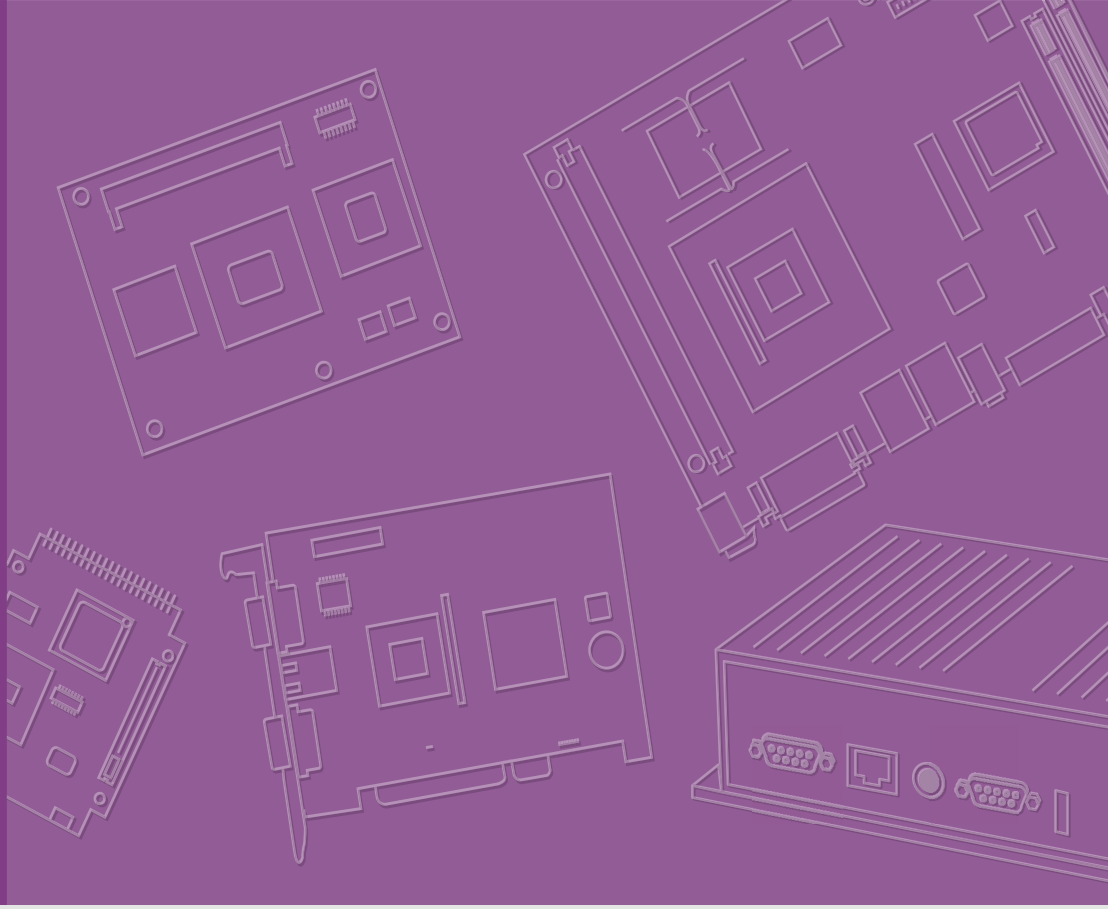

User Manual

SOM-3565

ADVANTECH

Enabling an Intelligent Planet

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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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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

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.

Safety Precautions - Static Electricity

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

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

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Chapter 1

General Information

This chapter gives background information on the SOM-3565 CPU System on Module.

Sections include:

- Introduction
- Specifications

1.1 Introduction

SOM-3565 is a Qseven module with pin-out that fully complies with the R1.20 specification. The new CPU module is built with an Intel Atom processor N2600 which contains an Intel GFX Core GMA3600 and supports full MPEG2, AVC/H.264, and VC-1 HW decode/acceleration. It has an NM10 chipset which supports advance expansion interfaces like PCI Express and I/O interfaces like Serial ATA (SATA) and USB2.0. The Qseven form factor is 70mm x 70mm; SOM-3565 provides a balance of high performance and easy to integrate solution for customer applications via golden finger, a plug-in CPU module on an application-specific customer solution board. With advanced interfaces like PCI Express, SATA, USB 2.0, and HDMI/DVI/DP interfaces, it provides not only high speed/performance but also small pin-count that makes it easy for the user to integrate in to their own system. SOM-3565 offers design partners more choices for their own applications needing higher computing speeds while maintaining a compact form factor.

1.2 Specifications

1.2.1 Board Information

- **Pin Definition:** Qseven standard pin-out definition based on MXM connector
- **Form Factor:** Qseven standard module, 70 x 70 mm

1.2.2 System Information

- **CPU**: Onboard Intel® Atom N2600 processor 1.6GHz, 1MB L2 Cache
- **Chipset**: Intel® NM10 Express Chipset
- **Memory**: Onboard DDR3 800MHz 2GB memory
- **BIOS**: AMI UEFI 16Mbit SPI BIOS
- **Power management**: Supports power saving modes including Normal / Standby / Suspend modes. ACPI 2.0 compliant
- **Expansion interface**: PCI Express x1: 3 ports or 4 ports (BOM option), LPC Bus, SMBus, I2C Bus, SPI

1.2.3 Display

- **Graphic Core**: Intel Atom integrated GMA3600 400MHz, supports DX9, OGL3.0, and MPEG2, AVC/H.264, VC-1 HW decode/acceleration
- **LVDS**: Supports single channel, resolution up to 1366 x 768
- **HDMI/DVI/DP**: Supports 1 port HDMI, DVI, or DP multiplexed (BIOS modification needed).
  Resolution: HDMI/DV up to 1920 x 1200
  DP up to 1600 x 1200
- **Dual Display**: Supports LVDS + HDMI/DVI/DP

1.2.4 Audio Functions

- **Audio Interface:** Intel HD Audio interface

1.2.5 I/O

- **Onboard Flash**: Supports onboard flash 4GB MLC
- **Ethernet**: Intel 82574L Gigabit LAN controller supports 10/100/1000 Mbps Speed

- **SATA**: Supports 1 port, SATAII 300 Gb/s compliant (2 port optional if onboard flash is removed)
- **USB Interface**: Supports 8 ports, USB 2.0
- **Serial Port**: Supports 2 ports
- **Express Card**: 2 ports
- **Panel Control**: Supports panel backlight on/off control, brightness control
- **Thermal Protection**: Supports thermal shutdown or CPU throttling
- **Watchdog Timer**: 65536 level timer interval, from 0~65535 sec, multi-level, multi-option watchdog timer
- **GPIO**: 8 GPIO
- **Hardware Monitor**: Vin, 5VSB, CMOS

1.2.6 iManager

- Refer to Chapter 4

1.2.7 Mechanical and Environmental Specifications

- **Dimensions**: 70 x 70 mm (2.75" x 2.75")
- **Power Type and Supply Voltage**
  ATX: +5V and +5VSB (standby power)
  AT: +5V
- **Power Requirement**:
  Idle: 4.6W
  Max: 6.0W (Burn-in V6.0 Pro)
- **Temperature Specification**
  Operating: 0 ~ 60°C (32 ~ 140°F)
- **Humidity Specification**
  Operating: 40°C@95% relative humidity, non-condensing
  Storage: 60°C@95%relative humidity, non-condensing

Chapter 2

Mechanical Information

This chapter gives mechanical information on the SOM-3565 CPU Q7 Module.

Sections include:

- Board Information
- Mechanical Drawing

2.1 Connectors

2.1.1 Board Connector

The figures below indicate the main chips on the SOM-3565 Q7 Module. Please be aware of these positions when designing a customer carrier board to avoid mechanical upset and thermal solutions for the best thermal optimization.

