



User Manual

SOM-5893

ADVANTECH

Enabling an Intelligent Planet

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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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CE

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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:

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- 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.
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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-5893 CPU module
- 1 x Heatspreader (1960069427N001)

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Chapter 1

General Information

This chapter provides basic information about the SOM-5893 computer-on-module.

- Introduction
- Specifications
- Functional Block Diagram

1.1 Introduction

SOM-5893 is a COM-Express basic pin-out Type 6 module that complies with the PICMG (PCI Industrial Computer Manufacturers Group) COM.0 R2.1 specification. The CPU module comprises a second-generation AMD embedded R-series APU, FCH A77E, and other peripheral chips to provide COM-specific functionalities. The latest AMD APU supports HeteroHSA.

SOM-5893 can support four independent symmetrical displays (LVDS, DDI, and VGA) of up to 4K2K DDI resolution, enabling users to set diverse combinations of simultaneous displays. With a next-generation AMD Radeon HD9000 graphics card, DX11.1 support, OpenCL 1.2, OpenGL 4.2, and a H.264 and MPEG4 decoder, this module offers enhanced media effects and outstanding 3D performance. Built-in high speed I/O ports include USB 3.0 and SATAIII for transmitting big data. The PEG x16 lane with up to Gen3 compliance (8 GT/s bit rate) and 7 PCIe x1 can be configured according to users' applications via the BIOS Setup utility.

Advantech's iManager 2.0 was developed to facilitate many embedded application functions, such as a multi-level watchdog timer, voltage and temperature monitoring, thermal protection and mitigation through processor throttling, LCD backlight on/off and brightness control, and embedded storage for customized information.

SUSIAccess, Advantech's remote management software, allows devices to be monitored and controlled remotely over the Internet for easy maintenance. All Advantech COM-Express modules are integrated with iManager and SUSIAccess to enhance customer applications.

The high performance, embedded platform-level power consumption, and diverse extensions and I/O interfaces of SOM-5893 make it suitable for computing-intensive, thermally sensitive, graphics/media-intensive 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 basic module 125 x 95 mm

1.2.2 System Information

- **CPU:** Second-generation AMD embedded R-series APU

CPU	Standard Freq. (GHz)	Max. Turbo Freq. (GHz)	Core	Cache (MB)	TDP (W)
RX-427BB	2.7	3.6	4	4	35
RX-425BB	2.5	3.4	4	4	35
RX-225FB	2.2	3.0	2	1	17

- **Chipset:** AMD A77E FCH
- **Memory:** 2 SODIMM socket for DDR3L-1600, up to 16GB
- **BIOS:** AMI UEFI 64Mbit SPI BIOS
- **Power management:** Supports power saving modes including Normal/Standby/Suspend modes. ACPI 2.0 compliant.

1.2.3 Display

- **Graphics Core:** AMD Radeon HD9000 GPU supports DX11.1, OpenCL 1.2, OpenGL 4.2, and H.264 and MPEG4 decoding.

CPU	Graphics Core	Base Freq.	Boost Freq.
RX-427BB	8	600MHz	686MHz
RX-425BB	6	576MHz	654MHz
RX-225FB	3	494MHz	533MHz

- **VGA:** Up to 1920 x 2000 resolution
- **LVDS:** Supports single and dual-channel 18/24-bit LVDS, up to 1920 x 1200
- **DDIs (HDMI/DVI/DP):** Supports 3 ports HDMI, DVI, or DP multiplexed.
- **Resolution:**
 - HDMI 1.4. supports up to 4096 x 2160 @ 30Hz, or 1920 x 1200 @ 60Hz
 - DisplayPort 1.2. supports up to 4096 x 2160 @ 30Hz
 - DVI Single-Link 1920 x 1200 @ 60Hz
- **Display Boot Up Order:**
 - First: LVDS (always first priority by default)
 - Second: DDIs
 - Third: VGA
- **Dual Displays: (in DOS/BIOS mode)**
 - LVDS + any DDI
 - LVDS + VGA
 - Any DDI + VGA (after LVDS function is disabled)
- **Triple Displays: (after booting to OS)**
 - LVDS + any 1 DDI + VGA
 - LVDS + any 2 DDIs
 - Any 2 DDIs + VGA (after LVDS function is disabled)
 - Any 3 DDIs (after LVDS function is disabled)
- **Quad Displays: (after booting to OS)**
 - LVDS + any 2 DDIs + VGA
 - LVDS + any 3 DDIs
 - Any 3 DDIs + VGA (after LVDS function is disabled)

1.2.4 Expansion Interface

- **PCI Express x16:** Supports one PCIe x16 port (default) compliant to PCIe Gen3* (8.0 GT/s) specifications. Other combinations can be configured using the BIOS Setup utility. Please contact Advantech's sales team for more information.

	x16	x8	x4	DDI
Default	1	0	0	0
Option 1	0	2	0	0
Option 2	0	1	1	1

Note! *PCIe x16 can be reconfigured to 1 DDI + PCIe x8 + PCIe x4 without hardware modifications.*



- **PCI Express x1:** Supports seven PCIe x1 ports (default) compliant to PCIe Gen2* (5.0 GT/s) specifications. Other combinations can be configured using the BIOS Setup utility. Please contact Advantech's sales team for more details.

	x4	x2	x1
Default	0	0	7
Option 1	0	2	3
Option 2	1	0	3

- **Audio Interface:** HD audio interface
- **LPC Bus**
- **SMBus**
- **I2C Bus:** Up to 400KHz
- **SPI:** Supports SPI BIOS only

1.2.5 I/O

- **Ethernet:** Intel i211AT Gigabit LAN supports speeds of 10/100/1000 Mbps
- **SATA:** Four SATA Gen3 (600 Gb/s) ports
- **USB Interface:** Four USB3.0 and eight USB 2.0 ports
- **Serial Port:** Two 2-wire serial ports
- **Express Card:** Two ports
- **Panel Control:** Supports panel backlight on/off and brightness control
- **Thermal Protection:** Supports thermal shutdown and APU throttling
- **Watchdog Timer:** Multi-level, multi-option watchdog timer with 65536-level timer interval (0 ~ 65535 seconds)
- **Smart Fan:** One port on module, one port on carrier board
- **GPIO:** 8-bit GPIO
- **Hardware Monitor:** Vin, 5VSB, CMOS
- **TPM:** BOM option, default not available

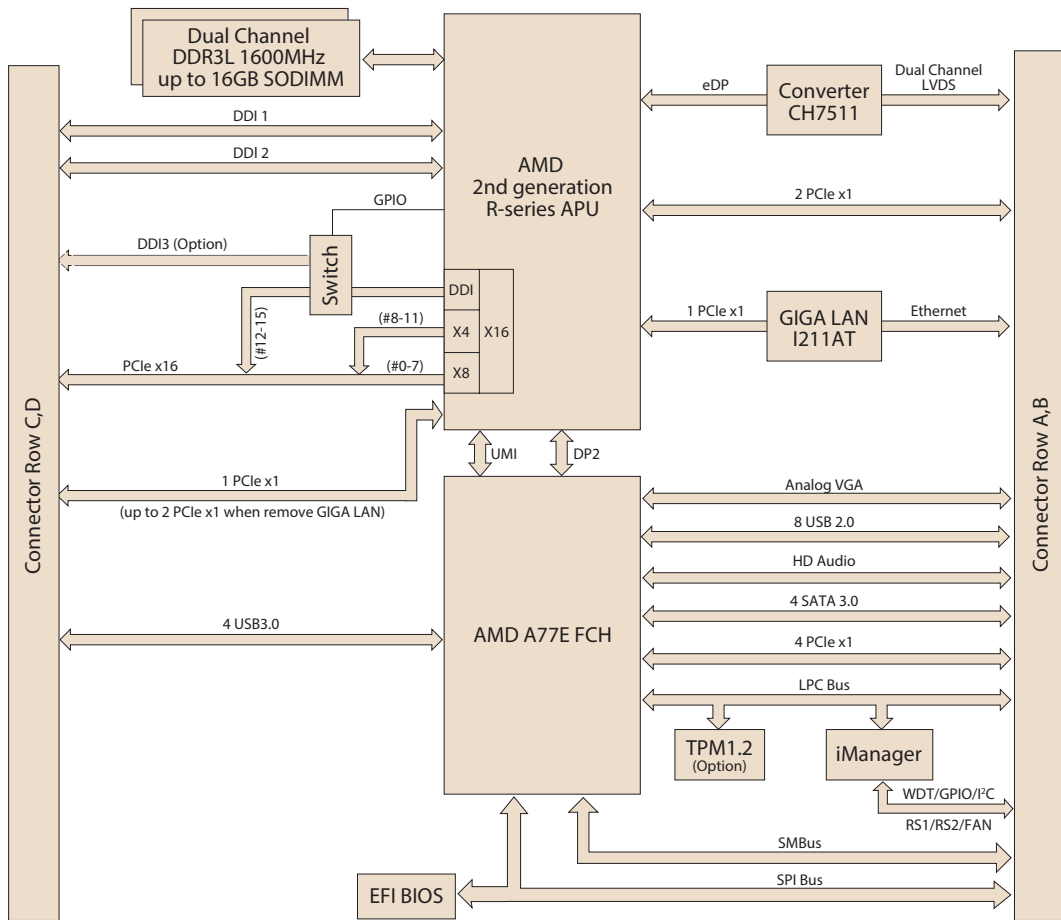
1.2.6 iManager 2.0

Refer to Section 4.3.

1.2.7 Mechanical and Environmental Specifications

- **Dimensions:** 125 x 95 mm (4.92 x 3.74")
- **Power Type and Supply Voltage:**
 - ATX: +8.5~20 V and +4.75~5.25VSB (standby power)
 - AT: +8.5~20 V
 - CMOS Battery: +3.3 V
- **Power Requirement:**
 - Test Condition: SOM-5893RG-U7A1E (RX-427BB), DDR3L-1600 16GB, WIN7 64-bit, under 12V and 5VSB input power supply.
 - Idle: 16.6W
 - Max: 35.8W (Burn-in V7.0 Pro)
- **Temperature Specifications:**
 - Operating: 0 ~ 60 °C (32 ~ 140 °F)
 - Storage: -40 ~ 85 °C (-40 ~ 185 °F)
- **Humidity Specifications:**
 - 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-5893 CPU computer-on-module.

- Board Information
- Mechanical Drawing
- Assembly Drawing

2.1 Board Information

The figures below indicate the main chips on SOM-5893 Computer-on-Module. Please aware of these positions while designing your own carrier board to avoid mechanical and thermal problems; keep in mind best heat dissipation performance.

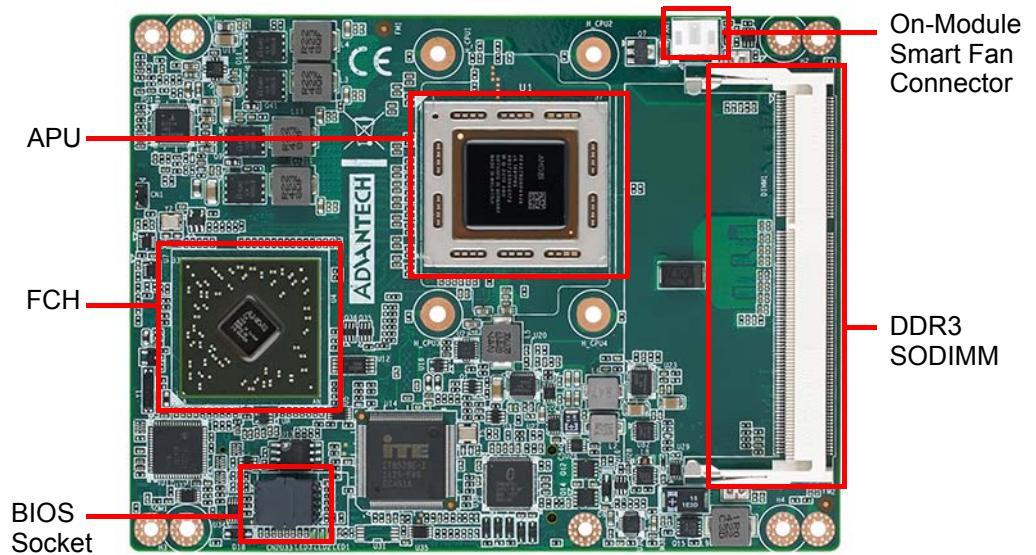


Figure 2.1 Board Chip Identification - Front

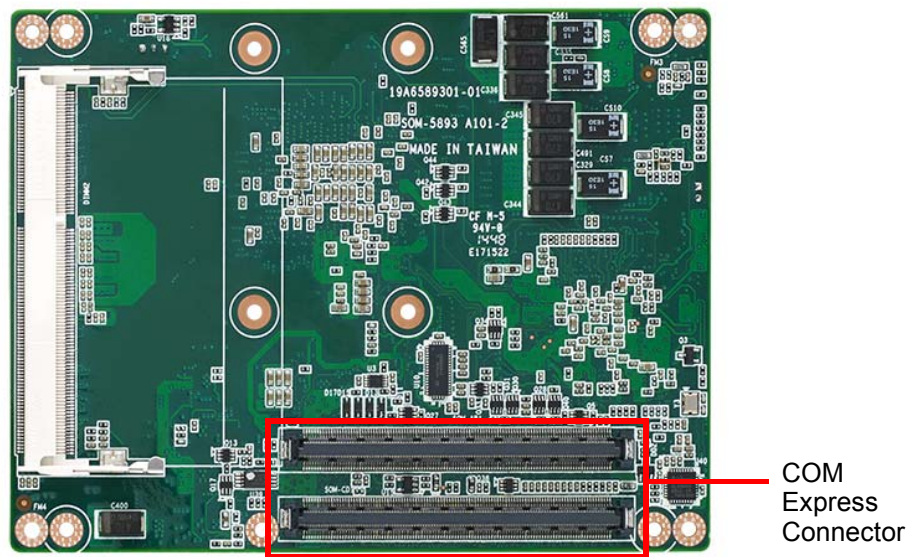


Figure 2.2 Board Chip Identification - Back

2.2 Mechanical Drawing

For more detail about 2D/3D models, please see the Advantech COM support service website <http://com.advantech.com>.

