USER'S MANUAL

BM-0962

Mini ITX Motherboard supports
Intel® Bay Trail SOC with
DVI/ LVDS/ Audio/ 2LAN/6COM

BM-0962 M4

BM-0962
Mini ITX Mother Board supports Intel® Bay Trail SOC With DVI/ LVDS/ Audio/ 2LAN/ 6COM

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DISCLAIMER

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

CE NOTICE

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

FCC NOTICE

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

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

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

TABLE OF CONTENTS

INTRODUCTION

CHAPTER

1

This chapter gives you the information for BM-0962. It also outlines the system specifications.

The following sections are included:

- About This Manual
- System Specifications
- Safety Precautions

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

1-1. ABOUT THIS MANUAL

Thank you for purchasing our BM-0962 Mini-ITX Motherboard with Intel® Atom E3815/ E3827/ E3845/ J1900/ N2930/ N2807 processor, enhanced with LAN, VGA, 6 USB & 6 COM, which is fully PC/AT compatible. The BM-0962 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 Graphics utility, LAN utility and Sound utility.

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

Appendix A Expansion Bus
This appendix introduces you the expansion bus for PCIe connectors.

Appendix B Technical Summary
This appendix gives you the information about the Technical maps and Flash BIOS Update. It also describes the Watchdog-timer configuration.

1-2. SYSTEM SPECIFICATIONS

System

CPU	● Intel® Atom E3815 (5W, 1.46GHz, 1C/1T) ● Intel® Atom E3827 (8W, 1.75GHz, 2C/2T) ● Intel® Atom E3845 (10W, 1.91GHz, 4C/4T) ● Intel® Atom J1900 (10W, 2GHz, 4C/4T) ● Intel® Atom N2930 (7.5W, 1.83GHz, 4C/4T) ● Intel® Atom N2807 (4.3W, 1.58GHz, 2C/2T)
OS Support	Windows 8, 7, 10
Chipset	Bay Trail-I SOC Co-lay Bay Trail-D/Bay Trail-M SOC
Memory	2 x 204-pin DDR3L SO-DIMM, support dual-channel DDR3L 1333/1600MHz (system max. 8GB) * If there is only one SO-DIMM, SO-DIMM1 should be inserted first instead of SO-DIMM2.
BIOS	AMI
Watchdog	1~255 seconds
Power Supply	DC 12V in
Dimension	170 mm x 170 mm (6.69” x 6.69”)
Certificate	CE/FCC Class A

I/O Ports

Serial Port	6 COM Ports: ● COM1, 2, 3: D-sub 9, rear IO ● COM4, 5, 6: 2.0mm pitch pin header ● COM3,4 support +5/+12V *COM 5/6 support RS-232/422/485 function via the daughter board. * BM-0962RB-08N and BM-0962RB-W6N SPEC do not support COM5 and COM6.
USB Port	6 USB ports: ● 5 x USB2.0: (3 x stack w/ LAN connector, rear IO, 2 x onboard Connector) ● 1 x USB3.0: stack w/ LAN connector, rear IO *BM-0962RB-01N, BM-0962RB-32N and BM-0962RB-W7N.
	4 USB ports: ● 3 x USB2.0: stack w/ LAN connector, rear IO ● 1 x USB3.0: stack w/ LAN connector, rear IO * BM-0962RB-W6N and BM-0962RB-08N.
SATA Interface	2 x SATA II, onboard Connector
LAN	● Dual ports are provided to support 10/100/1000Mbps, RJ-45, rear IO, support Wake-on-LAN ● LAN1: Intel I210-IT/AT ● LAN2: Intel I210- IT/AT * BM-0962RB-08N and BM-0962RB-W6N SPEC only support one LAN.
Audio	Realtek ALC888S, high definition audio, Line In/ Line Out/ Mic In, audio jack, rear I/O.
Keyboard/Mouse	1 x PS/2
Expansion Bus	1 x PCIe (1x) 1 x Mini-PCIe
GPIO/ DIO	GPIO 4in / 4out
LPC	1 x LPC pin head (supports TPM module for expansion)

Display

Graphics	1 x DVI-I, rear IO 1 x LVDS(DP), Dual channel 18/24bit ▪ * Only support two independent displays ▪ * BM-0962RB-08N SPEC does not support LVDS.
LED Indicator	HDD LED, Power LED, Power Switch, Reset Switch
Speaker	Internal buzzer

Environment

Operating Temp.	0°C~60°C (32°F ~140°F), Wide temp SKU: -40°C ~ 85°C
Storage Temp.	-40°C~80°C (-40°F ~176°F)
Operating Humidity	5%~90% (non-condensing)

1-3. SAFETY PRECAUTIONS

Follow the instructions below to safeguard your system from damages:

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

2. Prevent electric shock. Do not touch any components of the system when the system is powered on. Always disconnect the power supply when the system is not in use.

3. Disconnect the power supply 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

CHAPTER

2

*** QUICK START ***

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

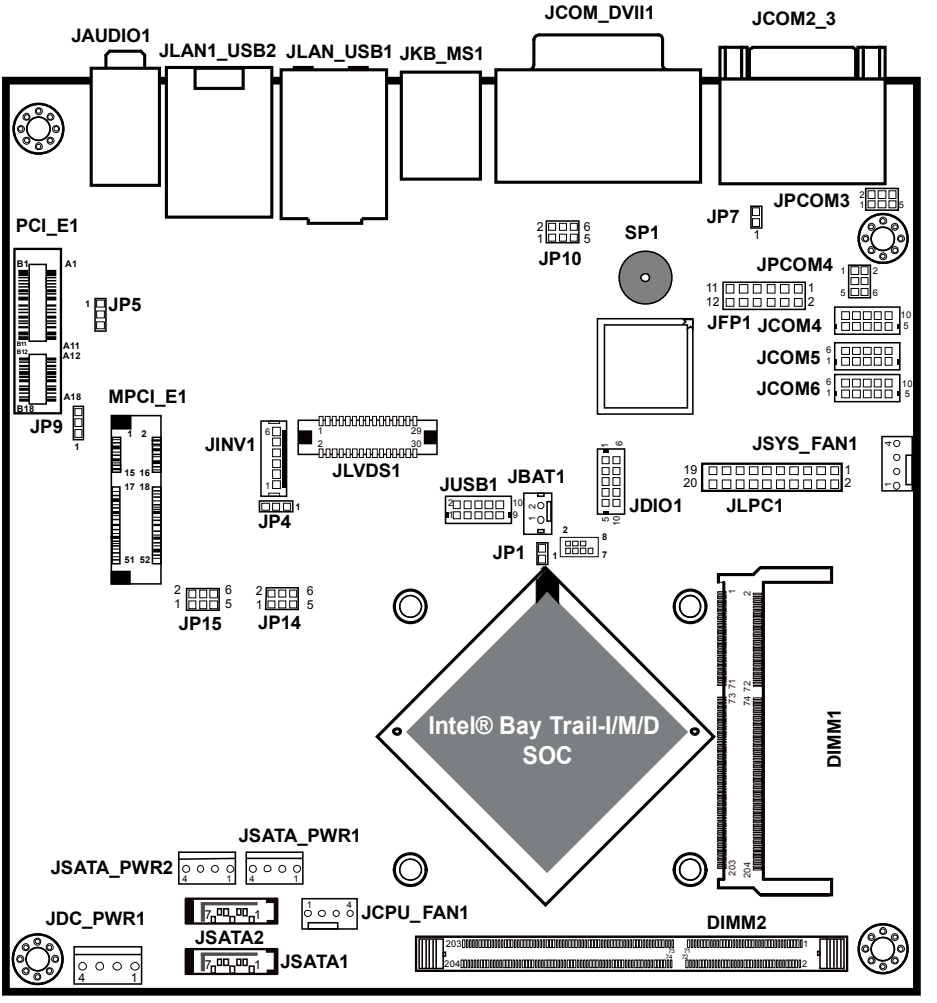
The following sections are included:

- 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	JP1
LVDS Power Selection	JP4
Backlight Power Selection	JP5
AT/ATX Mode Selection	JP7
Backlight Enable Selection	JP9
VGA/DVI Selection	JP10
LVDS Resolution Selection	JP14, JP15
COM3 Voltage Selection	JP_COM3
COM4 Voltage Selection	JP_COM4
Audio Port	JAUDIO1
Battery Wafer	JBAT1
COM Port	JCOM2_3
COM4 Connector	JCOM4
COM5 Connector	JCOM5
COM6 Connector	JCOM6
DVI-I & COM Port	JCOM_DVII1
FAN Connector	JCPU_FAN1, JSYS_FAN1
DC 12V Connector	JDC_PWR1
DIO Wafer	JDIO1
Front Connector	JFP1
Inverter Wafer	JINV1
KB/MS Port	JKB_MS1
LAN & USB2.0 Port	JLAN_USB1
LAN& USB2.0/3.0 Port	JLAN_USB2
LVDS Connector	JLVDS1
SATA Connector	JSATA1, JSATA2
SATA Power Connector	JSATA_PWR1, JSATA_PWR2
USB Connector	JUSB1
MINI PCIE Connector	M_PCI_E1
PCIE BUS	PCI_E1
LPC Connector	JLPC1

2-2. COMPONENT LOCATIONS



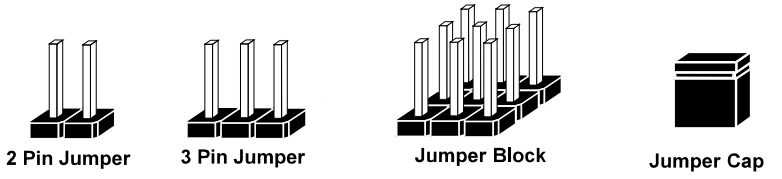
BM-0962 Connector, Jumper and Component Locations (Front Side)

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.

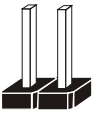
JUMPERS AND CAPS



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.

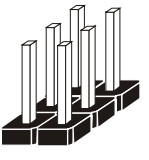
Jumper Diagrams

Jumper Cap looks like this

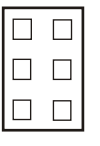


2 pin Jumper looks like this

3 pin Jumper looks like this

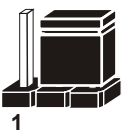


Jumper Block looks like this

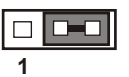


Jumper Settings

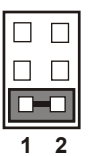
2 pin Jumper close(enabled) Looks like this



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



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



2-4. CLEAR CMOS DATA SELECTION

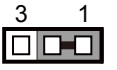
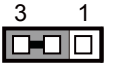
JP1: Clear CMOS Data Selection

SELECTION	JUMPTER SETTING	JUMPER ILLUSTRATION
NC	NC	 **JP1**
Clear CMOS	1-2	 **JP1**

Note: Manufacturing default is NC.

2-5. LVDS POWER SELECTION

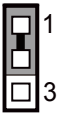
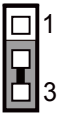
JP4: LVDS Power Selection

SELECTION	JUMPTER SETTING	JUMPER ILLUSTRATION
3.3V	1-2	 **JP4**
5V	2-3	 **JP4**

Note: Manufacturing default is 3.3V.

2-6. Backlight Inverter PWM Voltage Selection

JP5: Backlight Inverter PWM Voltage Selection

SELECTION	JUMPTER SETTING	JUMPER ILLUSTRATION
3.3V	**1-2**	 **JP5**
5V	2-3	 **JP5**
GND	NC	 **JP5**

Note: Manufacturing default is 3.3V.

2-7. Power-On Mode SELECTION

JP7: Power-On Mode Selection

SELECTION	JUMPTER SETTING	JUMPER ILLUSTRATION
Auto-on	**1-2**	 **JP7**
Select by BIOS	NC	 **JP7**

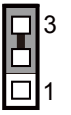
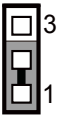
Note 1: Manufacturing default is **Auto-on**.

Note 2: Manufacturing default for BS-H292 (SBOX) is "NC".

Note 3: Auto-On means that system will turn on automatically whenever the main power is restored.

2-8. BACKLIGHT ENABLE SELECTION

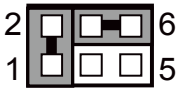
JP9: BACKLIGHT ENABLE Selection

SELECTION	JUMPTER SETTING	JUMPER ILLUSTRATION
5V	2-3	 **JP9**
3.3V	1-2	 **JP9**

Note: Manufacturing default is 5V.

2-9. VGA/DVI SELECTION

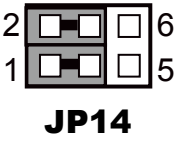
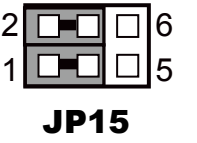
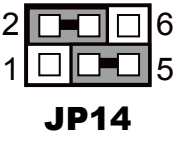
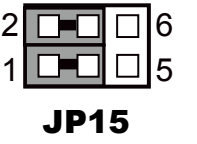
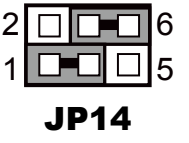
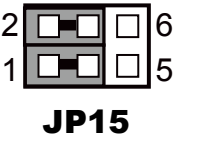
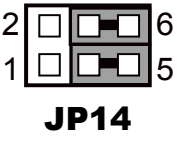
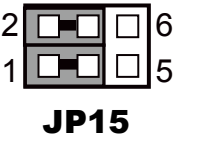
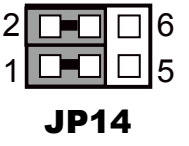
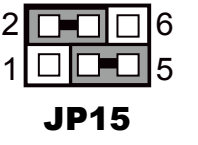
JP10: VGA/DVI Selection

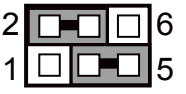
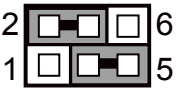
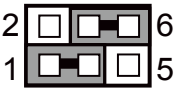
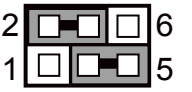
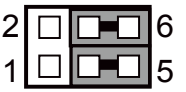
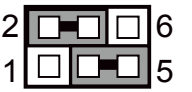
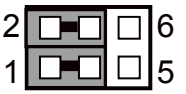
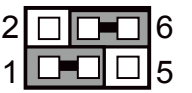
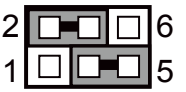
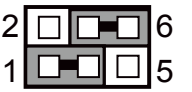
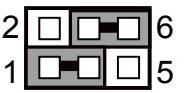
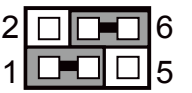
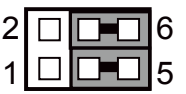
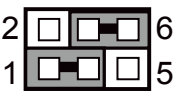
SELECTION	JUMPTER SETTING	JUMPER ILLUSTRATION
DVI	(1-3) (5-6)	 **JP10**
VGA	(1-2) (4-6)	 **JP10**

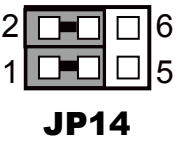
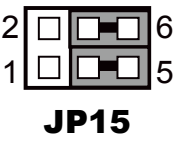
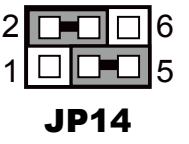
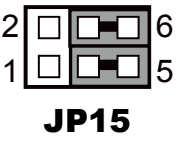
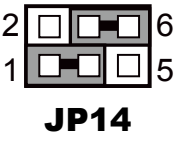
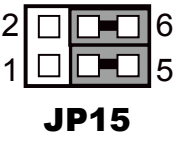
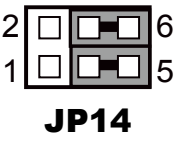
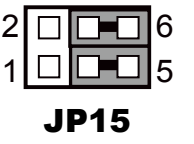
Note: Manufacturing default is DVI.

