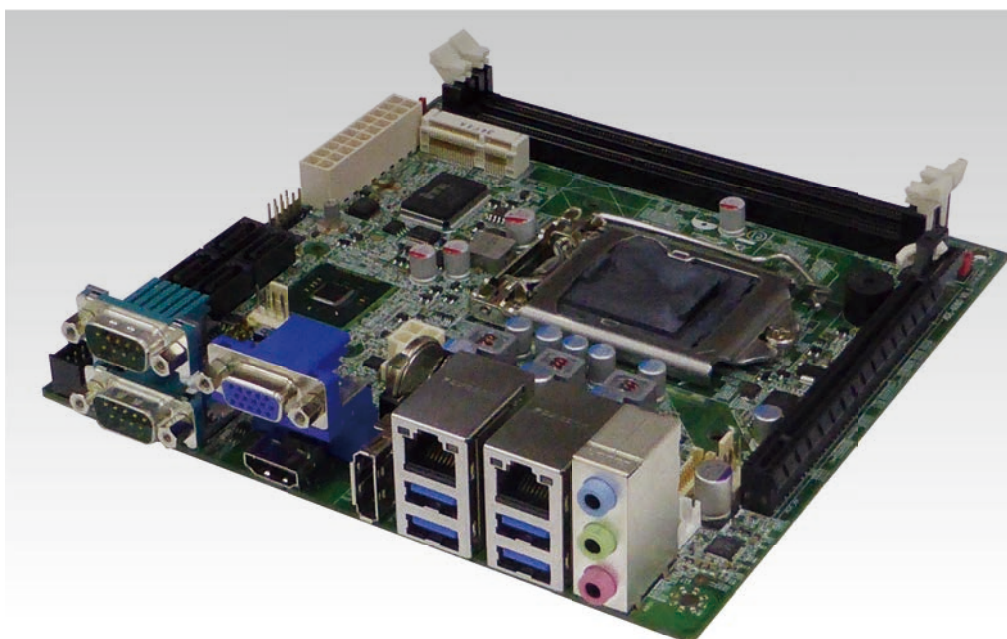


INS8348A

Mini ITX Industrial Motherboard
User's Manual



Safety Information

1. Electrical safety

- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
- Before connecting or removing signal cables from the motherboard, ensure that all power cables are unplugged.
- Seek professional assistance before using an adapter or extension cord. These devices could interrupt the grounding circuit.
- Make sure that your power supply is set to the correct voltage in your area.
- If you are not sure about the voltage of the electrical outlet you are using, contact your local power company.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your local distributor.

2. Operation safety

- Before installing the motherboard and adding devices on it, carefully read all the manuals that came with the package.
- Before using the product, make sure all cables are correctly connected and the power cables are not damaged. If you detect any damage, contact your dealer immediately.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Do not place the product in any area where it may become wet.
- Place the product on a stable surface.
- If you encounter any technical problems with the product, contact your local distributor

Statement

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- All trademarks are the properties of the respective owners.
- All product specifications are subject to change without prior notice

Revision History

Revision	Date (yyyy/mm/dd)	Changes
Version 1.0	2014/12/02	Initial release

Packing list

- ☐ INS8348A Mini ITX
- ☐ CD (Driver + user's manual)
- ☐ I/O shield
- ☐ Cable kit: 1 x SATA, 1 x COM, 1 x USB



If any of the above items is damaged or missing, please contact your local distributor.

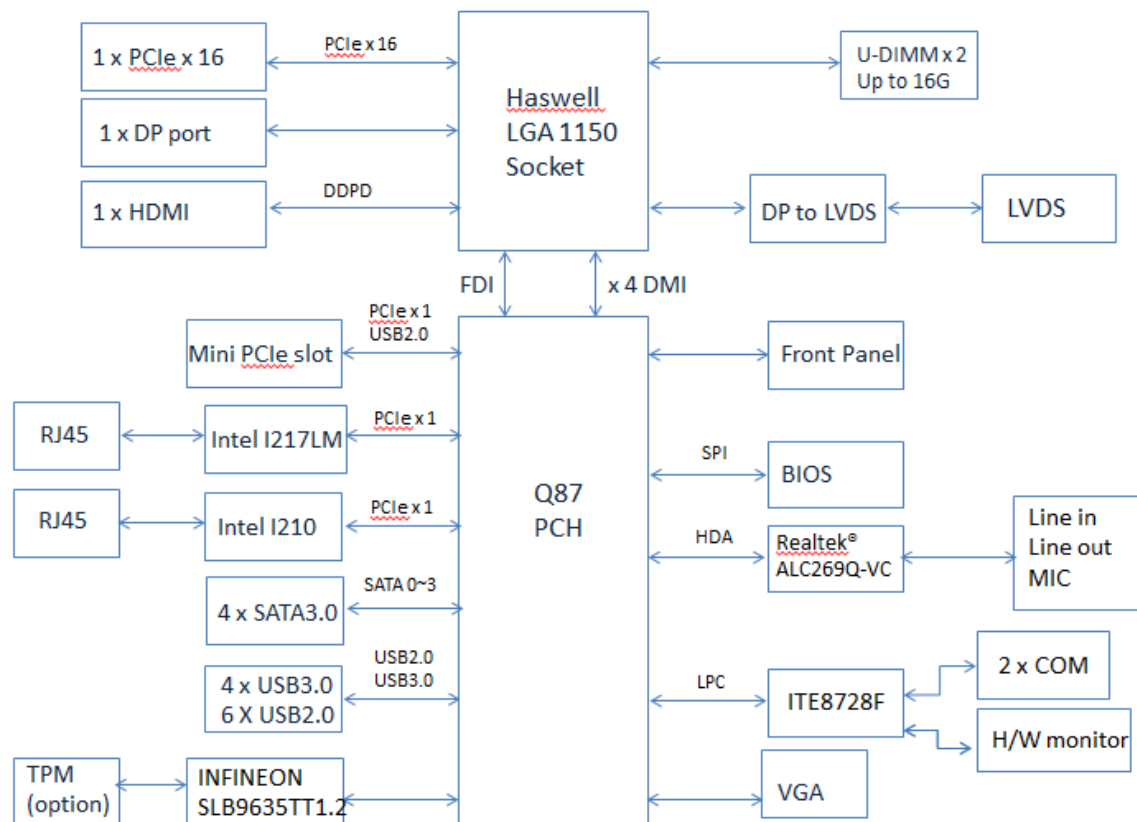
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Chapter 1: Product Information

1.1 Block Diagram



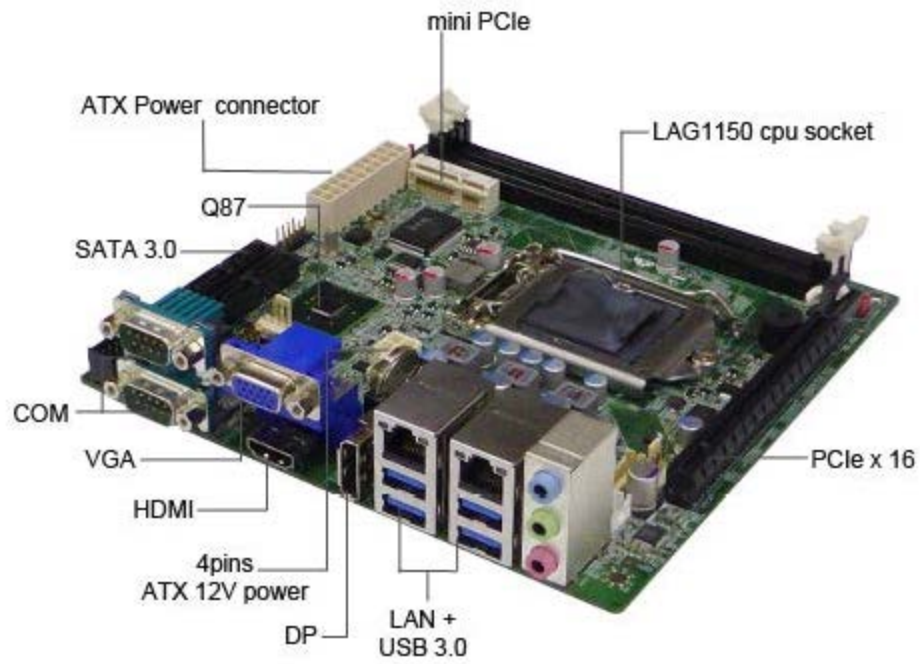
1.2 Key Features

System	
CPU Type	Intel® Haswell / Haswell-Refresh LGA1150 CPU Socket
Chipset	Intel® Haswell Q87 PCH
Memory Type	2 x DDR3 U-DIMM 240-pin sockets support DDR3/DDR3L 1333/1600 up to 16GB
BIOS	AMI UEFI BIOS with 64 Mb SPI Flash ROM support AMT9.0
Supoer I/O	ITE IT8728F
Watchdog	Reset; 1 sec.~255 min. and 1 sec. or 1 min. /step
Expansion Slot	1 x PCIe x16, 1 x miniPCle
Display	
Chipset	Integrated GFX in Haswell processor
Display Interface	Three / Dual display by VGA / Display Port / HDMI / LVDS Port
Audio	
Codec	Realtek® ALC269Q-VC High Definition Audio Codec
Ethernet	
Chipset	LAN1: Intel® I217LM 10/100/1000 Gigabit Ethernet PHY with AMT9.0 LAN2: Intel® I210 10/100/1000 Gigabit Ethernet Controller
WOL	Yes
Boot from LAN	Yes for PXE
Rear I/O	
COM Port	1 x RS-232/422/485 D-SUB 9-Pin Port for COM1 1 x RS-232 D-SUB 9-Pin Port for COM2 COM1&COM2 Pin 9 Selection for 5V/12V/RI , 5V & 12V (Max. : 1A output with Fuse)
Audio	1 x MIC-in, 1 x Line out, 1 x Line in
VGA	1
HDMI	1
DP	1
Ethernet	2 x RJ45
USB	2 x USB 3.0

