

EMX-H110KP-B1

Intel® LGA1151 Socket Supports 6/7th Generation Core™
i7/ i5/ i3 Processors

User's Manual

2nd Ed – 30 November 2022

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 UNDESIRABLE 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.

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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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2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information available.
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5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

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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 × EMX-H110KP-B1 motherboard
- 2 × SATA cables
- 1 × I/O Shieldtherboard



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

1.3 Document Amendment History

Revision	Date	By	Comment
1 st	November 2022	Avalue	Initial Release
2 nd	November 2022	Avalue	Update System Specifications

1.4 Manual Objectives

This manual describes in details Avalue Technology EMX-H110KP-B1 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 EMX-H110KP-B1 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 CMOS RAM that make booting impossible. If this should happen, clear the CMOS 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® LGA1151 Socket Supports 6/7th Generation Core™ i7/ i5/ i3 Processors (Max. TDP at 95W)
BIOS	AMI uEFI BIOS, 128Mbit SPI Flash ROM
System Chipset	Intel® H110 Chipset
I/O Chip	Nuvoton® NCT6106D
System Memory	Two 260-pin DDR4 2400MHz SO-DIMM socket, supports up to 32GB Max
Watchdog Timer	H/W Reset, 5~255 seconds/5~255 minutes
H/W Status Monitor	CPU temperature monitoring Voltages monitoring CPU fan speed control
Other	EEPROM: AMI uEFI BIOS, 128Mbit SPI Flash ROM
Expansion Slot	
mPCIe	1 x Full Size Mini-PCI-e with mSATA Support (SATA III) 1 x Half Size Mini PCI-e
PCIe	1 x PCI-e x16
Storage	
mSATA	1 x SATA III or 1 x full size Mini PCI-e support mSATA by BIOS selection
SATA	3 x SATA III 1 x SATA III or 1 x full size Mini PCI-e support mSATA by BIOS selection
Edge I/O	
COM	COM 1 Pin9 power selection: - 1 x 2 x 3 pin, pitch 2.00mm connector for COM 1 support RS232 with Pin 9, +5V/+12V/RI
LAN	2 x RJ-45 with Dual deck USB 3.0 connector
USB 2.0	2 x USB 2.0
USB 3.1	4 x USB 3.0
DP	1 x DP++
HDMI	1 x HDMI
VGA	1 x VGA
Audio	Realtek ALC888S HD Audio with 6W x2 Audio amplifier
PS2 Port	1 x PS/2 Keyboard or Mouse
Onboard I/O	
COM	COM 2 1 x 2 x 3 pin, pitch 2.00mm connector for COM 2 support RS232 with Pin 9,+5V/+12V/RI

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	1 x 2 x 3 pin, pitch 2.00mm connector for COM 2 support RS422/485 connector, Pin 5 with +5V 1 x 2 x 5 pin, pitch 2.00mm connector for COM2 support RS-232 connector COM 3~6 - 4 x 2 x 5 pin, pitch 2.00mm connector for COM 3~6: support RS-232 connector
USB 2.0	1 x 2 x 5 pin, pitch 2.54mm connector for 2 USB 2.0
GPIO	1 x 2 x 6 pin, pitch 2.00mm connector for 8 bits GPIO
CPU/System FAN	1 x 1 x 4 pin, pitch 2.54mm CPU fan connector with smart fan function supported 1 x 1 x 4 pin, pitch 2.54mm System fan connector with smart fan function supported
Buzzer	Onboard
Front Panel	1 x 2 x 5 pin, pitch 2.54mm connector for front panel
RTC Battery	1 x 2 Pin Pitch 1.25mm Vertical type battery connector
AT/ATX Selector	1 x 1 x 3 pin pitch 2.00mm connector for AT/ATX jumper 1 x 2 x 10 pin ATX power connector 1 x 2 x 2 pin ATX 12V power connector
Clear CMOS	1 x 1 x 3pin, pitch 2.54mm connector for COMS Clear
LVDS	1 x 2 x 20 pin, pitch 1.25mm connector for LVDS
LCD Inverter	1 x 1 x 5 pin, pitch 2.00mm Wafer connector for LCD inverter backlight connector (5V/12V)
LPC	1 x 2 x 5 pin, pitch 2.00 mm connector for LPC
BIOS SPI	1 x 2 x 4 pin, pitch 2.00 mm connector for BIOS SPI
Audio	1 x 2 x 5 pin, pitch 2.54mm connector for front Audio
Display	
Graphic Chipset	Intel® H110 chipset
Spec. & Resolution	VGA: 2560 x 1600 @ 60 Hz HDMI: 3840 x 2160 @ 30 Hz, 2560 x 1600@ 30 Hz (Note: This resolution is actual test result. Intel resolution: 4096 x 2160 @24Hz) DP++: 4096 x 2304@60Hz
Multiple Display	Triple Display
Audio	
Audio Codec	Realtek ALC888S HD Audio Decoding Controller
Amplifier	6W Amplifier
Ethernet	
LAN Chipset	1 x Intel® I219LM Gigabit Ethernet PHY 1 x Intel® I210AT PCI-e Gigabit Ethernet
Mechanical & Environmental Specification	
Power Requirement	+12V / +5V / 5VSB /+3.3V/ -12V
ACPI	Single power ATX Support S0, S3, S4, S5

Power Mode	AT / ATX mode Switchable Through Jumper
Operating Temp.	0~60°C (32~140°F)
Storage Temp.	-40~ 75°C
Operating Humidity	40°C @ 95% relative humidity, non-condensing
Size (L x W) (Please consult product engineers for the production feasibility if the size is larger than 410x360mm or smaller than 80x70mm)	6.7" x 6.7" (170mm x 170mm)
Weight	0.40 kg

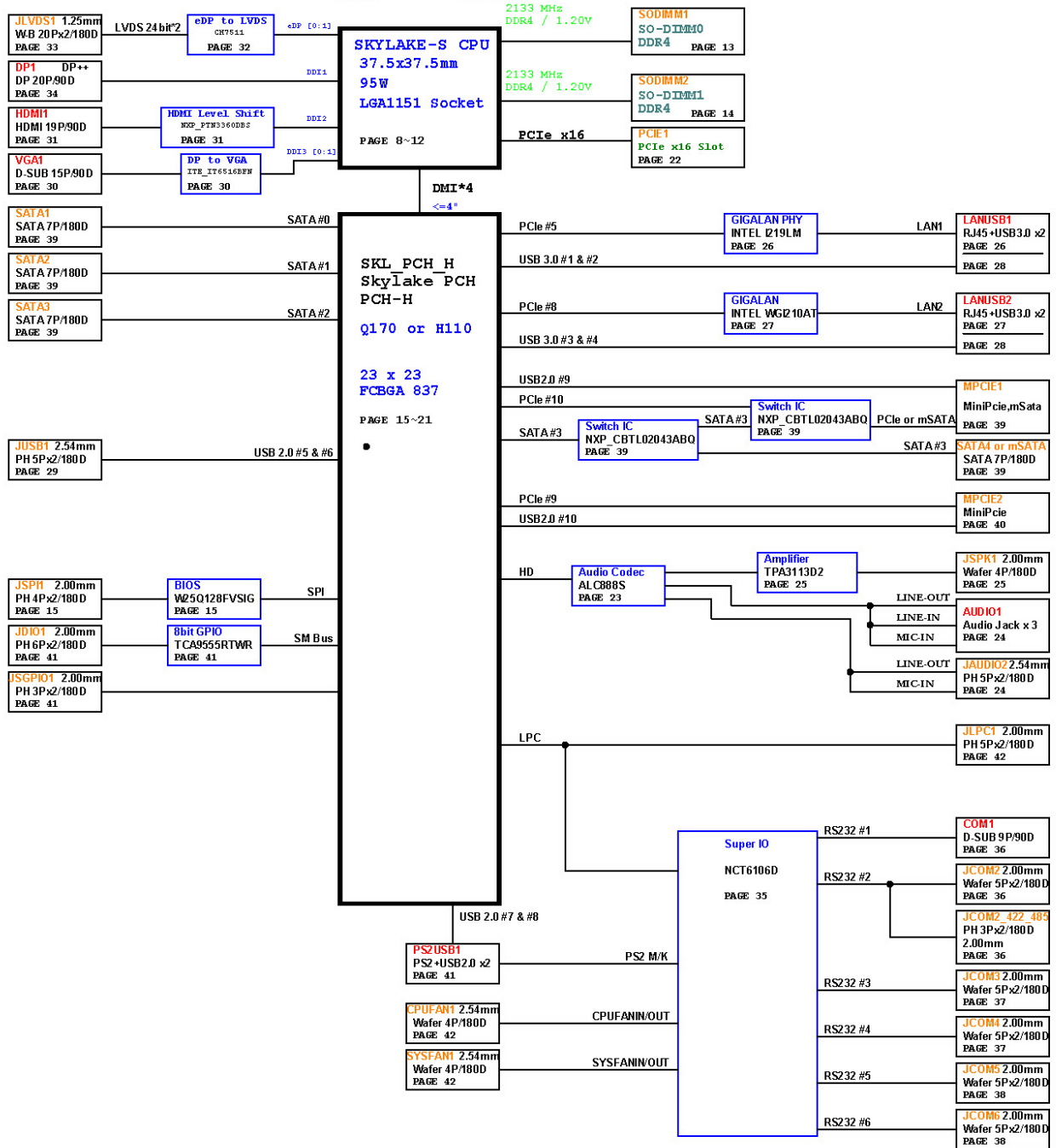


Note:

Specifications are subject to change without notice.

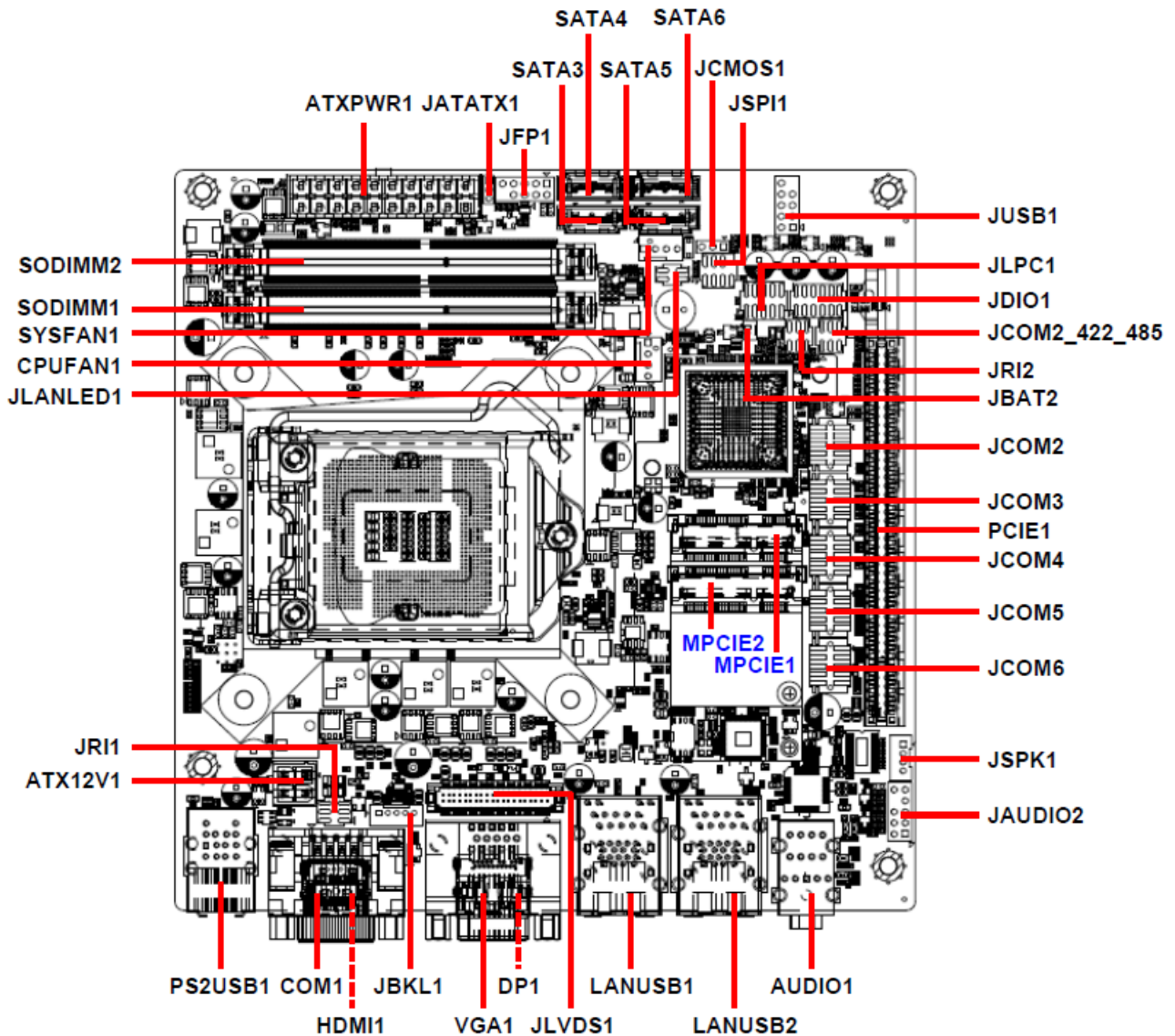
1.6 Architecture Overview—Block Diagram

The following block diagram shows the architecture and main components of EMX-H110KP-B1.



2. Hardware Configuration

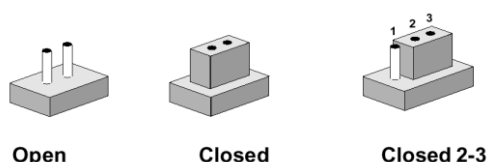
2.1 Product Overview



2.2 Jumper and 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.



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



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.

Jumpers

Label	Function	Note
JRI1/2	Serial port 1/2 pin9 signal select	3 x 2 header, pitch 2.00mm
JATATX1	AT/ATX Power Mode Select	3 x 1 header, pitch 2.00mm
JCMOS1	Clear CMOS	3 x 1 header, pitch 2.54mm

Connectors

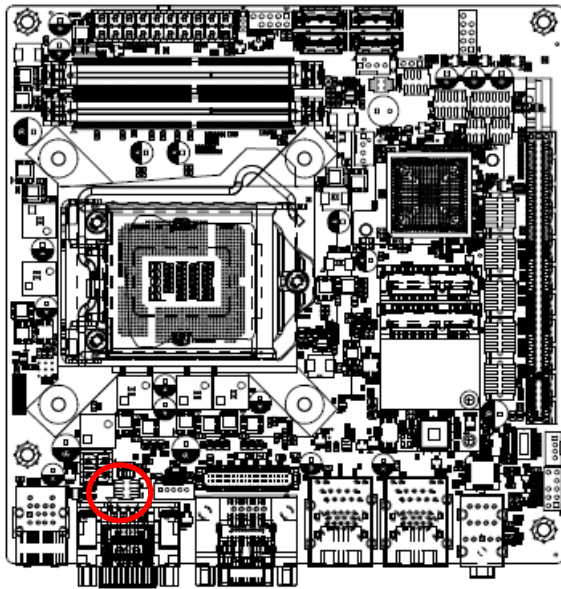
Label	Function	Note
CPUFAN1	CPU fan connector	4 x 1 wafer, pitch 2.54mm
SYSFAN1	System fan connector	4 x 1 wafer, pitch 2.54mm
JFP1	Front panel setting connector	5 x 2 header, pitch 2.54 mm
SODIMM1/2	260-pin DDR4 DIMM socket	
AUDIO1	Line out, Mic in, Line out	
JAUDIO2	Front Audio connector	5 x 2 header, pitch 2.54 mm

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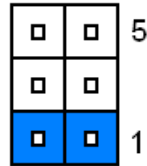
JBKL1	LCD Inverter connector	5 x 1 wafer, pitch 2.00mm
JSPI1	SPI connector	4 x 2 header, pitch 2.00mm
COM1	Serial Port 1 connector	D-sub 9 pin, male
JCOM2/3/4/5/6	Serial Port 2/3/4/5/6 connector	5 x 2 wafer, pitch 2.00mm
JCOM2_422_485	COM2 RS485/422 connector	3 x 2 header, pitch 2.00 mm
JDIO1	General purpose I/O connector	6 x 2 header, pitch 2.00mm
JSPK1	Amplifier connector	1 x 4 wafer, pitch 2.00 mm
JLVDS1	LVDS Connector	DIN 40-pin wafer, pitch 1.25mm
PS2USB1	PS/2 keyboard or mouse connector 2 x USB 2.0 connector	
LANUSB1/2	2 x RJ-45 with Dual deck USB 3.0 connector	
JUSB1	USB 2.0 connector 1	5 x 2 header, pitch 2.54mm
JLPC1	LPC connector	5 x 2 header, pitch 2.00mm
PCIE1	PCI-e x 16 connector	
JLANLED1	LAN1& LAN 2 active LED connector	2 x 2 header, pitch 2.00 mm
JBAT1	Battery connector	2 x 1 wafer, pitch 1.25mm
MPCIE1/2	Full size Mini-PCI-e connector 1 Half size Mini-PCI-e connector 2	
ATXPWR1	ATX Power connector	10 x 2 wafer, pitch 4.20mm
ATX12V1	ATX 12V power connector	2 x 2 wafer, pitch 4.20mm
SATA4~6	Serial ATA III connector 4~6	
HDMI1	HDMI connector	
DP1	DP connector	
VGA1	VGA connector	

2.3 Setting Jumpers & Connectors

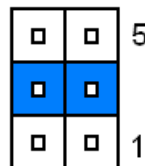
2.3.1 Serial port 1 pin9 signal select (JRI1)



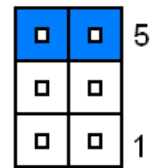
Ring*



+5V



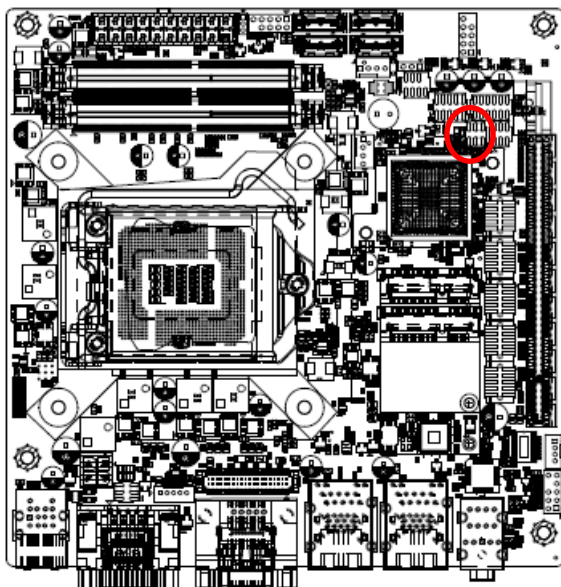
+12V



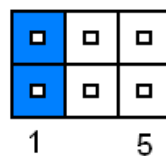
* Default

Note: Max Current 1A.

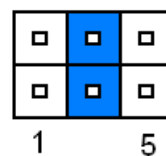
2.3.2 Serial port 2 pin9 signal select (JRI2)



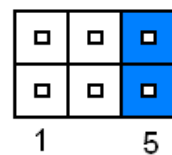
Ring*



+5V



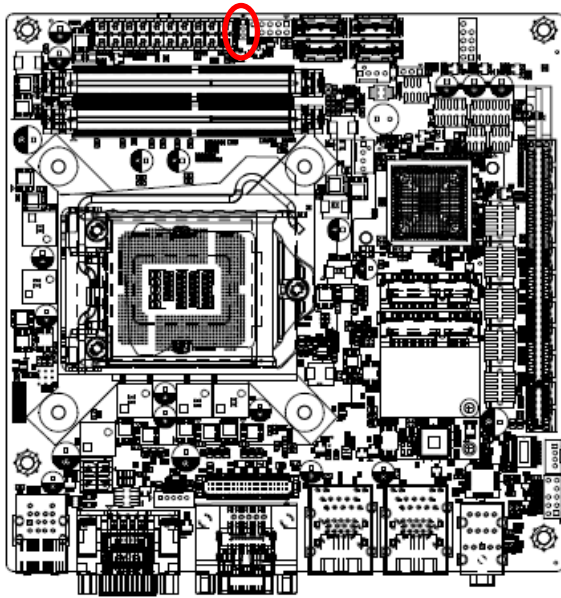
+12V



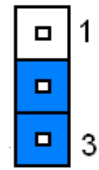
* Default

Note: Max Current 1A.

