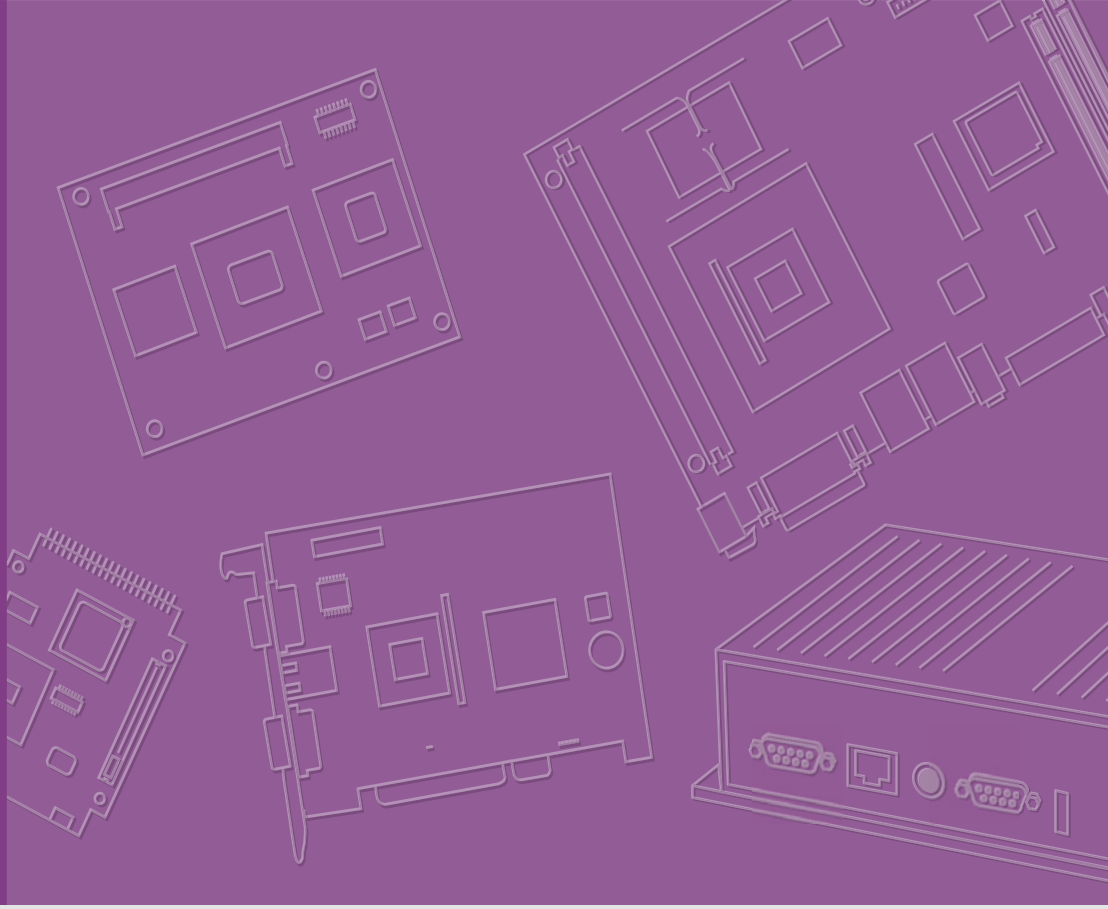

User Manual

SOM-4466

ETX Module User Manual

ADVANTECH

Enabling an Intelligent Planet

Copyright

Acknowledgements

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Product Warranty (2 years)

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandize authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Part No. 2006446600 Edition 1

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Declaration of Conformity

CE

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.

FCC Class B

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Technical Support and Assistance

1. Visit the Advantech website at http://support.advantech.com where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
   - Product name and serial number
   - Description of your peripheral attachments
   - Description of your software (operating system, version, application software, etc.)
   - A complete description of the problem
   - The exact wording of any error messages

Warnings, Cautions and Notes

Warning! *Warnings indicate conditions, which if not observed, can cause personal injury!*

Caution! *Cautions are included to help you avoid damaging hardware or losing data. e.g.*

There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Note! *Notes provide optional additional information.*

Document Feedback

To assist us in making improvements to this manual, we would welcome comments and constructive criticism. Please send all such - in writing to: support@advantech.com

Packing List

Before setting up the system, check that the items listed below are included and in good condition. If any item does not accord with the table, please contact your dealer immediately.

- One SOM-4466 ETX module
- One Heatspreader (1960058558N001)
- One 1 GB DDR3 Non-ECC SO-DIMM (Options: with or without memory)

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. DO NOT COVER THE OPENINGS.
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
    - The power cord or plug is damaged.
    - Liquid has penetrated into the equipment.
    - The equipment has been exposed to moisture.
    - The equipment does not work well, or you cannot get it to work according to the user's manual.
    - The equipment has been dropped and damaged.
    - The equipment has obvious signs of breakage.
15. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -20° C (-4° F) OR ABOVE 60° C (140° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.
16. CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER, DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.

The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).

DISCLAIMER: This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

Safety Precaution - Static Electricity

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

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

Contents

Chapter 1

General Information

This chapter gives background information on the SOM-4466 ETX module.

Sections include:

- Introduction
- Specification
- Functional Block Diagram
- SOM-4466 Pin Assignment

1.1 Introduction

SOM-4466 is an embedded ETX module that fully complies with the ETX form factor standard. This ETX module supports AMD G Series T16R APU+A55E chipset which delivering sufficient performance with extremely low power consumption. SOM-4466 comes with extensive legacy interfaces such as PCI, ISA, and IDE, and support for both 24-bit LVDS, and 18-bit TTL panels.

SOM-4466 adopts up to 4GB DDR3 memory to provide higher speeds and capacity for better availability. To fulfill on board storage inquiries, SOM-4466 supports mSATA storage interface, this function has the benefit of easy maintenance, compact size, and good availability and lots of sizes/technology selections. SOM-4466 is an entry level ruggized platform with sufficient performance, low power consumption and rich legacy interface support in HMI, M2M, medical, Industrial, automation and gaming applications.

1.2 Specifications

1.2.1 Board Information

- **Pin Definition:** ETX 3.02 pin-out definition
- **Form Factor:** ETX Module 114 x 95 mm

1.2.2 System Information

- CPU: AMD® Embedded G-Series Processor

CPU	Standard Freq.	Core	Cache (MB)	TDP(W)
T16R SC	615MHz	1	512KB	4.5

- **Chipset:** AMD® FCH A55E Chipset
- **Memory:** 1 DDR3-1066 MHz non-ECC unbuffered
- **BIOS:** AMI 32 Mbit, SPI BIOS
- **Power management:** Supports power saving modes including Normal / Suspend modes / Power off. ACPI 2.0 / APM compliant

1.2.3 Display

- **Graphic Core:** AMD Radeon HD6250 Support DX11, OGL3.2, OCL1.1 and HW acceleration for H.264/AVC, VC-1, MPEG2 decode/encode/transcode acceleration

CPU	Graphics Core	Base Freq.	Max Freq.
T16R SC	AMD Radeon™ HD 6250	276 MHz	276 MHz

- **VGA:** Resolution up to 1920 x 1200
- **LCD:**
  - **TTL Version:** 18-bit, resolution up to 800 x 600
  - **LVDS Version:** 24-bit, resolution up to 1024 x 768
- **Dual Display:** VGA + LCD

1.2.4 Expansion Interface

- **PCI:** Supports 4 PCI Master
- **ISA:** 16-bit data bus

*AMD announced ISA audio card support will be limited to single core G Series APU.

- **LPC Bus:** Yes
- **SMBus:** SMBus 2.0 specification

*SMBus can't support to simulate to I2C. It supports byte read write, word read write only.

- **I2C:** Supports 10 KHz ~ 100 KHz

1.2.5 I/O

- **Etherne**t: Realtek 8105E PCIe-to-10/100 Mbps LAN
- **SATA:** Supports 2 ports SATA Gen3 (600 Gb/s)
- **mSATA:** 1 Half-Size mSATA socket on ETX Module, SATA Gen 3 600 MB/s compliant
- **USB Interface:** Supports 4 ports USB 2.0
- **Audio Interface:** Realtek ALC262. Support Line-in(L/R), Line-out(L/R), MIC
- **Serial Port:** Supports 2 ports
- **IrDA:** shared with COM2
- **Panel Control:** Supports panel backlight on/off control, brightness control
- **IDE:** 2 Channels, each channel support up to 1 IDE device. ATA/ATAPI-7 (UDMA133) compliant
- **Watchdog Timer:** 256 level timer interval, from 0 to 255 sec or min setup by software, jumperless selection, generates system reset
- **GPIO:** 1 GPIO, 2 GPE (GPE function by customer define)
- **Hardware Monitor:** +5 V / +5 VSB / VBAT
- **LPT:** function selectable by BIOS setting
- **Floppy:** function selectable by BIOS setting

1.2.6 SUSI

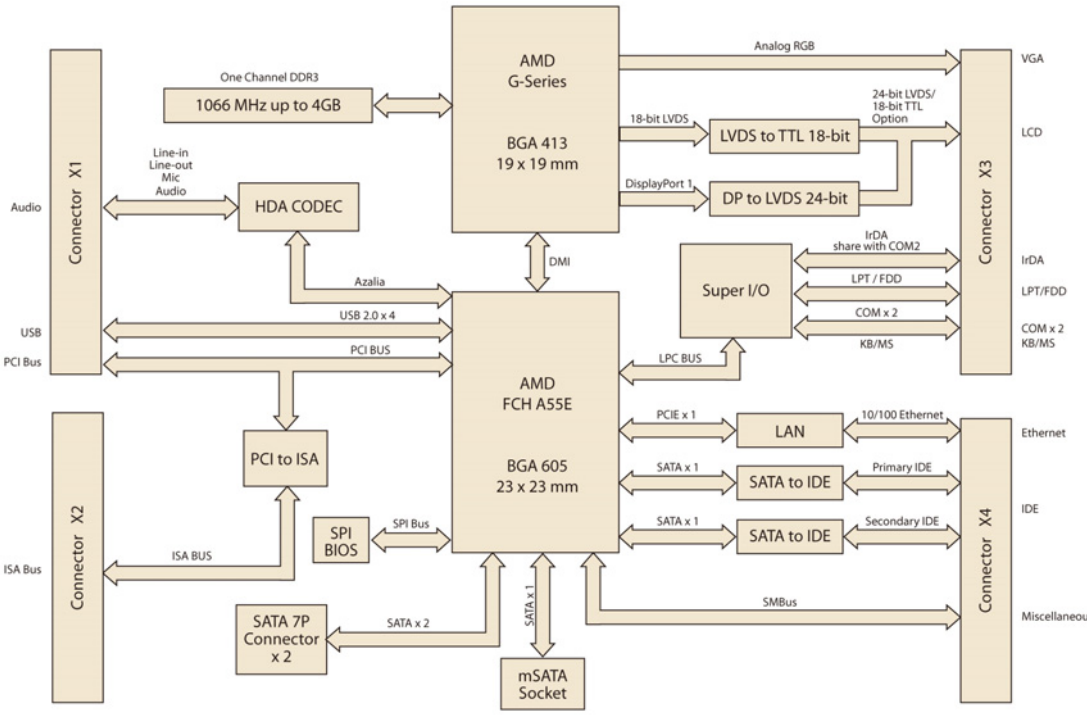
Refer to section 4.2.3.

1.2.7 Mechanical and Environmental Specification

- **Dimensions:** 114 x 95 mm (3.74" x 4.5")
- **Power Type:**
  - ATX: Vin, VSB; AT: Vin
- **Supply Voltage:**
  - Vin: 5V, VSB: 5 V, *VBAT:3 V
    (VBAT is optional; if remove VBAT, the RTC time will not be kept, and the partial bios setting will be lost.)
- **Power Requirement:**
  - Test condition: SOM-4466 (T16R), 4 GB DDR3 SO-DIMM, WIN XP SP3, Burn In Test V6.0 Pro.
  - Idle: +5 V @ 1.22 A
  - Max: +5 V @ 1.55 A
- **Temperature Specification:**
  - Operating: 0 ~ 60° C (32 ~ 140° F)
  - Storage: -40 ~ 85° C (-40 ~ 185° F)

- **Humidity Specification:**
  - Operating: 40° C @ 95% relative humidity, non-condensing
  - Storage: 60° C @ 95%relative humidity, non-condensing

1.3 Functional Block Diagram



1.4 SOM-4466 Pin Assignment

This section gives SOM-4466 pin assignment on ETX connector which compliant with ETX 3.02 pin-out definitions. More details about how to use these pins and get design references please contact to Advantech for design guide, checklist, reference schematic, and other hardware/software supports.

Table 1.1: Pin Assignment (A1-A100)

Pin	Signal	Pin	Signal
A1	GND	A2	GND
A3	PCICLK3	A4	PCICLK4
A5	GND	A6	GND
A7	PCICLK1	A8	PCICLK2
A9	REQ#3	A10	GNT#3
A11	GNT#2	A12	3V
A13	REQ#2	A14	GNT#1
A15	REQ#1	A16	3V
A17	GNT#0	A18	N/C
A19	VCC	A20	VCC
A21	SERIRQ	A22	REQ#0
A23	AD0	A24	3V
A25	AD1	A26	AD2
A27	AD4	A28	AD3
A29	AD6	A30	AD5
A31	CBE#0	A32	AD7
A33	AD8	A34	AD9
A35	GND	A36	GND
A37	AD10	A38	AUXAL
A39	AD11	A40	MIC
A41	AD12	A42	AUXAR
A43	AD13	A44	ASVCC
A45	AD14	A46	SNDL
A47	AD15	A48	ASGND
A49	CBE#1	A50	SNDR
A51	VCC	A52	VCC
A53	PAR	A54	SERR#
A55	GPERR#	A56	N/C
A57	PME#	A58	USB2-
A59	LOCK#	A60	DEVSEL#
A61	TRDY#	A62	USB3-
A63	IRDY#	A64	STOP#
A65	FRAME#	A66	USB2+
A67	GND	A68	GND
A69	AD16	A70	CBE#2

Table 1.1: Pin Assignment (A1-A100)			
A71	AD17	A72	USB3+
A73	AD19	A74	AD18
A75	AD20	A76	USB0-
A77	AD22	A78	AD21
A79	AD23	A80	USB1-
A81	AD24	A82	CBE#3
A83	VCC	A84	VCC
A85	AD25	A86	AD26
A87	AD28	A88	USB0+
A89	AD27	A90	AD29
A91	AD30	A92	USB1+
A93	PCIRST#	A94	AD31
A95	INTC#	A96	INTD#
A97	INTA#	A98	INTB#
A99	GND	A100	GND

Table 1.2: Pin Assignment (B1-B100)			
Pin	**Signal**	**Pin**	**Signal**
B1	GND	B2	GND
B3	SD14	B4	SD15
B5	SD13	B6	MASTER#
B7	SD12	B8	DREQ7
B9	SD11	B10	DACK#7
B11	SD10	B12	DREQ6
B13	SD9	B14	DACK#6
B15	SD8	B16	DREQ5
B17	MEMW#	B18	DACK#5
B19	MEMR#	B20	DREQ0
B21	LA17	B22	DACK#0
B23	LA18	B24	IRQ14
B25	LA19	B26	IRQ15
B27	LA20	B28	IRQ12
B29	LA21	B30	IRQ11
B31	LA22	B32	IRQ10
B33	LA23	B34	IO16#
B35	GND	B36	GND
B37	SBHE#	B38	M16#
B39	SA0	B40	OSC
B41	SA1	B42	BALE
B43	SA2	B44	TC
B45	SA3	B46	DACK#2
B47	SA4	B48	IRQ3
B49	SA5	B50	IRQ4

Table 1.2: Pin Assignment (B1-B100)			
B51	VCC	B52	VCC
B53	SA6	B54	IRQ5
B55	SA7	B56	IRQ6
B57	SA8	B58	IRQ7
B59	SA9	B60	SYSCLK
B61	SA10	B62	REFSH#
B63	SA11	B64	DREQ1
B65	SA12	B66	DACK#1
B67	GND	B68	GND
B69	SA13	B70	DREQ3
B71	SA14	B72	DACK#3
B73	SA15	B74	IOR#
B75	SA16	B76	IOW#
B77	SA18	B78	SA17
B79	SA19	B80	SMEMR#
B81	IOCHRDY	B82	AEN
B83	VCC	B84	VCC
B85	SD0	B86	SMEMW#
B87	SD2	B88	SD1
B89	SD3	B90	NOWS#
B91	DREQ2	B92	SD4
B93	SD5	B94	IRQ9
B95	SD6	B96	SD7
B97	IOCHK#	B98	RSTDRV
B99	GND	B100	GND

