EmETXe-a58M0

COM Express® Compact Type 6 CPU Module

User's Manual

Version 1.0

2016.02

Revision History

Version	Date	Description
1.0	FEB, 2016	Initial release

Copyright Notice

The information in this document is subject to change without prior notice in order to improve the reliability, design and function. It does not represent a commitment on the part of the manufacturer.

Under no circumstances will the manufacturer be liable for any direct, indirect, special, incidental, or consequential damages arising from the use or inability to use the product or documentation, even if advised of the possibility of such damages.

Declaration of Conformity

CE

The CE symbol on your product indicates that it is in compliance with the directives of the Union European (EU). A Certificate of Compliance is available by contacting Technical Support.

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This kind of cable is available from ARBOR. Please contact your local supplier for ordering information.

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

> Warning
>
> This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

FCC Class A

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1)This device may not cause harmful interference, and

(2)This device must accept any interference received, including interference that may cause undesired operation.

NOTE:

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 his own expense.

RoHS

ARBOR Technology Corp. certifies that all components in its products are in compliance and conform to the European Union's Restriction of Use of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive 2002/95/EC.

The above mentioned directive was published on 2/13/2003. The main purpose of the directive is to prohibit the use of lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB), and polybrominated diphenyl ethers (PBDE) in electrical and electronic products. Member states of the EU are to enforce by 7/1/2006.

ARBOR Technology Corp. hereby states that the listed products do not contain unintentional additions of lead, mercury, hex chrome, PBB or PBDB that exceed a maximum concentration value of 0.1% by weight or for cadmium exceed 0.01% by weight, per homogenous material. Homogenous material is defined as a substance or mixture of substances with uniform composition (such as solders, resins, plating, etc.). Lead-free solder is used for all terminations (Sn(96-96.5%), Ag(3.0-3.5%) and Cu(0.5%)).

SVHC / REACH

To minimize the environmental impact and take more responsibility to the earth we live, Arbor hereby confirms all products comply with the restriction of SVHC (Substances of Very High Concern) in (EC) 1907/2006 (REACH --Registration, Evaluation, Authorization, and Restriction of Chemicals) regulated by the European Union.

All substances listed in SVHC < 0.1 % by weight (1000 ppm)

Warning

Single Board Computers and their components contain very delicate Integrated Circuits (IC). To protect the Single Board Computer and its components against damage from static electricity, you should always follow the following precautions when handling it :

1. Disconnect your Single Board Computer from the power source when you want to work on the inside.

2. Hold the board by the edges and try not to touch the IC chips, leads or circuitry.

3. Use a grounded wrist strap when handling computer components.

4. Place components on a grounded antistatic pad or on the bag that comes with the Single Board Computer, whenever components are separated from the system.

Replacing the Lithium Battery

Incorrect replacement of the lithium battery may lead to a risk of explosion.

The lithium battery must be replaced with an identical battery or a battery type recommended by the manufacturer.

Do not throw lithium batteries into the trash-can. It must be disposed of in accordance with local regulations concerning special waste.

Technical Support

If you have any technical difficulties, please consult the user's manual first at:

http://www.arbor.com.tw

Please do not hesitate to call or e-mail our customer service when you still cannot find out the answer.

http://www.arbor.com.tw
E-mail:info@arbor.com.tw

Warranty

This product is warranted to be in good working order for a period of two years from the date of purchase. Should this product fail to be in good working order at any time during this period, we will, at our option, replace or repair it at no additional charge except as set forth in the following terms. This warranty does not apply to products damaged by misuse, modifications, accident or disaster.

Vendor assumes no liability for any damages, lost profits, lost savings or any other incidental or consequential damage resulting from the use, misuse of, or inability to use this product. Vendor will not be liable for any claim made by any other related party.

Vendors disclaim all other warranties, either expressed or implied, including but not limited to implied warranties of merchantability and fitness for a particular purpose, with respect to the hardware, the accompanying product's manual(s) and written materials, and any accompanying hardware. This limited warranty gives you specific legal rights.

Return authorization must be obtained from the vendor before returned merchandise will be accepted. Authorization can be obtained by calling or faxing the vendor and requesting a Return Merchandise Authorization (RMA) number. Returned goods should always be accompanied by a clear problem description.

Chapter 1

Introduction

1.1 The Product

The EmETXe-a58M0 is a space-conscious CPU board of 95 mm x 95 mm to take up only small footprint in your system. By the architecture of Type 6, the board has two high-performance connectors to promise stable data passing rate. The soldered onboard AMD APU G-series SoC, along with integrated Graphics chipset, bring LVDS, and DDI solution for most monitors or LCD video panels.

For system configuration, the board is supported by AMI UEFI BIOS. EmETXe-a58M0 is an ideal choice for some demanding industrial control and data communications by its significant processing performance, low power consumption and these features:

- Fanless Design
- Soldered onboard AMD APU G-series SoC GX-412HC processor
- Analog RGB and DDI Port
- Integrated Gigabit Ethernet

1.2 About This Manual

This user's manual provides general information and installation instructions about the product. This user's manual is intended for experienced users and integrators with hardware knowledge of personal computers. If you are not sure about any description in this booklet. Please consult your vendor before further handling.

1.3 Specifications

System	
CPU	AMD APU G-series SoC GX-412HC processor
Memory	1 x DDR3L SO-DIMM socket, up to 8GB 1666MT/s SDRAM
BIOS	AMI® UEFI BIOS
Watchdog Timer	1~255 levels reset
I/O	
USB Port	7 x USB 2.0 ports 2 x USB SS ports (Super Speed)
Expansion Bus	7x PCIe x 1 Lanes, SDIO
Storage	2 x Serial ATA ports with 600MB/s HDD transfer rate (one is shared with optionally SATA NANDrive via SATA switch ASM1456) 1 x Micro SD socket
Ethernet Chipset	Realtek RTL8111E GbE controller
Audio	HD link
Display	
Graphics Chipset	Integrated AMD Radeon™ HD 8000E Graphics
Graphics Interface	Analog RGB, 2 x DDI ports
Mechanical & Environmental	
Power Requirement	+12V, +5VSB
Power Consumption	1.03A@12V (Typical)
Operating Temp.	0 ~ 60ºC (32 ~ 140ºF)
Operating Humidity	10 ~ 95% @ 60ºC (non-condensing)
Dimension (L x W)	95 x 95mm (3.7” x 3.7”)

1.4 Inside the Package

Before you begin installing your single board, please make sure that the following materials have been shipped:

1 x EmETXe-a58M0-412HC COM Express CPU Module

1 x Driver CD
1 x Quick Installation Guide

If any of the above items is damaged or missing, contact your vendor immediately.

1.5 Ordering Information

EmETXe-a58M0-412HC	AMD APU G-series GX-412HC COM Express® Compact Type 6 CPU module

1.5.1 Optional Accessories

HS-58M0-F2-T	Heat Spreader; Threaded standoffs(bore hole) (95x95x11mm)
HS-58M0-F2-NT	Heat Spreader; Non-threaded standoffs(bore hole) (95x95x11mm)
HS-0000-W4	Universal evaluation heat sink kit w/ thermal pad,125x95x22mm, only used on a flat-type heat spreader
PBE-1702	COM Express type 6 evaluation carrier board in ATX form factor
CBK-04-1702-00	Cable Kit • 1 x SATA cable • 2 x Serial port cables • 1 x USB cable

1.6 The Installation Paths of CD Driver

The CPU module supports Windows 7 and 8. Find the necessary drivers on the CD that comes with your purchase. For different OS, the driver installation may vary slightly, but generally they are similar.

Find the drivers on CD by the following paths:

Windows 8.1

Driver	Path
Chipset	\EmETXe-a58M0\FT3B Chipset\Win8.1 64 bit\14.502.1030-150428a-183767C-AES
Audio	Win 32: \EmETXe-a58M0\Audio\32bit
	Win 64: \EmETXe-a58M0\Audio\64bit
LAN	\EmETXe-a58M0\LAN\RTL81111E for module\Install_ Win8_8015_05242013

Windows 7

Driver	Path
Chipset	Win 32: EmETXe-a58M0\FT3B Chipset\ Win7\32bit\14.502.1030-150428a-183767C-AES
	Win 64: EmETXe-a58M0\FT3B Chipset\Win7\64 bit\14.502.1030-150428a-183767C-AES
Audio	Win 32: \EmETXe-a58M0\Audio\32bit
	Win 64: \EmETXe-a58M0\Audio\64bit
LAN	\EmETXe-a58M0\LAN\RTL81111E for module\Install_ Win7_7061_07272012
USB3.0	\EmETXe-a58M0\USB 3.0\win7

Chapter 2

Board Overview

2.1 What Is "COM Express®"?

With more and more demands on small and embedded industrial boards, a multi-functional COM (Computer-on-Module) surfaces as a great solution.

COM Express® supports seven pin-out types applying to Basic and Extended form factors:

Module Type 1 and 10 support single connector with two rows (220 pins).

Module Type 2, 3, 4, 5 and 6 support two connectors with four rows (440 pins).

EmETXe-a58M0 is a Type-6 module.

Difference between Standard Type 6 and EmETXe-a58M0 is listed as below:

Module Type	Standard Type 6	EmETXe-a58M0
Connectors	2	2
Connector Rows	A, B, C, D	A, B, C, D
PCIe Lanes (Max)	24	7
LAN (Max)	1	1
Serial Ports (Max)	2	0
Digital Display I/F (Max)	3	2
USB 3.0 Ports (Max)	4	2

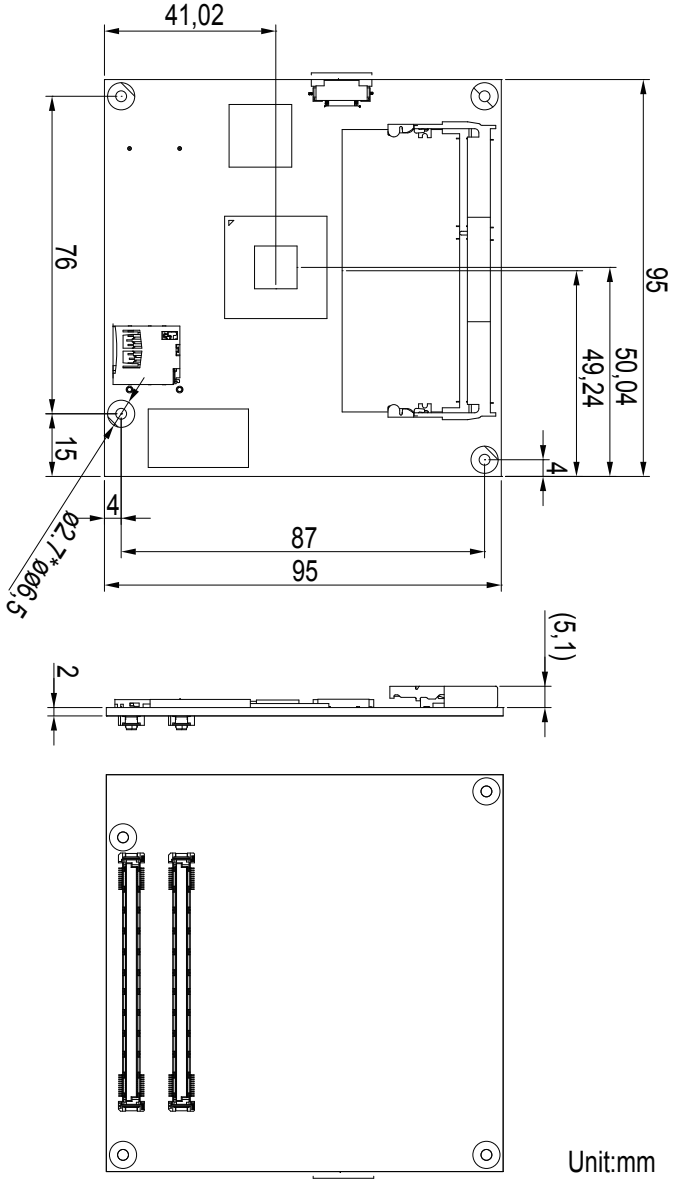
Row AB provides pins for PCI Express, SATA, LVDS, LCD channel, LPC bus, system and power management, VGA, LAN, and power and ground interfaces.

