

USER MANUAL

SP-7755

**15" Intel® Atom™ x7-E3950 /
Celeron® N3350 Processor
Fanless and all-around IP66
Panel PC**

SP-7755 M2

SP-7755

15" Intel[®] Atom[™] x7-E3950 / Celeron[®]

N3350 Processor Fanless and all-around IP66

Panel PC

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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.

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Revision History

The revision history of SP-7755 User Manual is described below:

Version No.	Revision History	Date
M1	Initial Release	2017/9
M2	Revised Default Setting of SW1 Selection	2018/1
	Modified USB3.0 Pin Assignment	
	Modified BIOS file name in the Flash BIOS Update section of Appendix B Technical Summary.	

1

Introduction

This chapter provides the introduction for the SP-7755 system as well as the framework of the user manual.

The following topic is included:

- About This Manual

1.1 About This Manual

Thank you for purchasing our SP-7755 system. The SP-7755 is an updated system designed to be comparable with the highest performance of IBM AT personal computers. The SP-7755 provides faster processing speed, greater expandability and can handle more tasks than before. This manual is designed to assist you how to install and set up the whole system. It contains 5 chapters and 2 appendixes. Users can configure the system according to their own needs. This user manual is intended for service personnel with strong hardware background. It is not intended for general users.

The following section describes the structure of this user manual.

Chapter 1 Introduction

This chapter introduces the framework of this user manual.

Chapter 2 Getting Started

This chapter describes the package contents and system specifications, and illustrates the physical appearances for the SP-7755 system. Read the safety reminders carefully on how to take care of your system properly.

Chapter 3 System Configuration

This chapter describes the locations and functions of the system motherboard components. You will learn how to properly configure the connectors and system configuration jumpers on the motherboard and configure the system to meet your own needs.

Chapter 4 Software Utilities

This chapter contains helpful information for proper installations of the Intel Chipset Software Installation Utility, Intel Trusted Execution Engine Driver Utility, Graphics Driver Utility, LAN Driver Utility, Microsoft Hotfix Driver Utility and Sound Driver Utility.

Chapter 5 AMI BIOS Setup

This chapter provides BIOS setup information.

Appendix A System Assembly Diagrams

This appendix provides the exploded diagrams and part numbers of the SP-7755.

Appendix B Technical Summary

This appendix provides the information about the system block diagram, allocation maps for system resources, Watchdog Timer Configuration and Flash BIOS Update.

2 Getting Started

This chapter provides the information for the SP-7755 system. It describes how to set up the system quickly and outlines the system specifications.

The following topics are included:

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

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

2.1 Package List

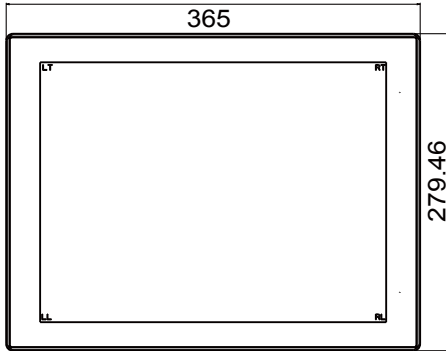
If you discover any of the items listed below are damaged or lost, please contact your local distributor immediately.

Item	Q'ty
SP-7755	1
Manual / Driver DVD	1
Quick Guide	1
M12 Power Supply Cable	1

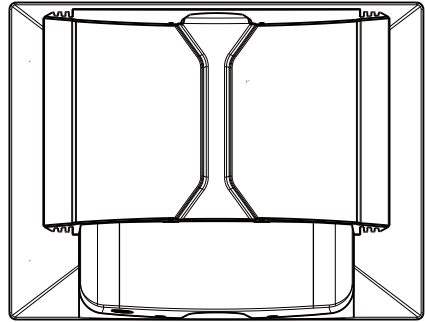
2.2 System Overview

Unit: mm

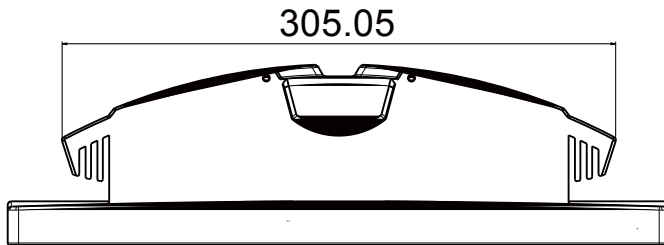
Front View



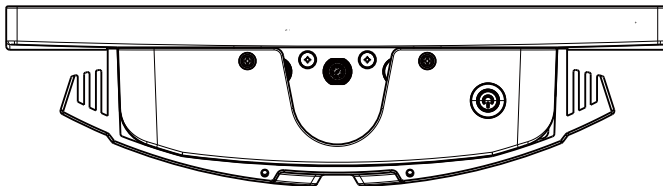
Rear View



Top View

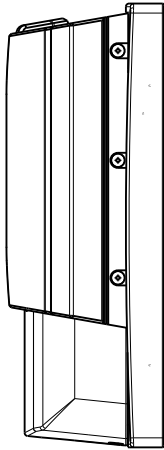


Bottom View

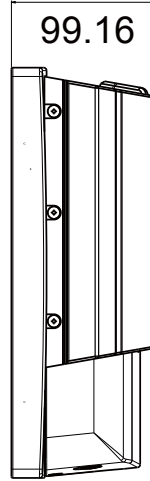


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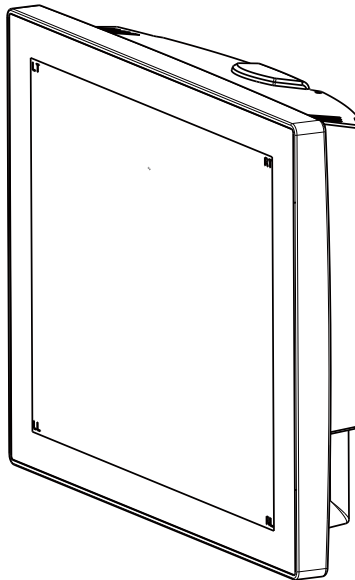
Left Side View



Right Side View



Quarter View



2.3 System Specifications

System	
CPU Support	<ul style="list-style-type: none"> ➤ Intel® Celeron® N3350 processor : 6w, 2M Cache, 2.4Ghz ➤ Intel® Atom™ x7 E3950 processor : 6.5w, 2M Cache, 1.8Ghz
Chipset	➤ Intel® SOC
Memory Support	➤ 1 x SO-DIMM socket supporting 1600/1867 DDR3L memory up to 8G (non-ECC)
Front Bezel	➤ Aluminum
Drive Bay	➤ 1 x SATAIII Port (6.0 Gb / sec)
IP Rating	➤ IP66
Power Supply	➤ DC in 12V / 24V
Operating System	➤ Windows 10 IoT Enterprise LTSC 2016 64bit / Ubuntu 16.04 LTS
Watchdog	➤ 1~255 second Watchdog timer selectable
System Weight	➤ 7.2 kg
Dimension (W x H x D)	➤ 365mm x 279.46mm x 99.16mm
Mounting Support	➤ Wall mount / VESA 100 / Stand
Certificate	➤ FCC / CE
I/O Ports (Rear side)	
Power Input	➤ 1 x M12 waterproof connector, supporting 12V / 24V DC
Power Switch	➤ 1 x Power Button
USB	➤ 2 x USB 3.0 with M12 waterproof connector
Serial Port	➤ 1 x COM port with M12 waterproof connector COM1 for RS-232
LAN	<ul style="list-style-type: none"> ➤ 2 x GbE LANs with M12 waterproof connector LAN 1: Intel® I210IT LAN 2 : Intel® I210IT
Drive Bay	➤ 1 x 2.5 inch SATAIII HDD or SSD drive space
Expansion Slot	➤ 1 x full-sized mini-PCIe slot (with mini-PCIe and USB signal)
Display	
LCD Panel	➤ 15" XGA (resolution 1024 x 768) LCD panel
Touch Screen	<ul style="list-style-type: none"> ➤ 15" Projective capacitive touch (USB interface) ➤ 15" 5-wire resistive touch (USB interface)

Environment

Operating Temperature	<ul style="list-style-type: none">➤ HDD: 0°C ~ 45°C (32°F ~ 113°F)➤ SSD: 0°C ~ 55°C (32°F ~ 131°F)➤ Wide Temperature: -20°C ~ 55°C (-4°F ~ 131°F) (w/ E3950)
Storage Temperature	<ul style="list-style-type: none">➤ -20°C ~ 80°C (-4°F ~ 176°F)
Humidity	<ul style="list-style-type: none">➤ 20%~ 90%

2.4 Safety Precautions

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

1. Check the Line Voltage
 - The operating voltage for the power supply should be within the range of 100V to 240V AC; otherwise the system may be damaged.
2. Environmental Conditions
 - Place your SP-7755 on a sturdy, level surface. Be sure to allow enough space around the system to have easy access needs.
 - Avoid installing your SP-7755 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 SP-7755 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 SP-7755 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 System Configuration

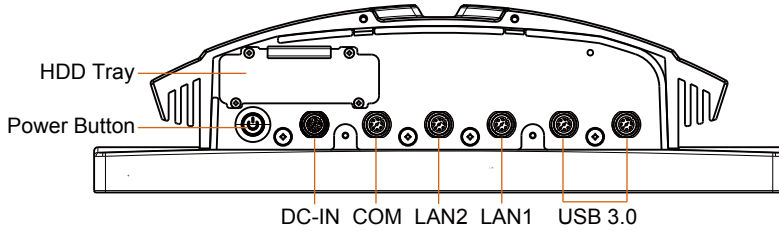
This chapter contains helpful information about the jumper & connector settings, and component locations for the main board.

The following topics are included:

- External I/O Ports Diagram
- Connector & Jumper Quick Reference Table
- System Main Board Component Locations
- How to Set Jumpers
- Setting Main Board Connectors and Jumpers
- External M12 waterproof Connector

3.1 External I/O Ports Diagram

3.1.1 Rear I/O Ports Diagram



3.2 Jumper & Connector Quick Reference Table

JUMPER Description	NAME
LVDS VCC Voltage Selection	JP_VDD1
Clear CMOS Data Selection	JP4
LVDS Backlight Control Selection	JP7
Slide Switch for LVDS Resolution Selection	SW1

CONNECTOR Description	NAME
COM Connector	COM1, COM2
2 x LAN Ports (Rear)	LAN1, LAN2
2 x Dual USB 3.0 Ports (Rear)	USB1, USB2
2 x USB 2.0 Ports (Internal)	USB3
Programmable GPIO Pin Header	JDIO1
I2C Wafer	JI2C1
MCU FW Rewrite Connector	JMCU1
System Fan Connector	FAN1
DC Power Input Connector	PWR2
Mini PCI Express Slot	M_PCIE1
LVDS Connector	LVDS1
Front Panel Connector	JFP1
HD Audio Connector	AUDIO1
Panel Inverter Connector	JINV1
SATA 3.0 Connector	SATA1
SATA Power Connector	SATA_PWR1
BIOS Reset Connector	JP9

3.3 Component Locations Of System Main Board

3.3.1 Top View of System Main Board

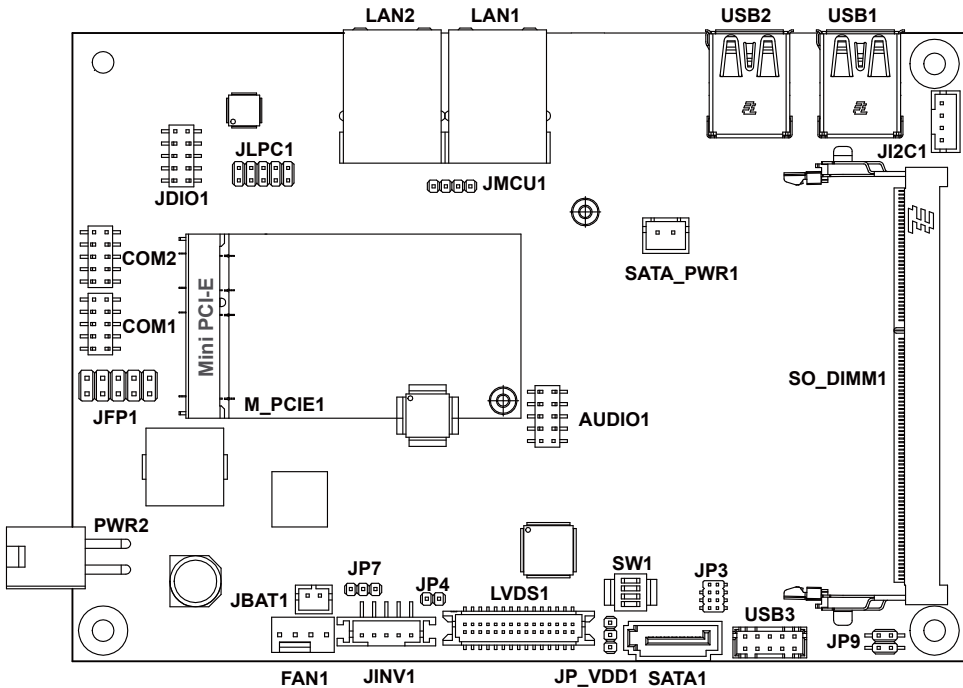




Figure 3-1. Main Board Component Location (Top View)

	<p>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 SP-7755 is properly grounded.</p>
	<p>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.</p>



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.

3.3.2 Bottom View of System Main Board

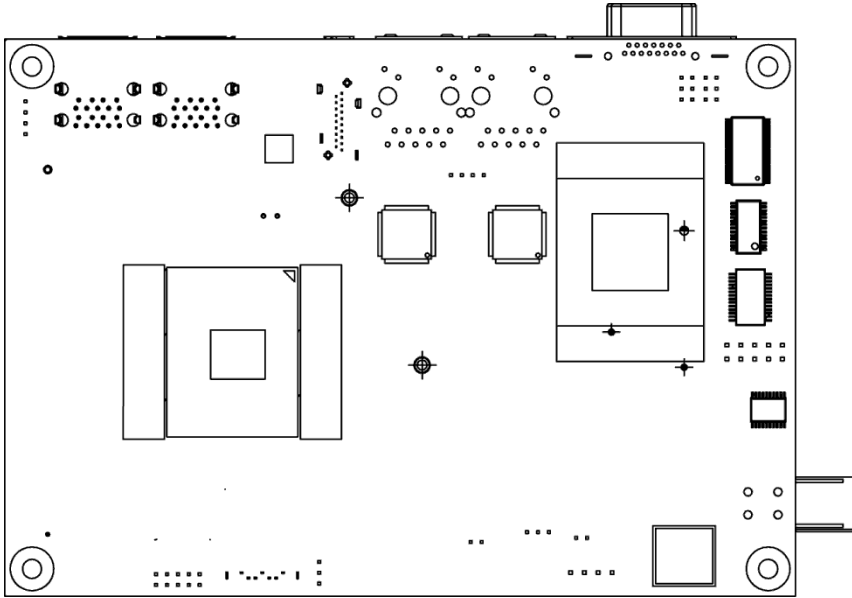


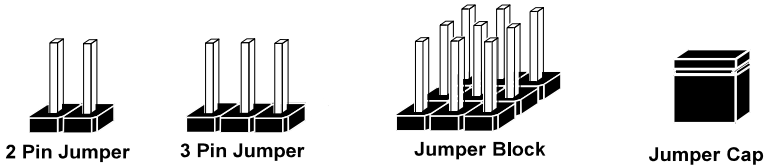
Figure 3-2. Main Board Component Location (Rear View)

3.4 How To Set Jumpers

You can configure your board by setting the jumpers. A jumper consists of two or three metal pins with a plastic base mounted on the card. 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 configure your hardware settings by "opening" or "closing" jumpers.

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

Jumpers & Caps

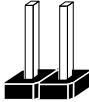


If a jumper has three pins, for example, labeled 1, 2 and 3. You can connect pins 1 and 2 to create one setting and shorting. You can also select to connect pins 2 and 3 to create another setting. The format of the jumper picture will be illustrated throughout this manual. The figure below shows different types of jumpers and jumper settings.

