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SECTION 1 INTRODUCTION



This chapter contains general information and detailed specifications of the . Chapter 1 includes the following sections:

- General Description
- System Specifications
- Dimensions
- I/O Outlets
- Jumper Settings
- Connectors
- Package List

1.1 General Description

are fanless systems with an optional fan module that can support LGA1151 socket for Intel[®] 9th/8th generation Core[™] i7/i5/i3 processors. The is also built with a rugged design that makes the system suitable for the most endurable operation.

For operation systems, the series not only supports Windows[®] 11, Windows[®] 10 and Ubuntu, but also supports embedded OS.

- The Series supports two hard-drive bays to make it easy for customers to install and maintain the system.
- > Embedded O.S. supported

1.2 System Specifications

1.2.1 Main CPU Board

• CPU

- Socket LGA1151 for 9th / 8th Generation Intel[®] CoreTM i7/i5/i3 processors, up to 65W
- Below is a list of supported CPUs.

Generation	Proc No	WATT	Core	Thread	Base frequency
Coffee Lake-S refresh	i9-9900	65	8	16	3.1 GHz
Coffee Lake-S refresh	i5-9600	65	6	6	3.1 GHz
Coffee Lake-S refresh	i5-9500F	65	6	6	3.0 GHz
Coffee Lake-S refresh	i5-9500E	65	6	6	3.0 GHz
Coffee Lake-S refresh	i5-9500	65	6	6	3.0 GHz
Coffee Lake-S refresh	i5-9400F	65	6	6	2.9 GHz
Coffee Lake-S refresh	i5-9400	65	6	6	2.9 GHz
Coffee Lake-S refresh	i7-9700TE	35	8	8	1.8 GHz
Coffee Lake-S refresh	i7-9700T	35	8	8	2.0 GHz
Coffee Lake-S refresh	i5-9600T	35	6	6	2.3 GHz
Coffee Lake-S refresh	i5-9500TE	35	6	6	2.2 GHz
Coffee Lake-S refresh	i5-9500T	35	6	6	2.2 GHz
Coffee Lake-S refresh	i5-9400T	35	6	6	1.8 GHz
Coffee Lake-S refresh	i3-9100TE	35	4	4	2.2 GHz
Coffee Lake-S refresh	i3-9100T	35	4	4	3.1 GHz
Coffee Lake-S refresh	G4930T	35	2	2	3.0 GHz
Coffee Lake-S	i5-8600	65	6	6	3.1 GHz
Coffee Lake-S	i5-8500	65	6	6	3.0 GHz
Coffee Lake-S	i5-8400	65	6	6	2.8 GHz
Coffee Lake-S	G4900	54	2	2	3.1 GHz
Coffee Lake-S	i7-8700T	35	6	12	2.4 GHz
Coffee Lake-S	i5-8600T	35	6	6	2.3 GHz
Coffee Lake-S	i5-8500T	35	6	6	2.1 GHz
Coffee Lake-S	i5-8400T	35	6	6	1.7 GHz
Coffee Lake-S	i3-8100T	35	4	4	3.1 GHz
Coffee Lake-S	G5400T	35	2	4	3.1 GHz
Coffee Lake-S	G4900T	35	2	2	2.9 GHz

System Chipset

Intel[®] H310 chipset
 Intel[®] Q370 chipset

- BIOS
 - AMI BIOS, with Smart View and Customer CMOS Backup.
- System Memory
 - Two DDR4-2666/2400 un-buffered SO-DIMM max. up to 64GB
- System Certification
 - CE/FCC
- Features
 - Compact front IO design
 - Supports PCIe/PCI expansion slots
 - DC to DC power supply support 24VDC (uMin=19V/uMax=30V)
 - Supports two 2.5" HDD bays (7/9.5mm height)
 - Supports RAID 0,1 (for Q370 PCH)
 - Supports TPM2.0
 - Supports optional 5G mobile module (for Q370 PCH) or WLAN module & antennas
 - Supports optional fan module

1.2.2 I/O System

- Standard I/O Interface -- Front
 - One ATX power on/off switch w/LED
 - One ATX/AT mode switch
 - One 2-pin connector output for remote power on/off switch
 - DC to DC power supply, which supports 24VDC (uMin=19V/uMax=30V) with phoenix power plug
 - Four USB 3.1 Gen.2 ports (for Q370 PCH) or

Four USB3.1 Gen.1 ports (for H310 PCH)

Two USB 2.0 ports



-support a internal USB2.0 with connector for license key, up to 30mm)

180D type A

- One HDD/SSD access LED
- Three user's LEDs
- Two G.E. LAN ports (i211AT & I219LM)
- Extension system I/O module:
 - > AX93511 4 x RS-232/422/485 module (default RS-232) or
 - AX93512 2 x RS-232/422/485 w/ isolated 1.5KVDC protection and 8-in/8-out isolated 1.5KVDC DIO or
 - > AX93516 4 x RS232/422/485 w/isolated 2KVDC module
 - AX93519 2 x RS232/422/485 + 1 G.E. LAN (i211AT) + 2 USB.3.1 (1 USB3.1 Gen.2 signal & 1 USB 2.0 signal) module (for Q370 PCH)



Note: The RS-485 auto flow control only supports below formats to communicate data:

> 8 data bits + 1 stop bit 8 data bits + 1 parity bit + 1 stop bit 8 data bits + 1 parity bit + 2 stop bits 8 data bits + 2 stop bits 7 data bits + 1 parity bit (even or odd) + 2 stop bits

- One VGA supports resolution up to 1920 x 1200 @60Hz
- One HDMI 1.4b supports resolution up to 4096 x 2160@24MHz
- 1 x Audio (Line-out)

Expansion Interface

Mini card slot or M.2 Key B socket

1 x on board full-size PCI Express Mini Card slot with USB interface (for H310 PCH) 1 x on board full-size PCI Express Mini Card slot with USB/PCIe interface or 1 x on board M.2 Key B socket (3042/3050) (for Q370 PCH)

- Mini card slot or M.2 Key B socket
 - 1 x on board full-size PCI Express Mini Card slot with USB interface (for H310 PCH) 1 x on board full-size PCI Express Mini Card slot with USB/PCIe interface or 1 x on board M.2 Key B socket (3042/3050) (for Q370 PCH)
- PCIe/PCI slot

1 x AX96205: 1 PCle x16 + 1 PCle x4 or

1 x AX96206: 1 PCIe x16 + 1 PCI or

1 x AX96207: 2 PCI

- Mini Card slot or M.2 Key B socket 1 x on board full-size PCI Express Mini Card slot with USB/PCIe interface or 1 x on board M.2 Key B socket (3042/3050)
- PCIe/PCI slot

1 x AX96410: 1 PClex16 + 3 PClex4 or

1 x AX96411: 1 PClex16 + 1 PClex4 + 2PCl

W Note: The maximum power rating for expansion slots at 60 ${}^{\!\!\!\!\!C}$ cannot exceed the following value:

The maximum loading of +3.3V+5V+12V<150W

Note: 12V maximum loading is 12A(144W).

Note: The system power rating may thus be changed base on differing combinations of attached devices.

Drive Capacity

Supports two 2.5" HDD driver bays (SSD/HDD 7 or 9.5mm height)

Note: Since Gen. 2 SSD with JMicron controller has a compatibility issue with Intel H310 PCH, it is strongly recommended to use Gen. 3 SSD on

Power Input

- 24VDC (uMin=19V/uMax=30V) with phoenix power plug
- Inrush current 34A or less

Note: Please fix the system power input in 24Vdc when plugging an add-on card.

Generation	Proc No	WATT	Core	Thread	Operating Temperature	Remark	Base frequency
Coffee Lake-S refresh	i9-9900	65	8	16	-10°C-50°C	*	3.1 GHz
Coffee Lake-S refresh	i5-9600	65	6	6	-10°C-50°C	*	3.1 GHz
Coffee Lake-S refresh	i5-9500F	65	6	6	-10°C-50°C	*	3.0 GHz
Coffee Lake-S refresh	i5-9500E	65	6	6	-10°C-50°C	*	3.0 GHz
Coffee Lake-S refresh	i5-9500	65	6	6	-10°C-50°C	*	3.0 GHz
Coffee Lake-S refresh	i5-9400F	65	6	6	-10°C-50°C	*	2.9 GHz
Coffee Lake-S refresh	i5-9400	65	6	6	-10°C-50°C	*	2.9 GHz
Coffee Lake-S refresh	i7-9700TE	35	8	8	-10°C-60°C	*	1.8 GHz
Coffee Lake-S refresh	i7-9700T	35	8	8	-10°C-60°C	*	2.0 GHz
Coffee Lake-S refresh	i5-9600T	35	6	6	-10°C-60°C	*	2.3 GHz
Coffee Lake-S refresh	i5-9500TE	35	6	6	-10°C-60°C	*	2.2 GHz
Coffee Lake-S refresh	i5-9500T	35	6	6	-10°C-60°C	*	2.2 GHz

Operating Temperature

Coffee Lake-S refresh	i5-9400T	35	6	6	-10°C-60°C	*	1.8 GHz
Coffee Lake-S refresh	i3-9100TE	35	4	4	-10°C-60°C		2.2 GHz
Coffee Lake-S refresh	i3-9100T	35	4	4	-10°C-60°C		3.1 GHz
Coffee Lake-S refresh	G4930T	35	2	2	-10°C-60°C		3.0 GHz
Coffee Lake-S	i5-8600	65	6	6	-10°C-50°C		3.1 GHz
Coffee Lake-S	i5-8500	65	6	6	-10°C-50°C	*	3.0 GHz
Coffee Lake-S	i5-8400	65	6	6	-10°C-50°C	*	2.8 GHz
Coffee Lake-S	G4900	54	2	2	-10°C-50°C		3.1 GHz
Coffee Lake-S	i7-8700T	35	6	12	-10°C-60°C	*	2.4 GHz
Coffee Lake-S	i5-8600T	35	6	6	-10°C-60°C		2.3 GHz
Coffee Lake-S	i5-8500T	35	6	6	-10°C-60°C		2.1 GHz
Coffee Lake-S	i5-8400T	35	6	6	-10°C-60°C		1.7 GHz
Coffee Lake-S	i3-8100T	35	4	4	-10°C-60°C		3.1 GHz
Coffee Lake-S	G5400T	35	2	4	-10°C-60°C		3.1 GHz
Coffee Lake-S	G4900T	35	2	2	-10°C-60°C		2.9 GHz

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* The may cause CPU frequency hopping when operating in an extremely high temperature environment, and thermal throttling may occur when the system remains in full loading conditions.

Note: The performance of the system might be adversely affected when operating at a temperature above the system's limitation or with an unrecommended processor.

Note: If the operating temperature is above 35 °C, it is recommended to use a wide temperature SSD on the device.

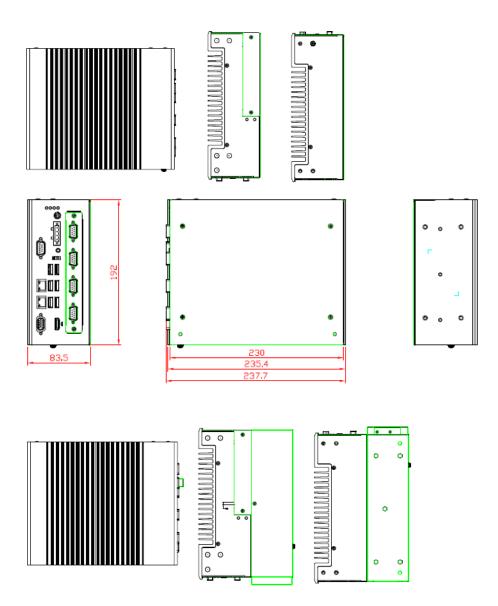
Storage Temperature

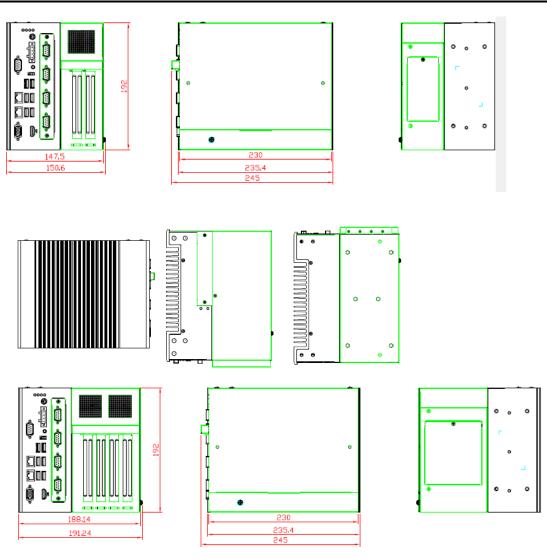
- -20°C ~ 80°C
- Humidity
 - 10% ~ 90% (Non-condensing)
- Dimensions
 - 83.5 mm (3.28") (W) x 192 mm (7.54") (H) x 230 mm (9.04") (D)
 - 147.5 mm (5.81") (W) x 192 mm (7.56") (H) x 230 mm (9.04") (D)

188.1 mm (7.39") (W) x 192 mm (7.54") (H) x 230 mm (9.04") (D)
 Note: All specifications and images are subject to change without notice.