Row CD provides SDVO and legacy PCI signals next to additional PCI Express, LAN and power and ground signals. The COM are targeted at following applications:

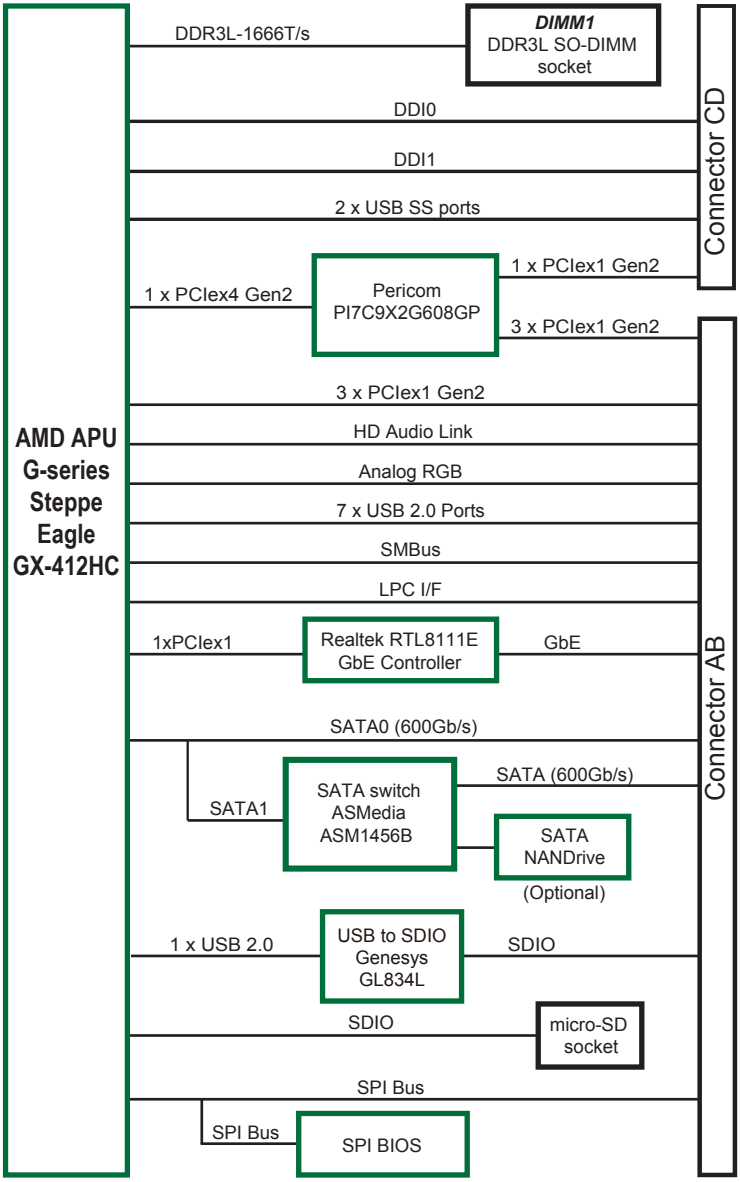
- Retail & Advertising
- Medical
- Test & Measurement
- Gaming & Entertainment
- Industrial & Automation
- Military & Government
- Security

2.2 Board Dimensions

The following illustration shows the dimension of EmETXe-a58M0, with the measurements in width, depth, and height called out.



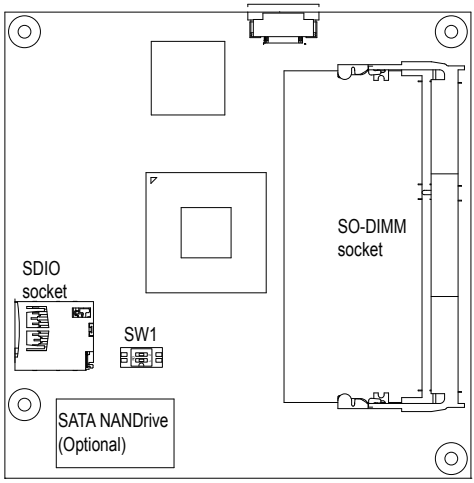
2.3 Block Diagram



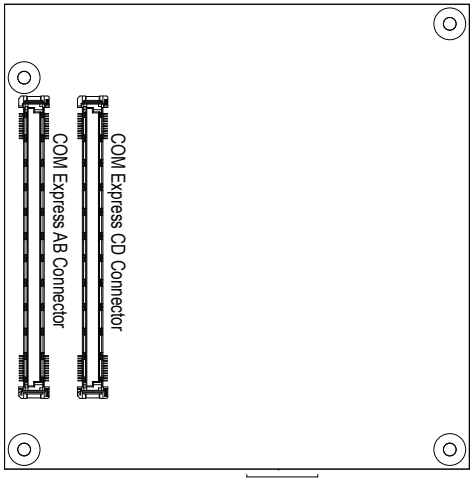
2.4 Connector Pin Definition

Being a most commonly-used Type 6, the EmETXe-a58M0 features two board-to-board connectors on bottom side.

Top Side



Bottom Side



COM Express AB Connector (bottom side)

B1	GND	GND	A1	B56	PCIE_RX4-	PCIE_TX4-	A56
B2	GBE0_ACT#	GBE0_MDI3-	A2	B57	GPO2	GND	A57
B3	LPC_FRAME#	GBE0_MDI3+	A3	B58	PCIE_RX3+	PCIE_TX3+	A58
B4	LPC_AD0	GBE0_LINK100#	A4	B59	PCIE_RX3-	PCIE_TX3-	A59
B5	LPC_AD1	GBE0_LINK1000#	A5	B60	GND	GND	A60
B6	LPC_AD2	GBE0_MDI2-	A6	B61	PCIE_RX2+	PCIE_TX2+	A61
B7	LPC_AD3	GBE0_MDI2+	A7	B62	PCIE_RX2-	GPI1	A63
B8	LPC_DRQ0#	GBE0_LINK#(N/C)	A8	B63	GPO3	PCIE_TX2-	A62
B9	LPC_DRQ1#(N/C)	GBE0_MDI1-	A9	B64	PCIE_RX1+	PCIE_TX1+	A64
B10	LPC_CLK	GBE0_MDI1+	A10	B65	PCIE_RX1-	PCIE_TX1-	A65
B11	GND	GND	A11	B66	WAKE0#	GND	A66
B12	PWRBTN#	GBE0_MDI0-	A12	B67	WAKE1#	GPI2	A67
B13	SMB_CK	GBE0_MDI0+	A13	B68	PCIE_RX0+	PCIE_TX0+	A68
B14	SMB_DAT	GBE0_CTREF(N/C)	A14	B69	PCIE_RX0-	PCIE_TX0-	A69
B15	SMB_ALRERT#	SUS_S3#	A15	B70	GND	GND	A70
B16	SATA1_TX+	SATA0_TX+	A16	B71	LVDS_B0+(N/C)	LVDS_A0+(N/C)	A71
B17	SATA1_TX	SATA0_TX-	A17	B72	LVDS_B0-(N/C)	LVDS_A0-(N/C)	A72
B18	SUS_STAT#	SUS_S4#	A18	B73	LVDS_B1+(N/C)	LVDS_A1+(N/C)	A73
B19	SATA1_RX+	SATA0_RX+	A19	B74	LVDS_B1-(N/C)	LVDS_A1-(N/C)	A74
B20	SATA1_RX	SATA0_RX	A20	B75	LVDS_B2+(N/C)	LVDS_A2+(N/C)	A75
B21	GND	GND	A21	B76	LVDS_B2-(N/C)	LVDS_A2-(N/C)	A76
B22	SATA3_TX+(N/C)	SATA2_TX+(N/C)	A22	B77	LVDS_B3+(N/C)	LVDS_VDD_EN(N/C)	A77
B23	SATA3_TX-(N/C)	SATA2_TX-(N/C)	A23	B78	LVDS_B3-(N/C)	LVDS_A3+(N/C)	A78
B24	PWR_OK	SUS_ S5#	A24	B79	LVDS_BKLT_EN(N/C)	LVDS_A3-(N/C)	A79
B25	SATA3_RX+(N/C)	SATA2_RX+(N/C)	A25	B80	GND	GND	A80
B26	SATA3_RX-(N/C)	SATA2_RX-(N/C)	A26	B81	LVDS_B_CK+(N/C)	LVDS_A_CK+(N/C)	A81
B27	WDT(N/C)	BATLOW#	A27	B82	LVDS_B_CK-(N/C)	LVDS_A_CK-(N/C)	A82
B28	AC_SDIN2	ATA_ACT#	A28	B83	LVDS_BKLT_CTRL(N/C)	LVDS_I2C_CK(N/C)	A83
B29	AC_SDIN1	AC_SYNC	A29	B84	VCC_5V_SBY	LVDS_I2C_DAT(N/C)	A84
B30	AC_SDIN0	AC_RST#	A30	B85	VCC_5V_SBY	GPI3	A85
B31	GND	GND	A31	B86	VCC_5V_SBY	RSV4	A86
B32	SPKR	AC_BITCLK	A32	B87	VCC_5V_SBY	RSV3	A87
B33	I2C_CK	AC_SDOUT	A33	B88	BIOS_DIS1#	PCIE0_CK_REF+	A88
B34	I2C_DAT	BIOS_DISABLE0#	A34	B89	VGA_RED	PCIE0_CK_REF	A89
B35	THRM#	THRMTRIP#	A35	B90	GND	GND	A90
B36	USB7-(N/C)	USB6-	A36	B91	VGA_GRN	SPI_POWER	A91
B37	USB7+(N/C)	USB6+	A37	B92	VGA_BLU	SPI_MISO	A92
B38	USB_4_5_OC#	USB_6_7_OC#	A38	B93	VGA_HSYNC	GPO0	A93
B39	USB5-	USB4-	A39	B94	VGA_VSYNC	SPI_CLK	A94
B40	USB5+	USB4+	A40	B95	VGA_I2C_CK	SPI_MOSI	A95
B41	GND	GND	A41	B96	VGA_I2C_DAT	TPM_PP(N/C)	A96
B42	USB3-	USB2-	A42	B97	SPI_CS#	TYPE10#(N/C)	A97
B43	USB3+	USB2+	A43	B98	RSV2(N/C)	SERR0_TX(N/C)	A98
B44	USB_0_1_OC#	USB_2_3_OC#	A44	B99	RSV1(N/C)	SERR0_RX(N/C)	A99
B45	USB1-	USB0-	A45	B100	GND	GND	A100
B46	USB1+	USB0+	A46	B101	FAN_PWMOUT	SERR1_TX(N/C)	A101
B47	EXCD1_PERST#	VCC_RTC	A47	B102	FAN_TACHIN	SERR1_RX(N/C)	A102
B48	EXCD1_CPPE#	EXCD0_PERST#	A48	B103	SLEEP#	LID#	A103
B49	SYS_REST#	EXCD0_CPPE#	A49	B104	VCC_12V	VCC_12V	A104
B50	CB_REST#	LPC_SERIRQ	A50	B105	VCC_12V	VCC_12V	A105
B51	GND	GND	A51	B106	VCC_12V	VCC_12V	A106
B52	PCIE_RX5+	PCIE_TX5+	A52	B107	VCC_12V	VCC_12V	A107
B53	PCIE_RX5-	PCIE_TX5-	A53	B108	VCC_12V	VCC_12V	A108
B54	GPO1	GPI0	A54	B109	VCC_12V	VCC_12V	A109
B55	PCIE_RX4+	PCIE_TX4+	A55	B110	GND	GND	A110

COM Express CD Connector (bottom side)

