USER MANUAL

BC-K200

Intel 7th/6th Gen. Core™ /
Pentium / Celeron Industrial
Rackmount Chassis

BC-K200 M1

BC-K200

Intel 7th / 6th Gen. Core™ / Pentium® / Celeron® Industrial Rackmount Chassis

DISCLAIMER
This user's manual is meant to assist 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 may occur when the battery is incorrectly replaced. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

WARNING: Some internal parts of the system may have high electrical voltage. We strongly recommend that only qualified engineers are allowed to service and disassemble the system. If any damages should occur on the system and are caused by unauthorized servicing, it will not be covered by the product warranty.

Contents

Revision History

The revision history of BC-K200 User Manual is described below:

Version No.	Revision History	Date
M1	Initial Release	20120/07/16

1 Introduction

This chapter provides the introduction for BC-K200 system as well as the framework of the user manual.

The following topic is included:

- About This Manual

1.1 About This Manual

Thank you for purchasing our BC-K200 system. BC-K200 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 whole system. It contains 5 chapters and 2 appendixes. Users can configure the system according to their own needs. This user manual is intended for service personnel with strong hardware background. It is not intended for general users.

The following section outlines the structure of this user manual.

Chapter 1 Introduction
This chapter provides the introduction for the BC-K200 system as well as the framework of the user manual.

Chapter 2 Getting Started
This chapter describes the package contents and outlines the system specifications. Read the safety reminders carefully on how to take care of your system properly.

Chapter 3 System Configuration
This chapter describes the external I/O ports, outlines the locations of the motherboard components and their respective functions. You will learn how to set the jumpers and configure the system to meet your own needs.

Chapter 4 Software Utilities
This chapter contains helpful information for proper installations of the Intel Chipset Software Installation Utility, Intel® Trusted Execution Engine Installation Utility, VGA Driver Utility, LAN Driver Utility, and Sound Driver Utility.

Chapter 5 BIOS Setup
This chapter indicates you how to change the BIOS configurations.

Appendix A System Assembly
This appendix gives you the system exploded diagram and part numbers of the BC-K200.

Appendix B Technical Summary
This appendix provides the information about the allocation maps for the system resources, Watchdog Timer Configuration and Flash BIOS Update.

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2 Getting Started

This chapter provides the information for the BC-K200 system. It describes the package contents and outlines the system specifications.

The following topics are included:

- Package List
- System Overview
- System Specification
- Safety Precautions

Experienced users can go to Chapter 3 System Configuration on page 3-1 for a quick start.

2.1 Packing List

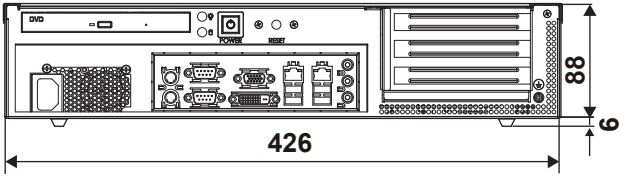
If you discover any of the items listed below are damaged or lost, please contact your local distributor immediately.

Item	Q'ty
BC-K200	1
Quick Reference Guide	1
Manual / Driver DVD	1
Mini Jumper (2.0 mm)	6

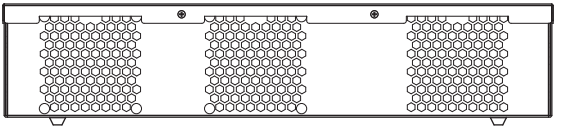
2.2 System Overview

Unit: mm

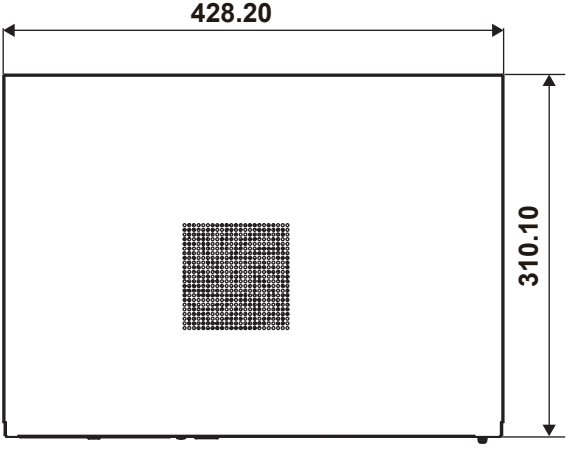
Front View



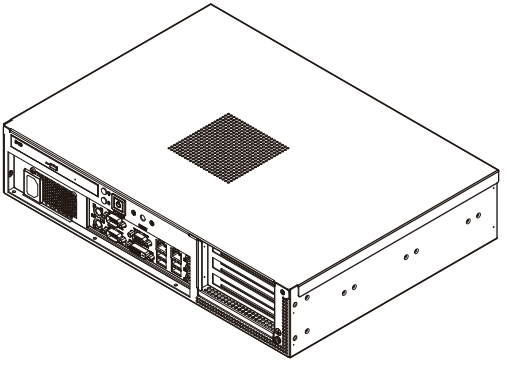
Rear View



Top View



Quarter View



2.3 System Specifications

System	
CPU Support	➢ LGA1151 socket for Intel® 7th / 6th Gen. Core™ i7 / i5 / i3 / Pentium® / Celeron® desktop CPU ➢ Xeon® E3-1200 V6/V5 server CPU
CPU List	➢ **Xeon®:** E3-1275 V6, E3-1275 V5, E3-1225 V5, E3-1268 V5 ➢ **7th Core™:** i7-7700(T), i5-7500(T), i3-7101E(TE) ➢ **6th Core™:** i7-6700(TE), i5-6500(TE), i3-6100(TE) ➢ **Pentium®:** G4400(TE) ➢ **Celeron®:** G3930E(TE), G3900E(TE)
Chipset	➢ Intel® C236 (supports Xeon® / Core™ / Pentium® / Celeron® CPU) ➢ Intel® Q170 / H110 (supports Core™ / Pentium® / Celeron® CPU)
Memory Support	➢ 4 x DIMM sockets, supporting 2133MHz DDR4 (up to 64GB) (C236/Q170) ➢ 2 x DIMM sockets, supporting 2133MHz DDR4 (up to 32GB) (H110) ➢ Supports ECC (C236)/non-ECC (C236/Q170/H110)
BIOS	➢ AMI UEFI BIOS
Power Supply	➢ Flex ATX 300W power
Dimensions	➢ 428.2 x 88 x 310.0 mm (W x H x D)
O.S. Support	➢ Windows® 10 IoT Enterprise
Certifications	➢ CE / FCC
I/O Ports	
Drive Bay	➢ 2 x 2.5" HDD/SSD (default) or 1 x 3.5” HDD ➢ 1 x Slim ODD
USB	➢ 4 x USB 3.0
Serial Ports	➢ 2 x COM, COM2: RS232/422/485 auto flow control
Parallel Port	➢ N/A
LAN	➢ Dual LAN (2 x RJ45) ➢ **LAN1:** Intel® PHY 219LM (GbE) ➢ **LAN 2:** Intel® LAN 210AT (GbE) ➢ Supports Wake-On-LAN
FAN	➢ 1 x CPU fan ➢ 2 x system fans (with iron mesh & air filter)

Keyboard / Mouse	➢ 2 x PS/2 connector for keyboard & mouse
Audio	➢ Mic In / Line In / Line Out
Expansion Bus (Option)	➢ PCIeX16 Riser Card + PCIeX16 Extended Card (1 set) ➢ PCIeX4 to PCI Riser Card
Display	
VGA	➢ 1 x VGA up to 1920 x 1200 @60Hz
DVI-D	➢ 1 x DVI-D up to 2560 x 1600 @60Hz
Others	
Notification LED	➢ 1 x Power LED ➢ 1 x HDD LED
Button	➢ 1 x Power Button ➢ 1 x Reset Button
Environment	
Operating Temp.	➢ 0°C ~ 40°C (32°F ~ 104°F)
Storage Temp.	➢ -20°C ~ 80°C (-4°F ~ 176°F)
Operating Humidity	➢ 20%~ 90% (non-condensing)

2.4 Safety Precautions

Before operating this system, read the following information carefully to protect your systems from damages, and extend the life cycle of the system.

1. Check the Line Voltage
   - The operating voltage for the power supply should be Flex ATX 300W power; otherwise the system may be damaged.

2. Environmental Conditions
   - Place your BC-K200 on a sturdy, level surface. Be sure to allow enough space around the system to have easy access needs.
   - Avoid installing your BC-K200 system in extremely hot or cold places.
   - Avoid direct sunlight exposure for a long period of time (for example, in a closed car in summer time. Also avoid the system from any heating device.). Or do not use BC-K200 when it has been left outdoors in a cold winter day.
   - Avoid moving the system rapidly from a hot place to a cold place, and vice versa, because condensation may occur inside the system.
   - Protect your BC-K200 from strong vibrations which may cause hard disk failure.
   - Do not place the system too close to any radio-active device. Radio-active device may cause signal interference.
   - Always shut down the operating system before turning off the power.
3. Handling
   - Avoid placing heavy objects on the top of the system.
   - Do not turn the system upside down. This may cause the hard drive to malfunction.
   - Do not allow any objects to fall into this device.
   - If water or other liquid spills into the device, unplug the power cord immediately.
4. Good Care
   - When the outside case gets stained, remove the stains using neutral washing agent with a dry cloth.
   - Never use strong agents such as benzene and thinner to clean the surface of the case.
   - If heavy stains are present, moisten a cloth with diluted neutral washing agent or alcohol and then wipe thoroughly with a dry cloth.
   - If dust is accumulated on the case surface, remove it by using a special vacuum cleaner for computers.

3 Hardware Configuration

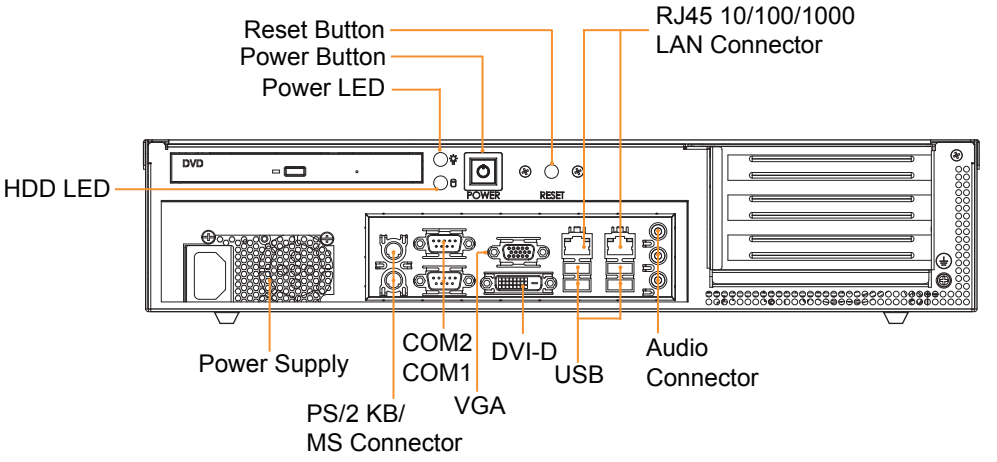
This chapter contains helpful information about the external I/O Ports diagrams, and jumper & connector settings, and component locations for the main board.

The following topics are included:

- External I/O Ports Diagrams
- Main Board Jumper Settings and Component Locations
- How to Set Jumpers
- Setting Main Board Connectors and Jumpers

3.1 External System I/O Ports Diagram

I/O Ports Diagram

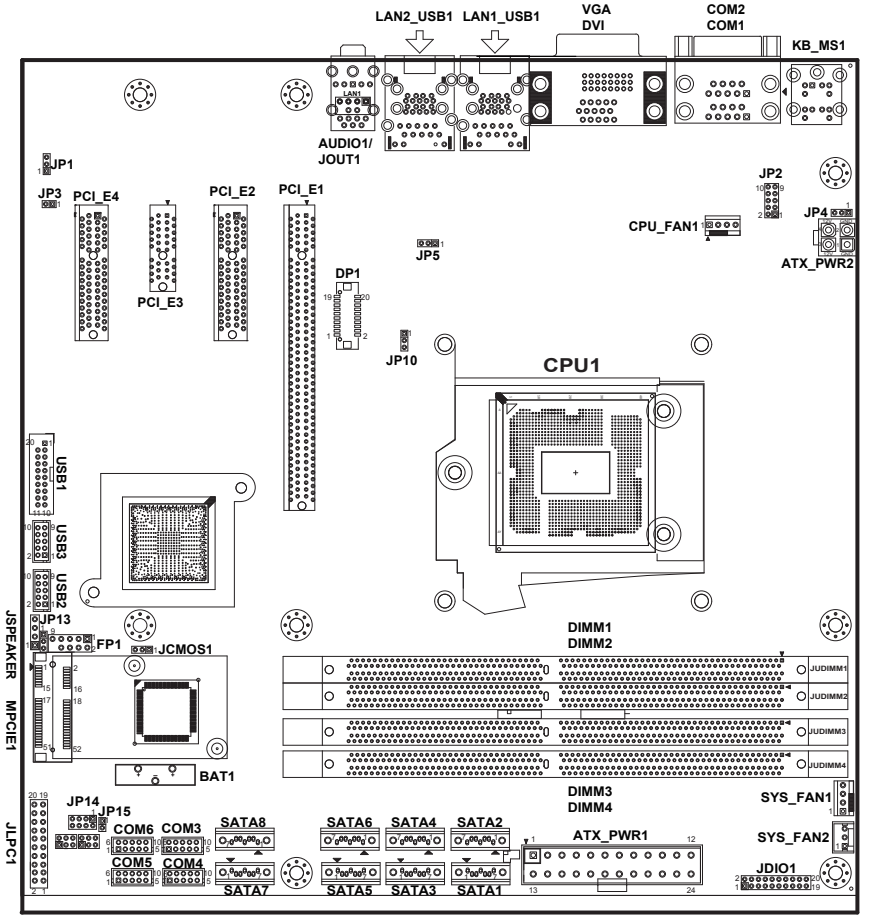


3.2 Jumper & Connector Quick Reference Table

The jumpers and connectors are arranged alphabetically below:

JUMPER/CONNECTOR	NAME
Power Input Connectors	ATX_PWR1, ATX_PWR2
Line-In, Line-Out and MIC-In Port	AUDIO1
COM Port and Connectors	COM1, COM2, COM3, COM4, COM5, COM6
CPU / System FAN Connectors	CPU_FAN1, SYS_FAN1, SYS_FAN2
Display Port Connector	DP1
DVI (Digital Video Interface) Port	DVI-D
Front Panel Connector	FP1
Clear CMOS Data Selection	JCMOS1
Digital Input / Output Connector	JDIO1
LPC Connector	JLPC1
COM Port RI/Voltage Selection	JPCOM3, JPCOM4
Speaker Connector	JSPEAKER
Keyboard / Mouse Connector	KB_MS1
LAN + USB Connectors	LAN1_USB1, LAN2_USB1
Mini PCI Express Slot	MPCIE1
PCI Express Slots	PCI_E1, PCI_E2, PCI_E3, PCI_E4
SATA Connectors	SATA1, SAT2, SATA3, SATA4, SATA5, SATA6, SATA7, SATA8
Universal Serial Bus 3.0 Connector	USB1
Universal Serial Bus 2.0 Connectors	USB2, USB3
VGA Port	VGA
RS-232/422/485 (COM2) Selection	JP2
COM2 Auto Detection Selection	JP4
Hardware Power Failure Selection	JP1
Flash Descriptor Override Selection	JP3
LAN2 Enable / Disable Selection	JP5
Mini PCI Express Voltage Selection	JP13
VCCIO Voltage Selection	JP10

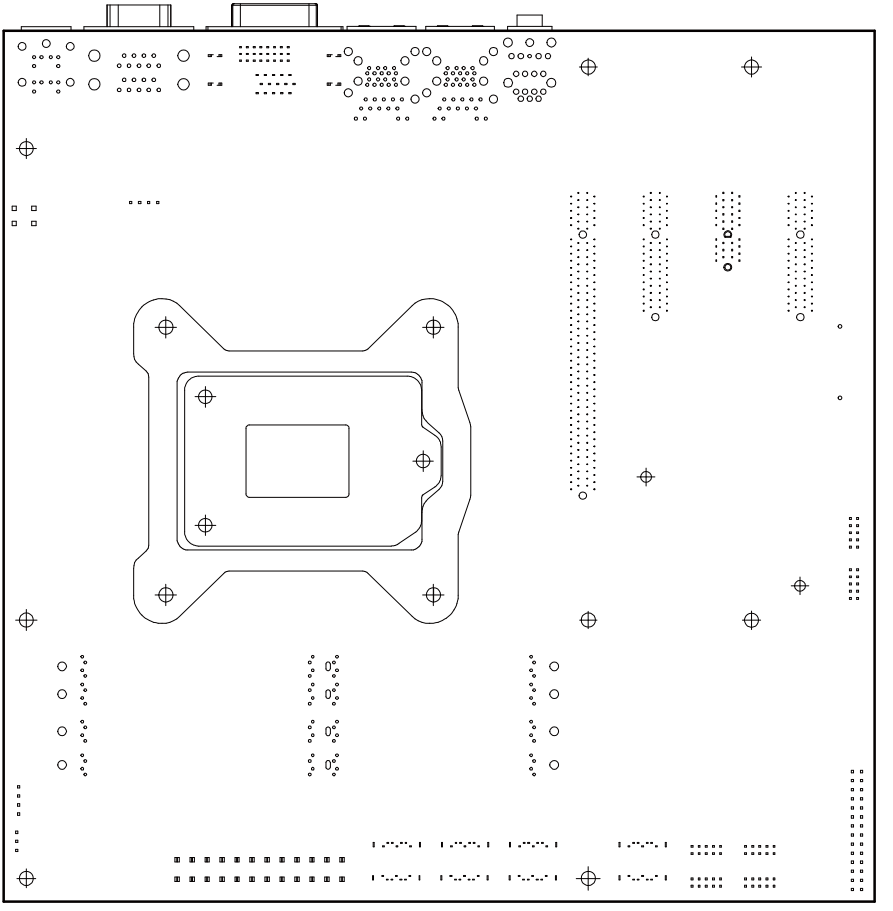
3.3 Component Locations



BU-2509 Connector, Jumper and Component Locations (Top Side)

Note 1: BC-K200 uses motherboard BU-2509

Note 2: C236 SKU has SATA1~6, JDIMM1~4, PCI_E1~4 available. Q170 SKU has SATA1~6, JDIMM1~4, PCI_E1~4 available. H110 SKU only has SATA1~4, JDIMM2, 4, PCI_E1~3 available. USB1 is not available for H110 SKU. DP1 is not available for BU-2509RA-D0P / D1P / D6P.



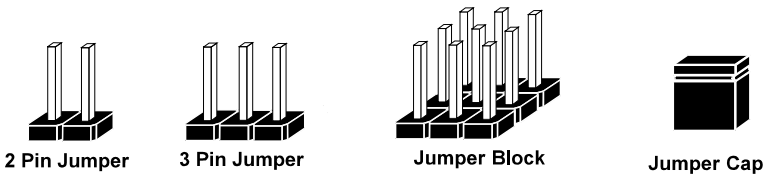
BU-2509 Connector, Jumper and Component Locations (Bottom Side)

3.4 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.

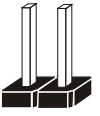
Jumpers and Caps



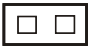
If a jumper has three pins (for examples, labelled PIN1, PIN2, and PIN3), you can connect PIN1 & PIN2 to create one setting by shorting. You can either connect PIN2 & PIN3 to create another setting. The same jumper diagrams are applied all through this manual. The figure below shows what the manual diagrams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

Jumper Diagrams

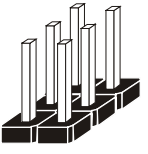
Jumper Cap looks like this



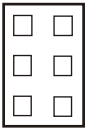
2 pin Jumper looks like this



3 pin Jumper looks like this

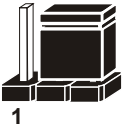


Jumper Block looks like this

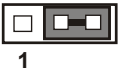


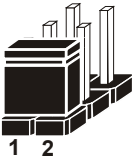
Jumper Settings

2 pin Jumper close(enabled) Looks like this

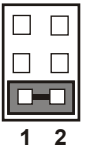


3 pin Jumper 2-3 pin close(enabled) Looks like this





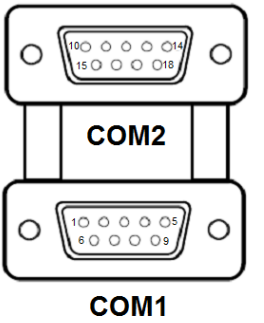
Jumper Block 1-2 pin close(enabled) Looks like this



3.5 COM Port and Connectors

COM1: COM1 Connector, fixed as RS-232.

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



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

COM2/ COM1

The pin assignments are as follows:

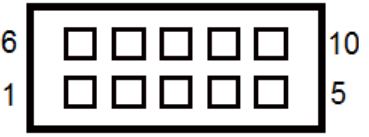
PIN	Signal		
	RS-232	RS-422	RS-485
10	DCD#	TX-	RS-485-
11	RX	TX+	RS-485+
12	TX	RX+	NC
13	DTR#	RX-	NC
14	GND	GND	GND
15	DSR#	NC	NC
16	RTS#	NC	NC
17	CTS#	NC	NC
18	RI#	NC	NC

COM3/COM4/COM5/COM6 Connector

COM3, COM4, COM5, COM6: COM Connector, 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	

Note: Pin 9 is selectable for RI, +5V or +12V for COM3 and COM4 only.



COM3/ COM4/ COM5/ COM6

3.6 Clear CMOS Data Selection

JCMOS1: Clear CMOS Data Selection

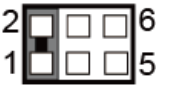
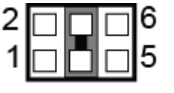
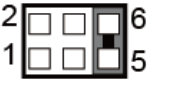
Selection	Jumper Setting	Jumper Illustration
Normal	1-2	 **JCMOS1**
Clear CMOS	2-3	 **JCMOS1**

Note 1: Manufacturing Default is **Normal**.

Note 2: To clear CMOS data, users must power off the computer and set the jumper to “Clear CMOS” as shown above. After 5 to 6 seconds, set the jumper back to “NC” and power on the computer.

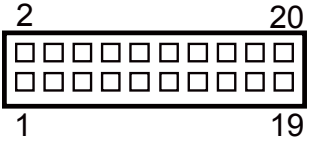
3.7 COM Port RI / Voltage Selection

COM3 and COM4 RI & Voltage Selection

Selection	Jumper Setting	Jumper Illustration
RI	1-2	 **JPCOM3/JPCOM4**
12V	3-4	 **JPCOM3/JPCOM4**
5V	5-6	 **JPCOM3/JPCOM4**

Note: Manufacturing default is **RI**.

3.8 Digital I/O Port Connector



JDIO1

JDIO1: Digital Input / Output Port Connector:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	VCC5	2	VCC12
3	DIN1	4	DOUT1
5	DIN2	6	DOUT2
7	DIN3	8	DOUT3
9	DIN4	10	DOUT4
11	DIN5	12	DOUT5-
13	DIN6	14	DOUT6
15	DIN7	16	DOUT7
17	DIN8	18	DOUT8
19	GND	20	GND

3.9 Keyboard & Mouse Port

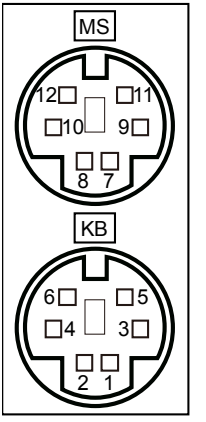
KB_MS1: PS/2 Keyboard & Mouse Port

Mouse:

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

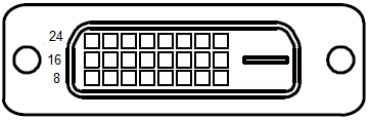
Keyboard:

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



KB_MS1

3.10 DVI (Digital Video Interface) Port



DVI-D

DVI-D: DVI-D (Digital Video Interface – Digital) function is supported.

