

USER'S MANUAL

BA-0951

**Intel® Xeon® E3 v3 with Intel®
C226 ATX Motherboard
features VGA/2 LAN/DP/6COM**

BA-0951 M2

BA-0951 Intel[®] Xeon[®] E3 v3 with Intel[®] C226 ATX Motherboard

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DISCLAIMER

This operation manual is meant to assist both Embedded Computer manufacturers and end users in installing and setting up the system. The information contained in this document is subject to change without any notice.

CE NOTICE

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 NOTICE

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.

You are cautioned that any change or modifications to the equipment not expressly approve by the party responsible for compliance could void your authority to operate such equipment.

CAUTION! Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

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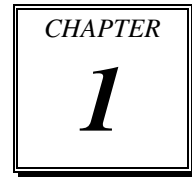
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INTRODUCTION



This chapter gives you the information for BA-0951. It also outlines the system specifications.

Sections included:

- About This Manual
- System Specifications
- Safety Precautions

Experienced users can jump to chapter 2 on page 2-1 for a quick start.

1-1. ABOUT THIS MANUAL

Thank you for purchasing our BA-0951 Intel® Xeon® E3 v3 with Intel® C226 ATX Motherboard enhanced with VGA/2LAN/DP, which is fully PC/AT compatible. The BA-0951 provides faster processing speed, greater expandability and can handle more tasks than before. This manual is designed to assist you how to install and set up the system. It contains four chapters. The user can apply this manual for configuration according to the following chapters:

Chapter 1 Introduction

This chapter introduces you to the background of this manual, and the specifications for this system. The final page of this chapter will indicate how to avoid damaging this board.

Chapter 2 Hardware Configuration

This chapter outlines the component locations and their functions. In the end of this chapter, you will learn how to set jumper and how to configure this card to meet your own needs.

Chapter 3 Software Utilities

This chapter contains helpful information for proper installations of the VGA utility, LAN utility, Sound utility, and Flash BIOS Update. It also describes the Watchdog-timer configuration.

Chapter 4 BIOS Setup

This chapter indicates you how to set up the BIOS configurations.

Appendix A Expansion Bus

This appendix introduces you the expansion bus for PCIe connectors.

Appendix B Technical Summary

This appendix gives you the information about the Technical maps.

1-2. SYSTEM SPECIFICATIONS

System

CPU	Intel® Xeon® Processor (LGA1150) <ul style="list-style-type: none"> ▪ E3-1275 v3 (84W) ▪ E3-1225 v3 (84W) ▪ E3-1268L v3 (45W)
OS Support	Windows 7, 8, Server 2008 R2
Chipset	Intel® C226
Memory	4 x DIMM (204 pins), DDR3/DDR3L 1333/1600 MHz, up to 32GB, support ECC/non-ECC
BIOS	AMI
Watchdog	1~255 seconds
Power Supply	ATX 24 + 4 power supply
Dimension	244 x 305 mm (9.6" x 12")
Certificate	CE/FCC

I/O Ports

Serial Port	6 ports: <ul style="list-style-type: none"> ▪ COM1: D-sub ▪ COM2~COM6: Box headers on board (COM1/3/4/5/6 for RS-232, COM2 for RS-232/422/485; COM3/4 supports 5V/12V)
USB Port	<ul style="list-style-type: none"> ▪ 4 x external USB 3.0, stacked with LAN ▪ 8 x USB 2.0 (2 are external & stacked with PS/2, 6 are internal pin-headers.)
Parallel Port	1 x printer port
SATA Interface	6 x SATA III connector
VGA	1 x VGA
LAN	2 ports, support Wake-on-LAN <ul style="list-style-type: none"> ▪ Intel® I217-LM/V, compatible with Intel® 82579 ▪ Intel® I210-AT
Audio	<ul style="list-style-type: none"> ▪ High Definition audio codec: Realtek ALC888S-VD2-GR ▪ Line-in/Line/out/MIC audio jack

Keyboard/Mouse	1 x PS/2
Expansion Bus	<ul style="list-style-type: none">▪ 2 x PCIe (8x) 3.0▪ 4 x PCIe (1x) 2.0▪ 1 x Mini-PCIe (without mSATA)

Display

Graphics	Built-in processor to share the system memory. <ul style="list-style-type: none">▪ 1 x CRT▪ 3 x Display connectors (Protech standard DP/eDP connectors)
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*Discrete graphic card is necessary for display if the chosen CPU doesn't support integrated graphics.

Environment

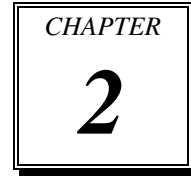
Operation Temp.	0 ~ 60°C (32 ~ 140°F)
Storage Temp.	-40 ~ 85°C (-40 ~ 185°F)
Humidity	Operation: 5~90% (non-condensing)

1-3. SAFETY PRECAUTIONS

Follow the messages below to avoid your systems from damage:

1. Keep your system away from static electricity on all occasions.
2. Prevent electric shock. Don't touch any components of this card when the card is power-on. Always disconnect power when the system is not in use.
3. Disconnect power when you change any hardware devices.
For instance, when you connect a jumper or install any cards, a surge of power may damage the electronic components or the whole system.

HARDWARE CONFIGURATION



***** QUICK START *****

Helpful information describes the jumper & connector settings, and component locations.

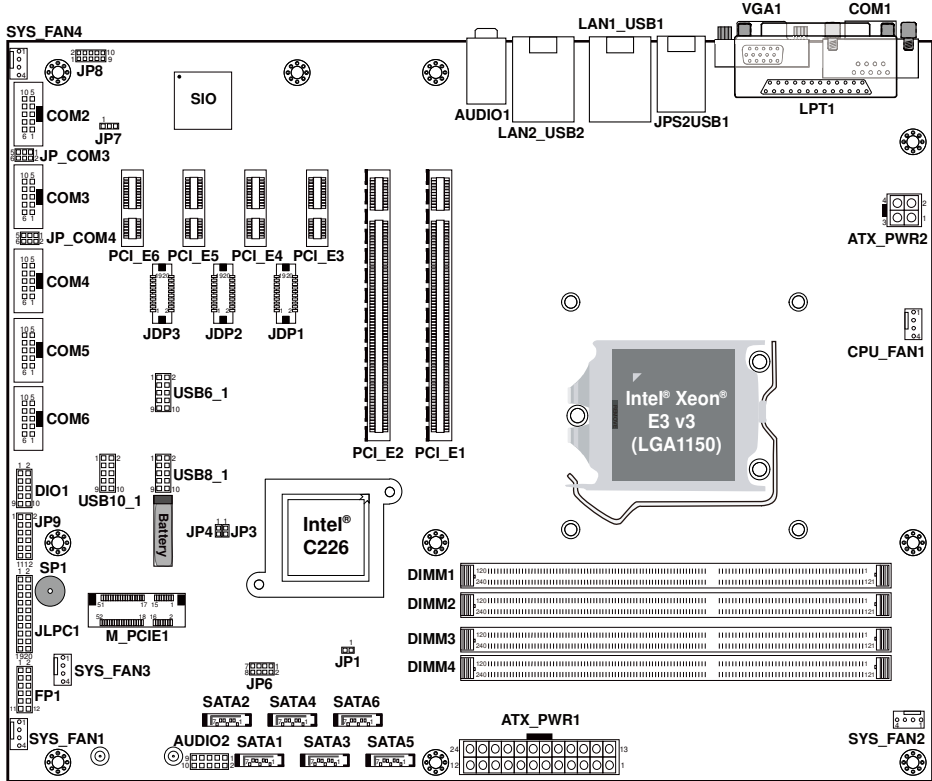
Sections included:

- Jumper & Connector Quick Reference Table
- Component Locations
- Configuration and Jumper settings
- Connector's Pin Assignments

2-1. JUMPER & CONNECTOR QUICK REFERENCE TABLE

JUMPER/CONNECTOR	NAME
COM Port & Connector	COM1, COM2, COM3, COM4, COM5, COM6
COM Port RI & Voltage Selection	JP_COM3, JP_COM4
RS-232/422/485 (COM2) Selection	JP8
COM2 Auto Detect Selection	JP7
BIOS Recovery Mode Selection	JP1
Clear CMOS Data Selection	JP4
VGA Port	VGA1
Mini-DIN & USB Port	JP2USB1
LAN & USB Port	LAN1_USB1, LAN2_USB1
USB Connector	USB6_1, USB8_1, USB10_1
TPM Connector	JLPC1
Front Panel Connector & Selection	FP1
ATX Power Connector	ATX_PWR1, ATX_PWR2
SATA Connector	SATA1, SATA2, SATA3, SATA4, SATA5, SATA6,
CPU Fan Connector	CPU_FAN1
System Fan Connector	SYS_FAN1, SYS_FAN2, SYS_FAN3, SYS_FAN4
Printer Port	LPT1
Display Port Connector	JDP1, JDP2, JDP3
Digital Input/Output Connector	DIO1
Audio Port & Connector	AUDIO1, AUDIO2

2-2. COMPONENT LOCATIONS



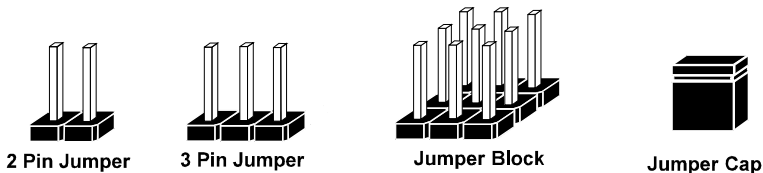
BA-0951 Front Connector, Jumper and Component locations

2-3. HOW TO SET THE JUMPERS

You can configure your board by setting jumpers. Jumper is consists of two or three metal pins with a plastic base mounted on the card, and by using a small plastic "cap", Also known as the jumper cap (with a metal contact inside), you are able to connect the pins. So you can set-up your hardware configuration by "open" or "close" pins.

The jumper can be combined into sets that called jumper blocks. When the jumpers are all in the block, you have to put them together to set up the hardware configuration. The figure below shows how this looks like.

JUMPERS AND CAPS

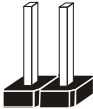


If a jumper has three pins (for examples, labelled PIN1, PIN2, and PIN3), You can connect PIN1 & PIN2 to create one setting by shorting. You can either connect PIN2 & PIN3 to create another setting. The same jumper diagrams are applied all through this manual. The figure below shows what the manual diagrams look and what they represent.

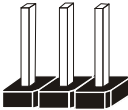
JUMPER DIAGRAMS



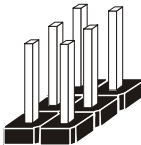
Jumper Cap
looks like this



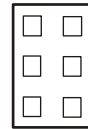
2 pin Jumper
looks like this



3 pin Jumper
looks like this



Jumper Block
looks like this



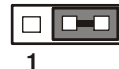
JUMPER SETTINGS



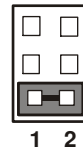
2 pin Jumper close(enabled)
Looks like this



3 pin Jumper
2-3 pin close(enabled)
Looks like this



Jumper Block
1-2 pin close(enabled)
Looks like this

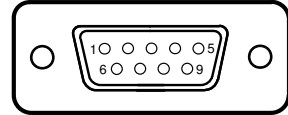


2-4. COM PORT & CONNECTOR

COM1: COM1 Port, fixed as RS-232

The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	COM1_DCD#	6	COM1_DSR#
2	COM1_RX	7	COM1_RTS#
3	COM1_TX	8	COM1_CTS#
4	COM1_DTR#	9	COM1_RI#
5	GND		

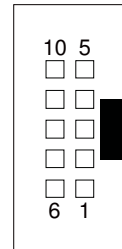


COM1

COM2: COM2 Connector, selectable as RS-232/422/485

The pin assignments are as follows:

PIN	ASSIGNMENT		
	RS-232	RS-422	RS-485
1	COM2_DCD#	TX-	485-
2	COM2_RX	TX+	485+
3	COM2_TX	RX+	X
4	COM2_DTR#	RX-	X
5	GND	GND	GND
6	COM2_DSR#	X	X
7	COM2_RTS#	X	X
8	COM2_CTS#	X	X
9	COM2_RI#	X	X
10	NC	NC	NC

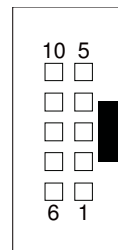


COM2

COM3: COM3 Connector, fixed as RS-232

The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	COM3_DCD#	6	COM3_DSR#
2	COM3_RX	7	COM3_RTS#
3	COM3_TX	8	COM3_CTS#
4	COM3_DTR#	9	COM3_RI#
5	GND	10	NC



**COM3/
COM4/
COM5**

COM4: COM4 Connector, fixed as RS-232

The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	COM4_DCD#	6	COM4_DSR#
2	COM4_RX	7	COM4_RTS#
3	COM4_TX	8	COM4_CTS#
4	COM4_DTR#	9	COM4_RI#
5	GND	10	NC

COM5: COM5 Connector, fixed as RS-232

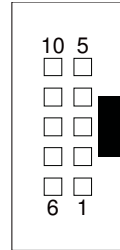
The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	COM5_DCD#	6	COM5_DSR#
2	COM5_RX	7	COM5_RTS#
3	COM5_TX	8	COM5_CTS#
4	COM5_DTR#	9	COM5_RI#
5	GND	10	NC

COM6: COM6 Connector, fixed as RS-232

The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	COM6_DCD#	6	COM6_DSR#
2	COM6_RX	7	COM6_RTS#
3	COM6_TX	8	COM6_CTS#
4	COM6_DTR#	9	COM6_RI#
5	GND	10	NC



COM6

2-5. COM PORT RI & VOLTAGE SELECTION

JP_COM3 & JP_COM4: COM3 & COM4 Port RI & Voltage Selection

The pin assignments are as follows:


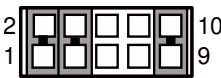

SELECTION	JUMPTER SETTING	JUMPER ILLUSTRATION
RI	1-2	<p>JP_COM3/ JP_COM4</p>
12V	3-4	<p>JP_COM3/ JP_COM4</p>
5V	5-6	<p>JP_COM3/ JP_COM4</p>

Note: Manufacturing default is RI.

2-6. RS-232/422/485 (COM2) SELECTION

JP8: RS-232/422/485 (COM2) Selection Connector, used to set COM2 function.

The jumper settings are as follows:

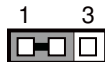

SELECTION	JUMPER SETTINGS	JUMPER ILLUSTRATION
RS-232	All Open	 <p style="text-align: center;">JP8</p>
RS-422	1-2, 3-4, 9-10	 <p style="text-align: center;">JP8</p>
RS-485	1-2, 5-6, 7-8	 <p style="text-align: center;">JP8</p>

Note: Manufacturing default is RS-232.

2-7. COM2 AUTO DETECT SELECTION

JP7: COM2 Auto Detect Selection

The jumper settings are as follows:



SELECTION	JUMPER SETTINGS	JUMPER ILLUSTRATION
Normal	1-2	 <p style="text-align: center;">JP7</p>
Auto Gating	2-3	 <p style="text-align: center;">JP7</p>

Note: Manufacturing default is Normal.

2-8. BIOS RECOVERY MODE SELECTION

JP1: BIOS Recovery Mode Selection

The selections are as follows:



SELECTION	JUMPER SETTINGS	JUMPER ILLUSTRATION
Normal	Close	 JP1
Recovery	Open	 JP1

Note: Manufacturing Default is Normal.

2-9. CLEAR CMOS DATA SELECTION

JP4: Clear CMOS Data Selection

The selections are as follows:

SELECTION	JUMPER SETTINGS	JUMPER ILLUSTRATION
Normal	Open	 JP4
Clear CMOS*	Close	 JP4

Note: Manufacturing Default is Normal.

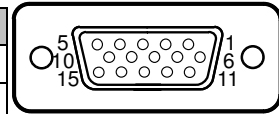
*To clear CMOS data, user must power-off the computer and set the jumper to “Clear CMOS” as illustrated above. After five to six seconds, set the jumper back to “Normal” and power-on the computer.

2-10. VGA PORT

VGA1: VGA Port

The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	CRTRED	9	CRTVCC_L
2	CRTGREEN	10	GND
3	CRTBLUE	11	NC
4	NC	12	CRTDATA
5	GND	13	HSYNC
6	CRT_ALWAYS_ON	14	VSYNC
7	GND	15	CRTCLK
8	GND		



VGA1

2-11. MINI-DIN & USB PORT

JPS2USB1: Mini-DIN & Two USB2.0 Ports

Mini-DIN port supports keyboard, Y-cable and PS/2 mouse.

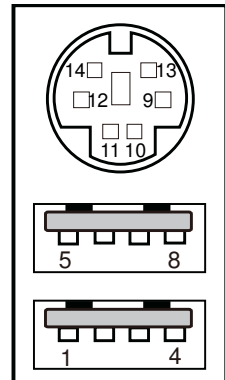
The pin assignments are as follows:

Mini-DIN Port:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
9	GND	12	5VDUAL
10	KDAT	13	KCLK
11	MDAT	14	MCLK

USB Ports:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	GND	5	GND
2	USB3+	6	USB2+
3	USB3-	7	USB2-
4	VCC5	8	VCC5



JPS2USB1

2-12. LAN & USB PORT

LAN1_USB1: LAN & Two USB3.0 Ports

The pin assignments are as follows:

LAN1 signal:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	LAN1_MDI0_DP	5	LAN1_MDI2_DP
2	LAN1_MDI0_DN	6	LAN1_MDI2_DN
3	LAN1_MDI1_DP	7	LAN1_MDI3_DP
4	LAN1_MDI1_DN	8	LAN1_MDI3_DN

LAN LED Indicator:

Left Side LED

Red Color On	Giga LAN Speed Indicator
Off	No LAN switch/hub connected.

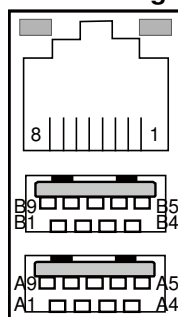
Right Side LED

Orange Color Blinking	LAN Message Active
Off	No LAN Message Active

USB signal:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
A1	VCCUSB1	B1	VCCUSB1
A2	USB_N0	B2	USB_N1
A3	USB_P0	B3	USB_P1
A4	GND	B4	GND
A5	USB3_RX1_DN	B5	USB3_RX2_DN
A6	USB3_RX1_DP	B6	USB3_RX2_DP
A7	GND	B7	GND
A8	USB3_TX1_DN	B8	USB3_TX2_DN
A9	USB3_TX1_DP	B9	USB3_TX2_DP

Red Orange



LAN1_USB1

LAN2_USB2: LAN & Two USB3.0 Ports

The pin assignments are as follows:

LAN2 signal:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	LAN2_MDI0_DP	5	LAN2_MDI2_DP
2	LAN2_MDI0_DN	6	LAN2_MDI2_DN
3	LAN2_MDI1_DP	7	LAN2_MDI3_DP
4	LAN2_MDI1_DN	8	LAN2_MDI3_DN

LAN LED Indicator:

Left Side LED

Red Color On	Giga LAN Speed Indicator
Off	No LAN switch/hub connected.