1.3 Dimensions

The following diagrams show you dimensions and outlines of the



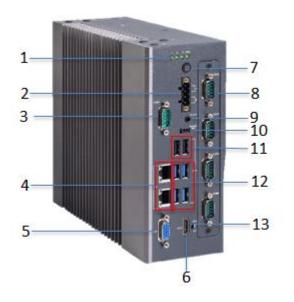


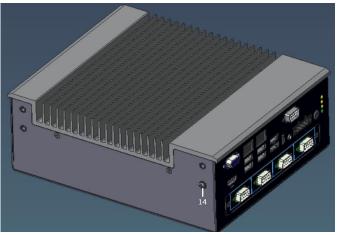
I/O outlets

1.4 I/O Outlets

The following figures show locations of the

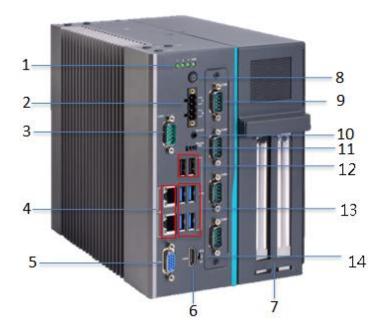
Front Panel

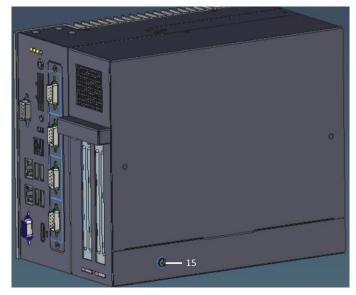




Mark	Description
	1 x HDD/SSD access LED
1	3 x User's LED
2	1 x 4-pin terminal block
3	1 x RS-232/422/485 (default RS-232)
4	2 x LAN
5	1 x VGA
6	1 x HDMI
7	1 x Switch for power on/off w/LED

r	
8	Extension system I/O module
9	1 x Line out
10	1 x Remote switch
11	2 x USB2.0
12	4 x USB 3.1
13	1 x AT/ATX switch (default ATX)
14	1 x Terminal ground

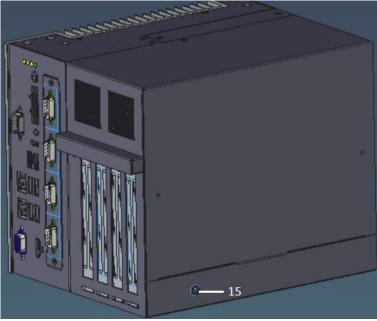




Mark	Description
1	1 x HDD/SSD access LED 3 x User's LED
2	1 x 4-pin terminal block
3	1 x RS-232/422/485 (default RS-232)
4	2 x LAN
5	1 x VGA
6	1 x HDMI

7	Riser (PCIe/PCI slots expansion)
8	1 x Switch for power on/off w/LED
9	Extension system I/O module
10	1 x Line out
11	1 x Remote switch
12	2 x USB2.0
13	4 x USB 3.1
14	1 x AT/ATX switch (default ATX)
15	1 x Terminal ground





Mark	Description
	1 x HDD/SSD access LED
1	3 x User's LED
2	1 x 4-pin terminal block
3	1 x RS-232/422/485 (default RS-232)
4	2 x LAN
5	1 x VGA

R	
6	1 x HDMI
7	Riser (PCIe/PCI slots expansion)
8	1 x Switch for power on/off w/LED
9	Extension system I/O module
10	1 x Line out
11	1 x Remote switch
12	2 x USB2.0
13	4 x USB 3.1
14	1 x AT/ATX switch (default ATX)
15	1 x Terminal ground

1.5 Packing List

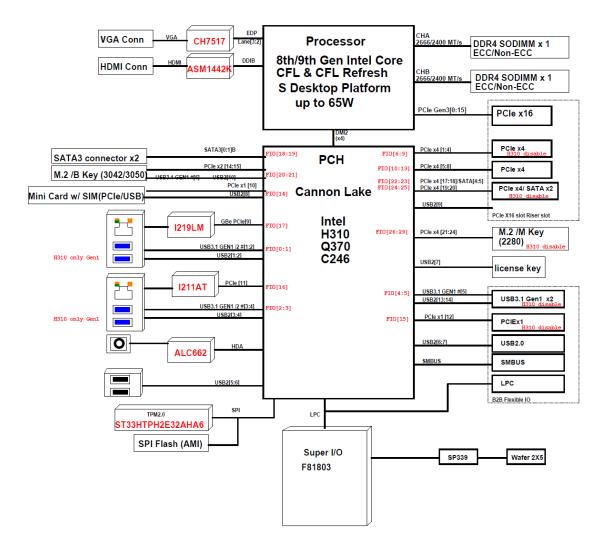
• unit x 1

:

- Screw pack x 1
- Foot pad x 4
- CPU grease x 1
- Terminal block x 1
- Remote switch cable x 1
- Holder bracket kit x1
- HDD spacer x1 (for 7mm height SSD/HDD)

1.6 M/B Block Diagram

The following diagram shows you the M/B block diagram of SBC87525.



1.7 Jumper Settings

Properly configure jumper settings on the SBC87525 to meet your application purpose. Below you can find a summary table of all jumpers and onboard default settings.

Note: How to setup Jumpers

Illustrations below show that a cap on a jumper is to "close" the jumper, whereas that off a jumper is to "open" the jumper.







[Open]

[Closed]

[Pin1-2 Closed]

Jumper	Descriptions	Setting
JP2	Clear RTC : Normal	Short 1-2
JP10&JP11	DELAY Function SW	Short 1-2

1.7.1 Restore BIOS Optimal Defaults (JP2)

Put jumper clip to pin 2-3 for a few seconds then move it back to pin 1-2. Doing this procedure can restore BIOS optimal defaults.

Function	Setting
Normal operation (Default)	1-2 close
Restore BIOS optimal defaults	2-3 close



1.7.2 DELAY Function SW (JP10&JP11)

3	2	1

JP11	JP10	function
2-3 close	2-3 close	delay 3s power on
2-3 close	1-2 close	delay 6s power on
1-2 close	1-2 close	disable delay function (default)

r

1.8 Connectors

Connectors connect the board with other parts of the system. Loose or improper connection might cause problems. Make sure all connectors are properly and firmly connected.

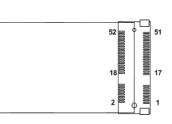
Here is a ta	le summarizing	all connectors	on the board.
110101010101	no oannianzing		on the bound.

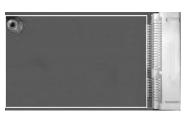
Connector	Label	
MINI Card slot	CN4	
LAN1+USB3.0	CN9	
LAN2+USB3.0	CN10	
VGA connector	CN3	
USB 2.0 connector	CN13	
Audio connector	CN1	
DC-in Phoenix power connector	CN12	
HDMI connector	CN2	
M.2 2280 Key M NVMe SSD	CN8	
M.2 3042/3050 Key B	CN5	
COM port connector	COM1	
SATA Power connector	SCN2	
SATA III connector	SATA1~2	
DDR4 SO-DIMM (260 Pin)	SDIMM1 SDIMM2	
Power button	SW2	
AT/ATX Power select	SW3	
Remote SW	PWRBT1	
Flexible IO-AX93511 COM x4 (RS232/422/485)	-	
Flexible IO-AX93516 isolated COM x4 (RS232/422/485)	SCN1	
Flexible IO-AX93512 isolated COM x2 (RS232/422/485) & 8in/8out DIO		
Flexible IO-AX93519 COM x2 (RS232/422/485), USB3.0 x2 & LAN1		
Riser Card-AX96205 PCIe x16 Gen3 & 1 PCIe x4 Gen 3	SHB1+SHB2	
Riser Card-AX96206 PCIe x16 Gen3 & 1 PCI		
Riser Card-AX96207 2 PCI		
Riser Card –AX96410 PCIe x16 Gen3 & 3 PCIe x4 Gen 3		
Riser Card –AX96411 PCIe x16 Gen3 & 1 PCIe x4 Gen 3 & 2 PCI		

MINI Card Slot (CN4) 1.8.1

A PCI-Express Mini Card connector is located on the top side . It follows mini PCIe 1.2 standard.

Pins	Signals	Pins	Signals
1	WAKE#	2	+3.3VSB
3	No use	4	GND
5	No use	6	+1.5V
7	CLKREQ#	8	No use
9	GND	10	No use
11	REFCLK-	12	No use
13	REFCLK+	14	No use
15	GND	16	No use
17	No use	18	GND
19	No use	20	W_DISABLE#
21	GND	22	PERST#
23	PE_RXN3/	24	+3.3VSB
25	PE_RXP3/	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PE_TXN3/	32	SMB_DATA
33	PE_TXP3/	34	GND
35	GND	36	USB_D8-
37	GND	38	USB_D8+
39	+3.3VSB	40	GND
41	+3.3VSB	42	No use
43	GND	44	No use
45	No use	46	No use
47	No use	48	+1.5V
49	No use	50	GND
51	No use	52	+3.3VSB







Solution Note: For H310 PCH, the on board full-size PCI Express Mini Card slot offers USB interface.

> For Q370 PCH, the on board full-size PCI Express Mini Card slot offers PCIe and USB interface.

1.8.2 LAN+USB3.0 (CN9, CN10)

The system has two RJ-45 connectors: LAN1 and LAN2. Ethernet connection can be established by plugging one end of the Ethernet cable into this RJ-45 connector and the other end (phone jack) to a 1000/100/10-Base-T hub.

Pins	1000 Base-T	100/10 Base-T	Descriptions	
L1	BI_DA+	TX+	Bidirectional or Transmit Data+	
L2	BI_DA-	TX-	Bidirectional or Transmit Data-	
L3	BI_DB+	RX+	Bidirectional or Receive Data+	
L4	BI_DC+	N.C.	Bidirectional or Not Connected	
L5	BI_DC-	N.C.	Bidirectional or Not Connected	
L6	BI_DB-	RX-	Bidirectional or Receive Data-	
L7	BI_DD+	N.C.	Bidirectional or Not Connected	
L8	BI_DD-	N.C.	Bidirectional or Not Connected	
A	Active Link LED (Yellow) Off: No link Blinking: Data activity detected			
	Speed LED			
	1000: Orange			
В	100: Greer	ı		
	10: OFF			

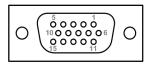
The Universal Serial Bus connectors are compliant with USB 3.0 (10Gb/s) and ideal for installing USB peripherals such as scanners, cameras and USB devices.

Pins	Signal USB Port 0	Pins	Signal USB Port 1
1	USB_VCC (+5V level standby power)	10	USB_VCC (+5V level standby power)
2	USB_Data2-	11	USB_Data3-
3	USB_Data2+	12	USB_Data3+
4	GND	13	GND
5	SSRX2-	14	SSRX3-
6	SSRX2+	15	SSRX3+
7	GND	16	GND
8	SSTX2-	17	SSTX3-
9	SSTX2+	18	SSTX3+

1.8.3 VGA Connector (CN3)

The CN9 is a 15-pin D-Sub connector which is commonly used for connecting a CRT monitor.

Pins	Signals	Pins	Signals
1	Red	2	Green
3	Blue	4	N.C.
5	GND	6	DETECT
7	GND	8	GND
9	+5V	10	GND
11	N.C.	12	DDC DATA
13	Horizontal Sync	14	Vertical Sync
15	DDC CLK		



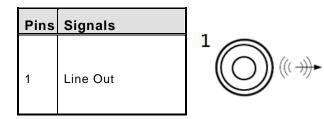
1.8.4 USB 2.0 Connector (CN13)

The Universal Serial Bus connectors are compliant with USB 2.0 (480Mbps), providing ideal interfaces ideal for installing USB peripherals such as a keyboard, mouse, scanner, etc.

Pin	Signal USB Port 0	Pin	Signal USB Port 1	
1	USB VCC (+5V level)	5	USB VCC (+5V level)	
2	USB #0_D-	6	USB #1_D-	
3	USB #0_D+	7	USB #1_D+	1 2 3 4
4	Ground (GND)	8	Ground (GND)	

1.8.5 Audio Connector (CN1)

These two audio jacks are ideal for Audio Mic-In and Audio Line-out.



1.8.6 DC-in Phoenix Power Connector (CN12)

The system supports the 24VDC (uMin=19V/uMax=30V) Phoenix DC-in connector for system power input.

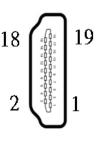
Pins	Signals	
1	DC+	
2	DC+	
3	DC-	
4	DC-	

+ +
00

1.8.7 HDMI Connector (CN2)

The HDMI (High-Definition Multimedia Interface) is a compact digital interface which is capable of transmitting high-definition video and high-resolution audio over a single cable.

Pins	Signals	Pins	Signals	
1	HDMI OUT_DATA2+	11	GND	
2	GND	12	HDMI OUT Clock-	
3	HDMI OUT_DATA2-	13	N.C.	
4	HDMI OUT_DATA1+	14	N.C.	
5	GND	15	HDMI OUT_SCL	
6	HDMI OUT_DATA1-	16	HDMI OUT_SDA	
7	HDMI OUT_DATA0+	17	GND	
8	GND	18	+5V	
9	HDMI OUT_DATA0-	19	HDMI_HTPLG	
10	HDMI OUT Clock+			



1.8.8 COM Port Connector (COM1)

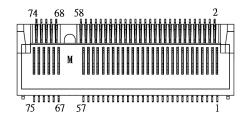
The system has a serial port: COM1 is RS-232/422/485 port. Please set configuration of the serial port in the Advanced menu in BIOS.

Pins	RS-232	RS-422	RS-485
	Detect	TX-	Data-
\bigcirc	$\begin{pmatrix} \mathbf{o} & \mathbf{o}^2 & \mathbf{o}^3 & \mathbf{o}^4 & \mathbf{o}^5 \\ \mathbf{o}_6 & \mathbf{o}_7 & \mathbf{o}_8 & \mathbf{o}_9 \end{pmatrix} \bigcirc \mathbf{a}$	TX+	Data+
		RX+	No use
4	DTR, Data Terminal Ready	RX-	No use
5	GND, Ground	No use	No use
6	DSR, Data Set Ready	No use	No use
7	RTS, Request To Send	No use	No use
8	CTS, Clear To Send	No use	No use
9	RI, Ring Indicator	No use	No use

1.8.9 M.2 2280 Key M NVMe SSD (CN8)

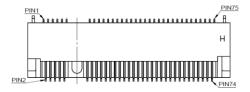
The M.2 2280 Key M NVM Express SSD for storage.