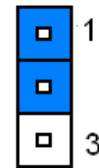
2.3.3 AT/ATX Power Mode Select (JATATX1)



ATX*

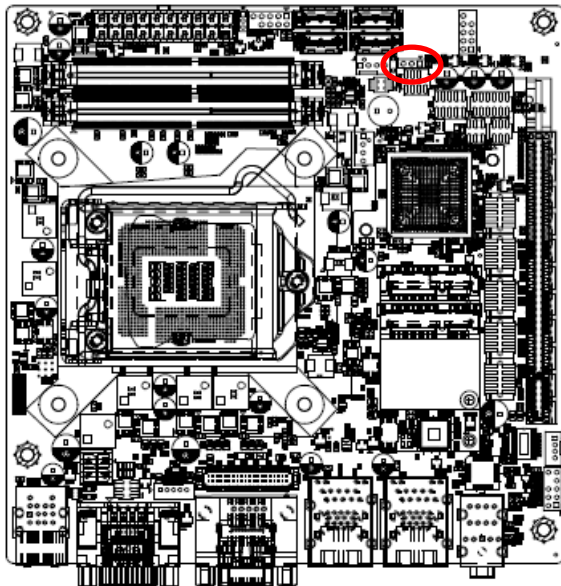


AT

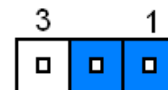


* Default

2.3.4 Clear CMOS (JCMOS1)



Protect*

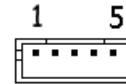
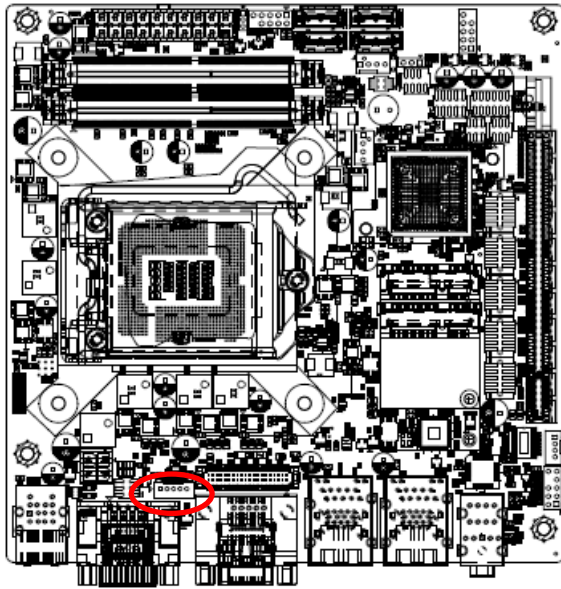


Clear CMOS



* Default

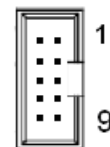
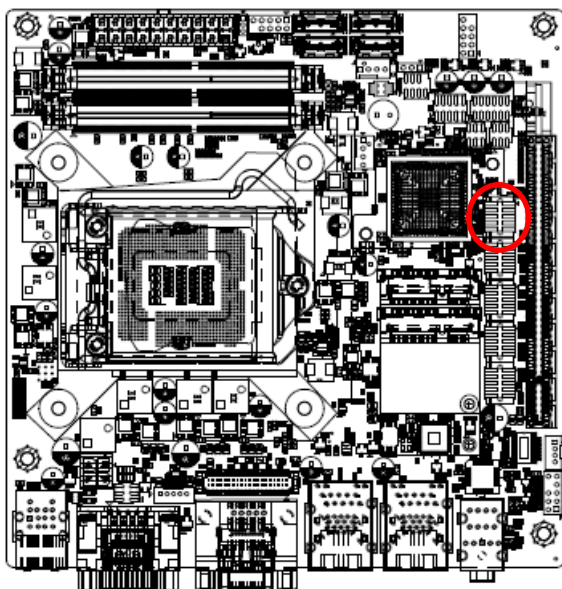
2.3.5 LCD Inverter connector (JBKL1)



PIN	Signal	Max current
1	+12V	2A
2	GND	
3	BKLEN	
4	VBRIGHT	
5	+5V	2A

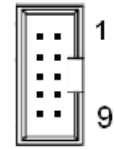
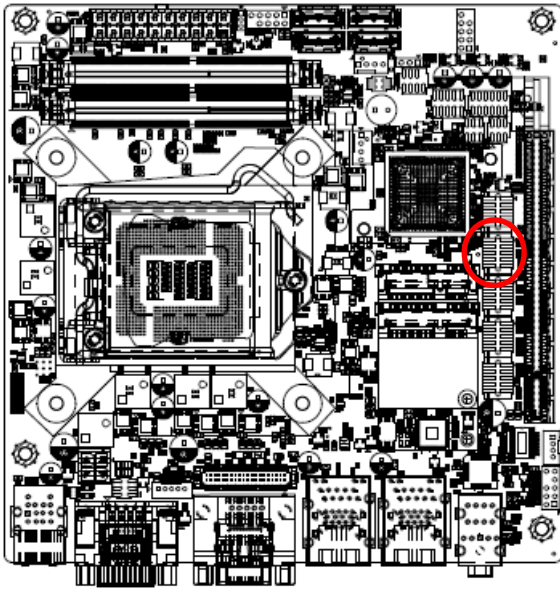
Note: Mapping connector PHR5.

2.3.6 Serial port 2 connector (JCOM2)



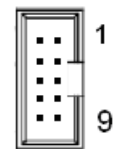
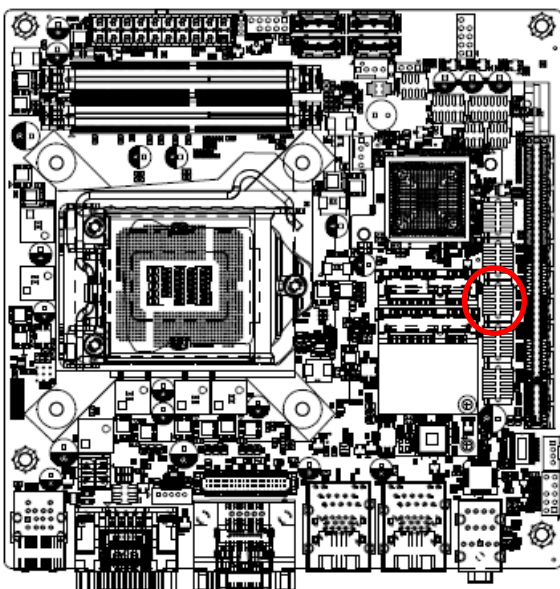
Signal	PIN	PIN	Signal
NRXDB	2	1	NDCDB#
NDTRB#	4	3	NTXDB
NDSRB#	6	5	GND
NCTSB#	8	7	NRTSB#
NC	10	9	NRIB#

2.3.7 Serial port 3 connector (JCOM3)



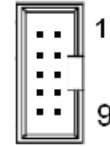
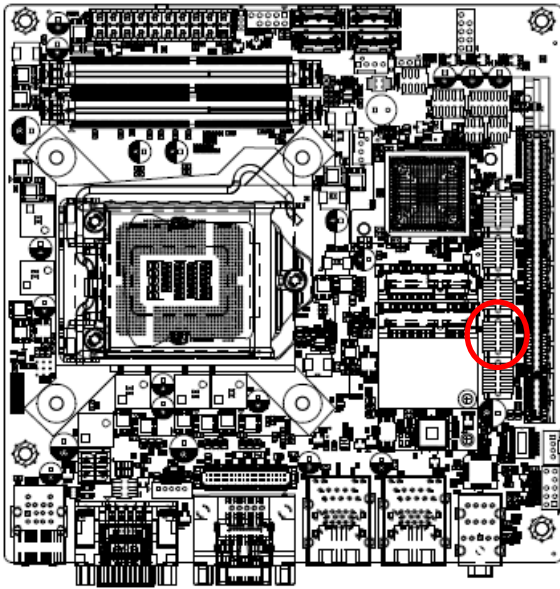
Signal	PIN	PIN	Signal
NRXDC	2	1	NDCDC#
NDTRC#	4	3	NTXDC
NDSRC#	6	5	GND
NCTSC#	8	7	NRTSC#
NC	10	9	NRIC#

2.3.8 Serial port 4 connector (JCOM4)



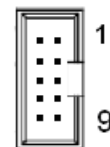
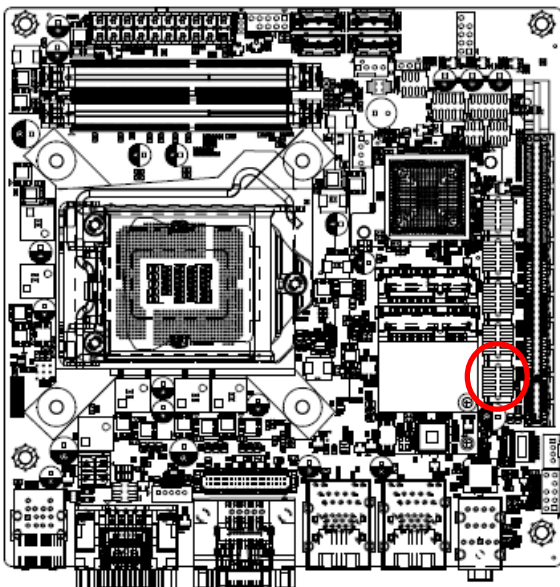
Signal	PIN	PIN	Signal
NRXDD	2	1	NDCDD#
NDTRD#	4	3	NTXDD
NDSRD#	6	5	GND
NCTSD#	8	7	NRTSD#
NC	10	9	NRID#

2.3.9 Serial port 5 connector (JCOM5)



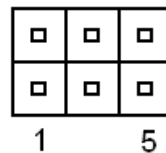
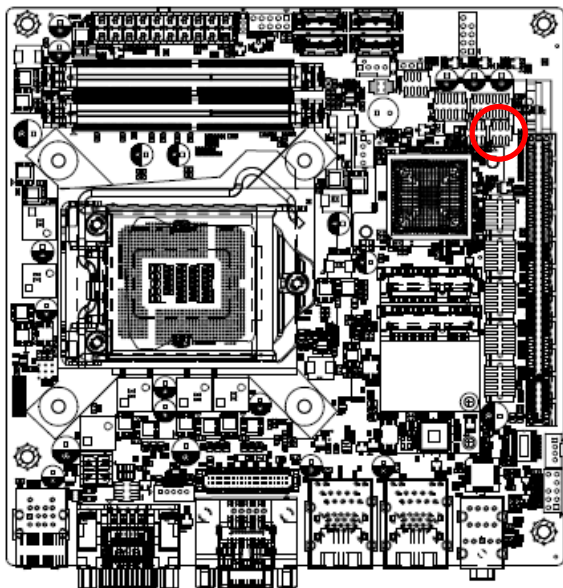
Signal	PIN	PIN	Signal
NRXDE	2	1	NDCDE#
NDTRE#	4	3	NTXDE
NDSRE#	6	5	GND
NCTSE#	8	7	NRTSE#
NC	10	9	NRIE#

2.3.10 Serial port 6 connector (JCOM6)



Signal	PIN	PIN	Signal
NRXDF	2	1	NDCDF#
NDTRF#	4	3	NTXDF
NDSRF#	6	5	GND
NCTSF#	8	7	NRTSF#
NC	10	9	NRIF#

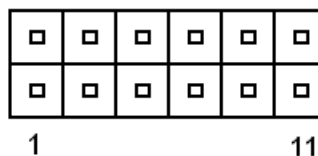
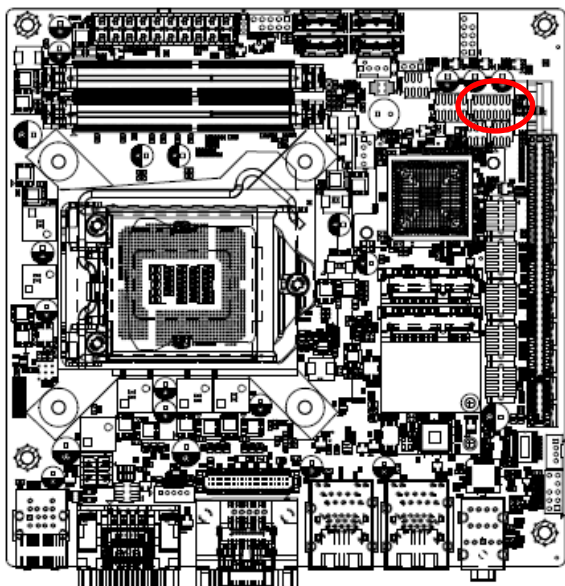
2.3.11 COM2 RS485/422 connector (JCOM2_422_485)



Signal	PIN	PIN	Signal
485_422TX-	1	2	422RX-
485_422TX+	3	4	422RX+
GND	5	6	GND

Note: Max Current 1A.

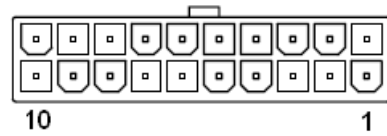
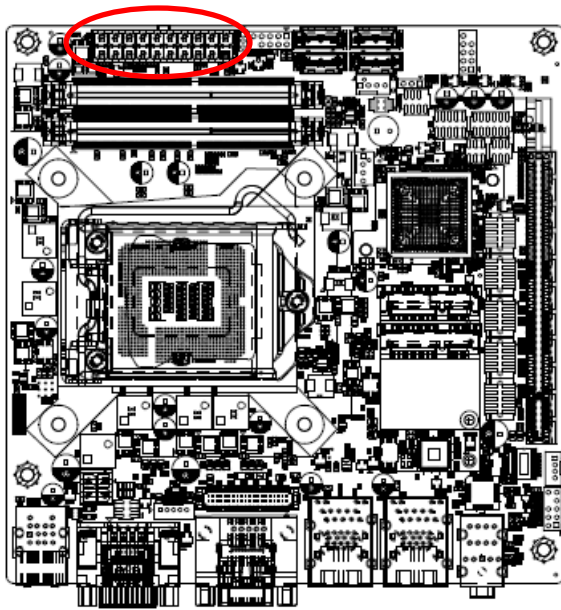
2.3.12 General purpose I/O connector (JDIO1)



Signal	PIN	PIN	Signal
DI0	1	2	DO0
DI1	3	4	DO1
DI2	5	6	DO2
DI3	7	8	DO3
SMB_CLK_9555_R	9	10	SMB_DATA_9555_R
GND	11	12	+V5S_DIO

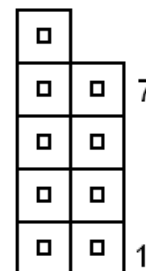
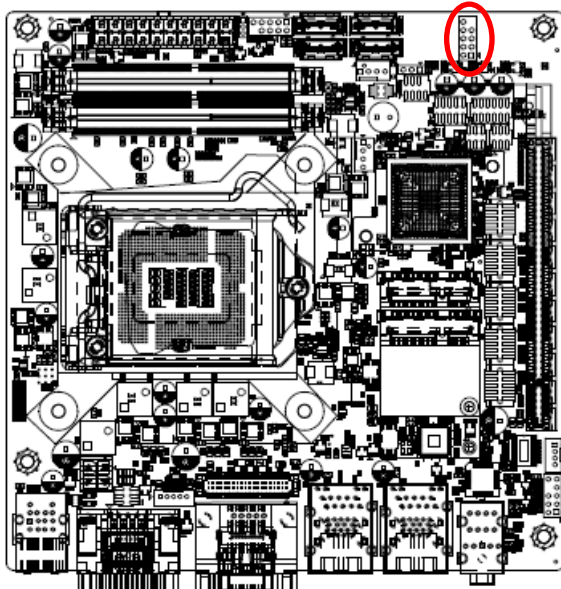
Note: Max Current 1A.

2.3.13 ATX Power connector (ATXPWR1)



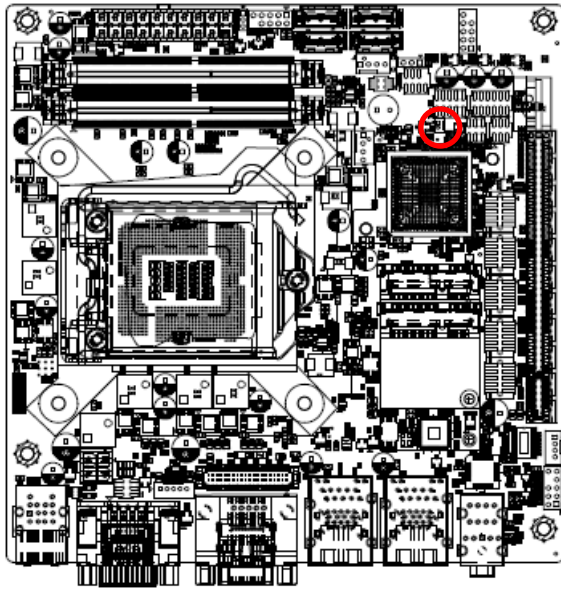
Signal	PIN	PIN	Signal
+3.3V	11	1	+3.3V
-12V	12	2	+3.3V
GND	13	3	GND
PSON#	14	4	+5V
GND	15	5	GND
GND	16	6	+5V
GND	17	7	GND
-5V	18	8	PG_ATX
+5V	19	9	+V5SB_DP
+5V	20	10	+12V

2.3.14 USB 2.0 connector 1 (JUSB1)



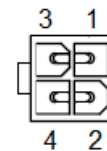
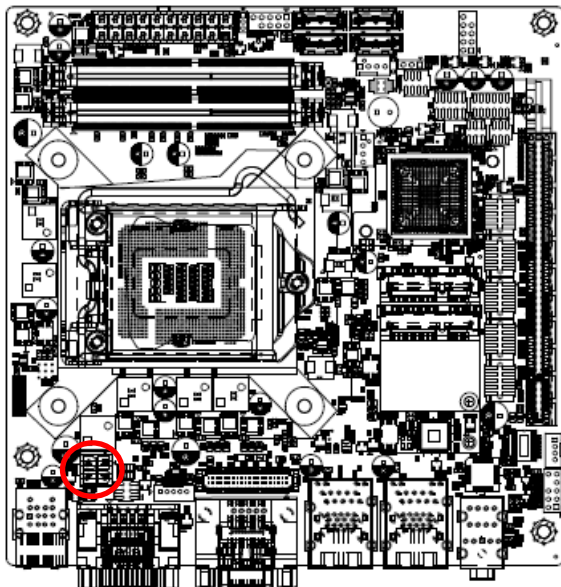
Signal	PIN	PIN	Signal
NC	10		
GND	8	7	GND
USB_R_DP6	6	5	USB_R_DP5
USB_R_DN6	4	3	USB_R_DN5
USBVCC_56	2	1	USBVCC_56

2.3.15 Battery connector (JBAT1)



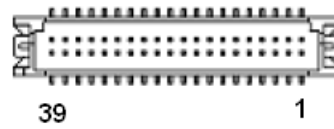
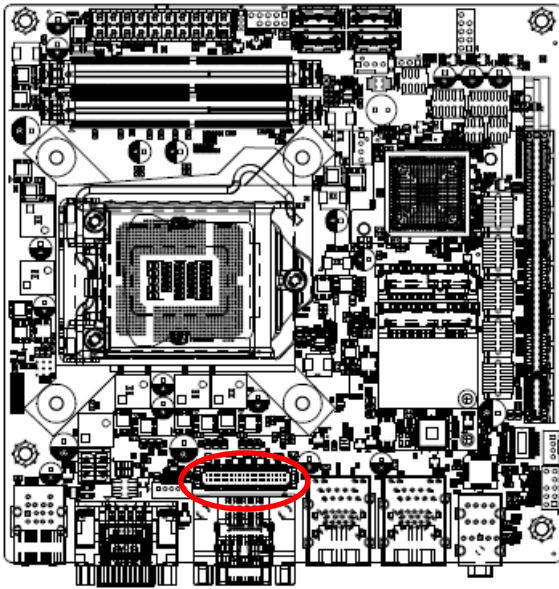
Signal	PIN
RTC_VBAT_1	1
GND	2

2.3.16 ATX 12V power connector (ATX12V1)



Signal	PIN	PIN	Signal
+V12S_4P	3	1	GND
+V12S_4P	4	2	GND

2.3.17 LVDS connector (JLVDS1)



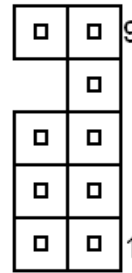
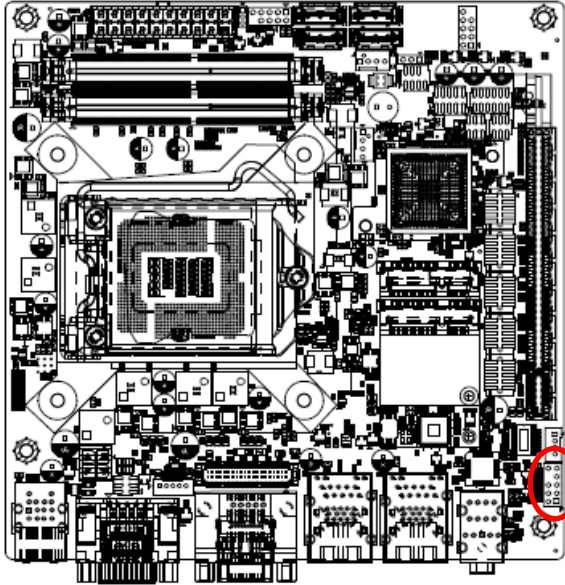
Signal	PIN	PIN	Signal
+V5S_LVDS	2	1	+V3.3S_LVDS
+V5S_LVDS	4	3	+V3.3S_LVDS
+V5S_LVDS	6	5	+V3.3S_LVDS
GND	8	7	GND
LVDS_DATA0_P	10	9	LVDS_DATA1_P
LVDS_DATA0_N	12	11	LVDS_DATA1_N
GND	14	13	GND
LVDS_DATA2_P	16	15	LVDS_DATA3_P
LVDS_DATA2_N	18	17	LVDS_DATA3_N
GND	20	19	GND
LVDS_DATA4_P	22	21	LVDS_DATA5_P
LVDS_DATA4_N	24	23	LVDS_DATA5_N
GND	26	25	GND
LVDS_DATA6_P	28	27	LVDS_DATA7_P
LVDS_DATA6_N	30	29	LVDS_DATA7_N
GND	32	31	GND
LVDS_CLK1_P	34	33	LVDS_CLK2_P
LVDS_CLK1_N	36	35	LVDS_CLK2_N
GND	38	37	GND
+V12S_LVDS	40	39	+V12S_LVDS

Note:

Mapping connector DF13-40DS-1.25C (1.0mm).

