LPC_AD3
A8	GBE0_LINK#	B8	N/A
A9	GBE0_MDI1-	B9	N/A
A10	GBE0_MDI1+	B10	LPC_CLK
A11	GND (FIXED)	B11	GND (FIXED)
A12	GBE0_MDI0-	B12	PWRBTN#
A13	GBE0_MDI0+	B13	SMB_CK
A14	N/A	B14	SMB_DAT
A15	SUS_S3#	B15	SMB_ALERT#
A16	SATA0_TX+	B16	SATA1_TX+
A17	SATA0_TX-	B17	SATA1_TX-
A18	SUS_S4#	B18	SUS_STAT#
A19	SATA0_RX+	B19	SATA1_RX+
A20	SATA0_RX-	B20	SATA1_RX-
A21	GND (FIXED)	B21	GND (FIXED)
A22	SATA2_TX+	B22	N/A
A23	SATA2_TX-	B23	N/A
A24	SUS_S5#	B24	PWR_OK
A25	SATA2_RX+	B25	N/A
A26	SATA2_RX-	B26	N/A
A27	BATLOW#	B27	WDT
A28	(S)ATA_ACT#	B28	N/A
A29	HDA_SYNC	B29	HDA_SDIN1
A30	HDA_RST#	B30	HDA_SDIN0
A31	GND (FIXED)	B31	GND (FIXED)
A32	HDA_BITCLK	B32	SPKR
A33	HDA_SDOUT	B33	I2C_CK
A34	BIOS_DIS0#	B34	I2C_DAT
A35	THRMTRIP#	B35	THRM#
A36	USB6-	B36	USB7-
A37	USB6+	B37	USB7+
A38	USB_6_7_OC#	B38	USB_4_5_OC#
A39	USB4-	B39	USB5-
A40	USB4+	B40	USB5+
A41	GND (FIXED)	B41	GND (FIXED)

A42	USB2-	B42	USB3-
A43	USB2+	B43	USB3+
A44	USB_2_3_OC#	B44	USB_0_1_OC#
A45	USB0-	B45	USB1-
A46	USB0+	B46	USB1+
A47	VCC_RTC	B47	N/A
A48	RSVD	B48	USB_HOST_PRSNT
A49	N/A	B49	SYS_RESET#
A50	LPC_SERIRQ	B50	CB_RESET#
A51	GND (FIXED)	B51	GND (FIXED)
A52	PCIE_TX5+	B52	PCIE_RX5+
A53	PCIE_TX5-	B53	PCIE_RX5-
A54	GPI0	B54	GPO1
A55	PCIE_TX4+	B55	PCIE_RX4+
A56	PCIE_TX4-	B56	PCIE_RX4-
A57	GND	B57	GPO2
A58	PCIE_TX3+	B58	PCIE_RX3+
A59	PCIE_TX3-	B59	PCIE_RX3-
A60	GND (FIXED)	B60	GND (FIXED)
A61	PCIE_TX2+	B61	PCIE_RX2+
A62	PCIE_TX2-	B62	PCIE_RX2-
A63	GPI1	B63	GPO3
A64	PCIE_TX1+	B64	PCIE_RX1+
A65	PCIE_TX1-	B65	PCIE_RX1-
A66	GND	B66	WAKE0#
A67	GPI2	B67	WAKE1#
A68	PCIE_TX0+	B68	PCIE_RX0+
A69	PCIE_TX0-	B69	PCIE_RX0-
A70	GND (FIXED)	B70	GND (FIXED)
A71	LVDS_A0+	B71	LVDS_B0+
A72	LVDS_A0-	B72	LVDS_B0-
A73	LVDS_A1+	B73	LVDS_B1+
A74	LVDS_A1-	B74	LVDS_B1-
A75	LVDS_A2+	B75	LVDS_B2+
A76	LVDS_A2-	B76	LVDS_B2-
A77	LVDS_VDD_EN	B77	LVDS_B3+
A78	LVDS_A3+	B78	LVDS_B3-
A79	LVDS_A3-	B79	LVDS_BKLT_EN
A80	GND (FIXED)	B80	GND (FIXED)
A81	LVDS_A_CK+	B81	LVDS_B_CK+
A82	LVDS_A_CK-	B82	LVDS_B_CK-
A83	LVDS_I2C_CK	B83	LVDS_BKLT_CTRL
A84	LVDS_I2C_DAT	B84	VCC_5V_SBY
A85	GPI3	B85	VCC_5V_SBY
A86	N/A (*Note)	B86	VCC_5V_SBY
A87	eDP_HPD	B87	VCC_5V_SBY
A88	PCIE_CLK_REF+	B88	BIOS_DIS1#
A89	PCIE_CLK_REF-	B89	VGA_RED

