ESM-APLC

Intel® Celeron®/ Pentium® SoC Processor Type 6 COMe Compact Module

User's Manual

1st Ed – 28 July 2017

Part No. E2047288500R

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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To receive the latest version of the user's manual; please visit our Web site at:
http://www.avalue.com.tw/

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-APLC COMe Module
- 1 x Driver/Utility DVD-ROM
- 1 x Desiccant (5g)
- Screws kit:
  1) For installing COMe Module + Heatsink / Heat spreader & Carrier Board
     - M2.5-4L Ni * 2pcs
     - M2.5-12L Ni * 4pcs
  2) For installing COMe Module & Carrier Board

  M2.5-6L Ni * 4pcs

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

1.3 Document Amendment History

Revision	Date	By	Comment
1st	July 2017	Avalue	Initial Release

1.4 Manual Objectives

This manual describes in details Avalue Technology ESM-APLC 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-APLC 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

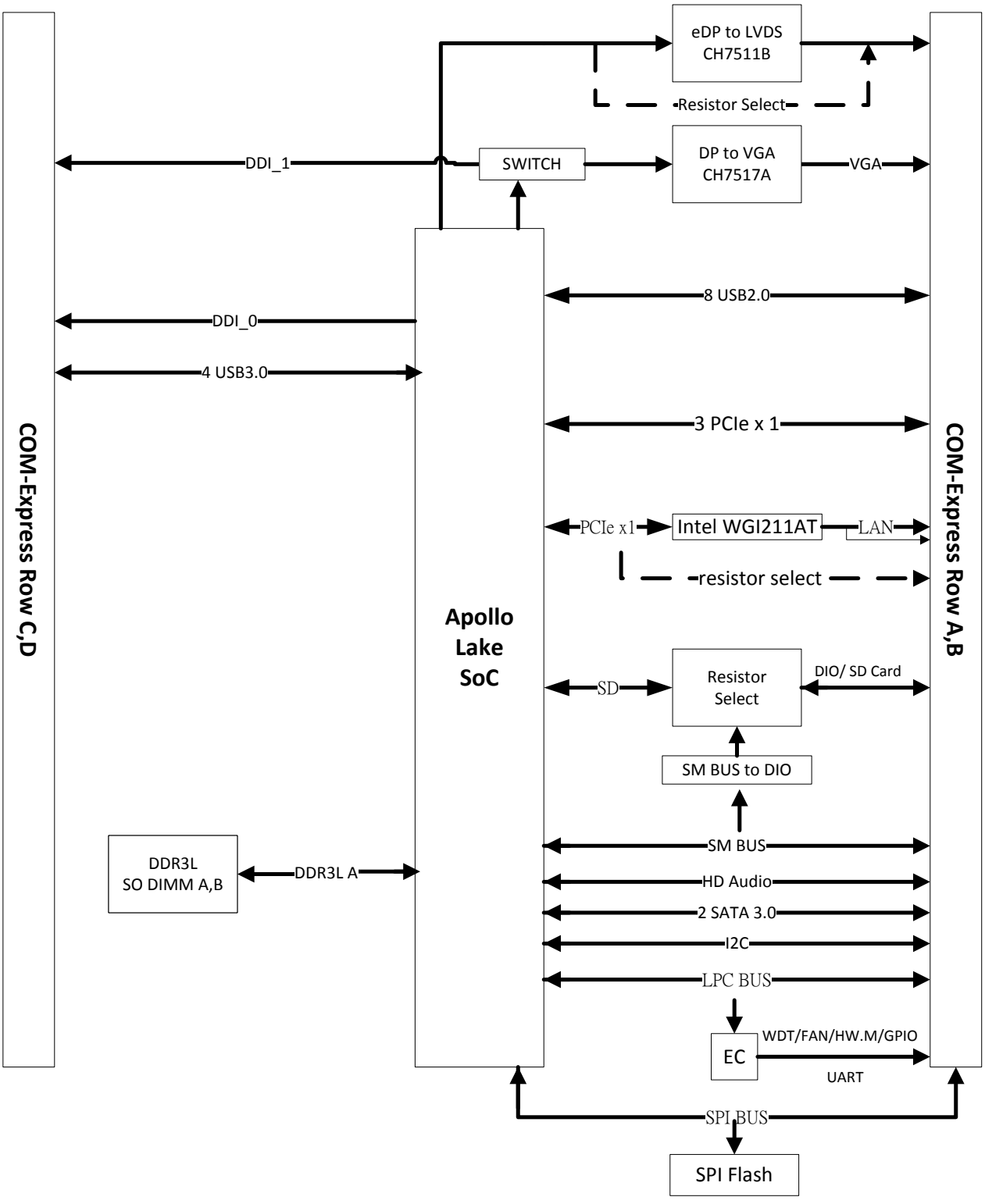
System	
CPU	Onboard Intel® Celeron®N3350 Processor / Pentium® N4200 SoC Processor Apollo Lake Platform Celeron®N3350 1.1GHz/6W Pentium® N4200 1.1GHz/6W
BIOS	AMI uEFI BIOS, 128Mbit SPI Flash ROM
System Chipset	Apollo Lake SoC integrated
I/O Chip	ITE IT8528VG
System Memory	1 Sockets 204-pin, SO-DIMM up to 8GB DDR3L 1866 SDRAM
TPM	TPM 2.0 NuvoTon NPCT650AAAWX (Optional)
Watchdog Timer	H/W Reset, 1sec. ~ 65535sec. and 1sec./step
EEPROM	Support SPI BIOS EEPROM
H/W Status Monitor	Monitoring System Temperature, Voltage and FAN Status
Expansion	3 Ports (optional 4 PCIex1 or 1 PCIex4 while removing Ethernet), compliant to PCIe Gen2 5.0 GT/s
I/O	
SATA	2 x SATA Gen3 (6GB/s)
USB	8 x USB 2.0, 4 x USB 3.0
GPIO	4-bit GPI, 4-bit GPO
eMMC	1 x eMMC 5.0 up to 64GB (option)
COM	2 x COM ports (RX/TX Only)
Display	
Chipset	Apollo lake SoC 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 4096 x 2160 @60Hz
DDI	1 Port, optional 2 while remove VGA, configurable to HDMI 1.4b/DP1.2a HDMI up to 3840 x 2160 @30Hz DP up to 4096 x 2160 @60Hz
Multiple Display	Supports 3 independent display
Ethernet	
LAN Chip	Intel WGI211AT (Expected Discontinuance is Q1'22)
Ethernet Interface	10/100/1000 Base-Tx Gigabit Ethernet Compatible
Mechanical & Environmental	

Power Requirement	+9V ~ +19V
ACPI	Single power ATX Support S0, S3, S4, S5 ACPI 3.0 Compliant
Power Type	AT/ATX
Operating Temp.	0°C ~ 60°C (32°F ~ 140°F) (Standard)
Storage Temp.	-40°C to 75°C
Operating Humidity	0% ~ 90% relative humidity, non-condensing
Random Vibration Test **- Operation** **- Non-operation**	**Operation** 1 PSD: 0.00454G²/Hz, 1.5 Grms 2 Operation mode 3 Test Frequency : 5-500Hz 4 Test Axis : X,Y and Z axis 5 30 min. per each axis 6 IEC 60068-2-64 Test:Fh **Non-Operation** 1 PSD: 0.01818G²/Hz, 3.0 Grms 2 Non-Operation mode 3 Test Frequency : 5-500Hz 4 Test Axis : X,Y and Z axis 5 30 min. per each axis 6 IEC 60068-2-64 Test:Fh
Package Vibration Test	1. PSD: 0.026G²/Hz, 2.16 Grms 2. Non-operation mode 3. Test Frequency : 5-500Hz 4. Test Axis : X,Y and Z axis 5. 30 min. per each axis 6. IEC 60068-2-64 Test:Fh
Package Drop Test	1 One corner , three edges, six faces 2 ISTA 2A, IEC-60068-2-32 Test:Ed
Size (L x W)	Compact Size: 95*95 mm
Weight	0.44lbs(0.2kg)
OS	Windows® 10 Enterprise (64-bit) Support Linux (Kernel>4.5)
Thermal Solution	Implementing the new thermal design conception which adds the screw hole next to the SoC to fix the thermal module. 1. Heatsink w/o Fan 2. Heat spreader

Note: Specifications are subject to change without notice.

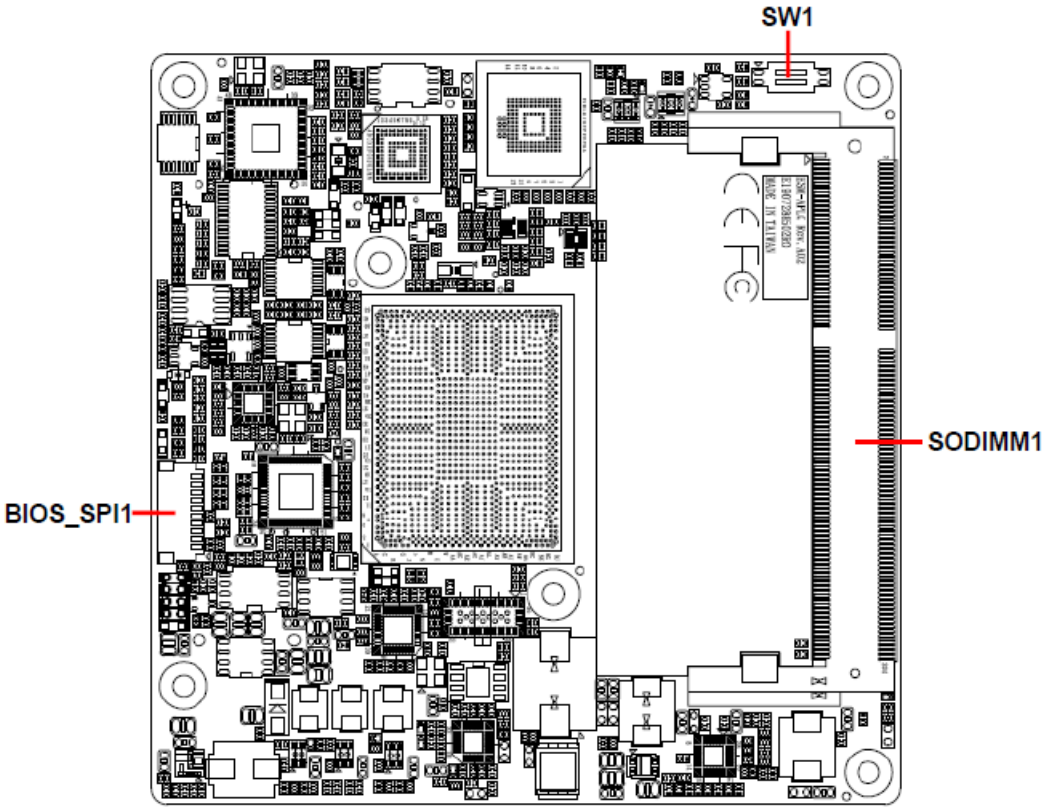
1.6 Architecture Overview—Block Diagram

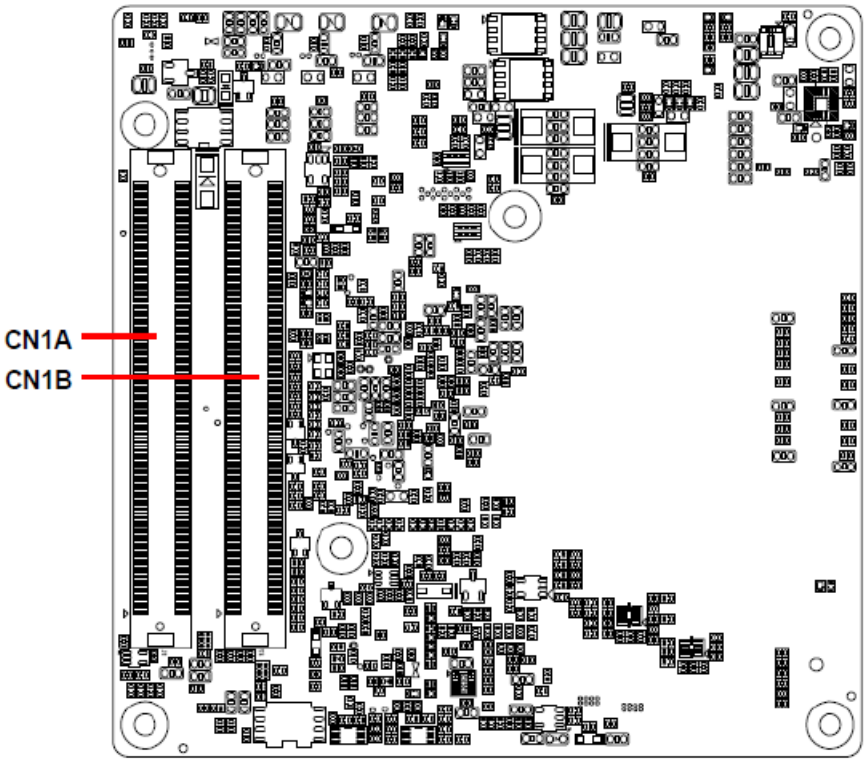
The following block diagram shows the architecture and main components of ESM-APLC.



2. Hardware Configuration

2.1 Product Overview





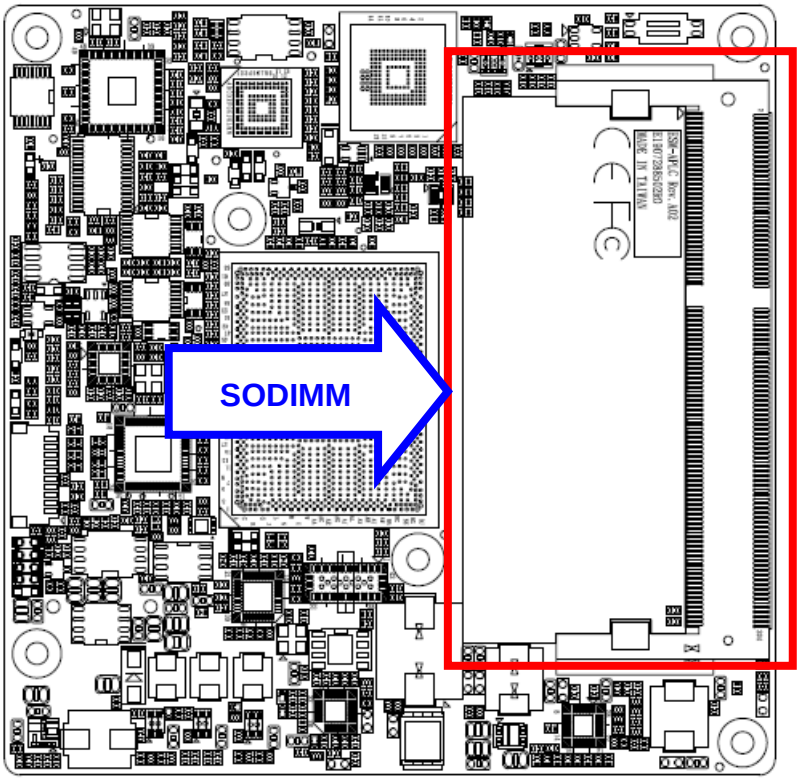
2.2 Installation Procedure

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.

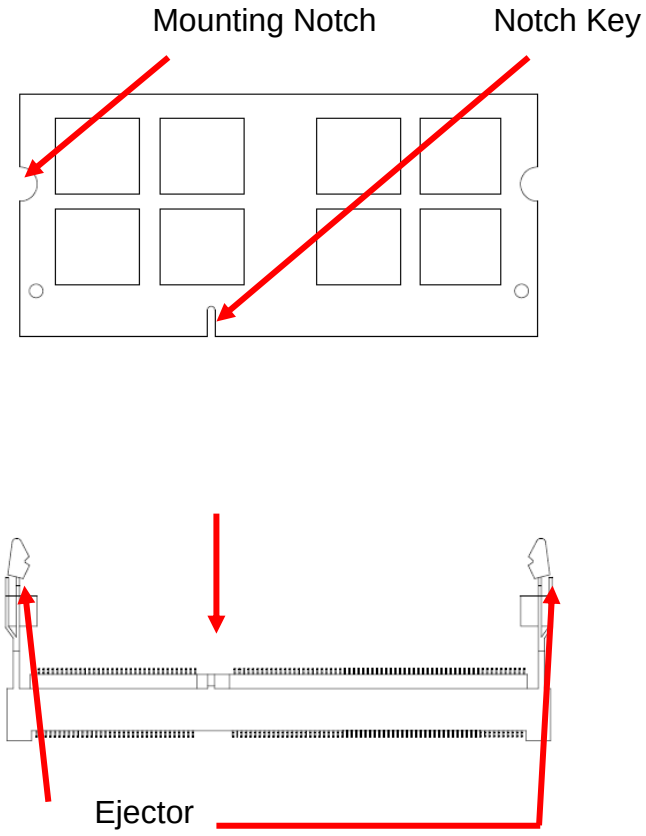
2.2.1 Main Memory

ESM-APLC provides the 204-pin SODIMM socket, supports up to 8GB DDR3L 1866 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.



204-pin DDR3L SODIMM

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

Note:

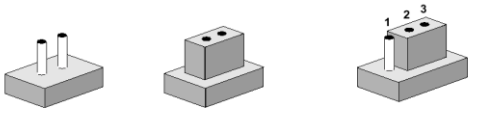
(1) Please do not change any DDR4 SDRAM parameter in BIOS setup to increase your system's performance without acquiring technical information in advance.

(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.

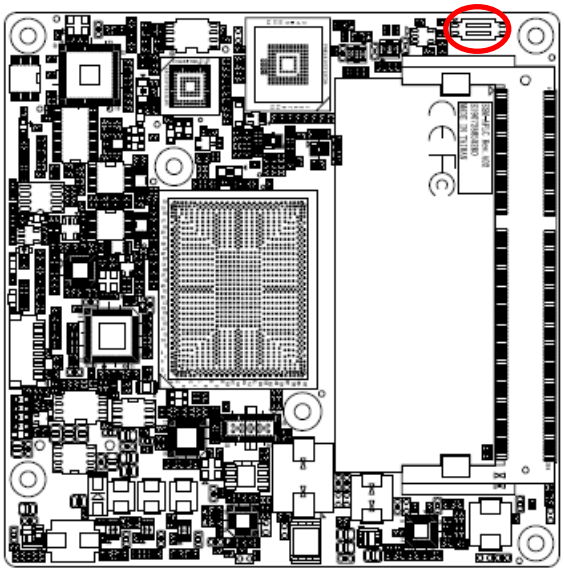
The following tables list the function of each of the board's jumpers and connectors.

Connectors

Label	Function	Note
BIOS_SPI1	(Reserved for BIOS programming)	5 x 2 header, pitch 2.00mm
CN1A	COM Express connector 1	
CN1B	COM Express connector 2	
SODIMM1	204-pin DDR3L SDRAM DIMM socket	
SW1	AT/ATX mode selector	

2.4 Setting Jumpers & Connectors

2.4.1 AT/ATX mode selector (SW1)



*Default

AT/ATX mode

AT mode*

OFF	1		⇨	ON
	2			

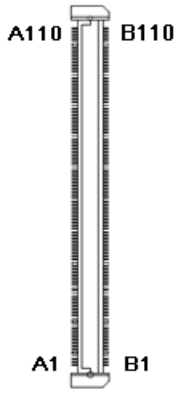
ATX mode

OFF	1	⇦		ON
	2			

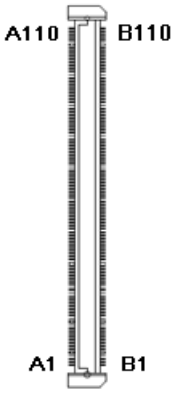
2.4.1.1 Signal Description –AT/ATX mode selection

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

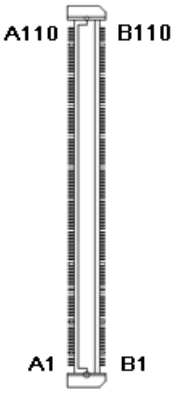
2.4.2 COM Express Connector 1 (CN1A)



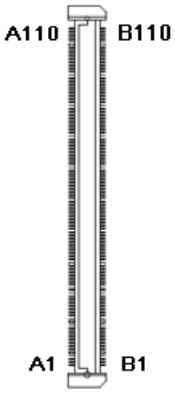
Signal	PIN	PIN	Signal
GND	A110	B110	GND
VCC	A109	B109	VCC
VCC	A108	B108	VCC
VCC	A107	B107	VCC
VCC	A106	B106	VCC
VCC	A105	B105	VCC
VCC	A104	B104	VCC
LID#	A103	B103	SLEEP#
SER1_RX	A102	B102	FAN_TACHIN
SER1_TX	A101	B101	FAN_PWMOUT
GND	A100	B100	GND
SER0_RX	A99	B99	FST_SPI_D3
SER0_TX	A98	B98	FST_SPI_D2
TYPE10#	A97	B97	CB_SPI_CS#
PP_TPM	A96	B96	VGA_I2C_DAT
FST_SPI_D0/MOSI	A95	B95	VGA_I2C_CK
FST_SPI_CLK	A94	B94	VGA_VSYNC
GPO0/SD_CLK	A93	B93	VGA_HSYNC
FST_SPI_D1/MISO	A92	B92	VGA_BLU
+1.8VSB	A91	B91	VGA_GRN
GND	A90	B90	GND
PCIE_CLK_REF-	A89	B89	VGA_RED
PCIE_CLK_REF+	A88	B88	BIOS_DIS1#
CB_EDP_HDP	A87	B87	+ATX5VSB
NC	A86	B86	+ATX5VSB
GPI3/SD_DATA3	A85	B85	+ATX5VSB
LVDS_I2C_DAT/EDP_AUX-	A84	B84	+ATX5VSB
LVDS_I2C_CK/EDP_AUX+	A83	B83	LVDS_BKLT_CTRL/ EDP_BKLT_CTRL
LVDS_A_CK-/EDP_TX3-	A82	B82	LVDS_B_CK-
LVDS_A_CK+/EDP_TX3+	A81	B81	LVDS_B_CK+



Signal	PIN	PIN	Signal
GND	A80	B80	GND
LVDS_A3-	A79	B79	LVDS_BKLT_EN/ EDP_BKLT_EN
LVDS_A3+	A78	B78	LVDS_B3-
LVDS_VDD_EN/EDP_VDD_EN	A77	B77	LVDS_B3+
LVDS_A2-/EDP_TX0-	A76	B76	LVDS_B2-
LVDS_A2+/EDP_TX0+	A75	B75	LVDS_B2+
LVDS_A1-/EDP_TX1-	A74	B74	LVDS_B1-
LVDS_A1+/EDP_TX1+	A73	B73	LVDS_B1+
LVDS_A0-/EDP_TX2-	A72	B72	LVDS_B0-
LVDS_A0+/EDP_TX2+	A71	B71	LVDS_B0+
GND	A70	B70	GND
PCIE_TX0-	A69	B69	PCIE_RX0-
PCIE_TX0+	A68	B68	PCIE_RX0+
GPI2/SD_DATA2	A67	B67	WAKE1#
GND	A66	B66	WAKE0#
PCIE_TX1-	A65	B65	PCIE_RX1-
PCIE_TX1+	A64	B64	PCIE_RX1+
GPI1/SD_DATA1	A63	B63	GPO3/SD_CD#
PCIE_TX2-	A62	B62	PCIE_RX2-
PCIE_TX2+	A61	B61	PCIE_RX2+
GND	A60	B60	GND
PCIE_TX3-	A59	B59	PCIE_RX3-
PCIE_TX3+	A58	B58	PCIE_RX3+
GND	A57	B57	GPO2/SD_WP
NC	A56	B56	NC
NC	A55	B55	NC
GPI0/SD_DATA0	A54	B54	GPO1/SD_CMD
NC	A53	B53	NC
NC	A52	B52	NC
GND	A51	B51	GND



