USER'S MANUAL

SA-5942

High Performance Desktop Intel® 4th Gen. CPU Book Size PC With 2DVI, 4COM & 2LAN

SA-5942 **M2**

SA-5942

High Performance Desktop Intel[®] 4th Gen. CPU Book Size PC

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DISCLAIMER

This user's manual is meant to assist you 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.

WARNING! Some internal parts of the system may have high electrical voltage. And therefore we strongly recommend that qualified engineers can open and disassemble the system. Access can only be gained by SERVICE PERSONS or by USERS who have been instructed about the reasons for the restrictions applied to the

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chapter I

INTRODUCTION

This chapter gives you the information for SA-5942. It also outlines the System specification.

Section includes:

- About This Manual
- System Specifications
- Safety Precautions

Experienced users can skip to chapter 2 on page 2-1 for Quick Start.

1-1. ABOUT THIS MANUAL

Thank you for purchasing our SA-5942 high Performance Desktop Intel[®] 4th Gen. CPU Book Size PC with 2DVI, 4COM and 2LAN. SA-5942 provides faster processing speed, greater expandability and can handle more task 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, and Sound utility.

Chapter 4 BIOS Setup

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

Appendix A System Diagrams

This appendix gives you the exploded diagrams and part numbers of the SA-5942

Appendix B Technical Summary

This appendix gives you the information about the Technical maps, Watchdog-timer configuration, and Flash BIOS Update.

1-2. SYSTEM ILLUSTRATION





Rear View



Top View





Side View



Quarter View



Unit: mm

1-3. SYSTEM SPECIFICATION

System

CPU	Intel [®] 4 th Gen. Core [™] i7/i5/i3, Pentium [®] , Celeron [®]	
	(LGA1150)	
Chipset	Intel [®] Q87/H81	
OS Support	Windows 8/Windows 7; WES8/7	
Memory	2 x DDR3 SO-DIMM socket (up to 16GB)	
BIOS	AMI	
Drive Bays	2 x 2.5" SATA HDD or 1x 3.5" SATA HDD	
	1 x slim DVD-RW (optional)	
Watchdog	1~255 seconds	
Power Supply	ATX Flex 220W	
Dimension	300 x 94 x 270 mm (11.8" x 3.7" x 10.6")	
Certificate	CE/FCC	

I/O Ports

Serial Port	4 ports:		
	• COM1/3/4: RS-232 only		
	• COM2: RS-232/422/485		
	 COM1/2: Both are RI/+5V/+12V selectable. 		
USB Port	• 6 x USB 2.0 (2 are external & stacked with LAN, 4 are		
	internal pin-headers.)		
	• 2 x external USB 3.0, stacked with LAN		
SATA Interface	• Intel [®] Q87: 3 x SATA III		
	 Intel[®] H81: 1 x SATA II, 2 x SATA III 		
LAN	Dual ports, support Wake-on-LAN		
	 LAN1: Intel[®] I217-LM/V 		
	 LAN2: Intel[®] I210-AT 		
Audio	Realtek ALC888S-VD2-GR High Definition audio codec		
	Line-in/Line-out/MIC		
	Option: S/PDIF		
Keyboard/Mouse	1 x PS/2		
Expansion Bus	1 x PCIe (16x) Gen. 2		

Display

Graphics	Built-in processor to share the system memory.
	• 1 x DVI-I
	• 1 x DVI-D
	 1 x Display Port

Environment

Operating Temp.	$0 \sim 40^{\circ} \text{C} (32 \sim 104^{\circ} \text{F})$
Storage Temp.	-20 ~ 60°C (-4 ~ 140°F)
Humidity	20~90%

1-4. SAFETY PRECAUTIONS

Follow the messages below to avoid your systems from damage:

- 1. The range of operating voltage should be between 100V~ 240V. Otherwise, the system could be damaged.
- 2. Place your SA-5942 on a sturdy & level surface. Be sure to allow enough space to have easy access around the system.
- 3. Avoid moving the system rapidly from a hot place to a cold one and vice versa because condensation may come from inside of the system.
- 4. Place SA-5942 in strong vibrations may cause hard disk failure.
- 5. Avoid putting heavy objects on top of the system.
- 6. Do not turn the system upside down. This may cause the floppy drive and hard drive to mal-function.
- 7. If water or other liquid spills into this product, unplug the power cord immediately.
- 8. When the outside of the case is stained, remove the stain with neutral washing agent with a dry cloth.
- 9. If dust has been accumulated on the outside, clean with a special vacuum cleaner made for computers.

HARDWARE CONFIGURATION



**** QUICK START ****

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

Section includes:

- System External I/O Ports & Pin Assignment
- Mainboard Component Locations & Jumper Settings

2-1. SYSTEM EXTERNAL I/O PORTS & PIN ASSIGNMENT

I/O View



2-1-1. COM Port

COM1/3/4: COM Ports

- COM1: fixed as RS-232
- COM3: fixed as RS-232, co-lay with the on-board COM3 connector
- · COM4: fixed as RS-232, co-lay with the on-board COM4 connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	DCD#	6	DSR#
2	RX	7	RTS#
3	TX	8	CTS#
4	DTR#	9	RI#
5	GND		



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

DIN	ASSIGNMENT			
PIN	RS-232	RS-422	RS-485	
1	DCD#	TX-	RS-485-	
2	RX	TX+	RS-485+	
3	ТХ	RX+	Х	
4	DTR#	RX-	Х	
5	GND	GND	GND	
6	DSR#	Х	Х	
7	RTS#	Х	Х	
8	CTS#	Х	Χ	
9	RI#	Х	Х	



2-1-2. PS/2 Keyboard & Mouse Jacks

PS/2: PS/2 Keyboard & Mouse Port

Keyboard:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	KBDATA	4	VCC5
2	NC	5	KBCLK
3	GND	6	NC

Mouse:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
7	MSDATA	10	VCC5
8	NC	11	MSCLK
9	GND	12	NC



2-1-3. LAN Port

LAN1, LAN2: RJ45 LAN Ports

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	MDI_0P	5	MDI_2P
2	MDI_0N	6	MDI_2N
3	MDI_1P	7	MDI_3P
4	MDI_1N	8	MDI_3N



LAN1/ LAN2

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

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2-1-4. USB Ports

PIN	ASSIGNMENT	PIN	ASSIGNMENT
A1	VCC5	B1	VCC5
A2	USBP0N	B2	USBP1N
A3	USBP0P	B3	USBP1P
A4	GND	B4	GND
A5	RX1_DN	B5	RX2_DN
A6	RX1_DP	B6	RX2_DP
A7	GND	B7	GND
A8	TX1_DN	B8	TX2_DN
A9	TX1_DP	B9	TX2_DP

USB3.0 Ports: USB Double Stack Connector



USB3.0

USB2.0 Ports: USB Double Stack Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	VCC5	5	VCC5
2	USBP2N	6	USBP3N
3	USBP2P	7	USBP3P
4	GND	8	GND



USB2.0

2-1-5. DVI Port

DVI1: Stacked DVI-D & DVI-I Ports

DVI-D: Supports only DVI signal.

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	DP_Data2-	13	NC
2	DP_Data2+	14	+5V Power
3	Ground	15	Ground
4	NC	16	HOT Plug Detect
5	NC	17	DP_Data0-
6	DP_Ctrl_Clock	18	DP_Data0+
7	DP_Ctrl_ Data	19	Ground
8	CRT_VSYNC	20	NC
9	DP_Data1-	21	NC
10	DP_Data1+	22	Ground
11	Ground	23	DP_Clock+
12	NC	24	DP_Clock-

DVI-D

DVI-I: Supports DVI or VGA signal.

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	DP_Data2-	15	Ground
2	DP_Data2+	16	HOT Plug Detect
3	Ground	17	DP_Data0-
4	NC	18	DP_Data0+
5	NC	19	Ground
6	DP_Ctrl_Clock	20	NC
7	DP_Ctrl_ Data	21	NC
8	CRT_VSYNC	22	Ground
9	DP_Data1-	23	DP_Clock+
10	DP_Data1+	24	DP_Clock-
11	Ground	C1	CRT_RED
12	NC	C2	CRT_GREE
13	NC	C3	CRT_BLUE
14	+5V Power	C4	CRT_HSYNC



2-1-6. Audio Jack

Line-in (Blue), Line-out (Green) & Mic-in (Pink):

The connector can also support only Microphone.

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_L
3	GND
4	GND
5	HD_MIC1-R_L

Mic-in

2-2. MAINBOARD COMPONENT LOCATIONS & JUMPER SETTINGS

M/B: BM-0942



FP1 SYS_FAN1

Mainboard Connectors, Jumpers and Component Locations - front



Mainboard Component Location - back

JUMPER/CONNECTOR	NAME
COM Port	COM1, COM2
COM Connector	COM3, COM4
Keyboard & Mouse Port	KB_MS1
DVI Port	DVI1
LAN & USB Port	LAN1_USB1, LAN2_USB2
Audio Jack	AUDIO1
COM Port RI & Voltage Selection	JP_COM1, JP_COM2
COM2 RS-232/422/485 Selection	JP8
COM2 Auto-detect Selection	JP7
Front Panel Connector & Selection	FP1
Intel [®] ME Selection	JP3
Clear CMOS Data Selection	JP4
BIOS Recovery Mode Selection	JP1
Fan Connector	CPU_FAN1, SYS_FAN1, SYS_FAN2
SATA Connector	SATA1, SATA2, SATA3
USB Connector	USB3, USB4
Display Port Connector	DP1
ATX Power Connector	ATX_PWR1, ATX_PWR2

2-2-1. Jumpers & Connectors Quick Reference Table

2-2-2. How to Set 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 & 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



Jumper Block looks like this	

Jumper Settings



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2-2-3. COM Port

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	DCD#	6	DSR#
2	RX	7	RTS#
3	ТХ	8	CTS#
4	DTR#	9	RI#
5	GND		





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

DIN	ASSIGNMENT			
FIN	RS-232	RS-422	RS-485	
1	DCD#	TX-	RS-485-	
2	RX	TX+	RS-485+	
3	ТХ	RX+	Х	
4	DTR#	RX-	Х	
5	GND	GND	GND	
6	DSR#	Х	Х	
7	RTS#	Х	Х	
8	CTS#	Х	Х	
9	RI#	Х	Х	



2-2-4. COM Connector

COM3, COM4: COM3 & COM4Connectors, fixed as RS-232

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	DCD#	6	DSR#
2	RX	7	RTS#
3	ТХ	8	CTS#
4	DTR#	9	RI#
5	GND	10	NC



2-2-5. Keyboard & Mouse Ports

KB_MS1: PS/2 Keyboard & Mouse Port

Keyboard:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	KBDATA	4	VCC5
2	NC	5	KBCLK
3	GND	6	NC

Mouse:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
7	MSDATA	10	VCC5
8	NC	11	MSCLK
9	GND	12	NC



Ο

2-2-6. DVI Port

DVI1: Stacked DVI-D & DVI-I Ports

DVI-D: Supports only DVI signal.