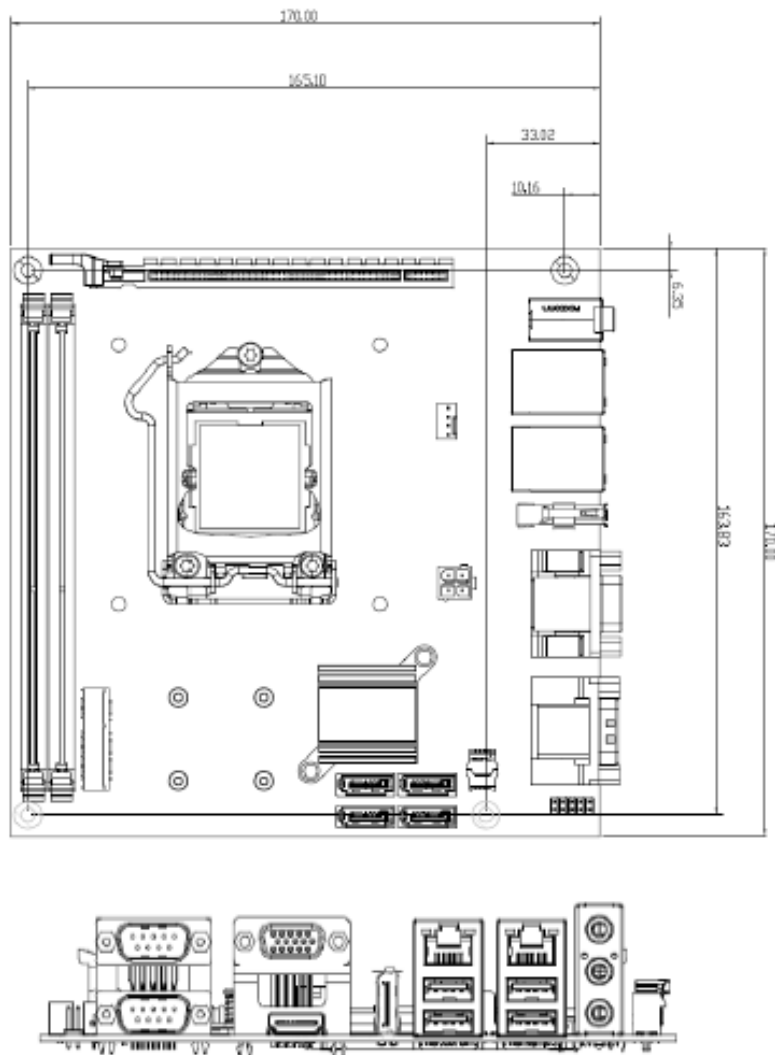
Internal I/O	
SATA	4 x SATAIII
USB	6x USB 2.0 by pin header
LVDS	1 (2 x 20-pin) for 24-bit with brightness control
Fan	2 (1 x 4-pin) for CPU & System fan
Front Panel	1 (2 x 5-pin)
Chassis intrusion	1 (1 x 3-pin)
Power Connector	2 (1 x 4-pin/ 2 x 2-pin)
Mechanical and Environment	
Form Factor	Mini-ITX
Power Type	24-pin ATX Power connector, 4-pin ATX 12V power connector
Dimension	170 x 170 mm (6.69" x 6.69")
Operating Temp.	0 to 60°C
Storage Temp.	-20 to 80°C
Relative Humidity	10% to 90%, non-condensing
EMI Protection	CE, FCC Class-B

***All specifications and photos are subject to change without notice.**

1.3 Board Placement



1.4 Mechanical Drawings



Chapter 2: Jumpers and Connectors

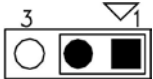
2.1 Jumpers and connectors list

JUMPERS	FUNCTION	REMARK
CLR_CMOS1	Clear CMOS	1 x 3 header
COM9_SW1	COM2 Pin 9 Setting	2 x 3 header
COM9_SW2	COM1 Pin 9 Setting	2 x 3 header
J6 ~ J9	COM1 RS232/422/485 Configure	1 x 3 header
PCH_ME_EBABLE	ME Function Setting	1 x 3 header
LCD_PWR	LCD Power source selection	1 x 3 header
INTR	Case Open	1 x 3 header

CONNECTORS	FUNCTION	REMARK
CPU_FAN	CPU FAN Connector	1 x 4 wafer
SYS_FAN	SYS FAN Connector	1 x 4 wafer
FP	Front Panel Connector	2 x 5 header
F_USB1	USB Connector	2 x 5 header
F_USB2	USB Connector	2 x 5 header
F_USB3	USB Connector	2 x 5 header
SPK	Speaker Connector	1 x 4 wafer
GPIO	GPIO Port Connector	2 x 5 box header
LCD_CTL	LCD Backlight Control Connector	1 x 5 wafer
LVDS	LVDS Connector	2 x 20 connector
ATX	ATX Power Connector	2 x 10 Connector
PWR_CPU	CPU Power Connector	2 x 2 Connector
MINIPCI1	Mini PCIe Connector	
PCI16X	PCIe x16 Connector	
SPI_SOCKET	BIOS Socket	
SATA1	SATA3.0 Connector	
SATA2	SATA3.0 Connector	
SATA3	SATA3.0 Connector	
SATA4	SATA3.0 Connector	
BAT1	Battery Socket	
DIMM3~4	Memory Socket	Slot

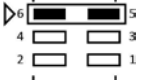
2.2 Jumpers & Connectors setting

CLR_CMOS1

PIN No.	Description	Setting
1-2	Normal ☐	
2-3	Clear CMOS	

Default setting: 1-2

COM9_SW1/SW2

PIN No.	Description	Setting
1-2	5V	
3-4	12V	
5-6	RI	

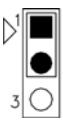
Default setting: 5-6

J6 ~ J9 COM1 RS232/RS422/RS485 Configure

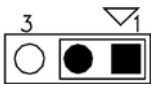
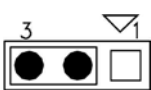
	RS232	RS422	RS485	Setting
J6	1-2	2-3	2-3	
J7	1-2	2-3	2-3	
J8	1-2	2-3	X	
J9	1-2	2-3	X	

Default setting: 1-2

PCH_ME_ENABLE

PIN No.	Description	Setting
1-2	Enable ☐	
2-3	Disable	
Default setting: 1-2		

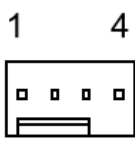
LCD_PWR

PIN No.	Description	Setting
1-2	5V	
2-3	3.3V	
Default setting: 1-2		

INTR

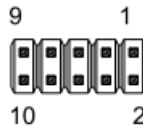
PIN No.	Description	Setting
Short (1-2)	Case is open	
Open (2-3)	NORMAL	
Default setting: open		

CPU_FAN /SYS_FAN

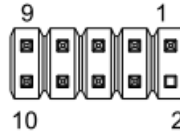
PIN	DEFINITION	
1	GND	
2	+12V	
3	FAN speed sense	
4	FAN speed control	

FP

PIN	DEFINITION	PIN	DEFINITION
1	HD LED+	2	Power LED+
3	HD LED-	4	Power LED-
5	GND	6	Power Button
7	Reset Button	8	GND
9	NC	10	

**F_USB1, F_USB2 & F_USB3**

PIN	DEFINITION	PIN	DEFINITION
1	5V Dual	2	5V Dual
3	USBa -	4	USBb -
5	USBa +	6	USBb +
7	GND	8	GND
9		10	

**GPIO**

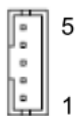
PIN	DEFINITION	PIN	DEFINITION
1	VCC5	2	GP47 for input
3	GP57 for output	4	GP63 for input
5	GP56 for output	6	GP15 for input
7	GP34 for output	8	GP64 for input
9	GP37 for output	10	GND

**SPK (Wafer, 4*1 2.0mm)**

PIN	DEFINITION
1	SPK – R+
2	SPK – R-
3	SPK – L+
4	SPK – L-

**LCD_CTL**

PIN	DEFINITION
1	12V
2	GND
3	LCD_BKL
4	L_BKLT_CTRL
5	GND



LVDS

PIN	DEFINITION	PIN	DEFINITION
1	NC	2	NC
3	GND	4	GND
5	LVDSA_DATA0N	6	LVDSA_DATA1N
7	LVDSA_DATA0P	8	LVDSA_DATA1P
9	GND	10	GND
11	LVDSA_DATA2N	12	LVDSA_CLKN
13	LVDSA_DATA2P	14	LVDSA_CLKP
15	GND	16	GND
17	LVDSA_DATA3N	18	LVDSB_DATA0N
19	LVDSA_DATA3P	20	LVDSB_DATA0P
21	GND	22	GND
23	LVDSB_DATA1N	24	LVDSB_DATA2N
25	LVDSB_DATA1P	26	LVDSB_DATA2P
27	GND	28	GND
29	LVDSB_CLKN	30	LVDSB_DATA3N
31	LVDSB_CLKP	32	LVDSB_DATA3P
33	NC	34	GND
35	LVDS_DDC_CLK	36	GND
37	LVDS_DDC_DATA	38	LCD Voltage
39	NC	40	LCD Voltage



Chapter 3: Getting Started

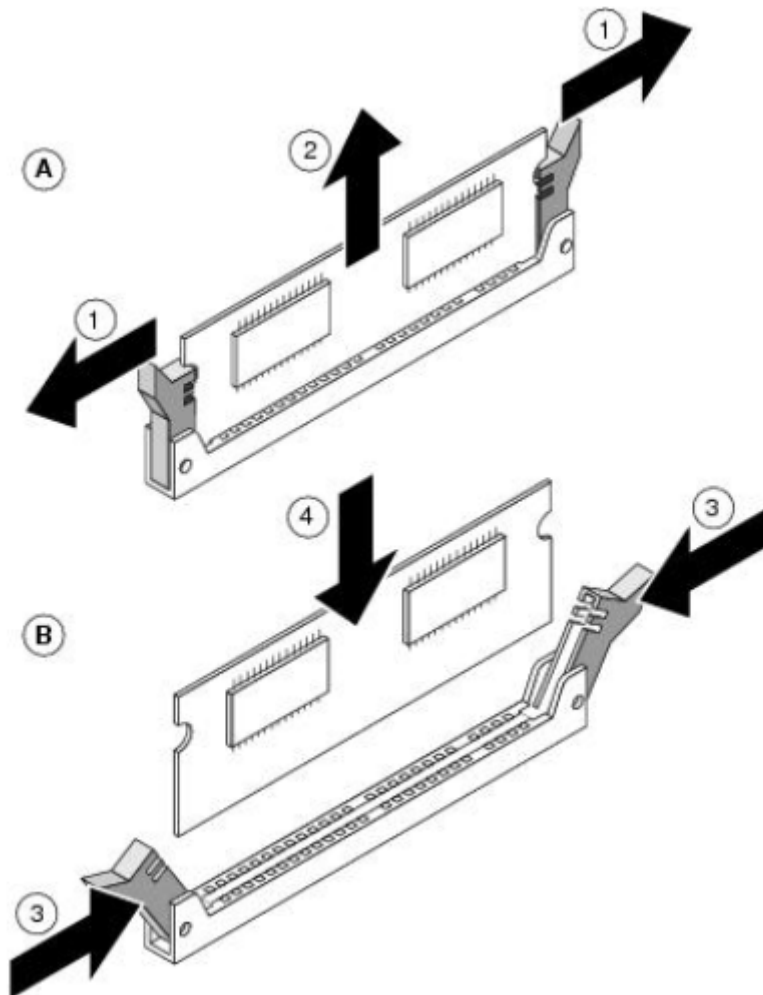
3.1 Installing System Memory

The INS8337A supports 2 x 204-pin SO-DIMM socket support DDR3L 1333/1600 SDRAM Max. up to 16 GB memory



Disconnect all power supplies to the board before installing a memory module to prevent damage to the board and memory module.

