IV32 Motherboard

3.5” SBC with Intel ® 3rd Generation Core™ i7 Processors
HDMI, LVDS, VGA, Dual Giga Ethernet, Mini PCIe Interface

User Manual / Engineering Spec.

Version 1.1

FCC Statement

This device complies with part 15 FCC rules. Operation is subject to the following two conditions :

. This device may not cause harmful interference.
. This device must accept any interference received including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a class "a" digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at him own expense.

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Trademark Acknowledgement

Disclaimer

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Warranty

We warrant that each of its products will be free from material and workmanship defects for a period of one year from the invoice date. If the customer discovers a defect, We will, at its option, repair or replace the defective product at no charge to the customer, provided it is returned during the warranty period of one year, with transportation charges prepaid. The returned product must be properly packaged in its original packaging to obtain warranty service.

If the serial number and the product shipping data differ by over 30 days, the in-warranty service will be made according to the shipping date. In the serial numbers the third and fourth two digits give the year of manufacture, and the fifth digit means the month (e. g., with A for October, B for November and C for December).

For example, the serial number 1W13Axxxxxxxx means October of year 2013.

Packing List

Before using this Motherboard, please make sure that all the items listed below are present in your package：

- IV32 Motherboard
- User Manual
- User's Manual & Driver CD
- HDD SATA Cable

If any of these items are missing or damaged, contact your distributor or sales representative immediately.

Customer Service

We provide service guide for any problem as follow steps：The first, contact with your distributor, sales representative, or our customer service center for technical support if you need additional assistance. You may have the following information ready before you call：

- Product serial number
- Peripheral attachments
- Software (OS, version, application software, etc.)
- Description of complete problem
- The exact wording of any error messages

In addition, free technical support is available from our engineers every business day. We are always ready to give advice on application requirements or specific information on the installation and operation of any of our products. Please do not hesitate to call or e-mail us.

Safety Precautions

- **Warning!**

Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges. Only experienced electronic personnel should open the PC chassis.

- **Caution!**

Always ground yourself to remove any static charge before touching the CPU card. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components in a static-dissipative surface or static-shielded bag when they are not in the chassis.

Safety and Warranty

1. Please read these safety instructions carefully.
2. Please keep this user's manual for later reference.
3. Please disconnect this equipment from any AC outlet before cleaning. Do not use liquid or spray detergents for cleaning. Use a damp cloth.
4. For pluggable equipment, the power outlet must be installed 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 could 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 over-voltage.
12. Never pour any liquid into an opening. This could cause fire or electrical shock.
13. Never open the equipment. For safety reasons, only qualified service personnel should open the equipment.
14. If any of the following situations arises, get the equipment checked by service personnel:
    A. The power cord or plug is damaged.
    B. Liquid has penetrated into the equipment.
    C. The equipment has been exposed to moisture.
    D. The equipment does not work well, or you cannot get it to work according to the user's manual.
    E. The equipment has been dropped and damaged.
    F. The equipment has obvious signs of breakage.
15. Do not leave this equipment in an uncontrolled environment where the storage temperature is below -20° C (-4°F) or above 60° C (140° F). It may damage the equipment.

Revision History

Version	Date	Note	Author
1.1	2015.03.26	Jumper , Connector	Austin Chang
1.0	2013.06.25	Initial Draft	Pirson Liang

Contents

CHAPTER 1

General Information

This chapter includes the IV32 Motherboard background information.

The section includes:

- Introduction
- Feature
- Motherboard Specification
- Function Block
- Board Dimension

Chapter 1 General Information

1.1 Introduction

The IV32 SBC is integrated with Intel® Express Chipset HM76 (22x22mm) and 3rd Generation Intel® Core™ i7 Processors which offers a high performance computing platform with low power consumption. The new motherboard supports 204-pin SO-DIMM DDR3 at speeds of 1333/1600 MHz, up to 8GB.

One SATAII 3.0Gb/s and one SATAIII 6.0Gb/s interfaces provide ample capacity. With dual Gigabit Ethernet, four COM ports, three USB 3.0 and four USB 2.0, IV32 SBC meets the requirements of today's various applications.

Display requirements are met with rich interfaces, such as HDMI, LVDS, and CRT. The graphic engine adopts Intel® Express Chipset HM76 to offer high definition display function, and it also supports 24-bit Dual-Channel LVDS.

With all of the integrated features, IV32 SBC is designed to satisfy most of the applications in the industrial computer market, such as Gaming, POS, KIOSK, Industrial Automation, and Programmable Control System. It is a compact design to meet the demanding performance requirements of today's business and industrial applications.

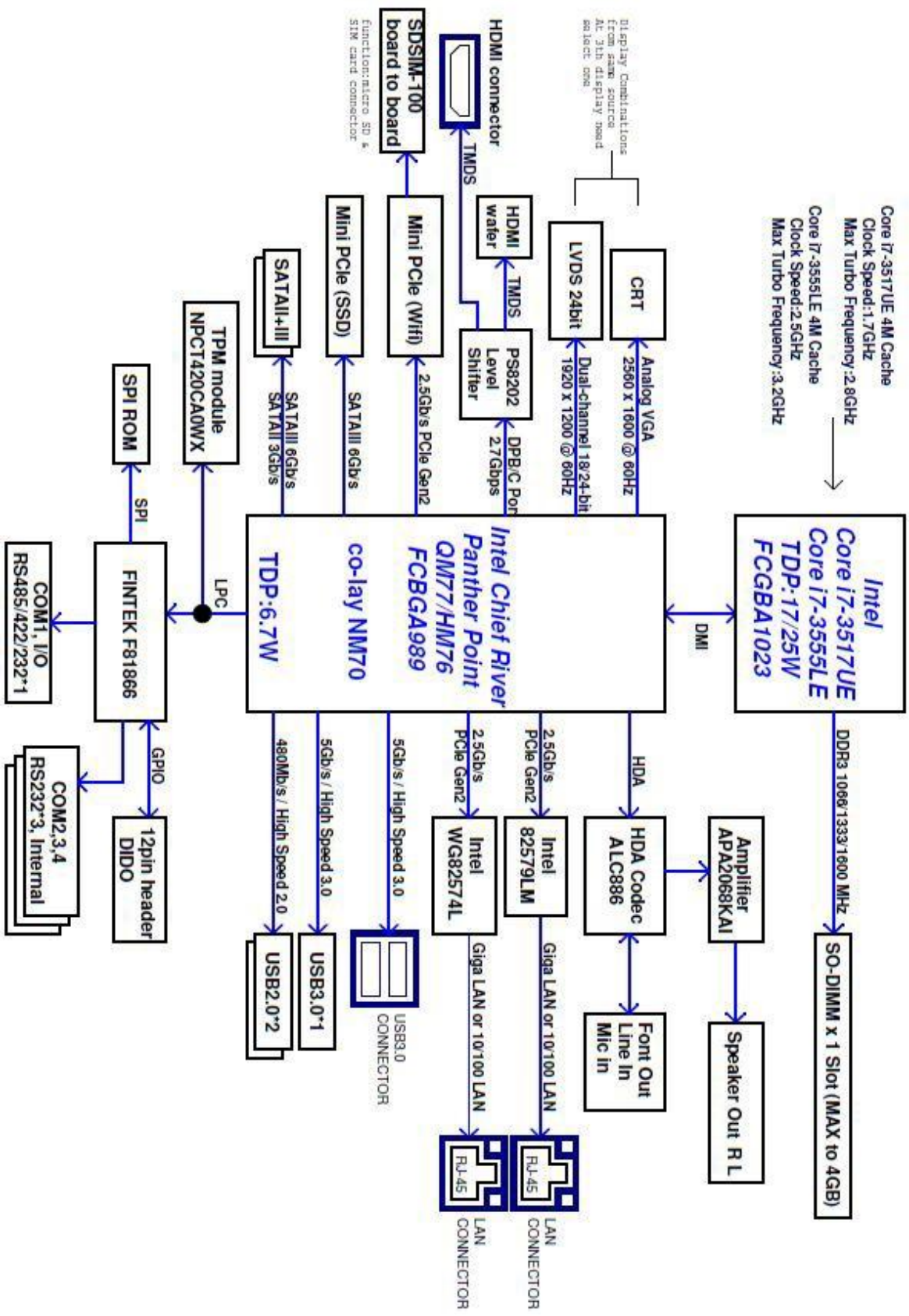
1.2 Feature

- 3.5-inch Form Factor (146mm x 102mm / 5.7 x 4 inches)
- Support 3rd Generation Intel® Core™ i7 processors
- Intel® ExpressChipsetHM7
- 204-pin SO-DIMM DDR 1333/1600 MHz, up to 8GB
- Intel® Graphic Accelerator 4000 Integrated Graphics Engine
- VGA, 18/24-bit Dual-Channel LVDS, 2 x HDMI
- Intel® 82579-LM GbE PHY and Intel® WG82574L GbE
- 1 x Mini PCIe, 1 x Mini Card Slot (for mSATA SSD), 4 x COM, 3 x USB 3.0, 4 x USB 2.0, 1 x SATA II, 1 x SATA III, 12-bit GPIO, 1 x 1394b
- +12V only operation

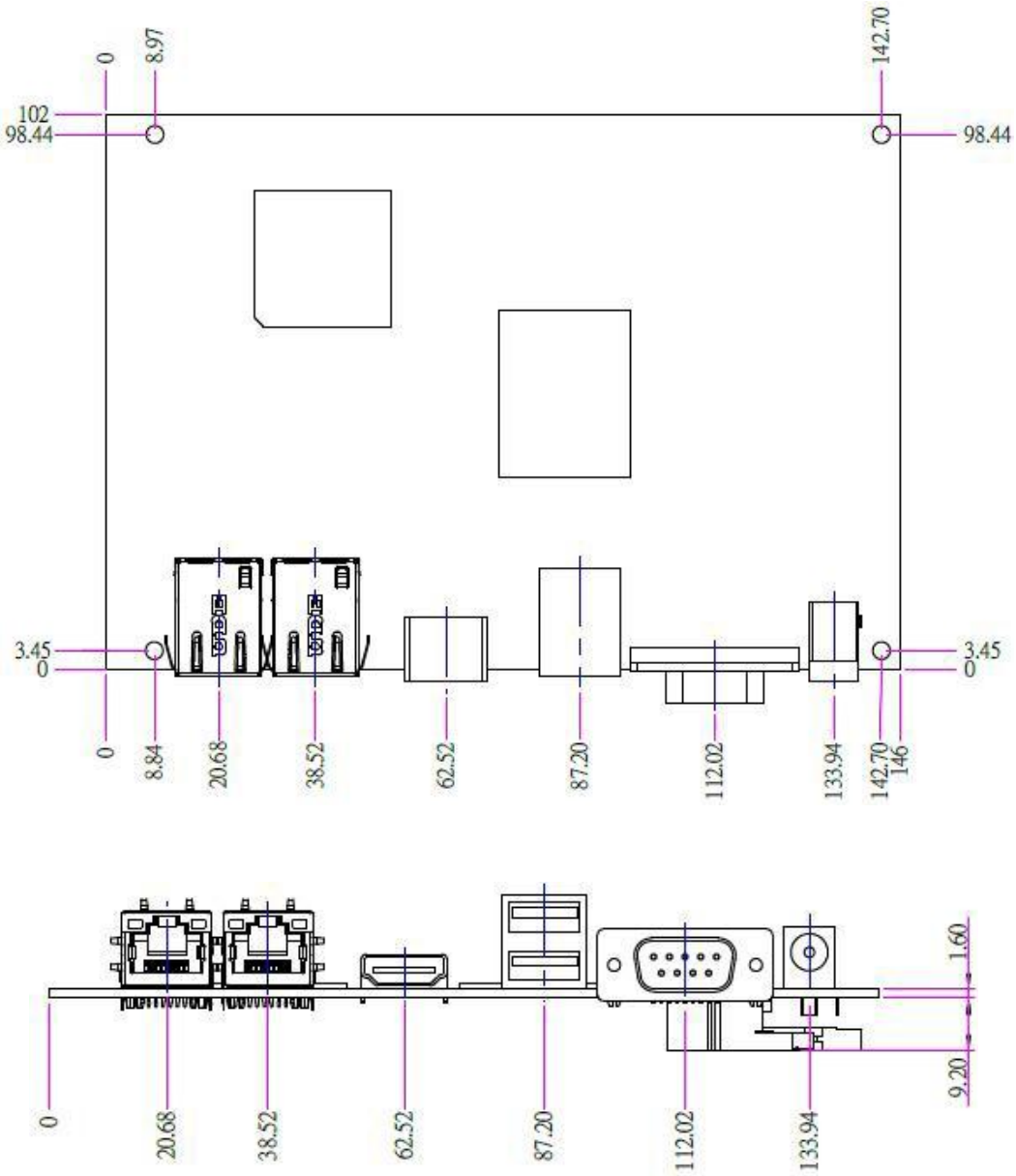
1.3 Motherboard Specifications

Processor	Intel® Core i7-3555LE 2.5GHz / Core i7-3517UE 1.7GHz
Chipset	Intel® Express Chipset HM76
BIOS	AMI 16Mbit Flash
Graphic	Intel® Graphic Accelerator 4000 support DX11, OpenGL 3.1
LCD Interface	Dual-Channel 18/24-bit LVDS up to 1920 x 1200 @ 60Hz
Resolution	Up to 1920 x 1200 for VGA, HDMI
LAN	2 x Giga LAN (Intel® 82579-LM GbE PHY and Intel® WG82574L GbE)
System Memory	204-pin SO-DIMM DDR 1333/1600 MHz, up to 8GB
Super I/O	Fintek F81866
Sound	Realtek ALC886 HD Audio Codec
USB	3 x USB 3.0, 4 x USB 2.0
COM	4 x COM ports
Edge Connectors	1 x DC-IN Power Jack (+12V) 1 x RS232/422/485 2 x USB 3.0 1 x HDMI 2 x Gigabit LAN RJ-45
On Board Pin-Header Connectors	3 x RS-232 / 10-pin(2x5) 1 x USB 3.0 / 10-pin(2x5) 4 x USB 2.0 / 8-pin(2x4) 1 x LVDS / 40-pin(2x20) DF-13 connector 1 x SATA II 3.0Gb/s 1 x SATA III 6.0Gb/s 1 x SATA Power 1 x Digital I/O(12-bit GPIO) / 14-pin(2x7) 1 x Power-input / 2-pin 1 x +12V for external power(Yellow) / 2-pin 1 x +5V for external power(Red) / 2-pin 1 x +3.3V for external power(Blue) / 2-pin 1 x Fan / 3-pin 1 x Panel inverter / 7-pin 1 x Front panel / 10-pin(2x5) 1 x Backlight brightness controller / 3-pin 2 x Speaker with Amp. / 2-pin 1 x HDMI (DVI-D) / 20-pin(2x10) 1 x VGA / 10-pin(2x5) 1 x 1394b / 10-pin(2x5) 1 x Audio (Mic-in / Line-in / Line-out) / 12-pin(2x6) 1 x Battery / 2-pin
Power Connector	2-pin Power-input connector
Expansion Slots	1 x Mini PCIe for wireless, 1 x Mini Card Slot for mSATA SSD
Form Factor	3.5 inch
Dimensions	146mm x 102mm
Environmental	Operating Temperature: 0~60℃ (32~140℉) Operating Humidity: 10~90% Relative Humidity, non-condensing Shock: Operating 15G, 11ms duration Vibration: Operating 5 Hz~500Hz / 1Grms / 3 Axis Certification: CE, FCC, RoHS

1.4 Function Block



1.5 Board Dimension



CHAPTER 2

Installations

This chapter provides information on how to use the jumpers and connectors on the IV32 Motherboard.

The section includes:

- Memory Module Installation
- I / O Equipment Installation
- Jumper and Connector Location
- Jumpers
- Connectors and Pin Assignment

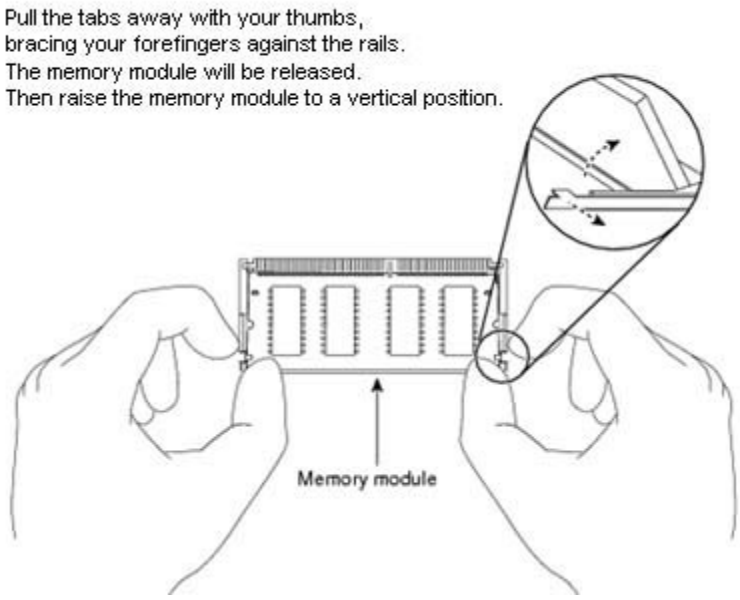
Chapter 2 Installations

2.1 Memory Module（SO-DIMM）Installation

The IV32 Motherboard provides one 204-pin SO-DIMM slot, and it supports up to 8GB DDR3 1333/1600MHz. When installing the Memory device, please follow the steps below：

Step 1. Firmly insert the SO-DIMM at an angle into its slot. Align the SO-DIMM on the slot such that the notch on the SO-DIMM matches the break on the slot.

Step 2. Press downwards on SO-DIMM until the retaining clips at both ends fully snap back in place and the SO-DIMM is properly seated.



- Caution!

The SO-DIMM only fits in one correct orientation. It will cause permanent damage to the development board and the SO-DIMM if the SO-DIMM is forced into the slot at the incorrect orientation.

2.2 I / O Equipment Installation

2.2.1 12V DC-IN

The Motherboard allows plugging 12V DC-IN jack on the board without another power module converter under power consumption of 3rd Generation Intel® Core™ Processor (Socket FCBGA1023) with Express Chipset HM76.

※Without power/reset OSD, short circuit pin 5 and 6 together to boot up the motherboard.(Front Panel Connector)

2.2.2 Serial COM ports

One COM port connector which supports RS232/422/485 function by jumper setting has been built-in the rear I/O, and one internal COM port can be connected to a serial or an optional touch-screen when an optional touch-screen is ordered with Panel PC.

2.2.3 External HDMI

The Motherboard has one HDMI port that can be connected to an external LCD monitor by using HDMI cable, and it also needs to be connected to the outlet by power cable. The HDMI connector is a standard 19-pin Type A connector.

2.2.4 Ethernet interface

The Motherboard is equipped with Intel® Gigabit Ethernet Controller which is fully compliant with the PCI 10/100/1000 Mbps Ethernet protocol compatible. It is supported by major network operating systems. The Ethernet ports provide two standard RJ-45 jacks.

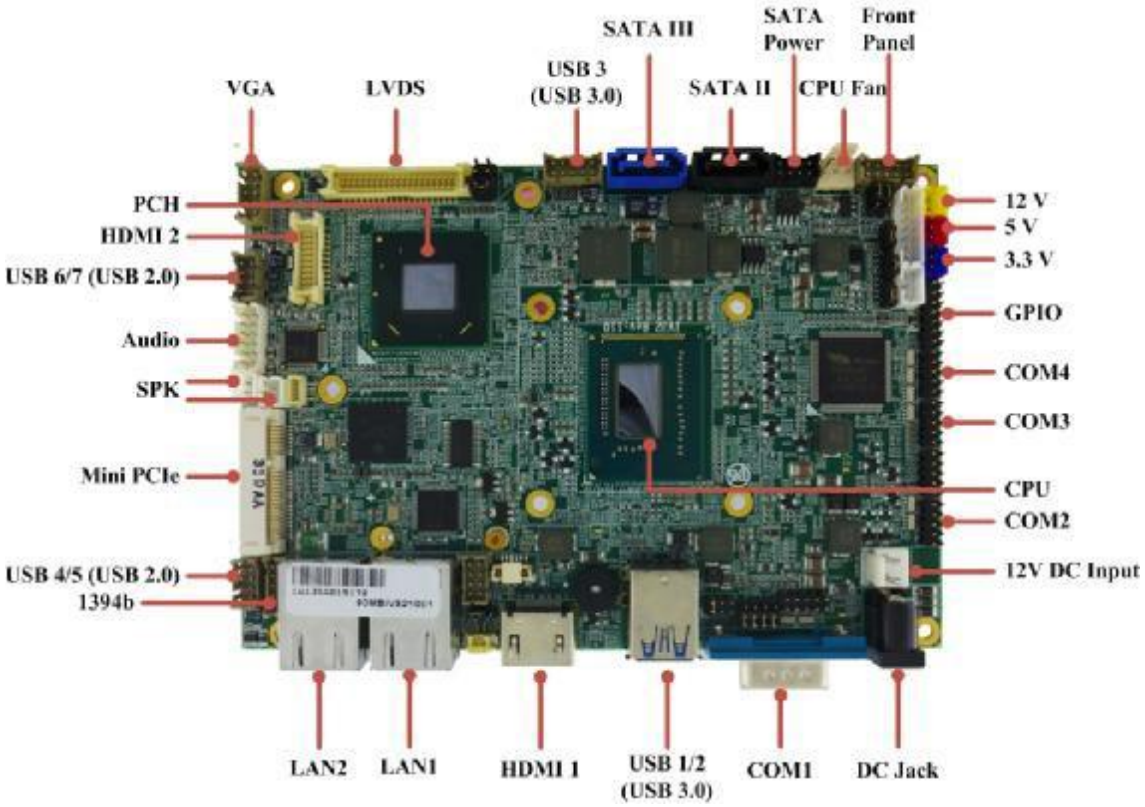
2.2.5 USB ports

Seven USB devices (five with pin headers) may be connected to the system through an adapter cable. Various adapters may come with USB ports. USB usually connect the external system to the system. The USB ports support hot plug-in connection. Whatever, you should install the device driver before you use the device.

