VMS-APL

Intel® Pentium®/Celeron®/Atom™ SoC BGA Processor
Fanless Vehicle Telematics System

Quick Reference Guide

4th Ed –07 May 2021

Part No. E2017HAI0A3R

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/

Content

1. Getting Started

1.1 Safety Precautions

Warning!

Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges. Only experienced electronics personnel should open the PC chassis.

Caution!

Always ground yourself to remove any static charge before touching the CPU card. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components in a static-dissipative surface or static-shielded bag when they are not in the chassis.

1.2 Packing List

- 1 x VMS-APL Intel® Pentium®/Celeron®/Atom™ SoC BGA Processor Fanless Vehicle Telematics System
- Other major components include the followings:
  - 1 x Accessory kit (Dust Covers, Rubber foot and Screws)
  - 1 x DP to VGA Converter

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

1.3 System Specifications

System	
Mother Board	• EBM-APLV (New Board for Vehicle)
CPU	• Intel® Atom™ Processor E3950 4C 1.6 GHz • Intel® Atom™ Processor E3940 4C 1.6 GHz • Intel® Atom™ Processor E3930 2C 1.3 GHz • Intel® Pentium® Processor N4200 4C 1.1 GHz • Intel® Celeron® Processor N3350 2C 1.1 GHz
BIOS	• AMI uEFI BIOS, 128Mbit SPI Flash ROM
Memory	• One 204-pin SODIMM Socket Up to 8GB DDR3L 1866MHz SDRAM
I/O Chipset	• ITE IT8528VG-I
TPM 2.0	• Infineon SLB9665TT2.0 (Factory Option)
Watchdog	• H/W Reset, 1sec. ~ 65535sec.
H/W Status Monitor	• Monitoring CPU & System Temperature and Voltage
Operation System	• Win10(64 bit)/ Linux(64 bit)/ Android(64 bit)
Expansion	• 1 x Avalue 80-Pin IET Interface (1 x DP, 4 x PCIex1, 3 x USB2.0, 1 x LPC, 1 x Line-Out(R/L), 1 x SMBus) • 1 x Mini-PCIe socket (PCIe + USB) for WLAN option • 1 x Mini-PCIe socket (PCIe + USB) for WWAN option • 1 x CAN
Storage	
Combination	• 1 x 2.5” Drive Bay (SATA III) • 1 x M.2 (SATAIII) • 1 x SD (SD3.0)
Front Side External I/O Connector	• 2 x USB 3.0 Host (included USB 2.0 signal) • 1 x SD Slot w/ dust protection cover • 2 x SIM Holder w/ dust protection cover • 1 x Swappable 2.5” drive bay • 1 x Push Button for Power on/off w/ LED • 1 x Push Button for Reset in hiding • 3 x LEDs for Storage, WLAN/ HSDPA • 1 x Line-Out • 1 x Mic-In • 1 x 8-bit GPIO from EC

<table>
<tr><td></td><td>
<table>
<tr><th colspan="2">Digital Input</th></tr>
<tr><td>Input Channels</td><td>8,source type</td></tr>
<tr><td>Input Voltage</td><td>0 to 30VDC Input</td></tr>
<tr><td>Digital Input Levels for Dry Contacts</td><td>Logic level 0:Close to GND.
Logic level 1:Open</td></tr>
<tr><td>Digital Input Levels for Wet Contacts</td><td>Logic level 0:+10V to +24V (DI To XIN_COM-).
Logic level 1:+3V max.</td></tr>
<tr><th colspan="2">Digital Output</th></tr>
<tr><td>Output Channels</td><td>8,sink type</td></tr>
<tr><td>Output Current</td><td>Max. 200 mA per channel, current sink type</td></tr>
<tr><td>External voltage</td><td>10 to 30VDC , open collector to 30V</td></tr>
</table>
</td></tr>
<tr><td>Rear Side External I/O Connector</td><td>
• 1 x DC Power input connector
• 1 x 12V/6A DC output
• 1 x DP
• 2 x RS232/422/485 (Jumper+Dip switch), with +5V and +12V support on Pin-9 via jumper+dip switch
• 1 x COM2 optional CAN support SAE J19399 or J1708 (Factory Option)
• 2 x RJ-45
• 2 x USB 3.0 Host (Included USB 2.0 signal)
• 1 x DB26 LVDS interface with 12V and USB2.0
LVDS Power input Voltage Selection in header
+5V in
+3.3V in
• 1 x Line-Out
• 1 x Mic-In
• 5 x Antenna Mounting w/ dust protection cover
</td></tr>
<tr><td>Internal I/O Connector</td><td>
• 1 x 3-pin header for CMOS (JCMOS1)
• 2 x 2x3-pin header for COM1/ 2 pin 9 signal selection (+5, +12, Ring), (JRI1/2)
• 1 x 3-pin header for LCD backlight brightness adjustment (JVR1)
• 1 x 3-pin header for Vehicle/Industrial PC power mode selector (JACC1)
• 1 x 2 x 4-pin header for Digital input selector (JDI1)
• 1 x 2 x 4-pin header for Digital output selector (JDO1)
• 1 x 16-pin DIP Switch for Serial Port 1/2 mode selector: power mode(AT/ATX)、DDI0(DP)/1(IET)mode(SW1)、COM2(CAN) mode
• 1 x 4-pin DIP switch for power input selector (SW2)
• 1 x 2 x 7 header for LPC port connector (JLPC1)
• 1 x 5-pin lockable connector for LVDS inverter backlight control (JBKL1)
• 1 x 2 x 4-Pin header for SPI (SPI1)
• 1 x 6-Pin DC Output Connector (DCOUY_S1), 12V/6A for DC-Out and
</td></tr>
</table>

	Powered LAN IET Module. • 1 x 2 x 5-pin header for EC debug connector (JEC_ROM1) • 2 x 5-pin wafer for 2 x USB 2.0 reservation (JUSB1/2) • 1 x 2 x 6 header for General purpose I/O connector (DIO1) • 1 x 2 x 7 header for CAN module slot (CAN1) • 1 x 2 x 20-pin lockable connector for 18/ 24-bit LVDS (JLVDS1) • 1 x 7+15-pin SATA connector (SATA 3.1, 1.5/3.0/6.0) • 1 x Buzzer
GPS	
Chipset	• u-blox NEO-M8N module supports GPS/ Gloness/ QZSS/ Galileo/ Beidou
Interface	• UART/USB
PCIe Switch	
Chipset	• 2 x PI7C9X2G404SL Port-4lane PCI Express Gen 2 Switch
Interface	• 4-Port/ 4-lane
Display	
Chipset	• Intel® Apollolake SoC integrated Graphics • 3 Independent Display: • 1st DP 1.2a for Edge connector on rear side • 2nd DP reserved for IET Interface • 3rd : LVDS
Resolution	• DP 1.2a: 4096x2160@60Hz • LVDS: 1920x1200@60Hz, supports 2 channels 18/24-bit via Chrontel® CH7511B (eDP to LVDS)
Ethernet	
Chipset	• 2 x Intel® I211AT GbE controller
Ethernet Interface	• 10/100/1000 Base-Tx GbE compatible
LAN Port	• 2 x RJ-45
Audio	
Chipset	• Realtek ALC888S HD codec
Audio Interface	• 2 x Mic-In and 2 x Line-Out
Mechanical	
Power Requirement	• +9 ~ 36Vdc
Power Connector Type	• 3-Pin Terminal Block
ACPI	• Single power ATX Support S0, S3, S4, S5 and ACPI 5.0 Compliant
Dimension	• 9.4” x 7.3” x 2.44 (239mm x 186mm x 62mm)
Weight	• 2.7KG(4.85lbs)
Color	• Compliant with the color plan of the new family look
Mounting Kit	• Wall mount kit (Standard)

Reliability	
Certification	• CE, FCC Class B w/ERP, IP50, e13 Mark, ISO 7637-2,
Dust and Rain Test	• IP 50 Rating
Vibration (Random)	• With SSD : 1.5g@5~500 Hz (in operation)
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
Mechanical 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
Operating Temperature	• -20/40°C ~70°C (w/SSD, M.2) ambient w/ air flow • N4200 and N3350 are -20°C ~70°C • E3950, E3940 and E3930 are -40°C ~70°C
Operating Humidity	• 5% ~ 90% relative humidity, non-condensing
Storage Temperature	• -40°C ~ 85°C
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 (SW2) 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-APL won't power on if the DC Input voltage is lower than the startup voltage.

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

  VMS-APL 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-APL 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-APL 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-APL if pressing power button.

  VMS-APL 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-APL if pressing power button.

  VMS-APL will automatically power off, if the delay time ends up. If it still doesn't power off and the time exceeds 60sec, VMS-APL 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.

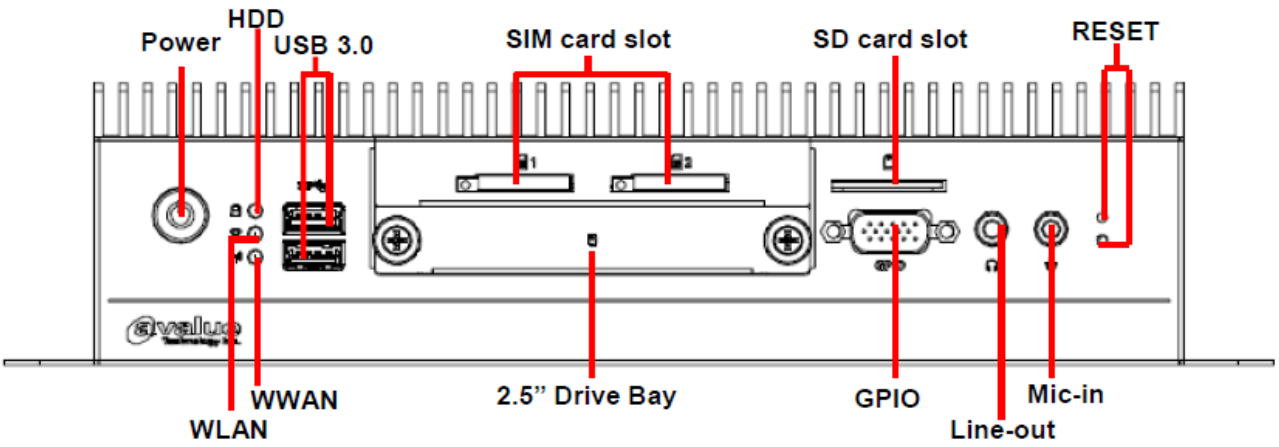
- The status of Ignition On/Off is detectable by SW

	• 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-APL 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-APL will shut down completely, and then power on again automatically, if the ignition is turned on again and the power off delay ended. • VMS-APL 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-APL is only 10mA if it is off.
IET modules	
AUX-M01	• 4COM module/ 4COM+2USB • Functional Testing & Mechanical Checking
AUX-M02	• 4LAN bypass Module/ 4LAN+2USB • Functional Testing & Mechanical Checking
AUX-M03	• 4LAN Powered LAN 802.3af module/ 4LAN+2USB • Functional Testing & Mechanical Checking
AUX-M07	• 4COM Isolation module/ 4COM+2USB • Functional Testing & Mechanical Checking
EBM-CDVS DB-A	• Display module/ DVI+2USB • Functional Testing & Mechanical Checking
EBM-BYTS DB-A	• Display Module/ HDMI+2USB+2COM+2LAN • Functional Testing & Mechanical Checking
EBM-BYTV DB-A	• COM, GPIO, CAN Isolation module • Functional Testing & Mechanical Checking
EBM-BYTV DB-B	• Mini PCIe Module/ 2 Mini PCIe w/2SIM+DVI-D • Functional Testing & Mechanical Checking

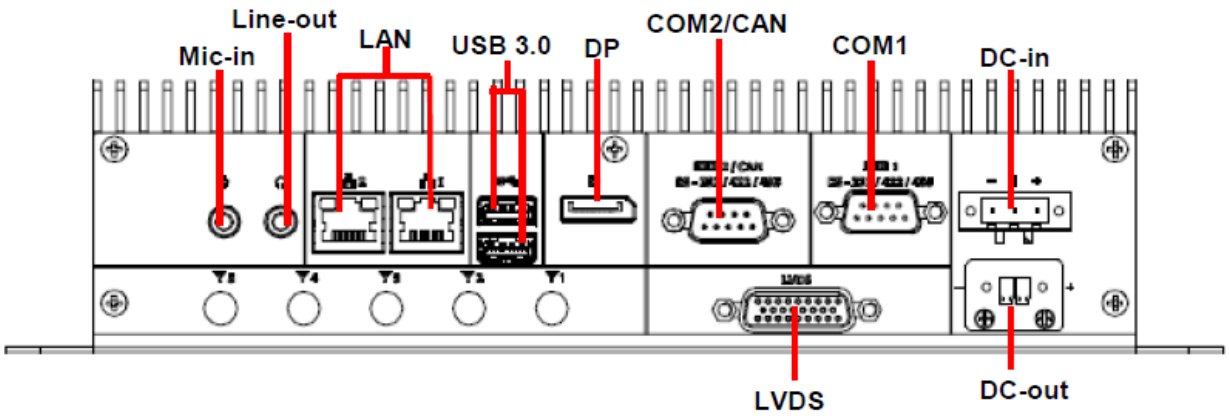
Note: Specifications are subject to change without notice.

1.4 System Overview

1.4.1 Front View



1.4.2 Rear View

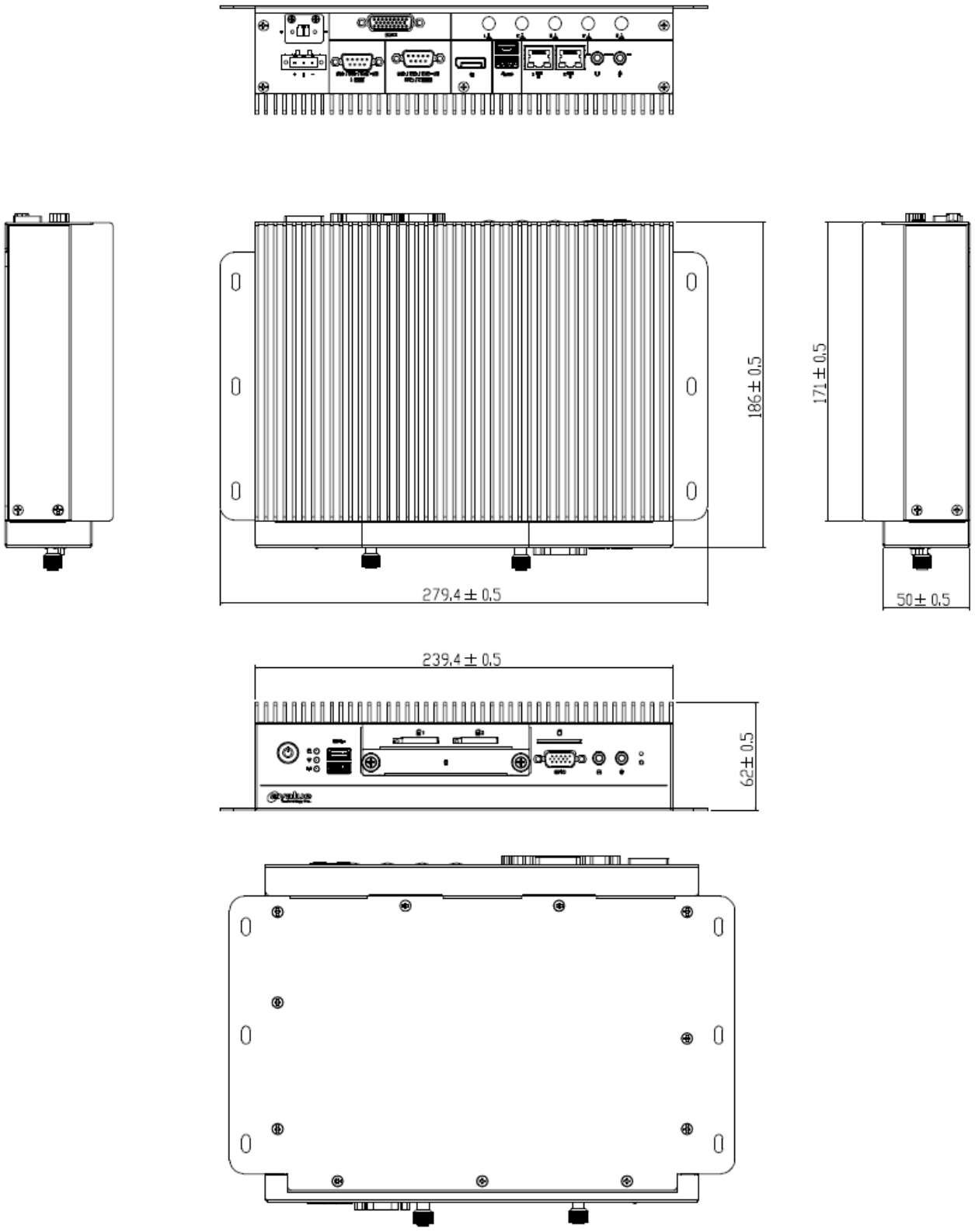


Connectors

Label	Function	Note
Power	Power on button	
USB 3.0	4 x USB 3.0 connector	
SIM card slot	2 x SIM card slot	
SD card slot	SD card slot	
2.5” Drive Bay	2.5” Driver Bay socket	
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
LVDS	LVDS connector
DC-in	DC power-in connector
DC-out	DC power-out connector

1.5 System Dimensions



(Unit: mm)

2. Hardware Configuration

Jumper and Connector Setting, Driver and BIOS Installing

For advanced information, please refer to:

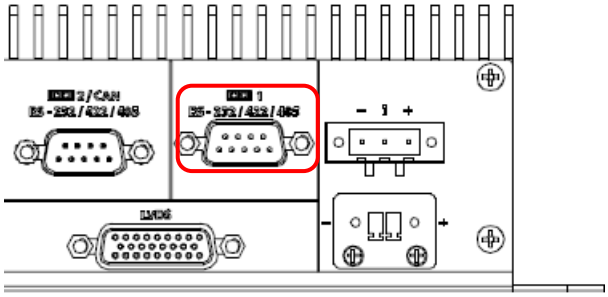
1- EBM-APLV included in this manual.

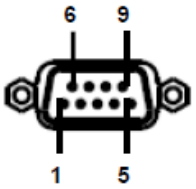
Note: If you need more information, please visit our website:

http://www.avalue.com.tw

2.1 VMS-APL 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		

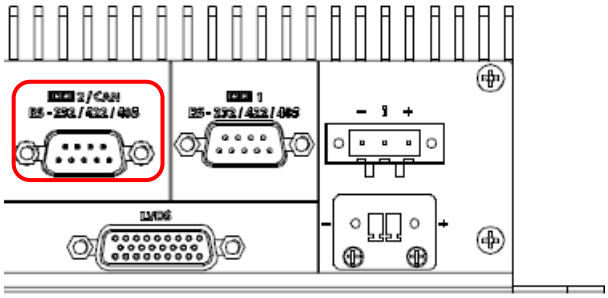
In RS-422 Mode

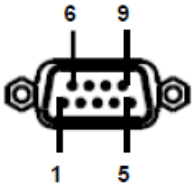
Signal	PIN	PIN	Signal
TxD1-	1	6	NC
TxD1+	2	7	NC
RxD1+	3	8	NC
RxD1-	4	9	NC
GND	5		

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)





Note:

COM2/CAN Bus mode selected by SW1 pin8 & JUART_SEL1/2.

CAN BUS

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

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		

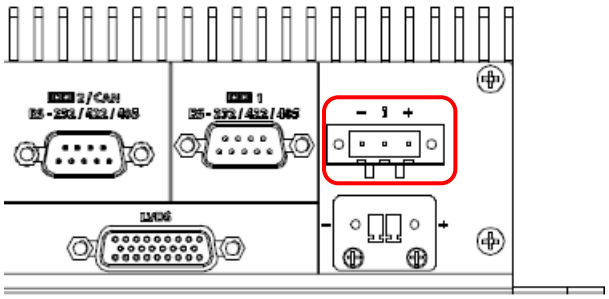
In RS-422 Mode

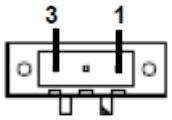
Signal	PIN	PIN	Signal
TxD1-	1	6	NC
TxD1+	2	7	NC
RxD1+	3	8	NC
RxD1-	4	9	NC
GND	5		

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		

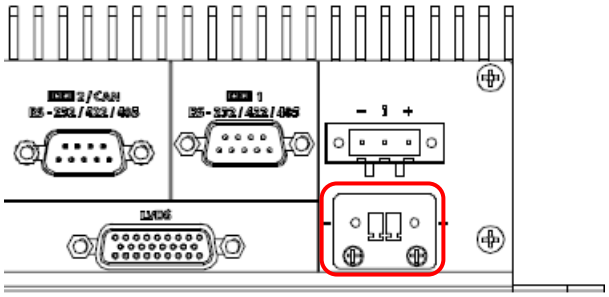
2.1.3 DC power-in connector (DC-in)

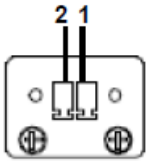




Signal	PIN
VIN + (BAT+)	1
ACC (IGN)	2
VIN- (BAT-)	3

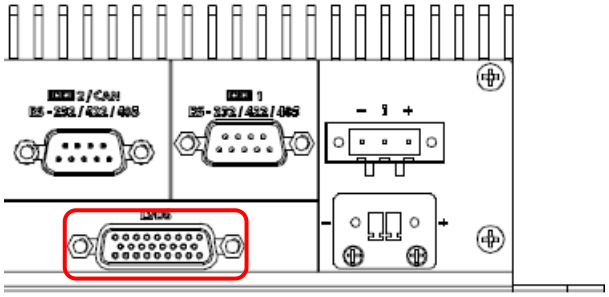
2.1.4 DC power-out connector (DC-out)

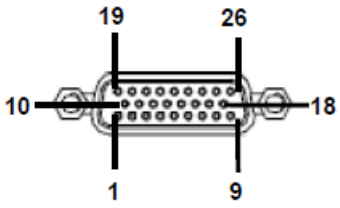




Signal	PIN
+12V	1
GND	2

2.1.5 LVDS connector (LVDS)



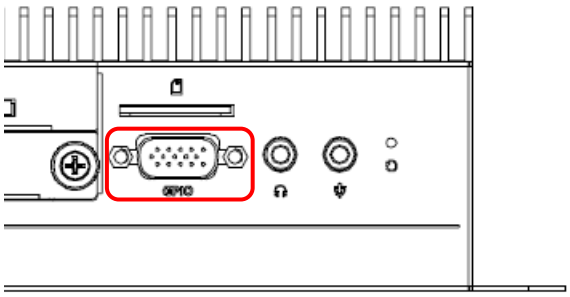


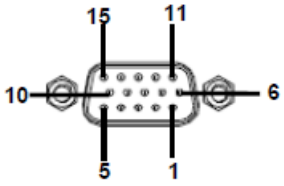
PIN	Signal	PIN	Signal	PIN	Signal
1	PS_ON	10	1+	19	12V
2	GND	11	1-	20	GND
3	3.3V	12	GND	21	Backlight_EN
4	5V	13	2+	22	VBRIGHT
5	GND	14	2-	23	USB_VCC
6	GND	15	3+	24	D-
7	0+	16	3-	25	D+
8	0-	17	CLK+	26	USB_GND
9	GND	18	CLK-		

Note:

This connector included LVDS, USB, 12V and 5V interfaces.

