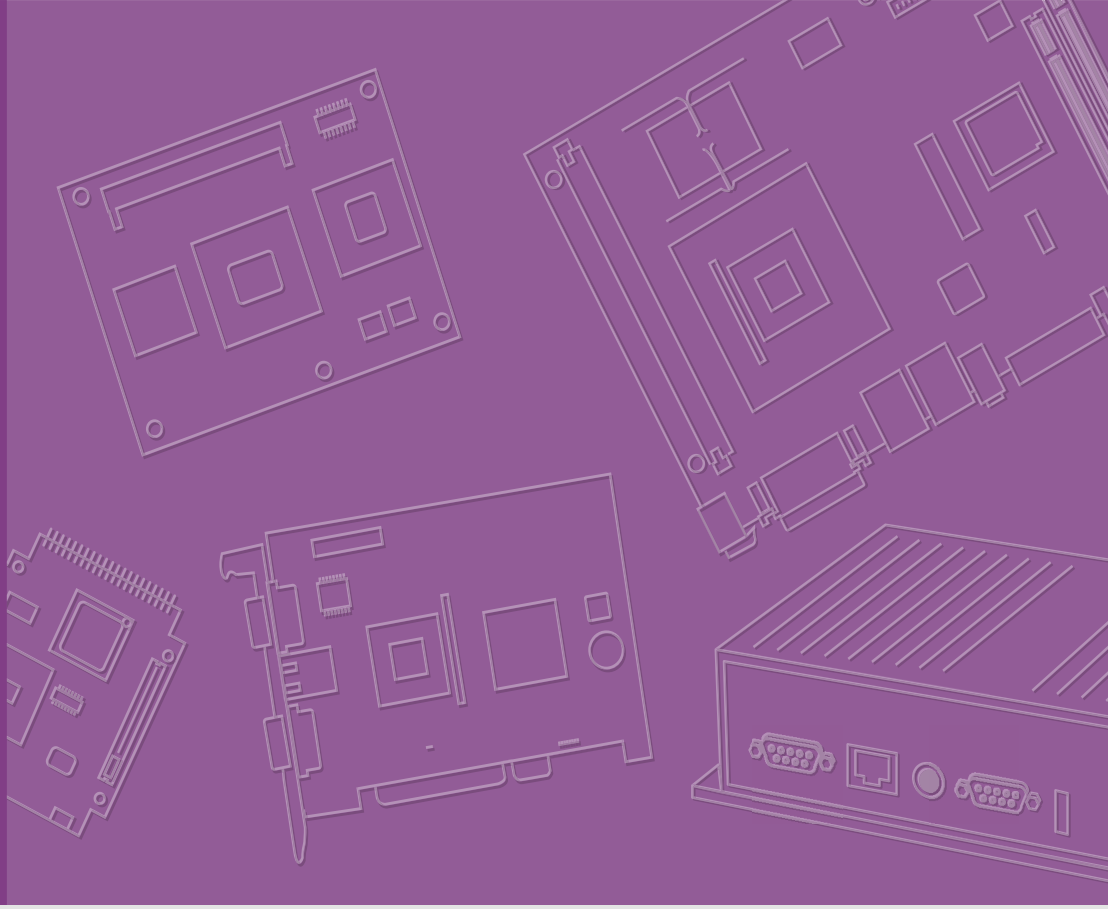

User Manual

SOM-6896

ADVANTECH

Enabling an Intelligent Planet

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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.

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

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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-6896 CPU module
- 1 x Heatspreader (1960069307N001)

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 1

1.1 Introduction 2
1.2 Specifications 2
1.2.1 Board Information 2
1.2.2 System Information 2
1.2.3 Display 2
1.2.4 Expansion Interface 3
1.2.5 I/O 3
1.2.6 iManager 2.0 3
1.2.7 Mechanical and Environmental Specification 3
1.3 Functional Block Diagram 4

Chapter 2 Mechanical Information 5

2.1 Board Information 6
Figure 2.1 Board Chips Identify - Front 6
Figure 2.2 Board Chips Identify - Back 6
2.2 Mechanical Drawing 7
Figure 2.3 Board Mechanical Drawing - Front 7
Figure 2.4 Board Mechanical Drawing - Back 7
2.3 Assembly Drawing 8
Figure 2.5 Assembly Drawing (For Reference Only) 8
Figure 2.6 Heatspreader Pre-Assembly (For Reference Only) 8
2.4 Assembly Drawing 9
Figure 2.7 Main Chip Height and Tolerance (GT2) 9
Figure 2.8 Main Chip Height and Tolerance (GT3) 9

Chapter 3 AMI BIOS 11

3.1 Introduction 12
Figure 3.1 BIOS Setup Utility Main Screen 12
3.2 Entering Setup 13
3.2.1 Main Setup 13
Figure 3.2 Main setup screen 13
3.2.2 Advanced BIOS Features Setup 14
Figure 3.3 Advanced BIOS Features Setup Screen 14
Figure 3.4 CPU Configuration 15
Figure 3.5 Trusted Computing 16
Figure 3.6 ACPI Settings 17
Figure 3.7 PCH-FW Configuration 18
Figure 3.8 Firmware Update Configuration 19
Figure 3.9 W83627DHG Super IO Configuration 19
Figure 3.10 Serial Port 0 Configuration 20
Figure 3.11 Serial Port 1 Configuration 21
Figure 3.12 Parallel Port Configuration 22
Figure 3.13 iManager Configuration 23
Figure 3.14 Serial Port 2 Configuration 24
Figure 3.15 Serial Port 3 Configuration 25
Figure 3.16 Hardware Monitor 26
Figure 3.17 Serial Port Console Redirection 27
Figure 3.18 SATA Configuration 28
Figure 3.19 Network Stack Configuration 29
Figure 3.20 CSM Configuration 29

Figure 3.21 USB Configuration 30
3.2.3 Chipset 32
Figure 3.22 Chipset Setup 32
Figure 3.23 System Agent (SA) Configuration 33
Figure 3.24 Graphics Configuration 34
Figure 3.25 LCD Control 35
Figure 3.26 Memory Configuration 36
Figure 3.27 PCH-IO Configuration 36
Figure 3.28 PCI Express Configuration 37
Figure 3.29 PCI Express Root Port 0 Configuration 38
Figure 3.30 PCI Express Root Port 1 Configuration 39
Figure 3.31 PCI Express Root Port 2 Configuration 40
Figure 3.32 PCI Express Root Port 3 Configuration 41
Figure 3.33 USB Configuration 42
Figure 3.34 PCH Azalia Configuration 43
3.2.4 Security Setting 44
Figure 3.35 Security Setup 44
3.2.5 Boot Settings 45
Figure 3.36 Boot Setting 45
3.2.6 Save & Exit 46
Figure 3.37 Save & Exit 46

Chapter 4 S/W Introduction & Installation 49

4.1 S/W Introduction 50
4.2 Driver Installation 50
4.2.1 Windows Driver Setup 50
4.2.2 Other OS 50
4.3 Advantech iManager 51

Appendix A Pin Assignment 53

A.1 SOM-6896 Type 6 Pin Assignment 54

Appendix B Watchdog Timer 59

B.1 Programming the Watchdog Timer 60

Appendix C Programming GPIO 61

C.1 GPIO Register 62

Appendix D System Assignments 63

D.1 System I/O Ports 64
Table D.1: System I/O ports 64
D.2 DMA Channel Assignments 65
Table D.2: DMA Channel Assignments 65
D.3 Interrupt Assignments 66
Table D.3: Interrupt Assignments 66
D.4 1st MB Memory Map 67
Table D.4: 1st MB Memory Map 67

Chapter 1

General Information

This chapter gives background information on the SOM-6896 CPU Computer on Module.

Sections include:

- Introduction
- Specification
- Functional Block Diagram

1.1 Introduction

SOM-6896 is a new COM Express (PICMG COM.0) R2.1 Compact Module in a Type 6 pin-out module board. SOM-6896 is equipped with the latest 5th generation Intel® Core™ Processor on a compact size 95x95mm COM Express module, resulting in low power consumption and excellent CPU and graphics performance. SOM-6896 is built for use in demanding applications such as medical equipment, automation, and gaming industries.

Compared with its predecessor, SOM-6896 is designed with the latest 5th generation Intel® Core™ Processor and supports DirectX 11.1, OpenGL 4.2 and OpenCL 2.0, and AVC/VC1/MPEG2 codec support. SOM-6896 supports 3 simultaneous displays (VGA, LVDS, HDMI/DisplayPort/DVI), and HDMI supports up to 4K (4096x2304) @ 24Hz resolutions.

SOM-6896 provides flexible IO interface options with up to 3 PCIe x1 to fulfill various function extension requirements. In addition, SOM-6896 improves thermal performance with an added mounting hole designed around the CPU with a stronger board structure that avoids board bending - designed to improve thermal effect, it offers excellent connection between the module board and thermal solution.

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:** 5th Gen Intel® Core™ / Celeron® Processors

CPU+PCH	Base Freq.	Max Turbo Frequency	Core	Cache (MB)	TDP(W)
Intel® i7-5650U	2.2 GHz	3.1 GHz	2	4	15
Intel® i5-5350U	1.8 GHz	2.9 GHz	2	3	15
Intel® i3-5010U	2.1 GHz	NA	2	3	15
Celeron® 3765U	1.9 GHz	NA	2	2	15

- **Memory:** 2 SODIMM Socket for DDR3L-1600, up to 16 GB
- **BIOS:** AMI UEFI BIOS 128 Mb
- **Power management:** Supports power saving modes including Normal / Standby / Suspend modes. ACPI 2.0 compliant

1.2.3 Display

Graphic Core: Intel® HD Graphic supports DX11.1, OpenGL 4.0/4.2, OCL1.2, HW Decode/Encode for H.264/AVC, VC-1, SVC, MPEG2, Decode for VP8

CPU	Graphics Core	Base Freq.	Max Freq.
Intel® i7-5650U	Intel® HD graphics 6000	300 MHz	1 GHz
Intel® i5-5350U	Intel® HD graphics 6000	300 MHz	1 GHz
Intel® i3-5010U	Intel® HD Graphics 5500	300 MHz	900 MHz
Celeron® 3765U	Intel® HD Graphics	300 MHz	850 MHz

- **VGA:** Resolution up to 1920 x 1200

- **LVDS:** Single and dual channel 18/24-bit resolutions up to 1920 x 1200
- **DDI (HDMI/DVI/DisplayPort):**
  - DDI 1: supports HDMI (1.4a specification compliant with 3D) resolutions up to 4096 x 2304, DisplayPort resolutions up to 3840 x 2160
    DVI resolutions up to 1920 x 1200 (DDI 2: Optional)
- **Dual Display:**
  - LVDS (eDP) + HDMI (DDI1)
  - LVDS (eDP) + VGA (DDI2 DP)
  - LVDS (eDP)+ DP (DDI1)
  - HDMI (DDI1) + VGA (DDI2 DP)
- **Triple Display:** LVDS (eDP) + VGA (DDI2 DP) + HDMI (DDI1)

1.2.4 Expansion Interface

- **PCI Express x1:** Supports 4 PCIe x1 compliant ports by default.

	x4	x2	x1
Default	0	0	4
Option 1	1	0	3

- **Audio Interface:** Intel HD Audio interface
- **LPC Bus**: Yes (24 MHz)
- **SMBus**: Yes
- **I2C Bus:** up to 1 MB/s
- **SPI:** Supports SPI BIOS only

1.2.5 I/O

- **Ethernet:** Intel i218LM Gigabit LAN supports 10/100/1000 Mbps Speed
- **SATA:** Supports 4 ports, Gen3 (6Gb/s) and Gen2 (3Gb/s), RAID 0, 1, 5, 10
- **COM Port:** 2 Ports (2-Wire)
- **Express Card:** Yes
- **USB Interface:** Supports 2 ports USB3.0, 8 ports USB 2.0
- **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
- **Smart Fan:** 2 Ports; 1 Port on COM Module. Support 12V Fan, 1 Port on Carrier Board
- **GPIO:** 8-bit GPIO
- **Power Supply Voltage:** ATX (Vin 4.75-20V, Vsb 4.75-5.25V)
- **TPM:** TPM 1.2 (Optional)

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 (Vin 4.75 - 20 V, Vsb 4.75 - 5.25 V)
- **Power Requirement:**
  - CPU SKU: Intel i7-5650U, Intel i5-5350U, Intel i3-5010U, 3765U (Celeron)
  - OS: Windows 7

- Test software: Burn In Test V7.0Pro (1014) (CPU, RAM, 2D&3D Graphics and Disk with 100%), TAT version 5.0.1010 (CPU100% and Graphic 100%)
- Idle: 5.267W (i3)
- Max: 15.775W (i3)

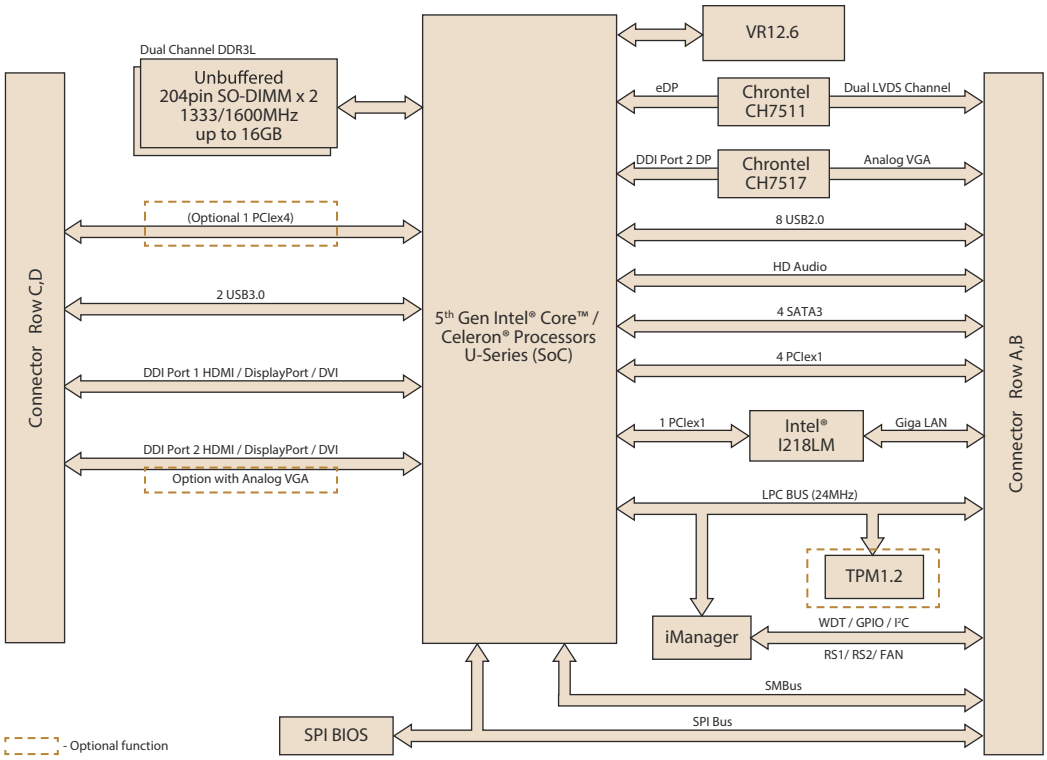
■ **Temperature Specification:**

- 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-6896 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-6896 Computer-on-Module. Please 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.