Signal	PIN	PIN	Signal
LPC_SERIRQ	A50	B50	CB_RESET#
EXCD0_CPPE#	A49	B49	SYS_RESET#
EXCD0_PERST#	A48	B48	EXCD1_CPPE#
+3.3V	A47	B47	EXCD1_PERST#
USB0+	A46	B46	USB1+
USB0-	A45	B45	USB1-
USB_2_7_OC#	A44	B44	USB_0_1_OC#
USB2+	A43	B43	USB3+
USB2-	A42	B42	USB3-
GND	A41	B41	GND
USB4+	A40	B40	USB5+
USB4-	A39	B39	USB5-
USB_2_7_OC#	A38	B38	USB_2_7_OC#
USB6+	A37	B37	USB7+
USB6-	A36	B36	USB7-
THRMTRIP#	A35	B35	THRM#
BIOS_DIS0#	A34	B34	I2C_DATA
HDA_SDOUT	A33	B33	I2C_CLK
HDA_BITCLK	A32	B32	SPKR
GND	A31	B31	GND
HDA_RST#	A30	B30	HDA_SDI0
HDA_SYNC	A29	B29	NC
SATA_ACT#	A28	B28	NC
BATLOW#	A27	B27	WDT
NC	A26	B26	NC
NC	A25	B25	NC
PCH_SLP_S4#	A24	B24	PWR_OK
NC	A23	B23	NC
NC	A22	B22	NC
GND	A21	B21	GND



Signal	PIN	PIN	Signal
SATA0_RX-	A20	B20	SATA1_RX-
SATA0_RX+	A19	B19	SATA1_RX+
PCH_SLP_S4#	A18	B18	SUS_STAT#
SATA0_TX-	A17	B17	SATA1_TX-
SATA0_TX+	A16	B16	SATA1_TX+
SUS_S3#	A15	B15	SMB_ALERT#
GND	A14	B14	SMB_SDA_S5
GBE0_MDI0+	A13	B13	SMB_SCL_S5
GBE0_MDI0-	A12	B12	PWRBTN#
GND	A11	B11	GND
GBE0_MDI1+	A10	B10	LPC_CLKOUT1
GBE0_MDI1-	A9	B9	NC
GBE0_LINK#	A8	B8	NC
GBE0_MDI2+	A7	B7	LPC_AD3
GBE0_MDI2-	A6	B6	LPC_AD2
GBE0_LINK1000#	A5	B5	LPC_AD1
GBE0_LINK100#	A4	B4	LPC_AD0
GBE0_MDI3+	A3	B3	LPC_FRAME#
GBE0_MDI3-	A2	B2	GBE0_ACT#
GND	A1	B1	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 _BITCLK	HD Audio Clock
HDA _SDOUT	HD Audio Data

2.4.2.1.2 Gigabit Ethernet Signals

<table>
<tr><th>Signal</th><th>Signal Description</th></tr>
<tr><td>GBE0_MD[0:3] +/-</td><td>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:
<table>
<tr><th></th><th>1000B-T</th><th>100B-T</th><th>10B-T</th></tr>
<tr><td>MDI[0]+/-</td><td>B1_DA+/</td><td>TX+/-</td><td>TX+/-</td></tr>
<tr><td>MDI[1]+/</td><td>B1_DB+/</td><td>RX+/-</td><td>RX+/-</td></tr>
<tr><td>MDI[2]+/</td><td>B1_DC+/</td><td>X</td><td>X</td></tr>
<tr><td>MDI[3]+/</td><td>B1_DD+/</td><td>X</td><td>X</td></tr>
</table></td></tr>
<tr><td>GBE0_ACT#</td><td>Gigabit Ethernet Controller 0 activity indicator, active low.</td></tr>
<tr><td>GBE0_Link#</td><td>Gigabit Ethernet Controller 0 link indicator, active low.</td></tr>
<tr><td>GBE0_Link100#</td><td>Gigabit Ethernet Controller 0 100 Mbit / sec link indicator, active low.</td></tr>
<tr><td>GBE0_Lin1000#</td><td>Gigabit Ethernet Controller 0 1000 Mbit / sec link indicator, active low.</td></tr>
</table>

2.4.2.1.3 PCI Express Signals

Signal	Signal Description
PCIE_TX[0:3] +/-	PCI Express Differential Transmit Pair 0-3
PCIE_RX[0:3] +/-	PCI Express Differential Receive Pair 0-3

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_CLKOUT1	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.

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.
BATLOW#	Indicates that external battery is low
PWRBTN#	Power button to bring system out of S5 (soft off), active on rising edge.
SMB_SCL_S5	System Management Bus bidirectional clock line.
SMB_SDA_S5	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[0:1]_TX +/-	Serial ATA Channel 0-1 transmit differential pair.
SATA[0:1]_RX +/-	Serial ATA Channel 0-1 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_7_OC#	USB over-current sense, USB channels 2 and 7

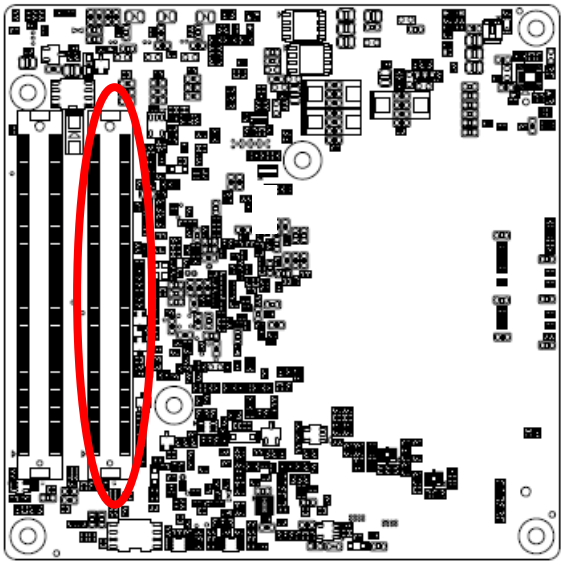
2.4.2.1.13 I2C Signals

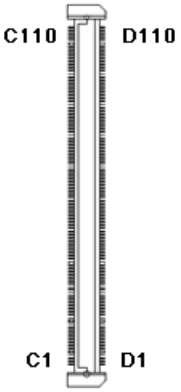
Signal	Signal Description
I2C_CLK	General purpose I2C port clock output.
I2C_DATA	General purpose I2C port data I/O line.

2.4.2.1.14 COM.0 Pins Signals

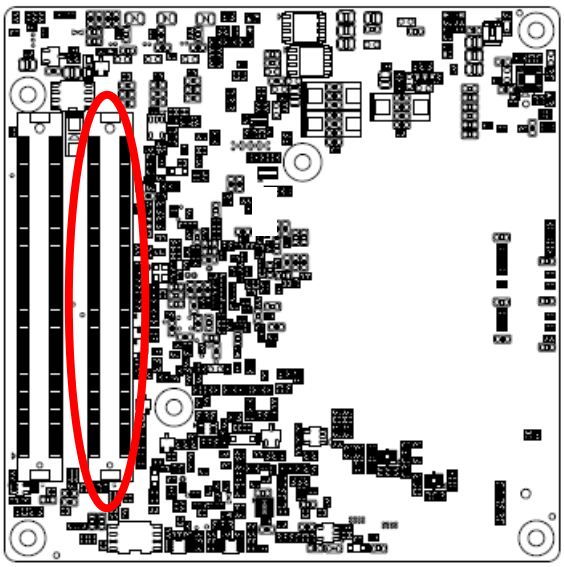
Signal	Signal Description
SER0/1_TX	TTL level outputs from the Module.
SER0/1_RX	TTL level inputs from the Module.

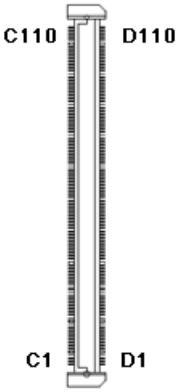
2.4.3 COM Express Connector 2 (CN1B)



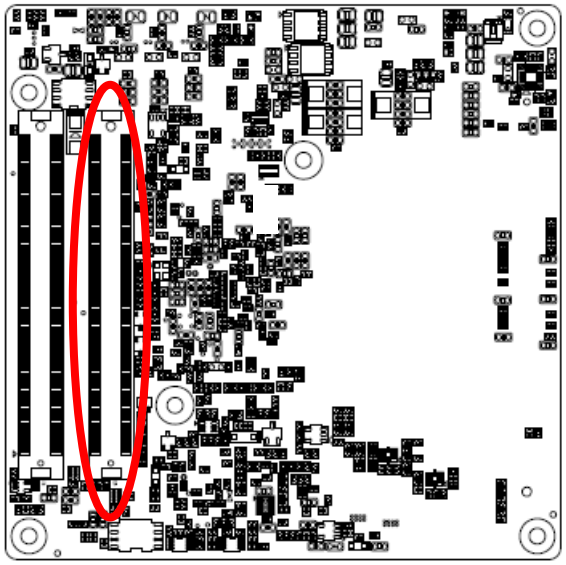


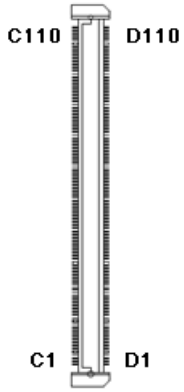
Signal	PIN	PIN	Signal
GND	C110	D110	GND
VCC	C109	D109	VCC
VCC	C108	D108	VCC
VCC	C107	D107	VCC
VCC	C106	D106	VCC
VCC	C105	D105	VCC
VCC	C104	D104	VCC
GND	C103	D103	GND
NC	C102	D102	NC
NC	C101	D101	NC
GND	C100	D100	GND
NC	C99	D99	NC
NC	C98	D98	NC
NC	C97	D97	NC
GND	C96	D96	GND
NC	C95	D95	NC
NC	C94	D94	NC
GND	C93	D93	GND
NC	C92	D92	NC
NC	C91	D91	NC
GND	C90	D90	GND
NC	C89	D89	NC
NC	C88	D88	NC
GND	C87	D87	GND
NC	C86	D86	NC
NC	C85	D85	NC
GND	C84	D84	GND
NC	C83	D83	NC
NC	C82	D82	NC
NC	C81	D81	NC



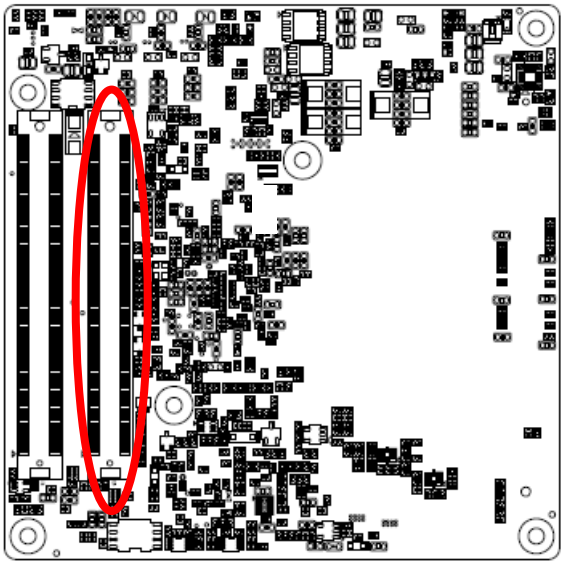


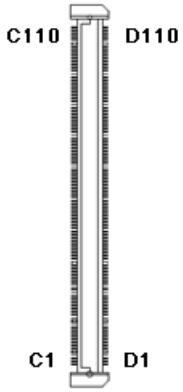
Signal	PIN	PIN	Signal
GND	C80	D80	GND
NC	C79	D79	NC
NC	C78	D78	NC
NC	C77	D77	NC
GND	C76	D76	GND
NC	C75	D75	NC
NC	C74	D74	NC
GND	C73	D73	GND
NC	C72	D72	NC
NC	C71	D71	NC
GND	C70	D70	GND
NC	C69	D69	NC
NC	C68	D68	NC
NC	C67	D67	GND
NC	C66	D66	NC
NC	C65	D65	NC
NC	C64	D64	NC-
NC	C63	D63	NC
NC	C62	D62	NC
NC	C61	D61	NC
GND	C60	D60	GND
NC	C59	D59	NC
NC	C58	D58	NC
TYPE1#	C57	D57	TYPE2#
NC	C56	D56	NC
NC	C55	D55	NC
TYPE0#	C54	D54	NC
NC	C53	D53	NC
NC	C52	D52	NC
GND	C51	D51	GND





Signal	PIN	PIN	Signal
NC	C50	D50	DDI2_PAIR3-
NC	C49	D49	DDI2_PAIR3+
NC	C48	D48	NC
NC	C47	D47	DDI2_PAIR2-
NC	C46	D46	DDI2_PAIR2+
NC	C45	D45	NC
NC	C44	D44	DDI2_HPD
NC	C43	D43	DDI2_PAIR1-
NC	C42	D42	DDI2_PAIR1+
GND	C41	D41	GND
NC	C40	D40	DDI2_PAIR0-
NC	C39	D39	DDI2_PAIR0+
NC	C38	D38	NC
NC	C37	D37	DDI1_PAIR3-
NC	C36	D36	DDI1_PAIR3+
NC	C35	D35	NC
DDI2_DDC_AUX_SEL	C34	D34	DDI1_DDC_AUX_SEL
DDI2_CTRLDATA_AUX-	C33	D33	DDI1_PAIR2-
DDI2_CTRLCLK_AUX+	C32	D32	DDI1_PAIR2+
GND	C31	D31	GND
NC	C30	D30	DDI1_PAIR1-
NC	C29	D29	DDI1_PAIR1+
NC	C28	D28	NC
NC	C27	D27	DDI1_PAIR0-
NC	C26	D26	DDI1_PAIR0+
NC	C25	D25	NC
DDI1_HPD	C24	D24	NC
NC	C23	D23	NC
NC	C22	D22	NC
GND	C21	D21	GND





Signal	PIN	PIN	Signal
NC	C20	D20	NC
NC	C19	D19	NC
LVDS_BLDN	C18	D18	NC
LVDS_BLUP	C17	D17	NC
NC	C16	D16	DDI1_CTRLDATA_AUX-
NC	C15	D15	DDI1_CTRLCLK_AUX+
GND	C14	D14	GND
USB_SSRX3+	C13	D13	USB_SSTX3+
USB_SSRX3-	C12	D12	USB_SSTX3-
GND	C11	D11	GND
USB_SSRX2+	C10	D10	USB_SSTX2+
USB_SSRX2-	C9	D9	USB_SSTX2-
GND	C8	D8	GND
USB_SSRX1+	C7	D7	USB_SSTX1+
USB_SSRX1-	C6	D6	USB_SSTX1-
GND	C5	D5	GND
USB_SSRX0+	C4	D4	USB_SSTX0+
USB_SSRX0-	C3	D3	USB_SSTX0-
GND	C2	D2	GND
GND	C1	D1	GND

2.4.3.1 Signal Description – COM Express Connector 2 (CN1B)

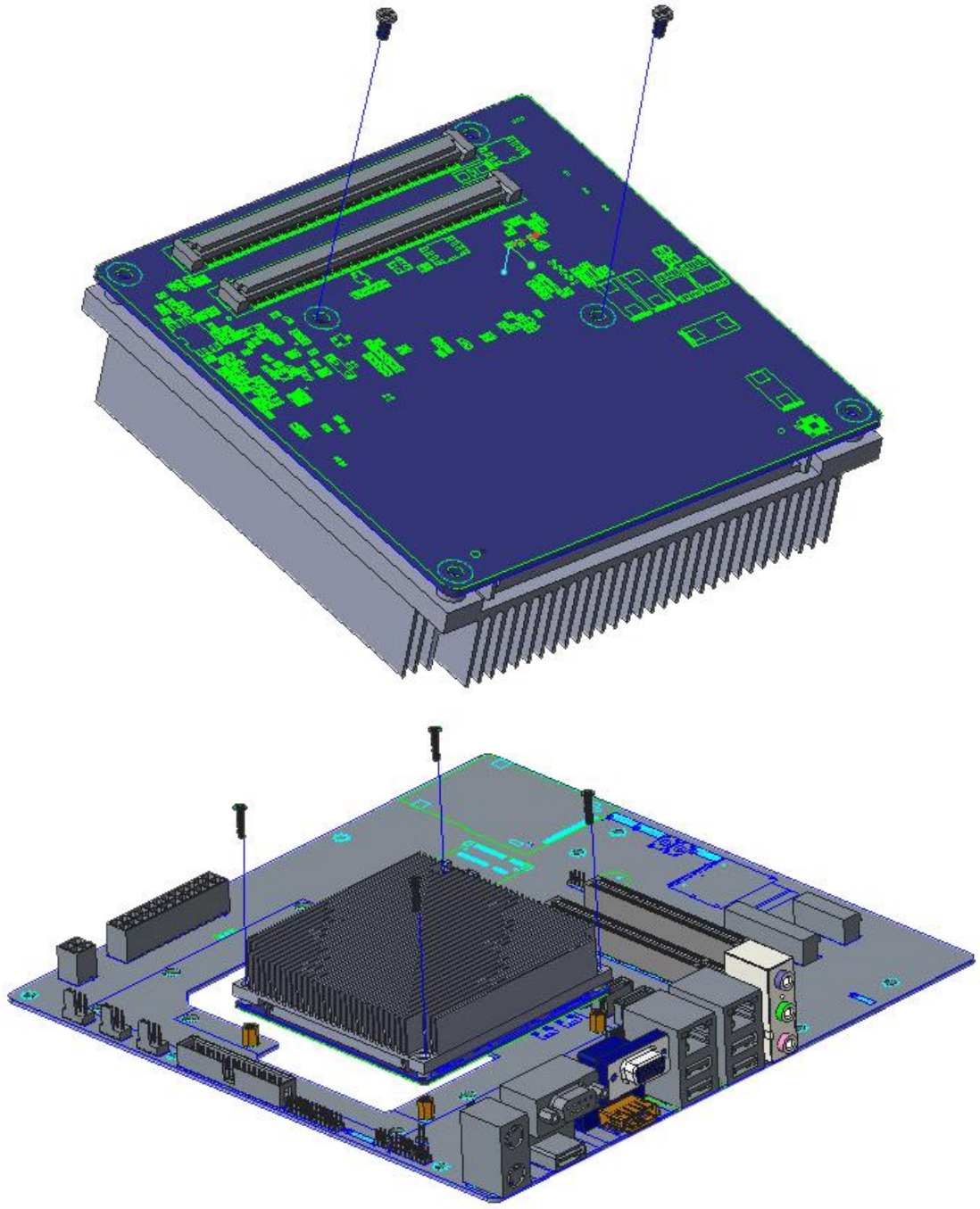
2.4.3.1.1 USB3.0 Signals

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 2Pair[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

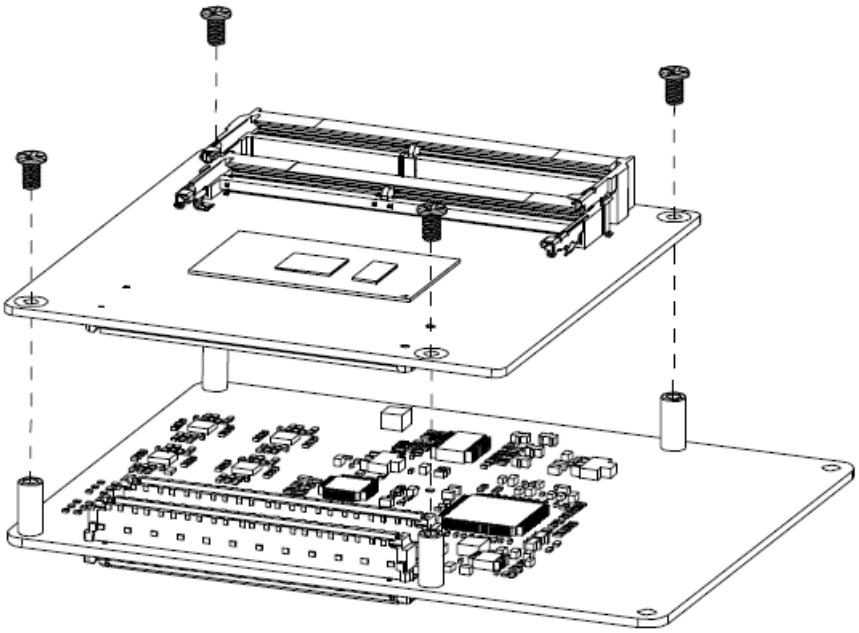
2.5 Installing COMe Module + Heatsink / Heat spreader & Carrier board

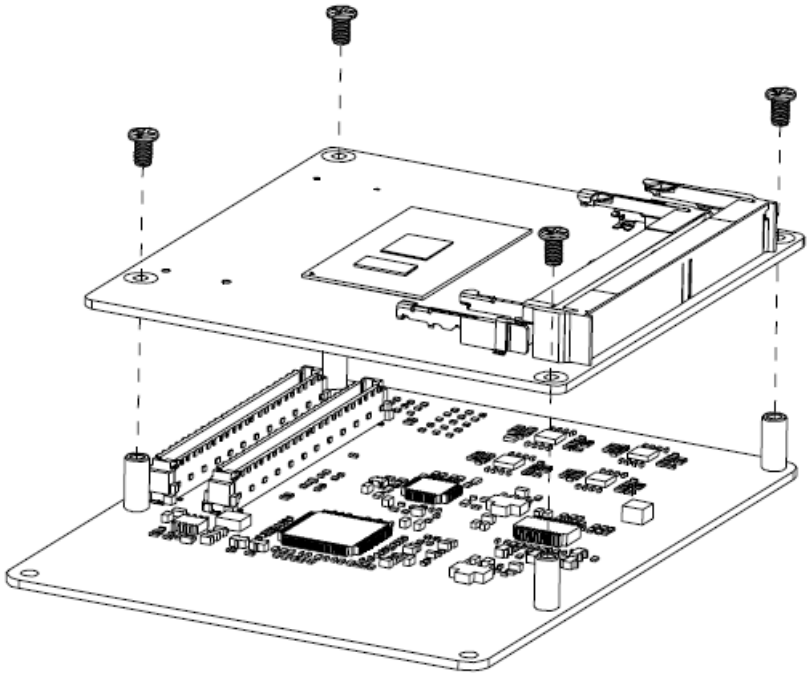


Step1. Using 2 screws (M2.5-4L) to lock the Heatsink/Heat spreader from PCB backside.
Step2. Using 4 screws (M2.5-12L) to assemble with Carrier board from top to bottom.

Note:
Recommendation of screwing torque force: 4kg
Screw Size / Q'TY
- M2.5-4L Ni * 2pcs
- M2.5-12L Ni * 4pcs

2.6 Installing COMe Module & Carrier board





Step1. Using 4 screws (M2.5-6L) to lock the Carrier board.

Note:

Recommendation of screwing torque force: 4kg

Screw Size / Q'TY: M2.5-6L Ni * 4pcs

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.