A90	GND (FIXED)	B90	GND (FIXED)
A91	SPI_POWER	B91	VGA_GRN
A92	SPI_MISO	B92	VGA_BLU
A93	GPO0	B93	VGA_HSYNC
A94	SPI_CLK	B94	VGA_VSYNC
A95	SPI_MOSI	B95	VGA_I2C_CK
A96	TPM_PP	B96	VGA_I2C_DAT
A97	N/A	B97	SPI_CS#
A98	SER0_TX	B98	N/A
A99	SER0_RX	B99	N/A
A100	GND (FIXED)	B100	GND (FIXED)
A101	SER1_TX	B101	FAN_PWMOUT
A102	SER1_RX	B102	FAN_TACHIN
A103	LID#	B103	SLEEP#
A104	VCC_12V	B104	VCC_12V
A105	VCC_12V	B105	VCC_12V
A106	VCC_12V	B106	VCC_12V
A107	VCC_12V	B107	VCC_12V
A108	VCC_12V	B108	VCC_12V
A109	VCC_12V	B109	VCC_12V
A110	GND (FIXED)	B110	GND (FIXED)
SOM-6882 Row C,D			
C1	GND (FIXED)	D1	GND (FIXED)
C2	GND	D2	GND
C3	USB_SSRX0-	D3	USB_SSTX0-
C4	USB_SSRX0+	D4	USB_SSTX0+
C5	GND	D5	GND
C6	USB_SSRX1-	D6	USB_SSTX1-
C7	USB_SSRX1+	D7	USB_SSTX1+
C8	GND	D8	GND
C9	USB_SSRX2-	D9	USB_SSTX2-
C10	USB_SSRX2+	D10	USB_SSTX2+
C11	GND (FIXED)	D11	GND (FIXED)
C12	USB_SSRX3-	D12	USB_SSTX3-
C13	USB_SSRX3+	D13	USB_SSTX3+
C14	GND	D14	GND
C15	N/A	D15	DDI1_CTRLCLK_AUX+
C16	N/A	D16	DDI1_CTRLDATA_AUX-
C17	N/A	D17	N/A
C18	N/A	D18	N/A
C19	PCIE_RX6+	D19	PCIE_TX6+
C20	PCIE_RX6-	D20	PCIE_TX6-
C21	GND (FIXED)	D21	GND (FIXED)
C22	PCIE_RX7+	D22	PCIE_TX7+
C23	PCIE_RX7-	D23	PCIE_TX7-
C24	DDI1_HPD	D24	N/A
C25	N/A	D25	N/A
C26	N/A	D26	DDI1_PAIR0+

C27	N/A	D27	DDI1_PAIR0-
C28	N/A	D28	N/A
C29	N/A	D29	DDI1_PAIR1+
C30	N/A	D30	DDI1_PAIR1-
C31	GND (FIXED)	D31	GND (FIXED)
C32	DDI2_CTRLCLK_AUX+	D32	DDI1_PAIR2+
C33	DDI2_CTRLDATA_AUX-	D33	DDI1_PAIR2-
C34	DDI2_DDC_AUX_SEL	D34	DDI1_DDC_AUX_SEL
C35	N/A	D35	N/A
C36	N/A	D36	DDI1_PAIR3+
C37	N/A	D37	DDI1_PAIR3-
C38	N/A	D38	N/A
C39	N/A	D39	DDI2_PAIR0+
C40	N/A	D40	DDI2_PAIR0-
C41	GND (FIXED)	D41	GND (FIXED)
C42	N/A	D42	DDI2_PAIR1+
C43	N/A	D43	DDI2_PAIR1-
C44	N/A	D44	DDI2_HPD
C45	N/A	D45	N/A
C46	N/A	D46	DDI2_PAIR2+
C47	N/A	D47	DDI2_PAIR2-
C48	N/A	D48	N/A
C49	N/A	D49	DDI2_PAIR3+
C50	N/A	D50	DDI2_PAIR3-
C51	GND (FIXED)	D51	GND (FIXED)
C52	N/A	D52	N/A
C53	N/A	D53	N/A
C54	N/A	D54	N/A
C55	N/A	D55	N/A
C56	N/A	D56	N/A
C57	N/A	D57	TYPE2# (GND)
C58	N/A	D58	N/A
C59	N/A	D59	N/A
C60	GND (FIXED)	D60	GND (FIXED)
C61	N/A	D61	N/A
C62	N/A	D62	N/A
C63	N/A	D63	N/A
C64	N/A	D64	N/A
C65	N/A	D65	N/A
C66	N/A	D66	N/A
C67	RAPID_SHUTDOWN	D67	GND
C68	N/A	D68	N/A
C69	N/A	D69	N/A
C70	GND (FIXED)	D70	GND (FIXED)
C71	N/A	D71	N/A
C72	N/A	D72	N/A
C73	GND	D73	GND
C74	N/A	D74	N/A

