USER MANUAL

BA-2501

ATX Intel® 6th/7th Gen. Core™ i7/i5/i3/ Pentium® / Celeron® Processor

BA-2501 M2

BA-2501

ATX Intel® 6th/7th Gen. Core™ i7/i5/i3/ Pentium® / Celeron® Processor

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 BA-2501 User Manual is described below:

Version No.	Revision History	Date
M1	Initial Release	07/19/2017
M2	The following modifications have been made in the Section 2.2 BA-2501 Specifications. • Added CPU support: Intel® Xeon® Processor E3 v5 for C236 SKU only. • Revised 1 System Fan (1 pin) to 1 System Fan (**4** pins) for Hardware Monitor item. • For Expansion Bus item, revised the description of 1 x mini-PCIe to **1 x mini-PCIe for C236/Q170 SKU only**. • Revised the description of **DisplayPort (option)** item.	10/25/2017
	• Revised Section 3.1 JUMPER & CONNECTOR QUICK REFERENCE TABLE. • Added C236/Q170 SKU support for MPCIE1 connector in the note description of Section 3.2.2 Jumper Setting of BA-2501RA-**N. • Revised the description of Mini PCIE and mSATA Selection (JP6). • Revised the description of Mini PCIE Voltage Selection (JP13). • The Mini-PCI Express Slot (MPCIE1) is only supported in C236/Q170 SKU. • Added the “USB Legacy Mouse Support” function in the Advanced > USB Configuration menu. • Added “For C236/Q170 SKU Only” description for Mini PCI Express Port option in Chipset > PCH-IO Configuration > PCI Express Configuration of Chapter 5 BIOS Setup. • Revised the BIOS Setting description table of Chipset > PCH-IO Configuration > PCI Express Configuration > PCI Express x4 slot of Chapter 5 BIOS Setup. • Added “For C236/Q170 SKU Only” description in Chipset > PCH-IO Configuration > PCI Express Configuration > Mini PCI Express Port Configuration of Chapter 5 BIOS Setup.	

1 Introduction

This chapter provides the introduction for the BA-2501 system as well as the framework of the user manual.

The following topics are included:

- About This Manual

1.1 About This Manual

Thank you for purchasing our BA-2501 system. The BA-2501 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 1 appendix. 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 BA-2501 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 Hardware Configuration
This chapter 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, VGA Driver Utility, LAN Driver Utility, Sound Driver Utility, KMDF Driver Utility, Intel® Management Engine Components Installer Driver Utility, Intel® Rapid Storage Driver Utility, Intel® F6 Floppy Disk Driver Utility, Intel® Serial I/O Driver Utility and Intel® USB 3.0 eXtensible Host Controller Driver Utility.

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

Appendix A Technical Summary
This appendix provides the information about the allocation maps for BA-2501 block diagram, system resources, Watchdog Timer Configuration and Flash BIOS Update.

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2 Getting Started

This chapter provides the information for the BA-2501 system. It describes the package contents and outlines the system specifications.

The following topics are included:

- Package List
- System Specification
- Safety Precautions

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

2.1 Packing List

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

Item	Q'ty
BA-2501	1
Quick Reference Guide	1
Manual / Driver DVD	1
Mini Jumper (2.0 mm)	6
SATA Cable (500mm)	1
I/O Shield	1

2.2 BA-2501 Specifications

System	
CPU Support	➢ LGA1151 socket for Intel® 6th (Skylake) / 7th (Kaby Lake) Gen. Core™ i7/i5/i3 and Pentium® / Celeron® processor ➢ Intel® Xeon® Processor E3 v5 for C236 SKU only
Chipset	➢ Intel® C236 / H110 / Q170
Memory Support	**JUDIMM1/3, JUDIMM2/4** ➢ Dual channel, DDR4-1866/2133, up to 64GB, 4 x 288-Pin DIMM for **C236/Q170** only **JUDIMM1/3** ➢ Dual channel, DDR4-1866/2133, up to 32GB, 2 x 288-Pin DIMM for **H110** only ➢ Support ECC (C236) / non-ECC (C236/Q170/H110)
BIOS	➢ AMI UEFI BIOS
Hardware Monitor	➢ CPU, System FAN (smart FAN connector*2), 12V, 5V, 5Vsb, Vcore ➢ 1 x CPU Fan (4 pins) + 1 System Fan (4 pins) + 1 System Fan (3 pins)
Watchdog Timer	➢ 1~255 seconds watchdog timer selectable
Power Supply	➢ ATX 24+ 4 power
Power Consumption	➢ +5V: 1.57A; +12V: 5.09A; +3.3V: 0.43A; +5VSB: 0.16A (CPU: i7 6700 3.4GHz)
Speaker	➢ 1 x Internal buzzer
Dimension	➢ 305mm x 244mm (12” x 9.6”)
O.S. Support	➢ Windows® 7 32/64bit ➢ Windows® 8.1 64bit ➢ Windows® 10 64bit ➢ Linux
Certificate	➢ CE/FCC
I/O Ports	
SATA Interface	➢ **C236 and Q170 SKU:** 6 x SATA III (6.0Gb/s) RAID 0,1,5,10 ➢ **H110 SKU:** 4 x SATA III (6.0Gb/s)
USB	**10 x USB ports** **C236/Q170 SKU:** ➢ 4 x USB 3.0 (rear I/O) ➢ 2 x USB 3.0 (on-board) ➢ 4 x USB 2.0 (on-board)

	H110 SKU: ➢ 2 x USB 3.0 (rear I/O) ➢ 2 x USB 3.0 (on-board) ➢ 2 x USB 2.0 (rear I/O) ➢ 4 x USB 2.0 (on-board)
Serial Ports	➢ 6 x COM ports (D-Sub 9, rear I/O) (C236=COM1~COM6, Q170=COM1~COM4, H110= COM1~COM2) ➢ COM1~COM6: RS232 ➢ COM2: RS232/422/485, selected by BIOS, default: RS232 ➢ COM3: RS232 with 5V/12V/RI selectable by jumper ➢ COM4: RS232 with 5V/12V/RI selectable by jumper ➢ COM3 / COM4 for C236/Q170 SKU only ➢ COM5 / COM6 for C236 SKU only
Parallel Port	➢ 1 x LPT connector for **C236** SKU only
LAN	➢ Dual ports to support 10/100/1000Mbps, RJ45, rear I/O ➢ **LAN1:** Intel® PHY I219-LM (10/100/1000 Mbps) ➢ **LAN2:** Intel® PHY I211-AT (10/100/1000 Mbps) ➢ Supports Wake-On-LAN & PXE
GPIO / DIO	➢ 8bits GPIO programmable
FAN	➢ 1 x CPU fan, 2 x system fans
Keyboard / Mouse	➢ 2 x PS/2 with mini DIN connectors (rear I/O)
Audio	➢ Mic-in / Line-in / Line-out; High definition audio with Realtek ALC888S
Expansion Bus	➢ 1 x PCIe(x16), 1 x PCIe (x4) (C236/Q170=Gen3), (H110=Gen2) ➢ 5 x PCI slots ➢ 1 x mini-PCIe for C236/Q170 SKU only
LPC	➢ 1 x LPC pin header
Display	
VGA	➢ 1 x VGA up to 1920x1200 @60Hz (rear I/O)
DVI	➢ 1 x DVI-D up to 1920x1200 @60Hz (rear I/O)
eDP (option)	➢ 1 x eDP up to 4096x2304@60Hz (for C236/Q170 only)
DisplayPort (option)	➢ 1 x display port up to 4096x2304 @60Hz (replace VGA and DVI-D)
Others	
I^2C	➢ 1 x I^2C 4-pin wafer
Front Panel LED Indicator	➢ HDD LED, Power LED, Power Switch, Reset Switch

	➢ On-board Power LED (Green)
Front Panel Audio	➢ 1 x Front Panel Audio Header (2 x 5-pin)
TPM on board (option)	➢ Co-lay TPMI1.2 / TPM2.0 chip
Case Open Detection	➢ 1 x 2-pin jumper for case intrusion detection
Shock	➢ 15G peak-to-peak, 11ms duration, non-operation
Vibration	➢ Non-operation: 2G, 5-200Hz, X, Y, Z axis
Environment	
Operating Temp.	➢ 0°C ~ 60°C (32°F ~ 104°F)
Storage Temp.	➢ -40°C ~ 85°C (-40°F ~ 185°F)
Operation Humidity	➢ 5%~ 90% (non-condensing)

2.3 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 this system should be an ATX power; otherwise, the system may be damaged.

2. Environmental Conditions
   - Place your BA-2501 on a sturdy, level surface. Be sure to allow enough space around the system to have easy access needs.
   - Avoid installing your BA-2501 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 BA-2501 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 BA-2501 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 jumper & connector settings, and component locations.

The following sections are included:

- Jumper & Connector Quick Reference Table
- Component Locations
- Configuration and Jumper Settings
- Connector Pin Assignments

3.1 JUMPER & CONNECTOR QUICK REFERENCE TABLE

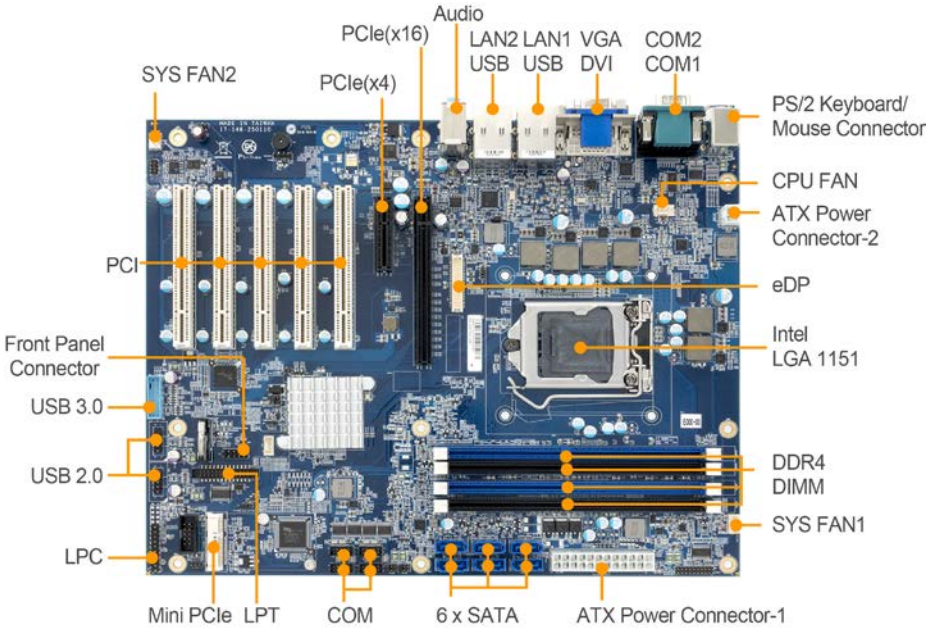
JUMPER Description	NAME
Hardware Power Failure Selection	JP1
Flash Descriptor Override Selection	JP3
LAN2 Enable / Disable Selection	JP5
Mini PCI Express and mSATA Selection (For C236/Q170 SKU Only)	JP6
VCCIO Voltage Selection	JP10
PCH Configuration / Recovery Selection	JP11
Case Open Detection Selection	JP12
Mini PCIE Voltage Selection (For C236/Q170 SKU Only)	JP13
COM3 Pin 9 RI/5V/12V Selection	JPCOM3
COM4 Pin9 RI/5V/12V Selection	JPCOM4
Clear CMOS Data Selection	JCMOS1

CONNECTOR Description	NAME
Power Input Connectors	ATX_PWR1, ATX_PWR2
Line-In, Line-Out and MIC-In Port	AUDIO1
COM Port	COM1, COM2
COM Connectors	COM3, COM4, COM5, COM6
CPU / System FAN Connectors	CPU_FAN1, SYS_FAN1, SYS_FAN2
Embedded Display Port (EDP) Connector (option) (For C236/Q170 only)	EDP
DVI (Digital Video Interface) Port	DVI-D
Front Panel Connector	FP1
Programmable GPIO Pin Header	JDIO1
LPC Connector	JLPC1
Speaker Connector	JSPEAKER
Keyboard / Mouse Connector	KB_MS1
LAN + USB Connectors	LAN1_USB1, LAN2_USB1
Mini PCI Express Slot (For C236/Q170 SKU Only)	MPCIE1

CONNECTOR Description	NAME
PCI Express Slots	PCI_E1, PCI_E2
PCI Bus Slots	PCI1~PCI5
SATA Connectors	SATA1, SAT2, SATA3, SATA4, SATA5, SATA6
Universal Serial Bus 3.0 Connector	USB1
VGA Port	VGA
Parallel Port (LPT) Connector (for C236 SKU only)	LPT1
Front Audio Line-In, Line-Out and MIC-In Port	J1
I2C Wafer	J17

3.2 COMPONENT LOCATIONS

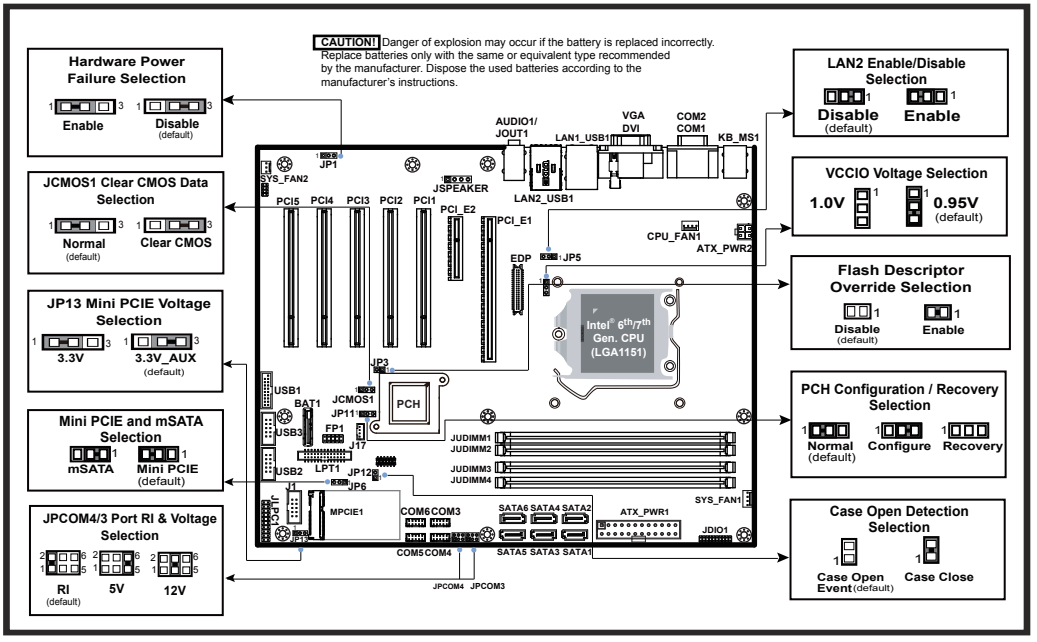
3.2.1 Top View of BA-2501RA-**N



	**WARNING:** Always disconnect the power cord when you are working with connectors and jumpers on the main board. Make sure both the system and peripheral devices are turned OFF as sudden surge of power could damage sensitive components. Make sure BA-2501 is properly grounded.
	**CAUTION:** Observe precautions while handling electrostatic sensitive components. Make sure to ground yourself to prevent static charge while you are working on the connectors and jumpers. Use a grounding wrist strap and place all electronic components in any static-shielded devices.

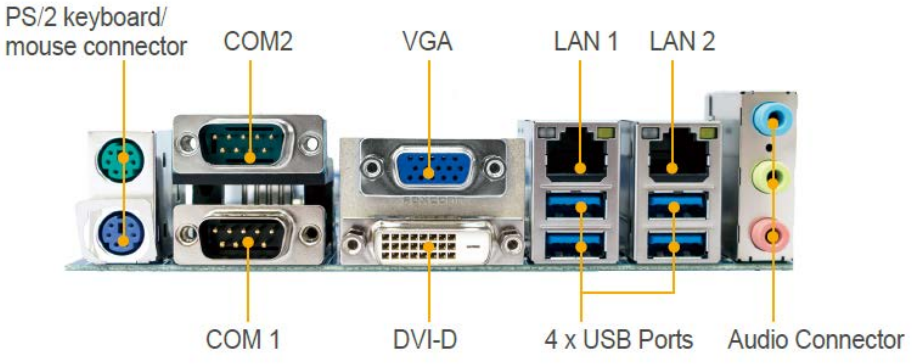
CAUTION: Always touch the motherboard components by the edges. Never touch components such as a processor by its pins. Take special cares while you are holding electronic circuit boards by the edges only. Do not touch the mainboard components.

3.2.2 Jumper Setting of BA-2501RA-**N



Note: C236 / Q170 SKU supports MPCIE1, SATA1~6, JUDIMM1~4, PCI_E1~2 available.
H110 SKU only supports SATA1~4, JUDIMM1/3, PCI_E1~2 available. LPT1 is only available for C236 SKU.

3.2.3 I/O View of BA-2501RA-**N

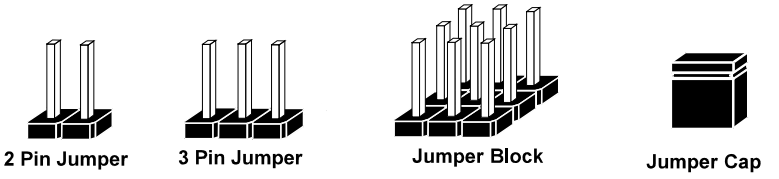


3.3 HOW TO SET JUMPERS

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

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

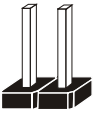
JUMPERS AND CAPS



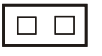
If a jumper has three pins (for examples, labelled PIN1, PIN2, and PIN3), you can connect PIN1 & PIN2 to create one setting by shorting. You can either connect PIN2 & PIN3 to create another setting. The same jumper diagrams are applied all through this manual. The figure below shows what the manual diagrams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

Jumper Diagrams

Jumper Cap looks like this

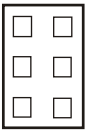


2 pin Jumper looks like this



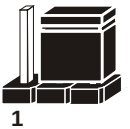
3 pin Jumper looks like this

Jumper Block looks like this

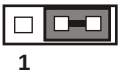


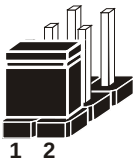
Jumper Settings

2 pin Jumper close(enabled) Looks like this

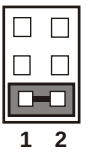


3 pin Jumper 2-3 pin close(enabled) Looks like this





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



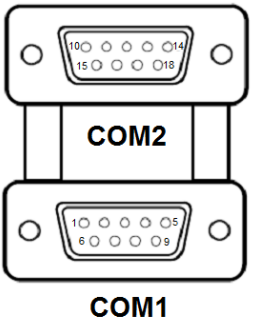
3.4 Setting Connectors and Jumpers

3.4.1 COM1 and COM2 PORT

Port Name: COM1, COM2

Description: COM1 and COM2 Connectors, fixed as RS-232

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



JD09M1

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

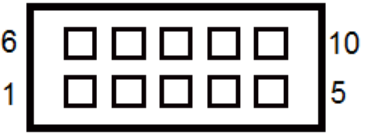
Notes:

1. COM2 is selectable as RS232, RS422, RS485 by BIOS setting.
2. Default setting is RS232. Please see **Chapter 5 "Advanced – F81866 Super IO Configuration"** for selection details.

