ECM-TGU-B1

11th Gen Intel® Tiger Lake U 3.5”Micro Module

User’s Manual

1st Ed –26 December 2022

Part No. E2047395404R

FCC Statement

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

(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE.

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

THIS EQUIPMENT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS "A" DIGITAL DEVICE, PURSUANT TO PART 15 OF THE FCC RULES.

THESE LIMITS ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST HARMFUL INTERFERENCE WHEN THE EQUIPMENT IS OPERATED IN A COMMERCIAL ENVIRONMENT. THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND, IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTION MANUAL, MAY CAUSE HARMFUL INTERFERENCE TO RADIO COMMUNICATIONS.

OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE HARMFUL INTERFERENCE IN WHICH CASE THE USER WILL BE REQUIRED TO CORRECT THE INTERFERENCE AT HIS OWN EXPENSE.

Notice

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

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2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information available.
3. If your product is diagnosed as defective, obtain an RMA (return material authorization) number from your dealer. This allows us to process your good return more quickly.
4. Carefully pack the defective product, a complete Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
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 x 3.5" ECM-TGU-B1 Micro Module
- 1 x Serial ATA cable (7-pin, standard) 1 x Wire SATA power cable (15-pin, 4P/2.0mm) 1 x Flat Cable 9P(M)-PHD (10P/2.0mm)
- 1 x CPU Heatsink set
- 1 x M.2 Module bracket set

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

1.3 Document Amendment History

Revision	Date	By	Comment
1st	December 2022	Avalue	Initial Release

1.4 Manual Objectives

This manual describes in details Avalue Technology ECM-TGU-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 ECM-TGU-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	Onboard Tiger Lake U Gen 11th Intel® Core™ SoC i7/i5/i3 & Celeron®BGA Processor Intel® Core™ i7-1185G7E, i7-1185GRE (up to 4.4GHz, quad-core, 12M Cache, TDP: 28/15/12W)* Intel® Core™ i5-1145G7E, i5-1145GRE (up to 4.1GHz, quad-core, 8M Cache, TDP: 28/15/12W)* Intel® Core™ i3-1115G4E, i3-1115GRE (up to 3.9GHz, dual-core, 6M Cache, TDP: 28/15/12W)* Intel® Celeron® 6305E (up to 1.8GHz, dual-core, 4M Cache, TDP: 15W)
BIOS	AMI uEFI BIOS, 256Mbit SPI Flash ROM
I/O Chip	iTE IT8528E
System Memory	One 260-pin DDR4 3200MHz SO-DIMM socket, supports up to 32GB Max (non ECC only.)
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
TPM	Onboard NuvoTon NPCT754AADYX support TPM 2.0
iAMT	Core i SKU CPU support iAMT Celeron SKU CPU no support iAMT
Expansion Slot	
M.2	1 x M.2 Key M support 2260/2242 (with 1 x PCI-e Gen4 x4 signal), standard package with 60 to 42 bracket + screw set 1 x M.2 Key B 3042/2242 (with PCIe x1, SATA and USB2.0 signal, with 1 x SIM card slot) standard package with 52 to 42 bracket + screw set. Support 4G, no 5G (no USB3 signal). 1 x M.2 Key E 2230 support WiFi module (1 x PCI-e x 1 & USB 2.0 Signal)
Storage	
M.2	1 x M.2 Key M support 2260/2242 (with 1 x PCI-e Gen4 x4 signal), standard package with 60 to 42 bracket + screw set 1 x M.2 Key B 3042/2242 (with PCIe x1, SATA and USB2.0 signal, with 1 x SIM card slot) standard package with 52 to 42 bracket + screw set
SATA	1 x SATA III
Edge I/O	
LAN	3 x Intel® I226LM/I226IT 2.5 Gigabit Ethernet(I226IT for Extend Temperature SKU)

USB 3.1	4 x USB 3.2 Gen 2 x1
DP	2x DP++
Audio	Support Audio Line-out & Mic-in by 2 in 1 Jack
LED Indicator	Power LED /HDD LED at IO
Onboard I/O	
COM	COM 1 & COM2: - COM 1 & COM2 support RS232/422/485 connector, with / +5V & +12V Supported and RS422/485 by BIOS setting - 2 x 2 x 5 pin, pitch 2.00mm connector support RS-232/422/485 connector, Pin 9 with / +5V & +12V Supported - 2 x 2 x 3 pin, pitch 2.00mm connector, for RI/+5V/+12V Supported COM3 to 6: - 1 x 2 x 20 pin, pitch 2.00mm connector for COM3~6: support RS-232 connector
USB 2.0	2 x 2 x 5 pin, pitch 2.00mm connector (or pin header) for 4 USB 2.0
GPIO	1 x 2 x 6 pin, pitch 2.00mm connector for GPIO: 8 bits & +3.3S Level
SATA Power	1 x SATA Power, pitch 2.54mm connector
CPU/System FAN	1 x 1 x 4 pin, pitch 2.54mm CPU fan connector with smart fan function supported
Buzzer	1 x Buzzer header_1 x 1 x 2pin 2.0mm Wafer connector for Buzzer
Front Panel	1 x 2 x 5 pin, pitch 2.00mm connector for front panel
RTC Battery	1 x 2 Pin Pitch 1.25mm horizontal type battery connector (CR2032X Battery)
AT/ATX Selector	1 x 1 x 3 pin pitch 2.00mm connector for AT/ATX jumper
Clear CMOS	1 x 1 x 3 pin pitch 2.00mm connector
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 (5V/12V)
eDP	1 x 1 x 40 pin, pitch 0.5mm IPEX connector for eDP
LPC	1 x 2 x 5 pin, pitch 1.27mm connector for LPC debug
BIOS SPI	1 x 2 x 5 pin, pitch 1.27mm connector for BIOS SPI
Audio	1 x 2 x 6 pin, pitch 2.00mm connector Support Audio Line-out & Mic-in & Line-in
DC-Input	Default: 1 x 2 x 2 pin, pitch 4.20mm connector for power input connector
Amp Connector	1 x 4 pin, pitch wafer 2.00mm connector for 3W x 2 Speaker
Display	
Graphic Chipset	Intel® Tiger Lake UP3 SoC Processor integrated Gen12 graphics
Spec. & Resolution	DP1+DP2 (DP1.4): Max: 7680 x 4320@60 Hz. Note: This resolution is actual test result, Intel spec: 2 x DP++ 1.4 : 4096 x 2304@60 Hz 1 x LVDS: 1920 x 1080 Dual channel 18/24-bits LVDS (Chrontel CH7511B eDP to LVDS)

	1 x eDP 4096 x 2304@60 Hz
Multiple Display	Four Display 2 x DP++, 1 x 2CH LVDS, 1 x eDP
Audio	
Audio Codec	Realtek ALC888S Audio Codec (co-lay ALC897)
Amplifier	ALC105 2W4Ω per channel Amplifier
Ethernet	
LAN Chip	3 x Intel® I226LM/I226IT 2.5 Gigabit Ethernet (I226IT for Extend Temperature SKU)
LAN Spec.	3 x 10/100/1000/2.5 Base-Tx GbE compatible
Mechanical & Environmental	
Power Requirement	DC in +12V ~ +24V
ACPI	Single power ATX Support S0,S3, S4, S5 ACPI 5.0 Compliant
Power Mode	AT / ATX mode Switchable Through Jumper, default AT
Operating Temp.	Intel® Standard Temperature CPU SKU support: 0~60°C (32~140°F) with 0.5m/s air flow Intel® Extend Temperature CPU SKU Support: -20~60°C (-4~140°F) with 0.5m/s air flow
Storage Temp.	-40°C ~ +75°C
Operating Humidity	40°C @ 95% Relative Humidity, Non-condensing
Size (L x W)	5.7" x 4" (146mm x 101mm) (Please consult product engineers for the production feasibility if the size is larger than 410x360mm or smaller than 80x70mm)
Weight	0.40kg
Vibration Test	Package Vibration Test Reference IEC60068-2-64 Testing procedures Test Fh: Vibration broadband random Test 1. PSD: 0.026G²/Hz, 2.16 Grms 2. Non-operation mode 3. Test Frequency: 5-500Hz 4. Test Axis: X,Y and Z axis 5. 30 min. per each axis 6. IEC 60068-2-64 Test:Fh Random Vibration Operation

	Reference IEC60068-2-64 Testing procedures Test Fh : Vibration broadband random Test 1. PSD: 0.00454G²/Hz, 1.5 Grms 2. Operation mode 3. Test Frequency : 5-500Hz 4. Test Axis : X,Y and Z axis 5. 30 minutes per each axis 6. IEC 60068-2-64 Test:Fh <u>Random Vibration Non Operation</u> Reference IEC60068-2-64 Testing procedures Test Fh : Vibration broadband random Test 1. PSD: 0.01818G²/Hz, 3.0 Grms 2. Non Operation mode 3. Test Frequency : 5-500Hz 4. Test Axis : X,Y and Z axis 5. 30 minutes per each axis 6. IEC 60068-2-64 Test:Fh
Drop Test	<u>Packing Drop</u> Reference ISTA 2A, Method : IEC-60068-2-32 Test: Ed Drop Test 1 One corner , three edges, six faces 2 ISTA 2A, IEC-60068-2-32 Test:Ed
OS Information	Win10 64bit, Linux

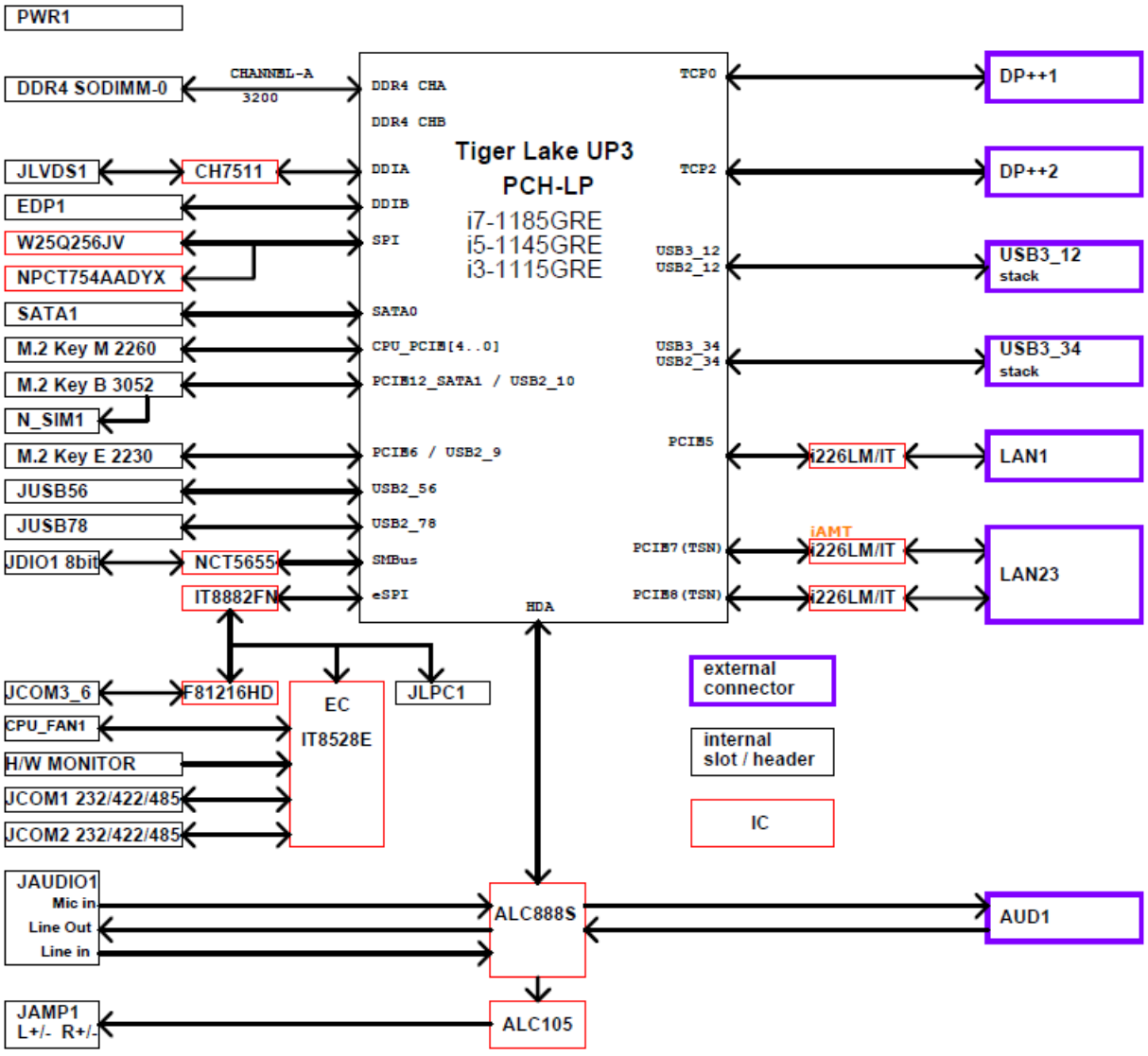
Note: Specifications are subject to change without notice.

User condition suggestion:

1. RealTek ALC888S-VD2-GR IC specification Operating Temp Range 0℃~+70℃.
2. It is required for 8K resolution by using 2 x DP simultaneously. Limitation: Black screen will be shown if close LVDS function in BIOS when using 2 x DP, with debug card code: Ad. User needs to connect one DP to OS, then connect the second DP.
3. When remove device M.2 KeyE (Intel® Wireless-AC 9560) from ECM-TGU-B1 motherboard, OS Device Manager will still show this on device item with exclamation mark 「！」(Code 10). It has to power off DC-In and reboot. (With system product, please request dedicated AE for OEM BIOS to enable, or customer can Enable from BIOS menu)
4. N_SIM1 and J_N_SIM1 can't be using at the same time, user can choose either one.

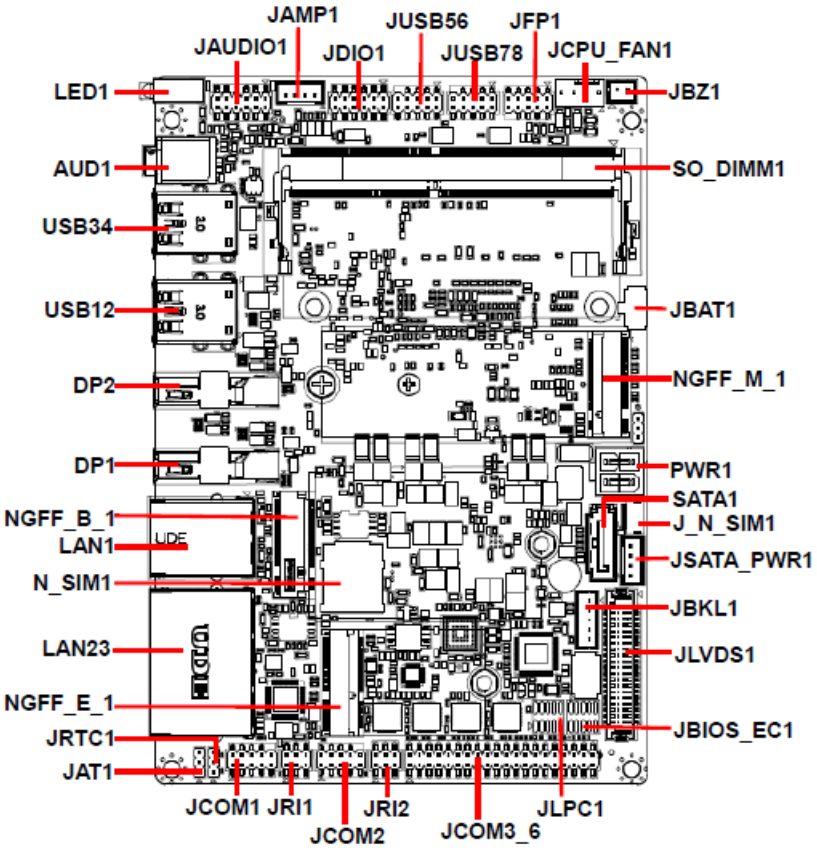
1.6 Architecture Overview—Block Diagram

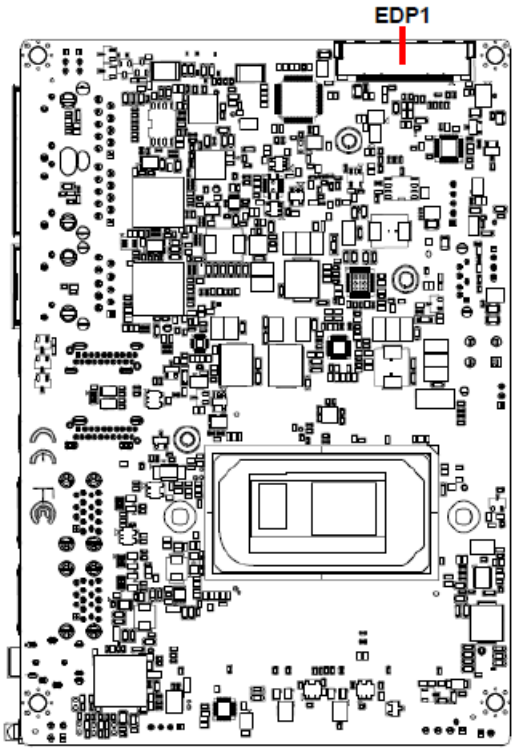
The following block diagram shows the architecture and main components of ECM-TGU-B1



2. Hardware Configuration

2.1 Product Overview

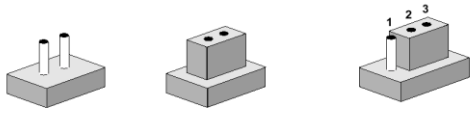




2.2 Jumper and Connector List

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.



Open Closed Closed 2-3

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

Open Closed Closed 2-3

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

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

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

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

Jumpers

Label	Function	Note
JRI1/2	Serial port 1/2 pin9 signal select	3 x 2 header, pitch 2.00mm
JAT1	AT/ATX Input power select	3 x 1 header, pitch 2.00mm
JRTC1	Clear CMOS	3 x 1 header, pitch 2.00mm

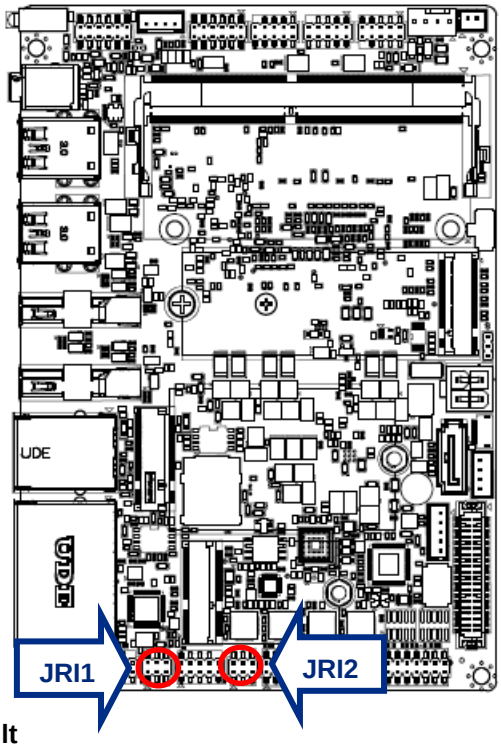
Connectors

Label	Function	Note
JBKL1	LCD inverter backlight connector	5 x 1 wafer, pitch 2.00mm Matching Connector: JST PHR-5
JCPU_FAN1	CPU fan connector	4 x 1 wafer, pitch 2.54mm
JCOM1	Serial Port 1 connector	5 x 2 header, pitch 2.00mm
JCOM2	Serial Port 2 connector	5 x 2 header, pitch 2.00mm

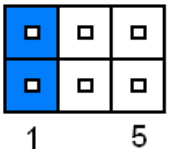
JCOM3_6	Serial Port 3-6 connector	20 x 2 header, pitch 2.00mm
JDIO1	General purpose I/O connector	6 x 2 wafer, pitch 2.00mm
NGFF_M_1	M.2 KEY-M 2260/2242 connector	
NGFF_E_1	M.2 KEY-E 2230 connector	
NGFF_B_1	M.2 KEY-B 3042/2242 connector	
LED1	HDD/Power LED indicator	
JLVDS1	LVDS connector	DIN 40-pin wafer, pitch 1.25mm Matching Connector: Hirose DF13-40DS-1.25C
JFP1	Front Panel connector	5 x 2 header, pitch 2.00mm
USB12/34	4 x USB3.2 connector	
JUSB56	USB2.0 connector	5 x 2 header, pitch 2.00mm
JUSB78	USB2.0 connector	5 x 2 header, pitch 2.00mm
JBZ1	PC Buzzer connector	2 x 1 wafer, pitch 2.00mm
LAN1/23	RJ-45 Ethernet 1/2/3	
JBAT1	Battery connector	2 x 1 wafer, pitch 1.25mm
JLPC1	LPC connector	5 x 2 header, pitch 1.27mm
PWR1	Power connector	2 x 2 wafer, pitch 4.20mm
JBIOS_EC1	BIOS SPI connector	5 x 2 header, pitch 1.27mm
JSATA_PWR1	SATA Power connector	4 x 1 wafer, pitch 2.00mm
SATA1	Serial ATA connector	
DP1/2	2 x DP connector	
SO_DIMM1	DDR4 SODIMM socket	
AUD1	Line-out & Mic-in audio jack	
JAUDIO1	Audio connector	6 x 2 header, pitch 2.00mm
N_SIM1	SIM card slot	
J_N_SIM1	SIM card slot	10 x 1 FPC, pitch 0.50 mm
JAMP1	Amp Connector	4 x 1 wafer, pitch 2.00mm
EDP1	EDP connector	40 x 1 wafer, pitch 0.50mm