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2.3.18 Front Audio connector (JAUDIO2)

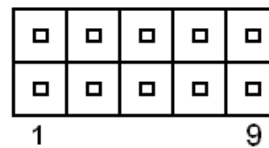
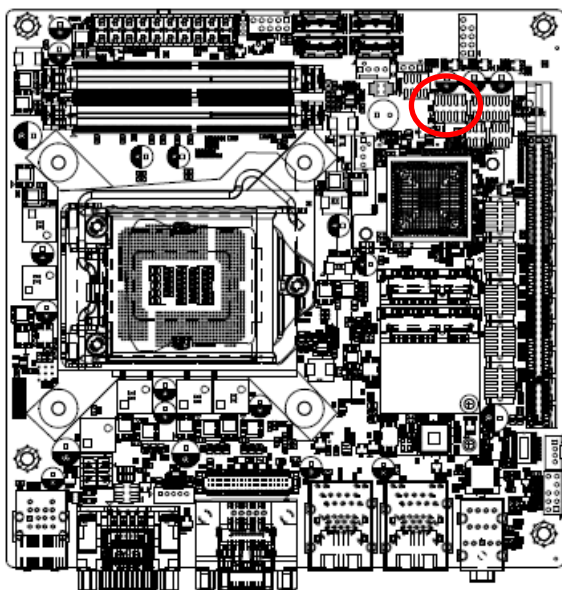


Signal	PIN	PIN	Signal
LINE2_JD	10	9	LINE2_LIN
		7	GND
MIC2_JD	6	5	LINE2_RIN
ACZ_DET#_R	4	3	MIC2_RIN
GND	2	1	MIC2_LIN

2.3.18.1 Signal Description –Audio connector 2 (JAUDIO2)

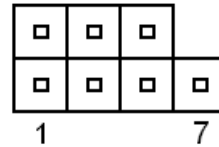
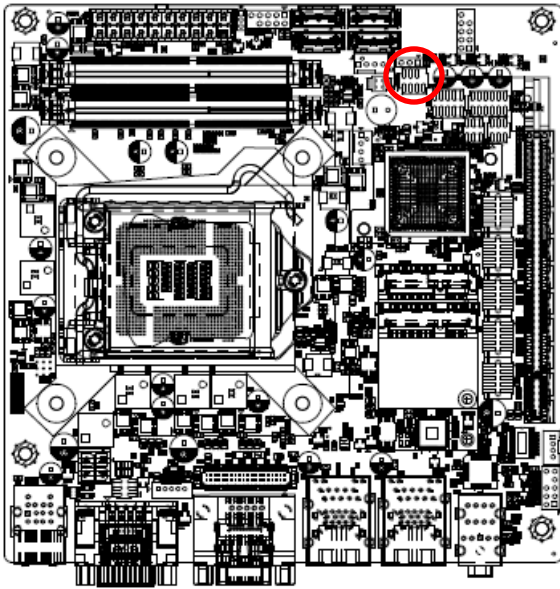
Signal	Signal Description
LINE2_JD	AUDIO IN (LINE_RIN/LIN)sense pin
MIC2_JD	MIC IN (MIC_RIN/LIN) sense pin

2.3.19 LPC connector (JLPC1)



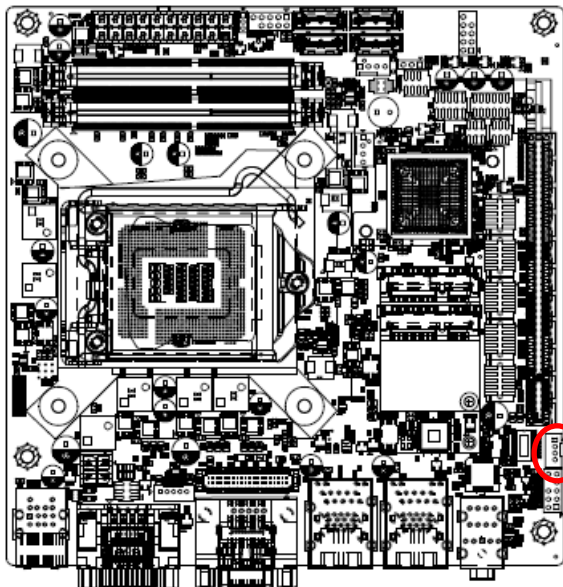
Signal	PIN	PIN	Signal
LPC_AD0	1	2	+3.3V
LPC_AD1	3	4	BUF_PLT_RST#
LPC_AD2	5	6	LPC_FRAME#
LPC_AD3	7	8	LPC_CLK
LPC_SERIRQ	9	10	GND

2.3.20 SPI connector (JSPI1)



Signal	PIN	PIN	Signal
+V3.3_SPI	1	2	GND
SSPI_CS0#_R	3	4	SSPI_SCLK_R
SSPI_SO_R	5	6	SSPI_SI_R
SSPI_HOLD#0	7		

2.3.21 Amplifier connector (JSPK1)

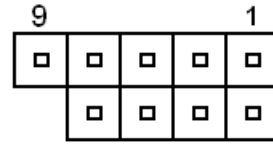
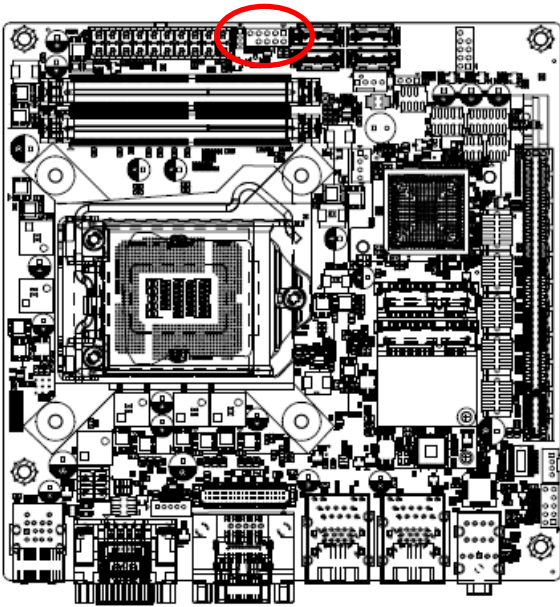


Signal	PIN
SPK_L+	1
SPK_L-	2
SPK_R+	3
SPK_R-	4

Note:

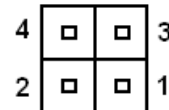
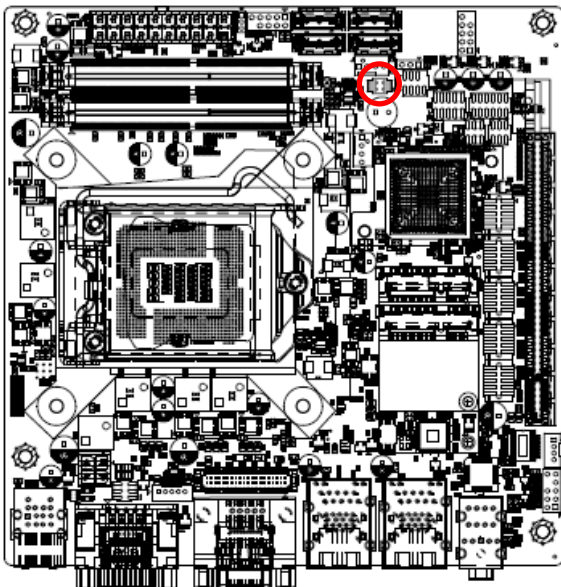
Support 6W x 2 speakers. Mapping Connector PHR-4.

2.3.22 Front panel setting connector (JFP1)



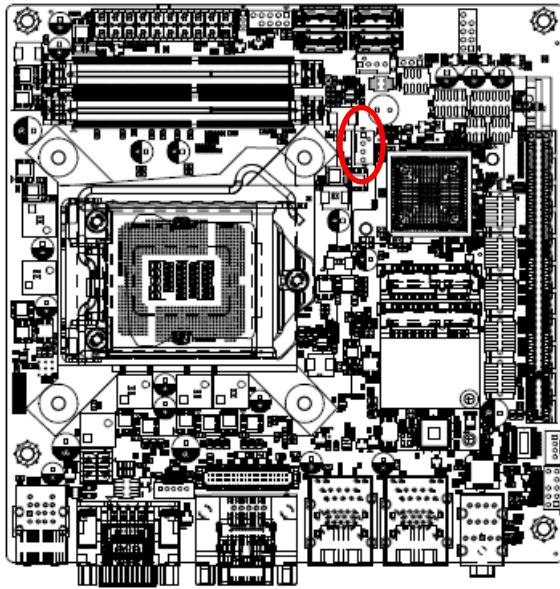
Signal	PIN	PIN	Signal
+HD_LED	1	2	+PWR_LED
-HD_LED	3	4	-PWE_LED
+Reset	5	6	+PWR_BNT
-Reset	7	8	-PWR_BNT
NC	9		

2.3.23 LAN1& LAN 2 active LED connector (JLANLED1)



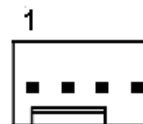
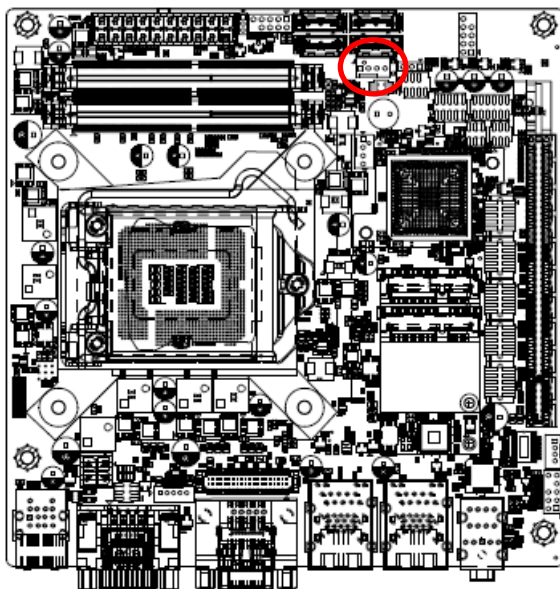
Signal	PIN	PIN	Signal
LAN2_ACT#	4	3	LAN1_ACT#
FRONT_LAN2_ACT	2	1	FRONT_LAN1_ACT

2.3.24 CPU fan connector (CPUFAN1)



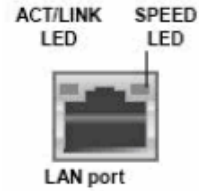
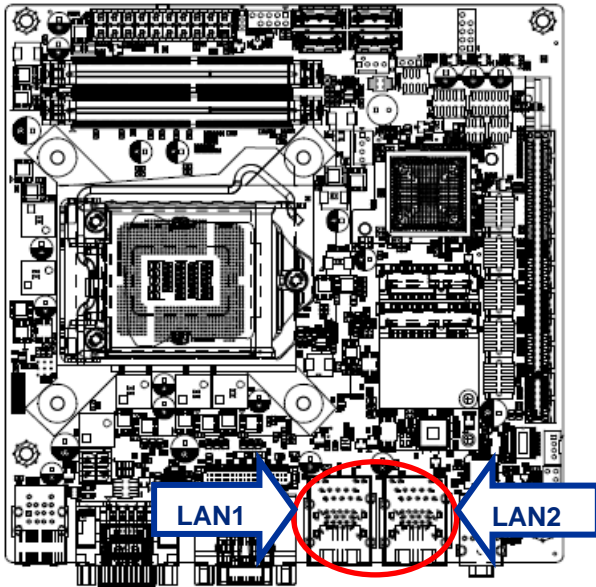
Signal	PIN
GND	1
+12V	2
CPUFANIN	3
CPUFANOUT	4

2.3.25 System fan connector (SYSFAN1)



Signal	PIN
GND	1
+12V	2
SYSFANIN	3
SYSFANOUT	4

2.3.26 Gigabit LAN (RJ-45) connector (LAN1/2)



Note:

This port allows Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table below for the LAN port LED indications.

ACT/LINK LED		SPEED LED	
Status	Description	Status	Description
OFF	No Light	OFF	10Mbps connection
Orange	Linked	Green	100Mbps connection
Blinking	Data activity	Orange	1Gbps connection

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

The 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 or <F2> immediately after switching the system on, or

By pressing the or <F2> key when the following message appears briefly at the left-top of the screen during the POST (Power On Self Test).

Press or <F2> 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. If you do not press the keys at the correct time and the system does not boot, an error message will be displayed and you will again be asked to.

Press F1 to Continue, DEL to enter SETUP

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 AMI BIOS supports an override to the NVRAM settings which resets your system to its defaults.

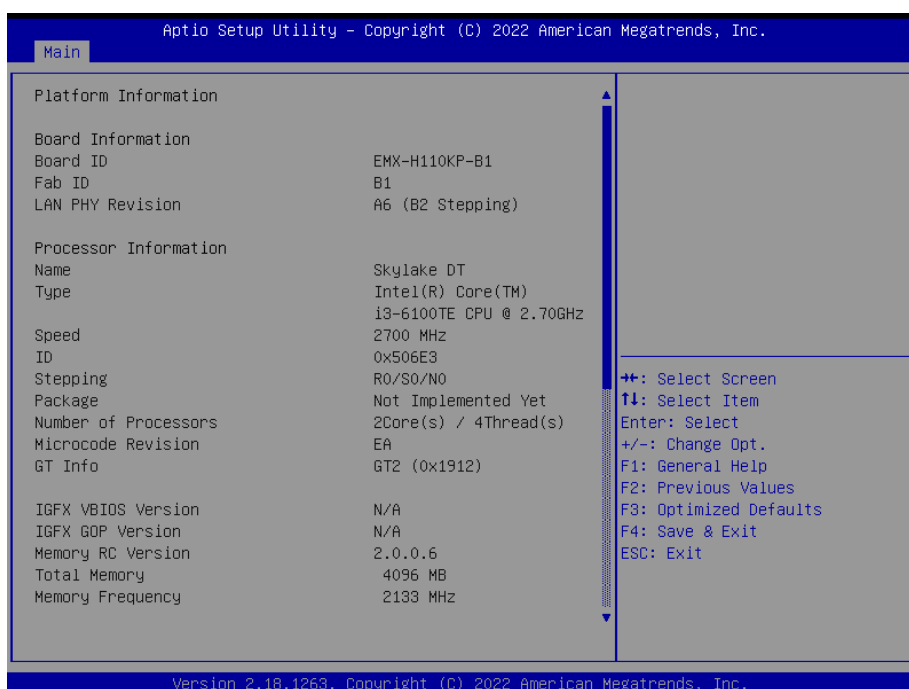
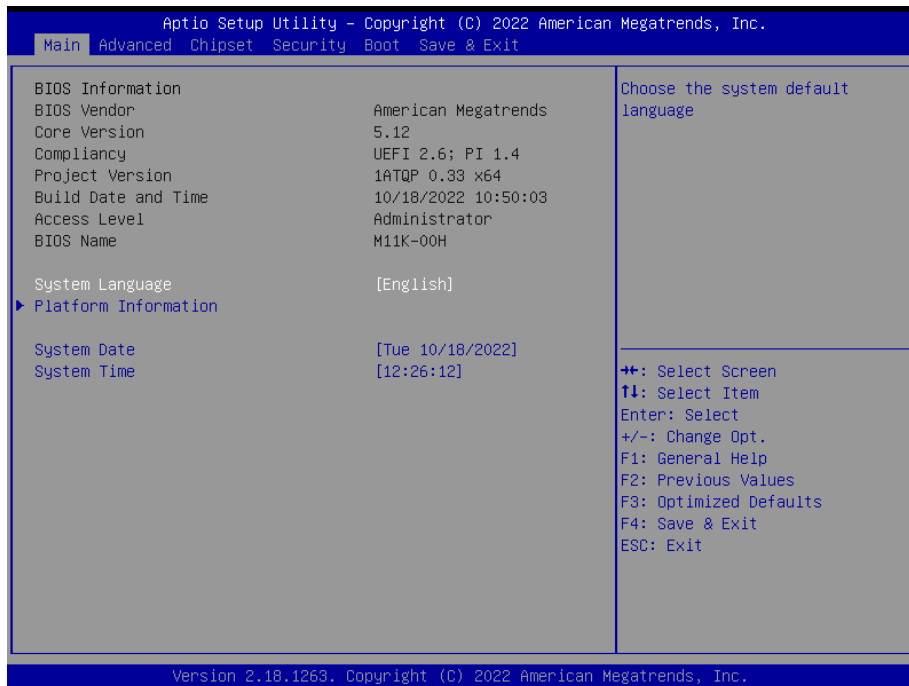
The best advice is to only alter settings which you thoroughly understand. To this end, we strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both BIOS Vendor and your systems manufacturer to provide the absolute maximum performance 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.



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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

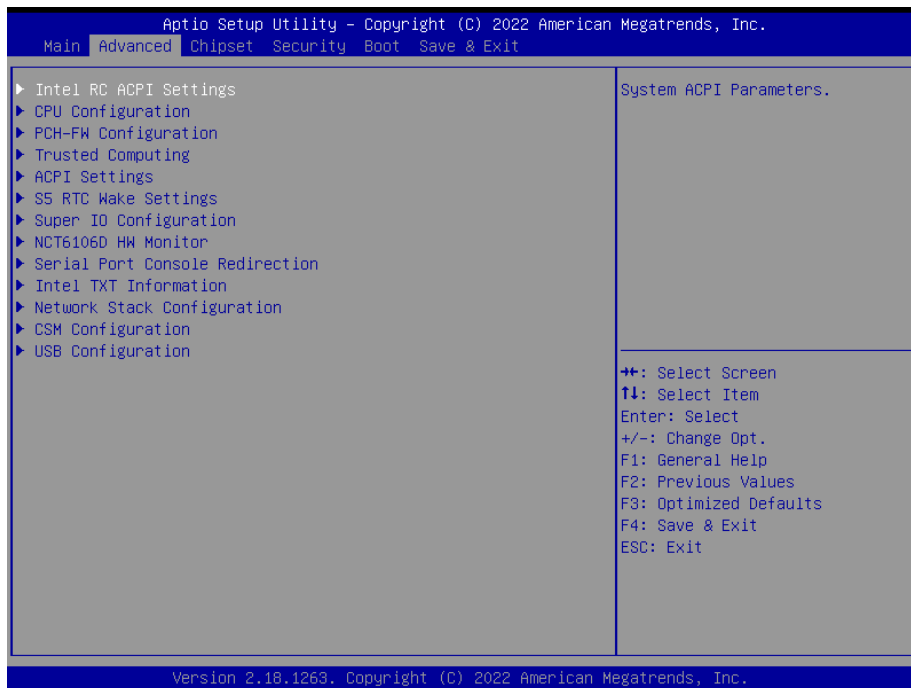
Use the system time option to set the system time. Manually enter the hours, minutes and seconds.



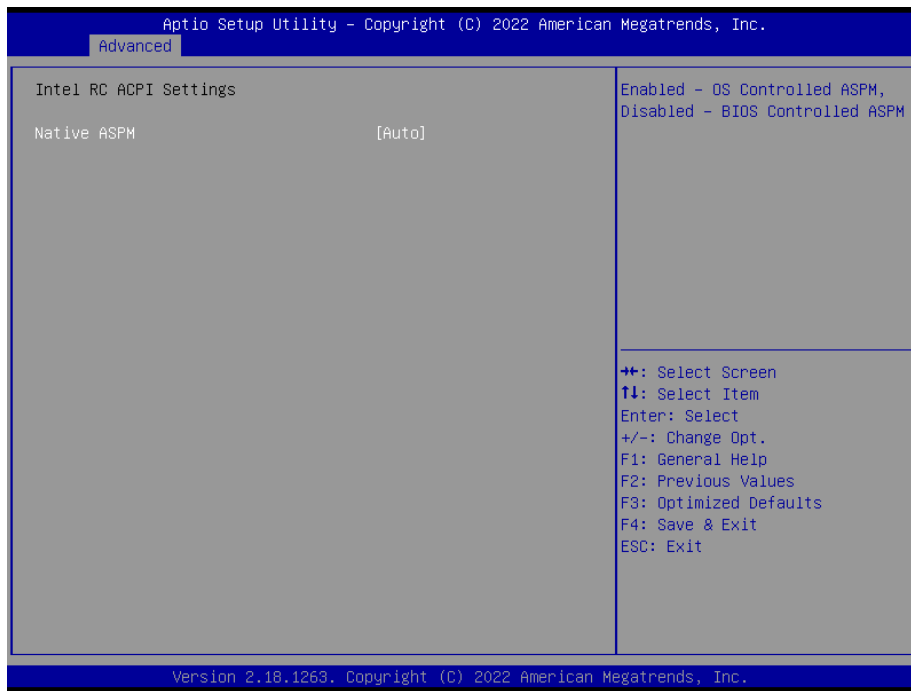
Note: The BIOS setup screens shown in this chapter are for reference purposes only, and may not exactly match what you see on your screen. Visit the Avalue website (www.avalue.com.tw) to download the latest product and BIOS information.

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.

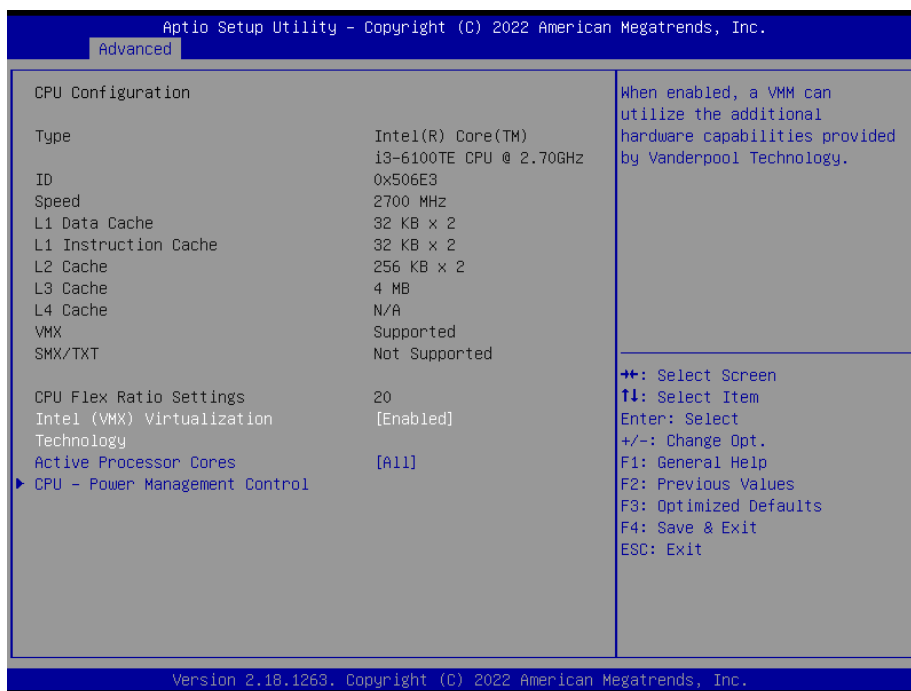


3.6.2.1 Intel RC ACPI Settings



Item	Options	Description
Native ASPM	Auto [Default] , Enabled Disabled	Enabled – OS Controlled ASPM, Disabled – BIOS Controlled ASPM

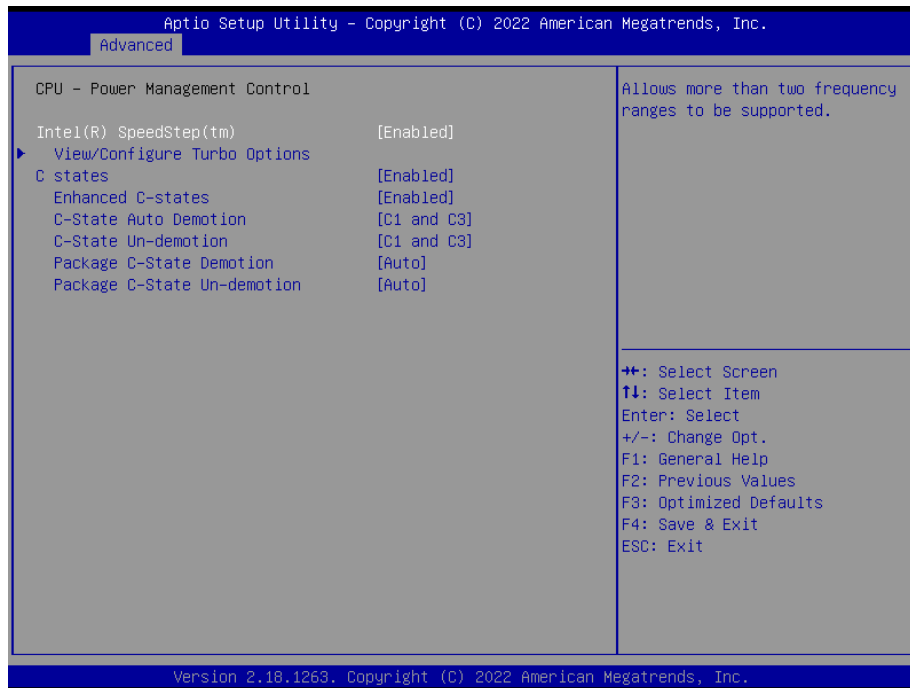
3.6.2.2 CPU Configuration



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Item	Options	Description
Intel (VMX) Virtualization Technology	Disabled Enabled [Default] ,	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Active Processor Cores	All [Default] , 1 2 3	Number of cores to enable in each processor package.

