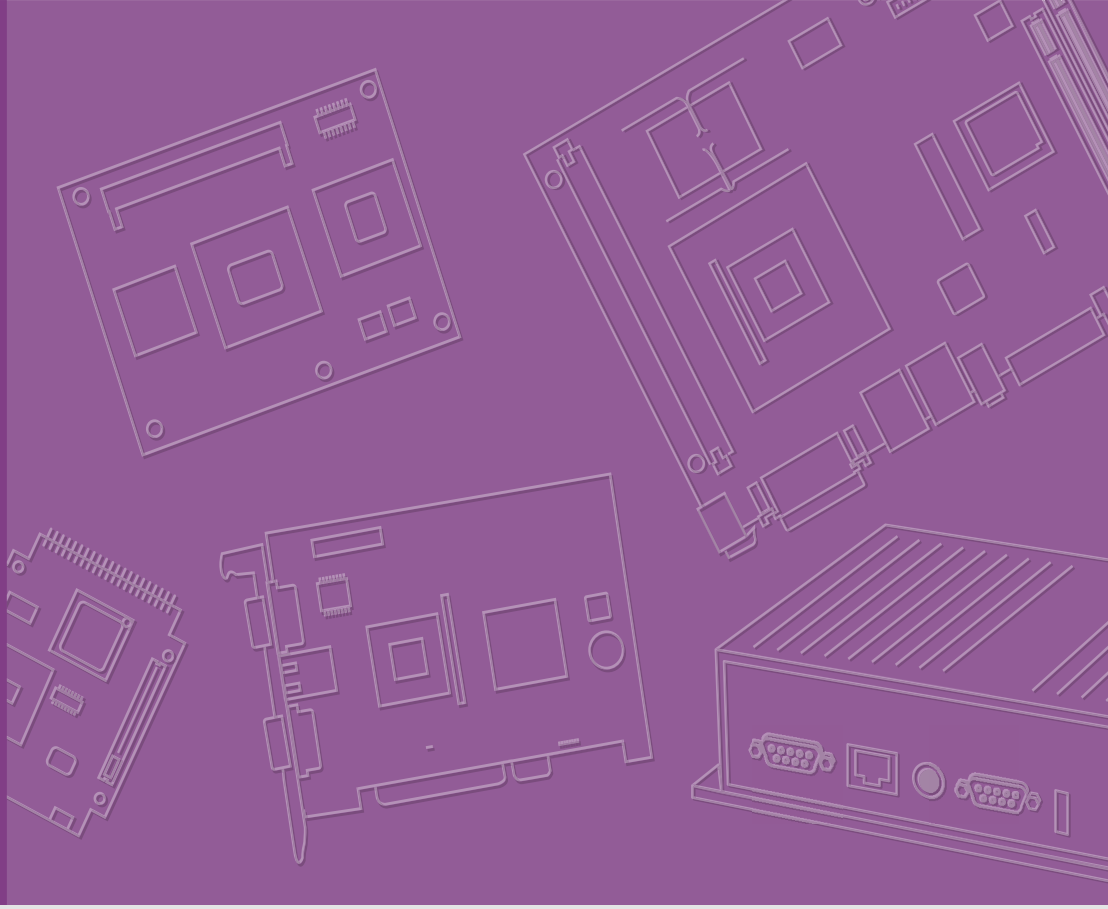

User Manual

SOM-5897

COM Express Compact Module

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 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. 2006589700 Edition 1

Printed in Taiwan August 2016

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-5897 CPU module
- 1 x Heatspreader (1960073944N001)

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.

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Chapter 1

General Information

This chapter gives background information on the SOM-5897 CPU Computer on Module.

Sections include:

- Introduction
- Specification
- Functional Block Diagram

1.1 Introduction

SOM-5897 is equipped with the Intel® 6th Generation Core™/ Celeron/ Xeon product family, which are manufactured on Intel 14nm process technology. SOM-5897 ECC/non-ECC memory supports DDR4 2133MT/s with 1.2V power design, and up to 32GB of dual channel. SOM-5897 not only supports higher memory bandwidth, but also has 33% better battery life than previous generations. SOM-5897 is able to support 8 x PCIex1 as well as x4, x8 configurations if requested. Most important of all, SOM-5897 adopts a 28mm low profile cooler with a TDP of 45watt at 60°C ambient temperature (optional accessory). SOM-5897 is suitable for rich I/O applications with high performance requirements, such as ultra sound, military, broadcasting, and industrial automation fields.

Compared with previous generations there is 30% improvement in processor performance and up to 50% better 3D graphics. It supports Qual/ Dual core CPU with GT4e/ GT2, DX12, OpenGL 4.4, and OpenCL 2.0 functions. In addition, multiple displays are supported such as dual or triple displays. HDMI/DisplayPort with 4K2K resolution and dual channel LVDS and 16 simultaneous channels at 1920x1080 full HD resolution are also available.

Advantech iManager was designed to satisfy a lot of embedded application requirements for monitoring and management of voltage and temperatures, thermal protection through processor throttling, LCD backlight on/off and brightness control and more. Combined Advantech SUSI Access, it can remotely monitor and control devices through the internet for easy maintenance and configuration. All Advantech COM Express modules integrate iManager and SUSI Access.

SOM-5897 is suitable for computing intensive designs, thermally sensitive applications, graphics/media insensitive designs and I/O demanding applications.

1.2 Specifications

1.2.1 Board Information

- **Pin Definition:** PICMG COM.0 R2.1 Type 6 pin-out definition
- **Form Factor:** PICMG COM.0 R2.1 Compact Module 95 x 95 mm

1.2.2 System Information

- **CPU:** 6th Gen Intel® Core Processors

CPU	Standard Freq.	Max. Turbo Freq.	Core	Cache (MB)	TDP(W)
i7-6820EQ	2.8GHz	3.5GHz	4	8	45
I7-6822EQ	2.0GHz	2.8GHz	4	8	25
i5-6440EQ	2.7GHz	3.4GHz	4	6	45
i5-6442EQ	1.9GHz	2.7GHz	4	6	25
i3-6100E	2.7GHz	NA	2	3	35
i3-6102E	1.9GHz	NA	2	3	25
G3900E	2.4GHz	NA	2	2	35
E3-1505M V5	2.8GHz	3.7GHz	4	8	45
E3-1505L V5	2.0GHz	2.8GHz	4	8	25
E3-1515M V5	2.8GHz	3.7GHz	4	8	45

- **Memory:** 2 SODIMM socket for DDR4 2133, up to 32GB
- **BIOS:** AMI UEFI

- **Power management:** Supports power saving modes including Normal / Standby / Suspend modes. ACPI 2.0 compliant

1.2.3 Display

- Graphic Core: Intel® Gen9 HD/P530/P580 Graphic supports DX12, OGL4.4, OCL2.0, and MPEG2, HEVC/H265, VC1/WMV9 HW decode/encode/transcode acceleration

CPU	Graphics Core	Base Freq.	Max Freq.
i7-6820EQ	Gen9 HD Graphic	350MHz	1000MHz
I7-6822EQ	Gen9 HD Graphic	350MHz	1000MHz
i5-6440EQ	Gen9 HD Graphic	350MHz	1000MHz
i5-6442EQ	Gen9 HD Graphic	350MHz	1000MHz
i3-6100E	Gen9 HD Graphic	350MHz	950MHz
i3-6102E	Gen9 HD Graphic	350MHz	950MHz
G3900E	Gen9 HD Graphic	350MHz	950MHz
E3-1505M V5	HD Graphic P530	350MHz	1050MHz
E3-1505L V5	HD Graphic P530	350MHz	1000MHz
E3-1515M V5	HD Graphic P580	350MHz	1000MHz

- **VGA:** Resolution up to 1920 x 1200
- **LVDS:** Supports single/dual channel 18/24-bit, resolution up to 1920 x 1200 @ 60 Hz
-
- **HDMI/DVI/DP:** Supports 3 ports HDMI (default), DVI, or DP multiplexed.
  Resolution: HDMI up to 4096 x 2160 @24Hz
  DVI up to 1920 x 1080 @ 60 Hz
  DP up to 4096 x 2304@60Hz 24bpp
- **Dual Display:**
  - VGA + LVDS,
  - VGA + HDMI/DVI/DP,
  - LVDS + HDMI/DVI/DP,
  - HDMI/DVI/DP + HDMI/DVI/DP
- **Triple Display:**
  - LVDS + DP + DP/HDMI,
  - LVDS + DP + VGA,
  - LVDS + HDMI + HDMI,
  - DP + DP + DP,
  - DP + HDMI +HDMI,
  - DVI + DP + HDMI,
  - VGA + DP + HDMI

1.2.4 Expansion Interface

- **PCI Express x1:** Supports default 8 PCIe x1 compliant ports to PCIe Gen3 (8.0 GT/s) specification; optionally configurable to PCIe x4 or PCIe x2. Several configurable combinations may need BIOS modification. Please contact Advantech sales or FAE for more details.
- **Audio Interface:** Intel HD Audio interface
- **LPC Bus**

- **SMBus**
- **I2C Bus:** Up to 400KHz
- **SPI:** Supports SPI BIOS only

1.2.5 I/O

- **Ethernet:** Intel I219LM Gigabit LAN supports 10/100/1000 Mbps Speed
- **SATA:** Supports 4 ports SATA Gen3 (600 Gb/s)
- **USB Interface:** Supports 4 ports USB3.0, 8 ports USB 2.0
- **Serial Port:** Supports 2 ports 2-wire serial port
- **Express Card:** 2 ports
- **Panel Control:** Supports panel backlight on/off control, brightness control
- **Thermal Protection:** Supports thermal shutdown or CPU throttling
- **Watchdog Timer:** 65536 level timer interval, from 0~65535 sec, multi-level, multi-option watchdog timer
- **Smart Fan:** 1 port on Module, 1 port down to carrier board
- **GPIO:** 8-bit GPIO
- **Hardware Monitor:** Vin, 5VSB, CMOS
- **TPM:** BOM option, default not available

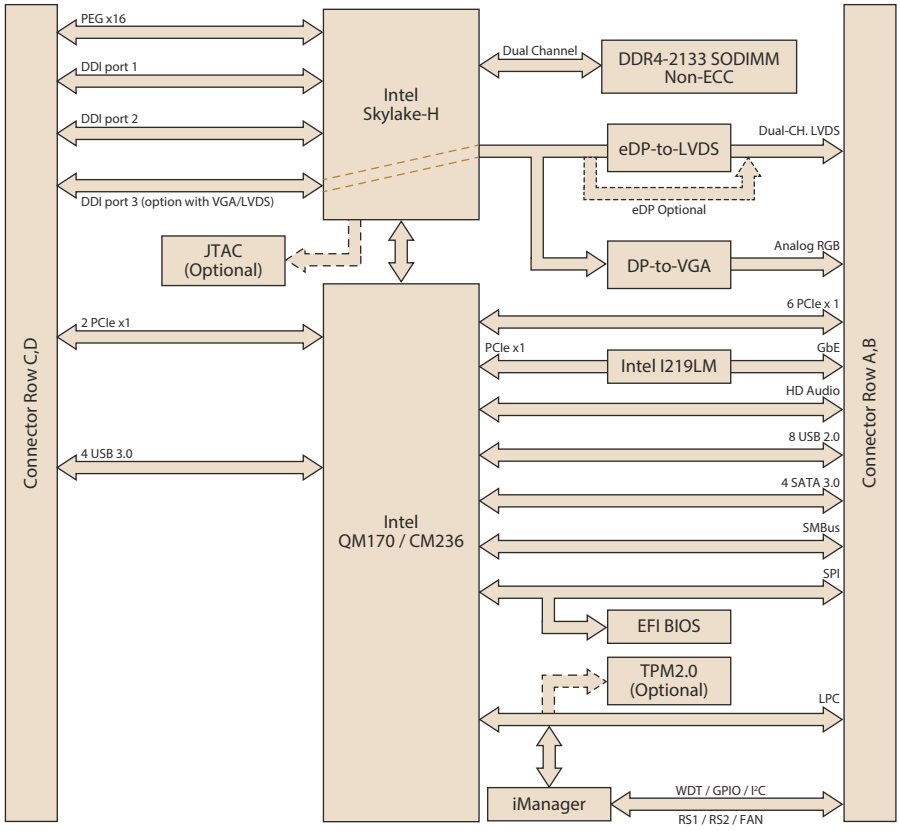
1.2.6 iManager 2.0

Refer to section 4.3.

1.2.7 Mechanical and Environmental Specification

- **Dimensions:** 95 x 95 mm (3.74" x 3.74")
- **Power Type and Supply Voltage:**
  - ATX: +8.5~20V and +4.75~5.25VSB (standby power)
  - AT: +8.5~20V
  - CMOS Battery: +3.3V
- **Power Requirement:**
  - Test condition: SOM-5897C3-U3A1E (i3-6100U), DDR3L-1600 16GB, WIN8.1 64-bit, under 12V and 5VSB input power supply.
  - Idle: 8.5W
  - Max: 41.8W (Burn-in V6.0 Pro)
- **Temperature Specification:**
  - Operating: 0 ~ 60° C (32 ~ 140° F)
  - Storage: -40 ~ 85° C (-40 ~ 185° F)
- **Humidity Specification:**
  - Operating: 40° C @ 95% relative humidity, non-condensing
  - Storage: 60° C @ 95% relative humidity, non-condensing

1.3 Functional Block Diagram



Chapter 2

Mechanical Information

This chapter gives mechanical information on the SOM-5897 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-5897 Computer-on-Module. Please be aware of these positions while designing your own carrier board to avoid mechanical issues, as well as designing thermal solution contact points for best thermal dissipation performance.

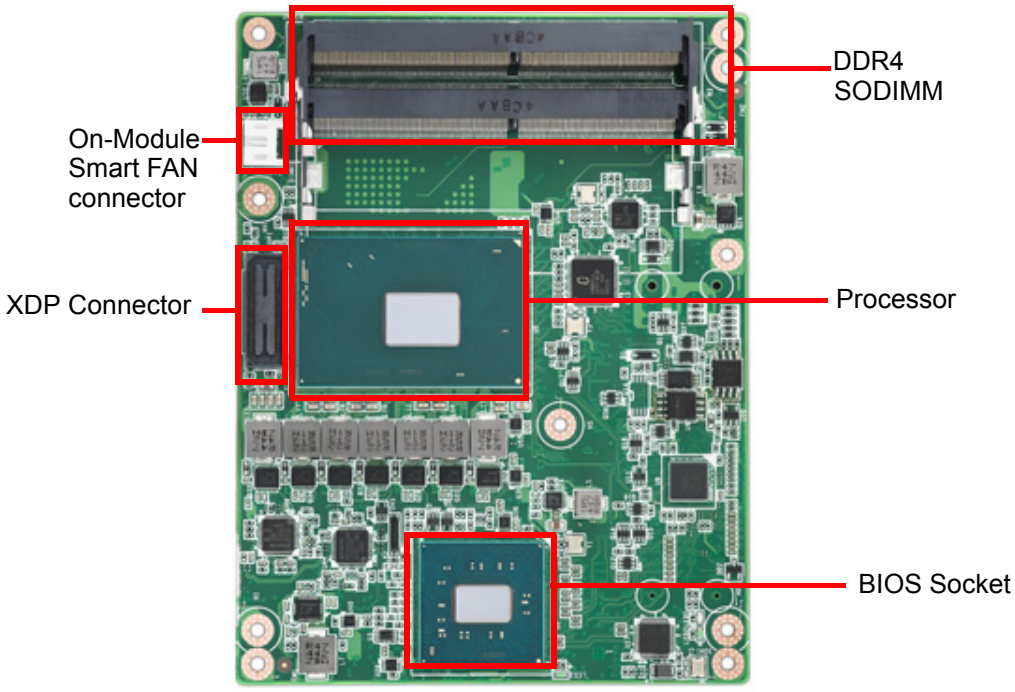


Figure 2.1 Board Chips Identify - Front

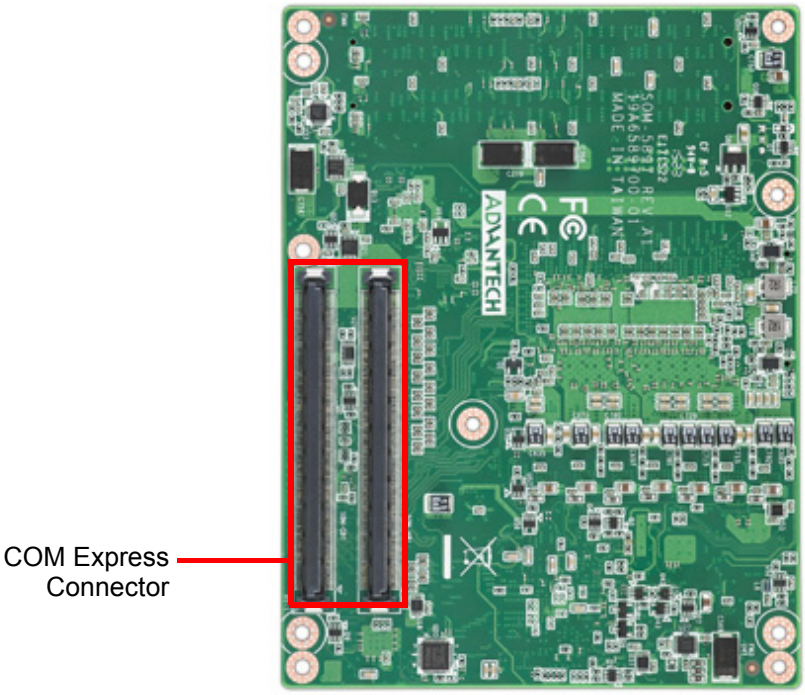


Figure 2.2 Board Chips Identify - Back

2.2 Mechanical Drawing

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

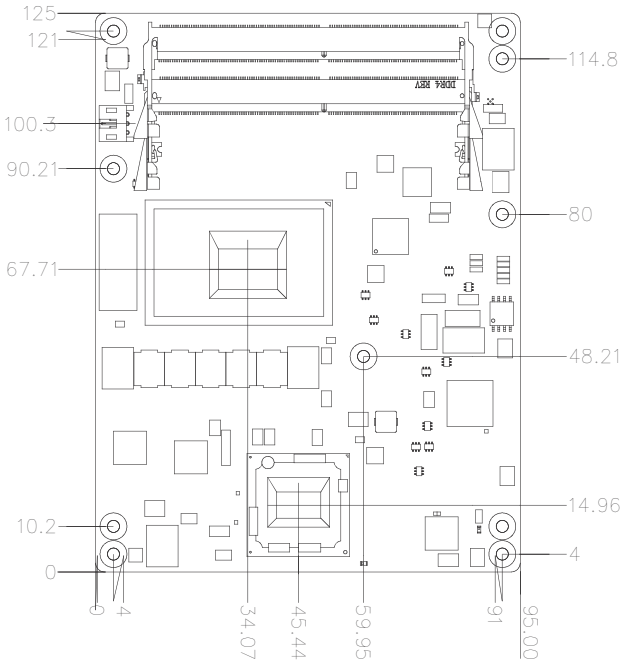


Figure 2.3 Board Mechanical Drawing - Front

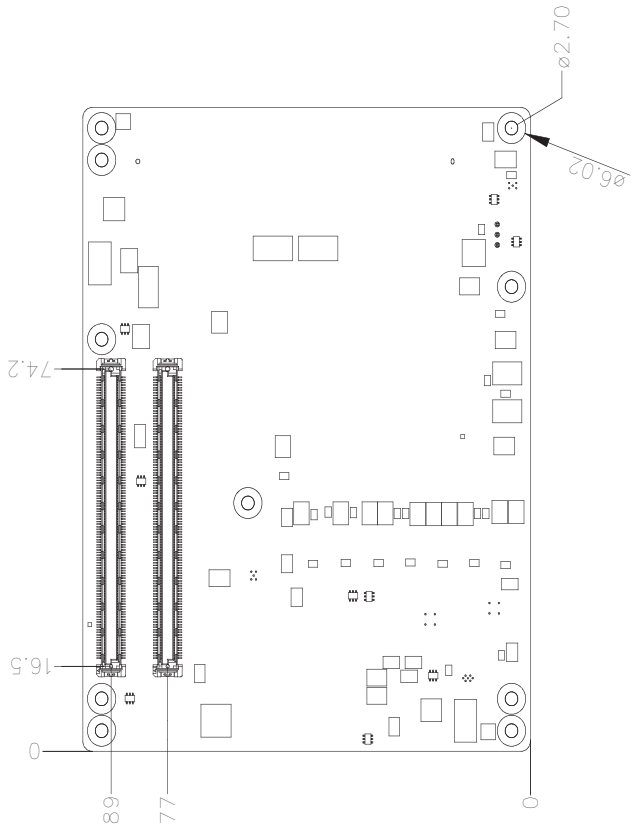


Figure 2.4 Board Mechanical Drawing - Back

2.3 Assembly Drawing

Assembly order for the thermal module and COM module onto the carrier board.