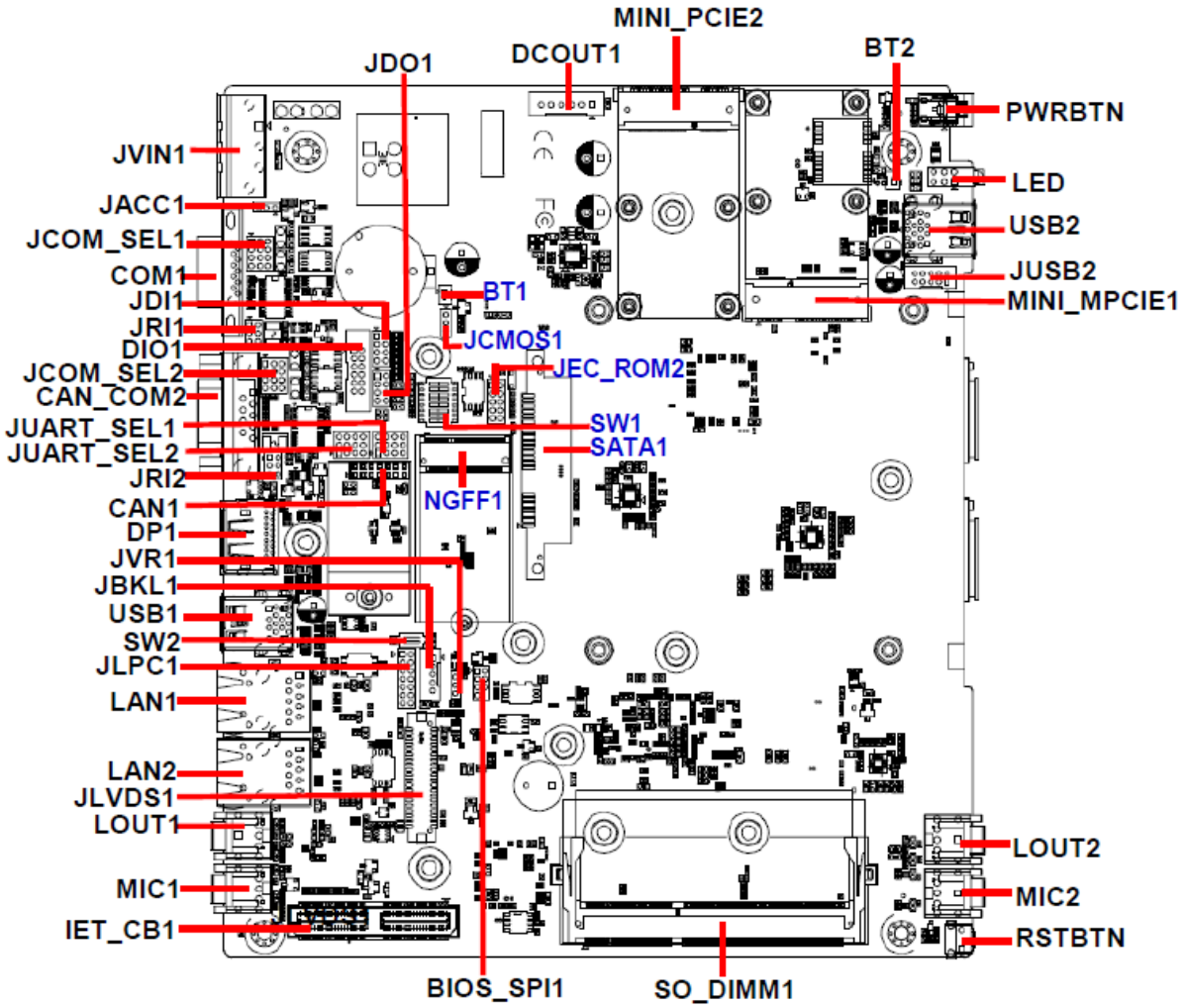
2.1.6 General purpose I/O connector (GPIO)

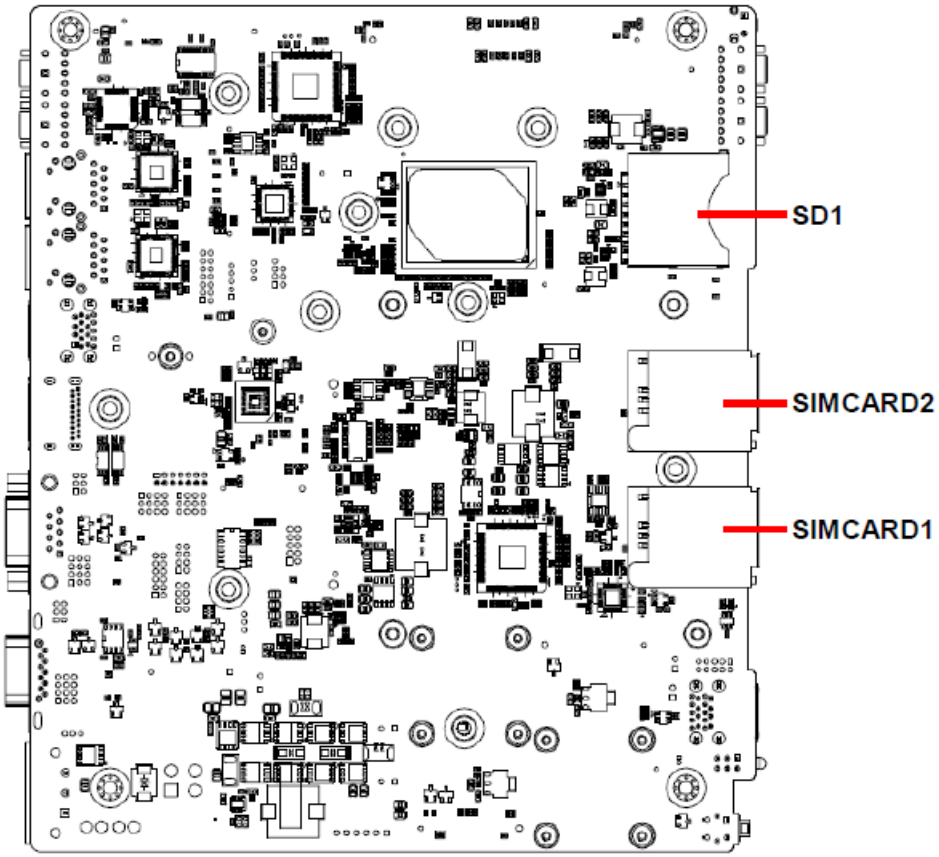




PIN	Signal	PIN	Signal	PIN	Signal
1	DIO_GPO0	6	DIO_GPI2	11	GND
2	DIO_GPI0	7	DIO_GPO3	12	+3.3V
3	DIO_GPO1	8	DIO_GPI3	13	NC
4	DIO_GPI1	9	MBCLK	14	NC
5	DIO_GPO2	10	SMB_DATA	15	NC

2.2 EBM-APLV Overviews




SD1
SIMCARD2
SIMCARD1

2.3 EBM-APLV Jumper & Connector list

Jumpers

Label	Function	Note
JCMOS1	Clear CMOS	3 x 1 header, pitch 2.00 mm
JRI1/2	COM 1/2 pin 9 signal selector	3 x 2 header, pitch 2.00 mm
SW1	Multi-function select	DIP switch 8pin
SW2	Power Input selector	DIP switch 4pin
JVR1	LCD backlight brightness adjustment	3 x 1 header, pitch 2.00 mm
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
JUART_SEL1/2	CAN/COM selector	4 x 3 header, pitch 2.00 mm

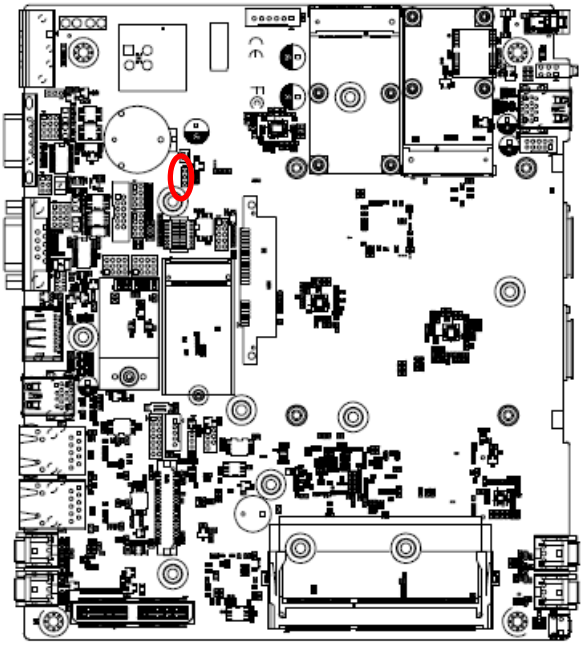
Connectors

Label	Function	Note
USB1/2	2 x USB 3.0 connector	
BT1	Battery connector 1	2 x 1 wafer, pitch 1.25 mm
BT2	Battery connector 2	2 x 1 wafer, pitch 1.25 mm
JUSB2	On-board header for USB2.0	5 x 2 wafer, pitch 2.00 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	
CAN_COM2	Serial port 2 connector CAN connector	5 x 2 wafer, pitch 2.00 mm
CAN1	CAN Module slot	7 x 2 header, pitch 2.00 mm
DP1	DP connector	
MPCIE1/2	Mini PCI Express connector 1/2	
PWRBTN	Power button	
RSTBTN	Reset button	
LED	LED Power HDD	
NGFF1	M.2 KEY-B 2242/3042 connector	

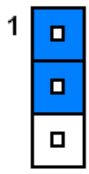
LOUT1	Audio line-out connector	
LOUT2	Audio line-out connector	
MIC1	Audio mic-in connector	
MIC2	Audio mic-in connector	
JLVDS1	LVDS connector	20 x 2 wafer, pitch 1.25 mm
SO_DIMM1	DDR3 SODIMM connector	
IET_CB1	IET Expansion slot	
JLPC1	LPC port connector	7 x 2 header, pitch 2.00 mm
BIOS_SPI1	BIOS SPI connector	4 x 2 header, pitch 2.00 mm
JBKL1	LCD inverter connector	5 x 1 wafer, pitch 2.00 mm
SATA1	Serial ATA connector 1	
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
SD1	SD card slot	
SIMCARD1/2	SIM card slot 1/2	

2.4 EBM-APLV Jumpers & Connectors settings

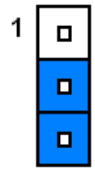
2.4.1 Clear CMOS (JCMOS1)



Protect*

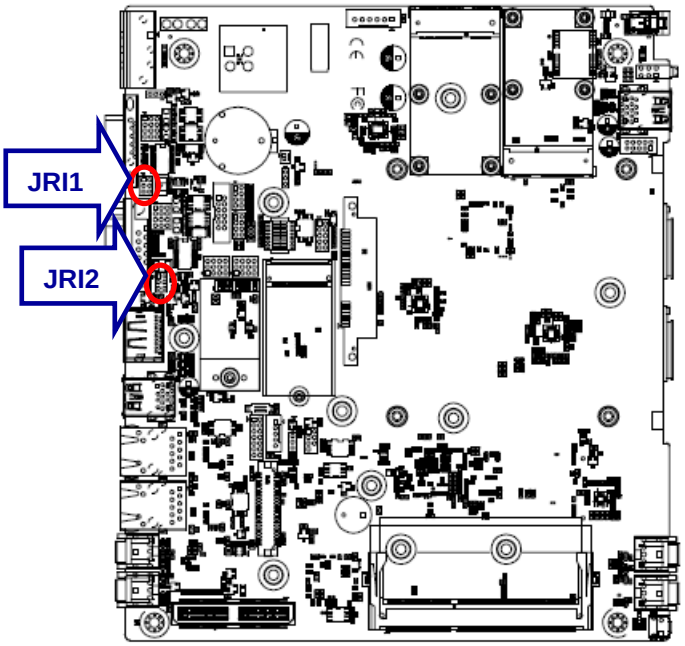


Clear CMOS

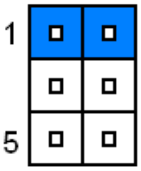


*Default

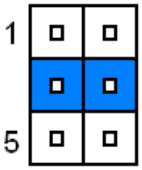
2.4.2 COM 1/2 pin 9 signal selector (JRI1/2)



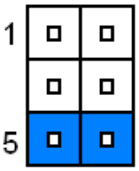
Ring*



+5V

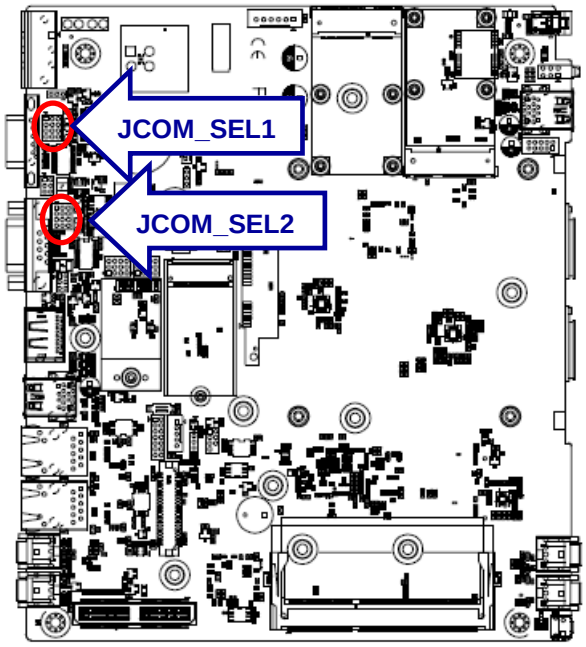


+12V

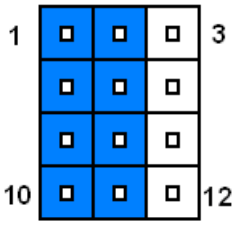


* Default

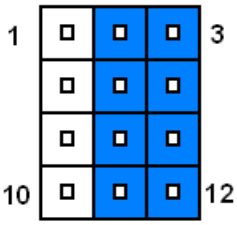
2.4.3 Serial port 1/2 – RS232/422/485 mode select (JCOM_SEL1/2)



RS-232*

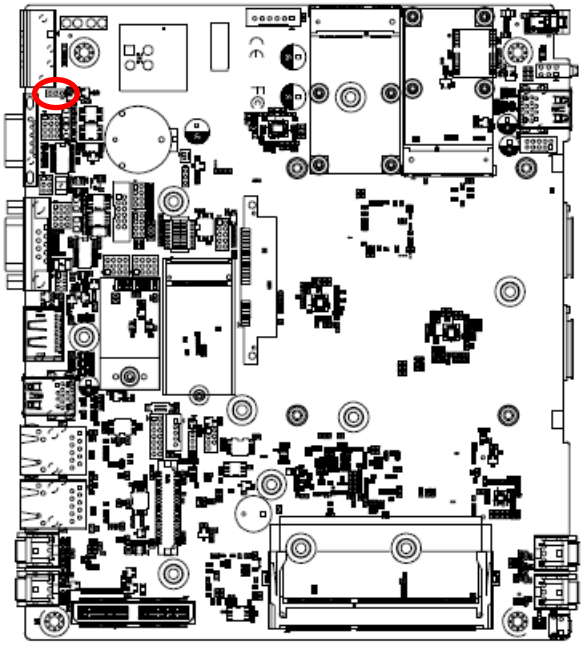


RS422/485

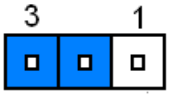


***Default**

2.4.4 Vehicle/Industrial PC power mode selector (JACC1)



Enable*



Disable

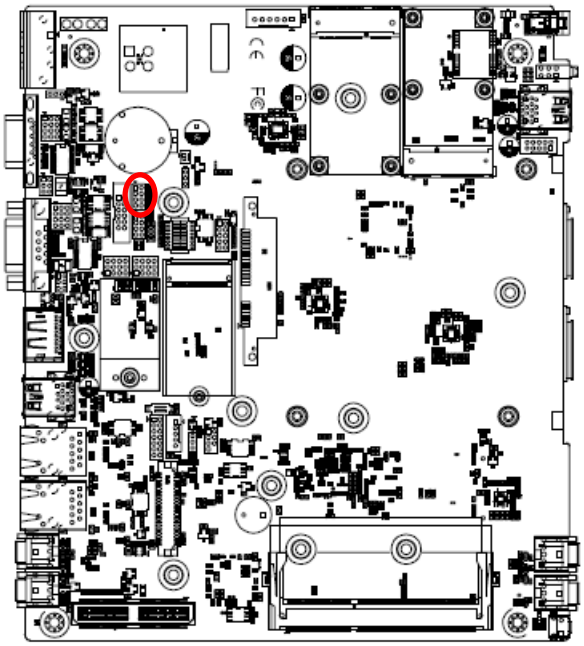
*** Default**

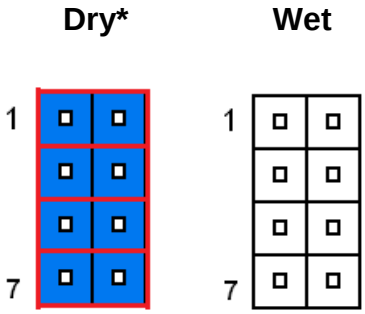
Note:

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.

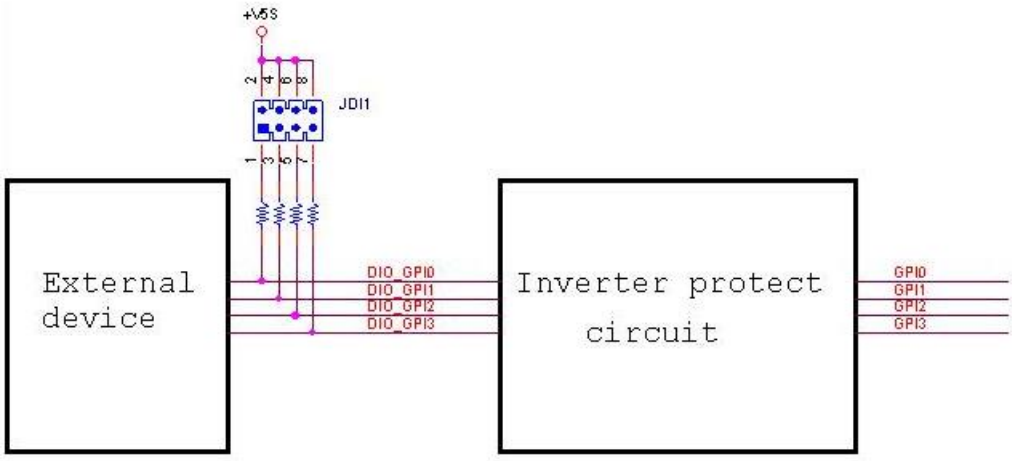
2.4.5 Digital Input selector (JDI1)



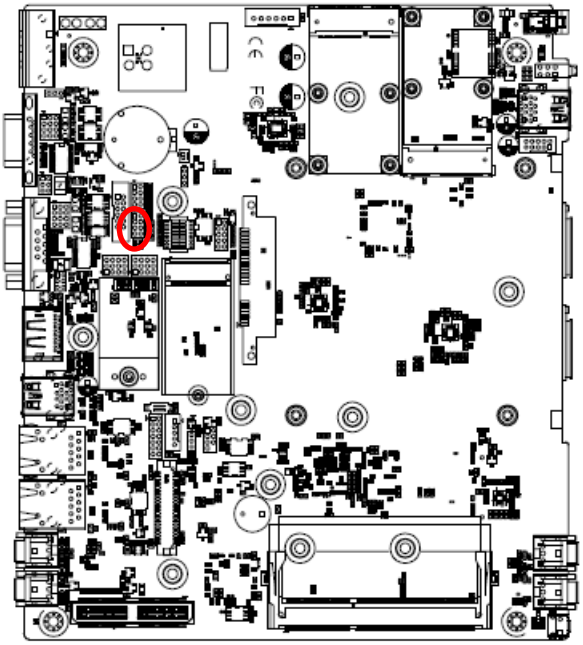


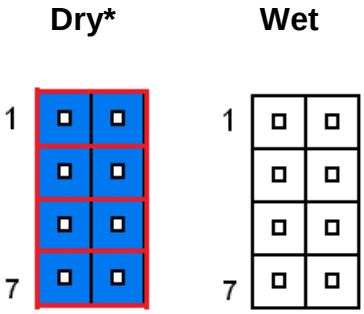
Mode	Digital Input
Dry	Logic level 1: Close to GND Logic level 0: Open
Wet	Logic level 1: < 3V Logic level 0: 5V ~ 30V

*** Default**



2.4.6 Digital Output selector (JDO1)

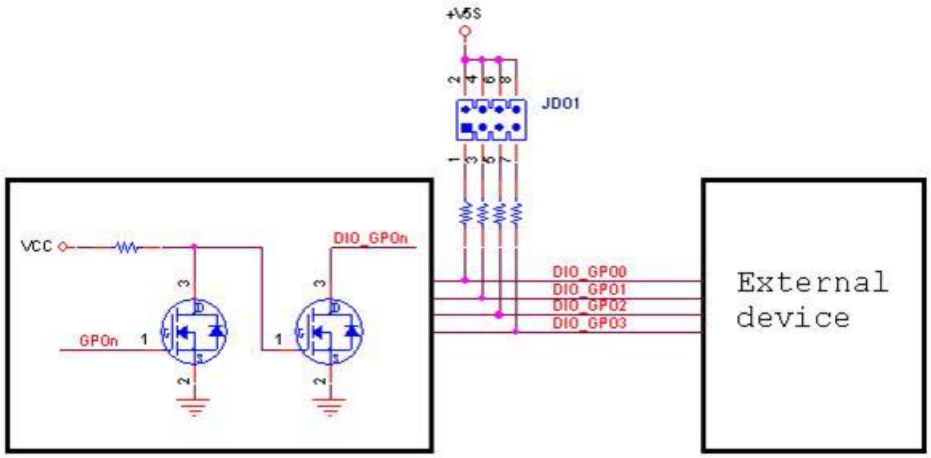




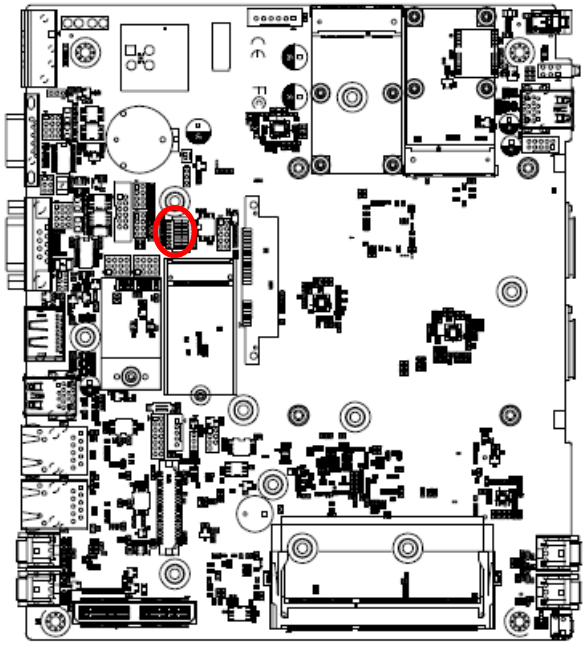
*** Default**

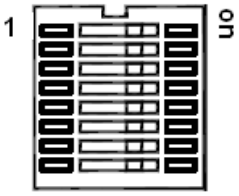
Note:

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



2.4.7 Multi-function select (SW1)





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

DDI1 mode(DP+)

	DisplayPort*	HDMI
6	ON	OFF

DDI0 mode(IET)