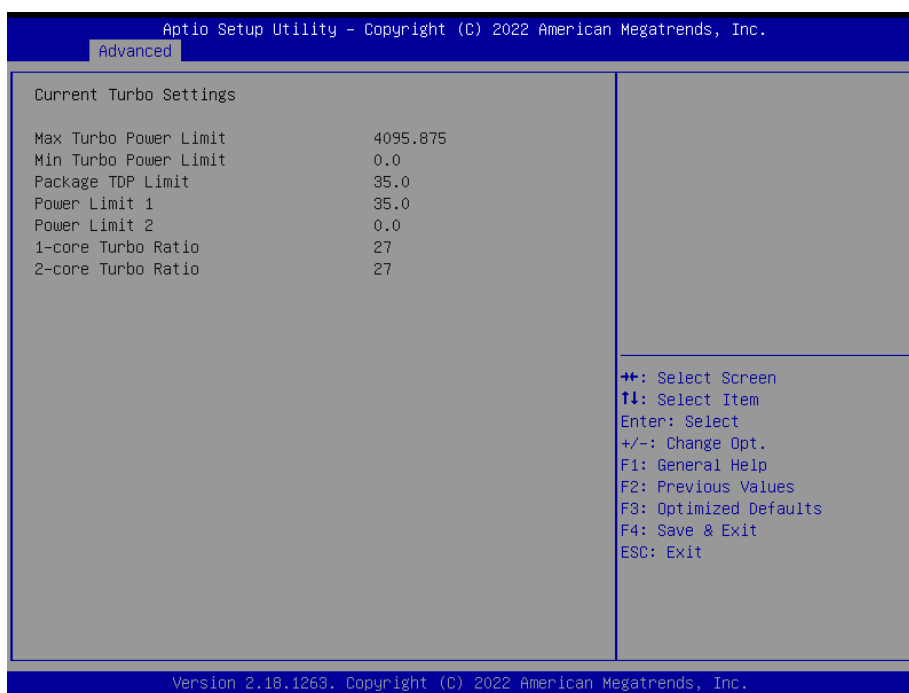
3.6.2.2.1 CPU - Power Management Control



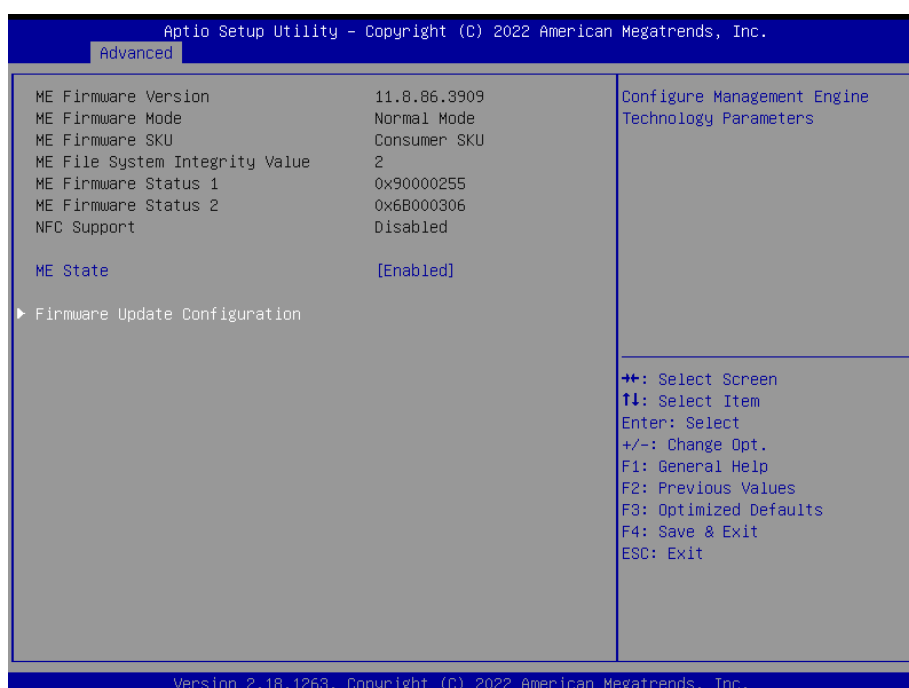
Item	Option	Description
Intel® SpeedStep™	Disabled, Enabled [Default]	Allows more than two frequency ranges to be supported.
C states	Enabled [Default] Disabled,	Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.
Enhanced C-states	Disabled, Enabled [Default]	Enable/Disable C1E. When enabled, CPU will switch to minimum speed when all cores enter C-State.
C-State Auto Demotion	Disabled C1 C3 C1 and C3 [Default]	Configure C-State Auto Demotion
C-State Un-demotion	Disabled C1 C3 C1 and C3 [Default]	Configure C-State Un-demotion

Package C-State Demotion	Disabled, Enabled Auto[Default]	Enable or Disable Package C-State Demotion. 0: Disable; 1: Enable; 2:Auto(Auto: Enabled for Skylake; Disabled for Kabylake)
Package C-State Un-demotion	Disabled, Enabled Auto[Default]	Enable or Disable Package C-State UnDemotion. 0: Disable; 1: Enable; 2:Auto(Auto: Enabled for Skylake; Disabled for Kabylake)

3.6.2.2.1.1 View/Configure Turbo Options



3.6.2.3 PCH-FW Configuration



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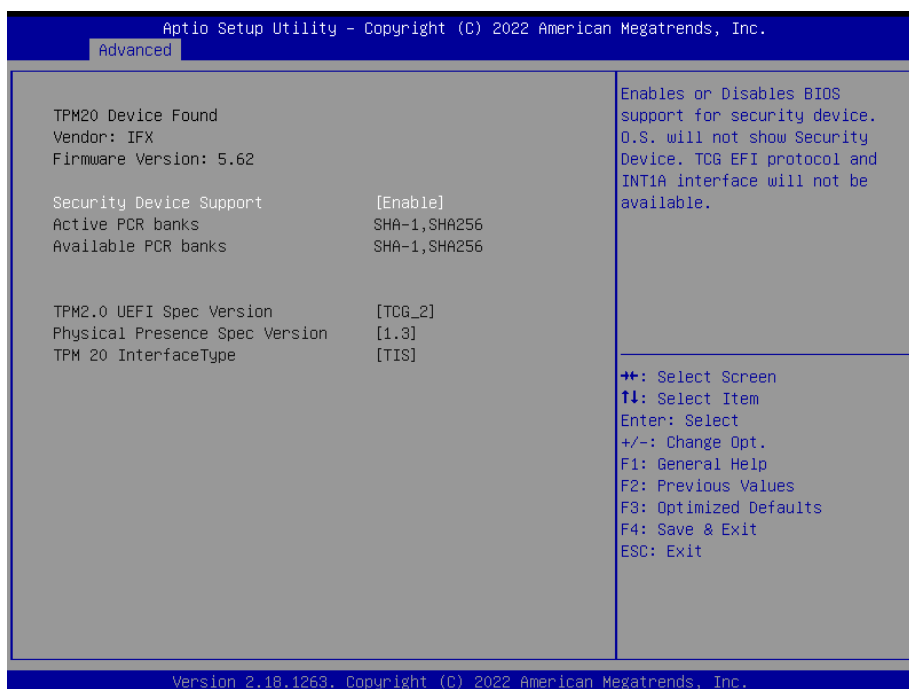
Item	Options	Description
ME State	Disabled, Enabled[Default]	When Disabled ME will be put into ME Temporarily Disabled Mode.

3.6.2.3.1 Firmware Update Configuration



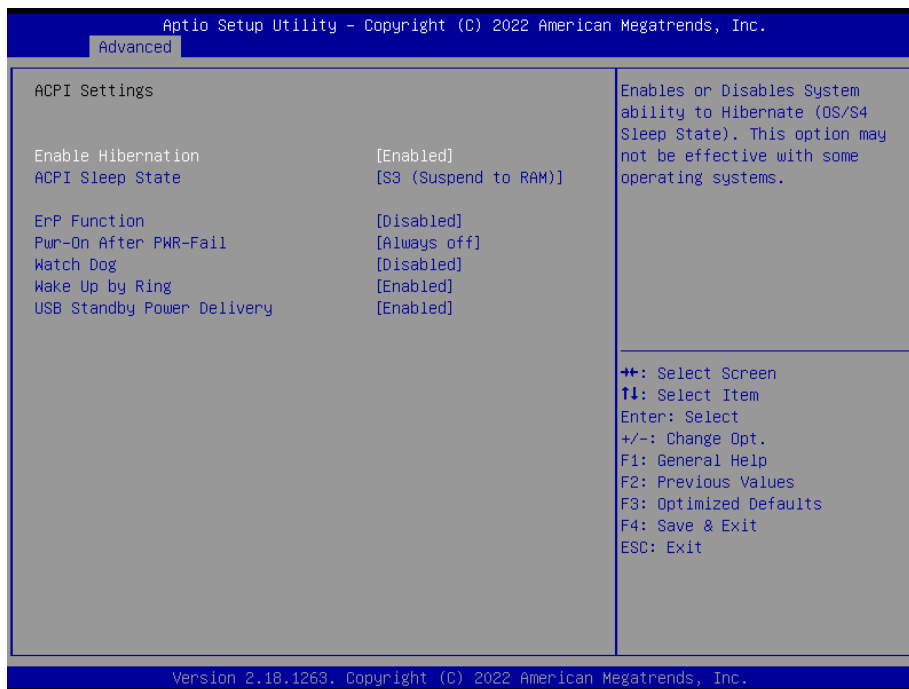
Item	Option	Description
Me FW Image Re-Flash	Disabled[Default], Enabled	Enable/Disable Me FW Image Re-Flash function.

3.6.2.4 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.

3.6.2.5 ACPI Settings

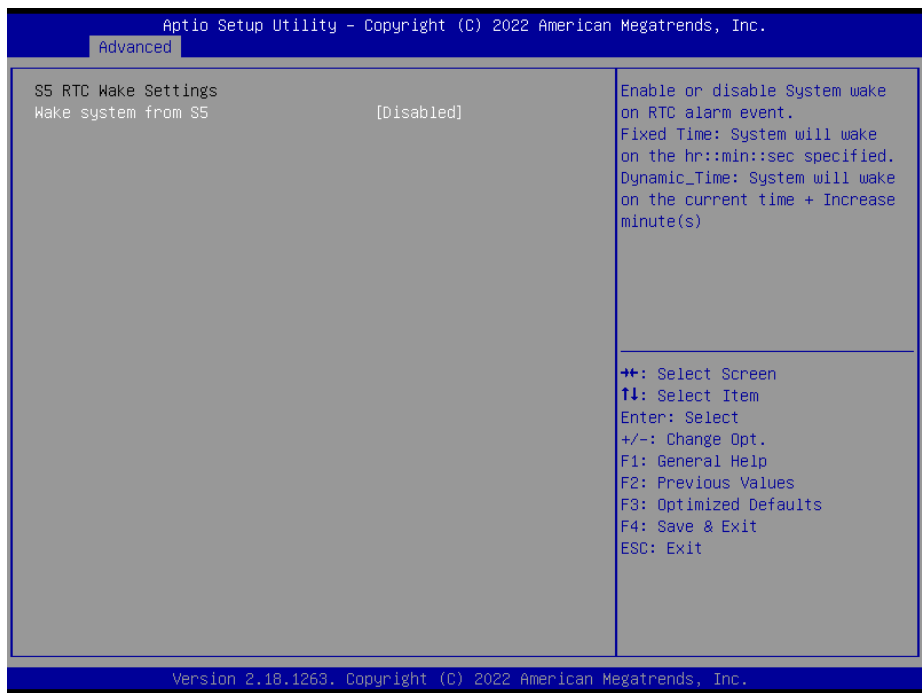


Item	Options	Description
Enable Hibernation	Disabled Enabled[Default],	Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some operating systems.
ACPI Sleep State	Suspend Disabled, S3 (Suspend to RAM)[Default]	Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.
ErP Function	Disabled[Default], Enabled	ErP(Deep S5) Function. Allow BIOS switching off peripheral power delivery at S5 state.
Pwr-On After PWR-Fail	Always Off[Default] Always On Keep Last state	Specify what state to go to when power is re-applied after a power failure (G3 state).
Watch Dog	Disabled[Default], 30 sec 40 sec 50 sec 1 min 2 min	Select Watch Dog Timer (WDT) Mode.

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	10 min 30 min	
Wake Up by Ring	Disabled Enabled[Default],	Enable/Disable system waked up by Ring signal from S3(Sleep), S4(Hibernate) and S5(Soft Off) States.
USB Standby Power Delivery	Disabled Enabled[Default],	Enable/Disable USB Power delivery in S3 (Sleep), S4 (Hibernate) and S5 (Soft Off) States.

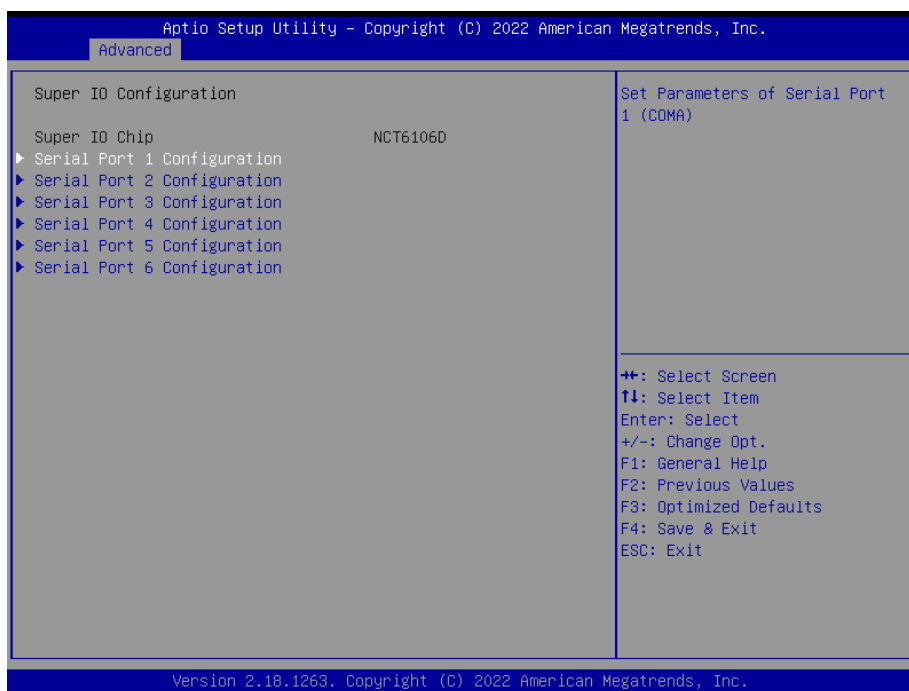
3.6.2.6 S5 RTC Wake Settings



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

3.6.2.7 Super IO Configuration

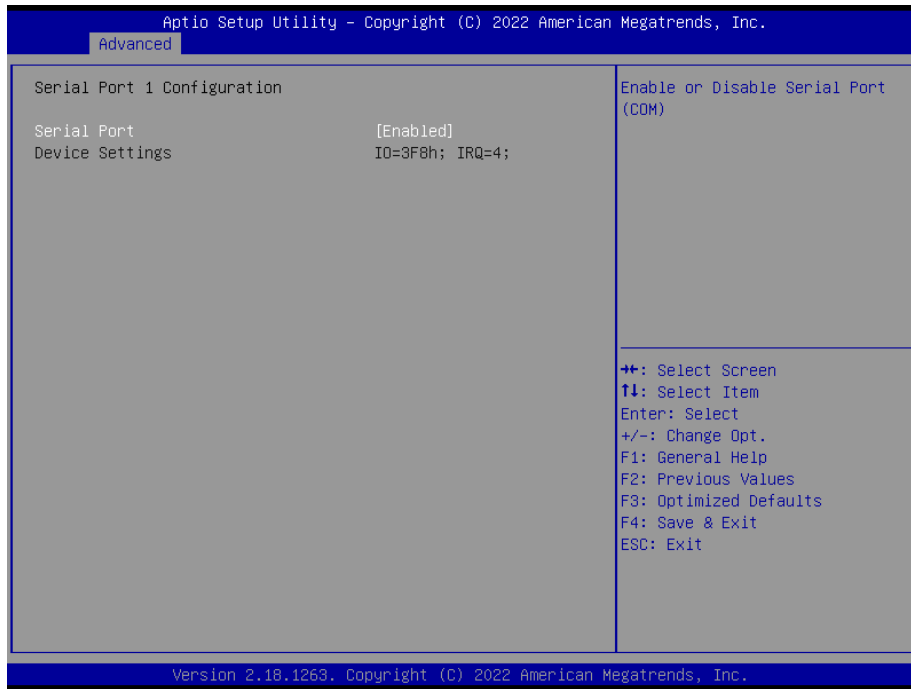
You can use this item to set up or change the Super IO configuration for serial ports. Please refer to 3.6.2.7.1~ 3.6.2.7.6 for more information.



Item	Description
Serial Port 1 Configuration	Set Parameters of Serial Port 1 (COMA).
Serial Port 2 Configuration	Set Parameters of Serial Port 2 (COMB).
Serial Port 3 Configuration	Set Parameters of Serial Port 3 (COMC).
Serial Port 4 Configuration	Set Parameters of Serial Port 4 (COMD).
Serial Port 5 Configuration	Set Parameters of Serial Port 5 (COME).
Serial Port 6 Configuration	Set Parameters of Serial Port 6 (COMF).

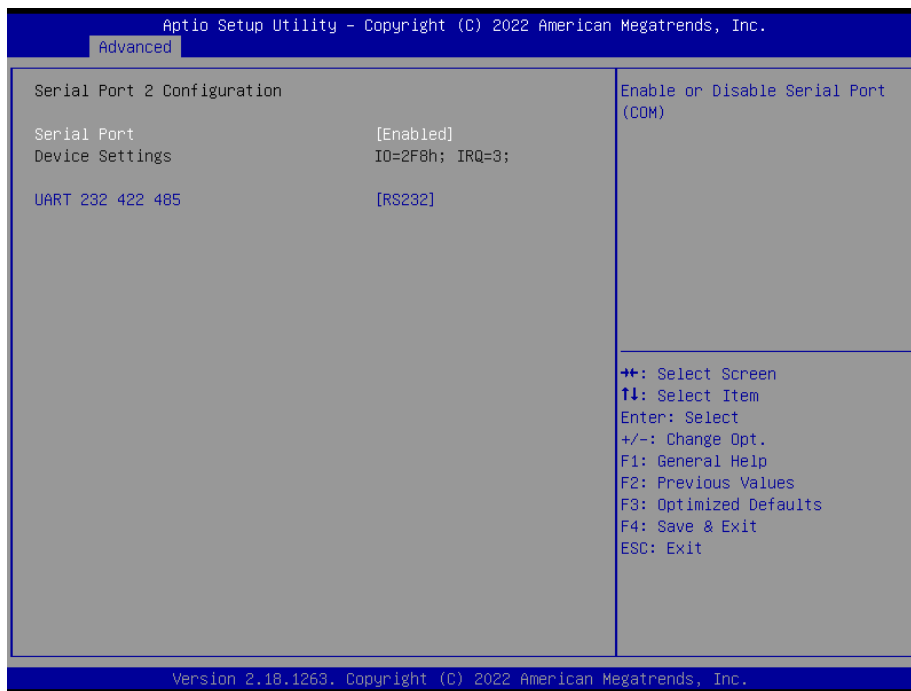
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3.6.2.7.1 Serial Port 1 Configuration



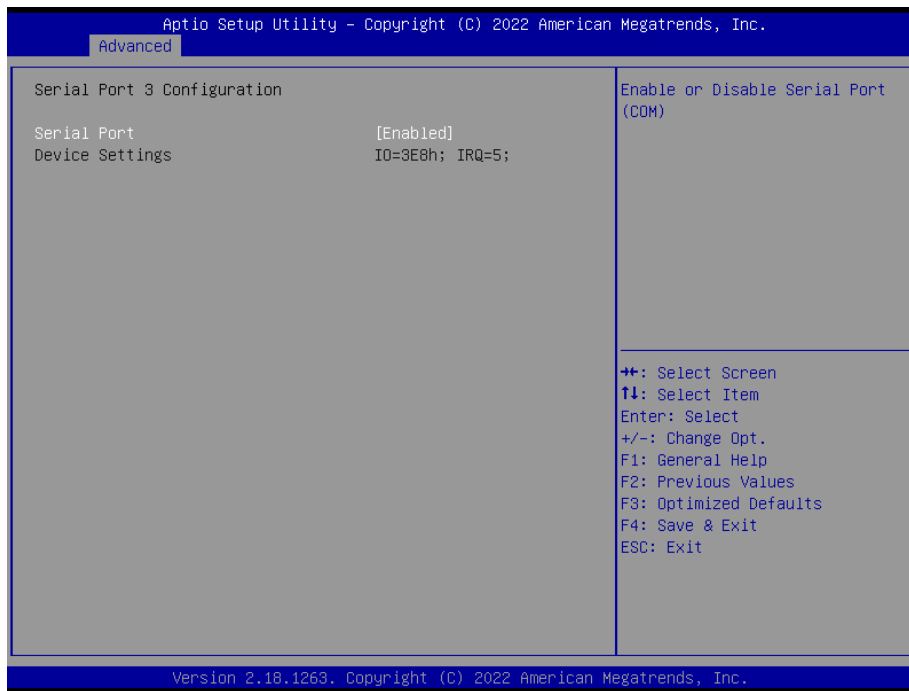
Item	Option	Description
Serial Port	Disabled Enabled[Default],	Enable or Disable Serial Port (COM).

3.6.2.7.2 Serial Port 2 Configuration



Item	Option	Description
Serial Port	Disabled Enabled[Default],	Enable or Disable Serial Port (COM).
UART 232 422 485	RS232[Default] RS422 RS485	Set COM Port as RS232, RS422 or RS485 mode.