D1	GND	GND	C1
D2	GND	GND	C2
D3	USB_SSTX0-	USB_SSRX0-	C3
D4	USB_SSTX0+	USB_SSRX0+	C4
D5	GND	GND	C5
D6	USB_SSTX1-	USB_SSRX1-	C6
D7	USB_SSTX1+	USB_SSRX1+	C7
D8	GND	GND	C8
D9	USB_SSTX2-(N/C)	USB_SSRX2-(N/C)	C9
D10	USB_SSTX2+(N/C)	USB_SSRX2+(N/C)	C10
D11	GND	GND	C11
D12	USB_SSTX3-(N/C)	USB_SSRX3-(N/C)	C12
D13	USB_SSTX3+(N/C)	USB_SSRX3+(N/C)	C13
D14	GND	GND	C14
D15	DDI1_CTRLCLK_AUX+	DDI1_PAIR6+/SDVO_FLDSTALL+(N/C)	C15
D16	DDI1_CTRLDATA_AUX-	DDI1_PAIR6-/SDVO_FLDSTALL-(N/C)	C16
D17	RSV10	RSV8	C17
D18	RSV9	RSV7	C18
D19	PCIE_TX6+	PCIE_RX6+	C19
D20	PCIE_TX6-	PCIE_RX6-	C20
D21	GND	GND	C21
D22	PCIE_TX7+(N/C)	PCIE_RX7+(N/C)	C22
D23	PCIE_TX7-(N/C)	PCIE_RX7-(N/C)	C23
D24	RSV5	DDI_HPD	C24
D25	RSV6	DDI1_PAIR4+/SDVO_IN+(N/C)	C25
D26	DDI1_PARI0+/SDVO_RED+	DDI1_PAIR4-/SDVO_INT-(N/C)	C26
D27	DDI1_PAIR0-/SDVO_RED-	RSV1(N/C)	C27
D28	RSV3	RSV2(N/C)	C28
D29	DDI1_PAIR1+/SDVO_GRN+	DDI1_PAIR5+/SDVO_TVCLK+(N/C)	C29
D30	DDI1_PAIR1-/SDV0_GRN-	DDI1_PAIR5-/SDVO_TVCLK-(N/C)	C30
D31	GND	GND	C31
D32	DDI_PAIR2+/SDVO_BLU+	DDI2_CTRLCLK_AUX+	C32
D33	DDI1_PAIR2-/SDVO_BLU-	DDI2_CTRLDATA_AUX-	C33
D34	DDI1_DDC_AUX_SEL	DDI2_DDC_AUX_SEL	C34
D35	RSV11(N/C)	RSV12(N/C)	C35
D36	DDI1_PAIR3+/SDVO_CLK+	DDI3_CTRLCLK_AUX+(N/C)	C36
D37	DDI1_PAIR3-/SDVO_CLK-	DDI3_CTRLDATA_AUX-(N/C)	C37
D38	RSV4(N/C)	DDI3_DDC_AUX_SEL(N/C)	C38
D39	DDI2_PAIR0+	DDI3_PAIR0+(N/C)	C39
D40	DDI2_PAIR0-	DDI3_PAIR0-(N/C)	C40
D41	GND	GND	C41
D42	DDI2_PAIR1+	DDI3_PAIR1+(N/C)	C42
D43	DDI2_PAIR1-	DDI3_PAIR1-(N/C)	C43
D44	DDI2_HPD	DDI3_HPD(N/C)	C44
D45	RSV13(N/C)	RSV14(N/C)	C45
D46	DDI2_PAIR2+	DDI3_PAIR2+(N/C)	C46
D47	DDI2_PAIR2-	DDI3_PAIR2-(N/C)	C47
D48	RSV16(N/C)	RSV15(N/C)	C48
D49	DDI2_PARI3+	DDI3_PAIR3+(N/C)	C49
D50	DDI2_PAIR3-	DDI3_PAIR3-(N/C)	C50
D51	GND	GND	C51
D52	PEG_TX0+(N/C)	PEG_RX0+(N/C)	C52
D53	PEG_TX0-(N/C)	PEG_RX0-(N/C)	C53
D54	PEG_LANE_RV#	TYPE0#(N/C)	C54
D55	PEG_TX1+(N/C)	PEG_RX1+(N/C)	C55

D56	PEG_TX1-(N/C)	PEG_RX1-(N/C)	C56
D57	TYPE2#(N/C)	TYPE1#(N/C)	C57
D58	PEG_TX2+(N/C)	PEG_RX2+(N/C)	C58
D59	PEG_TX2-(N/C)	PEG_RX2-(N/C)	C59
D60	GND	GND	C60
D61	PEG_TX3+(N/C)	PEG_RX3+(N/C)	C61
D62	PEG_TX3-(N/C)	PEG_RX3-(N/C)	C62
D63	RSV27(N/C)	RSV18(N/C)	C63
D64	RSV26(N/C)	RSV19(N/C)	C64
D65	PEG_TX4+(N/C)	PEG_RX4+(N/C)	C65
D66	PEG_TX4-(N/C)	PEG_RX4-(N/C)	C66
D67	GND	RSV20(N/C)	C67
D68	PEG_TX5+(N/C)	PEG_RX5+(N/C)	C68
D69	PEG_TX5-(N/C)	PEG_RX5-(N/C)	C69
D70	GND	GND	C70
D71	PEG_TX6+(N/C)	PEG_RX6+(N/C)	C71
D72	PEG_TX6-(N/C)	PEG_RX6-(N/C)	C72
D73	GND	GND	C73
D74	PEG_TX7+(N/C)	PEG_RX7+(N/C)	C74
D75	PEG_TX7-(N/C)	PEG_RX7-(N/C)	C75
D76	GND	GND	C76
D77	RSV17(N/C)	RSV21(N/C)	C77
D78	PEG_TX8+(N/C)	PEG_RX8+(N/C)	C78
D79	PEG_TX8-(N/C)	PEG_RX8-(N/C)	C79
D80	GND	GND	C80
D81	PEG_TX9+(N/C)	PEG_RX9+(N/C)	C81
D82	PEG_TX9-(N/C)	PEG_RX9-(N/C)	C82
D83	RSV25(N/C)	RSV24(N/C)	C83
D84	GND	GND	C84
D85	PEG_TX10+(N/C)	PEG_RX10+(N/C)	C85
D86	PEG_TX10-(N/C)	PEG_RX10-(N/C)	C86
D87	GND	GND	C87
D88	PEG_TX11+(N/C)	PEG_RX11+(N/C)	C88
D89	PEG_TX11-(N/C)	PEG_RX11-(N/C)	C89
D90	GND	GND	C90
D91	PEG_TX12+(N/C)	PEG_RX12+(N/C)	C91
D92	PEG_TX12-(N/C)	PEG_RX12-(N/C)	C92
D93	GND	GND	C93
D94	PEG_TX13+(N/C)	PEG_RX13+(N/C)	C94
D95	PEG_TX13-(N/C)	PEG_RX13-(N/C)	C95
D96	GND	GND	C96
D97	RSV23(N/C)	RSV22(N/C)	C97
D98	PEG_TX14+(N/C)	PEG_RX14+(N/C)	C98
D99	PEG_TX14-(N/C)	PEG_RX14-(N/C)	C99
D100	GND	GND	C100
D101	PEG_TX15+(N/C)	PEG_RX15+(N/C)	C101
D102	PEG_TX15-(N/C)	PEG_RX15-(N/C)	C102
D103	GND	GND	C103
D104	VCC_12V	VCC_12V	C104
D105	VCC_12V	VCC_12V	C105
D106	VCC_12V	VCC_12V	C106
D107	VCC_12V	VCC_12V	C107
D108	VCC_12V	VCC_12V	C108
D109	VCC_12V	VCC_12V	C109
D110	GND	GND	C110

2.5 Jumper Setting

SW1: SATA port selection

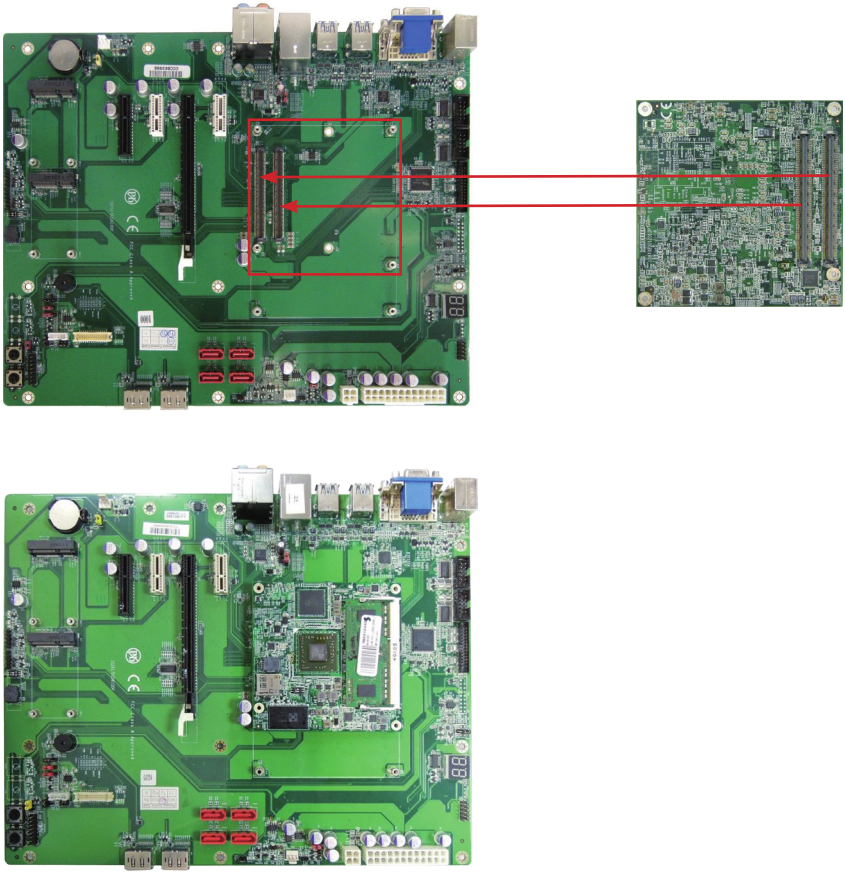
Pin	Mode	
1	Set to SATA port (default)	
2	Set to NANDrive	

Chapter 3

Installation & Maintenance

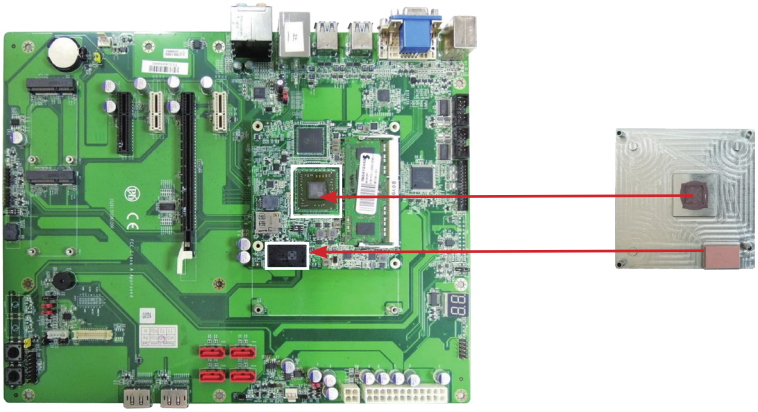
3.1 Installing the CPU Module on Carrier Board

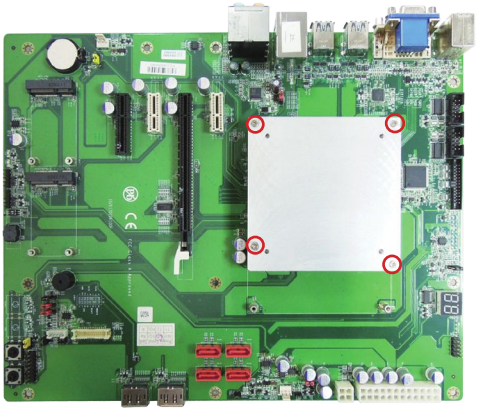
1. Find the COM Express connectors on carrier board PBE-1702, which is available in Section 1.5.1 Optional Accessories on page 4.
2. Embed EmETXe-a58M0 into PBE-1702 via COM Express connectors as below; that is, COM Express AB to AB and CD to CD.



3.2 Installing the Heatsink

1. Locate EmETXe-a58M0 mounted on PBE-1702.
2. Prepare the heatspred included in optional accessories. (See Section 1.5.1 Optional Accessories on page 4) Put heatspred on the CPU module and lock it. Make sure thermal grease in contact with CPU and chipset on CPU module. Plug power cable into appropriate connector if there is a fan.





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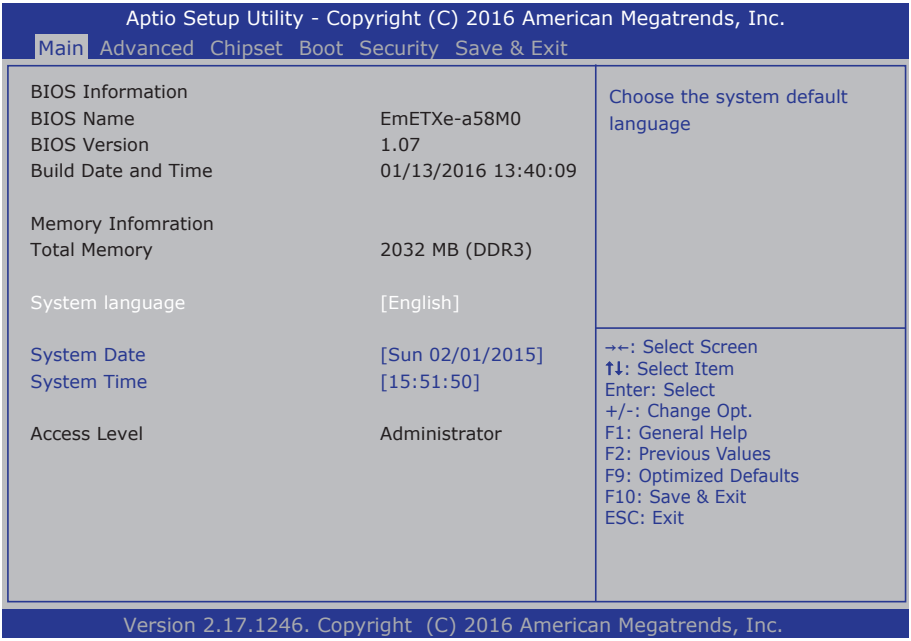
Chapter 4

BIOS

4.1 Main

The AMI BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS RAM of the system stores the Setup utility and configurations. When you turn on the computer, the AMI BIOS is immediately activated. To enter the BIOS SETUP UTILITY, press **"Delete"** once the power is turned on. When the computer is shut down, the battery on the motherboard supplies the power for BIOS RAM.