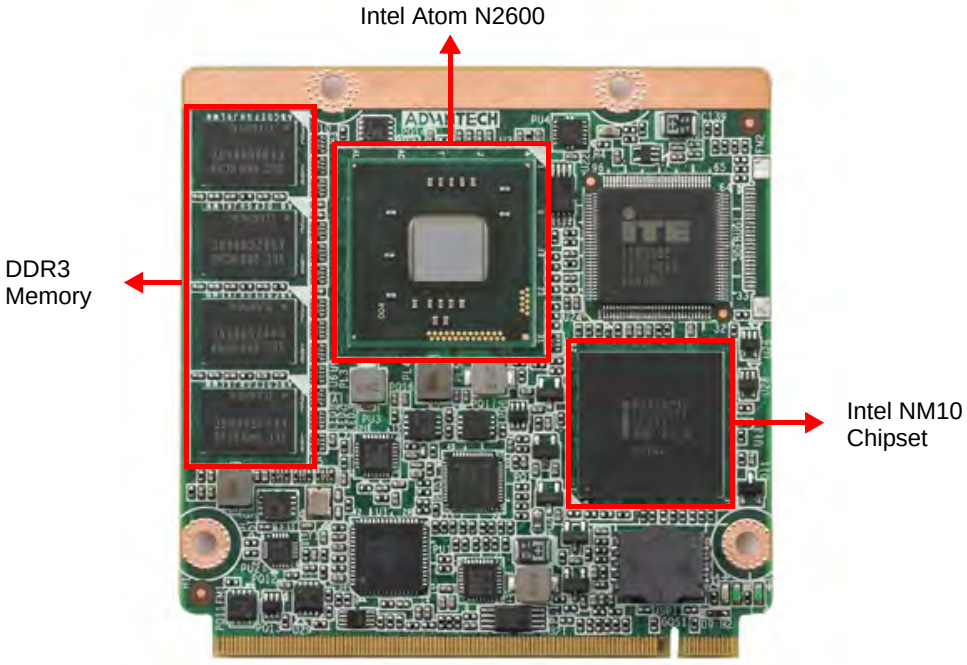

Figure 2.1 Board Chip Placement - Front

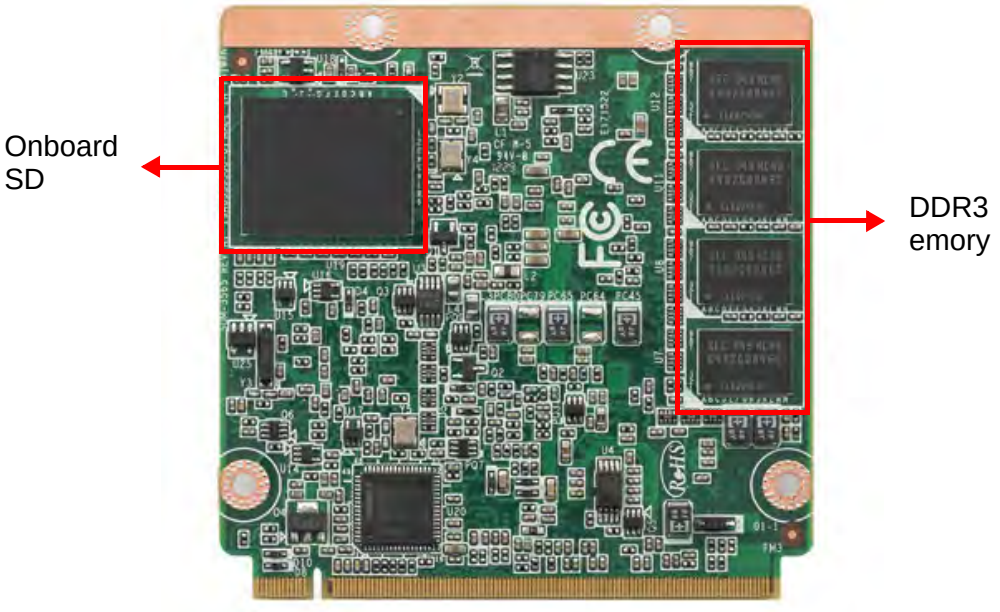

Figure 2.2 Board Chip Placement - Back

2.2 Mechanical Drawings

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

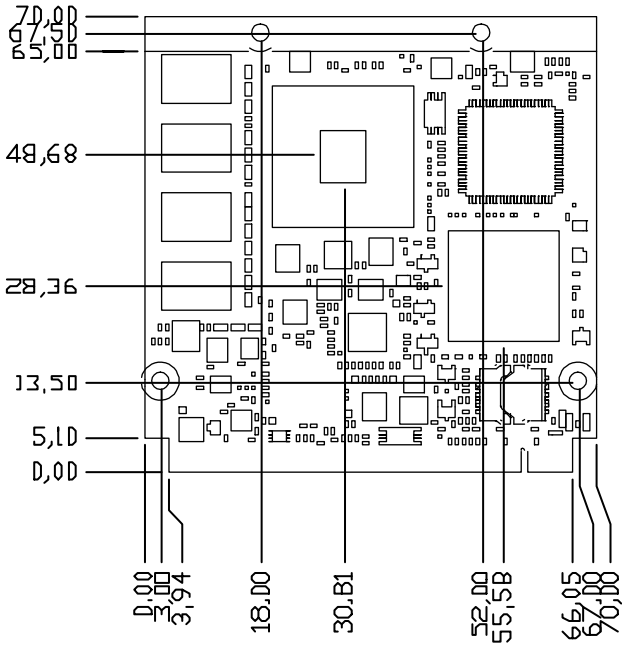

Figure 2.3 Board Mechanical Drawing - Front

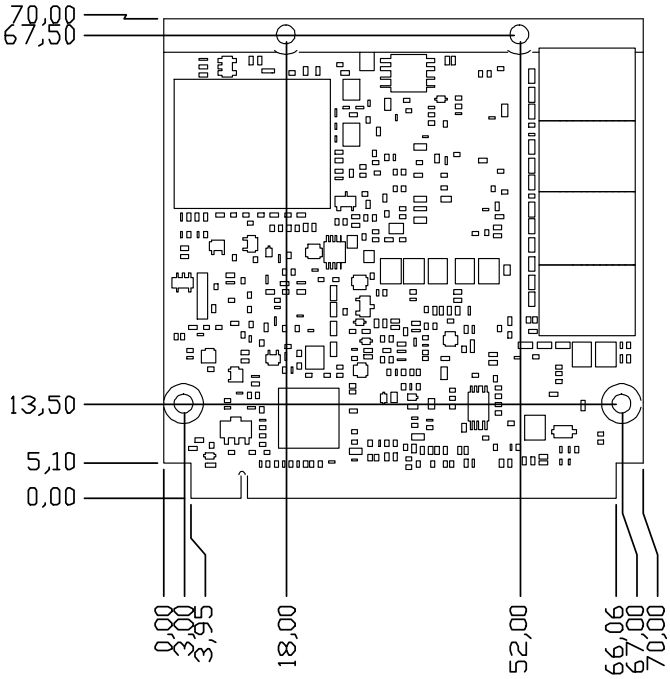

Figure 2.4 Board Mechanical Drawing - Back

Chapter 3

BIOS Setup Information

This chapter gives basic BIOS upgrade and setup information on the SOM-3565 CPU System on Module.

Sections include:

- Safety Precautions
- BIOS Update
- Basic BIOS Setup

AMIBIOS has been integrated into many motherboards over the past decade. With the AMIBIOS Setup program, users can modify BIOS settings and control various system features. This chapter describes the basic navigation of the SOM-3565 BIOS setup screens.

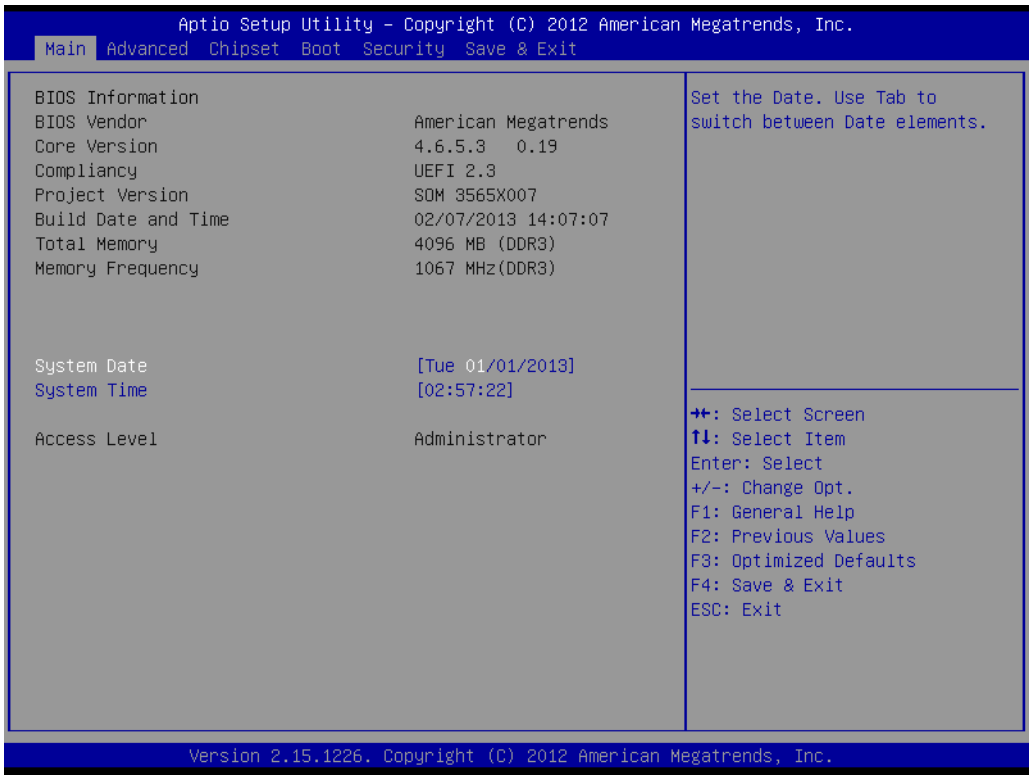

Figure 3.1 Setup Program Initial Screen

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

3.1 Entering Setup

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

3.2 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.

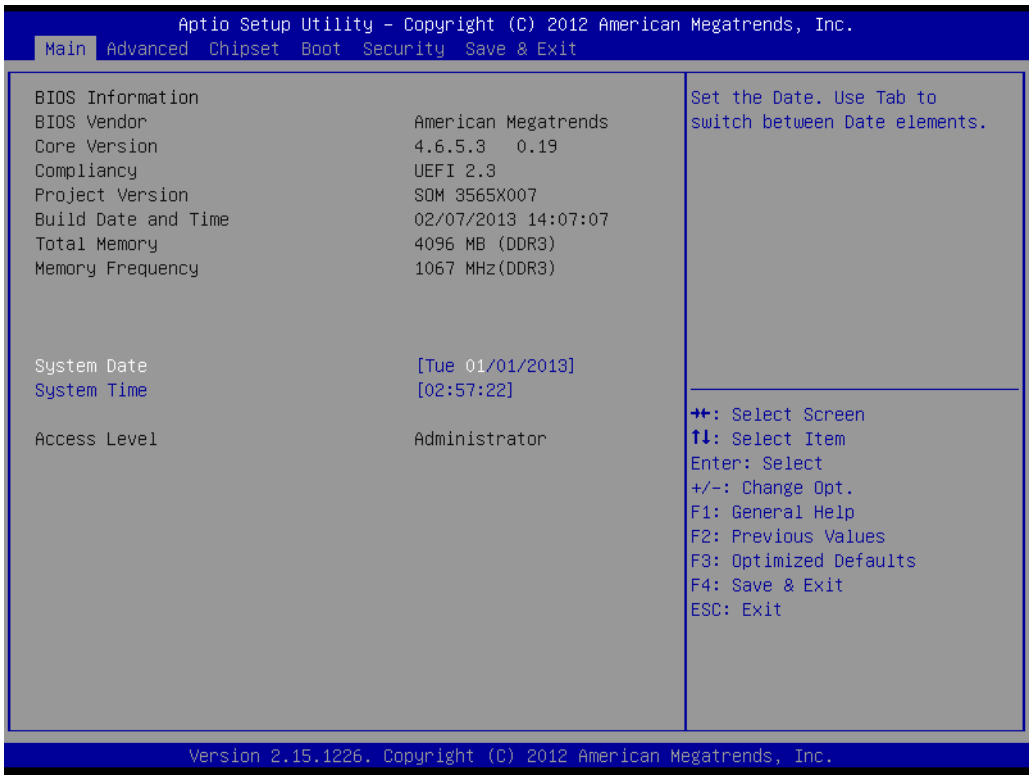

Figure 3.2 Main Setup Screen

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.

3.2.1 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.

3.3 Advanced BIOS Features Setup

Select the Advanced tab from the SOM-3565 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.

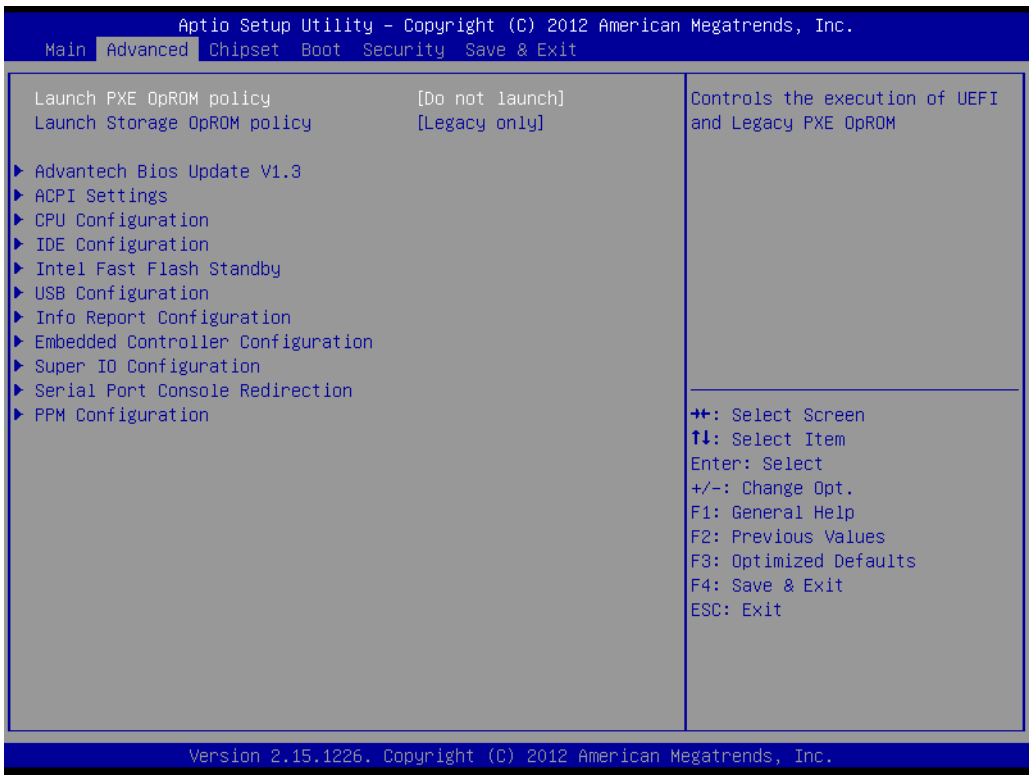

Figure 3.3 Advanced BIOS Features Setup Screen

Launch PXE OpROM

This item allows users to enable or disable launch PXE OpROM if available.