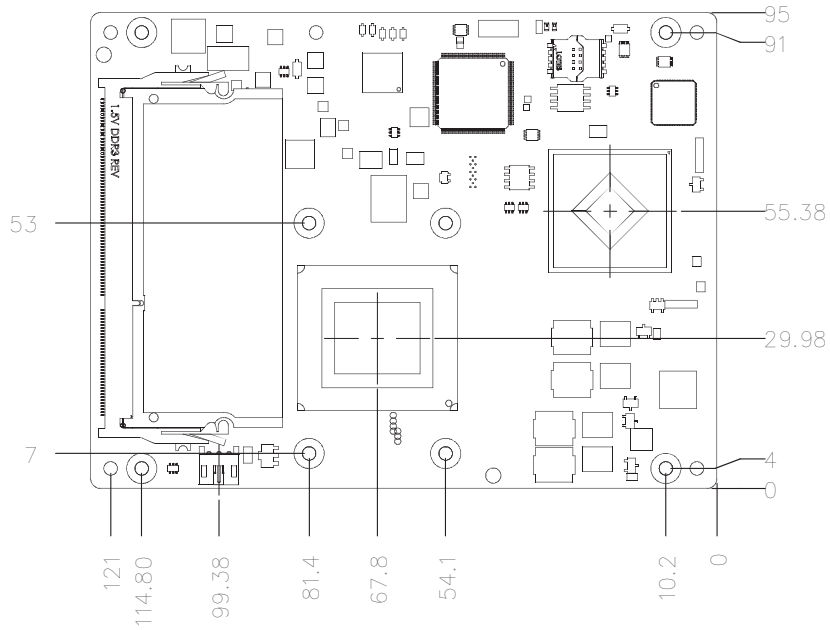


Figure 2.3 Board Mechanical Drawing - Front

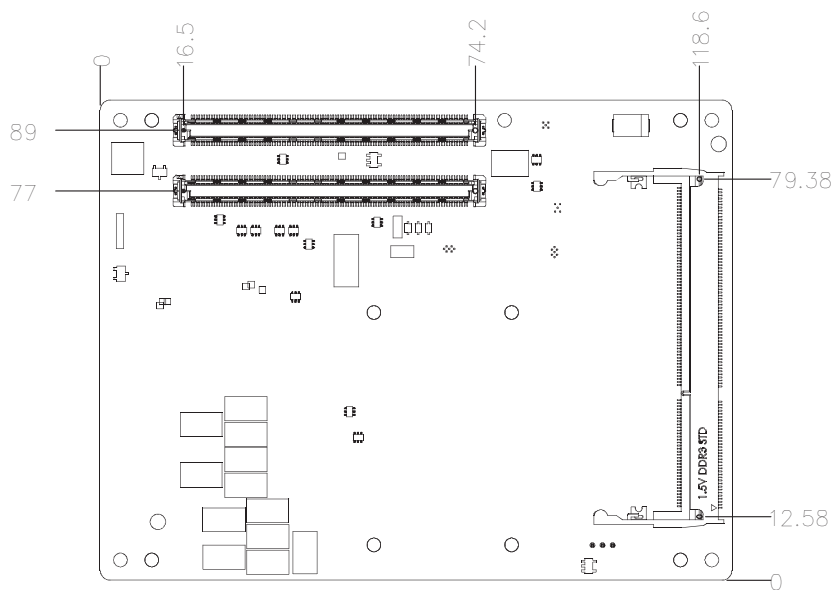


Figure 2.4 Board Mechanical Drawing - Back

2.3 Assembly Drawing

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

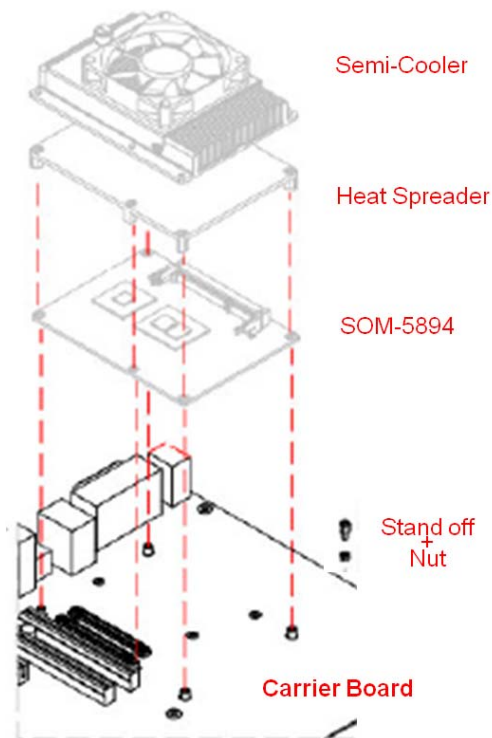


Figure 2.5 Assembly Drawing

There are 4 reserved screw holes for SOM-5893 to be pre-assembled with the heat spreader.

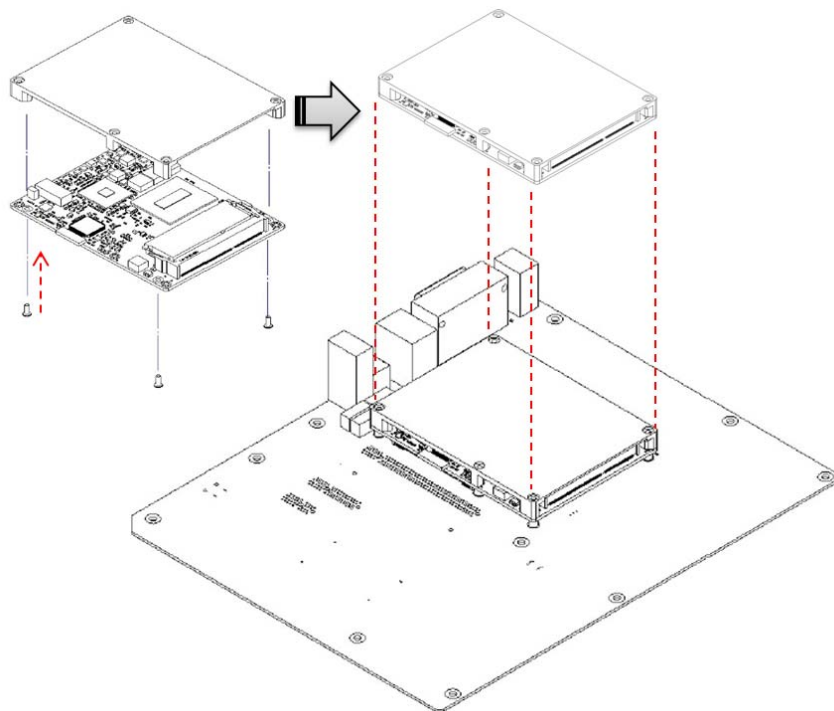


Figure 2.6 Heatspreader Pre-assembly

Chapter 3

AMI BIOS

This chapter gives BIOS setup information for the SOM-5893 CPU computer-on-module.

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

3.1 Introduction

SOM-5893 BIOS has been stored in 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-5893 BIOS setup screens.

Advantech will supply BIOS revisions for product optimization, and users can re-flash the latest BIOS through the AFU utility. Please contact Advantech support for details.

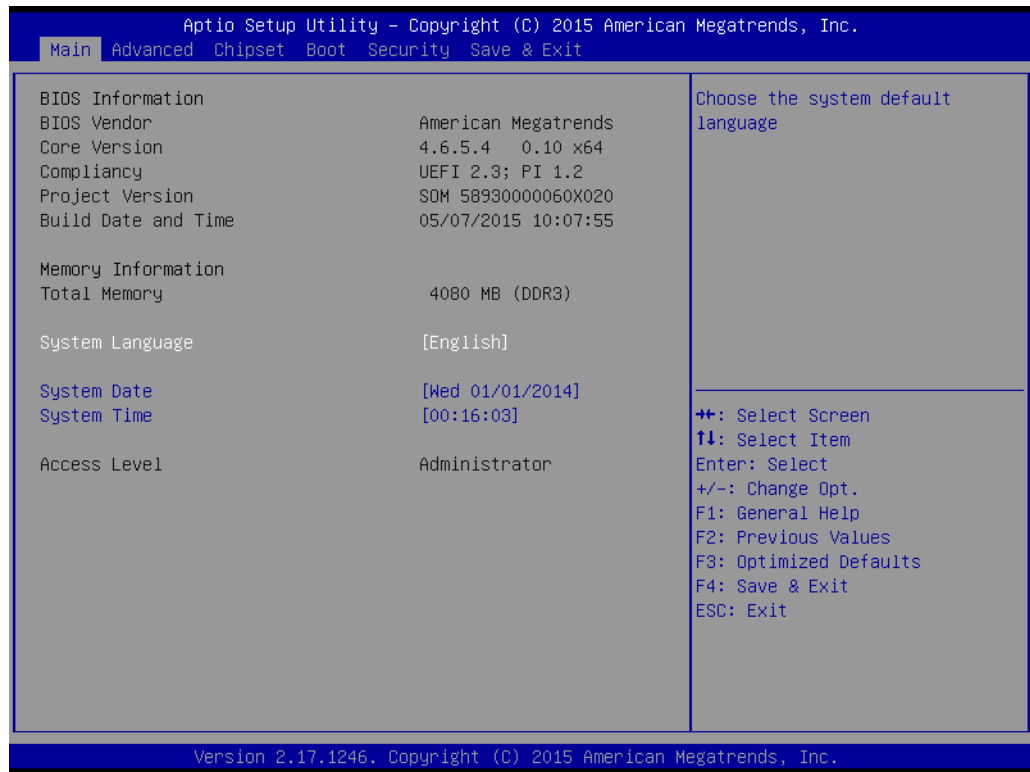


Figure 3.1 BIOS Setup Utility Main Screen

SOM-5893 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.

3.2 Entering Setup

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

3.2.1 Main Setup

When users first enter the BIOS Setup they 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 an explanatory text message will accompany it.

■ System Date / System Time

Use these options 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.

System Date: mm/dd/yyyy

System Time: hh/mm/ss

3.2.2 Advanced BIOS Features Setup

Select the Advanced tab from the SOM-5893 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.

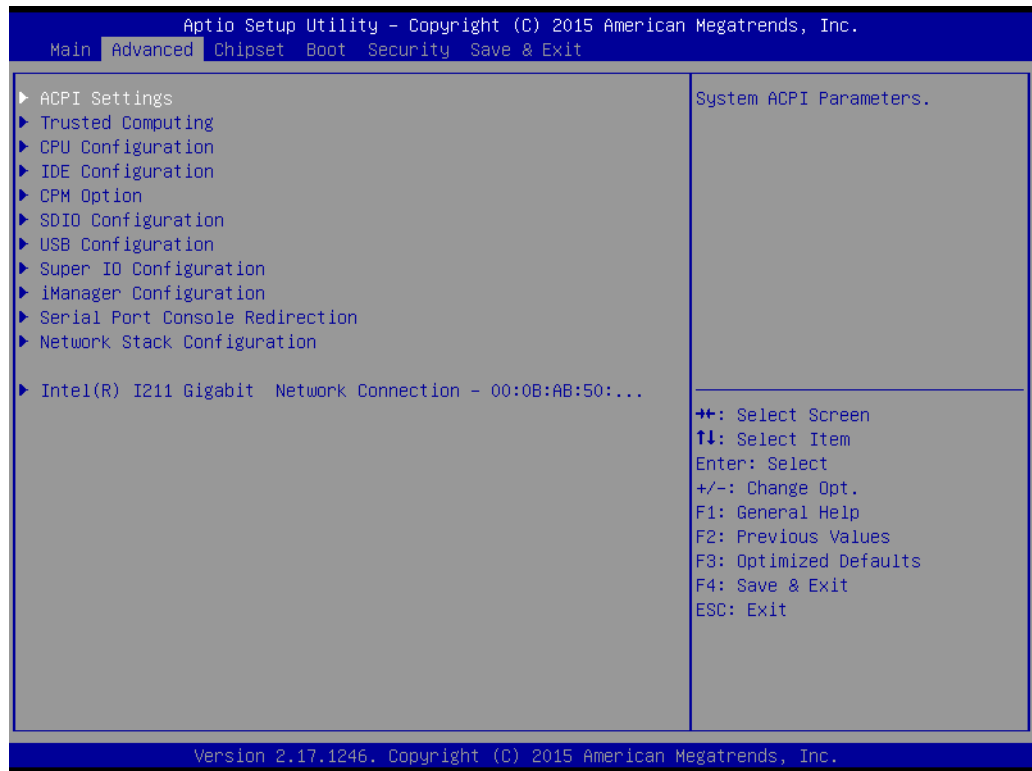


Figure 3.3 Advanced BIOS Features Setup Screen

3.2.2.1 ACPI Settings

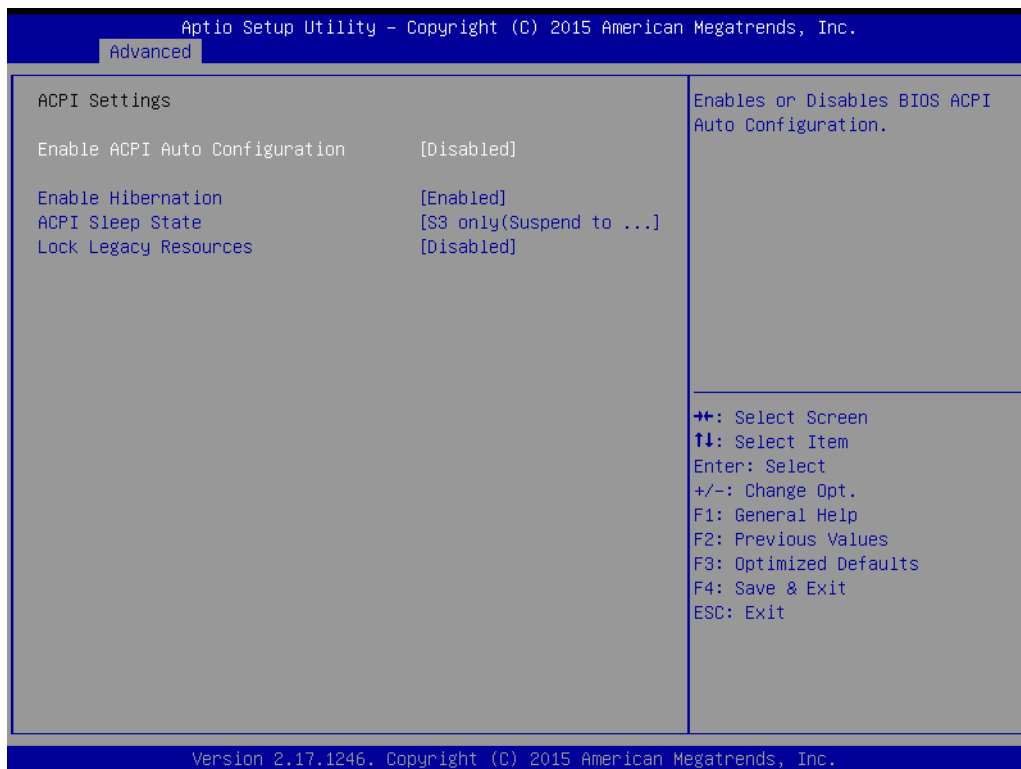


Figure 3.4 ACPI Settings

- **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 be not effective with some OS..
- **ACPI Sleep State**
This item allows users to select the ACPI sleep state. The system will enter when the SUSPEND button is pressed.
- **Lock Legacy Resources**
This item allows users to enable or disable Lock of Legacy Resources.

3.2.2.2 Trusted Computing



Figure 3.5 Trusted Computing

- **TPM Support**
Disable/Enable TPM, if available.

3.2.2.3 CPU Configuration

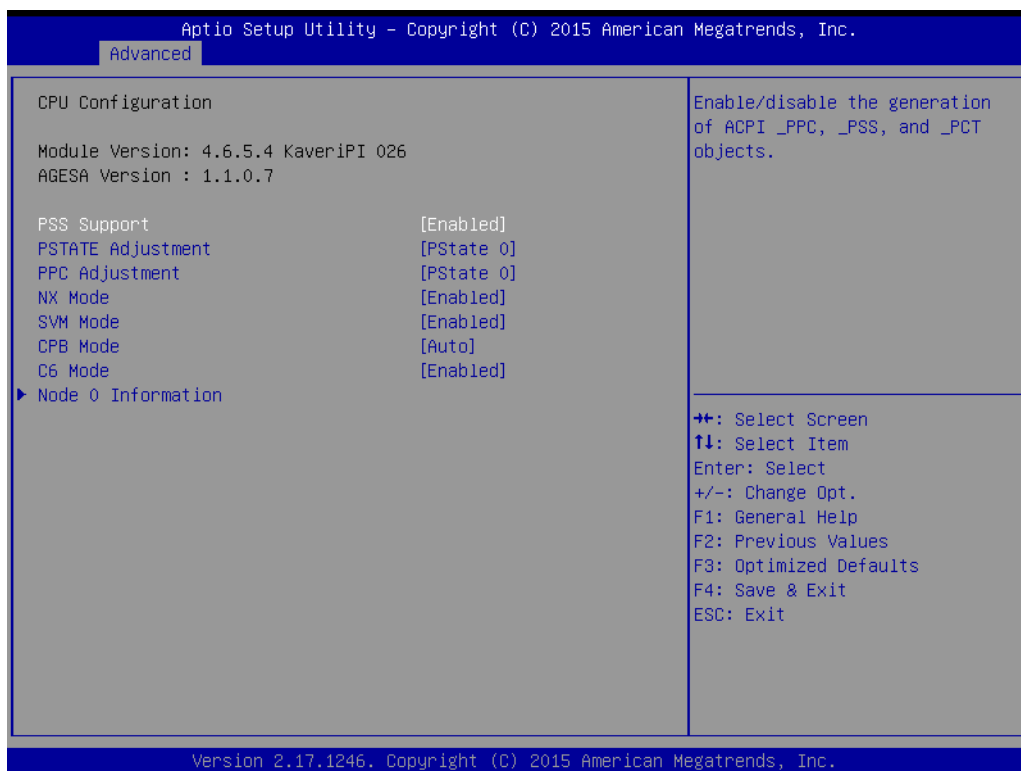


Figure 3.6 CPU Configuration

- **PSS Support**
This item allows users to enable or disable the generation of ACPI_PPC, _PSS, and _PCT objects.
- **PSTATE Adjust**
This item allows users to adjust startup P-State level.
- **PPC Adjustment**
This item is provided to adjust _PPC object.
- **NX Mode**
This item allows users to enable or disable No-execute page protection function.
- **SVM Mode**
This item allows users to enable or disable CPU Virtualization.
- **CPB Mode**
This item allows users to auto or disable CPB Mode.
- **C6 Mode**
This item allows users to enable or disable C6 Mode.
- **Node 0 Information**
View Memory information related to Node 0.

