ESM-SKLU

6th Generation Intel® Core™ and Celeron® Processors
COMe Type6 Compact Module

User's Manual

1st Ed – 18 August 2016

Part No. E2047288300R

FCC Statement

THIS DEVICE COMPLIES WITH PART 15 FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:

(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE.

(2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

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.

Notice

This guide is designed for experienced users to setup the system within the shortest time. For detailed information, please always refer to the electronic user's manual.

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Trademark Acknowledgement

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Disclaimer

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these products are free from patent, copyright, or mask work right infringement, unless otherwise specified. Applications that are described in this manual are for illustration purposes only. We make no representation or warranty that such application will be suitable for the specified use without further testing or modification.

Life Support Policy

OUR PRODUCTS ARE NOT FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE PRIOR WRITTEN APPROVAL.

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into body, or (b) support or sustain life and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

A Message to the Customer

Customer Services

Each and every product is built to the most exacting specifications to ensure reliable performance in the harsh and demanding conditions typical of industrial environments. Whether your new device is destined for the laboratory or the factory floor, you can be assured that your product will provide the reliability and ease of operation for which the name has come to be known.

Your satisfaction is our primary concern. Here is a guide to our customer services. To ensure you get the full benefit of our services, please follow the instructions below carefully.

Technical Support

We want you to get the maximum performance from your products. So if you run into technical difficulties, we are here to help. For the most frequently asked questions, you can easily find answers in your product documentation. These answers are normally a lot more detailed than the ones we can give over the phone. So please consult the user's manual first.

CONTENT

1. Getting Started

1.1 Safety Precautions

Warning!

Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges. Only experienced electronics personnel should open the PC chassis.

Caution!

Always ground yourself to remove any static charge before touching the CPU card. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components in a static-dissipative surface or static-shielded bag when they are not in the chassis.

1.2 Packing List

Before you begin installing your single board, please make sure that the following materials have been shipped:

- 1 x ESM-SKLU 6th Generation Intel® Core™ and Celeron® Processors COMe Type6 Compact Module
- 1 x Driver/Utility DVD-ROM
- 4 x Screw
- 1 x Desiccant

If any of the above items is damaged or missing, contact your retailer.

1.3 Document Amendment History

Revision	Date	By	Comment
1st	August 2016		Initial Release

1.4 Manual Objectives

This manual describes in details ESM-SKLU Single Board.

We have tried to include as much information as possible but we have not duplicated information that is provided in the standard IBM Technical References, unless it proved to be necessary to aid in the understanding of this board.

We strongly recommend that you study this manual carefully before attempting to set up ESM-SKLU series or change the standard configurations. Whilst all the necessary information is available in this manual we would recommend that unless you are confident, you contact your supplier for guidance.

Please be aware that it is possible to create configurations within the NVRAM that make booting impossible. If this should happen, clear the NVRAM settings, (see the description of the Jumper Settings for details).

If you have any suggestions or find any errors regarding this manual and want to inform us of these, please contact our Customer Service department with the relevant details.

1.5 System Specifications

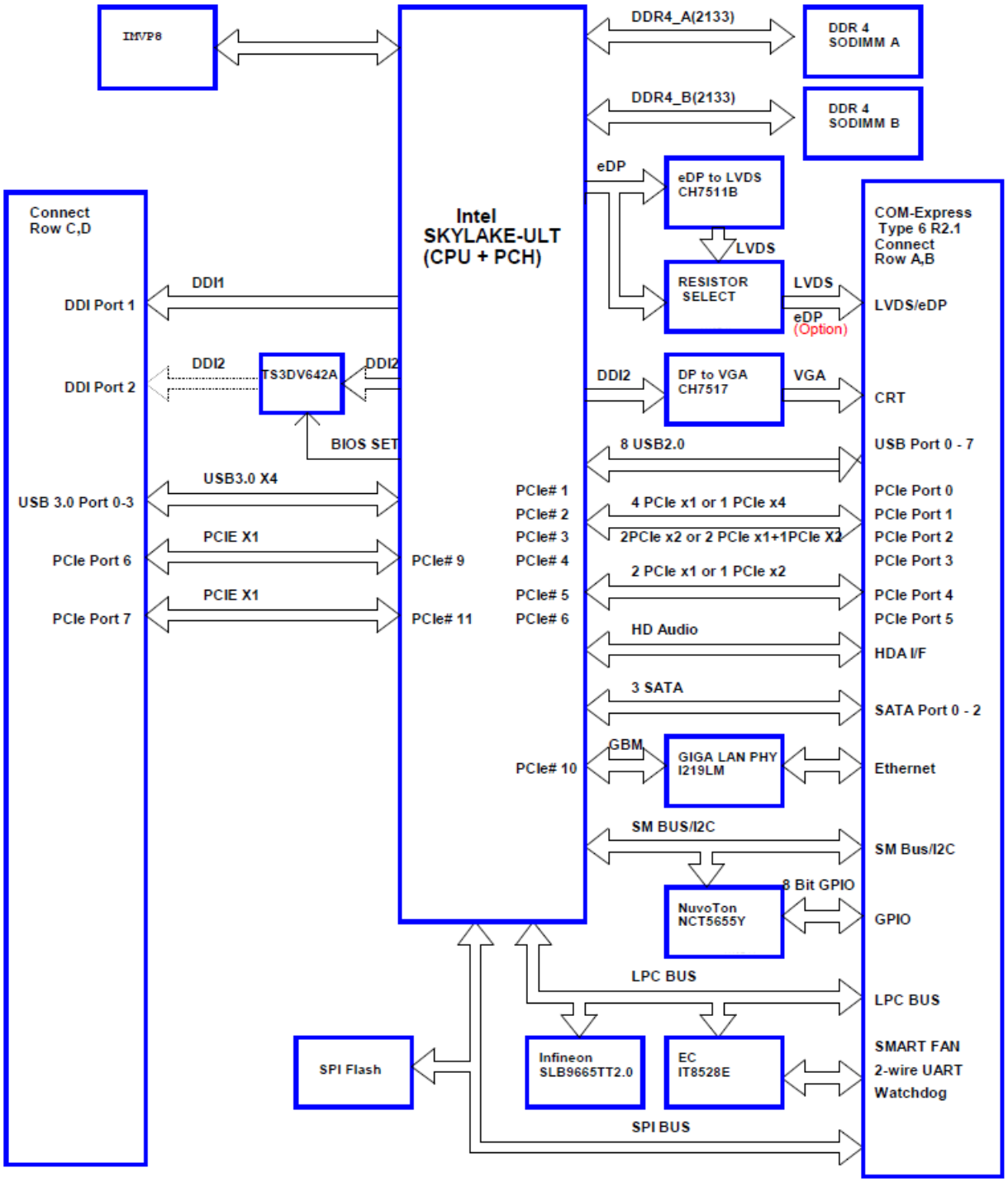
System	
CPU	Intel® Core™ i7-6600U Processor (4M Cache, up to 2.6 GHz) Intel® Core™ i5-6300U Processor (3M Cache, up to 2.4 GHz) Intel® Core™ i3-6100U Processor (3M Cache, 2.30 GHz) Intel® Celeron® Processor 3955U (2M Cache, 2.00 GHz)
BIOS	AMI uEFI BIOS, 128 Mbit SPI Flash ROM
System Chipset	Intel Skylake (U series) SoC integrated
I/O Chip	EC(IT8528E)
System Memory	Two 260-pin SODIMM DDR4 2133 SDRAM slot up to 32GB
TPM	SBL 9665 (LPC) (Factory Optional)
Watchdog Timer	H/W Reset, 1sec. ~ 65535sec. and 1sec./step
H/W Status Monitor	Monitoring System Temperature, Voltage and FAN Status with Auto Throttling Control
Expansion	8 x PCIex1 (it restricted to 5 devices due to LAN already count as one device)
I/O	
MIO	3 x SATAIII, LPC, I²C,SPI, SMBus
USB	8 USB 2.0, 4 USB 3.0
GPIO	8bit GPIO(NCT5655)
Display	
Chipset	Intel® Skylake Processor integrated Graphics
VGA	Supports up to 1920 x 1200@60Hz (Chrontel® 7517A)
LCD	LVDS support 2 channels 18/24-bit, up to 1920 x 1200@60Hz (Chrontel® CH7511B) Optional eDP 1.4 up to 2560 x 1440@60Hz
DDI	2 Ports, 1. configurable to HDMI 1.4/DP1.2 or VGA 2. HDMI up to 2560 x 1600@60Hz or 4096 x 2160@24Hz Or DP up to 4096 x 2304@60Hz
Multiple Display	Supports 3 independent display LVDS(eDP)+ DDI(DP-to-VGA or HDMI)+DDI(HDMI or DP)
Ethernet	

LAN Chip	Intel I219LM Gigabit Ethernet PHY
Ethernet Interface	10/100/1000 Base-Tx GbE compatible
Mechanical & Environmental	
Power Requirement	+9V ~ +19V
ACPI	Single power ATX Support S0, S3, S4, S5 ACPI 5.0 Complian
Power Type	AT/ATX
Operating Temp.	-20 ~ 80 °C
Storage Temp.	-40°C to 85°C
Operating Humidity	0% ~ 90% relative humidity, non-condensing
Size (L x W)	95 mm x 95 mm
Weight	0.44lbs(0.2kg)
OS support	Windows 7 (32/64)/ 8.x (32/64) / 10 (64-bit only)

Note: Specifications are subject to change without notice.

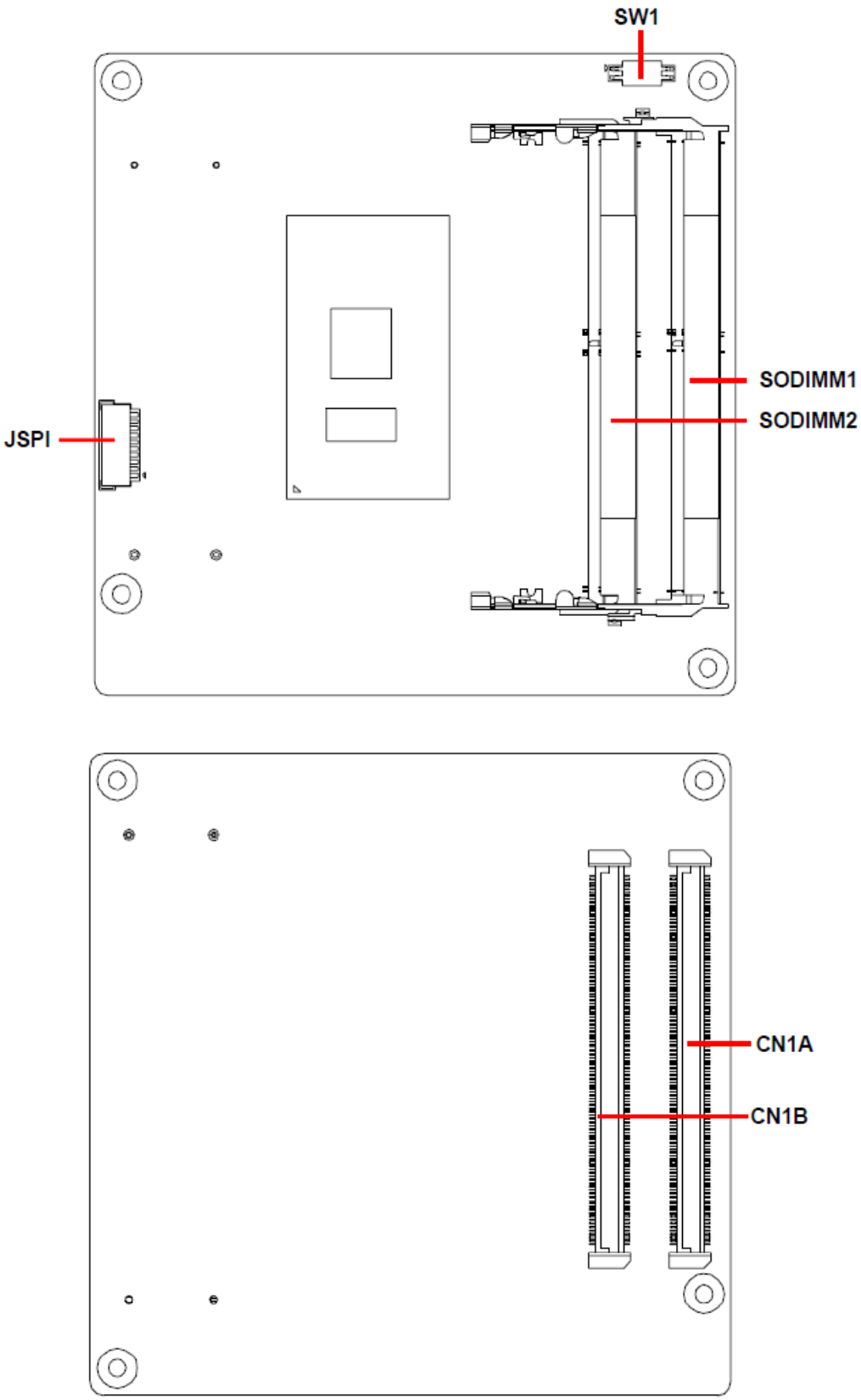
1.6 Architecture Overview—Block Diagram

The following block diagram shows the architecture and main components of ESM-SKLU.



2. Hardware Configuration

2.1 Product Overview



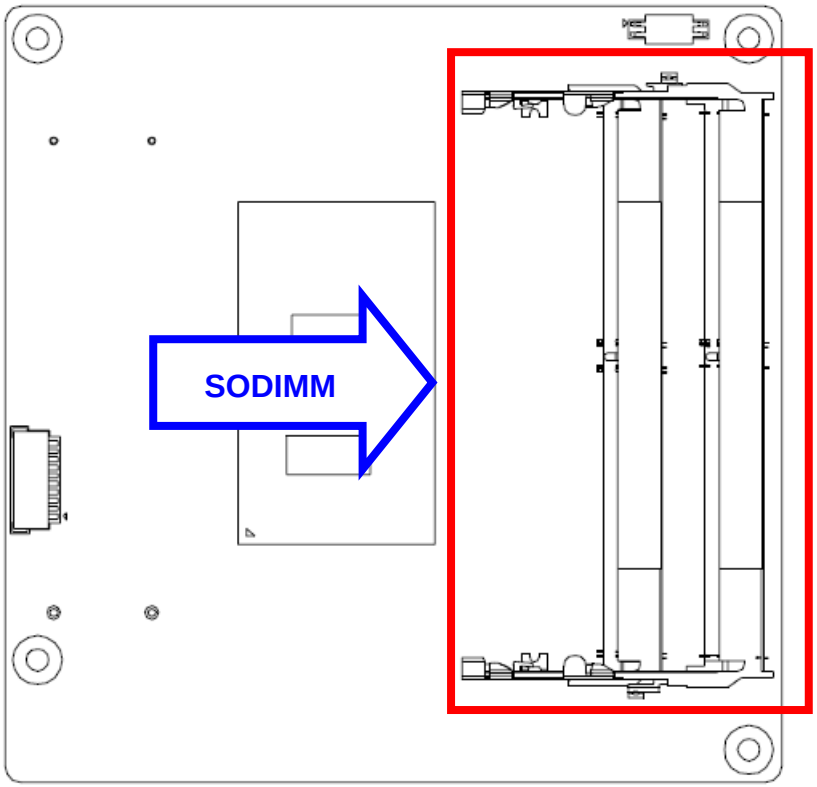
2.2 Installation Procedure

This chapter explains you the instructions of how to setup your system.

1. Turn off the power supply.
2. Insert the DIMM module (be careful with the orientation).
3. Insert all external cables for hard disk, keyboard, mouse, USB etc. except for flat panel. A CRT monitor must be connected in order to change NVRAM settings to support flat panel.
4. Connect power supply to the board via the ATXPWR.
5. Turn on the power.
6. Enter the BIOS setup by pressing the delete key during boot up. Use the "Save & Exit \ Restore Defaults" feature.
7. If TFT panel display is to be utilized, make sure the panel voltage is correctly set before connecting the display cable and turning on the power.

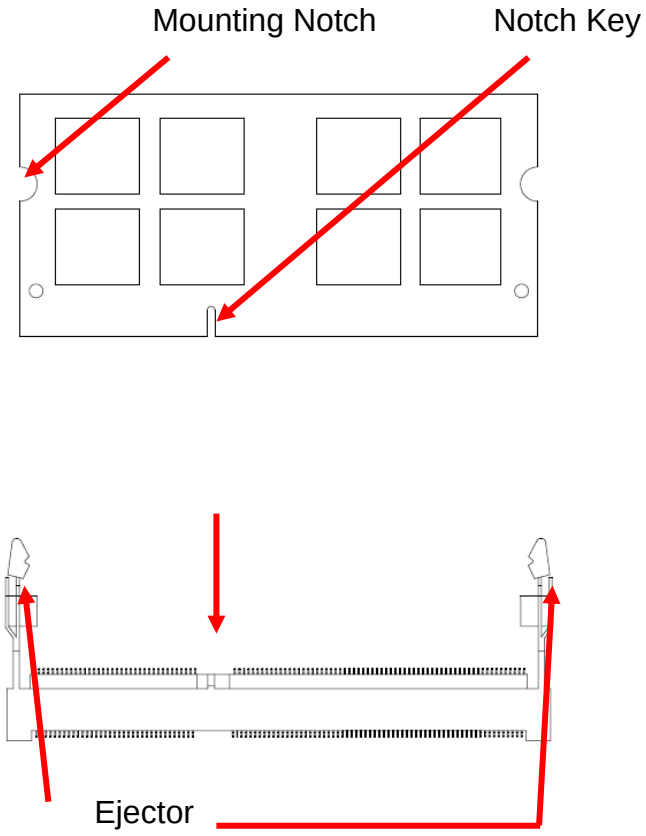
2.2.1 Main Memory

ESM-SKLU provides two 260-pin SODIMM socket, supports up to 32GB DDR4 2133 SDRAM



Make sure to unplug the power supply before adding or removing DIMMs or other system components. Failure to do so may cause severe damage to board and components.

- Locate the SODIMM socket on the board.
- Carefully hold two edges of the SODIMM module. avoid touching its connectors.
- Align the notch key on the module with the rib on the slot.
- Firmly press the modules into the socket which automatically snaps into the mounting notch. Do not force the SODIMM module in with extra force as the SODIMM module only fits in one direction.



260-pin DDR4 SODIMM

- To remove SODIMM modules, simultaneously push the two ejector tabs outward, then pull out the SODIMM module.

Note:

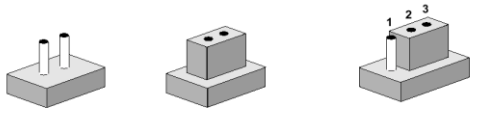
(1) Please do not change any DDR4 SDRAM parameter in BIOS setup to increase your system's performance without acquiring technical information in advance.

(2) Static electricity can damage the electronic components of the computer or optional boards. Before proceeding, ensure that you are discharged of static electricity by briefly touching a grounded metal object.

2.3 Connector List

You can configure your board to match the needs of your application by setting jumpers. A jumper is the simplest kind of electric switch.

It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To "close" a jumper you connect the pins with the clip. To "open" a jumper you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2, and 3. In this case, you would connect either two pins.



Open Closed Closed 2-3

The jumper settings are schematically depicted in this manual as follows:

Open Closed Closed 2-3

A pair of needle-nose pliers may be helpful when working with jumpers.

Connectors on the board are linked to external devices such as hard disk drives, a keyboard, or floppy drives. In addition, the board has a number of jumpers that allow you to configure your system to suit your application.

If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes.

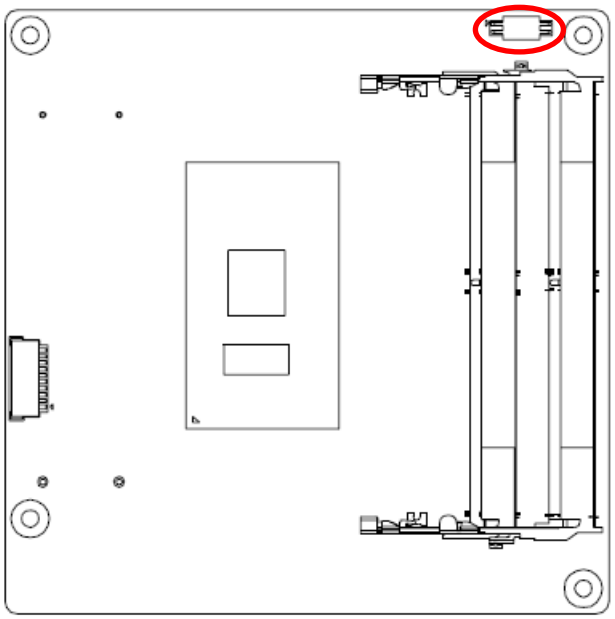
The following tables list the function of each of the board's jumpers and connectors.