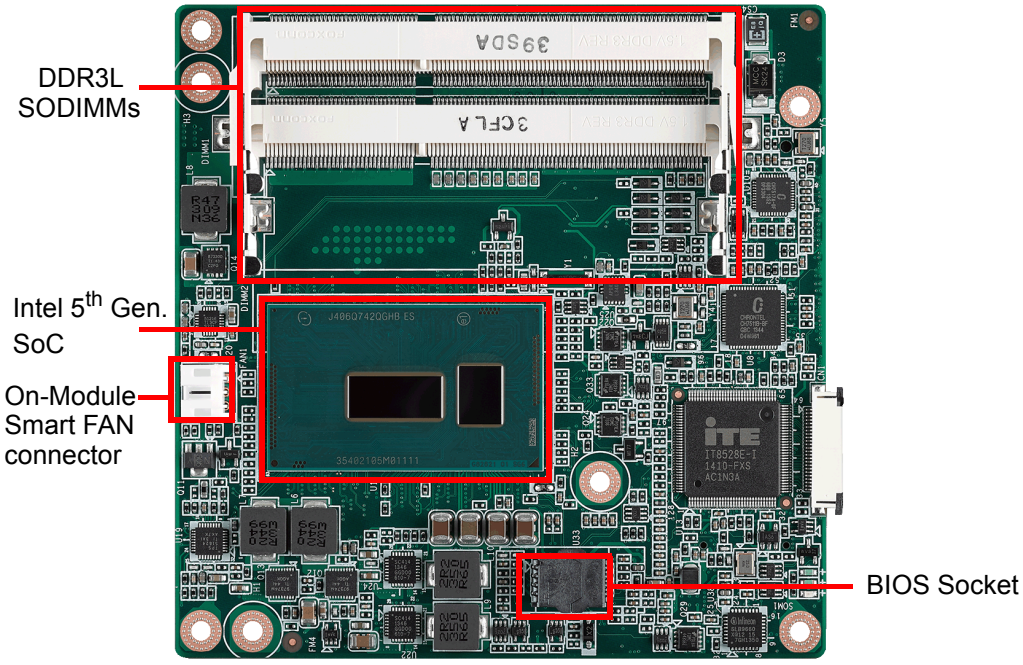


Figure 2.1 Board Chips Identify - Front

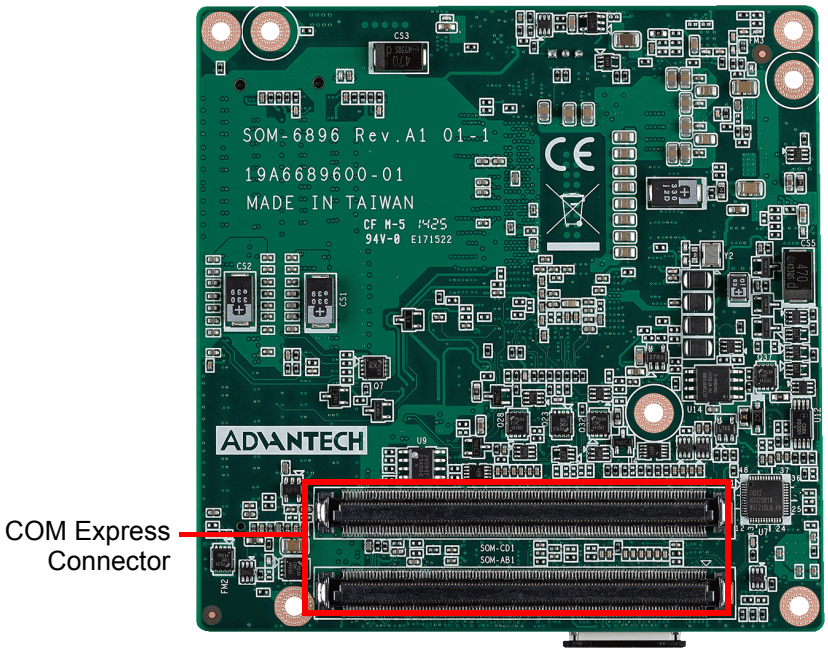


Figure 2.2 Board Chips Identify - Back

2.2 Mechanical Drawing

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

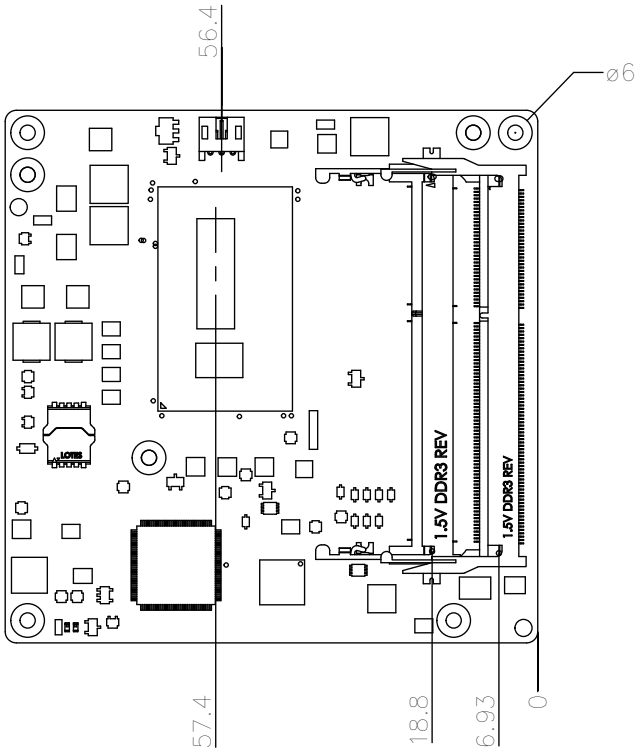


Figure 2.3 Board Mechanical Drawing - Front

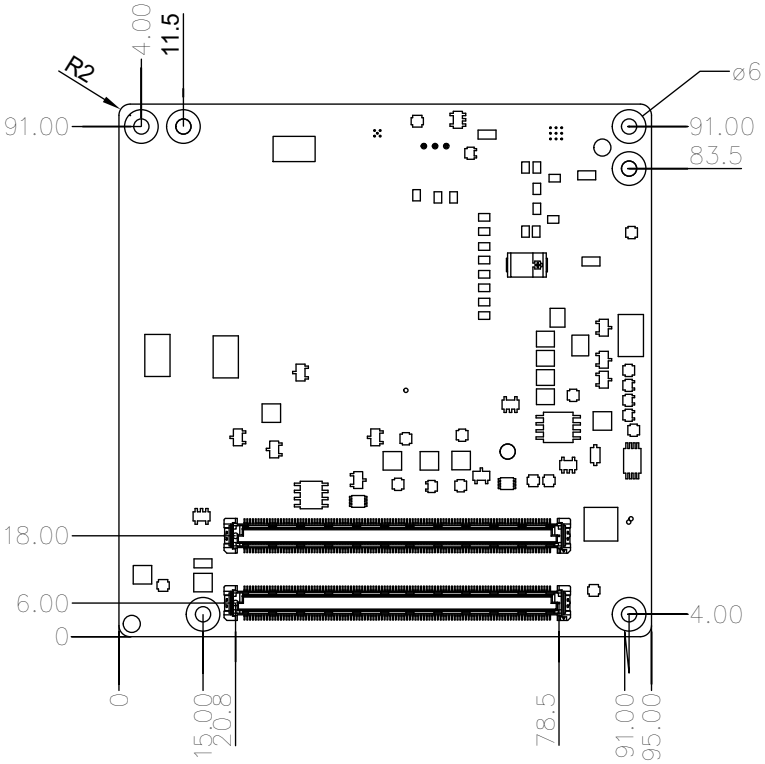


Figure 2.4 Board Mechanical Drawing - Back

2.3 Assembly Drawing

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

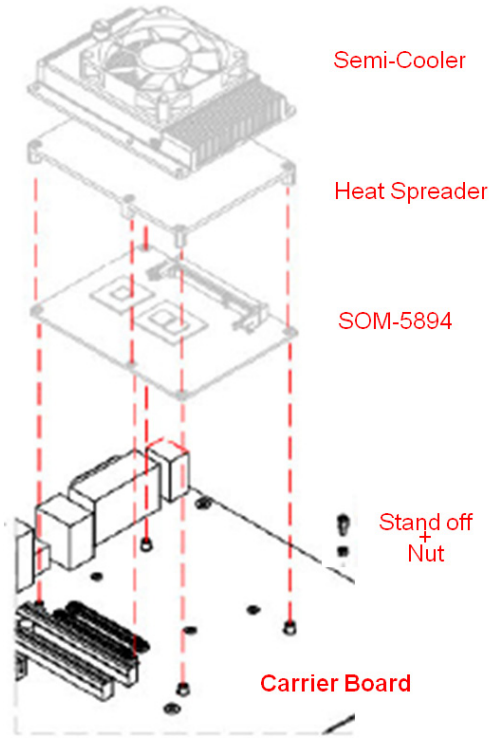


Figure 2.5 Assembly Drawing (For Reference Only)

There are 4 reserved screw holes for SOM-6896 to be pre-assembled with heat spreader.

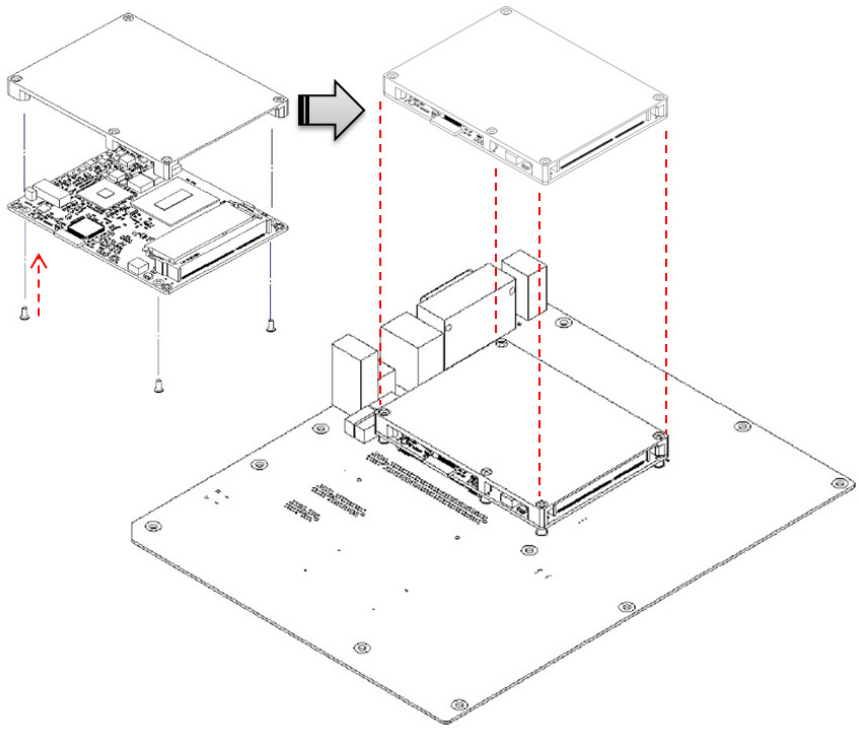
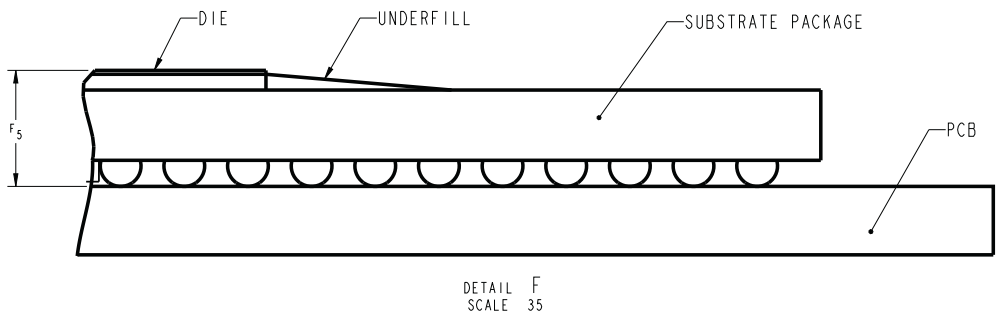


Figure 2.6 Heatspreader Pre-Assembly (For Reference Only)

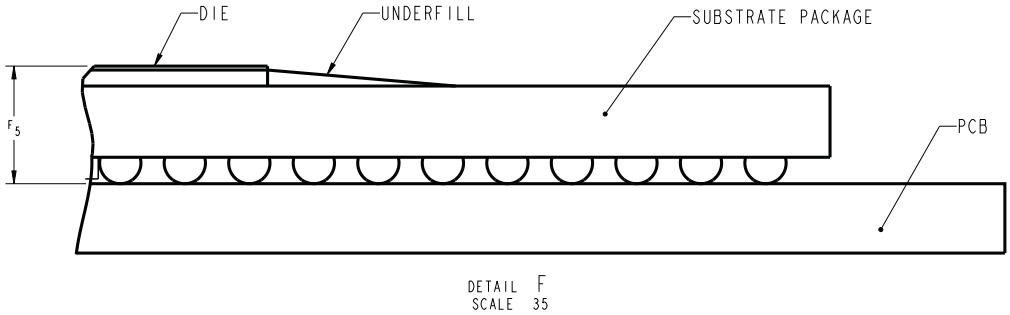
2.4 Assembly Drawing

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



*F5=NOM: 1.195 TOL:±0.089 (POST SMT STACKUP HEIGHT BASED ON LIMITED DATA FROM INTEL REFERENCE BOARD DESIGN)

Figure 2.7 Main Chip Height and Tolerance (GT2)



*F5=NOM: 1.195 TOL:±0.089 (POST SMT STACKUP HEIGHT BASED ON LIMITED DATA FROM INTEL REFERENCE BOARD DESIGN)

Figure 2.8 Main Chip Height and Tolerance (GT3)

Chapter 3

AMI BIOS

Sections include:

- Introduction
- Entering Setup

3.1 Introduction

AMI BIOS has been integrated into many motherboards for over a decade. With the AMI BIOS Setup program, users can modify BIOS settings and control various system features. This chapter describes the basic navigation of the BIOS Setup Utility.

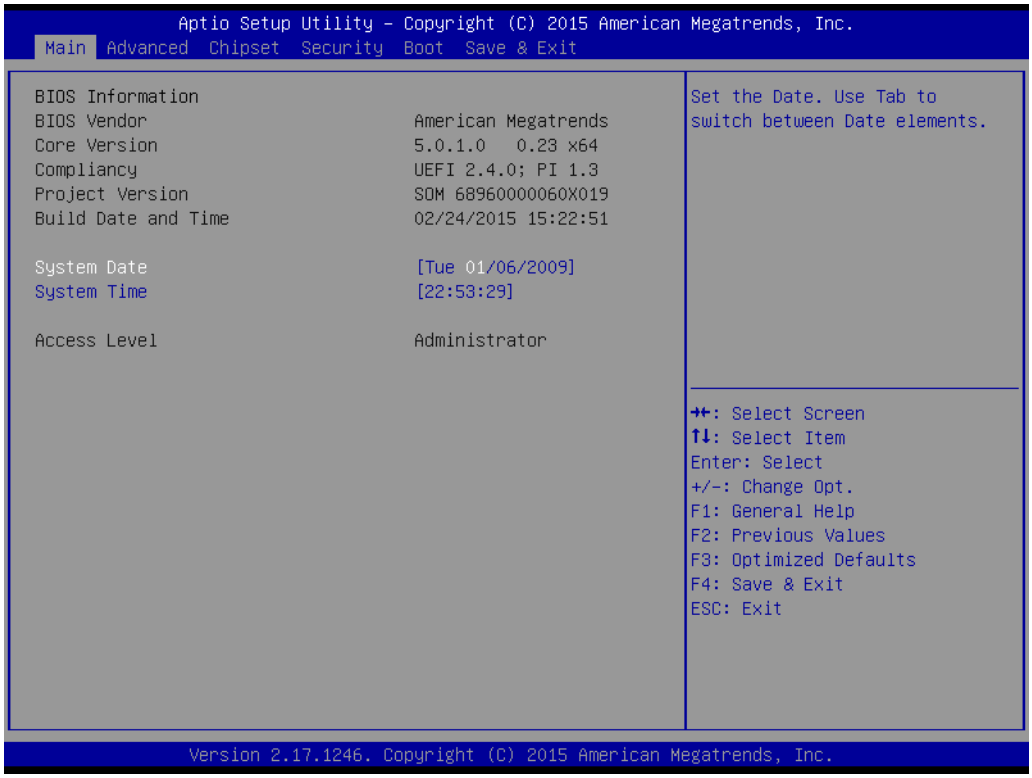


Figure 3.1 BIOS Setup Utility Main Screen

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 <ESC> or <DEL> to enter Setup menu.

3.2.1 Main Setup

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

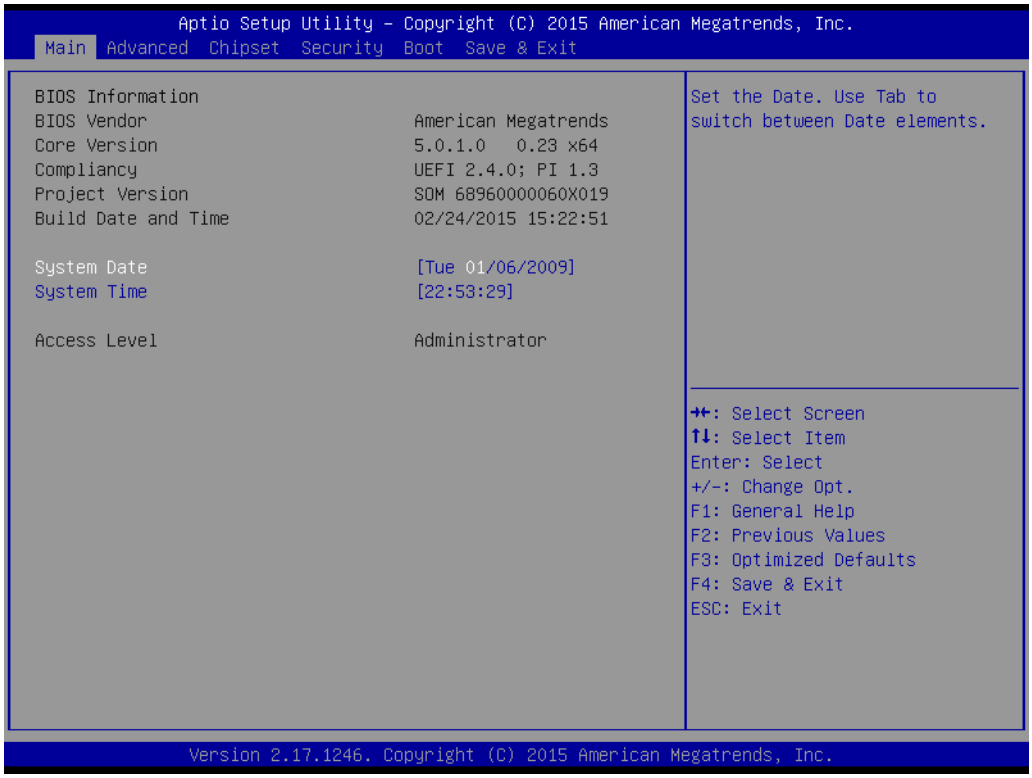


Figure 3.2 Main setup screen

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

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

- **System 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.

3.2.2 Advanced BIOS Features Setup

Select the Advanced tab from the SOM-6896 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.