3.6.2.7.3 Serial Port 3 Configuration



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

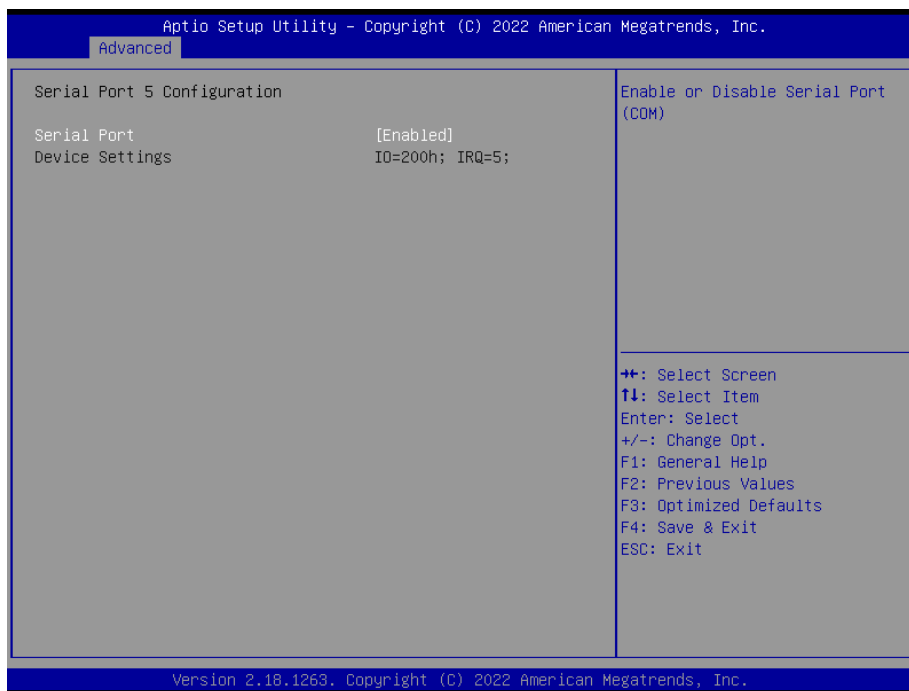
EMX-H110KP-B1 User's Manual

3.6.2.7.4 Serial Port 4 Configuration



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

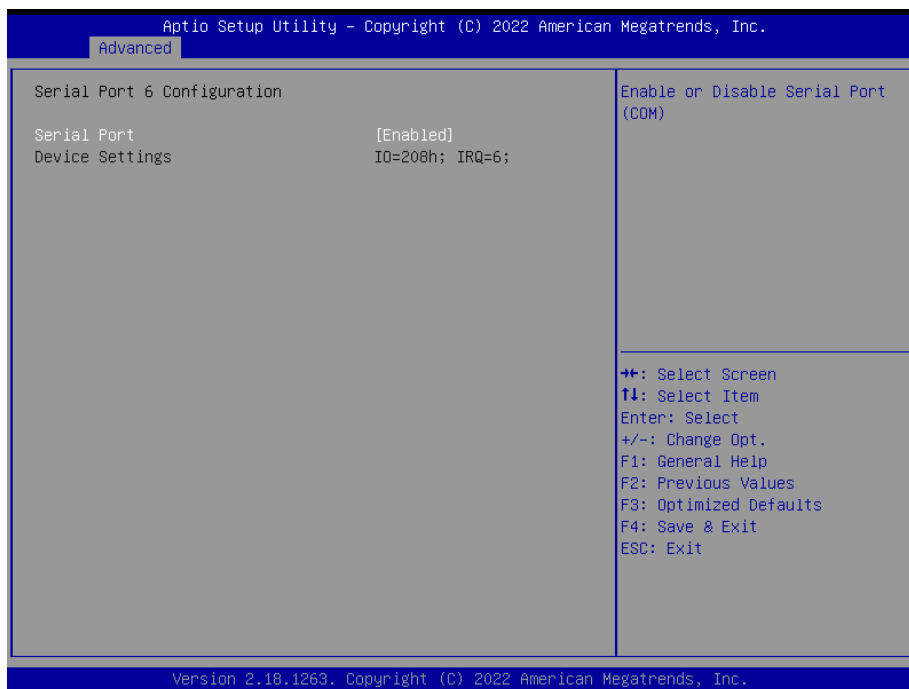
3.6.2.7.5 Serial Port 5 Configuration



Item	Option	Description
Serial Port	Disabled	Enable or Disable Serial Port (COM).

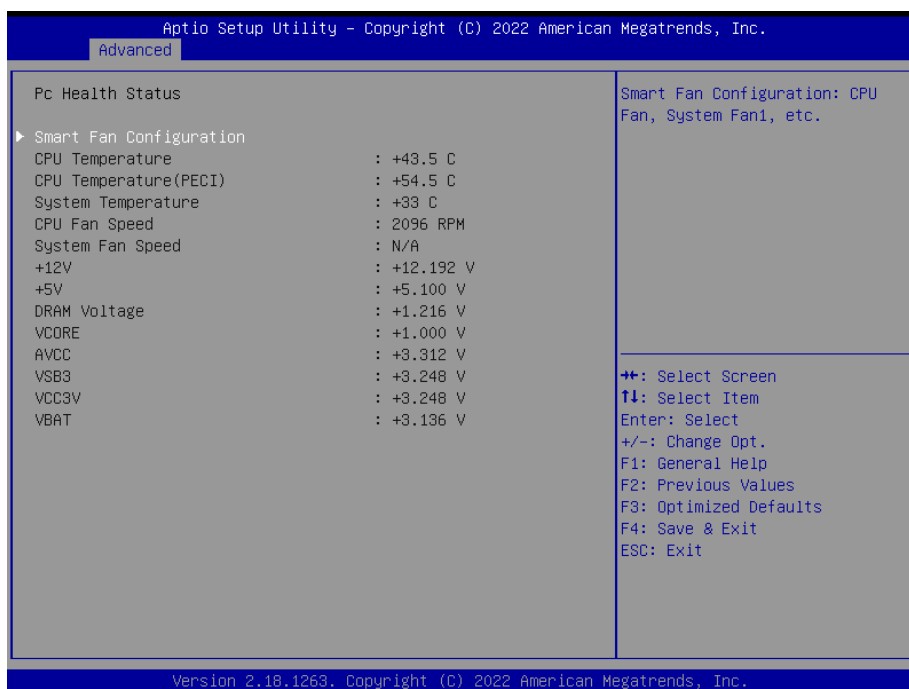
	Enabled[Default],	
--	-------------------	--

3.6.2.7.6 Serial Port 6 Configuration



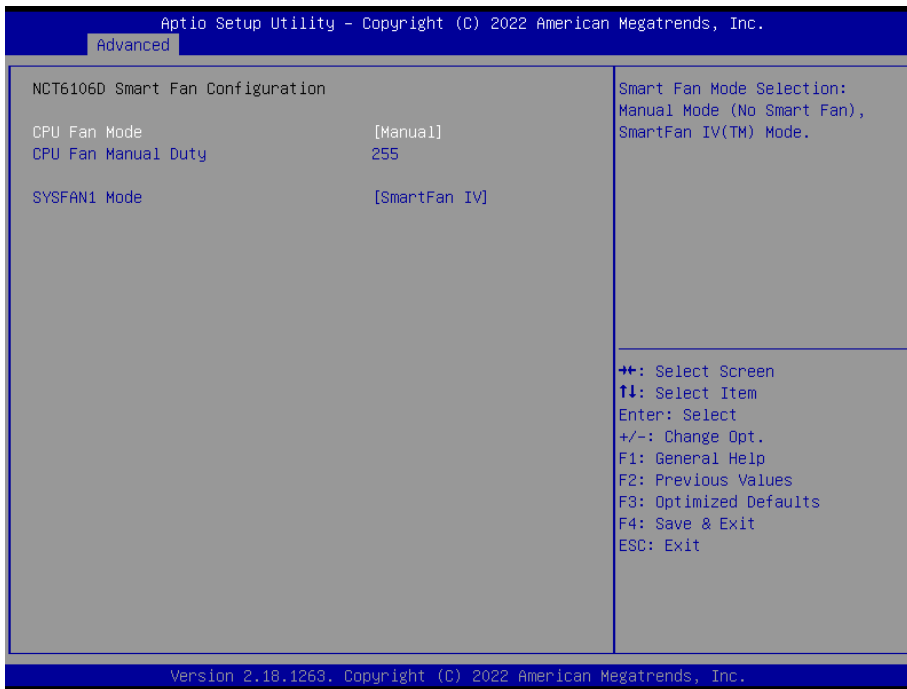
Item	Option	Description
Serial Port	Disabled Enabled[Default],	Enable or Disable Serial Port (COM).

3.6.2.8 NCT6106D H/W Monitor



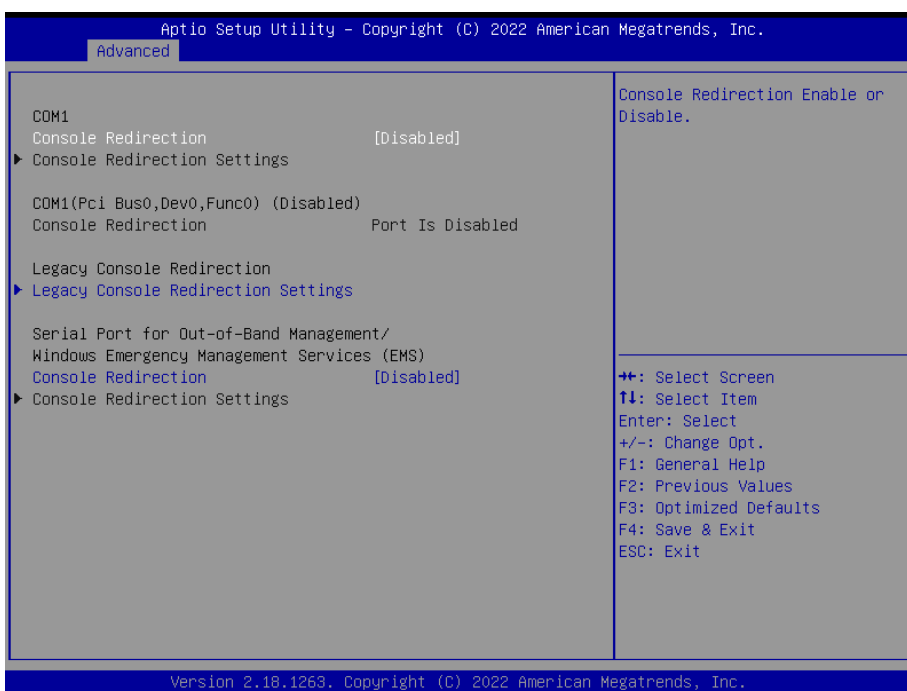
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3.6.2.8.1 Smart Fan Configuration



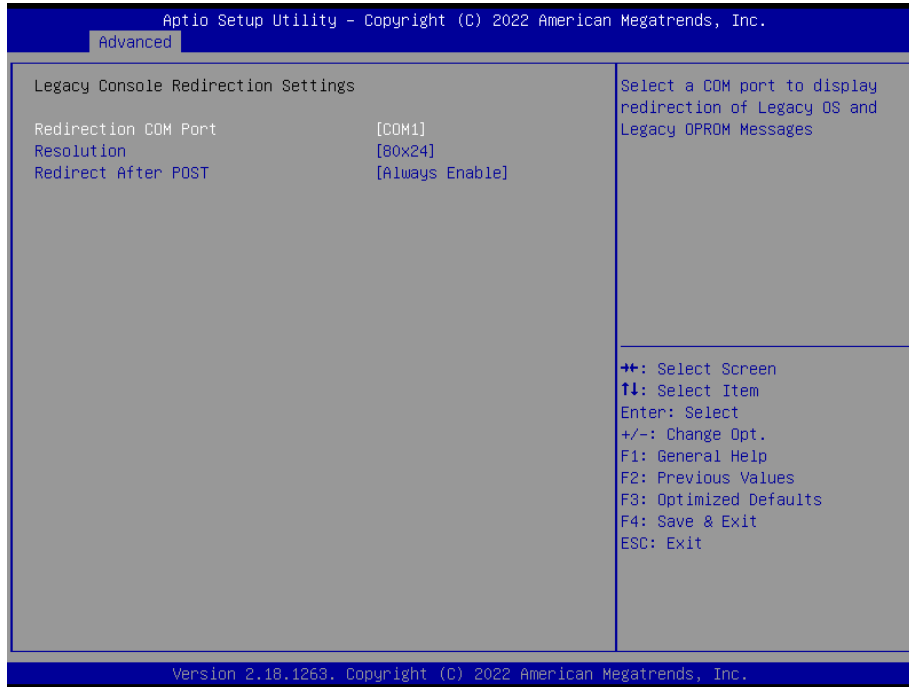
Item	Option	Description
CPU Fan Mode	Manual[Default], SmartFan IV	Smart Fan Mode Selection: Manual Mode (No Smart Fan), SmartFan IV™ Mode.
CPU Fan Manual Duty	255	CPU Fan manual output duty: 0 to 255.
SYSFAN1 Mode	Manual SmartFan IV[Default],	Smart Fan Mode Selection: Manual Mode (No Smart Fan), SmartFan IV™ Mode.

3.6.2.9 Serial Port Console Redirection



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

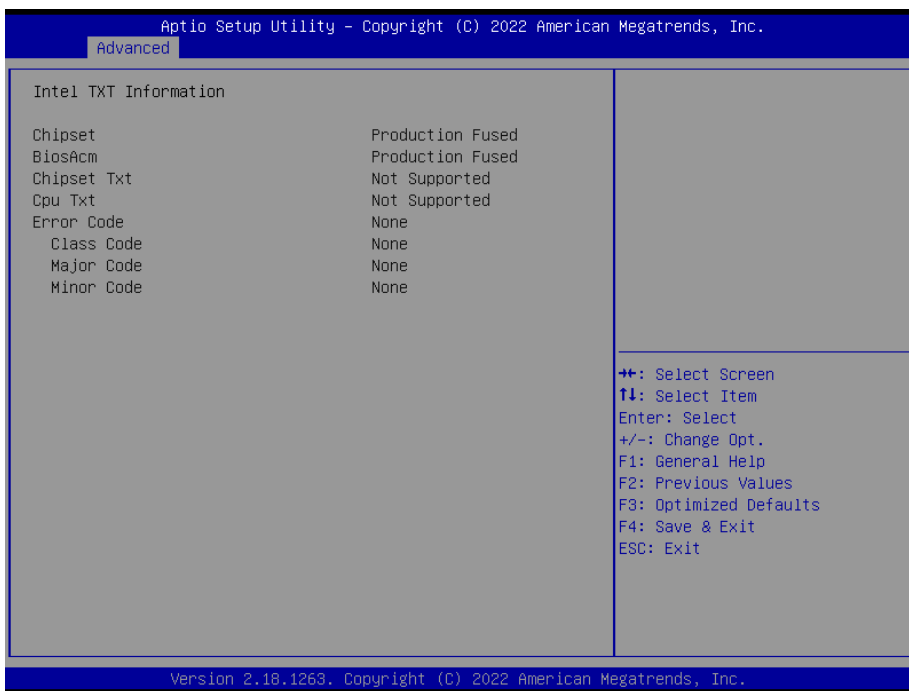
3.6.2.9.1 Legacy Console Redirection Settings



Item	Option	Description
Redirection COM Port	COM1	Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages
Resolution	80X24 [Default] 80X25	On Legacy OS, the Number of Rows and Columns supported redirection
Redirect After 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.

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3.6.2.10 Intel TXT Configuration

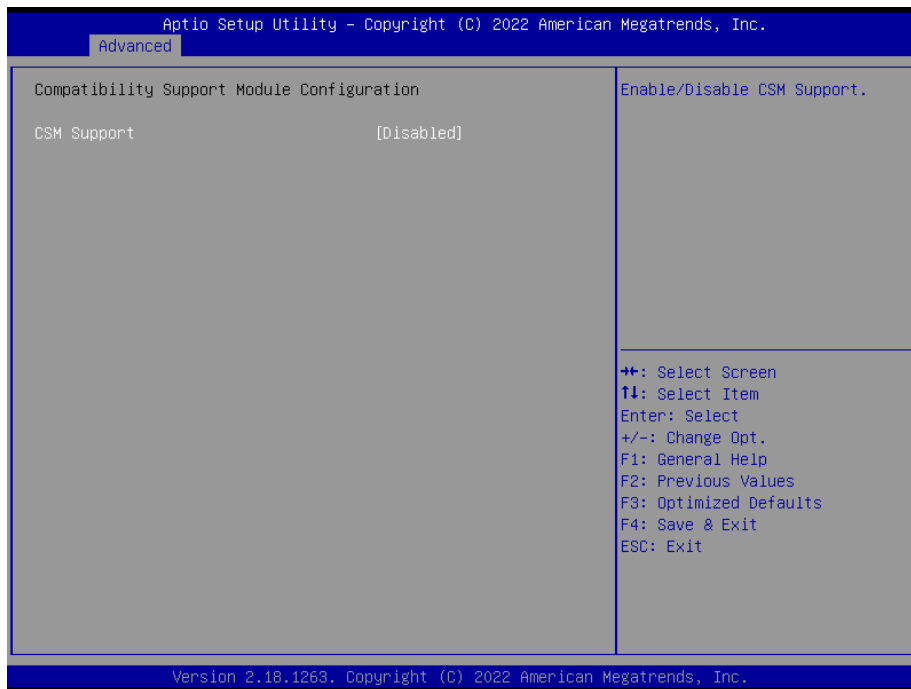


3.6.2.11 Network Stack Configuration



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

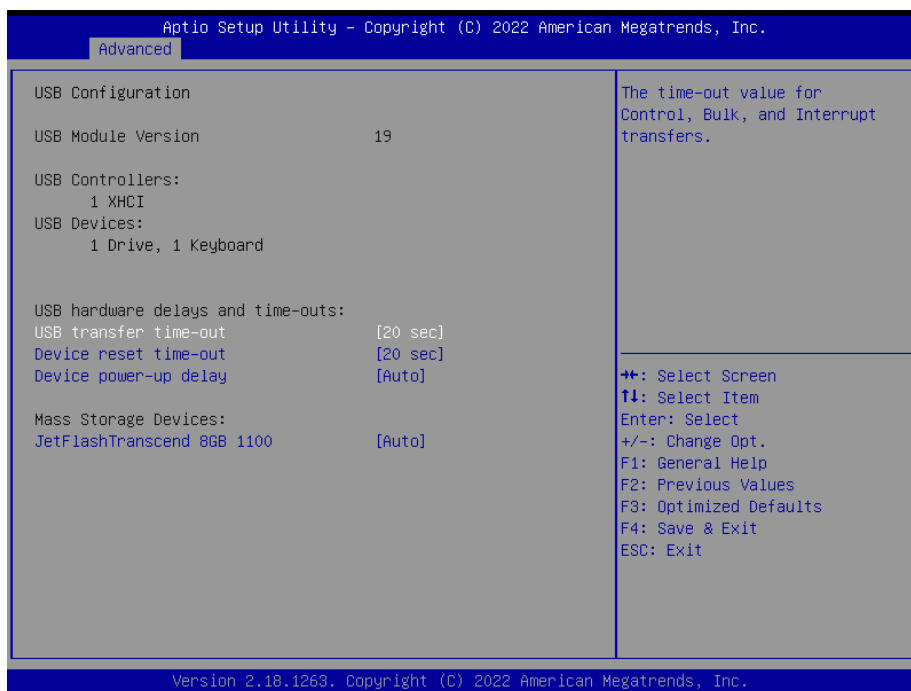
3.6.2.12 CSM Configuration



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

3.6.2.13 USB Configuration

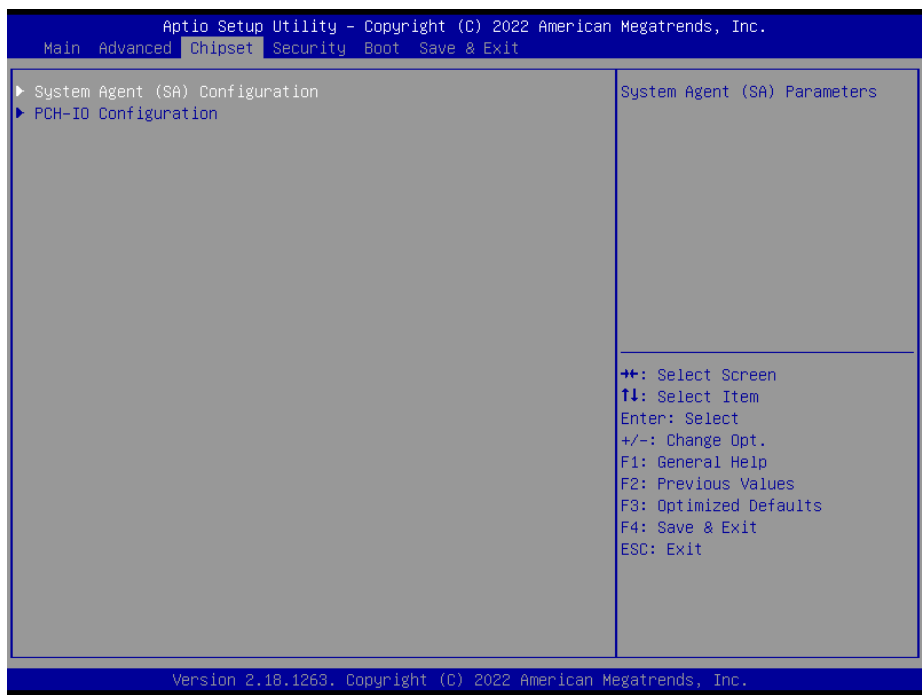
The USB Configuration menu helps read USB information and configures USB settings.