Launch Storage OpROM

This item allows users to enable or disable launch storage OpROM if available.

3.3.1 Advantech Bios Update V1.3

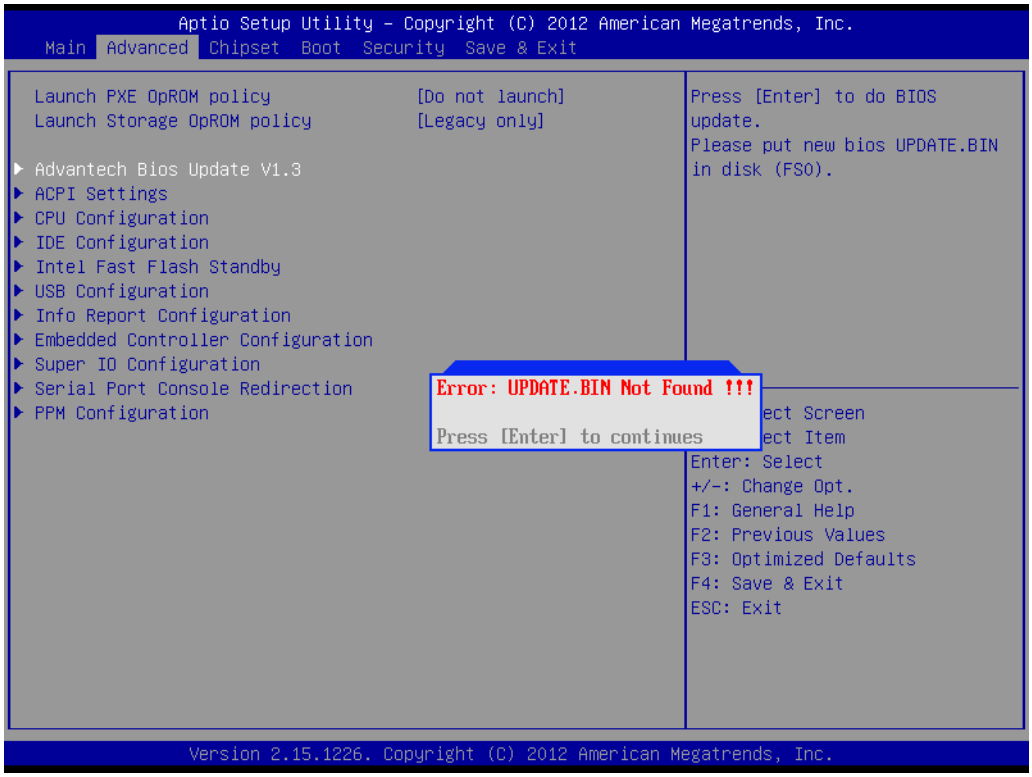

Figure 3.4 Advantech Bios Update V1.3

Advantech Bios Update V1.3

Press [Enter] to perform BIOS update.

Please put new bios UPDATE.BIN in disk(FS0).

3.3.2 ACPI Settings

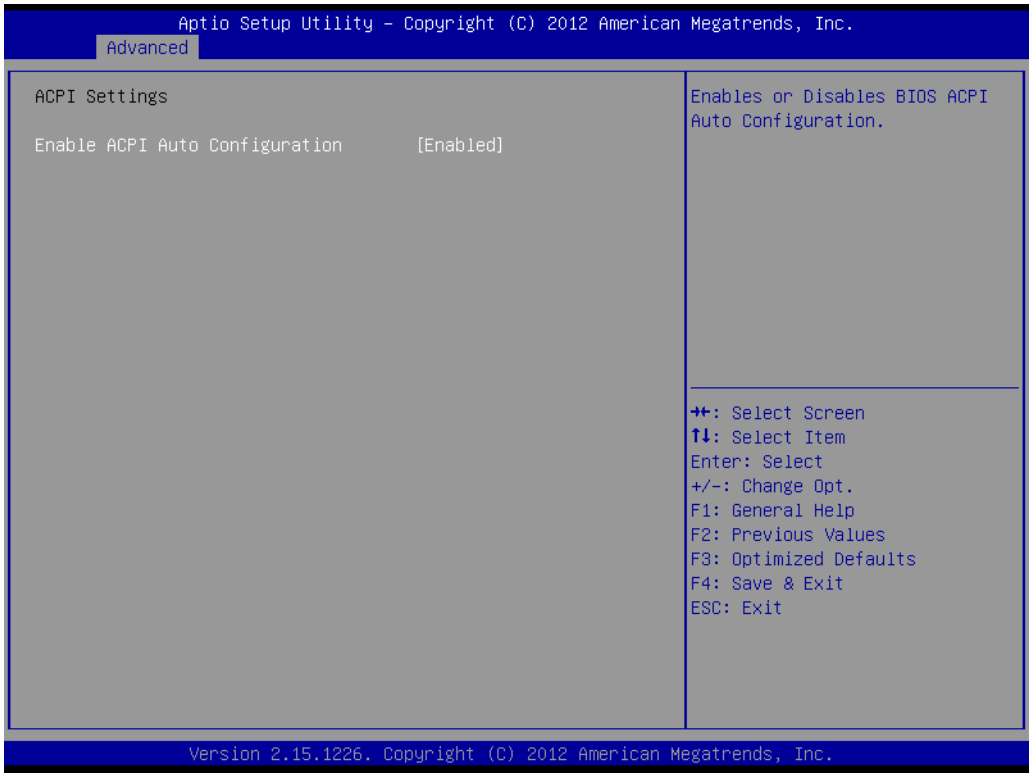

Figure 3.5 ACPI Settings

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 hibernation.

ACPI Sleep State

This item allows users to set the ACPI sleep state.

Lock Legacy Resources

This item allows users to lock legacy device resources.

S3 Video Repost

Enable or Disable S3 Video Repost.

3.3.3 CPU Configuration

Figure 3.6 Super I/O Configuration

Hyper Threading Technology

This item allows users to enable or disable Intel Hyper Threading technology.

Limit CPUID Maximum

This item allows users to limit the maximum value of CPUID.

Execute Disable Bit

This item allows users to enable or disable the No-Execution page Protection technology.

3.3.4 SATA Configuration

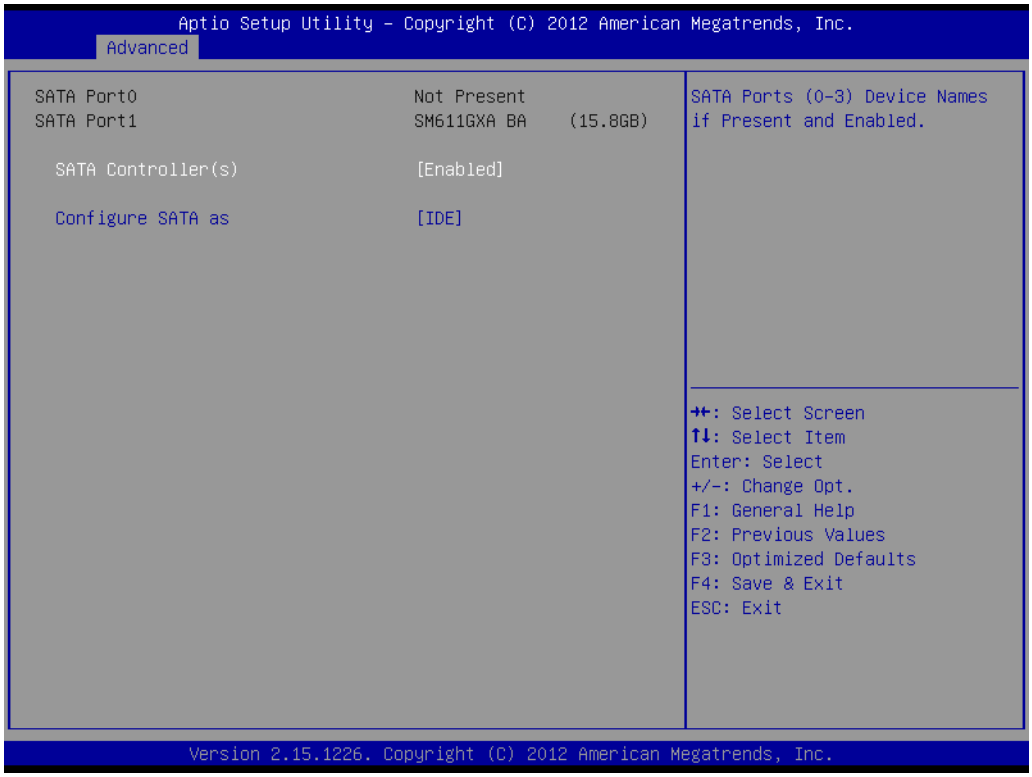

Figure 3.7 SATA Configuration

SATA Controller(s)

This item allows users to enable or disable the SATA controller(s).

SATA Mode Selection

This item allows users to select mode of SATA controller(s).

3.3.5 Intel Fast Flash Standy

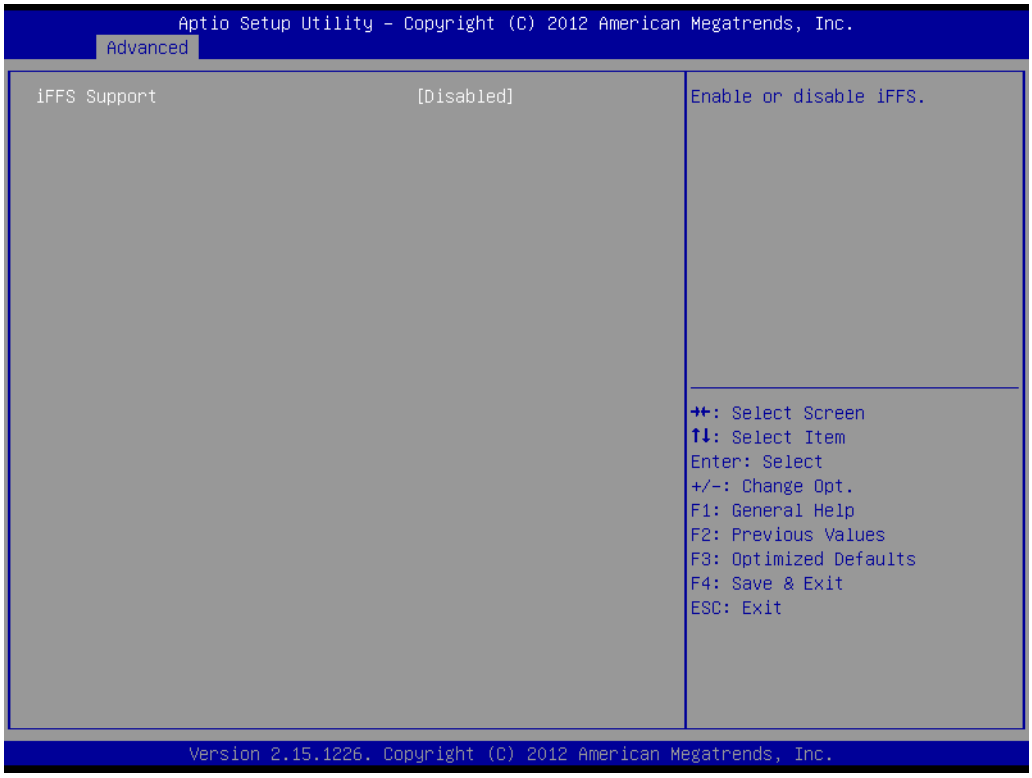

Figure 3.8 Intel Fast Flash Standy

iFFS Support

Enable or disable IFFS function.