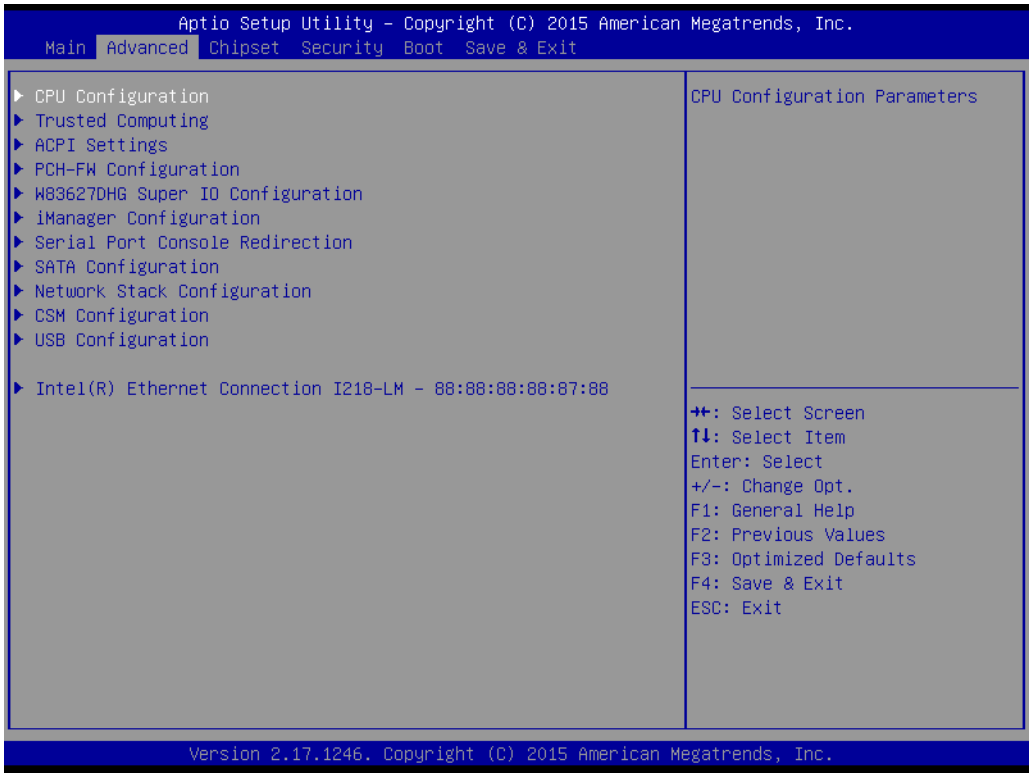


Figure 3.3 Advanced BIOS Features Setup Screen

3.2.2.1 CPU Configuration

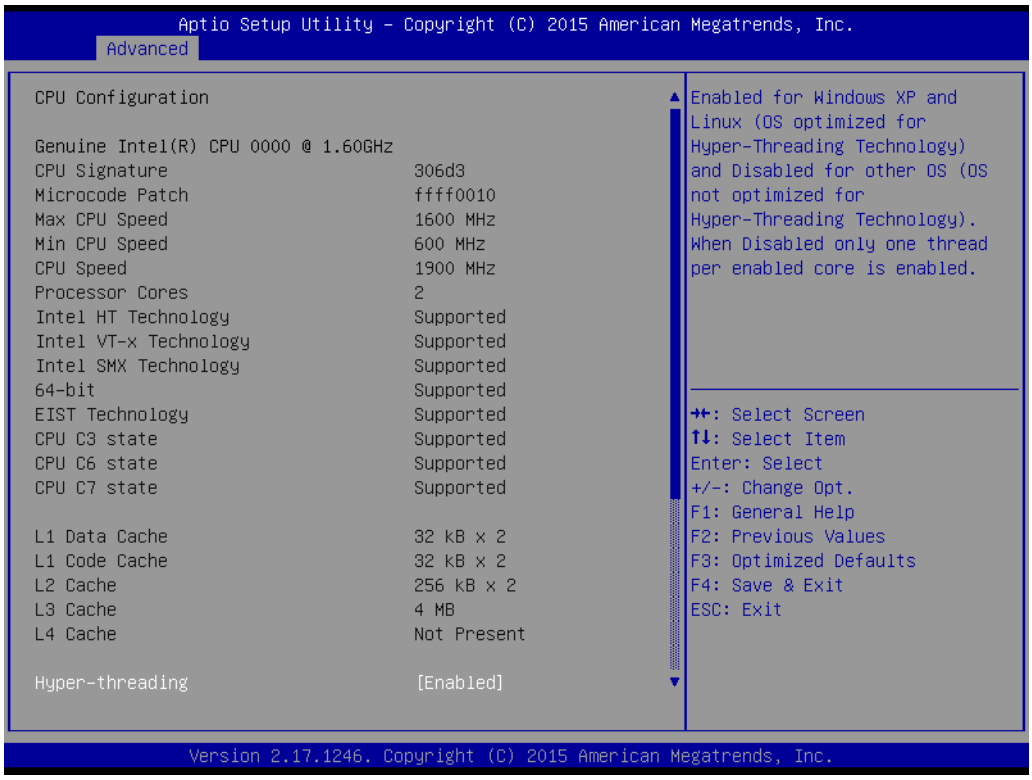


Figure 3.4 CPU Configuration

- **Hyper-threading**
  This item allows users to enable for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and Disable for other OS (OS not optimized for Hyper-Threading Technology) When Disable only one thread per enabled core is enabled.
- **Active Processor Cores**
  Number of cores to enable in each processor package.
- **Limit CPUID Maximum**
  This item disable for Windows XP.
- **Execute Disable Bit**
  XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Windows Server 2003 SP1, Windows XP SP2, SuSE Linux 9.2, RedHat Enterprise 3 update 3.)
- **Intel Virtualization Technology**
  When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
- **Hardware Prefetcher**
  Enable the Mid Level Cache (L2) streamer prefetcher.
- **Adjacent Cache Line Prefetch**
  Enable the Mid Level Cache (L2) prefetching of adjacent cache lines.
- **CPU AES**
  Enable/Disable CPU Advanced Encryption Standard instructions.
- **Boot performance mode**
  Select the performance state that the BIOS will set before OS handoff.
- **EIST**

Enable/Disable Intel SpeedStep.

- **CPU C States**
  Enable of disable CPU C states.
- **ACPI CTDP BIOS**
  Enable/Disable ACPI CTDP BIOS Support.
- **Configurable TDP**
  Allow reconfiguration of TDP levels base on current power and thermal delivery capabilities of the system.
- **Config TDP LOCK**
  Lock the Config TDP Control register.

3.2.2.2 Trusted Computing

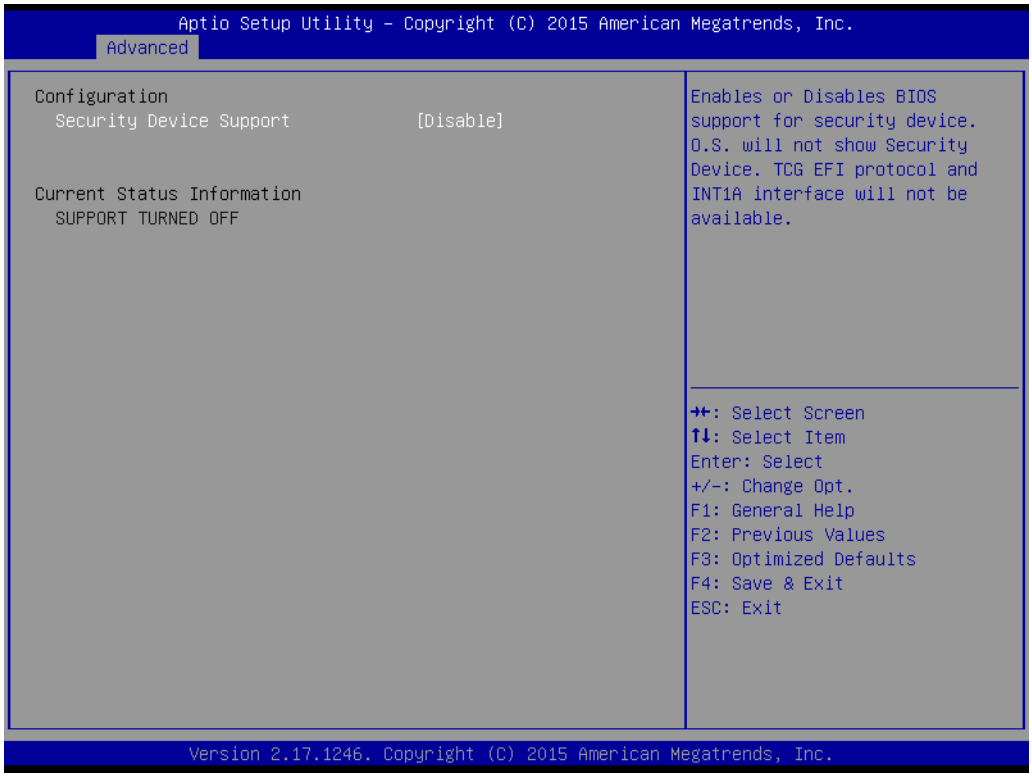


Figure 3.5 Trusted Computing

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

3.2.2.3 ACPI Settings

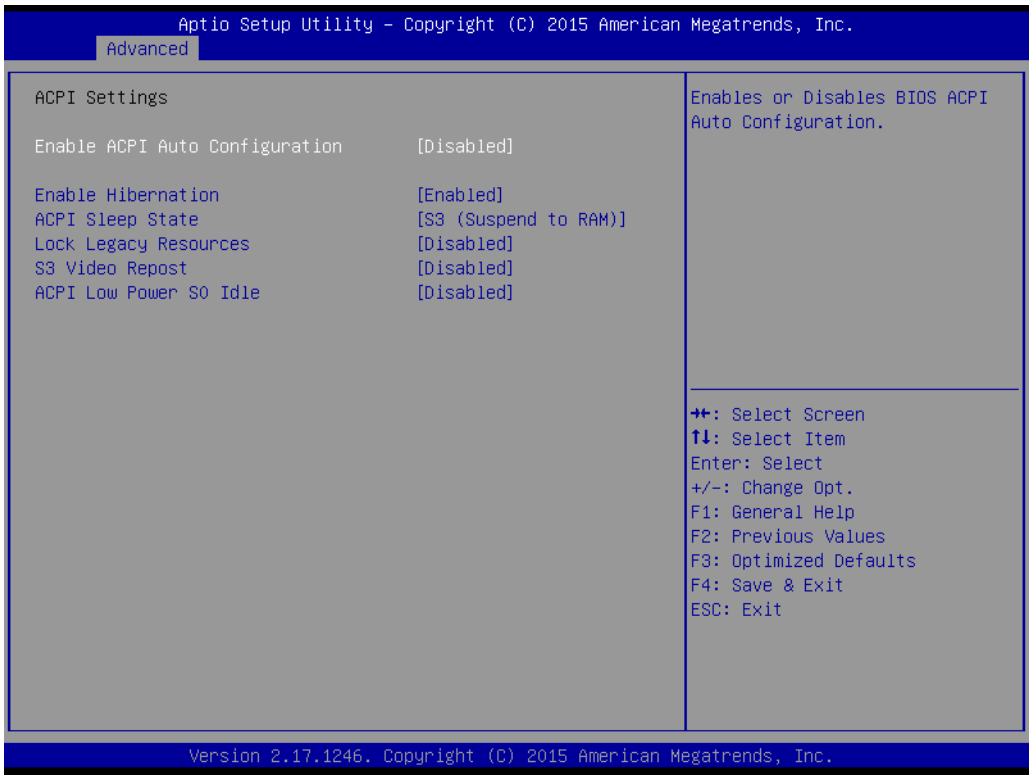


Figure 3.6 ACPI Settings

- **Enable ACPI Auto Configuration**
  Enables or Disables BIOS ACPI Auto Configuration.
- **Enable Hibernation**
  Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS.
- **ACPI Sleep State**
  Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.
- **Lock Legacy Resources**
  Enables or Disables Lock of Legacy Resources
- **S3 Video Repost**
  Enable or Disable S3 Video Repost
- **ACPI Low Power S0 Idle**
  Enable or Disable ACPI Low Power S0 Idle Support.

3.2.2.4 PCH-FW Configuration

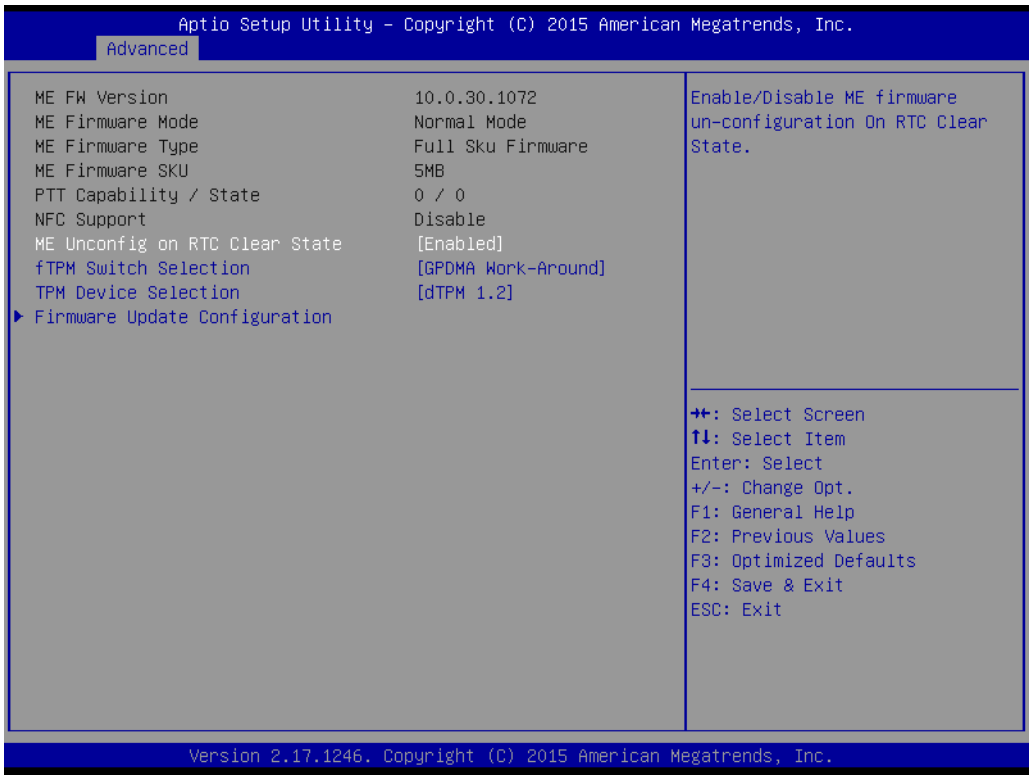


Figure 3.7 PCH-FW Configuration

- **ME Unconfig on RTC Clear State**
  Enable/Disable ME firmware un-configuration on RTC clear State.
- **fTPM Switch Selection**
  Selects the desired fTPM solution to be used.
- **TPM Device Selection**
  Selects TPM device: PTT or dTPM. PTT-Enable PTT in SkuMgr dTPM 1.2 - Disables PTT in SkuMgr Warning! PTT/dTPM will be disabled and all data saved on it will be lost.
- **Firmware Update Configuration**
  Configure Management Engine Technology Parameters.

3.2.2.5 Firmware Update Configuration

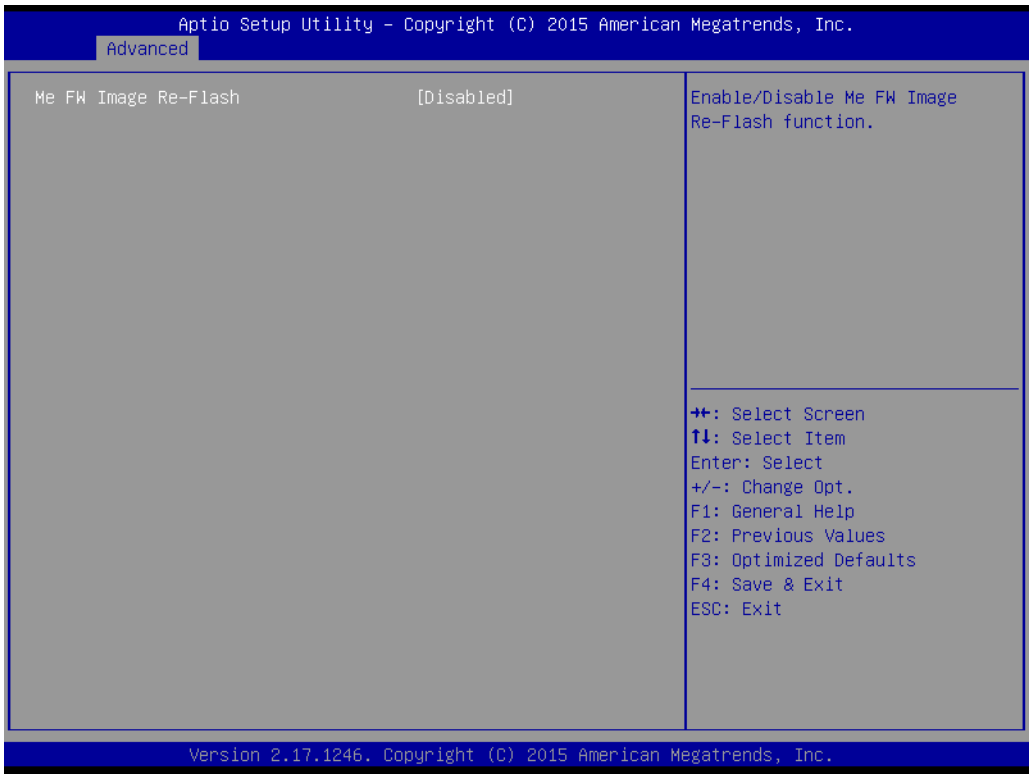


Figure 3.8 Firmware Update Configuration

- **ME FW Image Re-Flash**
  Enable/Disable Me FW Image Re-Flash function.