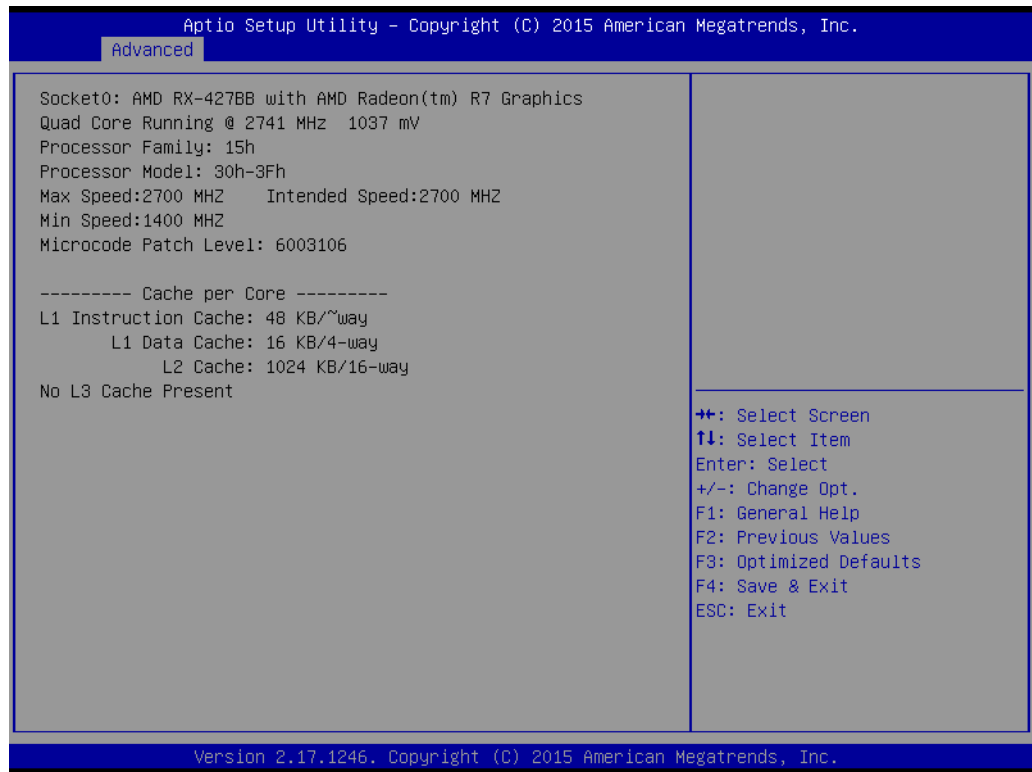


Figure 3.7 Node 0 Information

3.2.2.4 IDE Configuration (SATA port)

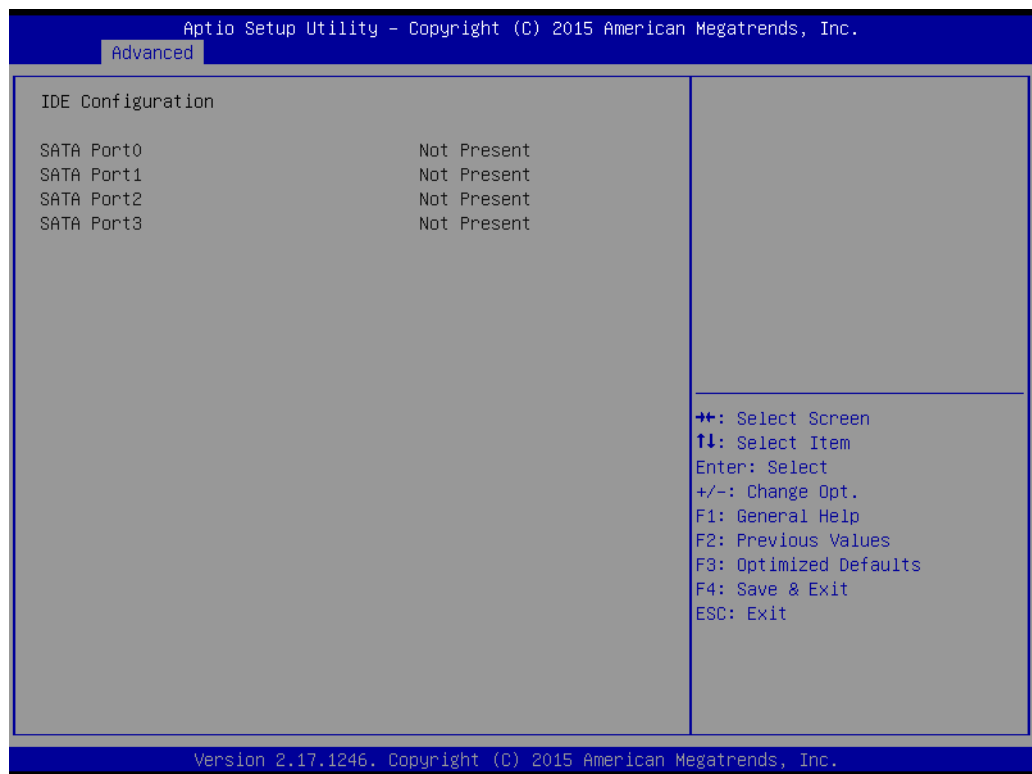


Figure 3.8 IDE Configuration

3.2.2.5 CPM Option

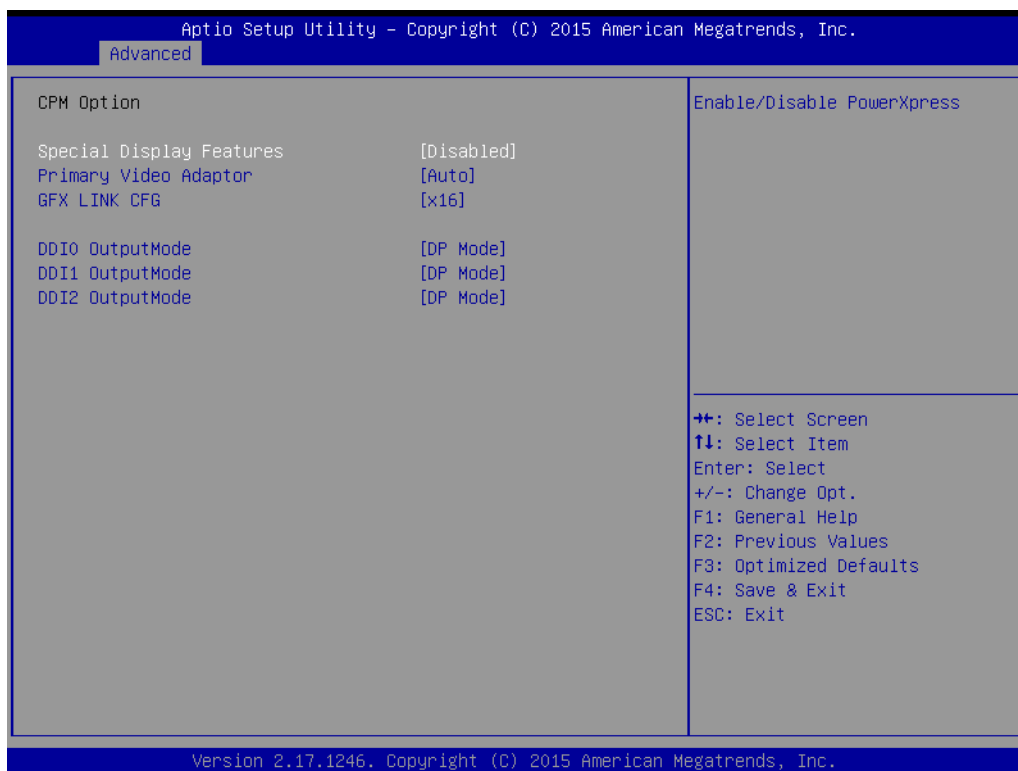


Figure 3.9 CPM Option

- **Special Display Features**
This item allows users to enable or disable PowerXpress.
- **Primary Video Adaptor**
This item allows users to select Internal or External Graphics.
- **GFX LINK CFG**
This item allows users to select GFX Link CFG.
- **DDI0 OutputMode**
This item allows users to select to DP mode or HDMI mode.
- **DDI1 OutputMode**
This item allows users to select to DP mode or HDMI mode.
- **DDI2 OutputMode**
This item allows users to select to DP mode or HDMI mode.

3.2.2.6 SDIO Configuration

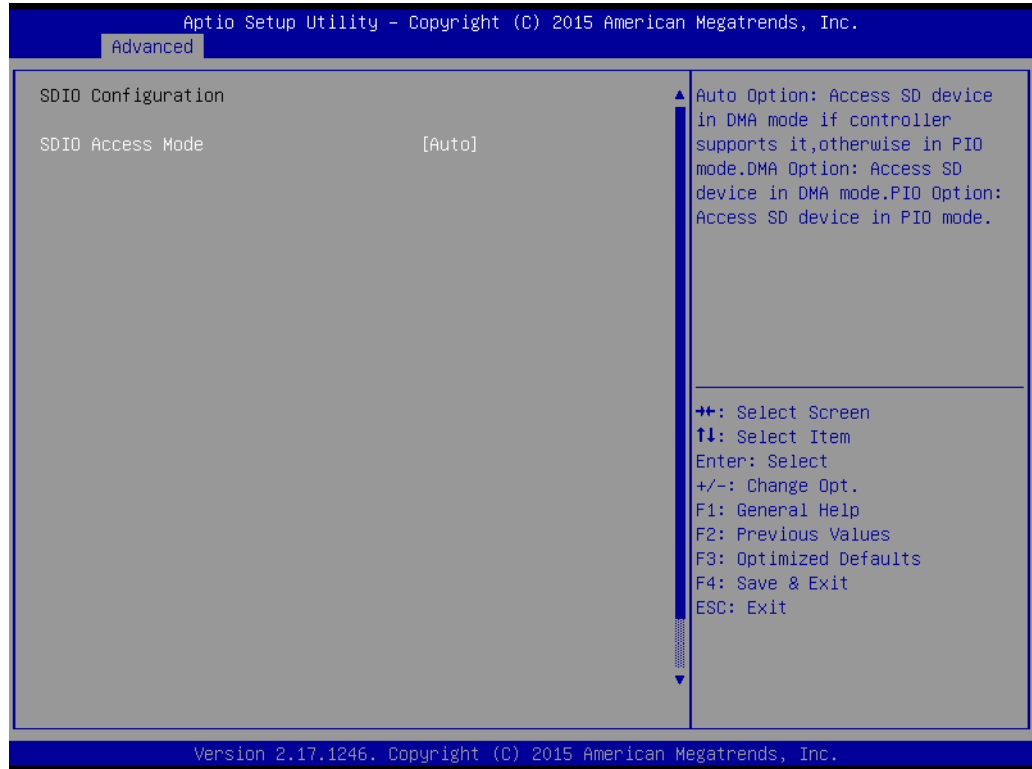


Figure 3.10 SDIO configuration

■ SDIO Access Mode

This item allows users to select SDIO Access Mode.

Auto Option: Access SD device in DMA mode if controller support it, otherwise in PIO mode.

DMA Option: Access SD device in DMA mode.

PIO Option: Access SD device in PIO mode.

3.2.2.7 USB Configuration



Figure 3.11 USB Configuration

- **Legacy USB Support**
 This item allows users to enable or disable 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 item allows users to enable or disable XHCI Hand-off. The XHCI ownership change should be claimed by XHCI driver.
- **EHCI Hand-off**
 This item allows users to enable or disable EHCI Hand-off. The EHCI ownership change should be claimed by EHCI driver.
- **USB Mass Storage Driver Support**
 This item allows users to enable or disable USB Mass Storage Driver Support.
- **USB transfer time-out**
 This item allows user to select time-out section. The time-out value for control, bulk, and interrupt transfers.
- **Device reset time-out**
 This item allows user to select device time-out section. USB mass storage devices start unit command time-out.
- **Device power-up delay**
 This item allows user to select device power-up section. Maximum time the device will take before it properly reports itself to the Host controller. "Auto" uses default value: for a Root port it is 100ms, for a Hub port the delay is taken from Hub descriptor.

3.2.2.8 Super IO Configuration

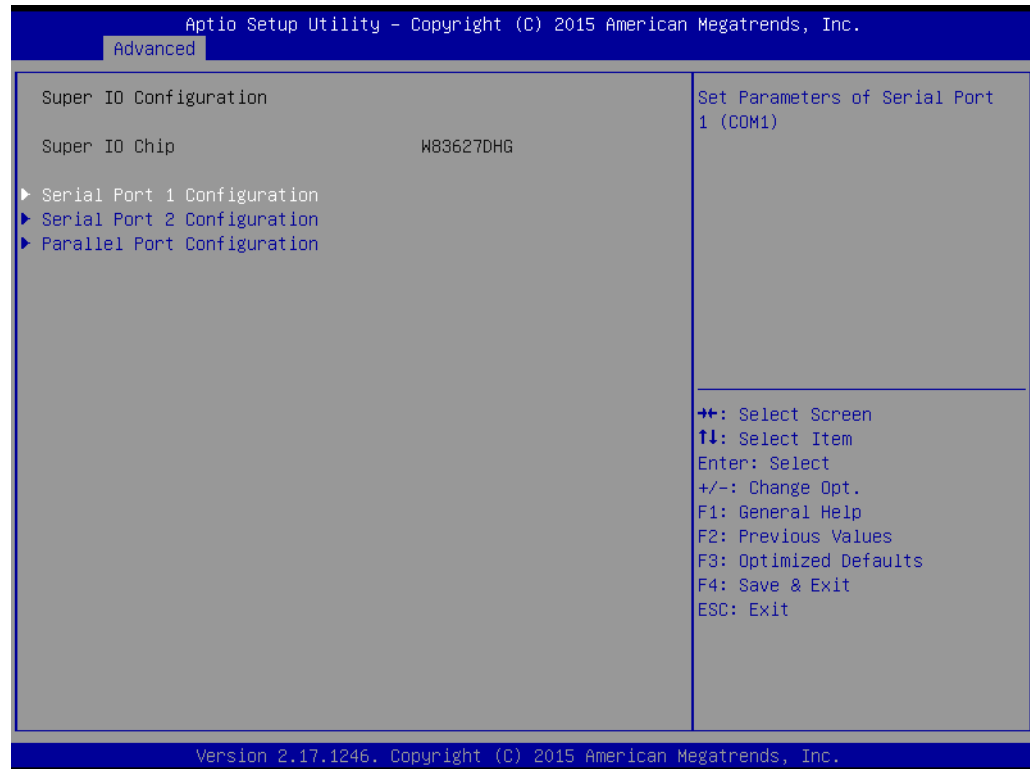


Figure 3.12 Super IO Configuration

- **COM Port 1 Configuration**
This item allows user to set Parameters of COM Port 1.
- **COM Port 2 Configuration**
This item allows user to set Parameters of COM Port 2.
- **Parallel Port Configuration**
This item allows user to set Parameters of Parallel Port (LPT/LPTE).

