

EMX-H110P

Intel® Core™ Processors with Intel® H110 Mini ITX
Motherboard

User's Manual



5th Ed – 15 January 2019

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 UNDESIRE 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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5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Content

1. Getting Started	8
1.1 Safety Precautions	8
1.2 Packing List	8
1.3 Document Amendment History	9
1.4 Manual Objectives	10
1.5 System Specifications	11
1.6 Architecture Overview—Block Diagram	14
2. Hardware Configuration	15
2.1 Product Overview	16
2.2 Jumper and Connector List	17
2.3 Setting Jumpers & Connectors	19
2.3.1 Serial port 1 pin9 signal select (JRI1)	19
2.3.2 Serial port 2 pin9 signal select (JRI2)	19
2.3.3 AT/ATX Power Mode Select (JATATX1)	20
2.3.4 Clear CMOS (JCMOS1)	20
2.3.5 LCD Inverter connector (JBKL1)	21
2.3.6 Serial port 2/3/4/5/6 connector (JCOM2/3/4/5/6)	21
2.3.7 COM2 RS485/422 connector (JCOM2_422_485)	22
2.3.8 General purpose I/O connector (JDIO1)	22
2.3.9 ATX Power connector (ATXPWR1)	23
2.3.10 USB 2.0 connector 1 (JUSB1)	23
2.3.11 Battery connector (JBAT1)	24
2.3.12 LPC connector (JLPC1)	24
2.3.13 LVDS connector (JLVDS1)	25
2.3.14 Front Audio connector (JAUDIO2)	26
2.3.14.1 Signal Description –Audio connector 2 (JAUDIO2)	26
2.3.15 SPI connector (JSPI1)	26
2.3.16 Amplifier connector (JSPK1)	27
2.3.17 Front panel setting connector (JFP1)	27
2.3.18 LAN1& LAN 2 active LED connector (JLANLED1)	28
2.3.19 CPU fan connector (CPUFAN1)	28
2.3.20 Serial port 1 connector (COM1)	29
2.3.21 System fan connector (SYSFAN1)	29
2.3.22 ATX 12V power connector (ATX12V1)	30
2.3.23 Gigabit LAN (RJ-45) connector (LAN1/2)	30

EMX-H110P User's Manual

3.BIOS Setup	31
3.1 Introduction	32
3.2 Starting Setup	32
3.3 Using Setup	33
3.4 Getting Help	34
3.5 In Case of Problems	34
3.6 BIOS setup	35
3.6.1 Main Menu	35
3.6.1.1 System Language	36
3.6.1.2 System Date	36
3.6.1.3 System Time	36
3.6.2 Advanced Menu	36
3.6.2.1 Trusted Computing	37
3.6.2.2 APCI Settings	37
3.6.2.3 PCH-FW Configuration	39
3.6.2.3.1 Firmware Update Configuration	39
3.6.2.4 Super IO Configuration	40
3.6.2.4.1 Serial Port 1 Configuration	41
3.6.2.4.2 Serial Port 2 Configuration	41
3.6.2.4.3 Serial Port 3 Configuration	42
3.6.2.4.4 Serial Port 4 Configuration	43
3.6.2.4.5 Serial Port 5 Configuration	43
3.6.2.4.6 Serial Port 6 Configuration	44
3.6.2.5 NCT6106D H/W Monitor	45
3.6.2.5.1 Smart Fan Configuration	45
3.6.2.6 S5 RTC Wake Settings	46
3.6.2.7 Serial Port Console Redirection	46
3.6.2.7.1 Legacy Console Redirection Settings	47
3.6.2.8 CPU Configuration	48
3.6.2.9 Intel TXT Configuration	49
3.6.2.10 SATA Configuration	50
3.6.2.10.1 Software Feature Mask Configuration	51
3.6.2.11 AMI Graphic Output Protocol Policy	51
3.6.2.12 Network Stack Configuration	52
3.6.2.13 CSM Configuration	52
If enable CSM Support:	53
3.6.2.14 USB Configuration	54
3.6.3 Chipset	55
3.6.3.1 System Agent (SA) Configuration	55
3.6.3.1.1 Graphics Configuration	56

3.6.3.1.2	DMI/OPI Configuration	57
3.6.3.1.3	PEG Port Configuration	58
3.6.3.1.4	Memory Configuration	59
3.6.3.2	PCH-IO Configuration	59
3.6.3.2.1	PCI Express Configuration	60
3.6.3.2.2	HD Audio Configuration	63
3.6.4	Security.....	63
3.6.4.1	Secure Boot menu	64
3.6.4.1.1	Key Management.....	65
3.6.5	Boot	65
3.6.6	Save and exit.....	66
3.6.6.1	Save Changes and Reset.....	67
3.6.6.2	Discard Changes and Reset.....	67
3.6.6.3	Restore Defaults	67
3.6.6.4	Launch EFI Shell from filesystem device	67
4.	Drivers Installation.....	68
4.1	Install Chipset Driver	69
4.2	Install VGA Driver.....	70
4.3	Install ME Driver	72
4.4	Install Audio Driver (For Realtek ALC892 HD Audio)	73
4.5	Install LAN Driver	74
4.6	Install RST Driver	75
5.	Mechanical Drawing	77

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 EMX-H110P motherboard
- 2 x SATA cable
- 1 x I/O Shield



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

1.3 Document Amendment History

Revision	Date	By	Comment
1 st	April 2016	Avalue	Initial Release
2 nd	October 2016	Avalue	Update BIOS Setup
3 rd	January 2017	Avalue	Update BIOS Setup
4 th	August 2017	Avalue	Update System Specifications
5 th	January 2019	Avalue	Update Setting Jumpers & Connectors

1.4 Manual Objectives

This manual describes in details Avalue Technology EMX-H110P 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-H110P 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 6th Generation Core™ i7/ i5/ i3 Processors (Max. TDP at 95W)
BIOS	AMI uEFI BIOS, 128Mbit SPI Flash ROM
System Chipset	Intel® H110 Express Chipset
I/O Chip	Nuvoton® NCT6106D
System Memory	Two 260-pin DDR4 2133MHz SO-DIMM socket, supports up to 32GB Max
Watchdog Timer	H/W Reset, 1sec. – 65535sec./min.1sec. or 1min. step
H/W Status Monitor	CPU temperature monitoring Voltages monitoring CPU fan speed control
Expansion	1 x PCI-e x 16 1 x Full Size Mini-PCI-e with mSATA Support (SATA III) 1 x Half Size Mini PCI-e
S3/S4	Yes (S0/S3/S4/S5)
Display	
Chipset	Intel® 6th Generation CPU integrated
Resolution	VGA: 2048 x 1536@50 Hz HDMI: 4096 x 2160@24 Hz, 2560 x 1600@60 Hz DP: 4096 x 2304@60Hz
Multiple Display	Dual Display
Audio	
Audio Codec	Realtek ALC892 HD Audio Decoding Controller
Ethernet	
LAN Chip	1 x Intel® I219LM Gigabit Ethernet PHY 1 x Intel® I211AT PCI-e Gigabit Ethernet
Internal I/O Connectors	
Internal I/O Connector	Storage: - 1 x SATA III or 1 x full size Mini PCI-e support mSATA by BIOS selection - 3 SATAIII 1 x Half Size Mini PCI-e 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 COM 2: - 1 x 2 x 3 pin, pitch 2.00mm connector for COM 2 support RS232 with Pin 9,

EMX-H110P User's Manual

	+5V/+12V/RI - 1 x 2 x 3 pin, pitch 2.00mm connector for COM 2 support RS422/485 connector, Pin 5 with +5V COM 2: 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 1 x 2 x 5 pin, pitch 2.54mm connector for 2 USB 2.0 1 x 2 x 20 pin, pitch 1.25mm connector for LVDS 1 x 1 x 5 pin, pitch 2.00mm Wafer connector for LCD inverter backlight connector (5V/12V) 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 1 x 2 x 5 pin, pitch 2.54mm connector for front panel 2 x 1 x 2 pin, pitch 2.00mm connector for LAN1 & LAN2 Activity Indicator LED 1 x 2 x 5 pin, pitch 2.54mm connector for front Audio 1 x 4 pin, pitch wafer 2.00mm connector for 6W x 2 Speaker 1 x 1 x 3 pin, pitch 2.54mm connector for COMS Clear 1 x 2 pin Pitch 1.25mm Vertical type battery connector 1 x 2 x 6 pin, pitch 2.00mm connector for 8 bits GPIO 1 x 2 x 3 pin, pitch 2.00mm connector for SGPIO (Only support C236 PCH platform) 1 x 2 x 4 pin, pitch 2.00mm connector for BIOS SPI 1 x 2 x 5 pin, pitch 2.0mm connector for LPC Onboard buzzer 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
Rear I/O Connectors	
Rear Side External I/O Connector	2 x RJ-45 with Dual deck USB 3.0 connector 1 x VGA 1 x DP 1 x HDMI COM1 support RS-232 DB9 connector, Pin 9 with / +5V/+12V/RI Supported 1 x Line-out, 1 x Mic-In, 1 x Line-in 1 x PS/2 Keyboard or PS/2 Mouse with Dual deck USB 2.0
Mechanical & Environmental	
Power Requirement	+12V / +5V / 5VSB / +3.3V / -12V
ACPI	Single power ATX Support S0, S3, S4, S5

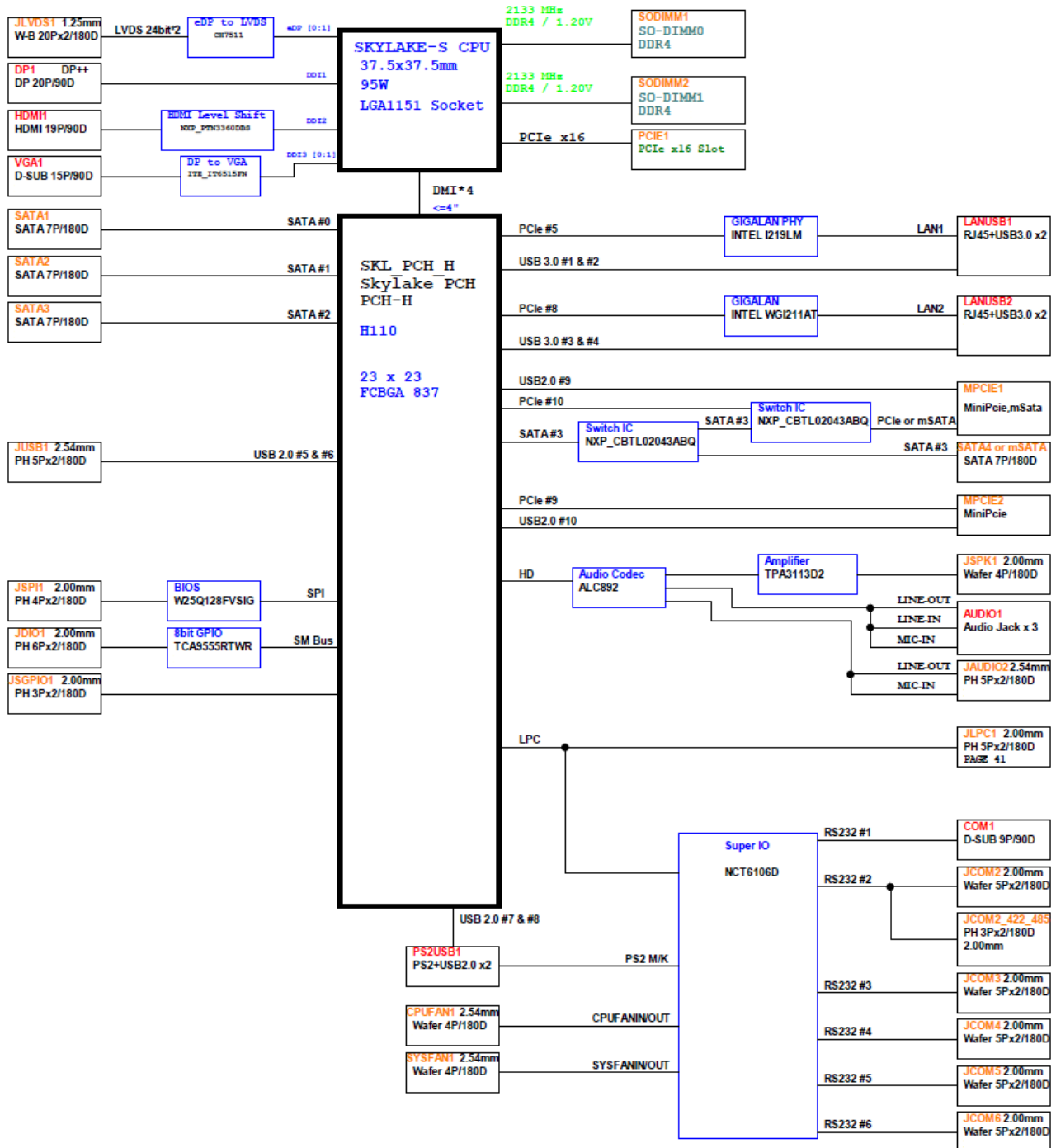
Power Type	AT / ATX mode Switchable Through Jumper
Operating Temp.	0 ~ 60°C (32~140°F)
Storage Temp.	-40 ~ 75°C
Operating Humidity	0% ~ 90% relative humidity, non-condensing
Size (L x W)	6.7" x 6.7" (170mm x 170mm)
Weight	0.40 kg

**Note:**

1. The Windows 7 & Windows 8 must be Setup USB 3.0 driver.
2. Specifications are subject to change without notice.

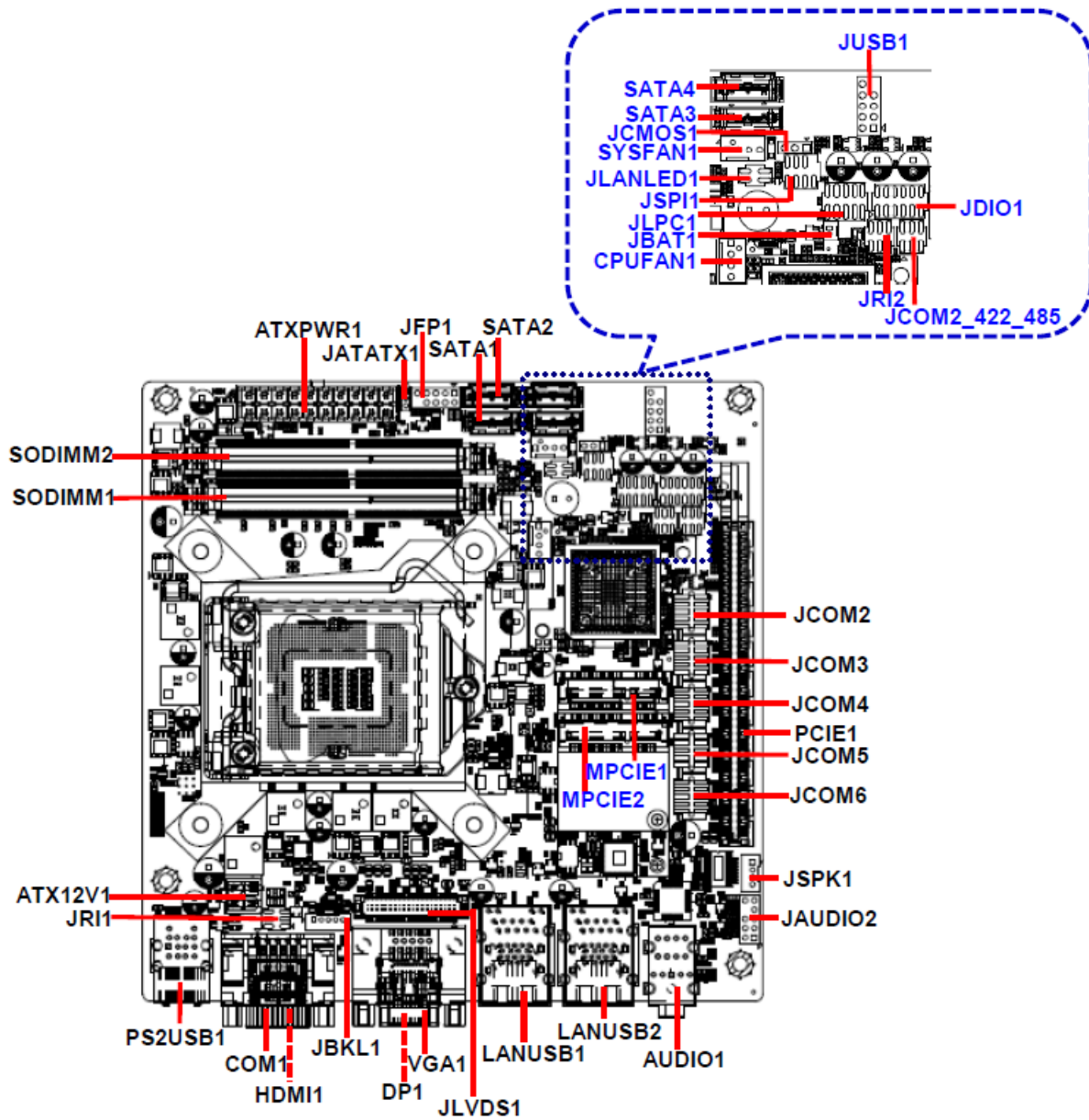
1.6 Architecture Overview—Block Diagram

The following block diagram shows the architecture and main components of EMX-H110P.



2. Hardware Configuration

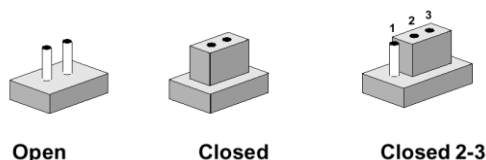
2.1 Product Overview



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

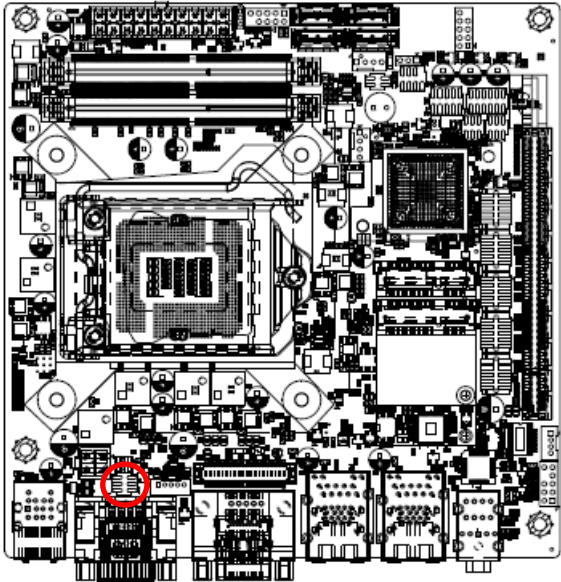
Label	Function	Note
CPUFAN1	CPU fan connector	4 x 1 wafer, pitch 2.54mm
SYSFAN1	System fan connector	4 x 1 wafer, pitch 2.54mm
JFP1	Front panel setting connector	5 x 2 header, pitch 2.54 mm
SODIMM1/2	260-pin DDR4 DIMM socket	
AUDIO1	Line out, Mic in, Line out	
JAUDIO2	Front Audio connector	5 x 2 header, pitch 2.54 mm
JBKL1	LCD Inverter connector	5 x 1 wafer, pitch 2.00mm

EMX-H110P User's Manual

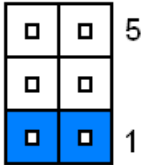
JSPI1	SPI connector	4 x 2 header, pitch 2.00mm
COM1	Serial Port 1 connector	D-sub 9 pin, male
JCOM2/3/4/5/6	Serial Port 2/3/4/5/6 connector	5 x 2 wafer, pitch 2.00mm
JCOM2_422_485	COM2 RS485/422 connector	3 x 2 header, pitch 2.00 mm
JDIO1	General purpose I/O connector	6 x 2 header, pitch 2.00mm
JSPK1	Amplifier connector	4 x 1 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
SATA1~4	Serial ATA III connector 1~4	
HDMI1	HDMI connector	
DP1	DP connector	
VGA1	VGA connector	

2.3 Setting Jumpers & Connectors

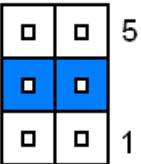
2.3.1 Serial port 1 pin9 signal select (JRI1)



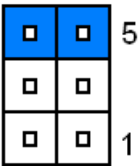
Ring*



+5V

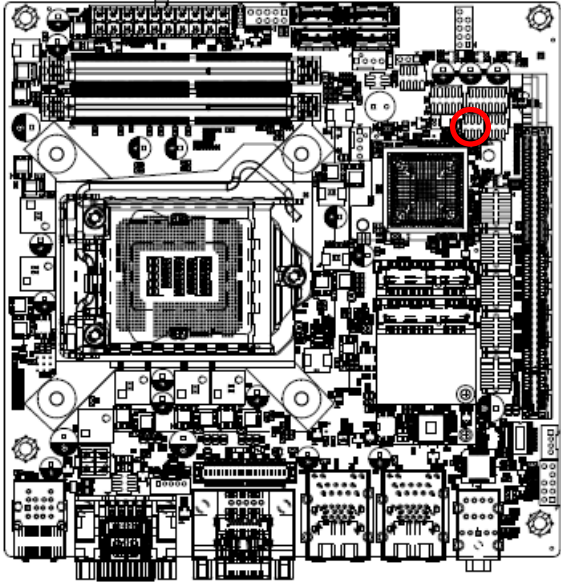


+12V

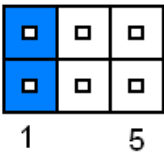


* Default
Note:
Max Current 1A.

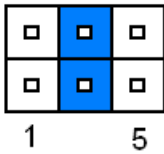
2.3.2 Serial port 2 pin9 signal select (JRI2)



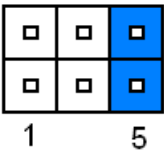
Ring*



+5V

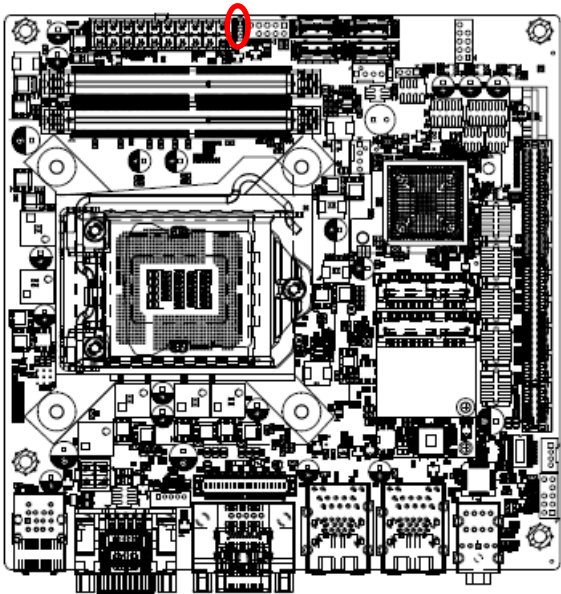


+12V

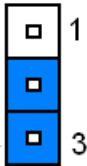


* Default
Note:
Max Current 1A.