The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	TMDS_D2-	13	NC
2	TMDS_D2+	14	VCC5
3	GND	15	GND
4	NC	16	TMDS_HPD
5	NC	17	TMDS_D0-
6	TMDS_CLK	18	TMDS_D0+
7	TMDS_DATA	19	GND
8	NC	20	NC
9	TMDS_D1-	21	NC
10	TMDS_D1+	22	GND
11	GND	23	TMDS_D3+
12	NC	24	TMDS_D3-

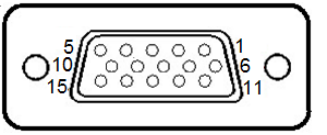
A DVI-D connector transfer only digital signals, providing faster transfer rates and better quality than their predecessor, the VGA cable. It is most commonly used to connect computer video cards to LCD monitors.

3.11 VGA Port

VGA: VGA (Video Graphics Array) Connector

The pin assignments are as follows:

PIN	ASSIGNMENT
1	CRT_RED
2	CRT_GREEN
3	CRT_BLUE
4	NC
5	GND
6	NC
7	GND
8	GND
9	CRT_VCC
10	GND
11	NC
12	CRT_SDA
13	CRT_HSYNC
14	CRT_VSYNC
15	CRT_SCL

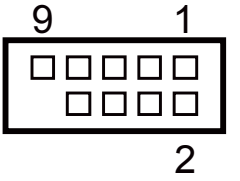


VGA

3.12 Front Panel Connector

FP1: Front Panel Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	HDD_LED+	2	PWR_LED+
3	HDD_LED-	4	PWR_LED-
5	GND	6	PWR_BTN
7	RST_BTN	8	GND
9	VCC5	-	-

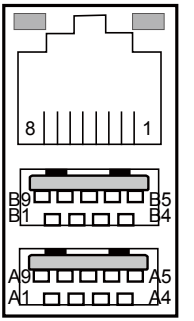


FP1

3.13 LAN & USB Port

LAN1_USB1: LAN1 & Two USB 3.0 Ports

Green/Orange Yellow



LAN1_USB1

LAN1 signals:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	MDI_P0	5	MDI_P2
2	MDI_N0	6	MDI_N2
3	MDI_P1	7	MDI_P3
4	MDI_N1	8	MDI_N3

LAN LED Indicator:

Left Side LED

Green Color On7	10/100Mbps LAN Speed Indicator
Orange Color On8	Giga LAN Speed Indicator
Off	No LAN Switch/HUB connected

Right Side LED

Yellow Color Blinking	LAN Message Active
Off	No LAN Message Active

USB 3.0 signals:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
A1	VCC	B1	VCC
A2	USB_N1	B2	USB_N2
A3	USB_P1	B3	USB_P2
A4	GND	B4	GND
A5	USB3_RX_N1	B5	USB3_RX_N2
A6	USB3_RX_P1	B6	USB3_RX_P2
A7	GND	B7	GND
A8	USB3_TX_N1	B8	USB3_TX_N2
A9	USB3_TX_P1	B9	USB3_TX_P2

LAN2_USB1: LAN2 & Two USB 3.0 Ports

LAN2 signals:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	MDI_P0	5	MDI_P2
2	MDI_N0	6	MDI_N2
3	MDI_P1	7	MDI_P3
4	MDI_N1	8	MDI_N3

LAN LED Indicator:

Left Side LED

Green Color On7	10/100 LAN Speed Indicator
Orange Color On8	Giga LAN Speed Indicator
Off	No LAN Switch/HUB connected

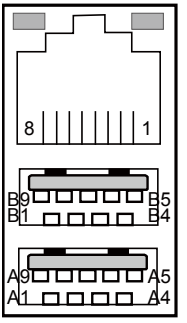
Right Side LED

Yellow Color Blinking	LAN Message Active
Off	No LAN Message Active

USB 3.0 signals:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
A1	VCC	B1	VCC
A2	USB_N3	B2	USB_N4
A3	USB_P3	B3	USB_P4
A4	GND	B4	GND
A5	USB3_RX_N3	B5	USB3_RX_N4
A6	USB3_RX_P3	B6	USB3_RX_P4
A7	GND	B7	GND
A8	USB3_TX_N3	B8	USB3_TX_N4
A9	USB3_TX_P3	B9	USB3_TX_P4

Green/Orange Yellow

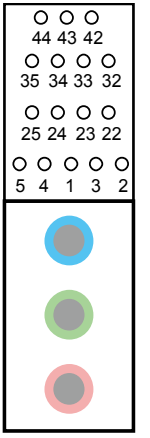


LAN2_USB1

3.14 Line-in, Line-out, Mic-in Port

AUDIO1: Line-In, Line-Out & Microphone

The connector can also support only Microphone.



AUDIO1

Line-In:

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

Line-Out:

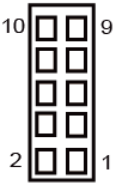
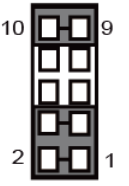
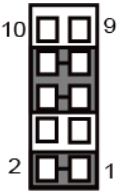
PIN	ASSIGNMENT
22	LINE-OUT-L
23	GND
24	GND
25	LINE-OUT-R

MIC-In:

PIN	ASSIGNMENT
1	GND
2	HD_MIC1-L_L
3	GND
4	GND
5	HD_MIC1-R_L

3.15 RS-232/422/485 (COM2) Selection

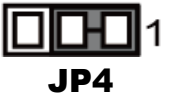
JP2: RS-232/422/485 (COM2) Selection
The selections are as follows:

Selection	Jumper Setting (Pin Closed)	Jumper Illustration
RS-232	Open	 **JP2**
RS-422	1-2, 3-4, 9-10	 **JP2**
RS-485	1-2, 5-6, 7-8	 **JP2**

***Manufacturing Default – **RS-232**.

3.16 COM2 Auto Detection Selection

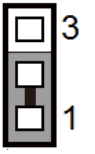
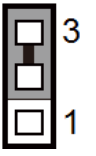
JP4: COM2 Auto Detection Selection
The selections are as follows:

Selection	Jumper Setting (Pin Closed)	Jumper Illustration
Normal	1-2	 JP4
Auto	2-3	 JP4

***Manufacturing Default – **Auto**.

3.17 Hardware Power Failure Selection

JP1: Hardware Power Failure Selection

Selection	Jumper Setting	Jumper Illustration
Enable	1-2	 **JP1**
Disable	2-3	 **JP1**

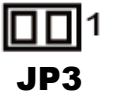
Note: Manufacturing default is **Disable**.

3.18 Flash Descriptor Override Selection

JP3: Flash Descriptor Override Selection

Description: Jumper for enable or disable the permission to updating BIOS ME firmware.

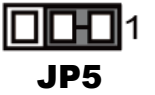
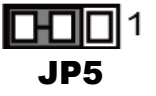
The selections are as follows:

Selection	Jumper Setting (Pin Closed)	Jumper Illustration
Disable	Open	 **JP3**
Enable	1-2	 **JP3**

***Manufacturing Default – **Disable**.

3.19 LAN2 Enable / Disable Selection

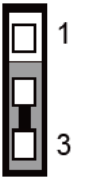
JP5: LAN2 Enable / Disable Selection
The selections are as follows:

Selection	Jumper Setting (Pin Closed)	Jumper Illustration
Enable	1-2	 **JP5**
Disable	2-3	 **JP5**

***Manufacturing Default – **Enable**.

3.20 Mini PCIE Voltage Selection

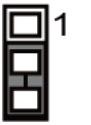
JP13: Mini PCIE Voltage Selection
The selections are as follows:

Selection	Jumper Setting (Pin Closed)	Jumper Illustration
3.3V	1-2	 JP13
3.3V_AUX	2-3	 JP13

***Manufacturing Default –**3.3V_AUX**.

3.21 VCCIO Voltage Selection

JP10: VCCIO Voltage Selection
The selections are as follows:

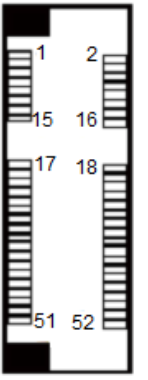
Selection	Jumper Setting (Pin Closed)	Jumper Illustration
1.0V	1-2	 JP10
0.95V	2-3	 JP10

***Manufacturing Default – **0.95V**.

3.22 MINI PCI Express Slot

MPCIE1: Mini-PCI Express Slot

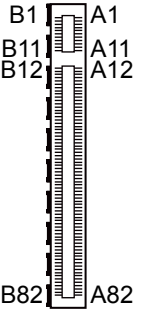
PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	WAKE_N	2	3.3V_SB
3	NC	4	GND
5	NC	6	1.5V
7	CLKREQ#	8	NC
9	GND	10	NC
11	REFCLK-	12	NC
13	REFCLK+	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	NC
21	GND	22	PERST#
23	PE_RX_N	24	3.3V_SB
25	PE_RX_P	26	GND
27	GND	28	1.5V
29	GND	30	SMB_CLK
31	PE_TX_N	32	SMB_DATA
33	PE_TX_P	34	GND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



MPCIE1

3.23 PCI Express Slots

PCI_E1 (X16): PCI_E1 (PCIE X16)



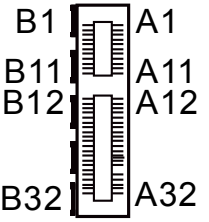
PCI_E1

PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT
A1	PRSNT#1	A21	HSIP1	A41	GND
A2	+ 12V	A22	HSIN1	A42	GND
A3	+ 12V	A23	GND	A43	HSIP6
A4	GND	A24	GND	A44	HSIN6
A5	NC	A25	HSIP2	A45	GND
A6	NC	A26	HSIN2	A46	GND
A7	NC	A27	GND	A47	HSIP7
A8	NC	A28	GND	A48	HSIN7
A9	+ 3.3V	A29	HSIP3	A49	GND
A10	+ 3.3V	A30	HSIN3	A50	RSVD
A11	PERST#	A31	GND	A51	GND
A12	GND	A32	RSVD	A52	HSIP8
A13	REFCLK+	A33	RSVD	A53	HSIN8
A14	REFCLK-	A34	GND	A54	GND
A15	GND	A35	HSIP4	A55	GND
A16	HSIP0	A36	HSIN4	A56	HSIP9
A17	HSIN0	A37	GND	A57	HSIN9
A18	GND	A38	GND	A58	GND
A19	RSVD	A39	HSIP5	A59	GND
A20	GND	A40	HSIN5	A60	HSIP10
A61	HSIN10	A69	HSIN12	A77	HSIN14
A62	GND	A70	GND	A78	GND
A63	GND	A71	GND	A79	GND
A64	HSIP11	A72	HSIP13	A80	HSIP15

PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT
A65	HSIN11	A73	HSIN13	A81	HSIN15
A66	GND	A74	GND	A82	GND
A67	GND	A75	GND	-	-
A68	HSIP12	A76	HSIP14	-	-

PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT
B1	+ 12V	B22	GND	B43	GND
B2	+ 12V	B23	HSOP2	B44	GND
B3	+ 12V	B24	HSON2	B45	HSOP7
B4	GND	B25	GND	B46	HSON7
B5	SMB_CLK	B26	GND	B47	GND
B6	SMB_DATA	B27	HSOP3	B48	PRSNT#2
B7	GND	B28	HSON3	B49	GND
B8	+ 3.3V	B29	GND	B50	HSOP8
B9	NC	B30	RSVD	B51	HSON8
B10	+ 3.3V_AXU	B31	PRSNT#2	B52	GND
B11	WAKE#	B32	GND	B53	GND
B12	RSVD	B33	HSOP4	B54	HSOP9
B13	GND	B34	HSON4	B55	HSON9
B14	HSOP0	B35	GND	B56	GND
B15	HSON0	B36	GND	B57	GND
B16	GND	B37	HSOP5	B58	HSOP10
B17	PRSNT#2	B38	HSON5	B59	HSON10
B18	GND	B39	GND	B60	GND
B19	HSOP1	B40	GND	B61	GND
B20	HSON1	B41	HSOP6	B62	HSOP11
B21	GND	B42	HSON6	B63	HSON11
B64	GND	B71	HSON13	B78	HSIP15
B65	GND	B72	GND	B79	HSIN15
B66	HSOP12	B73	GND	B80	GND
B67	HSON12	B74	HSOP14	B81	PRSNT#2
B68	GND	B75	HSIN14	B82	RSVD
B69	GND	B76	GND	-	-
B70	HSOP13	B77	GND	-	-

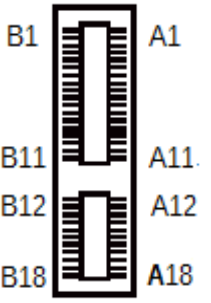
PCI_E2, PCI_E4 (X4): PCI_E2, PCI_E4 (PCIE X4)
PCI_E2, PCI_E4 are only supported in C236 and Q170 SKU.
Note1: H110 SKU PCI_E2 only supports PCIE X 1.



PCI_E2/PCI_E4

PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT
A1	PRSNT#1	A12	GND	A23	GND
A2	+ 12V	A13	REFCLK+	A24	GND
A3	+ 12V	A14	REFCLK-	A25	HSIP2
A4	GND	A15	GND	A26	HSIN2
A5	NC	A16	HSIP0	A27	GND
A6	NC	A17	HSIN0	A28	GND
A7	NC	A18	GND	A29	HSIP3
A8	NC	A19	RSVD	A30	HSIN3
A9	+ 3.3V	A20	GND	A31	GND
A10	+ 3.3V	A21	HSIP1	A32	RSVD
A11	PERST#	A22	HSIN1	-	-
B1	+ 12V	B12	RSVD	B23	HSOP2
B2	+ 12V	B13	GND	B24	HSON2
B3	+ 12V	B14	HSOP0	B25	GND
B4	GND	B15	HSON0	B26	GND
B5	SMB_CLK	B16	GND	B27	HSOP3
B6	SMB_DATA	B17	PRSNT#2	B28	HSON3
B7	GND	B18	GND	B29	GND
B8	+ 3.3V	B19	HSOP1	B30	RSVD
B9	NC	B20	HSON1	B31	PRSNT#2
B10	+ 3.3V_AXU	B21	GND	B32	GND
B11	WAKE#	B22	GND	-	-

PCI_E3 (X1): PCI_E3 (PCIE X1)



PCI_E3

PIN	ASSIGNMENT	PIN	ASSIGNMENT
A1	PRSNT#1	A10	+ 3.3V
A2	+ 12V	A11	PERST#
A3	+ 12V	A12	GND
A4	GND	A13	REFCLK+
A5	NC	A14	REFCLK-
A6	NC	A15	GND
A7	NC	A16	HSIP0
A8	NC	A17	HSIN0
A9	+ 3.3V	A18	GND

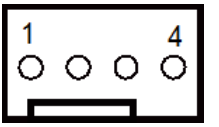
PIN	ASSIGNMENT	PIN	ASSIGNMENT
B1	+ 12V	B10	+ 3.3V_AXU
B2	+ 12V	B11	WAKE#
B3	+ 12V	B12	RSVD
B4	GND	B13	GND
B5	SMB_CLK	B14	HSOP0
B6	SMB_DATA	B15	HSON0
B7	GND	B16	GND
B8	+ 3.3V	B17	PRSNT#2
B9	NC	B18	GND

3.24 CPU / System Fan Connectors

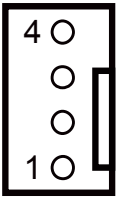
CPU_FAN1: CPU Fan Connector

SYS_FAN1: System Fan Connector 1

PIN	ASSIGNMENT
1	GND
2	VCC12
3	CPU_FANTAC
4	CPU_FANCTRL



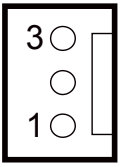
CPU_FAN1



SYS_FAN1

SYS_FAN2: System Fan Connector 2

PIN	ASSIGNMENT
3	NC
2	VCC12
1	GND



SYS_FAN2

3.25 Serial ATA (SATA) Connectors

SATA1, SATA2, SATA3, SATA4, SATA5, SATA6: SATA Connectors

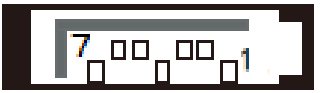
SATA1-6 Pin Assignment:

PIN	ASSIGNMENT
1	GND
2	SATA_TX_P
3	SATA_TX_N
4	GND
5	SATA_RX_N
6	SATA_RX_P
7	GND

SATA1/
SATA3/
SATA5/

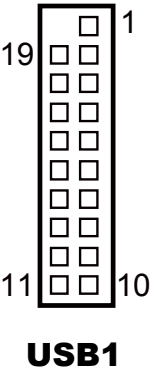
Notes:

1. C236 SKU supports SATA1~SATA6.
2. Q170 SKU supports SATA1~SATA6.
3. H110 SKU supports SATA1~SATA4.



SATA2/
SATA4/
SATA6/

3.26 Internal USB 3.0 Connector



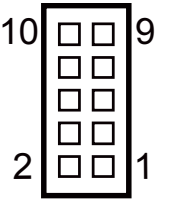
USB1: Internal USB 3.0 Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
-	-	1	VCC5
19	VCC5	2	USB3_RX_N
18	USB3_RX_N	3	USB3_RX_P
17	USB3_RX_P	4	GND
16	GND	5	USB3_TX_N
15	USB3_TX_N	6	USB3_TX_P
14	USB3_TX_P	7	GND
13	GND	8	USB2_N
12	USB2_N	9	USB2_P
11	USB2_P	10	GND

USB1

Note: USB1 is only available for C236/Q170 SKU, not available for H110 SKU.

3.27 Internal USB 2.0 Conncetors



USB2, USB3: Internal USB 2.0 Connector

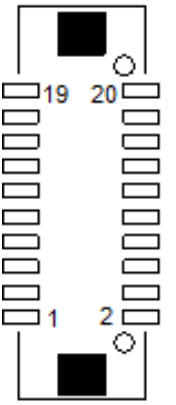
PIN	ASSIGNMENT	PIN	ASSIGNMENT
10	GND	9	NC
8	GND	7	GND
6	USB2_P	5	USB2_P
4	USB2_N	3	USB2_N
2	VCC5	1	VCC5

USB2/ USB3

3.28 Display Port Connector

DP1: Display Port Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
19	VCC5	20	VCC3
17	AUX	18	VCC3
15	AUX+	16	HPD
13	AUX_EN#	14	GND
11	GND	12	DATA3-
9	DATA2-	10	DATA3+
7	DATA2+	8	GND
5	GND	6	DATA1-
3	DATA0-	4	DATA1+
1	DATA0+	2	GND

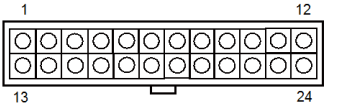


DP1

NOTE: BU-2509RA-D0P / D1P / D6P don't support DP.

3.29 Power Input Connectors

ATX_PWR1: ATX Connector



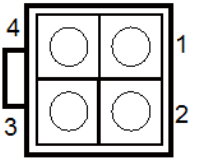
ATX_PWR1

The pin assignments are as follows:

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

ATX_PWR2: Power Connector

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



ATX_PWR2

3.30 Speaker Connector

JSPEAKER: Speaker Connector

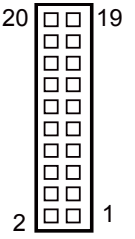
PIN	ASSIGNMENT
4	SPKR_SIGNAL
3	SPKR_SIGNAL
2	SPKR_SIGNAL
1	SPKR_VCC

JSPEAKER

3.31 LPC Connector

JLPC1: LPC Connector

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



JLPC1

4 Software Utilities

This chapter comprises the detailed information of drivers of BC-K200.

The following topics are included:

- Installing Intel Chipset Device Software Installer
- Installing Utility for Windows 7/8.1/10
- Installing Intel® Trusted Execution Engine Installation Utility
- Installing VGA Driver Utility
- Installing LAN Driver Utility
- Installing Sound Driver Utility

4.1 Introduction

Enclosed with the BC-K200 Series package is our driver utilities contained in a DVD-ROM disk. Refer to the following table for driver locations:

Filename (Assume that DVD ROM drive is D:)	Purpose	OS			
		Shell	Win7	Win8.1	Win10
D:\H110\Driver\Flash BIOS	For BIOS update utility	✓			
D:\H110\Driver\Platform\ Win7(32-bit)\Main Chip	Intel® Chipset Device Software installer		✓	✓	✓
D:\H110\Driver\Platform\ Win7(32-bit)\VGA	Intel® HD Graphics installer		✓	✓	✓
D:\H110\Driver\Platform\ Win7(32-bit)\LAN	Intel® Network Connections Software		✓	✓	✓
D:\H110\Driver\Platform\ Win7(32-bit)\Sound	Realtek High Definition Audio System Software		✓	✓	✓
D:\H110\Driver\Platform\ Win7(32-bit)\USB3.0	Intel® USB 3.0 eXtensible Host Controller		✓	✓	✓
D:\H110\Driver\Platform\ Win7(32-bit)\ME	Intel® Management Engine Components installer		✓	✓	✓
D:\H110\Driver\Platform\ Win7(64-bit)\Main Chip	Intel® Chipset Device Software installer		✓	✓	✓
D:\H110\Driver\Platform\ Win7(64-bit)\VGA	Intel® HD Graphics installer		✓	✓	✓
D:\H110\Driver\Platform\ Win7(64-bit)\LAN	Intel® Network Connections Software		✓	✓	✓
D:\H110\Driver\Platform\ Win7(64-bit)\Sound	Realtek High Definition Audio System Software		✓	✓	✓
D:\H110\Driver\Platform\ Win7(64-bit)\USB3.0	Intel® USB 3.0 eXtensible Host Controller		✓	✓	✓
D:\H110\Driver\Platform\ Win7(64-bit)\ME	Intel® Management Engine Components installer		✓	✓	✓
D:\H110\Driver\Platform\ Win8.1(64-bit)\Main Chip	Intel® Chipset Device Software installer		✓	✓	✓
D:\H110\Driver\Platform\ Win8.1(64-bit)\VGA	Intel® HD Graphics installer		✓	✓	✓
D:\H110\Driver\Platform\ Win8.1(64-bit)\LAN	Intel® Network Connections Software		✓	✓	✓
D:\H110\Driver\Platform\ Win8.1(64-bit)\Sound	Realtek High Definition Audio System Software		✓	✓	✓
D:\H110\Driver\Platform\ Win8.1(64-bit)\USB3.0	Intel® USB 3.0 eXtensible Host Controller		✓	✓	✓
D:\H110\Driver\Platform\ Win8.1(64-bit)\ME	Intel® Management Engine Components installer		✓	✓	✓

Filename (Assume that DVD ROM drive is D:)	Purpose	OS			
		Shell	Win7	Win8.1	Win10
D:\H110\Driver\Platform\ Win10(64-bit)\Main Chip	Intel® Chipset Device Software installer		✓	✓	✓
D:\H110\Driver\Platform\ Win10(64-bit)\VGA	Intel® HD Graphics installer		✓	✓	✓
D:\H110\Driver\Platform\ Win10(64-bit)\LAN	Intel® Network Connections Software		✓	✓	✓
D:\H110\Driver\Platform\ Win10(64-bit)\Sound	Realtek High Definition Audio System Software		✓	✓	✓
D:\H110\Driver\Platform\ Win10(64-bit)\USB3.0	Intel® USB 3.0 eXtensible Host Controller		✓	✓	✓
D:\H110\Driver\Platform\ Win10(64-bit)\ME	Intel® Management Engine Components installer		✓	✓	✓
D:\Q170\Driver\Flash BIOS	For BIOS update utility	✓			
D:\Q170\Driver\Platform\ Win7(32-bit)\Main Chip	Intel® Chipset Device Software installer		✓	✓	✓
D:\Q170\Driver\Platform\Win7 (32-bit)\VGA	Intel® HD Graphics installer		✓	✓	✓
D:\Q170\Driver\Platform\Win7 (32-bit)\LAN	Intel® Network Connections Software		✓	✓	✓
D:\Q170\Driver\Platform\Win7 (32-bit)\Sound	Realtek High Definition Audio System Software		✓	✓	✓
D:\Q170\Driver\Platform\Win7 (32-bit)\USB3.0	Intel® USB 3.0 eXtensible Host Controller		✓	✓	✓
D:\Q170\Driver\Platform\Win7 (32-bit)\RAID	Intel® Rapid Storage Technology (Intel® RST).		✓	✓	✓
D:\Q170\Driver\Platform\Win7 (32-bit)\ME	Intel® Management Engine Components installer		✓	✓	✓
D:\Q170\Driver\Platform\Win7 (64-bit)\Main Chip	Intel® Chipset Device Software installer		✓	✓	✓
D:\Q170\Driver\Platform\Win7 (64-bit)\VGA	Intel® HD Graphics installer		✓	✓	✓
D:\Q170\Driver\Platform\Win7 (64-bit)\LAN	Intel® Network Connections Software		✓	✓	✓
D:\Q170\Driver\Platform\Win7 (64-bit)\Sound	Realtek High Definition Audio System Software		✓	✓	✓
D:\Q170\Driver\Platform\Win7 (64-bit)\USB3.0	Intel® USB 3.0 eXtensible Host Controller		✓	✓	✓
D:\Q170\Driver\Platform\Win7 (64-bit)\ME	Intel® Management Engine Components installer		✓	✓	✓
D:\Q170\Driver\Platform\Win7 (64-bit)\RAID	Intel® Rapid Storage Technology (Intel® RST).		✓	✓	✓
D:\Q170\Driver\Platform\	Intel® Chipset Device		✓	✓	✓

Filename (Assume that DVD ROM drive is D:)	Purpose	OS			
		Shell	Win7	Win8.1	Win10
Win8.1(64-bit)\Main Chip	Software installer				
D:\Q170\Driver\Platform\ Win8.1(64-bit)\VGA	Intel® HD Graphics installer		✓	✓	✓
D:\Q170\Driver\Platform\ Win8.1(64-bit)\LAN	Intel® Network Connections Software		✓	✓	✓
D:\Q170\Driver\Platform\ Win8.1(64-bit)\Sound	Realtek High Definition Audio System Software		✓	✓	✓
D:\Q170\Driver\Platform\ Win8.1(64-bit)\USB3.0	Intel® USB 3.0 eXtensible Host Controller		✓	✓	✓
D:\Q170\Driver\Platform\ Win8.1(64-bit)\ME	Intel® Management Engine Components installer		✓	✓	✓
D:\Q170\Driver\Platform\ Win8.1(64-bit)\RAID	Intel® Rapid Storage Technology (Intel® RST).		✓	✓	✓
D:\Q170\Driver\Platform\ Win10(64-bit)\Main Chip	Intel® Chipset Device Software installer		✓	✓	✓
D:\Q170\Driver\Platform\ Win10(64-bit)\VGA	Intel® HD Graphics installer		✓	✓	✓
D:\Q170\Driver\Platform\ Win10(64-bit)\LAN	Intel® Network Connections Software		✓	✓	✓
D:\Q170\Driver\Platform\ Win10(64-bit)\Sound	Realtek High Definition Audio System Software		✓	✓	✓
D:\Q170\Driver\Platform\ Win10(64-bit)\USB3.0	Intel® USB 3.0 eXtensible Host Controller		✓	✓	✓
D:\Q170\Driver\Platform\ Win10(64-bit)\ME	Intel® Management Engine Components installer		✓	✓	✓
D:\Q170\Driver\Platform\ Win10(64-bit)\RAID	Intel® Rapid Storage Technology (Intel® RST).		✓	✓	✓

4.2 Intel® Chipset Device Software Installer

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

4.3 Installing Utility for Windows 7/8.1/10

The Utility Pack is to be installed only for Windows 7/8.1/10 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 Windows system, go to the directory where the Utility driver is located.
3. Run the application with the "Administrator" privilege.

