VMS-CFS-SLIM

Intel® 8th /9th Generation Intel® Processors Fanless Vehicle Telematics System

Quick Reference Guide

1st Ed –13 October 2023

Part No. E2017HAK0A6R

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 INSTATLLED 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.

A Message to the Customer

Avalue Customer Services

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

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

Technical Support

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

To receive the latest version of the user's manual; please visit our Web site at:

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

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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

- 1 x VMS-CFS-SLIM
- Other major components include the followings:
  — 1 x Accessory kit (Dust cover, Rubber foot and Screws)
  — 1 x DP to VGA Adapter
  — 1 x Integrated Wall Mount Kit

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

1.3 System Specifications

System Information	
Processor	Intel® Core™ i7-8700T Processor (12M Cache, up to 4.00 GHz)
	Intel® Core™ i5-8500T Processor (9M Cache, up to 3.50 GHz)
	Intel® Core™ i3-8100T Processor (6M Cache, 3.10 GHz)
	Intel® Pentium® Gold G5400T Processor (4M Cache, 3.10 GHz)
	Intel® Celeron® G4900T Processor (2M Cache, 2.90 GHz)
	Intel® Core™ i7-9700TE Processor (12M Cache, up to 3.80 GHz)
	Intel® Core™ i5-9500TE Processor (9M Cache, up to 3.60 GHz)
	Intel® Core™ i3-9100TE Processor (6M Cache, 3.20 GHz)
Platform Controller Hub	Intel® CNL PCH-H Q370
System Memory	2 x 260-pin SODIMM Socket (Capacity Max. Up to 32GB DDR4 2400/2666MHz SDRAM)
I/O Chipset	ITE IT8528VG-I
BIOS Information	AMI UEFI BIOS,256 Mbit SPI Flash ROM
Watchdog Timer	H/W Reset, 1sec. ~ 65535sec and 1sec.
H/W Status Monitor	Monitoring CPU & System Temperature and Voltage
RAID	RAID 0/1 supported
TPM	fTPM 2.0 support (default)
	Infineon SLB9665TT2.0 (Factory Option, for ST version only)
iAMT	iAMT 12.0
SBC	EBM-CFSV
Expansion	
mPCIe (Signal)	1 x Full Size Mini PCIe (PCIe + USB w/ push-push SIM Slot)
M.2 (Signal)	1 x M.2 Key-E 2230 for Wi-Fi & BT Module
	2 x M.2 Key-B 2242/3042/2280 w/ push-push SIM slot for SSD/ LTE/ I/O Modules
IET (Signals)	1 x Avalue 80-Pin IET Interface (4 x Gen.3 PCIex1, 3 x USB2.0, 1 x LPC, 1 x Line-Out (R/L), 1 x SMBus)
CAN Bus	1 x CANBus Module Interface for ATBS Module (via UART)
Storage	
M.2 (Signal)	2 x M.2 Key-B SSD (SATA III, Max. up to 2280)
Front I/O	
USB Port	2 x USB 3.2 Gen.1
Audio	1 x Line-Out
	1 x Mic-In

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Power Button	1 x Push Button for Power on/off w/ LED
Reset Button	1 x Push Button for Reset in hiding
LED Indicator	3 x LEDs for Storage, WLAN/ HSDPA
Digital I/O	1 x 8-bit GPIO, supports 1.5KV Isolation
SIM Slot	3 x SIM Card Slot (External Accessible w/Dust Protection Cover)
Rear I/O	
USB Port	4 x USB 3.2 Gen.1
COM Port	2 x RS232/422/485, (Jumper + DIP switch), with +5V and +12V support on Pin-9 via Jumper + DIP switch, support auto-flow (COM1 onboard, COM2 via Cable)
HDMI	2 x HDMI
DP	1 x DP
Audio	1 x Line-Out 1 x Mic-In
RJ-45	2 x RJ-45
CAN Bus	1 x CANBus (Factory option, supports OBDII, SAE J1939/ J1708), share with COM2
Left I/O (View on front side)	
Antenna	2 x Antenna w/cover
Right I/O (View on front side)	
Antenna	2 x Antenna w/cover
GPS	
Chipset	u-blox NEO-M8N module supports GPS/ Gloness/ QZSS/ Galileo/ Beidou (Factory Option NEO-M8U with Read Recording Supported)
Interface	UART
Display	
Graphic Chipset	Intel® UHD Graphics 630 (i7-8700T, i5-8500T, i3-8100T, i7-9700TE, i7-9700TE, i3-9100TE) Intel® UHD Graphics 610 (Pentium G5400T, Celeron G4900T)
Resolution	DP 1.2: 4096 x 2160@60Hz w/HDR HDMI 1.4: 4096 x 2160@30Hz
Audio	
Audio Codec	Realtek ALC888S HD codec
Ethernet	
LAN Chipset	1 x Intel I211-AT GbE Controller (I210-AT for B2 Ver.) 1 x Intel I219-LM GbE PHY
Data Rate Per Port	10/100/1000 Base-Tx GbE compatible
Power Requirement	
Voltage Input Spec.	Typical 12/24Vdc (+9~ 36Vdc)
Voltage Input Conn.	3-Pin Terminal Block

ACPI	Single Power ATX Support S0, S3, S4, S5
	ACPI 5.0 Compliant
Power Mode	Vehicle Power Mode (Default Setting)
	Industrial PC Power Mode supports AT/ATX

Power Management	
Definition	■ **Vehicle Power Mode** BIOS sets up as Vehicle PC ACC Function (JACC1) sets up as Enable AT/ATX Jumper (SW1) sets up as AT ■ **Industrial PC Power Mode** BIOS sets up as Industrial PC ACC Function (JACC1) sets up as Disable AT/ATX Jumper (SW1) sets up as AT or ATX ■ **ACC Function (JACC1)** It is Vehicle PC power mode (Power on/off controlled by Ignition or Power button) if ACC Function sets up as Enable. It is Industrial PC power mode (Power on/off controlled by Power button) if ACC Function sets up as Disable. ■ **AT/ATX Jumper(SW1)** This function will be active if ACC Function (JACC1) sets up Disable (Industrial PC power mode). ■ **Power Input Selection (SW1)** To set up the DC input voltage is +12Vdc, +24Vdc or wide range from +9~36Vdc. **Vin Work/Shutdown (BIOS)** To set up the startup/shutdown voltage in accordance with DC input voltage as +12Vdc, +24Vdc or wide range from +9~36Vdc.

Mode	+12Vdc		+24Vdc	
	Startup	Shutdown	Startup	Shutdown
1	11.5V	10.5V	23V	21V
2	12.0V	11.0V	24V	22V
3	12.5V	11.0V	25V	22V
4	12.5V	11.5V	25V	23V

The following behaviors happen if ACC Function (JACC1) sets up as Enable:
VMS-CFS won't power on if the DC Input voltage is lower than the startup voltage.

VMS-CFS will automatically power on, if the DC input voltage reaches the startup voltage.

VMS-CFS-SLIM

	VMS-CFS will automatically power on, if the DC input voltage reaches the startup voltage and power on delay ends up (the power on delay is Enable in BIOS). VMS-CFS will automatically power off, if the DC input voltage is lower than shutdown voltage, and the time exceeds 60sec. If it still doesn't power off and the time exceeds 6min, VMS-CFS will be forced power off immediately. ■ **Power on delay time is selectable by BIOS in following hierarchies** 10sec / 30sec / 1min / 5min / 10 min / 15min / 30min / 1hr. The delay time starts to count if ignition turns on. User can skip the delay time to turn on VMS-CFS if pressing power button. VMS-CFS will automatically power on if the delay time ends up. ■ **Power off delay time is selectable by BIOS in following hierarchies** 20sec / 1min / 5min / 10min / 30min / 1hr / 6hr / 18hr. The delay time starts to count if ignition turns off. User can skip the delay time to turn off VMS-CFS if pressing power button. VMS-CFS will automatically power off, if the delay time ends up. If it still doesn't power off and the time exceeds 60sec, VMS-CFS will be forced power off immediately. ■ **S3, S4 suspend mode** In the vehicle power mode, the S3/S4 is only able to resume from power button. ■ The status of Ignition On/Off is detectable by SW ■ The status of Low battery is detectable by SW ■ VMS will shut down automatically when internal temperature is reach the setting (it is selectable by BIOS). ■ VMS-CFS will cancel the delay function, and then continue to operate normally, if the ignition is turned on again and the power off delay is in process. ■ VMS-CFS will shut down completely, and then power on again automatically, if the ignition is turned on again and the power off delay ended. ■ VMS-CFS will cancel the delay and stayed in power off status, if the ignition is turned off again and power on delay is in process. VMS-CFS is only 10mA if it is off.
Mechanical & Environment	
Operating Temp.	-40°C ~ 60C (-40°F ~ 140°F) with 0.5m/s air flow, extended temperature peripherals
Storage Temp.	-30°C ~ 70°C (-22°F ~ 158°F)
Operating Humidity	40°C @ 95% Relative Humidity, Non-condensing
Dimension (W*L*H)	239 x 210 x 75mm

Weight	3.7kg
Vibration Test	Operating with SSD : MIL-STD-810G, Method 514.6, Category 4, common carrier US highway truck vibration exposure Storage with SSD : MIL-STD-810G, Method 514.6, Category 24, minimum integrity test
Shock Test	Operating with SSD : MIL-STD-810G, Method 516.6, Procedure I, functional shock=20G Non-Operating with SSD : MIL-STD-810G, Method 516.6, Procedure V, crash hazard shock test=75G
Drop Test	Package drop test Reference ISTA 2A, Method : IEC-60068-2-32 Test : Ed Test phase : One corner, three edges, six faces
IP Rating	IP 50 Rating
Mounting Kit	Wall Mount kit (Standard)
Software Support	
OS Information	Win10, Win11, Linux

Note: Specifications are subject to change without notice.

VMS-CFS-SLIM

1.4 System Overview

1.4.1 Front View
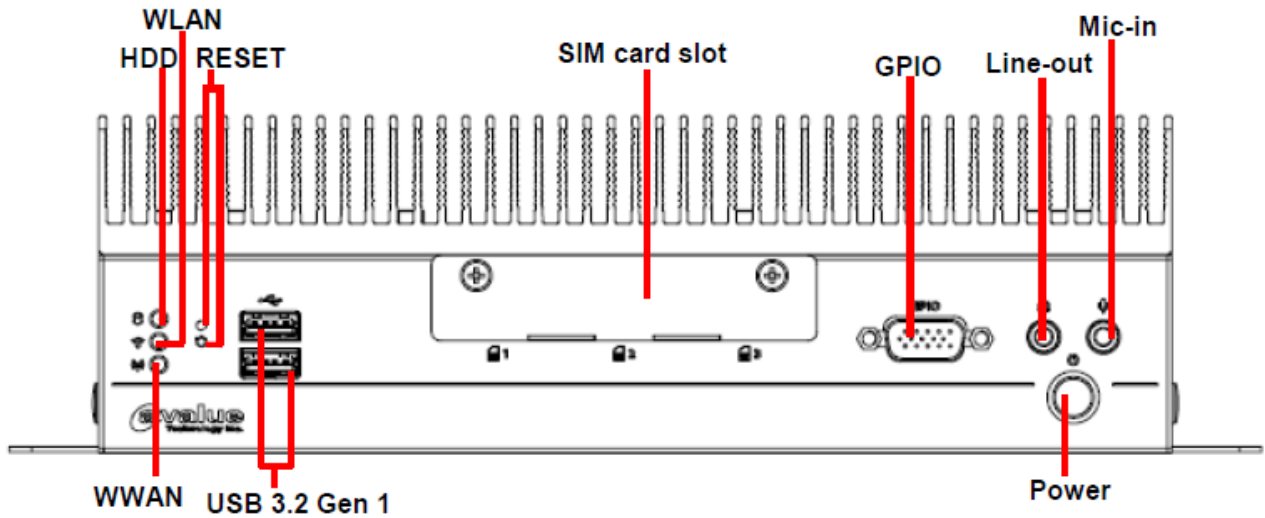
1.4.2 Rear View
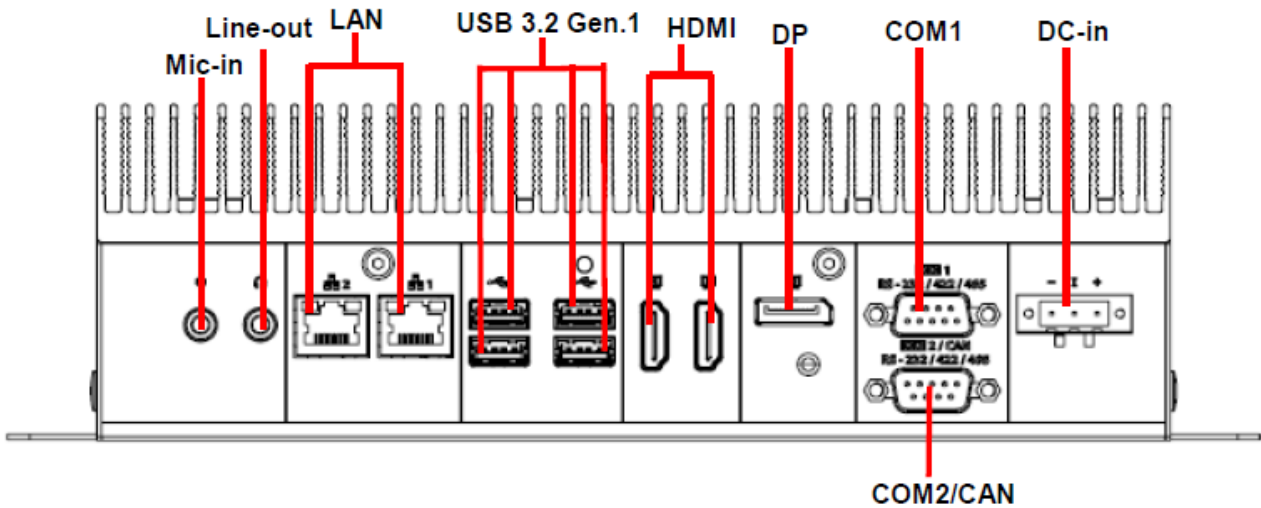
Connectors

Label	Function	Note
Power	Power on button	
USB 3.2 Gen 1	6 x USB 3.2 Gen 1 connector	
SIM card slot	3 x SIM card slot	
GPIO	General purpose I/O connector	
Line-out	Line-out jack	
Mic-in	Mic-in audio jack	
WWAN	WWAN Indicator	
WLAN	WLAN Indicator	
HDD	HDD Indicator	

RESET	Reset button
LAN	2 x RJ-45 Ethernet connector
DP	DP connector
COM1	Serial port 1 connector
COM2/CAN	Serial port 2 connector CAN connector
DC-in	DC power-in connector
HDMI	2 x HDMI connector

1.5 System Dimensions
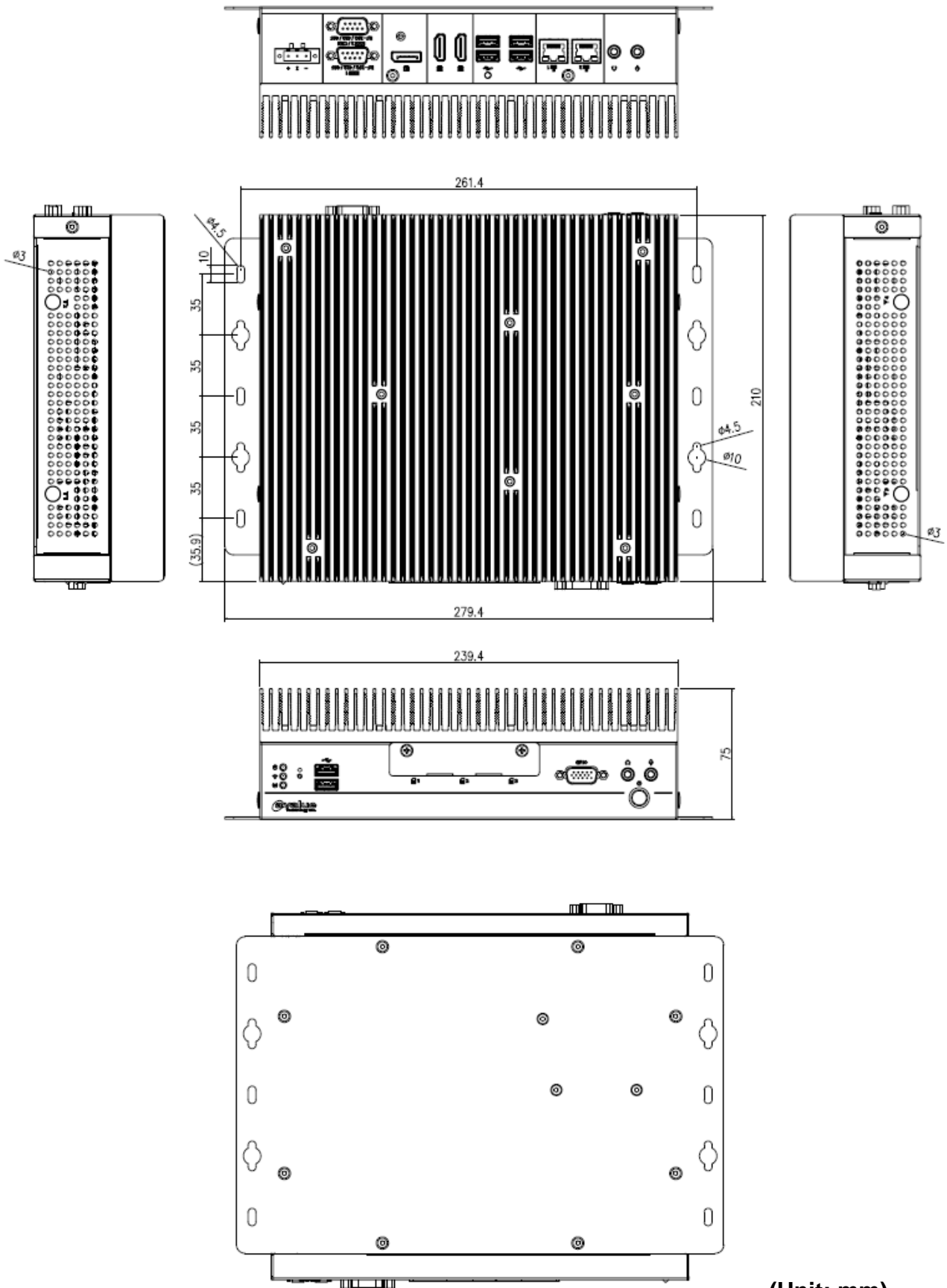
(Unit: mm)

2. Hardware Configuration

Jumper and Connector Setting, Driver and BIOS Installing

For advanced information, please refer to:

1- EBM-CFSV included in this manual.