Table 1.3: Pin Assignment (C1-C100)					
Pin	**TTL**	**LVDS**	**Pin**	**TTL**	**LVDS**
C1	GND	GND	C2	GND	GND
C3	R	R	C4	B	B
C5	HSY	HSY	C6	G	G
C7	VSY	VSY	C8	DDCK	DDCK
C9	DE	DE	C10	DDDA	DDDA
C11	LCDB0	N/C	C12	LCDB2	N/C
C13	LCDB1	N/C	C14	LCDB3	N/C
C15	GND	GND	C16	GND	GND
C17	LCDG5	N/C	C18	FPVSYNC	N/C
C19	LCDG4	N/C	C20	FPHSYNC	N/C
C21	GND	GND	C22	GND	GND
C23	LCDG0	TX03-	C24	LCDG3	N/C
C25	LCDG1	TX03+	C26	LCDG2	N/C
C27	GND	GND	C28	GND	GND
C29	LCDR4	TX02-	C30	LCDB5	TXCK0+
C31	LCDR5	TX02+	C32	LCDB4	TXCK0-

Table 1.3: Pin Assignment (C1-C100)					
C33	GND	GND	C34	GND	GND
C35	LCDR1	TX00+	C36	LCDR3	TX01+
C37	LCDR0	TX00-	C38	LCDR2	TX01-
C39	VCC	VCC	C40	VCC	VCC
C41	LVDS_DAT	LVDS_DAT	C42	LTGIO0	LTGIO0
C43	LVDS_CLK	LVDS_CLK	C44	BLON#	BLON#
C45	BIASON	BIASON	C46	DIGON	DIGON
C47	N/C	N/C	C48	N/C	N/C
C49	N/C	N/C	C50	N/C	N/C
	LPT	FDD	C52	N/C	N/C
C51	LPT/FLPY#	LPT/FLPY#		LPT	FDD
C53	VCC	VCC	C54	GND	GND
C55	STB#	N/C	C56	AFD#	DENSEL
C57	N/C	N/C	C58	PD7	DRV0#
C59	IRRX (share with COM2 RXD)	IRRX (share with COM2 RXD)	C60	ERR#	HDSEL#
C61	IRTX (share with COM2 TXD)	IRTX (share with COM2 TXD)	C62	PD6	MOT0#
C63	RXD2	RXD2	C64	INIT#	DIR#
C65	GND	GND	C66	GND	GND
C67	RTS2#	RTS2#	C68	PD5	N/C
C69	DTR2#	DTR2#	C70	SLIN#	STEP#
C71	DCD2#	DCD2#	C72	PD4	DSKCHG#
C73	DSR2#	DSR2#	C74	PD3	RDATA#
C75	CTS2#	CTS2#	C76	PD2	WP#
C77	TXD2	TXD2	C78	PD1	TRK0#
C79	RI2#	RI2#	C80	PD0	INDEX#
C81	VCC	VCC	C82	VCC	VCC
C83	RXD1	RXD1	C84	ACK#	DRV1#
C85	RTS1#	RTS1#	C86	BUSY	MOT1#
C87	DTR1#	DTR1#	C88	PE	WDATA#
C89	DCD1#	DCD1#	C90	SLCT#	WGATE#
C91	DSR1#	DSR1#	C92	MSCLK	MSCLK
C93	CTS1#	CTS1#	C94	MSDAT	MSDAT
C95	TXD1	TXD1	C96	KBCLK	KBCLK
C97	RI1#	RI1#	C98	KBDAT	KBDAT
C99	GND	GND	C100	GND	GND

Table 1.4: Pin Assignment (D1-D100)			
Pin	**Signal**	**Pin**	**Signal**
D1	GND	D2	GND
D3	5V_SB	D4	PWGIN
D5	PS_ON#	D6	SPEAKER

Table 1.4: Pin Assignment (D1-D100)			
D7	PWRBTN#	D8	BATT
D9	KBINH#	D10	LILED#
D11	WDTRIG#	D12	ACTLED#
D13	N/C	D14	SPEEDLED#
D15	N/C	D16	I2CLK
D17	VCC	D18	VCC
D19	USBOC#	D20	N/C
D21	EXTSMI#	D22	I2DAT
D23	SMBCLK	D24	SMBDATA
D25	SIDE_CS#3	D26	SMBALRT#
D27	SIDE_CS#1	D28	DASP_S(SATA_LED#)
D29	SIDE_A2	D30	PIDE_CS#3
D31	SIDE_A0	D32	PIDE_CS#1
D33	GND	D34	GND
D35	N/C	D36	PIDE_A2
D37	SIDE_A1	D38	PIDE_A0
D39	SIDE_INTRQ	D40	PIDE_A1
D41	BATLOW#	D42	GPE#1(LID#)
D43	SIDE_AK#	D44	PIDE_INTRQ
D45	SIDE_RDY	D46	PIDE_AK#
D47	SIDE_IOR#	D48	PIDE_RDY
D49	VCC	D50	VCC
D51	SIDE_IOW#	D52	PIDE_IOR#
D53	SIDE_DRQ	D54	PIDE_IOW#
D55	SIDE_D15	D56	PIDE_DRQ
D57	SIDE_D0	D58	PIDE_D15
D59	SIDE_D14	D60	PIDE_D0
D61	SIDE_D1	D62	PIDE_D14
D63	SIDE_D13	D64	PIDE_D1
D65	GND	D66	GND
D67	SIDE_D2	D68	PIDE_D13
D69	SIDE_D12	D70	PIDE_D2
D71	SIDE_D3	D72	PIDE_D12
D73	SIDE_D11	D74	PIDE_D3
D75	SIDE_D4	D76	PIDE_D11
D77	SIDE_D10	D78	PIDE_D4
D79	SIDE_D5	D80	PIDE_D10
D81	VCC	D82	VCC
D83	SIDE_D9	D84	PIDE_D5
D85	SIDE_D6	D86	PIDE_D9
D87	SIDE_D8	D88	PIDE_D6
D89	GPE#2 (RING#)	D90	N/C
D91	LAN_RXD-	D92	PIDE_D8
D93	LAN_RXD+	D94	SIDE_D7
D95	LAN_TXD-	D96	PIDE_D7
D97	LAN_TXD+	D98	HDRST#
D99	GND	D100	GND

Chapter 2

Mechanical Information

This chapter gives mechanical information on the SOM-4466 ETX module.

Sections include:

- Board Information
- Mechanical Drawing

2.1 Board Information

The figures below indicate the main chips on SOM-4466 ETX 3.02 module. Please be aware of these positions while designing the customer's own carrier board to avoid mechanical and thermal problems.

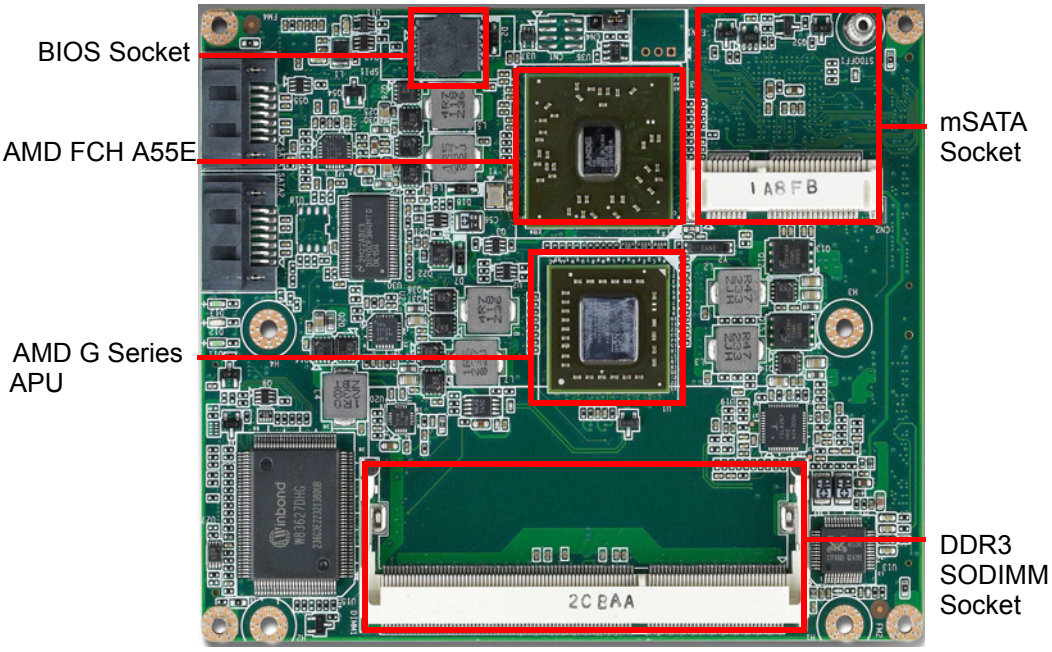


Figure 2.1 Board chips - Front

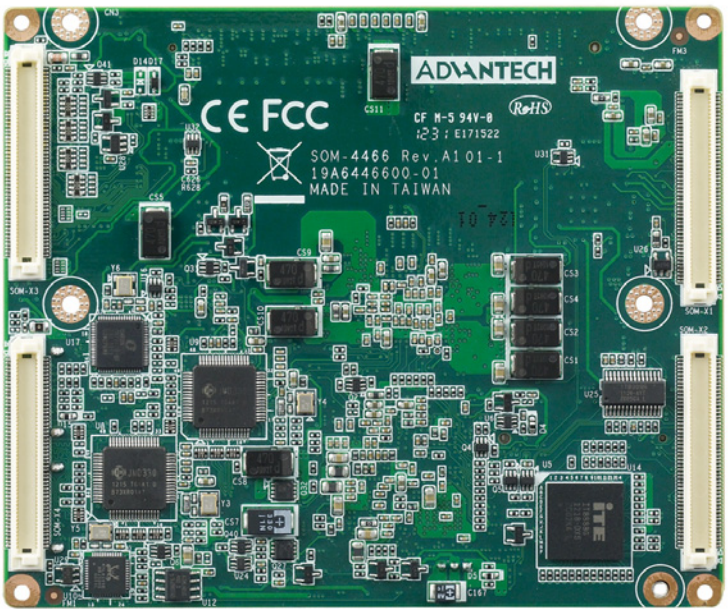


Figure 2.2 Board chips - Back

2.2 Mechanical Drawing

For more details about 2D/3D models, please refer to Advantech's COM support service website http://com.advantech.com.

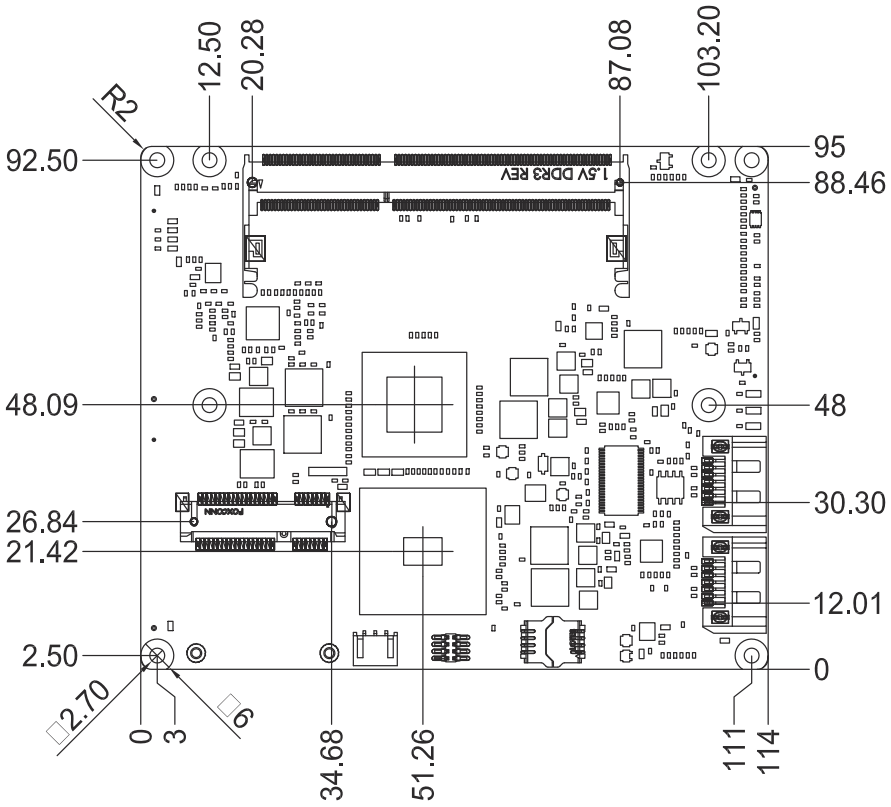


Figure 2.3 Board Mechanical Drawing - Front

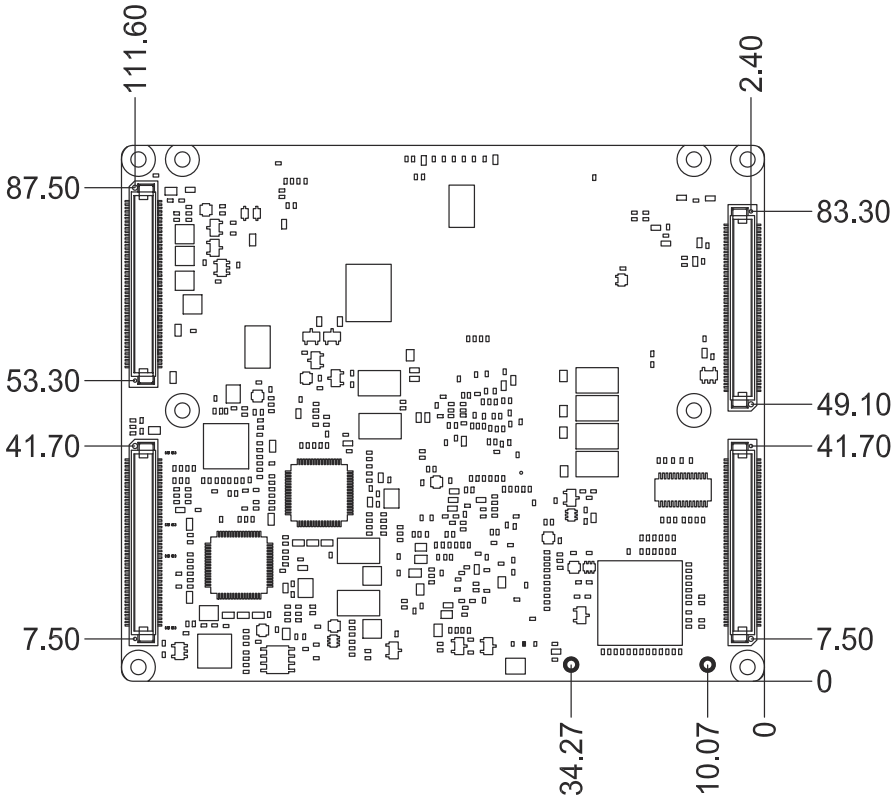


Figure 2.4 Board Mechanical Drawing - Back

Chapter 3

AMI BIOS

Sections include:

- Introduction
- Entering Setup

3.1 Introduction

AMI BIOS has been integrated into many motherboards for over a decade. With the AMI BIOS Setup program, users can modify BIOS settings and control various system features. This chapter describes the basic navigation of the SOM-4466 BIOS setup screens.