4.4 Installing Intel® Trusted Execution Engine Installation Utility

Pre-install Microsoft's Kernel-Mode Driver Framework (KMDF) version 1.11 for Windows 7/8.1/10 before you install the Intel® Trusted Execution Engine (TXE) driver in order to avoid errors in Device Manager.

Follow the steps below to install:

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

4.5 Installing VGA Driver Utility

The VGA interface embedded with our BC-K200 can support a wide range of display.

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

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

4.6 Installing LAN Driver Utility

BC-K200 is enhanced with LAN function that can support various network adapters. Installation programs for LAN drivers are listed as follows:

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

4.7 Sound Driver Utility

The Realtek sound function enhanced in this system is fully compatible with Windows 7/8.1. Below, you will find the content of the Sound driver:

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

5 BIOS SETUP

This chapter guides users how to configure the basic system configurations via the BIOS Setup Utilities. The information of the system configuration is saved in battery-backed CMOS RAM and BIOS NVRAM so that the Setup information is retained when the system is powered off. The BIOS Setup Utilities consist of the following menu items:

- Main Menu
- Advanced Menu
- Chipset Menu
- Security Menu
- Boot Menu
- Save & Exit Menu

5.1 Introduction

The BC-K200 System uses an AMI (American Megatrends Incorporated) Aptio BIOS that is stored in the Serial Peripheral Interface Flash Memory (SPI Flash) and can be updated. The SPI Flash contains the built-in BIOS setup program, Power-On Self-Test (POST), 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 the 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 elements have combined to provide a standard environment for booting the operating system and running pre-boot applications.

The diagram below shows the Extensible Firmware Interface's location in the software stack.

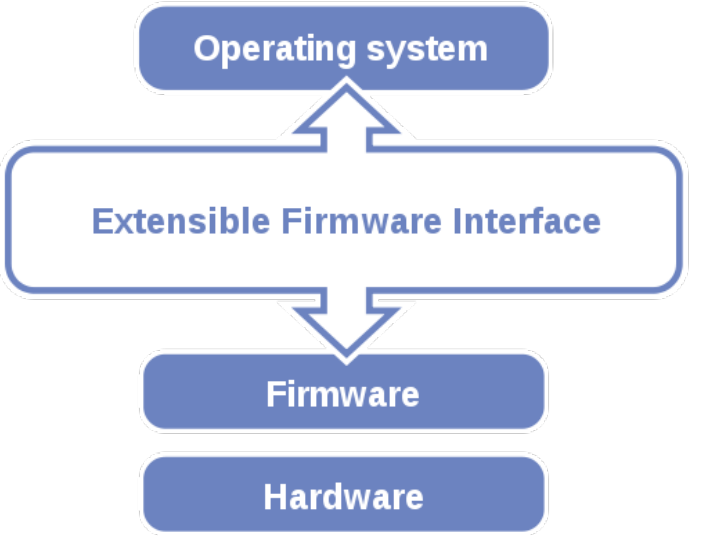


Figure 5-1. Extensible Firmware Interface Diagram

EFI BIOS provides an user interface that allows you to modify hardware configuration, e.g. change the system date and time, enable/disable a system component, determine bootable device priority, set up personal password, etc., which is convenient for engineers to perform modifications and customize the computer

system and allows technicians to troubleshoot the occurred errors when the hardware is faulty.

The BIOS setup menu allows users to view and modify the BIOS settings for the computer. After the system is powered on, users can access the BIOS setup menu by pressing <Del> or <Esc> immediately while the POST message is running before the operating system is loading.

Users will need to set up the system configuration from the BIOS Setup Utility when any of the following conditions occurs:

1. You are starting your system for the first time.
2. You have changed the hardware in your system or the hardware becomes faulty.
3. The system configuration is reset after the user configures to clear CMOS data via the JP3 jumper.
4. The power of the CMOS RAM became lost and the system configuration has been erased.

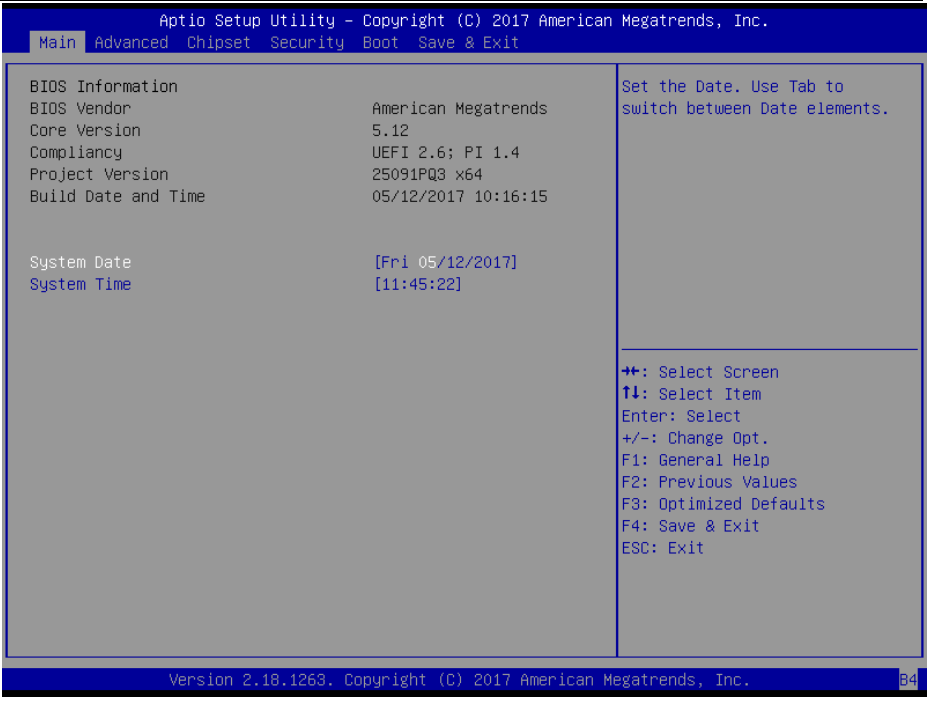
All the menu settings are described in details in this chapter.

5.2 Accessing Setup Utility

After the system is powered on, BIOS will enter the Power-On Self-Test (POST) routines and the POST message will be displayed:

Figure 5-2. POST Screen with AMI Logo

Press **<Del>** or **<Esc>** to access the Setup Utility program and the **Main** menu of the Aptio Setup Utility will appear on the screen as below:



BIOS Setup Menu Initialization Screen

You may move the cursor by <↑> and <↓> keys to highlight the individual menu items. As you highlight each item, a brief description of the highlighted selection will appear on the right side of the screen.

The language of the BIOS setup menu interface and help messages are shown in US English. You may use <↑> or <↓> key to select among the items and press <Enter> to confirm and enter the sub-menu. The following table provides the list of the navigation keys that you can use while operating the BIOS setup menu.

BIOS Setup Navigation Key	Description
<←> and <→>	Select a different menu screen (move the cursor from the selected menu to the left or right).
<↑> and <↓>	Select a different item (move the cursor from the selected item upwards or downwards)
<Enter>	Execute the command or select the sub-menu.
<F2>	Load the previous configuration values.
<F3>	Load the default configuration values.
<F4>	Save the current values and exit the BIOS setup menu.
<Esc>	Close the sub-menu. Trigger the confirmation to exit BIOS setup menu.

BIOS Messages

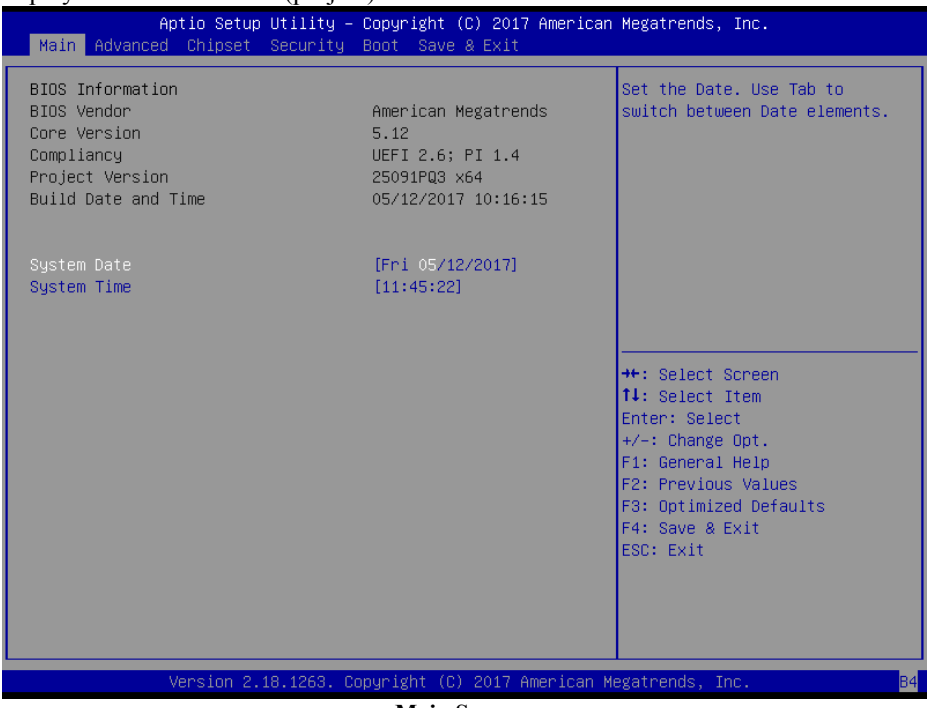
This section describes the alert messages generated by the board's BIOS. These messages would be shown on the monitor when certain recoverable errors/events occur during the POST stage. The table bellow gives an explanation of the BIOS alert messages:

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

5.3 Main

Menu Path *Main*

The **Main** menu allows you to view the BIOS Information and change the system date and time. Use tab to switch between date elements. Use <↑> or <↓> arrow keys to highlight the item and enter the value you want in each item. This screen also displays the BIOS version (project) and BIOS Build Date and Time.



Main Screen

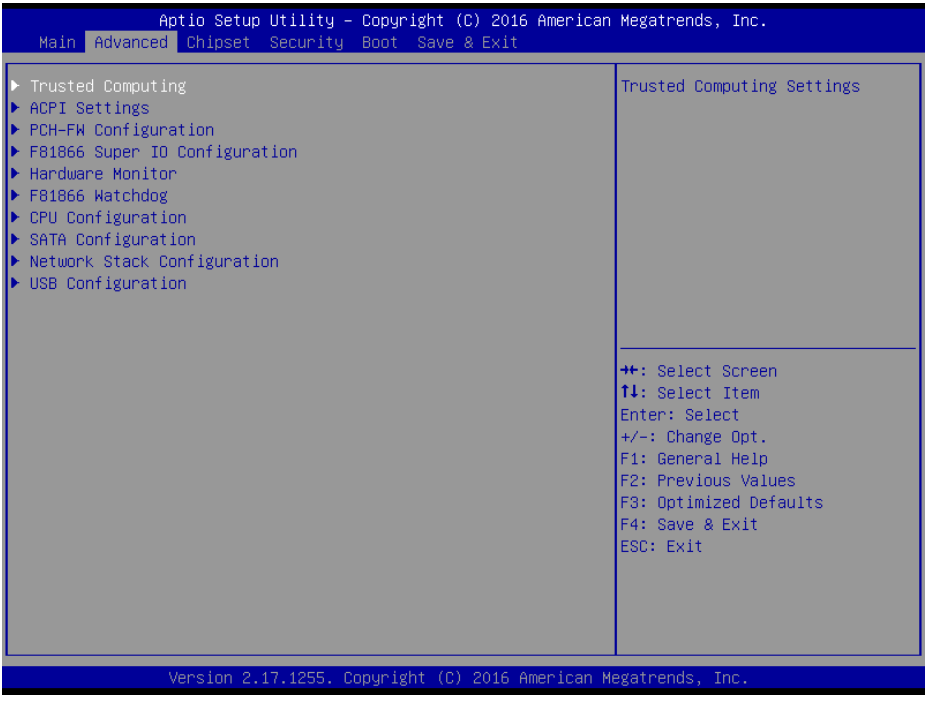
BIOS Setting	Options	Description/Purpose
BIOS Vendor	No changeable options	Displays the name of the BIOS vendor.
Core Version	No changeable options	Displays the current BIOS core version.
Compliancy	No changeable options	Displays the current UEFI version.
Project Version	No changeable options	Displays the version of the BIOS currently installed on the platform.
Build Date and Time	No changeable options	Displays the date that the current BIOS version is built.
System Date	Month, day, year	Sets the system date. The format is [Day Month/ Date/ Year]. Users can directly enter values or use <+> or <-> arrow keys to increase/decrease it. The “Day” is automatically changed.
System Time	Hour, minute, second	Sets the system time. The format is [Hour:

BIOS Setting	Options	Description/Purpose
		Minute: Second]. Users can directly enter values or use <+> or <-> arrow keys to increase/decrease it.

5.4 Advanced

Menu Path *Advanced*

This menu provides advanced configurations such as Trusted Computing, ACPI Settings, PCH-FW Configuration, F81866 Super IO Configuration, Hardware Monitor, F81866 Watchdog, CPU Configuration, SATA Configuration, Network Stack Configuration and USB Configuration.



Advanced Menu Screen

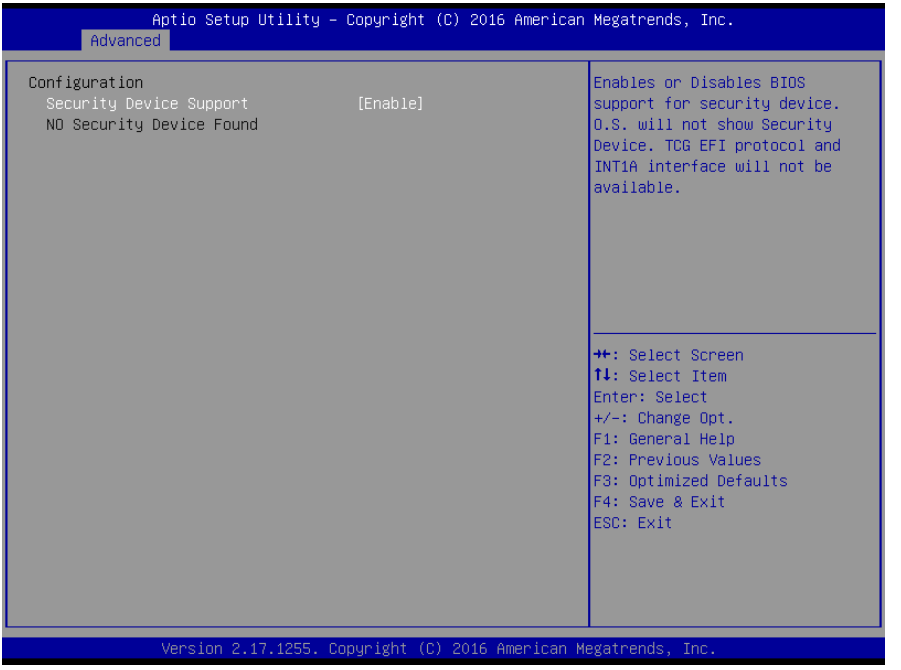
BIOS Setting	Options	Description/Purpose
Trusted Computing	Sub-Menu	Trusted Computing Settings.
ACPI Settings	Sub-Menu	System ACPI Parameters.
PCH-FW Configuration	Sub-Menu	Management Engine Technology Parameters.
F81866 Super IO Configuration	Sub-Menu	System Super IO Chip Parameters.

BIOS Setting	Options	Description/Purpose
Hardware Monitor	Sub-Menu	Monitor hardware status.
F81866 Watchdog	Sub-Menu	F81866 Watchdog Parameters.
CPU Configuration	Sub-Menu	CPU Configuration Parameters.
SATA Configuration	Sub-Menu	SATA Device Options Settings.
Network Stack Configuration	Sub-Menu	Network Stack Settings.
USB Configuration	Sub-Menu	USB Configuration Parameters.

Advanced – Trusted Computing

Menu Path *Advanced > Trusted Computing*

The ***Trusted Computing*** allows users to enable/disable BIOS support for security device. The operating system will not show Security Device. The TCG EFI protocol and INT1A interface will not be available.



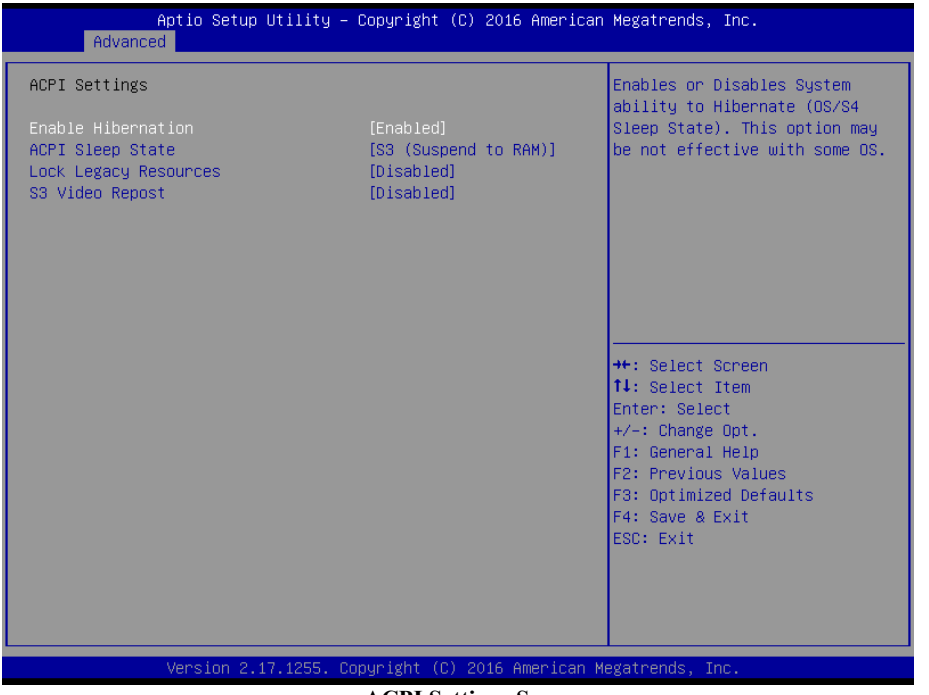
Trusted Computing Screen

BIOS Setting	Options	Description/Purpose
Security Device Support	- Disabled - Enabled	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.
Security Device Status	No changeable options	Security Device Information.

Advanced – ACPI Settings

Menu Path *Advanced > ACPI Settings*

The ***ACPI Settings*** allows users to configure relevant ACPI (Advanced Configuration and Power Management Interface) settings, such as enable/disable Hibernation, ACPI Sleep State, lock legacy resources, etc.



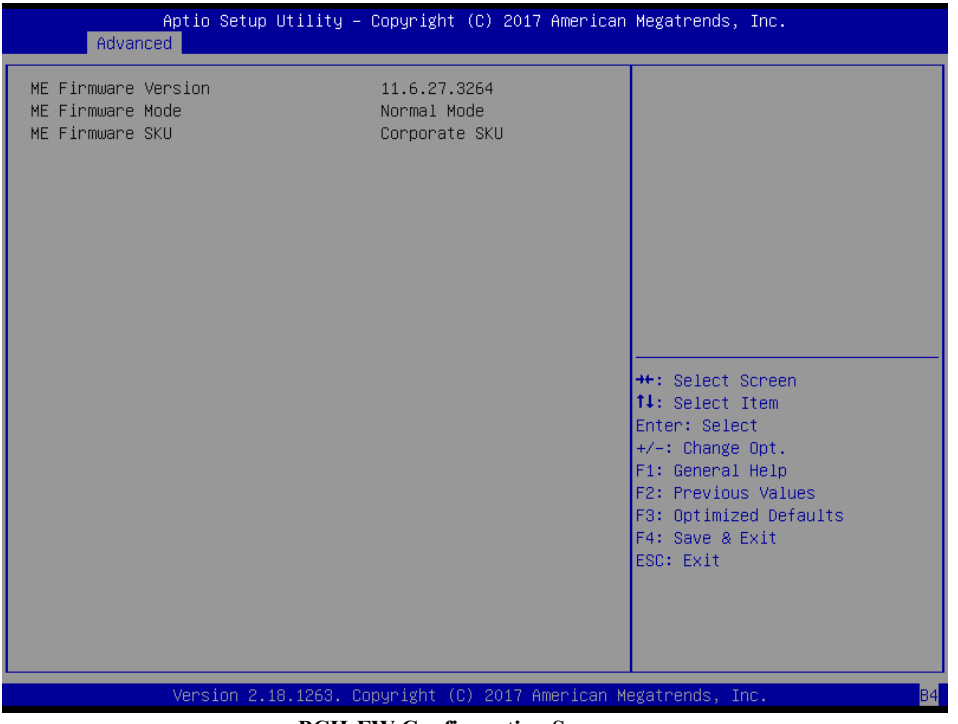
ACPI Settings Screen

BIOS Setting	Options	Description/Purpose
Enable Hibernation (S4)	- Disabled - Enabled (default)	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)	Selects the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.
Lock Legacy Resources	- Disabled - Enabled	Enables or Disables Lock of Legacy Resources.
S3 Video Repost	- Disabled - Enabled	Enables or Disables S3 Video Repost.

Advanced – PCH-FW Configuration

Menu Path *Advanced > PCH-FW Configuration*

The **PCH-FW** allows users to view the information about ME (Management Engine) firmware information, such ME firmware version, firmware mode, firmware type and firmware SKU.

