USER'S MANUAL

BE-0966

3.5" Single Board Computer
supports Intel® Bay Trail SOC
with VGA/ Audio/ 4COM/ 1LAN

BE-0966   M1

BE-0966
3.5" Single Board Computer

COPYRIGHT NOTICE

DISCLAIMER

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

CE NOTICE

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

FCC NOTICE

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

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

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INTRODUCTION
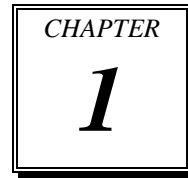
This chapter gives you the information for BE-0966. It also outlines the system specifications.

Sections included:

● About This Manual

● System Specifications

● Safety Precautions

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

1-1. ABOUT THIS MANUAL

Thank you for purchasing our BE-0966 with Intel® Bay Trail M N2930 2GHz
SBC enhanced with VGA/ Audio/ LAN(GbE)/ 4COM, which is fully PC/AT
compatible. The BE-0966 provides faster processing speed, greater expandability
and can handle more tasks than before. This manual is designed to assist you how
to install and set up the system. It contains four chapters. The user can apply this
manual for configuration according to the following chapters:

Chapter 1 Introduction
This chapter introduces you to the background of this manual, and the
specifications for this system. The final page of this chapter will indicate how to
avoid damaging this board.

Chapter 2 Hardware Configuration
This chapter outlines the component locations and their functions. In the end of
this chapter, you will learn how to set jumper and how to configure this card to
meet your own needs.

Chapter 3 Software Utilities
This chapter contains helpful information for proper installations of the VGA
utility, LAN utility, Sound utility, etc.

Chapter 4 Award BIOS Setup
This chapter indicates you how to set up the BIOS configurations.

Appendix A Expansion Bus
This appendix introduces you the expansion bus for a CFast slot.

Appendix B Technical Summary
This appendix gives you the information about the Technical maps, Flash BIOS
Update and the Watchdog-timer configuration.
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1-2. SYSTEM SPECIFICATIONS

System

CPU	Intel Bay Trail M N2930, I E3825 processors
OS Support	Windows 7/ 7 WES
Memory	1 x 204Pin DDR3L So-DIMM, Support DDR3L 1066/1333 up to 4GB
BIOS	AMI
Watchdog	1~255s
Speaker	External Buzzer
Power Supply	DC 12V only
Dimension	102mm x 145mm (4.02" x 5.71")

I/O Ports

Serial Port	4 ports: ● COM1 on edge ● COM2/3/4 : with pin-header
USB Port	6 ports: ● USB 2.0 x 4 port (stack connector on edge x 2, pin- header x 2) ● USB 3.0 x 2 port (stack connector on edge x 2)
SATA Interface	1 x SATAII
Display	● Build-in Bay trail, support VGA ● support LVDS x 1(24bits) ● DP port
LAN	Single Ports, supports Wake-on-LAN with ATX power ● Intel I210AT/IT 1000BaseT Ethernet
Audio	Realtek ALC888 high definition audio: ● with a pin-header on board
Digital IO	4 in / 4 out
Expansion Bus	˙ 1 x Mini-PCIe

Environment

Operation Temp.	N2930: 0 ~ 60℃ (-40~ 185℉)
	E3825: -40 ~ 85℃ (-40 ~ 185℉)
Storage Temp.	-40 ~ 85℃ (-40 ~ 185℉)
Humidity	Operation: 10~95%, Storage: 20~95%

1-3. SAFETY PRECAUTIONS

Follow the messages below to avoid your systems from damage:

1. Keep your system away from static electricity on all occasions.

2. Prevent electric shock. Don't touch any components of this card when the card is power-on. Always disconnect power when the system is not in use.

3. Disconnect power when you change any hardware devices.
    For instance, when you connect a jumper or install any cards, a surge of power may damage the electronic components or the whole system.

HARDWARE CONFIGURATION

*** QUICK START ***

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

Sections included:

- Jumper & Connector Quick Reference Table

- Component Locations

- Configuration and Jumper settings

- Connector's Pin Assignments

2-1. JUMPER & CONNECTOR QUICK REFERENCE TABLE

JUMPER/CONNECTOR	NAME
Clear CMOS Data Selection	JCMOS1
LVDS Panel Setting	JP4, JP5
LVDS Panel Voltage Selection	JP6
PMIC POWER ON Setting	JP7
Inverter ENABKL Voltage Selection	JP_BLEN1
COM Port	COM1
COM Connectors	COM2,3,4
Display Port	DP1
RJ 45 LAN Ports	LAN1
VGA Port	JVGA1
USB2.0/3.0 Ports	JUSB1
USB 2.0 Port	JUSB2, JUSB3
U20 Firmware Update Connector.	JP10
Digital I/O Connector	JDIO1
LPC For debug Connector	JLPC1
Front Panel Connector	JFP1
MINI PCIE Connector	SLOT1
Line-In, Line-Out & Microphone Connector	JAUDIO1
DC POWER IN Connector	PWR_CN1
FAN Connector	FAN1
Inverter Connector	INV1
LVDS Connector	LVDS1
BIOS firmware update connector	JP3
Serial ATA Connectors	SATA1
SATA Power Connector	SATA_PWR1
Battery Power Connector	JBAT1

2-2. COMPONENT LOCATIONS
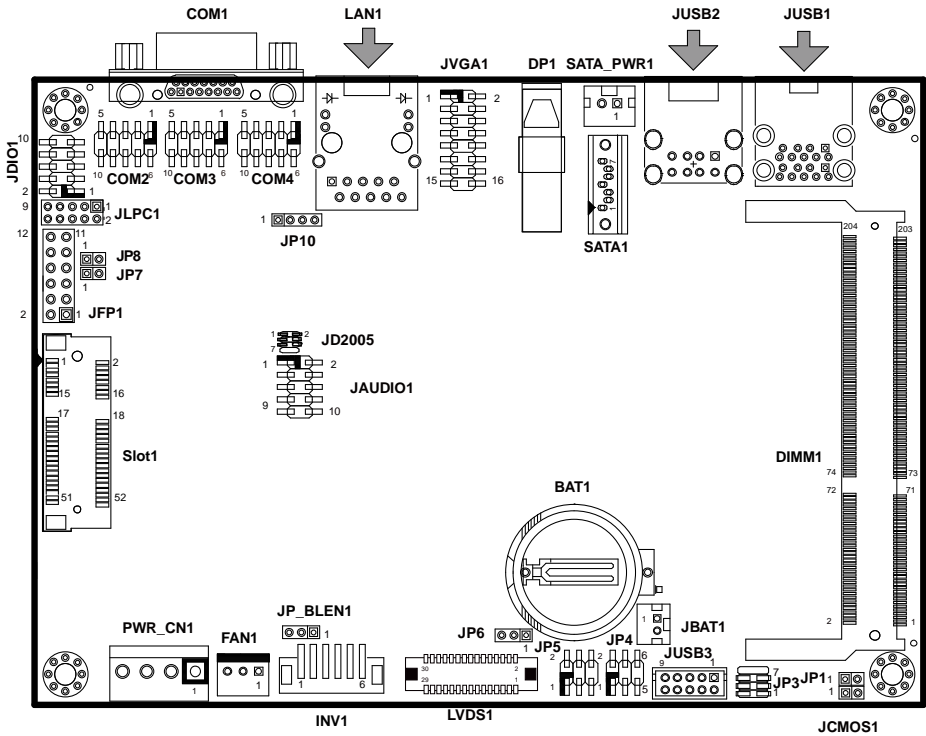
BE-0966 Front Connector, Jumper and Component locations

2-3. 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 AND CAPS

2 Pin Jumper   3 Pin Jumper   Jumper Block   Jumper Cap
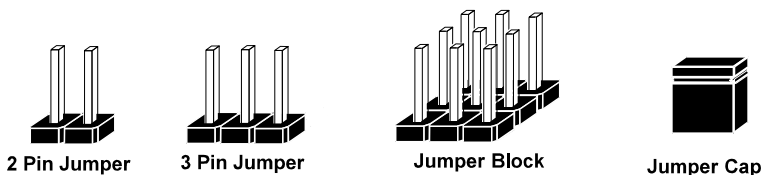
If a jumper has three pins (for examples, labelled PIN1, PIN2, and PIN3), You can connect PIN1 & PIN2 to create one setting by shorting. You can either connect PIN2 & PIN3 to create another setting. The same jumper diagrams are applied all through this manual. The figure below shows what the manual diagrams look and what they represent.

JUMPER DIAGRAMS

Jumper Cap looks like this

2 pin Jumper looks like this
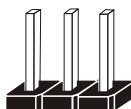
3 pin Jumper looks like this
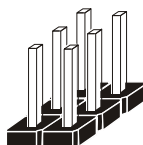
Jumper Block looks like this
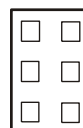
JUMPER SETTINGS

2 pin Jumper close(enabled) Looks like this

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

Jumper Block 1-2 pin close(enabled) Looks like this
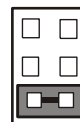
2-4. COM PORT

COM1: COM Port, fixed as RS-232
The pin assignments are as follows:

COM1:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	DCD1	6	DSR1
2	RX1	7	RTS1
3	TX1	8	CTS1
4	DTR1	9	RI1
5	GND		
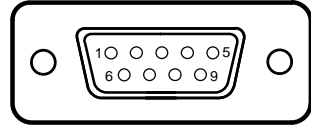
COM1

COM2, COM3, COM4: COM Connectors, all are fixed as RS-232

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	DCD	6	DSR
2	RX	7	RTS
3	TX	8	CTS
4	DTR	9	RI
5	GND	10	NC
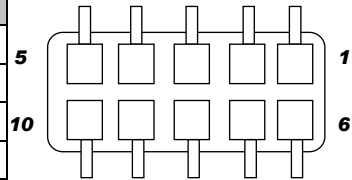
COM2/

COM3/

COM4

2-5. DISPLAY PORT

DP1: Display Port, The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	LANE0+	11	GND
2	GND	12	LANE3-
3	LANE0-	13	CONFIG1
4	LANE1+	14	CONFIG2
5	GND	15	AUX+
6	LANE1-	16	GND
7	LANE2+	17	AUX-
8	GND	18	HotPlugDetect
9	LANE2-	19	GND
10	LANE3+	20	+3.3V
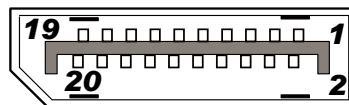
DP1

2-6. LAN PORT

LAN1: RJ45 LAN Ports

Yellow   Green/Orange

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	MDI_0P	5	LAN1_MDI_2N
2	MDI_0N	6	LAN1_MDI_1N
3	MDI_1P	7	LAN1_MDI_3P
4	MDI_2P	8	LAN1_MDI_3N
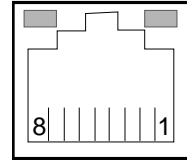
LAN1

LAN LED Indicator:

Right Side LED

Green Color ON	10/100 LAN Speed Indicator
Orange Color ON	Giga LAN Speed Indicator
OFF	No LAN Switch/ Hub Connected

Left Side LED

Yellow Color Blinking	LAN Message Active
OFF	No LAN Message Active

2-7. VGA PORT

JVGA1: VGA Ports

The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	RED	9	VCC5
2	GREEN1	10	GND
3	BLUE	11	NC
4	NC	12	DDC_DATA
5	GND	13	HSYNC
6	NC	14	VSYNC
7	GND	15	DDC_CLK
8	GND	16	NC

JVGA1
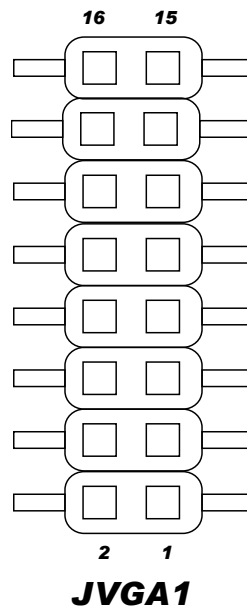
2-8. USB 2.0/3.0 PORT

USB3.0 Signal: Two stacked USB 3.0/2.0 Port

The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
A1	VCC5	B1	VCC5
A2	USBA_DM	B2	USBB_DM
A3	USBA_DP	B3	USBB_DP
A4	GND	B4	GND
A5	U3RXNDN1	B5	U3RXNDN2
A6	U3RXNDP1	B6	U3RXNDP2
A7	GND	B7	GND
A8	U3TXDN1	B8	U3TXDN2
A9	U3TXDP1	B9	U3TXDP2