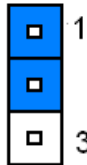
2.3.3 AT/ATX Power Mode Select (JATATX1)



ATX*

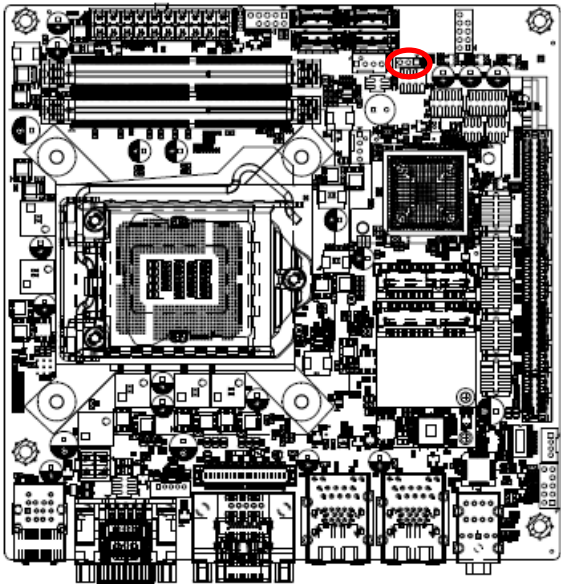


AT



* Default

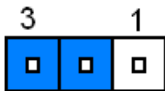
2.3.4 Clear CMOS (JCMOS1)



Protect*

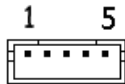
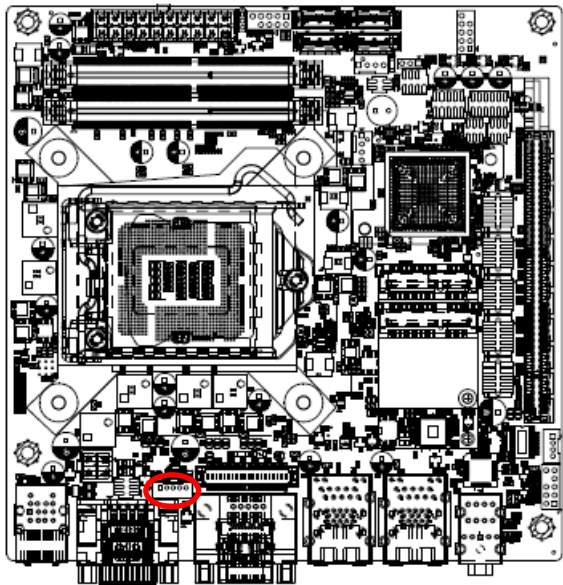


Clear CMOS



* Default

2.3.5 LCD Inverter connector (JBKL1)

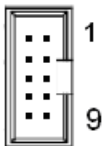
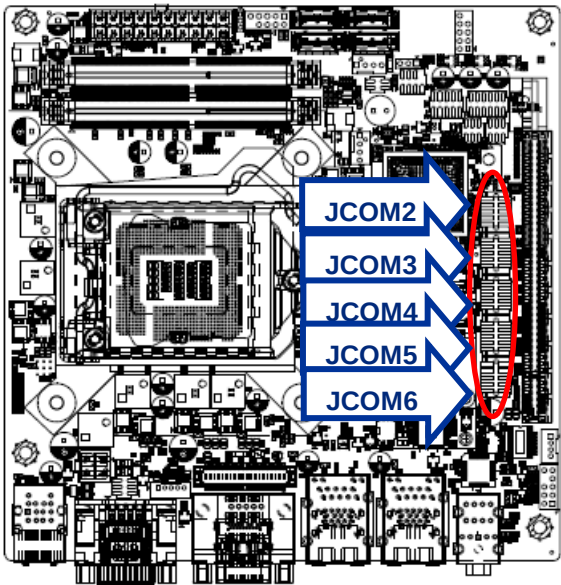


PIN	Signal	Max current
1	+12V	2A
2	GND	
3	BKLEN	
4	VBRIGHT	
5	+5V	2A

Note:

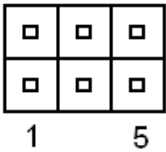
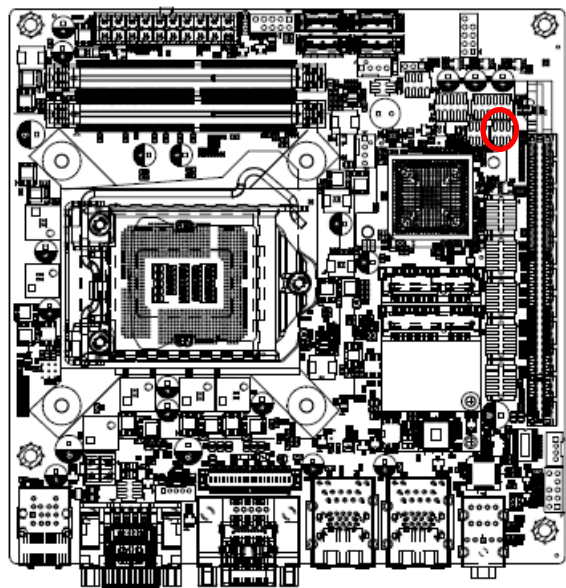
Mapping connector PHR5.

2.3.6 Serial port 2/3/4/5/6 connector (JCOM2/3/4/5/6)



Signal	PIN	PIN	Signal
RXD	2	1	DCD
DTR	4	3	TXD
DSR	6	5	GND
CTS	8	7	RTS
NC	10	9	RI

2.3.7 COM2 RS485/422 connector (JCOM2_422_485)



RS-422

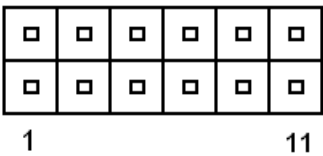
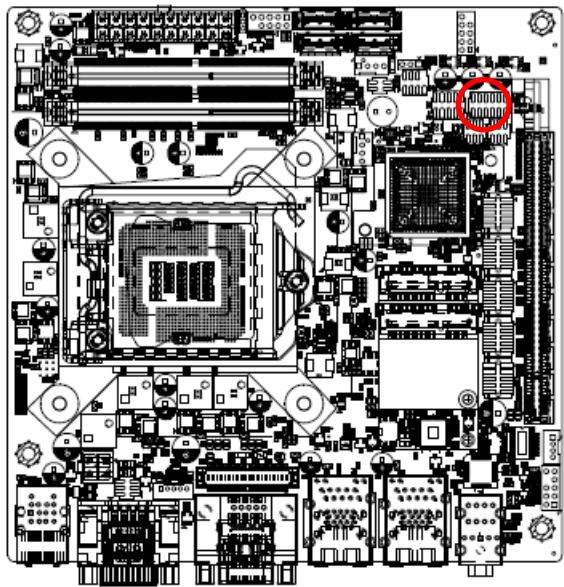
Signal	PIN	PIN	Signal
422TX-	1	2	422RX-
422TX+	3	4	422RX+
+5V	5	6	GND

RS-485

Signal	PIN	PIN	Signal
DATA-	1	2	NC
DATA+	3	4	NC
+5V	5	6	GND

Note:
Max Current 1A.

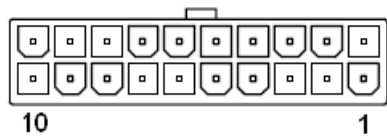
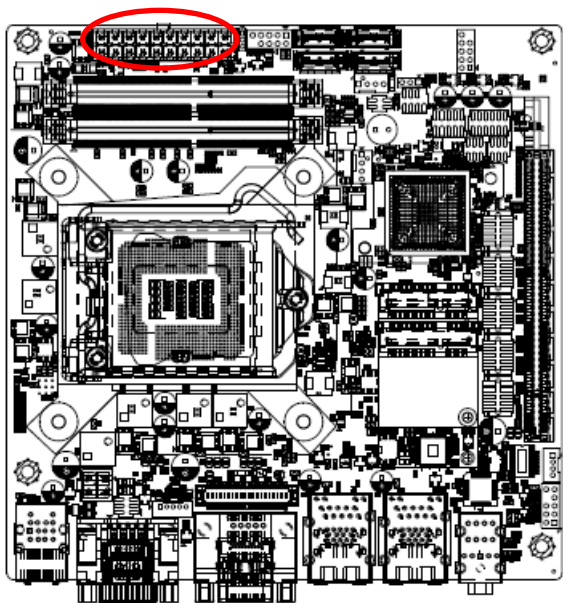
2.3.8 General purpose I/O connector (JDIO1)



Signal	PIN	PIN	Signal
DI0	1	2	DO0
DI1	3	4	DO1
DI2	5	6	DO2
DI3	7	8	DO3
SMB_CLK_9555	9	10	SMB_DATA_9555
GND	11	12	+5V

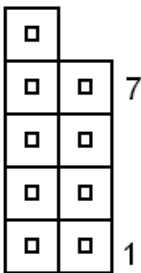
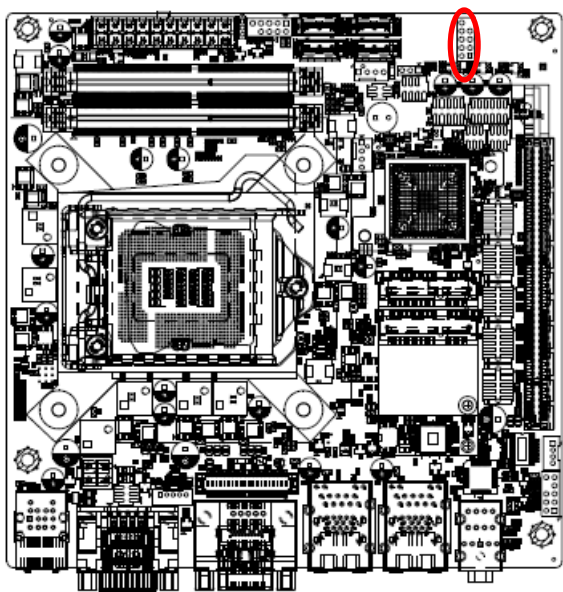
Note:
Max Current 1A.

2.3.9 ATX Power connector (ATXPWR1)



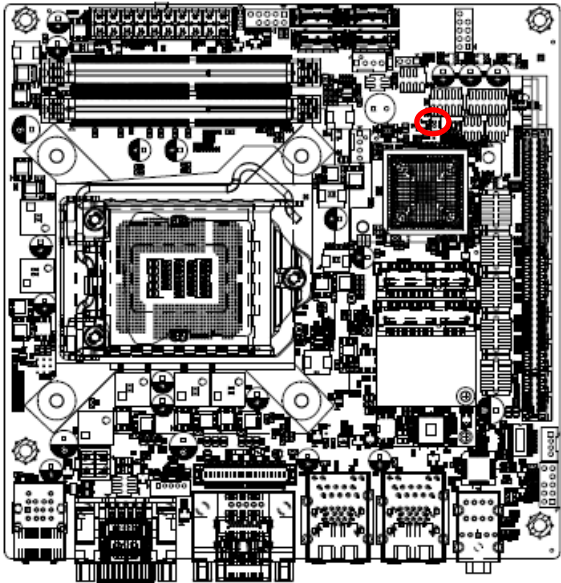
Signal	PIN	PIN	Signal
+3.3V	1	11	+3.3V
+3.3V	2	12	-12V
GND	3	13	GND
+5V	4	14	PSON#
GND	5	15	GND
+5V	6	16	GND
GND	7	17	GND
PG_ATX	8	18	-5V
+V5SB_DP	9	19	+5V
+12V	10	20	+5V

2.3.10 USB 2.0 connector 1 (JUSB1)



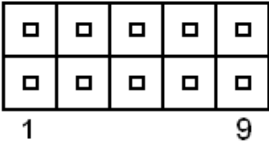
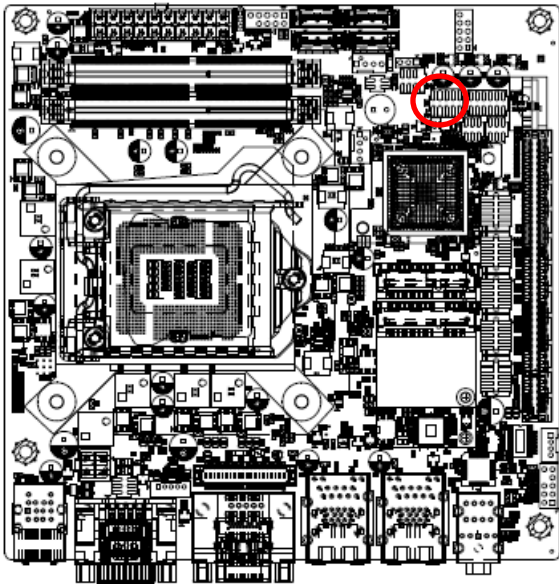
Signal	PIN	PIN	Signal
NC	10		
GND	8	7	GND
USB_R_DP6	6	5	USB_R_DP5
USB_R_DN6	4	3	USB_R_DN5
+5V	2	1	+5V

2.3.11 Battery connector (JBAT1)



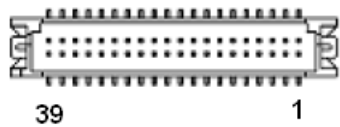
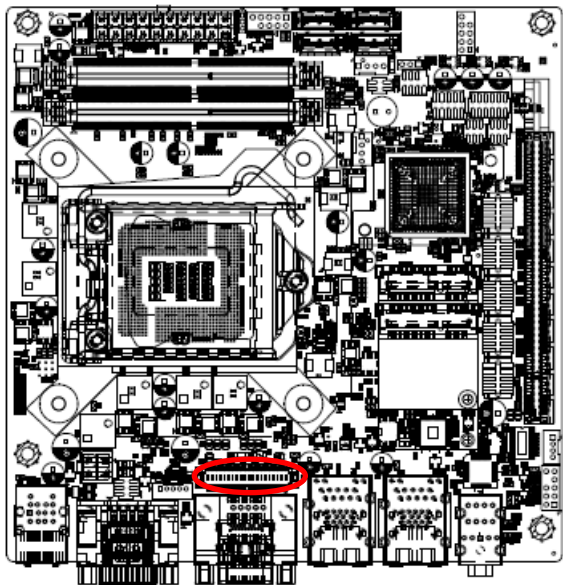
Signal	PIN
RTC_VBAT_1	1
GND	2

2.3.12 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

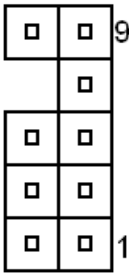
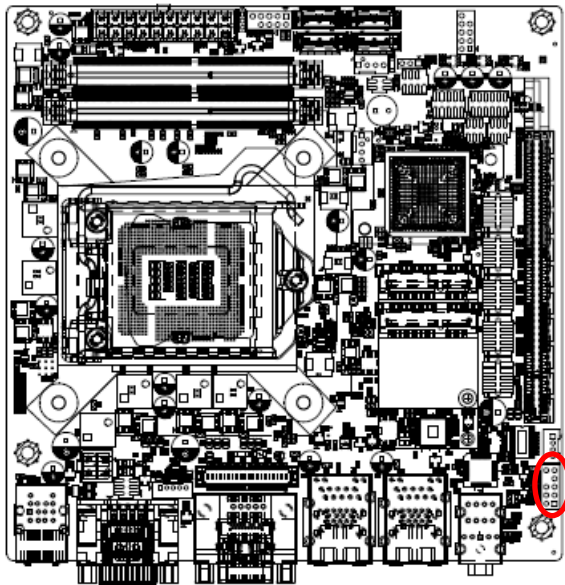
2.3.13 LVDS connector (JLVDS1)



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

Signal	PIN	PIN	Signal
+5V	2	1	+3.3V
+5V	4	3	+3.3V
NC	6	5	NC
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
+12V	40	39	+12V

2.3.14 Front Audio connector (JAUDIO2)

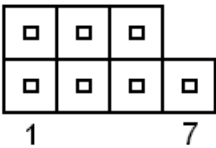
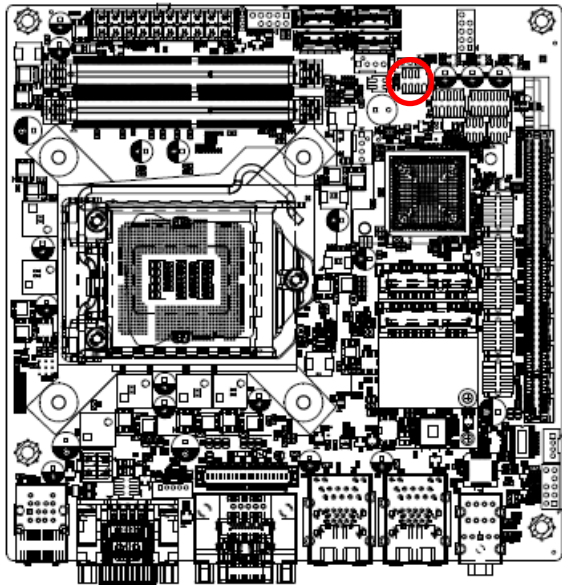


Signal	PIN	PIN	Signal
LINE2_JD	10	9	LINE2_LIN
		7	GND
MIC2_JD	6	5	LINE2_RIN
ACZ_DET#_R	4	3	MIC2_RIN
GND	2	1	MIC2_LIN

2.3.14.1 Signal Description –Audio connector 2 (JAUDIO2)

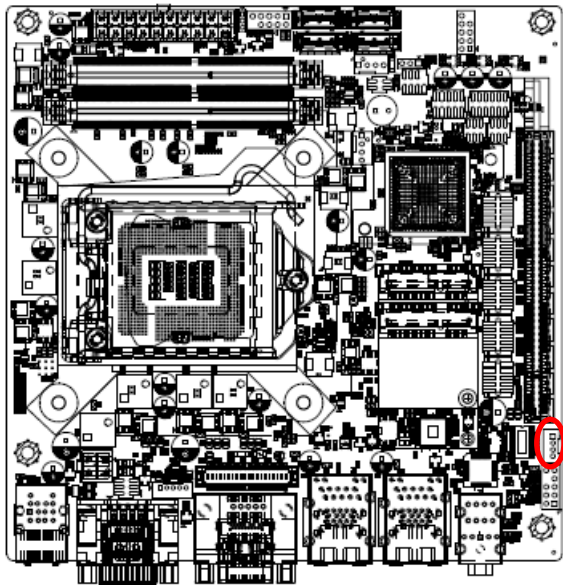
Signal	Signal Description
LINE2_JD	AUDIO IN (LINE_RIN/LIN)sense pin
MIC2_JD	MIC IN (MIC_RIN/LIN) sense pin

2.3.15 SPI connector (JSPI1)



Signal	PIN	PIN	Signal
+3.3V	1	2	GND
SSPI_CS0#_R	3	4	SSPI_SCLK_R
SSPI_SO_R	5	6	SSPI_SI_R
SSPI_HOLD#0	7		

2.3.16 Amplifier connector (JSPK1)

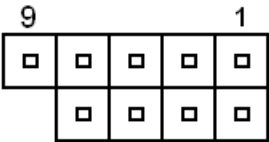
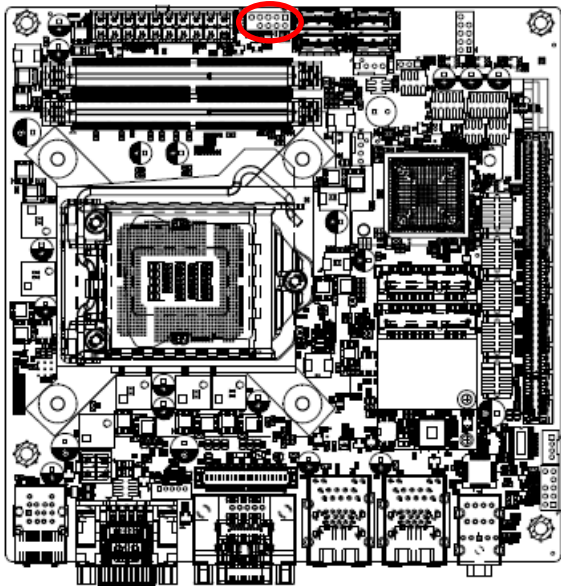


Signal	PIN
SPK_L+	1
SPK_L-	2
SPK_R+	3
SPK_R-	4

Note:

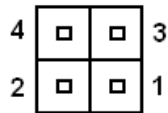
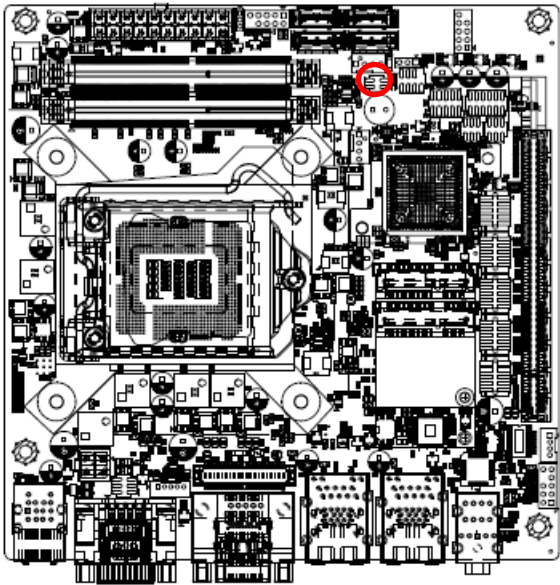
Support 6W x 2 speakers. Mapping Connector PHR-4.