The **Main Setup** screen lists the following information:



Info Item	Description
BIOS Name	Delivers the Project name.
BIOS Version	Delivers the version of BIOS.
Build Date and Time	Delivers the date and time the BIOS Setup utility was made/updated.
Total Memory	Delivers Memory info.
System Date	Sets system date.
System Time	Sets system time.

Access Level	Delivers the level by which the BIOS Setup utility is being accessed at the moment.

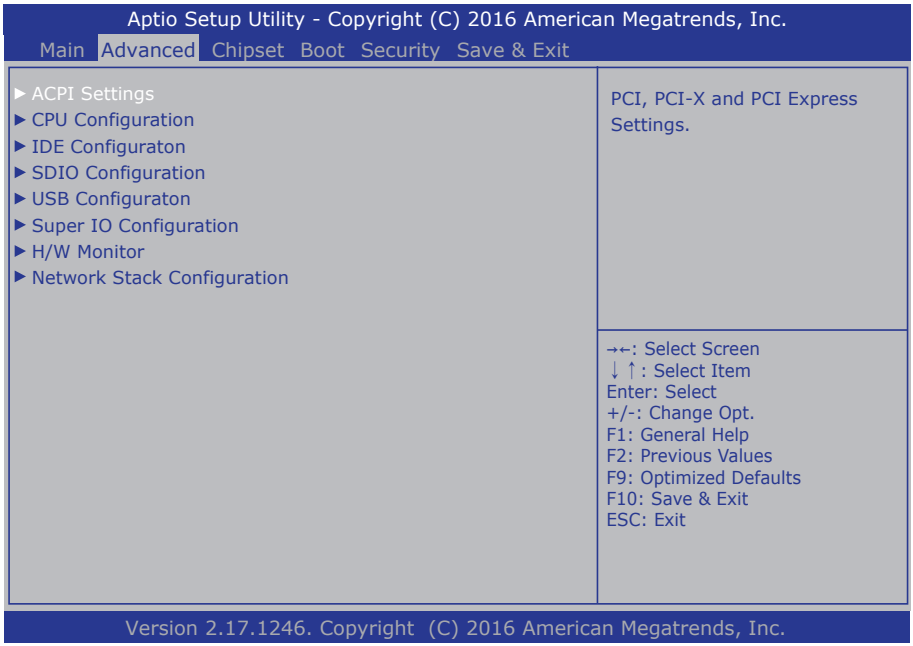
Key Commands

BIOS Setup Utility is mainly a key-based navigation interface. Please refer to the following key command instructions for navigation process.

Keystroke	Function
◄ ►	Move to highlight a particular configuration screen from the top menu bar / Move to highlight items on the screen
▼ ▲	Move to highlight previous/next item
Enter	Select and access a setup item/field
Esc	On the Main Menu – Quit the setup and not save changes into CMOS (a message screen will display and ask you to select “OK” or “Cancel” for exiting and discarding changes. Use “←” and “→” to select and press “Enter” to confirm) On the Sub Menu – Exit current page and return to main menu
Page Up / +	Increase the numeric value on a selected setup item / make change
Page Down -	Decrease the numeric value on a selected setup item / make change
F1	Activate “General Help” screen
F0	Save the changes that have been made in the setup and exit. (a message screen will display and ask you to select “OK” or “Cancel” for exiting and saving changes. Use “←” and “→” to select and press “Enter” to confirm)

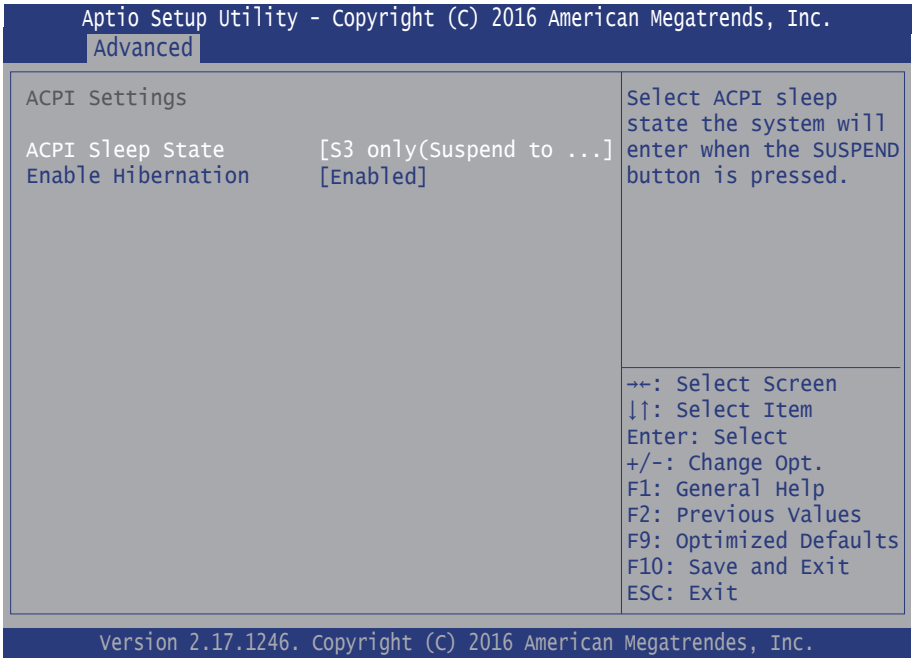
4.2 Advanced

The “Advanced” setting page provides you the options to configure the details of your hardware, such as ACPI, CPU, SATA, AMT, USB and Super IO.



Setting	Description
ACPI Settings	See Section 4.2.1 ACPI Settings on page 23
CPU Configuration	See Section 4.2.2 CPU Configuration on page 24
IDE Configuration	See Section 4.2.3 IDE Configuration on page 25
SDIO Configuration	See Section 4.2.4 SDIO Configuration on page 26
USB Configuration	See Section 4.2.5 USB Configuration on page 27
Super IO Configuration	See Section 4.2.6 Super IO Configuration on page 29
H/W Monitor	See Section 4.2.7 H/W Monitor on page 30
Network Stack Configuration	See Section 4.2.8 Network Stack Configuration on page 31

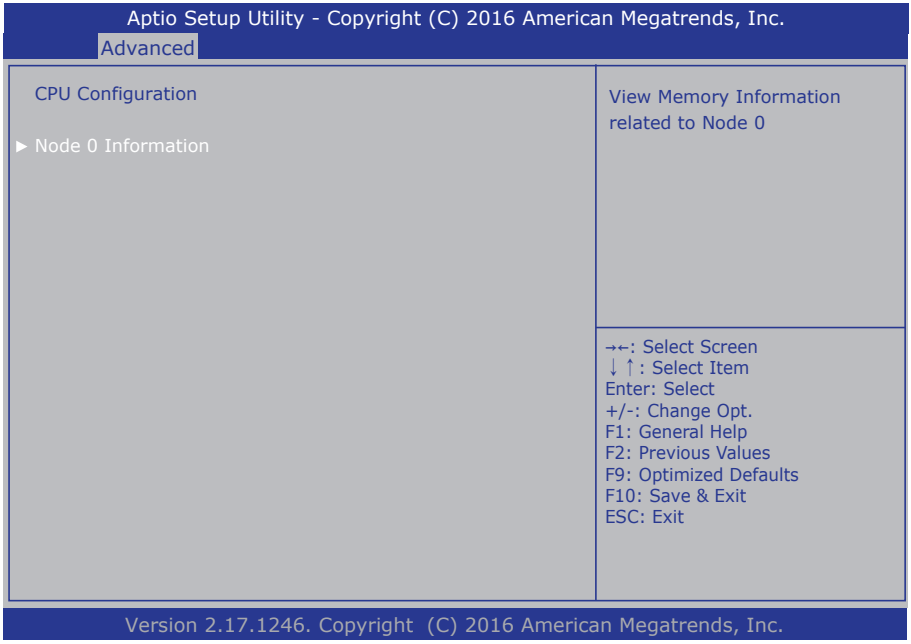
4.2.1 ACPI Settings



Setting	Description
ACPI Sleep State	Select ACPI sleep state the system will enter when the SUSPEND button is pressed. ► Options: **Suspend Disabled**, **S1 only(CPU Stop Clock)**, **S3 only(Suspend to RAM)** (default), **Both S1 and S3 available for OS to choose from**
Enable Hibernation	**Enables** (default) or **Disables** System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS.

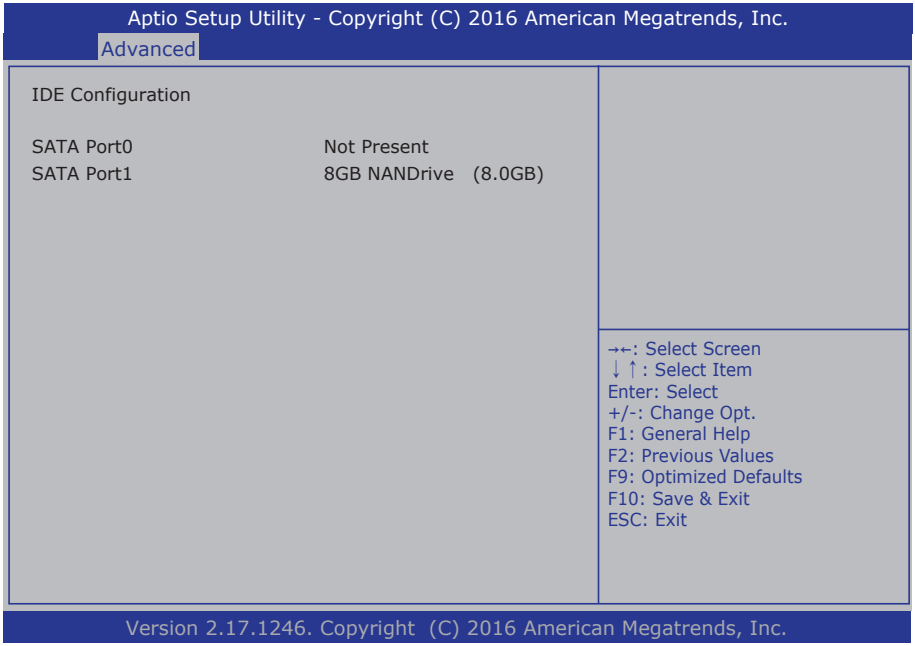
4.2.2 CPU Configuration

Access this submenu to configure the CPU features.

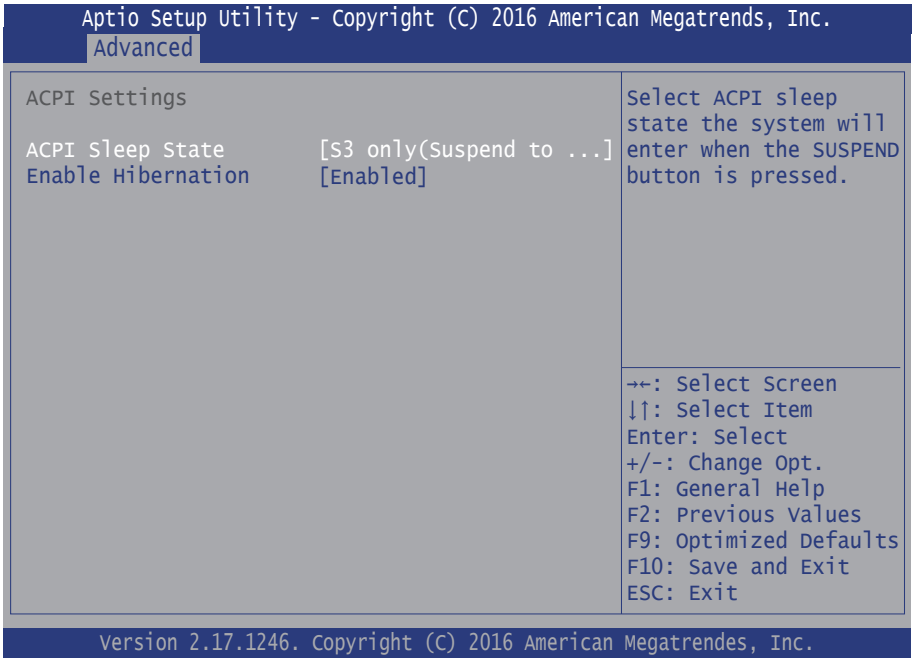


4.2.3 IDE Configuration

Access this submenu to view the presence of SATA device(s).



