GPC-1000MX USER Manual

Intel® Xeon®/Core™ i7/i5/i3 Dual GPU AI Computing System Workstation-grade, NVIDIA® Tesla®/Quadro®/GeForce®/AMD Radeon™ Grraphics

Vecow

1.1.0 Edition 20230613

Record of Revision

Version	Date	Page	Description	Remark
1.00	2022/7/1	All	Official Release	
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Declaration of Conformity

FCC

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CE

The products described in this manual comply with all applicable European Union (CE) directives if it has a CE marking. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques.

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Order Information

Part Number	Description
GPC-1000MX	GPC-1000MX, 4 M12 X-coded GigE LAN, 4 M12 A-coded COM, 2 M12 A-coded CAN Bus, 2 PCIe x8, 2 PCIe x4, 12-55V DC-in

Optional Accessories

Part Number	Description
DDR4 32G	Certified DDR4 32GB 2666MHz RAM
DDR4 16G	Certified DDR4 16GB 2666MHz RAM
DDR4 8G	Certified DDR4 8GB 2666MHz RAM
DDR4 4G	Certified DDR4 4GB 2666MHz RAM
PWS-600W1	600W, 24V, 90V AC to 264V AC Power Supply
PWS-1000W-24V	1000W, 24V, 90V AC to 264V AC Power Supply
PWS-1500W-24V	1500W, 24V, 90V AC to 264V AC Power Supply
TMK2-20P-100	Terminal Block 20-pin to Terminal Block 20-pin Cable, 100cm
TMK2-20P-500	Terminal Block 20-pin to Terminal Block 20-pin Cable, 500cm
TMB-TMBK-20P	Terminal Board with One 20-pin Terminal Block Connector and DIN-Rail Mounting
M.2 Storage Module	M.2 Key M Storage Module
5G Module	5G Module with Antenna
4G Module	4G/GPS Module with Antenna
WiFi & Bluetooth	WiFi & Bluetooth Module with Antenna

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1

GENERAL INTRODUCTION

1.1 Overview

Vecow GPC-1000MX is a workstation-grade Dual GPU AI Computing System. It is powered by 9th Gen Intel® Xeon®/Core™ i7/i5/i3 Processor and features dual GPUs with options of NVIDIA® or AMD Graphics. The GPC-1000MX brings the power of GPU to accelerate the deployment of AI solutions for High-Speed AOI, Rolling Stock, Vehicle Computing, Autonomous Driving, and any AIoT/Industry 4.0 applications.

Vecow GPC-1000MX is equipped with multiple rugged X-coded/A-coded M12 connections for GigE LAN, COM and CAN Bus. The system provides flexible configuration for expansion with 2 PCIe x8, 2 PCIe x4, 1 Mini PCIe, 1 M.2 Key E and 1 M.2 Key B. The GPC-1000MX features NVIDIA® or AMD GPU and supports 1500W power budget management with up to 750W for each dual graphics in edge computing while keeping the system reliable.

Designed to operate well in harsh industrial environments, Vecow GPC-1000MX supports a wide operating temperature range from -25°C to 45°C, anti-shock, anti-vibration tested EN50155, EN50121-3-2. Support for 12V to 55V DC-in, ignition power control, CAN Bus, and TPM 2.0 makes GPC-1000MX a trusted solution for Rolling Stock, Railway Security and Industrial EV.

1.2 Features

- 8 Cores 9th Gen Intel® Xeon®/Core™ i7/i5/i3 Processor with Workstation-grade Intel® C246 Chipset
- 1500W power budget supports max dual 750W NVIDIA® Tesla®/Quadro®/ GeForce® or AMD Radeon™ 3-slot graphics card
- Supports multiple rugged X-coded/A-coded M12 connections for GigE LAN, COM RS-232/422/485, and CAN Bus A/B
- Supports 5G/WiFi/BT/4G/LTE/GPRS/UMTS wireless communication
- Expansion : 2 PCIe x8, 2 PCIe x4, 1 Mini PCIe, 1 M.2 Key E, 1 M.2 Key B
- DC 12V to 55V Power Input, Ignition Power Control, TPM 2.0 Optional VHub AIoT Solution Service supports OpenVINO based AI accelerator and advanced Edge AI applications

1.3 Product Specification

1.3.1 Specifications of GPC-1000MX

System	
Processor	8-core 9th/8th Gen Intel® Xeon®/Core™ i7/i5/i3 Processor (Coffee Lake Refresh)
Chipset	Intel® C246
BIOS	AMI
SIO	IT8786E
Memory	4 DDR4 2133MHz SO-DIMM, up to 128GB (ECC/Non-ECC)
I/O Interface	
Serial	4 COM RS-232/422/485, A-coded M12 Connector
CAN Bus	2 CAN Bus 2.0 A/B, A-coded M12 Connector
USB	• 2 USB 3.1 Gen 2 • 4 USB 3.1 Gen 1
LED	Power, HDD, PoE, Wireless
SIM Card	2 External SIM Card Socket
Expansion	
Mini PCIe	1 Full-size for PCIe/USB/External SIM Card/mSATA
PCIe	• 2 PCIe x16 Slot with x8 signal • 2 PCIe x16 Slot with x4 signal
M.2	• 1 M.2 Key E Socket (2230) • 1 M.2 Key B Socket (3042/3052/2280)
Graphics	
Graphics Processor	• Intel® UHD graphics 630 • Independent Graphics 1 : By request • Independent Graphics 2 : By request
Interface	Multiple independent displays : • 1 DisplayPort : Up to 4096 x 2304 @60Hz • By requested Graphics Card
Storage	
SATA	2 SATA III (6Gbps) support software RAID 0, 1
mSATA	1 SATA III (Mini PCIe Type, 6Gbps)
M.2	1 M.2 Key M Socket (2280)
Storage Device	2 Front-access 2.5" SSD/HDD Tray

Audio	
Audio Codec	Realtek® ALC888S-VD, 7.1 Channel HD Audio
Audio Interface	1 Mic-in, 1 Line-out
Ethernet	
LAN 1 to LAN 4	Intel® I210 GigE LAN, X-Coded M12 Connector
Power	
Input Voltage	DC 12V to 55V
Power Interface	4-pin Terminal Block : V+, V+, V-, V-
Ignition Control	16-mode Software Ignition Control
Remote Switch	3-pin Terminal Block : On, Off, IGN
Others	
TPM	Infineon SLB9665 supports TPM 2.0, LPC interface
Watchdog Timer	Reset : 1 to 255 sec./min. per step
Smart Management	Wake on LAN, PXE supported
HW Monitor	Monitoring temperature, voltages. Auto throttling control when CPU overheats.
Software Support	
OS	Windows 10, Linux
Mechanical	
Dimension (W x D x H)	375.0mm x 243.0mm x 215.8mm (14.76" x 9.57" x 8.50")
Weight	9.1 kg (20.06 lb)
Mounting	Wallmount by mounting bracket
Environment	
Operating Temperature	-25°C to 45°C (-6°F to 113°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	5% to 95% humidity, non-condensing
Relative Humidity	95% at 45°C
Shock/ Vibration	• IEC 61373 : 2010 • Railway Applications : Rolling Stock Equipment, Shock and Vibration Tests
EMC	CE, FCC, EN50155, EN50121-3-2

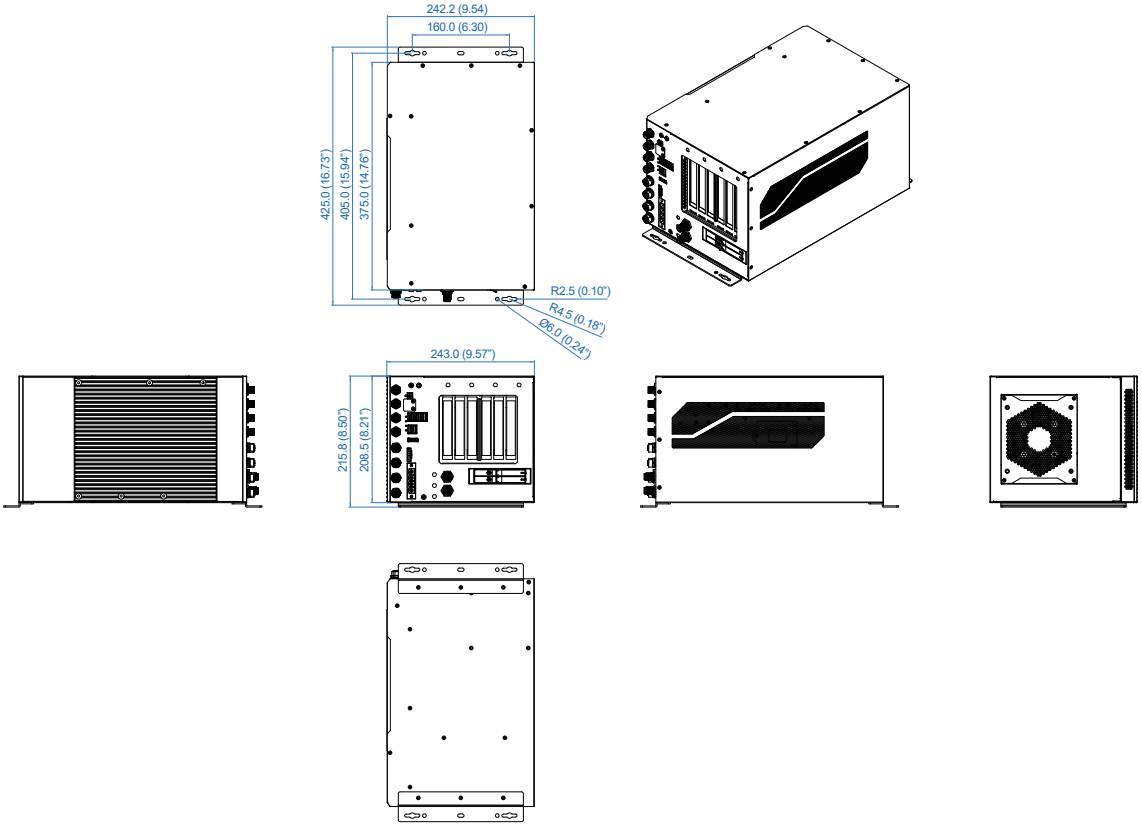
1.4 Supported CPU List

Series	CPU	Cores	GHz	TDP (W)	CPU	Cores	GHz	TDP (W)	ECC RAM
Intel® Xeon®	E-2176G	6	4.6	80	E-2278GE	8	4.7	80	Yes
					E-2278GEL	8	3.9	35	
	E-2124G	4	4.5	71	E-2226GE	6	4.6	80	
Intel® Core™	i7-8700	6	4.6	65	i7-9700E	8	4.4	65	N/A
	i7-8700T	6	4	35	i7-9700TE		3.8	35	
	i5-8500	6	4.1	65	i5-9500E	6	4.2	65	
	i5-8500T	6	3.5	35	i5-9500TE		3.6	35	
	i3-8100	4	3.6	65	i3-9100E	4	3.7	65	Yes
	i3-8100T	4	3.1	35	i3-9100TE		3.2	35	

1.5 Mechanical Dimension

1.5.1 Dimensions of GPC-1000MX

Unit : mm (inch)



2

GETTING TO KNOW YOUR GPC-1000MX

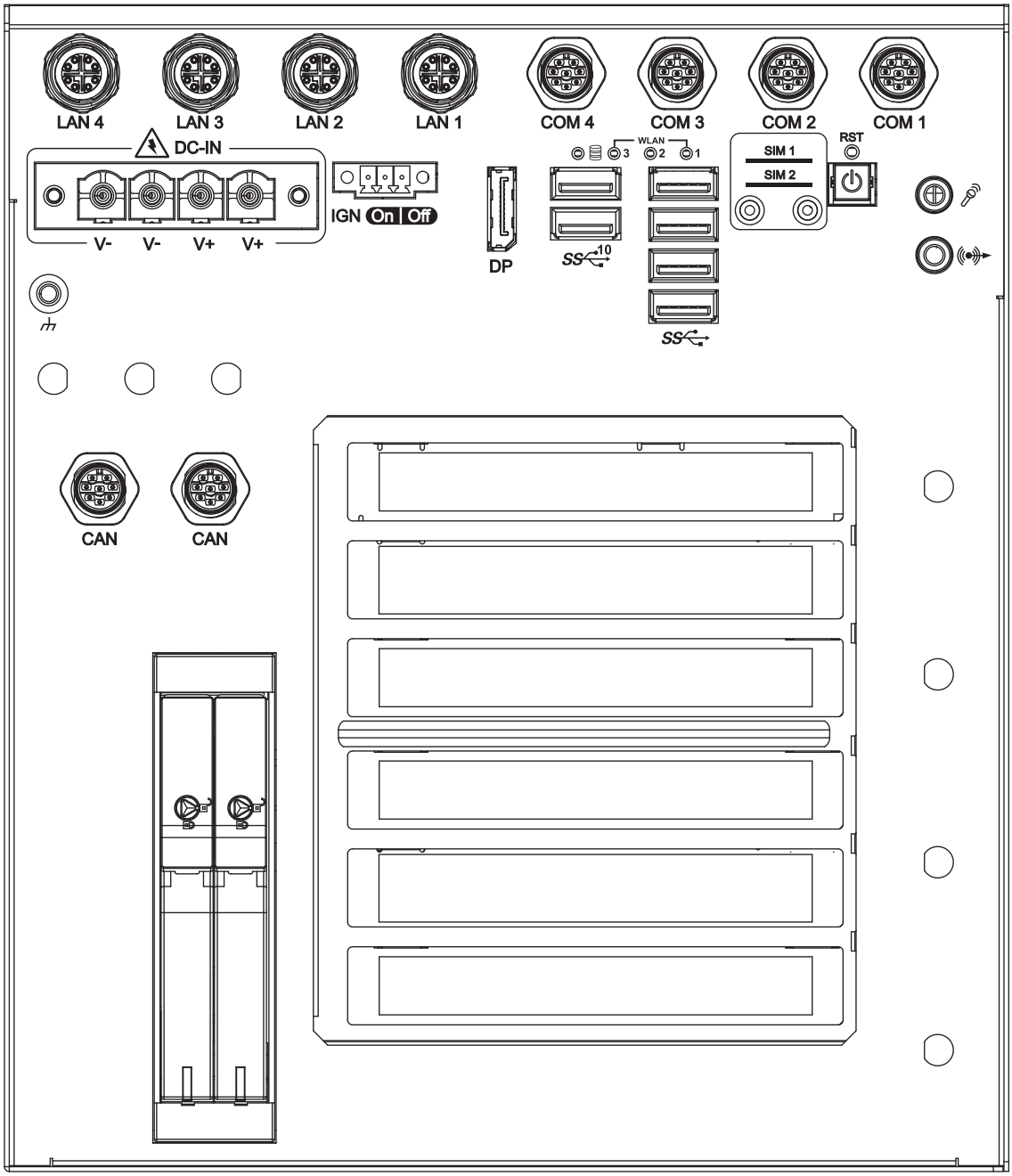
2.1 Packing List

Item	Description	Qty
1	GPC-1000MX AI Computing System (According to the configuration you order, the GPC-1000MX series may contain SSD/HDD and DDR4 SO-DIMM. Please verify these items if necessary.)	1

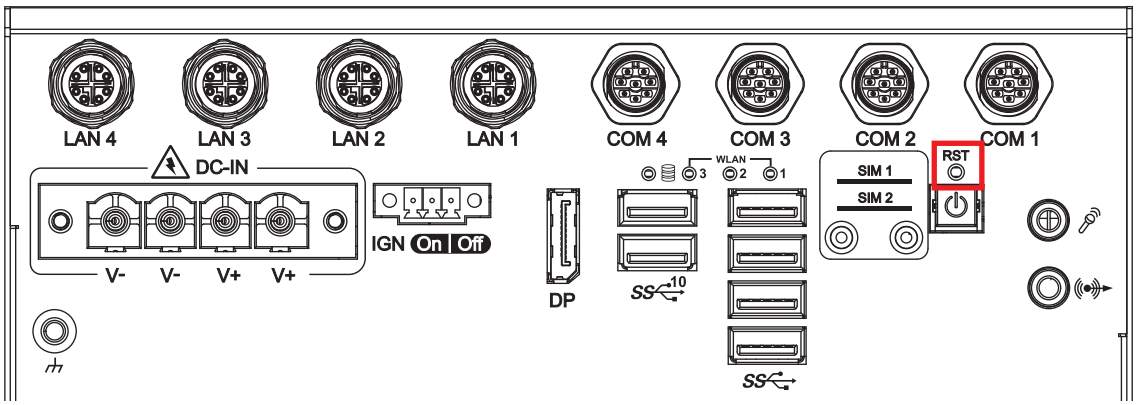
Item	Description	Outlook	Usage	P/N	Qty
1	P head_ M2.5x6L_Ni		Mini PCIe	53-2426906-30B	2
2	F Head_M3x5L_ Nylok		Wall mount	53-M004950-310	6
3	P head_M3x6L_ Ni_Nylok		M.2	53-2426206-80B	3
4	Terminal block 4-pin		DC-in	51-2711R04-S1Q	1
5	Terminal block3-pin(10.16mm)		Switch	51-2211R03-S1A	1
6	SSD TRAY KEY		KEY	---	1
7	FOOT PAD		---	---	1
8	Wall mount Bracket		---	62-03P0811-000	2

2.2 Front Panel I/O Functions

In Vecow's GPC-1000MX , all I/O connectors are located on the front panel. Most of the general connections to the computer device, such as audio, USB, LAN, COM Port, Display Port, and any additional storage, are placed on the front panel.

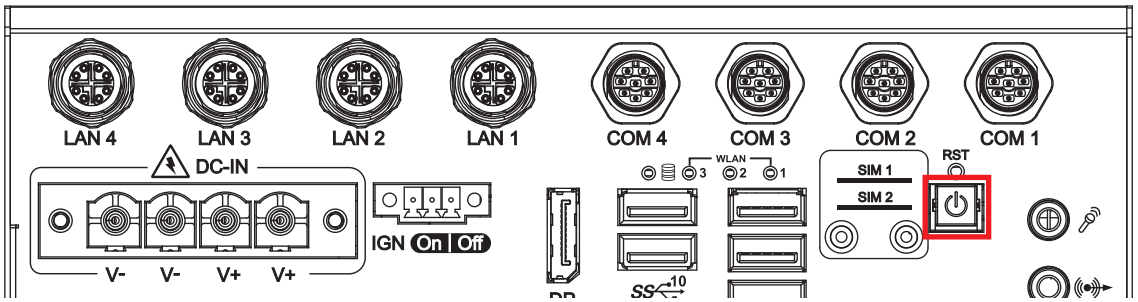


2.2.1 Reset Tact Switch



The item circled red is a hardware reset switch. Use this switch to reset the system without powering off the GPC-1000MX. Press and hold the reset switch for a few seconds, then reset will be enabled.

2.2.2 Power Button



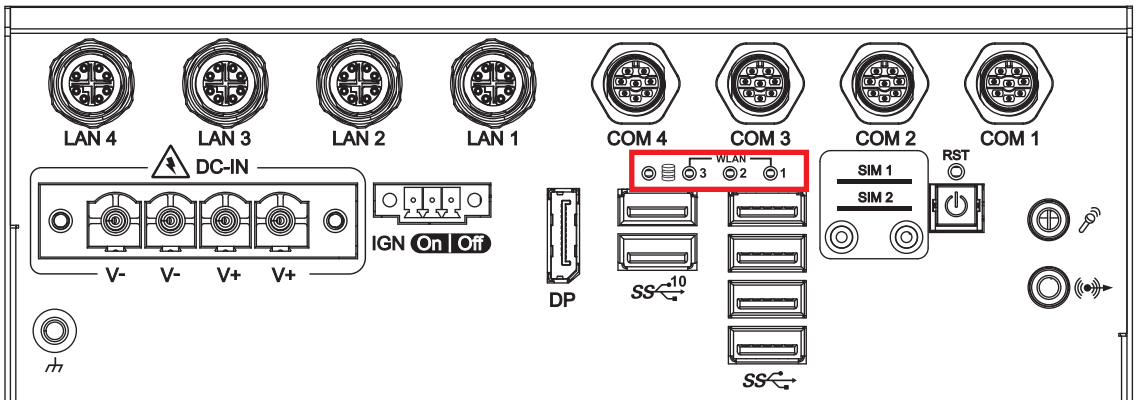
The power button is a non-latched switch with dual color LED indication. It indicates power statuses: S0, S3 and S5. More details on the LED indications are listed in the following chart:

LED Color	Indication	System Status
Solid Blue	S0	System working
Solid Orange	S3, S5	Suspend to RAM, System off with standby power

To power on GPC-1000MX, press the power button which will light the blue LED.To power off GPC-1000MX, you can either command shutdown by OS operation or simply press the power button. If system error appears, press and hold the power button for four seconds to shut down the machine directly.

Please note that a four-second interval between each two power-on/power-off operation is necessary in normal working status. (For example, once turning off the system, you have to wait for four seconds to initiate another power-on operation).

2.2.3 PWR & HDD LED Indicator

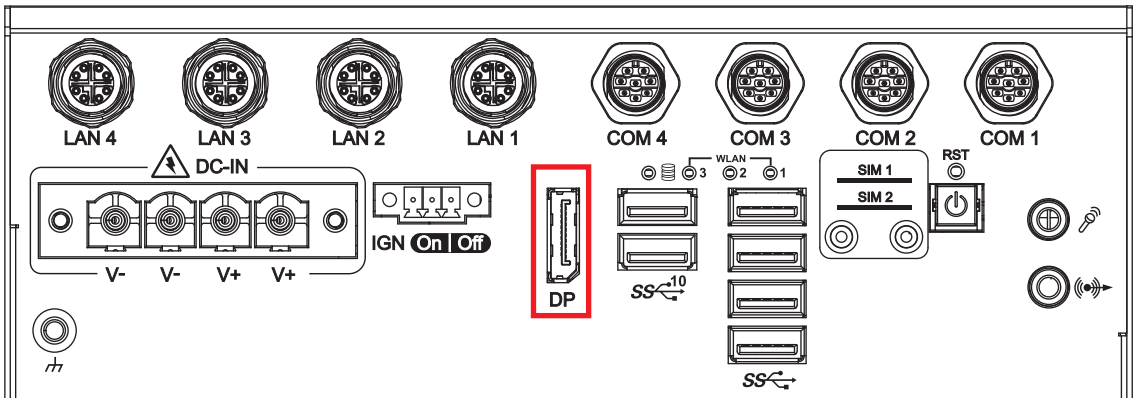


Yellow-HDD LED : A hard disk LED. If the LED is on, it indicates that the system's storage is functional. If it is off, it indicates that the system's storage is not functional. If it is flashing, it indicates data access activities are in progress.

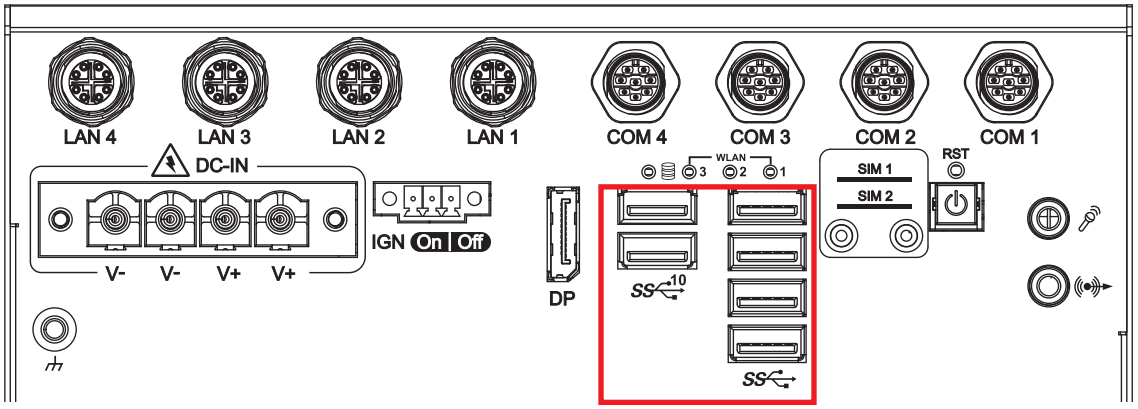
Green-WLAN LED : If the LED is on, it indicates that the WLAN1/2/3 device is working.

LED Color	Power Status	System Status
Yellow	HDD	• On/Off : Device status, function or not. • Twinkling : Data transferring.
Green	WLAN1 (M2B_CN1)	• On/Off : Device status, function or not. • Twinkling : Data transferring.
Green	WLAN2 (MPCIE1)	• On/Off : Device status, function or not. • Twinkling : Data transferring.
Green	WLAN3 (M2E_CN1)	• On/Off : Device status, function or not. • Twinkling : Data transferring.

2.2.4 Display Port

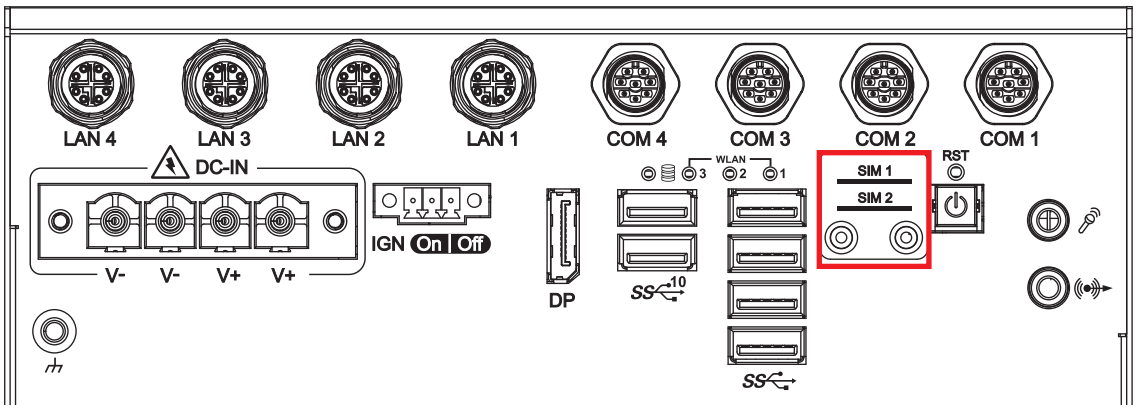


2.2.5 USB 3.1/3.2



There are 2 USB 3.2 Gen2 Type A connections available supporting up to 10GB and 4 USB 3.2 Gen1 supporting up to 5GB per second data rate in the front side of GPC-1000MX. It also compliant with the requirements of Super Speed (SS), high speed (HS), full speed F(S) and low speed (LS).

2.2.6 SIM 1, SIM 2

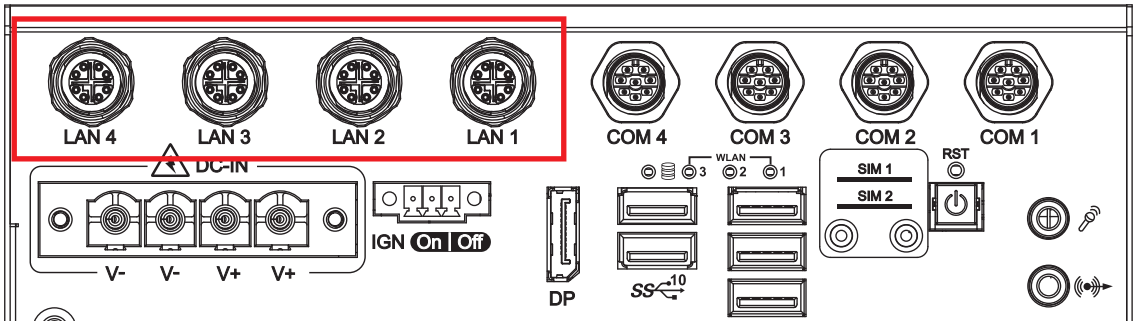


Onboard Display Port supports auxiliary channel dual mode, and the connection supports up to 4096x2304 resolution at 60Hz.

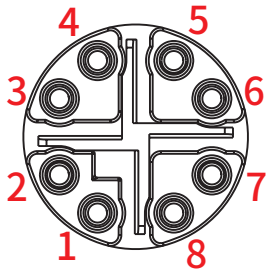
Multi-Stream Transport Display Resolutions Table :

Slot	SIM
M2B_CN1	SIM1
MPCIE1	SIM2

2.2.7 10/100/1000 Mbps Ethernet Port

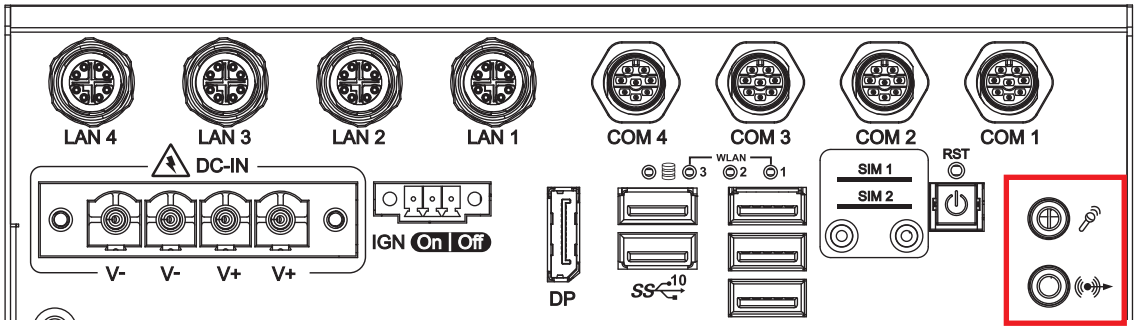


There are 2 M12 jacks supporting 10/ 100/1000 Mbps Ethernet connections in the rear side. LAN 1 to LAN 4 powered by Intel i210 Ethernet engine. When LAN1 to LAN2 work in normal status, iAMT 11.0 function is enabled. Using suitable M12 LAN cable, you can connect the system to a computer, or to any other devices with Ethernet connection, for example, a hub or a switch.
Moreover, LAN 1 to LAN 4 supports Wake on LAN and Pre-boot functions. The pin-outs of LAN 1 to LAN 4 are listed as follows:



Pin No.	LAN1	LAN2	LAN3	LAN4
1	LAN1_MDI_0P	LAN2_MDI_0P	LAN3_MDI_0P	LAN4_MDI_0P
2	LAN1_MDI_0N	LAN2_MDI_0N	LAN3_MDI_0N	LAN4_MDI_0N
3	LAN1_MDI_1P	LAN2_MDI_1P	LAN3_MDI_1P	LAN4_MDI_1P
4	LAN1_MDI_1N	LAN2_MDI_1N	LAN3_MDI_1N	LAN4_MDI_1N
5	LAN1_MDI_3P	LAN2_MDI_3P	LAN3_MDI_3P	LAN4_MDI_3P
6	LAN1_MDI_3N	LAN2_MDI_3N	LAN3_MDI_3N	LAN4_MDI_3N
7	LAN1_MDI_2N	LAN2_MDI_2N	LAN3_MDI_2N	LAN4_MDI_2N
8	LAN1_MDI_2P	LAN2_MDI_2P	LAN3_MDI_2P	LAN4_MDI_2P

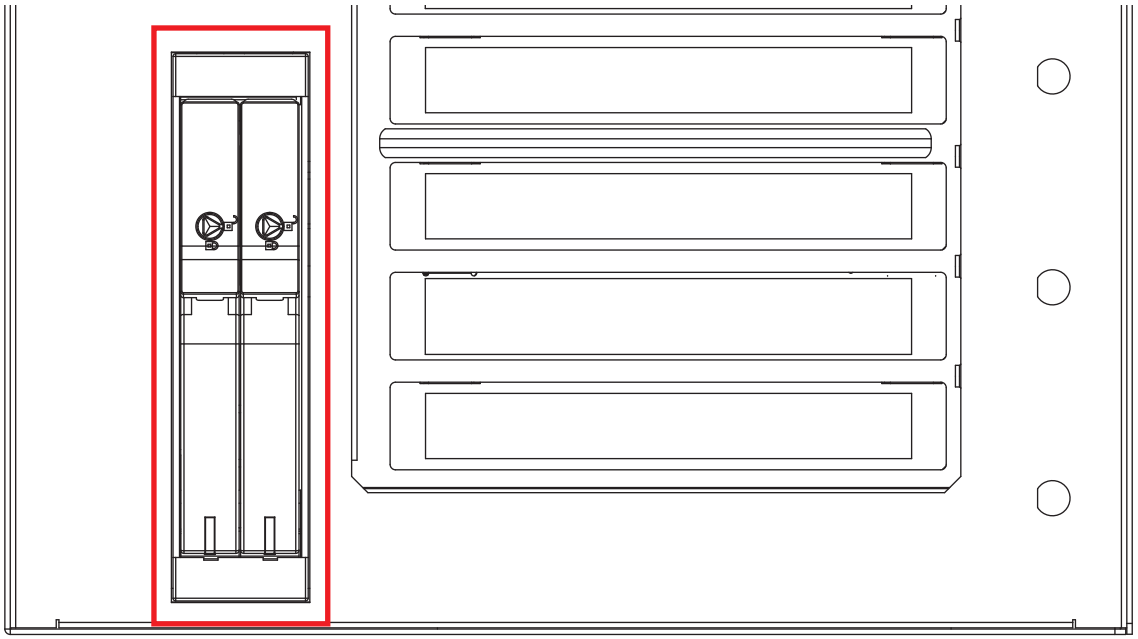
2.2.8 Audio Connector



There are two audio connectors, mic-in and line-out, on the front side of GPC-1000MX. Onboard Realtek ALC888 audio codec supports 7.1 channel HD audio and fully complies with Intel® High Definition Audio (Azalia) specifications.