※Note

2.3 Jumper and Connector Location

Component Side



Solder Side

2.4 Jumpers

2.4.1 Jumper List

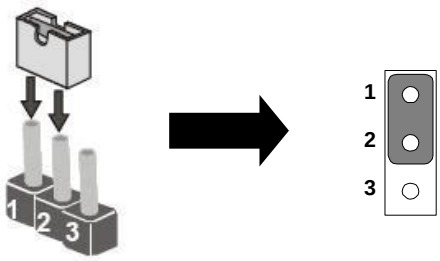
The following table lists the function of each of the board's jumpers.

Label	Function	Note
JP1	Clear CMOS	3x1 header , pitch 2.0mm
JP3	COM1 Setting (RS232/422/485)	2x3 header , pitch 2.0mm
JP4	COM1 Setting (RS232 or RS422/485)	3x4 header , pitch 2.0mm
JP5	Backlight Inverter VCC Selection	3x1 header , pitch 2.0mm
JP6	Backlight Inverter VCC Control	3x1 header , pitch 2.0mm
JP7	Operating VDD Selection	3x1 header , pitch 2.0mm
JP8	Backlight Brightness Control Mode Selection	3x1 header , pitch 2.0mm
JP9	DC Capacitor	3x1 header , pitch 2.0mm
CON1	LCD Panel Voltage Selection	2x3 header , pitch 2.0mm

2.4.2 Jumper Settings

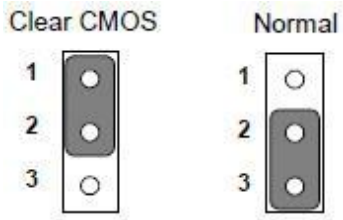
A metal-bridge jumper used to close an electric circuit, and it usually consists of two metal pins and one small clip protected by a plastic cover that slides over the pins to connect them. Users can connect the pins with the clip to close a jumper, and remove the clip to open a jumper. Generally, a jumper will have three pins which labeled 1, 2, and 3. In this case, you would connect either pins 1 and 2, or 2 and 3.

The jumper setting diagram is as below. If a jumper shorts pin 1 and pin 2, the setting diagram is shown as the right one.



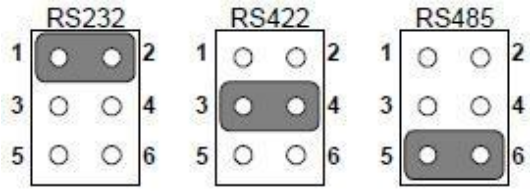
A pair of needle-nose pliers may be helpful when working with jumpers. If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes.

JP1: Clear CMOS



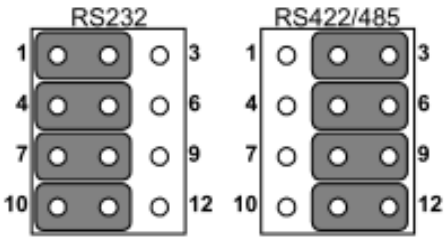
Pin No.	Functions
1-2	Clear CMOS
2-3	Normal (Default)

JP3: COM1 Setting (RS232/422/485)



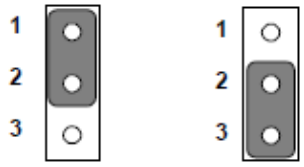
Pin No.	Functions
1-2	RS232 (Default)
3-4	RS422
5-6	RS485

JP4: COM1 Setting (RS232 or RS422/485)



RS232 (Default)	RS422 / 485
1-2	2-3
4-5	5-6
7-8	8-9
10-11	11-12

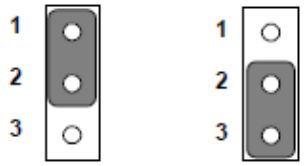
JP5: Backlight Inverter VCC Selection



+5V **+12V**

Pin No.	Functions
1-2	+5V (Default)
2-3	+12V

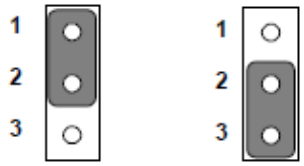
JP6: Backlight Inverter VCC Control



BIOS **GND**

Pin No.	Functions
1-2	BIOS (Default)
2-3	GND

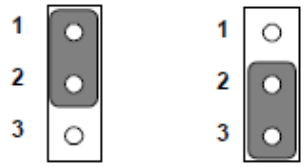
JP7: Operating VDD Selection



+3.3V **+5V**

Pin No.	Functions
1-2	+3.3V (Default)
2-3	+5V

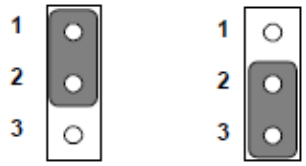
JP8: Backlight Brightness Control Mode Selection



DC **PWM**

Pin No.	Functions
1-2	DC Mode
2-3	PWM Mode (Default)

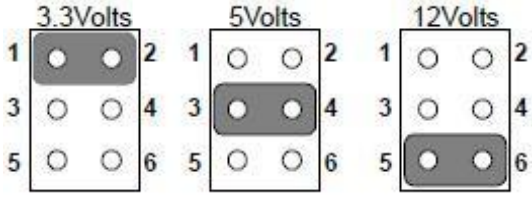
JP9: DC Capacitor



Capacitor **N/C**

Pin No.	Functions
1-2	Capacitor
2-3	N/C (Default)

CON1: LCD Panel Voltage Selection



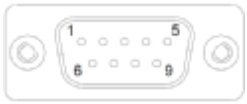
Pin No.	Functions
1-2	+3.3V (Default)
3-4	+5V
5-6	+12V

2.5 Connectors and Pin Assignment

The table below lists the function of each of the board's connectors.

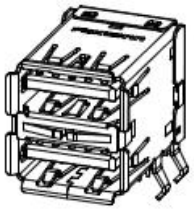
Label	Function
DC Jack	12V Power Input
COM1	RS232/422/485
USB 1/2	USB 3.0 Ports
HDMI 1	HDMI Connector
LAN1 / 2	Intel® LAN Ports
1394b	1394b (FireWire 800)
SPK	2W External Speaker
Audio	Line_in / Line_out / Mic_in
VGA	VGA Internal Wafer
HDMI 2	HDMI Internal Wafer
LVDS	LVDS Port
SATA II	SATA 2.0 3Gb/s Port
SATA III	SATA 3.0 6Gb/s Port
SATA Power	SATA Power
CPU Fan	CPU Fan
Front Panel	System Function (Power / Reset)
3.3V	3.3V Output
5V	5V Output
12V	12V Output
GPIO	General Purpose I/O
12V DC Input	12V DC Power Input Wafer
USB 3	USB 3.0 Wafer
USB 4/5	USB 2.0 Wafer
USB 6/7	USB 2.0 Wafer
COM2	RS232
COM3	RS232
COM4	RS232
Mini PCIe	Full / Half-Size Mini PCIe
Mini Card Slot	For mSATA SSD Card
DDR3 SO-DIMM	DDR3 SO-DIMM Socket

2.5.1 COM1: RS232/422/485



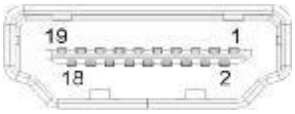
Pin No.	SYMBOL	Pin No.	SYMBOL
1	DCD	2	DxD
3	TxD	4	DTR
5	GND	6	DSR
7	RTX	8	CTS
9	RI		

2.5.2 USB 1/2: USB 3.0 Ports



Pin No.	SYMBOL	Pin No.	SYMBOL
1	+5VUSB3.0_CONNA	10	+5VUSB3.0_CONNB
2	USB_PN0_C	11	USB_PN1_C
3	USB_PP0_C	12	USB_PP1_C
4	USB_GND	13	USB_GND
5	USB3_RXN1_C	14	USB3_RXN2_C
6	USB3_RXP1_C	15	USB3_RXP2_C
7	USB_GND	16	USB_GND
8	USB3_TXN1_C	17	USB3_TXN2_C
9	USB3_TXP1_C	18	USB3_TXP2_C

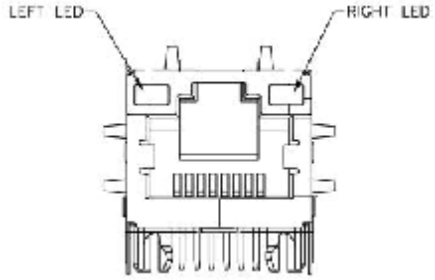
2.5.3 HDMI 1: HDMI Connector



Pin No.	SYMBOL	Pin No.	SYMBOL
1	HDMIB_TMDS0+	2	GND
3	HDMIB_TMDS0-	4	HDMIB_TMDS1+
5	GND	6	HDMIB_TMDS1-
7	HDMIB_TMDS2+	8	GND
9	HDMIB_TMDS2-	10	HDMIB_CLK+
11	GND	12	HDMIB_CLK-

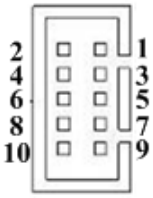
13	GND	14	NC
15	HDMI_DDC_CLK	16	HDMI_DDC_DATA
17	GND	18	+5V
19	HDMI_HPD1		

2.5.4 LAN1 (LAN2): Intel® LAN Ports (RJ-45)



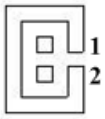
Pin No.	SYMBOL	Pin No.	SYMBOL
1	MDI0_IN+	2	MDI0_IN-
3	MDI1_IN+	4	MDI1_IN-
5	VLAN_12	6	LAN1_DGND
7	MDI2_IN+	8	MDI2_IN-
9	MDI3_IN+	10	MDI3_IN-
11	LAN_VDD(1.9V)	12	LAN_TRAFFICLED#
13	LAN_SPD100LED#	14	LAN_SPD1000LED#
15	UGND	16	UGND

2.5.5 1394b: FireWire 800



Pin No.	SYMBOL	Pin No.	SYMBOL
1	1394b_TPB0+	2	1394b_TPA0+
3	1394b_TPB0-	4	1394b_TPA0-
5	GND	6	GND
7	+12V	8	N/C
9	N/C	10	N/C

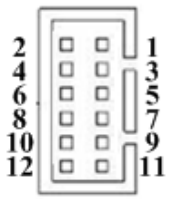
2.5.6 SPK: 2W External Speaker



Pin No.	SYMBOL	Pin No.	SYMBOL
1	LOUT+	2	LOUT-

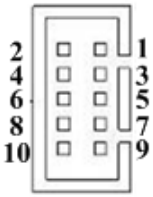
Pin No.	SYMBOL	Pin No.	SYMBOL
1	ROUT+	2	ROUT-

2.5.7 Audio: Line_in / Line_out / Mic_in



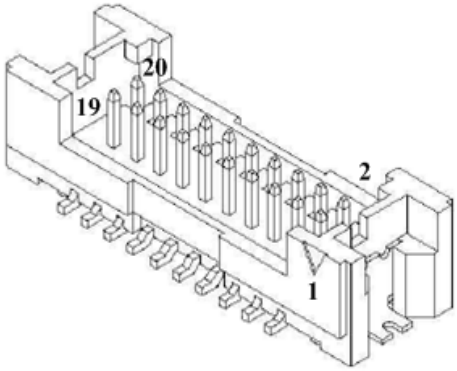
Pin No.	SYMBOL	Pin No.	SYMBOL
1	AZ_FOUT_R	2	AZ_FOUT_L
3	+5V	4	AUGND
5	LINE1_R	6	LINE1_L
7	MIC1_R	8	MIC1_L
9	AUGND	10	Font_SENSE
11	Mic_SENSE	12	Line_SENSE

2.5.8 VGA: VGA Internal Wafer



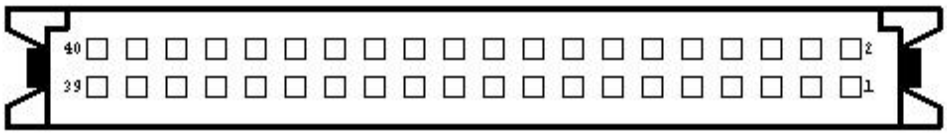
Pin No.	SYMBOL	Pin No.	SYMBOL
1	DAC_SDAT0	2	VGA_5V
3	DAC_SCL0	4	R_FILTER
5	3VHSYNC0	6	G_FILTER
7	3VVSYNC0	8	B_FILTER
9	GND	10	GND

2.5.9 HDMI 2: HDMI Internal Wafer



Pin No.	SYMBOL	Pin No.	SYMBOL
1	GND	2	HDMIC_TMDS2-
3	GND	4	HDMIC_TMDS2+
5	N/C	6	HDMIC_TMDS1-
7	N/C	8	HDMIC_TMDS1+
9	N/C	10	HDMIC_TMDS0-
11	HDMIC_HPD2	12	HDMIC_TMDS0+
13	N/C	14	HDMIC_CLK-
15	N/C	16	HDMIC_CLK+
17	+5V	18	HDMIC_DDC_CLK
19	+5V	20	HDMIC_DDC_DATA

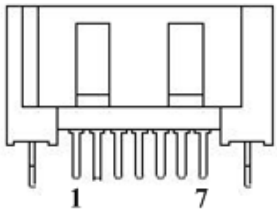
2.5.10 LVDS: LVDS Port



Pin No.	SYMBOL	Pin No.	SYMBOL
1	LCDVDD	2	TXOUT_L0-
3	LCDVDD	4	TXOUT_L0+
5	LCDVDD	6	TXOUT_L1-
7	GND	8	TXOUT_L1+
9	GND	10	TXOUT_L2-
11	GND	12	TXOUT_L2+
13	GND	14	TXCLK_L-
15	GND	16	TXCLK_L+
17	GND	18	TXOUT_L3-
19	GND	20	TXOUT_L3+
21	GND	22	TXOUT_U0-

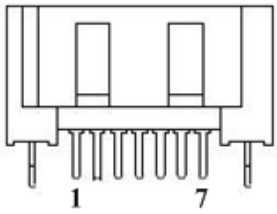
23	GND	24	TXOUT_U0+
25	GND	26	TXOUT_U1-
27	GND	28	TXOUT_U1+
29	GND	30	TXOUT_U2-
31	GND	32	TXOUT_U2+
33	GND	34	TXCLK_U-
35	GND	36	TXCLK_U+
37	GND	38	TXOUT_U3-
39	GND	40	TXOUT_U3+

2.5.11 SATA II: SATA 2.0 3Gb/s Port



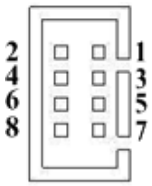
Pin No.	SYMBOL	Pin No.	SYMBOL
1	GND	2	SATA_TXP
3	SATA_TXN	4	GND
5	SATA_RXN	6	SATA_RXP
7	GND		

2.5.12 SATA III: SATA 3.0 6Gb/s Port



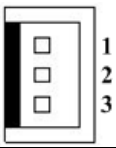
Pin No.	SYMBOL	Pin No.	SYMBOL
1	GND	2	SATA_TXP
3	SATA_TXN	4	GND
5	SATA_RXN	6	SATA_RXP
7	GND		

2.5.13 SATA Power:



Pin No.	SYMBOL	Pin No.	SYMBOL
1	+12V	2	+12V
3	GND	4	GND
5	GND	6	GND
7	+5V	8	+5V

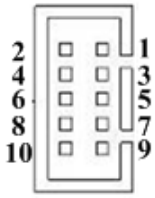
2.5.14 CPU Fan:



Pin No.	**SYMBOL**	**Pin No.**	**SYMBOL**
1	GND	2	+12V
3	SENSE		

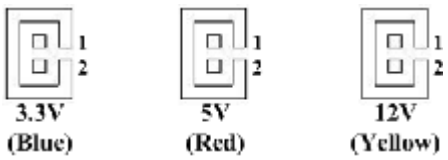
2.5.15 Front Panel: System Function (Power / Reset)

※Without power/reset OSD, short circuit pin 5 and 6 together to boot up the motherboard.



Pin No.	**SYMBOL**	**Pin No.**	**SYMBOL**
1	PW_LED+	2	HD_LED+-
3	PW_LED-	4	HD_LED-
5	PW_BT1	6	RT_BT1
7	PW_BT2	8	RT_BT2
9	RSEV	10	+5V

2.5.16 (3.3V /5V / 12V): Power Output

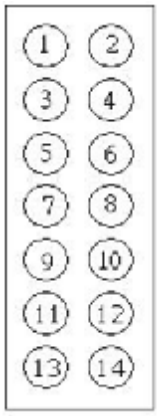


Pin No.	**SYMBOL**	**Pin No.**	**SYMBOL**

2.5.13 SATA Power:

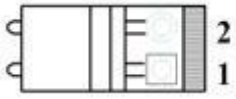
1	3.3V/ 5V/ 12V	2	GND

2.5.17 GPIO: General Purpose I/O



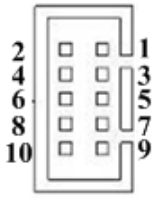
Pin No.	SYMBOL	Pin No.	SYMBOL
1	GND	2	+5V
3	DOUT3	4	DOUT1
5	DOUT2	6	DOUT0
7	DINT3	8	DINT2
9	DINT1	10	DINT0
11	GPIO53_IN0	12	GPIO56_OUT0
13	GPIO54_IN1	14	GPIO57_OUT1

2.5.18 12V DC Input: 12V DC Power Input Wafer



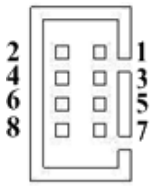
Pin No.	SYMBOL	Pin No.	SYMBOL
1	+12V	2	GND

2.5.19 USB 3: USB 3.0 Wafer



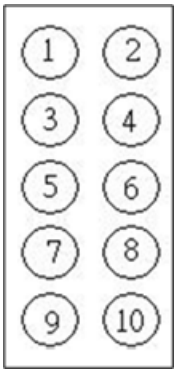
Pin No.	SYMBOL	Pin No.	SYMBOL
1	+5V	2	+5V
3	StdRx-	4	D-
5	StdRx+	6	D+
7	StdTx-	8	GND
9	StdTx+	10	GND

2.5.20 USB 4/5 (USB 6/7): USB 2.0 Wafer



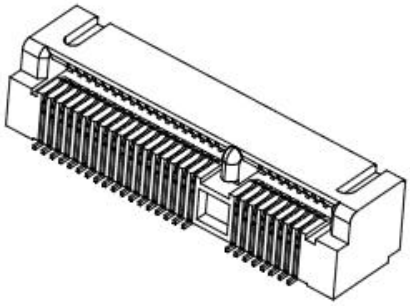
Pin No.	SYMBOL	Pin No.	SYMBOL
1	VCC(5V)	2	VCC(5V)
3	DATA0-	4	DATA1-
5	DATA0+	6	DATA1+
7	GND	8	GND

2.5.21 COM2 (COM3 / COM4): RS232



Pin No.	SYMBOL	Pin No.	SYMBOL
1	FK_NDCD[2:4]	2	FK_NDSR[2:4]
3	FK_NSIN[2:4]	4	FK_NRTS[2:4]
5	FK_NSOUT[2:4]	6	FK_NCTS[2:4]
7	FK_NDTR[2:4]	8	FK_NRI[2:4]
9	GND	10	GND

2.5.22 Mini PCIe: Full / Half-Size Mini PCIe



Pin No.	SYMBOL	Pin No.	SYMBOL
2	3.3V_MINIPCIE1	1	PCIE_WAKE#
4	GND	3	NA
6	+V1.5S	5	NA

8	VREG_USIM	7	CLK_SLOT4_OE#
10	NA	9	GND
12	NA	11	CLK_PCIE_SLOT4_N
14	NA	13	CLK_PCIE_SLOT4_P
16	NA	15	GND
18	GND	17	NA
20	WLAN-RFON2	19	NA
22	BUF_PLT_RST2#	21	GND
24	+V3.3A	23	PCIE_RXN3_SLOT4
26	GND	25	PCIE_RXP3_SLOT4
28	+V1.5S	27	GND
30	SMB_CLK	29	GND
32	SMB_DATA	31	PCIE_TXN3_SLOT4
34	GND	33	PCIE_TXP3_SLOT4
36	USB_PN5	35	GND
38	USB_PP5	37	GND
40	GND	39	3.3V_MINIPCIE1
42	NA	41	3.3V_MINIPCIE1
44	NA	43	GND
46	NA	45	NA
48	NA	47	NA
50	GND	49	NA
52	3.3V_MINIPCIE1	51	NA
m2	GND	m1	GND

2.5.23 mSATA Card Slot

Pin No.	SYMBOL	Pin No.	SYMBOL
2	+V3.3_	1	NA
4	GND	3	NA
6	+V1.5S	5	NA
8	NA	7	NA
10	NA	9	GND
12	NA	11	NA
14	NA	13	NA
16	NA	15	GND
18	GND	17	NA
20	NA	19	NA
22	NA	21	GND
24	+V3.3A	23	SATA_RXP1
26	GND	25	SATA_RXN1
28	+V1.5S	27	GND
30	NA	29	GND
32	NA	31	SATA_TXN1
34	GND	33	SATA_TXP1
36	NA	35	GND
38	NA	37	GND
40	GND	39	+V3.3_
42	NA	41	+V3.3_
44	NA	43	GND
46	NA	45	NA
48	+V1.5S	47	NA
50	GND	49	SSD_LED#
52	+V3.3_MINIPCIE1	51	NA
m2	GND	m1	GND

CHAPTER 3

Driver Installation

This chapter offers information on the drivers and installation utilities

The section includes:

- Installation of all drivers
- Installation of COM Port's driver

Chapter 3 Driver Installation

3.1 Installation of all drivers

The IV32 comes with AutoRun DVD-ROM that contains all drivers, utilities, and an installation AP that will help the user to install the driver successfully.