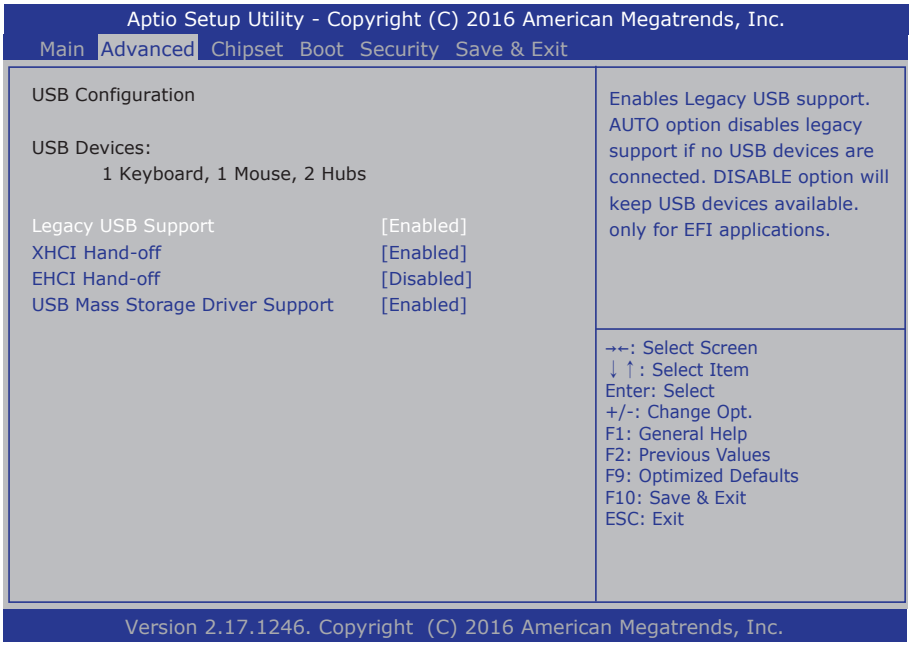
4.2.4 SDIO Configuration



Setting	Description
SDIO Access Mode	Select SDIO Access Mode. Auto: Access SD device in DMA mode if controller supports, otherwise in PIO mode. DMA: Access SD device in DMA mode. PIO: Access SD device in PIO mode. ► Options: **Auto** (default), **DMA**, **PIO**

4.2.5 USB Configuration

Select this submenu to view the status of the USB ports and configure USB features.

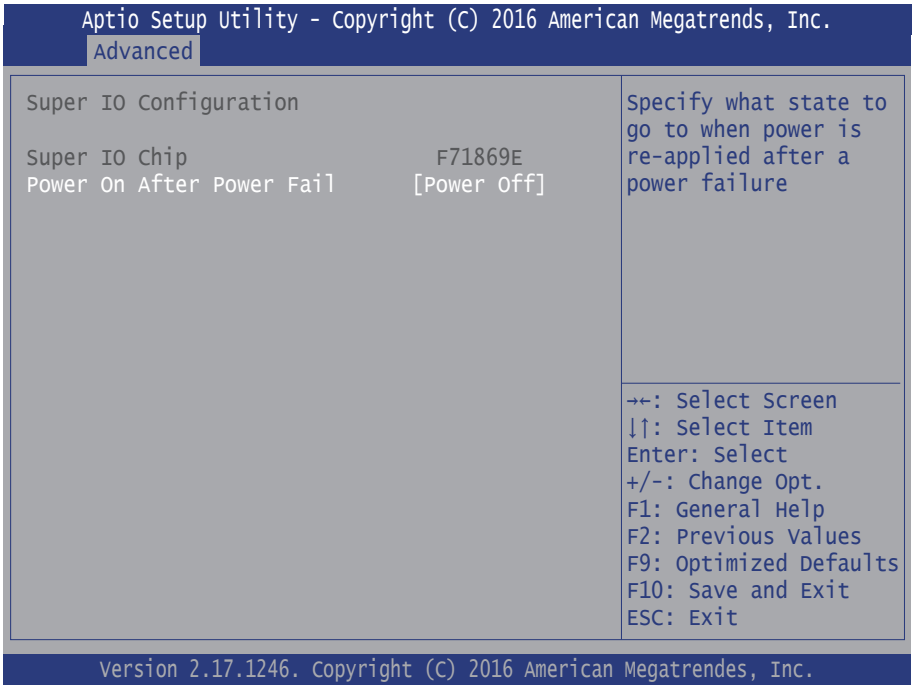


The featured settings and delivered info are:

Group	Setting / Info	Description
USB Configuration	Legacy USB Support	Enables/disables legacy USB support. ▸ Options available are **Enabled** (default), **Disabled** and **Auto**. ▸ Select **Auto** to disable legacy support if no USB device are connected. ▸ Select **Disabled** to keep USB devices available only for EFI applications.
	XHCI Hand-off	Enables/disables a workaround for the operating systems that have no XHCI hand-off support ▸ **Enabled** is the default.

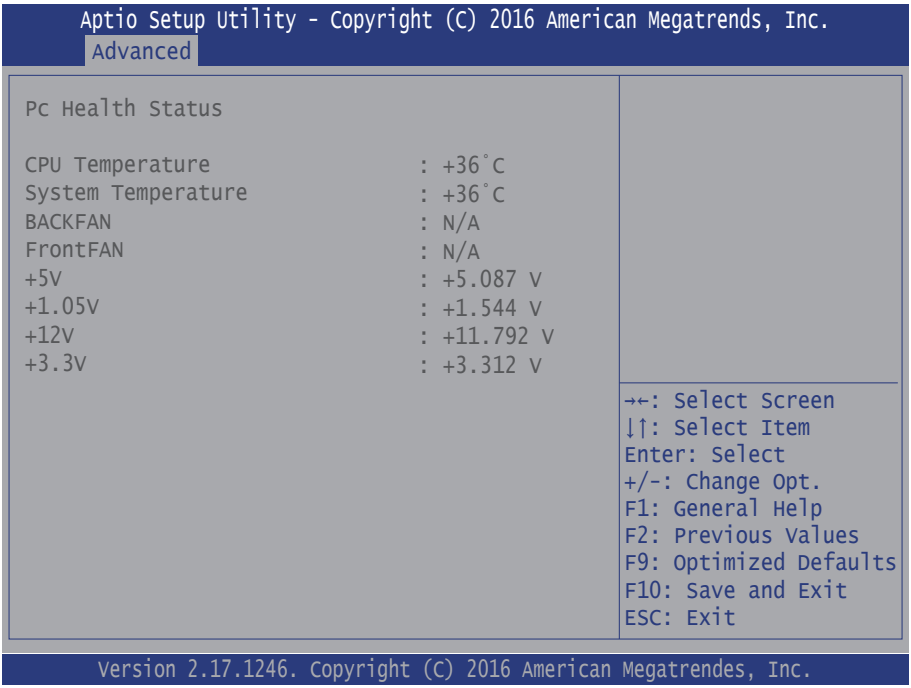
	EHCI Hand-off	Enables/disables a workaround for the operating systems that have no EHCI hand-off support ▸ **Disabled** is the default.
	USB Mass Storage Driver Support	Enables/disables the support for USB mass storage driver. ▸ **Enabled** is the default.

4.2.6 Super IO Configuration

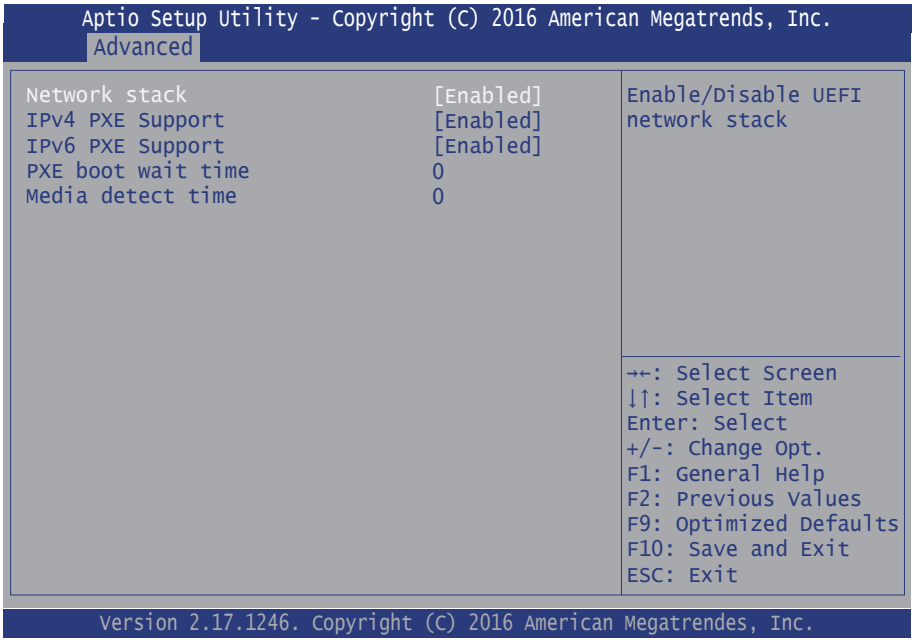


Setting	Description
Power On After Power Fail	Specify what state to go to when power is re-applied after a power failure. ► Options: **Last State**, **Power On** and **Power Off** (default)

4.2.7 H/W Monitor

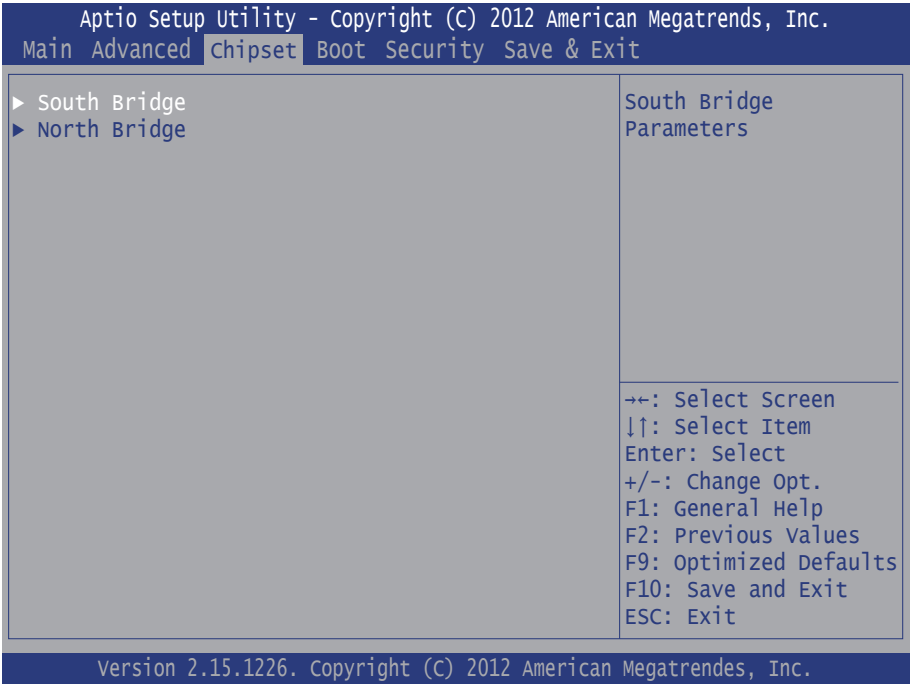


4.2.8 Network Stack Configuration



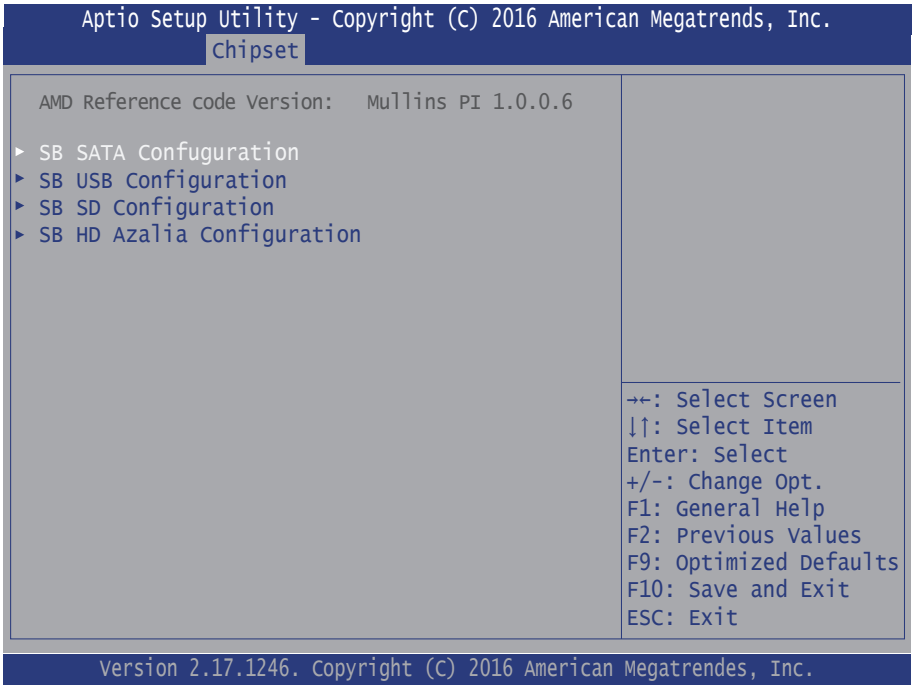
Setting	Description
Network Stack	Enables/disables UEFI network stack. ► **Disabled** is the default.
IPv4 PXE Support	Enables/disables IPv4 PXE boot Support. ► **Enabled** is the default.
IPv6 PXE Support	Enables/disables IPv6 PXE boot Support. ► **Enabled** is the default.
PXE boot wait time	Setup PXE boot wait time to press ESC key to about the PXE boot.
Media detect time	Setup wait time in sec to detect media.