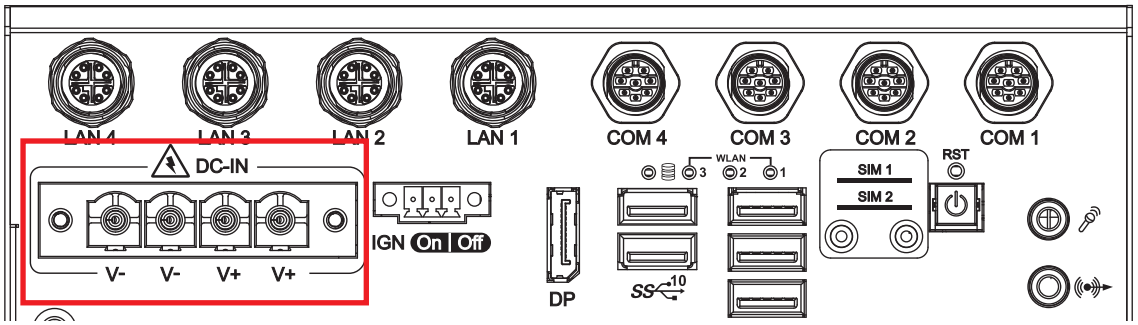
To utilize the audio function on the Windows platform, you need to install corresponding drivers for both Intel W580 chipset and Realtek ALC888 codec. Please refer to chapter four for more details on driver installation.

2.2.9 Front-access SSD/ HDD Tray



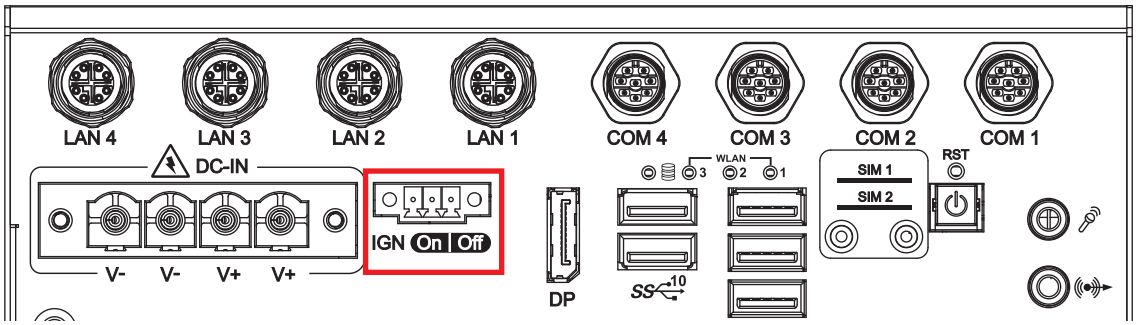
There are four front-access 2.5” SSD/HDD trays on the front side of GPC-1000MX. Press the trigger to open the SSD/HDD tray which has up to 8TB available.

2.2.10 Power Terminal Block



GPC-1000MX supports 12V to 55V DC power input.

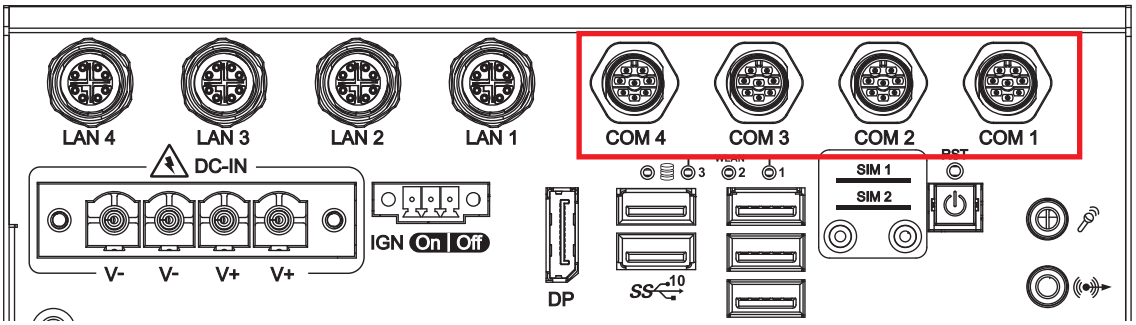
2.2.11 Remote Power On/Off Switch



It is a 2-pin power-on/power-off switch through Phoenix Contact terminal block. You could turn on or off the system power by using this contact. This terminal block supports dual function on soft power-on/power-off (instant off or delay four seconds), and suspend mode.

Pin Number	Definition
1	IGNITION
2	SW+
3	SW-

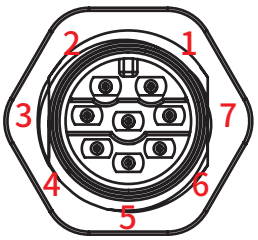
2.2.12 Serial Port COM



Serial port can be configured for RS-232, RS-422, or RS-485 with auto flow control communication. The default definition is RS-232, but if you want to change to RS-422 or RS-485, you can find the settings in BIOS.

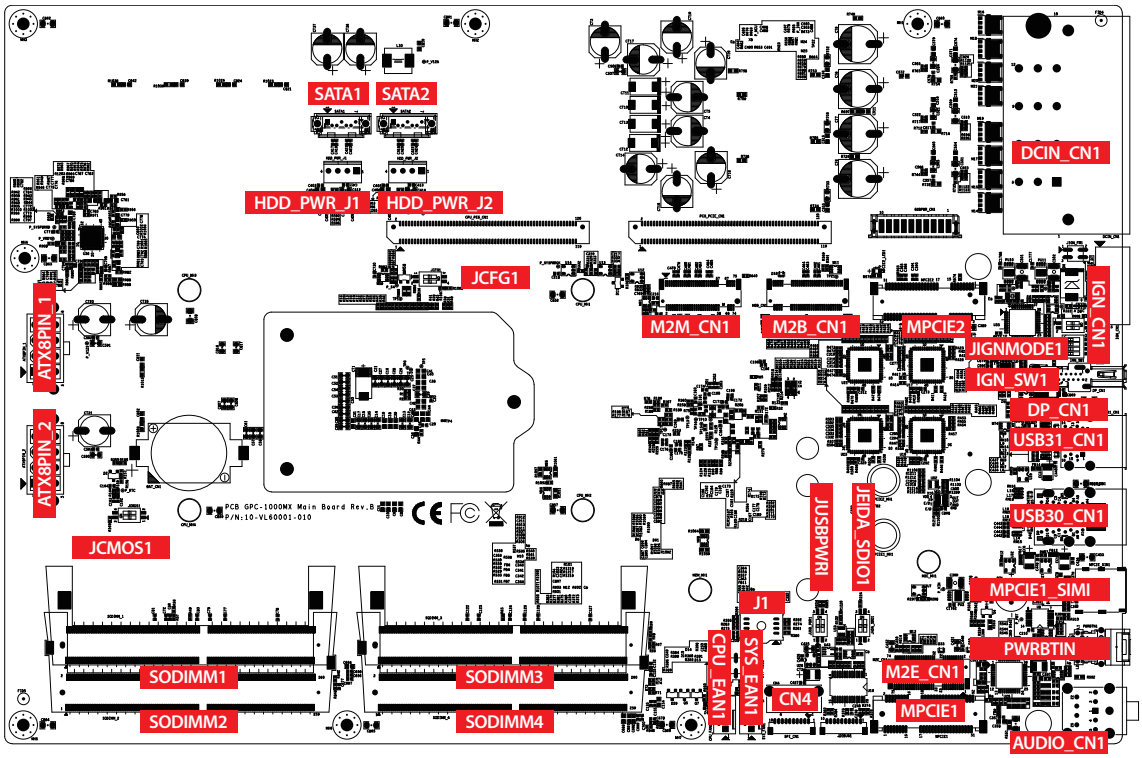
BIOS Setting	Description
COM 1 COM 2 COM 3 COM 4	RS-232
	RS-422(5-wire)
	RS-485
	RS-485 w/z auto-flow control

The pin assignments are listed in the table as follows:

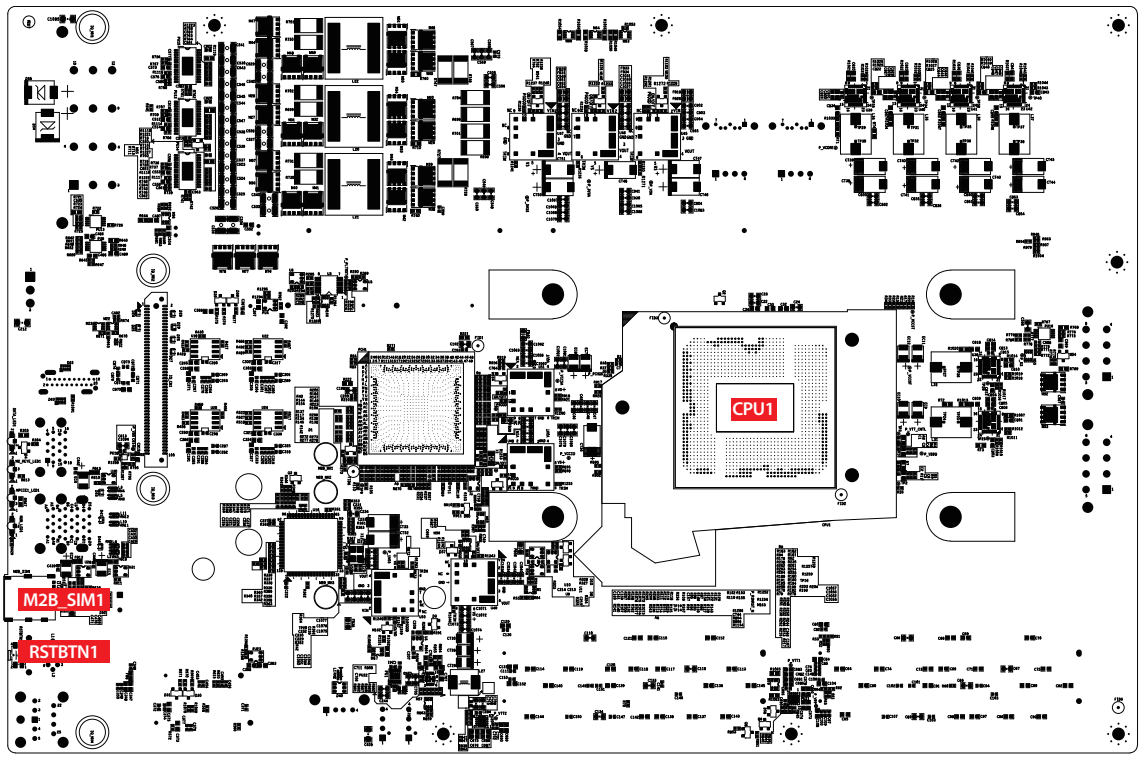
Serial Port	Pin Number	RS-232	RS-422 (5-wire)	RS-485 (3-wire)
	1	DCD	TXD-	DATA-
	2	RXD	TXD+	DATA+
	3	TXD	RXD+	----------
	4	DTR	RXD-	----------
	5	GND	GND	GND
	6	DSR	----------	----------
	7	RTS	----------	----------
	8	CTS	----------	----------
	9	RI	----------	----------

2.3 Main Board Expansion Connectors

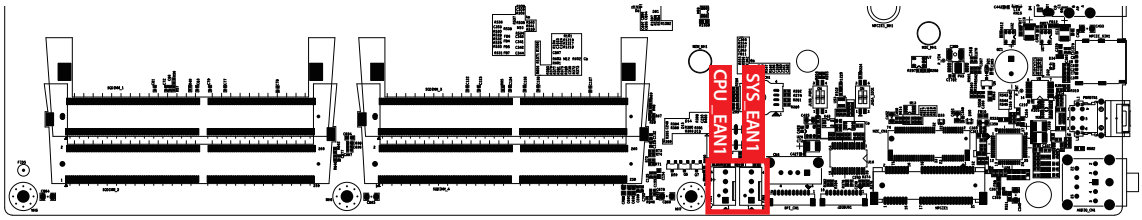
2.3.1 TOP View of GPC-1000MX Main Board with Connector Location



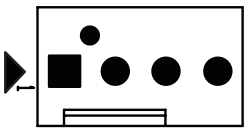
2.3.2 BOTTOM View of GPC-1000MX Main Board with Connector Location



2.3.3 CPU_FAN,SYS_FAN

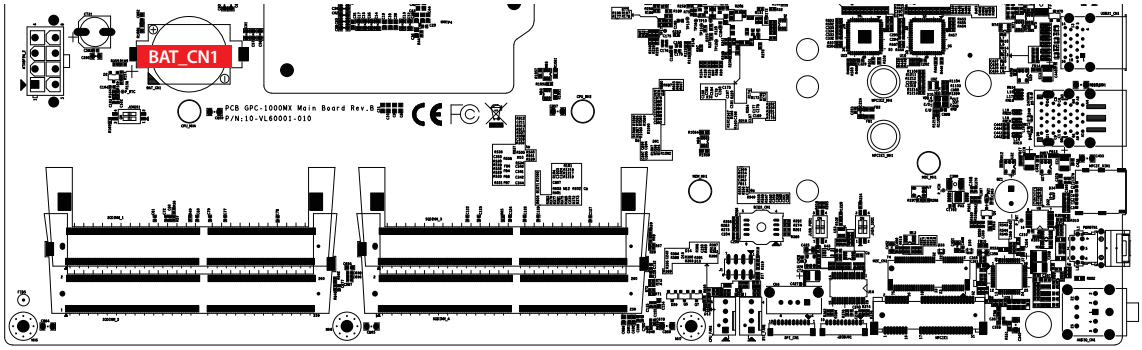


The fan power connector is for additional thermal requirements. The pin assignments of CPU_FAN and SYS_FAN are listed in the following table:



	CPU_FAN		SYS_FAN	
	Pin No.	Description	Pin No.	Description
	1	GND	1	GND
	2	+12V (up to 2A)	2	+12V (up to 2A)
	3	Fan speed sensor	3	NC
	4	Fan PWM	4	Fan PWM

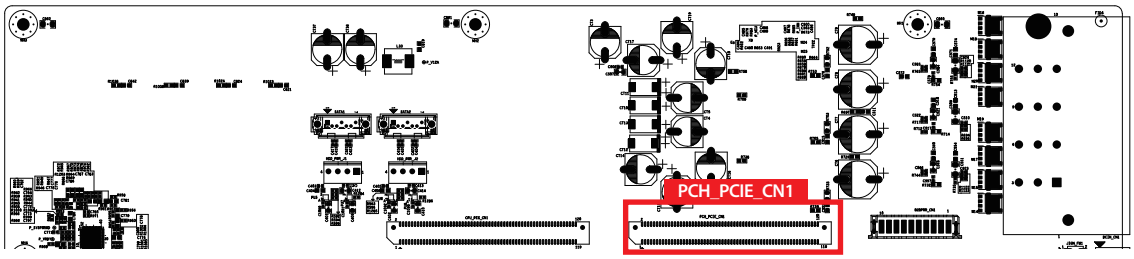
2.3.4 BAT_CN1 : Battery



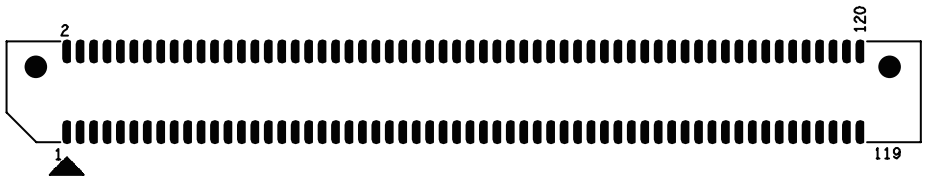
GPC-1000MX's real-time clock is powered by a lithium battery. It is equipped with Panasonic CR2032 220mAh lithium battery. It is recommended that you do not replace the lithium battery on your own. If the battery needs to be changed, please contact the Vecow RMA service team.

2.3.5 PCH_PCIE_CN1 : Board to Board Conn. (PCH)

There are 2 DDR4 channel onboard supporting DDR4 2133/1866 and up to 32GB. (Each channel 16GB)



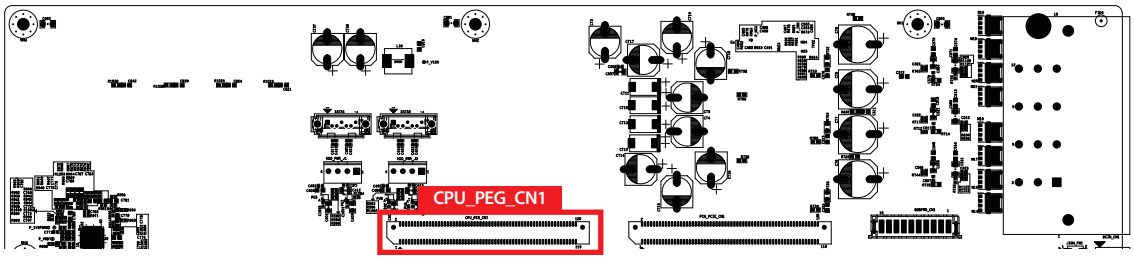
The pin assignments of PCH_PCIE_CN1 are listed in the following table:



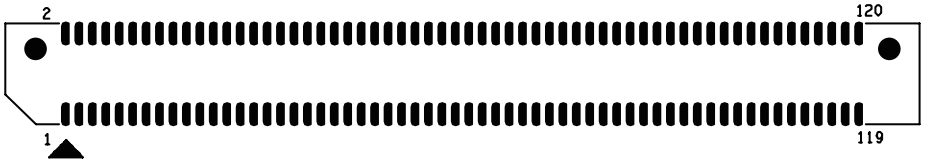
Pin No.	Function	Pin No.	Function
1	GND	2	GND
3	GND	4	CLKOUT_100M_X8_P2
5	GND	6	CLKOUT_100M_X8_N2
7	GND	8	GND
9	CLKOUT_100M_X8_N1	10	PCIE24_RX_N
11	CLKOUT_100M_X8_P1	12	PCIE24_RX_P
13	GND	14	GND
15	PCIE24_TX_N	16	PCIE23_RX_N
17	PCIE24_TX_P	18	PCIE23_RX_P
19	GND	20	GND
21	PCIE23_TX_N	22	PCIE22_RX_N
23	PCIE23_TX_P	24	PCIE22_RX_P
25	GND	26	GND
27	PCIE22_TX_N	28	PCIE21_RX_N
29	PCIE22_TX_P	30	PCIE21_RX_P
31	GND	32	GND
33	PCIE21_TX_N	34	PCIE16_RX_N
35	PCIE21_TX_P	36	PCIE16_RX_P
37	GND	38	GND
39	CLKOUT_100M_X4_N1	40	PCIE15_RX_N
41	CLKOUT_100M_X4_P1	42	PCIE15_RX_P
43	GND	44	GND
45	PCIE16_TX_N	46	PCIE14_RX_N
47	PCIE16_TX_P	48	PCIE14_RX_P

Pin No.	Function	Pin No.	Function
49	GND	50	GND
51	PCIE15_TX_N	52	PCIE13_RX_N
53	PCIE15_TX_P	54	PCIE13_RX_P
55	GND	56	GND
57	PCIE14_TX_N	58	GND
59	PCIE14_TX_P	60	GND
61	GND	62	GND
63	PCIE13_TX_N	64	GND
65	PCIE13_TX_P	66	GND
67	GND	68	GND
69	CLKOUT_100M_X4_N2	70	GND
71	CLKOUT_100M_X4_P2	72	GND
73	GND	74	GND
75	GND	76	GND
77	GND	78	GND
79	GND	80	GND
81	GND	82	GND
83	GND	84	GND
85	GND	86	GND
87	GND	88	+V3.3A
89	GND	90	+V3.3A
91	GND	92	+V3.3A
93	GND	94	+V3.3S
95	GND	96	+V3.3S
97	GND	98	+V3.3S
99	GND	100	+V3.3S
101	GND	102	+V3.3S
103	GND	104	+V3.3S
105	GND	106	+V3.3S
107	GND	108	+V3.3S
109	GND	110	+V3.3S
111	GND	112	+V3.3S
113	GND	114	+V3.3S
115	GND	116	+V3.3S
117	GND	118	+V3.3S
119	GND	120	+V3.3S

2.3.6 CPU_PEG_CN1 : Board to Board Conn. (CPU)



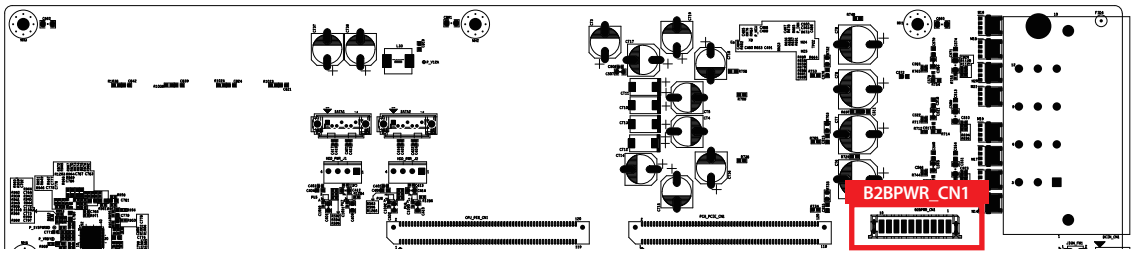
The pin assignments of CPU_PEG_CN1 are listed in the following table:



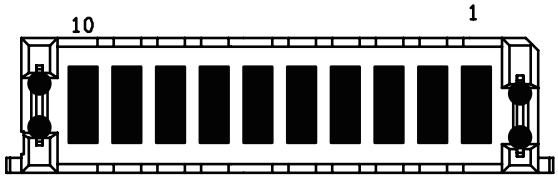
Pin No.	Function	Pin No.	Function
1	+V12S	2	+V12S
3	+V12S	4	+V12S
5	+V12S	6	+V12S
7	+V12S	8	+V12S
9	+V12S	10	+V12S
11	GND	12	GND
13	GND	14	GND
15	GND	16	GND
17	GND	18	GND
19	GND	20	GND
21	PEG_RX_DN_15	22	PEG_TX_DN_15
23	PEG_RX_DP_15	24	PEG_TX_DP_15
25	GND	26	GND
27	PEG_RX_DN_14	28	PEG_TX_DN_14
29	PEG_RX_DP_14	30	PEG_TX_DP_14
31	GND	32	GND
33	PEG_RX_DN_13	34	PEG_TX_DN_13
35	PEG_RX_DP_13	36	PEG_TX_DP_13
37	GND	38	GND
39	PEG_RX_DN_12	40	PEG_TX_DN_12
41	PEG_RX_DP_12	42	PEG_TX_DP_12
43	GND	44	GND
45	PEG_RX_DN_11	46	PEG_TX_DN_11
47	PEG_RX_DP_11	48	PEG_TX_DP_11

Pin No.	Function	Pin No.	Function
49	GND	50	GND
51	PEG_RX_DN_10	52	PEG_TX_DN_10
53	PEG_RX_DP_10	54	PEG_TX_DP_10
55	GND	56	GND
57	PEG_RX_DN_9	58	PEG_TX_DN_9
59	PEG_RX_DP_9	60	PEG_TX_DP_9
61	GND	62	GND
63	PEG_RX_DN_8	64	PEG_TX_DN_8
65	PEG_RX_DP_8	66	PEG_TX_DP_8
67	GND	68	GND
69	PEG_RX_DN_7	70	PEG_TX_DN_7
71	PEG_RX_DP_7	72	PEG_TX_DP_7
73	GND	74	GND
75	PEG_RX_DN_6	76	PEG_TX_DN_6
77	PEG_RX_DP_6	78	PEG_TX_DP_6
79	GND	80	GND
81	PEG_RX_DN_5	82	PEG_TX_DN_5
83	PEG_RX_DP_5	84	PEG_TX_DP_5
85	GND	86	GND
87	PEG_RX_DN_4	88	PEG_TX_DN_4
89	PEG_RX_DP_4	90	PEG_TX_DP_4
91	GND	92	GND
93	PEG_RX_DN_3	94	PEG_TX_DN_3
95	PEG_RX_DP_3	96	PEG_TX_DP_3
97	GND	98	GND
99	PEG_RX_DN_2	100	PEG_TX_DN_2
101	PEG_RX_DP_2	102	PEG_TX_DP_2
103	GND	104	GND
105	PEG_RX_DN_1	106	PEG_TX_DN_1
107	PEG_RX_DP_1	108	PEG_TX_DP_1
109	GND	110	GND
111	PEG_RX_DN_0	112	PEG_TX_DN_0
113	PEG_RX_DP_0	114	PEG_TX_DP_0
115	GND	116	GND
117	SMB_PCH_SMBCLK	118	PCIE_WAKE#
119	SMB_PCH_SMBDATA	120	PLTRST_PEG#

2.3.7 B2BPWR_CN1 : Board to Board Power Conn.



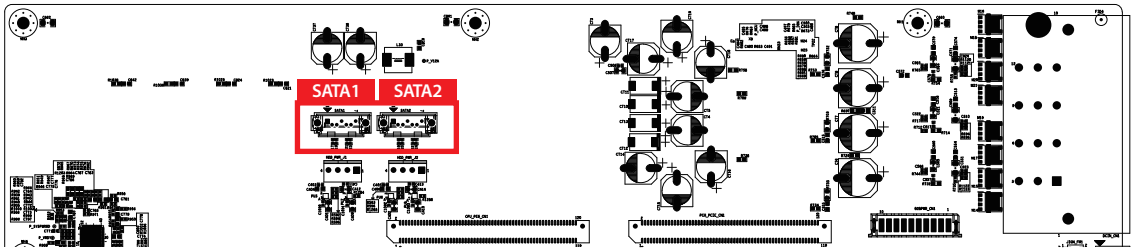
The pin assignments of B2BPWR_CN1 are listed in the following table:



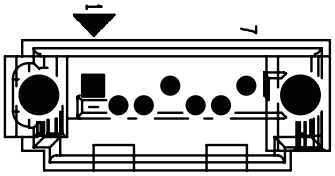
Pin No.	Function	Pin No.	Function
1	+VDC_IN	6	GND
2	+VDC_IN	7	GND
3	+VDC_IN	8	GND
4	+VDC_IN	9	GND
5	+VDC_IN	10	GND

2.3.8 SATA1, SATA2: SATA III Connector

The system's real-time clock is powered by a lithium battery. It is equipped with Panasonic BR2032 190mAh lithium battery. It is not recommended that you replace the lithium battery on your own. If the battery needs to be changed, please contact the Vecow RMA service team.