To install a memory module:



Chapter 4: AMI BIOS UTILITY

This chapter provides users with detailed descriptions on how to set up a basic system configuration through the AMI BIOS setup utility.

4.1 Starting

To enter the setup screens, perform the following steps:

- Turn on the computer and press the key immediately.
- After the key is pressed, the main BIOS setup menu displays. Other setup screens can be accessed from the main BIOS setup menu, such as the Chipset and Power menus.

4.2 Navigation Keys

The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process.

Some of the hot keys are <F1>, <F10>, <Enter>, <ESC>, and <Arrow> keys.

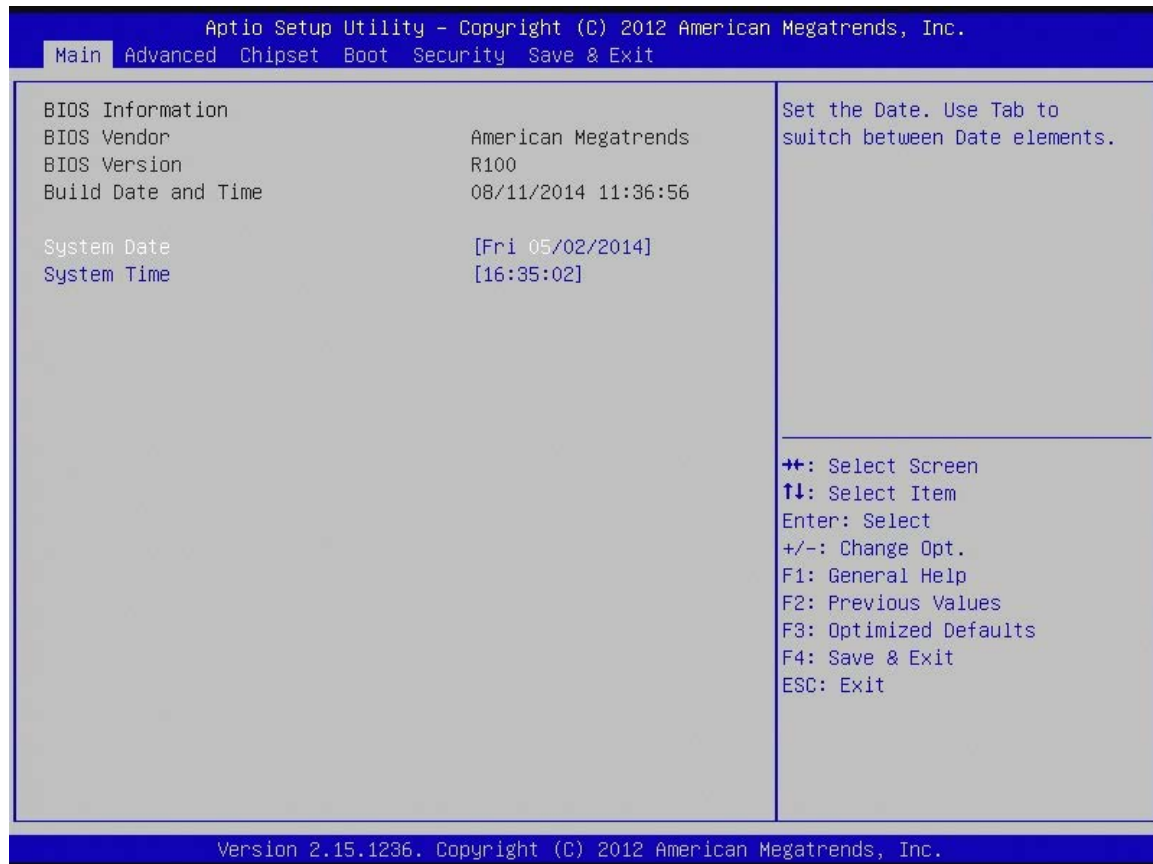


Some of the navigation keys may differ from one screen to another.

Left/Right	The Left and Right <Arrow> keys moves the cursor to select a menu.
Up/Down	The Up and Down <Arrow> keys moves the cursor to select a setup screen or sub-screen.
+– Plus/Minus	The Plus and Minus <Arrow> keys changes the field value of a particular setup setting.
Tab	The <Tab> key selects the setup fields.
F1	The <F1> key displays the General Help screen.
F10	The <F10> key saves any changes made and exits the BIOS setup utility.
Esc	The <Esc> key discards any changes made and exits the BIOS setup utility.
Enter	The <Enter> key displays a sub-screen or changes a selected or highlighted option in each menu.

4.3 Main Menu

The Main menu is the screen that first displays when BIOS Setup is entered, unless an error has occurred.



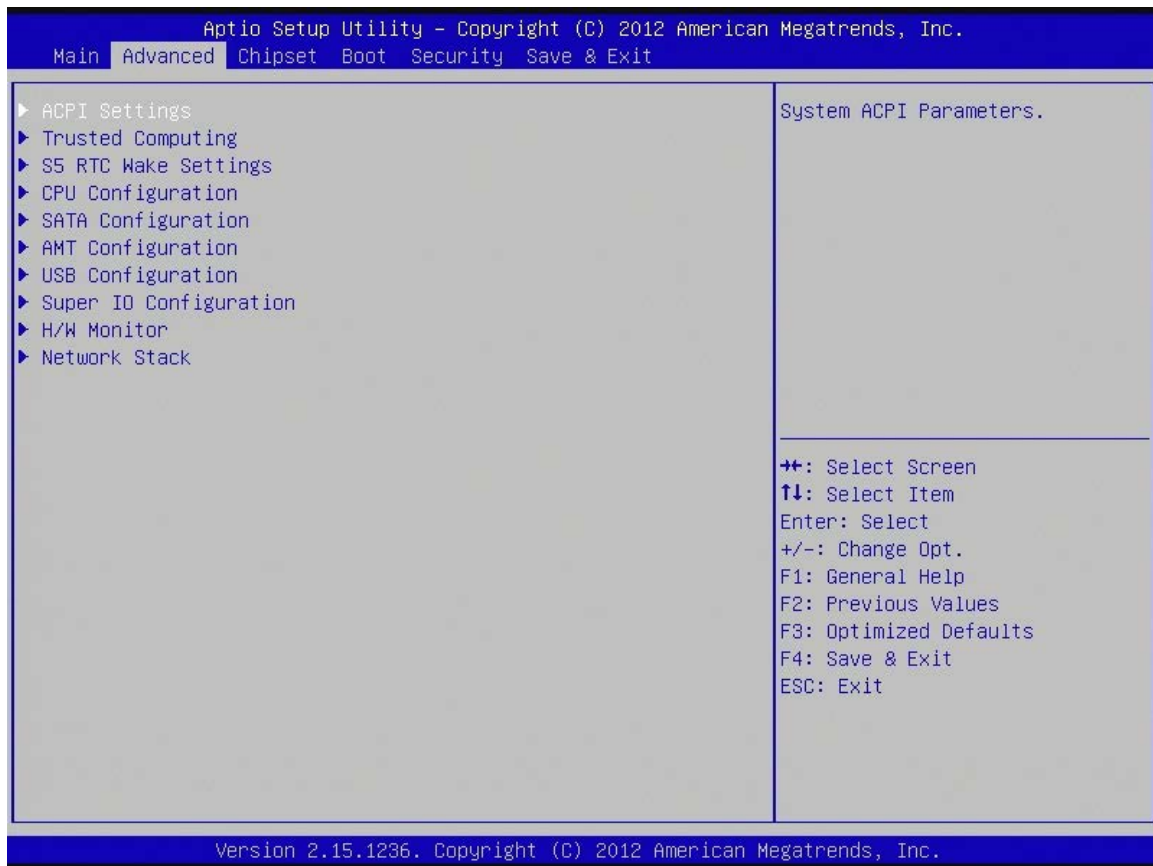
You could setup these items on the Main menu:

System Date: Set the date. Use Tab to switch between date elements.

System Time: Set the time. Use Tab to switch between time elements.