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	2	+3.3V	3	GND	4	+3.3V
5	PERn3	6	NC	7	PERp3	8	NC
9	GND	10	LED_1#	11	PETn3	12	+3.3V
13	РЕТр3	14	+3.3V	15	GND	16	+3.3V
17	PERn2	18	+3.3V	19	PERp2	20	NC
21	GND	22	NC	23	PETn2	24	NC
25	PETp2	26	NC	27	GND	28	NC
29	PERn1	30	NC	31	PERp1	32	NC
33	GND	34	NC	35	PETn1	36	NC
37	PETp1	38	NC	39	GND	40	NC
41	PERn0	42	NC	43	PERp0	44	NC
45	GND	46	NC	47	PETn0	48	NC
49	PETp0	50	PERST#	51	GND	52	CLKREQ#
53	REFCLKn	54	PEWAKE#	55	REFCLKp	56	NC
57	GND	58	NC	59	CONNECTOR Key M	60	CONNECTOR Key M
61	CONNECTOR Key M	62	CONNECTOR Key M	63	CONNECTOR Key M	64	CONNECTOR Key M
65	CONNECTOR Key M	66	CONNECTOR Key M	67	NC	68	NC
69	NC	70	+3.3V	71	GND	72	+3.3V
73	GND	74	+3.3V	75	GND		



Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
F 111	Sigilar	F 111	Signal	ГШ	Sigilar	F 111	Signal
1	CONFIG_3	2	+3.3V	3	GND	4	+3.3V
5	GND	6	Full Card PWR OFF	7	USB_D+	8	W_DISABLE1#
9	USB_D-	10	GPIO_9	11	GND	12	Key B
13	Key B	14	Key B	15	Key B	16	Key B
17	Key B	18	Key B	19	Key B	20	GPIO_5
21	CONFIG_0	22	GPIO_6	23	GPIO_11	24	GPIO_7
25	DPR	26	GPIO_10	27	GND	28	GPIO_8
29	USB3.1-Tx-	30	UIM-RESET	31	USB3.1-Tx+	32	UIM-CLK (O)
33	GND	34	UIM-DATA (I/O)	35	USB3.1-Rx-	36	UIM-PWR (O)
37	USB3.1-Rx+	38	NC	39	GND	40	GPIO_0
41	PERn0	42	GPIO_1	43	PERp0	44	GPIO_2
45	GND	46	GPIO_3	47	PETn0	48	GPIO_4
49	PETp0	50	PERST#	51	GND	52	CLKREQ#
53	REFCLKn	54	PEWAKE#	55	REFCLKp	56	NC
57	GND	58	NC	59	ANTCTLO	60	COEX3
61	ANTCTL1	62	COEX_RXD	63	ANTCTL2	64	COEX_TXD
65	ANTCTL3	66	SIM_DETECT	67	RESET# (I)(0/1.8V)	68	SUSCLK
69	CONFIG_1	70	+3.3V	71	GND	72	+3.3V
73	GND	74	+3.3V	75	CONFIG_2		

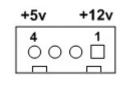
1.8.10 M.2 3042/3050 Key B (CN5)



1.8.11 SATA Power Connector (SCN2)

The SATA power connector is used for interfacing SATA 2.5" HDD/SSD power supply.

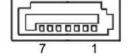
Pins	Signals	
1	+12V level	
2	GND	
3	GND	
4	+5V level	



1.8.12 SATA Connector (SATA1~SATA2)

These Serial Advanced Technology Attachment (Serial ATA or SATA) connectors are used as high-speed SATA interfaces. They are computer bus interfaces for connecting to devices such as hard disk drives. This board has two SATA 3.0 ports with 6Gb/s performance.

Pins	Signals
1	GND
2	SATA_TX+
3	SATA_TX-
4	GND
5	SATA_RX-
6	SATA_RX+
7	GND



1.8.13 Power On/OFF Button (SW2)

The power button is on the I/O side. It allows users to control SBC87525 power on/off.

Function	Description	
On	Turn on/off system	(⁽¹⁾
Off	Keep system status	C

1.8.14 AT/ATX Switch (SSW1)

If you set AT/ATX switch to AT mode, the system will be automatically powered on without pressing the soft power button during power input; we can use this switch to achieve auto power on demand.



1.8.15 Remote Power Switch Connector (PWRBT1)

The system has one 2-pin connector output for remote power on/off switch.

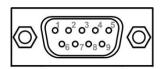
Function	Description	_
Short(1-2)	Turn on/off system	ļ
Open	Keep system status	

1.8.16 Flexible IO - COM I/O Card Connector (AX93511)

The system has an optional four serial port module. COM2~COM5 are RS-232/422/485 ports. Please refer to Chapter 3 for the details of BIOS setting.

%COM2,COM3,COM4,COM5

Pins	RS-232	RS-422	RS-485
1	DCD, Data Carrier Detect	TX-	Data-
2	RXD, Receive Data	TX+	Data+
3	TXD, Transmit Data	RX+	No use
4	DTR, Data Terminal Ready	RX-	No use
5	GND, Ground	No use	No use
6	DSR, Data Set Ready	No use	No use
7	RTS, Request To Send	No use	No use
8	CTS, Clear To Send	No use	No use
9	RI, Ring Indicator	No use	No use

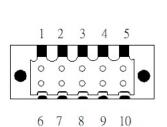


1.8.17 Flexible IO – Isolated COM x4 I/O Card (AX93516)

The system has an optional four serial ports module. COM2~COM5 are RS-232/422/485 w/isolated 2KV ports. Please refer to Chapter 4 for the details of BIOS setting.

%COM2,COM3,COM4,COM5

Pins	RS-232	RS-422	RS-485
1	DCD, Data Carrier Detect	TX-	Data-
2	RXD, Receive Data	TX+	Data+
3	TXD, Transmit Data	RX+	No use
4	DTR, Data Terminal Ready	RX-	No use
5	GND, Ground	No use	No use
6	DSR, Data Set Ready	No use	No use
7	RTS, Request To Send	No use	No use
8	CTS, Clear To Send	No use	No use
9	RI, Ring Indicator	No use	No use
10	GND_EARTH	No use	No use

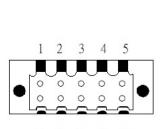


1.8.18 Flexible IO – Isolated COM & DIO I/O Card (AX93512)

The system has an optional module to support COM2~COM3, which are RS-232/422/485 with isolated 1.5KVDC protection and DIO1~DIO2 8-in/8-out isolated 1.5KVDC DIO ports. Please refer to Chapter 4 for the details of BIOS setting.

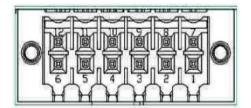
%COM2,COM3,DIO1,DIO2

	CN1 (COM2)& CN2(COM3)						
Pins	RS-232	RS-422	RS-485				
1	DCD, Data Carrier Detect	TX-	Data-				
2	RXD, Receive Data	TX+	Data+				
3	TXD, Transmit Data	RX+	No use				
4	DTR, Data Terminal Ready	RX-	No use				
5	GND, Ground	No use	No use				
6	DSR, Data Set Ready	No use	No use				
7	RTS, Request To Send	No use	No use				
8	CTS, Clear To Send	No use	No use				
9	RI, Ring Indicator	No use	No use				
10	GND_EARTH	No use	No use				



6 7 8 9 10

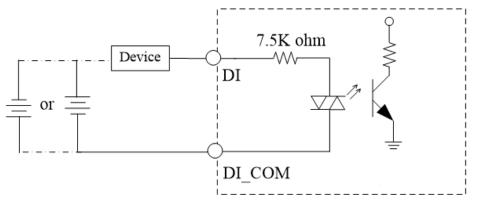
	CN3(DIO1)	CN4(DIO2)		
Pin	Function	Pin	Function	
1	Common1 PWR+	1	Common2 PWR+	
2	DO10	2	DO20	
3	DO11	3	DO21	
4	DO12	4	DO22	
5	DO13	5	DO23	
6	Common1 PWR-	6	Common2 PWR-	
7	External1 Power	7	External2 Power	
8	DI10	8	DI20	
9	DI11	9	DI21	
10	DI12	10	DI22	
11	DI13	11	DI23	
12	Isolation1 GND	12	Isolation2 GND	



Digital I/O Specification (per port)

Isolated Digital Input

The figure shows how to connect between external input source and the system. Each of the isolated digital input channels accepts 0~30 VDC with sink type and source type.

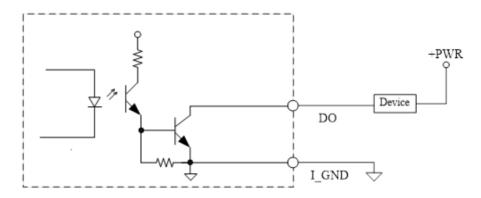


Isolated Digital Output

The figure shows how to connect between an output channel and the system.

If an external voltage 5~30 VDC is applied to an isolated output channel, the current will flow from the external voltage source to the system.

Please note that the current through each DO channel should not exceed 200 mA.



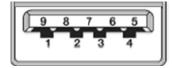
1.8.19 Flexible IO- USB3.0x2 & COMx2(RS232/422/485) & LAN(AX93519)

The system has an optional module to support two USB, two RS232/422/485 & one LAN. Please refer to Chapter 4 for the details of BIOS setting.

> AX93519 2 x RS232/422/485 + 1 G.E. LAN(i211AT) + 2 USB.3.1(1 USB3.1 Gen.2

Pins	Signal USB Port 0	Pins	Signal USB Port 1
1	USB_VCC (+5V level standby power)	1	USB_VCC (+5V level standby power)
2	USB_Data2-	2	USB_Data3-
3	USB_Data2+	3	USB_Data3+
4	GND	4	GND
5	SSRX2-	5	SSRX3-
6	SSRX2+	6	SSRX3+
7	GND	7	GND
8	SSTX2-	8	SSTX3-
9	SSTX2+	9	SSTX3+

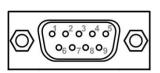
signal & 1 USB 2.0 signal) (for Q370 PCH)



The system has two serial ports. COM2~COM3 are RS-232/422/485 ports. Please refer to Chapter 3 for the detail of BIOS setting.

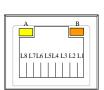
%COM2,COM3

Pins	RS-232	RS-422	RS-485
1	DCD, Data Carrier Detect	TX-	Data-
2	RXD, Receive Data	TX+	Data+
3	TXD, Transmit Data	RX+	No use
4	DTR, Data Terminal Ready	RX-	No use
5	GND, Ground	No use	No use
6	DSR, Data Set Ready	No use	No use
7	RTS, Request To Send	No use	No use
8	CTS, Clear To Send	No use	No use
9	RI, Ring Indicator	No use	No use



The system has two RJ-45 connectors: LAN Ethernet connection can be established by plugging one end of the Ethernet cable into this RJ-45 connector and the other end (phone jack) to a 1000/100/10-Base-T hub.

Pins	1000 Base-T	100/10 Base-T	Descriptions	
L1	BI_DA+	TX+	Bidirectional or Transmit Data+	
L2	BI_DA-	TX-	Bidirectional or Transmit Data-	
L3	BI_DB+	RX+	Bidirectional or Receive Data+	
L4	BI_DC+	N.C.	Bidirectional or Not Connected	
L5	BI_DC-	N.C.	Bidirectional or Not Connected	
L6	BI_DB-	RX-	Bidirectional or Receive Data-	
L7	BI_DD+	N.C.	Bidirectional or Not Connected	
L8	BI_DD-	N.C.	Bidirectional or Not Connected	
Active Link LED (Yellow)			()	
А	Off: No link			
	Blinking: Data activity detected			
Speed LED				
в	1000: Orange			
B	100: Green			
	10: OFF			



1.8.20 Riser Card- PCIe x16 Gen3 & 1 PCIe x4 Gen 3(AX96205)

Specification

- 1 PCIex16 Gen3 + 1 PCIex4 Gen3
- 1 x on board USB2.0 wafer
- 1 x system fan connectors
- 1 x 24V power connector (black, ATX1
- 1 x 12V power connector (white, ATX2

Note: Please refer to chapter 1.2.2 for the maximum power rating limitation of expansion slots.

Internal USB Wafer connector (CN1)

These are 5x1-Pin P=2.0mm headers for USB 2.0 interface.

Pins	Signals	
1	+5V_DUAL	
2	USB-	
3	USB+	
4	GND	
5	GND	

1	2	0 3	0 4	0 5	

Fan Connectors (FAN1~FAN2)

This motherboard has three fan connectors. Find fan speed option(s) at BIOS Setup Utility: Advanced\HW Monitor\PC Health Status.

The FAN1~2 (4x1-Pin P=2.54mm) is for the CPU fan connector.

Pins	Signals
1	GND
2	+12V
3	FAN Speed Detection
4	FAN Speed Control

4	1
00	00

Expansion Power Input Connectors (ATX1 And ATX2)

This ATX2 connector is for slot card use. (White color)

Pins	Signals
1	GND
2	GND
3	+12V
4	+12V



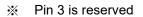
* ATX1 is reserved

Temperature Sensor Source Select (JP1)

Use these jumpers (3x1-Pin P=2.54mm) to set temperature sensor source to operate from external or onboard mode.

Onboard Sensor (Default) 1-2 close

Function	Setting
4	On Board
1	Thermistor
2	GND
3	Reserved



1.8.21 Riser Card- PCIe x16 Gen3 & 1 PCI(AX96206)

Specification

- 1 PClex16 Gen3 + 1 PCl
- 1 x on board USB2.0 wafer
- 1 x system fan connectors
- 1 x 24V power connector (black, ATX1
- 1 x 12V power connector (white, ATX2

Note: Please refer to chapter 1.2.2 for the maximum power rating limitation of expansion slots.

Internal USB Wafer connector (CN1)

These are 5x1-Pin P=2.0mm headers for USB 2.0 interface.

Pins	Signals	
1	+5V_DUAL	
2	USB-	
3	USB+	
4	GND	
5	GND	



Fan Connectors (FAN1~FAN2)

This motherboard has three fan connectors. Find fan speed option(s) at BIOS Setup Utility: Advanced\HW Monitor\PC Health Status.

000

FAN1~2 (4x1-Pin P=2.54mm) is for the CPU fan connector.

Pins	Signals	
1	GND	
2	+12V	4
3	Fan Speed Detection	C
4	Fan Speed Control	

Expansion Power Input Connectors (ATX1 And ATX2)

This ATX2 connector is for slot card use. (White color)

Pins	Signals	
1	GND	
2	GND	
3	+12V	
4	+12V	



ℜ ATX1 is reserved

Temperature Sensor Source Select (JP1)

Use these jumpers (3x1-Pin P=2.54mm) to set temperature sensor source to operate from external or onboard mode.

Onboard Sensor (Default) 1-2 close

Function	Setting	6-
1	On Board	2 1 0
1	Thermistor	∎ °°
2	GND	
3	Reserved	

※ Pin 3 is reserved

1.8.22 Riser Card- 2 PCI (AX96207)

Specification

- 2 PCI
- 1 x on board USB2.0 wafer
- 1 x system fan connectors
- 1 x 24V power connector (black, ATX1
- 1 x 12V power connector (white, ATX2

Note: Please refer to chapter 1.2.2 for the maximum power rating limitation of expansion slots.