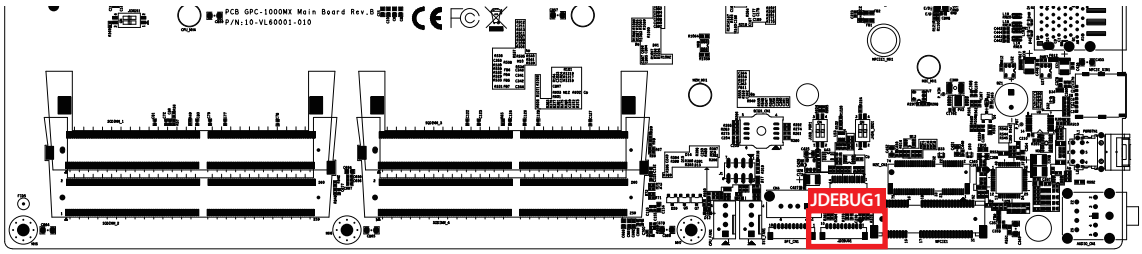


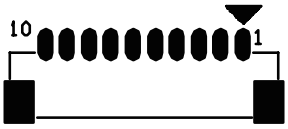
There are two onboard high performance Serial ATA III's (SATA III) on GPC-1000MX. It supports higher storage capacity with less cabling effort and smaller required space. The pin assignments of SATA1, SATA2 are listed in the following table:



Pin Number	Definition
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND

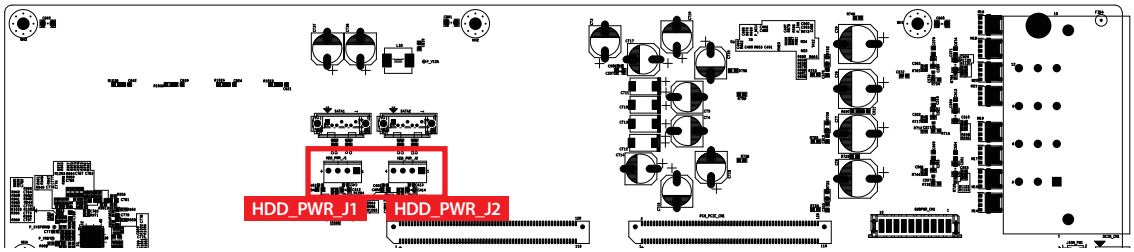
2.3.9 JDEBUG1 : ESPI Port 80 Debug Port



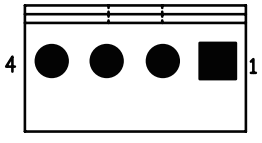


Pin Number	Definition
1	+V3.3A
2	Port 80_ESPI_CS#
3	Port 80_ESPI_IO0
4	Port 80_ESPI_IO1
5	Port 80_ESPI_IO2
6	Port 80_ESPI_IO3
7	GND
8	Port 80_ESPI_CLK
9	Port 80_ESPI_RST#
10	GND

2.3.10 HDD_PWR_J1, HDD_PWR_J2 : SATA Power Connector

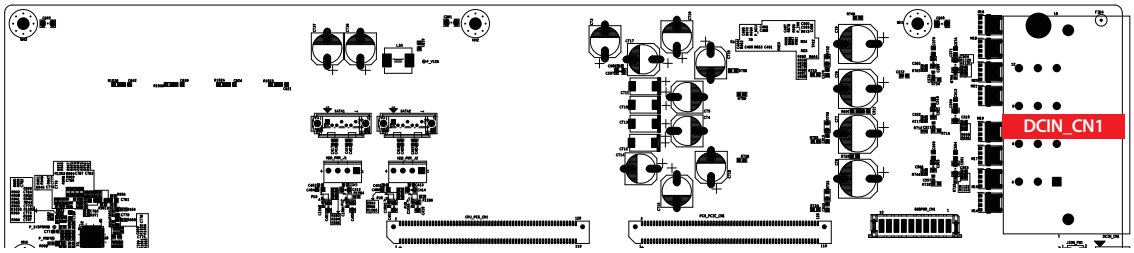


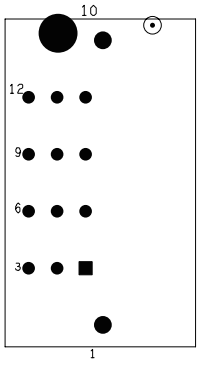
GPC-1000MX is also equipped with two SATA power connectors. It supports 5V (Up to 2A) and 12V (Up to 2A) currents to the hard drive or SSD. The pin assignments of HDD_PWR_J1 , HDD_PWR_J2 are listed in the following table:



Pin Number	Definition
1	GND
2	TXP
3	TXN
4	GND

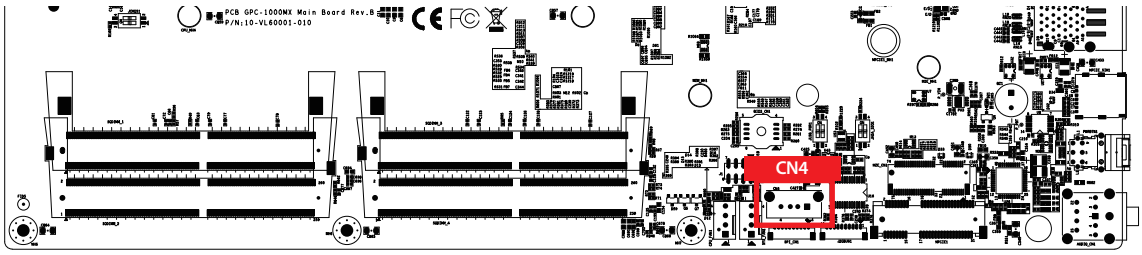
2.3.11 DCIN_CN1 : DC input Connector(12~55V)





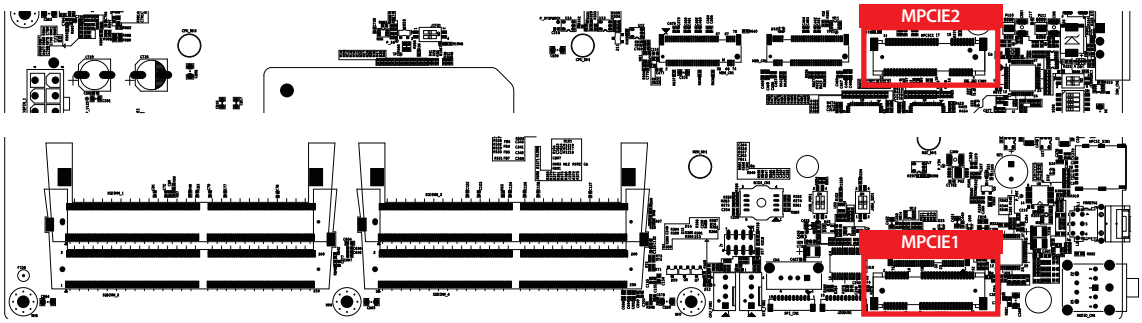
Pin Number	Definition	Pin Number	Definition
1	V+	7	V-
2	V+	8	V-
3	V+	9	V-
4	V+	10	V-
5	V+	11	V-
6	V+	12	V-

2.3.12 CN4 : Internal USB 2.0 Connector



GPC-1000MX main board provides a internal USB port.The USB interface supports 480Mbps transfer rate which complies with high speed USB specification Rev. 2.0 and are fuse protected.

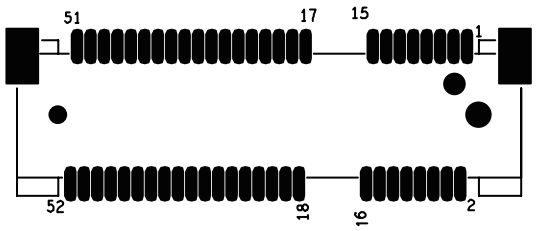
2.3.13 MPCIE1 ,MPCIE2 : Mini PCIe, mSATA



Both mSATA and mini PCIe share the same form factor and similar electrical pinout assignments on their connectors. There was no clear mechanism to distinguish if a mSATA drive or a Mini PCIe device is plugged into the socket until recently that SATA I/O issued an ECN change (ECN #045) to redefine pin-43 on mSATA connector as “no connect” instead of “return current path” (or GND).

When a mSATA drive is inserted, its pin-43 is “no connect”, and the respective pin on the socket is being pulled-up to logic 1. When a mini PCIe device is inserted, its pin-43 forces the respective pin on the socket to ground, or logic 0.

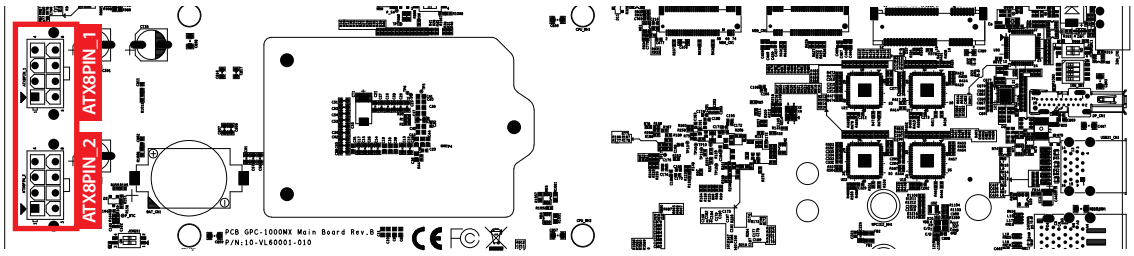
The pin assignments of MPCIE1, MPCIE2 are listed in the following table:



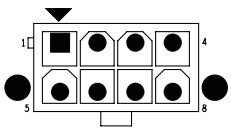
Pin Number	Signal Name	Pin Number	Signal Name
51	Reserved	52	+V3.3A
49	Reserved	50	GND
47	Reserved	48	+1.5V
45	Reserved	46	Reserved
43	Status	44	Reserved
41	+V3.3A	42	Reserved
39	+V3.3A	40	GND
37	GND	38	USB_D+
35	GND	36	USB_D-
33	PETp0	34	GND
31	PETn0	32	SMB_DATA
29	GND	30	SMB_CLK
27	GND	28	+1.5V

Pin Number	Signal Name	Pin Number	Signal Name
25	PERp0	26	GND
23	PERn0	24	+V3.3A
21	GND	22	PERST#
19	Reserved	20	reserved
17	Reserved	18	GND
Mechanical Key			
15	GND	16	Reserved
13	REFCLK+	14	Reserved
11	REFCLK-	12	Reserved
9	GND	10	Reserved
7	CLKREQ#	8	Reserved
5	Reserved	6	1.5V
3	Reserved	4	GND
1	WAKE#	2	+V3.3A

2.3.14 ATX8PIN_1,ATX8PIN_2 : 8Pin ATX Power Connector (Total Max 600W)

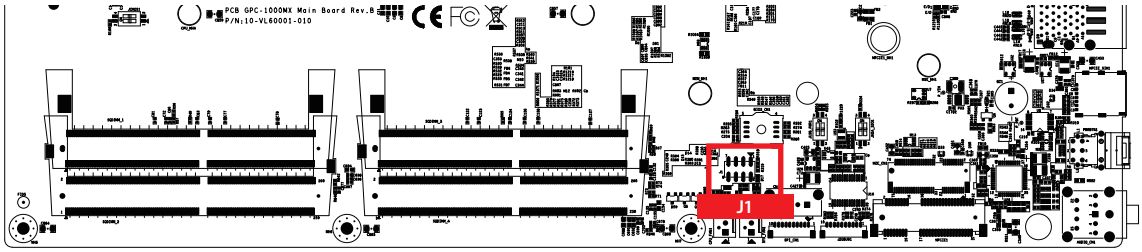


The pin assignments of ATX8PIN_1,ATX8PIN_2 are listed in the following table:



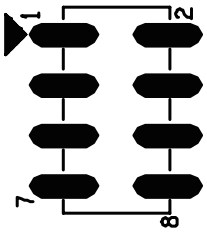
Pin No.	Signal Name	Pin No.	Signal Name
1	GND	5	+V12S
2	GND	6	+V12S
3	GND	7	+V12S
4	GND	8	+V12S

2.3.15 J1 : Miscellaneous Pin Header



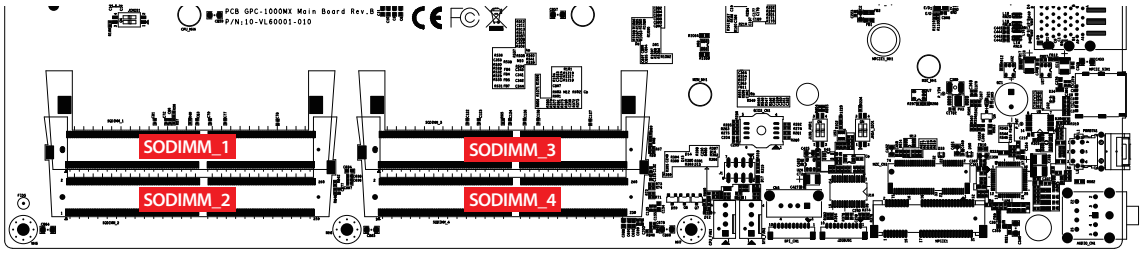
2.0mm 2x4p header
This pin header can be used as a backup for following functions, hard drive LED indicator, reset button, power LED indicator, and power-on/off button.

The pin assignments of J1 are listed in the following table:



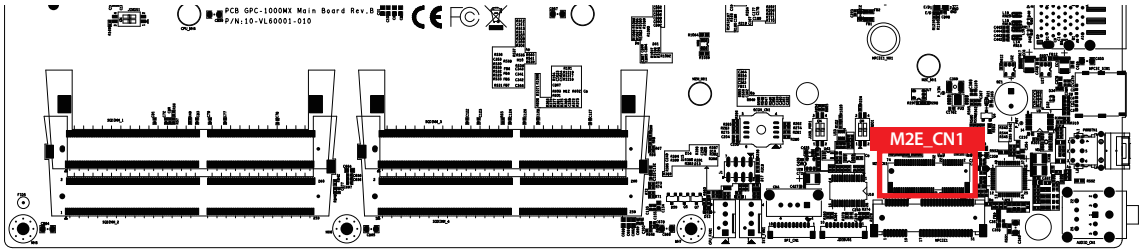
Group	Pin No.	Description
HDD LED	1	HDD_LED_P
	3	HDD_LED_N
RESET BUTTON	5	FP_RST_BTN_N
	7	Ground
POWER LED	2	PWR_LED_P
	4	PWR_LED_N
POWER BUTTON	6	FP_PWR_BTN_IN
	8	Ground

2.3.16 SODIMM_1,SODIMM_2,SODIMM_3,SODIMM_4



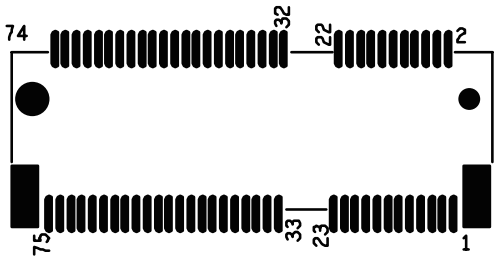
4 DDR4 2133MHz SO-DIMM, up to 128GB

2.3.17 M2E_CN1 : M.2 KEY E USB2, PCIex2 support



M.2 key E connector is suitable for applications that use wireless connectivity including Wi-Fi,Bluetooth, NFC of GNSS.

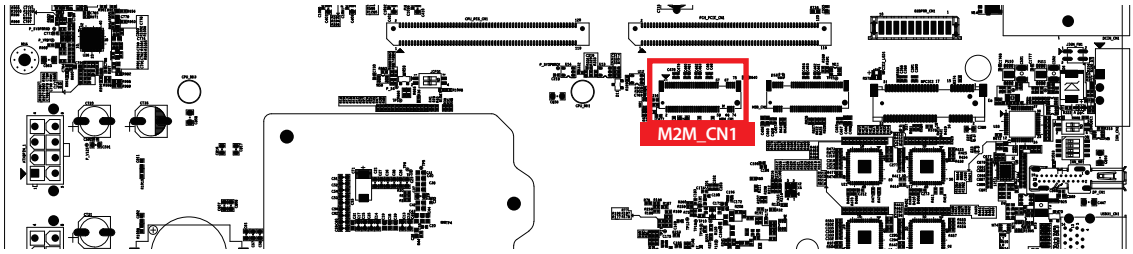
Module card types include 2230 Pin Out :



Pin Number	Signal Name	Pin Number	Signal Name
75	GND	74	+V3.3A
73	PCIE_100M_CLK__N1	72	+V3.3A
71	PCIE_100M_CLK__P1	70	NC
69	GND	68	PCIE_CLK_REQ1#
67	PCIE_RX_N1	66	NC
65	PCIE_RX_P1	64	NC
63	GND	62	SMB_ALERT#
61	PCIE_TX_N1	60	SMB_CLK
59	PCIE_TX_P1	58	SMB_DATA
57	GND	56	NC
55	PCIE_WAKE#	54	NC
53	PCIE_CLK_REQ0#	52	PLTRST#
51	GND	50	SUS_CLK
49	PCIE_100M_CLK__N0	48	NC
47	PCIE_100M_CLK__P0	46	NC
45	GND	44	NC

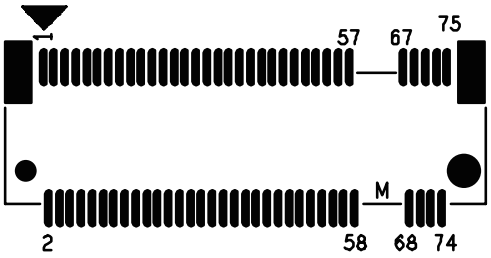
Pin Number	Signal Name	Pin Number	Signal Name
43	PCIE_RX_N0	42	CL_CLK
41	PCIE_RX_P0	40	CL_DATA
39	GND	38	CL_RST_N
37	PCIE_TX_N0	36	NC
35	PCIE_TX_P0	34	NC
33	GND	32	NC
Mechanical Key			
23	NC		
21	NC	22	NC
19	NC	20	NC
17	NC	18	GND
15	NC	16	NC
13	NC	14	NC
11	NC	12	NC
9	NC	10	NC
7	GND	8	NC
5	USB-	6	LED1#
3	USB+	4	+V3.3A
1	GND	2	+V3.3A

2.3.18 M2M_CN1 : M.2 KEY M PCIe x4 Support



M.2 key M connector is suitable for applications that use Host I/Fs. PCIe Module card type 2280 is supported.

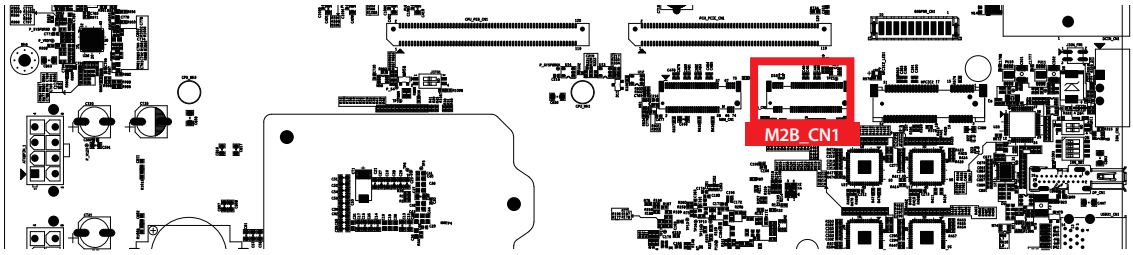
Pin Out :



Pin Number	Signal Name	Pin Number	Signal Name
75	GND		
73	GND	74	+V3.3S
71	GND	72	+V3.3S
69	NC	70	+V3.3S
67	GND	68	NC
Mechanical Key			
57	GND	58	NC
55	CLK100M_KEYM_P	56	NC
53	CLK100M_KEYM_N	54	PCIE_WAKE#
51	GND	52	CK_REQ9_N
49	PCIE_PEG60_TXP0	50	PLTRST#_MPCIE
47	PCIE_PEG60_TXN0	48	NC
45	GND	46	NC
43	PCIE_PEG60_RXP0	44	NC
41	PCIE_PEG60_RXN0	42	NC
39	GND	40	NC
37	PCIE_PEG60_TXP1	38	DEVSLP

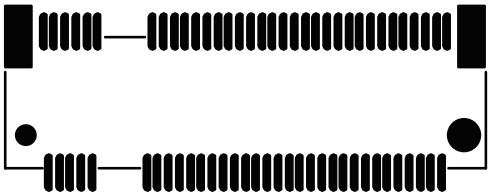
Pin Number	Signal Name	Pin Number	Signal Name
35	PCIE_PEG60_TXN1	36	NC
33	GND	34	NC
31	PCIE_PEG60_RXP1	32	NC
29	PCIE_PEG60_RXN1	30	NC
27	GND	28	NC
25	PCIE_PEG60_TXP2	26	NC
23	PCIE_PEG60_TXN2	24	NC
21	GND	22	NC
19	PCIE_PEG60_RXP2	20	NC
17	PCIE_PEG60_RXN2	18	+V3.3S
15	GND	16	+V3.3S
13	PCIE_PEG60_TXP3	14	+V3.3S
11	PCIE_PEG60_TXN3	12	+V3.3S
9	GND	10	M2M_SATA_LED#
7	PCIE_PEG60_RXP3	8	NC
5	PCIE_PEG60_RXN3	6	NC
3	GND	4	+V3.3S
1	GND	2	+V3.3S

2.3.19 M2B_CN1 : M.2 KEY B USB3,USB2,PCIe Support



USB3.0/USB2.0 Support(Default) , PCIex2(BIOS option)
Module card types include 3042,3052,2280.

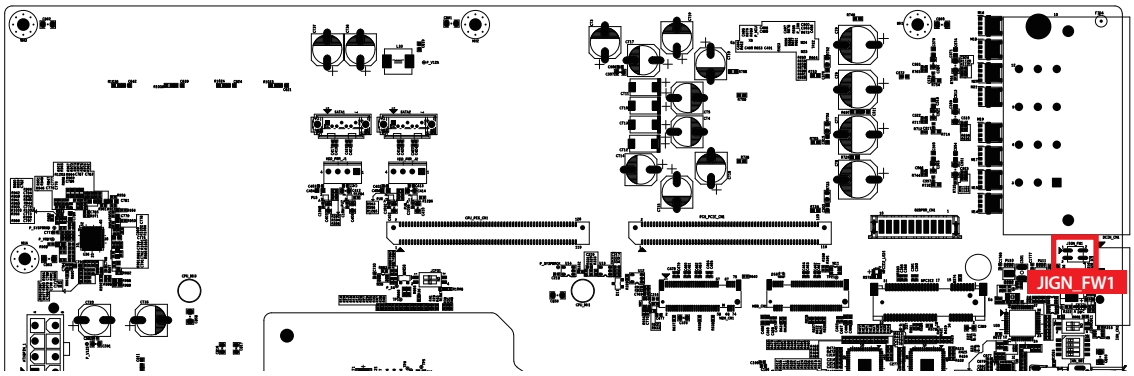
Pin Out :

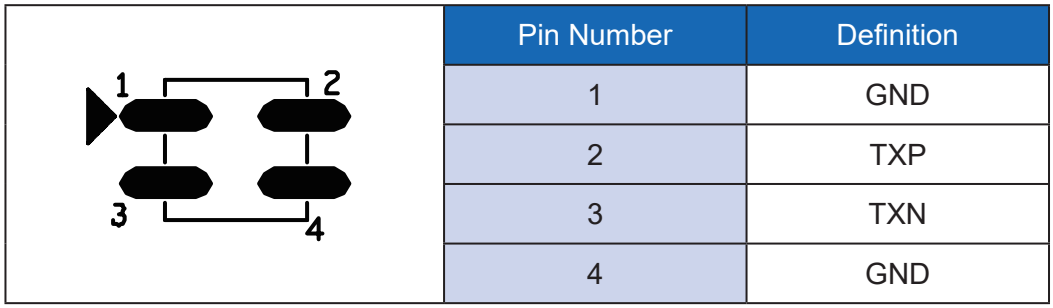


Pin Number	Signal Name	Pin Number	Signal Name
75	NC	74	+V3.3A
73	GND	72	+V3.3A
71	GND	70	+V3.3A
69	NC	68	NC
67	NC	66	SIM_DETECT
65	NC	64	NC
63	NC	62	NC
61	NC	60	NC
59	NC	58	NC
57	GND	56	NC
55	PCIE_100M_CLK_P	54	PCIE_WAKE#
53	PCIE_100M_CLK_N	52	PCIE_CLK_REQ
51	GND	50	PLTRST#
49	(default)USB_ TX_1P,PCIe_TX_1P	48	NC

Pin Number	Signal Name	Pin Number	Signal Name
47	(default)USB_TX_1N, PCIe_TX_1N	46	NC
45	GND	44	NC
43	(default)USB_RX_1P, PCIe_RX_1P	42	NC
41	(default)USB_RX_1N, PCIe_RX_1N	40	NC
39	GND	38	DEVSLP
37	(default)USB_TX_2P, PCIe_TX_2P	36	UIM_PWR
35	(default)USB_TX_2N, PCIe_TX_2N	34	UIM_DATA
33	GND	32	UIM_CLK
31	(default)USB_RX_2P, PCIe_RX_2P	30	UIM_RESET
29	(default)USB_RX_2N, PCIe_RX_2N	28	NC
27	GND	26	NC
25	NC	24	NC
23	NC	22	NC
21	NC	20	NC
Mechanical Key			
11	GND		
9	USB-	10	LED1#
7	USB+	8	NC
5	GND	6	FULL_CARD_PWR_OFF
3	GND	4	+V3.3A
1	NC	2	+V3.3A

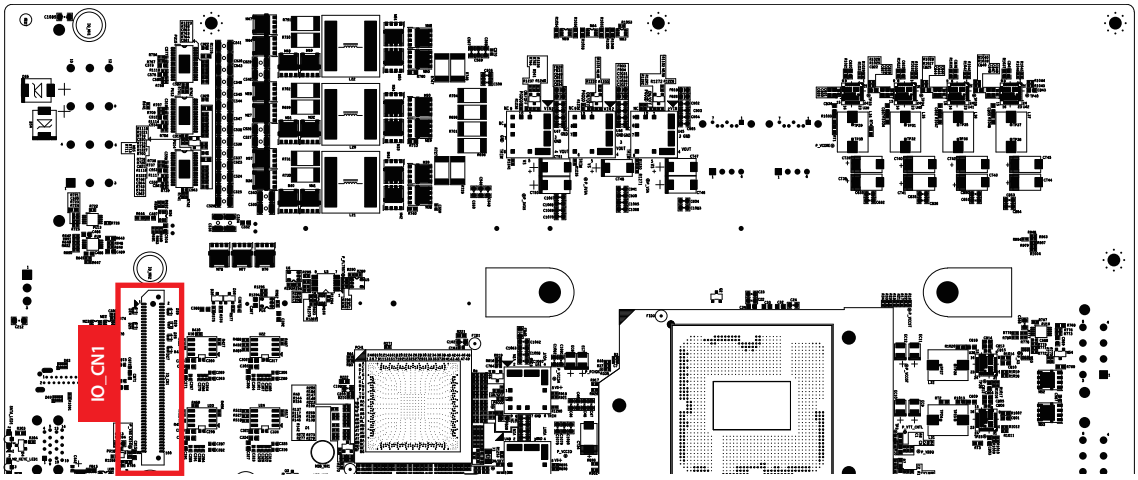
2.3.20 JIGN_FW1 : IGNITION FW Programming Header



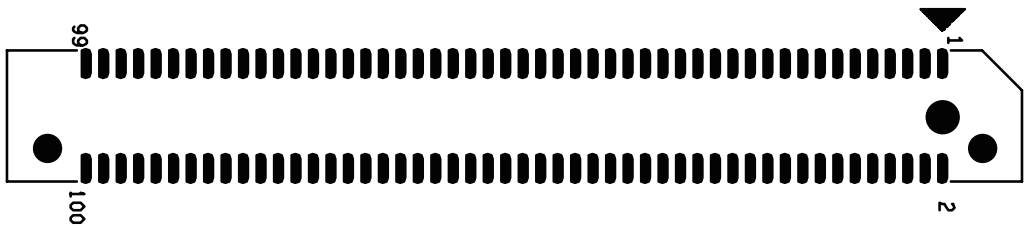


Pin Number	Definition
1	GND
2	TXP
3	TXN
4	GND

2.3.21 IO_CN1 : IO Board Connector



The pin assignments of IO_CN1 are listed in the following table:

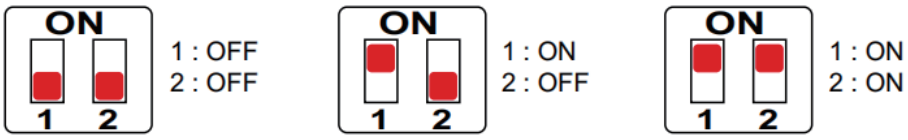


Pin Number	Signal Name	Pin Number	Signal Name
1	GND	2	GND
3	LAN2_MDI0_P	4	LAN4_MDI0_P
5	LAN2_MDI0_N	6	LAN4_MDI0_N
7	LAN2_MDI1_P	8	LAN4_MDI1_P
9	LAN2_MDI1_N	10	LAN4_MDI1_N
11	LAN2_MDI2_P	12	LAN4_MDI2_P
13	LAN2_MDI2_N	14	LAN4_MDI2_N
15	LAN2_MDI3_P	16	LAN4_MDI3_P
17	LAN2_MDI3_N	18	LAN4_MDI3_N
19	GND	20	GND
21	LAN1_MDI0_P	22	LAN3_MDI0_P
23	LAN1_MDI0_N	24	LAN3_MDI0_N
25	LAN1_MDI1_P	26	LAN3_MDI1_P
27	LAN1_MDI1_N	28	LAN3_MDI1_N
29	LAN1_MDI2_P	30	LAN3_MDI2_P
31	LAN1_MDI2_N	32	LAN3_MDI2_N
33	LAN1_MDI3_P	34	LAN3_MDI3_P
35	LAN1_MDI3_N	36	LAN3_MDI3_N
37	GND	38	GND
39	UART2_DCD#	40	UART4_DCD#
41	UART2_RXD	42	UART4_RXD
43	UART2_TXD	44	UART4_TXD
45	UART2_DTR#	46	UART4_DTR#
47	UART2_DSR#	48	UART4_DSR#
49	UART2_RTS#	50	UART4_RTS#
51	UART2_CTS#	52	UART4_CTS#
53	UART2_RI#	54	UART4_RI#
55	UART2_MODE0	56	UART4_MODE0
57	UART2_MODE1	58	UART4_MODE1
59	UART2_MODE2	60	UART4_MODE2
61	SP338E_TERM_COM2	62	SP338E_TERM_ COM4
63	GND	64	GND
65	GND	66	GND
67	+V3.3S	68	+V3.3S
69	+V3.3S	70	+V3.3S
71	UART1_DCD#	72	UART3_DCD#

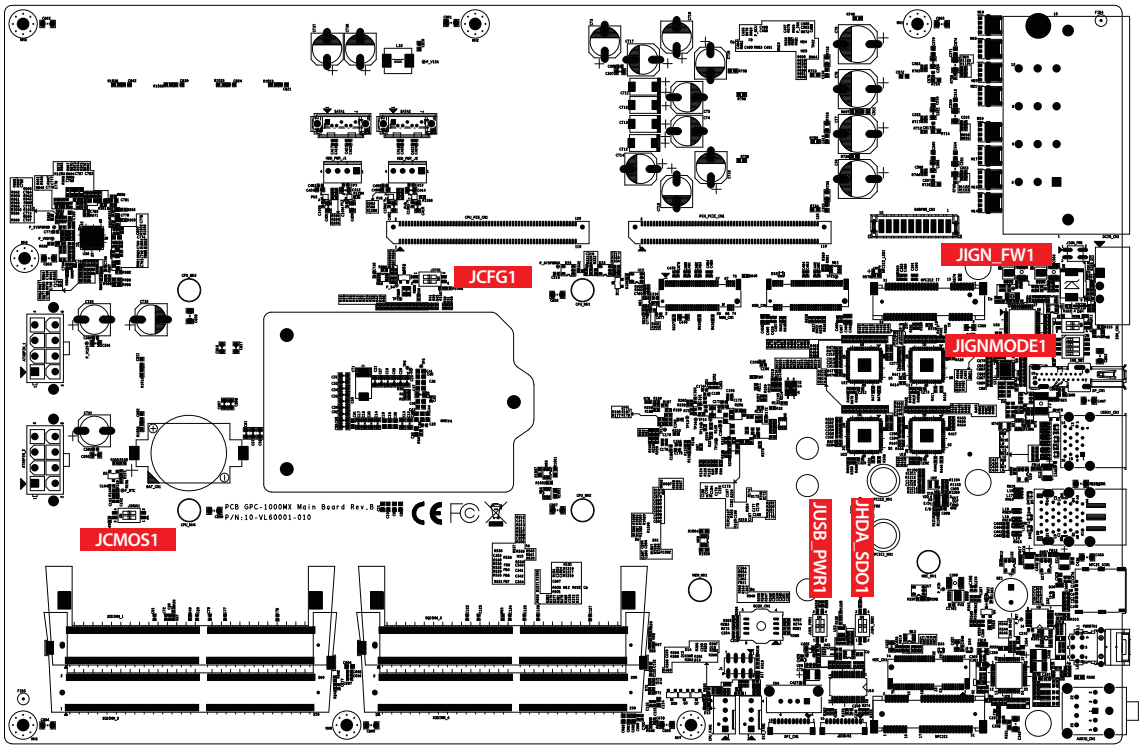
Pin Number	Signal Name	Pin Number	Signal Name
73	UART1_RXD	74	UART3_RXD
75	UART1_TXD	76	UART3_TXD
77	UART1_DTR#	78	UART3_DTR#
79	UART1_DSR#	80	UART3_DSR#
81	UART1_RTS#	82	UART3_RTS#
83	UART1_CTS#	84	UART3_CTS#
85	UART1_RI#	86	UART3_RI#
87	UART1_MODE0	88	UART3_MODE0
89	UART1_MODE1	90	UART3_MODE1
91	UART1_MODE2	92	UART3_MODE2
93	SP338E_TERM_COM1	94	SP338E_TERM_ COM3
95	GND	96	GND
97	+V5S	98	+V5S
99	+V5S	100	+V5S

2.4 Main Board DIP Switch Settings

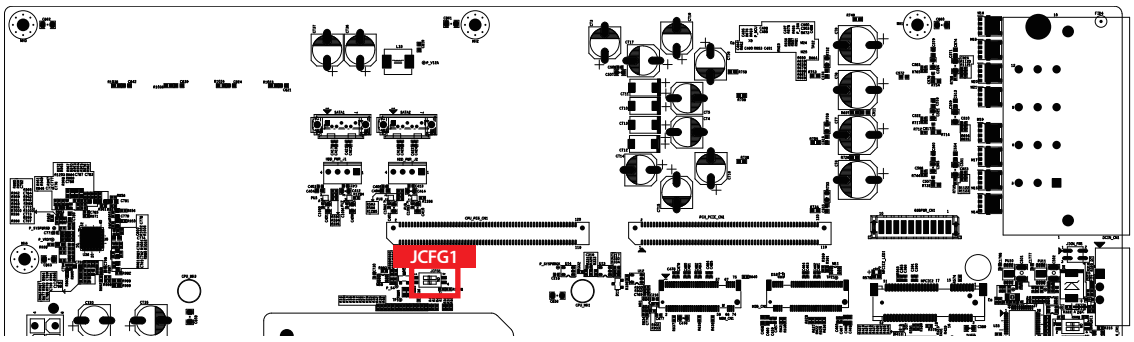
You may configure your card to match the needs of your application by DIP switch. As below shown the configuration of the DIP switch's on and off.