While inserting the driver DVD, an installation AP will be run automatically. After executing the AP, the UI shown below is used for driver installation. It will contain the drivers of all mother boards of Ivy Bridge which support Windows® XP and Windows® 7 (32-bit / 64-bit).

Depends on your operating system's version, select the corresponding one to find the drivers you need. (e.g. IV32_Win7_32 is used for IV32 with 32-bit Windows® 7) Then, each driver will be shown by various icons in the UI, and please follow the sequence below to install the drivers.

Follow the sequence below to install the drivers：

Step 1. Install Intel® Chipset Driver
Step 2. Install Graphic Driver
Step 3. Install LAN Driver
Step 4. Install Audio Driver
Step 5. Install Intel® ME Driver (in the icon AP)
Step 6. Install USB 3.0 Driver (Windows® 7 only)

Please read the instruction below for further detailed installation.

Installation：

Insert the Ivy Bridge DVD-ROM into the DVD-ROM drive, and install the drivers step by step.

Step 1. Install Intel® Chipset Driver

3.1.1Click on the icon ***Intel Chipset*** and the installation process will be executed.

3.1.2 Follow the instruction that the window shows.

3.1.3 The system will help you install the driver automatically.

Step 2. Install Graphic Driver

1. Click on the icon ***Graphic*** and the installation process will be executed.
2. Follow the instruction that the window shows.
3. The system will help you install the driver automatically.

Step 3. Install LAN Driver

1. Click on the icon ***LAN*** and the installation process will be executed.
2. Follow the instruction that the window shows.
3. The system will help you install the driver automatically.

Step 4. Install Audio Driver

1. Click on the icon ***Audio*** and the installation process will be executed.
2. Follow the instruction that the window shows.
3. The system will help you install the driver automatically.

Step 5. Install Intel® ME Driver

1. Click on the icon ***AP*** and ***Intel ME*** folder, and select the OS folder your system is.

2. Double click on the Setup.exe file located in each OS folder.
3. Follow the instruction that the window shows.
4. The system will help you install the driver automatically.

Step 6. Install USB 3.0 Driver (Windows® 7 only)

1. Click on the icon ***USB 3.0*** and the installation process will be executed.
2. Follow the instruction that the window shows.
3. The system will help you install the driver automatically.

3.2 Installation of COM Port's driver

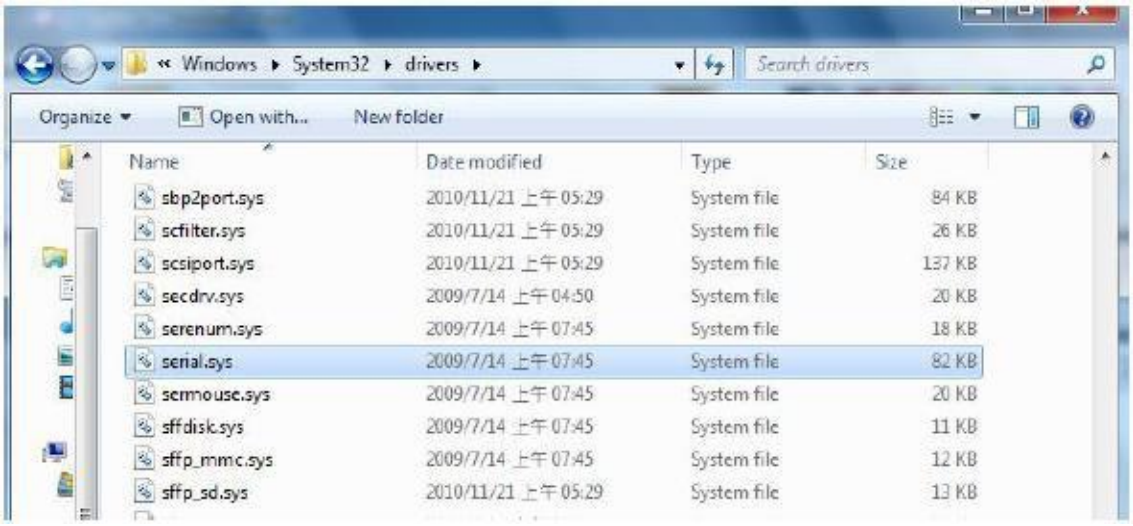
Step 1. If the system is WIN7, the UAC needs to be closed at first. (Refer to following "Disabling User Account Control (UAC) in Windows 7")

Step 2. Extract the ***Patch_0408.zip*** to a folder.

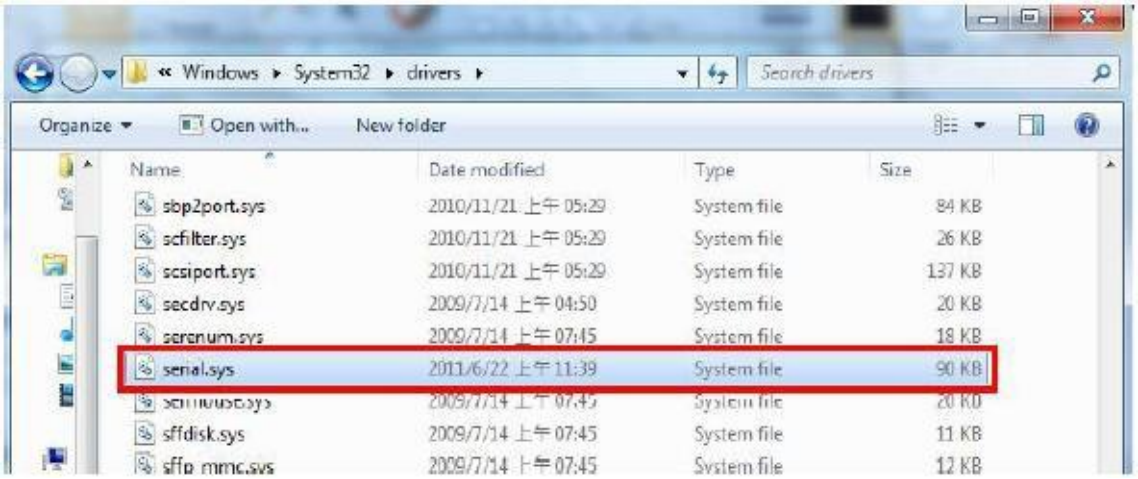
Step 3. Double click on the batch file (***patch.bat***), and the driver will be installed.

Step 4. Check whether the driver has been installed successfully.

Before the update or update fail.



After the update and update success.



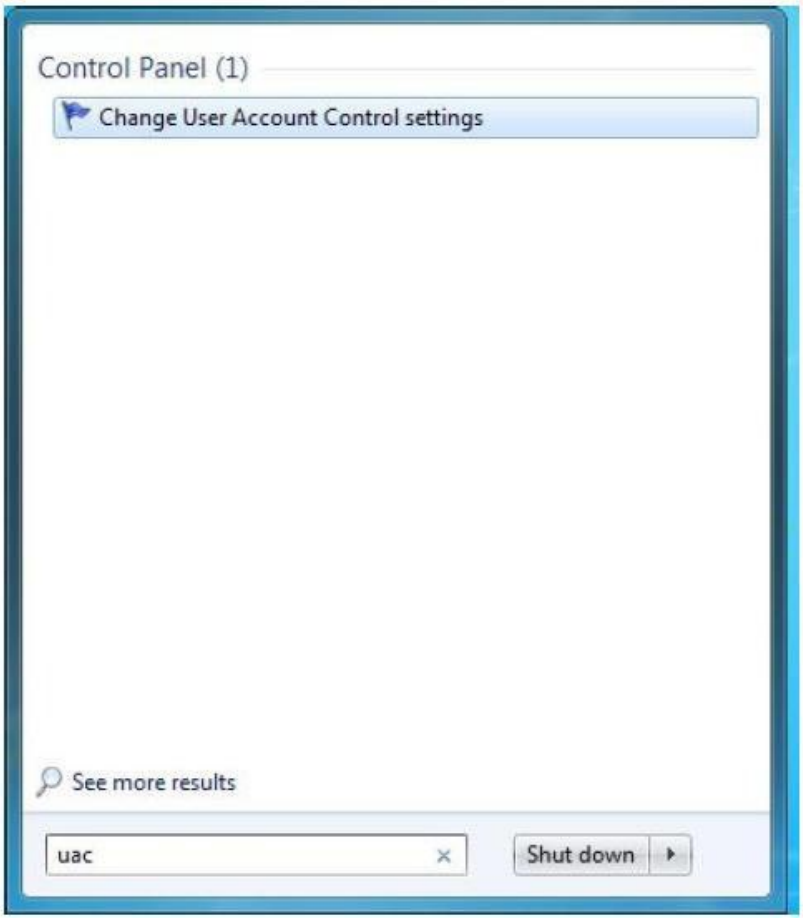
Step 5. You will need to restart your computer for driver install success.

Type in the following command on the Run Menu:

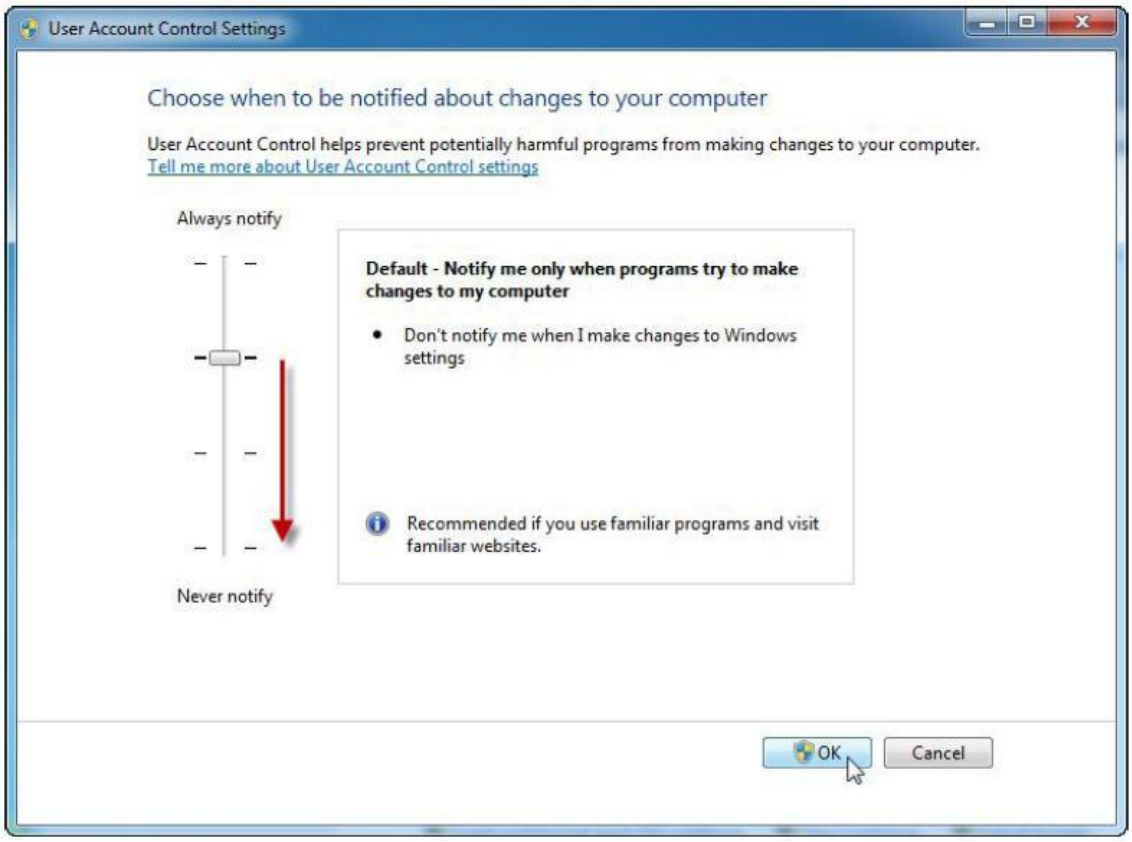
C:\Windows\System32\UserAccountControlSettings.exe

or

uac



To turn off the UAC, move the slider to the ***Never notify*** position, and then click ***OK***. If you're prompted for an administrator password or confirmation, type the password or provide confirmation.



To turn UAC back on, move the slider to choose when you want to be notified, and then click ***OK***. If you're prompted for an administrator password or confirmation, type the password or provide confirmation.

You will need to restart your computer for UAC to be turned off.

CHAPTER 4

BIOS Setup

This chapter describes how to set up the BIOS configuration.

The section includes:

- Entering BIOS Setup
- Advanced Setting
- Chipset Configuration
- Boot Setting
- Security Setup
- Save & Exit Setup

Chapter 4 BIOS Setup

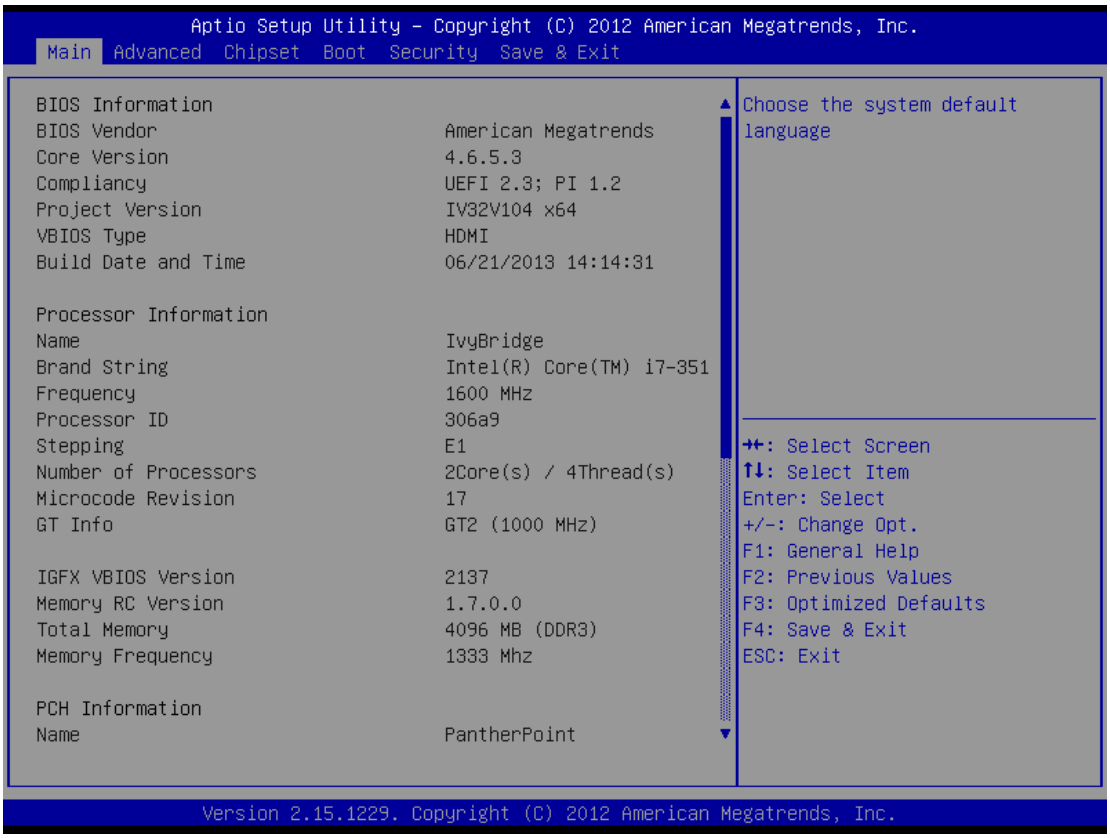
Your computer comes with a hardware configuration program which called BIOS Setup that allows you to view and set up the system parameters.
The BIOS (Basic Input / Output System) is a layer of the software called 'firmware' which translates instructions from software (such as the operating system) into instructions that allow the computer hardware to understand the software programs. The BIOS settings also identify installed devices and establish many special features.

4.1 Entering BIOS Setup

You can access the BIOS program just after you turn on your computer. Just press the "DEL" key when the following prompt appears:
Press <DEL> to enter Setup.
When you press <DEL> to enter the BIOS Setup image, the system interrupts the Power-On Self-Test (POST).

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

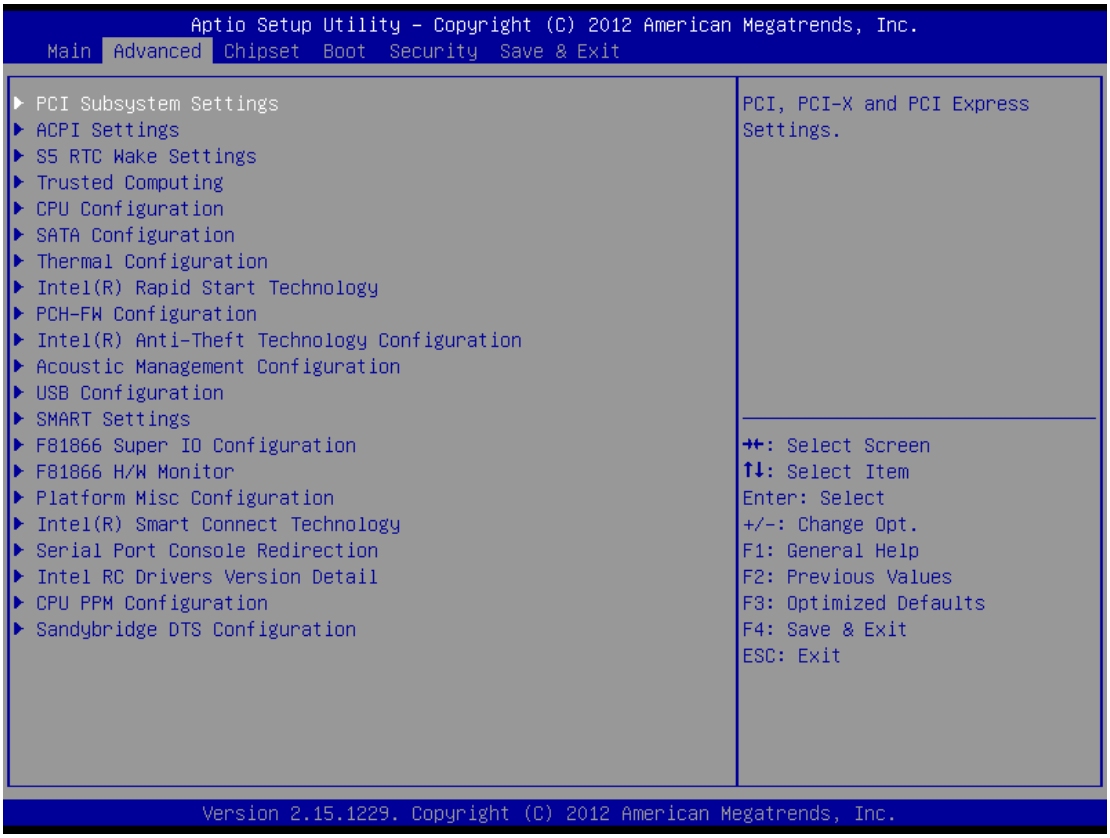
Control Keys	
Above 4G Decoding	Enables or Disables 64 bit capable devices to be decoded in above 4G address space
<Enter>	Select Item
<Esc>	Main Menu – Quit and not save changes into CMOS Sub Menu – Exit current page and return to Main Menu
<Page Up/+>	Increase the numeric value or make changes
<Page Down/->	Decrease the numeric value or make changes
<F1>	General help, for Setup Sub Menu
<F2>	Load Previous Values
<F3>	Load Setup Defaults
<F4>	Save all CMOS changes