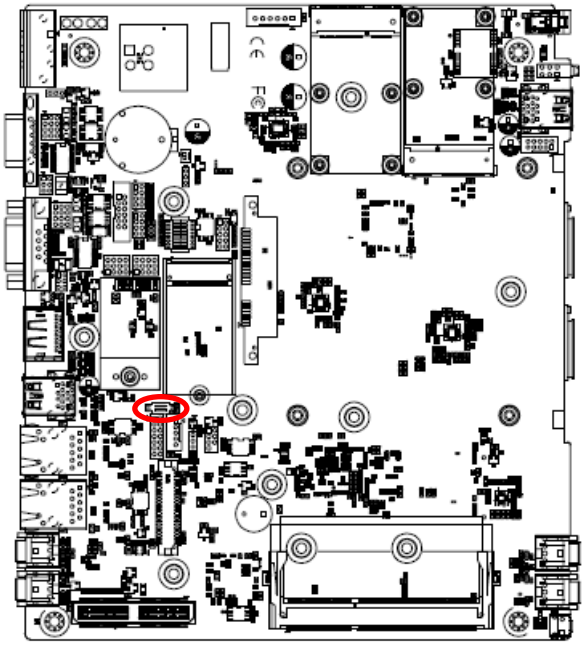
	DisplayPort	HDMI*
7	ON	OFF

UART2 mode

	CAN	COM*
8	ON	OFF

*** Default**

2.4.8 Power Input selector (SW2)



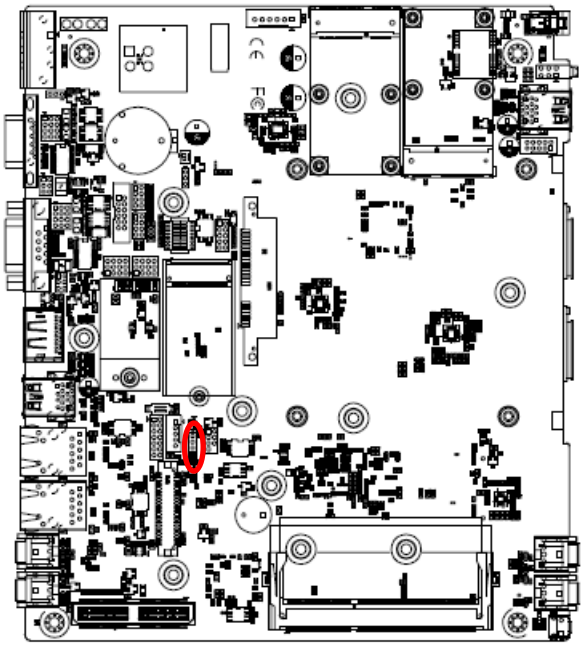
+12V*

+24V

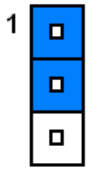
+9V-+36V

*** Default**

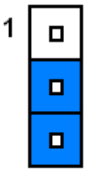
2.4.9 LCD backlight brightness adjustment (JVR1)



PWM Mode*

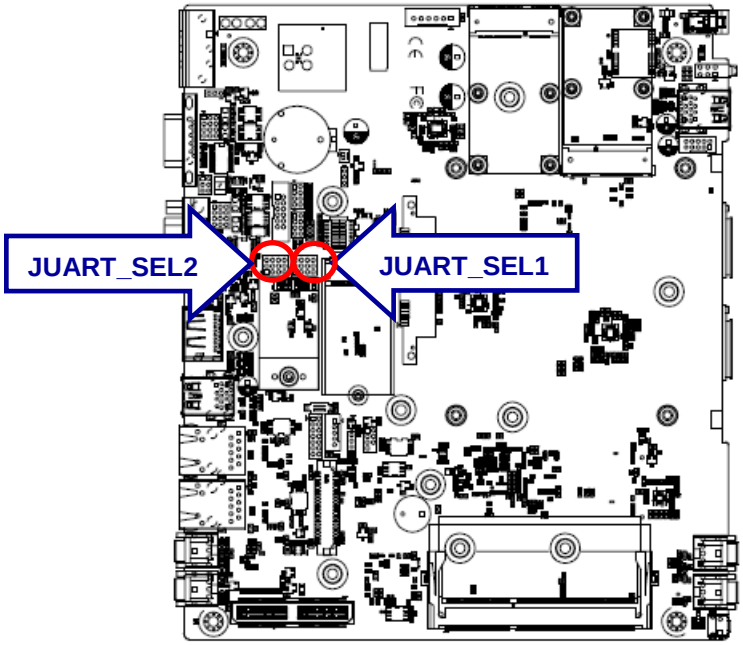


DC Mode

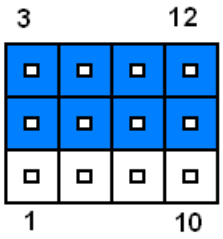


*** Default**

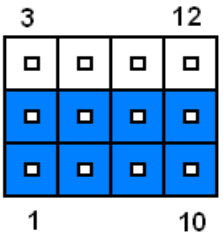
2.4.10 CAN/COM selector (JUART_SEL1/2)



COM*

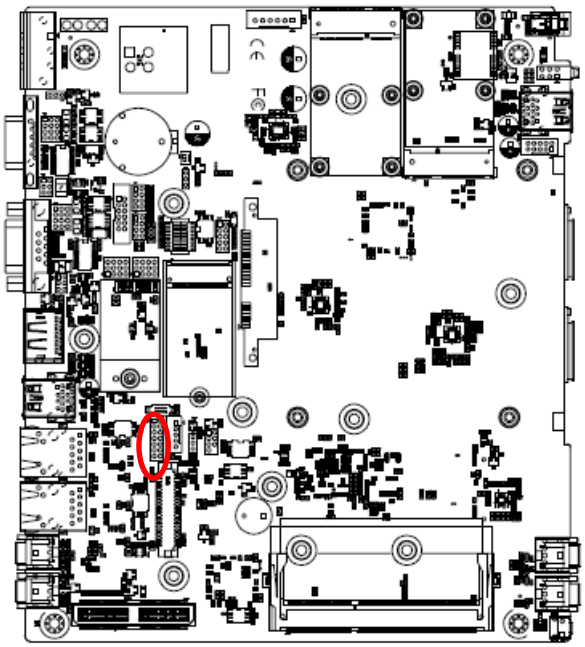


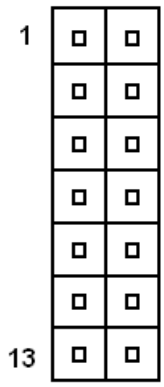
CAN



*** Default**

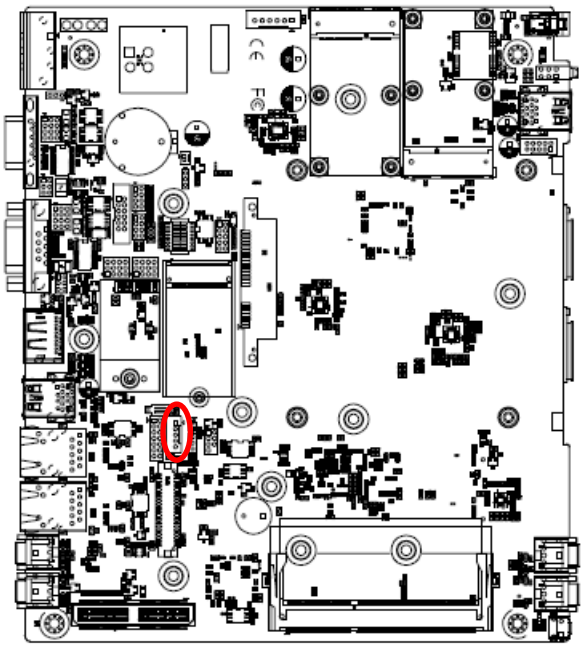
2.4.11 LPC port connector (JLPC1)





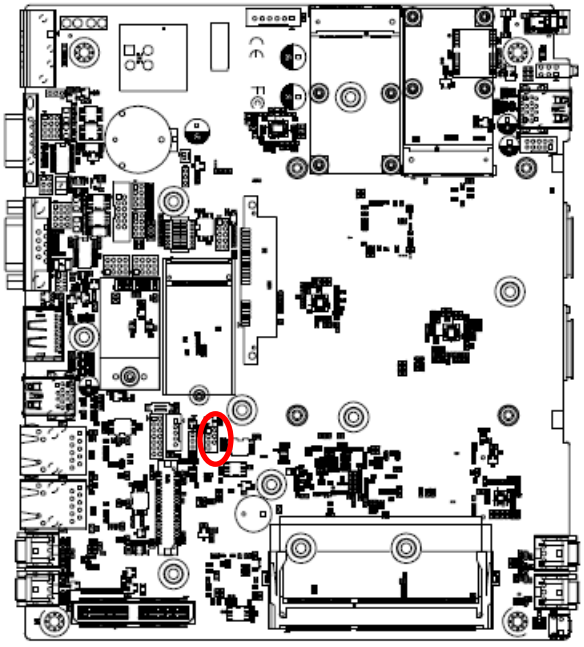
Signal	PIN	PIN	Signal
LPC_AD0	1	2	+3.3V
LPC_AD1	3	4	PLT_RST_BUF#
LPC_AD2	5	6	LPC_FRAME#
LPC_AD3	7	8	LPC1_PORT80_CLK
LPC_SERIRQ	9	10	GND
+5V	11	12	GND
+5VSB	13	14	NC

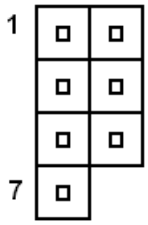
2.4.12 LCD inverter connector (JBKL1)



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

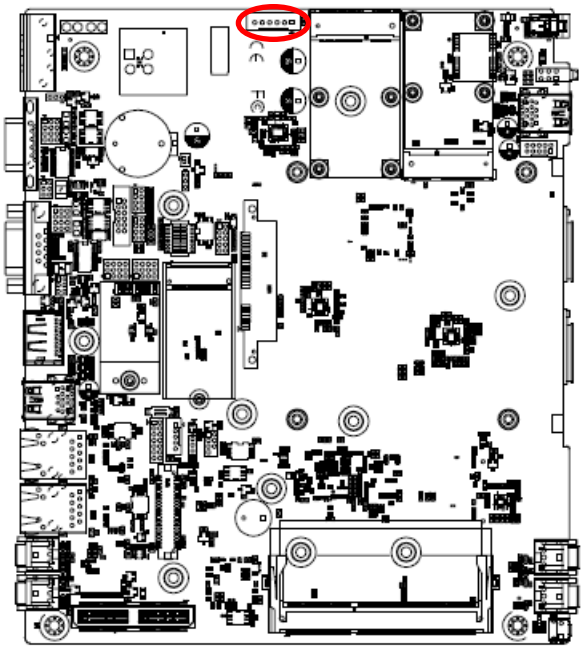
2.4.13 BIOS SPI connector (BIOS_SPI1)

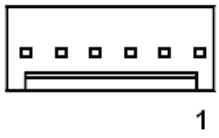




Signal	PIN	PIN	Signal
+1.8VSB	1	2	GND
SPI_CS#0	3	4	SPI_CLK
SPI_MISO	5	6	SPI_MOSI
SPI_HOLD#	7		

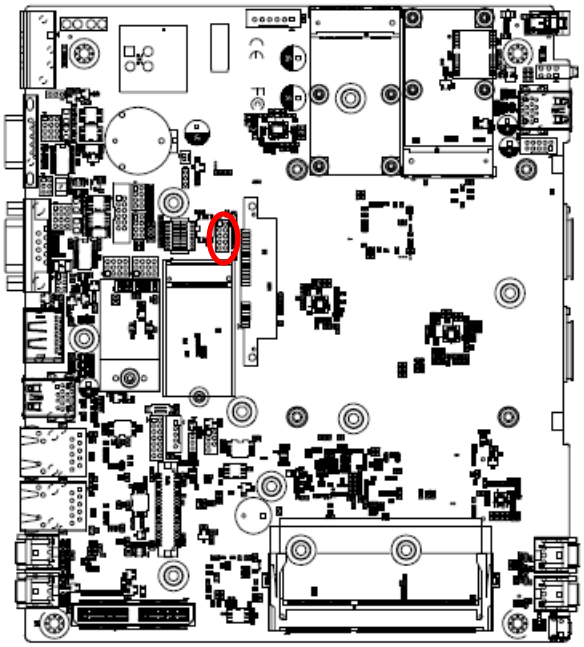
2.4.14 DC Output connector (DCOUT1)

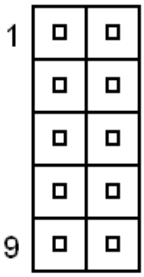




Signal	PIN
+12VSB	1
+12VSB	2
+12VSB	3
GND	4
GND	5
GND	6

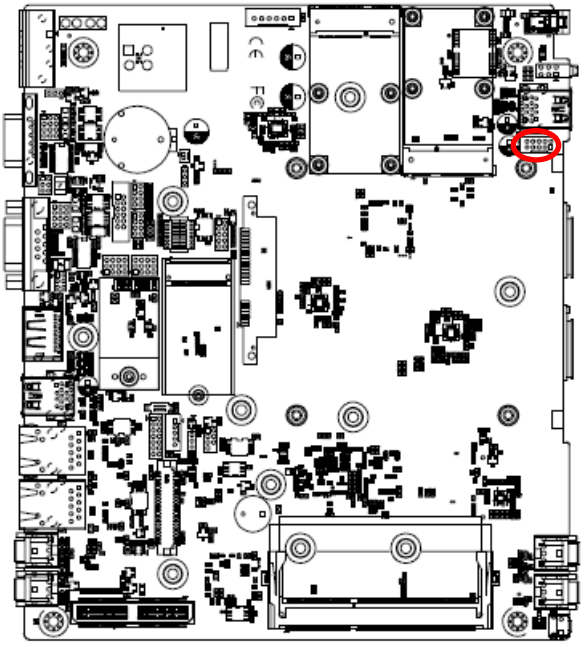
2.4.15 EC Debug connector (JEC_ROM2)

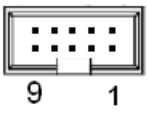




Signal	PIN	PIN	Signal
+VSPI_EC	1	2	GND
EC_FSCE#	3	4	EC_FSCK
EC_FMISO	5	6	EC_FMOSI
EC_HOLD#	7	8	NC
EC_SMCLK_DEBUG	9	10	EC_SMDAT_DEBUG

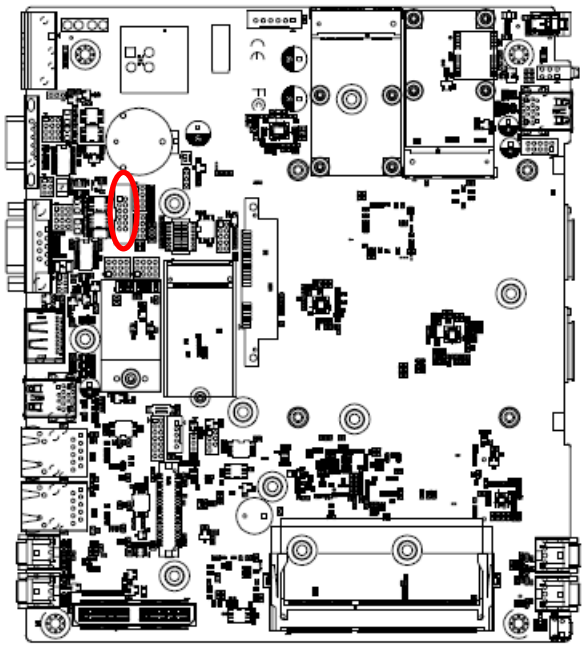
2.4.16 On-board header for USB2.0 (JUSB2)

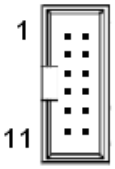




Signal	PIN	PIN	Signal
+5VSB	1	2	+5VSB
USB_HUB_Z_DN_4	3	4	USB_HUB_Z_DN_3
USB_HUB_Z_DP_4	5	6	USB_HUB_Z_DP_3
GND	7	8	GND
GND	9	10	GND

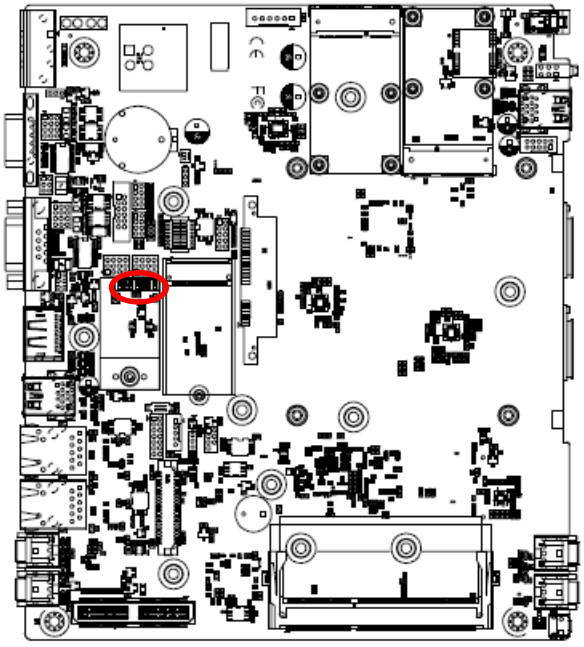
2.4.17 General purpose I/O connector (DIO1)

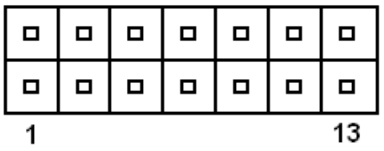




Signal	PIN	PIN	Signal
DIO_GPO0	1	2	DIO_GPI0
DIO_GPO1	3	4	DIO_GPI1
DIO_GPO2	5	6	DIO_GPI2
DIO_GPO3	7	8	DIO_GPI3
SMB_SCL_S0	9	10	SMB_SDA_S0
GND	11	12	+3.3V

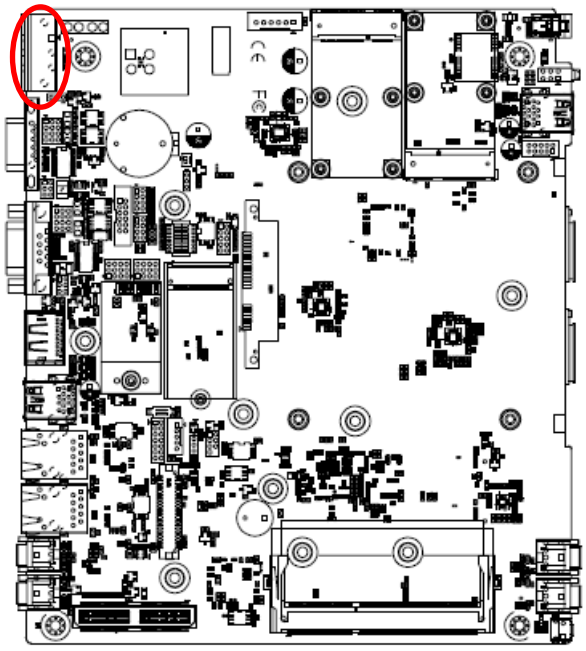
2.4.18 CAN Module slot (CAN1)

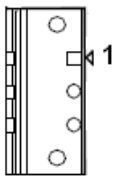




Signal	PIN	PIN	Signal
CAN_PWR	1	2	CAN_8
CAN_IND	3	4	CAN_9
GND	5	6	BAT_GND
CAN_WAKE	7	8	CAN_11
CAN_TX	9	10	CAN_12
CAN_RX	11	12	CAN_13
+5V	13	14	CAN_14

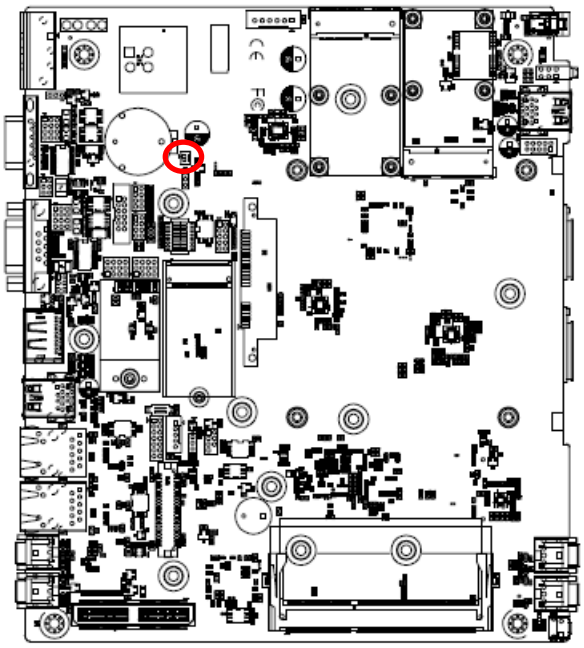
2.4.19 DC Input connector (JVIN1)





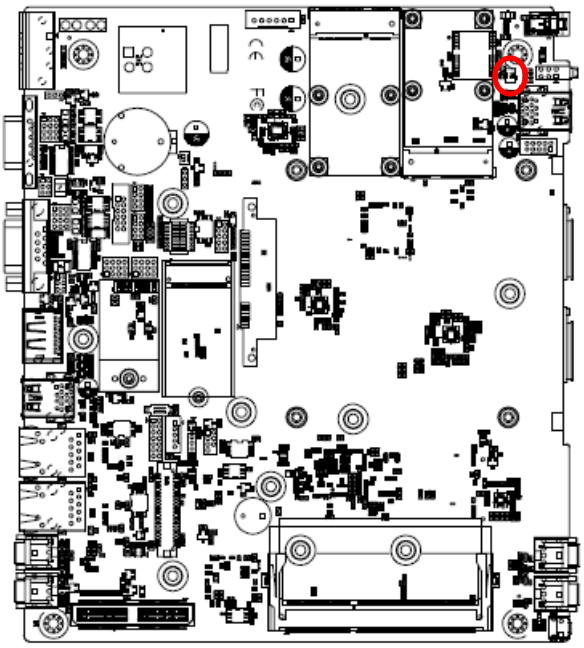
Signal	PIN
+VIN_BAT	1
ACC_ON	2
GND	3

2.4.20 Battery connector 1 (BT1)



Signal	PIN
+RTCBATT	1
GND	2

2.4.21 Battery connector 2 (BT2)

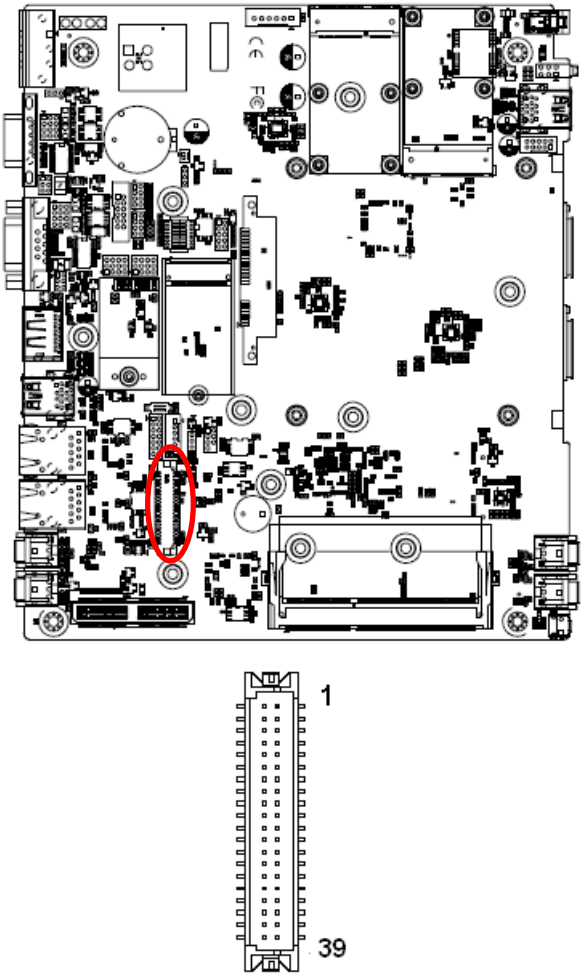


Signal	PIN
+GPSBATT	1
GND	2

Note:

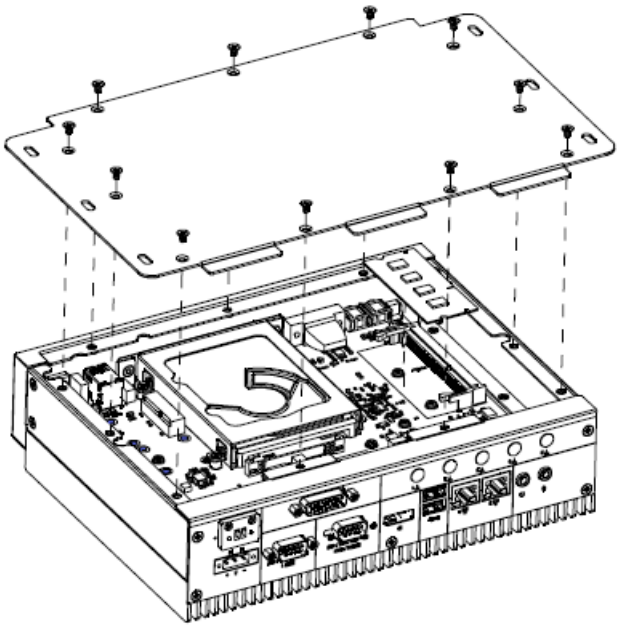
Reserved for GPS module.