2.4.1 Front View of GPC-1000MX Main Board With Switch Location



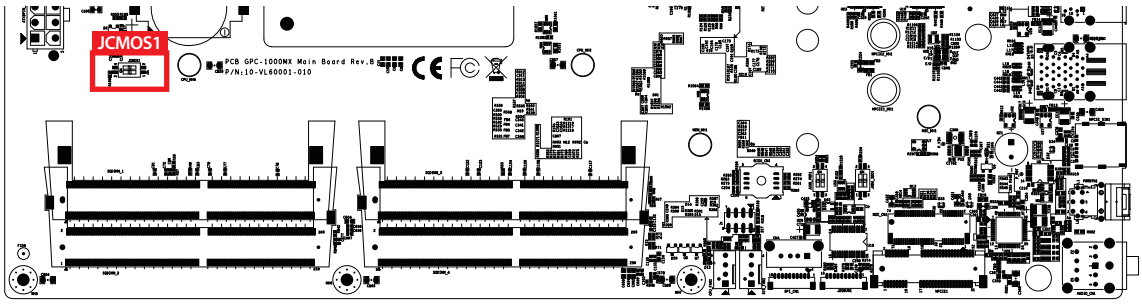
2.4.2 JCFG1 (CPU_PEG_CN1) Configuration



The pin assignments of IO_CN1 are listed in the following table:

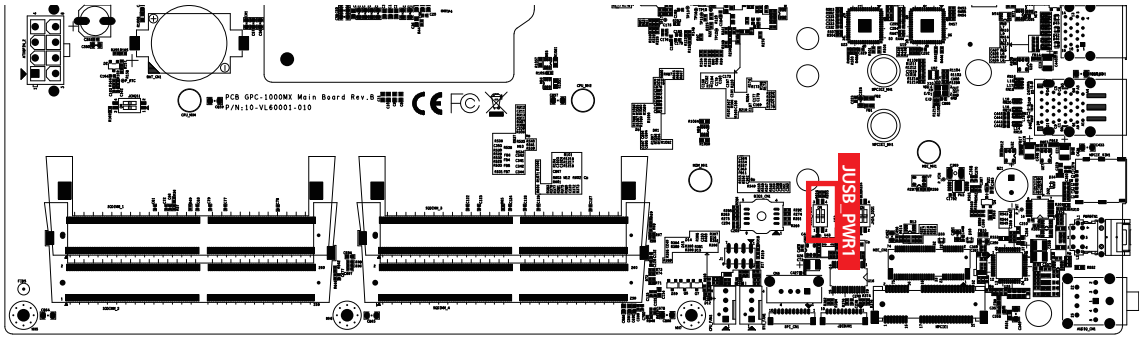
Riser Card	PCIe Configuration	Switch
	1 x8 , 2 x4	ON 1 2 — 1 : ON 2 : ON
GPC-1000MX-BPA	2 x 8	ON 1 2 — 1 : ON 2 : OFF
GPC-1000MX-BPA	1 x16(Default)	ON 1 2 — 1 : OFF 2 : OFF

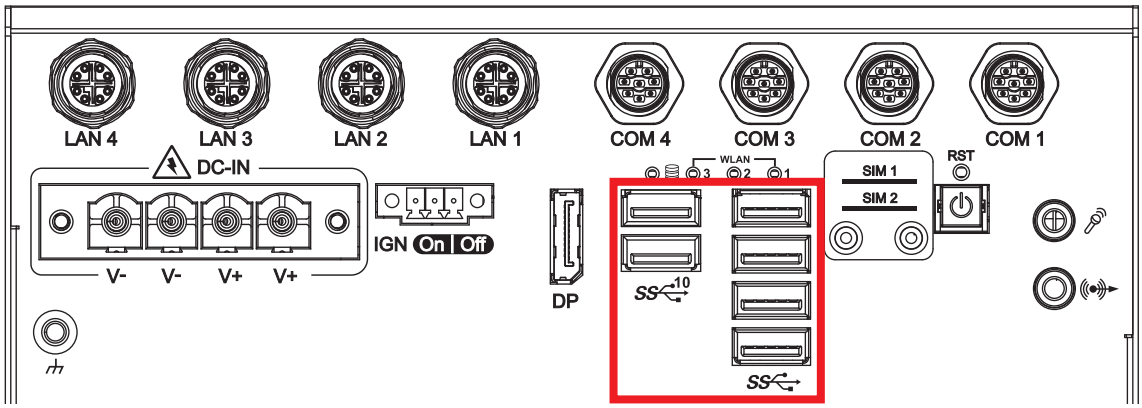
2.4.3 JCMOS1 : Clear CMOS

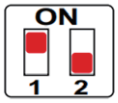
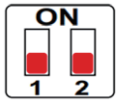


Description	Setting
Normal (Default)	ON 1 2 — 1 : OFF 2 : OFF
Clear CMOS	ON 1 2 — 1 : ON 2 : OFF

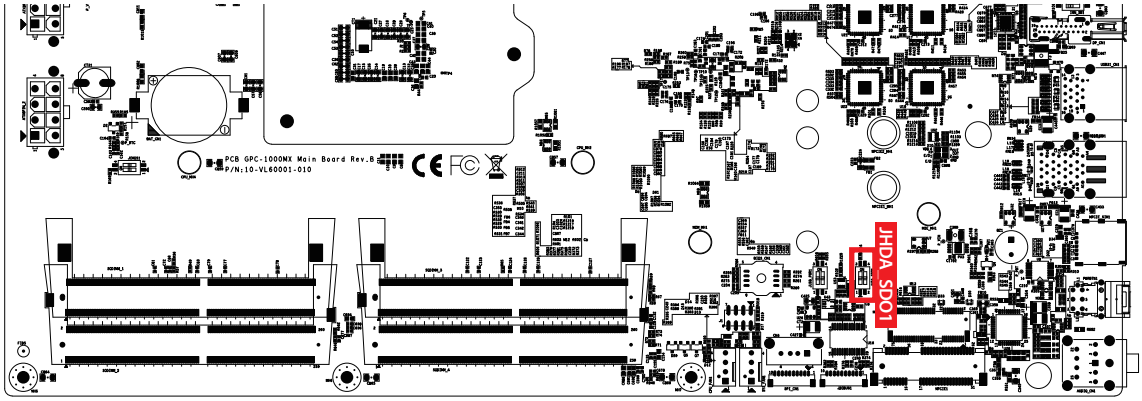
2.4.4 JUSB_PWR1 : USB Wake Up

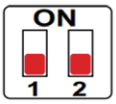
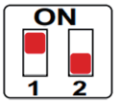




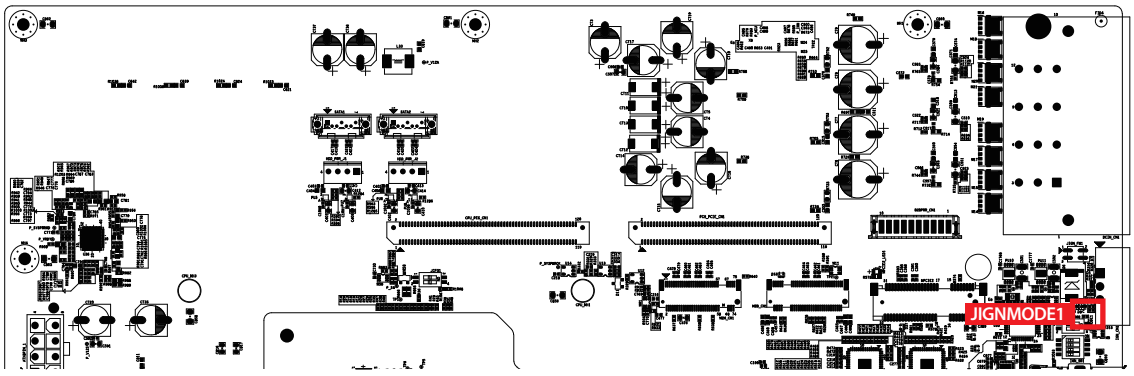
Description	Setting
USB 3.0 and USB 2.0 Wake Up Enable (Default)	 1 : ON 2 : OFF
USB 3.0 and USB 2.0 Wake Up Disable	 1 : OFF 2 : OFF

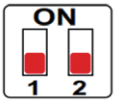
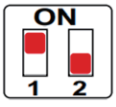
2.4.5 JHDA_SDO1



Description	Setting
Enable security measures defined in the Flash Descriptor. (Default)	 1 : OFF 2 : OFF
Disable Flash Descriptor Security (Flash ME)	 1 : ON 2 : OFF

2.4.6 JIGNMODE1 : IGN Mode



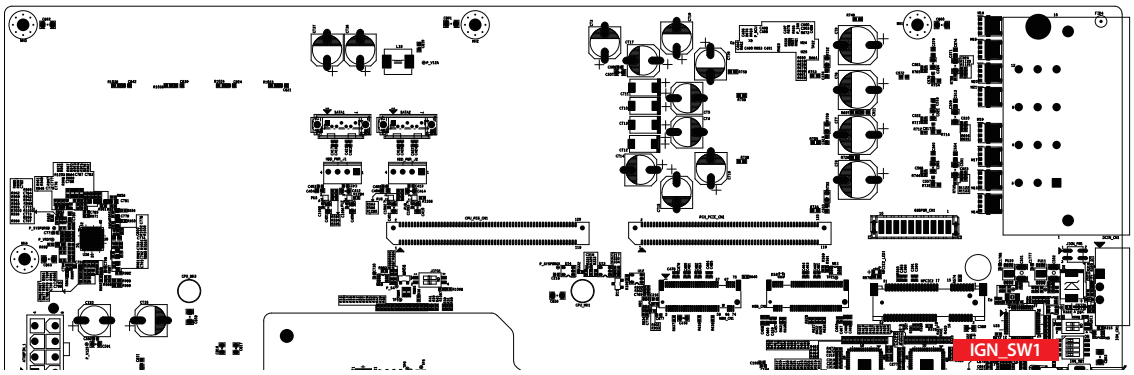
Function	Setting
HW Mode	 1 : OFF 2 : OFF
SW Mode (Default)	 1 : ON 2 : OFF

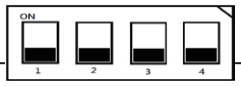
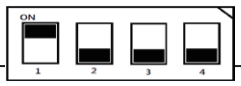
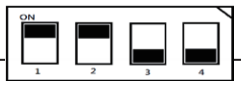
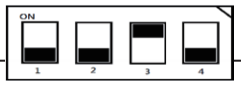
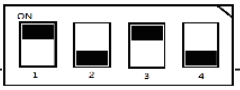
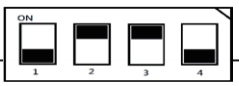
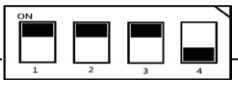
2.5 Riser Board Connectors

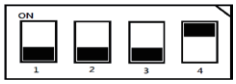
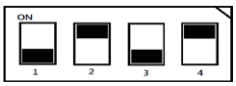
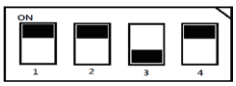
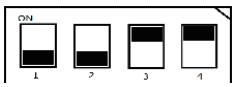
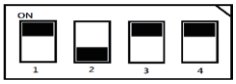
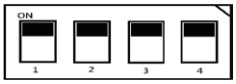
2.5.1 Adjust Ignition Control Modes

GPC-1000MX provides sixteen modes of different power on/off delay periods, adjustable via rotary switch. The default rotary switch is set to 0 in ATX/ AT power mode.

The modes are listed in the following table:



DIP Switch Position	Power on delay	Power off delay	Switch Position
0	ATX/AT mode (Default)		
1	No delay	No delay	
2	No delay	5 seconds	
3	No delay	10 seconds	
4	No delay	30 seconds	
5	No delay	60 seconds	
6	5 seconds	10 seconds	
7	5 seconds	30 seconds	

8	5 seconds	60 seconds	
9	5 seconds	90 seconds	
A	5 seconds	120 seconds	
B	10 seconds	10 seconds	
C	10 seconds	30 seconds	
D	10 seconds	60 seconds	
E	10 seconds	90 seconds	
F	10 seconds	120 seconds	

2.5.2 Ignition Control Wiring

To activate ignition control, you need to provide IGN signal via the 3-pin plugable terminal block located on the front panel. Please find below the general wiring configuration.

Pin	Definition
1	Ignition
2	SW+
3	SW-

For testing purpose, you can refer to the picture above to simulate ignition signal input controlled by a latching switch.

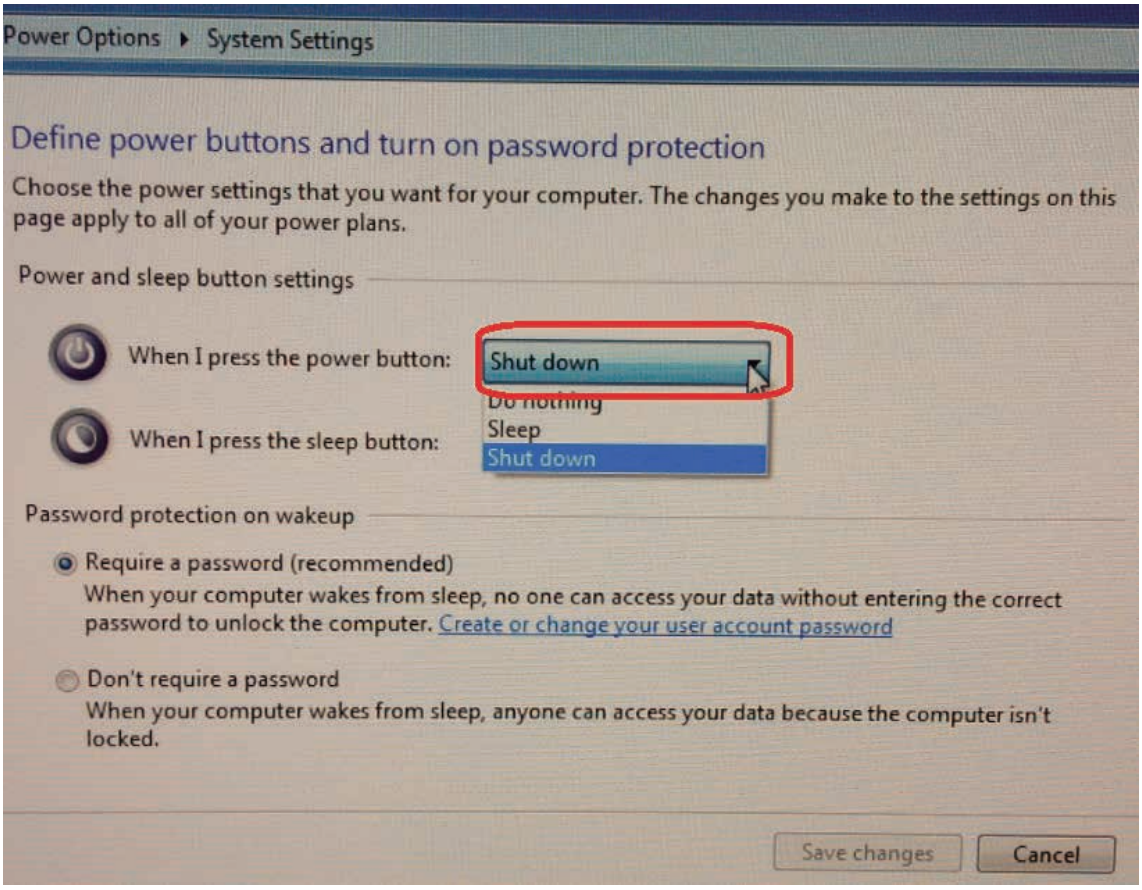
Note:

1. DC power source and IGN share the same ground.

2. GPC-1000MX supports 12V to 55V wide range DC power input in ATX/AT mode. In Ignition mode, the input voltage is fixed to 12V/24V for car battery scenario.

3. For proper ignition control, the power button setting should be “Power Down” mode.

In Windows for example, you need to set “When I press the power button” to "Shut down".

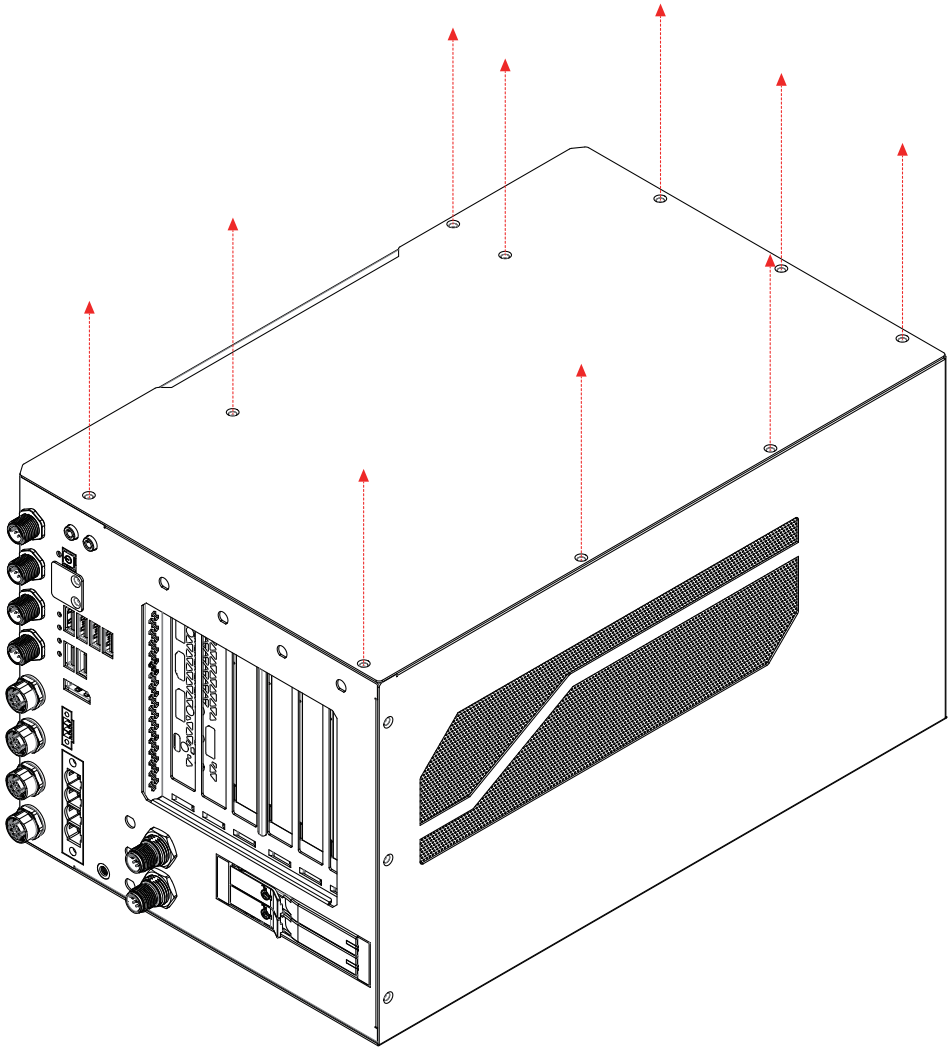

Power Options ▸ System Settings
Define power buttons and turn on password protection
Choose the power settings that you want for your computer. The changes you make to the settings on this page apply to all of your power plans.
Power and sleep button settings
When I press the power button:
Shut down
Sleep
Shut down
When I press the sleep button:
Password protection on wakeup
Require a password (recommended)
When your computer wakes from sleep, no one can access your data without entering the correct password to unlock the computer. Create or change your user account password
Don't require a password
When your computer wakes from sleep, anyone can access your data because the computer isn't locked.
Save changes
Cancel

3

SYSTEM SETUP

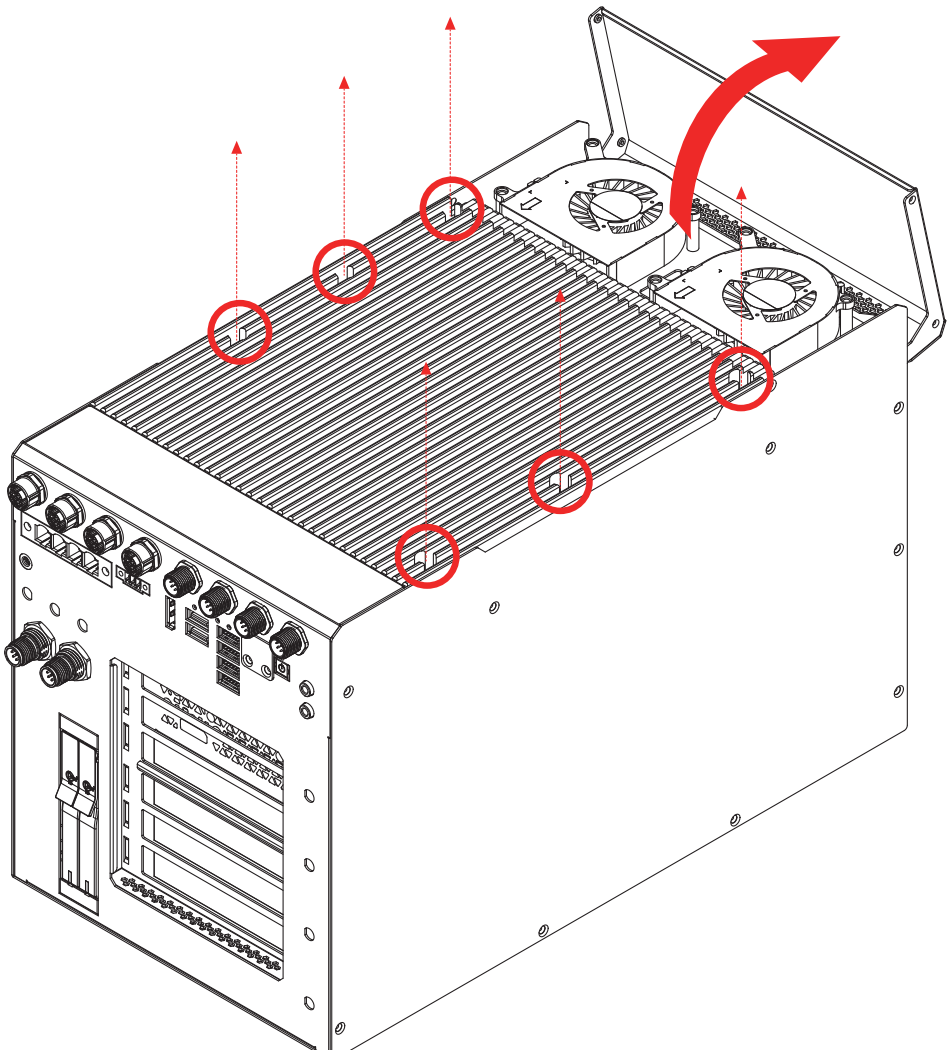
3.1 How to Open Your GPC-1000MX

Step 1 Remove the screws indicated and separate the Cover from the enclosure.

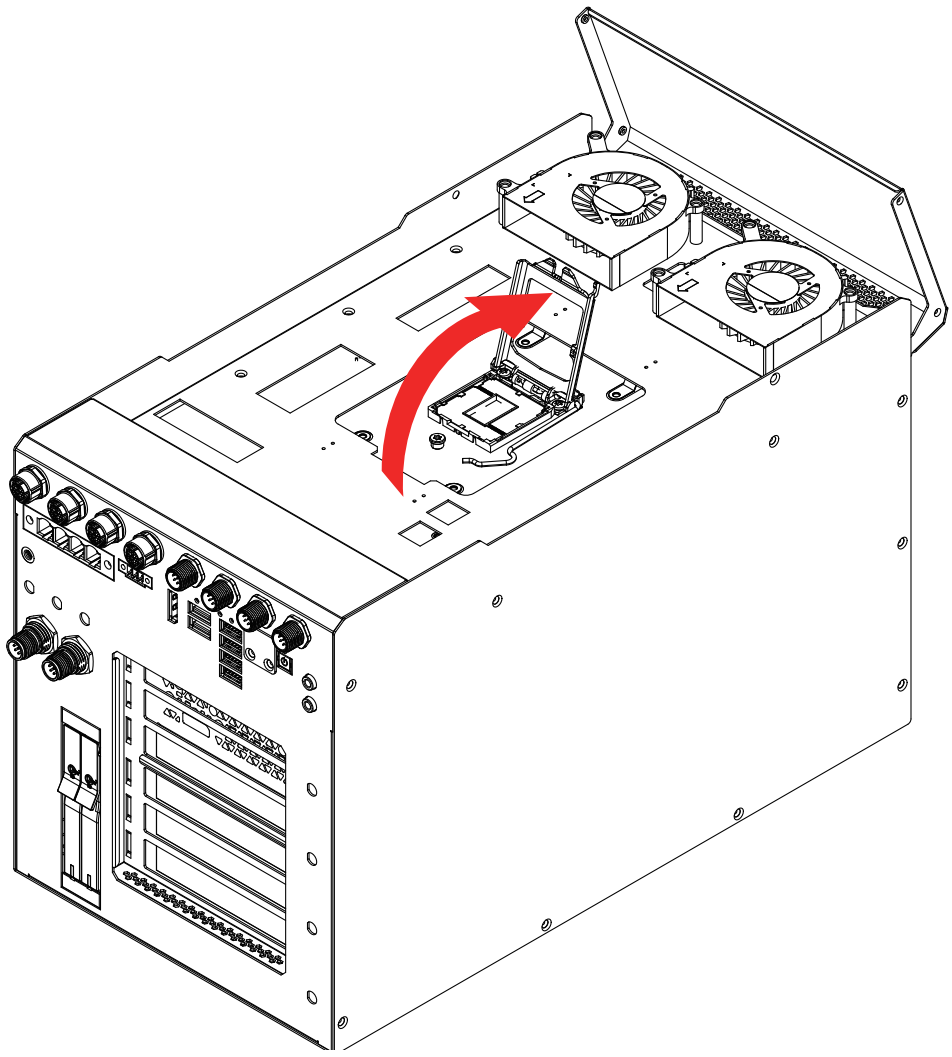


3.2 Installing CPU

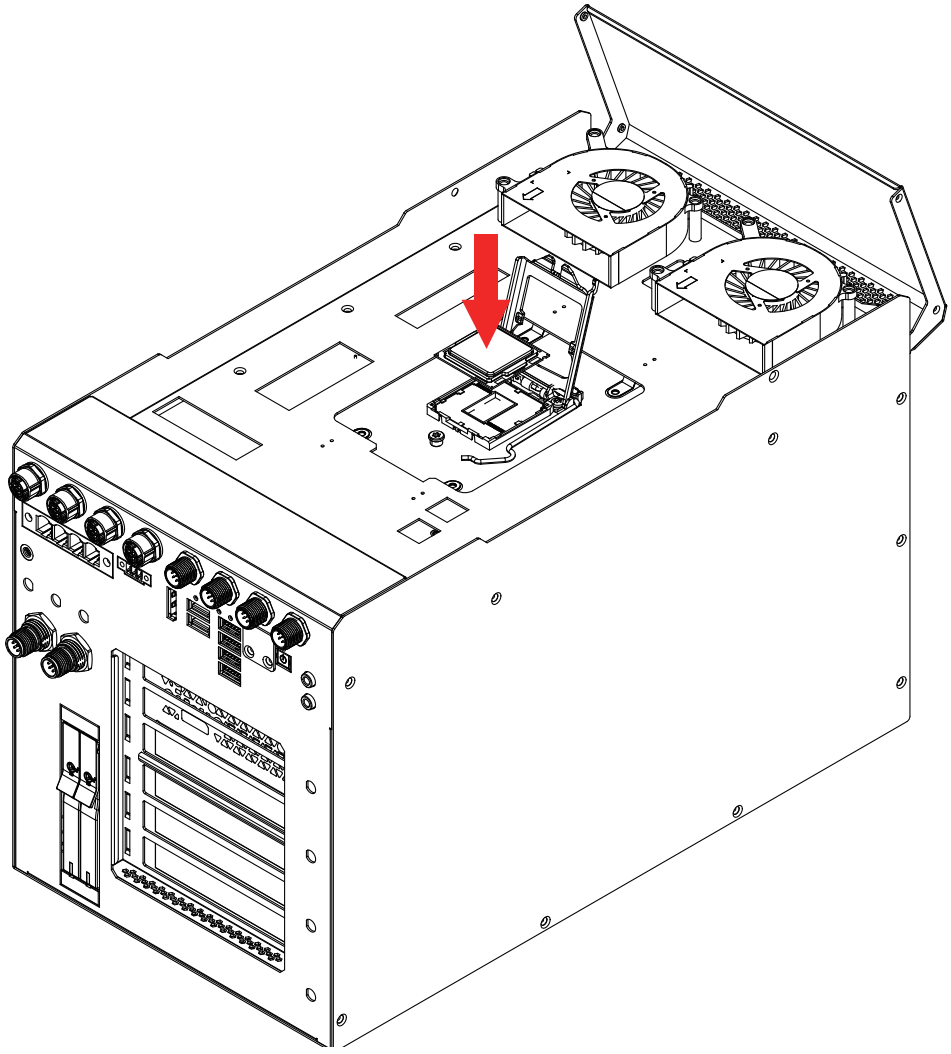
Step 1 Remove the screws indicated and separate the heat sink from the enclosure.