2-10. LVDS RESOLUTION SELECTION

JP14 & JP15: LVDS Resolution Selection

SELECTION	JUMPTER SETTING	JUMPER ILLUSTRATION	
1920x1200 2CH/24bit	JP15(2-4) JP15(1-3) JP14(2-4) JP14(1-3)		
1920x1080 2CH/24bit	JP15(2-4) JP15(1-3) JP14(2-4) JP14(3-5)		
1600x1200 2CH/24bit	JP15(2-4) JP15(1-3) JP14(4-6) JP14(1-3)		
1680x1050 2CH/24bit	JP15(2-4) JP15(1-3) JP14(4-6) JP14(3-5)		
1600x900 2CH/24bit	JP15(2-4) JP15(3-5) JP14(2-4) JP14(1-3)		

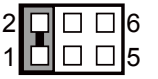
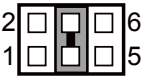
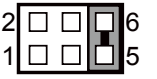
1400x1050 2CH/24bit	JP15(2-4) JP15(3-5) JP14(2-4) JP14(3-5)	 **JP14**	 **JP15**
1440x900 2CH/24bit	JP15(2-4) JP15(3-5) JP14(4-6) JP14(1-3)	 **JP14**	 **JP15**
1366x768 1CH/24bit	JP15(2-4) JP15(3-5) JP14(4-6) JP14(3-5)	 **JP14**	 **JP15**
1366x768 1CH/18bit	JP15(4-6) JP15(1-3) JP14(2-4) JP14(1-3)	 **JP14**	 **JP15**
1280x1024 2CH/24bit	JP15(4-6) JP15(1-3) JP14(2-4) JP14(3-5)	 **JP14**	 **JP15**
1280x960 1CH/24bit	JP15(4-6) JP15(1-3) JP14(4-6) JP14(1-3)	 **JP14**	 **JP15**
1280x800 1CH/18bit	JP15(4-6) JP15(1-3) JP14(4-6) JP14(3-5)	 **JP14**	 **JP15**

1280x768 1CH/18bit	JP15(4-6) JP15(3-5) JP14(2-4) JP14(1-3)		
1024x768 1CH/24bit	JP15(4-6) JP15(3-5) JP14(2-4) JP14(3-5)		
1024x768 1CH/18bit	JP15(4-6) JP15(3-5) JP14(4-6) JP14(1-3)		
800x600 1CH/18bit	JP15(4-6) JP15(3-5) JP14(4-6) JP14(3-5)		

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

2-11. COM3 VOLTAGE SELECTION

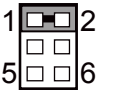
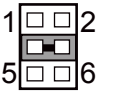
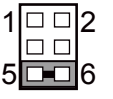
JP_COM3: COM3 Voltage Selection

SELECTION	JUMPTER SETTING	JUMPER ILLUSTRATION
RI	1-2	 **JP_COM3**
12V	3-4	 **JP_COM3**
5V	5-6	 **JP_COM3**

Note: Manufacturing default is RI.

2-12. COM4 VOLTAGE SELECTION

JP_COM4: COM4 Voltage Selection

SELECTION	JUMPTER SETTING	JUMPER ILLUSTRATION
RI	1-2	 **JP_COM4**
12V	3-4	 **JP_COM4**
5V	5-6	 **JP_COM4**

Note 1: Manufacturing default is **RI**.

Note 2: Manufacturing default for BS-H292 (SBOX)) is 5V (5-6).

2-13. AUDIO PORT

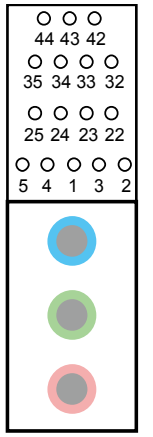
JAUDIO1: Line-In, Line-Out & Microphone
The connector can also support only Microphone.

Line-In:

PIN	ASSIGNMENT
32	LINE-IN-L
33	NC
34	NC
35	LINE-IN-R

Line-Out:

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



JAUDIO1

Mic-In:

PIN	ASSIGNMENT
1	GND
2	MIC_L
3	NC
4	NC
5	MIC_R

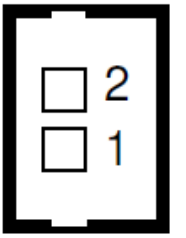
Others:

PIN	ASSIGNMENT
42	NC
43	NC
44	NC

2-14. BATTERY WAFER

JBAT1: Battery Wafer

PIN	ASSIGNMENT
1	RTC_BAT
2	GND

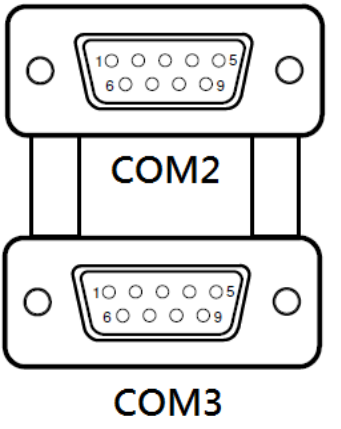


JBAT1

2-15. COM PORT

JCOM2_3: COM Port

PIN	ASSIGNMENT
1	DCD
2	RXD
3	TXD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

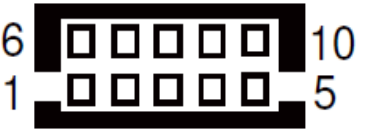


JCOM2_3

2-16. COM4 CONNECTOR

JCOM4: COM4 Connector

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

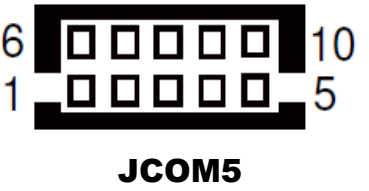


JCOM4

2-17. COM5 CONNECTOR

JCOM5: COM5 Connector

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

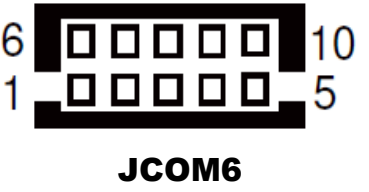


JCOM5

2-18. COM6 CONNECTOR

JCOM6: COM6 Connector

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



JCOM6

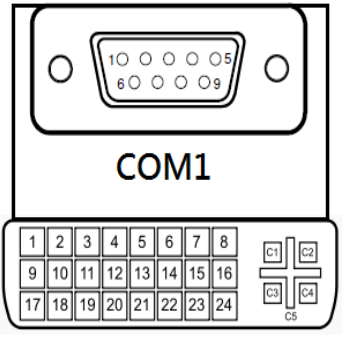
2-19. DVI-I & COM PORT

JCOM_DVII1: DVI-I & COM PORT
DVI-I: DVI Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	TMDS_D2-	2	TMDS_D2+
3	GND	4	NC
5	NC	6	DDC_CLK
7	DDC_DATA	8	VSYNC
9	TMDS_D1-	10	TMDS_D1+
11	GND	12	NC
13	NC	14	5V
15	GND	16	HPD
17	TMDS_D0-	18	TMDS_D0+
19	GND	20	NC
21	NC	22	GND
23	TMDS_CLK+	24	TMDS_CLK-
C1	RED	C2	GREEN
C3	BLUE	C4	HSYNC
C5	GND	-	-

COM1: COM Connector

PIN	ASSIGNMENT
1	DCD
2	RXD
3	TXD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

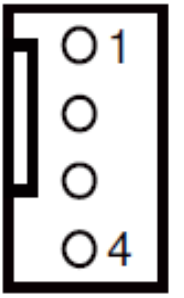


DVI-I
JCOM_DVII1

2-20. FAN CONNECTOR

JCPU_FAN1, JSYS_FAN1: Fan Connector

PIN	ASSIGNMENT
1	GND
2	12V
3	FAN_CONTROL
4	FAN_SIGNAL



JCPU_FAN1/
JSYS_FAN1

2-21. DC 12V CONNECTOR

JDC_PWR1: DC 12V Connector

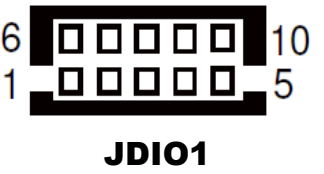
PIN	ASSIGNMENT
1	12V
2	12V
3	GND
4	GND

JDC_PWR1

2-22. DIO WAFER

JDIO1: DIO Wafer

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

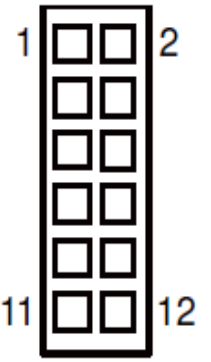


JDIO1

2-23. FRONT CONNECTOR

JFP1: Front Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	HDD_LED+	7	RESET SWITCH
2	PWR_LED+	8	SPEAKER SIGNAL
3	HDD_LED-	9	POWER BUTTON
4	PWR_LED-	10	SPEAKER SIGNAL
5	GND	11	GND
6	SPK_VCC	12	SPEAKER SIGNAL



JFP1

2-24. INVERTER WAFER

JINV1: Inverter Wafer

PIN	ASSIGNMENT
1	12V
2	12V
3	GND
4	PWM SIGNAL
5	GND
6	BACKLIGHT EN

JINV1

2-25. KB/MS PORT

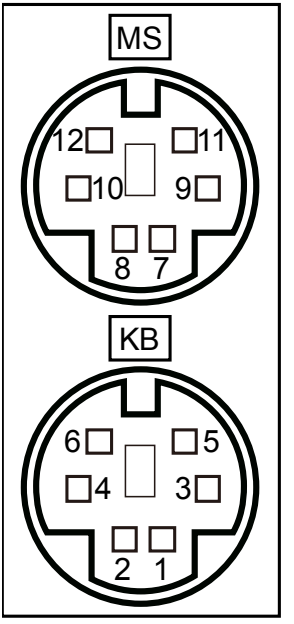
JKB_MS1: KB/MS Port

Keyboard:

PIN	ASSIGNMENT
1	DATA
2	NC
3	GND
4	5V
5	CLK
6	NC

Mouse:

PIN	ASSIGNMENT
7	DATA
8	NC
9	GND
10	5V
11	CLK
12	NC



JKB_MS1

2-26. LAN & USB2.0 PORT

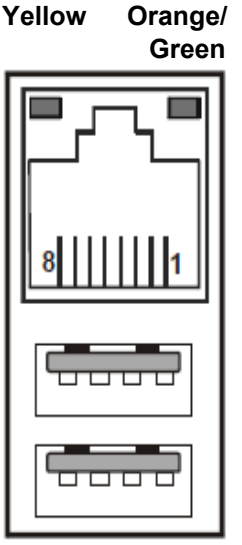
JLAN1_USB1: LAN & USB2.0 PORT

LAN:

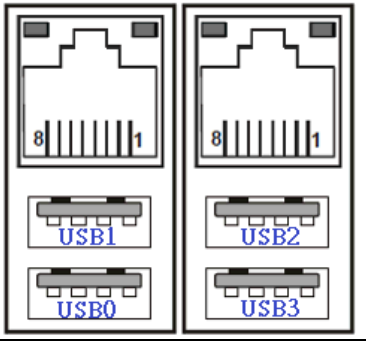
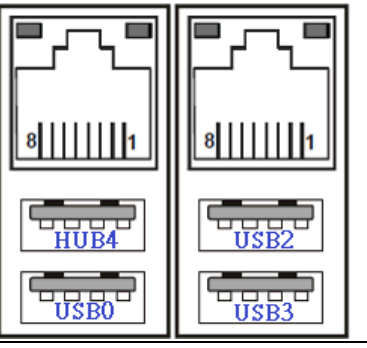
PIN	ASSIGNMENT
1	TX_D1+
2	TX_D1-
3	RX_D2+
4	BI_D3+
5	BI_D3-
6	RX_D2-
7	BI_D4+
8	BI_D4-

USB2.0:

PIN	ASSIGNMENT
1	5V
2	D-
3	D+
4	GND

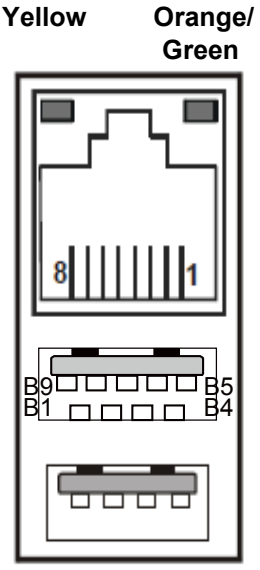


JLAN1_USB1

BM-0962RB-08N and BM-0962RB-W6N	BM-0962RB-01N, BM-0962RB-32N, BM-0962RB-W7N and BM-0962RB–E6N
	

2-27. LAN& USB2.0/3.0 PORT

JLAN1_USB2: LAN & USB2.0/3.0 PORT



JLAN1_USB2

LAN:

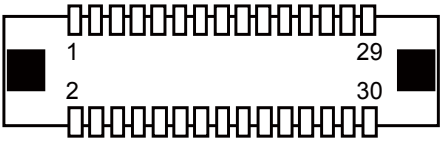
PIN	ASSIGNMENT
1	TX_D1+
2	TX_D1-
3	RX_D2+
4	BI_D3+
5	BI_D3-
6	RX_D2-
7	BI_D4+
8	BI_D4-

USB 3.0:

PIN	ASSIGNMENT
B1	VBUS
B2	D-
B3	D+
B4	GND
B5	STDA_SSRX-
B6	STDA_SSRX+
B7	GND
B8	STDA_SSTX-
B9	STDA_SSTX+

2-28. LVDS CONNECTOR

JLVDS1: LVDS Connector



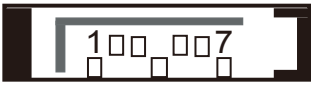
JLVDS1

PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	LVDS_VCC	11	LVDS1_D3+	21	GND
2	GND	12	LVDS1_D3-	22	LVDS0_D1+
3	LVDS1_CLK-	13	LVDS1_D0+	23	LVDS0_D1-
4	LVDS1_CLK+	14	LVDS1_D0-	24	GND
5	GND	15	GND	25	LVDS0_D0+
6	LVDS1_D2-	16	LVDS0_CLK+	26	LVDS0_D0-
7	LVDS1_D2+	17	LVDS0_CLK-	27	LVDS0_D3+
8	GND	18	GND	28	LVDS0_D3-
9	LVDS1_D1-	19	LVDS0_D2+	29	LVDS_VCC
10	LVDS1_D1+	20	LVDS0_D2-	30	LVDS_VCC

2-29. SATA CONNECTOR

JSATA1, JSATA2: Two Serial ATA Connectors

PIN	ASSIGNMENT
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

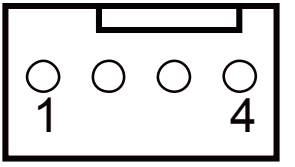


JSATA1/
JSATA2

2-30. SATA POWER CONNECTOR

JSATA_PWR1, JSATA_PWR2: SATA Power Connector

PIN	ASSIGNMENT
1	5V
2	GND
3	GND
4	12V

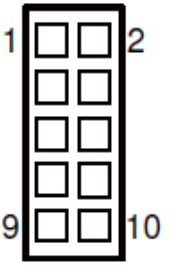


JSATA_PWR1/
JSATA_PWR2

2-31. USB CONNECTOR

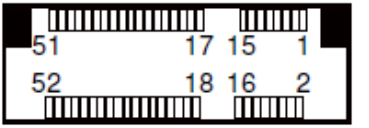
JUSB1: USB Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	5V	2	5V
3	D-	4	D-
5	D+	6	D+
7	GND	8	GND
9	GND	10	GND



JUSB1

2-32. MINI PCIE CONNECTOR

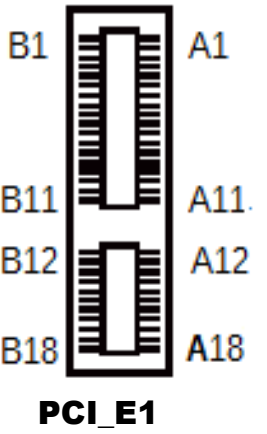


M_PCI_E1

M_PCI_E1: MINI PCIE Connector

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

2-33. PCIE BUS



PCI_E1

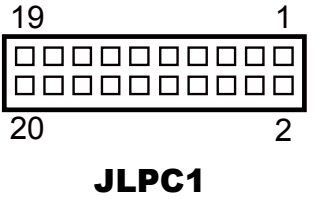
PCI_E1: PCIE BUS

PIN	ASSIGNMENT	PIN	ASSIGNMENT
A1	NC	B1	12V
A2	12V	B2	12V
A3	12V	B3	12V
A4	GND	B4	GND
A5	NC	B5	SMB_CLK
A6	NC	B6	SMB_DATA
A7	NC	B7	GND
A8	NC	B8	3.3V
A9	3.3V	B9	NC
A10	3.3V	B10	3.3V_SB
A11	PWRGD	B11	WAKE#
A12	GND	B12	NC
A13	REFCLK+	B13	GND
A14	REFCLK-	B14	HSOP0
A15	GND	B15	HSON0
A16	HSIP0	B16	GND
A17	HSIN0	B17	PRSNT#
A18	GND	B18	GND

2-34. LPC CONNECTOR

JLPC1: LPC Connector

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



JLPC1

SOFTWARE UTILITIES

CHAPTER

3

This chapter comprises the detailed information of Main Chip driver, TXE driver, KMDF driver for Windows 7, Graphics driver, LAN driver, Sound driver and USB 3.0 driver for Windows 7.