3.3.6 USB Configuration

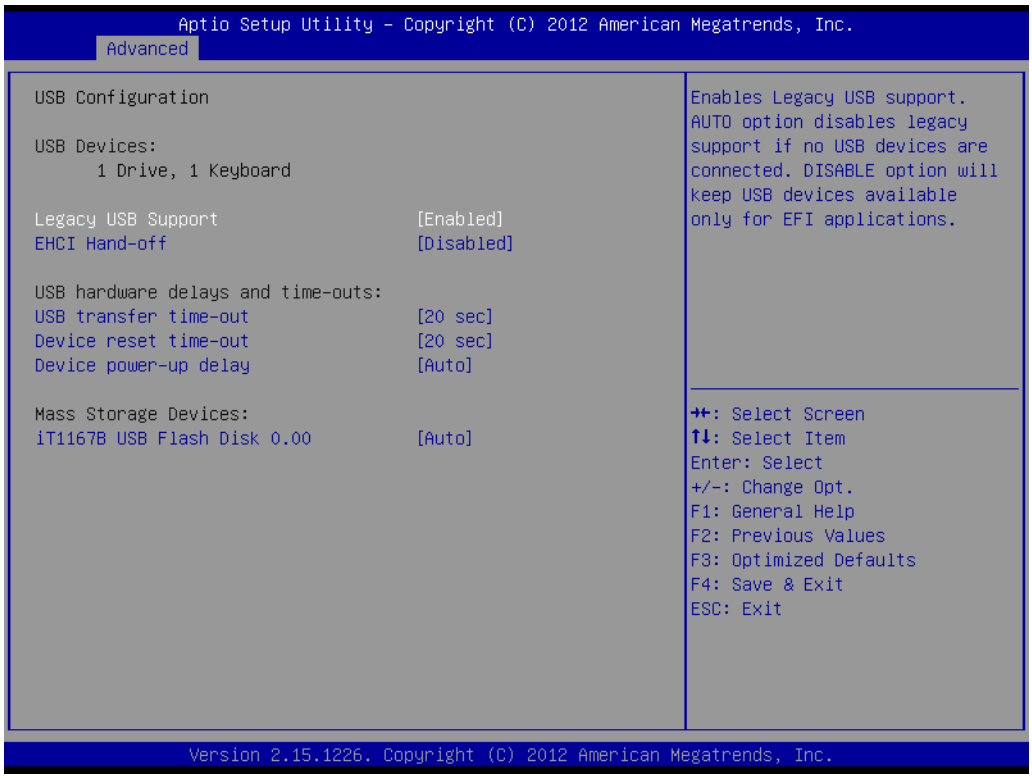

Figure 3.9 USB Configuration

Legacy USB Support

Enable support for legacy USB. Auto option disables legacy support if no USB devices are connected.

EHCI Hand-Off

This is a workaround for the OS without EHCI hand-off support. The EHCI ownership change should claim by EHCI driver.

USB Transfer Time-out

Set the time-out value for Control, Bulk, and Interrupt transfers.

Device Reset Time-out

Set USB mass storage device Start Unit command time-out value.

Device Power-up Delay

Set 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 100 ms, for a Hub port the delay is taken from Hub descriptor.

3.3.7 Embedded Controller Configuration

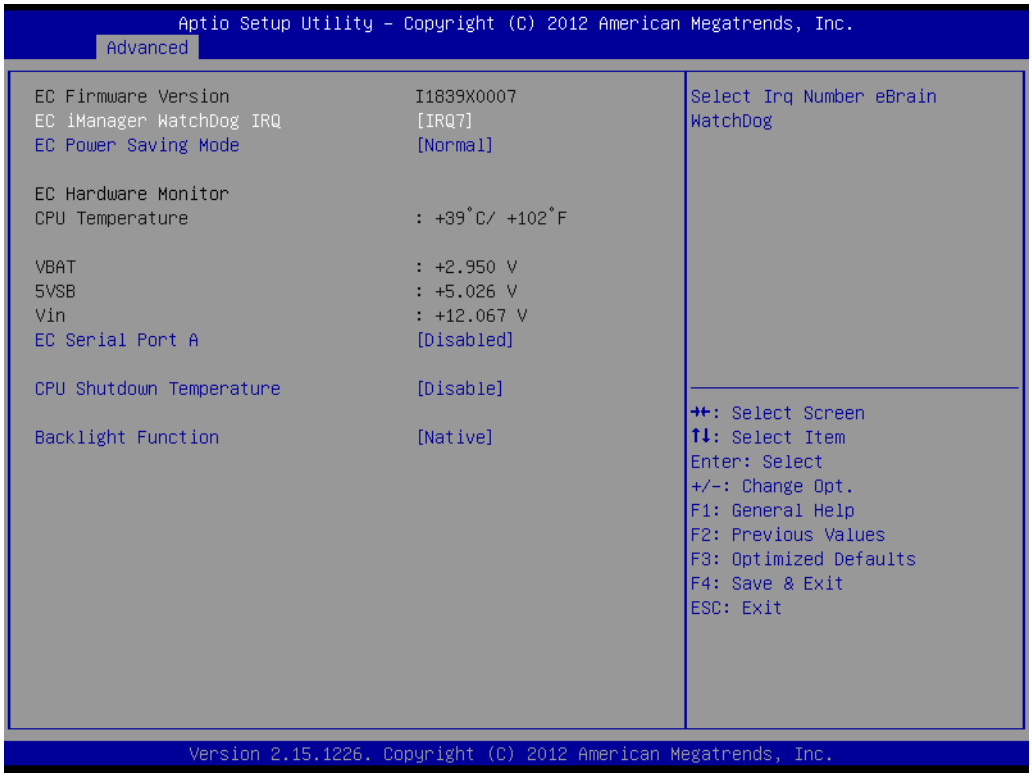

Figure 3.10 Embedded Controller Configuration

EC iManager WatchDog IRQ

This item allows users to set the irq number of EC watchdog.

EC Power Saving Mode

This item allows users to set board's power saving mode when off.

CPU Shutdown Temperature

This item allows users to set the value of CPU shutdown temperature.

EC iManager Smart FAN

This item allows users to enable or disable smart FAN feature.

Backlight Function

This item allows users to set backlight enable polarity.

3.3.8 SuperIO Configuration

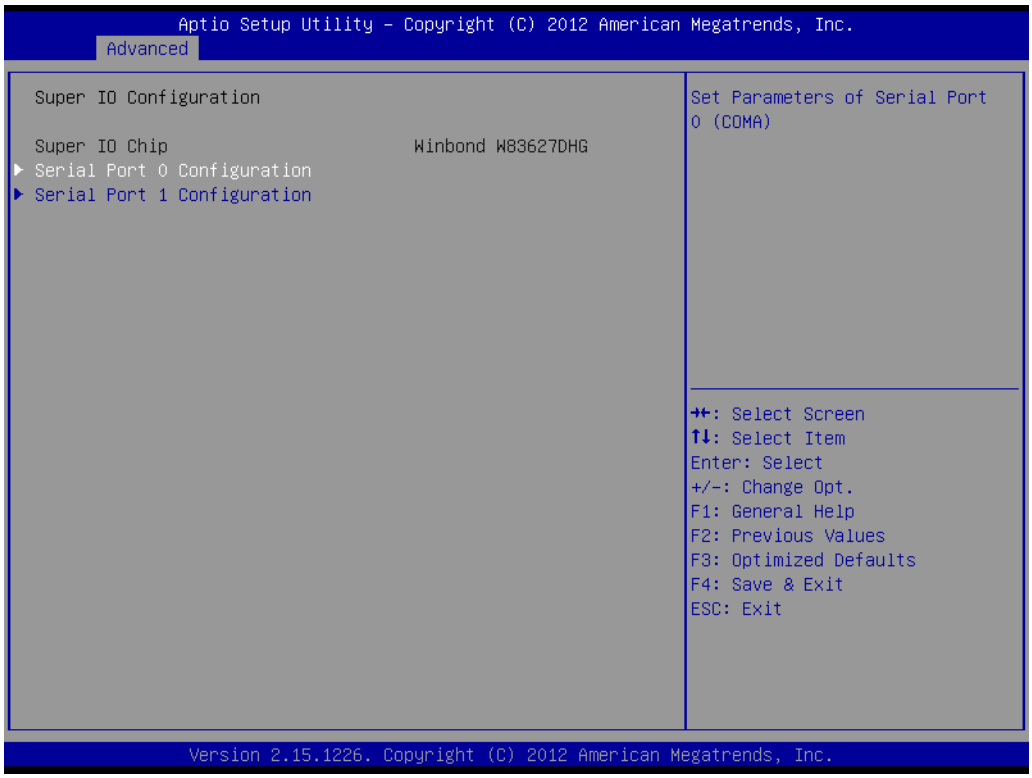

Figure 3.11 SuperIO Configuration

Serial Port 0 Configuration

This item allows users to configure serial port 0.

Serial Port 1 Configuration

This item allows users to configure serial port 1.

Parallel Port Configuration

This item allows users to configure the parallel port.

3.3.9 Serial Port Console Redirection

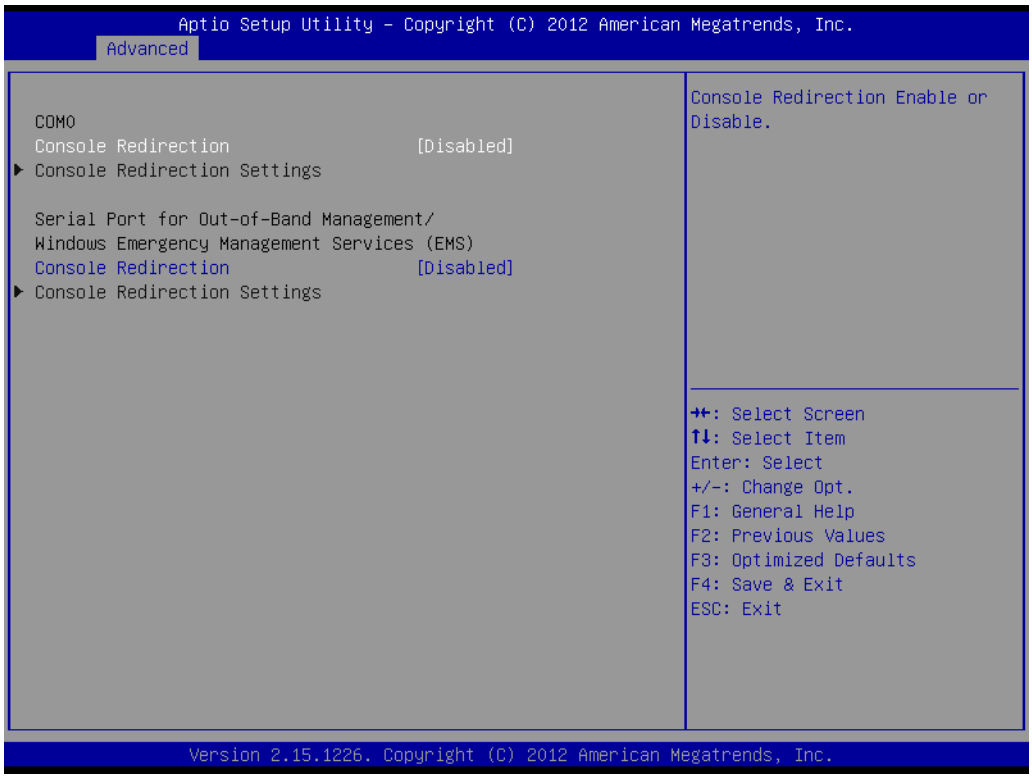

Figure 3.12 Serial Port Console Redirection

Console Redirection (COM0)

Console Redirection Enable or Disable.

