Contents

Chapter 3: System Setup

Chapter 4: BIOS Setup

Package Contents

	Item	Part Number	Description	Qty
			Terminal Blocks 3P Phoenix Contact:1803581 3.81mm Female DIP Green	1
			Terminal Blocks 3P Phoenix Contact:1777992 5.08mm Male DIP Green	2
			Round Head Screw w/Spring+Flat Washer Long Fei:P3x6L P3x6 iso/SW6x0.5 NI	3
			Flat Head Screw Long Fei:F#6-32x8 F#6-32x8 TROX 10 NI+ Nylok	4
			Flat Head Screw Long Fei:F3x4ISO+Nylok NIGP F3x4 NI Nylok	4
			Flat Head Screw Long Fei:F2x4 Nylok NIGP F2x4 NIGP Nylok	6
			Round Head Screw Long Fei:P6#32T T10 Nylok P6#32T Outer Teeth Washer T10 Nylok	
			Round Head Screw Long Fei:P2x3 ISO+Nylon P2x3 NI Nylok	2
			Price For Plastic Screw HS6-75P 75mm	9
			Plastic Nut Gin Lian:M6HW 10mmx6mm	1
			Thermal Pad E-LIN 24x24x0.5mm PTUT	1
			2.5 HDD Mylar E-LIN 96.2x70x0.1mm	1
			Mini PCIe Bracket CHYUAN-JYH 29x30x2.1mm SPCC t=1.0mm NI	1
			Washer Kang Yang:TW-320-01 10.4x6.4mm T=1mm Nylon Black	4
			Reference Guide VER:A Kramer Size:A4	1

Overview

Front View

Rear View

Key Features

- Support 8th & 9th generation Intel® Core™ i7/i5/i3 LGA socket type embedded processor
- Intel® H310 PCH
- Support 1 x 2.5” SATA HDD
- 1 x DVI-D and 1 x HDMI with independent display support
- Two Intel® GbE LAN ports
- 1 x External M.2 socket and 1 x SIM card socket
- 4 x USB 3.1 Gen 1, 2 x USB 2.0
- 2 x RS232/422/485 with auto flow control & 2 x RS232
- 2 x Internal mini-PCIe sockets support optional Wi-Fi/3.5G/4G LTE
- Support +9V to 30VDC input; ATX power mode
- One PCIe x4 expansion

Hardware Specifications

CPU Support

- Support 8th & 9th generation Intel® Core™ i7/i5/i3 LGA socket type embedded processor
  - Intel® Core™ i7-9700TE, 8 Core, 1.8GHz, 12M Cache
  - Intel® Core™ i5-9500TE, 6 Core, 2.2GHz, 9M Cache
  - Intel® Core™ i3-9100TE, 4 Core, 2.2GHz, 6M Cache
  - Intel® Core™ i7-8700T, 6 Core, 2.4GHz, 12M Cache
  - Intel® Core™ i5-8500T, 6 Core, 2.1GHz, 9M Cache
  - Intel® Core™ i3-8100T, 4 Core, 3.1GHz, 6M Cache
- Turbo-boost disabled by default

Main Memory

- 2 x DDR4 2400/2666 SO-DIMM sockets, support up to 32GB

Display Option

- Two independent display
  - HDMI + DVI-D

Front I/O Interface Status LEDs

- 3 x LAN active LEDs
- 2 x GPO status/COM1/2 TX/RX LEDs
- 1 x HDD access LEDs
- 1 x Battery low
- 1 x M.2

Front I/O Interface

- 1 x ATX power on/off switch
- 1 x Line-out and 1 x Mic-in
- 2 x Antenna holes
- 1 x External M.2 socket (M-key)
- 1 x SIM card holder
- 2 x USB 2.0 ports (500mA per each)

Rear I/O Interface

- 4 x DB9 for COM1 to COM4
  - COM1/2: RS232/422/485 auto flow control
  - COM3/4: RS232
- 4 x USB 3.1 Gen 1 ports (900mA per port)
- 1 x DVI-D port
- 1 x HDMI port
- 2 x Intel® I210AT GbE LAN ports; support WoL, teaming and PXE
- 1 x 3-pin remote power on/off switch
- +9V to 30V DC input

Internal I/O

- 8CH GPIO: internal pin header, support 4 x GPO and 4 x GPI, TTL 5V level
- Onboard TPM2.0 (SLB9665) for data encryption purposes
- 1 x Internal M.2 (B-key), supports optional LTE

Storage Device

- 1 x Internal M.2 socket (M-key SATA 3.0)
- 1 x 2.5" HDD or SSD (SATA 3.0) drive bay

Expansion Slot

- One PCIe x4 expansion slot
  - Add-on card length: 169mm max.
  - Power consumption: 10W/slot max.
- 1 x Internal mini-PCIe socket support optional Wi-Fi/3.5G/4G LTE

Power Requirements

- AT/ATX power mode (default: ATX power mode)
- Power input: +9 to +30V DC
- Power adapter: optional AC to DC power adapter (24V DC, 120W)

Dimensions

- 215mm (W) x 272mm (D) x 94mm (H) without wall mount bracket (8.5" x 10.7" x 3.7")

Construction

- Aluminum and metal chassis with fanless design

Environment

- Operating temperature:
  Ambient with air flow: -5°C to 55°C
  (According to IEC60068-2-1, IEC60068-2-2, IEC60068-2-14)
- Storage temperature: -20°C to 80°C
- Relative humidity: 10% to 95% (non-condensing)
- Shock protection:
  - HDD: 20G, half sine, 11ms, IEC60068-2-27
  - M.2: 50G, half sine, 11ms, IEC60068-2-27
- Vibration protection with HDD condition:
  - Random: 0.5Grms @ 5~500 Hz, IEC60068-2-64
  - Sinusoidal: 0.5Grms @ 5~500 Hz, IEC60068-2-6
- Vibration protection with SSD & M.2 condition:
  - Random: 2Grms @ 5~500 Hz, IEC60068-2-64
  - Sinusoidal: 2Grms @ 5~500 Hz, IEC60068-2-6

Certifications

- CE approval- EN61000-6-2- EN61000-6-4
- FCC Class A

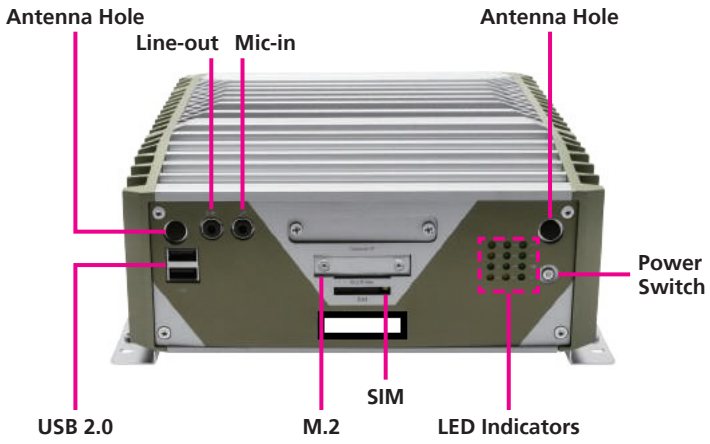
OS Support List

- Windows 10 64-bit
- Linux Kernel 4.9

Weight Information

- Gross weight: 6.54kg
- Net weight: 5kg

Front Panel



Antenna Hole

The external antenna mounting holes are used to mount and connect optional external antennas.

Line-out

Used to connect a headphone or a speaker.

Mic-in

Used to connect an external microphone.

USB 2.0

Used to connect USB 2.0/1.1 devices.

M.2 and SIM Card Slot

Used to install an M.2 and a SIM card.

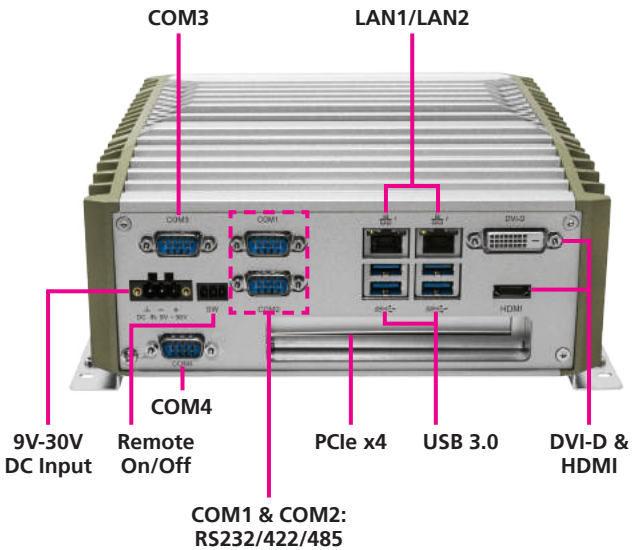
LED Indicators

Indicates the COM port, LAN, GPO, storage and M.2 activity as well as the low battery status of the system.

Power Switch

Press to power-on or power-off the system.

Rear Panel



9V-30V DC Input

Used to plug a DC power cord.

Remote On/Off Switch

Used to connect a remote to power on/off the system.

COM1 to COM4

COM1 and COM2 DB9 ports used to connect RS232/422/485 compatible devices. COM3 and COM4 DB9 ports used to connect RS232 compatible devices.

LAN1/LAN2

Used to connect the system to a local area network.

USB 3.0

Used to connect USB 3.0/2.0 devices.

DVI-D

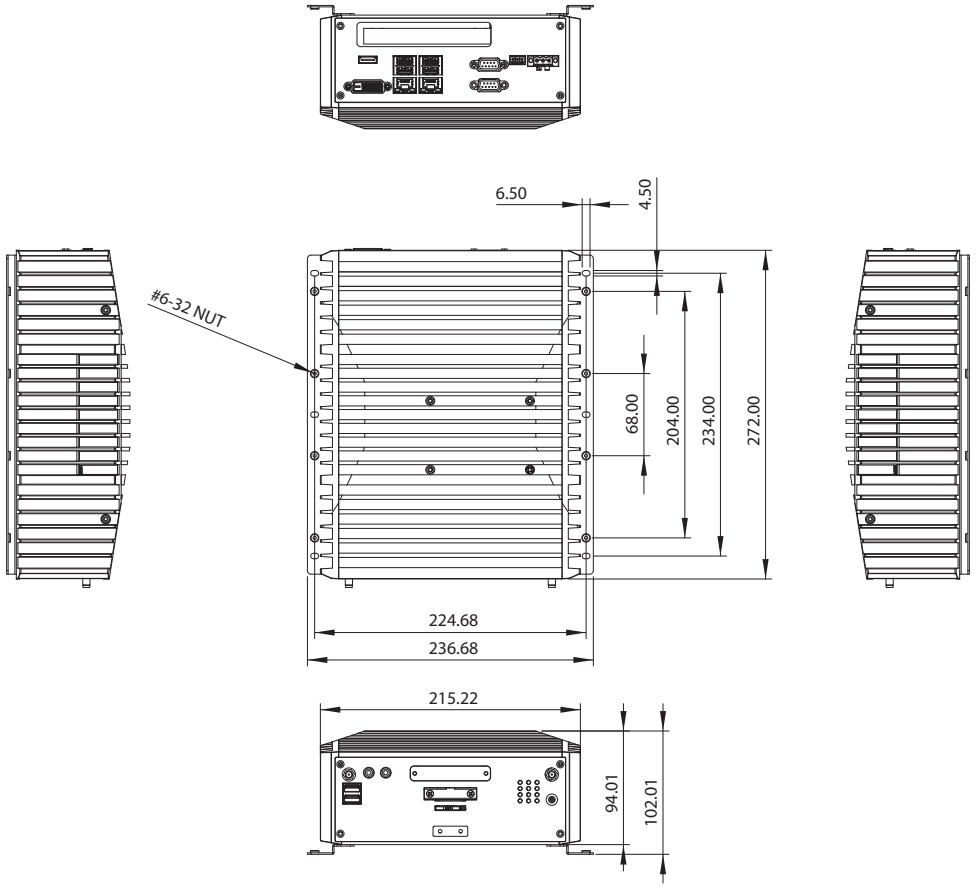
Used to connect a DVI-D interface monitor.

HDMI

Used to connect a HDMI interface monitor.

PCIe x4 (Expansion Slot)

One PCIe x4 expansion slot used to install add-on cards.


6.50
4.50
#6-32 NUT
68.00
204.00
234.00
272.00
224.68
236.68
215.22
94.01
102.01

Chapter 2: Jumpers and Connectors

This chapter describes how to set the jumpers and connectors on the motherboard.

Before You Begin

- Ensure you have a stable, clean working environment. Dust and dirt can get into components and cause a malfunction. Use containers to keep small components separated.
- Adequate lighting and proper tools can prevent you from accidentally damaging the internal components. Most of the procedures that follow require only a few simple tools, including the following:
  - A Philips screwdriver
  - A flat-tipped screwdriver
  - A set of jewelers screwdrivers
  - A grounding strap
  - An anti-static pad
- Using your fingers can disconnect most of the connections. It is recommended that you do not use needle-nosed pliers to disconnect connections as these can damage the soft metal or plastic parts of the connectors.
- Before working on internal components, make sure that the power is off. Ground yourself before touching any internal components, by touching a metal object. Static electricity can damage many of the electronic components. Humid environments tend to have less static electricity than dry environments. A grounding strap is warranted whenever danger of static electricity exists.