3.2.2.6 W83627DHG Super IO Configuration

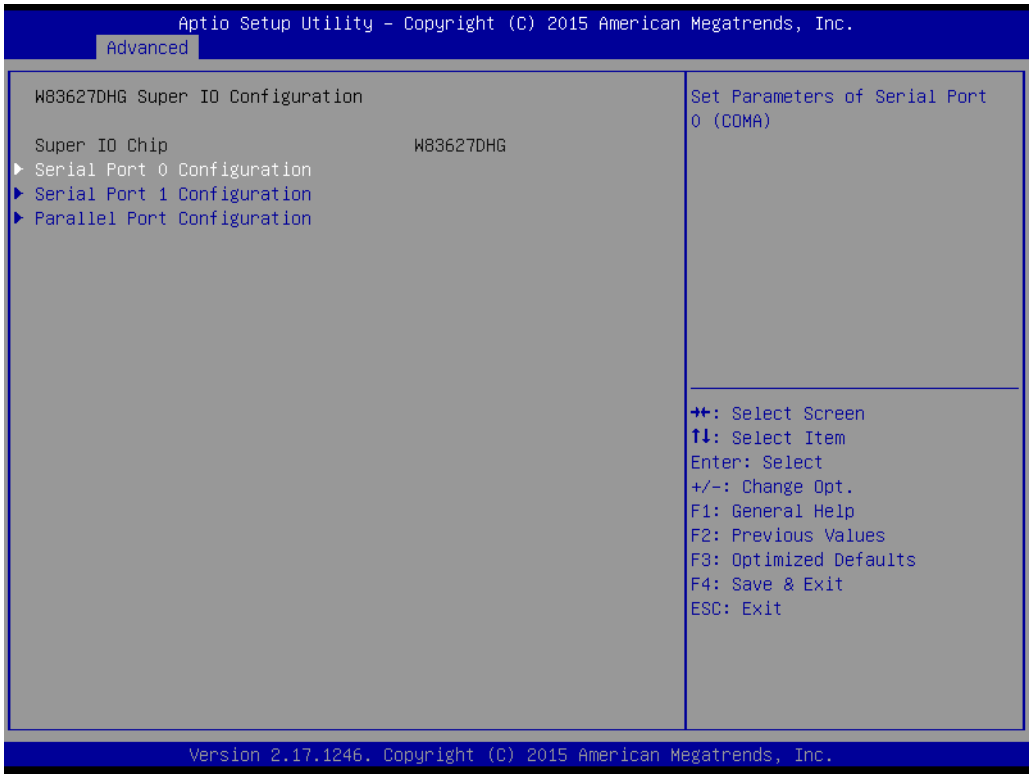


Figure 3.9 W83627DHG Super IO Configuration

- **Serial Port 0 Configuration**
  Set Parameters of Serial Port 0 (COMA)
- **Serial Port 1 Configuration**
  Set Parameters of Serial Port 1 (COMB)
- **Parallel Port Configuration**
  Set Parameters of Parallel Port (LPT/LPTE)

- **Serial Port 0 Configuration**

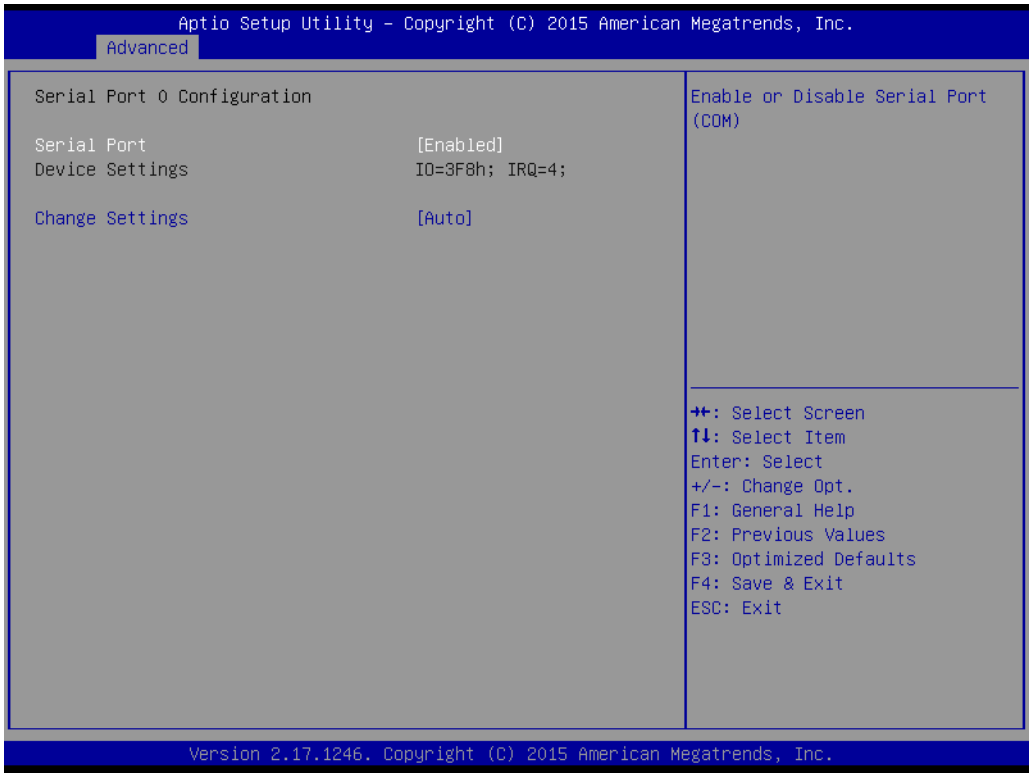


Figure 3.10 Serial Port 0 Configuration

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

Serial Port 1 Configuration

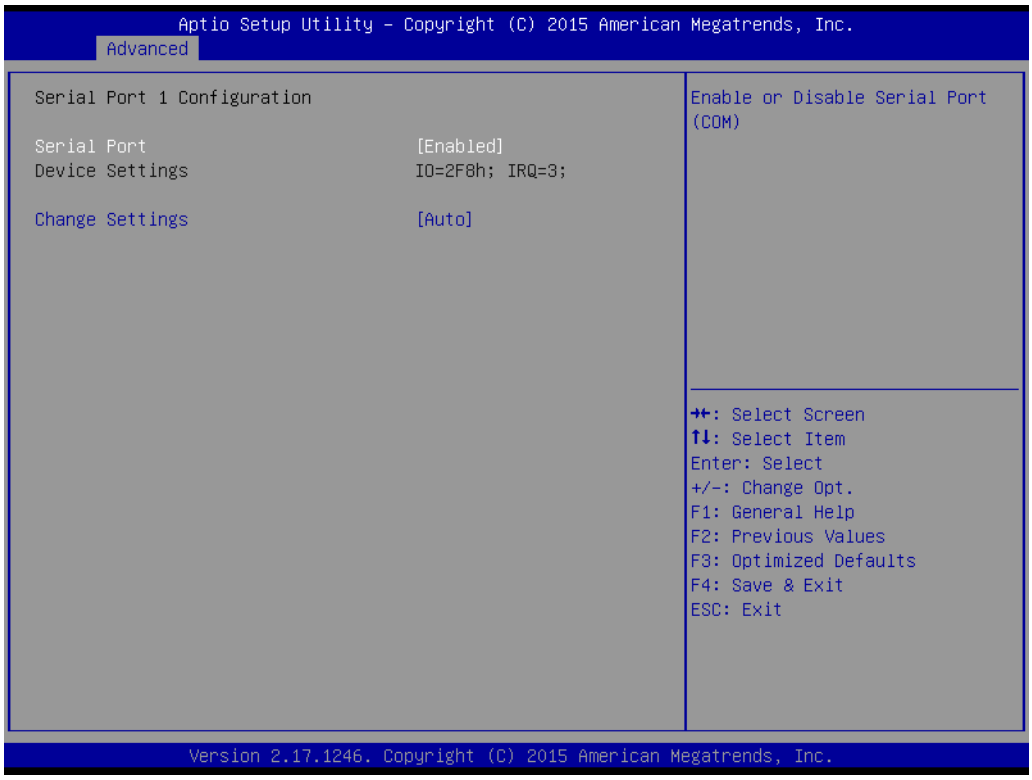


Figure 3.11 Serial Port 1 Configuration

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

Parallel Port Configuration

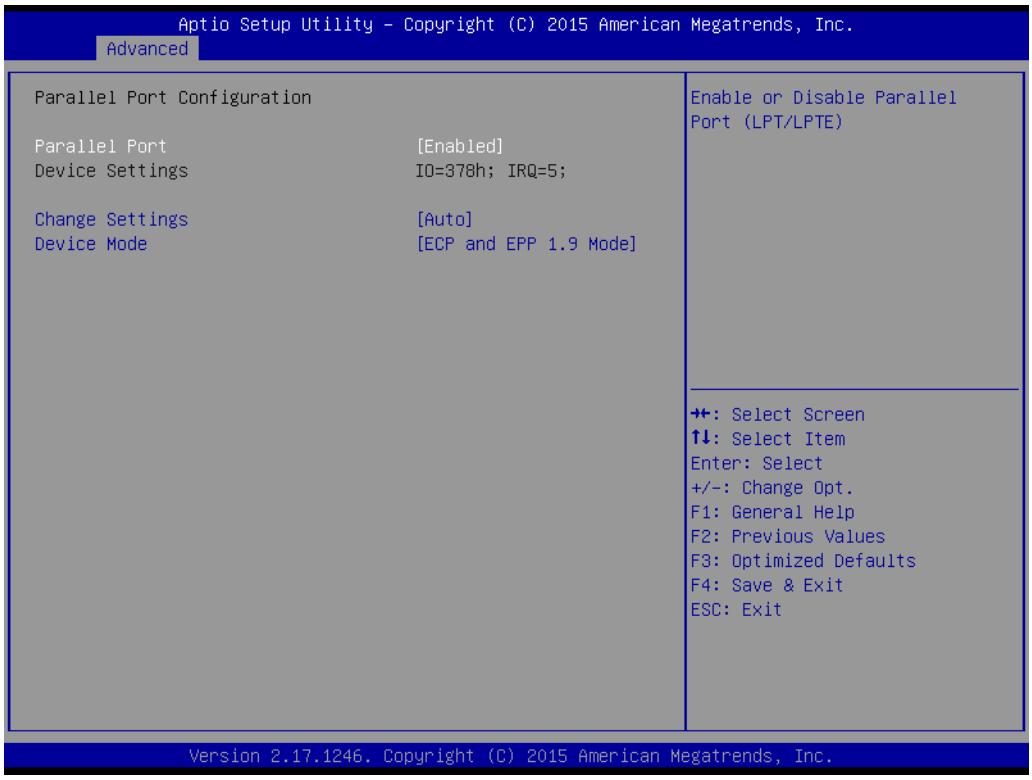


Figure 3.12 Parallel Port Configuration

– **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.

3.2.2.7 iManager Configuration

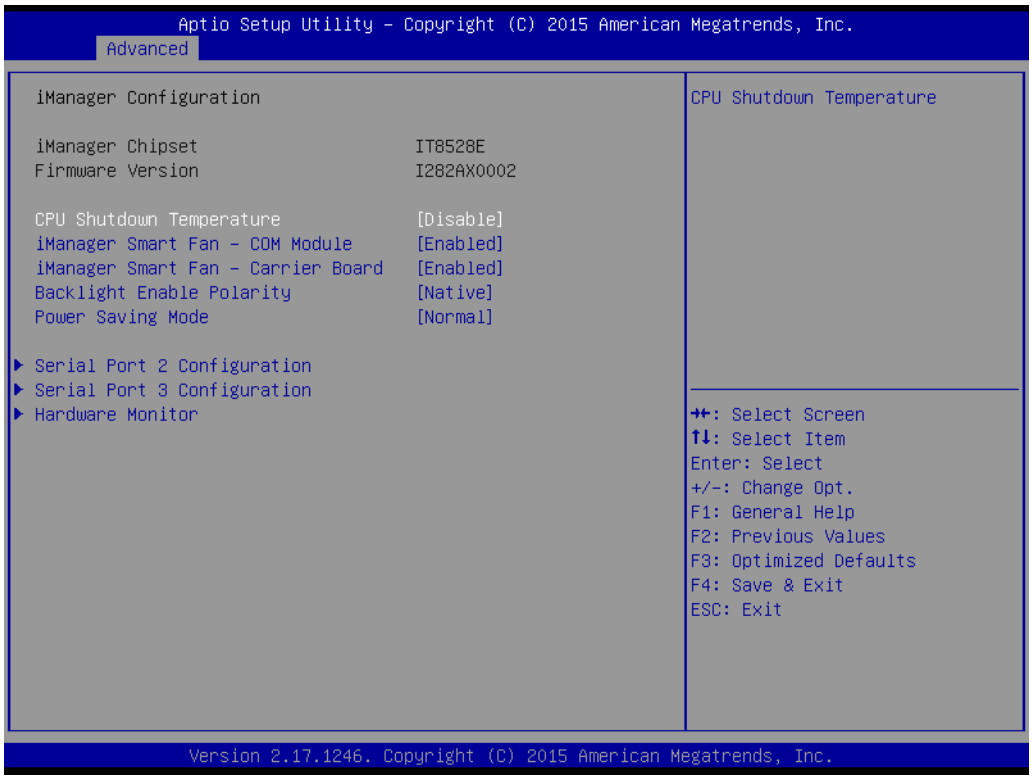


Figure 3.13 iManager Configuration

- **CPU Shutdown Temperature**
  Enable/Disable 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
- **Power Saving Mode**
  Select Ite8528 Power Saving Mode
- **Serial Port 2 Configuration**
  Set Parameters of Serial Port 2 (COMA)
- **Serial Port 3 Configuration**
  Set Parameters of Serial Port 3 (COMB)
- **Hardware Monitor**
  Monitor hardware status

Serial Port 2 Configuration

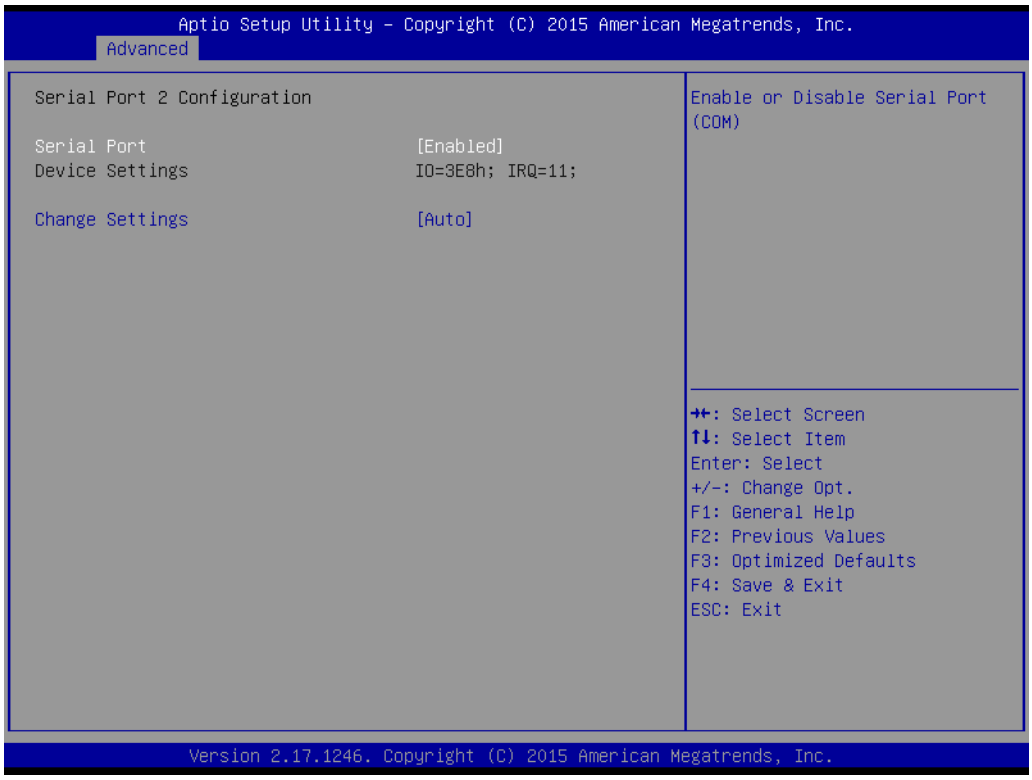


Figure 3.14 Serial Port 2 Configuration

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

Serial Port 3 Configuration

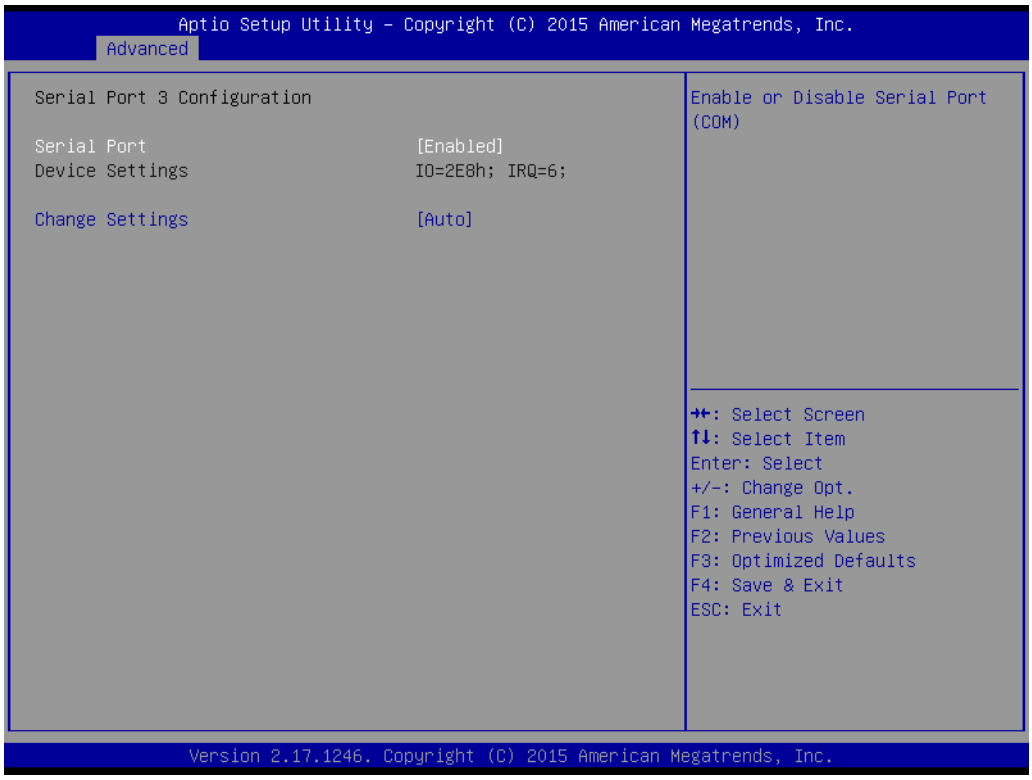


Figure 3.15 Serial Port 3 Configuration

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

Hardware Monitor

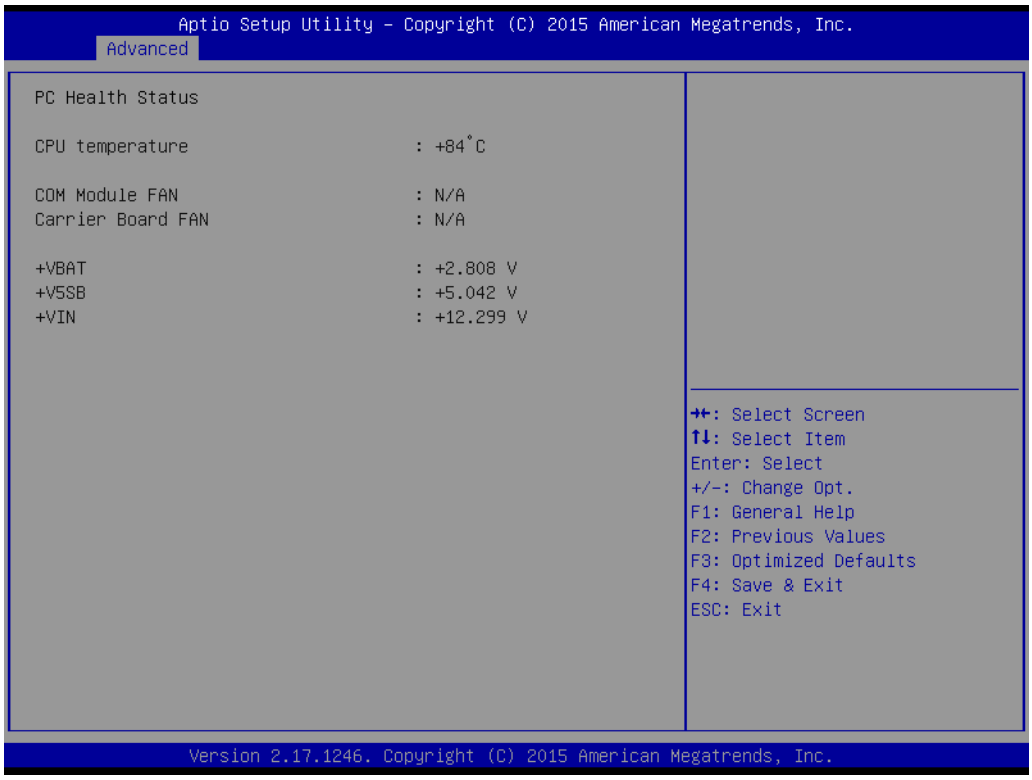


Figure 3.16 Hardware Monitor

– **Hardware Monitor Information**
This item shows Hardware information parameters.