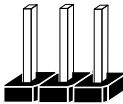
Jumper diagrams



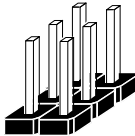
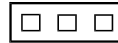
Jumper Cap looks like this



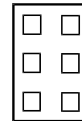
2 pin Jumper looks like this



3 pin Jumper looks like this



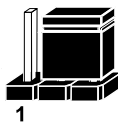
Jumper Block looks like this



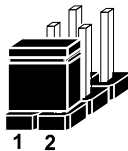
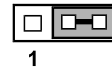
Jumper settings



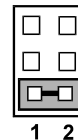
2 pin Jumper closed(enabled)
looks like this



3 pin Jumper
2-3 pin closed(enabled)
looks like this



Jumper Block
1-2 pin closed(enabled)
looks like this



3.5 Setting Main Board Connectors and Jumpers

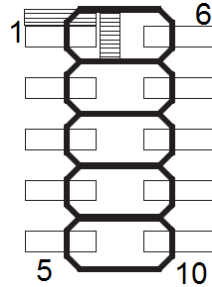
3.5.1 COM Connector

Connector Location: COM1, COM2

Description: COM Connector

COM1(RS232) Connector Pin Assignment:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	COM1_DCD	6	COM1_DSR
2	COM1_RX	7	COM1_RTS
3	COM1_TX	8	COM1_CTS
4	COM1_DTR	9	COM1_RI
5	GND	10	NC



**COM1/
COM2/**

COM2(RS232/RS422/RS485) Connector Pin Assignment:

PIN	ASSIGNMENT		
	RS232 <i>(Default Setting)</i>	RS422	RS485
1	COM2_DCD	TX-	D-
2	COM2_RX	TX+	D+
3	COM2_TX	RX-	NC
4	COM2_DTR	RX+	NC
5	GND	GND	GND
6	COM2_DSR	NC	NC
7	COM2_RTS	NC	NC
8	COM2_CTS	NC	NC
9	COM2_RI	NC	NC
10	NC	NC	NC

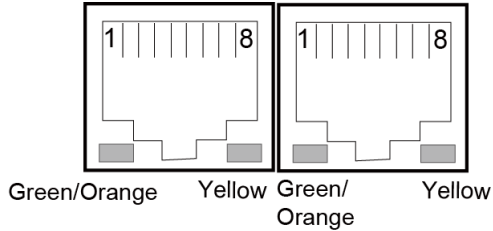
Notes:

1. COM2 is selectable as RS232, RS422, RS485 by BIOS setting.
2. Default setting is RS232. Please see **Chapter 5 “Advanced – Onboard Device Configuration”** for selection details.

3.5.2 LAN1, LAN2 Ports

Jumper Name: LAN1, LAN2

Description: LAN1, LAN2 Port, LAN RJ-45 Port (Rear I/O)



LAN1 / LAN2

LAN1 Pin Assignment:

PIN	ASSIGNMENT
1	LAN1_MDIP0
2	LAN1_MDIN0
3	LAN1_MDIP1
4	LAN1_MDIP2
5	LAN1_MDIN2
6	LAN1_MDIN1
7	LAN1_MDIP3
8	LAN1_MDIN3

LAN2 Pin Assignment:

PIN	ASSIGNMENT
1	LAN2_MDIP0
2	LAN2_MDIN0
3	LAN2_MDIP1
4	LAN2_MDIP2
5	LAN2_MDIN2
6	LAN2_MDIN1
7	LAN2_MDIP3
8	LAN2_MDIN3

LAN1 / LAN2 Status

There are LAN LED indicators on the rear side of the mainboard. By observing their status, you can know the status of the Ethernet connection.

LAN LED Indicator

Left Side LED

Green Color	10/100Mbps LAN Speed Indicator
Orange Color	Giga LAN Speed Indicator
Off	No LAN Switch/HUB connect

Right Side LED

Yellow Color Blinking	LAN Message Active
Off	No LAN Message Active

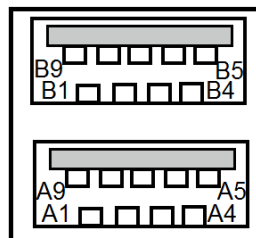
3.5.3 Dual USB 3.0 Connectors

Connector Location: USB1

Description: Dual USB 3.0 Connectors

USB 3.0 signals:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
B5	USB3_RXN2	-	-
B6	USB3_RXP2	B4	GND
B7	GND	B3	USB2_P2_DP
B8	USB3_TXN2	B2	USB2_P2_DN
B9	USB3_TXP2	B1	VCC5_USB1
A5	USB3_RXN1	-	-
A6	USB3_RXP1	A4	GND
A7	GND	A3	USB2_P1_DP
A8	USB3_TXN1	A2	USB2_P1_DN
A9	USB3_TXP1	A1	VCC5_USB1



USB1

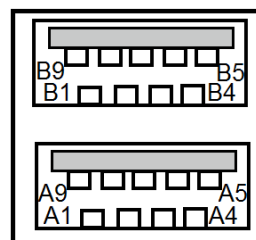
3.5.4 USB 3.0 Connectors

Connector Location: USB2

Description: USB 3.0 Connectors

USB 3.0 (USB2) signals:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
B5	USB3_RXN2	-	-
B6	USB3_RXP2	B4	GND
B7	GND	B3	USB2_P2_DP
B8	USB3_TXN2	B2	USB2_P2_DN
B9	USB3_TXP2	B1	VCC5_USB1
A5	USB3_RXN1	-	-
A6	USB3_RXP1	A4	GND
A7	GND	A3	USB2_P1_DP
A8	USB3_TXN1	A2	USB2_P1_DN
A9	USB3_TXP1	A1	VCC5_USB1

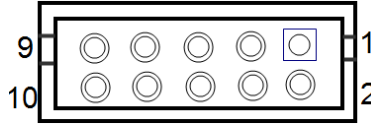


USB2

3.5.5 USB 2.0 Connectors

Connector Location: USB3

Description: USB 2.0 Connectors



USB3

USB 3.0 (USB2) signals:

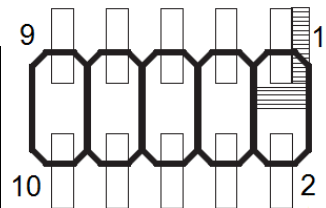
PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	VCC5_USB3	2	VCC5_USB3
3	USB2_P5_DN	4	USB2_P6_DN
5	USB2_P5_DP	6	USB2_P6_DP
7	GND	8	GND
9	GND	10	GND

3.5.6 Programmable GPIO Pin Header

Connector Location: JDIO1

Description: GPIO pin header and 5V power

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	VCC5	2	GND
3	DIN 0	4	DOUT0
5	DIN 1	6	DOUT1
7	DIN 2	8	DOUT2
9	DIN 3	10	DOUT3



JDIO1

Notes:

1. Users can set the GPI/GPO configuration via Protech's API/Utility.
2. Default setting is GPI every time when system AC power is re-applied from power failure state
3. Configuration can be still kept even in S5 state unless system AC power is lost.

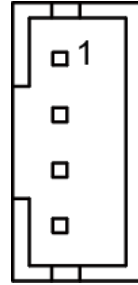
3.5.7 I2C Wafer

Connector Location: JI2C1

Description: I2C Wafer

JI2C1 Pin Assignment:

PIN	ASSIGNMENT
1	GND
2	VCC5
3	I2C0_SCL_33
4	I2C0_SDA_33



JI2C1

3.5.8 MCU FW Rewrite Connector

Connector Location: JMCU1

Description: MCU FW Rewrite Connector

PIN	ASSIGNMENT
1	MCU_5VSB
2	GND
3	MCU_SPD
4	MCU_SPC



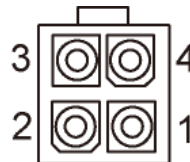
JMCU1

3.5.9 DC Power Input Connector

Connector Location: PWR2

Description: DC Power Input Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
3	VCC12	4	VCC12
2	GND	1	GND



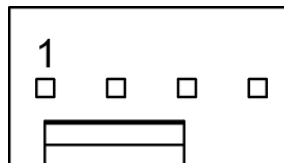
PWR2

3.5.10 System Fan Connector

Connector Location: FAN1

Description: System Fan Connector

PIN	ASSIGNMENT
1	GND
2	VCC12
3	SYSFANIN
4	SYSFANOUT



FAN1

Notes:

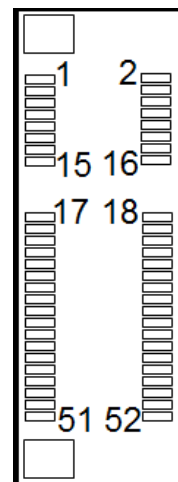
1. Fan speed mode can be set by BIOS or API.
2. Default BIOS setting is “Auto Duty-Cycle Mode”. Please see Chapter 5 or check API document for more details.

3.5.11 MINI PCI Express Slot

Connector Location: M_PCIE1

Description: Mini-PCI Express Slot

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	PCIE_WAKEJ	2	V3P3S
3	Reserved	4	GND
5	Reserved	6	VCC1_5
7	M_CLKREQJ	8	Reserved
9	GND	10	Reserved
11	M_PCIE_CLKN	12	Reserved
13	M_PCIE_CLKP	14	Reserved
15	GND	16	Reserved
17	Reserved	18	GND
19	Reserved	20	Reserved
21	GND	22	PMU_PLTRST_N
23	PCIE_P2_RXN	24	V3_3SB
25	PCIE_P2_RXP	26	GND
27	GND	28	VCC1_5
29	GND	30	SMB_3P3_SCL
31	PCIE_P2_TXN	32	SMB_3P3_SDA
33	PCIE_P2_TXP	34	GND
35	GND	36	USB2_P7_DN
37	GND	38	USB2_P7_DP
39	V3P3S	40	GND
41	V3P3S	42	NC
43	GND	44	NC
45	NC	46	NC
47	NC	48	VCC1_5
49	NC	50	GND
51	NC	52	V3P3S



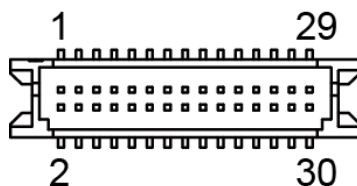
M_PCIE1

Mini PCI Express is the successor of the Mini PCI card and provides an increased data throughput. The cards have a detached network interface and are equipped with one lane. They are used in particular in embedded designs or compact box PCs.

3.5.12 LVDS Connector

Connector Location: LVDS1

Description: LVDS Connector








LVDS1



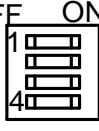
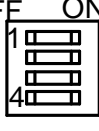

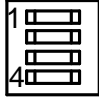
PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	LVDS_VCC	2	GND
3	LVDS_CLKB_DN	4	LVDS_CLKB_DP
5	GND	6	LVDS_B2_DN
7	LVDS_B2_DP	8	GND
9	LVDS_B1_DN	10	LVDS_B1_DP
11	LVDS_B3_DP	12	LVDS_B3_DN
13	LVDS_B0_DP	14	LVDS_B0_DN
15	GND	16	LVDS_CLKA_DP
17	LVDS_CLKA_DN	18	GND
19	LVDS_A2_DP	20	LVDS_A2_DN
21	GND	22	LVDS_A1_DP
23	LVDS_A1_DN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

3.5.13 Slide Switch For LVDS Resolution Selection

Connector Location: SW1

Description: Slide Switch for LVDS Resolution/Channel/Color Bit Selection

SELECTION	SW1	PIN	SETTING
1024 x 768 1CH/24bit <i>(Default Setting)</i>	OFF ON 	1	ON
		2	OFF
		3	ON
		4	ON
800 x 600 1CH/18bit	OFF ON 	1	ON
		2	ON
		3	ON
		4	ON
1024 x 768 1CH/18bit	OFF ON 	1	OFF
		2	ON
		3	ON
		4	ON
1280 x 768 1CH/18bit	OFF ON 	1	OFF
		2	OFF
		3	ON
		4	ON
1200 x 800 1CH/18bit	OFF ON 	1	ON
		2	ON
		3	OFF
		4	ON

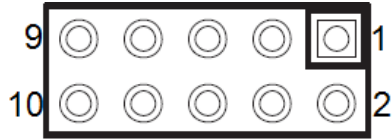
SELECTION	SW1	PIN	SETTING
1280 x 960 1CH/18bit		1	OFF
		2	ON
		3	OFF
		4	ON
1280 x 1024 2CH/24bit		1	ON
		2	OFF
		3	OFF
		4	ON
1366 x 768 1CH/18bit		1	OFF
		2	OFF
		3	OFF
		4	ON
1366 x 768 1CH/24bit		1	ON
		2	ON
		3	ON
		4	OFF
1440 x 900 2CH/24bit		1	OFF
		2	ON
		3	ON
		4	OFF
1400 x 1050 2CH/24bit		1	ON
		2	OFF
		3	ON

SELECTION	SW1	PIN	SETTING
		4	OFF
1600 x 900 2CH/24bit		1	OFF
		2	OFF
		3	ON
		4	OFF
1680 x 1050 2CH/24bit		1	ON
		2	ON
		3	OFF
		4	OFF
1600 x 1200 2CH/24bit		1	OFF
		2	ON
		3	OFF
		4	OFF
1920 x 1080 2CH/24bit		1	ON
		2	OFF
		3	OFF
		4	OFF
1920 x 1200 2CH/24bit		1	OFF
		2	OFF
		3	OFF
		4	OFF

3.5.14 Front Panel Connector

Connector Location: JFP1

Description: Front Panel Connector



JFP1

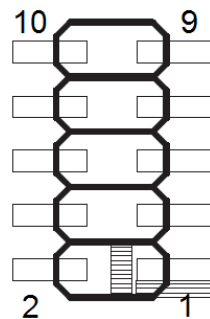
PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	HDD LED+	2	POWER LED+
3	HDD LED-	4	GND
5	GND	6	GND
7	RESET BTN	8	GND
9	NC	10	POWER BTN

3.5.15 HD Audio Connector

Connector Location: AUDIO1

Description: HD Audio Connector for Line_in / Line_out / Mic_in

PIN	ASSIGNMENT	PIN	ASSIGNMENT
10	LINE-OUT-R	9	LINE-OUT-L
8	HD_GND	7	HD_GND
6	HD_LINE-IN-R	5	HD_LINE-IN-L
4	HD_GND	3	HD_GND
2	HD_MIC1-R	1	HD_MIC1-L



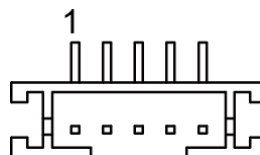
AUDIO1

3.5.16 Panel Inverter Connector

Connector Location: JINV1

Description: Panel Inverter Connector

PIN	ASSIGNMENT
1	VCC12
2	VCC12
3	GND
4	LVDS_BKLCTL
5	LVDS_BKLTEN



JINV1

3.5.17 Serial ATA (SATA) 3.0 Connector

Connector Location: SATA1

Description: Serial ATA (SATA) 3.0 Connector

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



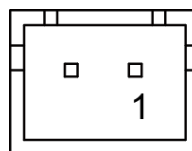
SATA1

3.5.18 SATA Power Connector

Connector Location: SATA_PWR1

Description: Serial ATA Power Connector

PIN	ASSIGNMENT
1	VCC5
2	GND



SATA_PWR1

3.5.19 BIOS Reset Connector



Connector Location: JP9

Description: This connector is only for Protech's engineers. (Purpose: BIOS reset). Please do not use this connector; otherwise, the system might be crashed.

3.5.20 LVDS Backlight Control Selection

Connector Location: JP7

Description: Jumper for selecting PIN5 (LVDS_BKLTEN) voltage of JINV1.

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
3.3V	1-2 <i>(Default Setting)</i>	 <p>JP7</p>
5V	2-3	 <p>JP7</p>

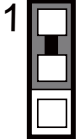

Note 1: Users can change the setting according to panel specification

Note 2: Please refer to **PANEL INVERTER CONNECTOR** for more details about pin definition of JINV1.

3.5.21 LVDS VCC Voltage Selection

Connector Location: JP_VDD1

Description: Voltage selection jumper for selecting PIN1, PIN29, PIN30 (LVDS_VCC) voltage of LVDS1.

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
3.3V	1-2 (Default Setting)	 <p>JP_VDD1</p>
5V	2-3	 <p>JP_VDD1</p>

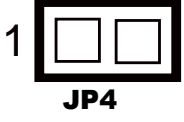
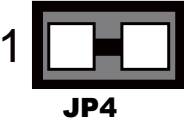
Note: Please refer to **PANEL INVERTER CONNECTOR** for more information about pin definition of JINV1.

3.5.22 Clear CMOS Data Selection

Jumper Name: JP4

Description: Clear CMOS Data Selection

- Step1.** Remove the main power of the PC.
- Step2.** Close JP4 (pins 1-2) for 6 seconds by a cap.
- Step3.** Remove the cap which is just used on JP4 (1-2), so that JP4 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	JUMPER ILLUSTRATION
Normal	Open <i>(Default Setting)</i>	
Clear CMOS*	1-2	

Note: Please make sure the main power is off before clearing CMOS.