■ COM Port 1 Configuration

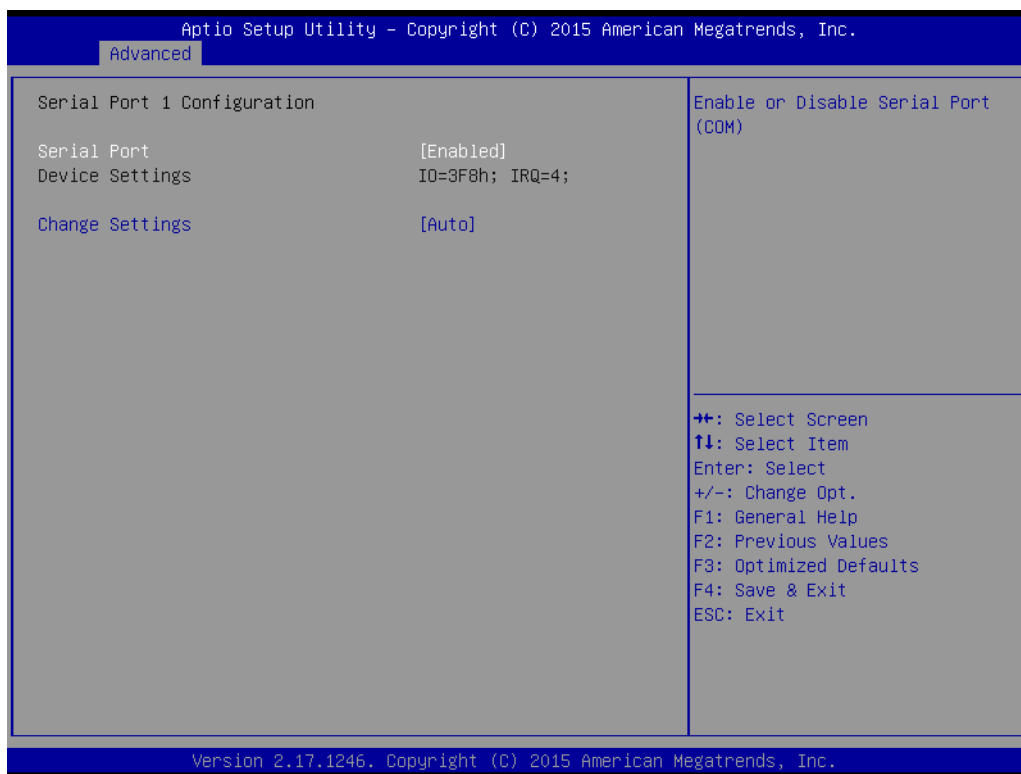


Figure 3.13 COM Port 1 Configuration

- **COM Port**
COM Port 1 enable or disable.
- **Change settings**
COM port 1 IRQ/IO/mode resources configuration.
Users can select an optional setting for Super IO device.

■ COM Port 2 Configuration

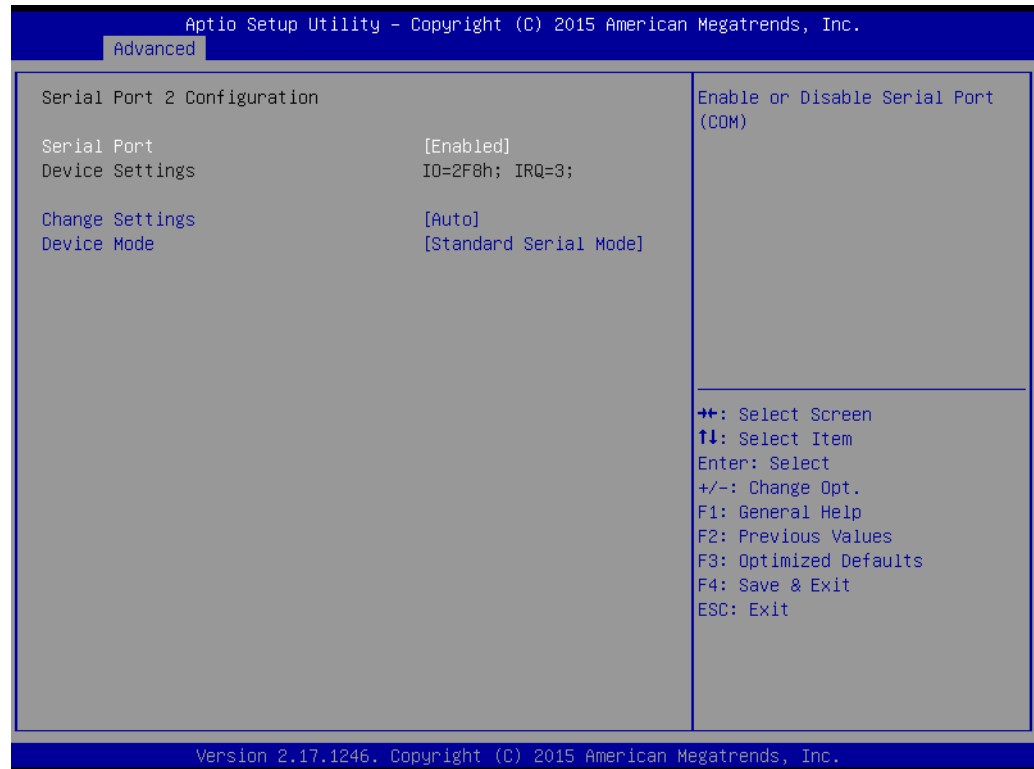


Figure 3.14 COM Port 2 Configuration

- **COM Port**
COM Port 2 enable or disable.
- **Change settings**
COM port 2 IRQ/IO/mode resources configuration.
Users can select an optional setting for Super IO device.

■ Parallel Port Configuration

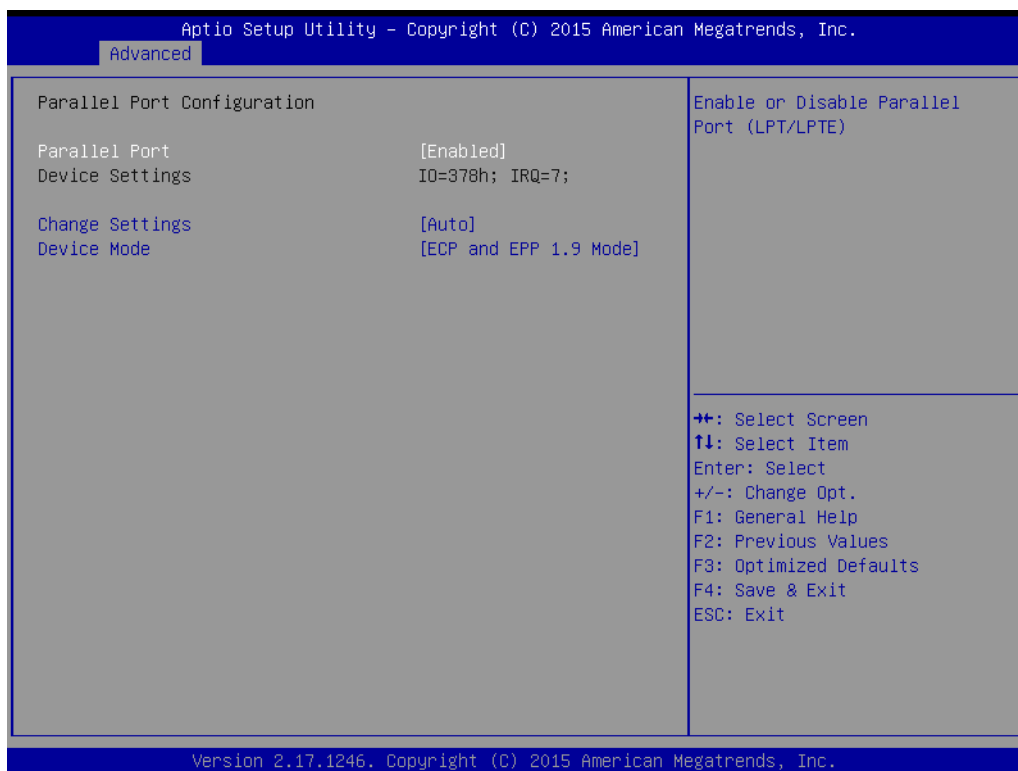


Figure 3.15 Parallel Port Configuration

- **Parallel Port**
This item allows users to enable or disable Parallel Port (LPT/LPTE).
- **Change settings**
This item allows users to select an optimal setting for Super IO device.
- **Device Mode**
This item allows users to change the Printer Port mode.

3.2.2.9 iManager Configuration

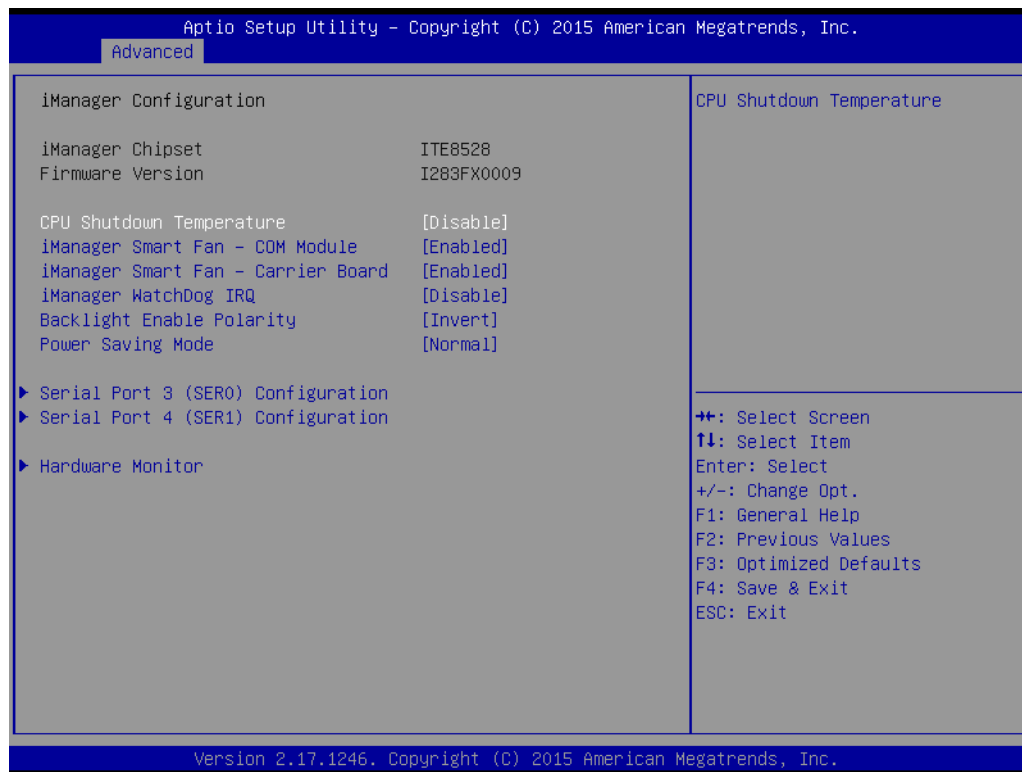


Figure 3.16 iManager Configuration

- **CPU Shutdown Temperature**
This item allows users to select CPU Shutdown Temperature.
- **iManager Smart Fan - COM Module**
This item allows users to control iManager Smart FAN function in COM Module.
- **iManager Smart Fan - Carrier Board**
This item allows users to control iManager Smart function in Carrier Board.
- **iManager WatchDog IRQ**
This item allows users to select iManager IRQ number eBrain WatchDog.
- **Backlight Enable Polarity**
This item allows users to switch Backlight Enable Polarity for Native or Invert.
- **COM Port 3 (SER0) Configuration**
Set parameter of series port 3 (COM3) refer to PICMG SER0_TX / SER0_RX.
- **COM Port 4 (SER1) Configuration**
Set parameter of series port 4 (COM4) refer to PICMG SER1_TX / SER1_RX.
- **Hardware Monitor**
This item allows users to monitor hardware status.

■ COM Port 3 Configuration

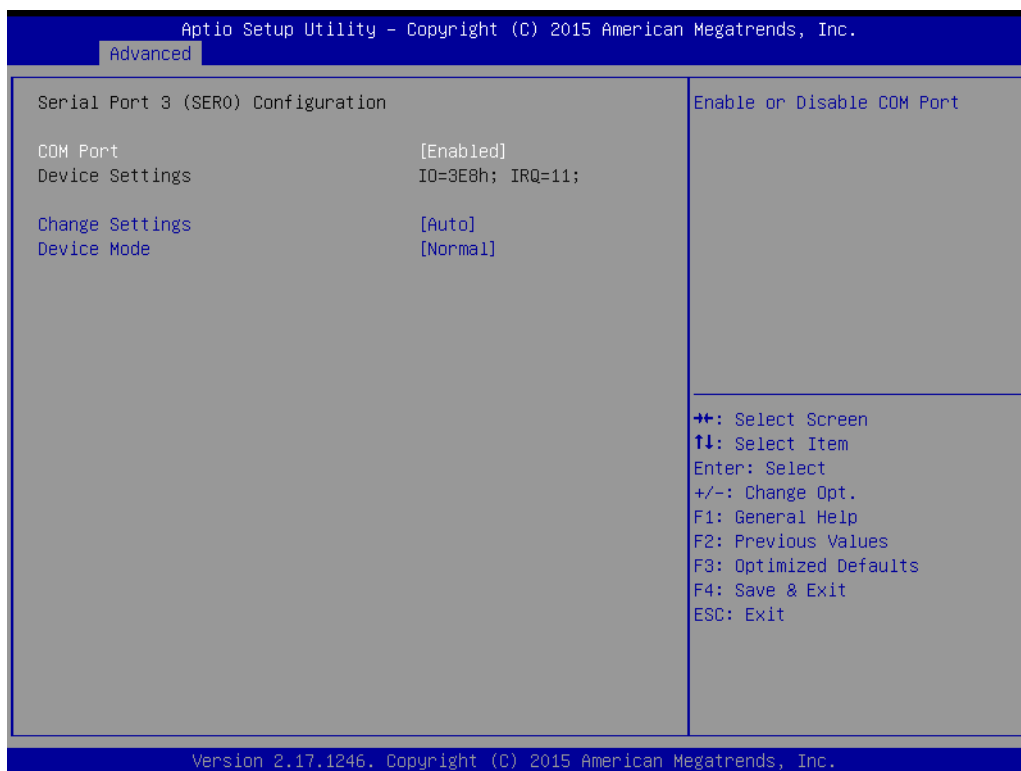


Figure 3.17 COM 3 Configuration

- **COM Port**
COM Port 3 enable or disable.
- **Change settings**
COM port 3 IRQ/IO/mode resources configuration.
Users can select an optional setting for Super IO device.
- **Device Mode**
Select the COM port mode.

■ COM Port 4 Configuration



Figure 3.18 COM Port 4 Configuration

- **COM Port 4**
COM Port 4 enable or disable.
- **Change settings**
COM port 4 IRQ/IO/mode resources configuration.
Users can select an optional setting for Super IO device.
- **Device Mode**
Select the COM port mode.

- **iManager - Hardware Monitor**
This item monitor hardware status.