2.3 Setting Jumpers & Connectors

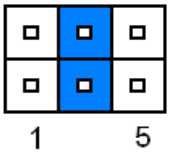
2.3.1 Serial port 1/2 pin9 signal select (JRI1/2)



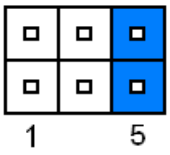
Ring*



+5V

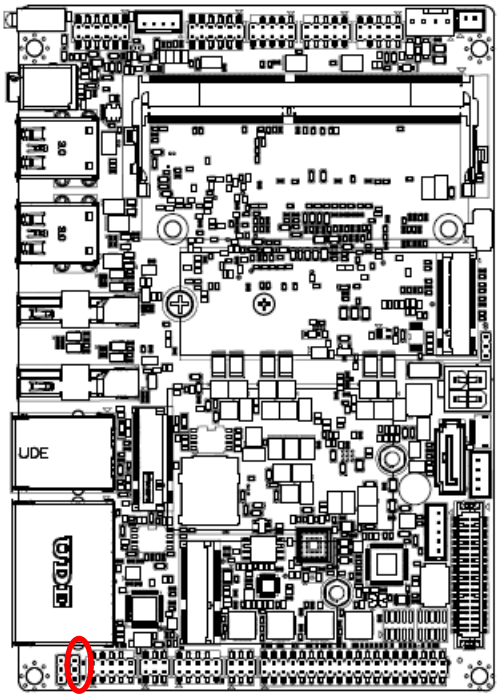


+12V

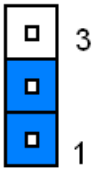


*** Default**

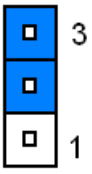
2.3.2 Clear CMOS (JRTC1)



Normal*

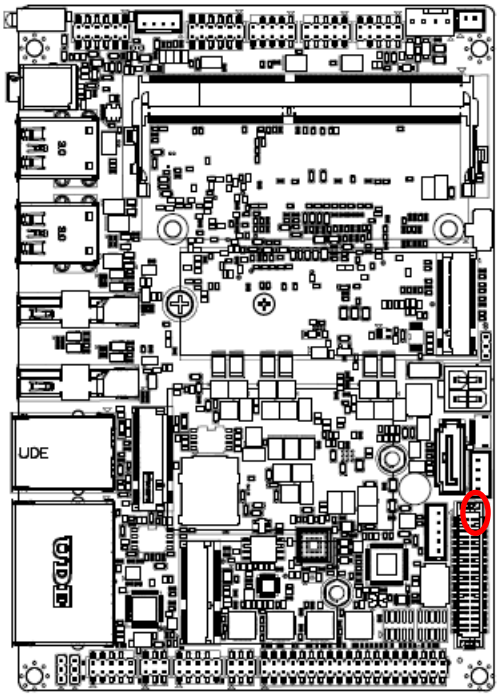


Clear CMOS



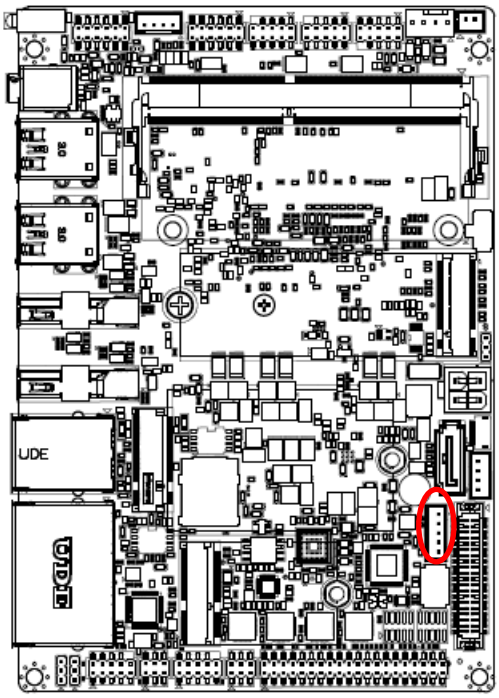
*** Default**

2.3.3 AT/ATX Input power select (JAT1)



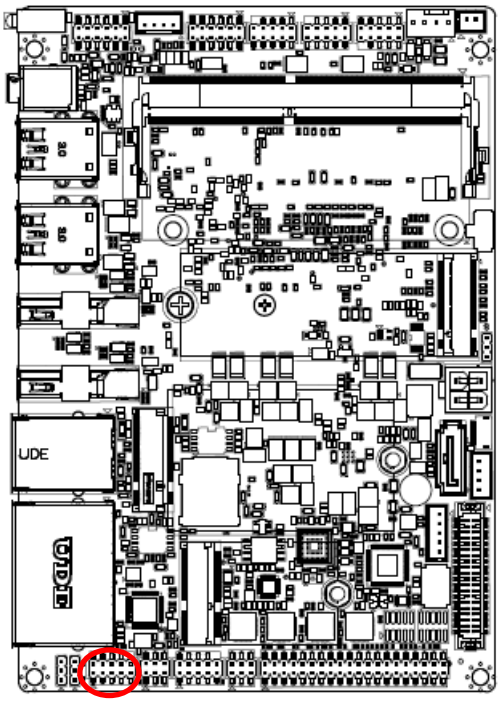
*** Default**

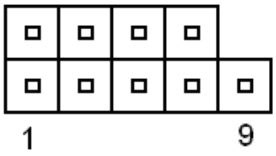
2.3.4 LCD inverter connector (JBKL1)



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

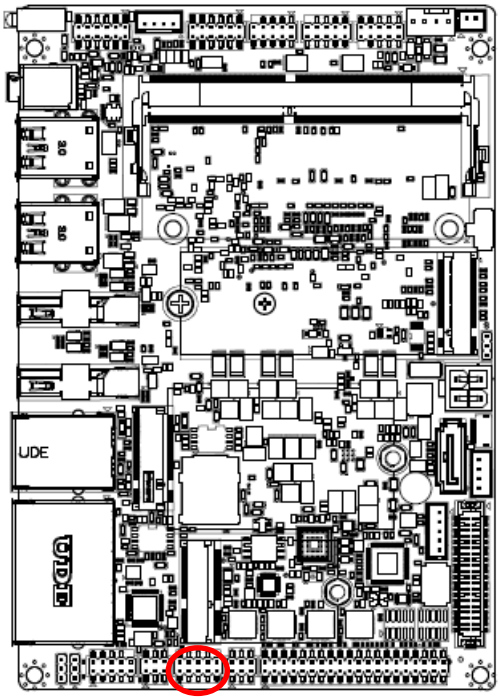
2.3.5 Serial port 1 connector (JCOM1)

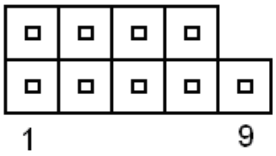




Signal	PIN	PIN	Signal
COM_DCD#_TXN_1	1	2	COM_RXD_TXP_1
COM_TXD_RXP_1	3	4	COM_DTR#_RXN_1
GND	5	6	COM_DSR#_1
COM_RTS#_1	7	8	COM_CTS#_1
+V12S_COM_RI#_1	9		

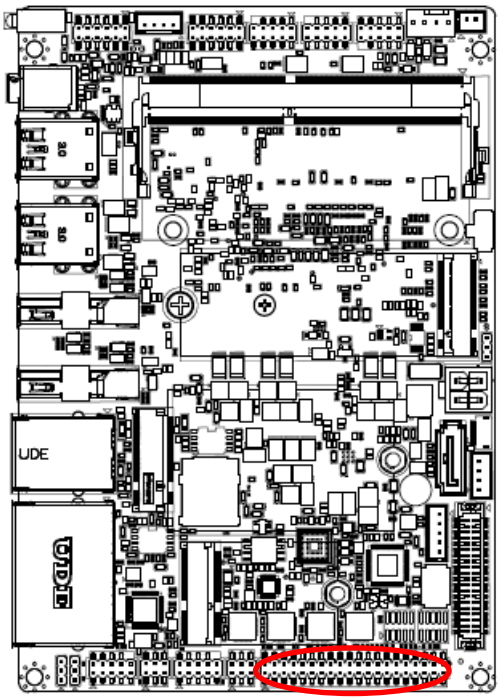
2.3.6 Serial port 2 connector (JCOM2)



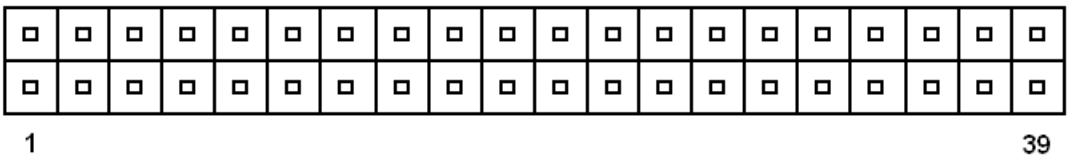


Signal	PIN	PIN	Signal
COM_DCD#_TXN_2	1	2	COM_RXD_TXP_2
COM_TXD_RXP_2	3	4	COM_DTR#_RXN_2
GND	5	6	COM_DSR#_2
COM_RTS#_2	7	8	COM_CTS#_2
+V12S_COM_RI#_2	9		

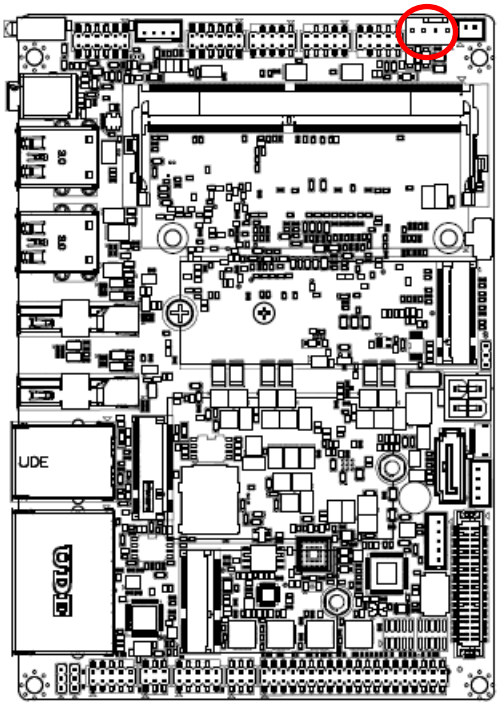
2.3.7 Serial port 3-6 connector (JCOM3_6)

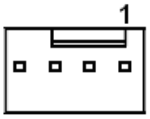


Signal	PIN	PIN	Signal
COM_DCD#_3	1	2	COM_RXD_3
COM_TXD_3	3	4	COM_DTR#_3
GND	5	6	COM_DSR#_3
COM_RTS#_3	7	8	COM_CTS#_3
COM_RI#_3	9	10	NC
COM_DCD#_4	11	12	COM_RXD_4
COM_TXD_4	13	14	COM_DTR#_4
GND	15	16	COM_DSR#_4
COM_RTS#_4	17	18	COM_CTS#_4
COM_RI#_4	19	20	NC
COM_DCD#_5	21	22	COM_RXD_5
COM_TXD_5	23	24	COM_DTR#_5
GND	25	26	COM_DSR#_5
COM_RTS#_5	27	28	COM_CTS#_5
COM_RI#_5	29	30	NC
COM_DCD#_6	31	32	COM_RXD_6
COM_TXD_6	33	34	COM_DTR#_6
GND	35	36	COM_DSR#_6
COM_RTS#_6	37	38	COM_CTS#_6
COM_RI#_6	39	40	NC



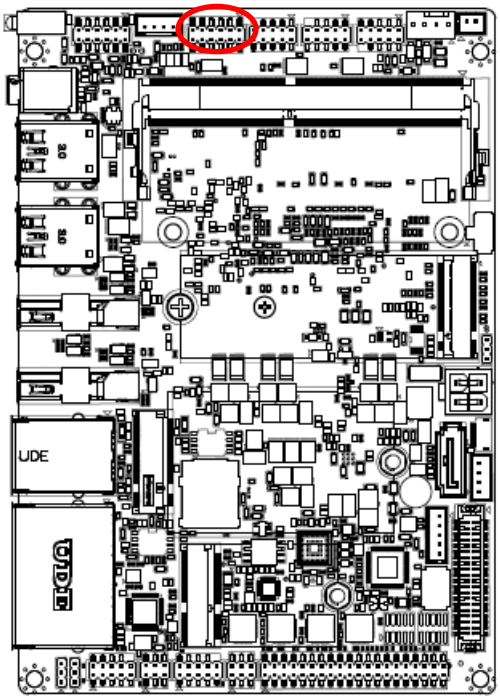
2.3.8 CPU fan connector (JCPU_FAN1)

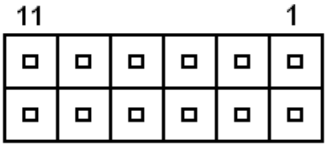




Signal	PIN
GND	1
+12V	2
CPUFAN_IN	3
CPUFAN_OUT	4

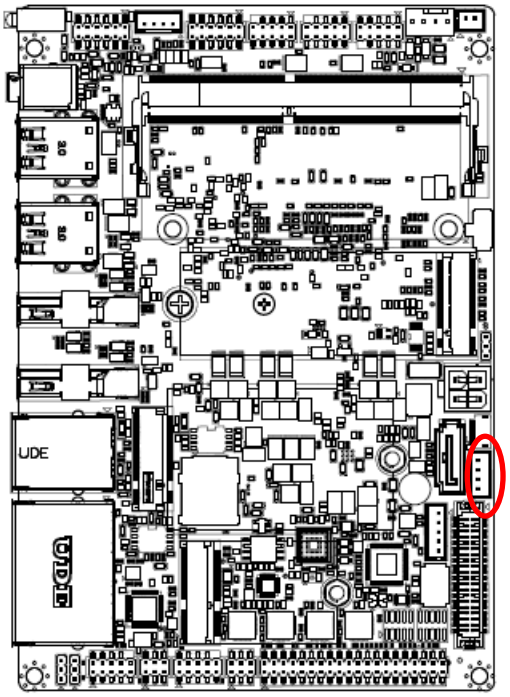
2.3.9 General purpose I/O connector (JDIO1)





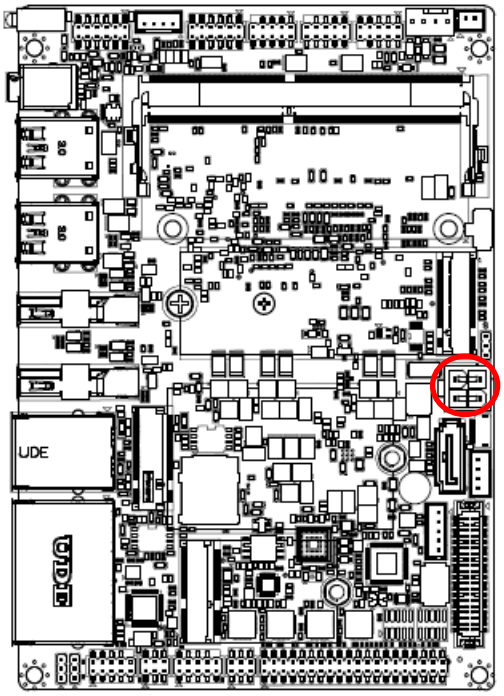
Signal	PIN	PIN	Signal
DIO_GP20	1	2	DIO_GP10
DIO_GP21	3	4	DIO_GP11
DIO_GP22	5	6	DIO_GP12
DIO_GP23	7	8	DIO_GP13
SMB_SCL_S0	9	10	SMB_SDA_S0
GND	11	12	+5V

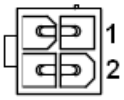
2.3.10 SATA Power connector (JSATA_PWR1)



Signal	PIN
+12V	4
GND	3
GND	2
+5V	1

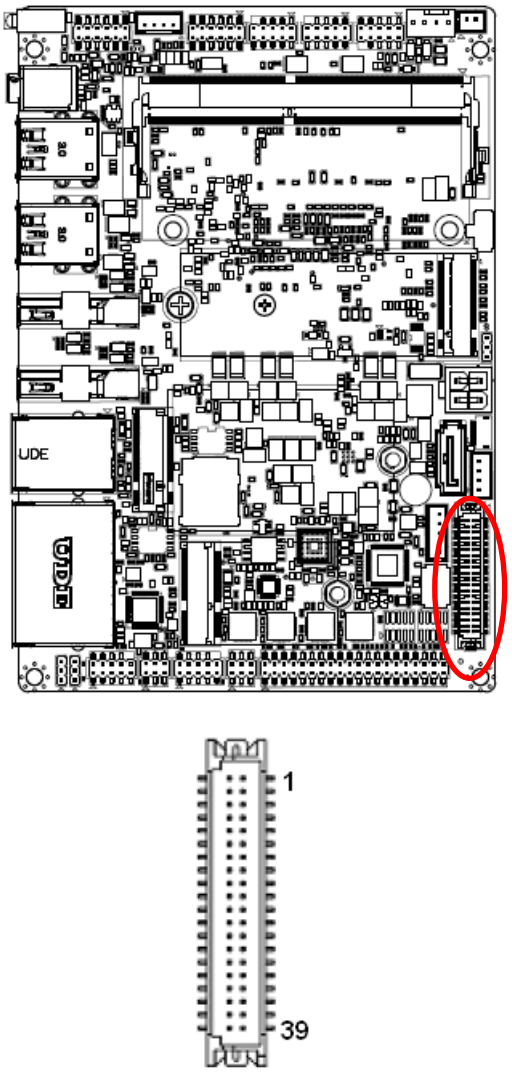
2.3.11 Power connector (PWR1)





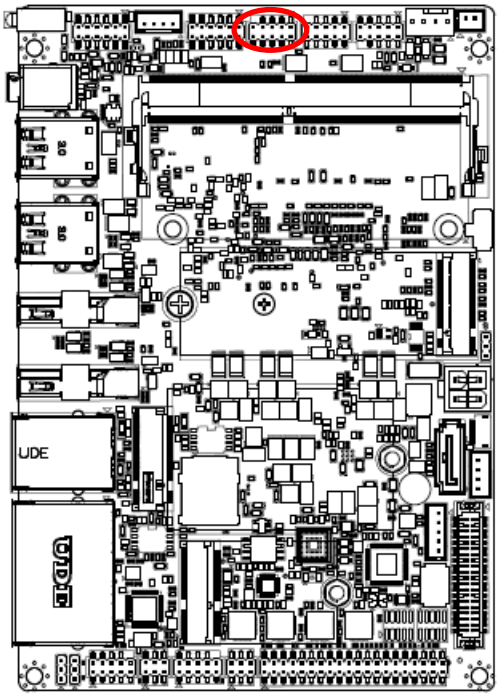
Signal	PIN	PIN	Signal
+24V	3	1	GND
+24V	4	2	GND

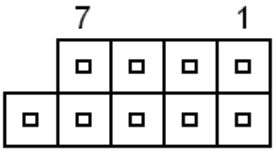
2.3.12 LVDS connector (JLVDS1)



Signal	PIN	PIN	Signal
+3.3V	1	2	+5V
+3.3V	3	4	+5V
+3.3V	5	6	+5V
GND	7	8	GND
LVDS_A_DATA_P_1	9	10	LVDS_A_DATA_P_0
LVDS_A_DATA_N_1	11	12	LVDS_A_DATA_N_0
GND	13	14	GND
LVDS_A_DATA_P_3	15	16	LVDS_A_DATA_P_2
LVDS_A_DATA_N_3	17	18	LVDS_A_DATA_N_2
GND	19	20	GND
LVDS_B_DATA_P_1	21	22	LVDS_B_DATA_P_0
LVDS_B_DATA_N_1	23	24	LVDS_B_DATA_N_0
GND	25	26	GND
LVDS_B_DATA_P_3	27	28	LVDS_B_DATA_P_2
LVDS_B_DATA_N_3	29	30	LVDS_B_DATA_N_2
GND	31	32	GND
LVDS_B_CLK_P	33	34	LVDS_A_CLK_P
LVDS_B_CLK_N	35	36	LVDS_A_CLK_N
GND	37	38	GND
+12V	39	40	+12V