The following sections are included:

- Introduction.
- Intel® Chipset Software Installation Utility
- Intel® Trusted Execution Engine Installation Utility
- Graphics Driver Utility
- LAN Driver Utility
- Sound Driver Utility

3-1. INTRODUCTION

Enclosed with our BM-0962 package are our driver utilities that are stored in a provided DVD-ROM. Refer to the following table for the driver locations:

Windows 7 (32bit/64bit), Windows 8/8.1 (32bit/64bit)

Filename (Assume that DVD- ROM drive is D :)	Purpose
D:\Driver\Flash BIOS	Aptio(EFI) BIOS update utility
D:\Driver\Platform\ Main Chip\Win7,Win8,Win8.1	Intel(R) Chipset Device Software Installation Utility
D:\Driver\Platform\TXE	For Intel Trusted Execution Engine Interface
D:\Driver\Platform\Graphics\Win7 or Win8, Win8.1	Intel CPU For VGA Driver installation
D:\Driver\Platform\LAN\Win7, Win8, Win8.1	Intel I210IT & I210AT For LAN Driver installation
D:\Driver\Platform\Sound\Win7, Win8, Win8.1	Realtek ALC888 For Sound driver installation
D:\Driver\Platform\USB3 for Win7	Intel(R) USB 3.0 eXtensible Host Controller
D:\Driver\Platform\KMDF for Win7\32bit or 64bit	Windows 7 update KMDF

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

Windows 10 2016 (32bit/64bit)

Filename (Assume that DVD- ROM drive is D :)	Purpose
D:\Driver\Flash BIOS	Aptio(EFI) BIOS update utility
D:\Driver\Platform\Main Chip\Win10	Intel(R) Chipset Device Software Installation Utility
D:\Driver\Platform\TXE	For Intel Trusted Execution Engine Interface
D:\Driver\Platform\Graphics\Win10\ 32bit or 64bit	Intel CPU For Graphics Driver installation
D:\Driver\Platform\LAN\Win10	Intel I210IT & I210AT For LAN Driver installation
D:\Driver\Platform\Sound\Win10	Realtek ALC888 For Sound driver installation

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

3-2. Intel® Chipset Device Software installer

3-2-1. Introduction

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

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

3-2-2. Installation of Utility for Windows 7/8/8.1/10 2016

The Utility Pack is to be installed only for Windows 7/8/8.1/10 2016 series, and it should be installed right after the OS installation. Please follow the steps below:

1. Insert the driver disk into a DVD-ROM device.
2. Under the Windows system, go to the directory where the Utility driver is located.
3. Run the application with the Administrator privilege.

3-3. INTEL® TRUSTED EXECUTION ENGINE INSTALLATION UTILITY

3-3-1. Introduction

Pre-install Microsoft's Kernel-Mode Driver Framework (KMDF) version 1.11 for Windows 7 before you install the Intel® Trusted Execution Engine (TXE) driver in order to avoid errors in Device Manager.

3-3-2. Installation Instructions for Windows 7/8/8.1/10 2016

1. Insert the driver disk into a DVD-ROM device.
2. Under the Windows system, go to the directory where the driver is located.
3. Run the application with the Administrator privilege.

3-4. Graphics DRIVER UTILITY

3-4-1. Introduction

The Graphics interface embedded with our BM-0962 can support a wide range of display. You can display DVI simultaneously in the same mode.

3-4-2. Installation of Graphics Driver for Windows 7/8/8.1/10 2016

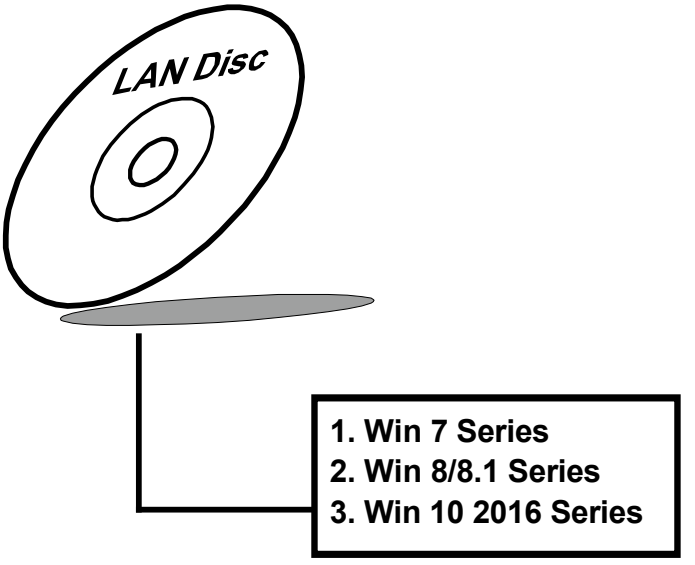
To install the Graphics Driver, simply follow the steps below:

1. Insert the driver disk into a DVD-ROM device.
2. Under the Windows system, go to the directory where the Graphics driver is located.
3. Run the application with the Administrator privilege.

3-5. LAN DRIVER UTILITY

3-5-1. Introduction

BM-0962 is enhanced with LAN function that can support various network adapters. The installation programs for LAN drivers are listed as follows:

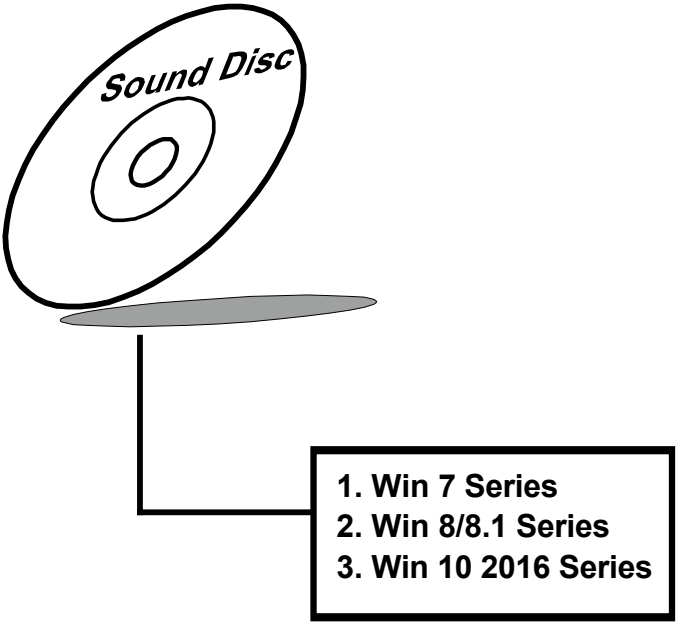


For more details on Installation procedure, please refer to Readme.txt file that can be found on LAN Driver Utility.

3-6. SOUND DRIVER UTILITY

3-6-1. Introduction

The Realtek sound function enhanced in this system is fully compatible with Windows 7/8/8.1/10 2016. You will find the content of the Sound driver below:



3-6-2. Installation of Sound Driver

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

AMI BIOS SETUP

CHAPTER

4

This chapter shows how to set up the AMI BIOS.

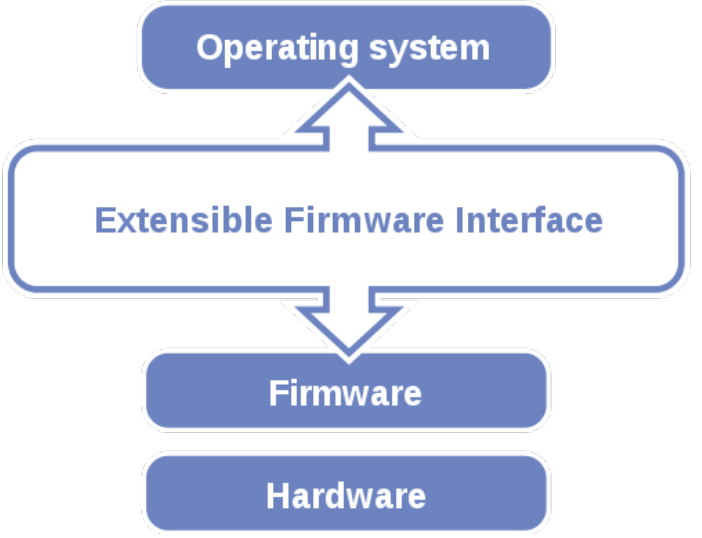
Sections included:

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

4-1. INTRODUCTION

The board BM-0962 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.



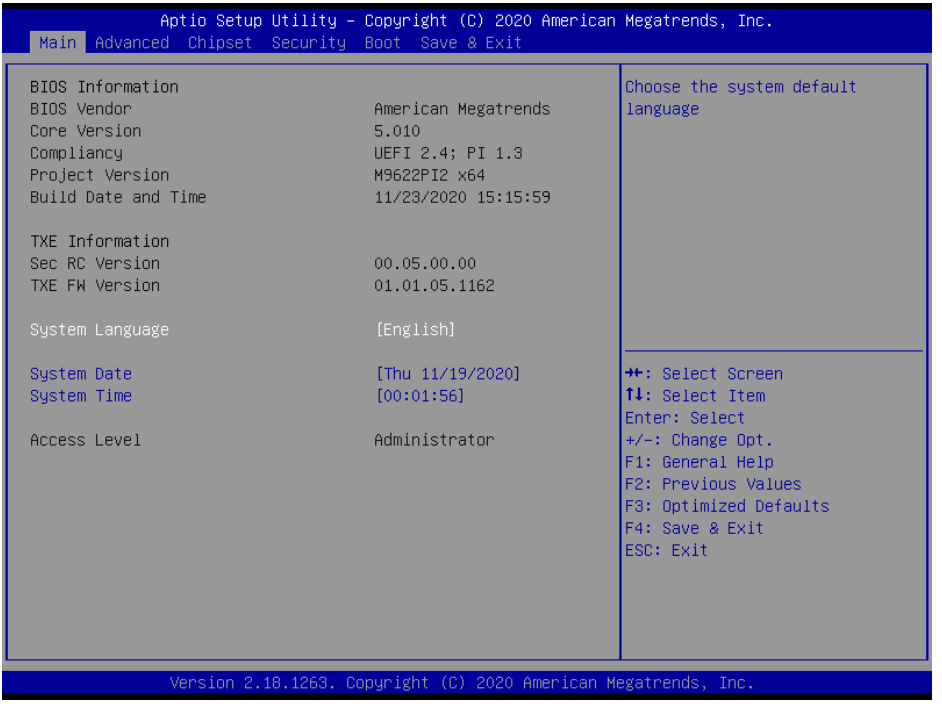
EFI BIOS provides an user interface allow users the ability to modify hardware configuration, e.g. change system date and time, enable or disable a system component, decide bootable device priorities, setup personal password, etc., which is convenient for modifications and customization of the computer 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 <F2> 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:

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



BIOS Setup Program Initial Screen

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

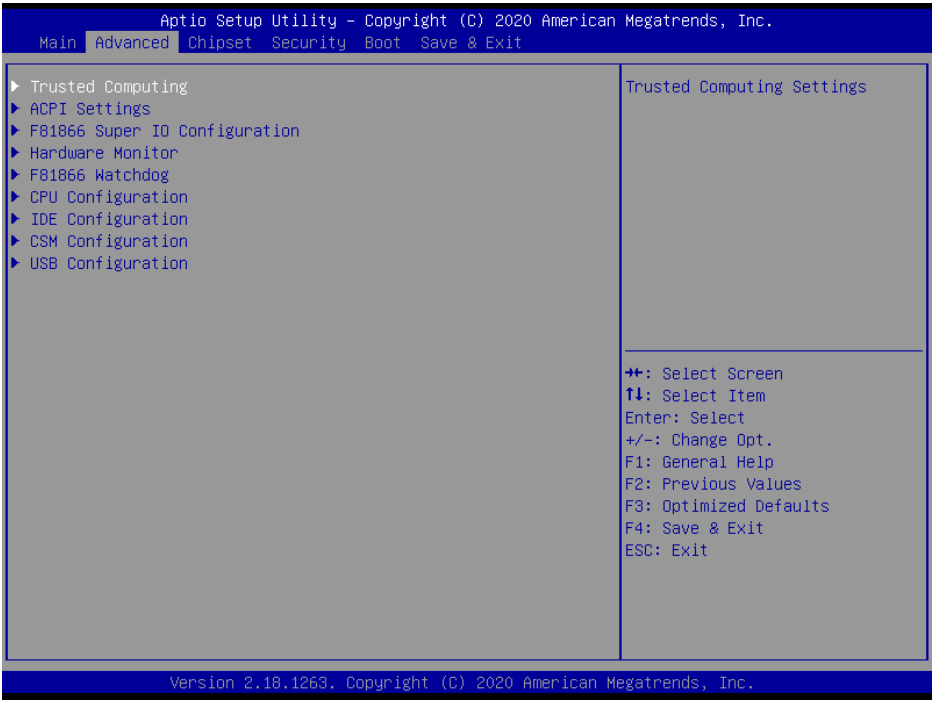
4-3. MAIN

Main Screen

BIOS Setting	Options	Description/Purpose
BIOS Vendor	No changeable options	Displays the BIOS vendor.
Core Version	No changeable options	Displays the current BIOS core version.
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.

BIOS Setting	Options	Description/Purpose
Sec RC Version	No changeable options	Displays the current Sec RC version.
TXE Firmware 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.
Access Level	Administrator	Displays Access level.