2.3.17 Front panel setting connector (JFP1)



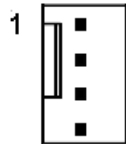
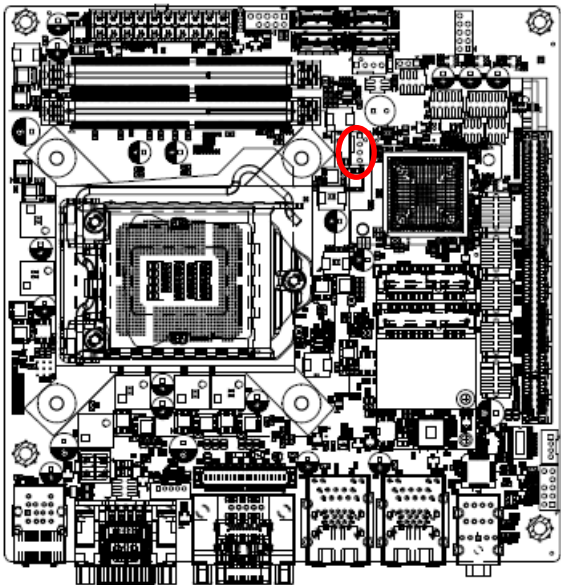
Signal	PIN	PIN	Signal
+HD_LED	1	2	+PWR_LED
-HD_LED	3	4	-PWE_LED
+Reset	5	6	+PWR_BNT
-Reset	7	8	-PWR_BNT
NC	9		

2.3.18 LAN1& LAN 2 active LED connector (JLANLED1)



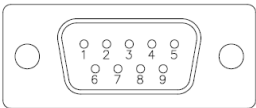
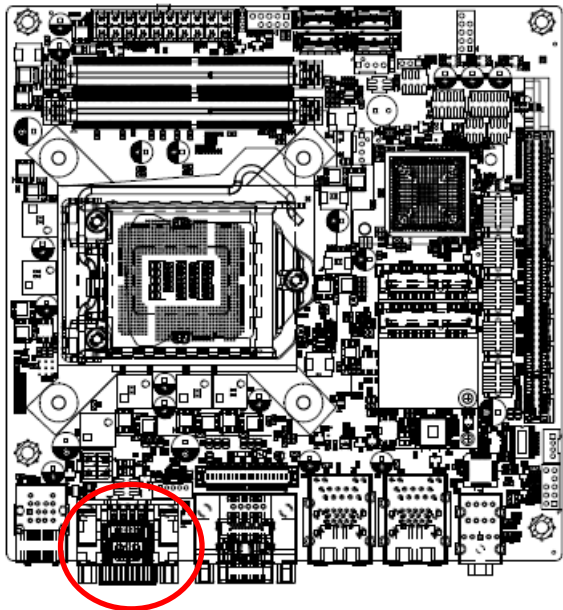
Signal	PIN	PIN	Signal
LAN2_ACT#	4	3	LAN1_ACT#
FRONT_LAN2_ACT	2	1	FRONT_LAN1_ACT

2.3.19 CPU fan connector (CPUFAN1)



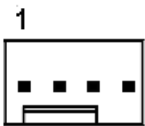
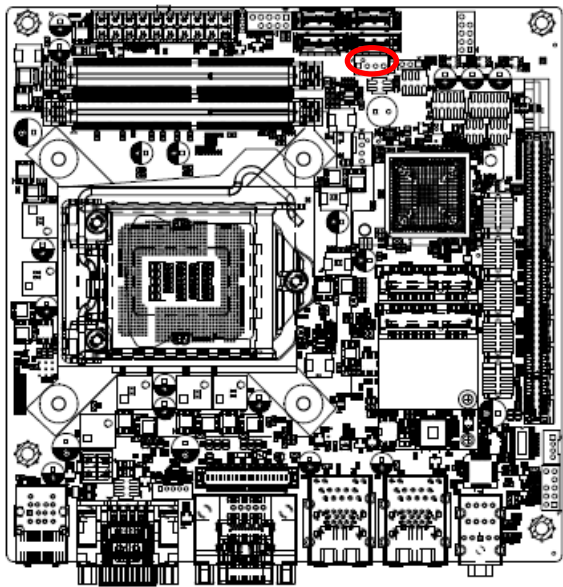
Signal	PIN
GND	1
+12V	2
CPUFANIN	3
CPUFANOUT	4

2.3.20 Serial port 1 connector (COM1)



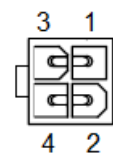
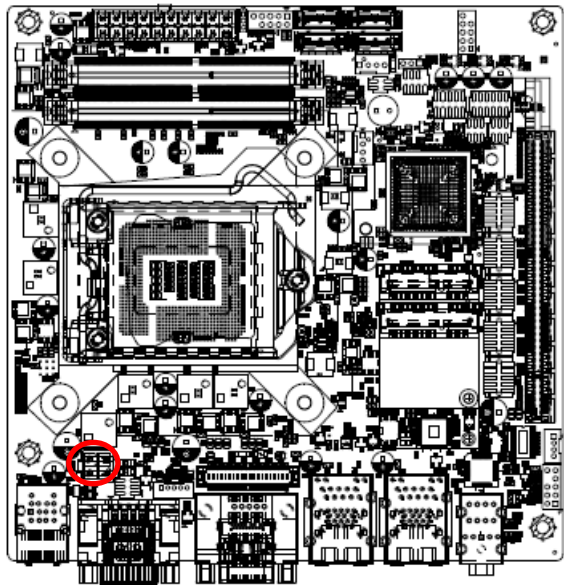
Signal	PIN	PIN	Signal
NDCDA#	1	6	NDSRA#
NRXDA	2	7	NRTSA#
NTXDA	3	8	NCTSA#
NDTRA#	4	9	NRIA#
GND	5		

2.3.21 System fan connector (SYSFAN1)



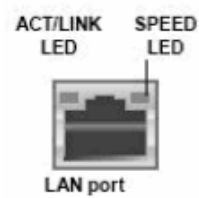
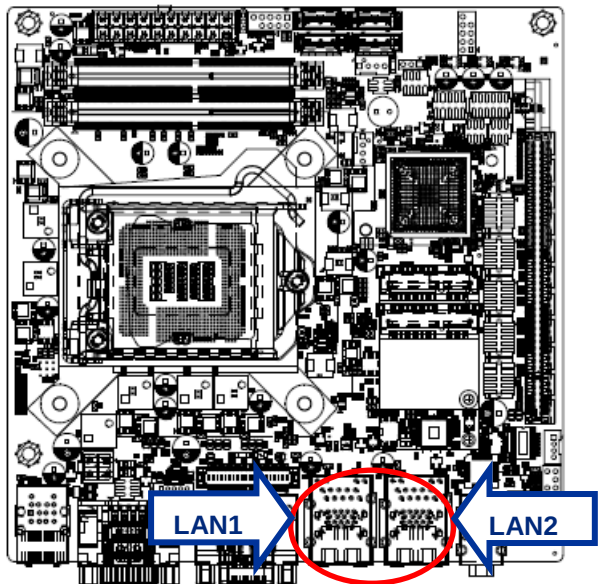
Signal	PIN
GND	1
+12V	2
SYSFANIN	3
SYSFANOUT	4

2.3.22 ATX 12V power connector (ATX12V1)



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

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



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

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.

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.

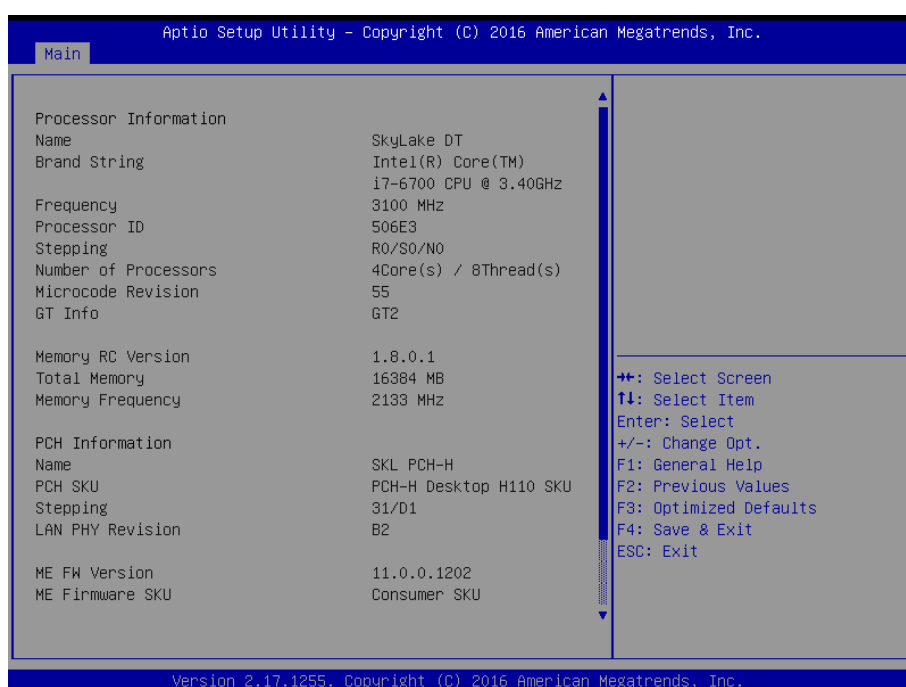
The best advice is to only alter settings which you thoroughly understand. To this end, we strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both BIOS Vendor and your systems manufacturer to provide the absolute maximum performance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



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.

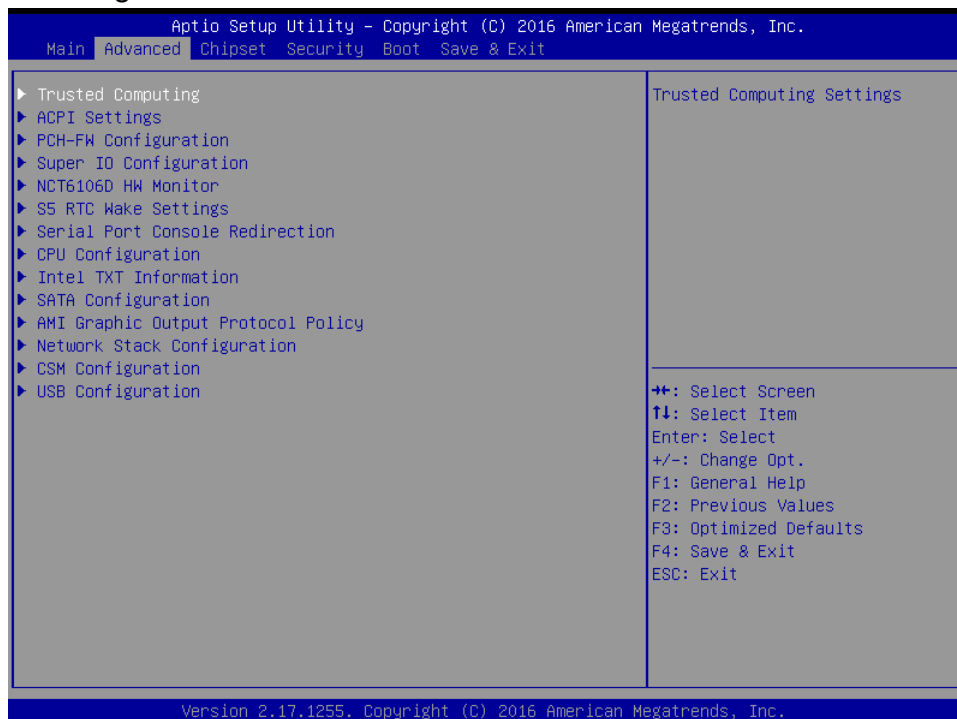


Note: The BIOS setup screens shown in this chapter are for reference purposes only, and may not exactly match what you see on your screen.

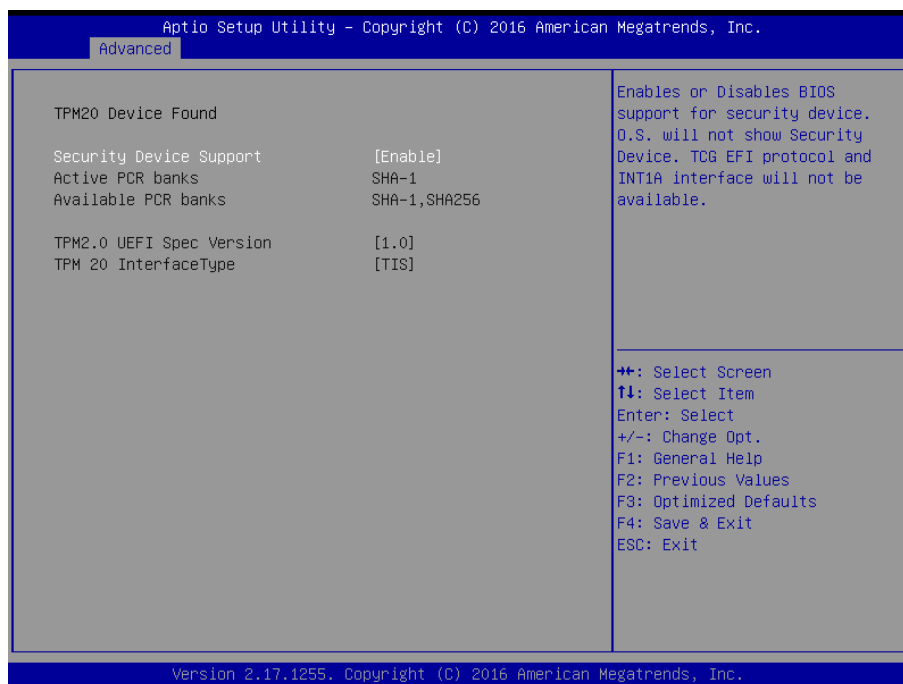
Visit the Avalue website (www.avalue.com.tw) to download the latest product and BIOS information.

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.

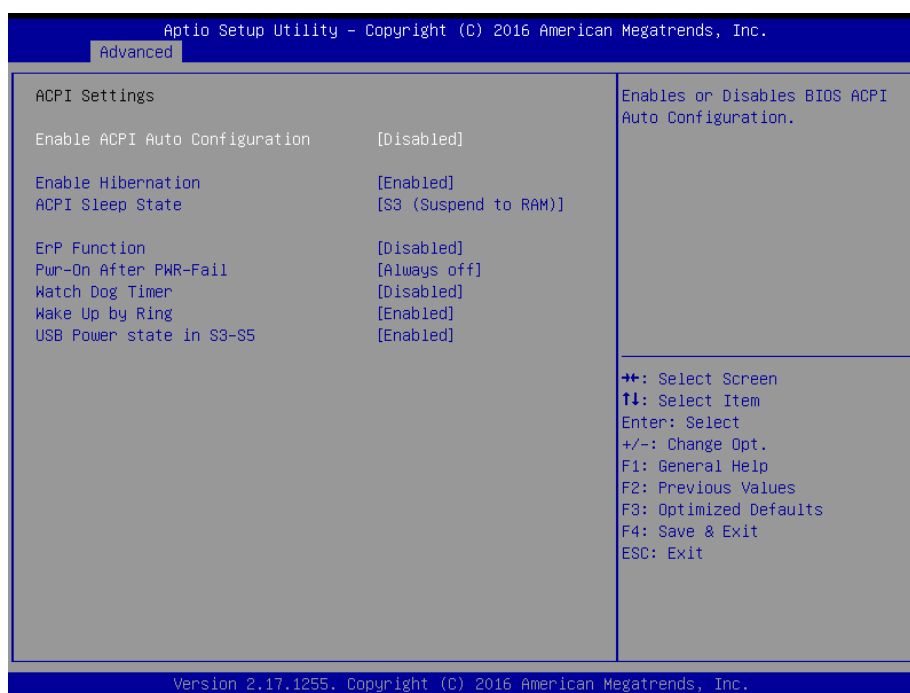


3.6.2.1 Trusted Computing



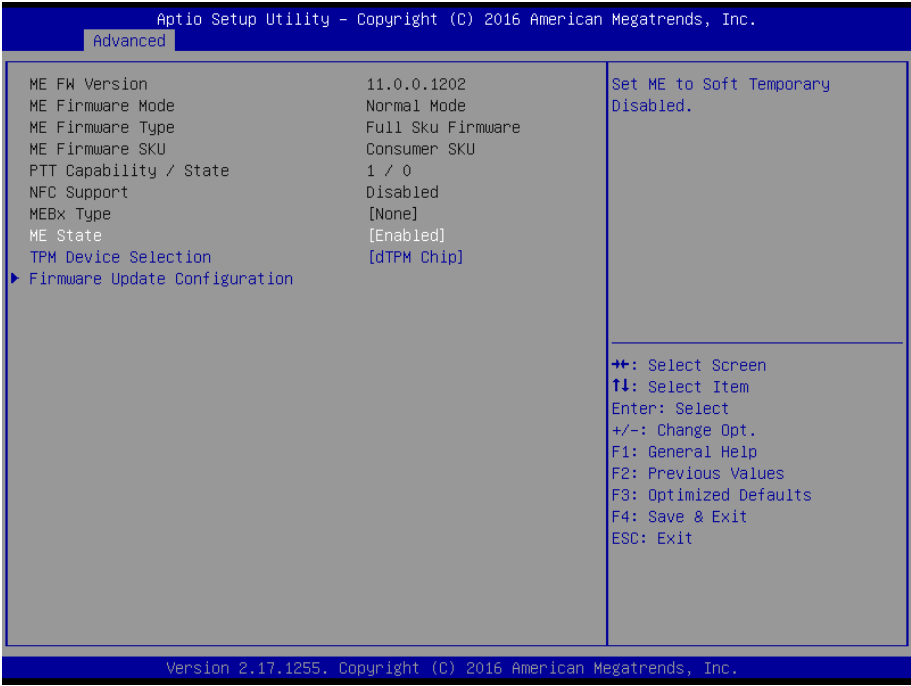
Item	Options	Description
Security Device Support	Disable, Enable[Default]	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1Ainterface will not be available.

3.6.2.2 APCI Settings



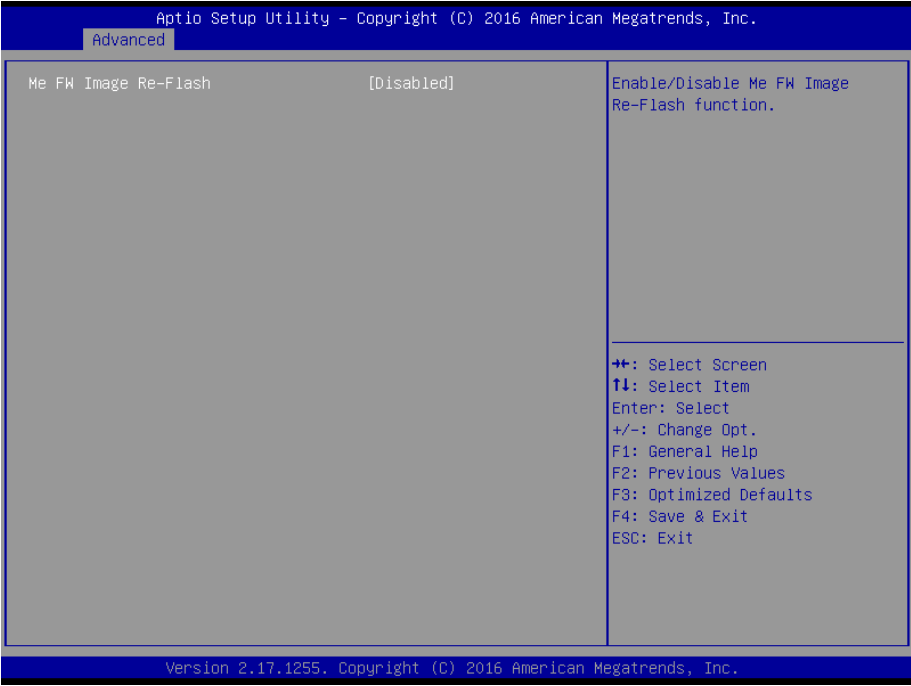
Item	Options	Description
Enable ACPI Auto Configuration	Disabled[Default], Enabled	Enables or Disables BIOS ACPI Auto Configuration.
Enable Hibernation	Disabled Enabled[Default],	Enables or Disables System ability to Hibernation (OS/S4 Sleep State). This option may be not effective with some OS.
ACPI Sleep State	Suspend Disabled, S3 (Suspend to RAM)[Default]	Select the highest ACPI sleep state the system will enter when the SUSPEDN button is pressed.
ErP Function	Disabled[Default], Enabled	ErP Function (Deep S5).
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 Timer	Disabled[Default], 30 sec 40 sec 50 sec 1 min 2 min 10 min 30 min	Select Watch Dog Timer (WDT) Mode.
Wake Up by Ring	Disabled Enabled[Default],	Enable/Disable system waked up by Ring signal from standby states (S3~S5).
USB Power state in S3-S5	Disabled Enabled[Default],	Enable/Disable USB Power delivery in S3 (Sleep), S4 (Hibernate) and S5 (Soft Off) States.

3.6.2.3 PCH-FW Configuration



Item	Options	Description
ME State	Disabled Enabled [Default] ,	Set ME to Soft Temporary Disabled.
TPM Device Selection	dTPM Chip [Default] , PTT	Selects TPM device: dTPM – The discrete TPM chip. PTT – Intel Platform Trust Technology. Warning! If PTT/dTPM was disabled, All data saved on it will be lost.