3.4.2 COM3, COM4, COM5, COM6 CONNECTOR

Connector Location: COM3, COM4, COM5, COM6
Description: 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	-	-



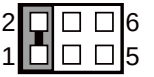
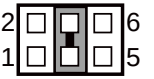
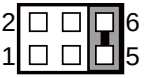
COM3/
COM4/
COM5/
COM6

Note:

1. COM3, COM4: Pin 9 is selectable for RI, +5V or +12V by jumper setting. Default setting is RI, please see "**COM3 and COM4 PIN9 Definition Selection Guide"** for selection details.
2. COM3 and COM4 are available for C236/Q170 SKU only.
3. COM5 and COM6 are available for C236 SKU only.

3.4.3 COM3 and COM4 PIN9 DEFINITION SELECTION GUIDE

Jumper Name: JPCOM3 / JPCOM4
Description: COM3 and COM4 RI & Voltage Selection

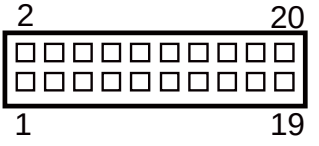
Selection	Jumper Setting (Pin Closed)	Jumper Illustration
RI	1-2 ***(Default Setting)***	 JPCOM3/JPCOM4
12V	3-4	 JPCOM3/JPCOM4
5V	5-6	 JPCOM3/JPCOM4

3.4.4 Programmable GPIO PIN HEADER

Connector Location: JDIO1

Description: General Purpose Input / Output Pin Header

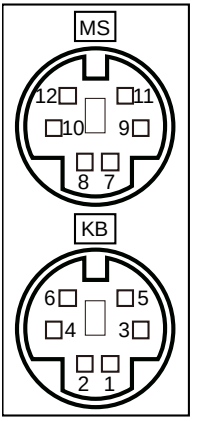
PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	VCC5	2	VCC12
3	DIN1	4	DOUT1
5	DIN2	6	DOUT2
7	DIN3	8	DOUT3
9	DIN4	10	DOUT4
11	DIN5	12	DOUT5-
13	DIN6	14	DOUT6
15	DIN7	16	DOUT7
17	DIN8	18	DOUT8
19	GND	20	GND



JDIO1

3.4.5 KEYBOARD & MOUSE PORT

Port Name: KB_MS1
Description: PS/2 Keyboard & Mouse Port



KB_MS1

Mouse:

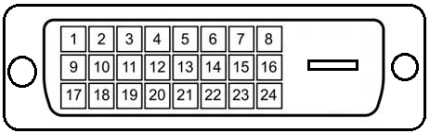
PIN	ASSIGNMENT	PIN	ASSIGNMENT
12	NC	11	MSCLK
10	VCC5	9	GND
8	NC	7	MSDATA

Keyboard:

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

3.4.6 DVI (Digital Video Interface) PORT

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



DVI-D

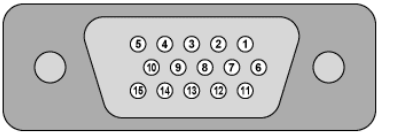
PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	TMDS_D2-	9	TMDS_D1-	17	TMDS_D0-
2	TMDS_D2+	10	TMDS_D1+	18	TMDS_D0+
3	GND	11	GND	19	GND
4	NC	12	NC	20	NC
5	NC	13	NC	21	NC
6	TMDS_CLK	14	VCC5	22	GND
7	TMDS_DATA	15	GND	23	TMDS_D3+
8	NC	16	TMDS_HPD	24	TMDS_D3-

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.

3.4.7 VGA PORT

Port Name: VGA
Description: VGA (Video Graphics Array) Connector

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



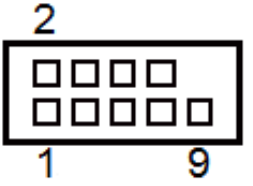
VGA

3.4.8 FRONT PANEL CONNECTOR

Connector Location: FP1

Description: 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	-	-



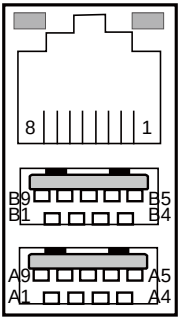
FP1

3.4.9 LAN & USB PORT

Dual LAN ports are provided to support 10/100/1000Mbps, RJ45, rear I/O, and supports Wake-On-LAN & PXE.

Port Name: LAN1_USB1
Description: LAN1 & Two USB 3.0 Ports
LAN1: Intel® PHY I219-LM (10/100/1000 Mbps)

Green/Orange Yellow



LAN1_USB1

LAN1 pin assignment:

PIN	ASSIGNMENT
1	MDI_P0
2	MDI_N0
3	MDI_1P
4	MDI_2P
5	MDI_2N
6	MDI_1N
7	MDI_P3
8	MDI_N3

LAN1 LED Indicator:

Left Side LED

Green Color On7	10/100/1000Mbps 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

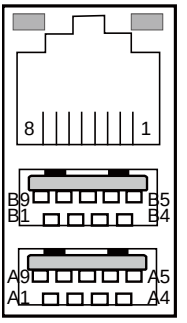
USB 3.0 signals:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
A1	VCC	A9	USB3_TX_P1
A2	USB_N1	A8	USB3_TX_N1
A3	USB_P1	A7	GND
A4	GND	A6	USB3_RX_P1
-	-	A5	USB3_RX_N1

PIN	ASSIGNMENT	PIN	ASSIGNMENT
B1	VCC	B9	USB3_TX_P2
B2	USB_N2	B8	USB3_TX_N2
B3	USB_P2	B7	GND
B4	GND	B6	USB3_RX_P2
-	-	B5	USB3_RX_N2

Port Name: LAN2_USB1
Description: LAN2 & Two USB 3.0 Ports
LAN2: Intel® PHY I211-AT (10/100/1000 Mbps)

Green/Orange Yellow



LAN2_USB1

LAN2 Pin Assignment:

PIN	ASSIGNMENT
1	MDI_P0
2	MDI_N0
3	MDI_1P
4	MDI_2P
5	MDI_2N
6	MDI_1N
7	MDI_P3
8	MDI_N3

LAN2 LED Indicator:
Left Side LED

Green Color On7	10/100/1000Mbps 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	A9	USB3_TX_P3
A2	USB_N3	A8	USB3_TX_N3
A3	USB_P3	A7	GND
A4	GND	A6	USB3_RX_P3
-	-	A5	USB3_RX_N3

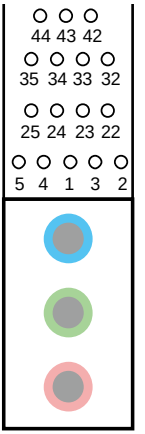
PIN	ASSIGNMENT	PIN	ASSIGNMENT
B1	VCC	B9	USB3_TX_P4
B2	USB_N4	B8	USB3_TX_N4
B3	USB_P4	B7	GND
B4	GND	B6	USB3_RX_P4
-	-	B5	USB3_RX_N4

3.4.10 LINE-IN, LINE-OUT, MIC-IN PORT

Connector Location: AUDIO1

Description: 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:

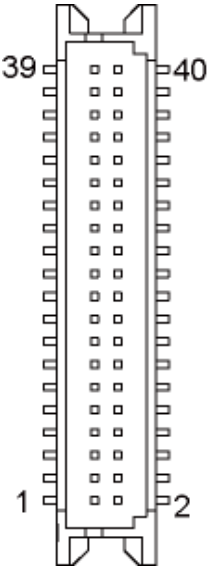
PIN	ASSIGNMENT
2	HD_MIC1-L_L
3	GND
1	GND
4	GND
5	HD_MIC1-R_L

3.4.11 EMBEDDED DISPLAY PORT (EDP) CONNECTOR (OPTION) (For C236/Q170 only)

Connector Location: EDP

Description: Embedded Display Port (EDP) Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	NC	2	GND
3	EDP_TX3_DN	4	EDP_TX3_DP
5	GND	6	EDP_TX2_DN
7	EDP_TX2_DP	8	GND
9	EDP_TX1_DN	10	EDP_TX1_DP
11	GND	12	EDP_TX0_DN
13	EDP_TX0_DP	14	GND
15	EDP_AUX_DP_C	16	EDP_AUX_DN_C
17	GND	18	LCDVCC
19	LCDVCC	20	LCDVCC
21	LCDVCC	22	NC
23	LCDGND	24	LCDGND
25	LCDGND	26	LCDGND
27	EDP_LVDS_HPD	28	BackLight GND
29	BackLight GND	30	GND
31	GND	32	EDP_BKLTEN
33	EDP_BKLTCTL	34	NC
35	NC	36	VCC12
37	VCC12	38	VCC12
39	VCC12	40	VCC12



EDP

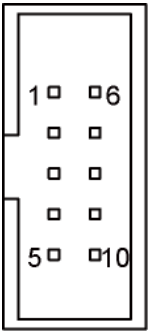
eDP (Embedded DisplayPort) was developed to be used specifically in embedded display applications, such as Notebook and Notepad PCs. eDP is based on the VESA DisplayPort Standard. It aims to define a standardized display panel interface for internal connections; e.g., graphics cards to notebook display panels. It has advanced power-saving features including seamless refresh rate switching. It has become the new mainstream display panel interface for LCD panels with the realized higher resolution.

3.4.12 FRONT PANEL AUDIO CONNECTOR

Connector Location: J1

Description: Front Panel Audio Connector

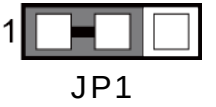
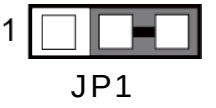
PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	MIC1-L	6	MIC1-R
2	GND	7	GND
3	LINE-IN-L	8	LINE-IN-R
4	GND	9	GND
5	LINE-OUT-L	10	LINE-OUT-R



J1

3.4.13 HARDWARE POWER FAILURE SELECTION

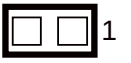
Connector Location: JP1
Description: Hardware Power Failure Selection

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

3.4.14 FLASH DESCRIPTOR OVERRIDE SELECTION

Connector Location: JP3

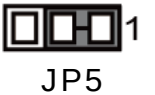
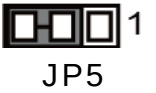
Description: Flash Descriptor Override Selection

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

3.4.15 LAN2 ENABLE / DISABLE SELECTION

Connector Location: JP5

Description: LAN2 Enable / Disable Selection

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

3.4.16 MINI PCIE and MSATA SELECTION (For C236/Q170 SKU Only)

Connector Location: JP6

Description: Mini PCIE and mSATA Selection

Selection	Jumper Setting (Pin Closed)	Jumper Illustration
mSATA	1-2	 JP6
Mini PCIE*	2-3 ***(Default Setting)***	 JP6

Note: Mini PCIE function is only supported in C236/Q170 SKU only.

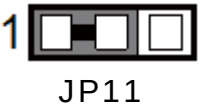
3.4.17 VCCIO VOLTAGE SELECTION

Connector Location: JP10
Description: VCCIO Voltage Selection

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

3.4.18 PCH CONFIGURATION / RECOVERY SELECTION

Connector Location: JP11
Description: PCH Configuration / Recovery Selection

Selection	Jumper Setting (Pin Closed)	Jumper Illustration
Normal	1-2 ***(Default Setting)***	 JP11
Configure	2-3	 JP11
Recovery	Open	 JP11

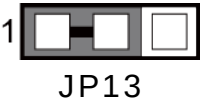
3.4.19 CASE OPEN DETECTION SELECTION

Connector Location: JP12
Description: Case Open Detection Selection

Selection	Jumper Setting (Pin Closed)	Jumper Illustration
Case Closed	1-2	
Case Opened Event	**Open** ***(Default Setting)***	

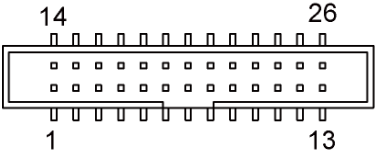
3.4.20 MINI PCIE VOLTAGE SELECTION (For C236/Q170 SKU Only)

Connector Location: JP13
Description: Mini PCIE Voltage Selection

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

3.4.21 PARALLEL PORT (LPT) CONNECTOR (For C236 SKU only)

Connector Location: LPT1
Description: Parallel Port Connector



LPT1

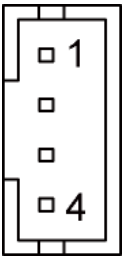
PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	PRN_STRBJ_R	14	PRN_AFD
2	PRN_R_D0	15	PRN_ERRJ
3	PRN_R_D1	16	PRN_INIT
4	PRN_R_D2	17	PRN_SLIN
5	PRN_R_D3	18	GND
6	PRN_R_D4	19	GND
7	PRN_R_D5	20	GND
8	PRN_R_D6	21	GND
9	PRN_R_D7	22	GND
10	PRN_ACKJ	23	GND
11	PRN_BUSY	24	GND
12	PRN_PE	25	GND
13	PRN_SLCT	26	GND

3.4.22 I2C WAFER

Connector Location: J17

Description: I2C Wafer

PIN	ASSIGNMENT
1	PRN_STRBJ_R
2	PRN_R_D0
3	PRN_R_D1
4	PRN_R_D2



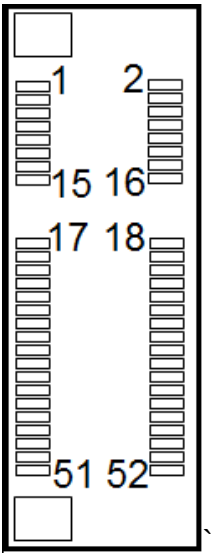
J17

3.4.23 MINI PCI EXPRESS SLOT (For C236/Q170 Only)

Connector Location: MPCIE1

Description: 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

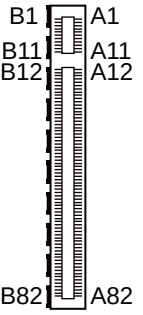


MPCIE1

3.4.24 PCIE Bus

Connector Location: PCI_E1

Description: 164-pin PCIE Bus (x16)

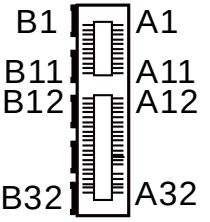


PCI_E1

PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT
B2	+ 12V	B1	+ 12V	A2	+ 12V	A1	PRSNT#1
B4	GND	B3	+ 12V	A4	GND	A3	+ 12V
B6	SMB_DATA	B5	SMB_CLK	A6	NC	A5	NC
B8	+ 3.3V	B7	GND	A8	NC	A7	NC
B10	+ 3.3V_AXU	B9	NC	A10	+ 3.3V	A9	+ 3.3V
-	-	B11	WAKE#	-	-	A11	PERST#
B12	RSVD	B13	GND	A12	GND	A13	REFCLK+
B14	HSOP0	B15	HSON0	A14	REFCLK-	A15	GND
B16	GND	B17	PRSNT#2	A16	HSIP0	A17	HSIN0
B18	GND	B19	HSOP1	A18	GND	A19	RSVD
B20	HSON1	B21	GND	A20	GND	A21	HSIP1
B22	GND	B23	HSOP2	A22	HSIN1	A23	GND
B24	HSON2	B25	GND	A24	GND	A25	HSIP2
B26	GND	B27	HSOP3	A26	HSIN2	A27	GND
B28	HSON3	B29	GND	A28	GND	A29	HSIP3
B30	RSVD	B31	PRSNT#2	A30	HSIN3	A31	GND
B32	GND	B33	HSOP4	A32	RSVD	A33	RSVD
B34	HSON4	B35	GND	A34	GND	A35	HSIP4
B36	GND	B37	HSOP5	A36	HSIN4	A37	GND
B38	HSON5	B39	GND	A38	GND	A39	HSIP5
B40	GND	B41	HSOP6	A40	HSIN5	A41	GND
B42	HSON6	B43	GND	A42	GND	A43	HSIP6
B44	GND	B45	HSOP7	A44	HSIN6	A45	GND
B46	HSON7	B47	GND	A46	GND	A47	HSIP7
B48	PRSNT#2	B49	GND	A48	HSIN7	A49	GND
B50	HSOP8	B51	HSON8	A50	RSVD	A51	GND
B52	GND	B53	GND	A52	HSIP8	A53	HSIN8
B54	HSOP9	B55	HSON9	A54	GND	A55	GND
B56	GND	B57	GND	A56	HSIP9	A57	HSIN9
B58	HSOP10	B59	HSON10	A58	GND	A59	GND
B60	GND	B61	GND	A60	HSIP10	A61	HSIN10

PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT
B62	HSOP11	B63	HSON11	A62	GND	A63	GND
B64	GND	B65	GND	A64	HSIP11	A65	HSIN11
B66	HSOP12	B67	HSON12	A66	GND	A67	GND
B68	GND	B69	GND	A68	HSIP12	A69	HSIN12
B70	HSOP13	B71	HSON13	A70	GND	A71	GND
B72	GND	B73	GND	A72	HSIP13	A73	HSIN13
B74	HSOP14	B75	HSIN14	A74	GND	A75	GND
B76	GND	B77	GND	A76	HSIP14	A77	HSIN14
B78	HSIP15	B79	HSIN15	A78	GND	A79	GND
B80	GND	B81	PRSNT#2	A80	HSIP15	A81	HSIN15
B82	RSVD	-	-	A82	GND	-	-

Connector Location: PCI_E2 (x4)
Description: PCIE Bus (x4)
You will find the **PCI_E2** connector with 64 pins on BA-2501. PCI_E2 is available for C236/Q170 SKU.