PIN	ASSIGNMENT	PIN	ASSIGNMENT	
1	DP_Data2-	13	NC	
2	DP_Data2+	14	+5V Power	
3	Ground	15	Ground	
4	NC	16	HOT Plug Detect	
5	NC	17	DP_Data0-	
6	DP_Ctrl_Clock	18	DP_Data0+	
7	DP_Ctrl_ Data	19	Ground	
8	CRT_VSYNC	20	NC	
9	DP_Data1-	21	NC	
10	DP_Data1+	22	Ground	
11	Ground	23	DP_Clock+	
12	NC	24	DP_Clock-	

DVI-I: Supports DVI or VGA signal.

				01.00
PIN	ASSIGNMENT	PIN	ASSIGNMENT	
1	DP_Data2-	15	Ground	
2	DP_Data2+	16	HOT Plug Detect	
3	Ground	17	DP_Data0-	
4	NC	18	DP_Data0+	
5	NC	19	Ground	
6	DP_Ctrl_Clock	20	NC	
7	DP_Ctrl_Data	21	NC	
8	CRT_VSYNC	22	Ground	
9	DP_Data1-	23	DP_Clock+	
10	DP_Data1+	24	DP_Clock-	
11	Ground	C1	CRT_RED	
12	NC	C2	CRT_GREE	
13	NC	C3	CRT_BLUE	
14	+5V Power	C4	CRT_HSYNC	

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2-2-7. LAN & USB Port

LAN1_USB1: LAN & Two USB3.0 Ports

LAN1 signal:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	MDI_0P	5	MDI_2P
2	MDI_0N	6	MDI_2N
3	MDI_1P	7	MDI_3P
4	MDI_1N	8	MDI_3N

LAN LED Indicator:

Left Side LED

Red Color On	Giga LAN Speed Indicator
Off	No LAN switch/hub connected.
D' 14 C' 1. LED	

Right Side LED

Orange Color Blinking	LAN Message Active
Off	No LAN Message Active

Red Orange

LAN1_USB1

USB3.0 signal:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
A1	VCC5	B1	VCC5
A2	USBP0N	B2	USBP1N
A3	USBP0P	B3	USBP1P
A4	GND	B4	GND
A5	RX1_DN	B5	RX2_DN
A6	RX1_DP	B6	RX2_DP
A7	GND	B7	GND
A8	TX1_DN	B8	TX2_DN
A9	TX1_DP	B9	TX2_DP

LAN2_USB2: LAN & Two USB2.0 Ports

LAN2 signal:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	MDI0_DP	5	MDI2_DP
2	MDI0_DN	6	MDI2_DN
3	MDI1_DP	7	MDI3_DP
4	MDI1_DN	8	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

USB2.0 signal:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
A1	VCC5	B1	VCC5
A2	USBP2N	B2	USBP3N
A3	USBP2P	B3	USBP3P
A4	GND	B4	GND



LAN2_USB2

2-2-8. Audio Jack

AUDIO1: Line-in, Line-out & Microphone The connector can also support only Microphone.

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_L
3	GND
4	GND
5	HD_MIC1-R_L



2-2-9. COM Port RI & Voltage Selection

SELECTION	JUMPTER	JUMPER ILLUSTRATION	
	SETTING	COM1	COM2
RI	1-2	6 5 2 1 JP_COM1	2 1 006 1 0 5 JP_COM2
12V	3-4	6 5 2 1 JP_COM1	2006 1005 JP_COM2
5V	5-6	6 5 2 0 1 JP_COM1	2006 1005 JP_COM2

JP_COM1 & JP_COM2: COM1 & COM2 Ports RI & Voltage Selection

Note: Manufacturing default is RI.

2-2-10. COM2 RS-232/422/485 Selection

SELECTION	JUMPER SETTINGS	JUMPER ILLUSTRATION
RS-232	All Open	2
		JP8
RS-422	1-2, 3-4, 9-10	2 10 1 10 1 10 9 JP8
RS-485	1-2, 5-6, 7-8	2 10 1 9 JP8

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

Note: Manufacturing default is RS-232.

2-2-11. COM2 Auto-Detect Selection

JP7: COM2 Auto-detect Selection

SELECTION	JUMPER SETTINGS	JUMPER ILLUSTRATION
Normal	1-2	3 1 JP7
Auto Gating	2-3	3 1 JP7

Note: Manufacturing default is Normal.

2-2-12. Front Panel Connector & Selection

FP1: Front Panel Con	nector
----------------------	--------

SELECTION	PIN & ASSIGNMENT	JUMPER SETTINGS	JUMPER ILLUSTRATION
HDD LED	1. HDD_LED+	1-3	
	3. HDD_LED-		2 FP1
Power LED	2. PWR_LED+	2-4	
	4. PWR_LED-		2 1 FP1
Reset Button	5. GND		
	7. RST_BTN	5-7	2001 FP1

SELECTION	PIN & ASSIGNMENT	JUMPER SETTINGS	JUMPER ILLUSTRATION
	6. SPK_VCC		12 11
External Speaker	8. Speaker signal	6-8-10-12	
	10. Speaker signal	0 0 10 12	2 🗌 1
	12. Speaker signal		FP1
ATX Power	9. GND	0.11	
Button	11. PWRBTNSW	9-11	2001 FP1

2-2-13. Intel[®] ME Selection

JP3: Intel[®] ME Selection

SELECTION	JUMPER SETTINGS	JUMPER ILLUSTRATION
Normal	Open	1 JP3
ME Disabled	Close	JP3

Note: Manufacturing Default is Normal.

2-2-14. Clear CMOS Data Selection

SELECTION	JUMPER SETTINGS	JUMPER ILLUSTRATION
Normal	Open	1 🗆 J P4
Clear CMOS*	Close	¹ JP4

JP4: Clear CMOS Data Selection

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.

2-2-15. BIOS Recovery Mode Selection

SELECTION	JUMPER SETTINGS	JUMPER ILLUSTRATION
Recovery	Open	1] JP1
Normal	Close	JP1

JP1: BIOS Recovery Mode Selection

Note: Manufacturing Default is Normal.

2-2-16. Fan Connector

CPU_FAN1: CPU Fan Connector **SYS_FAN1:** System Fan Connector

PIN	ASSIGNMENT
1	GND
2	VCC12
3	TAC
4	CTL



SYS_FAN2: System Fan Connector

PIN	ASSIGNMENT
1	GND
2	VCC12
3	NC



2-2-17. SATA Connector

SATA1, SATA2, SA	TA3: Three Serial	ATA Connectors
------------------	-------------------	----------------

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	GND	5	RXNC
2	TXPC	6	RXPC
3	TXNC	7	GND
4	GND		



2-2-18. USB Connector

USB3, USB4: USB Connectors

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	VCC5	6	USBP
2	VCC5	7	GND
3	USBN	8	GND
4	USBN	9	NC
5	USBP	10	GND



2-2-19. Display Connector

DP1: Display Port Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	DATA0+	11	GND
2	GND	12	DATA3-
3	DATA0-	13	AUX_ENJ
4	DATA1+	14	GND
5	GND	15	AUX+
6	DATA1-	16	HPD
7	DATA2+	17	AUX-
8	GND	18	VCC3_3
9	DATA2-	19	VCC5
10	DATA3+	20	VCC3_3


2-2-20. ATX Power Connector

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	РОК	20	-5V
9	5VSB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	+3.3V	24	GND

ATX_PWR1: ATX Power Connector



ATX_PWR2: ATX Power Connector

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



SOFTWARE UTILITIES



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 SA-5942 package are our driver utilities, which come in a format of CD ROM. Refer to the following table for driver locations: and go to the corresponding folder for the chipset Intel[®] Q87 or Intel[®] H81:

3-1-1. For Intel[®] Q87

FILENAME (Assume that CD ROM drive is D:)	PURPOSE
D:\Q87\Driver\Plaform\Win7,Win8(32-bit)\Main Chip	Intel [®] chipset device
 D:\Q87\Driver\Plaform\Win7,Win8(64-bit)\Main Chip 	software installation
	utility
 D:\Q87\Driver\Plaform\Win7,Win8(32-bit)\RAID 	Intel [®] Rapid Storage
 D:\Q87\Driver\Plaform\Win7,Win8(64-bit)\RAID 	Technology (formerly
	Matrix RAID) driver
	installation
 D:\Q87\Driver\Plaform\Win7,Win8(32-bit)\USB3.0 	Intel [®] USB3.0 eXtensible
 D:\Q87\Driver\Plaform\Win7,Win8(64-bit)\USB3.0 	host controller
 D:\Q87\Driver\Plaform\Win7,Win8(32-bit)\ME 	Intel [®] Management
 D:\Q87\Driver\Plaform\Win7,Win8(64-bit)\ME 	Engine Interface
 D:\Q87\Driver\Plaform\Win7,Win8(32-bit)\COM 	Patch files for COM
 D:\Q87\Driver\Plaform\Win7,Win8(64-bit)\COM 	ports
 D:\Q87\Driver\Plaform\Win7,Win8(32-bit)\VGA 	Intel [®] HD Graphics
 D:\Q87\Driver\Plaform\Win7,Win8(64-bit)\VGA 	Family for VGA driver
	installation
 D:\Q87\Driver\Plaform\Win7,Win8(32-bit)\LAN 	Intel [®] I217-LM/V &
 D:\Q87\Driver\Plaform\Win7,Win8(64-bit)\LAN 	I210-AT for LAN driver
	installation
 D:\Q87\Driver\Plaform\Win7,Win8(32-bit)\Sound 	Realtek ALC888S for
 D:\Q87\Driver\Plaform\Win7,Win8(64-bit)\Sound 	sound driver installation
D:\Q87\Driver\Flash BIOS	BIOS update utility