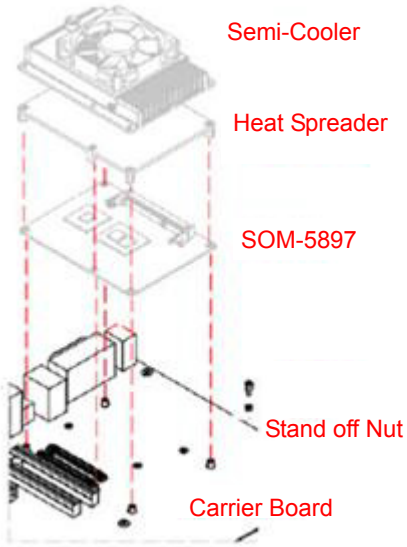


Figure 2.5 Assembly Drawing (Reference Only)

There are 3 reserved screw holes for SOM-5897 to be pre-assembled with the heat spreader.

Chapter 3

BIOS Operation

This chapter gives BIOS setup information for the SOM-5897 CPU Computer on Module.

Sections include:

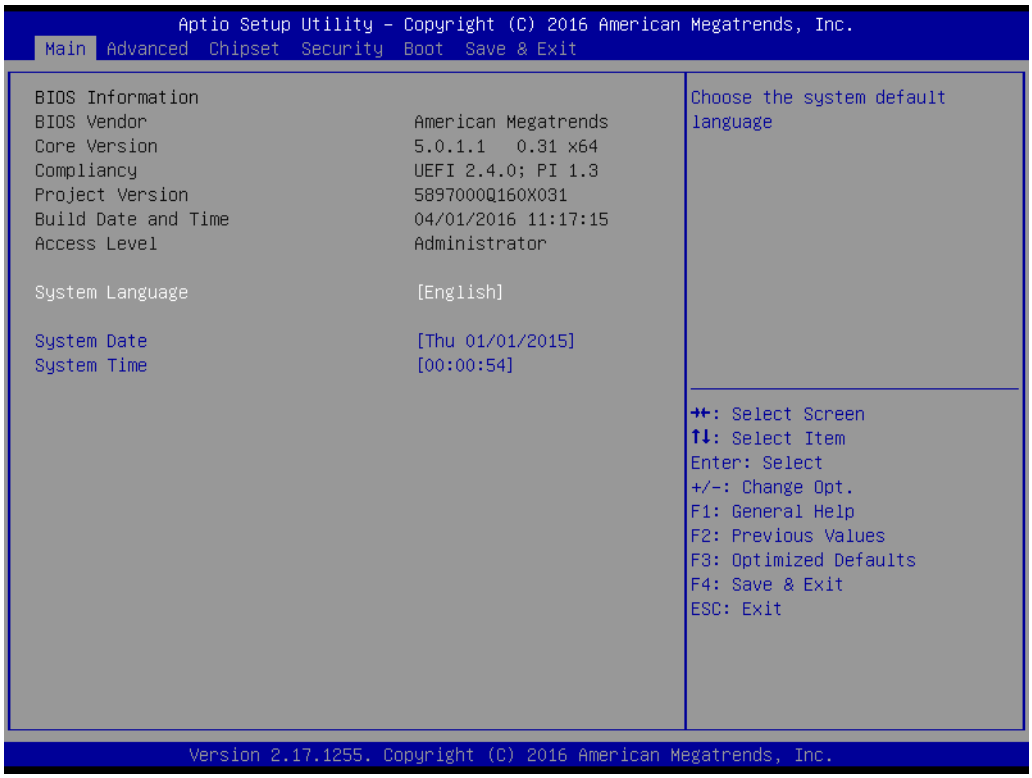
- Introduction
- Entering Setup
- Hot / Operation Key
- Exit BIOS Setup Utility

3.1 Entering Setup

SOM-5897 BIOS has been stored into a flash ROM which is inserted into a BIOS socket on the board. With the BIOS Setup program, users can modify BIOS settings and control various system features. This chapter describes the basic navigation of the SOM-5897 BIOS setup screens.

Advantech will have revisions for product optimization so customers can re-flash the latest BIOS through the AFU utility. Please contact Advantech sales or FAE for more details.

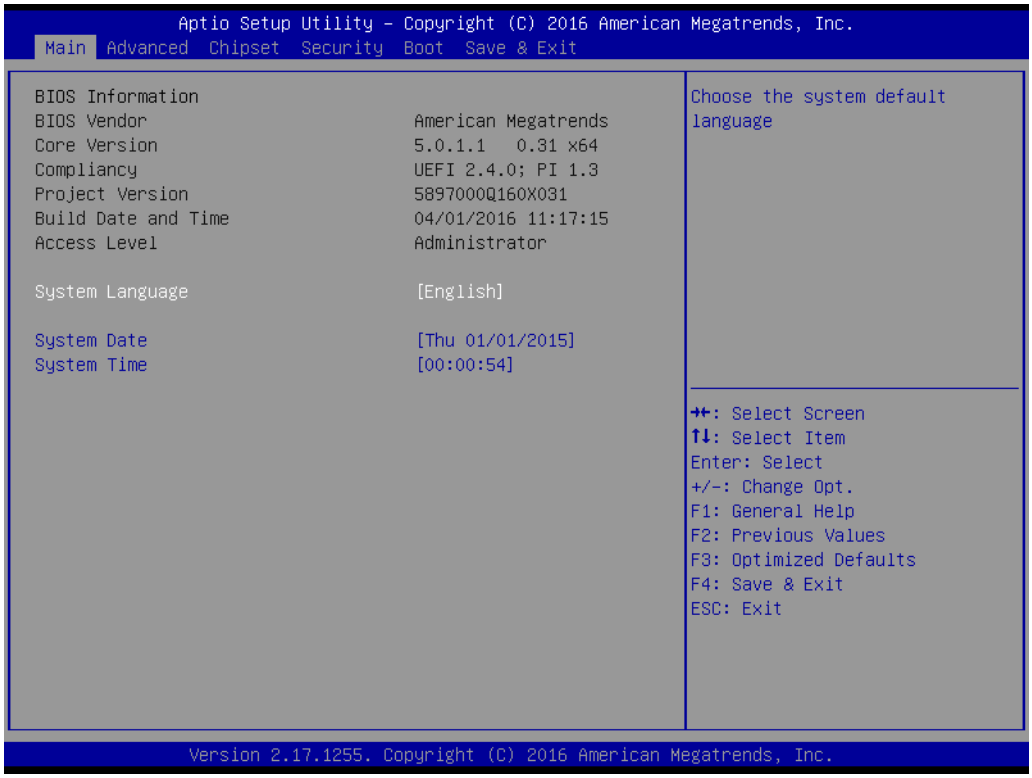
Turn on the computer and then press <ESC> or <DEL> to enter the Setup menu.



SOM-5897 BIOS has a built-in Setup program that allows users to modify the basic system configuration. This information is stored in flash ROM so it retains the Setup information when the power is turned off.

3.1.1 Main Setup

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



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.

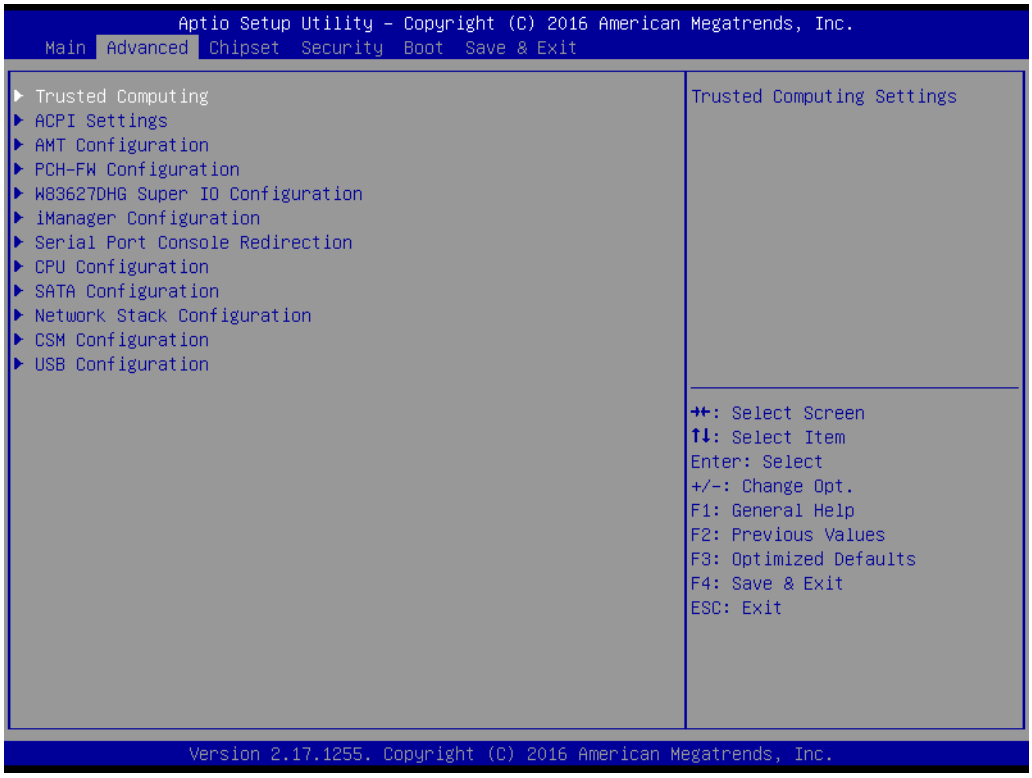
- **System time / System date**

  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.

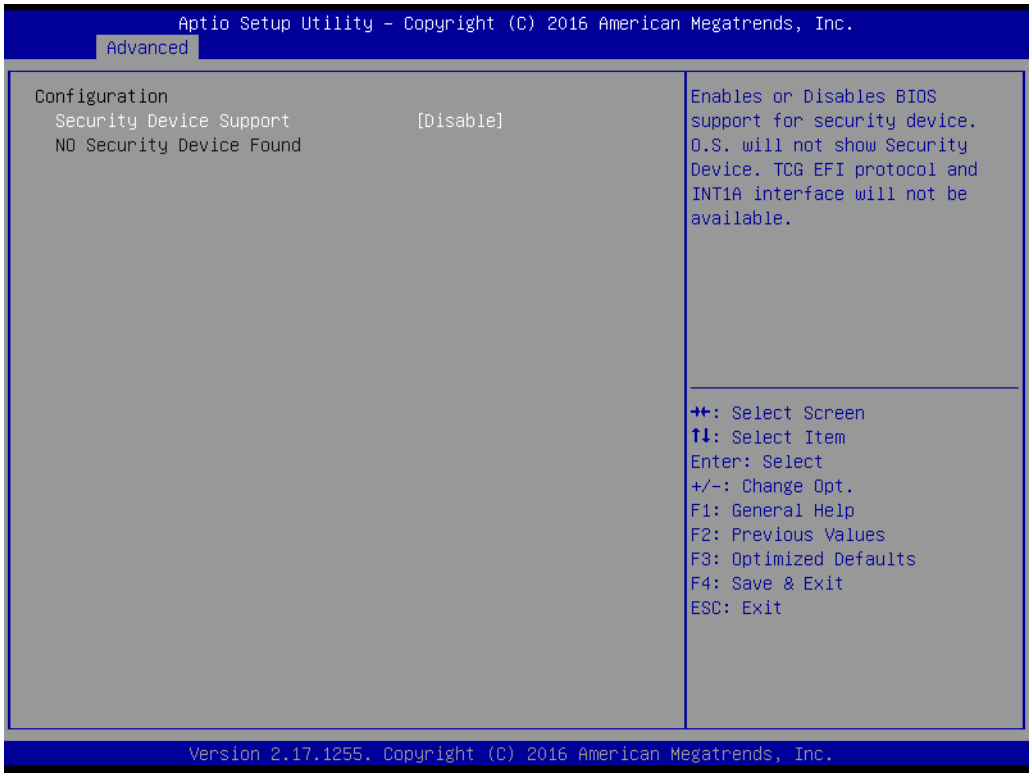
  - System Date: mm/dd/yyyy
  - System Time: hh/mm/ss

3.1.2 Advanced BIOS Features Setup

Select the Advanced tab from the SOM-5897 setup screen to enter the Advanced BIOS Setup screen. Users can select any item in the left frame of the screen, such as CPU Configuration, to go to the sub menu for that item. Users can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screens are shown below. The sub menus are described on the following pages.

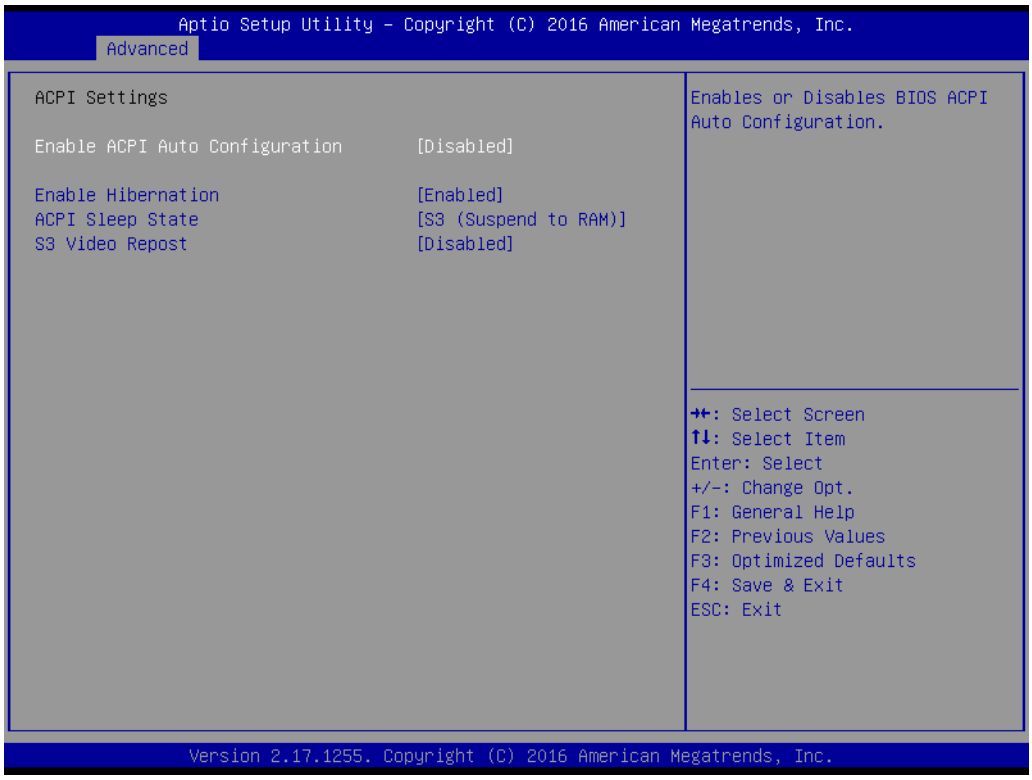


3.1.2.1 Trusted Computing



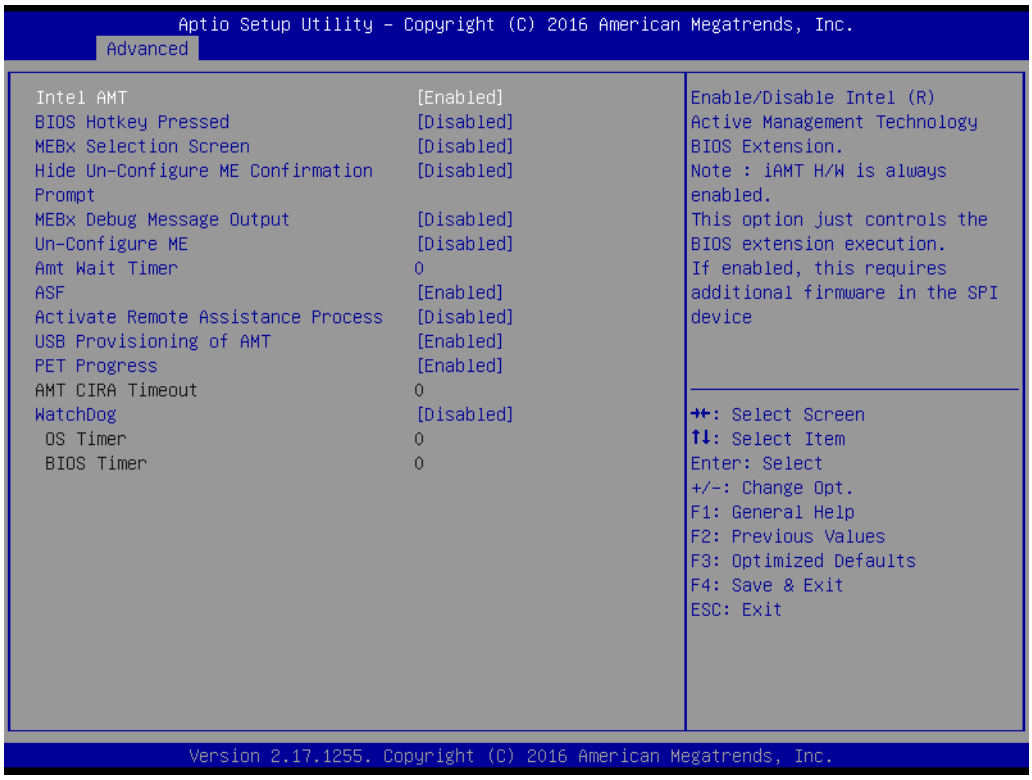
- **Security Device Support**
  Enables or Disables BIOS support for security devices. The OS will not show the security device. TCG EFI protocol and INT1A interface will not be available.

3.1.2.2 ACPI Settings



- **Enable ACPI Auto Configuration**
  This item allows users to enable or disable BIOS ACPI auto configuration.
- **Enable Hibernation**
  This item allows users to enable or disable system ability to hibernate (OS/S4 Sleep State). This option may not be effective with some OS.
- **ACPI Sleep State**
  This item allows users to select the highest ACPI sleep state the system will enter when the suspend button is pressed.
- **S3 Video Repost**
  This item allows users to enable or disable S3 Video Repost.