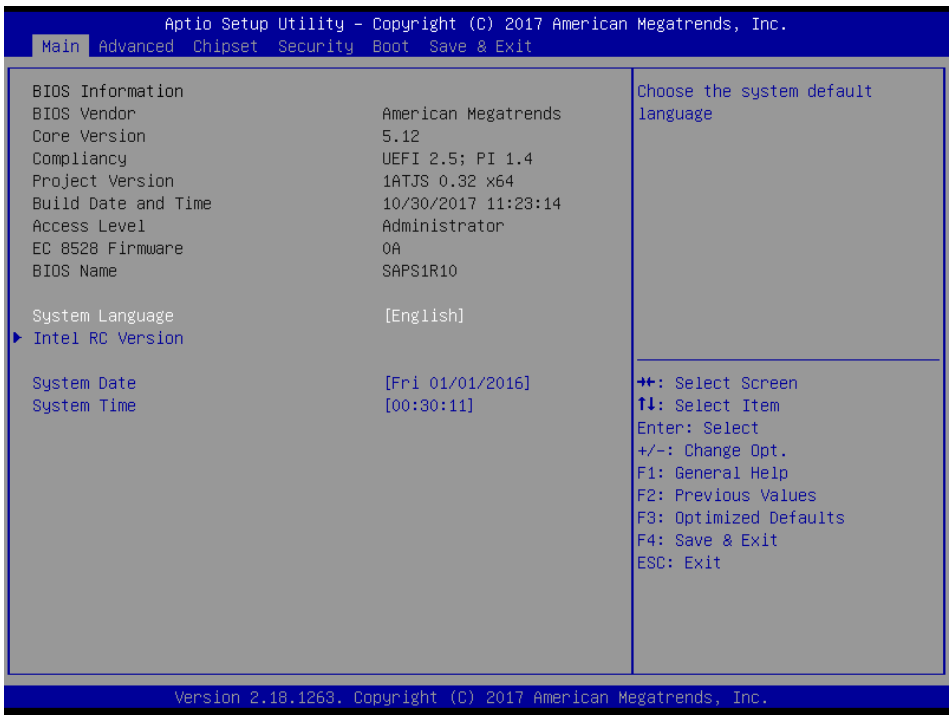
The best advice is to only alter settings which you thoroughly understand. To this end, we strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both your systems manufacturer to provide the absolute maximum performance and reliability.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

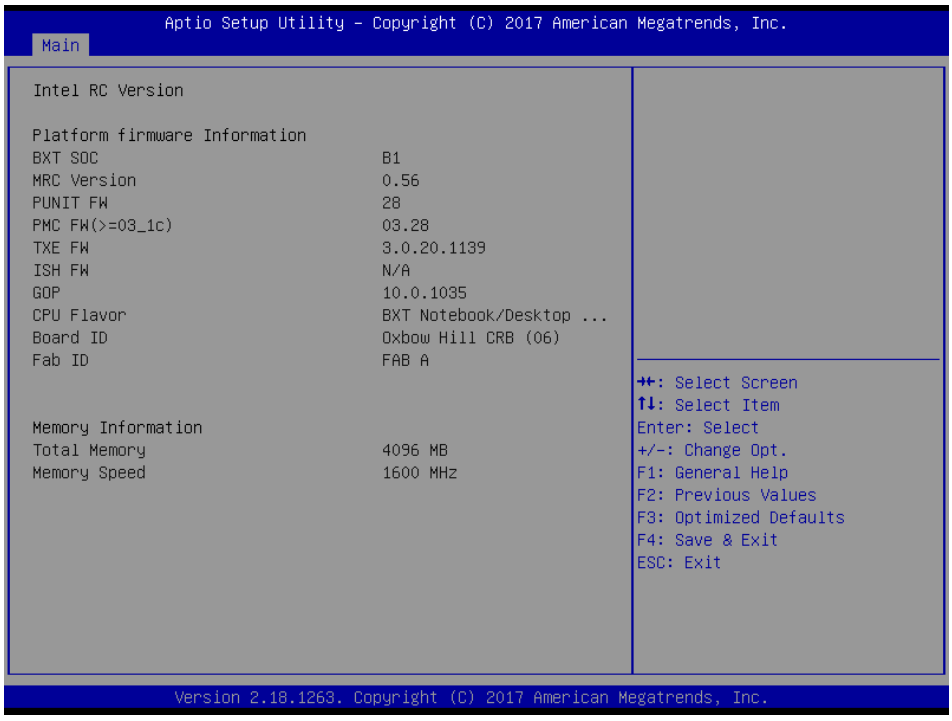
3.6 BIOS setup

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.

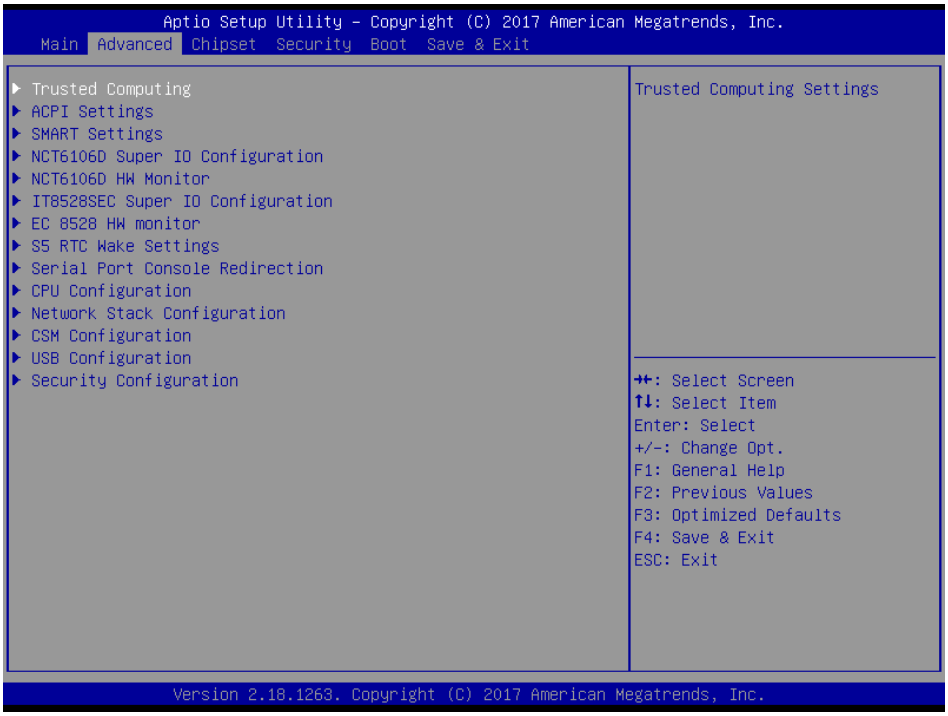
3.6.1.3 System Time

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

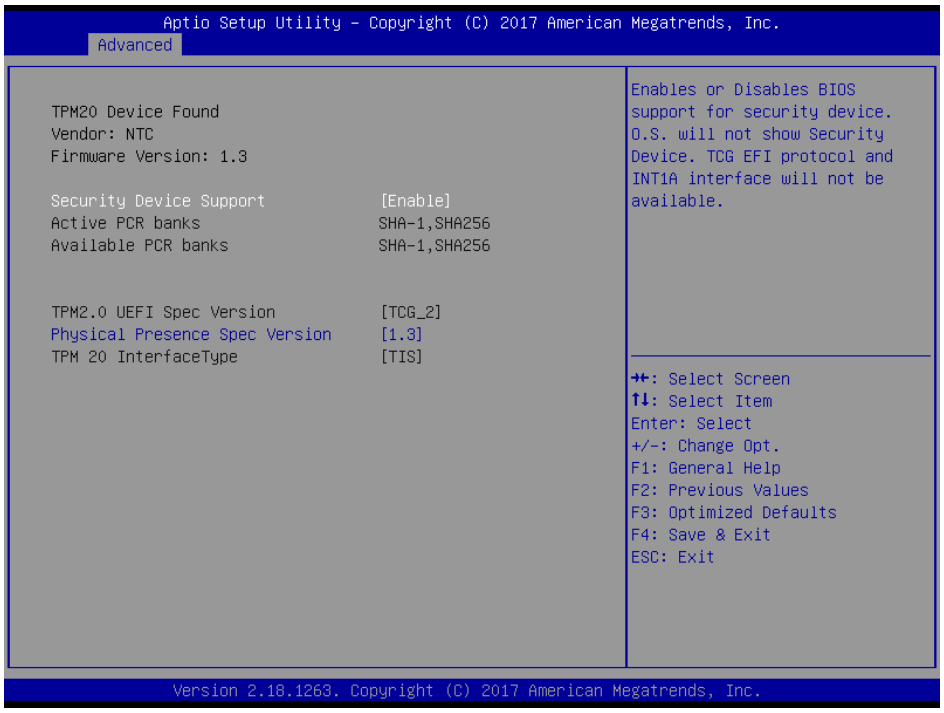
Note: The BIOS setup screens shown in this chapter are for reference purposes only, and may not exactly match what you see on your screen.
Visit the Avalue website (www.avalue.com.tw) to download the latest product and BIOS information.

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.

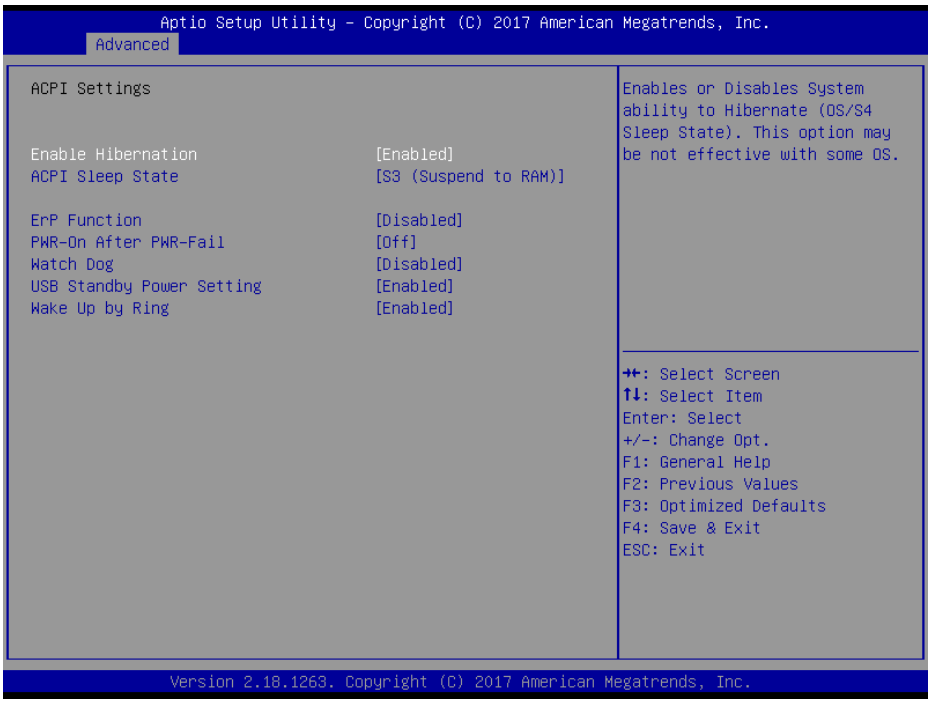


3.6.2.1 Trusted Computing



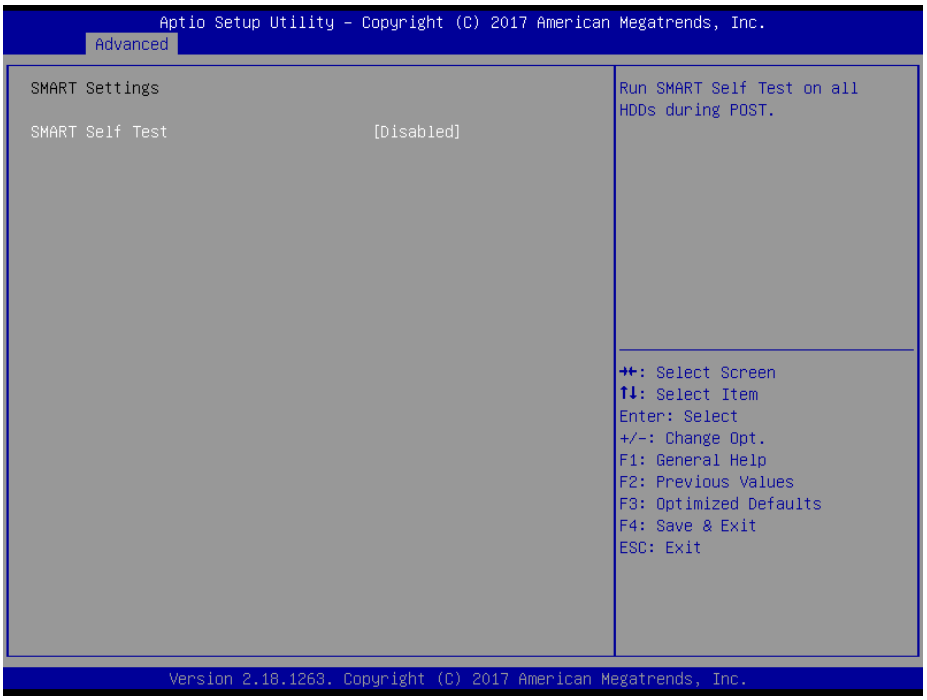
Item	Options	Description
Security Device Support	Disable, Enable**[Default]**	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
Physical Presence Spec Version	1.2 1.3**[Default]**,	Select to Tell O.S. to support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3.

3.6.2.2 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.
ErP Function	Disabled**[Default]**, Enabled	ErP Function (Deep S5).
Pwr-On After PWR-Fail	Off**[Default]** On Last state	Select the power station after power failure.
Watch Dog	Disabled**[Default]**, 30 sec 40 sec 50 sec 1 min 2 min 10 min 30 min	Select WatchDog.
USB Standby Power Setting	Disabled Enabled**[Default]**,	Enable/Disable USB Standby Power during S3/S4/S5.
Wake Up By Ring	Disabled Enabled**[Default]**,	Wake Up by Ring from S3/S4/S5.

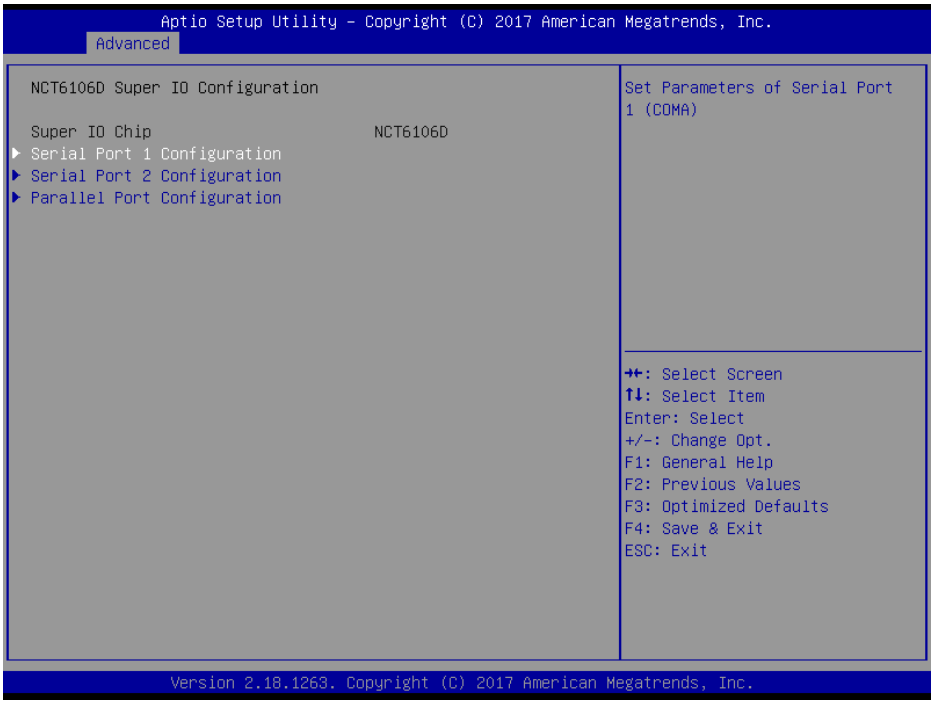
3.6.2.3 SMART Settings



Item	Options	Description
SMART Self Test	Disabled**[Default]** Enabled,	Run SMART Self Test on all HDDs during POST.

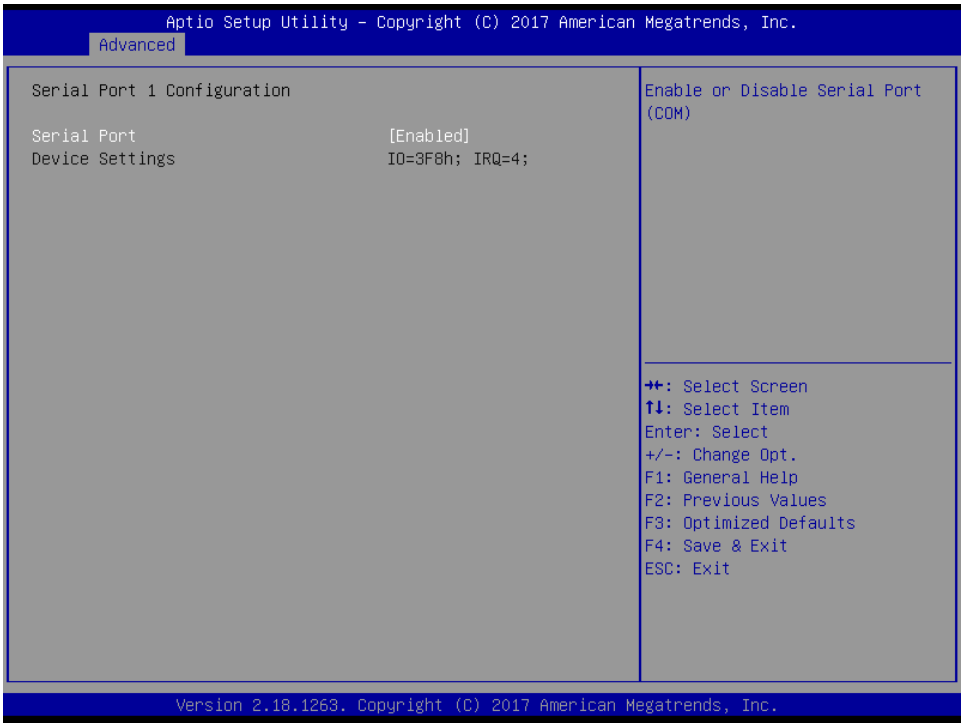
3.6.2.4 NCT6106D Super IO Configuration

You can use this item to set up or change the NCT6106D Super IO configuration for serial ports. Please refer to 3.6.2.3.1~ 3.6.2.3.3 for more information.



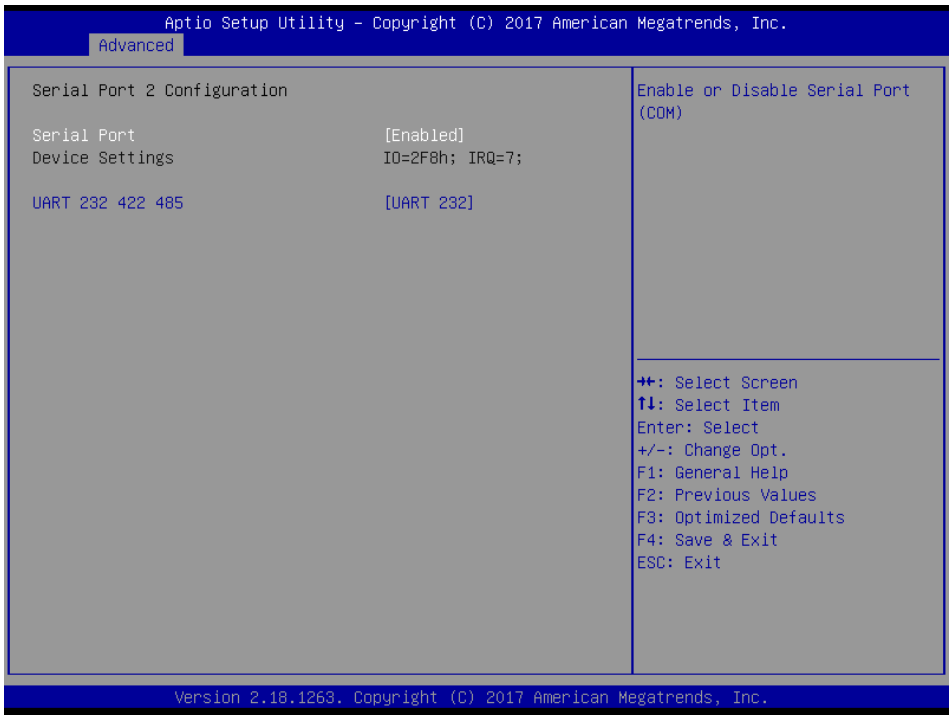
Item	Description
Serial Port 1 Configuration	Set Parameters of Serial Port 1 (COMA).
Serial Port 2 Configuration	Set Parameters of Serial Port 2 (COMB).
Parallel Port Configuration	Set Parameters of Parallel Port (LTP/LPTE).

3.6.2.4.1 Serial Port 1 Configuration



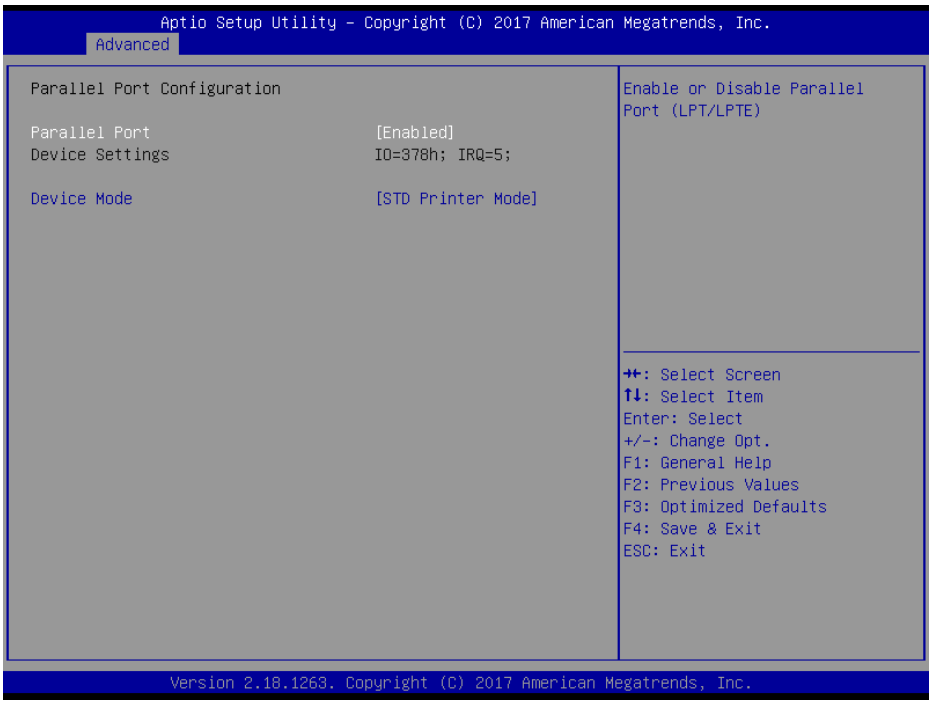
Item	Option	Description
Serial Port	Enabled**[Default]**, Disabled	Enable or Disable Serial Port (COM).