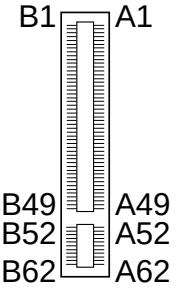
PCI_E2

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

3.4.25 PCI BUS CONNECTOR

Connector Location: PCI1, PCI2, PCI3, PCI4, PCI5

Description: 124-pin PCI Bus Connector



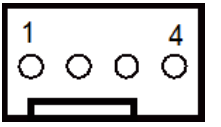
PCI1~PCI5

PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT
B2	+12V	B1	TRST#	A2	TCK	A1	-12V
B4	TDI	B3	TMS	A4	TDO	A3	GND
B6	INTA#	B5	+5V	A6	+5V	A5	+5V
B8	+5V	B7	INTC#	A8	INTD#	A7	INTB#
B10	+5V(I/O)	B9	CLKC	A10	REQ1#	A9	REQ3#
-	-	B11	CLKD	-	-	A11	GNT3#
B12	GND	B13	GND	A12	GND	A13	GND
B14	GNT1#	B15	RST#	A14	CLKA	A15	GND
B16	+5V(I/O)	B17	GNT0#	A16	CLKB	A17	GND
B18	GND	B19	REQ2#	A18	REQ0#	A19	+5V(I/O)
B20	AD30	B21	+3.3V	A20	AD31	A21	AD29
B22	AD28	B23	AD26	A22	GND	A23	AD27
B24	GND	B25	AD24	A24	AD25	A25	+3.3V
B26	GNT2#	B27	+3.3V	A26	C/BE3#	A27	AD23
B28	AD22	B29	AD20	A28	GND	A29	AD21
B30	GND	B31	AD18	A30	AD19	A31	+3.3V
B32	AD16	B33	+3.3V	A32	AD17	A33	C/BE2#
B34	FRAME#	B35	GND	A34	GND	A35	IRDY#
B36	TRDY#	B37	GND	A36	+3.3V	A37	DEVSEL#
B38	STOP#	B39	+3.3V	A38	GND	A39	LOCK#
B40	SDONE	B41	SB0#	A40	PERR#	A41	+3.3V
B42	GND	B43	PAR	A42	SERR#	A43	+3.3V
B44	AD15	B45	+3.3V	A44	C/BE1#	A45	AD14
B46	AD13	B47	AD11	A46	GND	A47	AD12
B48	GND	B49	AD09	A48	AD10	A49	GND
-	-	-	-	-	-	-	-
B52	C/BE0#	B53	+3.3V	A52	AD08	A53	AD07
B54	AD06	B55	AD04	A54	+3.3V	A55	AD05
B56	GND	B57	AD02	A56	AD03	A57	GND
B58	AD00	B59	+5V(I/O)	A58	AD01	A59	+5V(I/O)
B60	REQ64#	B61	+5V	A60	ACK64#	A61	+5V
B62	+5V	-	-	A62	+5V	-	-

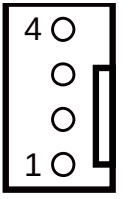
3.4.26 CPU / SYSTEM FAN CONNECTOR

Connector Location: CPU_FAN1, SYS_FAN1
Description: CPU Fan Connector (CPU_FAN1),
System Fan Connector 1 (SYS_FAN1)

PIN	ASSIGNMENT
1	GND
2	VCC12
3	CPU_FANTAC
4	CPU_FANCTRL



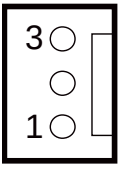
CPU_FAN1



SYS_FAN1

Connector Location: SYS_FAN2
Description: System Fan Connector 2

PIN	ASSIGNMENT
3	NC
2	VCC12
1	GND



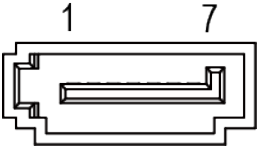
SYS_FAN2

3.4.27 SERIAL ATA (SATA) CONNECTOR

Connector Location: SATA1, SATA2, SATA3, SATA4, SATA5, SATA6
Description: SATA Connectors

SATA1 Pin Assignment:

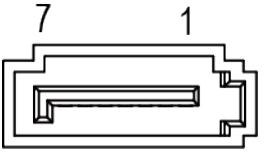
PIN	ASSIGNMENT
1	GND
2	SATA_TXP0
3	SATA_TXN0
4	GND
5	SATA_RXN0
6	SATA_RXP0
7	GND



SATA1/
SATA3/
SATA5

SATA2 Pin Assignment:

PIN	ASSIGNMENT
1	GND
2	SATA_TXP1
3	SATA_TXN1
4	GND
5	SATA_RXN1
6	SATA_RXP1
7	GND



SATA2/
SATA4/
SATA6

SATA3 Pin Assignment:

PIN	ASSIGNMENT
1	GND
2	SATA_TXP2
3	SATA_TXN2
4	GND
5	SATA_RXN2
6	SATA_RXP2
7	GND

SATA4 Pin Assignment:

PIN	ASSIGNMENT
1	GND
2	SATA_TXP3
3	SATA_TXN3
4	GND
5	SATA_RXN3
6	SATA_RXP3
7	GND

SATA5 Pin Assignment:

PIN	ASSIGNMENT
1	GND
2	SATA_TXP4
3	SATA_TXN4
4	GND
5	SATA_RXN4
6	SATA_RXP4
7	GND

Note: SATA5 is not supported in PCH H110. SATA5 is available for C236/Q170 SKU.

SATA6 Pin Assignment:

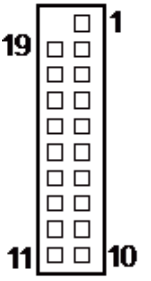
PIN	ASSIGNMENT
1	GND
2	SATA_TXP5
3	SATA_TXN5
4	GND
5	SATA_RXN5
6	SATA_RXP5
7	GND

Notes:

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

.

3.4.28 INTERNAL USB 3.0 CONNECTOR



USB1

Connector Location: USB1
Description: Internal USB 3.0 Connector

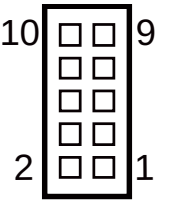
PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	VCC5	11	USB2_P
2	USB3_RX_N	12	USB2_N
3	USB3_RX_P	13	GND
4	GND	14	USB3_TX_P
5	USB3_TX_N	15	USB3_TX_N
6	USB3_TX_P	16	GND
7	GND	17	USB3_RX_P
8	USB2_N	18	USB3_RX_N
9	USB2_P	19	VCC5
10	GND	-	-

3.4.29 INTERNAL USB 2.0 CONNECTOR

Connector Location: USB2, USB3

Description: Internal USB 2.0 Connector

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



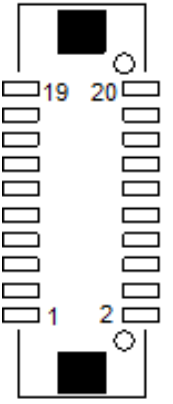
USB2/
USB3

3.4.30 DISPLAY PORT CONNECTOR (OPTION)

Connector Location: DP1

Description: DisplayPort Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	DATA0+	2	GND
3	DATA0-	4	DATA1+
5	GND	6	DATA1-
7	DATA2+	8	GND
9	DATA2-	10	DATA3+
11	GND	12	DATA3-
13	AUX_EN#	14	GND
15	AUX+	16	GND
17	AUX-	18	HPD
19	GND	20	3.3V



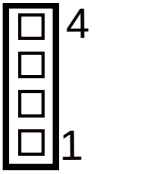
DP1

3.4.31 SPEAKER CONNECTOR

Connector Location: JSPEAKER

Description: Speaker Connector

PIN	ASSIGNMENT
1	SPKR_VCC
2	SPKR_SIGNAL
3	SPKR_SIGNAL
4	SPKR_SIGNAL

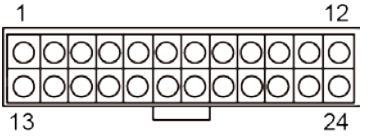


JSPEAKER

3.4.32 POWER INPUT CONNECTOR

Connector Location: ATX_PWR1
Description: ATX Connector

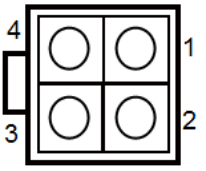
PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	+ 3.3V	13	+ 3.3V
2	+ 3.3V	14	-12V
3	GND	15	GND
4	+ 5V	16	PSON
5	GND	17	GND
6	+ 5V	18	GND
7	GND	19	GND
8	POK	20	-5V
9	+ 5V_SB	21	+ 5V
10	+ 12V	22	+ 5V
11	+ 12V	23	+ 5V
12	+ 12V	24	GND



ATX_PWR1

Connector Location: ATX_PWR2
Description: Power Connector

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

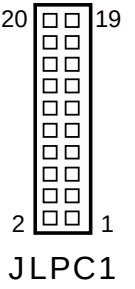


ATX_PWR2

3.4.33 LPC CONNECTOR

Connector Location: JLPC1

Description: LPC Connector



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

3.4.34 CLEAR CMOS DATA SELECTION

Jumper Name: JCMOS1
Description: Clear CMOS Data Selection

Step1. Remove the main power of the PC.
Step2. Close JCMOS1 (pins 1-2) for 6 seconds by a cap.
Step3. Remove the cap which is just used on JCMOS1 (1-2), so that JCMOS1 returns to "OPEN".
Step4. Power on the PC and the PC will then auto-reboot for once in order to set SoC's register.
Step5. Done!

Selection	Jumper Setting (Pin Closed)	Jumper Illustration
Normal	1-2 ***(Default Setting)***	 JCMOS1
Clear CMOS	2-3	 JCMOS1

4 Software Utilities

This chapter provides the detailed information that guides users to install driver utilities for the system. The following topics are included:

- Installing Intel® Chipset Software Installation Utility
- Installing VGA Driver Utility
- Installing LAN Driver Utility
- Installing Sound Driver Utility
- Installing KMDF Driver Utility
- Installing Intel® Management Engine Components Installer
- Installing Intel® Rapid Storage Driver Utility
- Installing Intel® F6 Floppy Disk Driver Utility
- Installing Intel® Serial I/O Driver Utility
- Installing Intel® USB 3.0 eXtensible Host Controller Driver Utility

4.1 Introduction

Enclosed with the BA-2501 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
D:\BA-2501_V1.0\Platform\1_Main Chip\Win7(32Bit) D:\BA-2501_V1.0\Platform\1_Main Chip\ Win7&8.1&10(64Bit)	Intel® Chipset Device Software installer
D:\BA-2501_V1.0\Platform\ 2_Graphics\Win7(32Bit) D:\BA-2501_V1.0\Platform\ 2_Graphics\Win7&8.1&10(64Bit)	Intel HD Graphics Family For VGA driver installation
D:\BA-2501_V1.0\Platform\ 3_Audio\Win7(32Bit) D:\BA-2501_V1.0\Platform\ 3_Audio\Win7&8.1&10(64Bit)	Realtek ALC888S-VD2-GR HD Audio codec System Software
D:\BA-2501_V1.0\Platform\ 4_ME\Kmdf For Win7 D:\BA-2501_V1.0\Platform\ 4_ME\Win7(32Bit) D:\BA-2501_V1.0\Platform\ 4_ME\Win7&8.1&10(64Bit)	Intel® Management Engine Components Installer
D:\BA-2501_V1.0\Platform\ 5_Lan Chip\Win7(32Bit) D:\BA-2501_V1.0\Platform\ 5_Lan Chip\ Win7&8.1&10 (64Bit)	Intel® I219-LM & Intel® I211-AT For LAN Driver installation
D:\BA-2501_V1.0\Platform\ 6_RAID\Win7(32Bit) D:\BA-2501_V1.0\Platform\ 6_RAID\Win7&8.1&10 (64Bit)	Intel® Rapid Storage Technology
D:\BA-2501_V1.0\Platform\ 7_F6Floppy\Win7(32Bit)	Intel® F6 Floppy Disk Utility

Filename (Assume that DVD-ROM drive is D:)	Purpose
D:\BA-2501_V1.0\Platform\ 7_F6Floppy\Win7(32Bit&64Bit)	
D:\BA-2501_V1.0\Platform\ 8_Serial IO\Win8.1(64Bit) D:\BA-2501_V1.0\Platform\8_Serial IO\Win7&8.1&10 (64Bit)	Intel® Serial I/O Driver
D:\BA-2501_V1.0\Platform\ 9_USB3.0\ Win7 (32Bit&64Bit)	Intel® USB 3.0 eXtensible Host Controller

Note: Install the driver utilities immediately after the OS installation is completed.

For more details on the installation sequence, refer to the Readme.txt file.

4.2 Installing Intel® Chipset Software Installation Utility

Introduction

The Intel® Chipset Software Installation Utility installs the 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 functions work properly:

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

Intel® Chipset Software Installation Utility

The utility pack is to be installed only for Windows 7 (32/64-bit) / Windows 8.1 (64-bit) / Windows 10 (64-bit), and it should be installed immediately after the OS installation is finished. Please follow the steps below:

1 Connect the USB DVD-ROM device to BA-2501 and insert the driver disk.

2 Enter the **Main Chip** folder where the Chipset driver is located (depending on your OS platform).

3 Click **Setup.exe** file for driver installation.

4 Follow the on-screen instructions to install the driver.

5 Once the installation is completed, shut down the system and restart BA-2501 for the changes to take effects.

4.3 Installing VGA Driver Utility

The VGA interface embedded in BA-2501 can support dual displays via VGA, DVI, DP (option) and eDP (option) interfaces and make the system work simultaneously.

To install the VGA driver utility, follow the steps below:

1. Connect the USB DVD-ROM device to BA-2501 and insert the driver disk.
2. Enter the **Graphics** folder where the driver is located (depending on your OS platform).
3. Click the **Setup.exe** file for driver installation.
4. Follow the on-screen instructions to complete the installation.
5. Once the installation is completed, shut down the system and restart BA-2501 for the changes to take effects.

4.4 Installing LAN Driver Utility

Enhanced with LAN function, BA-2501 supports various network adapters. To install the LAN Driver, follow the steps below:

1. Connect the USB DVD-ROM device to BA-2501 and insert the driver disk.
2. Enter the **LAN** folder where the driver is located (depending on your OS platform).
3. Click **Setup.exe** file for driver installation.
4. Follow the on-screen instructions to complete the installation.
5. Once the installation is completed, shut down the system and restart BA-2501 for the changes to take effects.

4.5 Installing Sound Driver Utility

To install the Sound Driver, follow the steps below:

1. Connect the USB DVD-ROM device to BA-2501 and insert the driver disk.
2. Open the **Audio** folder where the driver is located (depending on your OS platform).
3. Click the **Setup.exe** file for driver installation.
4. Follow the on-screen instructions to complete the installation.
5. Once the installation is completed, shut down the system and restart BA-2501 for the changes to take effects.

4.6 Intel® Management Engine Components Installer Installation

For Windows 7 only. Pre-install Microsoft's Kernel-Mode Driver Framework (KMDF) version 1.11 before you install the Intel® Management Engine Components Installer (ME) in order to avoid errors in Device Manager.

Installation Instructions for Kernel-Mode Driver Framework (KMDF)

To install the Kernel-Mode Driver Framework (KMDF), follow the steps below:

1. Insert the driver disk into a DVD-ROM device.
2. (For Windows 7 only) Enter the KMDF folder where the installation driver file is located.
3. (For Windows 7 only) Click the **Setup kmdf-1.11.exe** file for driver installation.

Installation Instructions for Intel® Management Engine Components Installer

1. Connect the USB DVD-ROM device to BA-2501 and insert the driver disk.
2. Enter the **ME** folder where the driver is located.
3. Select Windows 7 (32/64-bit) / Windows 8.1 (64-bit) / Windows 10 (64-bit) for your OS platform.
4. Click **Setup.exe** file for ME driver installation.
5. Follow the on-screen instructions to complete the installation.
6. Once the installation is completed, shut down the system and restart BA-2501 for the changes to take effect.

4.7 Installing RAID Driver Utility (Only for C236/Q170, Optional)

INTEL® RapidStorage Technology Option ROM

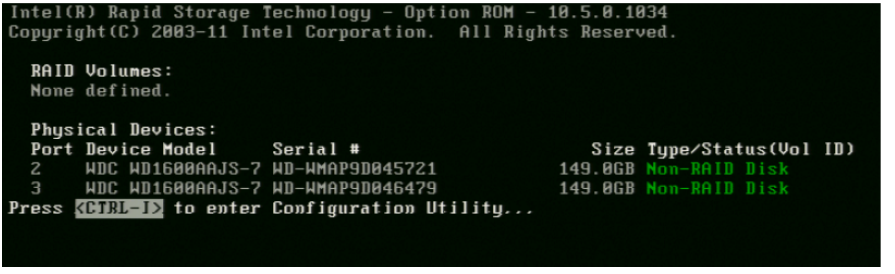
The Intel® Rapid Storage Technology option ROM provides the following:

- Pre-operating system user interface for RAID volume management
- Ability to create, delete and reset RAID volumes
- RAID recovery

User Interface

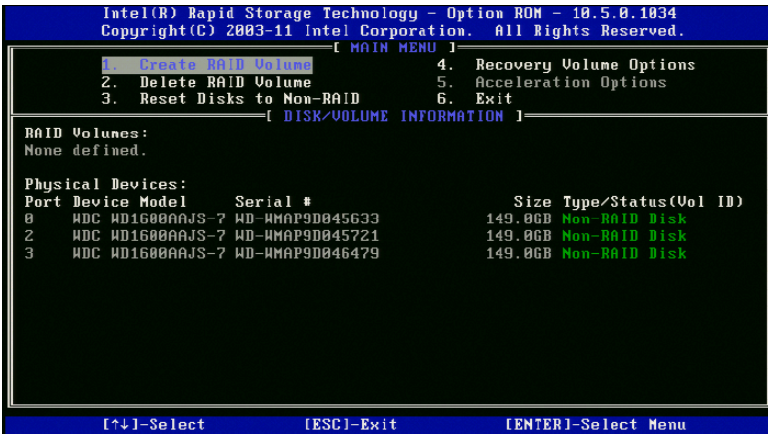
To enter the Intel® Rapid Storage Technology option ROM user interface, press Ctrl-I when prompted during the Power-On Self-Test (POST).

Option ROM prompt:



In the user interface, the hard drive(s) and hard drive information listed for your system will differ from the example in the figure below:

Option ROM user interface:



Installing RAID Driver Utility (Only for C236/Q170, Optional)

The Intel® Rapid Storage Technology (Intel® RST) driver supports RAID 0, 1, 5, 10 in C236/Q170 SKU. To install the RAID driver utility, follow the steps below:

1 Connect the USB DVD-ROM device to BA-2501 and insert the driver disk.

2 Enter the **RST** folder where the driver is located.

3 Select Windows 7 (32/64-bit) / Windows 8.1 (64-bit) / Windows 10 (64-bit) for your OS platform.

4 Click **Setup.exe** driver installation file for driver installation.

5 Follow the on-screen instructions to complete the installation.

6 Once the installation is completed, shut down the system and restart BA-2501 for the changes to take effect.

Note: The RAID driver utility is not supported for H110 SKU.

4.8 Installing Intel® F6 Floppy Disk Driver Utility

To install the F6 Floppy Disk Driver, follow the steps below:

1. Connect the USB DVD-ROM device to BA-2501 and insert the driver disk.
2. Open the **F6 Floppy** folder where the driver is located.
3. Select Windows 7 (32/64-bit) / Windows 8.1 (64-bit) / Windows 10 (64-bit) for your OS platform.
4. Copy the F6 Floppy Disk driver files into a removable disk for installing the OS.
5. Once the installation is completed, shut down the system and restart BA-2501 for the changes to take effects.

4.9 Installing Intel® Serial I/O Driver Utility

To install the Serial I/O Driver, follow the steps below:

1. Connect the USB DVD-ROM device to BA-2501 and insert the driver disk.
2. Open the **Serial I/O** folder where the driver is located.
3. Select Windows 7 (32/64-bit) / Windows 8.1 (64-bit) / Windows 10 (64-bit) for your OS platform.
4. Click the **Setup.exe** file for driver installation.
5. Follow the on-screen instructions to complete the installation.
6. Once the installation is completed, shut down the system and restart BA-2501 for the changes to take effects.

4.10 Installing Intel® USB 3.0 eXtensible Host Controller Utility

(For Windows 7 Only) Intel® USB 3.0 eXtensible Host Controller Driver supports the following Intel® Chipsets/Processors:

- Intel® 8 Series/C220 series Chipset Family
- Intel® 4th Generation Core™ Processors
- Intel® C610 series Chipset Family
- Intel® 9 Series Chipset Family
- Intel® Pentium® Processor or Intel® Celeron® Processor N- & J-Series
- Intel® 5th generation Intel® Core™ Processors
- Intel® Core™ M Processor
- Intel® 6th generation Intel® Core™ processors
- Intel® 100 Series Chipset Family

To install the utility, follow the steps below:

1 Insert the driver disk into a DVD-ROM device.

2 Open the **USB 3.0** folder where the driver is located.

3 Select Windows 7 (32/64-bit) for your OS platform.

4 Click the **Setup.exe** file for driver installation.

5 Follow the on-screen instructions to complete the installation.

6 Once the installation is completed, shut down the system and restart BA-2501 for the changes to take effects.

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:

- Accessing Setup Utilities
- Main Menu
- Advanced Menu
- Chipset Menu
- Security Menu
- Boot Menu
- Save & Exit Menu

5.1 Introduction

The BA-2501 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.