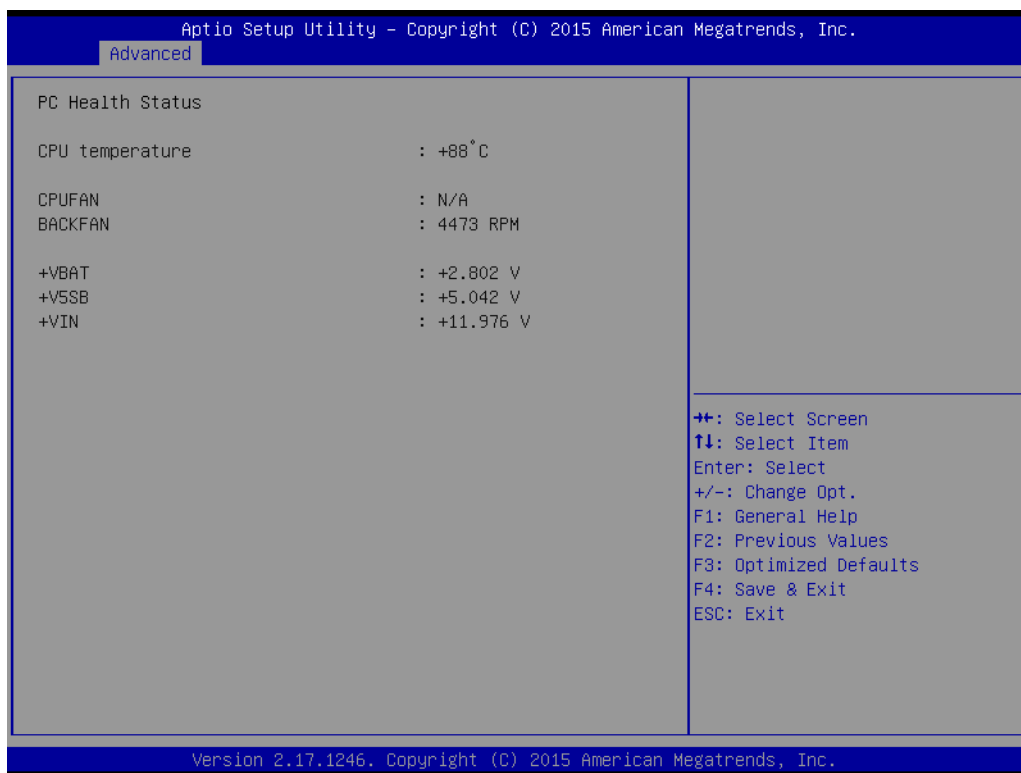


Figure 3.19 iManager - Hardware Monitor

3.2.2.10 Serial Port Console Redirection

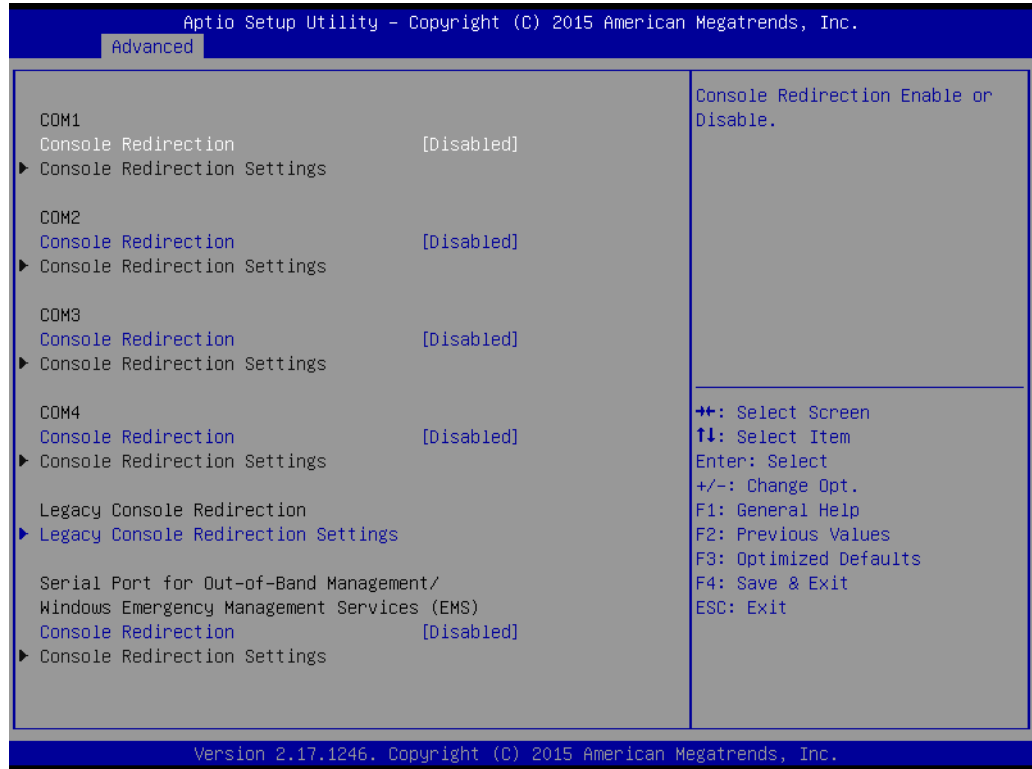


Figure 3.20 Serial Port Console Redirection

■ **Console Redirection**

This item allows users to enable or disable console redirection for Microsoft Windows Emergency Management Services (EMS).

3.2.2.11 Network Stack



Figure 3.21 Network Stack

- **Network Stack**
This item allows users to enable or disable UEFI Network Stack.

3.2.2.12 Intel i211 Gigabit Network Connection

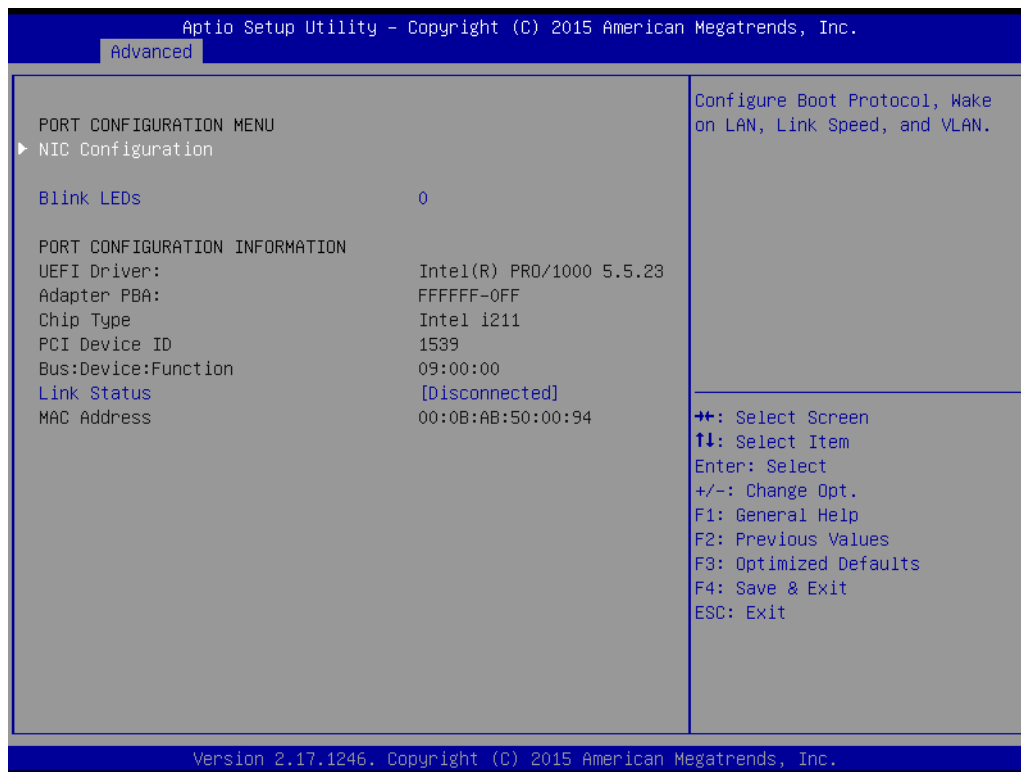


Figure 3.22 Intel i211 Gigabit Network Connection

- **NIC Configuration**
Configure boot protocol, Wake on LAN, Link Speed, and VLAN.
- **Blink LEDs**
Identify the physical network port by blinking the associated LED.

- **NIC (Network Interface Card) Configuration**



Figure 3.23 NIC Configuration

- **Link Speed**
Specifies the port speed used for the selected boot protocol.
- **Wake on LAN**
This item allows users to enable or disable the server to be powered on using an in-band magic packet.

3.2.3 Chipset

Select the Chipset tab from the SOM-5893 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.

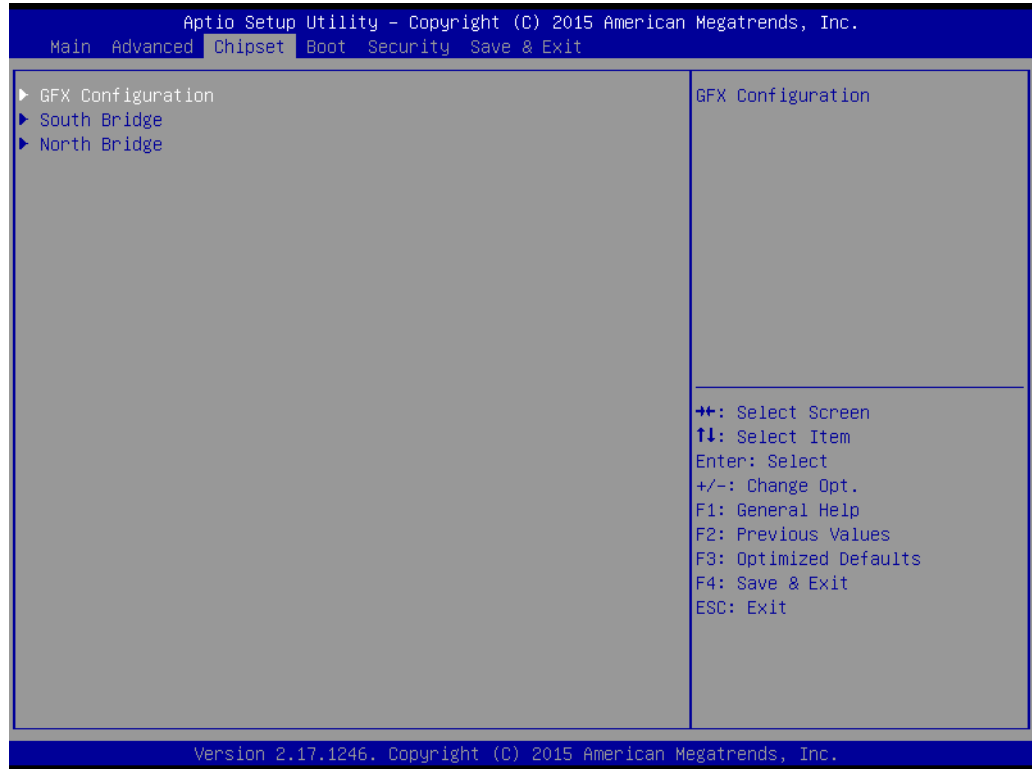


Figure 3.24 Chipset Setup

3.2.3.1 GFX Configuration

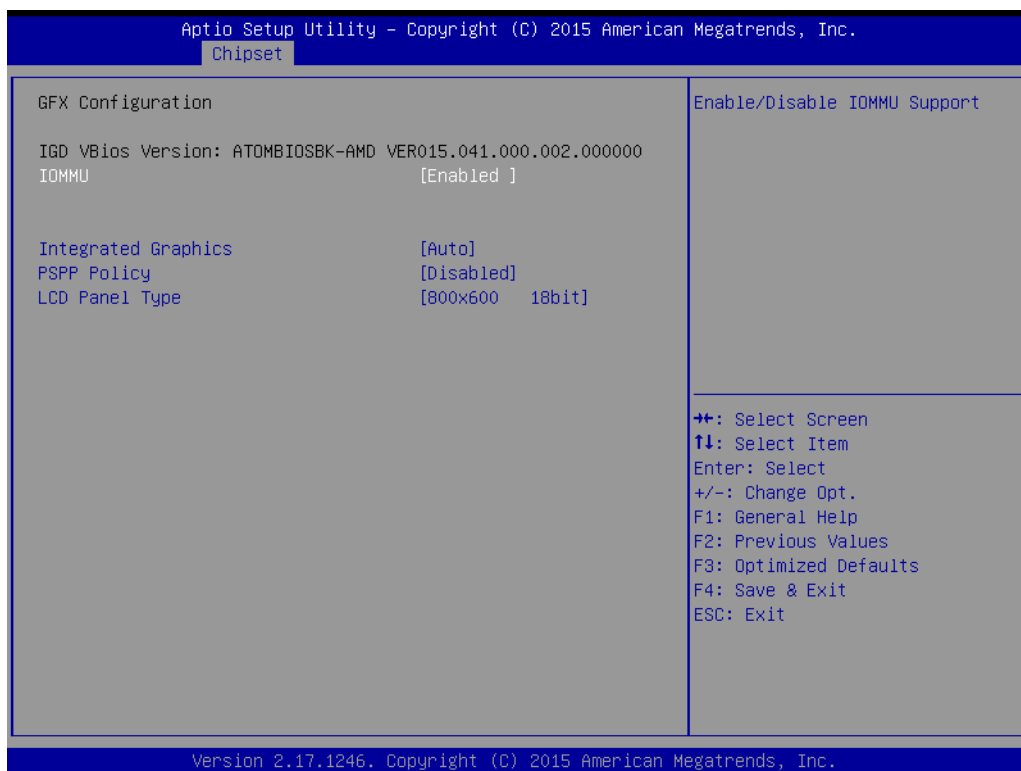


Figure 3.25 PCH-IO Configuration

- **IOMMU**
This item allows users to enable or disable IOMMU support.
- **Integrated Graphics**
This item allows users to enable or disable integrate graphics controller.
- **PSPP policy**
This item allows users to select PCIe Speed power policy.
- **LCD Panel Type**
This item allows users to select LCD panel used by internal graphics device by selecting the appropriate setup item.

3.2.3.2 South Bridge

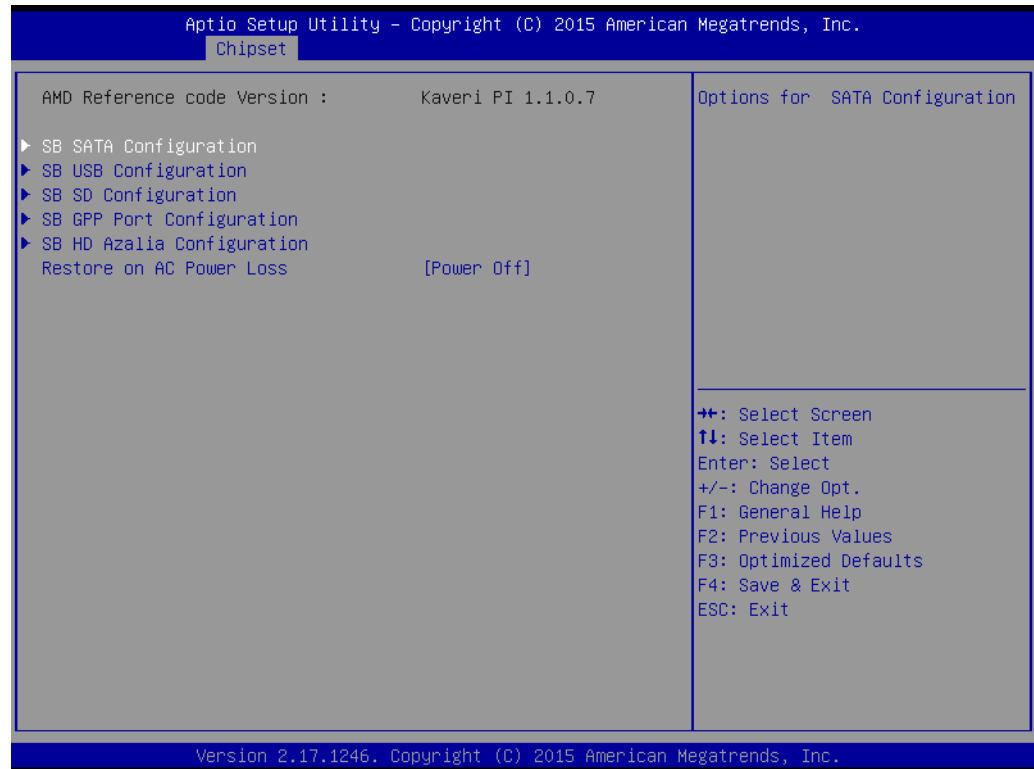


Figure 3.26 South Bridge

- **Restore on AC Power Loss**
This item allows users to select the options of Restore on AC Power Loss.

■ SB SATA Configuration

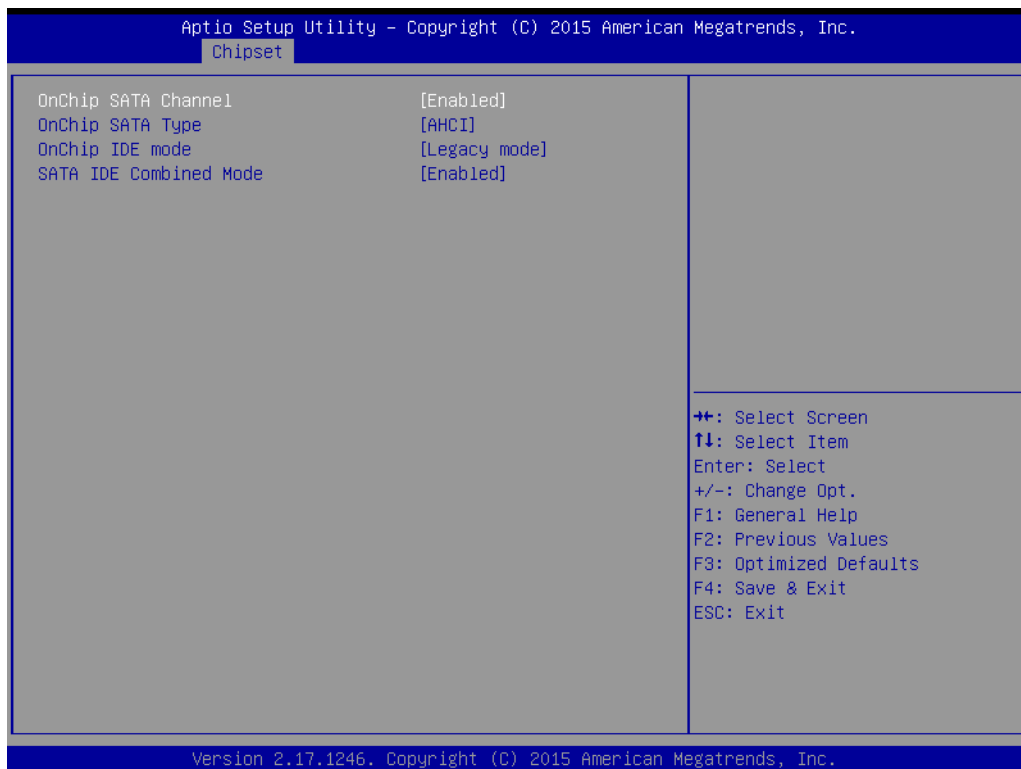


Figure 3.27 SB SATA Configuration

- **Onchip SATA Channel**
This item allows users to enable or disable Onchip SATA Channel.
- **Onchip SATA Type**
This item allows users to select Onchip SATA Type.
(Native IDE /n RAID /n AHCI /n AHCI /n Legacy IDE /n IDE → AHCI /n Hyper-Flash)
- **Onchip IDE mode**
This item allows users to select Legacy mode or Native mode.
- **SATA IDE Combined Mode**
This item allows users to enable or disable SATA IDE Combined Mode.