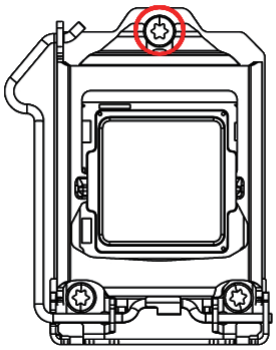
Step 2 Open CPU independent Loading Mechanism(ILM)

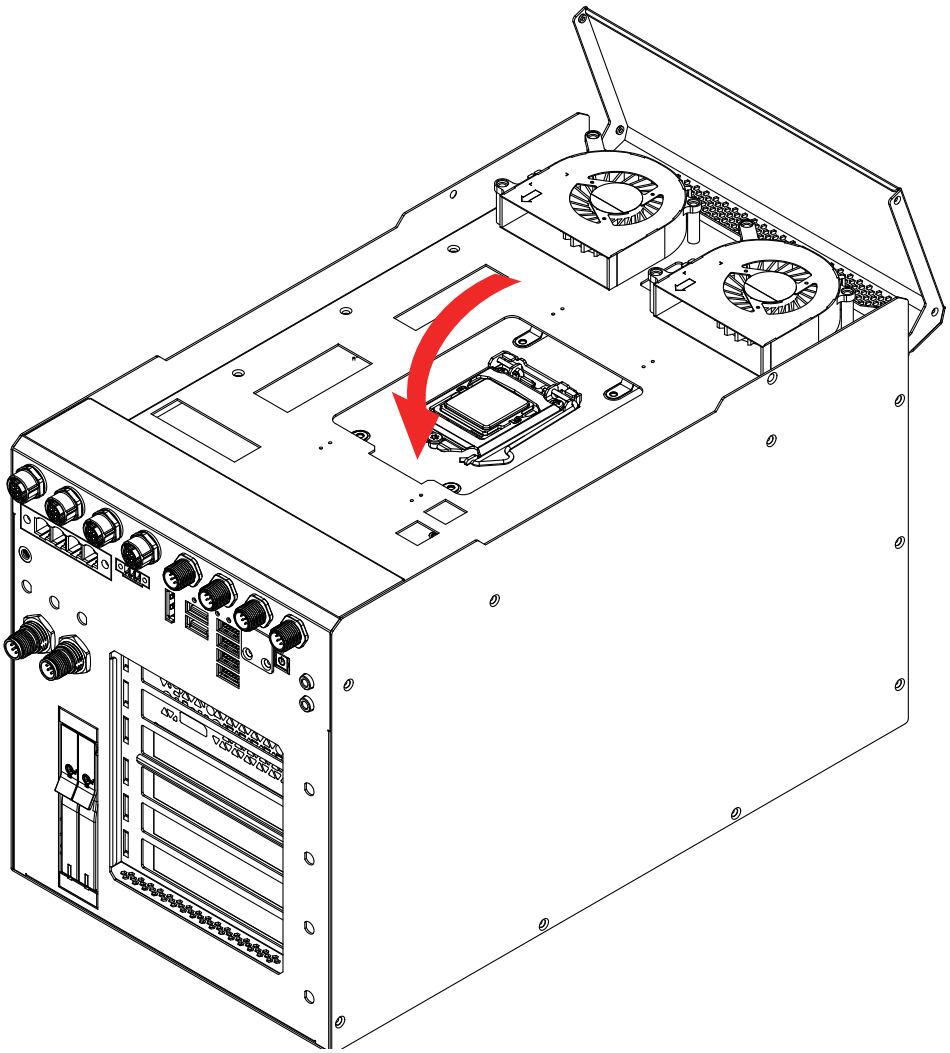


Step 3 Remove the mylar and Installing CPU.



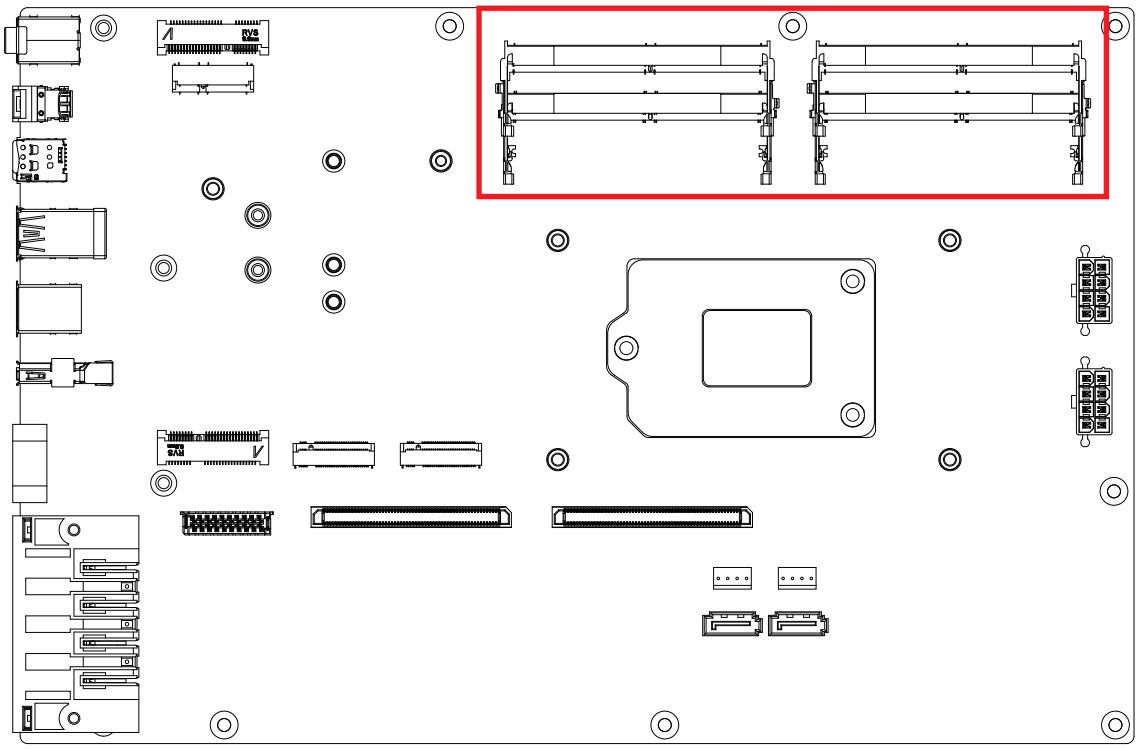
Step 4 Check CPU and CPU slot lock pin, Close CPU Independent Loading Mechanism (ILM) and finish.



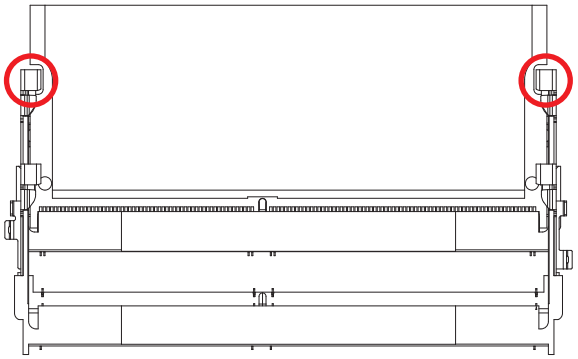


3.3 Installing DDR4 SO-DIMM Modules

Step 1 Install DDR4 RAM module into SO-DIMM slot.

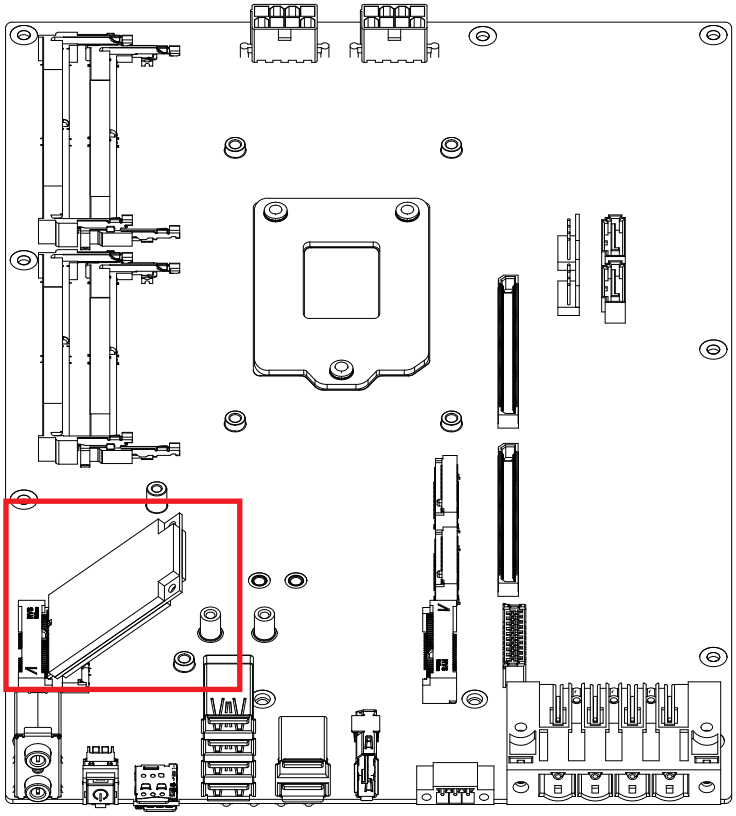


Step 2 Make sure the RAM module is locked by the memory slots (red).

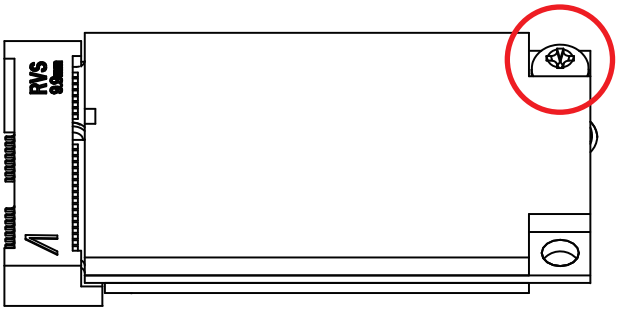


3.4 Installing Mini PCIe Card

Step 1 Install Mini PCIe card into the Mini PCIe slot.

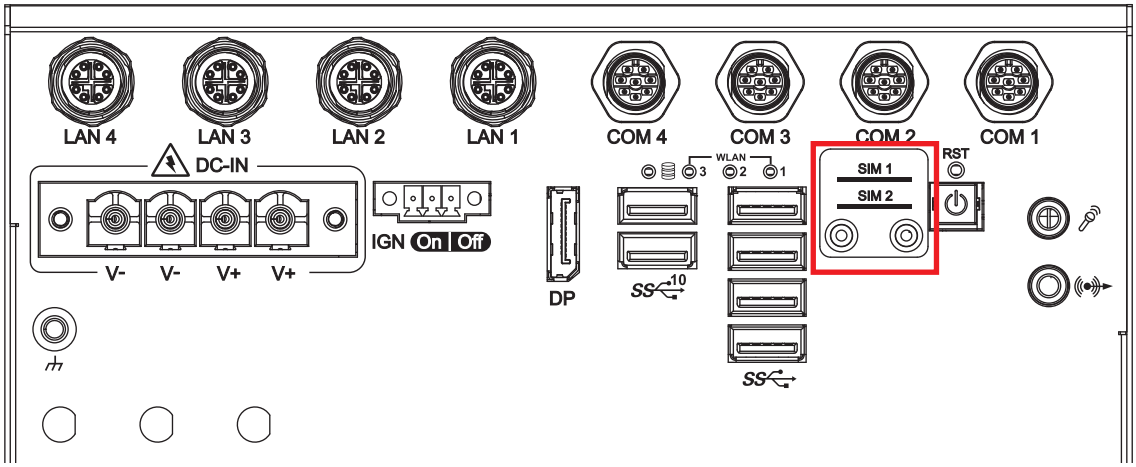


Step 2 Fasten one M2.5 screws.

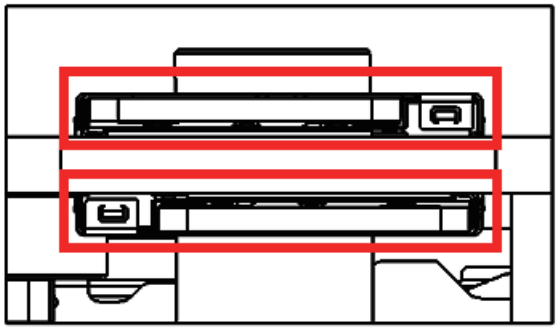


3.5 Installing Nano SIM Card

Step 1 Remove SIM cover (Remove M3 x 4L screws).



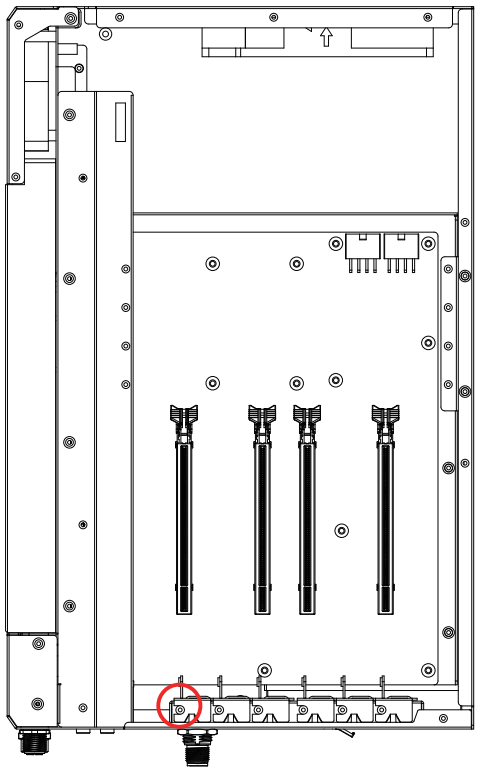
Step 2 Install SIM card in the marked red area.

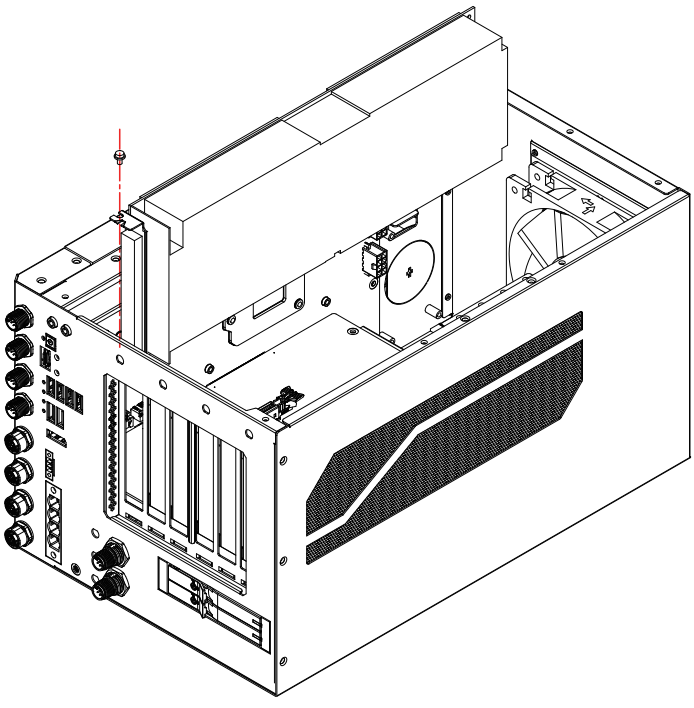


3.6 Installing PCI/PCIe Card

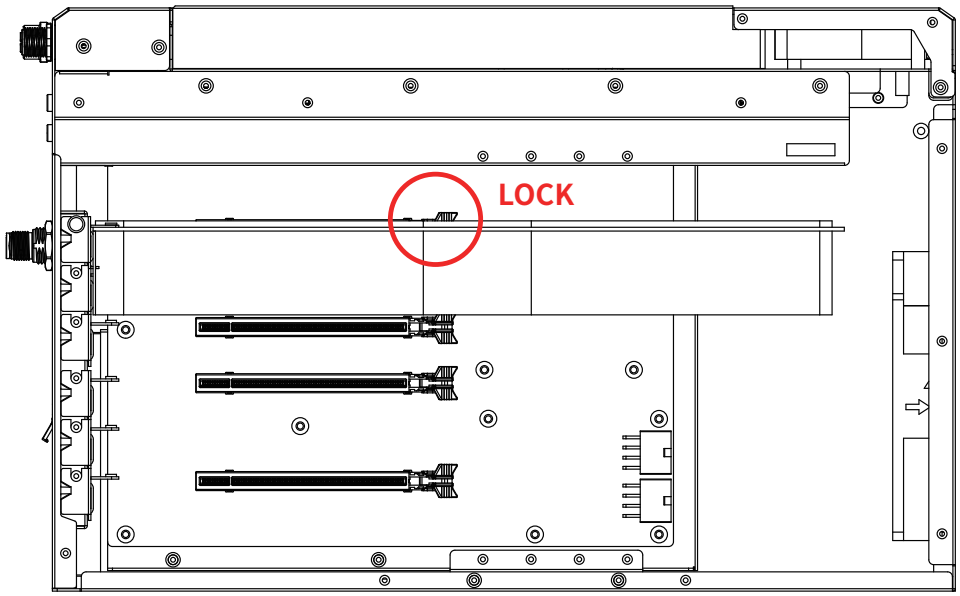
System designs will support 111.15 mm standard height, 320 mm maximum length (without the I/O bracket & power cable) expansion cards.
(*Based on the position of power connectors and the card sink/case design, not all expansion card within the maximum dimension can fit in to the system. Please consult the Vecow support team for confirmation.)

Step 1 Remove M3x5L screws and PCI bracket.





Notice For GPC-1000MX Series, please press the clip before removing the card.

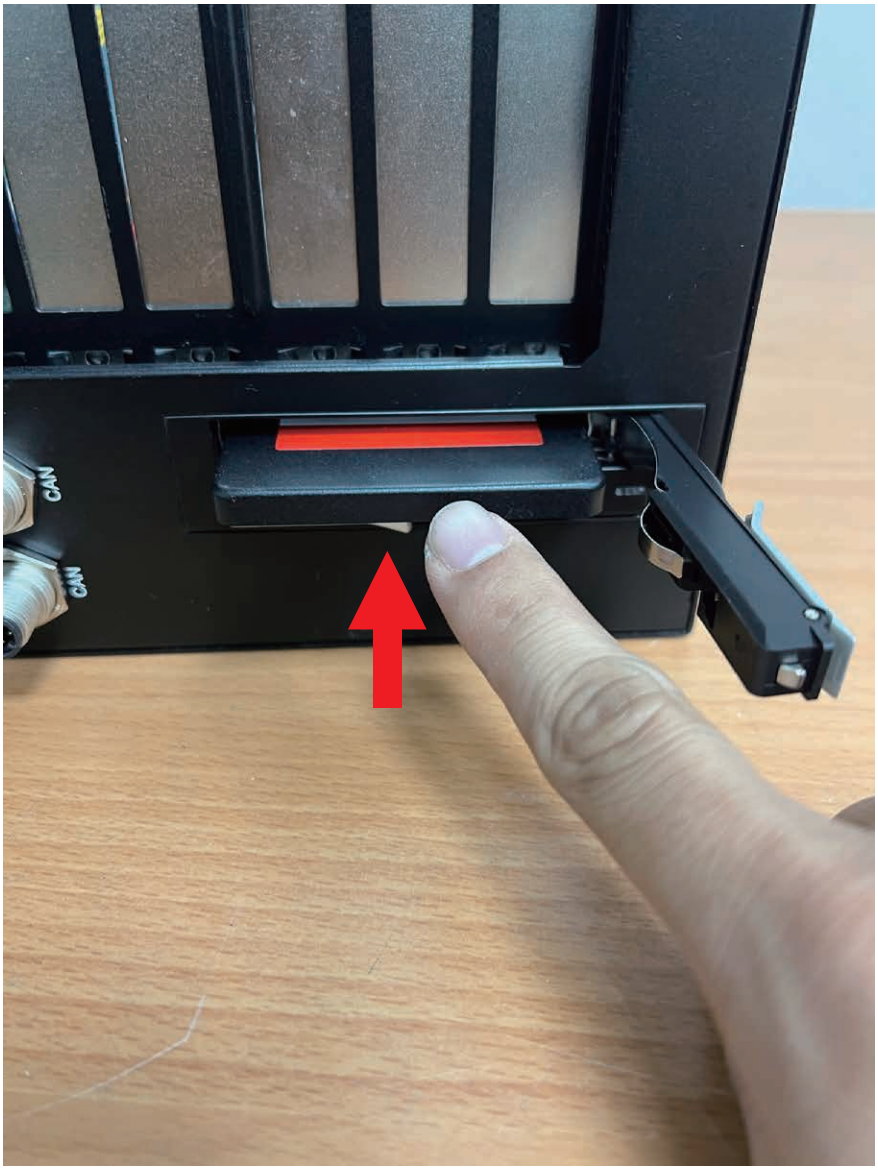


3.7 Installing SSD/HHD

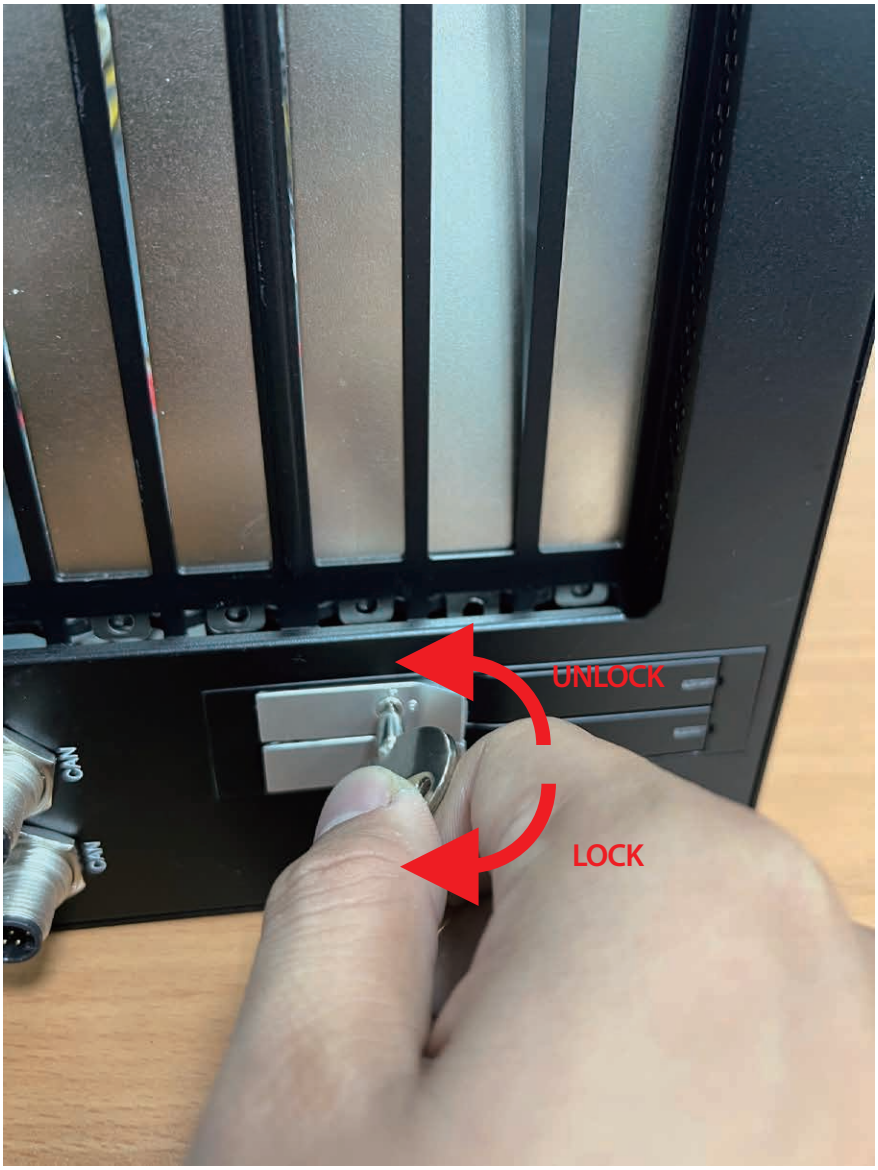
The 2.5” hard drive works with both 9.5mm and 7mm drives.

Step 1 Open SSD/HDD Door

Step 2 Insert 2.5” SSD/HDD into the tray.

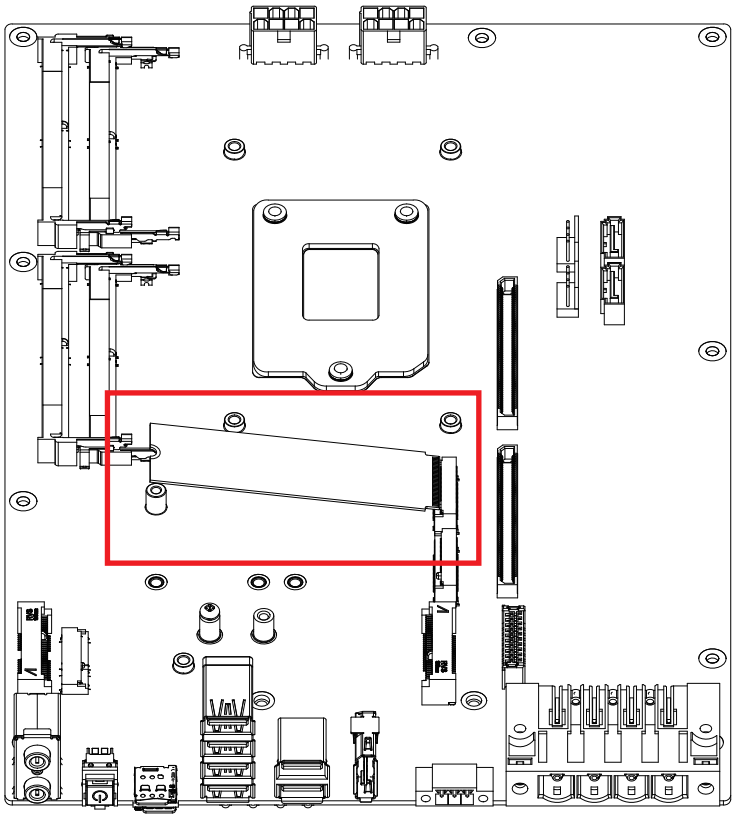


Step 3 Lock the SSD/HDD tray with the key.

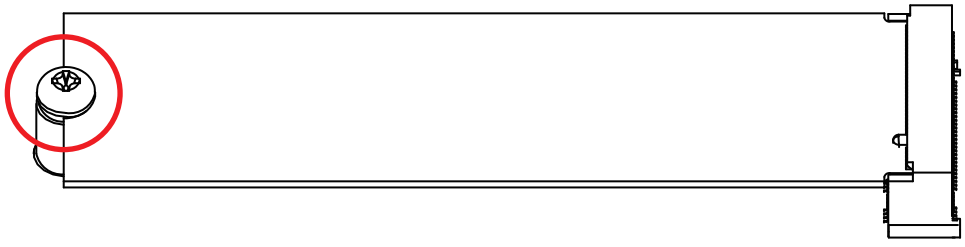


3.8 Installing M.2

Step 1 Install M.2 card into the slot.



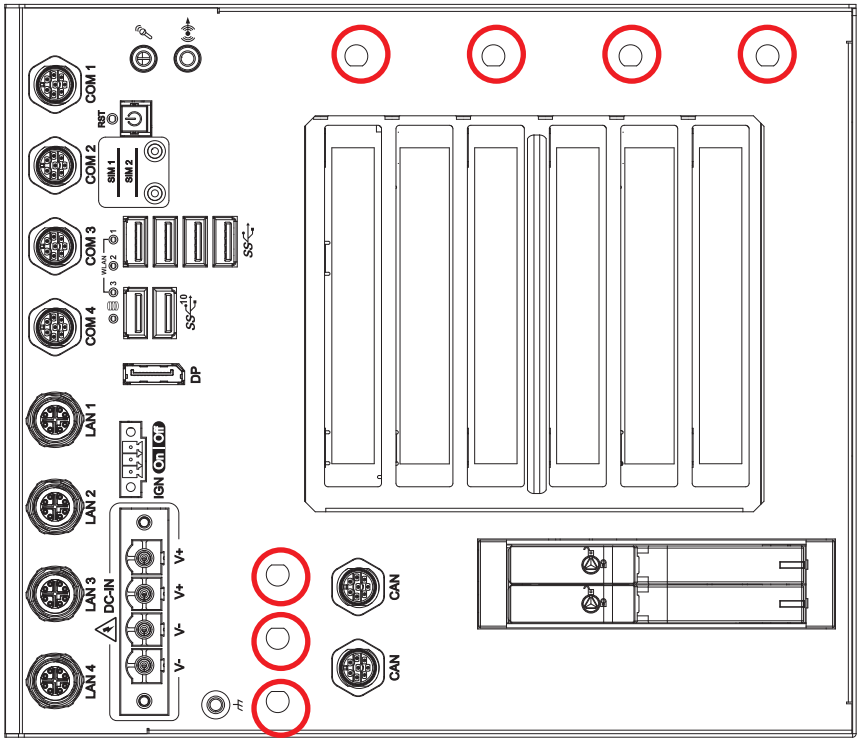
Step 2 Fasten one M3 screw.