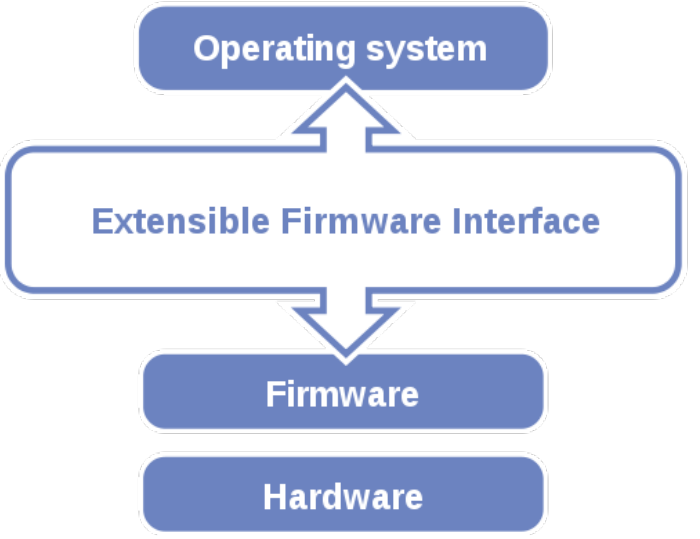


Figure 5-1. Extensible Firmware Interface Diagram

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 JCMOS1 jumper.
4. The power of the CMOS RAM became lost and the system configuration has been erased.

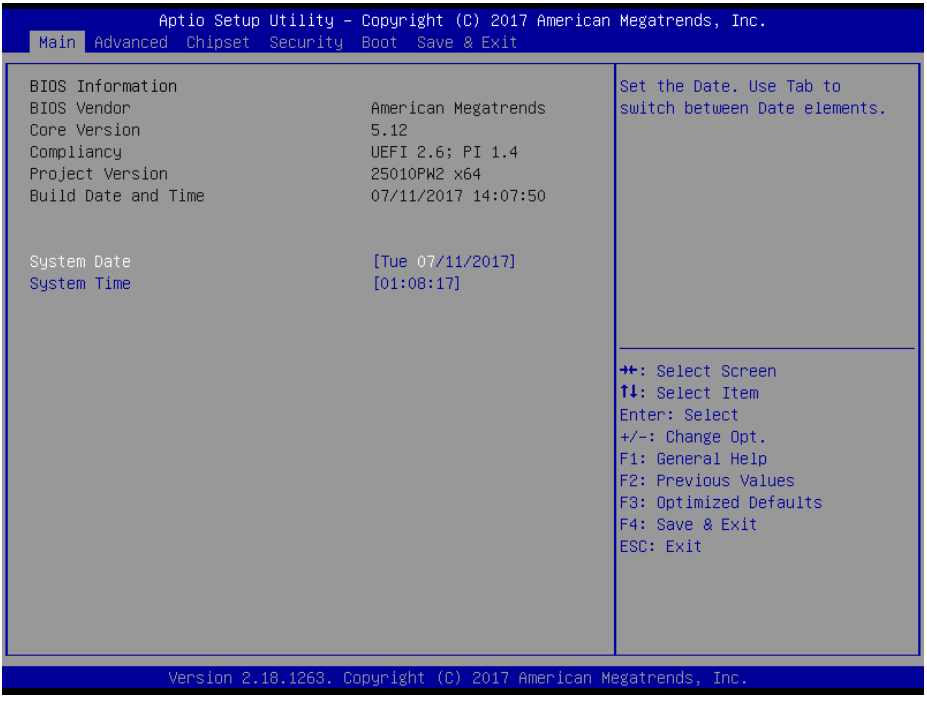
All the menu settings are described in details in this chapter.

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.

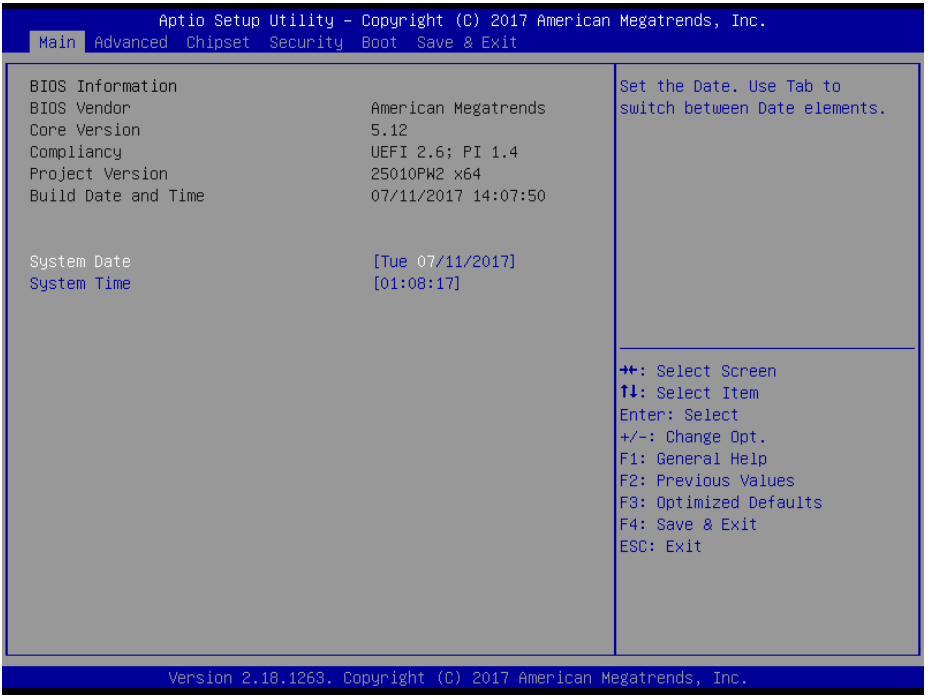
The language of the BIOS setup menu interface and help messages are shown in US English. You may use <↑> or <↓> key to select among the items and press <Enter> to confirm and enter the sub-menu. The following table provides the list of the navigation keys that you can use while operating the BIOS setup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

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

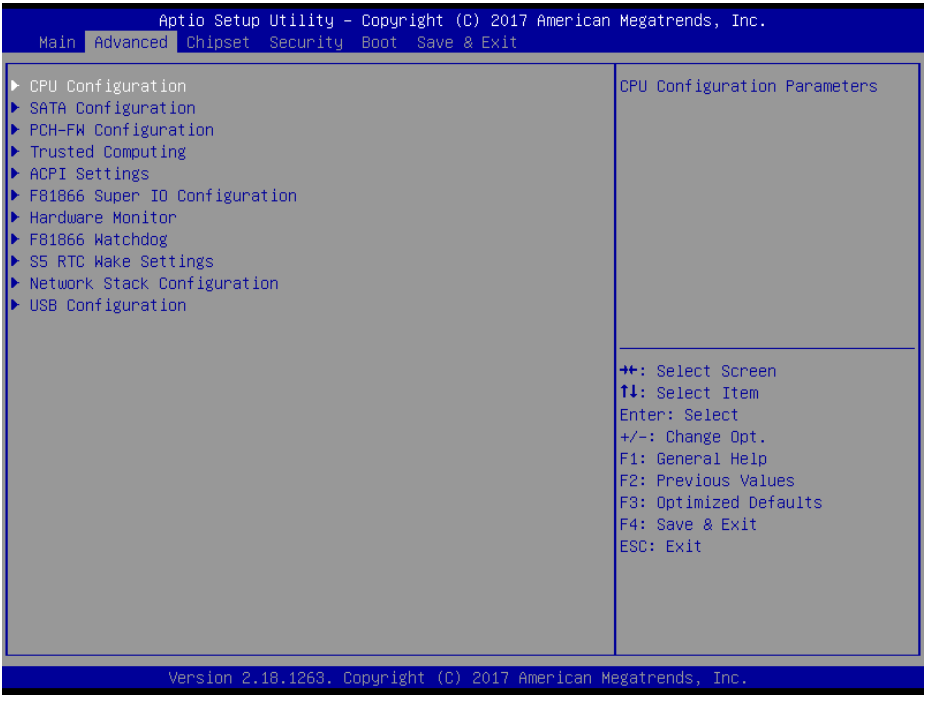
BIOS Setting	Options	Description/Purpose
BIOS Vendor	No changeable options	Displays the name of the BIOS vendor.
Core Version	No changeable options	Displays the current BIOS core version.
Compliancy	No changeable options	Displays the current UEFI version.
Project Version	No changeable options	Displays 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

BIOS Setting	Options	Description/Purpose
		to increase/decrease it. The "Day" is automatically changed.
System Time	Hour, minute, second	Sets the system time. The format is [Hour: 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 the sub-menu items such as CPU Configuration, SATA Configuration, PCH-FW Configuration, Trusted Computing, ACPI Settings, F81866 Super IO Configuration, Hardware Monitor, F81866 Watchdog, S5 RTC Wake Settings, Network Stack Configuration and USB Configuration.



Advanced Menu Screen

BIOS Setting	Options	Description/Purpose
CPU Configuration	Sub-Menu	CPU Configuration Parameters.
SATA Configuration	Sub-Menu	SATA Device Options Settings.
PCH-FW Configuration	Sub-Menu	Management Engine Technology Parameters.
Trusted Computing	Sub-Menu	Trusted Computing Settings.
ACPI Settings	Sub-Menu	System ACPI Parameters.
F81866 Super IO Configuration	Sub-Menu	System Super IO Chip Parameters.
Hardware Monitor	Sub-Menu	Monitor hardware status.
F81866 Watchdog	Sub-Menu	F81866 Watchdog Parameters.
S5 RTC Wake Setting	Sub-Menu	Enabled system to wake from S5 using RTC alarm.

BIOS Setting	Options	Description/Purpose
Network Stack Configuration	Sub-Menu	Network Stack Settings
USB Configuration	Sub-Menu	USB Configuration Parameters.

5.4.1 Advanced – CPU Configuration

Menu Path *Advanced > CPU Configuration*

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

CPU Configuration Screen

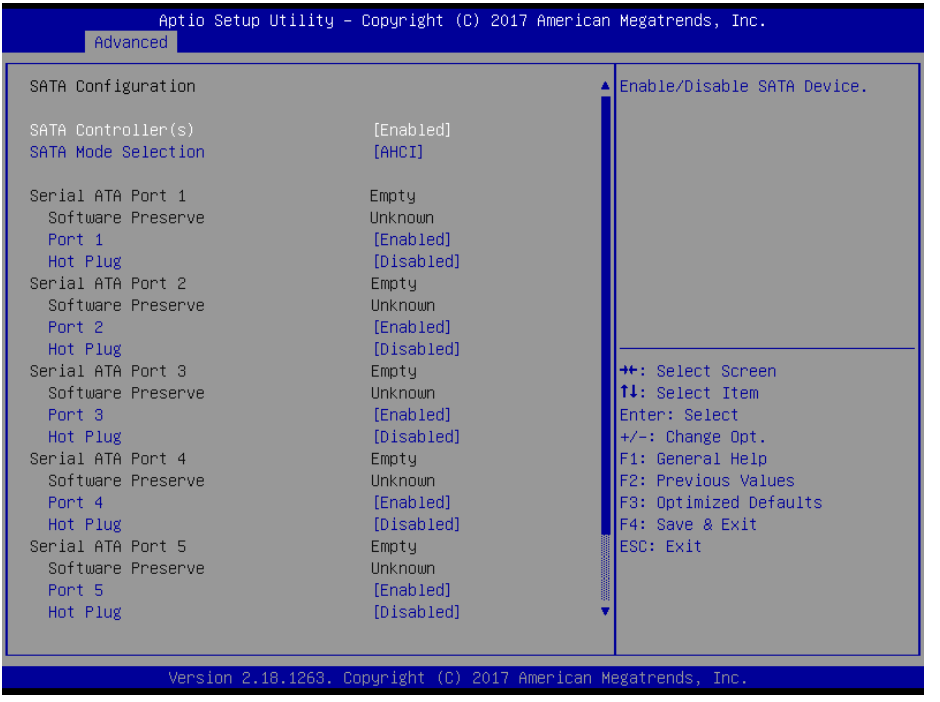
BIOS Setting	Options	Description/Purpose
Type	No changeable options	Displays the CPU Type.
ID	No changeable options	Displays the CPU ID.
Speed	No changeable options	Displays the CPU Speed.
L1 Data Cache	No changeable options	L1 Data Cache Size.
L1 Instruction Cache	No changeable options	L1 Instruction Cache Size.
L2 Cache	No changeable options	L2 Cache Size.
L3 Cache	No changeable options	L3 Cache Size.

BIOS Setting	Options	Description/Purpose
L4 Cache	No changeable options	L4 Cache Size.
VMX	No changeable options	CPU VMX hardware support for virtual machines.
SMX (Secure Mode Extensions) /TXT	No changeable options	Secure Mode extensions support.
Intel Virtualization Technology	- Disabled - Enabled	When enabled, VMM can utilize the additional hardware capabilities provided by Vanderpool Technology
Hyper-threading	- Disabled - Enabled	When Disabled, only one thread per enabled core is enabled.

5.4.2 Advanced - SATA Configuration

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.



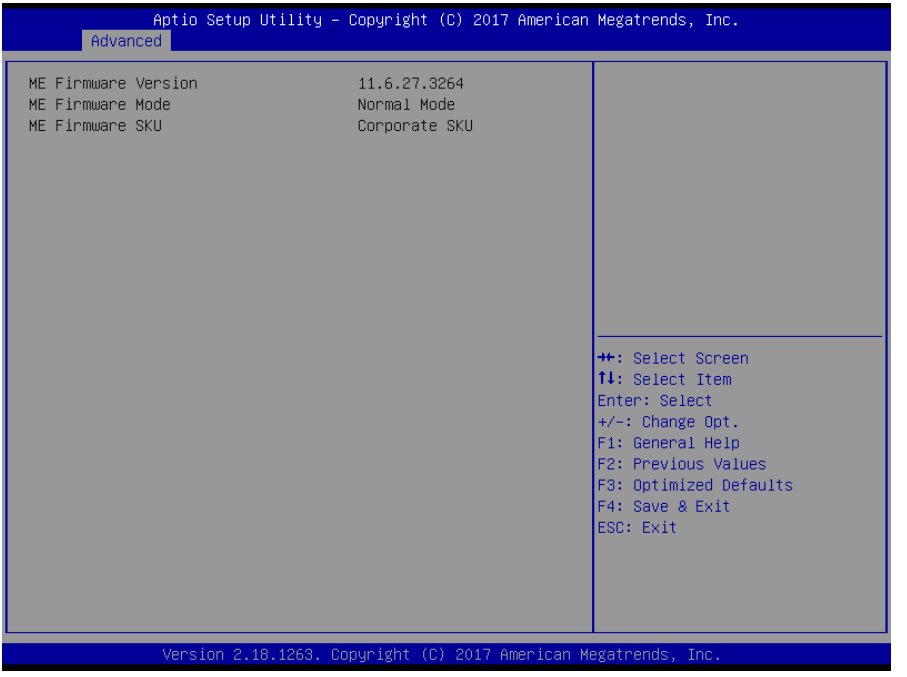
SATA Configuration Screen

BIOS Setting	Options	Description/Purpose
SATA Controller(s)	- Disabled - Enabled	Enables or Disables SATA Device.
SATA Mode	- AHCI - RAID *(for C236/Q170 only)*	Determines how SATA controller(s) operate.
Serial ATA Port 1 – 6 *(Serial ATA Port 1 – 4 for H110 only)*	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 1 - 6 *(Port 1 – 4 for H110 only)*	- Disabled - Enabled	Enables or Disables SATA Port Device.
HotPlug	- Disabled - Enabled	Enables or Disables Hot Plug function to designate a SATA port device as hot-pluggable.

5.4.3 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 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.

5.4.4 Advanced – Trusted Computing (option)

Menu Path *Advanced > Trusted Computing*

The Trusted Computing allows users to enable/disable BIOS support for security device. The operating system will now 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.
TPM State	- Disabled	Enables / Disables Security Device. NOTE:

BIOS Setting	Options	Description/Purpose
	- Enabled	Your Computer will reboot during restart in order to change State of the Device.
Pending operation	- None - TPM Clear	Schedules an Operation for the Security Device. NOTE: Your Computer will reboot during restart in order to change State of Security Device.
Device Select	- TPM 1.2 - TPM 2.0 - Auto	TPM 1.2 will restrict support to TPM 1.2 devices, TPM 2.0 will restrict support to TPM 2.0 devices, Auto will support both with the default set to TPM 2.0 devices if not found, TPM 1.2 devices will be enumerated.
TPM Enabled Status	No changeable options	Displays the TPM Enabled Status.
TPM Active Status	No changeable options	Displays the TPM Active Status.
TPM Owner Status	No changeable options	Displays the TPM Owner Status.

5.4.5 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 and S3 Video Repost.

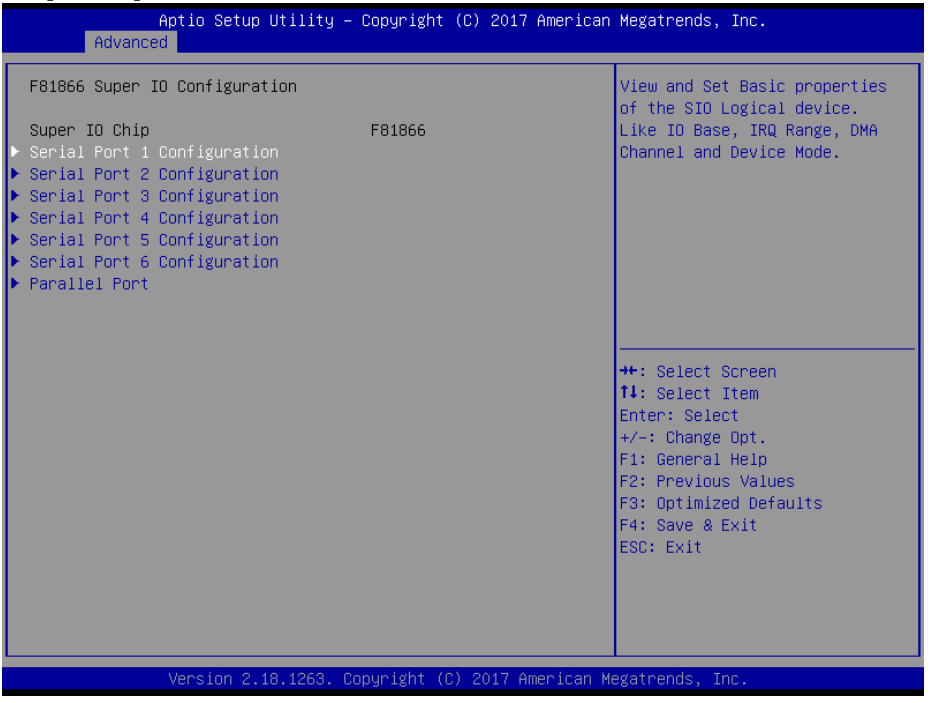
ACPI Settings Screen

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

5.4.6 Advanced – F81866 Super IO Configuration

Menu Path *Advanced > F81866 Super IO Configuration*

The **F81866 Super IO Configuration** allows users to configure the serial ports 1-6 and parallel port.