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

3-1-2. For Intel[®] H81

FILENAME (Assume that CD ROM drive is D:)	PURPOSE
 D:\H81\Driver\Plaform\Win7,Win8(32-bit)\Main Chip D:\H81\Driver\Plaform\Win7,Win8(64-bit)\Main Chip 	Intel [®] chipset device software installation utility
 D:\H81\Driver\Plaform\Win7,Win8(32-bit)\USB3.0 D:\H81\Driver\Plaform\Win7,Win8(64-bit)\USB3.0 	Intel [®] USB3.0 eXtensible host controller
 D:\H81\Driver\Plaform\Win7,Win8(32-bit)\ME D:\H81\Driver\Plaform\Win7,Win8(64-bit)\ME 	Intel [®] Management Engine Interface
 D:\H81\Driver\Plaform\Win7,Win8(32-bit)\COM D:\H81\Driver\Plaform\Win7,Win8(64-bit)\COM 	Patch files for COM ports
 D:\H81\Driver\Plaform\Win7,Win8(32-bit)\VGA D:\H81\Driver\Plaform\Win7,Win8(64-bit)\VGA 	Intel [®] HD Graphics Family for VGA driver installation
 D:\H81\Driver\Plaform\Win7,Win8(32-bit)\LAN D:\H81\Driver\Plaform\Win7,Win8(64-bit)\LAN 	Intel [®] I217-LM/V & I210-AT for LAN driver installation
 D:\H81\Driver\Plaform\Win7,Win8(32-bit)\Sound D:\H81\Driver\Plaform\Win7,Win8(64-bit)\Sound 	Realtek ALC888S for sound driver installation
D:\H81\Driver\Flash BIOS	BIOS update utility

Note: Be sure to install the utility right after the OS is 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

The Utility Pack is to be installed only for Windows 7/8 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

This utility is applicable to Intel[®] Q87 only.

3-3-1. Introduction

The Intel[®] RST driver utility supports RAID 0, 1, 5 and fully compatible with Windows 7/8 series, 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

To install the utility, 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 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:

- Intel[®] 4th Generation CoreTM Processor Family
- Intel[®] 8 Series/C220 Series Chipset Family
- Intel[®] 4th Generation U-Series Platform I/O

3-4-2. Installation Instructions for Windows 7/8

To install the utility, 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 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 series, detects the system's capabilities and installs the relevant drivers and applications.

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

To install the utility, 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 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 SA-5942 can support a wide range of display. You can display DVI 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

SA-5942 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. 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 AMI BIOS.

Section includes:

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

4-1. INTRODUCTION

The system SA-5942 uses an AMI (American Megatrends Incorporated) Aptio BIOS that is stored in the Serial Peripheral Interface Flash Memory (4MB SPI Flash) and can be updated. The SPI Flash contains the BIOS (Basic Input Output System) setup menu, 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.



SA-5942 USER'S MANUAL

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 menu can be used to view and change the BIOS settings for the computer. The BIOS setup menu is accessible by pressing the $\langle Del \rangle$ or $\langle F2 \rangle$ key on keyboard during the POST stage, right before the operating system is loading. All the settings are described in chapter to be followed.

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:



First POST screen with AMI logo

As long as this message is present on the screen before the operating system boot begins, you may press the <ESC> or key (the one that shares the decimal point at the bottom of the number keypad) to access the setup menu. In a moment, the main menu of the Aptio Setup Utility will appear on the screen:

Aptio Setup Utility - Main Advanced Chipset Boot Sec	- <mark>Copyright (C) 2012 American</mark> curity Save & Exit	Megatrends, Inc.
Main Advanced Chipset Boot Set BIOS Information BIOS Vendor Core Version Compliancy Project Version Build Date and Time System Language System Date System Time Access Level	American Megatrends 4.6.5.4 UEFI 2.3.1; PI 1.2 59420PH1 0.34 x64 12/27/2013 10:11:27 [English] [Thu 01/01/2009] [20:51:27] Administrator	Choose the system default language ++: Select Screen 14: 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 M	egatrends, Inc.

BIOS setup program initial screen

The BIOS setup menu interface and help messages are shown in US English. 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. The following table provides the list of keys available for BIOS setup menu.

4-2-1. BIOS Setup Menu Keys

BIOS Setup menu key	Description
$< \rightarrow$ and $< \rightarrow >$	Selects a different menu screen (moves the selection left or right).
$<\uparrow>$ and $<\downarrow>$	Selects an item (moves the selection up or down).
<enter></enter>	Executes command or selects the sub-menu.
<f2></f2>	Load the previous configuration values.
<f3></f3>	Load the default configuration values.
<f4></f4>	Save the current values and exits the BIOS setup menu.
<esc></esc>	Leaves the sub-menu.
	Triggers confirmation to exit BIOS setup menu.

The following table provides list of keys available for BIOS setup menu.

4-2-2. BIOS Messages

This section describes error messages generated by the board's BIOS. These messages would be displayed on the monitor when certain recoverable error/event occurs during POST stage. The table bellow gives an explanation of the BIOS messages.

BIOS Setup menu key	Explanation
A first boot or NVRAM reset condition has been detected.	BIOS has been updated or the battery was replaced.
The CMOS defaults were loaded.	Default values have been loaded after the BIOS was updated or the battery was replaced.
The CMOS battery is bad or was recently replaced.	The battery may be losing power, replace the battery soon. Also, this message is displayed once the new battery was placed.

4-3. MAIN

BIOS Information American Megatrends Choose the system default BIOS Vendor American Megatrends Language Core Version 4.6.5.4 Language Project Version 59420PH1 0.34 x64 Language Build Date and Time 12/27/2013 10:11:27 System Language System Date [Thu 01/01/2009] English	Aptio Se Main Advanced Chips	tup Utility – Copyright (C) 2012 American at Boot Security Save & Exit	Megatrends, Inc.
System Time [20:51:27]	BIOS Information BIOS Vendor Core Version Compliancy Project Version Build Date and Time System Language System Date System Time	American Megatrends 4.6.5.4 UEFI 2.3.1; PI 1.2 59420PH1 0.34 x64 12/27/2013 10:11:27 [English] [Thu 01/01/2009] [20:51:27]	Choose the system default language
Access Level Administrator ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	Access Level	Administrator	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

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.
Compliancy	No changeable options	Displays the current UEFI version.
Project 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.
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

Aptio Setup Utility – Copyright (C) 2012 American Main <mark>Advanced</mark> Chipset Boot Security Save & Exit	Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit ACPI Settings Trusted Computing CPU Configuration SATA Configuration FB1866 Super IO Configuration FB1866 H/W Monitor Network Stack Switchable Graphics	System ACPI Parameters. ++: Select Screen 14: 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 M	egatrends, inc.

Advanced screen

BIOS Setting	Options	Description/Purpose
ACPI Settings	Sub-Menu	System ACPI Parameters.
Trusted Computing	Sub-Menu	Trusted Computing Parameters.
CPU Configuration	Sub-Menu	CPU Configuration. Parameters.
SATA Configuration	Sub-Menu	SATA Configuration Parameters.
USB Configuration	Sub-Menu	USB Configuration Parameters.
F81866 Super IO Configuration	Sub-Menu	System Super IO Chip Parameters.
F81866 HW Monitor	Sub-Menu	Monitor hardware status
Network stack	Sub-Menu	UEFI network setting
Switchable Graphics	No changeable options	Switchable Graphics selections

4-4-1. Advanced – APCI Settings

Aptio Setup Utility Advanced	– Copyright (C) 2012 Americar	Megatrends, Inc.
ACPI Settings		Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may
Enable Hibernation ACPI Sleep State S3 Video Repost	[Enabled] [S3 only(Suspend to] [Disabled]	be not effective with some OS.
		++: Select Screen
		I∔: Select Item Enter: Select
		+/−: Change Opt. F1: General Help
		F2: Previous Values
		F3: Optimized Defaults F4: Save & Exit FSC: Exit
Version 2.15.1236.	Copyright (C) 2012 American ⊧	legatrends, Inc.

APCI Settings screen

BIOS Setting	Options	Description/Purpose
Enable Hibernation	- Disabled - Enabled	Enables/Disables System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS.
ACPI Sleep State	 Suspend Disabled S1 (CPU Stop Clock) S3 (Suspend to RAM) Both S1 and S3 available for OS to choose from 	 Specifies the ACPI sleep state. Suspend Disabled disables ACPI sleep feature. S1 mode allows the CPU enter Stop Clock mode to stop executing instructions. S3 allows the platform to enter Suspend to RAM mode.

BIOS Setting	Options	Description/Purpose
		• Both S1 and S3 available for OS to choose from allows the OS to choose the sleep state type.
S3 Video Repost	- Disabled	Enable or Disable S3 video Repost
	- Enabled	

4-4-2. Advanced – Trusted Computing

Aptio Setup Utility — (Advanced	Copyright (C) 2012 American	Megatrends, Inc.
Configuration Security Device Support	[Disable]	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TOS EEI protocol and
Current Status Information NO Security Device Found		INT1A interface will not be available.
		++: Select Screen 1↓: Select Item
		Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values
		F3: Uptimized Defaults F4: Save & Exit ESC: Exit
Version 2.15.1236. Co	oyright (C) 2012 American M	egatrends, Inc.