Note: If you need more information, please visit our website:

http://www.avalue.com.tw

2.1 VMS-CFS-SLIM connector mapping

2.1.1   Serial Port 1 connector (COM1)
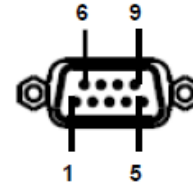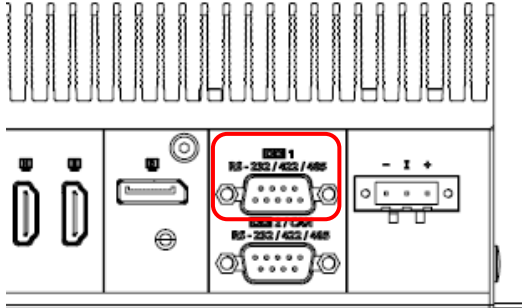
In RS-232 Mode

Signal	PIN	PIN	Signal
NDCD#	1	6	NDSR#
NRXD	2	7	NRTS#
NTXD	3	8	NCTS#
NDTR#	4	9	NRI#
GND	5		

In RS-422 Mode

Signal	PIN	PIN	Signal
TxD1-	1	6	NC
TxD1+	2	7	NC
RxD1+	3	8	NC
RxD1-	4	9	NC
GND	5		

In RS-485 Mode

Signal	PIN	PIN	Signal
DATA1-	1	6	NC
DATA1+	2	7	NC
NC	3	8	NC
NC	4	9	NC
GND	5		

2.1.2 Serial Port 2 connector/CAN connector (COM2/CAN)
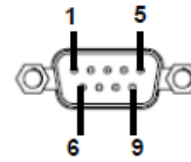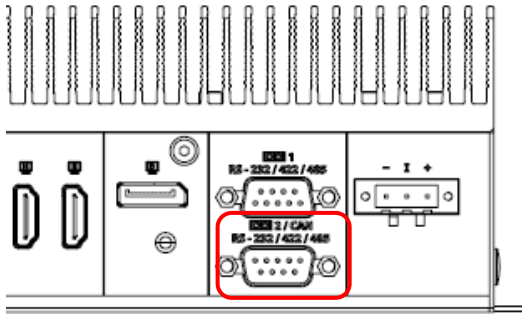
In RS-232 Mode

Signal	PIN	PIN	Signal
NDCD#	1	6	NDSR#
NRXD	2	7	NRTS#
NTXD	3	8	NCTS#
NDTR#	4	9	NRI#
GND	5		

CAN BUS

	DB9/M
1708-	1
1708+	8
1939-	5
1939+	3
GND	2

In RS-422 Mode

Signal	PIN	PIN	Signal
TxD1-	1	6	NC
TxD1+	2	7	NC
RxD1+	3	8	NC
RxD1-	4	9	NC
GND	5		

In RS-485 Mode

Signal	PIN	PIN	Signal
DATA1-	1	6	NC
DATA1+	2	7	NC
NC	3	8	NC
NC	4	9	NC
GND	5		

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2.1.3   DC power-in connector (DC-in)
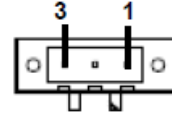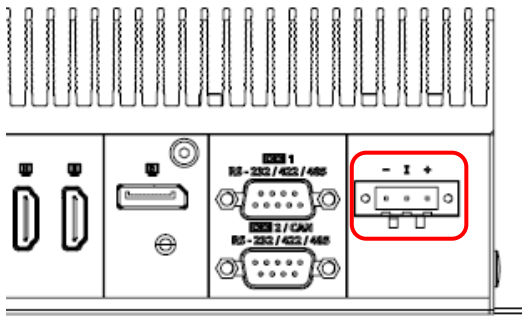
Signal	PIN
VIN + (BAT+)	1
ACC (IGN)	2
VIN- (BAT-)	3

2.1.4   General purpose I/O connector (GPIO)
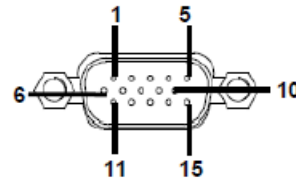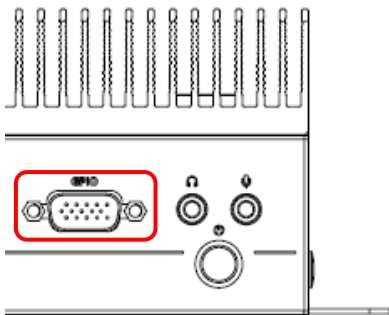
PIN	Signal	PIN	Signal	PIN	Signal
1	DIO_GPO0	6	DIO_GPI2	11	GND
2	DIO_GPI0	7	DIO_GPO3	12	NA
3	DIO_GPO1	8	DIO_GPI3	13	NC
4	DIO_GPI1	9	NA	14	NC
5	DIO_GPO2	10	NA	15	NC

2.2 EBM-CFSV Overviews
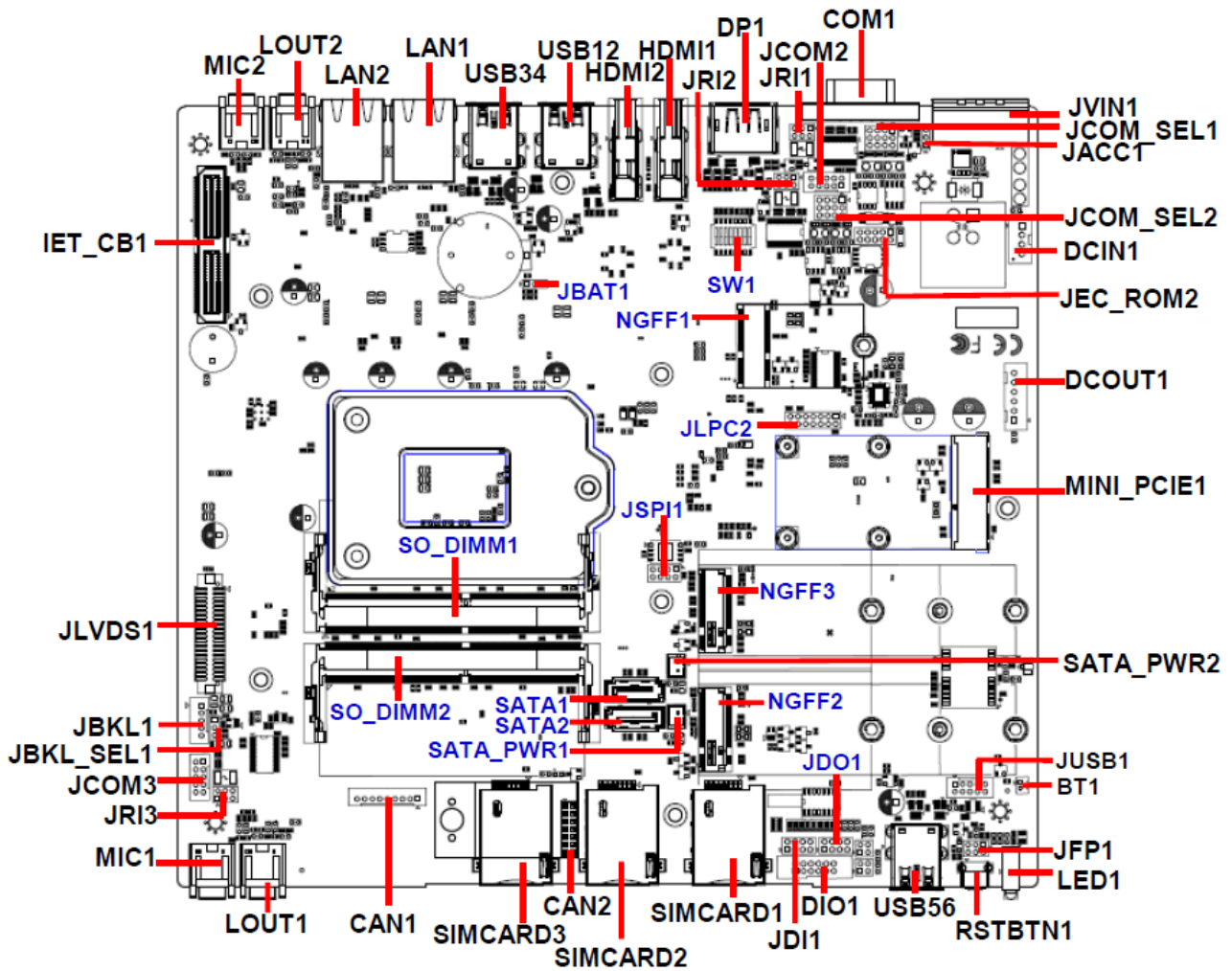
2.3 EBM-CFSV Jumper & Connector list

Jumpers

Label	Function	Note
JBAT1	Clear CMOS	3 x 1 header, pitch 2.00 mm
JRI1/2/3	COM 1/2/3 pin 9 signal selector	3 x 2 header, pitch 2.00 mm
SW1	Multi-function select	DIP switch 8pin
JCOM_SEL1/2	Serial port 1/2 – RS232/422/485 mode select	4 x 3 header, pitch 2.00 mm
JDI1	Digital Input selector	4 x 2 header, pitch 2.00 mm
JDO1	Digital Output selector	4 x 2 header, pitch 2.00 mm
JACC1	Vehicle/Industrial PC power mode selector	3 x 1 header, pitch 2.00 mm
JBKL_SEL1	LCD backlight brightness adjustment	3 x 1 header, pitch 2.00 mm

Connectors

Label	Function	Note
USB12/34/56	6 x USB 3.2 connector	
BT1	Battery connector	2 x 1 wafer, pitch 1.25 mm
LAN1/2	RJ-45 Ethernet 1/2	
JVIN1	DC-Input connector	1 x 3 terminal block, pitch 5.08 mm
DIO1	General purpose I/O connector	6 x 2 wafer, pitch 2.00 mm
COM1	Serial port connector 1	
JCOM2	Serial port 2 connector	5 x 2 wafer, pitch 2.00 mm
JCOM3	Serial port 3 connector	5 x 2 wafer, pitch 2.00 mm
CAN1	CAN Module connector 1	9 x 1 wafer, pitch 2.00 mm
CAN2	CAN Module connector 2	7 x 2 header, pitch 2.00 mm
DP1	DP connector	
MINI_PCIE1	Mini PCI Express connector	
RSTBTN1	Reset button	
LED1	LED Power HDD	
NGFF1/2/3	1 x M.2 KEY-E 2230 connector 2 x M.2 KEY-B 2242/3042/2280 connector	
LOUT1/2	Audio line-out connector 1/2	

MIC1/2	Audio mic-in connector 1/2	
JLVDS1	LVDS connector	20 x 2 wafer, pitch 1.25 mm
SO_DIMM1/2	DDR4 SODIMM connector 1/2	
IET_CB1	IET Expansion slot	
JLPC2	LPC port connector	7 x 2 header, pitch 2.00 mm
JSPI1	SPI connector	4 x 2 header, pitch 2.00 mm
JBKL1	LCD inverter connector	5 x 1 wafer, pitch 2.00 mm
SATA1/2	Serial ATA connector 1	
SATA_PWR1/2	SATA power connector 1/2	
DCOUT1	DC Output connector	6 x 1 wafer, pitch 2.50 mm
JEC_ROM2	EC Debug connector	5 x 2 header, pitch 2.00 mm
SIMCARD1/2/3	SIM card slot 1/2/3	
HDMI1/2	HDMI connector 1/2	
DCIN1	DC Input connector	4 x 1 wafer, pitch 2.50 mm
JFP1	Front Panel connector	3 x 2 header, pitch 2.00 mm
JUSB1	USB connector	5 x 2 wafer, pitch 2.00 mm

2.4 EBM-CFSV Jumpers & Connectors settings

2.4.1 Clear CMOS (JBAT1)

Protect*

1

Clear CMOS

1
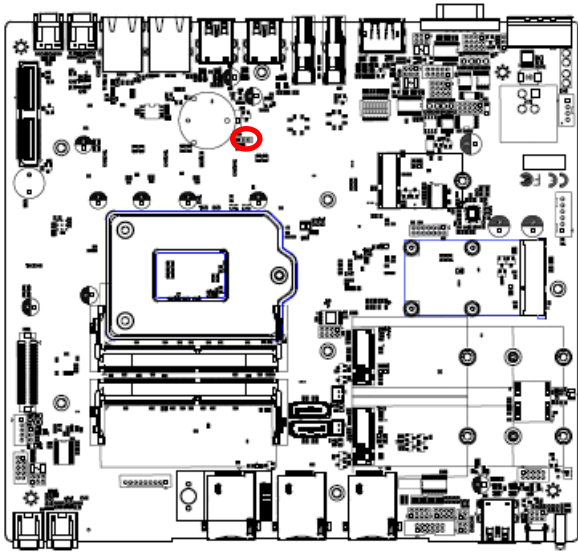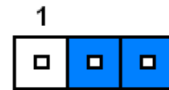
*Default

2.4.2 COM 1/2 pin 9 signal selector (JRI1/2)

JRI1

JRI2

Ring*

5   1

+5V

5   1

+12V

5   1
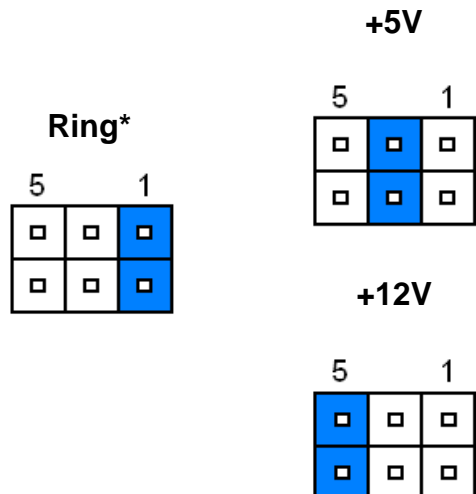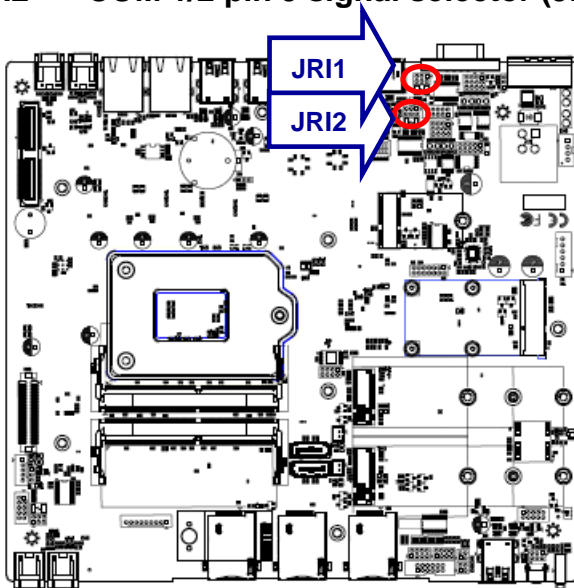
* Default

2.4.3   COM 3 pin 9 signal selector (JRI3)

* Default

Ring*

+5V

+12V
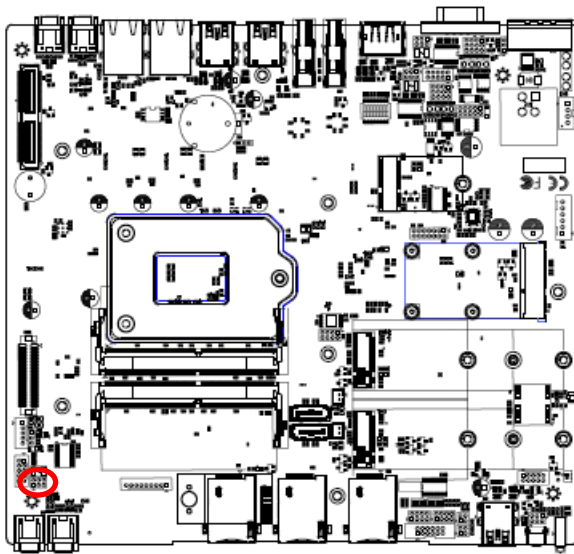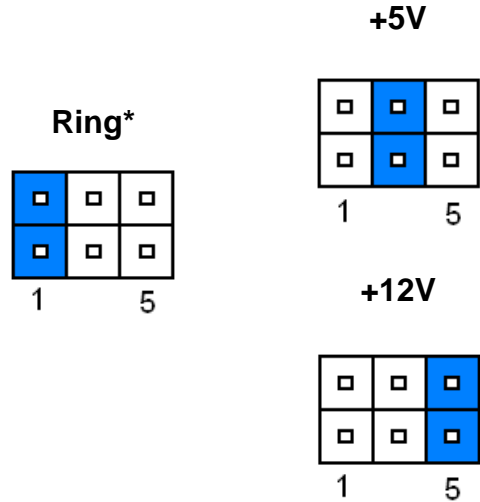
2.4.4   Serial port 1/2 – RS232/422/485 mode select (JCOM_SEL1/2)

JCOM_SEL1

JCOM_SEL2

*Default

RS-232*

10   1

12   3

RS422/485

10   1

12   3
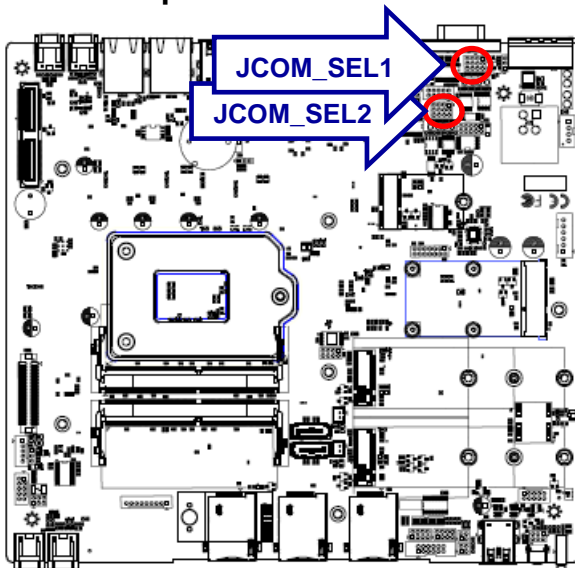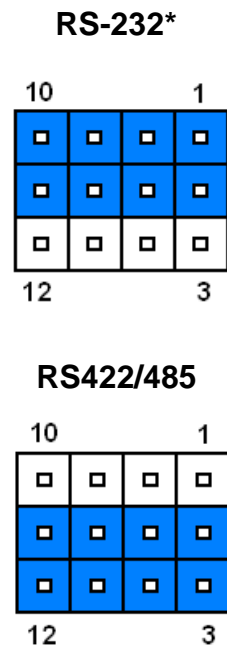
2.4.5   Digital Input selector (JDI1)

Dry*

1   7

Wet

1   7
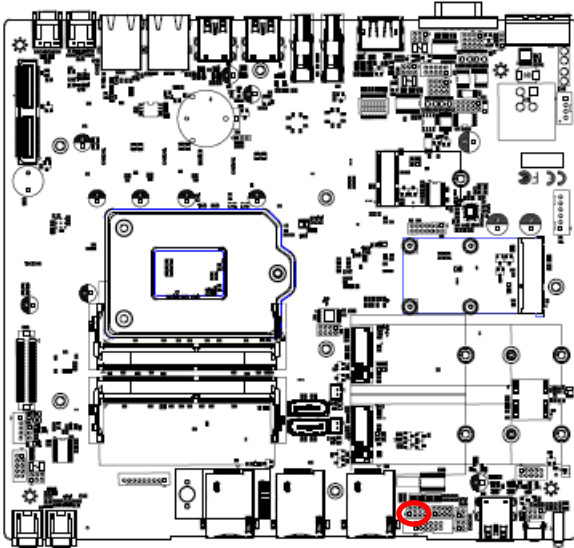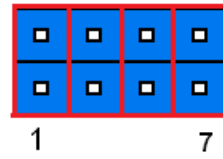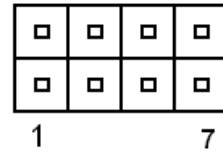
* Default

Mode	Digital Input
Dry	Logic level 1: Close to GND Logic level 0: Open
Wet	Logic level 1: < 3V Logic level 0: 5V ~ 30V
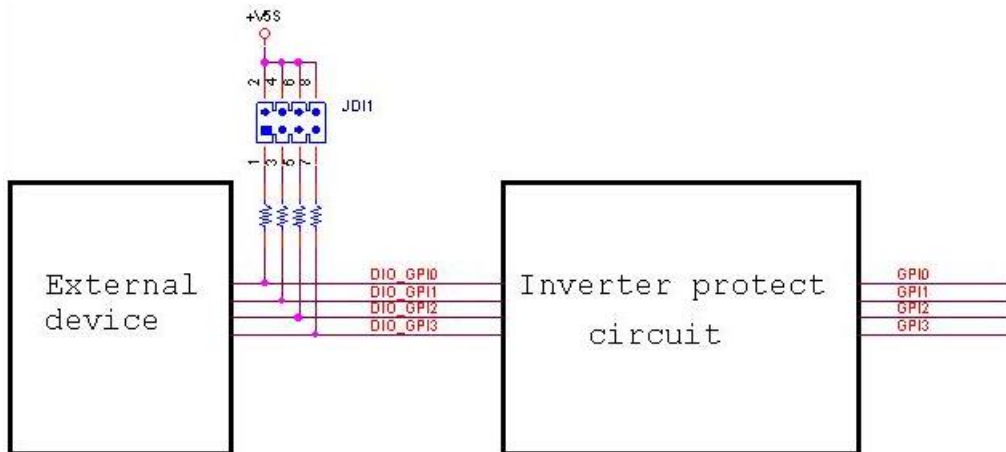
2.4.6   Digital Output selector (JDO1)

Dry*

Wet

1   7

1   7
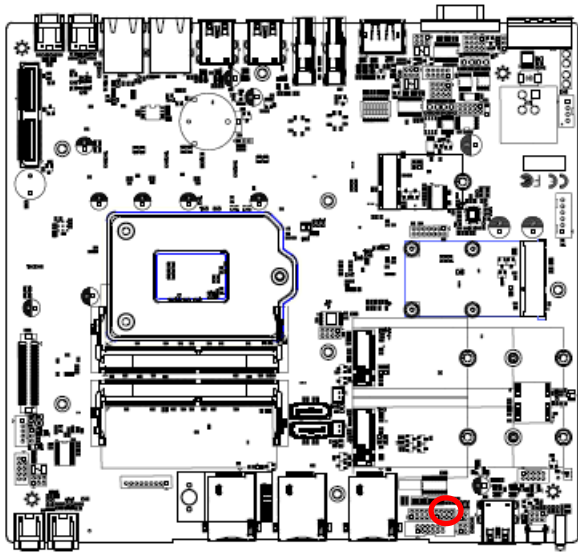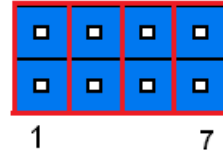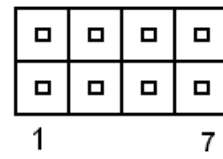
* Default

Note:

Output Voltage: Max 250 mA per channel, current sink type.