Connectors

Label	Function	Note
JSPI	(Reserved for BIOS programming)	10 x 1 wafer, pitch 1.00mm
CN1A	COM Express connector 1	
CN1B	COM Express connector 2	
SODIMM1	260-pin DDR4 SDRAM DIMM socket	
SODIMM2	260-pin DDR4 SDRAM DIMM socket	
SW1	AT/ATX mode selector	

2.4 Setting Jumpers & Connectors

2.4.1 AT/ATX mode selector (SW1)



AT/ATX mode

AT mode*

OFF	1		⇨	ON
	2			

ATX mode

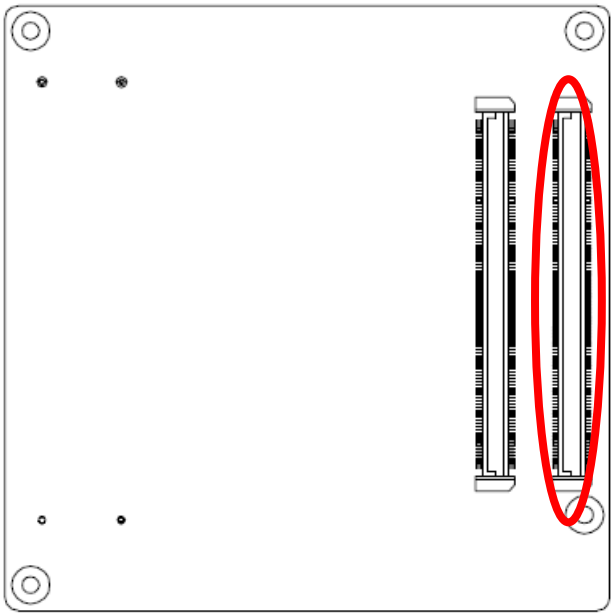
OFF	1	⇦		ON
	2			

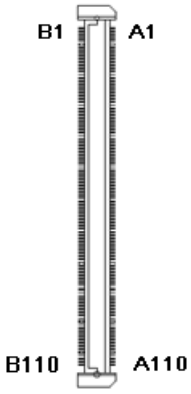
***Default**

2.4.1.1 Signal Description –AT/ATX mode selection

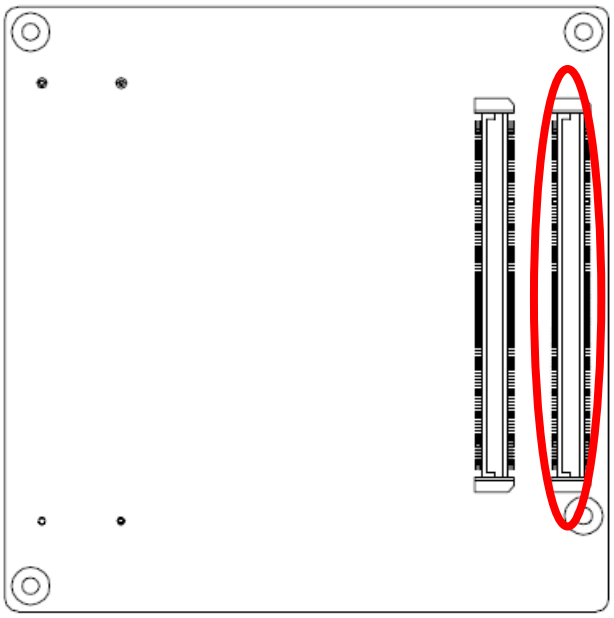
AT/ATX mode	Description
AT mode 	Auto-power on, no need to press Power button to enable power on/off
ATX mode 	Press the power button to enable power on/off

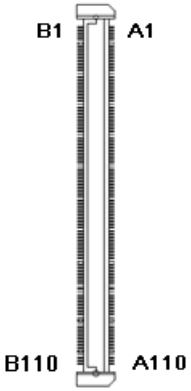
2.4.2 COM Express Connector 1 (CN1A)



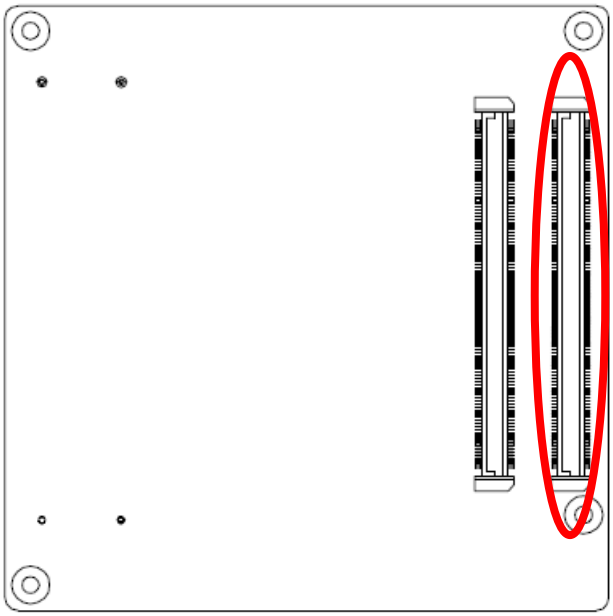


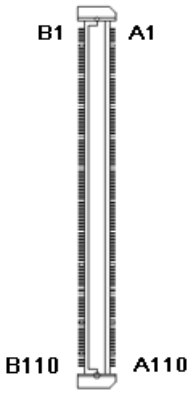
Signal	PIN	PIN	Signal
GND	B1	A1	GND
GBE0_ACT#	B2	A2	GBE0_MDI3-
LPC_FRAME#	B3	A3	GBE0_MDI3+
LPC_AD0	B4	A4	GBE0_LINK100#
LPC_AD1	B5	A5	GBE0_LINK1000#
LPC_AD2	B6	A6	GBE0_MDI2-
LPC_AD3	B7	A7	GBE0_MDI2+
NC	B8	A8	GBE0_LINK#
NC	B9	A9	GBE0_MDI1-
LPC_CLK	B10	A10	GBE0_MDI1+
GND	B11	A11	GND
PWRBTN#	B12	A12	GBE0_MDI0-
SMB_CK	B13	A13	GBE0_MDI0+
SMB_DAT	B14	A14	NC
SMB_ALERT#	B15	A15	SUS_S3#
SATA1_TX+	B16	A16	SATA0_TX+
SATA1_TX-	B17	A17	SATA0_TX-
SUS_STAT#	B18	A18	SUS_S4#
SATA1_RX+	B19	A19	SATA0_RX+
SATA1_RX-	B20	A20	SATA0_RX-
GND	B21	A21	GND
NC	B22	A22	SATA2_TX+
NC	B23	A23	SATA2_TX-
PWR_OK	B24	A24	SUS_S5#
NC	B25	A25	SATA2_RX+
NC	B26	A26	SATA2_RX-
WDT	B27	A27	BATLOW#
NC	B28	A28	(S)ATA_ACT#
HDA_SDIN1	B29	A29	HDA_SYNC
HDA_SDIN0	B30	A30	HDA_RST#



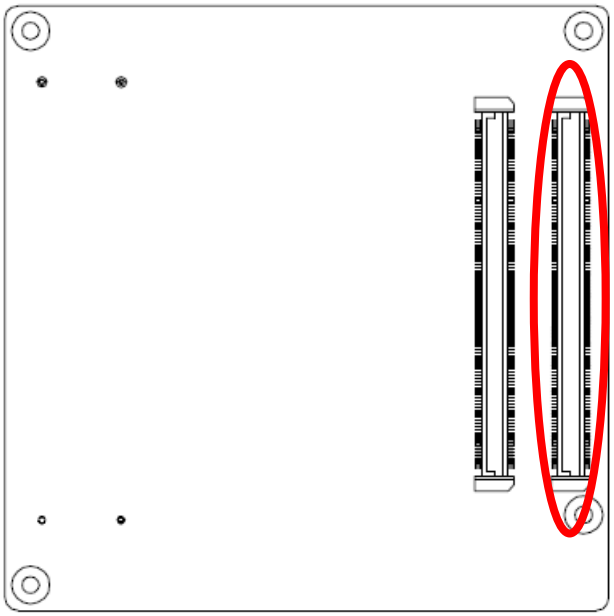


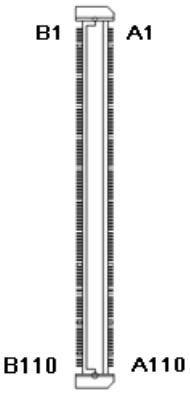
Signal	PIN	PIN	Signal
GND	B31	A31	GND
SPKR	B32	A32	HDA_BITCLK
I2C_CK	B33	A33	HDA_SDOUT
I2C_DAT	B34	A34	BIOS_DIS0#
THRM#	B35	A35	THRMTRIP#
USB7-	B36	A36	USB6-
USB7+	B37	A37	USB6+
USB_4_5_OC#	B38	A38	USB_6_7_OC#
USB5-	B39	A39	USB4-
USB5+	B40	A40	USB4+
GND	B41	A41	GND
USB3-	B42	A42	USB2-
USB3+	B43	A43	USB2+
USB_0_1_OC#	B44	A44	USB_2_3_OC#
USB1-	B45	A45	USB0-
USB1+	B46	A46	USB0+
EXCD1_PERST#	B47	A47	VCC_RTC
EXCD1_CPPE#	B48	A48	EXCD0_PERST#
SYS_RESET#	B49	A49	EXCD0_CPPE#
CB_RESET#	B50	A50	LPC_SERIRQ
GND	B51	A51	GND
PCIE_RX5+	B52	A52	PCIE_TX5+
PCIE_RX5-	B53	A53	PCIE_TX5-
GPO1	B54	A54	GPI0
PCIE_RX4+	B55	A55	PCIE_TX4+
PCIE_RX4-	B56	A56	PCIE_TX4-
GPO2	B57	A57	GND
PCIE_RX3+	B58	A58	PCIE_TX3+
PCIE_RX3-	B59	A59	PCIE_TX3-
GND	B60	A60	GND





Signal	PIN	PIN	Signal
PCIE_RX2+	B61	A61	PCIE_TX2+
PCIE_RX2-	B62	A62	PCIE_TX2-
GPO3	B63	A63	GPI1
PCIE_RX1+	B64	A64	PCIE_TX1+
PCIE_RX1-	B65	A65	PCIE_TX1-
WAKE0#	B66	A66	GND
WAKE1#	B67	A67	GPI2
PCIE_RX0+	B68	A68	PCIE_TX0+
PCIE_RX0-	B69	A69	PCIE_TX0-
GND	B70	A70	GND
LVDS_B0+	B71	A71	LVDS_A0+/eDP_TX2+
LVDS_B0-	B72	A72	LVDS_A0-/eDP_TX2-
LVDS_B1+	B73	A73	LVDS_A1+/eDP_TX1+
LVDS_B1-	B74	A74	LVDS_A1-/eDP_TX1-
LVDS_B2+	B75	A75	LVDS_A2+/eDP_TX0+
LVDS_B2-	B76	A76	LVDS_A2-/eDP_TX0-
LVDS_B3+	B77	A77	LVDS_VDD_EN /eDP_VDD_EN
LVDS_B3-	B78	A78	LVDS_A3+
LVDS_BKLT_EN /eDP_BKLT_EN	B79	A79	LVDS_A3-
GND	B80	A80	GND
LVDS_B_CK+	B81	A81	LVDS_A_CK+/eDP_TX3+
LVDS_B_CK-	B82	A82	LVDS_A_CK-/eDP_TX3-
LVDS_BKLT_CTRL /eDP_BKLT_ CTRL	B83	A83	LVDS_I2C_CK/eDP_AUX+
VCC_5V_SBY_1	B84	A84	LVDS_I2C_DAT/eDP_AUX-
VCC_5V_SBY_2	B85	A85	GPI3
VCC_5V_SBY_3	B86	A86	RSVD1
VCC_5V_SBY_4	B87	A87	RSVD/eDP_HPD
BIOS_DIS1#	B88	A88	PCIE_CLK_REF+
VGA_RED	B89	A89	PCIE_CLK_REF--
GND	B90	A90	GND





Signal	PIN	PIN	Signal
VGA_GRN	B91	A91	SPI_POWER
VGA_BLU	B92	A92	SPI_MISO
VGA_HSYNC	B93	A93	GPO0
VGA_VSYNC	B94	A94	SPI_CLK
VGA_I2C_CK	B95	A95	SPI_MOSI
VGA_I2C_DAT	B96	A96	TPM_PP
SPI_CS#	B97	A97	TYPE10#
NC	B98	A98	SER0_TX
NC	B99	A99	SER0_RX
GND	B100	A100	GND
FAN_PWMOUT	B101	A101	SER1_TX
FAN_TACHIN	B102	A102	SER1_RX
SLEEP#	B103	A103	LID#
VCC	B104	A104	VCC
VCC	B105	A105	VCC
VCC	B106	A106	VCC
VCC	B107	A107	VCC
VCC	B108	A108	VCC
VCC	B109	A109	VCC
GND	B110	A110	GND

2.4.2.1 Signal Description – COM Express Connector 1 (CN1A)

2.4.2.1.1 Audio Signals

Signal	Signal Description
HDA_SYNC	HD Audio Sync
HDA _RST#	HD Audio Reset
HDA _SDIN[0:2]	Audio CODEC Serial Data
HDA _BITCLK	HD Audio Clock
HDA _SDOUT	HD Audio Data

2.4.2.1.2 Gigabit Ethernet Signals

Signal	Signal Description
GBE0_MD[0:3] +/-	Gigabit Ethernet Controller 0: Media Dependent Interface Differential Pairs 0,1,2,3. The MDI can operate in 1000, 100 and 10 Mbit / sec modes. Some pairs are unused in some modes, per the following:
GBE0_ACT#	Gigabit Ethernet Controller 0 activity indicator, active low.
GBE0_Link#	Gigabit Ethernet Controller 0 link indicator, active low.
GBE0_Link100#	Gigabit Ethernet Controller 0 100 Mbit / sec link indicator, active low.
GBE0_Lin1000#	Gigabit Ethernet Controller 0 1000 Mbit / sec link indicator, active low.

	1000B-T	100B-T	10B-T
MDI[0]+/-	B1_DA+/	TX+/-	TX+/-
MDI[1]+/	B1_DB+/	RX+/-	RX+/-
MDI[2]+/	B1_DC+/	X	X
MDI[3]+/	B1_DD+/	X	X

2.4.2.1.3 PCI Express Signals

Signal	Signal Description
PCIE_TX[0:6] +/-	PCI Express Differential Transmit Pair 0-6
PCIE_RX[0:6] +/-	PCI Express Differential Receive Pair 0-6
PCIE0_CK_REF+/-	Reference clock output for PCI Express lanes 0-6 and for PCI Express Graphics lanes 0-15

2.4.2.1.4 Flat Panel LVDS Signals

Signal	Signal Description
LVDS_BKLT_CTRL	Controls panel digital power.
ENBKL#	Controls backlight power enable.
LVDS_I2C_CK	I2C clock output for LVDS display use.
LVDS_I2C_DAT	I2C data line for LVDS display use.
LVDS_A[0:3] +/-	LVDS Channel A differential pairs.
LVDS_B[0:3] +/-	LVDS Channel B differential pairs.
LVDS_VDD_EN	LVDS panel power enables.
LVDS_A_CK +/-	LVDS Channel A differential clock.
LVDS_B_CK +/-	LVDS Channel A differential clock.

2.4.2.1.5 LPC Signals

Signal	Signal Description
LPC_FRAME#	LPC frame indicates the start of an LPC cycle
LPC_AD[0:3]	LPC multiplexed address, command and data bus
LPC_DRQ[0:1]#	LPC serial DMA request
LPC_CLK	LPC clock output - 33MHz nominal
LPC_SERIRQ	LPC serial interrupt

2.4.2.1.6 Miscellaneous Signals

<table>
<tr><th>Signal</th><th>Signal Description</th></tr>
<tr><td>SPKR</td><td>Output for audio enunciator - the "speaker" in PC-AT systems</td></tr>
<tr><td>BIOS_DIS0#
BIOS_DIS1#</td><td>Selection straps to determine the BIOS boot device
<table>
<tr><th>BIOS_DIS1#</th><th>BIOS_DIS0#</th><th>Chipset SPI CS1# Destination</th><th>Chipset SPI CS0# Destination</th><th>Carrier SPI_CS#</th><th>SPI Descriptor</th><th>Bios Entry</th><th>Ref Line</th></tr>
<tr><td>1</td><td>1</td><td>Module</td><td>Module</td><td>High</td><td>Module</td><td>SPI0/SPI1</td><td>0</td></tr>
<tr><td>1</td><td>0</td><td>Module</td><td>Module</td><td>High</td><td>Module</td><td>Carrier FWH</td><td>1</td></tr>
<tr><td>0</td><td>1</td><td>Module</td><td>Carrier</td><td>SPI0</td><td>Carrier</td><td>SPI0/SPI1</td><td>2</td></tr>
<tr><td>0</td><td>0</td><td>Carrier</td><td>Module</td><td>SPI1</td><td>Module</td><td>SPI0/SPI1</td><td>3</td></tr>
</table></td></tr>
</table>

2.4.2.1.7 GPIO Signals

Signal	Signal Description
GPI[0:4]	General purpose input pins.
GPO[0:4]	General purpose output pins.

2.4.2.1.8 Power Signals

Signal	Signal Description
VCC_5V_SBY	Standby power input: +5.0V nominal. See Electrical Specifications for allowable input range. If VCC5_SBY is used, all available VCC_5V_SBY pins on the connector(s) must be used. Only used for standby and suspend functions. May be left unconnected if these functions are not used in the system design.
VCC_RTC	Real-time clock circuit-power input. Nominally +3.0V.

2.4.2.1.9 Power & System Management Signals

Signal	Signal Description
SUS_S3#	Indicates system is in Suspend to RAM state. Active low output.
SUS_S4#	Indicates system is in Suspend to Disk state. Active low output.
SUS_S5#	Indicates system is in Soft Off state.
BATLOW#	Indicates that external battery is low
PWRBTN#	Power button to bring system out of S5 (soft off), active on rising edge.
SMB_CK	System Management Bus bidirectional clock line.
SMB_DTA	System Management Bus bidirectional data line.
SMB_ALERT#	System Management Bus Alert - input can be used to generate an SMI# (System Management Interrupt) or to wake the system.
SUS_STAT#	Indicates imminent suspend operation.
PWR_OK	Power OK from main power supply
SYS_RESET#	Reset button input. Active low input.
WAKE0#	PCI Express wake up signal.
WAKE1#	General purpose wake up signal.

2.4.2.1.10 SATA Signals

Signal	Signal Description
SATA[0:2]_TX +/-	Serial ATA Channel 0-2 transmit differential pair.
SATA[0:2]_RX +/-	Serial ATA Channel 0-2 receive differential pair.
ATA_ACT#	ATA (parallel and serial) activity indicator, active low.

2.4.2.1.11 VGA Signals

Signal	Signal Description
VGA_RED	Red for monitor. Analog DAC output.
VGA_GRN	Green for monitor. Analog DAC output.
VGA_BLU	Blue for monitor. Analog DAC output.
VGA_HSYNC	Horizontal sync output to VGA monitor
VGA_VSYNC	Vertical sync output to VGA monitor
VGA_ I^2C_CK	DDC clock line (I2C port dedicated to identify VGA monitor capabilities)
VGA_ I^2C_DAT	DDC data line.

2.4.2.1.12 USB Signals

Signal	Signal Description
USB[0:7] +/-	USB differential pairs, channels 0 through 7
USB_0_1_OC#	USB over-current sense, USB channels 0 and 1
USB_2_3_OC#	USB over-current sense, USB channels 2 and 3
USB_4_5_OC#	USB over-current sense, USB channels 4 and 5
USB_6_7_OC#	USB over-current sense, USB channels 6 and 7

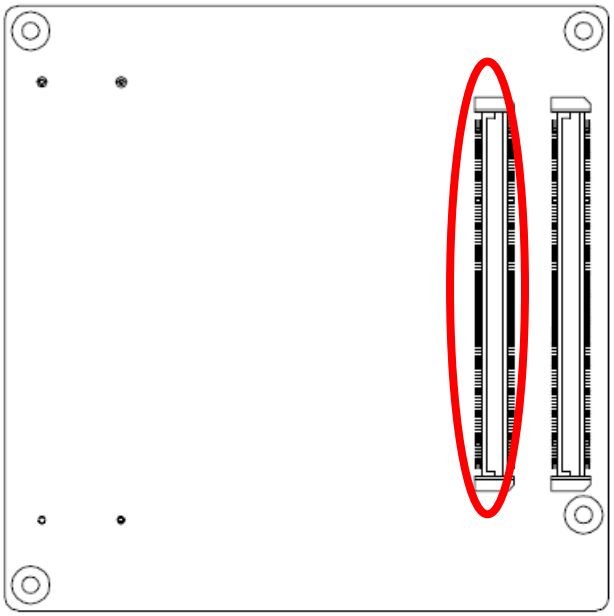
2.4.2.1.13 I2C Signals

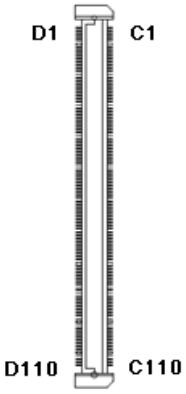
Signal	Signal Description
I2C_CK	General purpose I2C port clock output.
I2C_DAT	General purpose I2C port data I/O line.

2.4.2.1.14 COM.0 Pins Signals

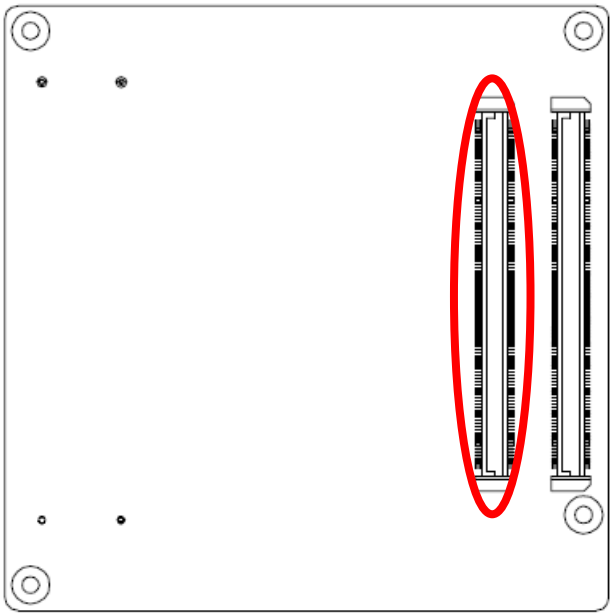
Signal	Signal Description
SER0/1_TX	TTL level outputs from the Module.
SER0/1_RX	TTL level inputs from the Module.

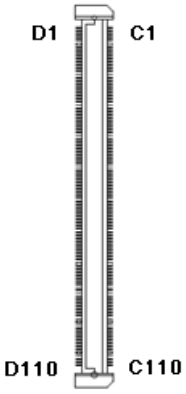
2.4.3 COM Express Connector 2 (CN1B)



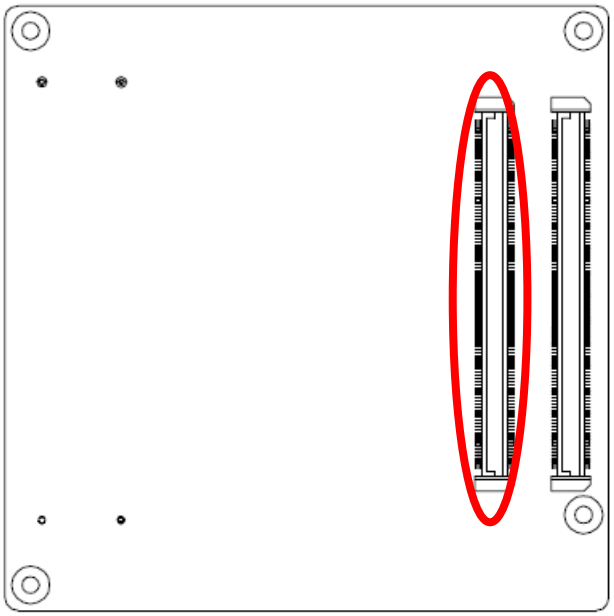


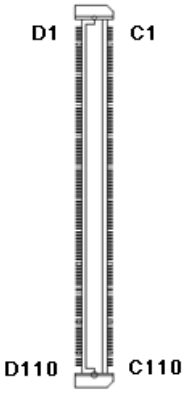
Signal	PIN	PIN	Signal
GND	D1	C1	GND
GND	D2	C2	GND
USB_SSTX0-	D3	C3	USB_SSRX0-
USB_SSTX0+	D4	C4	USB_SSRX0+
GND	D5	C5	GND
USB_SSTX1-	D6	C6	USB_SSRX1-
USB_SSTX1+	D7	C7	USB_SSRX1+
GND	D8	C8	GND
USB_SSTX2-	D9	C9	USB_SSRX2-
USB_SSTX2+	D10	C10	USB_SSRX2+
GND	D11	C11	GND
USB_SSTX3-	D12	C12	USB_SSRX3-
USB_SSTX3+	D13	C13	USB_SSRX3+
GND	D14	C14	GND
DDI1_CTRLCLK_AUX+	D15	C15	NC
DDI1_CTRLDATA_AUX-	D16	C16	NC
NC	D17	C17	NC
NC	D18	C18	NC
PCIE_TX6+	D19	C19	PCIE_RX6+
PCIE_TX6-	D20	C20	PCIE_RX6-
GND	D21	C21	GND
PCIE_TX7+	D22	C22	PCIE_RX7+
PCIE_TX7-	D23	C23	PCIE_RX7-
NC	D24	C24	DDI1_HPD
NC	D25	C25	NC
DDI1_PAIR0+	D26	C26	NC
DDI1_PAIR0-	D27	C27	RSVD7
NC	D28	C28	NC
DDI1_PAIR1+	D29	C29	NC
DDI1_PAIR1-	D30	C30	NC



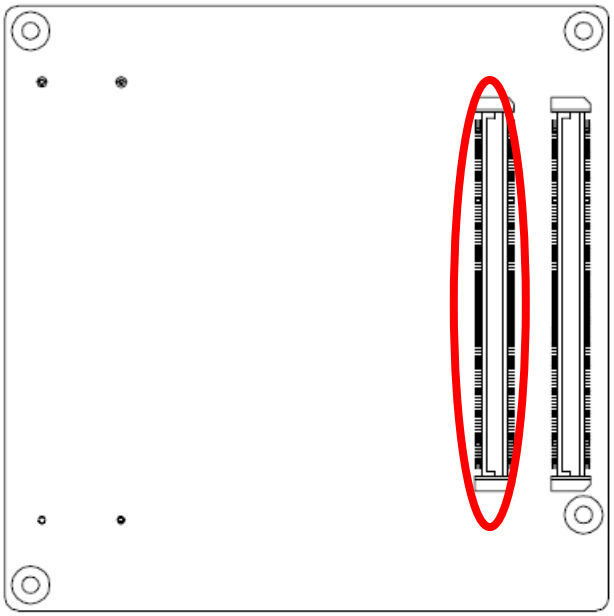


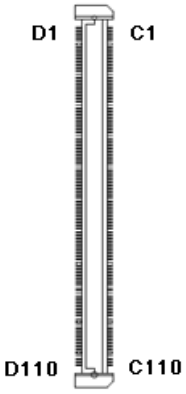
Signal	PIN	PIN	Signal
GND	D31	C31	GND
DDI1_PAIR2+	D32	C32	DDI2_CTRLCLK_AUX+
DDI1_PAIR2-	D33	C33	DDI2_CTRLDATA_AUX-
DDI1_DDC_AUX_SEL	D34	C34	DDI2_DDC_AUX_SEL
RSVD23	D35	C35	NC
DDI1_PAIR3+	D36	C36	NC
DDI1_PAIR3-	D37	C37	NC
RSVD24	D38	C38	NC
DDI2_PAIR0+	D39	C39	NC
DDI2_PAIR0-	D40	C40	NC
GND	D41	C41	GND
DDI2_PAIR1+	D42	C42	NC
DDI2_PAIR1-	D43	C43	NC
DDI2_HPD	D44	C44	NC
NC	D45	C45	NC
DDI2_PAIR2+	D46	C46	NC
DDI2_PAIR2-	D47	C47	NC
NC	D48	C48	NC
DDI2_PAIR3+	D49	C49	NC
DDI2_PAIR3-	D50	C50	NC
GND	D51	C51	GND
NC	D52	C52	NC
NC	D53	C53	NC
NC	D54	C54	TYPE0#
NC	D55	C55	NC
NC	D56	C56	NC
TYPE2#	D57	C57	TYPE1#
NC	D58	C58	NC
NC	D59	C59	NC
GND	D60	C60	GND





Signal	PIN	PIN	Signal
NC	D61	C61	NC
NC	D62	C62	NC
NC	D63	C63	NC
NC-	D64	C64	NC
NC	D65	C65	NC
NC	D66	C66	NC
GND	D67	C67	NC
NC	D68	C68	NC
NC	D69	C69	NC
GND	D70	C70	GND
NC	D71	C71	NC
NC	D72	C72	NC
GND	D73	C73	GND
NC	D74	C74	NC
NC	D75	C75	NC
GND	D76	C76	GND
NC	D77	C77	NC
NC	D78	C78	NC
NC	D79	C79	NC
GND	D80	C80	GND
NC	D81	C81	NC
NC	D82	C82	NC
NC	D83	C83	NC
GND	D84	C84	GND
NC	D85	C85	NC
NC	D86	C86	NC
GND	D87	C87	GND
NC	D88	C88	NC
NC	D89	C89	NC
GND	D90	C90	GND





Signal	PIN	PIN	Signal
NC	D91	C91	NC
NC	D92	C92	NC
GND	D93	C93	GND
NC	D94	C94	NC
NC	D95	C95	NC
GND	D96	C96	GND
NC	D97	C97	NC
NC	D98	C98	NC
NC	D99	C99	NC
GND	D100	C100	GND
NC	D101	C101	NC
NC	D102	C102	NC
GND	D103	C103	GND
VCC	D104	C104	VCC
VCC	D105	C105	VCC
VCC	D106	C106	VCC
VCC	D107	C107	VCC
VCC	D108	C108	VCC
VCC	D109	C109	VCC
GND	D110	C110	GND

2.4.3.1 Signal Description – COM Express Connector 2 (CN1B)

2.4.3.1.1 USB3.0 Signals

Signal	Signal Description
USB_SSTX[0:3]+ USB_SSTX[0:3]-	Additional transmit signal differential pairs for the SuperSpeed USB data path.
USB_SSRX[0:3]+ USB_SSRX[0:3]-	Additional receive signal differential pairs for the SuperSpeed USB data path.