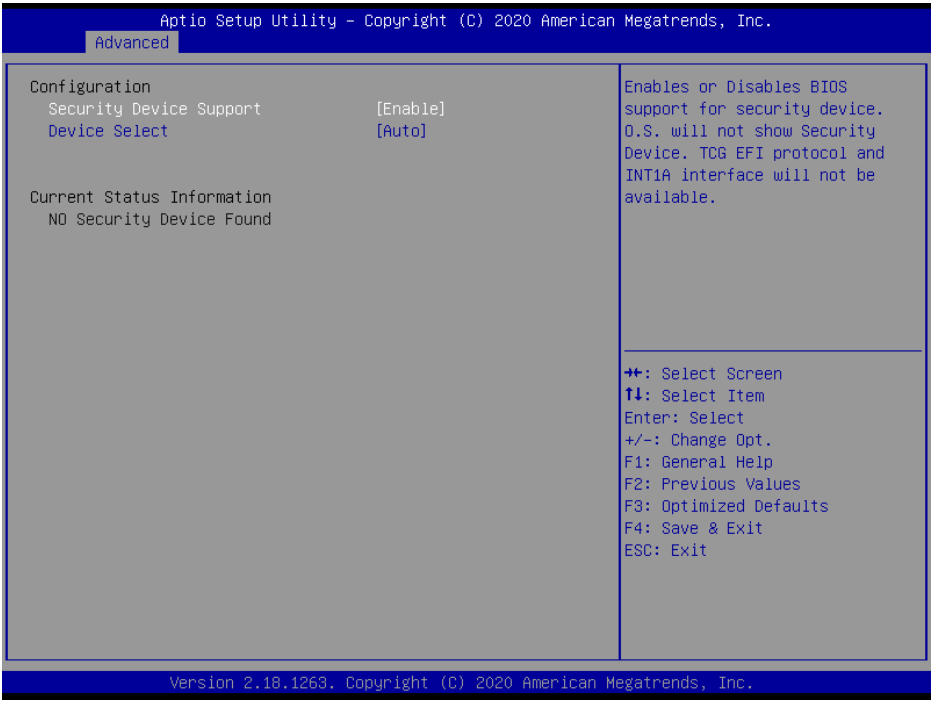
4-4. ADVANCED



Advanced Screen

BIOS Setting	Options	Description/Purpose
Trusted computing	Sub-Menu	Trusted computing Settings
ACPI Settings	Sub-Menu	System ACPI Parameters.
F81866 Super IO Configuration	Sub-Menu	Super I/O Chip Configuration.
Hardware Monitor	Sub-Menu	Monitors hardware status
F81866 Watchdog	Sub-Menu	F81866 Watchdog Parameters.
CPU Configuration	Sub-Menu	CPU Configuration. Parameters.
IDE Configuration	Sub-Menu	SATA Configuration Parameters.
CSM Configuration	Sub-Menu	Configures Option ROM execution, boot options filters, etc.
USB Configuration	Sub-Menu	USB Configuration Parameters.

4-4-1. Trusted Computing



BIOS Setting	Options	Description/Purpose
Security Device Support	- Disable - Enable	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI Protocol and INT1A interface will not be available.
Device Select	- TPM 1.2 - TPM 2.0 - Auto	**TPM 1.2** will restrict support to TPM 1.2 devices. **TPM2.0** will restrict support to TPM 2.0 devices. **Auto** will support both with the default set to TPM2.0 devices. If not found, TPM1.2 devices will be enumerated.

BIOS Setting	Options	Description/Purpose
Current Status Information	No changeable options	Display Status information.

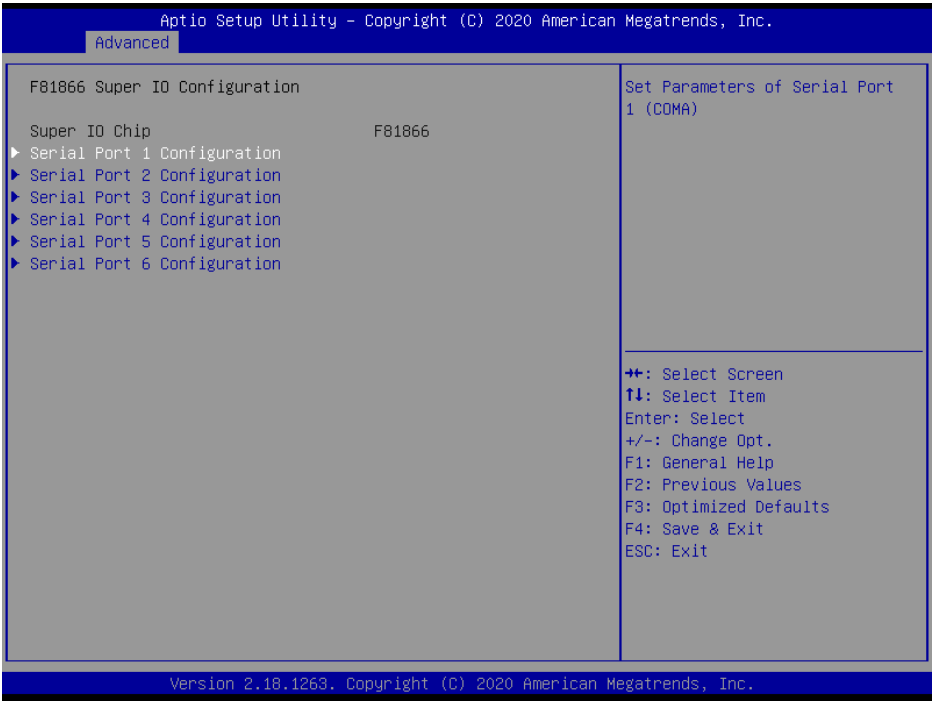
4-4-2. ACPI Settings

ACPI Settings Screen

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

BIOS Setting	Options	Description/Purpose
		• **S3** allows the platform to enter Suspend to RAM mode.

4-4-3. F81866 Super IO Configuration

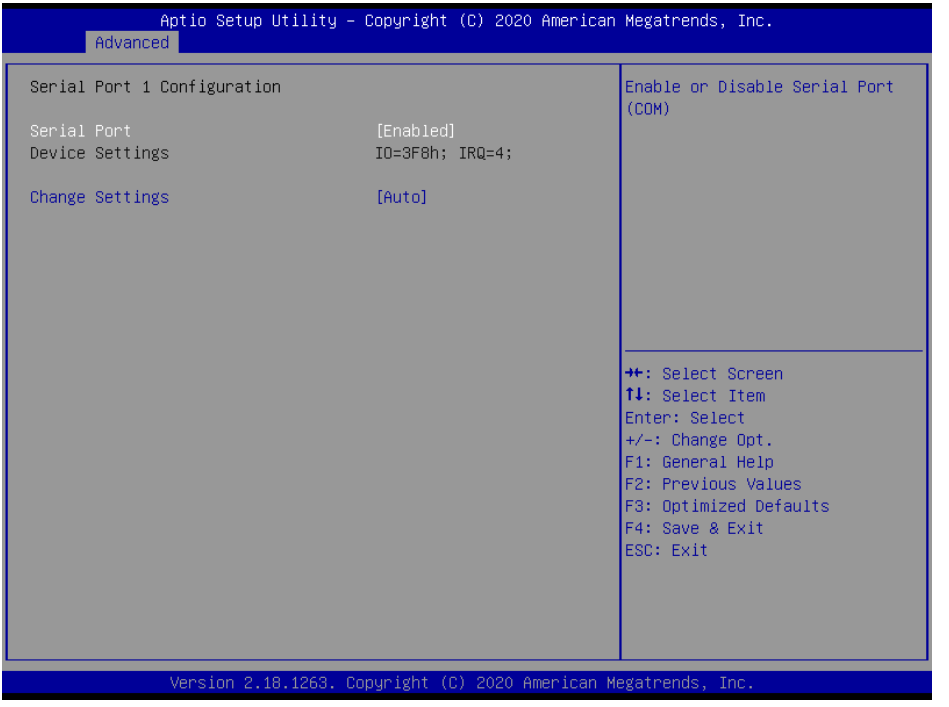


F81866 Super IO Configuration Screen

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

BIOS Setting	Options	Description/Purpose
Serial Port 5 Configuration	Sub-Menu	Sets Parameters for COME.
Serial Port 6 Configuration	Sub-Menu	Sets Parameters for COMF.

4-4-3-1. Serial Port 1 Configuration

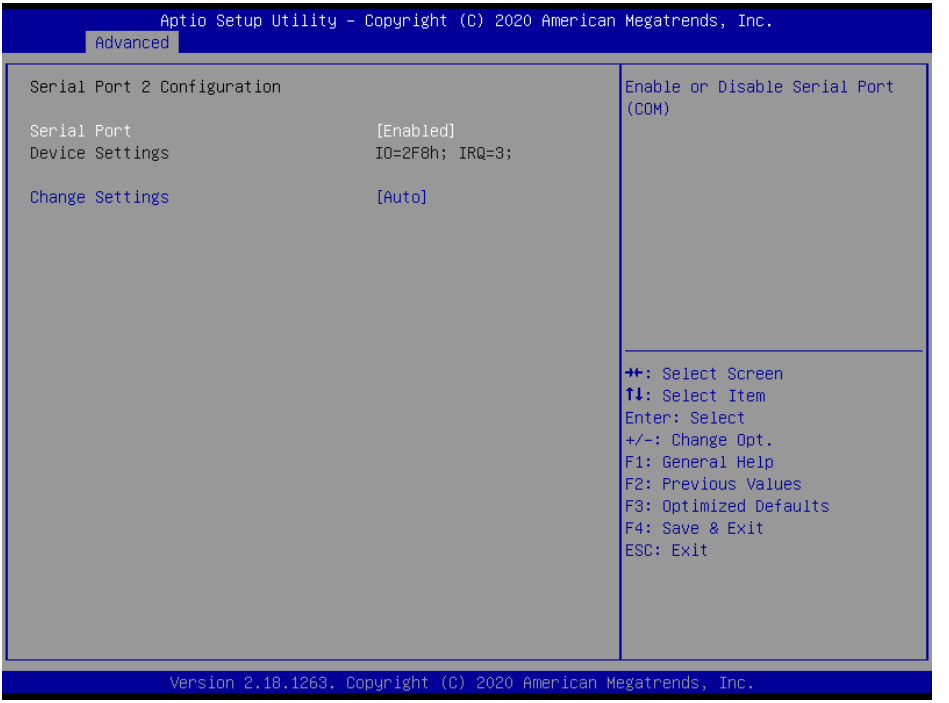


Serial Port 1 Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled	Enables or disables Serial Port 1.
Device Settings	No changeable options	Displays current settings of Serial Port 1.
Change Settings	- Auto - IO=3F8h; IRQ=4	Selects IRQ and I/O resource for Serial Port 1.

BIOS Setting	Options	Description/Purpose
	- 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	

4-4-3-2. Serial Port 2 Configuration

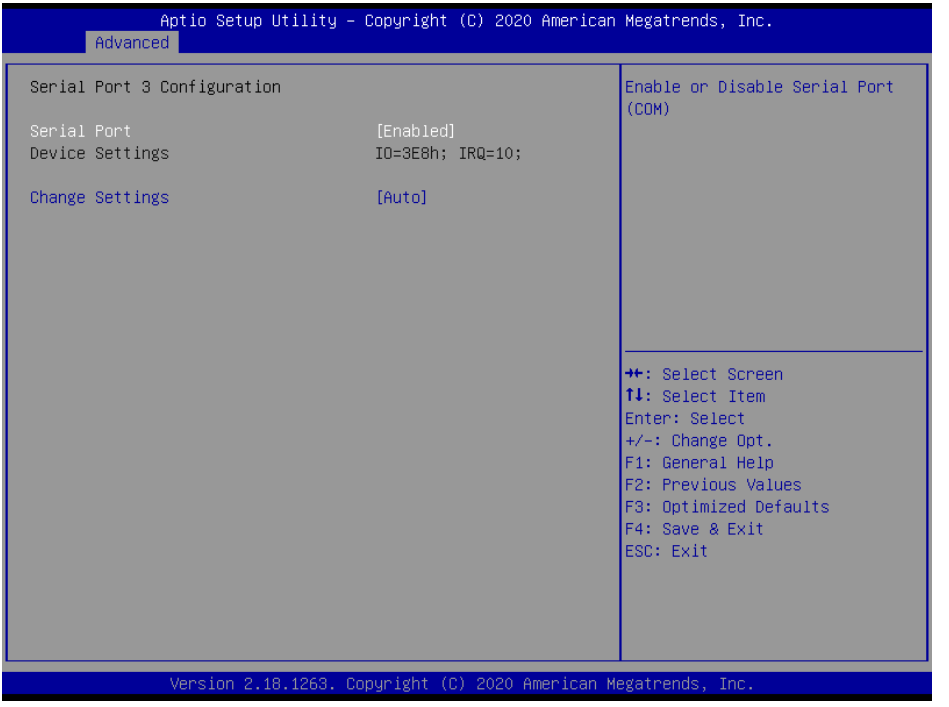


Serial Port 2 Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled	Enables or disables Serial Port 2.
Device Settings	No changeable options	Displays current settings of Serial Port 2.

BIOS Setting	Options	Description/Purpose
Change Settings	- Auto - 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	Selects IRQ and I/O resource for Serial Port 2.

4-4-3-3. Serial Port 3 Configuration

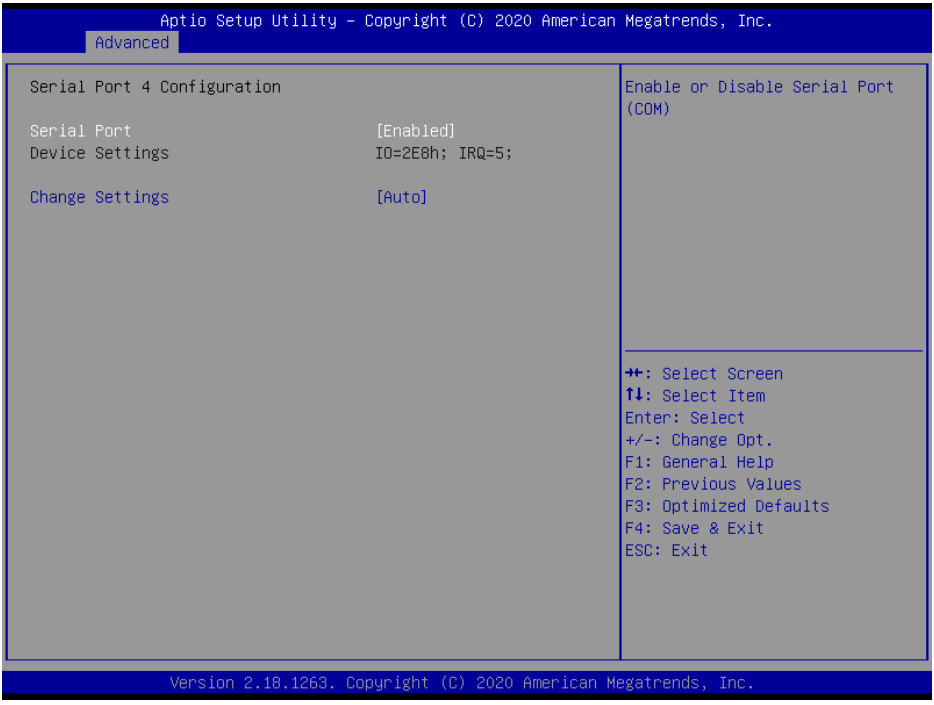


Serial Port 3 Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled	Enables or disables Serial Port 3.

BIOS Setting	Options	Description/Purpose
Device Settings	No changeable options	Displays current settings of Serial Port 3.
Change Settings	- Auto - IO=3E8h; IRQ=10 - IO=3F8h; IRQ=6,7,10,11,12 - IO=2F8h; IRQ=6,7,10,11,12 - IO=2F0h;IRQ=6,7,10,11,12 - IO=2E0h;IRQ=6,7,10,11,12	Selects IRQ and I/O resource for Serial Port 3.