3.6 External M12 Waterproof Connector

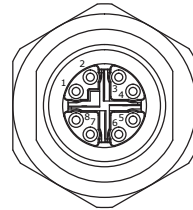
3.6.1 USB 3.0 Connectors

Connector Location: **USB 3.0**

Description: External USB 3.0 connector

Pin Assignment:

PIN	ASSIGNMENT
1	GND
2	VCC5 USB1
3	USB2 P2 DN
4	USB2 P2 DP
5	USB3 RXN2
6	USB3 RXP2
7	USB3 TXN2
8	USB3_TXP2



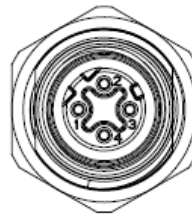
USB 3.0

3.6.2 Power Button

Connector Location: **Power Button**

Description: Power Button

PIN	ASSIGNMENT
1	Power BTN
2	Power LED +
3	GND
4	GND



Power Button

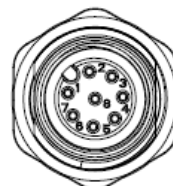
3.6.3 LAN1, LAN2 Ports

Connector Location: LAN1, LAN2

Description: LAN1, LAN2 Port

LAN1 Pin Assignment:

PIN	ASSIGNMENT
1	LAN1_MDIP0
2	LAN1_MDIN0
3	LAN1_MDIP1
4	LAN1_MDIP2
5	LAN1_MDIN2
6	LAN1_MDIN1
7	LAN1_MDIP3
8	LAN1_MDIN3



LAN1 / LAN2

LAN2 Pin Assignment:

PIN	ASSIGNMENT
1	LAN2_MDIP0
2	LAN2_MDIN0
3	LAN2_MDIP1
4	LAN2_MDIP2
5	LAN2_MDIN2
6	LAN2_MDIN1
7	LAN2_MDIP3
8	LAN2_MDIN3

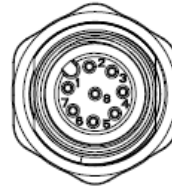
3.6.4 COM Connector

Connector Location: COM

Description: COM Connector

Pin Assignment:

PIN	ASSIGNMENT
1	COM1_DCD
2	COM1_RX
3	COM1_TX
4	COM1_DTR
5	COM1_DSR
6	COM1_RTS
7	COM1_CTS
8	COM1_RI



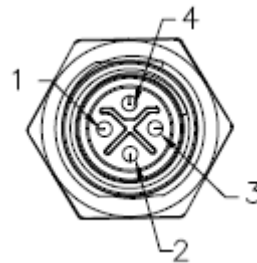
COM

3.6.5 DC Power Input Connector

Connector Location: DC-IN

Description: DC Power Input Connector

PIN	ASSIGNMENT
1	PWR_VCC12
2	PWR_GND
3	GND
4	Power BTN



DC-IN

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 Intel[®] Trusted Execution Engine Driver installation
- Servicing stack update for Windows 10 Version 1607
- Installing Graphics Driver Utility
- Installing LAN Driver Utility
- Installing Sound Driver Utility
- Installing Intel[®] Serial I/O Driver Utility

4.1 Introduction


Enclosed with the SP-7755 Series package is our driver utilities contained in a DVD-ROM disk. Refer to the following table for driver locations:

Filename (Assume that DVD-ROM drive is D:)	Purpose	OS
		Win10/64 bit
D:\Driver\Flash BIOS	For Aptio(EFI) BIOS update utility	X
D:\SP-7755_V1.0\Platform\1_Main Chip	Intel® Chipset Device Software Installation Utility	✓
D:\SP-7755_V1.0\Platform\3_Graphics	Intel® HD Graphics Family For VGA driver installation	✓
D:\SP-7755_V1.0\Platform\2_Hotfix	Servicing stack update for Windows 10 Version 1607	✓
D:\SP-7755_V1.0\Platform\7_TXE	Intel® Trusted Execution Engine Driver installation	✓
D:\SP-7755_V1.0\Platform\5_Lan Chip	Intel® I210-IT LAN Driver installation	✓
D:\SP-7755_V1.0\Platform\4_Audio	Realtek® ALC888 HD Audio codec System Software	✓
D:\SP-7755_V1.0\Platform\6_Serial IO	Intel® Serial IO Driver	✓

X : Not support

✓: Support

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

	<p>WARNING: It is <u>strongly recommended</u> that you follow the installation sequence below:</p> <ol style="list-style-type: none"> (1) Chipset Driver (2) Graphics Driver (3) TXE Driver (4) Other Drivers
---	---

4.2 Installing Intel® Chipset Software Installation Utility

4.2.1 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

4.2.2 Intel® Chipset Software Installation Utility

The utility pack is to be installed only for Windows® 10 series, 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 SP-7755 and insert the driver disk.
- 2** Enter the **Main Chip** folder where the Chipset driver is located
- 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 SP-7755 for the changes to take effects.

4.3 Intel® Trusted Execution Engine Driver Installation

4.3.1 Introduction

The Intel® ME software components that need to be installed depend on the system's specific hardware and firmware features. The installer, compatible with Windows 10, detects the system's capabilities and installs the relevant drivers and applications.

4.3.2 Installation Instructions for Windows 10

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

4.4 Servicing stack update for Windows 10 Version 1607

4.4.1 Introduction

The Microsoft Hotfix kb3211320 and kb3213986 Driver that needs to be installed depends on the system's specific hardware and firmware features. The installer, compatible with Windows 10, detects the system's capabilities and installs the relevant drivers and applications.

4.4.2 Installation Instructions for Windows 10

To install the utility, simply follow the following steps:

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

4.5 Installing Graphics Driver Utility

The GRAPHICS interface embedded in SP-7755 can support a wide range of display types. You can have dual displays via LVDS interfaces and make the system work simultaneously.

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

- 1** Connect the USB DVD-ROM device to SP-7755 and insert the driver disk.
- 2** Enter the **3_Graphics** folder where the driver is located
- 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 SP-7755 for the changes to take effects.

4.6 Installing LAN Driver Utility

Enhanced with LAN function, SP-7755 supports various network adapters. To install the LAN Driver, follow the steps below:

- 1** Connect the USB DVD-ROM device to SP-7755 and insert the driver disk.
- 2** Enter the **5_LAN Chip** folder where the driver is located
- 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 SP-7755 for the changes to take effects.

For more details on the installation procedure, refer to the Readme.txt file that you can find on LAN Driver Utility.

4.7 Installing Sound Driver Utility

The sound function enhanced in this system is fully compatible with Windows® 10 series.

To install the Sound Driver, follow the steps below:

- 1** Connect the USB DVD-ROM device to SP-7755 and insert the driver disk.
- 2** Open the **4_Audio** folder where the driver is located
- 3** Click the **Setup.exe** 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 SP-7755 for the changes to take effects.

4.8 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 SP-7755 and insert the driver disk.
2. Open the **6_Serial I/O** folder where the driver is located.
3. Select 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 SP-7755 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 SP-7755 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.

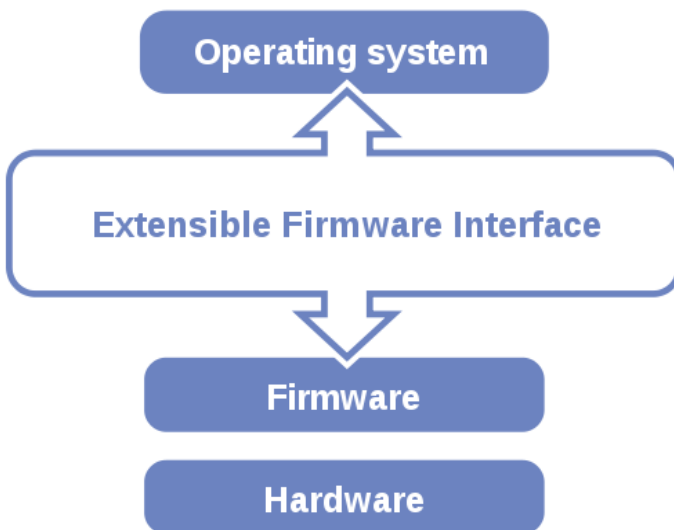


Figure 5-1. Extensible Firmware Interface Diagram

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 or <Esc> immediately while the POST message is running before the operating system is loading.

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

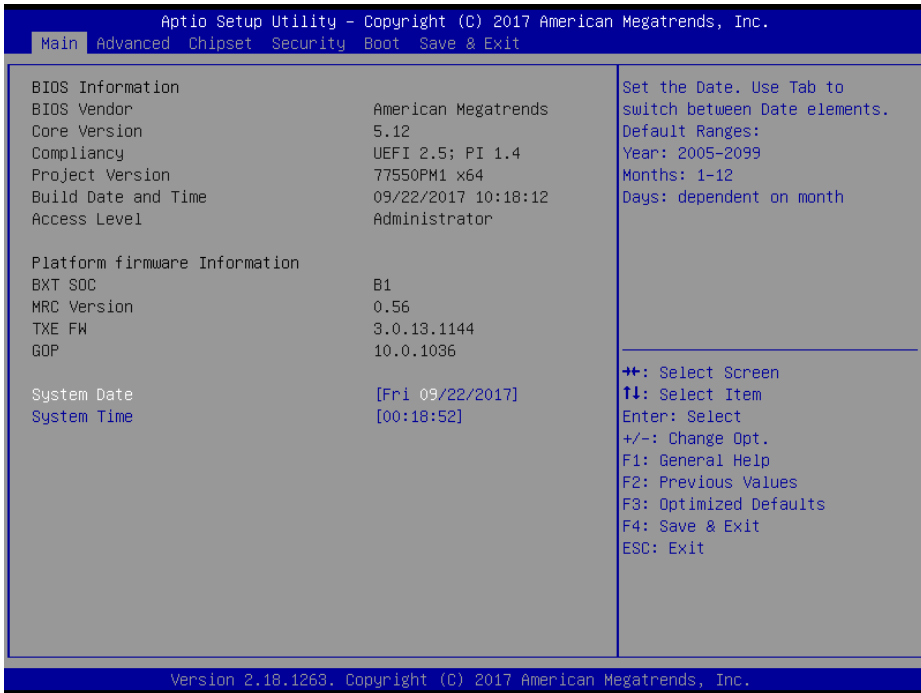
5.2 Accessing Setup Utility

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 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.

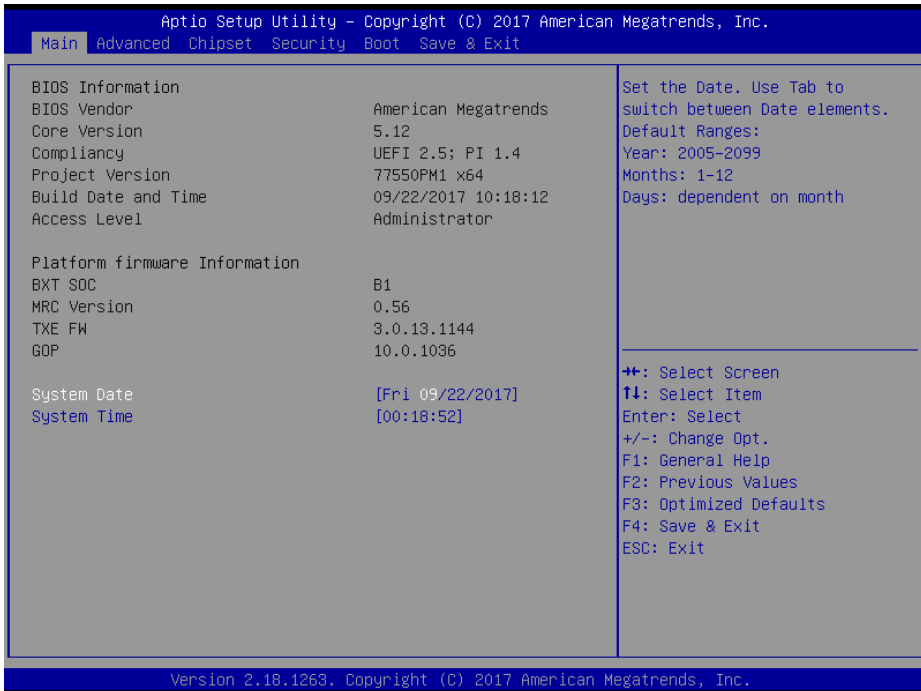
The language of the BIOS setup menu interface and help messages are shown in US English. You may use <↑> or <↓> key to select among the items and press <Enter> to confirm and enter the sub-menu. The following table provides the list of the navigation keys that you can use while operating the BIOS setup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

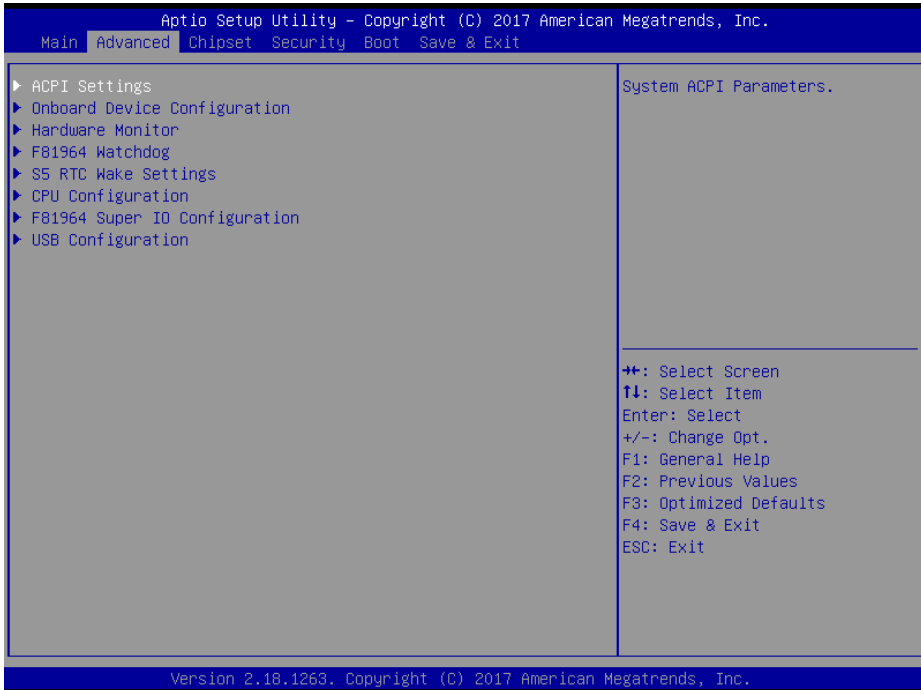
BIOS Setting	Options	Description/Purpose
BIOS Vendor	No changeable options	Displays the name of the BIOS vendor.
Core Version	No changeable options	Displays the current BIOS core version.
Compliance	No changeable options	Displays the current UEFI version.
Project Version	No changeable options	Displays 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.
Access Level	No changeable options	Displays the current user access level.
BXT SOC	No changeable options	Displays the SOC stepping.
MRC Version	No changeable options	Displays the MRC version.

BIOS Setting	Options	Description/Purpose
TXE FW	No changeable options	Displays the TXE FW version.
GOP	No changeable options	Displays the GOP version.
System Date	Month, day, year	Sets the system date. The format is [Day Month/ Date/ Year]. Users can directly enter values or use <+> or <-> arrow keys to increase/decrease it. The “Day” is automatically changed.
System Time	Hour, minute, second	Sets the system time. The format is [Hour: Minute: Second]. Users can directly enter values or use <+> or <-> arrow keys to increase/decrease it.