3.2.2.8 Serial Port Console Redirection

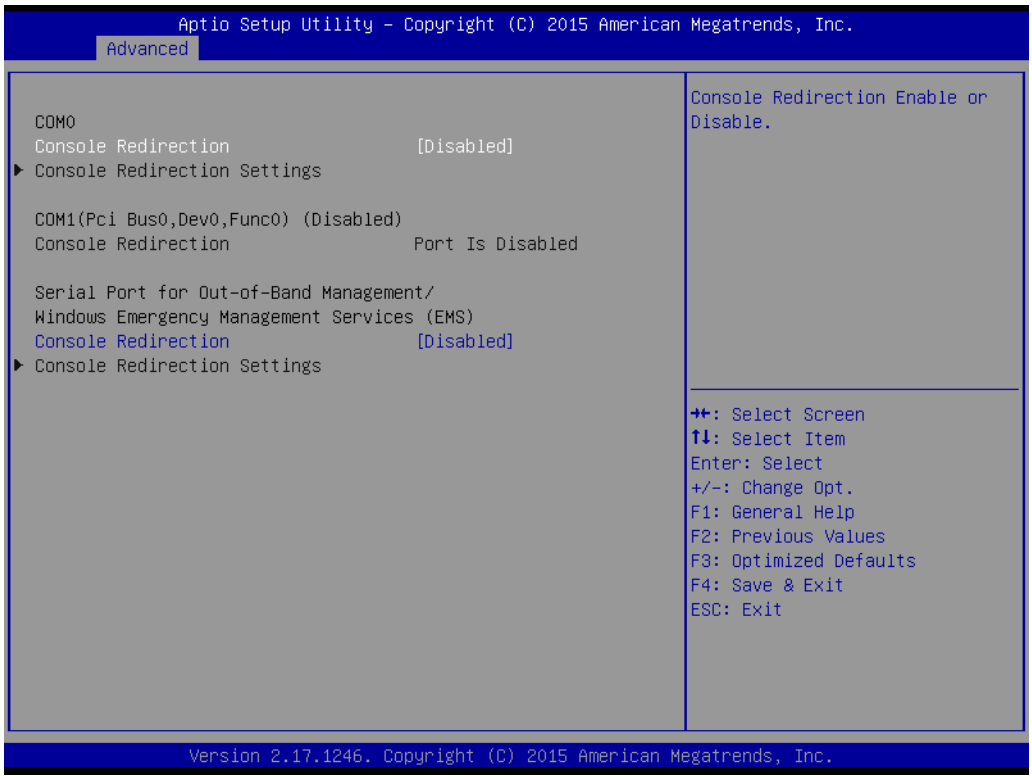


Figure 3.17 Serial Port Console Redirection

- **COM0 Console Redirection**
  Console Redirection Enable or Disable
- **Serial Port for Out-of-Band Management / Windows Emergency Management Service (EMS) Console Redirection**
  Console Redirection Enable or Disable

3.2.2.9 SATA Configuration

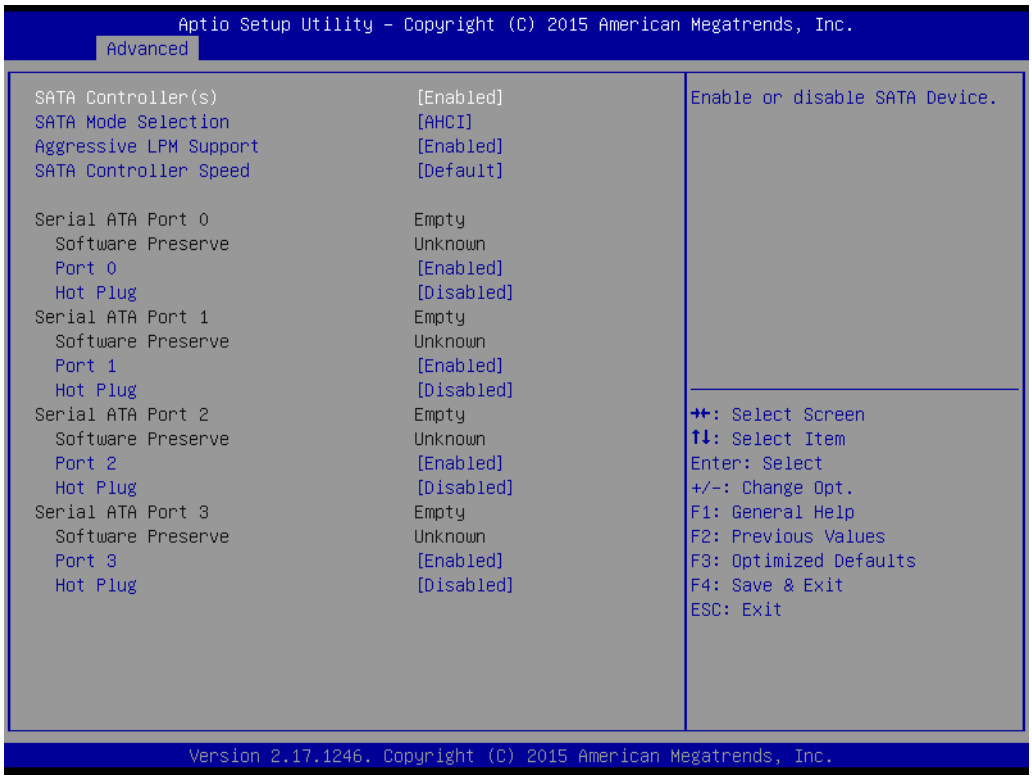


Figure 3.18 SATA Configuration

- **SATA Controller(s)**
  Enable or disable SATA Device
- **SATA Mode Selection**
  Determines how SATA controller(s) operate
- **Aggressive LPM Support**
  Enable PCH to aggressively enter link power state.
- **SATA Controller Speed**
  Indicates the maximum speed the SATA controller can support.
- **Port 0**
  Enable or Disable SATA port
- **Hot Plug**
  Designates this port as Hot Pluggable
- **Port 1**
  Enable or Disable SATA port
- **Hot Plug**
  Designates this port as Hot Pluggable
- **Port 2**
  Enable or Disable SATA port
- **Hot Plug**
  Designates this port as Hot Pluggable
- **Port 3**
  Enable or Disable SATA port
- **Hot Plug**
  Designates this port as Hot Pluggable

3.2.2.10 Network Stack Configuration

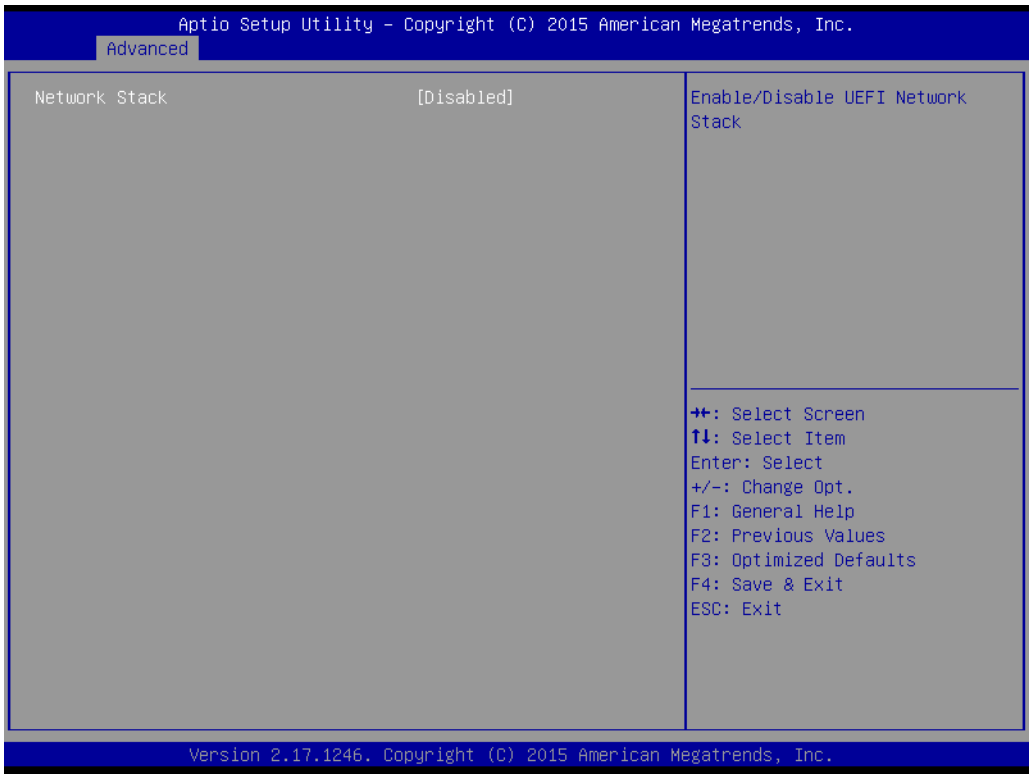


Figure 3.19 Network Stack Configuration

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

3.2.2.11 CSM Configuration

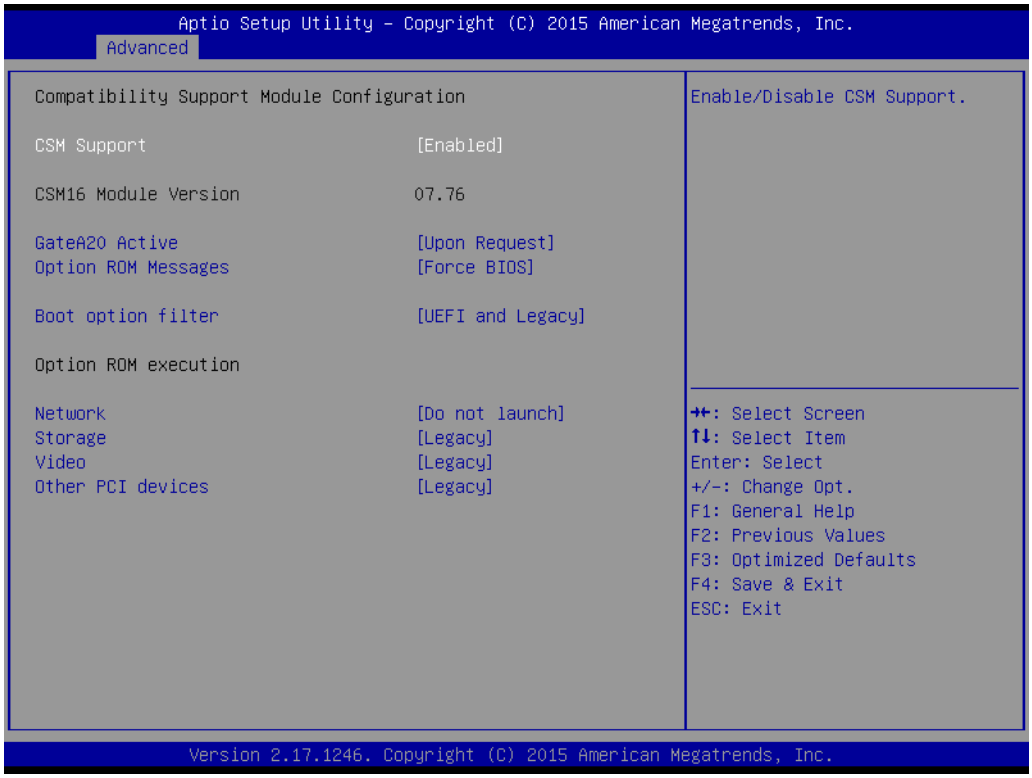


Figure 3.20 CSM Configuration

- **CSM Support**
  Enable/Disable CSM Support
- **GateA20 Active**
  UPON Request- GA20 can be disabled using BIOS services. Always - do not allow disabling GA20; this option is useful when any RT code is executed above 1MB.
- **Option ROM Messages**
  Set display mode for Option ROM
- **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.

3.2.2.12 USB Configuration

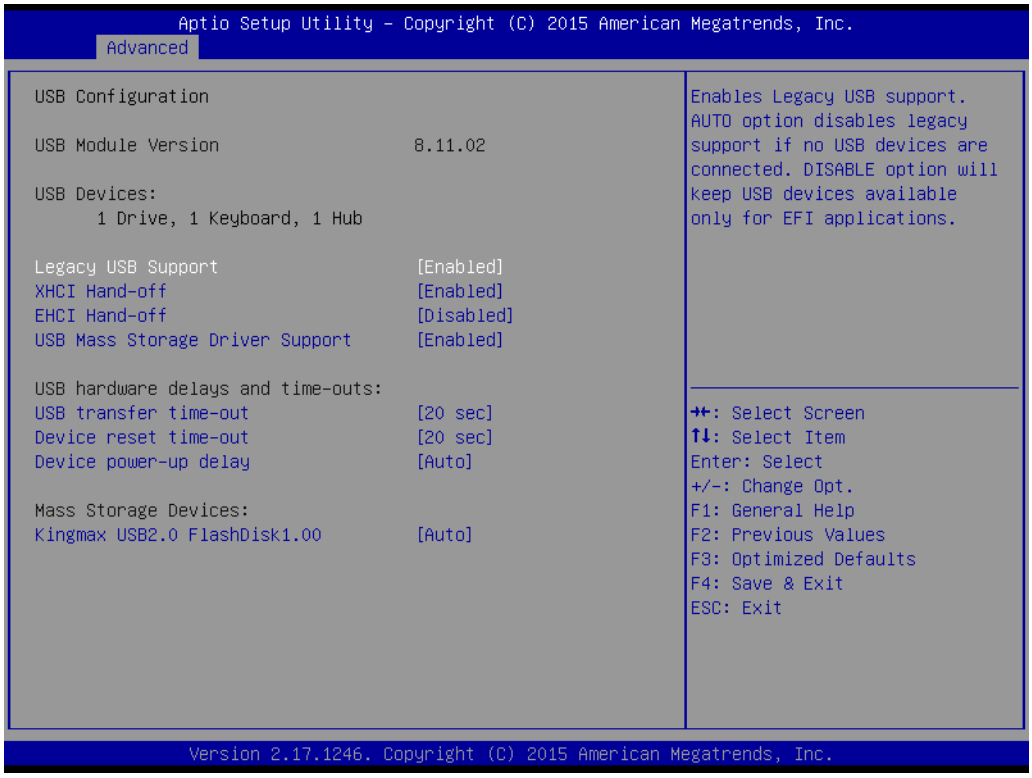


Figure 3.21 USB Configuration

- **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.

- **EHCI Hand-off**
  This is a workaround for OS without EHCI hand-off support. The EHCI ownership change should be claimed by EHCI driver.
- **USB Mass Storage Driver Support**
  Enable/Disable USB Mass Storage Driver Support.
- **USB transfer time-out**
  The time-out value for Control, Bulk, and Interrupt transfers.
- **Device reset time-out**
  USB mass storage device Start Unit command time-out.
- **Device power-up delay**
  Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port the delay is taken from Hub descriptor.

3.2.3 Chipset

Select the Chipset tab from the SOM-6896 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 3.22 Chipset Setup

- **System Agent (SA) Configuration**
  This item allows users to change System Agent (SA) Parameters.
- **PCH-IO Configuration**
  This item allows users to change PCH Parameters.