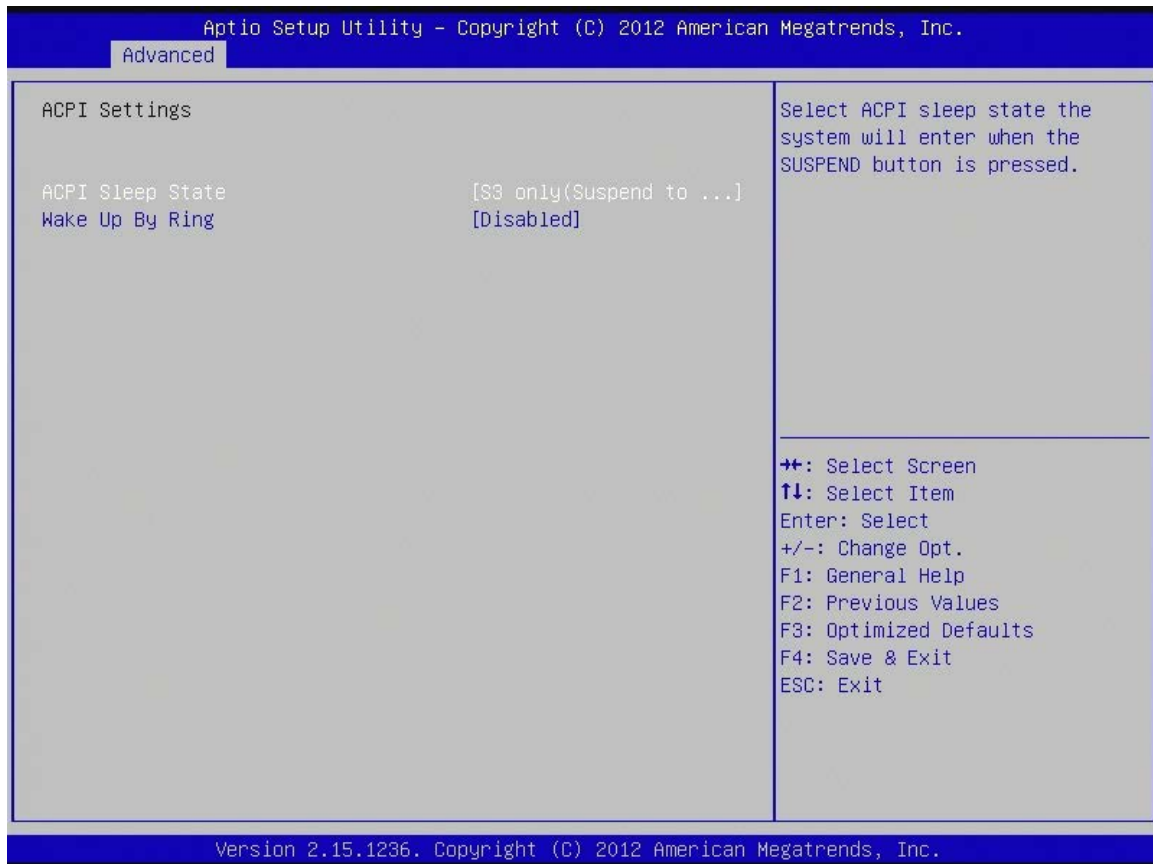
4.4 Advanced Menu

This section allows you to configure and improve your system and allows you to set up some system features according to your preference.



4.4.1 ACPI Settings

System ACPI Parameters



ACPI Sleep State

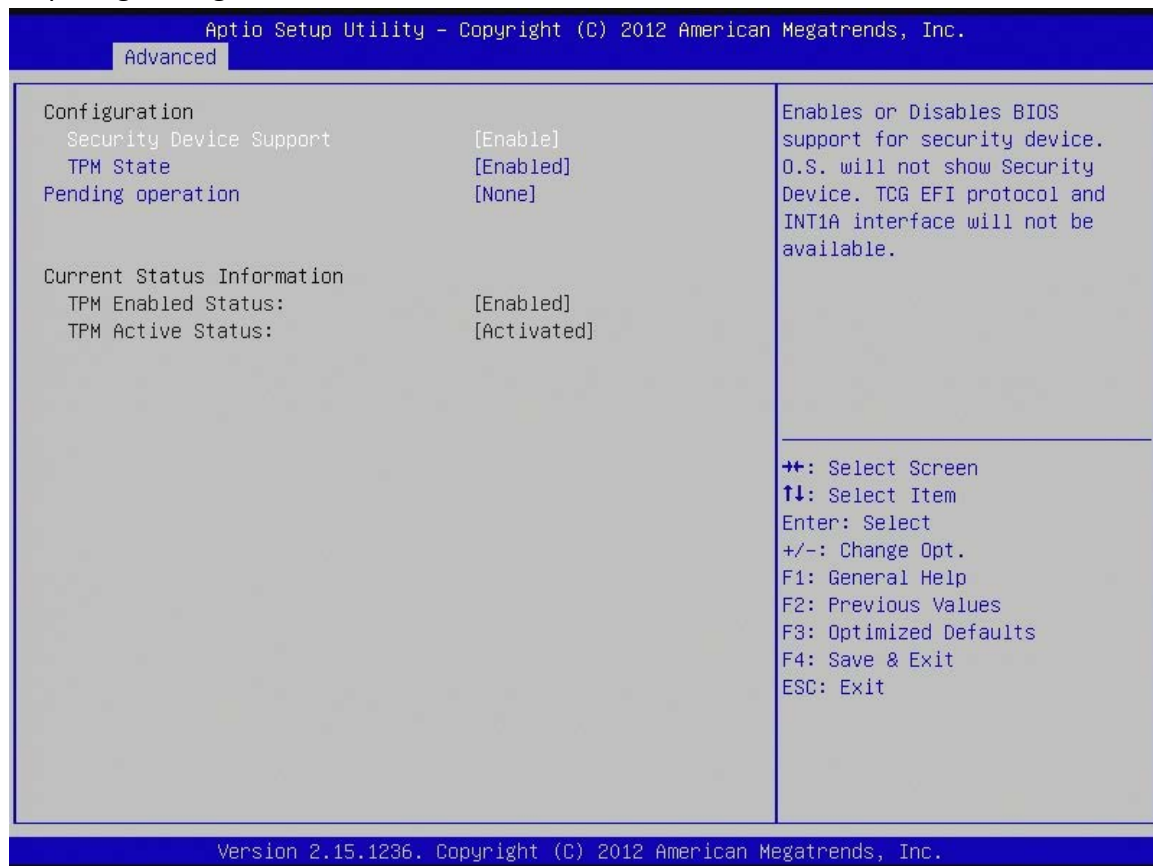
Select ACPI sleep state the system will enter when the SUSPEND button is pressed.

Wake Up by Ring

Main switch to enable Wake-Up by ring support

4.4.2 Trusted Computing

Trusted computing settings



Configuration

Security Device Support: Enables or disables BIOS support for security device. OS will not show security device. TCG EFI protocol and INT1A interface will not be available.

TPM State: Enable/Disable security device.

NOTE: your computer will reboot during restart in order to change state of the device

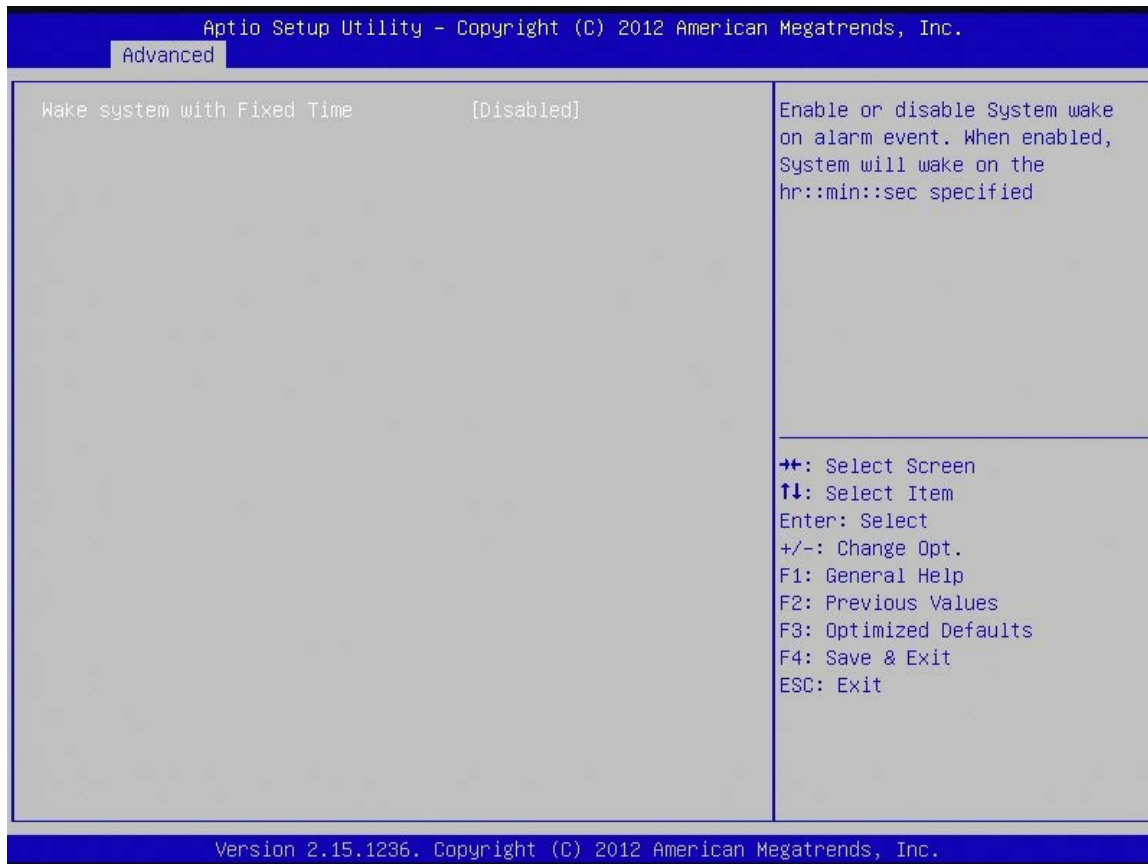
Pending operation

Schedule an operation for the security device

NOTE: your computer will reboot during restart in order to change state of security device

4.4.3 S5 RTC Wake settings

Enable system to wake from S5 using RTC alarm



Wake system with Fixed Time

Enable or disable system wake on alarm event. When enabled, system will wake on the hr::min::sec specified

4.4.4 CPU configuration

CPU configuration parameters.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.

Advanced

CPU Configuration		▲ Number of cores to enable in each processor package.
Intel(R) Core(TM) i5-4402E CPU @ 1.60GHz		
CPU Signature	306c3	
Processor Family	6	
Microcode Patch	8	
FSB Speed	100 MHz	
Max CPU Speed	1600 MHz	
Min CPU Speed	800 MHz	
CPU Speed	2600 MHz	
Processor Cores	2	
Intel HT Technology	Supported	
Intel VT-x Technology	Supported	
Intel SMX Technology	Supported	
64-bit	Supported	
EIST Technology	Supported	
CPU C3 state	Supported	
CPU C6 state	Supported	
CPU C7 state	Supported	
L1 Data Cache	32 kB x 2	
L1 Code Cache	32 kB x 2	
L2 Cache	256 kB x 2	
L3 Cache	3072 kB	
		++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

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Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.