5.4 Advanced

Menu Path *Advanced*

This menu provides advanced configurations such as ACPI Settings, Onboard Device Configuration, Hardware Monitor, F81964 Watchdog, S5 RTC Wake Settings, CPU Configuration, F81964 Super IO Configuration and USB Configuration



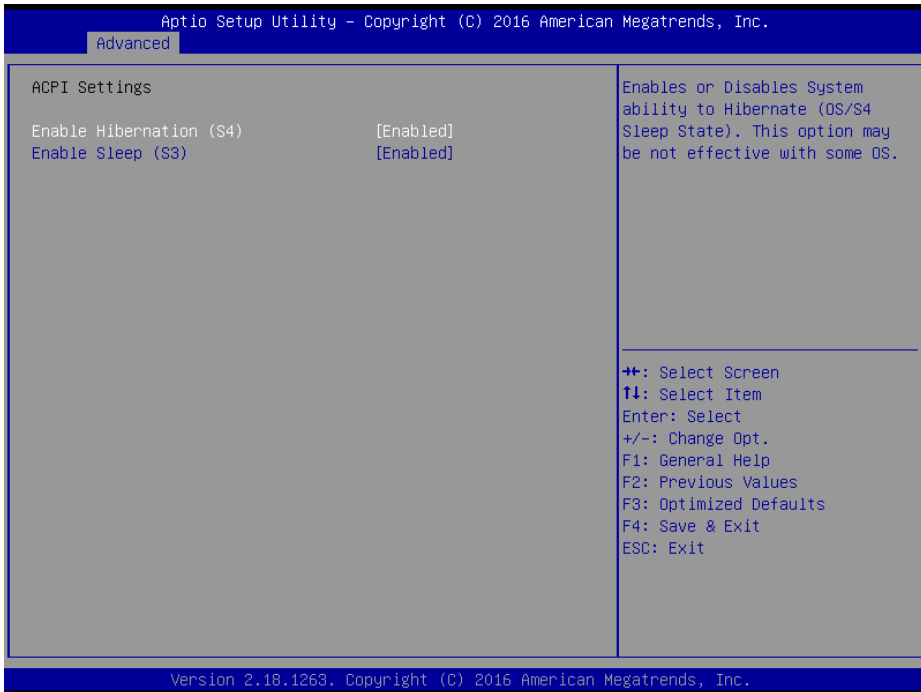
Advanced Menu Screen

BIOS Setting	Options	Description/Purpose
ACPI Settings	Sub-Menu	System ACPI parameters.
Onboard Device Configuration	Sub-Menu	Project specific parameters.
Hardware Monitor	Sub-Menu	Monitor hardware status.
F81964 Watchdog	Sub-Menu	Watchdog timer parameters.
S5 RTC Wake Settings	Sub-Menu	RTC wake parameters.
CPU Configuration	Sub-Menu	CPU configuration parameters.
F81964 Super IO Configuration	Sub-Menu	System Super IO chip parameters
USB Configuration	Sub-Menu	USB configuration parameters.

5.4.1 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 Hibernation (S4) and Enable Sleep (S3).



ACPI Settings Screen

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

5.4.2 Advanced – Onboard Device Configuration

Menu Path *Advanced > Onboard Device Configuration*

The **Onboard Device Configuration** allows users to configure COM2 Mode.



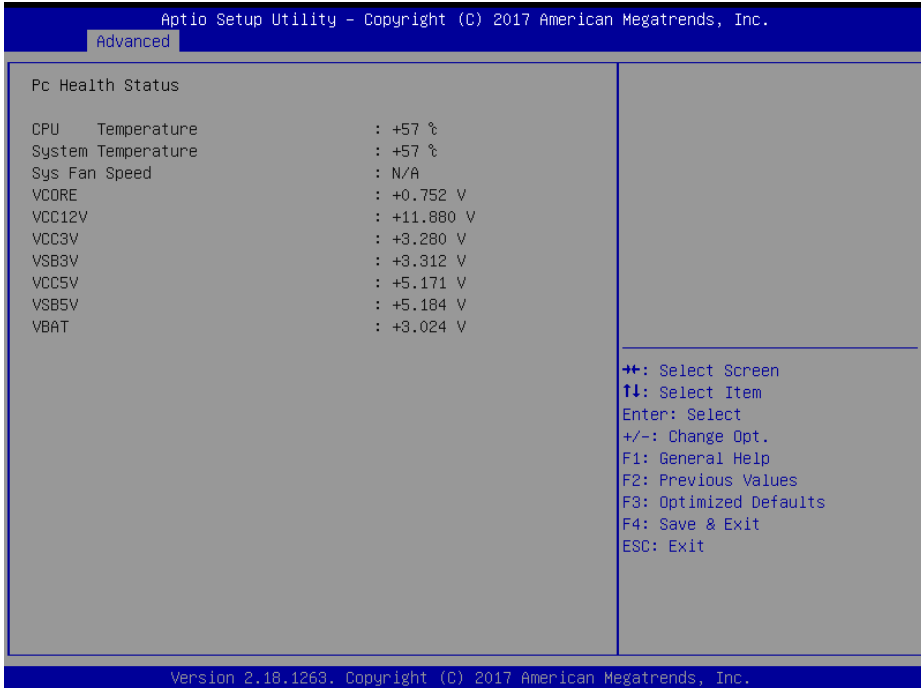
Onboard Device Configuration Screen

BIOS Setting	Options	Description/Purpose
COM2 Mode Selection	-RS-422 -RS-232 (default) -RS-485	Selects COM2 mode.

5.4.3 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, system fan speed and voltage levels in supply.



Hardware monitor Screen

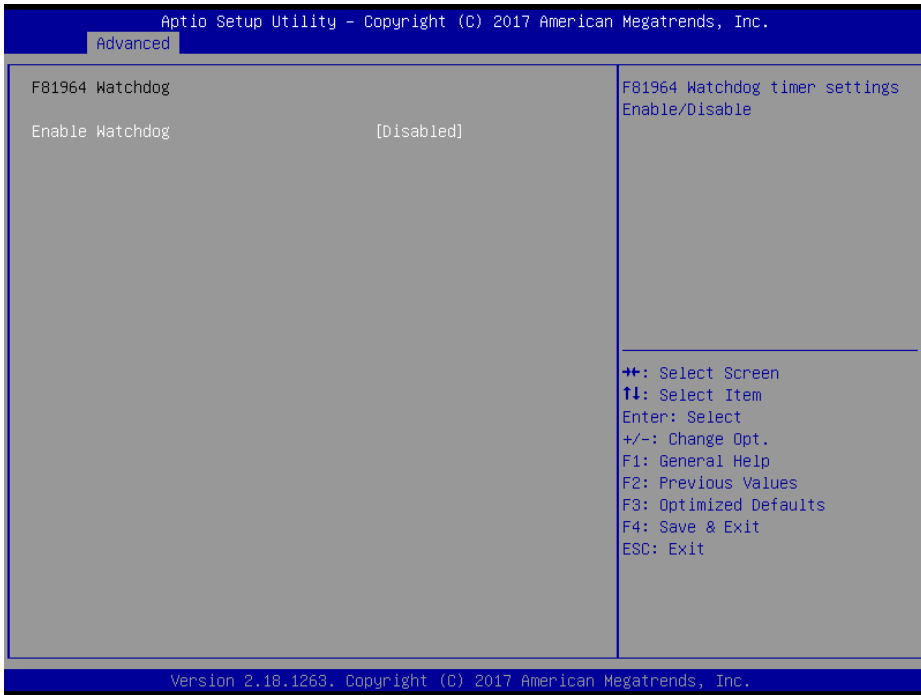
BIOS Setting	Options	Description/Purpose
CPU Temperature	No changeable options	Displays the processor's temperature.
System Temperature	No changeable options	Displays the system's temperature.
Sys Fan Speed	No changeable options	Displays system fan speed.
VCORE	No changeable options	Displays voltage level of the VCORE in supply.
VCC12V	No changeable options	Detects and displays 12V voltage.
VCC3V	No changeable options	Detects and displays the voltage level of VCC3V in supply.
VSB3V	No changeable options	Detects and displays VSB3V voltage.

VCC5V	No changeable options	Detects and displays the voltage level of VCC5V in supply.
VSB5V	No changeable options	Detects and displays the voltage level of VSB5V in supply.
VBAT	No changeable options	Detects and displays the battery voltage.

5.4.4 Advanced – F81964 Watchdog Configuration

Menu Path *Advanced > F81964 Watchdog*

If the system hangs or fails to respond, enable the F81964 watchdog function to trigger a system reset via the 255-level watchdog timer.



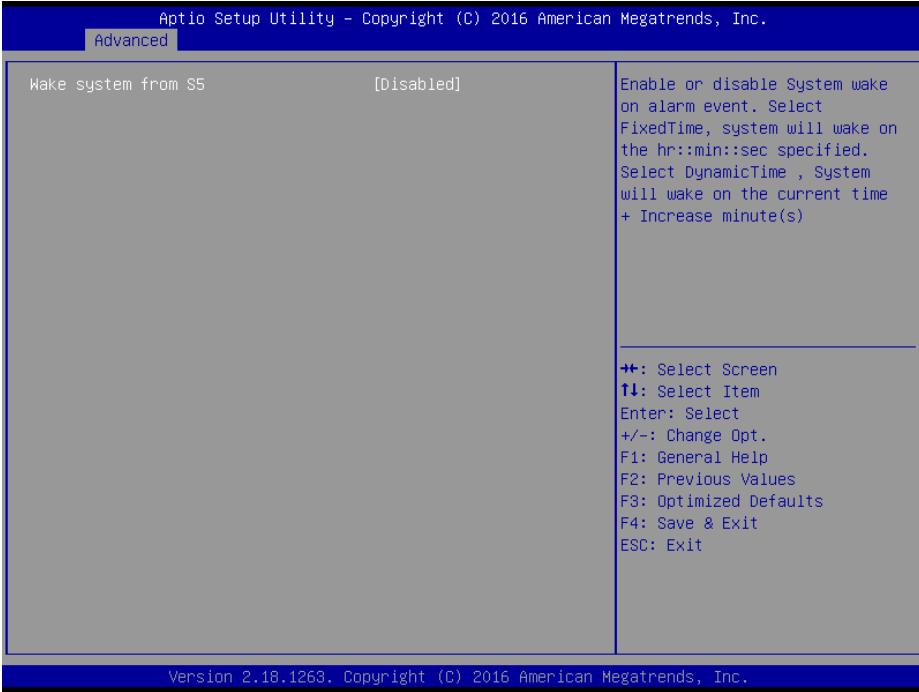
F81964 Watchdog Configuration Screen

BIOS Setting	Options	Description/Purpose
Enable Watchdog	- Enabled - Disabled (default)	Enables/Disables F81964 Watchdog timer settings.
Watchdog Timer Count	Numeric (from 10 to 255)	Sets the timeout for Watchdog timer. Watchdog Timer = 1sec * Count

5.4.5 Advanced - S5 RTC Wake Settings

Menu Path *Advanced > S5 RTC wake Settings*

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.

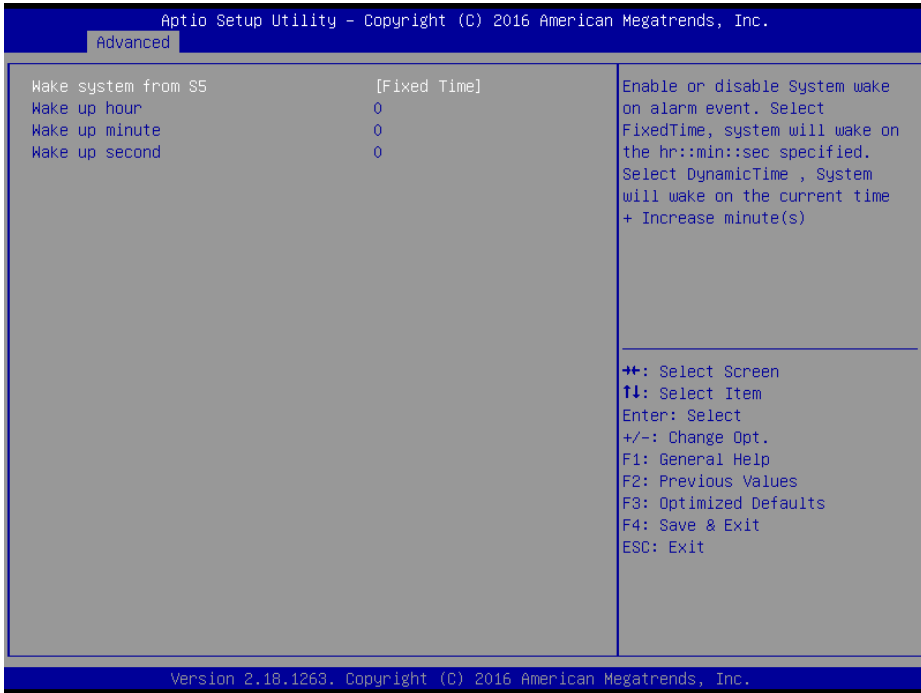


S5 RTC Wake Settings Screen

BIOS Setting	Options	Description/Purpose
Wake system from S5	<ul style="list-style-type: none"> - Disabled (default) - Fixed Time - Dynamic Time 	<p>Enables or disables System wake on alarm event.</p> <ul style="list-style-type: none"> • Fixed Time: The system will wake on the time (hr::min::sec) specified. • Dynamic Time: The system will wake on the current time + increased minute(s).

5.4.5.1 S5 RTC Wake Settings [Fixed Time]

Menu Path *Advanced > S5 RTC Wake Settings [Fixed Time]*

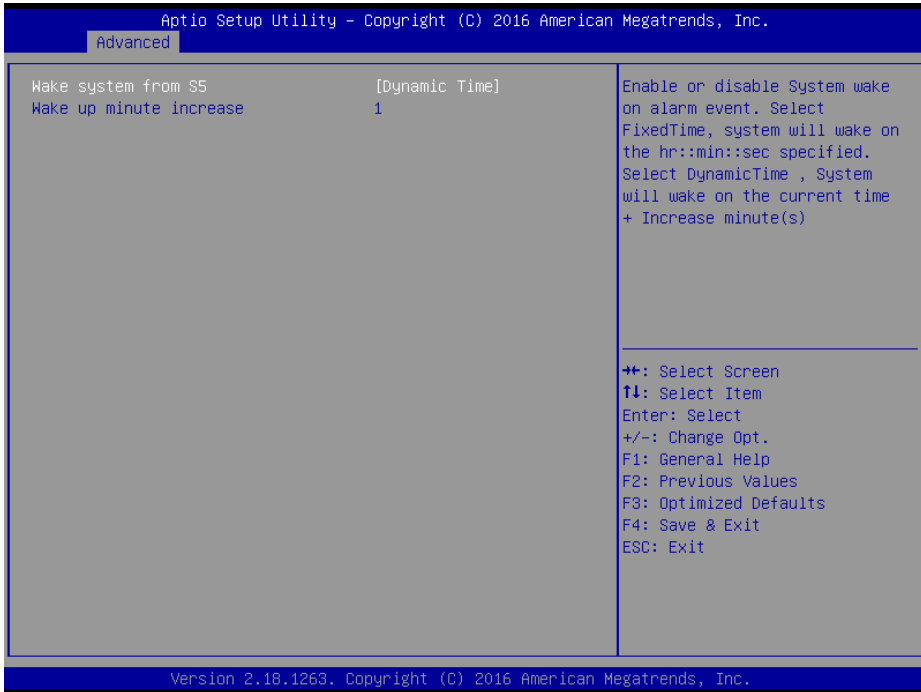


S5 RTC Wake Settings Screen (Fixed Time)

BIOS Setting	Options	Description/Purpose
Wake up hour	(Numeric) from 0 to 23	Sets an hour for a scheduled power-on event.
Wake up minute	(Numeric)from 0 to 59	Sets a minute for a scheduled power-on event.
Wake up second	(Numeric)from 0 to 59	Sets a second for a scheduled power-on event.

5.4.5.2 S5 RTC Wake Settings [Dynamic Time]

Menu Path *Advanced > S5 RTC Wake Settings [Dynamic Time]*



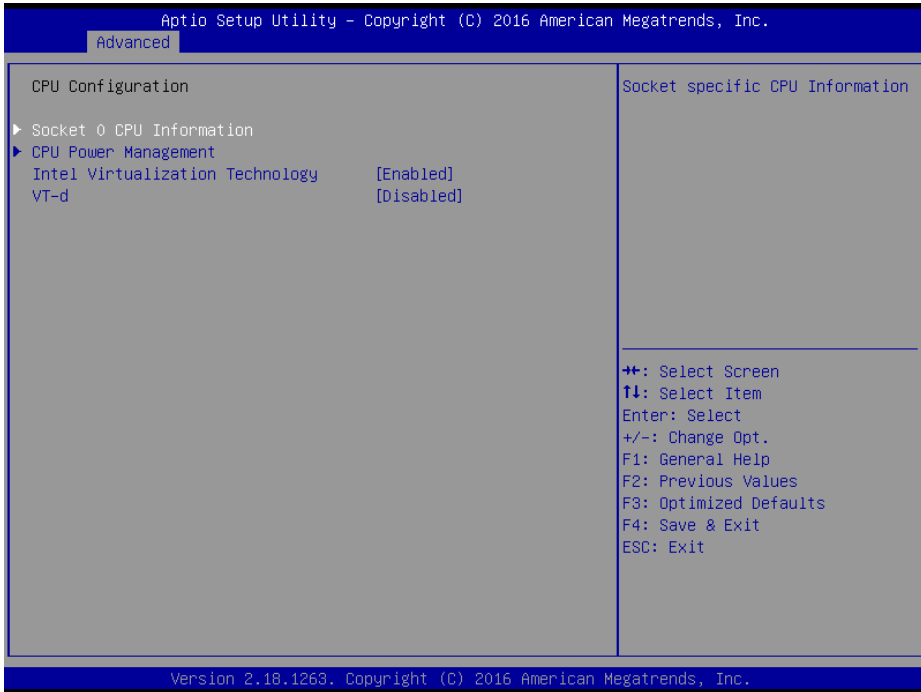
S5 RTC Wake Setting Screen (Dynamic Time)

BIOS Setting	Options	Description/Purpose
Wake up minute increase	(Numeric) from 1 to 5	Sets a period of time (in minutes) to wake up the system after it enters S5 state.