Internal USB Wafer connector (CN1)

These are 5x1-Pin P=2.0mm headers for USB 2.0 interface.

Pins	Signals	
1	+5V_DUAL	
2	USB-	
3	USB+	
4	GND	
5	GND	

Fan Connectors (FAN1~FAN2)

This motherboard has three fan connectors. Find fan speed option(s) at BIOS Setup Utility: Advanced\HW Monitor\PC Health Status.

The FAN1~2 (4x1-Pin P=2.54mm) is for the CPU fan connector.

Pins	Signals
1	GND
2	+12V
3	Fan Speed Detection
4	Fan Speed Control

4			1
0	0	0	0

Expansion Power Input Connectors (ATX1 And ATX2)

This ATX2 connector for slot card use. (White color)

Pins	Signals	
1	GND	
2	GND	
3	+12V	
4	+12V	



ℜ ATX1 is reserved

Temperature Sensor Source Select (JP1)

Use these jumpers (3x1-Pin P=2.54mm) to set temperature sensor source to operate from external or onboard mode.

Onboard Sensor (Default) 1-2 close

Function	Setting
	On Board
1	Thermistor
2	GND
3	Reserved

※ Pin 3 is reserved



1.8.23 Riser Card- PCIe x16 Gen3 & 3 PCIe x4 Gen 3 (AX96410)

Specification

- 1 PClex16 Gen3 + 3 PClex4 Gen3
- 1 x on board USB2.0 wafer
- 1 x system fan connectors
- 1 x 24V power connector (black, ATX1
- 1 x 12V power connector (white, ATX2

Note: Please refer to chapter 1.2.2 for the maximum power rating limitation of expansion slots.

Internal USB Wafer connector (CN1)

These are 5x1-Pin P=2.0mm headers for USB 2.0 interface.

Pins	Signals			
1	+5V_DUAL			
2	USB-			
3	USB+			
4	GND			
5	GND			

	0	0	0	$\overline{\mathbf{O}}$
	\sim	\sim	\sim	~
1	2	3	4	5

Fan Connectors (FAN1~FAN2)

This motherboard has two fan connectors. Find fan speed option(s) at BIOS Setup Utility: Advanced\HW Monitor\PC Health Status.

The FAN1~2 (4x1-Pin P=2.54mm) is for the system fan connectors.

Pins	Signals	
1	GND	
2	+12V	4
3	Fan Speed Detection	
4	Fan Speed Control	

Expansion Power Input Connectors (ATX1 And ATX2)

This ATX2 connector for slot card use. (White color)

Pins	Signals			
1	GND			
2	GND			
3	+12V			
4	+12V			

* ATX1 is reserved

Temperature Sensor Source Select (JP1)

Use these jumpers (3x1-Pin P=2.54mm) to set temperature sensor source to operate from external or onboard mode.

2

3

1

Onboard Sensor (Default) 1-2 close

Function	Setting
4	On Board
1	Thermistor
2	GND
3	Reserved

※ Pin 3 is reserved

1.8.24 Riser Card- PCIe x16 Gen3 & 1 PCIe x4 Gen 3 & 2 PCI (AX96411)

Specification

- 1 PClex16 Gen3 + 1 PClex4 Gen3 + 2 PCl
- 1 x on board USB2.0 wafer
- 1 x system fan connectors
- 1 x 24V power connector (black, ATX1
- 1 x 12V power connector (white, ATX2

Note: Please refer to chapter 1.2.2 for the maximum power rating limitation of expansion slots.

0 O C

Internal USB Wafer connector (CN1)

These are 5x1-Pin P=2.0mm headers for USB 2.0 interface.

Pins	Signals	
1	+5V_DUAL	
2	USB-	
3	USB+	1 2
4	GND	
5	GND	

Fan Connectors (FAN1~FAN2)

This motherboard has two fan connectors. Find fan speed option(s) at BIOS Setup Utility: Advanced\HW Monitor\PC Health Status.

000

The FAN1~2 (4x1-Pin P=2.54mm) is for the system fan connectors.

Pins	Signals
1	GND
2	+12V
3	Fan Speed Detection
4	Fan Speed Control

Expansion Power Input Connectors (ATX1 And ATX2)

This ATX2 connector is for slot card use (white color).

Pins	Signals			
1	GND			
2	GND			
3	+12V			
4	+12V			



※ ATX1 is reserved

Temperature Sensor Source Select (JP1)

Use these jumpers (3x1-Pin P=2.54mm) to set temperature sensor source to operate from external or onboard mode.

Onboard Sensor (Default) 1-2 close

Function	Setting
1	On Board
I.	Thermistor
2	GND
3	Reserved

※ Pin 3 is reserved

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SECTION 2 HARDWARE INSTALLATION

The products are convenient for your various hardware configurations, such as CPU (Central Processing Unit), memory module, HDD (Hard Disk Drive) and PCIe/PCI card. Chapter 2 will show you how to install these hardware parts.

2.1 Installing the Processor

The Intel[®] Core[™] i7/i5/i3 processors are available as a boxed processor for the system. Intel recommends the processors should be installed by a qualified computer professional since this electronic device may cause serious damage to the installer, system and processor if installed improperly.

<u>Important Notes</u> Before attempting to install a new processor, carefully review the documentation that came with your system and make sure that you will not be voiding your warranty by opening the computer or replacing your processor.

Instructions:

- Make sure that your system can accommodate the Intel[®] Core[™] i7/i5/i3/Celeron[®] processors that you want to install. Check for CPU card, BIOS, and thermal compatibility by using the manufacturer's documentation for the system, or by contacting the vendor if necessary. This processor should only be installed in systems supporting the Intel[®] Core[™] i7/i5/i3/Celeron[®] processors.
- 2. Obtain access to your processor socket as described in the documentation for your system.
- 3. If the cooling solution prevents you from accessing the processor socket, you may need to remove it. Instructions on how to remove your cooling solution should be provided in the documentation that came with the system.

2.2 Procedure of Installation

This chapter will guide you on installing a processor.

- **Step 1** Turn off the system.
- **Step 2** Disconnect the power connector.
- **Step 3** Loosen four screws to remove the heatsink cover from the chassis.



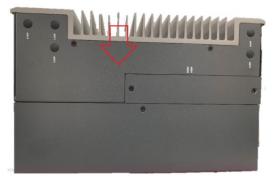
Step 4 After opening the heatsink cover, you can locate the CPU socket as marked. Align pins of the CPU with the pin holes of the socket. Beware of the CPU's orientation when you align the arrow mark on the CPU with the arrow key on the socket. Remove the Mylar before you install the CPU into the socket.



Step 5 Apply thermal grease on top of the CPU.



Step 6 After installing all components, close the heatsink cover back to the chassis and fasten all screws.

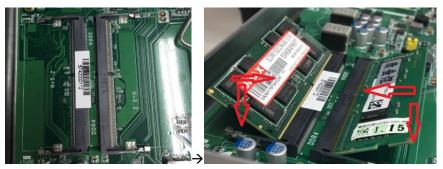


2.3 Installing the Memory Module

- Step 1 Turn off the system.
- **Step 2** Disconnect the power connector.
- **Step 3** Loosen four screws to remove the heatsink cover from the chassis.



Step 4 Install the SO-DIMM (small outline dual in-line memory module) into the socket and push it firmly down until it is fully seated. The socket latches are clipped onto the edges of the memory module.



Step 5 After installing the memory modules, close the heatsink cover back to the chassis and fasten all screws.

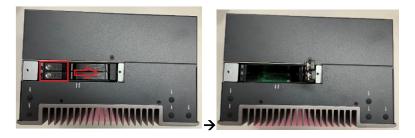
2.4 Installing the Hard Disk Drive

The offers a convenient drive bay module for users to install HDD/SSD. The system offers users two 2.5" Hard Disk Drives for installation. Please follow the steps to install:

- Step 1 Turn off the system.
- **Step 2** Disconnect the power connector.
- Step 3 Unscrew the two screws and remove the bracket from the HDD tray.



Step 4 Open the HDD tray.



- **Step 5** Align the connector of the HDD/SSD with the SATA slot of main board. Then, insert the HDD into the HDD tray.
- Note: When using 7mm height HDD/SDD, please take the HDD spacer out of the accessory box and follow the following steps to stick it on HDD/SSD.



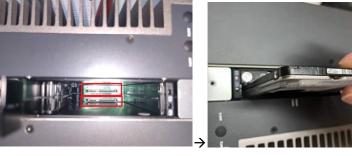


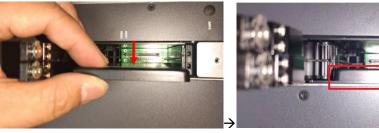














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Step 6 Screw the bracket. The installation is complete.

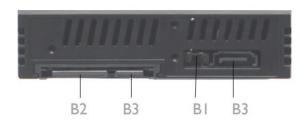




Note: The description of the 2.5" HDD tray (2in1) is as shown below.



- AI : Triangular key lock
- A2 : Aluminum bezel
- A3: Power & HDD access LED indication Power ON : Solid Green Accessing : Orange blinking



- BI : LED Switch ON : working status(see A3) LED Switch OFF : Solid Green for Power on and HDD accessing
- B2: I5pin SATA Power connector.
- B3 : 7pin SATA data signal connector

2.5 Installing the expansion box kit

The provides two/four-slot expansion box kit for expansion purposes. The procedure of installing the expansion box kit into system is instructed below.

- Step 1 Turn off the system.
- Step 2 Disconnect the power connector.
- Step 3 Loosen four screws to remove the system cover from the chassis.



Step 4 Loosen the screw to remove the system cover from the expansion box kit.



Step 5 Align the PCI or PCIe card with the slot, and press the card into the slot until it is firmly seated and screw it.



Step 6 After installing the expansion box kit, close the system cover back to the chassis and fasten the screw. Installation is complete.

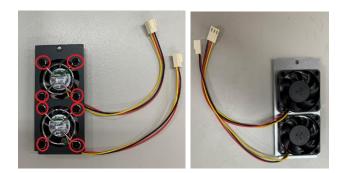


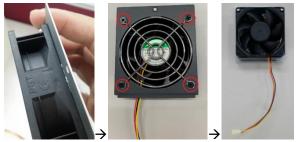
2.6 Installing the Fan Module

The provides either an internal fan module or an external fan module for optional selection. The procedure of installing the fan module into system is instructed below.

2.6.1 Installing Internal Fan Module

Step 1 Please take the Mylar out of the accessory box. Screw the screws into the fan and fan bracket.



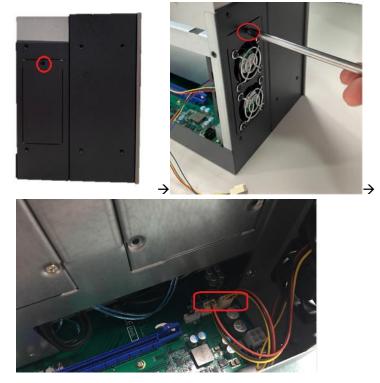


- Step 2 Turn off the system.
- **Step 3** Disconnect the power connector.

Step 4 Unscrew the system cover screw and remove the cover from the expansion box.



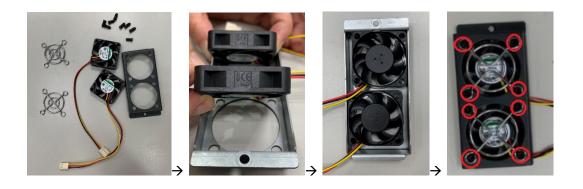
Step 5 Unscrew the bracket, fasten the fan module into the expansion box and plug cable(s) to connector(s).

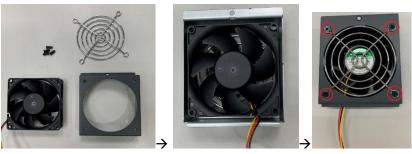


Step 6 After installing the fan module, close the system cover back to the chassis and fasten the screw. Installation is complete.

2.6.2 Installing external Fan Module

Step 1 Please take the Mylar out of the accessory box. Screw the fan to the fan bracket.





- **Step 2** Turn off the system.
- **Step 3** Disconnect the power connector.
- **Step 4** Unscrew the system cover screw and remove the cover from the expansion box.





Step 5 Unscrew the bracket, fasten the fan module into the expansion box and plug cable(s) to connector(s).



Step 6 After installing the fan module, close the system cover back to the chassis and fasten the screw. Installation is complete.



Note: Reserve at least 25mm space from the rear side for optimal fan air flow.

Installing PCI or PCIe Card 2.7

The provides two/four PCI or PCIe slots for expansion. The procedure of installing the fan module and PCI / PCIe expansion card into system is instructed below.

2.7.1 Installing PCI or PCIe card

Step 1 Turn off the system.

Step 2 Disconnect the power connector.

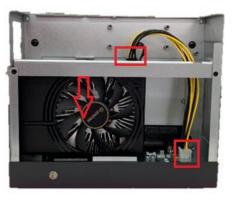
Step 3 Unscrew the system cover screw and remove the cover from the expansion box.



Step 4 Locate the PCI or PCIe slots and remove the slot bracket from the slot in which you want to add the card.



Align the PCI or PCIe card with the slot, press the card into the slot until it is firmly Step 5 seated and screw it. Then, plug the graphics card power cable.

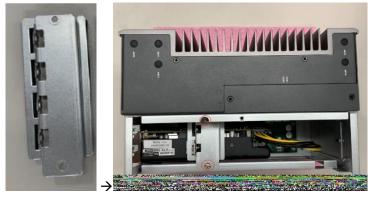




Note: The graphics card power cable will be needed when the graphics card power is over 75W.

Note: 12V maximum loading 12A (144W).

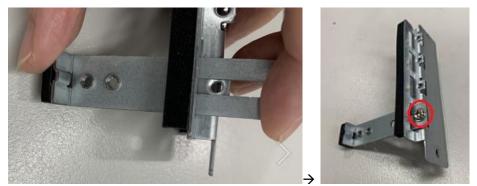
Step 6 Please take the holder bracket and screws from the accessory box. Fasten the below bracket in chassis with standard height (111mm) add-on cards.