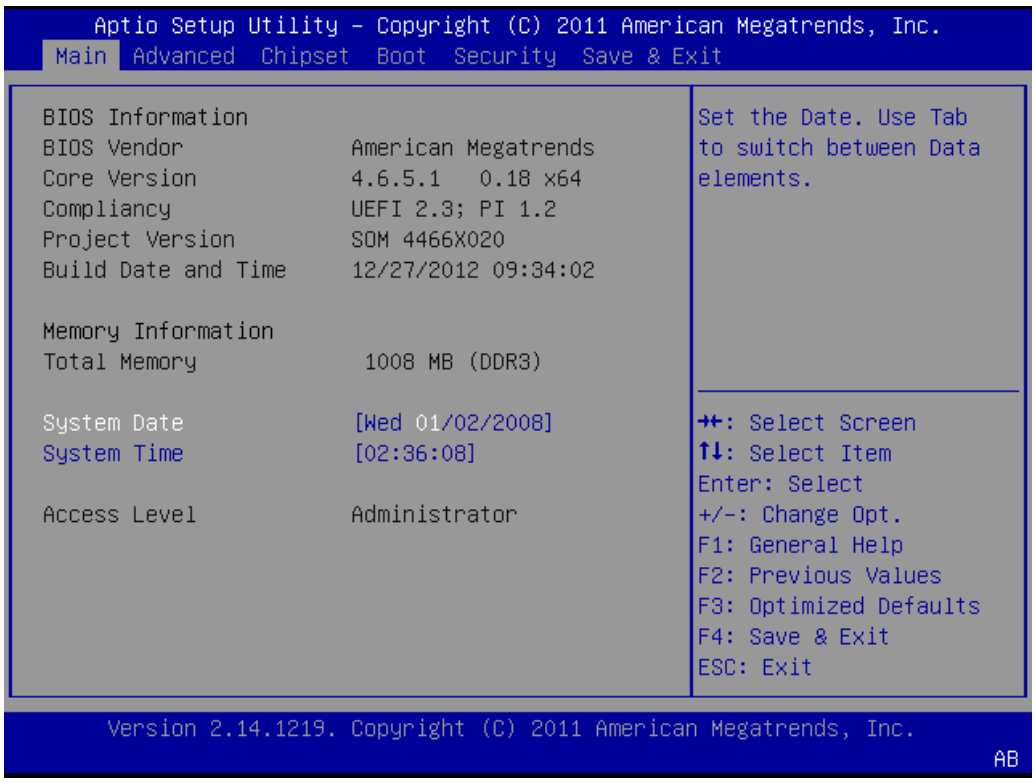


Figure 3.1 Setup program initial screen

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

3.2 Entering Setup

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

3.2.1 Main Setup

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

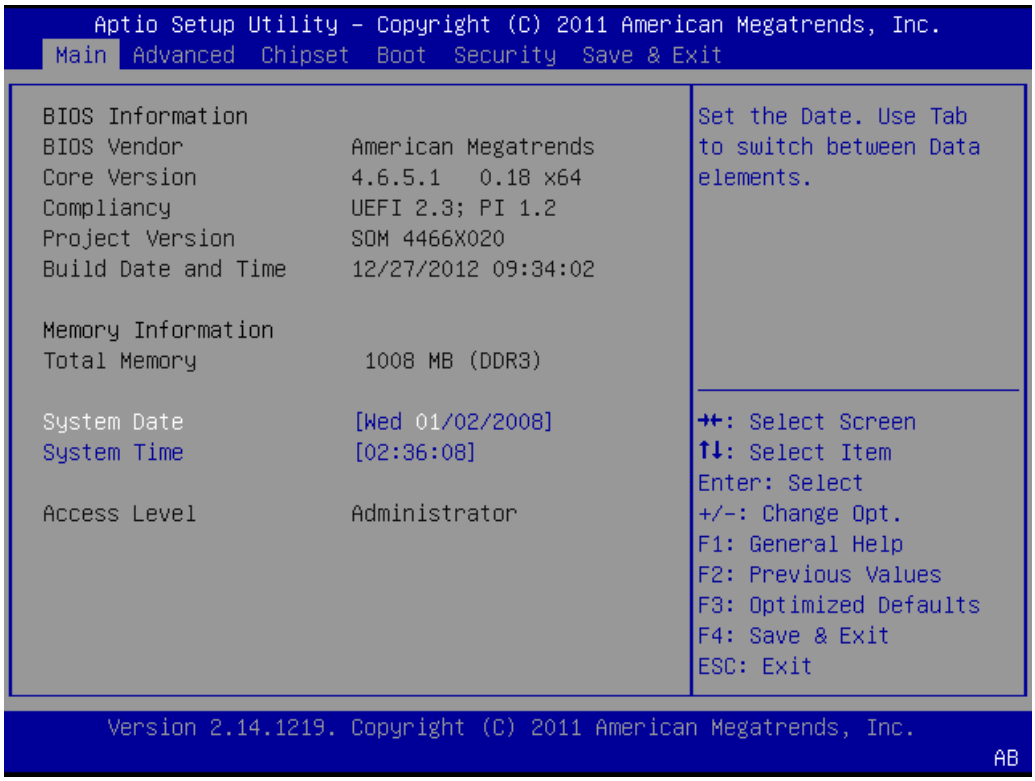


Figure 3.2 Main setup screen

The Main BIOS setup screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured; options in blue can. The right frame displays the key legend.

Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

- **System time / System date**

  Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time must be entered in HH:MM:SS format.

3.2.2 Advanced BIOS Features Setup

Select the Advanced tab from the SOM-4466 setup screen to enter the Advanced BIOS Setup screen. Users can select any item in the left frame of the screen, such as CPU Configuration, to go to the sub menu for that item. Users can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screens are shown below. The sub menus are described on the following pages.

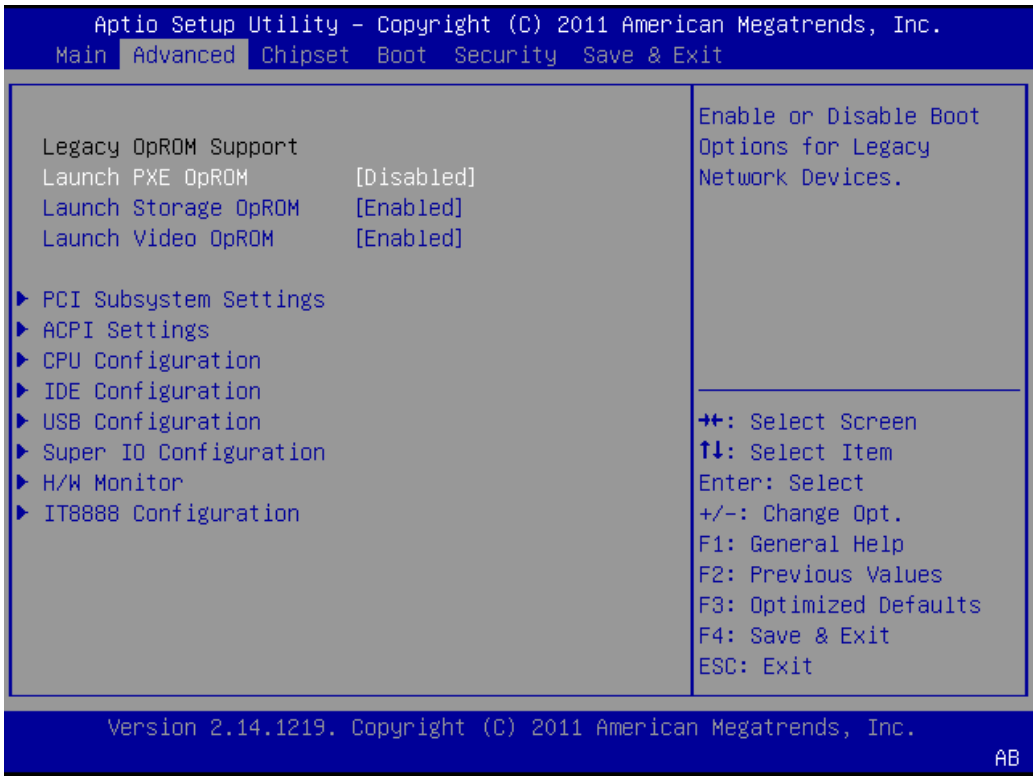


Figure 3.3 Advanced BIOS features setup screen

- **Launch PXE OpROM policy**
  This item allows users to enable or disable launch PXE OpROM if available.
- **Launch Storage OpROM policy**
  This item allows users to enable or disable launch storage OpROM if available.
- **Launch Video OpROM policy**
  This item allows users to enable or disable launch Video OpROM if available.

3.2.2.1 PCI Bus Driver Version

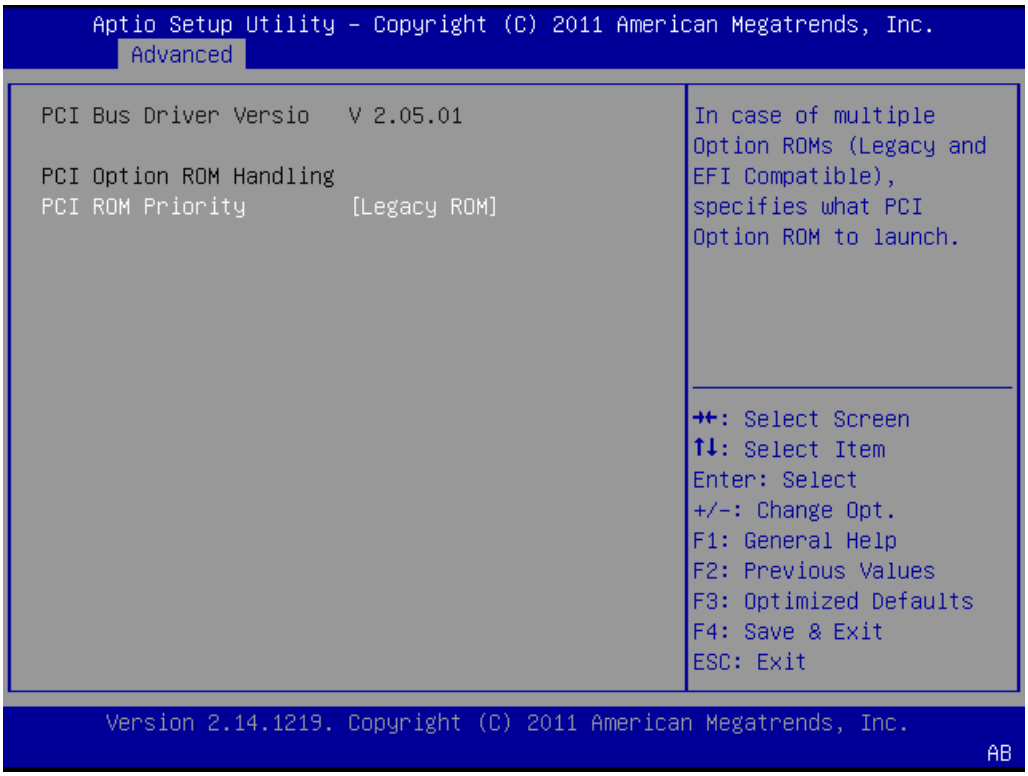


Figure 3.4 PCI Bus Driver Version

- **PCI ROM Priority**
  This item allows users to choose the priority.

3.2.2.2 ACPI Settings

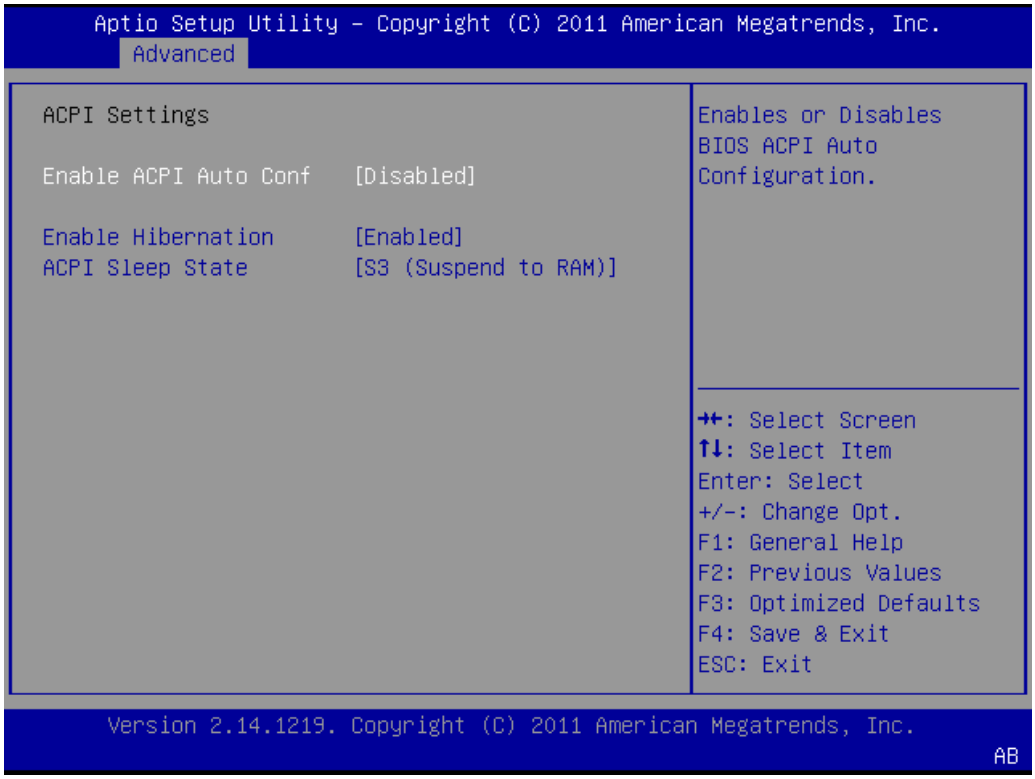


Figure 3.5 ACPI Settings

- **Enable ACPI Auto Configuration**
  This item allows users to enable or disable BIOS ACPI auto configuration.
- **Enable Hibernation**
  This item allows users to enable or disable hibernation.
- **ACPI Sleep State**
  This item allows users to set the ACPI sleep state.

3.2.2.3 CPU Configuration

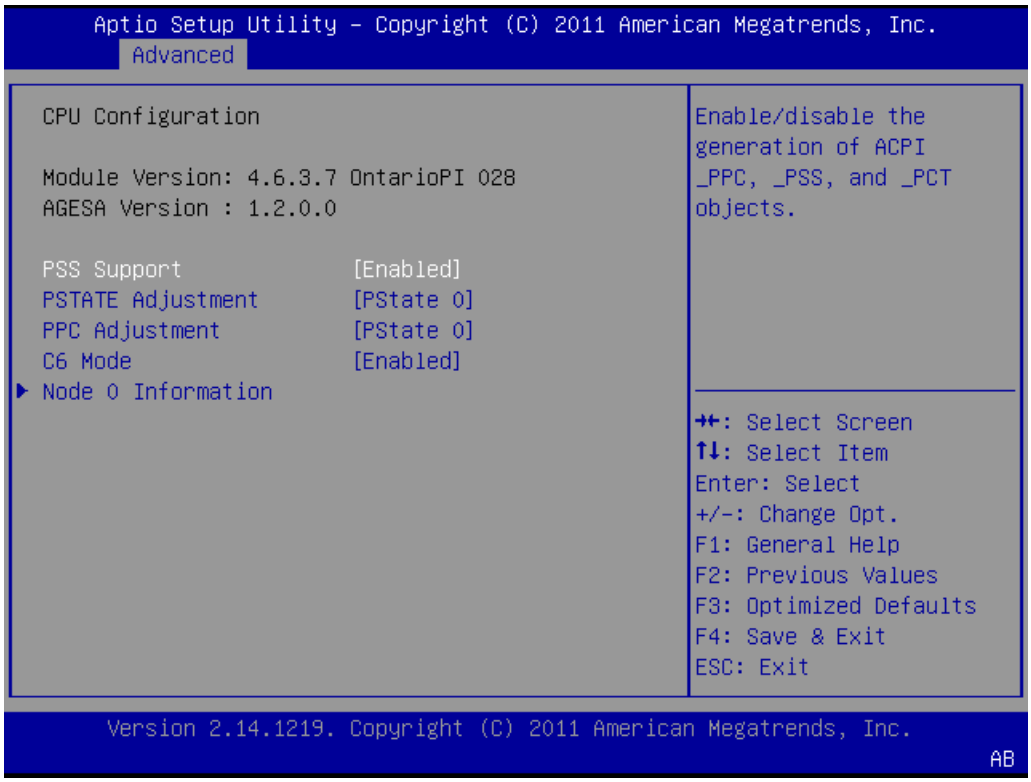


Figure 3.6 CPU Configuration

- **PSS Support**
  This item allows users to enable or disable PSS support.
- **PSTATE Adjustment**
  This item provides to adjust startup P-state level.
- **PPC Adjustment**
  This item provides to adjust PPC object.
- **C6 mode**
  This item allows users to enable or disable C6 mode.