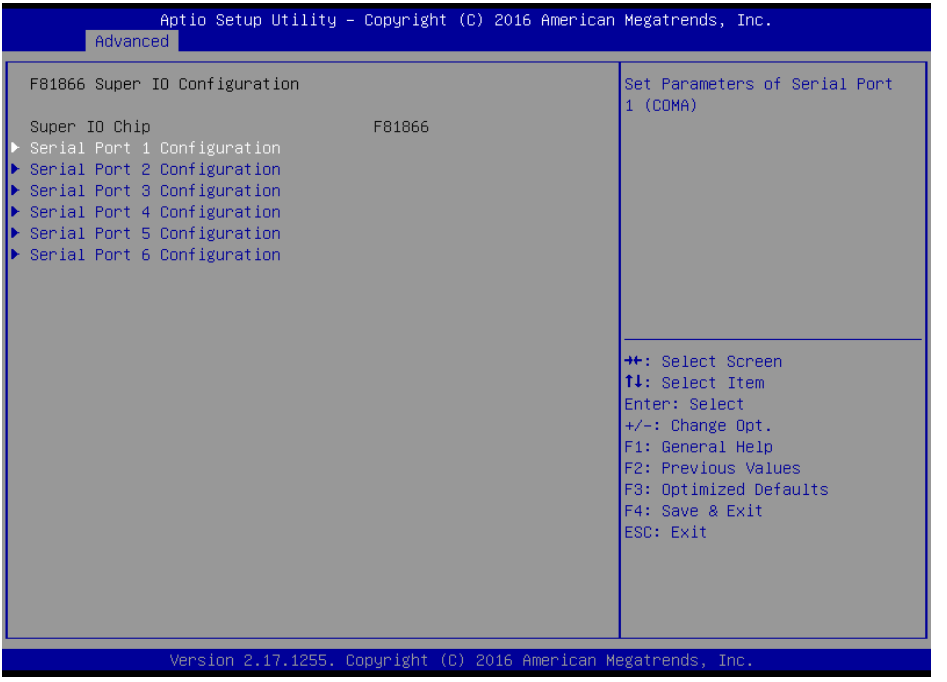


PCH-FW Configuration Screen

BIOS Setting	Options	Description/Purpose
ME Firmware Version	No changeable options	Displays the ME Firmware Version.
ME Firmware Mode	No changeable options	Displays the ME Firmware Mode.
ME Firmware SKU	No changeable options	Displays the ME Firmware SKU.

Advanced – F81866 Super IO Configuration

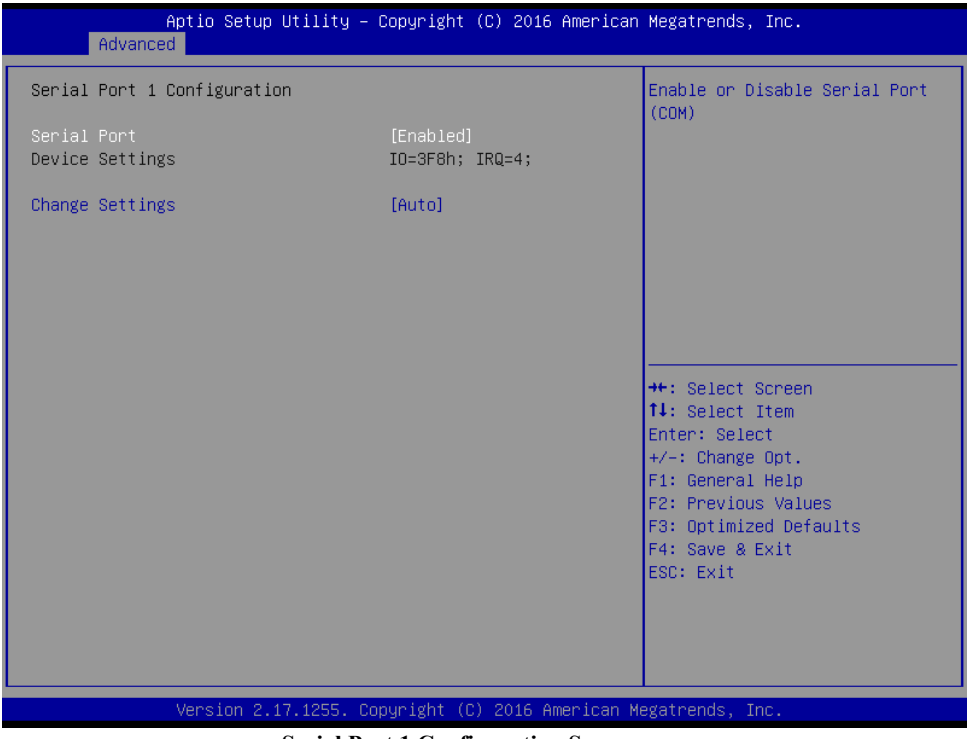
Menu Path *Advanced > F81866 Super IO Configuration*



F81866 Super IO Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial Port 1 Configuration	Sub-Menu	Sets parameters of Serial Port 1 (COMA).
Serial Port 2 Configuration	Sub-Menu	Sets parameters of Serial Port 2 (COMB).
Serial Port 3 Configuration	Sub-Menu	Sets parameters of Serial Port 3 (COMC).
Serial Port 4 Configuration	Sub-Menu	Sets parameters of Serial Port 4 (COMD).
Serial Port 5 Configuration	Sub-Menu	Sets parameters of Serial Port 5 (COME).
Serial Port 6 Configuration	Sub-Menu	Sets parameters of Serial Port 6 (COMF).

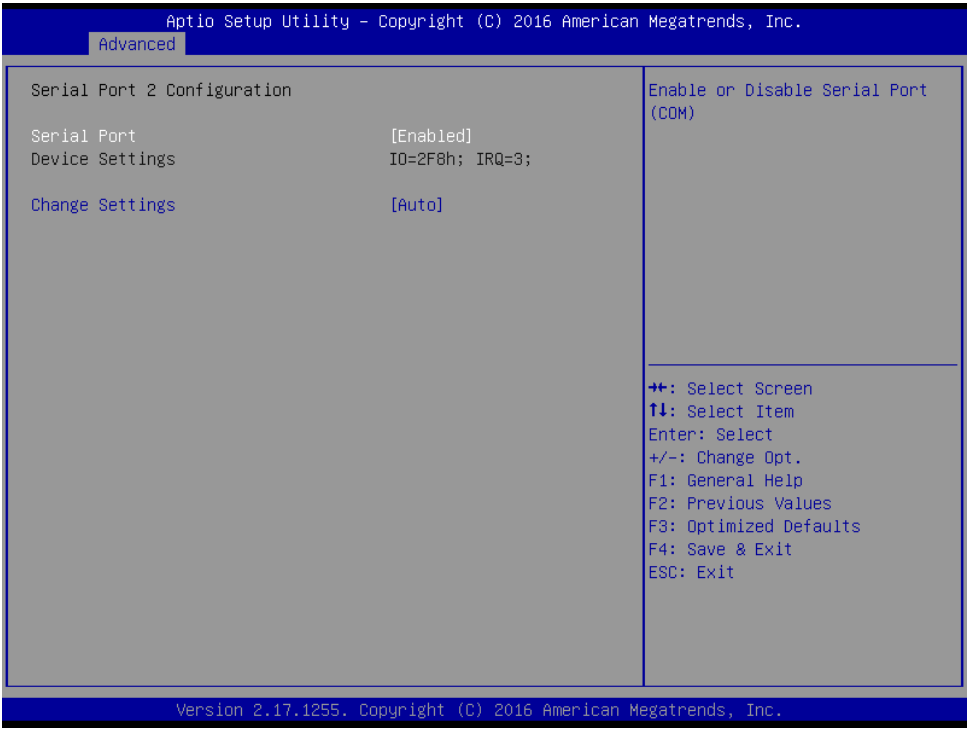
Menu Path *Advanced > F81866 Super IO Configuration > Serial Port 1 Configuration*



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 the current settings of Serial Port 1.
Change Settings	- Auto - 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;	Selects IRQ and I/O resource settings for Serial Port 1.

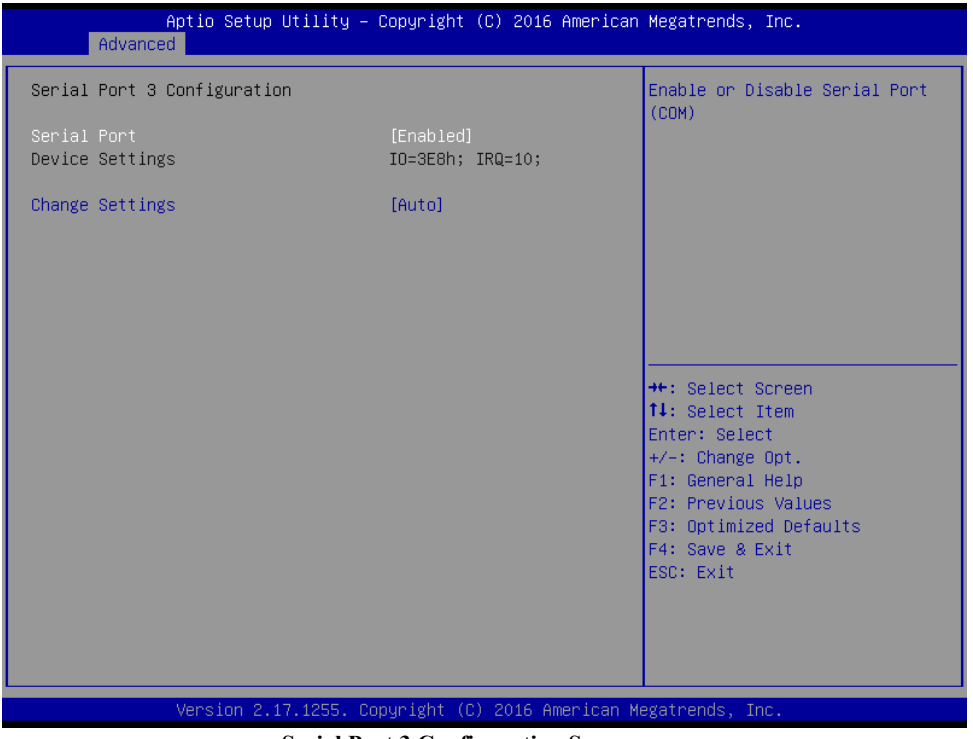
Menu Path *Advanced > F81866 Super IO Configuration > Serial Port 2 Configuration*



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 the current settings of Serial Port 2.
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 settings for Serial Port 2.

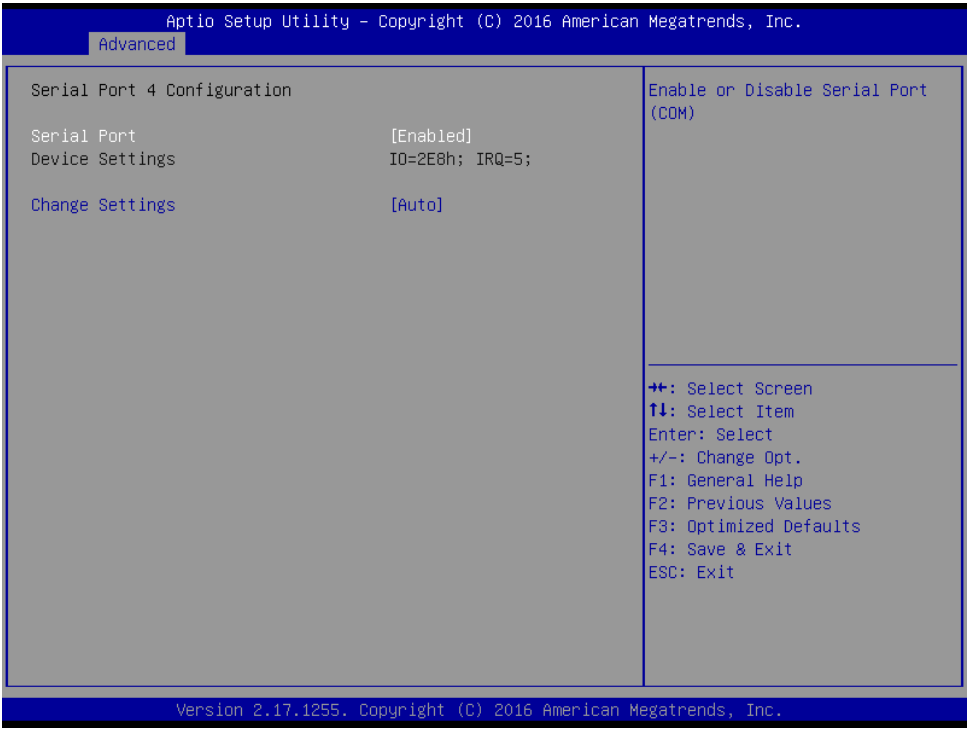
Menu Path *Advanced > F81866 Super IO Configuration > Serial Port 3 Configuration*



Serial Port 3 Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled	Enables or Disables Serial Port 3.
Device Settings	No changeable options	Displays the current settings of Serial Port 3.
Change Settings	- Auto - IO=3E8h; IRQ=10; - 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;	Selects IRQ and I/O resource settings for Serial Port 3.

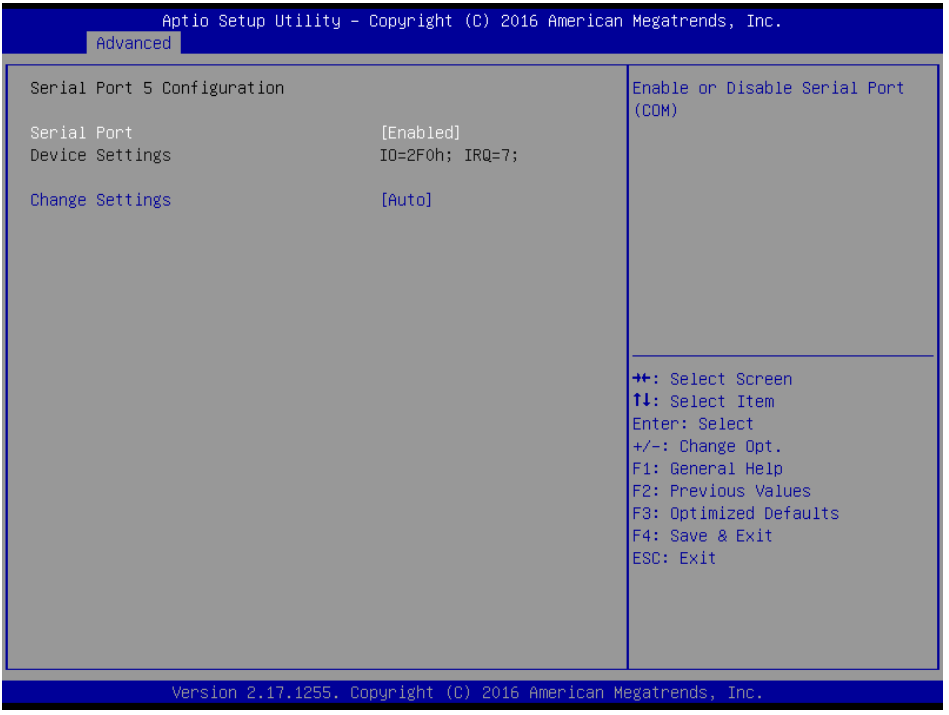
Menu Path *Advanced > F81866 Super IO Configuration > Serial Port 4 Configuration*



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 the current settings of Serial Port 4.
Change Settings	- Auto - 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;	Selects IRQ and I/O resource settings for Serial Port 4.

Menu Path *Advanced > F81866 Super IO Configuration > 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 the current settings of Serial Port 5.
Change Settings	- Auto - IO=2F0h; IRQ=7; - 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;	Selects IRQ and I/O resource settings for Serial Port 5.

Menu Path *Advanced > F81866 Super IO Configuration > Serial Port 6 Configuration*

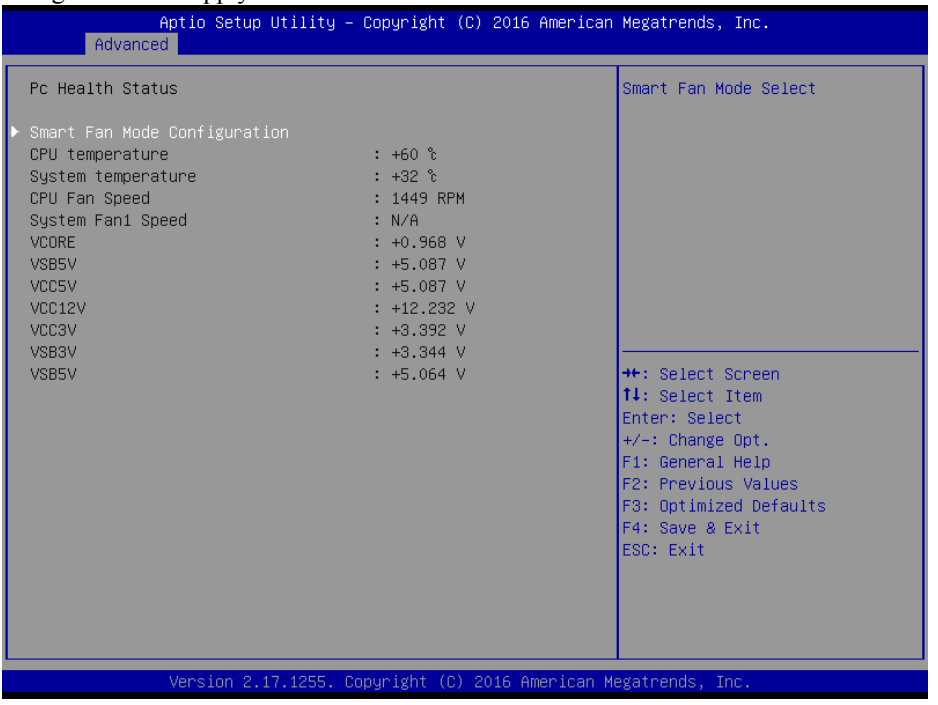
Serial Port 6 Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled	Enables or Disables Serial Port 6.
Device Settings	No changeable options	Displays the current settings of Serial Port 6.
Change Settings	- Auto - IO=2E0h; IRQ=6; - 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;	Selects IRQ and I/O resource settings for Serial Port 6.

Advanced – Hardware Monitor

Menu Path *Advanced > Hardware Monitor*

The ***Hardware Monitor*** allows users to monitor the health and status of the system such as CPU temperature, system temperature, CPU fan speed, system fan speed and voltage levels in supply.



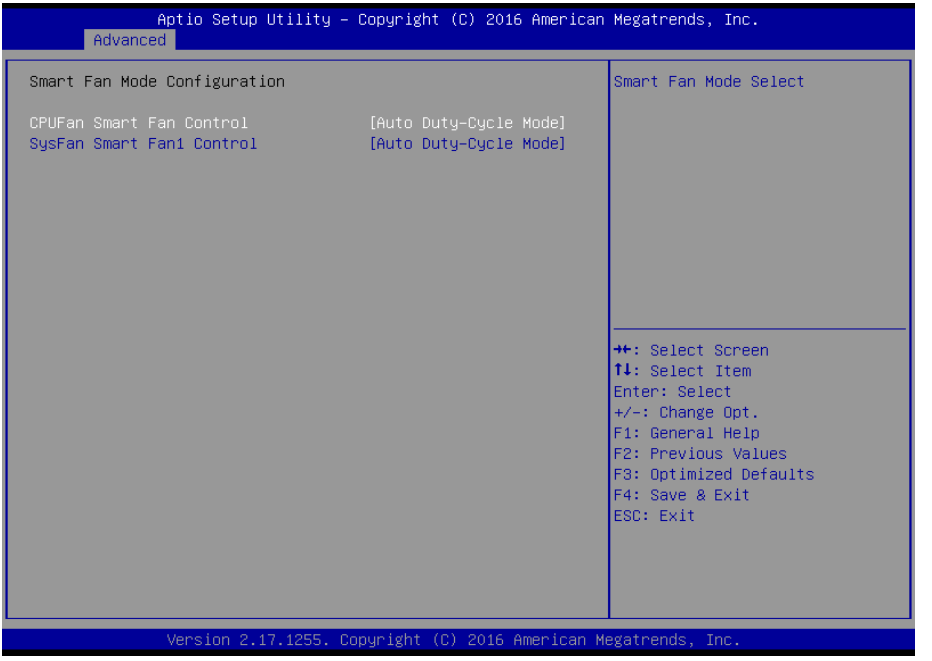
Hardware Monitor Screen

BIOS Setting	Options	Description/Purpose
Smart Fan Mode Configuration	Sub-Menu	Smart Fan Mode Selection.
CPU Temperature	No changeable options	Displays the processor's temperature.
System Temperature	No changeable options	Displays the system's temperature.
CPU Fan Speed	No changeable options	Displays CPU Fan speed.
System Fan1 Speed	No changeable options	Displays System Fan 1 speed
VCORE	No changeable options	Displays the VCORE CPU voltage in supply.
VSB5V	No changeable options	Displays the voltage level of VSB5V in supply.
VCC5V	No changeable options	Displays the voltage level of VCC5V in supply.

BIOS Setting	Options	Description/Purpose
VCC12V	No changeable options	Displays the voltage level of VCC12V in supply.
VCC3V	No changeable options	Displays the voltage level of VCC3V in supply.
VSB3V	No changeable options	Displays the voltage level of VSB3V in supply.
VSB5V	No changeable options	Displays the voltage level of VSB5V in supply.

Advanced – Smart Fan Mode Configuration

Menu Path *Advanced > Hardware Monitor > Smart Fan Mode Configuration*



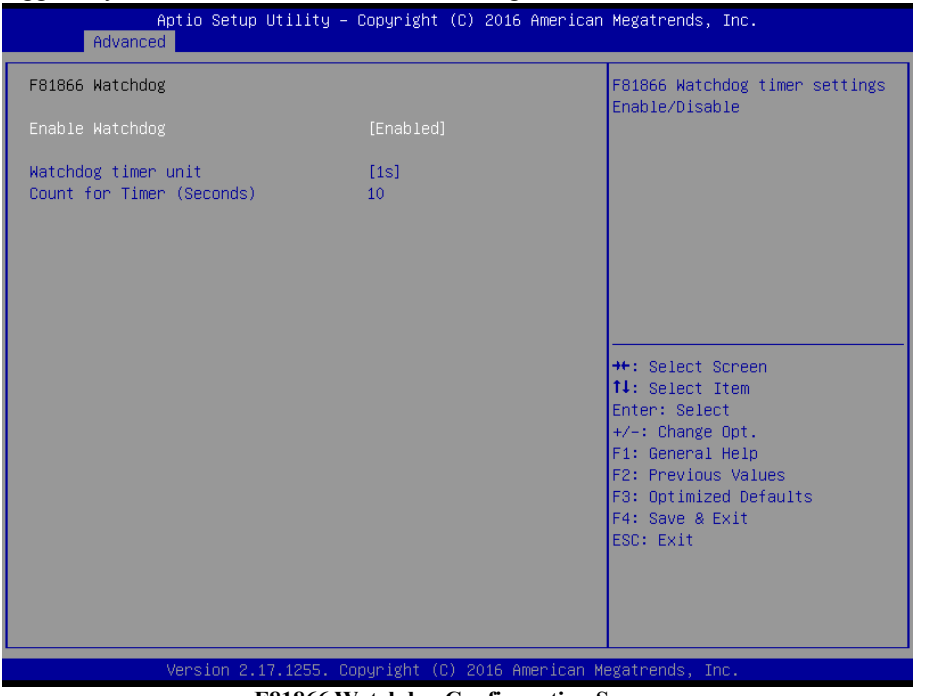
Smart Fan Mode Configuration Screen

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) from 1 to 100.
System Fan Smart Fan1 Control	- Manual Duty Mode - Auto Duty-Cycle Mode	Smart Fan Mode selection for system fan 1.
Manual Duty Mode	- Numeric (from 1 to 100)	Manual mode fan control. Users can write the expected duty cycle (PWM fan type) from 1 to 100.

Advanced – F81866 Watchdog Configuration

Menu Path *Advanced > F81866 Watchdog Configuration*

If the system hangs or fails to respond, enable the F81866 watchdog function to trigger a system reset via the 255-level watchdog timer.