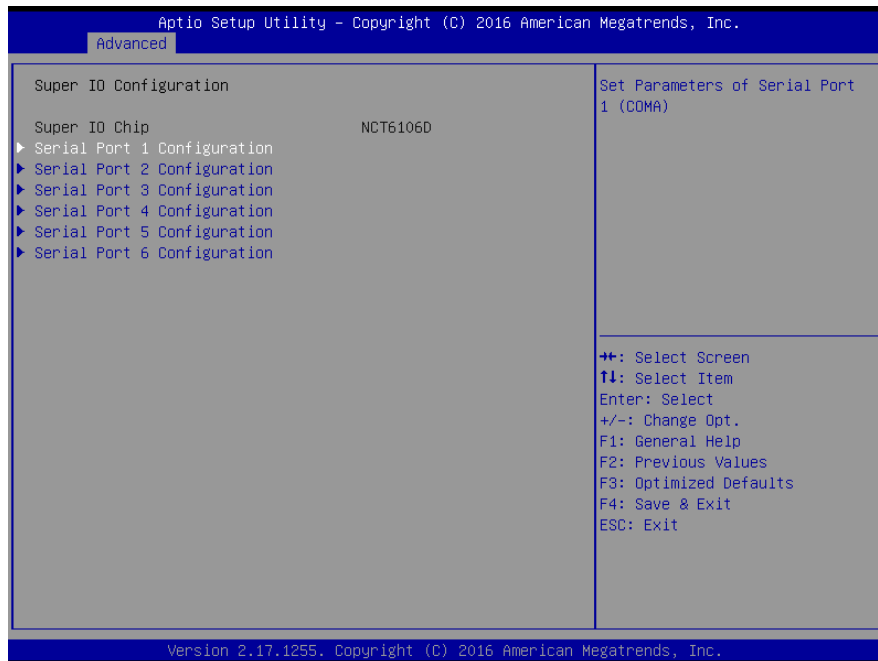
3.6.2.3.1 Firmware Update Configuration



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

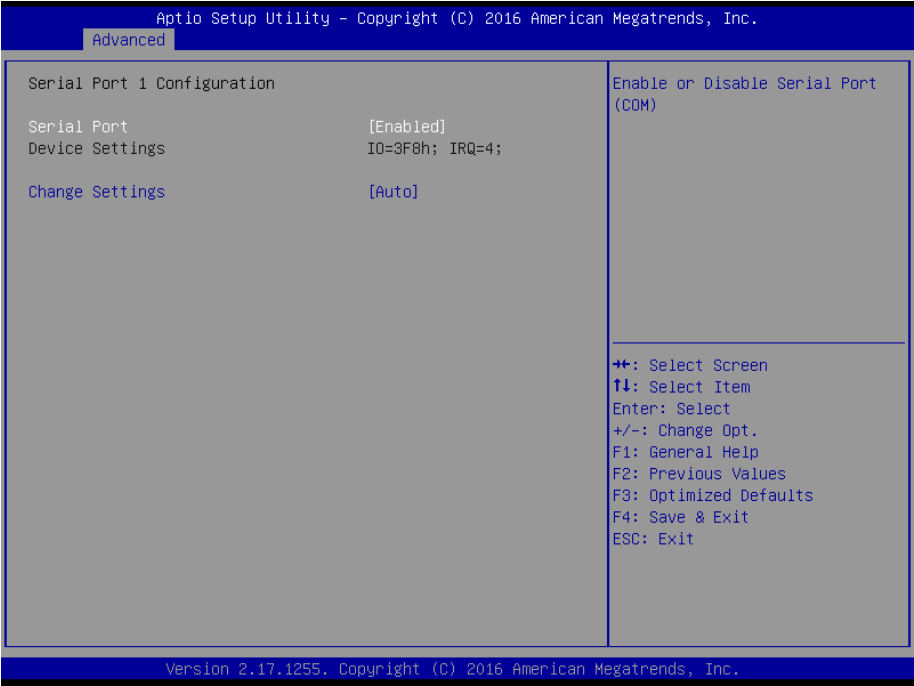
3.6.2.4 Super IO Configuration

You can use this item to set up or change the Super IO configuration for serial ports. Please refer to 3.6.2.4.1~ 3.6.2.4.5 for more information.



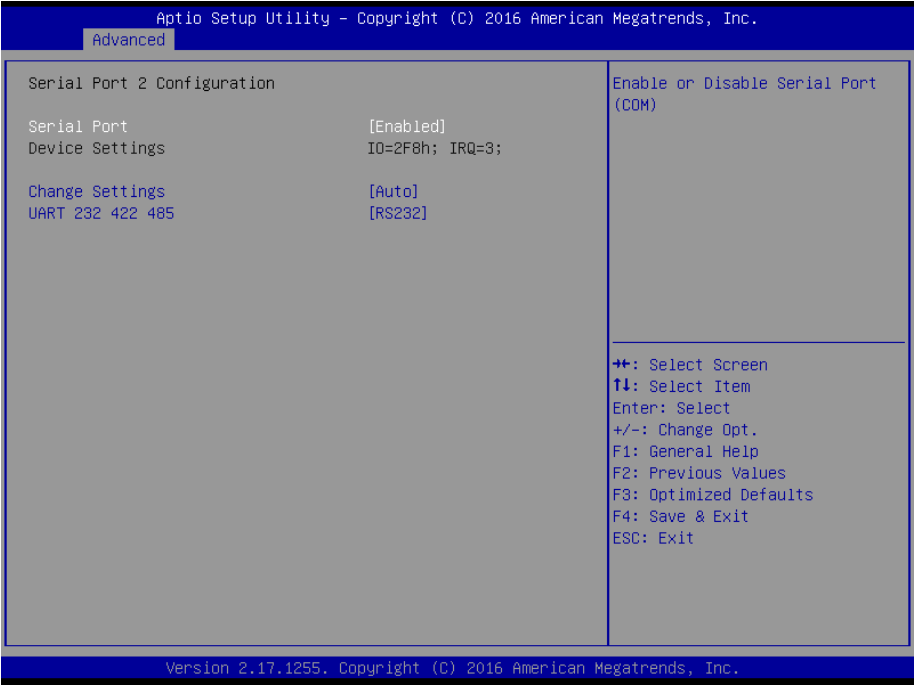
Item	Description
Serial Port 1 Configuration	Set Parameters of Serial Port 1 (COMA).
Serial Port 2 Configuration	Set Parameters of Serial Port 2 (COMB).
Serial Port 3 Configuration	Set Parameters of Serial Port 3 (COMC).
Serial Port 4 Configuration	Set Parameters of Serial Port 4 (COMD).
Serial Port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

3.6.2.4.1 Serial Port 1 Configuration



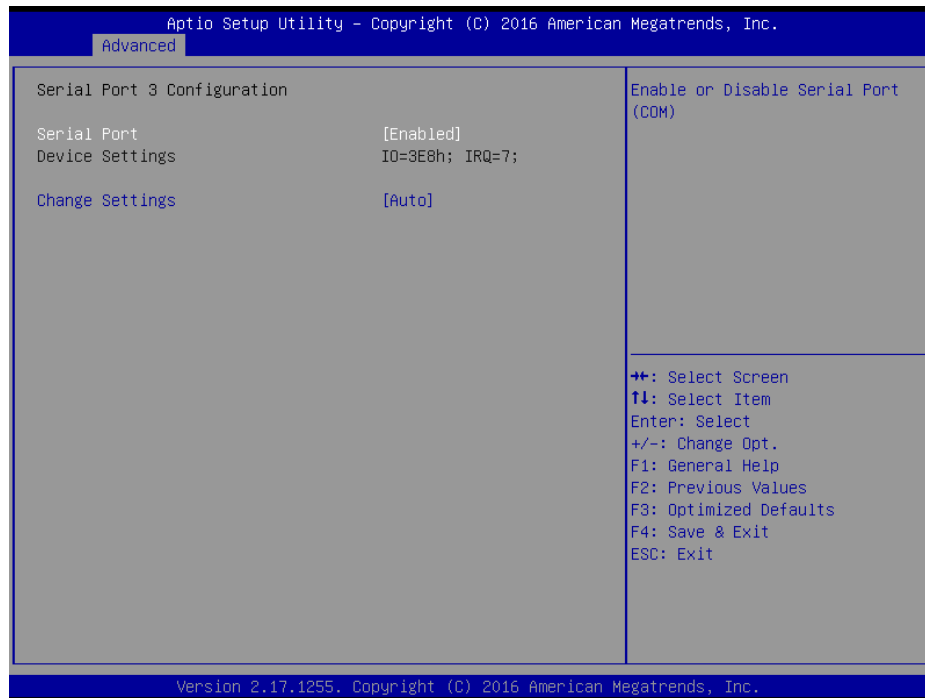
Item	Option	Description
Serial Port	Disabled Enabled[Default],	Enable or Disable Serial Port (COM).
Change Settings	Auto[Default]	Select an optimal setting for Super IO Device.

3.6.2.4.2 Serial Port 2 Configuration



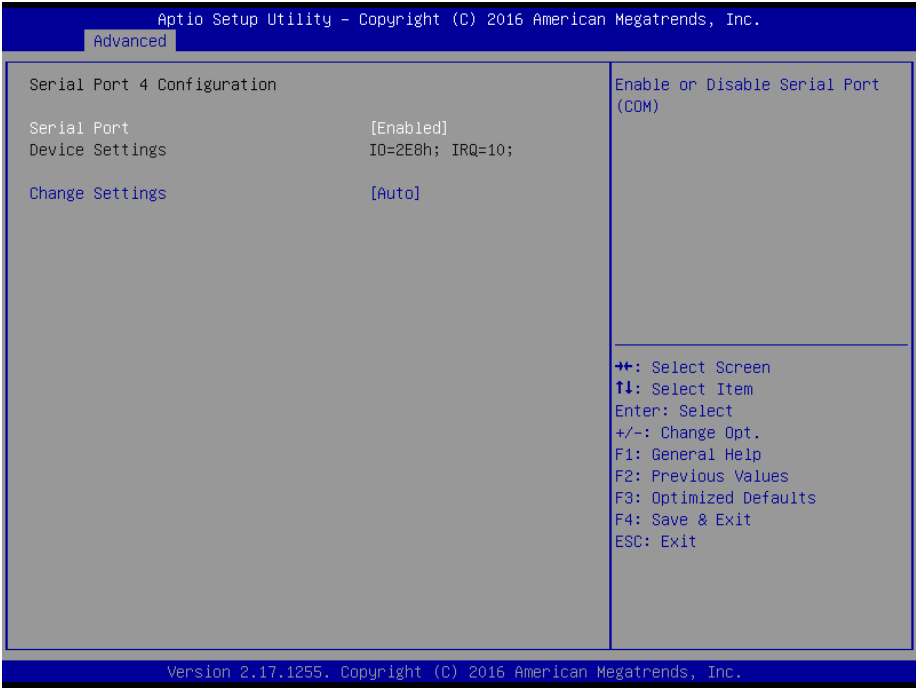
Item	Option	Description
Serial Port	Disabled Enabled[Default],	Enable or Disable Serial Port (COM).
Change Settings	Auto[Default]	Select an optimal setting for super IO Device.
UART 232 422 485	RS232[Default] RS422 RS485	Set COM Port as RS232, RS422 or RS485 mode.

3.6.2.4.3 Serial Port 3 Configuration



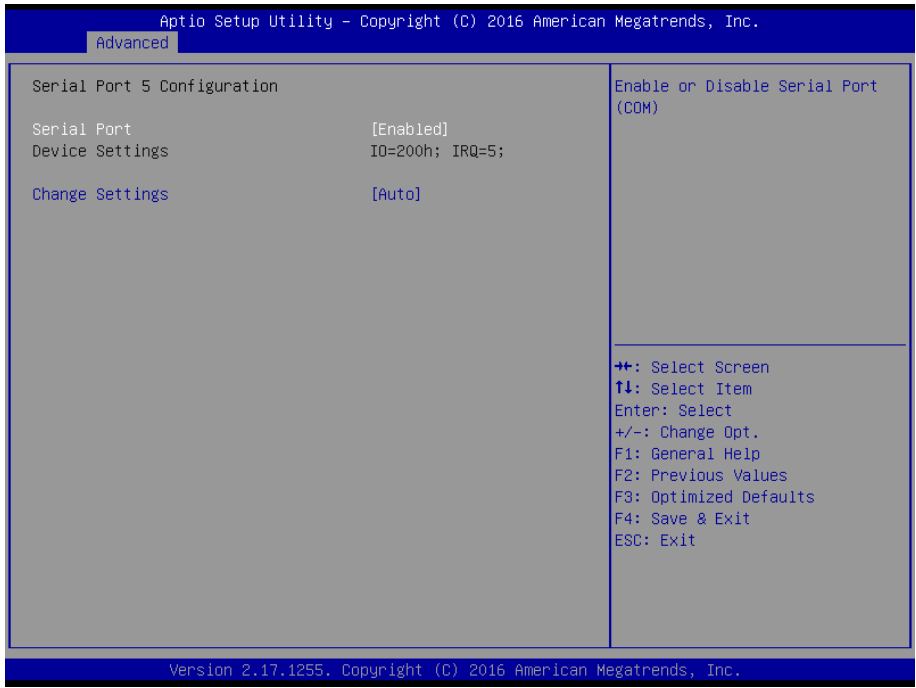
Item	Option	Description
Serial Port	Disabled Enabled[Default],	Enable or Disable Serial Port (COM).
Change Settings	Auto[Default]	Select an optimal setting for super IO Device.

3.6.2.4.4 Serial Port 4 Configuration



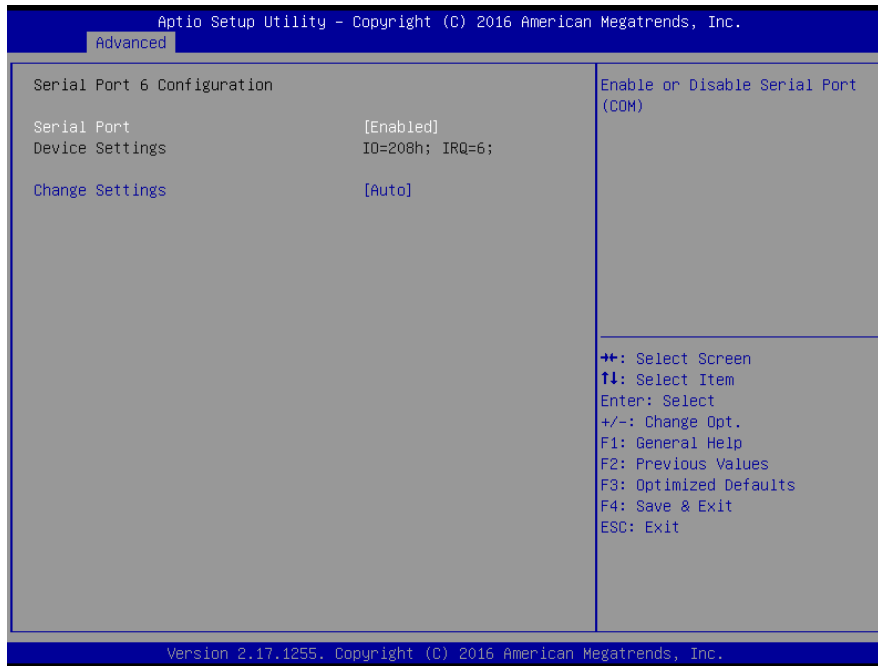
Item	Option	Description
Serial Port	Disabled Enabled [Default] ,	Enable or Disable Serial Port (COM).
Change Settings	Auto [Default]	Select an optimal setting for super IO Device.

3.6.2.4.5 Serial Port 5 Configuration



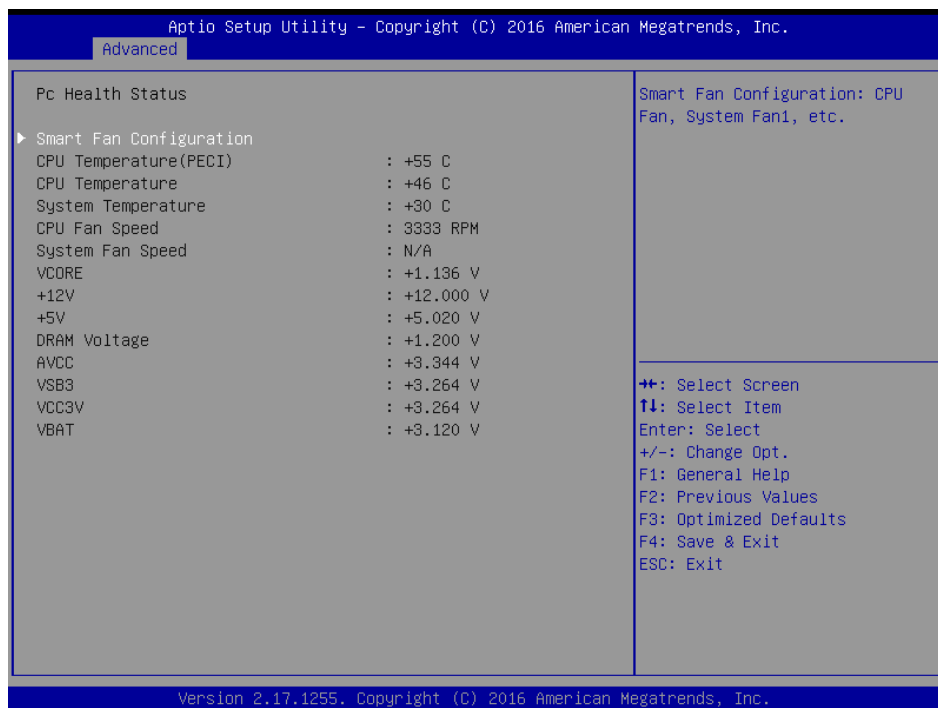
Item	Option	Description
Serial Port	Disabled Enabled[Default],	Enable or Disable Serial Port (COM).
Change Settings	Auto[Default]	Select an optimal setting for super IO Device.

3.6.2.4.6 Serial Port 6 Configuration

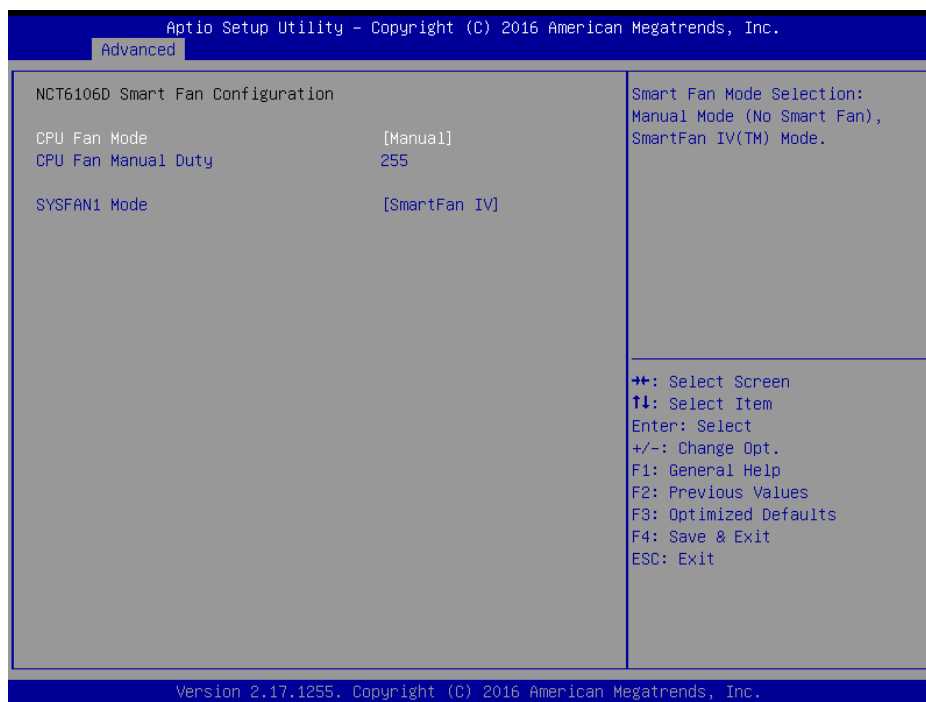


Item	Option	Description
Serial Port	Disabled Enabled[Default],	Enable or Disable Serial Port (COM).
Change Settings	Auto[Default]	Select an optimal setting for super IO Device.

3.6.2.5 NCT6106D H/W Monitor

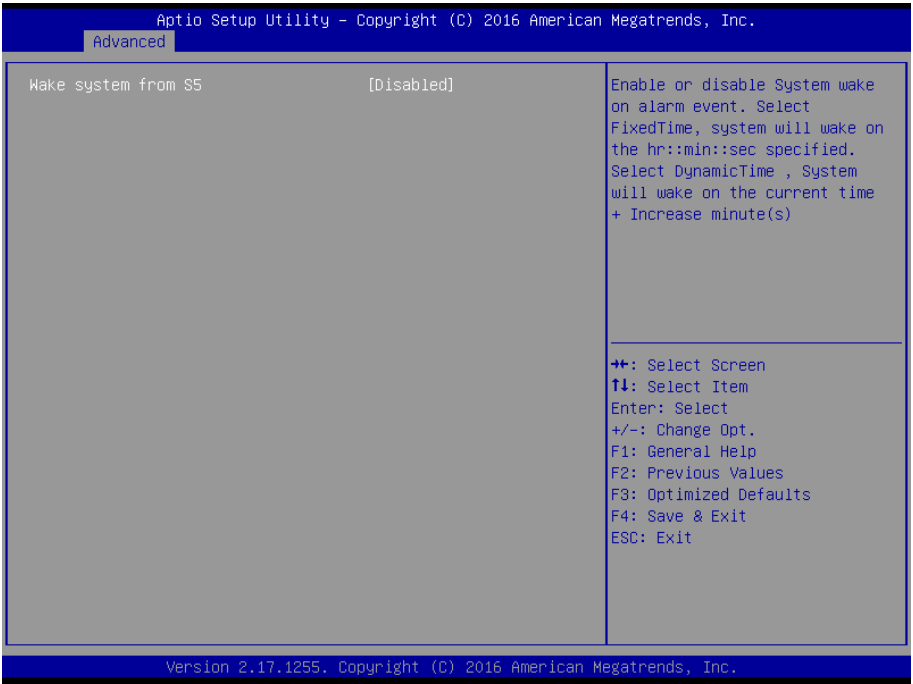


3.6.2.5.1 Smart Fan Configuration



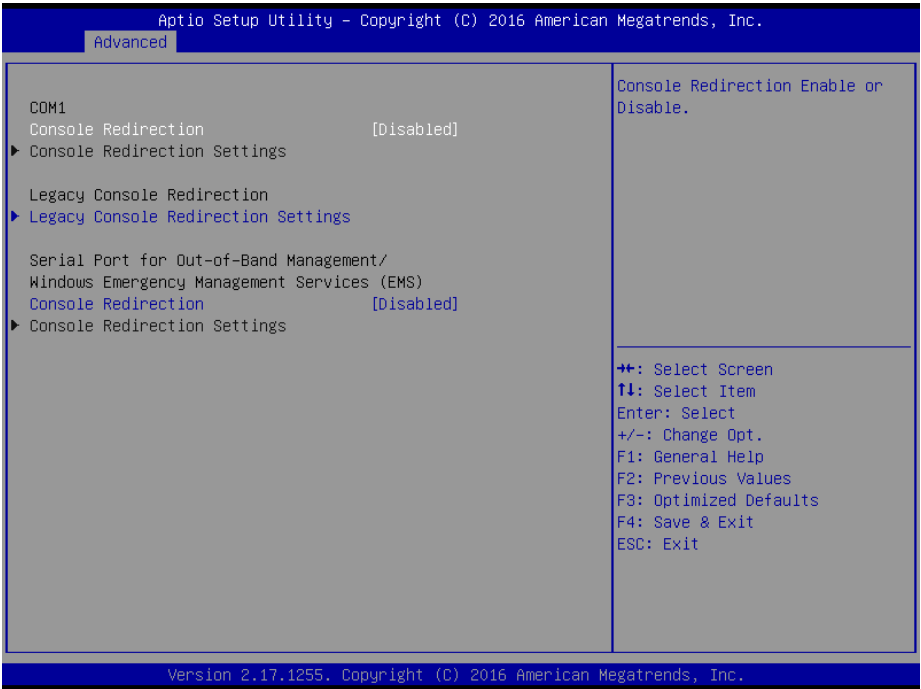
Item	Option	Description
CPU Fan Mode	Manual[Default], SmartFan IV	Smart Fan Mode Selection: Manual Mode (No Smart Fan), SmartFan IV™ Mode.
CPU Fan Manual Duty	0-255[Default]	CPU Fan manual output duty: 0 to 255.
SYSFAN1 Mode	Manual SmartFan IV[Default],	Smart Fan Mode Selection: Manual Mode (No Smart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