JUSB1
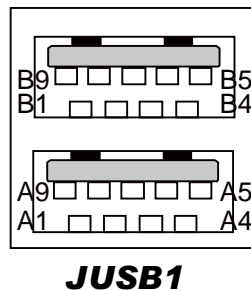
2-9. USB 2.0 PORTS

JUSB2: Two stacked USB2.0 Ports

The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
A1	VCC5	B1	VCC5
A2	USB_N0	B2	USB_N1
A3	USB_P0	B3	USB_P1
A4	GND	B4	GND
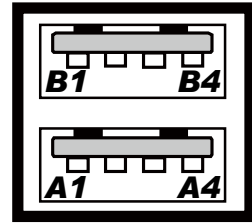
JUSB3: USB2.0 Connectors

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	VCC5	6	USB_P3
2	VCC5	7	GND
3	USB_N2	8	GND
4	USB_N3	9	GND
5	USB_P2	10	GND
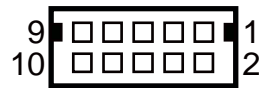
2-10. U20 FIRMWARE UPDATE CONNECTOR

JP10: U20 firmware updates connector

The pin assignments are as follows:

PIN	ASSIGNMENT
1	3.3V
2	GND
3	SDA
4	SCL

2-11. DIGITAL I/O CONNECTOR

JDIO1: Digital I/O Connector
The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	5V	2	GND
3	DIN0	4	DOUT0
5	DIN1	6	DOUT1
7	DIN2	8	DOUT2
9	DIN3	10	DOUT3

JDIO1
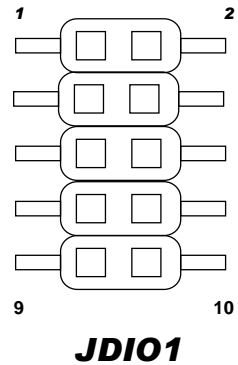
2-12. LPC FOR DEBUG CONNECTOR

JLPC1: LPC For debug Connector
The pin assignments are as follows:
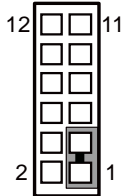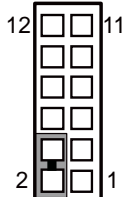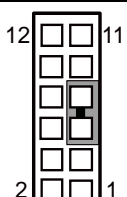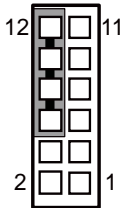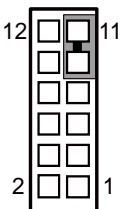
PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	CLK_PCI	2	GND
3	LPC_LFRAMEJ	4	GND
5	PLTRST	6	LPC_AD0
7	LPC_AD3	8	LPC_AD2
9	3.3V	10	LPC_AD1

JLPC1
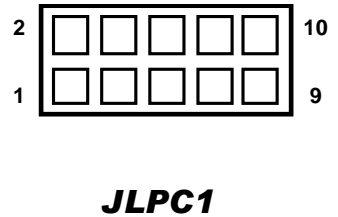
2-13. FRONT PANEL CONNECTOR

JFP1: Front Panel Connector

SELECTION	PIN & ASSIGNMENT	JUMPER SETTINGS	JUMPER ILLUSTRATION
HDD LED	1. HDD_LED+ 3. HDD_LED-	1-3	12 ☐☐ 11 ☐☐ ☐☐ ☐☐ ☐■ 2 ☐☐ 1 **JFP1**
Power LED	2. PWR_LED+ 4. PWR_LED-	2-4	12 ☐☐ 11 ☐☐ ☐☐ ☐☐ ■☐ 2 ■☐ 1 **JFP1**
Reset Button	5. GND 7. RST_BTN	5-7	12 ☐☐ 11 ☐☐ ☐■ ☐■ ☐☐ 2 ☐☐ 1 **JFP1**

SELECTION	PIN & ASSIGNMENT	JUMPER SETTINGS	JUMPER ILLUSTRATION
External Speaker	6. SPK_VCC	6-8-10-12	12 ☐☐ 11 ... 2 ☐☐ 1 **JFP1**
	8. Speaker Signal		
	10. Speaker Signal		
	12. Speaker Signal		
ATX Power Button	9. GND	9-11	12 ☐☐ 11 ... 2 ☐☐ 1 **JFP1**
	11. PWRBTNSW		

2-14. MINI-PCIE CONNECTOR

Slot1: Mini-PCIe Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	WAKEJ	27	GND
2	VCC_3_3_SB	28	VCC1_5
3	NC	29	GND
4	GND	30	SMB_CLK
5	NC	31	PCIE_TXN4
6	VCC1_5	32	SMB_DATA
7	M_PCIE_CLKREQJ	33	PCIE_TXP4
8	SIM_PWR	34	GND
9	GND	35	GND
10	SIM_DATA	36	USB5_DN
11	MINI_PCIE_CLK_DN	37	GND
12	SIM_CLK	38	USB5_DP
13	MINI_PCIE_CLK_DP	39	VCC3_3_SB
14	SIM_RESET	40	GND
15	GND	41	VCC3_3_SB
16	SIM_VPP	42	NC
17	SIM_SW2	43	GND
18	GND	44	LED_WLANJ
19	SIM_SW1	45	NC
20	NC	46	NC
21	GND	47	NC
22	PLTRSTJ_BUF	48	VCC1_5
23	PCIE_RX4_DN	49	NC
24	VCC3_3_SB	50	GND
25	PCIE_RX4_DP	51	NC
26	GND	52	VCC3_3_SB
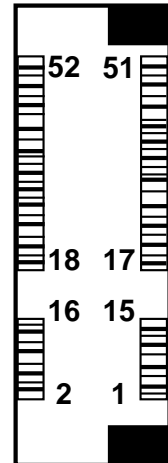
Slot1

2-15. LINE-IN, LINE-OUT & MICROPHONE CONNECTOR

JAUDIO1: Line-In, Line-Out & Microphone Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	MIC_L	2	M1C_R
3	GND	4	GND
5	LINE_IN_L	6	LINE_IN_R
7	GND	8	GND
9	LINE_OUT_L	10	LINE_OUT_R
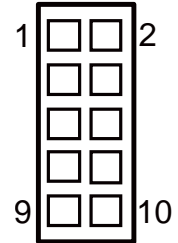
JAUDIO1

2-16. DC POWER IN CONNECTOR

PWR_CN1: DC POWER IN Connector

PIN	ASSIGNMENT
1	12V
2	12V
3	GND
4	GND
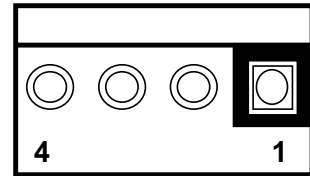
PWR_CN1

2-17. FAN CONNECTOR

FAN1: Fan Connector

PIN	ASSIGNMENT
1	GND
2	12V
3	FAN IN
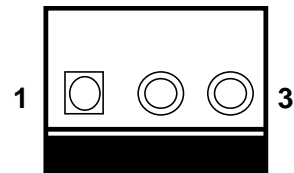
FAN1

2-18. INVERTER CONNECTOR

INV1: Inverter Connector

PIN	ASSIGNMENT
1	VCC12
2	VCC12
3	GND
4	BRCTR
5	GND
6	INV1_EN
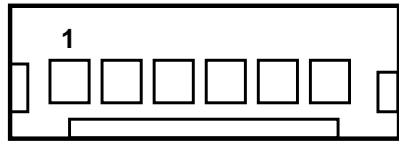
INV1

2-19. LVDS CONNECTOR

LVDS1

LVDS1: LVDS Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	LVDS_VCC	16	LVDS_CLKA_DP
2	GND	17	LVDS_CLKA_DN
3	LVDS_CLKB_DN	18	GND
4	LVDS_CLKB_DP	19	LVDS_A2_DP
5	GND	20	LVDS_A2_DN
6	LVDS_B2_DN	21	GND
7	LVDS_B2_DP	22	LVDS_A1_DP
8	GND	23	LVDS_A1_DN
9	LVDS_B1_DN	24	GND
10	LVDS_B1_DP	25	LVDS_A0_DP
11	LVDS_B3_DP	26	LVDS_A0_DN
12	LVDS_B3_DN	27	LVDS_A3_DP
13	LVDS_B0_DP	28	LVDS_A3_DN
14	LVDS_B0_DN	29	LVDS_VCC
15	GND	30	LVDS_VCC
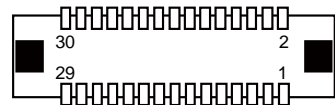
2-20. BIOS FIRMWARE UPDATE CONNECTOR

JP3: BIOS firmware updates connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	SPI_VDD(1.8V)	2	GND
3	SPI_CS0J	4	SPI_CLK
5	SPI_MISO	6	SPI_MOSI
7	NC	8	NC

JP3
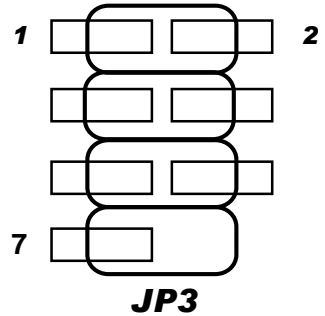
2-21. SATA CONNECTOR

SATA1: Serial ATA Connectors

PIN	ASSIGNMENT
1	GND
2	SATA0_TX_DP
3	SATA0_TX_DN
4	GND
5	SATA0_RX_DN
6	SATA0_RX_DP
7	GND

SATA1

2-22. SATA1 POWER CONNECTOR

SATA1: SATA1 Power Connector

PIN	ASSIGNMENT
1	5V
2	GND

SATA_PWR1
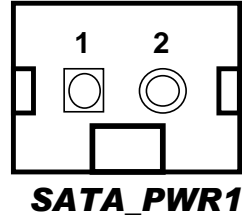
2-23. BATTERY POWER CONNECTOR

JBAT11: Battery Power Connector

PIN	ASSIGNMENT
1	V_Battery
2	GND

JBAT1
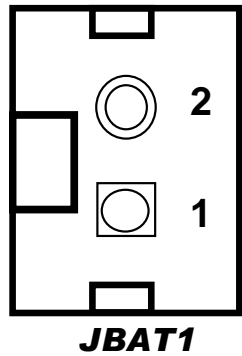
2-23. CLEAR CMOS DATA SELECTION

JCMOS1: Clear CMOS Data Selection
The selections are as follows:
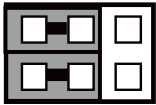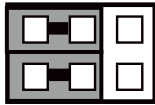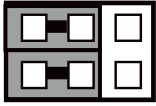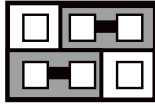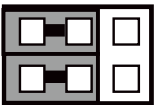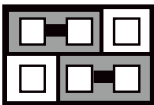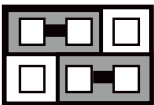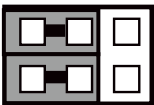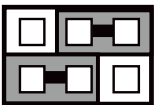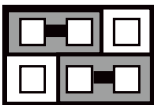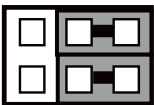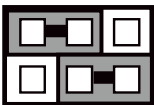
SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
Normal	Open	1 2 JCMOS1
Clear CMOS	CLOSED	1 2 JCMOS1

Note: Manufacturing default is Normal.

2-24. LVDS PANEL SETTING

JP4 & JP5: LVDS Panel Setting

SELECTION	JUMPTER SETTING	JUMPER ILLUSTRATION	
800x600 1CH/18bit	JP4(4-6) JP4(3-5) JP5(4-6) JP5(3-5)	5 1 6 2 JP4	5 1 6 2 JP5
1024x768 1CH/18bit	JP4(4-6) JP4(3-5) JP5(4-6) JP5(1-3)	5 1 6 2 JP4	5 1 6 2 JP5

		JP4	JP5
1024x768 1CH/24bit	JP4(4-6) JP4(3-5) JP5(2-4) JP5(3-5)	*JP4*	*JP5*
1366x768 1CH/24bit	JP4(2-4) JP4(3-5) JP5(4-6) JP5(3-5)	*JP4*	*JP5*
1280x1024 2CH/24bit	JP4(4-6) JP4(1-3) JP5(2-4) JP5(3-5)	*JP4*	*JP5*
1920x1080 2CH/24bit	JP4(2-4) JP4(1-3) JP5(2-4) JP5(3-5)	*JP4*	*JP5*

Note: Manufacturing default is 1 CH/24 bit 1024x768.