VMS-CFS-SLIM
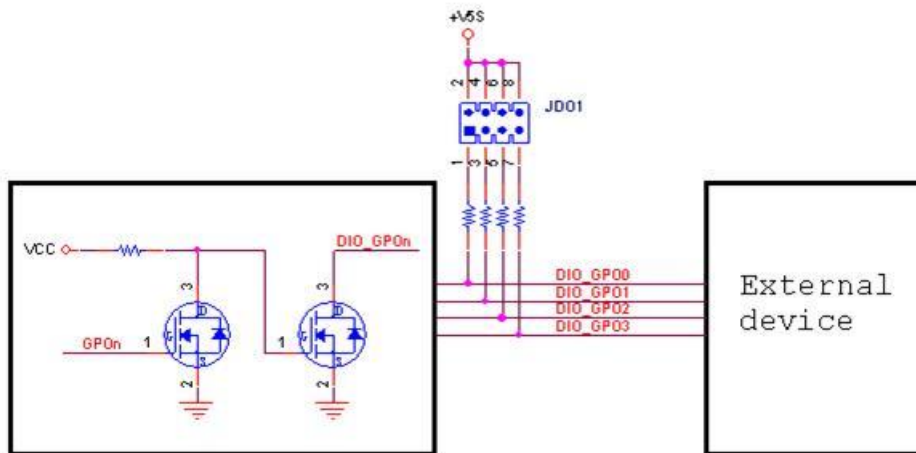
2.4.7   Vehicle/Industrial PC power mode selector (JACC1)
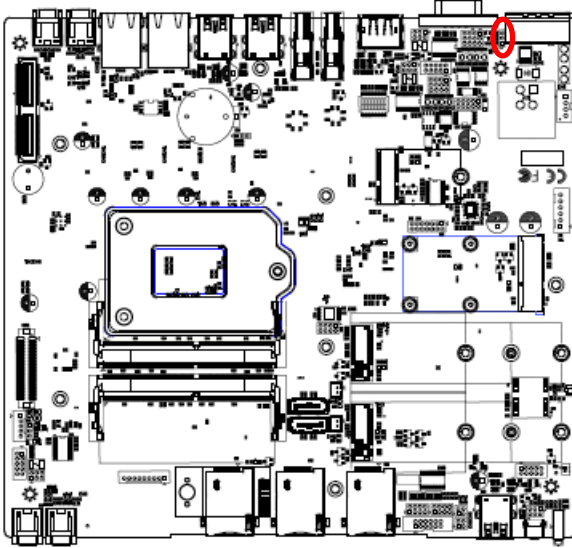
Enable*
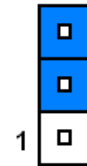
Disable
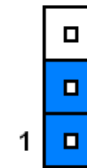
* Default

Note:

It is Vehicle PC power mode (Power on/off controlled by Ignition or Power button) if ACC Function sets up as Enable.

It is Industrial PC power mode (Power on/off controlled by Power button) if ACC Function sets up as Disable.

2.4.8   LCD backlight brightness adjustment (JBKL_SEL1)
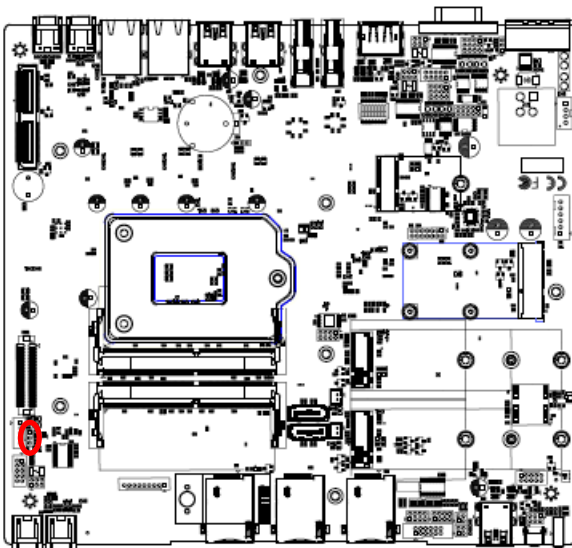
PWM Mode*
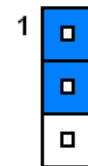
DC Mode

* Default

2.4.9   Multi-function select (SW1)
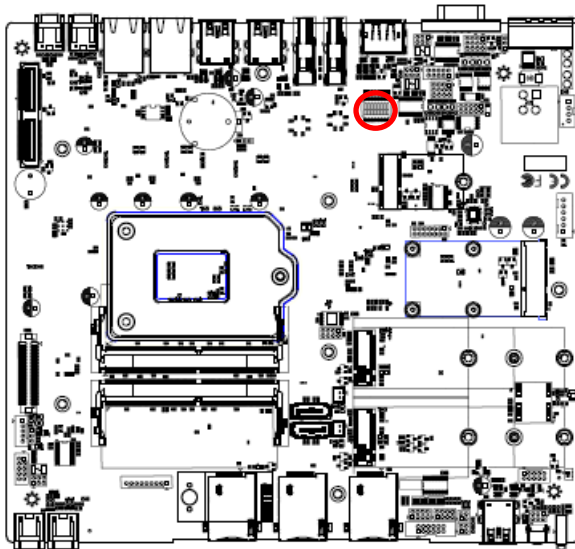
* Default
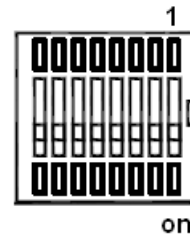
In Serial Port 1 mode

	RS-232*	RS-422	RS-485
1	OFF	ON	ON
2	ON	OFF	ON

In Serial Port 2 mode

	RS-232*	RS-422	RS-485
3	OFF	ON	ON
4	ON	OFF	ON

Power mode

	AT*	ATX
5	ON	OFF

Battery Type

	+12V	+24V	+9V~+36V*
6	OFF	ON	OFF
7	ON	ON	OFF

2.4.10   LPC port connector (JLPC2)
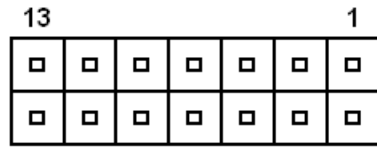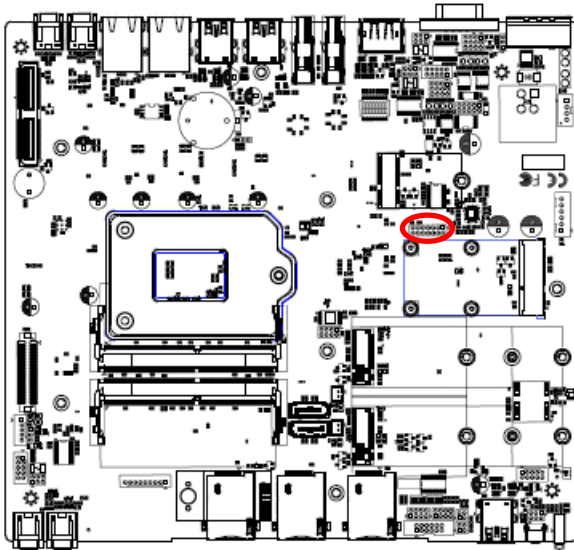
Signal	PIN	PIN	Signal
LPC_AD0	1	2	+3.3V
LPC_AD1	3	4	RST_BUF#
LPC_AD2	5	6	LPC_FRAME#
LPC_AD3	7	8	CLK_24M_80
LPC_SERIRQ	9	10	GND
+5V	11	12	GND
+5VSB	13	14	NC

2.4.11   LCD inverter connector (JBKL1)
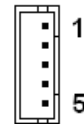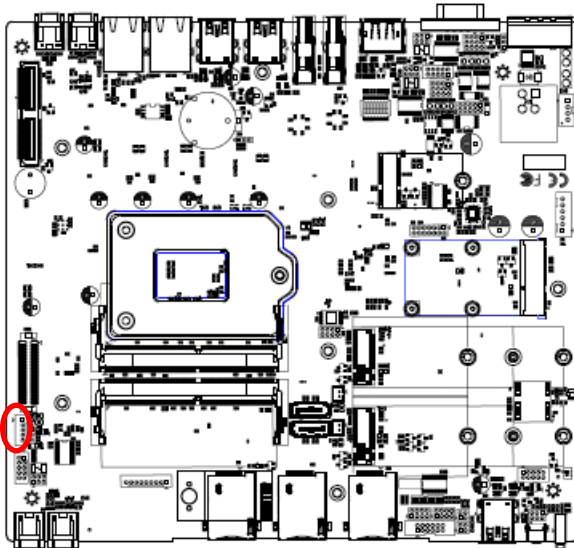
Signal	PIN
+12V	1
GND	2
BKLEN	3
VBRIGHT	4
+5V	5

2.4.12 SPI connector (JSPI1)
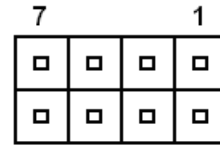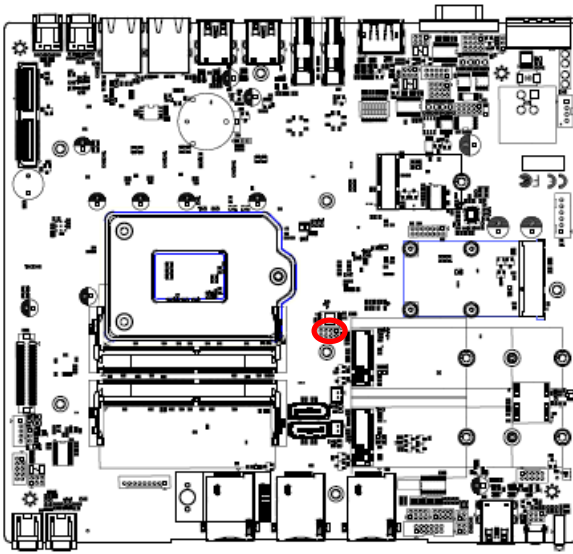
Signal	PIN	PIN	Signal
+3.3VSB	1	2	GND
SPI_CS0#	3	4	SPI_CLK
SPI_MISO	5	6	SPI_MOSI
BIOS_HOLD#	7	8	BIOS_WP#

2.4.13 DC Output connector (DCOUT1)
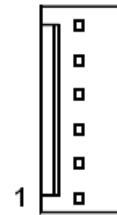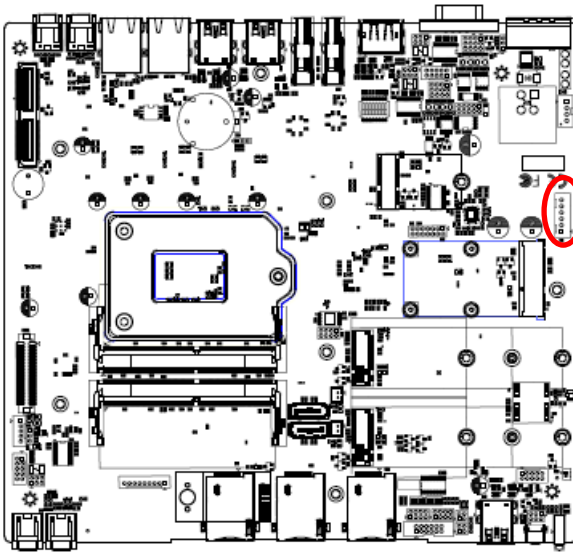
Signal	PIN
GND	6
GND	5
GND	4
+12VSB	3
+12VSB	2
+12VSB	1

2.4.14 EC Debug connector (JEC_ROM2)
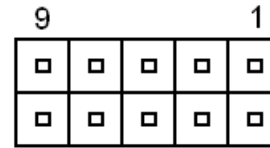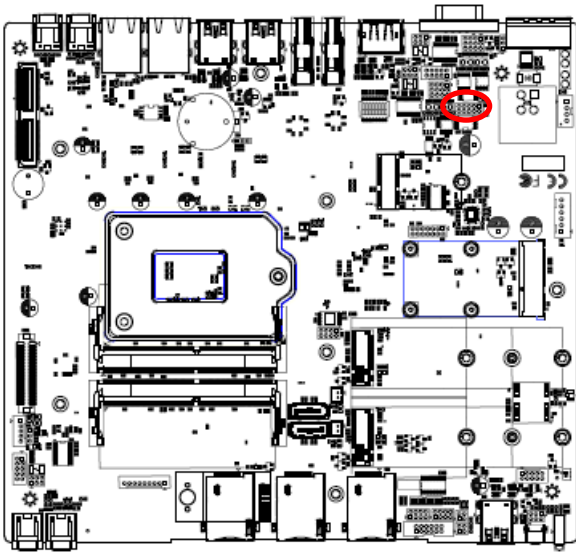
Signal	PIN	PIN	Signal
+VSPI_EC	1	2	GND
EC_FSCE#	3	4	EC_FSCK
EC_FMISO	5	6	EC_FMOSI
EC_HOLD#	7	8	NC
EC_SMCLK_DBU	9	10	EC_SMDAT_DBG

2.4.15 General purpose I/O connector (DIO1)
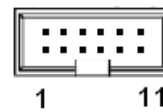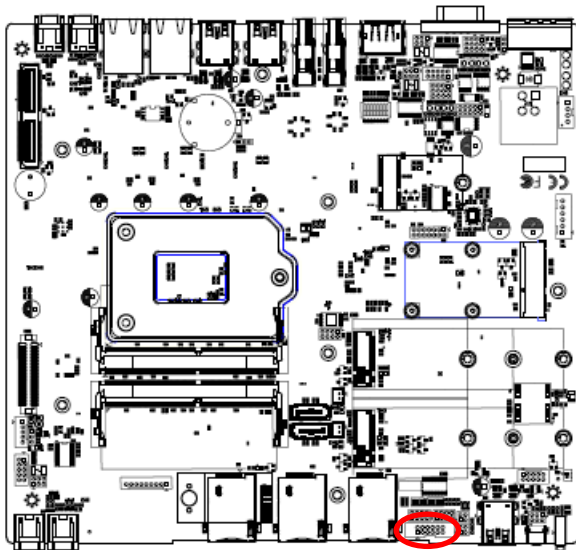
Signal	PIN	PIN	Signal
DIO_GPO0	1	2	DIO_GPI0
DIO_GPO1	3	4	DIO_GPI1
DIO_GPO2	5	6	DIO_GPI2
DIO_GPO3	7	8	DIO_GPI3
NC	9	10	NC
GND	11	12	NC

2.4.16 CAN Module connector 1 (CAN1)
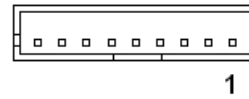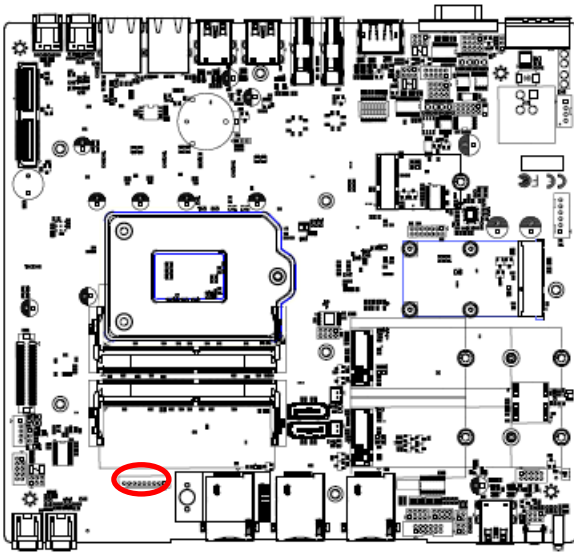
Signal	PIN
BAT_PWR	1
CAN_8	2
CAN_9	3
BAT_GND	4
CAN_11	5
CAN_12	6
CAN_13	7
CAN_14	8
NC	9

2.4.17 CAN Module connector 2 (CAN2)
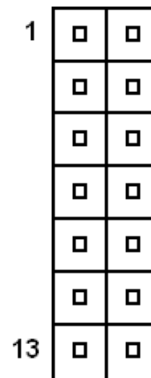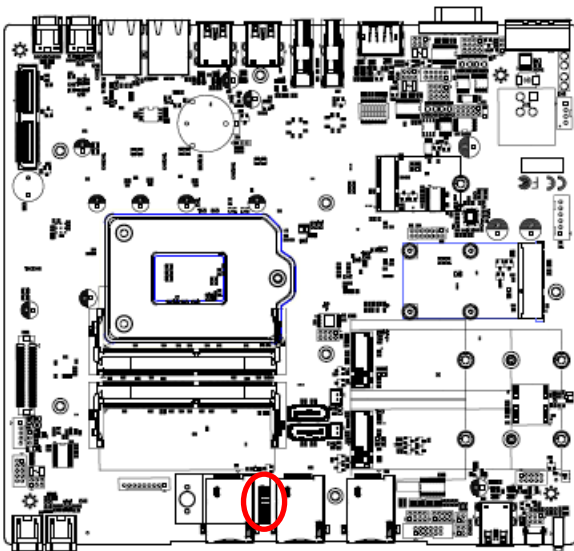
Signal	PIN	PIN	Signal
CAN_PWR	1	2	CAN_8
CAN_IND	3	4	CAN_9
GND	5	6	BAT_GND
CAN_WAKE	7	8	CAN_11
CAN_TX	9	10	CAN_12
CAN_RX	11	12	CAN_13
+5V	13	14	CAN_14

2.4.18 DC-Input connector (JVIN1)
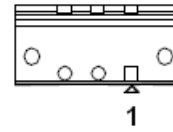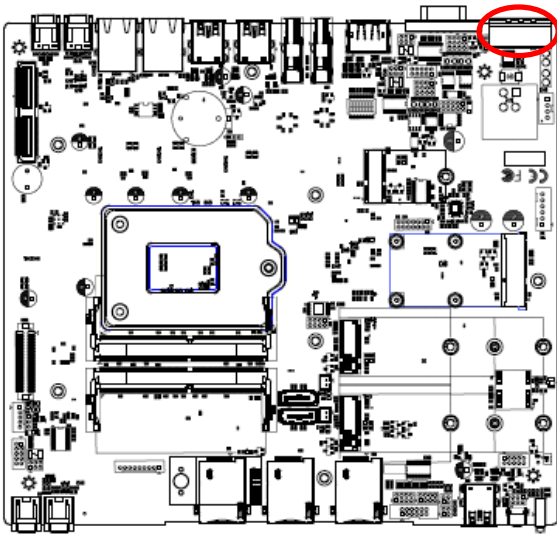
Signal	PIN
+VIN_BAT	1
ACC_ON	2
GND	3

2.4.19 Battery connector (BT1)
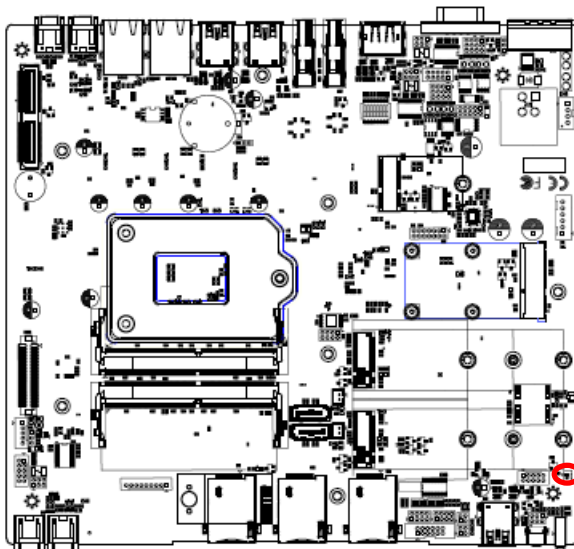
Signal	PIN
+RTCBATT	1
GND	2

2.4.20 DC Input connector (DCIN1)
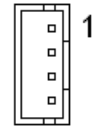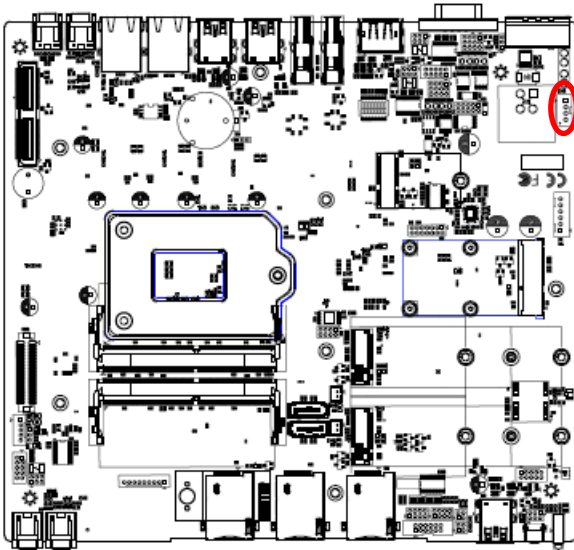
Signal	PIN
+VIN	1
+VIN	2
GND	3
GND	4

2.4.21 Front Panel connector (JFP1)
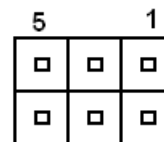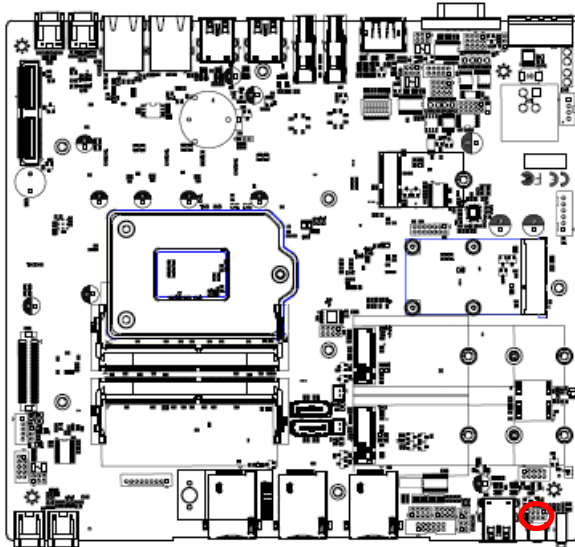
Signal	PIN	PIN	Signal
PWRBTN_R_IN#	1	2	GND
PWR_LED+	3	4	PWR_LED-
PM_R_SYSRST#	5	6	GND