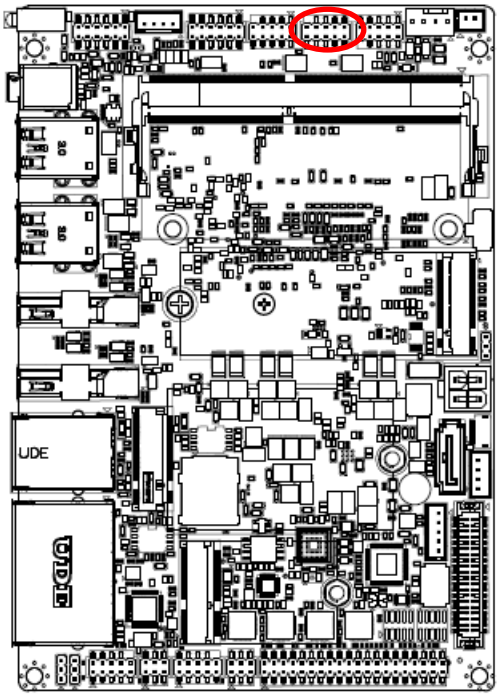
2.3.13 USB2.0 connector (JUSB56)

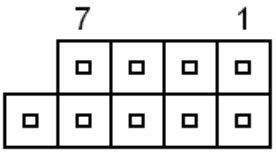




Signal	PIN	PIN	Signal
+5VSB	1	2	+5VSB
USB_R_DN5	3	4	USB_R_DN6
USB_R_DP5	5	6	USB_R_DP6
GND	7	8	GND
		10	GND

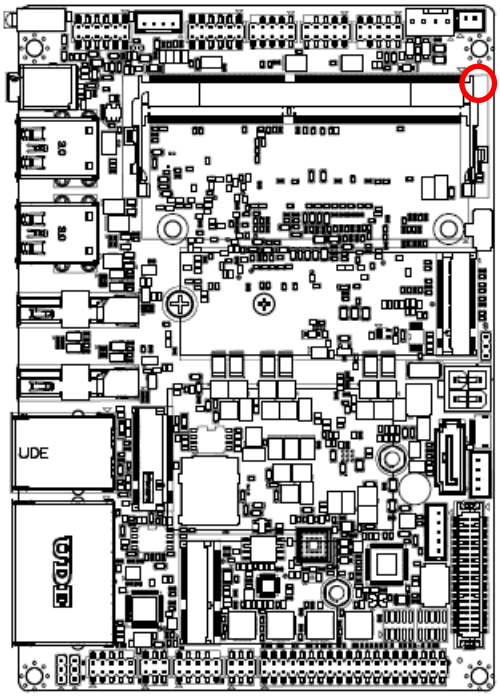
2.3.14 USB2.0 connector (JUSB78)

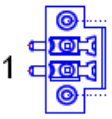




Signal	PIN	PIN	Signal
+5VSB	1	2	+5VSB
USB_R_DN7	3	4	USB_R_DN8
USB_R_DP7	5	6	USB_R_DP8
GND	7	8	GND
		10	GND

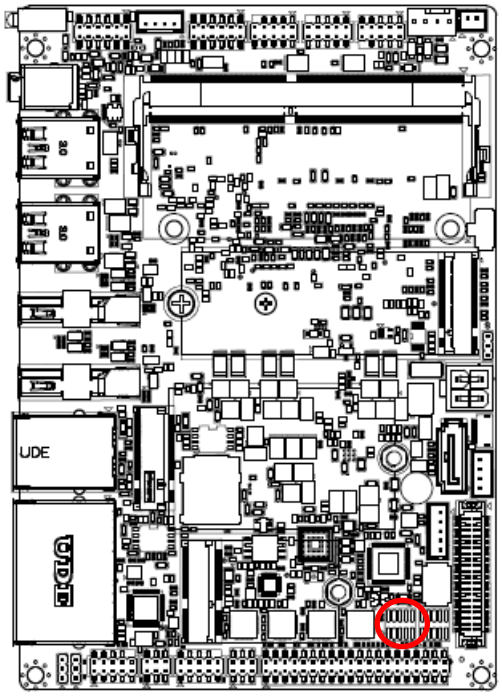
2.3.15 Battery connector (JBAT1)

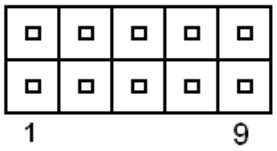




Signal	PIN
GND	2
+RTCBAT	1

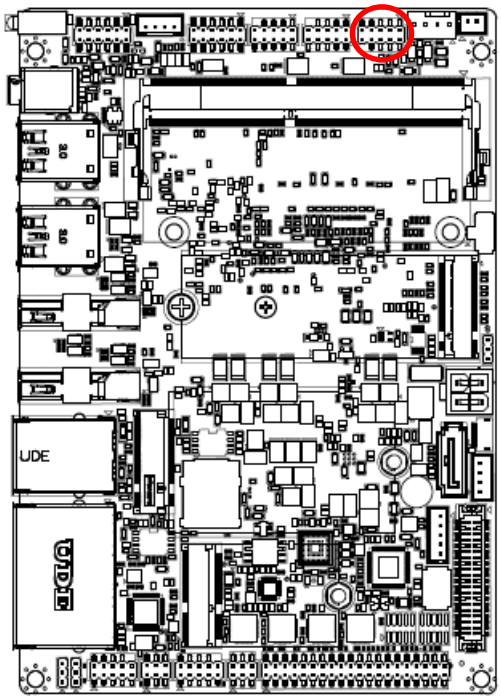
2.3.16 LPC connector (JLPC1)

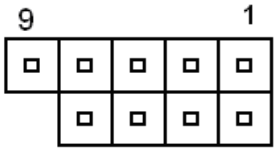




Signal	PIN	PIN	Signal
LPC_AD0	1	2	+3.3V
LPC_AD1	3	4	RST_TPM#
LPC_AD2	5	6	LPC_LFRAME#
LPC_AD3	7	8	CLK_24M_80
LPC_SERIRQ	9	10	GND

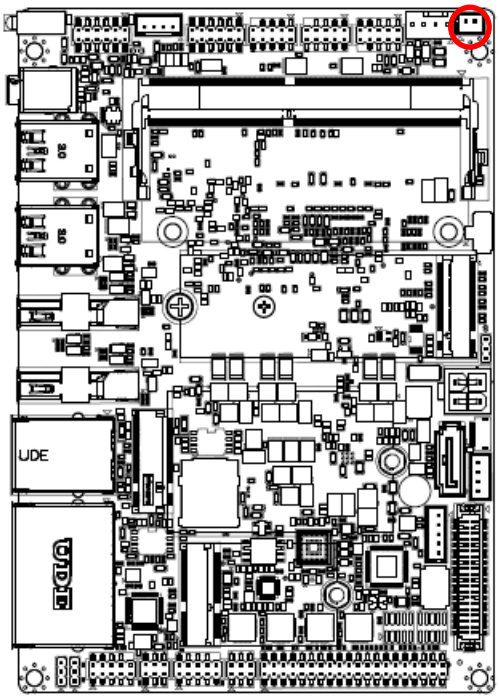
2.3.17 Front Panel connector (JFP1)





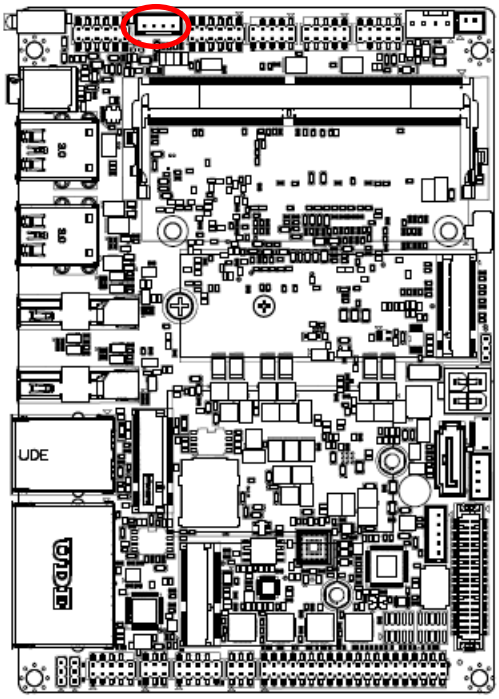
Signal	PIN	PIN	Signal
HDD_LED_P	1	2	PWR_LED_P
HDD_LED#	3	4	PWR_LED#
PM_SYSRST#	5	6	PWRBTN_IN#
GND	7	8	GND
NC	9		

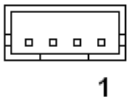
2.3.18 PC Buzzer connector (JBZ1)



Signal	PIN
SOC_SPKR_R	1
+5V	2

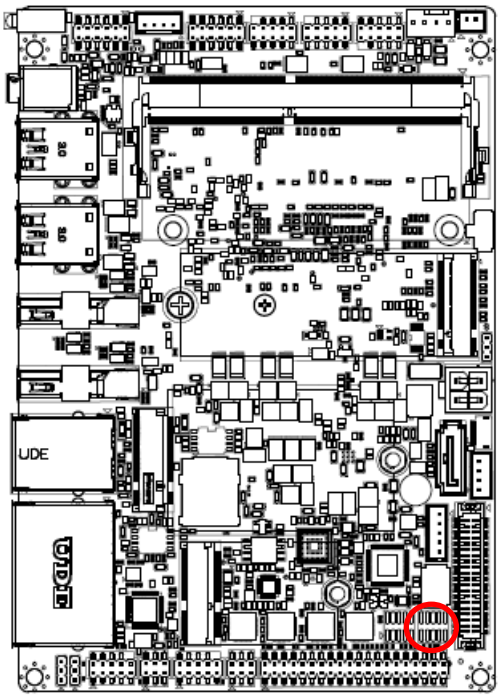
2.3.19 AMP connector (JAMP1)

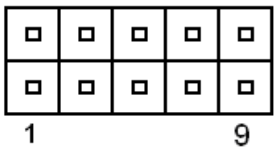




Signal	PIN
AMP_LOUT+	1
AMP_LOUT-	2
AMP_ROUT+	3
AMP_ROUT-	4

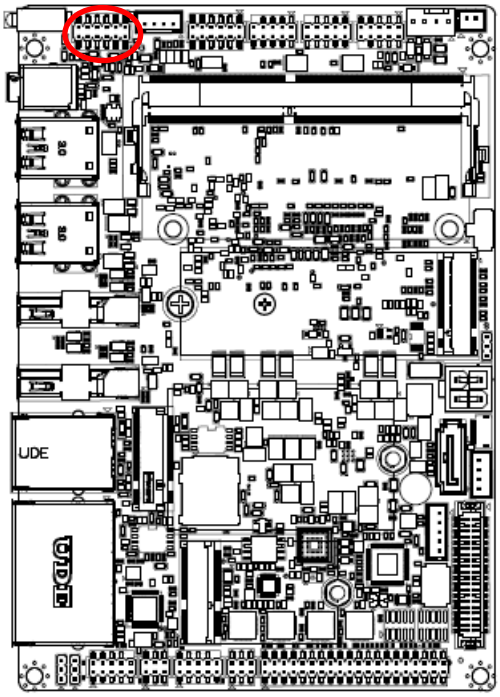
2.3.20 BIOS SPI connector (JBIOS_EC1)

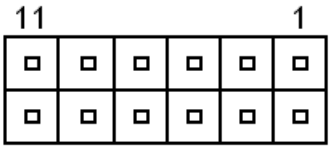




Signal	PIN	PIN	Signal
+V3.3A_SPI	1	2	GND
SPI_CS0#_ROM	3	4	SPI_CLK_ROM
SPI_MISO_ROM	5	6	SPI_MOSI_ROM
SPI_HOLD#_ROM	7	8	SPI_WP#_ROM
EC_SMCLK_DEBUG	9	10	EC_SMDAT_DEBUG

2.3.21 Audio connector (JAUDIO1)



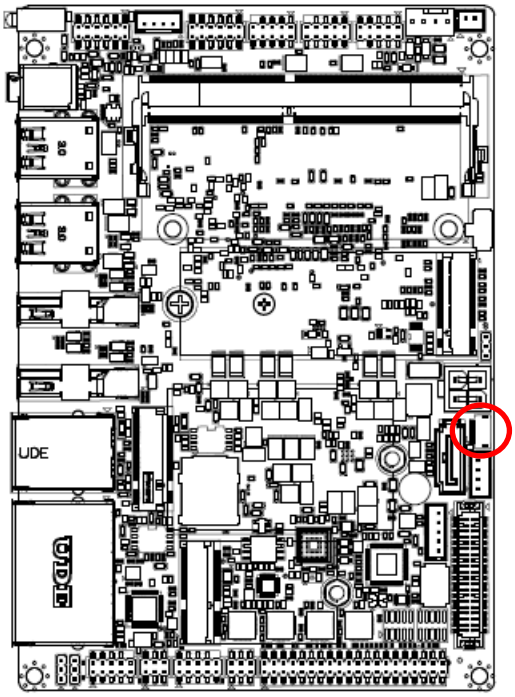


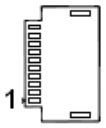
Signal	PIN	PIN	Signal
FRONT-R-OUT	1	2	FRONT-L-OUT
HD_AGND	3	4	HD_AGND
LINE1-R-IN	5	6	LINE1-L-IN
MIC1-R-IN	7	8	MIC1-L-IN
FRONT-JD	9	10	LINE1-JD
MIC1-JD	11	12	HD_AGND

2.3.21.1 Signal Description – Audio connector (JAUDIO1)

Signal	Signal Description
LINE1-JD	AUDIO IN (LINE_RIN/LIN)sense pin
FRONT-JD	AUDIO Out(ROUT/LOUT) sense pin
MIC1-JD	MIC IN (MIC_RIN/LIN) sense pin

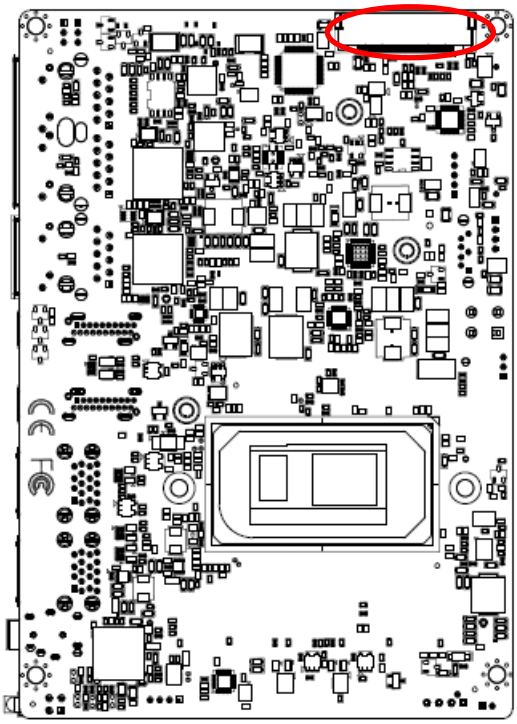
2.3.22 SIM card slot (J_N_SIM1)





Signal	PIN
NC	10
N_SIM_CD_R	9
GND	8
UIM_DATA_R	7
UIM_CLK_R	6
GND	5
+VPP_SIM_1	4
UIM_RESET#	3
GND	2
+VCC_SIM	1

2.3.23 EDP connector (EDP1)



Signal	PIN
NC	1
GND	2
eDP_TXN_3	3
eDP_TXP_3	4
GND	5
eDP_TXN_2	6
eDP_TXP_2	7
GND	8
eDP_TXN_1	9
eDP_TXP_1	10

Signal	PIN
GND	11
eDP_TXN_0	12
eDP_TXP_0	13
GND	14
eDP_AUX_P	15
eDP_AUX_N	16
GND	17
+3.3V	18
+3.3V	19
+3.3V	20
+3.3V	21
NC	22
GND	23
GND	24
GND	25
GND	26
eDP_HPD_R	27
GND	28
GND	29
GND	30
GND	31
eDP_BKLTEN_R	32
eDP_VBRIGHT	33
eDP_CTRL_CLK	34
eDP_CTRL_DATA	35
+12V	36
+12V	37
+12V	38
+12V	39
NC	40

3.BIOS Setup

3.1 Introduction

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

3.2 Starting Setup

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

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

Press <ESC> or <Del> to enter SETUP

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

3.3 Using Setup

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

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

- **Navigating Through The Menu Bar**

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

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

- **To Display a Sub Menu**

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

3.4 Getting Help

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

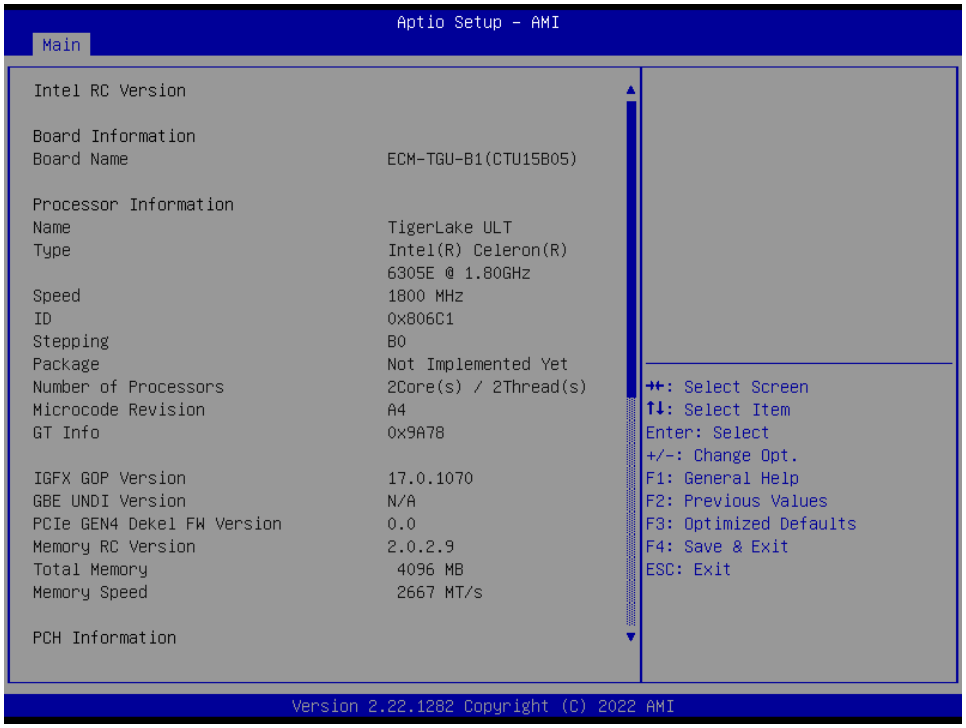
The best advice is to only alter settings which you thoroughly understand. To this end, we strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both BIOS Vendor and your systems manufacturer to provide the absolute maximum performance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

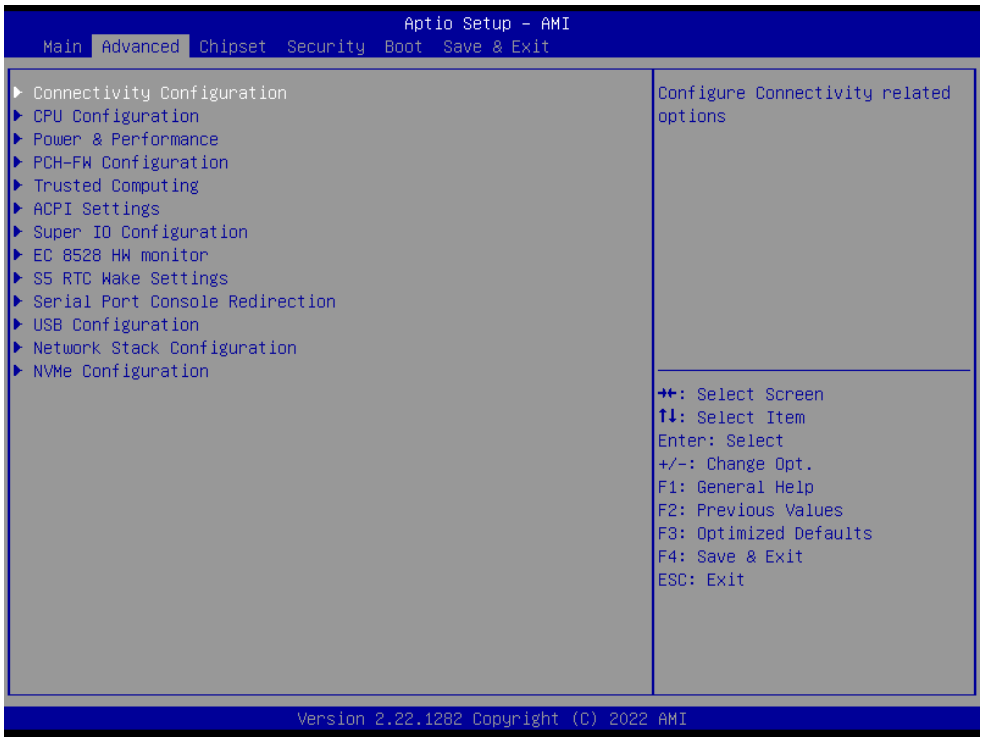
3.6.1.3 System Time

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.