Precautions

Computer components and electronic circuit boards can be damaged by discharges of static electricity. Working on computers that are still connected to a power supply can be extremely dangerous.

Follow the guidelines below to avoid damage to your computer or yourself:

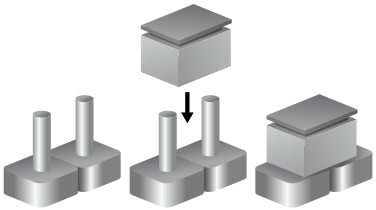
- Always disconnect the unit from the power outlet whenever you are working inside the case.
- If possible, wear a grounded wrist strap when you are working inside the computer case. Alternatively, discharge any static electricity by touching the bare metal chassis of the unit case, or the bare metal body of any other grounded appliance.
- Hold electronic circuit boards by the edges only. Do not touch the components on the board unless it is necessary to do so. Don't flex or stress the circuit board.
- Leave all components inside the static-proof packaging that they shipped with until they are ready for installation.
- Use correct screws and do not over tighten screws.

Jumper Settings

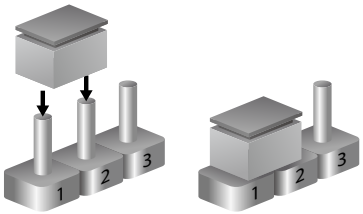
A jumper is the simplest kind of electric switch. It consists of two metal pins and a cap. When setting the jumpers, ensure that the jumper caps are placed on the correct pins. When the jumper cap is placed on both pins, the jumper is short. If you remove the jumper cap, or place the jumper cap on just one pin, the jumper is open.

Refer to the illustrations below for examples of what the 2-pin and 3-pin jumpers look like when they are short (on) and open (off).

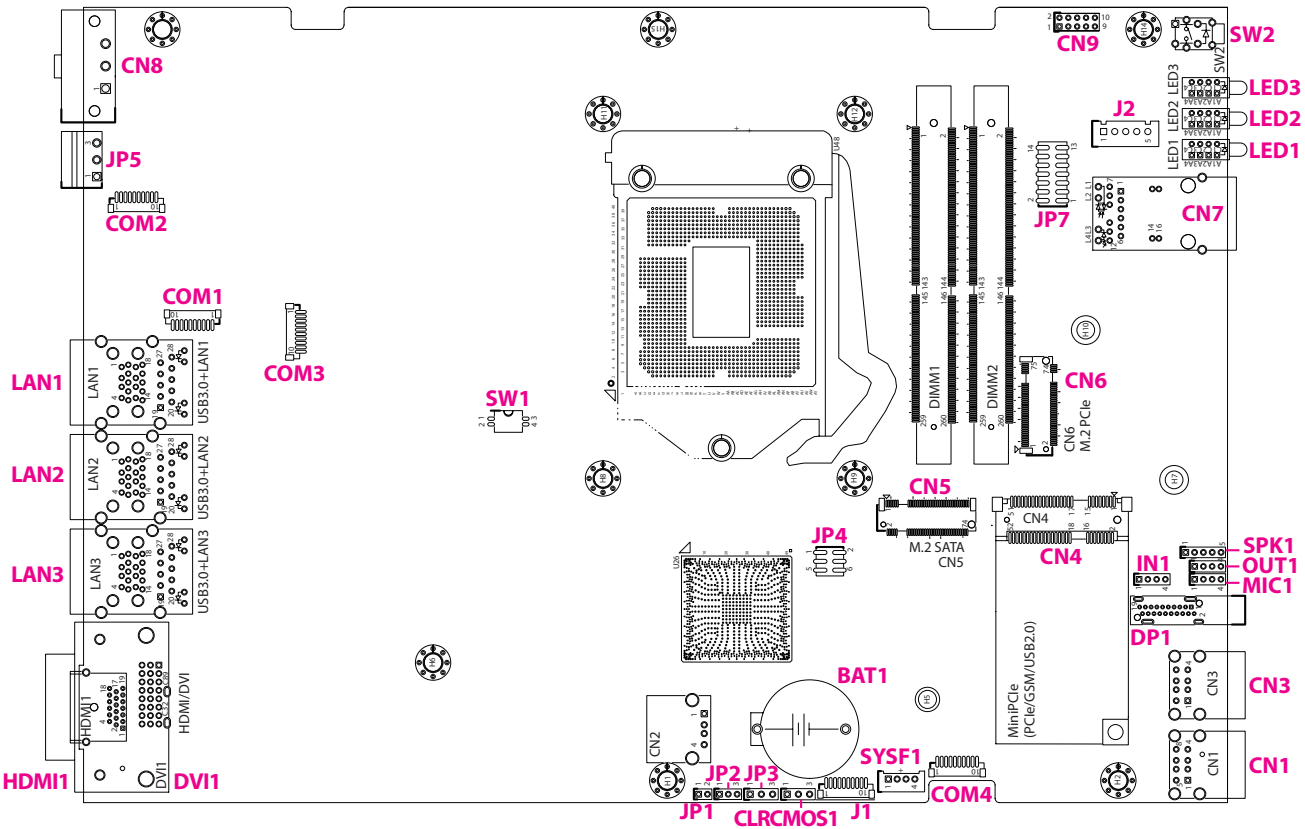
Two-Pin Jumpers: Open (Left) and Short (Right)



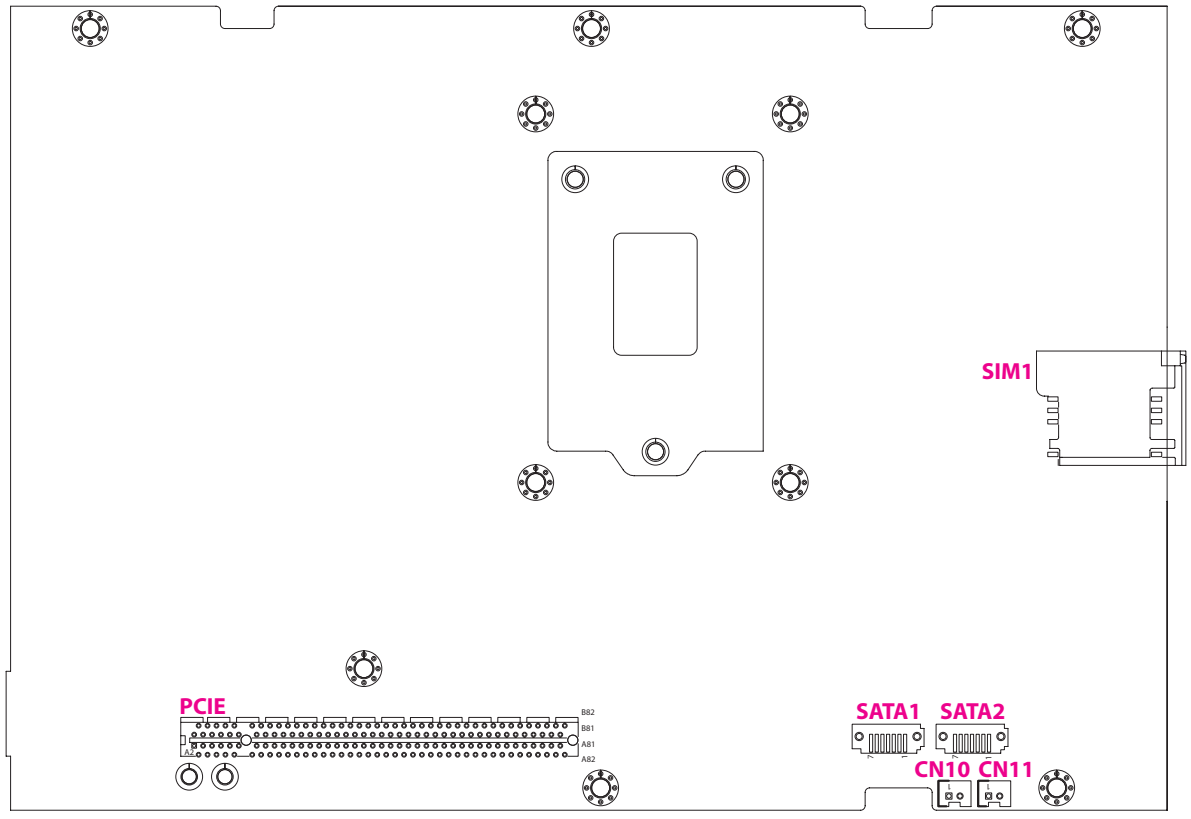
Three-Pin Jumpers: Pins 1 and 2 are Short



Locations of the Jumpers and Connectors



The figure below is the bottom view of the main board.



Jumpers and DIP Switch Settings

AT/ATX Power Select

Connector type: 1x3 3-pin header, 2.54mm pitch
Connector location: JP3

Pin	Settings
1-2 On	AT Mode
2-3 On	ATX Mode (Default)

Pin	Settings
1	AT_PWRBT#
2	S_PWRBTN#
3	PBT_SW

Clear CMOS

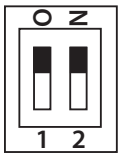
Connector type: 1x3 3-pin header, 2.54mm pitch
Connector location: CLRCMOS1

Pin	Settings
1-2 On	Normal (Default)
2-3 On	Clear CMOS

Pin	Settings
1	NC
2	S_RTCRST#
3	GND

CPU CFG Strap Pin

Connector type: 2-pin On/Off DIP switch
Connector location: SW1



Pin 1	Pin 2	Setting
ON	ON	1 x8, 2 x4 PCI Express*
ON	OFF	Reserved
OFF	ON	2 x8 PCI Express*
OFF	OFF	1 x16 PCI Express* (Default)

Pin	Definition
1	GND
2	GND
3	CFG_5
4	CFG_6

Connector Pin Definitions

External I/O Interfaces - Front Panel

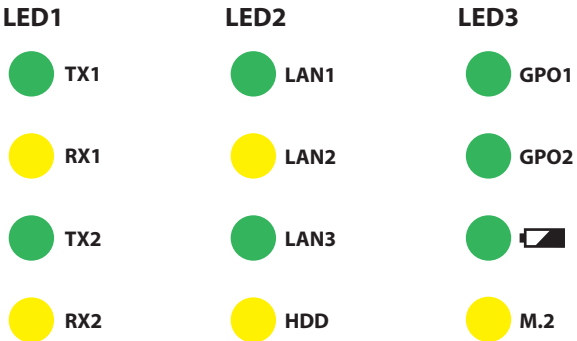
Power Button

Connector location: SW2

Pin	Definition	Pin	Definition
1	GND	2	PBT_PU
3	PBT_PU	4	GND
A1	PWRLED_N	C1	N19915412
MH1	GND	MH2	GND

LED Indicators

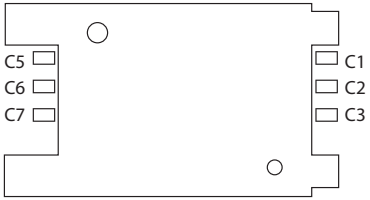
Connector location: LED1, LED2 and LED3



	Pin	Definition	Pin	Definition
LED1	A1	VCC3	C1	COM2_RXLEDN
	A2	VCC3	C2	COM2_TXLEDN
	A3	VCC3	C3	COM1_RXLEDN
	A4	VCC3	C4	COM1_TXLEDN
LED2	A1	VCC3	C1	I_SATALEDN
	A2	VCC3	C2	LAN3LEDACTN
	A3	VCC3	C3	LAN2LEDACTN
	A4	VCC3	C4	LAN1LEDACTN
LED3	A1	VCC3	C1	SATA_M2LEDL
	A2	VCC3	C2	BAT_LOWL
	A3	VCC3	C3	SIO_GP80
	A4	VCC3	C4	SIO_GP81

SIM Card Socket

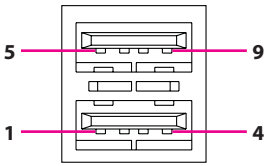
Connector location: SIM1



Pin	Definition	Pin	Definition
C1	UIM_PWR	C2	UIM_RESET
C3	UIM_CLK	C5	GND
C6	UIM_VPP	C7	UIM_DATA
MH1	GND	MH2	GND

USB 2.0 Ports

Connector type: Dual USB 2.0 port
Connector location: CN1

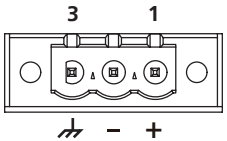


Pin	Definition	Pin	Definition
1	5VUSB2	2	USB2N_9
3	USB2P_9	4	GND
5	5VUSB2	6	USB2N_5
7	USB2P_5	8	GND
MH1	GND_CHASSIS	MH2	GND_CHASSIS
MH3	GND_CHASSIS	MH4	GND_CHASSIS

External I/O Interfaces - Rear Panel

9V - 30V DC Power Input

Connector type: Phoenix Contact 1x3 3-pin terminal block
Connector location: CN8



Pin	Definition
1	VIN_1
2	VIN_VSS
3	VINPIN3

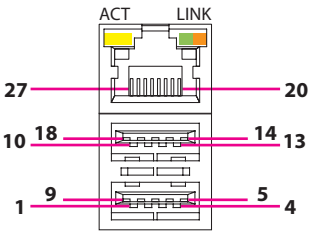
Remote Power On/Off & S3 Connector

Connector type: 3-pin switch
Connector location: JP5

Pin	Definition
1	PWRBTN#_J
2	GND
3	I_SLPS3N

LAN2 and USB 3.1 Ports

Connector type: RJ45 port with LEDs
Dual USB 3.1 port
Connector location: LAN2A (USB) and LAN2B (LAN)