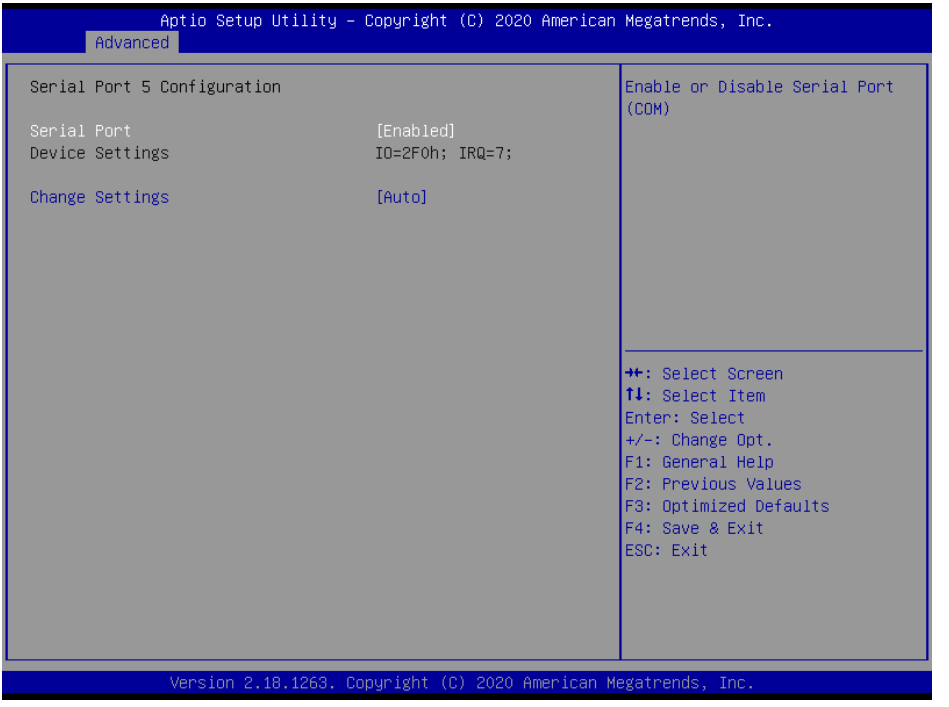
4-4-3-4. Serial Port 4 Configuration



Serial Port 4 Configuration Screen

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

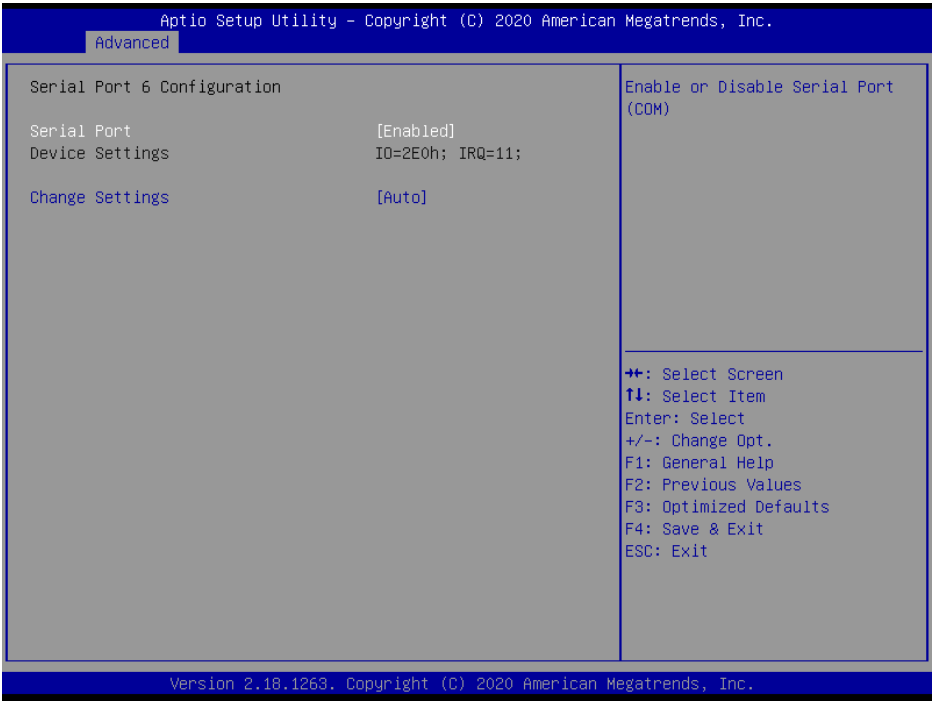
4-4-3-5. Serial Port 5 Configuration



Serial Port 5 Configuration Screen

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

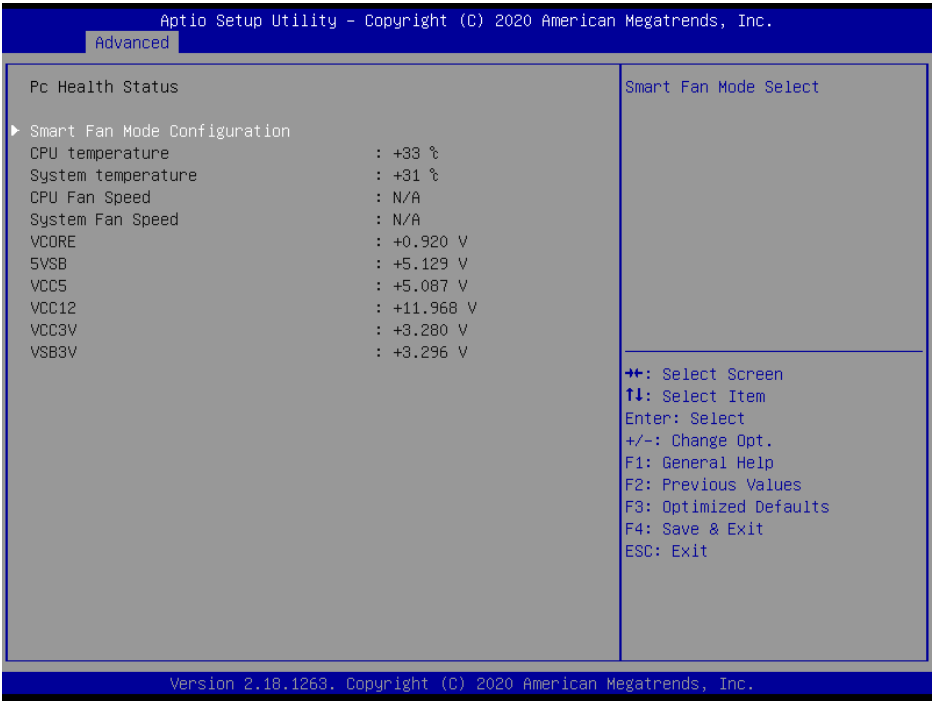
4-4-3-6. Serial Port 6 Configuration



Serial Port 6 Configuration Screen

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

4-4-4. Hardware Monitor



Hardware Monitor Screen

BIOS Setting	Options	Description/Purpose
Smart Fan Mode Configuration	Sub-Menu	Smart Fan Mode Selection.
CPU Temperature	No changeable options	Displays processor's temperature.
System Temperature	No changeable options	Displays system's temperature.
CPU Fan Speed	No changeable options	Displays fan's speed.
System Fan Speed	No changeable options	Displays fan's speed
VCORE	No changeable options	Displays voltage level of the +VCORE in supply.
5VSB	No changeable options	Displays voltage level of the +VSB5 in supply.

BIOS Setting	Options	Description/Purpose
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.

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

Smart Fan Configuration Screen

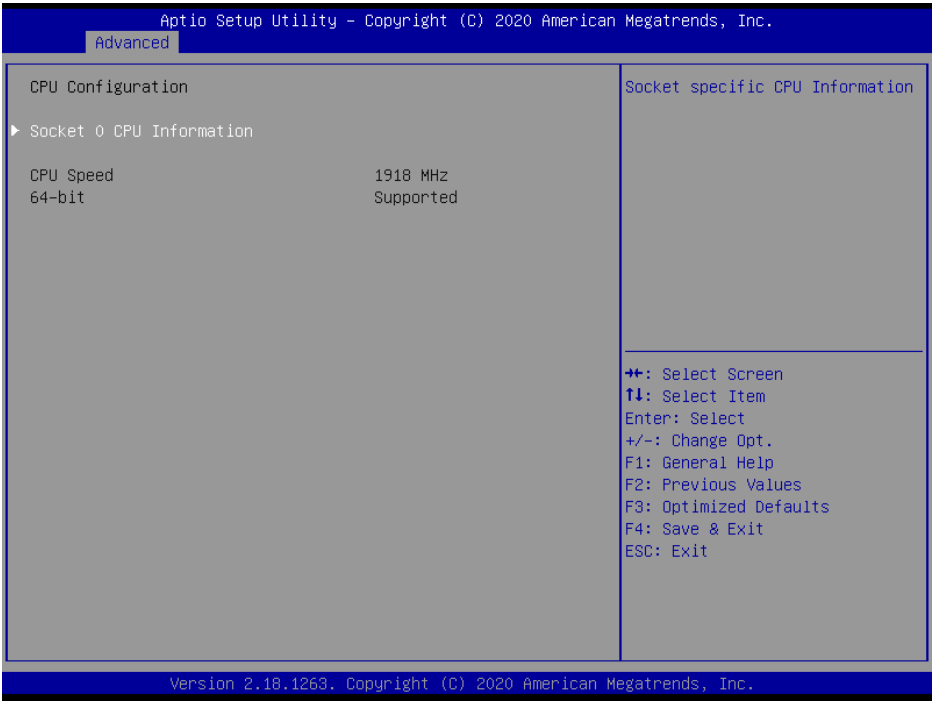
BIOS Setting	Options	Description/Purpose
CPU Fan Smart Fan Control	- Manual Duty Mode - Auto Duty-Cycle Mode	Smart Fan Mode selection for CPU Fan.
Manual Duty Mode	Numeric (from 1 to 100)	Manual mode fan control. Users can write expected duty cycle (PWM fan type) 1-100.
System Fan Smart Fan Control	- Manual Duty Mode - Auto Duty-Cycle Mode	Smart Fan Mode selection for CPU Fan.
Manual Duty Mode	Numeric (from 1 to 100)	Manual mode fan control, user can write expected duty cycle (PWM fan type) 1-100.

4-4-5. F81866 Watchdog

F81866 Watchdog Screen

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

4-4-6. CPU Configuration



CPU Configuration Screen

BIOS Setting	Options	Description/Purpose
Socket 0 CPU Information	Sub-Menu	Reports 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.

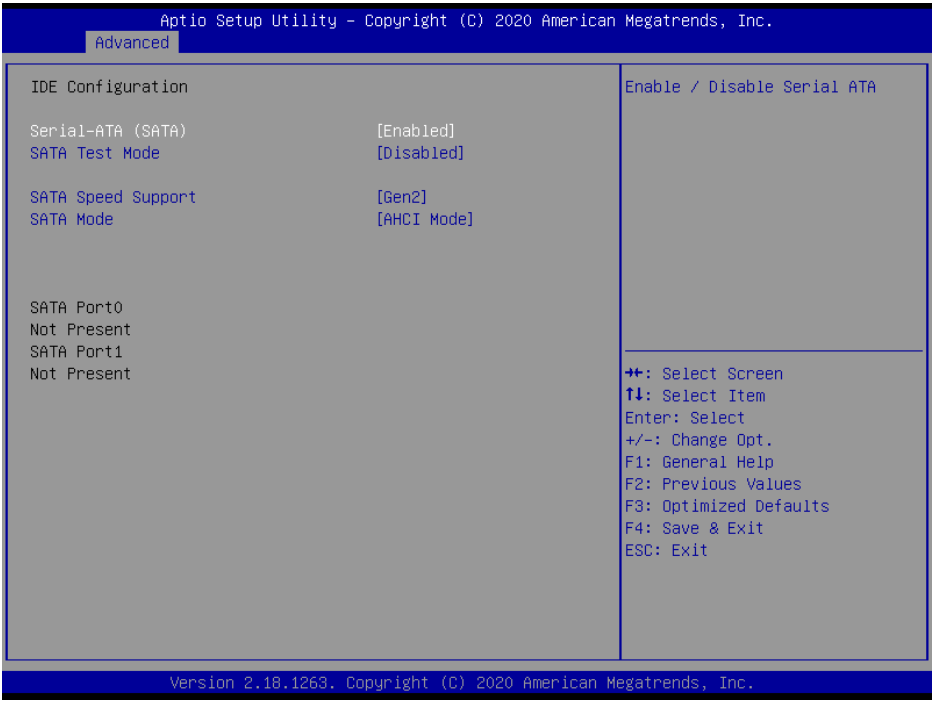
4-4-6-1. Socket 0 CPU Information

Socket 0CPU 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

BIOS Setting	Options	Description/Purpose
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.

4-4-7. IDE Configuration

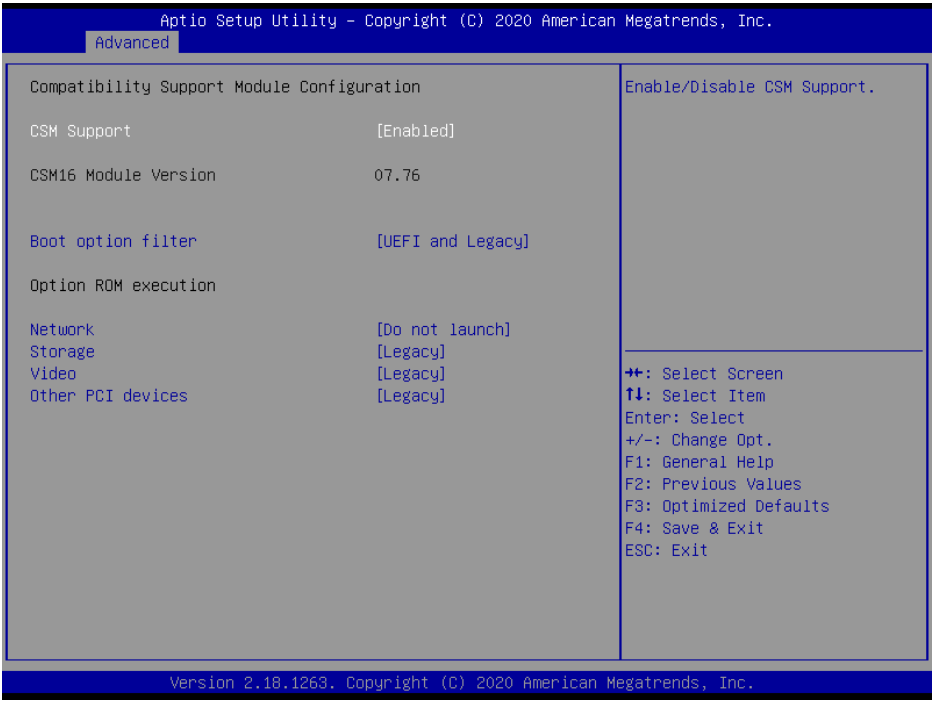


IDE Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial-ATA Controller(s)	- Disabled - Enabled	Enables or disables SATA Device.
SATA Test Mode	- Disabled - Enabled	Enables or disables SATA Test Mode.
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:** Sets SATA operation mode to IDE. • **AHCI:** SATA works as AHCI (Advanced

BIOS Setting	Options	Description/Purpose
		Host Controller Interface) mode for getting better performance.