2.4.22 Serial port 2 connector (JCOM2)
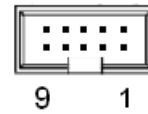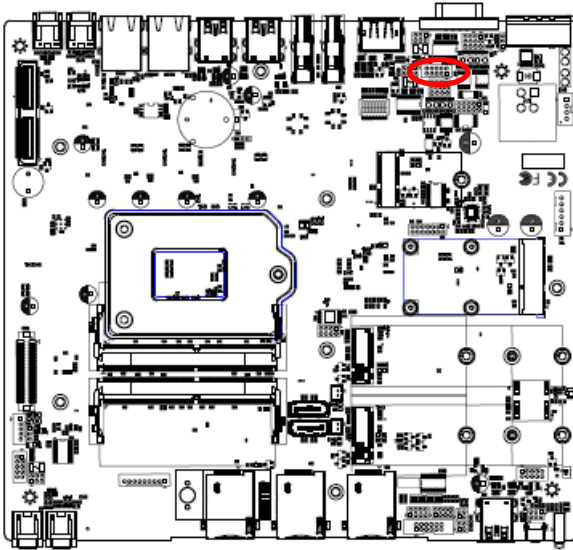
Signal	PIN	PIN	Signal
COM2-1	1	2	COM2-2
COM2-3	3	4	COM2-4
GND	5	6	NDSRB#
NRTSB#	7	8	NCTSB#
NRIB#	9	10	NC

2.4.23 Serial port 3 connector (JCOM3)
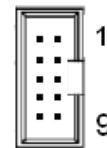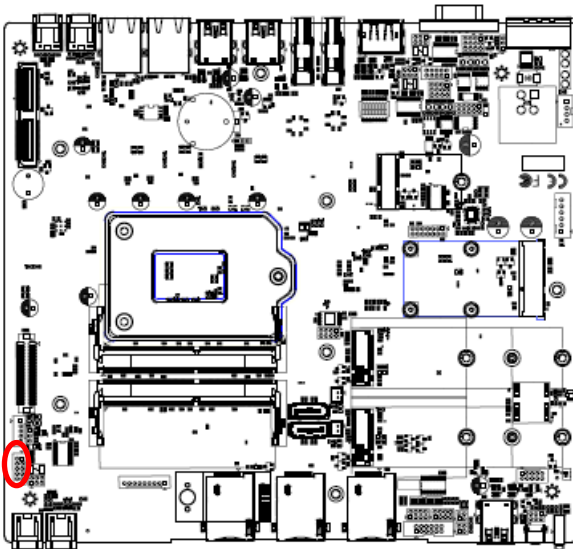
Signal	PIN	PIN	Signal
NDCDC#	1	2	NRXDC
NTXDC	3	4	NDTRC#
GND	5	6	NDSRC#
NRTSC#	7	8	NCTSC#
NRIC#	9	10	NC

2.4.24 LVDS connector (JLVDS1)
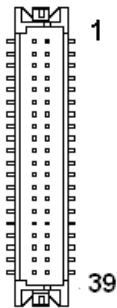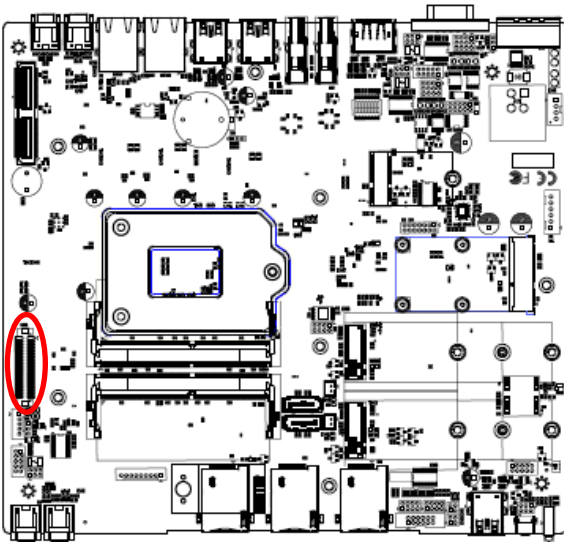
Signal	PIN	PIN	Signal
+5V	2	1	+3.3V
+5V	4	3	+3.3V
NC	6	5	NC
GND	8	7	GND
LVDS_DATA0_P	10	9	LVDS_DATA1_P
LVDS_DATA0_N	12	11	LVDS_DATA1_N
GND	14	13	GND
LVDS_DATA2_P	16	15	LVDS_DATA3_P
LVDS_DATA2_N	18	17	LVDS_DATA3_N
GND	20	19	GND
LVDS_DATA4_P	22	21	LVDS_DATA5_P
LVDS_DATA4_N	24	23	LVDS_DATA5_N
GND	26	25	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

2.4.25 USB connector (JUSB1)
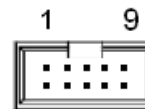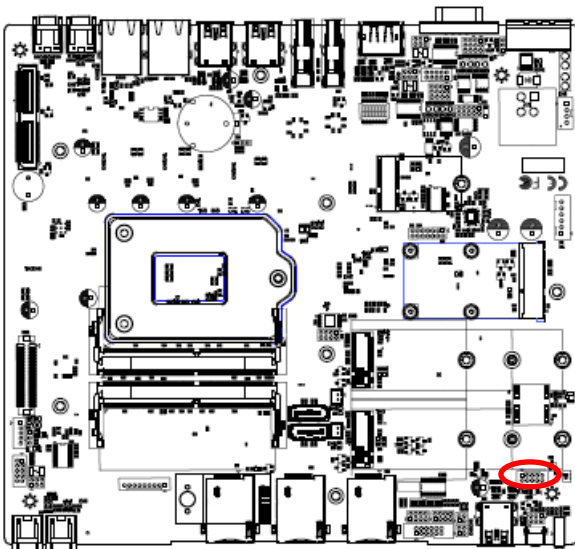
Signal	PIN	PIN	Signal
NC	1	2	+5VSB
NC	3	4	USB_DN14
NC	5	6	USB_DP14
NC	7	8	GND
NC	9	10	GND

2.5 Installing M.2 cards & Memory, PCI devices
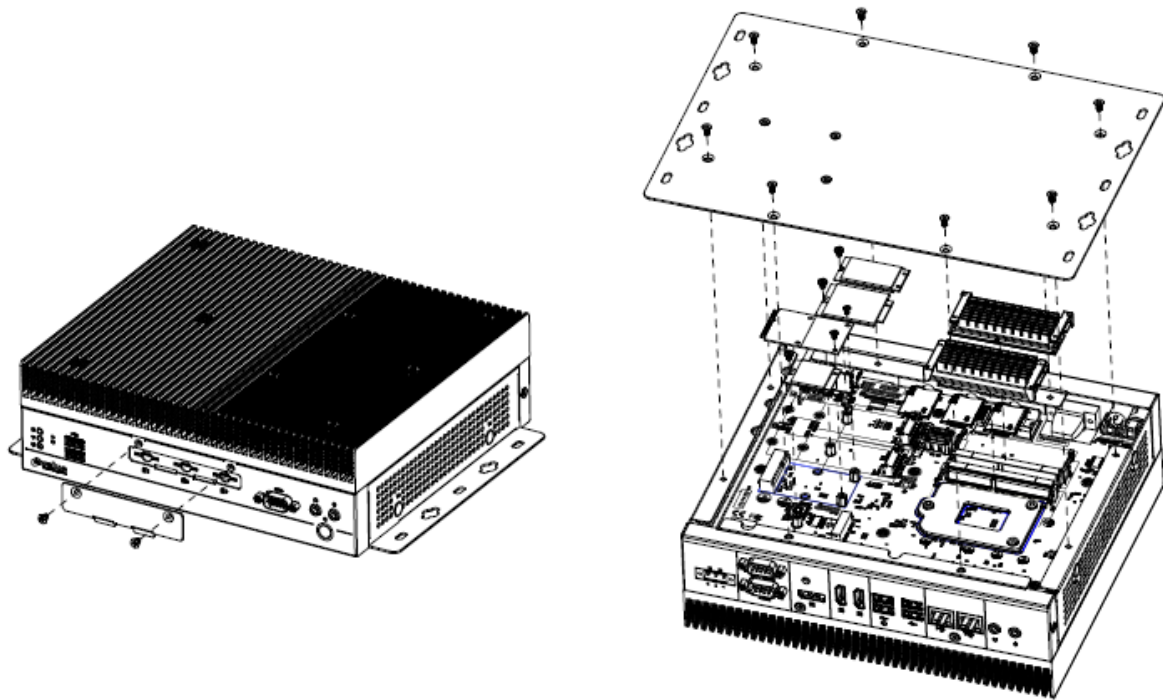
Step 1. Remove 2 screws from sim card slot.

Step 2. Remove 8 screws from the bottom of your system and take it off.

Step 3. Insert M.2 B-Key (2242)/(3042)/M.2 E-Key (2230) card into designated locations and fasten with screws.

Step 4. Slide the DDR4 SODIMM into the memory socket and press it down until properly seated.

Step 5. Insert MPCIE card into designated locations and fasten with 2 screws to complete MPCIE installation.

2.6 HDMI Cable Lock
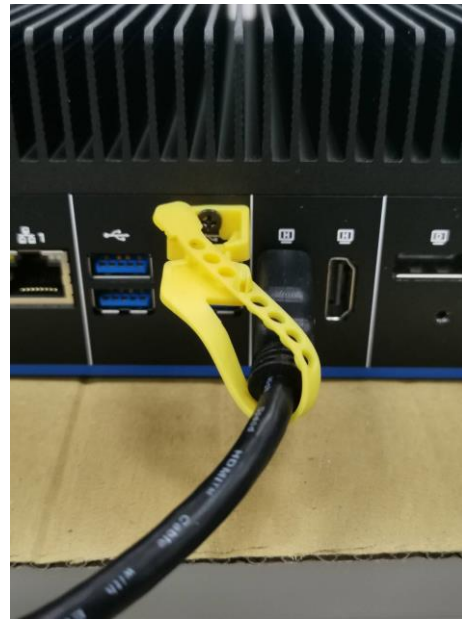
Step 1. Lock the cable tie on the screw to secure the HDMI cable.

3.BIOS Setup

3.1 Introduction

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

3.2 Starting Setup

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

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

Press <F2> or <Del> to enter SETUP

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

3.3 Using Setup

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

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

- **Navigating Through The Menu Bar**

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

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

- **To Display a Sub Menu**

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

3.4 Getting Help

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

3.5 In Case of Problems

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

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

3.6 BIOS setup

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

3.6.1 Main Menu

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

```
           Aptio Setup Utility – Copyright (C) 2023 American Megatrends, Inc.
  Main  Advanced  Chipset  Security  Boot  Save & Exit

  BIOS Information                                          Choose the system default
  BIOS Vendor                    American Megatrends        language
  Core Version                   5.13
  Compliancy                     UEFI 2.7; PI 1.6
  Project Version                1AUOK 0.41 x64
  Build Date and Time            07/11/2023 15:21:34
  Access Level                   Administrator
  EC 8528 Firmware               07
  BIOS Name                      VSCFSB01

  System Language                [English]
▶ Intel RC Version

  System Date                    [Mon 10/16/2023]          →←: Select Screen
  System Time                    [15:09:28]                ↑↓: Select Item
                                                           Enter: Select
                                                           +/-: Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F3: Optimized Defaults
                                                           F4: Save & Exit
                                                           ESC: Exit

           Version 2.20.1271. Copyright (C) 2023 American Megatrends, Inc.
```

```
           Aptio Setup Utility – Copyright (C) 2023 American Megatrends, Inc.
  Main

  Intel RC Version

  Board Information
  Board ID                       EBM-CFSV(VSCFSB01)
  LAN PHY Revision               A6 (B2 Stepping)

  Processor Information
  Name                           CoffeeLake DT
  Type                           Intel(R) Core(TM)
                                 i3-8100T CPU @ 3.10GHz
  Speed                          3100 MHz
  ID                             0x906EB
  Stepping                       B0
  Package                        LGA1151                   →←: Select Screen
  Number of Processors           4Core(s) / 4Thread(s)     ↑↓: Select Item
  Microcode Revision             B4                        Enter: Select
  GT Info                        GT2 (0x3E91)              +/-: Change Opt.
  eDRAM Size                     N/A                       F1: General Help
                                                           F2: Previous Values
  IGFX VBIOS Version             N/A                       F3: Optimized Defaults
  IGFX GOP Version               9.0.1087                  F4: Save & Exit
  Memory RC Version              0.7.1.103                 ESC: Exit
  Total Memory                    8192 MB
  Memory Frequency                2400 MHz

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```

3.6.1.1 System Language

This option allows choosing the system default language.

3.6.1.2 System Date

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

3.6.1.3 System Time

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

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

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

3.6.2 Advanced Menu

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

```
                 Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
         Main  Advanced  Chipset  Security  Boot  Save & Exit

       ▶ CPU Configuration                                    CPU Configuration Parameters
       ▶ PCH-FW Configuration
       ▶ Trusted Computing
       ▶ ACPI Settings
       ▶ IT8528 Super IO Configuration
       ▶ EC 8528 HW monitor
       ▶ S5 RTC Wake Settings
       ▶ Serial Port Console Redirection
       ▶ USB Configuration
       ▶ NVMe Configuration

       ▶ Network Stack Configuration

                                                              →←: Select Screen
                                                              ↑↓: Select Item
                                                              Enter: Select
                                                              +/-: Change Opt.
                                                              F1: General Help
                                                              F2: Previous Values
                                                              F3: Optimized Defaults
                                                              F4: Save & Exit
                                                              ESC: Exit

                 Version 2.20.1271. Copyright (C) 2019 American Megatrends, Inc.
```

3.6.2.1   CPU Configuration

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

```
              Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
         Advanced

    CPU Configuration                                      When enabled, a VMM can
                                                           utilize the additional
    Type                           Intel(R) Core(TM)       hardware capabilities provided
                                   i3-8100T CPU @ 3.10GHz  by Vanderpool Technology.
    ID                             0x906EB
    Speed                          3100 MHz
    L1 Data Cache                  32 KB x 4
    L1 Instruction Cache           32 KB x 4
    L2 Cache                       256 KB x 4
    L3 Cache                       6 MB
    L4 Cache                       N/A
    VMX                            Supported
    SMX/TXT                        Not Supported

    CPU Flex Ratio Settings        20
    Intel (VMX) Virtualization     [Enabled]               ↔: Select Screen
    Technology                                             ↑↓: Select Item
    Active Processor Cores         [All]                    Enter: Select
  ▶ CPU - Power Management Control                         +/-: Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F3: Optimized Defaults
                                                           F4: Save & Exit
                                                           ESC: Exit



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```

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

3.6.2.1.1 CPU – Power Management Control

```
              Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
              Advanced

     CPU - Power Management Control                           Allows more than two frequency
                                                               ranges to be supported.
     Intel(R) SpeedStep(tm)              [Enabled]
     Intel(R) Speed Shift Technology     [Enabled]
     C states                            [Enabled]
       Enhanced C-states                 [Enabled]
       C-State Auto Demotion             [C1 and C3]
       C-State Un-demotion               [C1 and C3]
       Package C-State Demotion          [Disabled]
       Package C-State Un-demotion       [Disabled]
     Package C State Limit               [Auto]


                                                              ++: Select Screen
                                                              ↑↓: Select Item
                                                              Enter: Select
                                                              +/-: Change Opt.
                                                              F1: General Help
                                                              F2: Previous Values
                                                              F3: Optimized Defaults
                                                              F4: Save & Exit
                                                              ESC: Exit



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```

Item	Option	Description
Intel® SpeedStep™	Enabled**[Default]**, Disabled	Allows more than two frequency ranges to be supported.
Intel® Speed Shift Technology	Enabled**[Default]**, Disabled	Enable/Disable Intel® Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.
C States	Enabled**[Default]**, Disabled	Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.
Enhanced C-states	Enabled**[Default]**, Disabled	Enable/Disable C1E. When enabled, CPU will switch to minimum speed when all cores enter C-State.
C-State Auto Demotion	Disabled, C1 C3 C1 and C3**[Default]**	Configure C-State Auto Demotion.
C-State Un-demotion	Disabled, C1 C3 C1 and C3**[Default]**	Configure C-State Un-demotion.
Package C-State Demotion	Enabled Disabled**[Default]**,	Package C-State Demotion.
Package C-State Un-demotion	Enabled Disabled**[Default]**,	Package C-State Un-demotion.
Package C State Limit	C0/C1 C2 C3 C6 C7 C7S	Maximum Package C State Limit Setting. CPU Default: Leaves to Factory default value. Auto: Initializes to deepest available Package C State Limit.

	C8	
	C9	
	C10	
	CPU Default	
	Auto**[Default]**	

3.6.2.2 PCH-FW Configuration
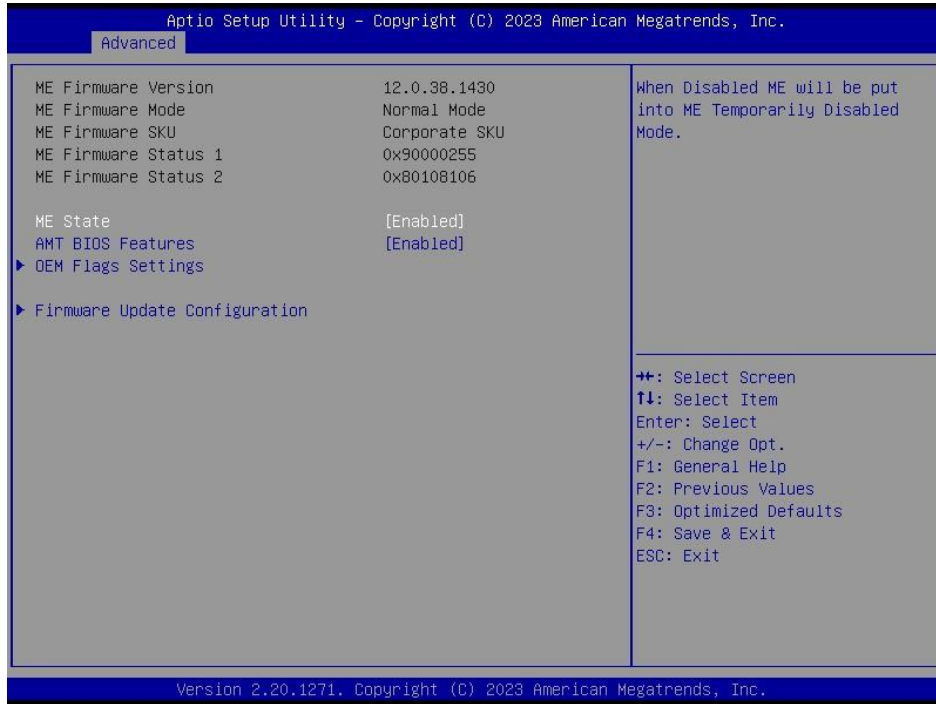
Item	Options	Description
ME State	Disabled, Enabled**[Default]**	When Disabled ME will be put into ME Temporarily Disabled Mode.
AMT BIOS Features	Disabled, Enabled**[Default]**	When disable AMT BIOS Features are no longer supported and user is no longer able to access MEBx Setup. Note: This option does not disable Manageability Features in FW.

3.6.2.2.1 OEM Flags Settings
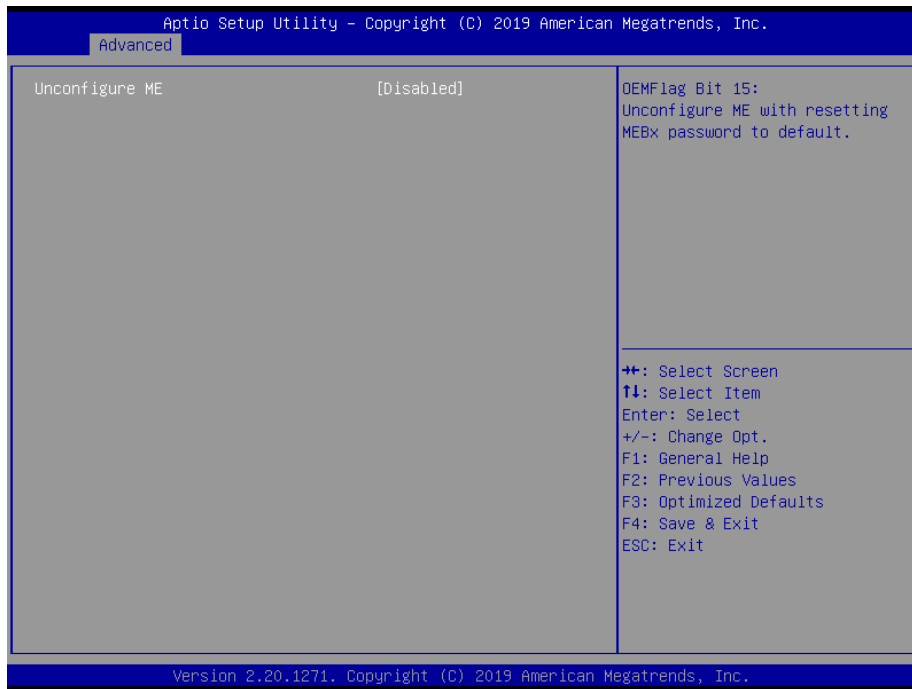
Item	Option	Description
Unconfigure ME	Disabled**[Default]**, Enabled	OEMFlag Bit 15: Unconfigure ME with resetting MEBx password to default.

3.6.2.2.2 Firmware Update Configuration

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

3.6.2.3 Trusted Computing
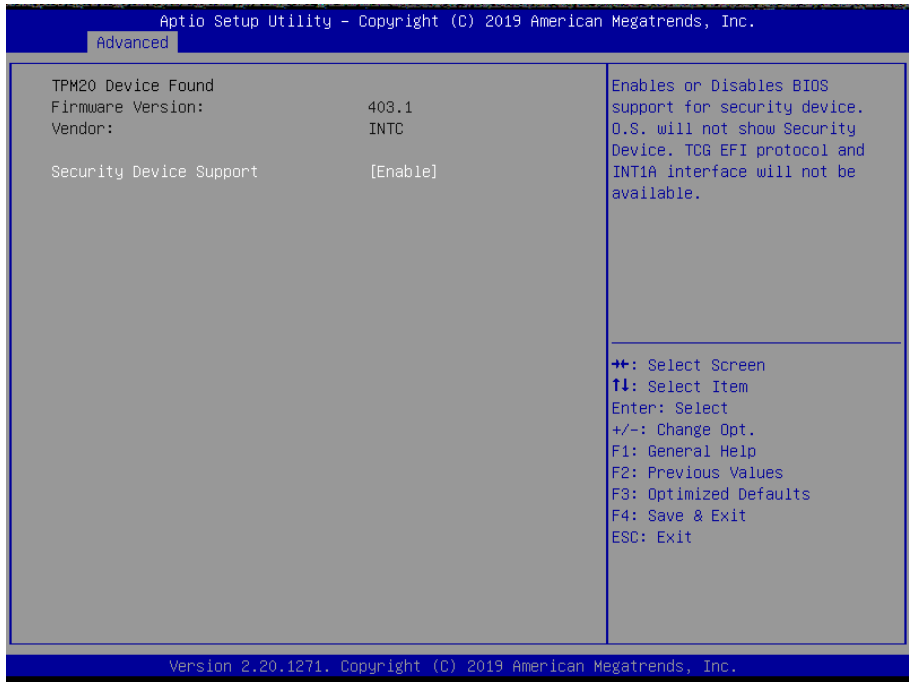
Item	Options	Description
Security Device Support	Disable, Enable**[Default]**	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

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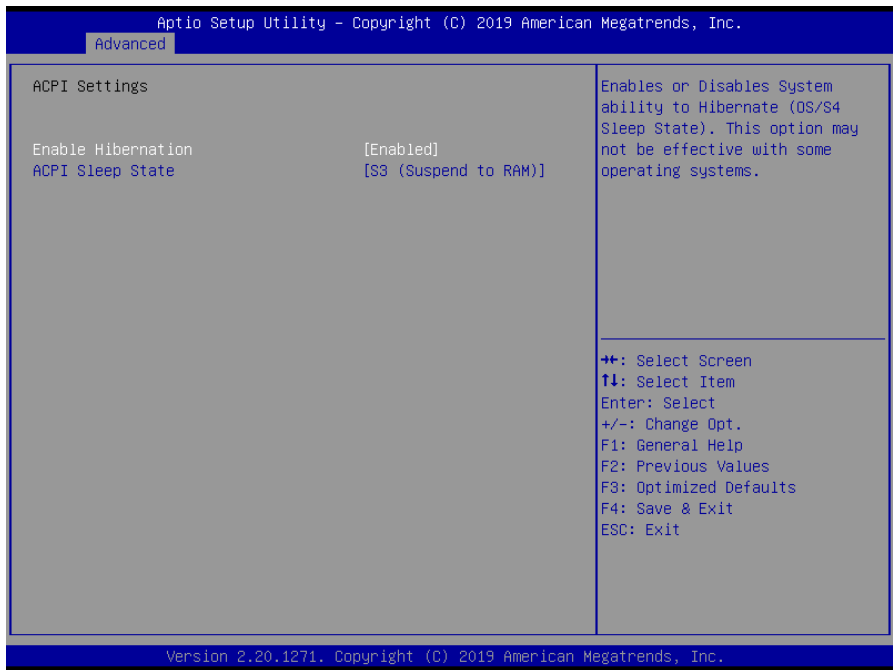
Item	Options	Description
Enable Hibernation	Disabled Enabled**[Default]**,	Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some operating systems.
ACPI Sleep State	Suspend Disabled, S3 (Suspend to RAM)**[Default]**	Select the highest ACPI sleep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

3.6.2.5 IT8528 Super IO Configuration

You can use this item to set up or change the IT8528 Super IO configuration for serial ports. Please refer to 3.6.2.5.1~ 3.6.2.5.2 for more information.