Act	Status
Flashing Yellow	Data activity
Off	No activity

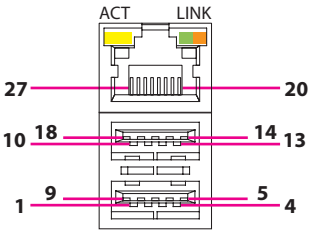
Link	Status
Steady Green	1G network link
Steady Orange	100Mbps network link
Off	No link

Pin	Definition	Pin	Definition
1	5VUSB3	2	USB2N_1
3	USB2P_1	4	GND
5	S_USB31_RXN1	6	S_USB31_RXP1
7	GND	8	USB31_TXN1
9	USB31_TXP1	10	5VUSB3
11	USB2N_7	12	USB2P_7
13	GND	14	S_USB31_RXN2
15	S_USB31_RXP2	16	GND

Pin	Definition	Pin	Definition
17	USB31_TXN2	18	USB31_TXP2
19	LAN2TCT	20	LAN2MDI0P
21	LAN2MDI0N	22	LAN2MDI1P
23	LAN2MDI1N	24	LAN2MDI2P
25	LAN2MDI2N	26	LAN2MDI3P
27	LAN2MDI3N	28	GND
29	LAN2ACTCON	30	LAN2LEDACTN
31	LAN2100CON	32	LAN2LINK1GN

LAN3 and USB 3.1 Ports

Connector type: RJ45 port with LEDs
Dual USB 3.1 port
Connector location: LAN3A (USB) and LAN3B (LAN)



Act	Status
Flashing Yellow	Data activity
Off	No activity

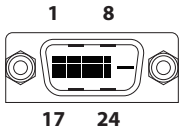
Link	Status
Steady Green	1G network link
Steady Orange	100Mbps network link
Off	No link

Pin	Definition	Pin	Definition
1	5VUSB3	2	USB2N_1
3	USB2P_1	4	GND
5	S_USB31_RXN1	6	S_USB31_RXP1
7	GND	8	USB31_TXN1
9	USB31_TXP1	10	5VUSB3
11	USB2N_7	12	USB2P_7
13	GND	14	S_USB31_RXN2
15	S_USB31_RXP2	16	GND

Pin	Definition	Pin	Definition
17	USB31_TXN2	18	USB31_TXP2
19	LAN2TCT	20	LAN2MDI0P
21	LAN2MDI0N	22	LAN2MDI1P
23	LAN2MDI1N	24	LAN2MDI2P
25	LAN2MDI2N	26	LAN2MDI3P
27	LAN2MDI3N	28	GND
29	LAN2ACTCON	30	LAN2LEDACTN
31	LAN2100CON	32	LAN2LINK1GN

DVI-D Connector

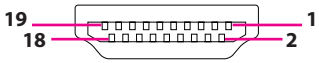
Connector type: 24-pin D-Sub, 2.0mm-M-180 (DVI)
Connector location: DVI1



Pin	Definition	Pin	Definition
1	DVI_D2_N	2	DVI_D2_P
3	GND	4	NC
5	NC	6	DVI_DDC_SCL
7	DVI_DDC_SDA	8	NC
9	DVI_D1_N	10	DVI_D1_P
11	GND	12	NC
13	NC	14	5VDVIPWR
15	GND	16	DVI_HPD
17	DVI_D0_N	18	DVI_D0_P
19	GND	20	NC
21	NC	22	GND
23	DVI_CK_P	24	DVI_CK_N

HDMI

Connector type: HDMI port
Connector location: HDMI1

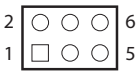


Pin	Definition	Pin	Definition
1	HDMI_D2_P	2	GND
3	HDMI_D2_N	4	HDMI_D1_P
5	GND	6	HDMI_D1_N
7	HDMI_D0_P	8	GND
9	HDMI_D0_N	10	HDMI_CK_P
11	GND	12	HDMI_CK_N
13	NC	14	NC
15	HDMI_SCL	16	HDMI_SDAT
17	GND	18	5VHDMIPWR
19	HDMI_HPD		

Internal Connectors

BIOS Pin Header

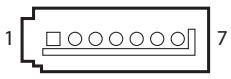
Connector type: 2x3 6-pin header, 2.0mm pitch
Connector location: JP4



Pin	Definition	Pin	Definition
1	+3V3_SPI	2	GND
3	CS#_0	4	CLK_0
5	DO_0	6	DI_0

SATA Connectors

Connector type: Standard Serial ATA 7P (1.27mm, SATA-M-180)
Connector location: SATA1 & SATA2



SATA1

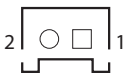
Pin	Definition	Pin	Definition
1	GND	2	SATA_TXP2
3	SATA_TXN2	4	GND
5	SATA_RXN2	6	SATA_RXP2
7	GND		

SATA2

Pin	Definition	Pin	Definition
1	GND	2	SATA_TXP3
3	SATA_TXN3	4	GND
5	SATA_RXN3	6	SATA_RXP3
7	GND		

SATA Power Connectors

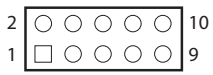
Connector type: 1x2 2-pin Wafer, 2.0mm pitch
Connector location: CN10 and CN11



Pin	Definition
1	VCC5
2	GND

GPIO Pin Header

Connector type: 2x5 10-pin header, 2.0mm pitch
Connector location: CN9



Pin	Definition	Pin	Definition
1	GPIO_PWR	2	GND
3	GPO0_OUT	4	GPI0_IN
5	GPO1_OUT	6	GPI1_IN
7	GPO2_OUT	8	GPI2_IN
9	GPO3_OUT	10	GPI3_IN

System Reset

Connector type: 1x2 2-pin header, 2.0mm pitch
Connector location: JP1

Pin	Definition
1	SYSRESETN
2	GND

Port 80 Connector

Connector type: 1x10 10-pin header, 1.0mm pitch
Connector location: J1

Pin	Definition	Pin	Definition
1	GND	2	PLTRST#_BUFF_1
3	CLKOUT_LPC1	4	ESPI_CS0#
5	ESPI_IO3	6	ESPI_IO2
7	ESPI_IO1	8	ESPI_IO0
9	SERIRQ	10	VCC3

COM1 Connector (Full RS232/422/485)

Connector type: 1x10 10-pin header, 1.0mm pitch
Connector location: COM1

Pin	Definition	Pin	Definition
1	SP1_DCD	2	SP1_RXD
3	SP1_TXD	4	SP1_DTR
5	ISO_GND	6	SP1_DSR
7	SP1_RTS	8	SP1_CTS
9	SP1_RI	10	ISO_GND

COM2 Connector (Full RS232/422/485)

Connector type: 1x10 10-pin header, 1.0mm pitch
Connector location: COM2

Pin	Definition	Pin	Definition
1	SP2_DCD	2	SP2_RXD
3	SP2_TXD	4	SP2_DTR
5	ISO_GND	6	SP2_DSR
7	SP2_RTS	8	SP2_CTS
9	SP2_RI	10	ISO_GND

COM3 Connector (Full RS232)

Connector type: 1x10 10-pin header, 1.0mm pitch
Connector location: COM3

Pin	Definition	Pin	Definition
1	COM_DCD#3	2	COM_RXD3
3	COM_TXD3	4	COM_DTR#3
5	GND	6	COM_DSR#3
7	COM_RTS#3	8	COM_CTS#3
9	COM_RI#3	10	GND

COM4 Connector (Full RS232)

Connector type: 1x10 10-pin header, 1.0mm pitch
Connector location: COM4

Pin	Definition	Pin	Definition
1	COM_DCD#4	2	COM_RXD4
3	COM_TXD4	4	COM_DTR#4
5	GND	6	COM_DSR#4
7	COM_RTS#4	8	COM_CTS#4
9	COM_RI#4	10	GND

Speaker-out Header

Connector type: 1x5 5-pin header, 2.0mm pitch
Connector location: SPK1

Pin	Definition	Pin	Definition
1	OUT-LR+_C	2	OUT-LR-_C
3	AGND	4	OUT-RR+_C
5	OUT-RR-_C		

Mic-in Header

Connector type: 1x4 4-pin header, 2.0mm pitch
Connector location: MIC1

Pin	Definition	Pin	Definition
1	MIC_OUT-L	2	AGND
3	MIC_JD	4	MIC_OUT-R

Line-out Header

Connector type: 1x4 4-pin header, 2.0mm pitch
Connector location: OUT1

Pin	Definition	Pin	Definition
1	LINE_OUT_LC	2	AGND
3	LINEOUT_JD	4	LINE_OUT_RC

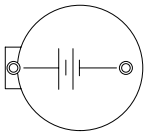
Line-in Header

Connector type: 1x4 4-pin header, 2.0mm pitch
Connector location: IN1

Pin	Definition	Pin	Definition
1	LINE1-L1	2	AGND
3	LINEIN_JD	4	LINE1-R1

RTC Battery Connector

Connector location: BAT1



Pin	Definition
1	3V_BAT1
2	GND

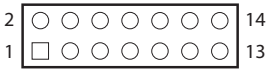
SMBus Header

Connector type: 1x3 3-pin header, 2.54mm pitch
Connector location: JP2

Pin	Definition
1	SMB_CLK
2	SMB_DATA
3	GND

LED Pin Header

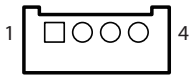
Connector type: 2x7 14-pin header, 2.0mm pitch
Connector location: JP7



Pin	Definition	Pin	Definition
1	TX1_P	2	COM1_TXLEDN
3	RX1_P	4	COM1_RXLEDN
5	TX2_P	6	COM2_TXLEDN
7	RX2_P	8	COM2_RXLEDN
9	SIO_GP81LED_P	10	SIO_GP81
11	SIO_GP80LED_P	12	SIO_GP80
13	LAN2_ACT#_LED_P	14	LAN2LEDACTN

System Fan Box Header

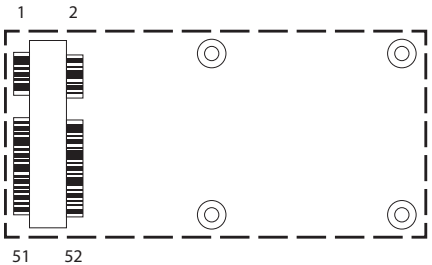
Connector type: 1x4 4-pin header JST, 2.0mm pitch
Connector location: SYSF1



Pin	Definition	Pin	Definition
1	GND	2	VCC12
3	FAN_TAC2	4	FAN_CTL2

Mini-PCIe Connector (PCIe/GSM/USB 2.0)

Connector location: CN4

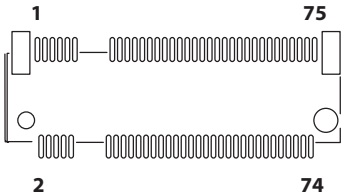


Pin	Definition	Pin	Definition
1	I_WAKEN	2	3VSBMINIPCIE
3	N/A	4	GND
5	N/A	6	1V5MINIPCIE
7	SRCCLKREQ8N	8	UIM_PWR
9	GND	10	UIM_DATA
11	I_CLKOUTPCIEN8	12	UIM_CLK
13	I_CLKOUTPCIEP8	14	UIM_RESET
15	GND	16	UIM_VPP
17	N/A	18	GND
19	N/A	20	MINICARD2DIS#
21	GND	22	MINIPCIEPERSTN
23	I_PCIERXN11	24	3VSBMINIPCIE
25	I_PCIERXP11	26	GND

Pin	Definition	Pin	Definition
27	GND	28	1V5MINIPCIE
29	GND	30	SMB_CLK
31	PCIETXN11	32	SMB_DATA
33	PCIETXP11	34	GND
35	GND	36	I_USB2N8
37	GND	38	I_USB2P8
39	3VSBMINIPCIE	40	GND
41	3VSBMINIPCIE	42	N/A
43	GND	44	N/A
45	N/A	46	N/A
47	N/A	48	1V5MINIPCIE
49	N/A	50	GND
51	NC	52	3VSBMINIPCIE

NGFF M.2 B-Key Connector (USB 3.0/USB 2.0)

Connector location: CN5

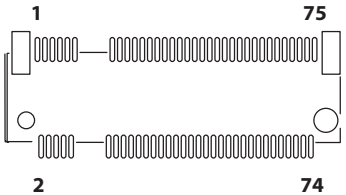


Pin	Definition	Pin	Definition
1	CONFIG_3	2	3VSB
3	GND	4	3VSB
5	GND	6	POWEROFF
7	S_USB2P_2	8	M2LTEDISL
9	S_USB2N_2	10	NC
11	GND	12	
13		14	
15		16	
17		18	
19		20	NC
21	CONFIG_0	22	NC
23	I_WAKEN	24	NC
25	NC	26	NC
27	GND	28	NC
29	H_USB31_RXN7	30	UIM_RESET
31	H_USB31_RXP7	32	UIM_CLK
33	GND	34	UIM_DATA
35	H_USB31_TXN7	36	UIM_PWR
37	H_USB31_TXP7	38	NC