4-4-8. CSM Configuration

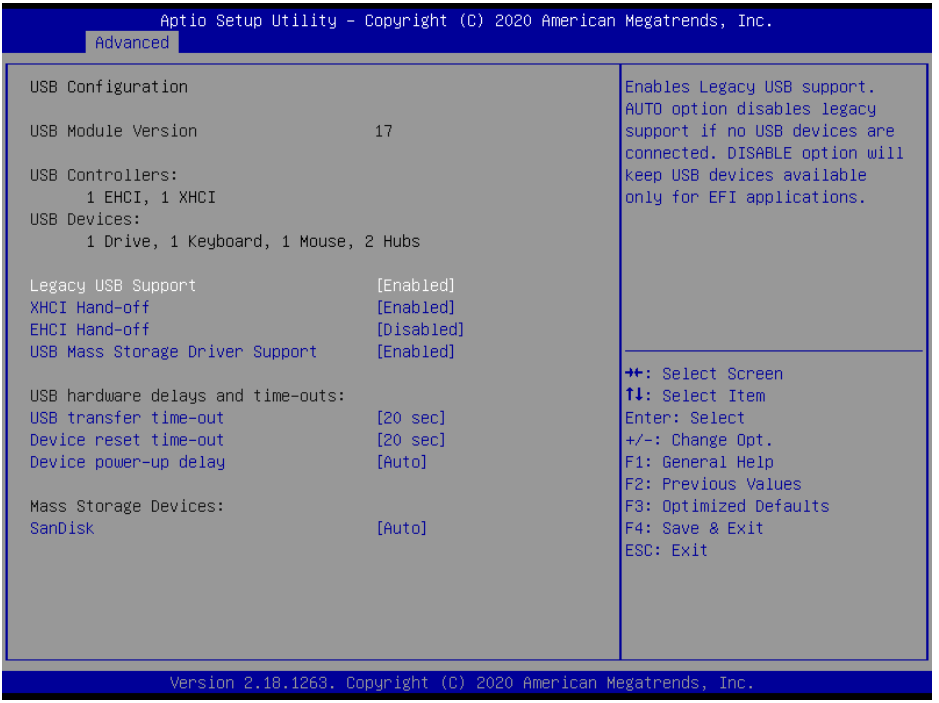


CSM Configuration Screen

BIOS Setting	Options	Description/Purpose
CSM Support	- Disabled - Enabled	Disables or Enables CSM support.
CSM16 Module Version	No changeable options	Displays the current CSM (Compatibility Support Module) version.

BIOS Setting	Options	Description/Purpose
Boot option filter	- UEFI and Legacy - Legacy only - UEFI only	This option controls what kind of devices system can boot.
Network	- Do not launch - UEFI - Legacy	Controls the execution of UEFI or Legacy PXE.
Storage	- Do not launch - UEFI - Legacy	Controls the execution of UEFI or Legacy Storage.
Video	- Do not launch - UEFI - Legacy	Controls the execution of UEFI and Legacy Video.
Other PCI devices	- Do not launch - UEFI - Legacy	Selects the launch method for other PCI devices, such as NIC, mass storage or video card.

4-4-9. USB Configuration

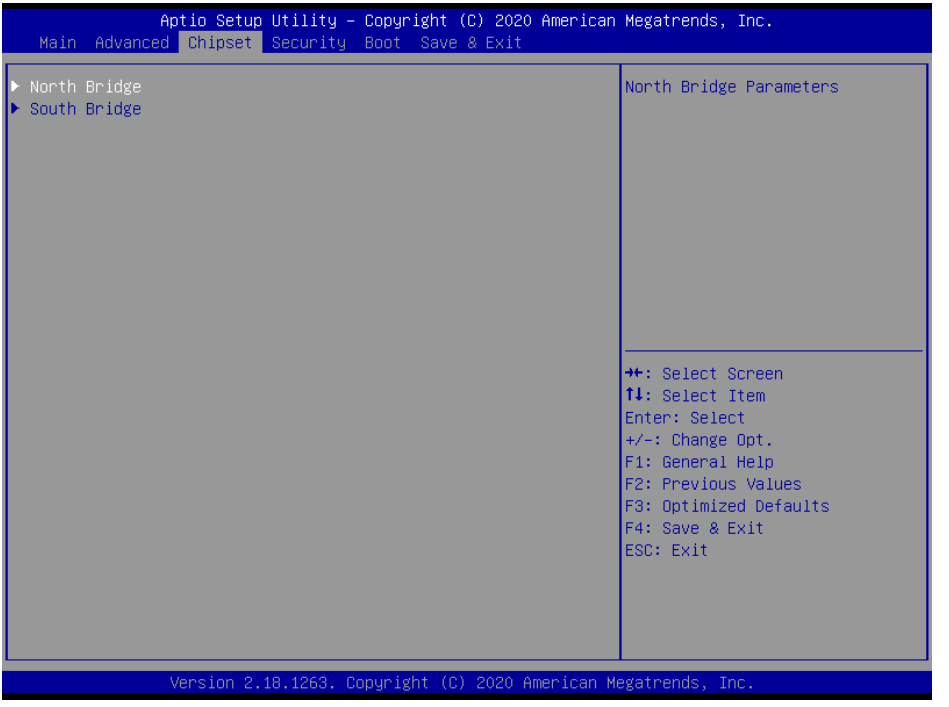


USB Configuration Screen

BIOS Setting	Options	Description/Purpose
USB Module Version	No changeable options	USB Module Version
USB Controllers	No changeable options	USB Controllers
USB Devices	No changeable options	Displays number of available USB devices.
Legacy USB Support	- Disabled - Enabled - Auto	Enables support for legacy USB.
XHCI Hand-off	- Disabled - Enabled	This is a workaround for OSes without XHCI hand-off support.

BIOS Setting	Options	Description/Purpose
EHCI Hand-off	- Disabled - Enabled	This is a workaround for OSes without EHCI hand-off support.
USB Mass Storage Driver Support.	- Disabled - Enabled	Enables/Disables 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.
Mass Storage Devices:	- Auto -Floppy - Force FDD - Hard Disk - CD-ROM	Display the device name and choose the device emulation type.

4-5. CHIPSET



Chipset Screen

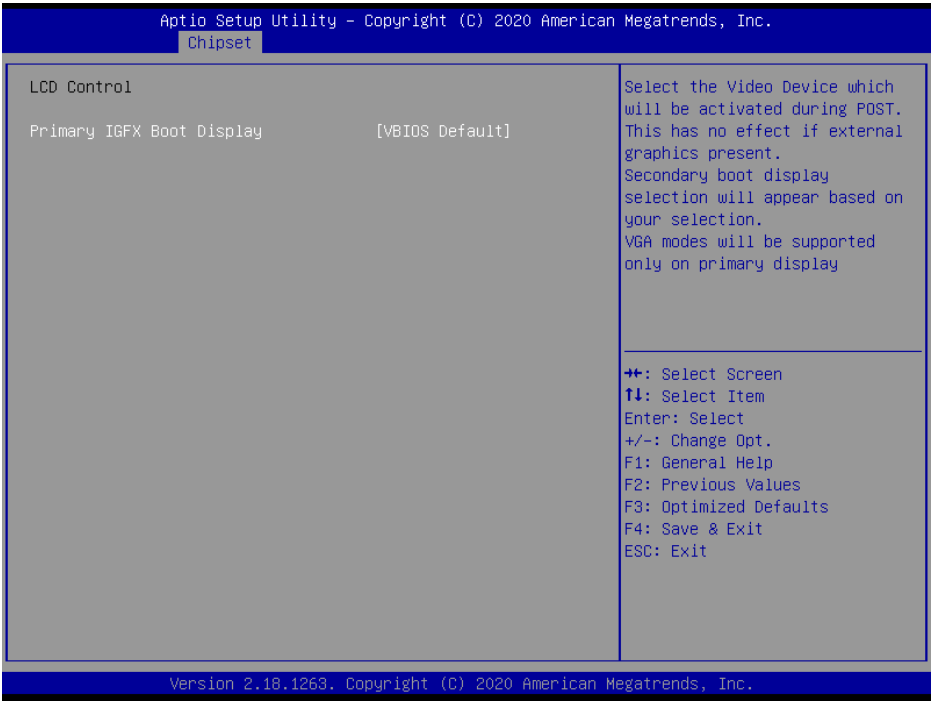
BIOS Setting	Options	Description/Purpose
North Bridge	Sub-Menu	Sets Parameter for (North Bridge) configuration.
South Bridge	Sub-Menu	Sets Parameter for (South Bridge) configuration.

4-5-1. North Bridge

North Bridge Screen

BIOS Setting	Options	Description/Purpose
LCD Control	Sub-Menu	LCD control.
Memory Information	No changeable options	Displays the DRAM information on platform.
Total Memory	No changeable options	Displays the DRAM size
Max TOLUD	- 2 GB - 2.25 GB - 2.5 GB - 2.75 GB - 3.0 GB	Maximum Value of TOLUD.

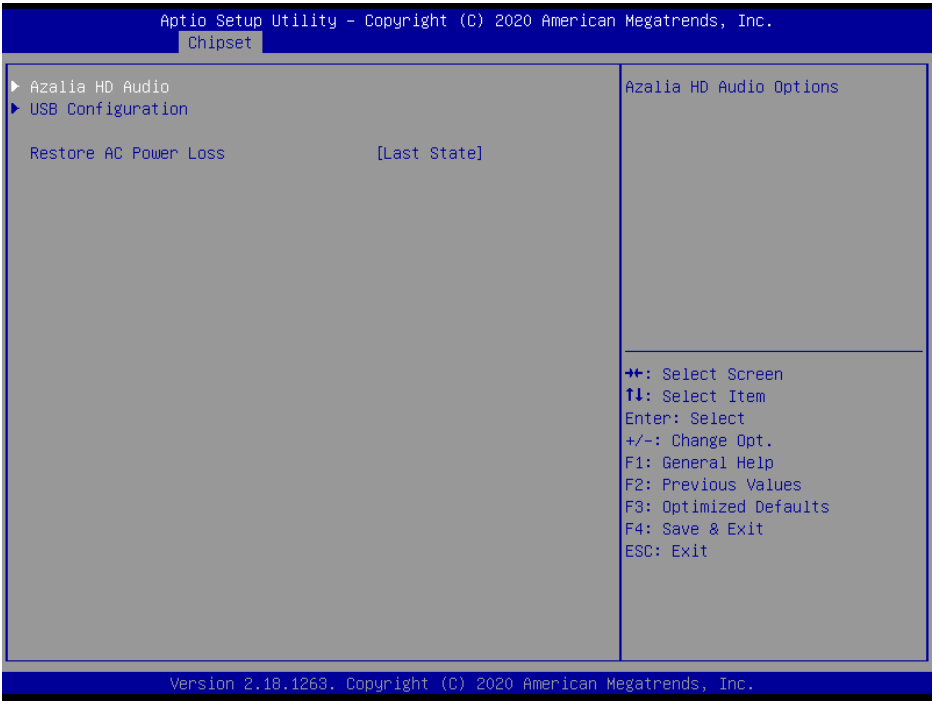
4-5-1-1. North Bridge – LCD Control



LCD Control Screen

BIOS Setting	Options	Description/Purpose
Primary IGFX Boot Display	- VBIOS Default - CRT - DVI - LVDS	Selects the Video Device that will be activated during POST.
Secondary IGFX Boot Display	- Disabled - CRT - DVI - LVDS	Selects Secondary Display Device.

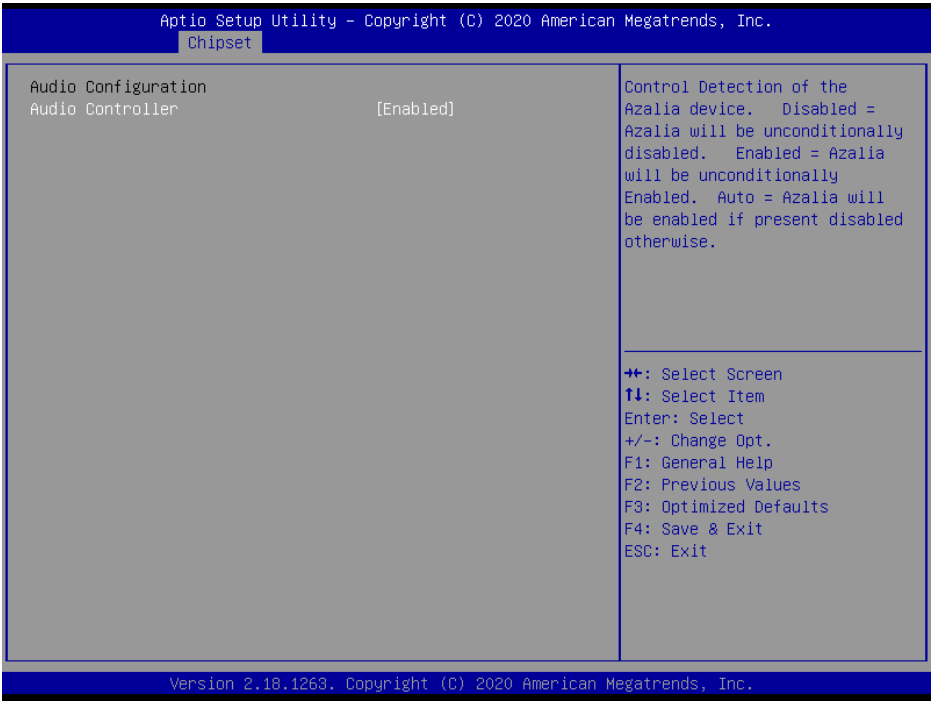
4-5-2. South Bridge



South Bridge Screen

BIOS Setting	Options	Description/Purpose
Azalia HD Audio	Sub-Menu	Configures Azalia HD Audio parameters.
USB Configuration	Sub-Menu	Configures USB parameters.
Restore AC Power Loss	- Power Off - Power On - Last State	Selects 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 power failed.

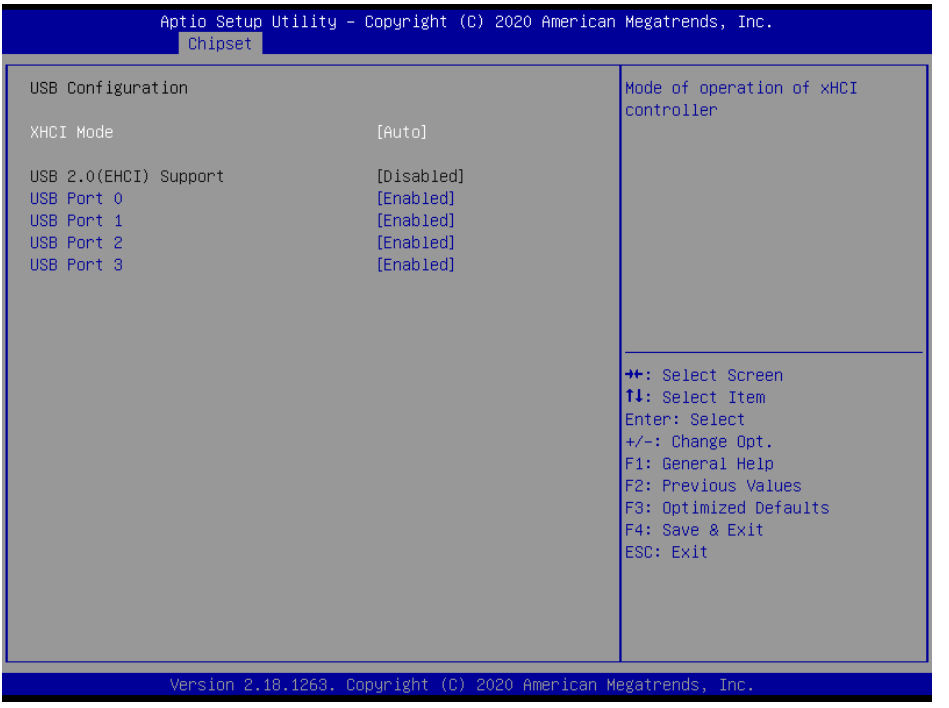
4-5-2-1. Azalia HD Audio



Azalia HD Audio Screen

BIOS Setting	Options	Description/Purpose
Audio Controller	- Disabled - Enabled - Auto	Controls Detection of the Azalia device. • **Disabled:** Azalia will be unconditionally disabled. • **Enabled:** Azalia will be unconditionally enabled. • **Auto:** Azalia will be enabled if present disabled otherwise.