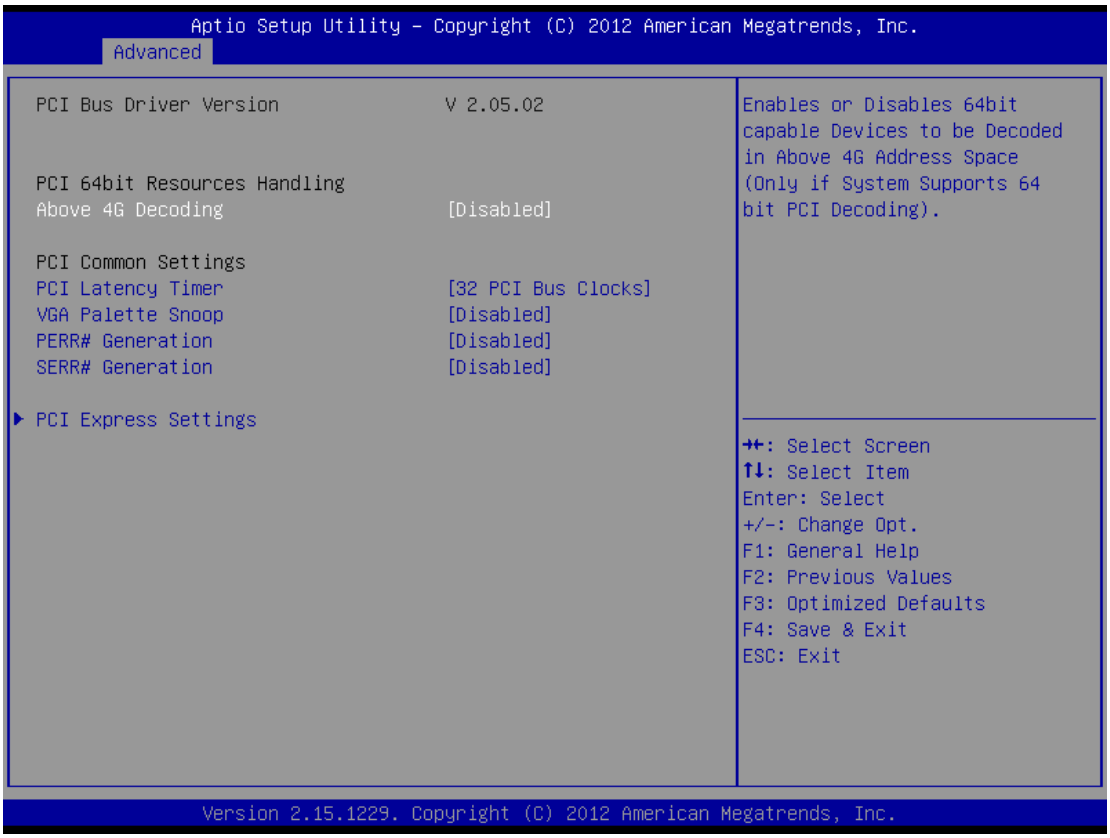


The Main BIOS setup image has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured. On the contrary, options in blue can be configured. The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

4.2 **Advanced Setting**

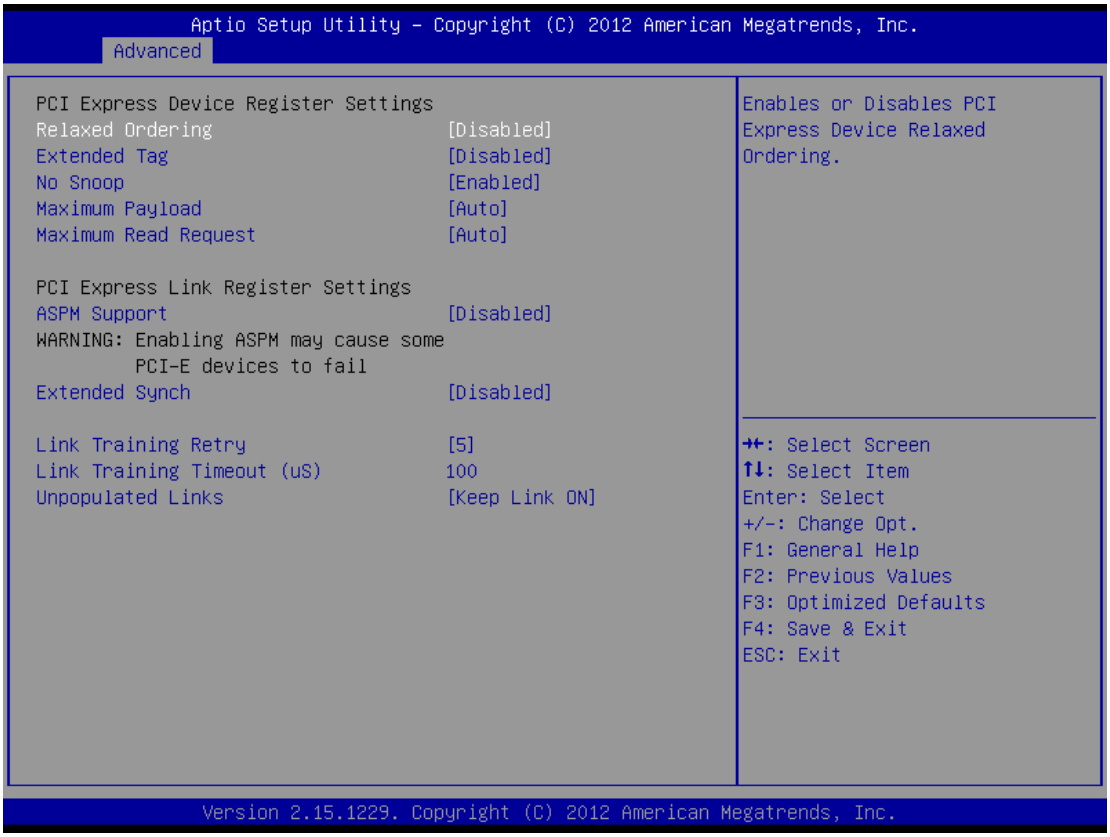
PCI Subsystem Setting





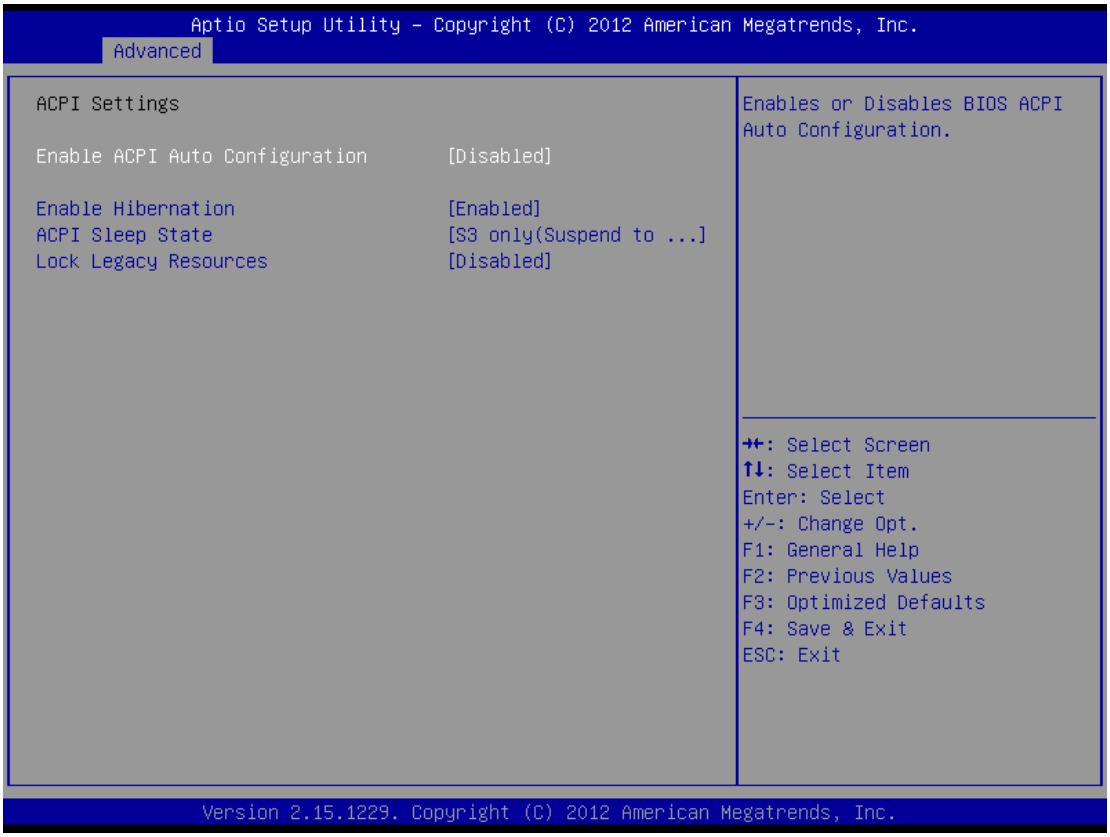
SETTING	DESCRIPTION
Above 4G Decoding	Enables or Disables 64 bit capable devices to be decoded in above 4G address space
PCI Latency Timer	Value to be programmed into PCI Latency Timer Register.(32~248)
VGA Palette Snoop	Enables or Disables VGA palette registers snooping
PERR# Generation	Enables or Disables PCI device to generate PERR#
SERR# Generation	Enables or Disables PCI device to generate SERR#

PCI Express Setting



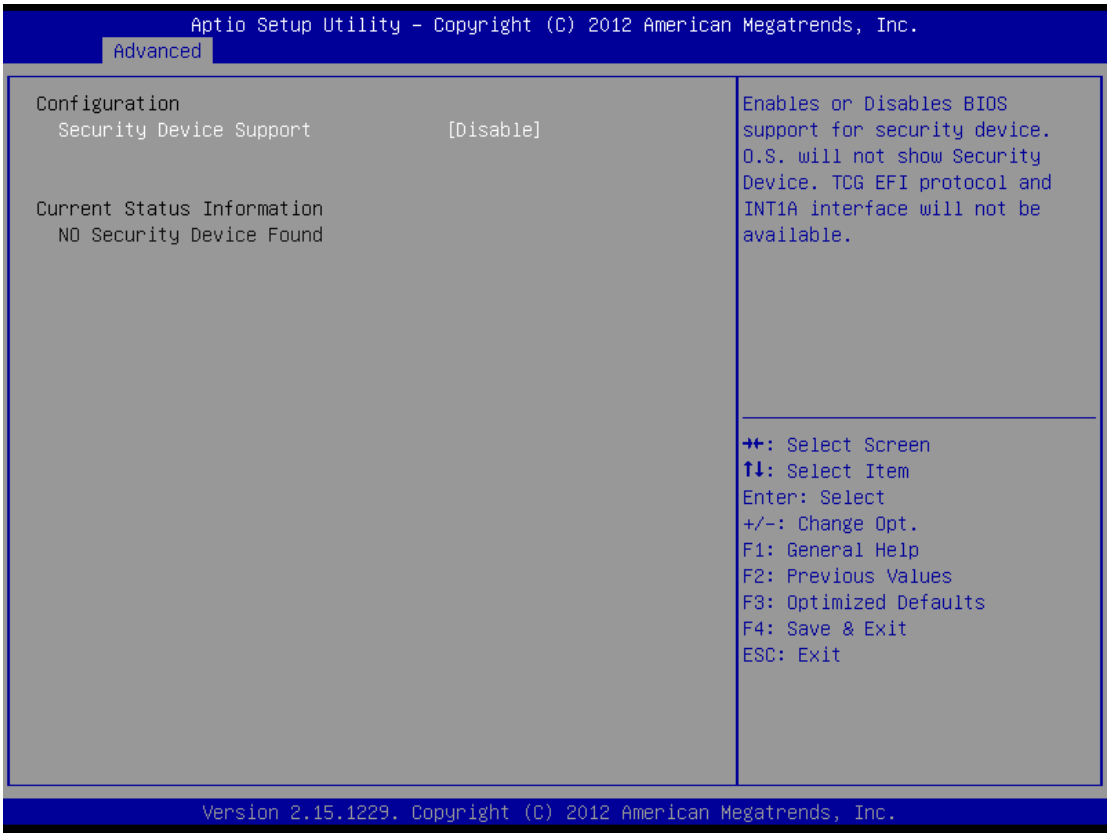
SETTING	DESCRIPTION
Relaxed Ordering	Enables or Disables PCI Express Device Relaxed Ordering
Extended Tag	If Enabled allows device to use 8-bit tag field as a requester
No Snoop	Enables or Disables PCI Express Device No Snoop option
Maximum Payload	Set maximum payload of PCI express device or allow system BIOS to select the value(128~4096 bytes)
Maximum Read Request	Set maximum Read Request size of PCI express device or allow system BIOS to select the value(128~4096 bytes)
ASPM Support	Set the ASPM Level: Force L0S-Force all links to L0s State: Auto- BIOS auto configure: Disabled- disables ASPM
Extended Synch	If Enabled allows generation of extended Synchronization patterns
Link Training Retry	Defines number of retry attempts software will take to retrain the link if previous training attempt was unsuccessful
Link Training Timeout	Defines number of microseconds software will wait before polling 'Link Training" bit in link status register. Value range from 10 to 1000 uS
Unpopulated Links	In order to save power, software will disable unpopulated PCI express links, if this option set to 'Disabled'

ACPI Setting



SETTING	DESCRIPTION
Enabled ACPI Auto Configuration	Enables or Disables BIOS ACPI Auto Configuration.
Enable Hibernation	Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS.
ACPI Sleep State	Select the ACPI sleep state the system will enter, when the SUSPEND button is pressed.
Lock Legacy Resources	Enables or Disables lock of legacy resources.

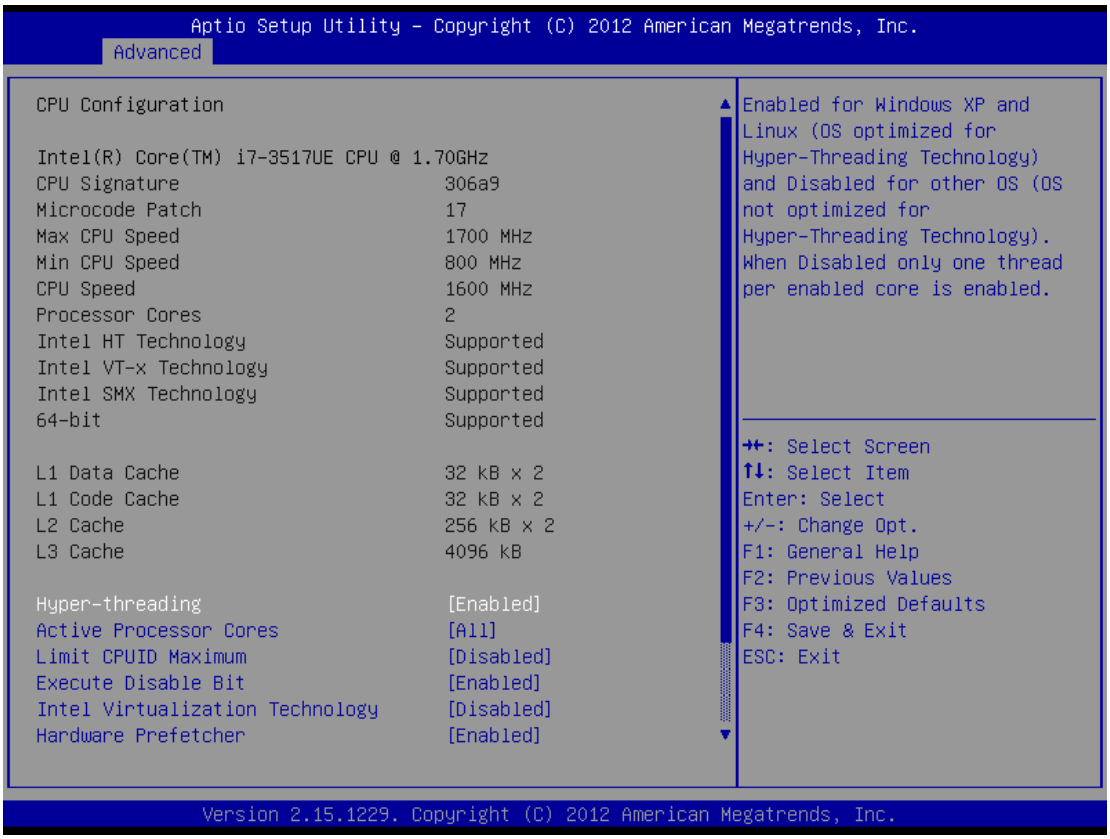
Trusted Computing



Security Device Support Enable or Disable BIOS support for security device

CPU Configuration

This section shows the CPU Configuration parameters.



Hyper-threading

Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology). When Disabled, only one thread per enabled core is enabled.

Active Processor Cores

This field is used to enter the number of cores to enable in each processor package.

Limit CPUID Maximum

Disabled for Windows XP.

Execute Disable Bit

XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Windows Server 2003 SP1, Windows XP SP2, SuSE Linux 9.2, RedHat Enterprise 3 Update 3.)

Hardware Prefetcher

Turns on/off the MLC streamer prefetcher.

Adjacent Cache Line Prefetch

To turn on/off prefetching of adjacent cache lines.

TCC Activation offset

Offset from the factory TCC activation temperature.

Primary Plane Current value

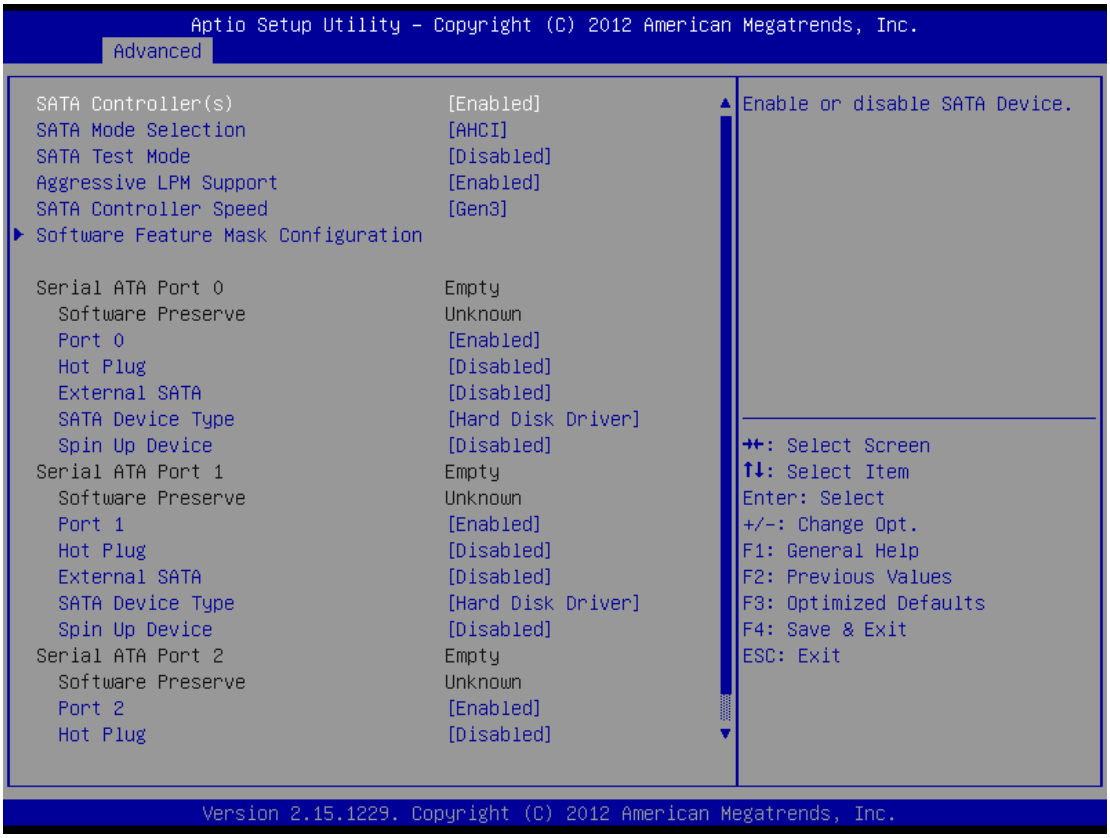
The maximum instantaneous current allow for Primary plane.

Secondary Plane Current value

The maximum instantaneous current allow for Second plane.