2-25. LVDS PANEL VOLTAGE SELECTION

JP6: LVDS Panel Voltage Selection
The selections are as follows:

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
3.3V	1-2	1 3 *JP6*
5V	2-3	1 3 *JP6*

Note: Manufacturing default is 3.3V.

2-26. INVERTER ENABKL VOLTAGE SELECTION

JP_BLEN1: Inverter ENABKL Voltage Selection
The selections are as follows:

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
3.3V	1-2	1 3 *JP_BLEN1*
5V	2-3	1 3 *JP_BLEN1*

Note: Manufacturing default is 3.3V.

2-27. PMIC POWER ON SETTING

JP7: PMIC POWER ON setting
The selections are as follows:

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
PMIC POWER ON	1-2	1 2 *JP7*
Open	-	1 2 *JP7*

Note: Manufacturing default is open.

SOFTWARE UTILITIES

This chapter comprises the detailed information of Graphics driver, LAN driver, and Audio driver.

Sections included:

● Introduction.

● Intel® Chipset Software Installation Utility

● Renesas Electronics USB3.0 Host Controller Installation Utility

● Graphics Driver Utility

● LAN Driver Utility

● Audio Driver Utility

3-1. INTRODUCTION

Enclosed with BE-0966 package are our driver utilities, which come in a format of CD ROM or floppy disk. Refer to the following table for driver locations:

FILENAME (Assume that CD ROM drive is D:)	PURPOSE
D:\Driver\BIOS	For Aptio(EFI) BIOS update utility
D:\Driver\Chipset	Intel(R) Chipset Device Software Installation Utility
D:\Driver\USB3	Renesas Electronics USB3.0 Exensible Host Controller
D:\Driver\Graphics	Intel HD Graphics Family For VGA driver installation
D:\Driver\LAN	Intel I217LM and I210-AT For LAN Driver installation
D:\Driver\Audio	Realtek ALC888S For Sound driver installation

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

3-2. INTEL® CHIPSET SOFTWARE INSTALLATION UTILITY

3-2-1. Introduction

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

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

3-2-2. Installation of Utility for Windows 7

The Chipset Pack is to be installed only for Windows 7 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 Chipset driver is located.
3. Run the application with administrative privileges.

3-3. RENESAS ELECTRONICS USB3.0 EXTENSIBLE HOST CONTROLLER INSTALLATION UTILITY

3-3-1. Introduction

Renesas Electronics USB 3.0 Host Controller Driver Kit (x86 and x64) supports for Windows XP, VISTA, 7 and Server 2008 Release 2.

3-3-2. Installation Instructions for Windows 7

1. Insert the driver disk into a CD ROM device.

2. Under Windows system, go to the directory where the USB3 driver is located.

3. Run the application with administrative privileges.

3-4. GRAPHICS DRIVER UTILITY

3-4-1. Introduction

The Graphics interface embedded with our BE-0966 can support a wide range of display.

You can display LCD, DP simultaneously with the same mode. (The Intel Graphics driver does not fully supports the Window 7.)

1. Win 7 Series
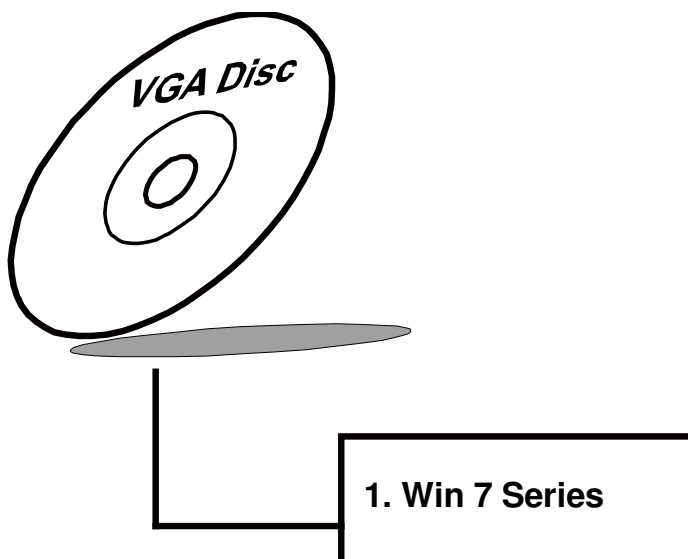
3-4-2. Installation of Graphics Driver

To install the Graphics 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 Graphics driver is located.
3. Run the application with administrative privileges.

3-5. LAN DRIVER UTILITY

3-5-1. Introduction

BE-0966 is enhanced with LAN function that can support various network adapters. Installation programs for LAN drivers are listed as follows:

1. Win 7 Series
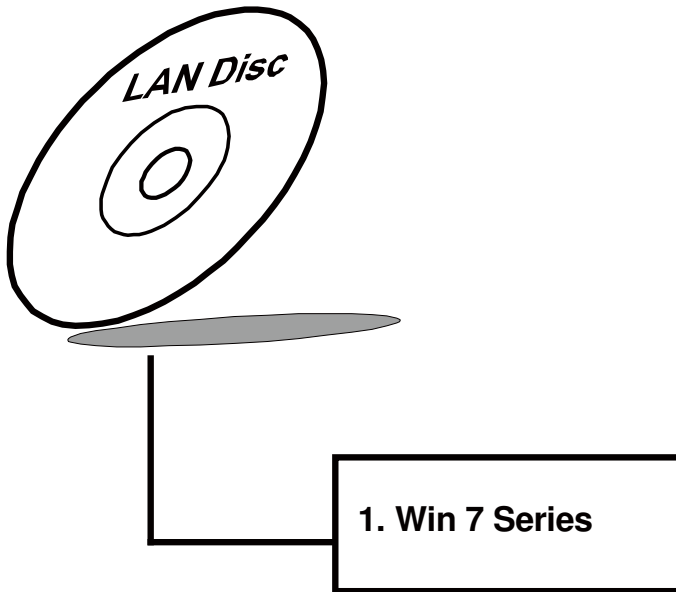
For more details on Installation procedure, please refer to Readme.txt file found on LAN Driver Utility.

3-6. AUDIO DRIVER UTILITY

3-6-1. Introduction

The Realtek Audio function enhanced in this system is fully compatible with Windows 7. Below, you will find the content of the Audio driver:

1. Win 7 Series
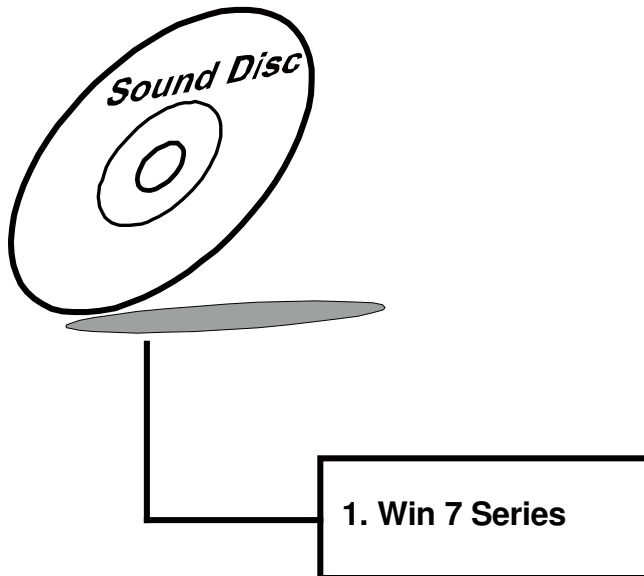
3-6-2. Installation of Audio Driver

1. Insert the driver disk into a CD ROM device.
2. Under Windows system, go to the directory where the Audio 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.

AMI
BIOS SETUP
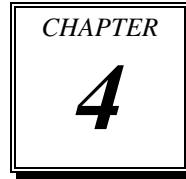
This chapter shows how to set up the AMI BIOS.

Sections included:

- Introduction

- Entering Setup

- Main

- Advanced

- Chipset

- Boot

- Security

- Save & Exit

4.1 Introduction

The board **BE-0966** uses an AMI Aptio BIOS that is stored in the Serial Peripheral Interface Flash Memory (SPI Flash) and can be updated. The SPI Flash contains the BIOS Setup program, Power-on Self-Test (POST), the PCI auto-configuration utility, LAN EEPROM information, and Plug and Play support.

Aptio is AMI's BIOS firmware based on the UEFI (Unified Extensible Firmware Interface) Specifications and the Intel Platform Innovation Framework for EFI. The UEFI specification defines an interface between an operating system and platform firmware. The interface consists of data tables that contain platform-related information, boot service calls, and runtime service calls that are available to the operating system and its loader. These provide standard environment for booting an operating system and running pre-boot applications. Following illustration shows Extensible Firmware Interface's position in the software stack.
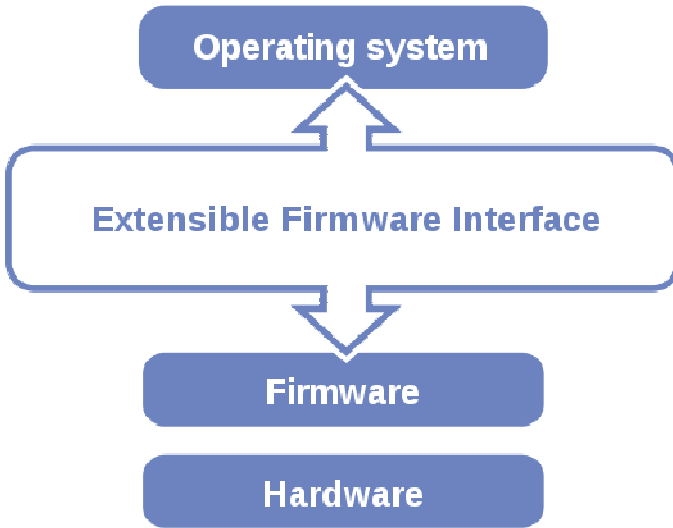
EFI BIOS provides an user interface allow users the ability to modify hardware configuration, e.g. change system date and time, enable or disable a system component, decide bootable device priorities, setup personal password, etc., which is convenient for modifications and customization of the computer system and allows technicians another method for finding solutions if hardware has any problems.

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

4.2 Entering Setup

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

BIOS POST Screen

As long as this message is present on the screen you may press the <Del> or <ESC> key to access the Setup program. In a moment, the main menu of the Aptio Setup Utility will appear on the screen:

```
            Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
   Main  Advanced  Chipset  Security  Boot  Save & Exit

   BIOS Information                                            Choose the system default
   BIOS Vendor                     American Megatrends        language
   Core Version                    5.010
   Compliancy                      UEFI 2.4; PI 1.3
   Project Version                 E9660TID x64
   Build Date and Time             02/12/2015 09:22:11
   BayTrail SoC                    DO Stepping

   GOP Information
   Intel(R) GOP Driver             [N/A]

   TXE Information
   Sec RC Version                  00.05.00.00
   TXE FW Version                  01.00.02.1067              →←: Select Screen
                                                              ↑↓: Select Item
   System Language                 [English]                 Enter: Select
                                                              +/-: Change Opt.
   System Date                     [Fri 01/02/2015]          F1: General Help
   System Time                     [10:31:38]                F2: Previous Values
                                                              F3: Optimized Defaults
   Access Level                    Administrator             F4: Save & Exit
                                                              ESC: Exit




            Version 2.17.1249. Copyright (C) 2015 American Megatrends, Inc.
```

Setup program initial screen

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

4.3 Main

```
                Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
  Main  Advanced  Chipset  Security  Boot  Save & Exit

  BIOS Information                                        Choose the system default
  BIOS Vendor                    American Megatrends      language
  Core Version                   5.010
  Compliancy                     UEFI 2.4; PI 1.3
  Project Version                E9660TID x64
  Build Date and Time            02/12/2015 09:22:11
  BayTrail SoC                   D0 Stepping

  GOP Information
  Intel(R) GOP Driver            [N/A]

  TXE Information
  Sec RC Version                 00.05.00.00
  TXE FW Version                 01.00.02.1067              →←: Select Screen
                                                            ↑↓: Select Item
  System Language                [English]                 Enter: Select
                                                            +/-: Change Opt.
  System Date                    [Fri 01/02/2015]          F1: General Help
  System Time                    [10:31:38]                F2: Previous Values
                                                            F3: Optimized Defaults
  Access Level                   Administrator             F4: Save & Exit
                                                            ESC: Exit



                Version 2.17.1249. Copyright (C) 2015 American Megatrends, Inc.
```

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.
Intel(R) GOP Driver	No changeable options	Displays the date of current GOP version.
Sec RC Version	No changeable options	Displays the current RC version.
TXE FW Version	No changeable options	Displays the current TXE version.
System Language	English	BIOS Setup language.
System Date	month, day, year	Specifies the current date.
System Time	hour, minute, second	Specifies the current time.
cess Level	No changeable options	Displays the current user level.