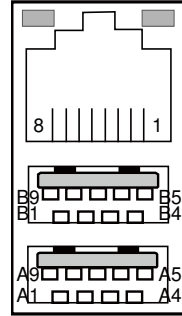
Right Side LED

Orange Color Blinking	LAN Message Active
Off	No LAN Message Active

USB signal:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
A1	VCCUSB1	B1	VCCUSB1
A2	USB_N4	B2	USB_N5
A3	USB_P4	B3	USB_P5
A4	GND	B4	GND
A5	USB3_RX5_DN	B5	USB3_RX6_DN
A6	USB3_RX5_DP	B6	USB3_RX6_DP
A7	GND	B7	GND
A8	USB3_TX5_DN	B8	USB3_TX6_DN
A9	USB3_TX5_DP	B9	USB3_TX6_DP

Red Orange



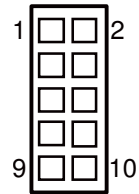
LAN2_USB2

2-13. USB CONNECTOR

USB6_1: Universal Serial Bus Connector

The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	USB_67_VCC5	6	USB_P7
2	USB_67_VCC5	7	GND
3	USB_N6	8	GND
4	USB_N7	9	NC
5	USB_P6	10	GND



USB6_1/

USB8_1/

USB10_1

USB8_1: Universal Serial Bus Connector

The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	USB_89_VCC5	6	USB_P9
2	USB_89_VCC5	7	GND
3	USB_N8	8	GND
4	USB_N9	9	NC
5	USB_P8	10	GND

USB10_1: Universal Serial Bus Connector

The pin assignments are as follows:

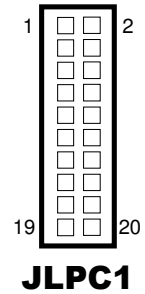
PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	USB_1011_VCC5	6	USB_P11
2	USB_1011_VCC5	7	GND
3	USB_N10	8	GND
4	USB_N11	9	NC
5	USB_P10	10	GND

2-14. TPM CONNECTOR

JLPC1: TPM Connector

The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	CLK	11	LAD0
2	GND	12	GND
3	FRAME	13	SMBCLK
4	NC	14	SMBDATA
5	RESET	15	3VSB
6	VCC5	16	SERIRQ
7	LAD3	17	GND
8	LAD2	18	CLK RUN
9	VCC3	19	SUS_TAT
10	LAD1	20	DREQ0

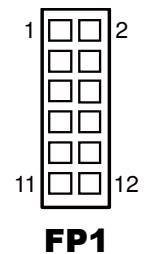


2-15. FRONT PANEL CONNECTOR & SELECTION

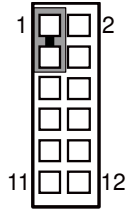
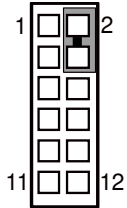
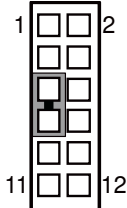
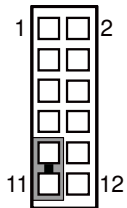
FP1: Front Panel Connector

The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	HDD_LED+	7	RST_BTN
2	PWR_LED+	8	SPEAKER SIGNAL
3	HDD_LED-	9	GND
4	PWR_LED-	10	SPEAKER SIGNAL
5	GND	11	PWRBTNSW
6	SPK_VCC	12	SPEAKER SIGNAL



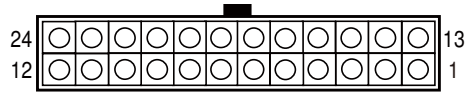
Front Panel selections are as follows:

SELECTION	JUMPER SETTINGS	JUMPER ILLUSTRATION
HDD LED	1-3	 <p>FP1</p>
Power LED	2-4	 <p>FP1</p>
Reset Button	5-7	 <p>FP1</p>
ATX Power Button	9-11	 <p>FP1</p>

2-16. ATX POWER CONNECTOR

ATX_PWR1: ATX Power Connector

The pin assignments are as follows:



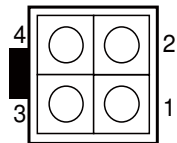
ATX_PWR1

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	+3.3V	13	+3.3V
2	+3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PSON
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	PWROK	20	-5V
9	5VSB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	+3.3V	24	GND

ATX_PWR2: ATX Power Connector

The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	GND	3	12V
2	GND	4	12V



ATX_PWR2

2-17. SATA CONNECTOR

SATA1~SATA6: Six Serial ATA Connectors

The pin assignments are as follows:

SATA1:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	GND	5	SATA_RXN_0_C
2	SATA_TXP_0_C	6	SATA_RXP_0_C
3	SATA_TXN_0_C	7	GND
4	GND		



**SATA1/
SATA2/
SATA3/
SATA4**

SATA2:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	GND	5	SATA_RXN_1_C
2	SATA_TXP_1_C	6	SATA_RXP_1_C
3	SATA_TXN_1_C	7	GND
4	GND		

SATA3:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	GND	5	SATA_RXN_2_C
2	SATA_TXP_2_C	6	SATA_RXP_2_C
3	SATA_TXN_2_C	7	GND
4	GND		

SATA4:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	GND	5	SATA_RXN_3_C
2	SATA_TXP_3_C	6	SATA_RXP_3_C
3	SATA_TXN_3_C	7	GND
4	GND		

SATA5:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	GND	5	SATA_RXN_4_C
2	SATA_TXP_4_C	6	SATA_RXP_4_C
3	SATA_TXN_4_C	7	GND
4	GND		



**SATA5/
SATA6**

SATA6:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	GND	5	SATA_RXN_5_C
2	SATA_TXP_5_C	6	SATA_RXP_5_C
3	SATA_TXN_5_C	7	GND
4	GND		

2-18. CPU FAN CONNECTOR

CPU_FAN1: CPU Fan Connector

The pin assignments are as follows:

PIN	ASSIGNMENT
1	GND
2	VCC12
3	FAN_TAC1
4	FAN_CTL1



CPU_FAN1

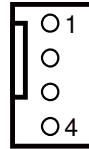
2-19. SYSTEM FAN CONNECTOR

SYS_FAN1~SYS_FAN4: System Fan Connectors

The pin assignments are as follows:

SYS_FAN1:

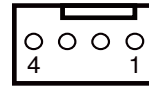
PIN	ASSIGNMENT
1	GND
2	VCC12
3	SYS_FAN_IN
4	SYS_FAN_CTL



**SYS_FAN1/
SYS_FAN3/
SYS_FAN4**

SYS_FAN2:

PIN	ASSIGNMENT
1	GND
2	VCC12
3	FAN_IN1
4	FAN_CTL1



SYS_FAN2

SYS_FAN3:

PIN	ASSIGNMENT
1	GND
2	VCC12
3	FAN_IN2
4	FAN_CTL2

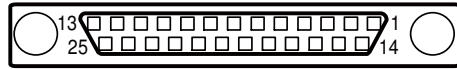
SYS_FAN4:

PIN	ASSIGNMENT
1	GND
2	VCC12
3	FAN_IN3
4	FAN_CTL3

2-20. PRINTER PORT

LPT1: Printer Port

The pin assignments are as follows:



LPT1

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	STB	14	AFD#
2	PDR0	15	ERR#
3	PDR1	16	INIT#
4	PDR2	17	SLIN#
5	PDR3	18	GND
6	PDR4	19	GND
7	PDR5	20	GND
8	PDR6	21	GND
9	PDR7	22	GND
10	ACK#	23	GND
11	BUSY	24	GND
12	PE	25	GND
13	SLCT		

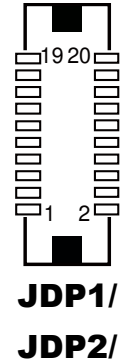
2-21. DISPLAY PORT CONNECTOR

JDP1, JDP2 & JDP3: Display Port Connectors

The pin assignments are as follows:

JDP1:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	DP_B_DATA0+	11	GND
2	GND	12	DP_B_DATA3-
3	DP_B_DATA0-	13	DP_B_AUX_ENJ
4	DP_B_DATA1+	14	GND
5	GND	15	DP_B_AUX+
6	DP_B_DATA1-	16	DP_B_HPD
7	DP_B_DATA2+	17	DP_B_AUX-
8	GND	18	DP_VCC3_3
9	DP_B_DATA2-	19	DP_VCC5
10	DP_B_DATA3+	20	DP_VCC3_3

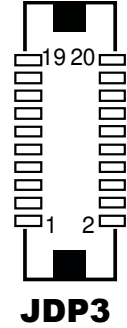


JDP2:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	DP_C_DATA0+	11	GND
2	GND	12	DP_C_DATA3-
3	DP_C_DATA0-	13	DP_C_AUX_ENJ
4	DP_C_DATA1+	14	GND
5	GND	15	DP_C_AUX+
6	DP_C_DATA1-	16	DP_C_HPD
7	DP_C_DATA2+	17	DP_C_AUX-
8	GND	18	DP_VCC3_3
9	DP_C_DATA2-	19	DP_VCC5
10	DP_C_DATA3+	20	DP_VCC3_3

JDP3:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	DP_D_DATA0+	11	GND
2	GND	12	DP_D_DATA3-
3	DP_D_DATA0-	13	DP_D_AUX_ENJ
4	DP_D_DATA1+	14	GND
5	GND	15	DP_D_AUX+
6	DP_D_DATA1-	16	DP_D_HPD
7	DP_D_DATA2+	17	DP_D_AUX-
8	GND	18	DP_VCC3_3
9	DP_D_DATA2-	19	DP_VCC5
10	DP_D_DATA3+	20	DP_VCC3_3

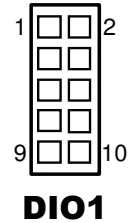


2-22. DIGITAL INPUT/OUTPUT CONNECTOR

DIO1: Digital I/O Connectors

The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	VCC5	6	DOUT_H1
2	GND	7	DIN_H2
3	DIN_H0	8	DOUT_H2
4	DOUT_H0	9	DIN_H3
5	DIN_H1	10	DOUT_H3



2-23. AUDIO PORT & CONNECTOR

AUDIO1: AUDIO Ports, including Line-In, Line-Out & Microphone

The connector can support only MIC Connector.

The pin assignments are as follows:

Line-In:

PIN	ASSIGNMENT
32	HD_LINE-IN-L
33	GND
34	GND
35	HD_LINE-IN-R

Line-Out:

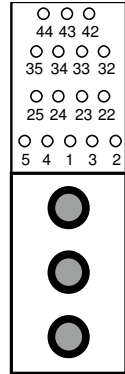
PIN	ASSIGNMENT
22	LINE-OUT-L
23	GND
24	GND
25	LINE-OUT-R

Mic-In:

PIN	ASSIGNMENT
1	GND
2	HD_MIC1-L
3	GND
4	GND
5	HD_MIC1-R

SPDIF (Optionally used with the same port as Line-In):

PIN	ASSIGNMENT
42	GND
43	VCC_AUD
44	SPDIF OUT

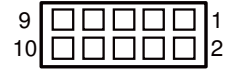


AUDIO1

AUDIO2: AUDIO Ports, including Line-In, Line-Out & Microphone

The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	HD_MIC1-L	6	HD_LINE-IN-R
2	HD_MIC1-R	7	GND
3	GND	8	GND
4	GND	9	LINE-OUT-L
5	HD_LINE-IN-L	10	LINE-OUT-R



AUDIO2

SOFTWARE UTILITIES

<i>CHAPTER</i>
3

This chapter comprises the detailed information of VGA driver, LAN driver, and Sound driver.

Sections included:

- Introduction.
- Intel® Chipset Software Installation Utility
- Intel® Rapid Storage Technology Utility
- Intel® USB3.0 eXtensible Host Controller Utility
- Intel® Management Engine Components Utility
- VGA Driver Utility
- LAN Driver Utility
- Sound Driver Utility

3-1. INTRODUCTION

Enclosed with our BA-0951 package are our driver utilities, which come in a format of CD ROM or floppy disk. Refer to the following table for driver locations:

FILENAME (Assume that CD ROM drive is D:)	PURPOSE
<ul style="list-style-type: none"> ▪ D:\DRIVER\Platform\Win7(32-bit)\UTILITY ▪ D:\DRIVER\Platform\Win7(64-bit)\UTILITY ▪ D:\DRIVER\Platform\Win8(32-bit)\UTILITY ▪ D:\DRIVER\Platform\Win8(64-bit)\UTILITY ▪ D:\DRIVER\Platform\Server2008R2(64-bit)\UTILITY 	Intel® chipset device software installation utility
<ul style="list-style-type: none"> ▪ D:\DRIVER\Platform\Win7(32-bit)\Intel RST ▪ D:\DRIVER\Platform\Win7(64-bit)\Intel RST ▪ D:\DRIVER\Platform\Win8(32-bit)\Intel RST ▪ D:\DRIVER\Platform\Win8(64-bit)\Intel RST ▪ D:\DRIVER\Platform\Server2008R2(64-bit)\Intel RST 	Intel® Rapid Storage Technology (RAID) driver installation
<ul style="list-style-type: none"> ▪ D:\DRIVER\Platform\Win7(32-bit)\USB3 ▪ D:\DRIVER\Platform\Win7(64-bit)\USB3 ▪ D:\DRIVER\Platform\Server2008R2(64-bit)\USB3 	Intel® USB3.0 eXtensible host controller
<ul style="list-style-type: none"> ▪ D:\DRIVER\Platform\Win7(32-bit)\ME ▪ D:\DRIVER\Platform\Win7(64-bit)\ME ▪ D:\DRIVER\Platform\Win8(32-bit)\ME ▪ D:\DRIVER\Platform\Win8(64-bit)\ME ▪ D:\DRIVER\Platform\Server2008R2(64-bit)\ME 	Intel® Management Engine Interface
<ul style="list-style-type: none"> ▪ D:\DRIVER\Platform\Win7(32-bit)\VGA ▪ D:\DRIVER\Platform\Win7(64-bit)\VGA ▪ D:\DRIVER\Platform\Win8(32-bit)\VGA ▪ D:\DRIVER\Platform\Win8(64-bit)\VGA ▪ D:\DRIVER\Platform\Server2008R2(64-bit)\VGA 	Intel® HD Graphics Family for VGA driver installation
<ul style="list-style-type: none"> ▪ D:\DRIVER\Platform\Win7(32-bit)\LAN ▪ D:\DRIVER\Platform\Win7(64-bit)\LAN ▪ D:\DRIVER\Platform\Win8(32-bit)\LAN ▪ D:\DRIVER\Platform\Win8(64-bit)\LAN ▪ D:\DRIVER\Platform\Server2008R2(64-bit)\LAN 	Intel® I217-LM/V & I210-AT for LAN driver installation

FILENAME (Assume that CD ROM drive is D:)	PURPOSE
<ul style="list-style-type: none"> ▪ D:\DRIVER\Platform\Win7(32-bit)\SOUND ▪ D:\DRIVER\Platform\Win7(64-bit)\SOUND ▪ D:\DRIVER\Platform\Win8(32-bit)\SOUND ▪ D:\DRIVER\Platform\Win8(64-bit)\SOUND ▪ D:\DRIVER\Platform\Server2008R2(64-bit)\SOUND 	Realtek ALC888S for sound driver installation
<ul style="list-style-type: none"> ▪ D:\DRIVER\Platform\Win7(32-bit)\F6Floppy ▪ D:\DRIVER\Platform\Win7(64-bit)\F6Floppy ▪ D:\DRIVER\Platform\Win8(32-bit)\F6Floppy ▪ D:\DRIVER\Platform\Win8(64-bit)\F6Floppy ▪ D:\DRIVER\Platform\ Server2008R2(64-bit)\F6Floppy 	Intel® F6 Floppy utility
D:\DRIVER\FIash BIOS	Aptio (EFI) BIOS update utility

Note: Be sure to install the Utility right after the OS fully installed.

3-2. INTEL® CHIPSET SOFTWARE INSTALLATION UTILITY

3-2-1. Introduction

The Intel® Chipset Device Software installs Windows INF files to the target system. These files outline to the operating system how to configure the Intel® chipset components in order to ensure that the following features function properly:

- Core PCI and ISAPNP Services
- PCIe Support
- IDE/ATA33/ATA66/ATA100 Storage Support
- SATA Storage Support
- USB Support
- Identification of Intel® Chipset Components in the Device Manager

3-2-2. Installation of Utility for Windows /7/8/Server 2008 R2

The Utility Pack is to be installed only for Windows 7/8/Server 2008 R2 series, and it should be installed right after the OS installation. Please follow the steps below:

1. Insert the driver disk into a CD ROM device.
2. Under Windows system, go to the directory where the Utility driver is located.
3. Run the application with administrative privileges.

3-3. INTEL® RAPID STORAGE TECHNOLOGY UTILITY

3-3-1. Introduction

The Intel® RST driver utility supports RAID 0, 1, 5 and 10 and fully compatible with Windows 7/8/Server 2008 R2, and it should be installed after the operating system is installed completely. Perform F6 and RAID BIOS configurations prior to installation of this driver for proper operation.

3-3-2. Installation of RST Driver for Windows 7/8/Server 2008 R2

1. Insert the driver disk into a CD ROM device.
2. Under Windows system, go to the directory where the RST driver is located.
3. Run the application with administrative privileges.

3-4. INTEL® USB3.0 EXTENSIBLE HOST CONTROLLER UTILITY

3-4-1. Introduction

Intel® USB 3.0 eXtensible Host Controller Driver supports the following Intel® Chipsets/Processors:

- 4th Generation Intel® Core™ Processor Family
- Intel® 8 Series/C220 Series Chipset Family
- 4th Generation U-Series Platform I/O

3-4-2. Installation Instructions for Windows 7/Server 2008 R2

1. Insert the driver disk into a CD ROM device.
2. Under Windows system, go to the directory where the driver is located.
3. Run the application with administrative privileges.

3-5. INTEL® MANAGEMENT ENGINE COMPONENTS UTILITY

3-5-1. Introduction

The Intel® ME software components that need to be installed depend on the system's specific hardware and firmware features. The installer, compatible with Windows 7/8/Server 2008 R2, detects the system's capabilities and installs the relevant drivers and applications.

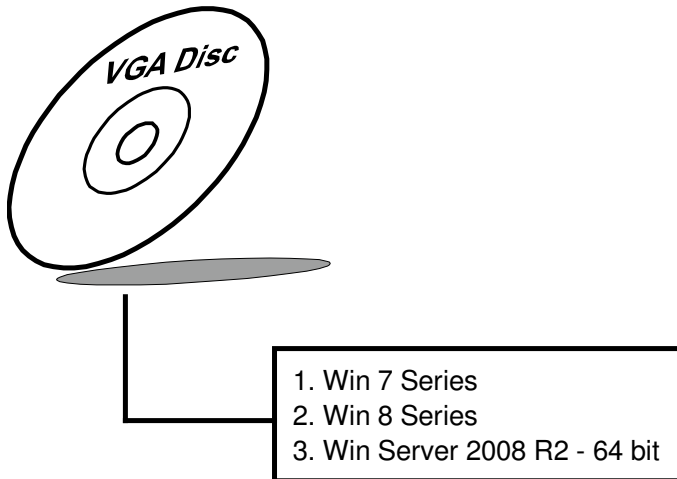
3-5-2. Installation Instructions for Windows 7/8/Server 2008 R2

1. Insert the driver disk into a CD ROM device.
2. Under Windows system, go to the directory where the driver is located.
3. Run the application with administrative privileges.

3-6. VGA DRIVER UTILITY

3-6-1. Introduction

The VGA interface embedded with our BA-0951 can support a wide range of display. You can display CRT simultaneously with the same mode.



3-6-2. Installation of VGA Driver

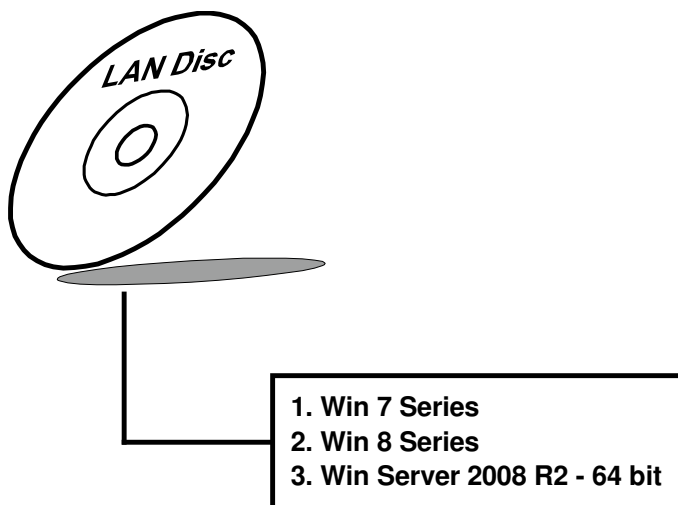
To install the VGA Driver, simply follow the following steps:

1. Insert the driver disk into a CD ROM device.
2. Under Windows system, go to the directory where the VGA driver is located.
3. Run the application with administrative privileges..

3-7. LAN DRIVER UTILITY

3-7-1. Introduction

BA-0951 is enhanced with LAN function that can support various network adapters. Installation programs for LAN drivers are listed as follows:

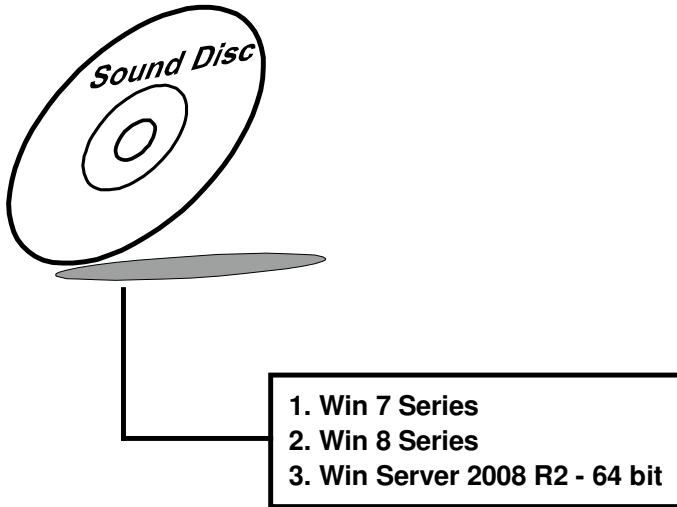


For more details on Installation procedure, please refer to Readme.txt file found on LAN Driver Utility.

3-8. SOUND DRIVER UTILITY

3-8-1. Introduction

The Realtek sound function enhanced in this system is fully compatible with Windows 7/8/Server 2008 R2. Below, you will find the content of the Sound driver:



3-8-2. Installation of Sound Driver

1. Insert the driver disk into a CD ROM device.
2. Under Windows system, go to the directory where the Sound driver is located.
3. Run the application with administrative privileges..
4. Follow the instructions on the screen to complete the installation.
5. Once the installation is completed, shut down the system and restart in order for the changes to take effect.

BIOS SETUP

This chapter shows how to set up the BIOS.