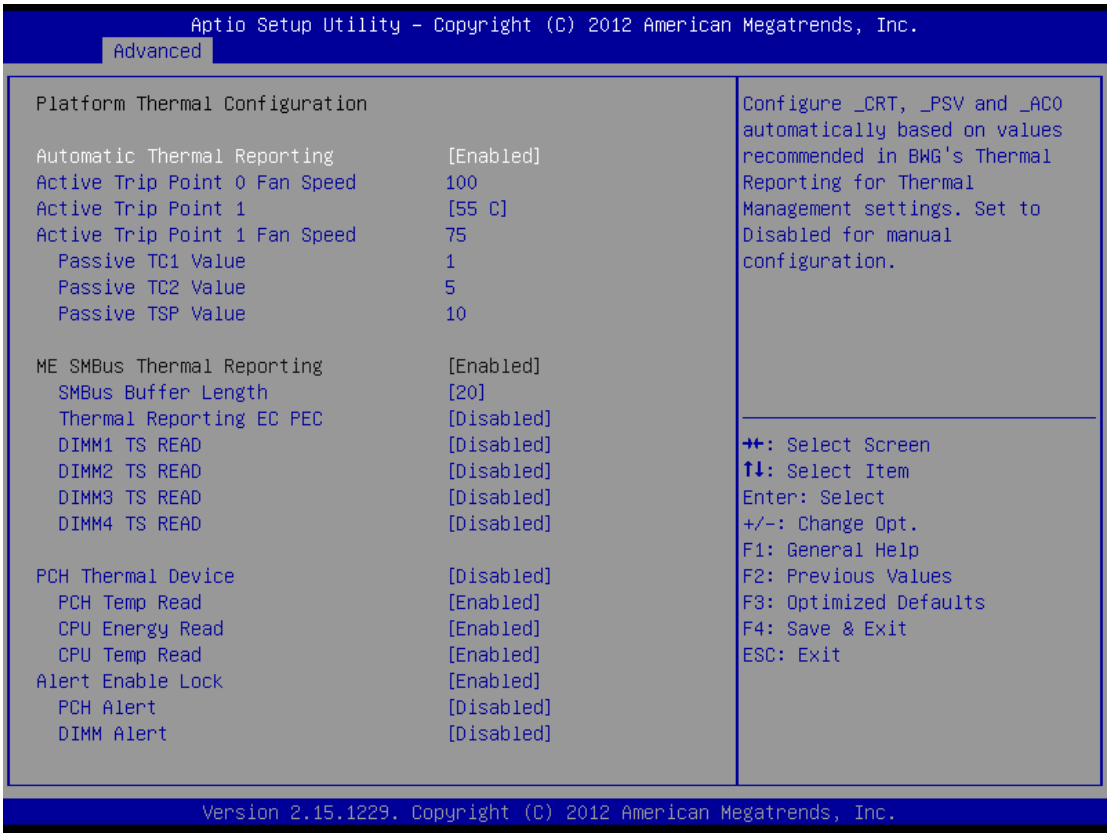
SATA Configuration

SATA Device Configuration



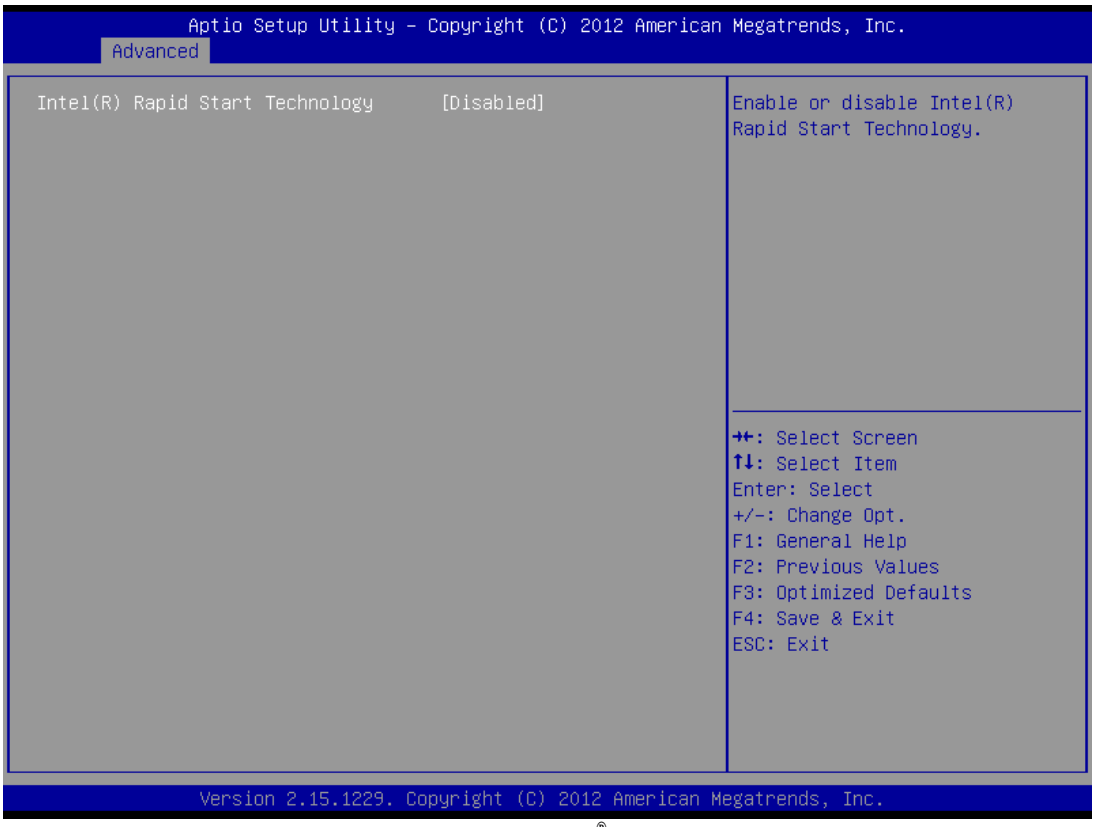
SETTING	DESCRIPTION
SATA Controller(s)	This item allows users to enable or disable the SATA controller(s).
SATA Mode Selection	This item allows users to select mode of SATA controller(s).
SATA Test Mode	This item allows users to enable or disable the Test mode.
Aggressive LPM Support	Enable PCH to aggressively enter link power state.

Thermal Configuration



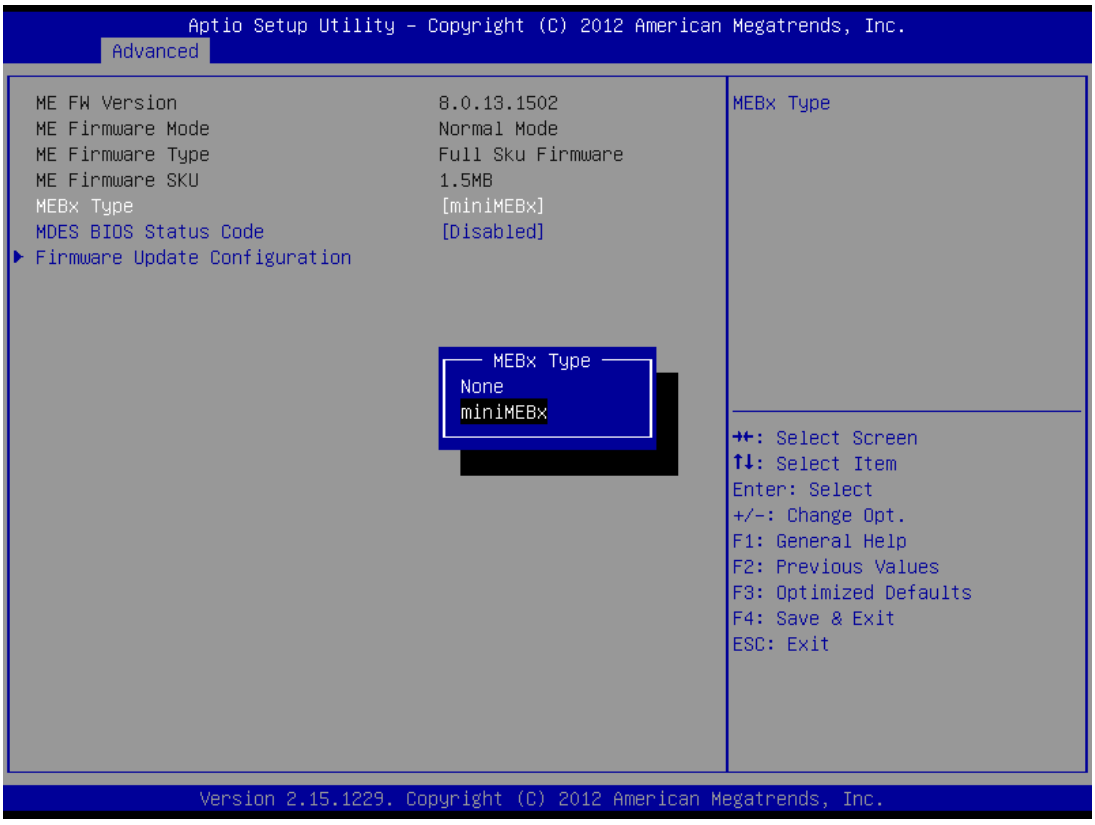
SETTING	DESCRIPTION
Automatic thermal reporting	Configure _CRT,_PSV and _ACO automatically based on values recommended in BWG's thermal reporting for thermal management settings. Set to disabled for manual configuration.
Active trip point 0 fan speed	Active trip point 0 fan speed in percentage.
Active trip point 1	This value controls the temperature of the ACPI active trip point 1- the point in which the OS will turn the processor fan on active trip point1 fan speed.
Active trip point 1 fan speed	Active trip point 1 fan speed in percentage.
Passive TC1 value	This value sets the TC1 value for the ACPI passive cooling formula.
Passive TC2 value	This value sets the TC2 value for the ACPI passive cooling formula.
Passive TSP value	This value sets the TSP value for the ACPI passive cooling formula.

Intel® Rapid Start Technology



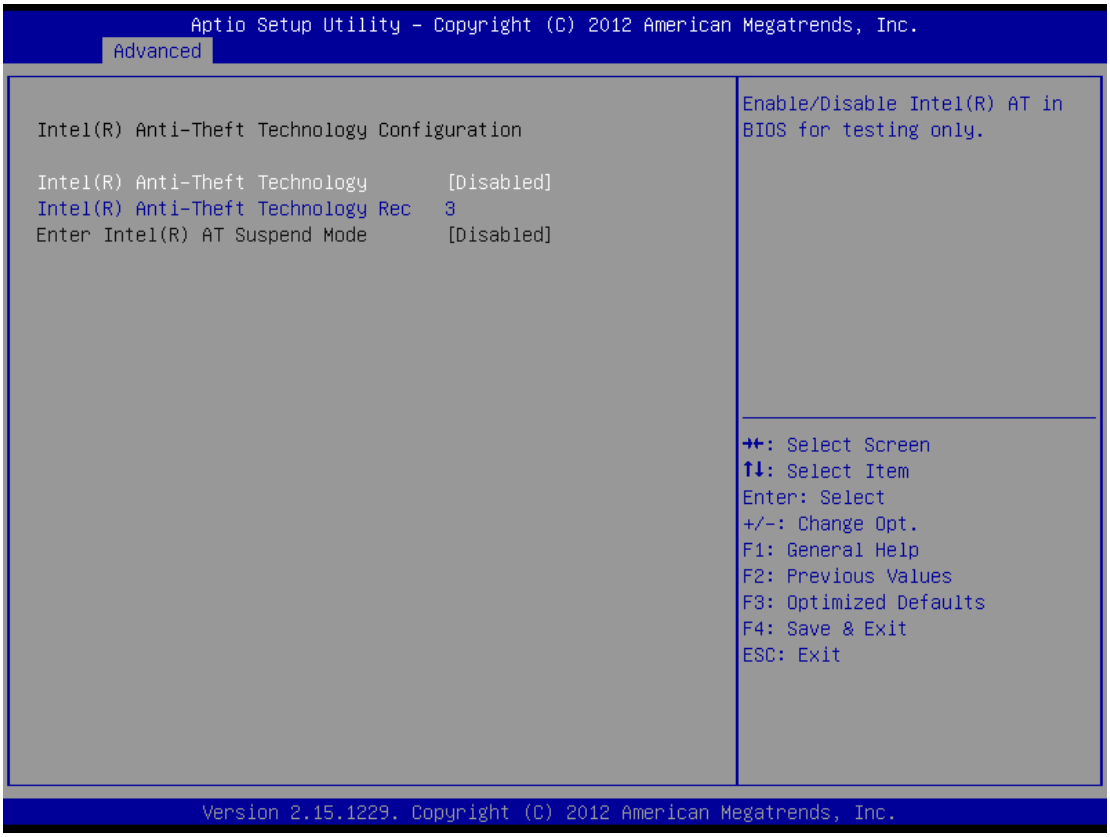
This item allows users to enable or disable Intel® rapid start technology.

PCH-FW Configuration



This item allows users to enable or disable ME FW image re-flash function.

Intel® Anti-Theft Technology Configuration



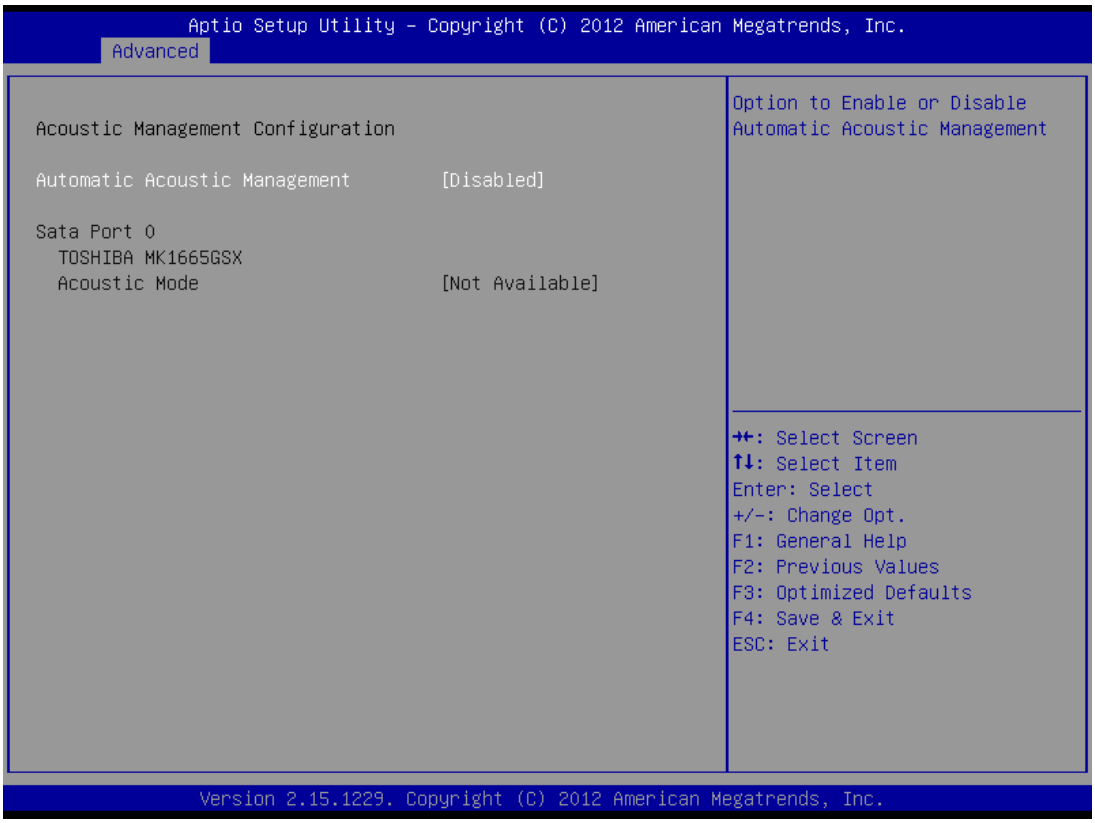
Intel® Anti-theft Technology

This item allows users to enable or disable Intel® AT in bios for testing only.

Intel® Anti-theft Technology Rec

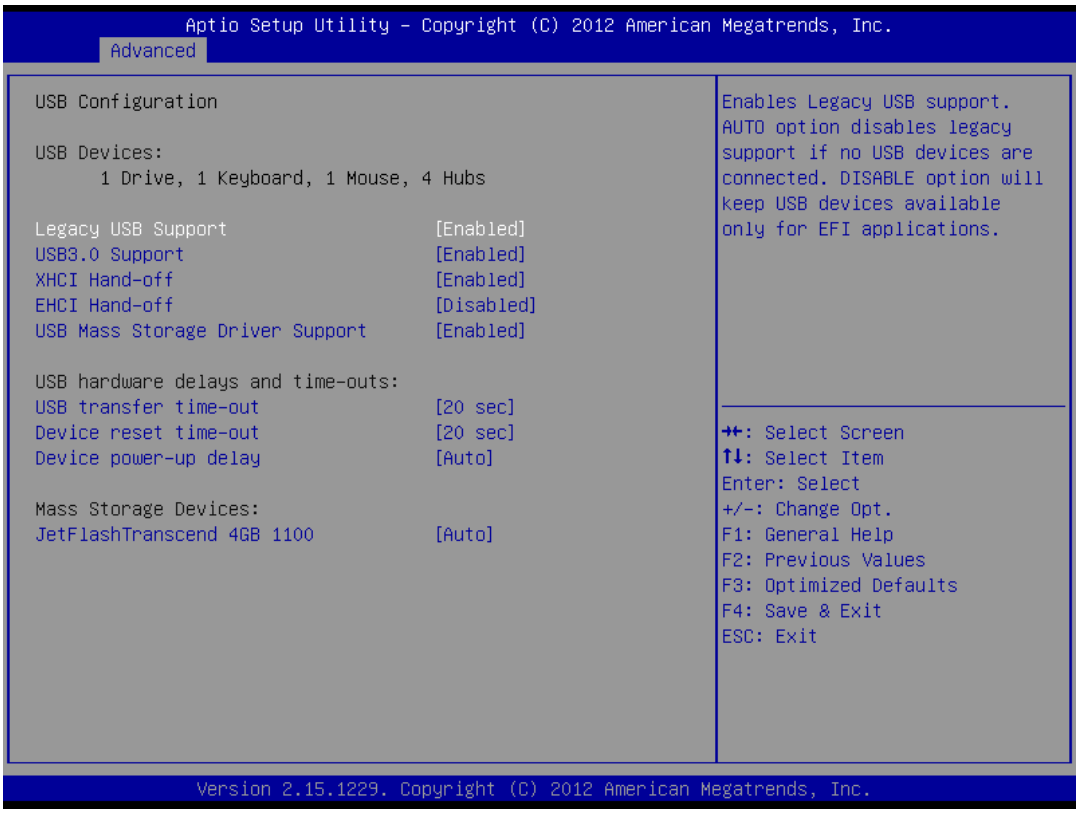
Set the number of times recovery attempted will be allowed.

Acoustic Management Configuration



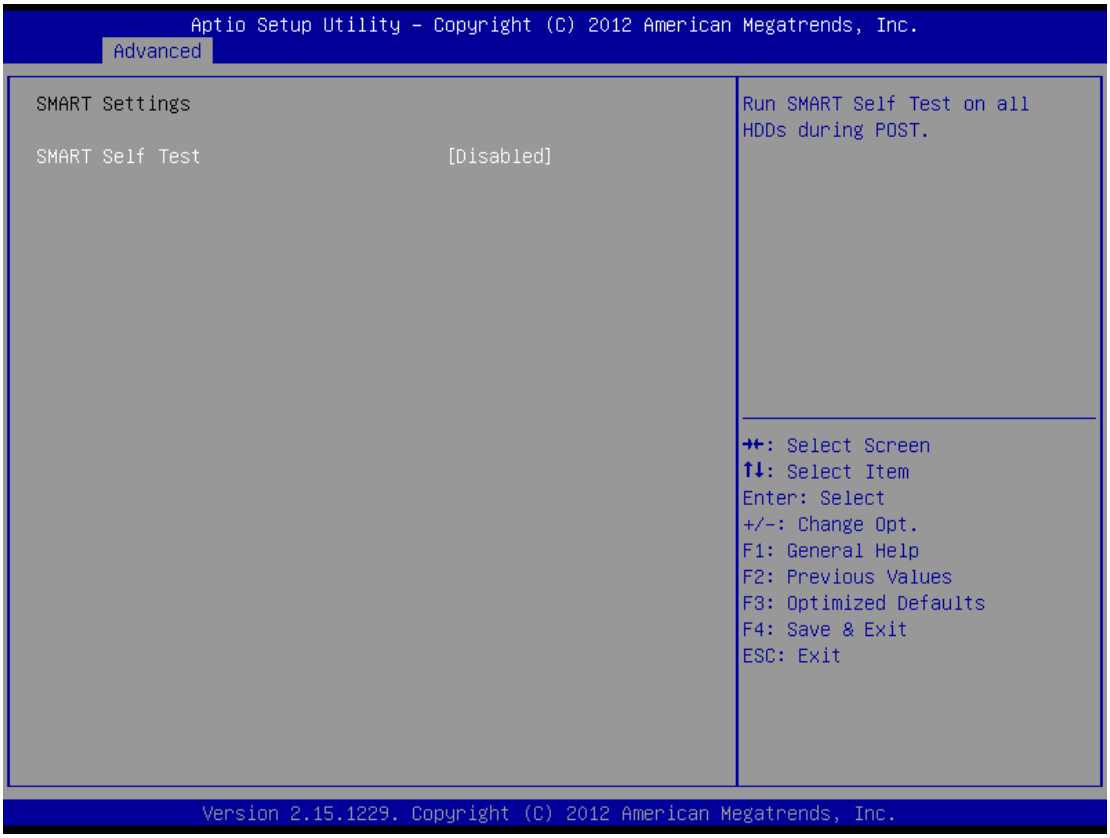
Option to enable or disable automatic acoustic management.

USB Configuration



SETTING	DESCRIPTION
Legacy USB Support	Enables support for legacy USB. Auto option disables legacy support if no USB devices are connected.
USB3.0 support	This item allows user to enable or disable USB3.0 function.
XHCI Hand-off	This is a workaround for OS without XHCI hand-off support. The XHCI ownership change should claim by XHCI driver.
EHCI Hand-off	This is a workaround for OS without EHCI hand-off support. The EHCI ownership change should claim by EHCI driver.
USB transfer time-out	Time-out value for control, bulk, and interrupt transfers.
Device reset time-out	USB mass storage device starts unit command time-out.
Device power-up delay	Maximum time the device will take before it properly report itself to the host controller.