5.4.6 Advanced - CPU Configuration

Menu Path *Advanced > CPU Configuration*

The **CPU Configuration** provides advanced CPU settings such as CPU power management and some information about CPU.



CPU Configuration Screen

BIOS Setting	Options	Description/Purpose
Socket 0 CPU Information	Sub-Menu	Socket specific CPU Information.
CPU Power Management	Sub-Menu	CPU power management options.
Intel Virtualization Technology	- Disabled - Enabled (default)	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
VT-d	- Disabled (default) - Enabled	Enables/Disables CPU VT-d.

5.4.6.1 Socket 0 CPU Information

Menu Path *Advanced > CPU Configuration > Socket 0 CPU Information*

Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.

Advanced

Socket 0 CPU Information

```

Intel(R) Pentium(R) CPU N4200 @ 1.10GHz
CPU Signature                506C9
Microcode Patch              20
Max CPU Speed                1100 MHz
Min CPU Speed                800 MHz
Processor Cores              4
Intel HT Technology          Not Supported
Intel VT-x Technology        Supported

L1 Data Cache                24 kB x 4
L1 Code Cache                32 kB x 4
L2 Cache                     1024 kB x 2
L3 Cache                     Not Present
  
```

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

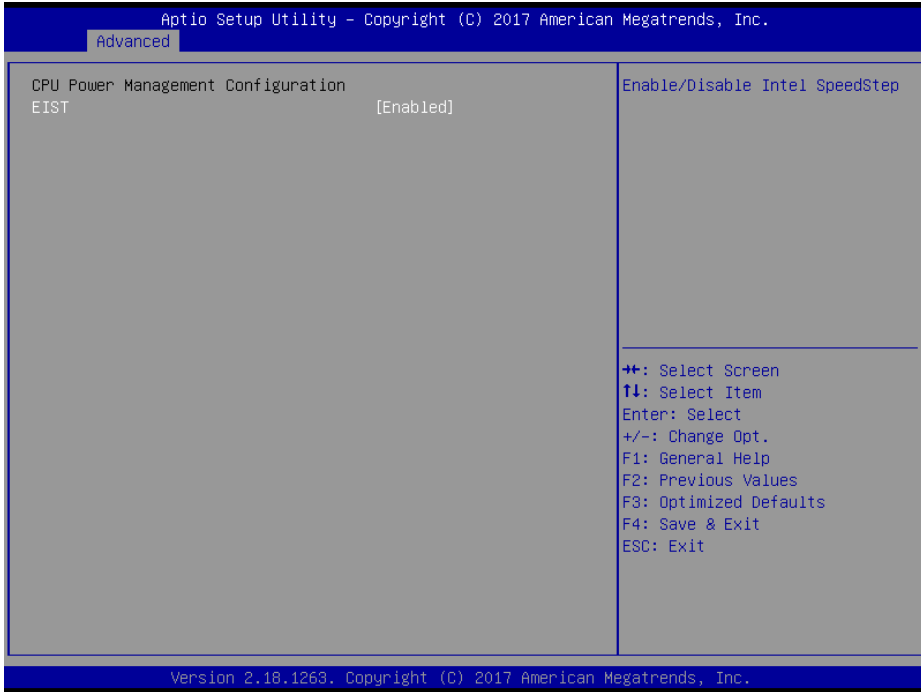
Version 2.18.1263. Copyright (C) 2016 American Megatrends, Inc.

Socket 0 CPU Information Screen

BIOS Setting	Options	Description/Purpose
CPU Branding String	No changeable options	Displays CPU Branding String.
CPU Signature	No changeable options	Displays CPU Signature.
Microcode Patch	No changeable options	CPU Microcode Patch Revision.
Max CPU Speed	No changeable options	Displays the Max CPU Speed.
Min CPU Speed	No changeable options	Displays the Min CPU Speed.
Processor Cores	No changeable options	Displays number of cores.
Intel HT Technology	No changeable options	Displays Hyper Threading support.
Intel VT-x Technology	No changeable options	Displays VT-x support.
L1 Data Cache	No changeable options	L1 Data Cache Size.
L1 Code Cache	No changeable options	L1 Code Cache Size.
L2 Cache	No changeable options	L2 Cache Size.
L3 Cache	No changeable options	L3 Cache Size.

5.4.6.2 CPU Power Management Configuration

Menu Path *Advanced > CPU Configuration > CPU Power Management Configuration*



CPU Power Management Configuration Screen

BIOS Setting	Options	Description/Purpose
EIST	- Disabled - Enabled (default)	Enables/Disables Intel Speed Step feature for dynamic scaling processor frequency.

5.4.7 Advanced - F81964 Super IO Configuration

Menu Path *Advanced > F81964 Super IO Configuration*



F81964 Super IO Configuration Screen

BIOS Setting	Options	Description/Purpose
Super IO Chip (F81964)	No changeable options	Displays the super I/O chip model.
Serial Port 1 Configuration	Sub-menu	Sets the parameters of Serial Port 1 (COM1).
Serial Port 2 Configuration	Sub-menu	Sets the parameters of Serial Port 2 (COM2).

Menu Path *Advanced > F81964 Super IO Configuration > Serial Port 2 Configuration*



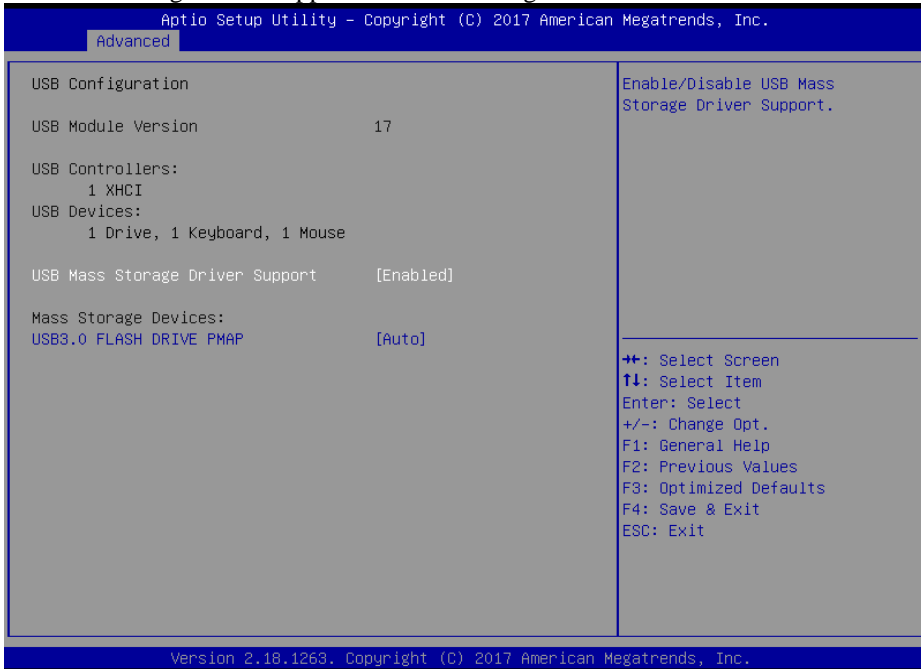
Serial Port 2 Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled (default)	Enables or Disables COM2
Device Settings	No changeable options	Reports the current COM setting.
Change Settings	-Auto (default) -IO=2F8h; IRQ=3 -IO=3F8h; IRQ=3,4,5,7,9,10,11,12; -IO=2F8h; IRQ=3,4,5,7,9,10,11,12; -IO=3E8h; IRQ=3,4,5,7,9,10,11,12; -IO=2E8h; IRQ=3,4,5,7,9,10,11,12;	Allows user to change Device's Resource settings. New settings will be reflected on This Setup Page after System restarts.

5.4.8 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 Mass Storage Devices.



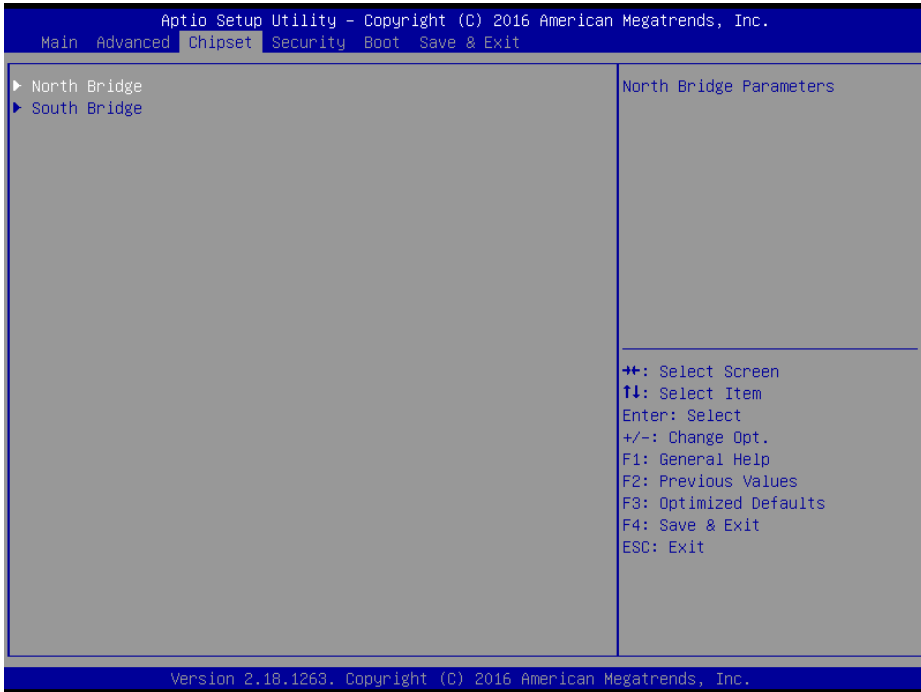
USB Configuration Screen

BIOS Setting	Options	Description/Purpose
USB Module Version	No changeable options	Displays USB module version.
USB Controllers	No changeable options	Displays number and type of USB controllers (if any).
USB Devices	No changeable options	Displays number and type of connected USB devices (if any).
USB Mass Storage Driver Support	- Disabled - Enabled (default)	Enables or Disables USB Mass Storage Driver Support.
Mass Storage Devices: [drive(s)]	-Auto (default) -Floppy -Forced FDD -Hard Disk -CD-ROM	AUTO enumerates devices according to their media format. Optical drives are emulated as ' CDROM ', drives with no media will be emulated according to a drive type.

5.4.9 Chipset

Menu Path *Chipset*

This menu allows users to configure advanced Chipset settings such as North Bridge and South Bridge configuration parameters..

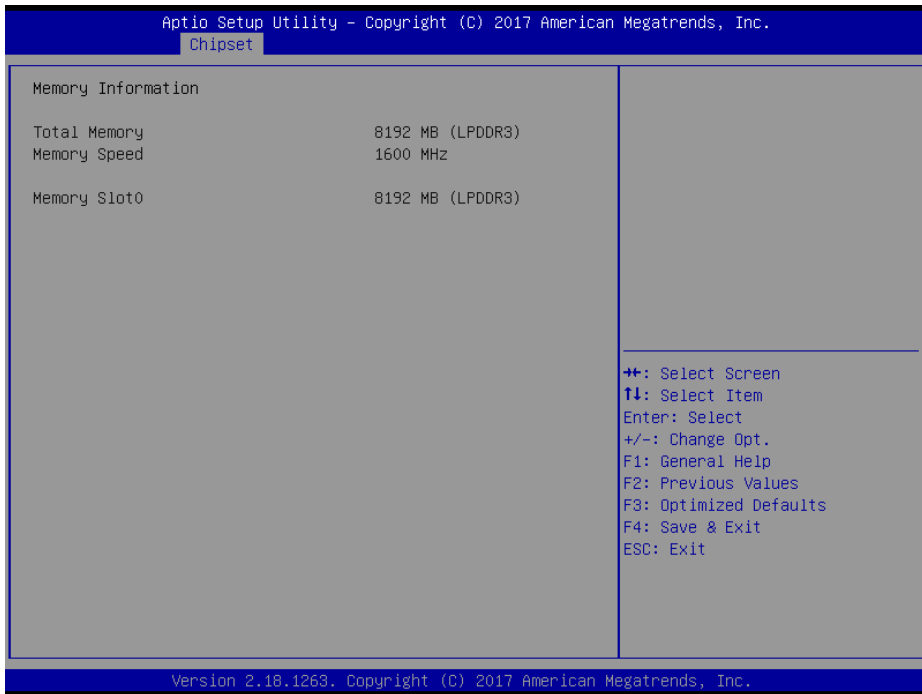


Chipset Screen

BIOS Setting	Options	Description/Purpose
North Bridge	Sub-menu	North Bridge Parameters.
South Bridge	Sub-menu	South Bridge Parameters.

5.4.9.1 Chipset –North Bridge

Menu Path *Chipset > North Bridge*

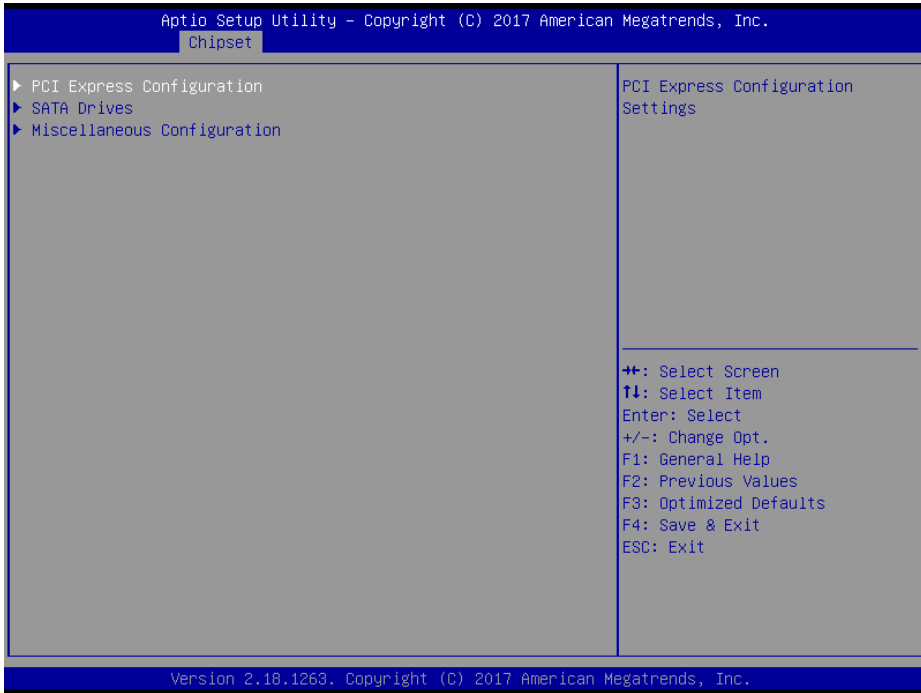


North Bridge Screen

BIOS Setting	Options	Description/Purpose
Total Memory	No changeable options	Displays the current amount and type of memory on the system, e.g. "8192 MB(LPDDR3)".
Memory Speed	No changeable options	Displays memory speed.
Memory Slot0	No changeable options	Displays the current amount and type of memory on each memory slot, e.g. "8192 MB (LPDDR3)".