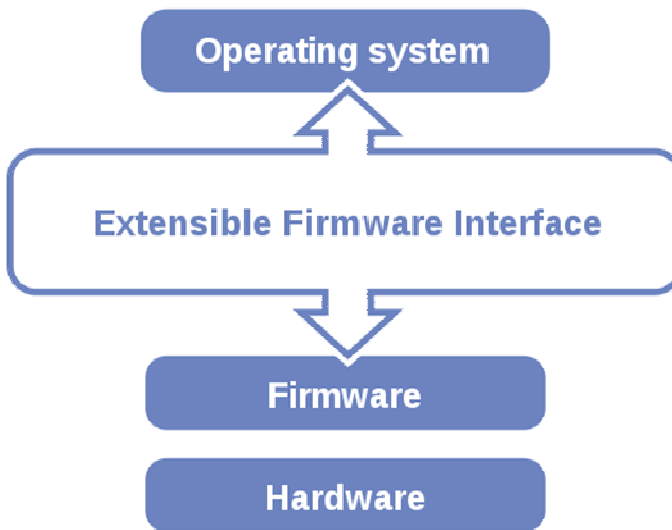
Sections included:

- Introduction
- Entering Setup
- Main
- Advanced
- Chipset
- Boot
- Security
- Save & Exit

4-1. INTRODUCTION

The board BA-0951 uses an AMI Aptio BIOS that is stored in the Serial Peripheral Interface Flash Memory (SPI Flash) and can be updated. The SPI Flash contains the BIOS Setup program, Power-on Self-Test (POST), the PCI auto-configuration utility, LAN EEPROM information, and Plug and Play support.

Aptio is AMI's BIOS firmware based on the UEFI (Unified Extensible Firmware Interface) Specifications and the Intel Platform Innovation Framework for EFI. The UEFI specification defines an interface between an operating system and platform firmware. The interface consists of data tables that contain platform-related information, boot service calls, and runtime service calls that are available to the operating system and its loader. These provide standard environment for booting an operating system and running pre-boot applications. Following illustration shows Extensible Firmware Interface's position in the software stack.



EFI BIOS provides an user interface allow users the ability to modify hardware configuration, e.g. change system date and time, enable or disable a system component, decide bootable device priorities, setup personal password, etc., which is convenient for modifications and customization of the computer system and allows technicians another method for finding solutions if hardware has any problems.

The BIOS Setup program can be used to view and change the BIOS settings for the computer. The BIOS Setup program is accessed by pressing the or <ESC> key after the POST memory test begins and before the operating system boot begins. The settings are shown below.

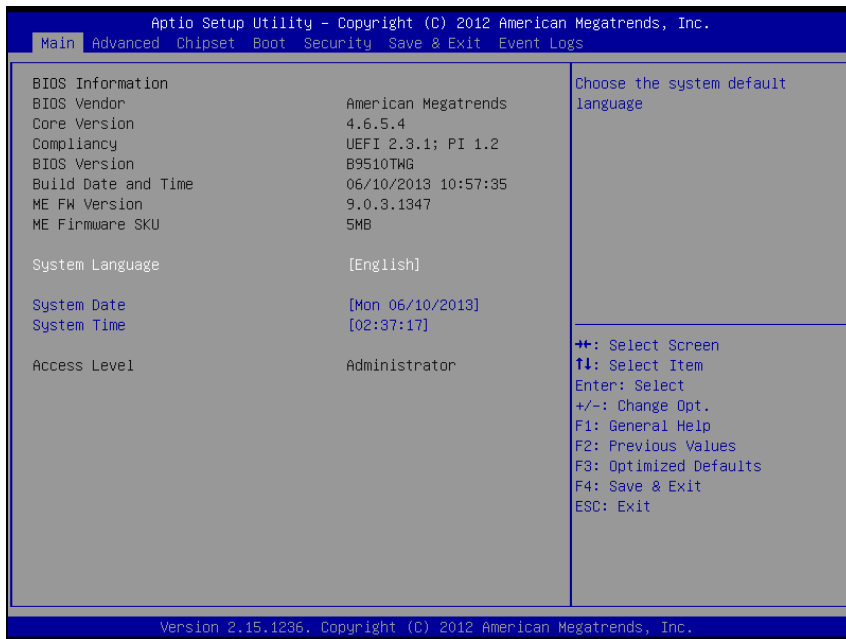
4-2. ENTERING SETUP

When the system is powered on, the BIOS will enter the Power-On Self Test (POST) routines and the following message will appear on the lower screen:



POST screen

As long as this message is present on the screen you may press the key (the one that shares the decimal point at the bottom of the number keypad) to access the Setup program. In a moment, the main menu of the Aptio Setup Utility will appear on the screen:

**BIOS setup program initial screen**

You may move the cursor by up/down keys to highlight the individual menu items. As you highlight each item, a brief description of the highlighted selection will appear at the bottom of the screen.

4-3. MAIN

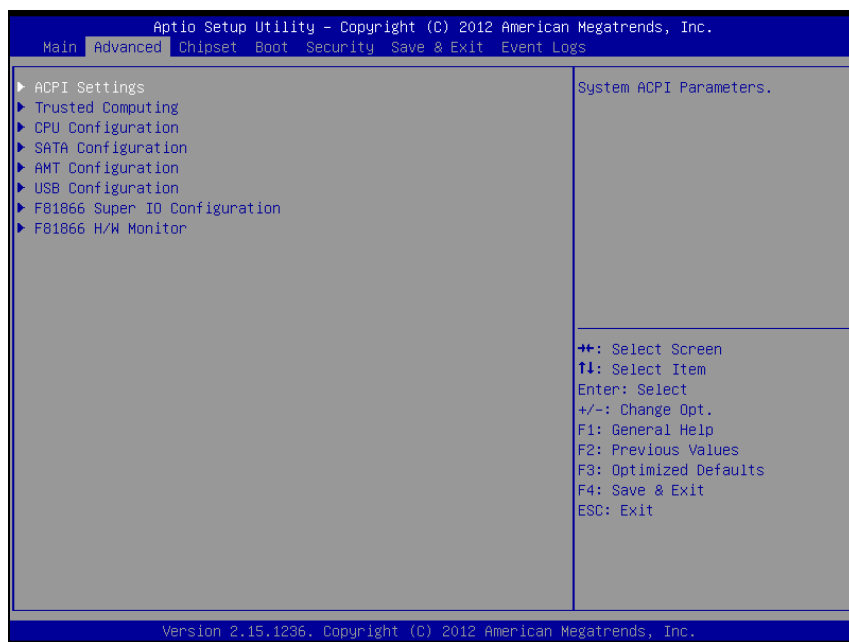


Main screen

BIOS Setting	Options	Description/Purpose
BIOS Vendor	No changeable options	Displays the BIOS vendor.
Core Version	No changeable options	Displays the current BIOS core version.
Compliance	No changeable options	Displays the current UEFI version.
BIOS Version	No changeable options	Displays the version of the BIOS currently installed on the platform.
Build Date and Time	No changeable options	Displays the date of current BIOS version.
ME FW Version	No changeable options	Displays the current ME version.
ME Firmware SKU	No changeable options	Displays the current ME SKU.

BIOS Setting	Options	Description/Purpose
System Date	Month, day, year	Specifies the current date.
System Time	Hour, minute, second	Specifies the current time.
Access Level	No changeable options	Displays the current user level.

4-4. ADVANCED



Advanced screen

BIOS Setting	Options	Description/Purpose
ACPI Settings	Sub-Menu	System ACPI Parameters.
Trusted Computing	Sub-Menu	Trusted Computing settings.
CPU Configuration	Sub-Menu	CPU Configuration. Parameters.
SATA Configuration	Sub-Menu	SATA Configuration Parameters.
AMT Configuration	Sub-Menu	Configure Active Management Technology parameters.
USB Configuration	Sub-Menu	USB Configuration Parameters.
F81866 Super IO Configuration	Sub-Menu	Super IO Configuration Parameters.
F81866 H/W Monitor	Sub-Menu	Monitor hardware status.

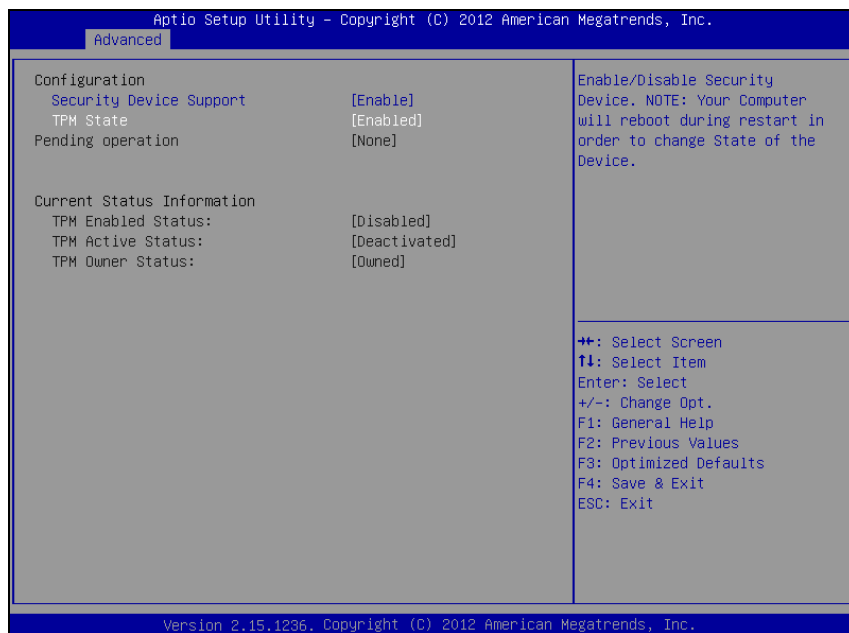
4-4-1. ACPI Settings



ACPI settings screen

BIOS Setting	Options	Description/Purpose
Enable Hibernation	- Disabled - Enabled	Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS.
ACPI Sleep State	- Suspend Disabled - S3 only (Suspend to RAM)	Specifies the ACPI sleep state. <ul style="list-style-type: none"> ▪ Suspend Disabled disables ACPI sleep feature. ▪ S3 mode allows the platform to enter Suspend to RAM mode.

4-4-2. Trusted Computing

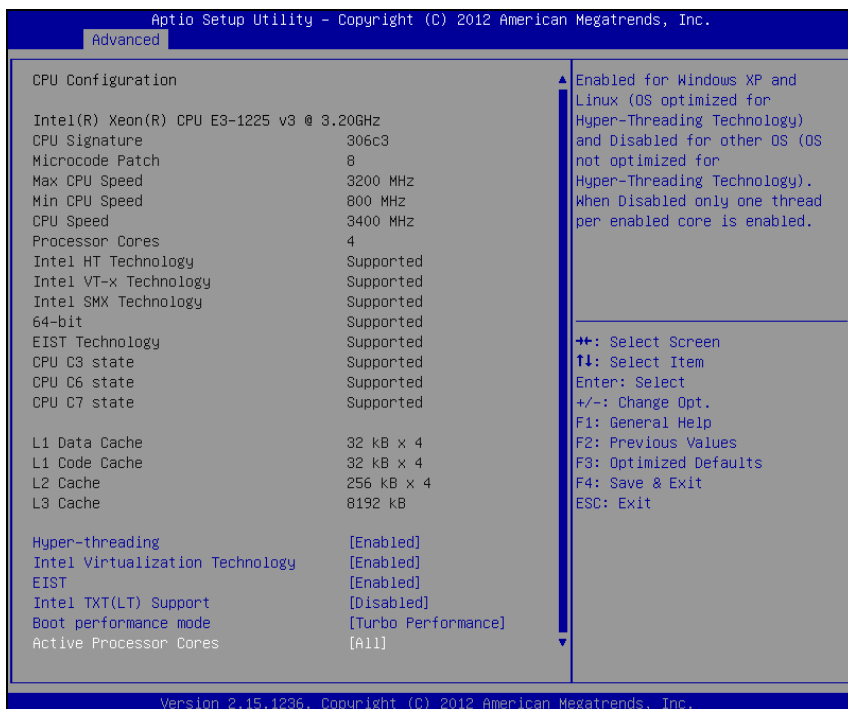


Trusted Computing screen

BIOS Setting	Options	Description/Purpose
Security Device Support	- Disable - Enable	Allows to active support for Trusted Platform Module.
TPM State	- Disabled - Enabled	Allows enabling TPM.
Pending TPM Operation	- None - Enable Take Ownership - Disable Take Ownership - TPM Clear	Schedule an operation for the security device.
TPM Enabled Status	No changeable options	Reports if TPM is enabled.

BIOS Setting	Options	Description/Purpose
TPM Active Status	No changeable options	Reports the current TPM active status.
TPM Owner Status	No changeable options	Reports the current TPM ownership status.

4-4-3. CPU Configuration



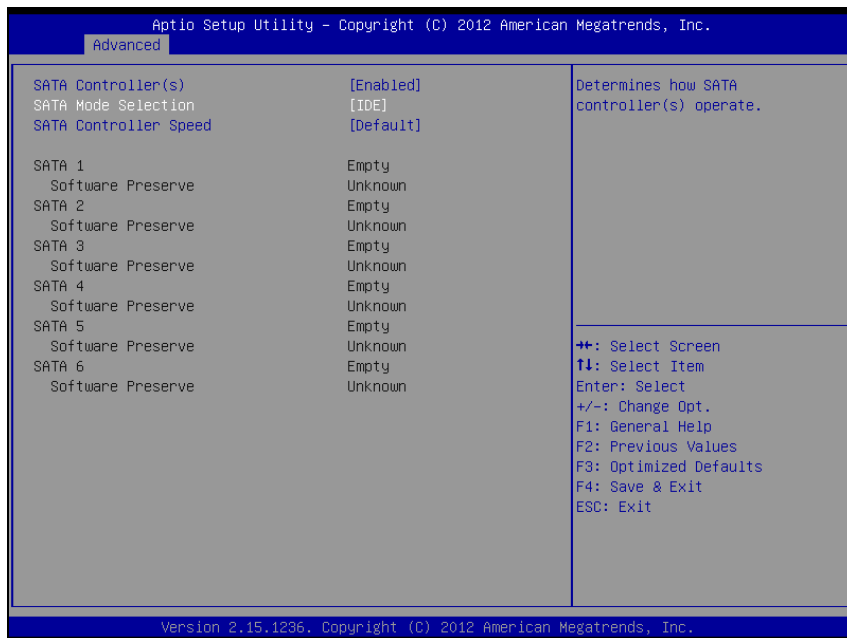
CPU configuration screen

BIOS Setting	Options	Description/Purpose
CPU Signature	No changeable options	Reports the CPU Signature
Microcode Patch	No changeable options	Reports the CPU Microcode Patch Version.
Max CPU Speed	No changeable options	Reports the Max CPU Speed.
Min CPU Speed	No changeable options	Reports the Min CPU Speed
CPU Speed	No changeable options	Reports the current CPU Speed
Processor Cores	No changeable options	Displays number of physical cores in processor.

BIOS Setting	Options	Description/Purpose
Intel HT Technology	No changeable options	Reports if Intel Hyper-Threading Technology is supported by processor
Intel VT-x Technology	No changeable options	Reports if Intel VT-x Technology is supported by processor.
Intel SMX Technology	No changeable options	Reports if Intel SMX Technology is supported by processor.
64-bit	No changeable options	Reports if 64-bit is supported by processor.
EIST Technology	No changeable options	Reports if Intel EIST Technology is supported by processor
CPU C3 State	No changeable options	Reports if Intel C3 Technology is supported by processor
CPU C6 State	No changeable options	Reports if Intel C6 Technology is supported by processor
CPU C7 State	No changeable options	Reports if Intel C7 Technology is supported by processor
L1 Data Cache	No changeable options	Displays size of L1 Data Cache
L1 Code Cache	No changeable options	Displays size of L1 Code Cache
L2 Cache	No changeable options	Displays size of L2 Cache.
L3 Cache	No changeable options	Displays size of L3 Cache.
Hyper-threading	- Disabled - Enabled	When disabled, only one thread per active core will operate.
Intel Virtualization Technology	- Disabled - Enabled	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology (VT).
EIST	- Disabled - Enabled	Enable or disable Intel EIST Technology support.
Intel TXT(LT) Support	- Disabled - Enabled	Enable or disable Intel TXT Support.
Boot performance mode	- Max Non-Turbo Performance - Max Battery - Turbo Performance	Boot performance mode supports different CPU performance for your system.

BIOS Setting	Options	Description/Purpose
Active Processor Cores	- All - 1 - 2 - 3	Indicates the number of cores to enable in processor.

4-4-4. SATA Configuration – IDE Mode

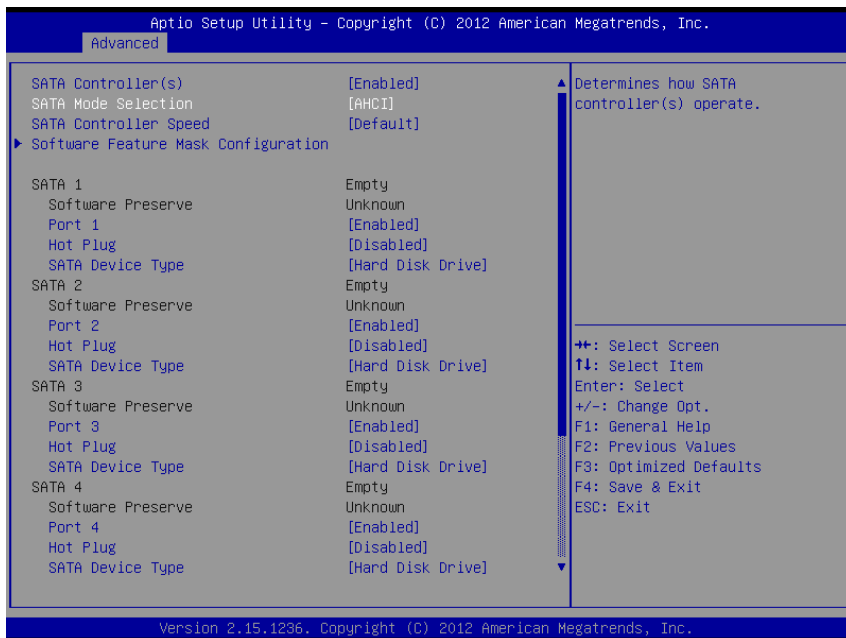


IDE Mode screen

BIOS Setting	Options	Description/Purpose
SATA Controller(s)	- Disabled - Enabled	Enable or disable SATA Device.
SATA Mode Selection	- IDE - AHCI - RAID	Configures SATA as following: <ul style="list-style-type: none"> ▪ IDE: Set SATA operation mode to IDE mode. ▪ AHCI: SATA works as AHCI (Advanced Host Controller Interface) mode for getting better performance. ▪ RAID: Enables RAID (Redundant Array of Inexpensive Disks) function which may require installing the RAID driver during OS installation.

BIOS Setting	Options	Description/Purpose
		Note: Some more items shows up when select to [AHCI] or [RAID] mode.
SATA Controller Speed	- Default - Gen1 - Gen2 - Gen3	Indicates the maximum speed the SATA controller can support.
SATA 1~6	[drive]	Displays the drive installed on these SATA ports. Shows [Empty] if no drive is installed.

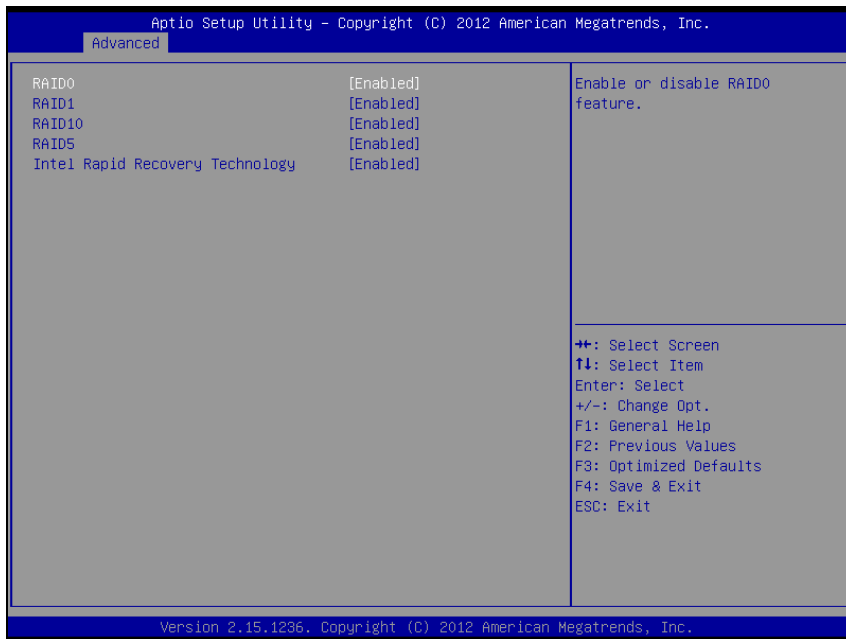
When you select SATA Mode to [AHCI] or [RAID], it shows some more items as below:



AHCI/RAID screen

BIOS Setting	Options	Description/Purpose
SATA Controller(s)	- Enabled - Disabled	Enable or disable SATA Device.
SATA Mode Selection	- IDE - AHCI - RAID	Configures SATA as following: <ul style="list-style-type: none"> ▪ IDE: Set SATA operation mode to IDE mode. ▪ AHCI: SATA works as AHCI (Advanced Host Controller Interface) mode to get better performance. ▪ RAID: Enables RAID (Redundant Array of Inexpensive Disks) function which may require installing the RAID driver during OS installation.