Console Redirection Settings

The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

Console Redirection (EMS)

Console Redirection Enable or Disable.

Console Redirection Settings

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

3.3.10 PPM Configuration

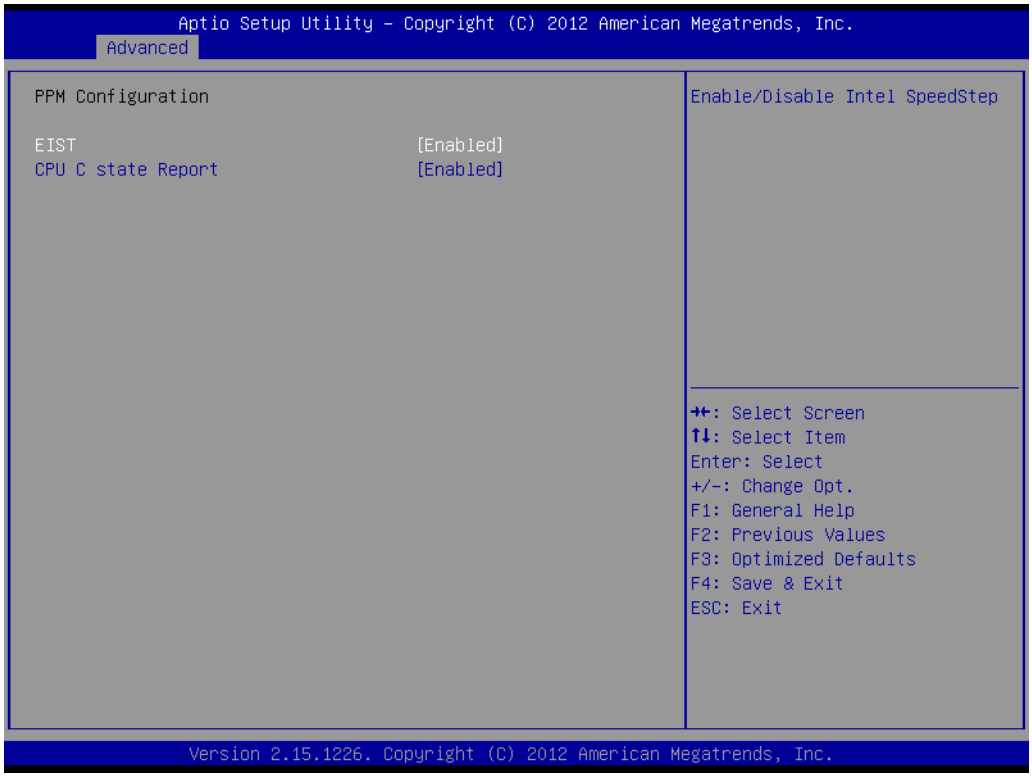

Figure 3.13 PPM Configuration

EIST

CPU runs at its default speed if disabled; CPU speed is controlled by the operating system if enabled.

CPU C state Report

This item allows users to enable or disable CPU C-state support.

3.4 Chipset

Select the Chipset tab from the SOM-3565 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.

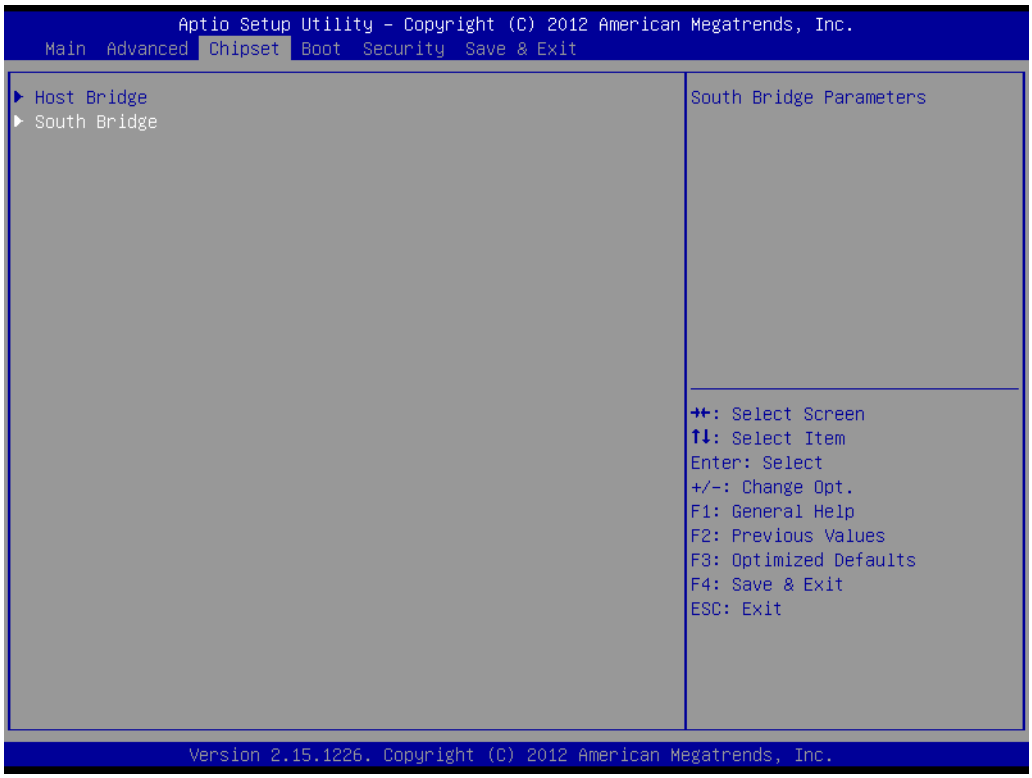

Figure 3.14 Chipset Setup

3.4.1 Intel IGD Configuration

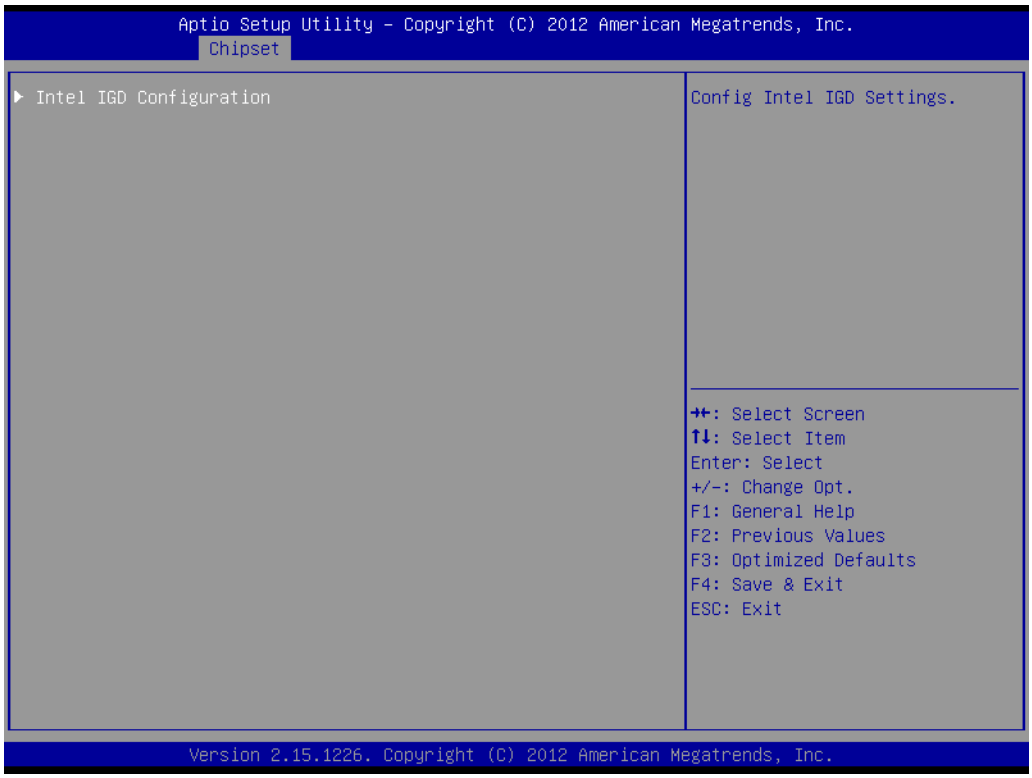

Figure 3.15 Intel IGD Configuration

Intel IGD Configuration

Config Intel IGD Settings.

3.4.1.1 Intel IGD Configuration

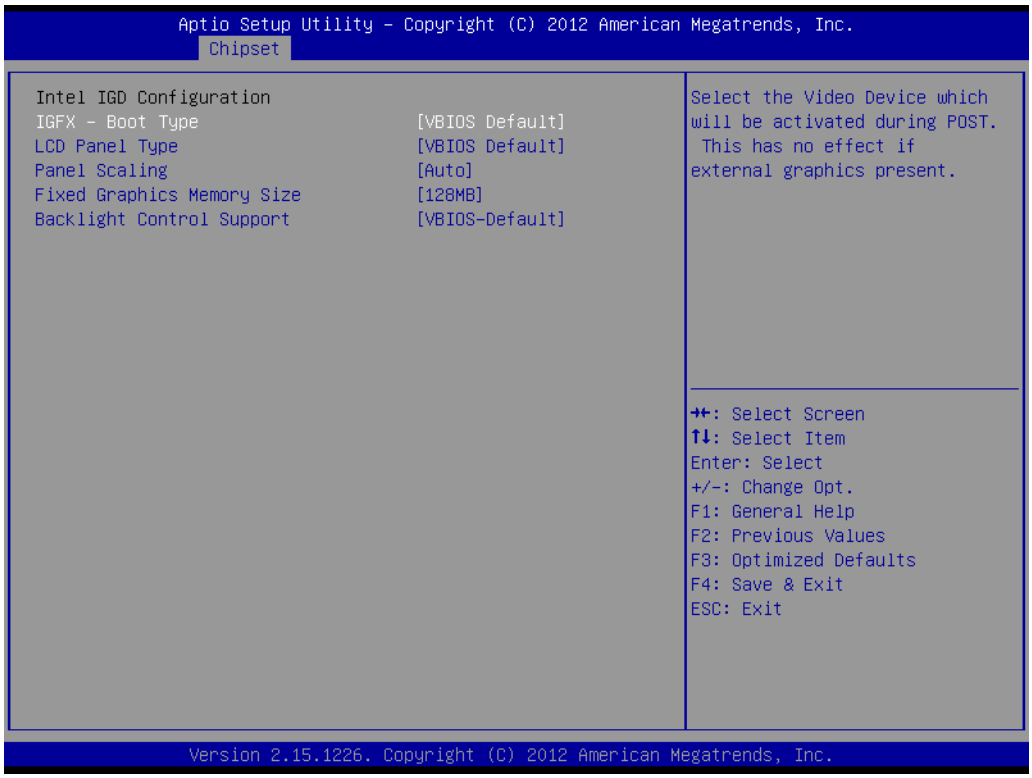

Figure 3.16 Intel IGD Configuration

IGFX - Boot Type

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

LCD Panel Type

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

Panel Scaling

Select the LCD panel scaling option used by the Internal Graphics Device.