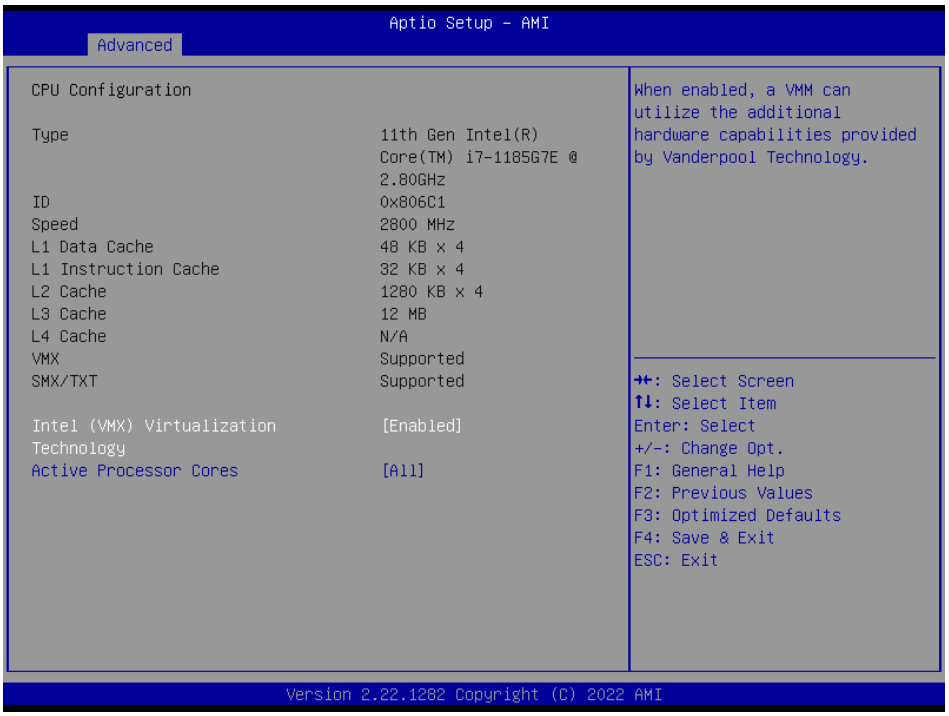


3.6.2.1 Connectivity Configuration

Item	Options	Description
CNVi Mode	Disable Integrated Auto Detection**[Default]**	This option configures Connectivity. [Auto Detection] means that if Discrete solution is discovered it will be enabled by default. Otherwise Integrated solution (CNVi) will be enabled; [Disable Integrated] disables Integrated Solution. NOTE: When CNVi is present, the GPIO pins that are used for radio.

3.6.2.2 CPU Configuration

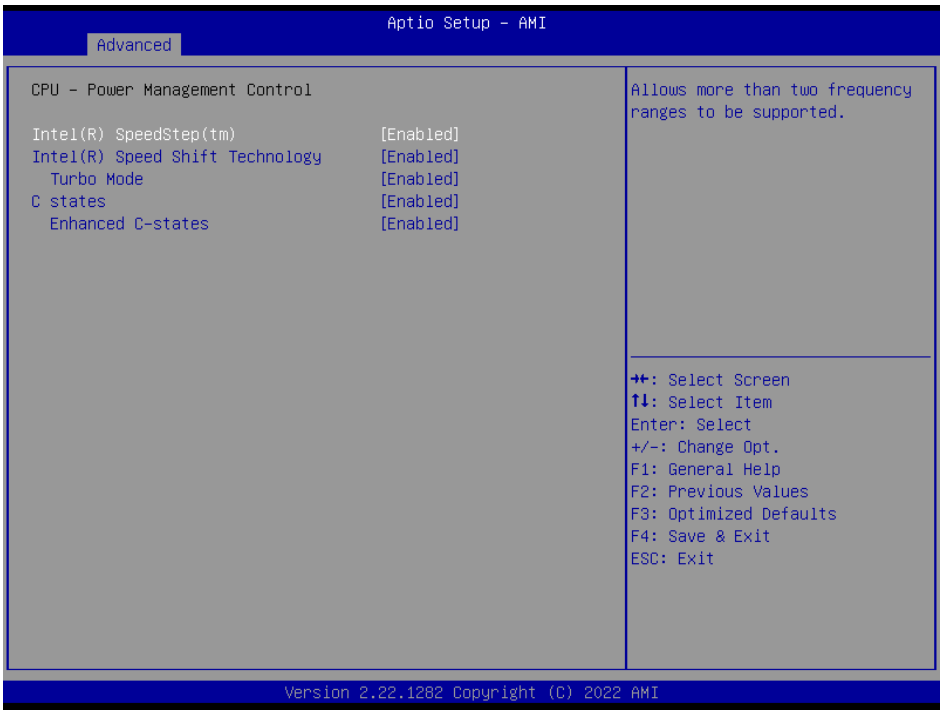
Use the CPU configuration menu to view detailed CPU specification and configure the CPU.



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 4 5 6 7 8	Number of cores to enable in each processor package.

3.6.2.3 Power & Performance

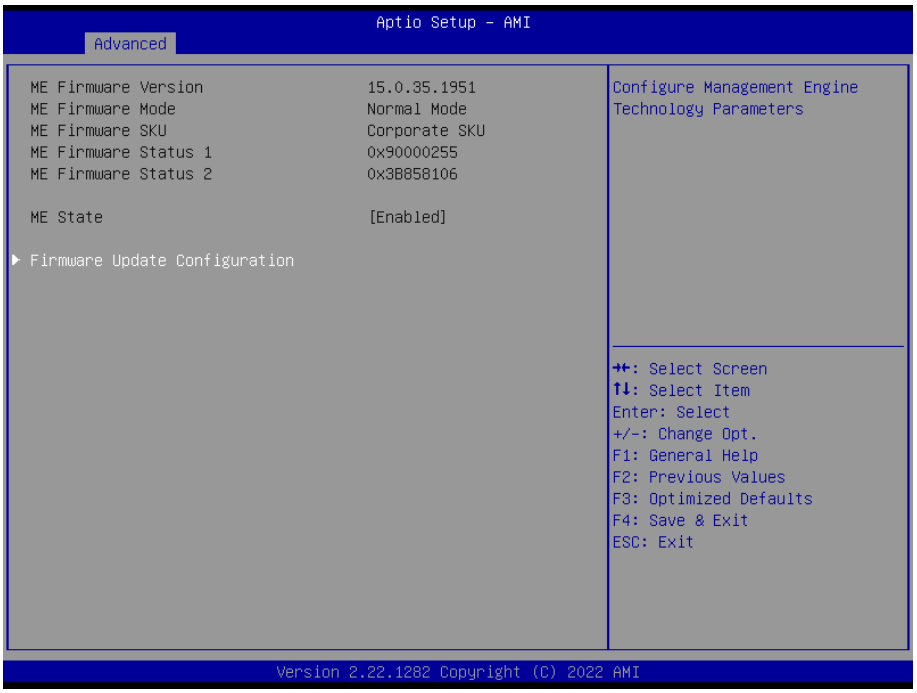
3.6.2.3.1 CPU – Power Management Control



Item	Option	Description
Intel® SpeedStep™	Enabled**[Default]**, Disabled	Allows more than two frequency ranges to be supported.
Intel® Speed Shift Technology	Enabled**[Default]**, Disabled	Eanble/Disable Intel® Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.

Turbo Mode	Enabled**[Default]**, Disabled	Enable/Disable processor Turbo Mode (requires Intel Speed Step or Intel Speed Shift to be available and enabled).
C States	Enabled**[Default]**, Disabled	Enable/Disable CPU Power Management.
Enhanced C-States	Enabled**[Default]**, Disabled	Enable/Disable C1E. When enabled, CPU will switch to minimum speed when all cores enter C-State.

3.6.2.4 PCH-FW Configuration



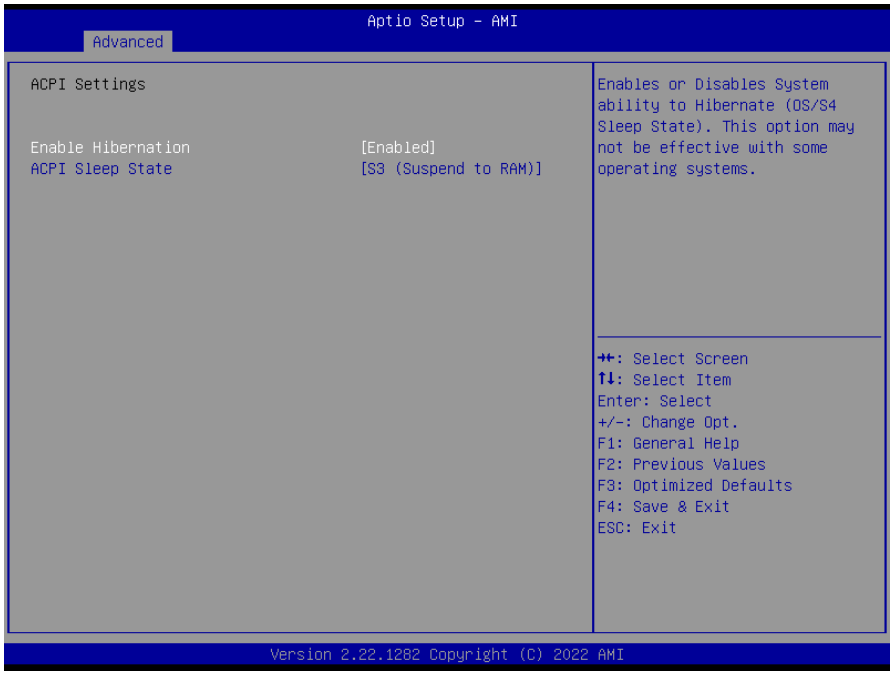
3.6.2.4.1 Firmware Update Configuration

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

3.6.2.5 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.

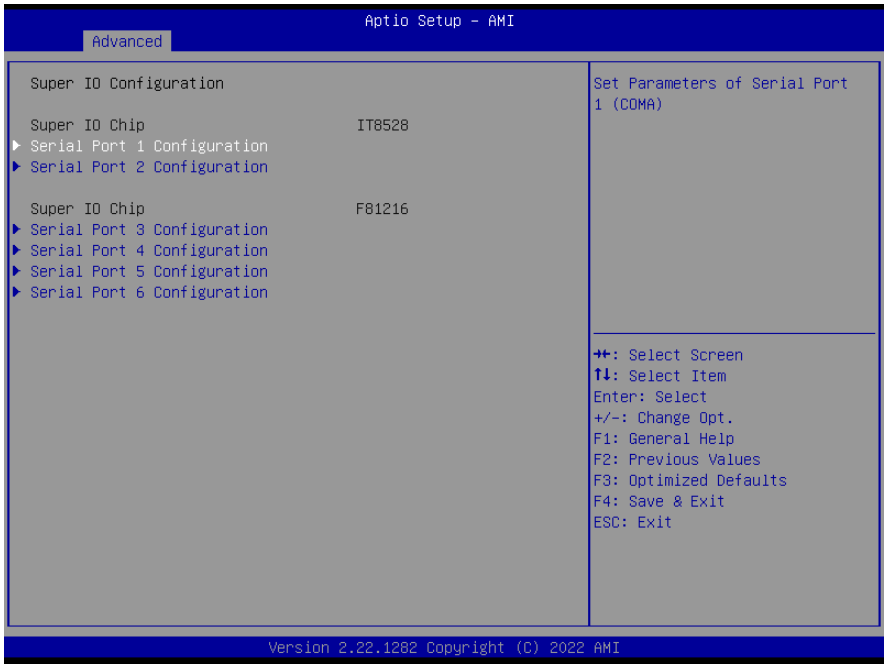
3.6.2.6 APCI Settings



Item	Options	Description
Enable Hibernation	Disabled Enabled**[Default]**,	Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some OS.
ACPI Sleep State	Suspend Disabled, S3 (Suspend to RAM)**[Default]**	Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.

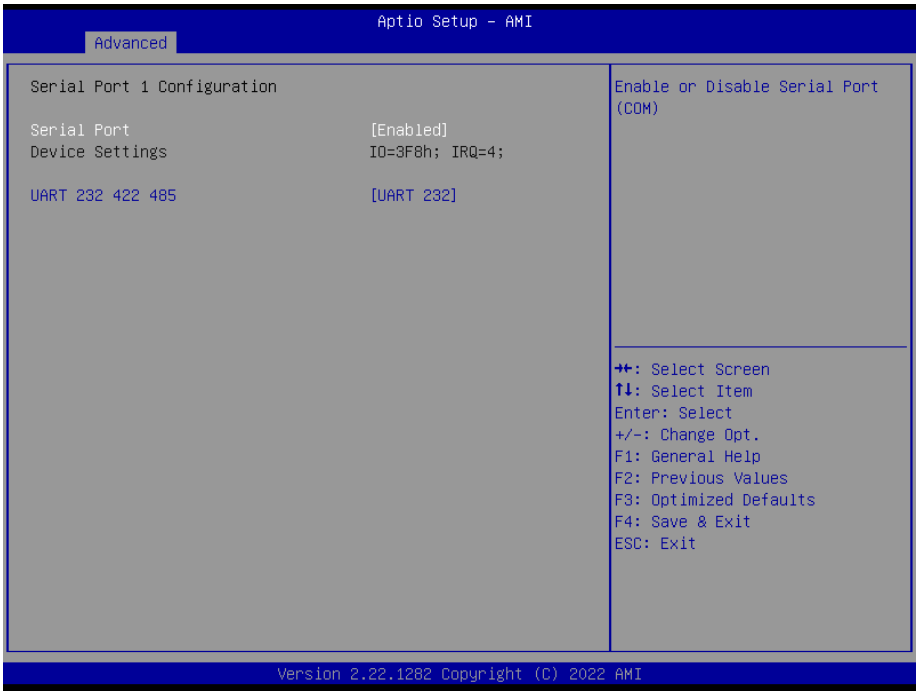
3.6.2.7 Super IO Configuration

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.



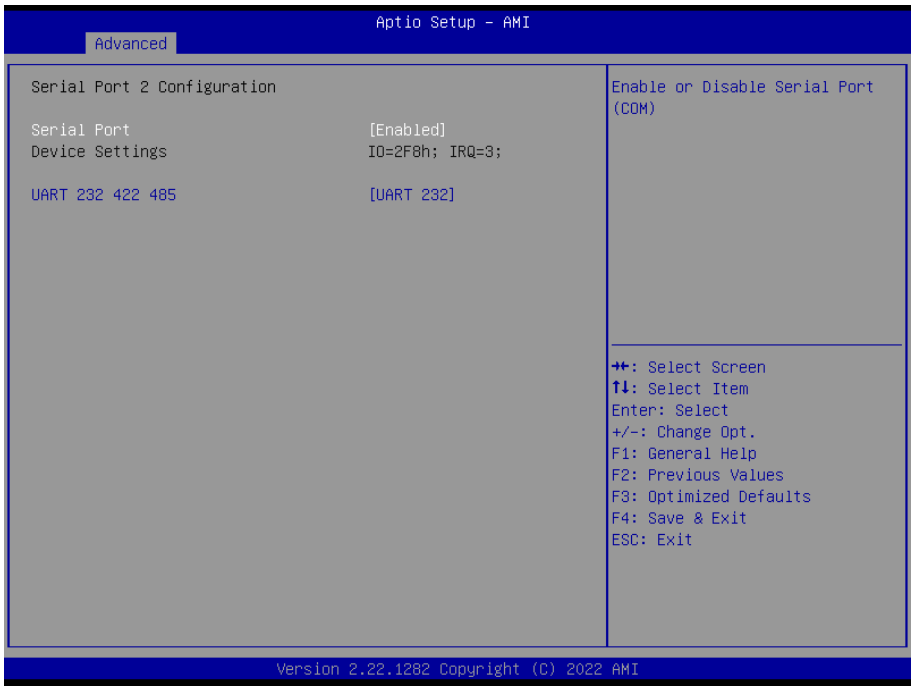
Item	Description
Serial Port 1 Configuration	Set Parameters of Serial Port 1 (COMA).
Serial Port 2 Configuration	Set Parameters of Serial Port 2 (COMB).
Serial Port 3 Configuration	Set Parameters of Serial Port 3 (COMC).
Serial Port 4 Configuration	Set Parameters of Serial Port 4 (COMD).
Serial Port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

3.6.2.7.1 Serial Port 1 Configuration



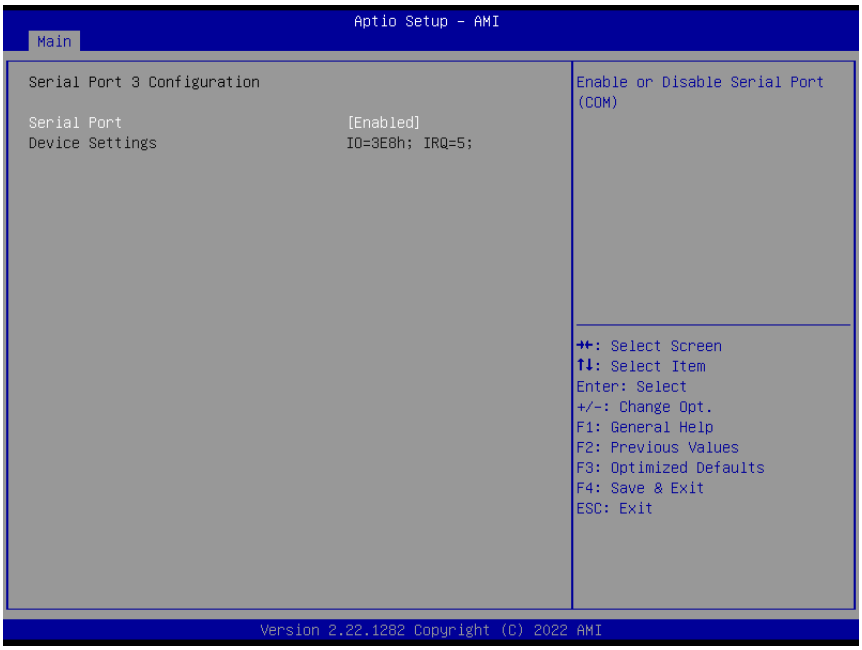
Item	Option	Description
Serial Port	Enabled**[Default]**, Disabled	Enable or Disable Serial Port (COM).
UART 232 422 485	UART 232**[Default]** UART 422 UART 485	Change the Serial Port as RS232/422/485.

3.6.2.7.2 Serial Port 2 Configuration



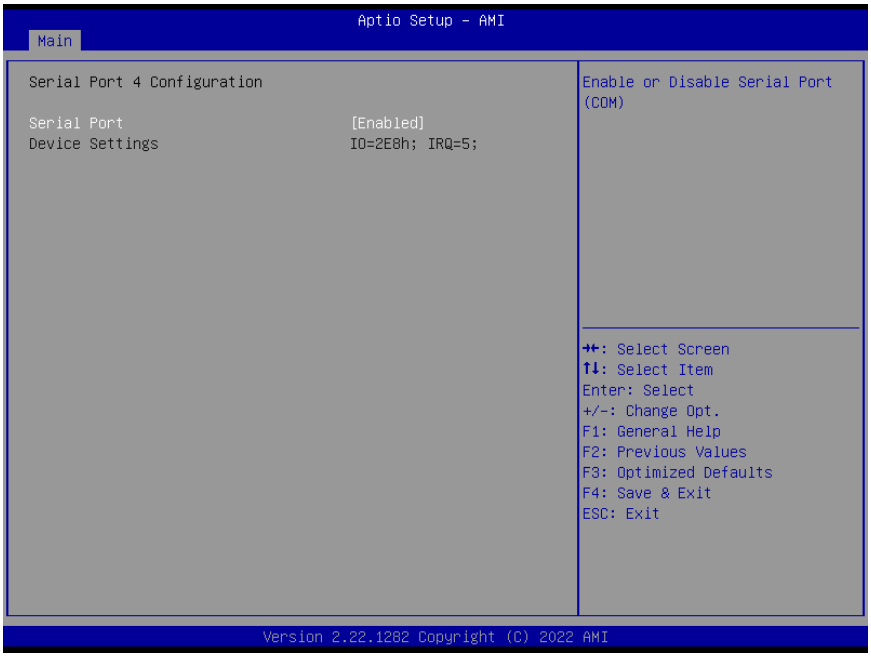
Item	Option	Description
Serial Port	Enabled**[Default]**, Disabled	Enable or Disable Serial Port (COM).
UART 232 422 485	UART 232**[Default]** UART 422 UART 485	Change the Serial Port as RS232/422/485.