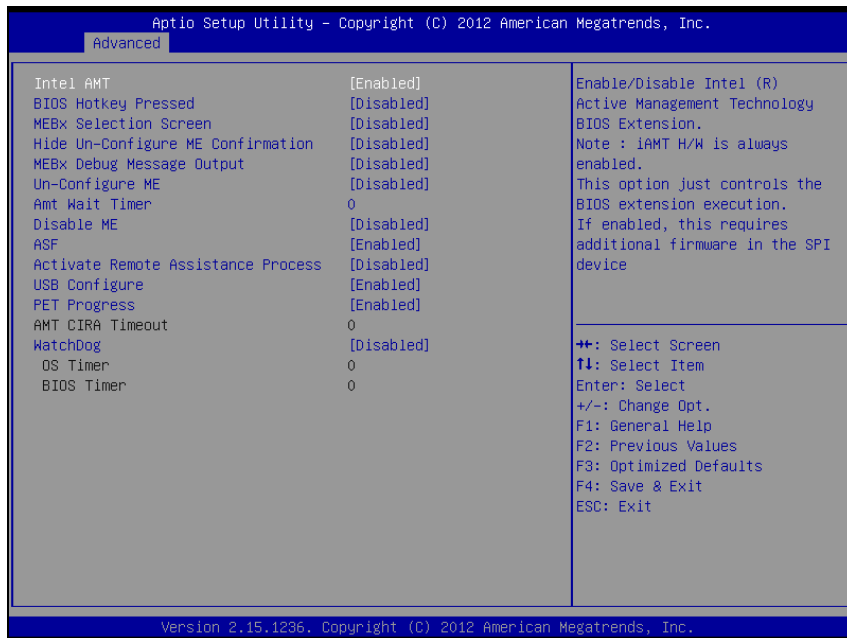
BIOS Setting	Options	Description/Purpose
		Note: Some more items shows up when select to [AHCI] or [RAID] mode.
SATA Controller Speed	- Gen1 - Gen2 - Gen3	Indicates the maximum speed of the SATA controller.
Software Feature Mask Configuration	Sub-menu	RAID OROM/RST driver will refer to the SWFM configuration to enable or disable the storage features.
Port 1~6	- Disabled - Enabled	Enables or disable SATA port.
Hot Plug	- Disabled - Enabled	Designates this port as Hot Pluggable.
SATA Device Type	- Hard Disk Driver - Solid State Drive	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.



Software Feature Mask screen

BIOS Setting	Options	Description/Purpose
RAID0	- Disabled - Enabled	Enable or disable RAID 0 feature.
RAID1	- Disabled - Enabled	Enable or disable RAID 1 feature.
RAID10	- Disabled - Enabled	Enable or disable RAID 10 feature.
RAID5	- Disabled - Enabled	Enable or disable RAID 5 feature.
Intel Rapid Recovery Technology	- Disabled - Enabled	Enable or disable Intel Rapid Recovery Technology.

4-4-5. AMT Configuration



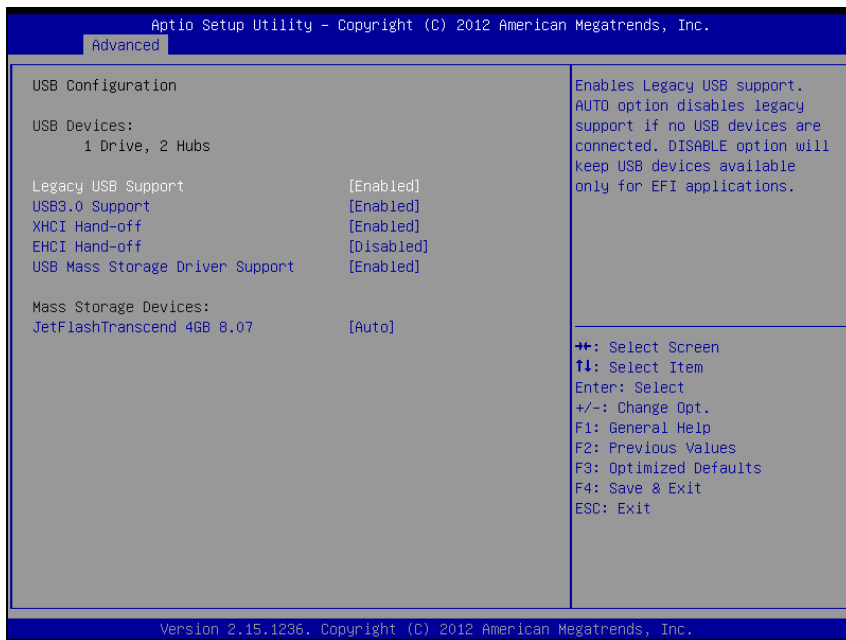
ATM configuration screen

BIOS Setting	Options	Description/Purpose
Intel AMT	- Disabled - Enabled	Enable/Disable Intel (R) Active Management Technology BIOS Extension. This option just controls the BIOS extension execution.
BIOS Hotkey Pressed	- Disabled - Enabled	OEMFLag Bit 1: Enable/Disable BIOS hotkey press.
MEBx Selection Screen	- Disabled - Enabled	OEMFLag Bit 2: Enable/Disable MEBx selection screen.
Hide Un-Configure ME Confirmation Prompt	- Disabled - Enabled	OEMFlag Bit 6: Hide Un-Configure ME without password Confirmation Prompt

BIOS Setting	Options	Description/Purpose
MEBx Debug Message Output	- Disabled - Enabled	OEMFlag Bit 14: Enable MEBx debug message output.
Un-Configure ME	- Disabled - Enabled	OEMFlag Bit 15: Un-Configure ME without password.
Amt Wait Timer	Multiple options ranging from 0 to 65535	Set timer to wait before sending ASF_GET_BOOT_OPTIONS.
Disable ME	- Disabled - Enabled	Set ME to Soft Temporary Disabled.
ASF	- Disabled - Enabled	Enable/Disable Alert Specification Format.
Activate Remote Assistance Process	- Disabled - Enabled	Trigger CIRA boot
USB Configure	- Disabled - Enabled	Enable/Disable USB Configure function.
PET Progress	- Disabled - Enabled	You can Enable/Disable PET Events progress to receive PET events or not.
AMT CIRA Timeout	Multiple options ranging from 0 to 255	OEM defined timeout for MPS connection to be established. <ul style="list-style-type: none"> ▪ 0: uses the default timeout value of 60 seconds. ▪ 255: MEBX waits until the connection succeeds <p>Note: This setting only available when [Activate Remote Assistance Process] = [Enabled]</p>
WatchDog	- Disabled - Enabled	Enable/Disable WatchDog Timer.
OS Timer	Multiple options ranging from 0 to 65535	Set OS watchdog timer. Note. This setting only available when [WatchDog] = [Enabled]

BIOS Setting	Options	Description/Purpose
BIOS Timer	Multiple options ranging from 0 to 65535	Set BIOS watchdog timer. Note. This setting only available when [WatchDog] = [Enabled]

4-4-6. USB Configuration



USB configuration screen

BIOS Setting	Options	Description/Purpose
USB Devices	No changeable options	Displays number of available USB devices.
Legacy USB Support	- Disabled - Enabled - Auto	Enables support for legacy USB.
USB3.0 Support	- Disabled - Enabled	Enable/Disable USB3.0 (XHCI) Controller support.
XHCI Hand-off	- Disabled - Enabled	This is a workaround for OSes w/o XHCI hand-off support.
EHCI Hand-off	- Disabled - Enabled	This is a workaround for OSes w/o EHCI hand-off support.

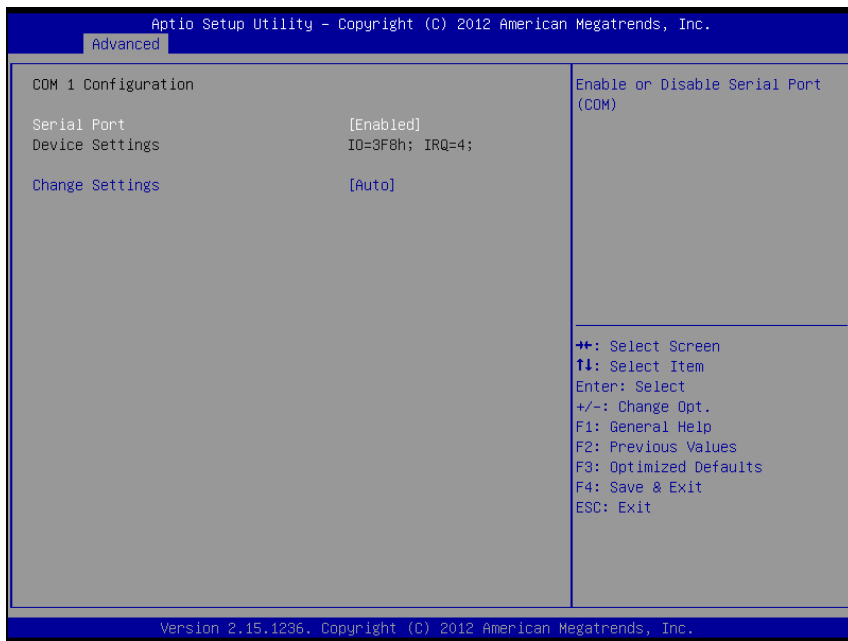
BIOS Setting	Options	Description/Purpose
Mass Storage Devices <Device Name>	- Auto - Floppy - Force FDD - Hard Disk - CD-ROM	Display the device name and choose the device emulation type.

4-4-7. F81866 Super IO Configuration



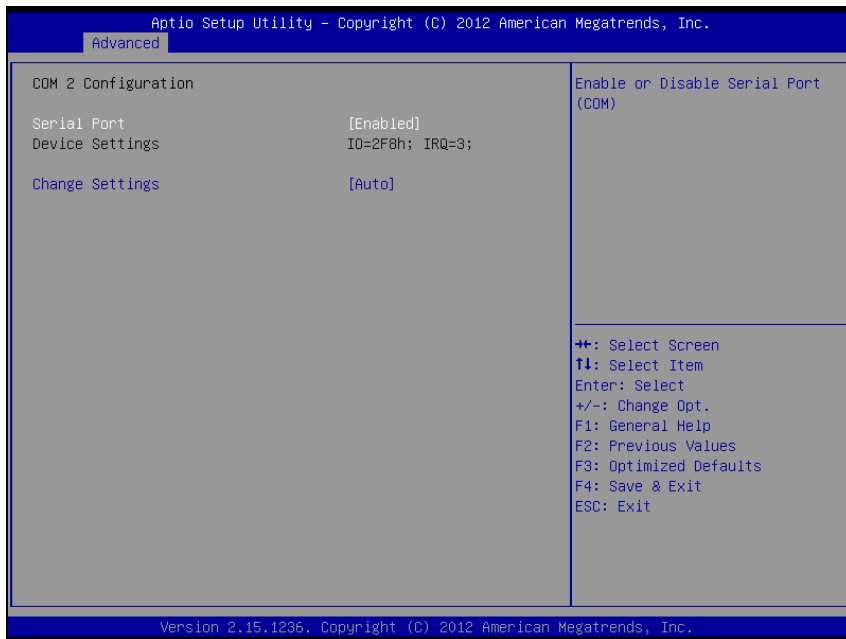
F81866 Super IO Configuration screen

BIOS Setting	Options	Description/Purpose
F81866 Super IO Chip	No changeable options	Displays the super IO chip model and its manufacturer.
COM 1~6 Configuration	Sub-menu	Set Parameters for COM 1.
Parallel Port Configuration	Sub-menu	Set Parameters for LPT port.
F81866 Watchdog	Sub-menu	Set Parameters for Watchdog.



COM 1 Configuration screen

BIOS Setting	Options	Description/Purpose
Serial Port	-Disabled -Enabled	Enable or disable COM 1.
Device Settings	No changeable options	Displays current settings of COM 1.
Change Settings	-Auto -IO=3F8h; IRQ=4 -IO=3F8h; IRQ=3,4,5,6,7,10,11,12 -IO=2F8h; IRQ=3,4,5,6,7,10,11,12 -IO=3E8h; IRQ=3,4,5,6,7,10,11,12 -IO=2E8h; IRQ=3,4,5,6,7,10,11,12	Select IRQ and I/O resource for COM 1.



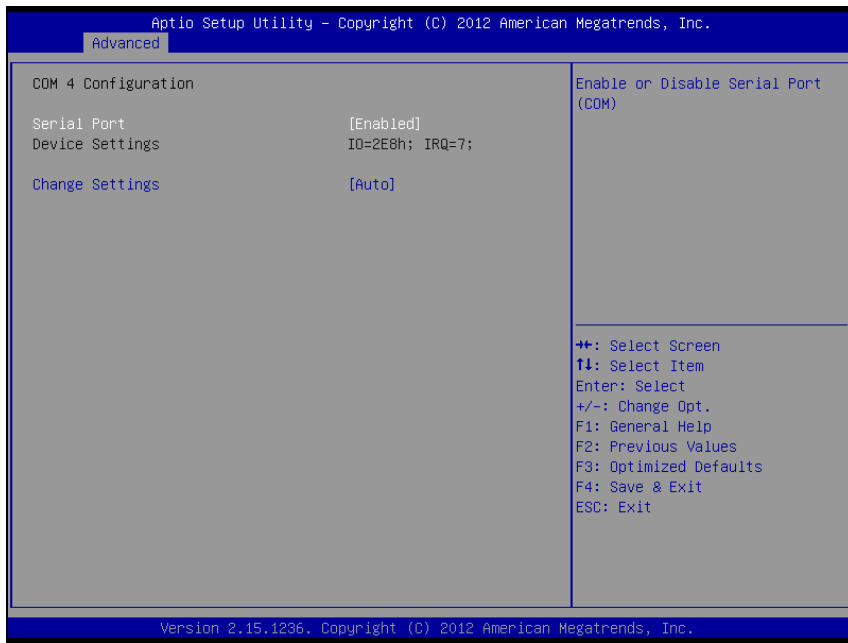
COM 2 Configuration screen

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled	Enable or disable COM 2.
Device Settings	No changeable options	Displays current settings of COM2.
Change Settings	- Auto - IO=2F8h; IRQ=3 - IO=3F8h; IRQ=3,4,5,6,7,10,11,12 - IO=2F8h; IRQ=3,4,5,6,7,10,11,12 - IO=3E8h; IRQ=3,4,5,6,7,10,11,12 - IO=2E8h; IRQ=3,4,5,6,7,10,11,12	Select IRQ and I/O resource for COM 2.



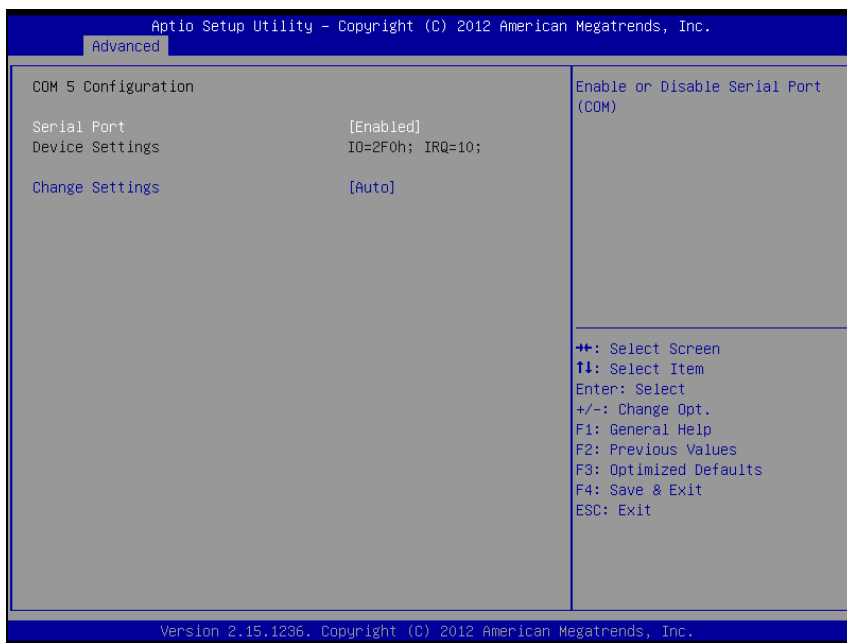
COM 3 Configuration screen

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled	Enable or disable COM 3.
Device Settings	No changeable options	Displays current settings of COM3.
Change Settings	- Auto - IO=3E8h; IRQ=7 - IO=3E8h; IRQ=3,4,5,6,7,10,11,12 - IO=2E8h; IRQ=3,4,5,6,7,10,11,12 - IO=2F0h; IRQ=3,4,5,6,7,10,11,12 - IO=2E0h; IRQ=3,4,5,6,7,10,11,12	Select IRQ and I/O resource for COM 3.



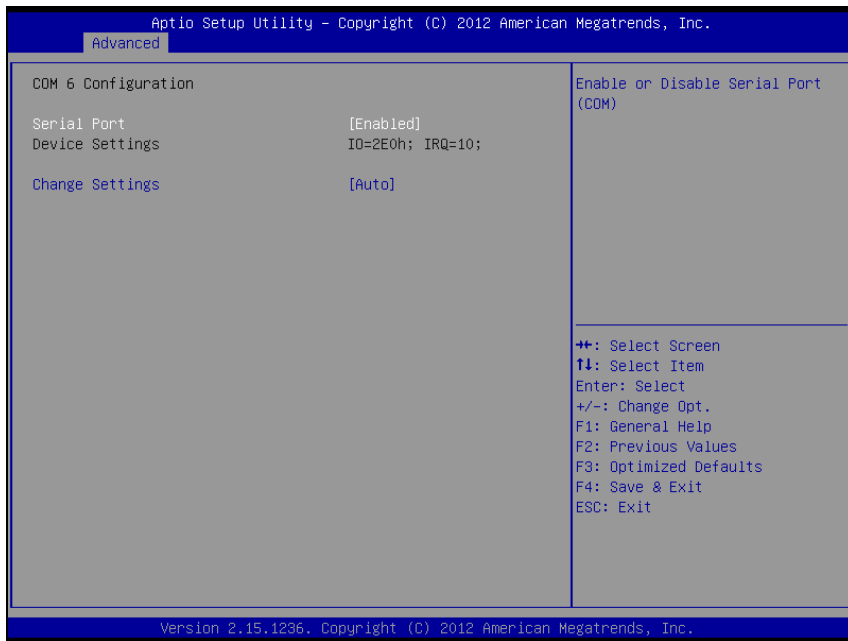
COM 4 Configuration screen

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled	Enable or disable COM 4.
Device Settings	No changeable options	Displays current settings of COM4.
Change Settings	- Auto - IO=2E8h; IRQ=7 - IO=3E8h; IRQ=3,4,5,6,7,10,11,12 - IO=2E8h; IRQ=3,4,5,6,7,10,11,12 - IO=2F0h; IRQ=3,4,5,6,7,10,11,12 - IO=2E0h; IRQ=3,4,5,6,7,10,11,12	Select IRQ and I/O resource for COM 4.



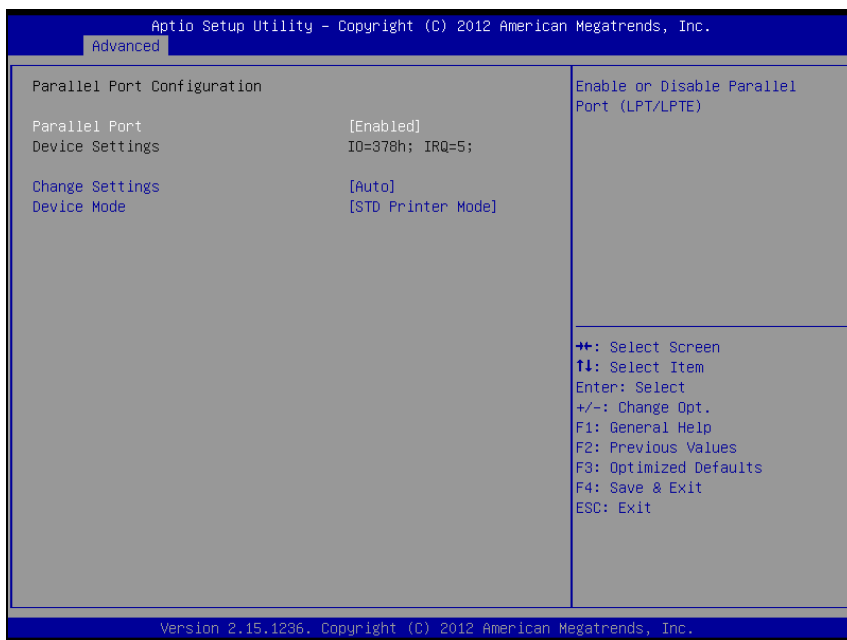
COM 5 Configuration screen

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled	Enable or disable COM 5.
Device Settings	No changeable options	Displays current settings of COM 5.
Change Settings	- Auto - IO=2F0h; IRQ=10 - IO=3E8h; IRQ=3,4,5,6,7,10,11,12 - IO=2E8h; IRQ=3,4,5,6,7,10,11,12 - IO=2F0h; IRQ=3,4,5,6,7,10,11,12 - IO=2E0h; IRQ=3,4,5,6,7,10,11,12	Select IRQ and I/O resource for COM 5.