2.4.22 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

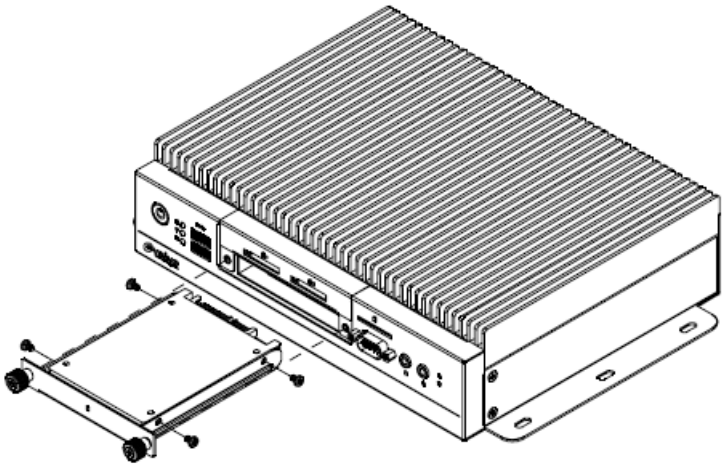
2.5 Installing Hard Disk & Memory, PCI devices



Step 1. Remove 11 screws from the bottom of your system and take it off.

Step 2. Slide the DDR3L SODIMM into the memory socket and press it down until properly seated.

Step 3. Insert MPCIE cards into designated locations and fasten with 4 screws to complete MPCIE installation.



Step 1. Unfasten 2 screws from the HDD bracket and take it off.

Step 2. Remove 4 screws to release the HDD bracket.

Step 3. Slide HDD into its bracket until properly seated.

Step 4. Secure HDD by means of 4 screws.

Step 5. Insert HDD bracket into designated locations and fasten with 2 screws to complete HDD installation.

3.BIOS Setup

3.1 Introduction

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

3.2 Starting Setup

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

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

Press <Del> or <ESC> to enter SETUP

If the message disappears before you respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the "RESET" button on the system case. You may also restart by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys. If you do not press the keys at the correct time and the system does not boot, an error message will be displayed and you will again be asked to.

Press F1 to Continue, DEL to enter SETUP

3.3 Using Setup

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

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

- **Navigating Through The Menu Bar**

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

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

- **To Display a Sub Menu**

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

3.4 Getting Help

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

3.5 In Case of Problems

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

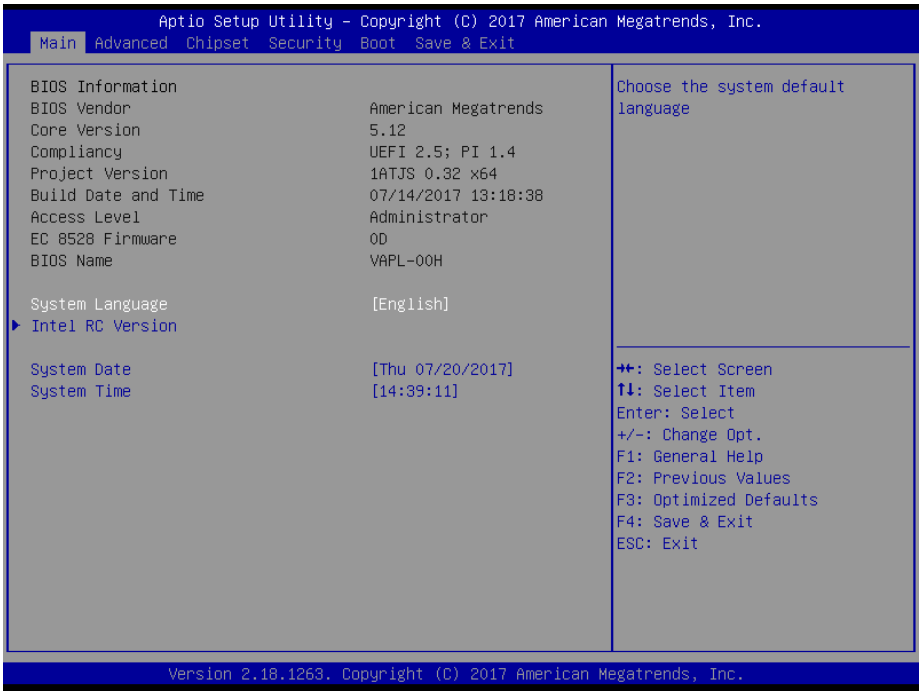
The best advice is to only alter settings which you thoroughly understand. To this end, we strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both BIOS Vendor and your systems manufacturer to provide the absolute maximum performance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

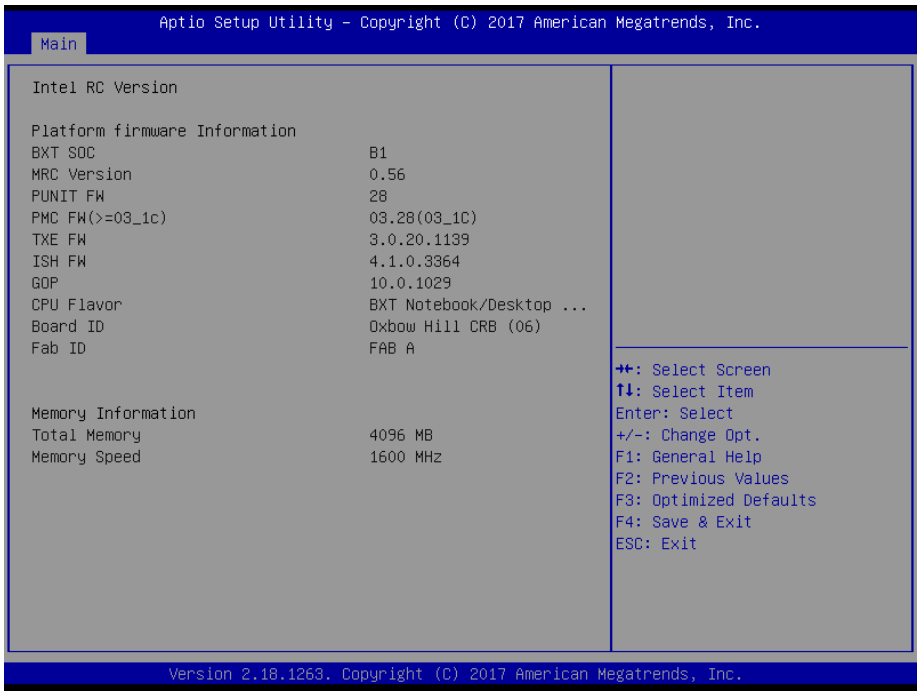
3.6 BIOS setup

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

3.6.1 Main Menu

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





3.6.1.1 System Language

This option allows choosing the system default language.

3.6.1.2 System Date

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

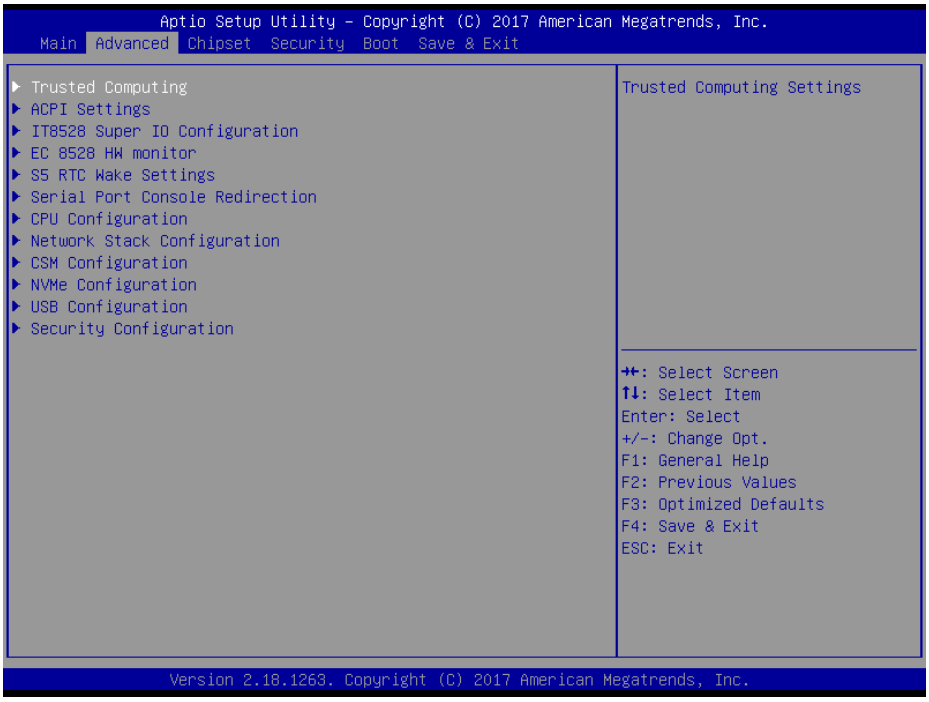
3.6.1.3 System Time

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

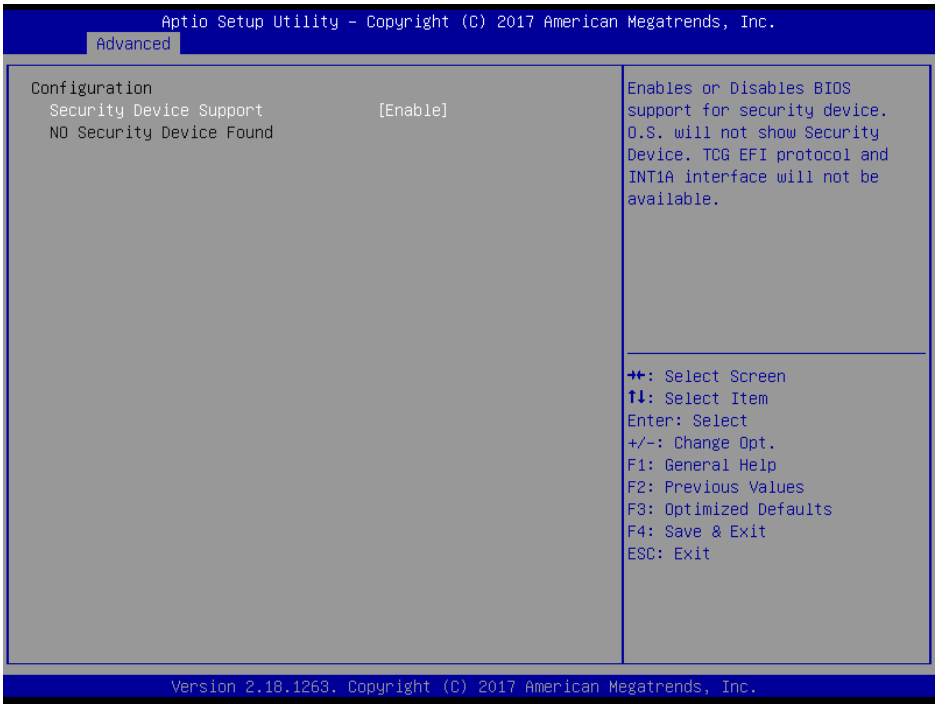
Note: The BIOS setup screens shown in this chapter are for reference purposes only, and may not exactly match what you see on your screen.
Visit the Avalue website (www.avalue.com.tw) to download the latest product and BIOS information.

3.6.2 Advanced Menu

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

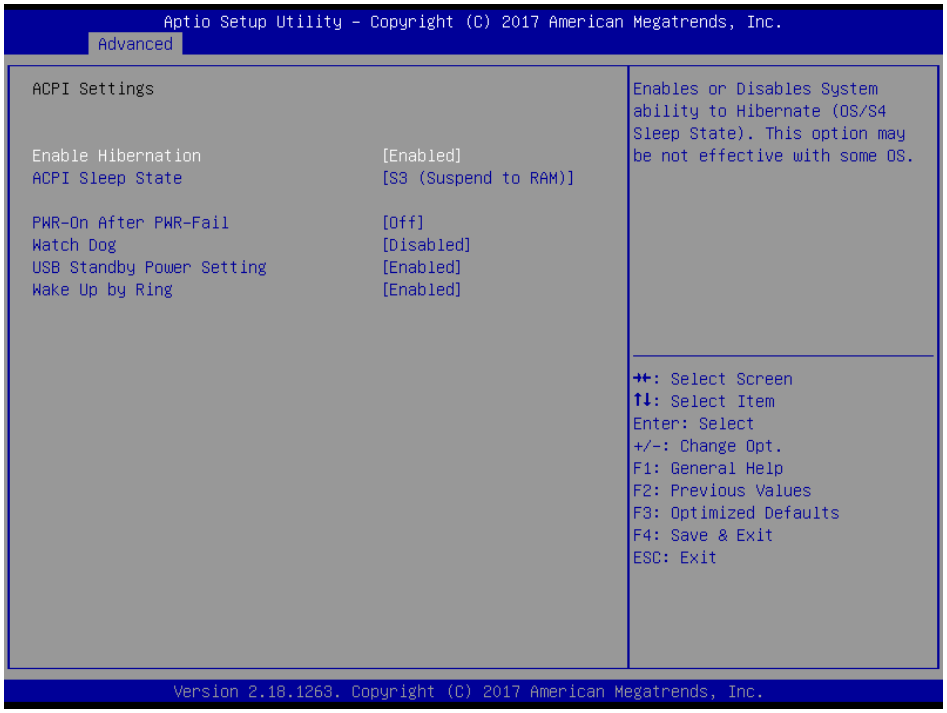


3.6.2.1 Trusted Computing



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.

3.6.2.2 ACPI Settings



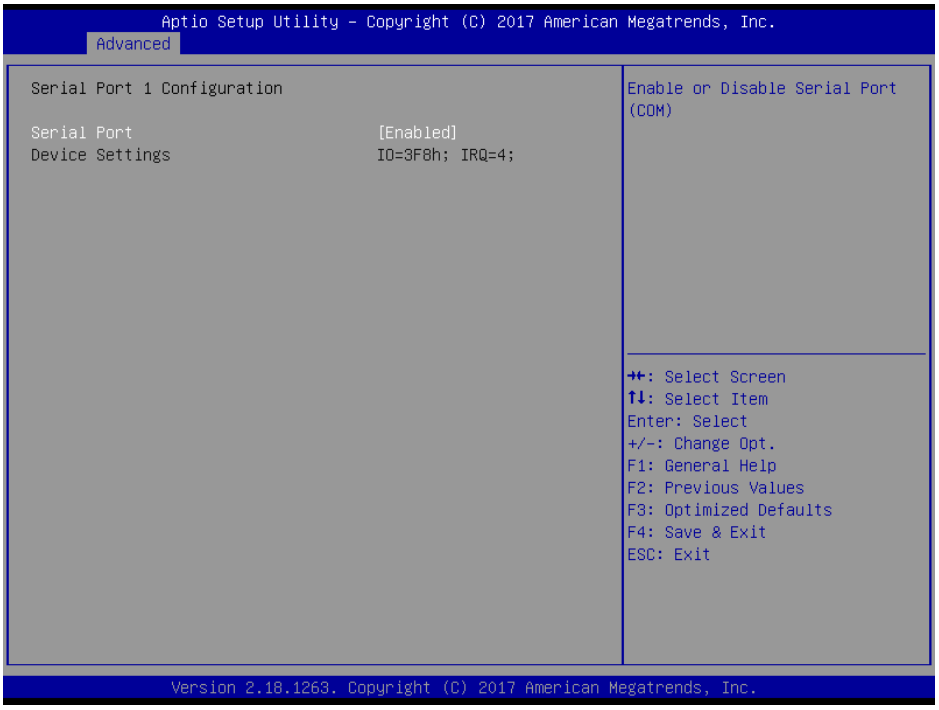
Item	Options	Description
Enable Hibernation	Disabled Enabled**[Default]**,	Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS.
ACPI Sleep State	Suspend Disabled, S3 (Suspend to RAM) **[Default]**	Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.
PWR-On After PWR-Fail	Off**[Default]** On Last state	AC loss resume.
Watch Dog	Disabled**[Default]**, 30 sec 40 sec 50 sec 1 min 2 min 10 min 30 min	Select WatchDog.
USB Standby Power Setting	Disabled Enabled**[Default]**,	Enabled/Disabled USB Standby Power during S3/S4/S5.
Wake Up by Ring	Disabled Enabled**[Default]**,	Wake Up by Ring from S3/S4/S5.

3.6.2.3 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 3.6.2.3.1~ 3.6.2.3.2 for more information.

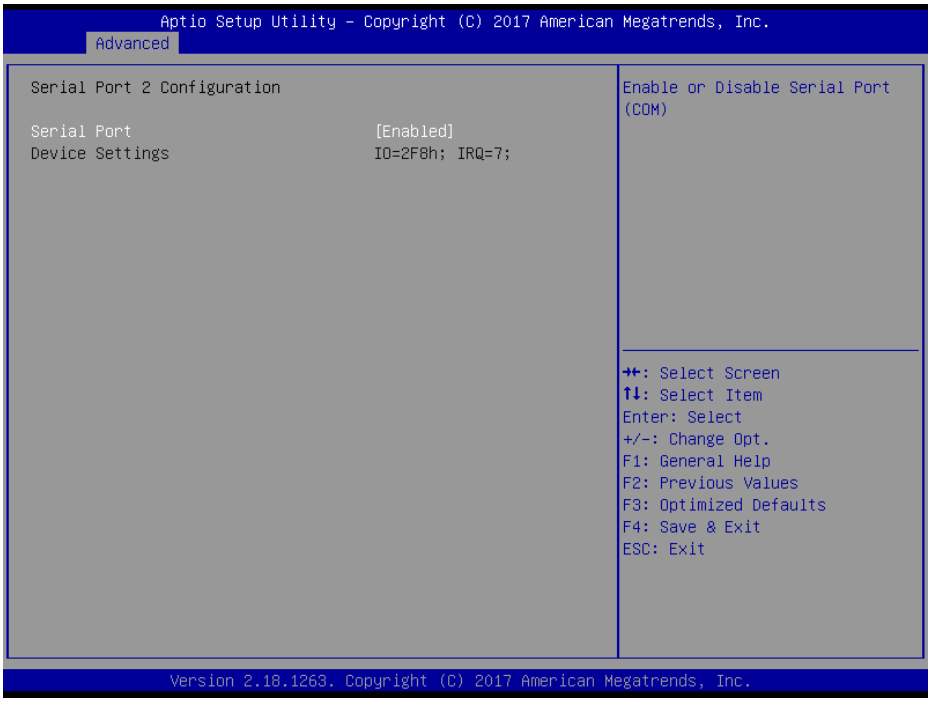
Item	Description
Serial Port 1 Configuration	Set Parameters of Serial Port 1 (COMA).
Serial Port 2 Configuration	Set Parameters of Serial Port 2 (COMB).

3.6.2.3.1 Serial Port 1 Configuration



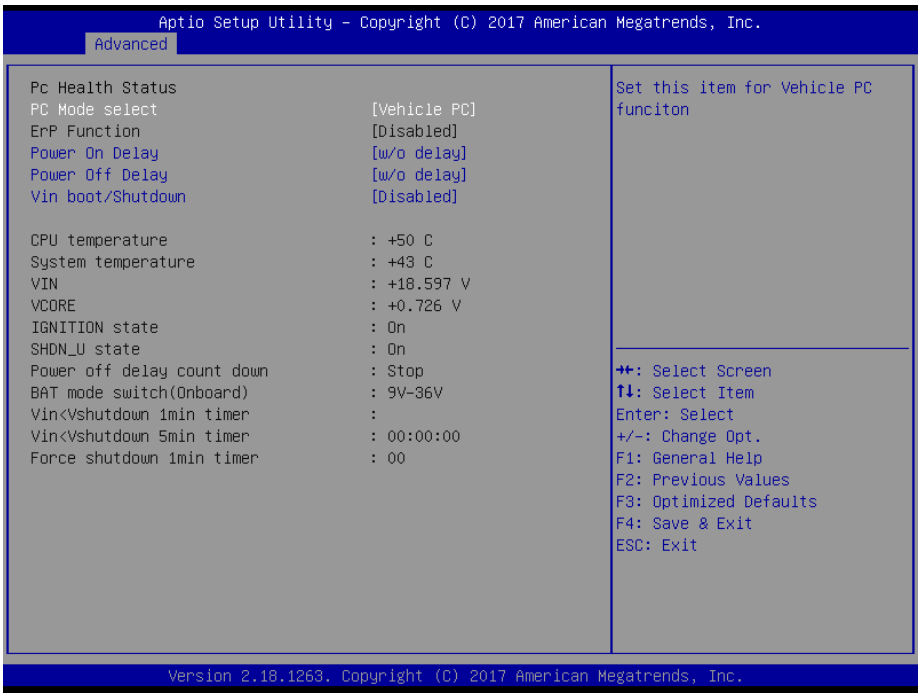
Item	Option	Description
Serial Port	Enabled**[Default]**, Disabled	Enable or Disable Serial Port (COM).

3.6.2.3.2 Serial Port 2 Configuration



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

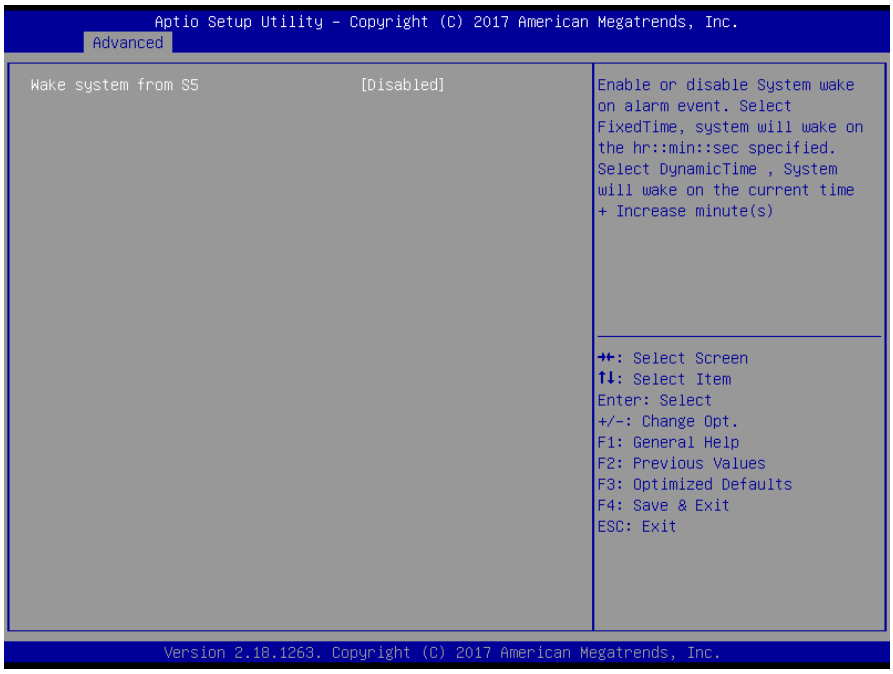
3.6.2.4 EC 8528 H/W Monitor



Item	Option	Description
PC Mode select	Industry PC Vehicle PC**[Default]**	Set this item for Vehicle PC function. **Vehicle PC:** BIOS will set item “Power on/off delay” & “Vin Work/Shutdown” function as active. **Industry PC:** Item “Power on/off delay” & “Vin Work/Shutdown” will be gray and has no function.
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	Power Off Delay.