2.4.3.1.2 DDI Signals

Signal	Signal Description
DDI[1:2]_PAIR[0:3]+ DDI[1:2]_PAIR [0:3]-	Digital Display Interface 1 to 2 Pair[0:3] differential pairs
DDI[1:2]_DDC_AUX_SEL	Selects the function of DDI[1:2]_CTRLCLK_AUX+ and DDI[1:2]_CTRLDATA_AUX-. If this input is floating the AUX pair is used for the DP AUX+/- signals. If pulled-high the AUX pair contains the CRTLCLK and CTRLDATA signals.
DDI[1:2]_CTRLCLK_AUX+	DP AUX+function if DDI[1:2]_DDC_AUX_SEL is no connect HDMI/DVI 12C CTRLCLK if DDI[1:2]_DDC_AUX_SEL is pulled high
DDI[1:2]_CTRLDATA_AUX-	DP AUX-function if DDI[1:2]_DDC_AUX_SEL is no connect HDMI/DVI 12C CTRLDATA if DDI[1:2]_DDC_AUX_SEL is pulled high
DDI[1:2]_HPD	Digital Display Interface Hot-Plug Detect

3.BIOS Setup

3.1 Introduction

The BIOS setup program allows users to modify the basic system configuration. In this following chapter will describe how to access the BIOS setup program and the configuration options that may be changed.

3.2 Starting Setup

AMI BIOS™ is immediately activated when you first power on the computer. The BIOS reads the system information contained in the NVRAM and begins the process of checking out the system and configuring it. When it finishes, the BIOS will seek an operating system on one of the disks and then launch and turn control over to the operating system.

While the BIOS is in control, the Setup program can be activated in one of two ways:
By pressing <F2> or <Del> immediately after switching the system on, or
By pressing the <F2> or <Del> key when the following message appears briefly at the left-top of the screen during the POST (Power On Self Test).

Press <F2> or <Del> to enter SETUP

If the message disappears before you respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the "RESET" button on the system case. You may also restart by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.

3.3 Using Setup

In general, you use the arrow keys to highlight items, press <Enter> to select, use the PageUp and PageDown keys to change entries, press <F1> for help and press <Esc> to quit. The following table provides more detail about how to navigate in the Setup program using the keyboard.

Button	Description
↑	Move to previous item
↓	Move to next item
←	Move to the item in the left hand
→	Move to the item in the right hand
Esc key	Main Menu -- Quit and not save changes into NVRAM Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
+ key	Increase the numeric value or make changes
- key	Decrease the numeric value or make changes
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 key	Previous Values
F3 key	Optimized defaults
F4 key	Save & Exit Setup

- **Navigating Through The Menu Bar**

  Use the left and right arrow keys to choose the menu you want to be in.

Note: Some of the navigation keys differ from one screen to another.

- **To Display a Sub Menu**

  Use the arrow keys to move the cursor to the sub menu you want. Then press <Enter>. A "➢" pointer marks all sub menus.

3.4 Getting Help

Press F1 to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window press <Esc> or the F1 key again.

3.5 In Case of Problems

If, after making and saving system changes with Setup, you discover that your computer no longer is able to boot, the BIOS supports an override to the NVRAM settings which resets your system to its defaults.

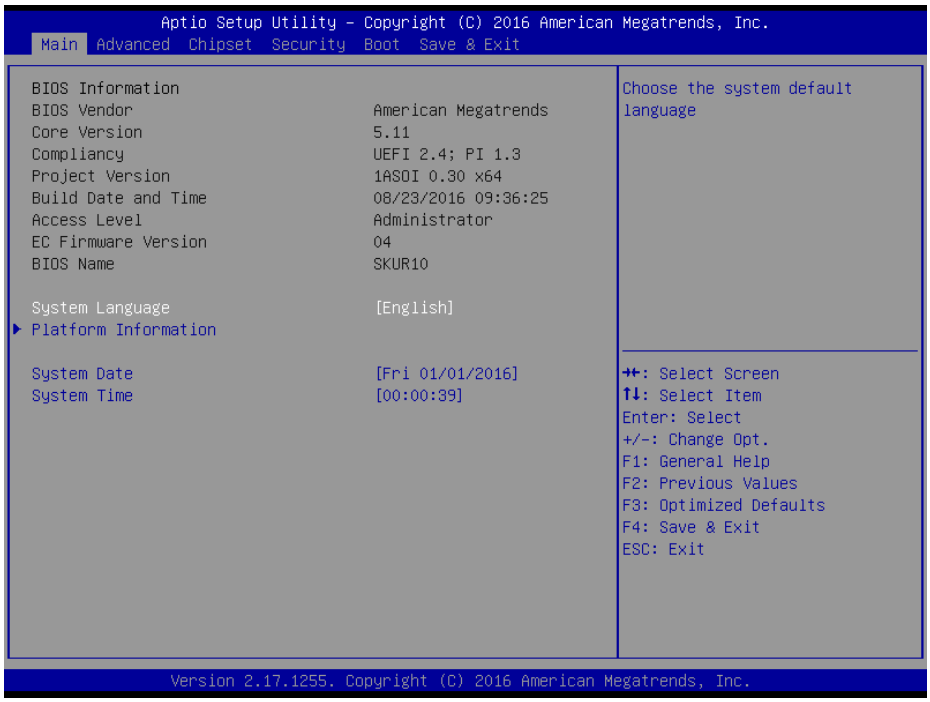
The best advice is to only alter settings which you thoroughly understand. To this end, we strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both your systems manufacturer to provide the absolute maximum performance and reliability. Even a seemingly small change to the chipset setup has the potential for causing you to use the override.

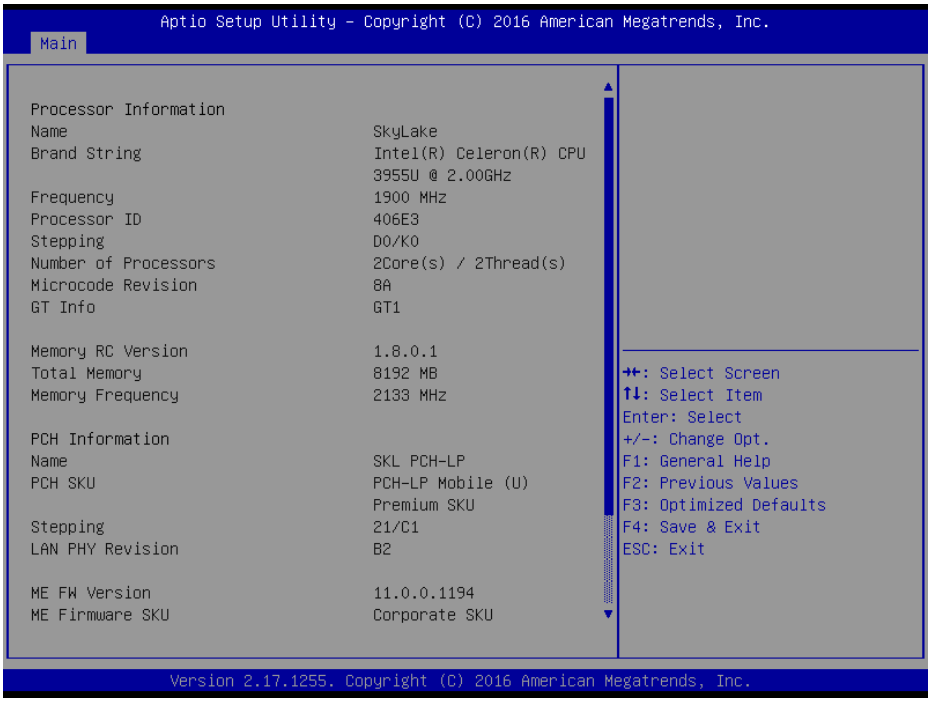
3.6 BIOS setup

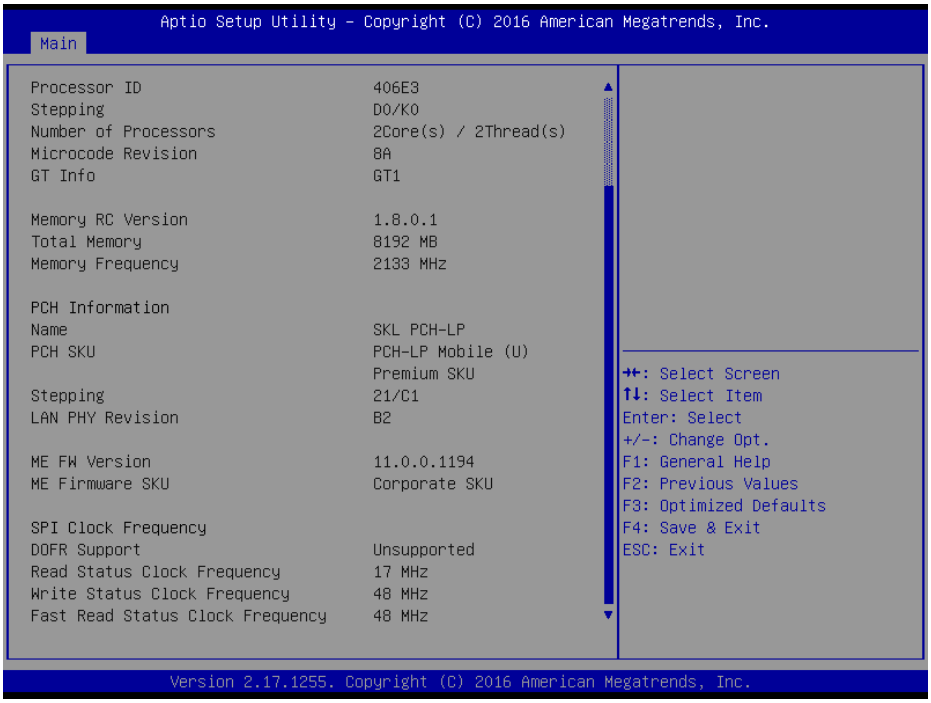
Once you enter the Aptio Setup Utility, the Main Menu will appear on the screen. The Main Menu allows you to select from several setup functions and exit choices. Use the arrow keys to select among the items and press <Enter> to accept and enter the sub-menu.

3.6.1 Main Menu

This section allows you to record some basic hardware configurations in your computer and set the system clock.







3.6.1.1 System Language

This option allows choosing the system default language.

3.6.1.2 System Date

Use the system date option to set the system date. Manually enter the day, month and year.

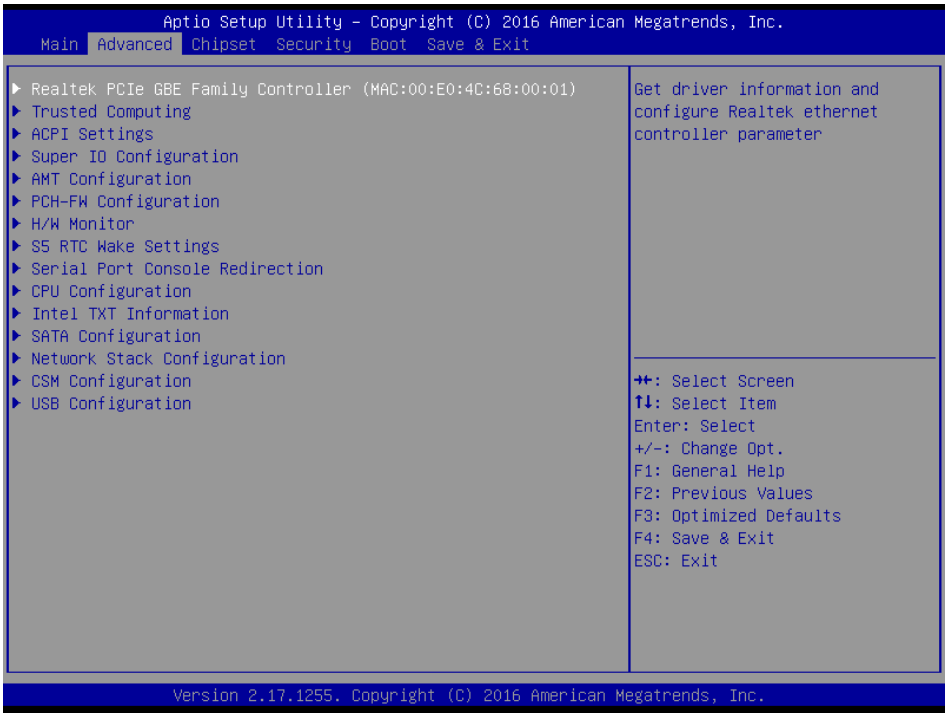
3.6.1.3 System Time

Use the system time option to set the system time. Manually enter the hours, minutes and seconds.

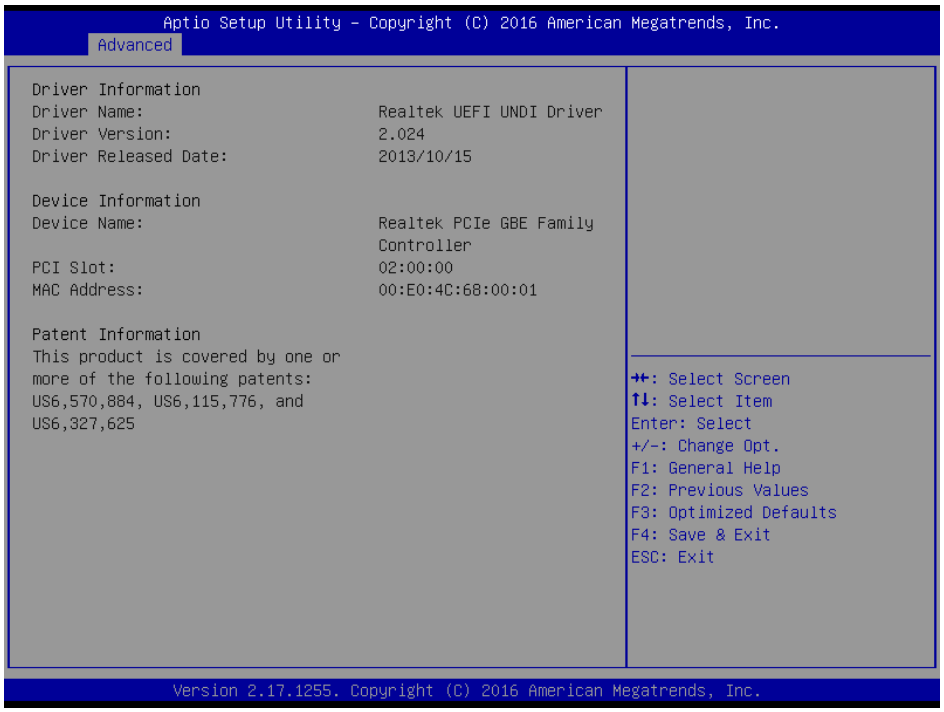
Note: The BIOS setup screens shown in this chapter are for reference purposes only, and may not exactly match what you see on your screen.

3.6.2 Advanced Menu

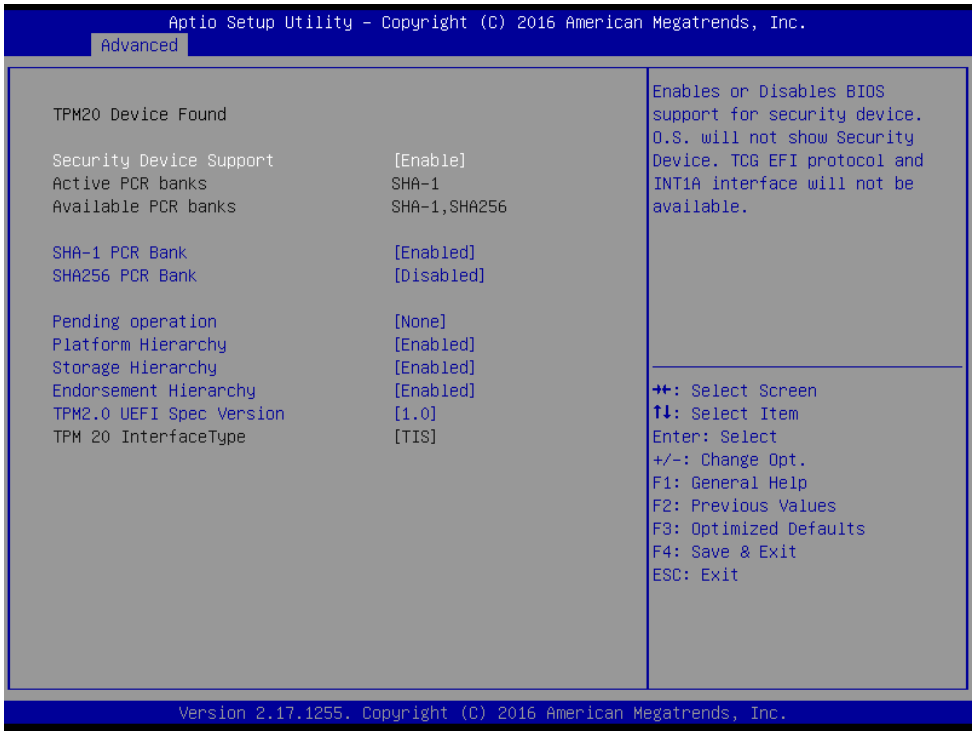
This section allows you to configure your CPU and other system devices for basic operation through the following sub-menus.



3.6.2.1 Realtek PCIe GBE Family Controller Driver Information

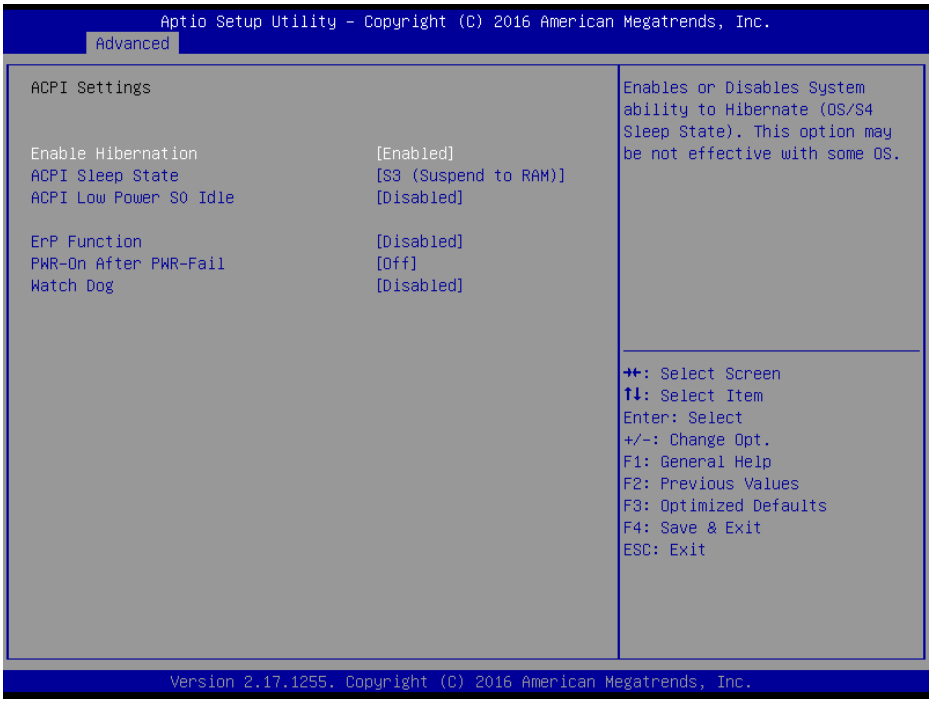


3.6.2.2 Trusted Computing



Item	Options	Description
Security Device Support	Disable, Enable**[Default]**	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.
SHA-1 PCR Bank	Disabled Enabled**[Default]**,	Enable or Disable SHA-1 PCR Bank.
SHA256 PCR Bank	Disabled**[Default]**, Enabled	Enable or Disable SHA256 PCR Bank.
Pending operation	None**[Default]**, TPM Clear	Schedule an Operation for the Security Device. NOTE: Your Computer will reboot during restart in order to change State of Security Device.
Platform Hierarchy	Disabled Enabled**[Default]**,	Enable or Disable Platform Hierarchy.
Storage Hierarchy	Disabled Enabled**[Default]**,	Enable or Disable Storage Hierarchy.
Endorsement Hierarchy	Disabled Enabled**[Default]**,	Enable or Disable Endorsement Hierarchy.
TPM2.0 UEFI Spec Version	1.0**[Default]**, 1.x	Select the TCG2 Spec Version Support, 1.0: the Compatible mode for Win8/Win10, 1.x: For TCG2 never spec for Win10.