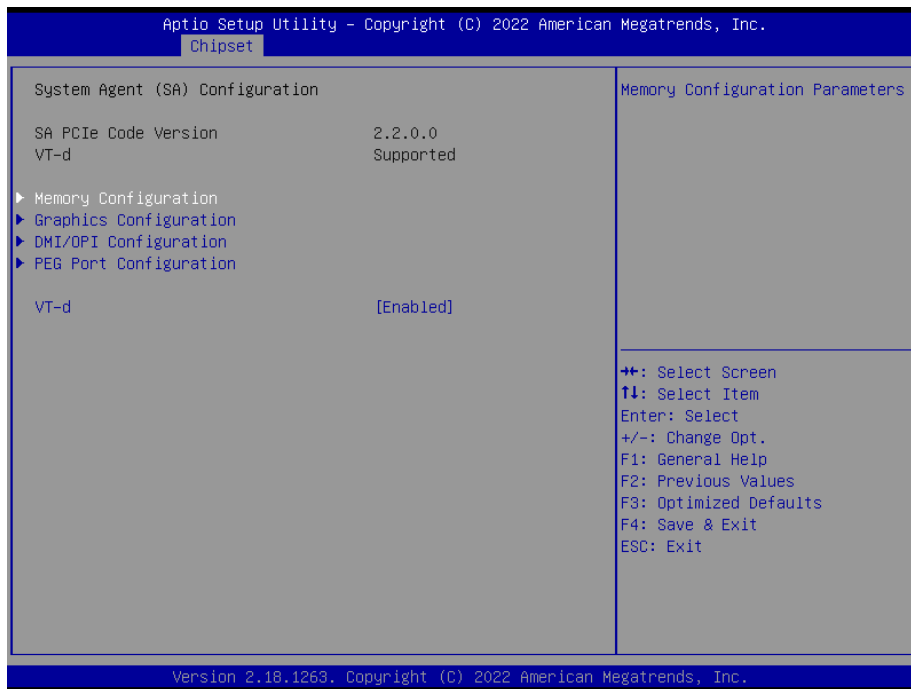
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Item	Options	Description
USB transfer time-out	1 sec 5 sec 10 sec 20 sec[Default]	The time-out value for Control, Bulk, and Interrupt transfers.
Device reset time-out	10 sec 20 sec[Default] 30 sec 40 sec	USB mass storage device Start Unit command time-out.
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 100 ms, 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

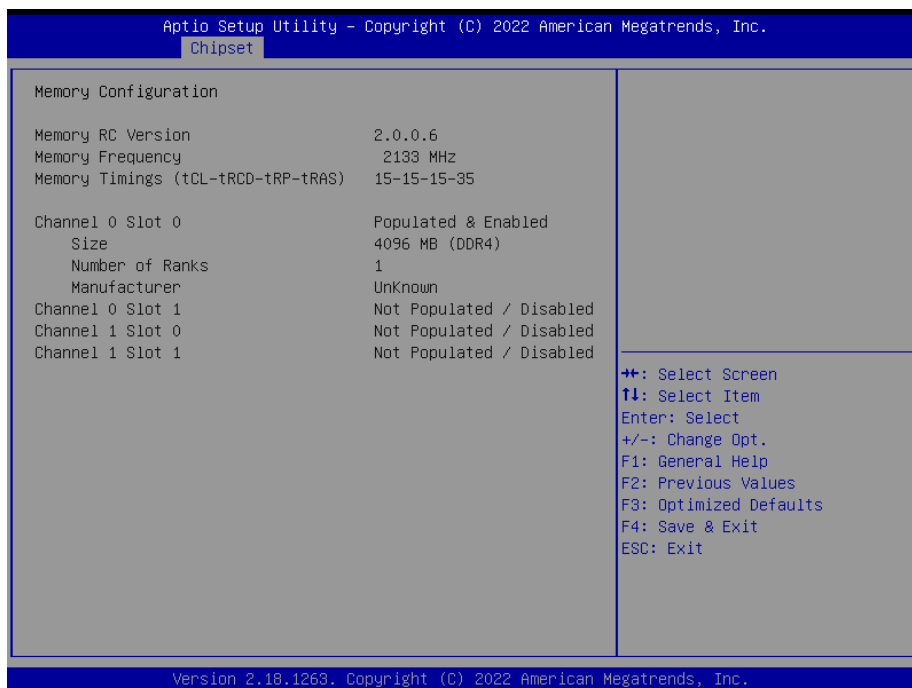


3.6.3.1 System Agent (SA) Configuration

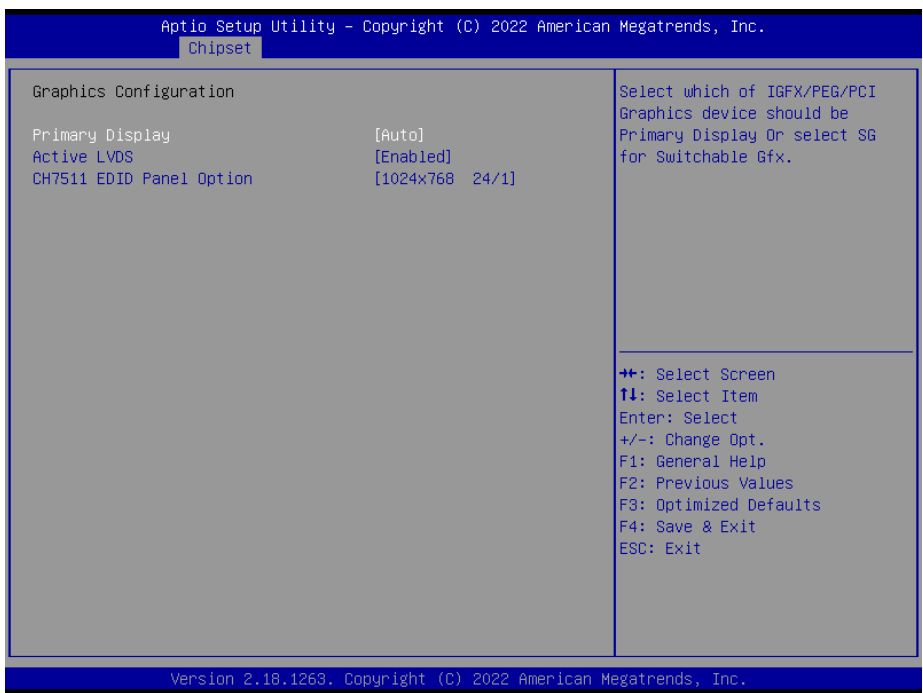


Item	Option	Description
VT-d	Disabled Enabled[Default]	VT-d capability

3.6.3.1.1 Memory Configuration

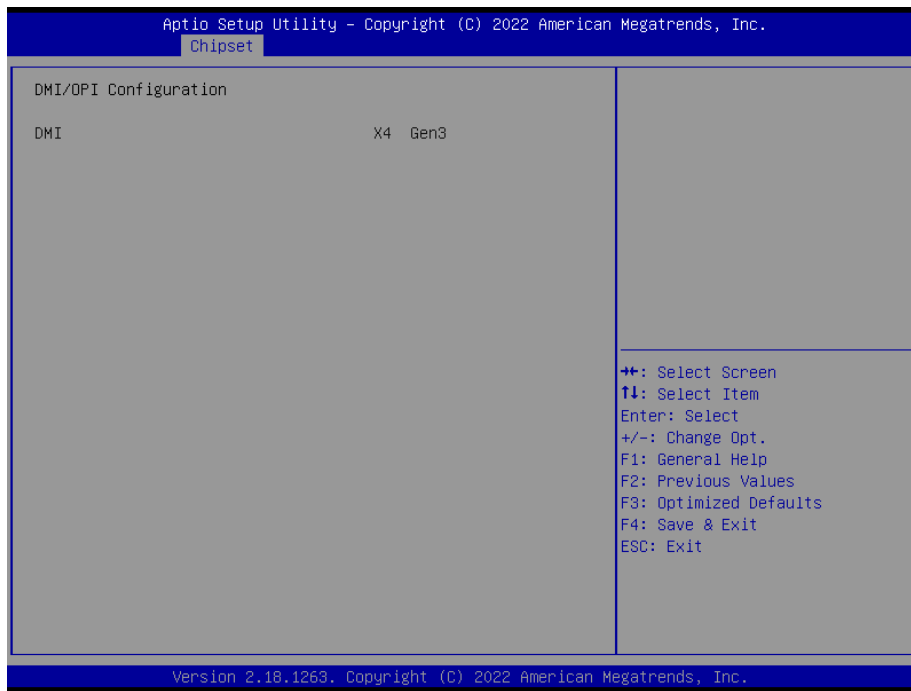


3.6.3.1.2 Graphics Configuration



Item	Option	Description
Primary Display	Auto[Default] IGFX PEG	Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select SG for Switchable Gfx.
Active LVDS	Disabled Enabled[Default]	Active on-board eDP to LVDS Converter
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	Set which panel resolution EDID reported by CH7511.

3.6.3.1.3 DMI/OPI Configuration



3.6.3.1.4 PEG Port Configuration

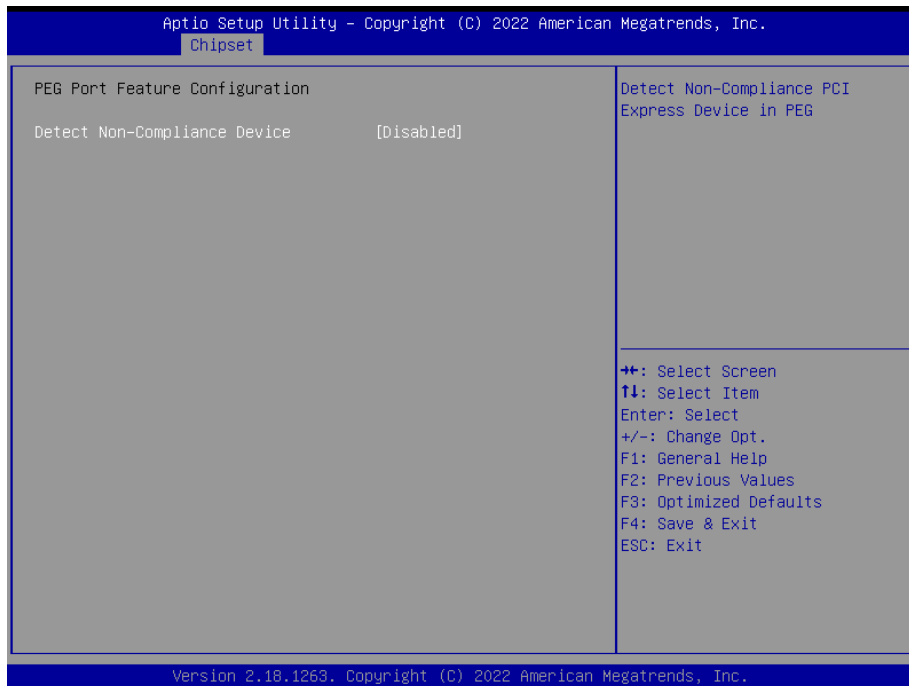


Item	Option	Description
Enable Root Port	Disabled Enabled Auto[Default]	Enable or Disable the Root Port
Max Link Speed	Auto[Default] Gen1	Configure PEG 0:1:0 Max Speed

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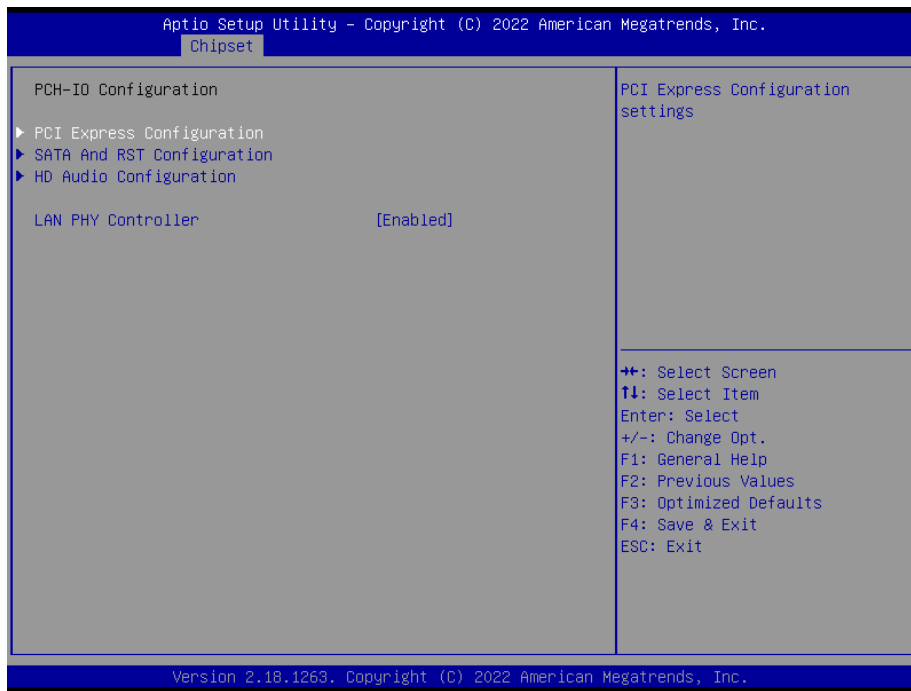
	Gen2 Gen3	
Max TLP payload size	128 TLP 256 TLP[Default]	Select PCI Express Max Transaction Layer Packet payload size.
Program PCIe ASPM after OpROM	Disabled[Default] Enabled	Enabled: PCIe ASPM will be programmed after OpROM. Disabled: PCIe ASPM will be programmed before OpROM.

3.6.3.1.4.1 PEG Port Feature Configuration



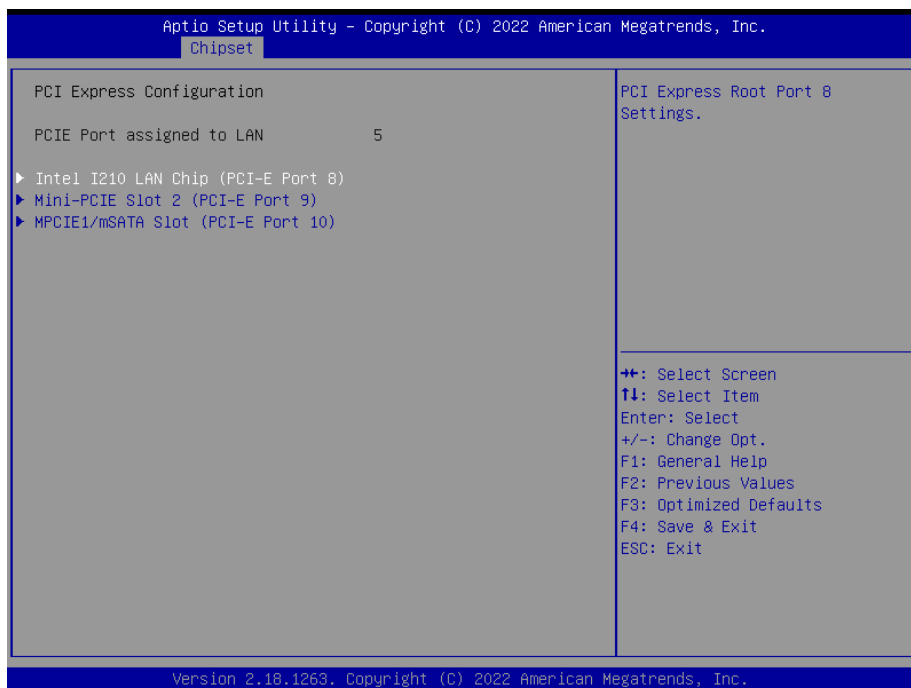
Item	Option	Description
Detect Non-Compliance Device	Disabled[Default] Enabled	Detect Non-Compliance PCI Express Device in PEG

3.6.3.2 PCH-IO Configuration

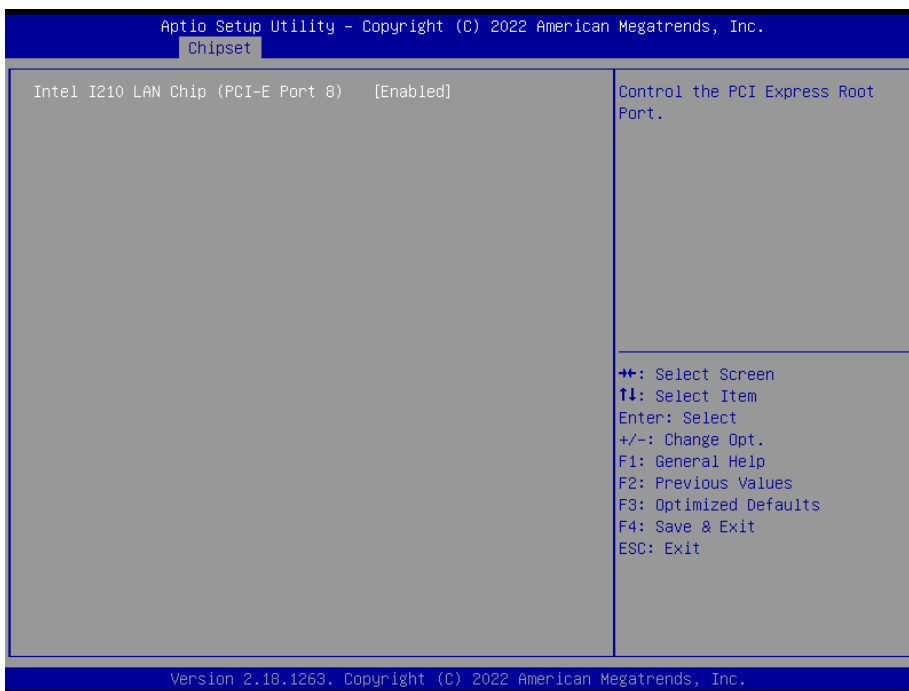


Item	Option	Description
LAN PHY Controller	Disabled Enabled[Default]	Enable or disable OnBoard PCH LAN PHY Controller.

3.6.3.2.1 PCI Express Configuration

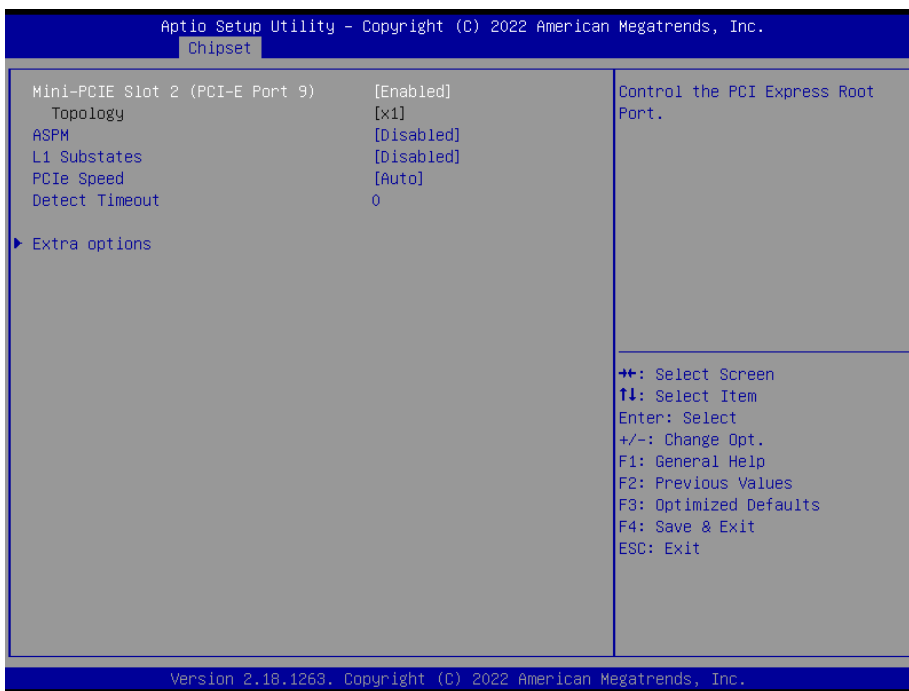


3.6.3.2.1.1 Intel I210 LAN Chip (PCI-E Port 8)



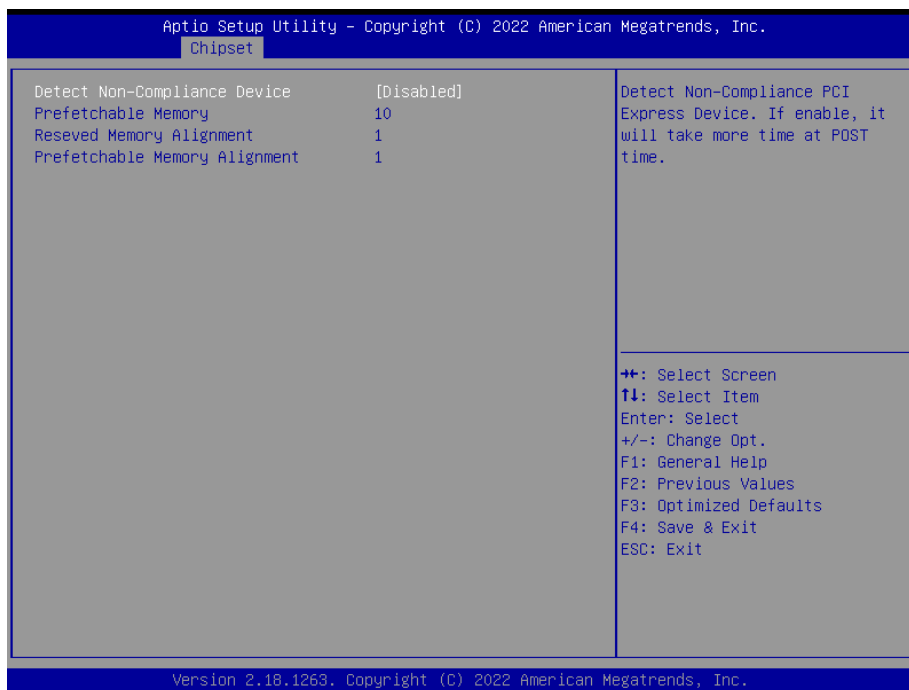
Item	Option	Description
Intel I210 LAN Chip (PCI-E Port 8)	Disabled Enabled[Default]	Control the PCI Express Root Port.

3.6.3.2.1.2 Mini-PCIE Slot 2 (PCI-E Port 9)



Item	Option	Description
Mini-PCIE Slot 2 (PCI-E Port 9)	Disabled Enabled[Default]	Control the PCI Express Root Port.
ASPM	Auto L0sL1 L1 L0s Disabled[Default]	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM
L1 Substates	Disabled[Default] L1.1 L1.2 L1.1 & L1.2	PCI Express L1 Substates settings.
PCle Speed	Auto[Default] Gen1 Gen2	Configure PCle Speed
Detect Timeout	0	The number of milliseconds reference code will wait for link to exit Detect state for enabled ports before assuming there is no device and potentially disabling the port.

3.6.3.2.1.2.1 Extra options

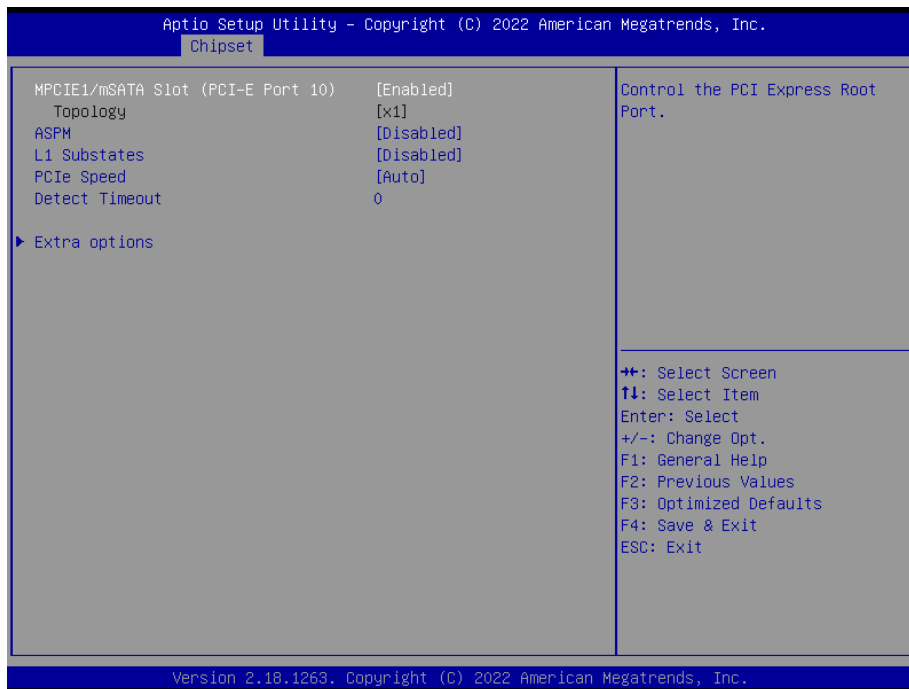


Item	Option	Description
Detect Non-Compliance Device	Disabled[Default] Enabled	Detect Non-Compliance PCI Express Device. If enable, it will take more time at POST time.
Prefetchable Memory	10	Prefetchable Memory Range for this Root Bridge.