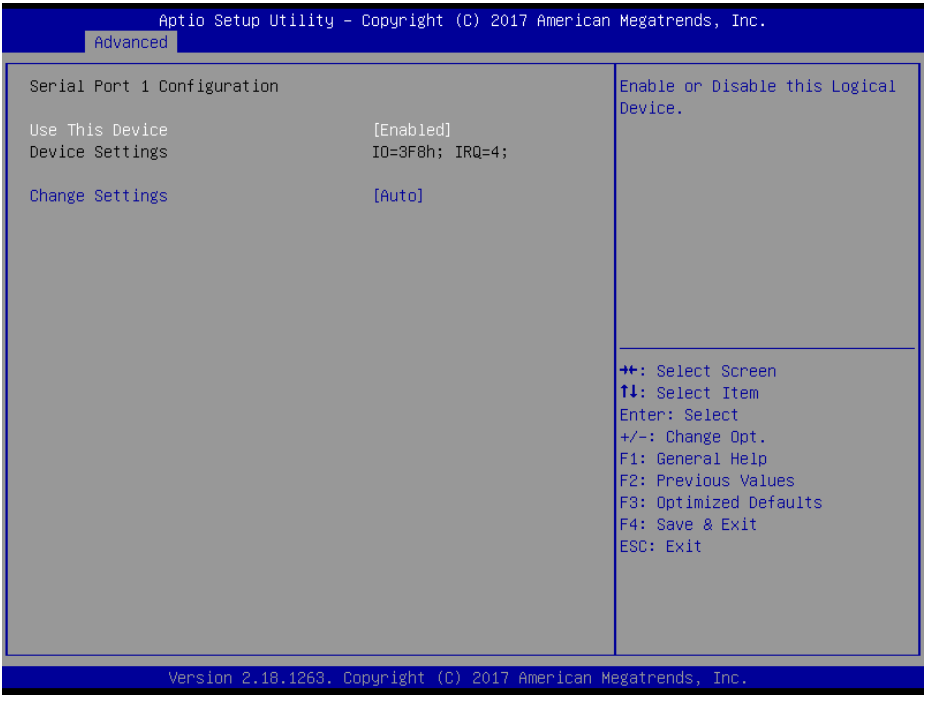


F81866 Super IO Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial Port 1 Configuration	Sub-menu	Configures Parameters of Serial Port 1 (COMA).
Serial Port 2 Configuration	Sub-menu	Configures Parameters of Serial Port 2 (COMB).
Serial Port 3 Configuration *(for C236/Q170 only)*	Sub-menu	Configures Parameters of Serial Port 3 (COMC).
Serial Port 4 Configuration *(for C236/Q170 only)*	Sub-menu	Configures Parameters of Serial Port 4 (COMD).
Serial Port 5 Configuration *(for C236 only)*	Sub-menu	Configures Parameters of Serial Port 5 (COME).
Serial Port 6 Configuration *(for C236 only)*	Sub-menu	Configures Parameters of Serial Port 6 (COMF).
Parallel Port *(for C236/Q170 only)*	Sub-menu	Configures Parameters of Parallel Port (LPT).

F81866 Super IO Configuration – Serial Port 1 Configuration

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

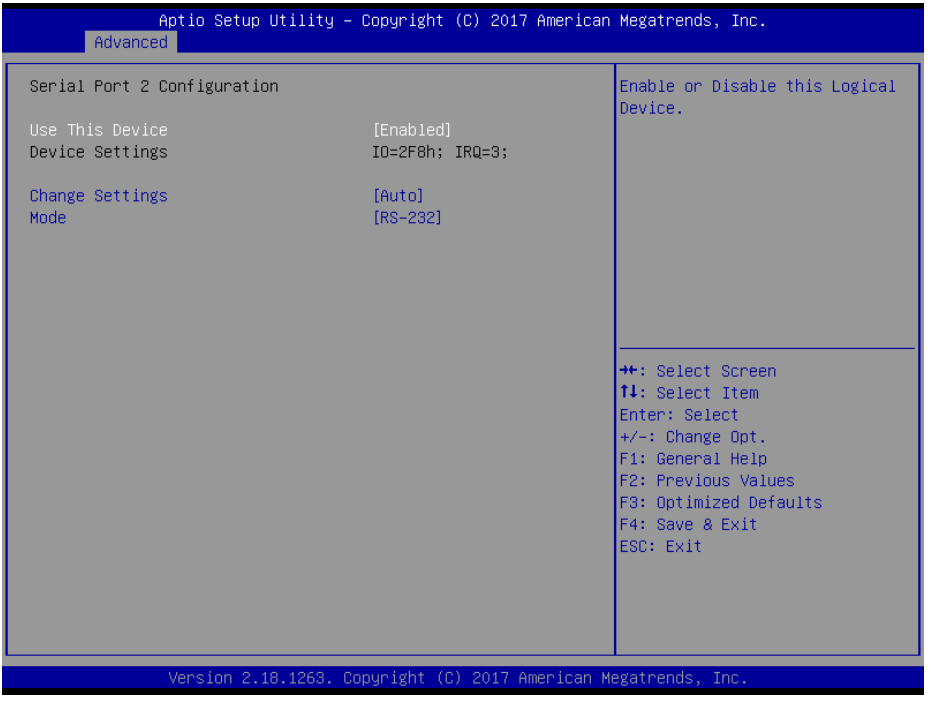


Serial Port 1 Configuration Screen

BIOS Setting	Options	Description/Purpose
Use This Device	- 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=3,4,5,6,7,10,11; - IO=2F8h; IRQ=3,4,5,6,7,10,11; - IO=3E8h; IRQ=3,4,5,6,7,10,11; - IO=2E8h; IRQ=3,4,5,6,7,10,11;	Selects IRQ and I/O resource settings for Serial Port 1.

F81866 Super IO Configuration – Serial Port 2 Configuration

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



Serial Port 2 Configuration Screen

BIOS Setting	Options	Description/Purpose
Use This Device	- 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=3,4,5,6,7,10,11; - IO=2F8h; IRQ=3,4,5,6,7,10,11; - IO=3E8h; IRQ=3,4,5,6,7,10,11; - IO=2E8h; IRQ=3,4,5,6,7,10,11;	Selects IRQ and I/O resource settings for Serial Port 2.
Mode	- RS-232 - RS-422 - RS-485	Selects COM mode.

F81866 Super IO Configuration – Serial Port 3 Configuration (For C236/Q170 Only)

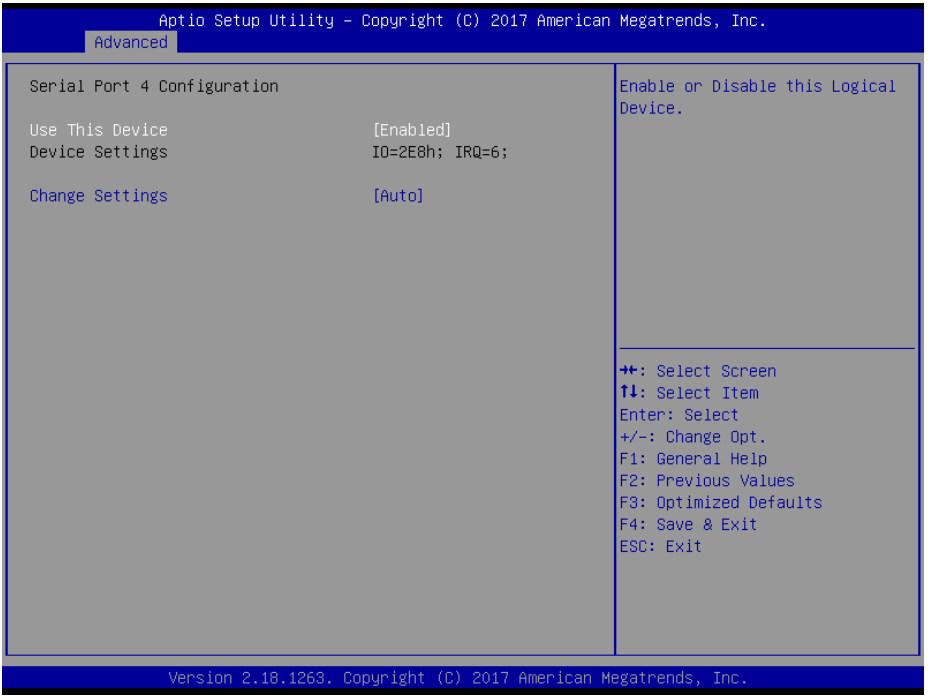
Menu Path	*Advanced > F81866 Super IO Configuration > Serial Port 3 Configuration*

Serial Port 3 Configuration Screen

BIOS Setting	Options	Description/Purpose
Use This Device	- 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=7; - IO=3E8h; IRQ=3,4,5,6,7,10,11; - IO=2E8h; IRQ=3,4,5,6,7,10,11; - IO=2F0h; IRQ=3,4,5,6,7,10,11; - IO=2E0h; IRQ=3,4,5,6,7,10,11;	Selects IRQ and I/O resource settings for Serial Port 3.

F81866 Super IO Configuration – Serial Port 4 Configuration (For C236/Q170 Only)

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

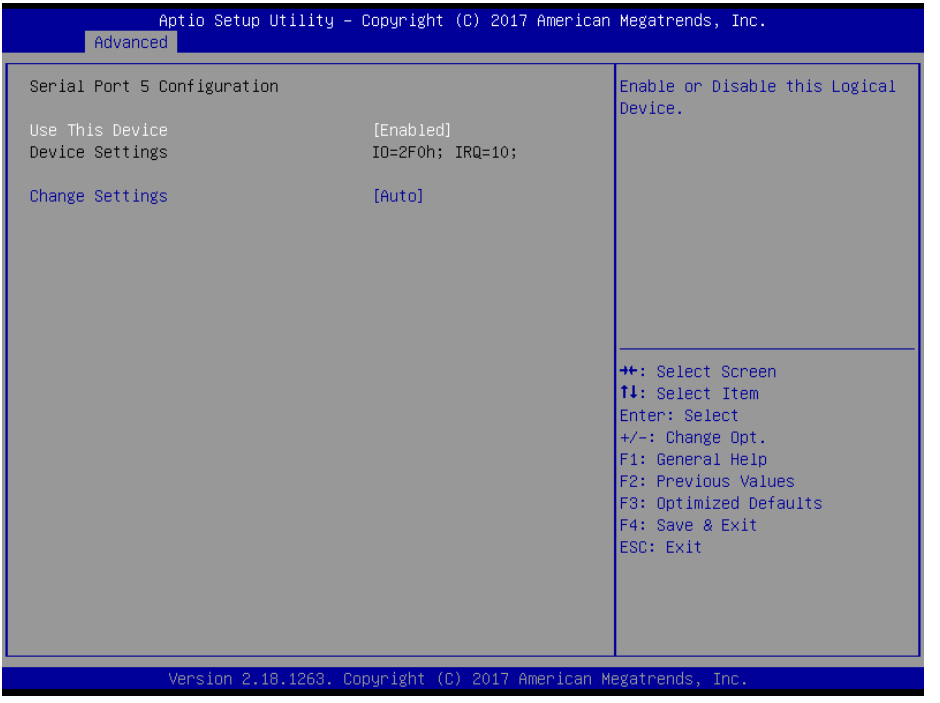


Serial Port 4 Configuration Screen

BIOS Setting	Options	Description/Purpose
Use This Device	- 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=6; - IO=3E8h; IRQ=3,4,5,6,7,10,11; - IO=2E8h; IRQ=3,4,5,6,7,10,11; - IO=2F0h; IRQ=3,4,5,6,7,10,11; - IO=2E0h; IRQ=3,4,5,6,7,10,11;	Selects IRQ and I/O resource settings for the Serial Port 4.

F81866 Super IO Configuration – Serial Port 5 Configuration (For C236 Only)

Menu Path	*Advanced > F81866 Super IO Configuration > Serial Port 5 Configuration*



Serial Port 5 Configuration Screen

BIOS Setting	Options	Description/Purpose
Use This Device	- 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=10; - IO=3E8h; IRQ=3,4,5,6,7,10,11; - IO=2E8h; IRQ=3,4,5,6,7,10,11; - IO=2F0h; IRQ=3,4,5,6,7,10,11; - IO=2E0h; IRQ=3,4,5,6,7,10,11;	Selects IRQ and I/O resource settings for Serial Port 5.

F81866 Super IO Configuration – Serial Port 6 Configuration (For C236 Only)

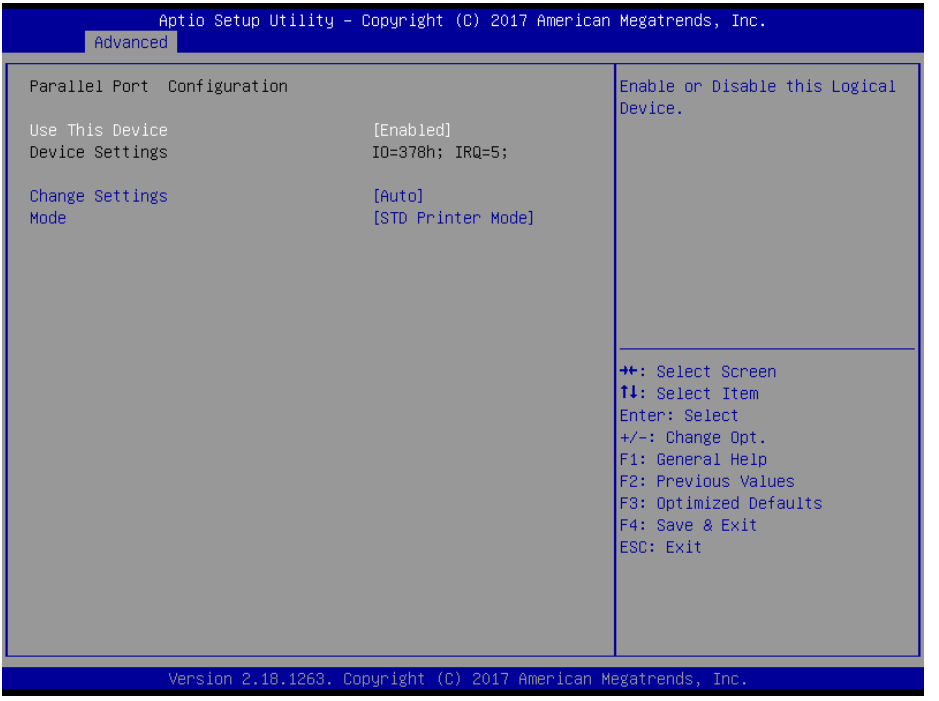
Menu Path	*Advanced > F81866 Super IO Configuration > Serial Port 6 Configuration*

Serial Port 6 Configuration Screen

BIOS Setting	Options	Description/Purpose
Use This Device	- Disabled - Enabled	Enables or Disables Serial Port 6. Note: When BIOS item Network is set to [Legacy], it'll be automatically set to Disabled.
Device Settings	No changeable options	Displays the current settings of Serial Port 6.
Change Settings	- Auto - IO=2E0h; IRQ=11; - IO=3E8h; IRQ=3,4,5,6,7,10,11; - IO=2E8h; IRQ=3,4,5,6,7,10,11; - IO=2F0h; IRQ=3,4,5,6,7,10,11; - IO=2E0h; IRQ=3,4,5,6,7,10,11;	Selects IRQ and I/O resource settings for Serial Port 6.

F81866 Super IO Configuration – Parallel Port Configuration (For C236/Q170 Only)

Menu Path	*Advanced > F81866 Super IO Configuration > Parallel Port Configuration*



Parallel Port Configuration Screen

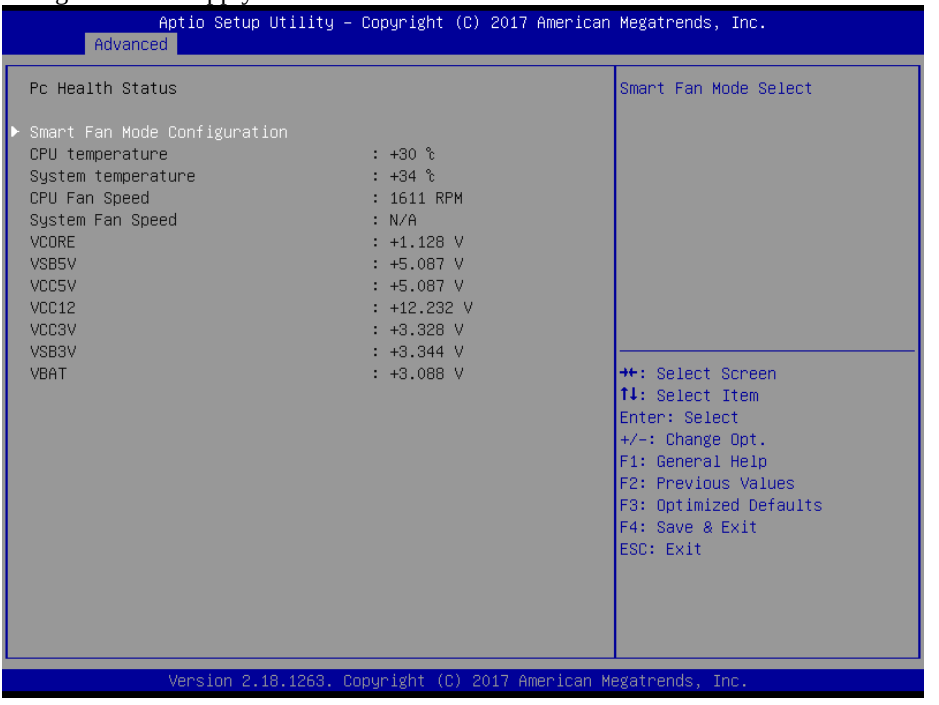
BIOS Setting	Options	Description/Purpose
Use This Device	- Disabled - Enabled	Enables or Disables Parallel Port.
Device Settings	No changeable options	Displays the current settings of Parallel Port.
Change Settings	- Auto - IO=378h; IRQ=5; - IO=378h; IRQ=5,6,7,9,10,11,12; - IO=278h; IRQ=5,6,7,9,10,11,12; - IO=3BCh; IRQ=5,6,7,9,10,11,12;	Selects IRQ and I/O resource settings for Parallel Port.
Mode	- STD Printer Mode - SPP Mode - EPP-1.9 and SPP Mode - EPP-1.7 and SPP Mode	Changes Parallel Port mode. Some of the Mode required a DMA resource. After the Mode is changed, reset the system to reflect the actual device

BIOS Setting	Options	Description/Purpose
	- ECP Mode - ECP and EPP 1.9 Mode - ECP and EPP 1.7 Mode	settings.

5.4.7 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 temperature.
CPU Fan Speed	No changeable options	Displays CPU Fan speed.
System Fan Speed	No changeable options	Displays System Fan Speed.

BIOS Setting	Options	Description/Purpose
VCORE	No changeable options	Detects and displays the voltage level of the VCORE in supply.
VSB5V	No changeable options	Detects and displays the voltage level of the VSB5V in supply.
VCC5V	No changeable options	Detects and displays the voltage level of the VCC5V in supply.
VCC12	No changeable options	Detects and displays the voltage level of the VCC12 in supply.
VCC3V	No changeable options	Detects and displays the voltage level of the VCC3V in supply.
VSB3V	No changeable options	Detects and displays the voltage level of the VSB3V in supply.
VBAT	No changeable options	Detects and displays the battery voltage.