Trusted Computing screen

BIOS Setting	Options	Description/Purpose
Security Device	- Disabled	Enables or Disables BIOS support
Support	- Enabled	for security device
Current Status	No changeable options	Display current security device
Information		information

4-4-3. Advanced – CPU Configuration

Aptio Setup Utility Advanced	– Copyright (C) 2012 America	n Megatrends, Inc.
CPU Configuration		Number of cores to enable in
Intel(R) Core(TM) i5–4570S CPU @ 2	2.90GHz	each processor package.
CPU Signature	306c3	
Processor Family	6	
Microcode Patch	17	
FSB Speed	100 MHz	
Max CPU Speed Min CPU Speed	2900 MHZ	
CPU Speed	3200 MHz	
Processor Cores	4	
Intel HT Technology	Not Supported	
Intel VT-x Technology	Supported	
Intel SMX Technology	Supported	++: Select Screen
54-D1T EIST Technologu	Supported	I↓: Select Item Enter: Select
CPU C3 state	Supported	+/-: Change Ont.
CPU C6 state	Supported	F1: General Help
CPU C7 state	Supported	F2: Previous Values
		F3: Optimized Defaults
L1 Data Cache	32 kB × 4	F4: Save & Exit
L1 Code Cache	32 KB X 4	ESU: EXIT
L3 Cache	6144 kB	
Version 2.15.1236.	Copyright (C) 2012 American	Megatrends, Inc.
Aptio Setup Utility Advanced	– Copyright (C) 2012 America	n Megatrends, Inc.
Aptio Setup Utility Advanced FSB Speed	– Copyright (C) 2012 American 100 MHz	n Megatrends, Inc.
Aptio Setup Utility Advanced FSB Speed Max CPU Speed	- Copyright (C) 2012 America 100 MHz 2900 MHz	n Megatrends, Inc. Enable/Disable Intel SpeedStep
Aptio Setup Utility Advanced FSB Speed Max CPU Speed Min CPU Speed	- Copyright (C) 2012 America 100 MHz 2900 MHz 800 MHz 2000 MHz	n Megatrends, Inc. ■ Enable/Disable Intel SpeedStep
Advanced FSB Speed Max CPU Speed Min CPU Speed CPU Speed CPU Speed CPU Speed	- Copyright (C) 2012 America 100 MHz 2900 MHz 800 MHz 3200 MHz 4	n Megatrends, Inc. ▲ Enable/Disable Intel SpeedStep
Aptio Setup Utility Advanced FSB Speed Max CPU Speed Min CPU Speed CPU Speed Processor Cores Intel HT Technology	- Copyright (C) 2012 America 100 MHz 2000 MHz 800 MHz 3200 MHz 4 Not Supported	n Megatrends, Inc. ▪ Enable/Disable Intel SpeedStep
Aptio Setup Utility Advanced FSB Speed Max CPU Speed Min CPU Speed CPU Speed Processor Cores Intel HT Technology Intel VT-x Technology	- Copyright (C) 2012 Americal 100 MHz 2900 MHz 3200 MHz 3200 MHz 4	n Megatrends, Inc. ▲ Enable/Disable Intel SpeedStep
Aptio Setup Utility Advanced FSB Speed Max CPU Speed CPU Speed CPU Speed Processor Cores Intel HT Technology Intel JT-x Technology Intel SMX Technology	- Copyright (C) 2012 America 100 MHz 2900 MHz 800 MHz 3200 MHz 4 4 Not Supported Supported Supported	n Megatrends, Inc.
Aptic Setup Utility Advanced FSB Speed Max CPU Speed CPU Speed CPU Speed Processor Cores Intel HT Technology Intel VT-× Technology Intel VT-× Technology 64-bit	- Copyright (C) 2012 America 100 MHz 2900 MHz 800 MHz 3200 MHz 4 Not Supported Supported Supported Supported	n Megatrends, Inc. ■ Enable/Disable Intel SpeedStep
Advanced FSB Speed Max CPU Speed Min CPU Speed CPU Speed Processor Cores Intel VT-× Technology Intel VT-× Technology Intel SMX Technology 64-bit EIST Technology CPU Speed EIST Technology	- Copyright (C) 2012 Americal 100 MHz 2000 MHz 3200 MHz 3200 MHz 4 Not Supported Supported Supported Supported Supported Supported	n Megatrends, Inc. ■ Enable/Disable Intel SpeedStep
Aptio Setup Utility Advanced FSB Speed Max CPU Speed Win CPU Speed CPU Speed Processor Cores Intel HT Technology Intel VT-x Technology Intel SMX Technology 64-bit EIST Technology CPU C3 state CPU C3 state	- Copyright (C) 2012 Americal 100 MHz 2900 MHz 800 MHz 3200 MHz 4 Not Supported Supported Supported Supported Supported Supported Supported Supported Supported	n Megatrends, Inc. ▲ Enable/Disable Intel SpeedStep
Aptio Setup Utility Advanced FSB Speed Max CPU Speed CPU Speed CPU Speed Processor Cores Intel HT Technology Intel SMX Technology Intel SMX Technology 64-bit EIST Technology CPU C3 state CPU C6 state CPU C6 state	- Copyright (C) 2012 Americal 100 MHz 2000 MHz 800 MHz 3200 MHz 4 Not Supported Supported Supported Supported Supported Supported Supported Supported Supported Supported	n Megatrends, Inc.
Aptio Setup Utility Advanced FSB Speed Max CPU Speed CPU Speed CPU Speed Processor Cores Intel HT Technology Intel VT-× Technology Intel VT-× Technology 64-bit EIST Technology CPU C3 state CPU C6 state CPU C7 state	- Copyright (C) 2012 Americal 100 MHz 2900 MHz 3200 MHz 3200 MHz 4 Not Supported Supported Supported Supported Supported Supported Supported Supported Supported	 Megatrends, Inc. Enable/Disable Intel SpeedStep ++: Select Screen
Aptic Setup Utility Advanced FSB Speed Max CPU Speed Min CPU Speed CPU Speed Processor Cores Intel NT—rechnology Intel VT—x Technology Intel VT—x Technology 64-bit EIST Technology CPU C3 state CPU C6 state CPU C6 state CPU C7 state	- Copyright (C) 2012 Americal 100 MHz 2900 MHz 800 MHz 3200 MHz 4 Not Supported S	 Hegatrends, Inc. Enable/Disable Intel SpeedStep Herable/Disable Intel SpeedStep Select Screen Select Item
Aptic Setup Utility Advanced FSB Speed Max CPU Speed Min CPU Speed CPU Speed Processor Cores Intel HT Technology Intel VT-× Technology Intel SMX Technology 64-bit EIST Technology CPU C3 state CPU C3 state CPU C4 state CPU C7 state L1 Data Cache L1 Code Cache	- Copyright (C) 2012 Americal 100 MHz 2000 MHz 3200 MHz 3200 MHz 4 4 Not Supported Supporte	 Hegatrends, Inc. Enable/Disable Intel SpeedStep Heiselect Screen Select Ttem Enter: Select tem F/-: Charge Ont
Aptic Setup Utility Advanced FSB Speed Max CPU Speed Min CPU Speed CPU Speed Processor Cores Intel HT Technology Intel VT-x Technology Intel SMX Technology 64-bit EIST Technology CPU C3 state CPU C3 state CPU C3 state CPU C7 state L1 Data Cache L1 Code Cache L2 Cache	- Copyright (C) 2012 Americal 100 MHz 2000 MHz 300 MHz 3200 MHz 4 Not Supported Supported Supported Supported Supported Supported Supported 32 kB x 4 32 kB x 4 32 kB x 4 6144 kB	 Hegatrends, Inc. Enable/Disable Intel SpeedStep Heiselect Screen Select Item Enter: Select +/-: Change Opt. F1: General Helo
Aptic Setup Utility Advanced FSB Speed Max CPU Speed Min CPU Speed CPU Speed Processor Cores Intel HT Technology Intel VT-× Technology 64-bit EIST Technology CPU C3 state CPU C6 state CPU C6 state CPU C7 state L1 Data Cache L1 Code Cache L2 Cache L3 Cache	- Copyright (C) 2012 Americal 100 MHz 2000 MHz 800 MHz 3200 MHz 4 Not Supported S	 Hegatrends, Inc. Enable/Disable Intel SpeedStep ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values
Aptio Setup Utility Advanced FSB Speed Max CPU Speed Min CPU Speed CPU Speed Processor Cores Intel NT Technology Intel VT-× Technology Intel VK Technology 64-bit EIST Technology CPU C3 state CPU C6 state CPU C6 state CPU C6 state CPU C7 state L1 Data Cache L1 Code Cache L2 Cache L3 Cache Active Processor Cores	- Copyright (C) 2012 Americal 100 MHz 2900 MHz 3000 MHz 3000 MHz 4 Not Supported	 Hegatrends, Inc. Enable/Disable Intel SpeedStep +: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults
Aptic Setup Utility Advanced FSB Speed Max CPU Speed Min CPU Speed CPU Speed Processor Cores Intel VT-× Technology Intel VT-× Technology G4-bit EIST Technology CPU C3 state CPU C6 state CPU C6 state CPU C7 state L1 Data Cache L1 Data Cache L2 Cache L3 Cache L3 Cache Active Processor Cores Limit CPUID Maximum	 Copyright (C) 2012 Americal 100 MHz 2900 MHz 800 MHz 3200 MHz 3200 MHz 4 Anot Supported Supported Suported Su	 Hegatrends, Inc. Enable/Disable Intel SpeedStep He: Select Screen Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Advanced Advanced FSB Speed Max CPU Speed Min CPU Speed CPU Speed Processor Cores Intel HT Technology Intel VT-× Technology Intel VT-× Technology G4-bit EIST Technology CPU C3 state CPU C3 state CPU C3 state CPU C4 state CPU C5 state CPU C7 state L1 Data Cache L1 Code Cache L2 Cache L3 Cache Active Processor Cores Limit CPUID Maximum Execute Disable Bit Data Cache	 Copyright (C) 2012 Americal 100 MHz 2900 MHz 800 MHz 3200 MHz 3200 MHz 4 Not Supported Supported Su	 Hegatrends, Inc. Enable/Disable Intel SpeedStep Herical Scheen Select Scheen Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Aptio Setup Utility Advanced FSB Speed Max CPU Speed Min CPU Speed CPU Speed Processor Cores Intel HT Technology Intel VT-× Technology 64-bit EIST Technology CPU C3 state CPU C6 state CPU C6 state CPU C7 state L1 Data Cache L2 Cache L3 Cache L3 Cache L3 Cache L3 Cache L3 Cache L3 Cache Limit CPUID Maximum Execute Disable Bit Intel Virtualization Technology	 Copyright (C) 2012 Americal 100 MHz 2000 MHz 800 MHz 3200 MHz 4 Not Supported Supported Suported Su	 A Enable/Disable Intel SpeedStep Inable/Disable Intel SpeedStep Intel SpeedStep Select Screen Select Item Enter: Select Fit: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Aptio Setup Utility Advanced FSB Speed Max CPU Speed Min CPU Speed CPU Speed Processor Cores Intel NT Technology Intel VT-× Technology 64-bit EIST Technology CPU C3 state CPU C6 state CPU C6 state CPU C7 state L1 Data Cache L1 Code Cache L2 Cache L3 Cache L3 Cache CPU C7 state CPU C7 state L1 Data Cache L3 C	 Copyright (C) 2012 Americal 100 MHz 2900 MHz 800 MHz 800 MHz 800 MHz 800 MHz 800 MHz 900 MHz	 Hegatrends, Inc. Enable/Disable Intel SpeedStep +: Select Screen 1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Aptio Setup Utility Advanced FSB Speed Max CPU Speed Min CPU Speed CPU Speed Processor Cores Intel NT Technology Intel VT-× Technology 64-bit EIST Technology CPU C3 state CPU C6 state CPU C6 state CPU C6 state CPU C6 state CPU C6 state CPU C7 state L1 Data Cache L2 Cache L3 Cache L3 Cache CACHER Execute Oisable Bit Intel Virtualization Technology EIST Intel TXT(LT) Support	 Copyright (C) 2012 Americal 100 MHz 2900 MHz 800 MHz	 Hegatrends, Inc. Enable/Disable Intel SpeedStep +: Select Screen 1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