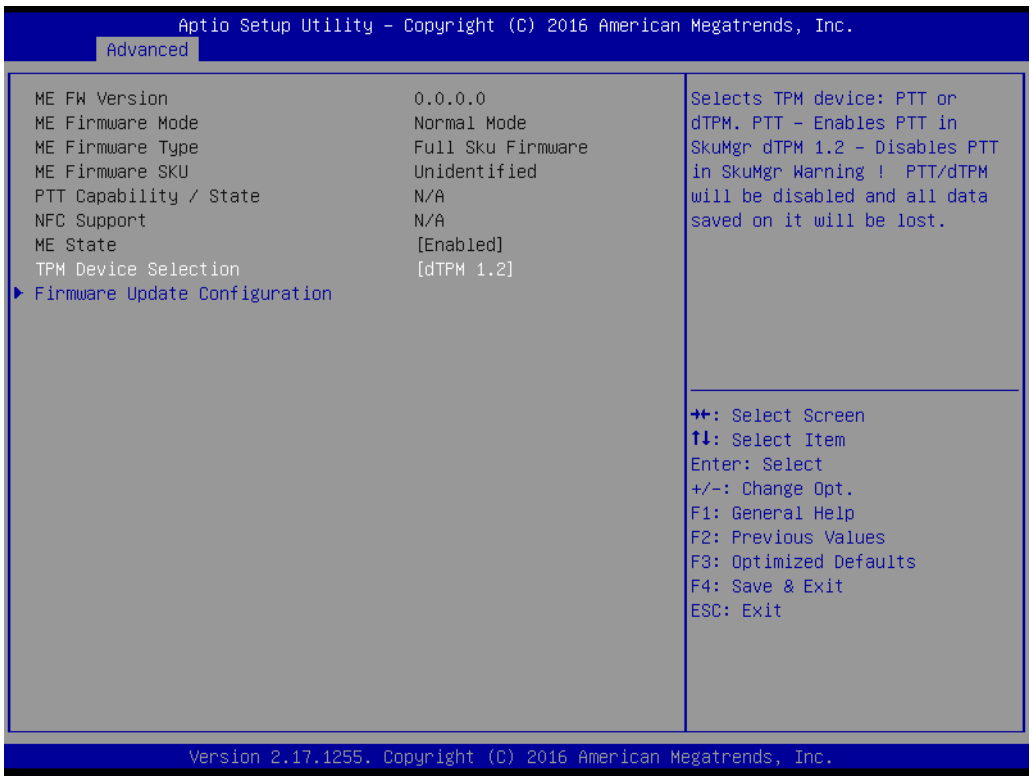
3.1.2.3 AMT Configuration



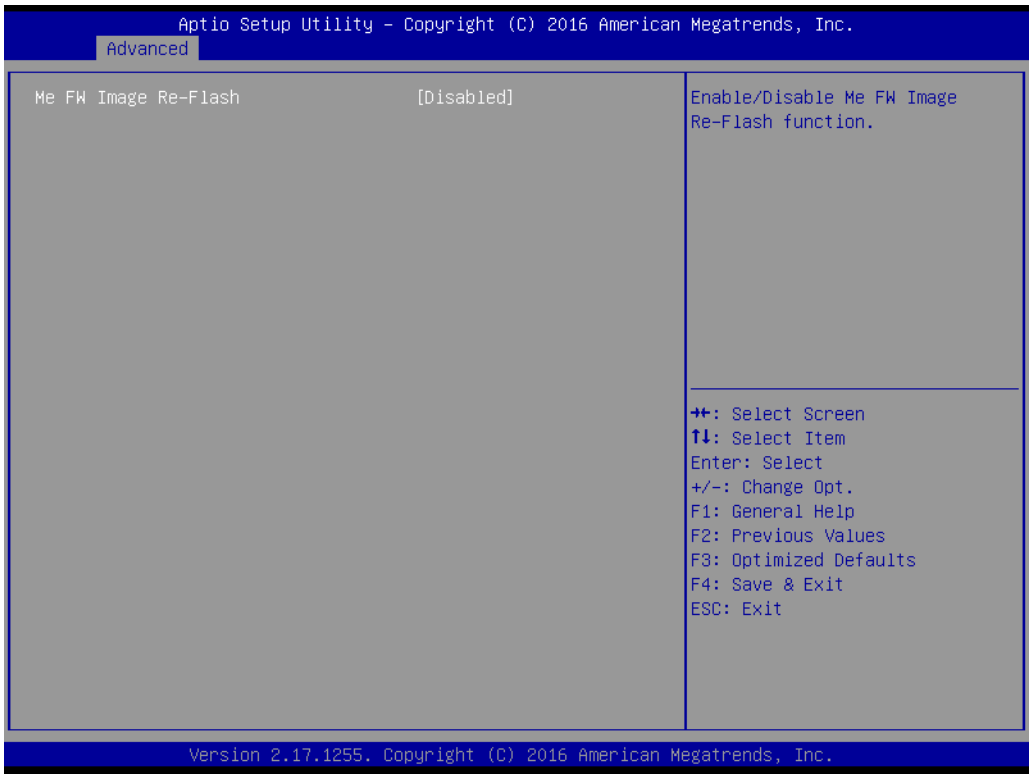
- **Intel AMT**
  Enable/disable Intel ® Active Management Technology BIOS Extension. Note: iAMT H/W is always enabled. This option just controls the BIOS extension execution. If enabled, this requires additional firmware in the SPI device.
- **BIOS Hotkey Pressed**
  OEMFlag Bit 1: Enable/disable BIOS hotkey press.
- **MEBx Selection Screen**
  OEMFlag Bit 2: Enable/disable selection screen.
- **Hide Un-Configuration ME Confirmation Prompt**
  OEMFlag Bit 6: Hide Un-configure ME without password confirmation prompt
- **MEBx Debug Message Output**
  OEMFlag Bit 14: Enable debug message output.
- **Un-Configure ME**
  OEMFlag Bit 15: Un-Configure ME without password
- **Amt Wait Timer**
  Set timer to wait before sending ASF_GET_BOOT_OPTIONS.
- **ASF**
  Enable/disable BIOS Alert specification format
- **Activate Remote Assistance Process**
  Trigger CIRA boot
- **USB Provisioning of AMT**
  Enable/disable of AMT USB provisioning
- **PET Progress**
  This item is able for user to enable/disable PET events progress to receive PET events or not.

- **WatchDog**
  Enable/disable watchdog timer.

3.1.2.4 PCH-FW Configuration

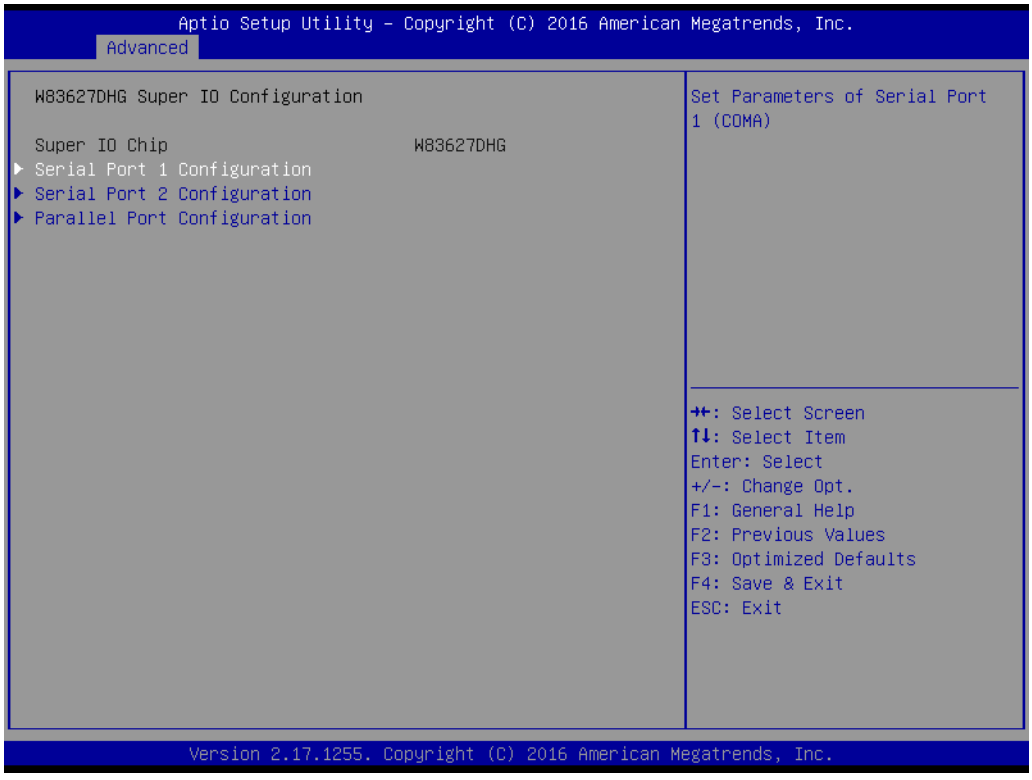


- **ME State**
  Set ME to soft temporary disabled.
- **TPM Device Selection**
  Selects TPM device: PTT or dTPM. PTT- Enable PTT in SkuMgr dTPM 1.2 – Disable PTT in SkuMgr warning.
  PTT/ dTPM will be disable and all data saved on it will be lost.
- **Firmware Update Configuration**
  Configure Management Engine Technology Parameters.



- **ME FW image re-flash**
  This is for enable or disable ME FW image re-flash function.

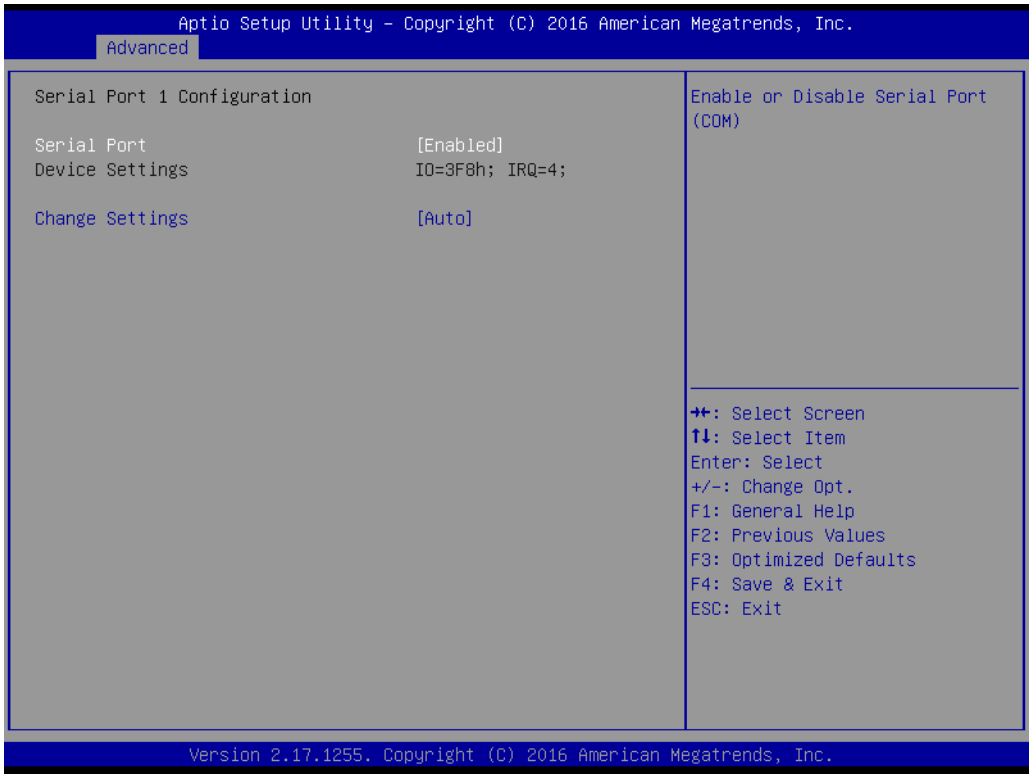
3.1.2.5 W83627DHG Super IO Configuration



- **Serial Port 1 Configuration**
  Set parameters of serial Port 1 (COMA)

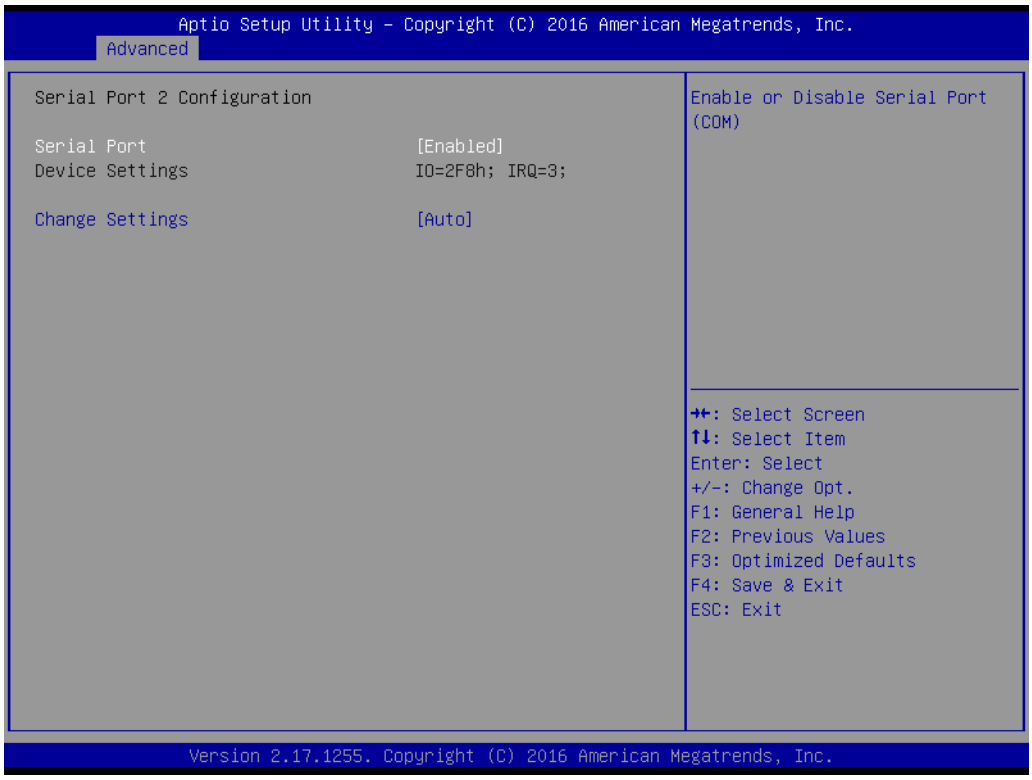
- **Serial Port 2 Configuration**
  Set parameters of serial Port 2 (COMB)
- **Parallel Port Configuration**
  Set parameters of parallel Port (LPT/ LPTE)

- **Serial Port 1 Configuration**



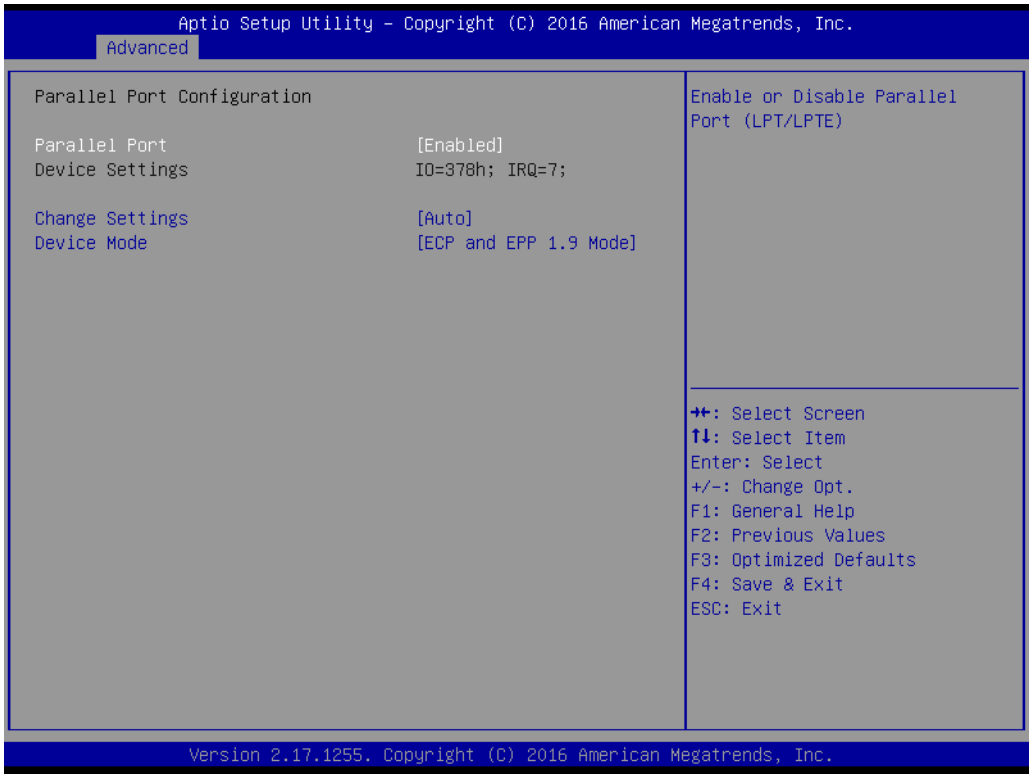
  - **Serial Port**
    Enable or Disable Serial Port (COM)
  - **Change Settings**
    Select an optimal setting for Super IO device.

Serial Port 2 Configuration



- **Serial Port**
  Enable or Disable Serial Port (COM)
- **Change Settings**
  Select an optimal setting for Super IO device.

Parallel Port Configuration



– **Parallel Port**

Enable or Disable Parallel Port (LPT/LPTE)

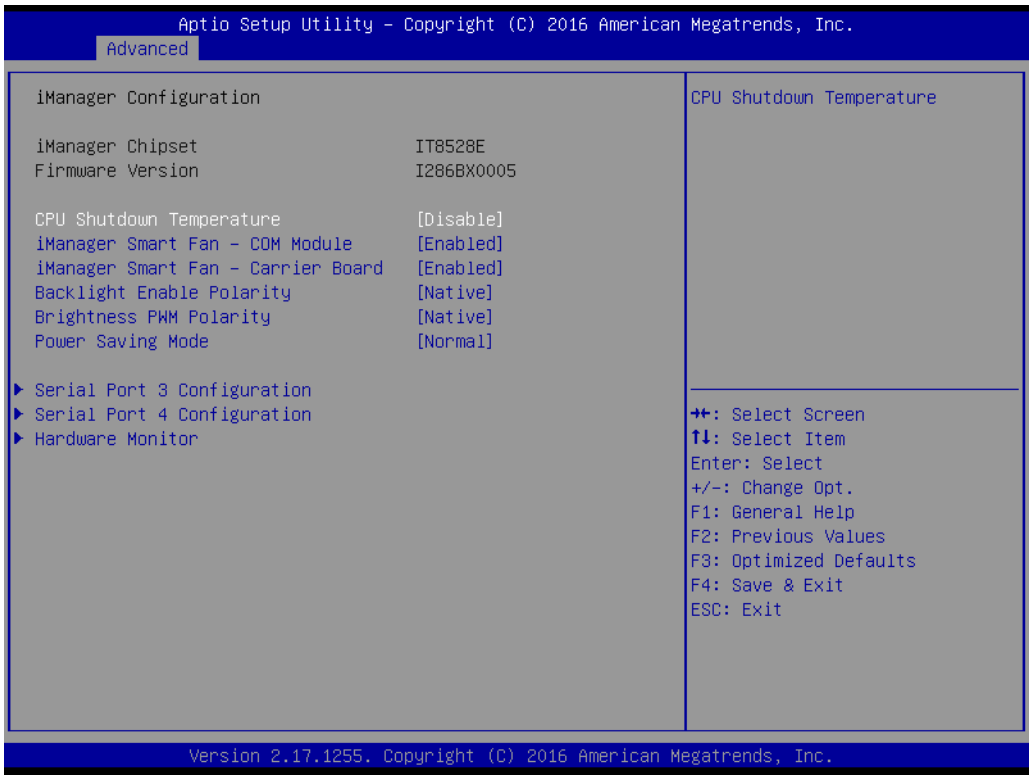
– **Change Settings**

Select an optimal setting for Super IO device.

– **Device Mode**

Change the Printer Port mode.