3.6.2.4.2 Serial Port 2 Configuration



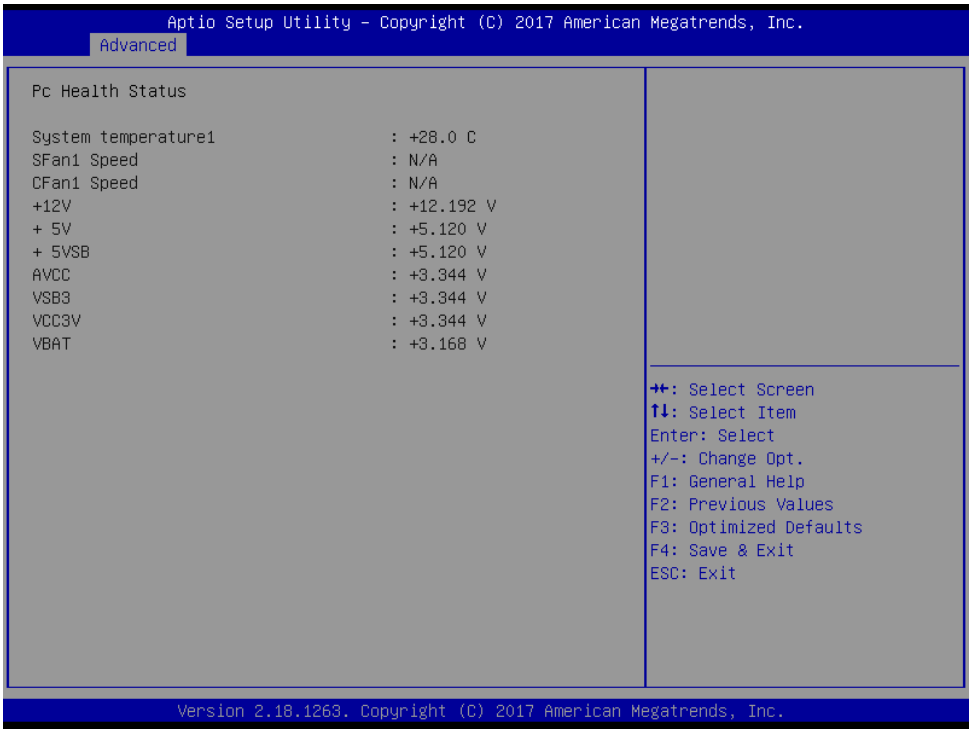
Item	Option	Description
Serial Port	Enabled**[Default]**, Disabled	Enable or Disable Serial Port (COM).
UART 232 422 485	UART 232**[Default]** UART 485 UART 422	Change the Serial Port as RS232/422/485.

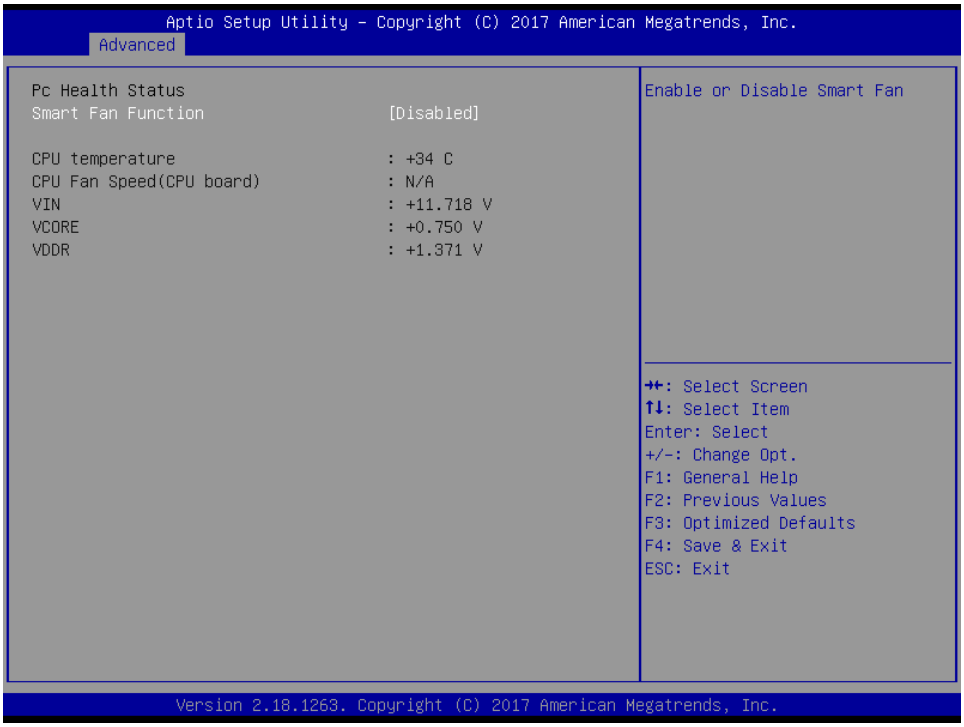
3.6.2.4.3 Parallel Port Configuration



Item	Option	Description
Parallel Port	Enabled**[Default]**, Disabled	Enable or Disable Parallel Port (LPT/LPTE).
Device Mode	STD Printer Mode**[Default]** SPP Mode EPP-1.9 and SPP Mode EPP-1.7 and SPP Mode ECP Mode ECP and EPP 1.9 Mode ECP and EPP 1.7 Mode	Change the Printer Port mode.

3.6.2.5 H/W Monitor

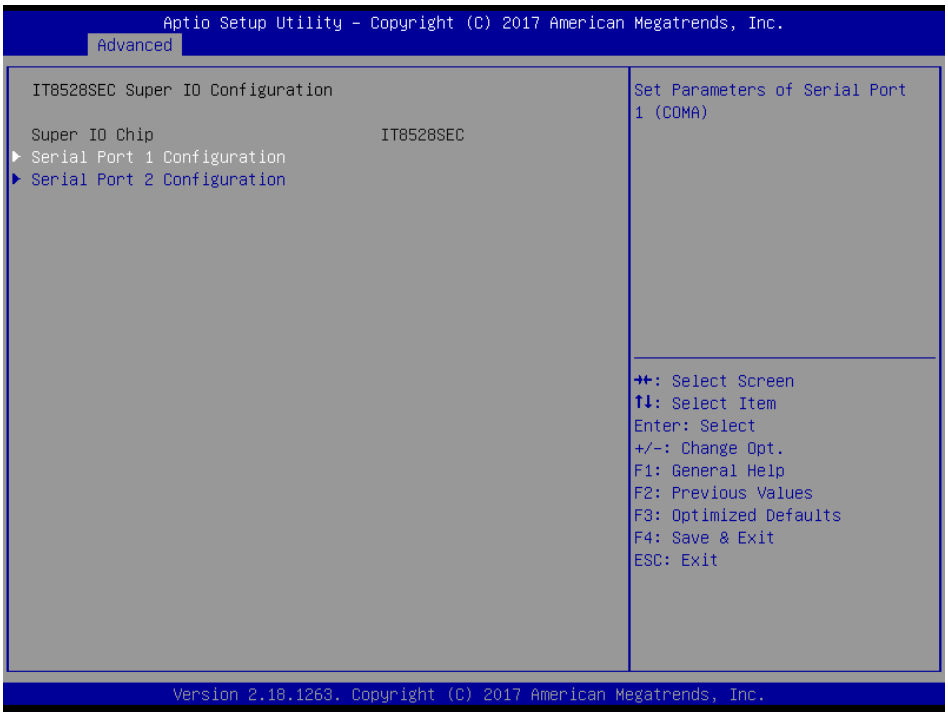




Item	Option	Description
Smart Fan Function	Enabled, Disabled**[Default]**	Enables or Disables Smart Fan.

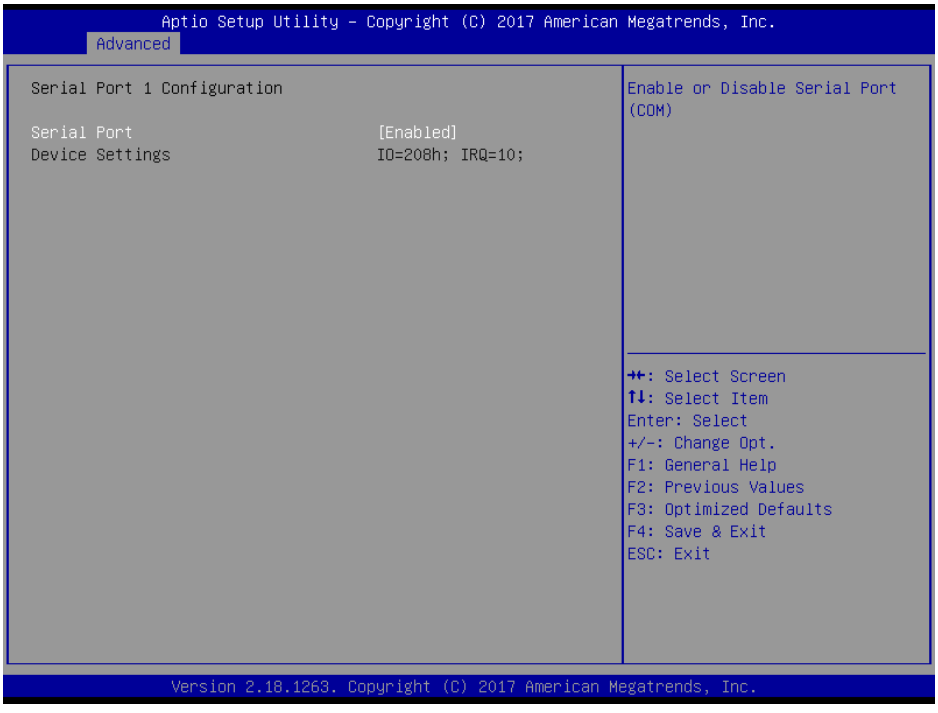
3.6.2.6 IT8528SEC Super IO Configuration

You can use this item to set up or change the IT8528SEC Super IO configuration for serial ports. Please refer to 3.6.2.6.1~ 3.6.2.6.2 for more information.



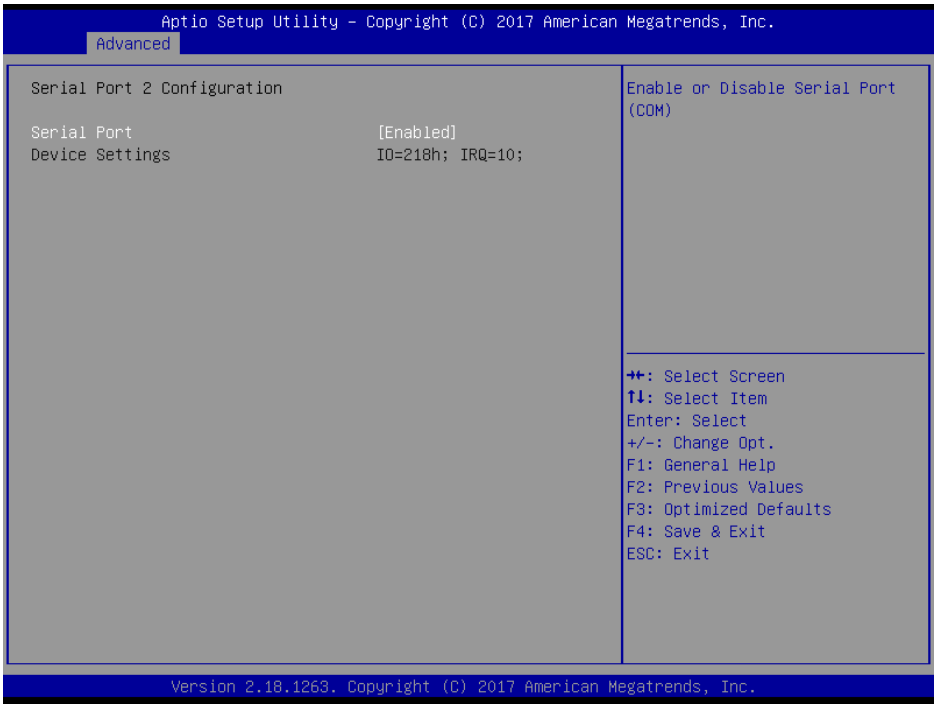
Item	Description
Serial Port 1 Configuration	Set Parameters of Serial Port 1 (COMA).
Serial Port 2 Configuration	Set Parameters of Serial Port 2 (COMB).

3.6.2.6.1 Serial Port 1 Configuration



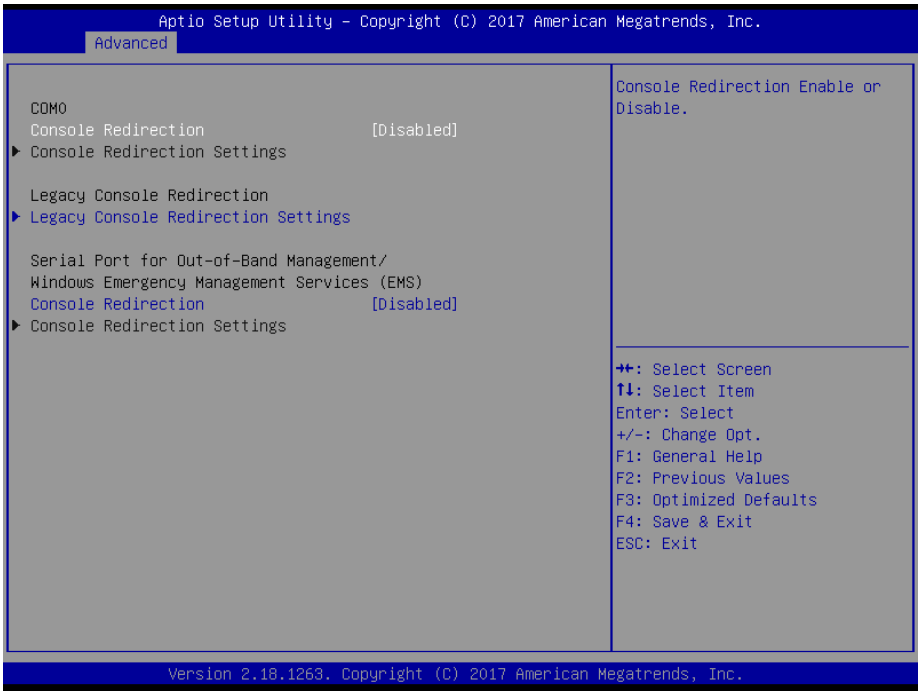
Item	Option	Description
Serial Port	Enabled**[Default]**, Disabled	Enable or Disable Serial Port (COM).

3.6.2.6.2 Serial Port 2 Configuration



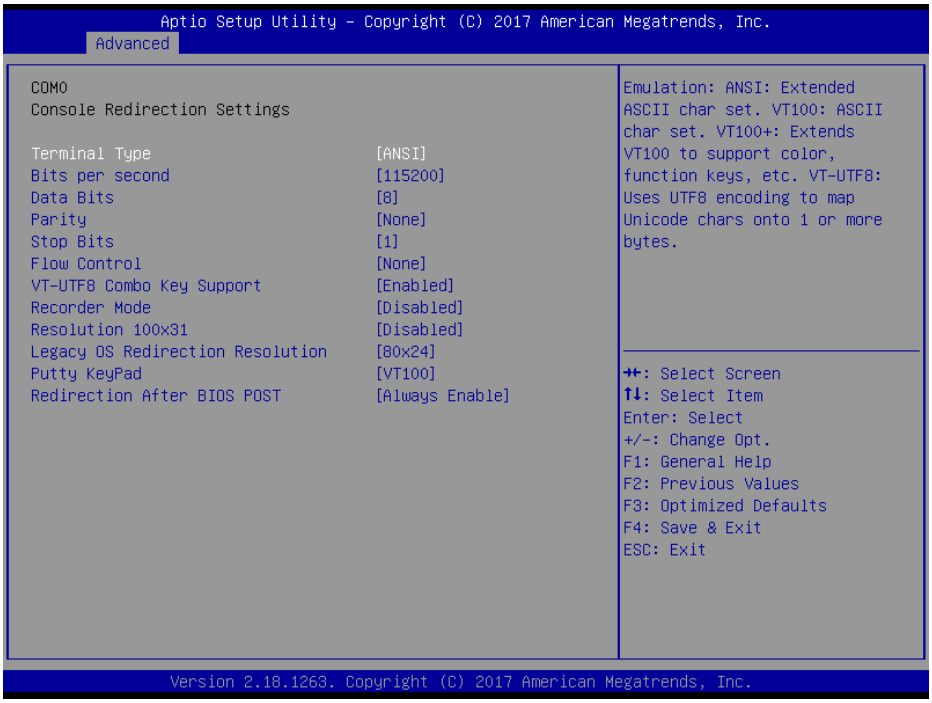
Item	Option	Description
Serial Port	Enabled**[Default]**, Disabled	Enable or Disable Serial Port (COM).

3.6.2.7 Serial Port Console Redirection



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

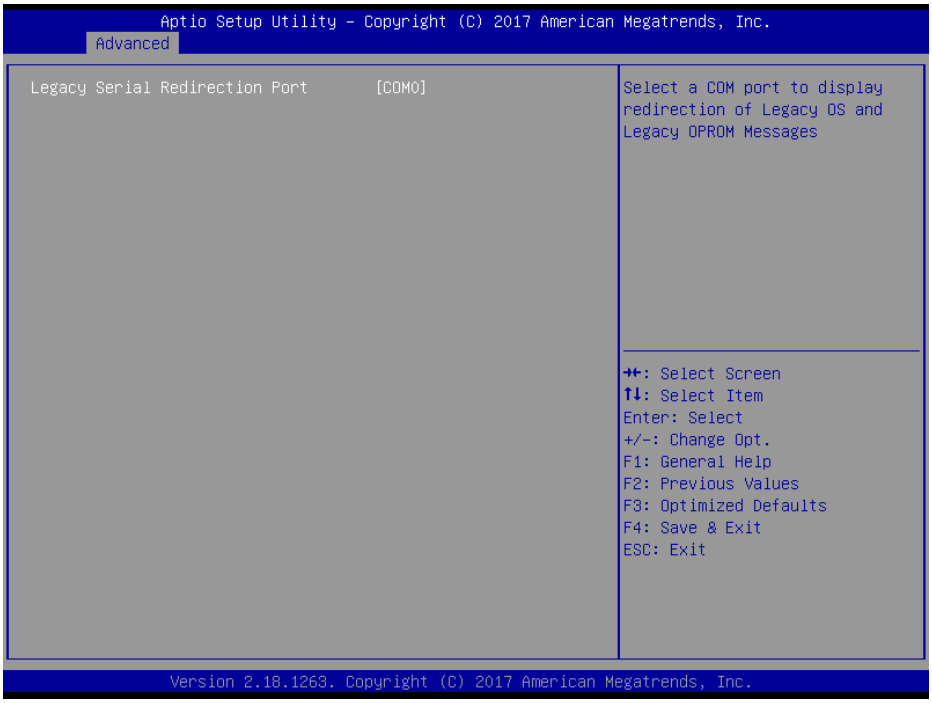
3.6.2.7.1 COM0



Item	Option	Description
Terminal Type	VT100 VT100+ VT-UTF8 ANSI**[Default]**,	Emulation: ANSI: Extender 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 Space	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.

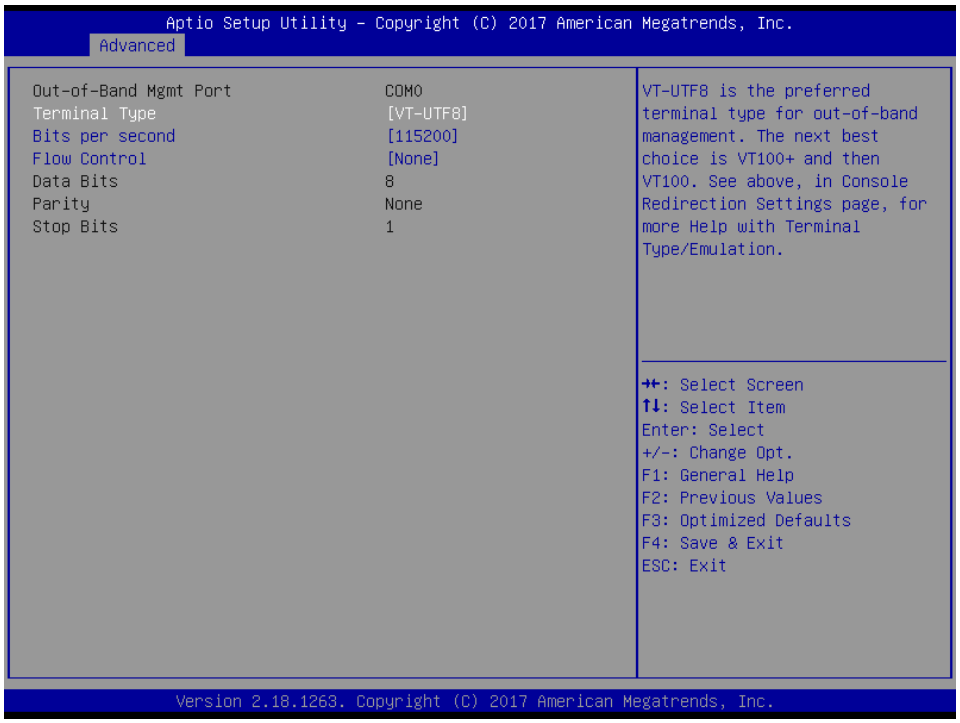
		Communication with slow devices may require more than 1 stop bit.
Flow Control	None Hardware RTS/CTS**[Default]**	Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, 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 Support 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]** Intel Linux XTERMR6 SCO ESCN VT400	Select FunctionKey and KeyPad on Putty.
Redirection After BIOS POST	Always Enable**[Default]** BootLoader	When Bootloader is selected, then Legacy Console Redirection is disabled before booting to legacy OS. When Always Enable is selected, then Legacy Console Redirection is enabled for legacy OS. Default setting for this option is set to Always Enable.

3.6.2.7.2 Legacy Console Redirection Settings



Item	Option	Description
Legacy Serial redirection Port	COM0**[Default]**,	Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages.