3.6.2.6 S5 RTC Wake Settings



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

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 Legacy Console Redirection Settings

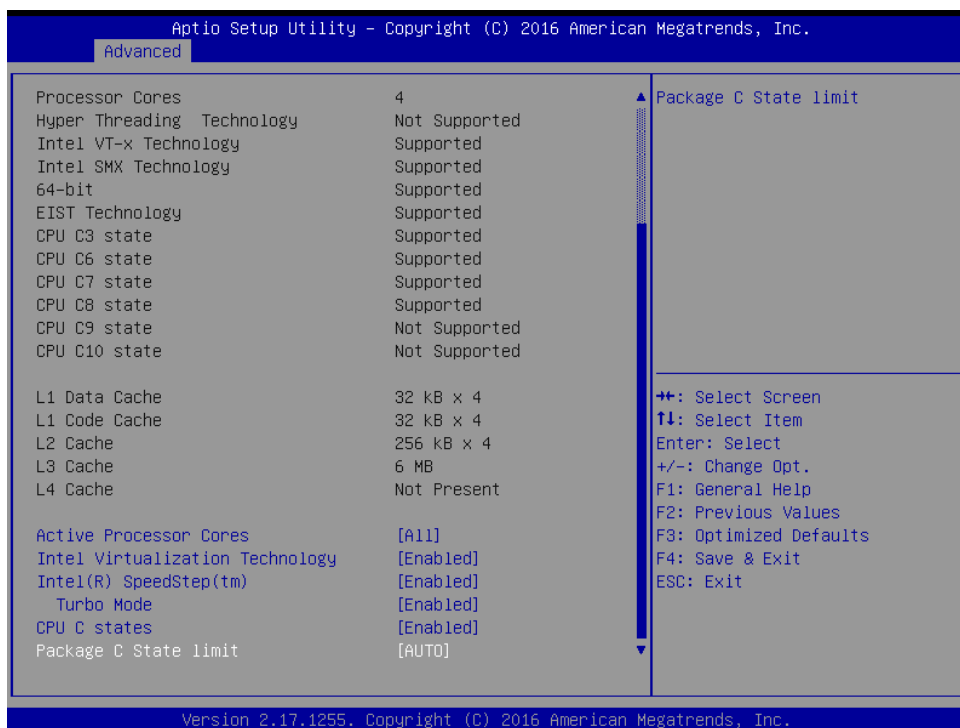
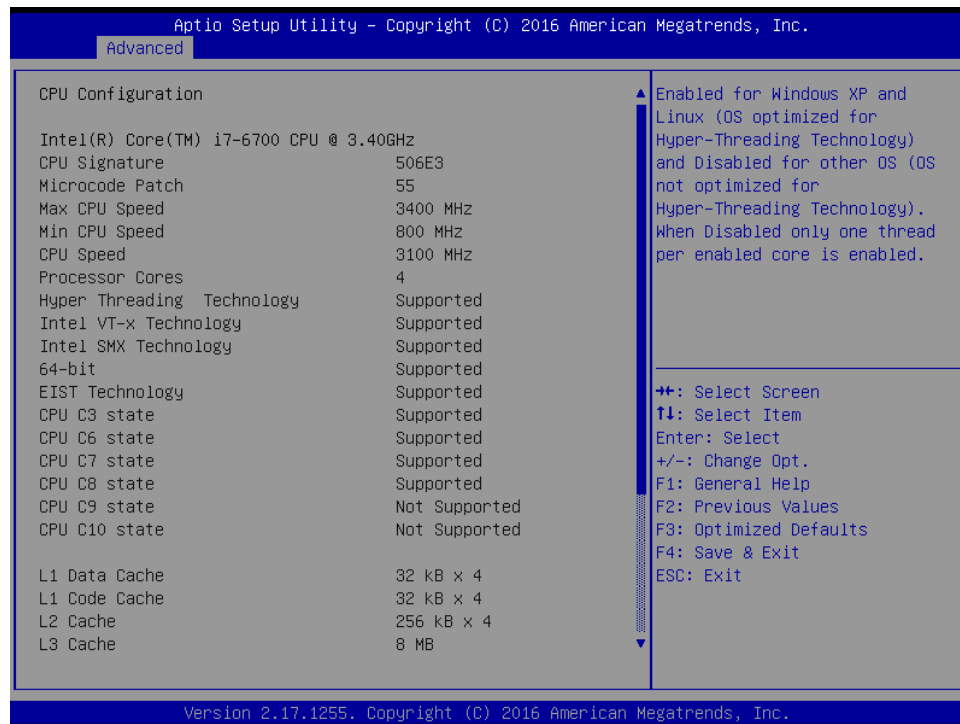


Item	Option	Description
Legacy Serial Redirection Port	COM1[Default]	Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages.

EMX-H110P User's Manual

3.6.2.8 CPU Configuration

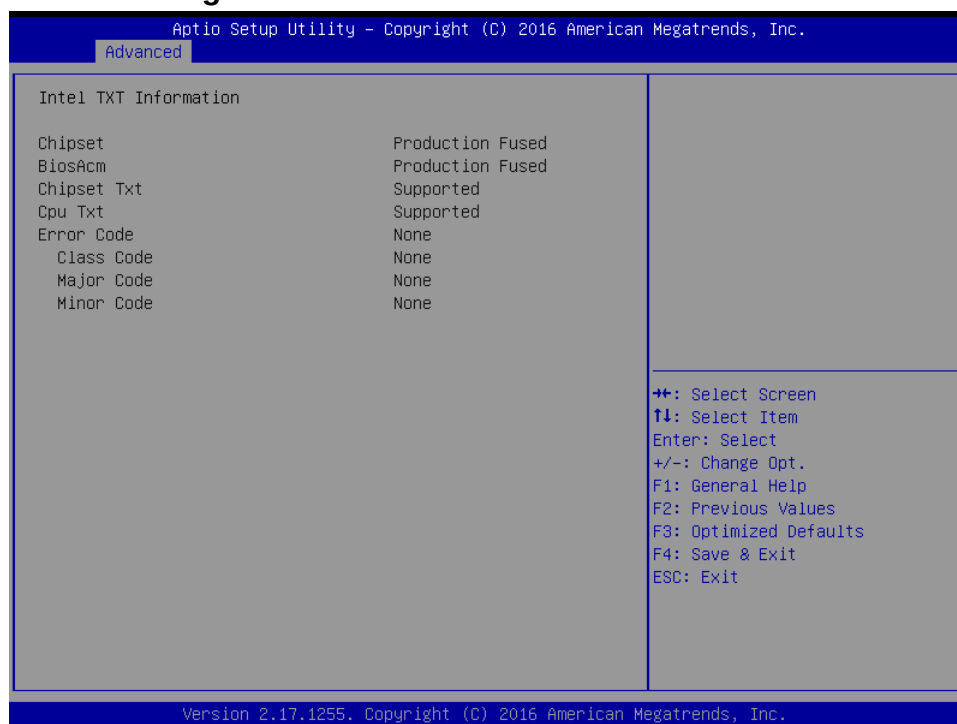
Use the CPU configuration menu to view detailed CPU specification and configure the CPU.



Item	Options	Description
Active Processor Cores	All[Default], 1	Number of cores to enable in each processor package.

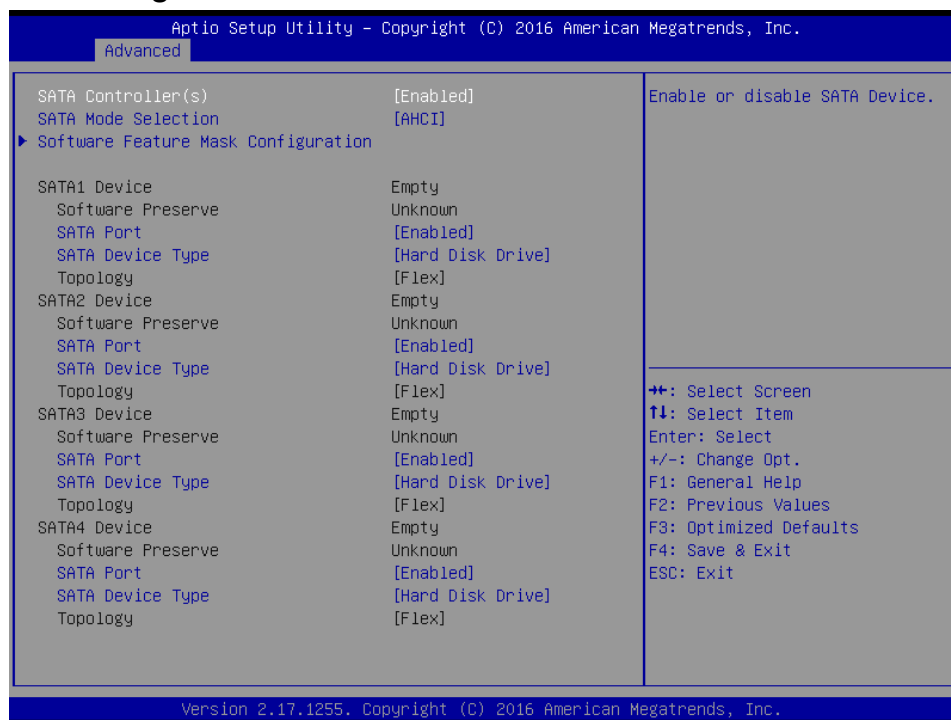
	2 3	
Intel Virtualization Technology	Disabled Enabled[Default]	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Intel® SpeedStep™	Disabled Enabled[Default]	Allows more than two frequency ranges to be supported.
Turbo Mode	Disabled Enabled[Default]	Turbo Mode.
CPU C states	Disabled Enabled[Default]	Enable or disable CPU C states.
Package C State limit	C0/C1 C2 C3 C6 C7 C7s AUTO[Default]	Package C State limit.

3.6.2.9 Intel TXT Configuration



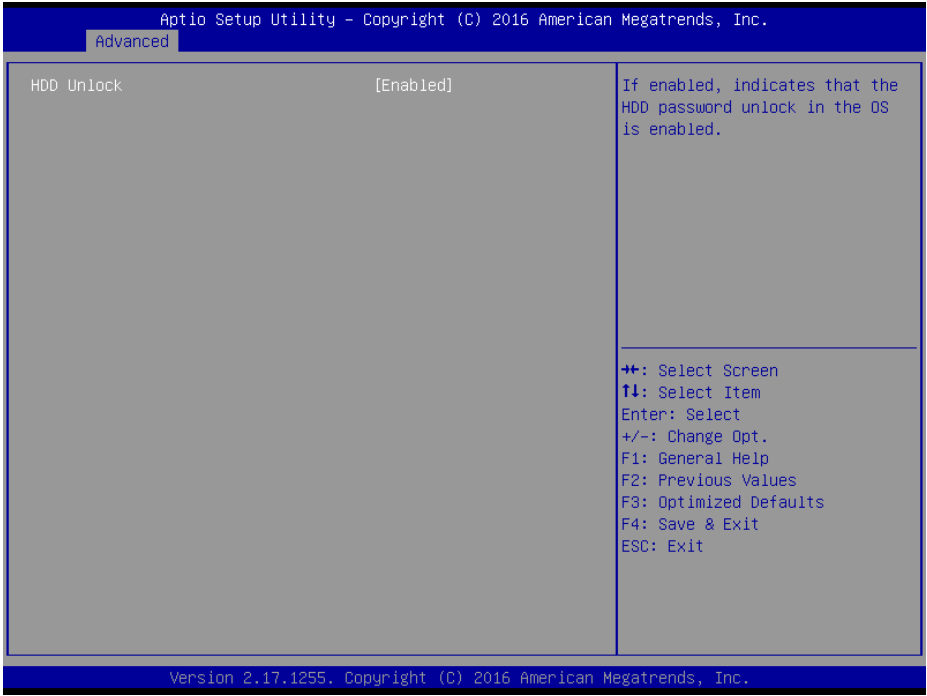
EMX-H110P User's Manual

3.6.2.10 SATA Configuration



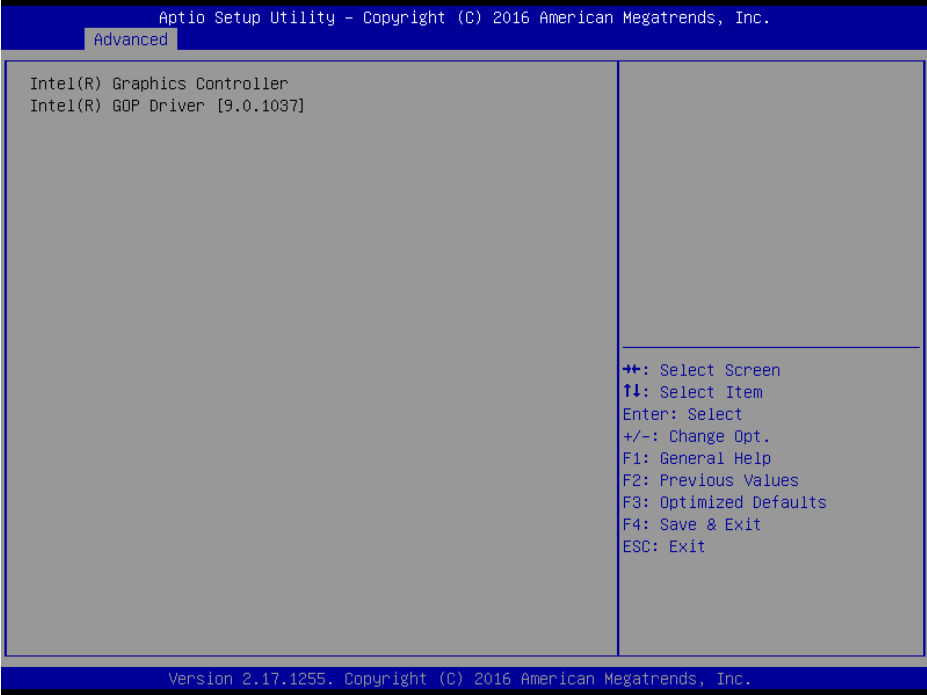
Item	Options	Description
SATA Controller(s)	Disabled, Enabled[Default]	Enable or disable SATA Device.
SATA Mode Selection	AHCI[Default] RAID	Determines how SATA controller(s) operate.
SATA Port	Disabled, Enabled[Default]	Enable or Disable SATA Port.
SATA Device Type	Hard Disk Drive[Default] Solid State Drive	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.

3.6.2.10.1 Software Feature Mask Configuration

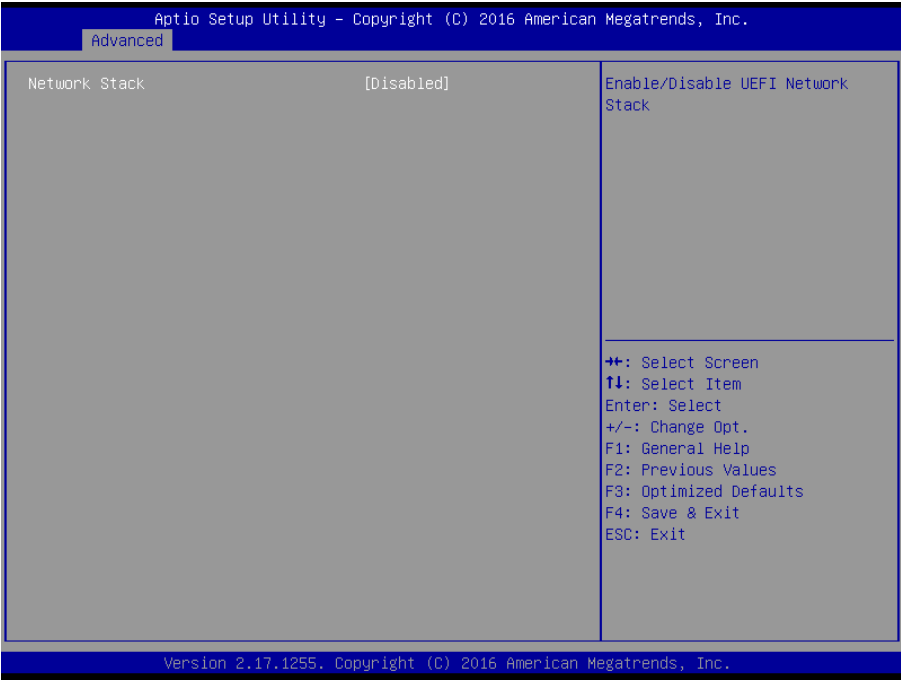


Item	Option	Description
HDD Unlock	Disabled Enabled[Default],	If enabled, indicates that the HDD password unlock in the OS is enabled.

3.6.2.11 AMI Graphic Output Protocol Policy



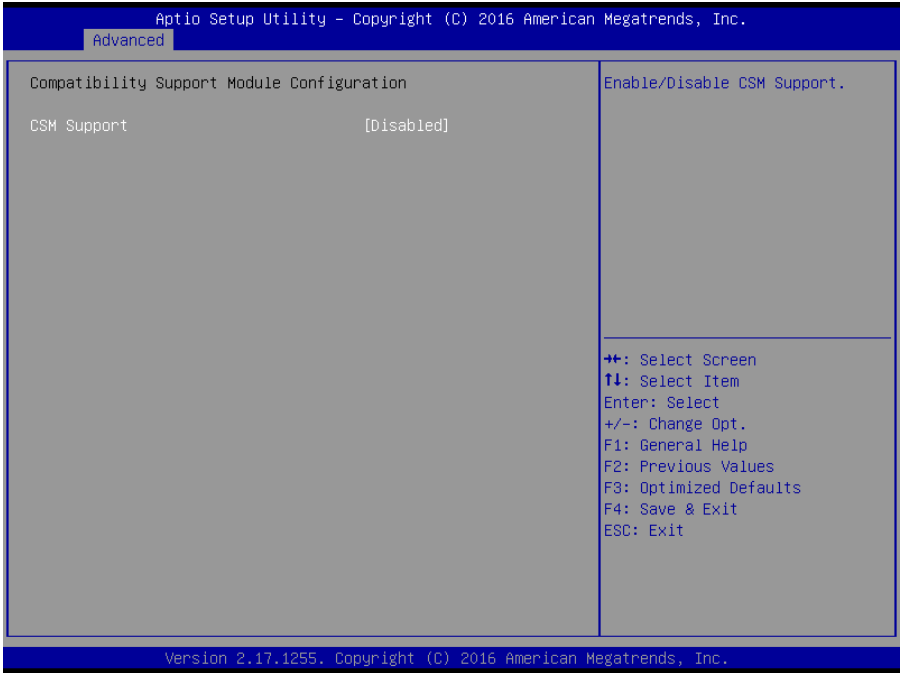
3.6.2.12 Network Stack Configuration



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

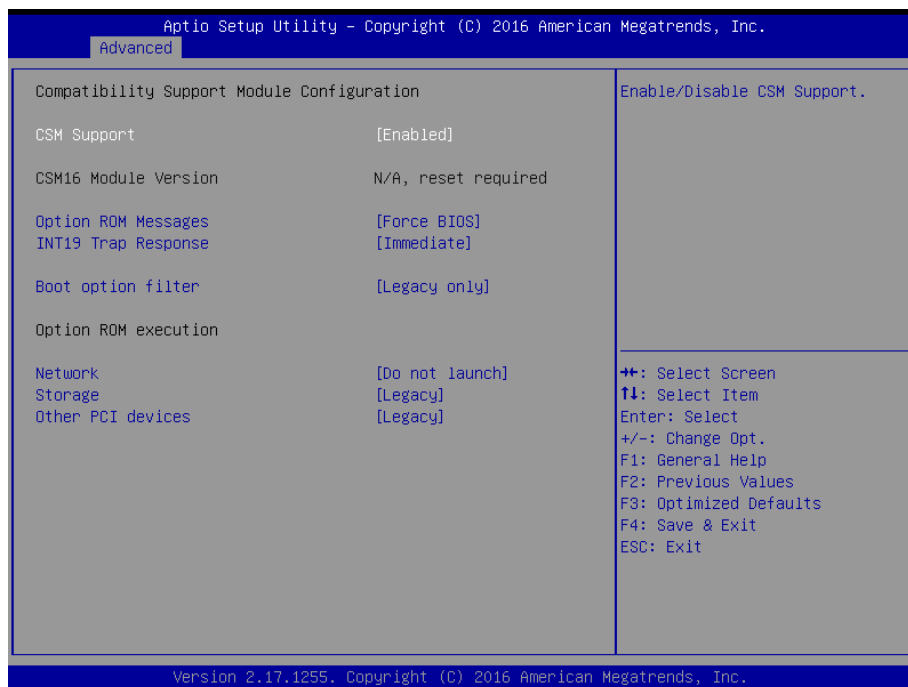
3.6.2.13 CSM Configuration

BIOS Default:



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

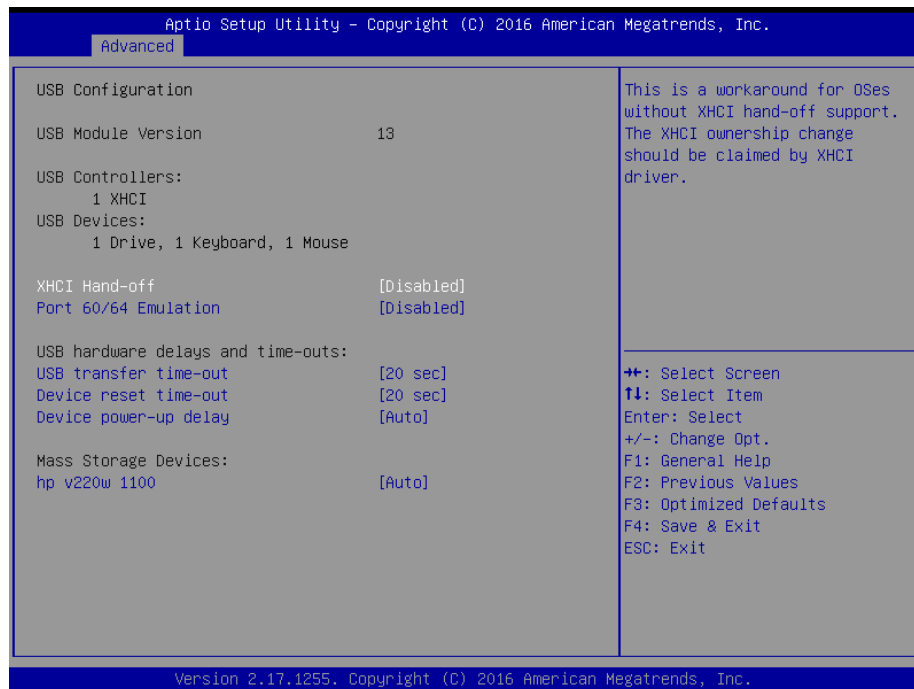
If enable CSM Support:



Item	Options	Description
CSM Support	Enable	Set to Enable CSM Support.
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.
Other PCI devices	Do not launch UEFI Legacy[Default]	Determines OpROM execution policy for devices other than Network, Storage, or Video.