3.1.2.6 iManager Configuration



- **CPU Shutdown Temperature**

  CPU Shutdown Temperature.
- **iManager Smart Fan - COM Module**

  Control iManager Smart FAN function
- **iManager Smart Fan - Carrier Board**

  Control iManager Smart FAN Carrier Board function.
- **Backlight Enable Polarity**

  Switch Backlight Enable Polarity for Native or Invert
- **Brightness PWM Polarity**

  Backlight control brightness PWM polarity for native or invert
- **Power Saving Mode**

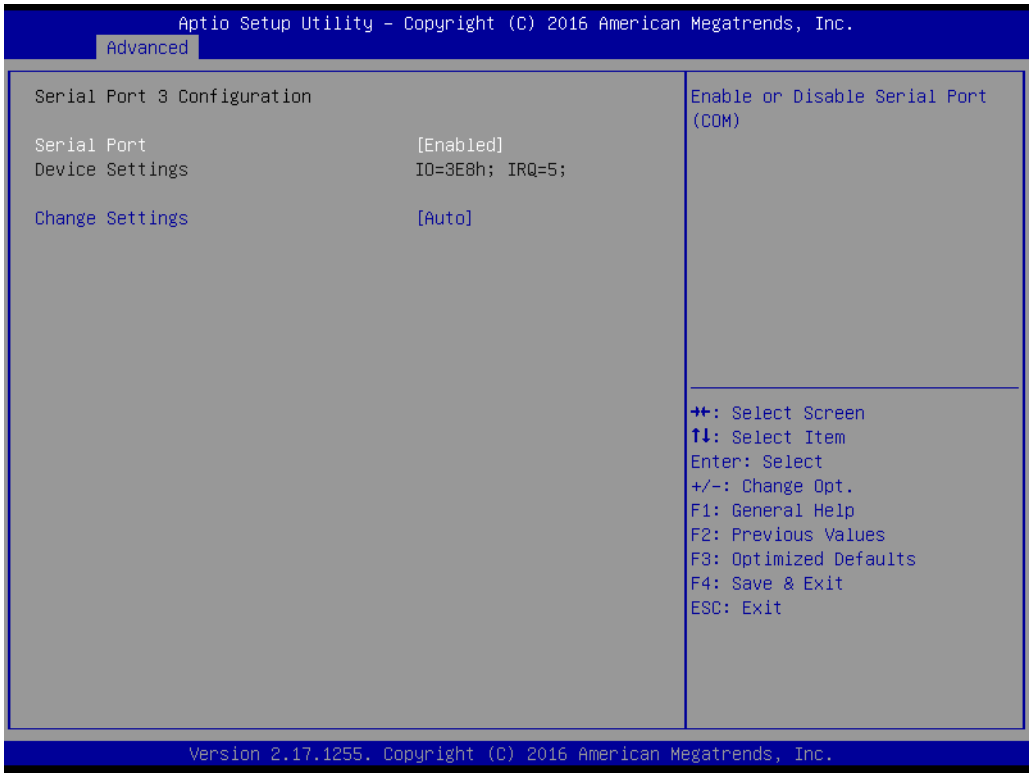
  Select ite8518 power saving mode
- **Serial Port 3 Configuration**

  Set parameters of serial port 3 (COMA)
- **Serial Port 4 Configuration**

  Set parameters of serial port 4 (COMB)
- **Hardware Monitor**

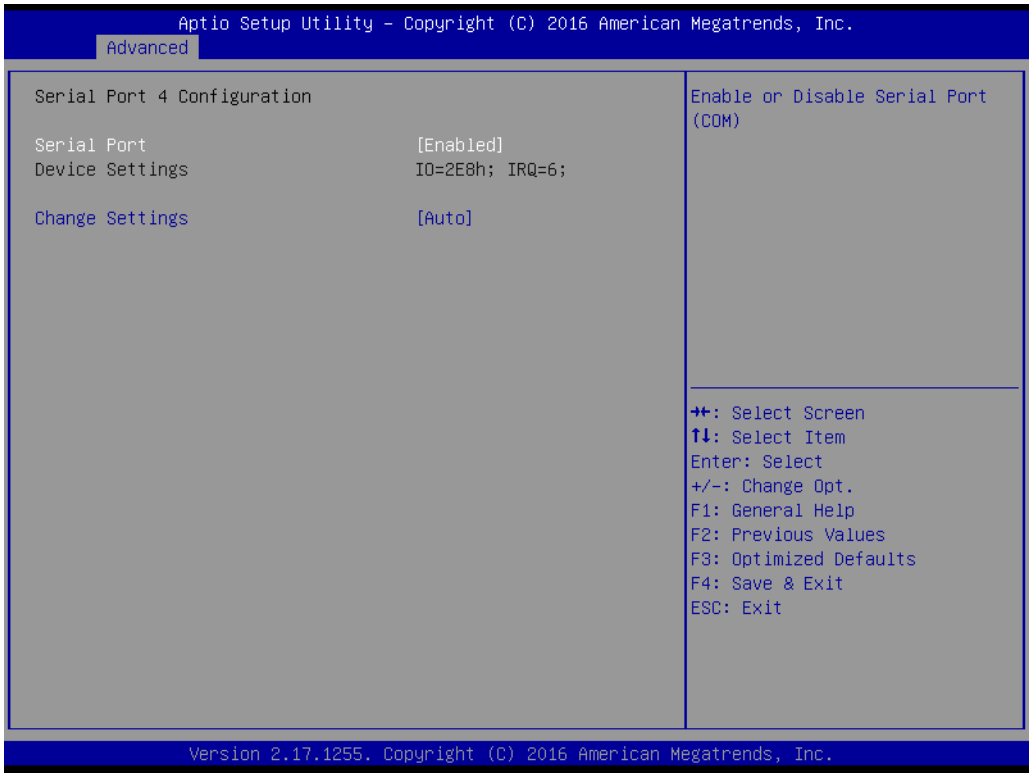
  Monitor hardware status

Serial Port 3 Configuration



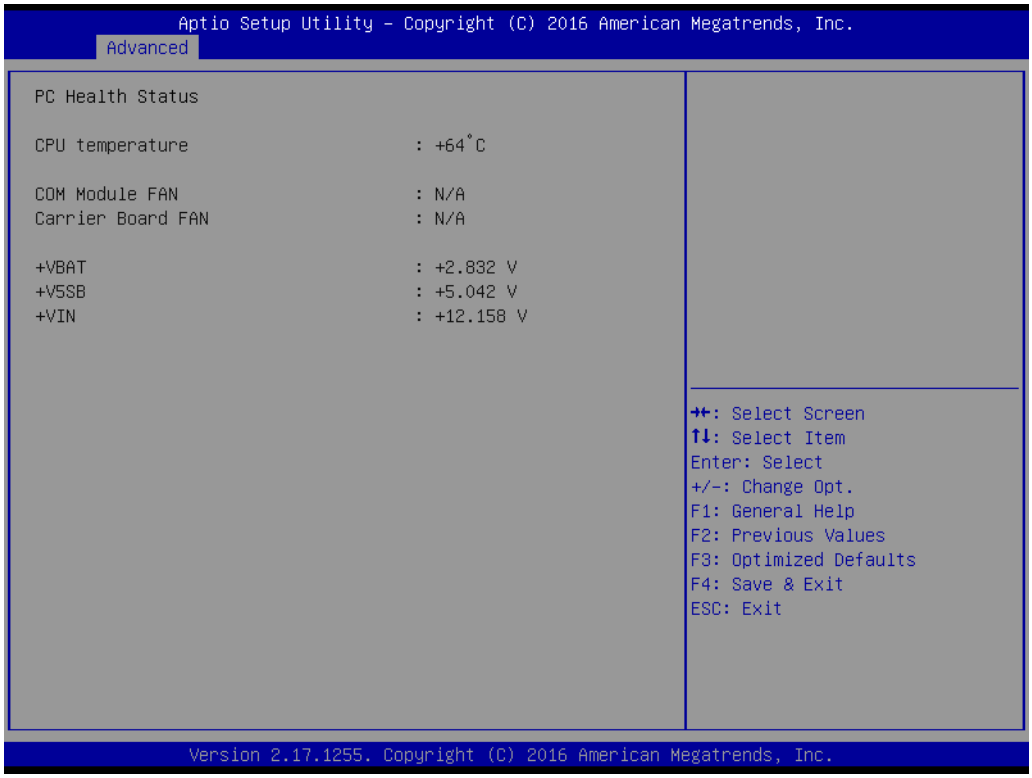
- **Serial Port**
  Enable or Disable Serial Port (COM)
- **Change Settings**
  Select an optimal setting for Super IO device.

Serial Port 4 Configuration



– **Serial Port**
  Enable or Disable Serial Port (COM)
– **Change Settings**
  Select an optimal setting for Super IO device.

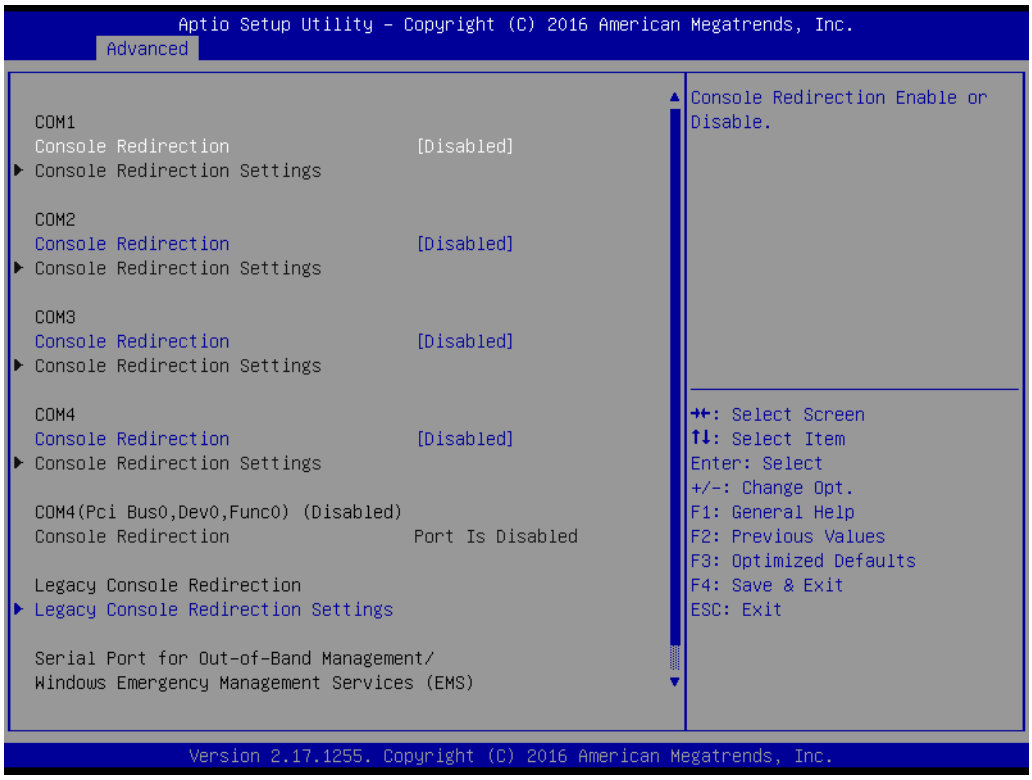
Hardware Monitor



Hardware Monitor

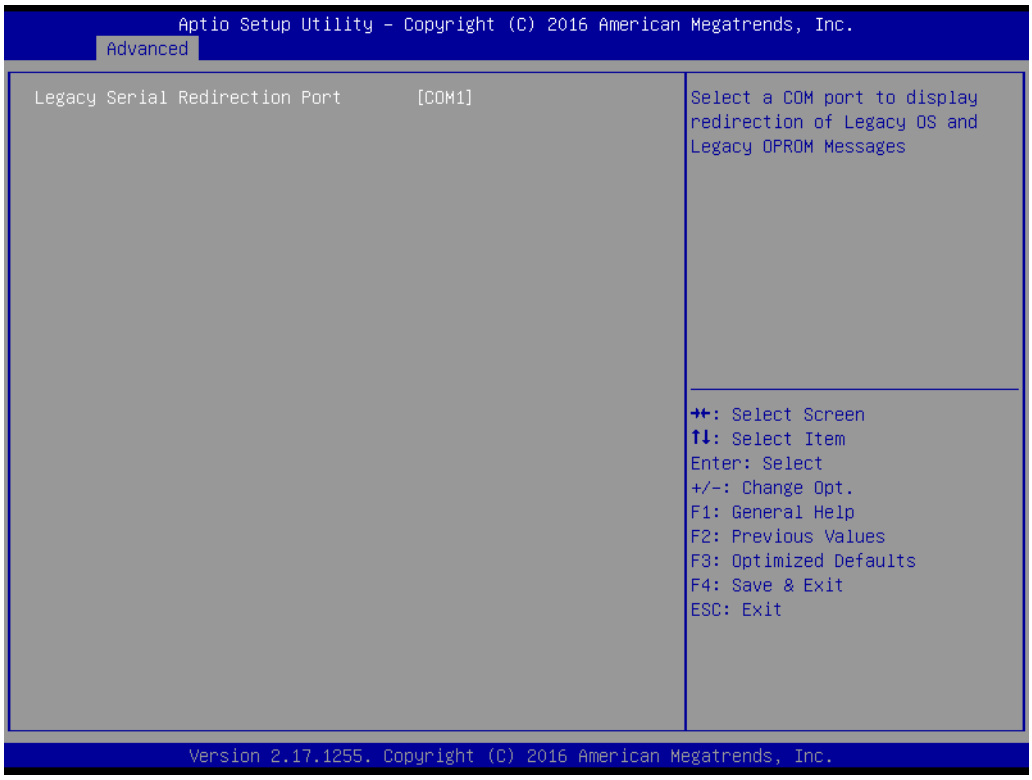
Monitor hardware status

3.1.2.7 Serial Port Console Redirection



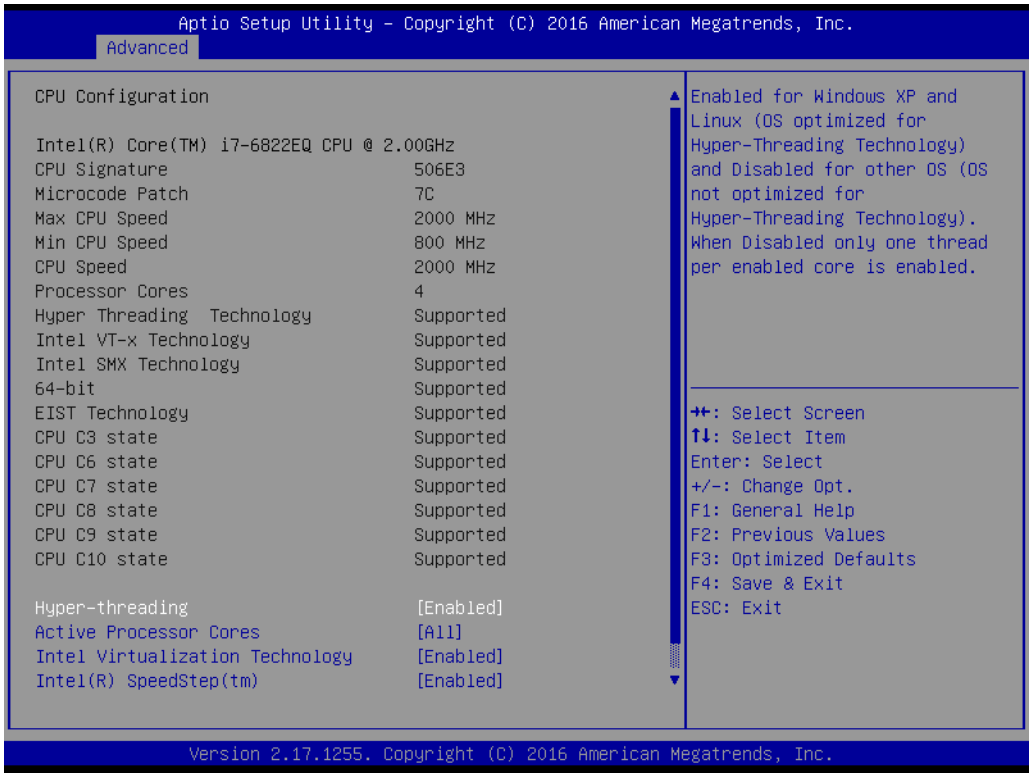
- **COM1**
  Console Redirection
  Console Redirection enable or disable
- **COM2**
  Console Redirection
  Console Redirection enable or disable
- **COM3**
  Console Redirection
  Console Redirection enable or disable
- **COM4**
  Console Redirection
  Console Redirection enable or disable

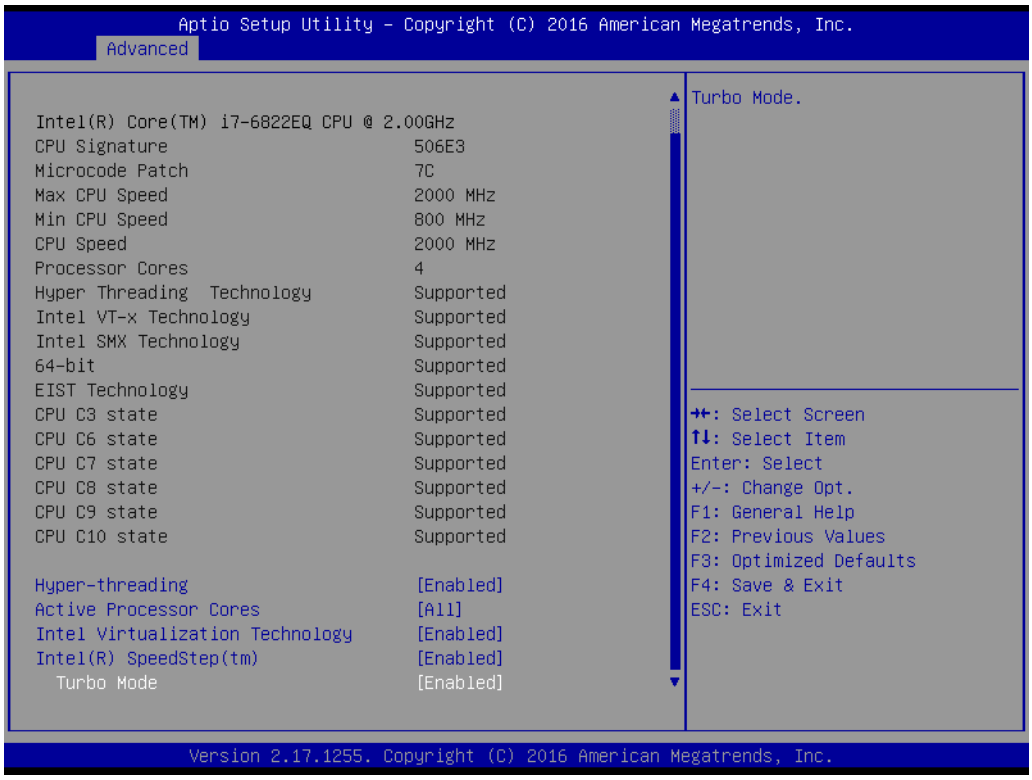
- **Legacy Console Redirection Settings**



- **Legacy Console Redirection**
  Select a COM port to display redirection of legacy OS and legacy OPROM message

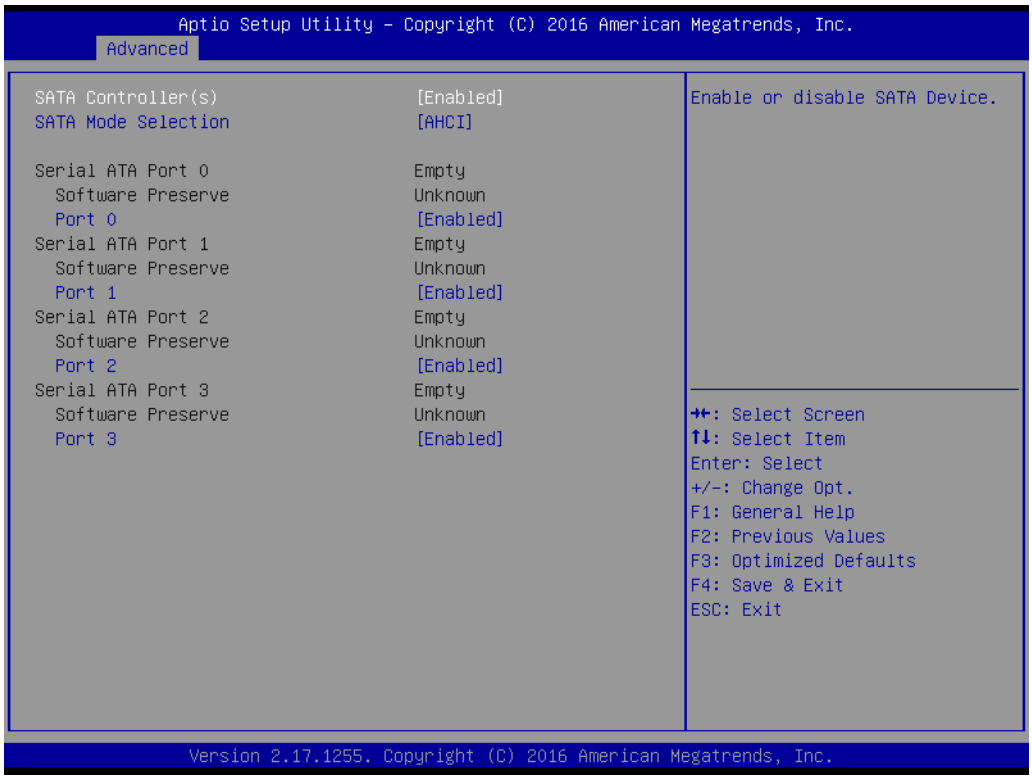
3.1.2.8 CPU Configuration





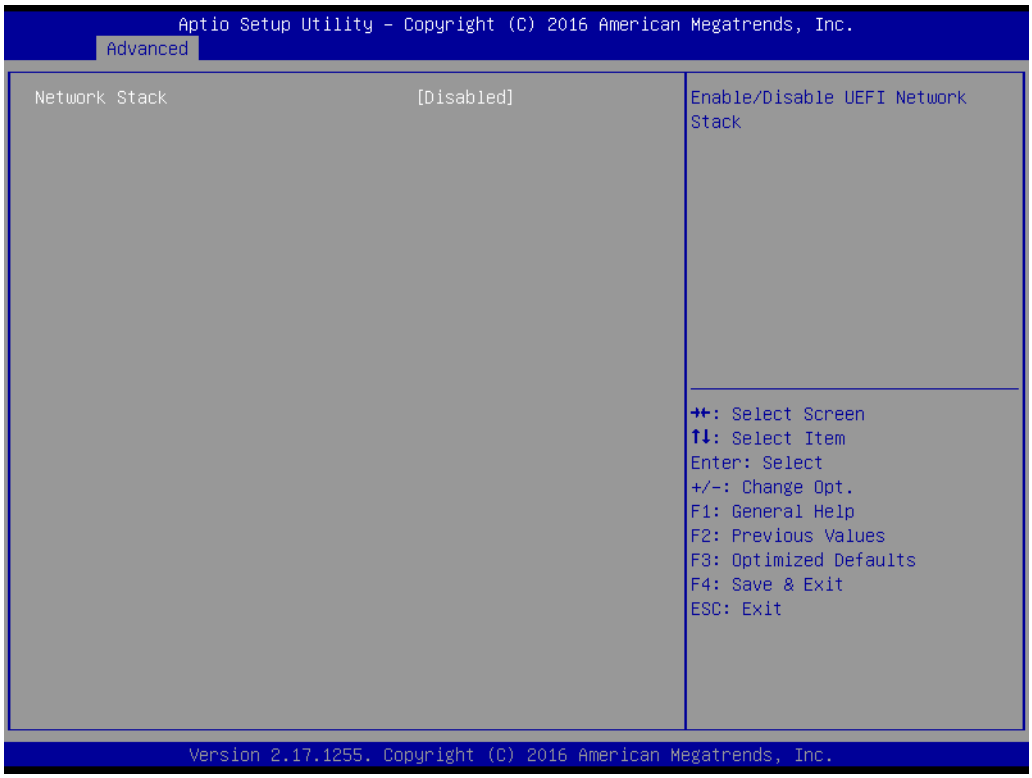
- **Hyper-Threading**
  This item allows users to enable Windows XP and Linux (OS optimized for Hyper Threading technology) and disable other OS (OS not optimized for Hyper Threading technology). When disabled only one thread per enabled core is activates.
- **Active Processor Cores**
  This item allows users to set how many processor cores should be active.
- **Intel Virtualization Technology**
  When enable, a VMM can utilize the additional hardware capabilities provided by vanderpool technology.
- **Intel(R) SpeedStep(tm)**
  Allows more than two frequency ranges to be supported.
- **Turbo Mode**
  Turbo Mode.