Smart Fan Mode Configuration

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

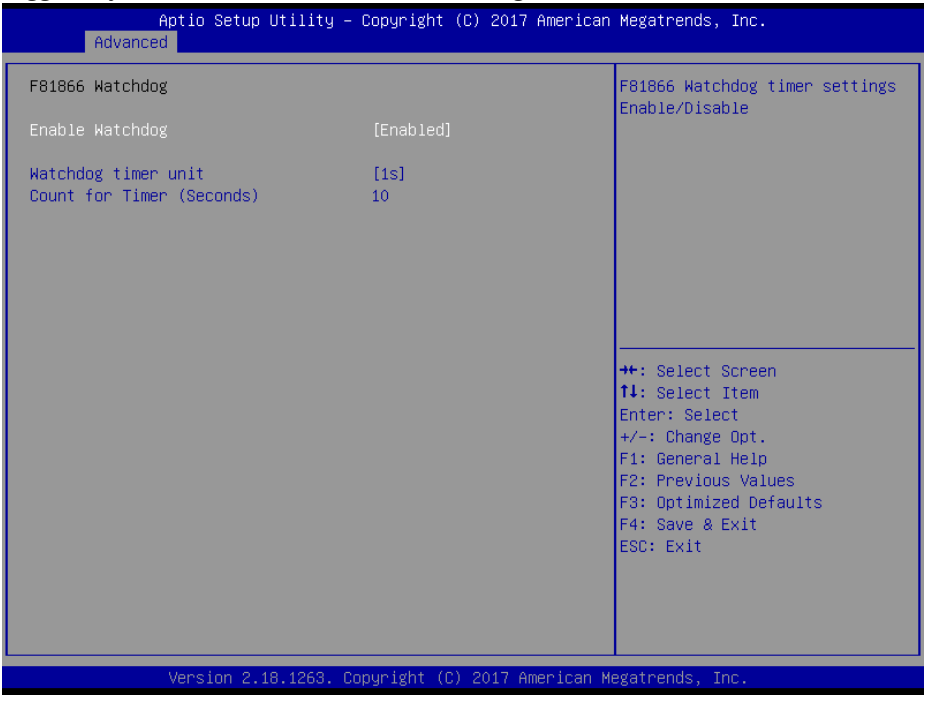
Smart Fan Mode Configuration Screen

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

5.4.8 Advanced – F81866 Watchdog

Menu Path *Advanced > F81866 Watchdog*

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 Screen

BIOS Setting	Options	Description/Purpose
Enable WatchDog	- Enabled - Disabled	Enable/Disable F81866 Watchdog timer settings.
Watchdog timer unit	- 1s - 60s	Watchdog timer unit.
Count for Timer (Seconds)	Numeric (from 1 to 255)	The number of count for Timer.

5.4.9 Advanced – S5 RTC Wake Settings

Menu Path *Advanced > S5 RTC wake Settings (Disabled)*

The **S5 RTC Wake Settings** enables/disables the system to wake up at a preset time of a day from S5 State using RTC alarm.

S5 RTC Wake Settings Screen (Disabled)

BIOS Setting	Options	Description/Purpose
Wake system from S5	- Disabled - Fixed Time - Dynamic Time	Allows enabling scheduled S5 to S0 (option **enabled**). • **Fixed Time:** System will wake on the hr::min::sec specified. • **Dynamic Time:** System will wake on the current time + Increase minute(s).

Menu Path *Advanced > S5 RTC wake Settings (Fixed Time)*

S5 RTC Wake Settings Screen (Fixed Time)

BIOS Setting	Options	Description/Purpose
Wake system from S5	- Disabled - Fixed Time - Dynamic Time	Allows enabling scheduled S5 to S0 (option: **enabled**). • **Fixed Time:** System will wake on the hr::min::sec specified. • **Dynamic Time:** System will wake on the current time + Increase minute(s).
Wake up hour	Multiple options ranging from 0 to 23	Sets an hour for schedule power on event.
Wake up minute	Multiple options ranging from 0 to 59	Sets a minute for schedule power on event.
Wake up second	Multiple options ranging from 0 to 59	Sets a second for schedule power on event.

Menu Path *Advanced > S5 RTC Wake Settings (Dynamic Time)*

S5 RTC Wake Settings Screen (Dynamic Time)

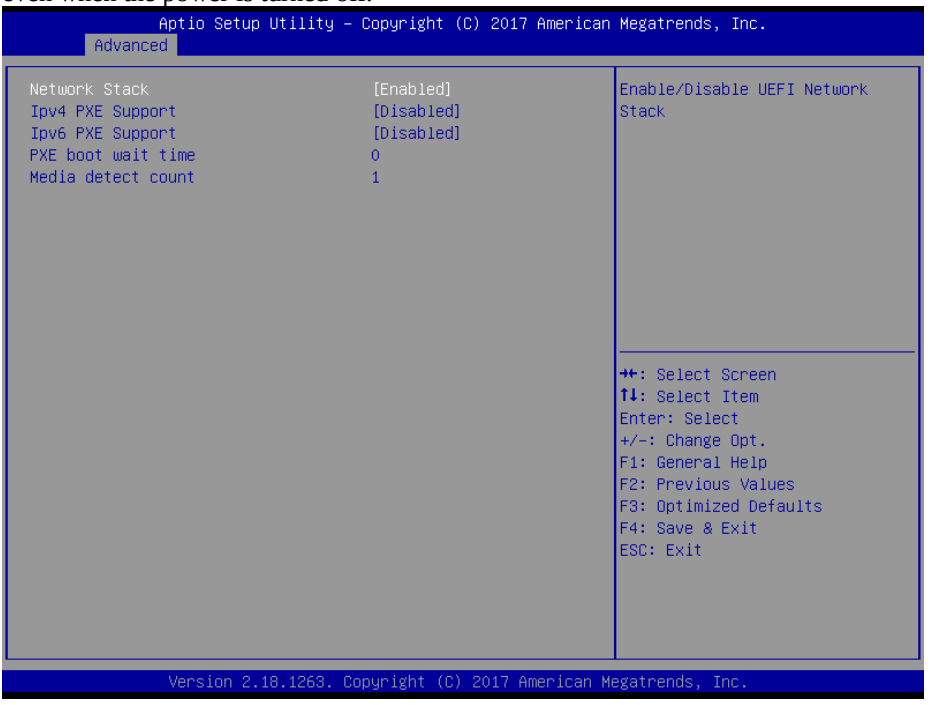
BIOS Setting	Options	Description/Purpose
Wake system from S5	- Disabled - Fixed Time - Dynamic Time	Allows enabling scheduled S5 to S0 (option: **enabled**). • **Fixed Time:** System will wake on the hr::min::sec specified. • **Dynamic Time:** System will wake on the current time + Increase minute(s).
Wake up minute increase	Multiple options ranging from 1 to 5	Sets a period of time (in minutes) after which the board wakes up from S5 state.

5.4.10 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

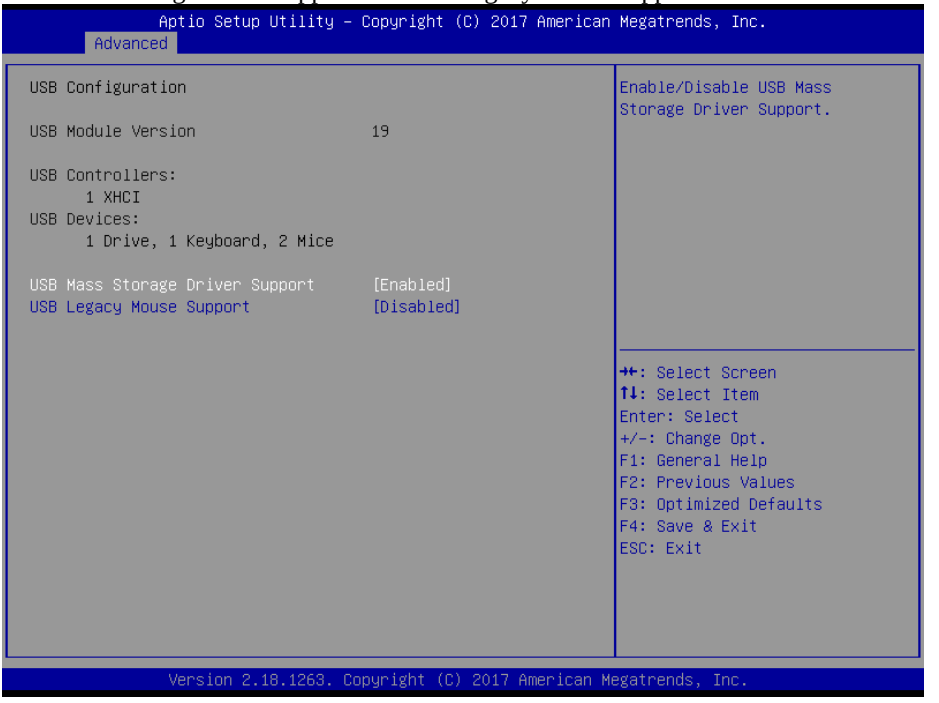
BIOS Setting	Options	Description/Purpose
Network Stack	- Disabled - Enabled	Enables or Disables UEFI Network Stack.
Ipv4 PXE Support	- Disabled - Enabled	Enables Ipv4 PXE Boot Support. If disabled, Ipv4 PXE boot option will not be created.
Ipv6 PXE Support	- Disabled - Enabled	Enables Ipv6 PXE Boot Support. If disabled, Ipv6 PXE boot option will not be created.

BIOS Setting	Options	Description/Purpose
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.

5.4.11 Advanced – USB Configuration

Menu Path *Advanced > USB Configuration*

The **USB Configuration** allows users to configure advanced USB settings such as USB mass storage driver support and USB legacy mouse support.



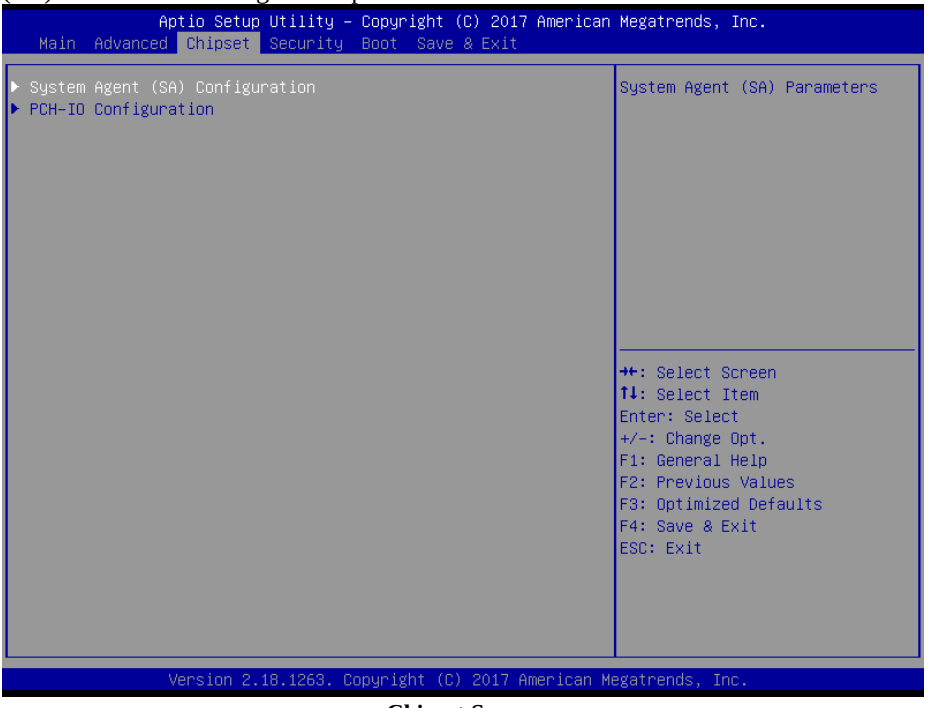
USB Configuration Screen

BIOS Setting	Options	Description/Purpose
USB Mass Storage Driver Support	- Disabled - Enabled	Enables/Disables USB Mass Storage Driver Support.
USB Legacy Mouse Support	- Disabled - Enabled	Enables/Disables USB Legacy Mouse 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.

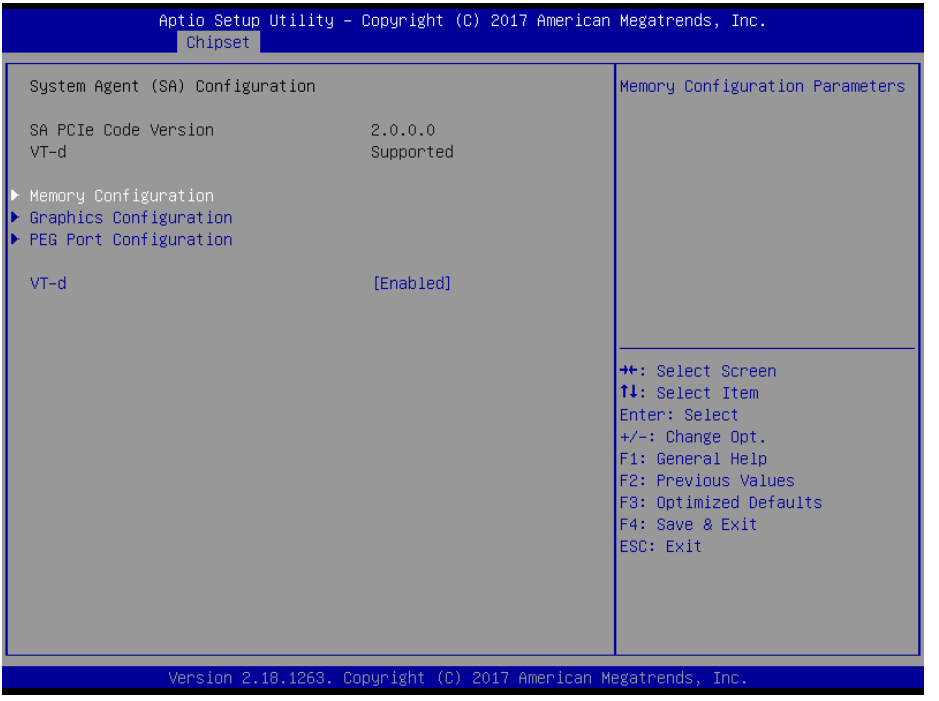


Chipset Screen

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

5.5.1 Chipset – System Agent (SA) Configuration

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

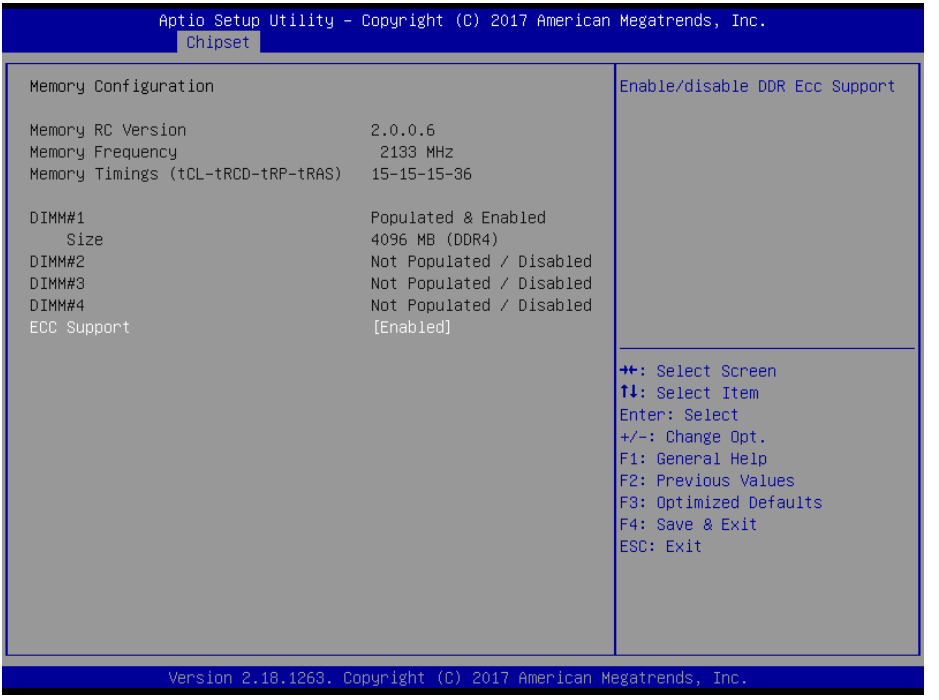


System Agent (SA) Configuration Screen

BIOS Setting	Options	Description/Purpose
SA PCIe Code Version	No changeable options	Displays the SA PCIe Code Version.
VT-d	No changeable options	VT-d capability.
Memory Configuration	Sub-menu	Memory Configuration
Graphics Configuration	Sub-menu	Graphics Configuration
PEG Port Configuration	Sub-menu	PEG Port Configuration
VT-d	- Disabled - Enabled	Enables or Disables VT-d function.

System Agent (SA) Configuration – Memory Configuration

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



Memory Configuration Screen

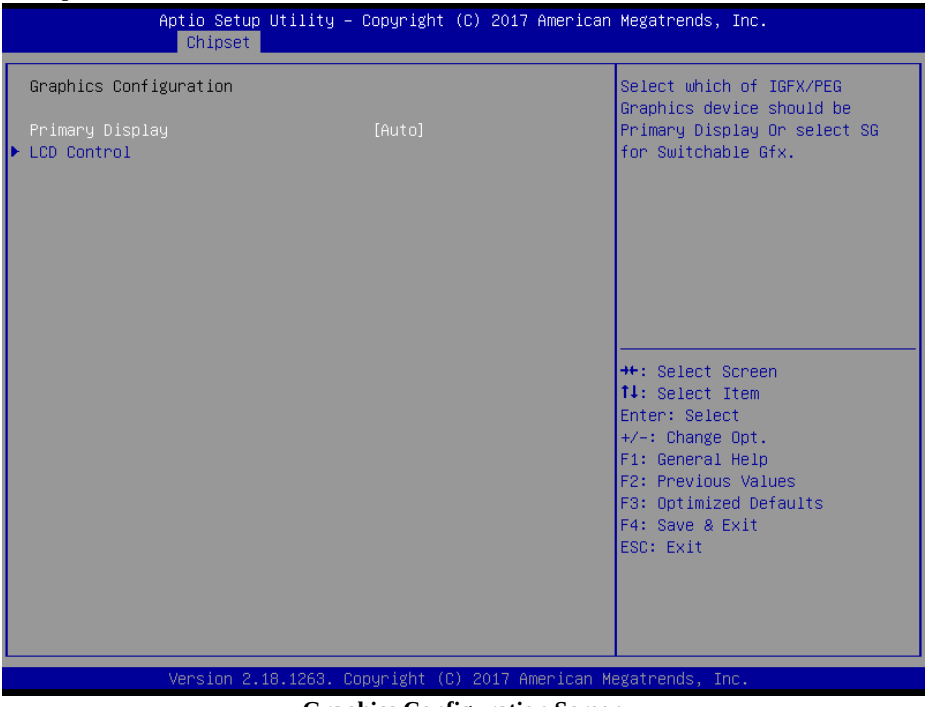
BIOS Setting	Options	Description/Purpose
Memory RC Version	No changeable options	Displays the Memory RC Version.
Memory Frequency	No changeable options	Displays the Frequency of Memory.
Memory Timings (tCL-tRCD-tRP-tRAS)	No changeable options	Displays the Memory Timings.
DIMM#1	No changeable options	Displays the size of SO-DIMM#1.
DIMM#2	No changeable options	Displays the size of SO-DIMM#2.
DIMM#3 *(for C236/Q170 only)*	No changeable options	Displays the size of SO-DIMM#3.
DIMM#4 *(for C236/Q170 only)*	No changeable options	Displays the size of SO-DIMM#4.

BIOS Setting	Options	Description/Purpose
ECC Support *(for C236 only)*	- Disabled - Enabled	Enables/Disables DDR ECC Support.

System Agent (SA) Configuration – 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.