```
              Aptio Setup Utility – Copyright (C) 2023 American Megatrends, Inc.
              Advanced

        IT8528 Super IO Configuration                        Set Parameters of Serial Port
                                                             1 (COMA)
        Super IO Chip                      IT8528
      ▶ Serial Port 1 Configuration
      ▶ Serial Port 2 Configuration




                                                             ➤←: Select Screen
                                                             ↑↓: Select Item
                                                             Enter: Select
                                                             +/-: Change Opt.
                                                             F1: General Help
                                                             F2: Previous Values
                                                             F3: Optimized Defaults
                                                             F4: Save & Exit
                                                             ESC: Exit


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```

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

3.6.2.5.1 Serial Port 1 Configuration
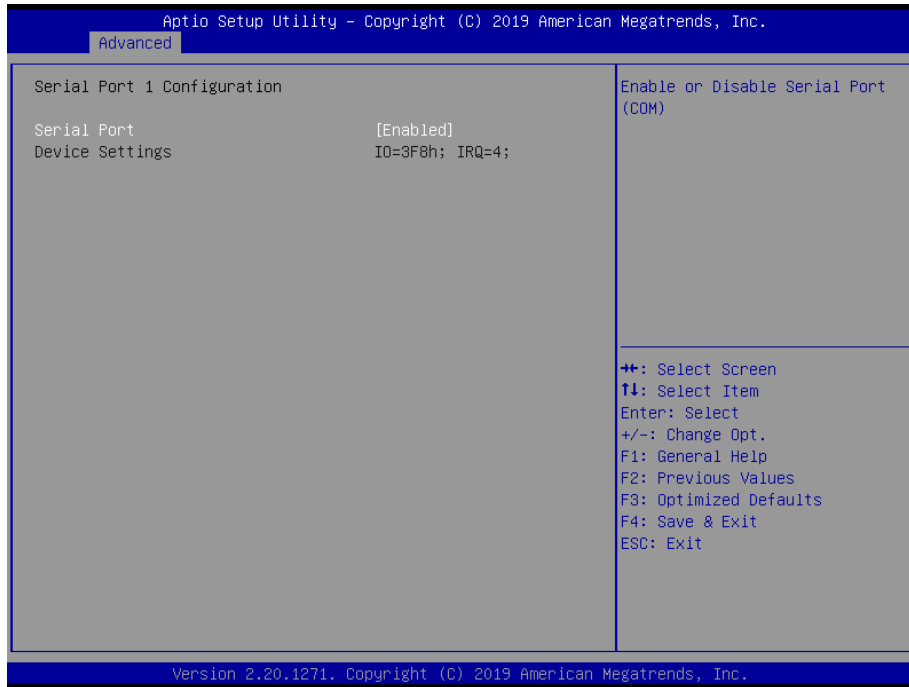
```
                    Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
          Advanced

  Serial Port 1 Configuration                                      Enable or Disable Serial Port
                                                                   (COM)
  Serial Port                        [Enabled]
  Device Settings                    IO=3F8h; IRQ=4;




                                                                   →←: Select Screen
                                                                   ↑↓: Select Item
                                                                   Enter: Select
                                                                   +/-: Change Opt.
                                                                   F1: General Help
                                                                   F2: Previous Values
                                                                   F3: Optimized Defaults
                                                                   F4: Save & Exit
                                                                   ESC: Exit



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```

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

3.6.2.5.2 Serial Port 2 Configuration
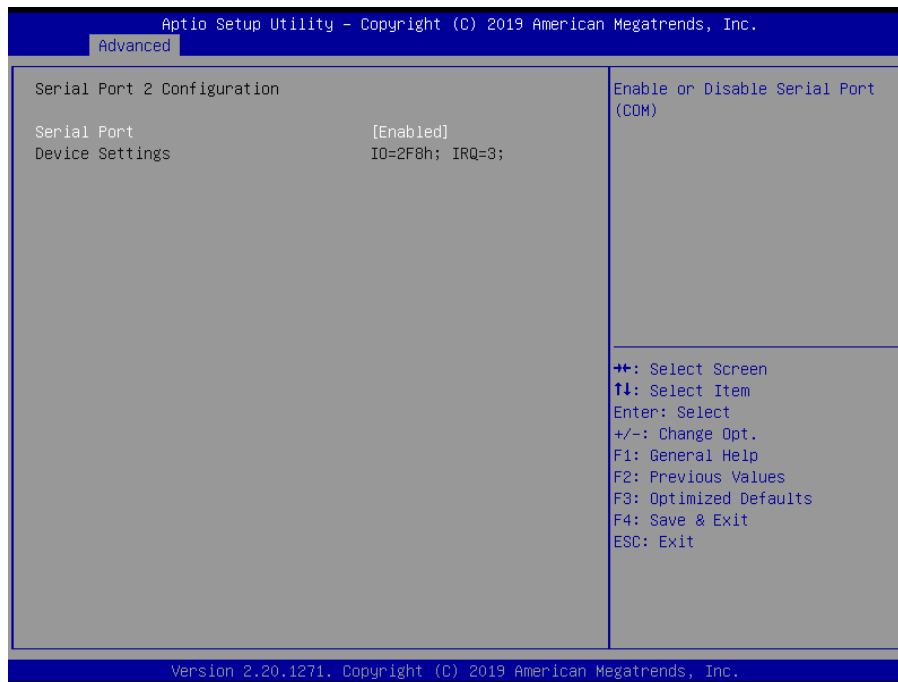
```
                    Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
          Advanced

  Serial Port 2 Configuration                                      Enable or Disable Serial Port
                                                                   (COM)
  Serial Port                        [Enabled]
  Device Settings                    IO=2F8h; IRQ=3;




                                                                   →←: Select Screen
                                                                   ↑↓: Select Item
                                                                   Enter: Select
                                                                   +/-: Change Opt.
                                                                   F1: General Help
                                                                   F2: Previous Values
                                                                   F3: Optimized Defaults
                                                                   F4: Save & Exit
                                                                   ESC: Exit



                    Version 2.20.1271. Copyright (C) 2019 American Megatrends, Inc.
```

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

3.6.2.6 EC 8528 HW Monitor

```
            Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
          Advanced

    Pc Health Status                                              Set this item for Vehicle PC
    PC Mode select                    [Vehicle PC]                funciton
    ErP Function                      [Disabled]
    Power On Delay                    [w/o delay]
    Power Off Delay                   [w/o delay]
    Vin boot/Shutdown                 [Disabled]

    CPU temperature                   : +37 C
    System temperature                : +31 C
    VIN                               : +18.750 V
    VCORE                             : +0.914 V
    IGNITION state                    : On
    SHDN_U state                      : On                        ++: Select Screen
    Power off delay count down        : Stop                      ↑↓: Select Item
    BAT mode switch(Onboard)          : 9V-36V                    Enter: Select
    Vin<Vshutdown 1min timer          :                           +/-: Change Opt.
    Vin<Vshutdown 5min timer          : 00:00:00                  F1: General Help
    Force shutdown 1min timer         : 00                        F2: Previous Values
                                                                  F3: Optimized Defaults
                                                                  F4: Save & Exit
                                                                  ESC: Exit




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```

Item	Options	Description
PC Mode select	Industry PC Vehicle PC**[Default]**	Set this item for Vehicle PC function.
ErP Function	Enabled, Disabled**[Default]**	ErP Function(Deep S5).
Power On Delay	w/o delay**[Default]** 10 Sec 30 Sec 1 Min 5 Min 10 Min 15 Min 30 Min 1 Hour	Power On Delay.
Power Off Delay	w/o delay**[Default]** 20 Sec 1 Min 5 Min 10 Min 30 Min 1 Hour 6 Hour 18 Hour	Power Off Delay.
Vin boot/Shutdown	Disabled**[Default]** (11.5V, 10.5V)/(23V, 21V) (12.0V, 11.0V)/(24V, 22V) (12.5V, 11.0V)/(25V, 22V) (12.5V, 11.5V)/(25V, 23V)	Vin > Vboot: Allow system power on Vin < Vshutdown: system shutdown.

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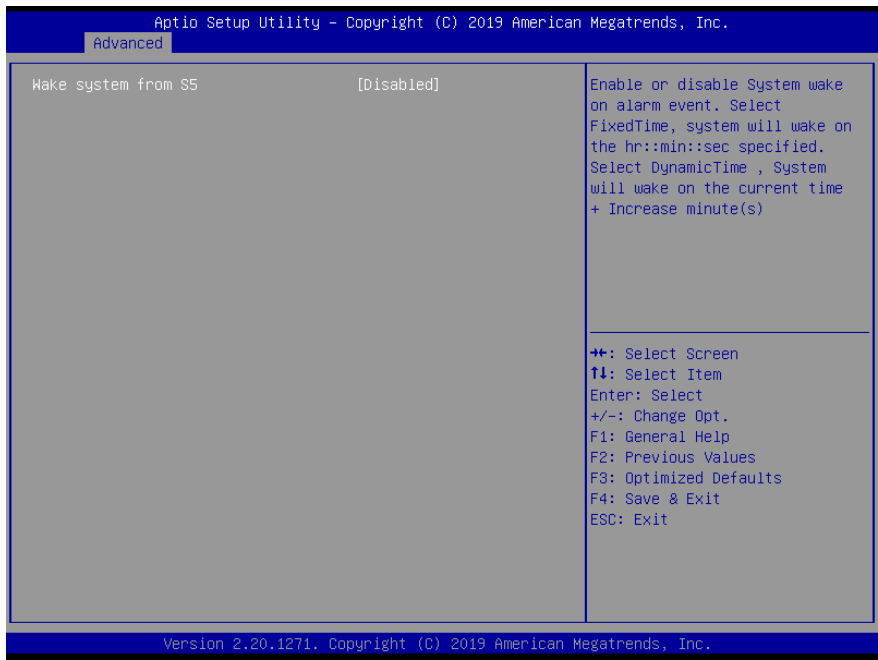
Item	Options	Description
Wake system from S5	Disabled**[Default]**, Fixed Time Dynamic Time	Enable or disable System wake on alarm event. Select Fixed Time, system will wake on the hr::min::sec specified. Select Dynamic Time, System will wake on the current time + Increase minute(s).

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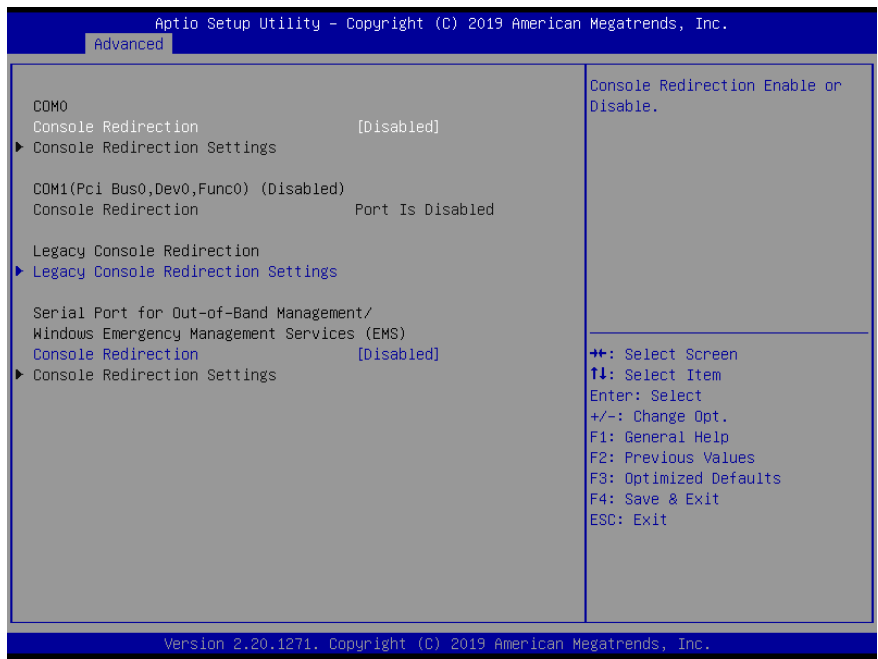
Item	Options	Description
Console Redirection	Disabled**[Default]**, Enabled	Console Redirection Enable or Disable.

3.6.2.8.1 Legacy Console Redirection Settings

```
            Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
        Advanced

 Legacy Console Redirection Settings                          Select a COM port to display
                                                              redirection of Legacy OS and
 Redirection COM Port              [COM0]                     Legacy OPROM Messages
 Resolution                        [80x24]
 Redirect After POST               [Always Enable]



                                                              →←: Select Screen
                                                              ↑↓: Select Item
                                                              Enter: Select
                                                              +/-: Change Opt.
                                                              F1: General Help
                                                              F2: Previous Values
                                                              F3: Optimized Defaults
                                                              F4: Save & Exit
                                                              ESC: Exit



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```

Item	Option	Description
Redirection COM Port	COM0**[Default]**	Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages.
Resolution	80x24**[Default]** 80x25	On Legacy OS, the Number of Rows and Columns supported redirection.
Redirect After POST	Always Enable**[Default]** BootLoader	When Bootloader is selected, then Legacy Console Redirection is disabled before booting to legacy OS. When Always Enable is selected, then Legacy Console Redirection is enabled for legacy OS. Default setting for this option is set to Always Enable.

3.6.2.9   USB Configuration

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

```
                Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
          Advanced

     USB Configuration                                    The time-out value for
                                                          Control, Bulk, and Interrupt
     USB Module Version              23                   transfers.

     USB Controllers:
          1 XHCI
     USB Devices:
          1 Drive, 1 Keyboard, 1 Mouse, 1 Hub


     USB hardware delays and time-outs:
     USB transfer time-out              [20 sec]
     Device reset time-out              [20 sec]
     Device power-up delay              [Auto]            →←: Select Screen
                                                          ↑↓: Select Item
     Mass Storage Devices:                                Enter: Select
     JetFlashTranscend 8GB 1100         [Auto]            +/-: Change Opt.
                                                          F1: General Help
                                                          F2: Previous Values
                                                          F3: Optimized Defaults
                                                          F4: Save & Exit
                                                          ESC: Exit




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```

Item	Options	Description
USB transfer time-out	1 sec 5 sec 10 sec 20 sec**[Default]**	The time-out value for Control, Bulk, and Interrupt transfers.
Device reset time-out	10 sec 20 sec**[Default]** 30 sec 40 sec	USB mass storage device Start Unit command time-out.
Device power-up delay	Auto**[Default]** Manual	Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 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.

3.6.2.10 NVMe Configuration

```
              Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
      Advanced

   NVMe Configuration

   No NVME Device Found

                                                                ++: Select Screen
                                                                ↑↓: Select Item
                                                                Enter: Select
                                                                +/-: Change Opt.
                                                                F1: General Help
                                                                F2: Previous Values
                                                                F3: Optimized Defaults
                                                                F4: Save & Exit
                                                                ESC: Exit

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```

3.6.2.11 Network Stack Configuration

```
              Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
      Advanced

   Network Stack                    [Disabled]         Enable/Disable UEFI Network
                                                        Stack

                                                                ++: Select Screen
                                                                ↑↓: Select Item
                                                                Enter: Select
                                                                +/-: Change Opt.
                                                                F1: General Help
                                                                F2: Previous Values
                                                                F3: Optimized Defaults
                                                                F4: Save & Exit
                                                                ESC: Exit

              Version 2.20.1271. Copyright (C) 2019 American Megatrends, Inc.
```

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

3.6.3 Chipset

```
        Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
      Main  Advanced  Chipset  Security  Boot  Save & Exit

 ▶ System Agent (SA) Configuration                  System Agent (SA) Parameters
 ▶ PCH-IO Configuration
 ▶ Board & Panel Configuration




                                                    →←: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F3: Optimized Defaults
                                                    F4: Save & Exit
                                                    ESC: Exit



        Version 2.20.1271. Copyright (C) 2019 American Megatrends, Inc.
```

3.6.3.1 System Agent (SA) Configuration

```
        Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
        Chipset

 System Agent (SA) Configuration                    Memory Configuration Parameters

 SA PCIe Code Version          7.0.92.80
 VT-d                          Supported

 ▶ Memory Configuration
 ▶ Graphics Configuration
 VT-d                          [Enabled]

                                                    →←: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F3: Optimized Defaults
                                                    F4: Save & Exit
                                                    ESC: Exit



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```

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

3.6.3.1.1 Memory Configuration

```
              Aptio Setup Utility - Copyright (C) 2023 American Megatrends, Inc.
                 Chipset

   Memory Configuration                                   Maximum Value of TOLUD.
                                                          Dynamic assignment would
   Memory RC Version              0.7.1.103               adjust TOLUD automatically
   Memory Frequency                2400 MHz               based on largest MMIO length
   Memory Timings (tCL-tRCD-tRP-tRAS)  17-17-17-39        of installed graphic controller

   Channel 0 Slot 0              Populated & Enabled
      Size                       8192 MB (DDR4)
      Number of Ranks            1
      Manufacturer               Micron
   Channel 1 Slot 0              Not Populated / Disabled

   Max TOLUD                     [Dynamic]
                                                          →←: Select Screen
                                                          ↑↓: Select Item
                                                          Enter: Select
                                                          +/-: Change Opt.
                                                          F1: General Help
                                                          F2: Previous Values
                                                          F3: Optimized Defaults
                                                          F4: Save & Exit
                                                          ESC: Exit

              Version 2.20.1271. Copyright (C) 2023 American Megatrends, Inc.
```

Item	Option	Description
Max TOLUD	Dynamic**[Default]** 1 GB 1.25 GB 1.5 GB 1.75 GB 2 GB 2.25 GB 2.5 GB 2.75 GB 3 GB	Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller.