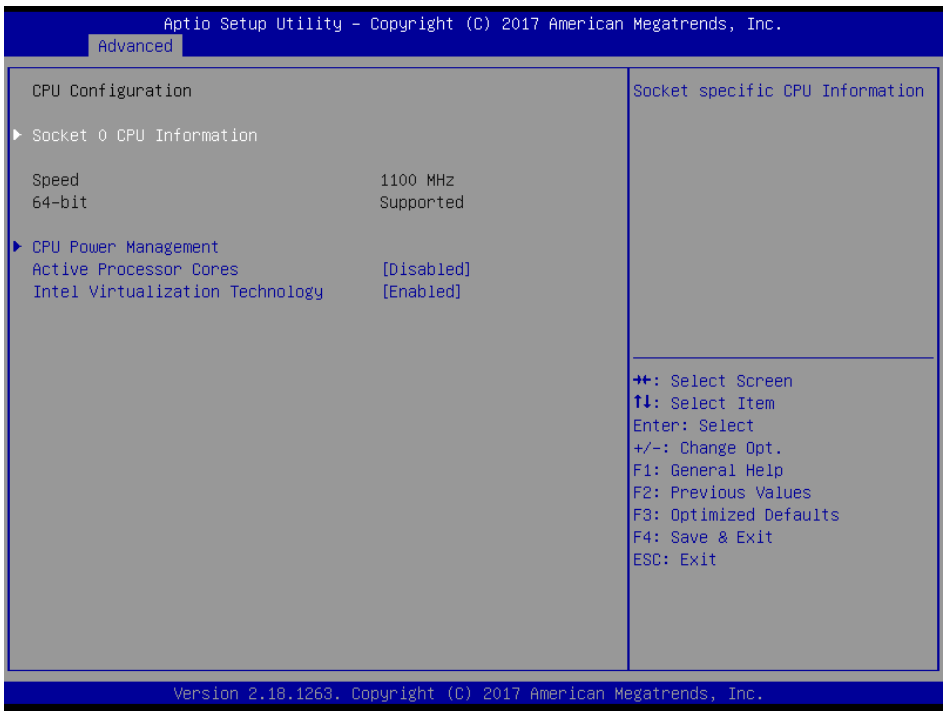
3.6.2.7.3 Console Redirection Settings



Item	Option	Description
Terminal Type	VT100 VT100+ VT-UTF8**[Default]**, ANSI	VT-UTF8 is the preferred terminal type for out-of-band management. The next best choice is VT100+ and then VT100+ and them VT100. See above, in Console Redirection Settings page, for more Help with Terminal Type/Emulation.
Bits per second	9600 19200 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.
Flow Control	None**[Default]** Hardware RTS/CTS Software Xon/Xoff	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.

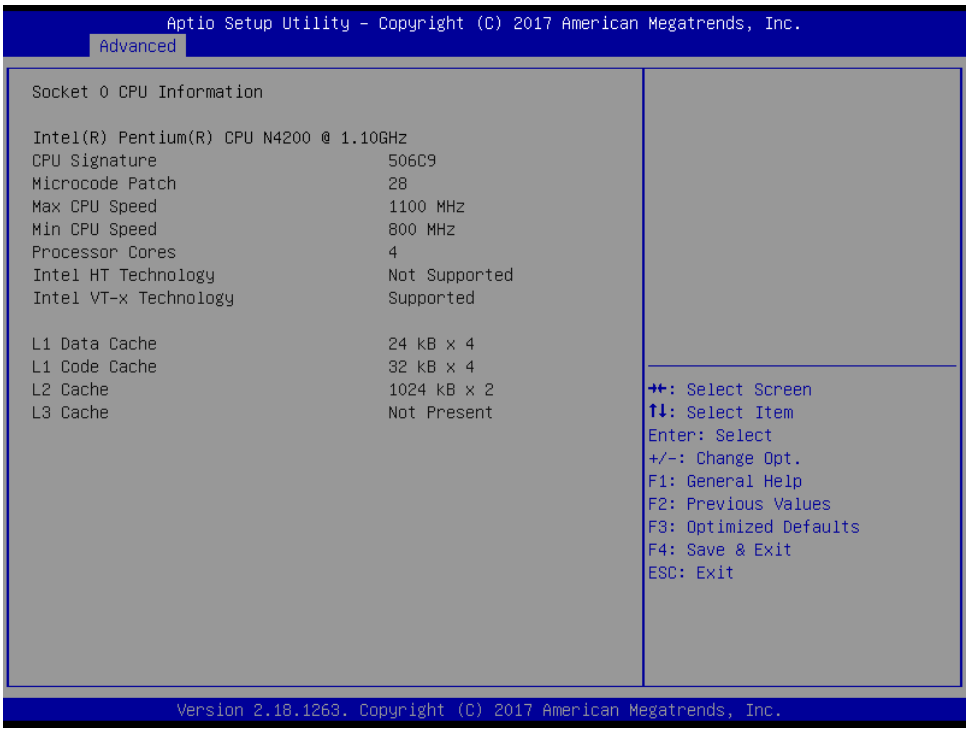
3.6.2.8 CPU Configuration

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

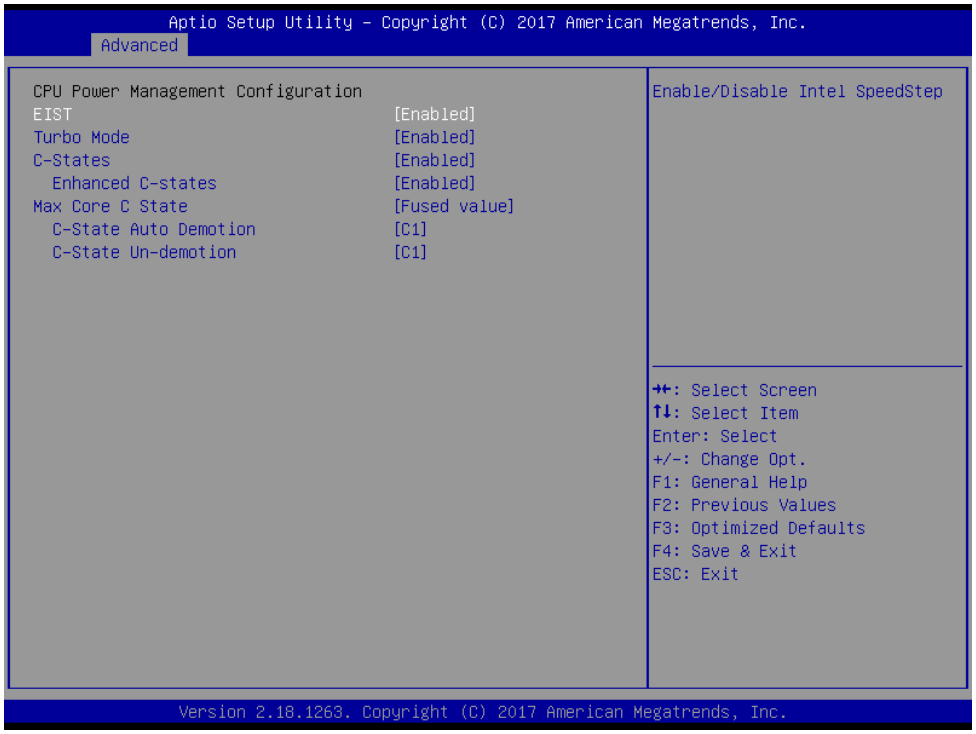


Item	Options	Description
Active Processor Cores	Disabled**[Default]** Enabled	Number of cores to enable in each processor package.
Intel Virtualization Technology	Disabled Enabled**[Default]**	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

3.6.2.8.1 Socket 0 CPU Information



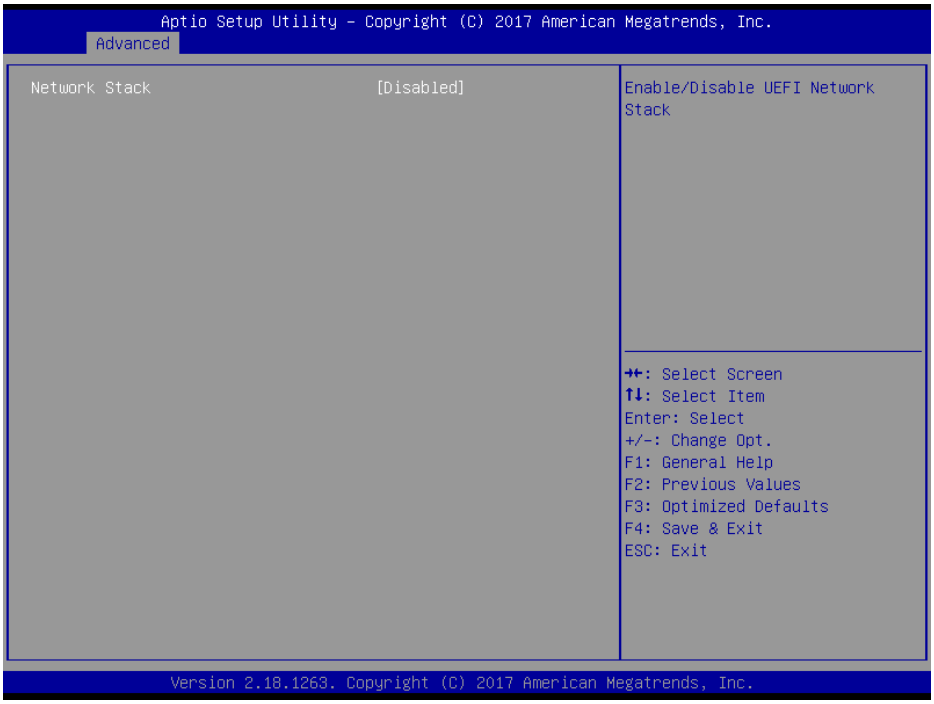
3.6.2.8.2 CPU Power Management Configuration



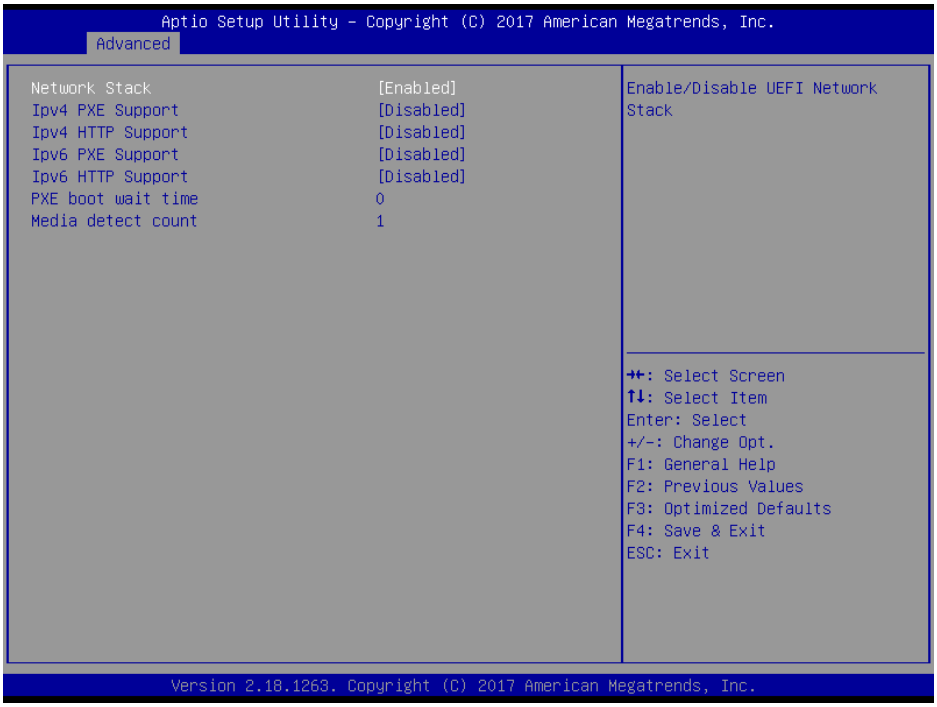
Item	Option	Description
EIST	Disabled Enabled**[Default]**	Enable/Disable Intel SpeedStep.

Turbo Mode	Disabled Enabled**[Default]**	Turbo Mode.
C-States	Disabled Enabled**[Default]**	Enable/Disable C States.
Enhanced C-states	Disabled Enabled**[Default]**	Enable/Disable C1E. When enabled, CPU will switch to minimum speed when all cores enter C-State.
Max Core C State	Fused value**[Default]** Core C10 Core C9 Core C8 Core C7 Core C6 Core C1 Unlimited	This option controls the Max Core C State that cores will support.
C-State Auto Demotion	Disabled C1**[Default]**	Configure C-State Auto Demotion.
C-State Un-demotion	Disabled C1**[Default]**	Configure C-State Un-demotion.

3.6.2.9 Network Stack Configuration

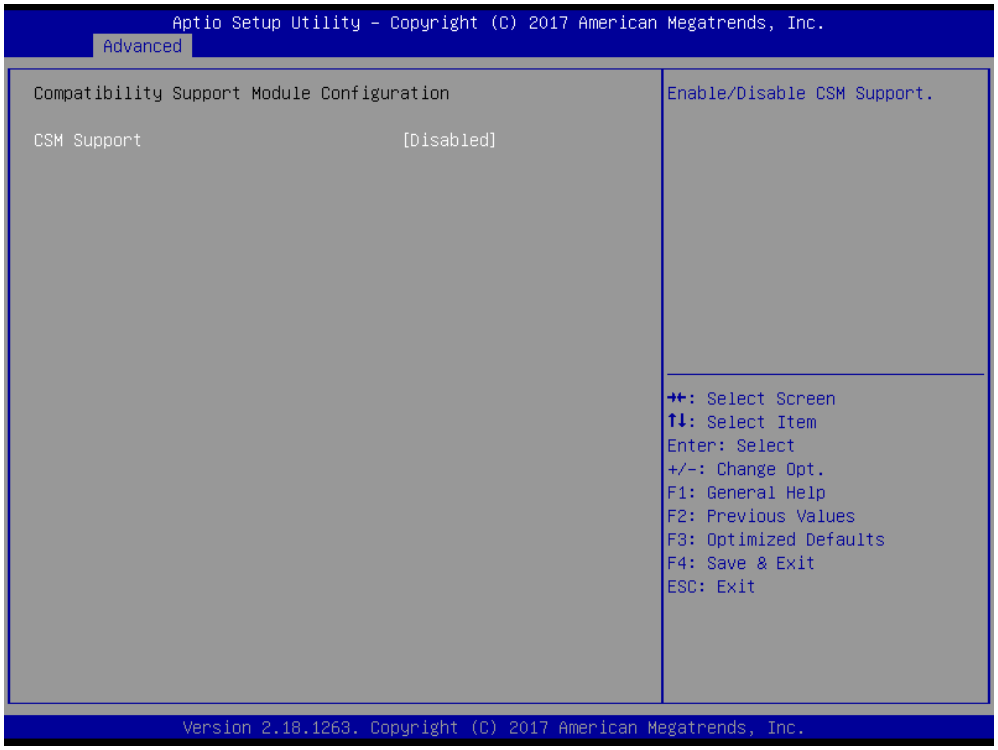


Item	Options	Description
Network Stack	Enabled Disabled**[Default]**	Enable/Disable UEFI Network Stack.

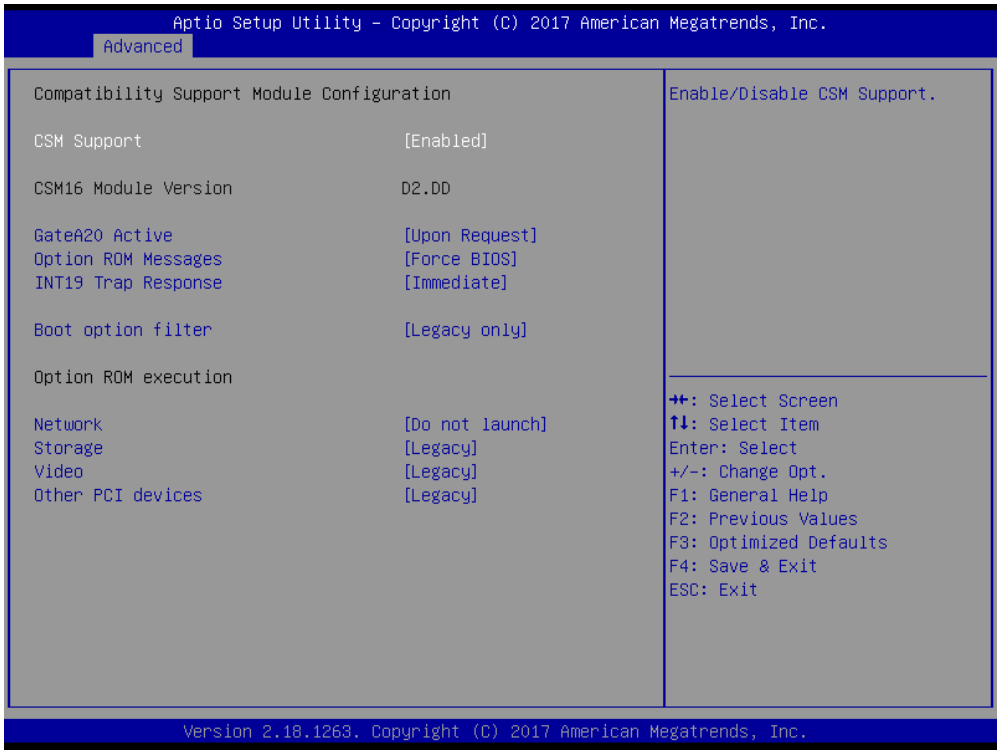


Item	Options	Description
Network Stack	Enabled**[Default]** Disabled	Enable/Disable UEFI Network Stack.
Ipv4 PXE Support	Enabled Disabled**[Default]**	Enable Ipv4 PXE Boot Support. If disabled IPV4 PXE boot option will not be created.
Ipv4 HTTP Support	Enabled Disabled**[Default]**	Enable Ipv4 HTTP Boot Support. If disabled IPV4 HTTP boot option will not be created.
Ipv6 PXE Support	Enabled Disabled**[Default]**	Enable Ipv6 PXE Boot Support. If disabled IPV6 PXE boot option will not be created.
Ipv6 HTTP Support	Enabled Disabled**[Default]**	Enable Ipv6 HTTP Boot Support. If disabled IPV4 HTTP 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.

3.6.2.10 CSM Configuration



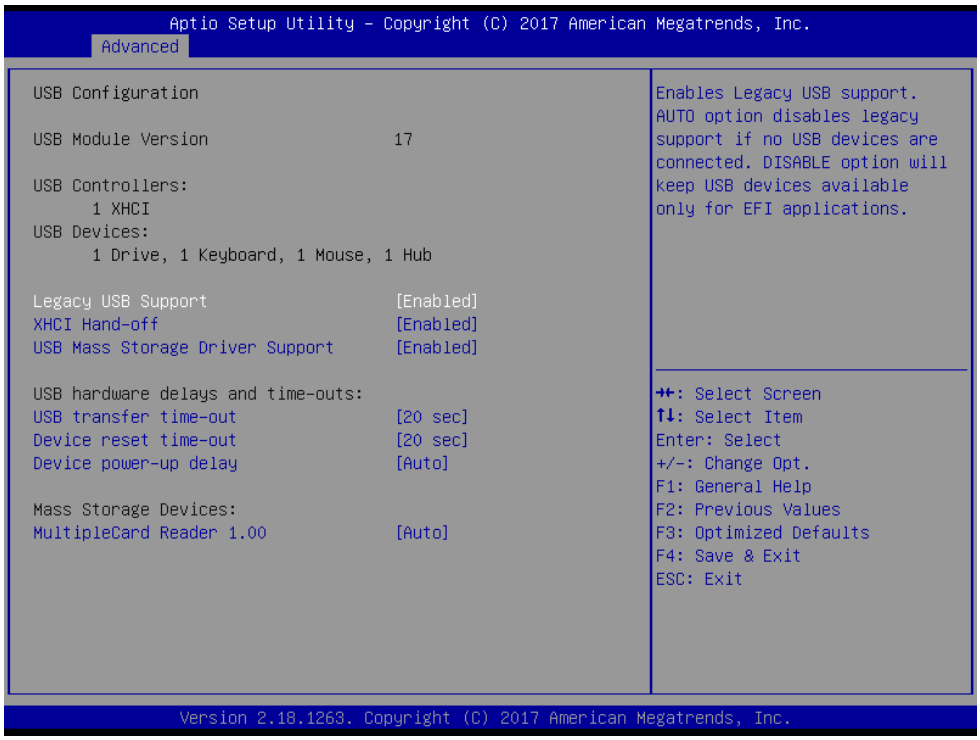
Item	Options	Description
CSM Support	Enabled Disabled**[Default]**	Enable/Disable CSM Support.



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.

3.6.2.11 USB Configuration

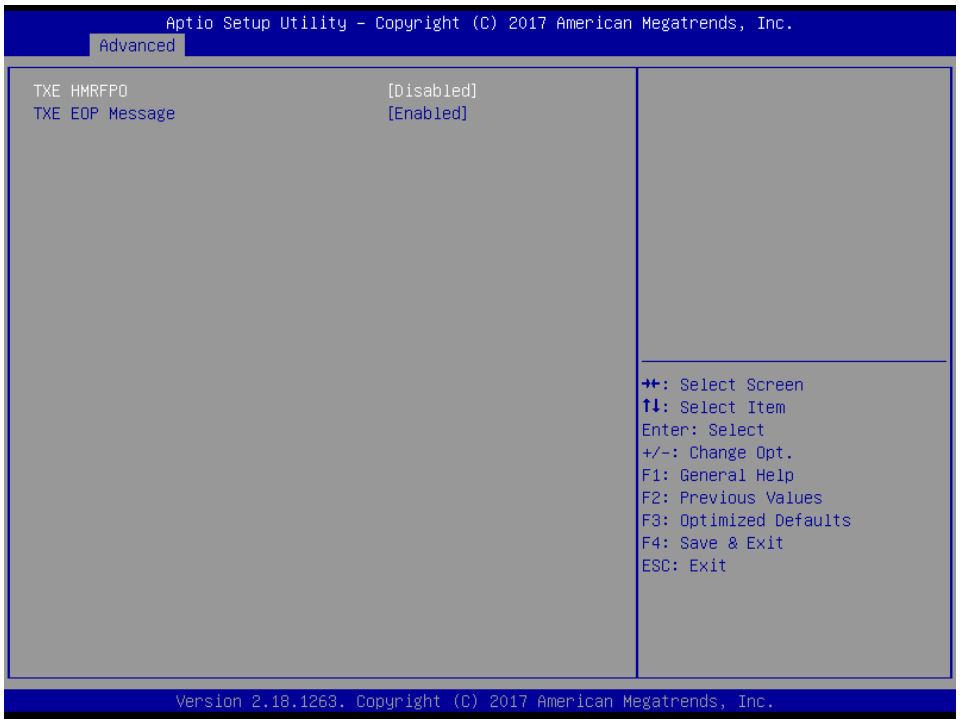
The USB Configuration menu helps read USB information and configures USB settings.



Item	Options	Description
Legacy USB Support	Enabled**[Default]** Disabled Auto	Enables Legacy USB support. AUTO option disables legacy support if no SUB 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.
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]**	Mass storage device emulation type. 'AUTO'

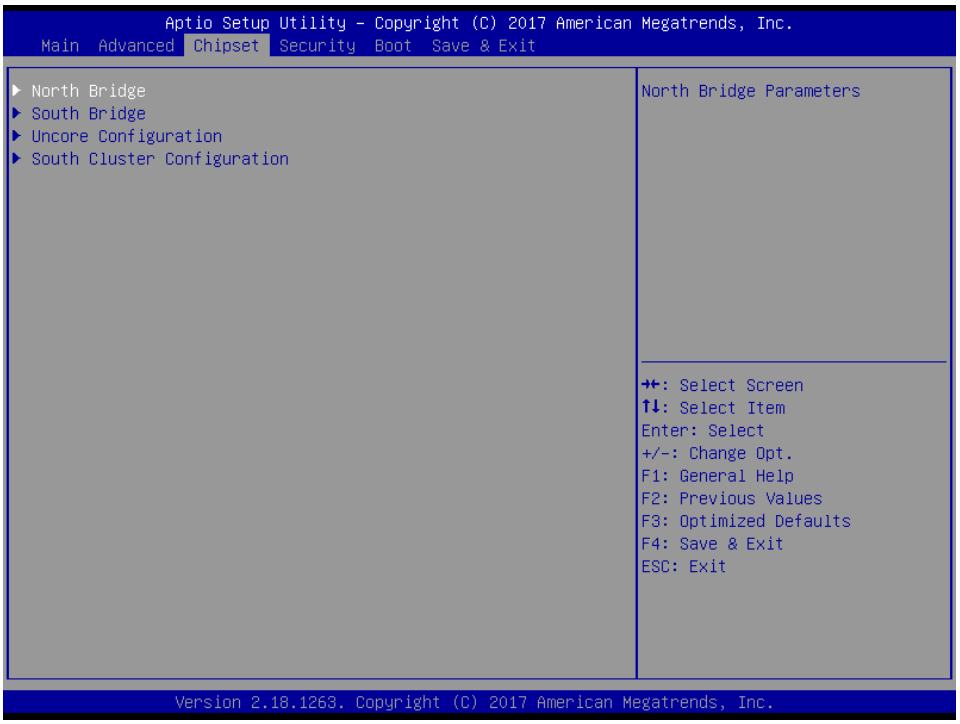
	Floppy Forced FDD Hard Disk CD-ROM	enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type.