4.4 Advanced

```
                Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
     Main  Advanced  Chipset  Security  Boot  Save & Exit

 ▶ ACPI Settings                                              System ACPI Parameters.
 ▶ F81866 Super IO Configuration
 ▶ Hardware Monitor
 ▶ F81866 Watchdog
 ▶ CPU Configuration
 ▶ IDE Configuration
 ▶ CSM Configuration
 ▶ USB Configuration




                                                             →←: Select Screen
                                                             ↑↓: Select Item
                                                             Enter: Select
                                                             +/-: Change Opt.
                                                             F1: General Help
                                                             F2: Previous Values
                                                             F3: Optimized Defaults
                                                             F4: Save & Exit
                                                             ESC: Exit



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```

Advanced Screen

BIOS Setting	Options	Description/Purpose
ACPI Settings	Sub-Menu	System ACPI Parameters.
F81866 Super IO Configuration	Sub-Menu	System Super IO Chip Parameters.
Hardware Monitor	Sub-Manu	Monitor hardware status.
F81866 Watchdog	Sub-Manu	F81866 Watchdog timer settings.
CPU Configuration	Sub-Menu	CPU configuration parameters.
IDE Configuration	Sub-Menu	IDE device options settings.
CSM Configuration	Sub-Menu	CSM configuration parameters.
USB Configuration	Sub-Menu	USB configuration parameters.

4.4.1 Advanced – ACPI Settings

```
              Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
     Advanced

    ACPI Settings                                              Enables or Disables System
                                                               ability to Hibernate (OS/S4
    Enable Hibernation              [Enabled]                  Sleep State). This option may
    ACPI Sleep State                [S3 (Suspend to RAM)]      be not effective with some OS.




                                                               →←: Select Screen
                                                               ↑↓: Select Item
                                                               Enter: Select
                                                               +/-: Change Opt.
                                                               F1: General Help
                                                               F2: Previous Values
                                                               F3: Optimized Defaults
                                                               F4: Save & Exit
                                                               ESC: Exit



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```

ACPI Settings Screen

BIOS Setting	Options	Description/Purpose
Enable Hibernation	-Disabled -Enabled	Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS.
ACPI Sleep State	- Suspend Disabled - S3 Only (Suspend to RAM)	Specifies the ACPI sleep state. ・ **Suspend Disabled** disables ACPI sleep feature. ・ **S3** allows the platform to enter Suspend to RAM mode.

4.4.2 Advanced -F81866 Super IO Configuration

```
           Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
    Advanced

   F81866 Super IO Configuration                              Set Parameters of Serial Port
                                                              1 (COMA)
   Super IO Chip                        F81866
 ▶ Serial Port 1 Configuration
 ▶ Serial Port 2 Configuration
 ▶ Serial Port 3 Configuration
 ▶ Serial Port 4 Configuration



                                                              →←: Select Screen
                                                              ↑↓: Select Item
                                                              Enter: Select
                                                              +/–: Change Opt.
                                                              F1: General Help
                                                              F2: Previous Values
                                                              F3: Optimized Defaults
                                                              F4: Save & Exit
                                                              ESC: Exit


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```

F81866 Super IO Configuration Screen

BIOS Setting	Options	Description/Purpose
Super IO Chip	No changeable options	Displays the super IO chip model and its manufacturer.
Serial Port 1 Configuration	Sub-menu	Set Parameters for COMA
Serial Port 2 Configuration	Sub-menu	Set Parameters for COMB
Serial Port 3 Configuration	Sub-menu	Set Parameters for COMC
Serial Port 4 Configuration	Sub-menu	Set Parameters for COMD

4.4.2.1 Advanced -F81866 Super IO Configuration- Serial Port 1 Configuration

```
            Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
    Advanced

 Serial Port 1 Configuration                                    Enable or Disable Serial Port
                                                                (COM)
 Serial Port                         [Enabled]
 Device Settings                     IO=3F8h; IRQ=4;

 Change Settings                     [Auto]




                                                                →←: Select Screen
                                                                ↑↓: Select Item
                                                                Enter: Select
                                                                +/-: Change Opt.
                                                                F1: General Help
                                                                F2: Previous Values
                                                                F3: Optimized Defaults
                                                                F4: Save & Exit
                                                                ESC: Exit



            Version 2.17.1249. Copyright (C) 2015 American Megatrends, Inc.
```

Serial Port 1 Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial Port	-Disabled -Enabled	Enable or disable serial port 1.
Device Settings	No changeable options	Displays current settings of serial port 1.
Change Settings	-IO=3F8h; IRQ=4 -IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12 -IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12 -IO=3E8h;IRQ=3,4,5,6,7 ,9,10,11,12 -IO=2E8h;IRQ=3,4,5,6,7 ,9,10,11,12	Select IRQ and I/O resource for the serial port 1.

4.4.2.2 Advanced -F81866 Super IO Configuration- Serial Port 2 Configuration

```
            Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
     Advanced

 Serial Port 2 Configuration                                    Enable or Disable Serial Port
                                                                (COM)
 Serial Port                         [Enabled]
 Device Settings                     IO=2F8h; IRQ=3;

 Change Settings                     [Auto]




                                                                →←: Select Screen
                                                                ↑↓: Select Item
                                                                Enter: Select
                                                                +/-: Change Opt.
                                                                F1: General Help
                                                                F2: Previous Values
                                                                F3: Optimized Defaults
                                                                F4: Save & Exit
                                                                ESC: Exit




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```

Serial Port 2 Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial Port	-Disabled -Enabled	Enable or disable serial port 2.
Device Settings	No changeable options	Displays current settings of serial port 2.
Change Settings	-IO=2F8h; IRQ=3 -IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12 -IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12 -IO=3E8h;IRQ=3,4,5,6,7,9,10,11,12 -IO=2E8h;IRQ=3,4,5,6,7,9,10,11,12	Select IRQ and I/O resource for the serial port 2.

4.4.2.3 Advanced -F81866 Super IO Configuration- Serial Port 3 Configuration

```
            Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
      Advanced

  Serial Port 3 Configuration                                    Enable or Disable Serial Port
                                                                 (COM)
  Serial Port                       [Enabled]
  Device Settings                   IO=3E8h; IRQ=7;

  Change Settings                   [Auto]




                                                                 →←: Select Screen
                                                                 ↑↓: Select Item
                                                                 Enter: Select
                                                                 +/-: Change Opt.
                                                                 F1: General Help
                                                                 F2: Previous Values
                                                                 F3: Optimized Defaults
                                                                 F4: Save & Exit
                                                                 ESC: Exit




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```
Serial Port 3 Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial Port	-Disabled -Enabled	Enable or disable serial port 3.
Device Settings	No changeable options	Displays current settings of serial port 3.
Change Settings	-IO=3E8h; IRQ=10 -IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12 -IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12 -IO=2F0h;IRQ=3,4,5,6,7,9,10,11,12 -IO=2E0h;IRQ=3,4,5,6,7,9,10,11,12	Select IRQ and I/O resource for the serial port 3.

4.4.2.4 Advanced -F81866 Super IO Configuration- Serial Port 4 Configuration

```
          Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
     Advanced

 Serial Port 4 Configuration                                   Enable or Disable Serial Port
                                                               (COM)
 Serial Port                            [Enabled]
 Device Settings                        IO=2E8h; IRQ=10;

 Change Settings                        [Auto]



                                                               →←: Select Screen
                                                               ↑↓: Select Item
                                                               Enter: Select
                                                               +/-: Change Opt.
                                                               F1: General Help
                                                               F2: Previous Values
                                                               F3: Optimized Defaults
                                                               F4: Save & Exit
                                                               ESC: Exit



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```

Serial Port 4 Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial Port	-Disabled -Enabled	Enable or disable serial port 4.
Device Settings	No changeable options	Displays current settings of serial port 4.
Change Settings	-IO=2E8h; IRQ=5 -IO=3E8h;IRQ=3,4,5,6,7,9,10,11,12 -IO=2E8h;IRQ=3,4,5,6,7,9,10,11,12 -IO=2F0h;IRQ=3,4,5,6,7,9,10,11,12 -IO=2E0h;IRQ=3,4,5,6,7,9,10,11,12	Select IRQ and I/O resource for the serial port 4.

4.4.3 Advanced –Hardware Monitor

```
              Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
        Advanced

       Pc Health Status

       CPU temperature                 : +31 ℃
       System temperature              : +25 ℃
       VCORE                           : +0.768 V
       VCC5                            : +5.129 V
       VCC12                           : +12.232 V
       VCC3V                           : +3.328 V
       VSB3V                           : +3.328 V
       VBAT                            : +3.280 V


                                                       →←: Select Screen
                                                       ↑↓: Select Item
                                                       Enter: Select
                                                       +/-: Change Opt.
                                                       F1: General Help
                                                       F2: Previous Values
                                                       F3: Optimized Defaults
                                                       F4: Save & Exit
                                                       ESC: Exit



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```

Hardware Monitor Screen

BIOS Setting	Options	Description/Purpose
CPU Temperature	No changeable options	Displays processor's temperature.
System Temperature	No changeable options	Displays system's temperature.
VCORE	No changeable options	Displays voltage level of the VCORE in supply.
VCC5	No changeable options	Displays voltage level of the VCC5 in supply.
VCC12	No changeable options	Displays voltage level of the VCC12 in supply.
VCC3V	No changeable options	Displays voltage level of the VCC3V in supply.
VSB3V	No changeable options	Displays voltage level of the VSB3V in supply.
VBAT	No changeable options	Displays voltage level of the VBAT in supply.

4.4.4 Advanced –F81866 Watchdog

```
              Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
     Advanced

   F81866 Watchdog                                           F81866 Watchdog timer settings
                                                             Enable/Disable
   Enable Watchdog                    [Disabled]




                                                             �→ : Select Screen
                                                             ↑↓ : Select Item
                                                             Enter: Select
                                                             +/– : Change Opt.
                                                             F1: General Help
                                                             F2: Previous Values
                                                             F3: Optimized Defaults
                                                             F4: Save & Exit
                                                             ESC: Exit


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```

F81866 Watchdog Screen

BIOS Setting	Options	Description/Purpose
Enable WatchDog	-Enabled -Disable	Enable/ Disable Watchdog timer.
Watchdog timer unit	-1s -60s	Select seconds or minutes
Count for Timer (Seconds)	Multiple options ranging from 1 to 255	Sets the desired value (seconds) for watchdog timer.