3.1.2.9 SATA Configuration



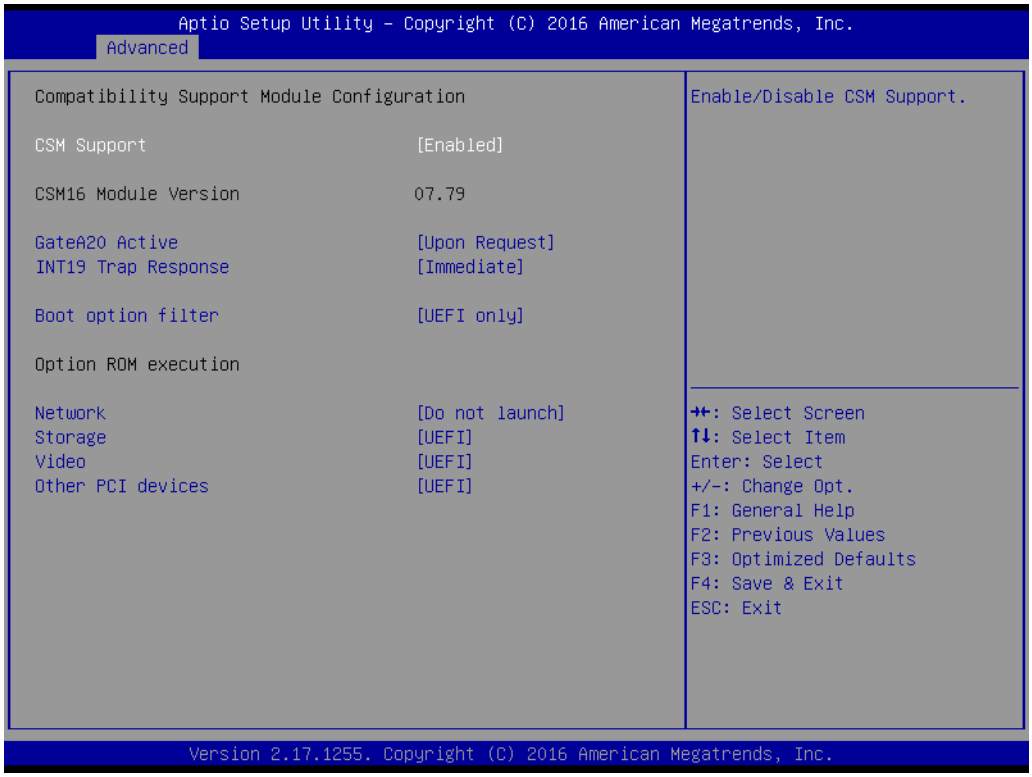
- **SATA Controller (S)**
  Enable or disable SATA device
- **SATA Mode Selection**
  Determines how SATA controller (s) operate.
- **Port 0**
  Enable or disable SATA port
- **Port 1**
  Enable or disable SATA port
- **Port 2**
  Enable or disable SATA port
- **Port 3**
  Enable or disable SATA port

3.1.2.10 Network Stack Configuration



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

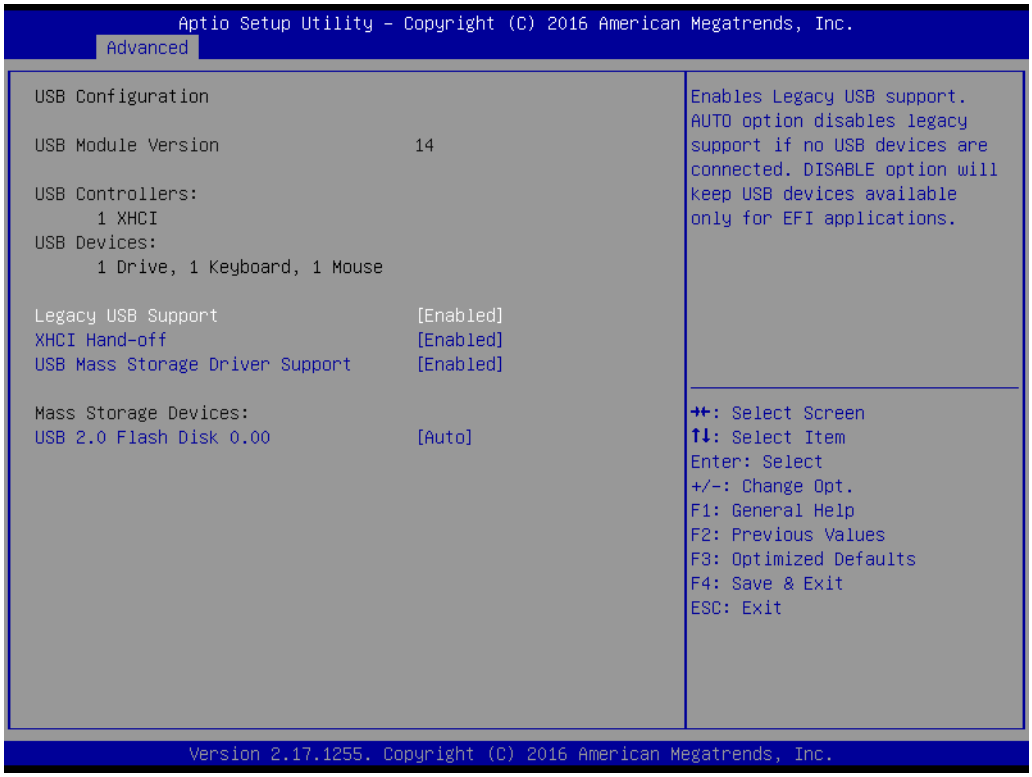
3.1.2.11 CSM Configuration



- **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

3.1.2.12 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 ownership change should be claimed by XHCI driver.
- **USB Mass Storage Driver Support**
  Enable/Disable USB Mass Storage Driver Support.

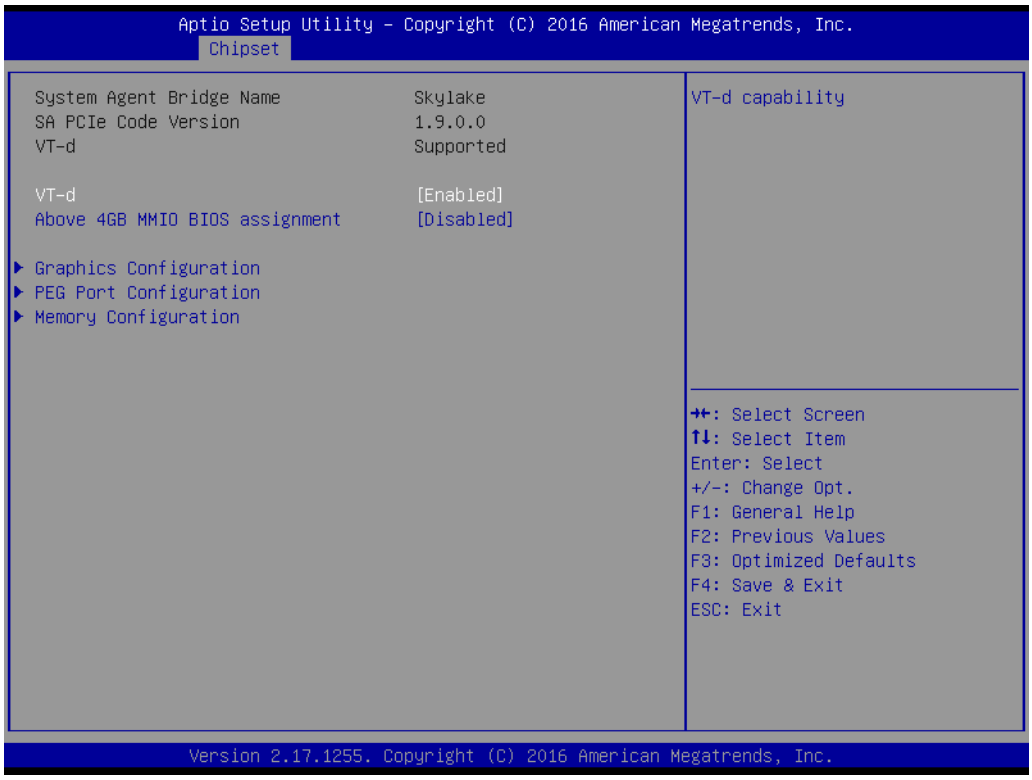
3.1.3 Chipset

Select the Chipset tab from the SOM-5897 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.

3.1.3.1 System Agent & PCH Configuration

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

- **System Agent Bridge Name**



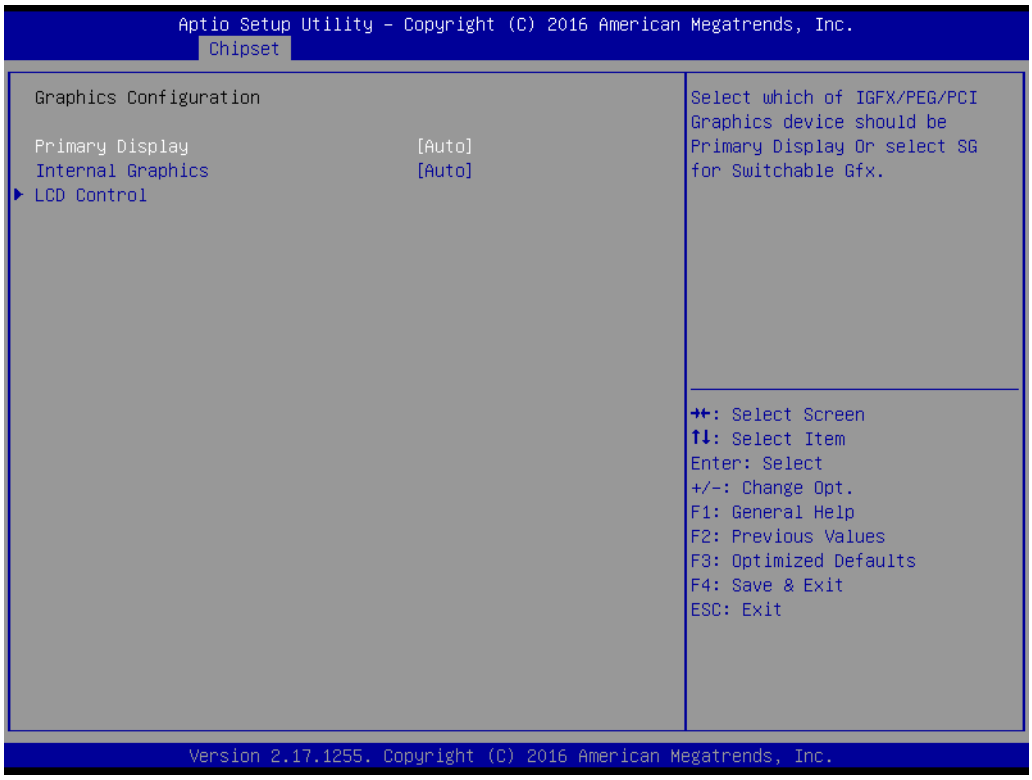
- **VT-d**

  VT-d capability

- **Above 4GB MMIO BIOS assignment**

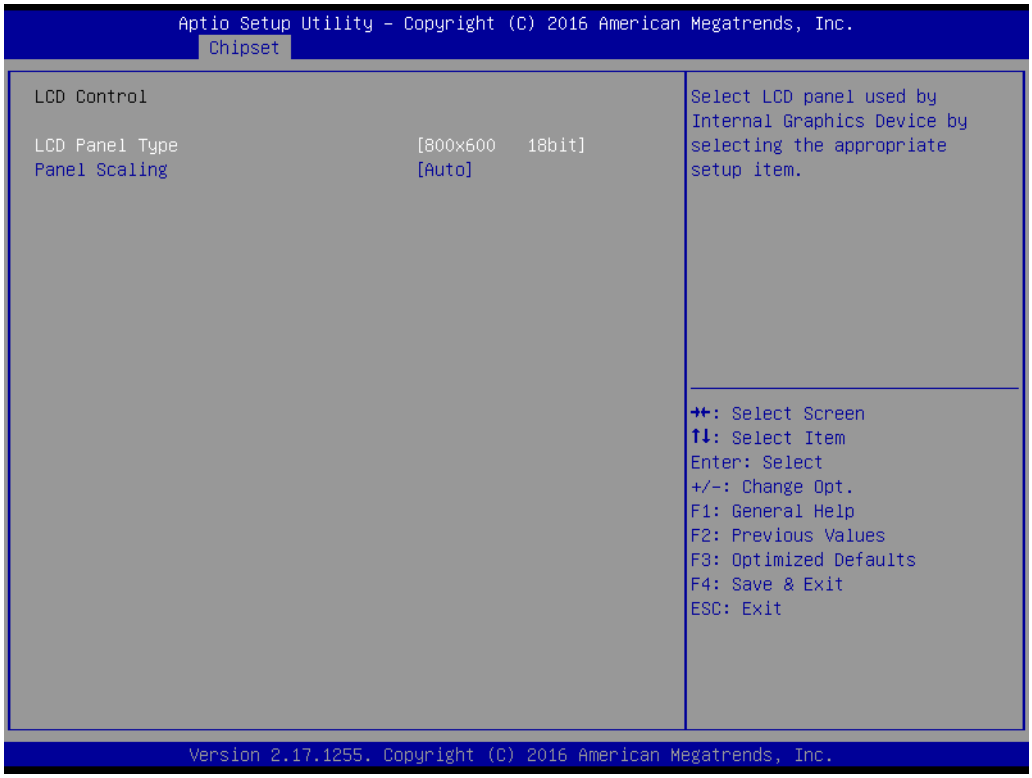
  Enable/disable above 4GB memory mapped IO BIOS assignment. This is disabled automatically when aperture size is set to 2048MB.

Graphics Configuration



- **Primary Display**
  Select IGFX/PEG/PCI Graphics device should be primary display or select SG for switchable Gfx.
- **Internal Graphics**
  Keep IGFX enabled based on the setup options.
- **LCD Control**
  LCD Control

LCD Control



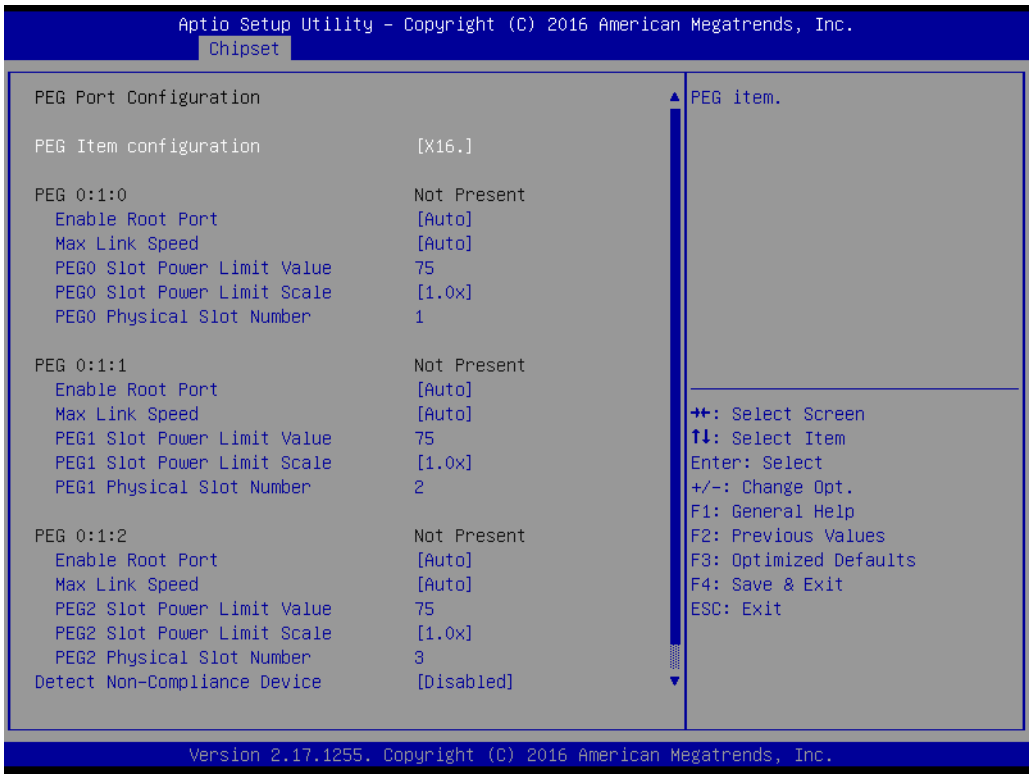
LCD Panel Type

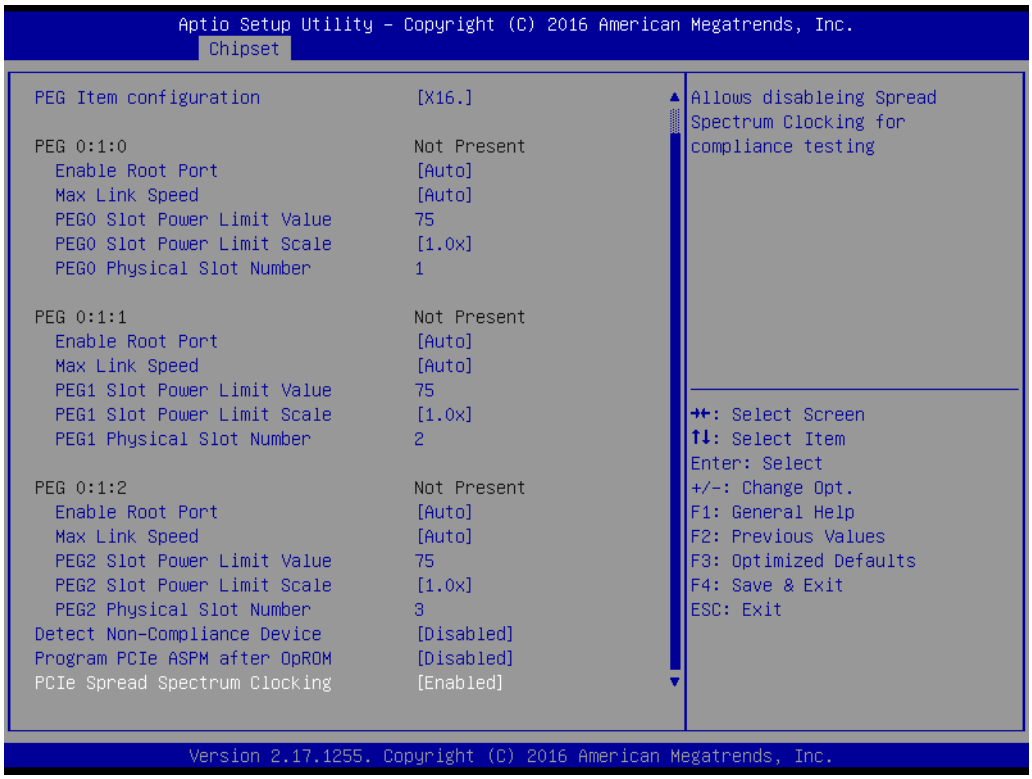
Select LCD panel used by internal graphics device by selecting the appropriate setup item.