Fixed Graphics Memory Size

Configure Fixed Graphics Memory Size

Backlight Control Support

Backlight Control Configuration

3.4.1.2 South Bridge

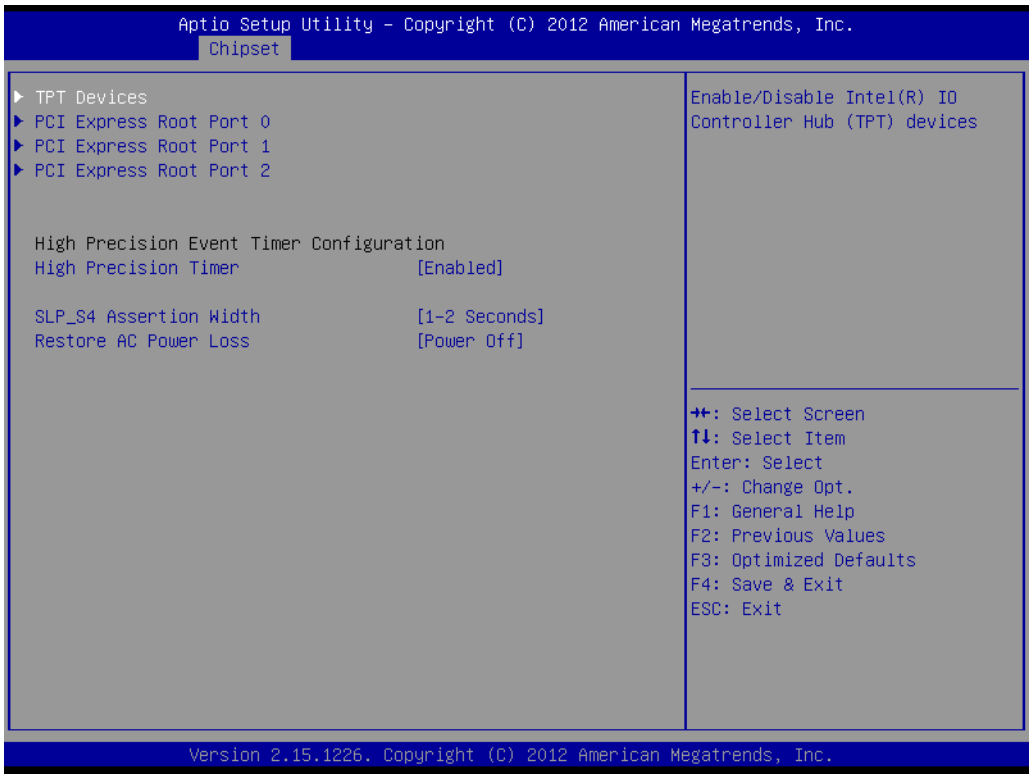

Figure 3.17 South Bridge

TPT Devices

Enable/Disable Intel(R) IO Controller Hub (TPT) devices.

PCI Express Root Port 0

PCI Express Root Port 0 Settings.

PCI Express Root Port 1

PCI Express Root Port 1 Settings.

PCI Express Root Port 2

PCI Express Root Port 2 Settings.

High Precision Timer

Enable or Disable the High Precision Event Timer.

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.

TPT Devices

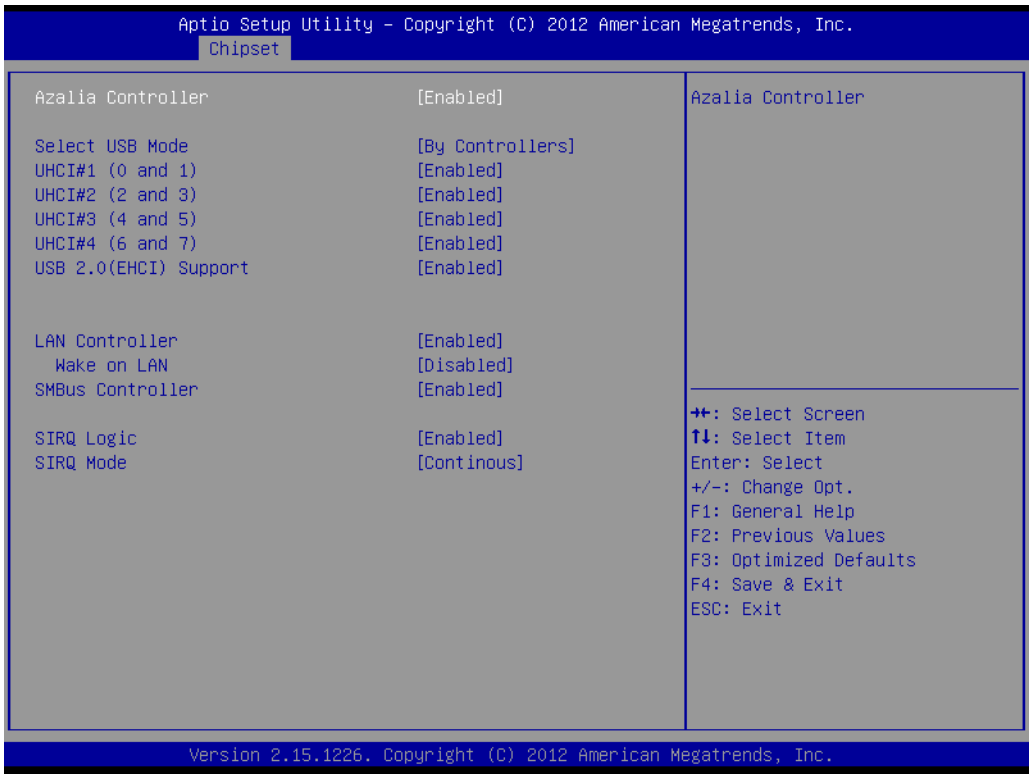

Figure 3.18 TPT Devices

Azalia Controller

Azalia Controller Enable/Disable

Select USB Mode

Select USB mode to control USB ports.

UHCI#1 (0 and 1) / UHCI#2 (2 and 3) / UHCI#3 (4 and 5) / UHCI#4 (6 and 7)

Control the USB UHCI (USB 1.1) functions.\n\nDisable from highest to lowest controller.

USB 2.0(EHCI) Support

Enable or Disable USB 2.0 (EHCI) Support.

LAN Controller

Enable or Disable OnChip NIC Controller.

Wake on LAN

Enable or disable PCIE LAN to wake the system.

SMBus Controller

Enable or Disable OnChip SMBus Controller.

SIRQ Logic

Enable or Disable SIRQ logic.

SIRQ Mode

Set SIRQ mode.

Debug Port 80

Show Debug Port 80 from PCI or LPC

PCI Express Root Port 0

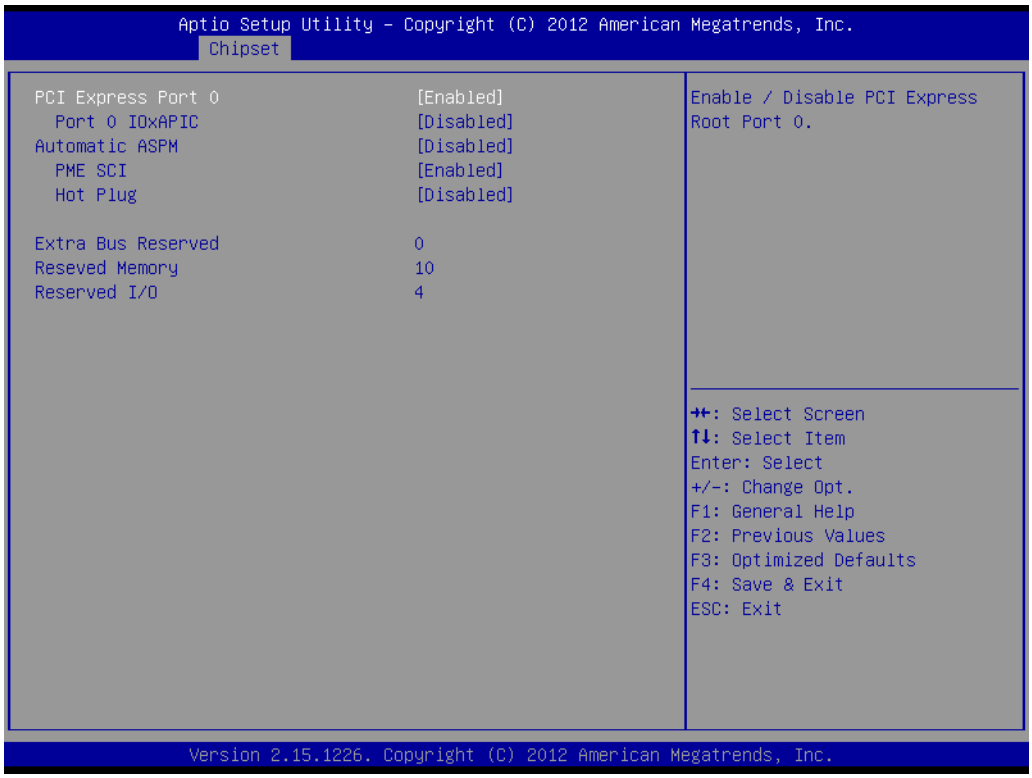

Figure 3.19 PCI Express Root Port 0

PCI Express Port 0

Enable / Disable PCI Express Root Port 0.

Port 0 IOxAPIC

Enable / Disable PCI Express Root Port 0 I/O APIC.

Automatic ASPM

Automatically enable ASPM based on reported capabilities and known issues.

PME SCI

PCI Express PME SCI Enable/Disable.

Hot Plug

PCI Express Hot Plug Enable/Disable.

Extra Bus Reserved

Extra Bus Reserved (0-7) for bridges behind this Root Bridge.

Reserved Memory

Reserved Memory and Prefetchable Memory (1-20MB) Range for this Root Bridge.

Reserved I/O

Reserved I/O (4K/8K/12K/16K/20K) Range for this Root Bridge.