3.6.2.12 Security Configuration

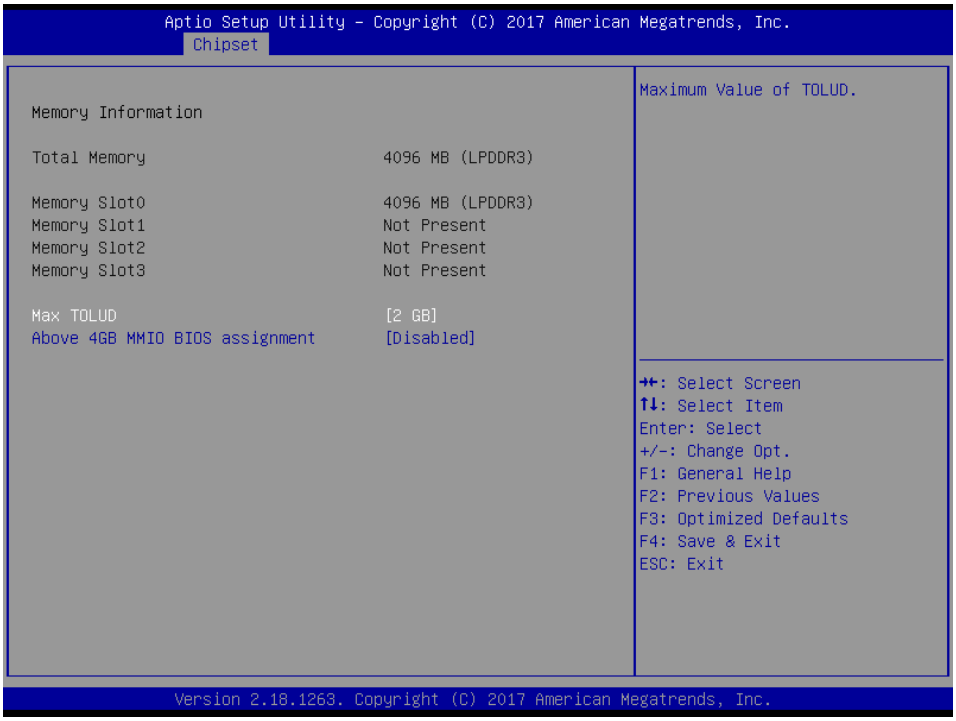


Item	Options	Description
TXE HMRFPO	Enabled Disabled**[Default]**	TXE HMRFPO.
TXE EOP Message	Enabled**[Default]** Disabled	Send EOP Message Before Enter OS.

3.6.3 Chipset



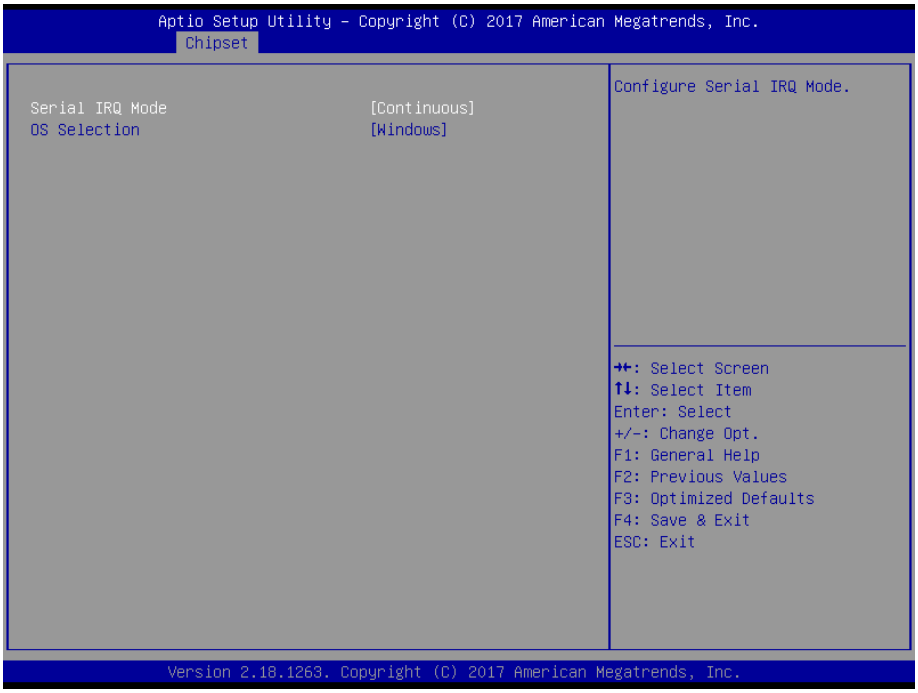
3.6.3.1 North Bridge



Item	Option	Description
Max TOLUD	2 GB**[Default]** 2.25 GB	Maximum Value of TOLUD.

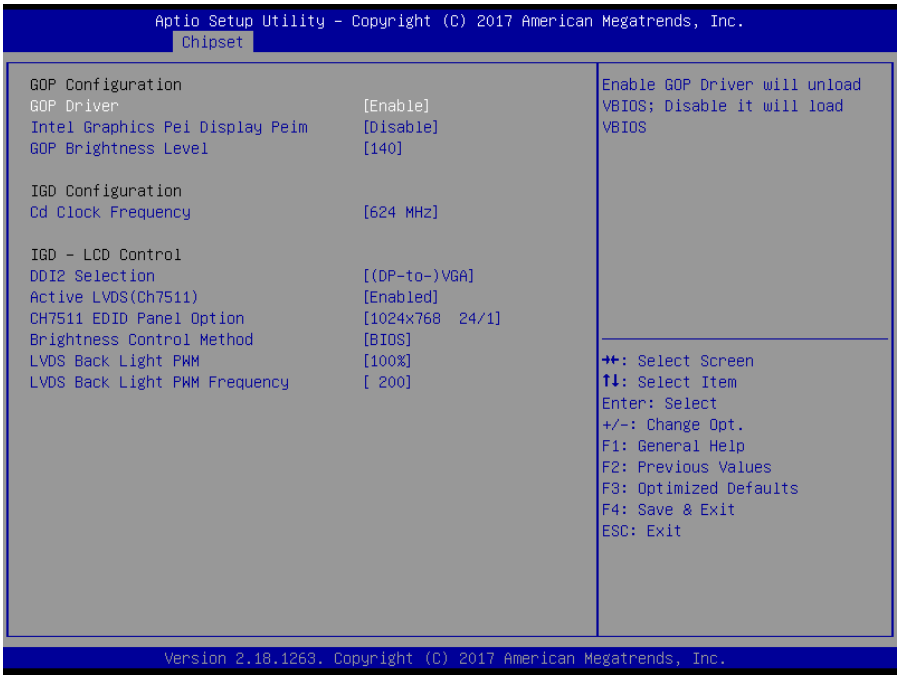
	2.5 GB 2.75 GB	
Above 4GB MMIO BIOS assignment	Enabled Disabled**[Default]**	Enable/Disable above 4GB MemoryMapped IO BIOS assignment. This is disabled automatically when Aperture Size is set to 2048MB.

3.6.3.2 South Bridge



Item	Option	Description
Serial IRQ Mode	Quiet Continuous**[Default]**	Configure Serial IRQ Mode.
OS Selection	Windows**[Default]** Android Intel Linux	Select the target OS.

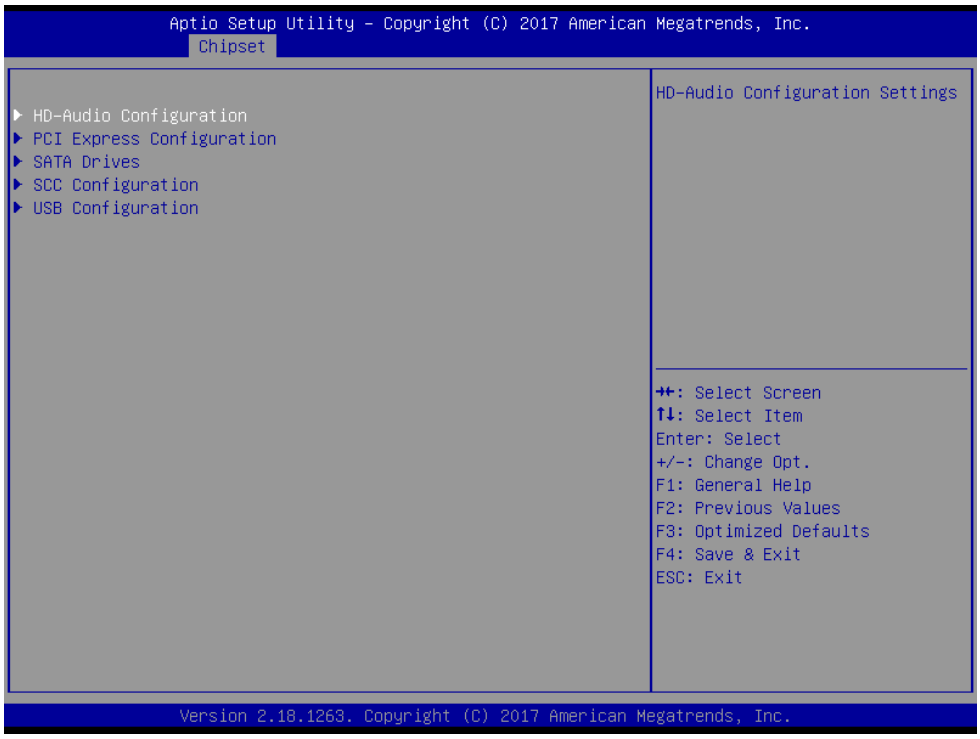
3.6.3.3 Uncore Configuration



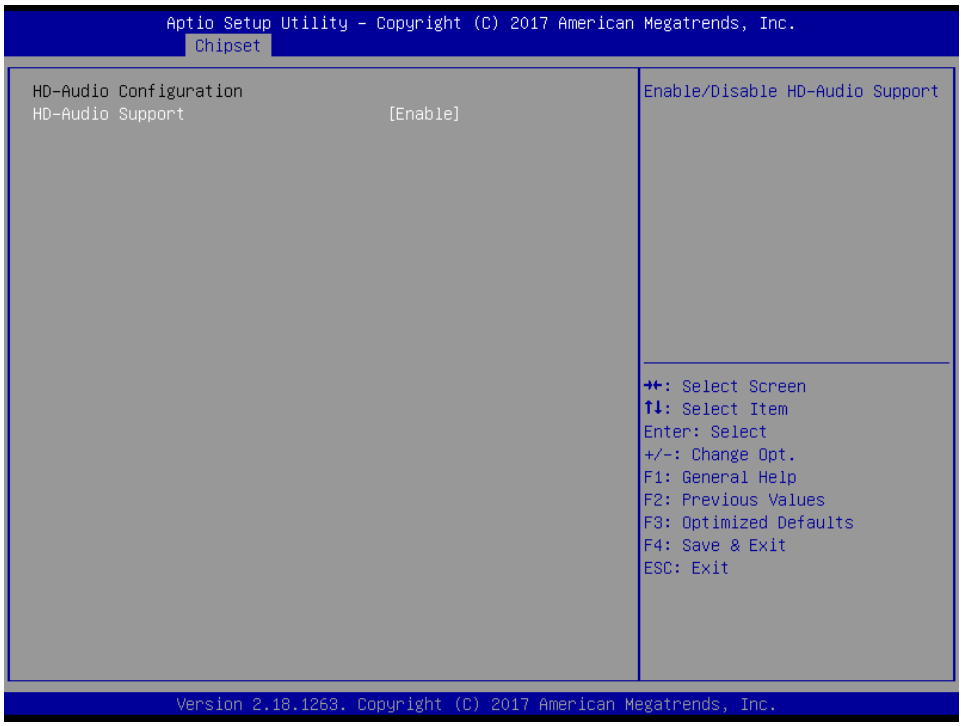
Item	Option	Description
GOP Driver	Enable**[Default]** Disable	Enable GOP Driver will unload VBIOS ; Dsiable it will load VBIOS.
Intel Graphics Pei Display Peim	Enable Disable**[Default]**	Enable/Disable Pei (Early) Display.
GOP Brightness Level	20/40/60/80/100/120/140/160 /180/200/220/240/255**[Default]**	Set GOP Brightness Level ; Value ranges from 0-255.
Cd Clock Frequency	144 MHz 288 MHz 384 MHz 576 MHz 624 MHz**[Default]**	Select the highest Cd Clock frequency supported by the platform.
DDI2 Selection	HDMI (DP-to-) VGA**[Default]**	HDMI or (DP-to-) VGA.
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	Port1-EDP to LVDS(Chrotel 7511) Panel EDID Option.

	1366x768 24/1 1920x1080 24/2 1680x1050 24/2	
LVDS Back Light PWM	00% 25% 50% 75% 100%**[Default]**	Select LVDS back light PWM duty.
LVDS Back Light PWM Frequency	200**[Default]** 300 400 500 700 1k 2k 3k 5k 10k 20k	Select LVDS back light PWM Frequency.

3.6.3.4 South Cluster Configuration

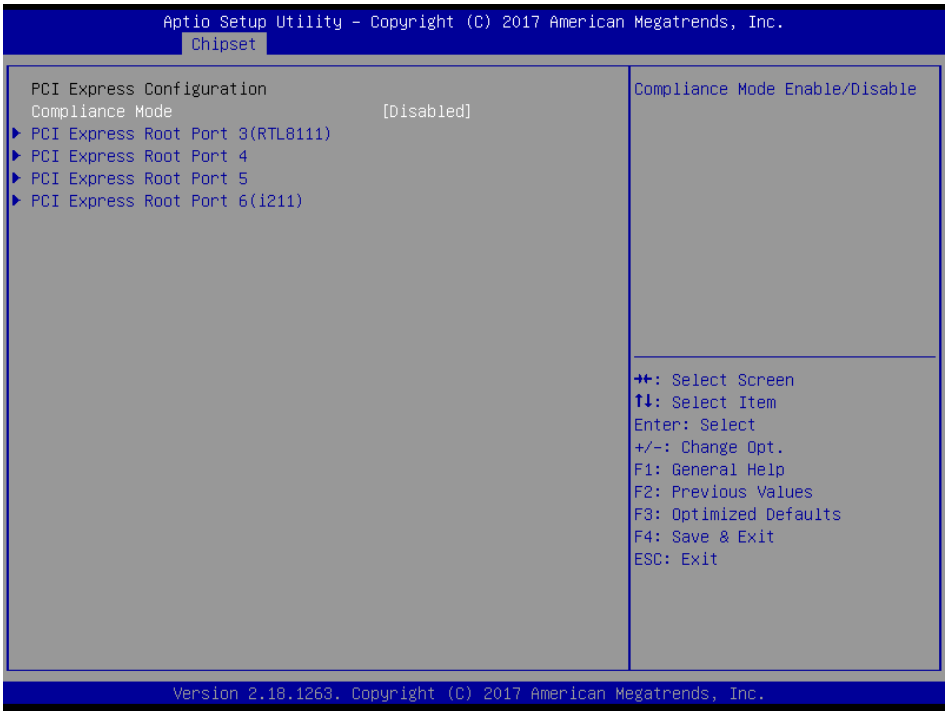


3.6.3.4.1 HD-Audio Configuration



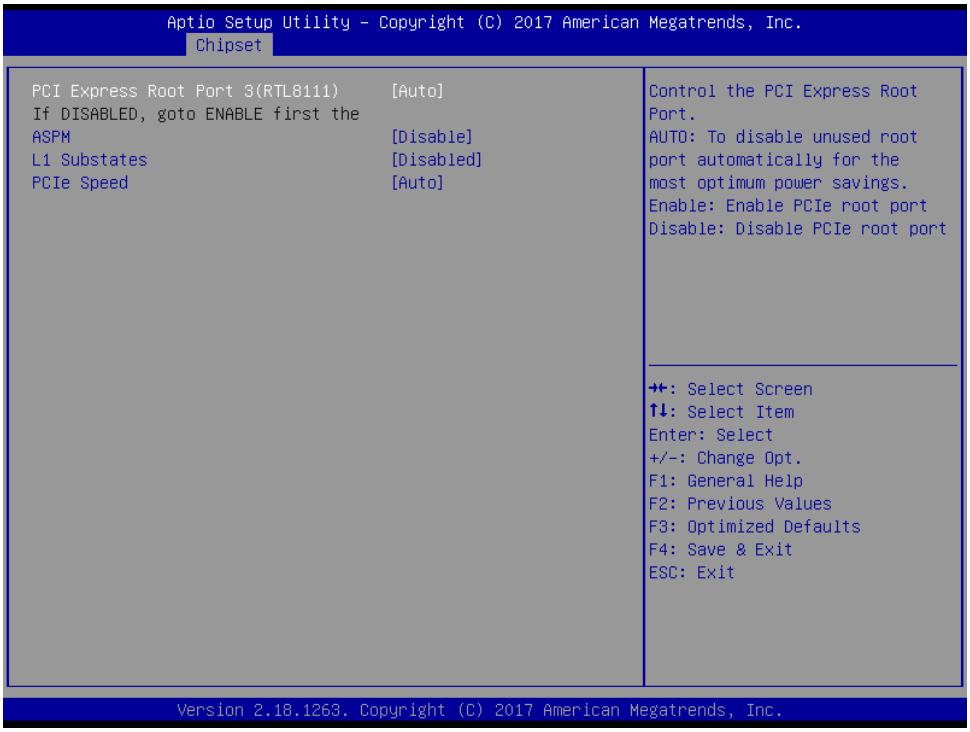
Item	Option	Description
HD-Audio Support	Disable Enable**[Default]**	Enable/Disable HD-Audio Support.

3.6.3.4.2 PCI Express Configuration



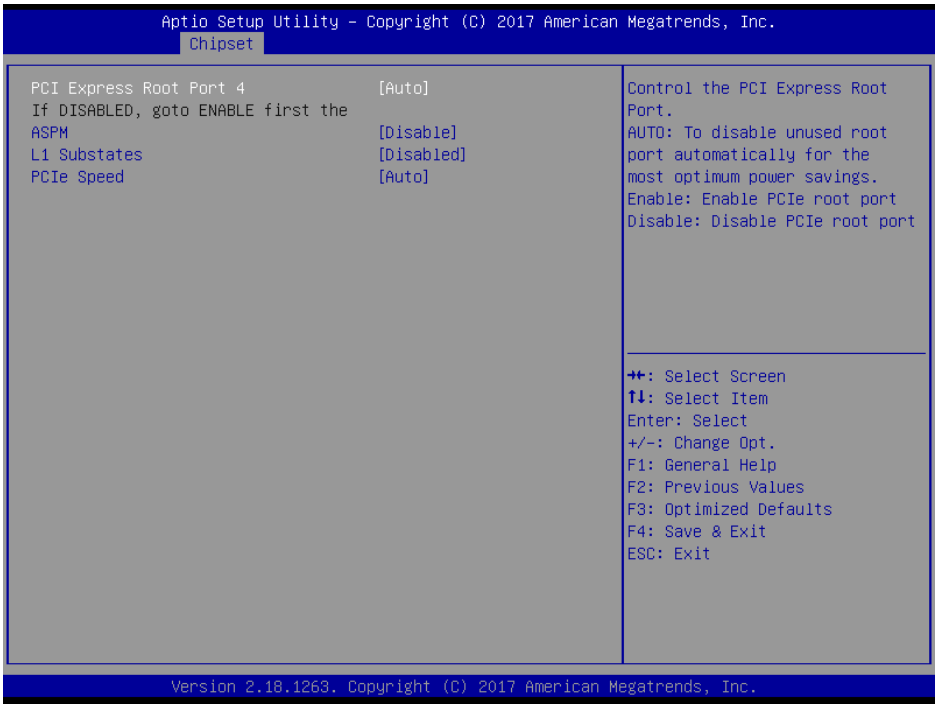
Item	Option	Description
Compliance Mode	Disabled**[Default]** Enabled	Compliance Mode Enable/Disable.

3.6.3.4.2.1 PCI Express Root Port (RTL8111)



Item	Option	Description
PCI Express Root Port (RTL8111)	Disable Enable Auto**[Default]**	Control the PCI Express Root Port. AUTO: To disable unused root port automatically for the most optimum power savings. Enable: Enable PCIe root port Disabled PCIe root port.
ASPM	Disable**[Default]** L0s L1 L0sL1 Auto	PCI Express Active State Power Management settings.
L1 Substates	Disabled**[Default]** L1.1 L1.2 L1.1 & L1.2	PCI Express L1 Substates settings.
PCIe Speed	Auto**[Default]** Gen1 Gen2	Configure PCIe Speed.

3.6.3.4.2.2 PCI Express Root Port 4



Item	Option	Description
PCI Express Root Port 4	Disable Enable Auto**[Default]**	Control the PCI Express Root Port. AUTO: To disable unused root port automatically for the most optimum power savings. Enable: Enable PCIe root port Disabled PCIe root port.
ASPM	Disable**[Default]** L0s L1 L0sL1 Auto	PCI Express Active State Power Management settings.
L1 Substates	Disabled**[Default]** L1.1 L1.2 L1.1 & L1.2	PCI Express L1 Substates settings.
PCIe Speed	Auto**[Default]** Gen1 Gen2	Configure PCIe Speed.