C75	N/A	D75	N/A
C76	GND	D76	GND
C77	N/A	D77	N/A
C78	N/A	D78	N/A
C79	N/A	D79	N/A
C80	GND (FIXED)	D80	GND (FIXED)
C81	N/A	D81	N/A
C82	N/A	D82	N/A
C83	N/A	D83	N/A
C84	GND	D84	GND
C85	N/A	D85	N/A
C86	N/A	D86	N/A
C87	GND	D87	GND
C88	N/A	D88	N/A
C89	N/A	D89	N/A
C90	GND (FIXED)	D90	GND (FIXED)
C91	N/A	D91	N/A
C92	N/A	D92	N/A
C93	GND	D93	GND
C94	N/A	D94	N/A
C95	N/A	D95	N/A
C96	GND	D96	GND
C97	N/A	D97	RSVD
C98	N/A	D98	N/A
C99	N/A	D99	N/A
C100	GND (FIXED)	D100	GND (FIXED)
C101	N/A	D101	N/A
C102	N/A	D102	N/A
C103	GND	D103	GND
C104	VCC_12V	D104	VCC_12V
C105	VCC_12V	D105	VCC_12V
C106	VCC_12V	D106	VCC_12V
C107	VCC_12V	D107	VCC_12V
C108	VCC_12V	D108	VCC_12V
C109	VCC_12V	D109	VCC_12V
C110	GND (FIXED)	D110	GND (FIXED)

Note! *A86 could be an optional pin reserved for SD_PWR_EN. Please contact FAE for details.*

Appendix B

Watchdog Timer

This appendix gives you the information about the watchdog timer programming on the SOM-6882 CPU System on Module.

Sections include:

- Watchdog Timer Programming

B.1 Programming the Watchdog Timer

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

** WDT new driver support automatically select available IRQ number from BIOS, and then set to EC. Only Win10 support it.

In other OS, it will still use IRQ number from BIOS setting as usual.

For details, please refer to iManager & Software API User Manual.

Appendix C

Programming GPIO

This Appendix gives the illustration of the General Purpose Input and Output pin setting.

Sections include:

- System I/O ports

C.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

For details, please refer to iManager & Software API User Manual.

Appendix D

System Assignments

This appendix gives you the information about the system resource allocation on the SOM-6882 CPU System on Module.

Sections include:

- System I/O ports
- DMA Channel Assignments
- Interrupt Assignments
- 1st MB Memory Map

D.1 System I/O Ports

Table D.1: System I/O ports

Addr.Range(Hex)	Device
0000-0CF7	PCI Express Root Complex
0020-0021	Programmable interrupt controller
0024-0025	Programmable interrupt controller
0028-0029	Programmable interrupt controller
002C-002D	Programmable interrupt controller
002E-002F	Motherboard resources
0030-0031	Programmable interrupt controller
0034-0035	Programmable interrupt controller
0038-0039	Programmable interrupt controller
003C-003D	Programmable interrupt controller
0040-0043	System timer
004E-004F	Motherboard resources
0050-0053	System timer
0060-0060	Standard PS/2 Keyboard
0061-0061	Motherboard resources
0062-0062	Microsoft ACPI-Compliant Embedded Controller
0063-0063	Motherboard resources
0065-0065	Motherboard resources
0066-0066	Microsoft ACPI-Compliant Embedded Controller
0067-0067	Motherboard resources
0070-0070	Motherboard resources
0070-0077	System CMOS/real time clock
0080-0080	Motherboard resources
0092-0092	Motherboard resources
00A0-00A1	Programmable interrupt controller
00A4-00A5	Programmable interrupt controller
00A8-00A9	Programmable interrupt controller
00AC-00AD	Programmable interrupt controller
00B0-00B1	Programmable interrupt controller
00B2-00B3	Motherboard resources
00B4-00B5	Programmable interrupt controller
00B8-00B9	Programmable interrupt controller
00BC-00BD	Programmable interrupt controller
00F0-00F0	Numeric data processor
0200-027F	Motherboard resources
0280-028F	Motherboard resources
0290-029F	Motherboard resources
0299-029A	Motherboard resources
029E-02AD	Motherboard resources
02A0-02BF	Motherboard resources
02C0-02DF	Motherboard resources
02F0-02F7	Motherboard resources
02F8-02FF	Communications Port (COM2)

Table D.1: System I/O ports	
0300-037F	Motherboard resources
03F8-03FF	Communications Port (COM1)
04D0-04D1	Programmable interrupt controller
0680-069F	Motherboard resources
0D00-FFFF	PCI Express Root Complex
164E-164F	Motherboard resources
1800-18FE	Motherboard resources
1854-1857	Motherboard resources
2000-20FE	Motherboard resources
3000-303F	Intel(R) UHD Graphics 630
3060-307F	Standard SATA AHCI Controller
3080-3083	Standard SATA AHCI Controller
3090-3097	Standard SATA AHCI Controller
EFA0-EFBF	Intel(R) SMBus – A323
FFF8-FFFF	Intel(R) Active Management Technology – SOL (COM3)