SMART Setting



Smart Self Test

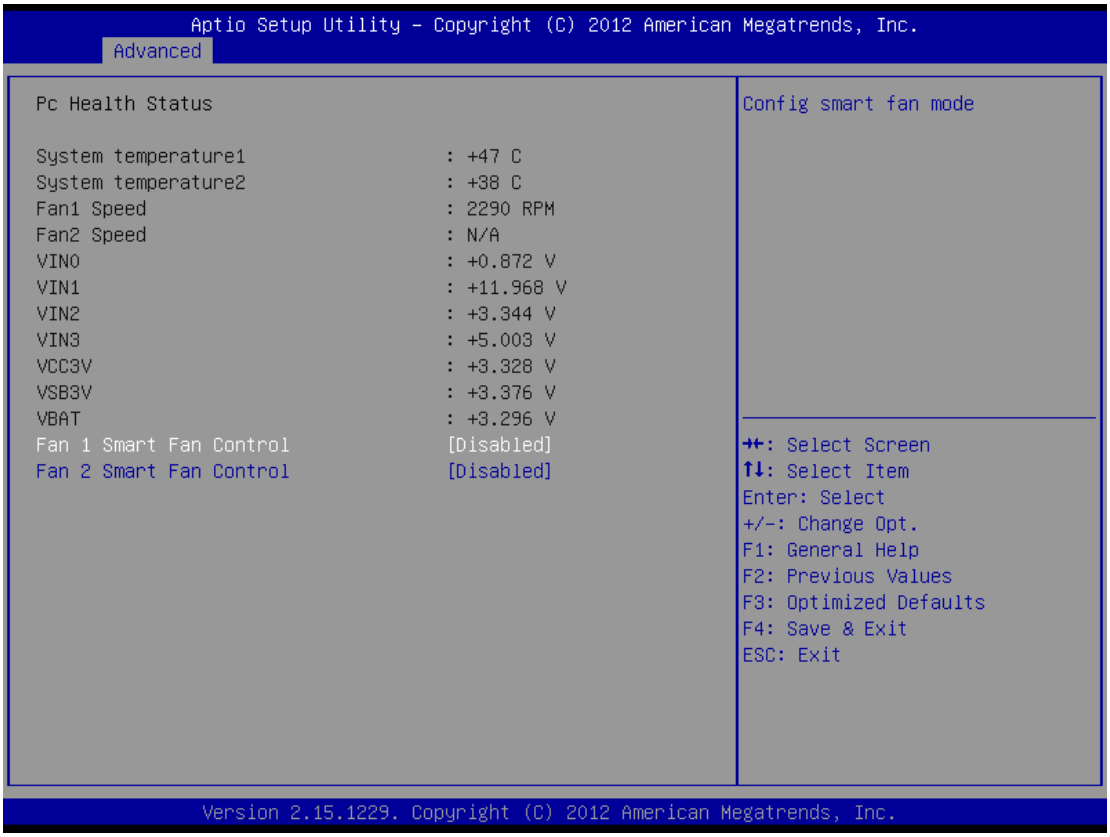
Enable or disable Run SMART Self test on all HDDs during Post.

F81866 Super I/O Configuration

Serial Port Configuration

Set Parameters of Serial Ports. User can Enable/Disable the serial port and Select an optimal settings for the Super IO Device.

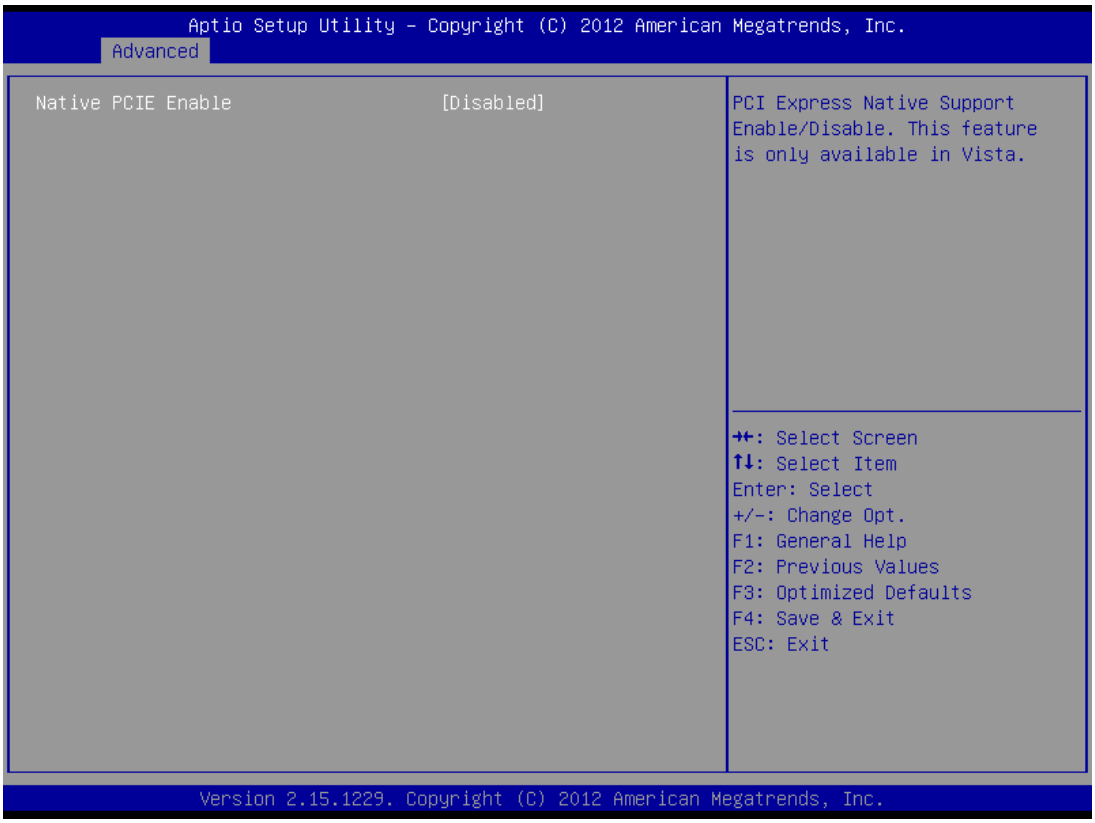
Smart Fan Control



Fan1/Fan2 Smart Fan Control

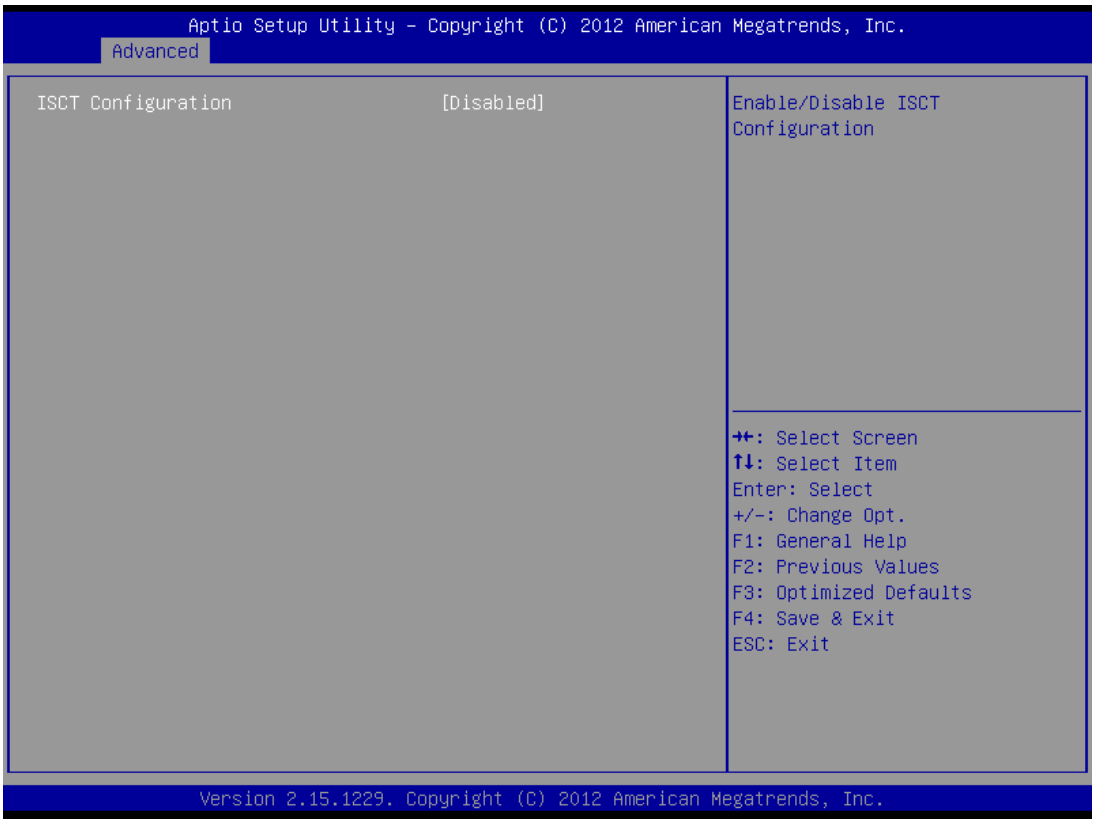
This field enables or disables the smart fan feature. At a certain temperature, the fan starts turning. Once the temperature drops to a certain level, it stops turning again.

Platform Misc Configuration



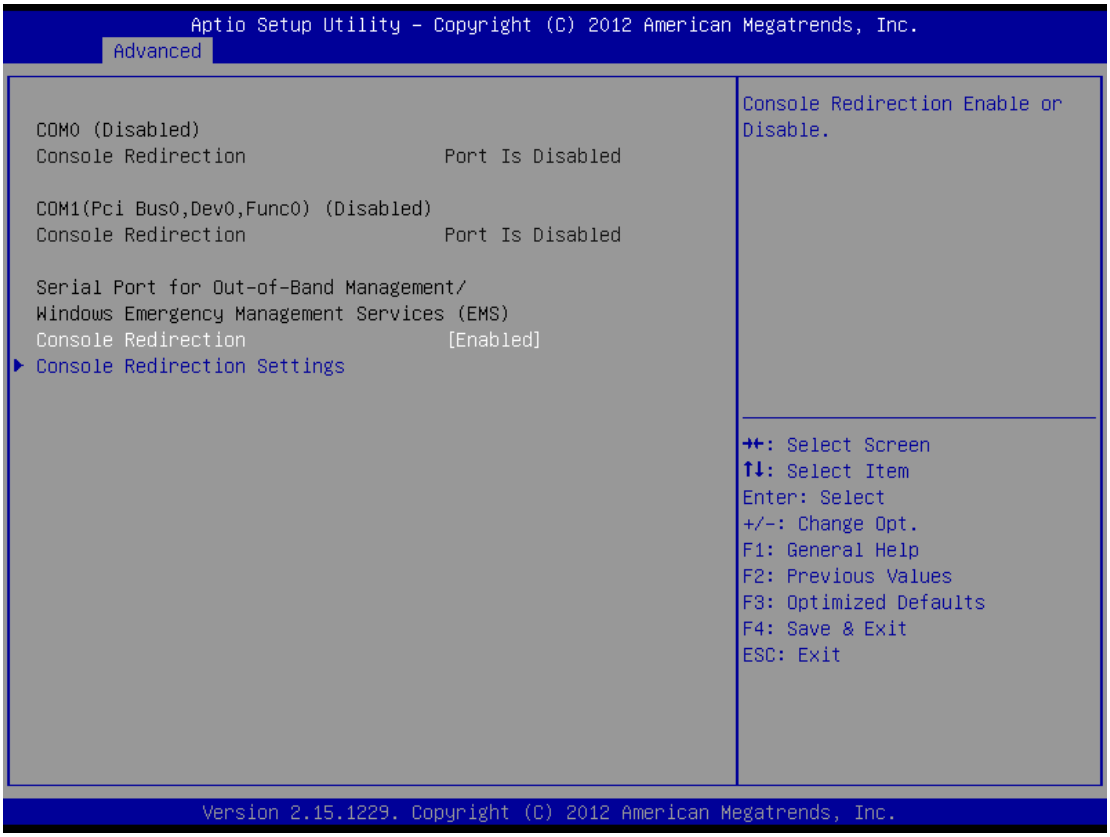
PCI Express Native Support Enable/Disable. This feature is only available in vista.

Intel® Smart Connect Technology



Enable/Disable ISCT configuration

Serial Port Console Redirection



Console Redirection

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

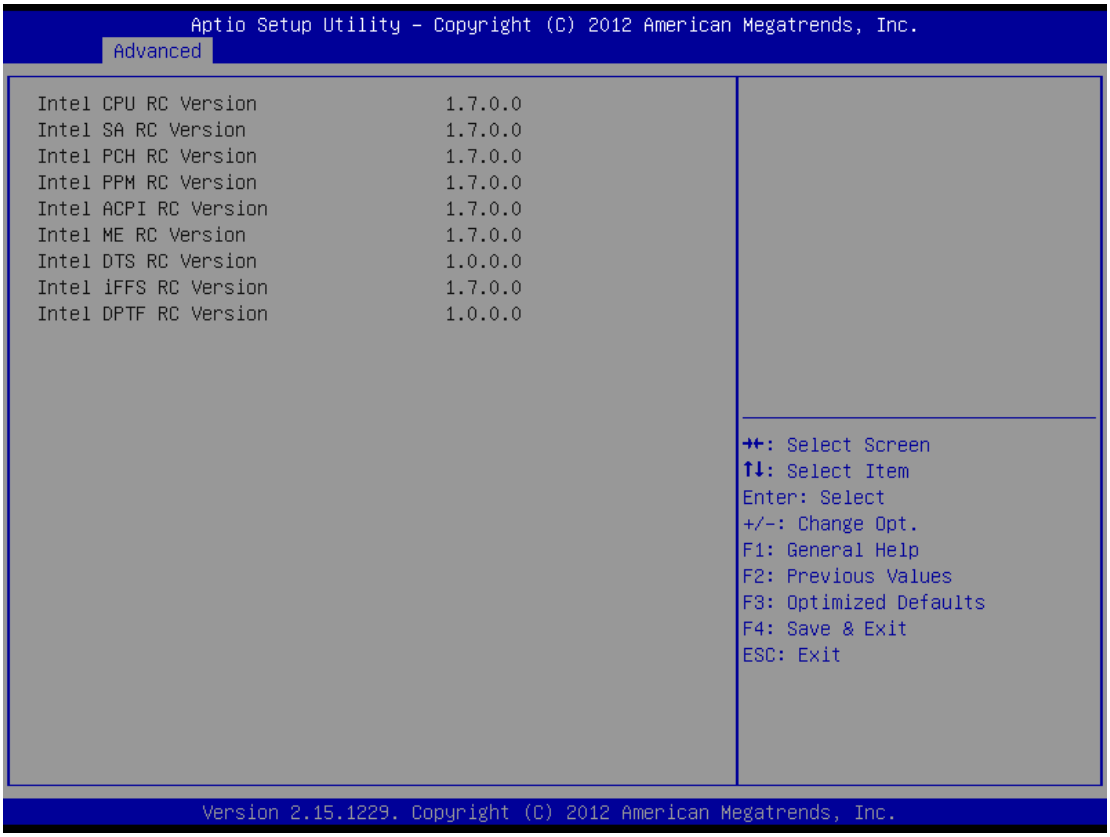
Out-of-Band Mgmt Port

Select the port for Microsoft Windows Emergency Management Services (EMS) to allow for remote management of a Windows Server OS.

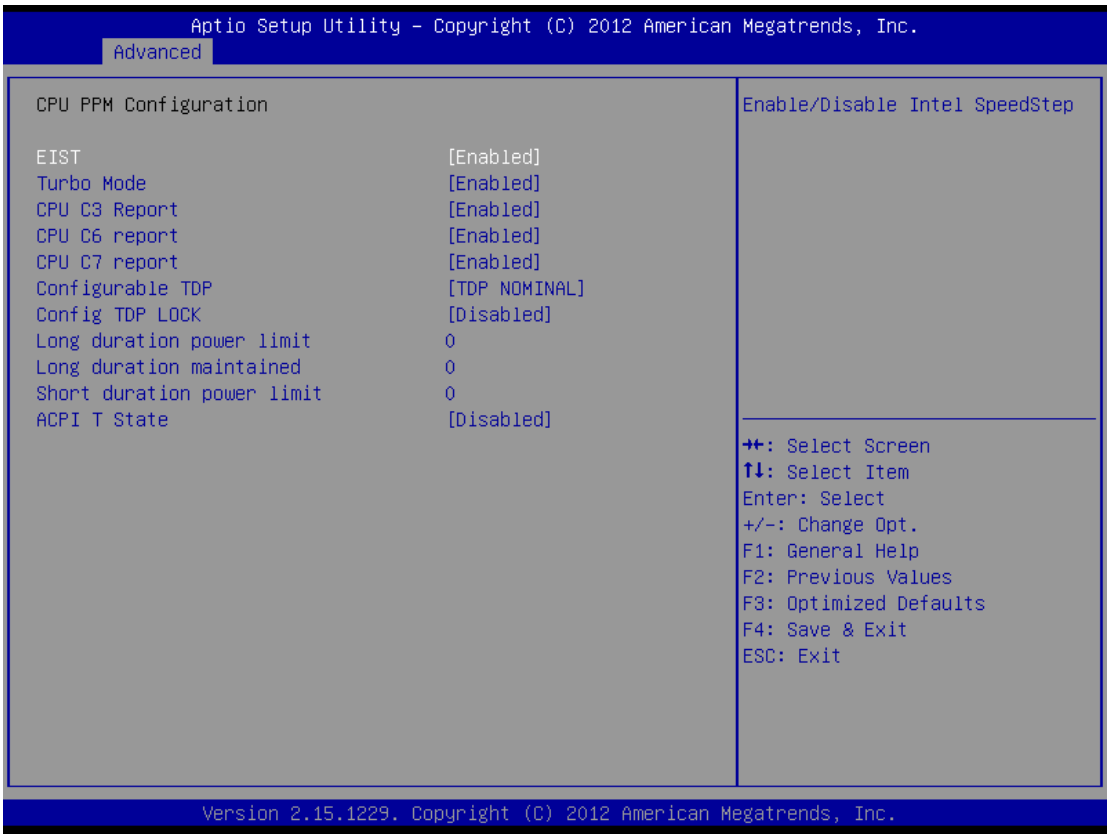
Terminal Type

VT-UTF8 is the preferred terminal type for out-of-band management. The next best choice is VT100+ and then VT100. See above, in Console Redirection Settings page, for more Help with Terminal Type/Emulation.

Intel® RC Drivers Version Detail

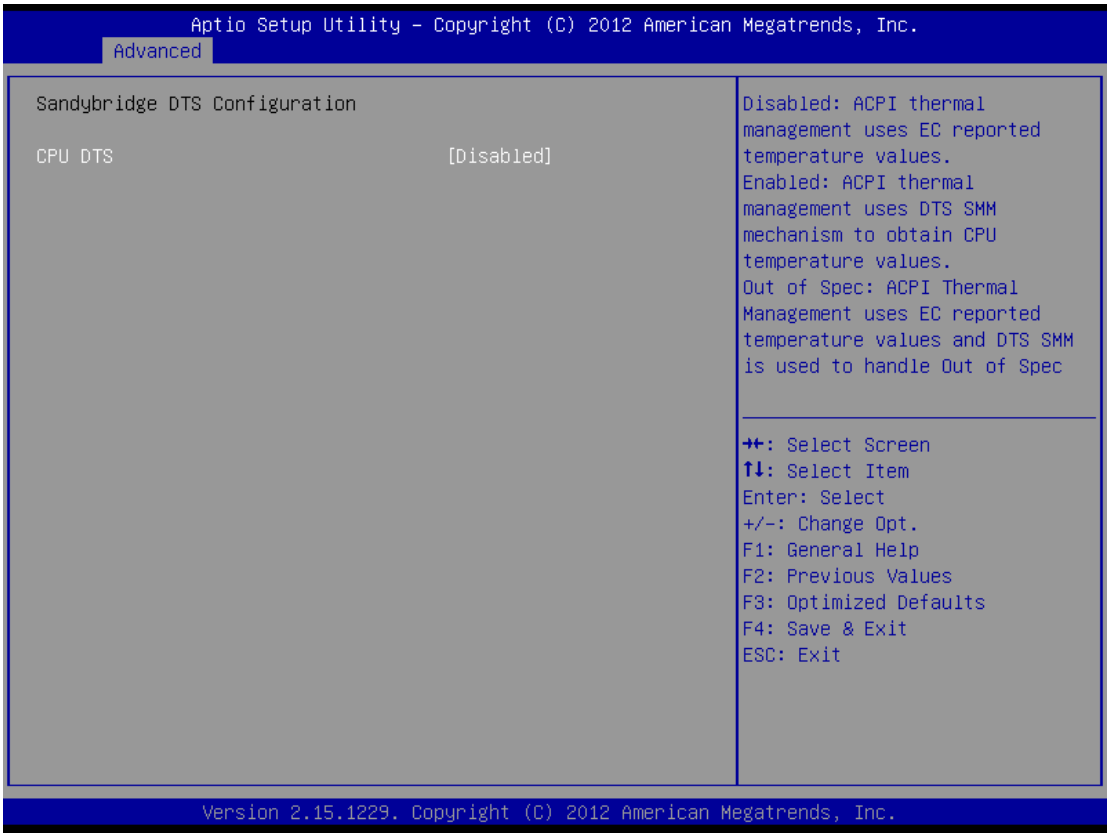


CPU PPM Configuration



SETTING	DESCRIPTION
EIST	CPU runs at its default speed if disabled; CPU speed is controlled by the operating system if enabled.
Turbo Mode	This item allows users to enable or disable turbo mode.
Config TDP lock	Lock the config TDP control register
Long duration power limit	Long duration power limit in watts, 0 means use factory default.
Long duration maintained	Time window which the long duration power is maintained.
Short duration power limit	This item allows users to enable or disable CPU TDP lock function.
ACPI T state	This item allows users to enable or disable ACPI T state function.