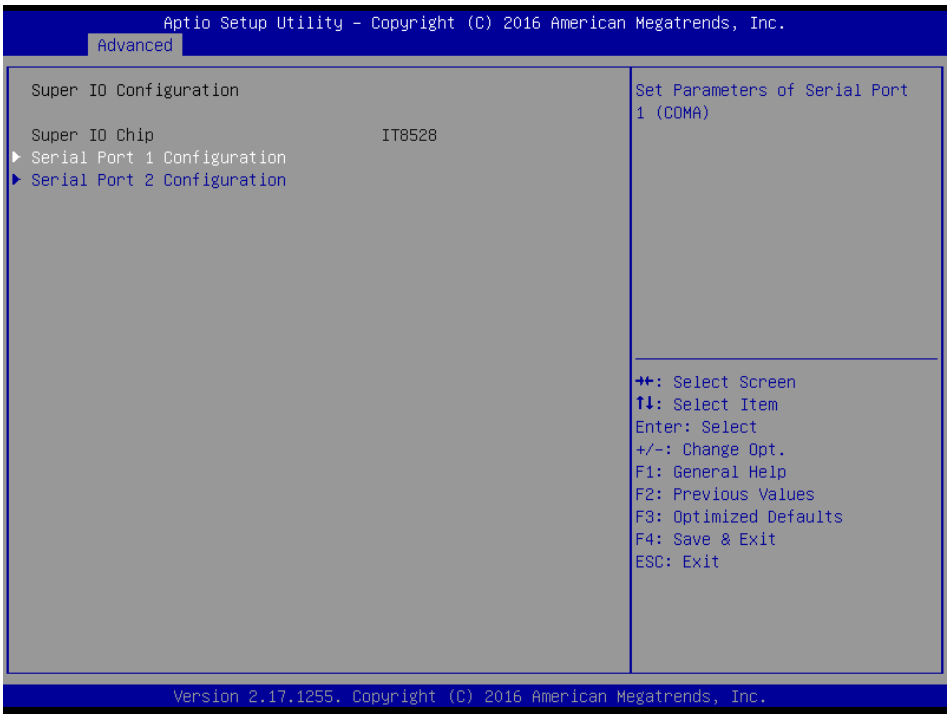
3.6.2.3 APCI Settings



Item	Options	Description
Enable Hibernation	Disabled Enabled**[Default]**,	Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS.
ACPI Sleep State	Suspend Disabled, S3 (Suspend to RAM) **[Default]**	Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.
ACPI Low Power S0 Idle	Disabled**[Default]**, Enabled	Enable or Disable ACPI Low Power S0 Idle Support.
ErP Function	Disabled**[Default]**, Enabled	ErP Function (Deep S5).
Pwr-On After PWR-Fail	Off**[Default]** On Last state	AC loss resume.
Watch Dog	Disabled**[Default]**, 30 sec 40 sec 50 sec 1 min 2 min 10 min 30 min	Select WatchDog.

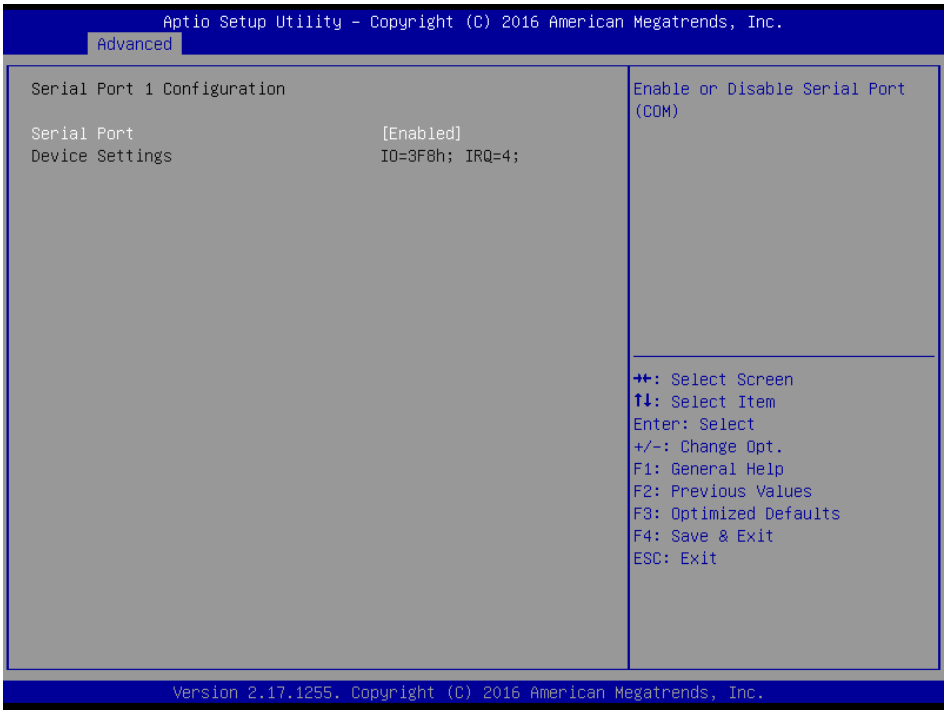
3.6.2.4 Super IO Configuration

You can use this item to set up or change the IT8528 Super IO configuration for serial ports. Please refer to 3.6.2.4.1~ 3.6.2.4.2 for more information.



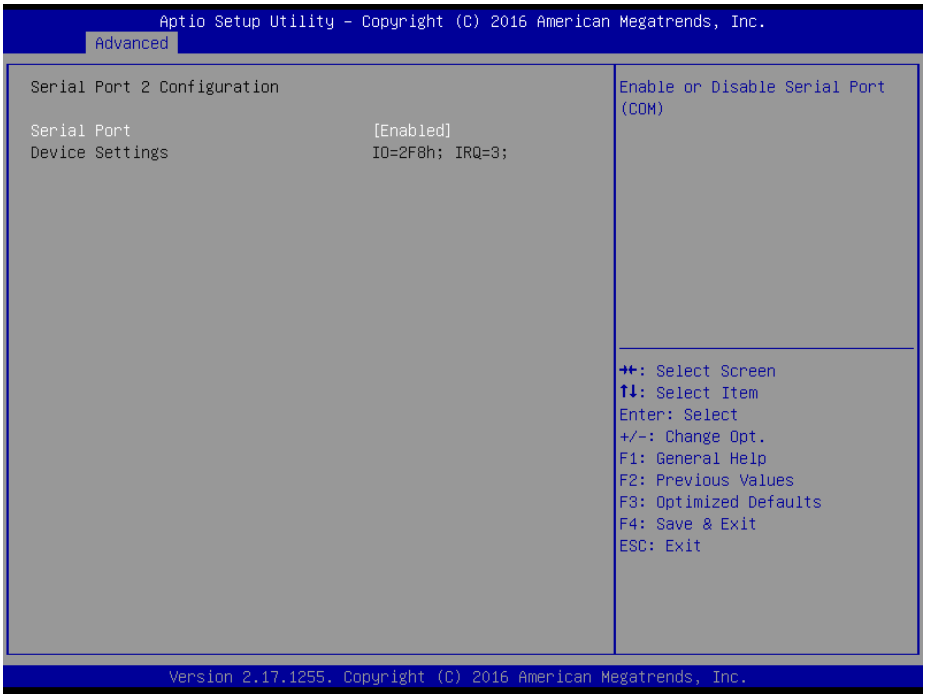
Item	Description
Serial Port 1 Configuration	Set Parameters of Serial Port 1 (COMA).
Serial Port 2 Configuration	Set Parameters of Serial Port 2 (COMB).

3.6.2.4.1 Serial Port 1 Configuration



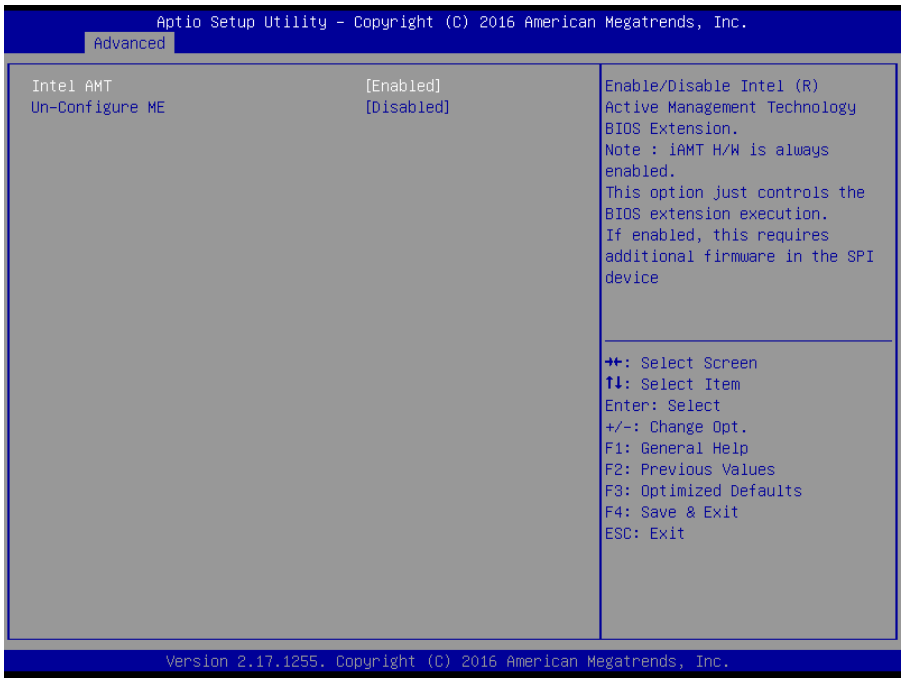
Item	Option	Description
Serial Port	Enabled**[Default]**, Disabled	Enable or Disable Serial Port (COM).

3.6.2.4.2 Serial Port 2 Configuration



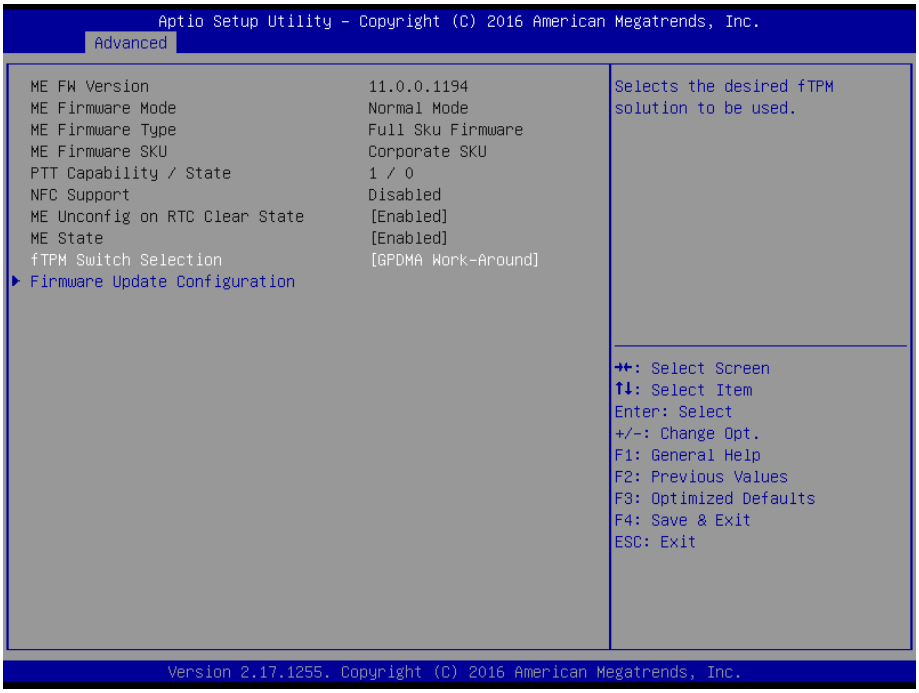
Item	Option	Description
Serial Port	Enabled**[Default]**, Disabled	Enable or Disable Serial Port (COM).

3.6.2.5 AMT Configuration



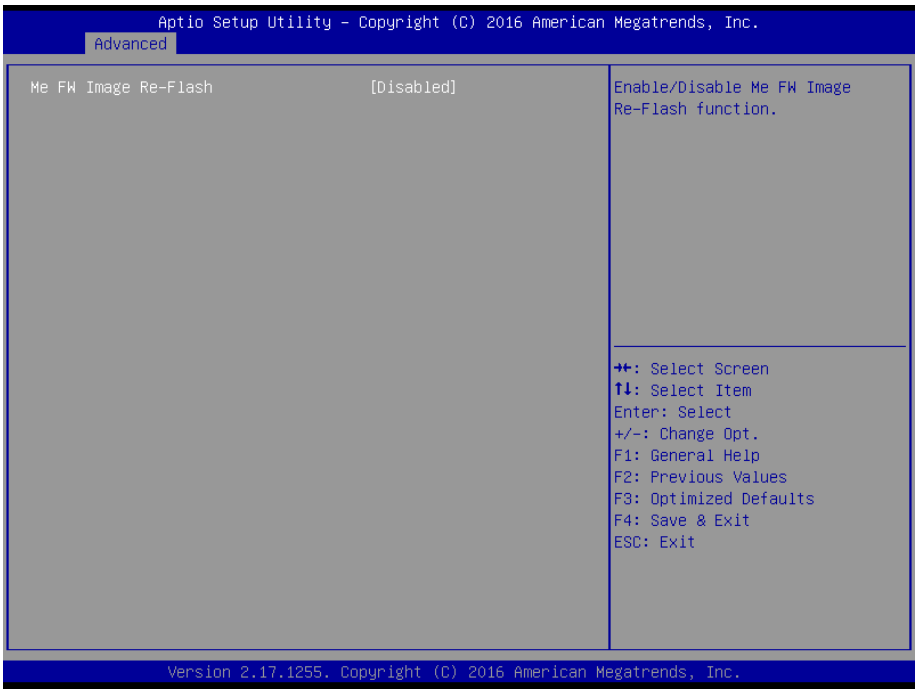
Item	Options	Description
Intel AMT	Disabled Enabled**[Default]**,	Enable/Disable Intel® Active Management Technology BIOS Extension. Note: iAMT H/W is always enabled. This option just controls the BIOS extension execution. If enabled, this requires additional firmware in the SPI device.
Un-Configure ME	Disabled**[Default]** Enabled,	OEMFlag Bit 15: Un-Configure ME without password.

3.6.2.6 PCH-FW Configuration



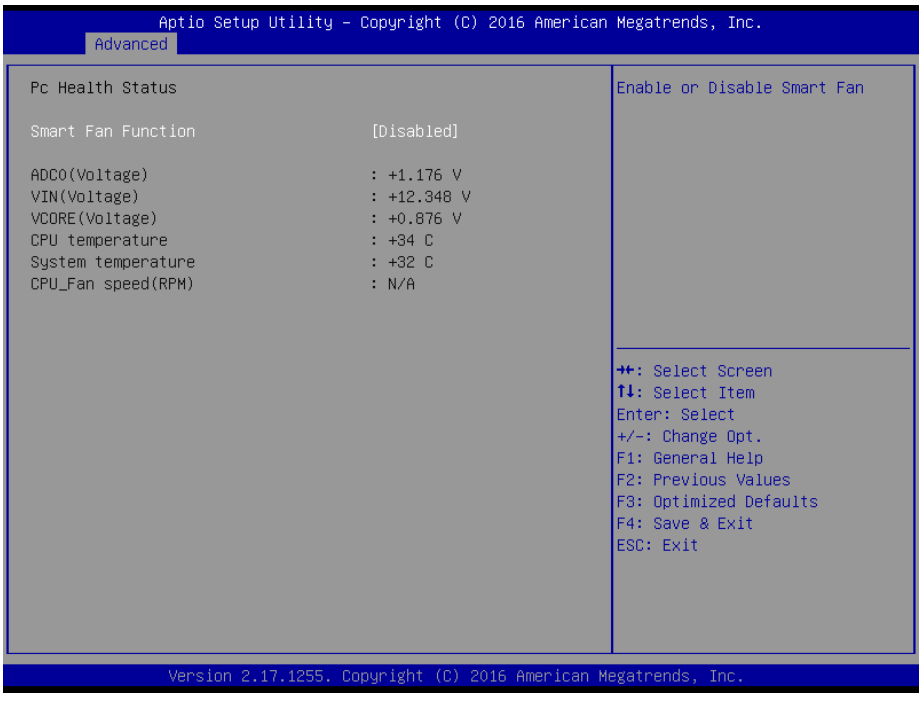
Item	Options	Description
fTPM Switch Selection	GPDMA Work-Around**[Default]**, MSFT QFE Solution	Select the desired fTPM solution to be used.

3.6.2.6.1 Firmware Update Configuration



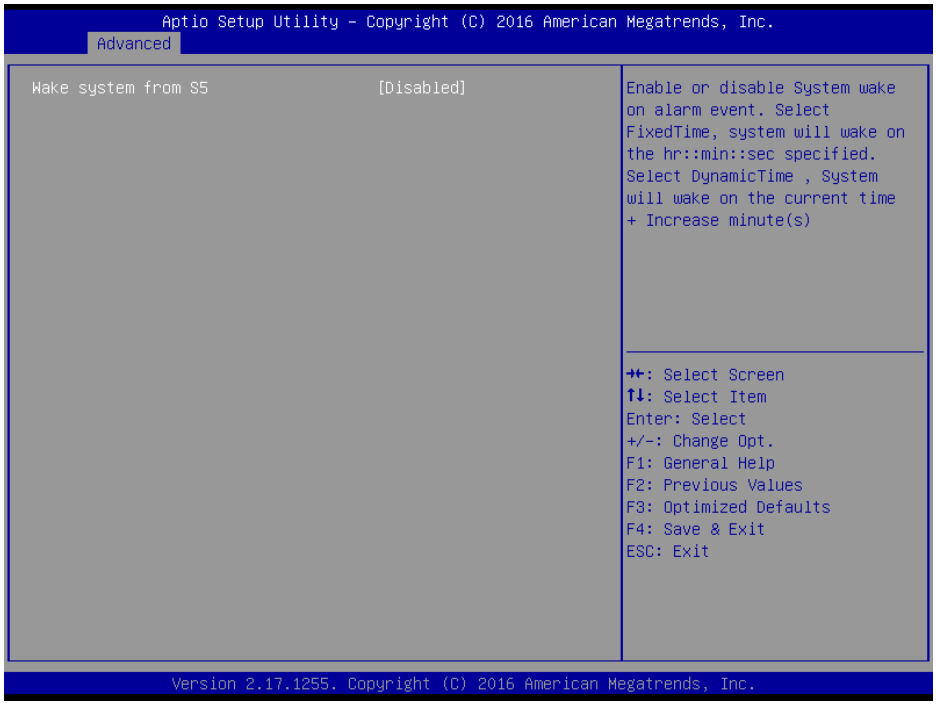
Item	Option	Description
ME FW Image Re-Flash	Disabled **[Default]**, Enabled	Enable/Disable Me FW Image Re-Flash function.

3.6.2.7 H/W Monitor

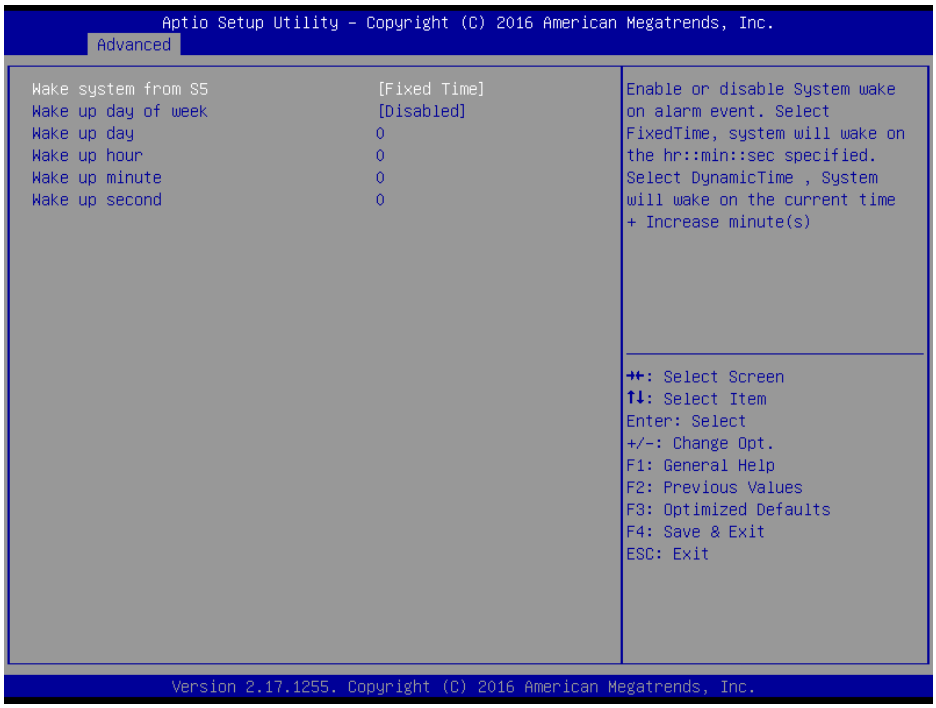


Item	Options	Description
Smart Fan Function	Enabled, Disabled**[Default]**	Enables or Disables Smart Fan.

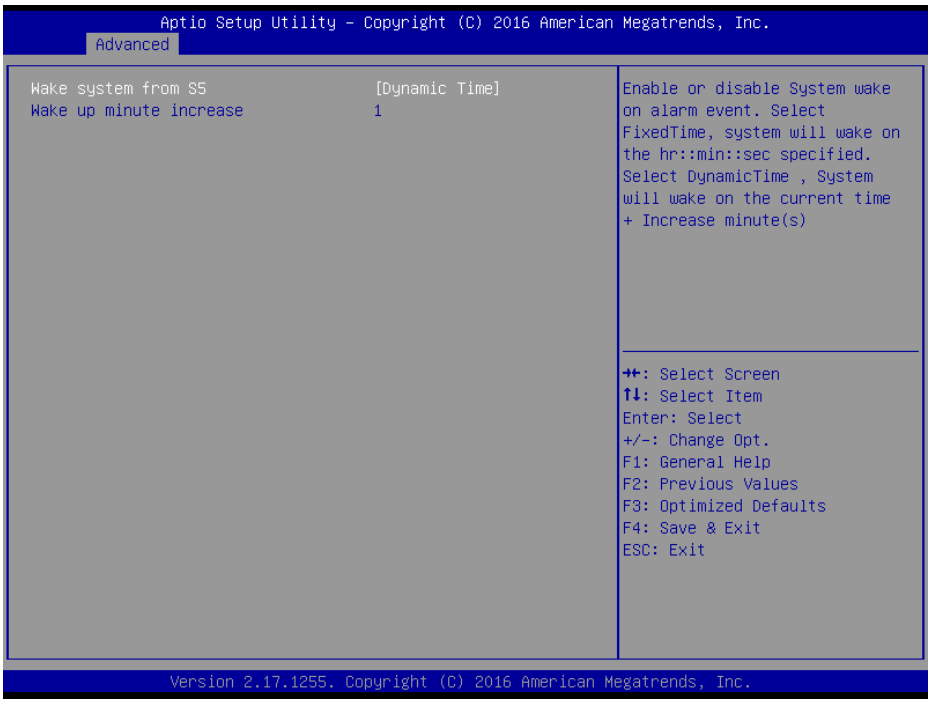
3.6.2.8 S5 RTC Wake Settings



Item	Options	Description
Wake system from S5	Disabled**[Default]**, Fixed Time Dynamic Time	Enable or disable System wake on alarm event. Select Fixed Time, system will wake on the hr::min::sec specified. Select Dynamic Time, System will wake on the current time + Increase minute(s).