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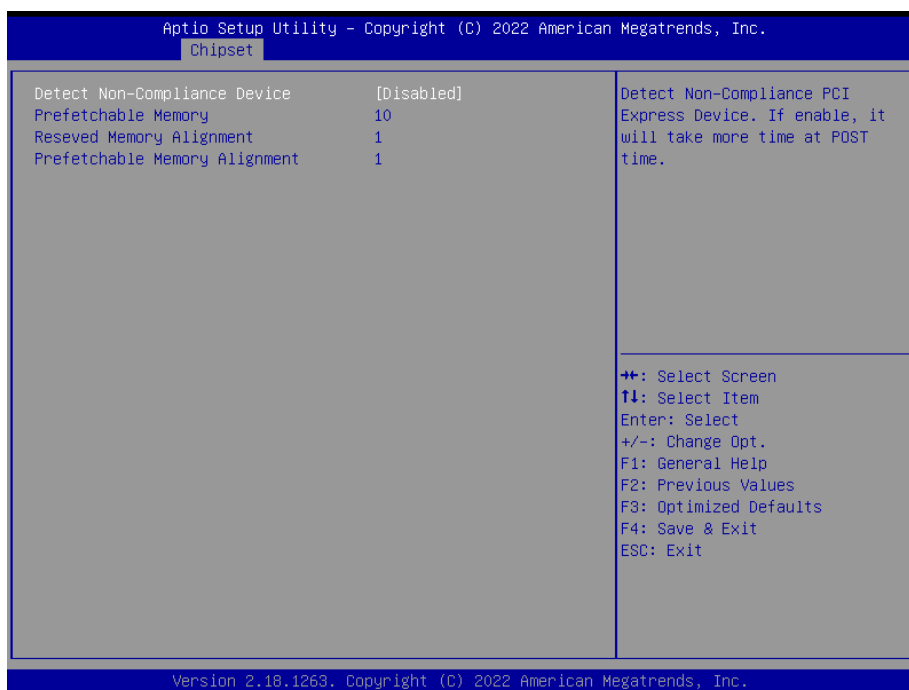
Reseved Memory Alignment	1	Reseved Memory Alignment (0-31 bits)
Prefetchable Memory Alignment	1	Prefetchable Memory Alignment (0-31 bits)

3.6.3.2.1.3 MPCIE1/mSATA Slot (PCI-E Port 10)



Item	Option	Description
MPCIE1/mSATA Slot (PCI-E Port 10)	Disabled Enabled[Default]	Control the PCI Express Root Port.
ASPM	Auto L0sL1 L1 L0s Disabled[Default]	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM
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
Detect Timeout	0	The number of milliseconds reference code will wait for link to exit Detect state for enabled ports before assuming there is no device and potentially disabling the port.

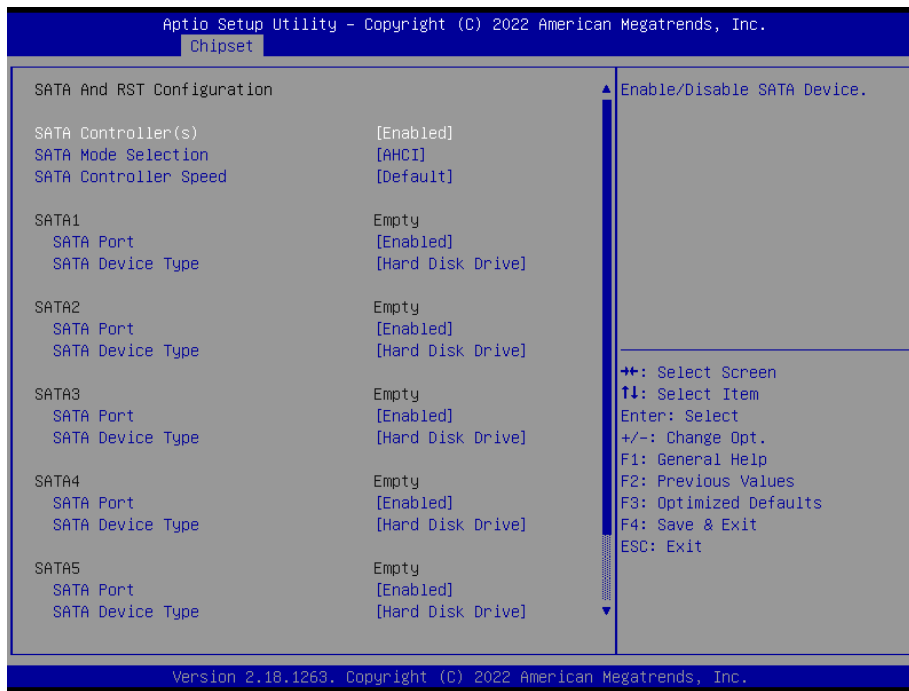
3.6.3.2.1.3.1 Extra options



Item	Option	Description
Detect Non-Compliance Device	Disabled[Default] Enabled	Detect Non-Compliance PCI Express Device. If enable, it will take more time at POST time.
Prefetchable Memory	10	Prefetchable Memory Range for this Root Bridge.
Reseved Memory Alignment	1	Reseved Memory Alignment (0-31 bits)
Prefetchable Memory Alignment	1	Prefetchable Memory Alignment (0-31 bits)

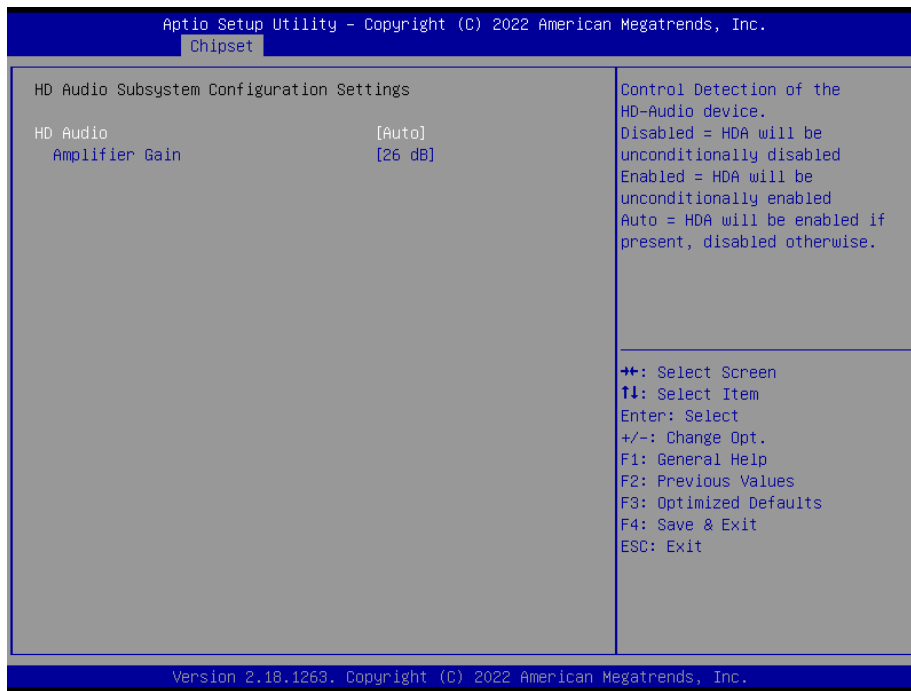
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3.6.3.2 SATA And RST Configuration



Item	Option	Description
SATA Controller(s)	Enabled[Default], Disabled	Enable/Disable SATA Device.
SATA Mode Selection	AHCI[Default], RAID	Determines how SATA controller(s) operate.
SATA Controller Speed	Default[Default], Gen1 Gen2 Gen3	Indicates the maximum speed the SATA controller can support.
SATA Port	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.

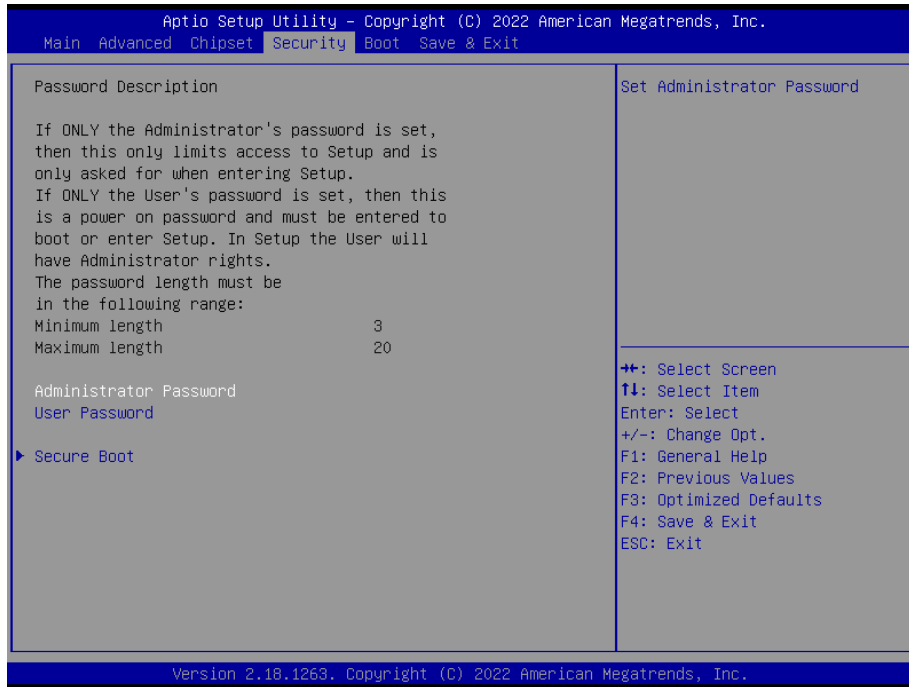
3.6.3.2.3 HD Audio Configuration



Item	Option	Description
HD Audio	Disabled Enabled, Auto [Default]	Control Detection of the HD-Audio device. Disabled = HDA will be unconditionally disabled Enabled = HDA will be unconditionally enabled Auto = HDA will be enabled if present, disabled otherwise.
Amplifier Gain	20 dB 26 dB [Default] , 32 dB 36 dB	Select Amplifier Gain(dB).

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3.6.4 Security



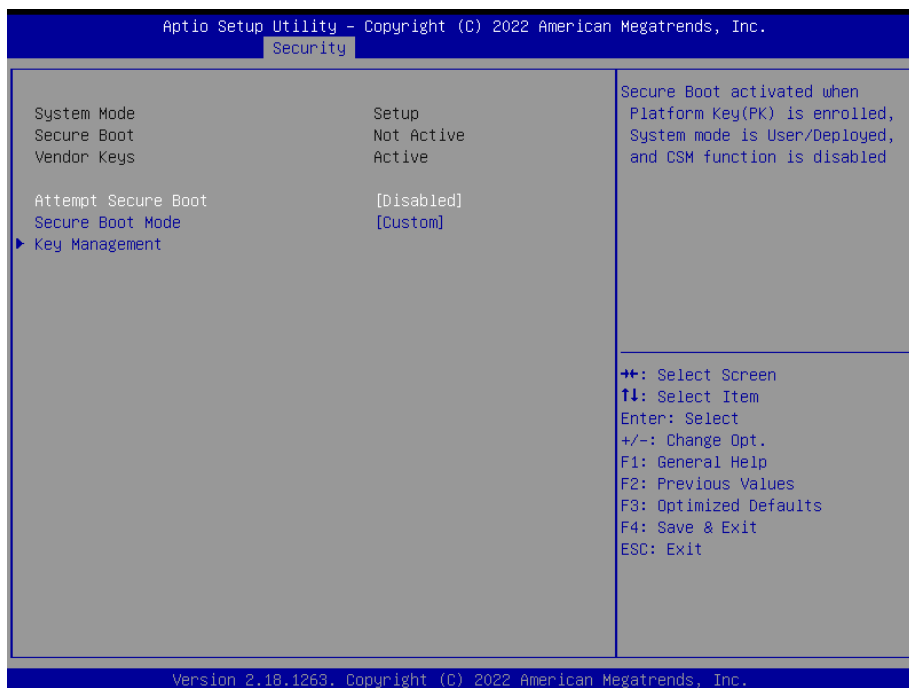
- **Administrator Password**

Set setup Administrator Password

- **User Password**

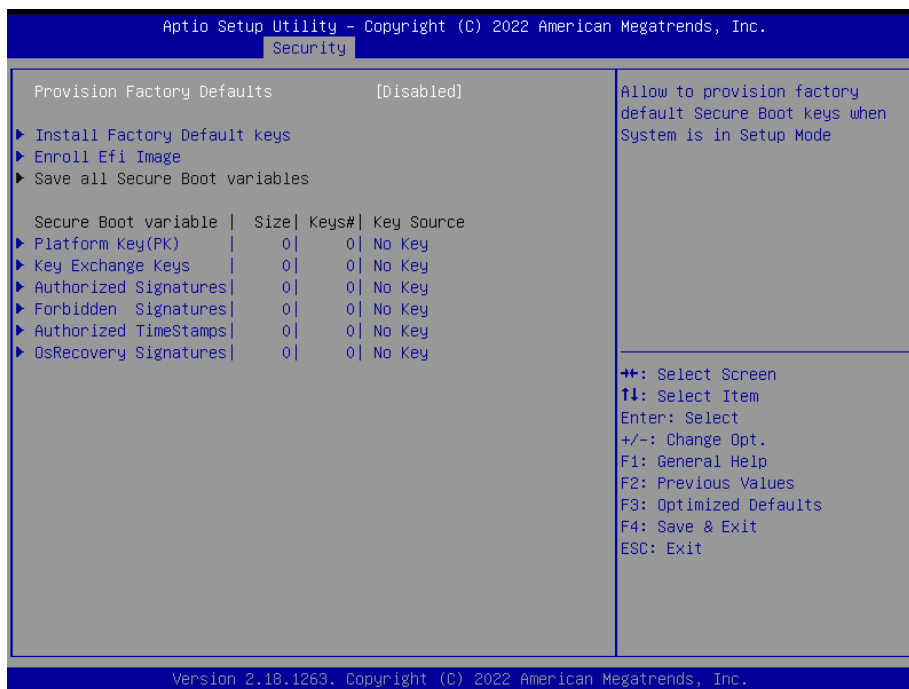
Set User Password

3.6.4.1 Secure Boot



Item	Option	Description
Attempt Secure Boot	Disabled[Default] Enabled	Secure Boot activated when Platform Key(PK) is enrolled, System mode is User/Deployed, and CSM function is disabled
Secure Boot Mode	Standard Custom[Default]	Secure Boot mode selector : Standard/Custom. In Custom mode Secure Boot Variables can be configured without authentication

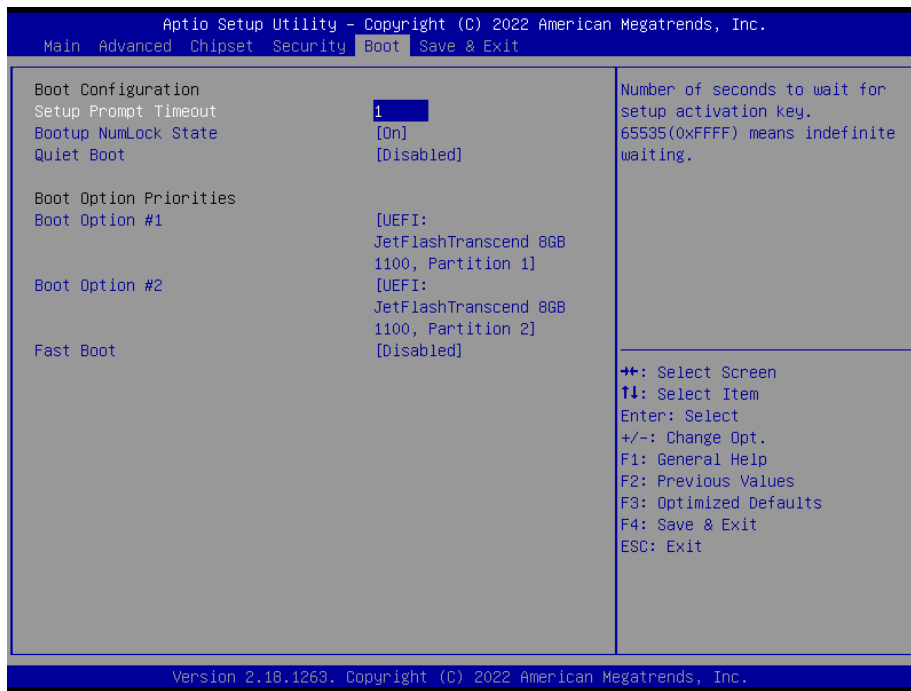
3.6.4.1.1 Key Management



Item	Option	Description
Provision Factory Defaults	Disabled[Default] Enabled,	Allow to provision factory default Secure Boot keys when System is in Setup Mode

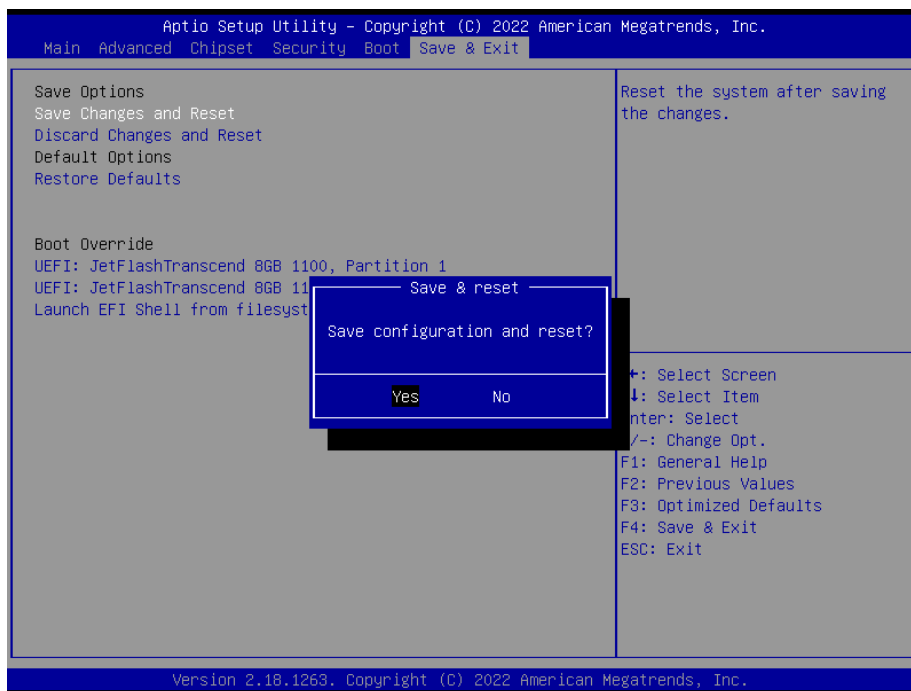
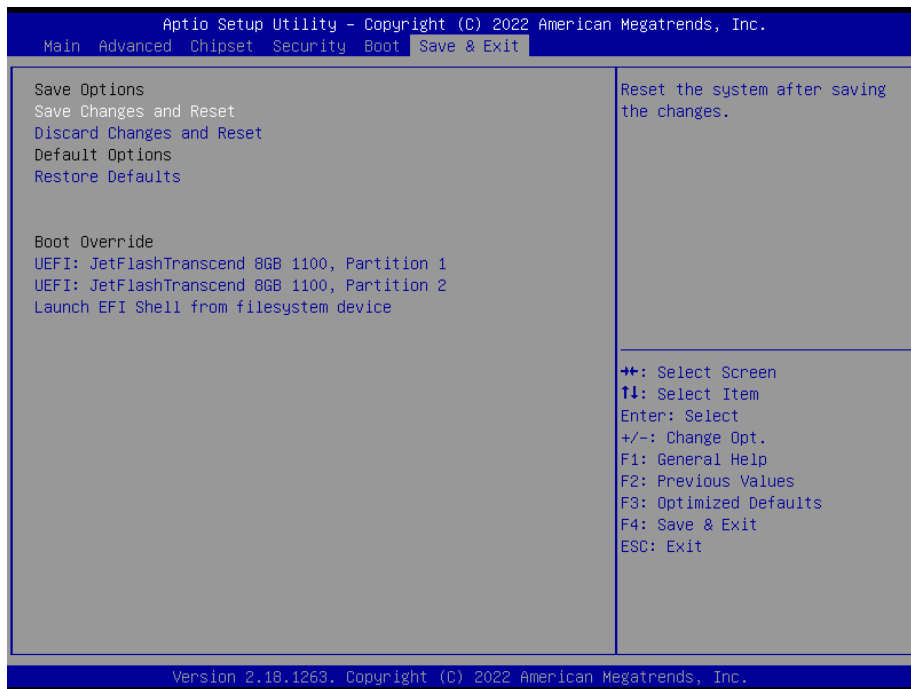
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3.6.5 Boot



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.

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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.

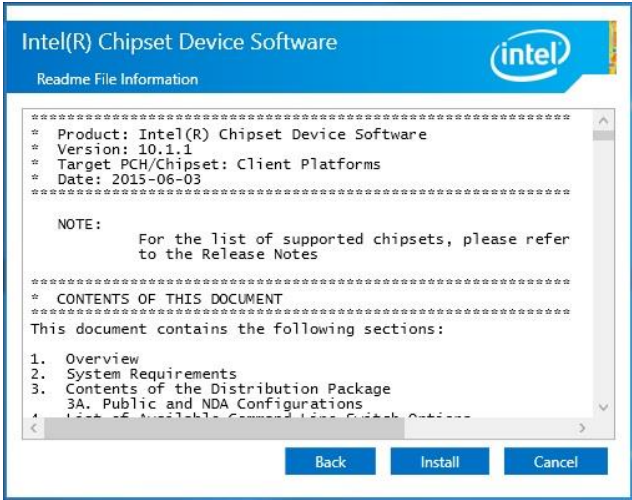
4.1 Install Chipset Driver

All drivers can be found on the Avalue Official Website:

<http://www.avalue.com.tw>.



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



Step 3. Click Install.



Step1. Click Next.



Step 4.



Step 2. Click Accept.



Step 5. Complete setup.

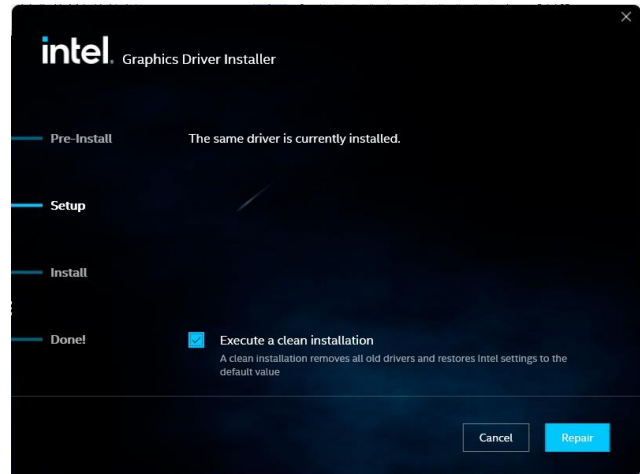
4.2 Install VGA Driver

All drivers can be found on the Avalue Official Website:

<http://www.avalue.com.tw>.