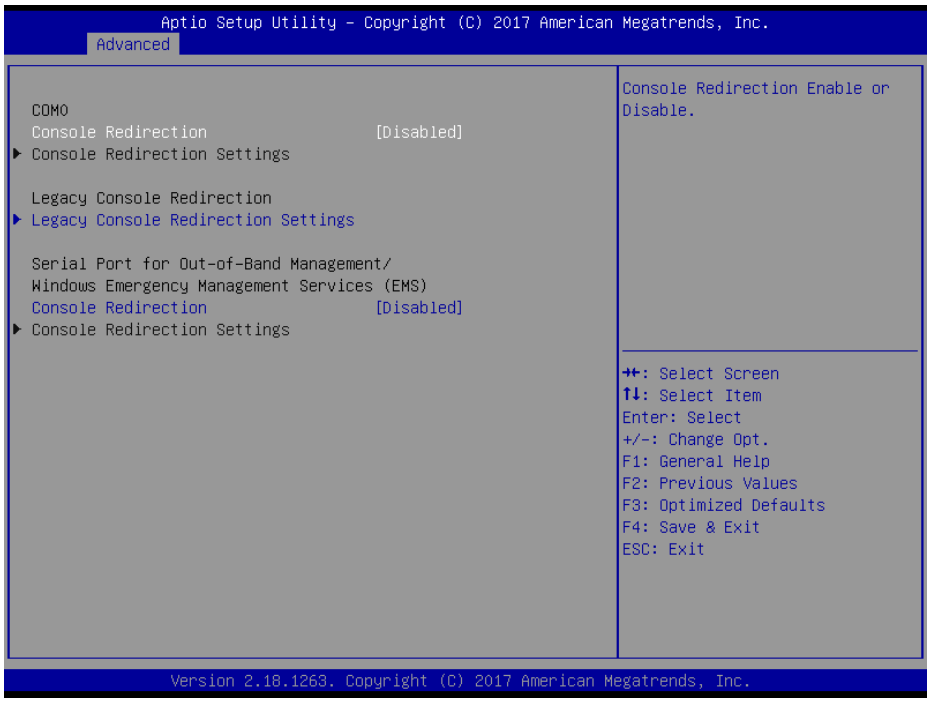
	6 Hour 18 Hour	
Vin Work/ Shutdown	Disabled**[Default]** (11.5V, 10.5V)/(23V,21V) (12.0V, 11.0V)/(24V,22V) (12.5V, 11.0V)/(25V,22V) (12.5V, 11.5V)/(25V,23V)	Vin>Vboot: Allow system power on Vin<Vshutdown: system shutdown.

3.6.2.5 S5 RTC Wake Settings



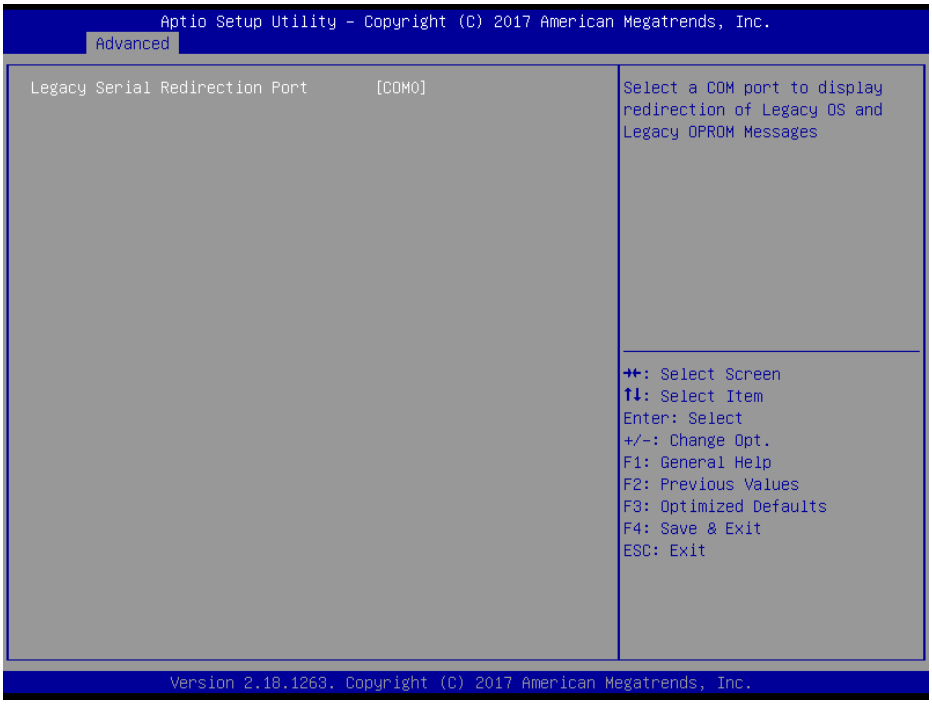
Item	Options	Description
Wake system from S5	Disabled**[Default]**, Fixed Time Dynamic Time	Enable or disable System wake on alarm event. Select Fixed Time, system will wake on the hr::min::sec specified. Select Dynamic Time, System will wake on the current time + Increase minute(s).

3.6.2.6 Serial Port Console Redirection



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

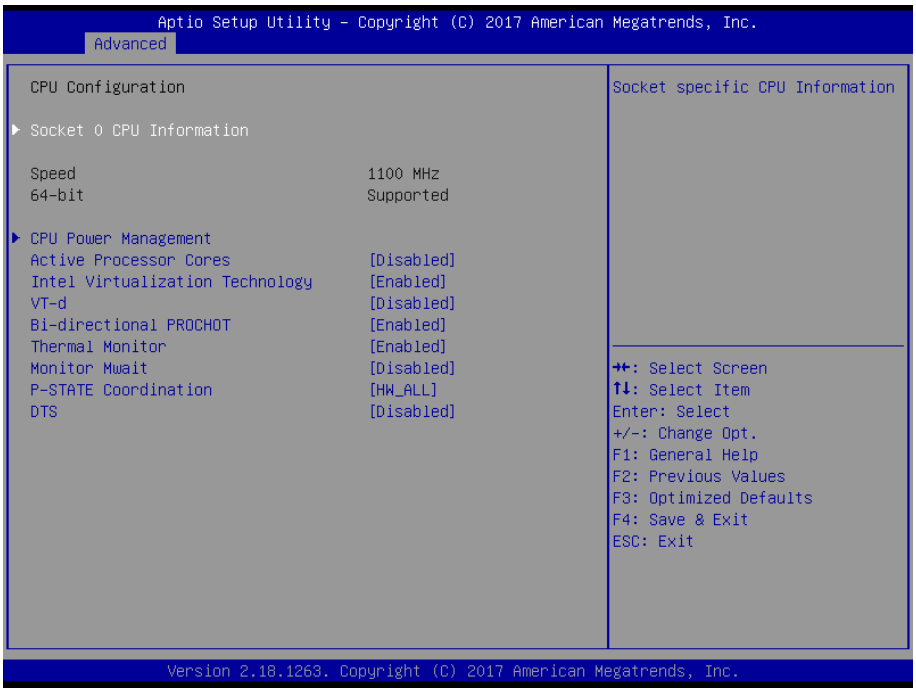
3.6.2.6.1 Legacy Console Redirection Settings



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

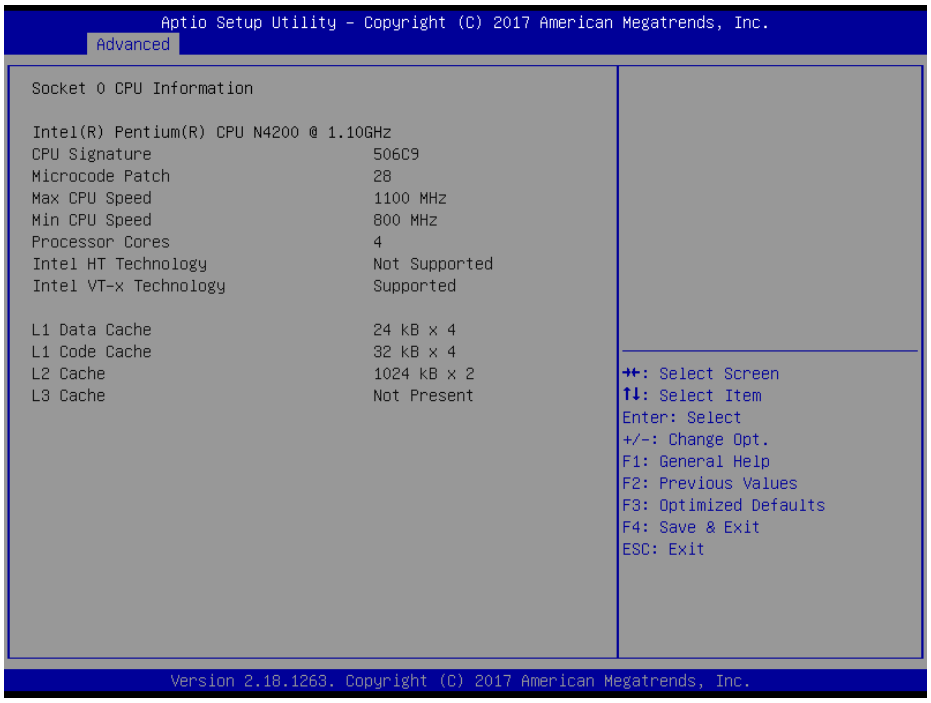
3.6.2.7 CPU Configuration

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

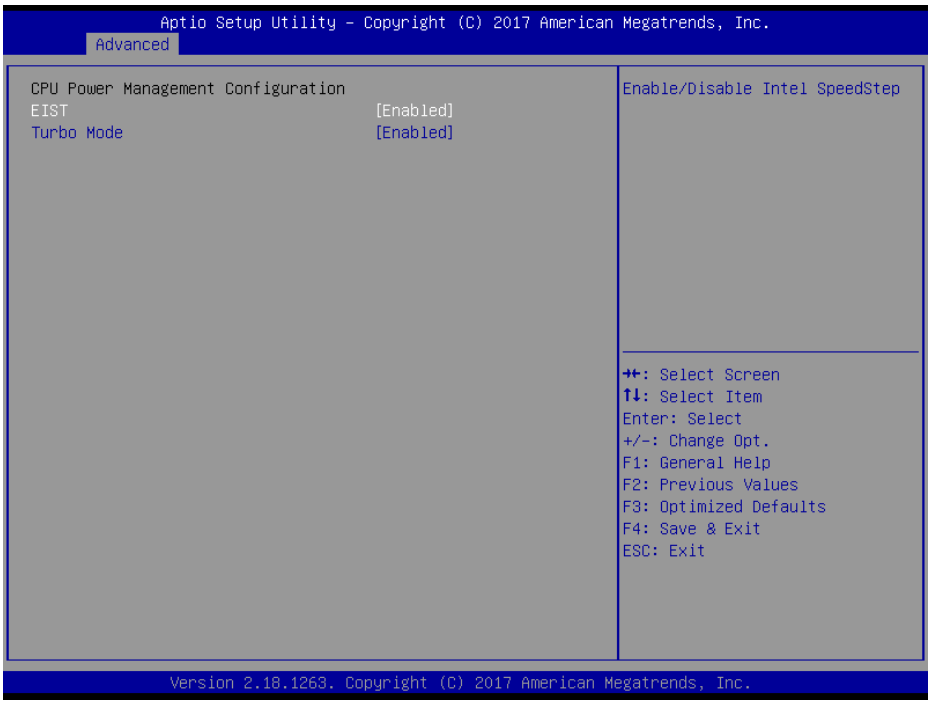


Item	Options	Description
Active Processor Cores	Disabled**[Default]**, Enabled	Number of cores to enable in each processor package.
Intel Virtualization Technology	Disabled, Enabled**[Default]**	When enabled, a VMM can utilize the additional hardware capabilities provided by Virtualization Technology.
VT-d	Disabled**[Default]**, Enabled	Enable/Disable CPU VT-d.
Bi-directional PROCHOT	Disabled, Enabled**[Default]**	When a processor thermal sensor trips (either core), the PROCHOT# will be driven. If bi-direction is enabled, external agents can drive PROCHOT# to throttle the processor.
Thermal Monitor	Disabled, Enabled**[Default]**	Enable/Disable Thermal Monitor.
Monitor Mwait	Disabled**[Default]**, Enabled Auto	Enable/Disable Monitor Mwait.
P-STATE Coordination	HW_ALL**[Default]** SW_ALL SW_ANY	Change P-STATE Coordination type.
DTS	Disabled**[Default]**, Enabled	Enable/Disable Digital Thermal Sensor.

3.6.2.7.1 Socket 0 CPU Information

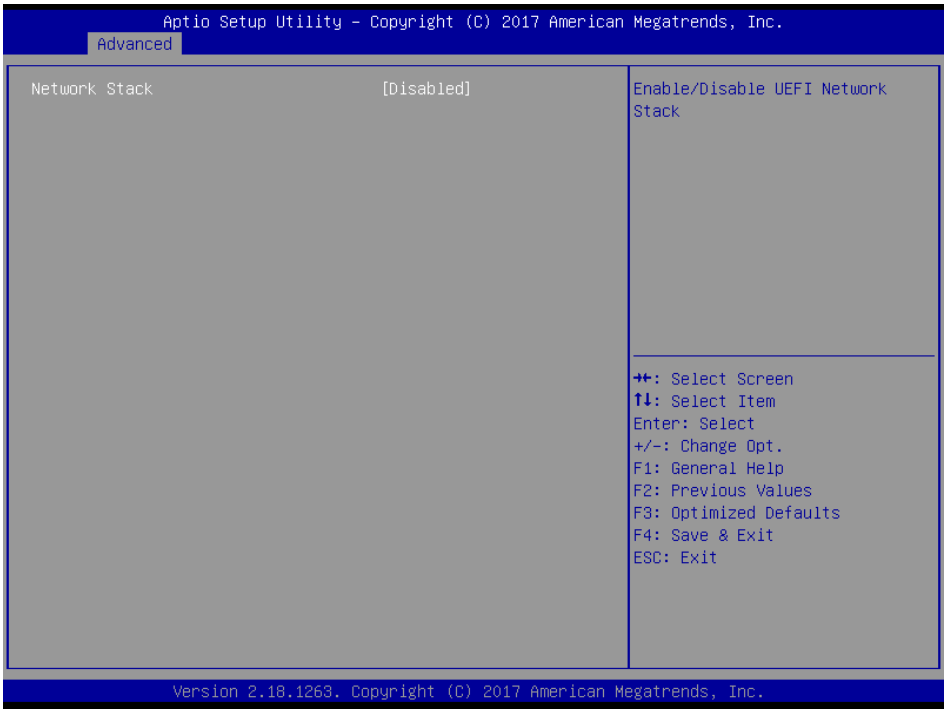


3.6.2.7.2 CPU Power Management Configuration



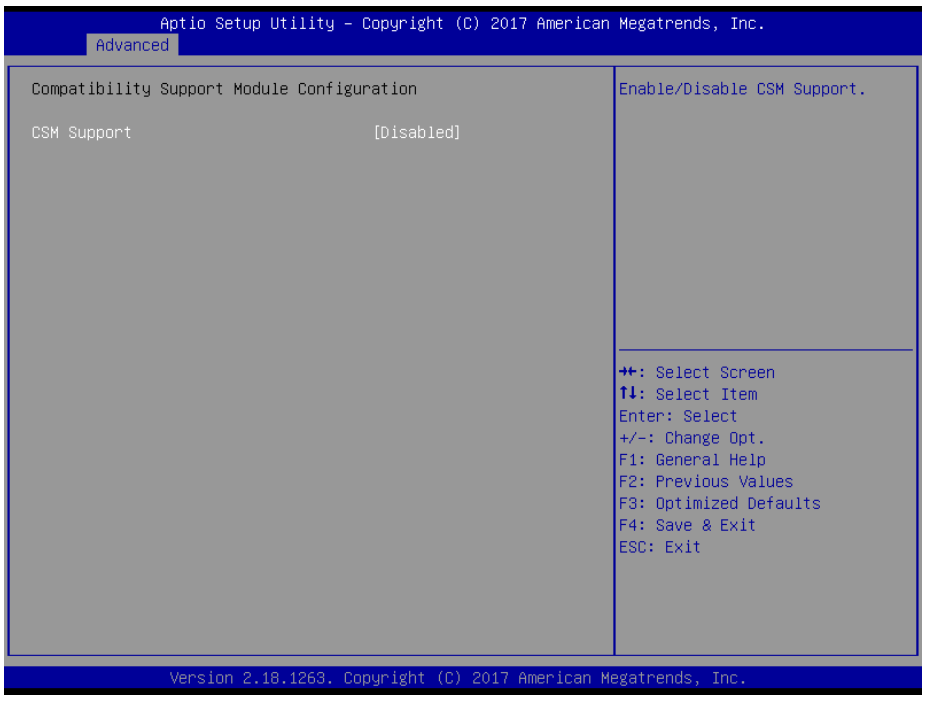
Item	Options	Description
EIST	Disabled, Enabled**[Default]**	Enable/Disable Intel SpeedStep.
Turbo Mode	Disabled, Enabled**[Default]**	Turbo Mode.

3.6.2.8 Network Stack Configuration



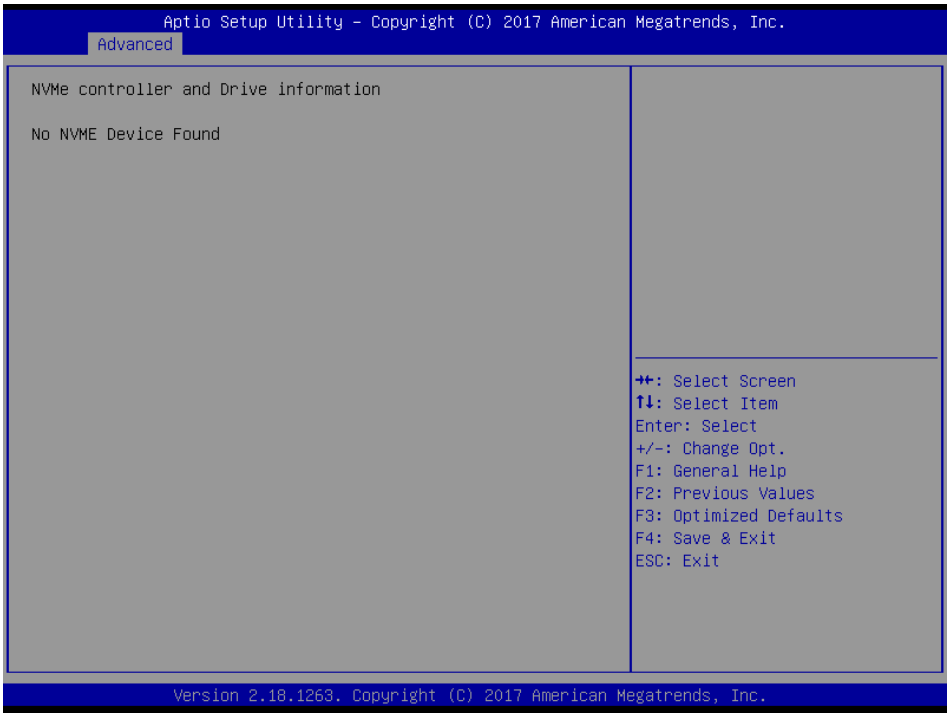
Item	Options	Description
Network Stack	Enabled Disabled**[Default]**,	Enable/Disable UEFI Network Stack.

3.6.2.9 CSM Configuration



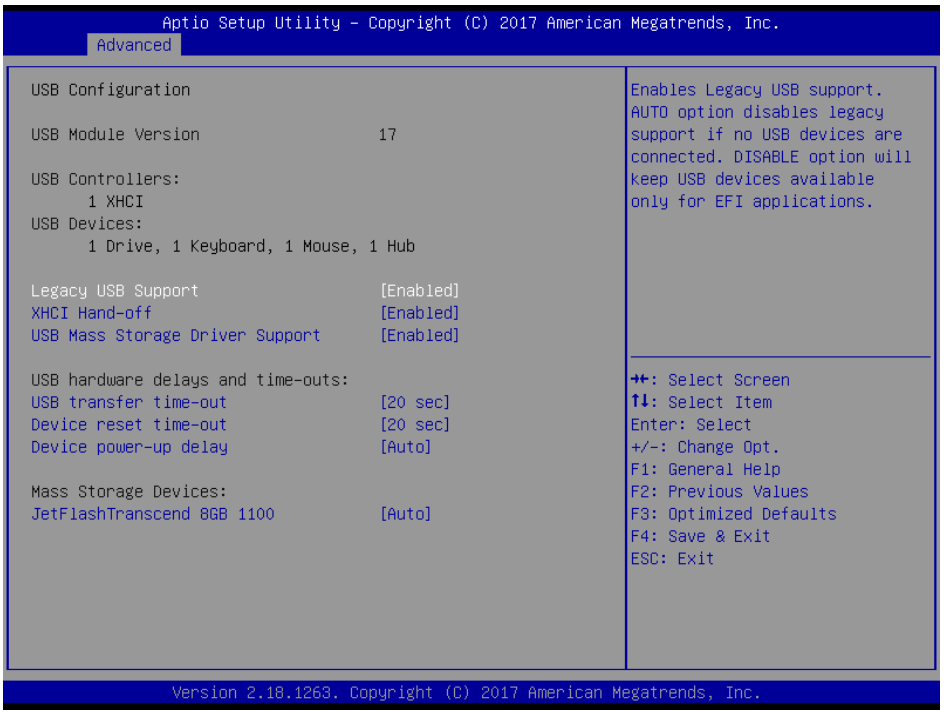
Item	Options	Description
CSM Support	Enabled Disabled**[Default]**	Enable/Disable CSM Support.

3.6.2.10 NVMe Configuration



3.6.2.11 USB Configuration

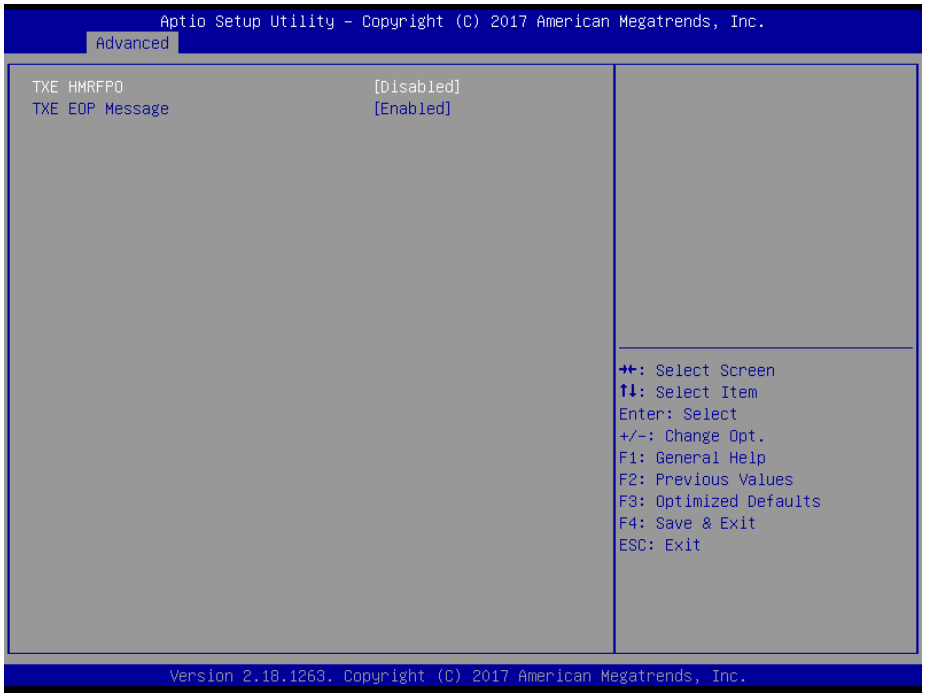
The USB Configuration menu helps read USB information and configures USB settings.



Item	Options	Description
Legacy USB Support	Enabled**[Default]** Disabled Auto	Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.