5.4.9.2 Chipset –South Bridge

Menu Path *Chipset > South Bridge*

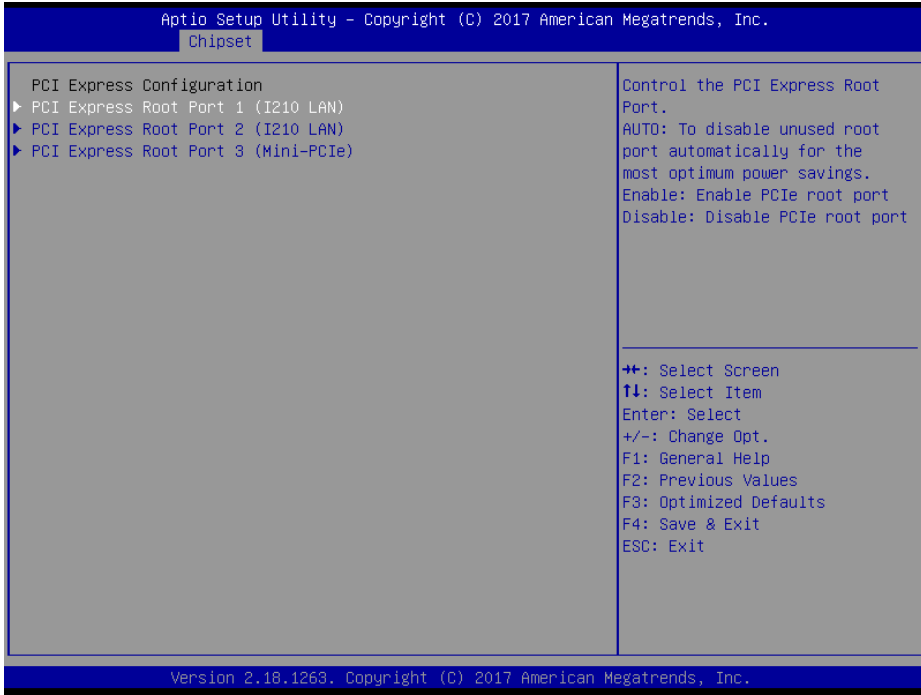


South Bridge Screen

BIOS Setting	Options	Description/Purpose
PCI Express Configuration	Sub-menu	PCI Express Configuration Settings.
SATA Drives	Sub-menu	SATA Device Configuration Settings.
Miscellaneous Configurations	Sub-menu	Miscellaneous Configuration Settings.

5.4.9.3 Chipset –South Bridge- PCI Express Configuration

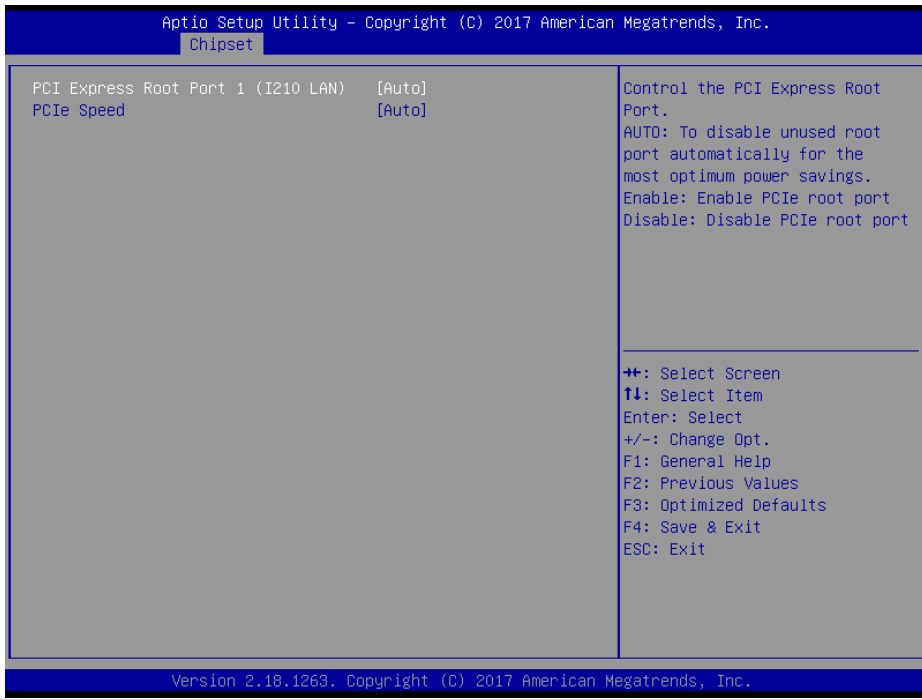
Menu Path *Chipset > South Bridge > PCI Express Configuration*



PCI Express Configuration Screen

BIOS Setting	Options	Description/Purpose
PCI Express Root Port 1 (I210 LAN)	Sub-menu	PCI Express Root Port 1 (I210 LAN) parameters..
PCI Express Root Port 2 (I210 LAN)	Sub-menu	PCI Express Root Port 2 (I210 LAN) parameters.
PCI Express Root Port 3 (Mini-PCIe)	Sub-menu	PCI Express Root Port 3 (Mini-PCIe) parameters..

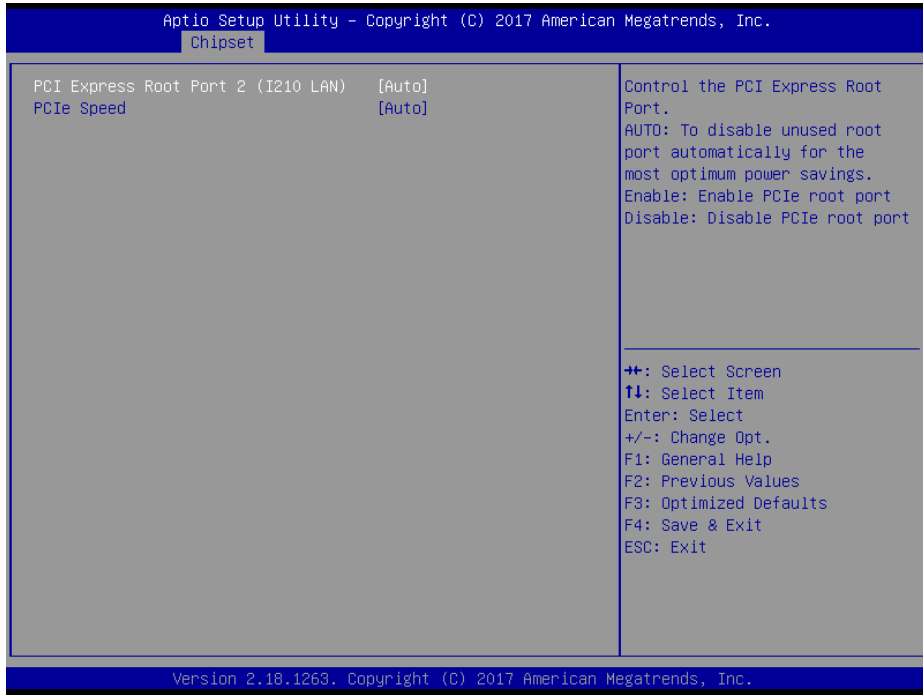
Menu Path *Chipset > South Bridge > PCI Express Configuration > PCI Express Root Port 1 (I210 LAN)*



PCI Express Root Port 1 (I210 LAN) Configuration Screen

BIOS Setting	Options	Description/Purpose
PCI Express Root Port 1 (LAN 1)	- Disabled - Enabled -Auto (default)	Enables or Disables PCI Express Root Port 1 (I210 LAN). <ul style="list-style-type: none"> • AUTO: Disables the unused Root Port automatically for saving the most optimum power. • Enabled: Enables PCI Express Root Port 1 (I210 LAN). • Disabled: Disables PCI Express Root Port 1 (I210 LAN).
PCIe Speed	- Auto (default) - Gen1 - Gen2	Configure PCIe speed.

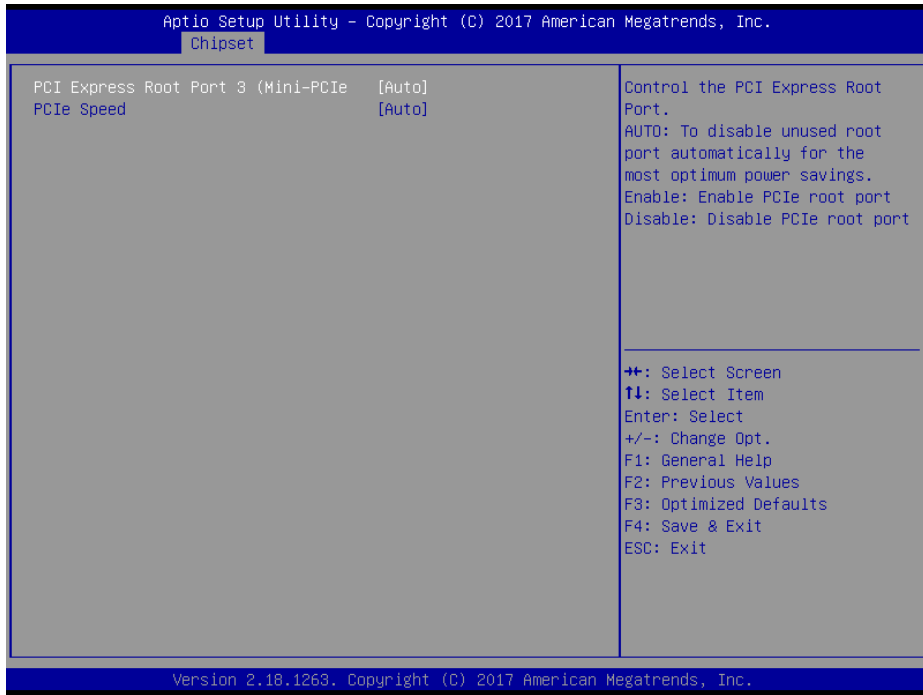
Menu Path *Chipset > South Bridge > PCI Express Configuration > PCI Express Root Port 2 (I210 LAN)*



PCI Express Root Port 2 (I210 LAN) Configuration Screen

BIOS Setting	Options	Description/Purpose
PCI Express Root Port 2 (I210 LAN)	- Disabled - Enabled - Auto (default)	Enables or Disables PCI Express Root Port 2 (I210 LAN). <ul style="list-style-type: none"> • AUTO: Disables the unused Root Port automatically for saving the most optimum power. • Enabled: Enables PCI Express Root Port 2 (I210 LAN). • Disabled: Disables PCI Express Root Port 2 (I210 LAN).
PCIe Speed	- Auto (default) - Gen1 - Gen2	Configure PCIe speed.

Menu Path *Chipset > South Bridge > PCI Express Configuration > PCI Express Root Port 3 (Mini-PCIe)*

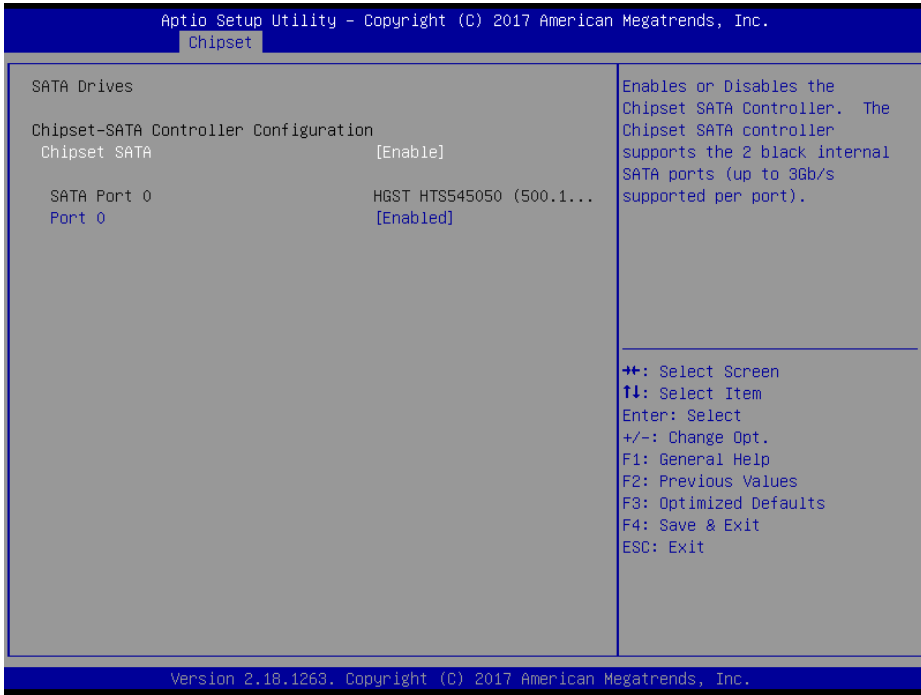


PCI Express Root Port 3 (Mini-PCIe) Configuration Screen

BIOS Setting	Options	Description/Purpose
PCI Express Root Port 3 (Mini-PCIe)	- Disabled - Enabled - Auto (default)	Enables or Disables PCI Express Root Port 3 (Mini-PCIe). <ul style="list-style-type: none"> • AUTO: Disables the unused Root Port automatically for saving the most optimum power. • Enabled: Enables PCI Express Root Port 3 (Mini-PCIe). • Disabled: Disables PCI Express Root Port 3 (Mini-PCIe).
PCIe Speed	- Auto (default) - Gen1 - Gen2	Configure PCIe speed.

5.4.9.4 Chipset –South Bridge- SATA Drives

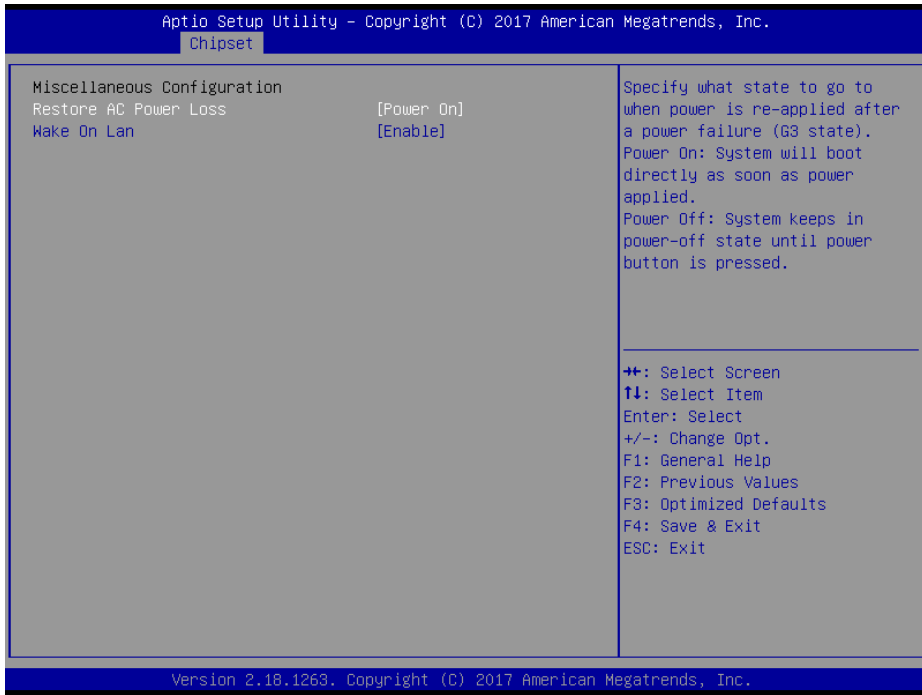
Menu Path *Chipset > South Bridge > SATA Drives*



SATA Drives Screen

BIOS Setting	Options	Description/Purpose
Chipset SATA	- Disabled - Enabled	Enables or Disables the Chipset SATA Controller.
SATA Port 0	No changeable options	Displays SATA drive branding information if the device exists on port 0.
Port 0	- Disabled - Enabled	Enables or Disables SATA Port 0

5.4.9.5 Chipset –South Bridge- Miscellaneous Configuration

Menu Path *Chipset > South Bridge > Miscellaneous Configuration*

Miscellaneous Configuration Screen

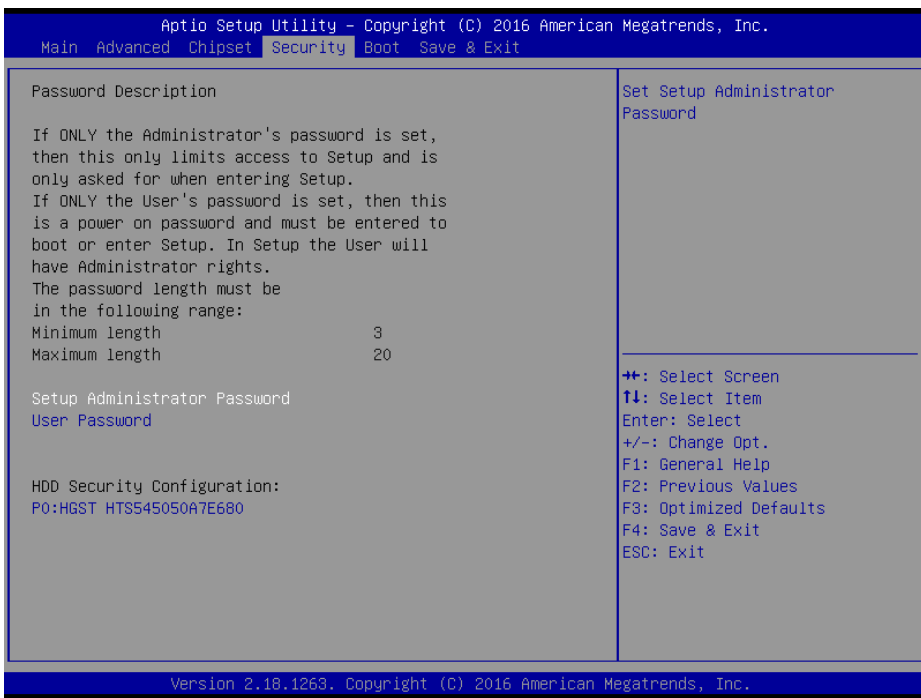
BIOS Setting	Options	Description/Purpose
Restore AC Power Loss	- Power On (default) - Power Off	Specify what state to go to when power is re-applied after power failure (G3 state). <ul style="list-style-type: none"> Power On: System will boot directly as soon as power applied. Power Off: System keeps in power-off state until power button is pressed.
Wake On Lan	- Disabled - Enabled	Enables or Disables the Wake on Lan (WOL). Win 8/8.1/10 don't support WOL from hybrid shutdown state (S4). If user needs WOL from classic shutdown state (S5), please turn off 'fast startup' feature in OS.