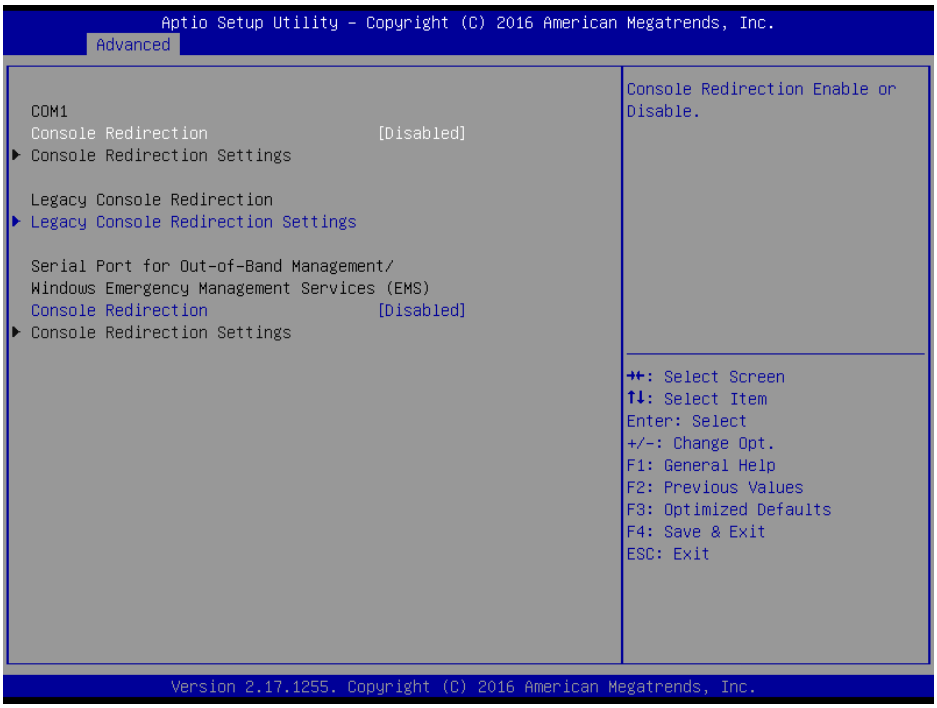


Item	Options	Description
Wake system from S5	Disabled, Fixed Time**[Default]** Dynamic Time	Enable or disable System wake on alarm event. Select Fixed Time, system will wake on the hr::min::sec specified. Select Dynamic Time, System will wake on the current time + Increase minute(s).
Wake up day of week	Disabled**[Default]** Monday-Friday Monday-Saturday	Wake up day of week. (Monday-Friday) or (Monday-Saturday).
Wake up day	1-31	Select 0 for daily system wake up 1-31 for which day of the month that you would like the system to wake up.
Wake up hour	0-23	Select 0-23 For example enter 3 for 3am and 15 for 3pm.
Wake up minute	0-23	Select 0-23 For example enter 3 for 3am and 15 for 3pm.
Wake up second	0-23	Select 0-23 For example enter 3 for 3am and 15 for 3pm.



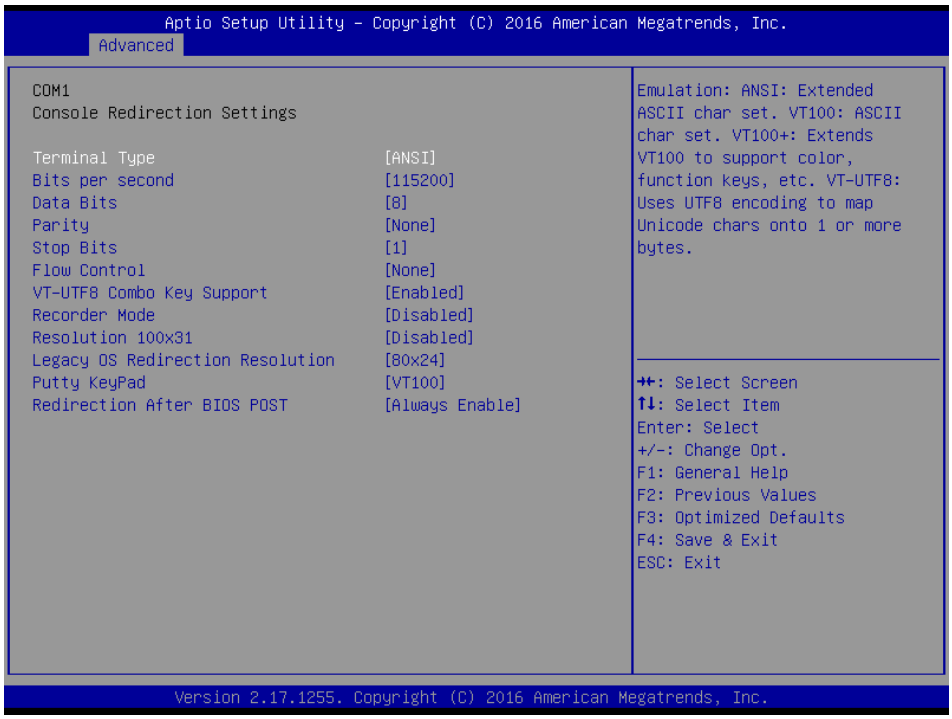
Item	Options	Description
Wake system from S5	Disabled, Fixed Time Dynamic Time**[Default]**	Enable or disable System wake on alarm event. Select Fixed Time, system will wake on the hr::min::sec specified. Select Dynamic Time, System will wake on the current time + Increase minute(s).
Wake up minute increase	1-5	1-5.

3.6.2.9 Serial Port Console Redirection



Item	Options	Description
Console Redirection	Disabled**[Default]**, Enabled	Console Redirection Enable or Disable.

3.6.2.9.1 COM1 Console Redirection Settings

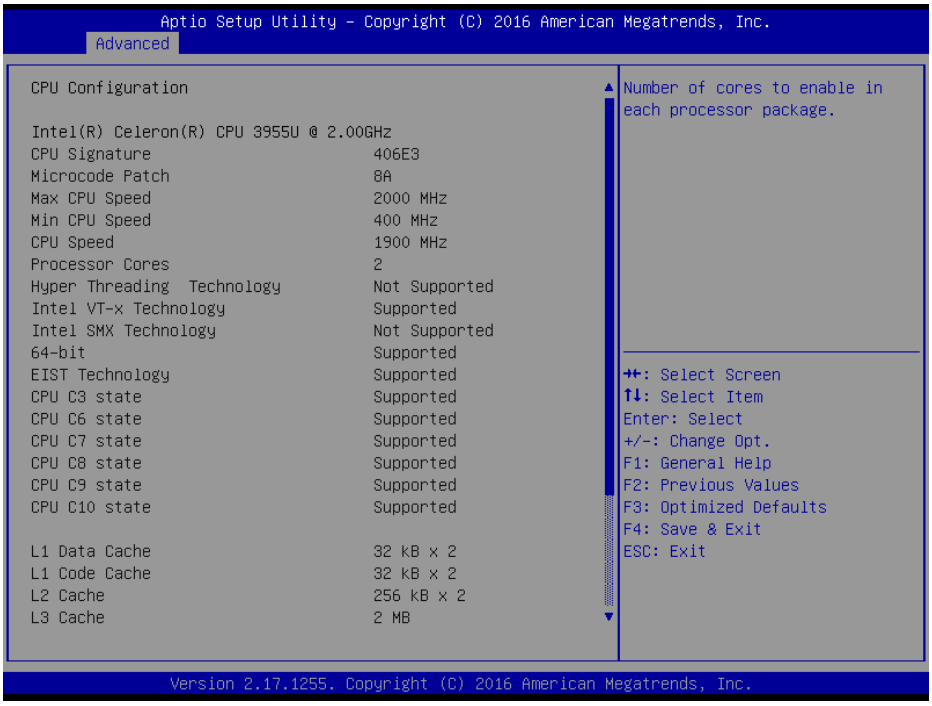


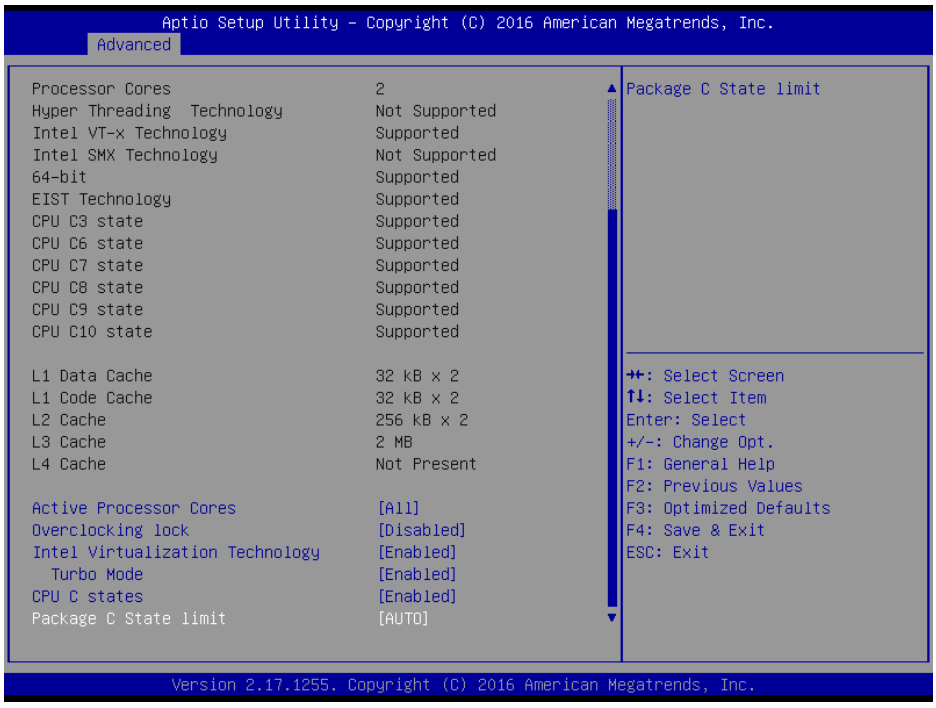
Item	Option	Description
Terminal Type	VT100 VT100+ VT-UTF8, ANSI**[Default]**	Emulation: ANSI: Extended ASCII char set. VT100 : ASCII char set. VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.
Bits per second	9600 19200 38400 57600 115200**[Default]**,	Select serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
Data Bits	7 8**[Default]**	Data Bits
Parity	None**[Default]** Even Odd Mark	A parity bit can be sent with the data bits to detect some transmission errors. Even: parity bit is 0 if the num of 1's in the data bits is even. Odd: parity bit is 0 if num of 1's in the data bits is odd. Mark: parity bit is always 1. Space: Parity bit is always 0. Mark and Space Parity do not allow for error detection. They can be used as an additional data bit.
Stop Bits	1**[Default]** 2	Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.
Flow Control	None**[Default]**, Hardware RTS/CTS	Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.
VT-UTF8 Combo Key Support	Disabled, Enabled**[Default]**	Enable VT-UTF8 Combination Key Supports for ANSI/VT100 terminals.
Recorder Mode	Disabled**[Default]** Enabled	With this mode enabled only text will be sent. This is to capture Terminal data.
Resolution 100x31	Disabled**[Default]** Enabled	Enables or disables extended terminal resolution.
Legacy OS Redirection Resolution	80x24**[Default]** 80x25	On Legacy OS, the Number of Rows and Columns supported redirection.
Putty KeyPad	VT100**[Default]** LINUX XTERMR6 SCO ESCN	Select FunctionKey and KeyPad on Putty.

	VT400	
Redirection After BIOS POST	Always Enable**[Default]** BootLoader	The Settings specify if BootLoader is selected then Legacy console redirection is disabled before booting to Legacy OS. Default value is Always Enable which means Legacy console Redirection is enabled.

3.6.2.10 CPU Configuration

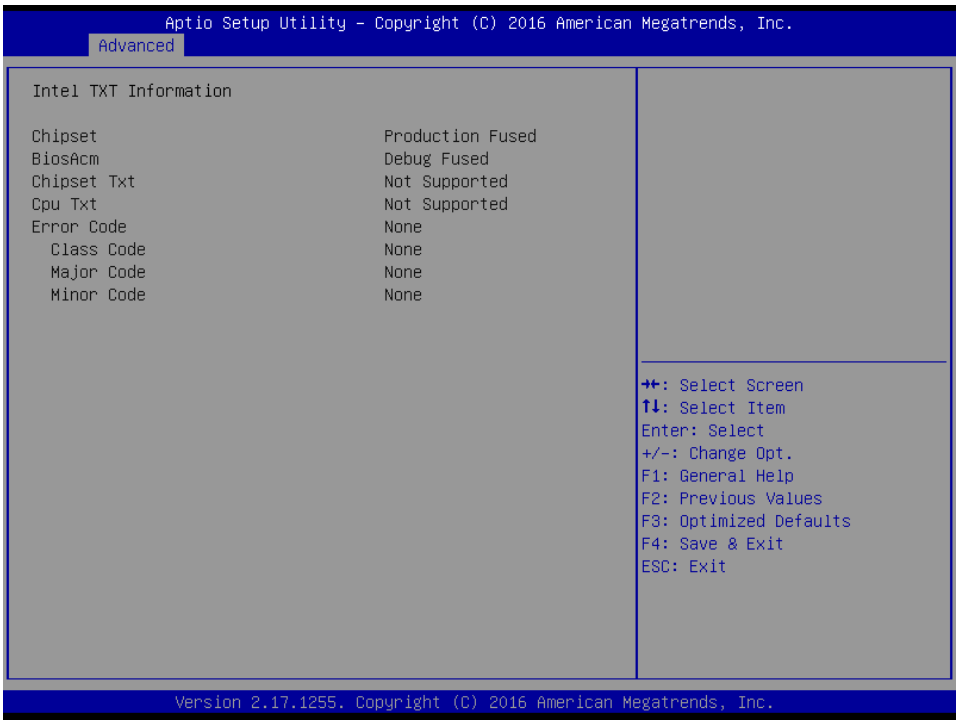
Use the CPU configuration menu to view detailed CPU specification and configure the CPU.



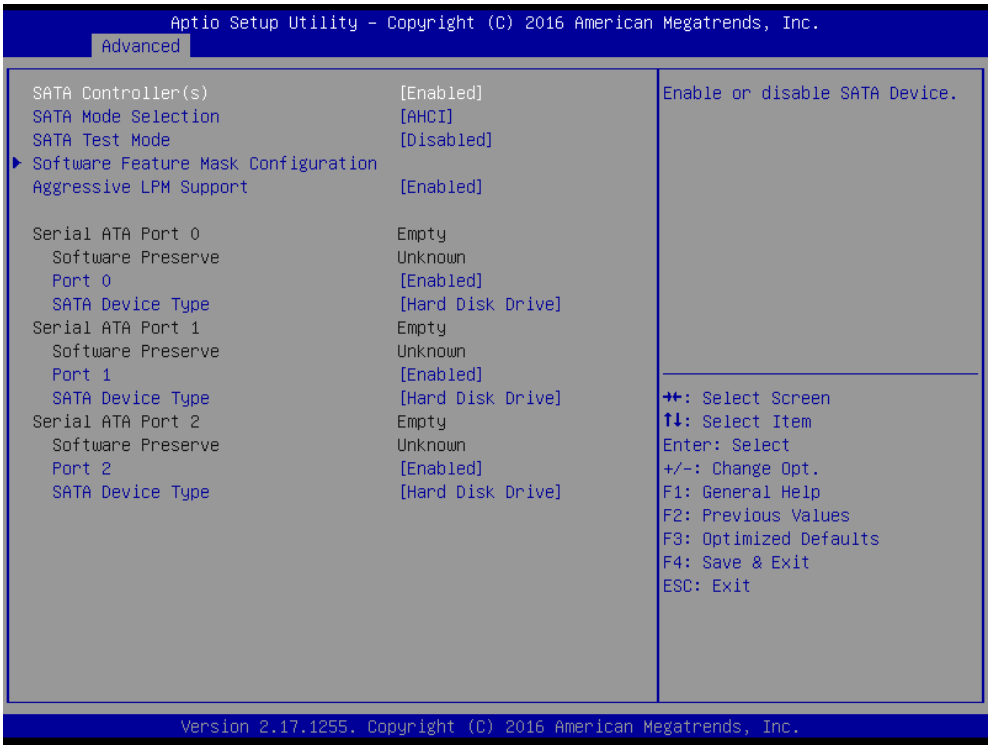


Item	Options	Description
Active Processor Cores	All**[Default]** 1	Number of cores to enable in each processor package.
Overclocking lock	Disabled**[Default]**, Enabled	FLEX_RATIO (194) MSR.
Intel Virtualization Technology	Disabled Enabled**[Default]**	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Turbo Mode	Disabled Enabled**[Default]**	Turbo Mode.
CPU C states	Disabled Enabled**[Default]**	Enable or disable CPU C states.
Package C State limit	C0/C1 C2 C3 C6 C7 C7s C8 C9 C10 AUTO**[Default]**	Package C State limit.

3.6.2.11 Intel TXT Configuration

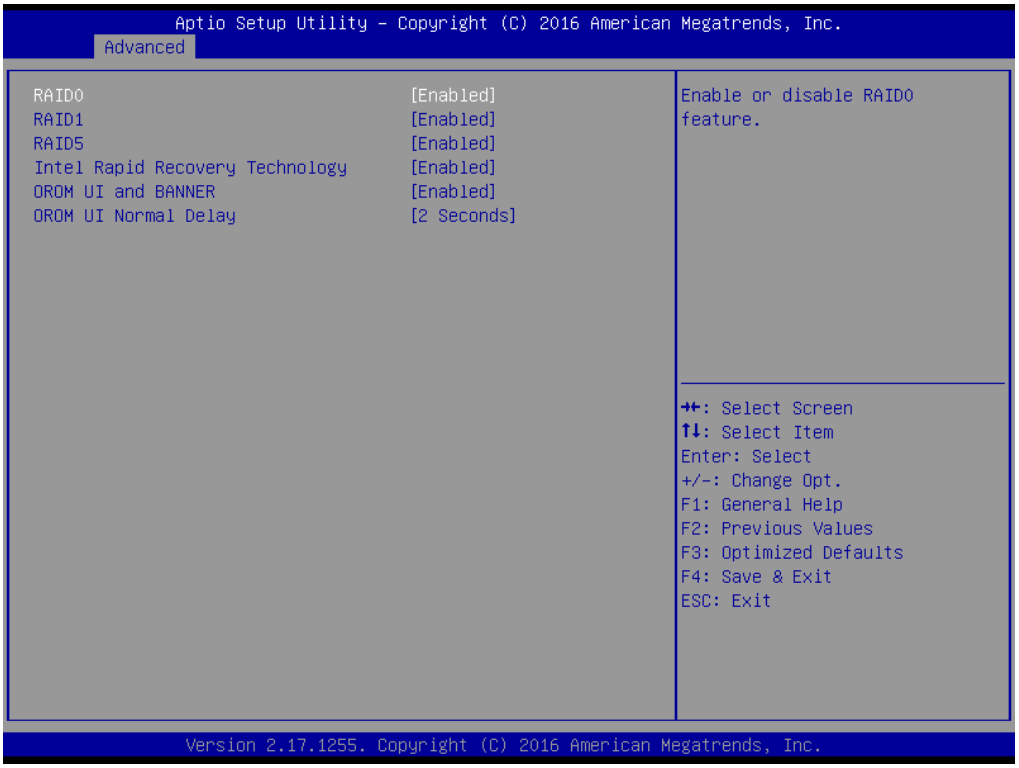


3.6.2.12 SATA Configuration



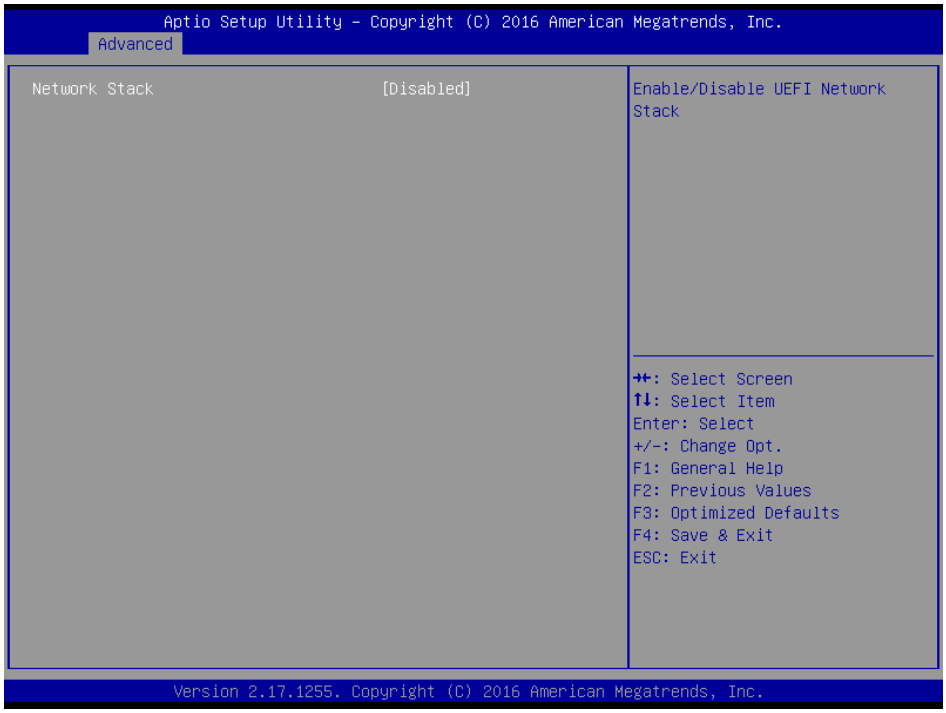
Item	Options	Description
SATA Controller(s)	Enabled**[Default]** Disabled,	Enable or disable SATA Device.
SATA Mode Selection	AHCI**[Default]**, RAID	Determines how SATA controller(s) operate.
SATA Test Mode	Enabled Disabled**[Default]**	Test Mode Enable/Disable (Loop Back).
Aggressive LPM Support	Enabled**[Default]** Disabled	Enable PCH to aggressively enter link power state.
Port 0/1/2	Enabled**[Default]** Disabled,	Enable or Disable SATA Port.
SATA Device Type	Hard Disk Drive **[Default]** Solid State Drive	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.

3.6.2.12.1 Software Feature Mask Configuration



Item	Option	Description
RAID0	Disabled, Enabled**[Default]**	Enable or disable RAID0 feature.
RAID1	Disabled, Enabled**[Default]**	Enable or disable RAID1 feature.
RAID5	Disabled, Enabled**[Default]**	Enable or disable RAID5 feature.
Intel Rapid Recovery Technology	Disabled, Enabled**[Default]**	Enable or disable Intel Rapid Recovery Technology.
OROM UI and BANNER	Disabled, Enabled**[Default]**	If enabled, then the OROM UI is shown. Otherwise, no OROM banner or information will be displayed if all disks and RAID volumes are Normal.
OROM UI Normal Delay	2 Seconds**[Default]** 4 Seconds 6 Seconds 8 Seconds	Select the delay time of the OROM UI Splash Screen in a normal status.

3.6.2.13 Network Stack Configuration

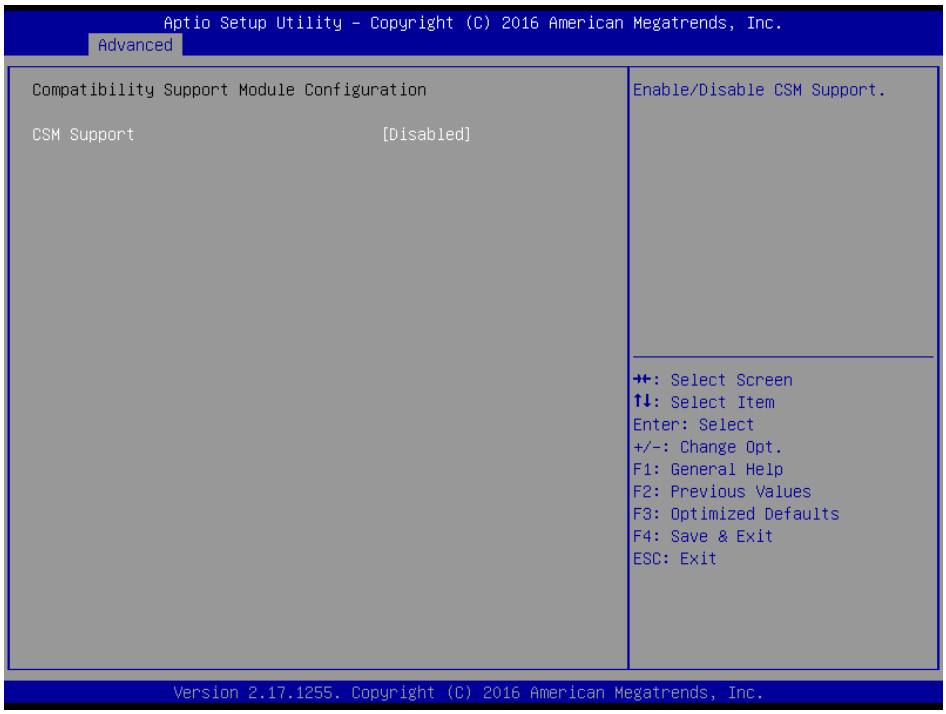


Item	Options	Description
Network Stack	Enabled Disabled**[Default]**	Enable/Disable UEFI Network Stack.