Panel Scaling

Select LCD panel used by internal graphics device.

PEG Port Configuration





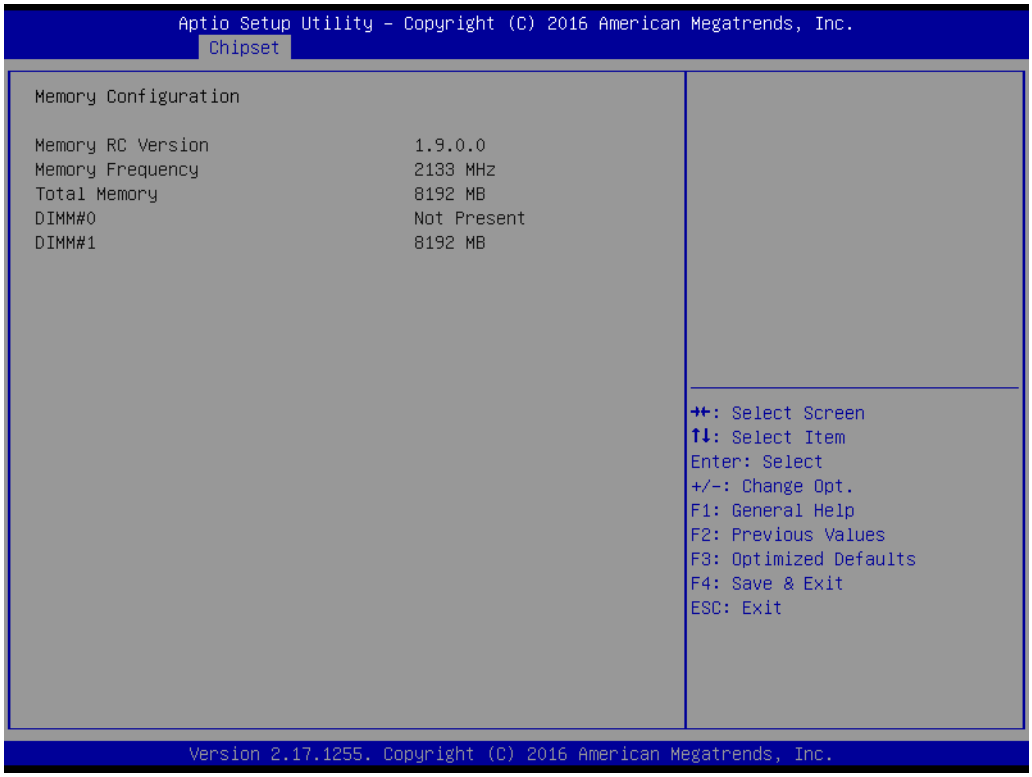
- **PEG 0:1:0**
  Link and Speed Information
- **Enable Root Port**
  Enable or disable the root port
- **Max Link Speed**

Configuration PEG 0:1:0 Max Speed

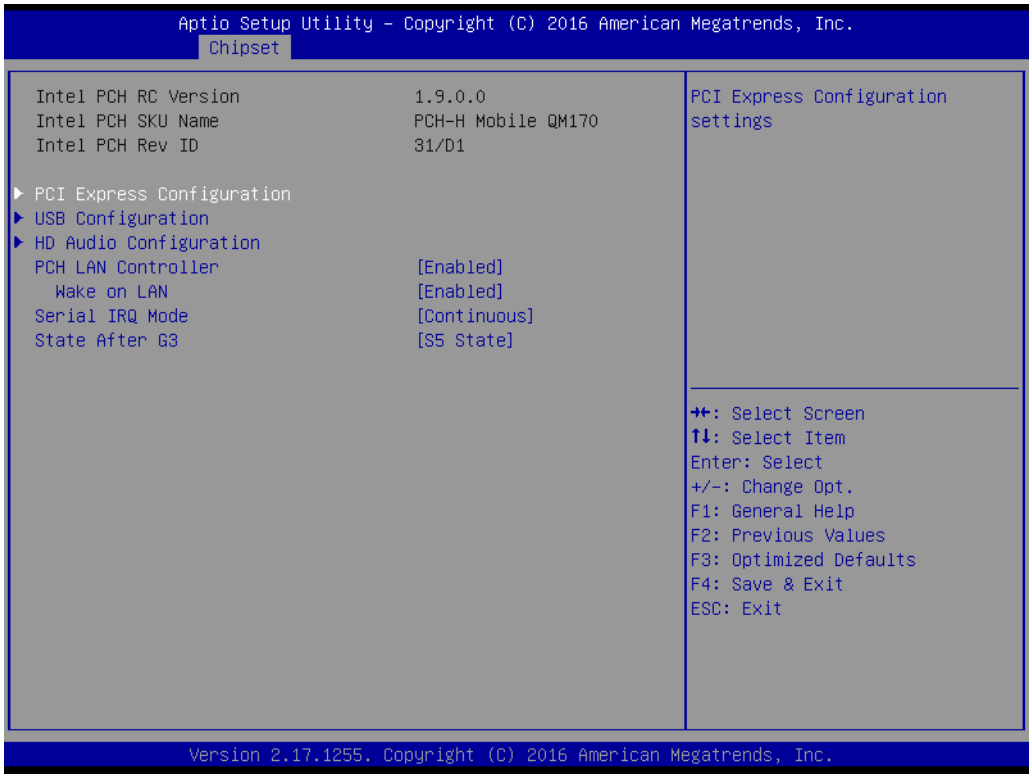
- **PEG0 Slot Power Limit Value**
  Set the upper limit on power supplied by slot. Power limit (in watts) is calculated by multiplying this value by the slot power limit scale. Values 0-255
- **PEG0 Slot Power Limit Scale**
  Select the scale used for the slot power limit value.
- **PEG0 Physical Slot Number**
  Set the physical slot number attached to this port. The number has to be globally unique within the chassis. Values 0-8191.
- **PEG 0:1:1**
  Link and Speed Information
- **Enable Root Port**
  Enable or disable the root port
- **Max Link Speed**
  Configuration PEG 0:1:1 Max Speed
- **PEG0 Slot Power Limit Value**
  Set the upper limit on power supplied by slot. Power limit (in watts) is calculated by multiplying this value by the slot power limit scale. Values 0-255
- **PEG0 Slot Power Limit Scale**
  Select the scale used for the slot power limit value.
- **PEG0 Physical Slot Number**
  Set the physical slot number attached to this port. The number has to be globally unique within the chassis. Values 0-8191.
- **PEG 0:1:2**
  Link and Speed Information
- **Enable Root Port**
  Enable or disable the root port
- **Max Link Speed**
  Configuration PEG 0:1:2 Max Speed
- **PEG0 Slot Power Limit Value**
  Set the upper limit on power supplied by slot. Power limit (in watts) is calculated by multiplying this value by the slot power limit scale. Values 0-255
- **PEG0 Slot Power Limit Scale**
  Select the scale used for the slot power limit value.
- **PEG0 Physical Slot Number**
  Set the physical slot number attached to this port. The number has to be globally unique within the chassis. Values 0-8191.
- **Detect Non-Compliance Device**
  Detect Non-Compliance PCI Express device in PEG.
- **Program PCIe ASPM after OpROM**
  Enabled: PCIe ASPM will be programmed after OpROM.
  Disable: PCIe ASPM will be programmed before OpROM.
- **PCIe Spread Spectrum Clocking**
  Allows disable spread spectrum clocking for compliance testing.

Memory Configuration

This page shows memory information.



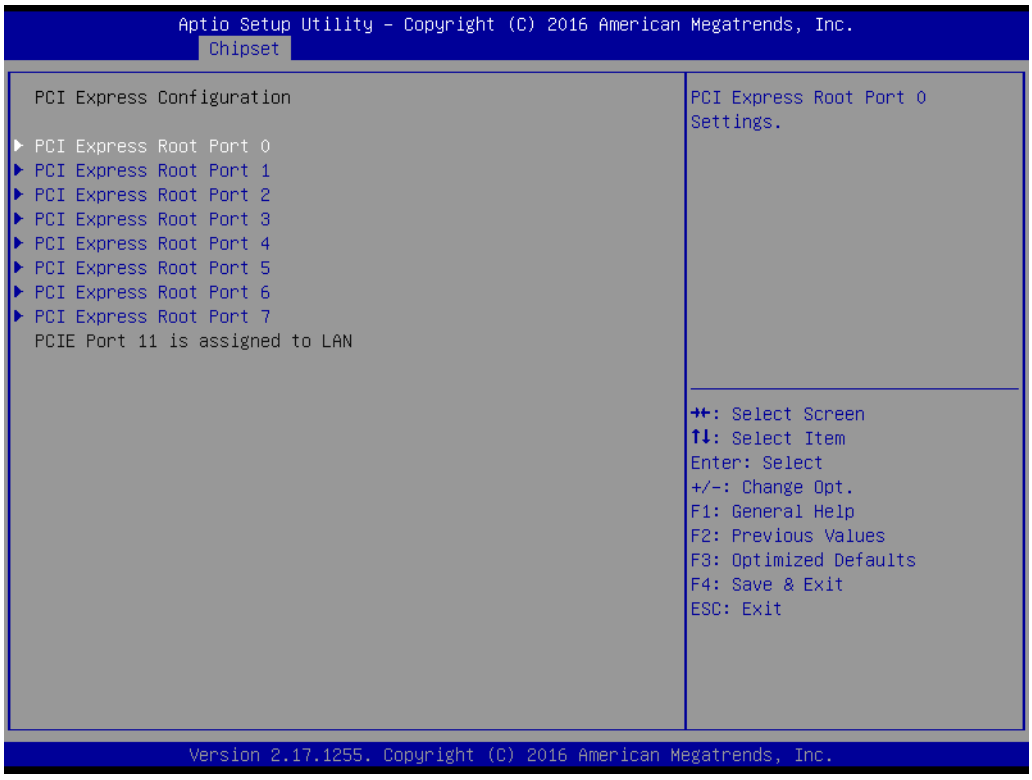
3.1.3.2 PCH-IO Configuration



PCI Express Configuration

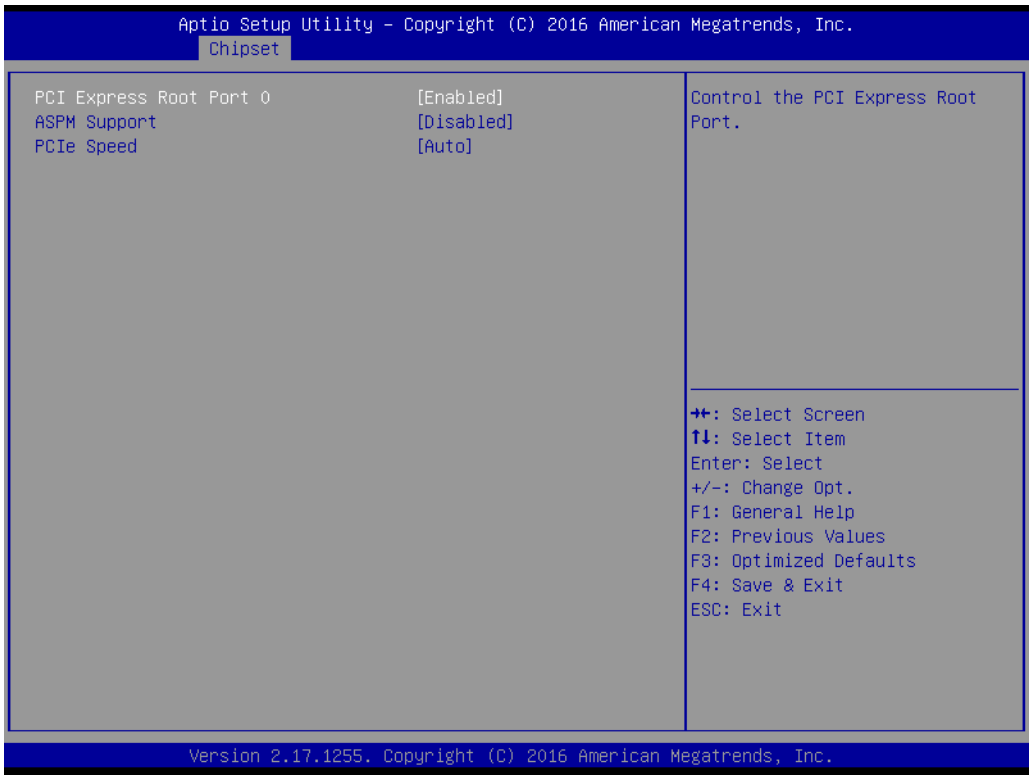
PCI Express Configuration settings.

- **USB Configuration**
  USB Configuration settings.
- **HD Audio Configuration**
  HD Audio subsystem configuration settings
- **PCH LAN Controller**
  Enable or disable onboard NIC.
- **Wake on LAN**
  Enable or disable integrated LAN to wake the system. (The wake on LAN cannot be disabled if ME is at Sx state.)
- **Serial IRQ Mode**
  Configure serial IRQ mode.
- **State After G3**
  Specify what state to go to when power is re-applied after a power failure (G3 state).
- **PCI Express Configuration**



  - **PCI Express Root Port 0-7**
    PCI Express Root Port 0-7 settings.

– **PCI Express Root Port 0**



PCI Express Root Port 0

Controls the PCI Express Root Port

ASPM Support

Sets the ASPM level: Force L0s – Force all links to L0s State

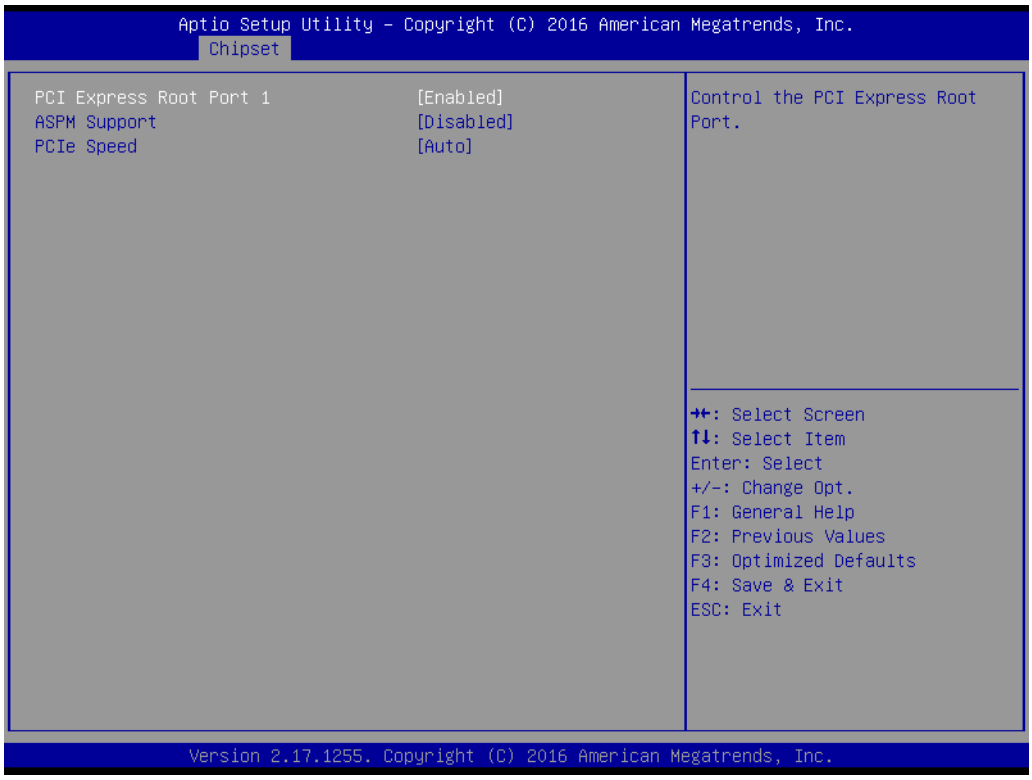
Auto – BIOS auto configure

Disable – disable ASPM

PCIe Speed

Select PCI Express port speed.

– **PCI Express Root Port 1**



PCI Express Root Port 1

Controls the PCI Express Root Port

ASPM Support

Set the ASPM level: Force L0s – Force all links to L0s State

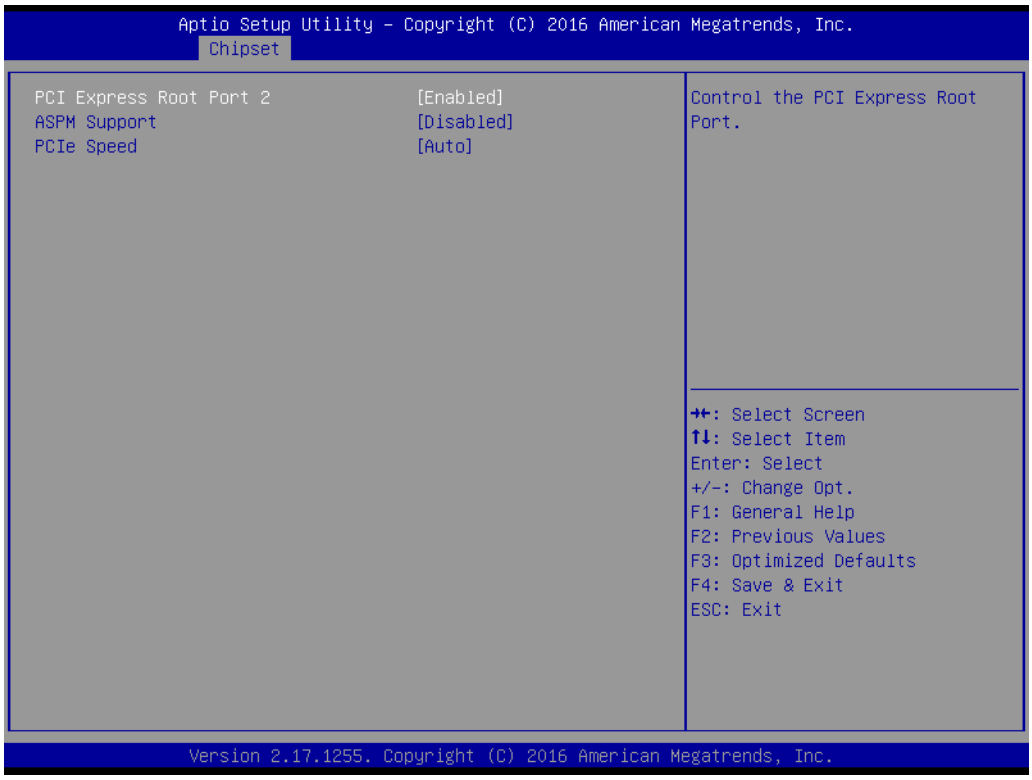
Auto – BIOS auto configure

Disable – disable ASPM

PCIe Speed

Selects PCI Express port speed.