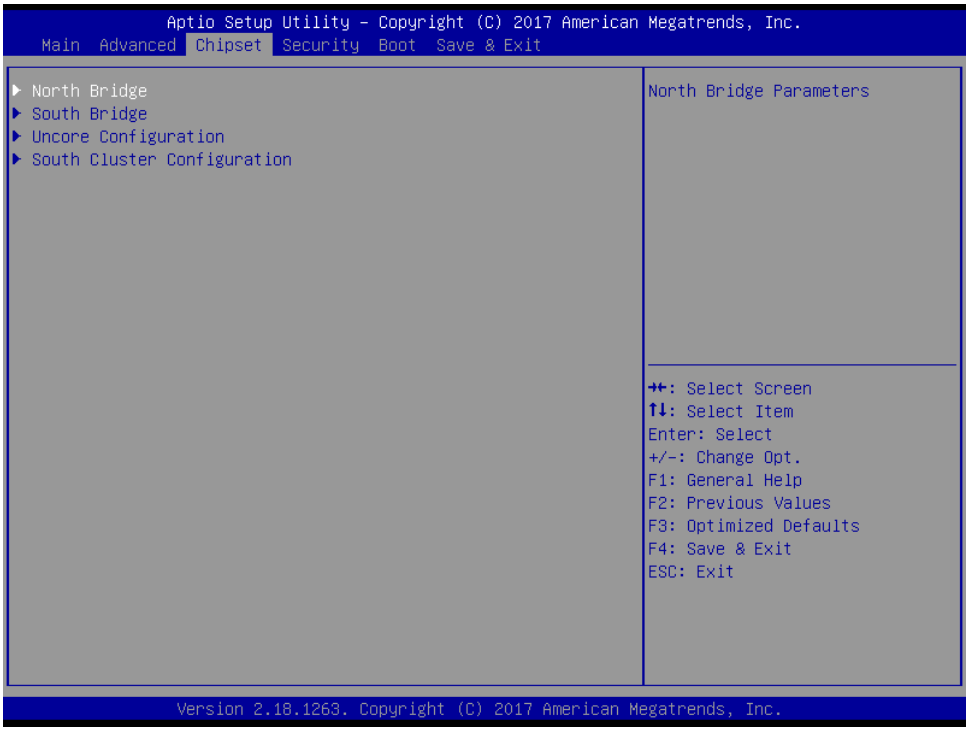
XHCI Hand-off	Enabled**[Default]** Disabled	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Enabled**[Default]** Disabled	Enable/Disable USB Mass Storage Driver Support.
USB transfer time-out	1 sec 5 sec 10 sec 20 sec**[Default]**	The time-out value for Control, Bulk, and Interrupt transfers.
Device reset time-out	10 sec 20 sec**[Default]** 30 sec 40 sec	USB mass storage device Start Unit command time-out.
Device power-up delay	Auto**[Default]** Manual	Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100ms, for a Hub port the delay is taken form Hub descriptor.

3.6.2.12 Security Configuration

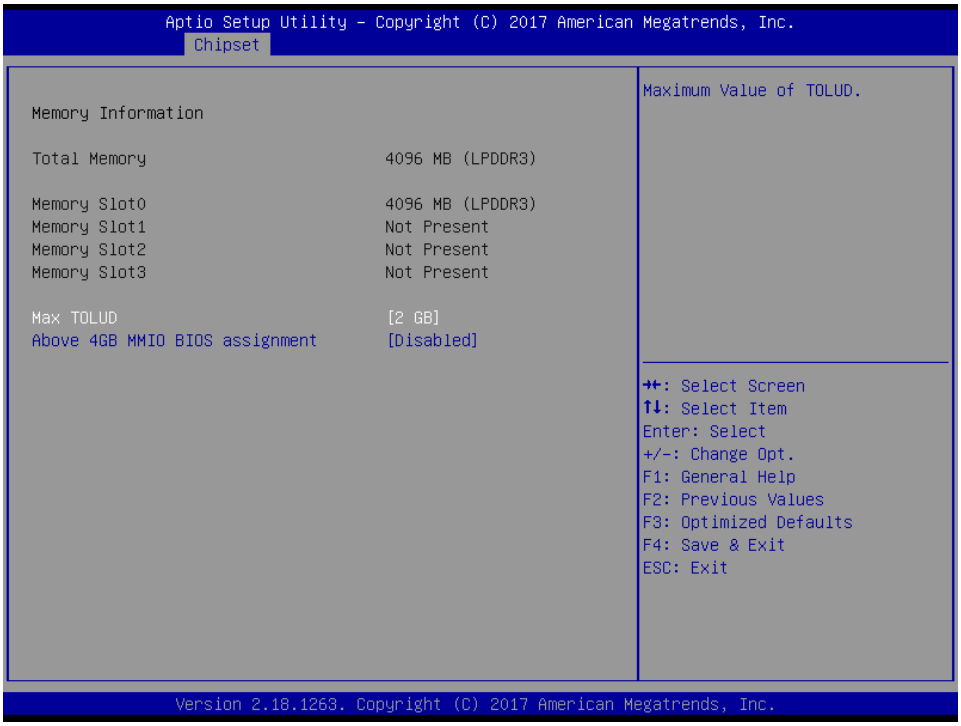


Item	Options	Description
TXE HMRFPO	Disabled**[Default]** Enabled,	TXE HMRFPO.
TXE EOP Message	Disabled Enabled**[Default]**,	Send EOP Message Before Enter OS.

3.6.3 Chipset



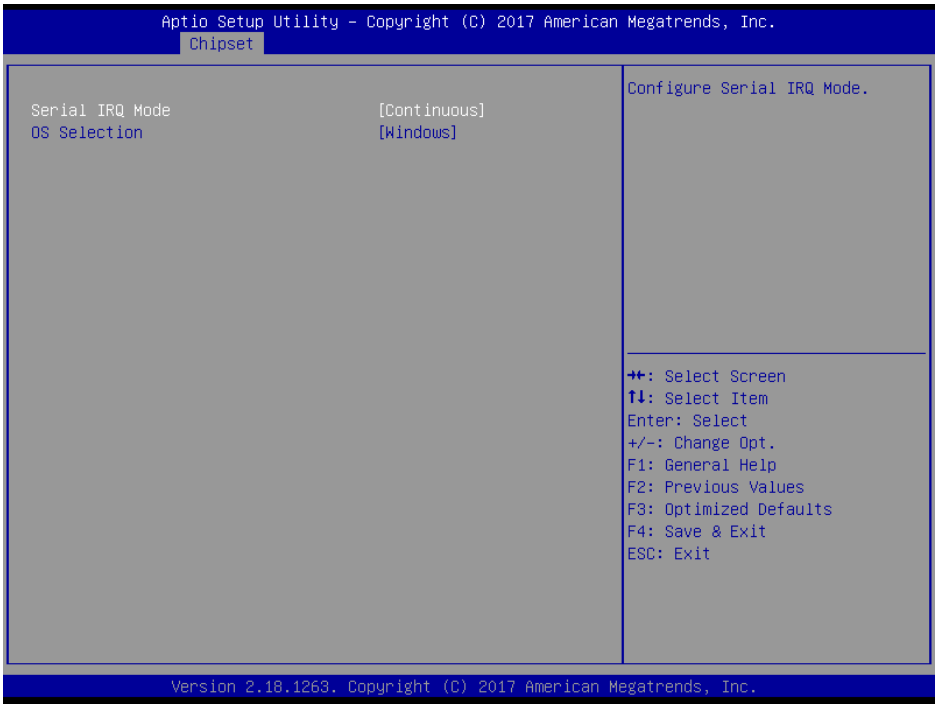
3.6.3.1 North Bridge



Item	Option	Description
Max TOLUD	2 GB**[Default]** 2.25 GB 2.5 GB 2.75 GB	Maximum Value of TOLUD.

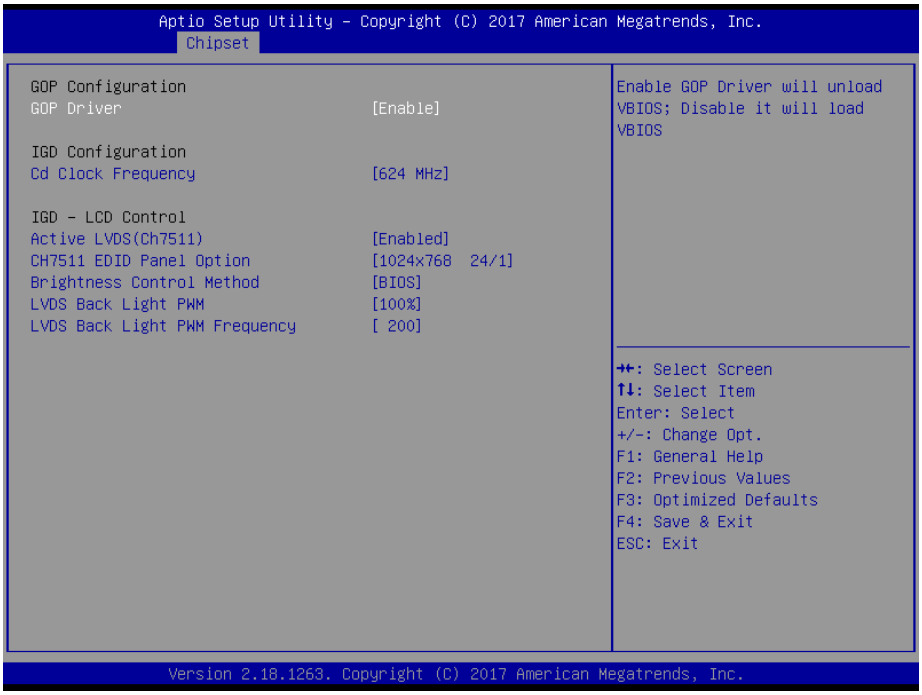
Above 4GB MMIO BIOS assignment	Disabled**[Default]** Enabled,	Enable/Disable above 4GB MemoryMapped IO BIOS assignment. This is disabled automatically when Aperture Size is set to 2048MB.

3.6.3.2 South Bridge



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

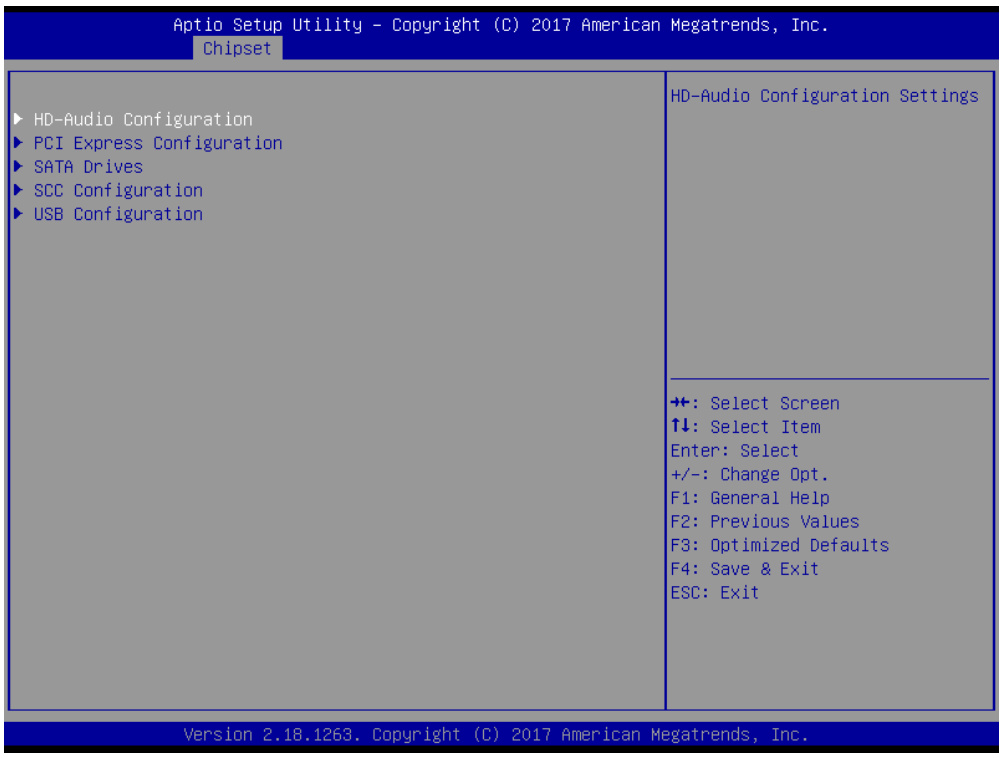
3.6.3.3 Uncore Configuration



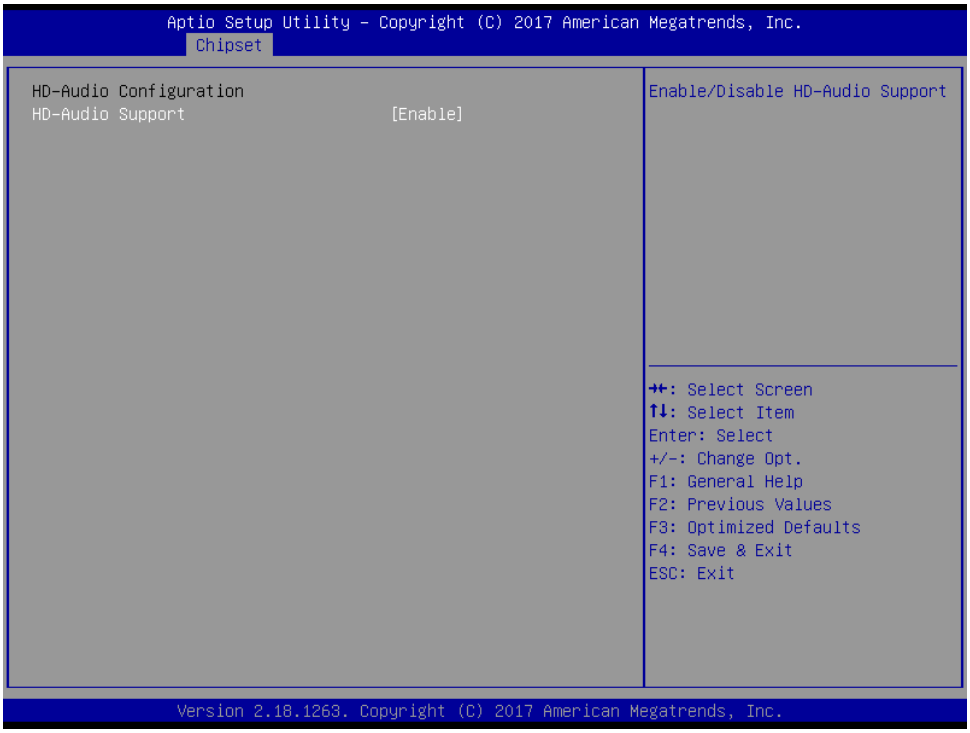
Item	Option	Description
GOP Driver	Enable**[Default]** Disable	Enable GOP Driver will unload VBIOS; Disable it will load VBIOS.
Cd Clock Frequency	144 MHz 288 MHz 384 MHz 576 MHz 624 MHz**[Default]**	Select the highest Cd Clock frequency supported by the platform.
Active LVDS(Ch7511)	Disable Enabled**[Default]**	Active Internal LVDS(eDP->CH7511->to-LVDS).
CH7511 EDID Panel Option	1024x768 24/1**[Default]** 800x600 18/1 1024x768 18/1 1366x768 18/1 1024x600 18/1 1280x800 18/1 1920x1200 24/2 1920x1080 18/2 1280x1024 24/2 1440x900 18/2 1600x1200 24/2 1366x768 24/1 1920x1080 24/2 1680x1050 24/2	Port1-EDP to LVDS(Chrotel 7511) Panel EDID Option.
Brightness Control Method	BIOS**[Default]** OS driver	LVDS Brightness Control Method. 1.BIOS 2.Brightness Button 3.Variable Resistor 4.OS Driver.
LVDS Back Light PWM	00% 25%	Select LVDS back light PWM duty.

	50% 75% 100%**[Default]**	
LVDS Back Light PWM Frequency	200**[Default]** 300 400 500 700 1k 2k 3k 5k 10k 20k	Select LVDS back light PWM Frequency.

3.6.3.4 South Cluster Configuration

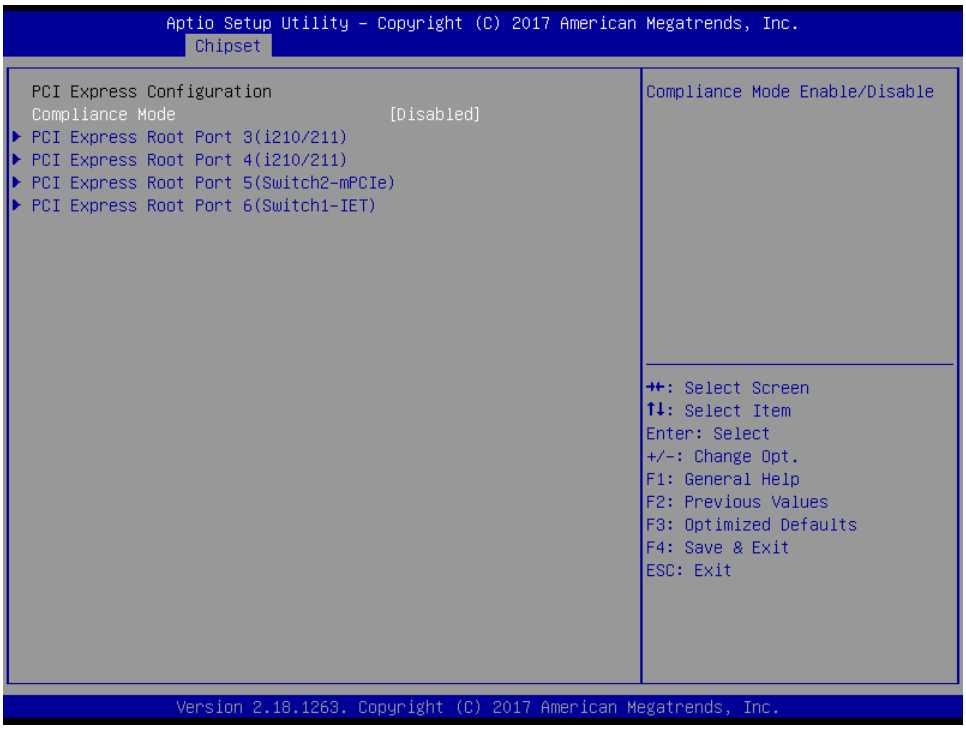


3.6.3.4.1 HD-Audio Configuration



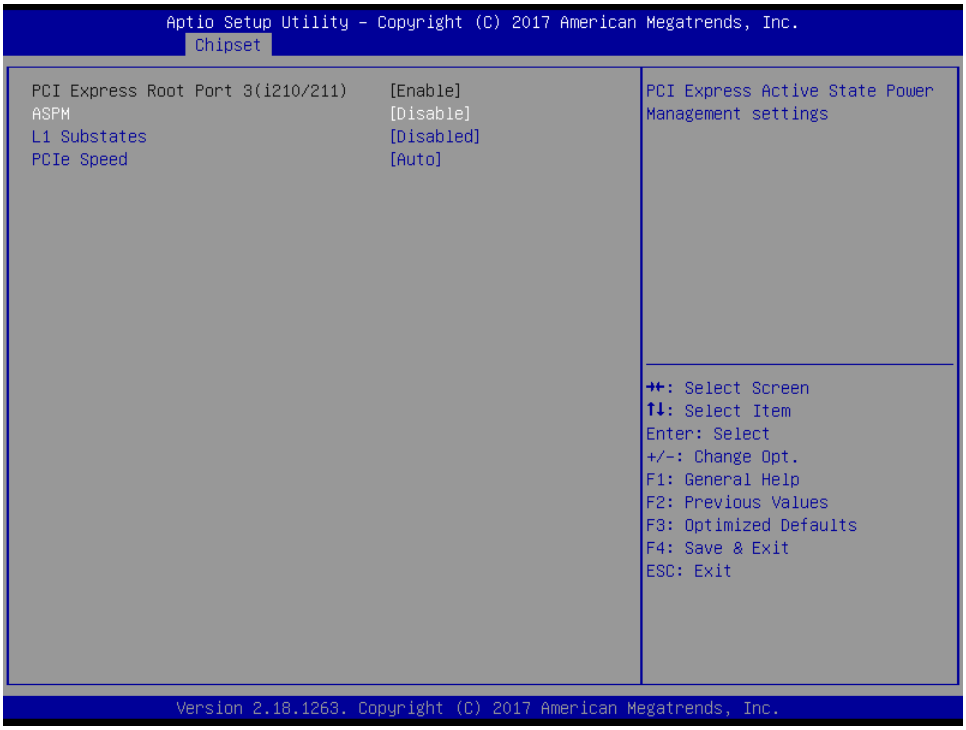
Item	Option	Description
HD-Audio Support	Disable Enable**[Default]**,	Enable/Disable HD-Audio Support.

3.6.3.4.2 PCI Express Configuration



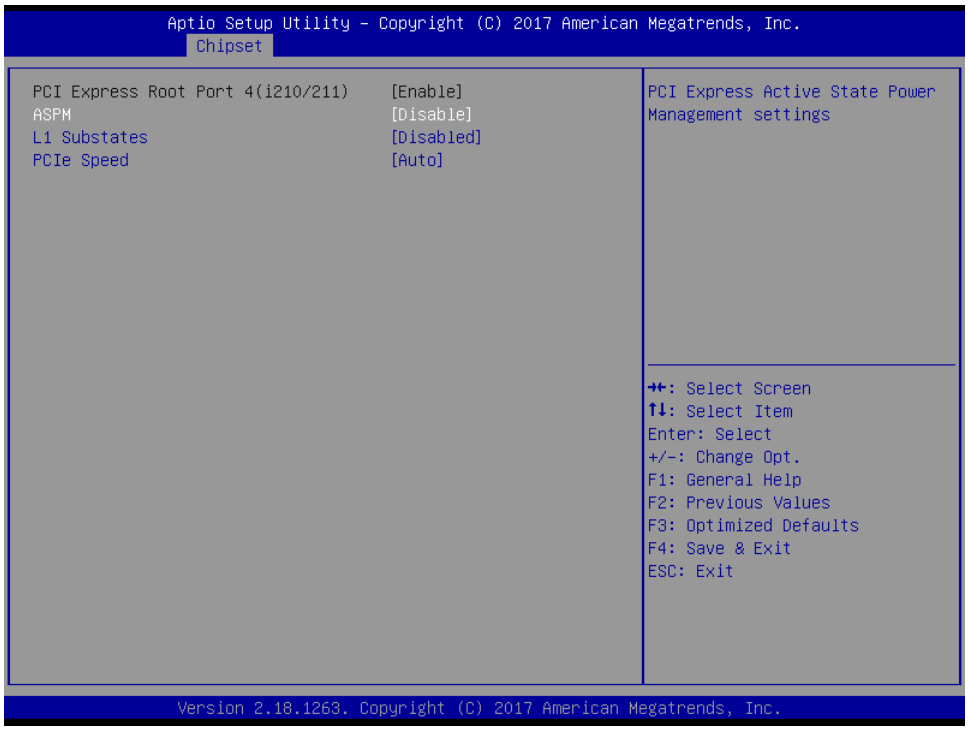
Item	Option	Description
Compliance Mode	Disabled**[Default]** Enabled,	Compliance Mode Enable/Disable.

3.6.3.4.2.1 PCI Express Root Port 3(i210/211)



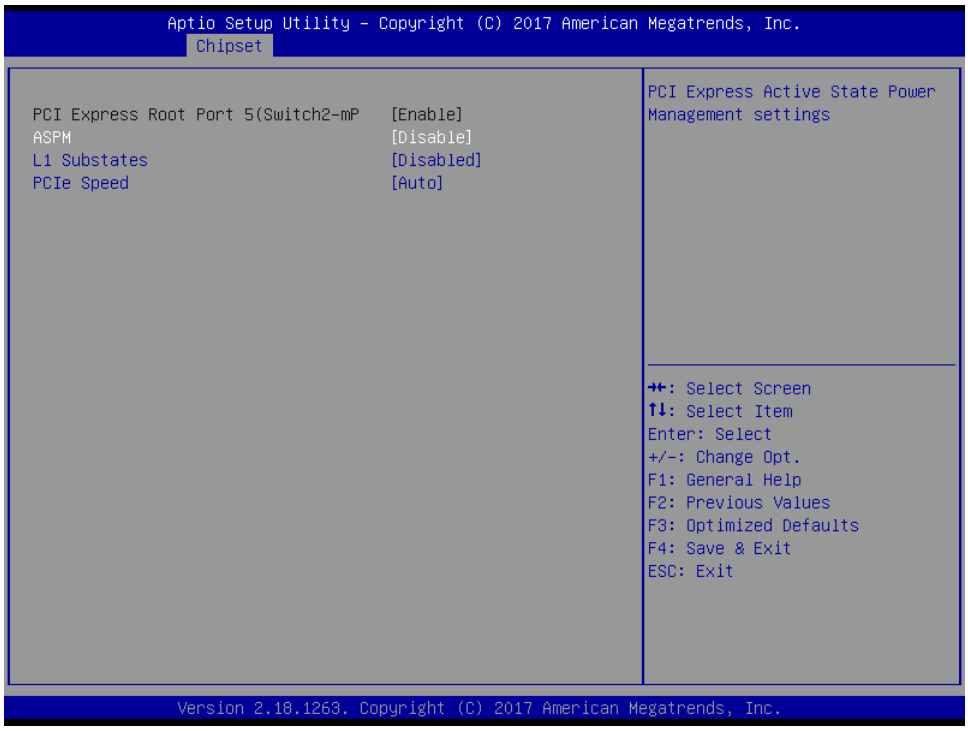
Item	Option	Description
ASPM	Disable**[Default]** L0s L1 L0sL1 Auto	PCI Express Active State Power Management settings.
L1 Substates	Disabled**[Default]** L1.1 L1.2 L1.1 & L1.2	PCI Express L1 Substates settings.
PCIe Speed	Auto**[Default]** Gen1 Gen2	Configure PCIe Speed.