4.3 Chipset



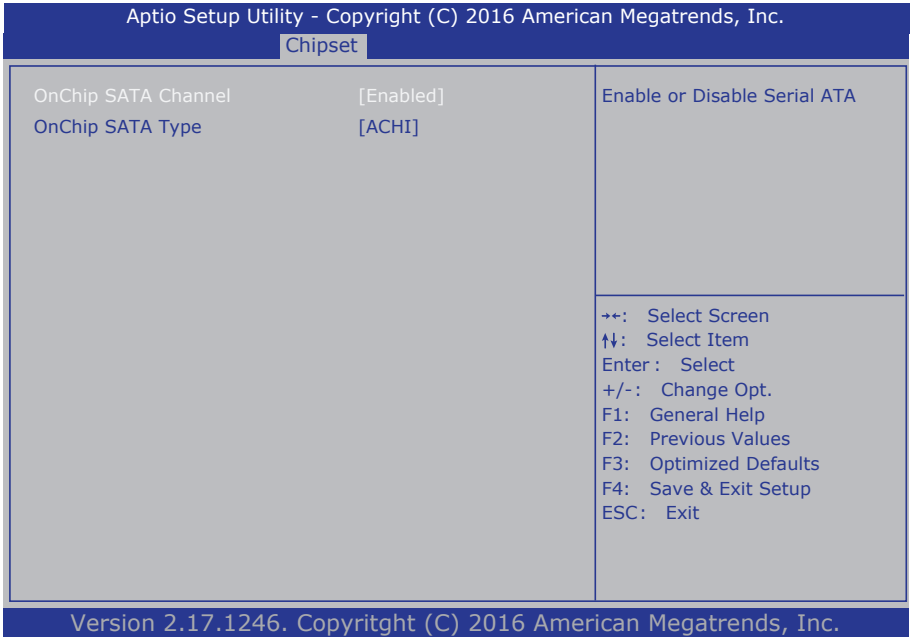
Setting	Description
South Bridge	See Section 4.3.1 South Bridge on page 33
North Bridge	See Section 4.3.2 North Bridge on page 38

4.3.1 South Bridge



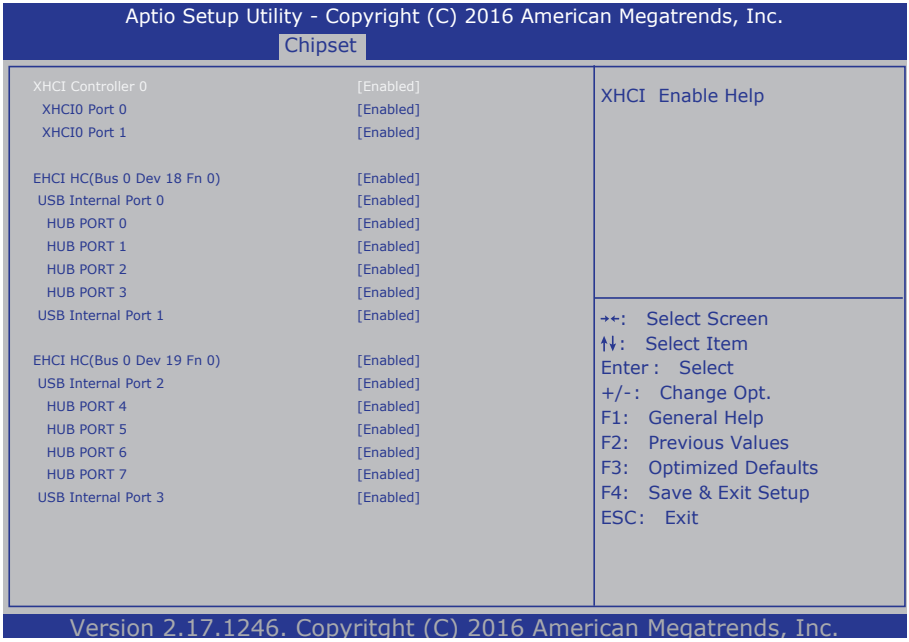
Item	Description
SB SATA Configuration	See SB SATA Configuration page
SB USB Configuration	See SB USB Configuration page
SB SD Configuration	See SB SD Configuration page
SB HD Azalia Configuration	See SB HD Azalia Configuration page

4.3.1.1 SB SATA Configuration



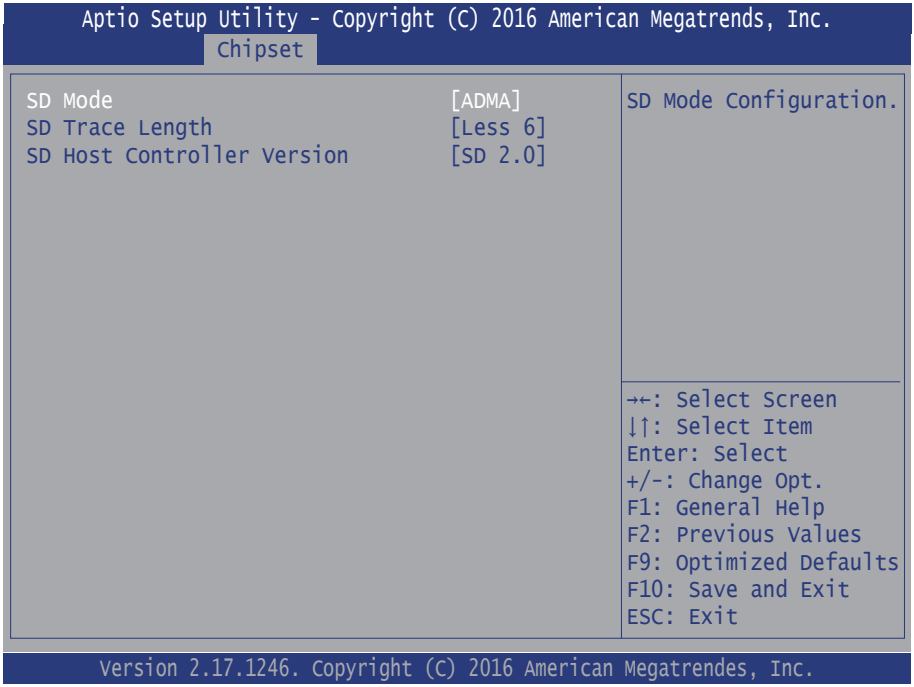
Item	Description
OnChip SATA Channel	**Enable** (default) or **Disable** Serial ATA.
OnChip SATA Type	► Options: **Native IDE**, **AHCI** (default), **Legacy IDE** and **AHCI as ID 7804**.

4.3.1.2 SB USB Configuration



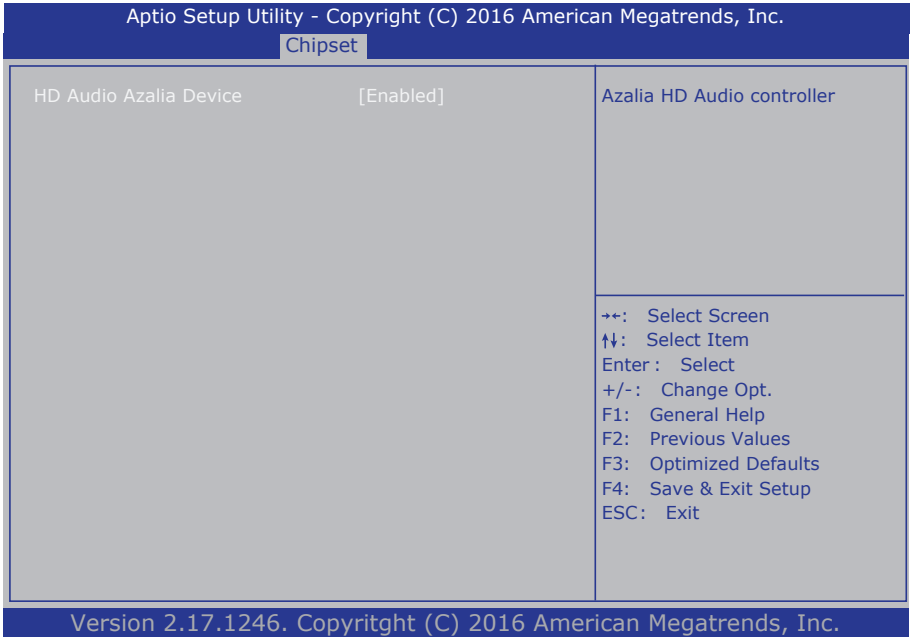
Item	Description
XHCI Controller 0	**Enable** (default) or **Disable** XHCI controller 0.
XHCI0 Port 0/1	**Enable** (default) or **Disable** XHCI0 Port 0/1.
EHCI HC (Bus 0 Dev 18 Fn 0)	**Enable** (default) or **Disable** EHCI HC (Bus 0 Dev 18 Fn 0)
USB Internal Port 0	**Enable** (default) or **Disable** USB Internal Port 0
HUB Port 0/1/2/3	**Enable** (default) or **Disable** HUB Port 0/1/2/3
USB Internal Port 1	**Enable** (default) or **Disable** USB Internal Port 1
EHCI HC (Bus 0 Dev 19 Fn 0)	**Enable** (default) or **Disable** EHCI HC (Bus 0 Dev 19 Fn 0)
USB Internal Port 2	**Enable** (default) or **Disable** USB Internal Port 2
HUB Port 4/5/6/7	**Enable** (default) or **Disable** HUB Port 4/5/6/7
USB Internal Port 3	**Enable** (default) or **Disable** USB Internal Port 3

4.3.1.3 SB SD Configuration



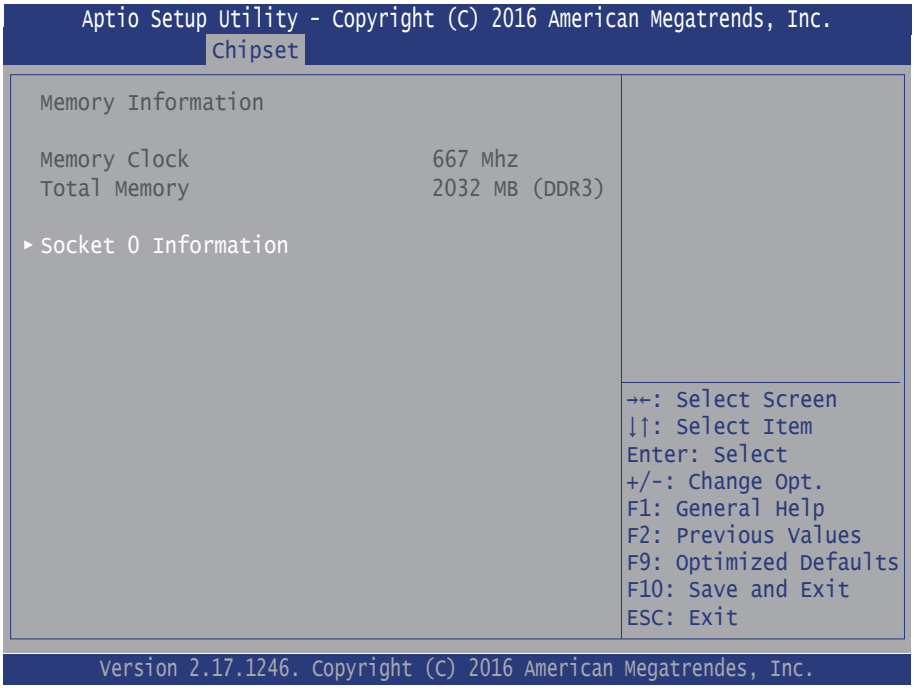
Setting	Description
SD Mode	Change SD Mode. ► Options: **Disabled**, **ADMA** (default), **DMA**, **PIO**
SD Trace Length	Configure SD Trace Length (Inches). ► Options: **Less 6**(default), **Between 6 AND 11**, **Greater 11**
SD Host Controller Version	Configure Secure Digital (SD) Host controller version. ► Options: **SD 2.0**(default), **SD 3.0**