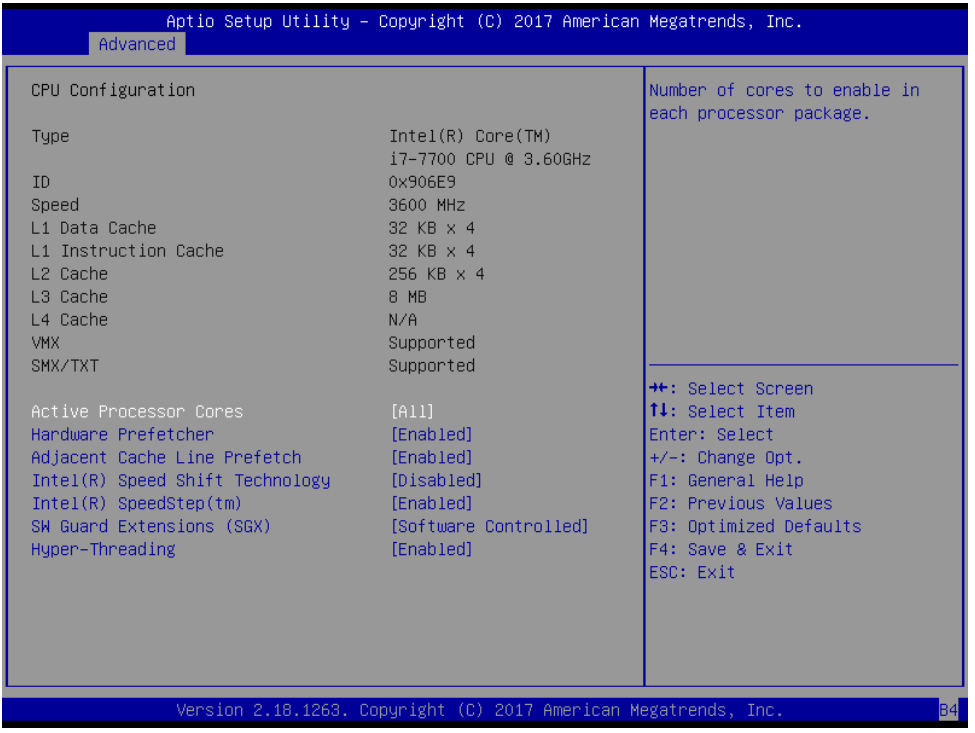
F81866 Watchdog Configuration Screen

BIOS Setting	Options	Description/Purpose
Enable Watchdog	- Enabled - Disabled	Enables/Disables F81866 Watchdog timer settings.
Watchdog timer unit	- 1s - 60s	Selects 1s (second) or 60s (minute) as the time unit of Watchdog timer.
Count for Timer (Seconds)	Numeric (from 1 to 255)	Sets the timeout for Watchdog timer. (Max. value: 255 seconds or minutes)

Advanced – CPU Configuration

Menu Path *Advanced > CPU Configuration*

The **CPU Configuration** provides advanced CPU settings and some information about CPU



CPU Configuration Screen

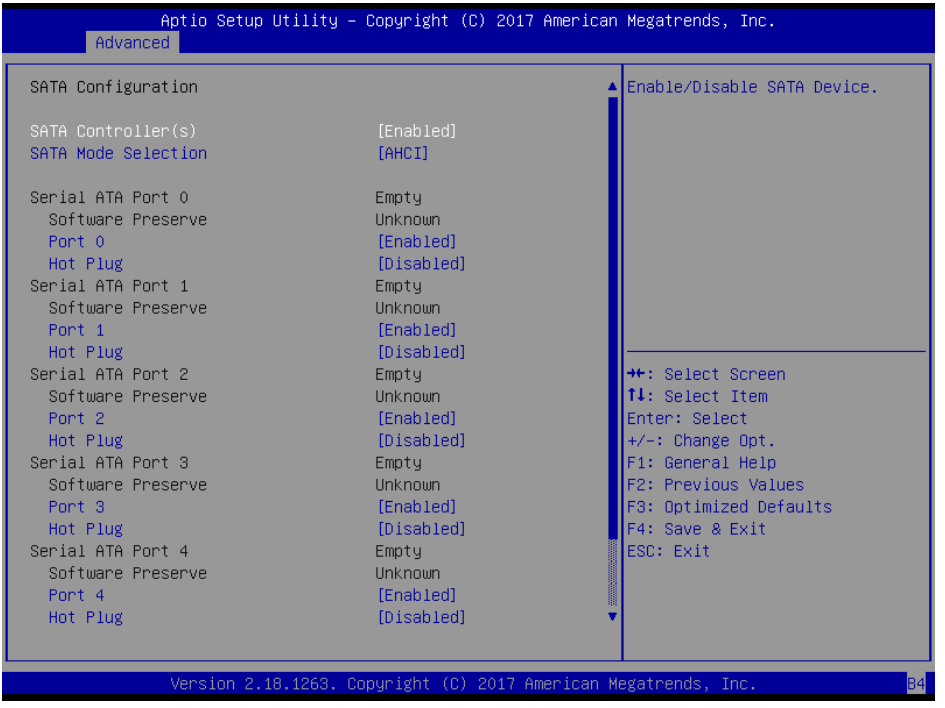
BIOS Setting	Options	Description/Purpose
Type	No changeable options	CPU type information.
ID	No changeable options	CPU ID number
Speed	No changeable options	Displays the CPU Speed.
L1 Data Cache	No changeable options	L1 Data Cache Size
L1 Instruction Cache	No changeable options	L1 Instruction Cache Size
L2 Cache	No changeable options	L2 Cache Size
L3 Cache	No changeable options	L3 Cache Size
L4 Cache	No changeable options	L4 Cache Size
VMX	No changeable options	CPU VMX hardware support for virtual machines.
SMX/TXT	No changeable options	Secure Mode extensions or TXT (LT) support. TXT stands for Trusted Execution Technology.

BIOS Setting	Options	Description/Purpose
Active Processor Cores	- All - 1 to n (depend on CPU)	Number of cores to enable in each processor package.
Hardware Prefetcher	- Disabled - Enabled	To turn on/off the MLC streamer prefetcher.
Adjacent Cache Line Prefetch	- Disabled - Enabled	To turn on/off prefetching of adjacent cache lines.
Intel(R) Speed Shift Technology	- Disabled - Enabled	Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.
Intel(R) SpeedStep(tm)	- Disabled - Enabled	Allows more than two frequency ranges to be supported.
SW Guard Extensions (SGX)	- Disabled - Enabled	Enables/Disables Software Guard Extensions (SGX)
Hyper-Threading	- Disabled - Enabled	Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology).

Advanced – SATA Configuration (AHCI Mode)

Menu Path *Advanced > SATA Configuration*

The **SATA Configuration** allows users to enable / disable the SATA controller as well as the operational mode after the SATA controller is enabled. The following screen indicates the functions available when the SATA controller is enabled and the AHCI mode is selected.



SATA Configuration Screen

BIOS Setting	Options	Description/Purpose
SATA Controller(s)	- Disabled - Enabled	Enables or Disables SATA Device.
SATA Mode Selection	- AHCI - RAID	Determines how SATA controller(s) operate.
Serial ATA Port 0 – 3 for H110 sku. Serial ATA Port 0 – 5 for Q170 sku. Serial ATA Port 0 – 7 for C236 sku.	No changeable options	Displays the SATA device's name.
Software Preserve	No changeable options	Indicates whether the connected SATA device supports Software Setting Preservation (SSP).
Port 0-3 for H110 sku. Port 0-5 for Q170 sku. Port 0-7 for C236 sku.	- Disabled - Enabled	Enables or Disables SATA Port Device.

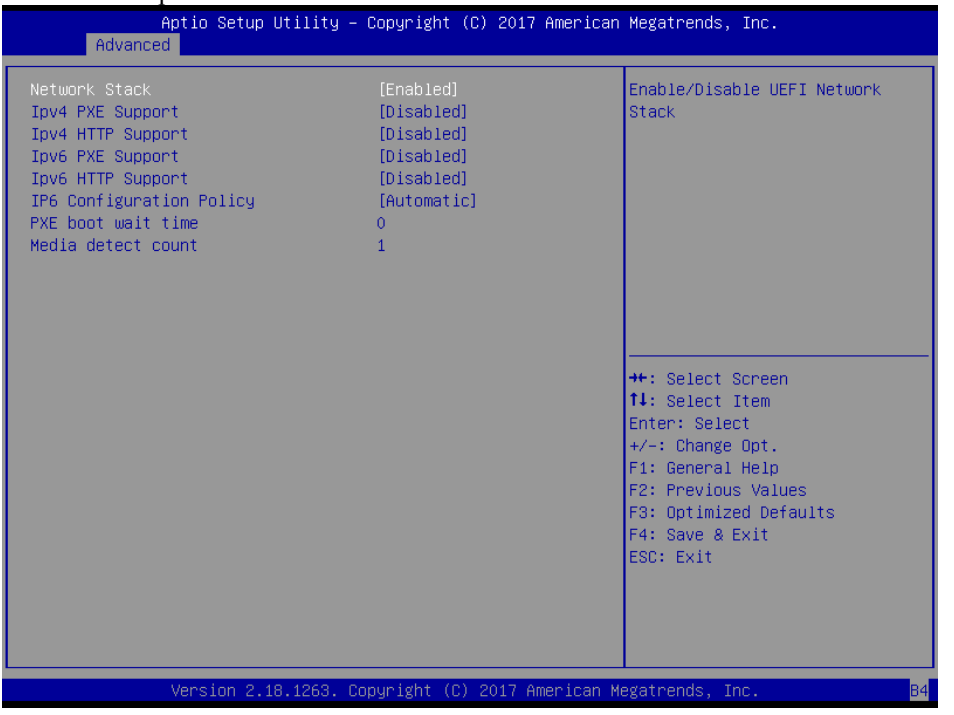
BIOS Setting	Options	Description/Purpose
Hot Plug	- Disabled - Enabled	Enables or Disables Hot Plug function to designate a SATA port device as hot-pluggable.

Advanced – Network Stack Configuration

Menu Path *Advanced > Network Stack Configuration*

The **Network Stack Configuration** allows users to enable/disable UEFI Network Stack, IPv4/IPv6 PXE (Pre-Boot Execution) support and configure PXE boot wait time and detects the media presence.

PXE allows a workstation to boot from a server on a network prior to booting the operating system on the local hard drive. A PXE-enabled workstation connects its NIC to the LAN via a jumper, which keeps the workstation connected to the network even when the power is turned off.



Network Stack Configuration Screen

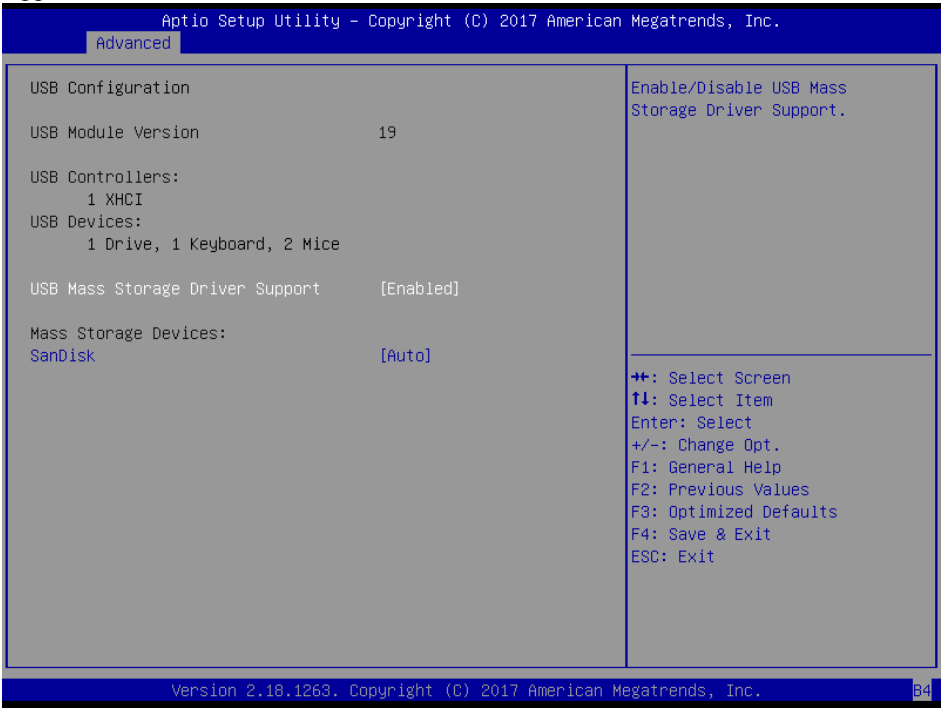
BIOS Setting	Options	Description/Purpose
Network Stack	- Disabled - Enabled	Enables or Disables UEFI Network Stack.
Ipv4 PXE Support	- Disabled - Enabled	Enables IPv4 PXE Boot Support. If disabled, IPv4 PXE boot option will not be created.
Ipv4 HTTP Support	- Disabled - Enabled	Enables/Disables IPv4 HTTP boot support. If disabled, IPv4 HTTP boot support will not be available.

BIOS Setting	Options	Description/Purpose
Ipv6 PXE Support	- Disabled - Enabled	Enables IPv6 PXE Boot Support. If disabled, IPv6 PXE boot option will not be created.
Ipv6 HTTP Support	- Disabled - Enabled	Enables/Disables IPv6 HTTP boot support. If disabled, IPv6 HTTP boot support will not be available.
IP6 Configuration Policy	- Automatic - Manual	Sets IP6 Configuration Policy.
PXE boot wait time	Numeric (from 0 to 5)	Number of seconds to wait for PXE boot to abort after the Esc key is pressed.
Media detect count	Numeric (from 1 to 50)	Number of times that the media presence will be checked.

Advanced – USB Configuration

Menu Path *Advanced > USB Configuration*

The **USB Configuration** allows users to enable/disable USB mass storage driver support.



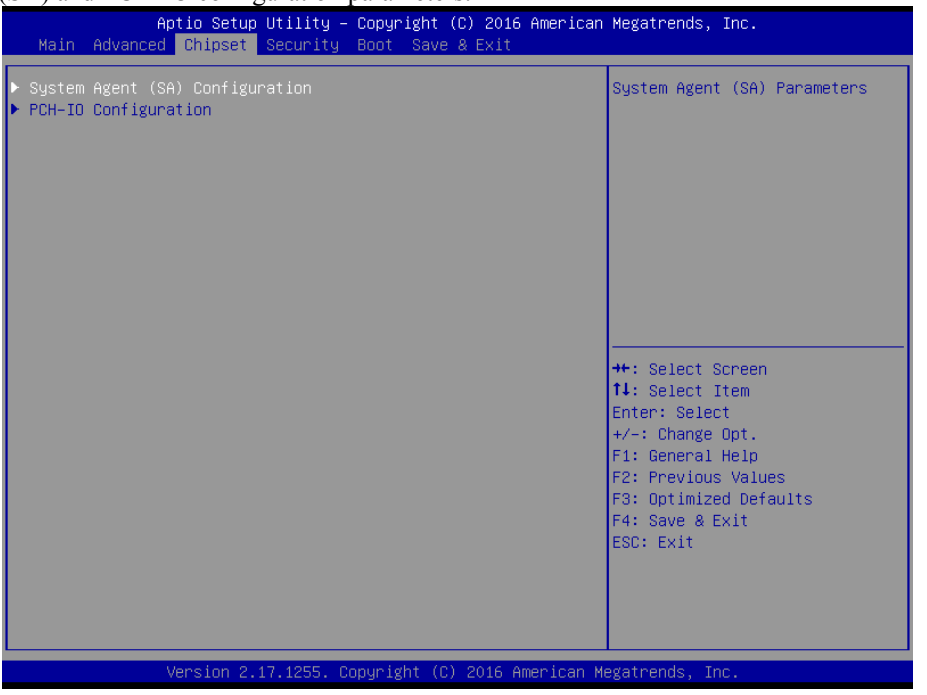
USB Configuration Screen

BIOS Setting	Options	Description/Purpose
USB Mass Storage Driver Support	- Disabled - Enabled	Enables/Disables USB mass storage driver support.

5.5 Chipset

Menu Path *Chipset*

This menu allows users to configure advanced Chipset settings such as System Agent (SA) and PCH-IO configuration parameters.



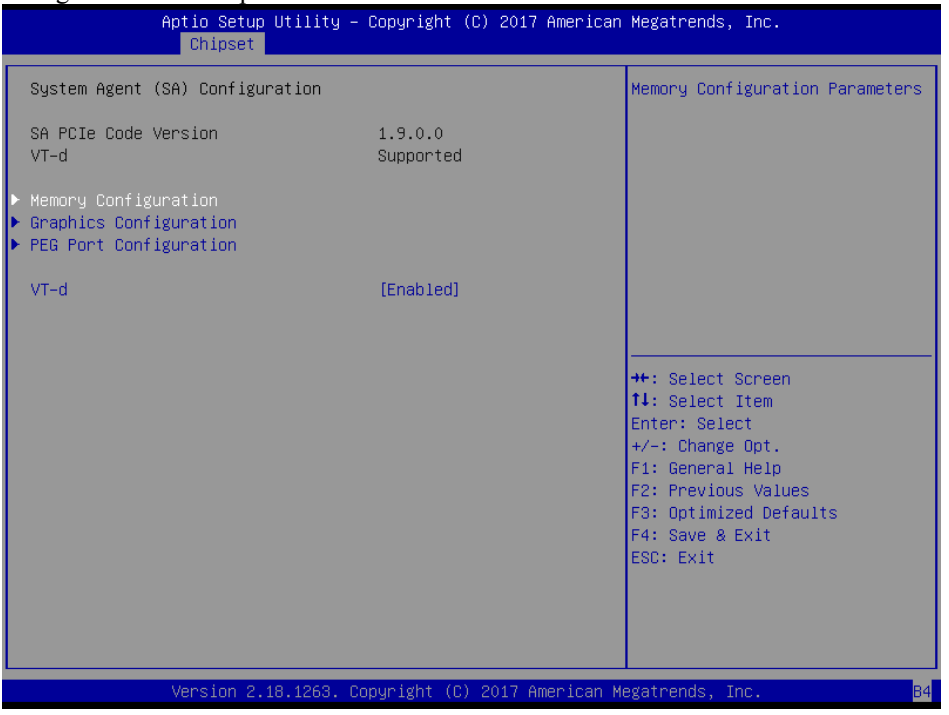
Chipset Screen

BIOS Setting	Options	Description/Purpose
System Agent (SA) Configuration	Sub-Menu	System Agent (SA) parameters.
PCH-IO Configuration	Sub-Menu	PCH parameters.

Chipset – System Agent (SA) Configuration

Menu Path *Chipset > System Agent (SA) Configuration*

The **System Agent Configuration** allows users to configure memory, graphics settings and PEG Port parameters.



System Agent (SA) Configuration Screen

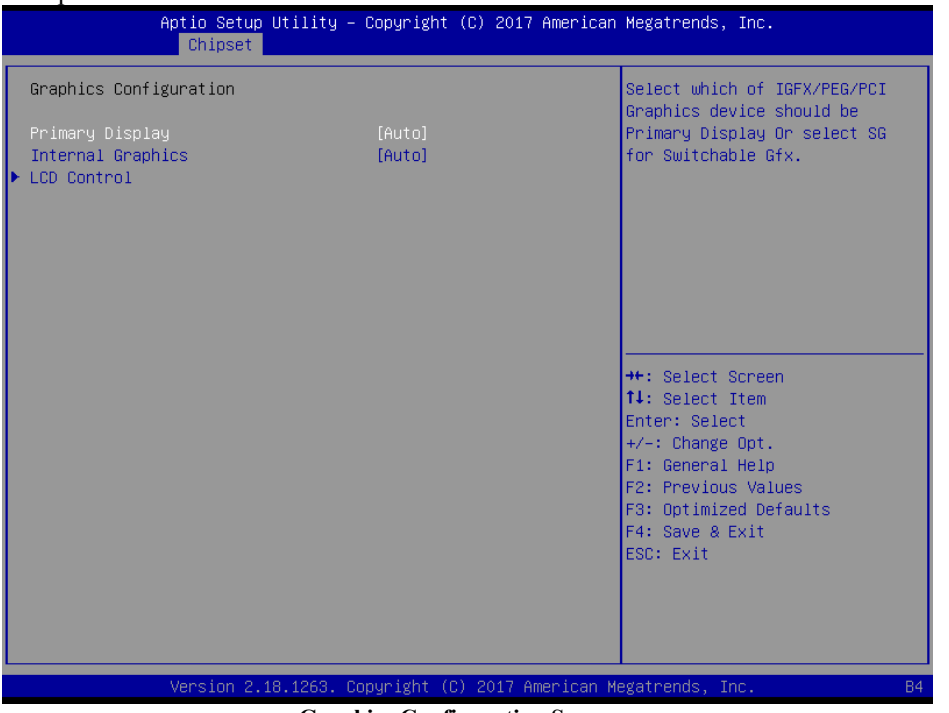
BIOS Setting	Options	Description/Purpose
System Agent Bridge Name	No changeable options	Displays the System Agent Bridge Name.
SA PCIe Code Version	No changeable options	Displays the SA PCIe Code Version.
VT-d	No changeable options	Indicates whether Intel's VT-d (Virtualization Technology for Directed I/O) capability is supported. VT-d extends Intel's Virtualization Technology (VT) roadmap by providing hardware assists for virtualization solution, and helps end users improve security and reliability of the systems and also improves performance of I/O devices in virtualized environment.
Memory Configuration	Sub-Menu	Displays the DRAM information on the platform.

BIOS Setting	Options	Description/Purpose
Graphics Configuration	Sub-Menu	Configures Graphics configurations.
PEG Port Configuration (PCI_E1)	Sub-Menu	PEG Port Configuration.
VT-d	- Disabled - Enabled	Enables or Disables VT-d function.

Chipset – Graphics Configuration

Menu Path	*Chipset > System Agent (SA) Configuration > Graphics Configuration*

The **Graphics Configuration** allows users to configure the display settings for the LCD panel.

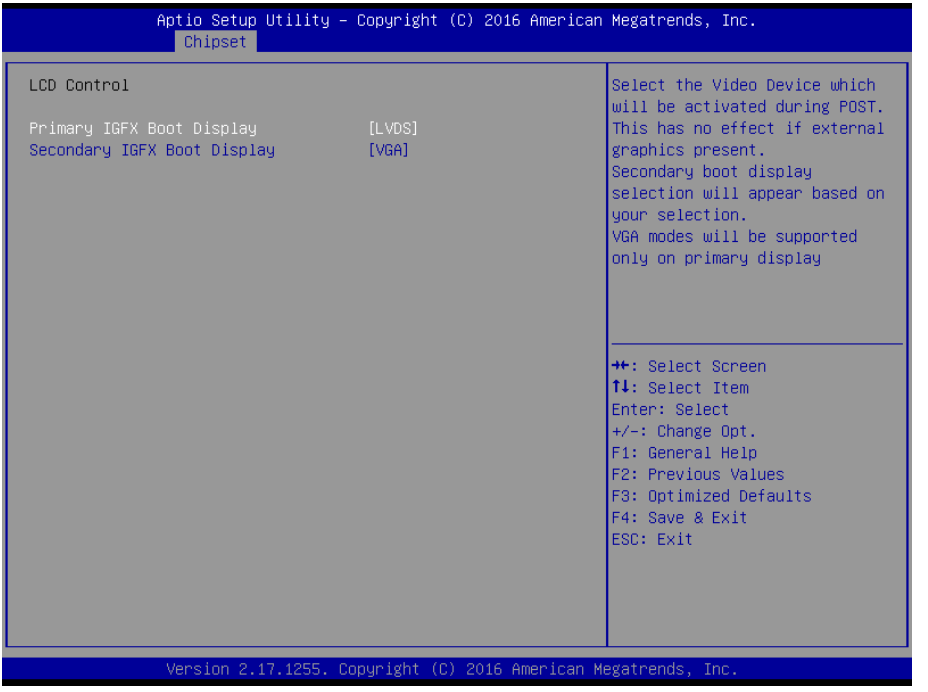


Graphics Configuration Screen

BIOS Setting	Options	Description/Purpose
IGFX VBIOS Version	No changeable options	Displays the IGFX VBIOS version.
Primary Display	- Auto - IGFX - PEG - PCIE	Selects IGFX, PEG or PCI Graphics device as the Primary Display or selects SG for Switchable Gfx.
Internal Graphics	- Auto - Disabled - Enabled	Keeps IGFX enabled based on the setup options.
LCD Control	Sub-Menu	LCD Control sub-menu.

Menu Path — *Chipset > System Agent (SA) Configuration > Graphics Configuration > LCD Control*

The **LCD Control** allows users to select the primary and secondary display device.