Pin	Definition	Pin	Definition
39	GND	40	NC
41	NC	42	NC
43	NC	44	NC
45	GND	46	NC
47	NC	48	NC
49	NC	50	M2_B_PERST
51	GND	52	NC
53	NC	54	M2_B_PEWAKE
55	NC	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	NC
67	M2LTERSTL	68	NC
69	M2LTECONFIG1	70	3VSB
71	GND	72	3VSB
73	GND	74	3VSB
75	M2LTECONFIG2		

NGFF M.2 M-Key Connector (SATA/PCIe x4)

Connector location: CN6



Pin	Definition	Pin	Definition
1	GND	2	3VSB
3	3VSB	4	3VSB
5	H_PCIERXN20	6	NC
7	H_PCIERXP20	8	NC
9	GND	10	DSS#_1(LED)
11	H_PCIETXN20	12	3VSB
13	H_PCIETXP20	14	3VSB
15	GND	16	3VSB
17	H_PCIERXN19	18	3VSB
19	H_PCIERXP19	20	NC
21	GND	22	NC
23	H_PCIETXN19	24	NC
25	H_PCIETXP19	26	NC
27	GND	28	NC
29	H_PCIERXN18	30	NC
31	H_PCIERXP18	32	NC
33	GND	34	NC
35	H_PCIETXN18	36	NC
37	H_PCIETXP18	38	DEVSLP_0

Pin	Definition	Pin	Definition
39	GND	40	NC
41	H_PCIESATARXN17	42	NC
43	H_PCIESATARXP17	44	NC
45	GND	46	NC
47	H_PCIESATATXN17	48	NC
49	H_PCIESATATXP17	50	M2_PLTRSTN1
51	GND	52	SRCCLKREQ3N
53	I_CLKOUTPCIEN3	54	I_WAKEN
55	I_CLKOUTPCIEP3	56	NC
57	GND	58	NC
59		60	
61		62	
63		64	
65		66	
67	NC	68	I_SUSCLK2
69	PEDET_1(VCC3)	70	3VSB
71	M2_SATADETL	72	3VSB
73	GND	74	3VSB
75	GND		

PCIe x16 Slot

Connector location: PCIE

Pin	Definition	Pin	Definition
A1	PCIE_PRSNT1	B1	VCC12
A2	VCC12	B2	VCC12
A3	VCC12	B3	VCC12
A4	GND	B4	GND
A5	PCIEX16_TCK	B5	PCIE_SMCLK
A6	PCIEX16_TDI	B6	PCIE_SMDAT
A7	PCIEX16_TDO	B7	GND
A8	PCIEX16_TMS	B8	VCC3
A9	VCC3	B9	PCIEX16_TRST#
A10	VCC3	B10	3VSB
A11	PCIEX16PLTRSTN	B11	3VSB
A12	GND	B12	FAN_TAC2(NC)
A13	I_CLKOUTPCIEP9	B13	GND
A14	I_CLKOUTPCIEN9	B14	PEG_TXP0_C
A15	GND	B15	PEG_TXN0_C
A16	PEG_RXP0	B16	GND
A17	PEG_RXN0	B17	PRSNT2#_1_C
A18	GND	B18	GND

Pin	Definition	Pin	Definition
A19	FAN_CTL2(NC)	B19	PEG_TXP1_C
A20	GND	B20	PEG_TXN1_C
A21	PEG_RXP1	B21	GND
A22	PEG_RXN1	B22	GND
A23	GND	B23	PEG_TXP2_C
A24	GND	B24	PEG_TXN2_C
A25	PEG_RXP2	B25	GND
A26	PEG_RXN2	B26	GND
A27	GND	B27	PEG_TXP3_C
A28	GND	B28	PEG_TXN3_C
A29	PEG_RXP3	B29	GND
A30	PEG_RXN3	B30	NC
A31	GND	B31	PRSNT2#_2
A32	NC	B32	GND
A33	NC	B33	PEG_TXP4_C
A34	GND	B34	PEG_TXN4_C
A35	PEG_RXP4	B35	GND
A36	PEG_RXN4	B36	GND

Pin	Definition	Pin	Definition
A37	GND	B37	PEG_TXP5_C
A38	GND	B38	PEG_TXN5_C
A39	PEG_RXP5	B39	GND
A40	PEG_RXN5	B40	GND
A41	GND	B41	PEG_TXP6_C
A42	GND	B42	PEG_TXN6_C
A43	PEG_RXP6	B43	GND
A44	PEG_RXN6	B44	GND
A45	GND	B45	PEG_TXP7_C
A46	GND	B46	PEG_TXN7_C
A47	PEG_RXP7	B47	GND
A48	PEG_RXN7	B48	PRSNT2#_3
A49	GND	B49	GND
A50	NC	B50	PEG_TXP8_C
A51	GND	B51	PEG_TXN8_C
A52	PEG_RXP8	B52	GND
A53	PEG_RXN8	B53	GND
A54	GND	B54	PEG_TXP9_C
A55	GND	B55	PEG_TXN9_C
A56	PEG_RXP9	B56	GND
A57	PEG_RXN9	B57	GND
A58	GND	B58	PEG_TXP10_C
A59	GND	B59	PEG_TXN10_C

Pin	Definition	Pin	Definition
A60	PEG_RXP10	B60	GND
A61	PEG_RXN10	B61	GND
A62	GND	B62	PEG_TXP11_C
A63	GND	B63	PEG_TXN11_C
A64	PEG_RXP11	B64	GND
A65	PEG_RXN11	B65	GND
A66	GND	B66	PEG_TXP12_C
A67	GND	B67	PEG_TXN12_C
A68	PEG_RXP12	B68	GND
A69	PEG_RXN12	B69	GND
A70	GND	B70	PEG_TXP13_C
A71	GND	B71	PEG_TXN13_C
A72	PEG_RXP13	B72	GND
A73	PEG_RXN13	B73	GND
A74	GND	B74	PEG_TXP14_C
A75	GND	B75	PEG_TXN14_C
A76	PEG_RXP14	B76	GND
A77	PEG_RXN14	B77	GND
A78	GND	B78	PEG_TXP15_C
A79	GND	B79	PEG_TXN15_C
A80	PEG_RXP15	B80	GND
A81	PEG_RXN15	B81	PRSNT2#_4
A82	GND	B82	NC

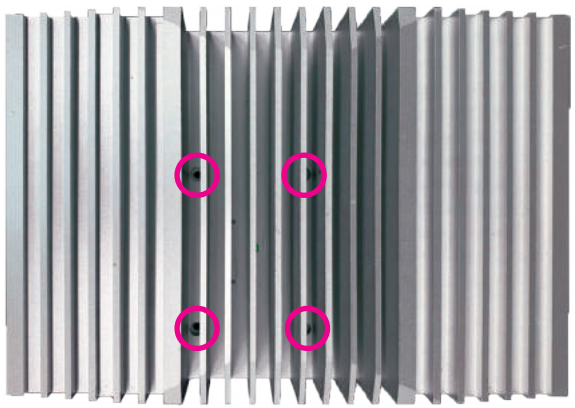
Chapter 3: System Setup

Removing the Top Cover

Prior to removing the chassis cover, make sure the unit's power is off and disconnected from the power sources to prevent electric shock or system damage.

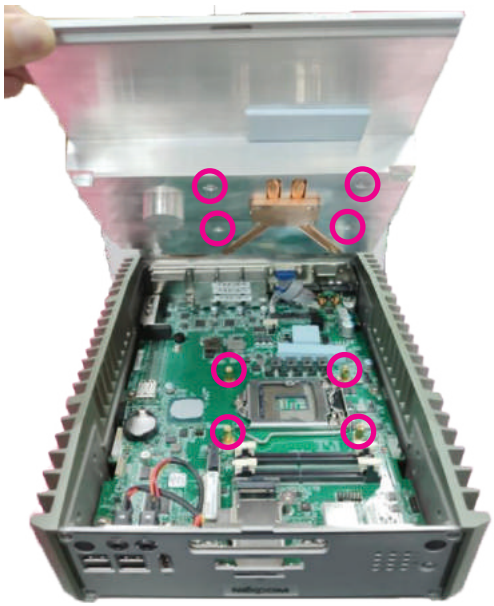
1. Remove the 4 screws on the sides.

2. Remove the 4 screws on the top.



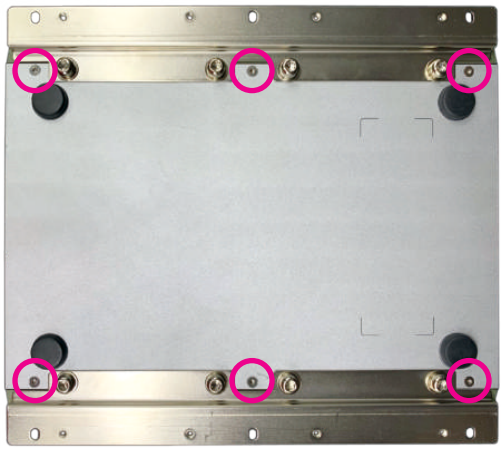
3. With the screws removed, lift up the cover and remove it from the chassis.

4. When reinstalling the top cover to the system, ensure that the 4 mounting holes on the top cover is aligned correctly to the four copper standoffs around the CPU socket.

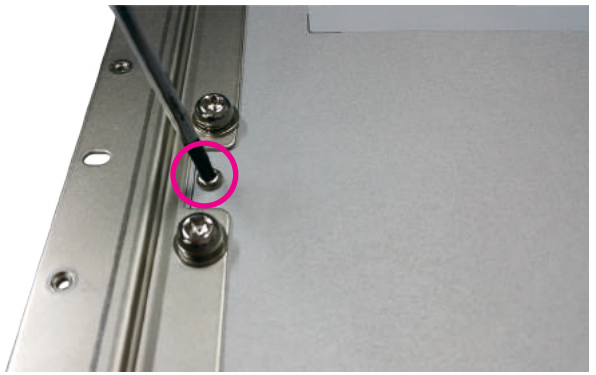


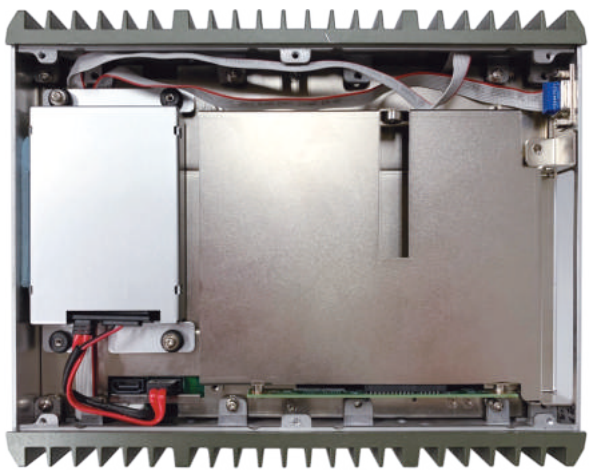
Removing the Bottom Cover

1. Locate the 6 screws on the bottom cover.



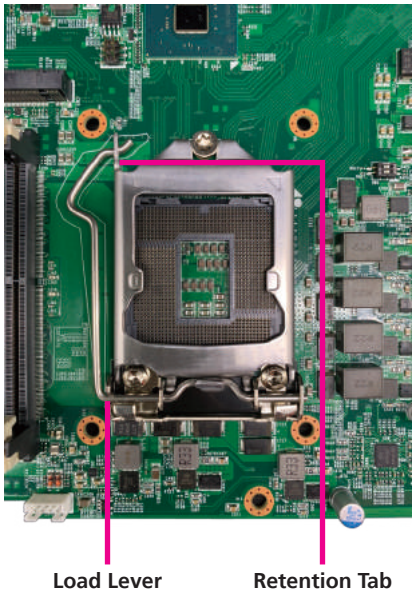
2. Remove the screws then lift up the bottom cover and remove it from the chassis.



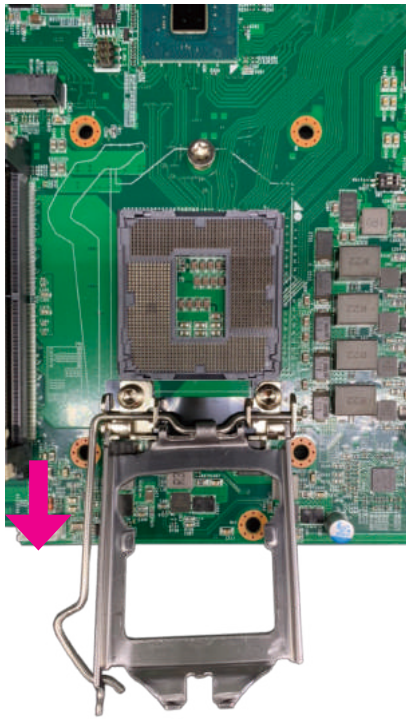


Installing a CPU

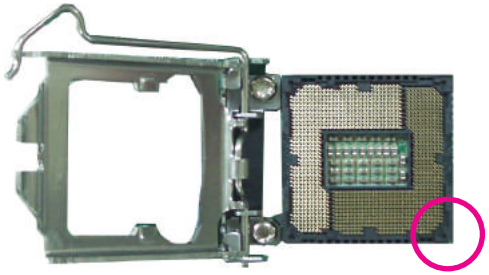
1. Locate the CPU socket on the board. Unlock the socket by pushing the load lever down, moving it sideways until it is released from the retention tab.