Node 0 Information

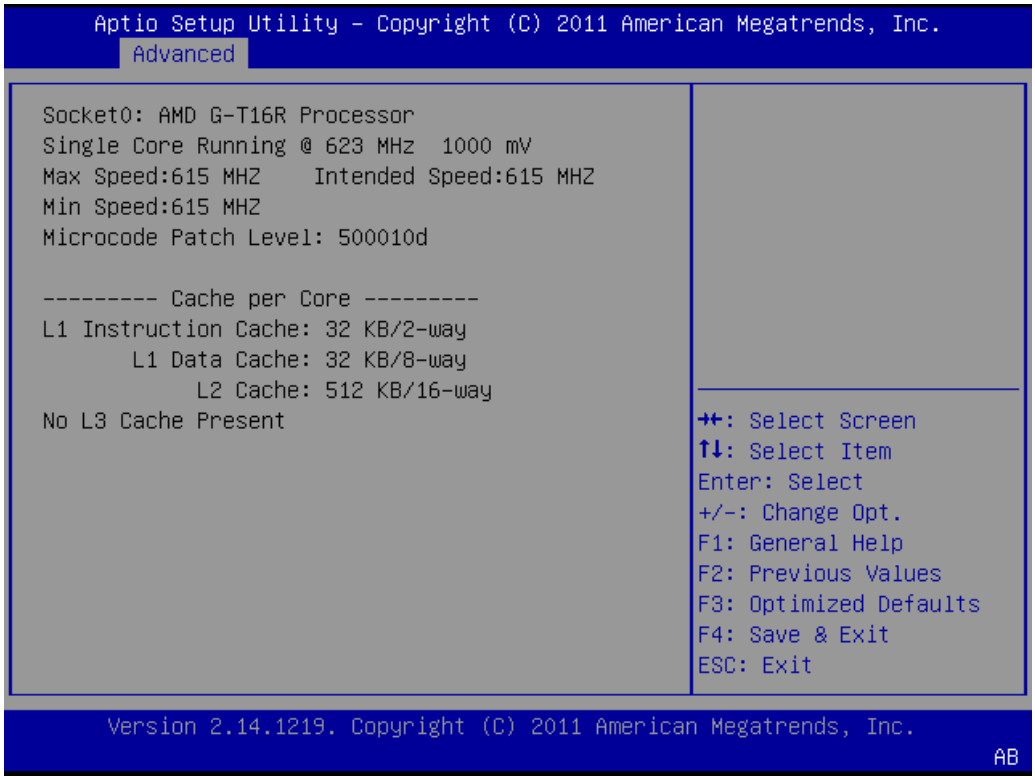


Figure 3.7 Node 0 Information

– **Node 0 Information**
View memory information related to Node 0

3.2.2.4 IDE Configuration

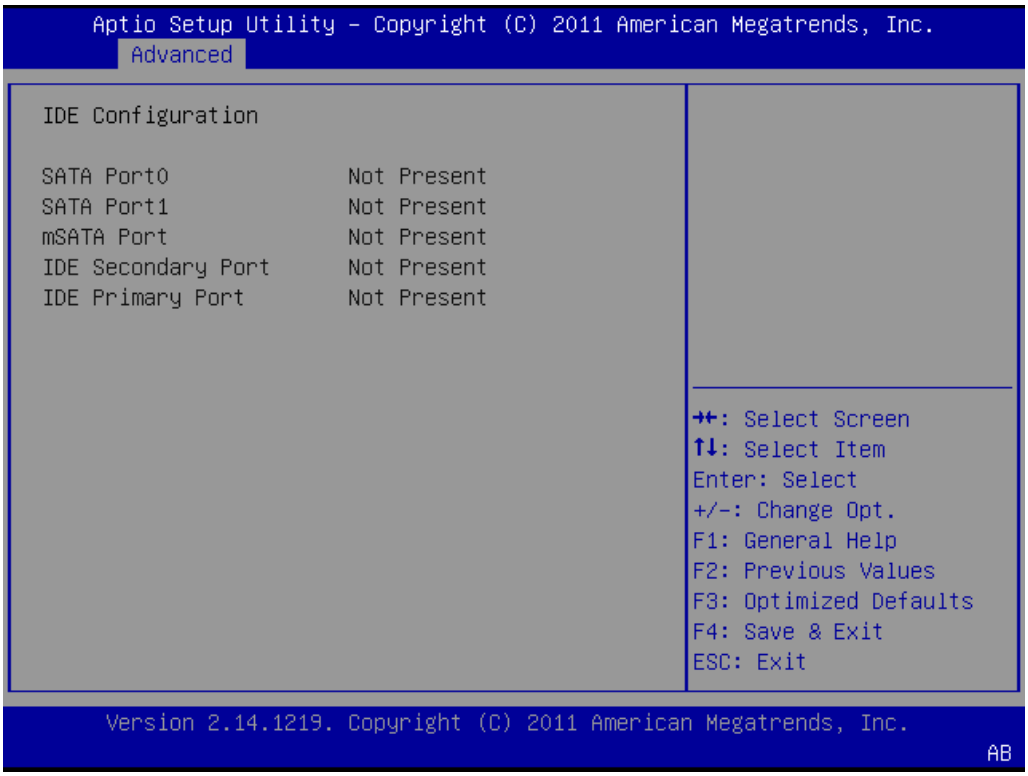


Figure 3.8 IDE Configuration

- **IDE Support**
  IDE default setting is closed.

*If this function is enabled and no device is attached, the boot time will be longer.

3.2.2.5 USB Configuration

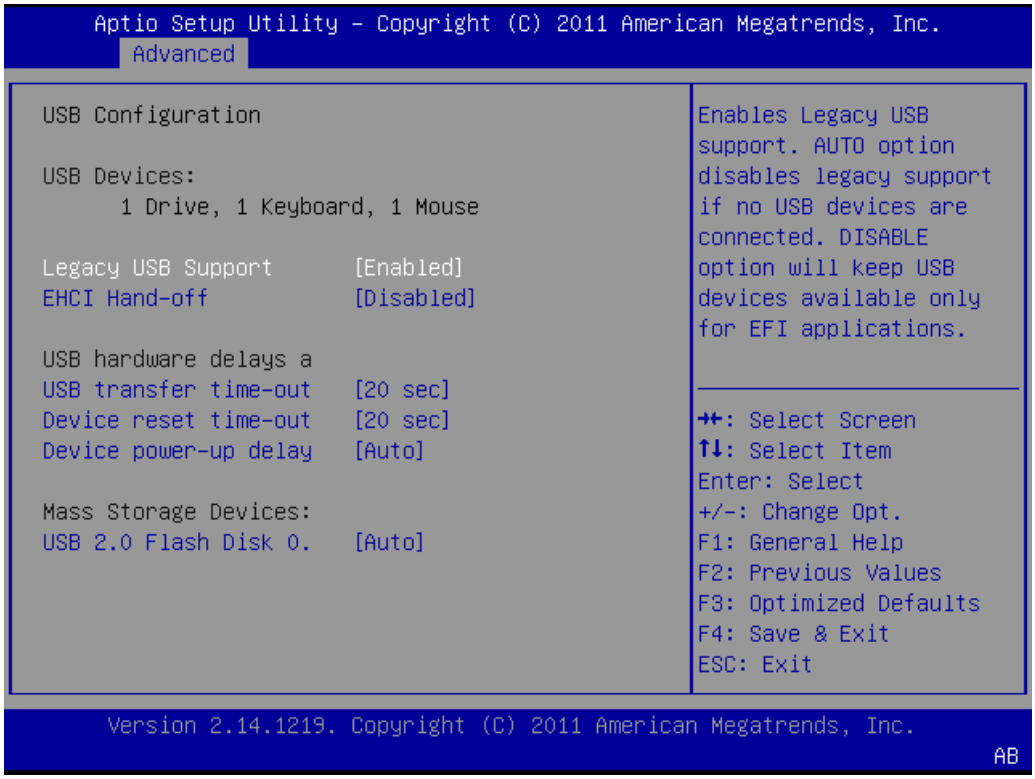


Figure 3.9 USB Configuration

- **Legacy USB Support**
  Enable the support for legacy USB. Auto option disables legacy support if no USB devices are connected.
- **EHCI Hand-Off**
  This is a workaround for the OS without EHCI hand-off support. The EHCI ownership change should claim by EHCI driver.
- **USB transfer time-out**
  Set the time-out value for Control, Bulk, and Interrupt transfers.
- **Device reset time-out**
  Set USB mass storage device Start Unit command and time-out value.
- **Device power-up delay**
  Set the maximum time of the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100 ms, for a Hub port the delay is taken from Hub descriptor.
- **Mass Storage Devices**
  USB 2.0 Flash Disk 0. uses "Auto" as default value.

3.2.2.6 Super IO Configuration

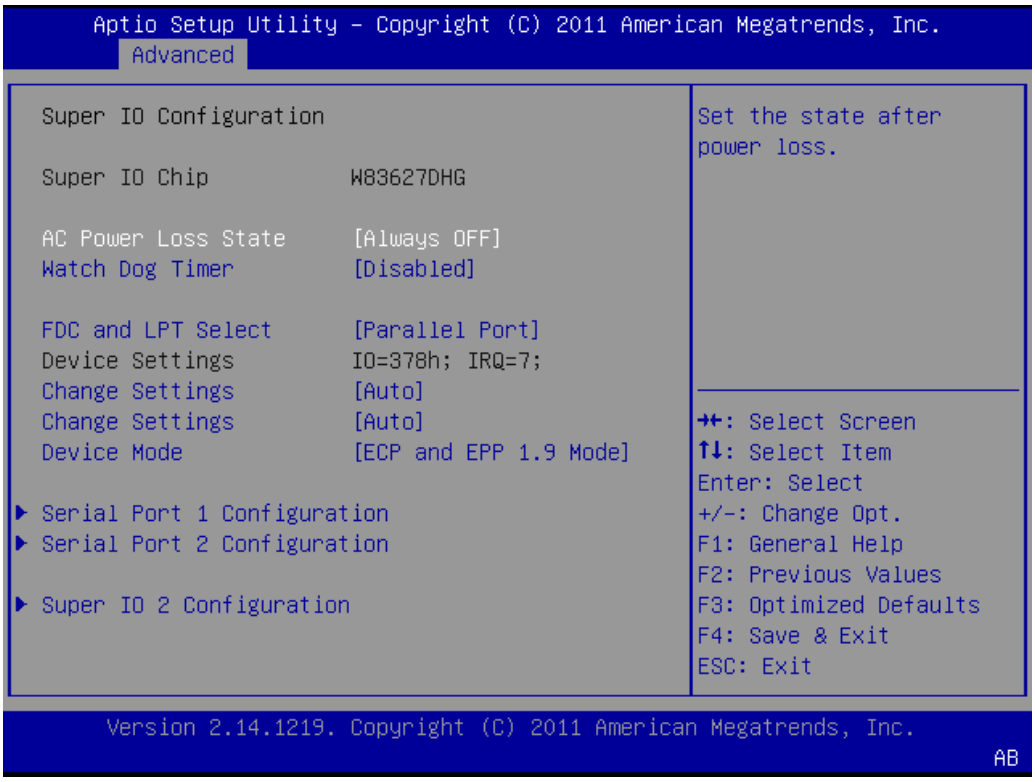


Figure 3.10 Super IO Configuration

- **AC Power Loss State**
  This item allows users to turn on or off.
- **Watch Dog Timer**
  This item allows users to enable or disable Watch Dog timer.
- **FDC and LPT Select**
  This item default is "Parallel Port". Change settings default is "Auto" and Device Mode default is "ECP and EPP 1.9 Mode".

Floppy Disk Controller Configuration

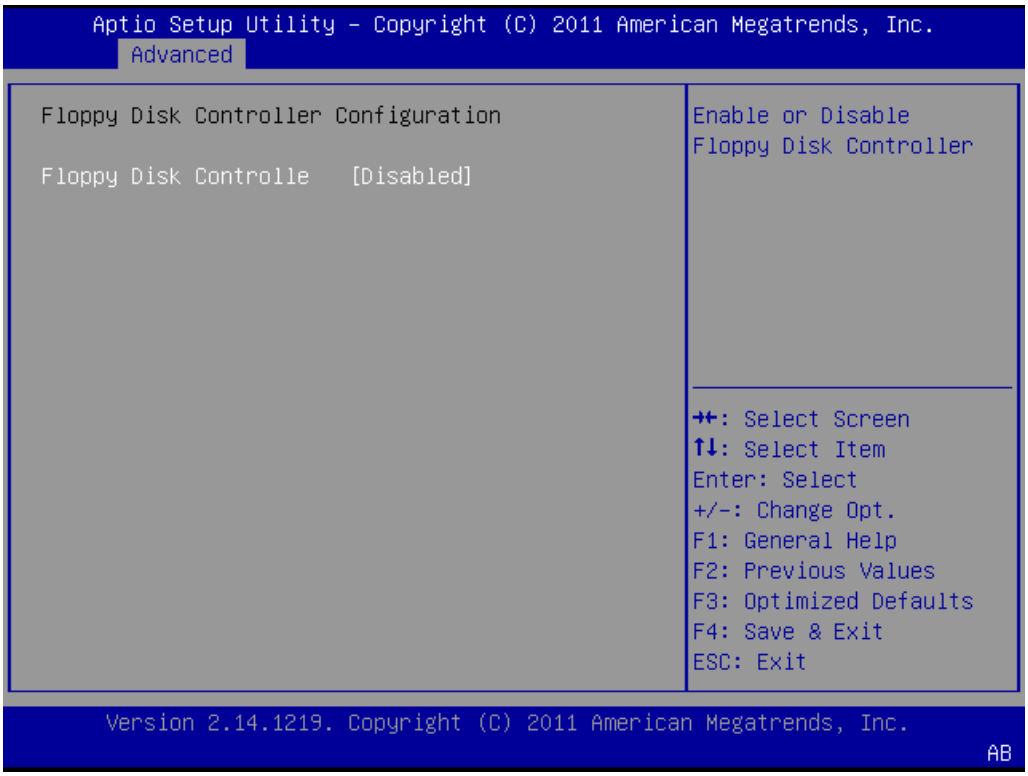


Figure 3.11 Floppy Disk Controller Configuration

– **Floppy Disk Controller**
  This item allows users to enable or disable Floppy Disk Controller.

Serial Port 1 Configuration

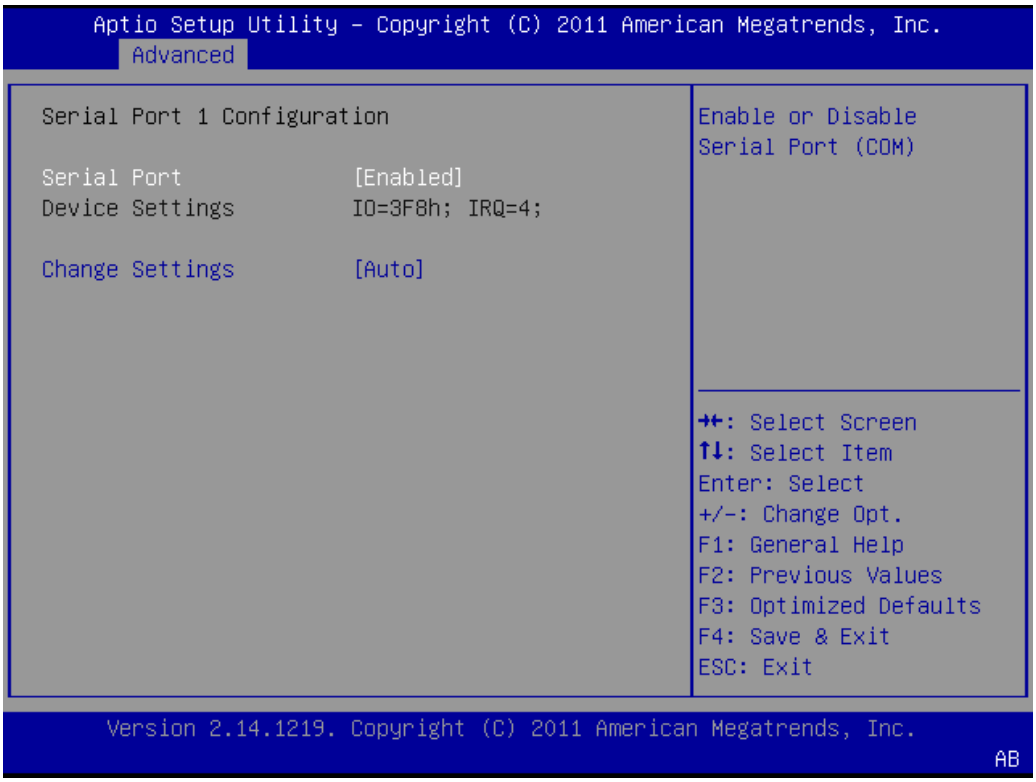


Figure 3.12 Serial Port 1 Configuration

- **Serial Port**
  This item allows users to enable or disable Serial port 1.
- **Change settings**
  Serial port 1 IRQ/IO/mode resources configuration. Users can choose IRQ,IO, and MODE.

- **Serial Port 2 Configuration**
  This item allows users to configure serial port 1.

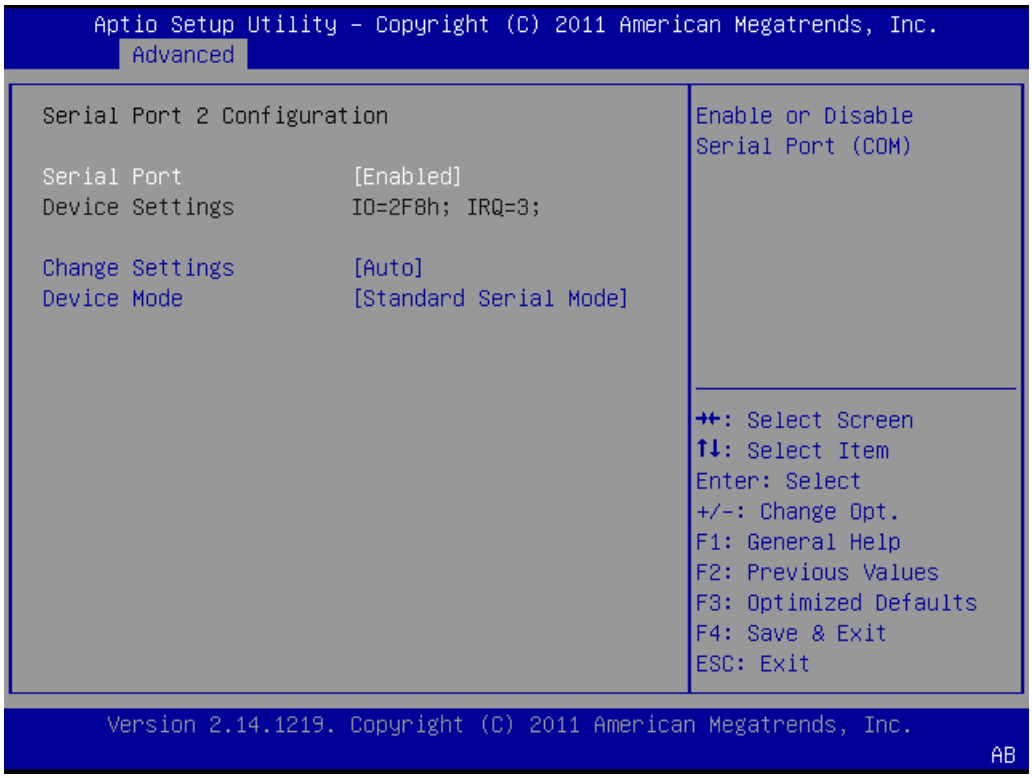


Figure 3.13 Serial Port 2 Configuration

- **Serial Port**
  This item allows users to enable or disable Serial port 2.
- **Change settings**
  Serial port 2 IRQ/IO/mode resources configuration. Users can choose IRQ,IO, and MODE.
- **Device Mode**
  Users can choose the mode.