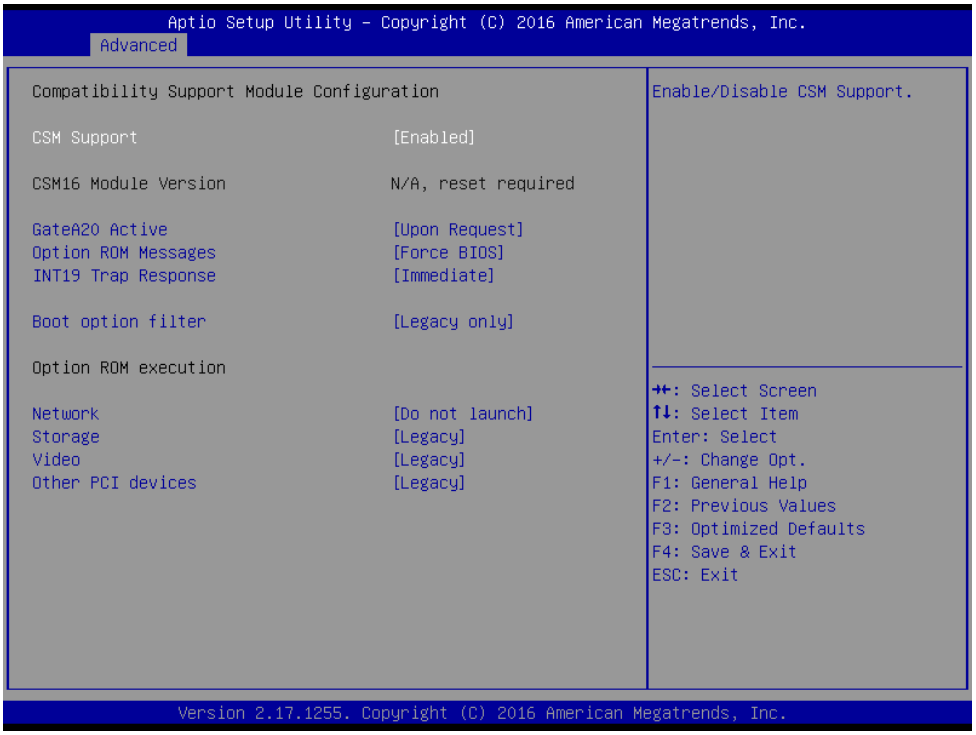
Item	Options	Description
Network Stack	Enabled**[Default]** Disabled	Enable/Disable UEFI Network Stack.

Ipv4 PXE Support	Enabled**[Default]** Disabled	Enable Ipv4 PXE Boot Support. If disabled IPV4 PXE boot option will not be created.
Ipv6 PXE Support	Enabled**[Default]** Disabled	Enable Ipv6 PXE Boot Support. If disabled IPV6 PXE boot option will not be created.
PXE boot wait time	0	Wait time to press ESC key to abort the PXE boot.
Media detect count	1	Number of times presence of media will be checked.

3.6.2.14 CSM Configuration



Item	Options	Description
CSM Support	Enabled Disabled**[Default]**	Enable/Disable CSM Support.



Item	Options	Description
CSM Support	Enabled**[Default]** Disabled	Enable/Disable CSM Support.
GateA20 Active	Upon Request**[Default]** Always	UPON REQUEST – GA20 can be disabled using BIOS services. ALWAYS – do not allow disabling GA20; this option is useful when any RT code is executed above 1MB.
Option ROM Messages	Force BIOS**[Default]** Keep Current	Set display mode for Option ROM.
INT19 Trap Response	Immediate**[Default]** Postponed	BIOS reaction on INT19 trapping by Option ROM: IMMEDIATE – execute the trap right away; POSTPONED – execute the trap during legacy boot.
Boot Option filter	UEFI and Legacy Legacy only**[Default]** UEFI only	This option controls Legacy/UEFI ROMs priority.
Network	Do not launch**[Default]** UEFI Legacy	Controls the execution of UEFI and Legacy PXE OpROM.
Storage	Do not launch UEFI Legacy**[Default]**	Controls the execution of UEFI and Legacy Storage OpROM.
Video	Do not launch UEFI Legacy**[Default]**	Controls the execution of UEFI and Legacy Video OpROM.
Other PCI devices	Do not launch UEFI Legacy**[Default]**	Determines OpROM execution policy for devices other than Network, Storage, or Vide.

3.6.2.15 USB Configuration

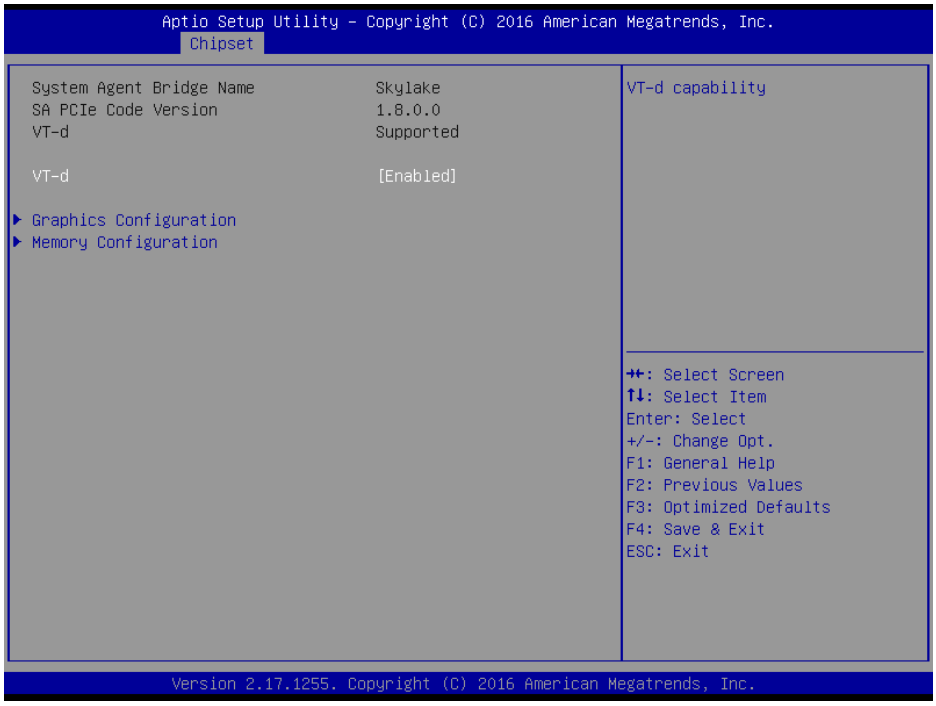
The USB Configuration menu helps read USB information and configures USB settings.

Item	Options	Description
Legacy USB Support	Enabled**[Default]** Disabled AUTO	Enable Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
XHCI Hand-off	Enabled**[Default]** Disabled	This is a workaround for OSew without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Enabled**[Default]** Disabled	Enable/Disable USB Mass Storage Driver Support.
Port 60/64 Emulation	Enabled Disabled**[Default]**	Enable I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSes.
USB transfer time-out	1 sec 5 sec 10 sec 20 sec**[Default]**	The time-out value for Control, Bulk, and Interrupt transfers.
Device reset time-out	10 sec 20 sec**[Default]** 30 sec 40 sec	USB mass storage device Start Unit command time-out.
Device power-up delay	Auto**[Default]** Manual	Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is

		100ms, for a Hub port the delay is taken form Hub descriptor.
Mass Storage Devices	Auto**[Default]** Floppy Forced FDD Hard Disk CD-ROM	Mass storage device emulation type. '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.

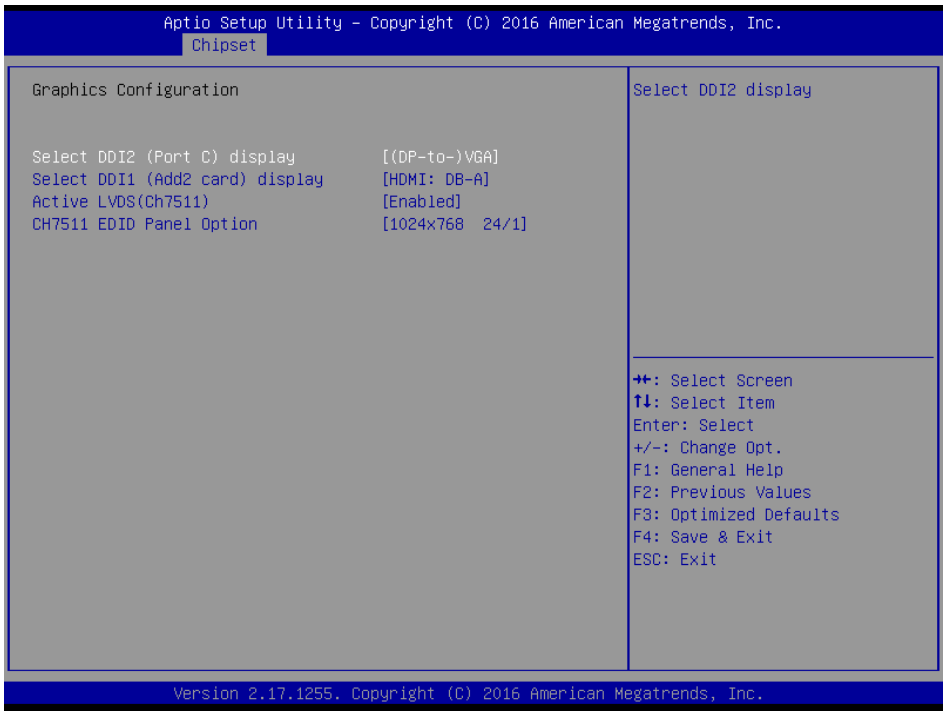
3.6.3 Chipset

3.6.3.1 System Agent (SA) Configuration



Item	Option	Description
VT-d	Enabled**[Default]** Disabled	VT-d capability.

3.6.3.1.1 Graphics Configuration



Item	Option	Description
Select DDI2 (Port C) display	(DP-to-)VGA**[Default]** HDMI	Select DDI2 display.

Select DDI1 (Add2 card) display	DP: DB-B HDMI: DB-A**[Default]**	Please using the corrected card and setting JHDMI, too. DP:JHDMI1 = open HDMI: JHDMI1= 1-2 short.
Active LVDS (CH7511)	Disabled Enabled**[Default]**	Active Internal LVDS(eDP-> CH7511-to-LVDS).
CH7511 EDID Panel Option	1024x768 24/1**[Default]** 800x600 18/1 1024x768 18/1 1366x768 18/1 1024x600 18/1 1280x800 18/1 1920x1200 24/2 1920x1080 18/2 1280x1024 24/2 1440x900 18/2 1600x1200 24/2 1366x768 24/1 1920x1080 24/2 1680x1050 24/2	Port1-EDP to LVDS (Chrotel 7511) Panel EDID Option.

3.6.3.1.2 Memory Configuration

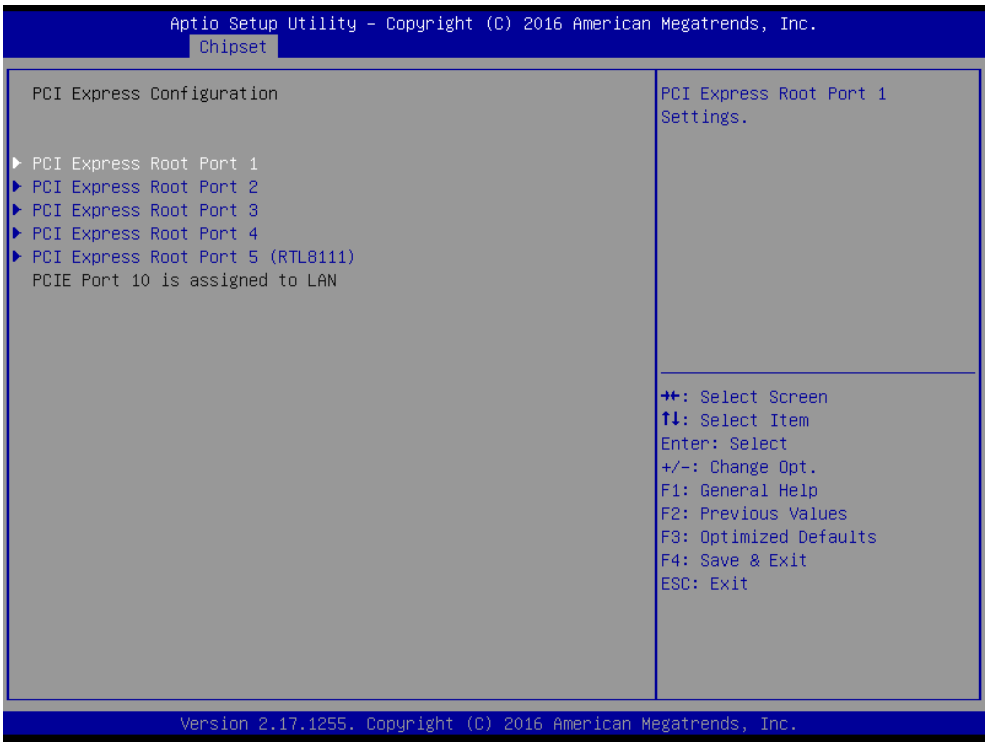
Item	Option	Description
Maximum Memory Frequency	Auto**[Default]** /1600/1867/2133/2400 /2667/2933/3200 **Note: CPU depends**	Maximum Memory Frequency Selections in Mhz.
Max TOLUD	Dynamic**[Default]** /1GB/1.25GB/1.5GB/1.75GB /2GB/2.25GB/2.5GB/2.75GB	Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO

	/3GB/3.25GB/3.5GB	length of installed graphic controller.

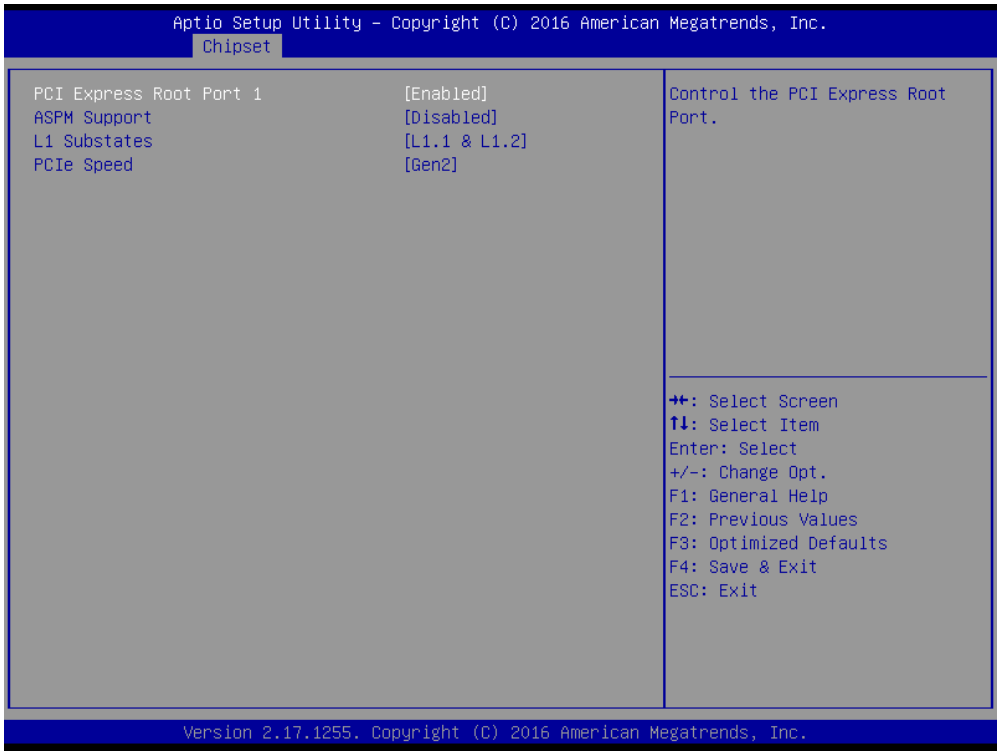
3.6.3.2 PCH-IO Configuration

Item	Option	Description
PCH LAN Controller (i219)	Disabled Enabled**[Default]**	Enable or disable onboard NIC.

3.6.3.2.1 PCI Express Configuration

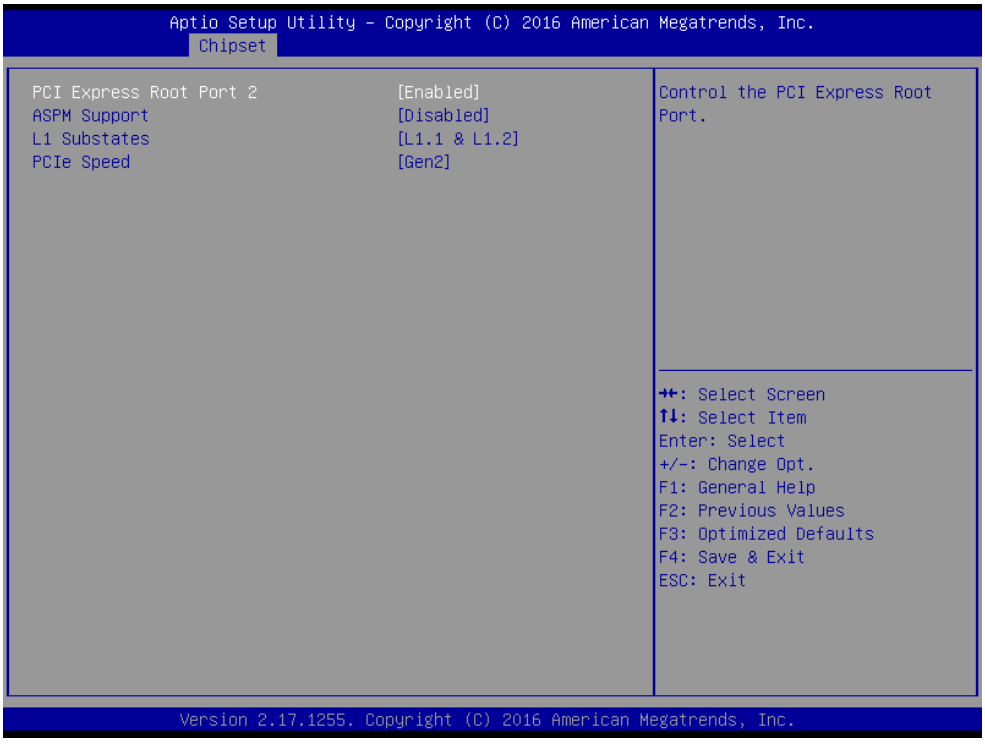


3.6.3.2.1.1 PCI Express Root Port1



Item	Option	Description
PCI Express Root Port 1	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM Support	Disabled**[Default]**, L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
L1 Substates	Disabled L1.1 L1.2 L1.1 & L1.2**[Default]**,	PCI Express L1 Substates settings.
PCIe Speed	Auto Gen1 Gen2**[Default]**	Select PCI Express port speed.

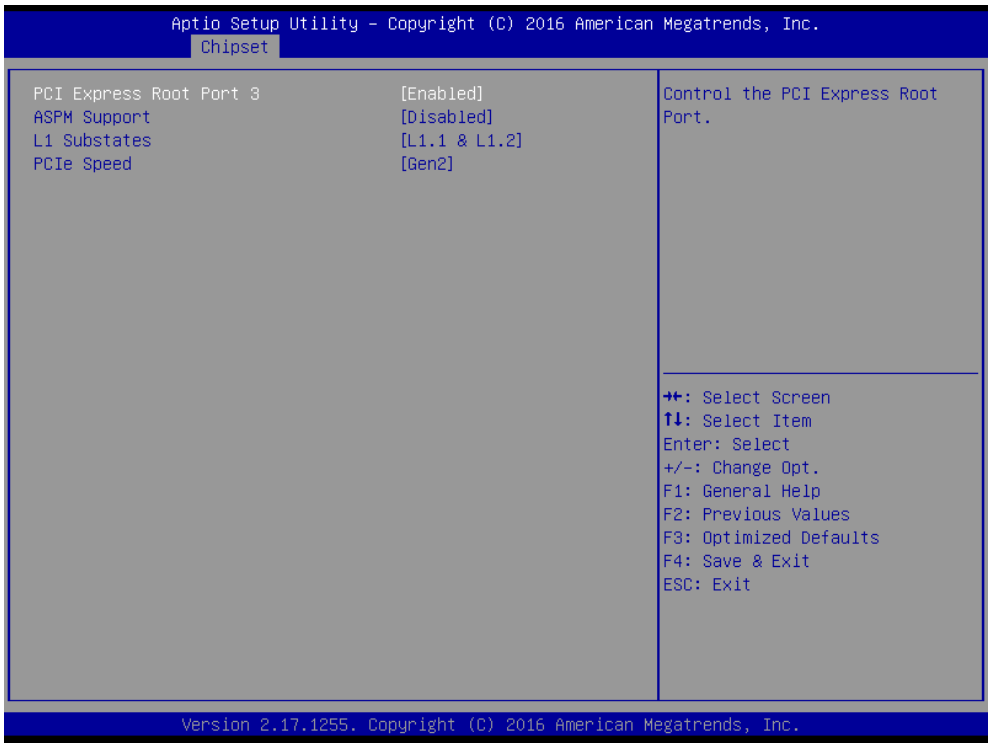
3.6.3.2.1.2 PCI Express Root Port2



Item	Option	Description
PCI Express Root Port 2	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM Support	Disabled**[Default]**, L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.

L1 Substates	Disabled L1.1 L1.2 L1.1 & L1.2**[Default]**,	PCI Express L1 Substates settings.
PCIe Speed	Auto Gen1 Gen2**[Default]**	Select PCI Express port speed.

3.6.3.2.1.3 PCI Express Root Port3



Item	Option	Description
PCI Express Root Port 3	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM Support	Disabled**[Default]**, L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
L1 Substates	Disabled L1.1 L1.2 L1.1 & L1.2**[Default]**,	PCI Express L1 Substates settings.
PCIe Speed	Auto Gen1 Gen2**[Default]**	Select PCI Express port speed.