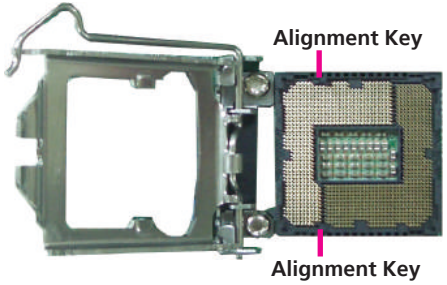


2. Lift the load lever up to open the CPU retention bracket.

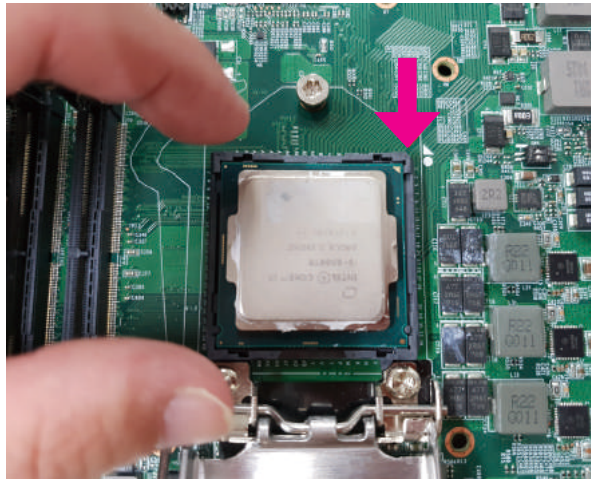


3. Insert the CPU into the socket. The triangular edge on the CPU must align with the corner of the CPU socket shown on the photo.



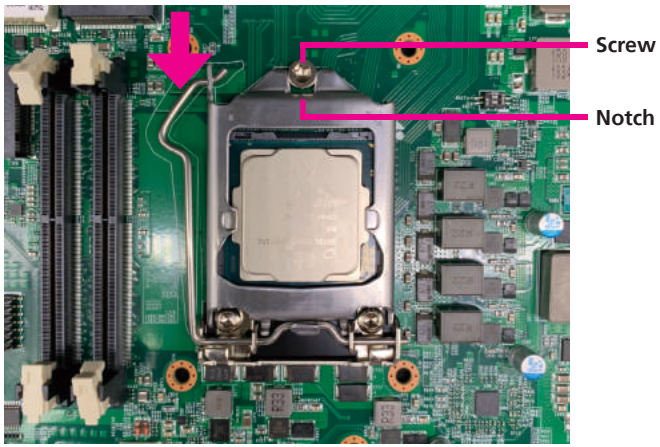


The CPU's notch will at the same time fit into the socket's alignment key.



- Handle the CPU by its edges and avoid touching the pins.
- The CPU will fit in only one orientation and can easily be inserted without exerting any force.

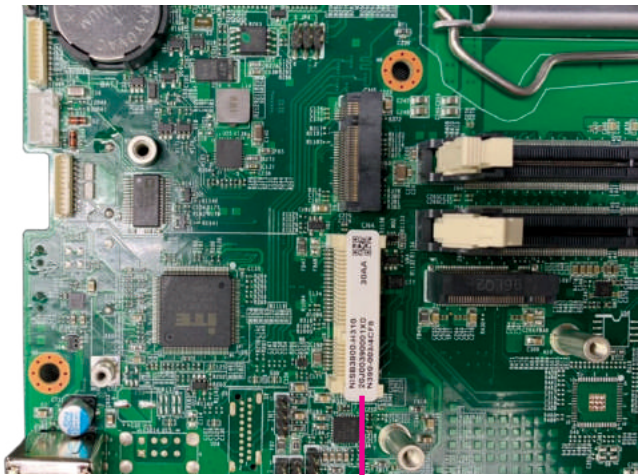
4. With the CPU installed, close the retention bracket and then hook the load lever under the retention tab. Ensure that the notch on the retention bracket is slid under the screw before lowering the load lever as shown below.



Do not force the CPU into the socket. Forcing the CPU into the socket may bend the pins and damage the CPU.

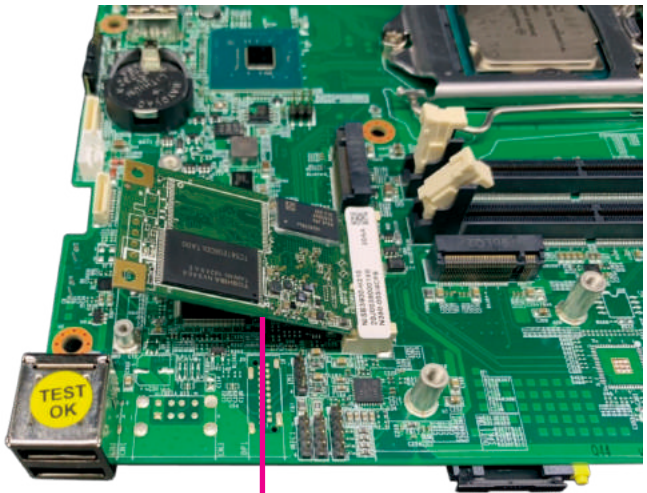
Installing a Mini-PCIe Module

1. Locate the mini-PCIe slot on the board.



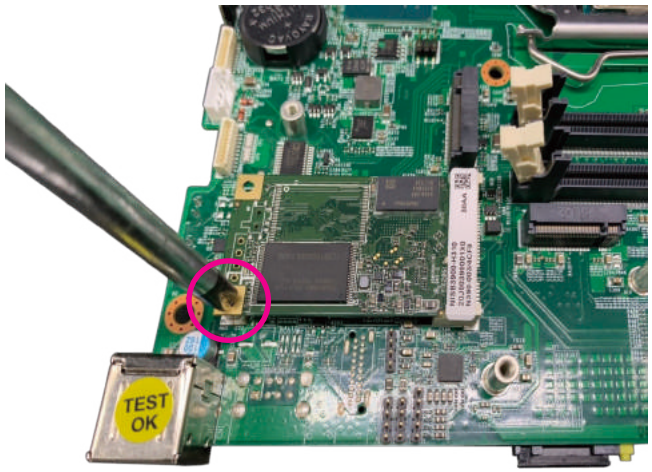
Mini-PCIe Slot

2. Insert the module into the mini-PCIe slot at a 30-degree angle.

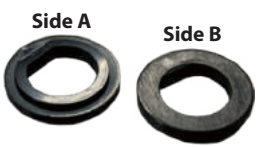


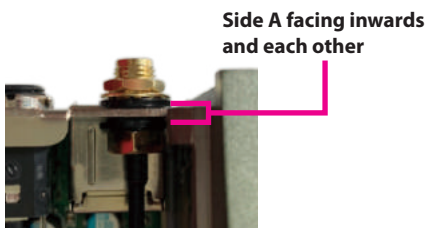
Mini-PCIe Module

3. Push the module down and then secure it with a mounting screw.



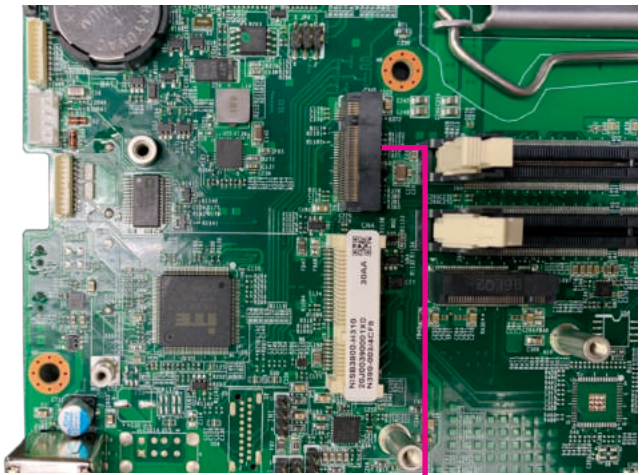
When installing Wi-Fi or 3G/4G LTE antennas, make sure the washers are fitted onto the antenna connector, one on each side as shown below:





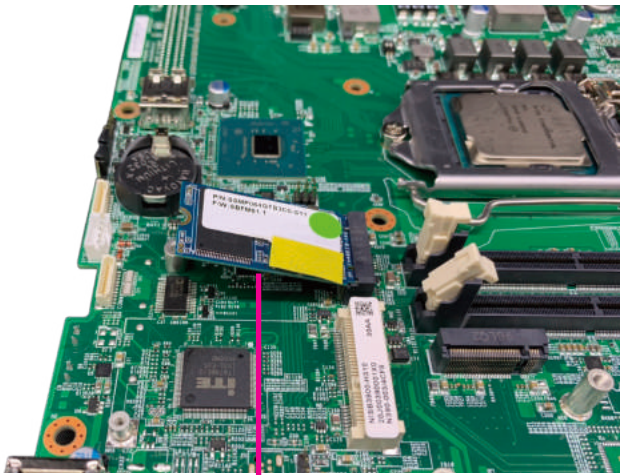
Installing an M.2 Module (Internal)

1. Locate the M.2 slot on the board.



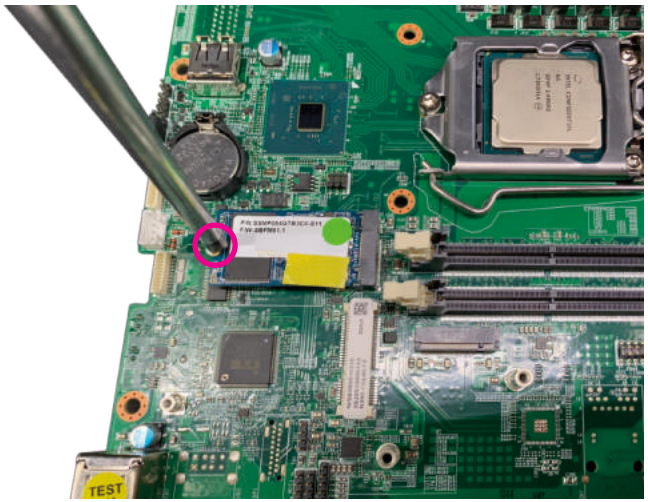
M.2 Slot

2. Insert the M.2 module into the slot at a 30-degree angle.



M.2 Module

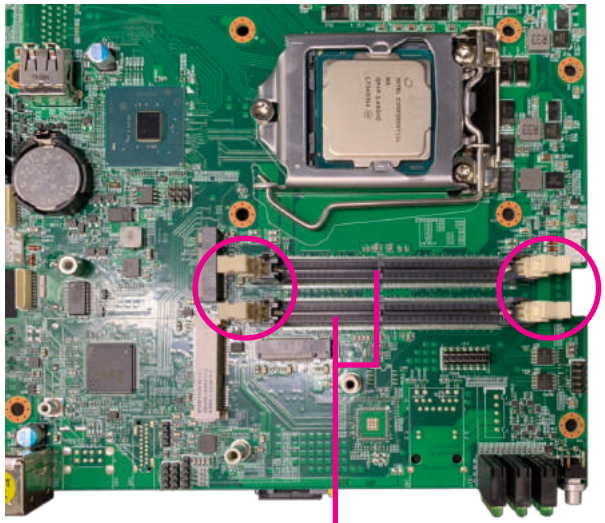
3. Push the module down and then secure it with a mounting screw.



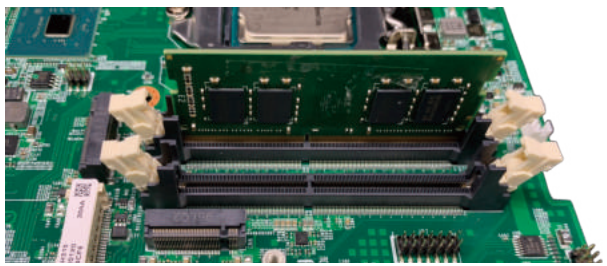
Installing a SO-DIMM Memory Module

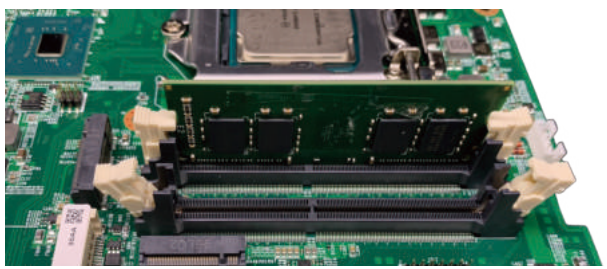
Remove the top cover before installing a SO-DIMM module.

1. Locate the SO-DIMM sockets and release the locks.



2. Insert the SO-DIMM module into the socket and apply even pressure to both ends of the module until it slips into the socket. While pushing the module into position, the locks will close automatically.

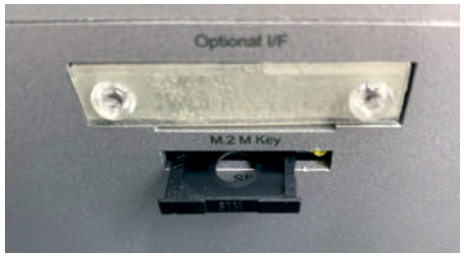




Installing a SIM Card

1. Locate the SIM card holder on the front panel.

2. Push the yellow button on the SIM card holder. The SIM card holder will eject. Then place the SIM card into the SIM card holder and insert it back to the original position.