COM 6 Configuration screen

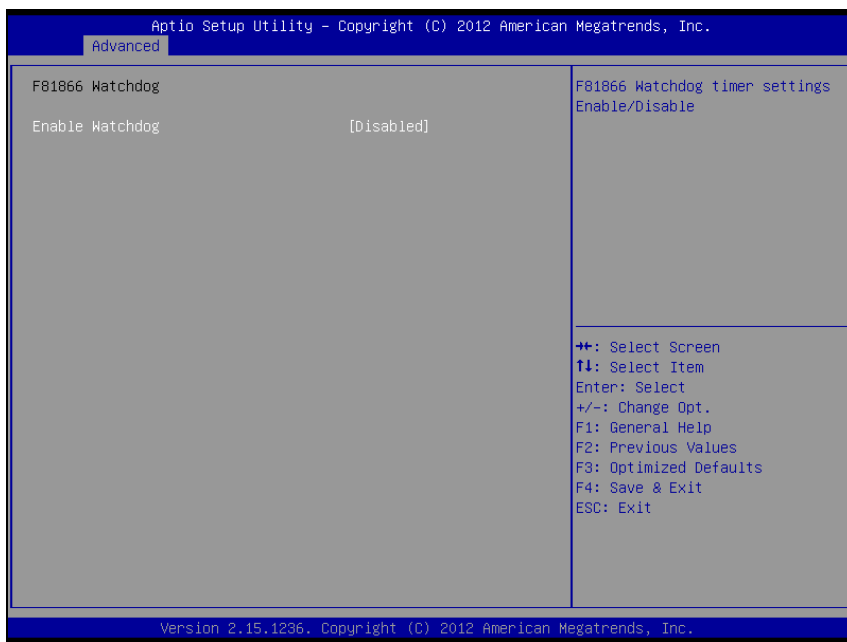
BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled	Enable or disable COM 6.
Device Settings	No changeable options	Displays current settings of COM 6.
Change Settings	- Auto - IO=2E0h; IRQ=10 - IO=3E8h; IRQ=3,4,5,6,7,10,11,12 - IO=2E8h; IRQ=3,4,5,6,7,10,11,12 - IO=2F0h; IRQ=3,4,5,6,7,10,11,12 - IO=2E0h; IRQ=3,4,5,6,7,10,11,12	Select IRQ and I/O resource for COM 6.



Parallel Port Configuration screen

BIOS Setting	Options	Description/Purpose
Parallel Port	- Disabled - Enabled	Enable or disable the printer port.
Device Settings	No changeable options	Displays current settings of the printer port.
Change Settings	- Auto - IO=378h; IRQ=5 - IO=378h; IRQ=5,6,7,10,11,12 - IO=278h; IRQ=5,6,7,10,11,12 - IO=3BCh; IRQ=5,6,7,10,11,12	Select IRQ and I/O resource for the printer port.

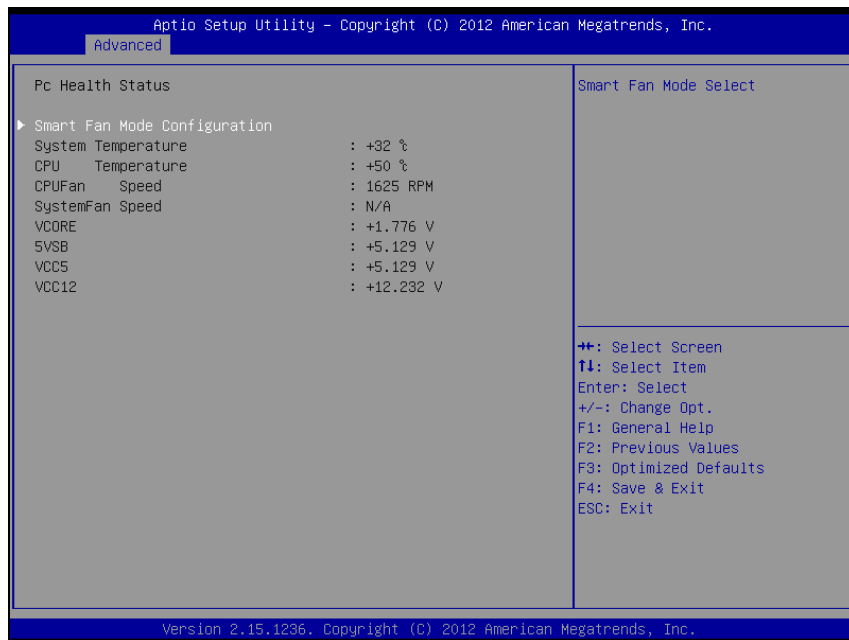
BIOS Setting	Options	Description/Purpose
Device Mode	- STD Printer Mode - SPP Mode - EPP-1.9 and SPP Mode - EPP-1.7 and SPP Mode - ECP Mode - ECP and EPP 1.9 Mode - ECP and EPP 1.7 Mode	Selects the mode for the parallel port. Not available if the parallel port is disabled. ▪ SPP is Standard Parallel Port mode, a bi-directional mode for printers. ▪ EPP is Enhanced Parallel Port mode, a high-speed bi-directional mode for non-printer peripherals. ▪ ECP is Enhanced Capability Port mode, a high-speed bi-directional mode for printers and scanners.



F81866 Watchdog screen

BIOS Setting	Options	Description/Purpose
Enable Watchdog	- Disabled - Enabled	Enable or disable Watchdog function..
Count for Timer(Seconds)	Multiple options ranging from 1 to 255	Sets the desired value (seconds) for watchdog timer.

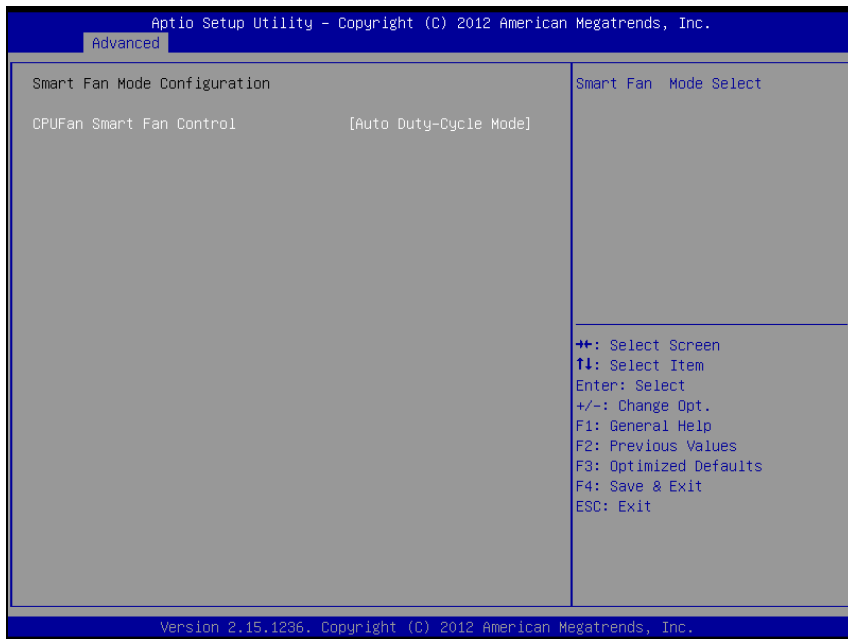
4-4-8. F81866 Hardware Monitor



F81866 Hardware Monitor screen

BIOS Setting	Options	Description/Purpose
Smart Fan Mode Configuration	Sub-menu	Set Parameters for Smart Fan function.
System Temperature	No changeable options	Displays system's temperature.
CPU Temperature	No changeable options	Displays processor's temperature.
CPUFan Speed	No changeable options	Displays fan speed of the CPU fan.
SysFan Speed	No changeable options	Displays fan speed of the chassis fan.
VCORE	No changeable options	Displays voltage level of the +VCORE in supply.

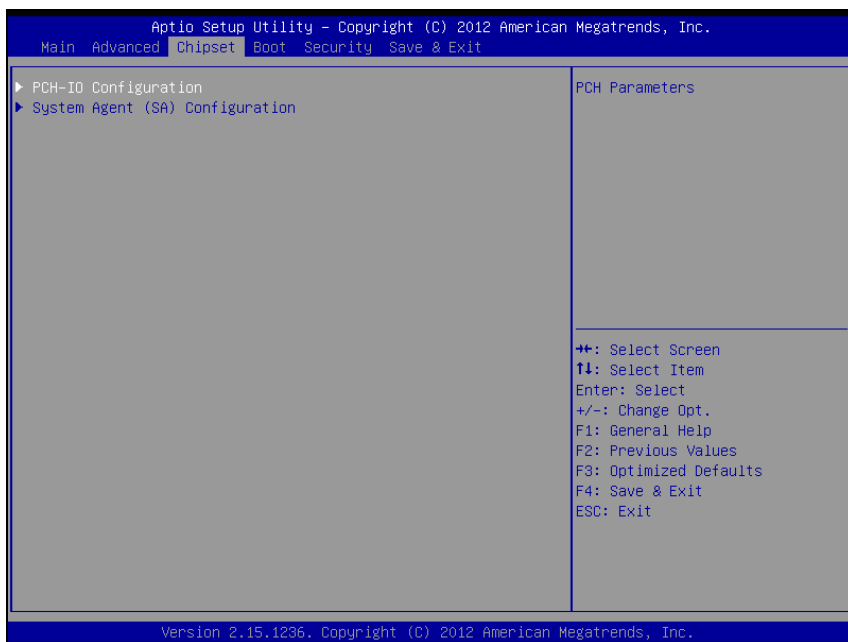
BIOS Setting	Options	Description/Purpose
5VSB	No changeable options	Displays voltage level of the +5V in supply.
VCC5	No changeable options	Displays voltage level of the +5V in supply.
VCC12	No changeable options	Displays voltage level of the +12V in supply.
AVCC	No changeable options	Displays voltage level of the +5V in supply.



Smart Fan Mode screen

BIOS Setting	Options	Description/Purpose
CPUFan Smart Fan Control	<ul style="list-style-type: none"> - Manual Duty Mode - Auto Duty-Cycle Mode 	Configure CPU fan as follows. <ul style="list-style-type: none"> ▪ Manual Duty Mode: You can write expected duty cycle (PWM type) 1-100. ▪ Auto Duty-Cycle Mode: Enables smart fan control.

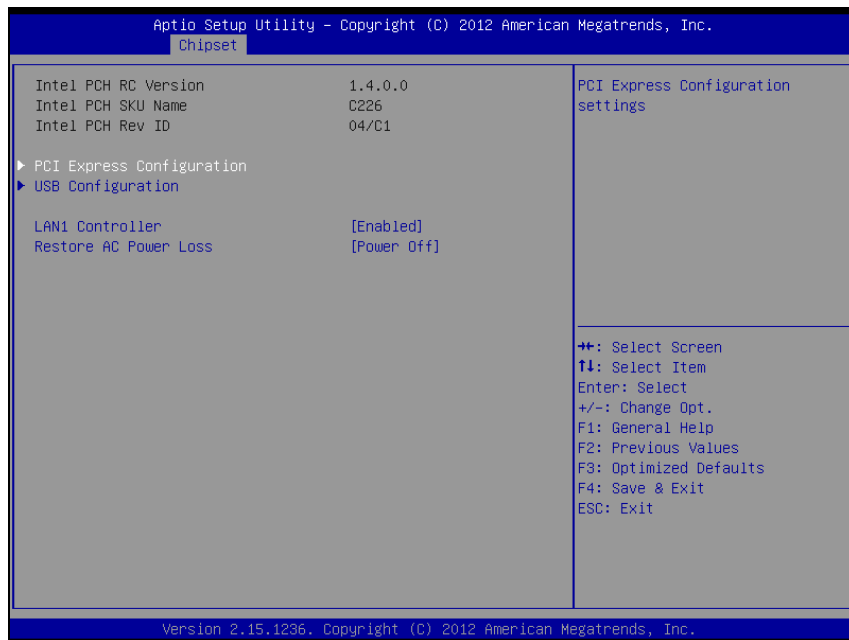
4-5. CHIPSET



Chipset screen

BIOS Setting	Options	Description/Purpose
PCH-IO Configuration	Sub-menu	Sets Parameter for Panther Point (South Bridge) configuration.
System Agent (SA) Configuration	Sub-menu	Sets Parameter for Ivy Bridge (North Bridge) configuration.

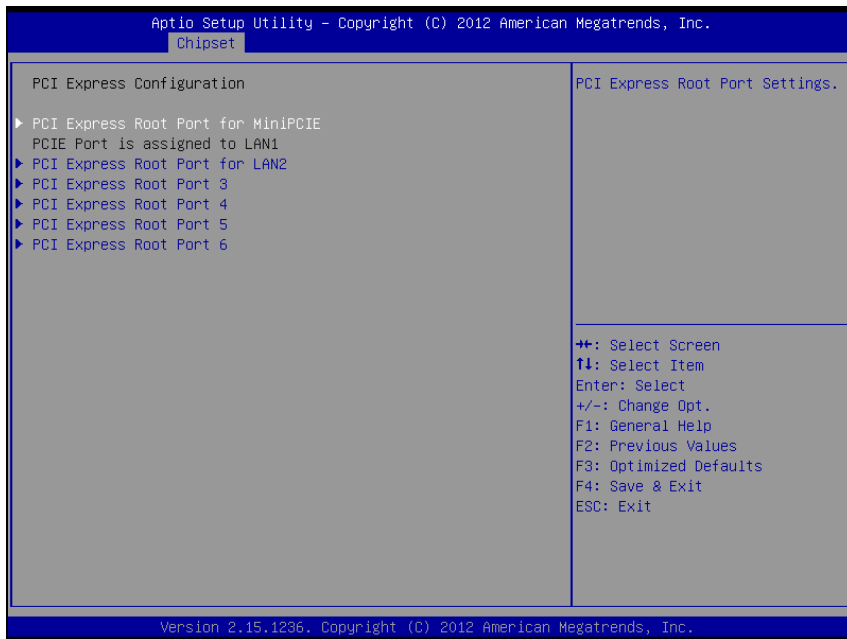
4-5-1. PCH IO Configuration



PCH IO Configuration screen

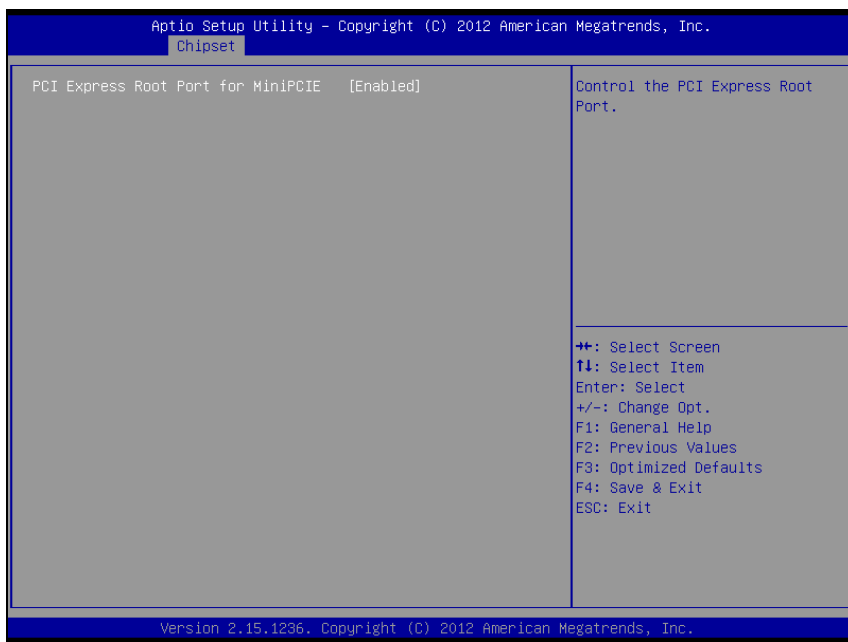
BIOS Setting	Options	Description/Purpose
Intel PCH RC Version	No changeable option	Displays the PCH source code version
Intel PCH SKU Name	No changeable option	Displays PCH product SKU name.
Intel PCH Rev ID	No changeable option	Displays onboard PCH chip revision.
PCI Express Configuration	Sub-menu	Configure PCH PCIE parameters
USB Configuration	Sub-menu	Configure USB parameters.
LAN1 Controller	- Disabled - Enabled	Enable/Disabled on board NIC.

BIOS Setting	Options	Description/Purpose
Restore AC Power Loss	- Power Off - Power On	Select AC power state when power is re-applied after a power failure. <ul style="list-style-type: none">▪ Power Off keeps the power off till the power button is pressed.▪ Power On makes system power on after restores AC power to the board.



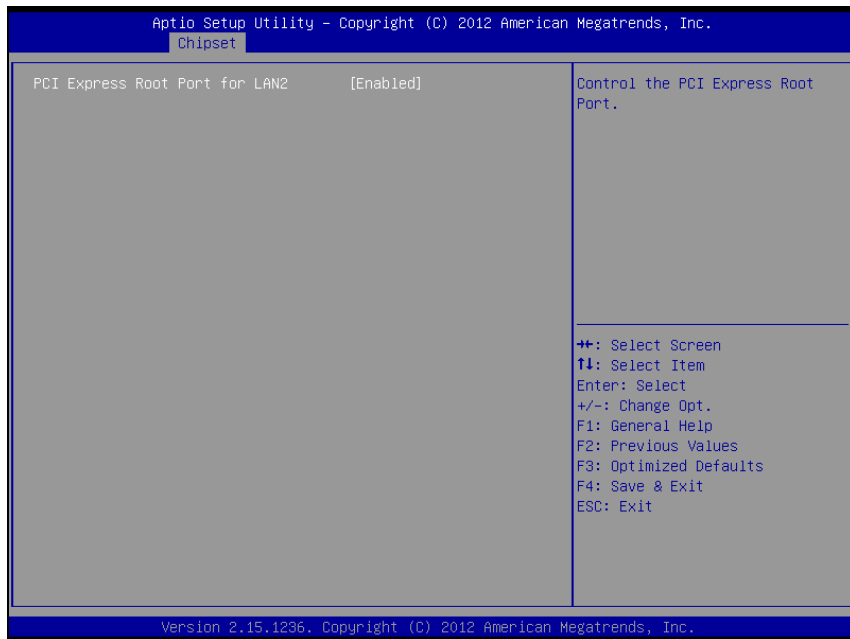
PCI Express Configuration screen

BIOS Setting	Options	Description/Purpose
PCI Express Root Port For MiniPCIE	Sub-menu	-
PCIE Port is assigned to LAN1	No changeable option	This port assigned to LAN1.
PCI Express Root Port for LAN2	Sub-menu	This port Assigned to LAN2.
PCI Express Root Port 3~6	-	Control the PCI Express Root port setting.



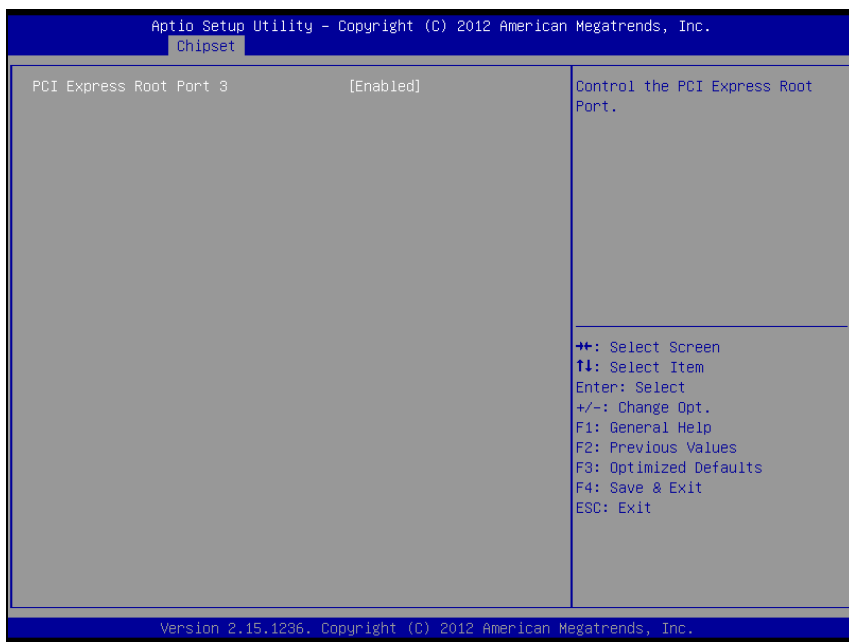
PCI Express Root Port for Mini-PCie screen

BIOS Setting	Options	Description/Purpose
PCI Express Root Port For MiniPCIE	- Disabled - Enabled	Enable or disable PCI Express Root port.