- PCI Express Root Port 1

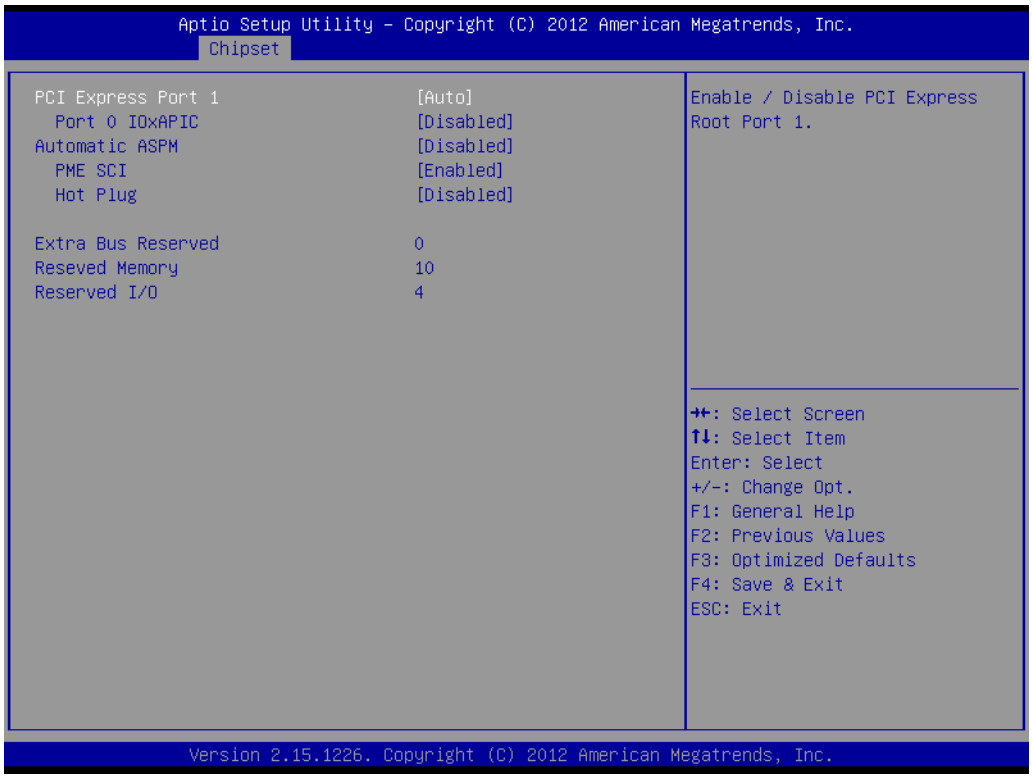

Figure 3.20 PCI Express Root Port 1

PCI Express Port 1

Enable / Disable PCI Express Root Port 1.

Port 0 IOxAPIC

Enable / Disable PCI Express Root Port 0 I/O APIC.

Automatic ASPM

Automatically enable ASPM based on reported capabilities and known issues.

PME SCI

PCI Express PME SCI Enable/Disable.

Hot Plug

PCI Express Hot Plug Enable/Disable.

Extra Bus Reserved

Extra Bus Reserved (0-7) for bridges behind this Root Bridge.

Reserved Memory

Reserved Memory and Prefetchable Memory (1-20MB) Range for this Root Bridge.

Reserved I/O

Reserved I/O (4K/8K/12K/16K/20K) Range for this Root Bridge.

- PCI Express Root Port 2

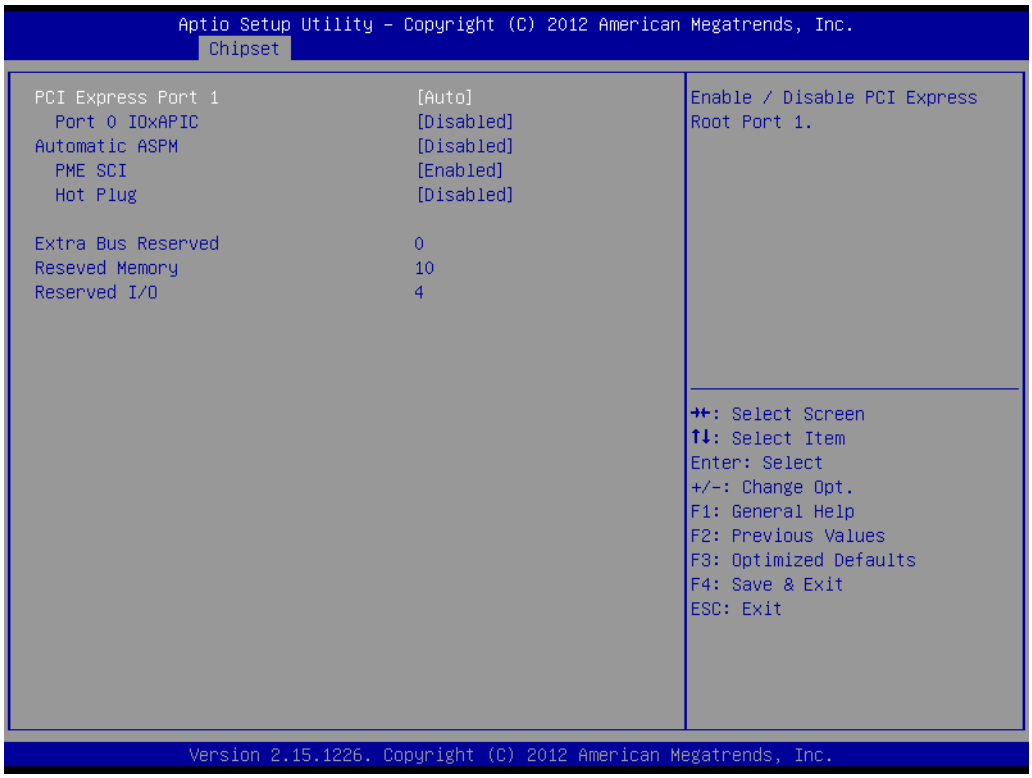

Figure 3.21 PCI Express Root Port 2

PCI Express Prot 2

Enable / Disable PCI Express Root Port 2.

Prot 0 IOxAPIC

Enable / Disable PCI Express Root Port 0 I/O APIC.

Automatic ASPM

Automatically enable ASPM based on reported capabilities and known issues.

PME SCI

PCI Express PME SCI Enable/Disable.

Hot Plug

PCI Express Hot Plug Enable/Disable.

Extra Bus Reserved

Extra Bus Reserved (0-7) for bridges behind this Root Bridge.

Reserved Memory

Reserved Memory and Prefetchable Memory (1-20MB) Range for this Root Bridge.

Reserved I/O

Reserved I/O (4K/8K/12K/16K/20K) Range for this Root Bridge.

3.5 Boot Settings

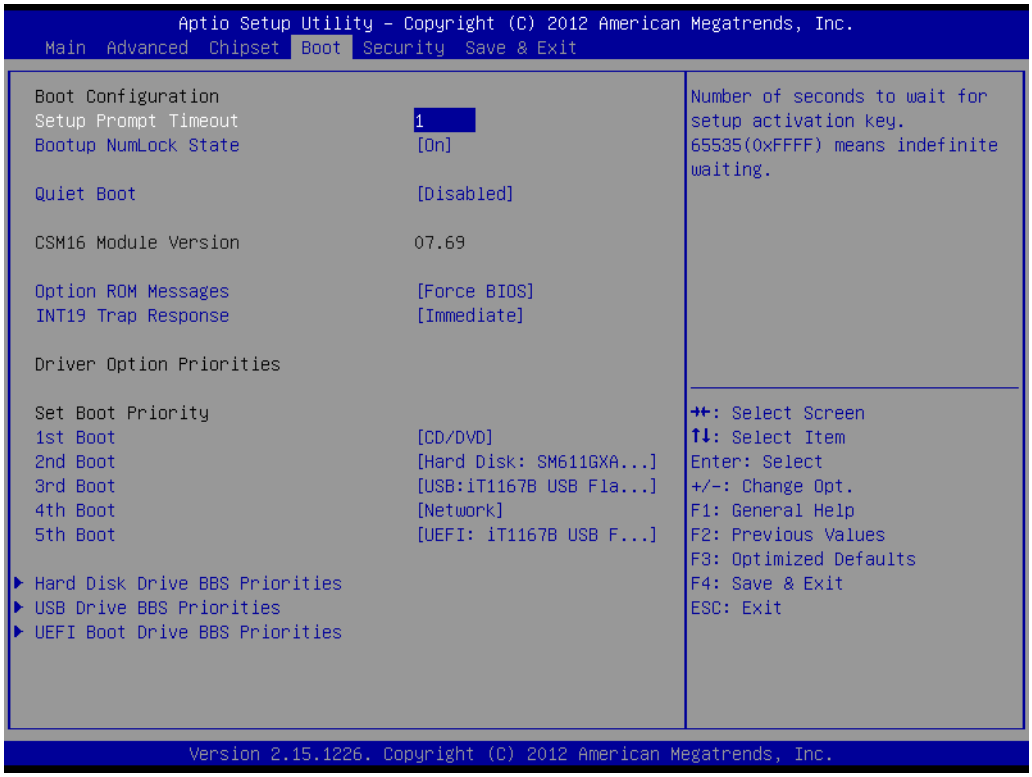

Figure 3.22 Boot Setup Utility

Setup Prompt Timeout

This item allows users to select the number of seconds to wait for setup activation key.

Bootup NumLock State

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.

Option ROM Message

Set display mode for option ROM.

Interrupt 19 Capture

This item allows option ROMs to trap interrupt 19.

$1^{st}/2^{nd}/3^{rd}/4^{th}/5^{th}$ Boot

This item allows users to set boot device priority.

3.6 Security Setup

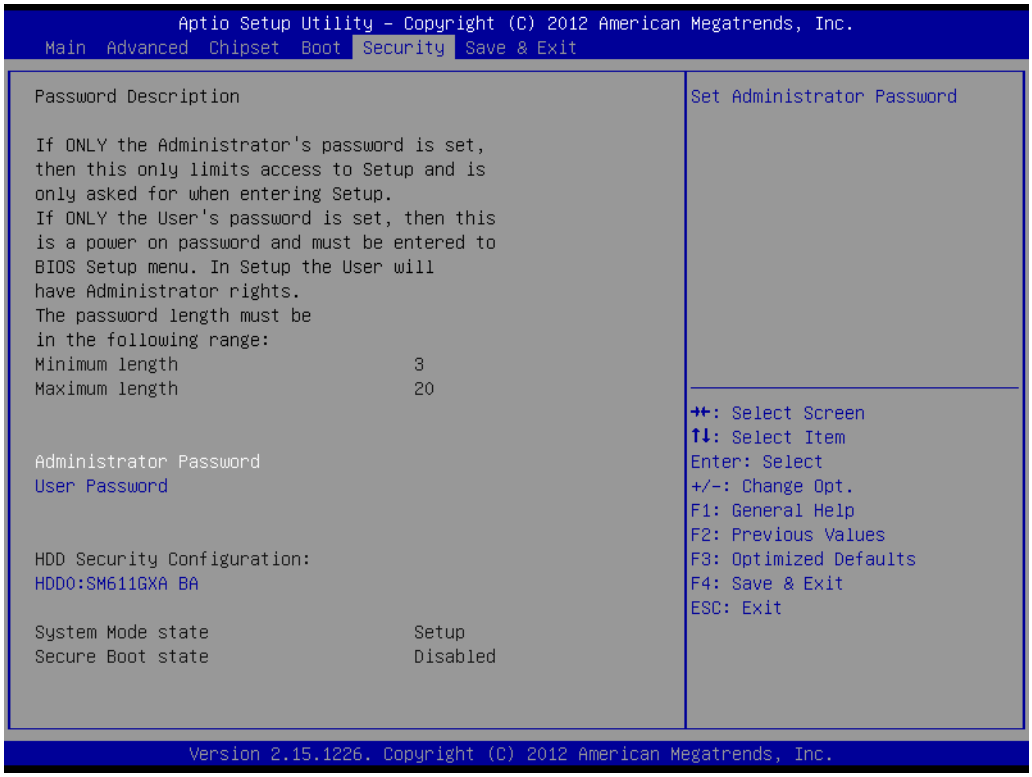

Figure 3.23 Password Configuration

Select Security Setup from the SOM-3565 Setup main BIOS setup menu. All Security Setup options, such as password selection 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.