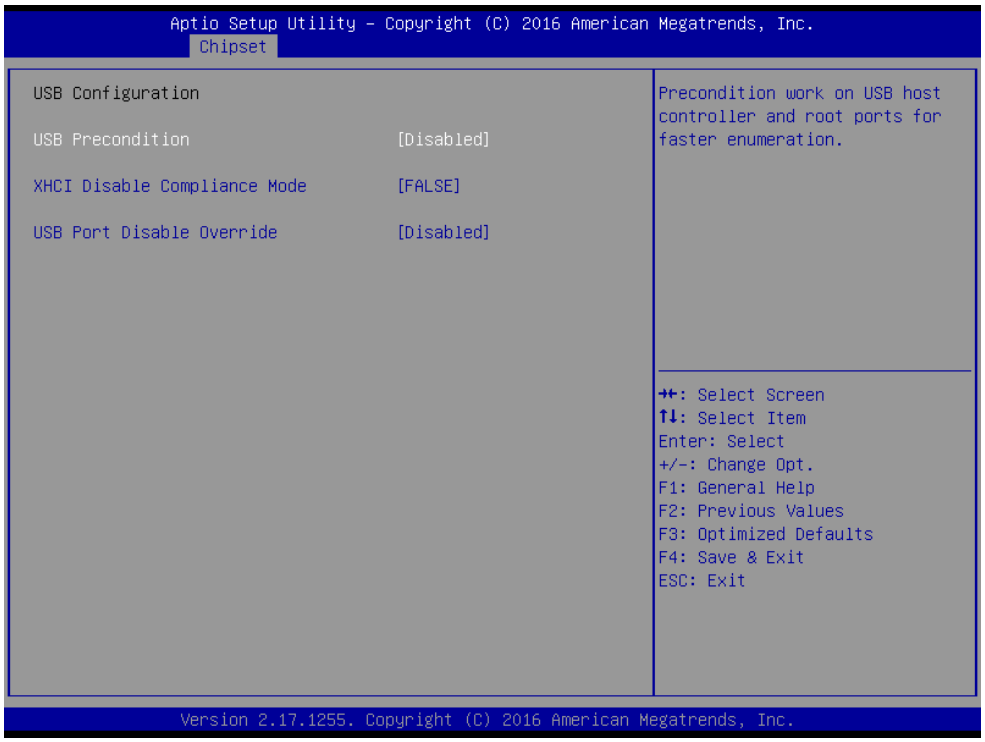
3.6.3.2.1.4 PCI Express Root Port4

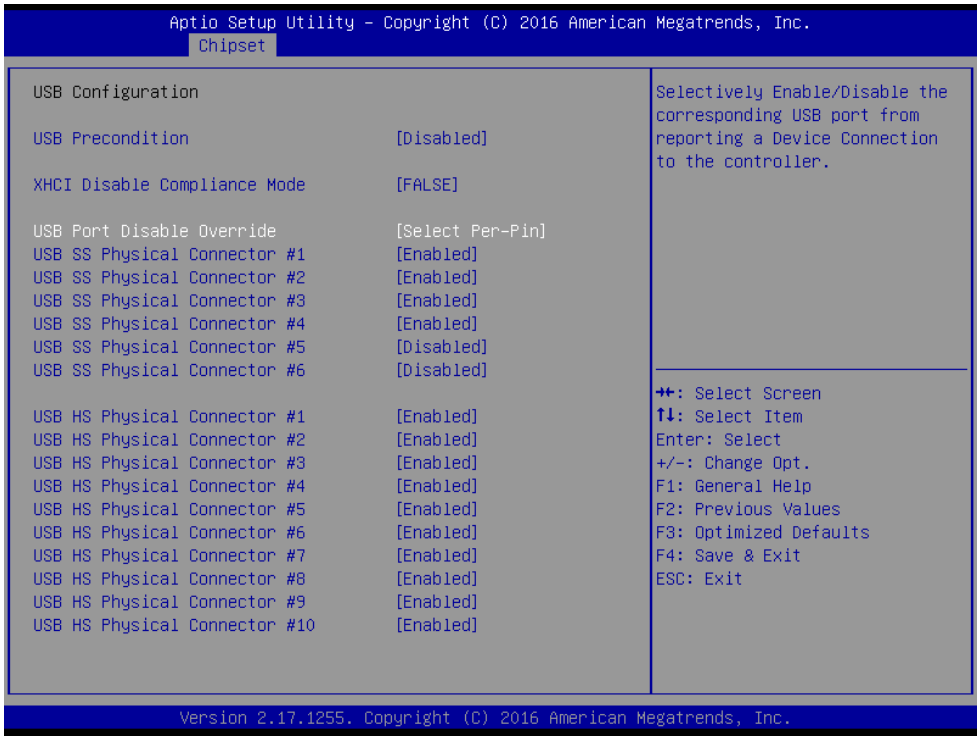
Item	Option	Description
PCI Express Root Port 4	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM Support	Disabled**[Default]**, L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
L1 Substates	Disabled L1.1 L1.2 L1.1 & L1.2**[Default]**,	PCI Express L1 Substates settings.
PCIe Speed	Auto Gen1 Gen2**[Default]**	Select PCI Express port speed.

3.6.3.2.1.5 PCI Express Root Port5

Item	Option	Description
PCI Express Root Port 5	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM Support	Disabled**[Default]**, L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
L1 Substates	Disabled L1.1 L1.2 L1.1 & L1.2**[Default]**,	PCI Express L1 Substates settings.
PCIe Speed	Auto Gen1 Gen2**[Default]**	Select PCI Express port speed.

3.6.3.2.2 USB Configuration

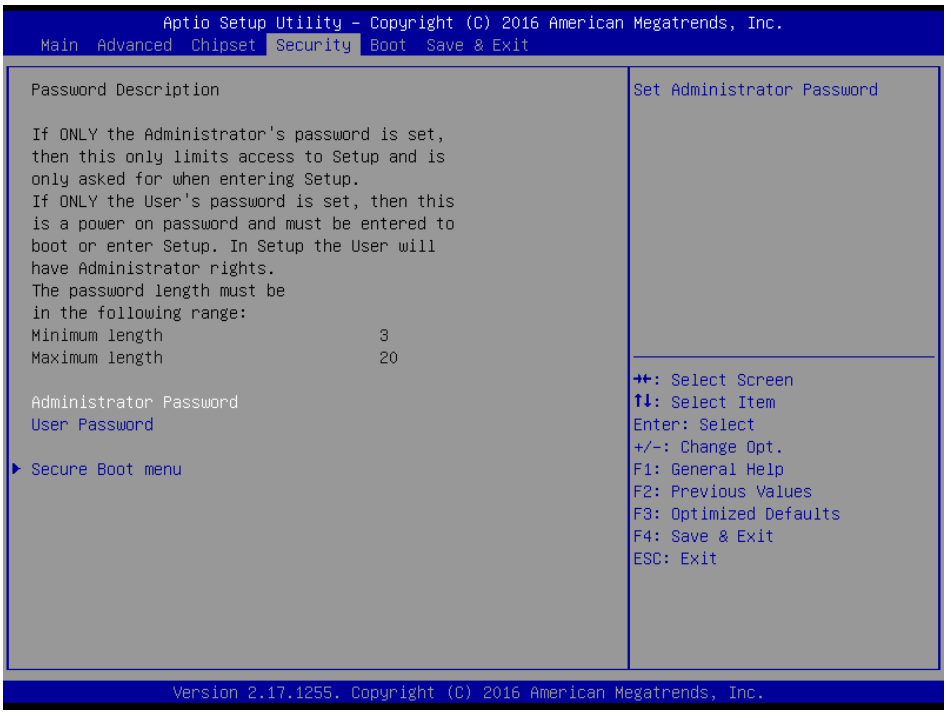




Item	Option	Description
USB Precondition	Enabled Disabled**[Default]**,	Precondition work on USB host controller and root ports for faster enumeration.
XHCI Disable Compliance Mode	FALSE**[Default]**, TRUE	Option to disable Compliance Mode. Default is FALSE to not disable Compliance Mode.

		Set TRUE to disable Compliance Mode.
USB Port Disable Override	Disabled**[Default]**, Select Per-Pin	Selectively Enable/Disable the corresponding USB port from reporting a Device Connection to the controller.

3.6.4 Security



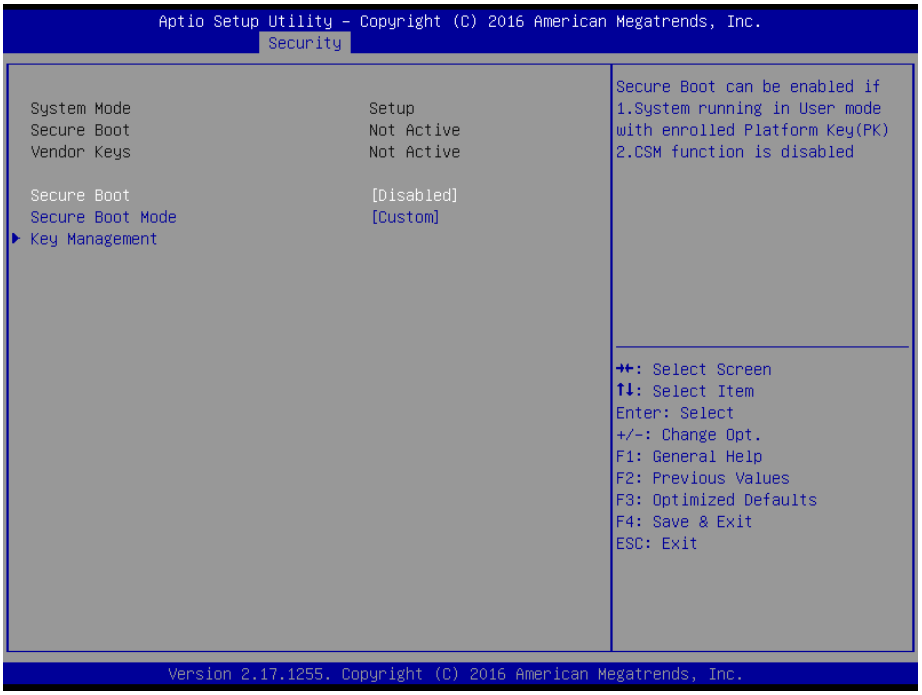
- **Administrator Password**

Set setup Administrator Password

- **User Password**

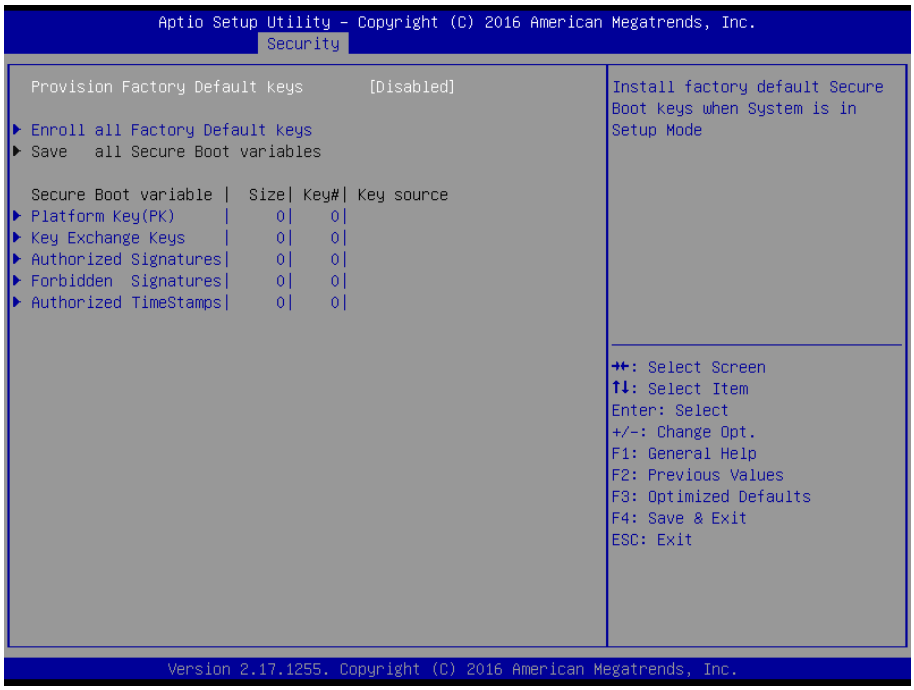
Set User Password

3.6.4.1 Secure Boot menu



Item	Option	Description
Secure Boot	Disabled**[Default]** Enabled	Secure Boot can be enabled if 1.System running in User mode with enrolled Platform Key(PK) 2.CSM function is disabled.
Secure Boot Mode	Standard Custom**[Default]**	Secure Boot mode selector. 'Custom' Mode enables users to change Image Execution policy and manage Secure Boot Keys.

3.6.4.1.1 Key Management

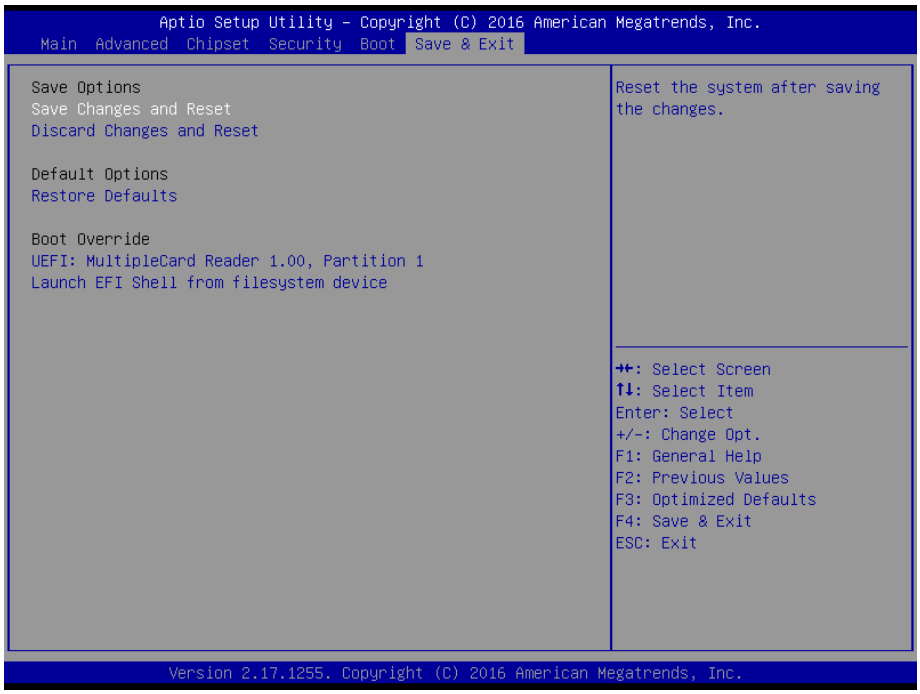


Item	Option	Description
Provision Factory Default Keys	Disabled**[Default]** Enabled	Install factory default Secure Boot keys when System is in Setup Mode.

3.6.5 Boot

Item	Option	Description
Setup Prompt Timeout	1~ 65535	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
Bootup NumLock State	On**[Default]** Off	Select the Keyboard NumLock state
Quiet Boot	Disabled**[Default]** Enabled	Enables or disables Quiet Boot option
Fast Boot	Disabled**[Default]** Enabled	Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.
Boot Option #1/2	Set the system boot order.	

3.6.6 Save and exit



3.6.6.1 Save Changes and Reset

Reset the system after saving the changes.

3.6.6.2 Discard Changes and Reset

Any changes made to BIOS settings during this session of the BIOS setup program are discarded. The setup program then exits and reboots the controller.

3.6.6.3 Restore Defaults

This option restores all BIOS settings to the factory default. This option is useful if the controller exhibits unpredictable behavior due to an incorrect or inappropriate BIOS setting.

3.6.6.4 Launch EFI Shell from filesystem device

Attempts to Launch EFI Shell application (Shellx64.efi) from one of the available filesystem devices.

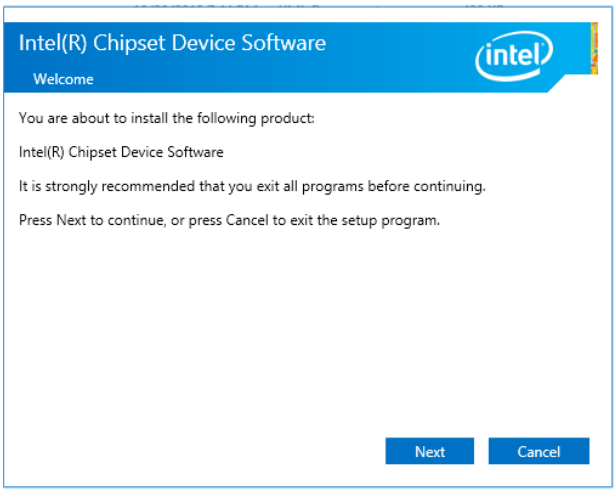
4. Drivers Installation

Note: Installation procedures and screen shots in this section are for your reference and may not be exactly the same as shown on your screen.

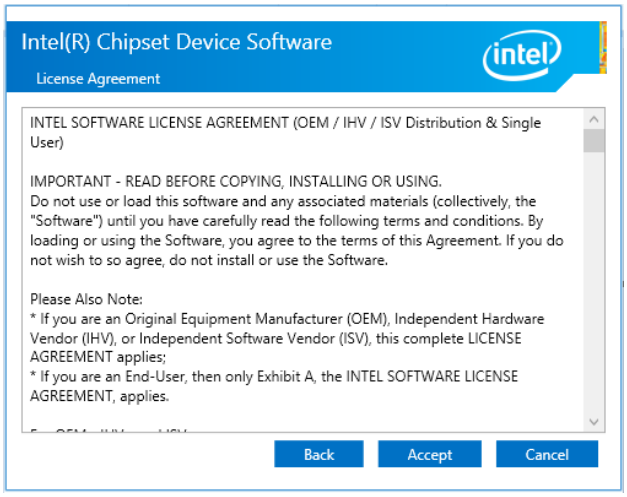
4.1 Install Chipset Driver

Insert the Supporting DVD-ROM to DVD-ROM drive, and it should show the index page of products automatically. If not, locate Index.htm and choose the product from the menu left, or link to **\Driver_Chipset\Intel\ESM-SKLU**.

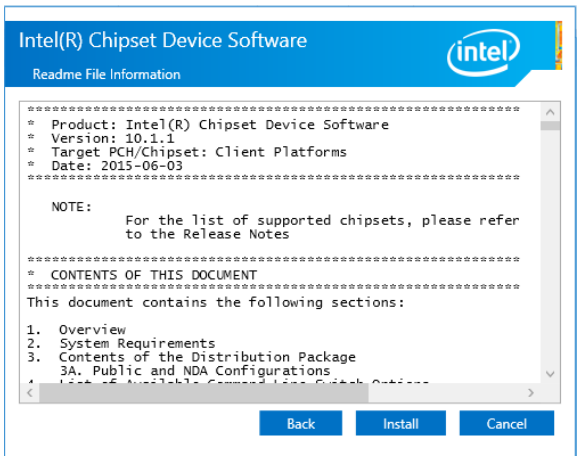
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system. If the warning message appears while the installation process, click Continue to go on.



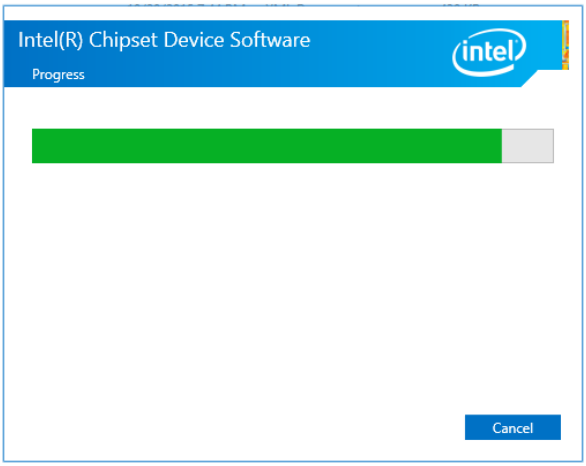
Step1. Click **Next**.



Step 2. Click **Accept**.



Step 3. Click **Install** to complete setup.



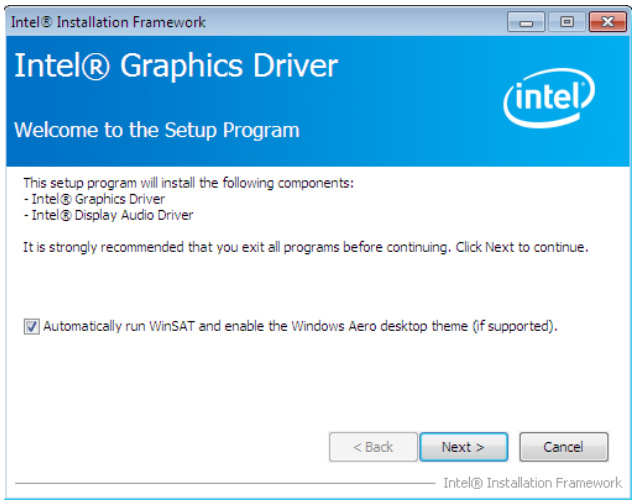
Step 4. Installing.

Step 5. Complete setup.

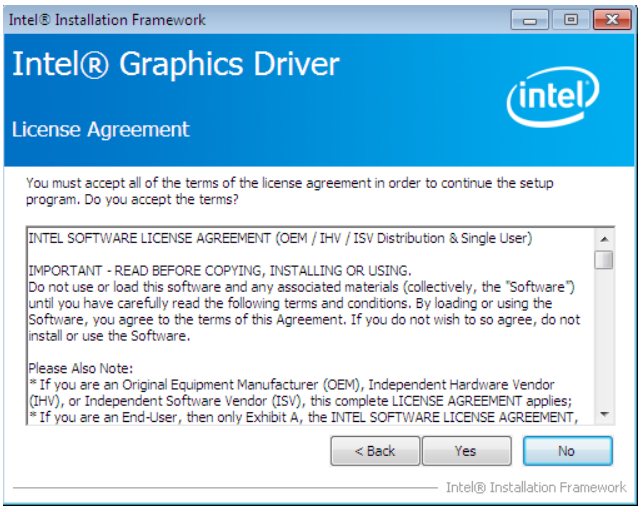
4.2 Install Display Driver

Insert the Supporting DVD-ROM to DVD-ROM drive, and it should show the index page of products automatically. If not, locate Index.htm and choose the product from the menu left, or link to **\VGA\ESM-SKLU**.

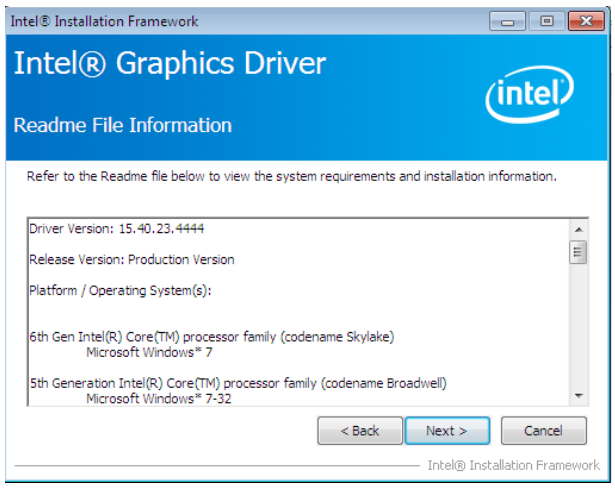
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



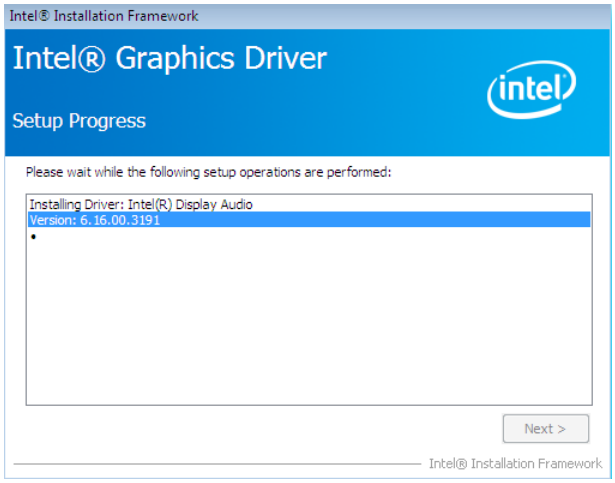
Step 1. Click **Next** to continue installation.



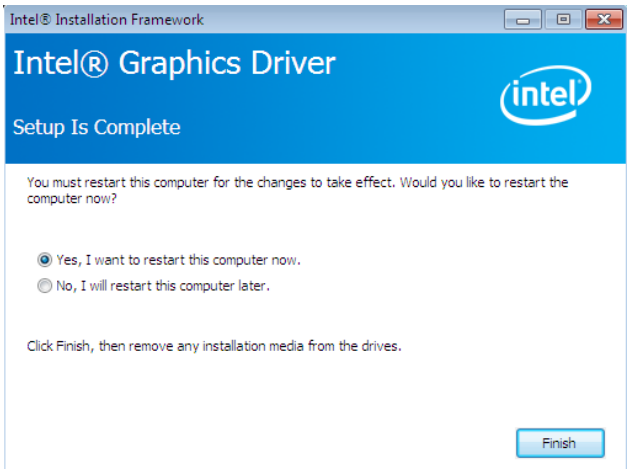
Step 2. Click **Yes** to accept license agreement.