– **PCI Express Root Port 2**



PCI Express Root Port 2

Controls the PCI Express Root Port

ASPM Support

Set the ASPM level: Force L0s – Force all links to L0s State

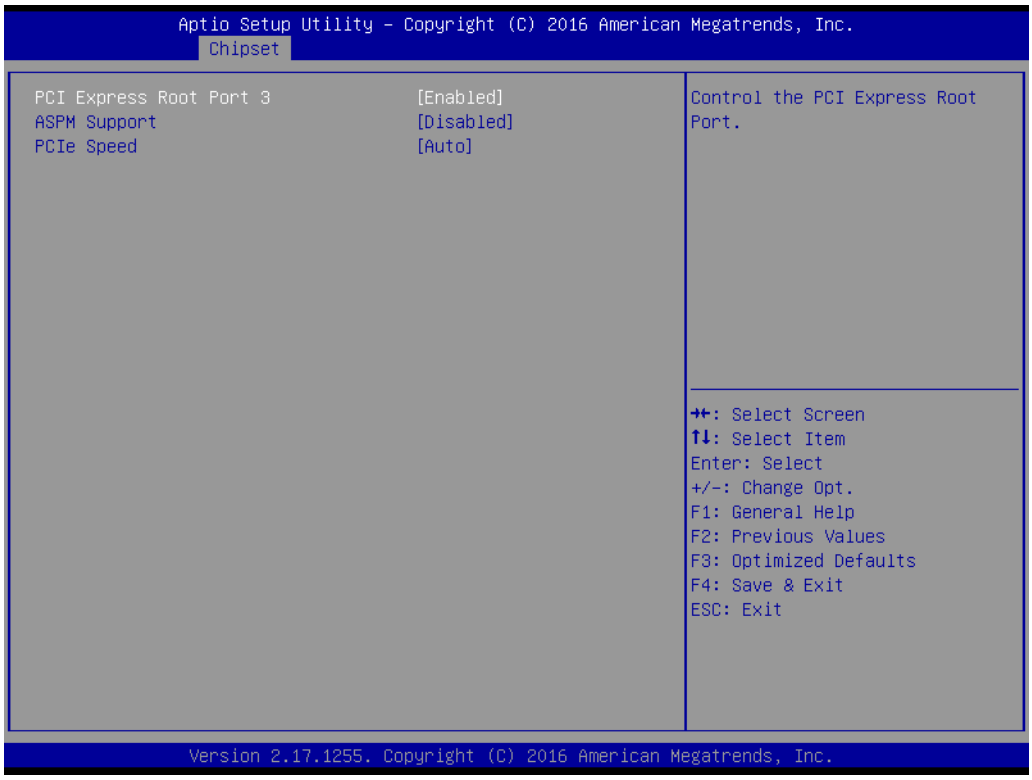
Auto – BIOS auto configure

Disable – disable ASPM

PCIe Speed

Selects PCI Express port speed.

– **PCI Express Root Port 3**



PCI Express Root Port 3

Controls the PCI Express Root Port

ASPM Support

Sets the ASPM level: Force L0s – Force all links to L0s State

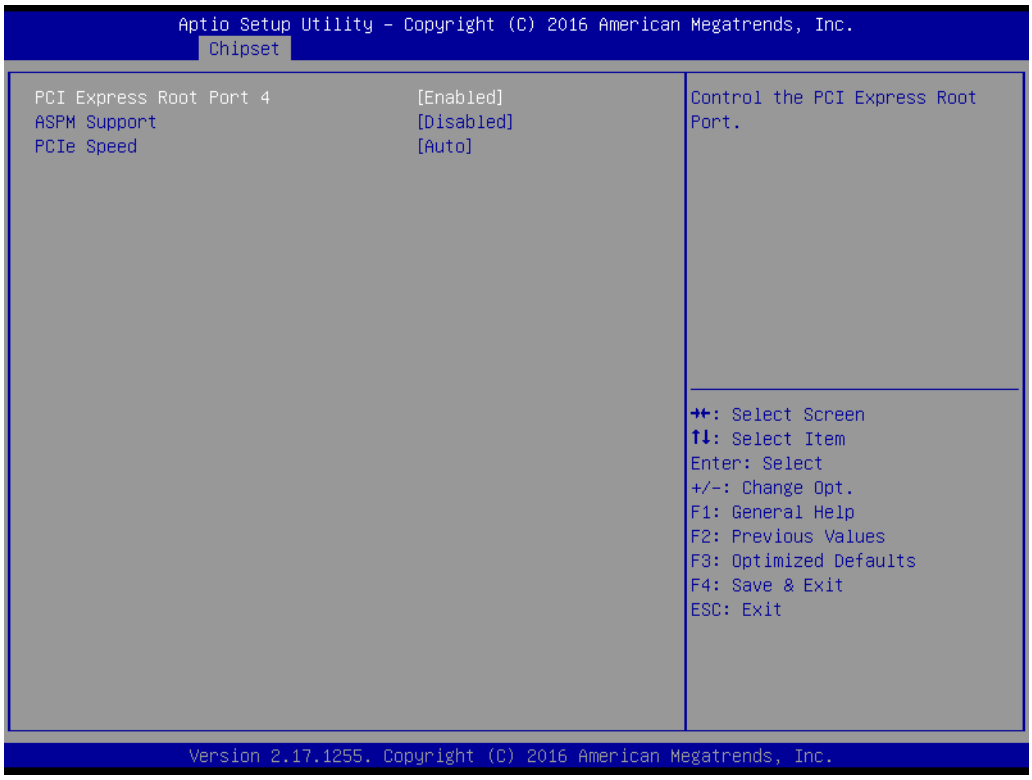
Auto – BIOS auto configure

Disable – disable ASPM

PCIe Speed

Selects PCI Express port speed.

– **PCI Express Root Port 4**



PCI Express Root Port 4

Controls the PCI Express Root Port

ASPM Support

Sets the ASPM level: Force L0s – Force all links to L0s State

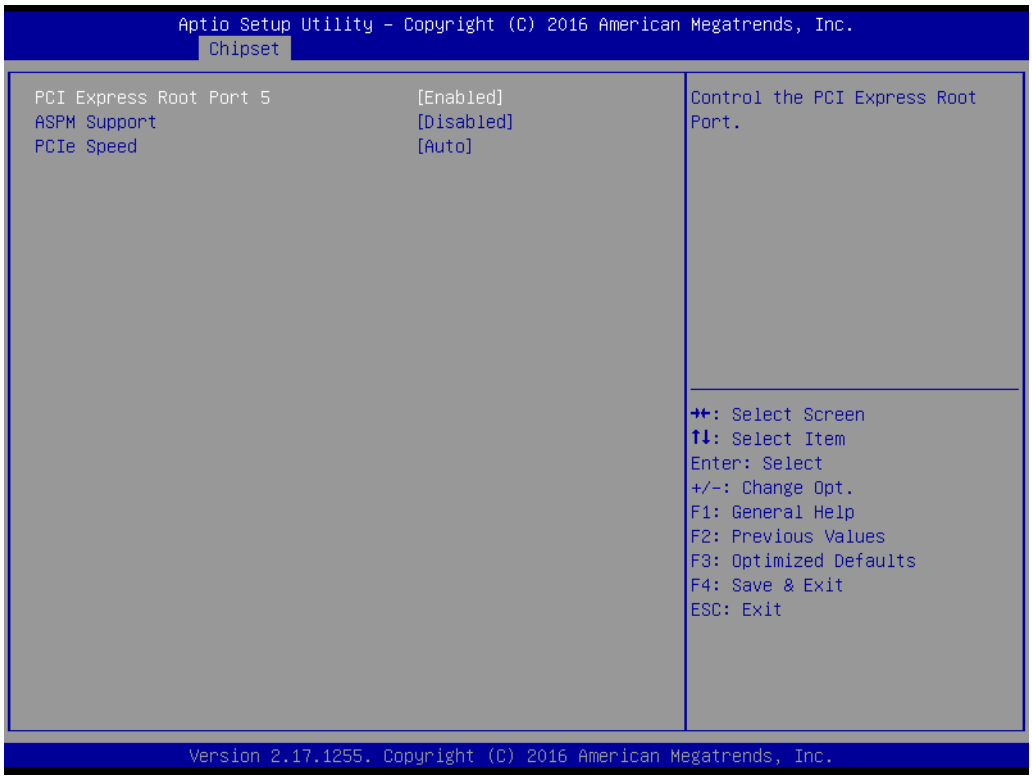
Auto – BIOS auto configure

Disable – disable ASPM

PCIe Speed

Selects PCI Express port speed.

– **PCI Express Root Port 5**



PCI Express Root Port 5

Controls the PCI Express Root Port

ASPM Support

Set the ASPM level: Force L0s – Force all links to L0s State

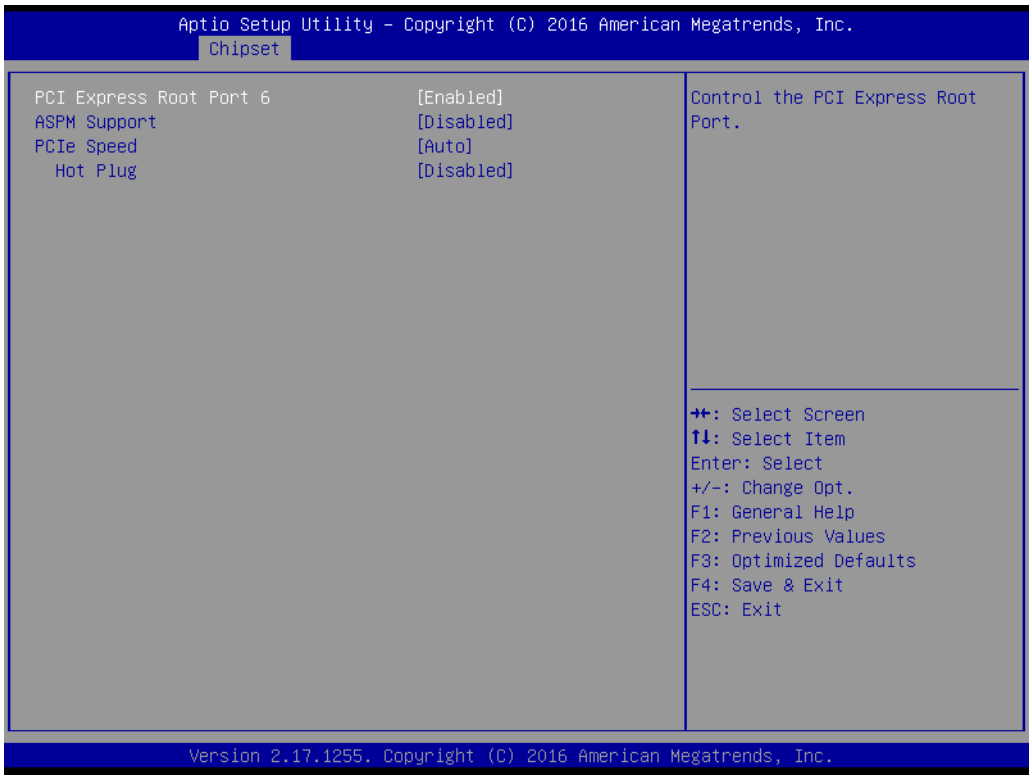
Auto – BIOS auto configure

Disable – disable ASPM

PCIe Speed

Selects PCI Express port speed.

– **PCI Express Root Port 6**



PCI Express Root Port 6

Controls the PCI Express Root Port

ASPM Support

Sets the ASPM level: Force L0s – Force all links to L0s State

Auto – BIOS auto configure

Disable – disable ASPM

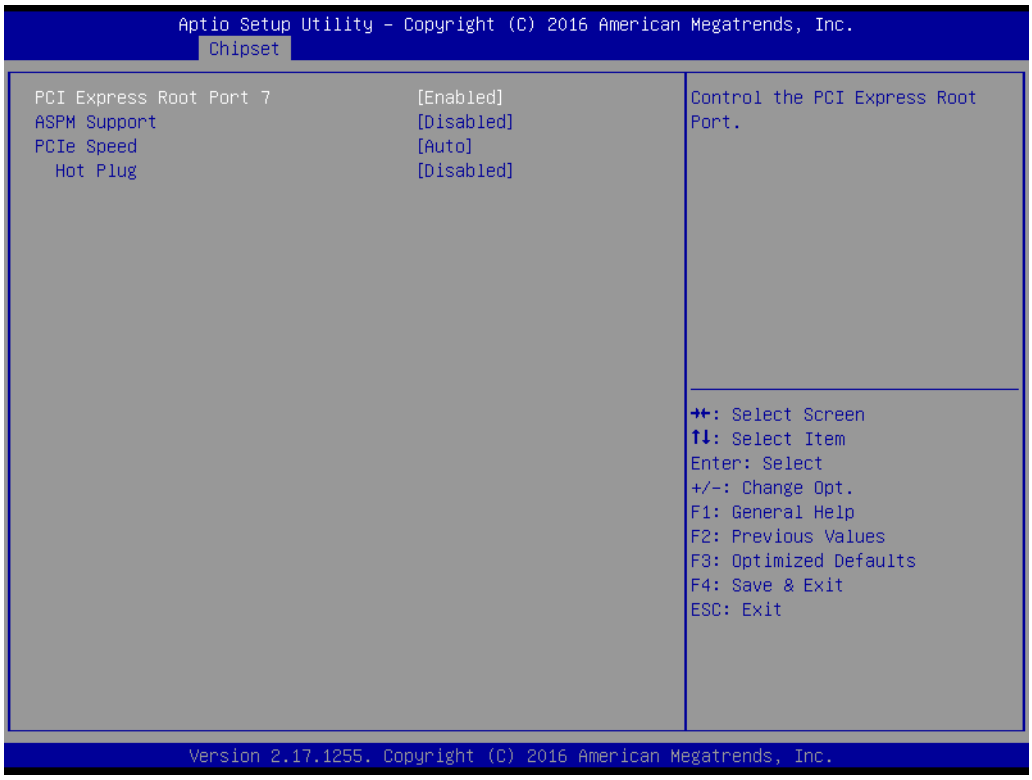
PCIe Speed

Selects PCI Express port speed.

Hot Plug

Enables or disables PCI Express Hot Plug

– **PCI Express Root Port 7**



PCI Express Root Port 7

Controls the PCI Express Root Port

ASPM Support

Sets the ASPM level: Force L0s – Force all links to L0s State

Auto – BIOS auto configure

Disable – disable ASPM

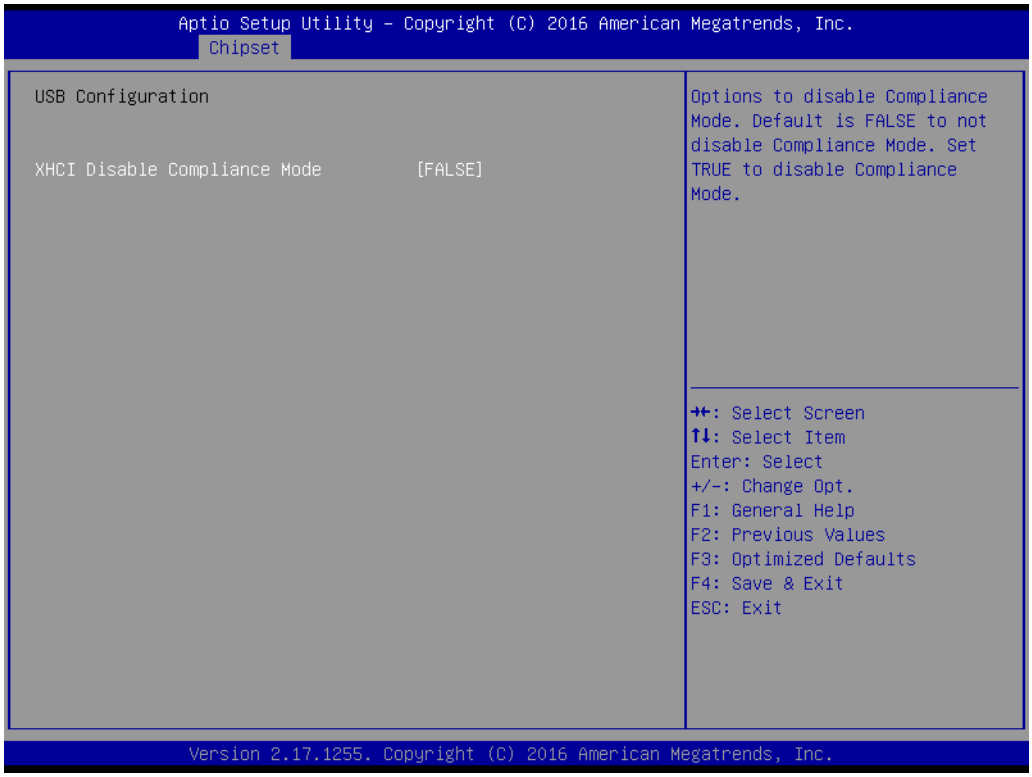
PCIe Speed

Selects PCI Express port speed.

Hot Plug

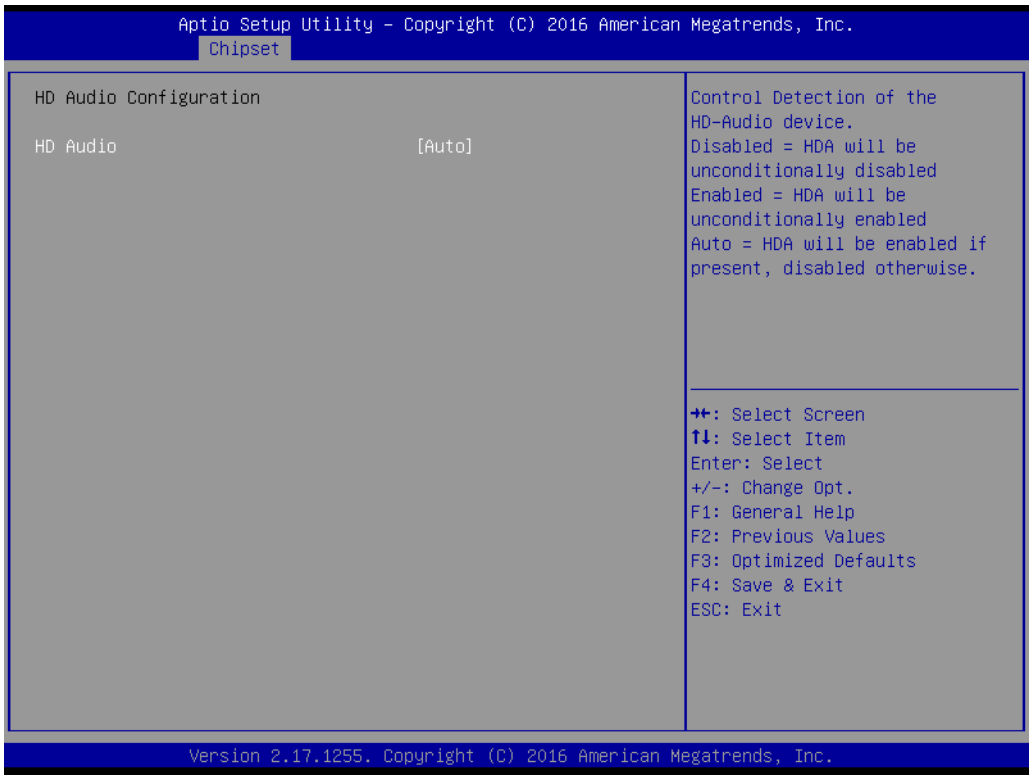
Enables or disables PCI Express Hot Plug

USB Configuration



– **XHCI Disable Compliance Mode**
Options to disable compliance mode. Default is FALSE to not disable compliance mode. Set TRUE to disable compliance mode.

HD Audio Configuration



– **HD Audio**

Controls detection of the HD-Audio device.

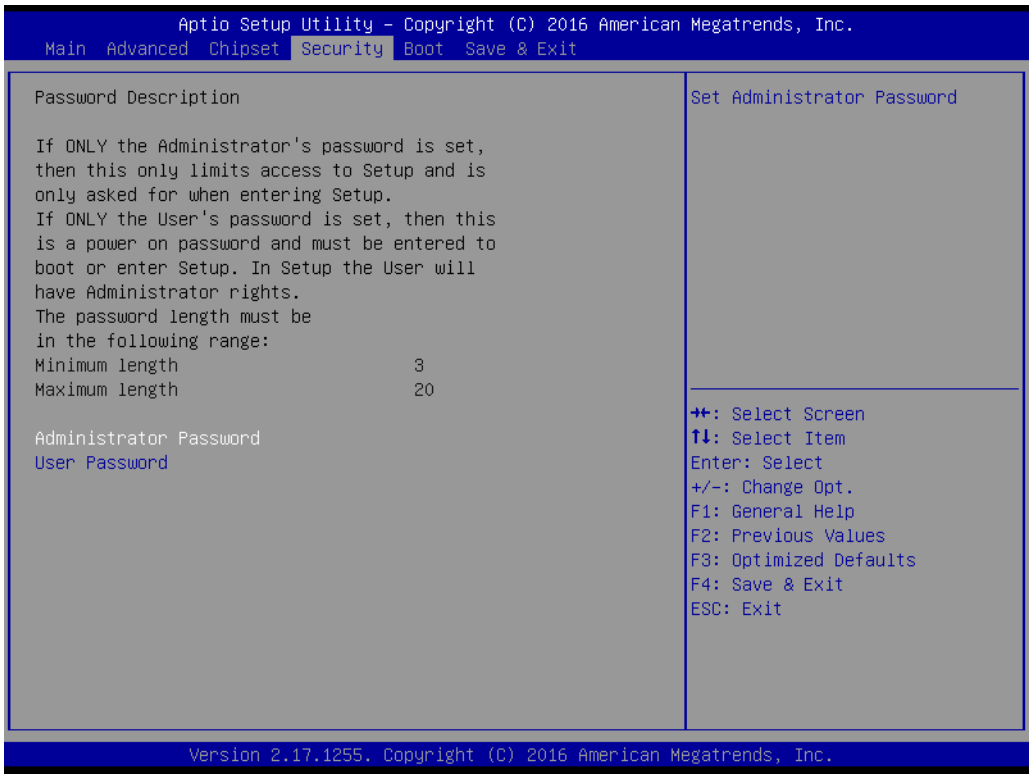
Disable = HDA will be unconditionally disabled

Enable = HDA will be unconditionally enabled

Auto = HDA will be enabled if present, disabled otherwise.