Advanced

FSB Speed		▲ Enable/Disable CPU C7 report to OS
Max CPU Speed	1600 MHz	
Min CPU Speed	800 MHz	
CPU Speed	2600 MHz	
Processor Cores	2	
Intel HT Technology	Supported	
Intel VT-x Technology	Supported	
Intel SMX Technology	Supported	
64-bit	Supported	
EIST Technology	Supported	
CPU C3 state	Supported	
CPU C6 state	Supported	
CPU C7 state	Supported	
L1 Data Cache	32 kB x 2	
L1 Code Cache	32 kB x 2	
L2 Cache	256 kB x 2	
L3 Cache	3072 kB	
Active Processor Cores	[All]	
Execute Disable Bit	[Enabled]	
Intel Virtualization Technology	[Enabled]	
EIST	[Enabled]	
Intel TXT(LT) Support	[Disabled]	
CPU C7 report	[Enabled]	
		++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

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Active Processor Core

Number of cores to enable in each processor package

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

EIST

Enable/Disable Intel SpeedStep

Intel TXT(LT) Support

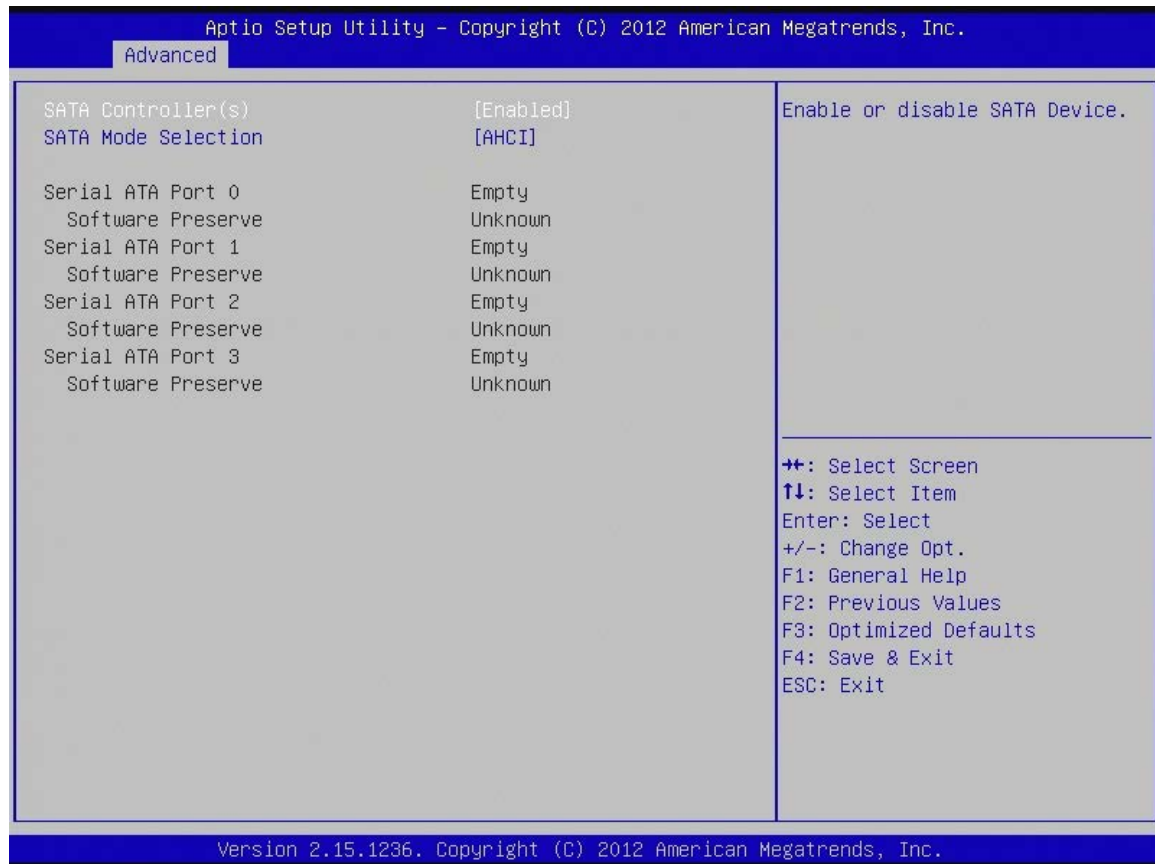
Enables or disables Intel TXT(LT) support

CPU C7 report

Enable/Disable CPU C7 report to OS

4.4.5 SATA Configuration

This section is used to configure the SATA drives.



SATA Controller(s)

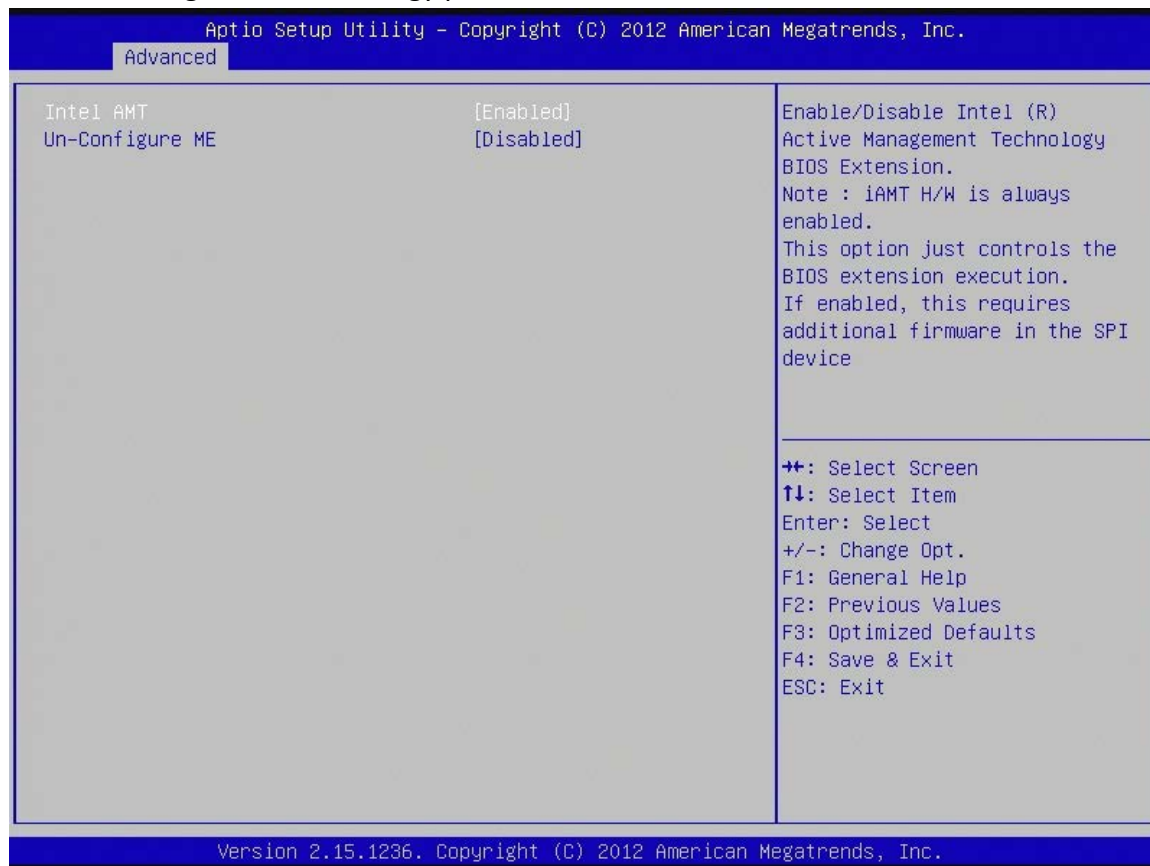
Enable or disable SATA device.

SATA Mode Selection

Determines how SATA controller(s) operate. The options are: IDE, AHCI, RAID

4.4.6 AMT Configuration

Configure Active Management Technology parameters.



Intel AMT

Enable/Disable Intel Active Management Technology BIOS Extension.

Note: iAMT H/W is always enabled.

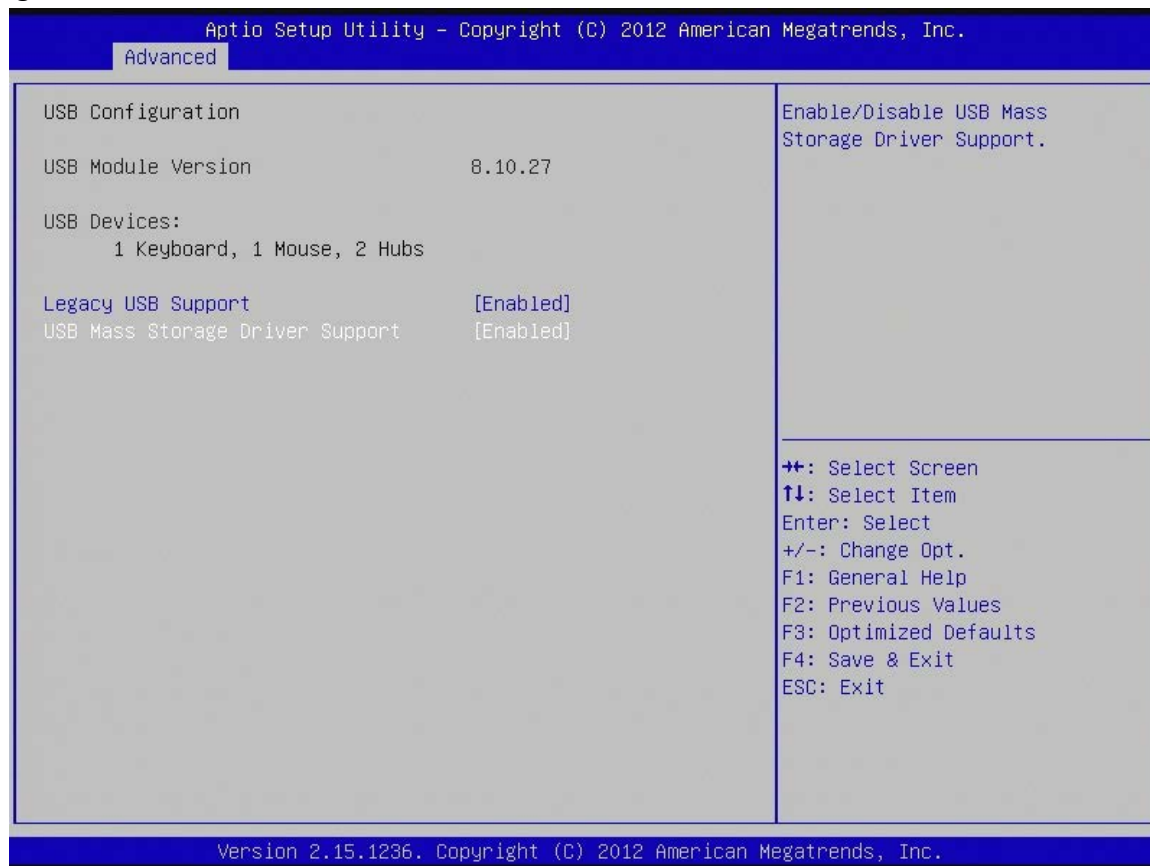
This option just controls the BIOS extension execution. If enabled, this requires additional firmware in the SPI device.