3.6.2.7.3 Serial Port 3 Configuration



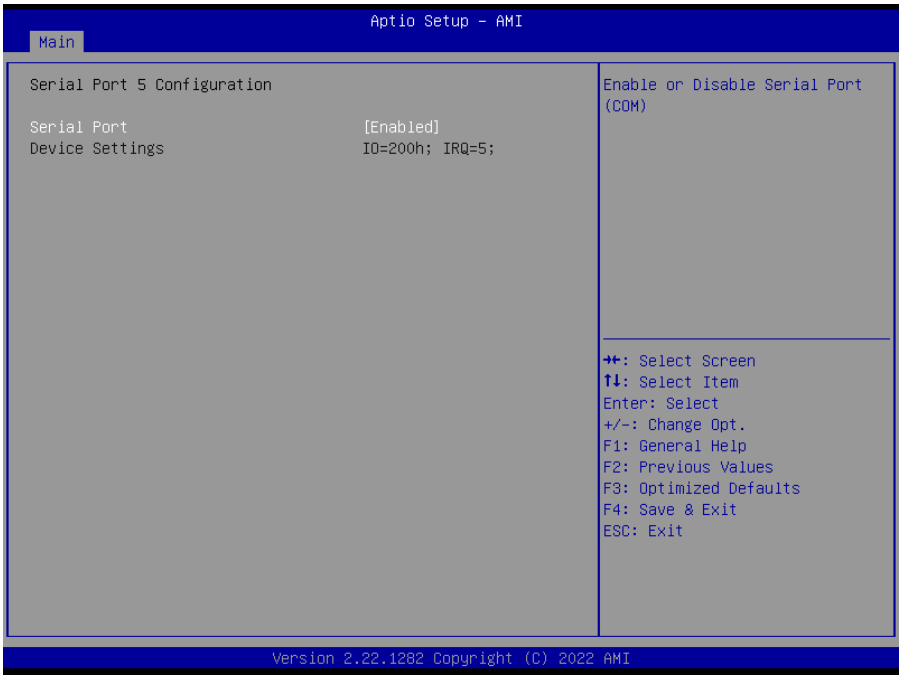
Item	Option	Description
Serial Port	Enabled**[Default]**, Disabled	Enable or Disable Serial Port (COM).

3.6.2.7.4 Serial Port 4 Configuration



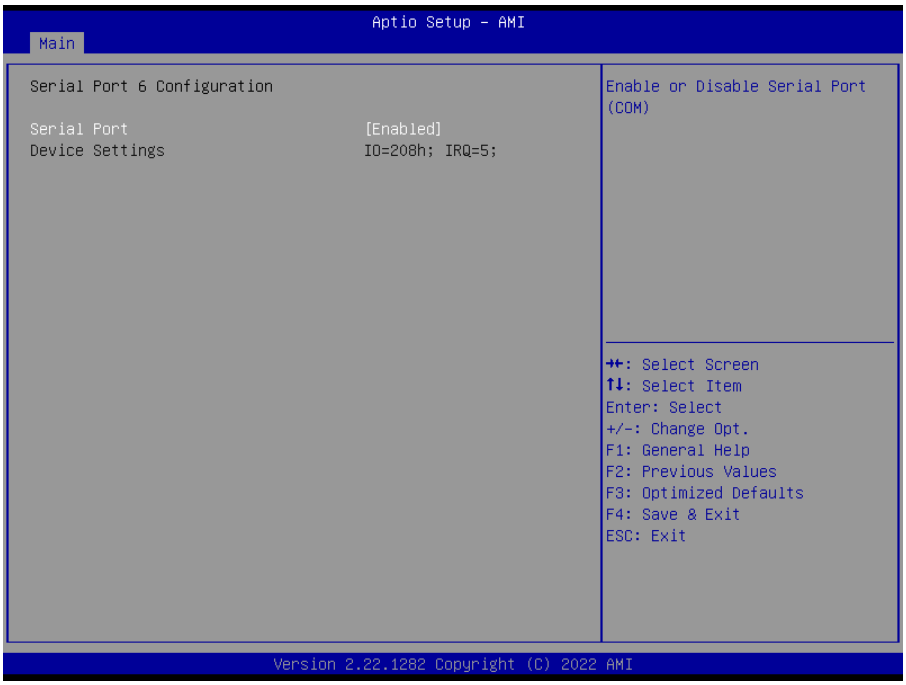
Item	Option	Description
Serial Port	Enabled**[Default]**, Disabled	Enable or Disable Serial Port (COM).

3.6.2.7.5 Serial Port 5 Configuration



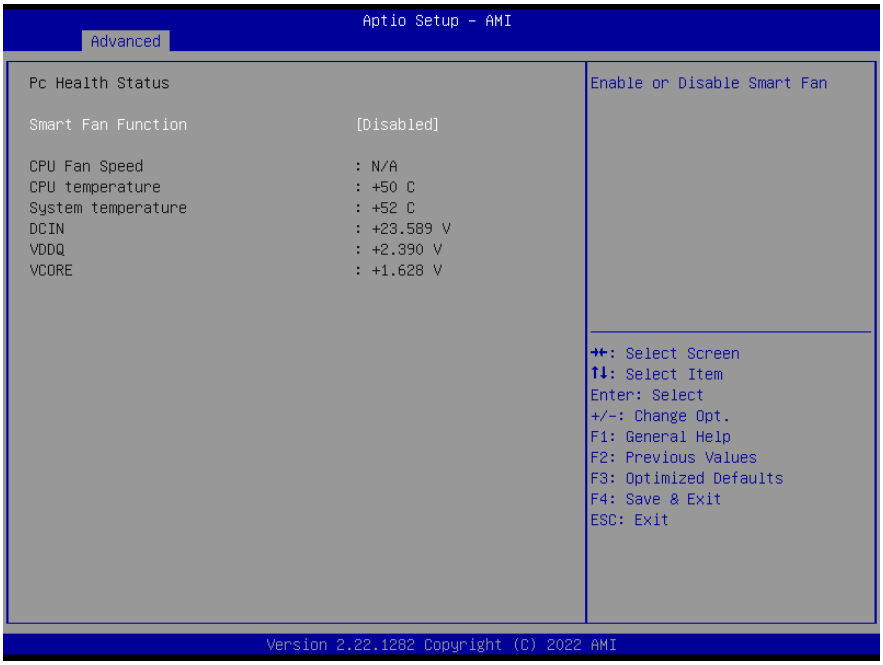
Item	Option	Description
Serial Port	Enabled**[Default]**, Disabled	Enable or Disable Serial Port (COM).

3.6.2.7.6 Serial Port 6 Configuration



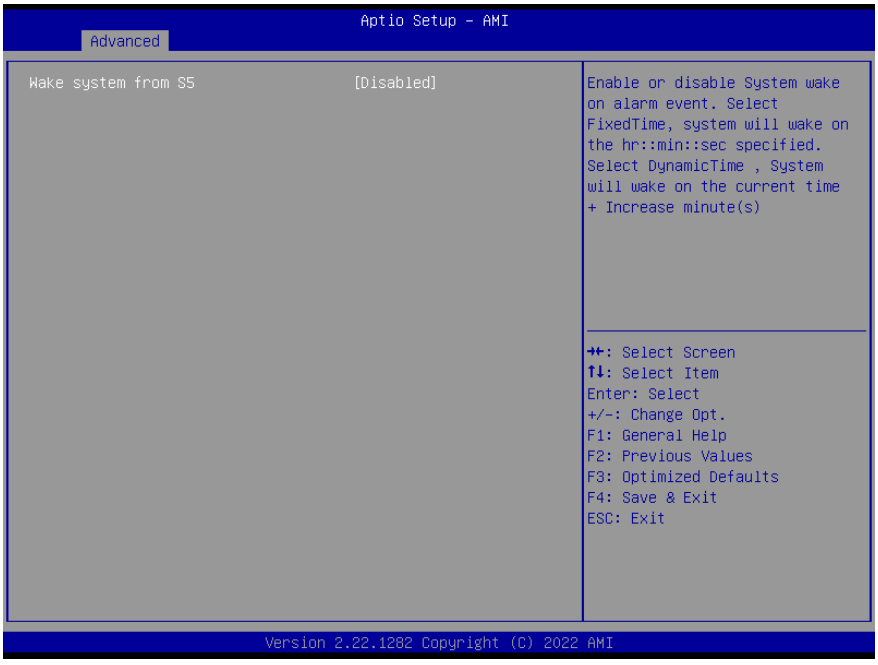
Item	Option	Description
Serial Port	Enabled**[Default]**, Disabled	Enable or Disable Serial Port (COM).

3.6.2.8 HW Monitor



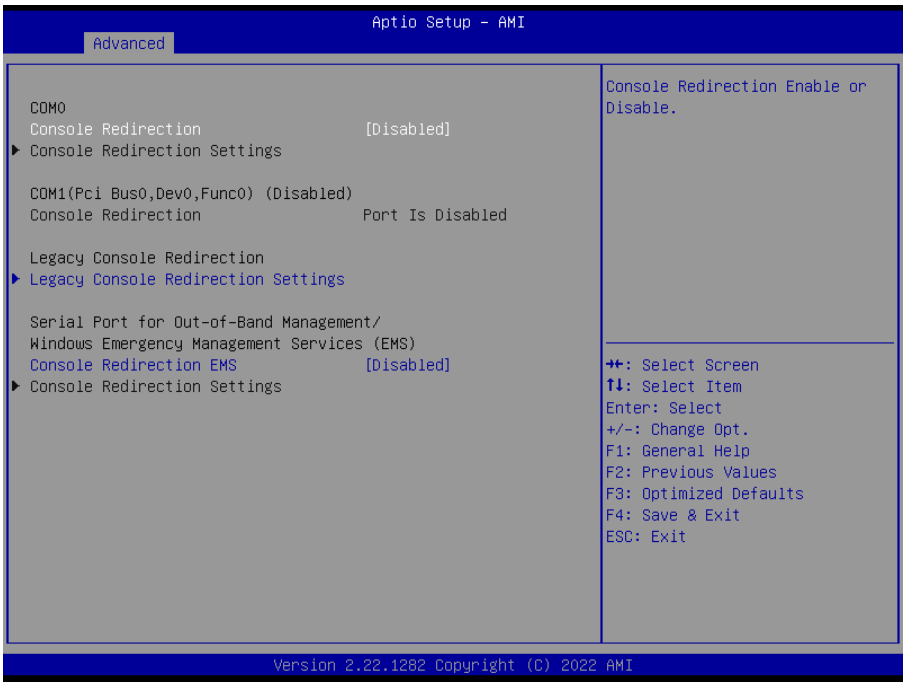
Item	Options	Description
Smart Fan Function	Enabled, Disabled**[Default]**	Enables or Disables Smart Fan.

3.6.2.9 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).

3.6.2.10 Serial Port Console Redirection



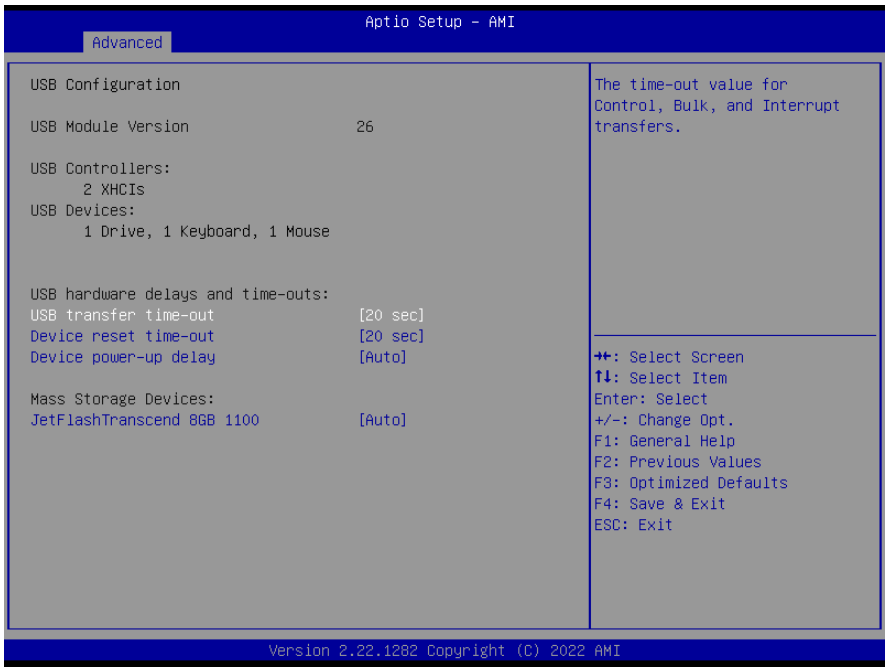
Item	Options	Description
Console Redirection	Disabled**[Default]**, Enabled	Console Redirection Enable or Disable.
Console Redirection EMS	Disabled**[Default]**, Enabled	Console Redirection Enable or Disable.

3.6.2.10.1 Legacy Console Redirection Settings

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

3.6.2.11 USB Configuration

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



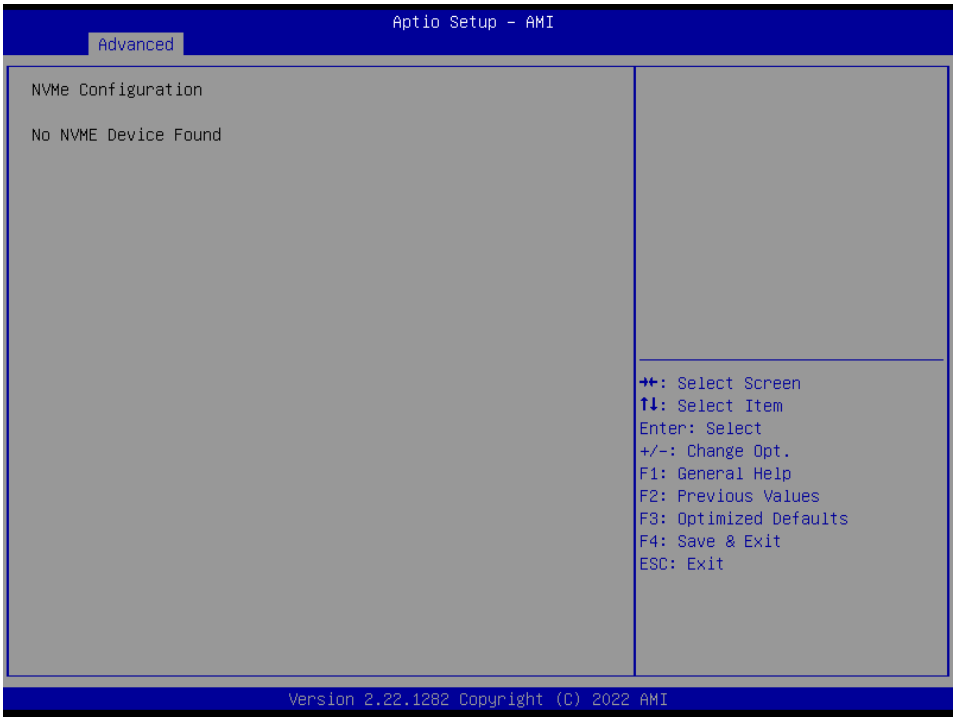
Item	Options	Description
USB transfer time-out	1 sec 5 sec	The time-out value for Control, Bulk, and Interrupt transfers.

	10 sec 20 sec**[Default]**	
Device reset time-out	10 sec 20 sec**[Default]** 30 sec 40 sec	USB mass storage device Start Unit command time-out.
Device power-up delay	Auto**[Default]** Manual	Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100ms, for a Hub port the delay is taken form Hub descriptor.
Mass Storage Devices	Auto**[Default]** Floppy Forced FDD Hard Disk CD-ROM	Mass storage device emulation type. 'AUTO' enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type.

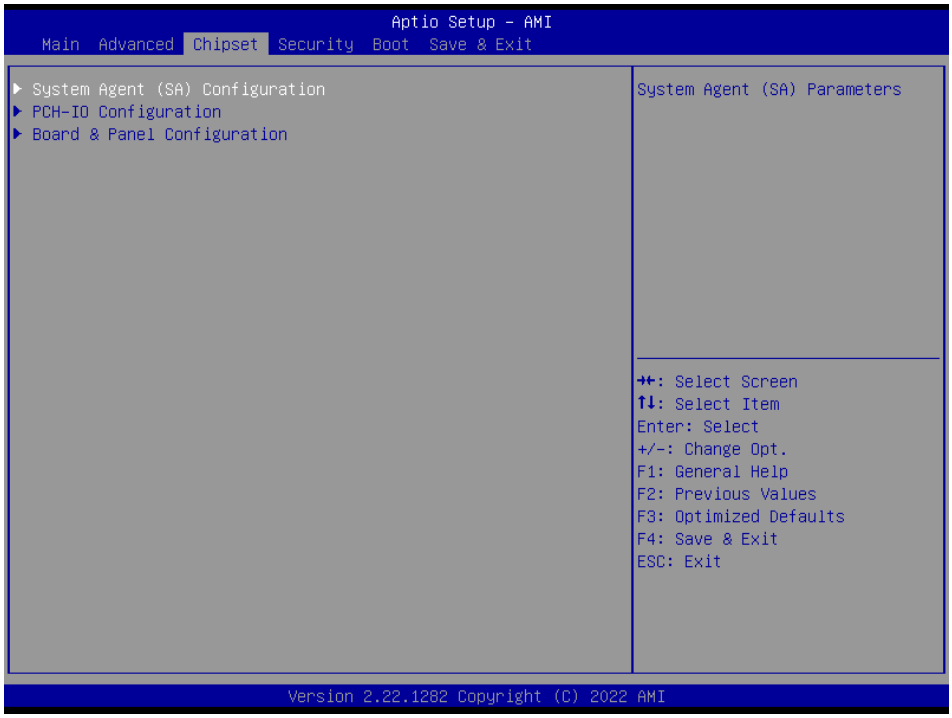
3.6.2.12 Network Stack Configuration

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

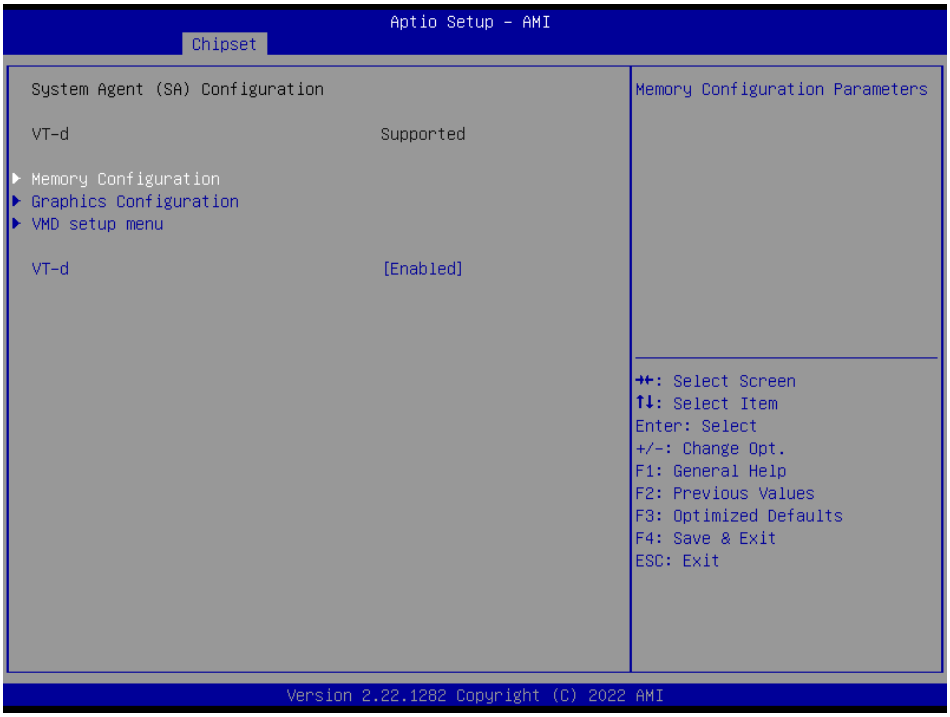
3.6.2.13 NVMe Configuration



3.6.3 Chipset

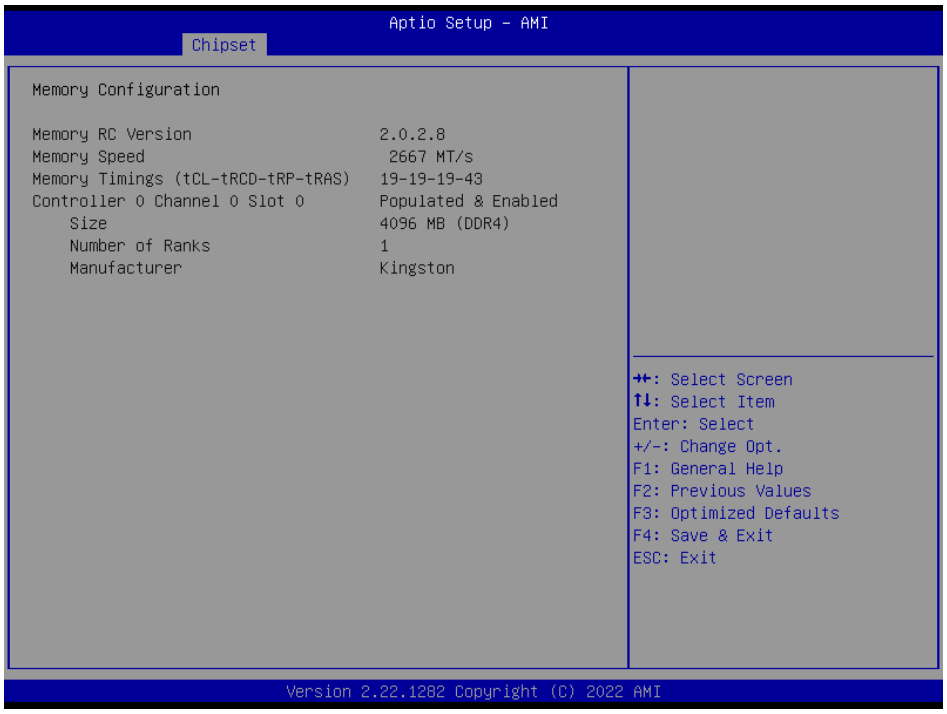


3.6.3.1 System Agent (SA) Configuration

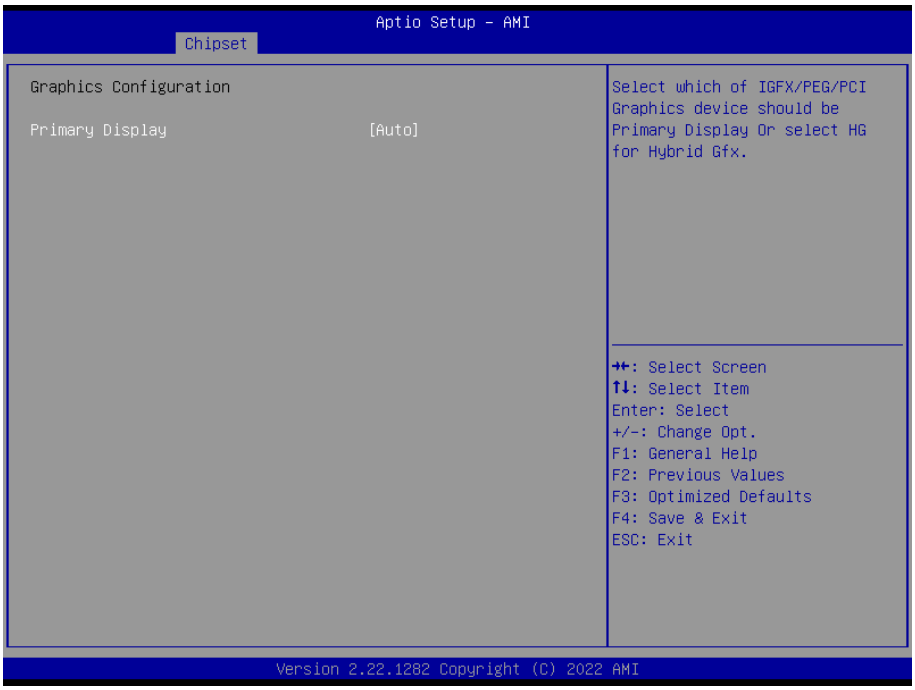


Item	Option	Description
VT-d	Enabled**[Default]** Disabled	VT-d capability.