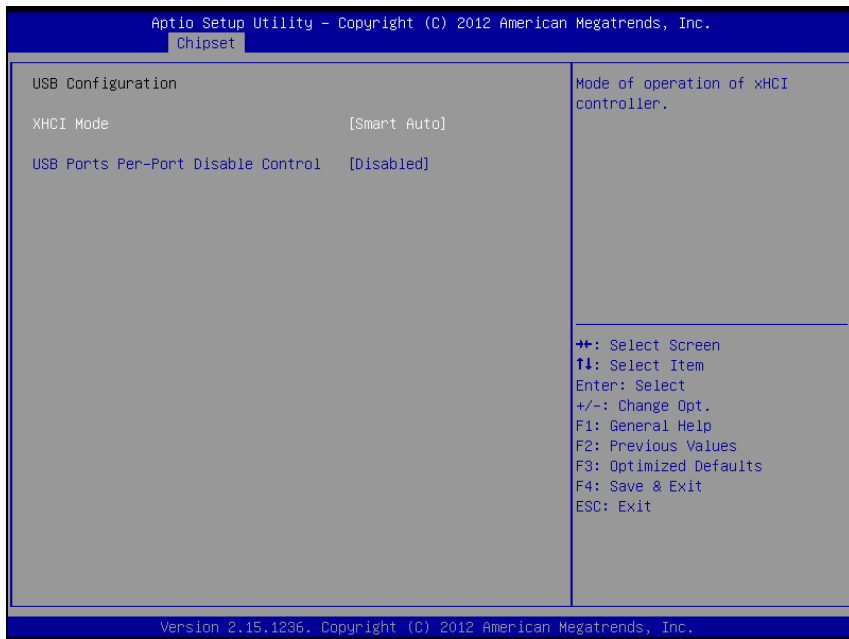
PCI Express Root Port for LAN2 screen

BIOS Setting	Options	Description/Purpose
PCI Express Root Port for LAN2	- Disabled - Enabled	Enable or disable PCI Express Root port.



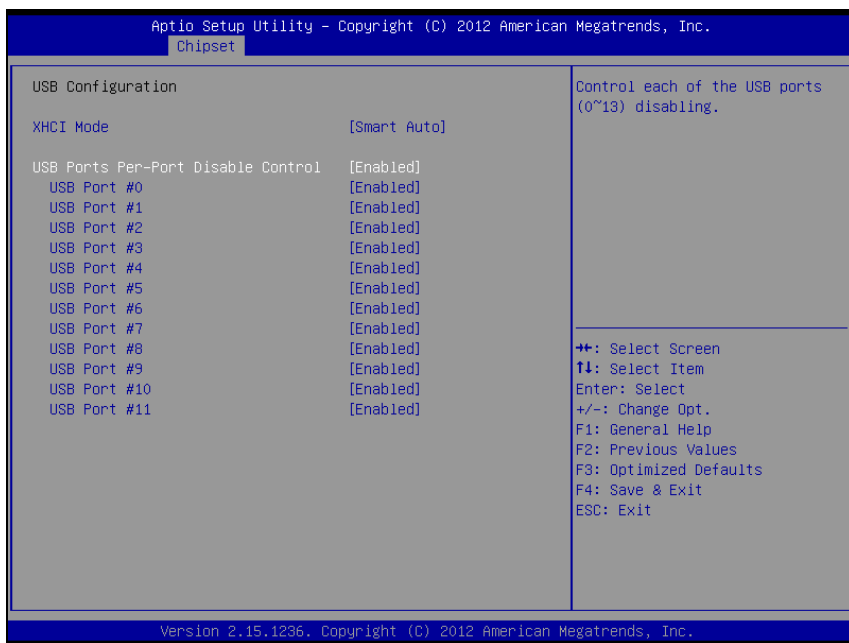
PCI Express Root Port 3~6 screen

BIOS Setting	Options	Description/Purpose
PCI Express Root Port 3~6	- Disabled - Enabled	Enable or disable PCI Express Root port.



USB Configuration screen

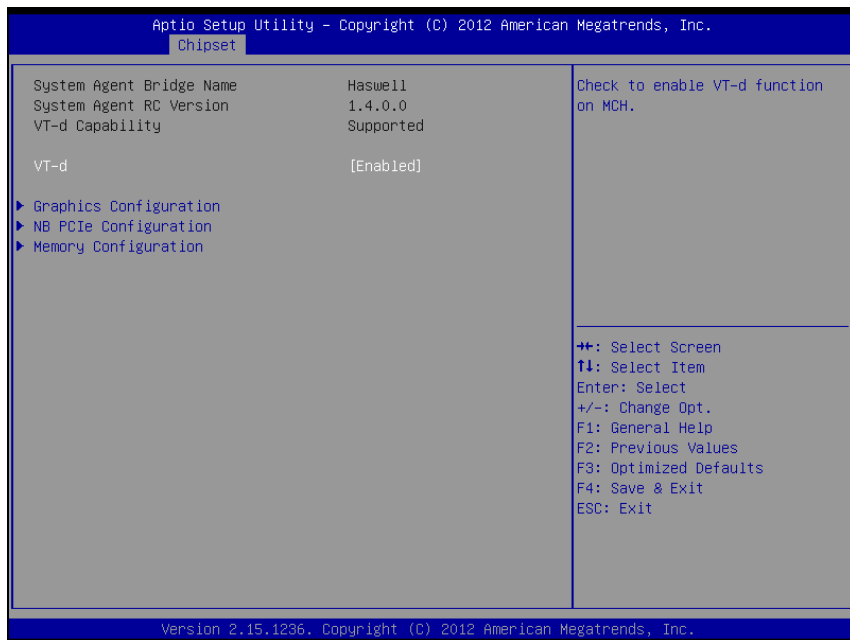
BIOS Setting	Options	Description/Purpose
XHCI Mode	<ul style="list-style-type: none"> - Smart Auto - Auto - Enabled - Disabled 	Select operation mode of XHCI controller.
USB Ports Pre-Port Disable Control	<ul style="list-style-type: none"> - Disabled - Enabled 	Control each of the USB ports (0~12) disabling.



USB Port Pre-port Disable Control screen

BIOS Setting	Options	Description/Purpose
USB Port#0~11	- Disabled - Enabled	Control each of the USB ports (0~12) disabling.

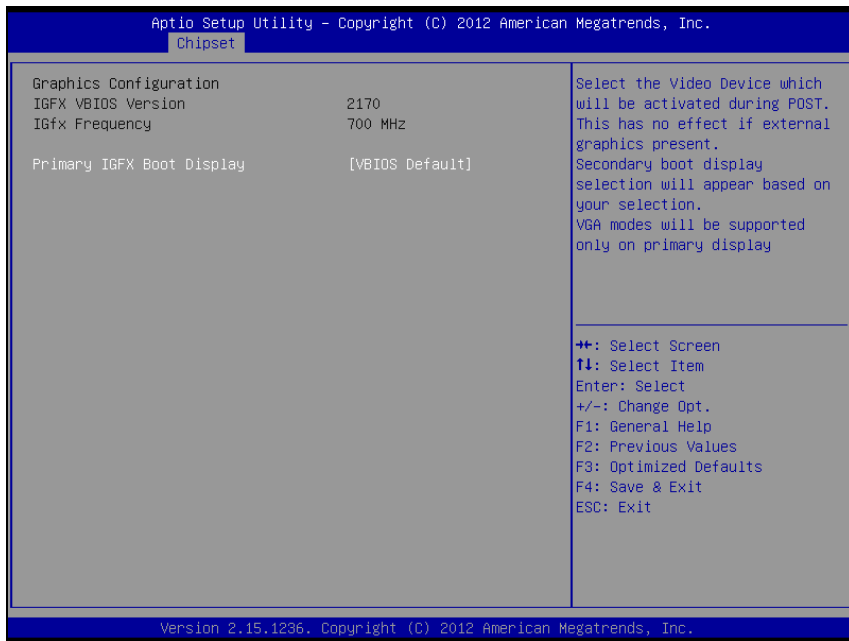
4-5-2. System Agent (SA) Configuration



System Agent (SA) Configuration screen

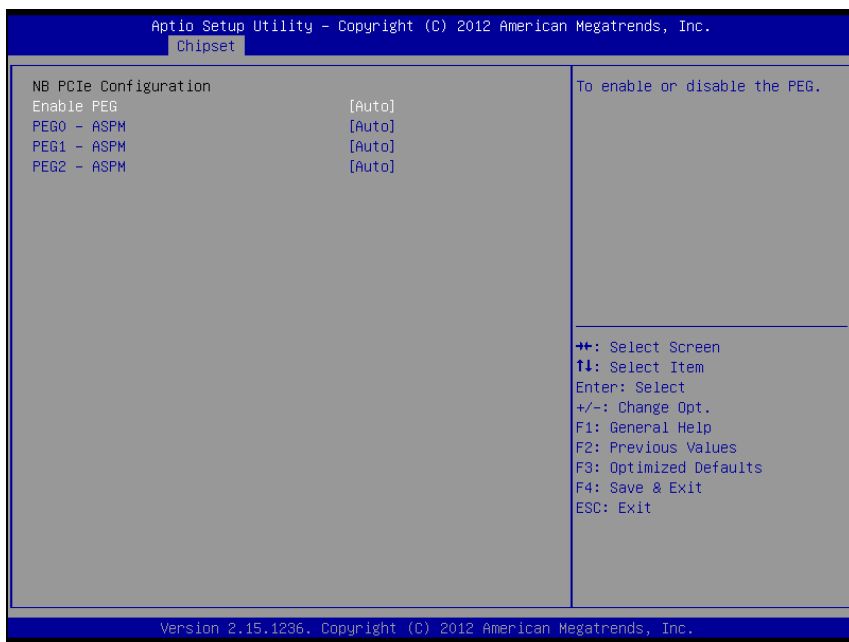
BIOS Setting	Options	Description/Purpose
System Agent Bridge Name	No changeable options	Displays the CPU/NB bridge name
System Agent RC Version	No changeable options	Displays the IVB source code module version
VT-d Capability	No changeable options	Display this chipset support VT-d or not.
VT-d	- Disabled - Enabled	Enable or disable Intel VT-d technology support.
Graphics Configuration	Sub-menu	Configure Graphic Settings.
NB PCIe Configuration	Sub-menu	Configure IVB PCIe Settings

BIOS Setting	Options	Description/Purpose
Memory Configuration	Sub-menu	Memory Configuration Parameters



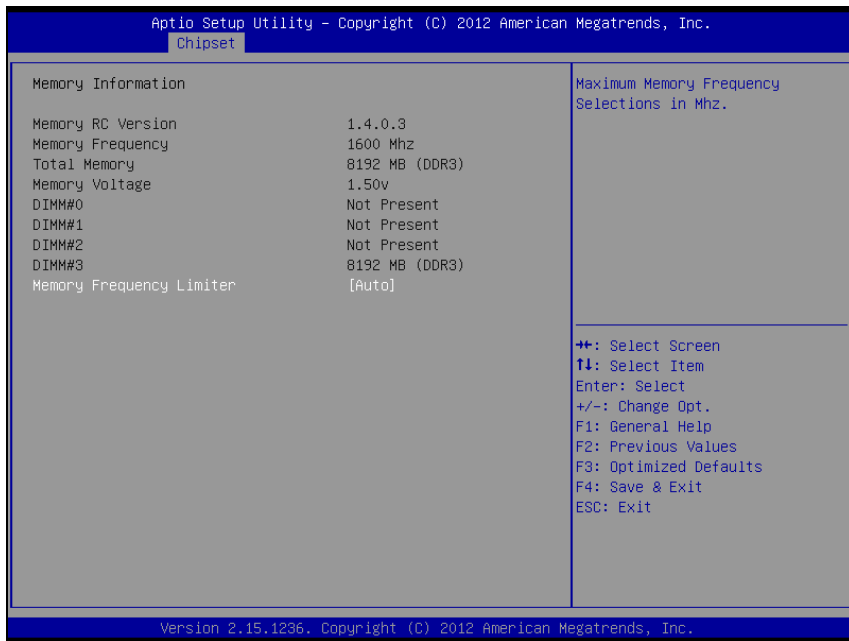
Graphics Configuration screen

BIOS Setting	Options	Description/Purpose
IGFX VBIOS Version	No changeable options	Displays the VBIOS version of integrated graphic controller.
IGfx Frequency	No changeable options	Displays the frequency of integrated graphic controller.
Primary IGFX Boot Display	- VBIOS Default - CRT - DP1 - DP3 - DP2	Select primary display device
Secondary IGFX Boot Display	- Disabled - CRT - DP1 - DP3 - DP2	Select secondary display device



NB PCIe Configuration screen

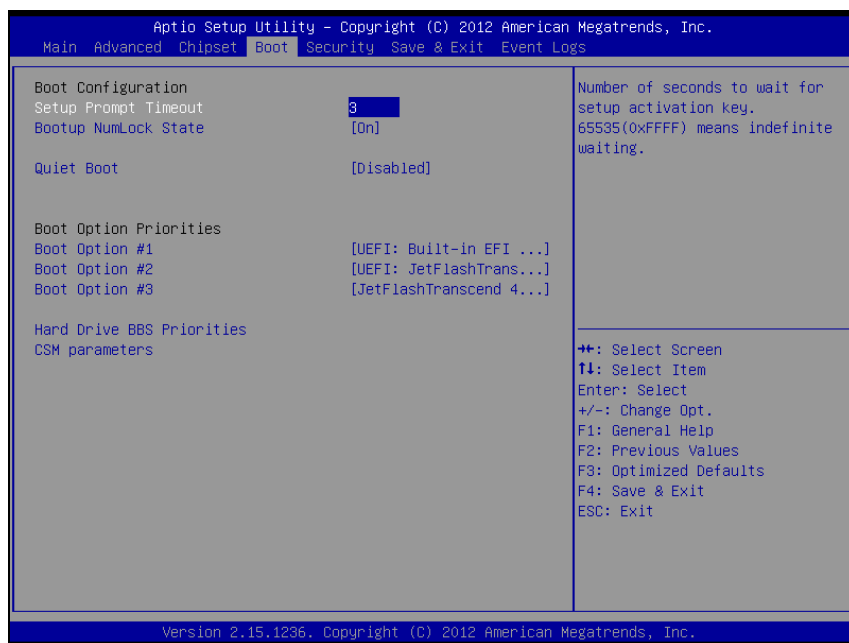
BIOS Setting	Options	Description/Purpose
Enable PEG	<ul style="list-style-type: none"> - Auto - Disabled - Enabled 	To enable or disable the PEG. Set Enable for always enables PEG no matter a device on PEG or not.
PEG0~2 - ASPM	<ul style="list-style-type: none"> - Disabled - Auto - ASPM L0s - ASPM L1 - ASPM L0sL1 	Control ASPM support for the PEG0. For example, [PEG0 – ASPM] control the PEG (locates at Device 1 Function 0) ASPM operation Mode. This has no effect if PEG is not the currently active device.



Memory Configuration screen

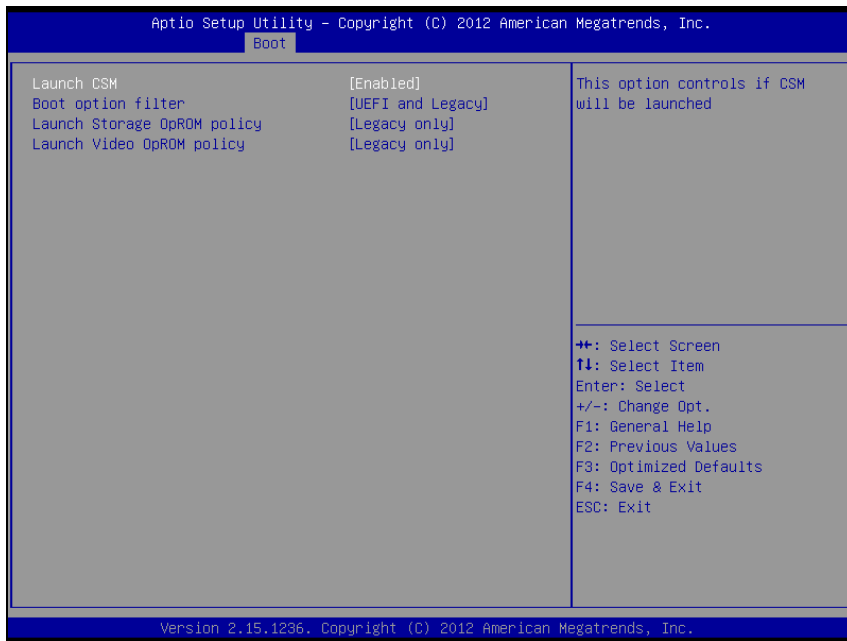
BIOS Setting	Options	Description/Purpose
Memory Information	No changeable option lists.	Displays the detail DRAM information on platform.
Memory Frequency Limiter	- Auto - 1333 - 1600	Maximum memory frequency selection in Mhz.

4-6. BOOT



Boot screen

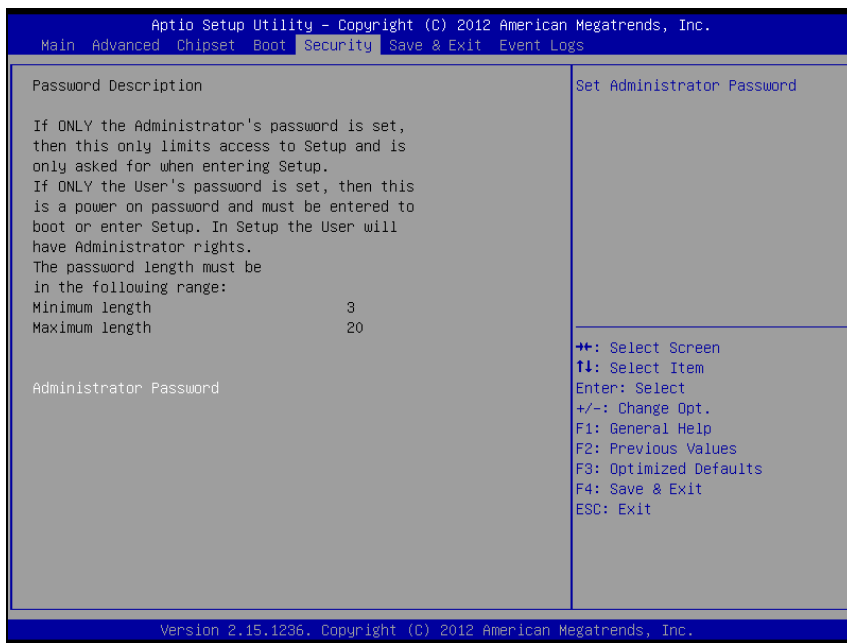
BIOS Setting	Options	Description/Purpose
Setup Prompt Timeout	Numeric	Number of seconds to wait for setup activation key.
Bootup NumLock State	- On - Off	Specifies the power-on state of the NumLock Key.
Quiet Boot	- Disabled - Enabled	Enable/Disable Quiet Boot Options
Boot Option #1~#n	- [Drive(s)] - Disabled	Allows setting boot option listed in Hard Drive BBS Priorities.
Hard Drive BBS Priorities	Sub-Menu	Allow user to select boot order of available drive(s)
CSM parameters	Sub-Menu	Configure Option ROM execution, boot options filters, etc.



CSM parameters screen

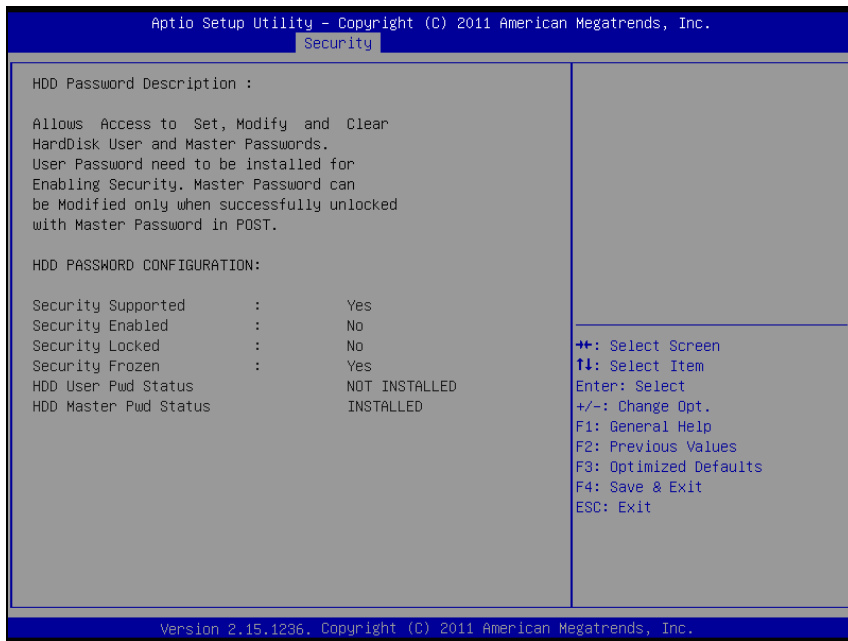
BIOS Setting	Options	Description/Purpose
Launch CSM	- Disabled - Enabled	This option controls if CSM will be launched.
Boot option filter	- UEFI and Legacy - Legacy only - UEFI only	This option controls what kind of devices system can boot.
Launch Storage OpROM policy	- Do not launch - UEFI only - Legacy only	Controls the execution of UEFI or Legacy Storage OpROM.
Launch Video OpROM policy	- Do not launch - UEFI only - Legacy only	Controls the execution of UEFI and Legacy Video OpROM.

4-7. SECURITY



Security screen

BIOS Setting	Options	Description/Purpose
Administrator Password	Password can be 3-20 alphanumeric characters.	Specifies the administrator password.
HDD Security Configuration:	Sub-menu	Set HDD password.