3.2.3.1 System Agent (SA) Configuration

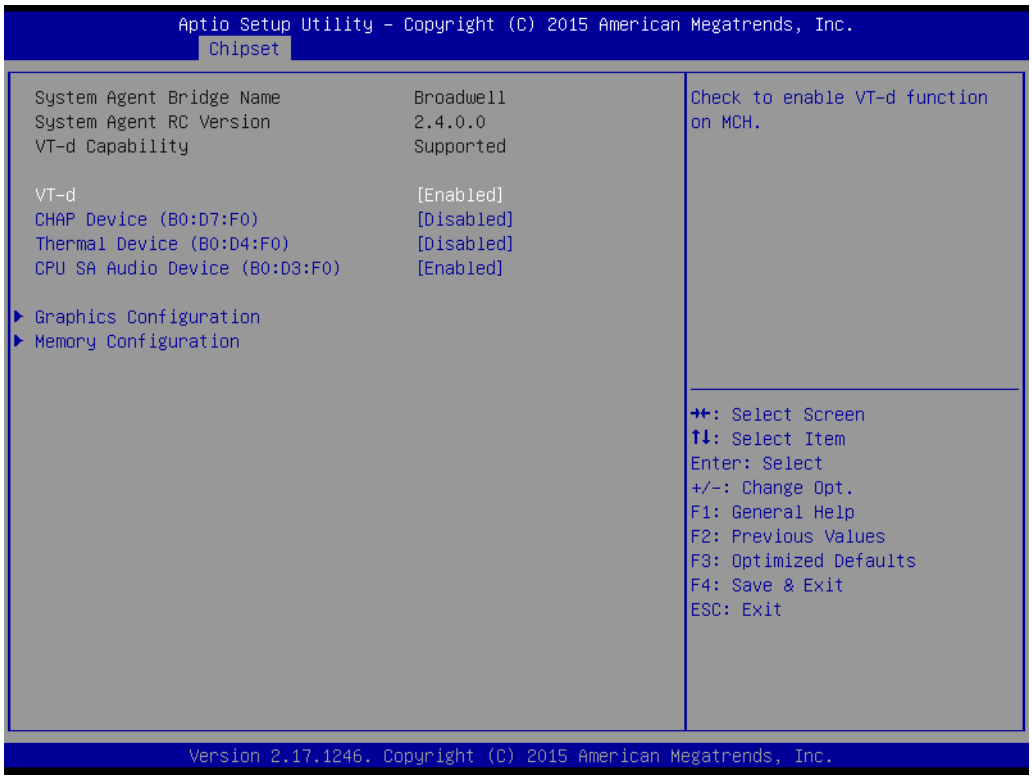


Figure 3.23 System Agent (SA) Configuration

- **VT-d**
  Check to enable VT-d function on MCH.
- **CHAP Device (B0:D7:F0)**
  Enable or disable SA Chap Device
- **Thermal Device (B0:D4:F0)**
  Enable or disable SA Thermal Device
- **CPU SA Audio Device (B0:D3:F0)**
  Enable or disable CPU SA Audio Device
- **Graphics Configuration**
  Config Graphics Settings
- **Memory Configuration**
  Memory Configuration Parameters

Graphics Configuration

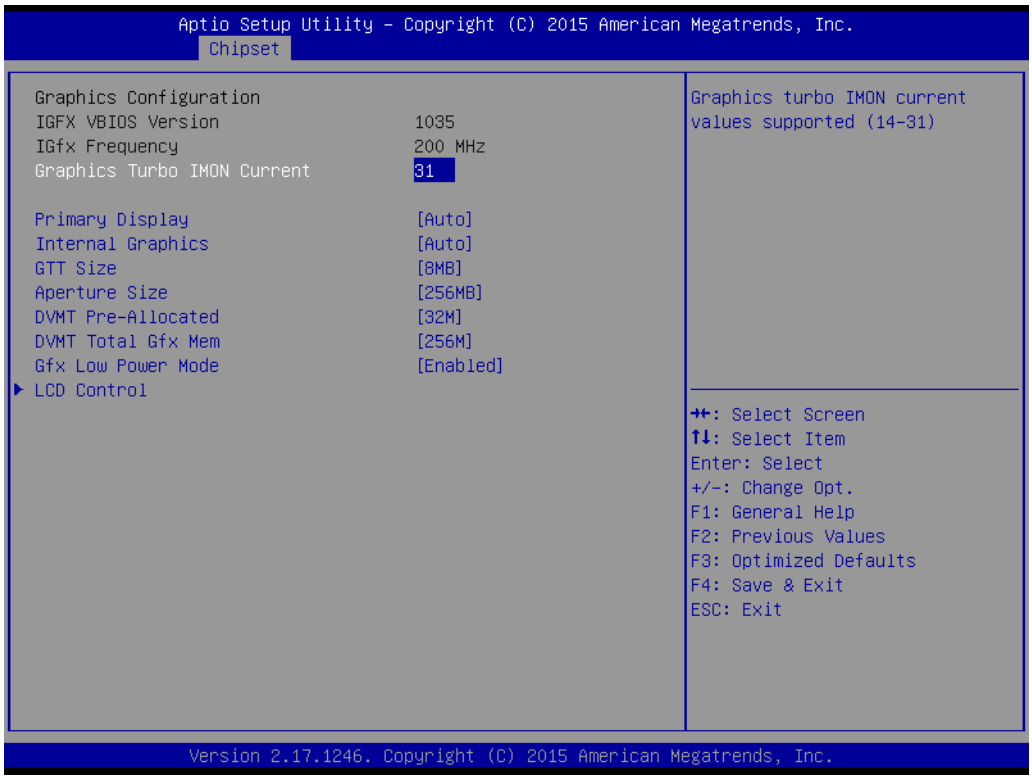


Figure 3.24 Graphics Configuration

- **Graphics Turbo IMON Current**
  Graphics turbo IMON current values supported (14-31)
- **Primary Display**
  Selects which IGFX/PEG/PCI Graphics Device should be Primary Display or select SG for Switchable Gfx.
- **Internal Graphics**
  Keeps IGD enabled based on the setup options.
- **GTT Size**
  Selects the GTT Size
- **Aperture Size**
  Selects the Aperture Size.
  Note: Above 4GB MMIO BIOS assignment is automatically enabled when selecting 2048 aperture. To use this feature, please disable CSM support
- **DVMT Pre-Allocated**
  Selects DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.
- **DVMT Total Gfx Mem**
  Selects DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device.
- **Gfx Low Power Mode**
  This option is applicable for SFF only.
- **LCD Control**
  This item allows customer to do LCD control.

LCD Control

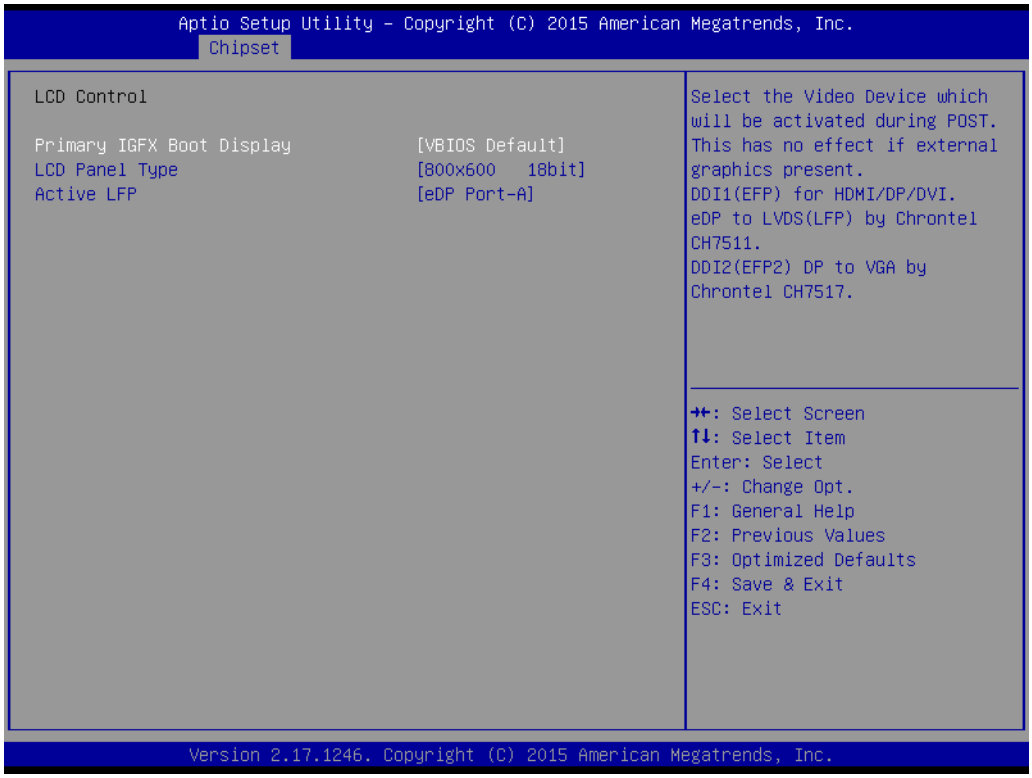


Figure 3.25 LCD Control

Primary IGFX Boot Display

Selects the Video Device which will be activated during POST. This has no effect if external graphics present.

DDI1(EFP) for HDMI/DP/DVI.

LVDS (LFP) by Chrontel CH7511.

VGA (EFP2) DP to VGA by Chrontel CH7517.

LCD Panel Type

Selects LCD panel used by Internal Graphics Device by selecting the appropriate setup item.

Active LFP

Selects the Active LFP Configuration.

No LVDS: VBIOS does not enable LVDS.

eDP Port-A: LFP Driver by Int-DisplayPort encoder from Port-A

Memory Configuration

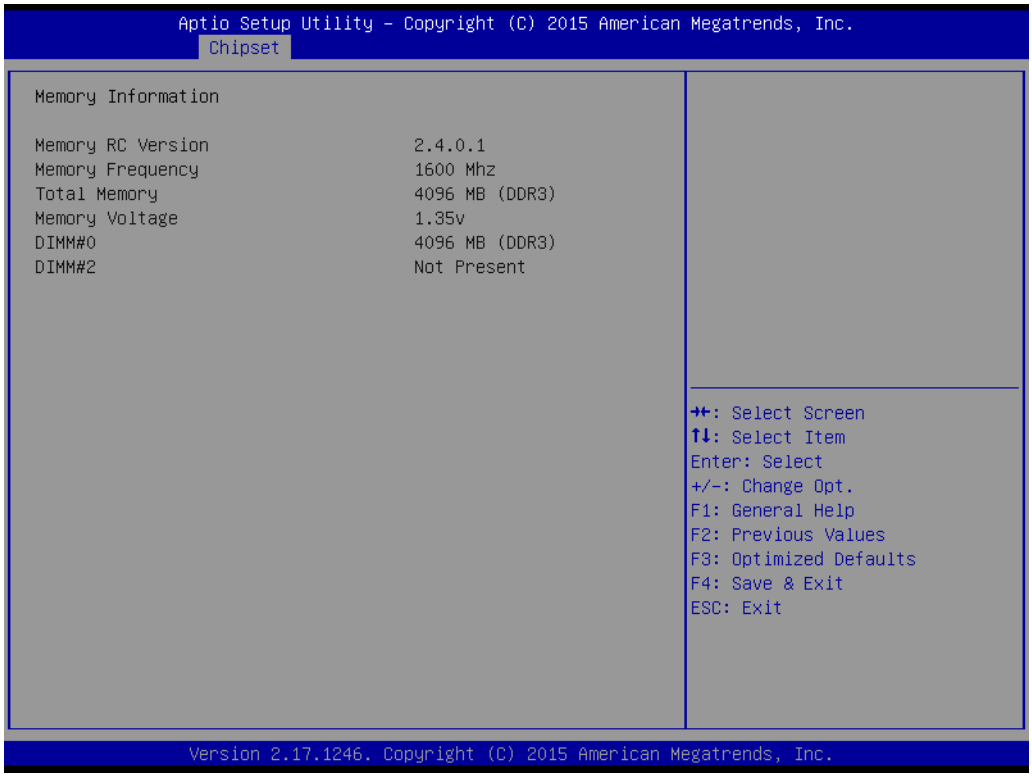


Figure 3.26 Memory Configuration

– **Memory Information**
This item shows memory configuration parameters.

3.2.3.2 PCH-IO Configuration

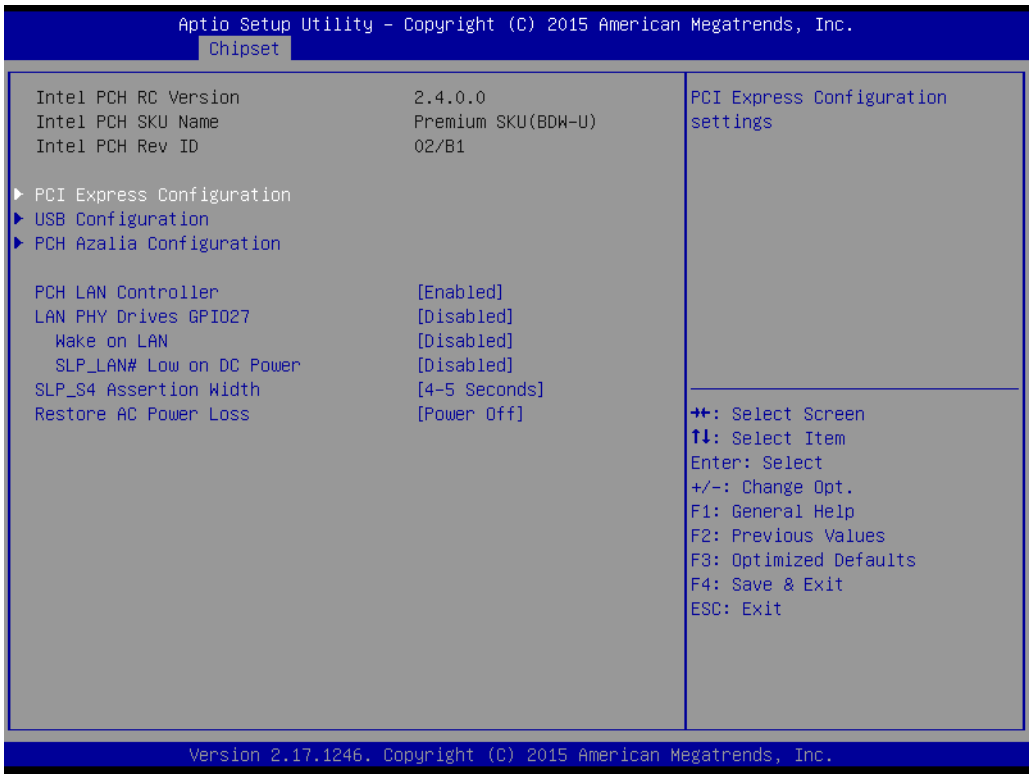


Figure 3.27 PCH-IO Configuration

- **PCI Express Configuration**
  This item allows users to change PCI Express Configuration settings.
- **USB Configuration**
  This item allows users to change USB Configuration settings.
- **PCH Azalia Configuration**
  This item allows users to change PCH Azalia Configuration settings.
- **PCH LAN Controller**
  Enable or disable onboard NIC.
- **LAN PHY Drives GPI027**
  Enable/Disables LAN Phy driving GPI027 else platform drivers GPI027.
- **Wake on LAN**
  Enable or disable integrated LAN to wake the system. (The Wake on LAN cannot be disabled if ME is on at Sx state.)
- **SLP_LAN# Low on DC Power**
  Enable or disable SLP_LAN# Low on DC Power.
- **SLP_S4 Assertion Width**
  Select a minimum assertion width of the SLP_S4# signal.
- **Restore AC Power Loss**
  Select AC power state when power is re-applied after a power failure.

- **PCI Express Configuration**

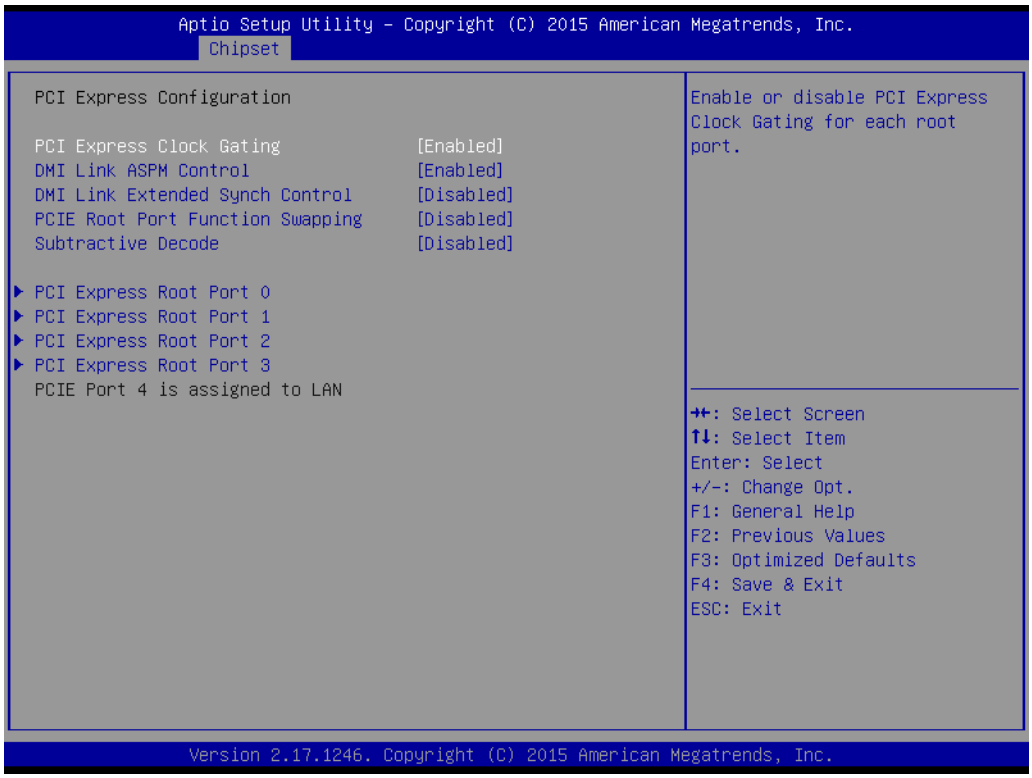


Figure 3.28 PCI Express Configuration

  - **PCI Express Clock Gating**
    This item allows users to enable or disable PCI Express Clock Gating for each root port.
  - **DMI Link ASPM Control**

This item allows users to enable or disable DMI Link ASPM Control.

The Control of Active State Power Management on both NB side and SB side of the DMI Link.

- **DMI Link Extended Synch Control**

  This item allows users to enable or disable DMI Link Extended Synch Control.

  The Control of Extended Synch on SB side of the DMI Link.

- **PCIE Root Port Function Swapping**

  This item allows users to enable or disable PCIE Root Port Function Swapping.

- **Subtractive Decode**

  This item allows users to enable or disable Subtractive Decode.

- **PCI Express Root Port 0**

  This item allows users to change PCI Express Root Port 0 settings.

- **PCI Express Root Port 1**

  This item allows users to change PCI Express Root Port 1 settings.

- **PCI Express Root Port 2**

  This item allows users to change PCI Express Root Port 2 settings.

- **PCI Express Root Port 4**

  This item allows users to change PCI Express Root Port 4 settings.

- **PCI Express Root Port 0 Configuration**

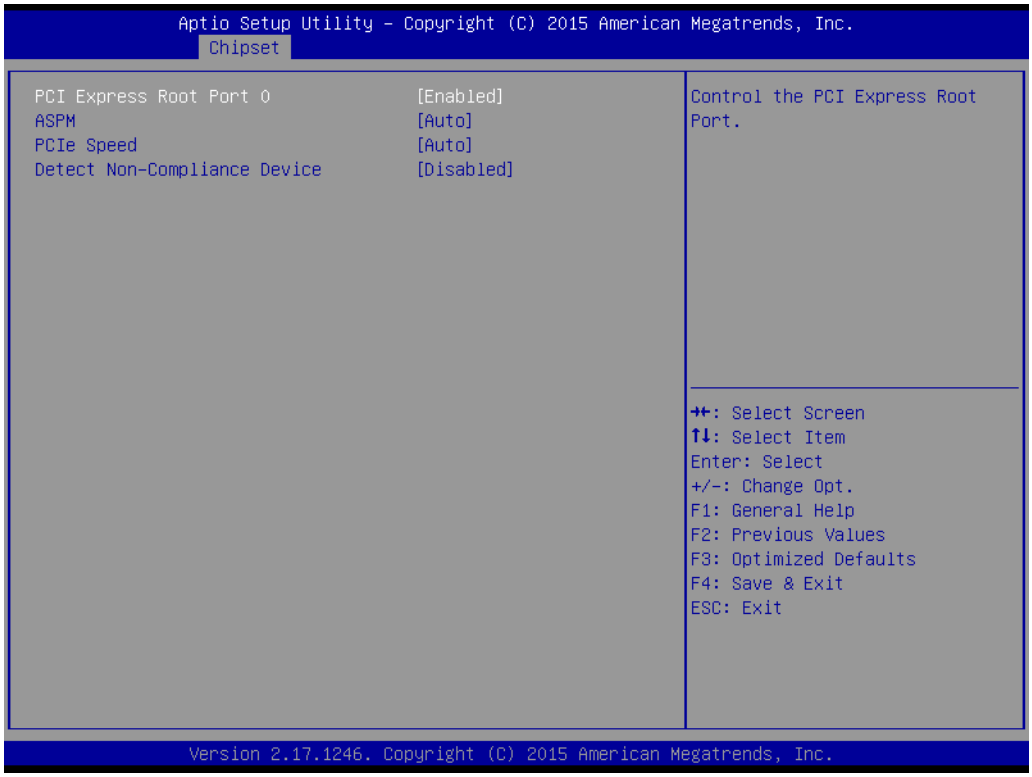


Figure 3.29 PCI Express Root Port 0 Configuration

PCI Express Root Port 0

This item allows users to enable or disable PCI Express Root Port.