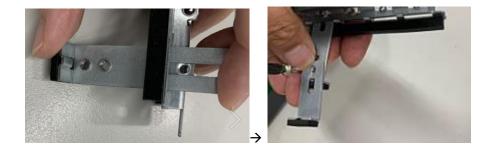
Step 7 offer 3 types of extension holder brackets. Please take the brackets and screws from the accessory box and assemble the extension holder bracket. The procedure is illustrated below.



Step 8 Assemble the extension holder bracket, as illustrated below.



Or



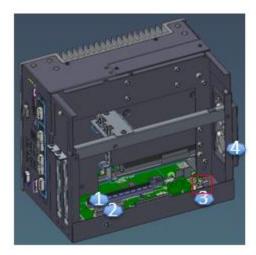
Step 9 Fasten the holder bracket in the chassis, adjust the screw position of the extension bracket to fix the add-on card, and then screw it.

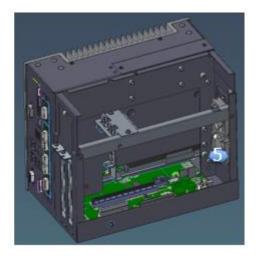


Step 10 Close the cover back to the chassis and fasten the screw. The installation is complete.

2.7.2 The limitation of an add-on card

The following figures show the limitation of an add-in card in different configuration.





No.	Description	No.	Description
1	Slot 1: PCIe x 16	4	External fan module
2	Slot 2: PCIe x4 or PCI	5	Internal fan module
3	Power connector of AX96205 or AX96206 or AX96206 or AX96207(riser)		



Note: Please note that below dimension is the maximum length for add-on card with I/O bracket.

Note: Considering heat dissipation potential, a space of 20mm must be left between add-on card and system.

Fan module is un-installed.

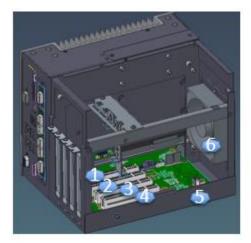
Fan module is un-installed.		
	Slot 1	Slot 2
	(PCIe x16)	(PCIe x4 or PCI)
height	49.48-119.78	49.48-119.78
	(mm)	(mm)
width	20.32(mm)	20.32(mm)
The following shows each slot's ma system with different configurations.		d-in card in the
1)	234.07(mm)	234.07(mm)
Riser card's power cable is un- installed.		
2)	185.00(mm)	185.00(mm)
Riser card's power cable is installed.		

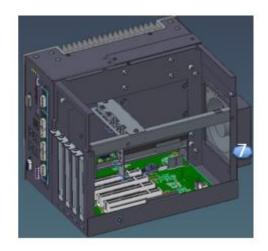
External fan module is installed.

External fan module is installed.		
	Slot 1	Slot 2
	(PCIe x16)	(PCIe x4 or PCI)
height	49.48-119.78	49.48-119.78
	(mm)	(mm)
width	20.32(mm)	20.32(mm)
The following shows each slot's ma system with different configurations.		d-in card in the
1)	234.07(mm)	234.07(mm)
Riser card's power cable is un- installed.		
2)	185.00(mm)	185.00(mm)
Riser card's power cable is installed.		

Internal fan module is installed.

Internal fan module is installed.					
	Slot 1	Slot 2			
	(PCIe x16)	(PCIe x4 or PCI)			
height	49.48-119.78	49.48-119.78			
	(mm)	(mm)			
width	20.32(mm)	20.32(mm)			
The following shows each slot's max. length for add-in card in the system with different configurations.					
1)	229.07(mm)	229.07mm)			
Riser card's power cable is un- installed.					
2)	185.00(mm)	185.00(mm)			
Riser card's power cable is installed.					





No.	Description	No.	Description
1	Slot 1: PCIe x 16	5	Power connector of AX96410 or AX96411(riser)
2	Slot 2: PCIe x4	6	Internal fan module
3	Slot 3: PCIe x4 or PCI	7	External fan module
4	Slot 4: PCIe x4 or PCI		

Note: Please note that below dimension is the maximum length for add-on card with I/O bracket.

Note: Considering heat dissipation potential, a space of 20mm must be left between add-on card and system.

Fan module is un-i			1	1
	Slot 1	Slot 2	Slot 3	Slot 4
	(PCIe x16)	(PCIe x4)	(PCI x4 or PCI)	(PCI x4 or PCI)
height	49.48-119.78	49.48-119.78	49.48-119.78	49.48- 119.78
	(mm)	(mm)	(mm)	(mm)
width	20.32(mm)	20.32(mm)	20.32(mm)	20.32(mm)
The following sh with different co		's max. length f	or add-in card in t	he system
1) Riser card's	234.07(mm)	234.07(mm)	234.07(mm)	234.07(mm)
power cable is un-installed.				
2)	234.07(mm)	234.07(mm)	185.00(mm)	185.00(mm)
Riser card's power cable is installed.				·

internal fan module is i	istancu.			
	Slot 1	Slot 2	Slot 3	Slot 4
	(PCIe x16)	(PCle x4)	(PCI x4 or PCI)	(PCI x4 or PCI)
height	113.06	113.06	113.06	113.06
	(mm)	(mm)	(mm)	(mm)
width	20.32(mm)	20.32(mm)	20.32(mm)	20.32(mm)
The following shows different configuration		ax. length fo	r add-in card in th	e system with
1) Riser card's power	214.07(mm)	214.07(m m)	214.07(mm)	214.07(mm)
2) Riser card's power	214.07(mm)	214.07(m m)	185.00(mm)	185.00(mm)
cable is installed.				

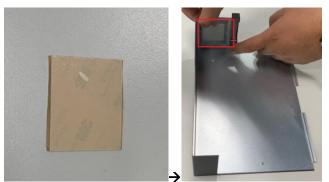
Internal fan module is installed.

External fan module is installed.

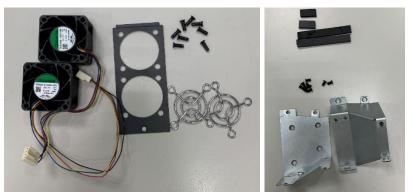
			-				
	Slot 1	Slot 2	Slot 3	Slot 4			
	(PCIe x16)	(PCIe x4)	(PCI x4 or PCI)	(PCI x4 or PCI)			
height	113.06	113.06	113.06	113.06			
	(mm)	(mm)	(mm)	(mm)			
width	20.32(mm)	20.32(mm)	20.32(mm)	20.32(mm)			
The following shows each slot's max. length for add-in card in the system with different configurations.							
1) Riser card's power	234.07(m m)	234.07(mm)	234.07(mm)	234.07(mm)			
installed.							
2)	234.07(m	234.07(mm)	185.00(mm)	185.00(mm)			
Riser card's power cable is installed.	m)						

2.7.3 Inatalling A2 graphics card w/A2 fan module

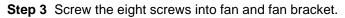
Step 1 Please take the Mylar from the accessory box. Then paste it on the cover 's vents.

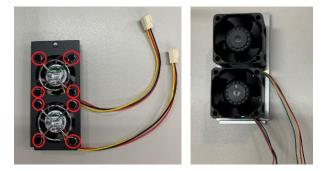


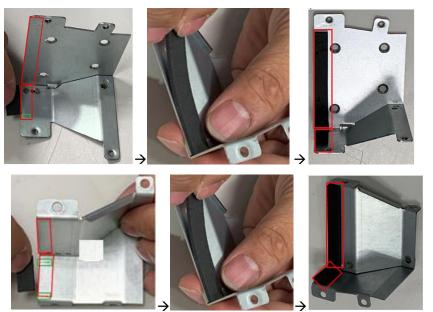
Step 2 Please take the fan module kit from the accessory box.











Step 4 Paste the 4 poron pads on air duct brackets, as illustrated below.

Step 5 Screw the bracket into chassis.



Step 6 Screw the fan module into chassis and plug in the fan connectors.



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User's Manual



Step 7 Route the cables and put the cables in red mark area, as illustrated below.



Step 8 Remove the slot brackets.



Step 9 Insert the air duct bracket's metal part as marked A below and screw the 4 screws.

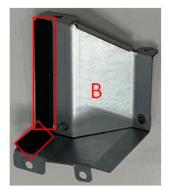


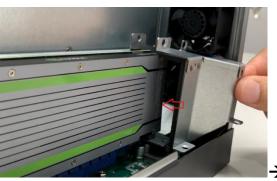


Step 10 Align the A2 card with the slot, press the card into the slot until it is firmly seated, and screw the A2 card bracket and slot bracket to the chassis.

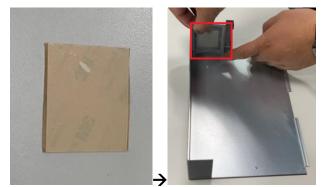


Step 11 Insert the air duct bracket's metal part as marked B below and screw the 4 screws.





Step 12 Paste the Mylar on the vents of the system cover.

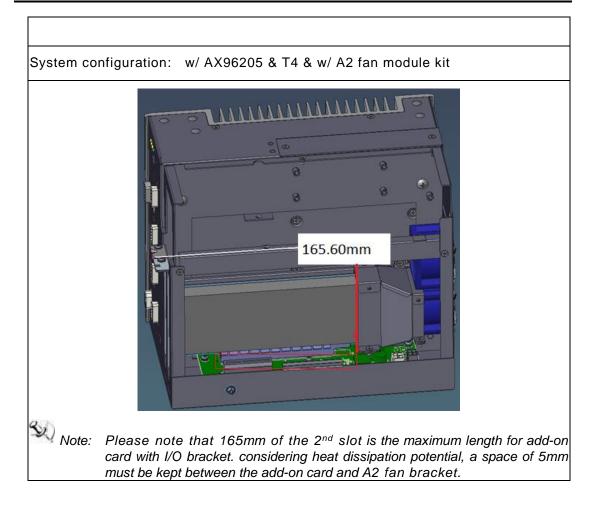


Step 13 Close the cover back to the chassis and fasten the screw. The installation is complete.

Note: Please note the A2 FAN module kit supports and only.



Note: Please note the power connector on the riser card can't be used in and A2 fan module kit configuration.



2.8 Installing the Mini Card Module

come with a mini card slot for users to install a wireless LAN card. Please refer to the following instructions and illustrations for the installation of the wireless LAN.

- **Step 1** Please take the wireless LAN card from the accessory box.
- Step 2 Turn off the system.
- **Step 3** Disconnect the power connector.
- Step 4 Loosen screws to remove the heatsink cover from the chassis.



Step 5 Insert the wireless LAN card into the slot and push it down firmly. Then screw the card tightly to the mainboard



Step 6 Remove the antenna plugs from the top of back cover, and then install the antennas on the antenna connectors.



Step 7 Close the cover back to the chassis and fasten all screws. The installation is complete.

Note: Please use an extended bracket when using a half-size Mini card

Note: a) 1 x on board full-size PCI Express Mini Card slot with USB/PCIe interface

b)1 x on board full-size PCI Express Mini Card slot with USB interface



M.2 Key B slot.

support either a mini card slot or an

2.9 Installing the 5G Wireless Module

The come with an M.2 Key B 3042/3050 slot for users to install a 5G wireless card. Please refer to the following instructions and illustrations for the installation of the 5G wireless module.

Step 1 Please take the 5G module kit from the accessory box.



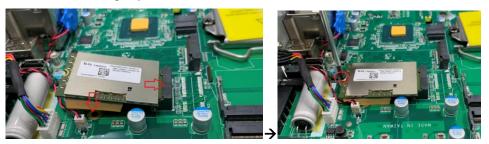
Step 2 Paste the thermal pad on the bottom side of the module, as illustrated below.



- **Step 3** Turn off the system.
- **Step 4** Disconnect the power connector.
- **Step 5** Loosen screws to remove the heatsink cover from the chassis.



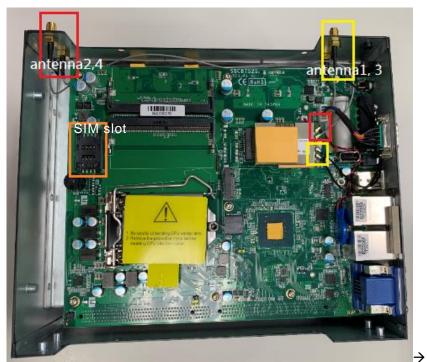
Step 6 Insert the 5G wireless module into the slot and push it down firmly. Then screw the card tightly to the mainboard.



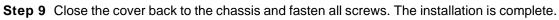
Step 7 Paste the other thermal pad on top of the module, as illustrated below.



Step 8 Remove the antenna plugs from the top of the back cover, install the antennas on the antenna connectors as marked in the illustration below, and then insert the SIM card into the SIM slot.









Note: Only Q370 platforms can support an M.2 Key B slot.

The thermal solution might be changed due to the different 5G module installed.



M.2 Key B slot.

either a mini card slot or an

2.10 Installing the NVMe SSD Module

n M.2 Key M 2280 socket (PCIe Gen3 x4) for users to install an NVMe SSD module. Please refer to the following instructions and illustrations for the installation of the NVMe SSD module.

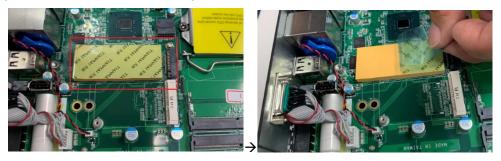
Step 1 Please take the NVMe SSD module kit from the accessory box.



- **Step 2** Turn off the system.
- Step 3 Disconnect the power connector.
- Step 4 Loosen screws to remove the heatsink cover from the chassis.



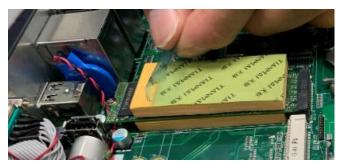
Step 5 Align the thermal pad with the slot and paste it on the slot. Remember to remove the protective film from the thermal pad.



Step 6 Insert the SSD card to slot and push it down firmly. Then screw the card tightly to the mainboard.



Step 7 Paste the other thermal pad on the module and then remove the protective film, as illustrated below.



Step 8 Close the cover back to the chassis and fasten all screws. The installation is complete.