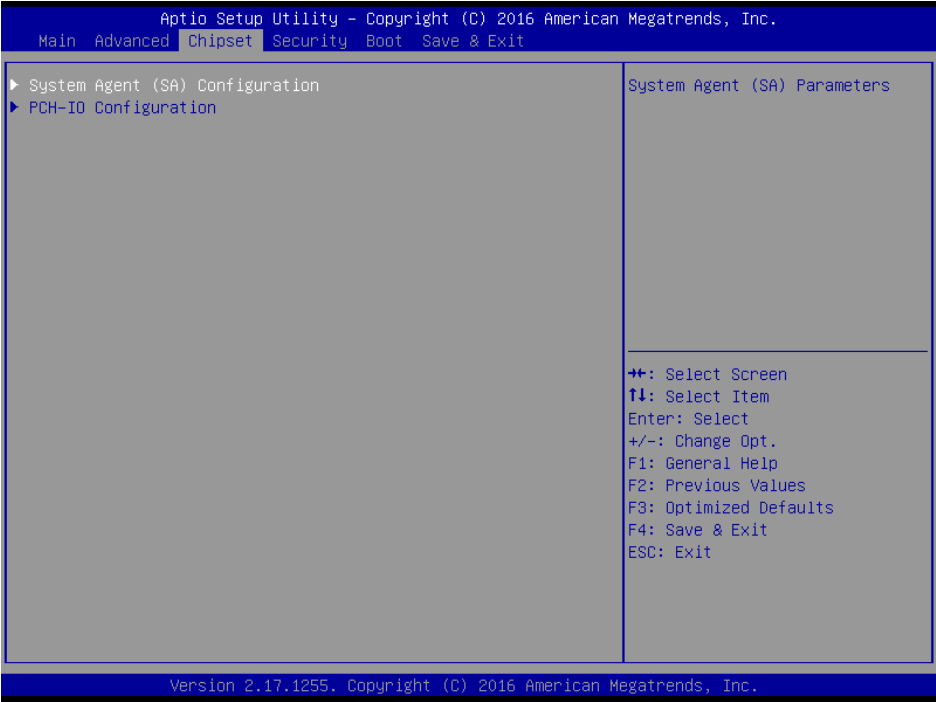
3.6.2.14 USB Configuration

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

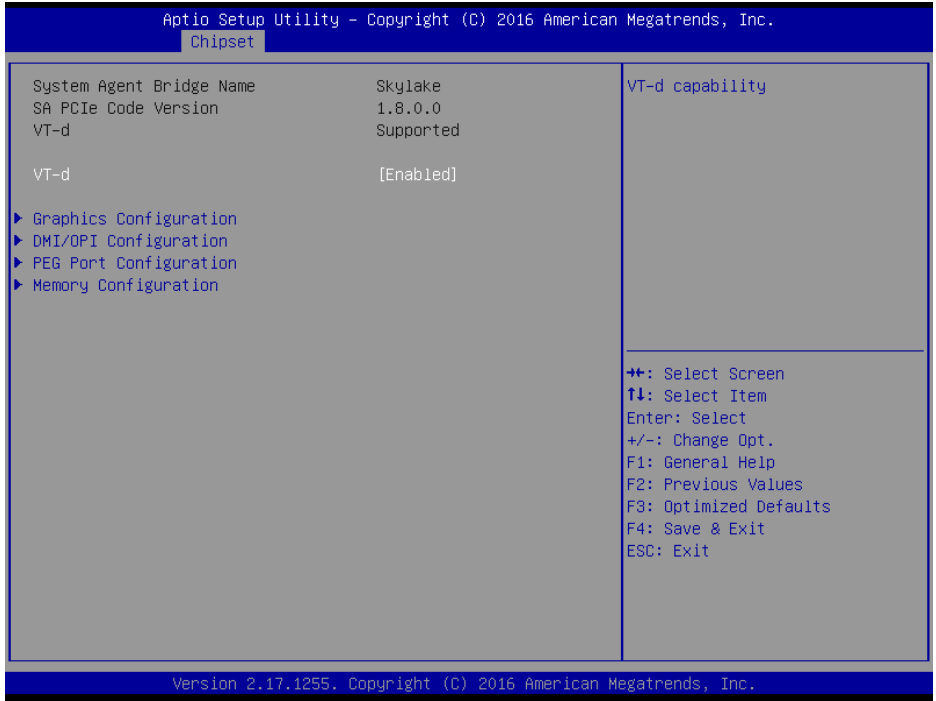


Item	Options	Description
XHCI Hand-off	Enabled Disabled [Default]	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
Port 60/64 Emulation	Enabled Disabled [Default]	Enables I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSes.
USB transfer time-out	1 sec 5 sec 10 sec 20 sec [Default]	The time-out value for Control, Bulk, and Interrupt transfers.
Device reset time-out	10 sec 20 sec [Default] 30 sec 40 sec	USB mass storage device Start Unit command time-out.
Device power-up delay	Auto [Default] Manual	Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100ms, for a Hub port the delay is taken from Hub descriptor.
Mass Storage Devices	Auto [Default] Floppy Forced FDD Hard Disk CD-ROM	Mass storage device emulation type. 'AUTO' enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type.

3.6.3 Chipset

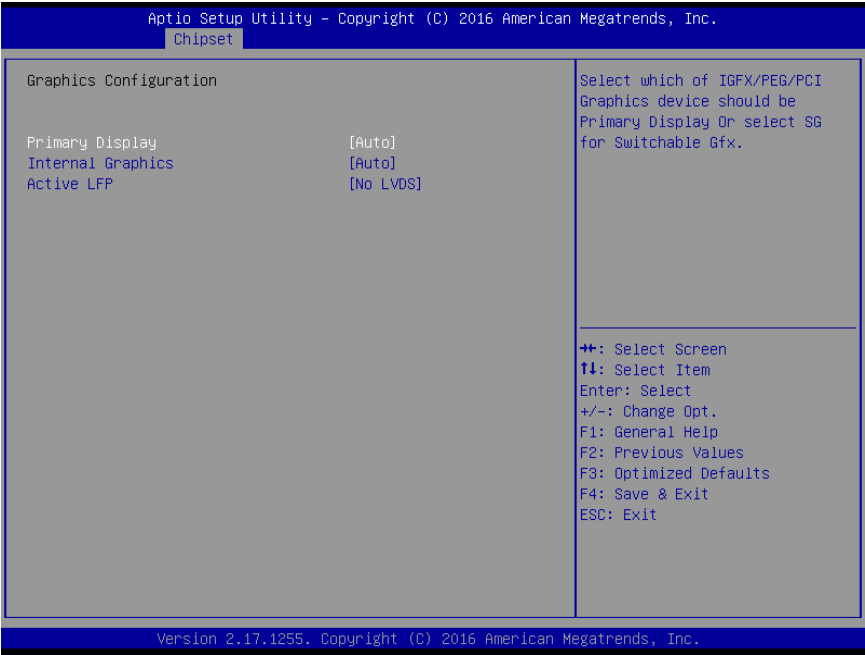


3.6.3.1 System Agent (SA) Configuration

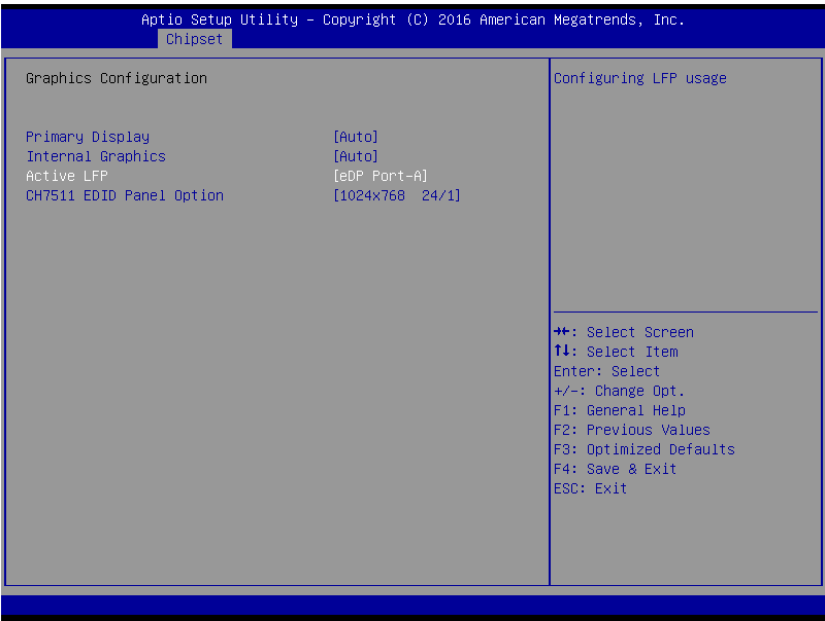


Item	Option	Description
VT-d	Enabled [Default] Disabled	VT-d capability.

3.6.3.1.1 Graphics Configuration



Item	Option	Description
Primary Display	Auto[Default] IGFX PEG	Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select SG for Switchable Gfx.
Internal Graphics	Auto [Default] Disabled Enabled	Keep IGFX enabled based on the setup options.
Active LFP	No LVDS[Default] eDP Port-A	Configuring LFP usage.

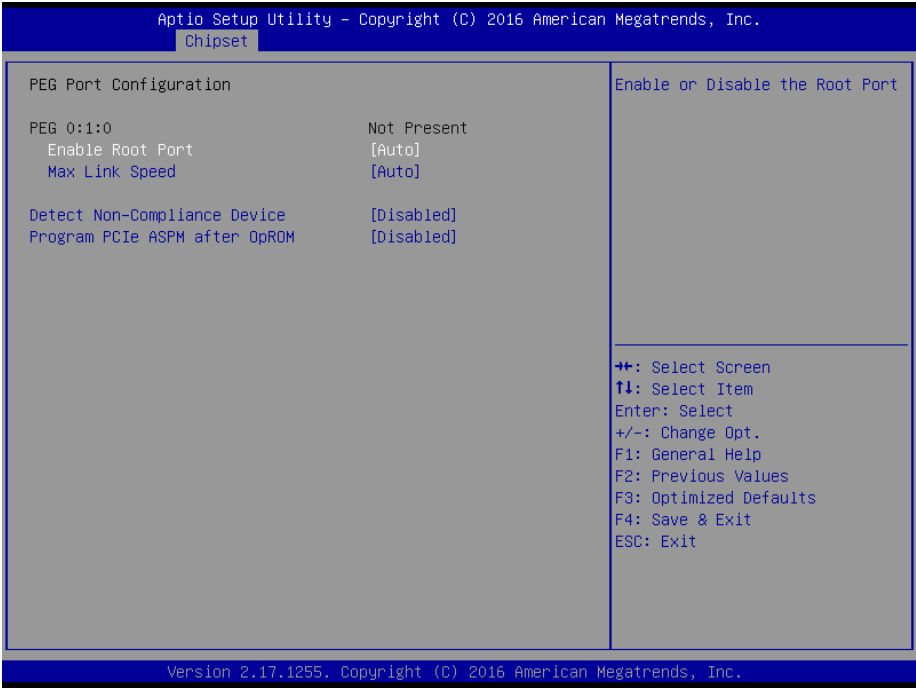


Item	Option	Description
Primary Display	Auto[Default] IGFX PEG	Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select SG for Switchable Gfx.
Internal Graphics	Auto [Default] Disabled Enabled	Keep IGFX enabled based on the setup options.
Active LFP	No LVDS eDP Port-A	Configuring LFP usage.
CH7511 EDID Panel Option	1024x768 24/1[Default] 800x600 18/1 1024x768 18/1 1366x768 18/1 1024x600 18/1 1280x800 18/1 1920x1200 24/2 1920x1080 18/2 1280x1024 24/2 1440x900 18/2 1600x1200 24/2 1366x768 24/1 1920x1080 24/2 1680x1050 24/2	Port1-EDP to LVDS (Chrotel 7511) Panel EDID Option.

3.6.3.1.2 DMI/OPI Configuration

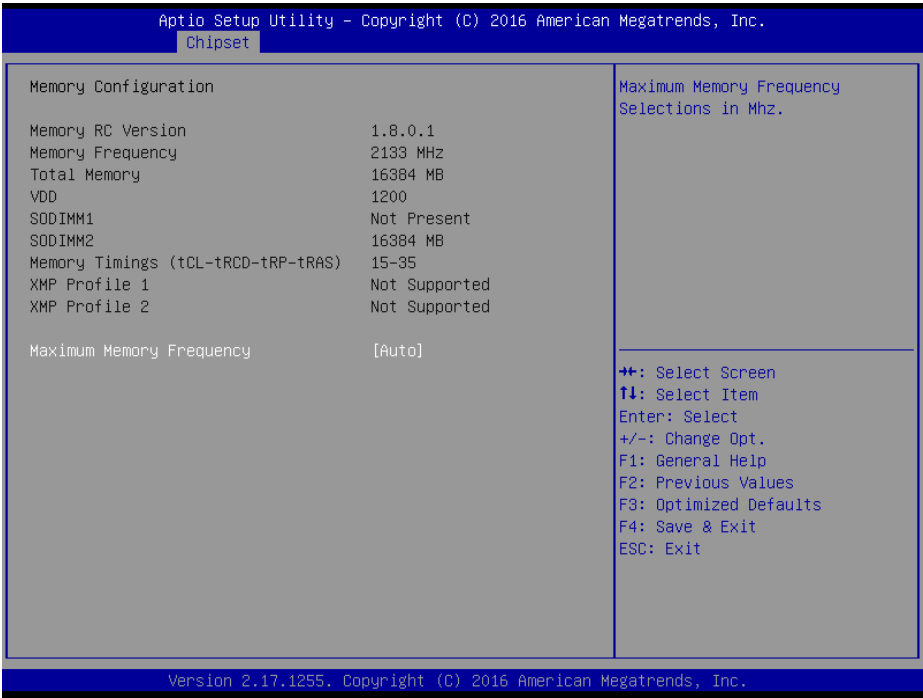


3.6.3.1.3 PEG Port Configuration



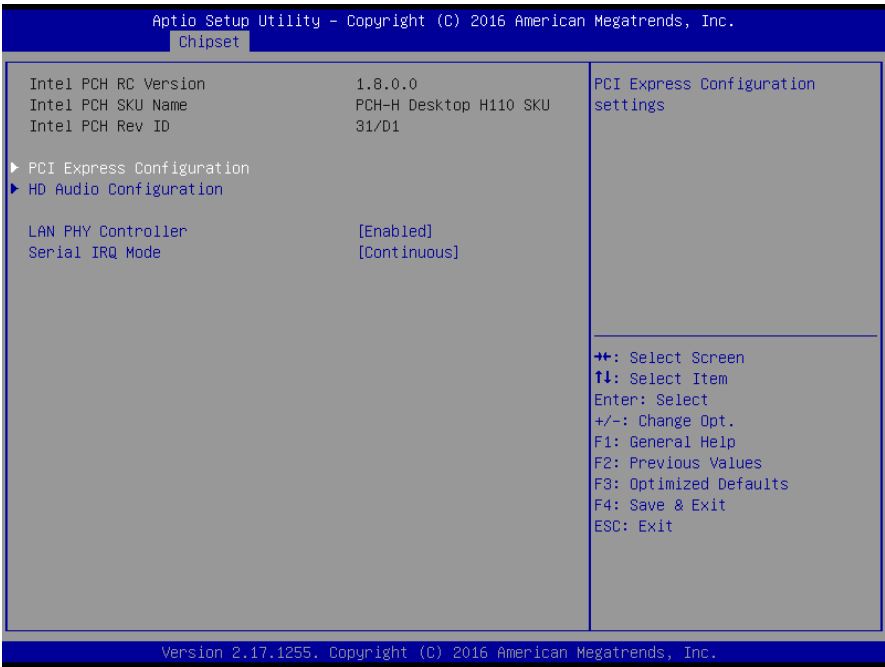
Item	Option	Description
Enable Root Port	Disabled Enabled Auto[Default]	Enable or Disable the Root Port.
Max Link Speed	Auto[Default] Gen1 Gen2 Gen3	Configure PEG 0:1:0 Max Speed.
Detect Non-Compliance Device	Disabled[Default] Enabled	Detect Non-Compliance PCI Express Device in PEG.
Program PCIe ASPM 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 Memory Configuration



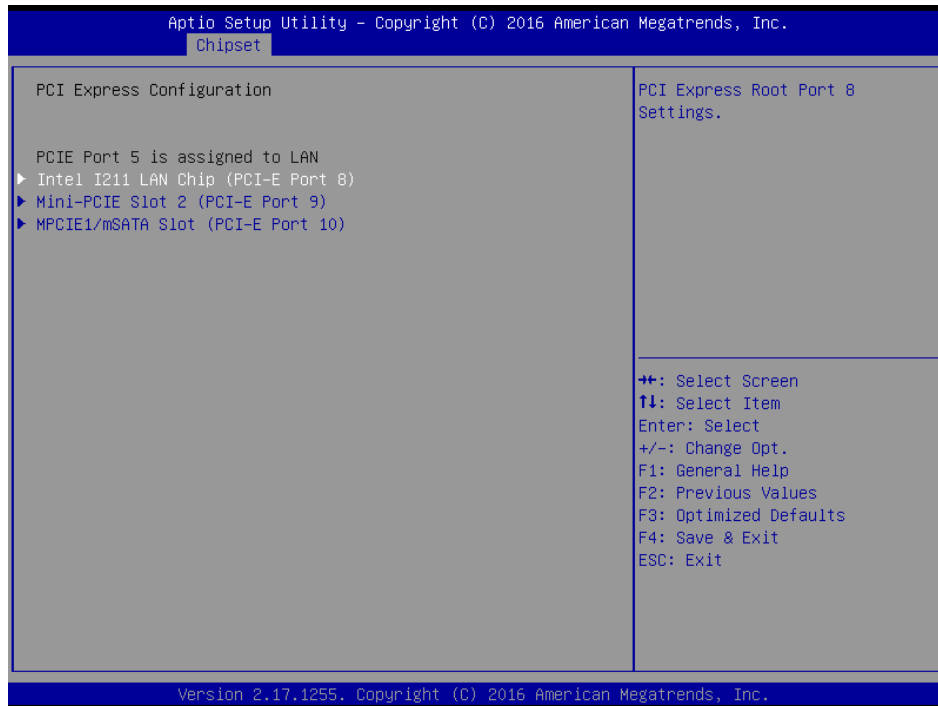
Item	Option	Description
Maximum Memory Frequency	Auto[Default] 1067/1200/1333/1400/1600 /1800/1867/2000/2133/2200 /2400/2600/2667/2800/2933 /3000/3200	Maximum Memory Frequency Selections in Mhz.

3.6.3.2 PCH-IO Configuration



Item	Option	Description
LAN PHY Controller	Disabled Enabled[Default]	Enable or disable OnBoard PCH LAN PHY Controller.
Serial IRQ Mode	Quiet Continuous[Default]	Configure Serial IRQ Mode.

3.6.3.2.1 PCI Express Configuration



3.6.3.2.1.1 Intel I211 LAN Chip (PCI-E Port 8)



Item	Option	Description
Intel I211 LAN Chip (PCI-E Port 8)	Disabled Enabled[Default],	Enable or Disable the Root Port.

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



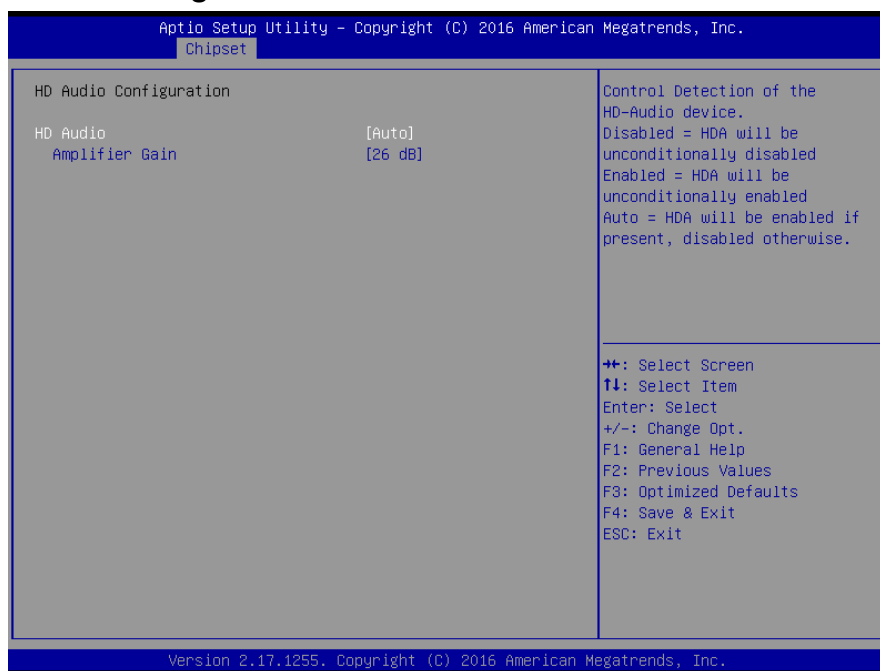
Item	Option	Description
Mini-PCIE Slot 2 (PCI-E Port 9)	Disabled Enabled[Default],	Enable or Disable the Root Port.
ASPM Support	Disabled[Default], L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
PCIe Speed	Auto[Default] Gen1 Gen2	Select PCI Express port speed.
Detect Non-Compliance Device	Disabled[Default] Enabled,	Detect Non-Compliance PCI Express Device. If enable, it will take more time at POST time.