3.6.3.4.2.2 PCI Express Root Port 4(i210/211)



Item	Option	Description
ASPM	Disable**[Default]** L0s L1 L0sL1 Auto	PCI Express Active State Power Management settings.
L1 Substates	Disabled**[Default]** L1.1 L1.2 L1.1 & L1.2	PCI Express L1 Substates settings.
PCIe Speed	Auto**[Default]** Gen1 Gen2	Configure PCIe Speed.

3.6.3.4.2.3 PCI Express Root Port 5(Switch2-mPCIe)

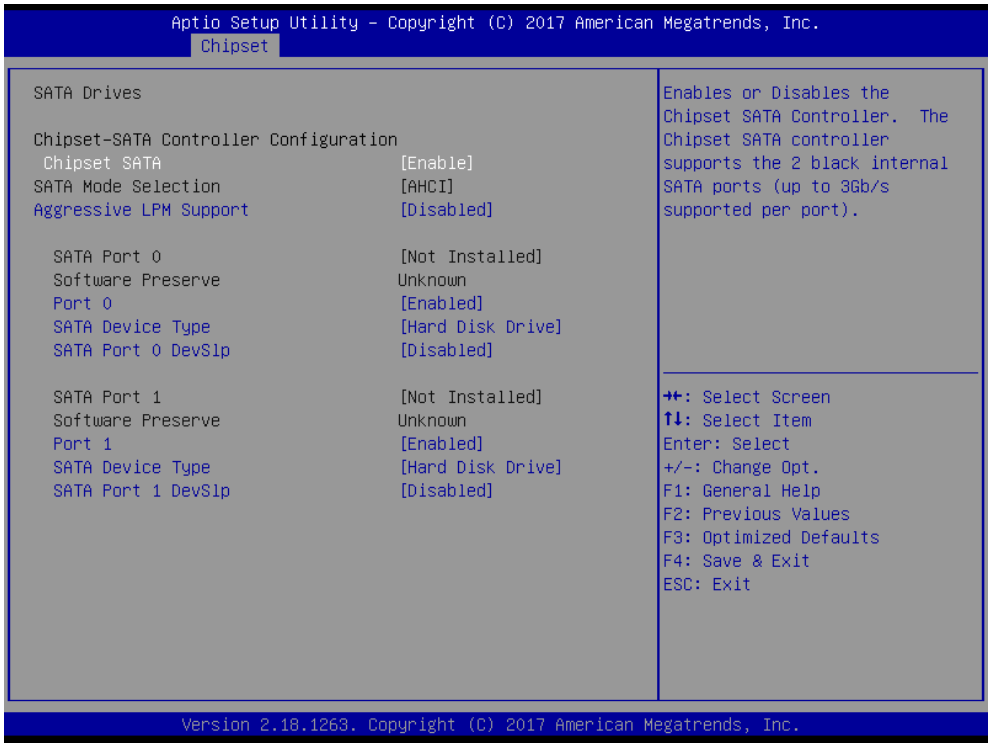


Item	Option	Description
ASPM	Disable**[Default]** L0s L1 L0sL1 Auto	PCI Express Active State Power Management settings.
L1 Substates	Disabled**[Default]** L1.1 L1.2 L1.1 & L1.2	PCI Express L1 Substates settings.
PCIe Speed	Auto**[Default]** Gen1 Gen2	Configure PCIe Speed.

3.6.3.4.2.4 PCI Express Root Port 6(Switch1-IET)

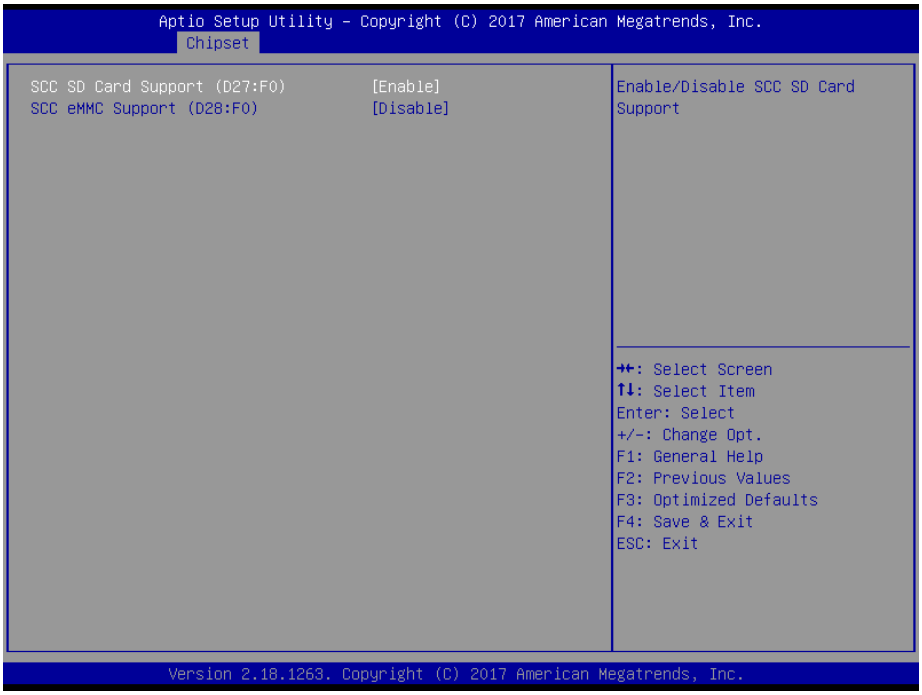
Item	Option	Description
ASPM	Disable**[Default]** L0s L1 L0sL1 Auto	PCI Express Active State Power Management settings.
L1 Substates	Disabled**[Default]** L1.1 L1.2 L1.1 & L1.2	PCI Express L1 Substates settings.
PCIe Speed	Auto**[Default]** Gen1 Gen2	Configure PCIe Speed.

3.6.3.4.3 SATA Drives



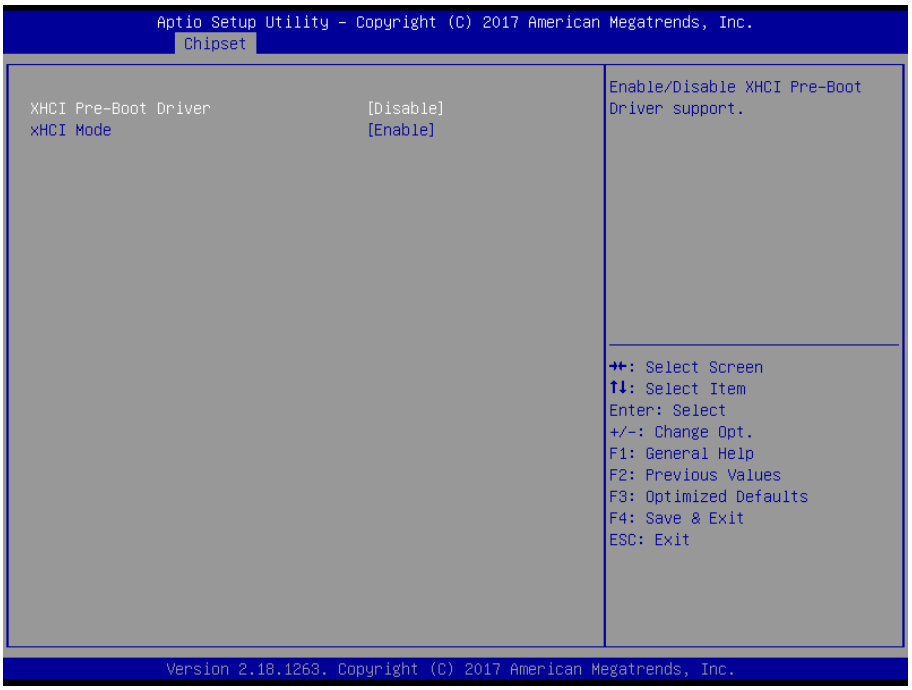
Item	Option	Description
Chipset SATA	Enable**[Default]** Disable	Enables or Disables the Chipset SATA Controller. The Chipset SATA controller supports the 2 black internal SATA ports (up to 3Gb/s supported per port).
Aggressive LPM Support	Disabled**[Default]** Enabled	Enable PCH to aggressively enter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

3.6.3.4.4 SCC Configuration



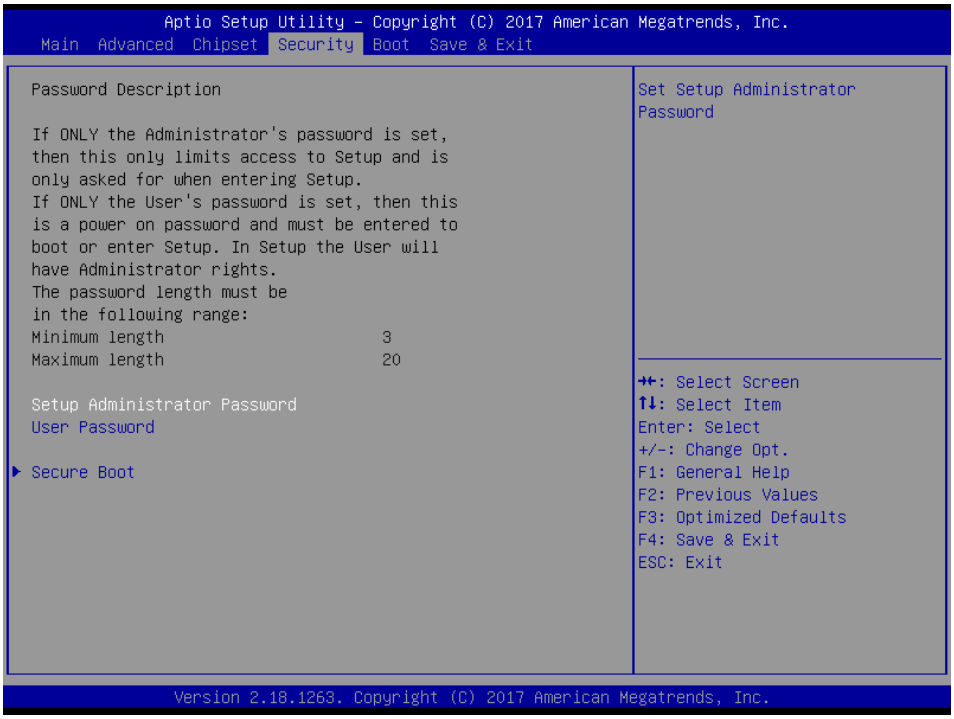
Item	Option	Description
SCC SD Card Support(D27:F0)	Enable**[Default]** Disable	Enable/Disable SCC SD Card Support.
SCC eMMC Support(D28:F0)	Enable Disable**[Default]**	Enable/Disable SCC eMMC Support.

3.6.3.4.4 USB Configuration



Item	Option	Description
XHCI Pre-Boot Driver	Enable Disable**[Default]**	Enable/Disable XHCI Pre-Boot Driver support.
xHCI Mode	Enable**[Default]** Disable	Once disabled, XHCI controller would be function disabled, none of the USB devices are detectable and usable during boot and in OS. Do not disable it unless for debug purpose.

3.6.4 Security



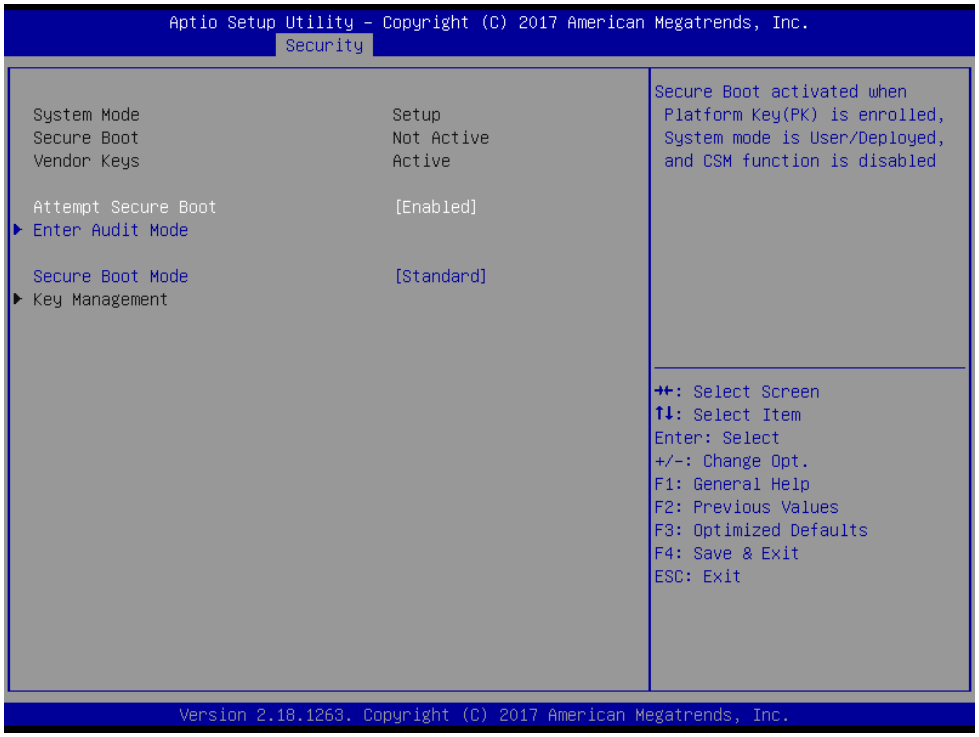
- **Setup Administrator Password**

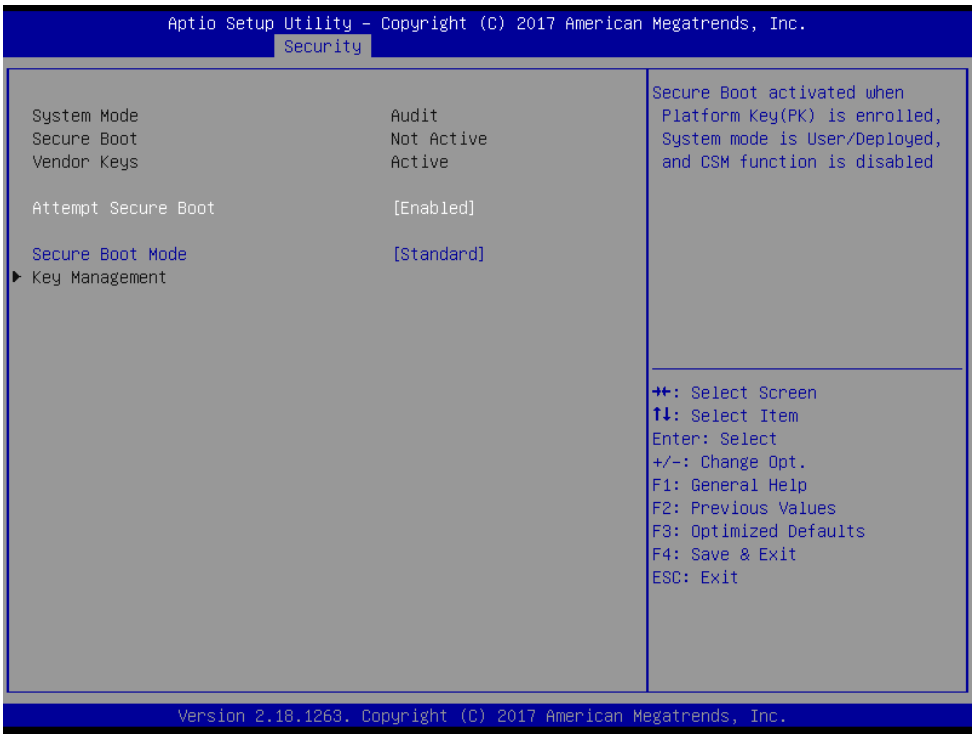
Set setup Administrator Password

- **User Password**

Set User Password

3.6.4.1 Secure Boot

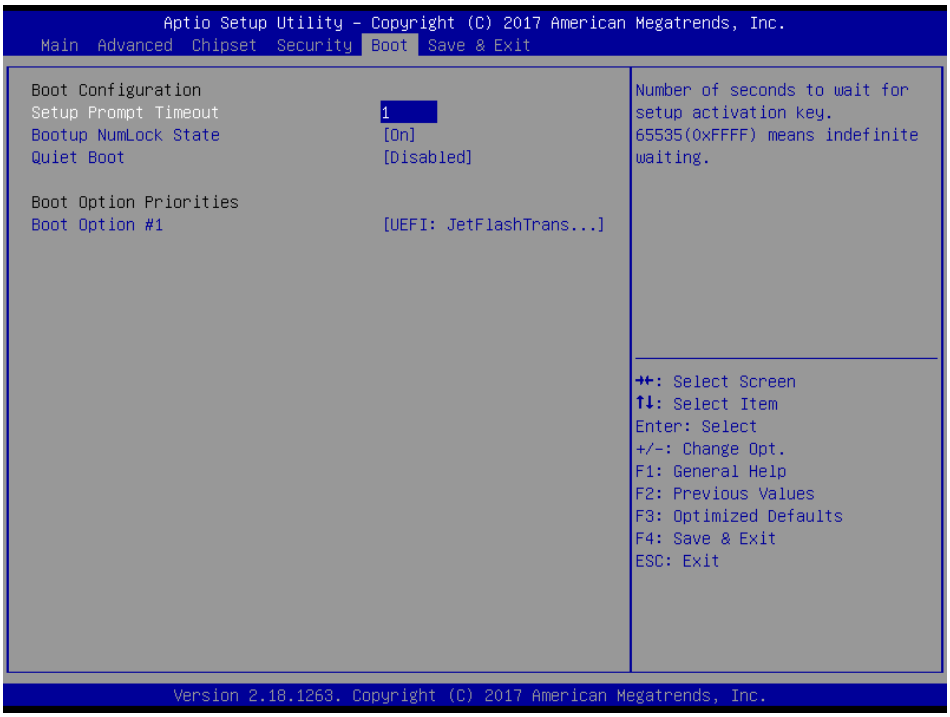




Item	Option	Description
Attempt Secure Boot	Disabled Enabled**[Default]**	Secure Boot activated when Platform Key(PK) is enrolled, System mode is User/Deployed, and CSM function is disabled.

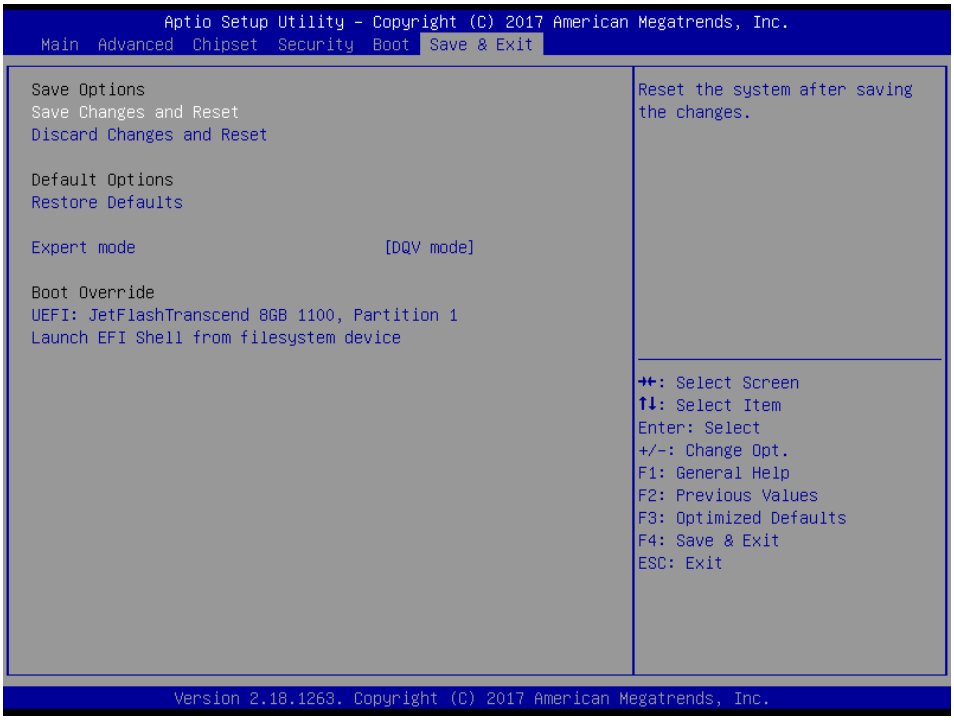
Secure Boot Mode	Standard**[Default]** Customized	Secure Boot mode – Custom_Standard, Set UEFI Secure Boot Mode to STANDARD mode or CUSTOM mode, this change is effect after save. And after reset, the mode will return to STANDARD mode.

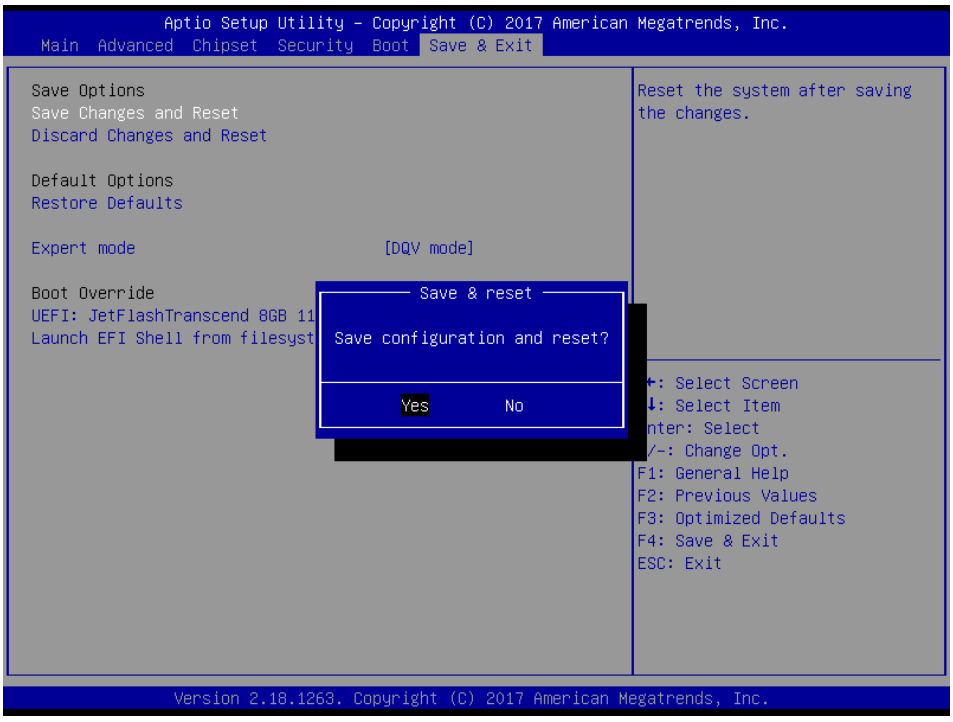
3.6.5 Boot



Item	Option	Description
Setup Prompt Timeout	1~ 65535	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
Bootup NumLock State	On**[Default]** Off	Select the Keyboard NumLock state
Quiet Boot	Disabled**[Default]** Enabled	Enables or disables Quiet Boot option
Boot Option #1	Set the system boot order.	

3.6.6 Save and exit





3.6.6.1 Save Changes and Reset

Reset the system after saving the changes.