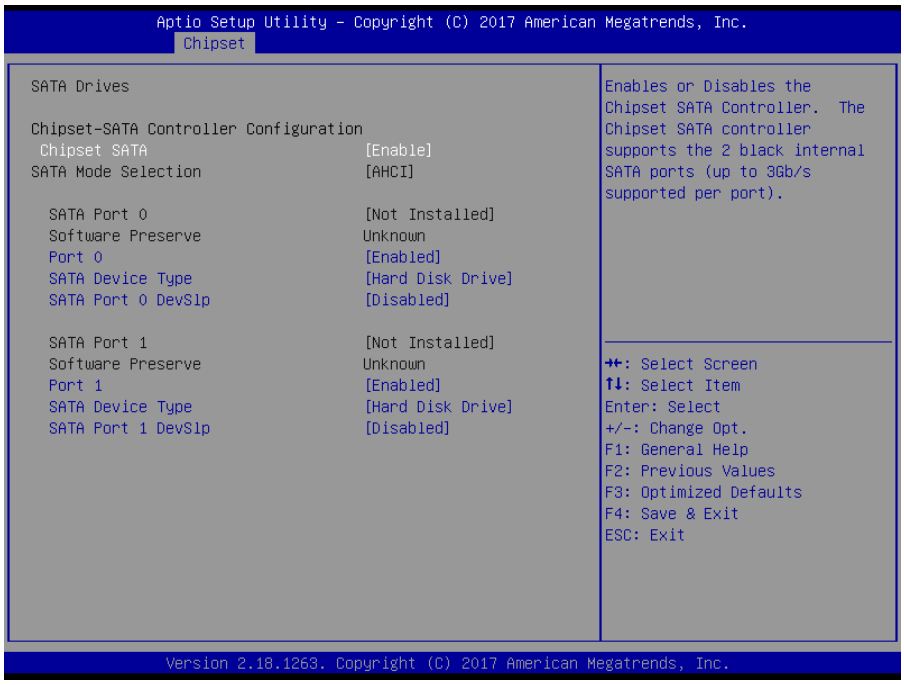
3.6.3.4.2.3 PCI Express Root Port 5

Item	Option	Description
PCI Express Root Port 5	Disable Enable Auto**[Default]**	Control the PCI Express Root Port. AUTO: To disable unused root port automatically for the most optimum power savings. Enable: Enable PCIe root port Disabled PCIe root port.
ASPM	Disable**[Default]** L0s L1 L0sL1 Auto	PCI Express Active State Power Management settings.
L1 Substates	Disabled**[Default]** L1.1 L1.2 L1.1 & L1.2	PCI Express L1 Substates settings.
PCIe Speed	Auto**[Default]** Gen1 Gen2	Configure PCIe Speed.

3.6.3.4.2.4 PCI Express Root Port 6(i211)

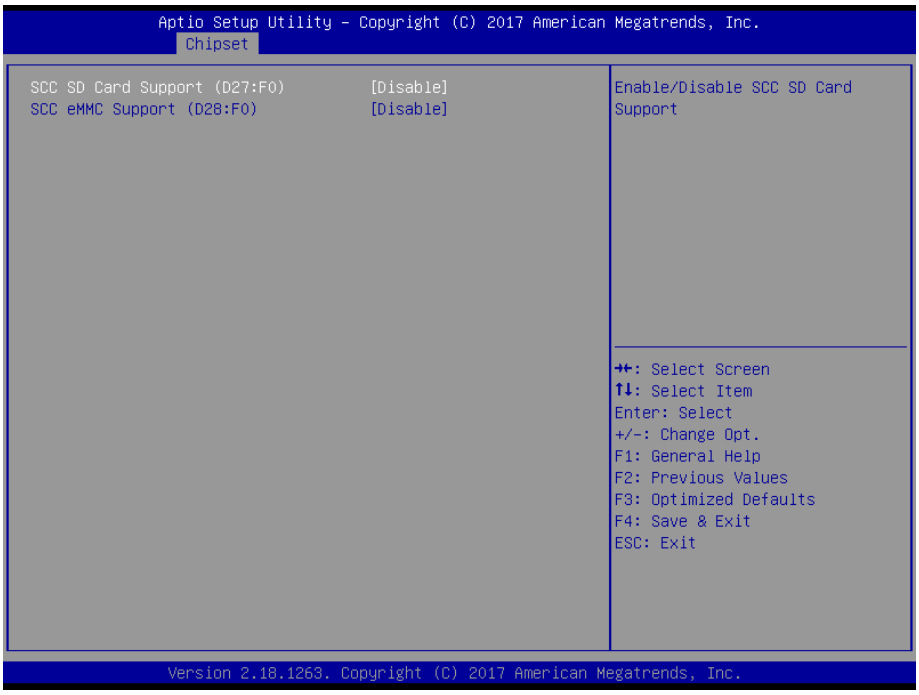
Item	Option	Description
PCI Express Root Port 6(i211)	Disable Enable Auto**[Default]**	Control the PCI Express Root Port. AUTO: To disable unused root port automatically for the most optimum power savings. Enable: Enable PCIe root port Disabled PCIe root port.
ASPM	Disable**[Default]** L0s L1 L0sL1 Auto	PCI Express Active State Power Management settings.
L1 Substates	Disabled**[Default]** L1.1 L1.2 L1.1 & L1.2	PCI Express L1 Substates settings.
PCIe Speed	Auto**[Default]** Gen1 Gen2	Configure PCIe Speed.

3.6.3.4.3 SATA Drivers



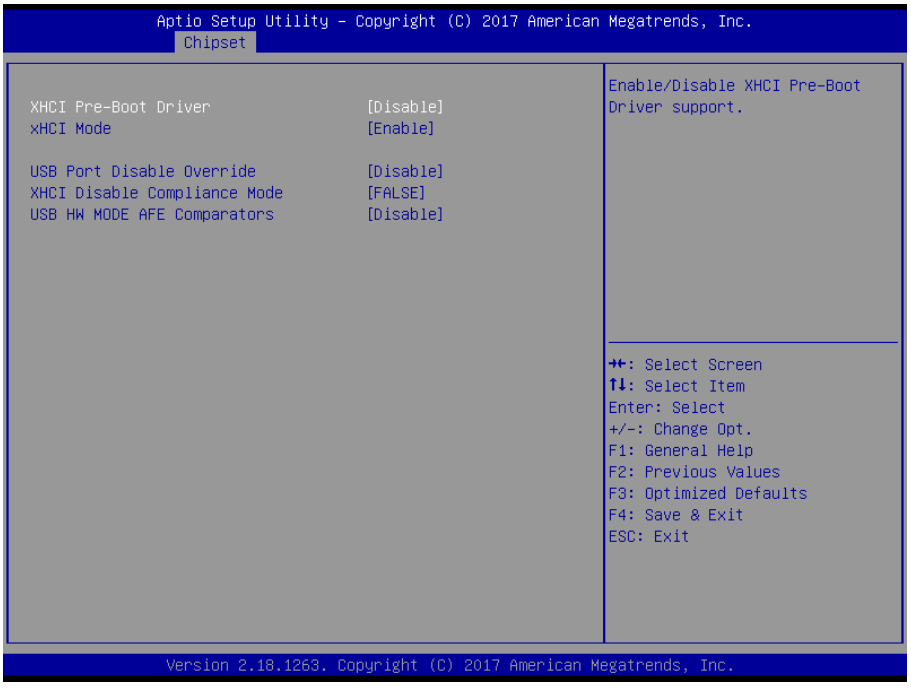
Item	Option	Description
Chipset SATA	Enable**[Default]** Disable	Enables or Disables the Chipset SATA Controller. The Chipset SATA controller supports the 2 black internal SATA ports (up to 3Gb/s supported per port).
Port 0/1	Disabled Enabled**[Default]**	Enable or Disable SATA Port.
SATA Device Type	Hard Disk Drive**[Default]** Solid State Drive	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.
SATA Port 0 DevSlp	Disabled**[Default]** Enabled	Enable/Disable SATA Port 0 DevSlp. Board rework for LP needed before enable.

3.6.3.4.4 SCC Configuration



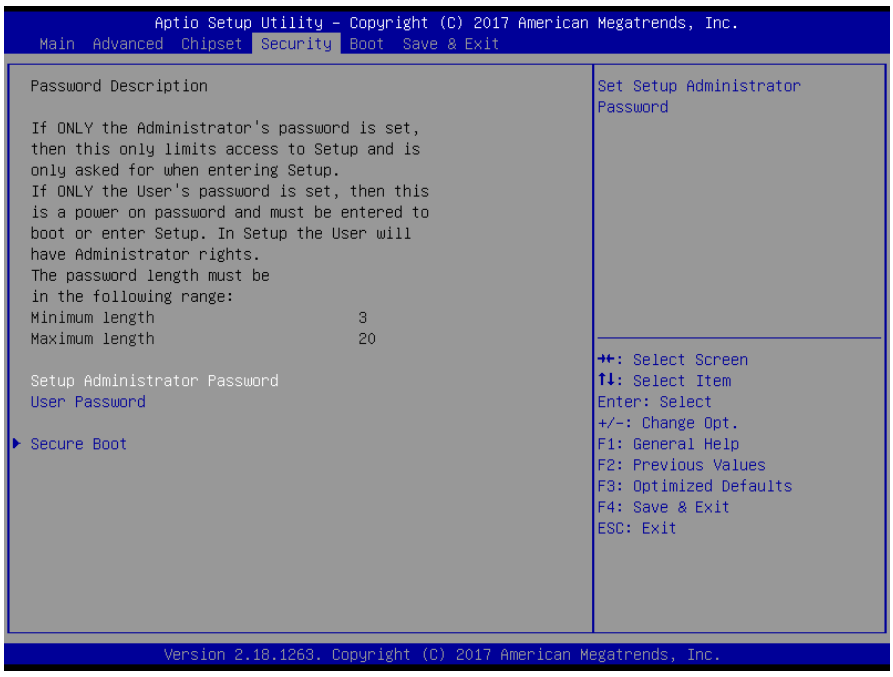
Item	Option	Description
SCC SD Card Support (D27:F0)	Enable Disable**[Default]**	Enable/Disable SCC SD Card Support.
SCC eMMC Support (D28:F0)	Enable Disable**[Default]**	Enable/Disable SCC eMMC Support.

3.6.3.4.4 USB Configuration



Item	Option	Description
XHCI Pre-Boot Driver	Enable Disable**[Default]**	Enable/Disable XHCI Pre-Boot Driver support.
xHCI Mode	Enable**[Default]** Disable	Once disabled, XHCI controller would be function disabled, none of the USB devices are detectable and usable during boot and in OS. Do not disable it unless for debug purpose.
USB Port Disable Override	Enable Disable**[Default]**	Selectively Enable/Disable the corresponding USB port from reporting a Device Connection to the controller.
XHCI Disable Compliance Mode	FALSE**[Default]** TRUE	Options to disable XHCI Link Compliance Mode. Default is FALSE to not disable Compliance Mode. Set TRUE to disable Compliance Mode.
USB HW MODE AFE Comparators	Enable Disable**[Default]**	Enable/Disable USB HW MODE AFE Comparators.

3.6.4 Security



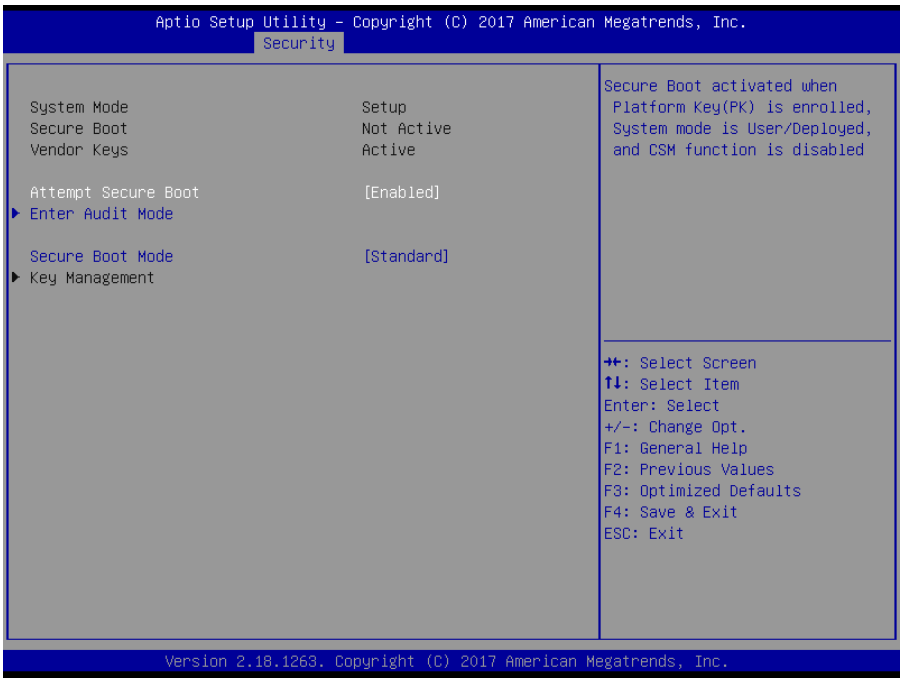
- **Setup Administrator Password**

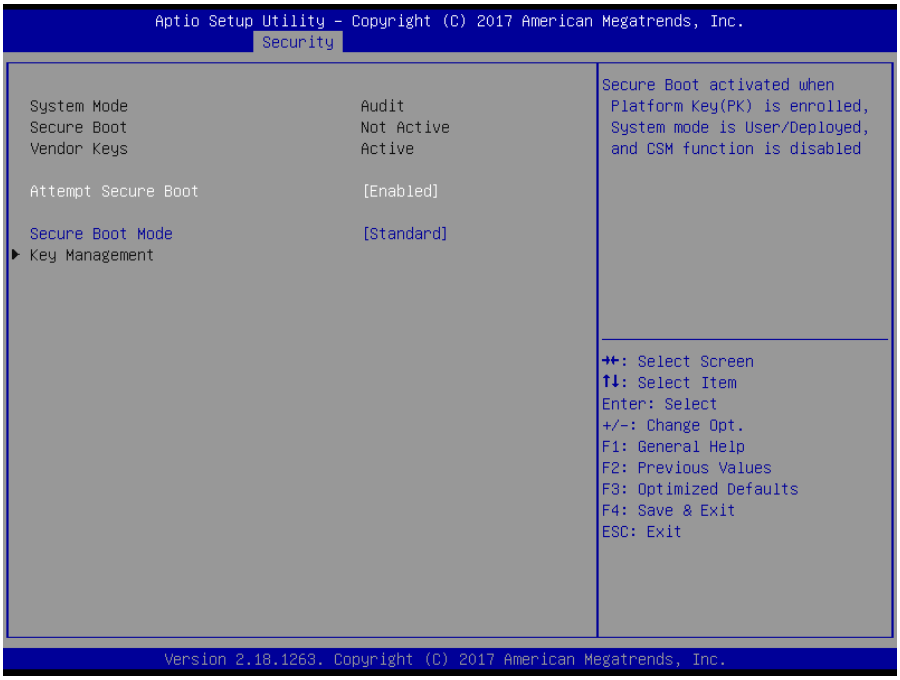
Set setup Administrator Password

- **User Password**

Set User Password

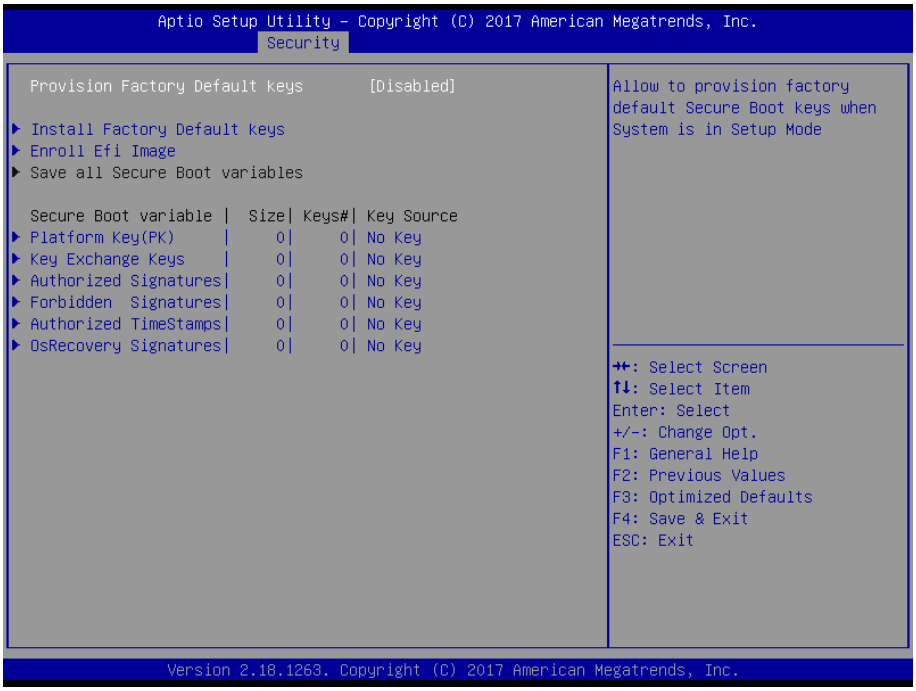
3.6.4.1 Secure Boot





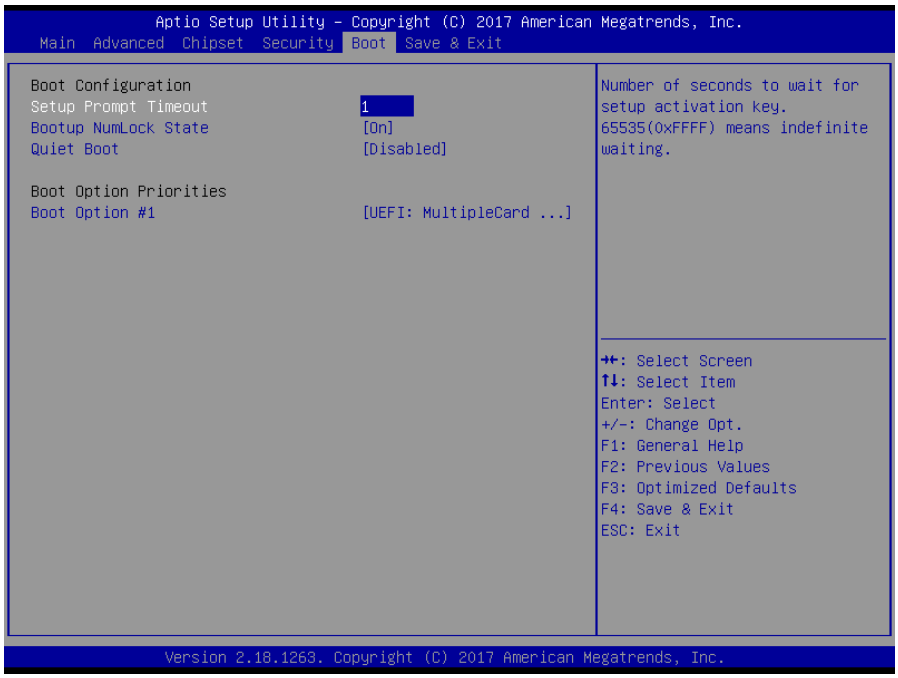
Item	Option	Description
Attempt Secure Boot	Disabled Enabled**[Default]**	Secure Boot activated when Platform Key(PK) is enrolled, System mode is User/Deployed, and CSM function is disabled.
Secure Boot Mode	Standard**[Default]** Customized	Secure Boot Mode – Custom_Standard, Set UEFI Secure Boot Mode to STANDARD mode or CUSTOM mode, this change is effect after save. And after reset, the mode will return to STANDARD mode.

3.6.4.1.1 Key Management



Item	Option	Description
Provision Factory Default Keys	Disable**[Default]** Enable	Allow to provision factory default Secure Boot keys when System is in Setup Mode.

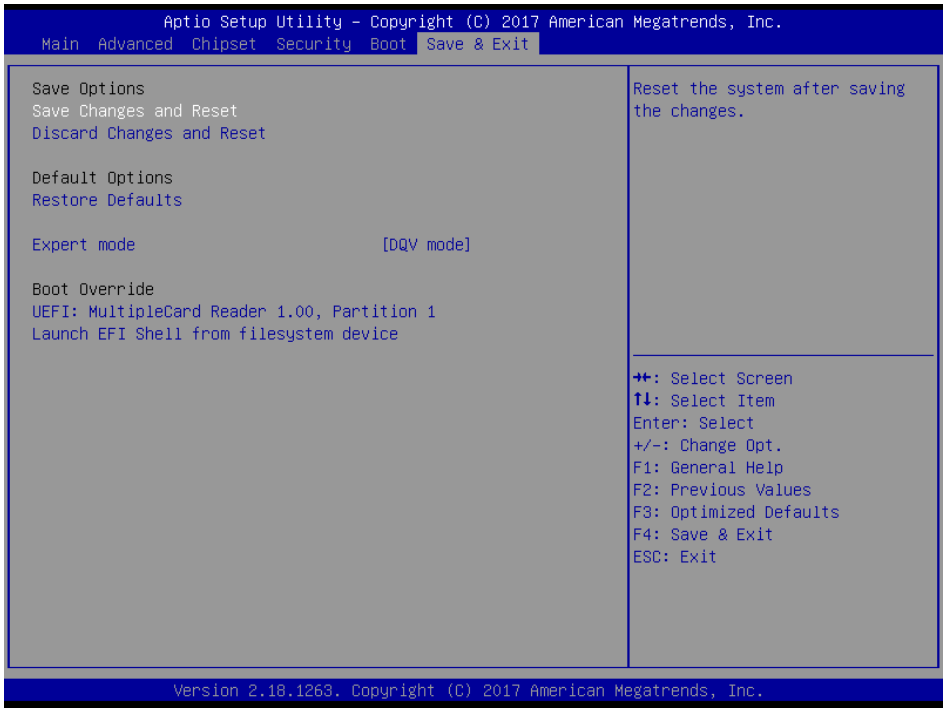
3.6.5 Boot



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
Boot Option #1	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.

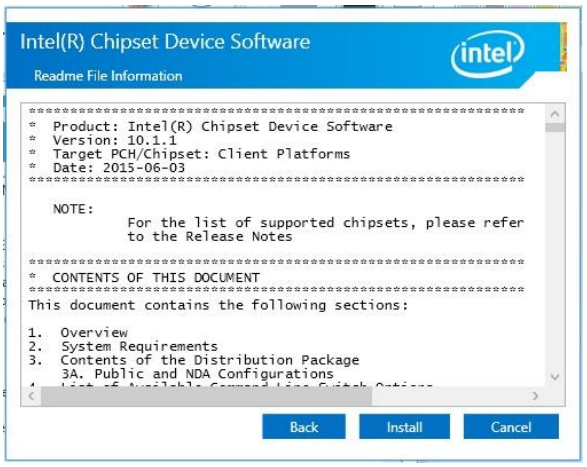
4.1 Install Chipset Driver

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

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**.



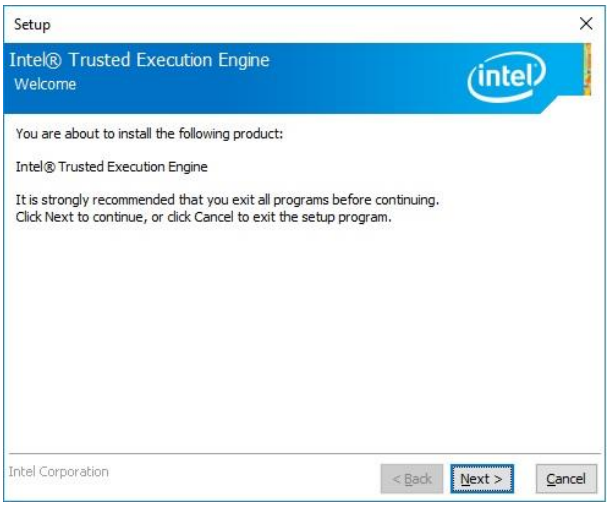
Step 3. Click **Install**.

Step 4. Complete setup.