3.6.3.1.2 Graphics Configuration

```
                Aptio Setup Utility – Copyright (C) 2019 American Megatrends, Inc.
                   Chipset

   Graphics Configuration                                          Select which of IGFX/PEG/PCI
                                                                   Graphics device should be
                                                                   Primary Display Or select SG
   Primary Display                       [Auto]                    for Switchable Gfx.




                                                                   ──────────────────────────────
                                                                   →←: Select Screen
                                                                   ↑↓: Select Item
                                                                   Enter: Select
                                                                   +/-: Change Opt.
                                                                   F1: General Help
                                                                   F2: Previous Values
                                                                   F3: Optimized Defaults
                                                                   F4: Save & Exit
                                                                   ESC: Exit




                Version 2.20.1271. Copyright (C) 2019 American Megatrends, Inc.
```
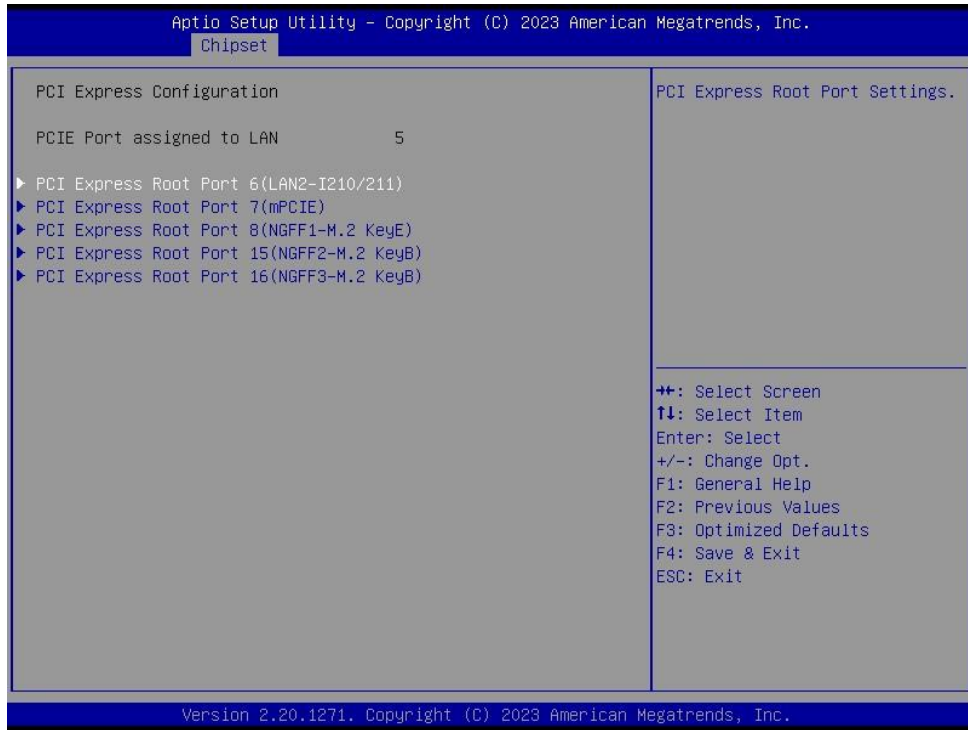
Item	Option	Description
Primary Display	Auto**[Default]** IGFX	Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select SG for Switchable Gfx.

3.6.3.2 PCH-IO Configuration

```
                Aptio Setup Utility – Copyright (C) 2019 American Megatrends, Inc.
                   Chipset

   PCH–IO Configuration                                            PCI Express Configuration
                                                                   settings
 ▶ PCI Express Configuration
 ▶ SATA And RST Configuration
 ▶ HD Audio Configuration

   PCH LAN Controller                    [Enabled]




                                                                   ──────────────────────────────
                                                                   →←: Select Screen
                                                                   ↑↓: Select Item
                                                                   Enter: Select
                                                                   +/-: Change Opt.
                                                                   F1: General Help
                                                                   F2: Previous Values
                                                                   F3: Optimized Defaults
                                                                   F4: Save & Exit
                                                                   ESC: Exit




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```

Item	Option	Description
PCH LAN Controller	Disabled Enabled**[Default]**	Enable/Disable onboard NIC.

3.6.3.2.1 PCI Express Configuration

3.6.3.2.1.1 PCI Express Root Port 6(LAN2-I210/I211)

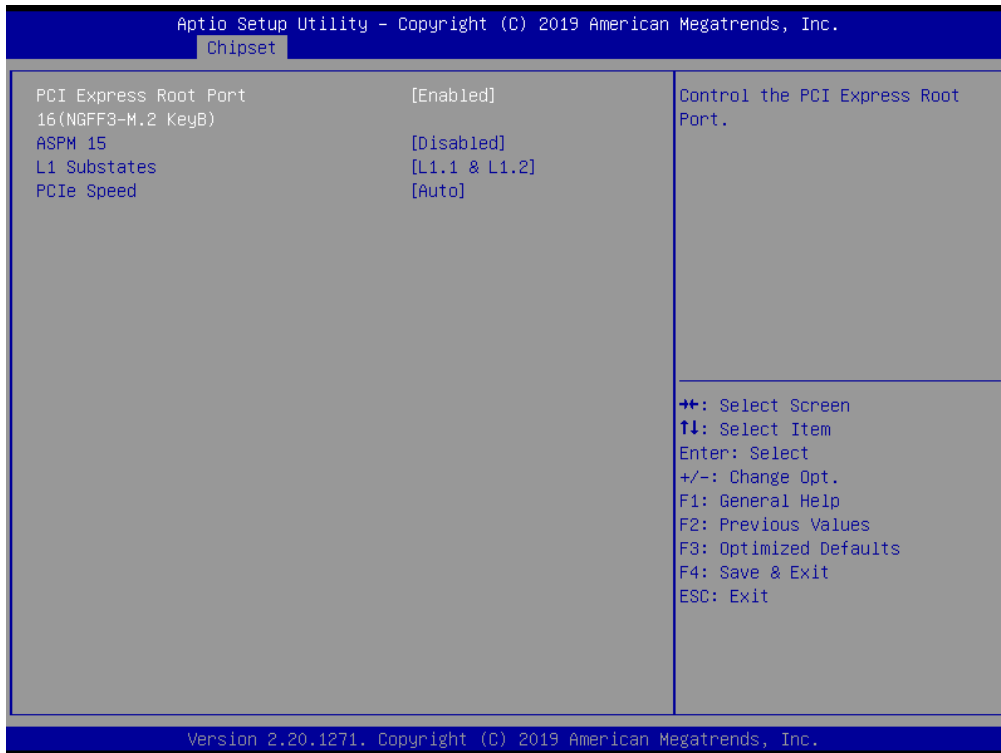| Item	Option	Description
PCI Express Root Port 6(LAN2-I210/I211)	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM 5	Disabled**[Default]**, L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
L1 Substates	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 7(mPCIE)
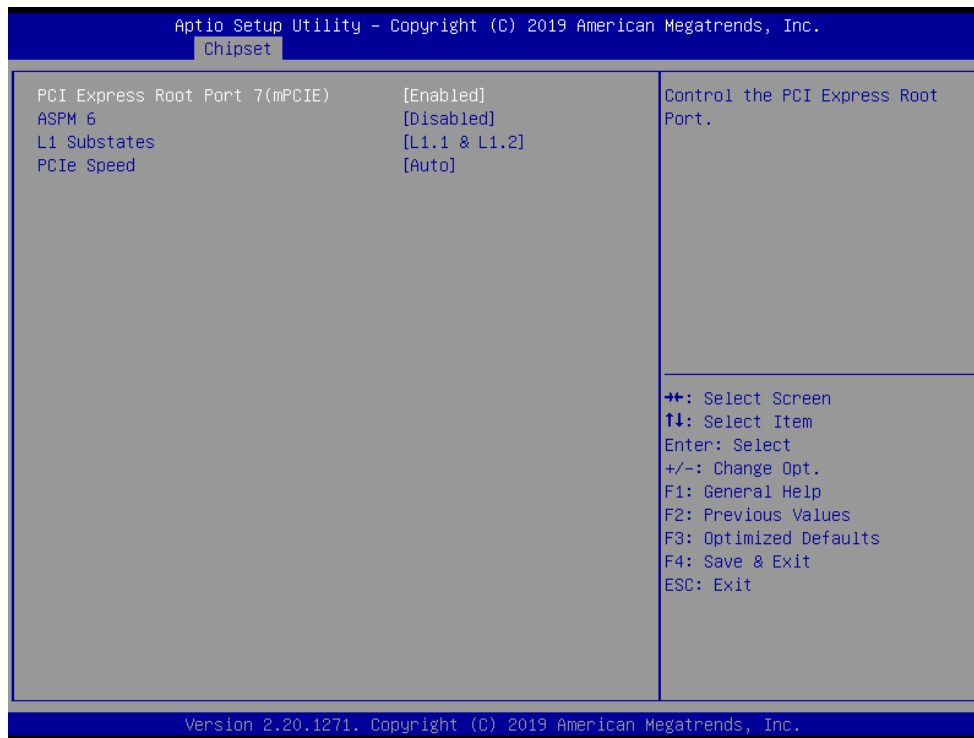
Item	Option	Description
PCI Express Root Port 7(mPCIE)	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM 6	Disabled**[Default]**, L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
L1 Substates	Disabled, L1.1 L1.1 & L1.2**[Default]**	PCI Express L1 Substates settings.

	Auto**[Default]**	
PCIe Speed	Gen1 Gen2 Gen3	Configure PCIe Speed.

3.6.3.2.1.3 PCI Express Root Port 8(NGFF1-M.2 KeyE)

```
Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
   Chipset

PCI Express Root Port 8(NGFF1-M.2   [Enabled]          Control the PCI Express Root
KeyE)                                                  Port.
ASPM 7                              [Disabled]
L1 Substates                        [L1.1 & L1.2]
PCIe Speed                          [Auto]




                                                       →←: Select Screen
                                                       ↑↓: Select Item
                                                       Enter: Select
                                                       +/-: Change Opt.
                                                       F1: General Help
                                                       F2: Previous Values
                                                       F3: Optimized Defaults
                                                       F4: Save & Exit
                                                       ESC: Exit




    Version 2.20.1271. Copyright (C) 2019 American Megatrends, Inc.
```
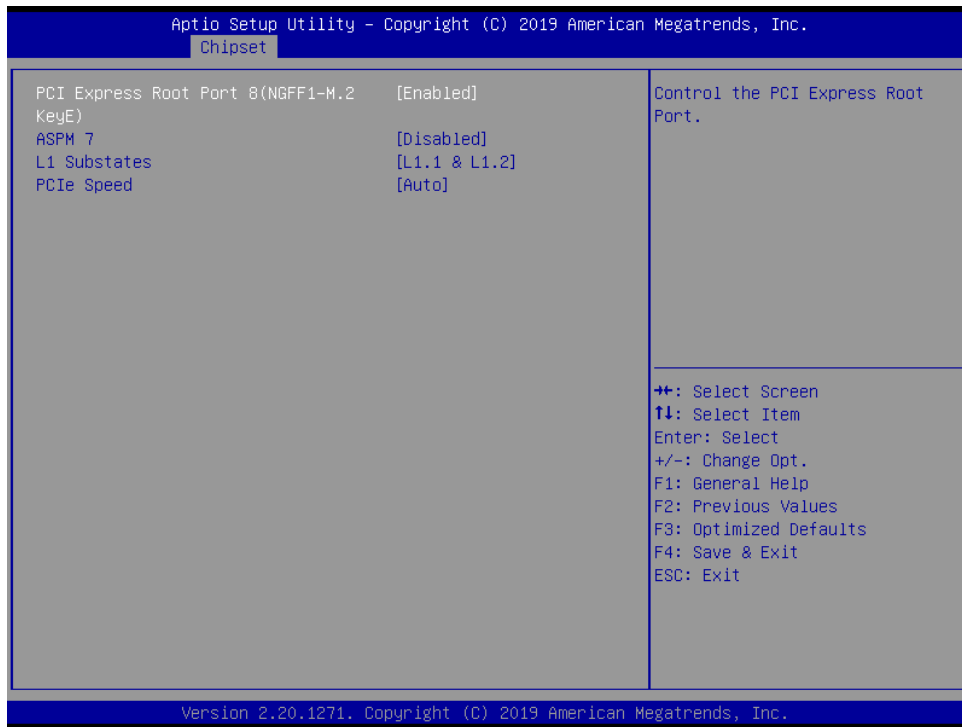
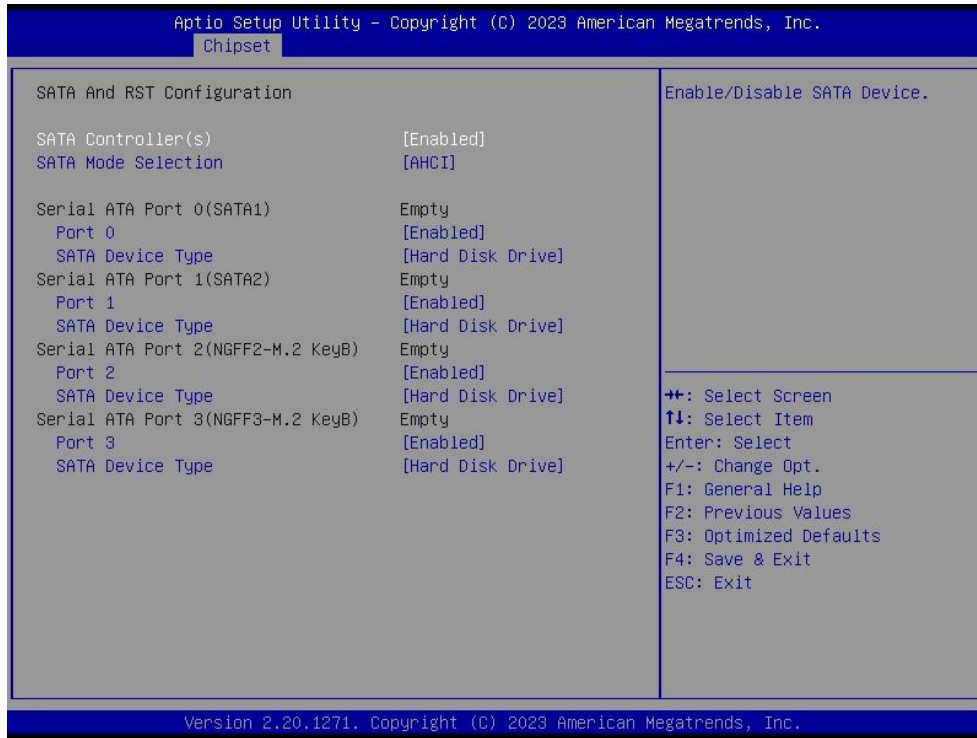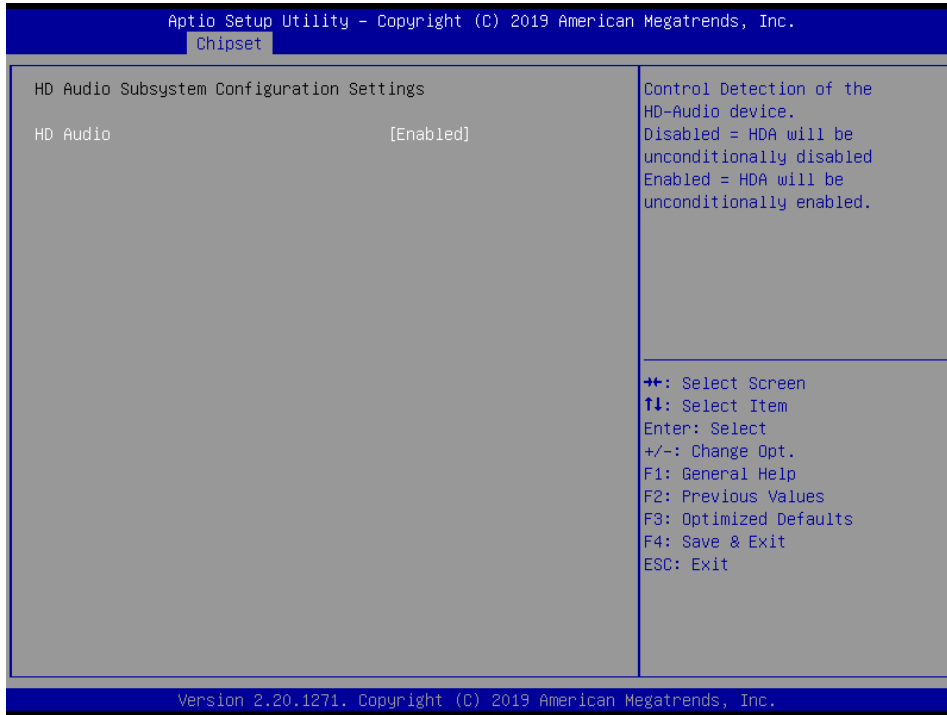| Item	Option	Description
PCI Express Root Port 8(NGFF1-M.2 KeyE)	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM 7	Disabled**[Default]**, L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
L1 Substates	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 15(NGFF2-M.2 KeyB)

```
              Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
                Chipset

  PCI Express Root Port            [Enabled]                  Control the PCI Express Root
  15(NGFF2-M.2 KeyB)                                          Port.
  ASPM 14                          [Disabled]
  L1 Substates                     [L1.1 & L1.2]
  PCIe Speed                       [Auto]




                                                           ←→: Select Screen
                                                           ↑↓: Select Item
                                                           Enter: Select
                                                           +/-: Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F3: Optimized Defaults
                                                           F4: Save & Exit
                                                           ESC: Exit



              Version 2.20.1271. Copyright (C) 2019 American Megatrends, Inc.
```
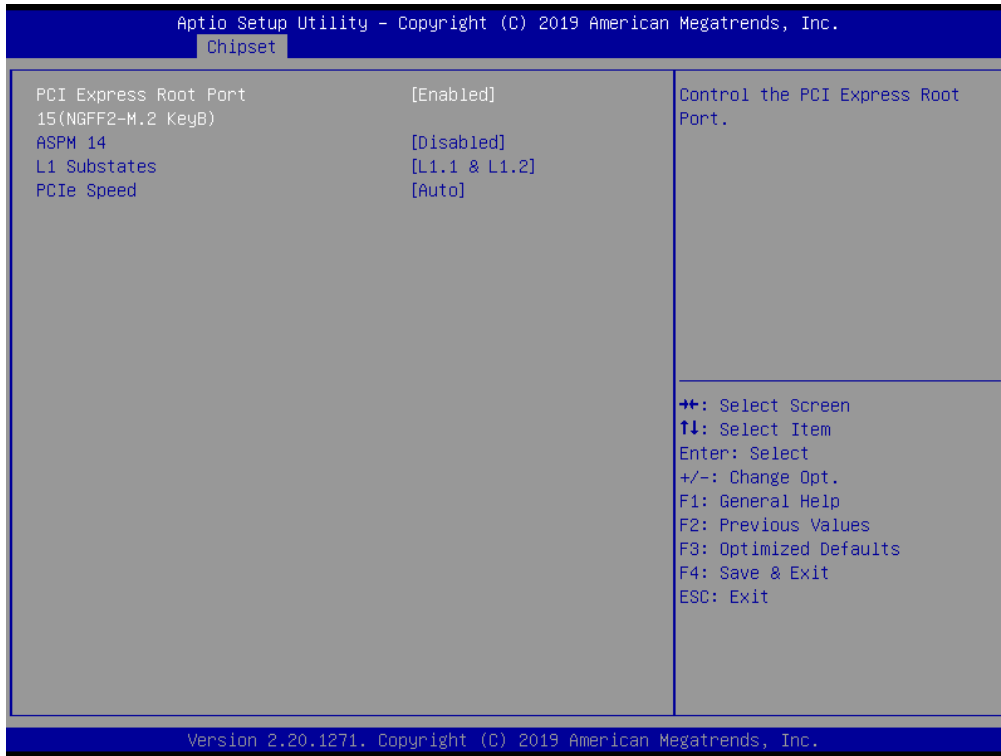
Item	Option	Description
PCI Express Root Port 15(NGFF2-M.2 KeyB)	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM 14	Disabled**[Default]**, L0s, L1, L0sL1, Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
L1 Substates	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 16(NGFF3-M.2 KeyB)

```
                    Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
                    Chipset

  PCI Express Root Port              [Enabled]                    Control the PCI Express Root
  16(NGFF3-M.2 KeyB)                                              Port.
  ASPM 15                            [Disabled]
  L1 Substates                       [L1.1 & L1.2]
  PCIe Speed                         [Auto]




                                                                 →←: Select Screen
                                                                 ↑↓: Select Item
                                                                 Enter: Select
                                                                 +/-: Change Opt.
                                                                 F1: General Help
                                                                 F2: Previous Values
                                                                 F3: Optimized Defaults
                                                                 F4: Save & Exit
                                                                 ESC: Exit


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```

Item	Option	Description
PCI Express Root Port 16(NGFF3-M.2 KeyB)	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM 15	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.
SATA Mode Selection	AHCI**[Default]**, Intel RST Premium With Intel Optane System Acceleration	Determines how SATA controller(s) operate.
Port 0/1/2/3	Enabled**[Default]** Disabled	Enable or Disable SATA Port.
SATA Device Type	Hard Disk Drive**[Default]** Solid State Drive	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.