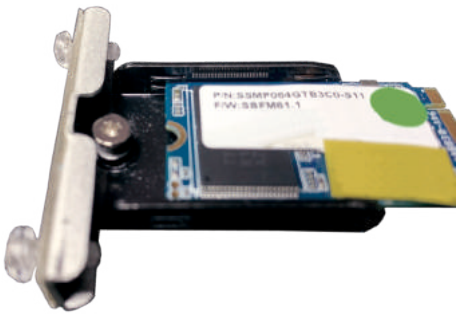


Installing an M.2 Card (External)

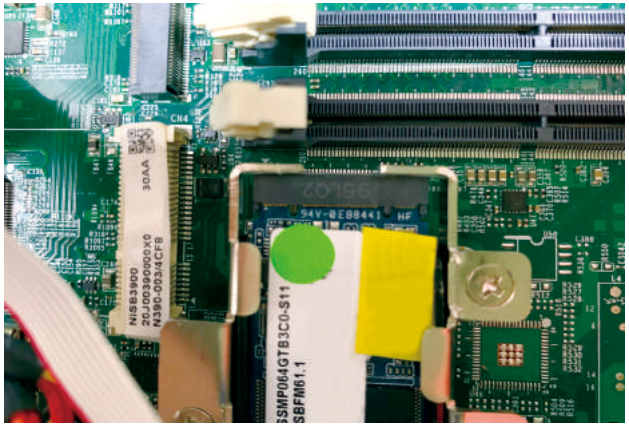
1. Locate the M.2 bracket cover on the front panel and unscrew the screws securing it. Then remove the bracket from the system.

M.2 Bracket

2. Slide the M.2 module to the mounting plate on the M.2 bracket and secure it with a screw.

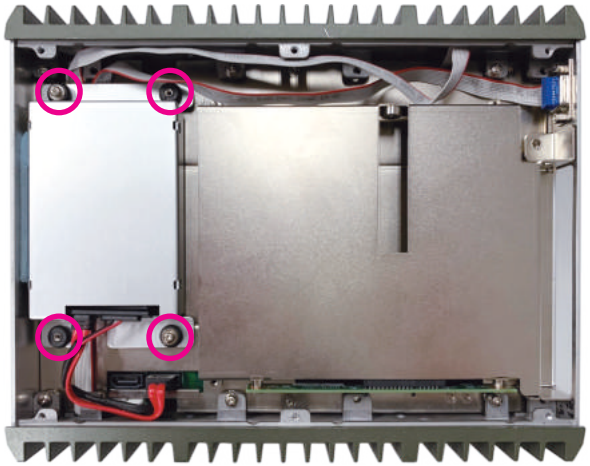


3. Install the M.2 bracket back to its original position. Make sure the connector on the edge of the module is plugged firmly into the connector on the board.



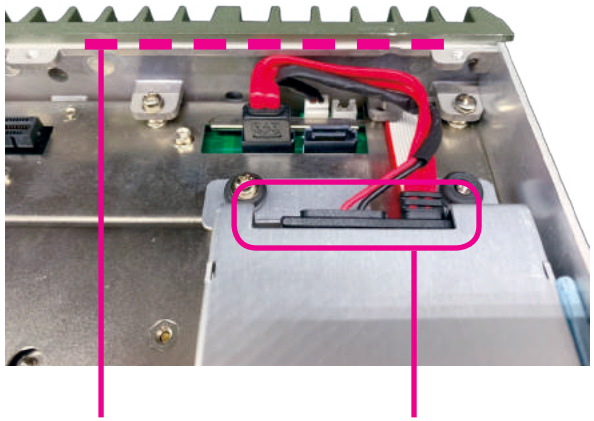
Installing an Internal SATA Storage Drive

1. With the bottom cover of the chassis removed, unscrew the screws securing the storage bracket and lift it up.



2. Place the storage drive into the bracket and secure the drive with screws.

3. Connect the SATA connector to the storage drive and secure the storage bracket back to its original location. If the SATA power and data cables are higher than the chassis, please rearrange the cables so that they are inside the chassis, as shown by the dotted line below.

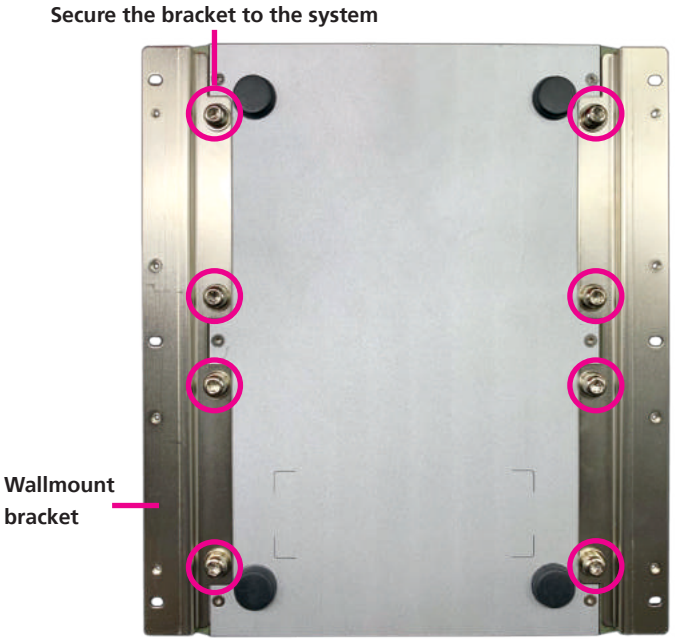


Wallmount Brackets

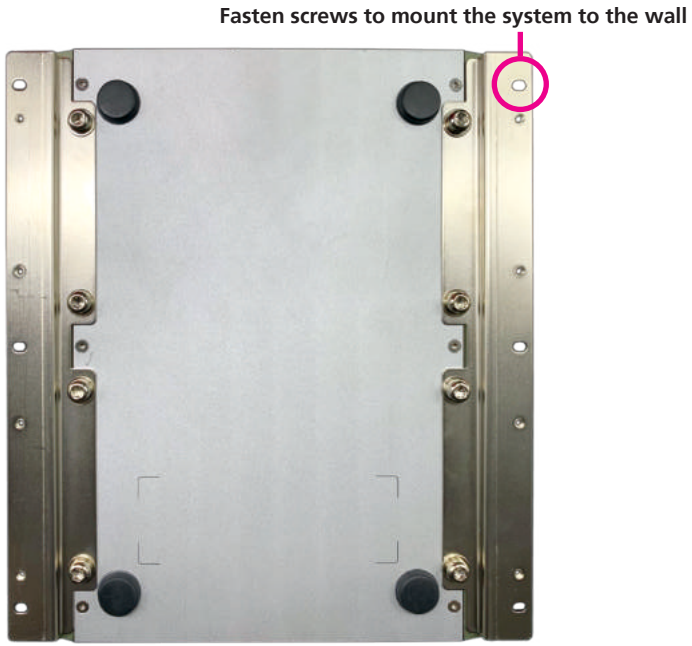
The wallmount brackets provide a convenient and economical way of mounting the system on the wall.

1. The mounting holes are located at the bottom of the system. Secure the brackets on each side of the system using the provided mounting screws.

2. Secure the brackets to the system by inserting four retention screws (M6*10mm) into each bracket.



3. Now mount the system on the wall by fastening screws through the bracket's mounting holes.



Chapter 4: BIOS Setup

About BIOS Setup

The BIOS (Basic Input and Output System) Setup program is a menu driven utility that enables you to make changes to the system configuration and tailor your system to suit your individual work needs. It is a ROM-based configuration utility that displays the system's configuration status and provides you with a tool to set system parameters.

These parameters are stored in non-volatile battery-backed-up CMOS RAM that saves this information even when the power is turned off. When the system is turned back on, the system is configured with the values found in CMOS.

With easy-to-use pull down menus, you can configure such items as:

- Hard drives, diskette drives, and peripherals
- Video display type and display options
- Password protection from unauthorized use
- Power management features

The settings made in the setup program affect how the computer performs. It is important, therefore, first to try to understand all the setup options, and second, to make settings appropriate for the way you use the computer.

When to Configure the BIOS

- This program should be executed under the following conditions:
- When changing the system configuration
- When a configuration error is detected by the system and you are prompted to make changes to the setup program
- When resetting the system clock
- When redefining the communication ports to prevent any conflicts
- When making changes to the Power Management configuration
- When changing the password or making other changes to the security setup

Normally, CMOS setup is needed when the system hardware is not consistent with the information contained in the CMOS RAM, whenever the CMOS RAM has lost power, or the system features need to be changed.

Default Configuration

Most of the configuration settings are either predefined according to the Load Optimal Defaults settings which are stored in the BIOS or are automatically detected and configured without requiring any actions. There are a few settings that you may need to change depending on your system configuration.

Entering Setup

When the system is powered on, the BIOS will enter the Power-On Self Test (POST) routines. These routines perform various diagnostic checks; if an error is encountered, the error will be reported in one of two different ways:

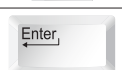
- If the error occurs before the display device is initialized, a series of beeps will be transmitted.
- If the error occurs after the display device is initialized, the screen will display the error message.

Powering on the computer and immediately pressing <Del> allows you to enter Setup.

Press the 

key to enter Setup:

Legends

Key	Function
	Moves the highlight left or right to select a menu.
	Moves the highlight up or down between sub-menus or fields.
	Exits the BIOS Setup Utility.
	Scrolls forward through the values or options of the highlighted field.
	Scrolls backward through the values or options of the highlighted field.
	Selects a field.
	Displays General Help.
	Load previous values.
	Load optimized default values.
	Saves and exits the Setup program.
	Press <Enter> to enter the highlighted sub-menu.

Scroll Bar

When a scroll bar appears to the right of the setup screen, it indicates that there are more available fields not shown on the screen. Use the up and down arrow keys to scroll through all the available fields.

Submenu

When "▶" appears on the left of a particular field, it indicates that a submenu which contains additional options are available for that field. To display the submenu, move the highlight to that field and press 

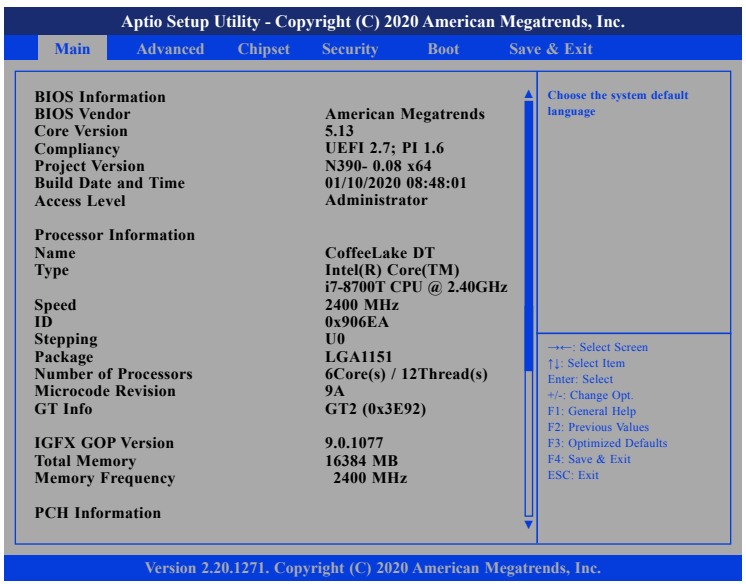
.

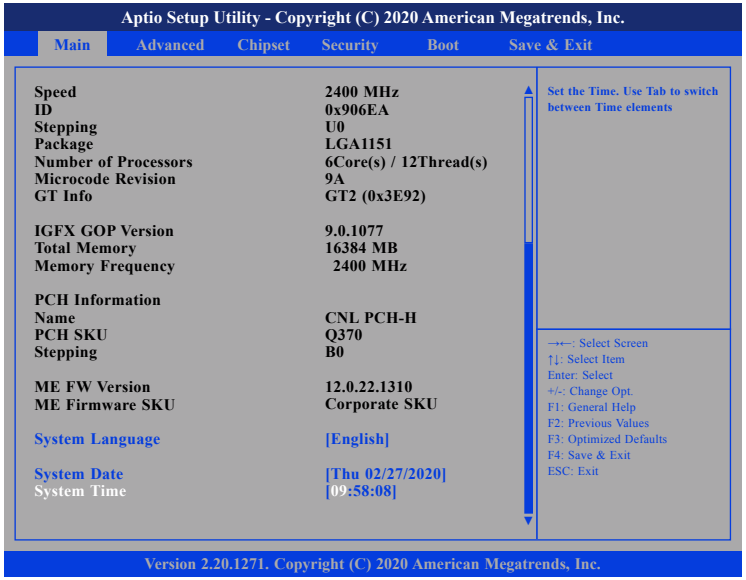
BIOS Setup Utility

Once you enter the AMI BIOS Setup Utility, the Main Menu will appear on the screen. The main menu allows you to select from several setup functions and one exit. Use arrow keys to select among the items and press Enter to accept or enter the submenu.

Main

The Main menu is the first screen that you will see when you enter the BIOS Setup Utility.





System Language

Selects the language of the system.