4.4.5 Advanced –CPU Configuration

```
                Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
   Advanced

   CPU Configuration                                         Socket specific CPU Information

 ▶ Socket 0 CPU Information

   CPU Speed                         1467 MHz
   64-bit                            Supported




                                                          ──────────────────────────
                                                          ➔←: Select Screen
                                                          ↑↓: Select Item
                                                          Enter: Select
                                                          +/-: Change Opt.
                                                          F1: General Help
                                                          F2: Previous Values
                                                          F3: Optimized Defaults
                                                          F4: Save & Exit
                                                          ESC: Exit



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```

CPU Configuration Screen

BIOS Setting	Options	Description/Purpose
Socket 0 CPU Information	Sub-Menu	Report CPU Information
CPU Speed	No changeable options	Reports the current CPU Speed
64-bit	No changeable options	Reports if 64-bit is supported by processor.

4.4.5.1 Advanced –CPU Configuration- Socket 0 CPU Information

```
                 Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
        Advanced

    Socket 0 CPU Information

    Intel(R) Atom(TM) CPU E3815 @ 1.46GHz
    CPU Signature                      30679
    Microcode Patch                    901
    Max CPU Speed                      1460 MHz
    Min CPU Speed                      533 MHz
    Processor Cores                    1
    Intel HT Technology                Not Supported
    Intel VT-x Technology              Supported

    L1 Data Cache                      24 kB x 1
    L1 Code Cache                      32 kB x 1
    L2 Cache                           512 kB x 1          →←: Select Screen
    L3 Cache                           Not Present         ↑↓: Select Item
                                                           Enter: Select
                                                           +/-: Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F3: Optimized Defaults
                                                           F4: Save & Exit
                                                           ESC: Exit

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```

Socket 0 CPU Information Screen

BIOS Setting	Options	Description/Purpose
CPU Signature	No changeable options	Reports the CPU Signature
Microcode Patch	No changeable options	Reports the CPU Microcode Patch Version.
Max CPU Speed	No changeable options	Reports the maximum CPU Speed.
Min CPU Speed	No changeable options	Reports the minimum 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.
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.

4.4.6 Advanced –IDE Configuration

```
                Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
       Advanced

    IDE Configuration                                         Enable / Disable Serial ATA

    Serial–ATA (SATA)                  [Enabled]

    SATA Speed Support                 [Gen2]
    SATA Mode                          [AHCI Mode]

    Serial–ATA Port 0                  [Enabled]
    SATA Port0 HotPlug                 [Disabled]
    Serial–ATA Port 1                  [Enabled]
    SATA Port1 HotPlug                 [Disabled]

    SATA Port0
    Not Present                                               →←: Select Screen
                                                              ↑↓: Select Item
    SATA Port1                                                Enter: Select
    Not Present                                               +/–: Change Opt.
                                                              F1: General Help
                                                              F2: Previous Values
                                                              F3: Optimized Defaults
                                                              F4: Save & Exit
                                                              ESC: Exit



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```

IDE Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial-ATA Controller(s)	- Disabled - Enabled	Enable or disable SATA Device.
SATA Speed Support	- Gen1 - Gen2	・ **Gen1** mode sets device to 1.5 Gbit/s speed. ・ **Gen2** mode sets the device to 3 Gbit/s speed (in case it is compatible).
SATA Mode	- IDE mode - AHCI mode	Configures SATA as following: ・ **IDE:** Set SATA operation mode to IDE. ・ **AHCI:** SATA works as AHCI (Advanced Host Controller Interface) mode for getting better performance.

Serial-ATA Port 0	- Disabled - Enabled	Enable or disable SATA port 0 Device.
SATA Port 0 HotPlug	- Disabled - Enabled	Enable or disable SATA port 0 Device HotPlug
Serial-ATA Port 1	- Disabled - Enabled	Enable or disable SATA port 1 Device.
SATA Port 1 HotPlug	- Disabled - Enabled	Enable or disable SATA port 1 Device HotPlug
SATA Port 0	[drive]	Displays the drive installed on this SATA port 0. Shows [Empty] if no drive is installed.
SATA Port 1	[drive]	Displays the drive installed on this SATA port 1. Shows [Empty] if no drive is installed.

4.4.7 Advanced –CSM Configuration

```
                    Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
        Advanced

   Compatibility Support Module Configuration                        Enable/Disable CSM Support.

   CSM Support                             [Enabled]

   CSM16 Module Version                    07.76

   GateA20 Active                          [Upon Request]
   Option ROM Messages                     [Force BIOS]

   Boot option filter                      [UEFI and Legacy]




                                                                   →←: Select Screen
                                                                   ↑↓: Select Item
                                                                   Enter: Select
                                                                   +/-: Change Opt.
                                                                   F1: General Help
                                                                   F2: Previous Values
                                                                   F3: Optimized Defaults
                                                                   F4: Save & Exit
                                                                   ESC: Exit




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```

CSM Configuration Screen

BIOS Setting	Options	Description/Purpose
CSM Support	- Disabled - Enabled	Disable or Enable CSM support
CSM16 Module Version	No changeable options	Displays the current CSM (Compatibility Support Module) version.
GateA20 Active	- Upon Request - Always	Select Gate A20 operation mode. ・ **Upon Request:** GA20 can be disabled using BIOS services. ・ **Always:** do not allow disabling GA20; this option is useful when any RT code is executed above 1MB.
Boot option filter	- UEFI and Legacy - Legacy only - UEFI only	This option controls what kind of devices system can boot.

4.4.8 Advanced –USB Configuration

```
              Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
        Advanced

   USB Configuration                                          Enables Legacy USB support.
                                                              AUTO option disables legacy
   USB Module Version            10                           support if no USB devices are
                                                              connected. DISABLE option will
   USB Devices:                                               keep USB devices available
         1 Drive, 1 Keyboard, 1 Mouse, 2 Hubs                 only for EFI applications.

   Legacy USB Support            [Enabled]
   EHCI Hand-off                 [Disabled]
   USB Mass Storage Driver Support  [Enabled]

   USB hardware delays and time-outs:
   USB transfer time-out         [20 sec]
   Device reset time-out         [20 sec]                     →←: Select Screen
   Device power-up delay         [Auto]                       ↑↓: Select Item
                                                              Enter: Select
   Mass Storage Devices:                                      +/-: Change Opt.
   SanDisk Cruzer Blade 1.20     [Auto]                       F1: General Help
                                                              F2: Previous Values
                                                              F3: Optimized Defaults
                                                              F4: Save & Exit
                                                              ESC: Exit

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```

USB Configuration Screen

BIOS Setting	Options	Description/Purpose
USB Devices	No changeable options	Displays number of available USB devices.
Legacy USB Support	- Disabled - Enabled - Auto	Enables support for legacy USB.
EHCI Hand-of	- Disabled - Enabled	This is a workaround for OSes w/o EHCI hand-off support.
USB Mass Storage Driver Support.	- Disabled - Enabled	Enable/Disable USB mass storage driver support.

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

4.5 Chipset
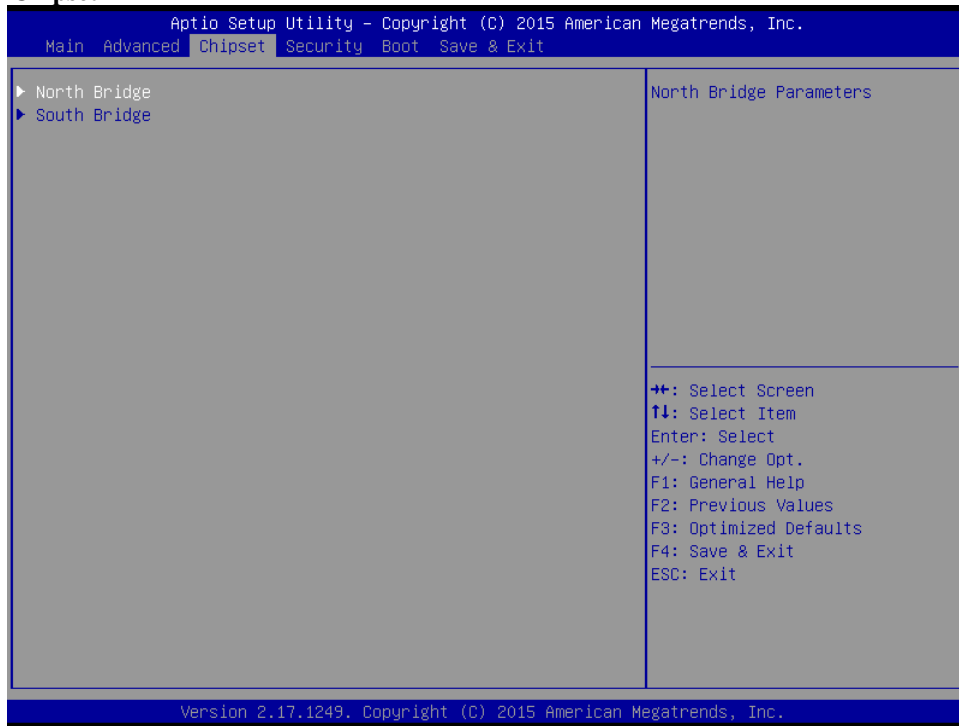
Chipset Screen

BIOS Setting	Options	Description/Purpose
North Bridge	Sub-menu	Sets Parameter for (North Bridge) configuration.
South Bridge	Sub-menu	Sets Parameter for (South Bridge) configuration.

4.5.1 Chipset - North Bridge

```
          Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
           Chipset

 ▶ LCD Control                                        LCD Control
   Memory Information

   Total Memory                    4096 MB (DDR3L)

   Memory Slot0                    4096 MB (DDR3L)




                                                      ➜←: Select Screen
                                                      ↑↓: Select Item
                                                      Enter: Select
                                                      +/-: Change Opt.
                                                      F1: General Help
                                                      F2: Previous Values
                                                      F3: Optimized Defaults
                                                      F4: Save & Exit
                                                      ESC: Exit


          Version 2.17.1249. Copyright (C) 2015 American Megatrends, Inc.
```
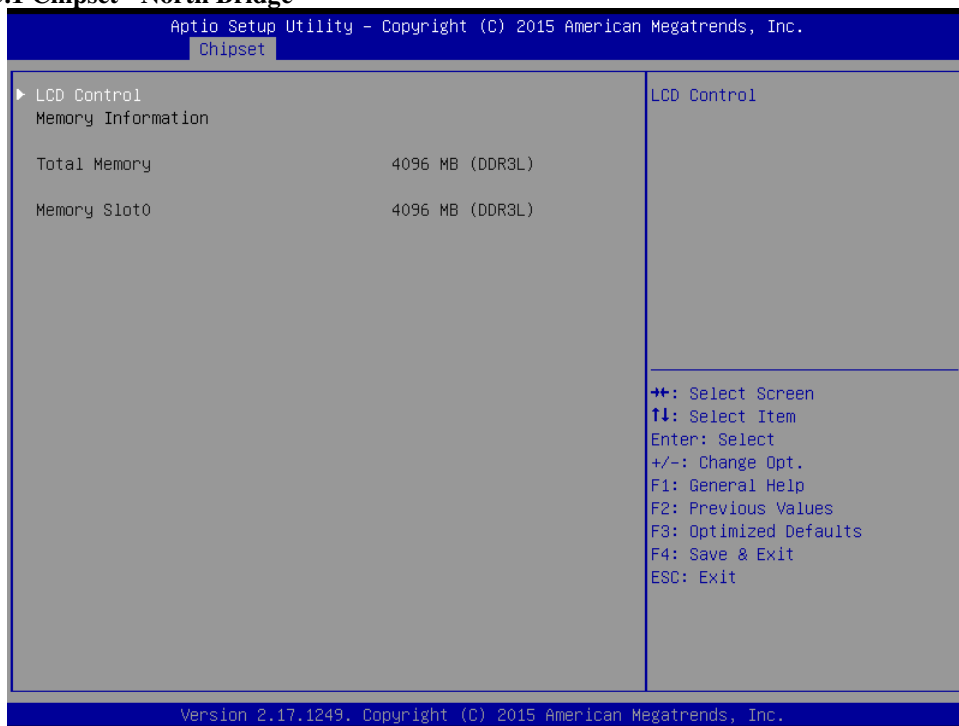
North Bridge Screen

BIOS Setting	Options	Description/Purpose
Intel IGD Configuration	Sub-menu	Configure Graphic Settings.
Memory Information	No changeable options	Displays the DRAM information on platform.
Total Memory	No changeable options	Displays the DRAM size

4.5.1.1 Chipset - North Bridge-LCD Control
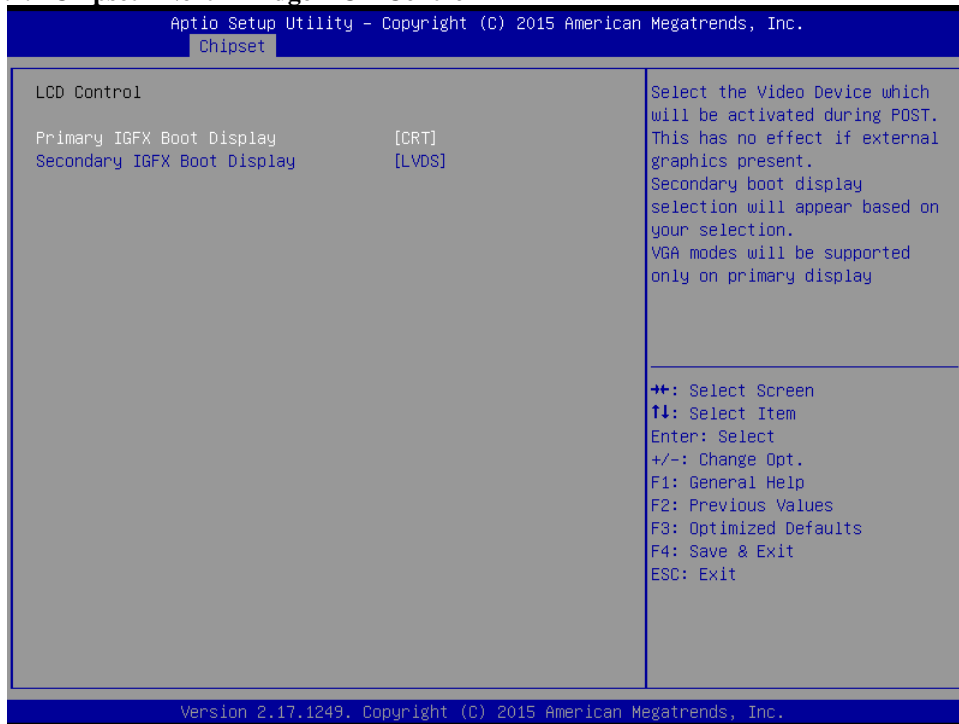
LCD Control Screen

BIOS Setting	Options	Description/Purpose
Primary IGFX Boot Display	- CRT - Display Port - LVDS	Primary Display Settings.
Secondary IGFX Boot Display	- Disabled - CRT - Display Port - LVDS	Secondary Display Settings.

4.5.2 Chipset - South Bridge