3.6.3.2.3 HD Audio Configuration

```
                 Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
                    Chipset

    HD Audio Subsystem Configuration Settings                  Control Detection of the
                                                               HD-Audio device.
    HD Audio                          [Enabled]                Disabled = HDA will be
                                                               unconditionally disabled
                                                               Enabled = HDA will be
                                                               unconditionally enabled.



                                                               ←→: Select Screen
                                                               ↑↓: Select Item
                                                               Enter: Select
                                                               +/-: Change Opt.
                                                               F1: General Help
                                                               F2: Previous Values
                                                               F3: Optimized Defaults
                                                               F4: Save & Exit
                                                               ESC: Exit




                 Version 2.20.1271. Copyright (C) 2019 American Megatrends, Inc.
```

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

```
                 Aptio Setup Utility - Copyright (C) 2023 American Megatrends, Inc.
                    Chipset

    Board & Panel Configuration                                AC loss resume.


    PWR-On After PWR-Fail              [Off]
    Wake Up by Ring                    [Enabled]
    Watch Dog                          [Disabled]
    USB Standby Power                  [Enabled]

    SHOW DMI INFO                      [Disabled]



                                                               ←→: Select Screen
                                                               ↑↓: Select Item
                                                               Enter: Select
                                                               +/-: Change Opt.
                                                               F1: General Help
                                                               F2: Previous Values
                                                               F3: Optimized Defaults
                                                               F4: Save & Exit
                                                               ESC: Exit




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```

VMS-CFS-SLIM

Item	Option	Description
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	Disabled Enabled**[Default]**	Enable/Disabled USB Standby Power during S3/S4/S5.
SHOW DMI INFO	Disabled**[Default]** Enabled	Show DMI INFO.

3.6.4   Security
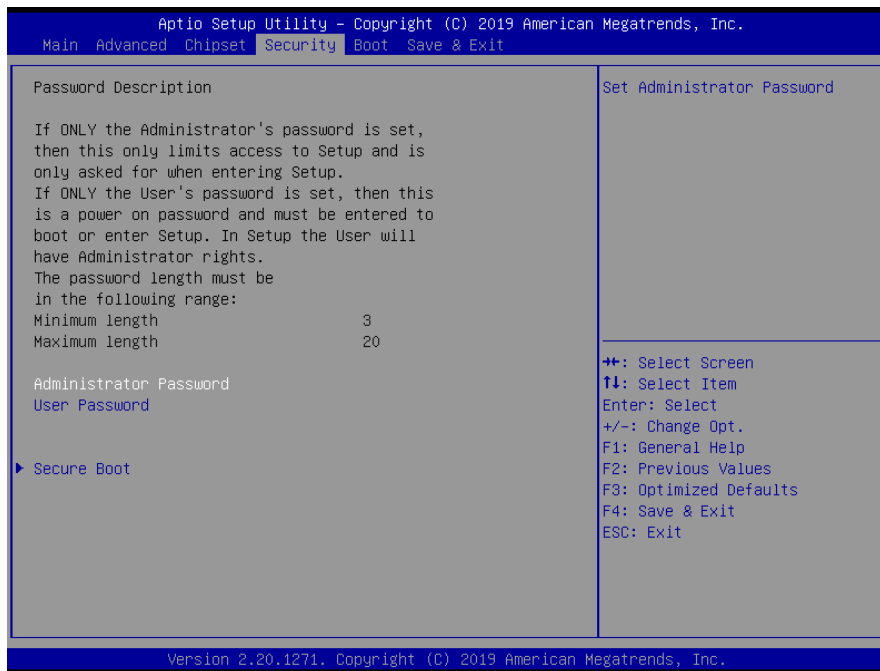
● **Administrator Password**

Set setup Administrator Password

● **User Password**

Set User Password

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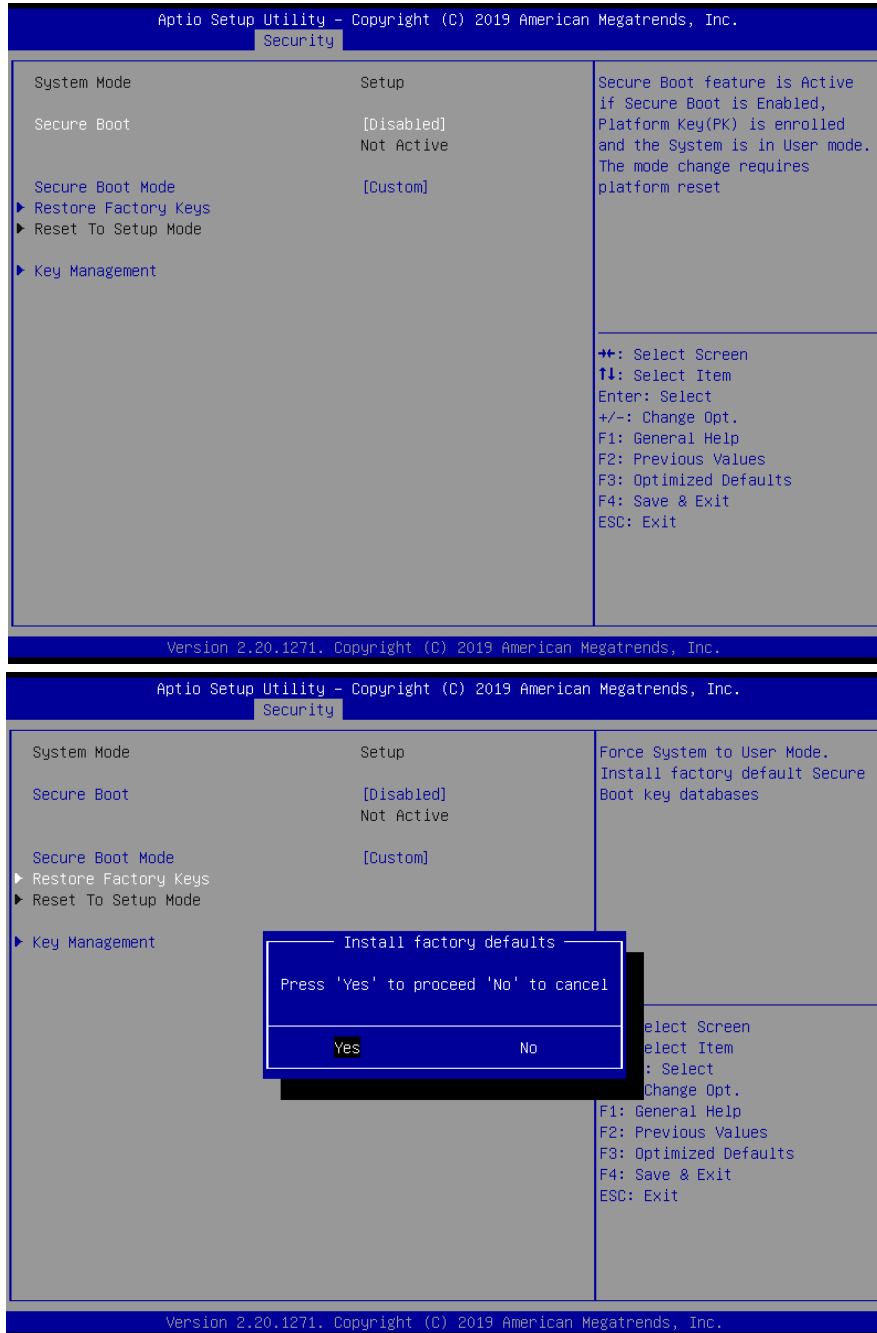
Item	Option	Description
Secure Boot	Disabled**[Default]** Enabled	Secure Boot feature is Active if Secure Boot is Enabled, Platform Key(PK) is enrolled and the System is in User mode. The mode chagne requires platform reset.
Secure Boot Mode	Standard Custom**[Default]**	Secure Boot mode selector: Standard/Custom.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

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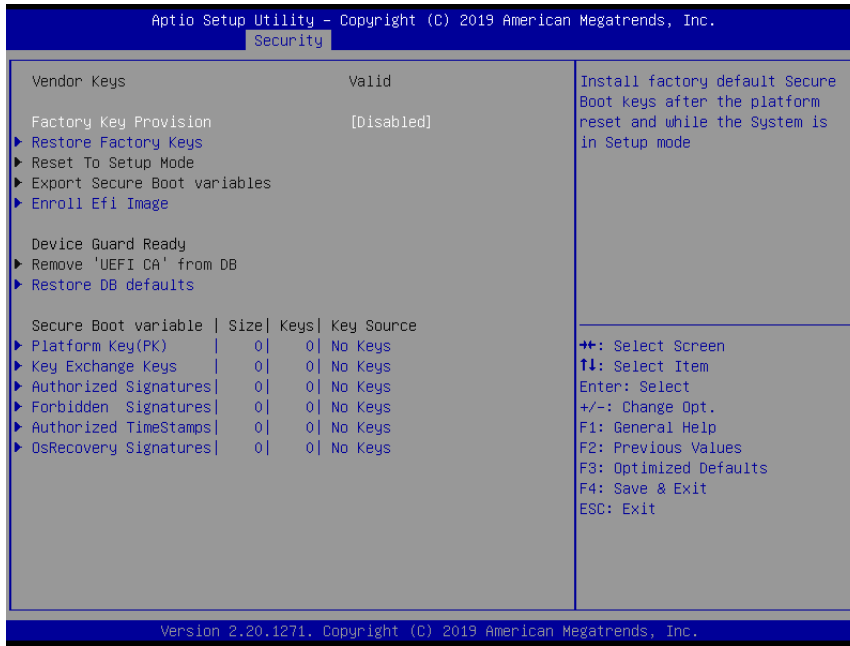
Item	Option	Description
Factory Key Provision	Disabled**[Default]** Enabled	Install factory default Secure Boot keys after the platform reset and while the System is in Setup mode.

3.6.5　　Boot
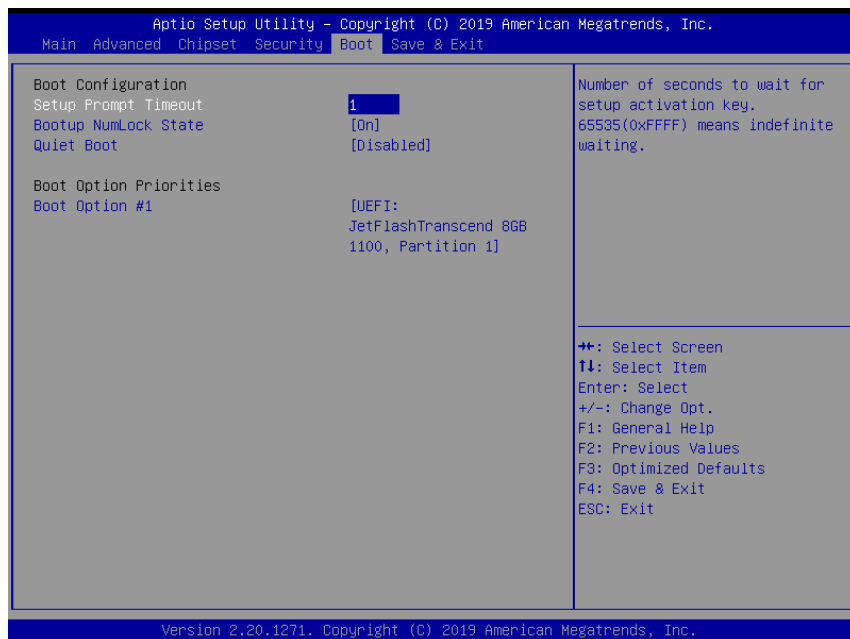
Item	Option	Description
Setup Prompt Timeout	1~ 65535	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