System Date

The date format is <day>, <month>, <date>, <year>. Day displays a day, from Monday to Sunday. Month displays the month, from January to December. Date displays the date, from 1 to 31. Year displays the year, from 1999 to 2099.

System Time

The time format is <hour>, <minute>, <second>. The time is based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00. Hour displays hours from 00 to 23. Minute displays minutes from 00 to 59. Second displays seconds from 00 to 59.

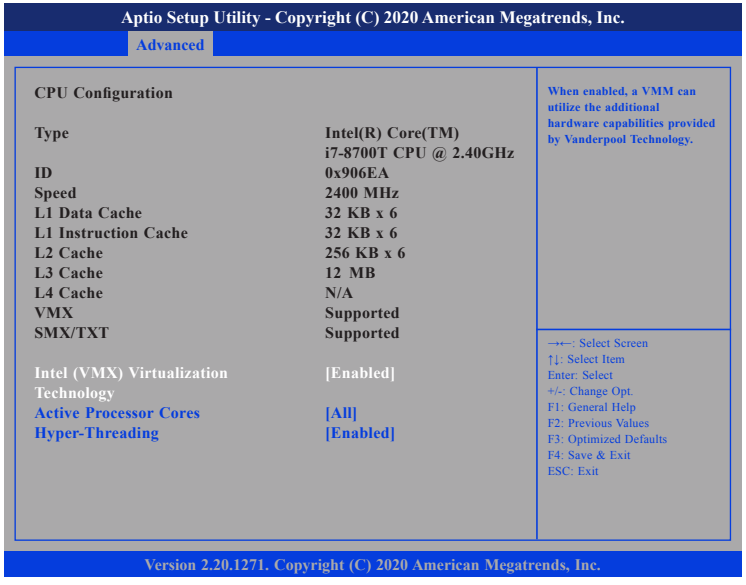
Advanced

The Advanced menu allows you to configure your system for basic operation. Some entries are defaults required by the system board, while others, if enabled, will improve the performance of your system or let you set some features according to your preference.

Setting incorrect field values may cause the system to malfunction.

CPU Configuration

This section is used to configure the CPU.



Intel® (VMX) Virtualization Technology

Enables or disables Intel Virtualization technology.

Active Processors Cores

Select the number of cores to enable in each processor package.

Hyper-Threading

Enables or disables hyper-threading technology.

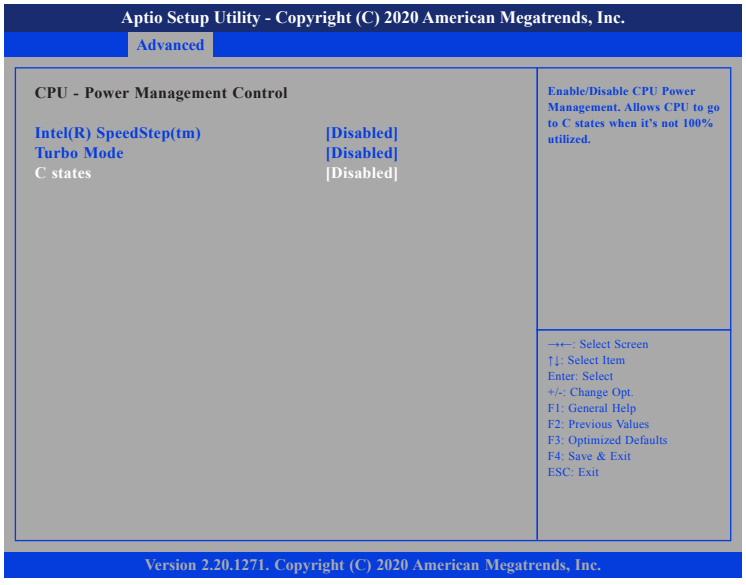
Power & Performance

This section is used to configure the CPU power management features.

CPU - Power Management Control

Enters the CPU - Power Management Control submenu.

CPU - Power Management Control



Intel® SpeedStep™

Enables or disables Intel SpeedStep technology.

Turbo Mode

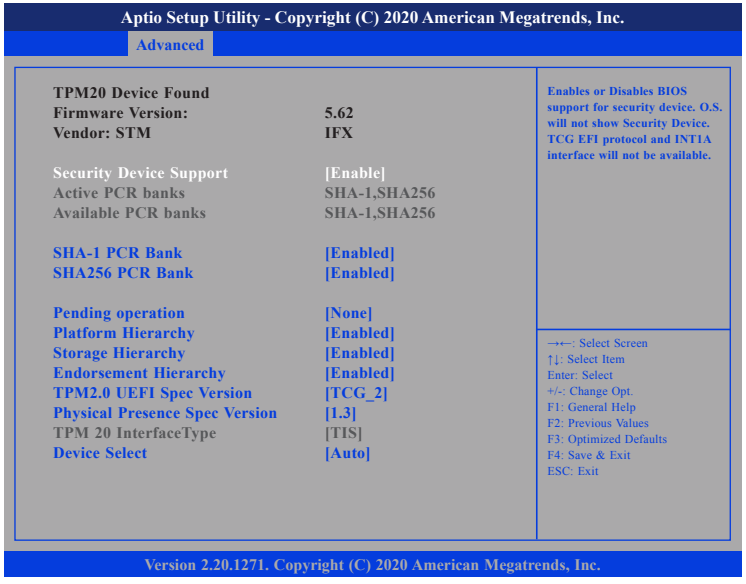
Enables or disables turbo mode.

C states

Enables or disables CPU C states support for power saving.

Trusted Computing

This section is used to configure Trusted Platform Module (TPM) settings.



Security Device Support
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.

SHA-1 PCR Bank
Enables or disables SHA-1 PCR Bank.

SHA256 PCR Bank
Enables or disables SHA256 PCR Bank.

Pending operation
Schedules an operation for the security device.

Platform Hierarchy
Enables or disables platform hierarchy.

Storage Hierarchy
Enables or disables storage hierarchy.

Endorsement Hierarchy
Enables or disables endorsement hierarchy.

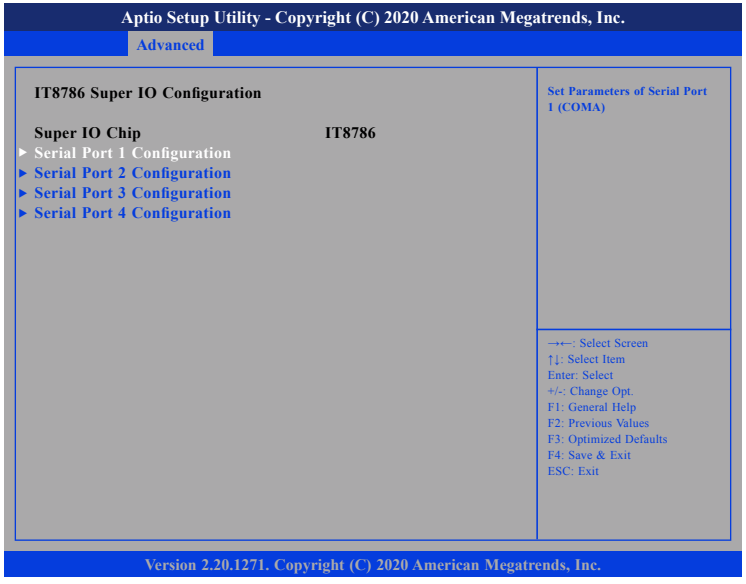
TPM2.0 UEFI Spec Version
Configures the TPM2.0 UEFI spec version.

Physical Presence Spec Version
Configures the physical presence spec version.

Device Select
Configures the TPM version. TPM 1.2 will restrict support to TPM 1.2 devices and TPM 2.0 will restrict support to TPM 2.0 devices. Auto will support both TPM 1.2 and 2.0 devices with the default set to TPM 2.0 devices if not found, and TPM 1.2 devices will be enumerated.

IT8786 Super IO Configuration

This section is used to configure the serial ports.

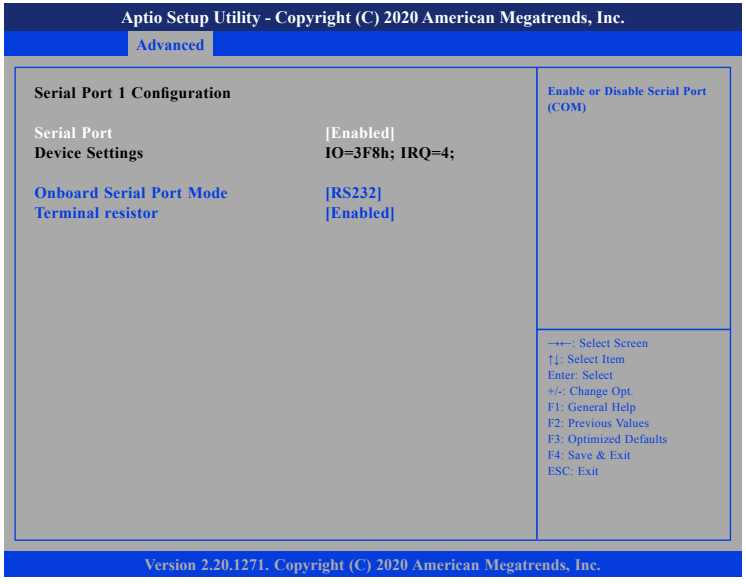


Super IO Chip

Displays the Super I/O chip used on the board.

Serial Port 1 Configuration

This section is used to configure serial port 1.



Serial Port

Enables or disables the serial port.

Onboard Serial Port Mode

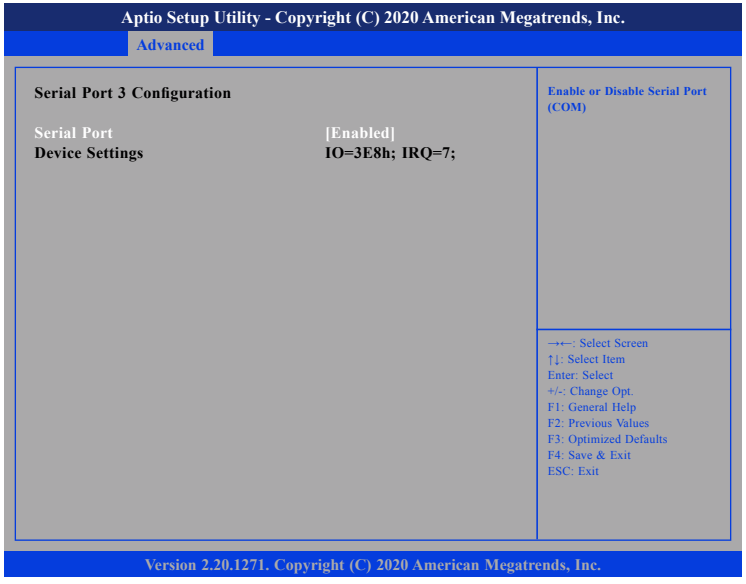
Select this to change the serial port mode to RS232, RS422 or RS485.

Terminal resistor

Enables or disables the terminal resistor.

Serial Port 3 Configuration

This section is used to configure serial port 3.

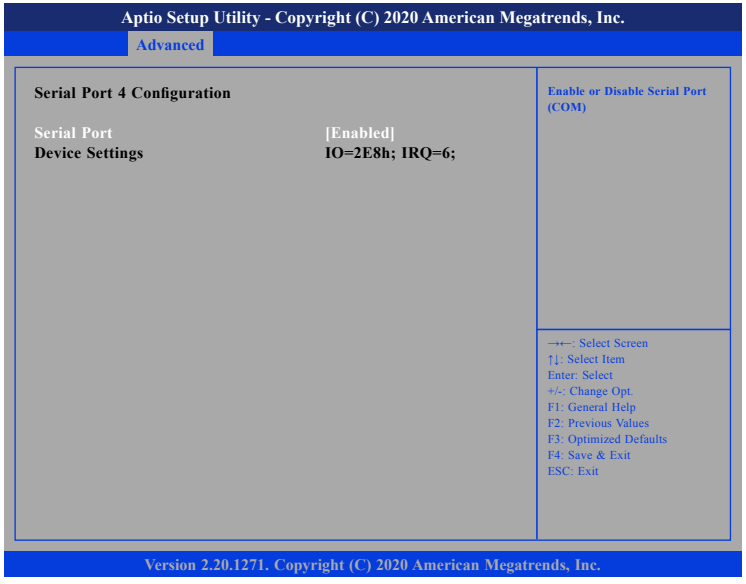


Serial Port

Enables or disables the serial port.

Serial Port 4 Configuration

This section is used to configure serial port 4.

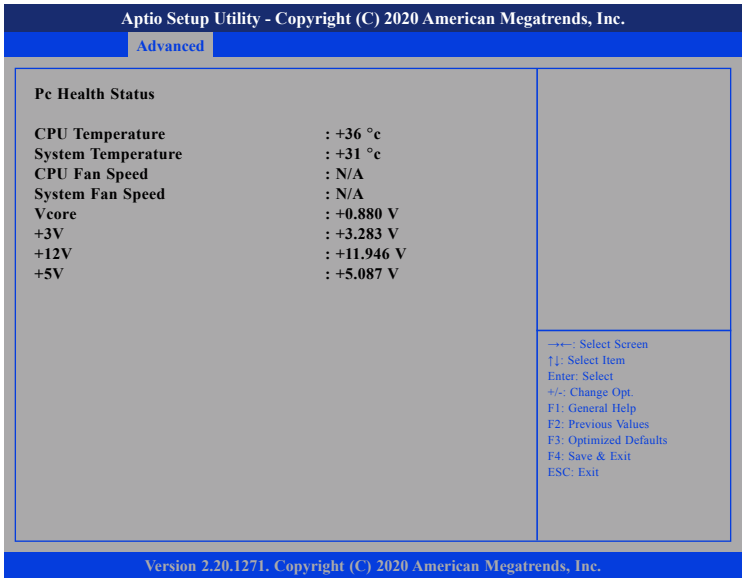


Serial Port

Enables or disables the serial port.