```
          Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
           Chipset

 ▶ Azalia HD Audio                                    Azalia HD Audio Options
   Restore AC Power Loss              [Last State]










                                                      ➔←: Select Screen
                                                      ↑↓: Select Item
                                                      Enter: Select
                                                      +/–: Change Opt.
                                                      F1: General Help
                                                      F2: Previous Values
                                                      F3: Optimized Defaults
                                                      F4: Save & Exit
                                                      ESC: Exit




          Version 2.17.1249. Copyright (C) 2015 American Megatrends, Inc.
```

South Bridge Screen

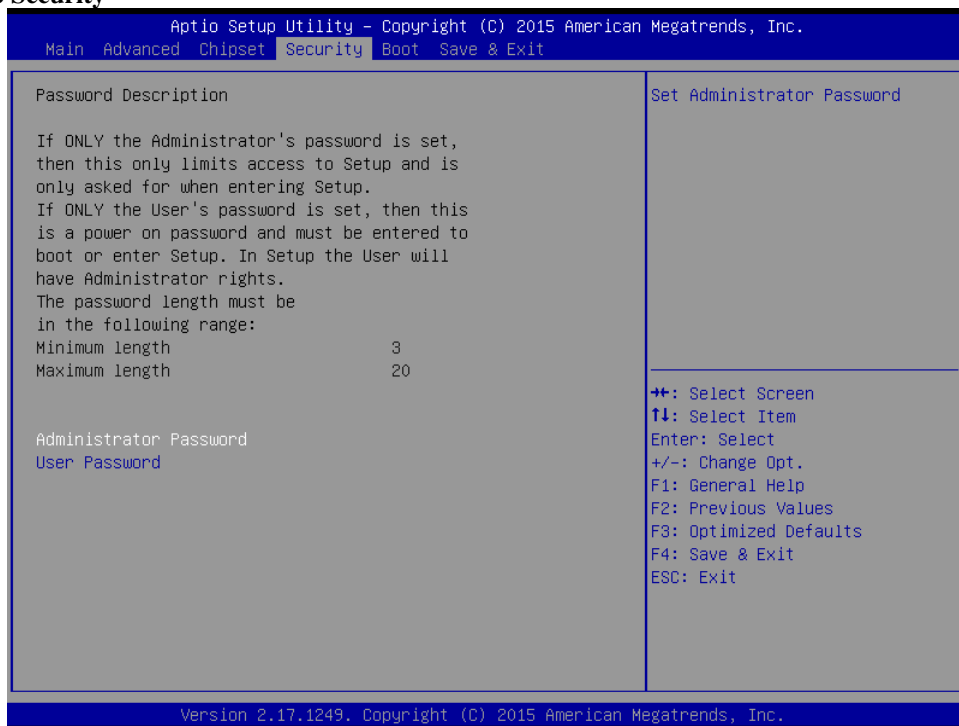| BIOS Setting	Options	Description/Purpose
Azalia HD Audio	Sub-menu	Azalia HD Audio Options.
Restore AC Power Loss	- Power Off - Power On - Last State	Select AC power state when power is re-applied after a power failure. ・ **Power Off** keeps the power off till the power button is pressed. ・ **Power On** makes system power on after restores AC power to the board. ・ **Last State** brings system back to the last power state before AC remove.

4.5.2.1 Chipset - South Bridge- Azalia HD Audio

```
                Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
                      Chipset

   Audio Configuration                                    Control Detection of the
   Audio Controller                     [Enabled]         Azalia device.  Disabled =
   DP Audio                             [Enabled]         Azalia will be unconditionally
                                                          disabled.  Enabled = Azalia
                                                          will be unconditionally
                                                          Enabled.  Auto = Azalia will
                                                          be enabled if present disabled
                                                          otherwise.


                                                          →←: Select Screen
                                                          ↑↓: Select Item
                                                          Enter: Select
                                                          +/-: Change Opt.
                                                          F1: General Help
                                                          F2: Previous Values
                                                          F3: Optimized Defaults
                                                          F4: Save & Exit
                                                          ESC: Exit


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```

Azalia HD Audio Screen

BIOS Setting	Options	Description/Purpose
Audio Controller	- Disabled - Enabled	Audio Controller Options.
DP Audio	- Disabled - Enabled	˙ DP Audio Options.

4.6 Security

```
            Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
    Main  Advanced  Chipset  Security  Boot  Save & Exit

    Password Description                                 Set Administrator Password

    If ONLY the Administrator's password is set,
    then this only limits access to Setup and is
    only asked for when entering Setup.
    If ONLY the User's password is set, then this
    is a power on password and must be entered to
    boot or enter Setup. In Setup the User will
    have Administrator rights.
    The password length must be
    in the following range:
    Minimum length                    3
    Maximum length                    20
                                                         →←: Select Screen
                                                         ↑↓: Select Item
    Administrator Password                               Enter: Select
    User Password                                        +/–: Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F3: Optimized Defaults
                                                         F4: Save & Exit
                                                         ESC: Exit



            Version 2.17.1249. Copyright (C) 2015 American Megatrends, Inc.
```

Security Screen

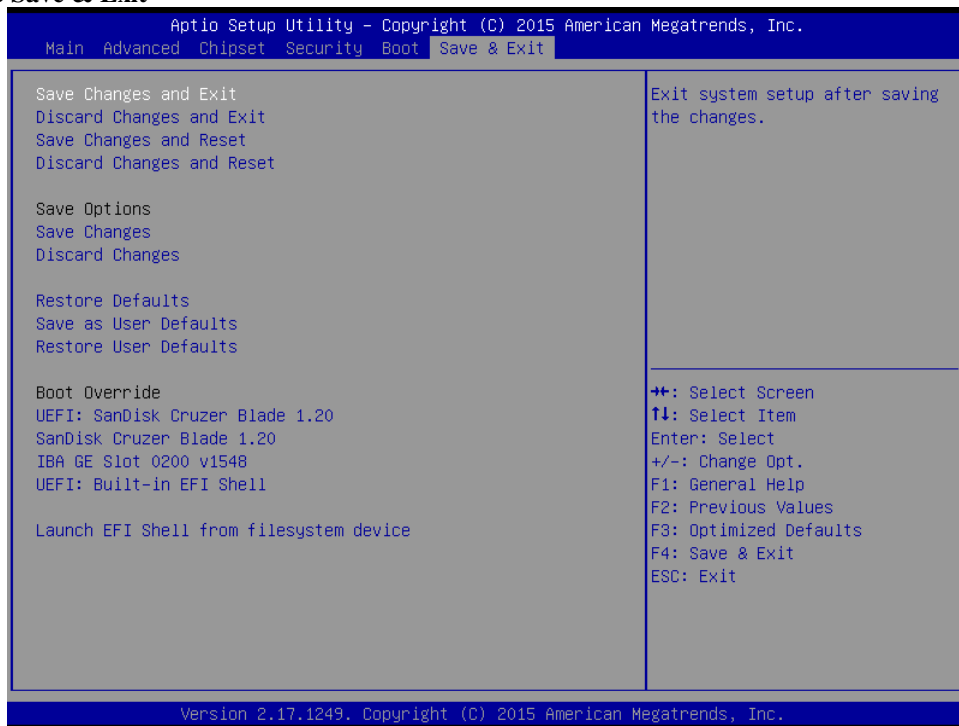| BIOS Setting	Options	Description/Purpose
Administrator Password	Password can be 3-20 alphanumeric characters.	Specifies the administrator password.
User Password	Password can be 3-20 alphanumeric characters.	Specifies the user password.

4.7 Boot

```
                Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
         Main  Advanced  Chipset  Security  Boot  Save & Exit

      Boot Configuration                                    Number of seconds to wait for
      Setup Prompt Timeout             1                    setup activation key.
      Bootup NumLock State             [On]                 65535(0xFFFF) means indefinite
                                                            waiting.
      Quiet Boot                       [Disabled]
      Fast Boot                        [Disabled]


      Boot Option Priorities
      Boot Option #1                   [UEFI: Built-in EFI ...]
      Boot Option #2                   [SanDisk Cruzer Blad...]
      Boot Option #3                   [IBA GE Slot 0200 v1548]
      Boot Option #4                   [UEFI: SanDisk Cruze...]

      Hard Drive BBS Priorities                             →←: Select Screen
      Network Device BBS Priorities                         ↑↓: Select Item
                                                            Enter: Select
                                                            +/-: Change Opt.
                                                            F1: General Help
                                                            F2: Previous Values
                                                            F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit


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```

Boot Screen

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

Hard Drive BBS Priorities	Sub-Menu	Allow user to select boot order of available drive(s)
Network Drive BBS Priorities	Sub-Menu	Allow user to select boot order of available drive(s)

4.8 Save & Exit

```
              Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
   Main  Advanced  Chipset  Security  Boot  Save & Exit

  Save Changes and Exit                              Exit system setup after saving
  Discard Changes and Exit                           the changes.
  Save Changes and Reset
  Discard Changes and Reset

  Save Options
  Save Changes
  Discard Changes

  Restore Defaults
  Save as User Defaults
  Restore User Defaults

  Boot Override                                      →←: Select Screen
  UEFI: SanDisk Cruzer Blade 1.20                    ↑↓: Select Item
  SanDisk Cruzer Blade 1.20                          Enter: Select
  IBA GE Slot 0200 v1548                             +/-: Change Opt.
  UEFI: Built-in EFI Shell                           F1: General Help
                                                     F2: Previous Values
  Launch EFI Shell from filesystem device            F3: Optimized Defaults
                                                     F4: Save & Exit
                                                     ESC: Exit