CPU Configuration screen

SA-5942 USER'S MANUAL

BIOS Setting	Options	Description/Purpose
CPU Signature	No changeable options	Reports the CPU Signature
Processor Family	No changeable options	Reports the CPU Family
Microcode Patch	No changeable options	Reports the CPU Microcode Patch Version.
FSB Speed	No changeable options	Display FSB Speed
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	Display CPU Speed
Processor Cores	No changeable options	Displays number of physical cores in processor.
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	Report if 64 bit support by processor
EIST	No changeable options	Report if EIST support by processor
CPU C3/C6/C7 state	No changeable options	Report if C3/C6/C7 support 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.
Active Processor	- All	Indicates the number of cores to
Cores	- 1	enable in processor.
	- 2	
	- 3	

BIOS Setting	Options	Description/Purpose
Limit CPUID Maximum	- Disabled - Enabled	Enables for legacy operating systems to boot processors with extended CPUID functions.
Execute Disable Bit	- Disabled - Enabled	XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Windows Server 2003 SP1, Windows XP Sp2, SuSE Linux 9.2, Redhat Enterprise 3 Update 3.)
Intel Virtualization Technology	- Disabled - Enabled	When enabled, a VMM can utilize the additional hardware capabilities provided by Vander pool Technology.
EIST	- Disabled - Enabled	Enable or Disable EIST

+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc. Advanced [Enabled] [IDE] SATA Controller(s) SATA Mode Selection Determines how SATA controller(s) operate. Serial ATA Port O Empty Software Preserve Unknown Serial ATA Port 1 Empty Software Preserve Unknown Serial ATA Port 4 Empty Software Preserve Unknown ↔: Select Screen î↓: Select Item Enter: Select

4-4-4. Advanced - SATA Configuration

rsion 2.15.1236. Copyright (C) 2012 American Megatrends, SATA Configuration screen

BIOS Setting	Options	Description/Purpose
SATA	- Disabled	Enable or disable SATA Device.
Controller(s)	- Enabled	
SATA Mode	- IDE	Configures SATA as IDE, AHCI or
Selection	- AHCI	RAID (Q87 only) mode.
	- RAID	
SATA 0/1/4	[drive]	Displays the drive installed on this
		SATA port.
		Shows [Empty] if no drive is installed.

4-4-4-1. AHCI/RAID Mode

Aptio Setup Utility Advanced	– Copyright (C) 2012 America	n Megatrends, Inc.
Advanced SATA Controller(s) SATA Mode Selection Aggressive LPM Support SATA Controller Speed Serial ATA Port 0 Software Preserve Port 0 Hot Plug External SATA SATA Device Type Spin Up Device Serial ATA Port 1 Software Preserve Port 1	Enabled] [Enabled] [Enabled] [Default] ST9160314AS (160.06B) SUPPORTED [Enabled] [Disabled] [Disabled] [Disabled] Hird Disk Drive] [Disabled] Hitachi HTS545 (160.06B) SUPPORTED [Enabled]	Enable or disable SATA Device. ++: Select Screen 11: Select Item
Hot Plug External SATA SATA Device Type Spin Up Device Serial ATA Port 4 Software Preserve Port 4 Hot Plug External SATA SATA Device Type	[Disabled] [Disabled] [Hard Disk Drive] [Disabled] Empty Unknown [Enabled] [Disabled] [Disabled] [Hard Disk Drive]	Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

AHCI/RAID Mode screen

BIOS Setting	Options	Description/Purpose
SATA	- Disabled	Enable SATA Controller
Controller(s)	- Enabled	
Aggressive LPM	- Disabled	Enable PCH to aggressively enter link
Support	- Enabled	power state.
SATA Controller	- Gen1	Indicates the maximum speed the SATA
Speed	- Gen2	controller can support.
	- Gen3	
Port 0/1/4	- Disabled	Enables or disable SATA port.
	- Enabled	
Hot Plug	- Disabled	Designates this port as Hot Pluggable.
	- Enabled	

BIOS Setting	Options	Description/Purpose
External SATA	- Disabled	External SATA Support.
	- Enabled	
SATA Device	- Hard Disk Driver	Identify the SATA port is connected to
Туре	- Solid State Drive	Solid State Drive or Hard Disk Drive.
Spin Up Device	- Disabled	On an edge detect from 0 to 1, the PCH
	- Enabled	starts a COMRESET initialization sequence
		to the device.

4-4-5. Advanced – USB Configuration

Aptio Setup Utility - Advanced	Copyright (C) 2012 American	Megatrends, Inc.
USB Configuration		Enables Legacy USB support.
USB Module Version	8.10.28	AUTO option disables legacy support if no USB devices are connected DISABLE option will
USB Devices: 1 Drive, 2 Hubs		keep USB devices available only for EFI applications.
Legacy USB Support		
USB3.0 Support	[Enabled]	
XHCI Hand-off	[Enabled]	
EHCI Hand-off	[Disabled]	
USB Mass Storage Driver Support	[Enabled]	
USB hardware delays and time-outs:		++: Select Screen
USB transfer time-out	[20 sec]	†↓: Select Item
Device reset time-out	[20 sec]	Enter: Select
Device power-up delay	[Auto]	+/-: Change Opt.
		F1: General Help
Mass Storage Devices:		F2: Previous Values
JetFlashTranscend 1GB 8.07	[Auto]	F3: Optimized Defaults
		F4: Save & Exit
		ESC: Exit
Version 2.15.1236. C	opyright (C) 2012 American M	legatrends, Inc.

USB configuration screen

BIOS Setting	Options	Description/Purpose
USB Devices	No changeable options	Displays number of available USB devices.
Legacy USB	- Enabled	Enables support for legacy USB.
Support	- Disabled	
	- Auto	
USB 3.0 Support	- Enabled	Enable/Disable USB3.0 (XHCI) controller
	- Disabled	support.
XHCI Hand-off	- Enabled	This is a workaround for OSes without
	- Disabled	XHCI hand-off support.
EHCI Hand-off	- Disabled	This is a workaround for OSes w/o EHCI
	- Enabled	hand-off support.

BIOS Setting	Options	Description/Purpose
USB transfer	1/5/10/20 sec	The time-out value for Control, Bulk, and
time-out		Interrupt transfers.
Device reset time-	10/20/30/40 sec	USB mass storage device Start Unit
out		command time-out.
Device power-up	- Auto	Maximum time the device will take before it
delay	- Manual	properly reports itself to the Host
		Controller.
		"Auto" uses default value: for a Root port it
		is 100 ms, for a Hub port the delay is taken
		from Hub descriptor.

4-4-6. Advanced – F81866 Super IO Configuration

Aptio Setup Utility - Advanced	Copyright (C) 2012 American	Megatrends, Inc.
F81866 Super IO Configuration		Set Parameters of COM 1
F81866 Super IO Chip > COM 1 Configuration > COM 2 Configuration > COM 3 Configuration > COM 4 Configuration > F81866 Watchdog	F81866	
		++: Select Screen 1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.15.1236. C	opyright (C) 2012 American M	egatrends, Inc.

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 1/2/3/4	Sub-menu	Set Parameters for COM 1/2/3/4
F81866 Watchdog	Sub-menu	Set watchdog time



4-4-6-1. F81866 IO Configuration – COM1/2/3/4 Configuration

COM1/2/3/4 Configuration screen

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled	Enable/Disable COM 1.
	- Enabled	
Device Settings	No changeable options	Reports the current COM 1 setting.
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	Specifies the base I/O address and interrupt request for the serial port 0 if enabled.

Aptio Se Advanced	etup Utility – Copyright (C) 2012 American	n Megatrends, Inc.
F81866 Watchdog		F81866 Watchdog timer settings
Enable Watchdog		Chapter Disable
Count for Timer (Secor	nds) 1	
		<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version	n 2.15.1236. Copyright (C) 2012American ⊧	legatrends, Inc.

4-4-6-2. F81866 Watchdog

F81866 Watchdog screen

BIOS Setting	Options	Description/Purpose
Enable watchdog	- Disabled	Enable/Disable COM 1.
	- Enabled	
Count for Timer	Timer value	The number of second count for timer
(Seconds)		(1-255 seconds)

Aptio Setup Utility Advanced	y – Copyright (C) 2012 f	American Megatrends, Inc.
Pc Health Status		Smart Fan Mode Select
 Smart Fan Mode Configuration System Temperature CPU Temperature CPU Fan Speed VCORE SVSB VPTS 	: +46 C : +64 C : N/A : +1.768 V : +5.045 V : +5.129 V	
VCC12	: +12.056 V	++: Select Screen
		<pre>fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F0: Octioned Defoute</pre>
		F3: UptImizeo Deraults F4: Save & Exit ESC: Exit
Version 2 45 1226	Popupidht (P) 2042 Am	anican Meratoonds The

4-4-7. Advanced – F81866 Hardware Monitor

USB Configuration screen

BIOS Setting	Options	Description/Purpose
Smart Fan Mode	Sub-menu	Smart Fan Mode select.
Configuration		
System	No changeable options	Displays temperature in the remote
Temperature		thermal sensor zone.
CPU Temperature	No changeable options	Displays processor's temperature.
CPU Fan Speed	No changeable options	Displays fan speed of the CPU fan.
VCORE	No changeable options	Displays voltage level of the +Vcore in
		supply.
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.