3.6.6.2 Discard Changes and Reset

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

3.6.6.3 Restore Defaults

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

3.6.6.4 Launch EFI Shell from filesystem device

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

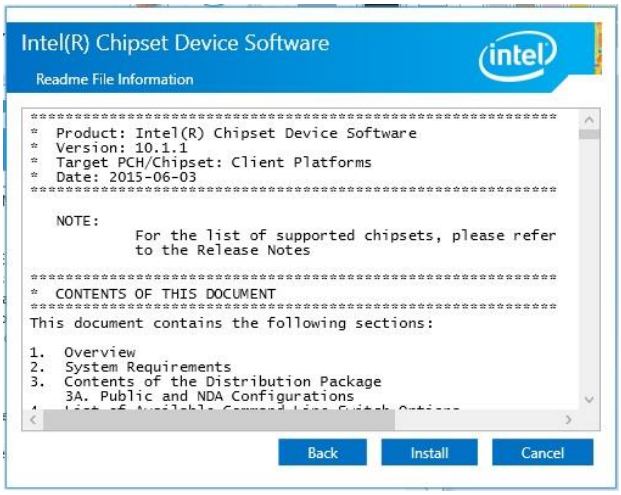
4. Drivers Installation

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

4.1 Install Chipset Driver

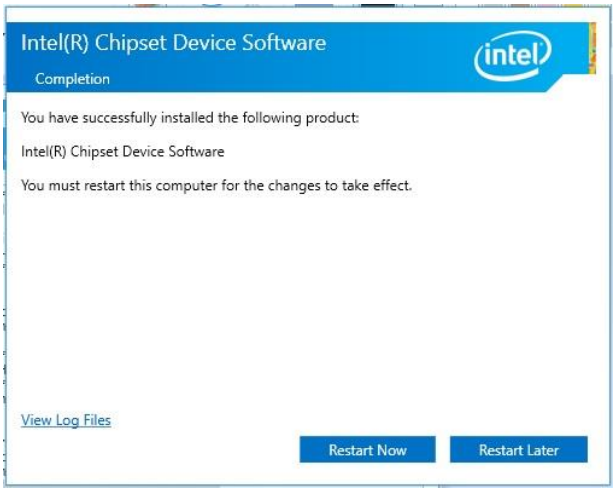
All drivers can be found on the Avalue Official Website: http://www.avalue.com.tw.

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



Step 3. Click **Install**.

Step1. Click **Next**.



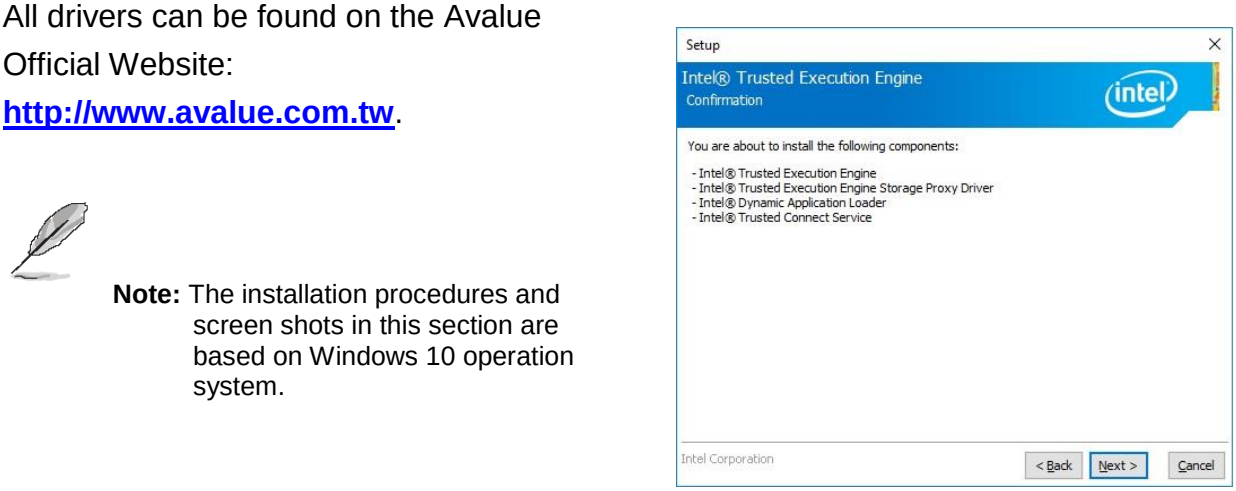
Step 4. Click **Finish** to complete setup.

Step 2. Click **Accept**.

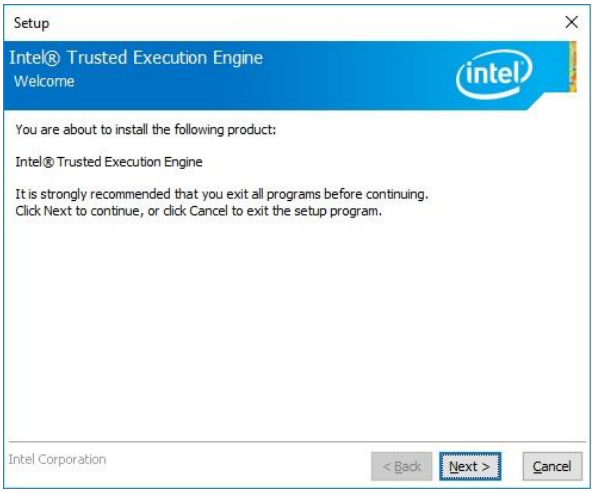
4.2 Install TXE Driver

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

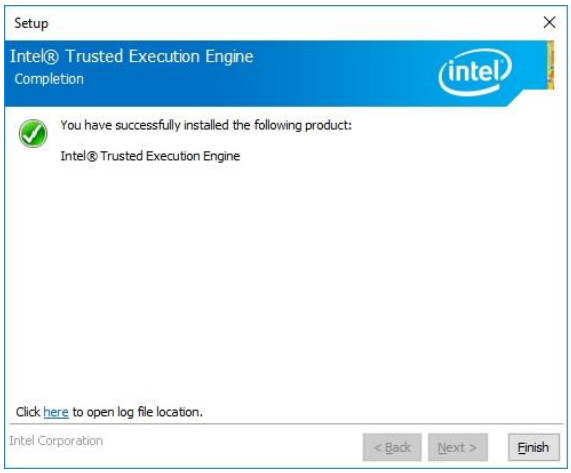
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



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



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



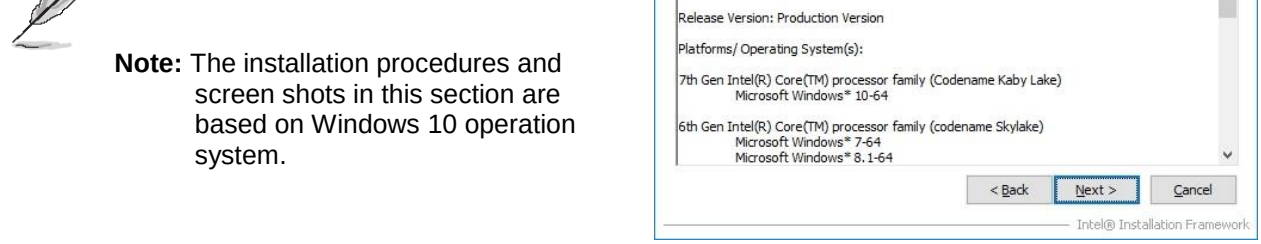
Step 4. Click **Finish** to complete setup.

Step 2. Click **Next**.

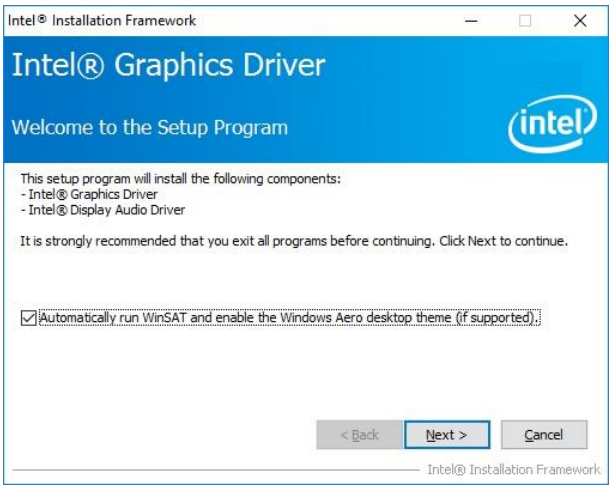
4.3 Install VGA Driver

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

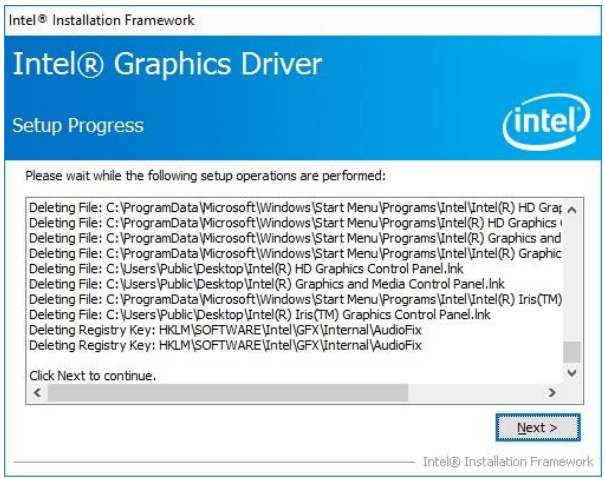
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



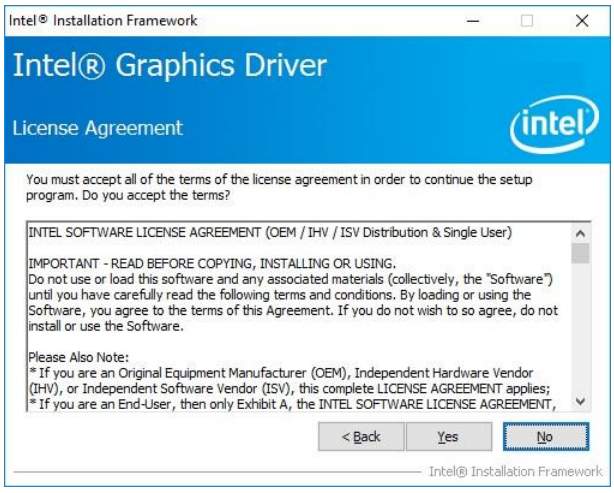
Step 3. Click **Next.**



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

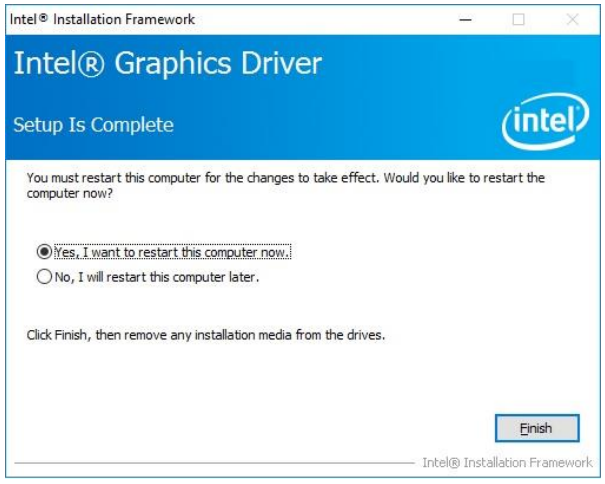


Step 4. Click **Next**.



Step 2.

Click **Yes** to accept license agreement.

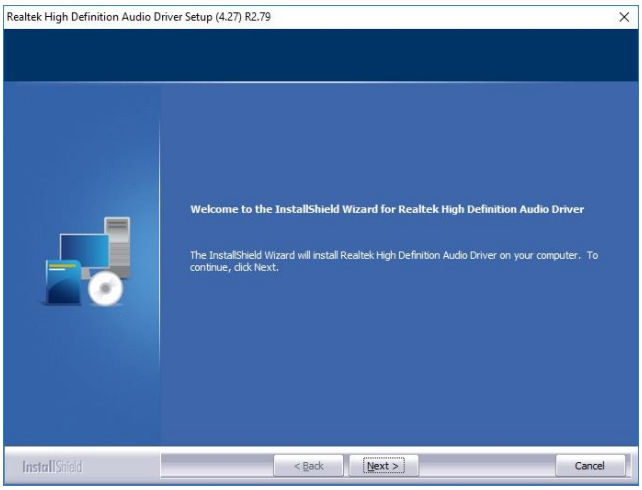


Step 5. Click **Finish** to complete setup.

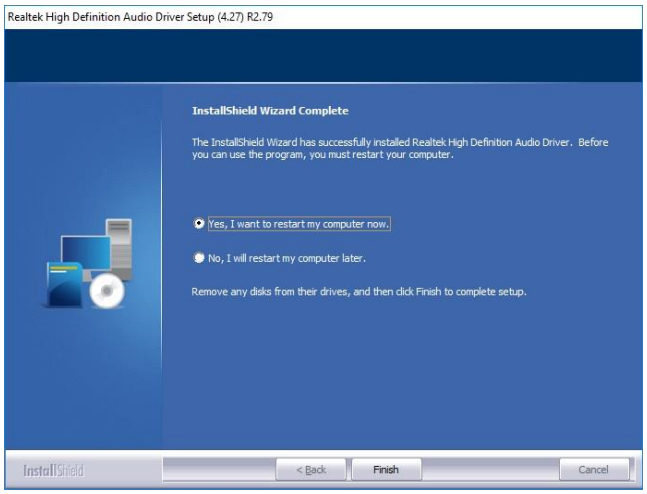
4.4 Install Audio Driver (For Realtek ALC888S)

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

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



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

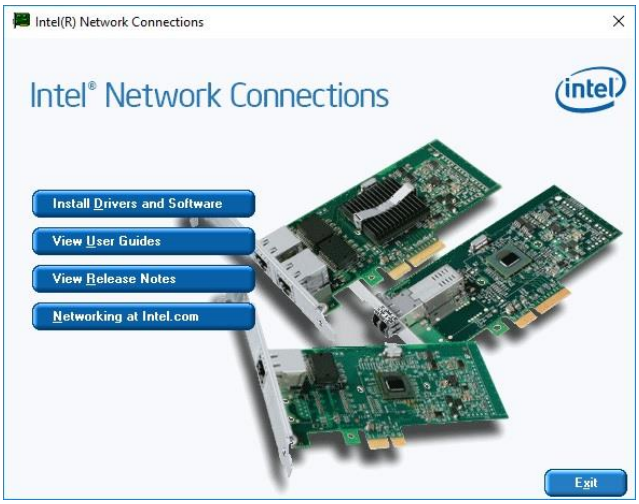


Step 2. Click **Finish** to complete the setup.

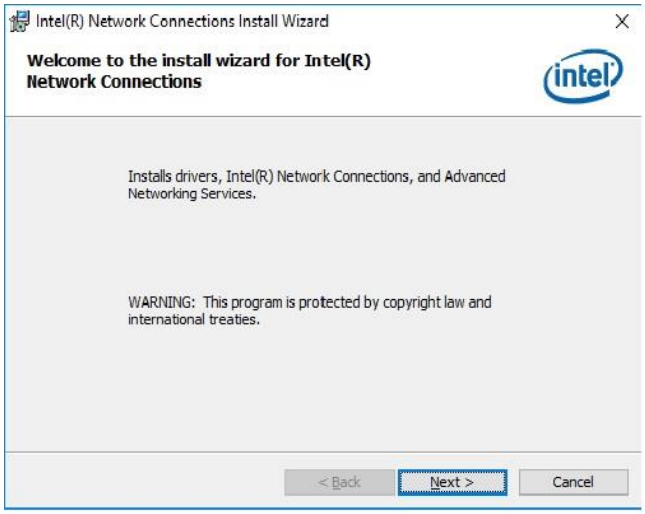
4.5 Install Gigabit Driver

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

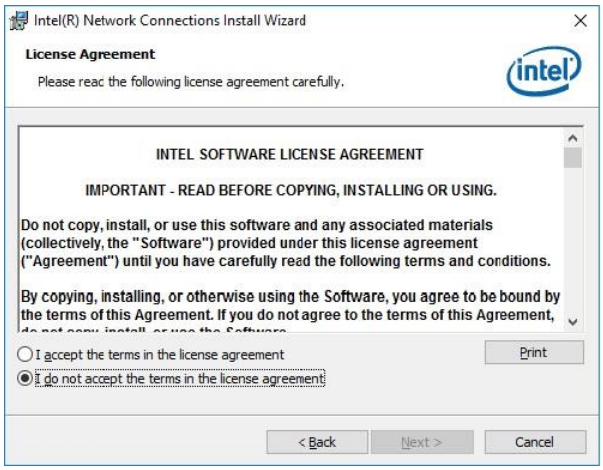
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



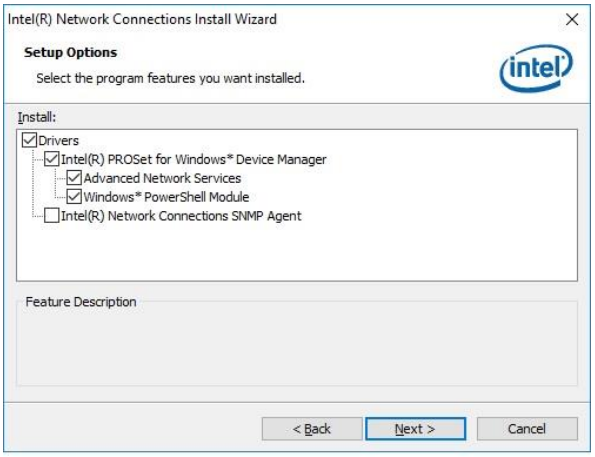
Step 1. Click **Install Drivers and Software**.



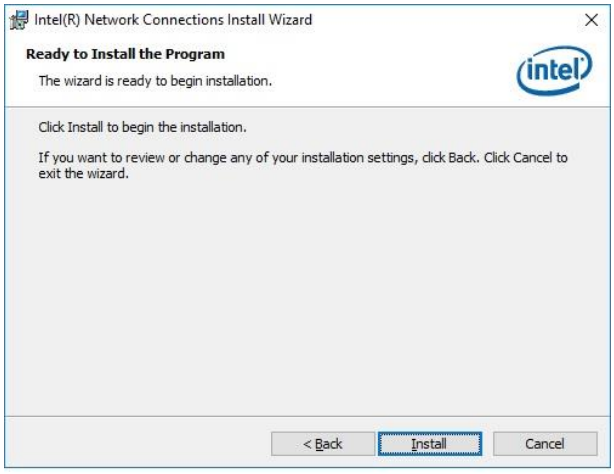
Step 2. Click **Next** to accept license agreement.



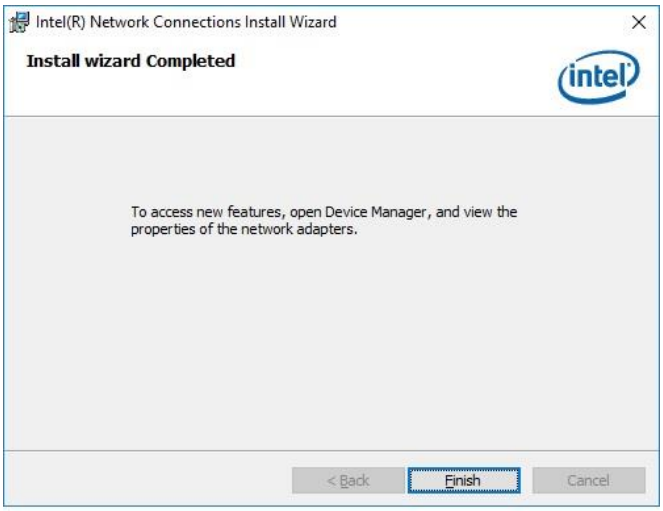
Step 3. Click **Next**.



Step 4. Click **Next** to proceed.



Step 5. Click **Install**.



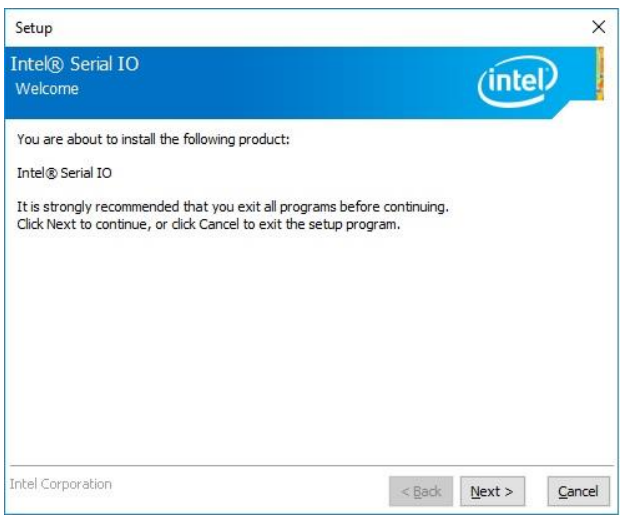
Step 6. Click **Finish** to complete the setup.

4.6 Install Serial IO Driver

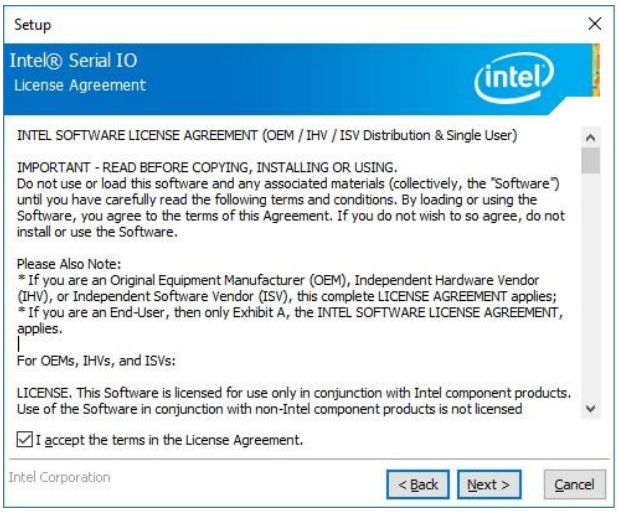
All drivers can be found on the Avalue Official Website:

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

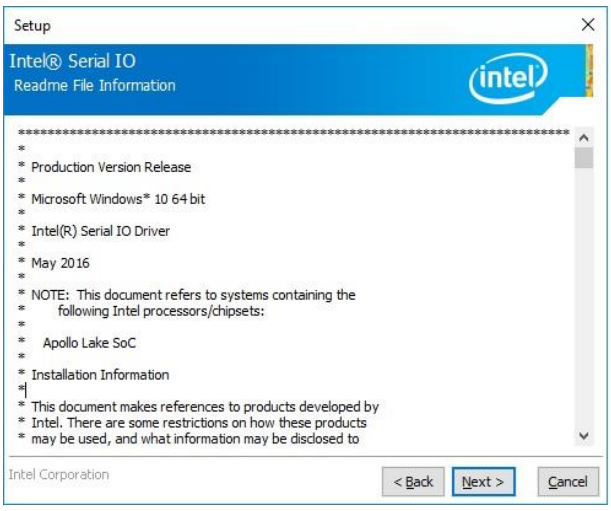
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



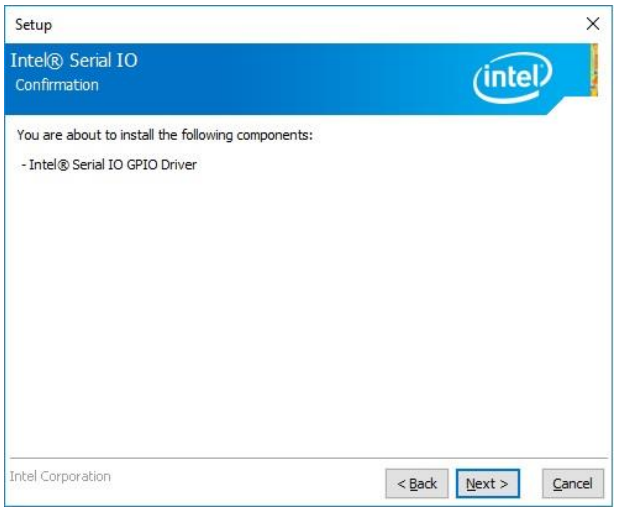
Step 1. Click **Next**.



Step 2. Click **Next**.



Step 3. Click **Next**.



Step 4. Click **Next** to proceed.

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