HDD Security Configuration screen

BIOS Setting	Options	Description/Purpose
Security Supported	No changeable options	Reports if there is security feature available.
Security Enabled	No changeable options	Reports if there is security feature enabled.
Security Locked	No changeable options	Reports if there is security feature locked.
Security Frozen	No changeable options	Reports if there is security feature frozen.
HDD User Pwd Status	No changeable options	Reports if there is HDD User Password installed.
HDD Master Pwd Status	No changeable options	Reports if there is HDD Master Password installed.
Set User Password	Password can be up to 32 alphanumeric characters.	Specifies the user password. (Need TPM module)
Set Master Password	Password can be up to 32 alphanumeric characters.	Specifies the master password.

4-8. SAVE & EXIT



Save & Exit screen

BIOS Setting	Options	Description/Purpose
Save Changes and Exit	No changeable options	Exits and saves the changes in NVRAM.
Discard Changes and Exit	No changeable options	Exits without saving any changes made in BIOS settings.
Discard Changes and Reset	No changeable options	Resets without saving any changes made in BIOS settings.
Restore Defaults	No changeable options	Loads the optimized defaults for BIOS settings.
Boot Override	- [Drive(s)]	Forces to boot from selected [drive(s)].

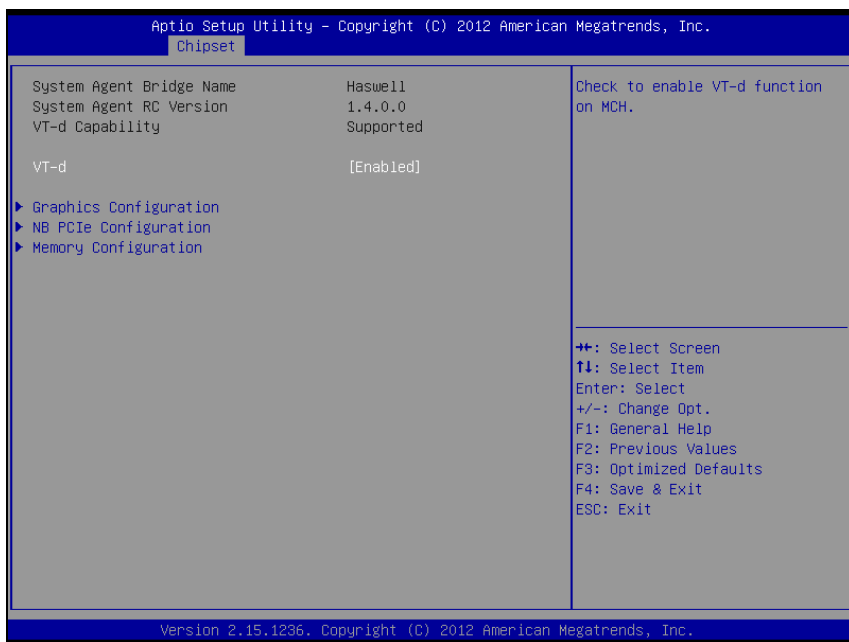
4-9. EVENT LOGS



Event Logs screen

BIOS Setting	Options	Description/Purpose
Change Smbios Event Log Settings	Sub-menu	Change the SMBIOS Even Log configuration.
View Smbios Event Log	Sub-menu	View the SMBIOS Even Log configuration.

4-9-1. Change Smbios Event Log Settings



Change Smbios Event Log Settings screen

BIOS Setting	Options	Description/Purpose
Smbios Event Log	- Disabled - Enabled	Change this to enable or disable all features of Smbios Event Logging during boot.
Erase Event Log	- No - Yes, Next reset - Yes, Every reset	Choose options for erasing Smbios Event Log. Erasing is done prior to any logging activation during reset.
When Log is Full	- Do Nothing - Erase Immediately	Choose options for reactions to a full Smbios Event Log.
Log System Boot Event	- Disabled - Enabled	Choose option to enable/disable logging of System boot event.
MECI	Multiple options ranging from 1 to 33	Multiple Event Count Increment:

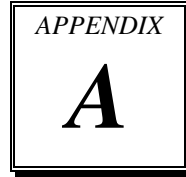
BIOS Setting	Options	Description/Purpose
		The number of occurrences of a duplicate event that must pass before the multiple-event counter associated with the log entry has updated, specified as a numeric value in the range 1 to 33.
METW	Multiple options ranging from 0 to 99	Multiple Event Time Window: The numbers of minutes which must pass between duplicate log entries which utilize a multiple-event counter. The value ranges from 0 to 99 minutes.
Log OEM Codes	- Disabled - Enabled	Enable or disable the logging of EFI Status Codes as OEM Codes (if not already converted to legacy).
Convert OEM Codes	- Disabled - Enabled	Enable or disable the converting of EFI Status Codes to Standard Smbios Types (Not all may be translated).

4-9-2. View Smbios Event Log

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.				
Event Logs				
DATE	TIME	ERROR CODE	SEVERITY	DESCRIPTION
06/10/13	00:12:10	Smbios 0x16	N/A	Log Area Reset
06/10/13	00:12:10	Smbios 0x17	N/A	
06/10/13	00:12:21	Smbios 0x17	N/A	
06/10/13	00:12:33	Smbios 0x17	N/A	
06/10/13	00:13:21	Smbios 0x17	N/A	
06/10/13	02:09:47	Smbios 0x17	N/A	
06/10/13	02:20:56	Smbios 0x17	N/A	
06/10/13	02:27:41	Smbios 0x17	N/A	
06/10/13	02:34:25	Smbios 0x17	N/A	
06/10/13	02:34:41	Smbios 0x17	N/A	
				++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.				

View Smbios Event Log screen

EXPANSION BUS



This appendix indicates the pin assignments.

Sections included:

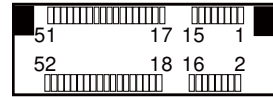
- Mini-PCIe Bus
- PCIe Bus

MINI-PCIE BUS

You will find a **M_PCIE1** on BA-0951.

The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	WAKE#	27	GND
2	+3.3V	28	+1.5V
3	Reserved	29	GND
4	GND	30	SMB_CLK
5	Reserved	31	PETn0
6	+1.5V	32	SMB_DATA
7	CLKREQ#	33	PETp0
8	Reserved	34	GND
9	GND	35	GND
10	Reserved	36	USB_D-
11	REFCLK-	37	GND
12	Reserved	38	USB_D+
13	REFCLK+	39	+3.3V
14	Reserved	40	GND
15	GND	41	+3.3V
16	Reserved	42	Reserved
17	Reserved	43	GND
18	GND	44	Reserved
19	Reserved	45	CLINK_CLK
20	Reserved	46	Reserved
21	GND	47	CLINK_DATA
22	PERST#	48	+1.5V
23	PERn0	49	CLINK_RST_N
24	+3.3Vaux	50	GND
25	PERp0	51	Reserved
26	GND	52	+3.3V

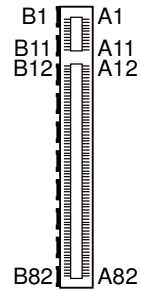


M_PCIE1

PCIE BUS

You will find **PCI_E1 & PCI_E2** with 164 pins each on BA-0951.

The pin assignments are as follows:



PCI_E1:

PCI_E1/PCI_E2

A				B			
PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT
A1	Reserved	A42	GND	B1	+12V	B42	EXP_A_TX_6_D N
A2	+12V	A43	EXP_A_RX_6_D P	B2	+12V	B43	GND
A3	+12V	A44	EXP_A_RX_6_D N	B3	+12V	B44	GND
A4	GND	A45	GND	B4	GND	B45	EXP_A_TX_7_DP
A5	Reserved	A46	GND	B5	SMB_CLK	B46	EXP_A_TX_7_DN
A6	Reserved	A47	EXP_A_RX_7_D P	B6	SMB_DATA_	B47	GND
A7	Reserved	A48	EXP_A_RX_7_D N	B7	GND	B48	Reserved
A8	Reserved	A49	GND	B8	+3.3V	B49	GND
A9	+3.3V	A50	Reserved	B9	Reserved	B50	Reserved
A10	+3.3V	A51	Reserved	B10	+3.3SB	B51	Reserved
A11	PWRGD	A52	Reserved	B11	Wakeup	B52	Reserved
A12	GND	A53	Reserved	B12	Reserved	B53	Reserved
A13	PEG1_CLK_P	A54	Reserved	B13	GND	B54	Reserved
A14	PEG1_CLK_N	A55	Reserved	B14	EXP_A_TX_0_D P	B55	Reserved
A15	GND	A56	Reserved	B15	EXP_A_TX_0_D N	B56	Reserved
A16	EXP_A_RX_0_DP	A57	Reserved	B16	GND	B57	Reserved
A17	EXP_A_RX_0_DN	A58	Reserved	B17	PCIEX16_PRSN T2	B58	Reserved
A18	GND	A59	Reserved	B18	GND	B59	Reserved
A19	Reserved	A60	Reserved	B19	EXP_A_TX_1_D P	B60	Reserved

A				B			
PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT
A20	GND	A61	Reserved	B20	EXP_A_TX_1_D N	B61	Reserved
A21	EXP_A_RX_1_D P	A62	Reserved	B21	GND	B62	Reserved
A22	EXP_A_RX_1_D N	A63	Reserved	B22	GND	B63	Reserved
A23	GND	A64	Reserved	B23	EXP_A_TX_2_D P	B64	Reserved
A24	GND	A65	Reserved	B24	EXP_A_TX_2_D N	B65	Reserved
A25	EXP_A_RX_2_D P	A66	Reserved	B25	GND	B66	Reserved
A26	EXP_A_RX_2_D N	A67	Reserved	B26	GND	B67	Reserved
A27	GND	A68	Reserved	B27	EXP_A_TX_3_D P	B68	Reserved
A28	GND	A69	Reserved	B28	EXP_A_TX_3_D N	B69	Reserved
A29	EXP_A_RX_3_D P	A70	Reserved	B29	GND	B70	Reserved
A30	EXP_A_RX_3_D N	A71	Reserved	B30	Reserved	B71	Reserved
A31	GND	A72	Reserved	B31	Reserved	B72	Reserved
A32	Reserved	A73	Reserved	B32	GND	B73	Reserved
A33	Reserved	A74	Reserved	B33	EXP_A_TX_4_D P	B74	Reserved
A34	GND	A75	Reserved	B34	EXP_A_TX_4_D N	B75	Reserved
A35	EXP_A_RX_4_D P	A76	Reserved	B35	GND	B76	Reserved
A36	EXP_A_RX_4_D N	A77	Reserved	B36	GND	B77	Reserved
A37	GND	A78	Reserved	B37	EXP_A_TX_5_D P	B78	Reserved
A38	GND	A79	Reserved	B38	EXP_A_TX_5_D N	B79	Reserved
A39	EXP_A_RX_5_D P	A80	Reserved	B39	GND	B80	Reserved
A40	EXP_A_RX_5_D N	A81	Reserved	B40	GND	B81	Reserved
A41	GND	A82	Reserved	B41	EXP_A_TX_6_D P	B82	Reserved

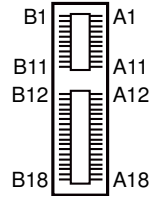
PCI_E2:

A				B			
PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT
A1	Reserved	A42	GND	B1	+12V	B42	EXP_A_TX_14_DN
A2	+12V	A43	EXP_A_RX_14_DP	B2	+12V	B43	GND
A3	+12V	A44	EXP_A_RX_14_DN	B3	+12V	B44	GND
A4	GND	A45	GND	B4	GND	B45	EXP_A_TX_15_DP
A5	Reserved	A46	GND	B5	SMB_CLK	B46	EXP_A_TX_15_DN
A6	Reserved	A47	EXP_A_RX_15_DP	B6	SMB_DATA_	B47	GND
A7	Reserved	A48	EXP_A_RX_15_DN	B7	GND	B48	Reserved
A8	Reserved	A49	GND	B8	+3.3V	B49	GND
A9	+3.3V	A50	Reserved	B9	Reserved	B50	Reserved
A10	+3.3V	A51	Reserved	B10	+3.3SB	B51	Reserved
A11	PWRGD	A52	Reserved	B11	Wakeup	B52	Reserved
A12	GND	A53	Reserved	B12	Reserved	B53	Reserved
A13	PEG2_CLK_P	A54	Reserved	B13	GND	B54	Reserved
A14	PEG2_CLK_N	A55	Reserved	B14	EXP_A_TX_8_DP	B55	Reserved
A15	GND	A56	Reserved	B15	EXP_A_TX_8_DN	B56	Reserved
A16	EXP_A_RX_8_DP	A57	Reserved	B16	GND	B57	Reserved
A17	EXP_A_RX_8_DN	A58	Reserved	B17	PCIEX16_PRSN_T2	B58	Reserved
A18	GND	A59	Reserved	B18	GND	B59	Reserved
A19	Reserved	A60	Reserved	B19	EXP_A_TX_9_DP	B60	Reserved
A20	GND	A61	Reserved	B20	EXP_A_TX_9_DN	B61	Reserved
A21	EXP_A_RX_9_DP	A62	Reserved	B21	GND	B62	Reserved
A22	EXP_A_RX_9_DN	A63	Reserved	B22	GND	B63	Reserved
A23	GND	A64	Reserved	B23	EXP_A_TX_10_DP	B64	Reserved
A24	GND	A65	Reserved	B24	EXP_A_TX_10_DN	B65	Reserved

A				B			
PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT
A25	EXP_A_RX_10_D P	A66	Reserved	B25	GND	B66	Reserved
A26	EXP_A_RX_10_D N	A67	Reserved	B26	GND	B67	Reserved
A27	GND	A68	Reserved	B27	EXP_A_TX_11_ DP	B68	Reserved
A28	GND	A69	Reserved	B28	EXP_A_TX_11_ DN	B69	Reserved
A29	EXP_A_RX_11_D P	A70	Reserved	B29	GND	B70	Reserved
A30	EXP_A_RX_11_D N	A71	Reserved	B30	Reserved	B71	Reserved
A31	GND	A72	Reserved	B31	Reserved	B72	Reserved
A32	Reserved	A73	Reserved	B32	GND	B73	Reserved
A33	Reserved	A74	Reserved	B33	EXP_A_TX_12_ DP	B74	Reserved
A34	GND	A75	Reserved	B34	EXP_A_TX_12_ DN	B75	Reserved
A35	EXP_A_RX_12_D P	A76	Reserved	B35	GND	B76	Reserved
A36	EXP_A_RX_12_D N	A77	Reserved	B36	GND	B77	Reserved
A37	GND	A78	Reserved	B37	EXP_A_TX_13_ DP	B78	Reserved
A38	GND	A79	Reserved	B38	EXP_A_TX_13_ DN	B79	Reserved
A39	EXP_A_RX_13_D P	A80	Reserved	B39	GND	B80	Reserved
A40	EXP_A_RX_13_D N	A81	Reserved	B40	GND	B81	Reserved
A41	GND	A82	Reserved	B41	EXP_A_TX_14_ DP	B82	Reserved

You will find **PCI_E3, PCI_E4, PCI_E5 & PCI_E6** connectors with 36 pins each on BA-0951.

The pin assignments are as follows:



PCI_E3~PCI_E6

PCI_E3:

A				B			
PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT
A1	Reserved	A10	+3.3V	B1	+12V	B10	+3.3SB
A2	+12V	A11	PWRGD	B2	+12V	B11	wakeup
A3	+12V	A12	GND	B3	+12V	B12	Reserved
A4	GND	A13	CLK_DP	B4	GND	B13	GND
A5	Reserved	A14	CLK_DN	B5	SMB_CLK	B14	PCH_PE_TXP_5
A6	Reserved	A15	GND	B6	SMB_DATA	B15	PCH_PE_TXN_5
A7	Reserved	A16	PCH_PE_RXP_5	B7	GND	B16	GND
A8	Reserved	A17	PCH_PE_RXN_5	B8	+3.3V	B17	SLOT1_PRSNT2_N
A9	+3.3V	A18	GND	B9	Reserved	B18	GND

PCI_E4:

A				B			
PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT
A1	Reserved	A10	+3.3V	B1	+12V	B10	+3.3SB
A2	+12V	A11	PWRGD	B2	+12V	B11	wakeup
A3	+12V	A12	GND	B3	+12V	B12	Reserved
A4	GND	A13	CLK_DP	B4	GND	B13	GND
A5	Reserved	A14	CLK_DN	B5	SMB_CLK	B14	PCH_PE_TXP_6
A6	Reserved	A15	GND	B6	SMB_DATA	B15	PCH_PE_TXN_6
A7	Reserved	A16	PCH_PE_RXP_6	B7	GND	B16	GND
A8	Reserved	A17	PCH_PE_RXN_6	B8	+3.3V	B17	SLOT2_PRSNT2_N
A9	+3.3V	A18	GND	B9	Reserved	B18	GND

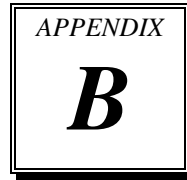
PCI_E5:

A				B			
PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT
A1	Reserved	A10	+3.3V	B1	+12V	B10	+3.3SB
A2	+12V	A11	PWRGD	B2	+12V	B11	wakeup
A3	+12V	A12	GND	B3	+12V	B12	Reserved
A4	GND	A13	CLK_DP	B4	GND	B13	GND
A5	Reserved	A14	CLK_DN	B5	SMB_CLK	B14	PCH_PE_TXP_7
A6	Reserved	A15	GND	B6	SMB_DATA	B15	PCH_PE_TXN_7
A7	Reserved	A16	PCH_PE_RXP_7	B7	GND	B16	GND
A8	Reserved	A17	PCH_PE_RXN_7	B8	+3.3V	B17	SLOT3_PRSENT2_N
A9	+3.3V	A18	GND	B9	Reserved	B18	GND

PCI_E6:

A				B			
PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT
A1	Reserved	A10	+3.3V	B1	+12V	B10	+3.3SB
A2	+12V	A11	PWRGD	B2	+12V	B11	Wakeup
A3	+12V	A12	GND	B3	+12V	B12	Reserved
A4	GND	A13	CLK_DP	B4	GND	B13	GND
A5	Reserved	A14	CLK_DN	B5	SMB_CLK	B14	PCH_PE_TXP_8
A6	Reserved	A15	GND	B6	SMB_DATA	B15	PCH_PE_TXN_8
A7	Reserved	A16	PCH_PE_RXP_8	B7	GND	B16	GND
A8	Reserved	A17	PCH_PE_RXN_8	B8	+3.3V	B17	SLOT4_PRSENT2_N
A9	+3.3V	A18	GND	B9	Reserved	B18	GND

TECHNICAL SUMMARY

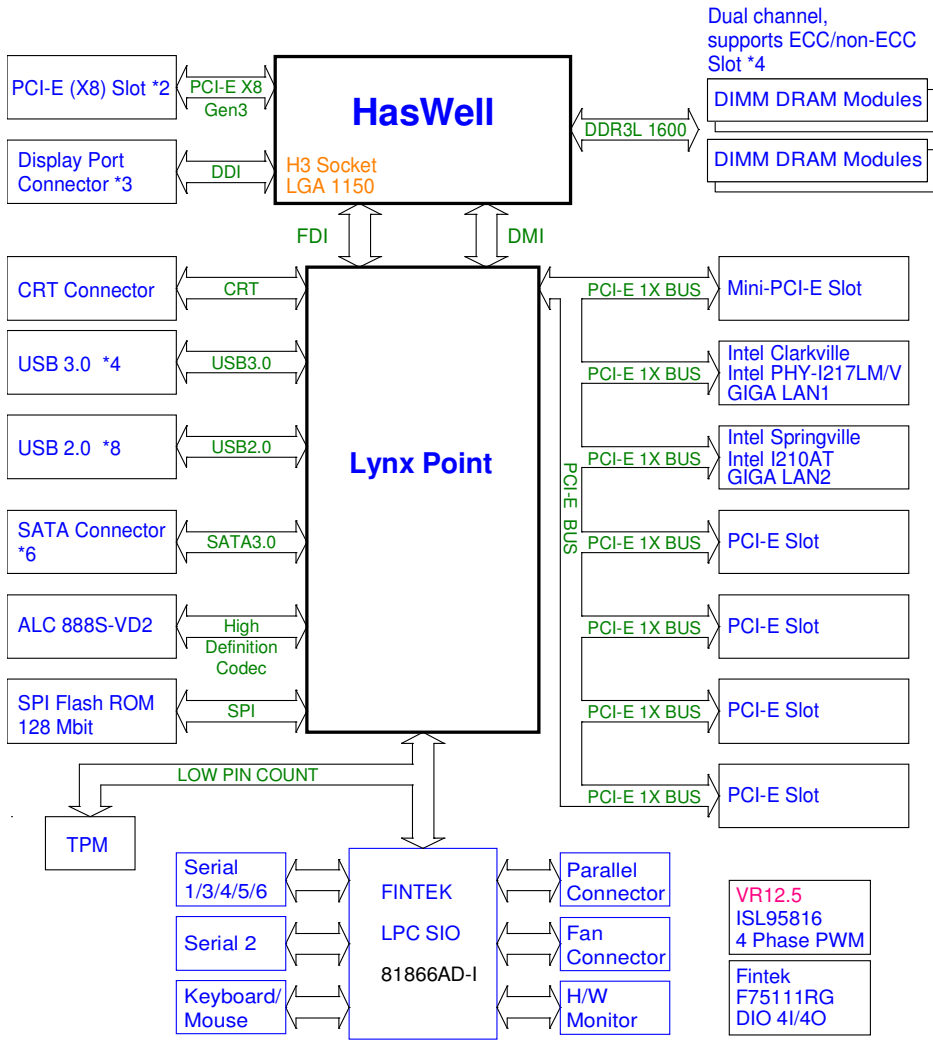


This section introduce you the maps concisely.