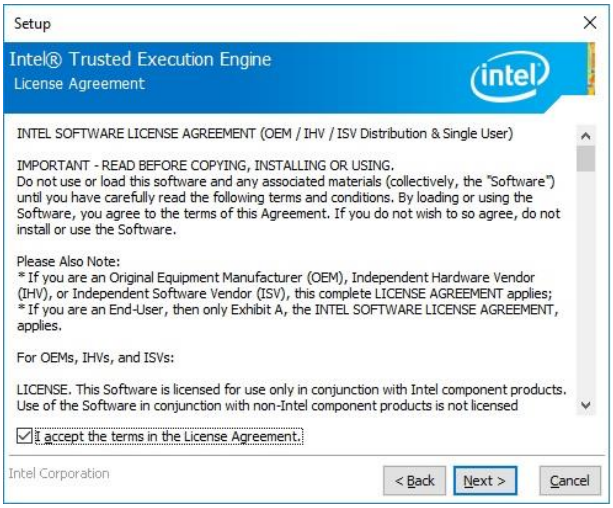
4.2 Install TXE Driver

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

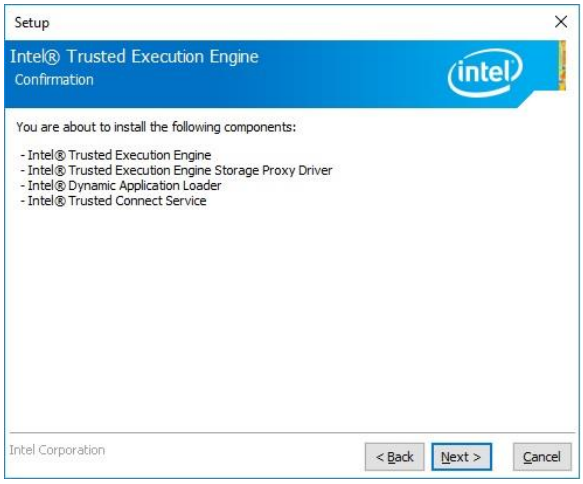
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system. If the warning message appears while the installation process, click Continue to go on.



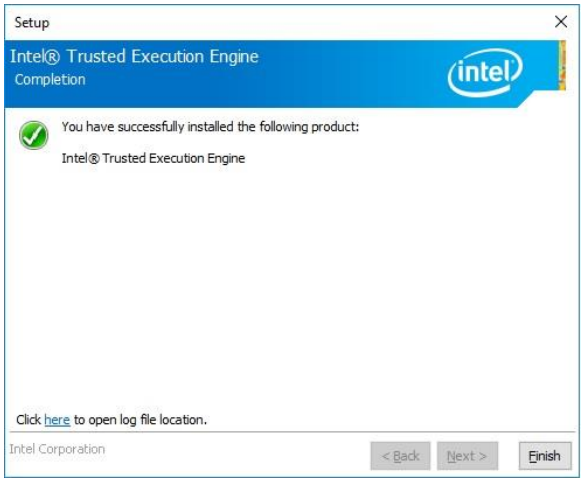
Step1. Click **Next** to start installation.



Step 2. Click **Next**.



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

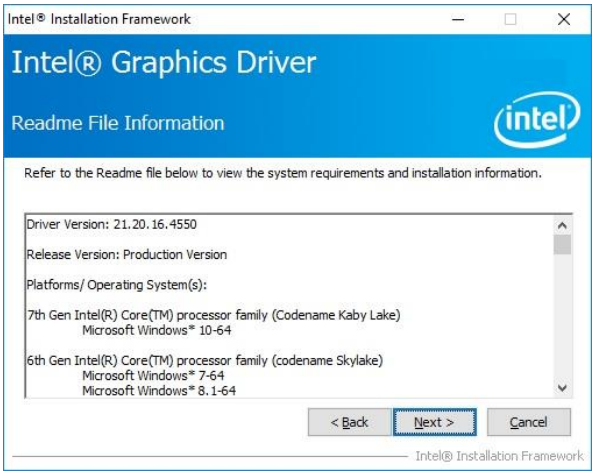


Step 4. Click **Finish** to complete setup.

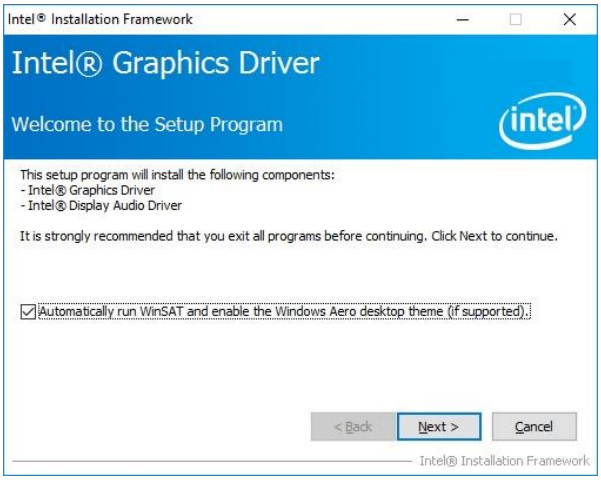
4.3 Install VGA Driver

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

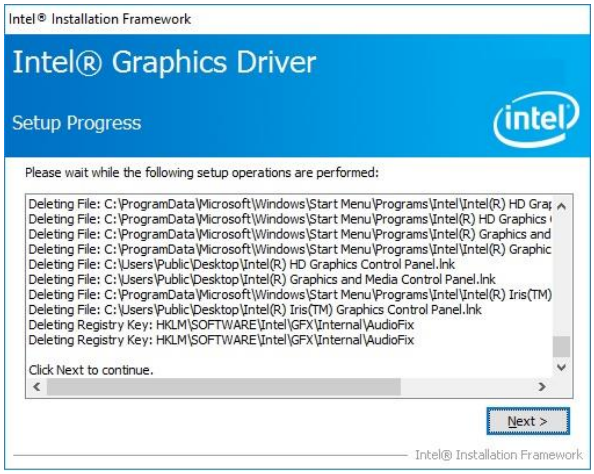
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



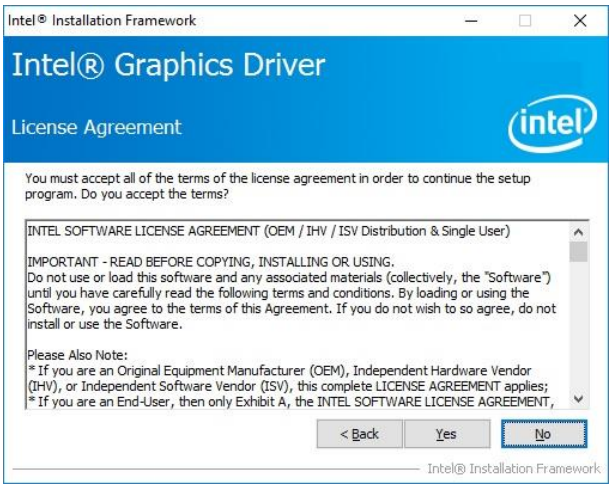
Step 3. Click **Next.**



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

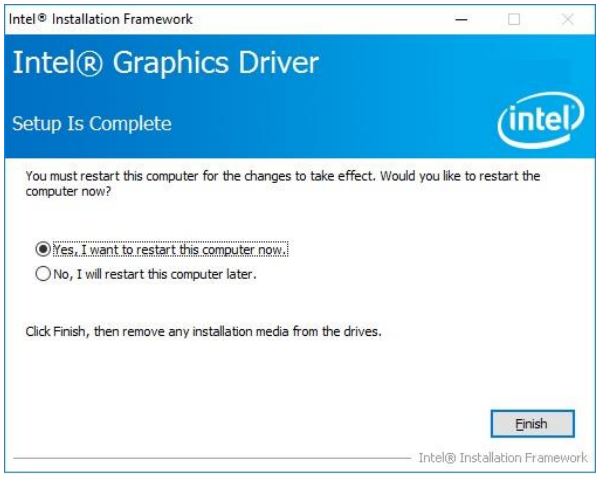


Step 4. Click **Next**.



Step 2.

Click **Yes** to accept license agreement.

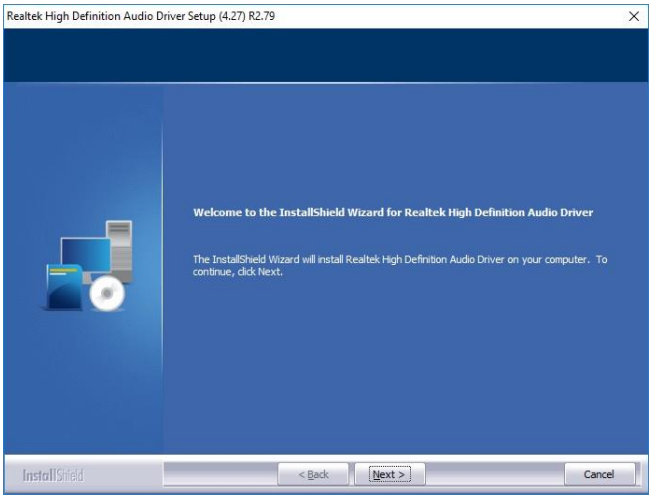


Step 5. Click **Finish** to complete setup.

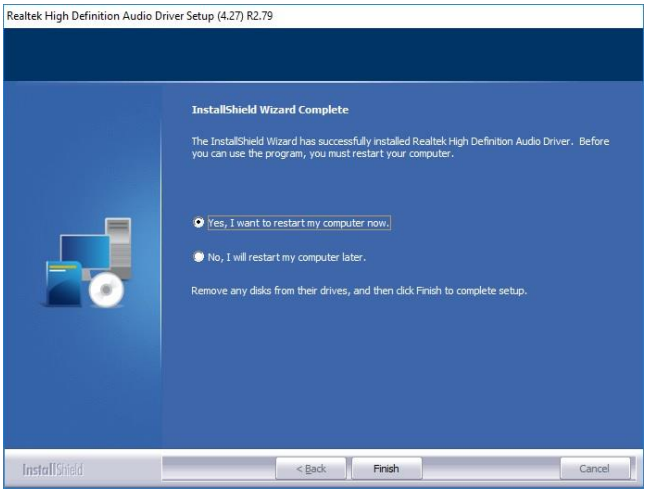
4.4 Install Audio Driver

Insert the Supporting CD-ROM to CD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left, or link to **/Driver_Audio/Realtek/ALC892/ESM-APLC_Audio**.

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



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

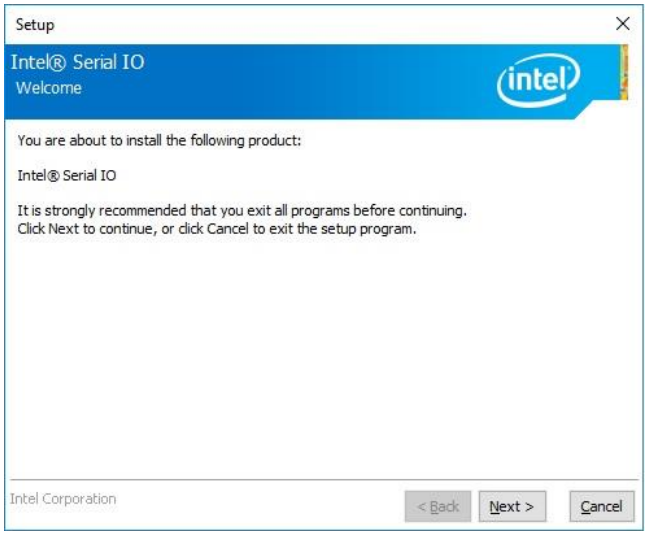


Step 2. Click **Finish** to complete the setup.

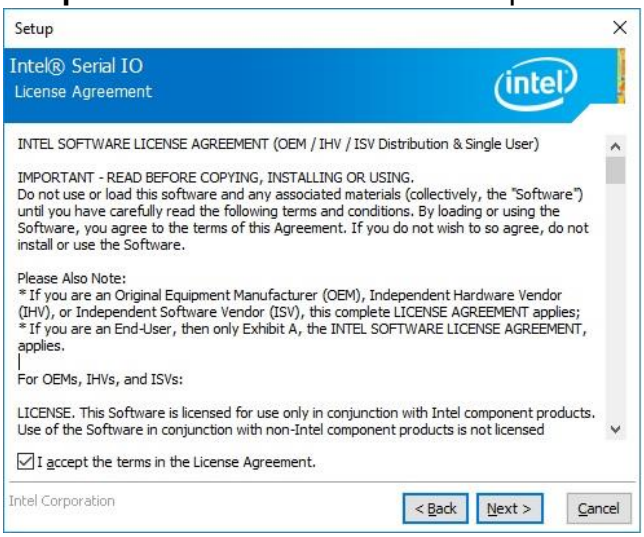
4.5 Install Serial IO Driver

Insert the Supporting CD-ROM to CD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left, or link to **/Utility/ESM-APLC_SerialIO**.

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

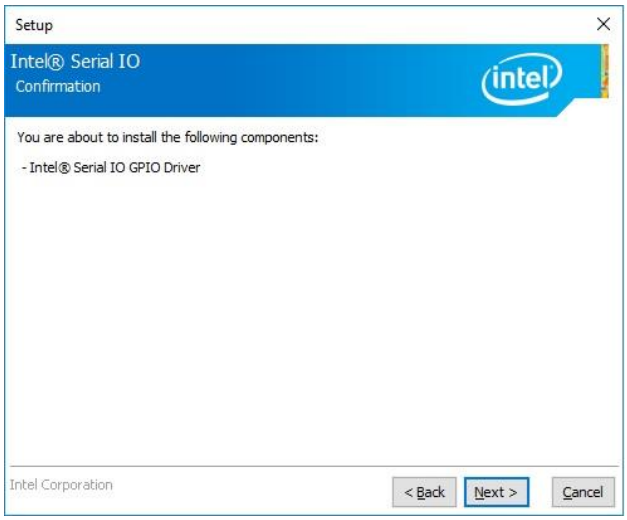


Step 1. Click **Next** to continue setup.



Step 2. Click **Next**.

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



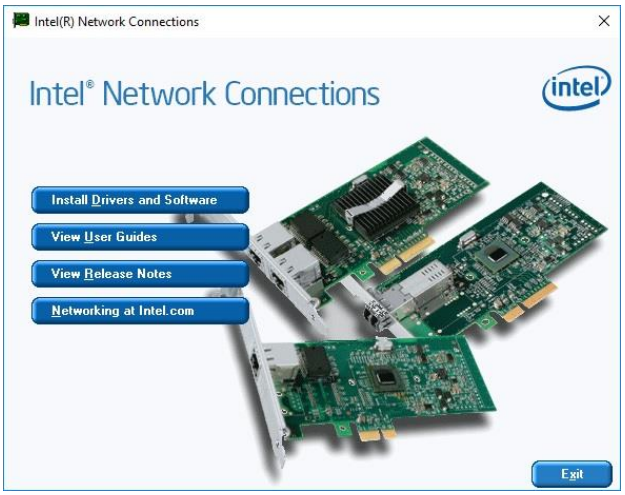
Step 4. Click **Next**.

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

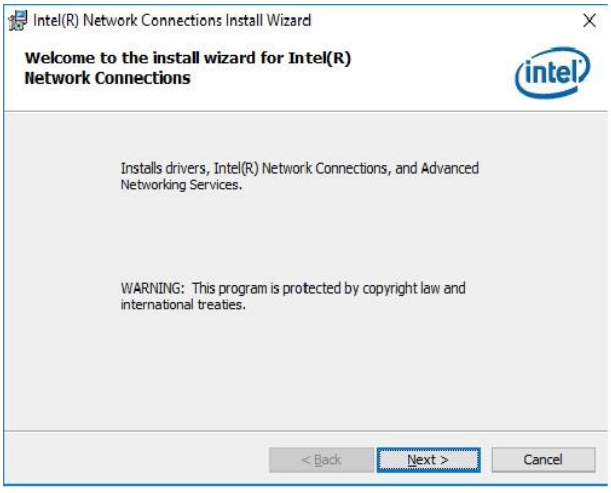
4.6 Install Ethernet Driver

Insert the Supporting CD-ROM to CD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left, or link to **/Driver_Gigabit/Intel/I211AT/ESM-APLC_LAN**.

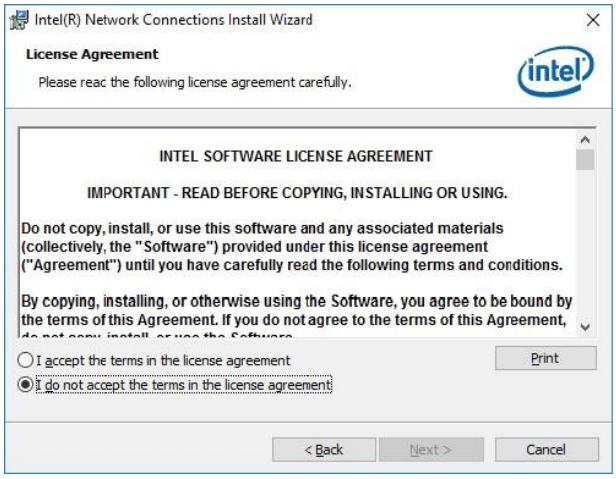
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



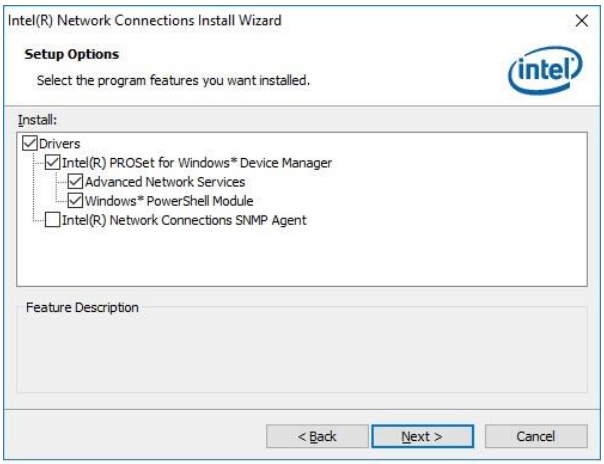
Step 1. Click **Install Drivers and Software**.



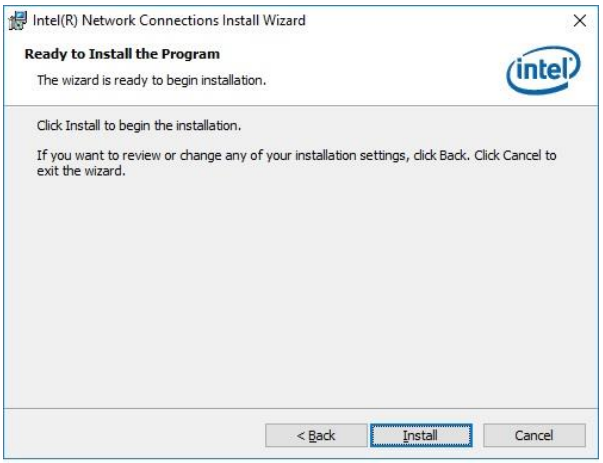
Step 2. Click **Next**.



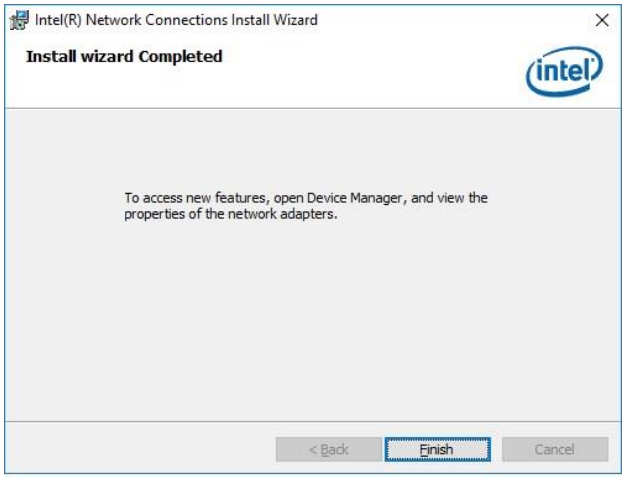
Step 3. Click **Next** to continue setup.



Step 4. Click **Next**.

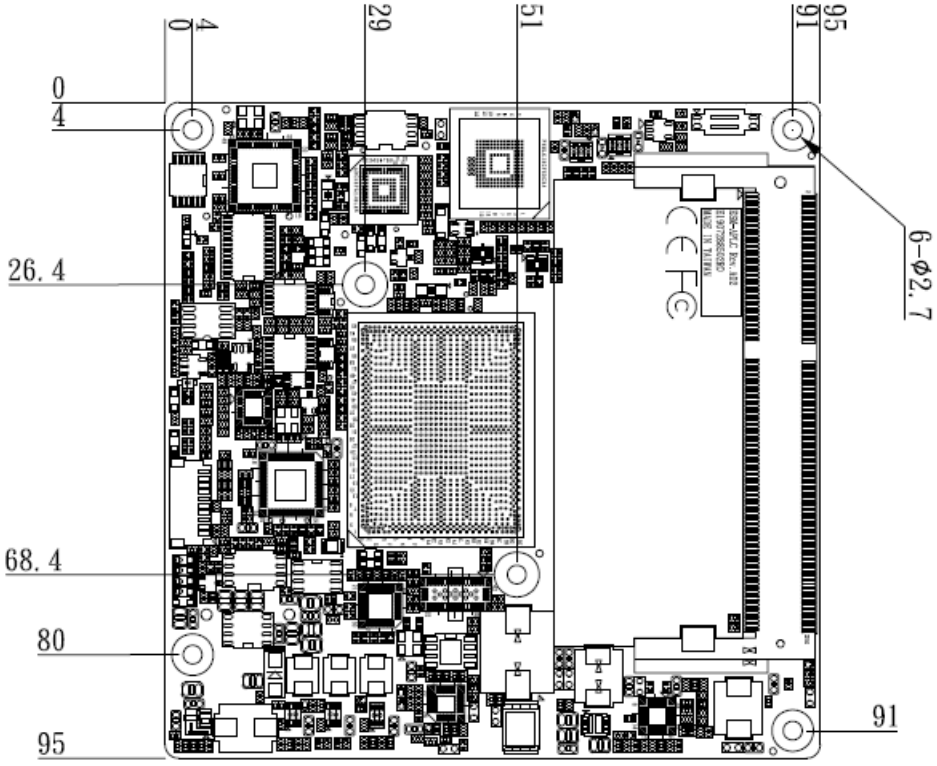


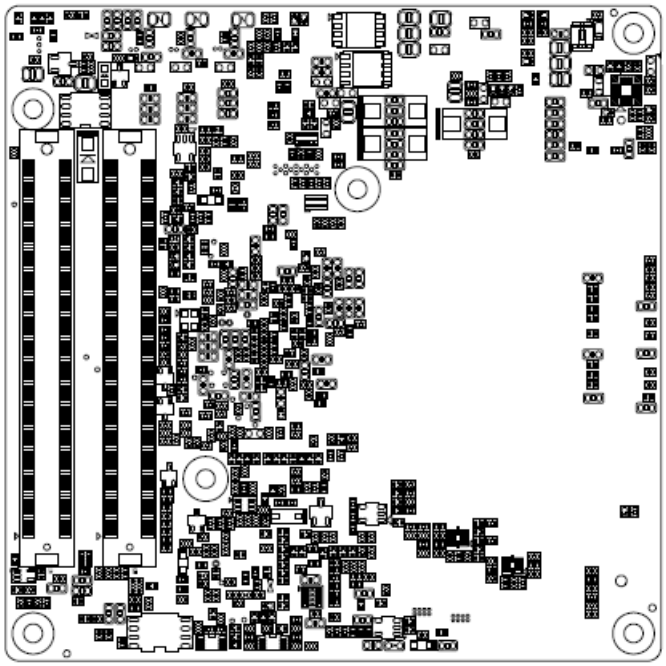
Step 5. Click **Install**.



Step 6. Click **Finish** to complete the setup.

5. Mechanical Drawing





Unit: mm