5.5 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
Setup Administrator Password	Password can be 3-20 alphanumeric characters.	Specifies the administrator password.
User Password	Password can be 3-20 alphanumeric characters.	Specifies the user password.
HDD Security Configuration	Sub-menu	Enter sub-menu with option to enabled password protected HDD/SSD (if supported by SATA device).

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>.

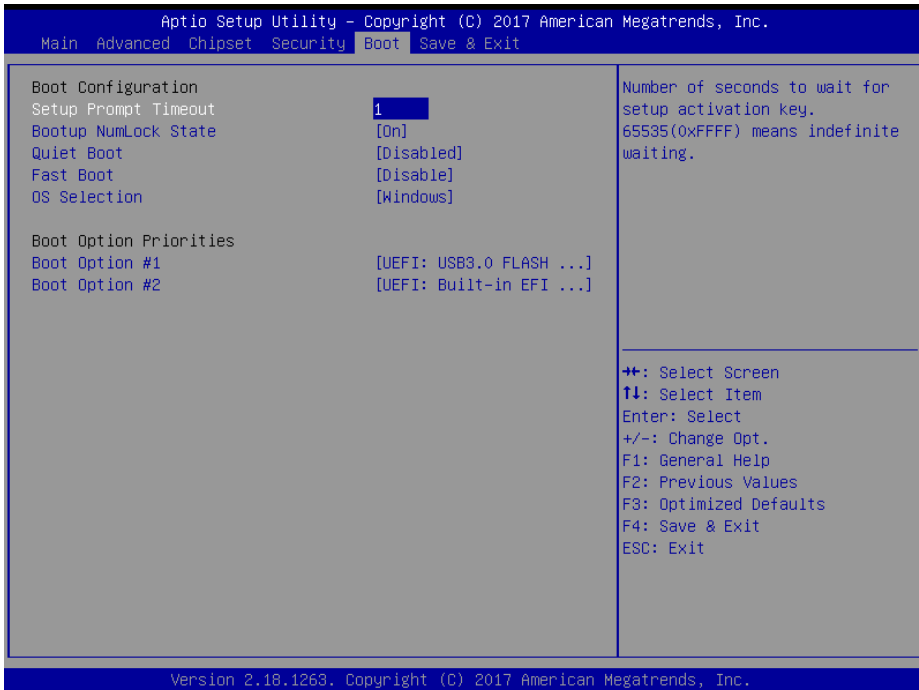
Remove an Administrator or User Password

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.

5.6 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).



Boot Screen

BIOS Setting	Options	Description/Purpose
Setup Prompt Timeout	Numeric (from 1 to 65535)	Number of seconds to wait for setup activation key.
Bootup NumLock State	- On (default) - Off	Selects the NumLock state after the system is powered on. <ul style="list-style-type: none"> • On: Enables the NumLock function automatically after the system is powered on. • Off: Disables the NumLock function after the system is powered on.

BIOS Setting	Options	Description/Purpose
Quiet Boot	- Disabled (default) - Enabled	Enables or Disables Quiet Boot options. When this option is set to “Enabled”, BIOS will display AMI or OEM logo (if implemented) instead of POST messages during the boot..
Fast Boot	- Disabled (default) - Enabled	Enables or Disables Fast Boot option. It allows users to reduce the system startup time and start up the system in a fast manner.
OS Selection	-Windows (default) -Intel Linux	Select the target OS.
Boot Option #1~#n	- [Drive(s)] - Disabled	Allows users to change the boot order from the available device(s). Note that in the menu displayed, you will only see the device with the highest priority for a specific boot device type.

5.7 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

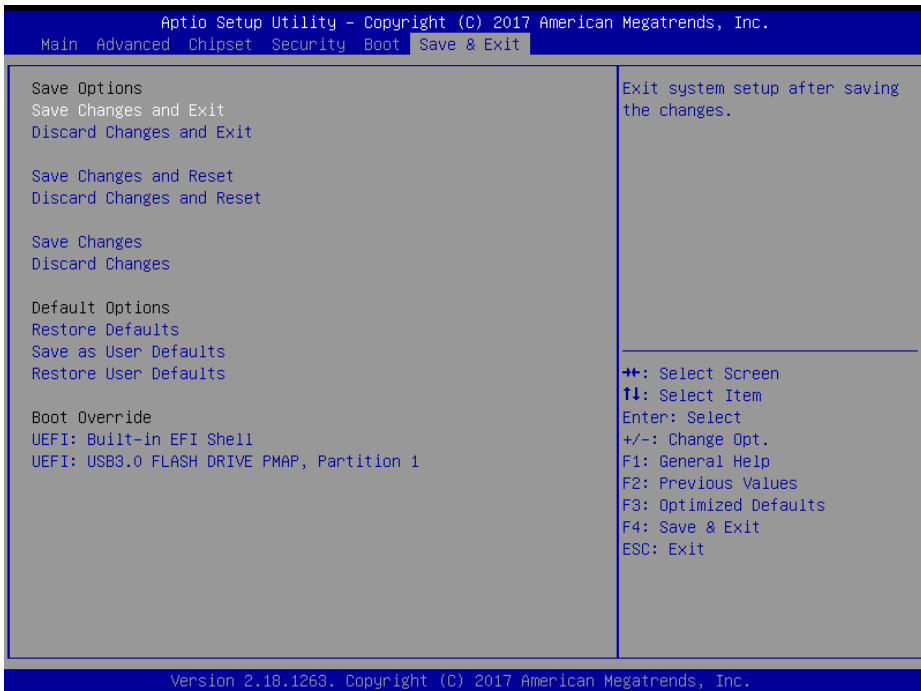
To save and validate the changed BIOS settings, select **Save Changes** from the **Save & Exit** menu, or you can select **Save Changes and Exit** (or press **F4**) to validate the changes and then exit the system. Select **Save Changes and Reset** to validate the changed BIOS settings and then restart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

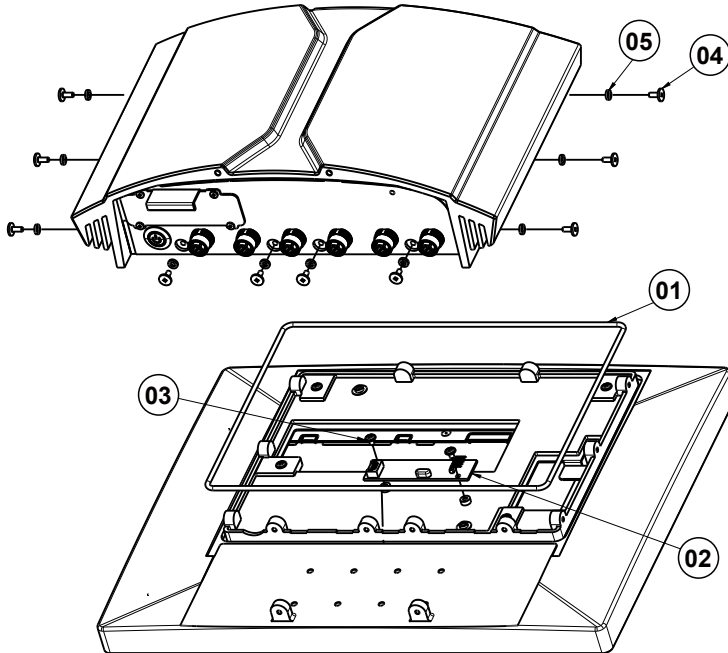
BIOS Setting	Options	Description/Purpose
Save Changes and Exit	No changeable options	Exits the system and saves the changes in NVRAM.
Discard Changes and Exit	No changeable options	Exits the system without saving any changes configured in BIOS settings.
Save Changes and Reset	No changeable options	Saves the changes in NVRAM and resets the system.
Discard Changes and Reset	No changeable options	Resets the system without saving any changes configured in BIOS settings.
Save Changes	No changeable options	Saves the changes done so far to any of the setup options.
Discard Changes	No changeable options	Discards the changes done so far to any of the setup settings.
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 BIOS settings.
Boot Override	- [Drive(s)]	Forces to boot the system from selected [drive(s)].

Appendix A System Diagrams

This appendix includes the exploded diagrams of the system and the parts list as well as the part numbers of the SP-7755 system.

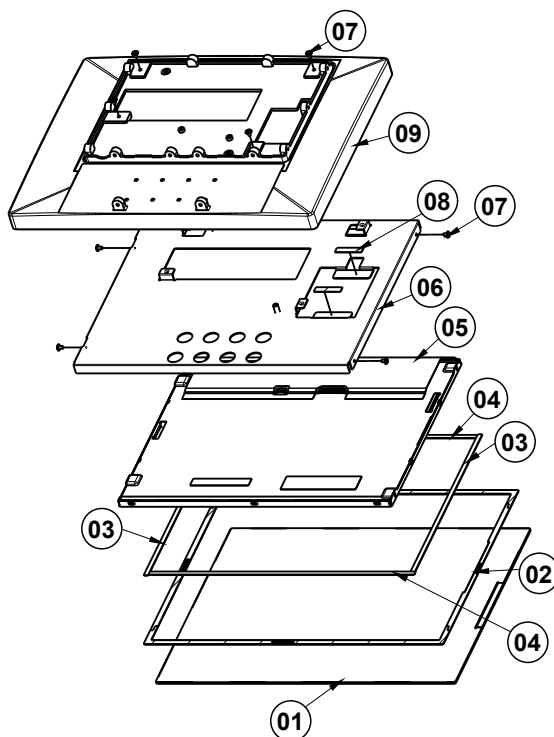
- System Exploded Diagram
- Front Panel Module Exploded Diagram
- Heatsink Cover Exploded Diagram
- Stand installation and Wall Mount Exploded Diagram
- Packing Exploded Diagram

System Exploded Diagram



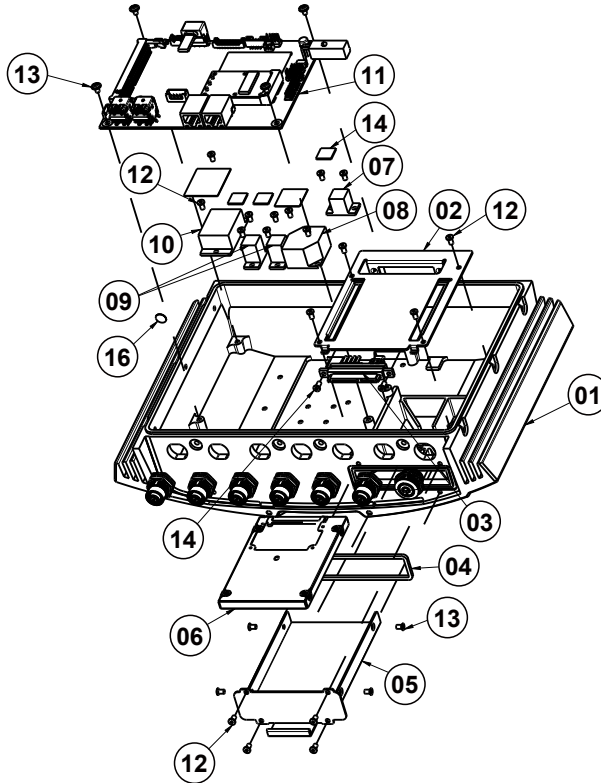
No.	Component Name	P/N No.	Q'ty
1	Heatsink O Ring Circle (φ 260.15x3mm)	30-013-06200426	1
2	TP PCBA	N/A	1
3	Round Washer Head Screw M3x0.5Px5mm	22-242-30005311	2
4	Fillister Head Screw #2 / M3x0.5Px7mm	22-270-30007011	10
5	Waterproof Screw O Ring (OD= φ 6.5mm, ID= φ 3.6mmx1.5T)	23-680-36156507	10

Front Panel Module Exploded Diagram



No.	Component Name	P/N No.	Q'ty
1	15" Projected Capacitive Touch Panel	52-380-00150517	1
	Res. TP	N/A	1
2	SP-7755 TP Double Tape	34-026-06101426	1
3	SP-7755 LCD Strips - RL (243.3x5.3x0.85mm)	30-013-24100426	2
	SP-7755 LCD Strips - TB (317.95x5.3x0.85mm)		
4	SP-7755 LCD Strips - TB (317.95x5.3x0.85mm)	30-013-24200426	2
5	15" TFT LCD Panel (LED Backlight), 450nits, HD(1024x768)	52-351-03006802	1
6	SP-7755 LCD Holder	20-029-03001426	1
7	Round Washer Head Screw M3x0.5Px5mm	22-242-30005311	8
8	TPMB Double Tape (32x8x0.14mm)	34-026-06105426	2
9	SP-7755 Front Panel Die Casting (w/Paint) (Silver)	20-003-01061426	1

Heatsink Cover Exploded Diagram

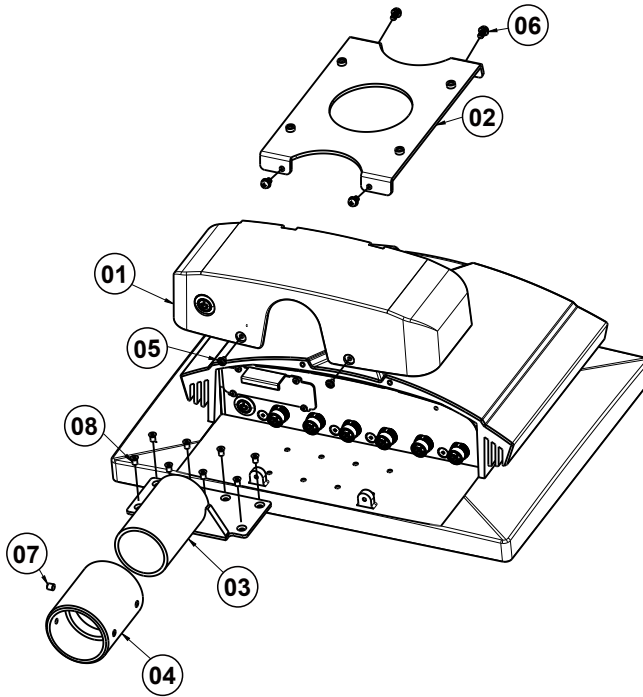


No.	Component Name	P/N No.	Q'ty
1	SP-7755 Heatsink Cover (w/Paint) (Silver)	20-004-01062426	1
2	SP-7755 HDD Holder	20-029-03002426	1
3	SATA Cable	27-008-41505081	1
4	HDD Square Ring (82.05x22.29x2.4mm)	30-013-06100426	1
5	HDD Tray (w/Paint) (Silver)	20-054-03061426	1
6	SATA HDD	N/A	1
7	SP-7755 Heatsink For PWR (23.1x11.7x15.2mm)	21-002-12312002	1
8	SP-7755 Heatsink For Super I/O (26.7x26.2x17.8mm)	21-002-12726001	1
9	SP-7755 Heatsink For LAN (23.1x11.7x18mm)	21-002-12312001	2
10	Heatsink CPU (37.2x24x14.73mm)	21-002-13724001	1