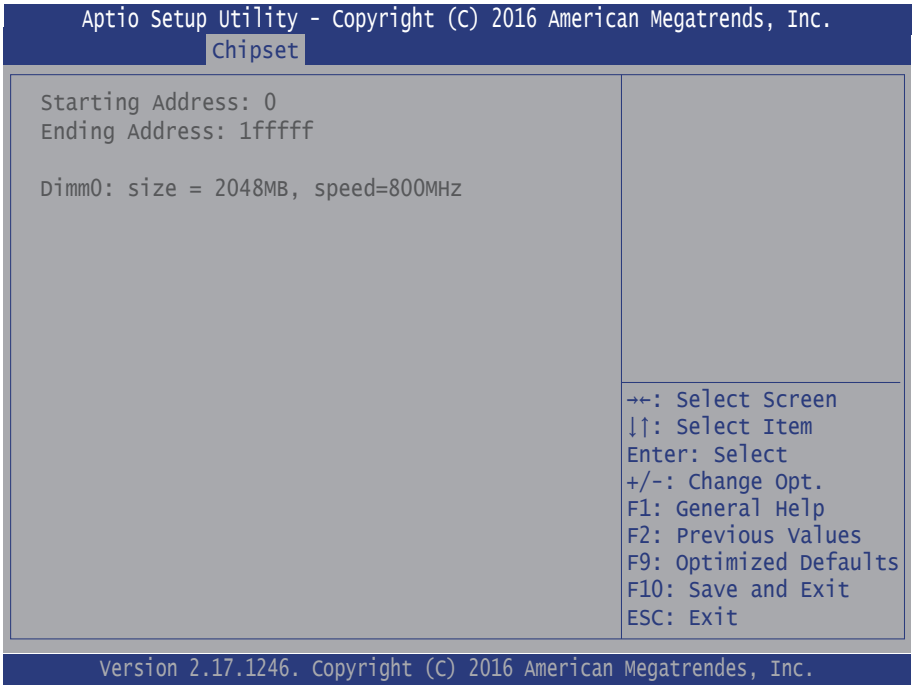
4.3.1.4 SB HD Azalia Configuration



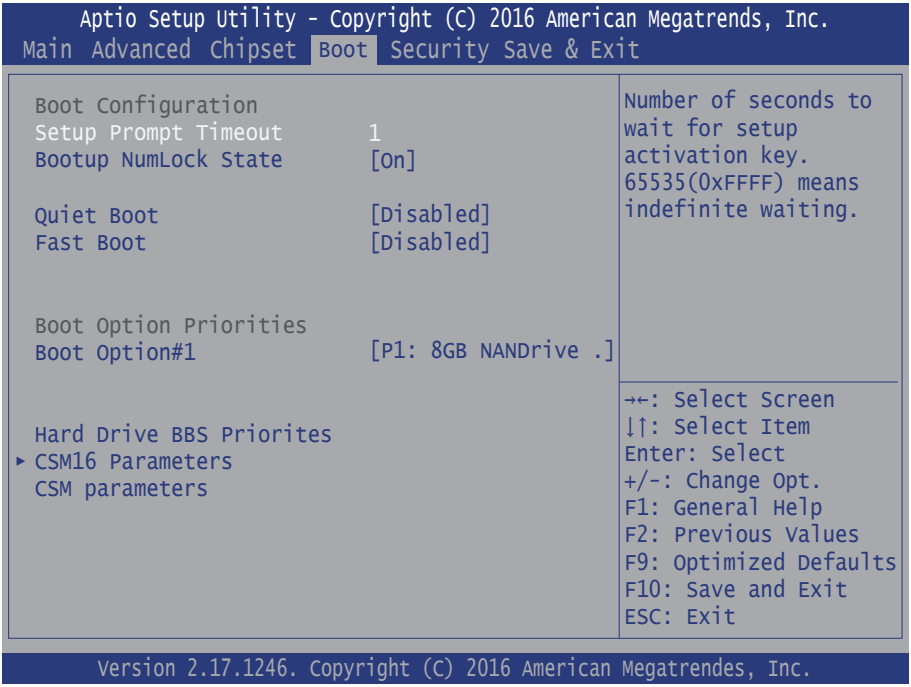
Item	Description
HD Audio Azalia Device	► Options: **Disabled** and **Enabled** (default).

4.3.2 North Bridge




Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
Chipset
Starting Address: 0
Ending Address: 1fffff
Dimm0: size = 2048MB, speed=800MHz
→←: Select Screen
↓↑: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F9: Optimized Defaults
F10: Save and Exit
ESC: Exit
Version 2.17.1246. Copyright (C) 2016 American Megatrendes, Inc.

4.4 Boot



Setting	Description
Setup Prompt Timeout	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
Boot NumLock State	Select the keyboard NumLock state. ► Options: **On** (default) and **Off**.
Quiet Boot	**Enable** (default) or **Disable** Quiet Boot option.
Fast Boot	**Enables** (default) or **disable** initializing only a minimal set of devices required to launch the active boot options when booting up the system.
Boot Option Priorities	Sets the boot priority among the available device types.

4.4.1 CSM16 Parameters

Setting	Description
GateA20 Active	Select setting for GateA20 ► Options: **UPON REQUEST** (default) and **Always**
Option ROM Messages	Set display mode for Option ROM. ► Options: **Force BIOS (default) and Keep Current**.

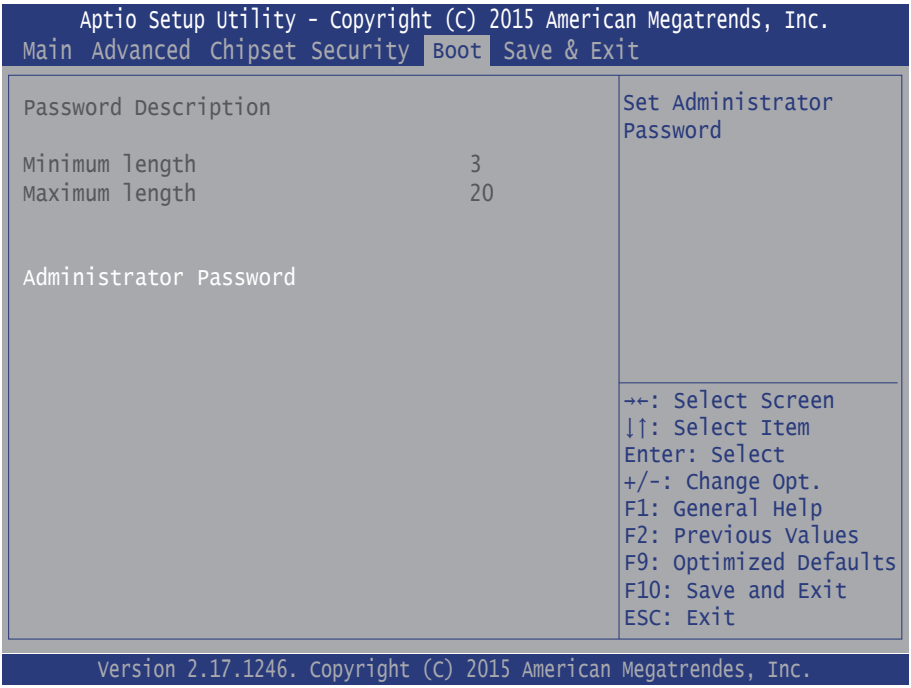
4.4.2 CSM Parameters

Setting	Description
Launch CSM	Enables/disables launching CSM (capability support module), which provides UEFI with the additional functionality to allow loading a traditional OS or using a traditional OpROM. ► Options: **Enabled** (default) and **Disabled**.
Boot Option Filter	Defines the devices to boot the system to. ► Options: **UEFI and Legacy** (default)**, Legacy only** and **UEFI only.** ► This setting is only available when Launch CSM is enabled (set to Always).
Launch PXE OpROM policy	Configures whether to launch the UEFI or legacy OpROM of PXE (Preboot eXecution Environment) ► Options: **Do not launch** (default), **UEFI only** and **Legacy only**. ► This setting is only available when Launch CSM is enabled (set to Always).
Launch Storage OpROM policy	Configures whether to launch the UEFI or legacy OpROM of storage. ► Options: **Do not launch**, **UEFI only** and **Legacy only** (default). ► This setting is only available when Launch CSM is enabled (set to Always).

Launch Video OpROM policy	Configures whether to launch the UEFI or legacy OpROM of video. ► Options: **Do not launch**, **UEFI** only and **Legacy only** (default).
Other PCI device ROM priority	Configures which OpROM to run for the PCI devices other than network, mass storage, or video. ► Options: **UEFI OpROM** and **Legacy OpROM** (default).

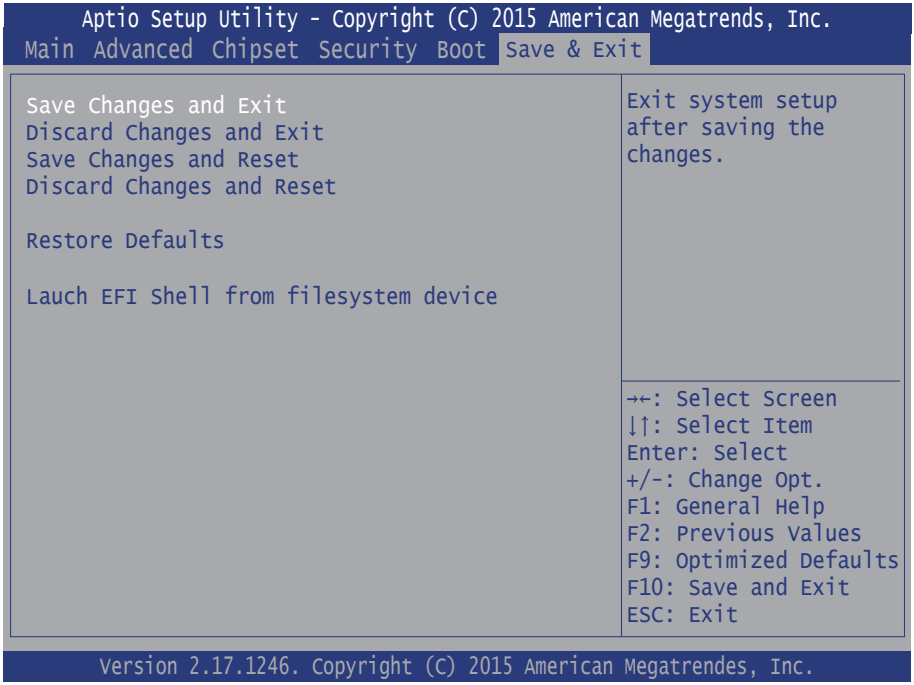
4.5 Security

The **Security** menu sets up the administrator password.



Setting	Description
Administrator Password	To set up an administrator password: 1. Select **Administrator Password**. The screen then pops up an **Create New Password** dialog. 2. Enter your desired password that is no less than 3 characters and no more than 20 characters. 3. Hit [Enter] key to submit.

4.6 Save & Exit



Setting	Description
Save Changes and Exit	Exit system setup after saving the changes. ► Enter the item and then a dialog box pops up: **Save configuration and exit? (Yes/ No)**
Discard Changes and Exit	Exit system setup without saving the changes. ► Enter the item and then a dialog box pops up: **Quit without saving? (Yes/ No)**
Save Changes and Reset	Reset the system after saving the changes.
Discard Changes and Reset	Discard the changes and reset the system
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 Default values for all the setup options. ► Enter the item and then a dialog box pops up: **Load Optimized Defaults? (Yes/ No)**
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.
Launch EFI Shell from filesystem device	Attempts to launch EFI shell application (Shell.efi) from one of the available filesystem devices.

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Appendix

Appendix A: I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses which also becomes the identity of the device. The following table lists the I/O port addresses used.