Un-Configure ME

OEMFlag Bit 15: Un-Configure ME without password.

4.4.7 USB Configuration

USB Configuration Parameters.



Legacy USB Support

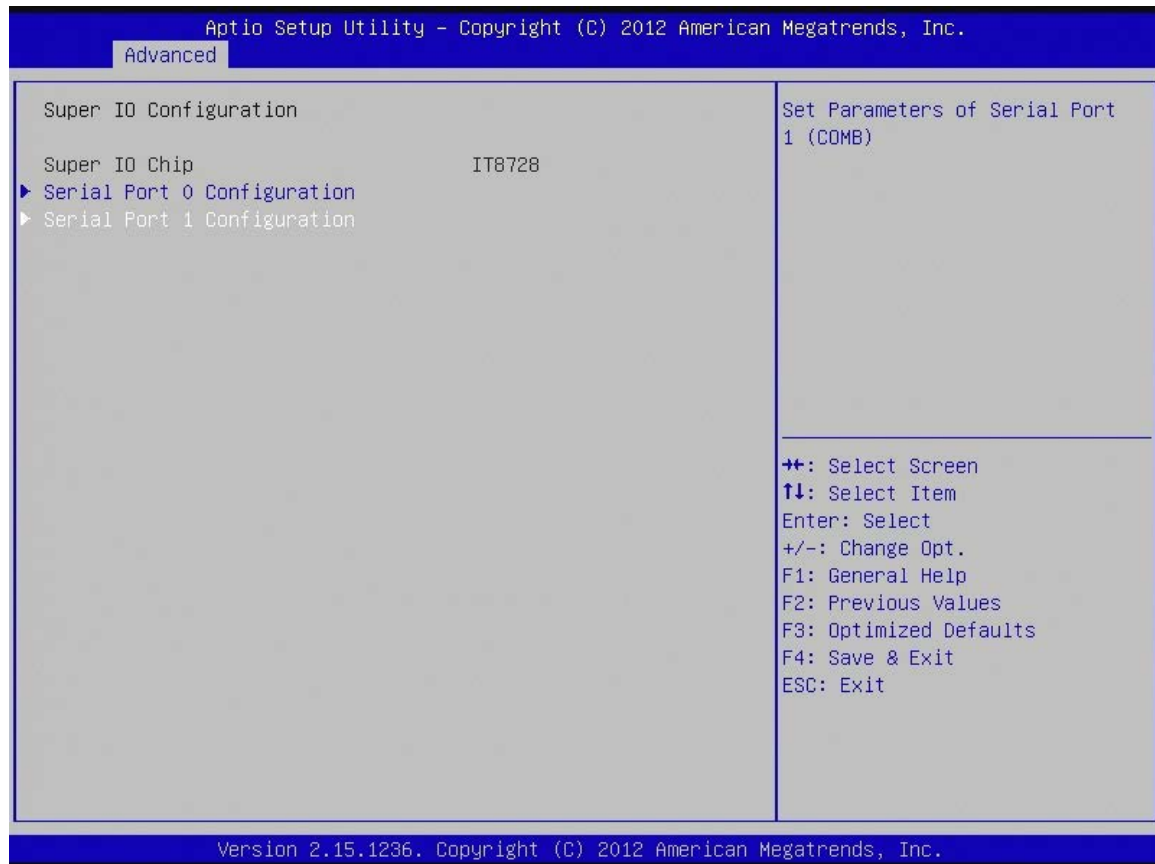
Enables legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.

USB Mass Storage Driver Support

Enable/Disable USB Mass Storage Driver Support.

4.4.8 Super IO Configuration

System Super IO chip parameters.



Serial Port 0 Configuration: Set Parameters of Serial Port 0 (COMB).

Serial Port: RS232

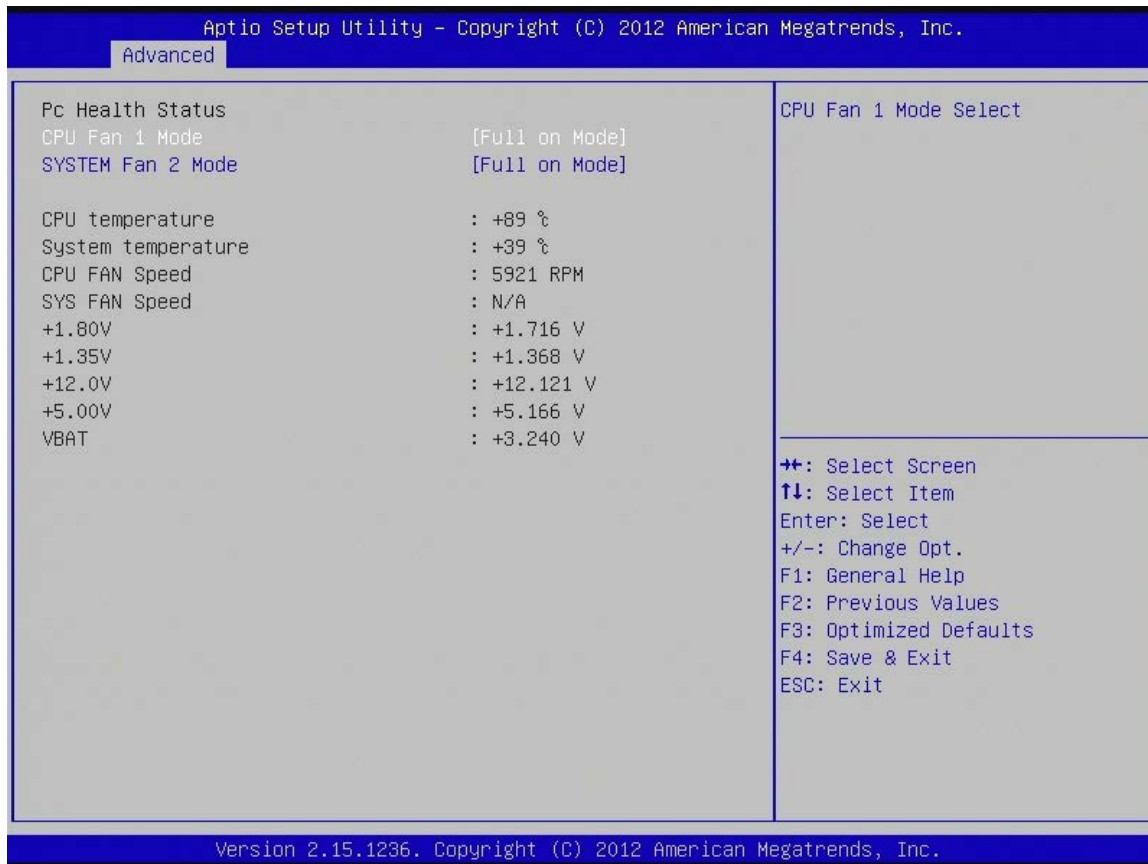
Serial Port 1 Configuration: Set Parameters of Serial Port 1 (COMB).

Serial Port: Enable or Disable Serial Port (COM).

Change Settings: Select an optimal setting for Super IO device.

4.4.9 HW Monitor

Monitor hardware status.