Appendix A System Diagrams

No.	Component Name	P/N No.	Q'ty
11	Main PCBA	N/A	1
12	Fillister Head Screw #2 / M3x0.5Px5mm	22-272-30049015	18
13	Flat Head Screw #2 / M3x0.5Px4mm	22-215-30004311	4
14	Fillister Head Screw #2 / M3x0.5Px6mm	82-275-30006018	2
15	Theraml - PAD	N/A	5
16	Waterproof Film	34-034-06201426	1

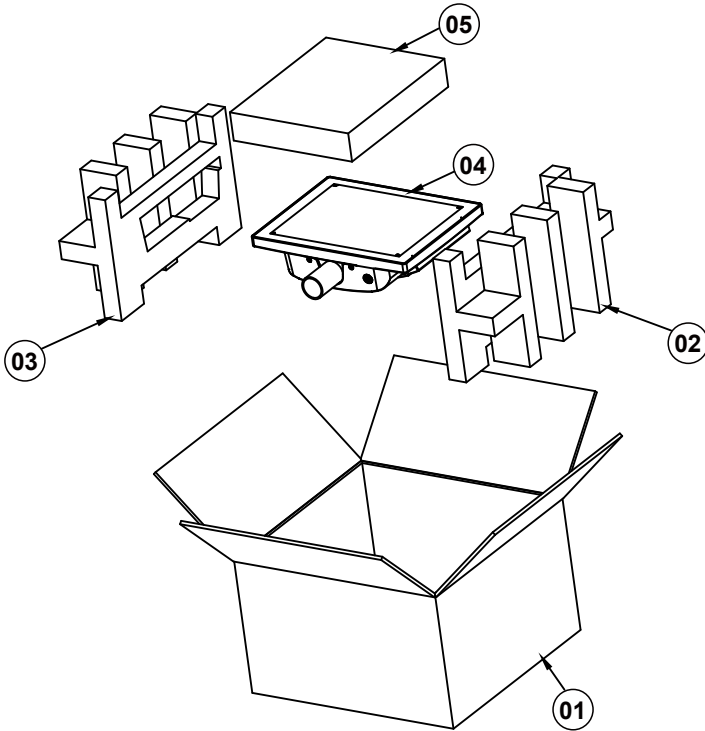
Stand installation and Wall Mount Exploded Diagram



No.	Component Name	P/N No.	Q'ty
1	Cable Cover (w/Paint) (Silver)	20-004-01061426	1
2	Wall Mount (w/Paint) (Silver)	20-038-03061426	1
3	Wire Tube - Any (w/Paint)	20-023-03061426	1
4	Wire Tube Import (w/Paint) (Silver)	20-023-19061426	1
5	Round Washer Head Screw M3x0.5Px5mm	22-242-30005311	2
6	Round Head With Spring Washer Screw M4x0.7Px8mm	22-232-40008211	4
7	Fillister Head Screw #2 / M3x0.5Px7mm	22-270-30007011	1
8	Flat Head Screw #2 / φ 6/M4x0.7Px6mm	22-212-40006011	8

Note: The tube import adapter is designed for Stand Installation with 48 mm tubes.

Packing Exploded Diagram



No.	Component Name	P/N No.	Q'ty
1	Outer Carton (462x442x285mm)	94-001-01404350	1
2	EPE Right (430x266x126mm)	94-016-00301426	1
3	EPE Left (430x266x126mm)	94-016-00302426	1
4	SP-7755	N/A	1
5	Carton Boxes (340x278x60mm)	94-003-01301318	1
	PE Bag 480X460 (42X56cmX0.07)	32-10020010000	1
	Silica Gel 1gm	34-005-00010007	2
	Cardboard	94-004-01301426	1
	Mylar 335x260x0.125	30-056-02100008	1
	Driver DVD	52-601-02000005	1
	Quick Manual	50-099-77550000	1
	Power Supply Cable	27-019-42636111	1

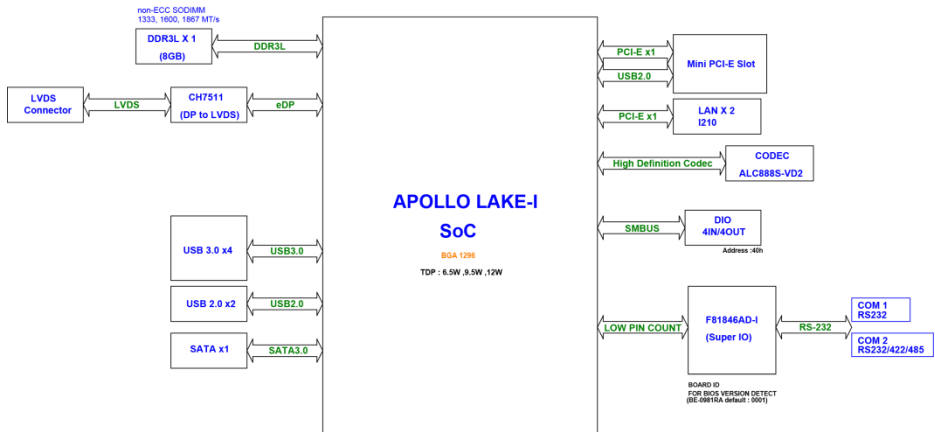
Appendix B Technical Summary

This appendix will give you a brief introduction of the allocation maps for the system resources.

The following topics are included:

- System Block Diagram
- Interrupt Map
- I/O Map
- Memory Map
- Configuring WatchDog Timer
- Flash BIOS Update

System Block Diagram



Interrupt Map

IRQ	ASSIGNMENT
IRQ 0	System timer
IRQ 3	Communications Port (COM2)
IRQ 4	Communications Port (COM1)
IRQ 8	System CMOS/real time clock
IRQ 54	Microsoft ACPI-Compliant System
IRQ 55	Microsoft ACPI-Compliant System
IRQ 56	Microsoft ACPI-Compliant System
IRQ 57	Microsoft ACPI-Compliant System
IRQ 58	Microsoft ACPI-Compliant System
IRQ 59	Microsoft ACPI-Compliant System
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IRQ	ASSIGNMENT
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IRQ 4294967277	Intel(R) I210 Gigabit Network Connection #2
IRQ 4294967278	Intel(R) I210 Gigabit Network Connection #2
IRQ 4294967279	Intel(R) I210 Gigabit Network Connection #2
IRQ 4294967280	Intel(R) I210 Gigabit Network Connection #2
IRQ 4294967281	Intel(R) I210 Gigabit Network Connection #2
IRQ 4294967282	Intel(R) I210 Gigabit Network Connection #2
IRQ 4294967283	Intel(R) I210 Gigabit Network Connection

IRQ	ASSIGNMENT
IRQ 4294967284	Intel(R) I210 Gigabit Network Connection
IRQ 4294967285	Intel(R) I210 Gigabit Network Connection
IRQ 4294967286	Intel(R) I210 Gigabit Network Connection
IRQ 4294967287	Intel(R) I210 Gigabit Network Connection
IRQ 4294967288	Intel(R) I210 Gigabit Network Connection
IRQ 4294967289	Intel(R) HD Graphics
IRQ 4294967290	Intel(R) Trusted Execution Engine Interface
IRQ 4294967291	Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
IRQ 4294967292	Standard SATA AHCI Controller
IRQ 4294967293	Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD9
IRQ 4294967294	Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD8

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

I/O MAP

I/O	ASSIGNMENT
0x00000000-0x0000006F	PCI Express Root Complex
0x00000020-0x00000021	Programmable interrupt controller
0x00000024-0x00000025	Programmable interrupt controller
0x00000028-0x00000029	Programmable interrupt controller
0x0000002C-0x0000002D	Programmable interrupt controller
0x0000002E-0x0000002F	Motherboard resources
0x00000030-0x00000031	Programmable interrupt controller
0x00000034-0x00000035	Programmable interrupt controller
0x00000038-0x00000039	Programmable interrupt controller
0x0000003C-0x0000003D	Programmable interrupt controller
0x00000040-0x00000043	System timer
0x0000004E-0x0000004F	Motherboard resources
0x00000050-0x00000053	System timer
0x00000061-0x00000061	Motherboard resources
0x00000063-0x00000063	Motherboard resources
0x00000065-0x00000065	Motherboard resources
0x00000067-0x00000067	Motherboard resources
0x00000070-0x00000070	Motherboard resources
0x00000070-0x00000070	System CMOS/real time clock
0x00000078-0x000000CF7	PCI Express Root Complex
0x00000080-0x0000008F	Motherboard resources
0x00000092-0x00000092	Motherboard resources
0x000000A0-0x000000A1	Programmable interrupt controller
0x000000A4-0x000000A5	Programmable interrupt controller
0x000000A8-0x000000A9	Programmable interrupt controller
0x000000AC-0x000000AD	Programmable interrupt controller
0x000000B0-0x000000B1	Programmable interrupt controller
0x000000B2-0x000000B3	Motherboard resources

I/O	ASSIGNMENT
0x000000B4-0x000000B5	Programmable interrupt controller
0x000000B8-0x000000B9	Programmable interrupt controller
0x000000BC-0x000000BD	Programmable interrupt controller
0x000002F8-0x000002FF	Communications Port (COM2)
0x000003F8-0x000003FF	Communications Port (COM1)
0x00000400-0x0000047F	Motherboard resources
0x000004D0-0x000004D1	Programmable interrupt controller
0x00000500-0x000005FE	Motherboard resources
0x00000600-0x0000061F	Motherboard resources
0x00000680-0x0000069F	Motherboard resources
0x00000A00-0x00000A0F	Motherboard resources
0x00000A10-0x00000A1F	Motherboard resources
0x00000A20-0x00000A2F	Motherboard resources
0x00000D00-0x0000FFFF	PCI Express Root Complex
0x0000164E-0x0000164F	Motherboard resources
0x0000D000-0x0000DFFF	Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD9
0x0000E000-0x0000EFFF	Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD8
0x0000F000-0x0000F03F	Intel(R) HD Graphics
0x0000F040-0x0000F05F	Intel(R) Celeron(R)/Pentium(R) Processor SMBUS - 5AD4
0x0000F060-0x0000F07F	Standard SATA AHCI Controller
0x0000F080-0x0000F083	Standard SATA AHCI Controller
0x0000F090-0x0000F097	Standard SATA AHCI Controller

Memory Map

MEMORY MAP	ASSIGNMENT
0xE0000000-0xFFFFFFFF	Motherboard resources
0xE0000000-0xFFFFFFFF	PCI Express Root Complex
0xFEAA00000-0xFEAF00000	Motherboard resources
0xFED01000-0xFED01FFF	Motherboard resources
0xFED03000-0xFED03FFF	Motherboard resources
0xFED06000-0xFED06FFF	Motherboard resources
0xFED08000-0xFED09FFF	Motherboard resources
0xFED80000-0xFEDB0000	Motherboard resources
0xFED1C000-0xFED1CFFF	Motherboard resources
0xFEE00000-0xFEE00000	Motherboard resources
0x91212000-0x912120FF	Intel(R) Celeron(R)/Pentium(R) Processor SMBUS - 5AD4
0x91000000-0x91000000	Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD9
0x91180000-0x91180000	Intel(R) I210 Gigabit Network Connection #2
0x9117C000-0x9117C000	Intel(R) I210 Gigabit Network Connection #2
0x91080000-0x91080000	Intel(R) I210 Gigabit Network Connection
0x9107C000-0x9107C000	Intel(R) I210 Gigabit Network Connection
0xFED00000-0xFED00000	High precision event timer
0x91200000-0x91200000	Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
0x91100000-0x91100000	Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port -

MEMORY MAP	ASSIGNMENT
	5AD8
0x80000000-0xCFFFFFFF	PCI Express Root Complex
0x80000000-0xCFFFFFFF	Intel(R) HD Graphics
0x91217000-0x91217FFF	Intel(R) Trusted Execution Engine Interface
0x90000000-0x90FFFFFF	Intel(R) HD Graphics
0x91210000-0x9121FFFF	Standard SATA AHCI Controller
0x91214000-0x913140FF	Standard SATA AHCI Controller
0x91213000-0x913137FF	Standard SATA AHCI Controller
0x7B800001-0x7BFFFFFF	PCI Express Root Complex
0x7C000001-0x7FFFFFFF	PCI Express Root Complex

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-----
dec     dx
mov     al,          30h
out     dx,          al
inc     dx
mov     al,          01h
out     dx,          al
;-----Set timeout interval as 30seconds and start counting -----
dec     dx
mov     al,          F6h
out     dx,          al
inc     dx
mov     al,          1Eh
out     dx,          al
;-----Enable Watch PME-----
dec     dx
mov     al,          FAh
out     dx,          al
inc     dx

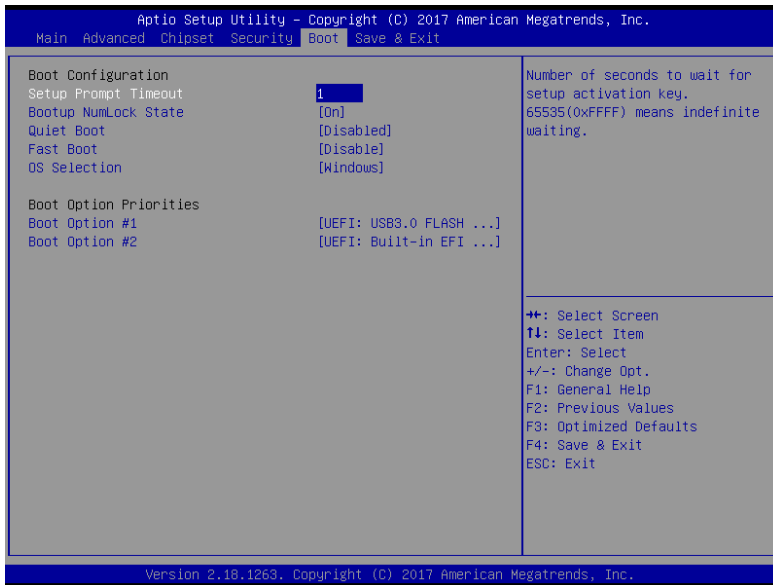
```

```
in      al,      dx
or      al,      51h
out     dx,      al
; -----Set second as counting unit -----
dec     dx
mov     al,      F5h
out     dx,      al
inc     dx
in      al,      dx
and     al,      DEh
out     dx,      al
; -----Start the watchdog timer -----
or      al,      20h
out     dx,      al
; -----Exit the extended function mode-----
dec     dx
mov     al,      AAh
out     dx,      al
```

Flash BIOS Update

I. Prerequisites

- 1 Prepare a bootable media (e.g. USB storage device) which can boot the system to EFI Shell.
- 2 Download and save the BIOS file (e.g. 77550PM1.bin) to the bootable device.
- 3 Copy AMI flash utility – AfuEfix64.efi (v5.08.02.1189) into bootable device.
- 4 Make sure the target system can first boot to the bootable USB device.
 - (1) Connect the bootable USB device.
 - (2) Turn on the computer and press <ESC> or key during boot to enter BIOS Setup.
 - (3) Select [**Boot**] menu and set USB bootable device as the 1st boot device.
 - (4) Press <F4> key to save configuration and exit the BIOS setup menu.



AFUEFI 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 see all the definition of each control options. The recommended options for BIOS ROM update include following parameters:

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

II. BIOS Update Procedure

- 1** Use the bootable USB storage to boot up the system into the EFI Shell.
- 2** Type " **AfuEfix64 7755xxxx.bin /p /b /n /x**" and press **Enter** to start the flash procedure.
(Note that xxxx means the BIOS revision part, e.g. 0PM1...)
- 3** During the BIOS 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 when the entire update procedure are not complete; otherwise, the BIOS ROM may be crashed and the system will be unable to boot up next time.
- 4** After the BIOS update procedure is completed, the following messages will be shown:

```
fs0:\> AfuEfix64 77550PM1.bin /p /b /n /x
+-----+
|          AMI Firmware Update Utility v5.08.02.1189          |
| Copyright (C)2016 American Megatrends Inc. All Rights Reserve. |
+-----+
Reading flash ..... done
- FFS checksums ..... ok
Erasing Boot Block ..... done
Updating Boot Block ..... done
Verifying Boot Block ..... done
Erasing Main Block ..... done
Updating Main Block ..... done
Verifying Main Block ..... done
Erasing NVRAM Block ..... done
Updating NVRAM Block ..... done
Verifying NVRAM Block ..... done

fs0:\>
```

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.