Parallel Port Configuration

This item allows users to configure parallel port.

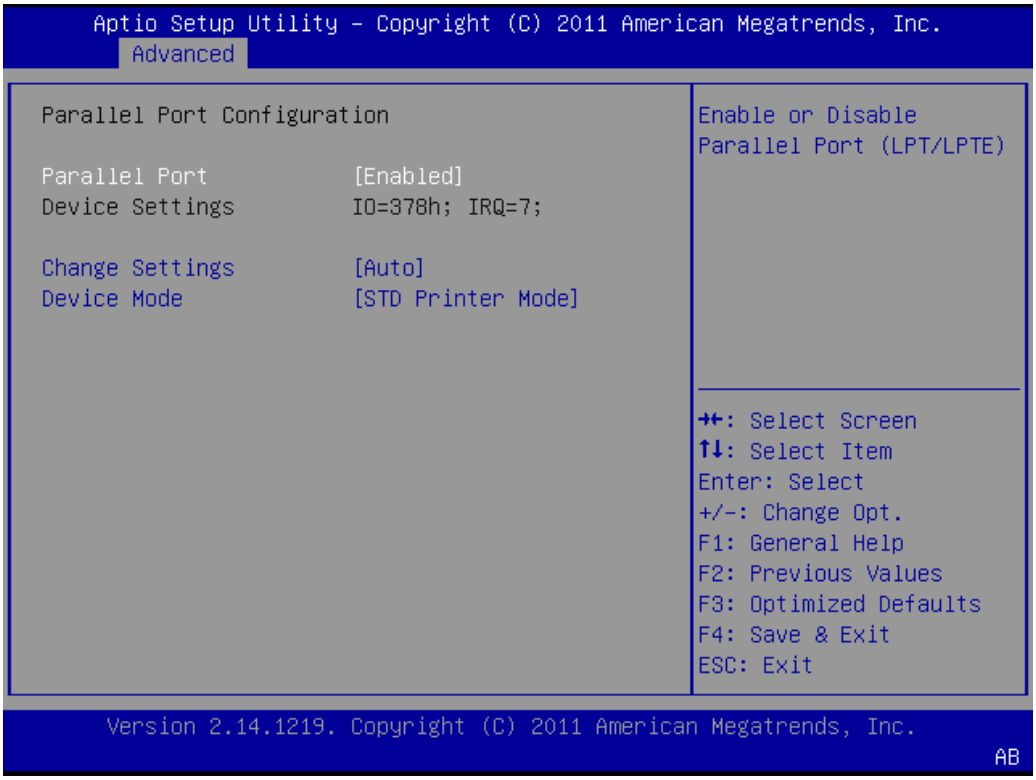


Figure 3.14 Parallel Port Configuration

- **Parallel Port**
  This item allows users to enable or disable.
- **Change Setting**
  This item allows users to change settings.
- **Device Mode**
  This item allows users to change the mode.

3.2.2.7 Super IO 2 Configuration

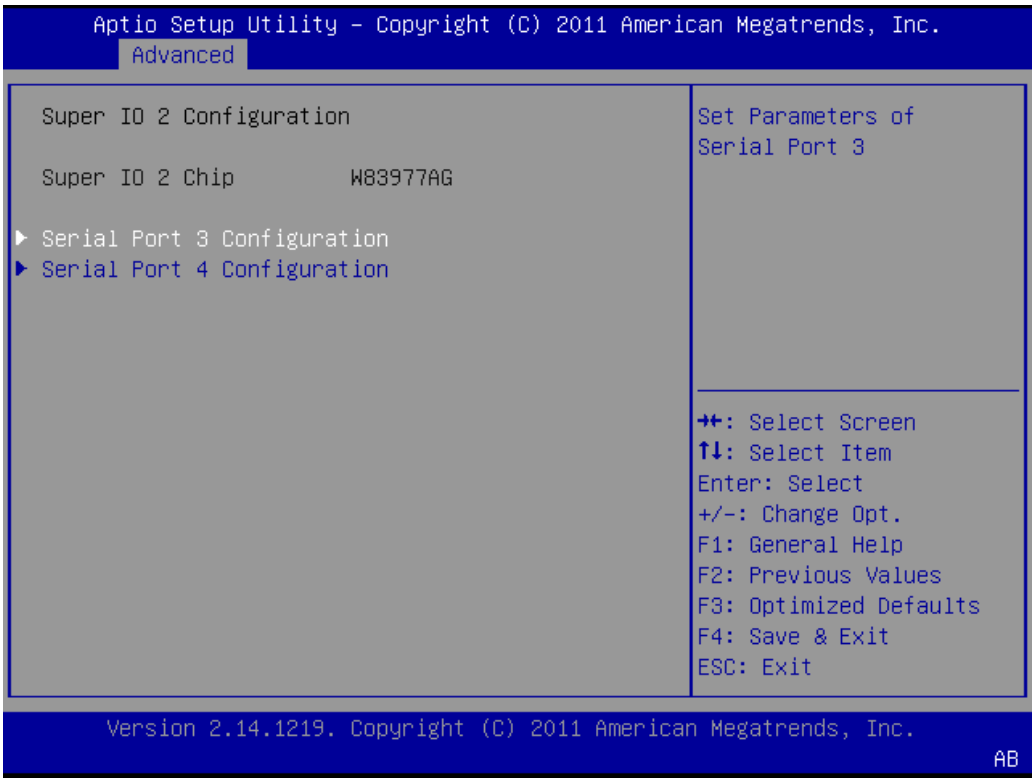


Figure 3.15 Super IO 2 Configuration

- **Serial Port 3 Configuration**
  This item allows users to configure serial port 3.
- **Serial Port 4 Configuration**
  This item allows users to configure serial port 4.

Serial Port 3 Configuration

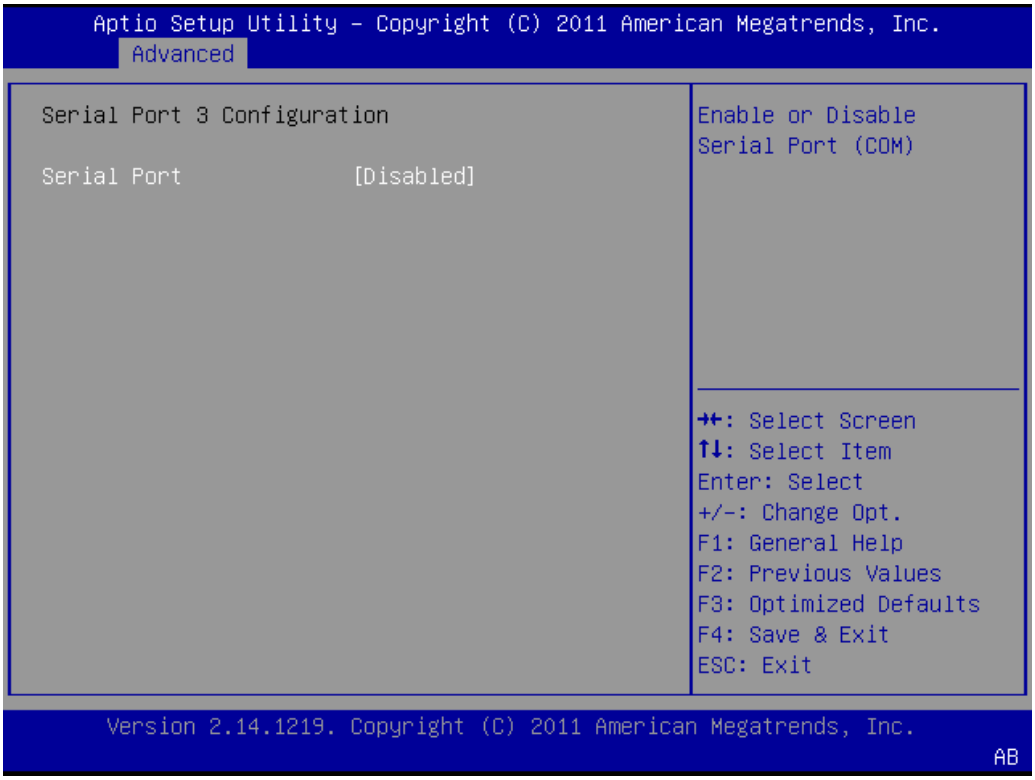


Figure 3.16 Serial Port 3 Configuration

– **Serial Port**
This item allows users to enable or disable Serial port 3.

Serial Port 4 Configuration

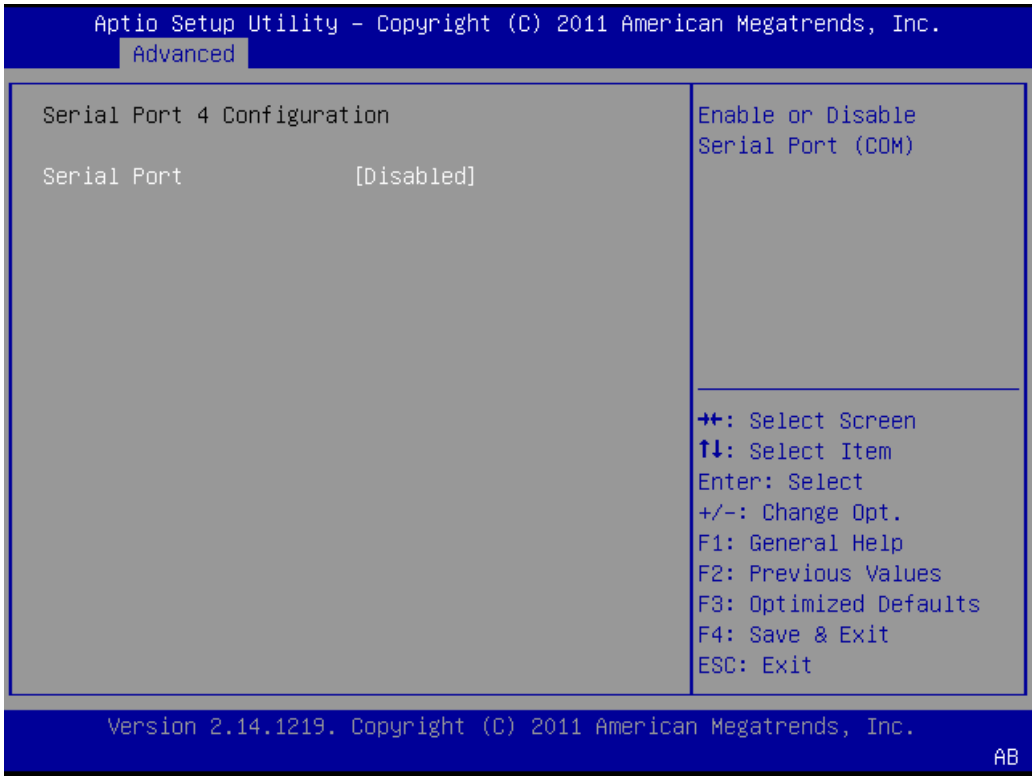


Figure 3.17 Serial Port 4 Configuration

– **Serial Port**
This item allows users to enable or disable Serial port 4.

■ **Parallel Port 2 Configuration**

This item allows users to configure parallel port.

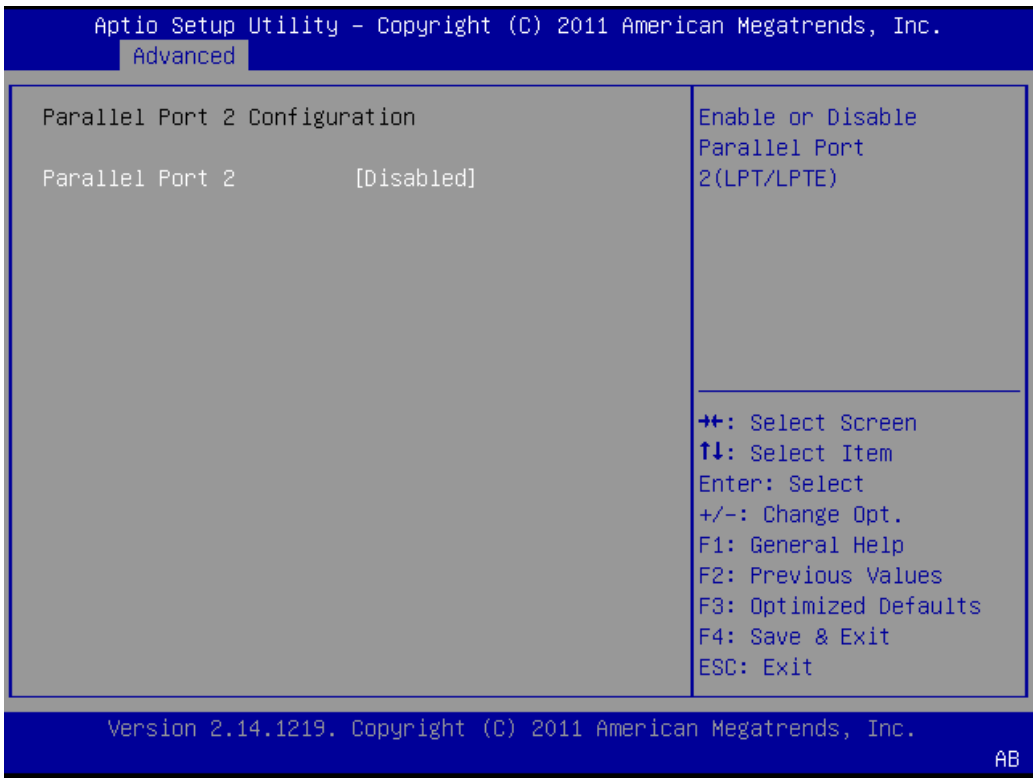


Figure 3.18 Parallel Port 2 Configuration

– **Parallel Port 2**

This item allows users to enable or disable Parallel Port 2.

3.2.2.8 H/W Monitor

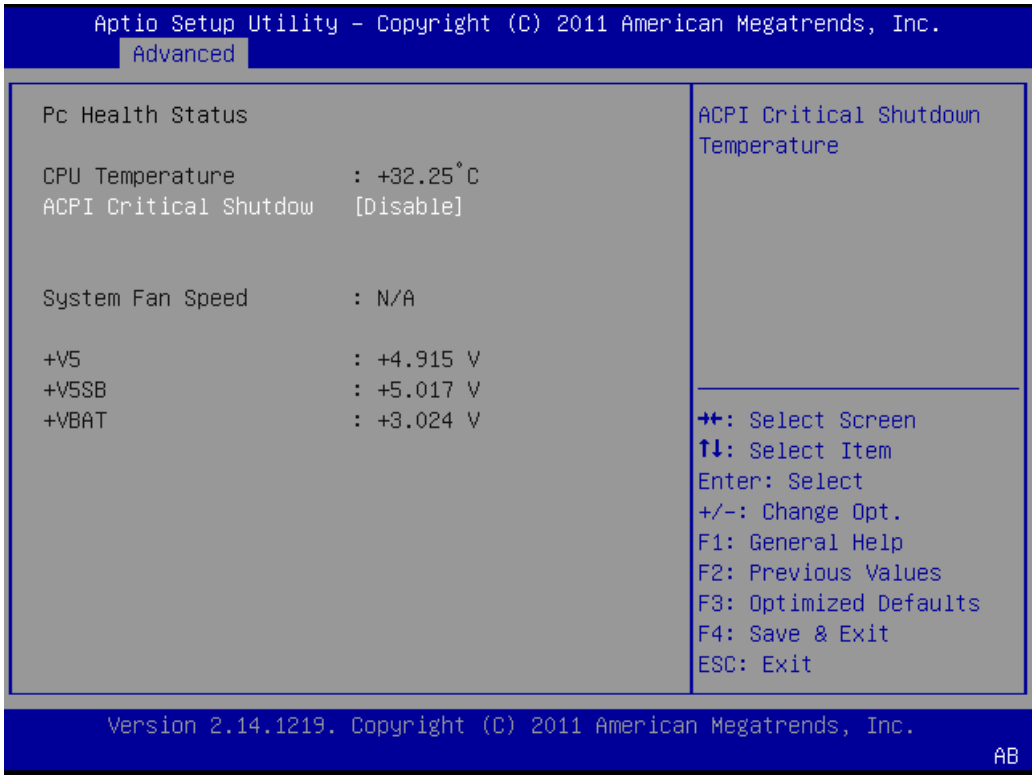


Figure 3.19 H/W Monitor

- **ACPI Critical Shutdown**
  This item allows users to enable or disable ACPI Critical shutdown.