DTS Configuration

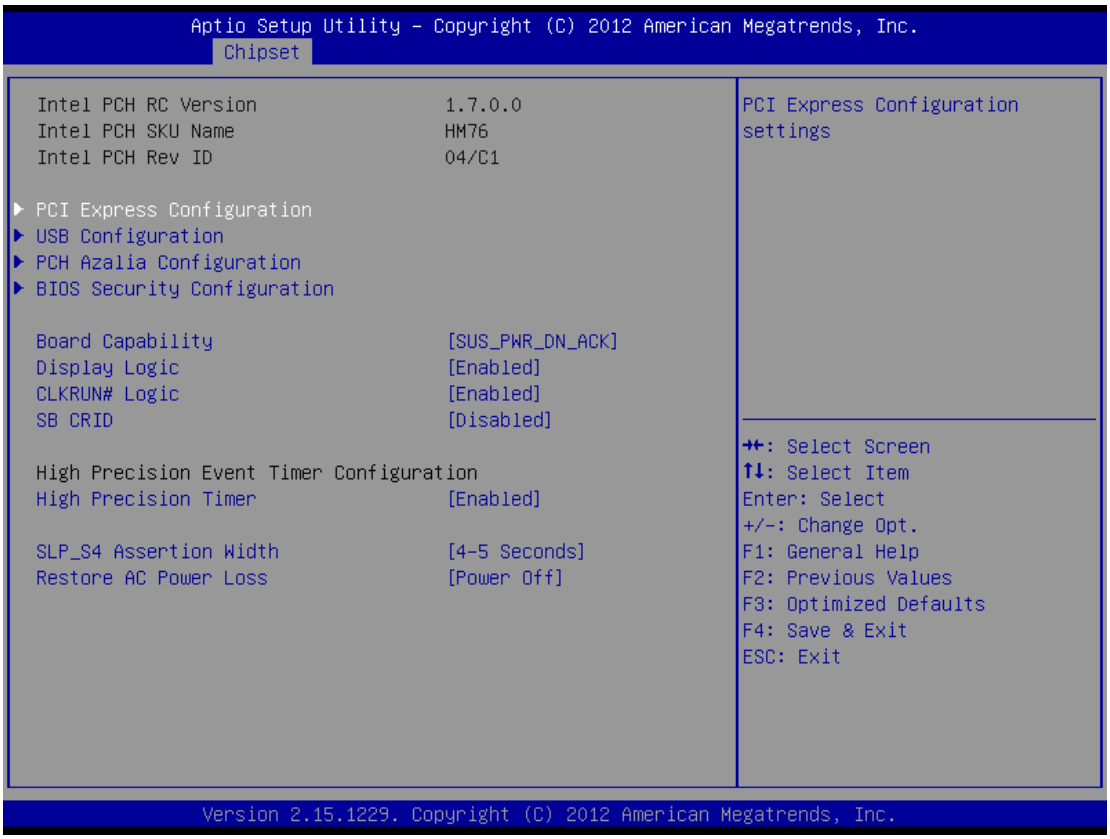


CPU DTS

This item allows users to select the ACPI thermal management uses EC reported temperature value function.

4.3 Chipset Configuration

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



PCI Express Configuration

Detail of PCI Express items.

USB Configuration

Details of USB items.

PCH Azalia Configuration

Details of PCH azalia items.

High Precision Timer

Enables or disables the high precision timer.

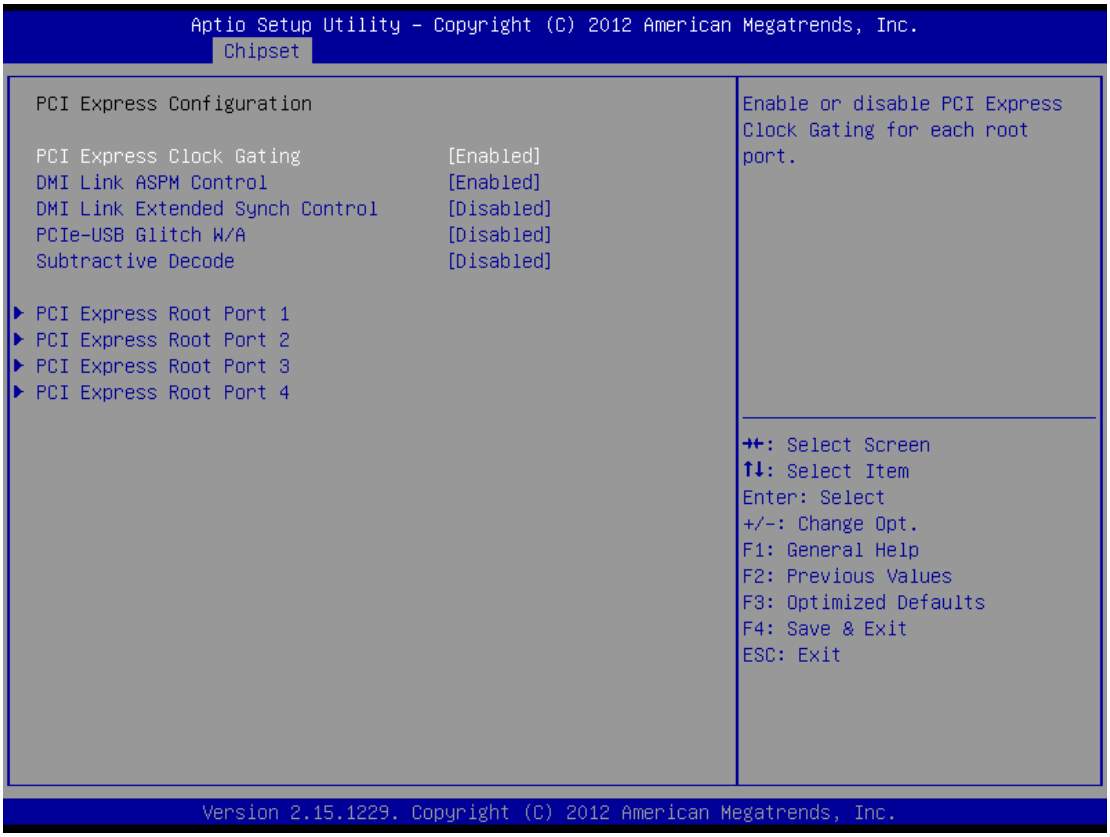
SLP_S4 Assertion Width

This item allows users to set a delay of sorts.

Restore AC Power Loss

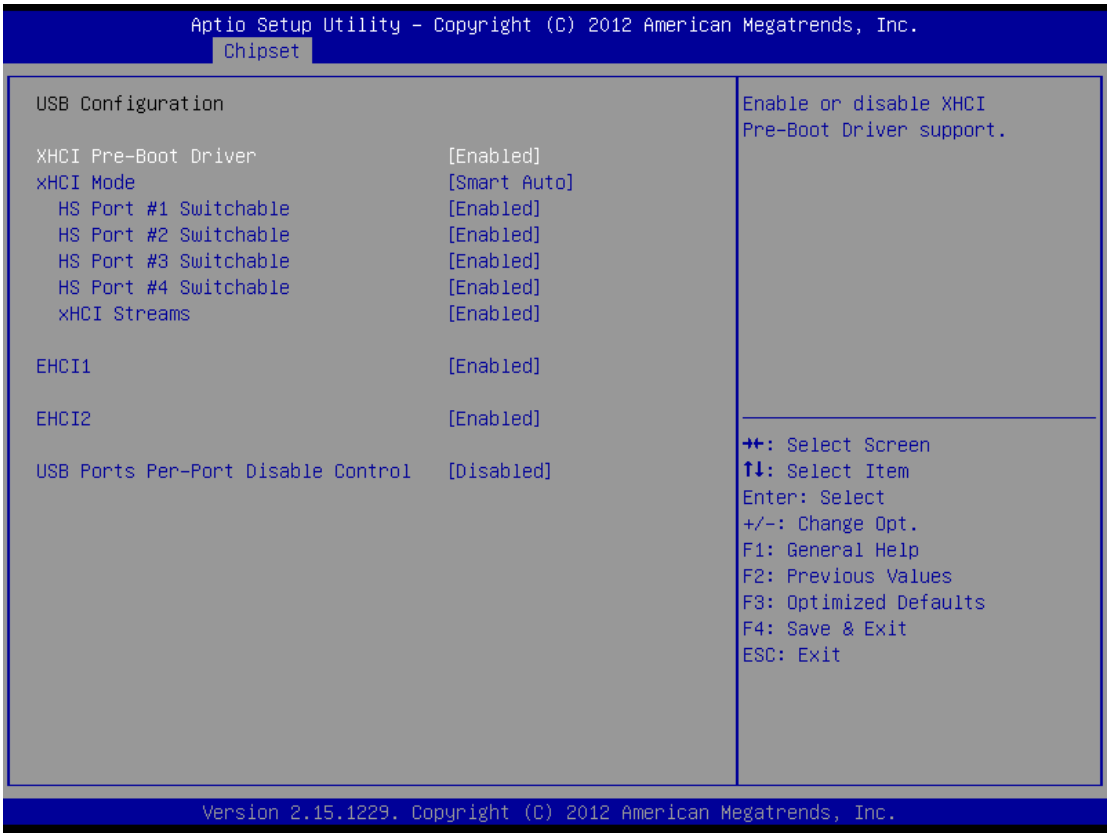
This item allows users to select off, on and last state.

PCI Express Configuration



SETTING	DESCRIPTION
PCI Express Clock Gating	Enable or disable PCI Express clock gating for each root port.
DMI Link ASPM Control	The control of active state power management on both NB side and SB side of the DMI link.
DMI Link Extended Synch Control	The control of extended synch on SB side of the DMI link.
PCIe-USB Glitch W/A	PCIe-USB glitch W/A for bad USB device connected behind PCIE/PEG port.
Subtractive Decode	Enable or disable PCI Express subtractive decode.
PCI Express Root Port 1~7	This item allows users to enable or disable the PCI Express Root Port.

USB Configuration



XHCI Pre-Boot Driver

This item allows user to enable or disable XHCI Pre-boot driver.

XHCI Mode

This item allows user to enable or disable XHCI Mode.

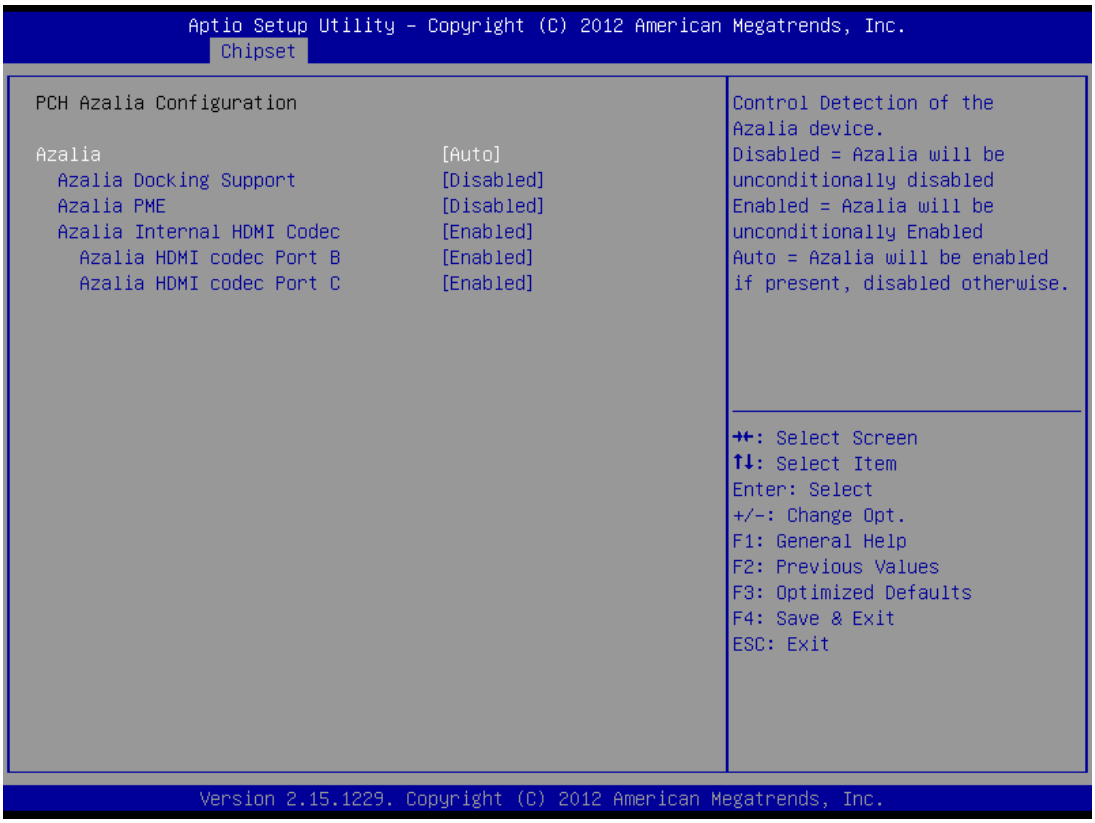
EHCI 1/2

Enables or disables the EHCI controller.

USB Ports pre-port Disable Control

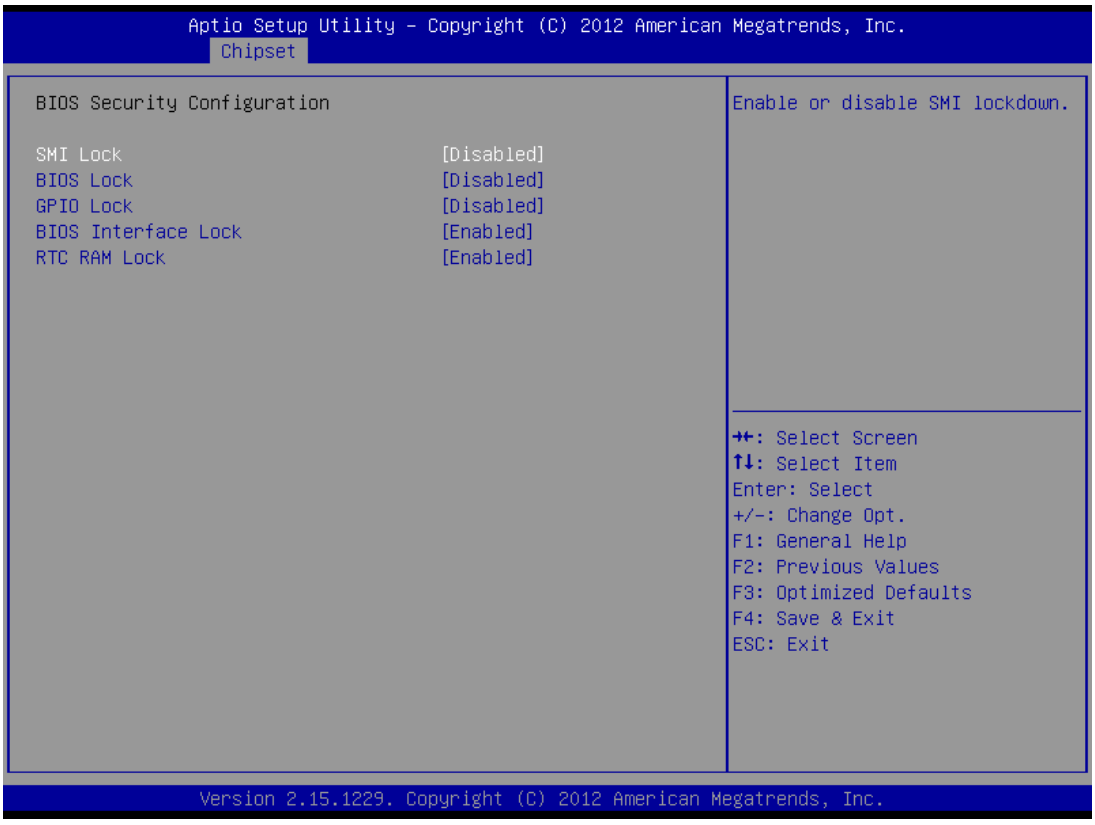
This item allows users to enable or disable each USB port individually.

PCH Azalia Configuration



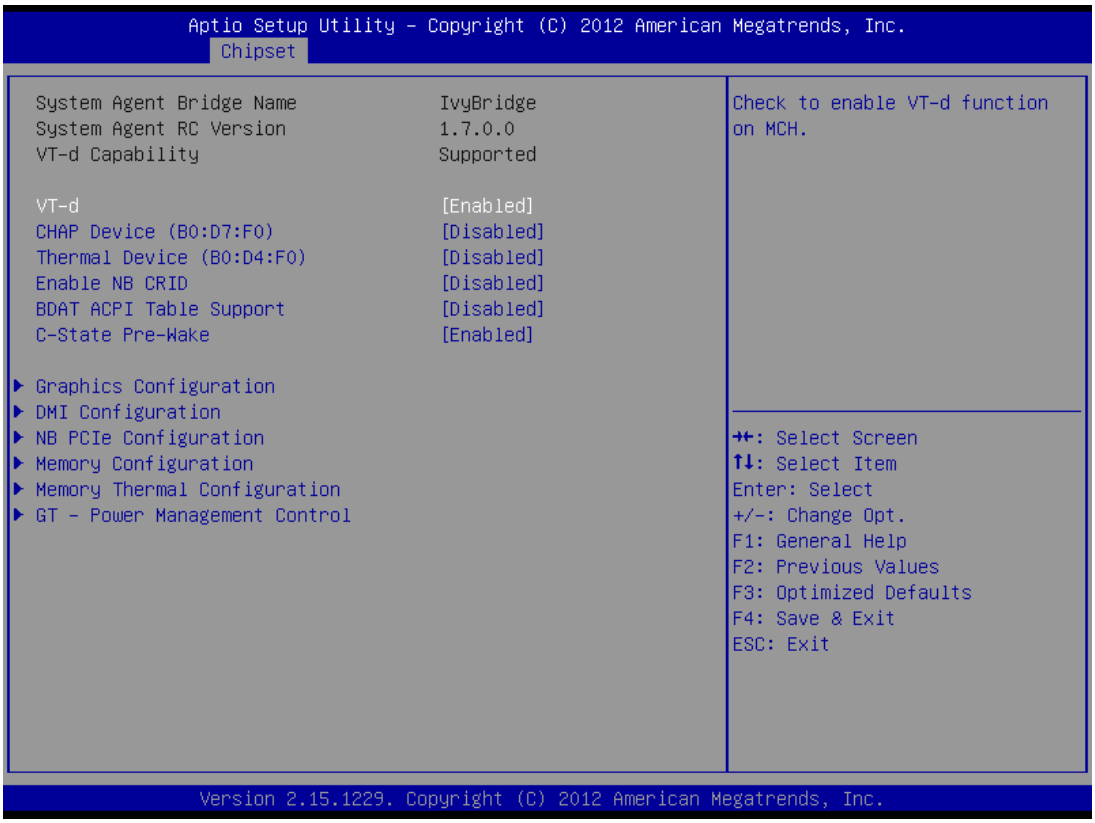
This item allows user to enable or disable azalea device.

BIOS Security Configuration



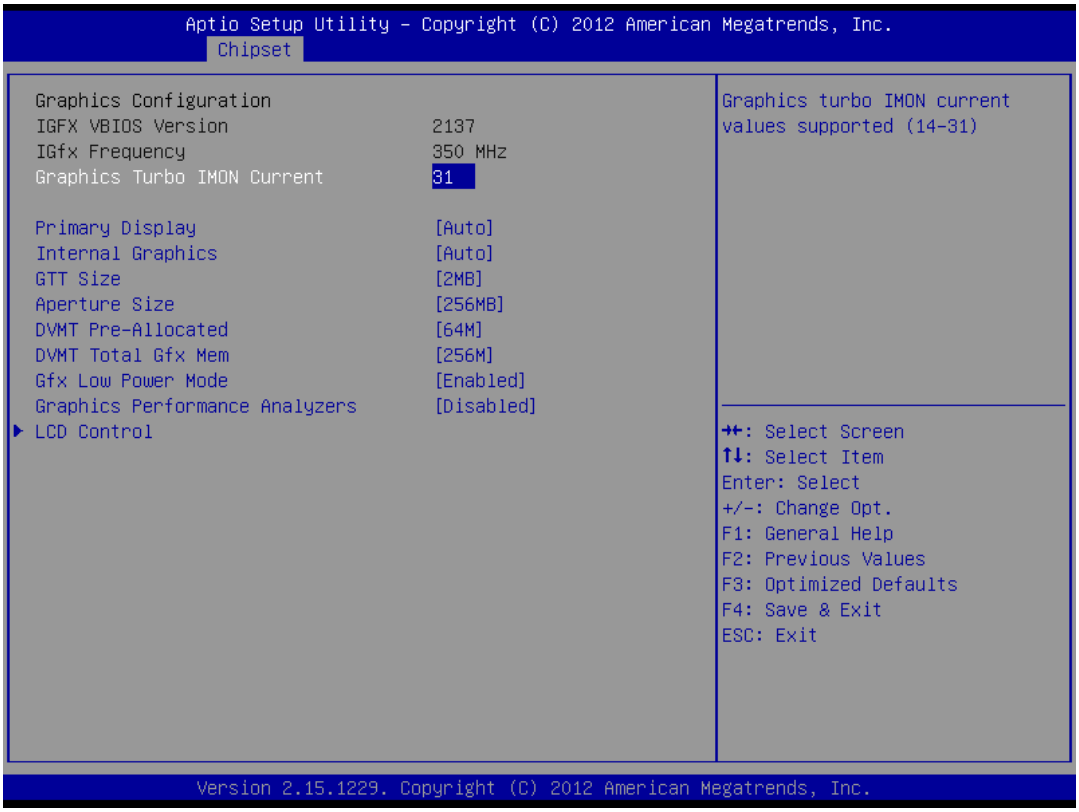
Enable or disable SMI/BIOS/GPIO/BIOS interface/RTC RAM Lock.