CPU Fan 1 Mode

CPU Fan 1 Mode select

SYSTEM Fan 2 Mode

System Fan 2 mode select

4.4.10 Network Stack

Network stack settings

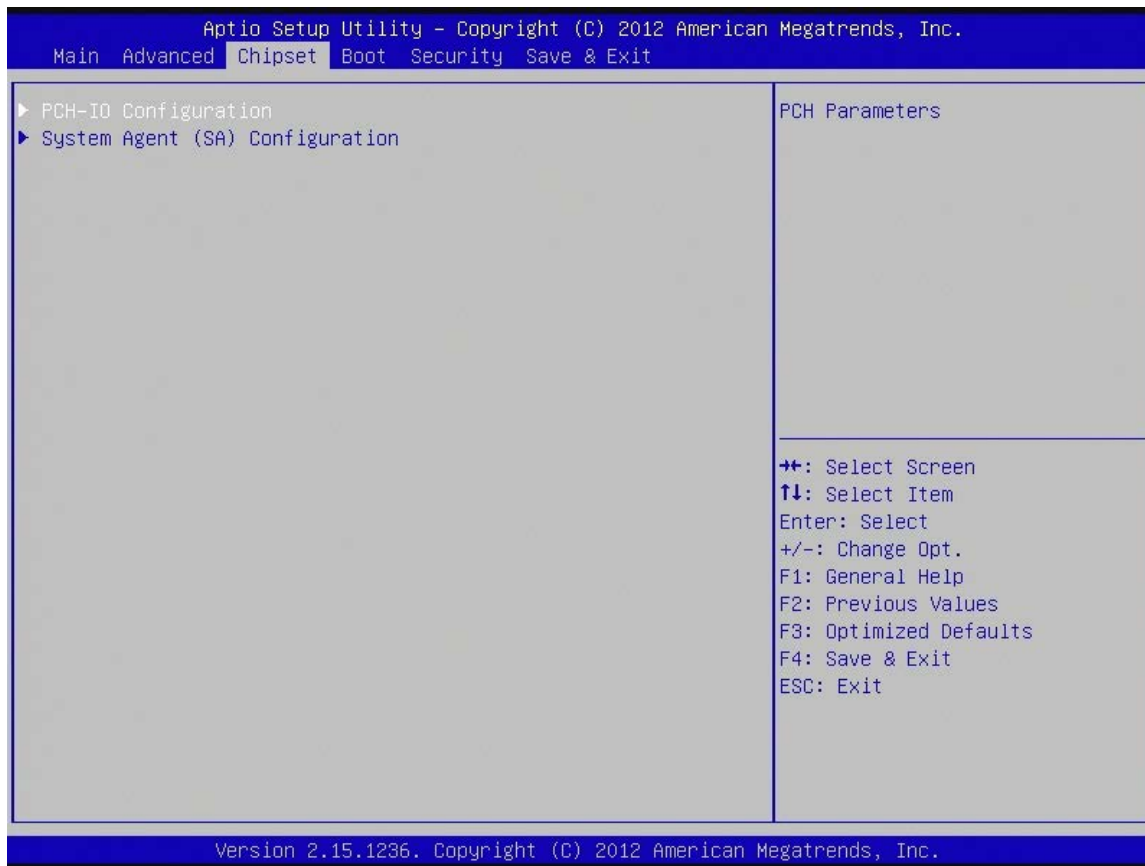


Network Stack

Enable/Disable UEFI network stack

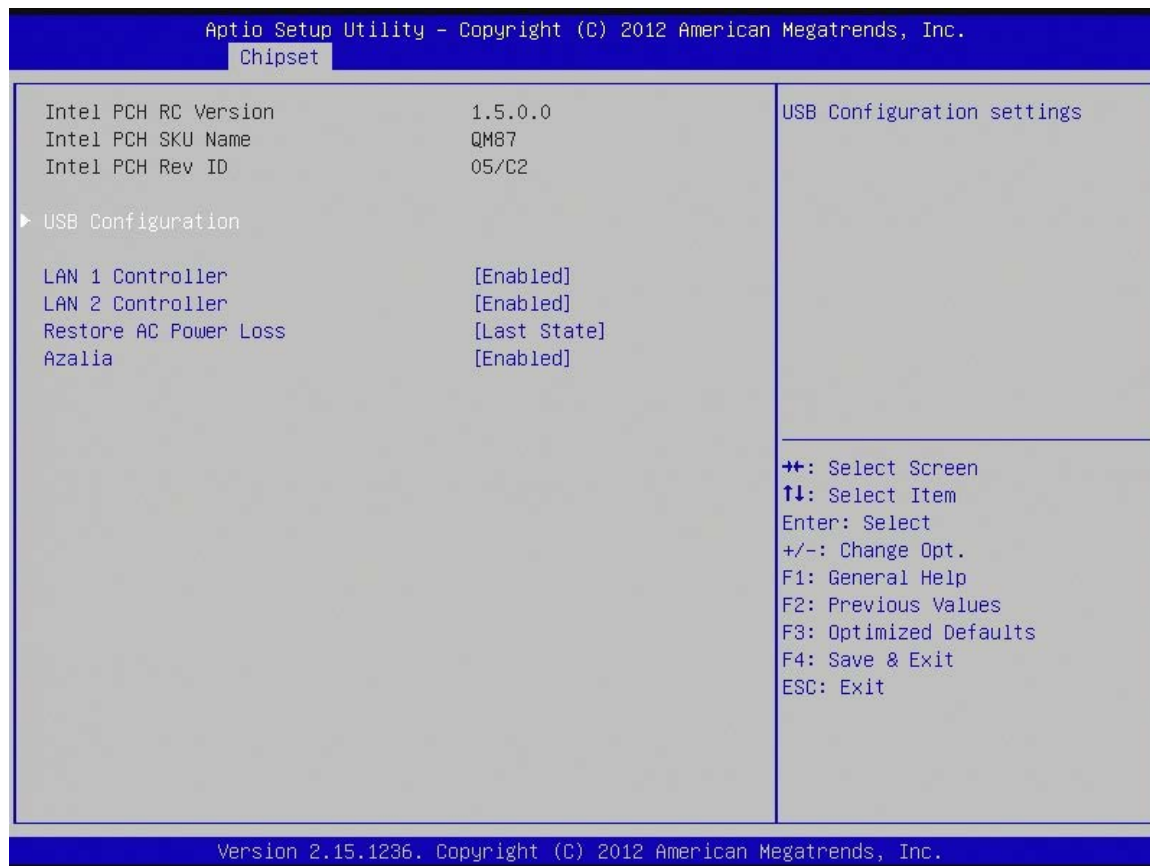
4.5 Chipset

This section gives you functions to configure the system based on the specific features of the chipset. The chipset manages bus speeds and access to system memory resources.



4.5.1 PCH IO configuration

PCH parameters



USB Configuration

XHCI Mode: Mode of operation of xHCI controller.

LAN1 Controller

Enable or disable onboard NIC.

LAN2 Controller

Control the PCI Express Root port

Restore AC Power Loss

Select AC power state when power is re-applied after a power failure

Azalia

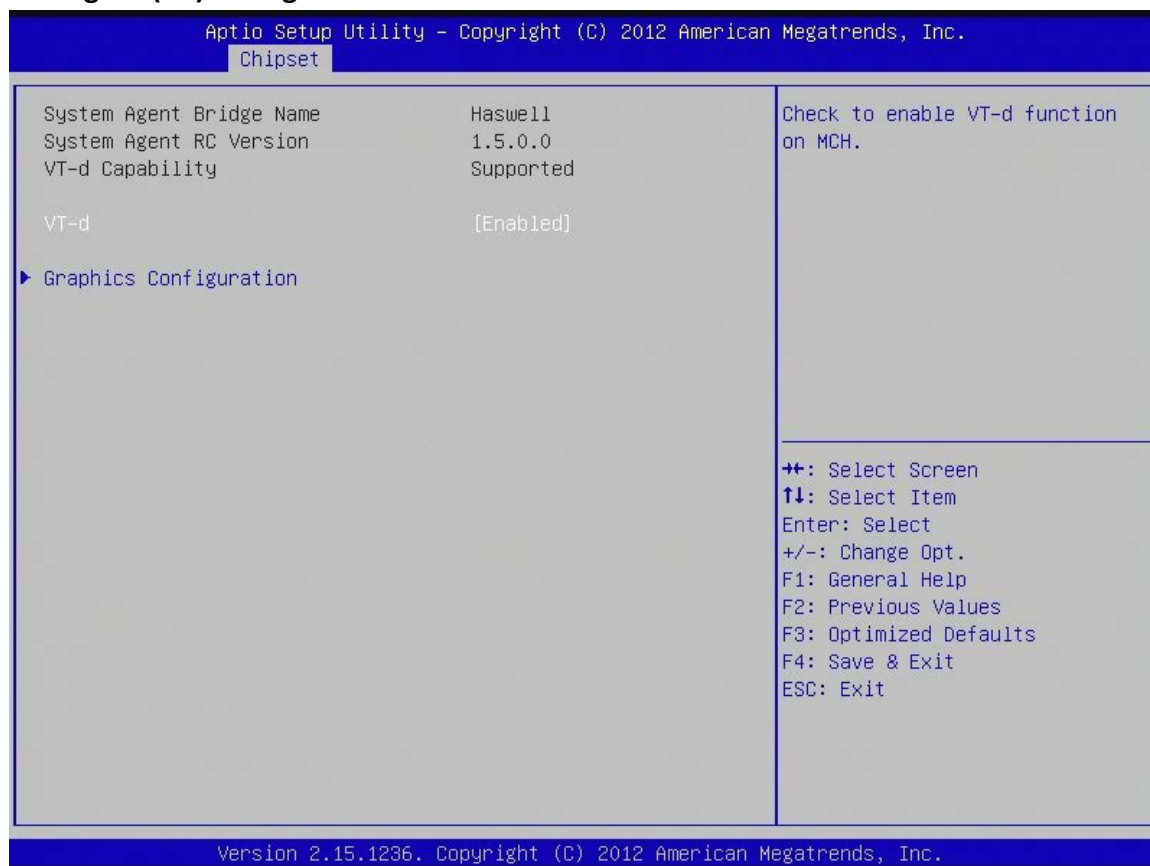
Control Detection of the Azalia device.

Disabled=Azalia will be unconditionally disabled.

Enabled=Azalia will be unconditionally Enabled.

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

4.5.2 System Agent (SA) Configuration



VT-d

Check to enable VT-d function on MCH.

Graphics Configuration Config Graphics settings

Primary Display: select which of IGFX/PEG/PCI graphics device should be primary display or select SG for switchable GFX