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



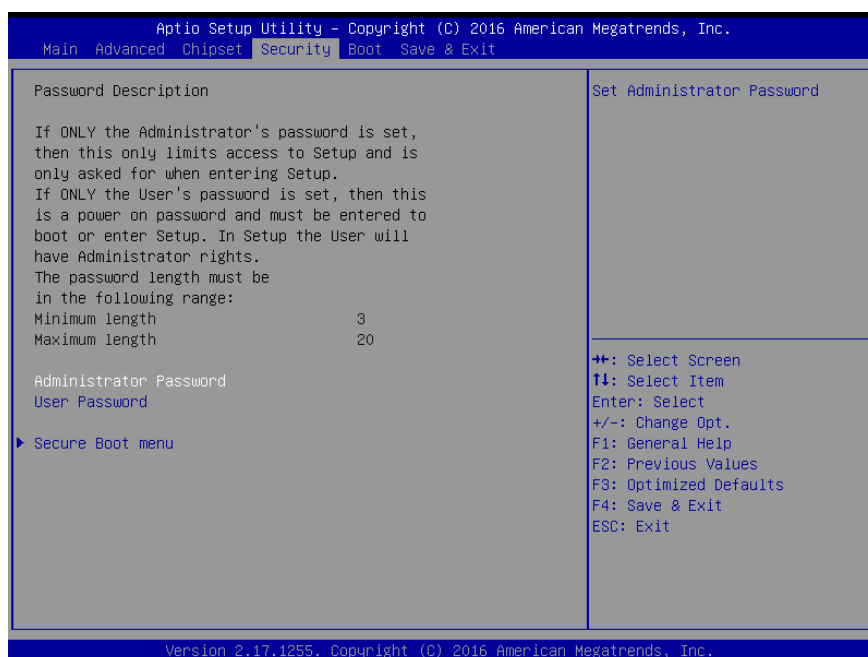
Item	Option	Description
MPCIE1/mSATA Slot (PCI-E Port 10)	Enabled[Default], Disabled	Enable or Disable the Root Port.
ASPM Support	Disabled[Default], L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
PCIe Speed	Auto[Default] Gen1 Gen2	Select PCI Express port speed.
Detect Non-Compliance Device	Enabled, Disabled[Default]	Detect Non-Compliance PCI Express Device. If enable, it will take more time at POST time.

3.6.3.2.2 HD Audio Configuration



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

3.6.4 Security



EMX-H110P User’s Manual

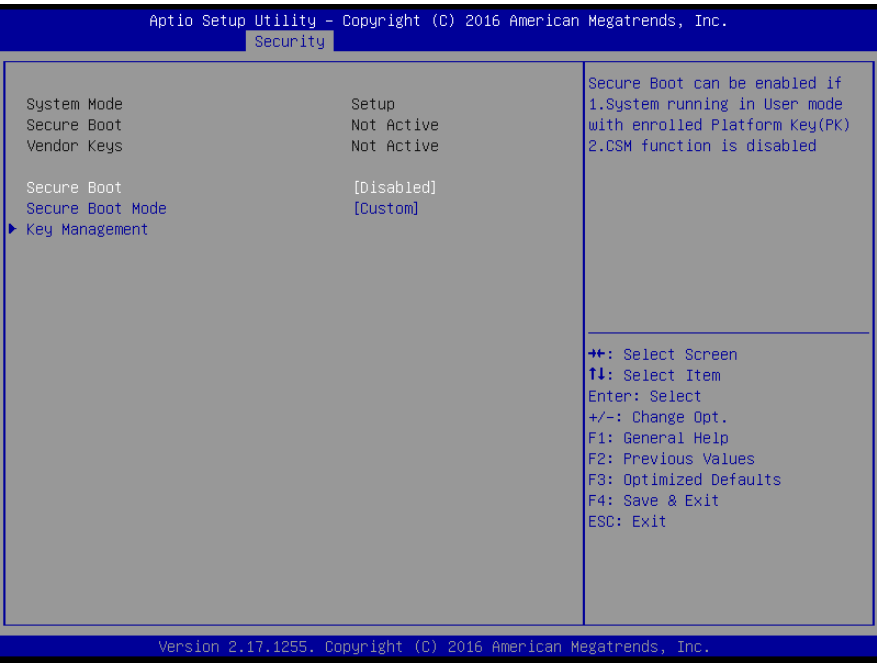
● Administrator Password

Set setup Administrator Password

● User Password

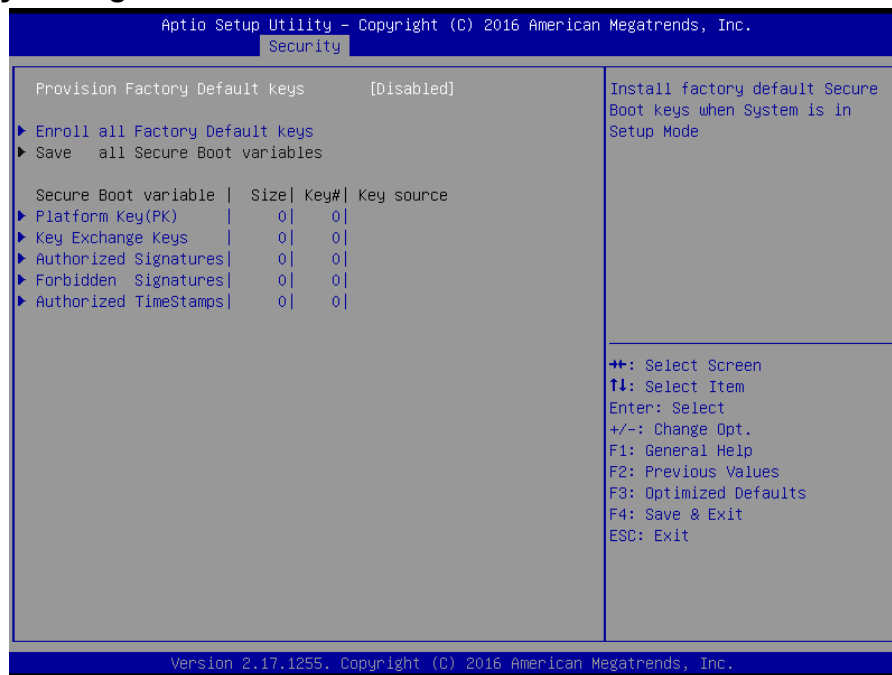
Set User Password

3.6.4.1 Secure Boot menu



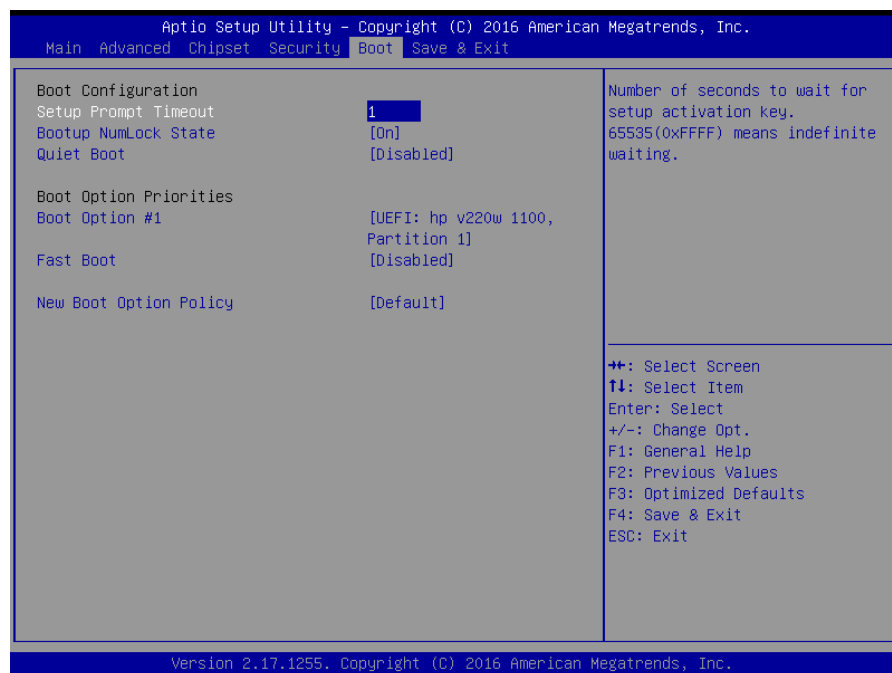
Item	Option	Description
Secure Boot	Disabled[Default] Enabled	Secure Boot can be enabled if 1.System running in User mode with enrolled Platform Key(PK) 2.CSM function is disabled.
Secure Boot Mode	Standard Custom[Default]	Secure Boot mode selector. 'Custom' Mode enables users to change Image Execution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

3.6.4.1.1 Key Management



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

3.6.5 Boot

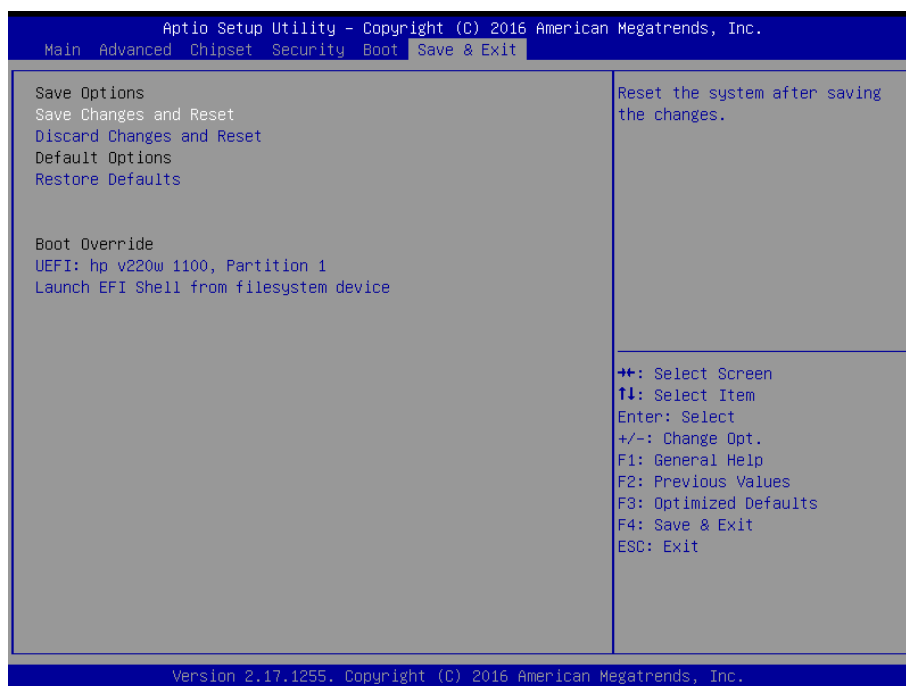


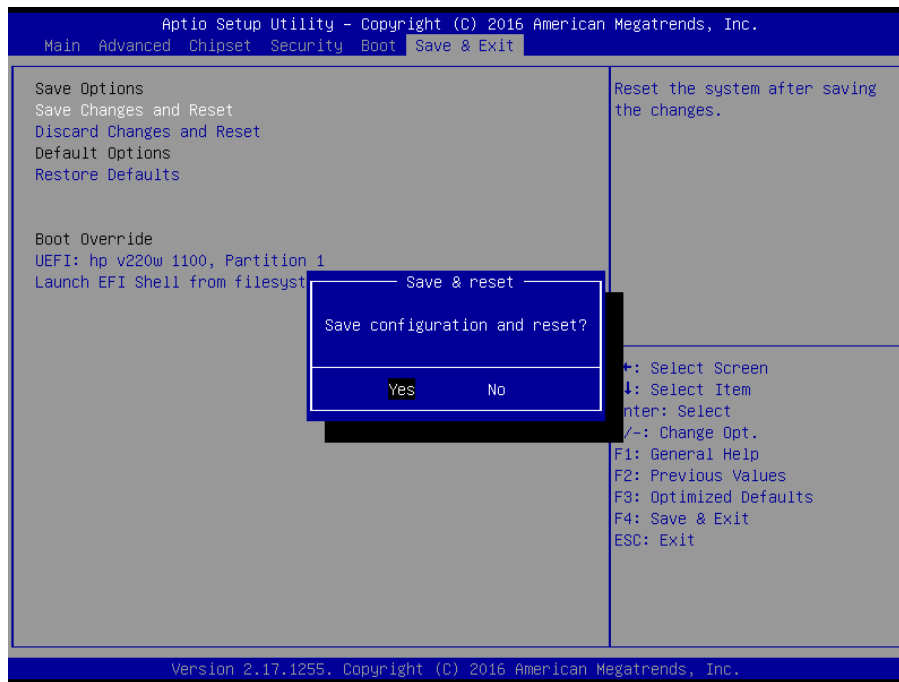
Item	Option	Description
Setup Prompt Timeout	1~ 65535	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

EMX-H110P User's Manual

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.
New Boot Option Policy	Default[Default] Place First Place Last	Controls the placement of newly detected UEFI boot options.
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



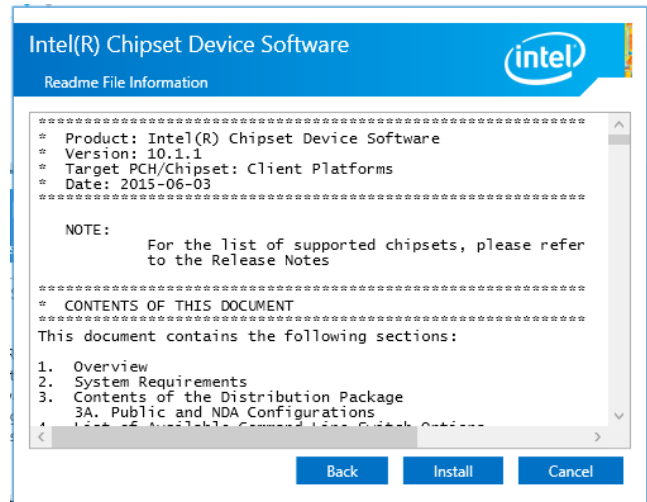
Note: Installation procedures and screen shots in this section are for your reference and may not be exactly the same as shown on your screen.

4.1 Install Chipset Driver

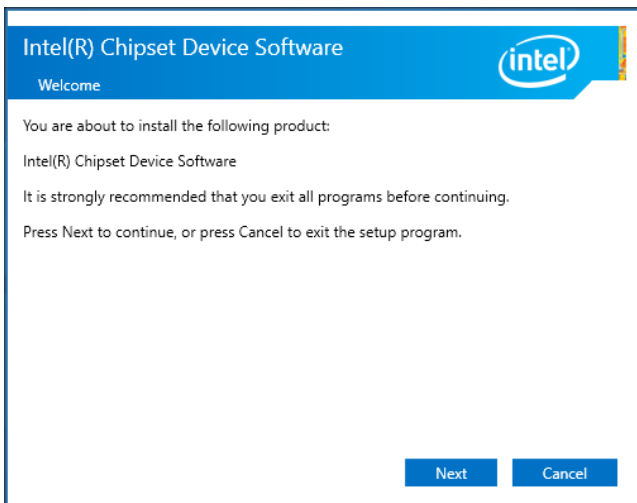
Insert the Supporting DVD-ROM to DVD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left.



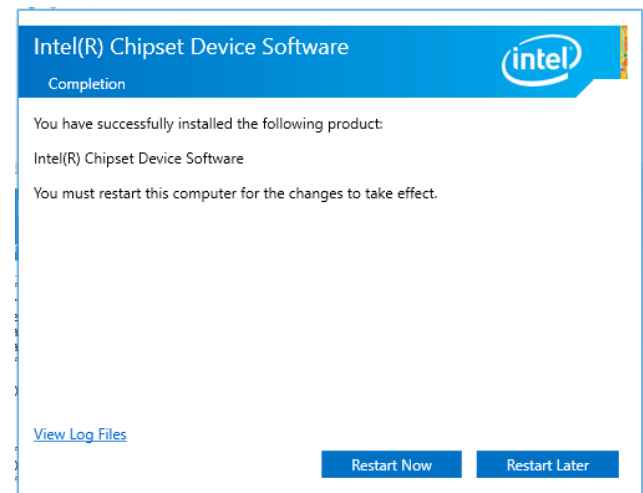
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system. If the warning message appears while the installation process, click Continue to go on.



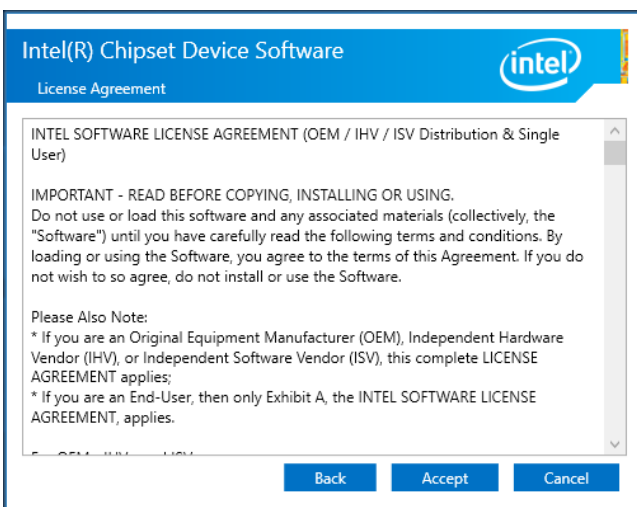
Step 3. Click Install.



Step1. Click Next.



Step 4. Complete setup.



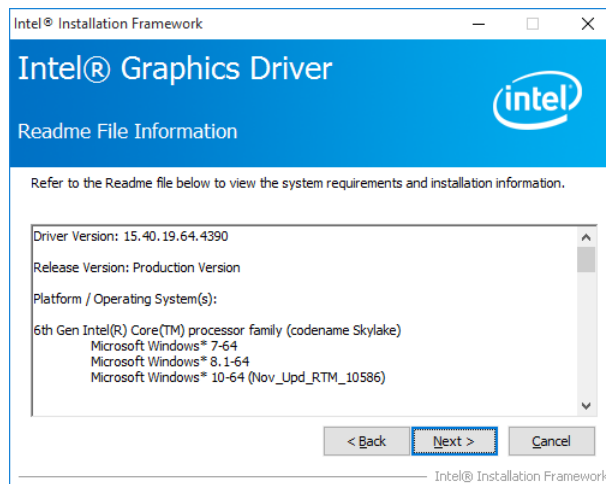
Step 2. Click Accept.

4.2 Install VGA Driver

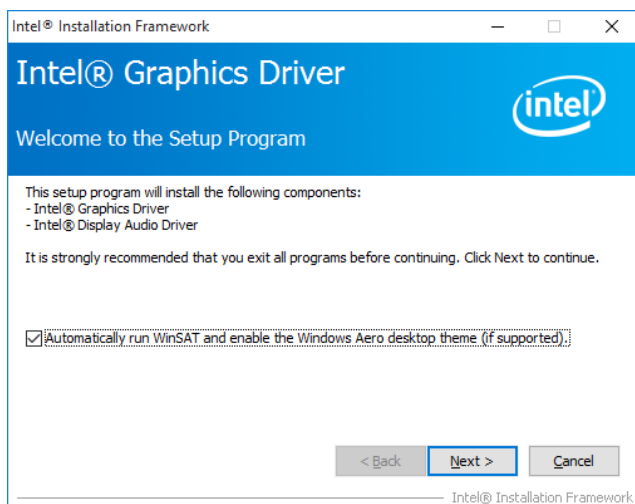
Insert the Supporting DVD-ROM to DVD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left.



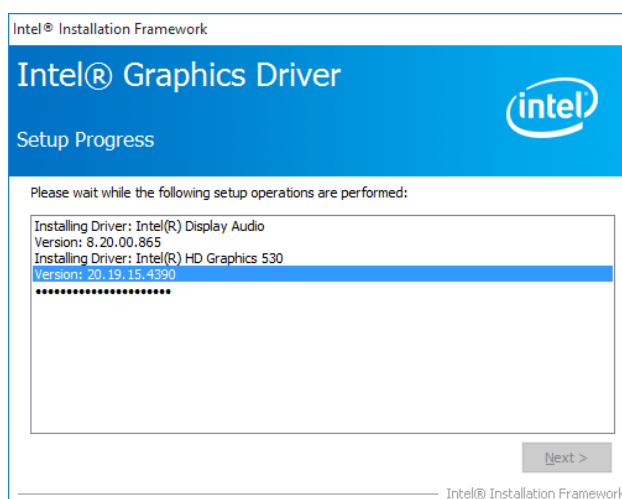
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



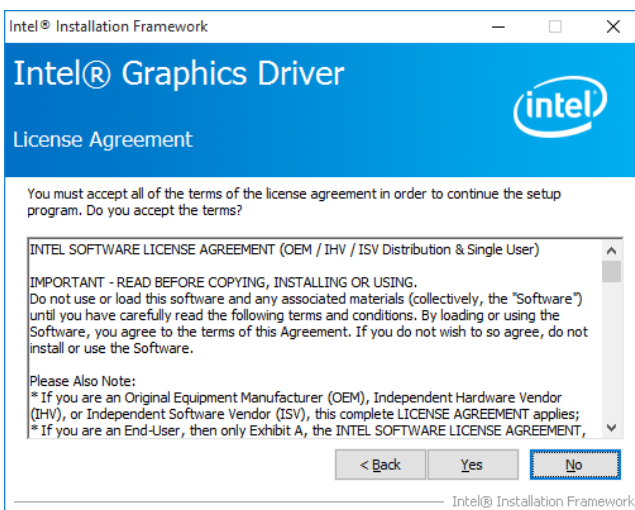
Step 3. Click Next.



Step 1. Click Next to continue installation.