■ SB USB Configuration

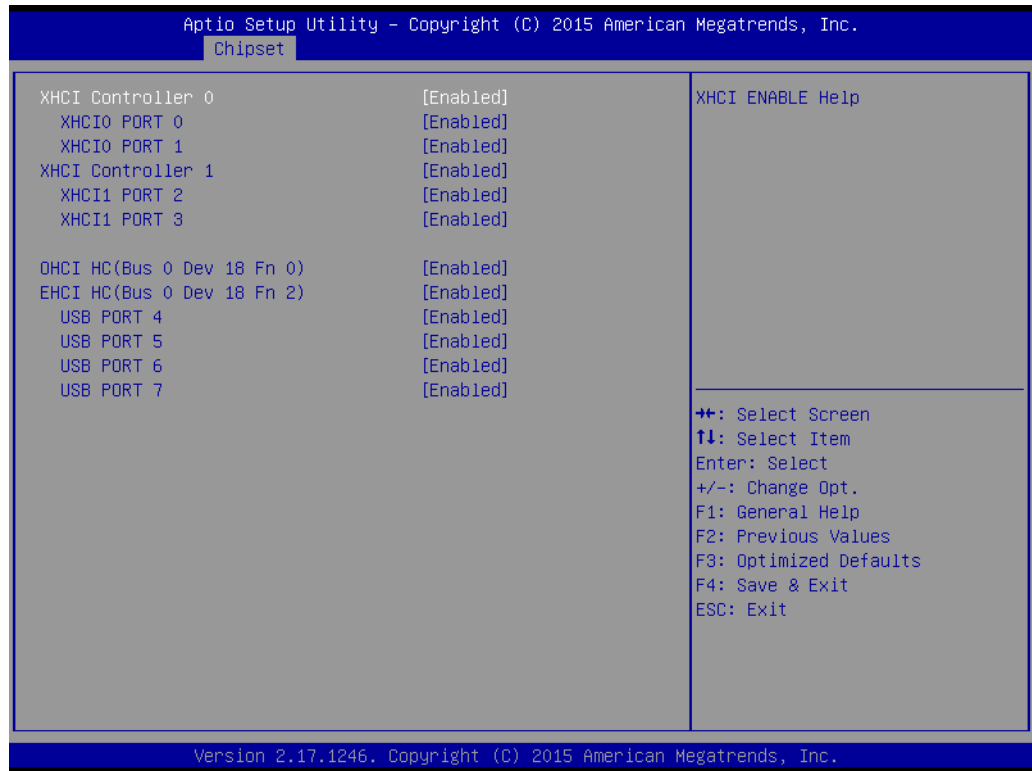


Figure 3.28 SB USB Configuration

This page helps users to enable and set up XHCI.

■ SB SD Configuration

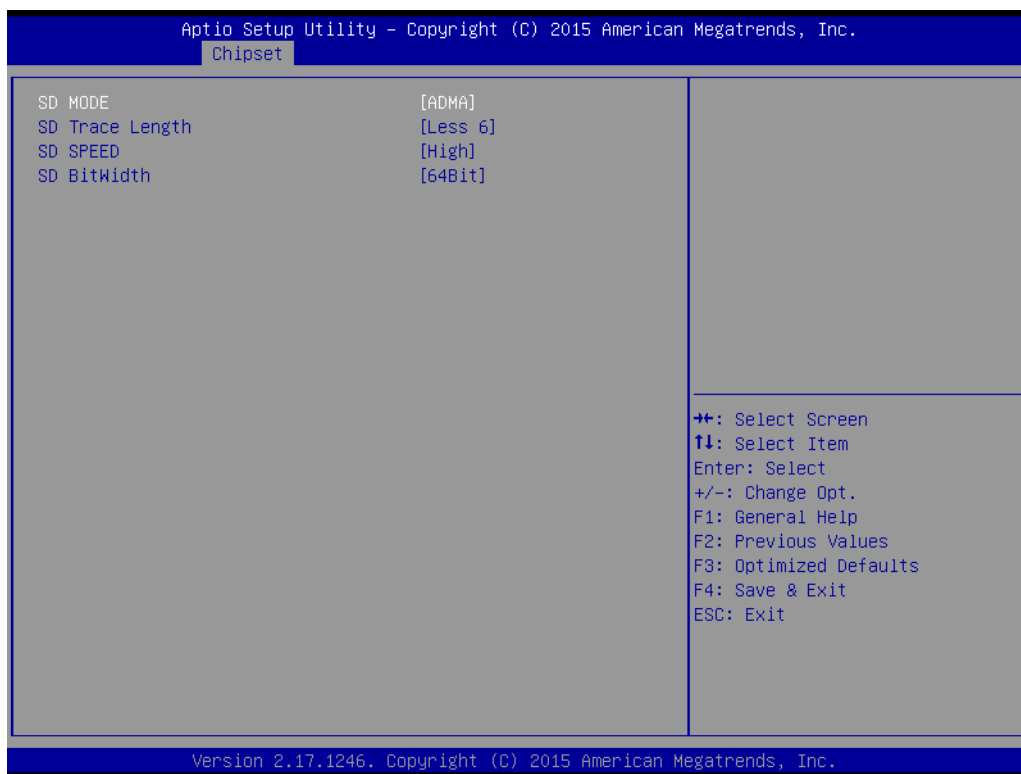


Figure 3.29 SB SD Configuration

This page helps users to select the options of SD.

■ SB GPP Port Configuration

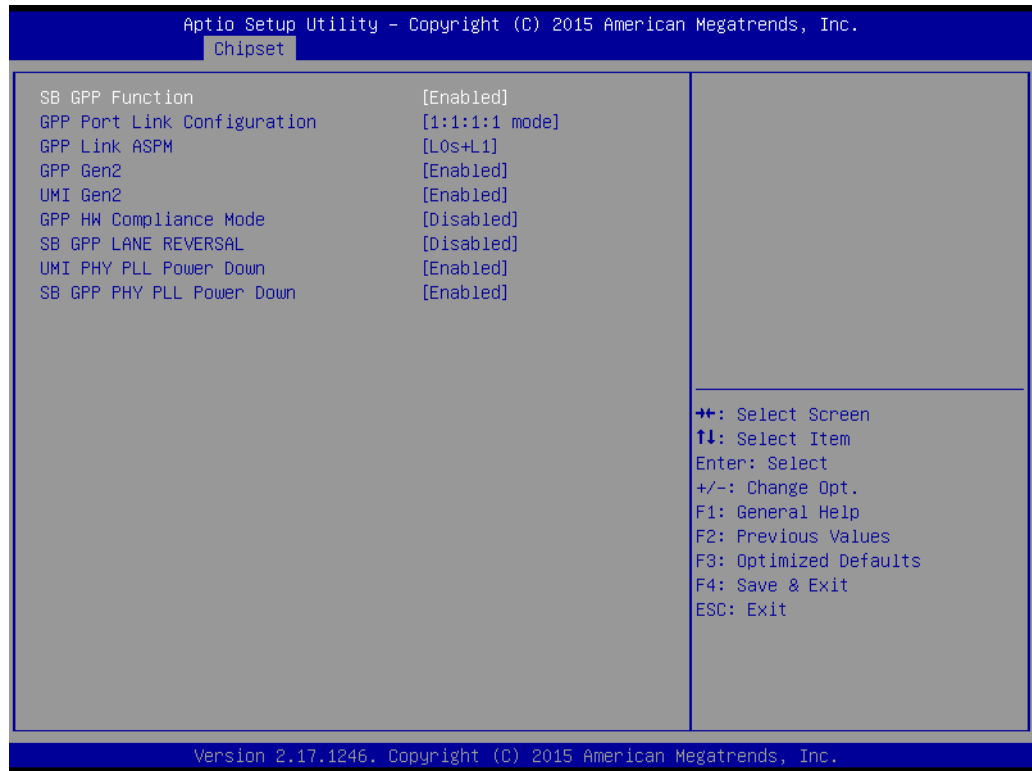


Figure 3.30 SB GPP Port Configuration

This page helps users to select the options for SB GPP Port Config.

■ SB HD Azalia Configuration

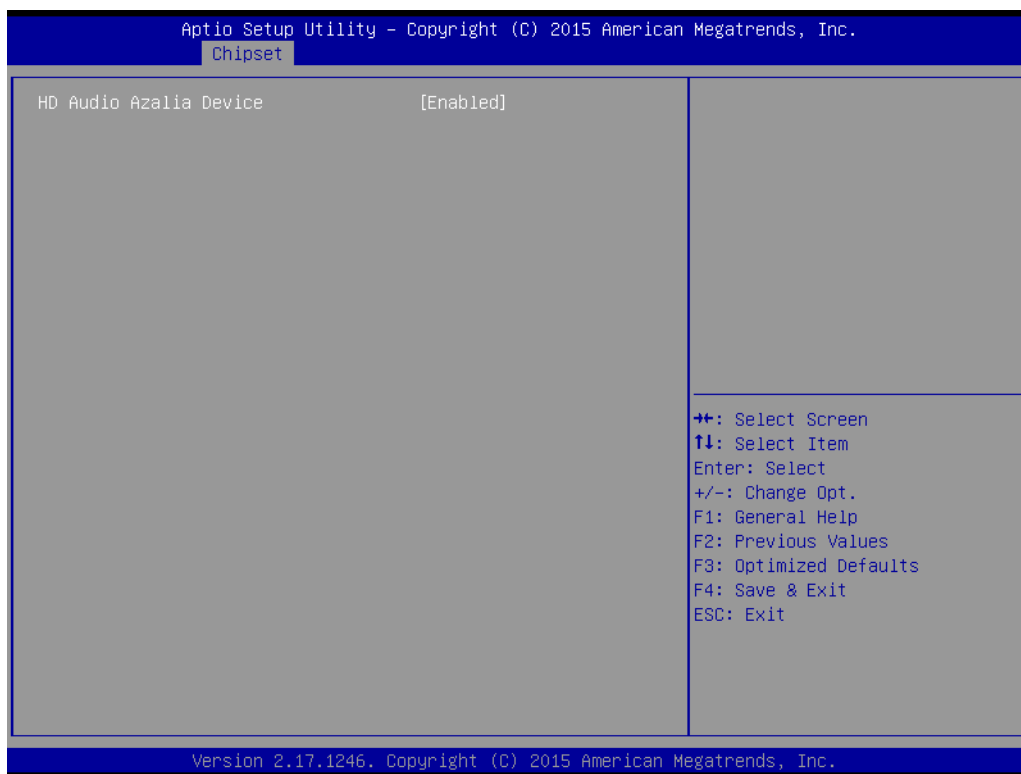


Figure 3.31 SB HD Azalia Configuration

This page helps users to select the options for SB HD Azalia.

3.2.3.3 North Bridge

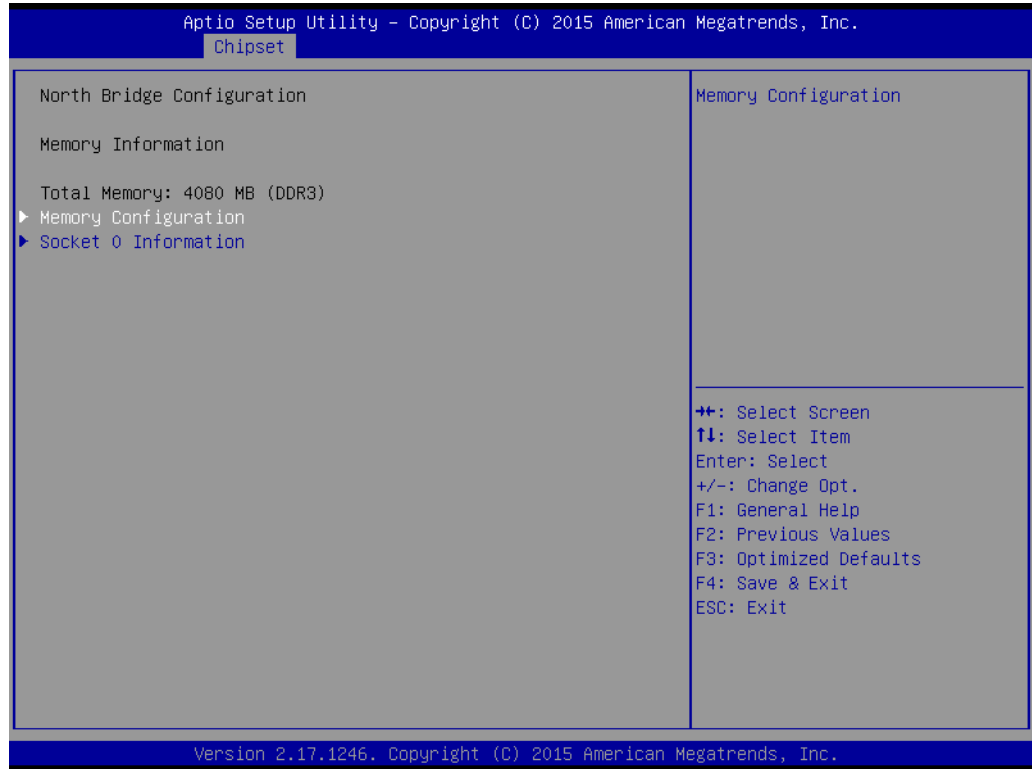


Figure 3.32 North Bridge

■ Memory Configuration

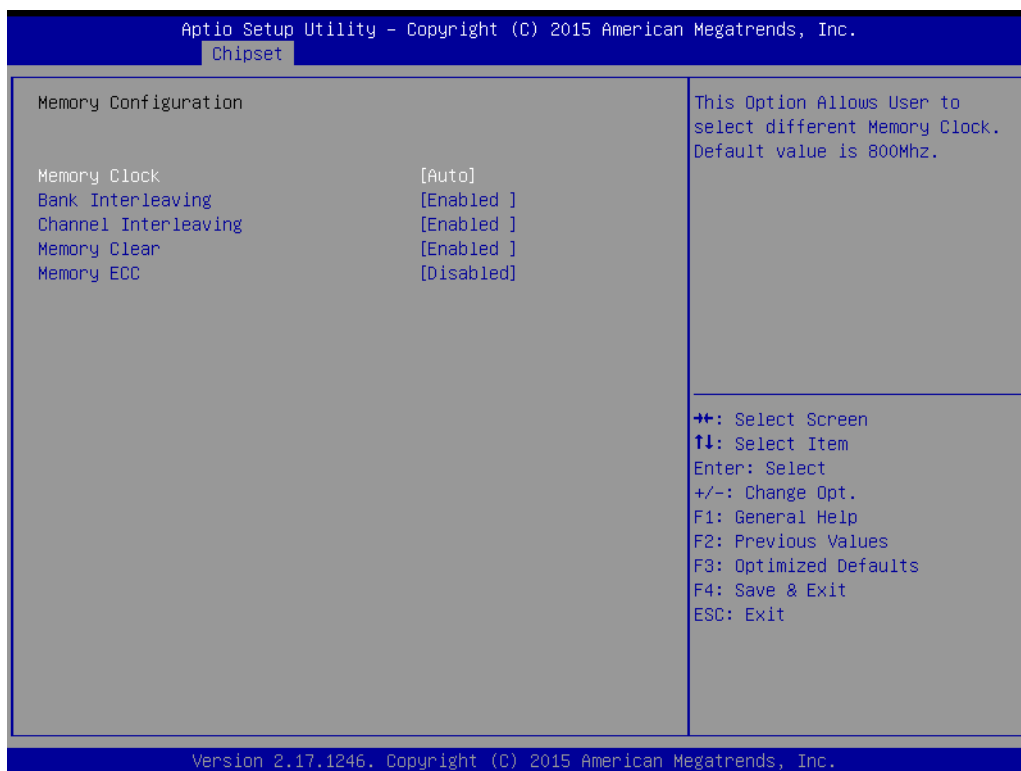


Figure 3.33 Memory configuration

- **Memory Clock**
This option allows users to select different memory clock. Default value is 800Mhz.
- **Bank Interleaving**
This option allows users to enable or disable Bank Interleaving.
- **Channel Interleaving**
This option allows users to enable or disable Channel Interleaving.
- **Memory Clear**
This option allows users to enable or disable Memory Clear function.
- **Memory ECC**
This option allows users to enable or disable memory ECC.