3.2.2.9 IT8888 Configuration

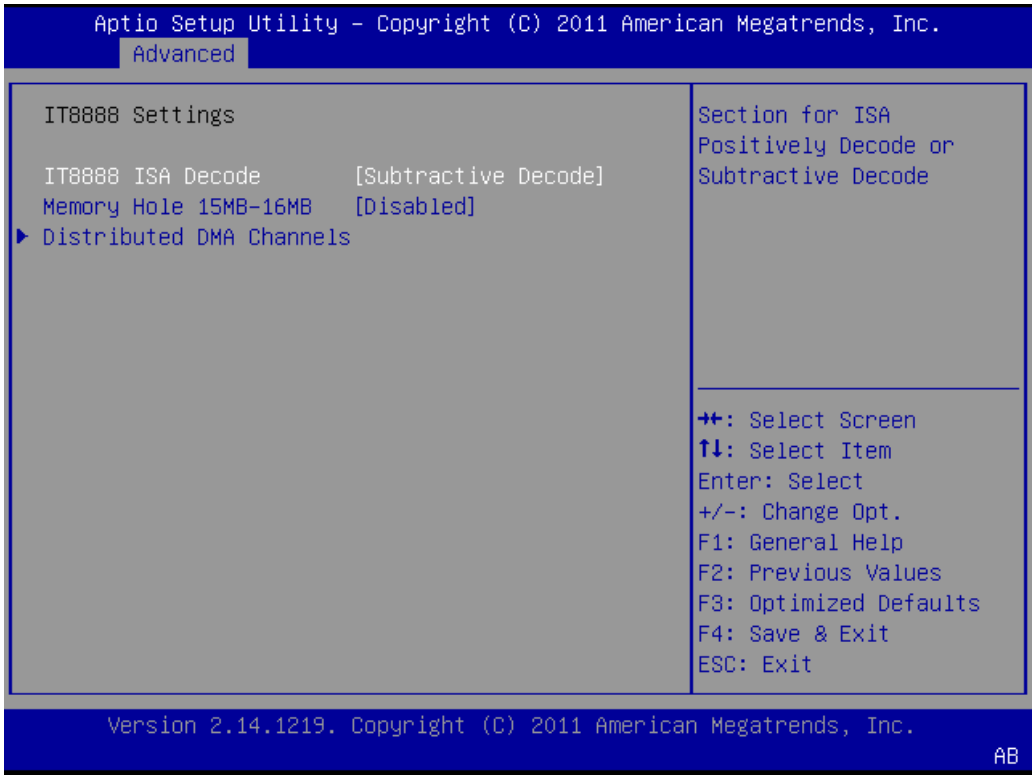


Figure 3.20 IT8888 Configuration

- **IT8888 ISA Decode**
  This item allows users to select the decode mode.
- **Memory Hole 15 MB - 16 MB**
  This item allows users to enable or disable Memory Hole 15 MB - 16 MB.

Distributed DMA Channels

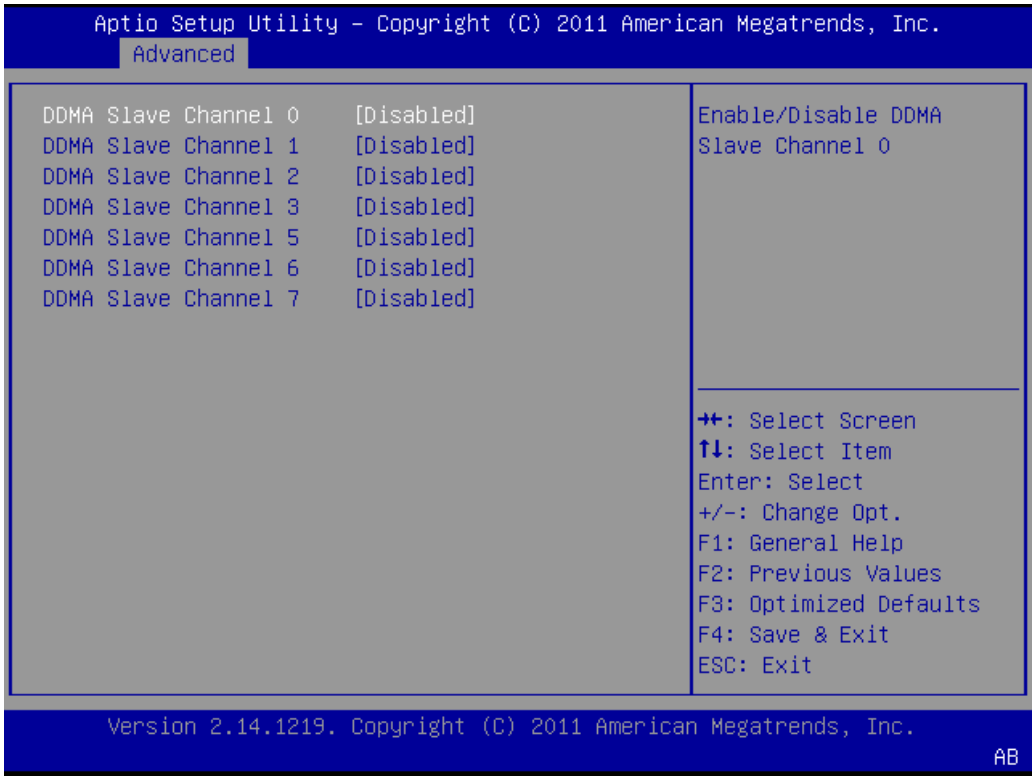


Figure 3.21 Distributed DMA Channels

- **DDMA Slave Channel 1**
  This item allows users to enable or disable DDMA Slave Channel 1.
- **DDMA Slave Channel 2**
  This item allows users to enable or disable DDMA Slave Channel 2.
- **DDMA Slave Channel 3**
  This item allows users to enable or disable DDMA Slave Channel 3.
- **DDMA Slave Channel 5**
  This item allows users to enable or disable DDMA Slave Channel 5.
- **DDMA Slave Channel 6**
  This item allows users to enable or disable DDMA Slave Channel 6.
- **DDMA Slave Channel 7**
  This item allows users to enable or disable DDMA Slave Channel 7.

3.2.3 Chipset

Select the Chipset tab from the SOM-4464 setup screen to enter the Chipset BIOS Setup screen. You can display a Chipset BIOS Setup option by highlighting it using the <Arrow> keys. All Plug and Play BIOS Setup options are described in this section. The Plug and Play BIOS Setup screen is shown below.

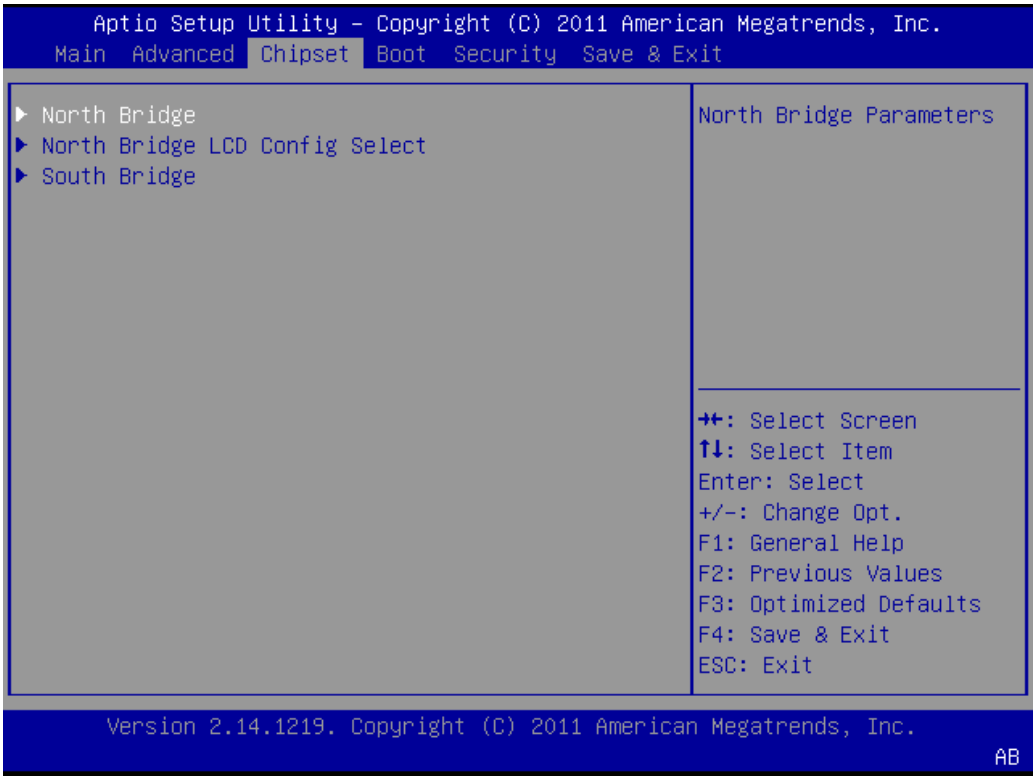


Figure 3.22 Chipset Setup

3.2.3.1 North Bridge Configuration

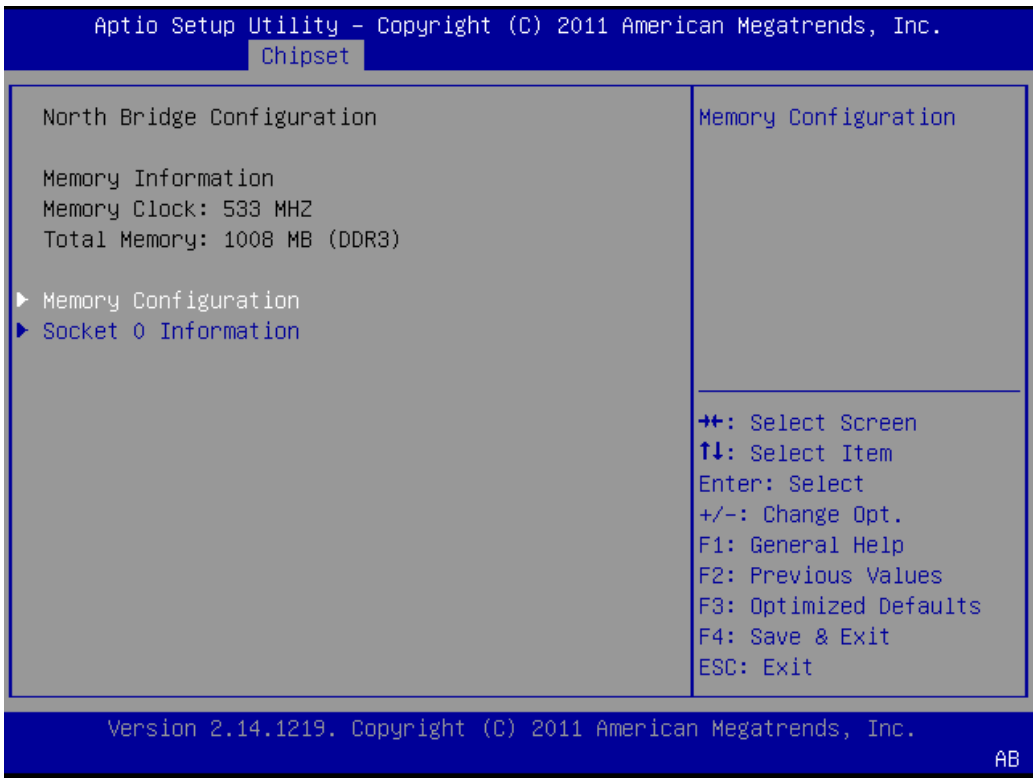


Figure 3.23 North Bridge Configuration

- **Memory Configuration**
  This item allows users to enable or disable Integrated Graphics.
- **Socket 0 Information**
  This item is shown the socket 0 information.

Memory Configuration

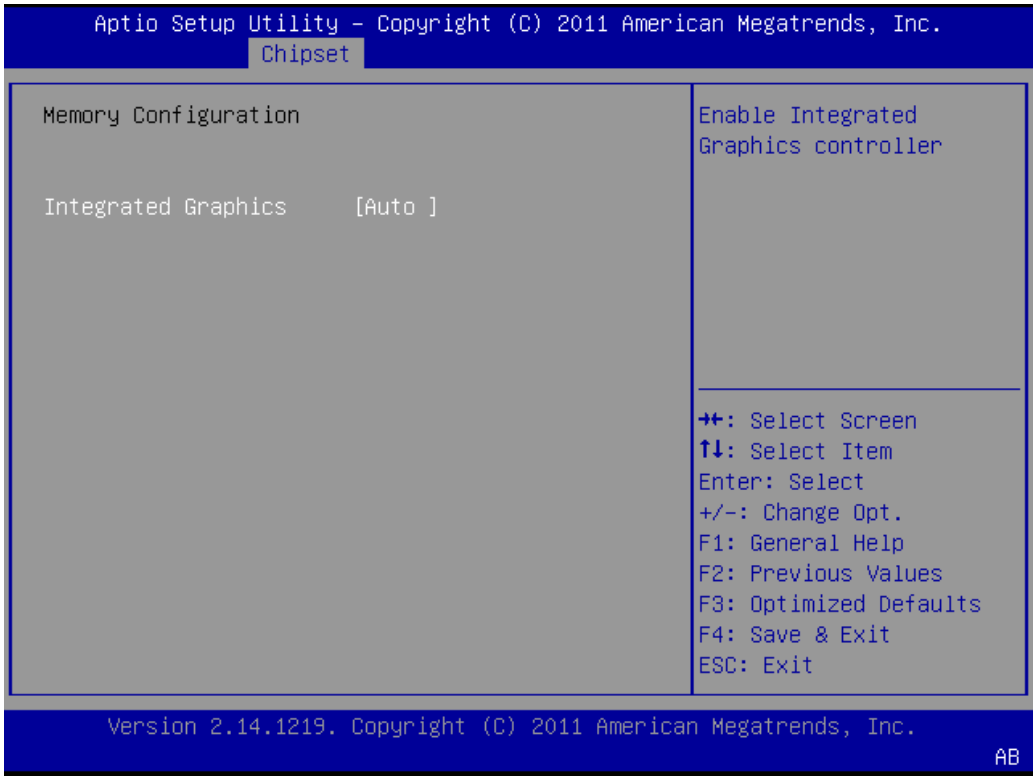


Figure 3.24 Memory Configuration

– **Integrated Graphics**
This item allows users to enable or disable Integrated Graphics.

Socket 0 Information

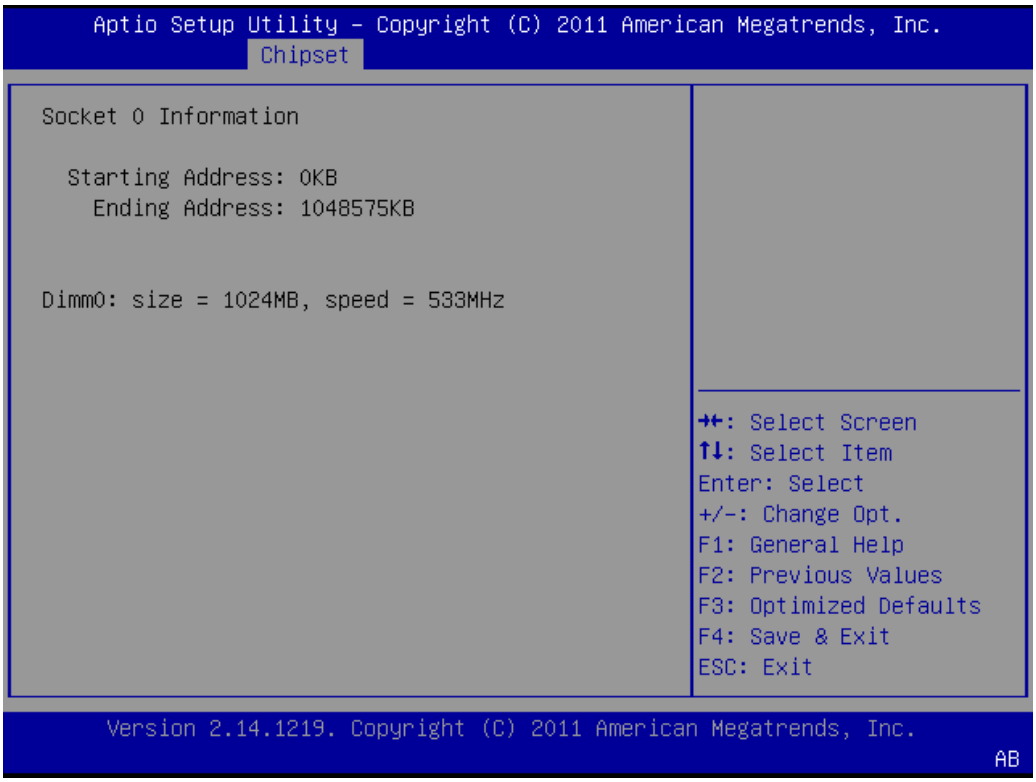


Figure 3.25 Socket 0 Information

– **Socket 0 Information**
This item is shown the socket 0 information.