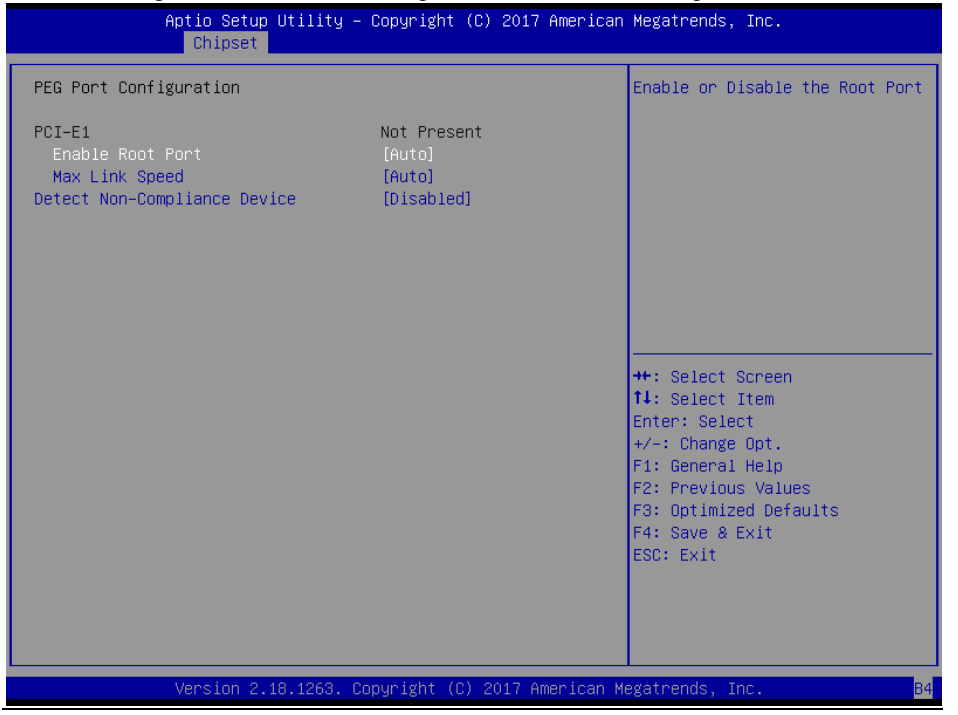
LCD Control Screen

BIOS Setting	Options	Description/Purpose
Primary IGFX Boot Display	- VBIOS Default - DisplayPort - VGA - DVI	Selects Primary Display device.
Secondary IGFX Boot Display	- Disabled - DisplayPort - VGA - DVI	Selects Secondary Display device.

Chipset – SA Configuration > PEG Port Configuration

Menu Path	*Chipset > System Agent (SA) Configuration > PEG Port Configuration (PCI_E1)*

The **PEG Port Configuration** allows users to display the PEG status, enable Root Port and configure the maximum link speed, and detect non-compliance device.



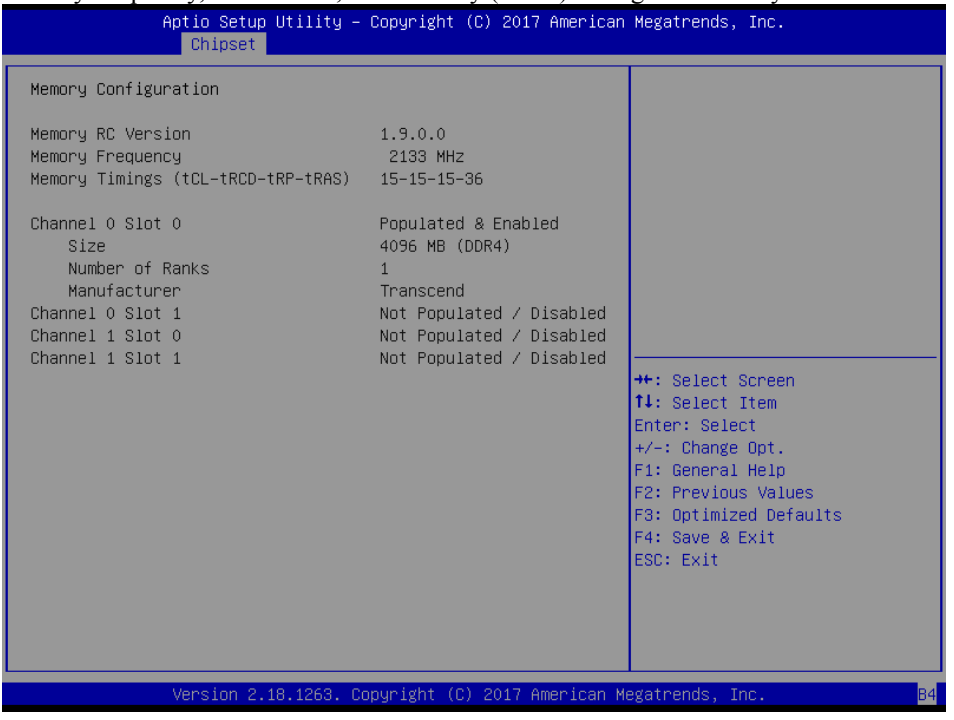
PEG Port Configuration Screen

BIOS Setting	Options	Description/Purpose
PEG 0:1:0	No changeable options	Displays the PEG Status.
Enable Root Port	- Disabled - Enabled - Auto	Enables or Disables to the Root Port.
Max Link Speed	- Auto - Gen 1 - Gen 2 - Gen 3	Configures PEG 0:1:0 maximum speed.
Detect Non-Compliance Device	- Disabled - Enabled	Detects Non-Compliance PCI Express Device in PEG.

Chipset – SA Configuration > Memory Configuration

Menu Path	*Chipset > System Agent (SA) Configuration > Memory Configuration*

The **Memory Configuration** allows users to check for the information about the memory frequency, DIMM size, and memory (RAM) timings and latency.



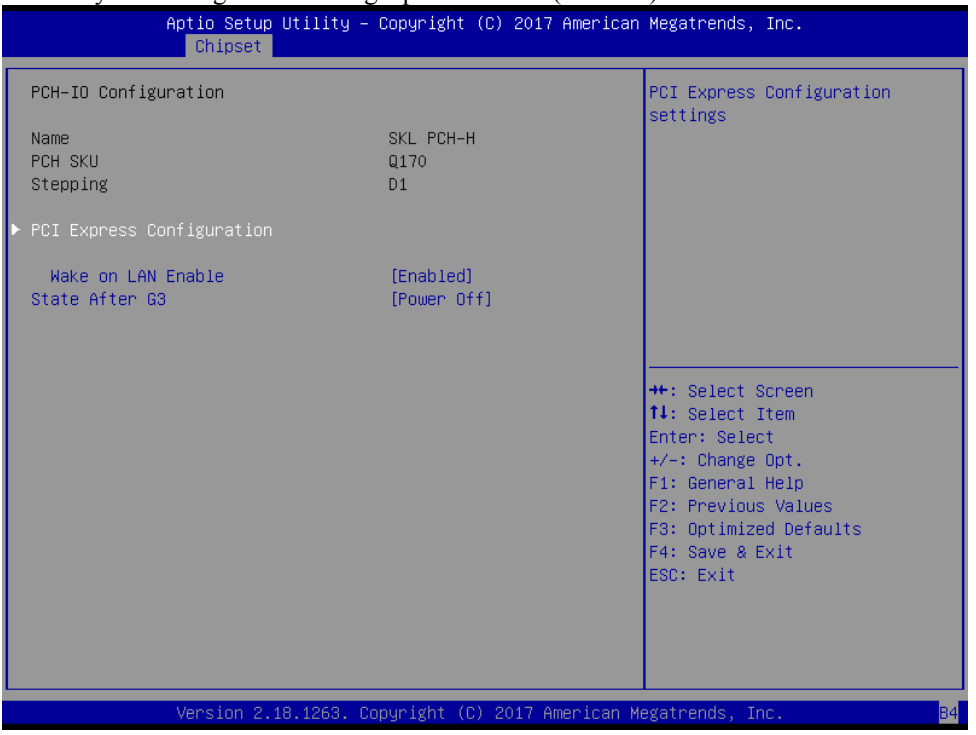
Memory Configuration Screen

BIOS Setting	Options	Description/Purpose
Memory RC Version	No changeable options	Displays the Memory RC Version.
Memory Frequency	No changeable options	Displays the Frequency of Memory.
Memory Timings (tCL-tRCD-tRP-tRAS)	No changeable options	Display the Memory Timings.
Channel 0 Slot 0	No changeable options	Displays the information of Channel 0 Slot 0.
Channel 0 Slot 1	No changeable options	Displays the information of Channel 0 Slot 1.
Channel 1 Slot 0 for Q170 and C236 sku.	No changeable options	Displays the information of Channel 1 Slot 0.
Channel 1 Slot 1 for Q170 and C236 sku.	No changeable options	Displays the information of Channel 1 Slot 1.

Chipset – PCH-IO Configuration

Menu Path *Chipset > PCH-IO Configuration*

The **PCH-IO Configuration** allows users to view the information of PCH name, Intel PCH SKU name and the stepping of Intel PCH Revision ID, configure PCI Express settings, enable/disable Wake-On-LAN function and determine the power on/off state that the system will go to following a power failure (G3 state).



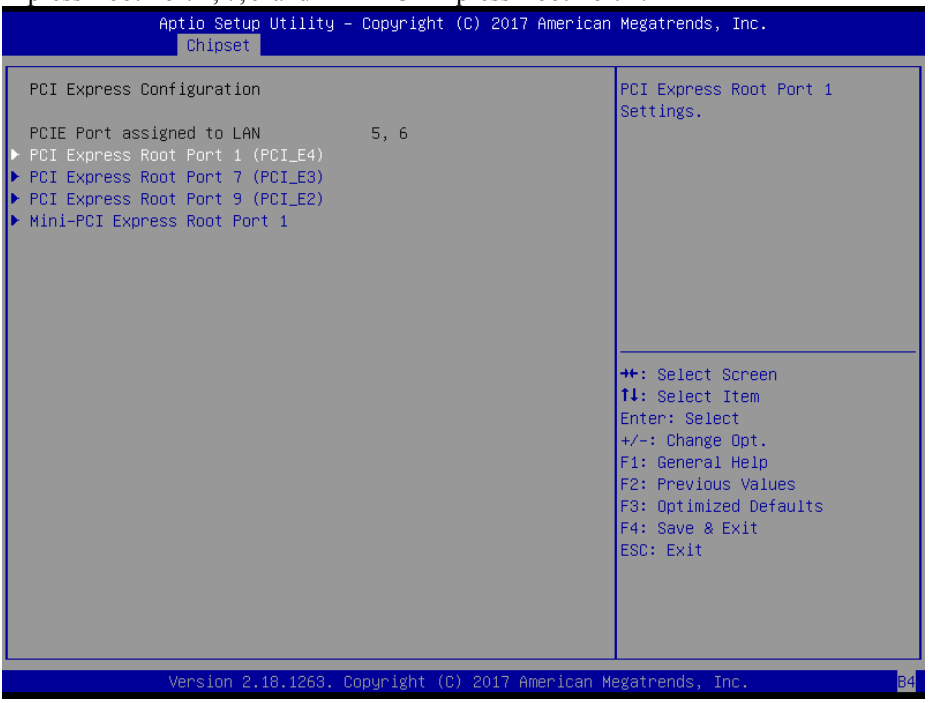
PCH-IO Configuration Screen

BIOS Setting	Options	Description/Purpose
Name	No changeable options	Displays the PCH name.
PCH SKU	No changeable options	Displays the Intel PCH SKU Name.
Stepping	No changeable options	Displays the stepping of Intel PCH Revision ID.
PCI Express Configuration	Sub-Menu	PCI Express Configuration settings.
Wake On LAN Enable	- Disabled - Enabled	Enables or Disables integrated LAN to wake up the system.
State After G3	- Power On - Power Off	Specifies what state to go to when power is re-applied following a power failure (G3 state).

Chipset – PCI Express Configuration

Menu Path	*Chipset > PCH-IO Configuration > PCI Express Configuration*

The **PCI Express Configuration** allows users to configure the settings for PCI Express Root Port 1, 7, 9 and Mini-PCI Express Root Port 1.

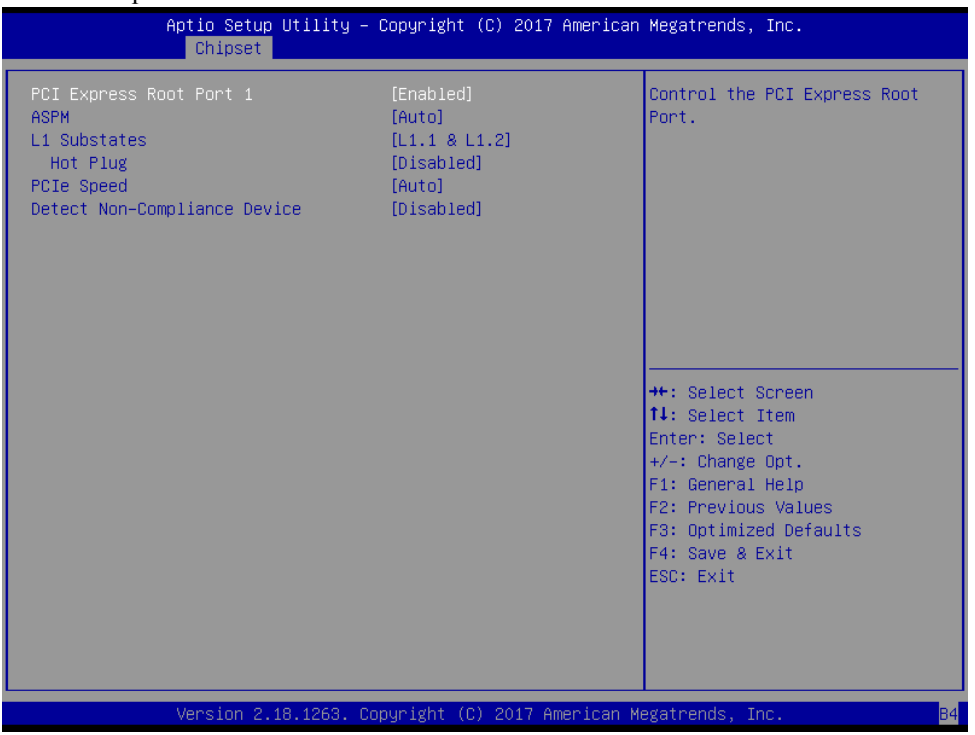


PCI Express Configuration Screen

BIOS Setting	Options	Description/Purpose
PCIE Port assigned to LAN	No changeable options	PCIE Port 5, 6 are assigned to LAN.
PCI Express Root Port 1 (PCI_E4)	Sub-Menu	Configures PCI Express Root Port 1 settings.
PCI Express Root Port 7 (PCI_E3)	Sub-Menu	Configures PCI Express Root Port 7 settings.
PCI Express Root Port 9 (PCI_E2)	Sub-Menu	Configures PCI Express Root Port 9 settings.
Mini-PCI Express Root Port 1	Sub-Menu	Configures Mini-PCI Express Root Port 1 settings.

Menu Path *Chipset > PCH-IO Configuration > PCI Express Configuration PCI Express Root Port 1(PCI_E4)*

The **PCI Express Root Port 1 (PCI_E4)** function allows users to enable/disable PCI Express Root Port 1, select the PCIe port's speed, configure ASPM support and detect the non-compliance device.



PCI Express Root Port 1 Configuration Screen

BIOS Setting	Options	Description/Purpose
PCI Express Root Port 1 (PCI_E4)	- Disabled - Enabled	Controls the PCI Express Root Port 1.
ASPM	- Disabled - L0s - L1 - L0sL1 - Auto	Sets the ASPM (Active-State Power Management) Level. The option allows users to set the lower power mode that activates when the bus is not being used. Force L0s – Force all links to L0s State Auto – BIOS Auto configure Disable – Disables ASPM

BIOS Setting	Options	Description/Purpose
L1 Substates	- Disabled - L1.1 - L1.2 - L1.1 & L1.2	PCI Express L1 Substates settings.
Hot Plug	- Disabled - Enabled	PCI Express Hot Plug Enabled / Disabled.
PCIe Speed	- Auto - Gen1 - Gen2 - Gen3	Configures PCIe Speed.
Detect Non-Compliance Device	- Disabled - Enabled	Detects a Non-Compliance PCI Express device that is connected to the PCI Express port. If enabled, it will take more time during POST.

Menu Path	*Chipset > PCH-IO Configuration > PCI Express Configuration PCI Express Root Port 7 (PCI_E3)*

The **PCI Express Root Port 7 (PCI_E3)** function allows users to enable/disable PCI Express Root Port 7, select the PCIe port's speed, configure ASPM support and detect the non-compliance device.

PCI Express Root Port 7 Configuration Screen

BIOS Setting	Options	Description/Purpose
PCI Express Root Port 7 (PCI_E3)	- Disabled - Enabled	Controls the PCI Express Root Port 7.
ASPM	- Disabled - L0s - L1 - L0sL1 - Auto	Sets the ASPM (Active-State Power Management) Level. The option allows users to set the lower power mode that activates when the bus is not being used. Force L0s – Force all links to L0s State Auto – BIOS Auto configure Disable – Disables ASPM

BIOS Setting	Options	Description/Purpose
L1 Substates	- Disabled - L1.1 - L1.2 - L1.1 & L1.2	PCI Express L1 Substates settings.
Hot Plug	- Disabled - Enabled	PCI Express Hot Plug Enabled / Disabled.
PCIe Speed	- Auto - Gen1 - Gen2 - Gen3	Configures PCIe Speed.
Detect Non-Compliance Device	- Disabled - Enabled	Detects a Non-Compliance PCI Express device that is connected to the PCI Express port. If enabled, it will take more time during POST.

Menu Path *Chipset > PCH-IO Configuration > PCI Express Configuration PCI Express Root Port 9 (PCI_E2)*

The **PCI Express Root Port 9 (PCI_E2)** function allows users to enable/disable PCI Express Root Port 9, select the PCIe port's speed, configure ASPM support and detect the non-compliance device.

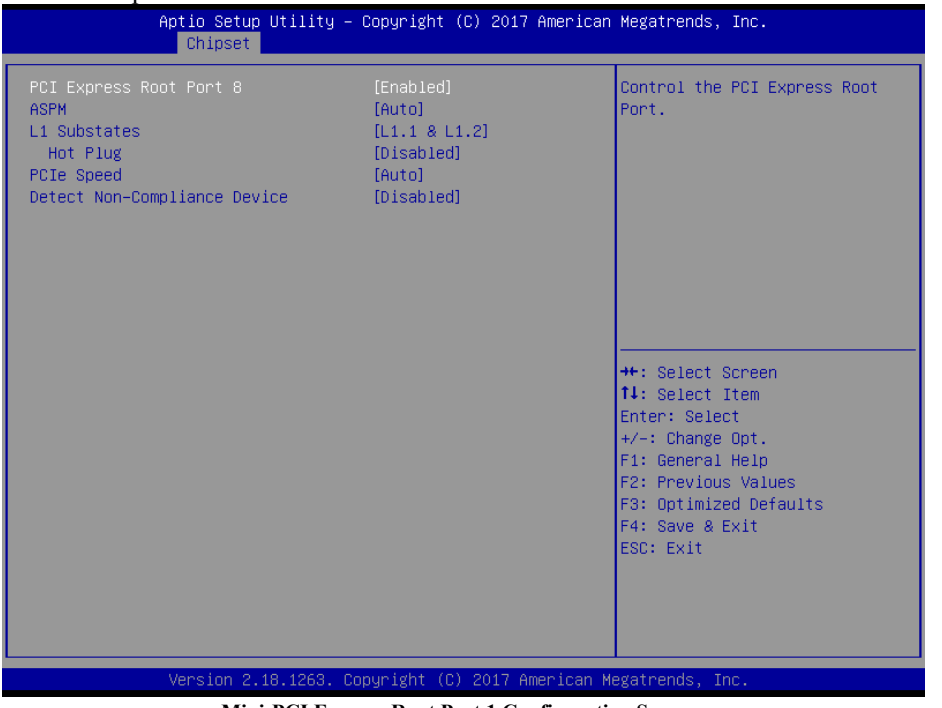
PCI Express Root Port 9 Configuration Screen

BIOS Setting	Options	Description/Purpose
PCI Express Root Port 9 (PCI_E2)	- Disabled - Enabled	Controls the PCI Express Root Port 9.
ASPM	- Disabled - L0s - L1 - L0sL1 - Auto	Sets the ASPM (Active-State Power Management) Level. The option allows users to set the lower power mode that activates when the bus is not being used. Force L0s – Force all links to L0s State Auto – BIOS Auto configure Disable – Disables ASPM

BIOS Setting	Options	Description/Purpose
L1 Substates	- Disabled - L1.1 - L1.2 - L1.1 & L1.2	PCI Express L1 Substates settings.
Hot Plug	- Disabled - Enabled	PCI Express Hot Plug Enabled / Disabled.
PCIe Speed	- Auto - Gen1 - Gen2 - Gen3	Configures PCIe Speed.
Detect Non-Compliance Device	- Disabled - Enabled	Detects a Non-Compliance PCI Express device that is connected to the PCI Express port. If enabled, it will take more time during POST.

Menu Path	*Chipset > PCH-IO Configuration > PCI Express Configuration > Mini-PCI Express Root Port 1*

The **Mini-PCI Express Root Port 1** function allows users to enable/disable Mini-PCI Express Root Port 1, select the PCIe port's speed, configure ASPM support and detect the non-compliance device.



Mini-PCI Express Root Port 1 Configuration Screen

BIOS Setting	Options	Description/Purpose
PCI Express Root Port 8 (Mini-PCI Express Root Port)	- Disabled - Enabled	Controls the PCI Express Root Port.
ASPM	- Disabled - L0s - L1 - L0sL1 - Auto	Sets the ASPM (Active-State Power Management) Level. The option allows users to set the lower power mode that activates when the bus is not being used. Force L0s – Force all links to L0s State Auto – BIOS Auto configure Disable – Disables ASPM
L1 Substates	- Disabled - L1.1 - L1.2 - L1.1 & L1.2	PCI Express L1 Substates settings.

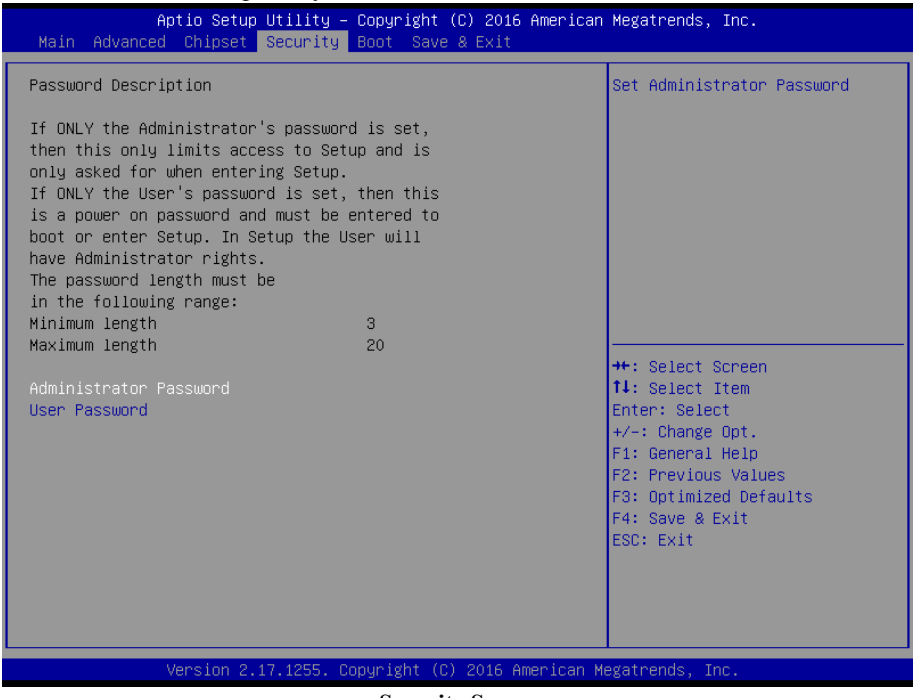
BIOS Setting	Options	Description/Purpose
Hot Plug	- Disabled - Enabled	PCI Express Hot Plug Enabled / Disabled.
PCIe Speed	- Auto - Gen1 - Gen2 - Gen3	Configures PCIe Speed.
Detect Non-Compliance Device	- Disabled - Enabled	Detects a Non-Compliance PCI Express device that is connected to the Mini PCI Express root port. If enabled, it will take more time during POST.