Step 3. Click **Next** to complete setup.



Step 4. Click **Next**.

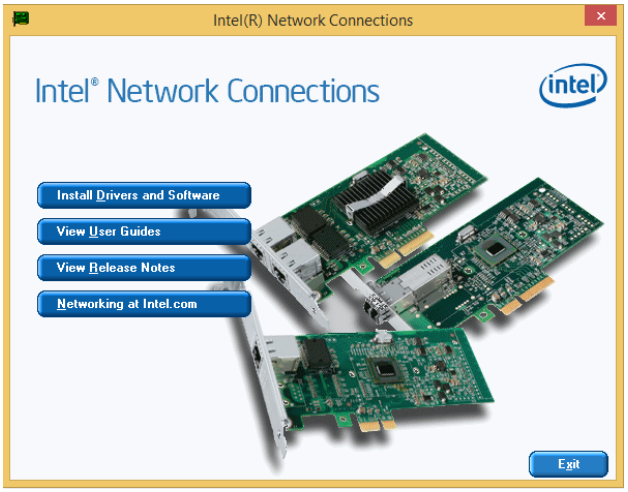


Step 5. Click **Finish** to complete setup.

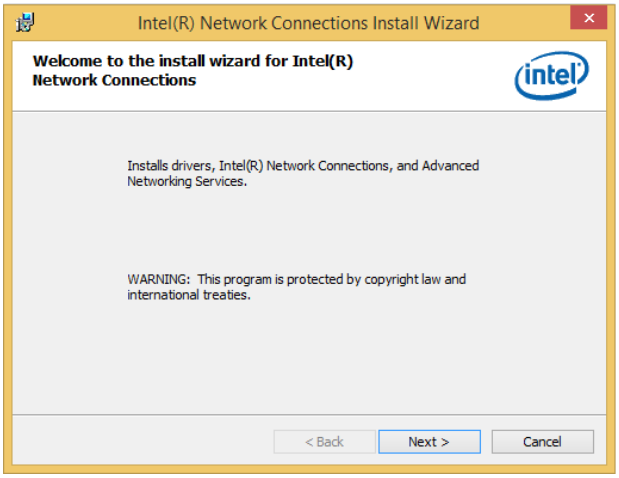
4.3 Install LAN Driver (For Intel I219LM)

Insert the Supporting DVD-ROM to DVD-ROM drive, and it should show the index page of products automatically. If not, locate Index.htm and choose the product from the menu left, or link to **\Driver_Gigabit\Intel\I219LM\ESM-SKLU_LAN**.

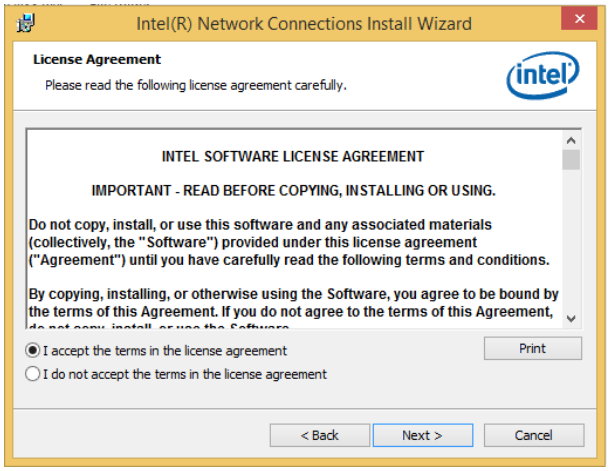
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



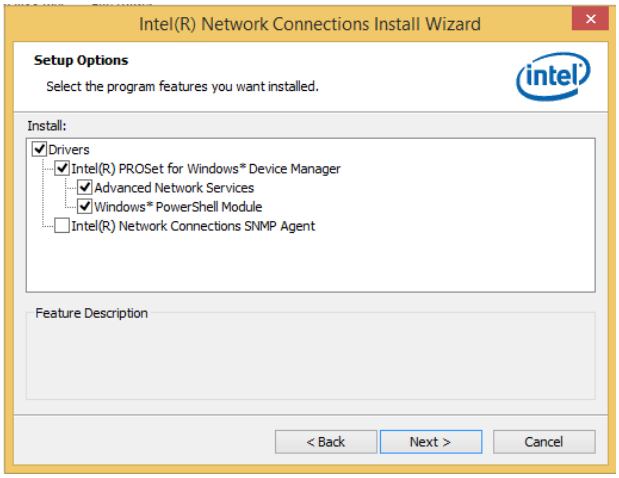
Step 1. Click **Install Drivers and Software**.



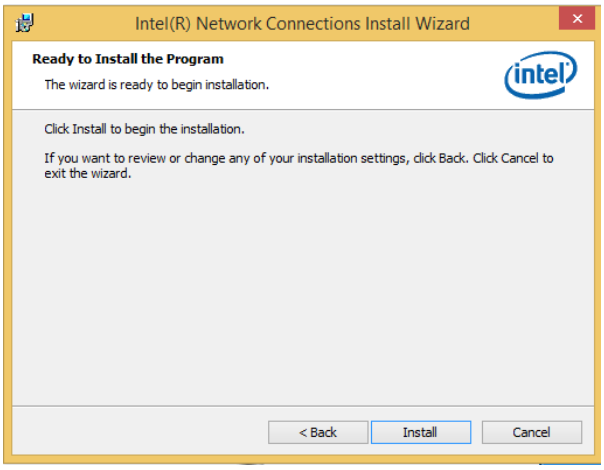
Step 2. Click **Next** to complete setup.



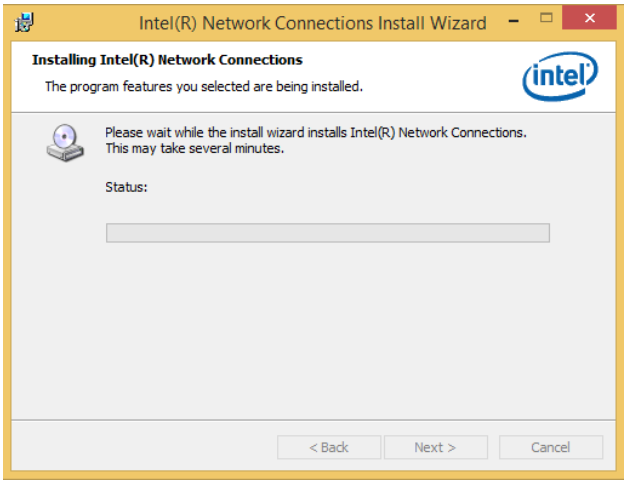
Step 3. Click **Next.**



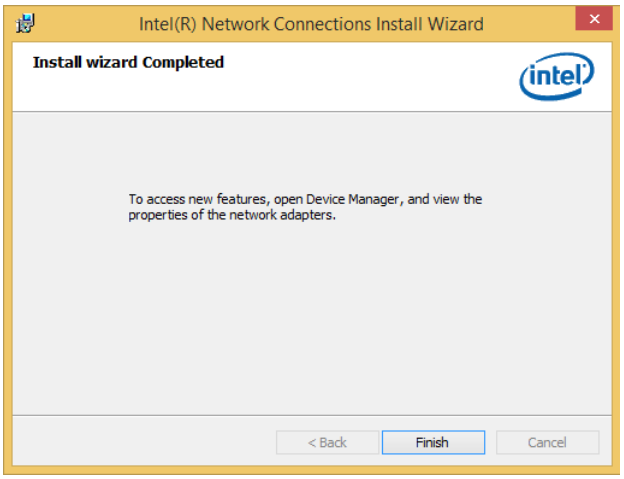
Step 4. Click **Next** to continue.



Step 5. Click **Install**.



Step 6. Installing.

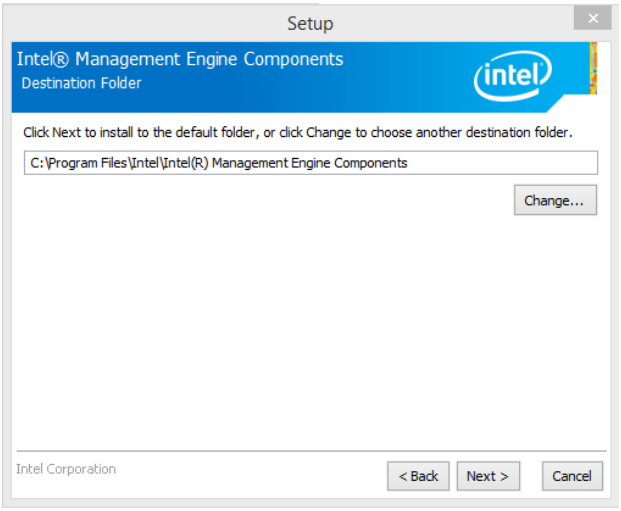


Step 7. Click **Finish** to complete setup.

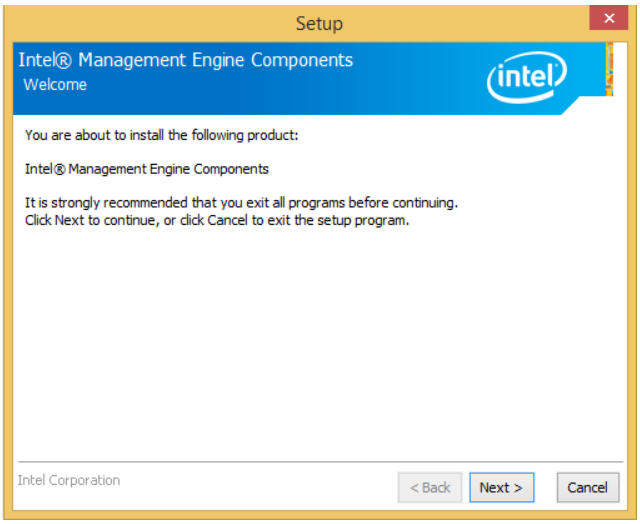
4.6 Install ME Driver

Insert the Supporting DVD-ROM to DVD-ROM drive, and it should show the index page of products automatically. If not, locate Index.htm and choose the product from the menu left, or link to **\Utility\ESM-SKLU_ME**.

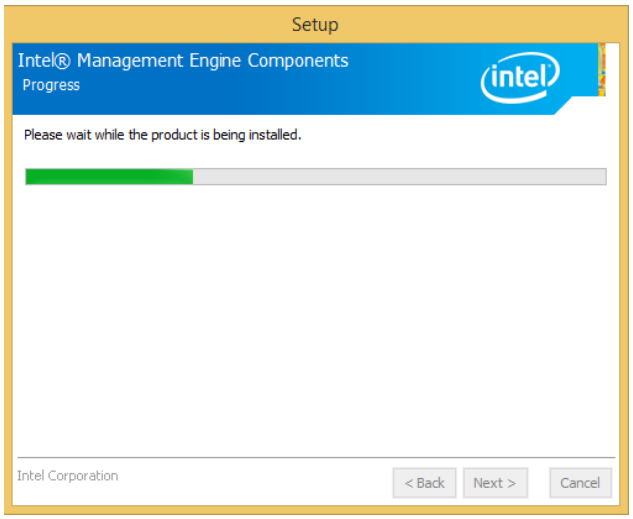
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system. If the warning message appears while the installation process, click Continue to go on.



Step 3. Click **Next**.

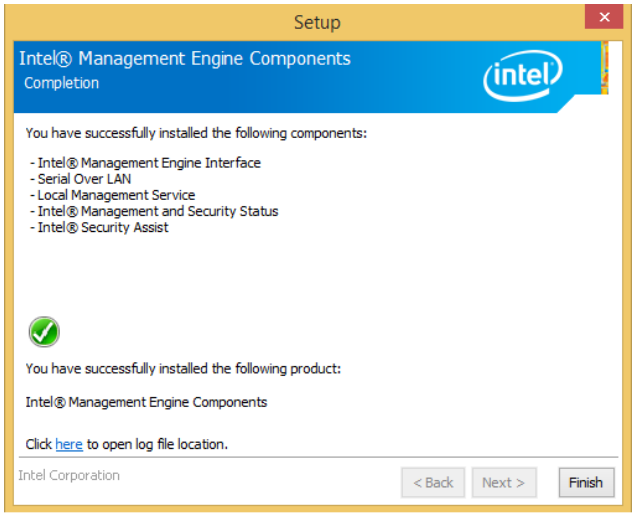


Step1. Click **Next** to start installation.



Step 4. Installing.

Step 2. Click **Next** to complete setup.

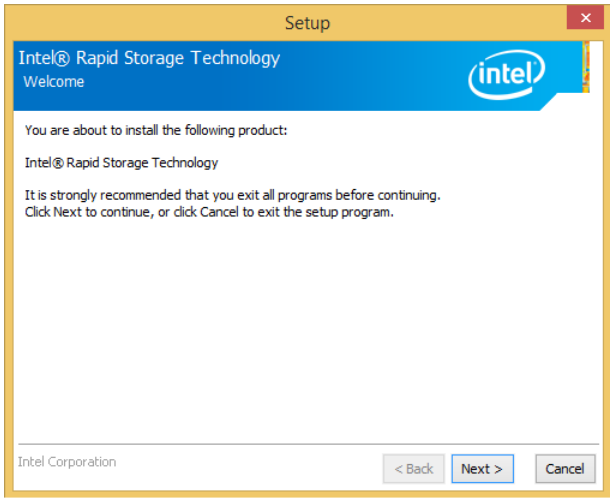


Step 5. Click **Finish** to complete setup.

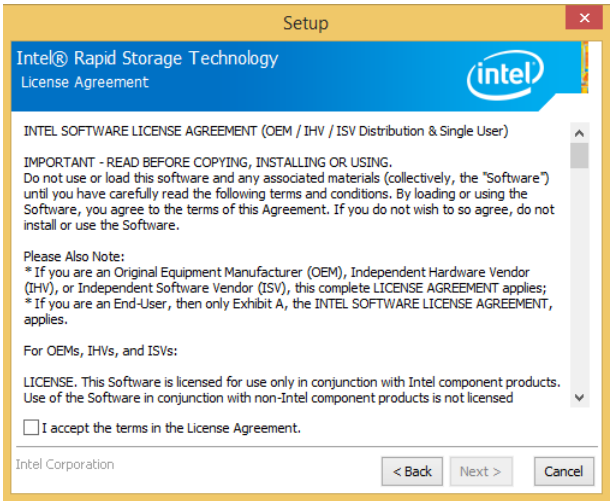
4.7 Install IRST Driver

Insert the Supporting DVD-ROM to DVD-ROM drive, and it should show the index page of products automatically. If not, locate Index.htm and choose the product from the menu left, or link to **\Utility\ESM-SKLU_IRST**.

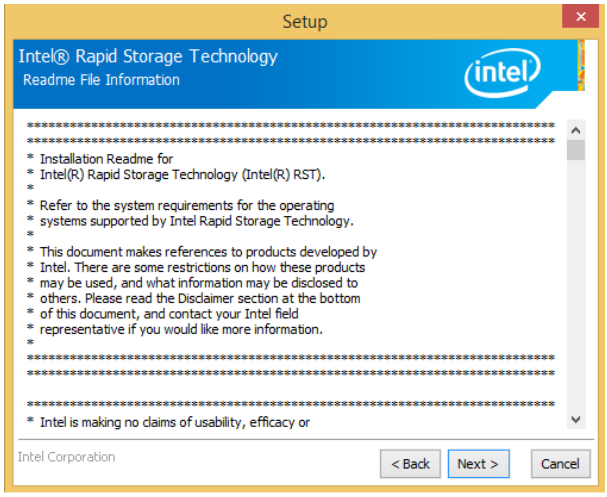
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system. If the warning message appears while the installation process, click Continue to go on.



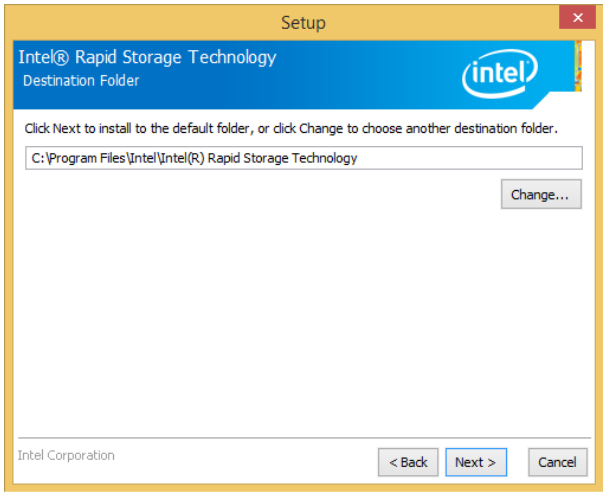
Step1. Click **Next** to start installation.



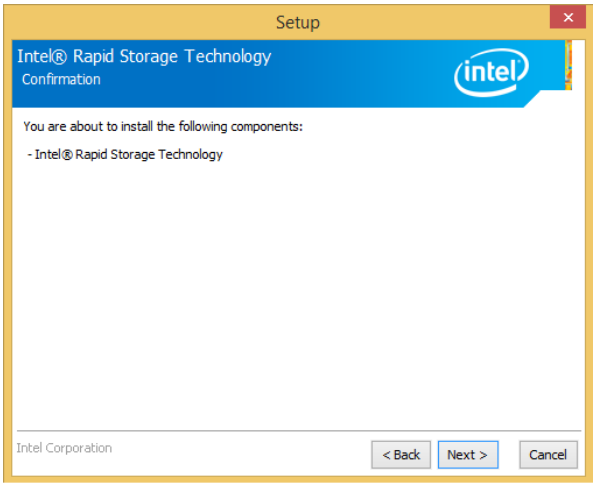
Step 2. Click **Next**.



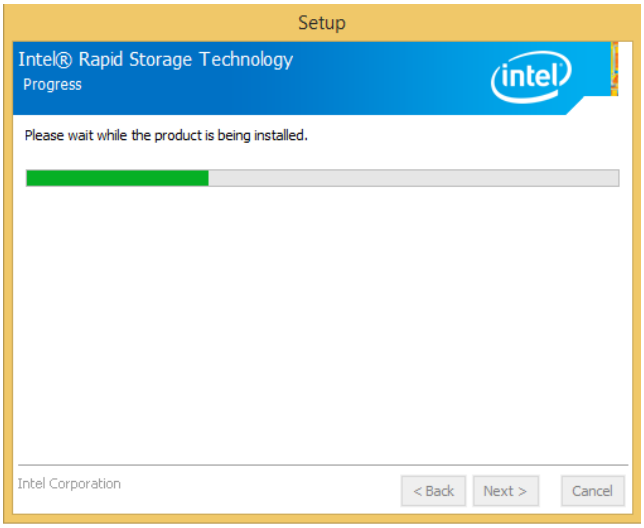
Step 3. Click **Next** to continue installation.



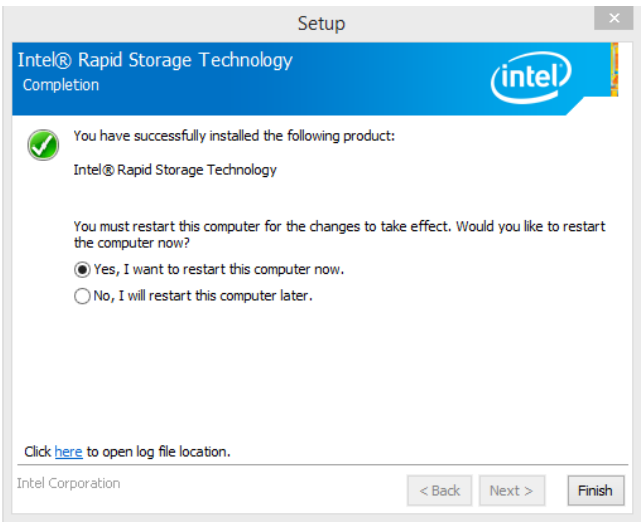
Step 4. Click **Next**.



Step 5. Click **Next**.

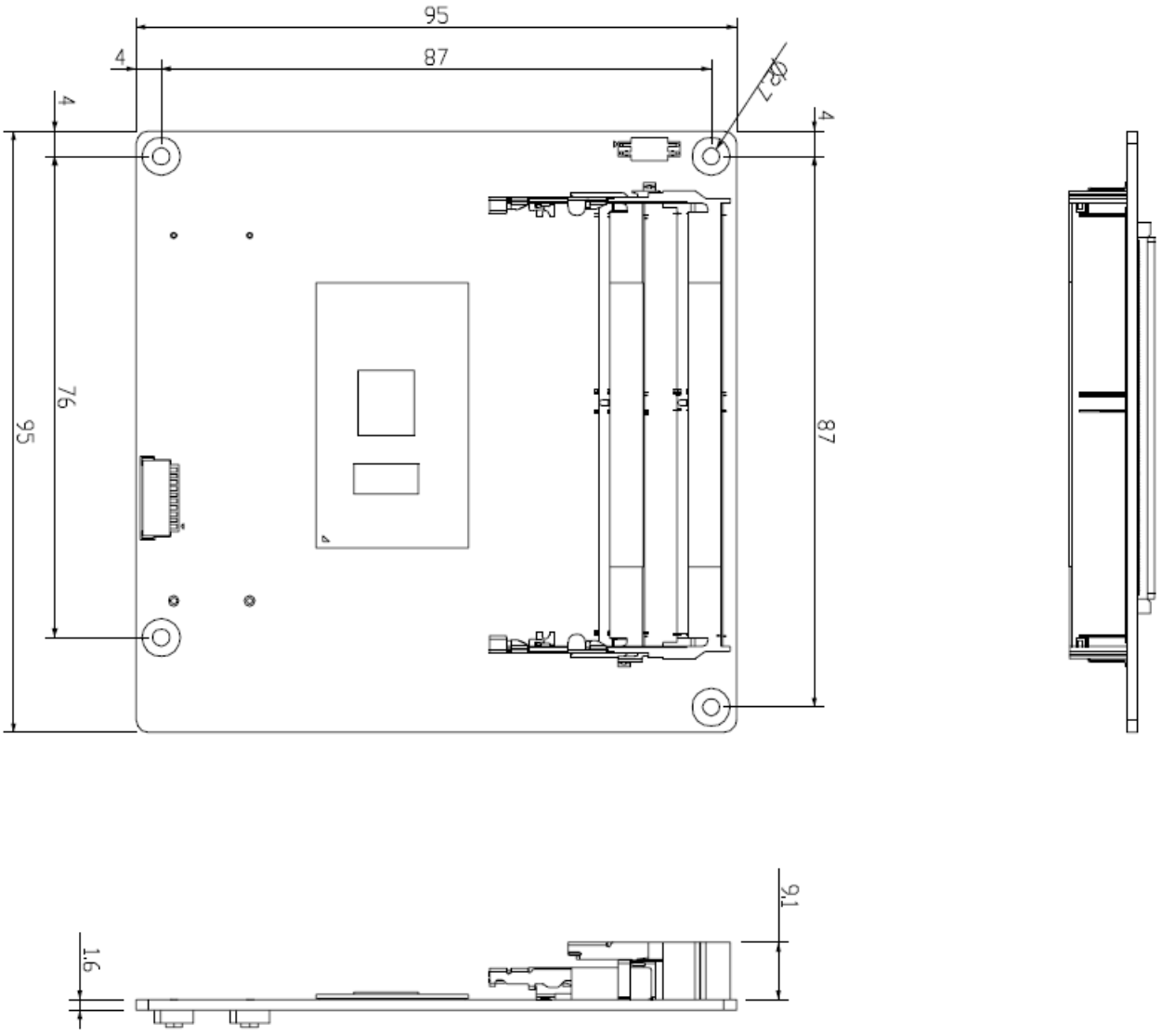


Step 6. Installing.



Step 7. Click **Finish** to complete setup.

5. Mechanical Drawing



Unit: mm