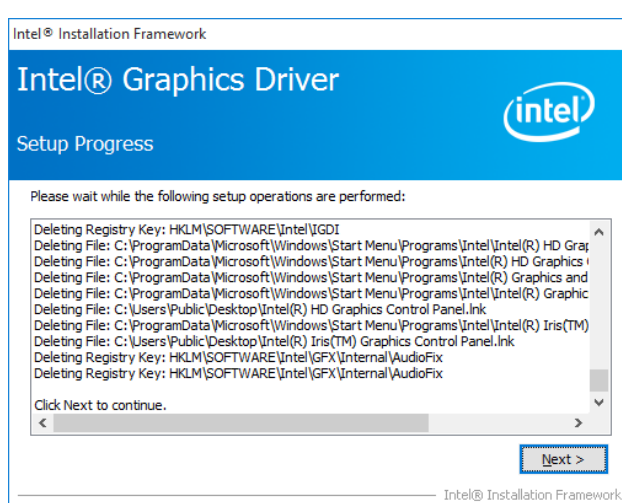


Step 4. Click Next.

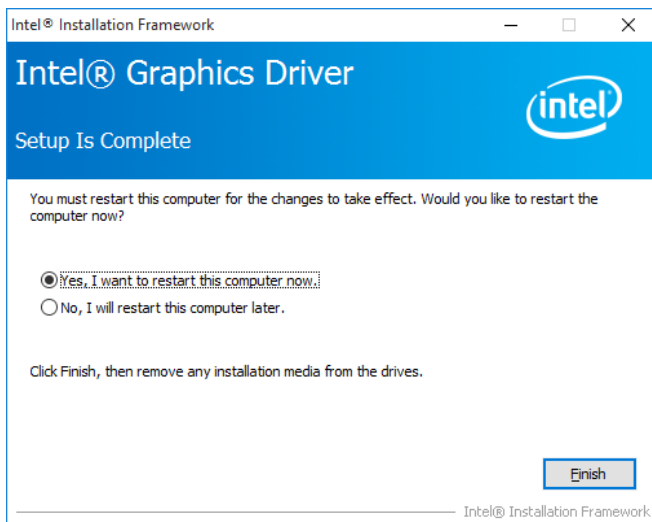


Step 2.

Click **Yes** to accept license agreement.



Step 5. Click Next.



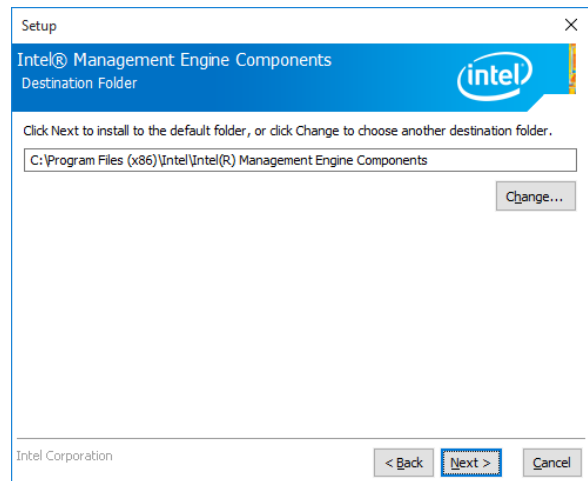
Step 6. Click **Finish** to complete setup.

4.3 Install ME Driver

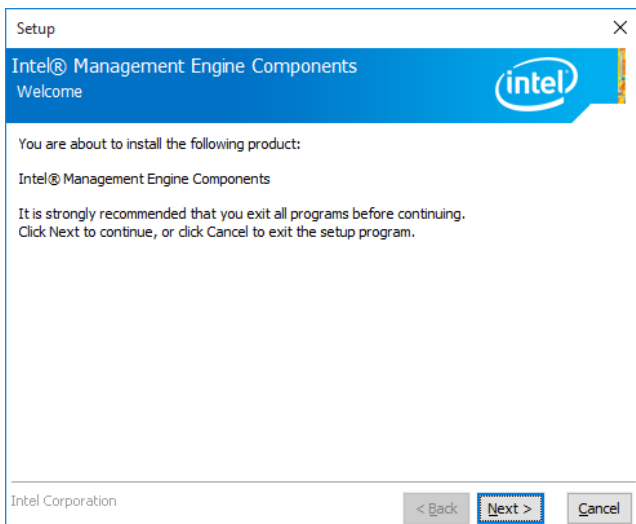
Insert the Supporting CD-ROM to CD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left.



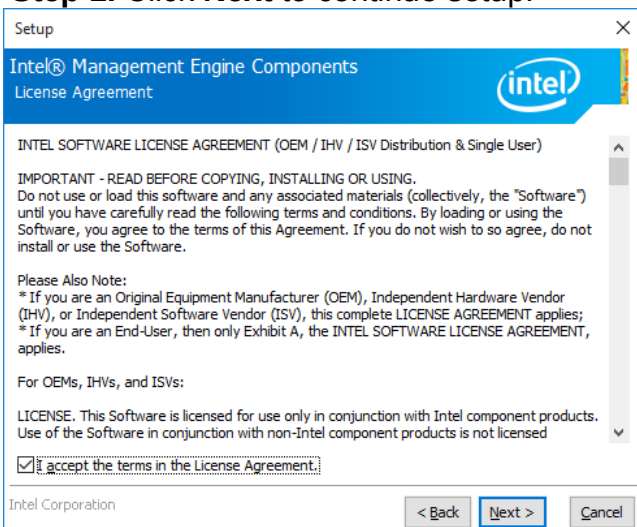
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



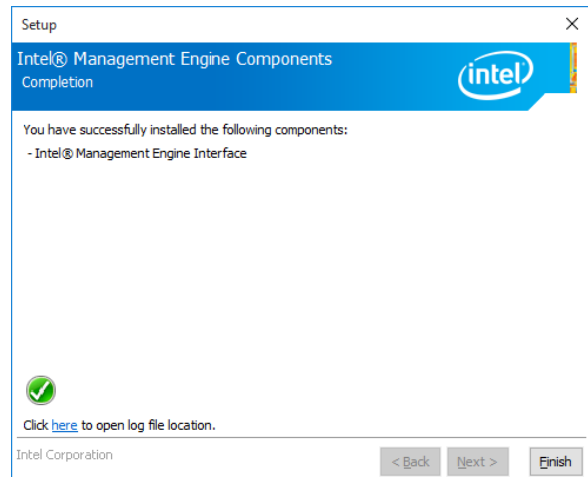
Step 3. Click Next



Step 1. Click Next to continue setup.



Step 2. Click Next.



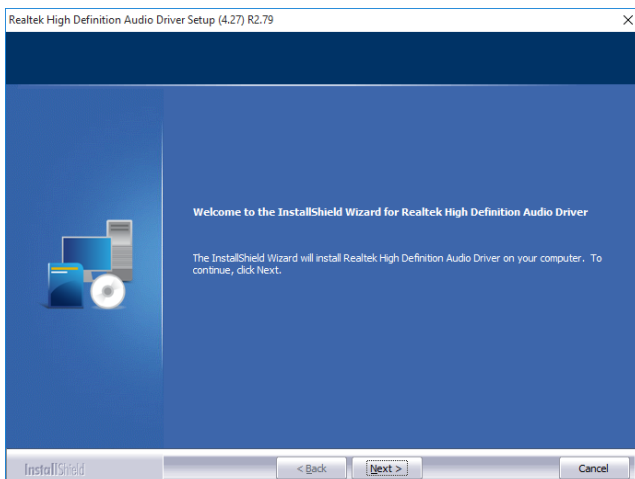
Step 4. Click Finish to complete the setup

4.4 Install Audio Driver (For Realtek ALC892 HD Audio)

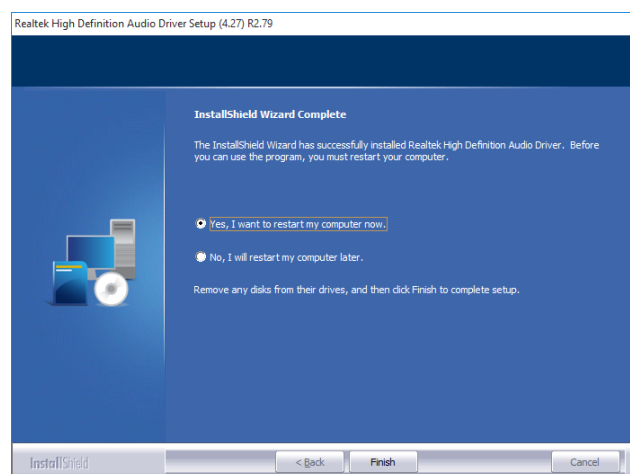
Insert the Supporting DVD-ROM to DVD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left.



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 Install.



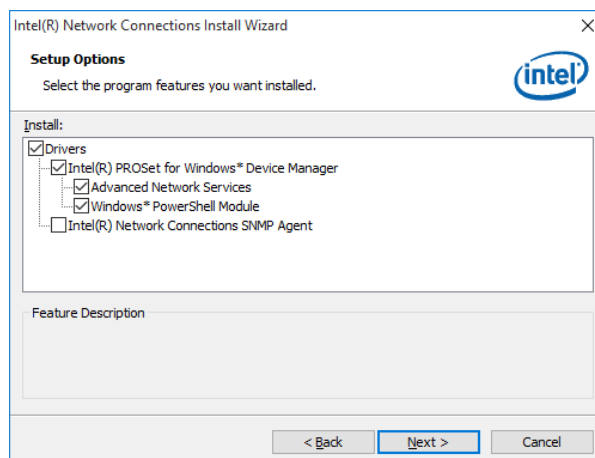
Step 2. Select **Finish** to complete Installation.

4.5 Install LAN Driver

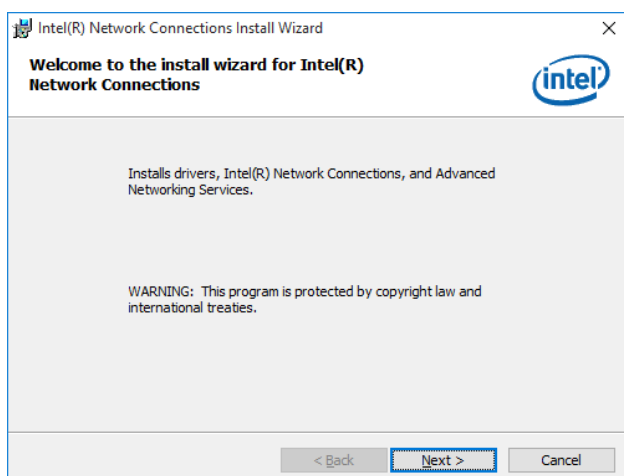
Insert the Supporting DVD-ROM to DVD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left.



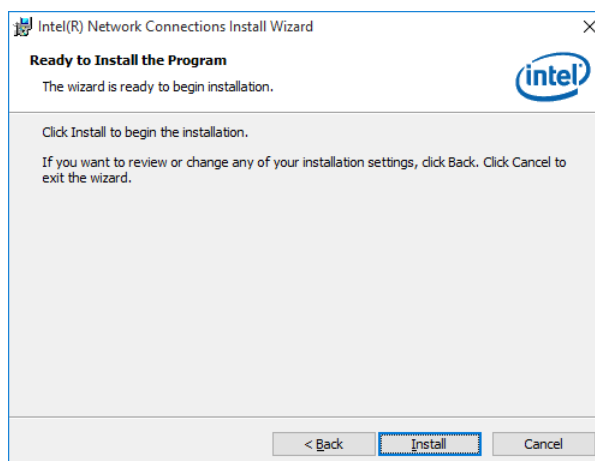
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



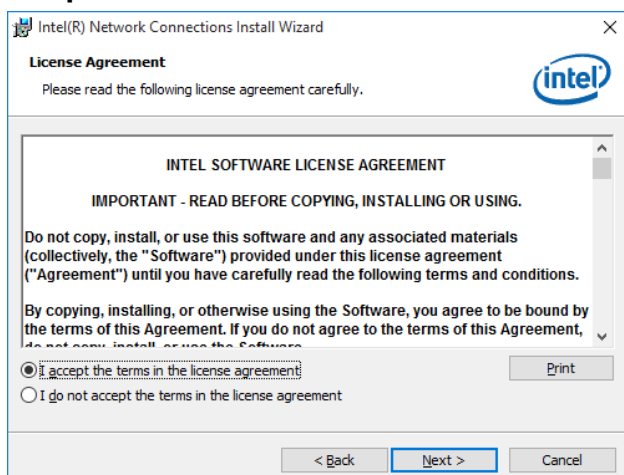
Step 3. Click Next.



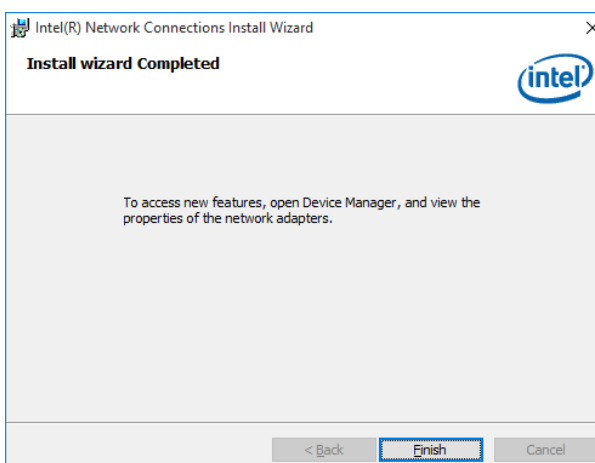
Step 1. Click Next to continue installation.



Step 4. Click Install.



Step 2. Click Next.



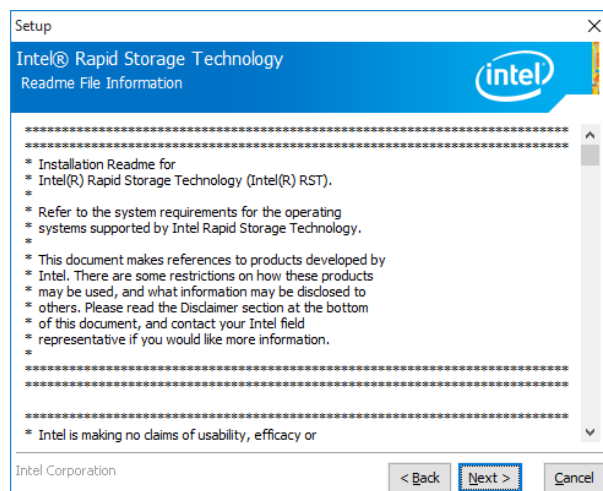
Step 5. Click Finish to complete setup.

4.6 Install RST Driver

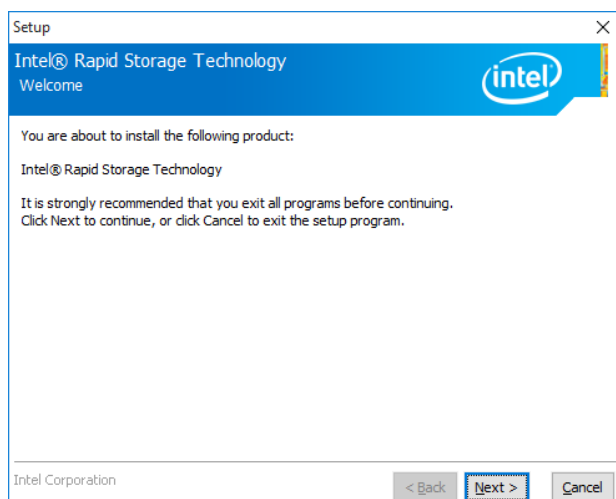
Insert the Supporting DVD-ROM to DVD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left.



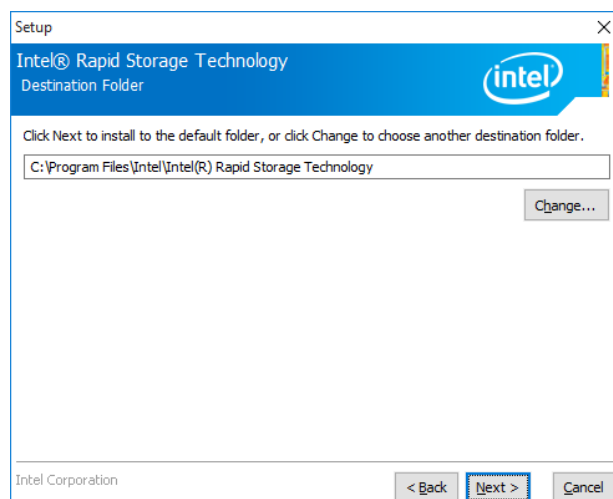
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



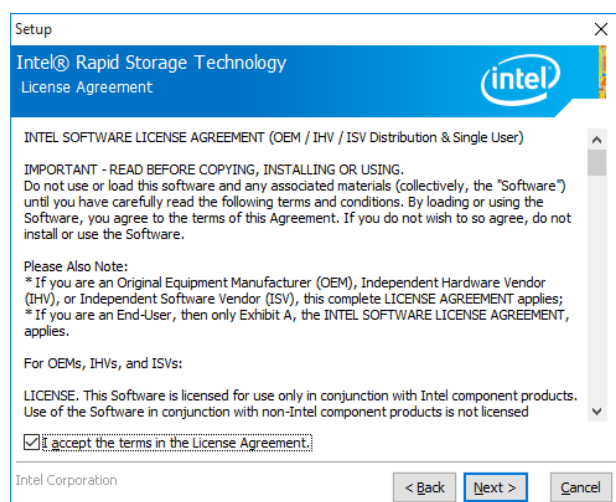
Step 3. Click Next.



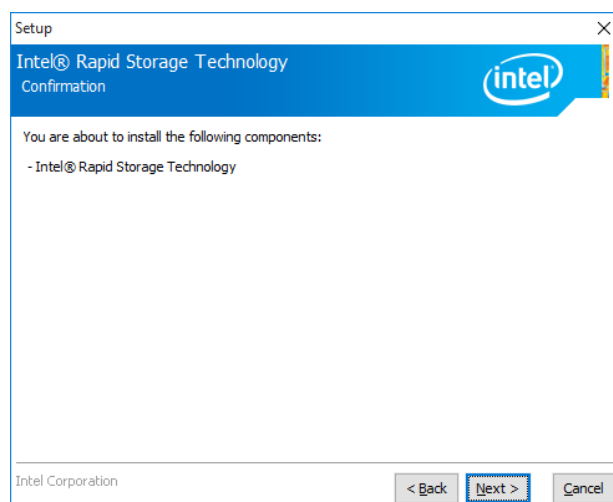
Step 1. Click Next to continue installation.



Step 4. Click Next.



Step 2. Click Next.



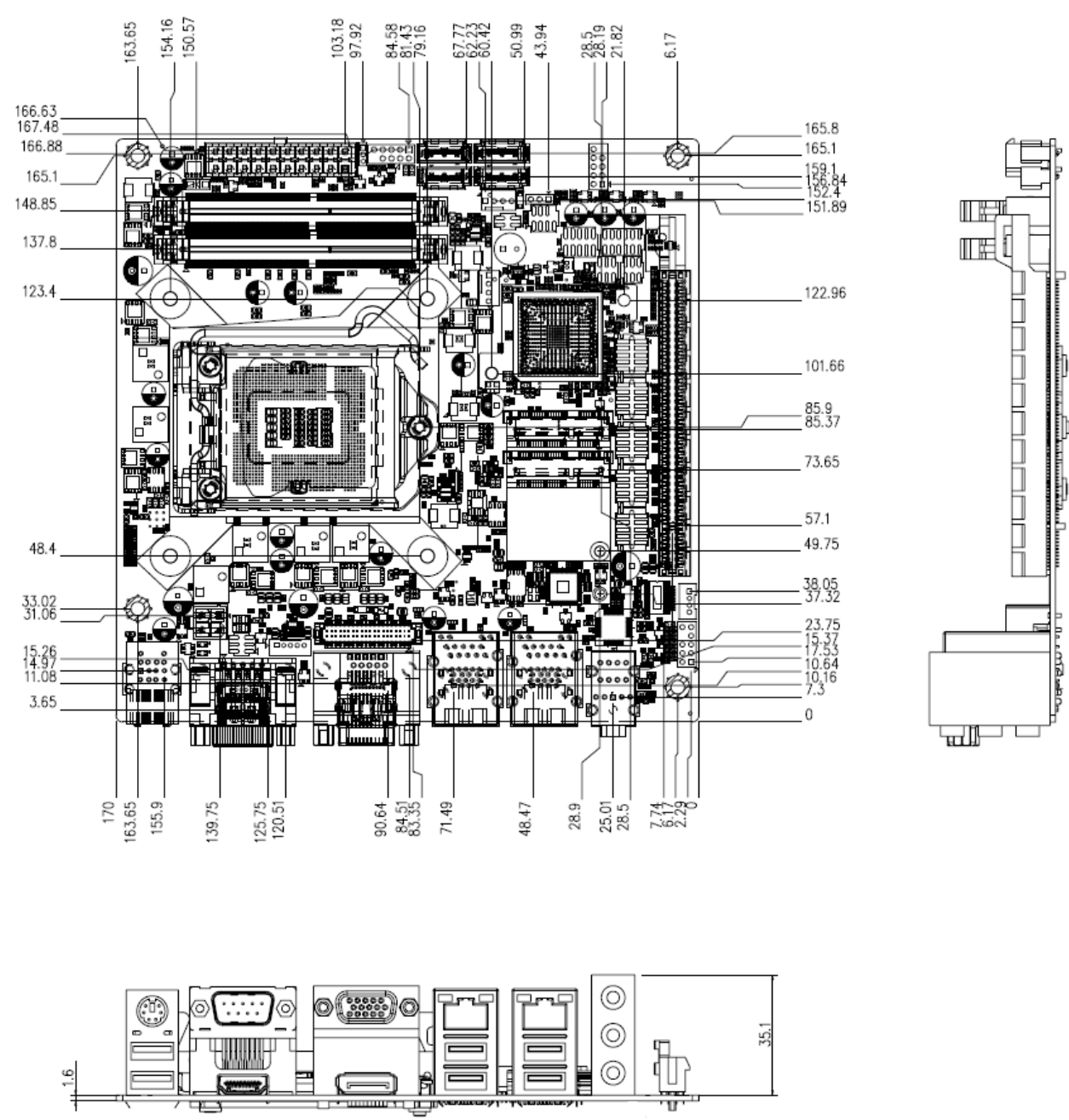
Step 5. Click Next.

EMX-H110P User's Manual



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

5. Mechanical Drawing



Unit: mm