5.6 Security

Menu Path *Security*

From the **Security** menu, you are allowed to create, change or clear the administrator password. You will be asked to enter the configured administrator password before you can access the Setup Utility.

By setting an administrator password, you will prevent other users from changing your BIOS settings. You can configure an Administrator password and then configure a user password. An administrator has much more privileges over the settings in the Setup utility than a user. Heed that a user password does not provide access to most of the features in the Setup utility.



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.

Create an Administrator or User Password

1. Select the **Administrator Password** / **User Password** option from the Security menu and press <Enter>, and the password dialog entry box appears.
2. Enter the password you want to create. A password can be 3-20 alphanumeric characters. After you have configured the password, press <Enter> to confirm.
3. Type the new password again and press <Enter>.

Change an Administrator or User Password

1. Select the **Administrator Password** / **User Password** option from the Security menu and press <Enter>, and the password dialog entry box appears.
2. Select the Administrator Password or User Password that you want to change. A password can be 3-20 alphanumeric characters. After you have changed the password, press <Enter> to confirm.
3. Type the changed password again and press <Enter>.

Remove an Administrator or User Password

1. Select the **Administrator Password** / **User Password** option from the Security menu and press <Enter>, and the password dialog entry box appears.
2. Select the configured Administrator Password or User Password that you want to delete. Leave the dialog box blank and press <Enter>.
3. Press <Enter> again when the password confirmation box appears.

5.7 Boot

Menu Path *Boot*

This menu provides control items for system boot configuration such as setting setup prompt timeout, enabling/disabling quiet boot and fast boot, selecting the boot sequence from the available device(s) and BBS option priorities, and setting CSM (Compatibility Support Module) configuration parameters to support legacy BIOS operation systems, various VGA, bootable devices and add-on devices for achieving better compatibility.

Boot Screen

BIOS Setting	Options	Description/Purpose
Setup Prompt Timeout	(Numeric) from 1 to 65535	Number of seconds to wait for setup activation key.
Bootup NumLock State	- On (default) - Off	Selects the NumLock state after the system is powered on. • **On:** Enables the NumLock function automatically after the system is powered on. • **Off:** Disables the NumLock

BIOS Setting	Options	Description/Purpose
		function after the system is powered on.
Quiet Boot	- Disabled (default) - Enabled	When quite boot is enabled, it displays AMI or OEM logo (if implemented) instead of POST messages during the boot.
Fast Boot	- Disabled (default) - Enabled	Enables or Disables Fast Boot Options.
Boot Option #1~#n	- [Drive(s)] - Disabled	Sets the system boot order.
Hard Drive BBS Priorities	Sub-Menu	Defines the boot order for all the hard drives connected to the system, e.g. SATA, USB drive.
CSM Configuration	Sub-Menu	Configures CSM parameters.

Menu Path *Boot > Hard Drive BBS Priorities*

Select **Hard Drive BBS Priorities** from the Boot menu to configure the boot sequence and priority of the available drives.

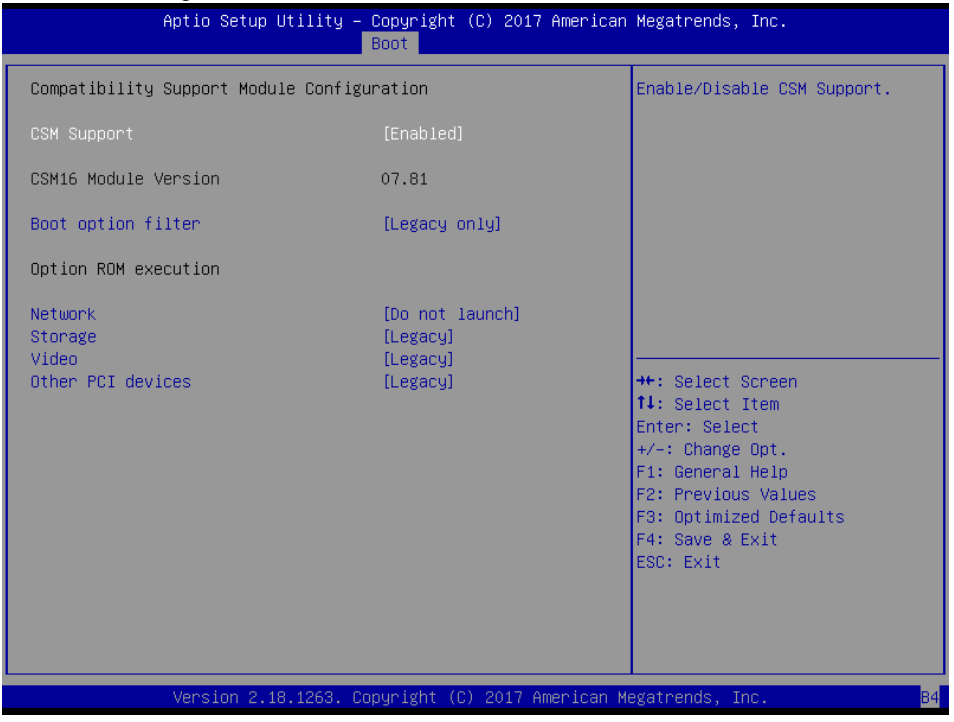
Hard Drive BBS Priorities Screen

BIOS Setting	Options	Description/Purpose
Boot Option #1~#n	- [Drive(s)] - Enabled	Allows users to set the priority of all the drives connected to the system or another bootable USB storage. Press **Enter** to enter the sub-menu and press <↑> or <↓> arrow keys to select the device. Another way is to press <+> or <-> to move the selected device up/down in the priority list.

Boot – CSM Configuration

Menu Path *Boot > CSM Configuration*

The **CSM Configuration** provides advanced CSM (Compatibility Support Module) configurations such as Enable/Disable CSM Support, configure Option ROM execution, boot option filter, etc.



CSM Configuration Screen

BIOS Setting	Options	Description/Purpose
CSM Support	- Disabled - Enabled	Enables or Disables CSM Support.
CSM16 Module Version	No changeable options	Displays the CSM 16 Module version.
Boot option filter	- UEFI and Legacy - Legacy only - UEFI only	This option controls Legacy/UEFI ROMs priority.

BIOS Setting	Options	Description/Purpose
Network	- Do not launch - UEFI - Legacy	Controls the execution of UEFI and Legacy PXE Option ROM.
Storage	- Do not launch - UEFI - Legacy	Controls the execution of UEFI and Legacy Storage Option ROM.
Video	- Do not launch - UEFI - Legacy	Controls the execution of UEFI and Legacy Video Option ROM.
Other PCI devices	- Do not launch - UEFI - Legacy	Determines Option ROM execution policy for devices other than Network, Storage or Video.

5.8 Save & Exit

Menu Path *Save & Exit*

The **Save & Exit** allows users to save or discard changed BIOS settings as well as load factory default settings.

Save Changed BIOS Settings
To save and validate the changed BIOS settings, select **Save Changes** from the **Save & Exit** menu, or you can select **Save Changes and Exit** (or press **F4**) to validate the changes and then exit the system. Select **Save Changes and Reset** to validate the changed BIOS settings and then restart the system

Discard Changed BIOS Settings
To cancel the BIOS settings you have previously configured, select **Discard Changes and Exit** from this menu, or simply press **Esc** to exit the BIOS setup. You can also select **Discard Changes and Reset** to discard any changes you have made and restore the factory BIOS defaults.

Load User Defaults
You may simply press **F3** at any time to load the **Optimized Values** which resets all BIOS settings to the factory defaults.

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

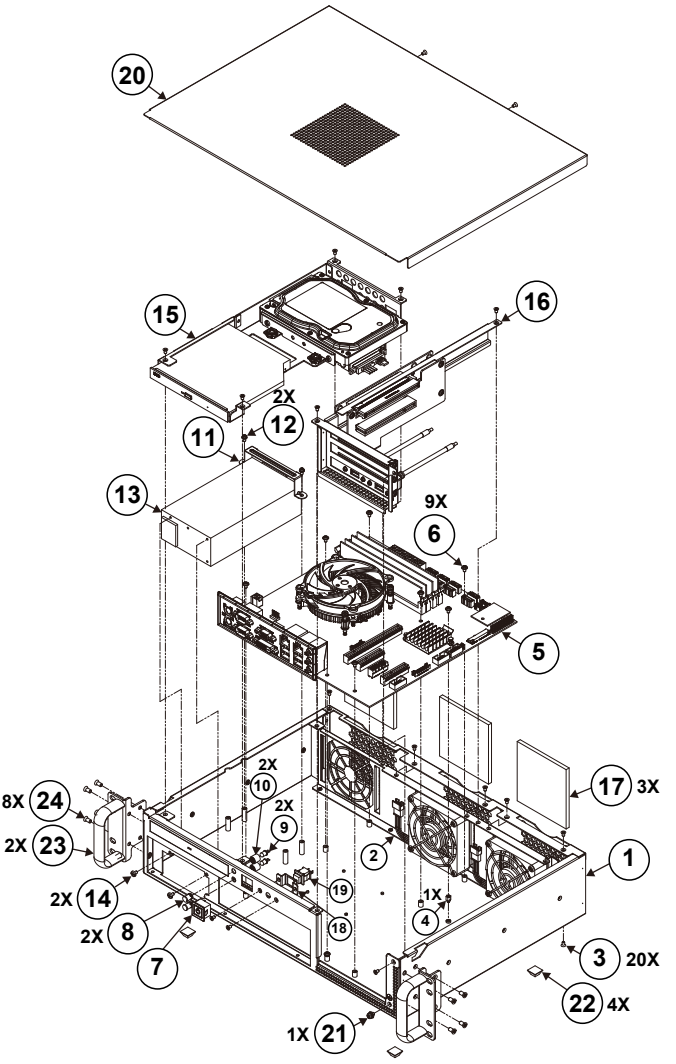
Appendix A System Diagrams

This appendix provides the exploded diagrams and part numbers of BC-K200 system.

The following topics are included:

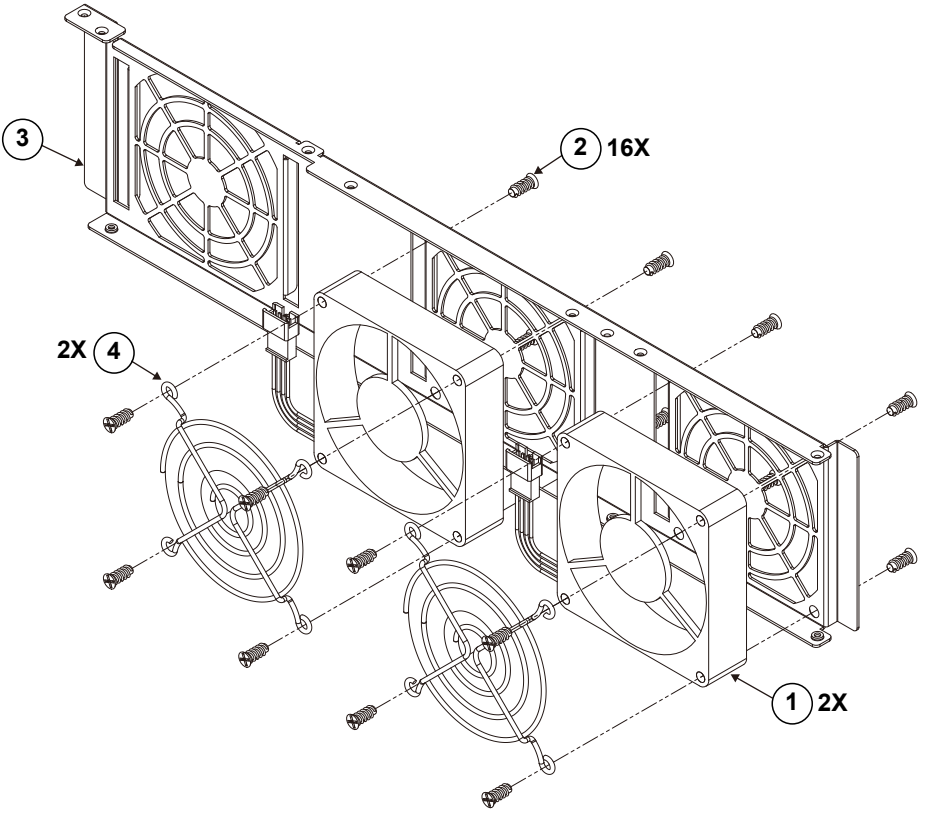
- BC-K200 System Exploded Diagram
- BC-K200 System Fan Assembly Exploded Diagram
- BC-K200 DVD & 3.5” HDD Module Assembly Exploded Diagram
- BC-K200 DVD & 2.5” HDD Module Assembly Exploded Diagram
- BC-K200 3.5” HDD Module Assembly Exploded Diagram
- BC-K200 2.5” HDD Module Assembly Exploded Diagram
- BC-K200 2.5” HDD Stand Assembly Exploded Diagram
- BC-K200 Riser Card Assembly Exploded Diagram
- BC-K200 Main Board I/O Shield Assembly Exploded Diagram
- BC-K200 Rack Mount Holder Assembly Exploded Diagram

BC-K200 System Exploded Diagram



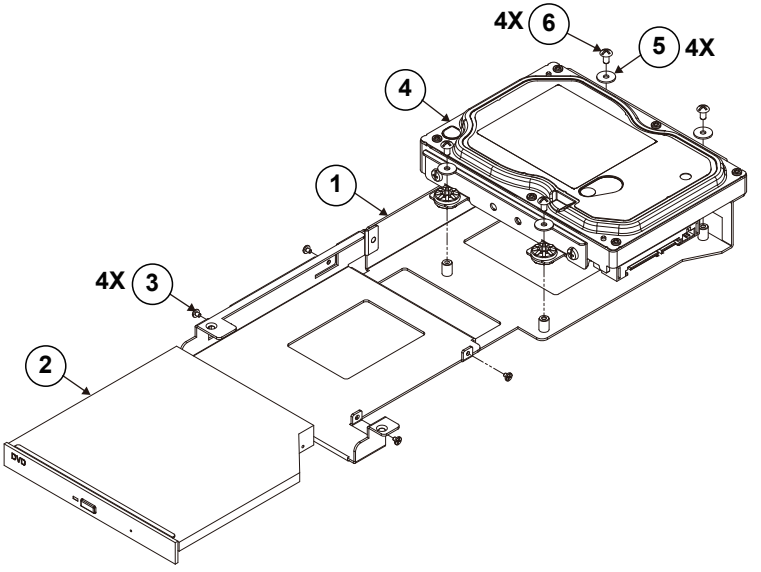
No.	Component Name	P/N No.	Q'ty
1	BC-K200 BOT CASE PWS IO PLATE KIT FOR TEL(w/Paint)(Black)	20-104-03061498	1
2	FAN_FIXED_FRAME_PLATE_ASSY_EXP	See Page A-4	1
3	FLAT HEAD SCREW #2 / M3x0.5Px5mm	22-215-30005011	20
4	HEX CU BOSS M3x0.5Px3L,H=5mm	22-290-30005051	1
5	BU-2509 Main PCB ASSY	See Page A-10	1
6	ROUND WASHER HEAD SCREW M3x0.5Px5mm	22-242-30005311	9
7	BT-0981 POWER & INDICATION LIGHT CABLE L=400mm	27-019-40608111	1
8	LED HOUSING	90-014-02200000	2
9	LED Cable	N/A	2
10	PDS-8082 LAMP HOLDER (Φ7x8.2mm)(Black)	90-012-04100221	2
11	PMB-531LF POWER SUPPLY HOLDER(	20-029-03001082	1
12	ROUND HEAD WITH SPRING WASHER SCREW M3x0.5Px6mm	22-232-30060211	2
13	ATX 220W POWER SUPPLY	52-001-23220601	1
14	PAN HEAD SCREW UNC-No.6-32,L=5mm	22-622-60005011	2
15	DVD_HDD_HOLDER_KIT	See Page A-5 & Page A-6	1
16	RISER_EXPAND_CARD_HOLDER_KIT_EXP	See Page A-9	1
17	BC-B015 DUST SPONGE (85x81x5mm)	30-013-23100498	3
18	BC-K200 RESET BUTTON SUPPORT (w/Paint) (Black)	20-102-03061498	1
19	SPA-108B_RESET_BUTTON	N/A	1
20	BC-K200 TOP CASE CLAMP BUCKLE KIT FOR TEL (w/Paint)(Black)	20-101-03061498	1
21	ROUND HEAD WITH SPRING WASHER SCREW #2 / M4x0.7Px6mm	22-232-40006011	1
22	PS-8380/8800/8580 RUBBER FOOT (12.7x12.7x6mm)(Black)	90-004-01100000	4
23	HANDTEER_RACK_MOUNT_HOLDER_KIT	See Page A-11	2
24	FLAT HEAD SCREW Φ6.4/M4x0.7Px8mm(Black)	22-215-40008711	8

BC-K200 System Fan Assembly Exploded Diagram



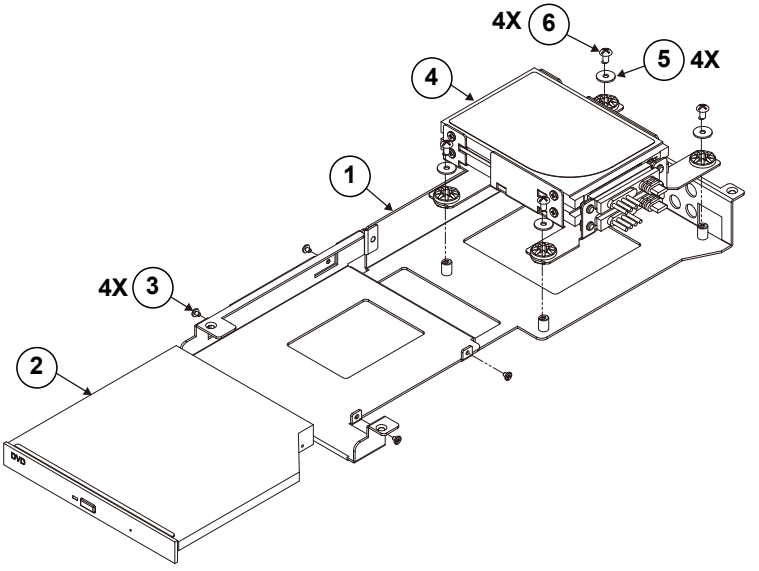
No.	Component Name	P/N No.	Q'ty
1	KT-7290 SYSTEM FAN (80x80x20mm) L=300mm	21-004-08080134	2
2	FLAT HEAD SCREW #2 / T4.7x11mm	82-712-47011018	16
3	BC-K200 FAN FIXED FRAME PLATE (w/Paint)(Black)	20-104-03062498	1
4	Fan_holder_for_80-80	20-044-02011012	2

BC-K200 DVD & 3.5" HDD Module Assembly Exploded Diagram



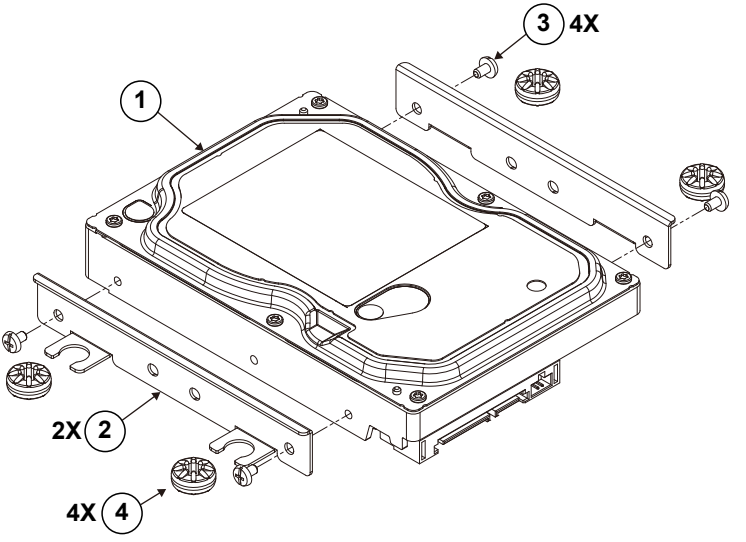
No.	Component Name	P/N No.	Q'ty
1	BC-K200 DVD HDD HOLDER (w/Paint) (Black)	20-129-03061498	1
2	DVD Player	N/A	1
3	FILLISTER HEAD SCREW M2x0.4Px2.5mm	22-272-20002011	4
4	HDD_3.5inch_SATA_STAND_RUBBER_KIT_ EXP	See Page A-7	1
5	WASHER (OD=Φ10mm,ID=Φ3mmx0.8T)	23-312-30080101	4
6	TRUSS HEAD SCREW M3x0.5Px6mm	22-282-30006811	4

BC-K200 DVD & 2.5" HDD Module Assembly Exploded Diagram



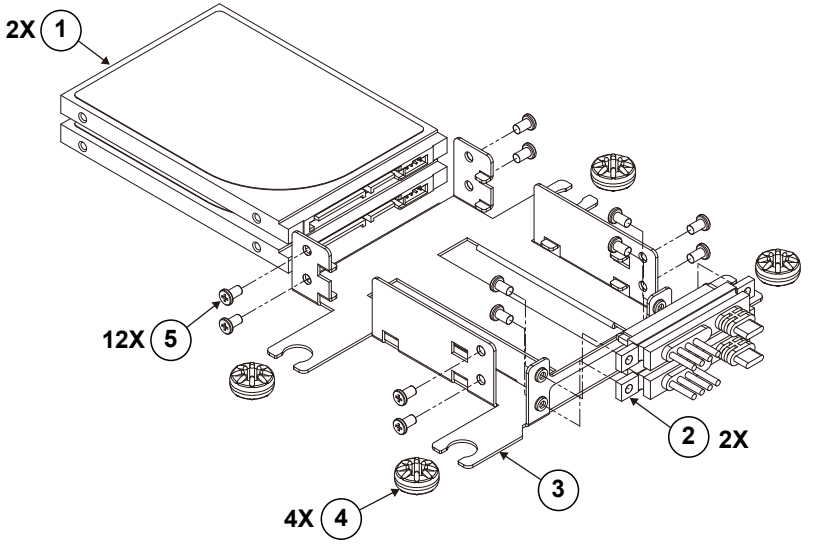
No.	Component Name	P/N No.	Q'ty
1	BC-K200 DVD HDD HOLDER(w/Paint)(Black)	20-129-03061498	1
2	DVD Player	N/A	1
3	FILLISTER HEAD SCREW M2x0.4Px2.5mm	22-272-20002011	4
4	HDD_2.5inch_DOUBLE_SATA_STAND_ RUBBER_KIT_EXP	See Page A-8	1
5	WASHER (OD=Φ10mm,ID=Φ3mmx0.8T)	23-312-30080101	4
6	TRUSS HEAD SCREW M3x0.5Px6mm	22-282-30006811	4

BC-K200 3.5” HDD Module Assembly Exploded Diagram



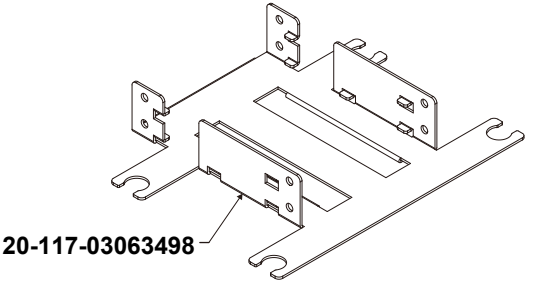
No.	Component Name	P/N No.	Q’ty
1	HDD Module	N/A	1
2	BC-K200 3.5INCH HDD STAND (w/Paint)(Black)	20-117-03062498	2
3	PAN HEAD SCREW UNC-No.6-32, L=5mm	22-622-60005011	4
4	BC-B015 SHOCK ABSORB RUBBER (Black)	90-013-01100498	4