Internal Graphics: Keep IGD enabled based on the setup options

Aperture Size: select the aperture size

LCD Control

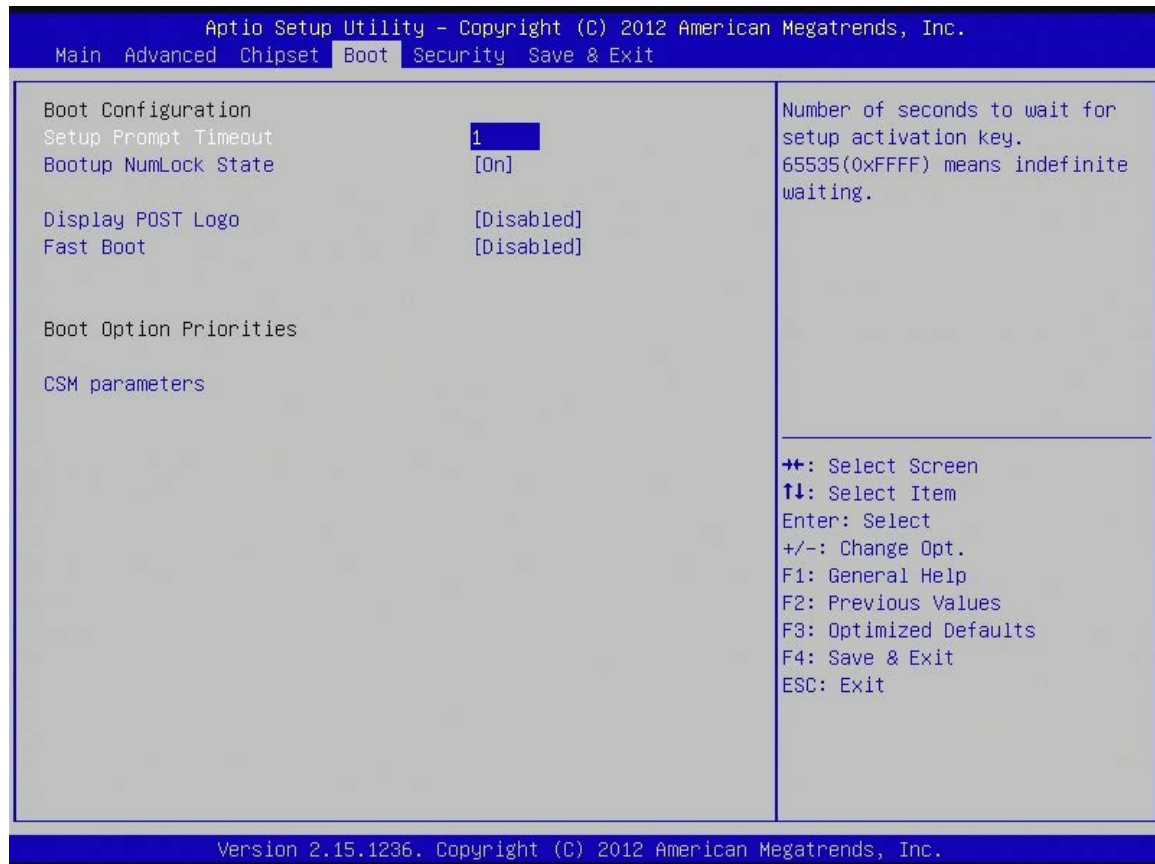
Primary IGFX Boot Display: select the Video Device which will be activated during POST. This has no effect if external graphics present. Secondary boot display selection will appear based on your selection. VGA modes will be supported only on primary display.

Secondary IGFX Boot Display: select secondary display device

LCD Panel Type: select LCD panel used by Internal Graphics Device by selecting the appropriate setup item

4.6 Boot

This section is used to configure the boot features.



Setup Prompt Timeout

Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

Bootup NumLock State

Select the keyboard NumLock state.

Display POST Logo

Enables or disables Quiet Boot option

Fast Boot

Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options

CSM Parameters

OpROM execution, boot options filter, etc.

Launch CSA: this option controls if CSM will be launched

Boot option filter: this option controls what devices system can boot to

Launch PXE OpROM policy: Controls the execution of UEFI and Legacy PXE OpROM

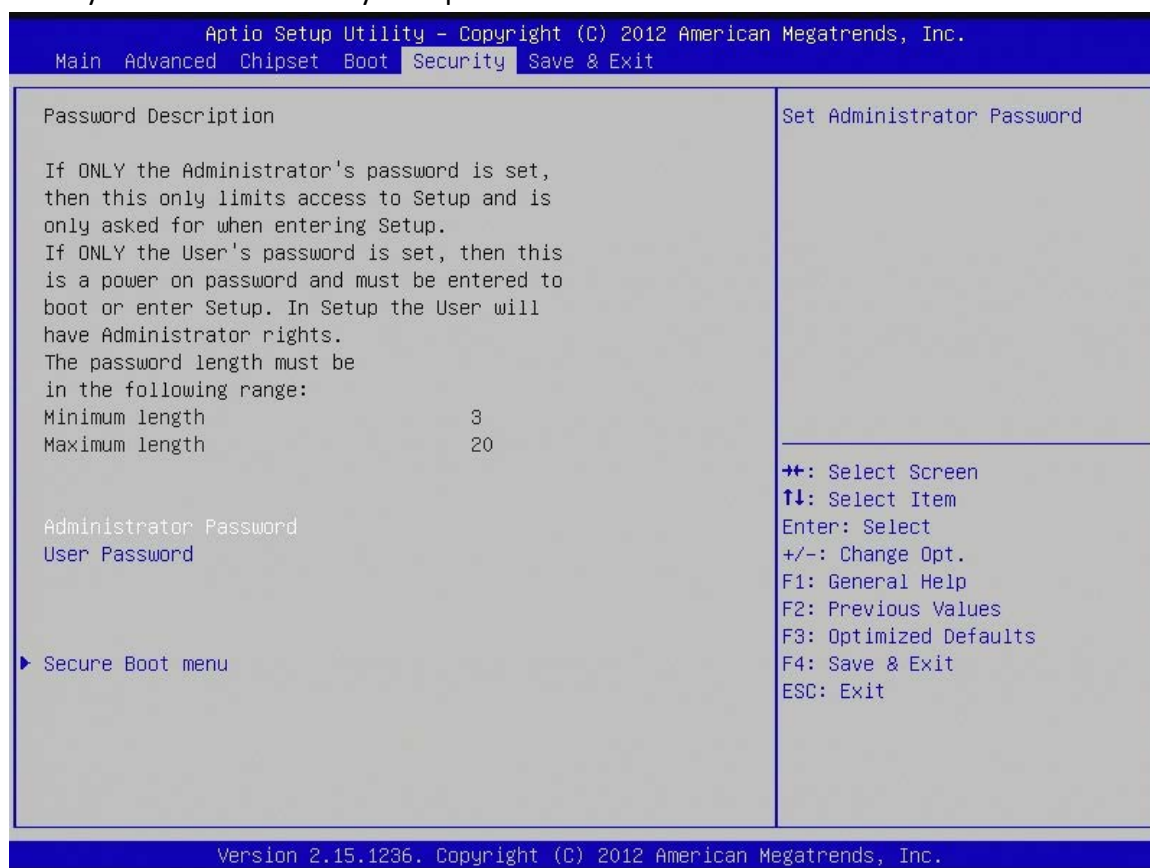
Launch Storage OpROM policy: Controls the execution of UEFI and Legacy Storage OpROM.

Launch Video OpROM policy: 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.

4.7 Security

Use the Security Menu to establish system passwords



Administrator Password

Set Administrator Password.

User Password

Set User Password.

Secure Boot Menu

Customizable secure boot settings

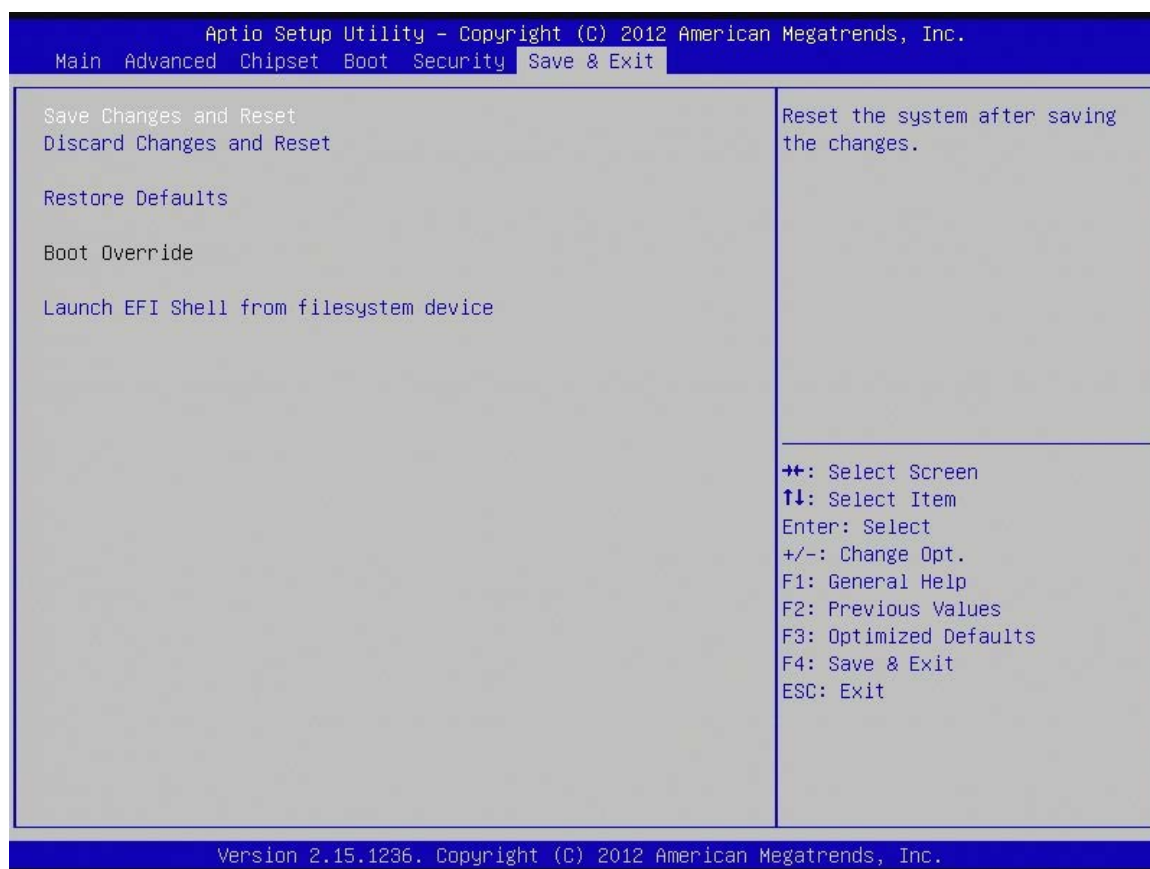
Secure Boot Mode Control: secure boot flow control. Secure boot can be enabled only when

1. platform key (PK) is enrolled and platform is operating in user mode and
2. CSM function is disabled in setup

Secure Boot Mode: secure boot mode selector. 'Custom' Mode allows for more flexibility changing image execution policy and secure boot key management

4.8 Save and Exit

This screen provides functions for handling changes made to the BIOS settings and the exiting of the Setup program.



Save Changes and Reset

Reset the system after saving the changes.

Discard Changes and Reset

Reset system setup without saving any changes.

Restore Defaults

Restore/Load Default values for all the setup options.

Launch EFI Shell from filesystem device

Attempts to launch EFI Shell application (Shellx64.efi) from one of the available filesystem devices.