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4-4-7-1. Smart Fan Mode Configuration

Aptio Setup Utility - Advanced	Copyright (C) 2012 American	Megatrends, Inc.
Smart Fan Mode Configuration		Smart Fan Mode Select
Smart Fan Mode Configuration CPUFan Smart Fan Control Manual Duty Mode	[Manual Duty Mode] 100	<pre>++: Select Screen 14: Select Item Enter: Select +/: Change Opt. f1: General Help F2: Previous Values F3: Optimized Defaults</pre>
		F4: Save & Exit ESC: Exit
Version 2.15.1236. Co	pyright (C) 2012 American M	egatrends, Inc.

Smart Fan Mode Configuration screen

BIOS Setting	Options	Description/Purpose
CPUFan/ SysFan Samrt Fan Control	- Manual Duty Mode - Auto Duty-Cycle Mode	Smart Fan Mode select.
Manual Duty Mode	Duty value	Set duty cycle(PWM fan type) 1-100

4-4-8. Advanced – Network Stack

Aptio Setup Utility - Advanced	· Copyright (C) 2012 American	Megatrends, Inc.
Network stack Ipv4 PXE Support Ipv6 PXE Support	[Enabled] [Enabled] [Enabled]	Enable/Disable UEFI network stack
		<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.15.1236. C	opyright (C) 2012 American M	egatrends, Inc.

SMART Settings screen

BIOS Setting	Options	Description/Purpose
Network stack	- Disabled	Enable/Disable UEFI Network stack.
	- Enabled	
Ipv4/6 PXE	- Disabled	Enable Ipv4/6 PXE boot support
Support	- Enabled	
Aptio Advanced	Setup Utility – Copyright (C) 2012 Americ	an Megatrends, Inc.
-------------------	--	--
SG Mode Select	[Muxless]	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Versi	lon 2.15.1227. Copyright (C) 2012 American	Megatrends, Inc.

4-4-9. Advanced – Switchable Graphics

NCT6106D Super IO Configuration screen

BIOS Setting	Options	Description/Purpose
SG Mode Select	- Muxless	Switchable Graphics selections

4-5. Chipset

Aptio Setup Utility – Copyright (C) 2012 American Main Advanced <mark>Chipset</mark> Boot Security Save & Exit	Megatrends, Inc.
 PCH-IO Configuration System Agent (SA) Configuration 	PCH Parameters ++: Select Screen 14: 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 Me	egatrends, Inc.

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. Chipset – PCH IO Configuration

Aptio Setup Ut: Chipset	ility – Copyright (C) 2012 A	merican Megatrends, Inc.
Intel PCH RC Version Intel PCH SKU Name Intel PCH Rev ID ▶ PCI Express Configuration	1.6.2.0 H81 05/C2	PCI Express Configuration settings
 USB Configuration PCH Azalia Configuration 		
PCH LAN Controller Wake on LAN SB CRID Restore AC Power Loss	[Enabled] [Disabled] [Disabled] [Power Off]	
		++: Select Screen 11: Select Item Enter: Select
		+/-: Change Opt. F1: General Help F2: Previous Values
		F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.15.1	L236. Copyright (C) 2012 Ame	rican Megatrends, Inc.

PCH IO Configuration screen

BIOS Setting	Options	Description/Purpose
Intel PCH RC Version	No changeable options	Displays the PCH source code module version
Intel PCH SKU Name	No changeable options	Displays PCH product SKU name.
Intel PCH Rev ID	No changeable options	Displays onboard PCH chip revision.
PCI Express Configuration	Sub-menu	PCI Express Configuration settings.
USB Configuration	Sub-menu	USB Configuration setting
PCH Azalia Configuration	Sub-menu	PCH Azalia Configuration settings.
PCH LAN Controller	- Disabled - Enabled	Enable or disable onboard NIC

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BIOS Setting	Options	Description/Purpose
Wake on LAN	- Disabled - Enabled	Enable or disable integrated LAN to wake the system. (The Wake On LAN cannot be disabled if ME is on at Sx state.)
SB CRID	- Disabled - Enabled	Enable or disable SB CRID workaround
Restore AC Power Loss	- Power off - Power on	Select AC power state when power is re-applied after a power failure.



4-5-1-1. PCH IO Configuration - PCI Express Configuration

PCI Express Configuration screen

BIOS Setting	Options	Description/Purpose
PCIE Port 3 is assigned to LAN	No changeable options	Display LAN 1 is locate at PCIE port 3
PCI Express Root Port 4	- Disabled - Enabled	Enable or disable PCIE port 4 for LAN 2.

4-5-1-2. PCH IO Configuration - USB Configuration

Aptio Setup Utility – Chipset	Copyright (C) 2012 American	Megatrends, Inc.
USB Configuration		Control each of the USB ports (0~13) disabling.
USB Ports Per-Port Disable Control USB Port #0 USB Port #1 USB Port #2 USB Port #3 USB Port #3 USB Port #9 USB Port #10 USB Port #11	[Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled]	
USB30 Port #0 USB30 Port #1	[Enabled] [Enabled]	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.15.1236. Co	opyright (C) 2012 American M	egatrends, Inc.

USB Configuration screen

BIOS Setting	Options	Description/Purpose
USB Ports Per-Port	- Enabled	Main control to enable or disable USB
Disable Control	- Disabled	ports.
USB Port	- Enabled	Enable or disable each USB ports.
#0/1/2/3/8/9/10/11	- Disabled	
USB30 Port #0/1		

Aptio Setup Chipset	Utility – Copyright (C)	2012 American Megatren	ds, Inc.
PCH Azalia Configuration Azalia Azalia Docking Support	(Auto) (Enabled)	Control Azalia d Disabled uncondit Enabled uncondit Auto = A if prese	Detection of the evice. = Azalia will be ionally disabled = Azalia will be ionally Enabled zalia will be enabled nt, disabled otherwise.
		++: Sele 14: Sele Enter: S +/-: Cha F1: Gene F2: Prev F3: Opti F4: Save ESC: Exi	ct Screen ct Item elect nge Opt. ral Help ious Values mized Defaults & Exit t
Version 2.1		2012 American Megatrends	

4-5-1-3. PCH IO Configuration – PCH Azalia Configuration

PCH Azalia Configuration screen

BIOS Setting	Options	Description/Purpose
Azalia	- Enabled	Enable or disable internal HDMI
	- Disabled	codec for Azalia.
	- Auto	
Azalia Docking	- Enabled	Enable or disable Azalia Docking
Support	- Disabled	Support of Audio Controller

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

Aptio Setup Chipset	Utility – Copyright (C) 2012 Amer	rican Megatrends, Inc.
System Agent Bridge Name System Agent RC Version VT-d Capability	Haswell 1.6.2.0 Supported	Check to enable VT–d function on MCH.
VT-d Enable NB CRID	[Enabled] [Disabled]	
 Graphics Configuration NB PCIE Configuration Memory Configuration 		
		++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt.
		F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.3	15.1236. Copyright (C) 2012 Americ	can Megatrends, Inc.

System Agent Configuration screen

BIOS Setting	Options	Description/Purpose
System Agent Bridge Name	No changeable options	Displays the system bridge name
System Agent RC version	No changeable options	Displays the IVB source code module version
VT-d Capability	No changeable options	Report if VT-d support by processor
VT-d	- Enabled	Enable or disable VT-d
Enable NB CRID	- Enabled - Disabled	Enable or disable NB CRID workaround
Graphics Configuration	Sub-menu	Configure Graphic Settings.

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

4-5-2-1. System Agent (SA) Configuration – Graphics Configuration

Aptio Setup Utility Chipset	– Copyright (C) 2012 America	an Megatrends, Inc.
Graphics Configuration IGFX VBIOS Version IGfx Frequency Graphics Turbo IMON Current	2179 700 MHz 31	Graphics turbo IMON current values supported (14–31)
Primary Display Aperture Size DVMT Pre-Allocated DVMT Total Gfx Mem ▶ LCD Control	(Auto) [256MB] [32M] [256M]	
		++: 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, 1235	Copyright (C) 2012 American	Medatrends. Inc.

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 integrated graphic controller.
Primary Display	- AUTO - IGFX	Select which of IGFX/PEG Graphics device should be Primary Display
Aperture Size	- 128MB - 256MB - 512MB	Select the Aperture Size
DVMT Pre- Allocated	- 32M ~ 1024M	Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by

BIOS Setting	Options	Description/Purpose
		the Internal Graphics Device.
DVMT Total Gfx Mem	- 128M - 256M - MAX	Intel Dynamic Video Memory Technology allows additional memory to be allocated for graphics usage based on application need. Once the application is closed, the memory that was allocated for graphics usage is then released and made available for system use
LCD Control	Sub-menu	Display devices active selection

Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc. Chipset		
LCD Control		Select Secondary Display Device
Primary IGFX Boot Display Secondary IGFX Boot Display	[CRT (DVI-I)] [DVI 2]	++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.15.1236. Cc	pyright (C) 2012 American M	egatrends, Inc.

LCD Control screen

BIOS Setting	Options	Description/Purpose
Primary IGFX Boot Display	 VBIOS Default CRT (DVI-I) DVI 1 (DVI-I) Onboard DP DVI 2 	Select the Video Device which will be activated during POST. This has no effect if external graphics present. Secondary boot display selection will appear based on your selection. VGA modes will be supported only on primary display.
Secondary IGFX Boot Display	- Disabled - CRT (DVI-I) - DVI 1 (DVI-I) - Onboard DP - DVI 2	Select Secondary Display Device

4-5-2-2. System Agent (SA) Configuration – NB PCIe Configuration

Aptio Setup Utility - Chipset	Copyright (C) 2012 American	Megatrends, Inc.
Chipset NB PCIe Configuration PEGO - Gen X Enable PEG Detect Non-Compliance Device	Not Present [Auto] [Auto] [Disabled]	Configure PEGO BO:D1:FO Gen1-Gen3 ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
		ESC: Exit
Version 2.15.1236. C	opyright (C) 2012American M	egatrends, Inc.