4-5-2-2. South Bridge – USB Configuration

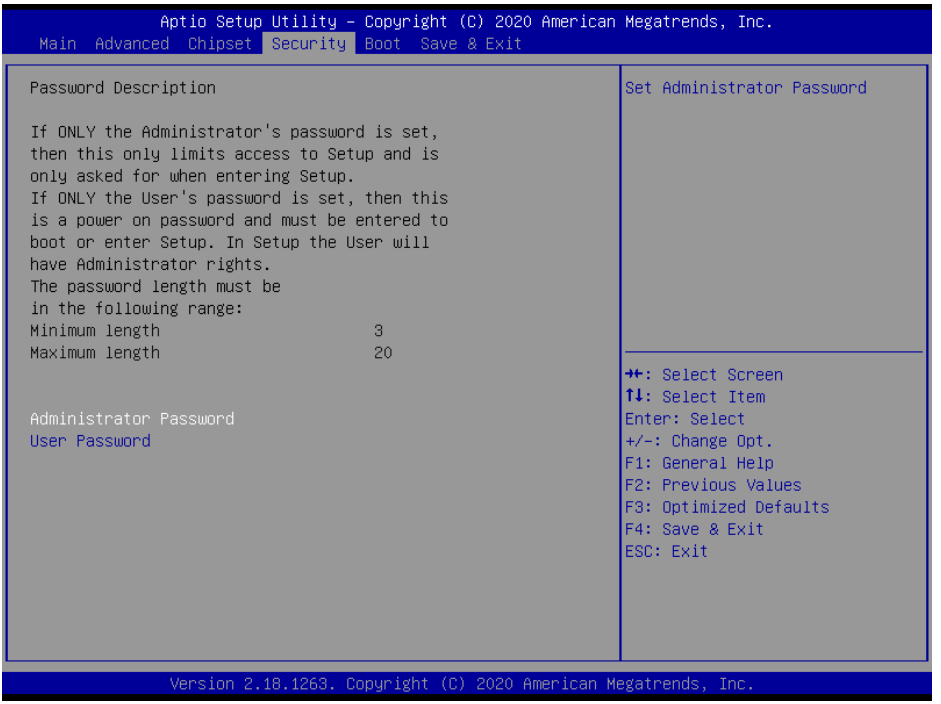


USB Configuration Screen

BIOS Setting	Options	Description/Purpose
XHCI Mode	- Enabled - Disabled - Auto - Smart Auto	Mode of operation of xHCI contoroller.
USB 2.0(EHCI) Support	- Disabled - Enabled	Enables Enhanced Host Controller Interface 1 for high-speed USB functions (USB 2.0).
USB Per Port	- Disabled - Enabled	Controls each of the USB ports (0~3). • **Enabled:** Enables USB per port.

BIOS Setting	Options	Description/Purpose
		• **Disabled:** Uses USB port X settings.
USB Port 0	- Disabled - Enabled	Enables or Disables USB port 0
USB Port 1	- Disabled - Enabled	Enables or Disables USB port 1. (USB Hub 1~4)
USB Port 2	- Disabled - Enabled	Enables or Disables USB port 2.
USB Port 3	- Disabled - Enabled	Enables or Disables USB port 3.

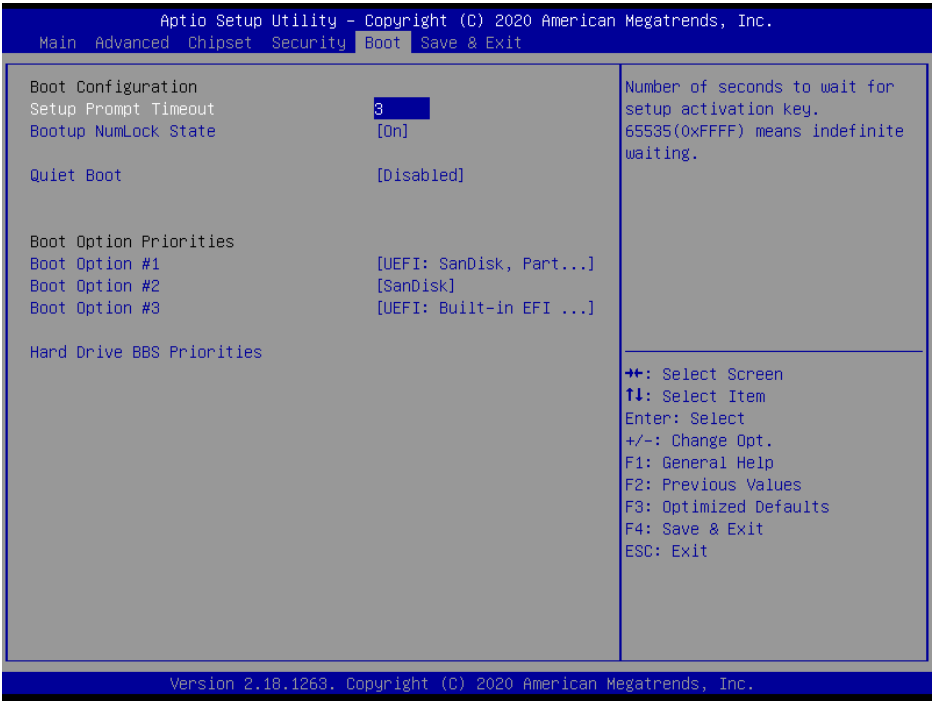
4-6. SECURITY



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

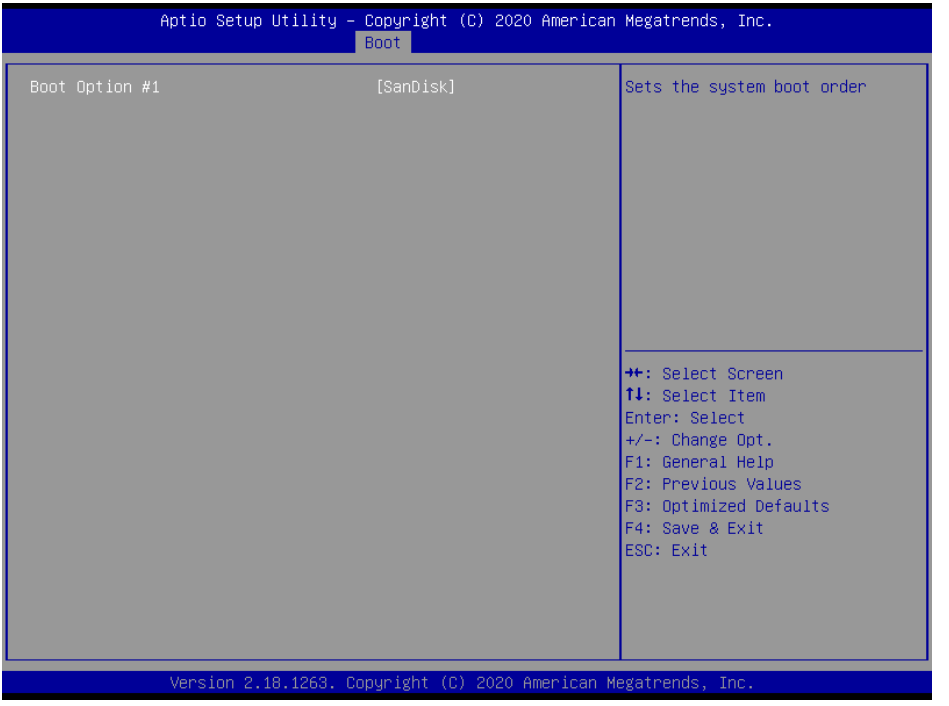


Boot Screen

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	Enables/Disables Quiet Boot Options
Boot Option #1~#n	- [Drive(s)] - Disabled	Allows setting boot option listed in Hard Drive BBS Priorities.
Hard Drive BBS Priorities	Sub-Menu	Allow users to select boot order of available drive(s).

BIOS Setting	Options	Description/Purpose
Network Drive BBS Priorities	Sub-Menu	Allow users to select boot order of available drive(s).

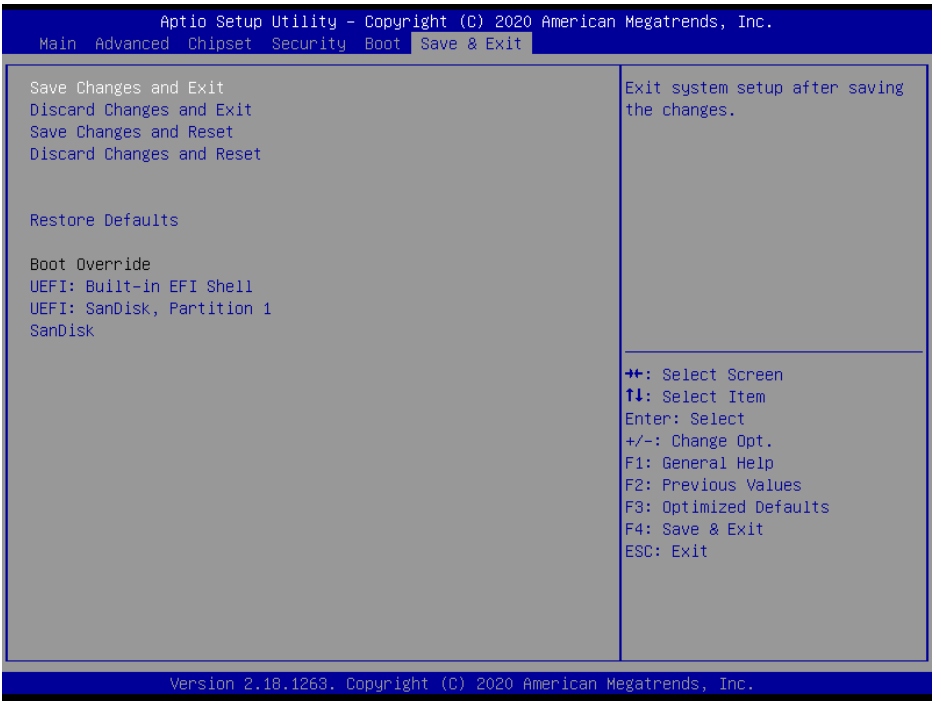
4-7-1. Hard Drive BBS Priorities



Hard Drive BBS Priorities Screen

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

4-8. SAVE & EXIT



Save & Exit Screen

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

EXPANSION BUS

APPENDIX

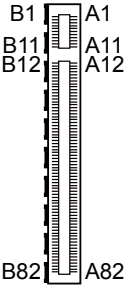
A

This appendix indicates the pin assignments of expansion bus.

The following section is included:

- PCIe Bus

PCIE BUS



PCI_E1 with 164 pins is optional on BM-0962.
The pin assignments are as follows:

PCI_E1: **PCI_E1**

A				B			
PIN	**ASSIGNMENT**	**PIN**	**ASSIGNMENT**	**PIN**	**ASSIGNMENT**	**PIN**	**ASSIGNMENT**
A1	Reserved	A42	GND	B1	+12V	B42	EXP_A_TX_6_DN
A2	+12V	A43	EXP_A_RX_6_DP	B2	+12V	B43	GND
A3	+12V	A44	EXP_A_RX_6_DN	B3	+12V	B44	GND
A4	GND	A45	GND	B4	GND	B45	EXP_A_TX_7_DP
A5	Reserved	A46	GND	B5	SMB_CLK	B46	EXP_A_TX_7_DN
A6	Reserved	A47	EXP_A_RX_7_DP	B6	SMB_DATA_	B47	GND
A7	Reserved	A48	EXP_A_RX_7_DN	B7	GND	B48	Reserved
A8	Reserved	A49	GND	B8	+3.3V	B49	GND
A9	+3.3V	A50	Reserved	B9	Reserved	B50	Reserved
A10	+3.3V	A51	Reserved	B10	+3.3SB	B51	Reserved
A11	PWRGD	A52	Reserved	B11	Wakeup	B52	Reserved
A12	GND	A53	Reserved	B12	Reserved	B53	Reserved
A13	PEG1_CLK_P	A54	Reserved	B13	GND	B54	Reserved
A14	PEG1_CLK_N	A55	Reserved	B14	EXP_A_TX_0_DP	B55	Reserved
A15	GND	A56	Reserved	B15	EXP_A_TX_0_DN	B56	Reserved
A16	EXP_A_RX_0_DP	A57	Reserved	B16	GND	B57	Reserved
A17	EXP_A_RX_0_DN	A58	Reserved	B17	PCIEX16_PRSNT2	B58	Reserved
A18	GND	A59	Reserved	B18	GND	B59	Reserved
A19	Reserved	A60	Reserved	B19	EXP_A_TX_1_DP	B60	Reserved
A20	GND	A61	Reserved	B20	EXP_A_TX_1_DN	B61	Reserved
A21	EXP_A_RX_1_DP	A62	Reserved	B21	GND	B62	Reserved
A22	EXP_A_RX_1_DN	A63	Reserved	B22	GND	B63	Reserved
A23	GND	A64	Reserved	B23	EXP_A_TX_2_DP	B64	Reserved
A24	GND	A65	Reserved	B24	EXP_A_TX_2_DN	B65	Reserved
A25	EXP_A_RX_2_DP	A66	Reserved	B25	GND	B66	Reserved
A26	EXP_A_RX_2_DN	A67	Reserved	B26	GND	B67	Reserved
A27	GND	A68	Reserved	B27	EXP_A_TX_3_DP	B68	Reserved
A28	GND	A69	Reserved	B28	EXP_A_TX_3_DN	B69	Reserved

A				B			
PIN	**ASSIGNMENT**	**PIN**	**ASSIGNMENT**	**PIN**	**ASSIGNMENT**	**PIN**	**ASSIGNMENT**
A29	EXP_A_RX_3_DP	A70	Reserved	B29	GND	B70	Reserved
A30	EXP_A_RX_3_DN	A71	Reserved	B30	Reserved	B71	Reserved
A31	GND	A72	Reserved	B31	Reserved	B72	Reserved
A32	Reserved	A73	Reserved	B32	GND	B73	Reserved
A33	Reserved	A74	Reserved	B33	EXP_A_TX_4_DP	B74	Reserved
A34	GND	A75	Reserved	B34	EXP_A_TX_4_DN	B75	Reserved
A35	EXP_A_RX_4_DP	A76	Reserved	B35	GND	B76	Reserved
A36	EXP_A_RX_4_DN	A77	Reserved	B36	GND	B77	Reserved
A37	GND	A78	Reserved	B37	EXP_A_TX_5_DP	B78	Reserved
A38	GND	A79	Reserved	B38	EXP_A_TX_5_DN	B79	Reserved
A39	EXP_A_RX_5_DP	A80	Reserved	B39	GND	B80	Reserved
A40	EXP_A_RX_5_DN	A81	Reserved	B40	GND	B81	Reserved
A41	GND	A82	Reserved	B41	EXP_A_TX_6_DP	B82	Reserved