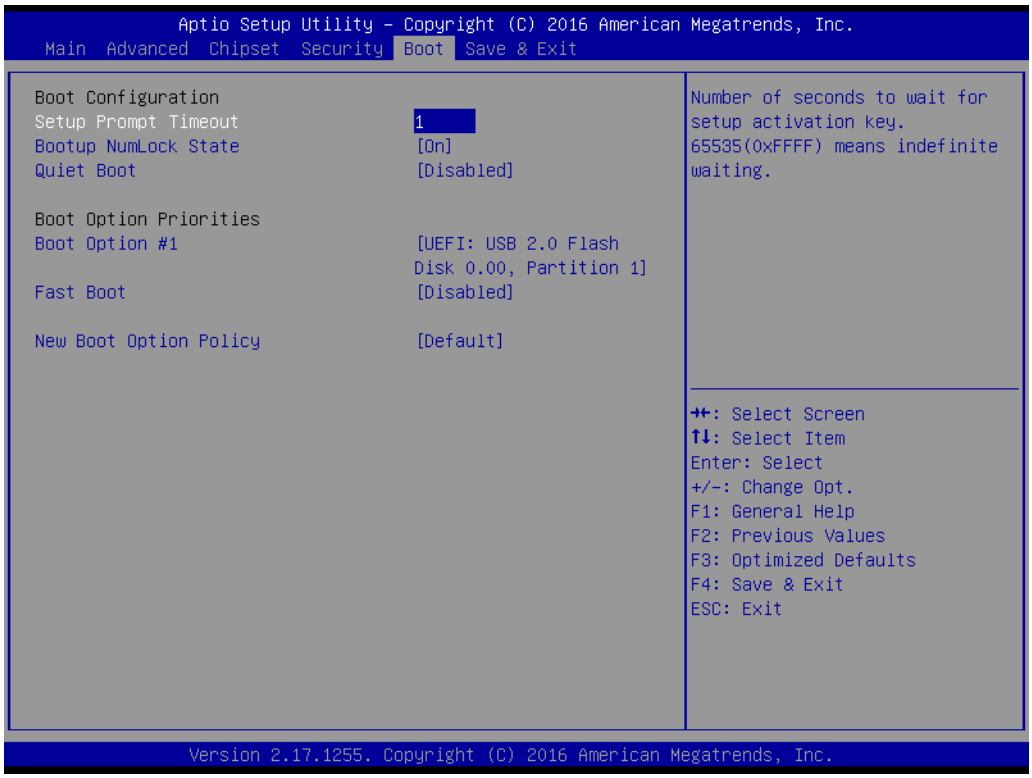
3.1.4 Security

Select Security Setup from the SOM-5897 main BIOS setup menu. All Security Setup options, such as password protection are described in this section. To access the sub menu for the following items, select the item and press <Enter>:



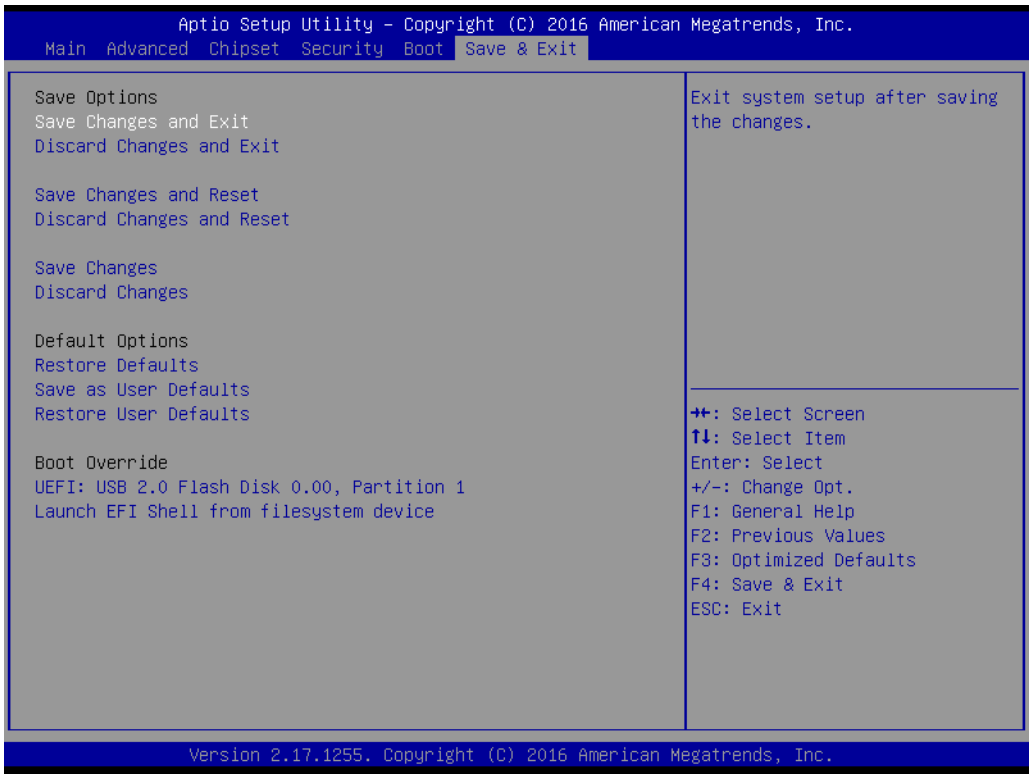
Change Administrator / User Password: Select this option and press <ENTER> to access the sub menu, and then type in the password.

3.1.5 Boot Settings



- **Setup Prompt Timeout**
  This item allows users to select the number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.
- **Bootup NumLock State**
  This item allows users to select the keyboard Numlock state.
- **Quiet Boot**
  This item allows users to enable or disable quiet boot option
- **Boot Option #1**
  Sets the system boot order
- **Fast Boot**
  This item allows users to enable or disable boot with initialization of a minimal set of devices required to launch 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



3.1.6.1 Save Changes and Exit

When users have completed system configuration, select this option to save changes, exit BIOS setup menu and reboot the computer if necessary to take effect all system configuration parameters.

3.1.6.2 Discard Changes and Exit

Select this option to quit Setup without making any permanent changes to the system configuration.

3.1.6.3 Save Changes and Reset

When users have completed system configuration, select this option to save changes, exit BIOS setup menu and reboot the computer to take effect all system configuration parameters.

3.1.6.4 Discard Changes and Reset

Select this option to quit Setup without making any permanent changes to the system configuration and reboot the computer.

3.1.6.5 Save Changes

When users have completed system configuration, select this option to save changes without exit BIOS setup menu.

3.1.6.6 Discard Changes

Select this option to discard any current changes and load previous system configuration.

3.1.6.7 Restore Defaults

The SOM-5897 automatically configures all setup items to optimal settings when users select this option. Optimal Defaults are designed for maximum system performance, but may not work best for all computer applications. In particular, do not use the Optimal Defaults if the user's computer is experiencing system configuration problems.

3.1.6.8 Save as User Defaults

When users have completed system configuration, select this option to save changes as user defaults without exit BIOS setup menu.

3.1.6.9 Restore User Defaults

The users can select this option to restore user defaults.

3.1.6.10 Launch EFI Shell from file system device

This items attempts to Launch EFI Shell application (Shell.efi) from one of the available file system devices.

Chapter 4

S/W Introduction & Installation

Sections include:

- 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

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.

4.2.1 Windows Driver Setup

To install the drivers on a windows-based OS, please connect to the internet and go to http://support.advantech.com.tw to download the drivers that you want to install and follow Driver Setup instructions to complete the installation.

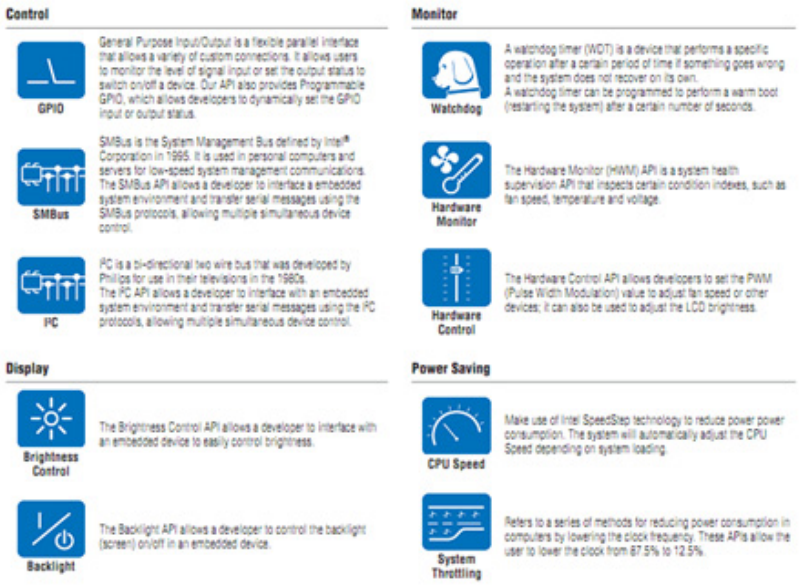
4.2.2 Other OS

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

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 as they happen. iManager also comes with a secure & encrypted EEPROM for storing important security keys or other customer information. All the embedded functions are configured through the API and provide corresponding utilities to demonstrate. These APIs comply with PICMG EAPI (Embedded Application Programmable Interface) specifications and makes these embedded features easier to integrate, speed development schedules, and provide customer's with software continuity while upgrading hardware. More details of how to use the APIs and utilities, please refer to the 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-5897 CPU System on Module.

Sections include:

- SOM-5897 Type 6 Pin Assignment

A.1 SOM-5897 Type 6 Pin Assignment

This section gives SOM-5897 pin assignment on COM Express connector which compliant with COMR.0 R2.1 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-5897 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	SATA3_TX+
A23	SATA2_TX-	B23	SATA3_TX-
A24	SUS_S5#	B24	PWR_OK
A25	SATA2_RX+	B25	SATA3_RX+
A26	SATA2_RX-	B26	SATA3_RX-
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	EXCD1_PERST#
A48	EXCD0_PERST#	B48	EXCD1_CPPE#
A49	EXCD0_CPPE#	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	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-5897 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	DDI3_CTRLCLK_AUX+	D36	DDI1_PAIR3+
C37	DDI3_CTRLDATA_AUX-	D37	DDI1_PAIR3-
C38	DDI3_DDC_AUX_SEL	D38	N/A
C39	DDI3_PAIR0+	D39	DDI2_PAIR0+
C40	DDI3_PAIR0-	D40	DDI2_PAIR0-
C41	GND (FIXED)	D41	GND (FIXED)
C42	DDI3_PAIR1+	D42	DDI2_PAIR1+
C43	DDI3_PAIR1-	D43	DDI2_PAIR1-
C44	DDI3_HPD	D44	DDI2_HPD
C45	N/A	D45	N/A
C46	DDI3_PAIR2+	D46	DDI2_PAIR2+
C47	DDI3_PAIR2-	D47	DDI2_PAIR2-
C48	N/A	D48	N/A
C49	DDI3_PAIR3+	D49	DDI2_PAIR3+
C50	DDI3_PAIR3-	D50	DDI2_PAIR3-
C51	GND (FIXED)	D51	GND (FIXED)
C52	PEG_RX0+	D52	PEG_TX0+
C53	PEG_RX0-	D53	PEG_TX0-
C54	N/A	D54	PEG_LANE_RV#
C55	PEG_RX1+	D55	PEG_TX1+
C56	PEG_RX1-	D56	PEG_TX1-
C57	N/A	D57	TYPE2#
C58	PEG_RX2+	D58	PEG_TX2+
C59	PEG_RX2-	D59	PEG_TX2-
C60	GND (FIXED)	D60	GND (FIXED)
C61	PEG_RX3+	D61	PEG_TX3+
C62	PEG_RX3-	D62	PEG_TX3-
C63	N/A	D63	N/A
C64	N/A	D64	N/A
C65	PEG_RX4+	D65	PEG_TX4+
C66	PEG_RX4-	D66	PEG_TX4-
C67	N/A	D67	GND
C68	PEG_RX5+	D68	PEG_TX5+
C69	PEG_RX5-	D69	PEG_TX5-
C70	GND (FIXED)	D70	GND (FIXED)
C71	PEG_RX6+	D71	PEG_TX6+
C72	PEG_RX6-	D72	PEG_TX6-
C73	GND	D73	GND
C74	PEG_RX7+	D74	PEG_TX7+

C75	PEG_RX7-	D75	PEG_TX7-
C76	GND	D76	GND
C77	N/A	D77	N/A
C78	PEG_RX8+	D78	PEG_TX8+
C79	PEG_RX8-	D79	PEG_TX8-
C80	GND (FIXED)	D80	GND (FIXED)
C81	PEG_RX9+	D81	PEG_TX9+
C82	PEG_RX9-	D82	PEG_TX9-
C83	N/A	D83	N/A
C84	GND	D84	GND
C85	PEG_RX10+	D85	PEG_TX10+
C86	PEG_RX10-	D86	PEG_TX10-
C87	GND	D87	GND
C88	PEG_RX11+	D88	PEG_TX11+
C89	PEG_RX11-	D89	PEG_TX11-
C90	GND (FIXED)	D90	GND (FIXED)
C91	PEG_RX12+	D91	PEG_TX12+
C92	PEG_RX12-	D92	PEG_TX12-
C93	GND	D93	GND
C94	PEG_RX13+	D94	PEG_TX13+
C95	PEG_RX13-	D95	PEG_TX13-
C96	GND	D96	GND
C97	N/A	D97	PEG_ENABLE#
C98	PEG_RX14+	D98	PEG_TX14+
C99	PEG_RX14-	D99	PEG_TX14-
C100	GND (FIXED)	D100	GND (FIXED)
C101	PEG_RX15+	D101	PEG_TX15+
C102	PEG_RX15-	D102	PEG_TX15-
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)

Appendix B

Watchdog Timer

This appendix gives you the information about the watchdog timer programming on the SOM-5897 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	Power button event
Power Off	Support
H/W Restart	Support
External WDT	N/A

** WDT new driver support automatically selects available IRQ. Only Win XP, Win7 and Win8 support it.

In other OS, 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-5897 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
0064-0064	Standard PS/2 Keyboard
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
029C-029D	Motherboard resources
02E8-02EF	Communications Port (COM4)
02F8-02FF	Communications Port (COM2)
0378-037F	Printer Port (LPT1)
03E8-03EF	Communications Port (COM3)
03F8-03FF	Communications Port (COM1)
04D0-04D1	Programmable interrupt controller
0680-069F	Motherboard resources

Table D.1: System I/O ports	
0778-077F	Printer Port (LPT1)
0800-087F	Motherboard resources
0A00-0A0F	Motherboard resources
0A10-0A1F	Motherboard resources
0D00-FFFF	PCI Express Root Complex
164E-164F	Motherboard resources
1800-18FE	Motherboard resources
1854-1857	Motherboard resources
F000-F03F	Intel(R) HD Graphics 530
F040-F05F	Intel 100 Series/C230 Series Chipset Family SMBus – A123
F060-F07F	Intel 100 Series/C230 Series Chipset Family SATA AHCI Controller
F080-F083	Intel 100 Series/C230 Series Chipset Family SATA AHCI Controller
F090-F097	Intel 100 Series/C230 Series Chipset Family SATA AHCI Controller
FEF8-FEFF	Intel Active Management Technology – SOL (COM5)
FF00-FFFE	Motherboard resources
FFFF-FFFF	Motherboard resources

D.2 DMA Channel Assignments

Table D.2: DMA Channel Assignments	
Channel	**Function**
3	Printer Port (LPT1)

D.3 Interrupt Assignments

Table D.3: Interrupt Assignments	
Interrupt#	**Interrupt Source**
IRQ 0	System Timer
IRQ 1	Standard PS/2 Keyboard
IRQ 3	Communications Port (COM2)
IRQ 4	Communications Port (COM1)
IRQ 5	Communications Port (COM3)
IRQ 6	Communications Port (COM4)
IRQ 8	System CMOS/real time clock
IRQ 12	Microsoft PS/2 Mouse
IRQ 13	Numeric data processor
IRQ 14	Motherboard resources
IRQ 81~511	Microsoft ACPI-Compliant System
IRQ 11	Intel(R) 100 Series/C230 Series Chipset Family Thermal subsystem – A131
IRQ 11	Intel(R) 100 Series/C230 Series Chipset Family SMBus – A123
IRQ 16	High Definition Audio Controller
IRQ 19	Intel(R) Active Management Technology – SOL (COM5)

Table D.3: Interrupt Assignments	
IRQ FFFFFFFA (-6)	Intel(R) Management Engine Interface
IRQ FFFFFFFB (-5)	Intel(R) USB 3.0 Host Controller Adaptation Driver
IRQ FFFFFFFC (-4)	Intel(R) HD Graphics 530
IRQ FFFFFFFD (-3)	Intel(R) Ethernet Connection (2) I219-LM
IRQ FFFFFFFE (-2)	Intel(R) 100 Series/C230 Chipset Family SATA AHCI Controller

D.4 1st MB Memory Map

Table D.4: 1st MB Memory Map	
Addr. Range (Hex)	**Device**
0x000A0000-0x000BFFFF	PCI Express Root Complex
0x90000000-0xDFFFFFFF	PCI Express Root Complex
0xC0000000-0xCEFFFFFF	Intel(R) HD Graphics 530
0xDE000000-0xDEFFFFFF	Intel(R) HD Graphics 530
0xDF000000-0xDF01FFFF	Intel(R) I210 Ethernet Connection I219-LM
0xDF020000-0xDF02FFFF	High Definition Audio Controller
0xDF030000-0xDF03FFFF	Intel(R) USB 3.0 Host controller Adaptation Driver
0xDF040000-0xDF043FFF	High Definition Audio Controller
0xDF044000-0xDF047FFF	Intel(R) 100 Series/C230 Series Chipset Family PMC - A121
0xDF048000-0xDF049FFF	Intel(R) 100 Series/C230 Series Chipset Family SATA AHCI Controller
0xDF04A000-0xDF04A0FF	Intel(R) 100 Series/C230 Series Chipset Family SMBus - A123
0xDF04B000-0xDF04B7FF	Intel(R) 100 Series/C230 Series Chipset Family SATA AHCI Controller
0xDF04C000-0xDF04C0FF	Intel(R) 100 Series/C230 Series Chipset Family SATA AHCI Controller
0xDF04F000-0xDF04FFFF	Intel(R) 100 Series/C230 Series Chipset Family Thermal subsystem - A131
0xDFFE0000-0xDFFFFFFF	Motherboard resources
0xE0000000-0xEFFFFFFF	Motherboard resources
0xFD000000-0xFDABFFFF	Motherboard resources
0xFD000000-0xFE7FFFFF	PCI Express Root Complex
0xFDAC0000-0xFDACFFFF	Intel(R) Serial IO GPIO Host Controller - INT345D
0xFDAD0000-0xFDADFFFF	Motherboard resources
0xFDAE0000-0xFDAEFFFF	Intel(R) Serial IO GPIO Host Controller - INT345D
0xFDAF0000-0xFDAFFFFF	Intel(R) Serial IO GPIO Host Controller - INT345D
0xFDB00000-0xFDFFFFFF	Motherboard resources
0xFE000000-0xFE01FFFF	Motherboard resources
0xFE036000-0xFE03BFFF	Motherboard resources
0xFE03D000-0xFE3FFFFF	Motherboard resources
0xFE10000-0xFE1FFFFF	Intel(R) 100 Series/C230 Series Chipset Family Trace Hub - A126

Table D.4: 1st MB Memory Map	
0xFE20000-0xFE3FFFFF	Intel(R) 100 Series/C230 Series Chipset Family Trace Hub - A126
0xFE40E000-0xFE40EFFF	Intel(R) Management Engine Interface
0xFE40F000-0xFE40FFFF	Intel(R) Active Management Technology - SOL (COM5)
0xFE410000-0xFE7FFFFF	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
0xFF000000-0xFFFFFFFF	Intel(R) 82802 Firmware Hub Device
0xFF000000-0xFFFFFFFF	Motherboard resources

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