ASPM

This item allows users to select PCI Express Active State Power Management settings.

PCIe Speed

This item allows users to select PCIe Speed.

Detect Non-Compliance Device

Detect Non-Compliance Device PCI Express Device.

If enable, it will take more time at POST time.

– **PCI Express Root Port 1 Configuration**

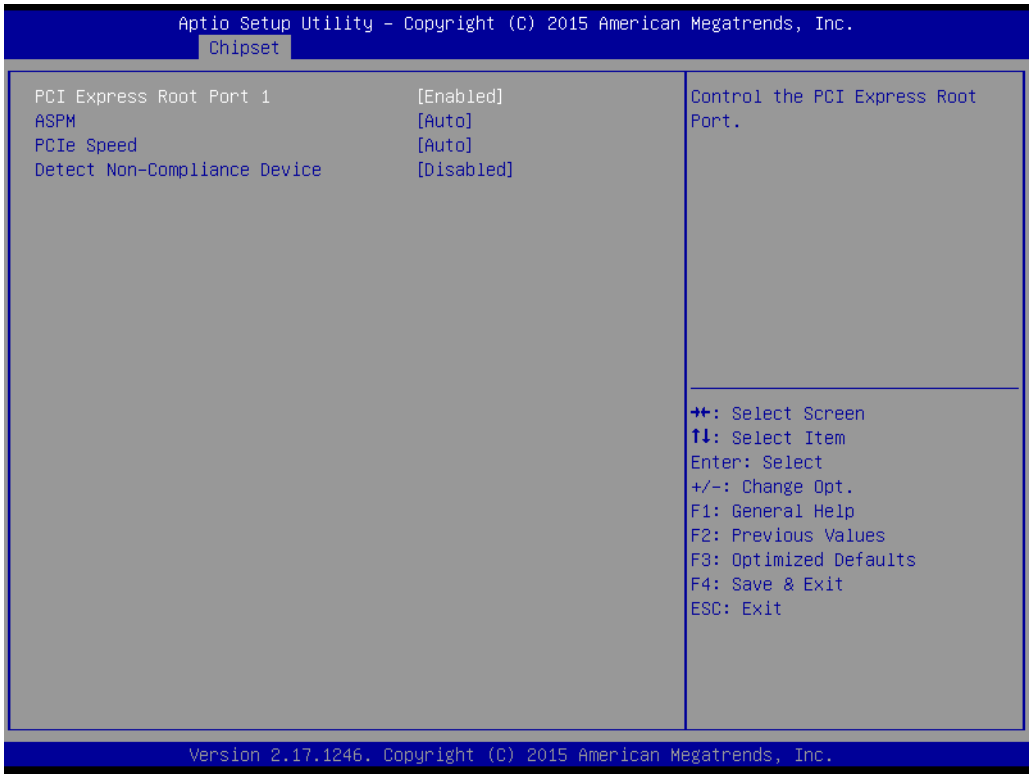


Figure 3.30 PCI Express Root Port 1 Configuration

PCI Express Root Port 1

This item allows users to enable or disable PCI Express Root Port.

ASPM

This item allows users to select PCI Express Active State Power Management settings.

PCIe Speed

This item allows users to select PCIe Speed.

Detect Non-Compliance Device

Detect Non-Compliance Device PCI Express Device.

If enable, it will take more time at POST time.

– **PCI Express Root Port 2 Configuration**

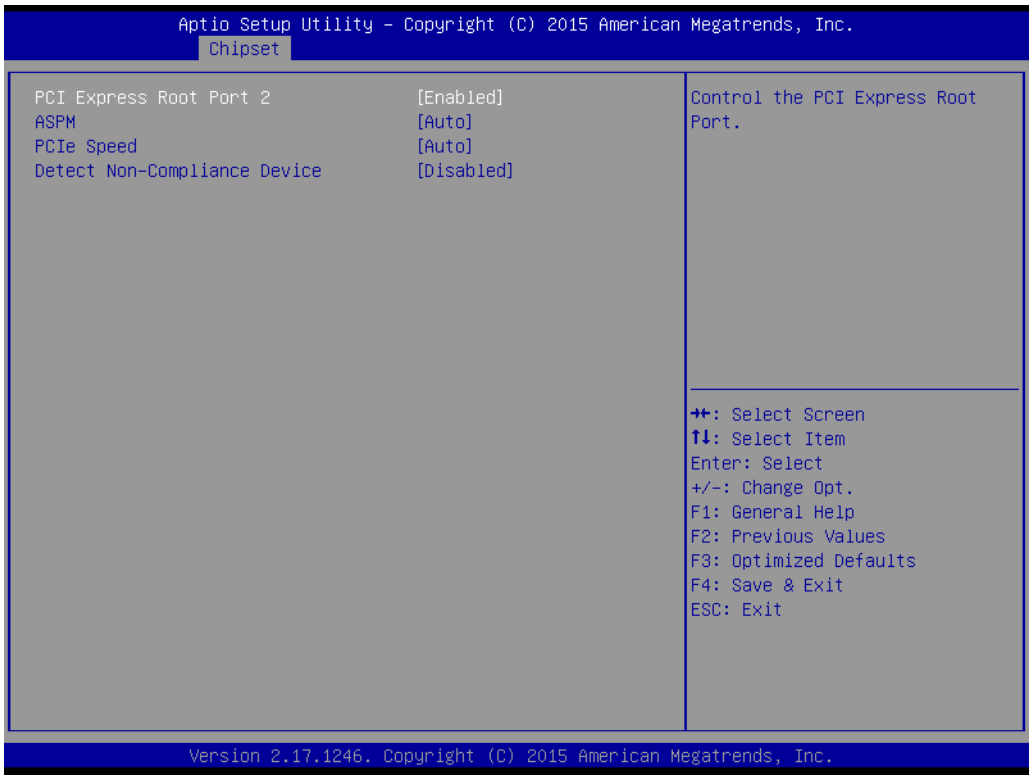


Figure 3.31 PCI Express Root Port 2 Configuration

PCI Express Root Port 2

This item allows users to enable or disable PCI Express Root Port.

ASPM

This item allows users to select PCI Express Active State Power Management settings.

PCIe Speed

This item allows users to select PCIe Speed.

Detect Non-Compliance Device

Detect Non-Compliance Device PCI Express Device.

If enable, it will take more time at POST time.

– **PCI Express Root Port 3 Configuration**

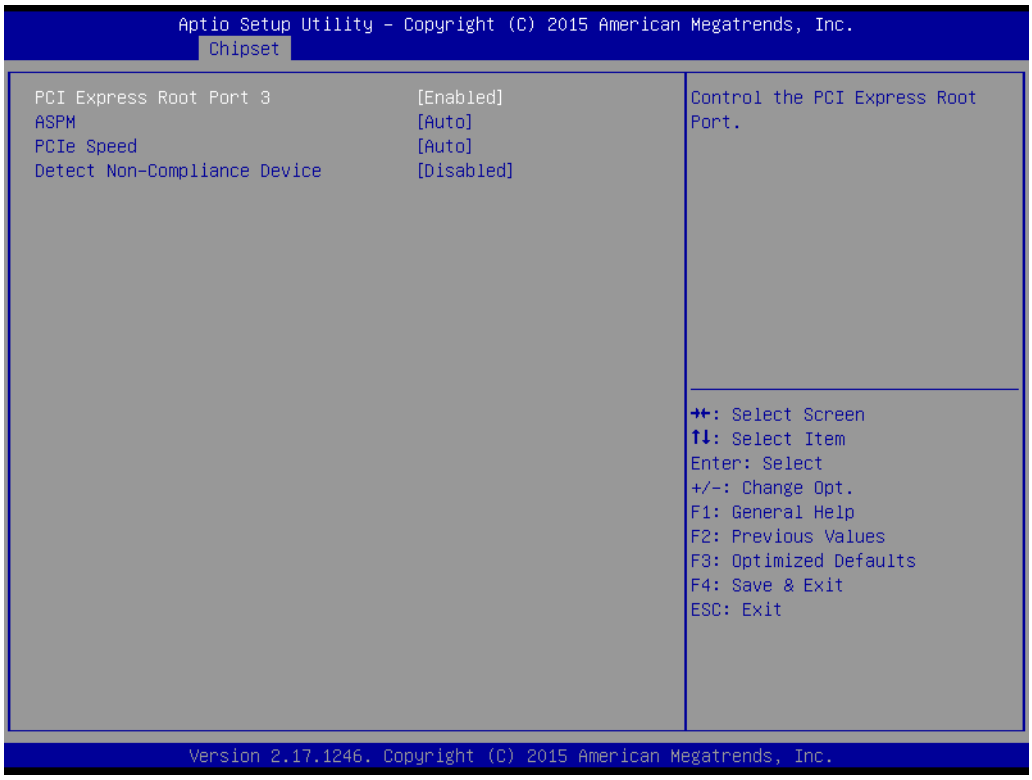


Figure 3.32 PCI Express Root Port 3 Configuration

PCI Express Root Port 3

This item allows users to enable or disable PCI Express Root Port.

ASPM

This item allows users to select PCI Express Active State Power Management settings.

PCIe Speed

This item allows users to select PCIe Speed.

Detect Non-Compliance Device

Detect Non-Compliance Device PCI Express Device.

If enable, it will take more time at POST time.

USB Configuration

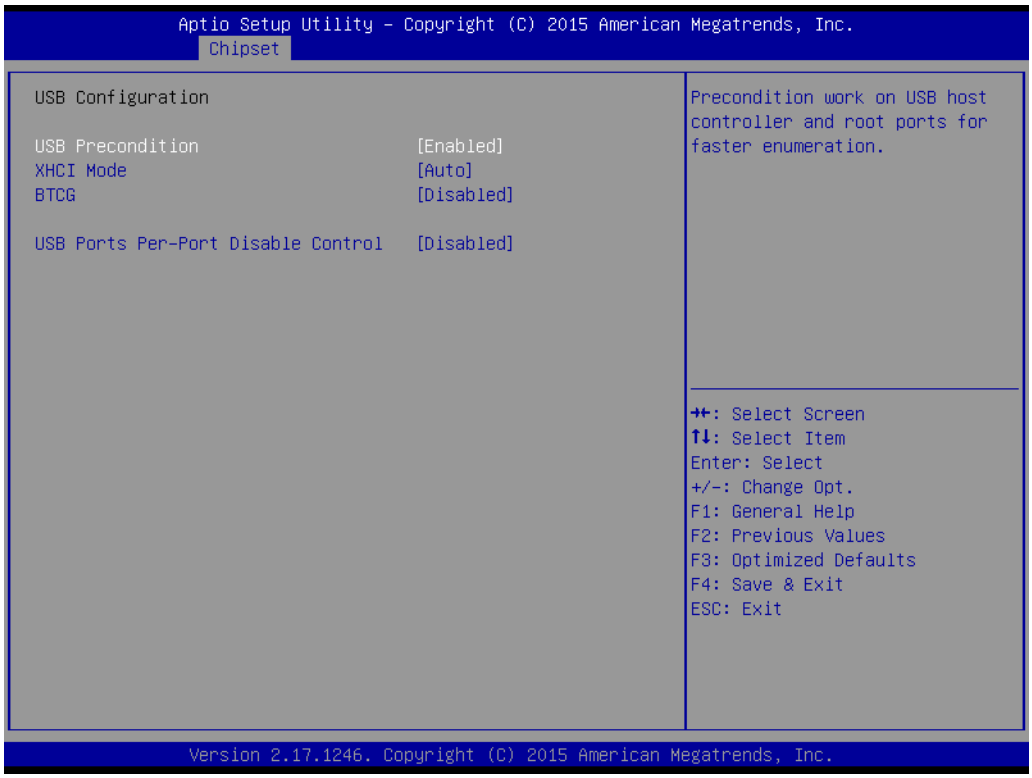


Figure 3.33 USB Configuration

- **USB Precondition**
  This item allows users to enable or disable USB Precondition.
  Precondition work on USB host controller and root ports for faster enumeration.
- **XHCI Mode**
  This item allows users to select mode of operation of XHCI mode.
- **BTCG**
  This item allows users to enable or disable trunk clock gating.
- **USB Ports Per-Port Disable Control**
  This item allows users to enable or disable USB Ports Per-Port Disable Control. Control each of the USB ports (0~13) disabling

PCH Azalia Configuration

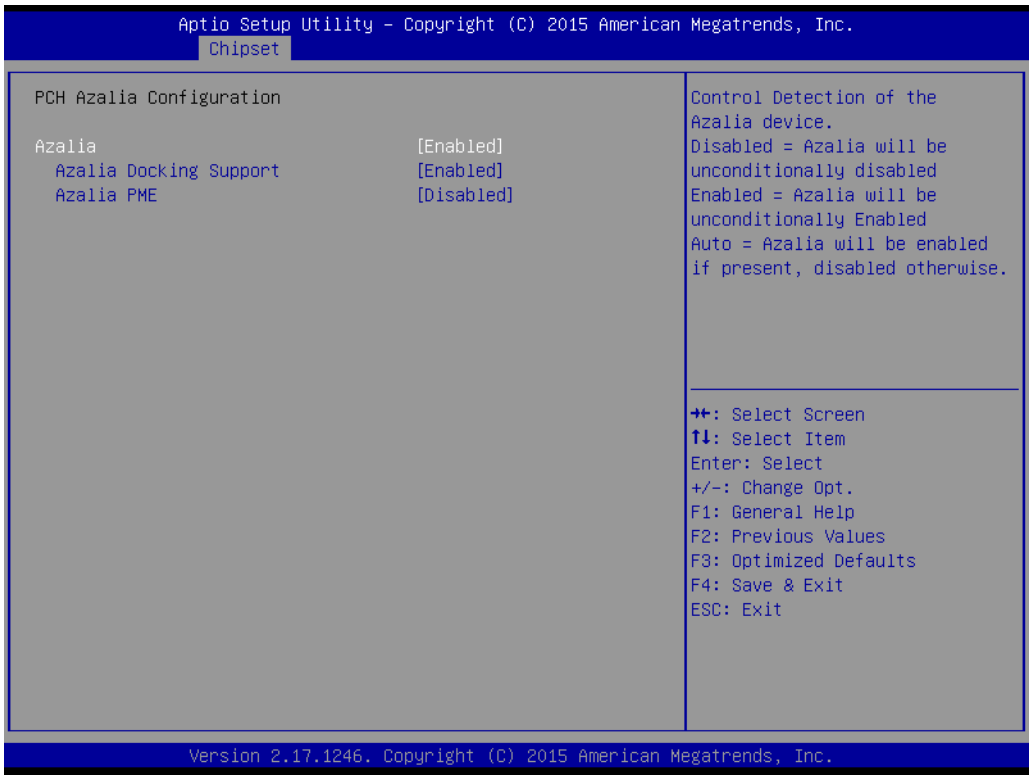


Figure 3.34 PCH Azalia Configuration

- **Azalia**
  Control Detection of the Azalia device.
  Disable- Azalia will be unconditionally disabled
  Enable- Azalia will be unconditionally Enabled
  Auto- Azalia will be enabled if present, disabled otherwise.
- **Azalia Docking Support**
  Enable or disable Azalia Docking Support of Audio Controller
- **Azalia PME**
  Enable or disable Power Management capability of Audio Controller.