3.6.3.1.1 Memory Configuration

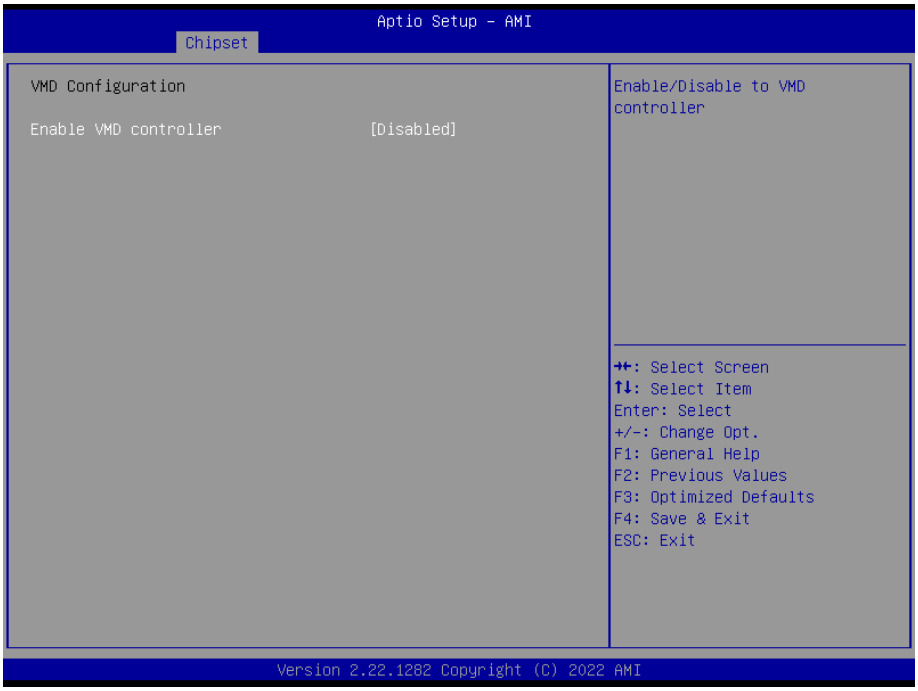


3.6.3.1.2 Graphics Configuration



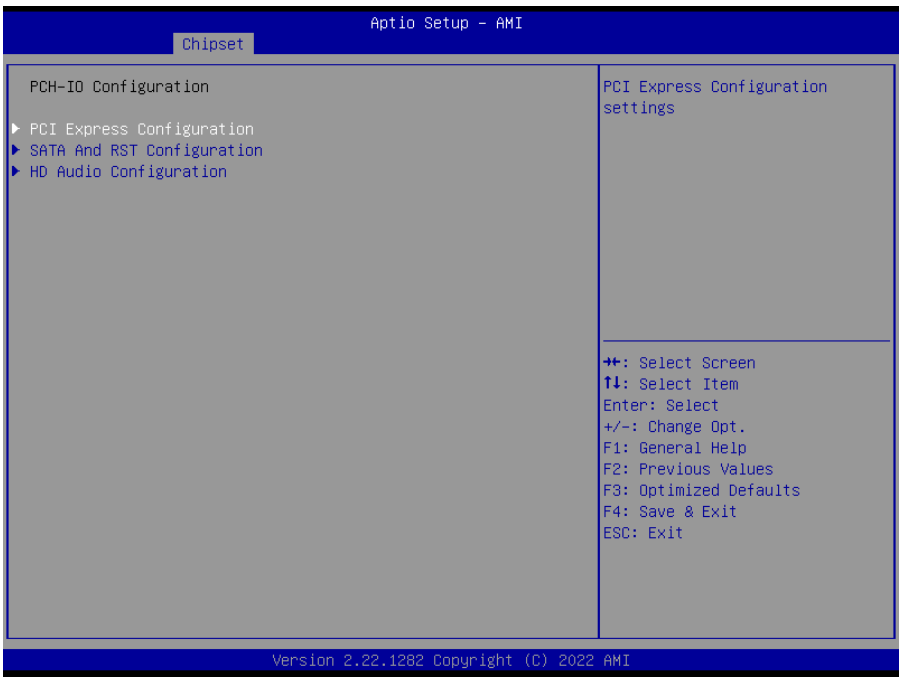
Item	Option	Description
Primary Display	Auto**[Default]** IGFX	Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select HG for Hybrid Gfx.

3.6.3.1.3 VMD setup menu

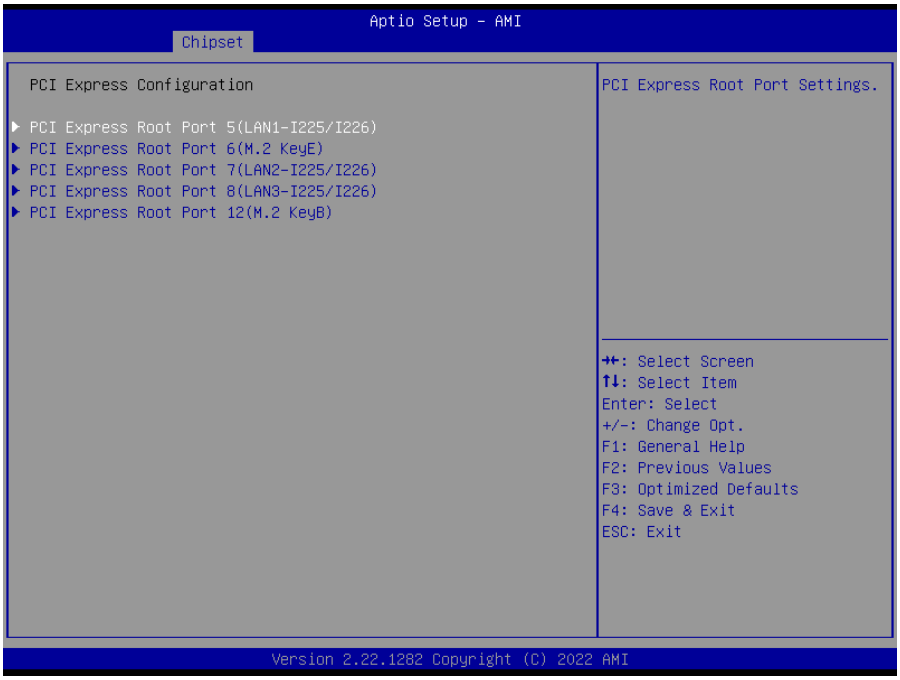


Item	Option	Description
Enable VMD controller	Enabled Disabled**[Default]**	Enable/Disable VMD controller.

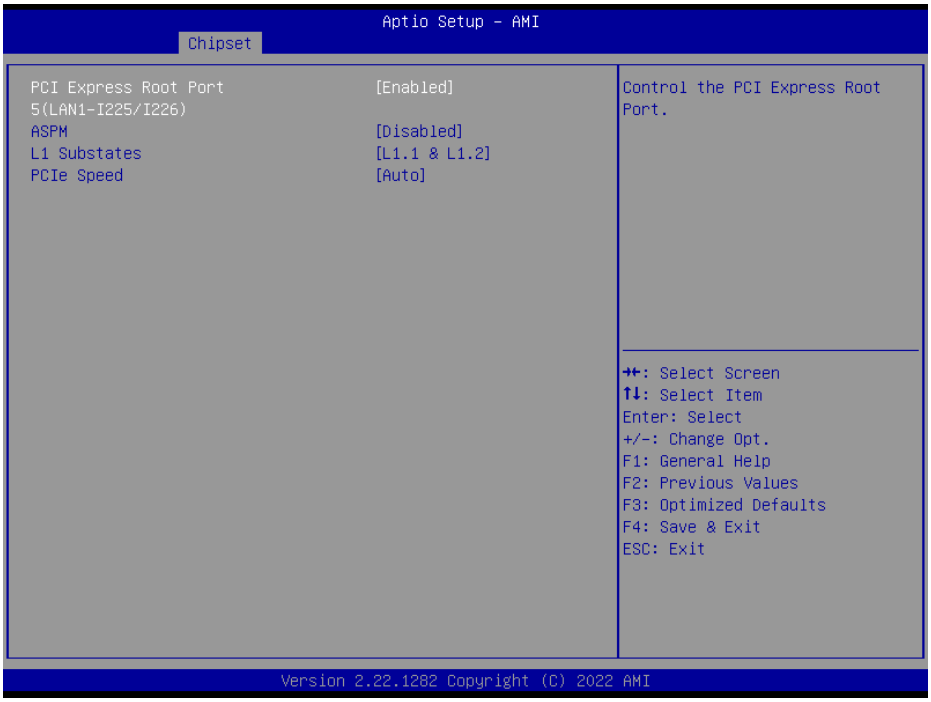
3.6.3.2 PCH-IO Configuration



3.6.3.2.1 PCI Express Configuration

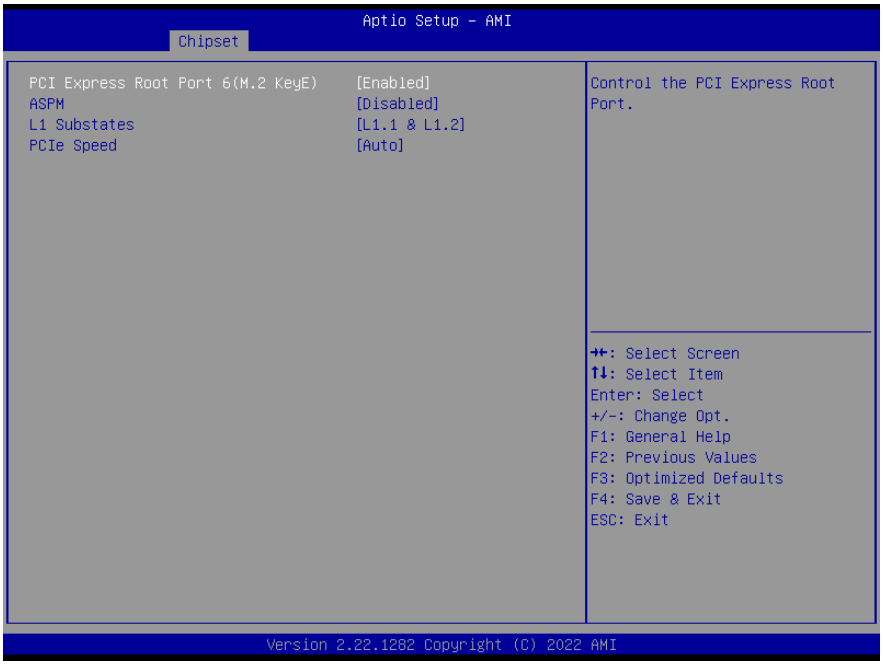


3.6.3.2.1.1 PCI Express Root Port 5(LAN1-I225/I226)



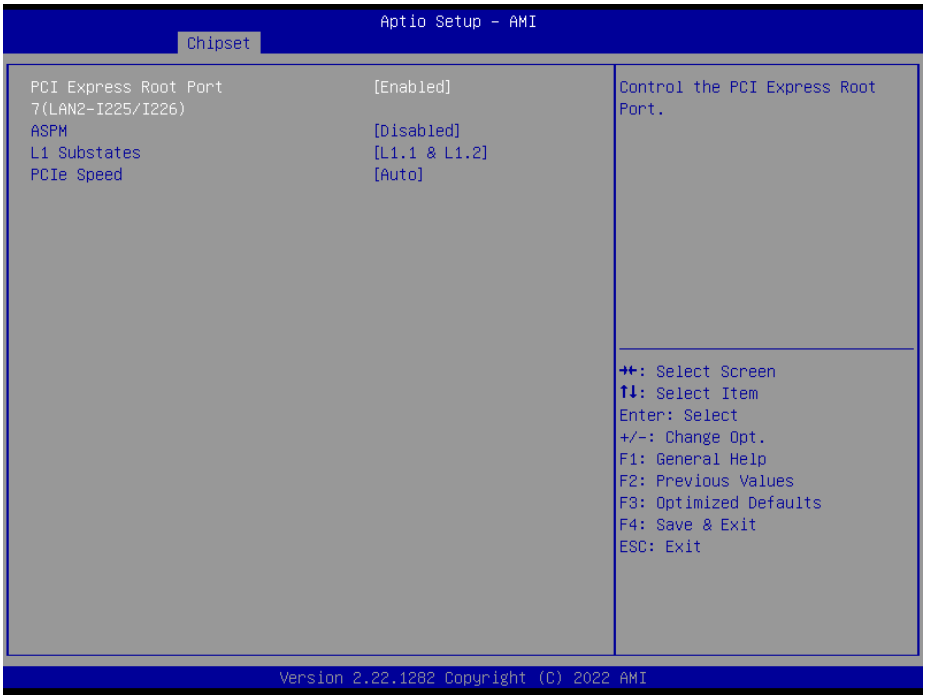
Item	Option	Description
PCI Express Root Port 5(LAN1-I225/I226)	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM	Disabled**[Default]**, L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
L1 Substates	Disabled, L1.1 L1.1 & L1.2**[Default]**	PCI Express L1 Substates settings.
PCIe Speed	Auto**[Default]** Gen1 Gen2 Gen3	Configure PCIe Speed.

3.6.3.2.1.2 PCI Express Root Port 6(M.2 KeyE)



Item	Option	Description
PCI Express Root Port 6(M.2 KeyE)	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM	Disabled**[Default]**, L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
L1 Substates	Disabled, L1.1 L1.1 & L1.2**[Default]**	PCI Express L1 Substates settings.
PCIe Speed	Auto**[Default]** Gen1 Gen2 Gen3	Configure PCIe Speed.

3.6.3.2.1.3 PCI Express Root Port 7(LAN2-I225/I226)

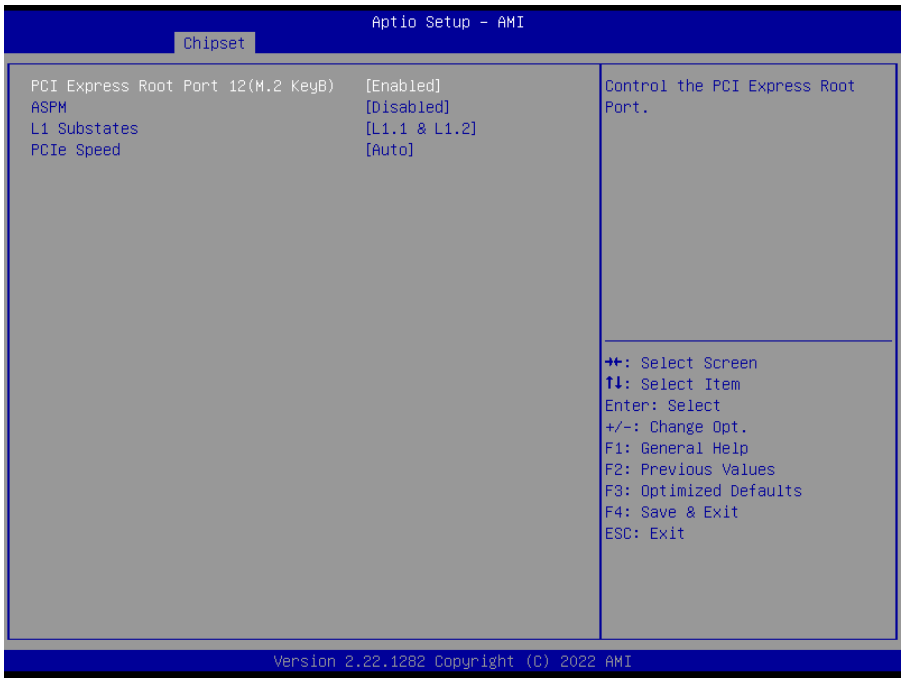


Item	Option	Description
PCI Express Root Port 7(LAN2-I225/I226)	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM	Disabled**[Default]**, L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
L1 Substates	Disabled, L1.1 L1.1 & L1.2**[Default]**	PCI Express L1 Substates settings.
PCIe Speed	Auto**[Default]** Gen1 Gen2 Gen3	Configure PCIe Speed.

3.6.3.2.1.4 PCI Express Root Port 8(LAN3-I225/I226)

Item	Option	Description
PCI Express Root Port 8(LAN3-I225/I226)	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM	Disabled**[Default]**, L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
L1 Substates	Disabled, L1.1 L1.1 & L1.2**[Default]**	PCI Express L1 Substates settings.
PCIe Speed	Auto**[Default]** Gen1 Gen2 Gen3	Configure PCIe Speed.

3.6.3.2.1.5 PCI Express Root Port 12(M.2 KeyB)

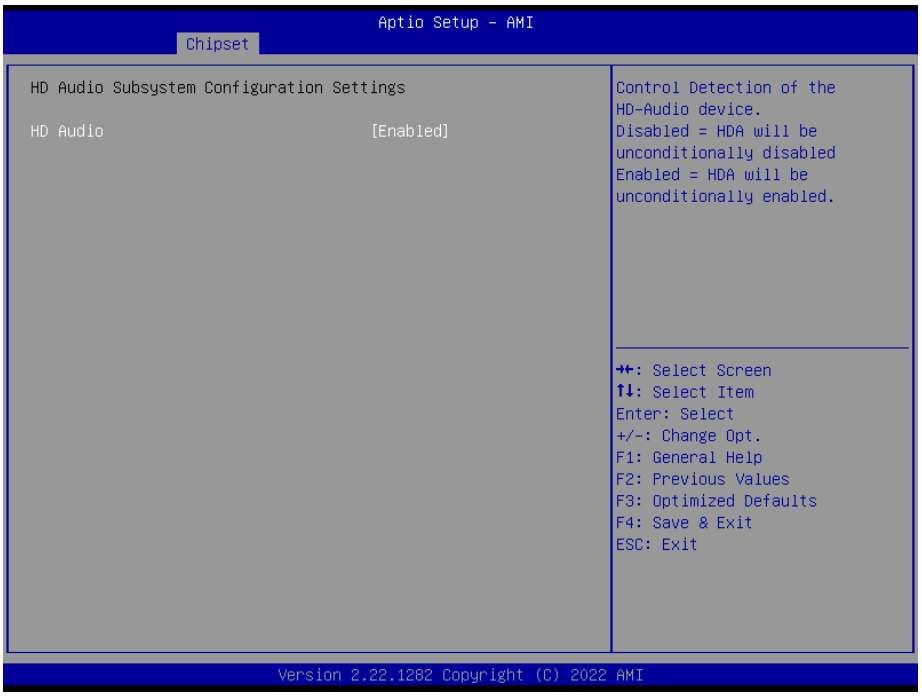


Item	Option	Description
PCI Express Root Port 12(M.2 KeyB)	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM	Disabled**[Default]**, L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
L1 Substates	Disabled, L1.1 L1.1 & L1.2**[Default]**	PCI Express L1 Substates settings.
PCIe Speed	Auto**[Default]** Gen1 Gen2 Gen3	Configure PCIe Speed.