■ Socket 0 Information

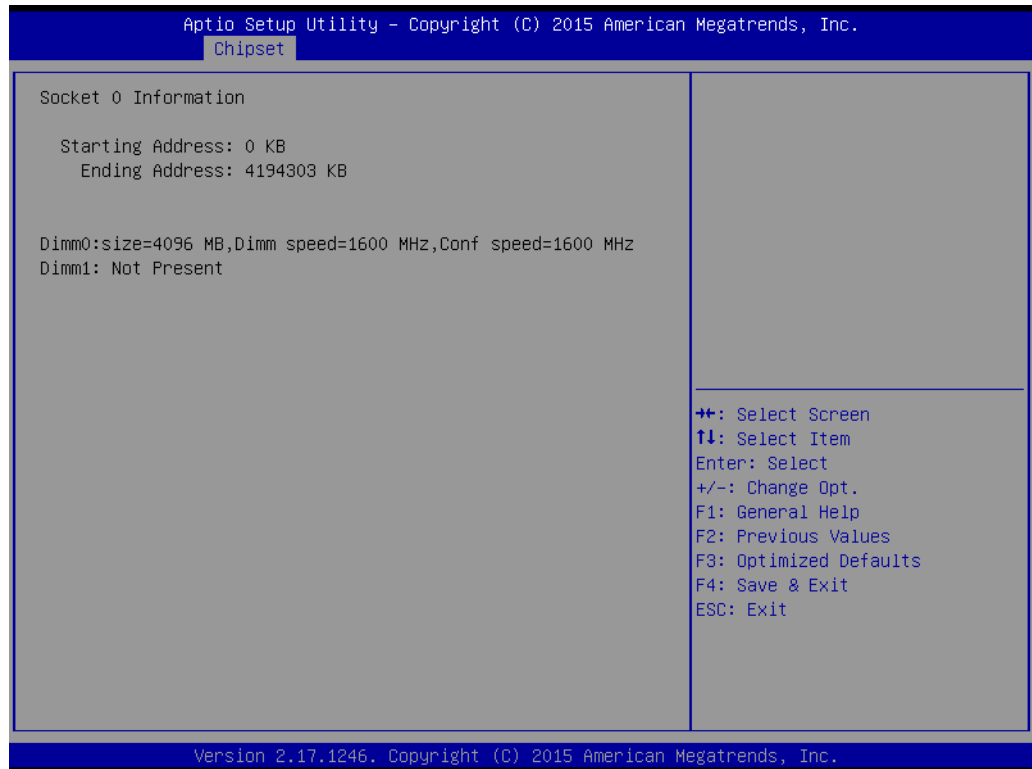


Figure 3.34 Socket 0 information

3.2.4 Boot Settings



Figure 3.35 Boot Setup Utility

- **Setup Prompt Timeout**
This item allows users to select the number of seconds to wait for setup activation key.
- **Bootup NumLock State**
This item allows users to select the Power-on state for Numlock.
- **Quiet Boot**
If this option is set to Disabled, the BIOS displays normal POST messages. If enabled, an OEM Logo is shown instead of POST messages.
- **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.

3.2.4.1 CSM16 parameters

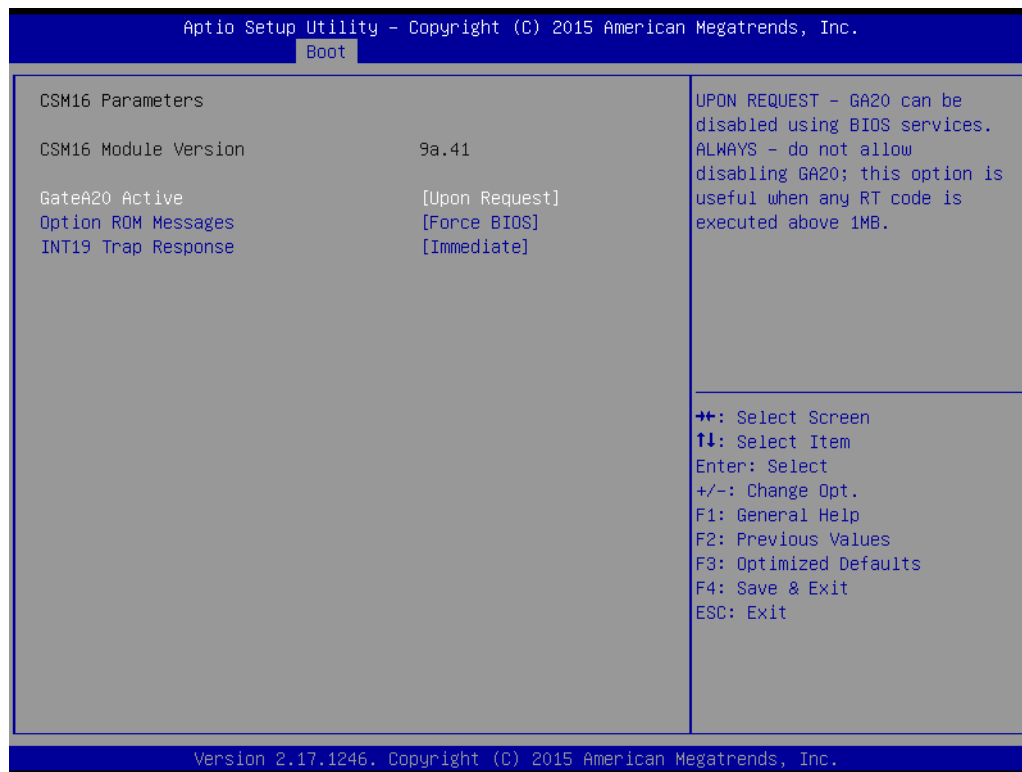


Figure 3.36 CSM16 parameters

- **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**
This item allows users to select option ROM message.
- **InT19 Trap Response**
BIOS reaction on INT19 trapping by Option ROM:
IMMEDIATE – execute the trap right away;
POSTPONED – execute the trap during legacy boot.

3.2.4.2 CSM Parameters

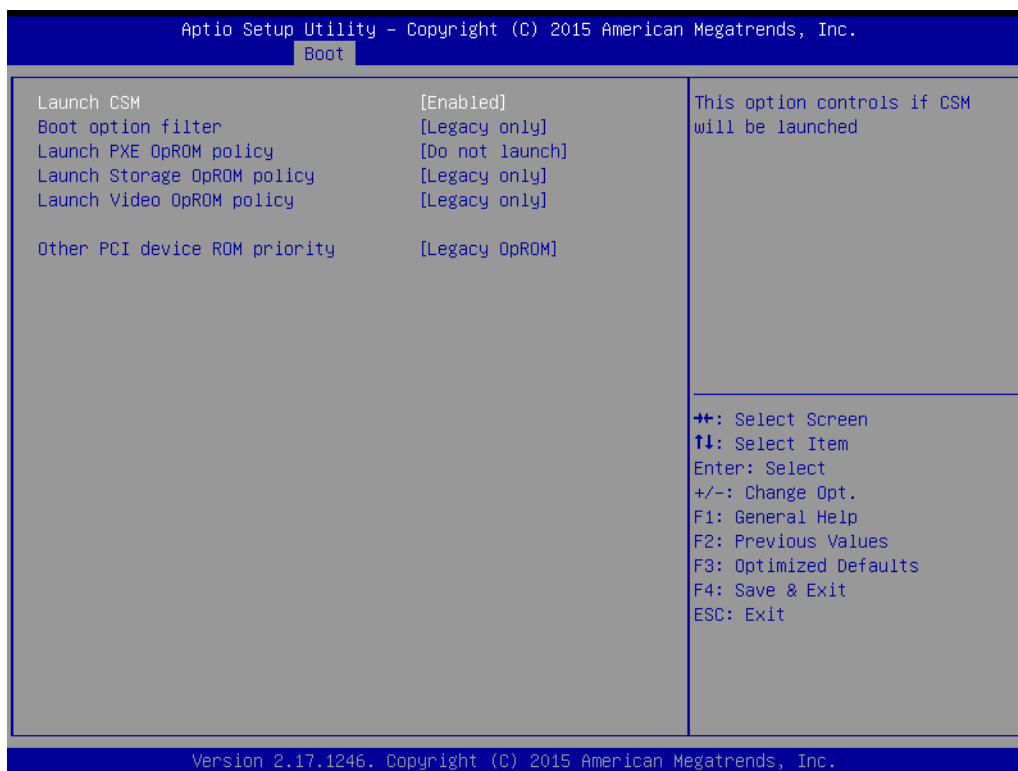


Figure 3.37 CSM parameters

- **Launch CSM**
This option controls if CSM will be launched.
- **Boot option filter**
This option controls what device system can boot to
- **Launch PXE OpROM policy**
This item controls the execution of UEFI and Legacy PXE OpROM.
- **Launch Video OpROM policy**
This item controls the execution of UEFI and legacy Video OpROM.
- **Other PCI device ROM priority**
For PCI devices other than Network, Mass storage or video defines which OpROM to launch.

3.2.5 Security Setup

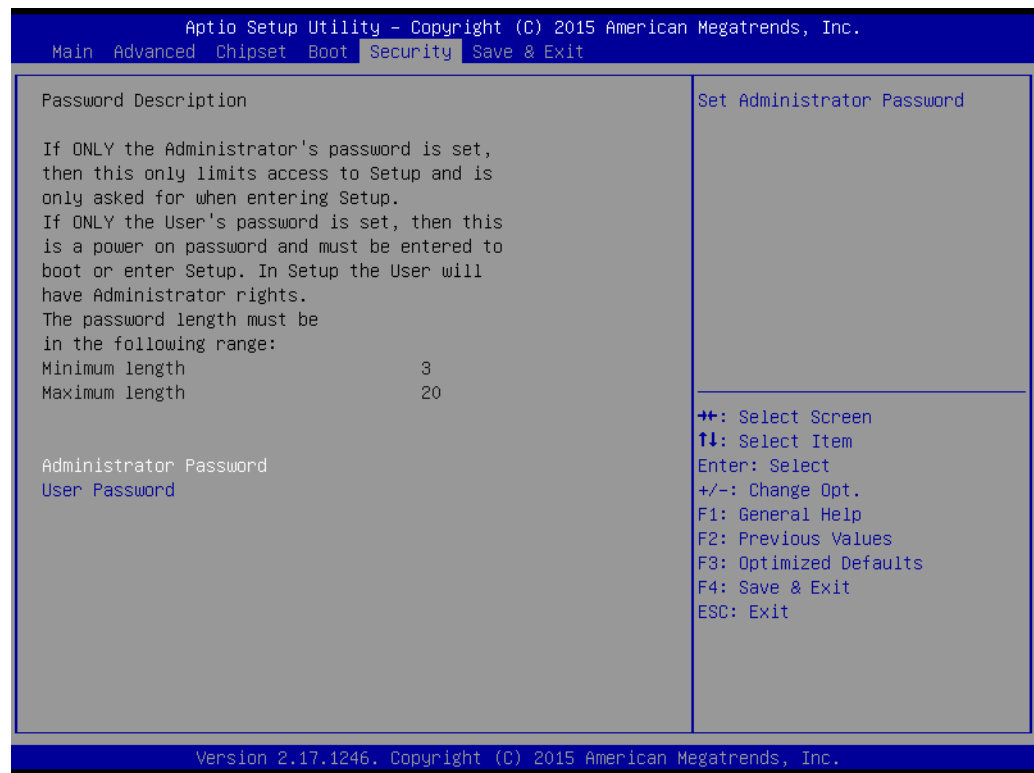


Figure 3.38 Password Description

Select Security Setup from the SOM-5893Setup 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.

3.2.6 Save & Exit

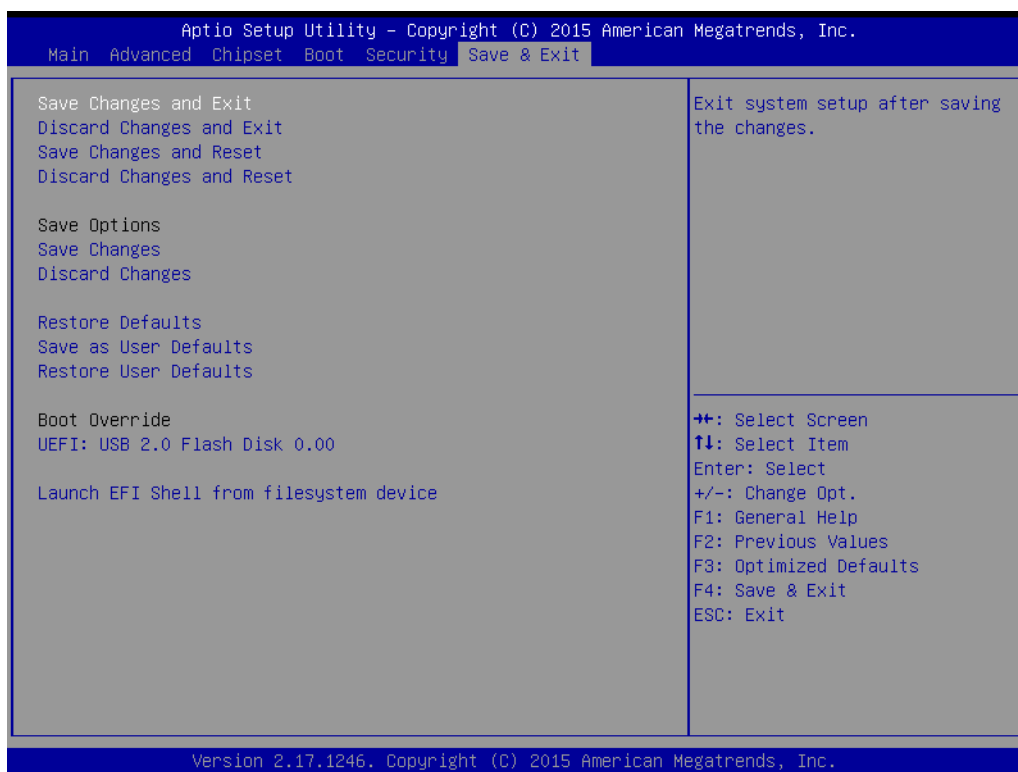


Figure 3.39 Save & Exit

- **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.
- **Discard Changes and Exit**
Select this option to quit Setup without making any permanent changes to the system configuration.
- **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.
- **Discard Changes and Reset**
Select this option to quit Setup without making any permanent changes to the system configuration and reboot the computer.
- **Save Changes**
When users have completed system configuration, select this option to save changes without exit BIOS setup menu.
- **Discard Changes**
Select this option to discard any current changes and load previous system configuration.
- **Restore Defaults**
The SOM-5893 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 partic-

ular, do not use the Optimal Defaults if the user's computer is experiencing system configuration problems.

- **Save as User Defaults**

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

- **Restore User Defaults**

The users can select this option to restore user defaults.

- **Launch EFI Shell from filesystem device**

Attempts to Launch EFI Shell application from one of the available filesystem devices.

Chapter 4

S/W Introduction and Installation

- S/W Introduction
- Driver Installation
- Advantech iManager

4.1 S/W Introduction

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

4.2 Driver Installation

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

4.2.1 Windows 7 Driver Setup

To install the drivers, please connect to the internet and browse the website <http://support.advantech.com.tw> and download the drivers that you want to install and follow Driver Setup instructions to complete the installation.