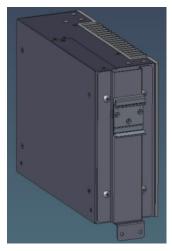
Note: Only Q370 platforms can support an NMVe SSD Key M slot.

provides versatile mount kits for optional selection.

2.11 Mounting

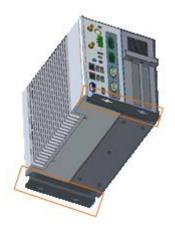
The

DIN rail mounting



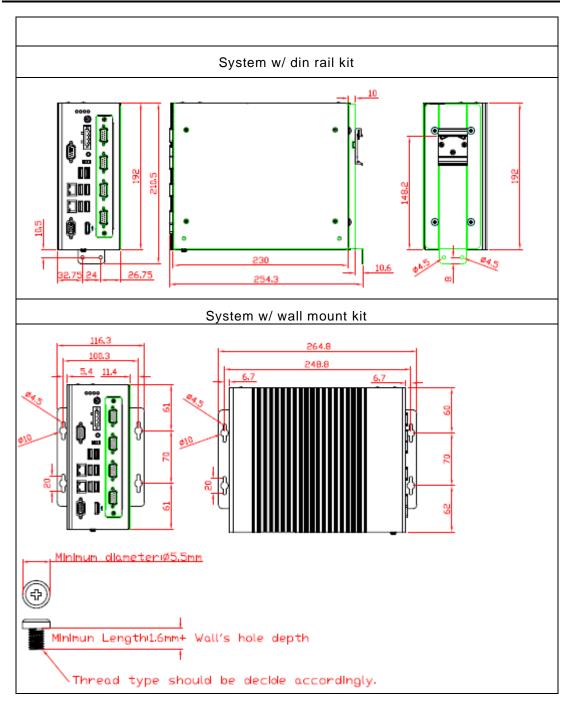
Wall mounting

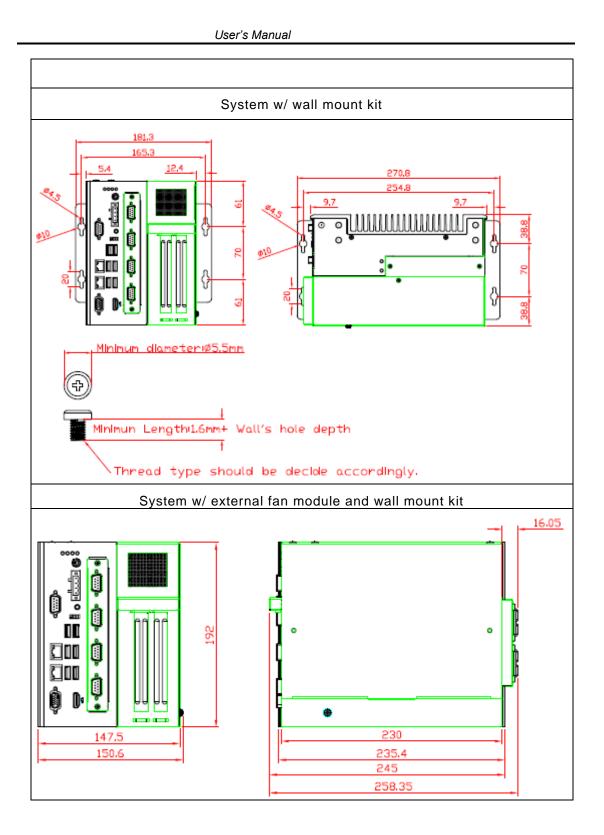


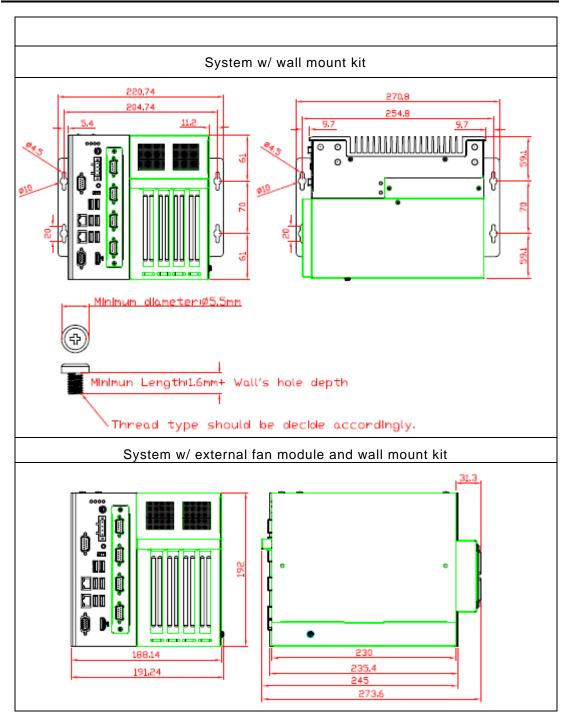


DIN rail kit or wall mount kit.

Hardware Installation







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SECTION 3 AMI BIOS UTILITY

The AMI UEFI BIOS provides users with a built-in setup program to modify basic system configuration. All configured parameters are stored in a 16MB flash chip to save the setup information whenever the power is turned off. This chapter provides users with detailed description about how to set up basic system configuration through the AMI BIOS setup utility.

3.1 Starting

To enter the setup screens, follow the steps below:

- 1. Turn on the computer and press the key immediately.
- After you press the key, the main BIOS setup menu displays. You can access the 2. other setup screens from the main BIOS setup menu, such as the Advanced and Chipset menus.

Note: If your computer cannot boot after making and saving system changes with Setup, you can restore BIOS optimal defaults by setting JP1 (see section 1.6.2).

It is strongly recommended that you should avoid changing the chipset's defaults. Both AMI and your system manufacturer have carefully set up these defaults that provide the best performance and reliability.

3.2 Navigation Keys

The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process. These keys include $\langle F1 \rangle$, $\langle F2 \rangle$, $\langle Enter \rangle$, $\langle ESC \rangle$, $\langle Arrow \rangle$ keys, and so on.

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

Hot Keys	Description
→← Left/Right	The Left and Right < Arrow> keys allow you to select a setup screen.
∱↓ Up/Down	The Up and Down <arrow> keys allow you to select a setup screen or sub- screen.</arrow>
+– Plus/Minus	The Plus and Minus <arrow> keys allow you to change the field value of a particular setup item.</arrow>
Tab	The <tab> key allows you to select setup fields.</tab>
F1	The <f1> key allows you to display the General Help screen.</f1>
F2	The <f2> key allows you to Load Previous Values.</f2>
F3	The <f3> key allows you to Load Optimized Defaults.</f3>
F4	The <f4> key allows you to save any changes you have made and exit Setup. Press the <f4> key to save your changes.</f4></f4>
Esc	The <esc> key allows you to discard any changes you have made and exit the Setup. Press the <esc> key to exit the setup without saving your changes.</esc></esc>
Enter	The <enter> key allows you to display or change the setup option listed for a particular setup item. The <enter> key can also allow you to display the setup sub- screens.</enter></enter>

3.3 Main Menu

The first time you enter the setup utility, you will be in the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. System Time/Date can be set up as described below. The Main BIOS setup screen is shown below.

BIDS Information SBC87525 Set the Date. Use Tab to suitch between Date elements. PCH SKU Q370 Set the Date. Use Tab to suitch between Date elements. PCH PCIE X4 Default Ranges: Build Date and Time 08/18/2020 15:09:31 Default Ranges: System Date [Wed 09/19/2020] Days: dependent on month System Time [10:22:58] Height State Stat	Aptio Setup Utility – Main Advanced Chipset Security	Copyright (C) 2020 American Boot Save & Exit	Megatrends, Inc.
<pre>14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>	Version PCH SKU PCH PCIE Build Date and Time System Date System Time	X108_Test_CoffeeLake Q370 X4 08/18/2020 15:09:31 [Wed 08/19/2020] [10:22:58]	switch between Date elements. Default Ranges: Year: 2005–2099 Months: 1–12
			↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

• System Date/Time

Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

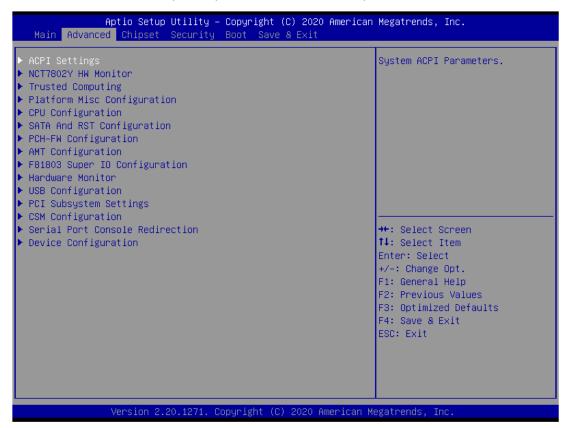
3.4 Advanced Menu

• Launch PXE OpROM

Use this item to enable or disable the boot ROM function of the onboard LAN chip when the system boots up.

The Advanced menu also allows users to set configuration of the CPU and other system devices. You can select any of the items in the left frame of the screen to go to the sub menus.

For items marked with "▶", please press <Enter> for more options.



HW Monitor

This screen monitors hardware health.

Aptio Setup Util Advanced	lity — Copyright (C) 2020 Amer	rican Megatrends, Inc.
Pc Health Status		
CPU temperature System temperature +3.3VS +5VS +5VSB VBAT	: +39 % : +43 % : +3.264 V : +4.968 V : +4.992 V : +2.992 V	<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.20.12	271. Copyright (C) 2020 Americ	can Megatrends, Inc.

• 7802Y HW Monitor

This screen monitors fan speed.

Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc. Advanced			
Pc Health Status		NCT7802Y Smart Fan Configuration	
▶ NCT7802Y Smart Fan Configuration		Sour 18ai a chom	
System temperature1	: +26 C		
Fan2 Speed	: N/A		
Fan1 Speed	: N/A		
+3.3VS	: +3.324 V		
+12VS	: +12.128 V		
		↔+: Select Screen	
		†↓: Select Item	
		Enter: Select	
		+/-: Change Opt.	
		F1: General Help	
		F2: Previous Values	
		F3: Optimized Defaults	
		F4: Save & Exit	
		ESC: Exit	
Version 2.20.1271. Co	pyright (C) 2020 American M	egatrends, Inc.	

• Ethercat Configuration

Setting "Disable" mode in the following 5 itmes to support Ethercat.

Aptio Setup Utility - Advanced	- Copyright (C) 2019 American	Megatrends, Inc.
Ethercat Configuration Hyper-Threading Intel(R) SpeedStep(tm) Turbo Mode C states Native ASPM ACPI Sleep State	[Enabled] [Disabled] [Disabled] [Disabled] [Auto] [S3 (Suspend to RAM)]	Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology).
		<pre>++: Select Screen f↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.18.1263. C	Copyright (C) 2019 American M	egatrends, Inc.

• ME

Display ME firmware information.

Aptio : Advanced	Setup Utility – Copyright (C) 2020 American	Megatrends, Inc.
ME Firmware Version ME Firmware Mode ME Firmware SKU	12.0.64.1551 Normal Mode Corporate SKU	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Versi	on 2.20.1271. Copyright (C) 2020 American Me	egatrends, Inc.

ACPI Settings

ACPI configuration can be configured in ACPI Settings. A description of the selected item appears on the right side of the screen.

Aptio Se Advanced	tup Utility – Copyright (C) 2020 Americar	n Megatrends, Inc.
ACPI Settings		Select the highest ACPI sleep state the system will enter
ACPI Sleep State	[S3 (Suspend to RAM)]	when the SUSPEND button is pressed.
		<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version	2.20.1271. Copyright (C) 2020 American N	legatrends, Inc.

> ACPI Sleep State

Select the highest ACPI sleep state the system will enter when the suspend button is pressed. Configuration options are Suspend S3 only (Suspend to RAM).

• Trusted Computing

Select Security Device Support to enable or disable the TPM function.

Aptio Setup Utility — Advanced	Copyright (C) 2020 American	Megatrends, Inc.
TPM20 Device Found Firmware Version: Vendor: Security Device Support Active PCR banks Available PCR banks SHA-1 PCR Bank	71.4 STM [Enable] SHA-1,SHA256 SHA-1,SHA256 [Enabled]	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.
SHA256 PCR Bank Pending operation Platform Hierarchy Storage Hierarchy Endorsement Hierarchy TPM2.0 UEFI Spec Version Physical Presence Spec Version TPM 20 InterfaceType Device Select	[Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [TCG_2] [1.3] [TTS] [Auto]	<pre> ++: Select Screen 1↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.20.1271. Co	ppyright (C) 2020 American Mu	egatrends, Inc.

• CPU Configuration

This screen shows the CPU configuration, and you can change the value of the selected option.

Aptio Setup Utility - Advanced	- Copyright (C) 2020 America	n Megatrends, Inc.
CPU Configuration		To turn on/off the MLC streamer prefetcher.
Туре	Intel(R) Core(TM)	
	i7-9700TE CPU @ 1.80GHz	
ID	0×906ED	
Speed	1800 MHz	
L1 Data Cache	32 KB x 8	
L1 Instruction Cache	32 KB x 8	
L2 Cache	256 KB x 8	
L3 Cache	12 MB	
L4 Cache	NZA	
VMX	Supported	
SMX/TXT	Supported	
		++: Select Screen
Hardware Prefetcher	[Enabled]	↑↓: Select Item
Adjacent Cache Line Prefetch	[Enabled]	Enter: Select
Intel (VMX) Virtualization	[Enabled]	+/−: Change Opt.
Technology		F1: General Help
Active Processor Cores	[A11]	F2: Previous Values
AES	[Enabled]	F3: Optimized Defaults
Boot performance mode	[Max Non-Turbo	F4: Save & Exit
Tatal(D) OraciOtas(ta)	Performance]	ESC: Exit
Intel(R) SpeedStep(tm)	[Enabled]	
Turbo Mode	[Disabled] [Disabled]	
C states	[DISADIED]	
Version 2 20 1271	Copyright (C) 2020 American M	And strends Inc
VEI STOIT 2.20.1271. 1	sopyright (c) 2020 A merican i	legati chus, inc.

Intel Virtualization Technology

This item allows a hardware platform to run multiple operating systems separately and simultaneously, enabling one system to virtually function as several systems.