TECHNICAL SUMMARY

APPENDIX

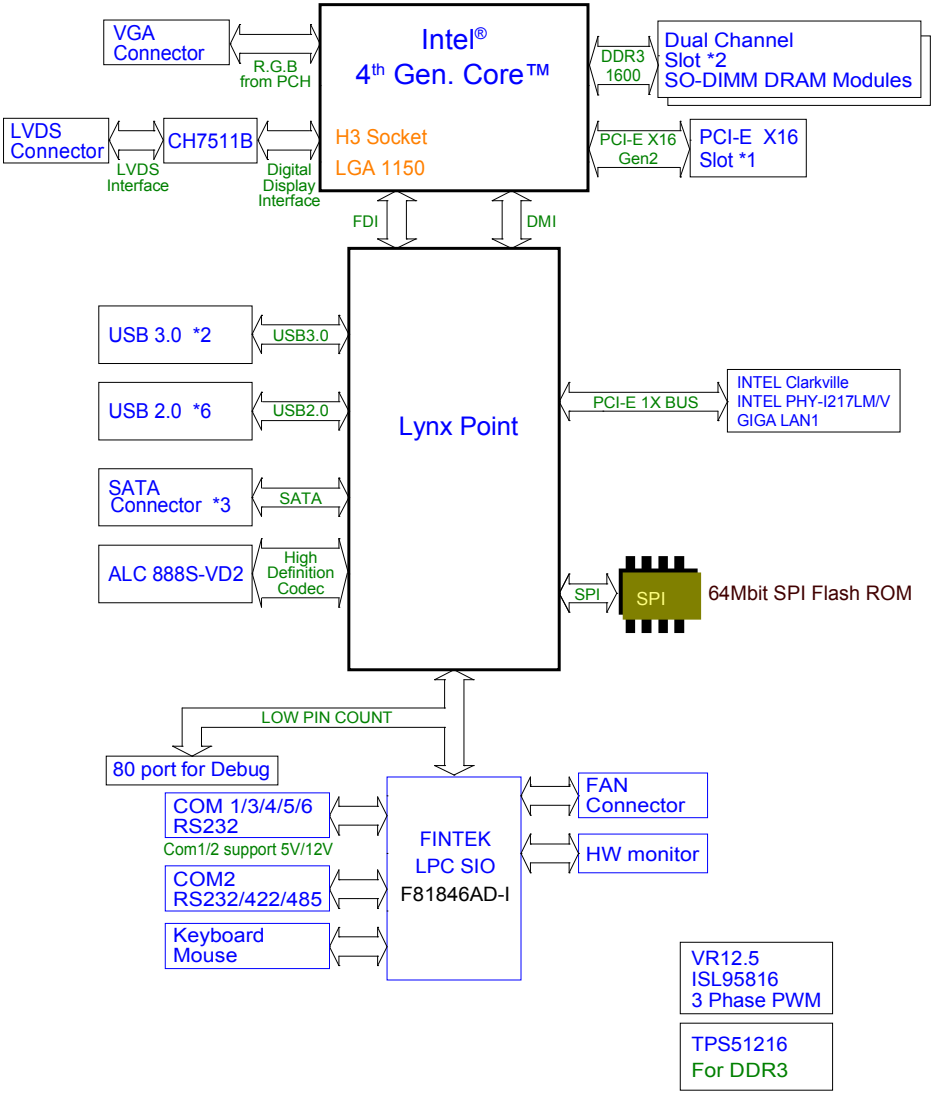
B

This section introduce you the maps concisely.

The following sections are 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 0	System timer
IRQ 1	Standard PS/2 Keyboard
IRQ 3	Communications Port (COM2)
IRQ 4	Communications Port (COM1)
IRQ 5	Communications Port (COM4)
IRQ 7	Communications Port (COM5)
IRQ 8	High precision event timer
IRQ 10	Communications Port (COM3)
IRQ 11	Communications Port (COM6)
IRQ 12	PS/2 Compatible Mouse
IRQ 22	High Definition Audio Controller
IRQ 23	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor EHCI USB - 0F34
IRQ 54	Microsoft ACPI-Compliant System
IRQ 55	Microsoft ACPI-Compliant System
IRQ 56	Microsoft ACPI-Compliant System
IRQ 57	Microsoft ACPI-Compliant System
IRQ 58	Microsoft ACPI-Compliant System
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IRQ	ASSIGNMENT
IRQ 77	Microsoft ACPI-Compliant System
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IRQ 81	Microsoft ACPI-Compliant System
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IRQ 83	Microsoft ACPI-Compliant System
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IRQ	ASSIGNMENT
IRQ 114	Microsoft ACPI-Compliant System
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IRQ	ASSIGNMENT
IRQ 151	Microsoft ACPI-Compliant System
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IRQ	ASSIGNMENT
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IRQ	ASSIGNMENT
IRQ 276	Microsoft ACPI-Compliant System
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IRQ	ASSIGNMENT
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IRQ	ASSIGNMENT
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IRQ	ASSIGNMENT
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IRQ	ASSIGNMENT
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IRQ	ASSIGNMENT
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IRQ	ASSIGNMENT
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IRQ 511	Microsoft ACPI-Compliant System
IRQ 4294967292	Intel(R) Trusted Execution Engine Interface
IRQ 4294967293	Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
IRQ 4294967294	Standard SATA AHCI Controller

MEMORY MAP

MEMORY MAP	ASSIGNMENT
0x91000000-0x917FFFFF	Ethernet Controller
0x91000000-0x917FFFFF	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 3 - 0F4C
0x91800000-0x91803FFF	Ethernet Controller
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
0x90000000-0x907FFFFF	Ethernet Controller
0x90000000-0x907FFFFF	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 4 - 0F4E
0x90800000-0x90803FFF	Ethernet Controller
0x92214000-0x9221401F	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor Platform Control Unit - SMBus Port - 0F12
0x92100000-0x921FFFFF	Intel(R) Trusted Execution Engine Interface
0x92000000-0x920FFFFF	Intel(R) Trusted Execution Engine Interface
0xFED00000-0xFED003FF	High precision event timer
0x92216000-0x922167FF	Standard SATA AHCI Controller
0x92215000-0x922153FF	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor EHCI USB - 0F34
0x80000000-0x92216FFE	PCI Express Root Complex
0x80000000-0x92216FFE	Microsoft Basic Display Adapter
0x91C00000-0x91FFFFFF	Microsoft Basic Display Adapter
0x92210000-0x92213FFF	High Definition Audio Controller
0xFF000000-0xFFFFFFFF	Legacy device
0x92200000-0x9220FFFF	Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
0xA0000-0xBFFFF	PCI Express Root Complex
0xA0000-0xBFFFF	Microsoft Basic Display Adapter
0xC0000-0xDFFFF	PCI Express Root Complex

MEMORY MAP	ASSIGNMENT
0xE0000-0xFFFFF	PCI Express Root Complex

I/O MAP

I/O	ASSIGNMENT
0x00000000-0x0000006F	PCI Express Root Complex
0x00000020-0x00000021	Programmable interrupt controller
0x00000024-0x00000025	Programmable interrupt controller
0x00000028-0x00000029	Programmable interrupt controller
0x0000002C-0x0000002D	Programmable interrupt controller
0x0000002E-0x0000002F	Motherboard resources
0x00000030-0x00000031	Programmable interrupt controller
0x00000034-0x00000035	Programmable interrupt controller
0x00000038-0x00000039	Programmable interrupt controller
0x0000003C-0x0000003D	Programmable interrupt controller
0x00000040-0x00000043	System timer
0x0000004E-0x0000004F	Motherboard resources
0x00000050-0x00000053	System timer
0x00000060-0x00000060	Standard PS/2 Keyboard
0x00000060-0x00000060	PS/2 Compatible Mouse
0x00000061-0x00000061	Motherboard resources
0x00000063-0x00000063	Motherboard resources
0x00000064-0x00000064	Standard PS/2 Keyboard
0x00000064-0x00000064	PS/2 Compatible Mouse
0x00000065-0x00000065	Motherboard resources
0x00000067-0x00000067	Motherboard resources
0x00000070-0x00000070	Motherboard resources
0x00000070-0x00000070	System CMOS/real time clock
0x00000078-0x00000CF7	PCI Express Root Complex
0x00000080-0x0000008F	Motherboard resources
0x00000092-0x00000092	Motherboard resources
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
0x000000B2-0x000000B3	Motherboard resources
0x000000B4-0x000000B5	Programmable interrupt controller

I/O	ASSIGNMENT
0x000000B8-0x000000B9	Programmable interrupt controller
0x000000BC-0x000000BD	Programmable interrupt controller
0x000002E0-0x000002E7	Communications Port (COM6)
0x000002E8-0x000002EF	Communications Port (COM4)
0x000002F0-0x000002F7	Communications Port (COM5)
0x000002F8-0x000002FF	Communications Port (COM2)
0x000003B0-0x000003BB	Microsoft Basic Display Adapter
0x000003C0-0x000003DF	Microsoft Basic Display Adapter
0x000003E8-0x000003EF	Communications Port (COM3)
0x000003F8-0x000003FF	Communications Port (COM1)
0x00000400-0x0000047F	Motherboard resources
0x000004D0-0x000004D1	Programmable interrupt controller
0x00000500-0x000005FE	Motherboard resources
0x00000600-0x0000061F	Motherboard resources
0x00000680-0x0000069F	Motherboard resources
0x00000A00-0x00000A0F	Motherboard resources
0x00000A10-0x00000A1F	Motherboard resources
0x00000A20-0x00000A2F	Motherboard resources
0x00000D00-0x0000FFFF	PCI Express Root Complex
0x0000C000-0x0000C01F	Ethernet Controller
0x0000C000-0x0000C01F	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 4 - 0F4E
0x0000D000-0x0000D01F	Ethernet Controller
0x0000D000-0x0000D01F	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 3 - 0F4C
0x0000E000-0x0000E01F	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor Platform Control Unit - SMBus Port - 0F12
0x0000E020-0x0000E03F	Standard SATA AHCI Controller
0x0000E040-0x0000E043	Standard SATA AHCI Controller
0x0000E050-0x0000E057	Standard SATA AHCI Controller
0x0000E060-0x0000E063	Standard SATA AHCI Controller
0x0000E070-0x0000E077	Standard SATA AHCI Controller
0x0000E080-0x0000E087	Microsoft Basic Display Adapter

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. Users must first assign the register address by writing the address value into the 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, follow the configuration sequence described below:

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 timeout interval to 30 seconds.

```
; ------------------------ Enter to extended function mode -----------------------------
mov     dx,     2Eh
mov     al,     87h
out     dx,     al
out     dx,     al
; ---------------------- Select Logical Device 7 of watchdog timer ---------------------
mov     al,     07h
out     dx,     al
inc     dx
mov     al,     07h
out     dx,     al
;---------------------------------Enable Watch dog feature ----------------------------
dec     dx
mov     al,     30h
out     dx,     al
inc     dx
mov     al,     01h
out     dx,     al
; ---------------- Set timeout interval as 30seconds and start counting --------------
dec     dx
mov     al,     F6h
out     dx,     al
inc     dx
mov     al,     1Eh
out     dx,     al
;------------------------------ Enable Watch PME-----------------------------------------
dec     dx
mov     al,     FAh
out     dx,     al
inc     dx
in      al,     dx
or      al,     51h
out     dx,     al
;------------------------ Set second as counting unit -----------------------------------
dec     dx
mov     al,     F5h
out     dx,     al
inc     dx
in      al,     dx
and     al,     DEh
out     dx,     al
```

```
;------------------------- Start the watchdog timer ------------------------------------
or      al,     20h
out     dx,     al
;---------------------------------Exit the extended function mode -------------------------
dec     dx
mov     al,     AAh
out     dx,     al
```

Flash BIOS Update

I. Before System BIOS Update

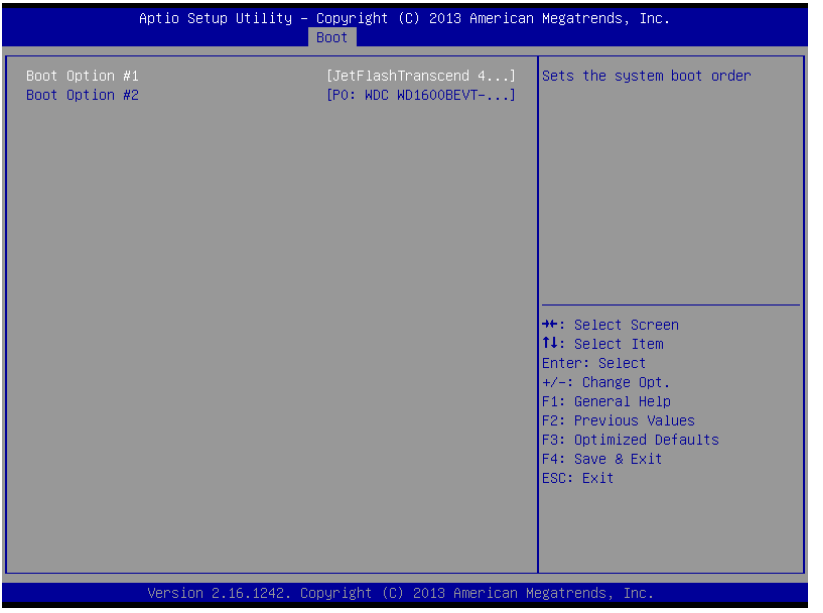
1 Prepare a bootable media (e.g. USB storage device) which can boot the system to DOS prompt.

2 Download and save the BIOS file (e.g. M9622PI2.bin) to the bootable device.

3 Copy AMI flash utility – AFUDOS.exe (V5.07) into the bootable device.

4 Make sure the target system can first boot to the bootable device.

(1) Connect the bootable USB device.
(2) Turn on the computer and press **<F2>** or **<Del>** key during boot to enter BIOS Setup.
(3) The system will go into the BIOS setup menu.
(4) Select **[Boot]** menu.
(5) Select **[Hard Drive BBS Priorities]** and set the USB bootable device as the 1st boot device.
(6) Press **<F4>** to save the configuration and exit the BIOS setup menu.



II. AFUDOS Command for System BIOS Update

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

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

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

/P: program main BIOS image
/B: program Boot Block
/N: program NVRAM
/X: don't check ROM ID

III. BIOS Update Procedure

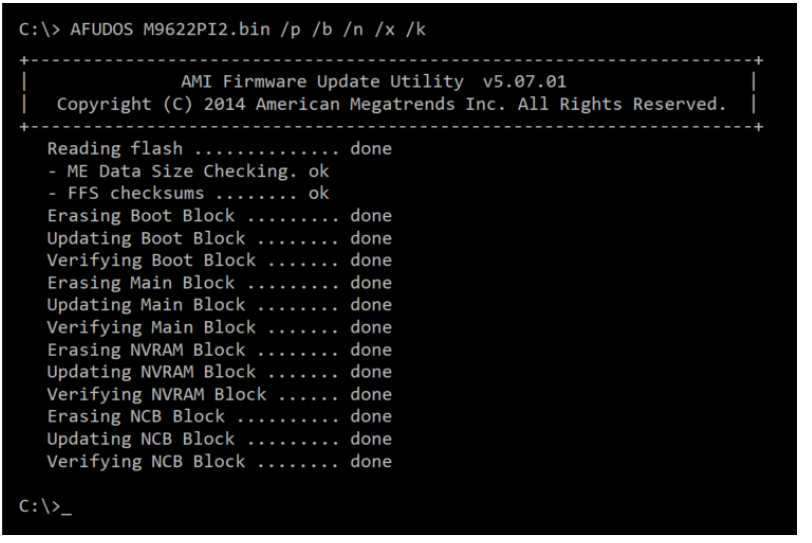
1 Use the bootable USB device to boot up the system into the MS-DOS command prompt.

2 Type **"AFUDOS M962xxxx.bin /p /b /n /x"** and press Enter to start the flash update procedure.

Note: xxxx means the BIOS revision part, e.g. 2PI2.

3 During the BIOS update procedure, you will see the BIOS update process status and its update percentage. Beware! Do not turn off the system power or reset your computer when the entire update procedure are not completed yet; otherwise, the BIOS ROM may be crashed and the system will be unable to boot up next time.

4 After the BIOS update procedure is completed, the following messages will be shown:



5 You can restart the system and boot up the system with the new BIOS configurations.

6 The BIOS update procedure is completed after the system is restarted.

7 Reboot the system and verify if the BIOS version shown on the initialization screen has been updated.