System Agent Bridge Name



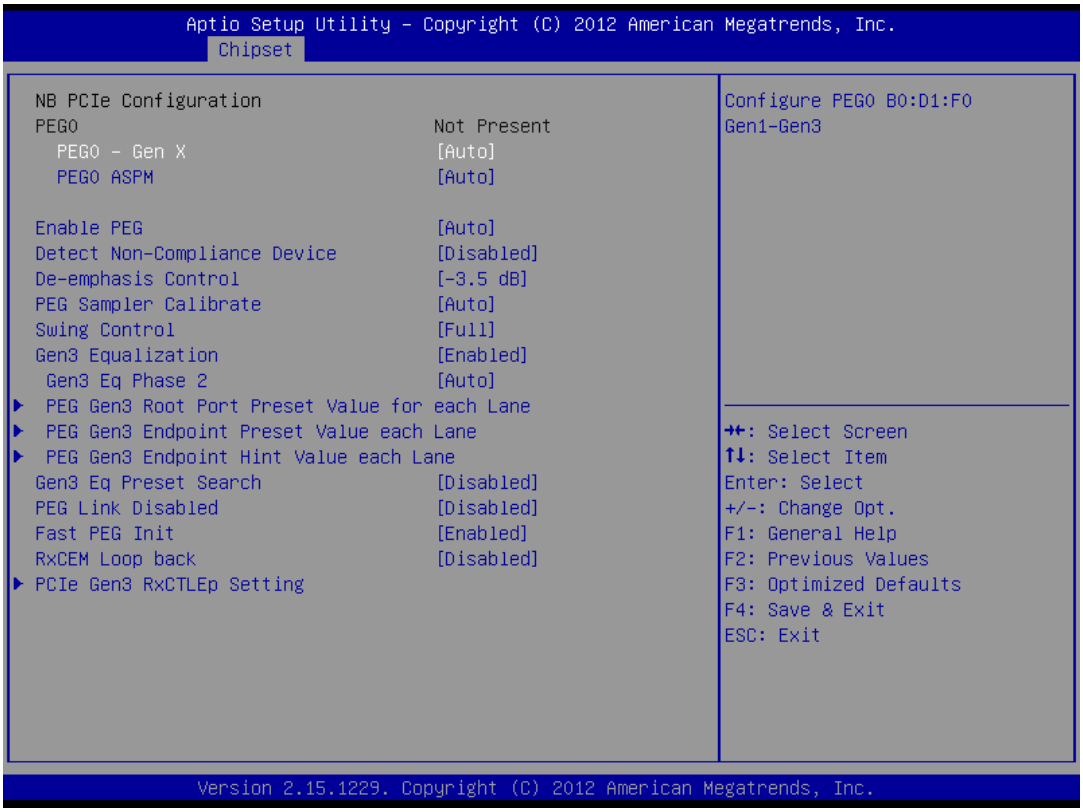
This item allows users to enable or disable VT-d.

Graphic Configuration



SETTING	DESCRIPTION
Primary Display	This item allows users to select which graphics controller to use as the primary boot device.
Internal Graphics	This item allows users to enable or disable IGD.
GTT Size	This item allows users to select GTT size.
Aperture Size	This item allows users to select aperture size.
DVMT Pre-Allocated	This item allows users to select DVMT pre-allocated memory size.
DVMT Total Gfx Mem	This item allows users to select DVMT total memory size.
Gfx Low Power Mode	This item allows users to enable or disable IGD low power mode.
Graphic Performance Analyzers	This item allows users to enable or disable graphic performance analyzer function.

NB PCIe Configuration



PEG0 - Gen x

Select PEG0 speed.

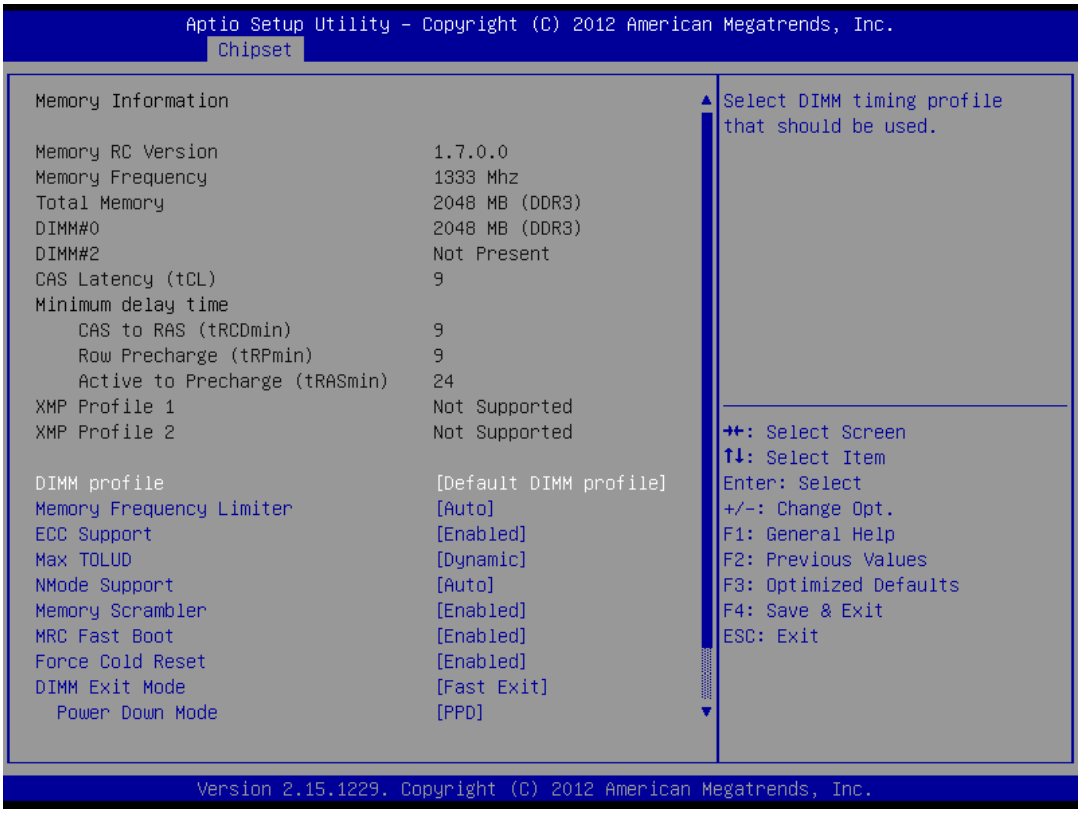
Enable PEG

This item allows users to enable or disable PEG always.

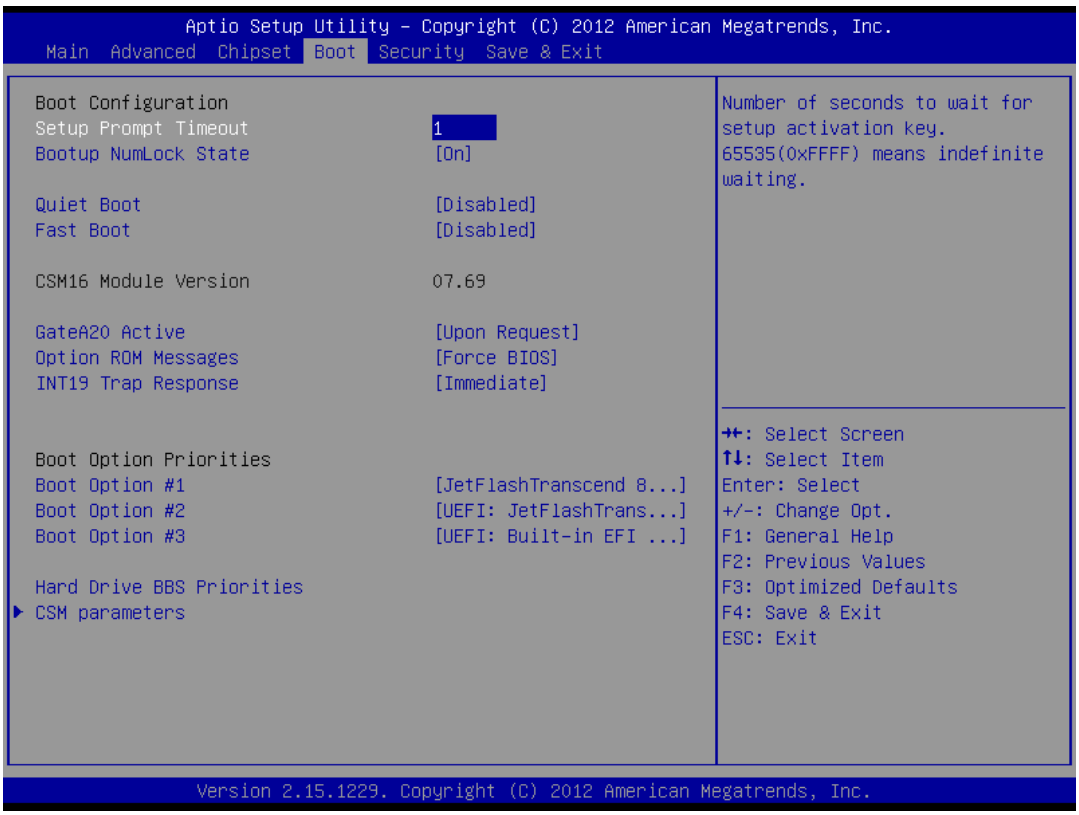
PEG Sampler Calibrate

This item allows users to enable or disable PEG sampler calibrate function.

Memory Information

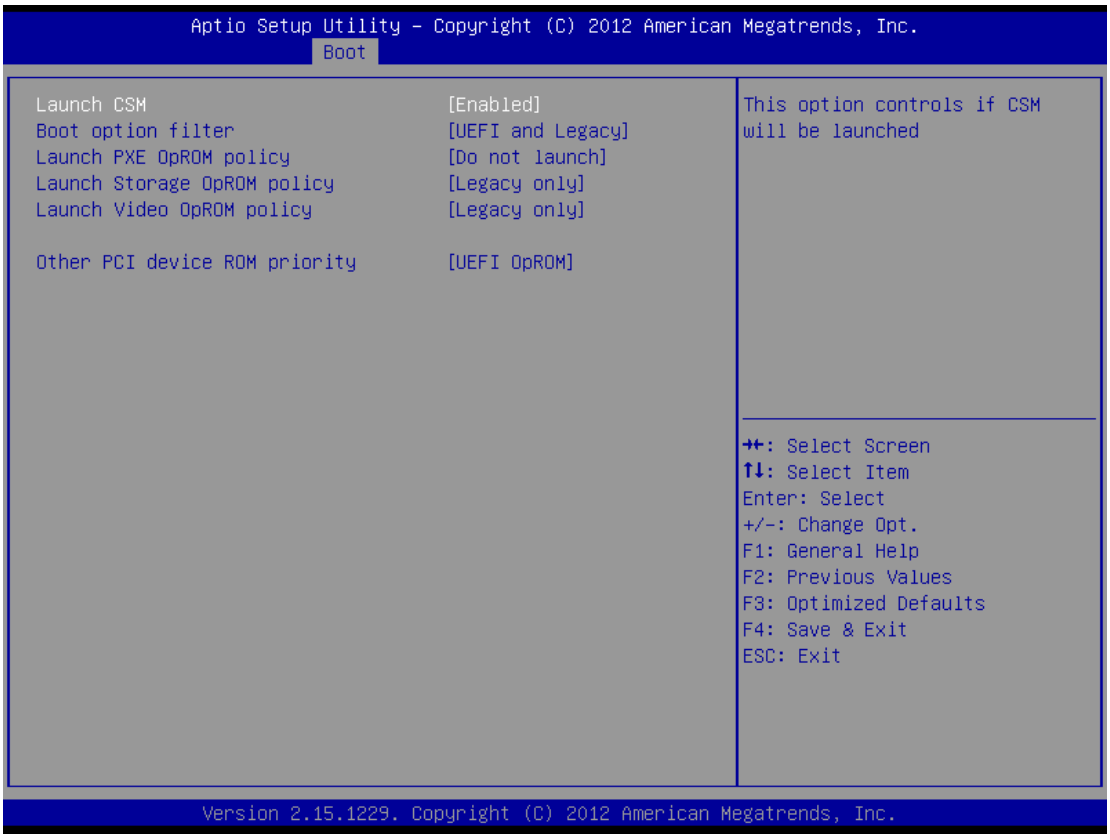


4.4 Boot Setting



SETTING	DESCRIPTION
Setup Prompt Timeout	This item allows you to change number of seconds to wait for setup activation key.
Bootup NumLock State	This allows you to determine the default state of the numeric keypad. By default, the system boots up with NumLock on wherein the function of the numeric keypad is the number keys. When set to Off, the function of the numeric keypad is the arrow keys.
Quiet Boot	If this option is set to Disabled, the BIOS display normal POST messages. If Enabled, an OEM Logo is shown instead of POST messages.
Fast Boot	Enables/Disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.
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.
OptionROM Messages	Set display mode for Option ROM. Options are Force BIOS and Keep Current.
INT19 Trap Response	This item allows option ROMs to trap interrupt 19
Boot Option #1、#2、#3	Selects the boot sequence of the device.
Hard Drive BBS Priorities	Set the order of the legacy devices in this group.

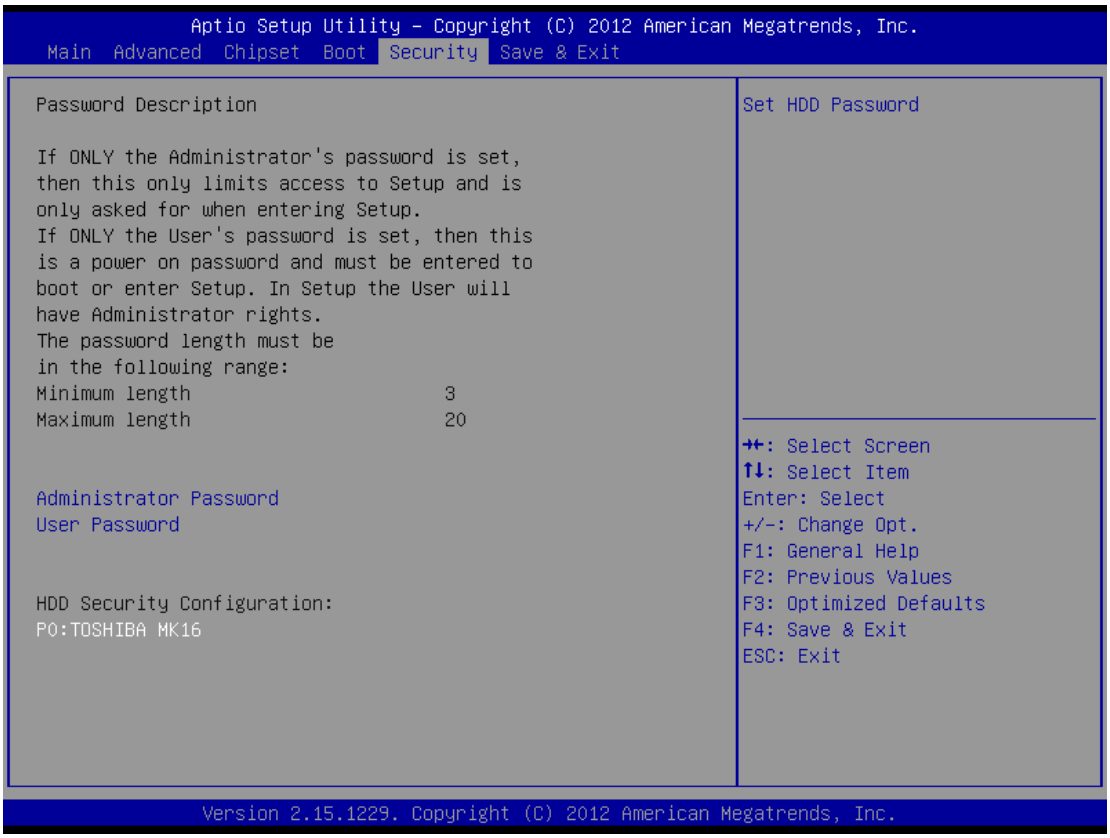
CSM Parameters



SETTING	DESCRIPTION
Launch CSM	This option controls if CSM will be launch.
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 device than Network, mass storage or video defines which OpROM to launch.

4.5 Security Setup

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



Administrator Password

Set Setup Administrator Password.

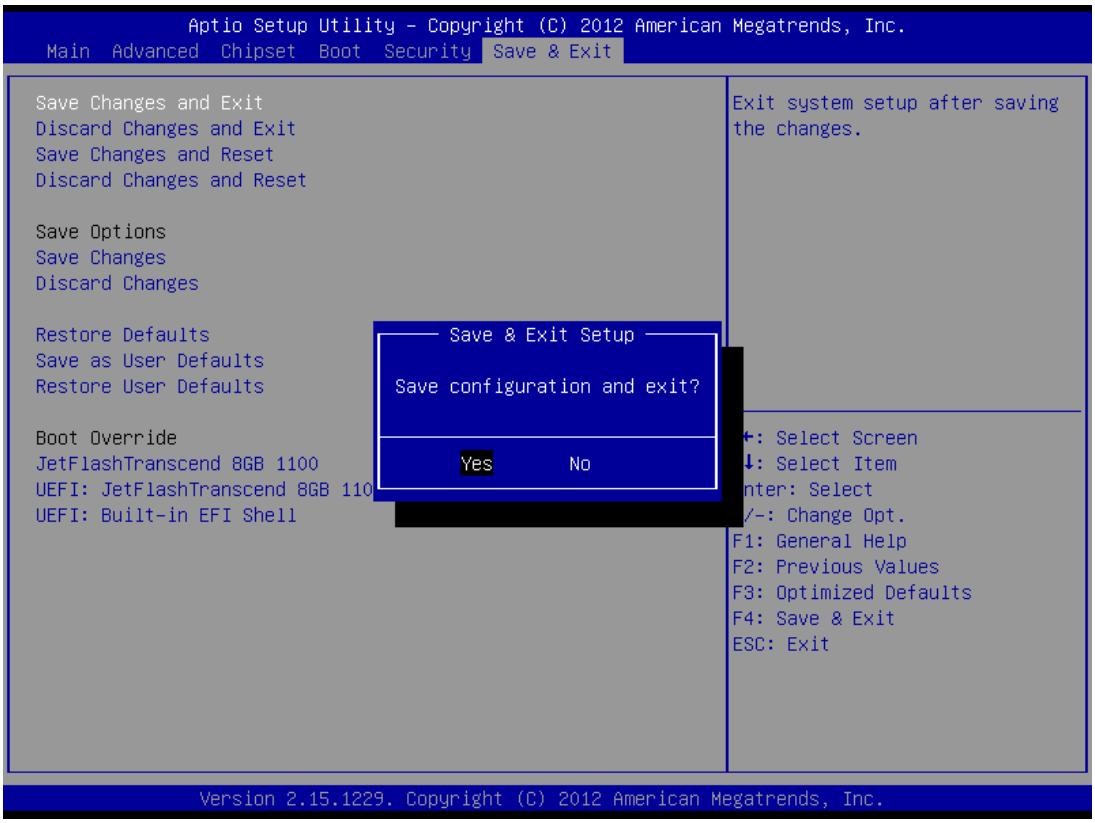
User Password

Set User Password.

HDD 0: FUJITSU MHY2

Set the HDD password.

4.6 Save & Exit



Save Changes and Exit

Exit system setup after saving the changes.

Discard Changes and Exit

Exit system setup without saving any changes.

Save Changes and Reset

Reset the system after saving the changes.

Discard Changes and Reset

Reset system setup without saving any changes.

Save Changes

Save Changes done so far to any of the setup options.

Discard Changes

Discard Changes done so far to any of the setup options.

Restore Defaults

Restore/Load Defaults values for all the setup options.

Save as User Defaults

Save the changes done so far as User Defaults.

Restore User Defaults

Restore the User Defaults to all the setup options.

Service / Update

Official Website

The relevant information about IV32 including the latest news and downloads will be presented in the website below:
http://www.winmate.com.tw/BoxPc/EmbeddedSpec.asp?Prod=05_0156
Please go there to obtain further details of IV32 Motherboard.

Company Information

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