3.6.3.2.2 SATA And RST Configuration

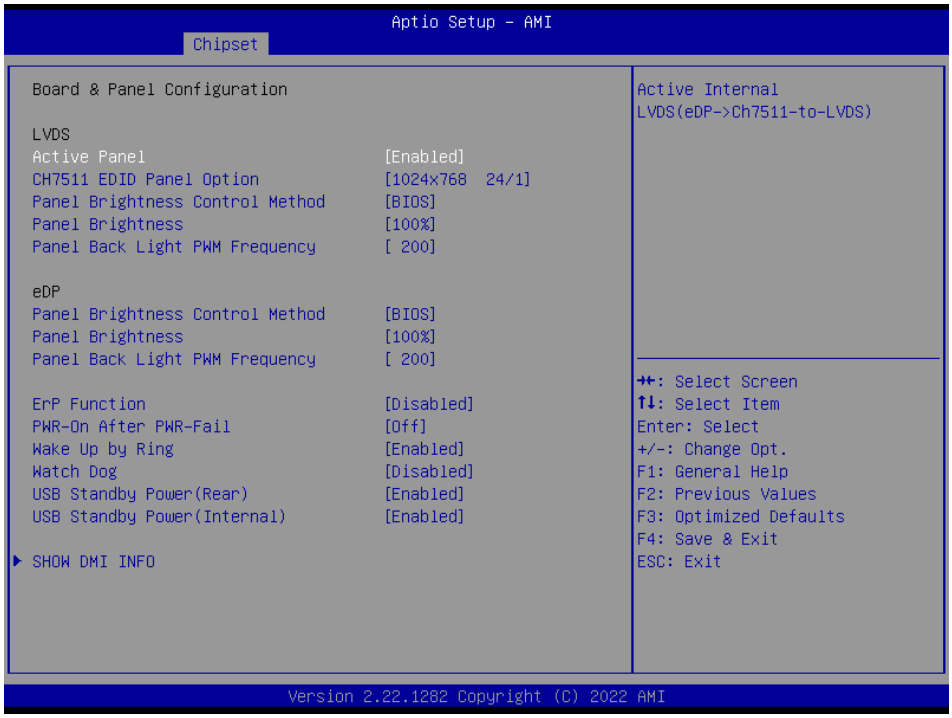
Item	Options	Description
SATA Controller(s)	Enabled**[Default]** Disabled,	Enable/Disable SATA Device.
Port 0	Enabled**[Default]** Disabled	Enable or Disable SATA Port.
Port 1	Enabled**[Default]** Disabled	Enable or Disable SATA Port.

3.6.3.2.3 HD Audio Configuration



Item	Option	Description
HD Audio	Disabled Enabled**[Default]**	Control Detection of the HD-Audio device. Disable = HDA will be unconditionally disabled Enabled = HDA will be unconditionally enabled.

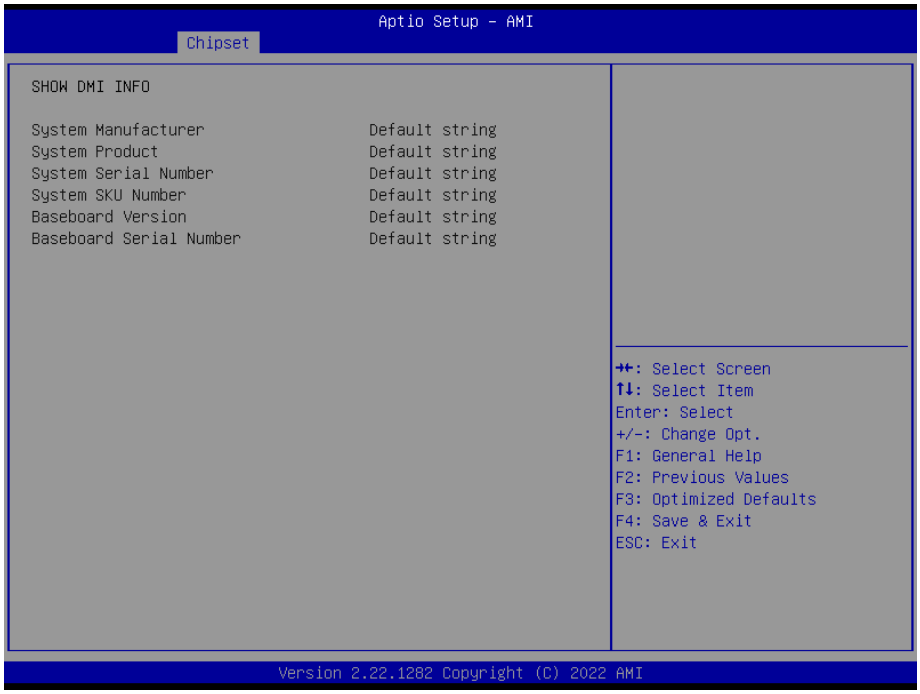
3.6.3.3 Board & Panel Configuration



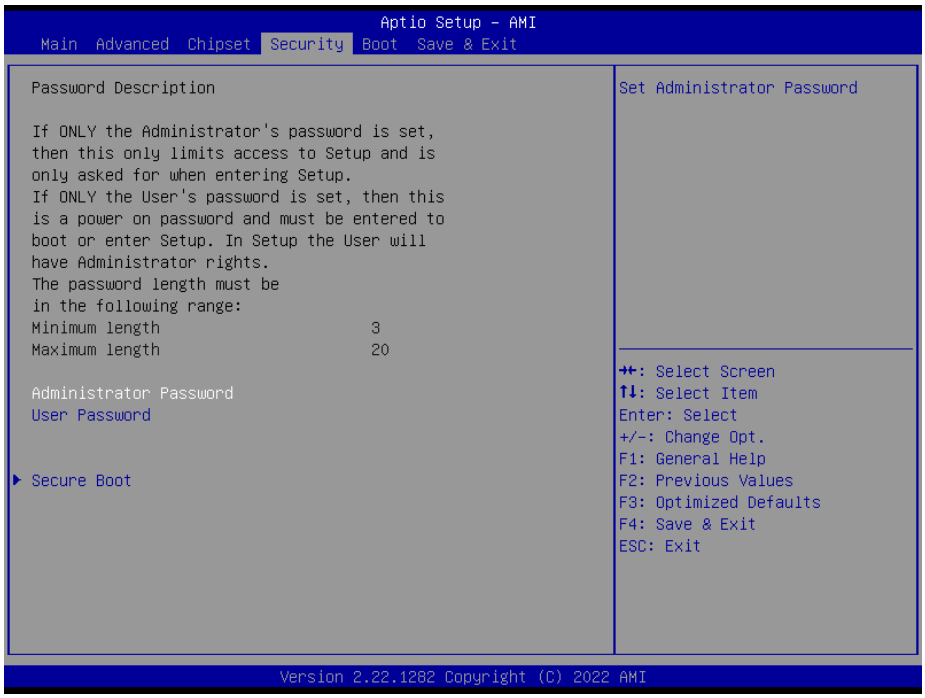
Item	Option	Description
Active Panel	Disabled Enabled**[Default]**	Active Internal LVDS(eDP->Ch7511-to-LVDS).
CH7511 EDID Panel Option	1024x768 24/1**[Default]** 800x600 18/1 1024x768 18/1 1366x768 18/1 1024x600 18/1 1280x800 18/1 1920x1200 24/2 1920x1080 18/2 1280x1024 24/2 1366x768 24/1 1920x1080 24/2 1680x1050 24/2	Port-EDP to LVDS(Chrotel 7511) Panel EDID Option.
Panel Brightness Control Method	BIOS**[Default]** OS Driver	Panel Brightness Control Method. 1.BIOS 2.OS Driver.
Panel Brightness	00% 25% 50% 75% 100%**[Default]**	Select Panel(eDP/LVDS) back light PWM duty.
Panel Back Light PWM	200**[Default]**	Select Panel(eDP/LVDS) back light PWM

Frequency	300 400 500 700 1k 2k 3k 5k 10k 20k	Frequency.
ErP Function	Disabled**[Default]** Enabled	ErP Function (Deep S5).
PWR-On After PWR-Fail	Off**[Default]** On Last state	AC loss resume.
Wake Up by Ring	Disabled Enabled**[Default]**	Wake Up by Ring from S3/S4/S5.
Watch Dog	Disabled**[Default]** 30 sec 40 sec 50 sec 1 min 2 min 10 min 30 min	Select WatchDog.
USB Standby Power(Rear)	Disabled Enabled**[Default]**	Enable/Disabled USB Standby Power during S3/S4/S5.
USB Standby Power(Internal)	Disabled Enabled**[Default]**	Enable/Disabled USB Standby Power during S3/S4/S5.

3.6.3.3.1 SHOW DMI INFO



3.6.4 Security



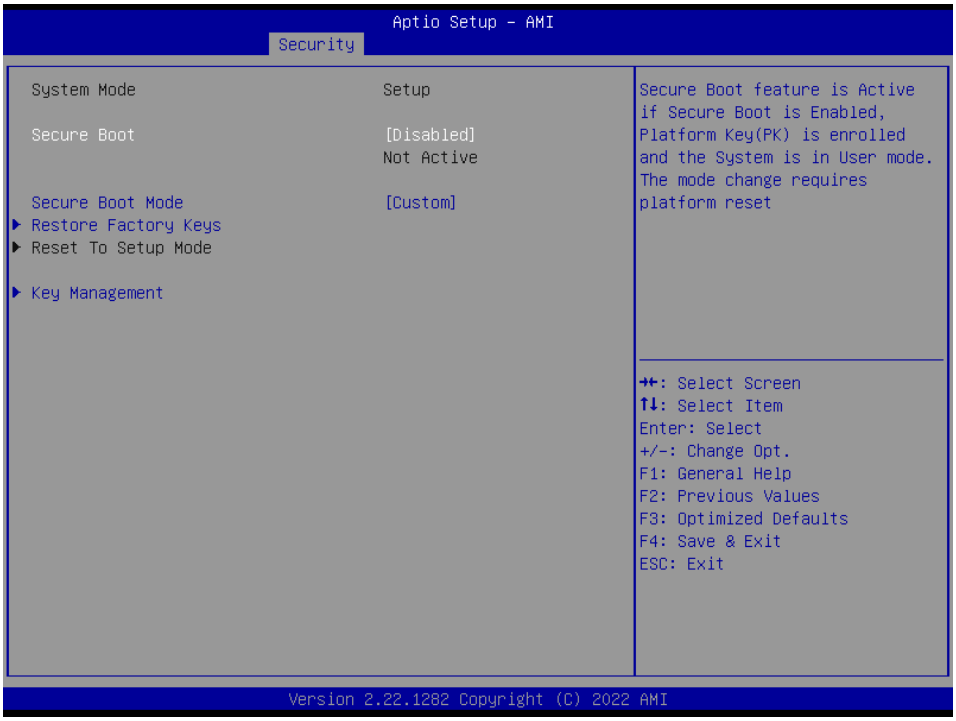
- **Administrator Password**

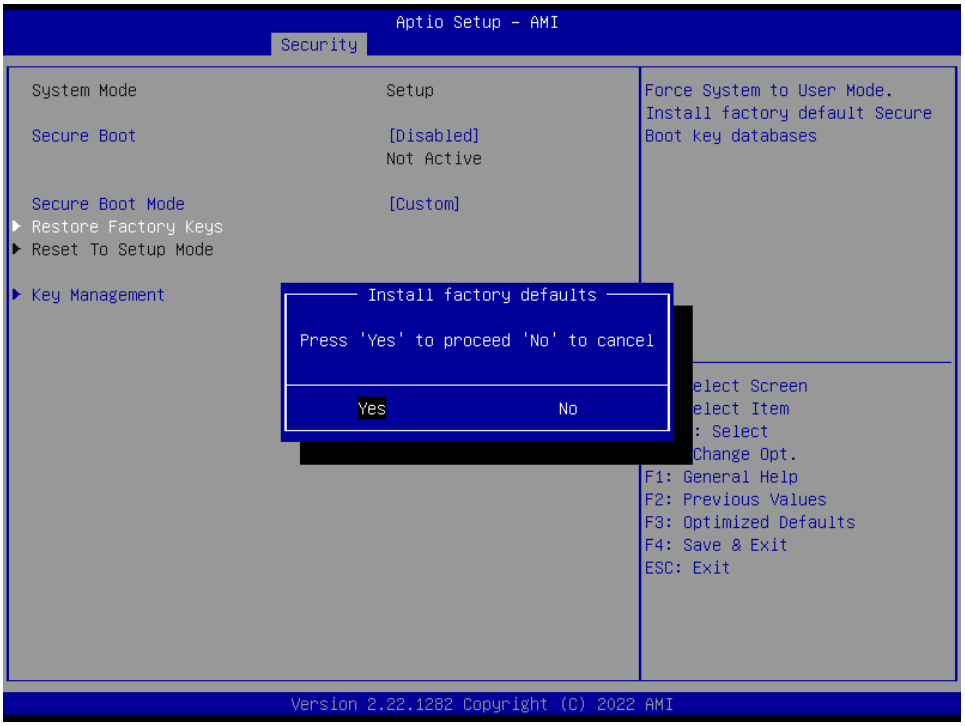
Set setup Administrator Password

- **User Password**

Set User Password

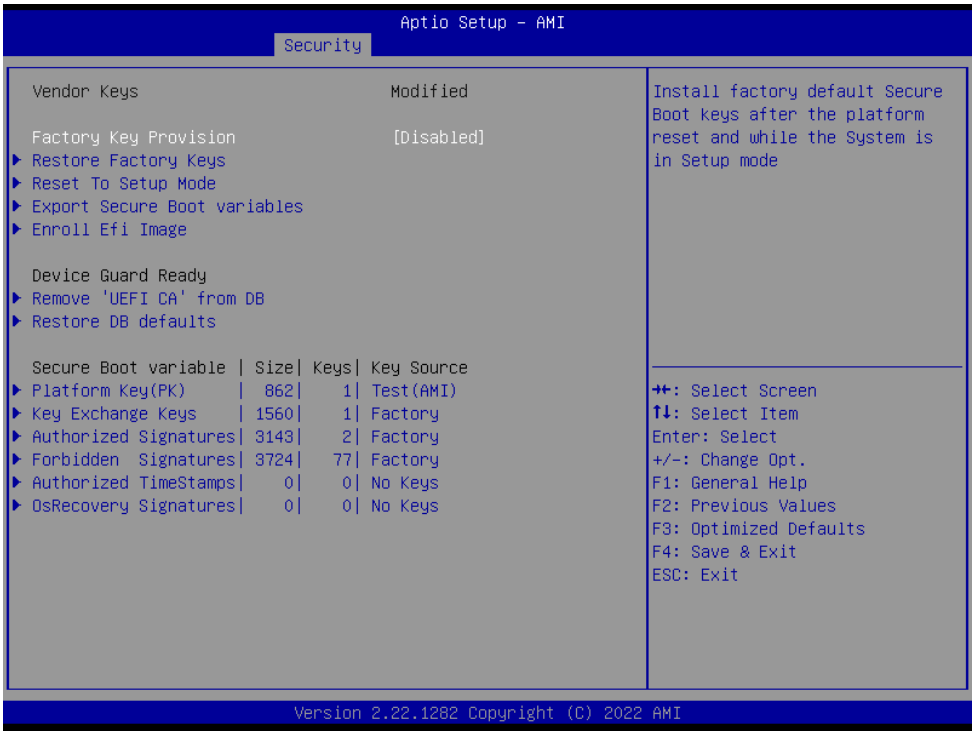
3.6.4.1 Secure Boot





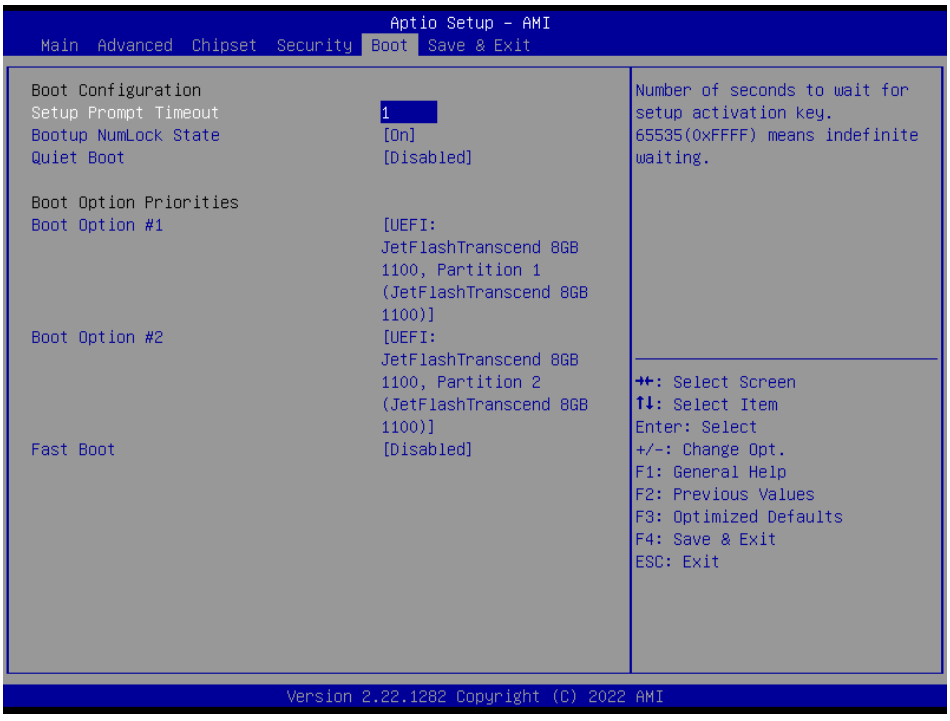
Item	Option	Description
Secure Boot	Disabled**[Default]** Enabled	Secure Boot feature is Active if Secure Boot is Enable, Platform Key(PK) is enrolled and the System is in User mode. The mode change requires platform reset.
Secure Boot Mode	Standard Custom**[Default]**	Secure Boot mode selector: Standard/Custom. In Custom mode Secure Boot Variables can be configured without authentication.

3.6.4.1.1 Key Management



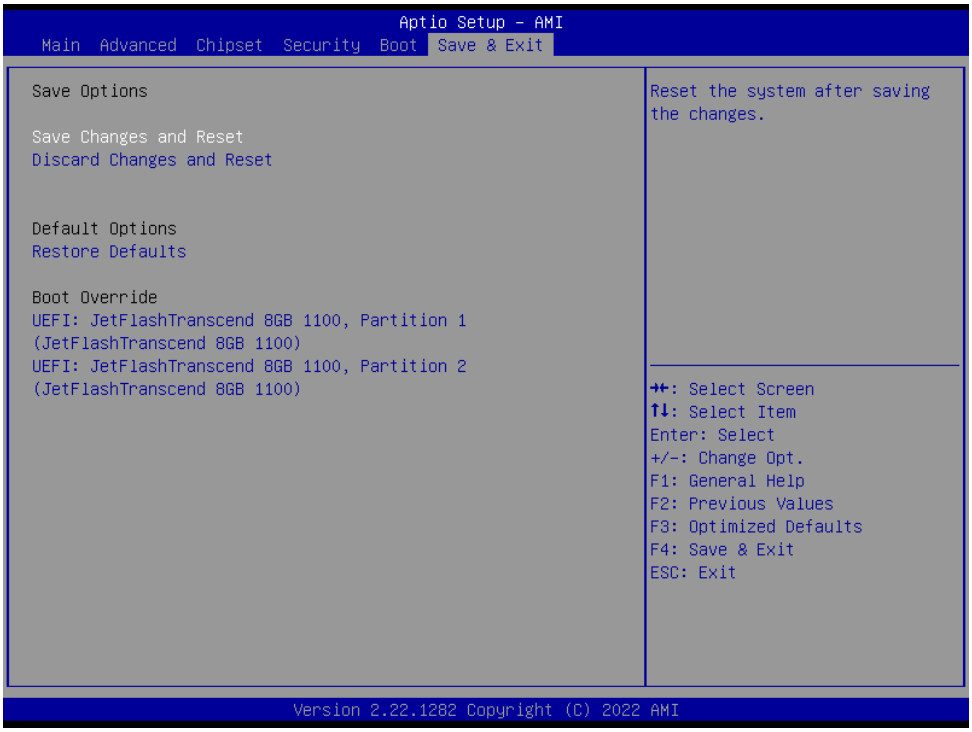
Item	Option	Description
Factory Key Provision	Disabled**[Default]** Enabled	Install factory default Secure Boot keys after the platform reset and while the System is in Setup mode.