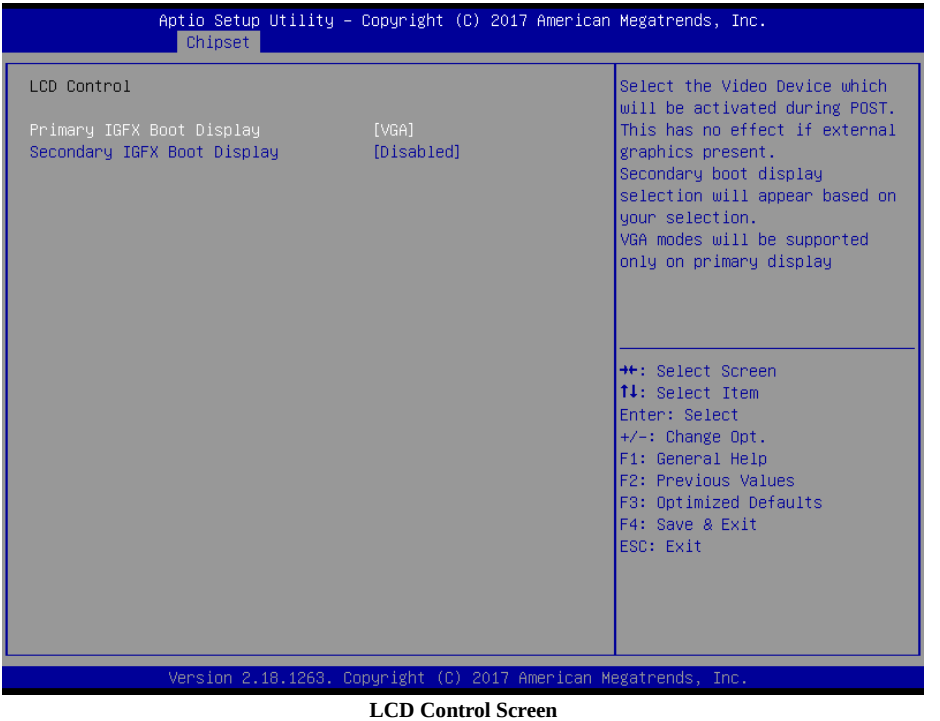
Graphics Configuration Screen

BIOS Setting	Options	Description/Purpose
Primary Display	- Auto - IGFX - PEG	Selects IGFX or PEG Graphics device as the Primary Display.
LCD Control	Sub-menu	LCD Control sub-menu.

System Agent (SA) Configuration – Graphics Configuration – LCD Control

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

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



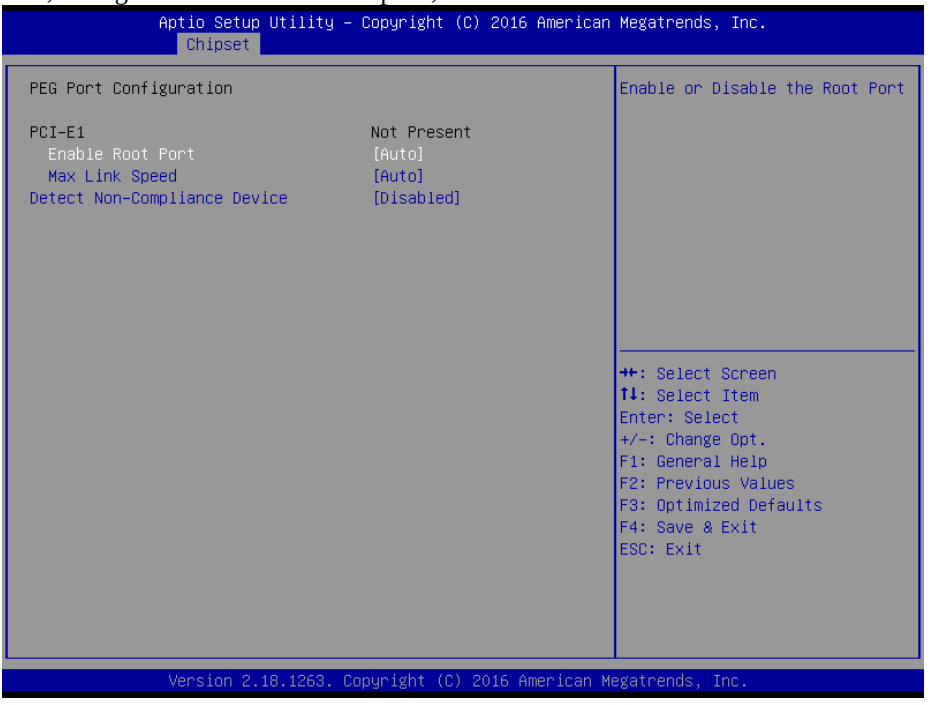
LCD Control Screen

BIOS Setting	Options	Description/Purpose
Primary IGFX Boot Display	- VBIOS default - EDP - DP *(option)* - DVI-D - VGA	Selects Primary Display Device.
Secondary IGFX Boot Display	- Disabled - DP - DVI-D - VGA	Selects Secondary Display Device.

System Agent (SA) Configuration – PEG Port Configuration

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

The **PEG Port Configuration** allows users to display the PEG status, enable Root Port, configure PCI-E1 maximum speed, etc.



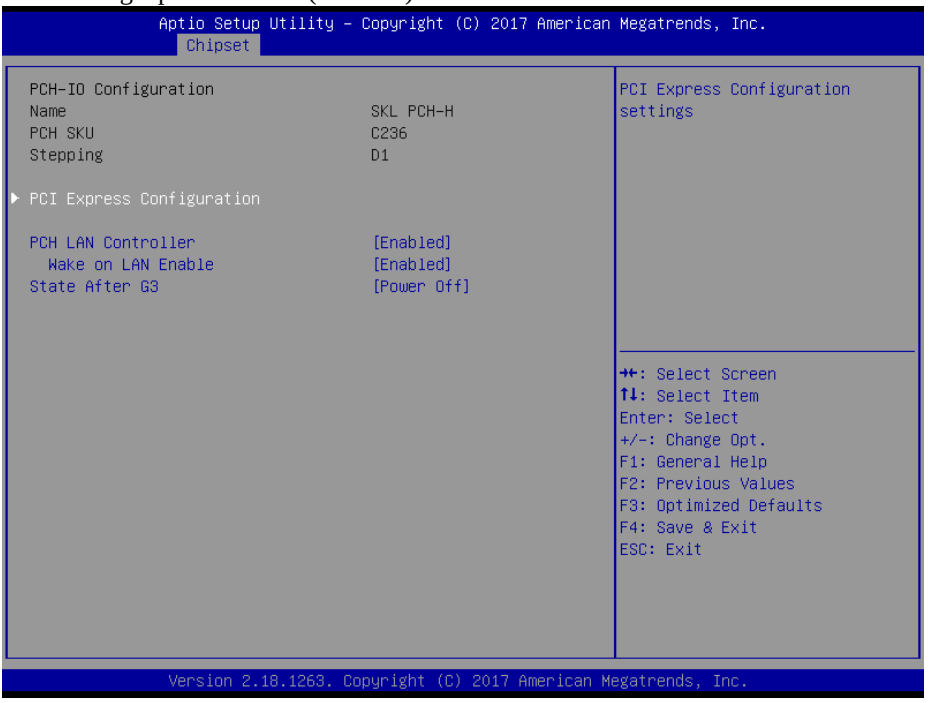
PEG Port Configuration Screen

BIOS Setting	Options	Description/Purpose
PCI-E1	No changeable options	PCI-E1 Link and Speed information.
Enable Root Port	- Disabled - Enabled - Auto	Enables or Disables the Root Port.
Max Link Speed	- Auto - Gen1 - Gen2 - Gen3	Configures PCI-E1 Max Speed.
Detect Non-Compliance Device	- Disabled - Enabled	Detects Non-Compliance PCI Express Device in PEG.

5.5.2 Chipset – PCH IO Configuratioin

Menu Path *Chipset > PCH-IO Configuration*

The **PCH-IO Configuration** allows users to configure North Bridge chipset, set PCI Express configuration parameters, enable/disable PCH LAN Controller and 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 Intel PCH Name.
PCH SKU	No changeable options	Displays the Intel PCH SKU.
Stepping	No changeable options	Displays the Intel PCH Stepping.
PCI Express Configuration	Sub-menu	PCI Express Configuration settings.
PCH LAN Controller	- Disabled - Enabled	Enables or Disables onboard NIC.

BIOS Setting	Options	Description/Purpose
Wake on LAN Enable	- Disabled - Enabled	Enables or Disables integrated LAN to wake the system.
State After G3	- Power On - Power Off	Specifies the Power On/Off state that the system will go to when the power is re-applied following a power failure (G3 state).

PCH-IO Configuration – PCI Express Configuration

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

PCI Express Configuration Screen

BIOS Setting	Options	Description/Purpose
PCIE Port assigned to LAN	No changeable options	Displays the LAN assigned PCIE Port.
PCI Express x4 slot	Sub-menu	PCI Express x4 slot settings.
Mini PCI Express Port (For C236/Q170 SKU Only)	Sub-menu	Mini PCI Express Port settings.

PCH-IO Configuration – PCI Express Configuration – PCI Express x4 slot

Menu Path *Chipset > PCH-IO Configuration > PCI Express Configuration > PCI Express x4 slot*

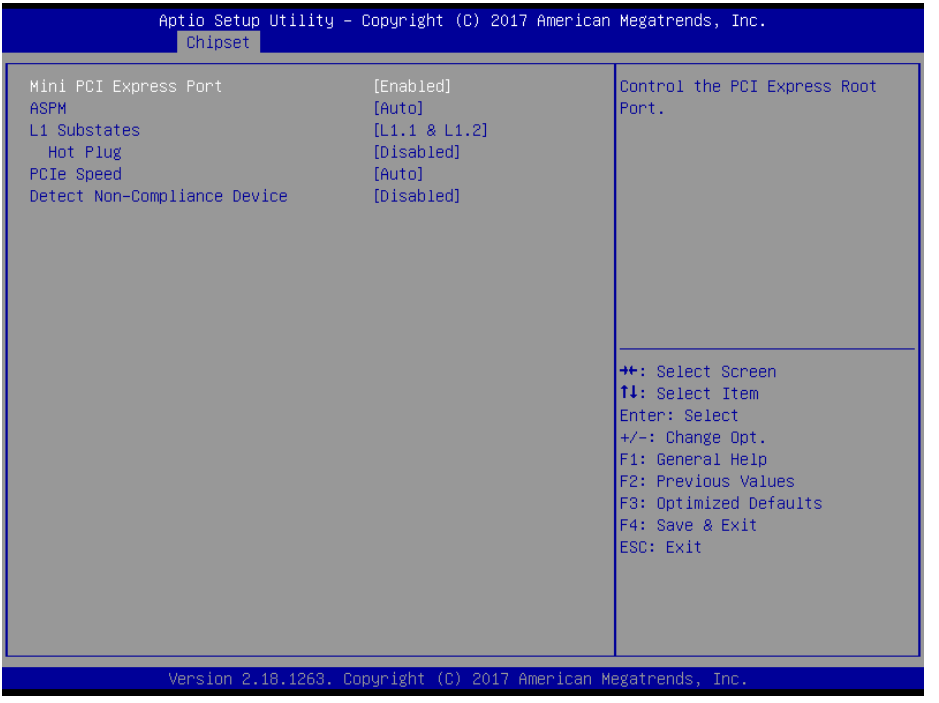
PCI Express x4 slot Screen

BIOS Setting	Options	Description/Purpose
PCI Express x4 slot	- Disabled - Enabled	Controls the PCI Express x4 slot settings.
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.
L1 Substates	- Disabled - L1.1 - L1.2 - L1.1 & L1.2	PCI Express L1 Substates settings.
Hot Plug	- Disabled - Enabled	Enables or Disables PCI Express Hot Plug.
PCIe Speed	- Auto - Gen1	Selects PCI Express port speed.

BIOS Setting	Options	Description/Purpose
	- Gen2 - Gen3	
Detect Non-Compliance Device	- Disabled - Enabled	Detects Non-Compliance PCI Express Device. If enabled, it will take more time during POST.

PCH-IO Configuration – PCI Express Configuration – Mini PCI Express Port Configuration (For C236/Q170 SKU Only)

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



Mini PCI Express Port Configuration Screen

BIOS Setting	Options	Description/Purpose
Mini PCI Express Port	- Disabled - Enabled	Controls the PCI Express Root Port.
ASPM	- Disabled - L0s - L1 - L0sL1	Sets the ASPM (Active-State Power Management) Level. The option allows users to set the lower power mode that activates when the bus is

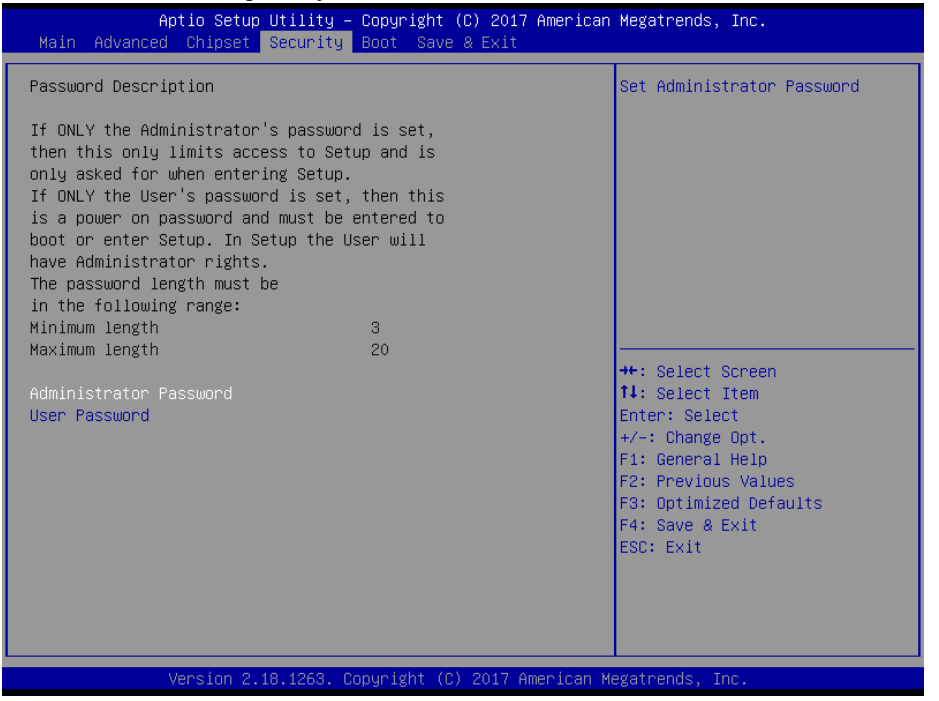
BIOS Setting	Options	Description/Purpose
	- Auto	not being used.
L1 Substates	- Disabled - L1.1 - L1.2 - L1.1 & L1.2	PCI Express L1 Substates settings.
Hot Plug	- Disabled - Enabled	Enables or Disables PCI Express Hot Plug.
PCIe Speed	- Auto - Gen1 - Gen2 - Gen3	Selects PCI Express port speed.
Detect Non-Compliance Device	- Disabled - Enabled	Detects Non-Compliance PCI Express Device. 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.

BIOS Setting	Options	Description/Purpose
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, changing the boot order from the available bootable device(s) and CSM configuration.

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 - Off	Specifies the power-on state of the NumLock Key.
Quiet Boot	- Disabled - Enabled	Enables or Disables Quiet Boot options.
Fast Boot	- Disabled - Enabled	Enables or Disables Fast Boot options.

BIOS Setting	Options	Description/Purpose
Boot Option #1~#n	- [Drive(s)] - Disabled	Sets the system boot order.
CSM Configuration	Sub-Menu	CSM configuration: Enable/Disable, Option ROM execution settings, etc.

5.7.1 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	No changeable options	Displays the CSM 16 Module version.
Boot option filter	- UEFI and Legacy - Legacy only	This option controls Legacy/UEFI ROMs priority.

BIOS Setting	Options	Description/Purpose
	- UEFI only	
Network	- Do not launch - UEFI - Legacy	Controls the execution of UEFI and Legacy PXE OpROM. Note: In Legacy PXE OpROM, it'll automatically set Serial Port 6 to Disabled.
Storage	- Do not launch - UEFI - Legacy	Controls the execution of UEFI and Legacy Storage OpROM.
Video	- Do not launch - UEFI - Legacy	Controls the execution of UEFI and Legacy Video OpROM.
Other PCI devices	- Do not launch - UEFI - Legacy	Determines OpROM execution policy for devices other than Network, Storage or Video.

5.8 Save & Exit

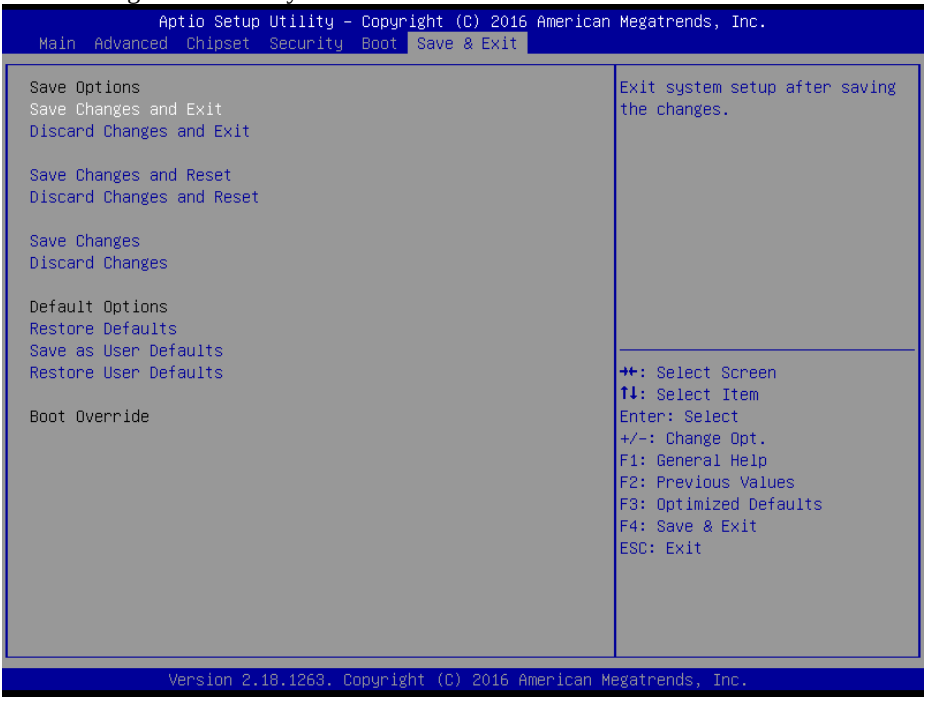
Menu Path *Save & Exit*

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	Saves Changes done so far to any of the setup options.
Discard Changes	No changeable options	Discards 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	Saves the changes done so far as User Defaults.
Restore User Defaults	No changeable options	Restores the User Defaults to all the setup options.
Boot Override	- [Drive(s)]	Forces to boot from selected [drive(s)].