NB PCIe Configuration screen

BIOS Setting	Options	Description/Purpose
PEG0	No changeable options	Display PEG device exist
PEG0 – Gen X	- Auto	Configure PEG0 Gen1~3
	- Gen1	
	- Gen2	
	- Gen3	
Enable PEG	- Disabled	Enable or disable the PEG
	- Enabled	
	- Auto	
Detect Non-	- Disabled	Enable or disable Detect Non-
Compliance	- Enabled	Compliance Device in PEG
Device		

4-5-2-3. System Agent (SA) Configuration – Memory Configuration

Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc. Chipset		
Memory Information		
Memory RC Version Memory Frequency Total Memory Memory Voltage DIMM#0 DIMM#1 DIMM#2 CAS Latency (tCL) Minimum delay time CAS to RAS (tRCDmin) Row Precharge (tRPmin) Active to Precharge (tRASmin) XMP Profile 1 XMP Profile 2	1.6.2.1 1333 Mhz 1024 MB (DDR3) 1.50V Not Present 1024 MB (DDR3) Not Present 9 9 9 9 24 Not Supported Not Supported	++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.15.1236. Co	opyright (C) 2012 American M	egatrends, Inc.

Memory Configuration screen

BIOS Setting	Options	Description/Purpose
Memory	No changeable option	Displays the detail DRAM information
Information	lists.	on platform.

4-6. Boot

Aptio Setup Utility Main Advanced Chipset Boot Se	– Copyright (C) 2012 Americar scurity Save & Exit	n Megatrends, Inc.
Boot Configuration Setup Prompt Timeout Bootup NumLock State	1 [0n]	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting
Quiet Boot Fast Boot	[Disabled] [Disabled]	
Boot Option Priorities Boot Option #1 Boot Option #2 Boot Option #3	[UEFI: Built-in EFI] [JetFlashTranscend 1] [UEFI: JetFlashTrans]	
Hard Drive BBS Priorities CSM16 Parameters CSM parameters		++: Select Screen 11: 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 ⊧	legatrends, Inc.

Boot screen

BIOS Setting	Options	Description/Purpose
Setup Prompt Timeout	Numeric	Number of seconds to wait for setup activation key.
Bootup NumLock Status	- On - Off	Specifies the power-on state of the NumLock Key.
Quiet Boot	- Disabled - Enabled	Enable/Disable Quiet Boot Options
Boot Option #1~#3	- [Drive(s)] - Disabled	Allows setting boot option listed in Hard Drive BBS Priorities.
CSM16 Parameters	Sub-menu	CSM features selection
CSM parameters	Sub-menu	CSM features selection

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc. Boot Boot Option #1 [JetFlashTranscend 1...] JetFlashTranscend 168 8.07 Pisabled #*: Select Screen I: Select Item Enter: Select Screen F: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit ESC: Exit ESC: Exit

4-6-1. Boot - Hard Drive BBS Priorities

Hard drive BBS Priorities screen

BIOS Setting	Options	Description/Purpose
Boot Option #1 -	- [Drive(s)]	Allows setting the boot order of
#3	- Disabled	available drive(s).

4-6-2. Boot – CSM16 Parameters

Aptio Setup U B	tility – Copyright (C) 2012 Ame <mark>oot</mark>	rican Megatrends, Inc.
CSM16 Parameters		UPON REQUEST - GA2O can be disabled using BIOS services.
CSM16 Module Version	78.d0	ALWAYS – do not allow disabling GA20; this option is
GateA20 Active		useful when any RT code is
Option ROM Messages	[Force BIOS]	executed above 1MB.
		<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.15	.1236. Copyright (C) 2012 Ameri	can Megatrends, Inc.

CSM16 Parameters screen

BIOS Setting	Options	Description/Purpose
CSM16 Module Version	78.d0	CSM version information
GateA20 Active	- Upon Request - Always	Specifies Gate-A20 logic gate status. At boot time, Gate-A20 is enabled when counting and testing of all the system's memory and disabled before transferring control to OS.
Option ROM Messages	- Force BIOS - Keep Current	Allows the POST screen to display Option ROM messages.
INT19 Trap Response	- Immediate - Postponed	When enabled it allows host adapters ROM BIOS to capture Interrupt 19 during the boot process and eventually boot from disk(s) connected to those adapters.

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4-6-3. Boot – CSM Parameters

Launch CSM Boot option filter Launch PXE OpROM policy Launch Storage OpROM policy Launch Video OpROM policy Other PCI device ROM priority	[Enabled] [UEFI and Legacy] [Do not launch] [Legacy only] [Legacy only] [UEFI OpROM]	This option controls if CSM will be launched
		<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>

CSM Parameters screen

BIOS Setting	Options	Description/Purpose
Launch CSM	- Disabled	This option controls if CSM will be
	- Enabled	launched
Boot option filter	- UEFI and Legacy	Allows the system run the boot option
	- Legacy only	rom type.
	- UEFI only	
Launch PXE	- Do not launch	Controls the execution of UEFI and
OpROM policy	- UEFI only	Legacy PXE OpROM
	- Legacy only	
Launch Storage	- Do not launch	Controls the execution of UEFI and
OpROM policy	- UEFI only	Legacy Storage OpROM
	- Legacy only	

BIOS Setting	Options	Description/Purpose
Launch Video	- Do not launch	Controls the execution of UEFI and
OpROM policy	- UEFI only	Legacy Video OpROM
	- Legacy only	
	- Legacy first	
	- UEFI first	
Other PCI device	- UEFI OpROM	For PCI devices other than Network,
ROM priority	- Legacy OpROM	Mass storage or Video defines which
		OpROM to launch

4-7. Security

Aptio Setup Ut Main Advanced Chipset Bo	ility – Copyright (C) 2012 American ot Security Save & Exit	Megatrends, Inc.
Password Description		Set Administrator Password
If ONLY the Administrator's then this only limits access only asked for when entering If ONLY the User's password is a power on password and m boot or enter Setup. In Setu have Administrator rights. The password length must be in the following range: Minimum length	password is set, to Setup and is Setup. is set, then this ust be entered to p the User will	
Maximum length	20	→+: Select Screen
Administrator Password User Password		11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values
HDD Security Configuration: P0:ST9160314AS		F3: Optimized Defaults F4: Save & Exit
P1:Hitachi HTS5		ESC: Exit
Version 2.15.	1236. Copyright (C) 2012 American M	egatrends, Inc.

Security screen

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

4-7-1. HDD Security Configuration – HDD 0 [drive]

Aptio Se	tup Utilit	y – Copyright (C) 2012 Am Security	merican Megatrends, Inc.
HDD Password Descripti	on :		
Allows Access to Set, Modify and Clear HardDisk User and Master Passwords. User Password need to be installed for Enabling Security. Master Password can be Modified only when successfully unlocked with Master Password in POST.			
HDD PASSWORD CONFIGURA	TION:		
Security Supported Security Enabled Security Locked Security Frozen HDD User Pwd Status HDD Master Pwd Status	:	Yes No Yes NOT INSTALLED INSTALLED	++: Select Screen 14: 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 Amer	rican Megatrends, Inc.

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.

BIOS Setting	Options	Description/Purpose
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

Aptio Setup Utility – Copyright (C) 2012 American Main Advanced Chipset Boot Security <mark>Save & Exit</mark>	Megatrends, Inc.
Save Changes and Exit Discard Changes and Exit Save Changes and Reset Discard Changes and Reset	Exit system setup after saving the changes.
Save Options Save Changes Discard Changes	
Restore Defaults Save as User Defaults Restore User Defaults	
Boot Override JetFlashTranscend 16B 8.07 UEFI: JetFlashTranscend 16B 8.07 UEFI: Built-in EFI Shell	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.15.1236. Copyright (C) 2012 American Ma	egatrends, Inc.

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.
Save Changes and Reset	No changeable options	Reset the system after saving the changes
Discard Changes and Reset	No changeable options	Reset system without saving any changes
Save Changes	No changeable options	Saves the changes done in BIOS settings so far.
Discard Changes	No changeable options	Discards the changes done in BIOS settings so far.

BIOS Setting	Options	Description/Purpose
Restore Defaults	No changeable options	Loads the optimized defaults for BIOS settings.
Save as User Defaults	No changeable options	Save the changes done so far as User Defaults
Restore User Defaults	No changeable options	Restore the User Defaults to all the setup options
Boot Override	- [Drive(s)]	Forces to boot from selected [drive(s)].

APPENDIX **A**

SYSTEM ASSEMBLY

This appendix contains the exploded diagram of the system.

Section includes:

• Exploded Diagram for Whole System of SA-5942

EXPLODED DIAGRAM FOR WHOLE SYSTEM OF SA-5942



NO.	COMPONENT NAME	PART NO.	Q'TY
1	CPU COOLER	21-003-07575001	1
2	DVD-ROM	SEE ORDER	1
З	FILLISTR HEAD SCREW	22-272-20002011	4
4	POWER CABLE	27-012-00003071	1
5	POWER CABLE(20M to 20F)	27-012-00002073	1
6	SATA LOCK CABLE	27-008-31305031	1
7	FRONT PANEL STD	30-003-28210006	1
8	TOP CHASSIS	20-015-03061233	1
9	SYSTEM FAN	21-004-04040008	1
10	HEX CU BOSS	22-692-40048051	12
11	POWER SWITCH CABLE	27-019-25104071	1
12	POWER SUPPLY HOLDER	20-029-03001082	1
13	POWER SUPPLY	52-001-23220601	1
14	HOLD PLUG	30-054-04100000	1
15	LED CABLE	27-018-08204071	1
16	PAN HEAD SCREW	22-222-30018011	2
17	FRONR PANEL CD-ROM FDD LID	30-003-08410006	1
18	1/0 SHIELD	20-010-07001251	1
19	PAN HEAD SCREW	22-622-60005011	2
20	HANDEL HEAD SCREW	22-382-06005031	2
21	SPRING WASHER SCREW	22-232-30060211	6
22	DRIVER BAY FOR 2.5"HDD	20-004-03001082	1
23	LED HOUSING	30-014-04100009	2
24	FLAT HEAD SCREW	22-215-30060011	4
25	FLAT HEAD SCREW	82-712-47011018	8
26	2.5' SATA HDD	SEE ORDER	1
27	FLAT HEAD SCREW	22-212-30005311	2
28	РСВА	BM-0942	1
29	INNER CHASSIS ASSY	20-015-03005203	1
30	COM PORT CABLE	27-024-23702031	2
31	SATA CABLE FOR CD-ROM	27-008-255030881	1

TECHNICAL SUMMARY



This section introduces you the maps concisely.