Sections included:

- Block Diagram
- Interrupt Map
- DMA Channel Map
- I/O Map
- Memory Map
- Watchdog Timer Configuration
- Flash BIOS Update

BLOCK DIAGRAM



INTERRUPT MAP

IRQ	ASSIGNMENT
0	System timer
1	Standard PS/2 Keyboard
3	Communications Port (COM2)
4	Communications Port (COM1)
7	Communications Port (COM3)
7	Communications Port (COM4)
8	System CMOS/real time clock
10	Communications Port (COM5)
10	Communications Port (COM6)
11	SM Bus Controller
11	Ethernet Controller
11	Ethernet Controller
11	Universal Serial Bus (USB) Controller
11	PCI Simple Communications Controller
11	PCI Serial Port
12	Microsoft PS/2 Mouse
13	Numeric data processor
16	High Definition Audio Controller
16	Standard Enhanced PCI to USB Host Controller
16	PCI standard PCI-to-PCI bridge
19	Standard AHCI 1.0 Serial ATA Controller
19	PCI standard PCI-to-PCI bridge
22	High Definition Audio Controller
23	Standard Enhanced PCI to USB Host Controller
81	Microsoft ACPI-Compliant System
82	Microsoft ACPI-Compliant System
83	Microsoft ACPI-Compliant System
84	Microsoft ACPI-Compliant System
85	Microsoft ACPI-Compliant System
86	Microsoft ACPI-Compliant System

IRQ	ASSIGNMENT
87	Microsoft ACPI-Compliant System
88	Microsoft ACPI-Compliant System
89	Microsoft ACPI-Compliant System
90	Microsoft ACPI-Compliant System
91	Microsoft ACPI-Compliant System
92	Microsoft ACPI-Compliant System
93	Microsoft ACPI-Compliant System
94	Microsoft ACPI-Compliant System
95	Microsoft ACPI-Compliant System
96	Microsoft ACPI-Compliant System
97	Microsoft ACPI-Compliant System
98	Microsoft ACPI-Compliant System
99	Microsoft ACPI-Compliant System
100	Microsoft ACPI-Compliant System
101	Microsoft ACPI-Compliant System
102	Microsoft ACPI-Compliant System
103	Microsoft ACPI-Compliant System
104	Microsoft ACPI-Compliant System
105	Microsoft ACPI-Compliant System
106	Microsoft ACPI-Compliant System
107	Microsoft ACPI-Compliant System
108	Microsoft ACPI-Compliant System
109	Microsoft ACPI-Compliant System
110	Microsoft ACPI-Compliant System
111	Microsoft ACPI-Compliant System
112	Microsoft ACPI-Compliant System
113	Microsoft ACPI-Compliant System
114	Microsoft ACPI-Compliant System
115	Microsoft ACPI-Compliant System
116	Microsoft ACPI-Compliant System
117	Microsoft ACPI-Compliant System
118	Microsoft ACPI-Compliant System

IRQ	ASSIGNMENT
119	Microsoft ACPI-Compliant System
120	Microsoft ACPI-Compliant System
121	Microsoft ACPI-Compliant System
122	Microsoft ACPI-Compliant System
123	Microsoft ACPI-Compliant System
124	Microsoft ACPI-Compliant System
125	Microsoft ACPI-Compliant System
126	Microsoft ACPI-Compliant System
127	Microsoft ACPI-Compliant System
128	Microsoft ACPI-Compliant System
129	Microsoft ACPI-Compliant System
130	Microsoft ACPI-Compliant System
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141	Microsoft ACPI-Compliant System
142	Microsoft ACPI-Compliant System
143	Microsoft ACPI-Compliant System
144	Microsoft ACPI-Compliant System
145	Microsoft ACPI-Compliant System
146	Microsoft ACPI-Compliant System
147	Microsoft ACPI-Compliant System
148	Microsoft ACPI-Compliant System
149	Microsoft ACPI-Compliant System
150	Microsoft ACPI-Compliant System

IRQ	ASSIGNMENT
151	Microsoft ACPI-Compliant System
152	Microsoft ACPI-Compliant System
153	Microsoft ACPI-Compliant System
154	Microsoft ACPI-Compliant System
155	Microsoft ACPI-Compliant System
156	Microsoft ACPI-Compliant System
157	Microsoft ACPI-Compliant System
158	Microsoft ACPI-Compliant System
159	Microsoft ACPI-Compliant System
160	Microsoft ACPI-Compliant System
161	Microsoft ACPI-Compliant System
162	Microsoft ACPI-Compliant System
163	Microsoft ACPI-Compliant System
164	Microsoft ACPI-Compliant System
165	Microsoft ACPI-Compliant System
166	Microsoft ACPI-Compliant System
167	Microsoft ACPI-Compliant System
168	Microsoft ACPI-Compliant System
169	Microsoft ACPI-Compliant System
170	Microsoft ACPI-Compliant System
171	Microsoft ACPI-Compliant System
172	Microsoft ACPI-Compliant System
173	Microsoft ACPI-Compliant System
174	Microsoft ACPI-Compliant System
175	Microsoft ACPI-Compliant System
176	Microsoft ACPI-Compliant System
177	Microsoft ACPI-Compliant System
178	Microsoft ACPI-Compliant System
179	Microsoft ACPI-Compliant System
180	Microsoft ACPI-Compliant System
181	Microsoft ACPI-Compliant System
182	Microsoft ACPI-Compliant System

IRQ	ASSIGNMENT
183	Microsoft ACPI-Compliant System
184	Microsoft ACPI-Compliant System
185	Microsoft ACPI-Compliant System
186	Microsoft ACPI-Compliant System
187	Microsoft ACPI-Compliant System
188	Microsoft ACPI-Compliant System
189	Microsoft ACPI-Compliant System
190	Microsoft ACPI-Compliant System

DMA CHANNELS MAP

TIMER CHANNEL	ASSIGNMENT
Channel 3	Printer port (LPT1)
Channel 4	Direct memory access controller

I/O MAP

I/O MAP	ASSIGNMENT
0x00000000-0x0000001F	Direct memory access controller
0x00000000-0x0000001F	PCI bus
0x00000010-0x0000001F	Motherboard resources
0x00000020-0x00000021	Programmable interrupt controller
0x00000022-0x0000003F	Motherboard resources
0x00000024-0x00000025	Programmable interrupt controller
0x00000028-0x00000029	Programmable interrupt controller
0x0000002C-0x0000002D	Programmable interrupt controller
0x0000002E-0x0000002F	Motherboard resources
0x00000030-0x00000031	Programmable interrupt controller
0x00000034-0x00000035	Programmable interrupt controller
0x00000038-0x00000039	Programmable interrupt controller
0x0000003C-0x0000003D	Programmable interrupt controller
0x00000040-0x00000043	System timer
0x00000044-0x0000005F	Motherboard resources
0x0000004E-0x0000004F	Motherboard resources
0x00000050-0x00000053	System timer
0x00000060-0x00000060	Standard PS/2 Keyboard
0x00000061-0x00000061	Motherboard resources
0x00000062-0x00000063	Motherboard resources
0x00000063-0x00000063	Motherboard resources
0x00000064-0x00000064	Standard PS/2 Keyboard
0x00000065-0x0000006F	Motherboard resources
0x00000065-0x0000006F	Motherboard resources
0x00000067-0x00000067	Motherboard resources
0x00000070-0x00000077	System CMOS/real time clock
0x00000070-0x00000077	Motherboard resources
0x00000072-0x0000007F	Motherboard resources
0x00000080-0x00000080	Motherboard resources
0x00000080-0x00000080	Motherboard resources

I/O MAP	ASSIGNMENT
0x00000081-0x00000091	Direct memory access controller
0x00000084-0x00000086	Motherboard resources
0x00000088-0x00000088	Motherboard resources
0x0000008C-0x0000008E	Motherboard resources
0x00000090-0x0000009F	Motherboard resources
0x00000092-0x00000092	Motherboard resources
0x00000093-0x0000009F	Direct memory access controller
0x000000A0-0x000000A1	Programmable interrupt controller
0x000000A2-0x000000BF	Motherboard resources
0x000000A4-0x000000A5	Programmable interrupt controller
0x000000A8-0x000000A9	Programmable interrupt controller
0x000000AC-0x000000AD	Programmable interrupt controller
0x000000B0-0x000000B1	Programmable interrupt controller
0x000000B2-0x000000B3	Motherboard resources
0x000000B4-0x000000B5	Programmable interrupt controller
0x000000B8-0x000000B9	Programmable interrupt controller
0x000000BC-0x000000BD	Programmable interrupt controller
0x000000C0-0x000000DF	Direct memory access controller
0x000000E0-0x000000EF	Motherboard resources
0x000000F0-0x000000F0	Numeric data processor
0x000002E0-0x000002E7	Communications Port (COM6)
0x000002E8-0x000002EF	Communications Port (COM4)
0x000002F0-0x000002F7	Communications Port (COM5)
0x000002F8-0x000002FF	Communications Port (COM2)
0x00000378-0x0000037F	Printer Port (LPT1)
0x000003B0-0x000003BB	Standard VGA Graphics Adapter
0x000003C0-0x000003DF	Standard VGA Graphics Adapter
0x000003E8-0x000003EF	Communications Port (COM3)
0x000003F8-0x000003FF	Communications Port (COM1)
0x000004D0-0x000004D1	Motherboard resources
0x000004D0-0x000004D1	Programmable interrupt controller
0x00000680-0x0000069F	Motherboard resources

I/O MAP	ASSIGNMENT
0x0000A00-0x0000A0F	Motherboard resources
0x0000A10-0x0000A1F	Motherboard resources
0x0000A20-0x0000A2F	Motherboard resources
0x0000D00-0x0000FFFF	PCI bus
0x0000164E-0x0000164F	Motherboard resources
0x00001800-0x000018FE	Motherboard resources
0x00001854-0x00001857	Motherboard resources
0x00001C00-0x00001CFE	Motherboard resources
0x00001D00-0x00001DFE	Motherboard resources
0x00001E00-0x00001EFE	Motherboard resources
0x00001F00-0x00001FFE	Motherboard resources
0x0000E000-0x0000E01F	Ethernet Controller
0x0000E000-0x0000E01F	PCI standard PCI-to-PCI bridge
0x0000F000-0x0000F03F	Standard VGA Graphics Adapter
0x0000F040-0x0000F05F	SM Bus Controller
0x0000F060-0x0000F07F	Standard AHCI 1.0 Serial ATA Controller
0x0000F080-0x0000F09F	Ethernet Controller
0x0000F0A0-0x0000F0A3	Standard AHCI 1.0 Serial ATA Controller
0x0000F0B0-0x0000F0B7	Standard AHCI 1.0 Serial ATA Controller
0x0000F0C0-0x0000F0C3	Standard AHCI 1.0 Serial ATA Controller
0x0000F0D0-0x0000F0D7	Standard AHCI 1.0 Serial ATA Controller
0x0000F0E0-0x0000F0E7	PCI Serial Port
0x0000FFFF-0x0000FFFF	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources

MEMORY MAP

MEMORY MAP	ASSIGNMENT
0xF7D39000-0xF7D390FF	SM Bus Controller
0xF7D34000-0xF7D37FFF	High Definition Audio Controller
0xF7D3B000-0xF7D3B3FF	Standard Enhanced PCI to USB Host Controller
0xF7C00000-0xF7C7FFFF	Ethernet Controller
0xF7C00000-0xF7C7FFFF	PCI standard PCI-to-PCI bridge
0xF7C80000-0xF7C83FFF	Ethernet Controller
0xF7D3C000-0xF7D3C3FF	Standard Enhanced PCI to USB Host Controller
0xDF200000-0xFEAF7FFF	PCI bus
0xF7D00000-0xF7D1FFFF	Ethernet Controller
0xF7D3D000-0xF7D3DFFF	Ethernet Controller
0xF7D20000-0xF7D2FFFF	Universal Serial Bus (USB) Controller
0xFED40000-0xFED44FFF	System board
0xFED1C000-0xFED1FFFF	Motherboard resources
0xFED10000-0xFED17FFF	Motherboard resources
0xFED18000-0xFED18FFF	Motherboard resources
0xFED19000-0xFED19FFF	Motherboard resources
0xF8000000-0xFBFFFFFF	Motherboard resources
0xFED20000-0xFED3FFFF	Motherboard resources
0xFED90000-0xFED93FFF	Motherboard resources
0xFED45000-0xFED8FFFF	Motherboard resources
0xFF000000-0xFFFFFFFF	Motherboard resources
0xFF000000-0xFFFFFFFF	Intel(R) 82802 Firmware Hub Device
0xFEE00000-0xFEEFFFFFF	Motherboard resources
0xF7FEF000-0xF7FEFFFF	Motherboard resources
0xF7FF0000-0xF7FF0FFF	Motherboard resources
0xF7D3A000-0xF7D3A7FF	Standard AHCI 1.0 Serial ATA Controller

MEMORY MAP	ASSIGNMENT
0xF7D40000-0xF7D4000F	PCI Simple Communications Controller
0xF7D3E000-0xF7D3EFFF	PCI Serial Port
0xF7800000-0xF7BFFFFFF	Standard VGA Graphics Adapter
0xE0000000-0xFFFFFFFF	Standard VGA Graphics Adapter
0xF7D30000-0xF7D33FFF	High Definition Audio Controller
0xFED00000-0xFED003FF	High precision event timer
0xA0000-0xBFFFF	PCI bus
0xA0000-0xBFFFF	Standard VGA Graphics Adapter
0xD0000-0xD3FFF	PCI bus
0xD4000-0xD7FFF	PCI bus
0xD8000-0xDBFFF	PCI bus
0xDC000-0xDFFFF	PCI bus
0xE0000-0xE3FFF	PCI bus
0xE4000-0xE7FFF	PCI bus

WATCHDOG TIMER CONFIGURATION

The I/O port address of the watchdog timer is 2E (hex) and 2F (hex). 2E (hex) is the address port. 2F (hex) is the data port. User must first assign the address of register by writing address value into address port 2E (hex), then write/read data to/from the assigned register through data port 2F (hex).

Configuration Sequence

To program F81866 configuration registers, the following configuration sequence must be followed:

1. Enter the extended function mode
2. Configure the configuration registers
3. Exit the extended function mode

1. Enter the extended function mode

To place the chip into the Extended Function Mode, two successive writes of 0x87 must be applied to Extended Function Enable Registers (EFERs, i.e. 2Eh or 4Eh).

2. Configure the configuration registers

The chip selects the Logical Device and activates the desired Logical Devices through Extended Function Index Register (EFIR) and Extended Function Data Register (EFDR). The EFIR is located at the same address as the EFER, and the EFDR is located at address (EFIR+1). First, write the Logical Device Number (i.e. 0x07) to the EFIR and then write the number of the desired Logical Device to the EFDR. If accessing the Chip (Global) Control Registers, this step is not required. Secondly, write the address of the desired configuration register within the Logical Device to the EFIR and then write (or read) the desired configuration register through the EFDR.

3. Exit the extended function mode

To exit the Extended Function Mode, writing 0xAA to the EFER is required. Once the chip exits the Extended Function Mode, it is in the normal running mode and is ready to enter the configuration mode.

Example Program

Enable watchdog timer and set 30 seconds as the timeout interval.

```
;----- Enter to extended function mode -----  
mov  dx,    2eh  
mov  al,    87h  
out  dx,    al  
out  dx,    al  
;----- Select Logical Device 7 of watchdog timer -----  
mov  al,    07h  
out  dx,    al  
inc  dx  
mov  al,    07h  
out  dx,    al  
;----- Set second as counting unit -----  
dec  dx  
mov  al,    0f5h  
out  dx,    al  
inc  dx  
in   al,    dx  
and  al,    not 08h  
out  dx,    al  
;----- Set timeout interval as 30seconds and start counting -----  
dec  dx  
mov  al,    0f6h  
out  dx,    al  
inc  dx  
mov  al,    30  
out  dx,    al  
;----- Enable watchdog counting -----  
dec  dx  
mov  al,    0f5h  
out  dx,    al
```

```
inc    dx
in     al,    dx
or     al,    20h
```

;----- Enable watchdog reset function -----

```
dec    dx
mov    al,    0fah
out    dx,    al
```

```
inc    dx
in     al,    dx
or     al,    01h
out    dx,    al
```

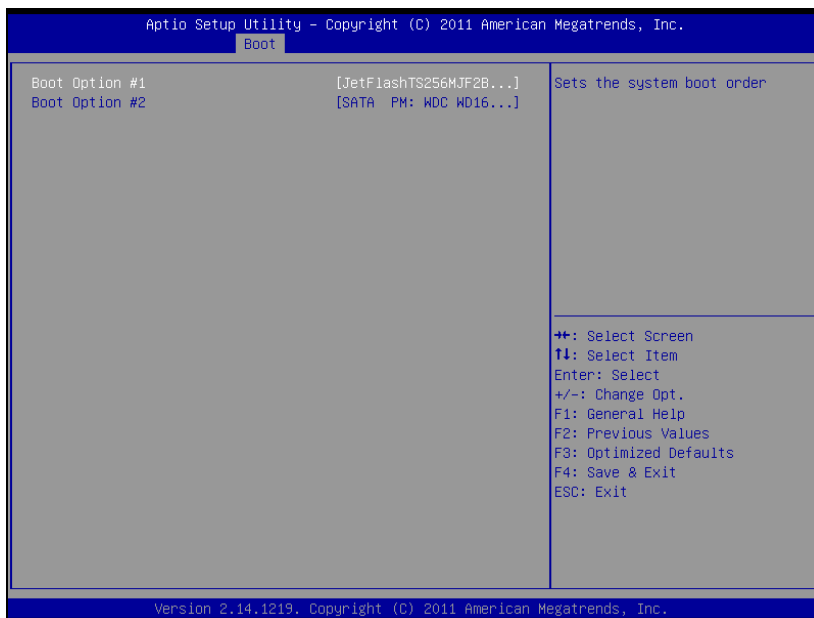
;----- Exit the extended function mode -----

```
dec    dx
mov    al,    0aah
out    dx,    al
```

Flash BIOS Update

I. Before System BIOS update

1. Prepare a bootable media (ex. USB storage device) which can boot system to DOS prompt.
2. Download and save the BIOS file (ex. B95100PW1.bin) to the bootable device.
3. Copy AMI flash utility – AFUDOS.exe (V3.04) into bootable device.
4. Make sure the target system can first boot to the bootable device.
 - a. Connect the bootable USB device.
 - b. Turn on the computer and press or <ESC> key during boot to enter BIOS Setup.
 - c. System will go into the BIOS setup menu.
 - d. Select [Boot] menu.
 - e. Select [Hard Drive BBS Priorities], set the USB bootable device to be the 1st boot device.
 - f. Press <F4> key to save configuration and exit the BIOS setup menu.



II. AFUDOS Command for System BIOS Update

AFUDOS.exe is the AMI firmware update utility; the command line is shown as below:

AFUDOS <ROM File Name> [option1] [option2]...

You can type **AFUDOS /?** to see all the definition of each control options. The recommended options for BIOS ROM update consist of following parameters:

/P: program main BIOS image

/B: program Boot Block

/N: program NVRAM

/X: don't check ROM ID

III. BIOS update procedure

1. Use the bootable USB device to boot up system into the MS-DOS command prompt.
2. Type in `AFUDOS B951xxxx.ROM /p /b /n /x` and press enter to start the flash procedure.

Note: `xxxx` means the BIOS revision part, ex. 0PW1...

3. During the update procedure, you will see the BIOS update process status and its percentage. Beware! Do not turn off system power or reset your computer if the whole procedure are not complete yet, or it may crash the BIOS ROM and make system unable to boot up next time.
4. After BIOS update procedures is complete, the messages should be like the figure shown below:

```
C:\TEST\951>afudos B9510TWR.bin /p /b /n /x
-----+
:                AMI Firmware Update Utility v3.04.00                :
:      Copyright (C)2012 American Megatrends Inc. All Rights Reserved.  :
:-----+
Reading flash ..... done
- ME Data Size checking . ok
- FFS checksums ..... ok
Erasing Boot Block ..... done
Updating Boot Block ..... done
Verifying Boot Block ..... done
Erasing Main Block ..... done
Updating Main Block ..... done
Verifying Main Block ..... done
Erasing NVRAM Block ..... done
Updating NVRAM Block ..... done
Verifying NVRAM Block ..... done

C:\TEST\951>
```

5. You can restart the system and boot up with new BIOS now.
6. Update is complete after restart.

7. Verify during following boot that the BIOS version displayed at initialization screen has changed.