3.2.3.2 North Bridge LCD Config Select (LVDS SKU)

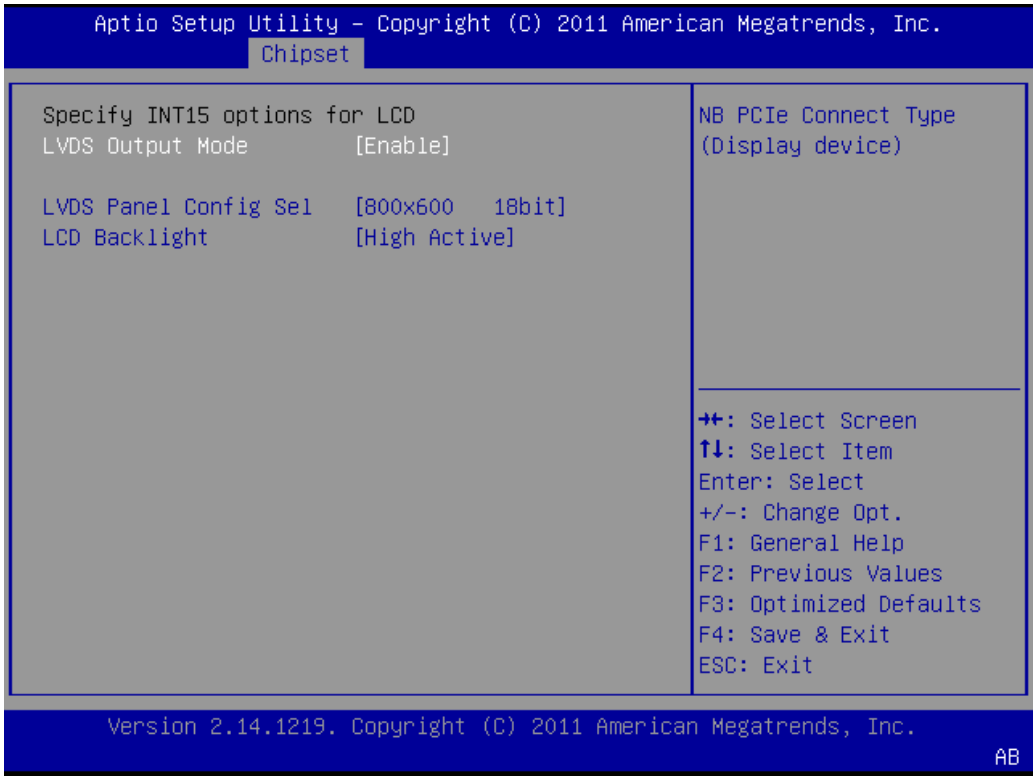


Figure 3.26 North Bridge LCD Config Select (LVDS SKU)

- **LVDS Output Mode**
  This item allows users to enable or disable LVDS Output mode.

3.2.3.3 North Bridge LCD Config Select (TTL SKU)

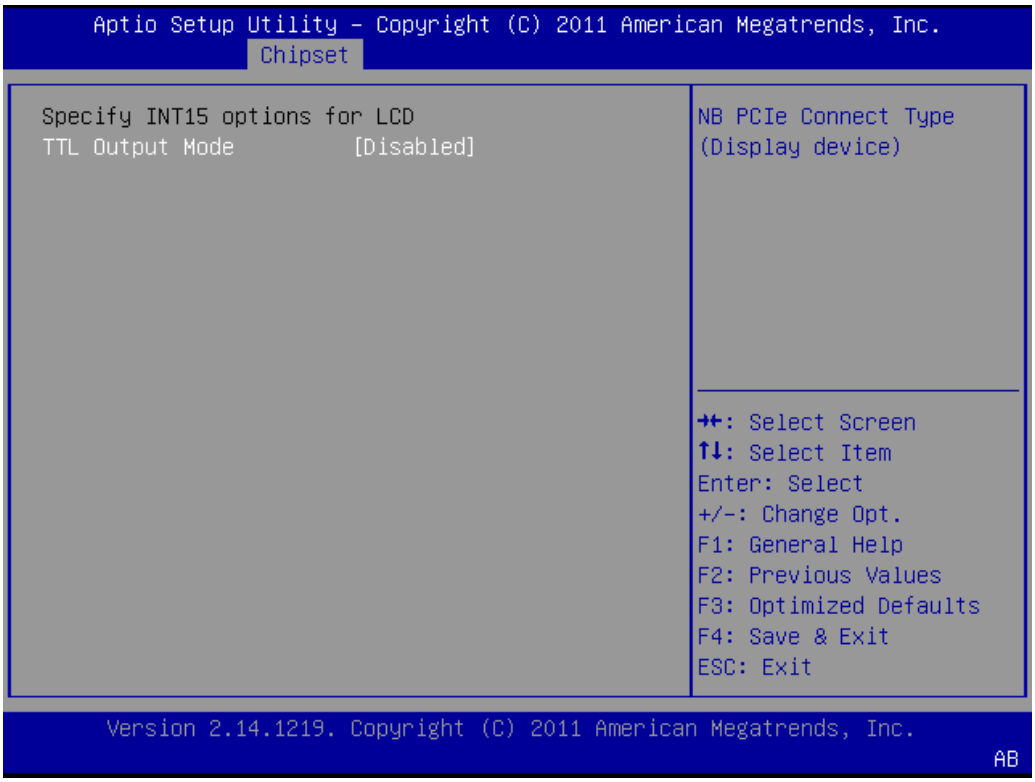


Figure 3.27 North Bridge LCD Config Select (TTL SKU)

- **TTL Output Mode**
  This item allows users to enable or disable TTL Output mode.

3.2.3.4 South Bridge

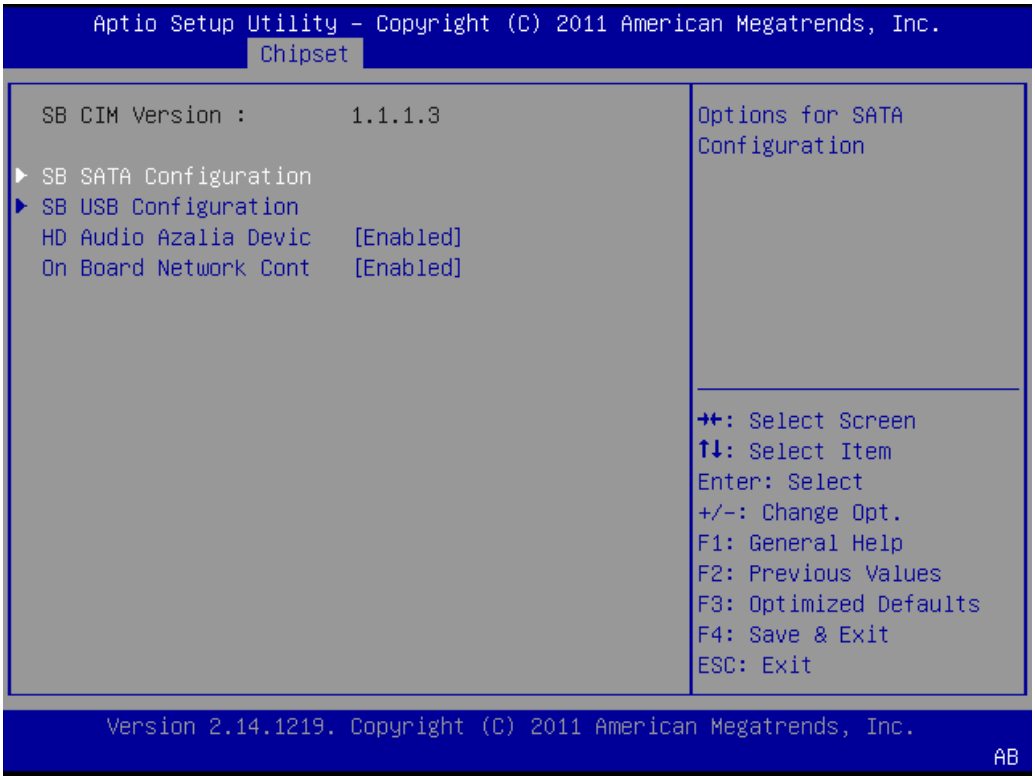


Figure 3.28 South Bridge

- **HD Audio Azalia Device**
  This item allows users to enable or disable HD Audio Azalia Device.
- **On Board Network Cont**
  This item allows users to enable or disable On Board Network Cont.

SB SATA Configuration

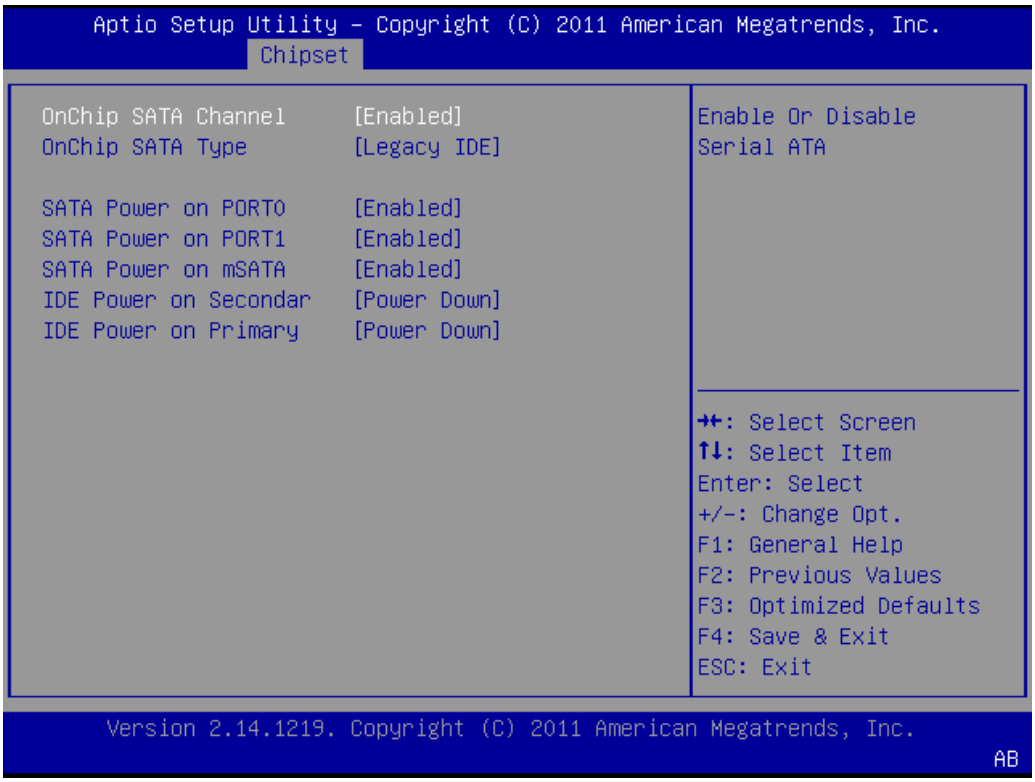


Figure 3.29 SB SATA Configuration

- **OnChip SATA Channel**
  This item allows users to enable or disable OnChip SATA Channel.
- **OnChip SATA Type**
  This item allows users to select OnChip SATA type mode.
- **SATA Power on PORT0**
  This item allows users to enable or disable SATA Power on Port0.
- **SATA Power on PORT1**
  This item allows users to enable or disable SATA Power on Port1.
- **SATA Power on mSATA**
  This item allows users to enable or disable SATA Power on mSATA.
- **IDE Power on Secondary**
  This item allows users to enable or power down IDE Power on Secondary.
- **IDE Power on Primary**
  This item allows users to enable or power down IDE Power on Primary.

SB USB Configuration

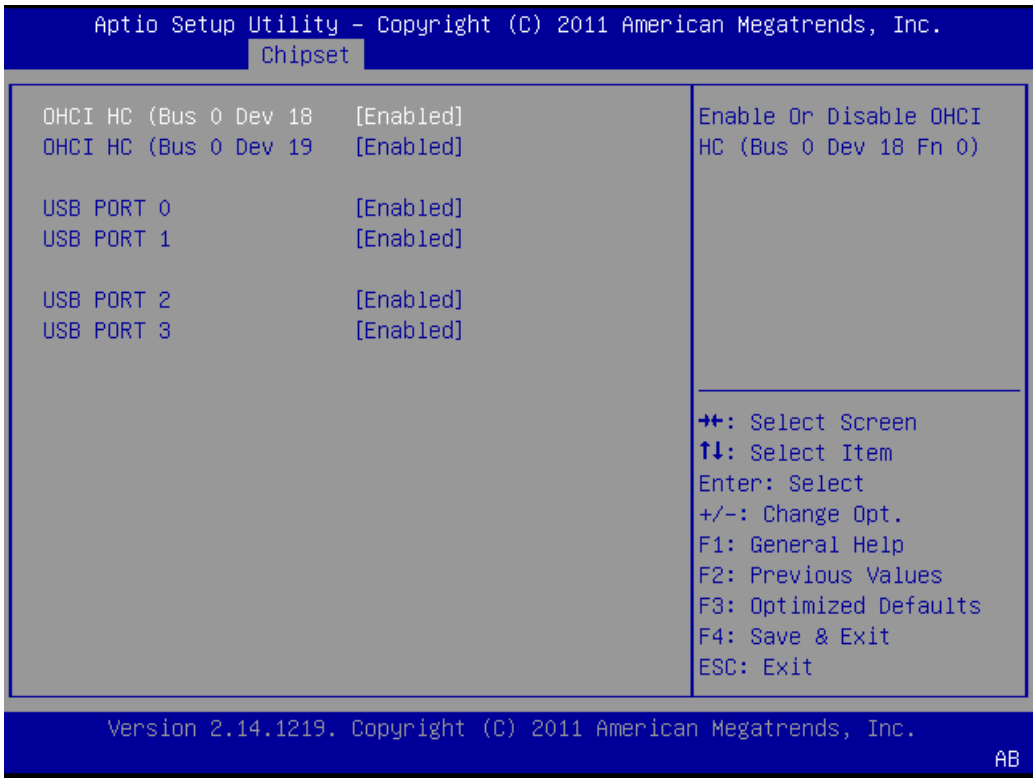


Figure 3.30 SB USB Configuration

- **OHCI HC (Bus 0 Dev 18)**
  This item allows users to enable or disable OHCI HC (Bus 0 Dev 18).
- **OHCI HC (Bus 0 Dev 19)**
  This item allows users to enable or disable OHCI HC (Bus 0 Dev 19).
- **USB PORT 0**
  This item allows users to enable or disable USB Port 0.
- **USB PORT 1**
  This item allows users to enable or disable USB Port 1.
- **USB PORT 2**
  This item allows users to enable or disable USB Port 2.
- **USB PORT 3**
  This item allows users to enable or disable USB Port 3.