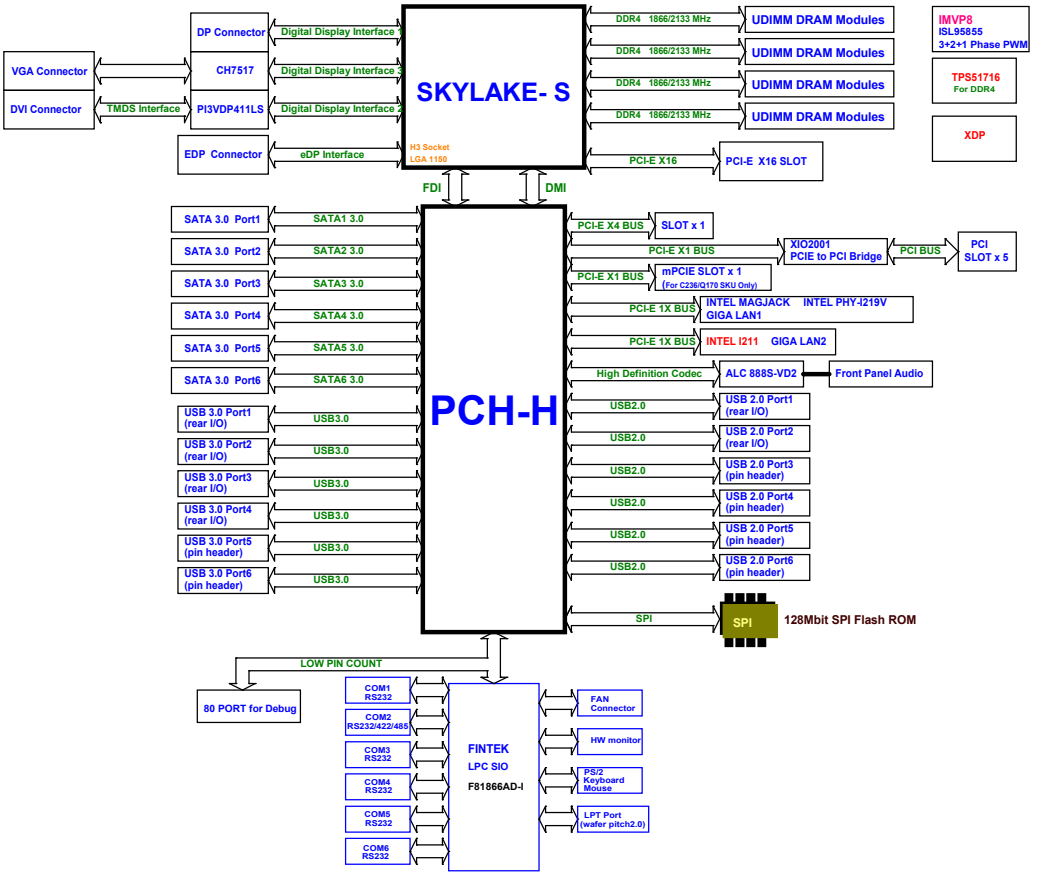
Appendix A Technical Summary

This appendix will give you a brief introduction of the allocation maps for BA-2501 resources.

The following topics are included:

- BA-2501 Block Diagram
- Interrupt Map
- I/O Map
- Memory Map
- DMA Map
- Configuring WatchDog Timer
- Flash BIOS Update

BA-2501 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 6	Communications Port (COM4)
IRQ 7	Communications Port (COM3)
IRQ 8	System CMOS/real time clock
IRQ 10	Communications Port (COM5)
IRQ 11	Communications Port (COM6)
IRQ 12	PS/2 Port Compatible Pointing Device
IRQ 13	Numeric data processor
IRQ 14	Motherboard resources
IRQ 16	Intel(R) Serial IO I2C Host Controller - A160
IRQ 16	High Definition Audio Controller
IRQ 16	Standard AHCI 1.0 Serial ATA Controller
IRQ 19	Intel(R) Active Management Technology - SOL (COM7)
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	Assignment
IRQ 90	Microsoft ACPI-Compliant System
IRQ 91	Microsoft ACPI-Compliant System
IRQ 92	Microsoft ACPI-Compliant System
IRQ 93	Microsoft ACPI-Compliant System
IRQ 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	Assignment
IRQ 115	Microsoft ACPI-Compliant System
IRQ 116	Microsoft ACPI-Compliant System
IRQ 117	Microsoft ACPI-Compliant System
IRQ 118	Microsoft ACPI-Compliant System
IRQ 119	Microsoft ACPI-Compliant System
IRQ 120	Microsoft ACPI-Compliant System
IRQ 121	Microsoft ACPI-Compliant System
IRQ 122	Microsoft ACPI-Compliant System
IRQ 123	Microsoft ACPI-Compliant System
IRQ 124	Microsoft ACPI-Compliant System
IRQ 125	Microsoft ACPI-Compliant System
IRQ 126	Microsoft ACPI-Compliant System
IRQ 127	Microsoft ACPI-Compliant System
IRQ 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	Assignment
IRQ 142	Microsoft ACPI-Compliant System
IRQ 143	Microsoft ACPI-Compliant System
IRQ 144	Microsoft ACPI-Compliant System
IRQ 145	Microsoft ACPI-Compliant System
IRQ 146	Microsoft ACPI-Compliant System
IRQ 147	Microsoft ACPI-Compliant System
IRQ 148	Microsoft ACPI-Compliant System
IRQ 149	Microsoft ACPI-Compliant System
IRQ 150	Microsoft ACPI-Compliant System
IRQ 151	Microsoft ACPI-Compliant System
IRQ 152	Microsoft ACPI-Compliant System
IRQ 153	Microsoft ACPI-Compliant System
IRQ 154	Microsoft ACPI-Compliant System
IRQ 155	Microsoft ACPI-Compliant System
IRQ 156	Microsoft ACPI-Compliant System
IRQ 157	Microsoft ACPI-Compliant System
IRQ 158	Microsoft ACPI-Compliant System
IRQ 159	Microsoft ACPI-Compliant System
IRQ 160	Microsoft ACPI-Compliant System
IRQ 161	Microsoft ACPI-Compliant System
IRQ 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	Assignment
IRQ 167	Microsoft ACPI-Compliant System
IRQ 168	Microsoft ACPI-Compliant System
IRQ 169	Microsoft ACPI-Compliant System
IRQ 170	Microsoft ACPI-Compliant System
IRQ 171	Microsoft ACPI-Compliant System
IRQ 172	Microsoft ACPI-Compliant System
IRQ 173	Microsoft ACPI-Compliant System
IRQ 174	Microsoft ACPI-Compliant System
IRQ 175	Microsoft ACPI-Compliant System
IRQ 176	Microsoft ACPI-Compliant System
IRQ 177	Microsoft ACPI-Compliant System
IRQ 178	Microsoft ACPI-Compliant System
IRQ 179	Microsoft ACPI-Compliant System
IRQ 180	Microsoft ACPI-Compliant System
IRQ 181	Microsoft ACPI-Compliant System
IRQ 182	Microsoft ACPI-Compliant System
IRQ 183	Microsoft ACPI-Compliant System
IRQ 184	Microsoft ACPI-Compliant System
IRQ 185	Microsoft ACPI-Compliant System
IRQ 186	Microsoft ACPI-Compliant System
IRQ 187	Microsoft ACPI-Compliant System
IRQ 188	Microsoft ACPI-Compliant System
IRQ 189	Microsoft ACPI-Compliant System
IRQ 190	Microsoft ACPI-Compliant System
IRQ 4294967284	Intel(R) I211 Gigabit Network Connection #2
IRQ 4294967285	Intel(R) I211 Gigabit Network Connection #2
IRQ 4294967286	Intel(R) I211 Gigabit Network Connection #2

IRQ	Assignment
IRQ 4294967287	Intel(R) I211 Gigabit Network Connection #2
IRQ 4294967288	Intel(R) Management Engine Interface
IRQ 4294967289	USB 3.0 eXtensible Host Controller
IRQ 4294967290	Intel(R) HD Graphics 530
IRQ 4294967291	Intel(R) Ethernet Connection (2) I219-LM
IRQ 4294967292	PCI standard PCI Express to PCI/PCI-X Bridge

Note: These resource information were gathered using Windows 7 at C236 PCH (the IRQ could be assigned differently depending on OS).

I/O MAP

I/O Map	Assignment
0x00000000-0x00000CF7	PCI bus
0x00000020-0x00000021	Programmable interrupt controller
0x00000024-0x00000025	Programmable interrupt controller
0x00000028-0x00000029	Programmable interrupt controller
0x0000002C-0x0000002D	Programmable interrupt controller
0x0000002E-0x0000002F	Motherboard resources
0x00000030-0x00000031	Programmable interrupt controller
0x00000034-0x00000035	Programmable interrupt controller
0x00000038-0x00000039	Programmable interrupt controller
0x0000003C-0x0000003D	Programmable interrupt controller
0x00000040-0x00000043	System timer
0x0000004E-0x0000004F	Motherboard resources
0x00000050-0x00000053	System timer
0x00000060-0x00000060	Standard PS/2 Keyboard
0x00000061-0x00000061	Motherboard resources

I/O Map	Assignment
0x00000063-0x00000063	Motherboard resources
0x00000064-0x00000064	Standard PS/2 Keyboard
0x00000065-0x00000065	Motherboard resources
0x00000067-0x00000067	Motherboard resources
0x00000070-0x00000077	Motherboard resources
0x00000070-0x00000077	System CMOS/real time clock
0x00000080-0x00000080	Motherboard resources
0x00000092-0x00000092	Motherboard resources
0x000000A0-0x000000A1	Programmable interrupt controller
0x000000A4-0x000000A5	Programmable interrupt controller
0x000000A8-0x000000A9	Programmable interrupt controller
0x000000AC-0x000000AD	Programmable interrupt controller
0x000000B0-0x000000B1	Programmable interrupt controller
0x000000B2-0x000000B3	Motherboard resources
0x000000B4-0x000000B5	Programmable interrupt controller
0x000000B8-0x000000B9	Programmable interrupt controller
0x000000BC-0x000000BD	Programmable interrupt controller
0x000000F0-0x000000F0	Numeric data processor
0x000002E0-0x000002E7	Communications Port (COM6)
0x000002E8-0x000002EF	Communications Port (COM4)
0x000002F0-0x000002F7	Communications Port (COM5)
0x000002F8-0x000002FF	Communications Port (COM2)
0x00000378-0x0000037F	Printer Port (LPT1)
0x000003B0-0x000003BB	Intel(R) HD Graphics 530
0x000003C0-0x000003DF	Intel(R) HD Graphics 530
0x000003E8-0x000003EF	Communications Port (COM3)
0x000003F8-0x000003FF	Communications Port (COM1)

I/O Map	Assignment
0x000004D0-0x000004D1	Programmable interrupt controller
0x00000680-0x0000069F	Motherboard resources
0x00000800-0x0000087F	Motherboard resources
0x00000A00-0x00000A0F	Motherboard resources
0x00000A10-0x00000A1F	Motherboard resources
0x00000A20-0x00000A2F	Motherboard resources
0x00000D00-0x0000FFFF	PCI bus
0x0000164E-0x0000164F	Motherboard resources
0x00001800-0x000018FE	Motherboard resources
0x00001854-0x00001857	Motherboard resources
0x0000E000-0x0000EFFF	Intel(R) 100 Series/C230 Series Chipset Family PCI Express Root Port #9 - A118
0x0000F000-0x0000F03F	Intel(R) HD Graphics 530
0x0000F040-0x0000F05F	Intel(R) 100 Series/C230 Series Chipset Family SMBus - A123
0x0000F060-0x0000F07F	Standard AHCI 1.0 Serial ATA Controller
0x0000F080-0x0000F083	Standard AHCI 1.0 Serial ATA Controller
0x0000F090-0x0000F097	Standard AHCI 1.0 Serial ATA Controller
0x0000F0A0-0x0000F0A7	Intel(R) Active Management Technology - SOL (COM7)
0x0000FF00-0x0000FFFE	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources

Memory Map

Memory Map	Assignment
0xFF000000-0xFFFFFFFF	Intel(R) 82802 Firmware Hub Device
0xFF000000-0xFFFFFFFF	Motherboard resources
0xFED10000-0xFED17FFF	Motherboard resources
0xFED18000-0xFED18FFF	Motherboard resources
0xFED19000-0xFED19FFF	Motherboard resources
0xE0000000-0xEFFFFFFF	Motherboard resources
0xFED20000-0xFED3FFFF	Motherboard resources
0xFED90000-0xFED93FFF	Motherboard resources
0xFED45000-0xFED8FFFF	Motherboard resources
0xFEE00000-0xFEEFFFFF	Motherboard resources
0xDFFE0000-0xDFFFFFFF	Motherboard resources
0xFDAF0000-0xFDAFFFFF	Motherboard resources
0xFDAE0000-0xFDAEFFFF	Motherboard resources
0xFDAC0000-0xFDACFFFF	Motherboard resources
0xDF000000-0xDF01FFFF	Intel(R) 100 Series/C230 Series Chipset Family PCI Express Root Port #9 - A118
0xDF000000-0xDF01FFFF	Intel(R) I211 Gigabit Network Connection #2
0xDF100000-0xDF11FFFF	Intel(R) Ethernet Connection (2) I219-LM
0xFED00000-0xFED003FF	High precision event timer
0xDF148000-0xDF149FFF	Standard AHCI 1.0 Serial ATA Controller
0xDF14C000-0xDF14C0FF	Standard AHCI 1.0 Serial ATA Controller
0xDF14B000-0xDF14B7FF	Standard AHCI 1.0 Serial ATA Controller
0xFD000000-0xFDABFFFF	Motherboard resources
0xFD000000-0xFDABFFFF	PCI bus

Memory Map	Assignment
0xFDAD0000-0xFDADFFFF	Motherboard resources
0xFDB00000-0xFDFFFFFF	Motherboard resources
0xFE000000-0xFE01FFFF	Motherboard resources
0xFE036000-0xFE03BFFF	Motherboard resources
0xFE03D000-0xFE3FFFFF	Motherboard resources
0xFE410000-0xFE7FFFFF	Motherboard resources
0xDF144000-0xDF147FFF	Intel(R) 100 Series/C230 Series Chipset Family PMC - A121
0x90000000-0xDFFFFFFF	PCI bus
0xFE40E000-0xFE40EFFF	Intel(R) Serial IO I2C Host Controller - A160
0xFED40000-0xFED44FFF	Trusted Platform Module 1.2
0xDF14D000-0xDF14DFFF	Intel(R) Active Management Technology - SOL (COM7)
0xDF020000-0xDF023FFF	Intel(R) I211 Gigabit Network Connection #2
0xFE40F000-0xFE40FFFF	Intel(R) Management Engine Interface
0xDF130000-0xDF13FFFF	Intel(R) USB 3.0 eXtensible Host Controller
0xDF14A000-0xDF14A0FF	Intel(R) 100 Series/C230 Series Chipset Family SMBus - A123
0xDE000000-0xDEFFFFFF	Intel(R) HD Graphics 530
0xC0000000-0xCFFFFFFF	Intel(R) HD Graphics 530
0xDF150000-0xDF150FFF	Intel(R) 100 Series/C230 Series Chipset Family Thermal subsystem - A131
0xDF140000-0xDF143FFF	High Definition Audio Controller

Memory Map	Assignment
0xDF120000-0xDF12FFFF	High Definition Audio Controller
0xA0000-0xBFFFF	PCI bus
0xA0000-0xBFFFF	Intel(R) HD Graphics 530

DMA Map

DMA Map	Assignment
Channel 3	Printer Port (LPT1)

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 timeout interval to 30 seconds.

```
; ------------------------ Enter to extended function mode -----------------------------
mov     dx,   2eh
mov     al,   87h
out     dx,   al
out     dx,   al
; ---------------------- Select Logical Device 7 of watchdog timer ---------------------
mov     al,   07h
out     dx,   al
inc     dx
mov     al,   07h
out     dx,   al
;--------------------------- Enable Watch dog feature ------------------------------------
mov     al,   030h
out     dx,   al
inc     dx
mov     al,   01h
out     dx,   al
; ------------------------- Set timeout interval as 30 seconds ---------------------------
dec     dx
mov     al,   0F6h
out     dx,   al
inc     dx
mov     al,   1Eh
out     dx,   al
;------------------------------ Enable Watch PME-----------------------------------------
dec     dx
mov     al,   0FAh
out     dx,   al
inc     dx
in      al,   dx
or      al,   51h
out     dx,   al
;-------------------- Set second as counting unit and start counting ---------------------
dec     dx
mov     al,   0F5h
out     dx,   al
inc     dx
in      al,   dx
and     al,   0F7h
or      al,   20h
out     dx,   al
;--------------------------- Exit the extended function mode -----------------------------
dec     dx
mov     al,   0AAh
out     dx,   al
```

Flash BIOS Update

I. Prerequisites

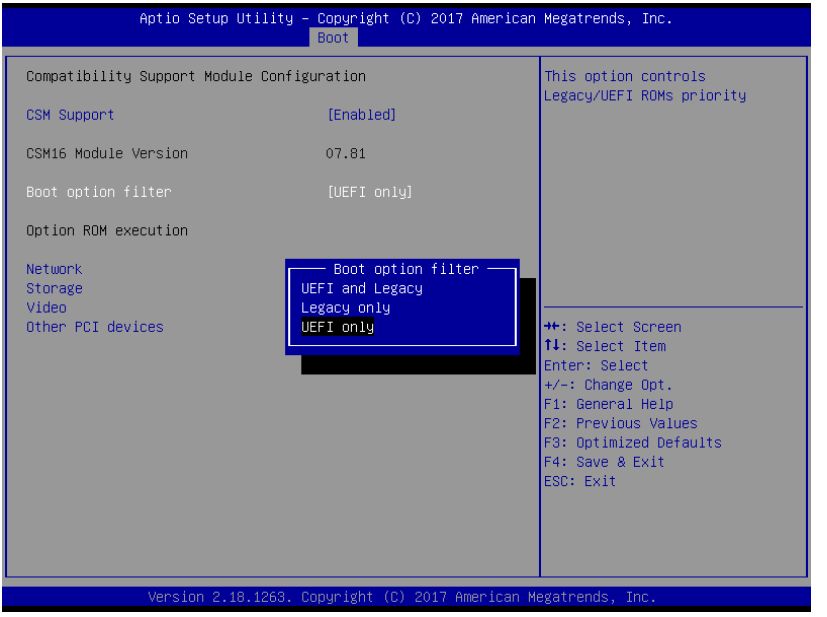
1 Prepare a USB storage device which can save the required files for BIOS update.

2 Download and save the BIOS file (e.g. 25010PW2.bin) to the storage device.

3 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.

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

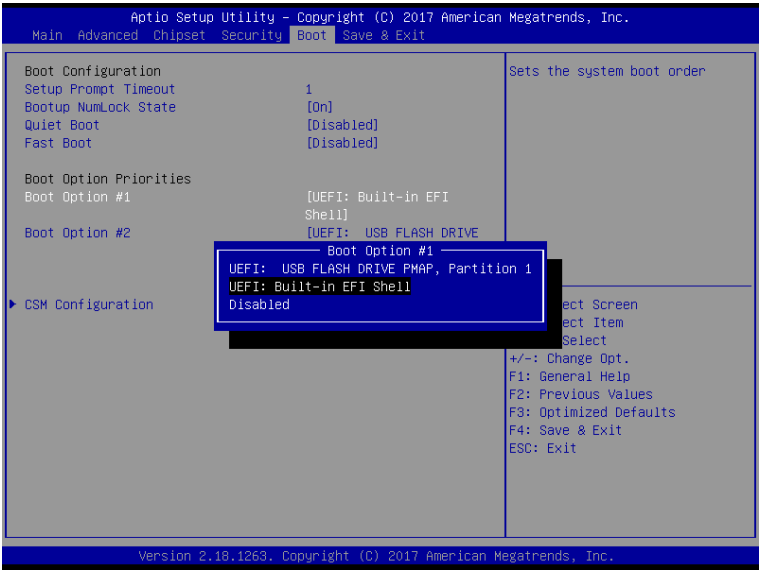
(1) Connect the USB storage device.
(2) Turn on the computer and press **<ESC>** or **<DEL>** key during boot to enter BIOS Setup.
(3) The system will go into the BIOS setup menu.
(4) Select **[Boot]** menu and enter into **[CSM Configuration]** menu.
(5) Set **[Boot option filter]** to **[UEFI Only]** and press **<F4>** key to save the 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]….
Users can type "AFUEFIx64 /?" to view 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 "**AFUEFIx64 25010Pxx.bin /p /b /n /x"** and press enter to start the flash procedure. (xx means the BIOS revision part, e.g. W2…)

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

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

```
fs0:\afuefix64> 25010PW2.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
   - Check RomLayout ...... 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.