3.9 Installing Antenna Cable

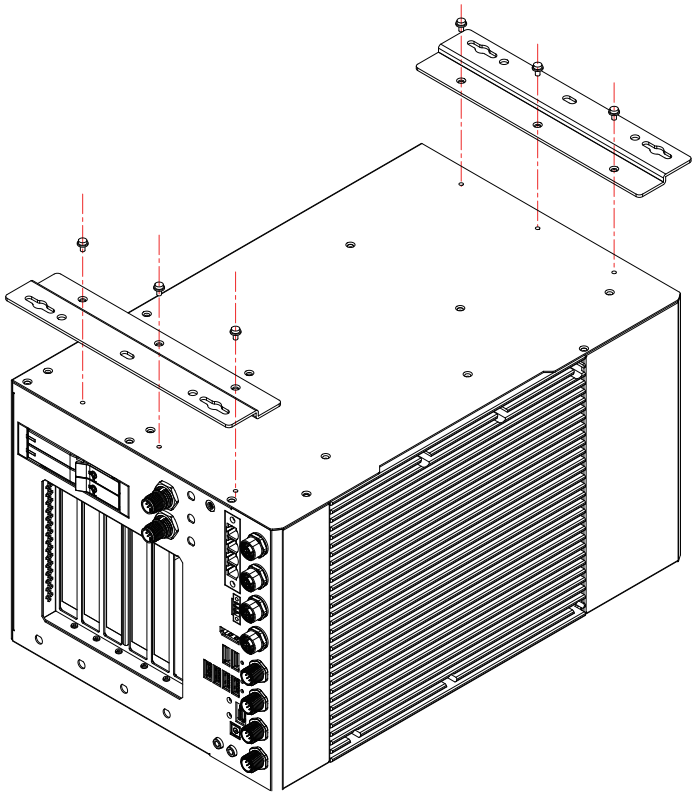
Step 1 Check antenna parts (cable and washers).

Step 2 Fasten washer 1, washer 2, and on Antenna cable connector .



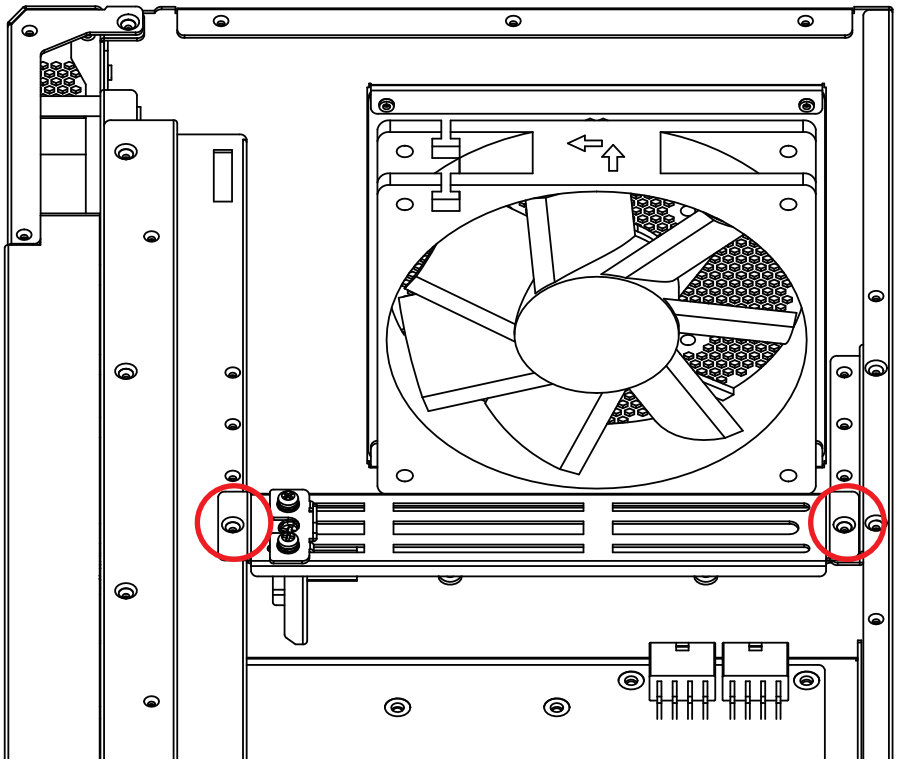
3.10 Mounting Your GPC-1000MX

Step 1 Install wall mount to GPC-1000MX bottom, Install six F head M3x5L screws.

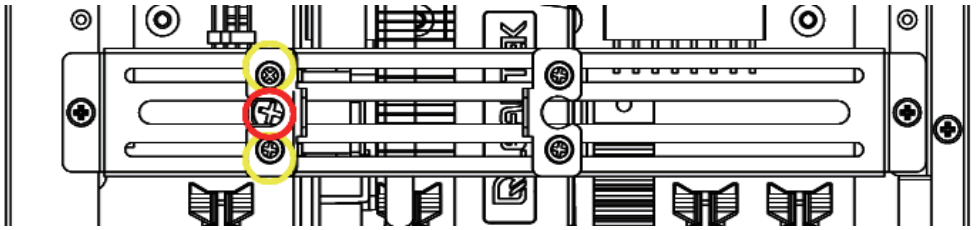


3.11 Installing Hold-down Kit

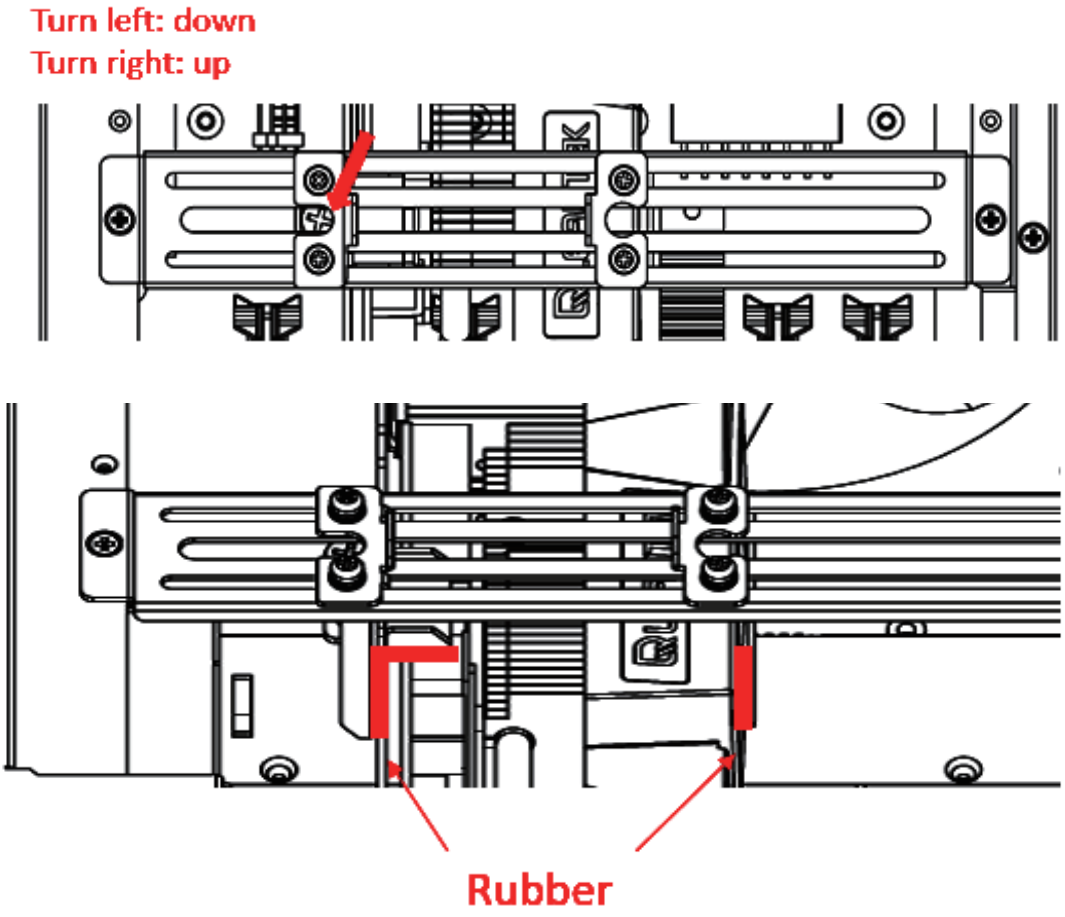
Step 1 Fasten four F head M3 x 4L Screws.



Step 2 Adjust the plate left or right to fix the card and then fasten two screws on the marked yellow area.



Step 3 Turn the screw (circled in red) left or right with Phillips screwdriver to adjust the pad up and down.



4

BIOS SETUP

4.1 BIOS Setup

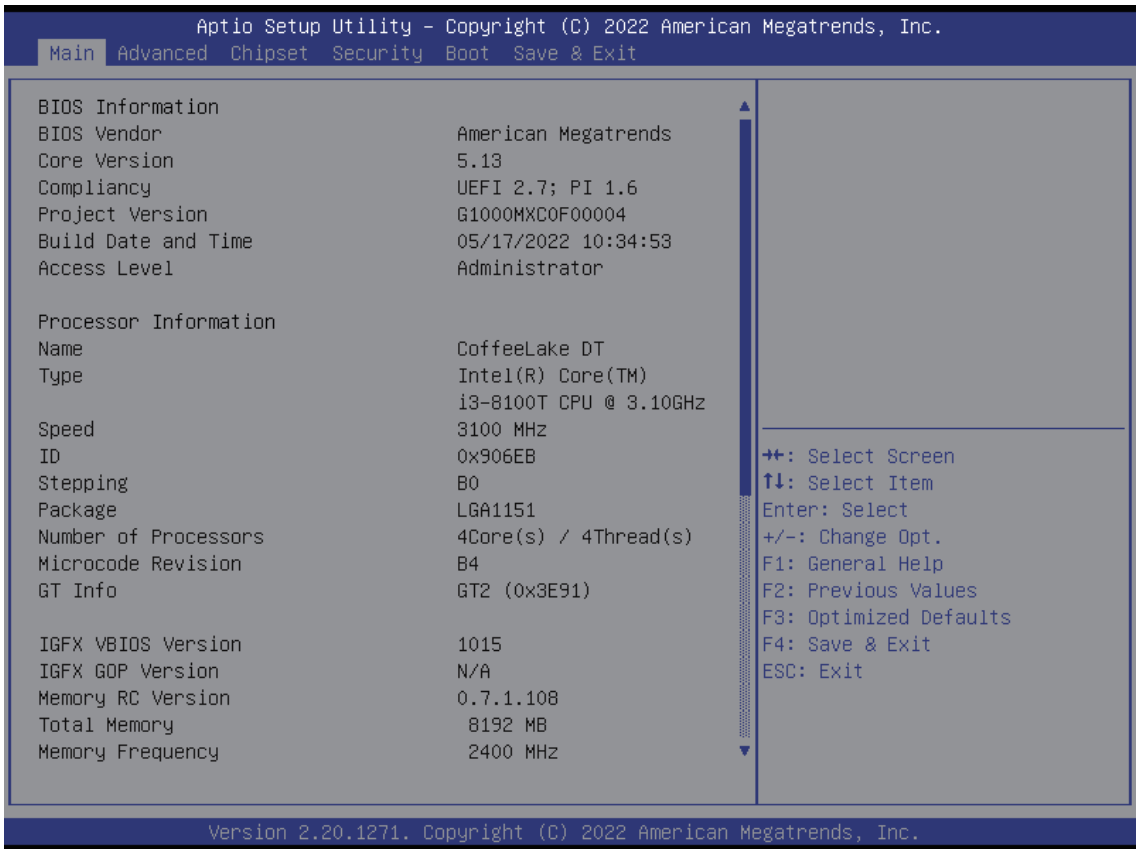


Figure 4-1 : Entering Setup Screen

BIOS provides an interface for users to check and change system configuration. The BIOS setup program is accessed by pressing the <Del> key when POST display output is shown.

4.2 Main Menu

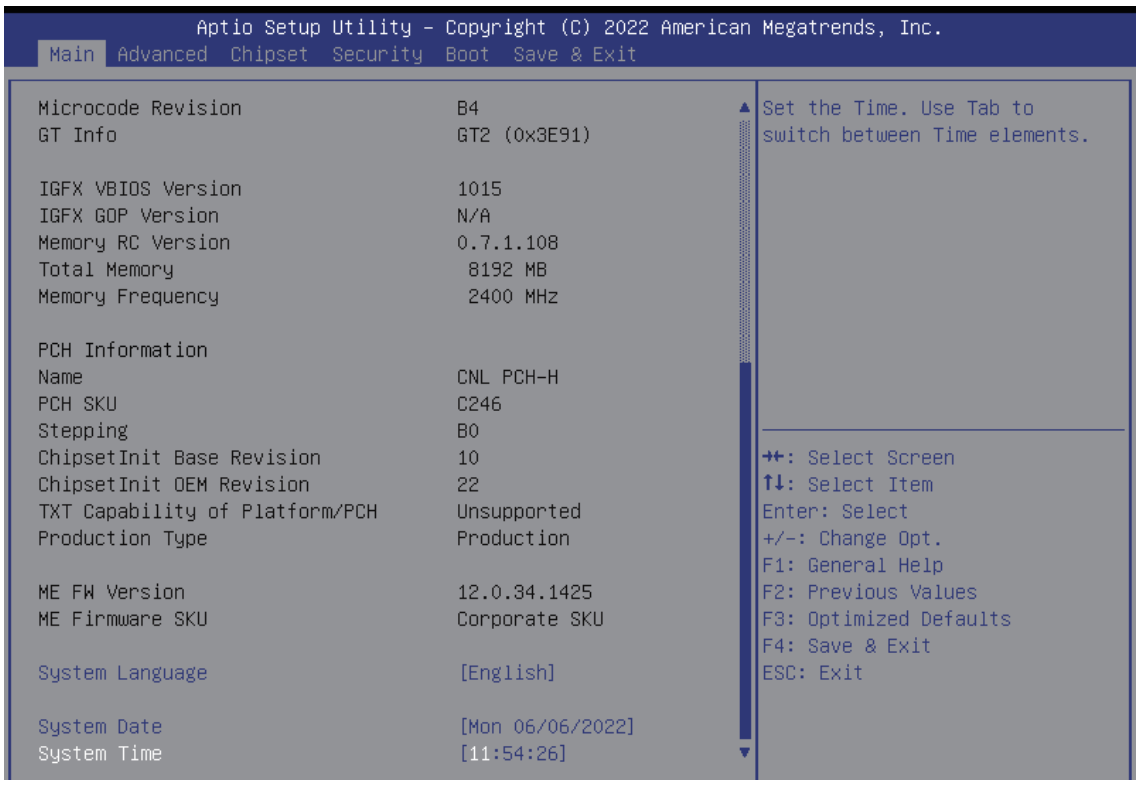


Figure 4-2 : BIOS Main Menu

The main menu displays BIOS version and system information. There are two options on the main menu, system date and system time.

System Date

Set the date. Use Tab to switch between date elements.

System Time

Set the time. Use Tab to switch between time elements.

4.3 Advanced Functions

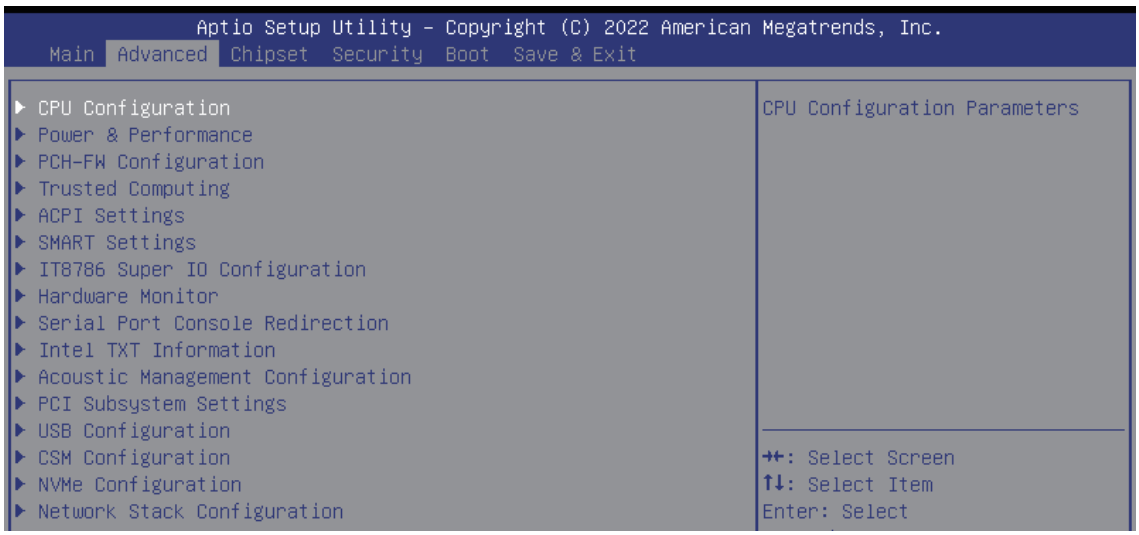


Figure 4-3 : BIOS Advanced Menu

Select advanced tab to enter advanced BIOS setup options such as CPU configuration, USB configuration, and Network Stack configuration.

4.3.1 CPU Configuration

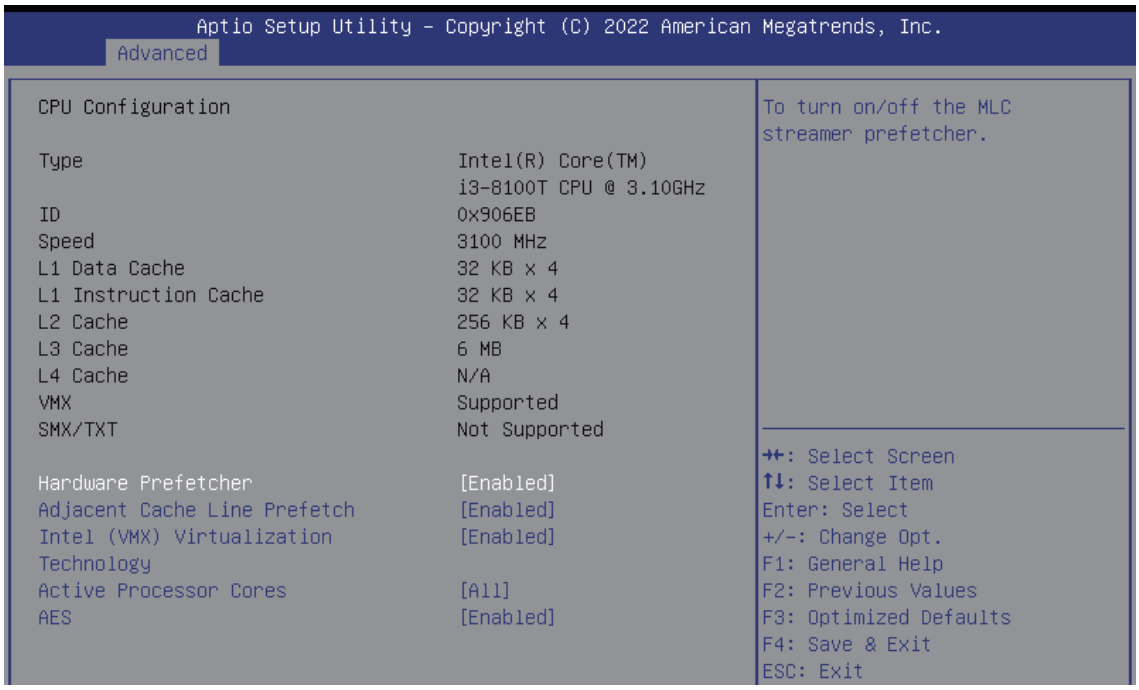


Figure 4-3-1 : CPU Configuration

Hardware Prefetcher
To turn on/off the MLC streamer prefetcher.

Adjacent Cache Line Prefetch
To turn on/off prefetching of adjacent cache lines.

Intel (VMX) Virtualization Technology
When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

Active Processor Cores
Number of cores to enable in each processor package.

AES
Enable/Disable AES (Advanced Encryption Standard).

4.3.2 Power & Performance

Figure 4-3-2 : Power & Performance

4.3.2.1 CPU – Power Management Control

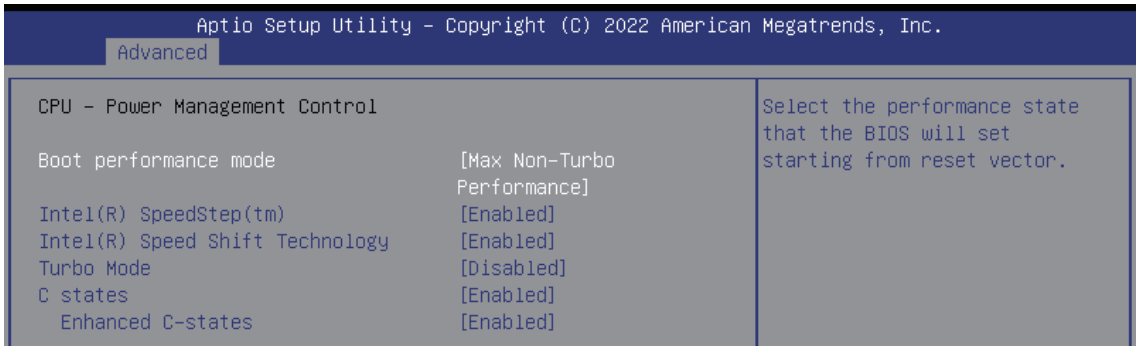


Figure 4-3-2-1 : CPU – Power Management Control

Boot performance mode
Select the performance state that the BIOS will set starting from reset vector.

Intel(R) SpeedStep(tm)
Allows more than two frequency ranges to be supported.

Intel(R) Speed shift Technology
Enable/Disable Intel(R) Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.

Turbo Mode
Enable/Disable processor Turbo Mode (requires Intel Speed Step or Intel Speed Shift to be available and enabled).

C states
Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.

Enhanced C-states
Enable/Disable C1E. When enabled, CPU will switch to minimum speed when all cores enter C-State.

4.3.2.2 GT – Power Management Control

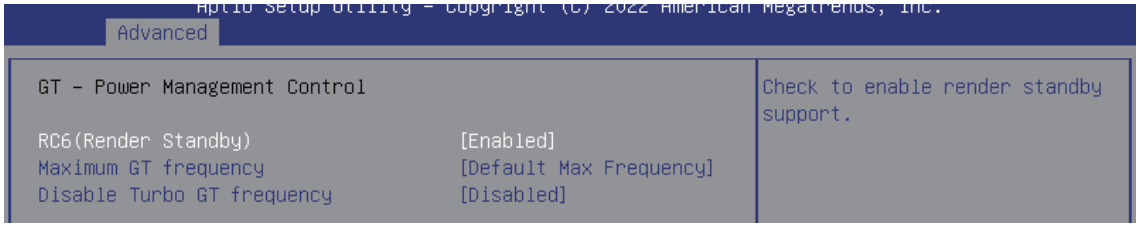


Figure 4-3-2-2 : GT – Power Management Control

RC6(Render Standby)
Check to enable render standby support.

Maximum GT frequency
Maximum GT frequency limited by the user. Choose between 350MHz (RPN) and 1000MHz (RP0). Value beyond the range will be clipped to min/max supported by SKU.

Disable Turbo GT frequency
Enabled: Disables Turbo GT frequency. Disabled: GT frequency is not limited.

4.3.3 PCH-FW Configuration

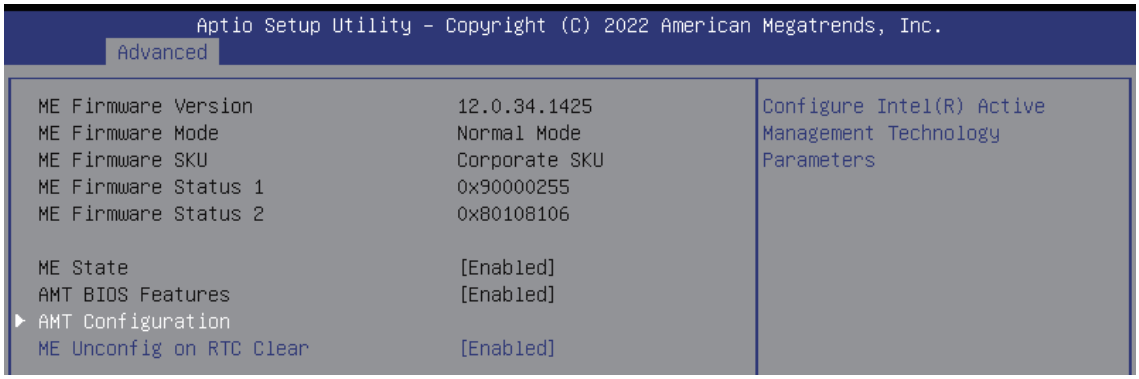


Figure 4-3-3 : PCH-FW Configuration

AMT Configuration
Configure Intel(R) Active Management Technology Parameters

ME Unconfig on RTC Clear
When Disabled ME will not be unconfigured on RTC Clear.

4.3.4 Trusted Computing

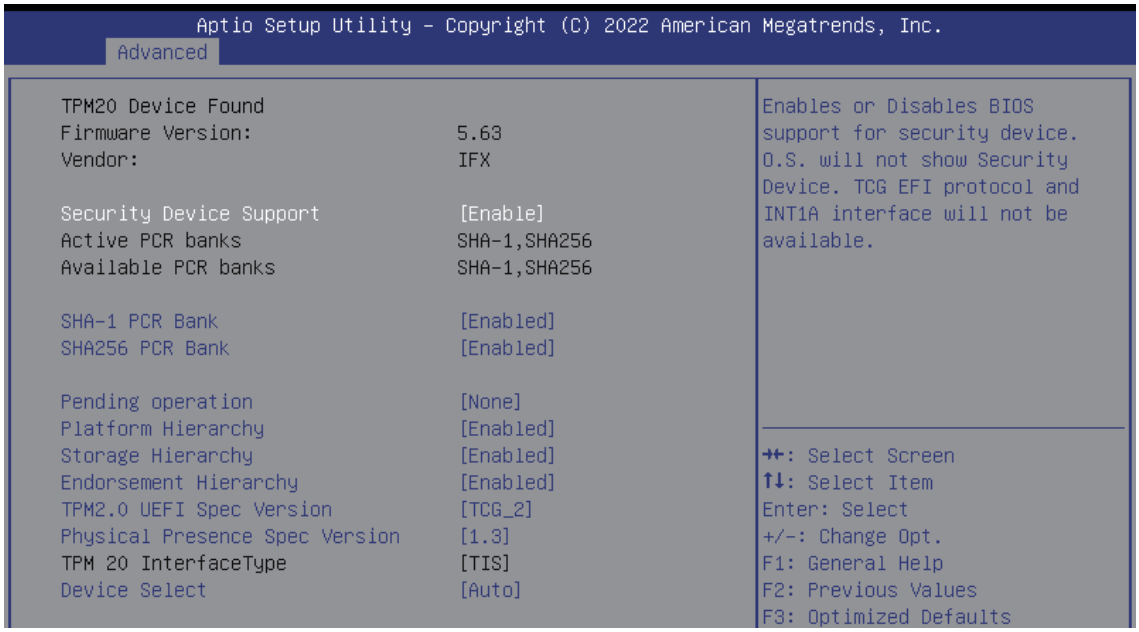


Figure 4-3-4 : Trusted Computing

Control the TPM device status and display related information if TPM chip is present.

4.3.5 ACPI Settings

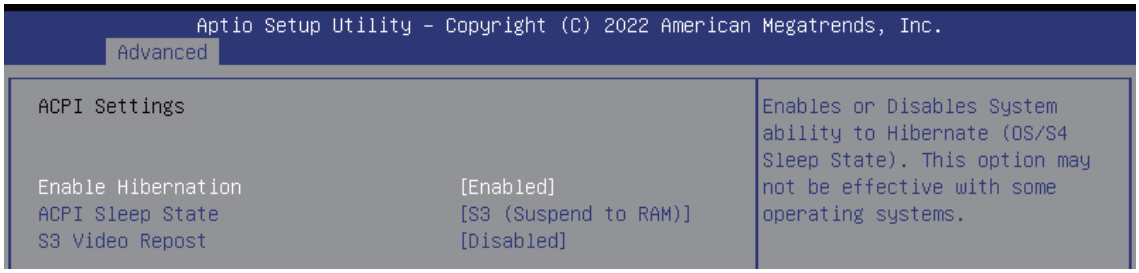


Figure 4-3-5 : ACPI Settings

Enable Hibernation
Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some operating systems.

ACPI Sleep State
Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.

S3 Video Repost
Enable or Disable S3 Video Repost.

4.3.6 SMART Settings

Figure 4-3-6 : SMART Settings

SMART Self Test
Run SMART Self Test on all HDDs during POST.

4.3.7 IT8786 Super IO Configuration

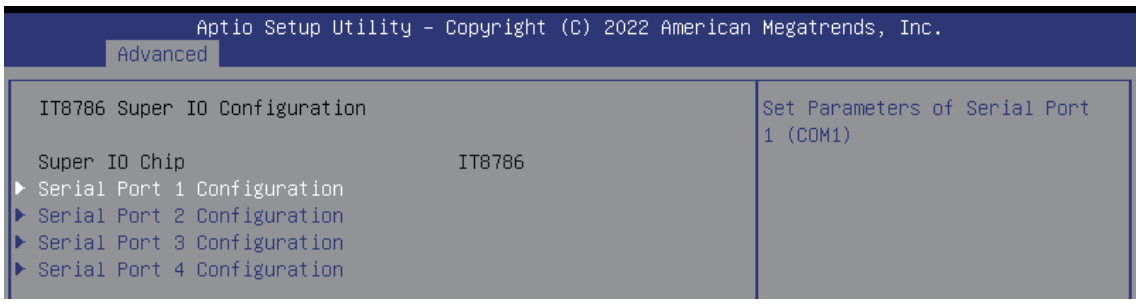


Figure 4-3-7 : IT8786 Super IO Settings

Serial Port 1 Configuration
Set Parameters of Serial Port 1 (COM1).

Serial Port 2 Configuration
Set Parameters of Serial Port 2 (COM2)

Serial Port 3 Configuration
Set Parameters of Serial Port 3 (COM3).

Serial Port 4 Configuration
Set Parameters of Serial Port 4 (COM4).