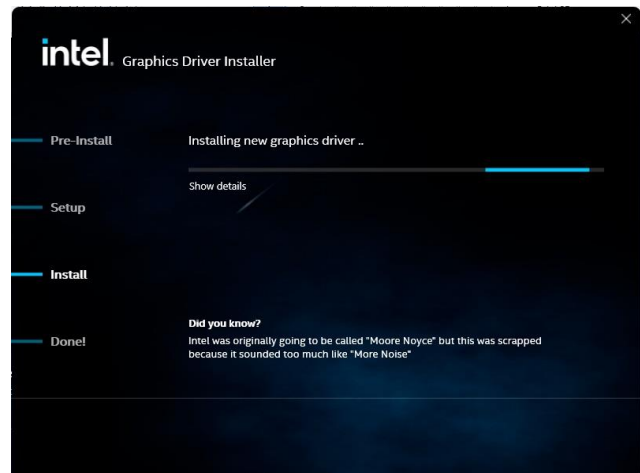
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



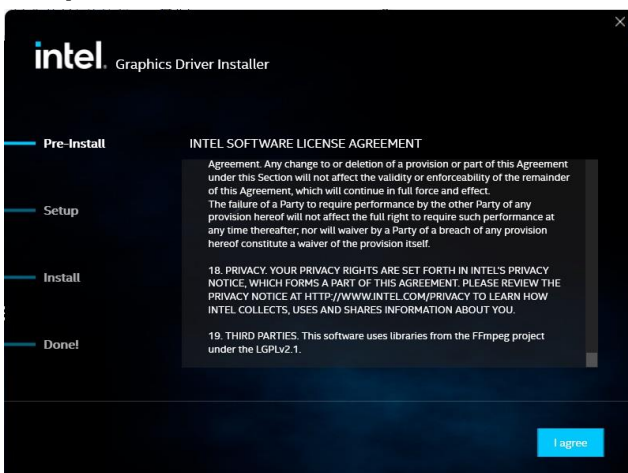
Step 3. Click Next.



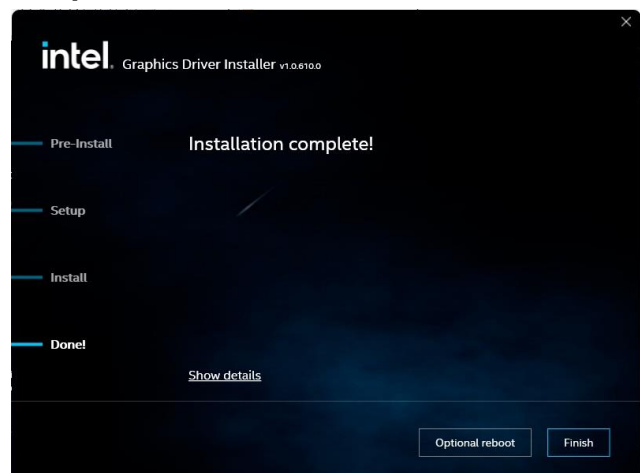
Step 1. Click Next to continue installation.



Step 4. Click Next.



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



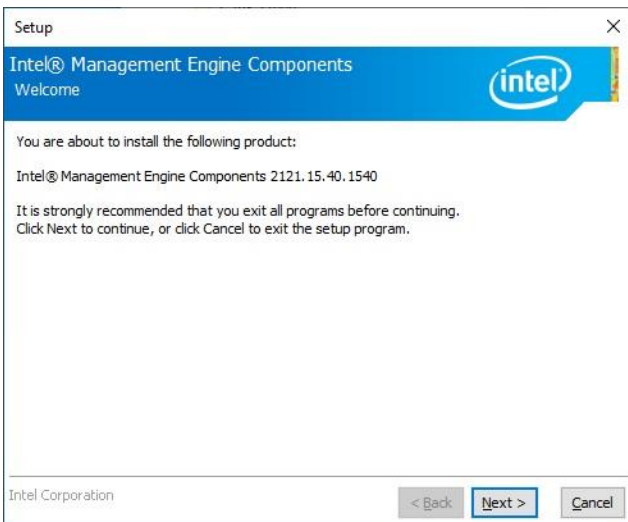
Step 5. Click Finish to complete setup.

4.3 Install SOL Driver

All drivers can be found on the Avalue Official Website:
<http://www.avalue.com.tw>.



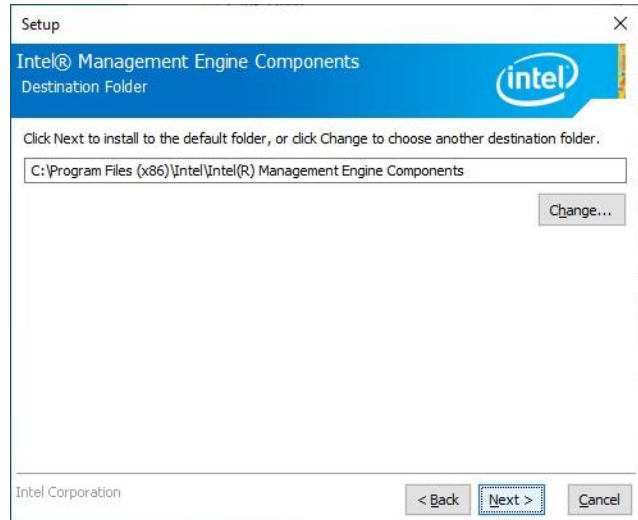
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



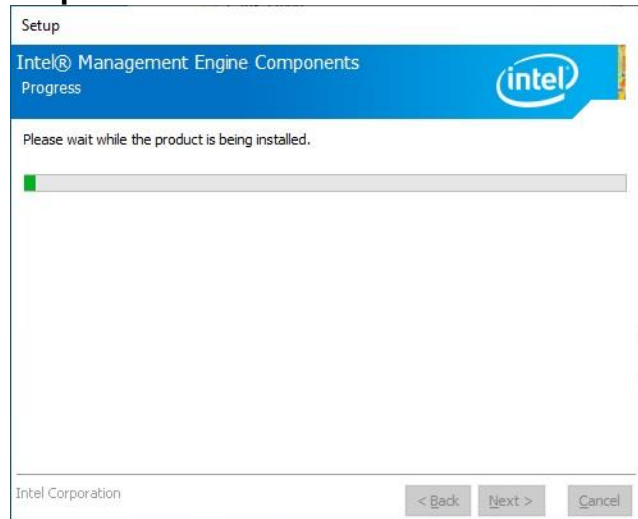
Step 1. Click **Next** to continue setup.



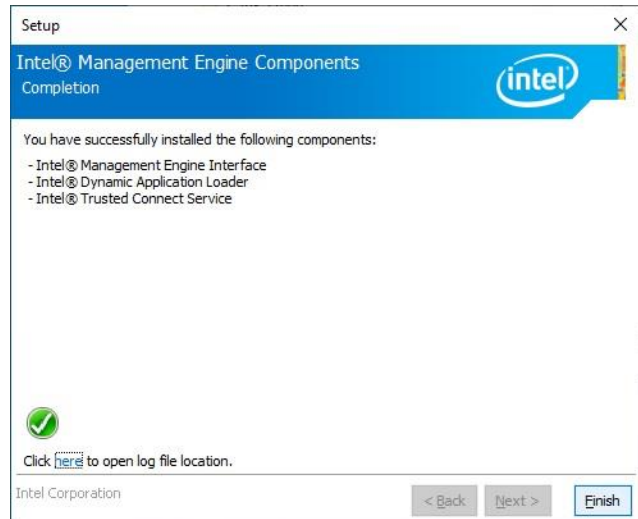
Step 2. Click **Next**.



Step 3. Click **Next**



Step 4.



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

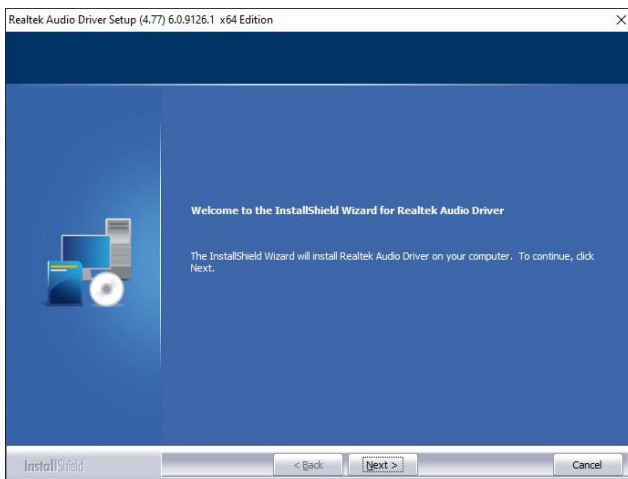
4.4 Install Audio Driver (For Realtek ALC888S HD Audio)

All drivers can be found on the Avalue Official Website:

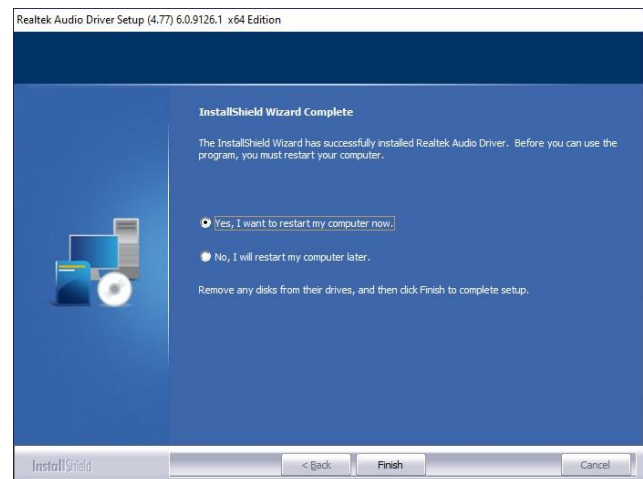
<http://www.avalue.com.tw>.



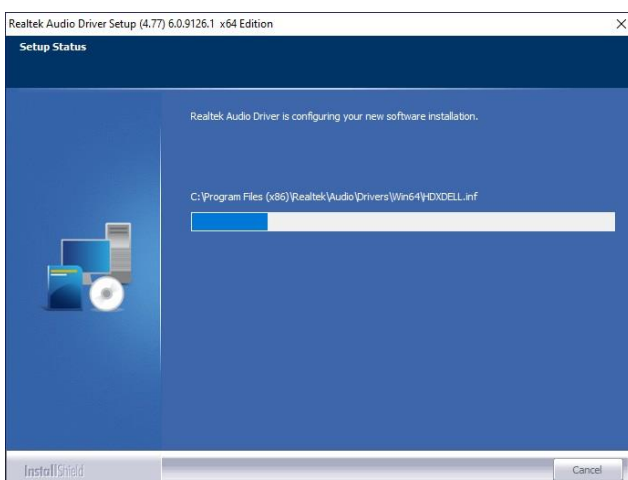
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



Step 1. Click **Next** to Install.



Step 3. Select **Finish** to complete Installation.



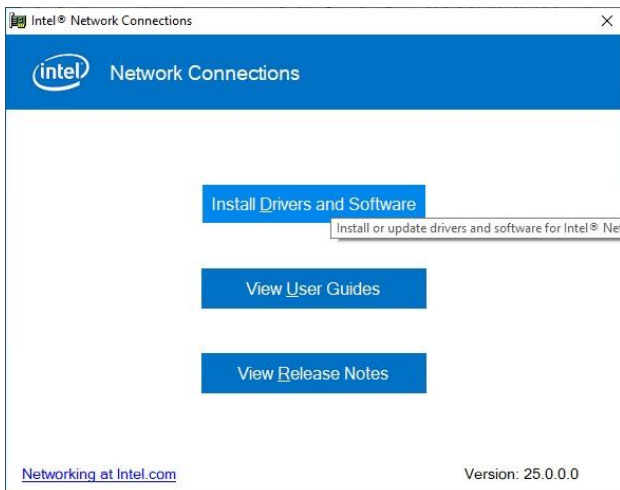
Step 2.

4.5 Install LAN Driver

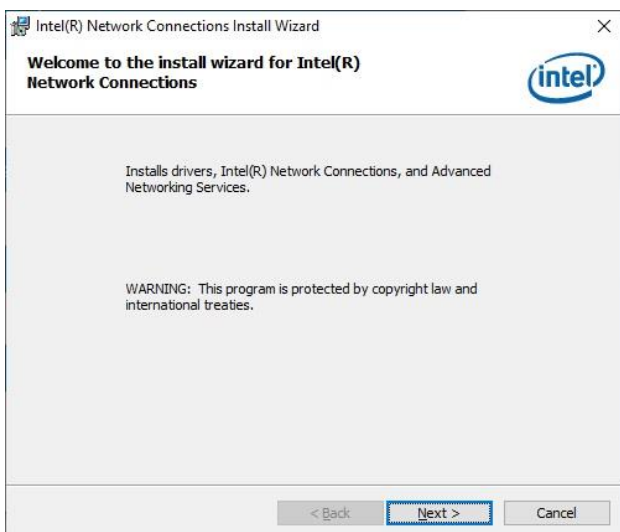
All drivers can be found on the Avalue Official Website:
<http://www.avalu.com.tw>.



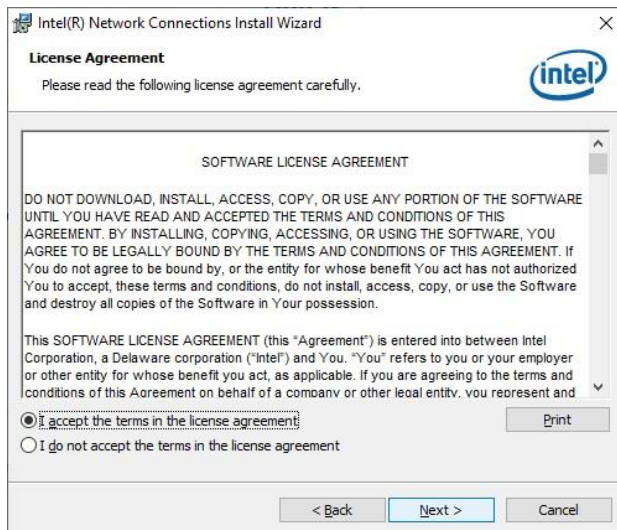
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



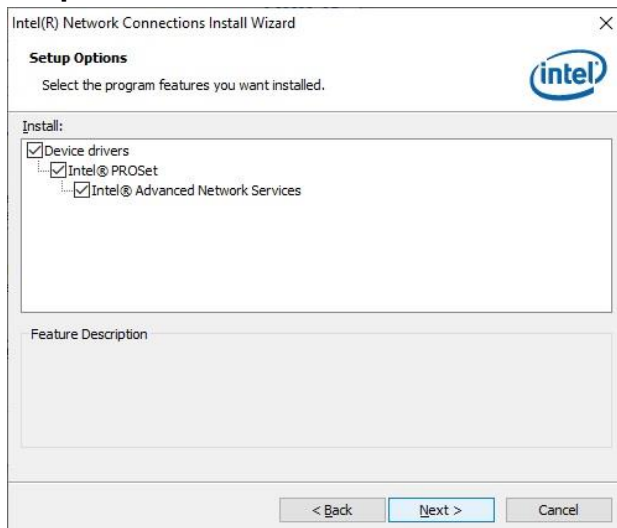
Step 1. Click Install Drivers and Software.



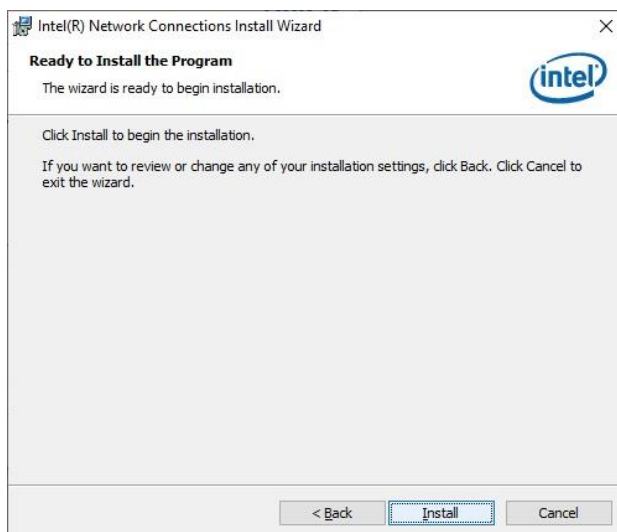
Step 2. Click Next.



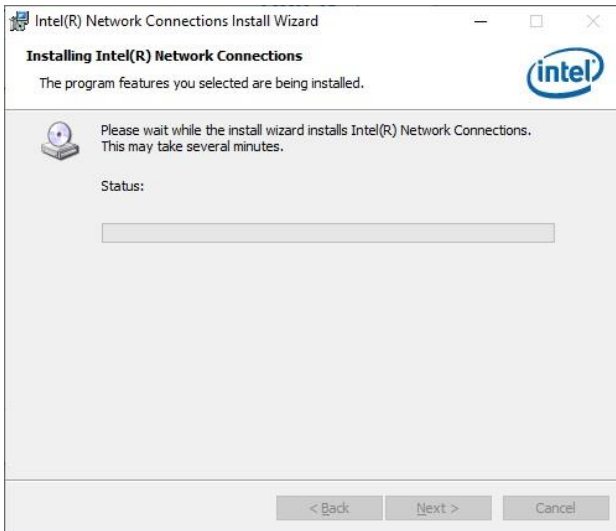
Step 3. Click Next.



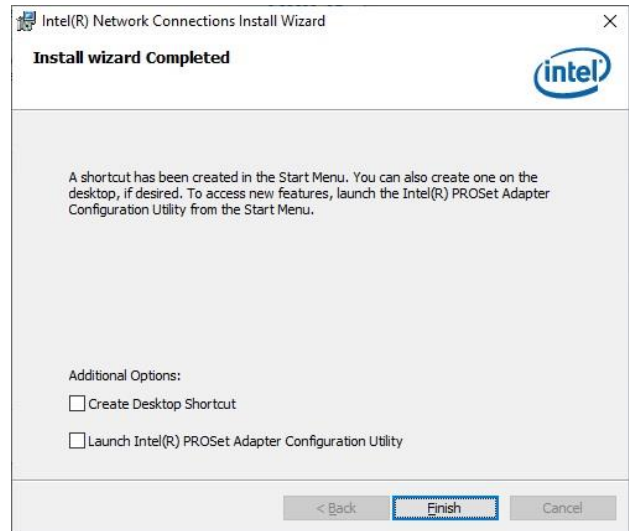
Step 4. Click Next.



Step 5. Click Install.



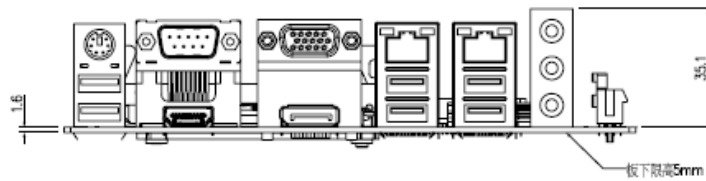
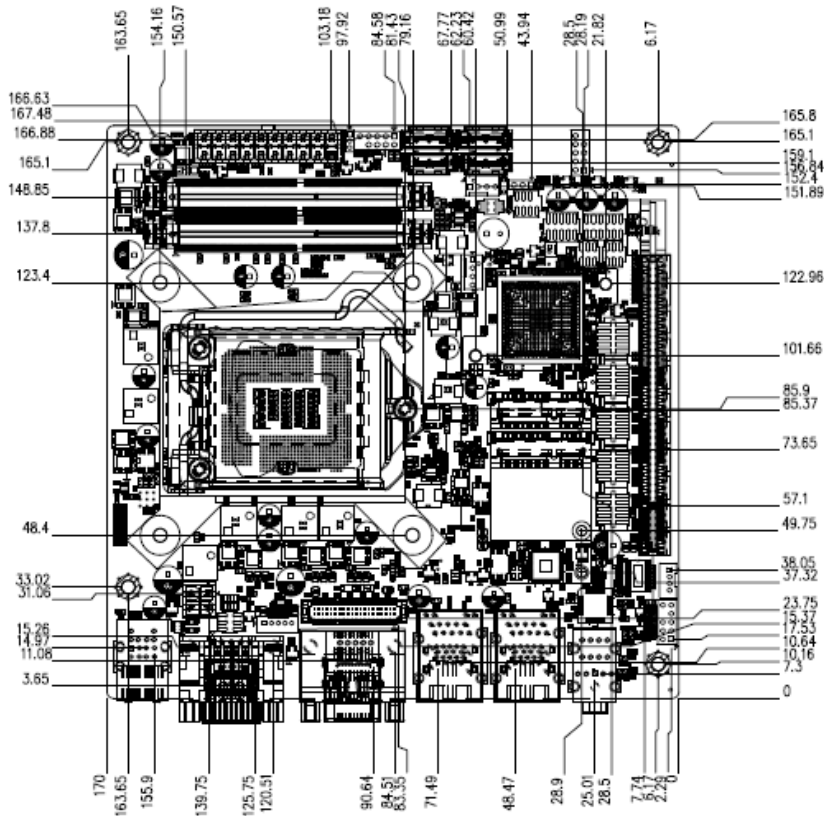
Step 6. Click Install.



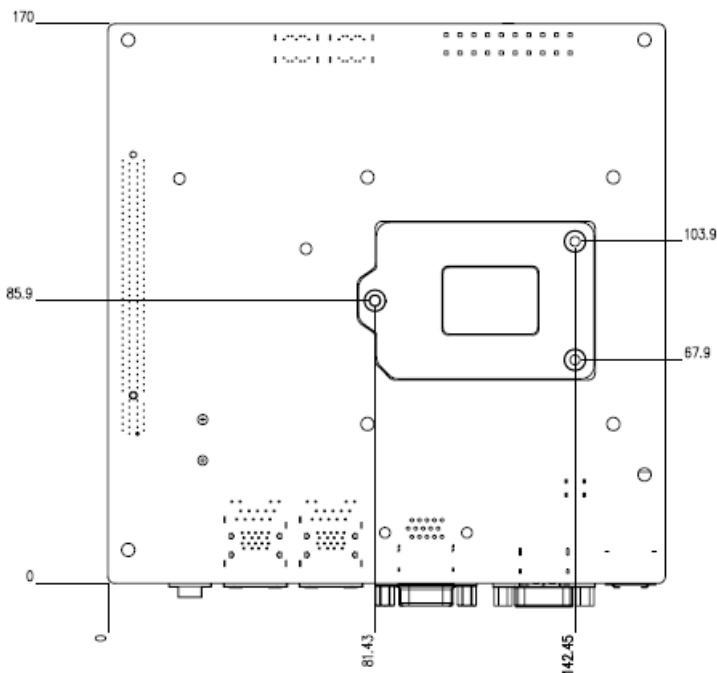
Step 7. Click Finish to complete setup.

5. Mechanical Drawing





Unit: mm



Unit: mm