3.2.4 Boot Settings

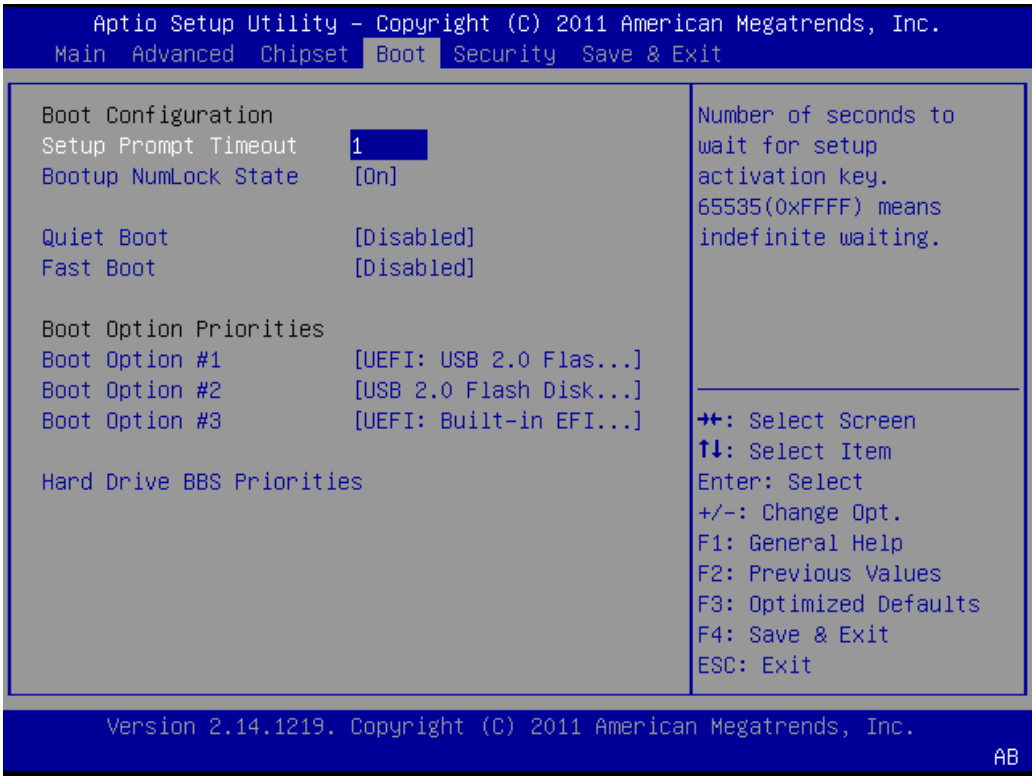


Figure 3.31 Boot Setup Utility

- **Setup Prompt Timeout**
  This item allows users to select the number of seconds to wait for setup activation key.
- **Bootup NumLock State**
  Select the Power-on state for Numlock.
- **Quiet Boot**
  If this option is set to Disabled, the BIOS displays normal POST messages. If Enabled, an OEM Logo is shown instead of POST messages.
- **Fast Boot**
  This option is set to Disabled.
- **1st/2nd/3rd Boot**
  This item allows users to set boot device priority.

3.2.5 Security Setup

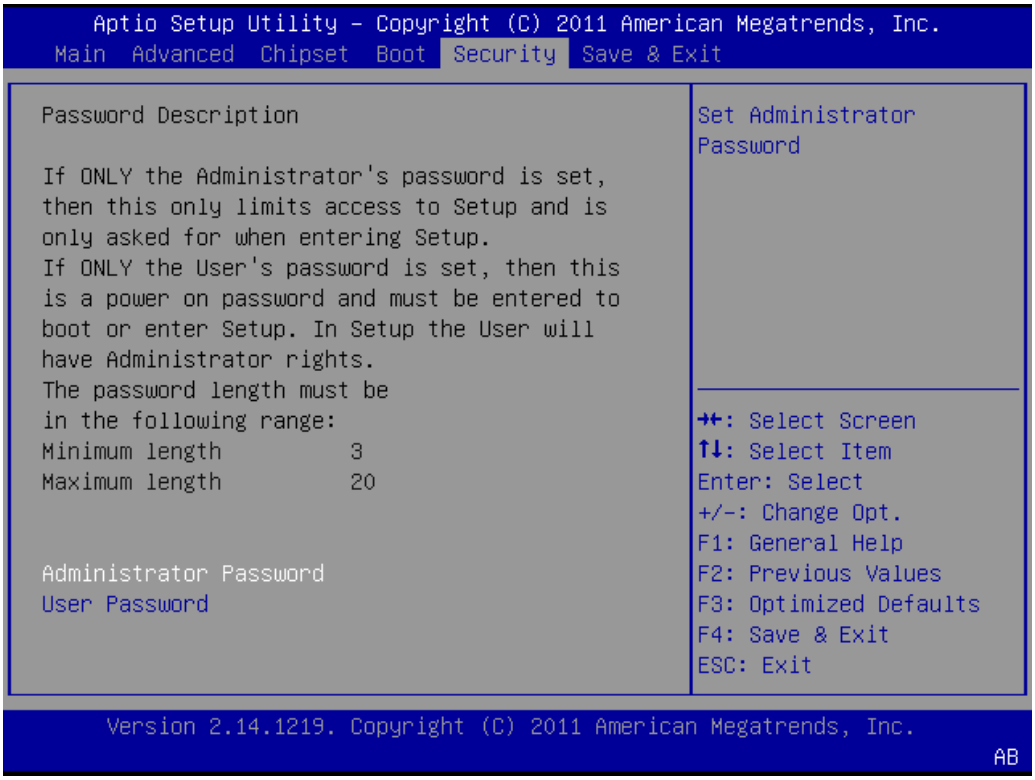


Figure 3.32 Password Configuration

Select Security Setup from the SOM-4466 Setup main BIOS setup menu. All Security Setup options, such as password protection is described in this section. To access the sub menu for the following items, select the item and press <Enter>:

- **Change Administrator / User Password**
  Select this option and press <ENTER> to access the sub menu, and then type in the password.

3.2.6 Save & Exit

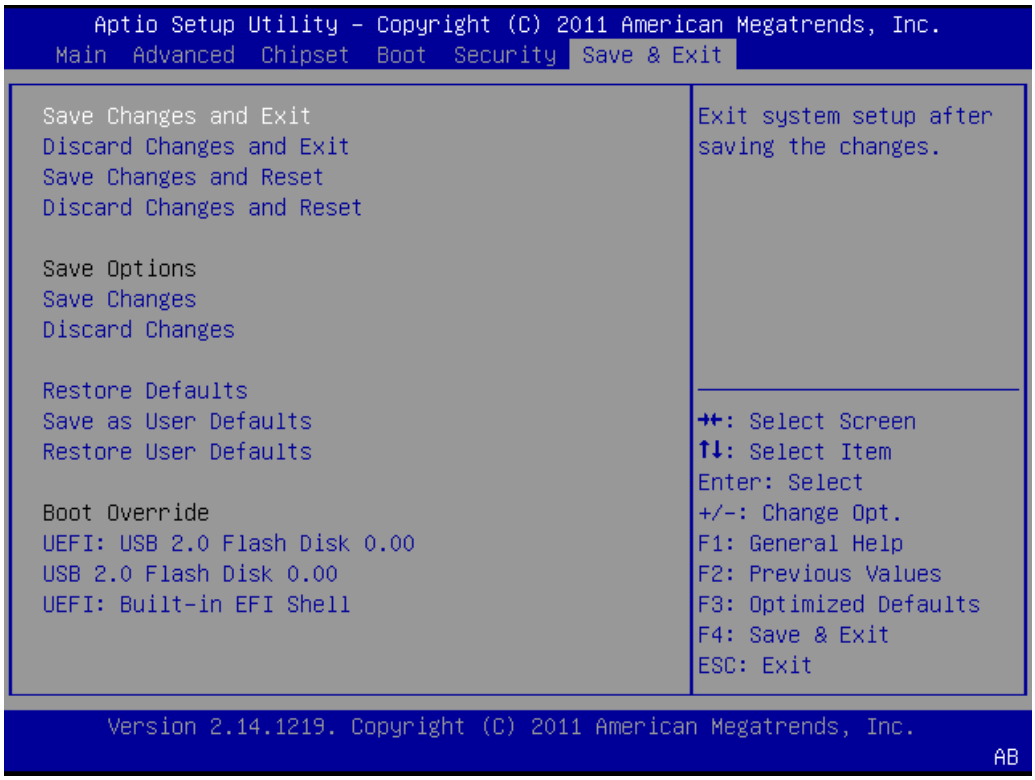


Figure 3.33 Save & Exit

- **Save Changes and Exit**

  When users have completed system configuration, select this option to save changes, exit BIOS setup menu and reboot the computer if necessary to take effect all system configuration parameters.

- **Discard Changes and Exit**

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

- **Save Changes and Reset**

  When users have completed system configuration, select this option to save changes, exit BIOS setup menu and reboot the computer to take effect all system configuration parameters.

- **Discard Changes and Reset**

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

- **Save Changes**

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

- **Discard Changes**

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

- **Restore Defaults**

  The SOM-4466 automatically configures all setup items to optimal settings when users select this option. Optimal Defaults are designed for maximum system performance, but may not work best for all computer applications. In particular, do not use the Optimal Defaults if the user's computer is experiencing system configuration problems.

- **Save User Defaults**
  When users have completed system configuration, select this option to save changes as user defaults without exit BIOS setup menu.
- **Restore User Defaults**
  The users can select this option to restore user defaults.

Chapter 4

S/W Introduction & Installation

Sections include:

- S/W Introduction
- Driver Installation

4.1 S/W Introduction

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

4.2 Driver Installation

4.2.1 Windows XP / Windows 7 / Windows 8 Driver Setup

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

* For Windows 8: Before you install the OS, please reference the Application Note document first.

4.2.2 Other OS

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

4.2.3 SUSI

Advantech's own SUSI (Secure and Unified Smart Interface) API library speeds software development, and global logistics and support streamline the product development process. To get the API, please contact with sales.

Appendix A

Watchdog Timer

This appendix gives you the information about the watchdog timer programming on the SOM-4466 ETX module.

Sections include:

- Watchdog Timer Programming

A.1 Programming the Watchdog Timer

The sample code of programming the Watchdog Timer function:

```
;------------------------------------------------------------
; Enter the extended function mode, interruptible double-write |
;------------------------------------------------------------
MOV DX,2EH
MOV AL,87H
OUT DX,AL
OUT DX,AL
;------------------------------------------------------------
; Configured logical device 8, configuration register CRF6 |
;------------------------------------------------------------
MOV DX,2EH
MOV AL,2BH
OUT DX,AL
MOV DX,2FH
IN AL,DX
AND AL.OEF;Setbit 4=0 Pin 89=WDTO
OUT DX,AL
MOV DX,2EH
MOV AL,07H; point to Logical Device Number Reg.
OUT DX,AL
MOV DX,2FH
MOV AL,08H; select logical device 8
OUT DX,AL;
MOV DX,2EH
MOV AL,30H;Set watch dog activate or inactivate
OUT DX,AL
MOV DX,2FH
MOV AL,01H; 01:activate 00:inactivate
OUT DX,AL;
MOV DX,2EH
MOV AL,F5H; Setting counter unit is second
OUT DX,AL
MOV DX,2FH
MOV AL,00H
OUT DX,AL;
MOV DX,2EH
MOV AL,F6H
OUT DX,AL
MOV DX,2FH
MOV AL,05H; Set 5 seconds
OUT DX,AL
;------------------------------------------------------------
; Exit extended function mode |
;------------------------------------------------------------
MOV DX,2EH
MOV AL,AAH
```

```
OUT DX,AL
```

Appendix B

System Assignments

This appendix gives you the information about the system resource allocation on the SOM-4466 ETX module.

Sections include:

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

B.1 System I/O Ports

Table B.1: System I/O Ports

Addr.range(Hex)	Device
0000 - 000F	Direct memory access controller
0000 - 000F	Motherboard resources
0000 - 03AF	PCI bus
0010 - 001F	Motherboard resources
0020 - 0021	Programmable interrupt controller
0022 - 003F	Motherboard resources
0040 - 0043	Sys0em timer
0044 - 005F	Motherboard resources
0060 - 0060	Standard 101/102-Key or Microsoft Natural PS/2
0061 - 0061	System speaker
0062 - 0063	Motherboard resources
0064 - 0064	Standard 101/102-Key or Microsoft Natural PS/2
0065 - 006F	Motherboard resources
0070 - 0071	System CMOS/real time clock
0072 - 007F	Motherboard resources
0080 - 0080	Motherboard resources
0081 - 0083	Direct memory access controller
0084 - 0086	Motherboard resources
0087 - 0087	Direct memory access controller
0088 - 0088	Motherboard resources
0089 - 008B	Direct memory access controller
008C - 008E	Motherboard resources
008F - 008F	Direct memory access controller
0090 - 009F	Motherboard resources
00A0 - 00A1	Programmable interrupt controller
00A2 - 00BF	Motherboard resources
00C0 - 00DF	Direct memory access controller
00E0 - 00EF	Motherboard resources
00F0 - 00FF	Numeric data processor
0170 - 0177	Secondary IDE Channel
01F0 - 01F7	Primary IDE Channel
0274 - 0277	ISAPNP Read Data Port
0279 - 0279	ISAPNP Read Data Port
0370 - 0371	Motherboard resources
0376 - 0376	Secondary IDE Channel
0378 - 037F	Printer Port (LPT1)
03B0 - 03BB	AMD Radeon HD 6250 Graphics
03B0 - 03DF	PCI bus
03C0 - 03DF	AMD Radeon HD 6250 Graphics
03E0 - 0CF7	PCI bus
03F6 - 03F6	Primary IDE Channel
03F8 - 03FF	Communications Port (COM1)
040B - 040B	Motherboard resources
04D0 - 04D1	Motherboard resources
04D6 - 04D6	Motherboard resources
0800 - 089F	Motherboard resources

0900 - 090F	Motherboard resources
0910 - 091F	Motherboard resources
0A79 - 0A79	ISAPNP Read Data Port
0B20 - 0B3F	Motherboard resources
0C00 - 0C01	Motherboard resources
0C14 - 0C14	Motherboard resources
0C50 - 0C51	Motherboard resources
0C52 - 0C52	Motherboard resources
0C6C - 0C6C	Motherboard resources
0C6F - 0C6F	Motherboard resources
0CD0 - 0CD1	Motherboard resources
0CD2 - 0CD3	Motherboard resources
0CD4 - 0CD5	Motherboard resources
0CD6 - 0CD7	Motherboard resources
0CD8 - 0CDF	Motherboard resources
0D00 - FFFF	PCI bus
0E00 - E0FF	Realtek PCIe FE Family Controller
0E00 - EFFF	PCI standard PCI-to-PCI bridge
0F00 - F0FF	AMD Radeon HD 6250 Graphics
F100 - F10F	Standard Dual Channel PCI IDE Controller
F110 - F113	Standard Dual Channel PCI IDE Controller
F120 - F127	Standard Dual Channel PCI IDE Controller
F130 - F133	Standard Dual Channel PCI IDE Controller
F140 - F147	Standard Dual Channel PCI IDE Controller
F150 - F15F	Standard Dual Channel PCI IDE Controller
FE00 - FEFE	Motherboard resources

B.2 DMA Channel Assignments

Table B.2: DMA Channel Assignments

Channel	Function
4	Direct memory access controller

B.3 Interrupt Assignments

Table B.3: Interrupt Assignments

Interrupt#	Interrupt Source
IRQ 0	System timer
IRQ 1	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
IRQ 3	Communications Port (COM2)
IRQ 4	Communications Port (COM1)
IRQ 8	System CMOS/real time clock
IRQ 9	Microsoft ACPI-Compliant System
IRQ 12	PS/2 Compatible Mouse
IRQ 13	Numeric data processor
IRQ 14	Primary IDE Channel
IRQ 15	Secondary IDE Channel
IRQ 16	Microsoft UAA Bus Driver for High Definition Audio
IRQ 16	PCI standard PCI-to-PCI bridge
IRQ 16	Realtek PCIe FE Family Controller
IRQ 17	Standard Dual Channel PCI IDE Controller
IRQ 17	Standard Enhanced PCI to USB Host Controller
IRQ 17	Standard Enhanced PCI to USB Host Controller
IRQ 18	AMD Radeon HD 6250 Graphics
IRQ 18	Standard OpenHCD USB Host Controller
IRQ 18	Standard OpenHCD USB Host Controller
IRQ 19	Microsoft UAA Bus Driver for High Definition Audio

B.4 1st MB Memory Map

Table B.4: 1st MB Memory Map

Addr. range (Hex)	Device
000A0000-000BFFFF	AMD Radeon HD 6250 Graphics
000A0000-000BFFFF	PCI Bus
000C0000-000DFFFF	PCI Bus
67000000-7EFFFFFF	Motherboard resources
7F000000-FFFFFFFF	PCI Bus
C0000000-CFFFFFFF	AMD Radeon HD 6250 Graphics
D0000000-D0003FFF	Realtek PCIe FE Family Controller
D0000000-D00FFFFF	PCI standard PCI-to-PCI bridge
D0004000-D0004FFF	Realtek PCIe FE Family Controller
E0000000-EFFFFFFF	System board
FEB00000-FEB3FFFF	AMD Radeon HD 6250 Graphics
FEB40000-FEB43FFF	Microsoft UAA Bus Driver for High Definition Audio
FEB44000-FEB47FFF	Microsoft UAA Bus Driver for High Definition Audio
FEB48000-FEB480FF	Standard Enhanced PCI to USB Host Controller
FEB49000-FEB49FFF	Standard OpenHCD USB Host Controller
FEB4A000-FEB4A0FF	Standard Enhanced PCI to USB Host Controller
FEB4B000-FEB4BFFF	Standard OpenHCD USB Host Controller
FEB4C000-FEB4C3FF	Standard Dual Channel PCI IDE Controller
FEC00000-FEC00FFF	Motherboard resources
FEC1000-FEC10FFF	Motherboard resources
FED0000-FED003FF	High precision event timer
FED0000-FED00FFF	Motherboard resources
FED6100-FED70FFF	Motherboard resources
FED8000-FED8FFFF	Motherboard resources
FEE0000-FEE00FFF	Motherboard resources
FEC0000-FFFFFFFF	Motherboard resources

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