4.3.8 Hardware Monitor

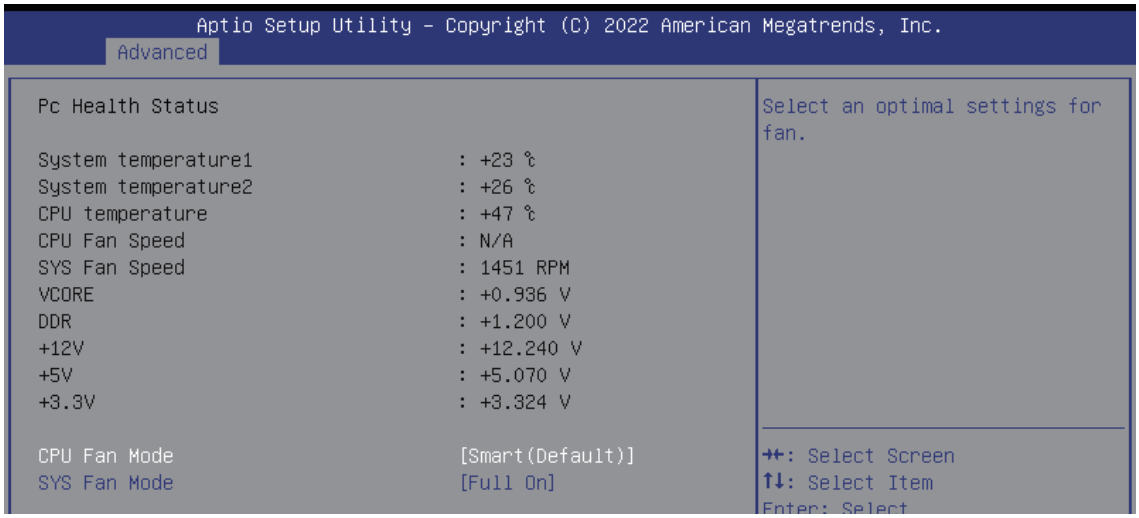


Figure 4-3-8 : Hardware Monitor Settings

The IT8786 SIO features an enhanced hardware monitor providing thermal, fan speed, and system voltages' status monitoring.

CPU Fan Mode
Select an optimal settings for fan.

SYS Fan Mode
Select an optimal settings for fan.

4.3.9 Serial Port Console Redirection

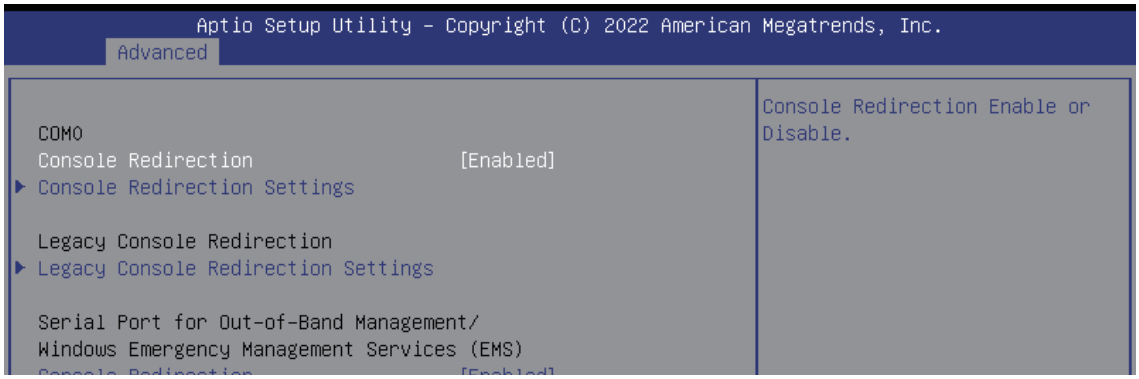


Figure 4-3-9 : Serial Port Console Redirection Settings

Console Redirection
Console Redirection Enable or Disable.

Console Redirection Settings
The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

Legacy Console Redirection
Legacy Console Redirection Settings.

4.3.10 Intel TXT Information

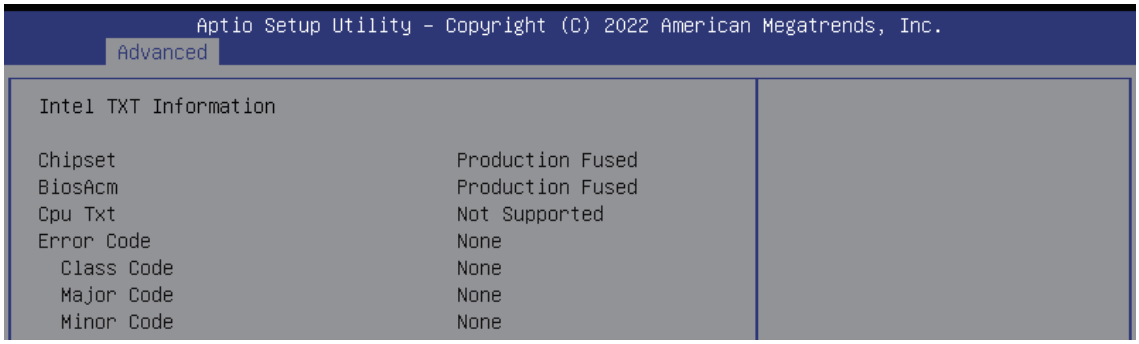


Figure 4-3-10 : Intel TXT Information

Display Intel TXT information.

4.3.11 Acoustic Management Configuration

Figure 4-3-11 : Acoustic Management Configuration

Acoustic Management Configuration

Option to Enable or Disable Automatic Acoustic Management.

4.3.12 PCI Subsystem Setting

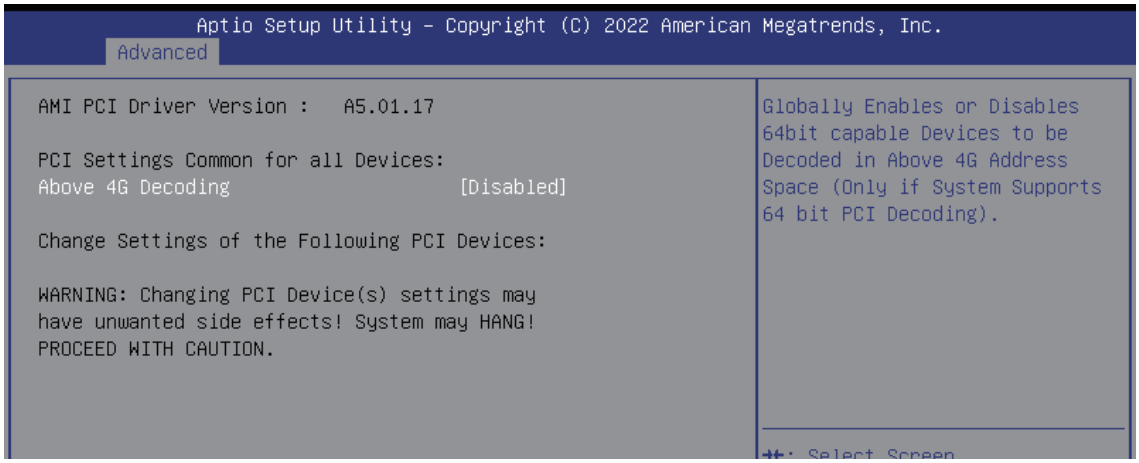


Figure 4-3-12 : PCI Subsystem Settings

Above 4G Decoding

Globally Enables or Disables 64bit capable Devices to be Decoded in Above 4G Address Space (Only if System Supports 64 bit PCI Decoding).

4.3.13 USB Configuration

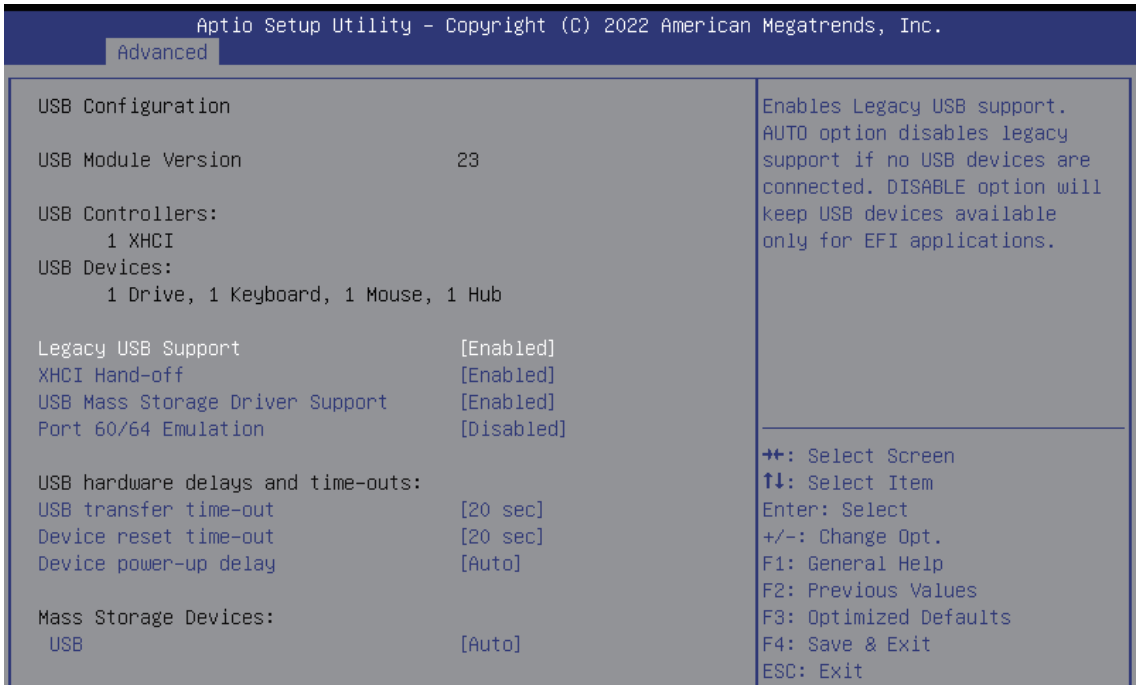


Figure 4-3-13 : USB Configuration

Legacy USB Support
Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.

XHCI Hand-off
This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.

USB Mass Storage Driver Support
Enable/Disable USB Mass Storage Driver Support.

Port 60/64 Emulation
Enables I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSes.

USB transfer time-out
The time-out value for Control, Bulk, and Interrupt transfers.

Device reset time-out
USB mass storage device Start Unit command time-out.

Device power-up delay
Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100 ms, for a Hub port the delay is taken from Hub descriptor.

4.3.14 CSM Configuration

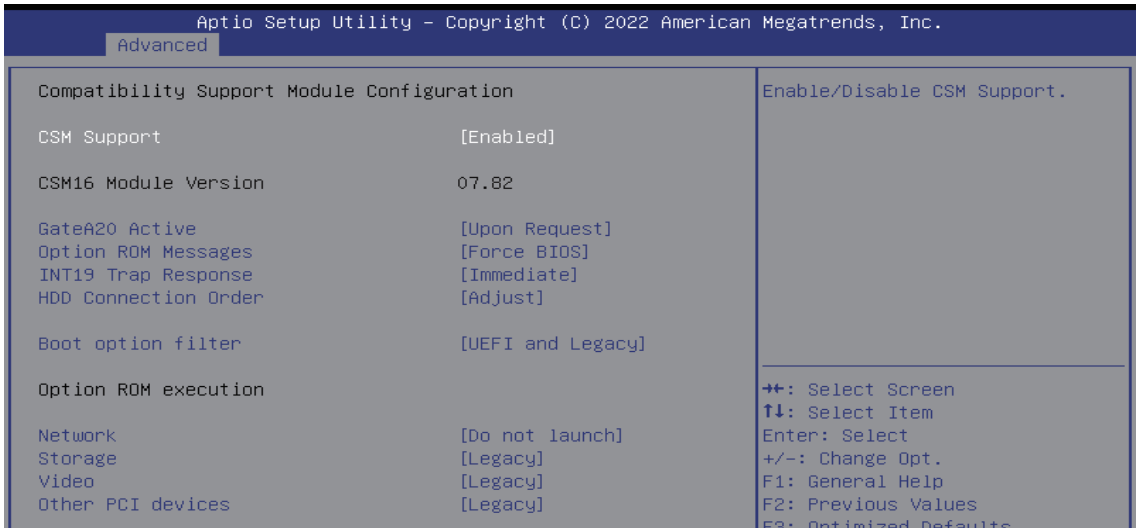


Figure 4-3-14 : CSM Settings

CSM Support
Enable/disable CSM support.

GateA20 Active
UPON REQUEST - GA20 can be disabled using BIOS services. ALWAYS - do not allow disabling GA20; this option is useful when any RT code is executed above 1MB.

Option ROM Messages
Set display mode for Option ROM.

INT19 Trap Response
BIOS reaction on INT19 trapping by Option ROM: IMMEDIATE - execute the trap right away; POSTPONED - execute the trap during legacy boot.

HDD Connection Order
Some OS require HDD handles to be adjusted, i.e. OS is installed on drive 80h.

Boot option filter
This option controls Legacy/UEFI ROMs priority.

Network
Controls the execution of UEFI and Legacy Network OpROM.

Storage
Controls the execution of UEFI and Legacy Storage OpROM.

Video
Controls the execution of UEFI and Legacy Video OpROM.

Other PCI devices
Determines OpROM execution policy for devices other than Network, Storage, or Video.

4.3.15 NVMe Configuration

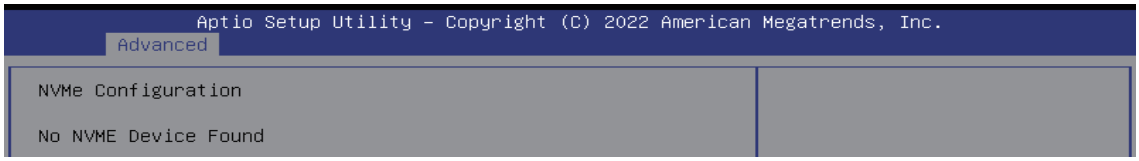


Figure 4-3-15 : NVMe Settings

Display NVMe controller and Drive information.

4.3.16 Network Stack Configuration

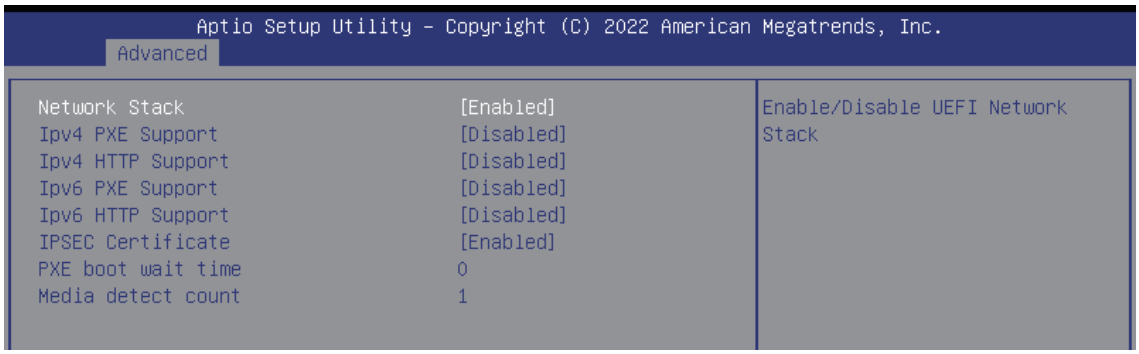


Figure 4-3-16 : USB Settings

Network Stack
Enable/Disable UEFI Network Stack.

IPv4 PXE Support
Enable/Disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.

IPv4 HTTP Support
Enable/Disable IPv4 HTTP boot support. If disabled, IPv4 HTTP boot support will not be available.

IPv6 PXE Support
Enable/Disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.

IPv6 HTTP Support
Enable/Disable IPv6 HTTP boot support. If disabled, IPv6 HTTP boot support will not be available.

IPSEC Certificate
Support to Enable/Disable IPSEC certificate for Ikev.

PXE boot wait time
Wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value.

Media detect count
Number of times the presence of media will be checked. Use either +/- or numeric keys to set the value.

4.4 Chipset Functions

Figure 4-4 : BIOS Chipset Menu

Select chipset tab to enter chipset BIOS setup options such as SA configuration and PCH-IO configuration.

4.4.1 System Agent (SA) Configuration

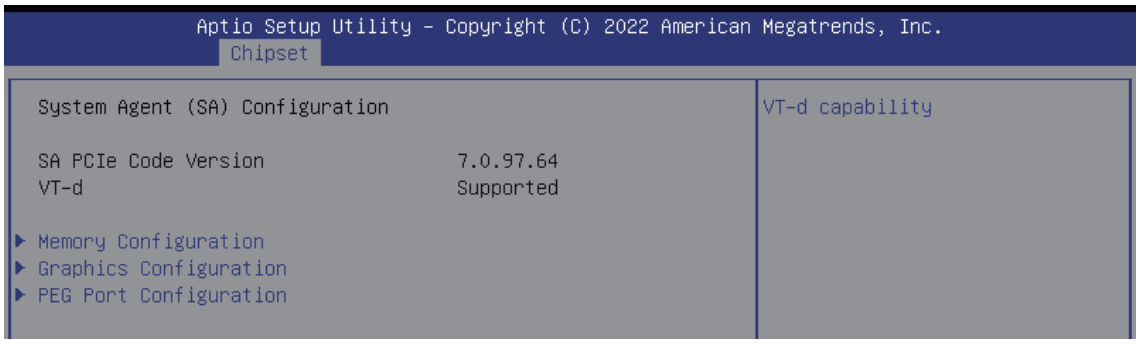


Figure 4-4-1 : System Agent (SA) Configuration

VT-d
VT-d capability.

Above 4GB MMIO BIOS assignment
Enable/Disable above 4GB MemoryMappedIO BIOS assignment. This is enabled automatically when Aperture Size is set to 2048MB.

4.4.1.1 Memory Configuration

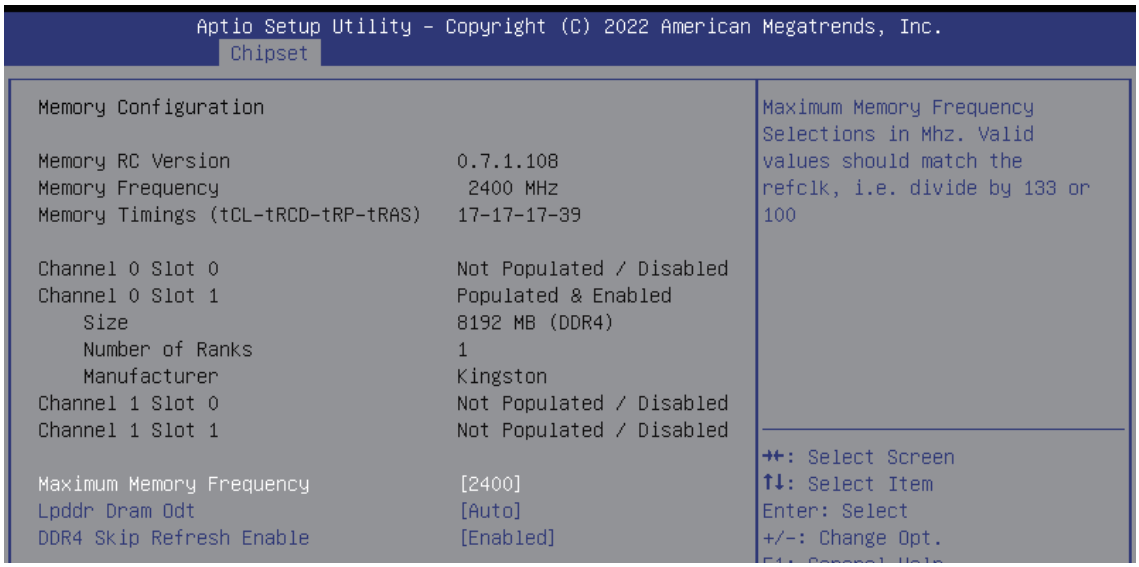


Figure 4-4-1-1 : Memory Information

Maximum Memory Frequency
Maximum Memory Frequency Selections in Mhz. Valid values should match the refclk, i.e. divide by 133 or 100.

Lpddr Dram Odt
Override Enable/Disable for the ODT logic for LPDDR3 memory. Default is AUTO.

DDR4 Skip Refresh Enable
Enable/Disable of DDR4 Temperature Controlled Refresh on DRAM. Default is Enabled.

4.4.1.2 Graphics Configuration

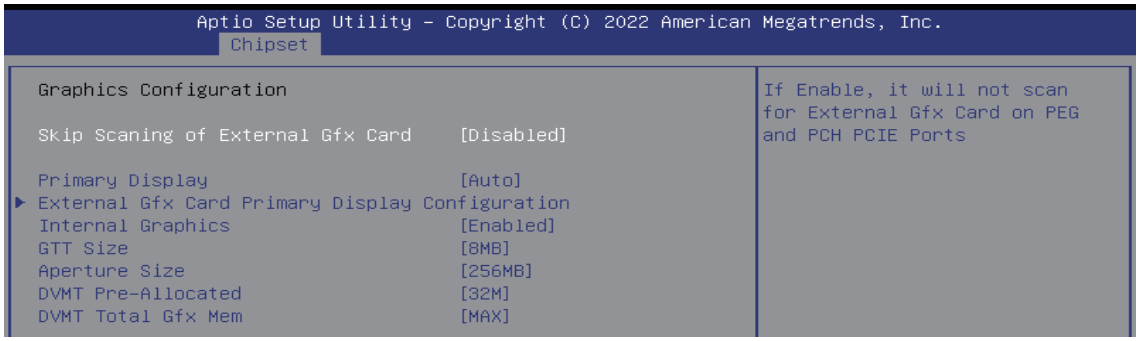


Figure 4-4-1-2 : Graphics Configuration

Skip Scanning of External Gfx Card
If Enable, it will not scan for External Gfx Card on PEG and PCH PCIE Ports.

Primary Display
Select which of IGFX/PEG/PCI Graphics device should be Primary Display or select SG for Switchable Gfx.

External Gfx Card Primary Display Configuration
External Gfx Card Primary Display Configuration.

Internal graphics
Keep IGFX enabled based on the setup options.

GTT Size
Select the GTT Size.

Aperture Size
Select the Aperture Size.
Note : Above 4GB MMIO BIOS assignment is automatically enabled when selecting 2048MB aperture. To use this feature, please disable CSM Support.

DVMT Pre-Allocated
Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.

DVMT Total Gfx Mem
Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device.

4.4.1.3 PEG Port Configuration

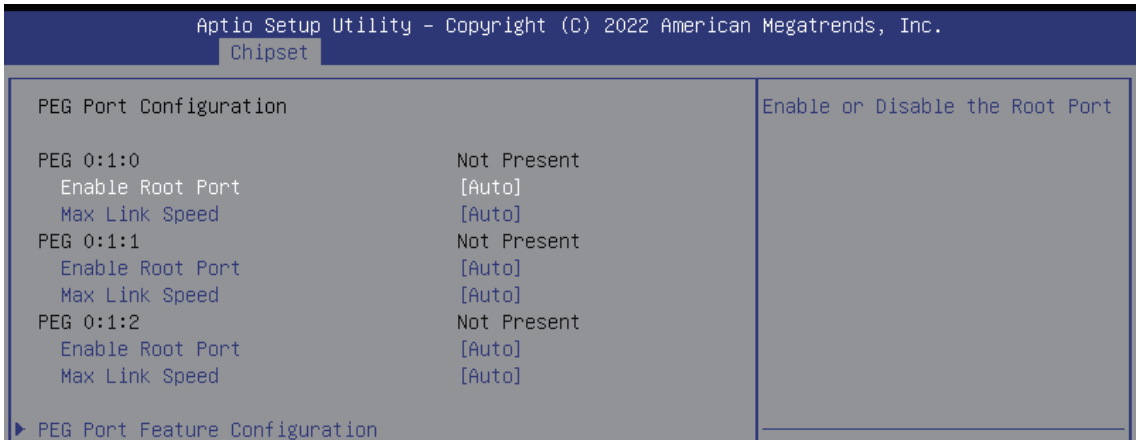


Figure 4-4-1-3 : PEG Port Configuration

Enable Root Port
Enable or Disable the Root Port.

Max Link Speed
Configure PEG 0:1:X Max Speed.

PEG Port Feature Configuration
PEG Port Feature Configuration.

4.4.2 PCH-IO Configuration

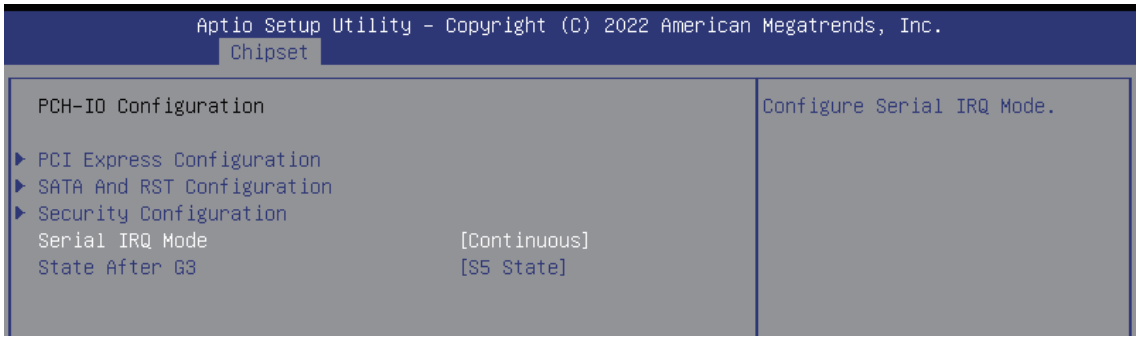


Figure 4-4-2 : PCH-IO Configuration

Serial IRQ Mode
Configure Serial IRQ Mode.

State After G3
Specify what state to go to when power is re-applied after a power failure (G3 state).

4.4.2.1 PCI Express Configuration

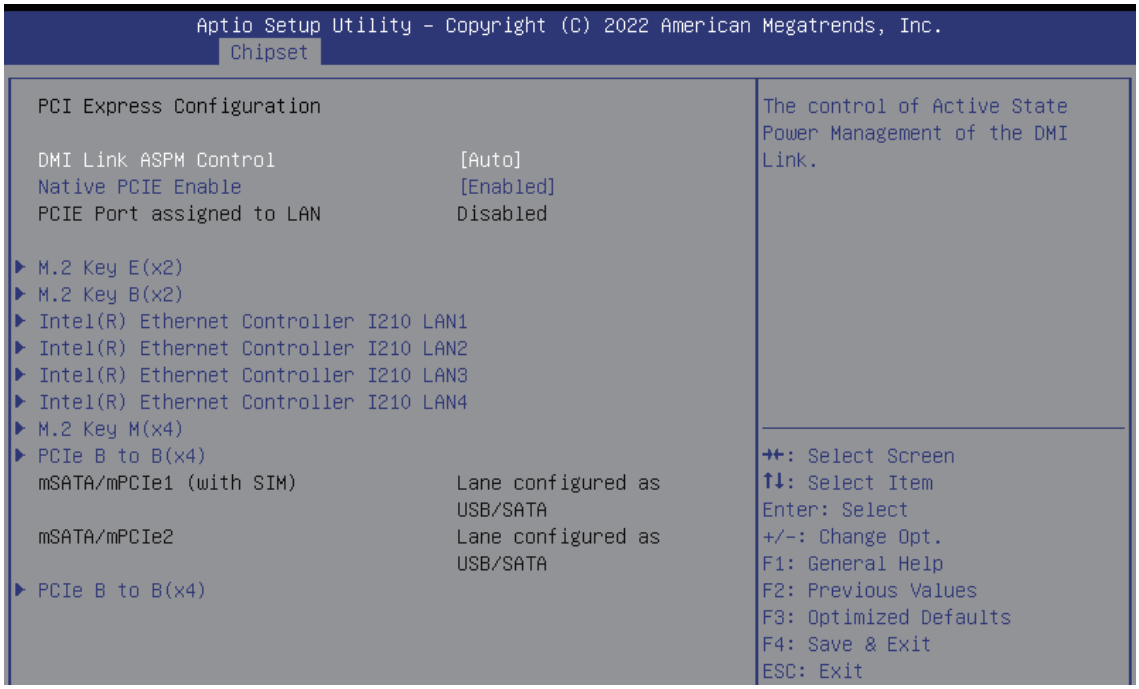


Figure 4-4-2-1 : PCI Express Configuration

DMI Link ASPM Control
The control of Active State Power Management of the DMI Link.

Native PCIE Enable
Bit - PCIe Native * control

0 - ~ Hot Plug

1 - SHPC Native Hot Plug control

2 - ~ Power Management Events

3 - PCIe Advanced Error Reporting control

4 - PCIe Capability Structure control

5 - Latency Tolerance Reporting control

PCI Express device settings
Bios options for PCI Express device setting.

4.4.2.2 SATA and RST Configuration

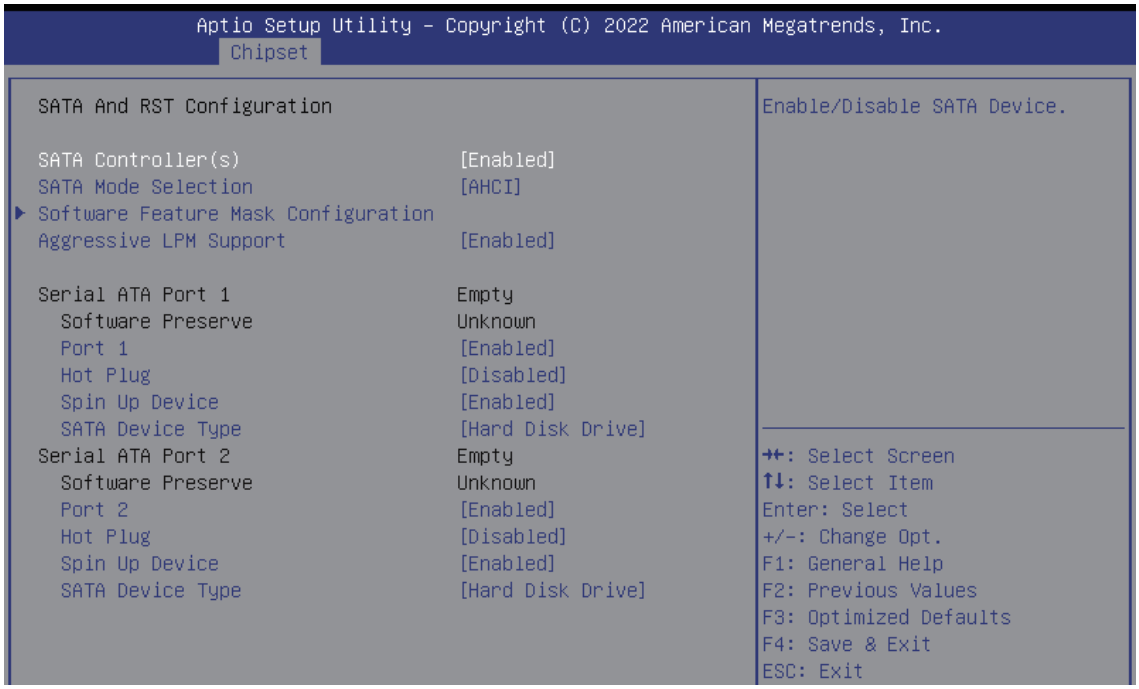


Figure 4-4-2-2 : SATA And RST Configuration

SATA Controller(s)
Enable/Disable SATA Device.

SATA Mode Selection
Determines how SATA controller(s) operate.

Software Feature Mask Configuration
RST Legacy OROM/RST UEFI driver will refer to the SWFM configuration to enable/disable the storage features.

Aggressive LPM Support
Enable PCH to aggressively enter link power state.

Port n
Enable or Disable SATA Port.

Hot Plug
Designates this port as Hot Pluggable.