Bootup NumLock State	On**[Default]**	Select the Keyboard NumLock state

	Off	
Quiet Boot	Disabled**[Default]** Enabled	Enables or disables Quiet Boot option
Boot Option #1	Set the system boot order.	

3.6.6   Save and exit
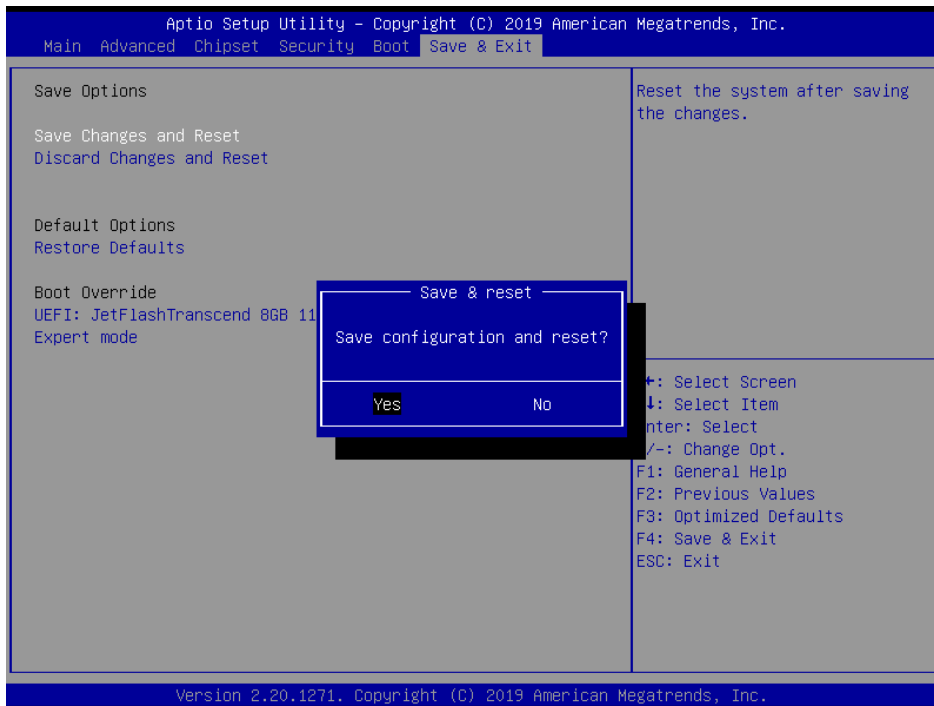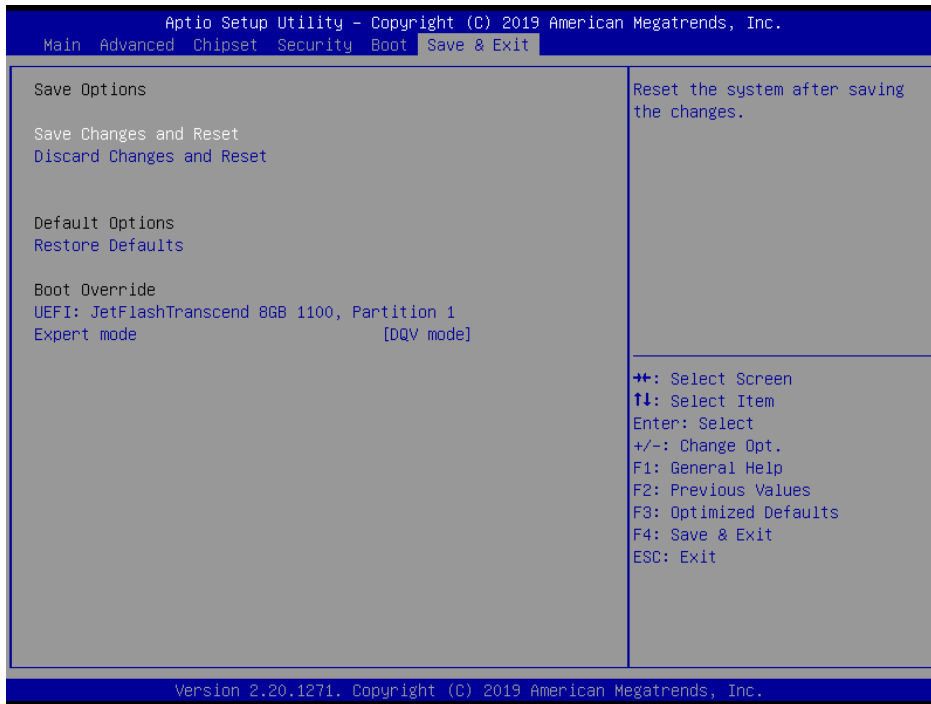
3.6.6.1   Save Changes and Reset

Reset the system after saving the changes.

3.6.6.2   Discard Changes and Reset

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

3.6.6.3   Restore Defaults

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

3.6.6.4   Launch EFI Shell from filesystem device

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

4. Drivers Installation

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

4.1 Install Chipset Driver

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.
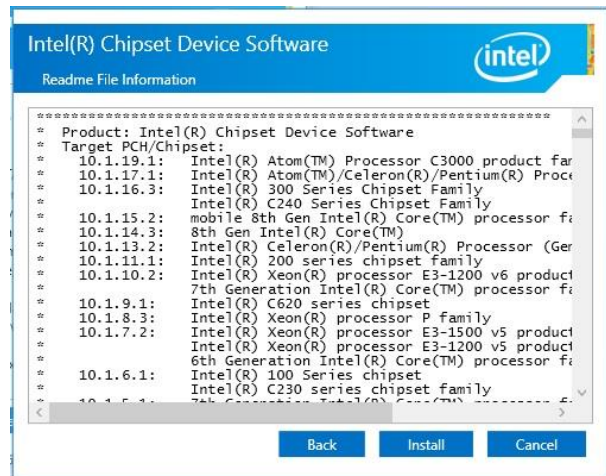
Step 3. Click **Install**.

Step1. Click **Next**.

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

Step 2. Click **Accept**.

4.2 Install VGA Driver

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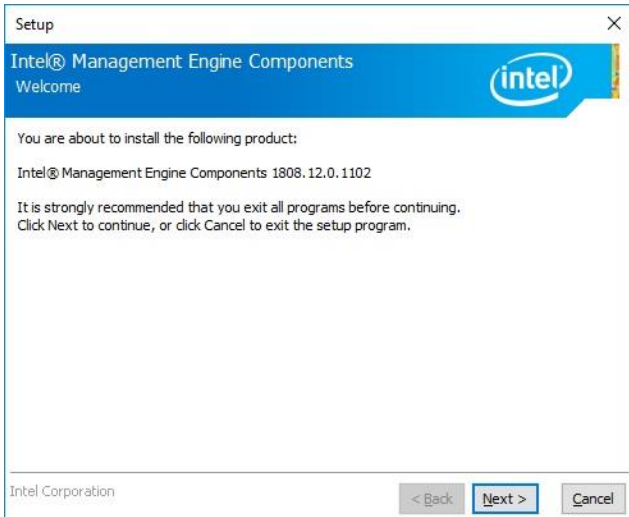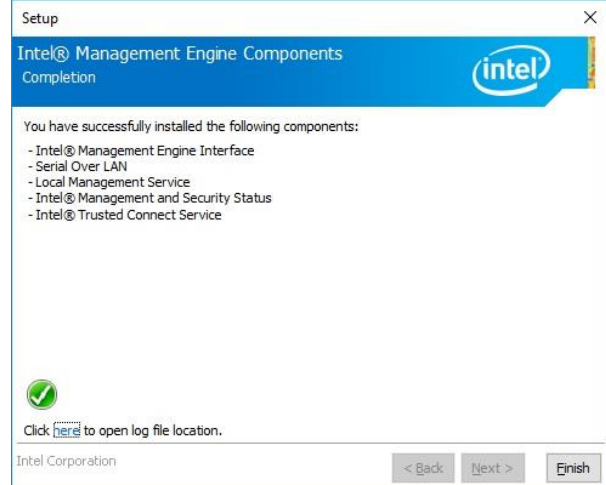Official Website:
http://www.avalue.com.tw.

Note: The installation procedures and
screen shots in this section are
based on Windows 10 operation
system.
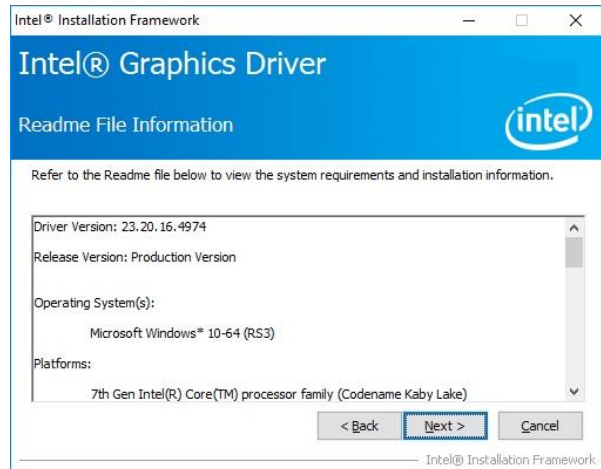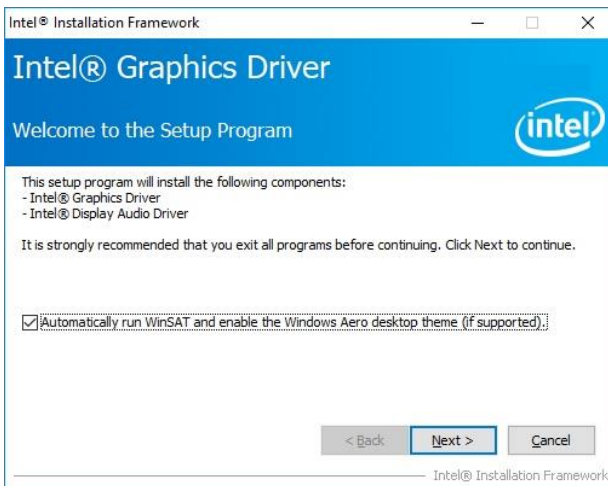
Step 3. Click **Next.**

Step 1. Click **Next** to continue installation.
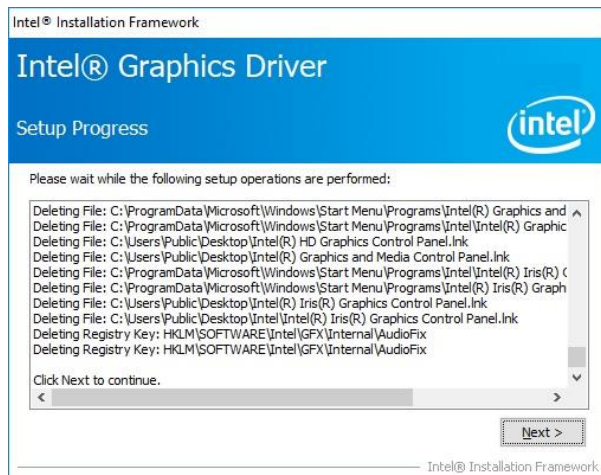
Step 4. Click **Next**.
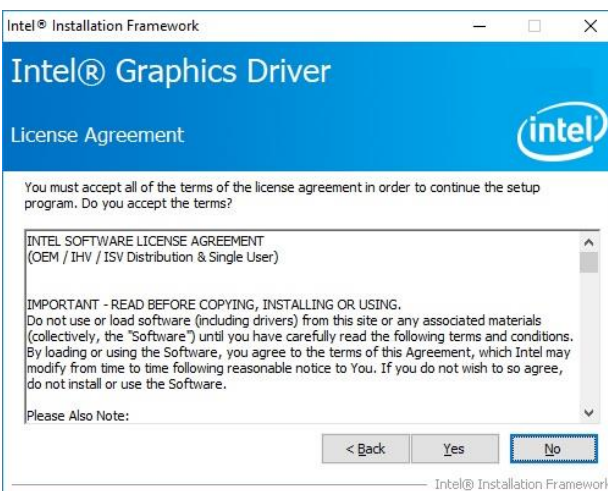
Step 2.

Click **Yes** to accept license agreement.
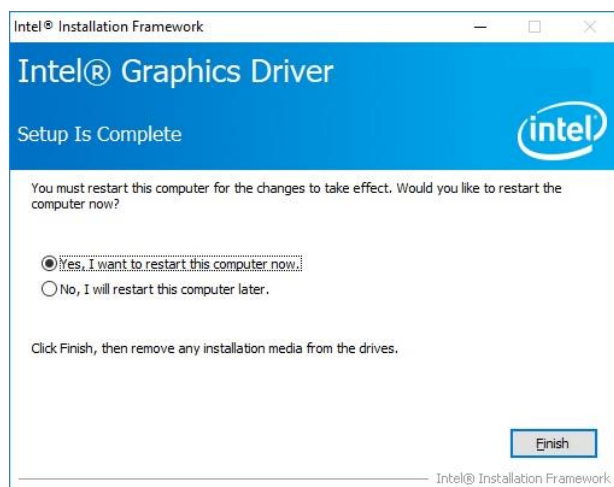
Step 5. Click **Finish** to complete setup.

4.3 Install Audio Driver (For Realtek ALC888S HD Audio)

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

Note: The installation procedures and screen shots in this section are based on Windows 10 operation system. If the warning message appears while the installation process, click Continue to go on.
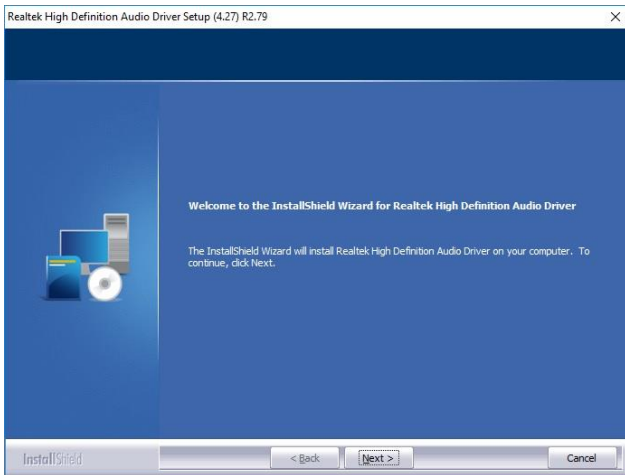
Step1. Click **Next** to Install.
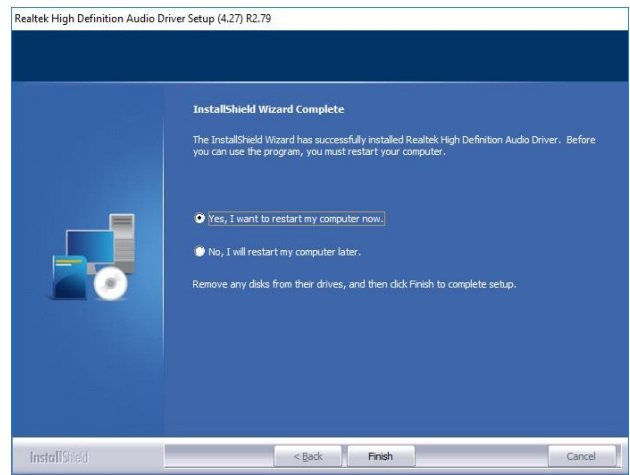
Step 2. Select **Finish** to complete Installation.

4.4 Install LAN Driver (For Intel I211AT)

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

Note: The installation procedures and
screen shots in this section are
based on Windows 10 operation
system.
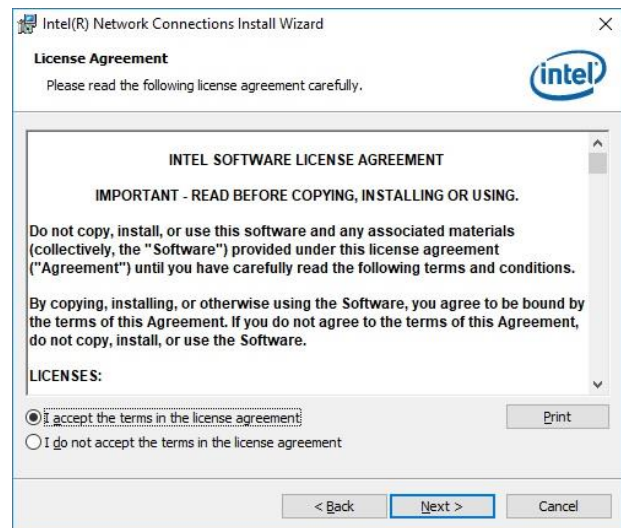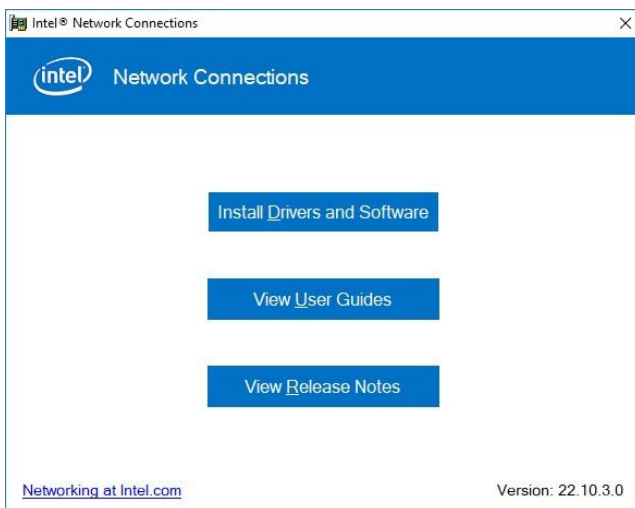
Step 3. Click **Next**.

Step 1. Click **Install Drivers and Software**
to continue installation.
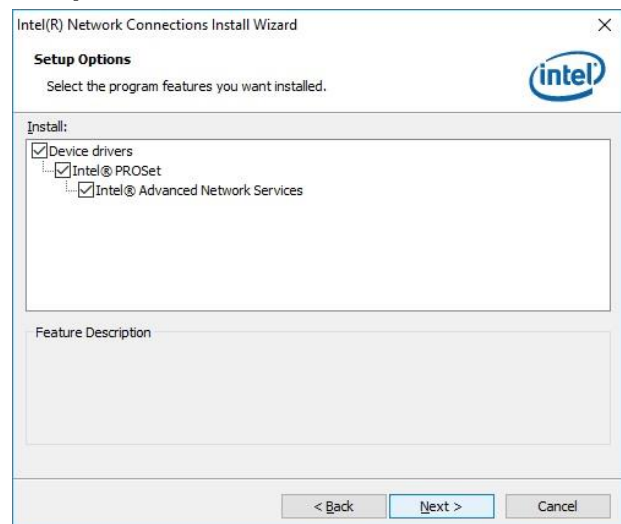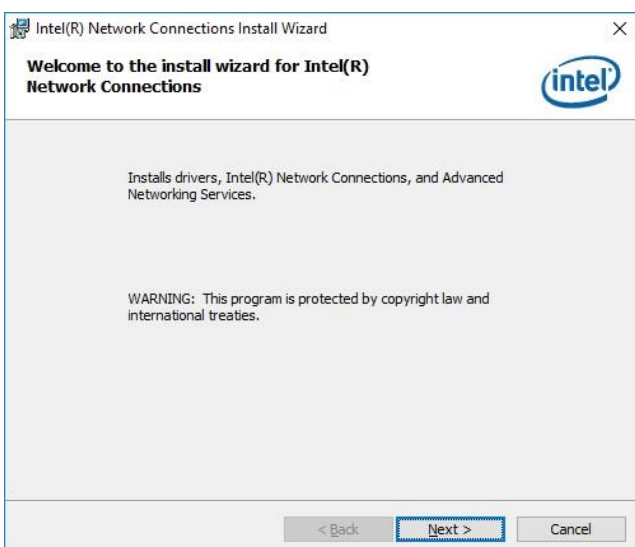
Step 4. Click **Next**.
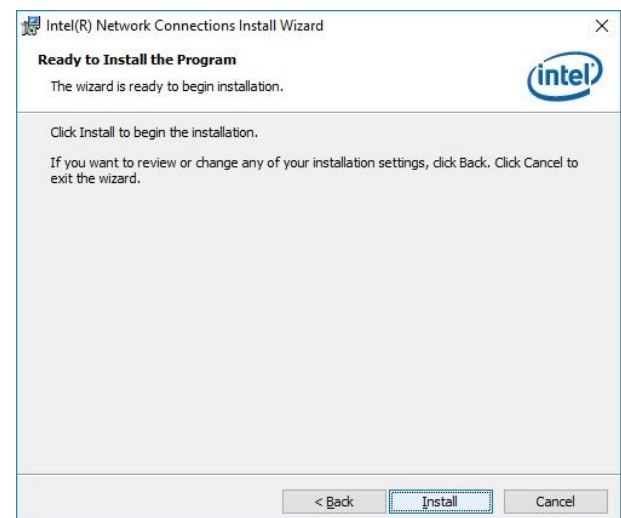
Step 5. Click **Install**.

Step 2. Click **Next**.
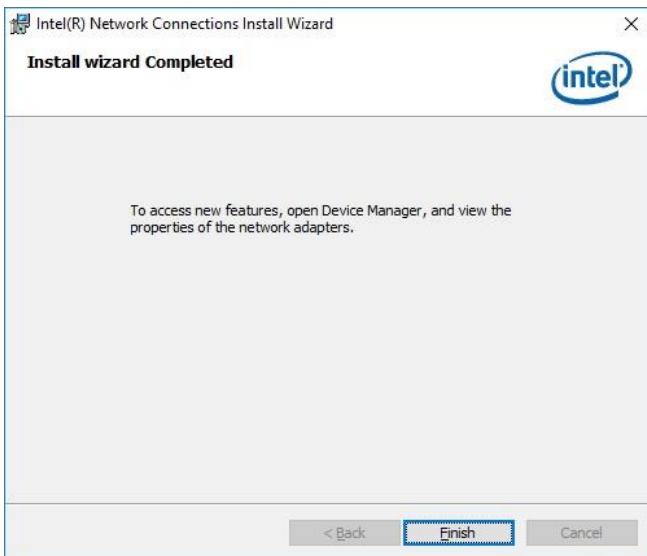
Step 6. Click **Finish** to complete setup.

4.5 Install Serial IO Driver

All drivers can be found on the Avalue Official Website:

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

Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.
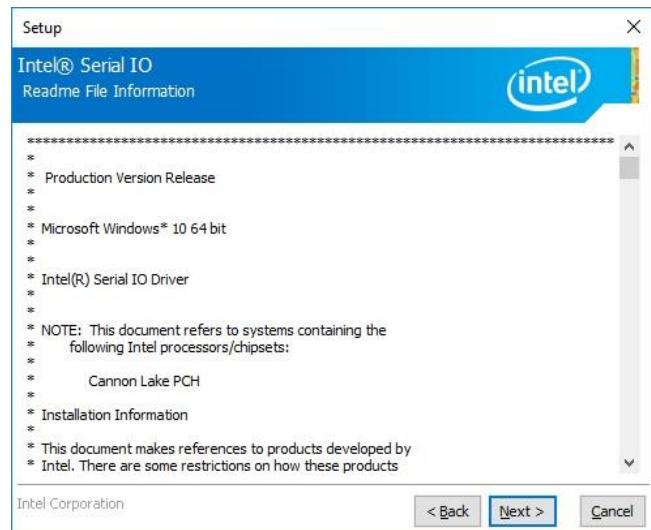
Step 3. Click **Next**.

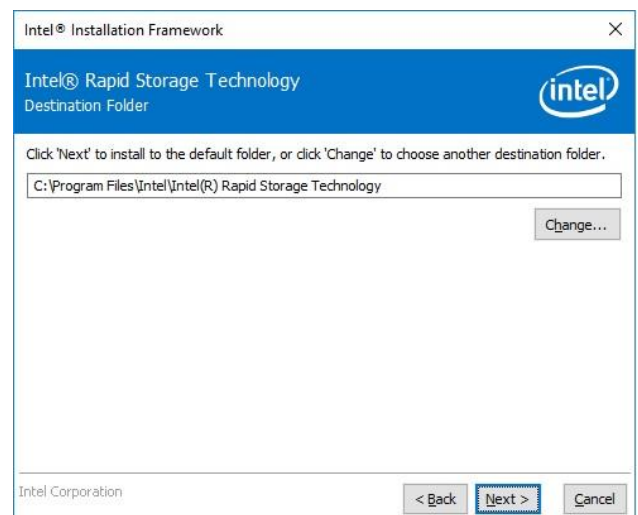**Step 1.** Click **Next** to continue setup.
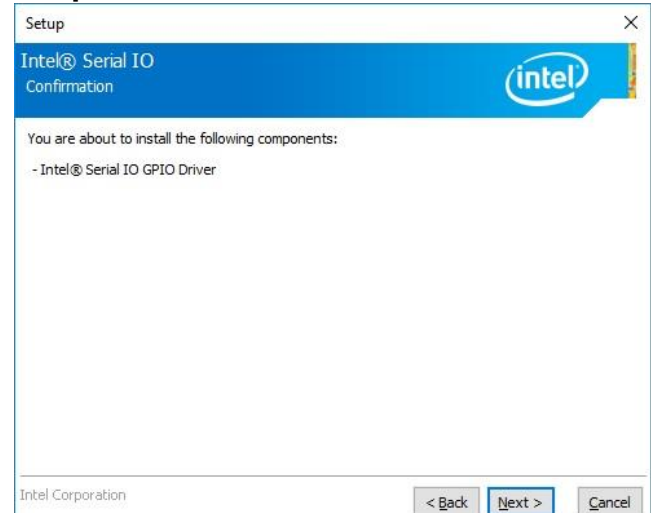
Step 4. Click **Next**.

Step 2. Click **Next**.

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

4.6 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.
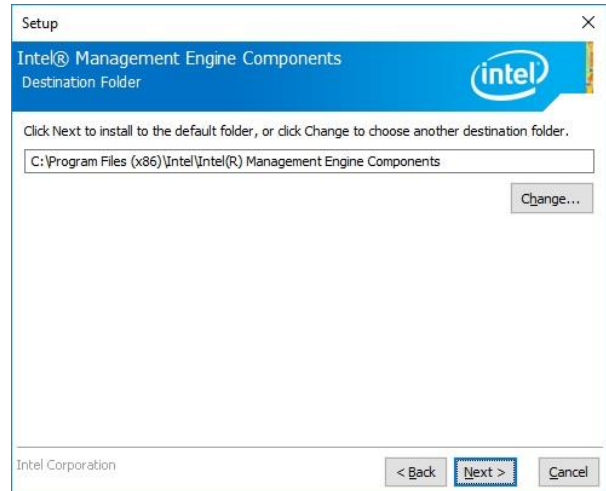
Step 3. Click **Next**

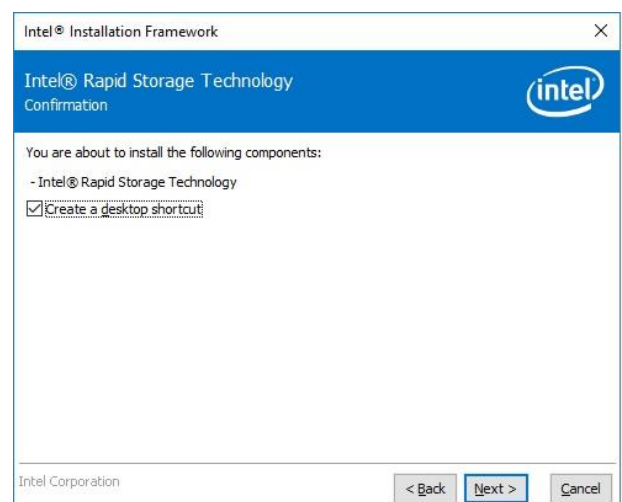**Step 1.** Click **Next** to continue setup.

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

Step 2. Click **Next**.

4.7 Install IRST Driver

All drivers can be found on the Avalue Official Website:

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

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

Step 3. Click **Next**.

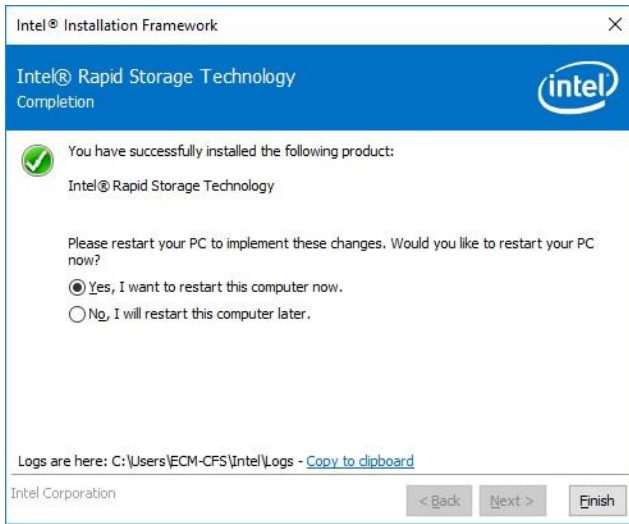**Step 1.** Click **Next** to continue installation.

Step 4. Click **Next**.

Step 2. Click **Next**.

Step 5. Click **Next**.

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