Section includes:

- Block Diagram
- Interrupt Map
- DMA Channels 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)
5	Intel [®] 8 Series/C220 Series SMBus Controller - 8C22
7	Communications Port (COM3)
7	Communications Port (COM4)
8	System CMOS/real time clock
12	Microsoft PS/2 Mouse
13	Numeric data processor
16	Intel [®] 8 Series/C220 Series USB EHCI #2 - 8C2D
16	High Definition Audio Controller
19	Intel [®] 8 Series/C220 Series SATA AHCI Controller - 8C02
22	High Definition Audio Controller
23	Intel [®] 8 Series/C220 Series USB EHCI #1 - 8C26
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
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

IRQ	ASSIGNMENT
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
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

IRQ	ASSIGNMENT
128	Microsoft ACPI-Compliant System
129	Microsoft ACPI-Compliant System
130	Microsoft ACPI-Compliant System
131	Microsoft ACPI-Compliant System
132	Microsoft ACPI-Compliant System
133	Microsoft ACPI-Compliant System
134	Microsoft ACPI-Compliant System
135	Microsoft ACPI-Compliant System
136	Microsoft ACPI-Compliant System
137	Microsoft ACPI-Compliant System
138	Microsoft ACPI-Compliant System
139	Microsoft ACPI-Compliant System
140	Microsoft ACPI-Compliant System
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
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

IRQ	ASSIGNMENT
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
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
4294967283	Intel [®] I210 Gigabit Network Connection #3

IRQ	ASSIGNMENT
4294967284	Intel [®] I210 Gigabit Network Connection #3
4294967285	Intel [®] I210 Gigabit Network Connection #3
4294967286	Intel [®] I210 Gigabit Network Connection #3
4294967287	Intel [®] I210 Gigabit Network Connection #3
4294967288	Intel [®] I210 Gigabit Network Connection #3
4294967289	Intel [®] Ethernet Connection I217-LM
4294967290	Intel [®] Management Engine Interface
4294967291	Intel [®] USB 3.0 eXtensible Host Controller
4294967292	Intel [®] HD Graphics 4600
4294967293	Intel [®] 8 Series/C220 Series PCI Express Root Port #4 - 8C16
4294967294	Intel [®] 8 Series/C220 Series PCI Express Root Port #1 - 8C10

Note: The resource information were gathered on Windows 7. (The IRQ could be assigned differently depending on your OS.)

DMA CHANNELS MAP

TIMER CHANNEL	ASSIGNMENT
Channel 4	Direct memory access controller

I/O MAP

I/O MAP	ASSIGNMENT
0x0000000-0x0000001F	Direct memory access controller
0x0000000-0x0000001F	PCI bus
0x00000010-0x0000001F	Motherboard resources
0x0000020-0x00000021	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
0x0000060-0x0000060	Standard PS/2 Keyboard
0x00000061-0x00000061	Motherboard resources
0x0000062-0x0000063	Motherboard resources
0x0000063-0x0000063	Motherboard resources
0x0000064-0x0000064	Standard PS/2 Keyboard
0x00000065-0x0000006F	Motherboard resources
0x00000065-0x0000006F	Motherboard resources
0x0000067-0x0000067	Motherboard resources
0x00000070-0x00000070	Motherboard resources
0x00000070-0x00000070	System CMOS/real time clock
0x00000072-0x0000007F	Motherboard resources
0x00000080-0x00000080	Motherboard resources
0x0000080-0x0000080	Motherboard resources

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I/O MAP	ASSIGNMENT
0x00000081-0x00000091	Direct memory access controller
0x00000084-0x00000086	Motherboard resources
0x0000088-0x0000088	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
0x000002E8-0x000002EF	Communications Port (COM4)
0x000002F8-0x000002FF	Communications Port (COM2)
0x000003B0-0x000003BB	Intel [®] HD Graphics 4600
0x000003C0-0x000003DF	Intel [®] HD Graphics 4600
0x000003E8-0x000003EF	Communications Port (COM3)
0x000003F8-0x000003FF	Communications Port (COM1)
0x000004D0-0x000004D1	Motherboard resources
0x000004D0-0x000004D1	Programmable interrupt controller
0x00000680-0x0000069F	Motherboard resources
0x00000A00-0x00000A0F	Motherboard resources
0x00000A10-0x00000A1F	Motherboard resources
0x00000A20-0x00000A2F	Motherboard resources

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I/O MAP	ASSIGNMENT
0x00000D00-0x0000FFFF	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
0x0000E000-0x0000EFFF	Intel [®] 8 Series/C220 Series PCI Express Root Port #4 - 8C16
0x0000F000-0x0000F03F	Intel [®] HD Graphics 4600
0x0000F040-0x0000F05F	Intel [®] 8 Series/C220 Series SMBus Controller - 8C22
0x0000F060-0x0000F07F	Intel [®] 8 Series/C220 Series SATA AHCI Controller - 8C02
0x0000F0A0-0x0000F0A3	Intel [®] 8 Series/C220 Series SATA AHCI Controller - 8C02
0x0000F0B0-0x0000F0B7	Intel [®] 8 Series/C220 Series SATA AHCI Controller - 8C02
0x0000F0C0-0x0000F0C3	Intel [®] 8 Series/C220 Series SATA AHCI Controller - 8C02
0x0000F0D0-0x0000F0D7	Intel [®] 8 Series/C220 Series SATA AHCI Controller - 8C02
0x0000FFFF-0x0000FFFF	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources

MEMORY MAP

I/O MAP	ASSIGNMENT
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 [®] 82802 Firmware Hub Device
0xFEE00000-0xFEEFFFFF	Motherboard resources
0xF7FDF000-0xF7FDFFFF	Motherboard resources
0xF7FE0000-0xF7FEFFFF	Motherboard resources
0xF7C00000-0xF7C7FFFF	Intel [®] I210 Gigabit Network Connection #3
0xF7C00000-0xF7C7FFFF	Intel [®] 8 Series/C220 Series PCI Express Root Port
	#4 - 8C16
0xF7C80000-0xF7C83FFF	Intel [®] I210 Gigabit Network Connection #3
0xF7D3B000-0xF7D3B3FF	Intel [®] 8 Series/C220 Series USB EHCI #1 - 8C26
0xF7D3C000-0xF7D3C3FF	Intel [®] 8 Series/C220 Series USB EHCI #2 - 8C2D
0xF7D00000-0xF7D1FFFF	Intel [®] Ethernet Connection I217-LM
0xF7D3D000-0xF7D3DFFF	Intel [®] Ethernet Connection I217-LM
0xF7D20000-0xF7D2FFFF	Intel [®] USB 3.0 eXtensible Host Controller
0xF7D3A000-0xF7D3A7FF	Intel [®] 8 Series/C220 Series SATA AHCI Controller - 8C02
0xF7D3F000-0xF7D3F00F	Intel [®] Management Engine Interface
0xFED00000-0xFED003FF	High precision event timer
0xF7800000-0xF7BFFFFF	Intel [®] HD Graphics 4600
0xE0000000-0xEFFFFFFF	Intel [®] HD Graphics 4600
0xF7D34000-0xF7D37FFF	High Definition Audio Controller

I/O MAP	ASSIGNMENT
0xF7D30000-0xF7D33FFF	High Definition Audio Controller
0xF7D39000-0xF7D390FF	Intel [®] 8 Series/C220 Series SMBus Controller -
	8C22
0xA0000-0xBFFFF	Intel [®] HD Graphics 4600
0xA0000-0xBFFFF	PCI bus
0xD0000-0xD3FFF	PCI bus
0xD4000-0xD7FFF	PCI bus
0xD8000-0xDBFFF	PCI bus
0xDC000-0xDFFFF	PCI bus
0xE0000-0xE3FFF	PCI bus
0xE4000-0xE7FFF	PCI bus
0x3E200000-0xFEAFFFFF	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

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.

Code example for watchdog timer

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

Ent	ter to ext	ended function mode
Mov	dx,	2eh
Mov	al,	87h
Out	dx,	al
Out	dx,	al
Sel	ect Logic	cal Device 7 of watchdog timer
Mov	al,	07h
Out	dx,	al
Inc	dx	
Mov	al,	07h
Out	dx,	al
Ena	able watc	hdog feature
Mov	al,	30h
Out	dx,	al
Inc	dx	
Mov	al,	01h
Out	dx,	al
Ena	able watc	h PME
Dec	dx	
Mov	al,	OFAh
Out	dx,	al
Inc	dx	
In	al,	dx
And	al,	51h
Out	dx,	al
Set	second a	as counting unit
Dec	dx	
Mov	al,	0f5h
Out	dx,	al
Inc	dx	

In	al,	dx
And	al,	20h
Out	dx,	al
Set	timeout	interval as 30seconds and start counting
Dec	dx	
Mov	al,	Of6h
Out	dx,	al
Inc	dx	
Mov	al,	1Eh
Out	dx,	al
Exi	it the exte	ended function mode
Dec	dx	
Mov	al,	Oaah
Out	dx,	al

FLASH BIOS UPDATE

I. Before system BIOS update

- 1. Prepare a bootable media (e.g. USB storage device) which can boot system to DOS prompt.
- 2. Download and save the BIOS file (e.g. 59420PH1.bin) to the bootable device.
- 3. Copy AMI flash utility AFUDOS.exe (V3.05.02) into the 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 <F2l> key during boot to enter BIOS setup menu.
 - c.) System will go into the BIOS setup menu.
 - d.) Select [Boot] menu as the picture shows below.
 - e.) Select [Hard Drive BBS Priorities], set the USB bootable device as the 1st boot device.
 - f.) Press <F4> key to save configuration and exit the BIOS setup menu.



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II. AFUDOS command for system BIOS update

AFUDOS.exe is aforementioned 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 5942xxxx.bin /p /b /n /x and press enter to start the flash procedure

Note: xxxx means the BIOS revision part, ex. 0P01...

- 3. During the update procedure, you will see the BIOS update process status and its percentage. Beware! Do not turn off or reset your computer before the update is complete, or it may crash the BIOS ROM and make the system unable to boot up next time. The whole update process may take up to 3 minutes.
- 4. After the BIOS update is complete, the messages from AFUDOS utility should be like the figure shown below.

AMI Firmware Update Utility v3.05.02 Copyright (C)2013 American Megatrends Inc. All Rights Reserved.		
Reading flash	done done done done done done done done	

- 5. You can restart the system and boot up with new BIOS now
- 6. Update is complete after restart
- 7. Verify during the following boot that BIOS version displayed at the initialization screen has changed.