              Version 2.17.1249. Copyright (C) 2015 American Megatrends, Inc.
```

Save & Exit Screen

Save & Exit		
BIOS Setting	**Options**	**Description/Purpose**
Save Changes and Exit	No changeable options	Exits and saves the changes in CMOS SRAM.
Discard Changes and Exit	No changeable options	Exits without saving any changes made in BIOS settings.
Save Changes and Reset	No changeable options	Saves the changes in CMOS SRAM and resets.
Discard Changes and Reset	No changeable options	Resets without saving any changes made in BIOS settings.
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.
Restore Defaults	No changeable options	Loads the optimized defaults for BIOS settings.
Save as User Defaults	No changeable options	Saves the current values as user defaults.
Restore User Defaults	No changeable options	Loads the user defaults for BIOS settings.
Boot Override	-[drive(s)]	Forces to boot from selected [drive(s)].

TECHNICAL SUMMARY
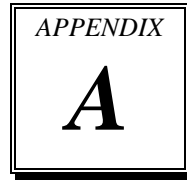
This section introduce you the maps concisely.

Sections included:

- Block Diagram

- Interrupt Map

- DMA Channel Map

- I/O Map

- Memory Map

- Watchdog Timer Configuration

- Flash BIOS Update

BLOCK DIAGRAM
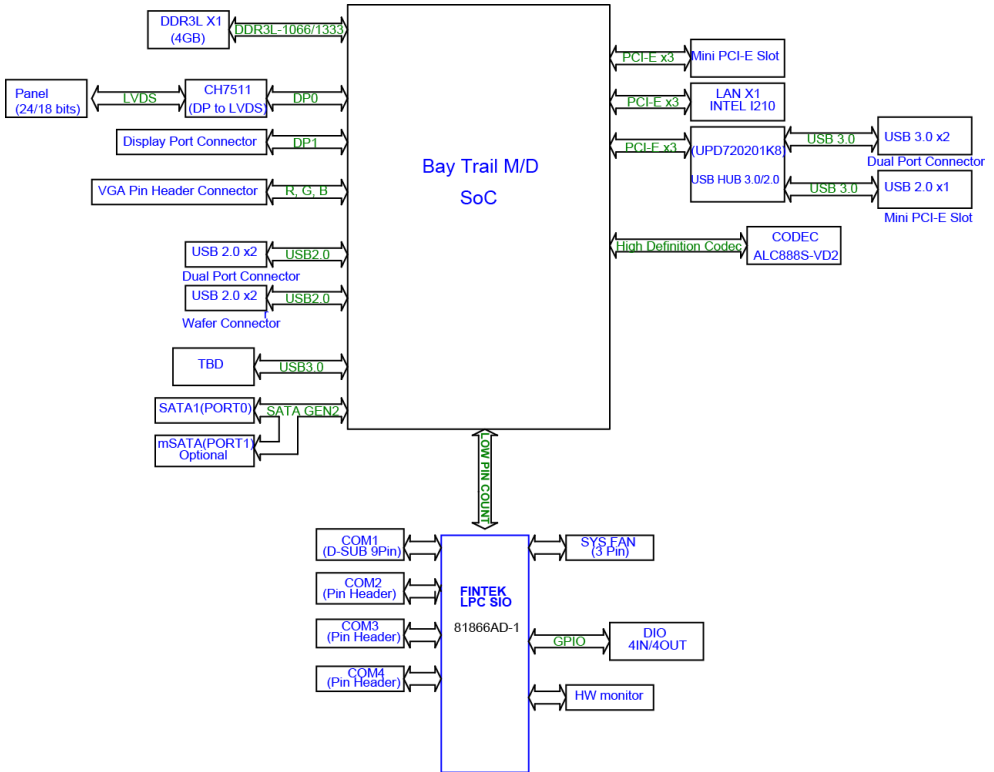
INTERRUPT MAP

IRQ	ASSIGNMENT
IRQ 23	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor EHCI USB - 0F34
IRQ 16	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 1 - 0F48
IRQ 0	System timer
IRQ 22	High Definition Audio Controller
IRQ 8	High precision event timer
IRQ 10	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor Platform Control Unit - SMBus Port - 0F12
IRQ 10	Communications Port (COM4)
IRQ 18	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 3 - 0F4C
IRQ 4	Communications Port (COM1)
IRQ 5	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor Trusted Execution Engine Interface - 0F18
IRQ 3	Communications Port (COM2)
IRQ 19	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 4 - 0F4E
IRQ 19	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor AHCI - 0F23
IRQ 7	Communications Port (COM3)
IRQ 81	Microsoft ACPI-Compliant System
IRQ 82	Microsoft ACPI-Compliant System
IRQ 83	Microsoft ACPI-Compliant System
IRQ 84	Microsoft ACPI-Compliant System
IRQ 85	Microsoft ACPI-Compliant System
IRQ 86	Microsoft ACPI-Compliant System
IRQ 87	Microsoft ACPI-Compliant System
IRQ 88	Microsoft ACPI-Compliant System
IRQ 89	Microsoft ACPI-Compliant System
IRQ 90	Microsoft ACPI-Compliant System
IRQ 91	Microsoft ACPI-Compliant System
IRQ 92	Microsoft ACPI-Compliant System
IRQ 93	Microsoft ACPI-Compliant System

IRQ	ASSIGNMENT
IRQ 94	Microsoft ACPI-Compliant System
IRQ 95	Microsoft ACPI-Compliant System
IRQ 96	Microsoft ACPI-Compliant System
IRQ 97	Microsoft ACPI-Compliant System
IRQ 98	Microsoft ACPI-Compliant System
IRQ 99	Microsoft ACPI-Compliant System
IRQ 100	Microsoft ACPI-Compliant System
IRQ 101	Microsoft ACPI-Compliant System
IRQ 102	Microsoft ACPI-Compliant System
IRQ 103	Microsoft ACPI-Compliant System
IRQ 104	Microsoft ACPI-Compliant System
IRQ 105	Microsoft ACPI-Compliant System
IRQ 106	Microsoft ACPI-Compliant System
IRQ 107	Microsoft ACPI-Compliant System
IRQ 108	Microsoft ACPI-Compliant System
IRQ 109	Microsoft ACPI-Compliant System
IRQ 110	Microsoft ACPI-Compliant System
IRQ 111	Microsoft ACPI-Compliant System
IRQ 112	Microsoft ACPI-Compliant System
IRQ 113	Microsoft ACPI-Compliant System
IRQ 114	Microsoft ACPI-Compliant System
IRQ 115	Microsoft ACPI-Compliant System
IRQ 116	Microsoft ACPI-Compliant System
IRQ 117	Microsoft ACPI-Compliant System
IRQ 118	Microsoft ACPI-Compliant System
IRQ 119	Microsoft ACPI-Compliant System
IRQ 120	Microsoft ACPI-Compliant System
IRQ 121	Microsoft ACPI-Compliant System
IRQ 122	Microsoft ACPI-Compliant System
IRQ 123	Microsoft ACPI-Compliant System
IRQ 124	Microsoft ACPI-Compliant System
IRQ 125	Microsoft ACPI-Compliant System
IRQ 126	Microsoft ACPI-Compliant System
IRQ 127	Microsoft ACPI-Compliant System

IRQ	ASSIGNMENT
IRQ 128	Microsoft ACPI-Compliant System
IRQ 129	Microsoft ACPI-Compliant System
IRQ 130	Microsoft ACPI-Compliant System
IRQ 131	Microsoft ACPI-Compliant System
IRQ 132	Microsoft ACPI-Compliant System
IRQ 133	Microsoft ACPI-Compliant System
IRQ 134	Microsoft ACPI-Compliant System
IRQ 135	Microsoft ACPI-Compliant System
IRQ 136	Microsoft ACPI-Compliant System
IRQ 137	Microsoft ACPI-Compliant System
IRQ 138	Microsoft ACPI-Compliant System
IRQ 139	Microsoft ACPI-Compliant System
IRQ 140	Microsoft ACPI-Compliant System
IRQ 141	Microsoft ACPI-Compliant System
IRQ 142	Microsoft ACPI-Compliant System
IRQ 143	Microsoft ACPI-Compliant System
IRQ 144	Microsoft ACPI-Compliant System
IRQ 145	Microsoft ACPI-Compliant System
IRQ 146	Microsoft ACPI-Compliant System
IRQ 147	Microsoft ACPI-Compliant System
IRQ 148	Microsoft ACPI-Compliant System
IRQ 149	Microsoft ACPI-Compliant System
IRQ 150	Microsoft ACPI-Compliant System
IRQ 151	Microsoft ACPI-Compliant System
IRQ 152	Microsoft ACPI-Compliant System
IRQ 153	Microsoft ACPI-Compliant System
IRQ 154	Microsoft ACPI-Compliant System
IRQ 155	Microsoft ACPI-Compliant System
IRQ 156	Microsoft ACPI-Compliant System
IRQ 157	Microsoft ACPI-Compliant System
IRQ 158	Microsoft ACPI-Compliant System
IRQ 159	Microsoft ACPI-Compliant System
IRQ 160	Microsoft ACPI-Compliant System
IRQ 161	Microsoft ACPI-Compliant System

IRQ	ASSIGNMENT
IRQ 162	Microsoft ACPI-Compliant System
IRQ 163	Microsoft ACPI-Compliant System
IRQ 164	Microsoft ACPI-Compliant System
IRQ 165	Microsoft ACPI-Compliant System
IRQ 166	Microsoft ACPI-Compliant System
IRQ 167	Microsoft ACPI-Compliant System
IRQ 168	Microsoft ACPI-Compliant System
IRQ 169	Microsoft ACPI-Compliant System
IRQ 170	Microsoft ACPI-Compliant System
IRQ 171	Microsoft ACPI-Compliant System
IRQ 172	Microsoft ACPI-Compliant System
IRQ 173	Microsoft ACPI-Compliant System
IRQ 174	Microsoft ACPI-Compliant System
IRQ 175	Microsoft ACPI-Compliant System
IRQ 176	Microsoft ACPI-Compliant System
IRQ 177	Microsoft ACPI-Compliant System
IRQ 178	Microsoft ACPI-Compliant System
IRQ 179	Microsoft ACPI-Compliant System
IRQ 180	Microsoft ACPI-Compliant System
IRQ 181	Microsoft ACPI-Compliant System
IRQ 182	Microsoft ACPI-Compliant System
IRQ 183	Microsoft ACPI-Compliant System
IRQ 184	Microsoft ACPI-Compliant System
IRQ 185	Microsoft ACPI-Compliant System
IRQ 186	Microsoft ACPI-Compliant System
IRQ 187	Microsoft ACPI-Compliant System
IRQ 188	Microsoft ACPI-Compliant System
IRQ 189	Microsoft ACPI-Compliant System
IRQ 190	Microsoft ACPI-Compliant System
IRQ 4294967288	Renesas Electronics USB 3.0 Host Controller
IRQ 4294967287	Renesas Electronics USB 3.0 Host Controller
IRQ 4294967286	Renesas Electronics USB 3.0 Host Controller

IRQ	ASSIGNMENT
IRQ 4294967285	Renesas Electronics USB 3.0 Host Controller
IRQ 4294967284	Renesas Electronics USB 3.0 Host Controller
IRQ 4294967283	Renesas Electronics USB 3.0 Host Controller
IRQ 4294967282	Renesas Electronics USB 3.0 Host Controller
IRQ 4294967281	Renesas Electronics USB 3.0 Host Controller
IRQ 4294967294	Intel(R) I210 Gigabit Network Connection
IRQ 4294967293	Intel(R) I210 Gigabit Network Connection
IRQ 4294967292	Intel(R) I210 Gigabit Network Connection
IRQ 4294967291	Intel(R) I210 Gigabit Network Connection
IRQ 4294967290	Intel(R) I210 Gigabit Network Connection
IRQ 4294967289	Intel(R) I210 Gigabit Network Connection

Note: These resource information were gathered using Windows 7 (the IRQ could be assigned differently depending on OS)

I/O MAP

I/O MAP	ASSIGNMENT
0x0000E080-0x0000E087	Standard VGA Graphics Adapter
0x000003B0-0x000003BB	Standard VGA Graphics Adapter
0x000003C0-0x000003DF	Standard VGA Graphics Adapter
0x00000A00-0x00000A0F	Motherboard resources
0x00000A10-0x00000A1F	Motherboard resources
0x00000A20-0x00000A2F	Motherboard resources
0x0000002E-0x0000002F	Motherboard resources
0x0000004E-0x0000004F	Motherboard resources
0x00000061-0x00000061	Motherboard resources
0x00000063-0x00000063	Motherboard resources
0x00000065-0x00000065	Motherboard resources
0x00000067-0x00000067	Motherboard resources
0x00000070-0x00000070	Motherboard resources
0x00000070-0x00000070	System CMOS/real time clock
0x00000080-0x0000008F	Motherboard resources
0x00000092-0x00000092	Motherboard resources
0x000000B2-0x000000B3	Motherboard resources
0x00000680-0x0000069F	Motherboard resources
0x00000400-0x0000047F	Motherboard resources
0x00000500-0x000005FE	Motherboard resources
0x00000600-0x0000061F	Motherboard resources
0x00000020-0x00000021	Programmable interrupt controller
0x00000024-0x00000025	Programmable interrupt controller
0x00000028-0x00000029	Programmable interrupt controller
0x0000002C-0x0000002D	Programmable interrupt controller
0x00000030-0x00000031	Programmable interrupt controller
0x00000034-0x00000035	Programmable interrupt controller
0x00000038-0x00000039	Programmable interrupt controller

I/O MAP	ASSIGNMENT
0x0000003C-0x0000003D	Programmable interrupt controller
0x000000A0-0x000000A1	Programmable interrupt controller
0x000000A4-0x000000A5	Programmable interrupt controller
0x000000A8-0x000000A9	Programmable interrupt controller
0x000000AC-0x000000AD	Programmable interrupt controller
0x000000B0-0x000000B1	Programmable interrupt controller
0x000000B4-0x000000B5	Programmable interrupt controller
0x000000B8-0x000000B9	Programmable interrupt controller
0x000000BC-0x000000BD	Programmable interrupt controller
0x000004D0-0x000004D1	Programmable interrupt controller
0x00000040-0x00000043	System timer
0x00000050-0x00000053	System timer
0x0000E000-0x0000E01F	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor Platform Control Unit - SMBus Port - 0F12
0x0000D000-0x0000DFFF	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 3 - 0F4C
0x000003F8-0x000003FF	Communications Port (COM1)
0x000002F8-0x000002FF	Communications Port (COM2)
0x000003E8-0x000003EF	Communications Port (COM3)
0x000002E8-0x000002EF	Communications Port (COM4)
0x00000000-0x0000006F	PCI bus
0x00000078-0x00000CF7	PCI bus
0x00000D00-0x0000FFFF	PCI bus
0x0000E070-0x0000E077	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor AHCI - 0F23
0x0000E060-0x0000E063	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor AHCI - 0F23
0x0000E050-0x0000E057	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor AHCI - 0F23
0x0000E040-0x0000E043	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor AHCI - 0F23

I/O MAP	ASSIGNMENT
0x0000E020-0x0000E03F	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor AHCI - 0F23

MEMORY MAP

MEMORY MAP	ASSIGNMENT
0x90000000-0x903FFFFF	Standard VGA Graphics Adapter
0x80000000-0x8FFFFFFF	Standard VGA Graphics Adapter
0x80000000-0x8FFFFFFF	PCI bus
0xA0000-0xBFFFF	Standard VGA Graphics Adapter
0xA0000-0xBFFFF	PCI bus
0xFF000000-0xFFFFFFFF	Intel(R) 82802 Firmware Hub Device
0xE0000000-0xEFFFFFFF	Motherboard resources
0xFED01000-0xFED01FFF	Motherboard resources
0xFED03000-0xFED03FFF	Motherboard resources
0xFED04000-0xFED04FFF	Motherboard resources
0xFED0C000-0xFED0FFFF	Motherboard resources
0xFED08000-0xFED08FFF	Motherboard resources
0xFED1C000-0xFED1CFFF	Motherboard resources
0xFEE00000-0xFEEFFFFF	Motherboard resources
0xFEF00000-0xFEFFFFFF	Motherboard resources
0xE00000D0-0xE00000DB	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor MBI Device - 33BD
0x90805000-0x908053FF	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor EHCI USB - 0F34
0x90800000-0x90803FFF	High Definition Audio Controller
0xFED00000-0xFED003FF	High precision event timer
0x90804000-0x9080401F	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor Platform Control Unit - SMBus Port - 0F12
0x90700000-0x907FFFFF	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 3 - 0F4C
0x90700000-0x907FFFFF	Intel(R) I210 Gigabit Network Connection
0x90500000-0x905FFFFF	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor Trusted Execution Engine Interface - 0F18

MEMORY MAP	ASSIGNMENT
0x90400000-0x904FFFFF	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor Trusted Execution Engine Interface - 0F18
0x90600000-0x906FFFFF	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 4 - 0F4E
0x90600000-0x906FFFFF	Renesas Electronics USB 3.0 Host Controller
0x90780000-0x90783FFF	Intel(R) I210 Gigabit Network Connection
0xC0000-0xDFFFF	PCI bus
0xE0000-0xFFFFF	PCI bus
0x90806000-0x908067FF	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor AHCI - 0F23

WATCHDOG TIMER CONFIGURATION

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

Configuration Sequence

To program F81866 configuration registers, the following configuration sequence must be followed:
(1) Enter the extended function mode
(2) Configure the configuration registers
(3) Exit the extended function mode

(1) Enter the extended function mode

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

(2) Configure the configuration registers

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

(3) Exit the extended function mode

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

Example Program

Enable watchdog timer and set 30 sec. as timeout interval