D.2 Interrupt Assignments

Table D.2: Interrupt Assignments

Interrupt#	Interrupt Source
IRQ 0	System Timer
IRQ 3	Communications Port (COM2)
IRQ 4	Communications Port (COM1)
IRQ 6	Motherboard resources
IRQ 8	System CMOS/real time clock
IRQ 13	Numeric data processor
IRQ 14	Intel(R) Serial IO GPIO host Controller – INT3450
IRQ 54~511	Microsoft ACPI-Compliant System
IRQ 11	Intel(R) SMBus – A323
IRQ 11	Intel(R) Thermal subsystem – A379
IRQ 16	High Definition Audio Controller
IRQ 19	Intel SD Host Controller
IRQ 19	Intel(R) Active Management Technology – SOL (COM3)
IRQ 1024	Intel SD Host Controller
IRQ 0xFFFFFFFA (-6)	Intel(R) Ethernet Connection (7) I219-LM
IRQ 0xFFFFFFFB (-5)	Intel(R) Management Engine Interface
IRQ 0xFFFFFFFC(-4)	Intel(R) USB 3.1 eXtensible Host Controller – 1.10 (Microsoft)
IRQ 0xFFFFFFFD (-3)	Intel(R) UHD Graphics 630
IRQ 0xFFFFFFFE (-2)	Standard SATA AHCI Controller

D.3 1st MB Memory Map

Table D.3: 1st MB Memory Map	
Addr. Range (Hex)	Device
0x000A0000-0x000BFFFF	PCI Express Root Complex
0x90000000-0x9FFFFFFF	Intel(R) UHD Graphics 630
0x90000000-0xDFFFFFFF	PCI Express Root Complex
0xA0000000-0xA0FFFFFF	Intel(R) UHD Graphics 630
0xA1000000-0xA10FFFFF	High Definition Audio Controller
0xA1100000-0xA111FFFF	Intel(R) Ethernet Connection (7) I219-LM
0xA1120000-0xA112FFFF	Intel(R) USB 3.1 eXtensible Host Controller – 1.10 (Microsoft)
0xA1130000-0xA1133FFF	High Definition Audio Controller
0xA1134000-0xA1135FFF	Standard SATA AHCI Controller
0xA1138000-0xA11380FF	Intel(R) SMBus – A323
0xA1139000-0xA11397FF	Standard SATA AHCI Controller
0xA113A000-0xA113A0FF	Standard SATA AHCI Controller
0xA113D000-0xA113DFFF	Intel SD Host Controller
0xA113F000-0xA113FFFF	Intel(R) Thermal Subsystem – A379
0xE0000000-0xEFFFFFFF	Motherboard resources
0xFC800000-0xFE7FFFFF	PCI Express Root Complex
0xFD000000-0xFD69FFFF	Motherboard resources
0xFD6A0000-0xFD6AFFFF	Intel(R) Serial IO GPIO host Controller – INT3450
0xFD6B0000-0xFD6BFFFF	Intel(R) Serial IO GPIO host Controller – INT3450
0xFD6C0000-0xFD6CFFFF	Motherboard resources
0xFD6D0000-0xFD6DFFFF	Intel(R) Serial IO GPIO host Controller – INT3450
0xFD6E0000-0xFD6EFFFF	Intel(R) Serial IO GPIO host Controller – INT3450
0xFD6F0000-0xFDFFFFFF	Motherboard resources
0xFE000000-0xFE01FFFF	Motherboard resources

Table D.3: 1st MB Memory Map	
0xFE010000- 0xFE010FFF	Intel(R) SPI (flash) Controller – A324
0xFE1FE000- 0xFE1FEFFF	Intel(R) Management Engine Interface
0xFE1FF000- 0xFE1FFFFF	Intel(R) Active Management Technology – SOL (COM3)
0xFE200000- 0xFE7FFFFF	Motherboard resources
0xFED00000- 0xFED003FF	High precision event timer
0xFED10000- 0xFED17FFF	Motherboard resources
0xFED18000- 0xFED18FFF	Motherboard resources
0xFED19000- 0xFED19FFF	Motherboard resources
0xFED20000- 0xFED3FFFF	Motherboard resources
0xFED45000- 0xFED8FFFF	Motherboard resources
0xFED90000- 0xFED93FFF	Motherboard resources
0xFEE00000- 0xFEEFFFFF	Motherboard resources
0xFF000000- 0xFFFFFFFFF	Motherboard resources

ADVANTECH

Enabling an Intelligent Planet

www.advantech.com