• SATA and RST Configuration

You can read the current installed hardware configurations from those SATA ports in the SATA and RST Configuration menu. During system boot up, BIOS will detect the present SATA devices automatically.

Aptio Setup Utility – Advanced	Copyright (C) 2020 Americar	Megatrends, Inc.
SATA And RST Configuration		Enable/Disable SATA Device.
SATA Controller(s) SATA Mode Selection Serial ATA Port 1 Port 1 Hot Plug Spin Up Device SATA Device Type Serial ATA Port 2 Port 2 Hot Plug Spin Up Device SATA Device Type	[Enabled] [AHCI] Empty [Enabled] [Disabled] [Disabled] [Hard Disk Drive] Empty [Enabled] [Disabled] [Disabled] [Hard Disk Drive]	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.20.1271. C	opyright (C) 2020American №	legatrends, Inc.

• AMT Configuration

Advanced		erican Megatrends, Inc.
AMT BIOS Features	[Disabled]	When disabled AMT BIOS Features are no longer supported and user is no longer able to access MEBx Setup. Note: This option does not disable Manageability Features in FW.
	1271. Copyright (C) 2020 Amer	<pre> ++: Select Screen f↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>

USB Configuration

USB configuration can be configured here by selecting and changing each item. A description of the selected item appears on the right side of the screen.

Aptio Setup Utility - Advanced	Copyright (C) 2020 American	Megatrends, Inc.
USB Configuration		Enables Legacy USB support.
USB Module Version	21	AUTO option disables legacy support if no USB devices are connected.
USB Controllers: 1 XHCI USB Devices: 1 Drive, 1 Keyboard, 1 Mouse		connected.
Legacy USB Support	[Enabled]	
XHCI Hand-off	[Enabled]	
USB Mass Storage Driver Support	[Enabled]	
USB hardware delays and time-outs: USB transfer time-out Device reset time-out	[20 sec] [20 sec]	↔: Select Screen ↓: Select Item Enter: Select
Device power-up delay	[Auto]	+/-: Change Opt.
		F1: General Help
Mass Storage Devices:		F2: Previous Values
Generic Flash Disk 8.07	[Auto]	F3: Optimized Defaults F4: Save & Exit ESC: Exit
		LSC. LAIL
Version 2.20.1271. Co	opyright (C) 2020 American M	egatrends, Inc.

> USB Devices

Display all detected USB devices.

• F81803 Super IO Configuration

Aptio Setup Utility Advanced	– Copyright (C) 20	20 American Megatrends, Inc.
F81803 Super IO Configuration Super IO Chip ▶ Serial Port 1 Configuration	F81803	Set Parameters of Serial Port 1 (COMA)
		<pre> ++: Select Screen 1↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.20.1271.	Copyright (C) 2020	American Megatrends, Inc.

> Serial Port 1~4 Configuration

Use this item to set parameters of serial port 1 to 4.

• Serial Port (1~4) Console

COM1 Console Redirection [Disabled] ▶ Console Redirection Settings	Console Redirection Enable or Disable.
Legacy Console Redirection Legacy Console Redirection Settings Serial Port for Out-of-Band Management/ Windows Emergency Management Services (EMS) Console Redirection [Disabled] Console Redirection Settings	
	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

> COM Port Type

Use this item to set parameters of RS232/422/485.

Compatibility Support Module Configuration		Enable/Disable CSM Support.
CSM Support	[Enabled]	
CSM16 Module Version	07.82	
GateA2O Active Option ROM Messages INT19 Trap Response HDD Connection Order	[Upon Request] [Force BIOS] [Immediate] [Adjust]	
Boot option filter	[UEFI and Legacy]	
Option ROM execution		<pre>++: Select Screen f↓: Select Item</pre>
Launch PXE OpROM policy Storage Video Other PCI devices	[Do not launch] [Legacy] [Legacy] [Legacy]	Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

• Compatibility Support Module (CSM) Configuration

• PCI Subsystem Setting

Aptio Setup Utility — (Advanced	Copyright (C) 2020 American	Megatrends, Inc.
PCI Subsystem Settings		Value to be programmed into PCI Latency Timer Register.
PCI Settings Common for all Devices: PCI Latency Timer VGA Palette Snoop	[32 PCI Bus Clocks] [Disabled]	For Eateney filler hegister.
		<pre>++: Select Screen f1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.20.1271. Co	oyright (C) 2020 American Me	egatrends, Inc.

3.5 Chipset Menu

The Chipset menu allows users to change the advanced chipset settings. You can select any of the items in the left frame of the screen to go to the sub menus:



► System Agent (SA) Configuration

For items marked with " \blacktriangleright ", please press <Enter> for more options.

Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc. Chipset			
System Agent (SA) Configuration		VT-d capability	
SA PCIE Code Version VT-d	7.0.72.64 Supported		
VT-d Above 4GB MMIO BIOS assignment	[Enabled] [Disabled]		
 Graphics Configuration Memory Configuration PEG Port Configuration 			
		<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>	
Version 2.20.1271. Co	pyright (C) 2020 American Mu	egatrends, Inc.	

PEG Port Configuration

Aptio Setup Utility - Chipset	- Copyright (C) 2020 Americ	can Megatrends, Inc.
PEG Port Configuration		Enable or Disable the Root Port
PEG 0:1:0 Enable Root Port Max Link Speed	Not Present [Enabled] [Auto]	
▶ PEG Port Feature Configuration		
		<pre> ++: Select Screen 1↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.20.1271. C	Copyright (C) 2020 Americar	n Megatrends, Inc.

• PEG Port Feature Configuration



• Graphics Configuration

Aptio Setup Chipset	Utility – Copyright (C) 2020	American Megatrends, Inc.
IGFX VBIOS Version Internal Graphics	1014 [Auto]	Keep IGFX enabled based on the setup options.
		<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.	20.1271. Copyright (C) 2020 Am	erican Megatrends, Inc.

> Display Select

Allows you to select which graphics controller to use as the primary boot device.

• Memory Configuration

f	Aptio Setup Utility Chipset	– Copyright (C) 202	0 American	Megatrends, In	с.
Memory RC Vers: Total Memory DIMM#1 Size DIMM#2 Size		0.7.1.89 32768 MB Populated & Enab 16384 MB (DDR4) Populated & Enab 16384 MB (DDR4)	led	++: Select Scr fJ: Select Ite Enter: Select +/-: Change Op F1: General He F2: Previous V F3: Optimized F4: Save & Exi ESC: Exit	m t. lp alues Defaults t
	Version 2.20.1271.	Copyright (C) 2020	American Me	gatrends, Inc.	

3.6 Security Menu

The Security menu allows users to change the security settings for the system.

	tility – Copyright (C) 2020 Au ecurity Boot Save & Exit	merican Megatrends, Inc.	
Password Description		Set Administrator Password	
If ONLY the Administrator's then this only limits acces			
only asked for when enterin If ONLY the User's password	is set, then this		
boot or enter Setup. In Set	is a power on password and must be entered to boot or enter Setup. In Setup the User will		
have Administrator rights. The password length must be			
in the following range: Minimum length	3		
Maximum length	20	++: Select Screen	
Administrator Password		↑↓: Select Item	
User Password		Enter: Select +/-: Change Opt.	
		F1: General Help F2: Previous Values	
		F3: Optimized Defaults	
		F4: Save & Exit ESC: Exit	
User for 0.00	.1271. Conuright (C) 2020 Ame		

> Administrator Password

This item indicates whether an administrator password has been set (installed or uninstalled).

User Password

This item indicates whether an user password has been set (installed or uninstalled).

3.7 Boot Menu

Boot Configuration Setup Prompt Timeout	1	Number of seconds to wait for setup activation key.
Bootup NumLock State	[0n]	65535(0xFFFF) means indefinite waiting.
Quiet Boot	[Disabled]	
Launch PXE OpROM policy	[Do not launch]	
Boot Option Priorities		
Boot Option #1	[P1: HGST HTS725050A7E630]	
Boot Option #2	[Generic Flash Disk 8.07]	
Boot Option #3	[Windows Boot Manager (P1: HGST HTS725050A7E630)]	
Boot Option #4	[UEFI: Generic Flash Disk 8.07, Partition 1]	Enter: Select +/-: Change Opt. F1: General Help
Hard Drive BBS Priorities		F2: Previous Values
USB Device BBS Priorities		F3: Optimized Defaults F4: Save & Exit ESC: Exit

The Boot menu allows users to change boot options of the system.

> Setup Prompt Timeout

Set the number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

Bootup NumLock State

Use this item to select the power-on state for the keyboard NumLock.

Quiet Boot

Select to display either POST output messages or a splash screen during boot-up.

Launch PXE OpROM policy

Use this item to enable or disable the boot ROM function of the onboard LAN chip when the system boots up.

Boot Option Priorities

These are settings for boot priority. Specify the boot device priority sequence from the available devices.

3.8 Save & Exit Menu

The Save & Exit menu allows users to load your system configuration with optimal or fail-safe default values.

Aptio Setup Utility – Copyright (C) 2020 American Main Advanced Chipset Security Boot <mark>Save & Exit</mark>	Megatrends, Inc.
Save Options Save Changes and Exit Discard Changes and Exit Save Changes and Reset Discard Changes and Reset Save Changes Discard Changes Default Options Restore Defaults	Exit system setup after saving the changes.
Save as User Defaults Restore User Defaults Boot Override P1: HGST HTS725050A7E630 Windows Boot Manager (P1: HGST HTS725050A7E630) Generic Flash Disk 8.07 UEFI: Generic Flash Disk 8.07, Partition 1	<pre>++: Select Screen 1↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.20.1271. Copyright (C) 2020 American Me	egatrends, Inc.

Save Changes and Exit

When finishing the system configuration settings, select this option to leave Setup and return to Main Menu. Select Save Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to save changes and exit.

Discard Changes and Exit

Select this option to quit Setup without making any permanent changes to the system configuration and return to Main Menu. Select Discard Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to discard changes and exit.

Save Changes and Reset

When finishing the system configuration settings, select this option to leave Setup and reboot the computer so the new system configuration parameters can take effect. Select Save Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to save changes and reset.

> Discard Changes and Reset

Select this option to quit Setup without making any permanent changes to the system configuration and reboot the computer. Select Discard Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to discard changes and reset.

> Save Changes

When finishing the system configuration settings, select this option to save changes. Select Save Changes from the Save & Exit menu and press <Enter>. Select Yes to save changes.

> Discard Changes

Select this option to quit Setup without making any permanent changes to the system configuration. Select Discard Changes from the Save & Exit menu and press <Enter>. Select Yes to discard changes.

Restore Defaults

After selecting this option, all the settings will be restored to defaults automatically. Select Restore Defaults from the Save & Exit menu and press <Enter>.

Save as User Defaults

Select this option to save your current system configuration settings as User Defaults. Select Save as User Defaults from the Save & Exit menu and press <Enter>.

Restore User Defaults

After selecting this option, all the settings will be restored to user defaults automatically. Select Restore User Defaults from the Save & Exit menu and press <Enter>.

Boot Override

Select a drive to immediately boot that device regardless of the current boot order.

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APPENDIX A WATCHDOG TIMER

A.1 About Watchdog Timer

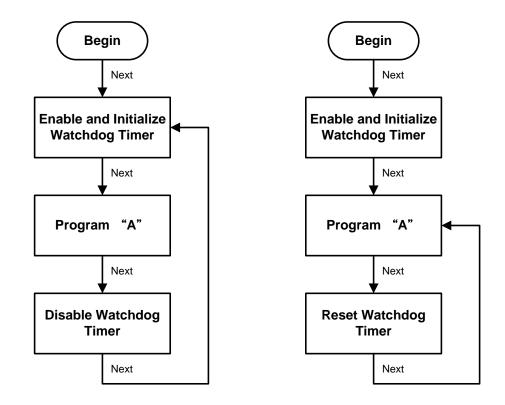
Software stability is a major issue in most applications. Some embedded systems are not watched by an operator for 24 hours. It is usually too late to wait for someone to reboot when computer hangs. The systems need to be able to reset automatically when things go wrong. The watchdog timer gives us a solution in this regard.

The watchdog timer is a counter that triggers a system reset when it counts down to zero from a preset value. The software starts the counter with an initial value and must reset it periodically. If the counter ever reaches zero which means the software has crashed, the system will reboot.

A.2 How to Use Watchdog Timer

The I/O port base addresses of watchdog timer are 2E (hex) and 2F (hex). The 2E (hex) and 2F (hex) are address and data port respectively.

Assume that program A is put in a loop that must execute at least once every 10ms. Initialize watchdog timer with a value bigger than 10ms. If the software has no problems, watchdog timer will never expire because software will always restart the counter before it reaches zero.



A.3 Sample Program

Assembly sample code:

;Enabl	e WDT:			
mo∨	dx,2Eh			
mov	al,87	;Un-lock	super	I/0
out	dx,al			
out	dx,al			
;Selec	t Logic device:			
mov	dx,2Eh			
mov	al,07h			
out	dx,al			
mo∨	dx,2Fh			
mov	al,07h			
out	dx,al			
;Enabl	e WDT base addre	ss:		
mo∨	dx,2Eh			
mo∨	al,30h			
out	dx,al			
mo∨	dx,2Fh			
mo∨	al,01h			
out	dx,al			
;Activ	ate WDT:			
mov	dx,2Eh			
mov	al,OFOh			
out	dx,al			
mo∨	dx,2Fh			
mo∨	al,80h			
out	dx,al			
;Set b	ase timer :			
mov	dx,2Eh			
mov	al,OF6h			

```
dx,al
out
       dx,2Fh
mov
                       ;M=00h,01h,...FFh (hex),Value=0 to 255
       al,Mh
mov
                       ;(see M <u>Note</u> below)
out
       dx,al
;Set Second or Minute :
mov
       dx,2Eh
       al,0F5h
mov
       dx,al
out
       dx,2Fh
mov
                     ;N=71h or 79h(see 🖾 <u>Note</u> below)
mov
       al,Nh
out
       dx,al
```

Note:

```
If N=71h, the time base is set to second.
```

M = time value

- 00: Time-out disable
- 01: Time-out occurs after 1 second
- 02: Time-out occurs after 2 seconds
- 03: Time-out occurs after 3 seconds
- FFh: Time-out occurs after 255 seconds

If **N**=79h, the time base is set to minute.