Address	Device Description
0x000003F8-0x000003FF	Communications Port (COM1)
0x000002F8-0x000002FF	Communications Port (COM2)
0x00000000-0x0000000F	Direct memory access controller
0x00000081-0x00000083	Direct memory access controller
0x00000087-0x00000087	Direct memory access controller
0x00000089-0x0000008B	Direct memory access controller
0x0000008F-0x0000008F	Direct memory access controller
0x000000C0-0x000000DF	Direct memory access controller
0x0000E000-0x0000EFFF	Ethernet Controller
0x00000000-0x0000000F	Motherboard resources
0x00000010-0x0000001F	Motherboard resources
0x00000010-0x0000001F	Motherboard resources
0x00000022-0x0000003F	Motherboard resources
0x00000022-0x0000003F	Motherboard resources
0x00000044-0x0000005F	Motherboard resources
0x00000072-0x0000007F	Motherboard resources
0x00000072-0x0000007F	Motherboard resources
0x00000080-0x00000080	Motherboard resources
0x00000080-0x00000080	Motherboard resources
0x00000084-0x00000086	Motherboard resources
0x00000084-0x00000086	Motherboard resources
0x00000088-0x00000088	Motherboard resources
0x00000088-0x00000088	Motherboard resources
0x0000008C-0x0000008E	Motherboard resources
0x0000008C-0x0000008E	Motherboard resources
0x00000090-0x0000009F	Motherboard resources
0x00000090-0x0000009F	Motherboard resources

0x000000A2-0x000000BF	Motherboard resources
0x000000A2-0x000000BF	Motherboard resources
0x000000E0-0x000000EF	Motherboard resources
0x000000E0-0x000000EF	Motherboard resources
0x000004D0-0x000004D1	Motherboard resources
0x000004D0-0x000004D1	Motherboard resources
0x00000290-0x0000029F	Motherboard resources
0x00000063-0x00000063	Motherboard resources
0x00000065-0x00000065	Motherboard resources
0x00000067-0x0000006F	Motherboard resources
0x000000B1-0x000000B1	Motherboard resources
0x0000040B-0x0000040B	Motherboard resources
0x000004D6-0x000004D6	Motherboard resources
0x00000C00-0x00000C01	Motherboard resources
0x00000C14-0x00000C14	Motherboard resources
0x00000C50-0x00000C51	Motherboard resources
0x00000C52-0x00000C52	Motherboard resources
0x00000C6C-0x00000C6C	Motherboard resources
0x00000C6F-0x00000C6F	Motherboard resources
0x00000CD0-0x00000CD1	Motherboard resources
0x00000CD2-0x00000CD3	Motherboard resources
0x00000CD4-0x00000CD5	Motherboard resources
0x00000CD6-0x00000CD7	Motherboard resources
0x00000CD8-0x00000CDF	Motherboard resources
0x00000800-0x0000089F	Motherboard resources
0x00000B20-0x00000B3F	Motherboard resources
0x00000900-0x0000090F	Motherboard resources
0x00000910-0x0000091F	Motherboard resources
0x0000FE00-0x0000FEFE	Motherboard resources
0x000000F0-0x000000FF	Numeric data processor
0x00000000-0x0000000F	PCI bus

0x000003B0-0x000003BB	PCI bus
0x000003E0-0x00000CF7	PCI bus
0x00000D00-0x0000FFFF	PCI bus
0x0000E000-0x0000EFFF	PCI Express standard Root Port
0x00000378-0x0000037F	Printer Port (LPT1)
0x00000020-0x00000021	Programmable interrupt controller
0x000000A0-0x000000A1	Programmable interrupt controller
0x0000F140-0x0000F147	Standard AHCI 1.0 Serial ATA Controller
0x0000F130-0x0000F133	Standard AHCI 1.0 Serial ATA Controller
0x0000F120-0x0000F127	Standard AHCI 1.0 Serial ATA Controller
0x0000F110-0x0000F113	Standard AHCI 1.0 Serial ATA Controller
0x0000F100-0x0000F10F	Standard AHCI 1.0 Serial ATA Controller
0x00000060-0x00000060	Standard PS/2 Keyboard
0x00000064-0x00000064	Standard PS/2 Keyboard
0x0000F000-0x0000F0FF	Standard VGA Graphics Adapter
0x000003B0-0x000003BB	Standard VGA Graphics Adapter
0x000003C0-0x000003DF	Standard VGA Graphics Adapter
0x00000070-0x00000071	System CMOS/real time clock
0x00000061-0x00000061	System speaker
0x00000040-0x00000043	System timer

Appendix B: BIOS Memory Mapping

Address	Device Description
0x000003F8-0x000003FF	Communications Port (COM1)
0x000002F8-0x000002FF	Communications Port (COM2)
0x00000000-0x0000000F	Direct memory access controller
0x00000081-0x00000083	Direct memory access controller
0x00000087-0x00000087	Direct memory access controller
0x00000089-0x0000008B	Direct memory access controller
0x0000008F-0x0000008F	Direct memory access controller
0x000000C0-0x000000DF	Direct memory access controller
0x0000E000-0x0000EFFF	Ethernet Controller
0x00000000-0x0000000F	Motherboard resources
0x00000010-0x0000001F	Motherboard resources
0x00000010-0x0000001F	Motherboard resources
0x00000022-0x0000003F	Motherboard resources
0x00000022-0x0000003F	Motherboard resources
0x00000044-0x0000005F	Motherboard resources
0x00000072-0x0000007F	Motherboard resources
0x00000072-0x0000007F	Motherboard resources
0x00000080-0x00000080	Motherboard resources
0x00000080-0x00000080	Motherboard resources
0x00000084-0x00000086	Motherboard resources
0x00000084-0x00000086	Motherboard resources
0x00000088-0x00000088	Motherboard resources
0x00000088-0x00000088	Motherboard resources
0x0000008C-0x0000008E	Motherboard resources
0x0000008C-0x0000008E	Motherboard resources
0x00000090-0x0000009F	Motherboard resources
0x00000090-0x0000009F	Motherboard resources
0x000000A2-0x000000BF	Motherboard resources
0x000000A2-0x000000BF	Motherboard resources

0x000000E0-0x000000EF	Motherboard resources
0x000000E0-0x000000EF	Motherboard resources
0x000004D0-0x000004D1	Motherboard resources
0x000004D0-0x000004D1	Motherboard resources
0x00000290-0x0000029F	Motherboard resources
0x00000063-0x00000063	Motherboard resources
0x00000065-0x00000065	Motherboard resources
0x00000067-0x0000006F	Motherboard resources
0x000000B1-0x000000B1	Motherboard resources
0x0000040B-0x0000040B	Motherboard resources
0x000004D6-0x000004D6	Motherboard resources
0x00000C00-0x00000C01	Motherboard resources
0x00000C14-0x00000C14	Motherboard resources
0x00000C50-0x00000C51	Motherboard resources
0x00000C52-0x00000C52	Motherboard resources
0x00000C6C-0x00000C6C	Motherboard resources
0x00000C6F-0x00000C6F	Motherboard resources
0x00000CD0-0x00000CD1	Motherboard resources
0x00000CD2-0x00000CD3	Motherboard resources
0x00000CD4-0x00000CD5	Motherboard resources
0x00000CD6-0x00000CD7	Motherboard resources
0x00000CD8-0x00000CDF	Motherboard resources
0x00000800-0x0000089F	Motherboard resources
0x00000B20-0x00000B3F	Motherboard resources
0x00000900-0x0000090F	Motherboard resources
0x00000910-0x0000091F	Motherboard resources
0x0000FE00-0x0000FEFE	Motherboard resources
0x000000F0-0x000000FF	Numeric data processor
0x00000000-0x0000000F	PCI bus
0x000003B0-0x000003BB	PCI bus
0x000003E0-0x00000CF7	PCI bus

0x00000D00-0x0000FFFF	PCI bus
0x0000E000-0x0000EFFF	PCI Express standard Root Port
0x00000378-0x0000037F	Printer Port (LPT1)
0x00000020-0x00000021	Programmable interrupt controller
0x000000A0-0x000000A1	Programmable interrupt controller
0x0000F140-0x0000F147	Standard AHCI 1.0 Serial ATA Controller
0x0000F130-0x0000F133	Standard AHCI 1.0 Serial ATA Controller
0x0000F120-0x0000F127	Standard AHCI 1.0 Serial ATA Controller
0x0000F110-0x0000F113	Standard AHCI 1.0 Serial ATA Controller
0x0000F100-0x0000F10F	Standard AHCI 1.0 Serial ATA Controller
0x00000060-0x00000060	Standard PS/2 Keyboard
0x00000064-0x00000064	Standard PS/2 Keyboard
0x0000F000-0x0000F0FF	Standard VGA Graphics Adapter
0x000003B0-0x000003BB	Standard VGA Graphics Adapter
0x000003C0-0x000003DF	Standard VGA Graphics Adapter
0x00000070-0x00000071	System CMOS/real time clock
0x00000061-0x00000061	System speaker
0x00000040-0x00000043	System timer

Appendix C: Interrupt Request Lines (IRQ)

Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

Level	Function
IRQ0	System timer
IRQ0	High precision event timer
IRQ1	Standard PS/2 Keyboard
IRQ3	Communications Port (COM2)
IRQ4	Communications Port (COM1)
IRQ5	Ethernet Controller
IRQ8	High precision event timer
IRQ10	Universal Serial Bus (USB) Controller
IRQ12	Microsoft PS/2 Mouse
IRQ13	Numeric data processor
IRQ16	High Definition Audio Controller
IRQ16	SDA Standard Compliant SD Host Controller
IRQ18	Standard Enhanced PCI to USB Host Controller
IRQ18	Standard Enhanced PCI to USB Host Controller
IRQ19	Standard AHCI 1.0 Serial ATA Controller
IRQ45	High Definition Audio Controller
IRQ81~190	Microsoft ACPI-Compliant System
IRQ4294967289	PCI Express standard Downstream Switch Port
IRQ4294967290	PCI Express standard Downstream Switch Port
IRQ4294967291	PCI Express standard Downstream Switch Port
IRQ4294967292	PCI Express standard Downstream Switch Port
IRQ4294967293	PCI Express standard Root Port
IRQ4294967294	PCI Express standard Root Port

Appendix D: Watchdog Timer (WDT) Setting

WDT is widely used for industry application to monitor the activity of CPU. Application software depends on its requirement to trigger WDT with adequate timer setting. Before WDT time out, the functional normal system will reload the WDT. The WDT never time out for a normal system. The WDT will not be reloaded by an abnormal system, then WDT will time out and reset the system automatically to avoid abnormal operation.

This board supports 255 levels watchdog timer by software programming I/O ports. Below are the source codes written in C, please take them as WDT application example.

```
#include "math.h"
#include "stdio.h"
#include "dos.h"

#define   DELAY_TIME                          10

#define _SMBBA                                0xF040          /*  SMBus  Base  Ad-
dress */
#define _SMBSA                                0x6E            /*  SMBus  Slave  Ad-
dress , 75111R's Add = 6Eh or 9Ch */

unsigned char DIO_Set(unsigned char oMode, unsigned char oData);
unsigned char SMB_Byte_READ(int SMPORT, int DeviceID, int iREG_INDEX);
void SMB_Byte_WRITE(int SMPORT, int DeviceID, int oREG_INDEX, int oREG_DATA);

void main()
{
        WDT_Start(10);

        while(1)
        {
                iCount = WDT_Count();
                printf("\r Counts : %d ",iCount);

                delay(1000);
        }
}

void WDT_Start(int iCount)
{
        int iData;

        /* Configuration and function select Register - Enable WDTOUT2# output */
        iData = SMB_Byte_READ(SMB_PORT_AD,SMB_DEVICE_ADD,0x03);
        iData = iData | 0x03;
        SMB_Byte_WRITE(SMB_PORT_AD,SMB_DEVICE_ADD,0x03,iData);
    delay(DELAY_TIME);

        /* Watchdog Timer Range Register */
        SMB_Byte_WRITE(SMB_PORT_AD,SMB_DEVICE_ADD,0x37,iCount);
```

```
    delay(DELAY_TIME);

    /* Watchdog Timer Control Register */
    SMB_Byte_WRITE(SMB_PORT_AD,SMB_DEVICE_ADD,0x36,0x72);
}

int WDT_Count(void)
{
    int iData;

    /* Watchdog Timer Range Register */
         iData = SMB_Byte_READ(SMB_PORT_AD,SMB_DEVICE_ADD,0x37);

    return iData;
}

void WDT_Clear(int iCount)
{
         /* Watchdog Timer Range Register */
         SMB_Byte_WRITE(SMB_PORT_AD,SMB_DEVICE_ADD,0x37,iCount);
}

void WDT_Stop(void)
{
         /* Watchdog Timer Control Register */
         SMB_Byte_WRITE(SMB_PORT_AD,SMB_DEVICE_ADD,0x36,0x52);
}
```