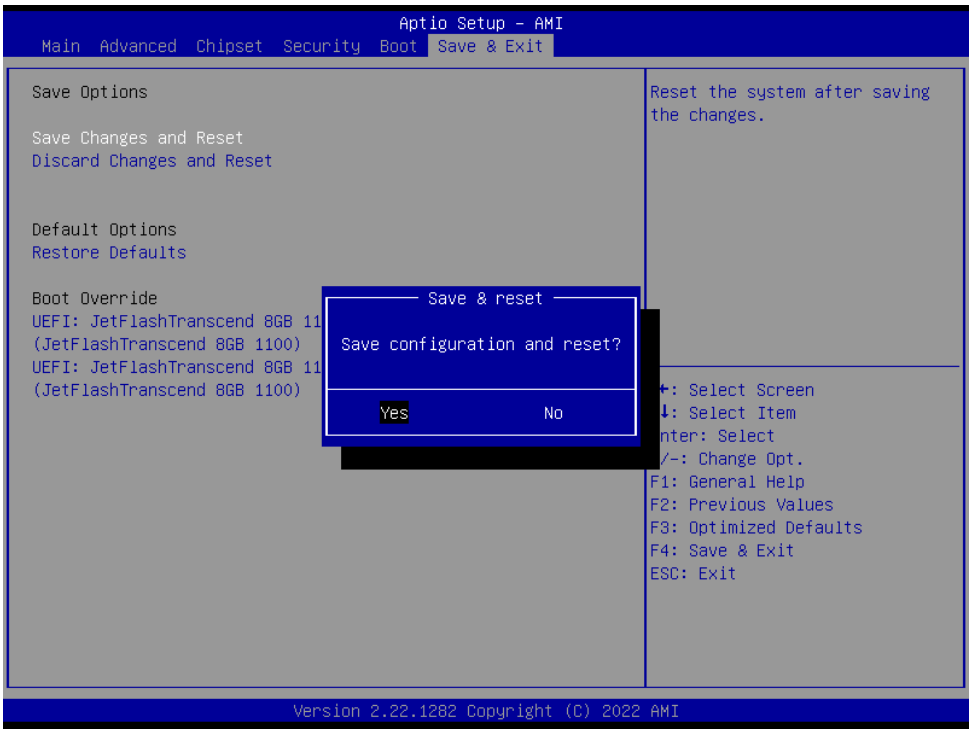
3.6.5 Boot



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

3.6.6 Save and exit





3.6.6.1 Save Changes and Reset

Reset the system after saving the changes.

3.6.6.2 Discard Changes and Reset

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

3.6.6.3 Restore Defaults

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

3.6.6.4 Launch EFI Shell from filesystem device

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

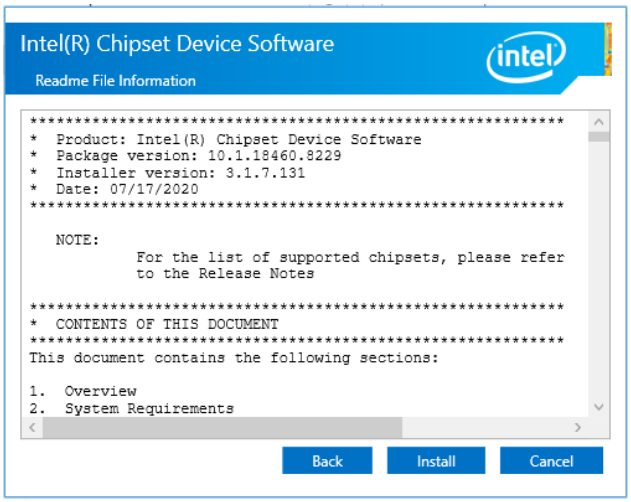
4. Drivers Installation

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

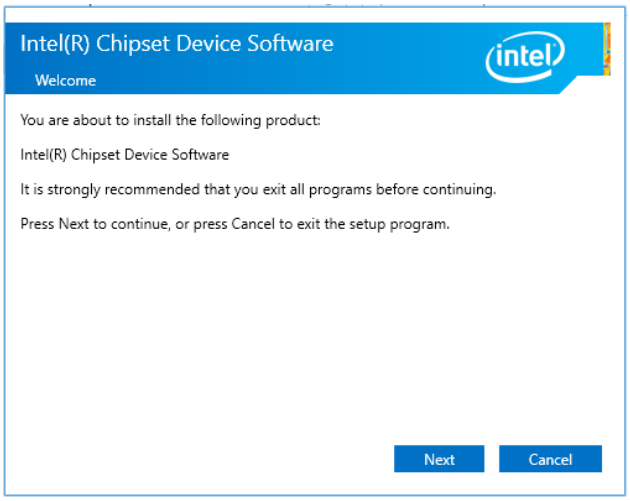
4.1 Install Chipset Driver

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. If the warning message appears while the installation process, click Continue to go on.



Step 3. Click **Install**.



Step1. Click **Next**.

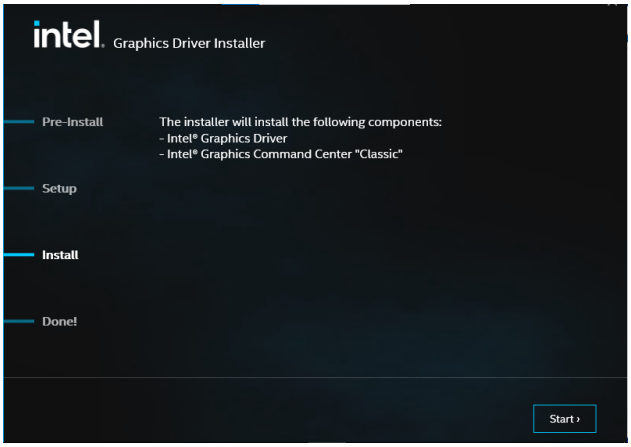
Step 4. Complete setup.

Step 2. Click **Accept**.

4.2 Install VGA Driver

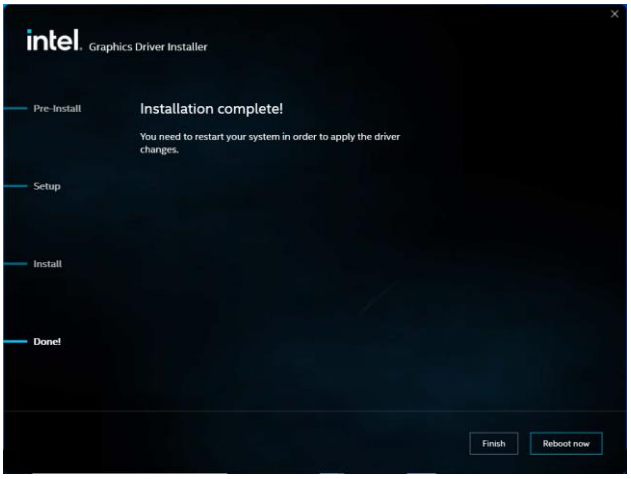
All drivers can be found on the Avalue Official Website: http://www.avalue.com.tw.

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

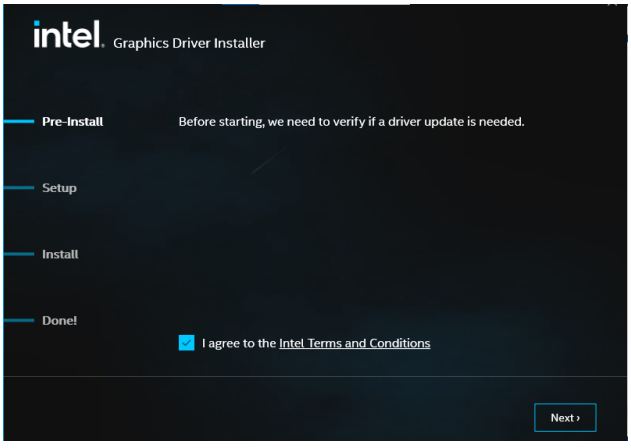


Step 3. Click **Start.**

Step 1. Click **Begin installation**.



Step 4. Click **Reboot now.**



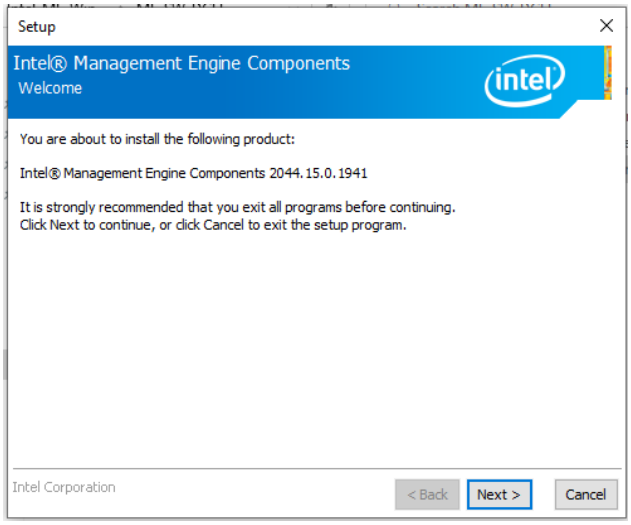
Step 2.

Click **Next** to accept license agreement.

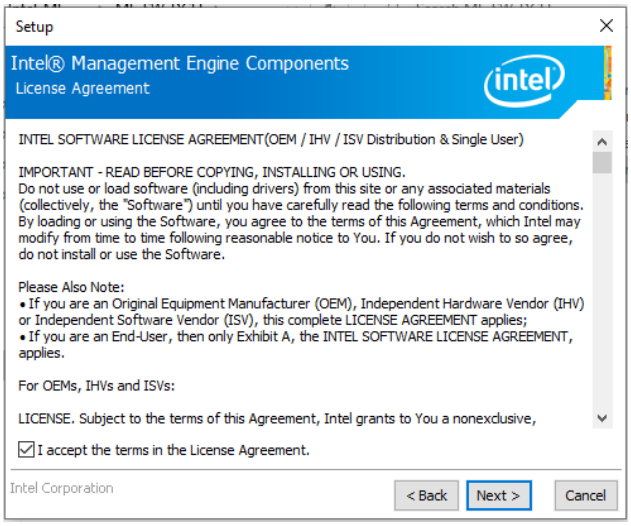
4.3 Install ME Driver

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

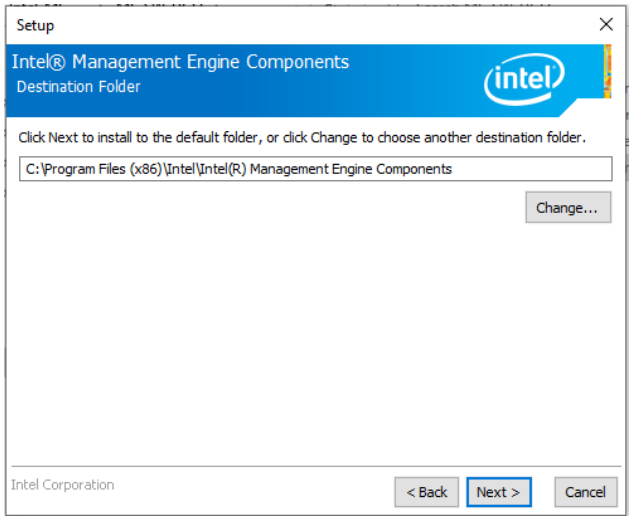
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system. If the warning message appears while the installation process, click Continue to go on.



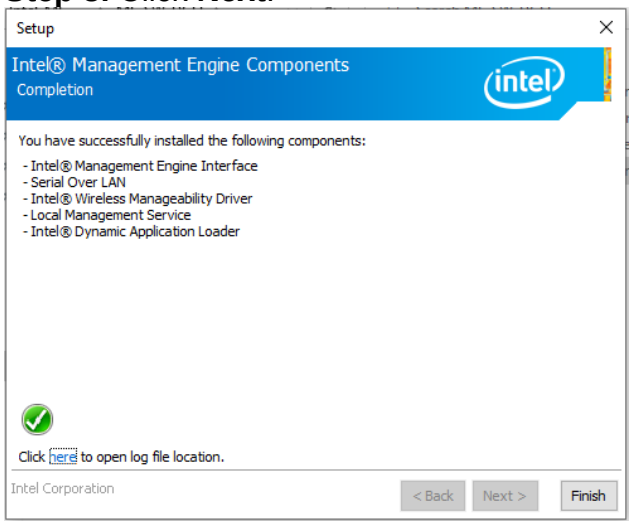
Step 1. Click **Next** to continue setup.



Step 2. Click **Next**.



Step 3. Click **Next**.

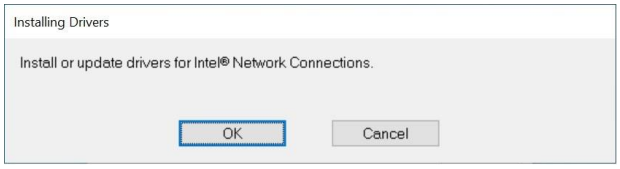


Step 4. Click **Finish** to complete setup.

4.4 Install LAN 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. If the warning message appears while the installation process, click Continue to go on.



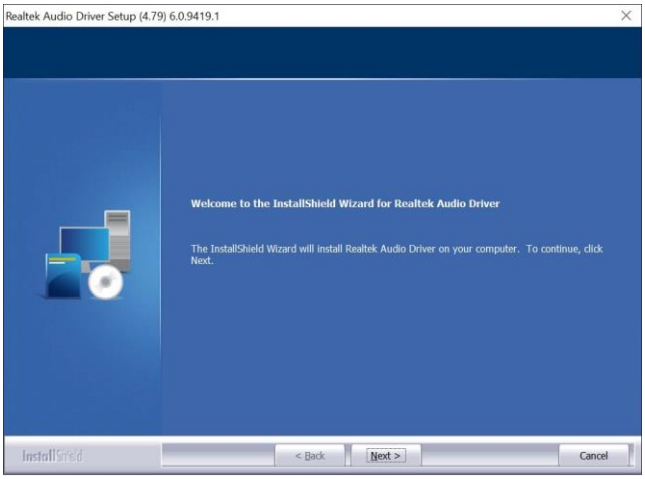
Step 1. Click **OK** to continue installation.

Step 2. Complete setup.

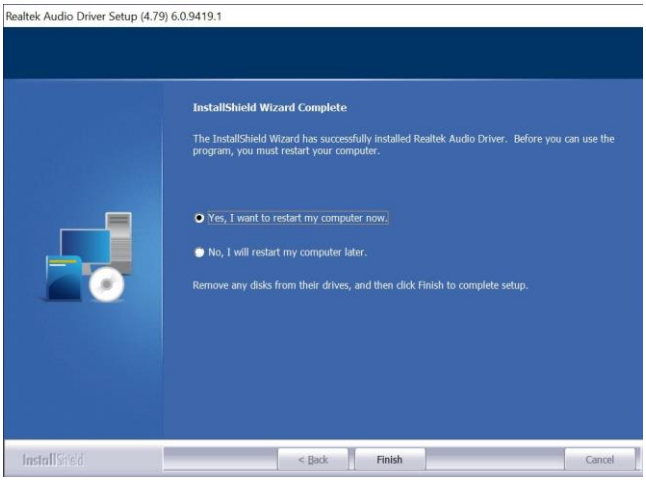
4.5 Install Audio Driver

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. If the warning message appears while the installation process, click Continue to go on.

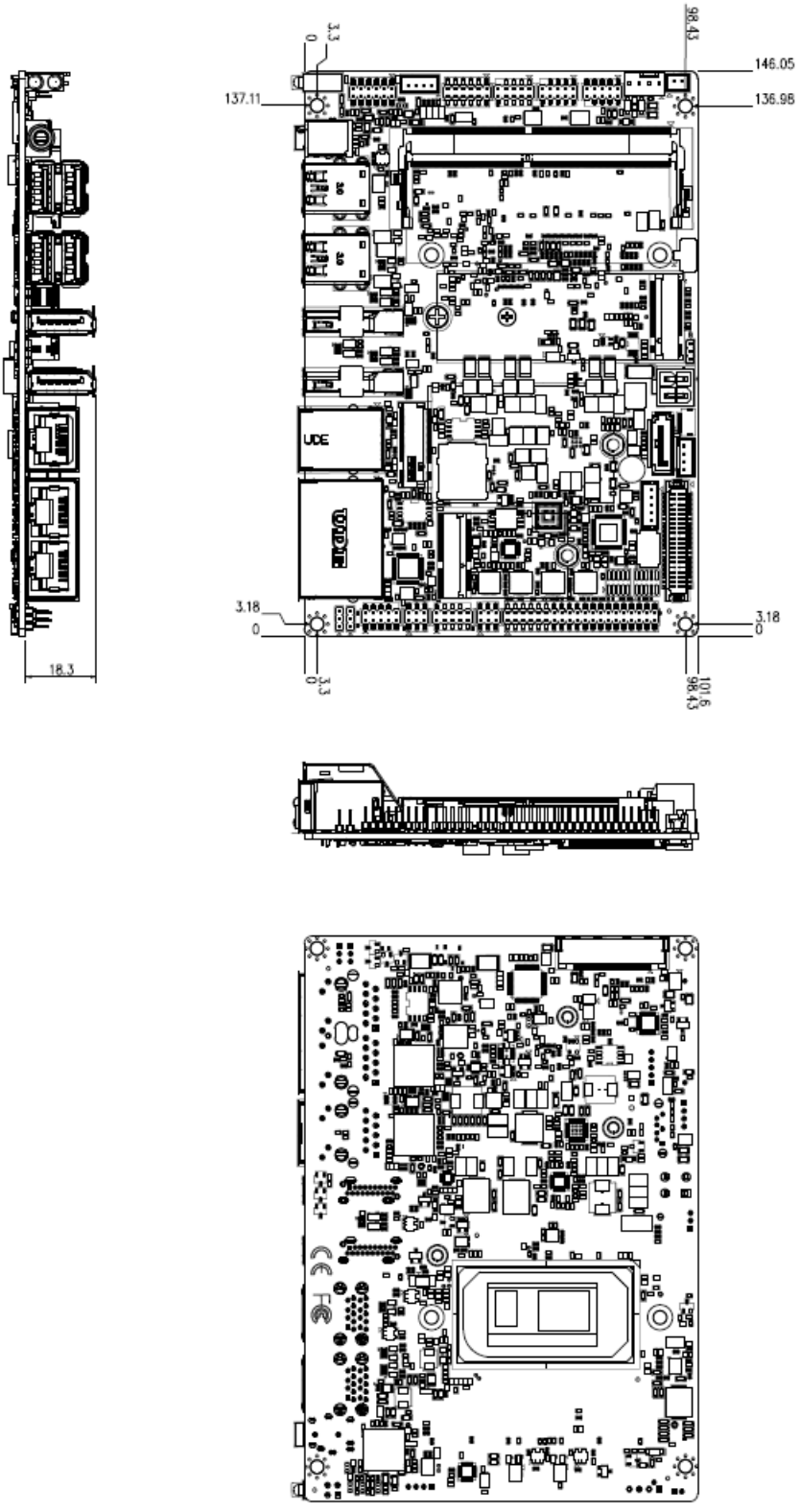


Step 1. Click **Next** to continue installation.



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

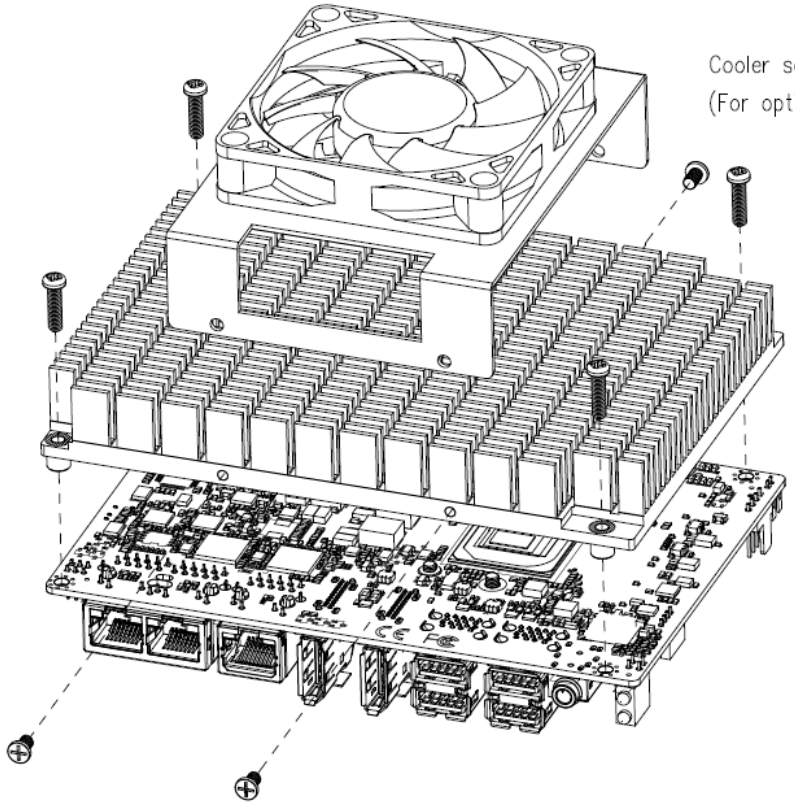
5. Mechanical Drawing



Unit: mm

Thermal Solutions:

ECM-TGU-B1 standard package with heatsink (BIOS TDP: 15W), we also design cooler (BIOS TDP: 28W) solution for customer optional purchase.



Cooler set for 15W upgrade to 28W: E1756211300R
(For optional purchase,not in standard package)

15W Heatsink + screw set:
E1961211150026R (in standard package)