M = time value

.

- 00: Time-out disable
- 01: Time-out occurs after 1 minute
- 02: Time-out occurs after 2 minutes
- 03: Time-out occurs after 3 minutes

•

FFh: Time-out occurs after 255 minutes

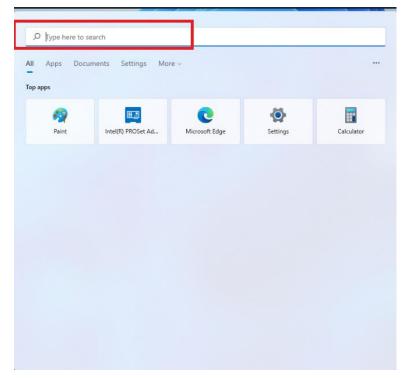
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APPENDIX B WAKE on LAN

How to Set up Wake on LAN

Please follow the following steps to set up Wake on LAN on Windows 11.

- 1. Press "•• w/ "S" or press "• on Windows desktop.
- 2. Enter "proset" in red area.



3. Select "Run as administrator"

I Apps Documents Settings More ~	
st match	
Intel(R) PROSet Adapter Configuration Utility App	
	Intel(R) PROSet Adapter Configuration Utility App
	🕜 Open
	🕞 Run as administrator
	Open file location

User's Manual

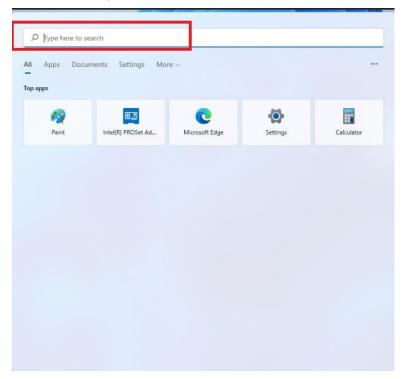
4. Select a LAN port (1) which will support "Wake on LAN", then enable functionality you need under "Adapter Settings" (2)

				intel	
SKTOP-7GLT8QT	0 <	Intel(R) Ethernet Cont	oller (3) 1225-LM		
Intel(R) Ethemet Controller (3) 1225-LM Intel(R) 1211 Gigabit Network Connection Intel(R) 1211 Gigabit Network Connection #2		Adapter Te	aming/VLANs	(2)	
and sharp you'r algaes reinan Carsocain ru		Adapter Information	0 ^	Adapter Settings	() /
		Speed: Not Available		Large Send Offload V2 (IPv4)	Current Value:
		Bus Type	PCI Express	Large Send Offload V2 (IPv6) Locally Administered Address	Enabled ~
		Driver Name	eZexpress	Log Link State Event Low Latency Interrupt Ports	Device Default
		Driver Version	1.0.2.13	Low Latency Interrupts Maximum Number of RSS Queues NS Offload	Enabled
		ETrackID	Not Supported	Packet Priority & VLAN Receive Buffers	
		Location	PCI Bus 1, device 0, function 0	Selective Suspend Selective Suspend Idle Timeout Speed & Duplex TCP Checksum Offload (IPv4) TCP Checksum Offload (IPv6)	
		Media Type	Copper		Use Default
		Negotiated Link Speed	I See Not Supported	Transmit Buffers UDP Checksum Offload (IPv4)	
		Negotiated Link Width	Not Supported	UDP Checksum Offload (IPv6) Wate for Link Wate form Six on Magic Packet Wate on Link Settings Wate on Magic Packet Wate on Magic Packet Wate on Pattern Match	
		Part Number	G23456-000		
		Permanent Ethernet Address	0060E07C0111		
		Port	A		

5. Press "Any Changes" (3).

**Please follow step 4 and step 5 to set the other LAN ports for "Wake on LAN"

- 6. Press "•• w/ "S" or press "• on Windows desktop.
- 7. Enter "control panel" in red area.



8. Select "Open".

O control Panel		
All Apps Documents Web	More ~	
Best match		
Control Panel App		
Apps		Control Panel
🐼 Settings	>	Арр
🔁 Windows Tools	>	🕜 Open
🖃 Run	>	Open file location
Settings		 Pin to Start Pin to taskbar
Change User Account Control	,	

9. Press Power options \rightarrow Change what the power button do

$\leftarrow \rightarrow \cdot \uparrow = = \cdot \cdot$	Control Panel > Hardware and Sound >
Control Panel Home System and Security Network and Internet	Change Windows To Go startup options
Hardware and Sound Programs	AutoPlay Change default settings for media or devices Play CDs or other media automatically
User Accounts Appearance and	Sound Adjust system volume Change system sounds Manage audio devices
Personalization Clock and Region Ease of Access	Power Options Change battery settings Choose a power plan Encrower plan
	Windows Mobility Center Adjust commonly used mobility settings Adjust settings before giving a presentation
	Realtek HD Audio Manager
emove " 🔽" fro	m "Turn on fast startup", the press "Save changes".
$\leftarrow \rightarrow \checkmark \uparrow $ $> $ Contr	ol Panel > Hardware and Sound > Power Options > System Settings
	Define power buttons and turn on password protection
	Choose the power settings that you want for your computer. The changes you make to the settings on this

Turn on fast startup (recommended) This helps start your PC faster after shutdown. Restart isn't affected. <u>Learn More</u>
Show in Power menu.
Show in Power menu.
Show in account picture menu.

When I press the power button: Sleep

When I press the sleep button: Sleep

~

~

Power and sleep button settings

Shutdown settings

11. Reboot the system to enable the above settings. Installation is completed.

10

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APPENDIX C CONFIGURING SATA FOR RAID

Configuring SATA Hard Drive(s) for RAID (Controller: Intel[®] Q370)

Before you begin the SATA configuration, please prepare four SATA hard drives (to ensure optimal performance, it is recommended that you use two hard drives with the identical model and capacity). If you do not want to create RAID with the SATA controller, you may prepare only one hard drive.

Please follow the steps below to configure SATA hard drive(s):

- 1. Install SATA hard drive(s) in your system.
- 2. Enter the BIOS Setup to configure SATA controller mode and boot sequence.
- 3. Configure RAID using the RAID BIOS.

1. Installing SATA hard drive(s) in your system.

Connect one end of the SATA signal cable to the rear of the SATA hard drive, and the other end to an available SATA port on the board. Then, connect the power connector of power supply to the hard drive.

2. Configuring SATA controller mode and boot sequence by the BIOS Setup.

You have to make sure whether the SATA controller is configured correctly by system BIOS Setup and then set up BIOS boot sequence for the SATA hard drive(s).

2.1. Turn on your system, and then press the button to enter BIOS Setup during the process of running POST (Power-On Self-Test). If you want to create RAID, just go to the Advanced Settings menu\SATA Configuration, select the "SATA Mode Selection", and press <Enter> for more options.

Aptio Advanced	Setup Utility – Copyright	(C) 2018 American	Megatrends, Inc.
SATA Mode Selection	[AHCI]		Determines how SATA controller(s) operate.
Serial ATA Port 1	Empty		
Serial ATA Port 2	Empty		
Serial ATA Port 3	Empty		
Serial ATA Port 4	Empty		
Serial ATA Port 5	Empty		
	AHCI Intel RST Pi	remium	<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Vers	ion 2.18.1263. Copyright (1	C) 2018 American M	egatrends, Inc.

Configuring SATA for Raid

		Determines how SATA controller(s) operate.
erial ATA Port 1	Empty	controller (a) operate.
Serial ATA Port 2	Empty	
Serial ATA Port 3	Empty	
Serial ATA Port 4	Empty	
Serial ATA Port 5	AXIOMTEK Corp. (64.0GB)	
		++: Select Screen 1↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

A list of options appears. Please select "Intel RST Premium".

2.2. Save and exit the BIOS Setup.

3. Configuring RAID by the RAID BIOS.

Enter the RAID BIOS setup utility to configure a RAID array. Skip this step and proceed if you do not want to create a RAID.

3.1. After the POST memory testing and before the operating system booting, a message "Press <Ctrl-I> to enter Configuration Utility" shows up. Press <Ctrl + I> to enter the RAID BIOS setup utility.

RAID VO				- 1		
ID	Name	Level	Strip		Status	
0	Volume1	RAIDO(Stripe)	128KB	149.1GB	Normal	Yes
Physica	1 Devices:					
ID	Device Model	Serial #		Size	Type/Stat	tus(Vol ID
4	ST320LT012-9WS14				Member Di	
5	ST380817AS	5MR1BSS7			Member Di	
	RL-I> to enter Confi		/			
		gurueron oerriej				

3.2. After you press <Ctrl + I>, the Create RAID Volume screen will appear. If you want to create a RAID array, select the Create RAID Volume option in the Main Menu and press <Enter>.

	d Storage Technology (C) Intel Corporatio	on. All right	
1. Create RA 2. Delete RA 3. Reset Dis	ID VOlume ks to Non-RAID	5. Accelerat 6. Exit	Volume Options ion Options
RAID Volumes: None Defined. Physical Devices: ID Device Model 4 ST320LT012-9WS14 5 ST380817AS	Serial # WOV20YPA 5MR1BSS7	Size 298.0GB	Type/Status(Vol ID) Non-RAID Disk Non-RAID Disk
[†]]-Select	[ESC]-Exit	[E	nter]-Select Menu

3.3. After entering the Create Volume Menu screen, you can type the disk array name with 1~16 letters (letters cannot be special characters) in the item "Name:".

Intel(R) Rapid Storage Technology - Option ROM - 15.2.0.2740 Copyright (C) Intel Corporation. All rights reserved.					
CREATE VOLUME MENU Name: Volume1 RAID Level: RAID0(Stripe) Disks: Select Disks Strip Size: 16KB Capacity: 149.1 Sync: N/A Create Volume					
[HELP] - Enter a unique volume name that has no special characters and is 16 characters or less.					
[lt]Change [TAB]-Next [ESC]-Previous Menu [ENTER]-Select					

3.4. When finished, press <Enter> to select a RAID level. There are two RAID levels: RAID0, RAID1. Select a RAID level and press <Enter>.

Note: eBOX671-517 supports RAID0, RAID1 Only.

Intel(R) Rapid Storage Technology - Option ROM - 15.2.0.2740 Copyright (C) Intel Corporation. All rights reserved. CREATE VOLUME MENU Ľ Name: Volume1 RAID Level: RAIDO(Stripe) Disks: Select Disks Strip Size: 16KB Capacity: 149.1 GB N/A Sync: Create Volume E [HELP] RAID 0: Stripes data (performance). []]Change [TAB]-Next [ESC]-Previous Menu [ENTER]-Select

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3.5. Set the stripe block size. The KB is the standard unit of stripe block size. The stripe block size can be 4KB to 128KB. After the setting, press <Enter> for the array capacity.

	t (C) Intel (c): RAIDO(Stripe) (s: Select Disks (c: 128KB (c): 149.1 GB				
[HELP] The following are typical values: RAIDO - 128KB RAID10 - 64KB RAID5 - 64KB						
[†]Change	[TAB]-Next	[ESC]-Previous Menu	[ENTER]-Select			

3.6. After setting all the items on the menu, select Create Volume and press <Enter> to start creating the RAID array.

Intel(R) Rapid Storage Technology - Option ROM - 15.2.0.2740 Copyright (C) Intel Corporation. All rights reserved.					
CREATE VOLUME MENU] Name: Volume1 RAID Level: RAID0(Stripe) Disks: Select Disks Strip Size: 128KB Capacity: 149.1 Sync: N/A Create Volume					
[HELP] The default value indicates the maximum capacity using the selected disks. Entering a lower capacity allows you to create a second volume on these disks.					
[]Change [TAB]-Next [ESC]-Previous Menu [ENTER]-Select					

3.7. When prompting for confirmation, press <Y> to create this volume, or <N> to cancel the creation.

Intel(R) Rapid Storage Technology - Option ROM - 15.2.0.2740 Copyright (C) Intel Corporation. All rights reserved.					
	[CREATE VOLUME MENU] Name: Volume1 RAID Level: RAIDO(Stripe) Disks: Select Disks Strip Size: 128KB Capacity: 149.1 GB				
	Sync: N/A WARNING: ALL DATA ON SELECTED DISKS WILL BE LOST. Are you sure you want to create this volume? (Y/N):				
	Press ENTER to create the specified volume.				
[[]Change [TAB]-Next [ESC]-Previous Menu [ENTER]-Select				

After the creation is complete, you will see detailed information about the RAID array in the Disk/Volume Information section, including RAID mode, disk block size, disk name, disk capacity, etc.

Intel(R) Rapid Storage Technology - Option ROM - 15.2.0.2740 Copyright (C) Intel Corporation. All rights reserved.						
2. Delete	RAID Volume RAID Volume Disks to Non-RAID	 Recovery Volume Options Acceleration Options Exit 				
RAID Volumes: ID Name O Volume1 Physical Devices: ID Device Model 4 ST320LT012-9WS14 5 ST380817AS	Level RAIDO(Stripe) Serial #	Strip Size Status Bootable 128KB 149.1GB Normal Yes Size Type/Status(Vol ID) 298.0GB Member Disk(0) 74.5GB Member Disk(0)				
[11]-Select	[ESC] -	Exit [Enter]-Select Menu				

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Delete RAID volume

If you want to delete a RAID volume, select the Delete RAID Volume option in Main Menu. Press <Enter> and follow on-screen instructions.

Intel(R) Rapid Storage Technology - Option ROM - 15.2.0.2740 Copyright (C) Intel Corporation. All rights reserved.						
1. Create RAID Volume4. Recovery Volume Options2. Delete RAID Volume5. Acceleration Options3. Reset Disks to Non-RAID6. Exit						
RAID Volumes: ID Name O Volume1	Level RAIDO(Stripe)	ME INFORMATIO Strip 128KB	Size Status 149.1GB Normal	Bootable Yes		
Physical Devices: ID Device Model 4 ST320LT012-9WS14 5 ST380817AS	Serial # WOV2OYPA 5MR1BSS7		Size Type/Sta 298.0GB Member D 74.5GB Member D			
[†]-Select	[ESC]-	-Exit	[Enter]-Select	Menu		

Please press <Esc> to exit the RAID BIOS utility. Now, you can proceed to install a SATA driver controller and the operating system.