BC-K200 2.5” HDD Module Assembly Exploded Diagram



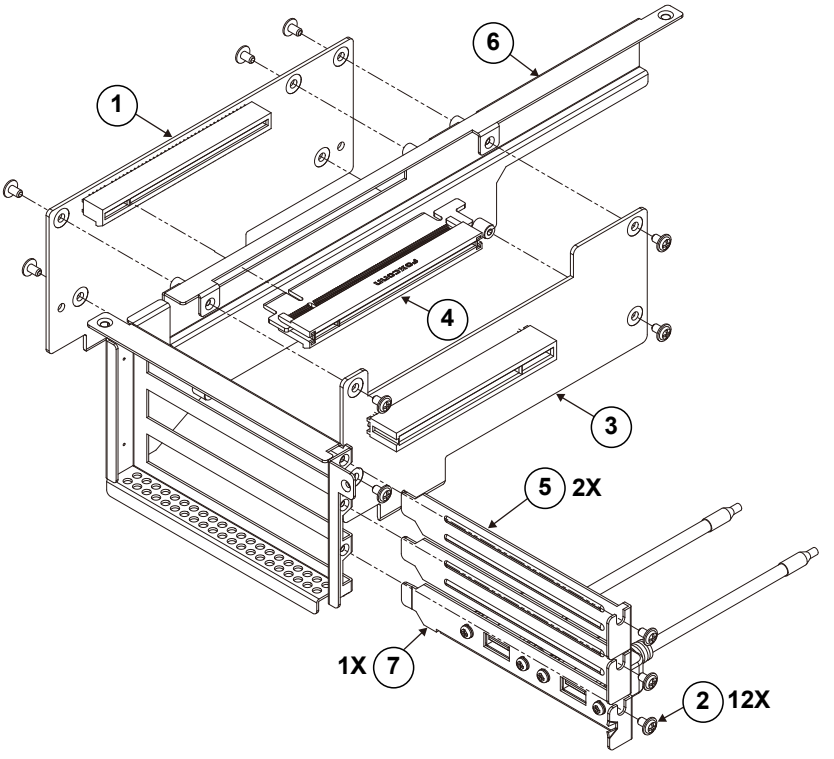
No.	Component Name	P/N No.	Q’ty
1	HDD_25_H7_SEAGATE_SATA	N/A	2
2	SE-8210 SATA HDD & POWER CABLE L=240mm	27-008-26105082	2
3	BC-K200 2.5INCH DOUBLE HDD STAND(w/Paint)(Black)	20-117-03061498	1
4	BC-B015 SHOCK ABSORB RUBBER(Black)	90-013-01100498	4
5	FILLISTER HEAD SCREW #2 / M3x0.5Px5mm	22-272-30049015	2

BC-K200 2.5” HDD Stand Assembly Exploded Diagram



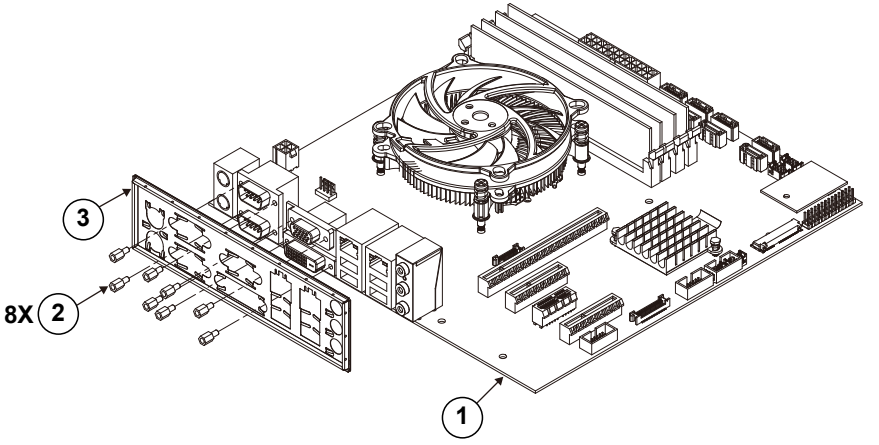
No.	Component Name	P/N No.	Q’ty
1	BC-K200 2.5INCH DOUBLE HDD STAND-B (w/Paint) (Black)	20-117-03063498	1

BC-K200 Riser Card Assembly Exploded Diagram



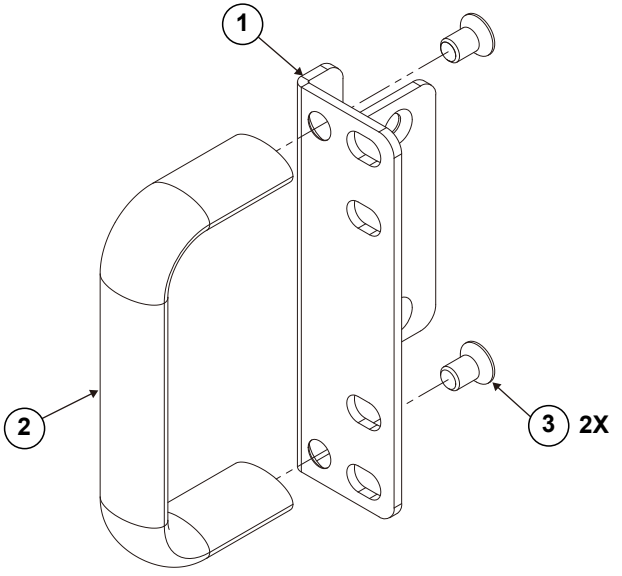
No.	Component Name	P/N No.	Q'ty
1	BR-2509-1_ASM	N/A	1
2	ROUND WASHER HEAD SCREW (M3x0.5Px5mm)	22-242-30005311	12
3	BR-2509-3_ASM	N/A	1
4	BR-2509-2_ASM	N/A	1
5	PDS-8080 IO BRACKET	80-006-21001006	2
6	BC-K200 RISER EXPAND CARD HOLDER KIT(w/Paint)(Black)	20-129-03062498	1
7	USB CABLE (WITH BRACKET) (USBx2 to 10F/P2.0) L=300mm	27-006-49806111	1

BC-K200 Main Board I/O Shield Assembly Exploded Diagram



No.	Component Name	P/N No.	Q'ty
1	BU-2509_MAIN_PCB_ASSY	N/A	1
2	HEX CU BOSS UNC No.4-40,L=5,H=6mm	22-392-40005301	8
3	BK-0940 IO SHIELD	80-010-07001357	1

BC-K200 Rack Mount Holder Assembly Exploded Diagram



No.	Component Name	P/N No.	Q'ty
1	BC-K200 RACK MOUNT HOLDER (w/Paint)(Black)	20-229-03061498	1
2	ALUMINUM HANDLE	20-035-01001000	1
3	FLAT HEAD SCREW #2/M5x0.8Px8mm	22-215-50008011	2

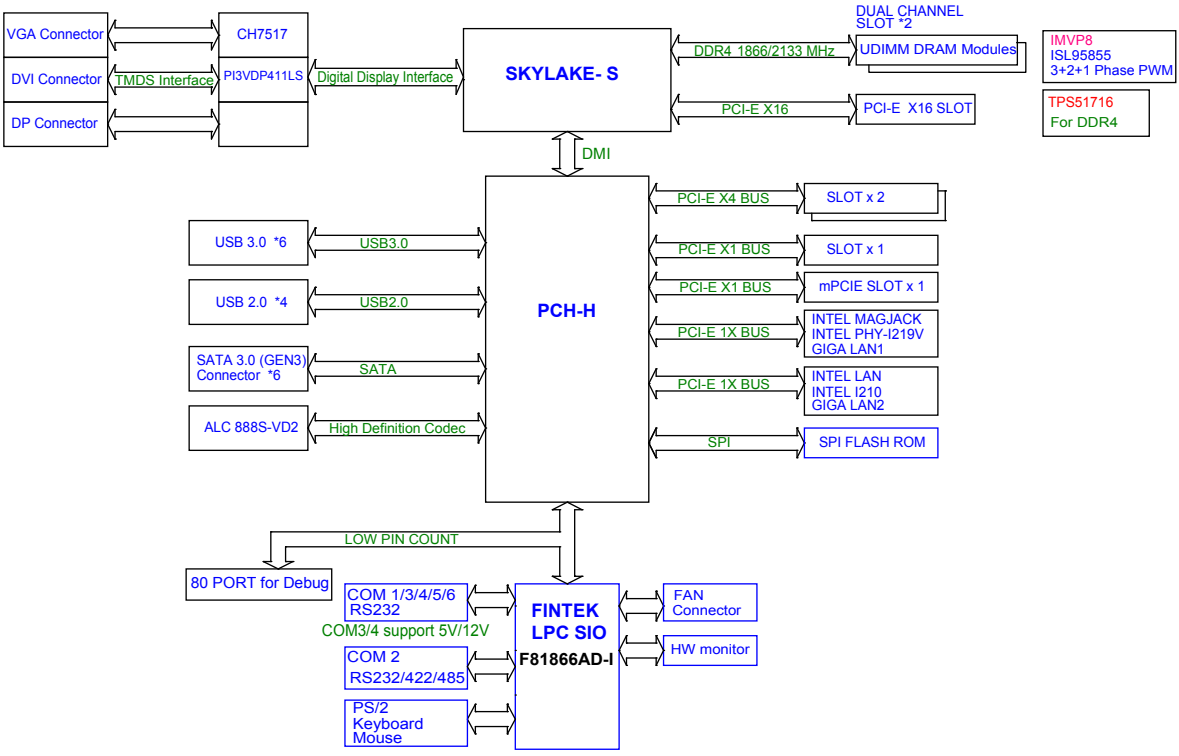
Appendix B Technical Summary

This appendix will give you a brief introduction of the allocation maps for BC-K200 resources.

The following topics are included:

- Block Diagram
- Interrupt Map
- I/O Map
- Memory Map
- Configuring Watchdog Timer
- 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 6	Communications Port (COM6)
IRQ 7	Communications Port (COM5)
IRQ 8	System CMOS/real time clock
IRQ 10	Communications Port (COM3)
IRQ 10	Ethernet Controller
IRQ 11	Intel® Active Management Technology – SOL(COM 7)
IRQ 12	Standard PS/2 Mouse
IRQ 13	Numeric data processor
IRQ 14	Motherboard resources
IRQ 16	Standard AHCI 1.0 Serial ATA Controller
IRQ 16	High Definition Audio Controller
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	Assignment
IRQ 93	Microsoft ACPI-Compliant System
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	Assignment
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 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	Assignment
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 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	Assignment
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 191	Microsoft ACPI-Compliant System
IRQ 256	Microsoft ACPI-Compliant System
IRQ 257	Microsoft ACPI-Compliant System
IRQ 258	Microsoft ACPI-Compliant System
IRQ 259	Microsoft ACPI-Compliant System
IRQ 260	Microsoft ACPI-Compliant System
IRQ 261	Microsoft ACPI-Compliant System
IRQ 262	Microsoft ACPI-Compliant System
IRQ 263	Microsoft ACPI-Compliant System
IRQ 264	Microsoft ACPI-Compliant System
IRQ 265	Microsoft ACPI-Compliant System
IRQ 266	Microsoft ACPI-Compliant System
IRQ 267	Microsoft ACPI-Compliant System
IRQ 268	Microsoft ACPI-Compliant System
IRQ 269	Microsoft ACPI-Compliant System
IRQ 270	Microsoft ACPI-Compliant System
IRQ 271	Microsoft ACPI-Compliant System
IRQ 272	Microsoft ACPI-Compliant System

IRQ	Assignment
IRQ 273	Microsoft ACPI-Compliant System
IRQ 274	Microsoft ACPI-Compliant System
IRQ 275	Microsoft ACPI-Compliant System
IRQ 276	Microsoft ACPI-Compliant System
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IRQ	Assignment
IRQ 302	Microsoft ACPI-Compliant System
IRQ 303	Microsoft ACPI-Compliant System
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IRQ	Assignment
IRQ 331	Microsoft ACPI-Compliant System
IRQ 332	Microsoft ACPI-Compliant System
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IRQ	Assignment
IRQ 360	Microsoft ACPI-Compliant System
IRQ 361	Microsoft ACPI-Compliant System
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IRQ	Assignment
IRQ 389	Microsoft ACPI-Compliant System
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IRQ	Assignment
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IRQ	Assignment
IRQ 447	Microsoft ACPI-Compliant System
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IRQ	Assignment
IRQ 476	Microsoft ACPI-Compliant System
IRQ 477	Microsoft ACPI-Compliant System
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IRQ	Assignment
IRQ 505	Microsoft ACPI-Compliant System
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IRQ 510	Microsoft ACPI-Compliant System
IRQ 511	Microsoft ACPI-Compliant System

Note: These resource information were gathered using Windows 10 (the IRQ could be assigned differently depending on OS).

I/O MAP

I/O MAP	ASSIGNMENT
0x000003F8-0x000003FF	Communications Port (COM1)
0x000002F8-0x000002FF	Communications Port (COM2)
0x000003E8-0x000003EF	Communications Port (COM3)
0x000002E8-0x000002EF	Communications Port (COM4)
0x000002F0-0x000002F7	Communications Port (COM5)
0x000002E0-0x000002E7	Communications Port (COM6)
0x0000F090-0x0000F097	Standard AHCI 1.0 Serial ATA Controller
0x0000F080-0x0000F083	Standard AHCI 1.0 Serial ATA Controller
0x0000F060-0x0000F07F	Standard AHCI 1.0 Serial ATA Controller
0x00008000-0x0000BFFF	PCI bus
0x0000C000-0x0000CFFF	PCI bus
0x0000D000-0x0000DFFF	PCI bus
0x0000E000-0x0000EFFF	PCI bus
0x00000070-0x00000077	System CMOS/real time clock
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
0x00000080-0x00000080	Motherboard resources
0x00000092-0x00000092	Motherboard resources
0x000000B2-0x000000B3	Motherboard resources
0x00000680-0x0000069F	Motherboard resources
0x00001800-0x000018FE	Motherboard resources

I/O MAP	ASSIGNMENT
0x0000FF00-0x0000FFFE	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x00001800-0x000018FE	Motherboard resources
0x0000164E-0x0000164F	Motherboard resources
0x0000FF00-0x0000FFFE	Motherboard resources
0x00000800-0x0000087F	Motherboard resources
0x00001854-0x00001857	Motherboard resources
0x0000164E-0x0000164F	Motherboard resources
0x000000F0-0x000000F0	Numeric data processor
0x0000F000-0x0000F03F	Intel® HD Graphics 510
0x000003B0-0x000003BB	Intel® HD Graphics 510
0x000003C0-0x000003DF	Intel® HD Graphics 510
0x00000060-0x00000060	Standard PS/2 Keyboard
0x00000064-0x00000064	Standard PS/2 Keyboard
0x00000020-0x00000021	Programmable interrupt controller
0x00000024-0x00000025	Programmable interrupt controller
0x00000028-0x00000029	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
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
0x000000B2-0x000000B3	Programmable interrupt controller

I/O MAP	ASSIGNMENT
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

Memory Map

MEMORY MAP	ASSIGNMENT
0x000A0000-0x000BFFFF	Intel® HD Graphics 53
0x000A0000-0x000BFFFF	PCI Express Root Complex
0x90000000-0xDFFFFFFF	PCI Express Root Complex
0xC0000000-0xCFFFFFFF	Intel® HD Graphics 530
0xD0000000-0xD09FFFFF	Intel®100 Series/C230 Series Chipset Family PCI Express Root Port #9 – A118
0xD0A00000-0xD13FFFFF	Intel® 100 Series/C230 Series Chipset Family PCI Express Root Port #7 – A116
0xD1400000-0xD1DFFFFF	Intel® 100 Series/C230 Series Chipset Family PCI Express Root Port #1 – A110
0xDC000000-0xDCFFFFFF	Intel® HD Graphics 530
0xDD000000-0xDD7FFFFF	Ethernet Controller
0xDD000000-0xDD8FFFFF	Intel® 100 Series/C230 Series Chipset Family PCI Express Root Port #6 – A115
0xDD800000-0xDD803FFF	Ethernet Controller
0xDD900000-0xDE2FFFFF	Intel® 100 Series/C230 Series Chipset Family PCI Express Root Port #9 – A118
0xDE300000-0xDECFFFFF	Intel® 100 Series/C230 Series Chipset Family PCI Express Root Port #7 – A116
0xDED00000-0xDF6FFFFF	Intel® 100 Series/C230 Series Chipset Family PCI Express Root Port #1 – A110
0xDF700000-0xDF71FFFF	Intel® Ethernet Connection (2) I219-LM
0xDF720000-0xDF72FFFF	High Definition Audio Controller
0xDF730000-0xDF73FFFF	Intel® USB 3.0 eXtensible Host Controller
0xDF740000-0xDF743FFF	High Definition Audio Controller
0xDF744000-0xDF747FFF	Intel®100 Series Chipset Family PMC
0xDF748000-0xDF749FFF	Standard SATA AHCI Controller
0xDF74A000-0xDF7470FF	Intel® 100 Series Chipset Family SMBus

MEMORY MAP	ASSIGNMENT
0xDF74B000-0xDF7B7FFF	Standard SATA AHCI Controller
0xDF74C000-0xDF74C0FF	Standard SATA AHCI Controller
0xDF74D000-0xDF74DFFF	Intel® 100 Series Chipset Family Thermal subsystem
0xDF74D000-0xDF74DFFF	Intel® Active Management Technology -SOL (COM7)
0xDFFE0000-DFFFFFFF	Motherboard resource
0xE00000000-EFFFFFFF	Motherboard resource
0xFD000000-FDABFFFF	Motherboard resource
0xFD000000-FE7FFFFF	PCI Express Root Complex
0xFDAC0000-FDACFFFF	Motherboard resource
0xFDAD0000-FDADFFFF	Motherboard resource
0xFDAE0000-FDAEFFFF	Motherboard resource
0xFDAF0000-FDAFFFFF	Motherboard resource
0xFDB00000-FDFFFFFF	Motherboard resource
0xFE000000-FE01FFFF	Motherboard resource
0xFE036000-FE03BFFF	Motherboard resource
0xFE03D000-FE3FFFFF	Motherboard resource
0xFE410000-FE7FFFFF	Motherboard resource
0xFED00000-FED003FF	Motherboard resource
0xFE000000-FE01FFFF	High precision event timer
0xFED10000-FED17FFF	Motherboard resource
0xFED18000-FED18FFF	Motherboard resource
0xFED19000-FED19FFF	Motherboard resource
0xFED20000-FED3FFFF	Motherboard resource
0xFED45000-FED8FFFF	Motherboard resource
0xFED90000-FED93FFF	Motherboard resource
0xFEE00000-FEEFFFFF	Motherboard resource
0xFF000000-FFFFFFFF	Motherboard resource

MEMORY MAP	ASSIGNMENT
0xFF000000-FFFFFFFF	Intel® 82802 Firmware Hub Device
0xFF000000-FFFFFFFF	Intel® 82802 Firmware Hub Device

Configuring WatchDog Timer

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

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

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

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

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

Code example for watch dog timer

Enable watchdog timer and set the time-out 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 ----------
mov    al,    030h
out    dx,    al
inc    dx
mov    al,    01h
out    dx,    al
;---------- Enable Watch PME----------
dec    dx
mov    al,    0FAh
out    dx,    al
inc    dx
in     al,    dx
and    al,    51h
out    dx,    al
;---------- Set second as counting unit ----------
dec    dx
mov    al,    0f5h
out    dx,    al
inc    dx
in     al,    dx
and    al,    30h
out    dx,    al
; ---------- Set timeout interval as 30seconds and start counting ----------
dec    dx
mov    al,    0f6h
out    dx,    al
inc    dx
mov    al,    1Eh
out    dx,    al
;----------Exit the extended function mode ----------
dec    dx
mov    al,    0aah
out    dx,    al
```

Flash BIOS Update

I. Prerequisites

4 Prepare a USB storage device which can save the required files for BIOS update.

5 Download and save the BIOS file (ex. 25091PQ1.bin) to the storage device.

6 Copy AMI flash utility – AFUEFIx64.exe (v5.09.01) into the storage device. The utility and BIOS file should be saved to the same path.

7 Make sure the target system can first boot to the EFI shell environment.

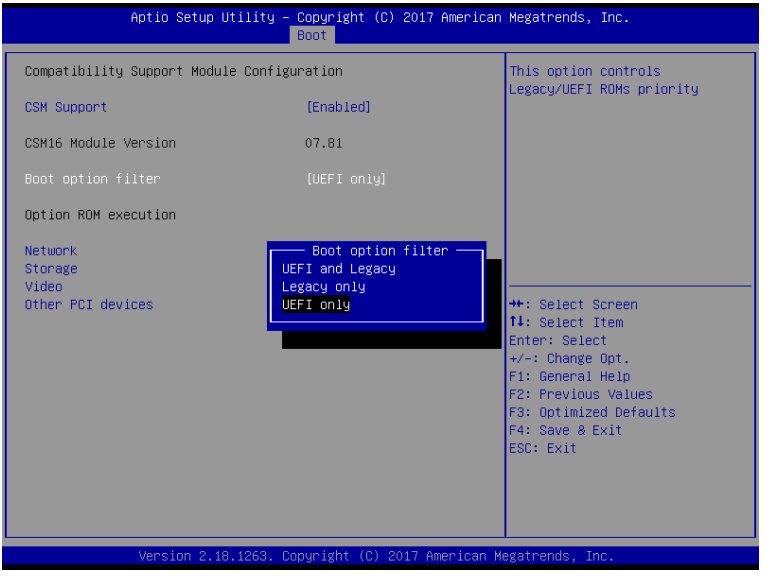
(1) Connect the USB storage device.

(2) Turn on the computer and press **<ESC>** or **<DEL>** key during boot to enter BIOS Setup.

(3) The system will go into the BIOS setup menu.

(4) Select **[Boot]** menu and enter into **[CSM Configuration]** menu.

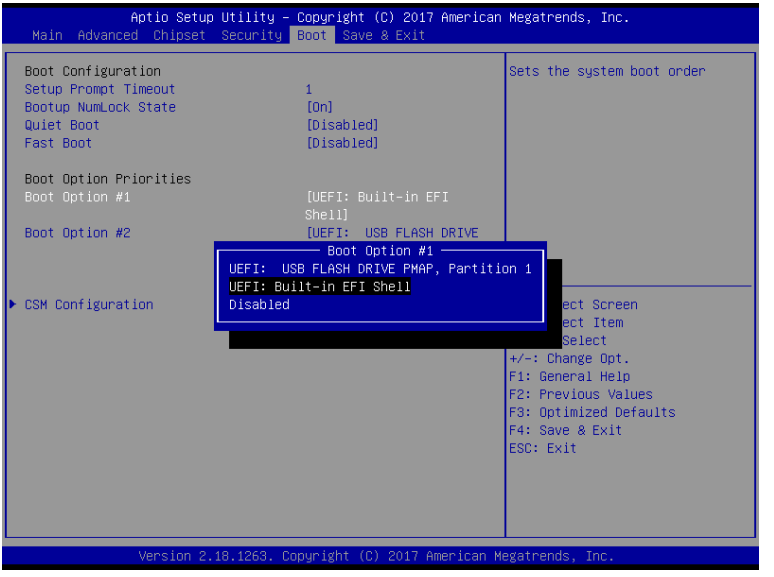
(5) Set **[Boot option filter]** to **[UEFI Only]** and press <F4> key to save configuration and restart the system.



(6) Press <**ESC**> or **<DEL>** to enter into BIOS setup menu again.

(7) Select **[Boot]** menu and set **[UEFI: Built-in EFI Shell]** as the 1st boot device.

(8) Press **<F4>** key to save the configuration and restart the system to boot into EFI Shell environment.



II. AFUEFIx64 Command for System BIOS Update

AFUEFIx64.efi is the AMI firmware update utility; the command line is shown as below:

AFUEFIx64 <ROM File Name> [option1] [option2]…

You can type "AFUEFIx64 /?" to see all the definition of each control option. The recommended options for BIOS ROM update include 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 Boot into EFI Shell, change to the path where you put BIOS image and AFUEFIx64.

```
Shell> fs0:
 fs0:\> cd afuefix64
```

2 Type " **AFUEFIx64 2509xxxx.bin /p /b /n /x"** and press Enter to start the flash procedure. (xxxx means the BIOS revision part, ex. 1PQd1…)

3 During the update procedure, you will see the BIOS update process status and its execution percentage. Beware! Do not turn off system power or reset your computer when the whole procedure are not complete yet, or it may crash the BIOS ROM and make the system unable to boot up next time.

4 After BIOS update procedure is completed, the following picture will display:

```
fs0:\afuefix64> afuefix64 25091PQ1.bin /p /b /n /x
+-------------------------------------------------------------------------+
|         AMI Firmware Update Utility  v5.09.01.1317                      |
|                                                                         |
|  Copyright (C) 2016 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

fs0:\afuefix64
```

5 Restart the system and boot up with the new BIOS configurations.

6 The BIOS Update 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.