4.2.2 Other OSs

To install the drivers for Linux or other OSs, please connect to internet and browse the website <http://support.advantech.com.tw> to download the appropriate 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 just as they happen. iManager also comes with a secure & encrypted EEPROM for storing important security key or other customer define information. All the embedded functions are configured through API and provide corresponding utilities to demonstrate. These APIs comply with PICMG EAPI (Embedded Application Programmable Interface) specification and unify in the same structures. It makes these embedded features easier to integrate, speed up developing schedule, and provide the customer's software continuity while upgrade hardware. For more details of how to use the APIs and utilities, please refer to Advantech iManager 2.0 Software API User Manual.

Control



GPIO

General Purpose Input/Output is a flexible parallel interface that allows a variety of custom connections. It allows users to monitor the level of signal input or set the output status to switch on/off a device. Our API also provides Programmable GPIO, which allows developers to dynamically set the GPIO input or output status.



SMBus

SMBus is the System Management Bus defined by Intel® Corporation in 1995. It is used in personal computers and servers for low-speed system management communications. The SMBus API allows a developer to interface a embedded system environment and transfer serial messages using the SMBus protocols, allowing multiple simultaneous device control.



I2C

I2C is a bi-directional two wire bus that was developed by Philips for use in their televisions in the 1980s. The I2C API allows a developer to interface with an embedded system environment and transfer serial messages using the I2C protocols, allowing multiple simultaneous device control.

Display



Brightness Control

The Brightness Control API allows a developer to interface with an embedded device to easily control brightness.



Backlight

The Backlight API allows a developer to control the backlight (screen) on/off in an embedded device.

Monitor



Watchdog

A watchdog timer (WDT) is a device that performs a specific operation after a certain period of time if something goes wrong and the system does not recover on its own. A watchdog timer can be programmed to perform a warm boot (restarting the system) after a certain number of seconds.



Hardware Monitor

The Hardware Monitor (HWM) API is a system health supervision API that inspects certain condition indexes, such as fan speed, temperature and voltage.



Hardware Control

The Hardware Control API allows developers to set the PWM (Pulse Width Modulation) value to adjust fan speed or other devices; it can also be used to adjust the LCD brightness.

Power Saving



CPU Speed

Make use of Intel SpeedStep technology to reduce power power consumption. The system will automatically adjust the CPU Speed depending on system loading.



System Throttling

Refers to a series of methods for reducing power consumption in computers by lowering the clock frequency. These APIs allow the user to lower the clock from 87.5% to 12.5%.

Appendix **A**

Pin Assignment

This appendix gives you the information about the hardware pin assignments of the SOM-5893 CPU computer-on-module.

- SOM-5893 Type 6 Pin Assignments

A.1 SOM-5893 Type 6 Pin Assignments

This section gives SOM-5893 pin assignments on COM Express connector, which are compliant with COMR.0 R2.1 Type 6 pin-out definitions. For more detail about how to use these pins and get design reference, please contact Advantech for the design guide, checklist, reference schematic, and other hardware/software support.

SOM-5893 Row A,B			
A1	GND	B1	GND
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	LPC_DRQ0#
A9	GBE0_MDI1-	B9	LPC_DRQ1#
A10	GBE0_MDI1+	B10	LPC_CLK
A11	GND	B11	GND
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	B21	GND
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	SATA_ACT#	B28	HDA_SDIN2
A29	HDA_SYNC	B29	HDA_SDIN1
A30	HDA_RST#	B30	HDA_SDIN0
A31	GND	B31	GND
A32	HDA_BITCLK	B32	SPKR
A33	HDA_SDOOUT	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	B41	GND
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	B51	GND
A52	PCIE_TX5+	B52	PCIE_RX5+
A53	PCIE_TX5-	B53	PCIE_RX5-
A54	GPIO	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	B60	GND
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	B70	GND
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	B80	GND
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	B86	VCC_5V_SBY
A87	RSVD	B87	VCC_5V_SBY
A88	PCIE0_CK_REF+	B88	BIOS_DIS1#

A89	PCIE0_CK_REF-	B89	VGA_RED
A90	GND	B90	GND
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	PP_TPM	B96	VGA_I2C_DAT
A97	TYPE10#	B97	SPI_CS#
A98	RS1_TX	B98	RSVD
A99	RS1_RX	B99	RSVD
A100	GND	B100	GND
A101	RS2_TX	B101	FAN_PWMOUT
A102	RS2_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	B110	GND

SOM-5893 Row C,D

C1	GND	D1	GND
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	D11	GND
C12	USB_SSRX3-	D12	USB_SSTX3-
C13	USB_SSRX3+	D13	USB_SSTX3+
C14	GND	D14	GND
C15	DDI1_PAIR6+	D15	DDI1_AUX+
C16	DDI1_PAIR6-	D16	DDI1_AUX-
C17	RSVD	D17	RSVD
C18	RSVD	D18	RSVD
C19	PCIE_RX6+	D19	PCIE_TX6+
C20	PCIE_RX6-	D20	PCIE_TX6-
C21	GND	D21	GND
C22	PCIE_RX7+	D22	PCIE_TX7+
C23	PCIE_RX7-	D23	PCIE_TX7-
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	D31	GND
C32	DDI2_CTRLCLK_AUX+	D32	DDI1_PAIR2+
C33	DDI2_CTRLCLK_AUX-	D33	DDI1_PAIR2-
C34	DDI2_DDC_AUX_SEL	D34	DDI1_DDC_AUX_SEL
C35	RSVD	D35	RSVD
C36	DDI3_CTRLCLK_AUX+	D36	DDI1_PAIR3+
C37	DDI3_CTRLCLK_AUX-	D37	DDI1_PAIR3-
C38	DDI3_DDC_AUX_SEL	D38	RSVD
C39	DDI3_PAIR0+	D39	DDI2_PAIR0+
C40	DDI3_PAIR0-	D40	DDI2_PAIR0-
C41	GND	D41	GND
C42	DDI3_PAIR1+	D42	DDI2_PAIR1+
C43	DDI3_PAIR1-	D43	DDI2_PAIR1-
C44	DDI3_HPD	D44	DDI2_HPD
C45	RSVD	D45	RSVD
C46	DDI3_PAIR2+	D46	DDI2_PAIR2+
C47	DDI3_PAIR2-	D47	DDI2_PAIR2-
C48	RSVD	D48	RSVD
C49	DDI3_PAIR3+	D49	DDI2_PAIR3+
C50	DDI3_PAIR3-	D50	DDI2_PAIR3-
C51	GND	D51	GND
C52	PEG_RX0+	D52	PEG_TX0+
C53	PEG_RX0-	D53	PEG_TX0-
C54	TYPE0#	D54	PEG_LANE_RV#
C55	PEG_RX1+	D55	PEG_TX1+
C56	PEG_RX1-	D56	PEG_TX1-
C57	TYPE1#	D57	TYPE2#
C58	PEG_RX2+	D58	PEG_TX2+
C59	PEG_RX2-	D59	PEG_TX2-
C60	GND	D60	GND
C61	PEG_RX3+	D61	PEG_TX3+
C62	PEG_RX3-	D62	PEG_TX3-
C63	RSVD	D63	RSVD
C64	RSVD	D64	RSVD
C65	PEG_RX4+	D65	PEG_TX4+
C66	PEG_RX4-	D66	PEG_TX4-
C67	RSVD	D67	GND
C68	PEG_RX5+	D68	PEG_TX5+
C69	PEG_RX5-	D69	PEG_TX5-
C70	GND	D70	GND
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	RSVD	D77	RSVD
C78	PEG_RX8+	D78	PEG_TX8+
C79	PEG_RX8-	D79	PEG_TX8-
C80	GND	D80	GND
C81	PEG_RX9+	D81	PEG_TX9+
C82	PEG_RX9-	D82	PEG_TX9-
C83	RSVD	D83	RSVD
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	D90	GND
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	RSVD	D97	PEG_ENABLE#
C98	PEG_RX14+	D98	PEG_TX14+
C99	PEG_RX14-	D99	PEG_TX14-
C100	GND	D100	GND
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	D110	GND

Appendix **B**

Watchdog Timer

This appendix gives you the information about the watchdog timer programming on the SOM-5893 CPU computer-on-module.

■ 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 selects an available IRQ number from BIOS, and then sets to EC. Only Win XP, Win7 and Win8 support it. In other OSs, it will still use an IRQ number from BIOS setting as usual.

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

Appendix **C**

Programming GPIO

This Appendix gives an illustration of General Purpose Input and Output pin settings.

- 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 information about the system resource allocations on the SOM-5893 CPU computer-on-module.

- 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
0x000003F8-0x000003FF	Communications Port (COM1)
0x000002F8-0x000002FF	Communications Port (COM2)
0x000003E8-0x000003EF	Communications Port (COM3)
0x00000062-0x00000062	Microsoft ACPI-Compliant Embedded Controller
0x000002E8-0x000002EF	Communications Port (COM4)
0x00000061-0x00000061	System speaker
0x00000060-0x00000060	Standard PS/2 Keyboard
0x00000064-0x00000064	Standard PS/2 Keyboard
0x00000000-0x000003AF	PCI bus
0x00000000-0x000003AF	Motherboard resources
0x00000000-0x000003AF	Direct memory access controller
0x000003E0-0x00000CF7	PCI bus
0x000003B0-0x000003DF	PCI bus
0x000003B0-0x000003DF	AMD Radeon(TM) R7 Graphics
0x00000D00-0x0000FFFF	PCI bus
0x00000070-0x00000071	System CMOS/real time clock
0x0000F000-0x0000F0FF	AMD Radeon(TM) R7 Graphics
0x000003C0-0x000003DF	AMD Radeon(TM) R7 Graphics
0x00000020-0x00000021	Programmable interrupt controller
0x000000A0-0x000000A1	Programmable interrupt controller
0x00000010-0x0000001F	Motherboard resources
0x00000022-0x0000003F	Motherboard resources
0x00000044-0x0000005F	Motherboard resources
0x00000072-0x0000007F	Motherboard resources
0x00000080-0x00000080	Motherboard resources
0x00000084-0x00000086	Motherboard resources
0x00000088-0x00000088	Motherboard resources
0x0000008C-0x0000008E	Motherboard resources
0x00000090-0x0000009F	Motherboard resources
0x000000A2-0x000000BF	Motherboard resources
0x000000E0-0x000000EF	Motherboard resources
0x000004D0-0x000004D1	Motherboard resources
0x0000E000-0x0000EFFF	PCI Express standard Root Por
0x0000F190-0x0000F197	AMD SATA Controller
0x0000F180-0x0000F183	AMD SATA Controller
0x0000F170-0x0000F177	AMD SATA Controller
0x0000F160-0x0000F163	AMD SATA Controller
0x0000F150-0x0000F15F	AMD SATA Controller
0x00000040-0x00000043	System timer
0x0000029C-0x0000029D	Motherboard resources
0x0000D000-0x0000DFFF	PCI Express standard Root Port
0x00000063-0x00000063	Motherboard resources
0x00000065-0x00000065	Motherboard resources

Table D.1: System I/O ports	
0x00000067-0x0000006F	Motherboard resources
0x00000067-0x0000006F	Motherboard resources
0x0000040B-0x0000040B	Motherboard resources
0x000004D6-0x000004D6	Motherboard resources
0x00000C00-0x00000C01	Motherboard resources
0x00000C14-0x00000C14	Motherboard resources
0x00000C50-0x00000C51	Motherboard resources
0x00000C52-0x00000C52	Motherboard resources
0x00000C6C-0x00000C6C	Motherboard resources
0x00000C6F-0x00000C6F	Motherboard resources
0x00000CD0-0x00000CD1	Motherboard resources
0x00000CD2-0x00000CD3	Motherboard resources
0x00000CD4-0x00000CD5	Motherboard resources
0x00000CD6-0x00000CD7	Motherboard resources
0x00000CD8-0x00000CDF	Motherboard resources
0x00000800-0x0000089F	Motherboard resources
0x00000B20-0x00000B3F	Motherboard resources
0x00000900-0x0000090F	Motherboard resources
0x00000910-0x0000091F	Motherboard resources
0x0000FE00-0x0000FEFE	Motherboard resources
0x000001F0-0x000001F7	ATA Channel 0
0x000003F6-0x000003F6	ATA Channel 0
0x00000081-0x00000083	Direct memory access controller
0x00000087-0x00000087	Direct memory access controller
0x00000089-0x0000008B	Direct memory access controller
0x0000008F-0x0000008F	Direct memory access controller
0x000000C0-0x000000DF	Direct memory access controller
0x0000C000-0x0000CFFF	PCI Express standard Root Port
0x00000170-0x00000177	ATA Channel 1
0x00000376-0x00000376	ATA Channel 1
0x0000F100-0x0000F10F	AMD PCI IDE Controller
0x00000378-0x0000037F	ECP Printer Port (LPT1)
0x00000778-0x0000077F	ECP Printer Port (LPT1)
0x000000F0-0x000000FF	Numeric data processor

D.2 DMA Channel Assignments

Table D.2: DMA channel assignments

Channel	Function
3	ECP 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 7	SUSI4 Driver
IRQ 8	High precision event timer
IRQ 10	Communications Port (COM4)
IRQ 11	Communications Port (COM3)
IRQ 12	PS/2 Compatible Mouse
IRQ 13	Numeric data processor
IRQ 14	ATA Channel 0
IRQ 15	ATA Channel 1
IRQ 16	SDA Standard Compliant SD Host Controller & High Definition Audio Controller
IRQ 17	Standard Enhanced PCI to USB Host Controller
IRQ 18	Standard OpenHCD USB Host Controller
IRQ 19	AMD SATA Controller
IRQ 27	High Definition Audio Controller

D.4 1st MB Memory Map

Table D.4: 1st MB Memory Map

Addr. range (Hex)	Device
0xFEB68000-0xFEB69FFF	AMD USB 3.0 Host Controller
0xFEB71000-0xFEB71FFF	Standard OpenHCD USB Host Controller
0xFEB60000-0xFEB63FFF	High Definition Audio Controller
0xFEB6F000-0xFEB6FFFF	Standard OpenHCD USB Host Controller
0xFEAA0000-0xFEAA1FFF	Intel(R) I211 Gigabit Network Connection
0xFEAA0000-0xFEAA1FFF	PCI Express standard Root Port
0xFEAA20000-0xFEAA23FFF	Intel(R) I211 Gigabit Network Connection
0xA0000-0xBFFFF	PCI bus
0xA0000-0xBFFFF	AMD Radeon(TM) R7 Graphics
0xC0000-0xDFFFF	PCI bus
0x90000000-0xFED3FFFF	PCI bus
0x90000000-0xFED3FFFF	AMD Radeon(TM) R7 Graphics
0xFED45000-0xFFFFFFFF	PCI bus
0xFEB6D000-0xFEB6DFFF	Standard OpenHCD USB Host Controller
0xA0000000-0xA07FFFFF	AMD Radeon(TM) R7 Graphics
0xFEB00000-0xFEB3FFFF	AMD Radeon(TM) R7 Graphics
0xE0000000-0xFFFFFFFF	System board
0xFE000000-0xFE9FFFFF	PCI Express standard Root Port
0xC0800000-0xD07FFFFF	PCI Express standard Root Port
0xFEB72000-0xFEB727FF	AMD SATA Controller
0x70000000-0x8FFFFFFF	Motherboard resources
0xFEB80000-0xFEBBFFFF	Motherboard resources
0xFD600000-0xFDFFFFFFF	PCI Express standard Root Port
0xA0800000-0xC07FFFFF	PCI Express standard Root Port
0xFEB70000-0xFEB700FF	Standard Enhanced PCI to USB Host Controller
0xFEC00000-0xFEC00FFF	Motherboard resources
0xFEE00000-0xFEE00FFF	Motherboard resources
0xFED80000-0xFED8FFFF	Motherboard resources
0xFED61000-0xFED70FFF	Motherboard resources
0xFEC10000-0xFEC10FFF	Motherboard resources
0xFF000000-0xFFFFFFFF	Motherboard resources
0xFED00000-0xFED003FF	High precision event timer
0xFEB6C000-0xFEB6C0FF	SDA Standard Compliant SD Host Controller
0xFEB6E000-0xFEB6E0FF	Standard Enhanced PCI to USB Host Controller
0xFEB6A000-0xFEB6BFFF	AMD USB 3.0 Host Controller
0xFEB64000-0xFEB67FFF	High Definition Audio Controller

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