```
;------ Enter to extended function mode ----------------------------------------------------
Mov     dx,     2eh
Mov     al,     87h
Out     dx,     al
Out     dx,     al
;------ Select Logical Device 8 of watchdog timer -----------------------------------------
Mov     al,     07h
Out     dx,     al
Inc     dx
Mov     al,     08h
Out     dx,     al
;------ Set second as counting unit -------------------------------------------------------------
Dec     dx
Mov     al,     0f5h
Out     dx,     al
Inc     dx
In      al,     dx
And     al,     not 08h
Out     dx,     al
;------ Set timeout interval as 30seconds and start counting -------------------------------
Dec     dx
Mov     al,     0f6h
Out     dx,     al
Inc     dx
Mov     al,     30
Out     dx,     al
;------ Exit the extended function mode ------------------------------------------------------
Dec     dx
Mov     al,     0aah
Out     dx,     al
```

A. Before System BIOS update
1.   Prepare a bootable media (ex. USB storage device) which can boot system to DOS prompt.
2.   Download and save the BIOS file (ex. E9660TID.bin) to the bootable device.
3.   Copy AMI flash utility – AFUDOS.exe (v5.07) into bootable device.
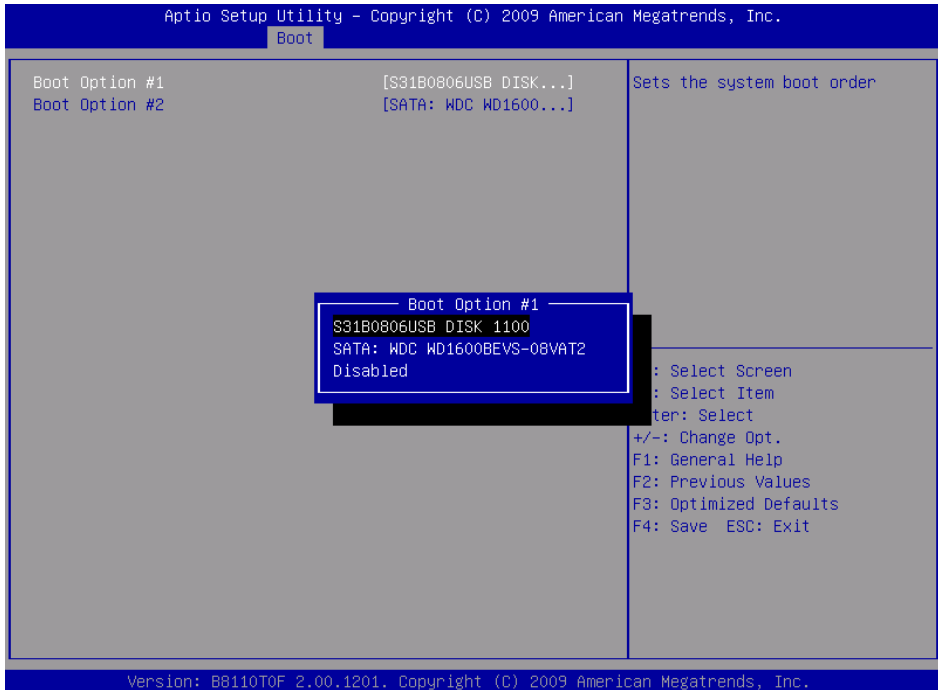
```
C:\AFUDOS>dir

 Volume in drive C has no label
 Volume serial Number is 0846-7844
 Directory of C:\AFUDOS


.               <DIR>        02-04-15 11:20a
..              <DIR>        02-04-15 11:20a
AFUDOS   EXE      169,120  02-02-15  2:43p
AFUDOS   TXT        5,686  02-02-15  2:17p
README   TXT        5,052  01-30-15  5:57p
AMI_AP~1 PDF    1,088,978  02-02-15  3:03p
E9660TID BIN    8,388,608  02-10-15  3:07p
         5 file(s)      9,657,444 bytes
         2 dir(s)        5,242.82 MB free

C:\AFUDOS>
```

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 <Esc> or <Del> key during boot to enter BIOS Setup.
    c.   System will go into the BIOS setup menu.
    d.   Select [Boot] menu.
    e.   Select [Hard Drive BBS Priorities], set the USB bootable device to be the 1st boot device.
    f.   Press <F4> key to save configuration and exit the BIOS setup menu.

```
              Aptio Setup Utility - Copyright (C) 2009 American Megatrends, Inc.
                         Boot

    Boot Option #1                    [S31B0806USB DISK...]      Sets the system boot order
    Boot Option #2                    [SATA: WDC WD1600...]




                          ┌─────── Boot Option #1 ───────┐
                          │ S31B0806USB DISK 1100         │
                          │ SATA: WDC WD1600BEVS-08VAT2   │              : Select Screen
                          │ Disabled                      │              : Select Item
                          └───────────────────────────────┘         ter: Select
                                                                   +/-: Change Opt.
                                                                   F1: General Help
                                                                   F2: Previous Values
                                                                   F3: Optimized Defaults
                                                                   F4: Save  ESC: Exit




              Version: B8110TOF 2.00.1201. Copyright (C) 2009 American Megatrends, Inc.
```

B. AFUDOS command for system BIOS update

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

AFUDOS <BIN File Name> [option1] [option2]….

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

/P: Program main BIOS image.
/B: Program Boot Block.
/N: Program NVRAM.
/X: Don't check ROM ID.

C. BIOS update procedure

1. Use the bootable USB storage to boot up system into the DOS command prompt.
2. Type "**AFUDOS E966xxxx.bin /p /b /n /x"** and press enter to start the flash procedure.
   (Note that 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 system power or reset your computer if the whole procedure are not complete yet, or it may crash the BIOS ROM and make system unable to boot up next time.

4.   After BIOS update procedures is complete, the messages should be like the figure shown below.

```
C:\AFUDOS>AFUDOS E9660TID.bin /P /B /N /X
+----------------------------------------------------------------------+
¦                  AMI Fireware Update Utility  v5.07.01                ¦
¦      Copyright (C)2014 American Megatrends Inc. All Rights Reserved.  ¦
+----------------------------------------------------------------------+
 Reading flash .............. done
 - ME Data Size checking . ok
 - FFS checksums ........ ok
 Erasing Boot Block ......... done
 Updating Boot Block ........ done
 Verifying Boot Block ....... done
 Erasing Main Block ......... done
 Updating Main Block ........ done
 Verifying Main Block ....... done
 Erasing NVRAM Block ........ done
 Updating NVRAM Block ....... done
 Verifying NVRAM Block ...... done

C:\AFUDOS>
```

5. User can restart the system and boot up with new BIOS now.
6. Update is complete after restart.
7. Verify the BIOS version on BIOS Setup.
   (1) Turn on the computer and press <Esc> or <Del> key during boot to enter BIOS Setup.
   (2) System will go into the BIOS setup menu.
   (3) Select [Main] menu.
   (4) Check Project Version