3.2.4 Security Setting

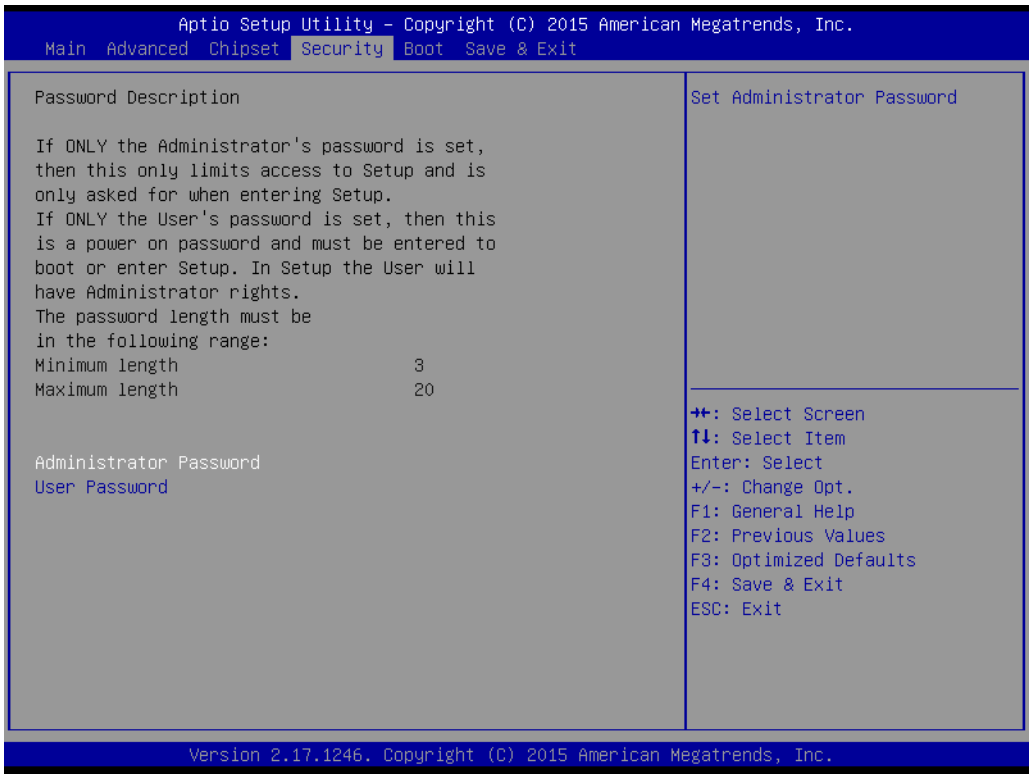


Figure 3.35 Security Setup

Select Security Setup from the SOM-6896 Setup main BIOS setup menu. All Security Setup options, such as password protection is described in this section. To access the sub menu for the following items, select the item and press <Enter>:

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

3.2.5 Boot Settings

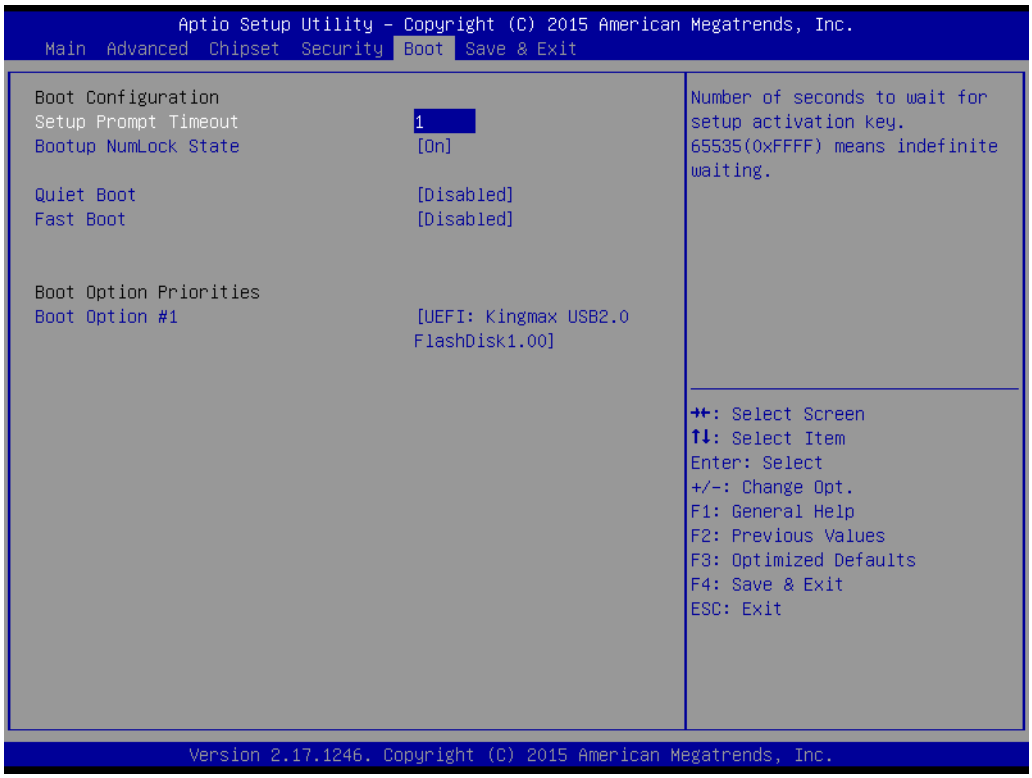


Figure 3.36 Boot Setting

- **Setup Prompt Timeout**
  This item allows users to select the number of seconds to wait for setup activation key.
- **Bootup NumLock State**
  Select the keyboard NumLock state.
- **Quiet Boot**
  This item allows users to enable or disable Quiet Boot option.
- **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. It has no effect for BBS boot options.

3.2.6 Save & Exit

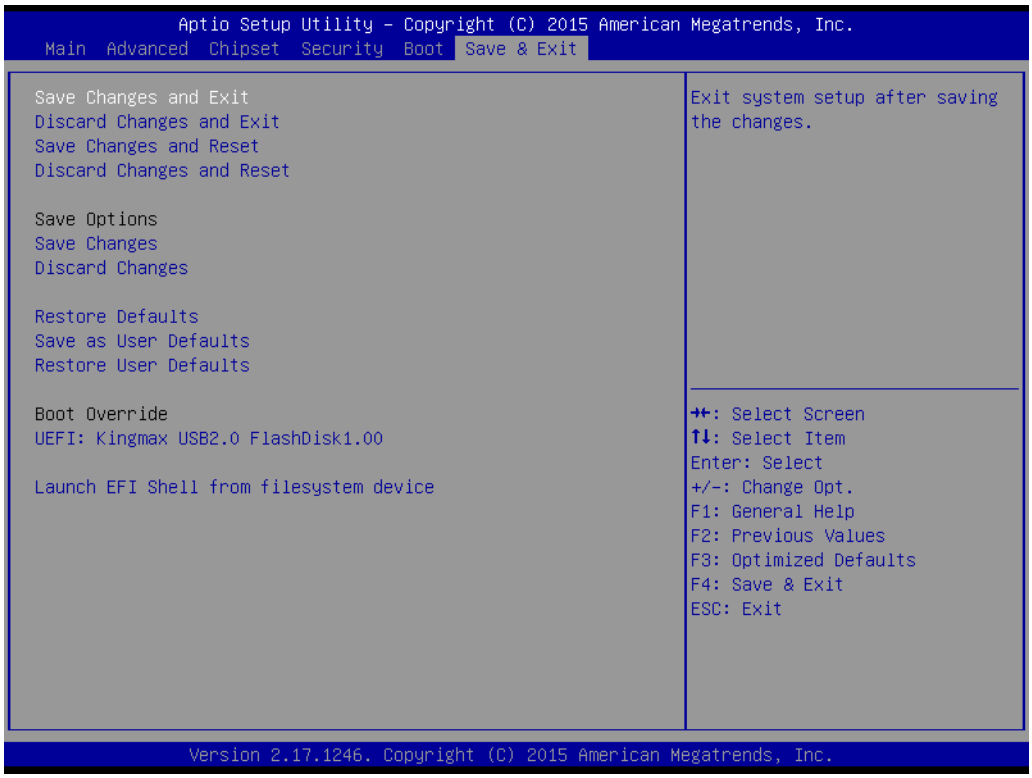


Figure 3.37 Save & Exit

3.2.6.1 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.

3.2.6.2 Discard Changes and Exit

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

3.2.6.3 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.

3.2.6.4 Discard Changes and Reset

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

3.2.6.5 Save Changes

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

3.2.6.6 Discard Changes

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

3.2.6.7 Restore Defaults

The SOM-6896 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.

3.2.6.8 Save User Defaults

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

3.2.6.9 Restore User Defaults

The users can select this option to restore user defaults.

3.2.6.10 Launch EFI Shell from file system device

This item 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

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

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.

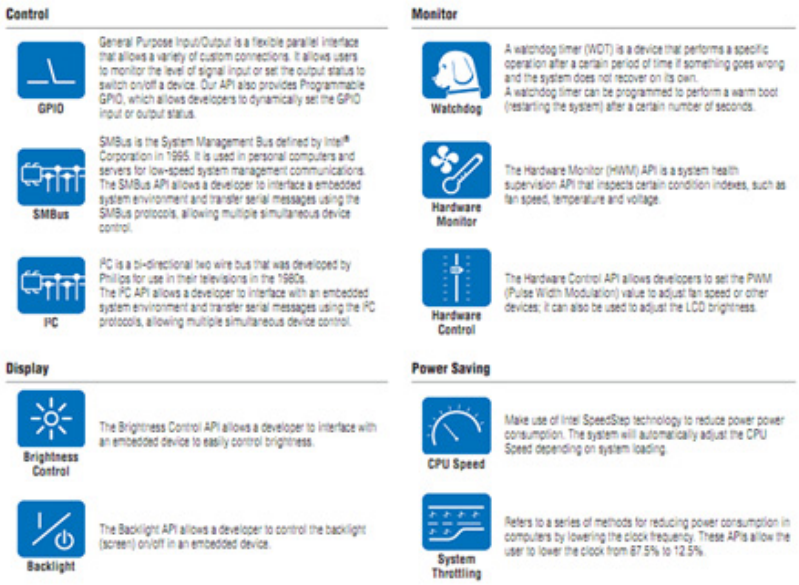
4.2.2 Other OS

To install the drivers for Linux or other OS, please connect to the internet and go to 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-6896 CPU System on Module.

Sections include:

- SOM-6896 Type 6 Pin Assignment

A.1 SOM-6896 Type 6 Pin Assignment

This section gives SOM-6896 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-6896 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	AC/HDA_SDIN2
A29	AC/HDA_SYNC	B29	AC/HDA_SDIN1
A30	AC/HDA_RST#	B30	AC/HDA_SDIN0
A31	GND (FIXED)	B31	GND (FIXED)
A32	AC/HDA_BITCLK	B32	SPKR
A33	AC/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+ (if C25 stuffed)	B58	PCIE_RX3+ (if R545 stuffed)
A59	PCIE_TX3- (if C24 stuffed)	B59	PCIE_RX3- (if R546 stuffed)
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	RSVD(KBD_RST# if R472 stuffed)	B86	VCC_5V_SBY
A87	N/A	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	N/A	B96	VGA_I2C_DAT
A97	TYPE10#	B97	SPI_CS#
A98	SER0_TX	B98	RSVD
A99	SER0_RX	B99	RSVD
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-6896 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	N/A	D9	N/A
C10	N/A	D10	N/A
C11	GND (FIXED)	D11	GND (FIXED)
C12	N/A	D12	N/A
C13	N/A	D13	N/A
C14	GND	D14	GND
C15	N/A	D15	DDI1_CTRLCLK_AUX+
C16	N/A	D16	DDI1_CTRLDATA_AUX-
C17	RSVD	D17	RSVD
C18	RSVD	D18	RSVD
C19	N/A	D19	N/A
C20	N/A	D20	N/A
C21	GND (FIXED)	D21	GND (FIXED)
C22	N/A	D22	N/A
C23	N/A	D23	N/A
C24	DDI1_HPD	D24	RSVD
C25	N/A	D25	RSVD

C26	N/A	D26	DDI1_PAIR0+
C27	RSVD	D27	DDI1_PAIR0-
C28	RSVD	D28	RSVD
C29	N/A	D29	DDI1_PAIR1+
C30	N/A	D30	DDI1_PAIR1-
C31	GND (FIXED)	D31	GND (FIXED)
C32	DDI2_CTRLCLK_AUX+ (if R108 stuffed)	D32	DDI1_PAIR2+
C33	DDI2_CTRLDATA_AUX- (if R109 stuffed)	D33	DDI1_PAIR2-
C34	DDI2_DDC_AUX_SEL (if R108/R109 stuffed)	D34	DDI1_DDC_AUX_SEL
C35	RSVD	D35	RSVD
C36	N/A	D36	DDI1_PAIR3+
C37	N/A	D37	DDI1_PAIR3-
C38	N/A	D38	RSVD
C39	N/A	D39	DDI2_PAIR0+ (if R6 stuffed)
C40	N/A	D40	DDI2_PAIR0- (if R5 stuffed)
C41	GND (FIXED)	D41	GND (FIXED)
C42	N/A	D42	DDI2_PAIR1+ (if R8 stuffed)
C43	N/A	D43	DDI2_PAIR1- (if R7 stuffed)
C44	N/A	D44	DDI2_HPD (if R544 stuffed)
C45	RSVD	D45	RSVD
C46	N/A	D46	DDI2_PAIR2+ (if R5/R6/R7/R8 stuffed)
C47	N/A	D47	DDI2_PAIR2- (if R5/R6/R7/R8 stuffed)
C48	RSVD	D48	RSVD
C49	N/A	D49	DDI2_PAIR3+ (if R5/R6/R7/R8 stuffed)
C50	N/A	D50	DDI2_PAIR3- (if R5/R6/R7/R8 stuffed)
C51	GND (FIXED)	D51	GND (FIXED)
C52	PCIE_RX16+ (if R140 stuffed)	D52	PCIE_TX16+ (if C13 stuffed)
C53	PCIE_RX16- (if R139 stuffed)	D53	PCIE_TX16- (if C12 stuffed)
C54	TYPE0#	D54	N/A
C55	PCIE_RX17+ (if R140/R139 stuffed)	D55	PCIE_TX17+ (if C13/C12 stuffed)
C56	PCIE_RX17- (if R140/R139 stuffed)	D56	PCIE_TX17- (if C13/C12 stuffed)
C57	TYPE1#	D57	TYPE2#
C58	PCIE_RX18+ (if R140/R139 stuffed)	D58	PCIE_TX18+ (if C13/C12 stuffed)
C59	PCIE_RX18- (if R140/R139 stuffed)	D59	PCIE_TX18- (if C13/C12 stuffed)
C60	GND (FIXED)	D60	GND (FIXED)
C61	PCIE_RX19+ (if R140/R139 stuffed)	D61	PCIE_TX19+ (if C13/C12 stuffed)
C62	PCIE_RX19- (if R140/R139 stuffed)	D62	PCIE_TX19- (if C13/C12 stuffed)
C63	RSVD	D63	RSVD

C64	RSVD	D64	RSVD
C65	N/A	D65	N/A
C66	N/A	D66	N/A
C67	RSVD	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	RSVD	D77	RSVD
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	RSVD	D83	RSVD
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	RSVD	D97	N/A
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)

Appendix B

Watchdog Timer

This appendix gives you the information about the watchdog timer programming on the SOM-6896 CPU System on Module.

Sections include:

- Watchdog Timer Programming

B.1 Programming the Watchdog Timer

Trigger Event	Note
IRQ	IRQ5, 7, 14 (BIOS setting default disable)**
NMI	N/A
SCI	Power button event
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 Win XP, Win7 and Win8 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-6896 CPU System on Module.

Sections include:

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

Note! *All System Assignments are based on HD Graphics.*

D.1 System I/O Ports

Table D.1: System I/O ports

Addr.Range(Hex)	Device
0000-001F	Direct memory access controller
0000-001F	PCI bus
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
0070-0077	System CMOS/real time clock
0070-0077	Motherboard resources
0080-0080	Motherboard resources
0081-0091	Direct memory access controller
0092-0092	Motherboard resources
0093-009F	Direct memory access controller
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

Table D.1: System I/O ports	
00C0-00DF	Direct memory access controller
029C-029D	Motherboard resources
02E8-02EF	Communications Port (COM4)
02F8-02FF	Communications Port (COM2)
0378-037F	Printer Port (LPT1)
03B0-03BB	Intel(R) HD Graphics 6000
03C0-03DF	Intel(R) HD Graphics 6000
03E8-03EF	Communications Port (COM3)
03F8-03FF	Communications Port (COM1)
04D0-04D1	Programmable interrupt controller
0680-069F	Motherboard resources
0778-077F	Printer Port (LPT1)
0A00-0A0F	Motherboard resources
0A10-0A1F	Motherboard resources
0D00-FFFF	PCI bus
164E-164F	Motherboard resources
1800-18FE	Motherboard resources
1854-1857	Motherboard resources
F000-F03F	Intel(R) HD Graphics 6000
F040-F05F	Mobile 5th Generation Intel(R) Core(TM) SMBus Controller - 9CA2
F060-F07F	Mobile 5th Generation Intel(R) Core(TM) SATA Controller [AHCI Mode] - 9C83
F0A0-F0A3	Mobile 5th Generation Intel(R) Core(TM) SATA Controller [AHCI Mode] - 9C83
F0B0-F0B7	Mobile 5th Generation Intel(R) Core(TM) SATA Controller [AHCI Mode] - 9C83
F0C0-F0C3	Mobile 5th Generation Intel(R) Core(TM) SATA Controller [AHCI Mode] - 9C83
F0D0-F0D7	Mobile 5th Generation Intel(R) Core(TM) SATA Controller [AHCI Mode] - 9C83
FFFF-FFFF	Motherboard resources
FFFF-FFFF	Motherboard resources
FFFF-FFFF	Motherboard resources

D.2 DMA Channel Assignments

Table D.2: DMA Channel Assignments	
Channel	**Function**
3	Printer Port (LPT1)
4	Direct memory access controller

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 6	Communications Port (COM4)
IRQ 8	System CMOS/real time clock
IRQ 10	Mobile 5th Generation Intel(R) Core(TM) SMBus Controller - 9CA2
IRQ 11	Communications Port (COM3)
IRQ 12	Microsoft PS/2 Mouse
IRQ 19	Mobile 5th Generation Intel(R) Core(TM) SATA Controller [AHCI Mode] - 9C83
IRQ 22	High Definition Audio Controller
IRQ 23	Mobile 5th Generation Intel(R) Core(TM) USB EHCI Controller - 9CA6
IRQ 81 ~ IRQ 190	Microsoft ACPI-Compliant System
IRQ 4294967292	Intel(R) Ethernet Connection I218-LM
IRQ 4294967293	Intel(R) Management Engine Interface
IRQ 4294967294	Intel(R) HD Graphics 6000

D.4 1st MB Memory Map

Table D.4: 1st MB Memory Map

Addr. Range (Hex)	Device
0xA0000-0xBFFFF	PCI bus
0xA0000-0xBFFFF	Intel(R) HD Graphics 6000
0xE0000000-0xFEAFFFFF	PCI bus
0xE0000000-0xFEAFFFFF	Intel(R) HD Graphics 6000
0xF6000000-0xF6FFFFFF	Intel(R) HD Graphics 6000
0xF7000000-0xF701FFFF	Intel(R) Ethernet Connection I218-LM
0xF7020000-0xF7023FFF	High Definition Audio Controller
0xF7028000-0xF70280FF	Mobile 5th Generation Intel(R) Core(TM) SMBus Controller - 9CA2
0xF7029000-0xF70297FF	Mobile 5th Generation Intel(R) Core(TM) SATA Controller [AHCI Mode] - 9C83
0xF702A000-0xF702A3FF	Mobile 5th Generation Intel(R) Core(TM) USB EHCI Controller - 9CA6
0xF702B000-0xF702BFFF	Intel(R) Ethernet Connection I218-LM
0xF702E000-0xF702E01F	Intel(R) Management Engine Interface
0xF7FE0000-0xF7FEFFFF	Motherboard resources
0xF7FF0000-0xF7FFFFFF	Motherboard resources
0xF8000000-0xFBFFFFFF	Motherboard resources
0xFED00000-0xFED003FF	High precision event timer
0xFED10000-0xFED17FFF	Motherboard resources
0xFED18000-0xFED18FFF	Motherboard resources
0xFED19000-0xFED19FFF	Motherboard resources
0xFED1C000-0xFED1FFFF	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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