3.7 Save & Exit

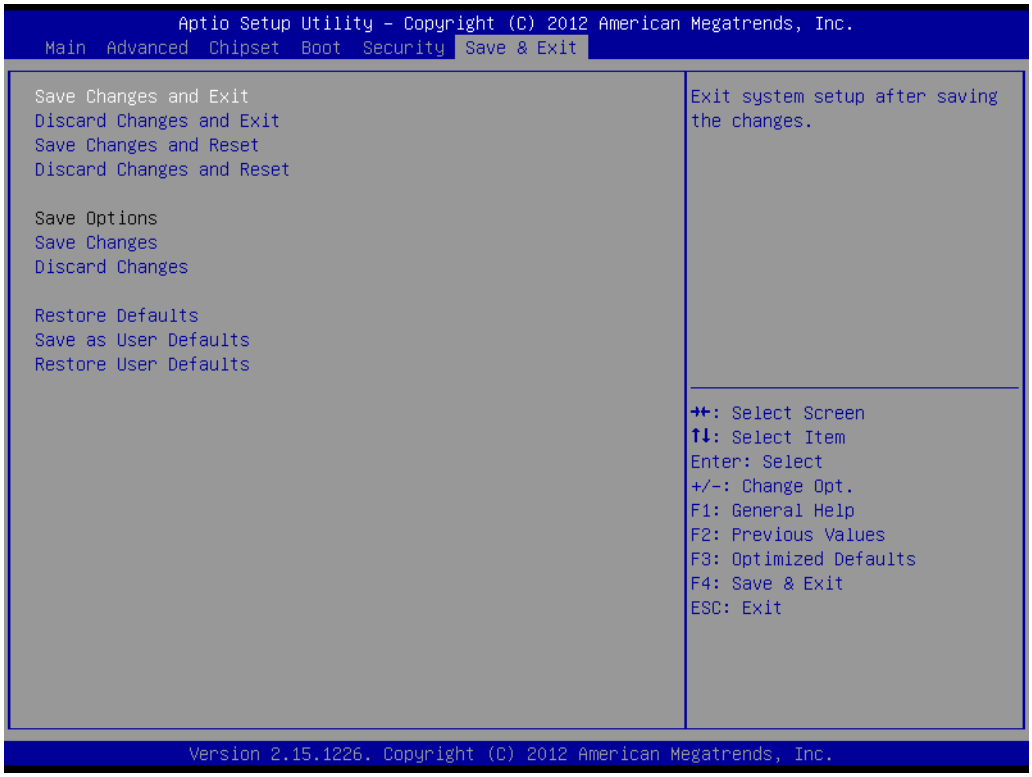

Figure 3.24 Save & Exit

3.7.1 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.

3.7.2 Discard Changes and Exit

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

3.7.3 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.

3.7.4 Discard Changes and Reset

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

3.7.5 Save Changes

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

3.7.6 Discard Changes

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

3.7.7 Restore Defaults

The SOM-3565 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 users computer is experiencing system configuration problems.

3.7.8 Save User Defaults

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

3.7.9 Restore User Defaults

The users can select this option to restore user defaults.

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 free 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 OS Driver Setup

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

4.2.2 Other OS

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

4.3 Advantech iManager

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

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

4.4 Advantech Software Utilities

Advantech also provides value-add utilities to make it easier for our customer to create their own unique and innovative systems. For more details about how to get and use these utilities, please contact Advantech.

Appendix A

Watchdog Timer

This appendix gives you the information about the watchdog timer programming on the SOM-3565 CPU System on Module. Sections include:

- **Watchdog Timer Programming**

A.1 Programming the Watchdog Timer

Trigger Event	Note
IRQ	IRQ7, 9, 11 (default disable) IRQ can be set in BIOS
NMI	N/A
SCI	Power button event
Power Off	Support
H/W Restart	Support
External WDT	N/A

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

Appendix B

Programming GPIO

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

- **System I/O ports**

B.1 GPIO Register

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

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

Appendix C

System Assignments

This appendix gives you the information about the system resource allocation on the SOM-3565 CPU System on Module.
Sections include:

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

C.1 System I/O Ports

Table C.1: System I/O Ports

Addr.range(Hex)	Device
0000 - 000F	Direct memory access controller
0000 - 0CF7	PCI bus
0010 - 001F	Motherboard resources
0020 - 0021	Programmable interrupt controller
0022 - 003F	Motherboard resources
0040 - 0043	System timer
0044 - 005F	Motherboard resources
0060 - 0060	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
0061 - 0061	System speaker
0062 - 0062	Microsoft ACPI-Compliant Embedded Controller
0063 - 0063	Motherboard resources
0064 - 0064	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
0065 - 0065	Motherboard resources
0066 - 0066	Microsoft ACPI-Compliant Embedded Controller
0067 – 006F	Motherboard resources
0070 - 0071	System CMOS/real time clock
0072 - 007F	Motherboard resources
0080 - 0080	Motherboard resources
0081 - 0083	Direct memory access controller
0084 - 0086	Motherboard resources
0087 - 0087	Direct memory access controller
0088 - 0088	Motherboard resources
0089 - 008B	Direct memory access controller
008C - 008E	Motherboard resources
008F - 008F	Direct memory access controller
0090 - 009F	Motherboard resources
00A0 - 00A1	Programmable interrupt controller
00A2 - 00BF	Motherboard resources
00C0 - 00DF	Direct memory access controller
00E0 - 00EF	Motherboard resources
00F0 - 00FF	Numeric data processor
01F0 - 01F7	Primary IDE Channel
0274 - 0277	ISAPNP Read Data Port
0279 - 0279	ISAPNP Read Data Port
0378 - 037F	Parallel port (LPT1) N455 CPU only
03B0 - 03BB	Intel(R) Graphic Media Accelerator 3150
03C0 - 03DF	Intel(R) Graphic Media Accelerator 3150
03F6 - 03F6	Primary IDE Channel
03F8 - 03FF	Communications Port (COM1)
0400 - 041F	Intel(R) ICH8 Family SMBus Controller – 283E
04D0 - 04D1	Motherboard resources
0500 - 053F	Motherboard resources
0800 - 087F	Motherboard resources

Table C.1: System I/O Ports	
0A00 - 0A0F	Motherboard resources
0A79 - 0A79	ISAPNP Read Data Port
0D00 - FFFF	PCI bus
D080 - D087	Intel(R) Graphic Media Accelerator 3150
D400 – D41F	Intel 82567V-3 Gigabit Network Connection
D480 - D49F	Standard Universal PCI to USB Host Controller
D800 – D81F	Intel ICH8 Family USB Universal Host Controller - 2832
D880 – D89F	Intel ICH8 Family USB Universal Host Controller - 2831
DC00 – DC1F	Intel ICH8 Family USB Universal Host Controller - 2830
E080 – E08F	Intel ICH8M 3 port Serial ATA Storage Controller - 2828
E400 – E40F	Intel ICH8M 3 port Serial ATA Storage Controller - 2828
E480 – E483	Intel ICH8M 3 port Serial ATA Storage Controller - 2828
E800 – E807	Intel ICH8M 3 port Serial ATA Storage Controller - 2828
E880 – E883	Intel ICH8M 3 port Serial ATA Storage Controller - 2828
EC00 – EC07	Intel ICH8M 3 port Serial ATA Storage Controller - 2828
FFA0 – FFAF	Intel ICH8M Ultra ATA Storage Controller - 2850

C.2 DMA Channel Assignments

Table C.2: DMA Channel Assignments	
Channel	**Function**
0	Available
1	Available
2	Available
3	Available
4	Direct memory access controller
5	Available
6	Available
7	Available

C.3 Interrupt Assignments

Table C.3: Interrupt Assignments

Interrupt#	Interrupt source
NMI	Parity error detected
IRQ 0	System timer
IRQ 1	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
IRQ2	Available
IRQ3	Available
IRQ 4	Communications Port (COM1)
IRQ 5	Available
IRQ 6	Available
IRQ 7	Available
IRQ 8	System CMOS/real time clock
IRQ 9	Microsoft ACPI-Compliant System
IRQ 10	Available
IRQ 11	Available
IRQ 12	PS/2 Compatible Mouse
IRQ 13	Numeric data processor
IRQ 14	Primary IDE Channel
IRQ 15	Available
IRQ 16	Intel(R) Graphic Media Accelerator 3150
IRQ 16	Standard Universal PCI to USB Host Controller
IRQ 18	Intel(R) ICH8 Family USB Universal Host Controller - 2832*
IRQ 18	Intel(R) ICH8M 3 port Serial ATA Host Controller - 2828
IRQ 19	Intel(R) ICH8 Family USB Universal Host Controller - 2831*
IRQ 21	Microsoft UAA Bus Driver for High Definition Audio
IRQ 23	Intel(R) 82567V-3 Gigabit Network Connection*
IRQ 23	Intel ICH8 Family USB Universal Host Controller - 2830*
IRQ 23	Intel ICH8 Family USB2 Universal Host Controller - 2836*

*USB and Ethernet IRQ is automatically set by the system.

C.4 1st MB Memory Map

Table C.4: 1st MB Memory Map	
Addr. range (Hex)	**Device**
00000000 - 0009FFFF	System board
000A0000 - 000BFFFF	Intel(R) Graphic Media Accelerator 3150
000A0000 - 000BFFFF	PCI Bus
000C0000 - 000CFFFF	System board
000D0000 - 000DFFFF	PCI bus
000E0000 - 000FFFFF	System board
00100000 - 7F6FFFFF	System board
7F700000 - DFFFFFFF	PCI Bus
D0000000 - DFFFFFFF	Intel(R) Graphic Media Accelerator 3150
E0000000 - EFFFFFFF	Motherboard resource
F0000000 - FED8FFFF	PCI Bus
FE980000 - FE9FFFFF	Intel(R) Graphic Media Accelerator 3150
FEA00000 - FEAFFFFF	Intel(R) Graphic Media Accelerator 3150
FEB00000 - FEB7FFFF	Intel(R) Graphic Media Accelerator 3150
FEBC0000 - FEBDFFFF	Intel 82567V-3 Gigabit Network Connection
FEBF8000 - FEBFBFFF	Microsoft UAA Bus Driver for High Definition Audio
FEBFE000 - FEBFEFFF	Intel 82567V-3 Gigabit Network Connection
FEBFF800 - FEBFFBFF	Intel ICH8 Family USB2 Enhanced Host Controller - 2836
FEBFFC00 - FEBFFCFF	Intel ICH8 Family SMBus Controller - 283E
FEC00000 - FEC00FFF	Motherboard resources
FED00000-FED003FF	HPET (High Precision Event Timer)
FED14000 - FED19FFF	System board
FED1C000 - FED1FFFF	Motherboard resources
FED20000 - FED3FFFF	Motherboard resources
FED40000 - FED8FFFF	Motherboard resources
FED90000 - FED93FFF	System board
FED90000 - FFFFFFFF	System board
FEE00000 - FEE00FFF	Motherboard resources
FFB00000 - FFBFFFFF	Intel 82802 Firmware Hub Device
FFC00000 - FFEFFFFF	Motherboard resources
FFF00000 - FFFFFFFF	Intel 82802 Firmware Hub Device

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