Hardware Monitor

This section is used to monitor hardware status such as temperature, fan speed and voltages.



CPU Temperature

Detects and displays the current CPU temperature.

System Temperature

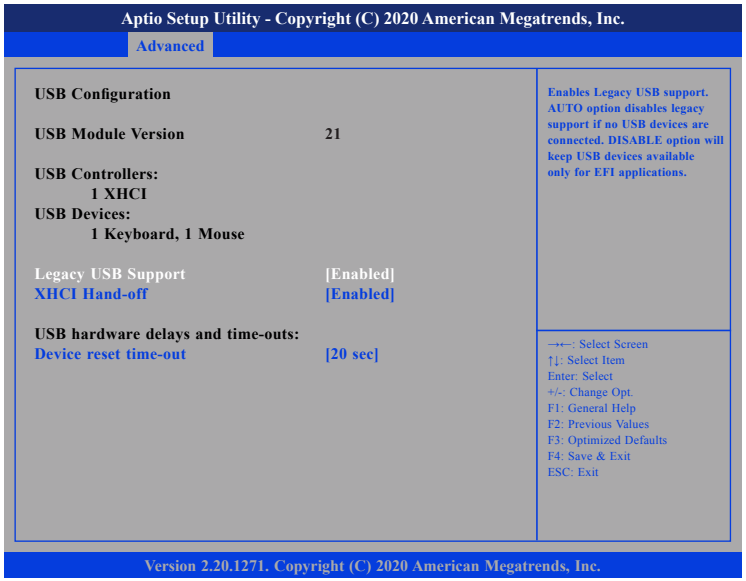
Detects and displays the current system temperature.

Vcore to +5V

Detects and displays the output voltages.

USB Configuration

This section is used to configure the USB.



Legacy USB Support

Enabled Enables Legacy USB.
Auto Disables support for Legacy when no USB devices are connected.
Disabled Keeps USB devices available only for EFI applications.

XHCI Hand-off

This is a workaround for OSs that does not support XHCI hand-off. The XHCI ownership change should be claimed by the XHCI driver.

Device reset time-out

Selects the USB mass storage device's start unit command timeout.

Chipset

This section gives you functions to configure the system based on the specific features of the chipset. The chipset manages bus speeds and access to system memory resources.

System Agent (SA) Configuration
System Agent (SA) parameters.

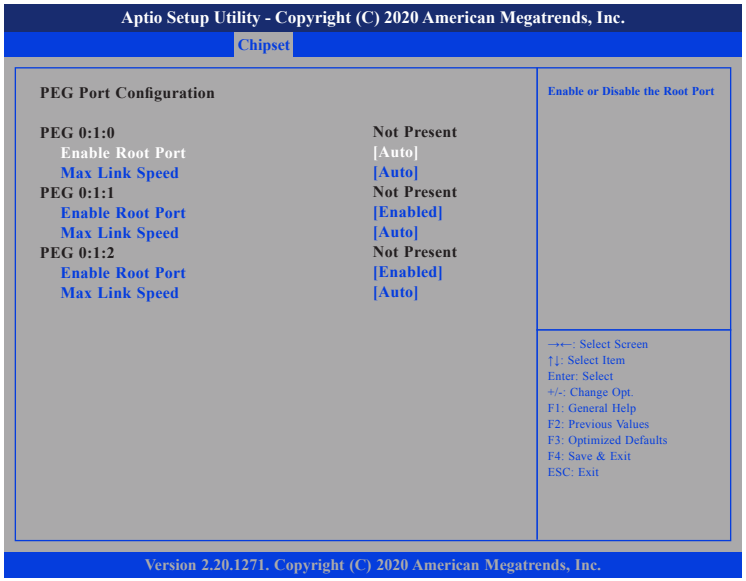
PCH-IO Configuration
PCH-IO parameters.

System Agent (SA) Configuration

This section is used to configure the System Agent (SA) configuration.

VT-d
Enables or disables VT-d function on MCH.

PEG Port Configuration



Enable Root Port
Enables or disables the root port.

Max Link Speed
Select the maximum link speed of the PEG device.

PCH-IO Configuration

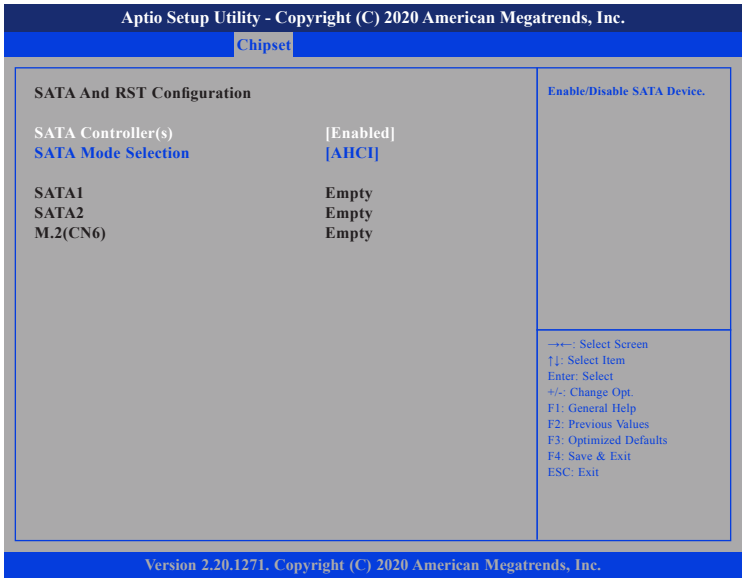
This section is used to configure PCH-IO configuration.

PCH LAN Controller
Enables or disables onboard NIC.

State After G3
Configures the power state when power is re-applied after a power failure (G3 state).

LAN2 and LAN3
Enables or disables LAN2 and LAN3 controllers.

SATA And RST Configuration



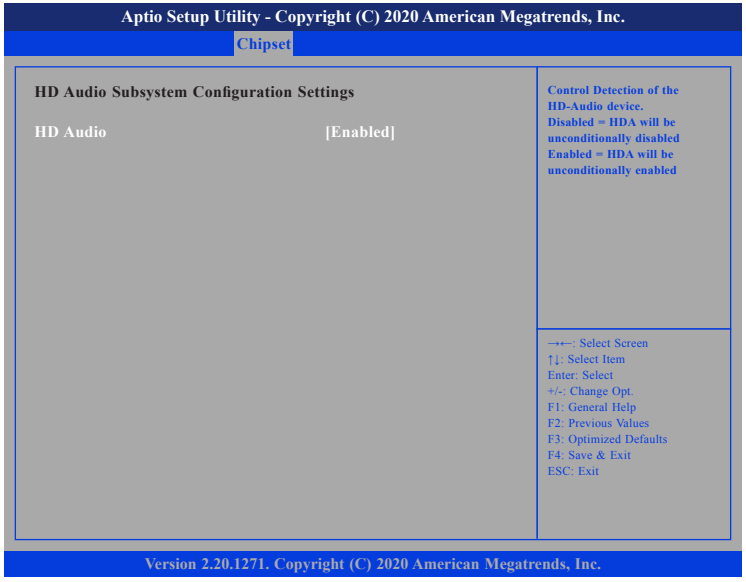
SATA Controller(s)
Enables or disables SATA device.

SATA Mode Selection
Configures the SATA controller as AHCI mode or Intel RST Premium mode.

Security Configuration

RTC Memory Lock
Enables or disables bytes 38h-3Fh in the upper and lower 128-byte bank of RTC RAM.

HD Audio Configuration



HD Audio
Control detection of the HD audio device.

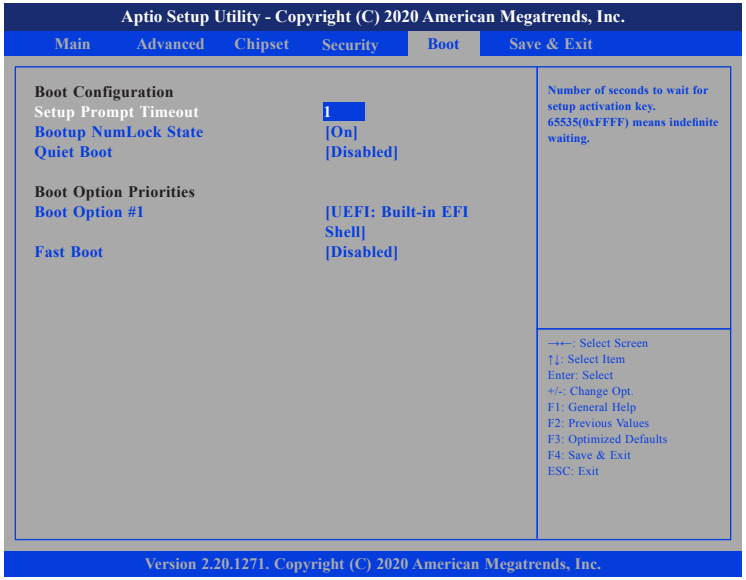
Disabled	HD audio will be unconditionally disabled.
Enabled	HD audio will be unconditionally enabled.

Security

Administrator Password
Select this to reconfigure the administrator's password.

User Password
Select this to reconfigure the user's password.

Boot



Setup Prompt Timeout
Selects the number of seconds to wait for the setup activation key. 65535(0xFFFF) denotes indefinite waiting.

Bootup NumLock State
This allows you to determine the default state of the numeric keypad. By default, the system boots up with NumLock on wherein the function of the numeric keypad is the number keys. When set to Off, the function of the numeric keypad is the arrow keys.

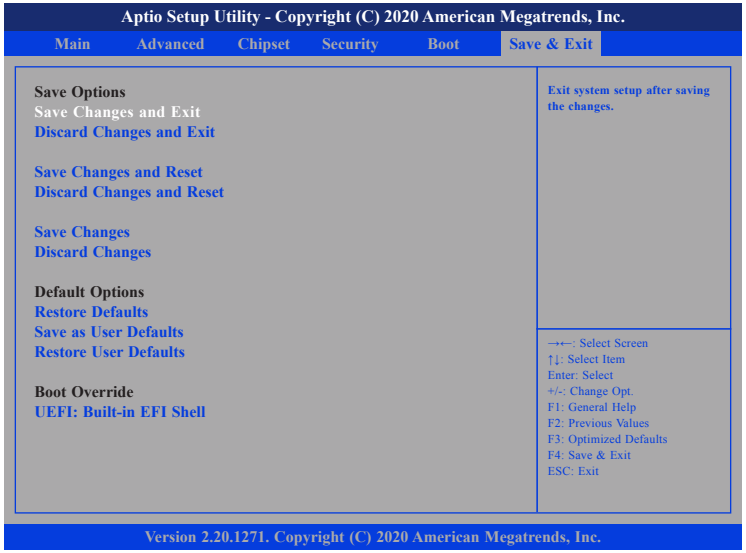
Quiet Boot

Enabled	Displays OEM logo instead of the POST messages.
Disabled	Displays normal POST messages.

Boot Option Priorities
Adjusts the boot sequence of the system. Boot Option #1 is the first boot device that the system will boot from, next will be #2 and so forth.

Fast Boot
Enables or disables fast boot technology to speed up the system boot time. This is achieved by skipping specific tests during BIOS POST routine.

Save & Exit



Save Changes and Exit
To save the changes and exit the Setup utility, select this field then press <Enter>. A dialog box will appear. Confirm by selecting Yes. You can also press <F4> to save and exit Setup.

Discard Changes and Exit
To exit the Setup utility without saving the changes, select this field then press <Enter>. You may be prompted to confirm again before exiting. You can also press <ESC> to exit without saving the changes.

Save Changes and Reset
To save the changes and reset, select this field then press <Enter>. A dialog box will appear. Confirm by selecting Yes.

Discard Changes and Reset
To exit the Setup utility and reset without saving the changes, select this field then press <Enter>. You may be prompted to confirm again before exiting.

Save Changes
To save changes and continue configuring the BIOS, select this field then press <Enter>. A dialog box will appear. Confirm by selecting Yes.

Discard Changes
To discard the changes, select this field then press <Enter>. A dialog box will appear. Confirm by selecting Yes to discard all changes made and restore the previously saved settings.

Restore Defaults
To restore the BIOS to default settings, select this field then press <Enter>. A dialog box will appear. Confirm by selecting Yes.

Save as User Defaults
To use the current configurations as user default settings for the BIOS, select this field then press <Enter>. A dialog box will appear. Confirm by selecting Yes.

Restore User Defaults
To restore the BIOS to user default settings, select this field then press <Enter>. A dialog box will appear. Confirm by selecing Yes.

Boot Override
To bypass the boot sequence from the Boot Option List and boot from a particular device, select the desired device and press <Enter>.