Spin Up Device
If enabled for any of ports Staggerred Spin Up will be performed and only the drives which have this option enabled will spin up at boot. Otherwise all drives spin up at boot.

SATA Device Type
Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.

4.4.2.3 Security Configuration

Figure 4-4-2-3 : Security Configuration

BIOS Lock

Enable/Disable the PCH BIOS Lock Enable feature. Required to be enabled to ensure SMM protection of flash.

4.4.3 SW Ignition Configuration

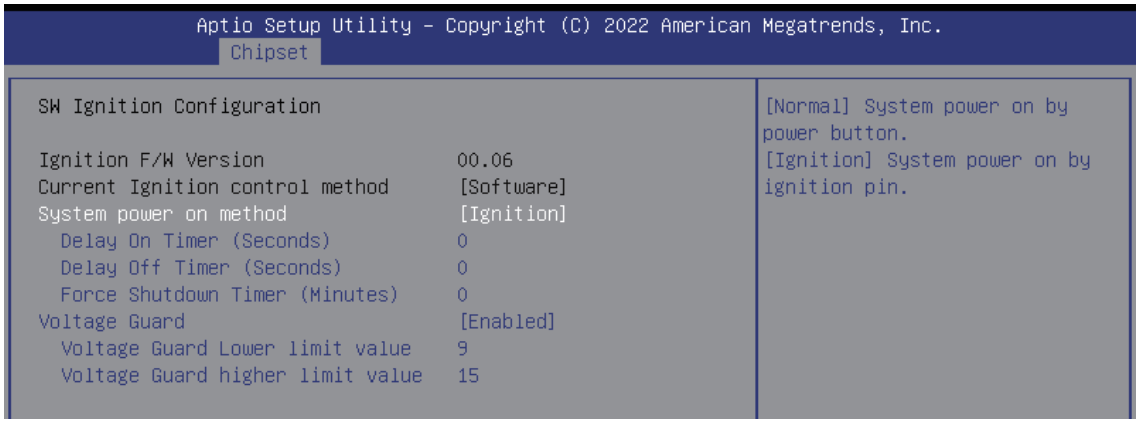


Figure 4-4-3 : SW Ignition Configuration

System power on method

[Normal] System power on by power button. [Ignition] System power on by ignition pin.

Delay On Timer (Seconds)

The delay time after user trigger ignition on signal (Seconds).

Delay Off Timer (Seconds)

The delay time after user trigger ignition off signal (Seconds).

Force Shutdown Timer (Minutes)

Used to force cut off system power when OS unable gracefully shutdown system successfully.

Voltage Guard

Voltage Guard enable or disable, only effect on Ignition mode.

Voltage Guard Lower limit value

Voltage Guard lower limit value setting. Range: 9v ~ 40v.

Voltage Guard higher limit value

Voltage Guard Higher limit value setting. Range: 15v ~ 55v.

4.5 Security Function

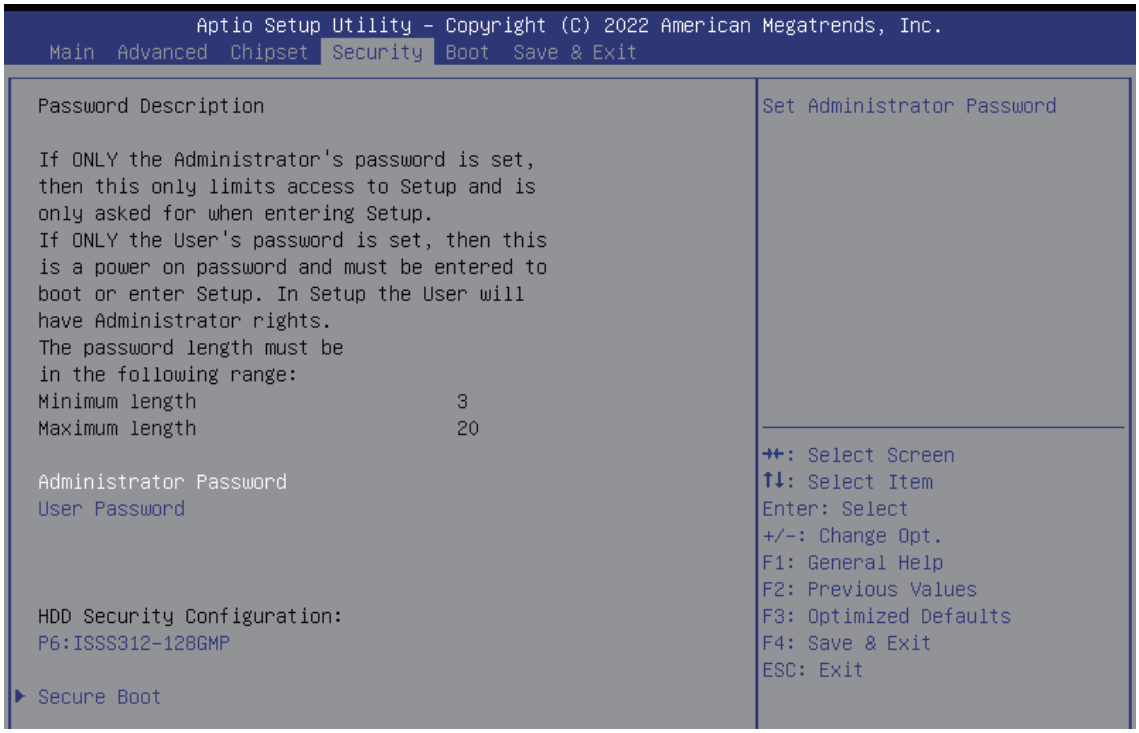


Figure 4-5 : BIOS Security Menu

Administrator Password
Set Administrator Password.

User Password
Set User Password.

4.5.1 HDD Security Configuration

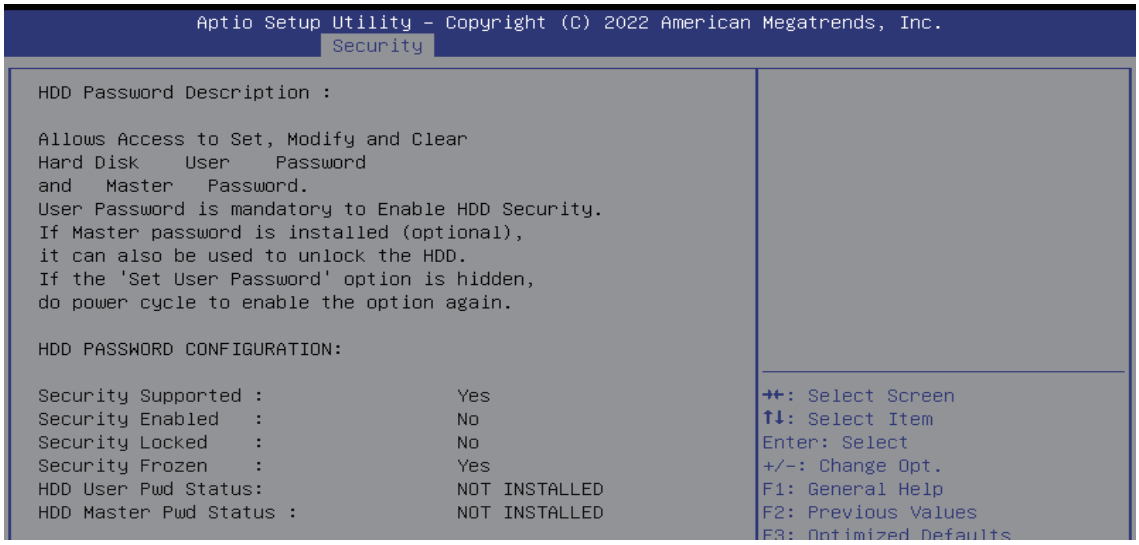


Figure 4-5-1 : HDD Security Configuration

Set User Password

Set HDD user password.
*** Advisable to power cycle system after setting hard disk passwords ***
Discard or save changes option in setup does not have any impact on HDD when password is set or removed. If the 'Set HDD User Password' option is hidden, do power cycle to enable the option again.

4.5.2 Security Boot

Figure 4-5-2 : Security Boot

Secure Boot

Secure Boot feature is Active if Secure Boot is Enabled, Platform Key(PK) is enrolled and the System is in User mode. The mode change requires platform reset.

Secure Boot Mode

Secure Boot mode options: Standard or Custom. In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication.

Restore Factory Keys

Force System to User Mode. Install factory default Secure Boot key databases.

Reset To Setup Mode

Delete all Secure Boot key databases from NVRAM.

Key Management

Enables expert users to modify Secure Boot Policy variables without full authentication.

4.6 Boot

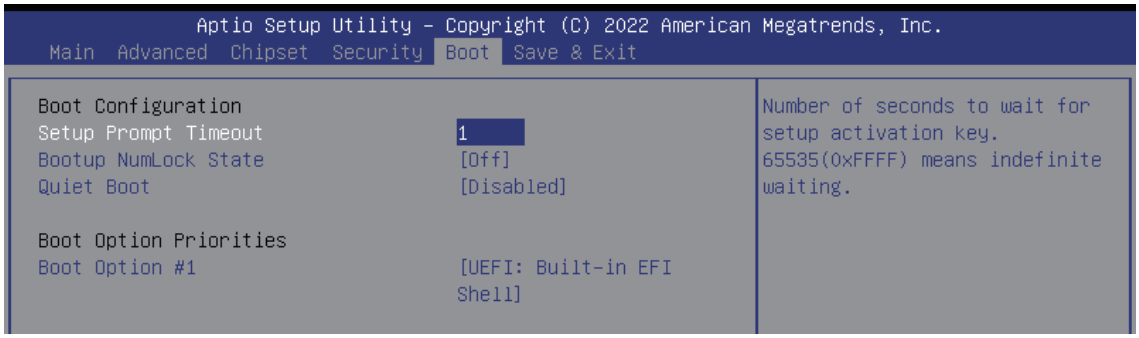


Figure 4-6 : BIOS Boot Menu

Setup Prompt Timeout

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

Bootup NumLock State

Select the keyboard NumLock state.

Quiet Boot

Enables or disables Quiet Boot option.

Boot Option #x

Sets the system boot order.

4.7 Save & Exit

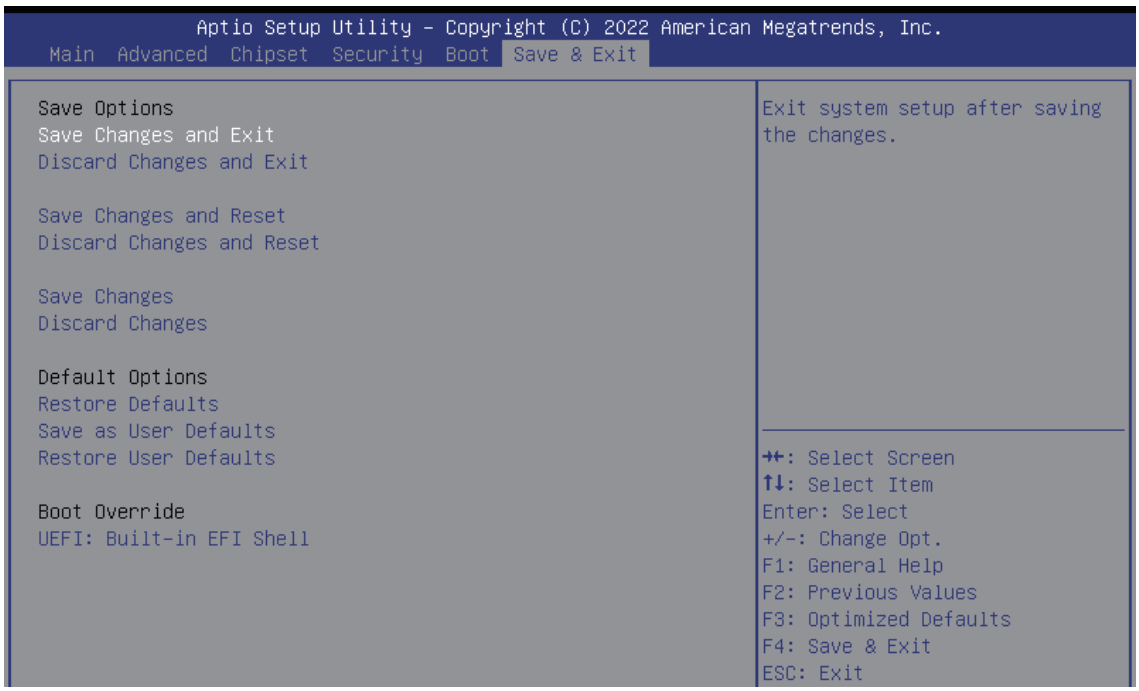


Figure 4-7 : Save and Exit Menu

Save Changes and Exit
Exit system setup after saving the changes.

Discard Changes and Exit
Exit system setup without saving any changes.

Save Changes and Reset
Reset the system after saving the changes.

Discard Changes and Reset
Reset system setup without saving any changes.

Save Changes
Save Changes done so far to any of the setup options.

Discard Changes
Discard Changes done so far to any of the setup options.

Restore Defaults
Restore/Load Default values for all the setup options.

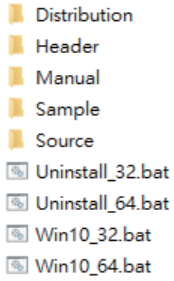
Save as User Defaults
Save the changes done so far as User Defaults.

Restore User Defaults
Restore the User Defaults to all the setup options.

APPENDIX A : Driver/Sample Guide

A.1 Software Package Contain

Distribution folders include x32 and x64 versions, use the batch file for driver installation.



There are included as fallowed:

Win10_32.bat, and Win10_64.bat:

Installation for driver, and

Uninstall_32.bat, and Uninstall_64.bat:

Uninstallation for driver

Run batch file as Administrator.

Make sure Windows version before installation.

Header folders include head file for software developer or System Integration.

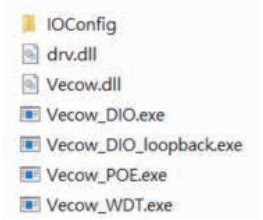
Manual folders include API description.

Sample folders include sample program, driver library, and API library for Windows/Linux

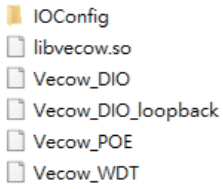
Source folders include sample program source code that compile on Visual Studio 2008/ ubuntu18.04.

A.2 Sample

Execute demo tool.



Windows



Linux

```
WDT sample version : v1.0.0509.0608
Load Vecow.dll at least v1.8.1409.0608
Vecow.dll Version : v1.8.1409.0608
Config : IO port  I - Isolated DIO
         IO port II - Non-Isolated DIO(GPIO)

Set WDT timer seconds (1~3932100) :
```

Vecow_WDT

B

APPENDIX B : Software Functions

B.1 Driver API Guide

In Header folder, Vecow.h and VecowLinux.h contain usabled API for Windows/ Linux.

BOOL get_WDT(DWORD *WDT)

Get watchdog timer setup.

WDT: watchdog timer setup.

Unit: second (Range: 0 ~ 65535 sec, 1093 ~ 65535 min (=65580 ~ 3932100 sec)).

Return :

TRUE (1): Success;

FALSE (0): Fail (Initial error, or call by pointer error, or hardware problem).

BOOL set_WDT(DWORD WDT)

Set watchdog timer setup.

WDT: watchdog timer setup.

Unit: second (Range: 0 ~ 65535 sec, 1093 ~ 65535 min (=65580 ~ 3932100 sec)).

Return :

TRUE (1) : Success;

FALSE (0): Fail (Initial error, or setup 0, or hardware problem).

BOOL cancel_WDT()

Cancel watchdog timer.

Return :

TRUE (1) : Success;

FALSE (0): Fail (Driver not exists, or version is too old, or out of range error).

BOOL config_COMPORT(BYTE *PORT_NUM)

Set COMPORT configuration.

A. PORT_NUM: Usable COMPORT number.

Range: 1~6.

Return :

TRUE (1) : Success;

FALSE (0): Fail (Initial error, or setup 0, or hardware problem).

BOOL set_COMPORT_mode(BYTE port, BYTE mode, BYTE term)

Set COMPORT mode.

B. port: which port set.
Range: 1~6.

C. mode: Usable COMPORT number.
0: RS232 mode; 1: RS422-5Wire mode.
2: RS422-9Wire mode; 4: RS485 mode.
4: Loopback mode.

D. term: Termination enable for RS422/RS485 mode.
1: Enable; 0: Disable.

Return :
TRUE (1) : Success;
FALSE (0): Fail (Initial error or hardware problem).

BOOL get_COMPORT_mode(BYTE port, BYTE *mode, BYTE term)

Get COMPORT mode.

E. port: which port get.
Range: 1~6.

F. mode: Usable COMPORT number.
0: RS232 mode; 1: RS422-5Wire mode.
2: RS422-9Wire mode; 4: RS485 mode.
4: Loopback mode.

G. term: Termination enable for RS422/RS485 mode.
1: Enable; 0: Disable.

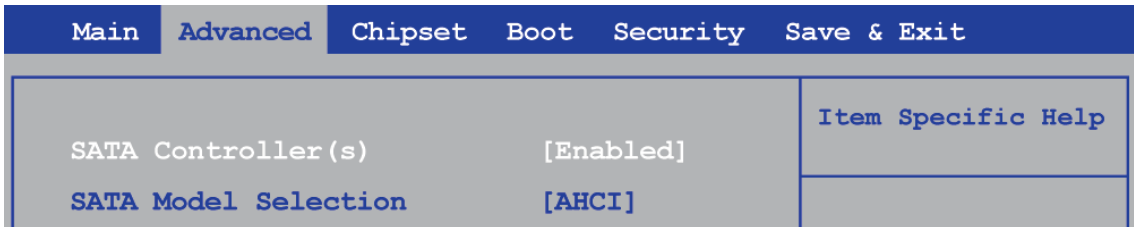
Return :
TRUE (1) : Success;
FALSE (0): Fail (Initial error or hardware problem).

APPENDIX C : RAID Functions

C.1.1 SATA Mode for RAID

Please select SATA Device to RAID mode on BIOS menu.

Advanced → SATA Configuration → SATA Mode Selection → RAID (Skylake platform) / Intel RST Premium (Kaby Lake/Coffee Lake platform)

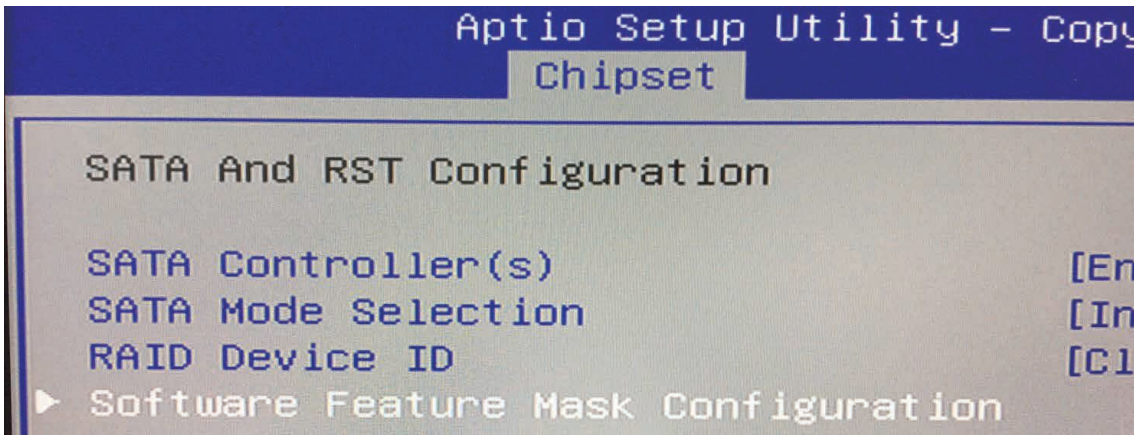


C.1.2 UEFI Mode for RAID

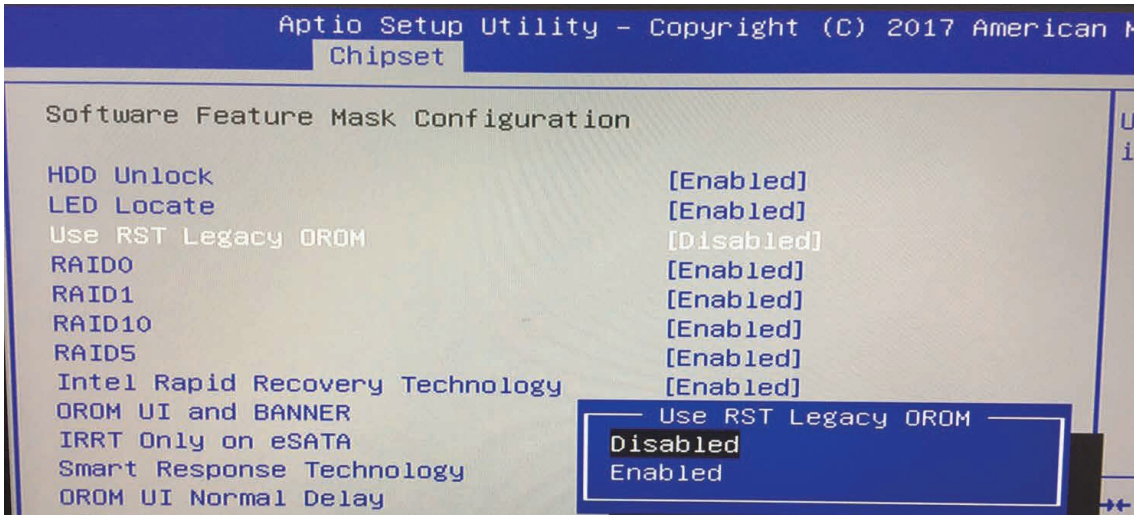
1. Please select SATA device to RAID mode on BIOS menu.

Advanced → SATA Configuration → SATA Mode Selection → RAID (Skylake platform) / Intel RST Premium (Kaby Lake/Coffee Lake platform)

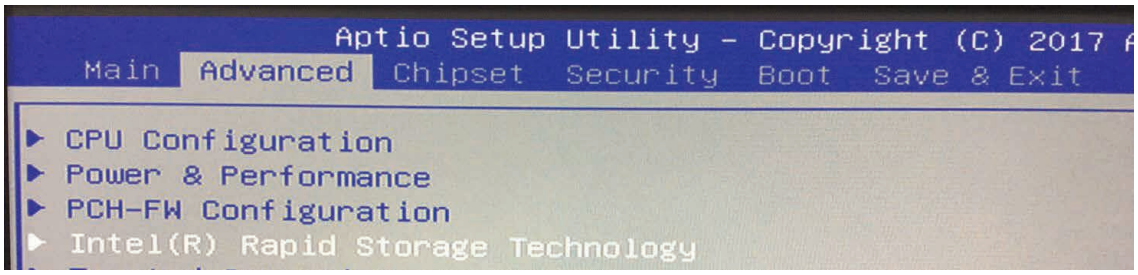
2. Please select Software Feature Mask Configuration on BIOS menu.



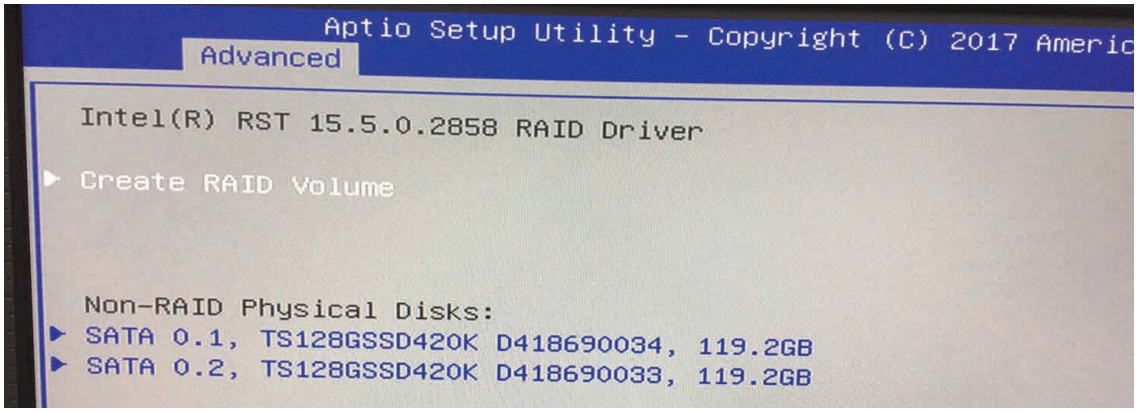
3. Use RST Legacy OROM → Disabled → Save Changes and Reset.



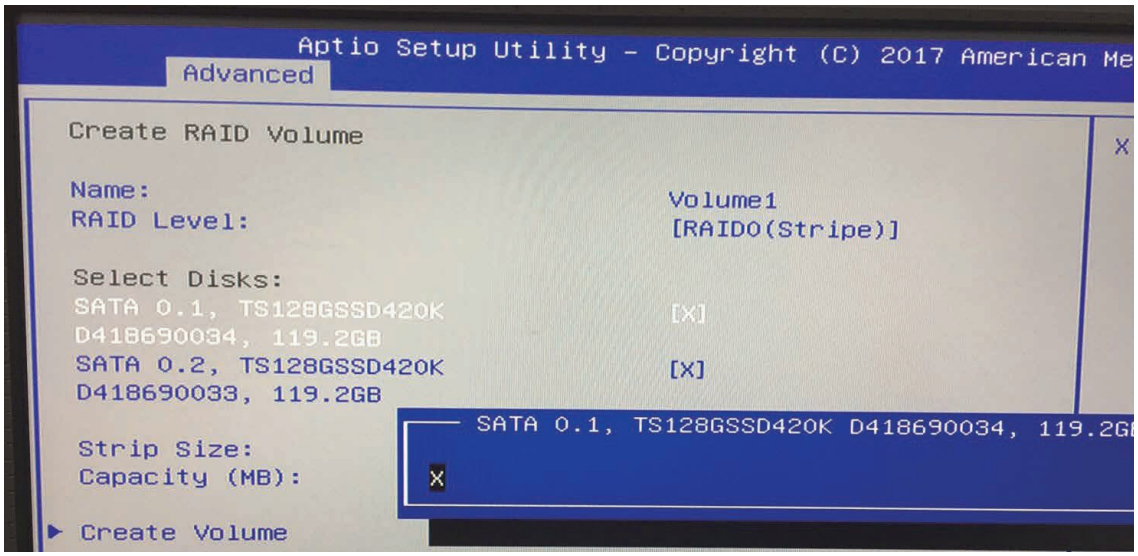
4. Into BIOS menu again, select Intel(R) Rapid Storage Technology on BIOS menu.



5. Select Create RAID Volume on BIOS menu.



6. Select disks to create RAID Volume then Save Changes and Reset to install OS with EFI mode.



C.2 OS Installation

The system is featured with four SATA, including four internal SATA, one mSATA and one CFast.

You can select one of the SATA ports for OS installation

We used CFast card for Windows 10 OS installation as an example.

C.3 To Install All Device Drivers of the System

The instructions are as follows:
1. Install Chipset driver
2. Install Network driver
3. Install ME driver (if available)
4. Install Audio driver
5. Install VGA driver

C.4 To Install "Intel Rapid Storage Technology" Software

You can get the software from driver CD.

Also, you can find the latest information and software directly from Intel's website.

http://www.intel.com/p/en_US/support/highlights/chpsts/imsm

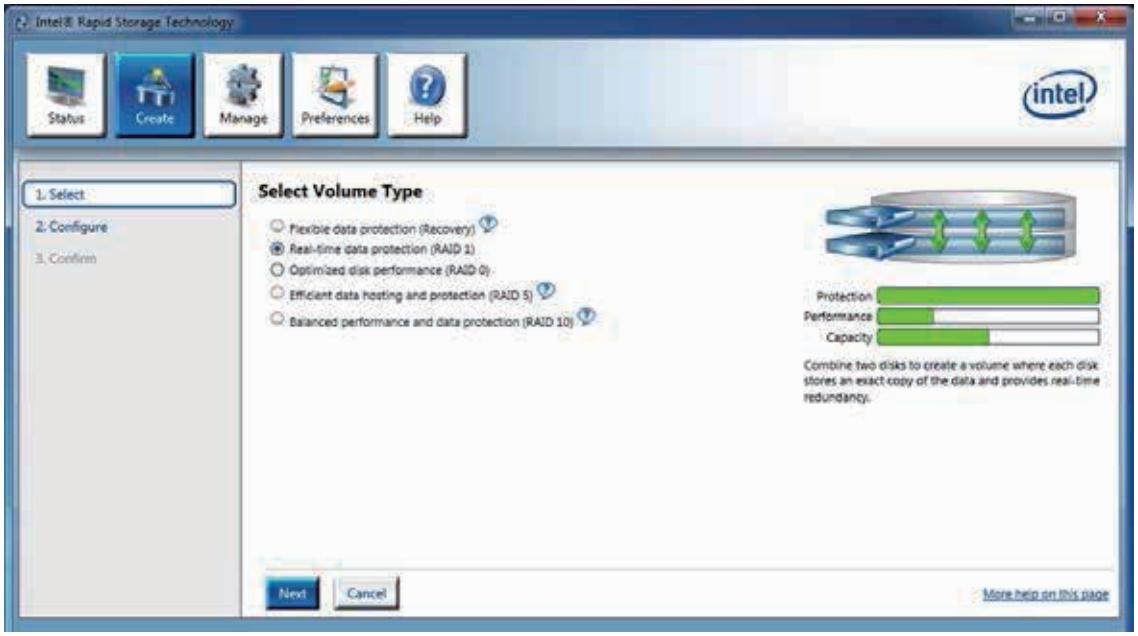
The RAID environment has been done if you completed the steps above.

C.5 To Insert SATA HDD for RAID 1

Please note, you can use two SATA ports for SATA HDD, except for the CFast port and mSATA slot.

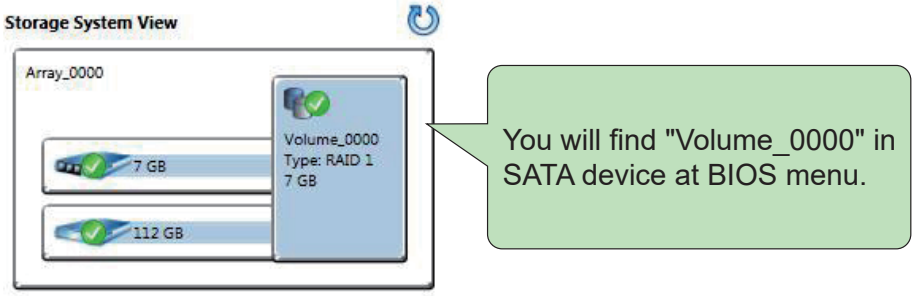
C.6 To Create RAID Volume on "Rapid Storage Technology" Software

The system is featured with six SATA HDD's for RAID volume, so there are three options to choose on this page. Let's take RAID 1 as an example, select "RAID 1".



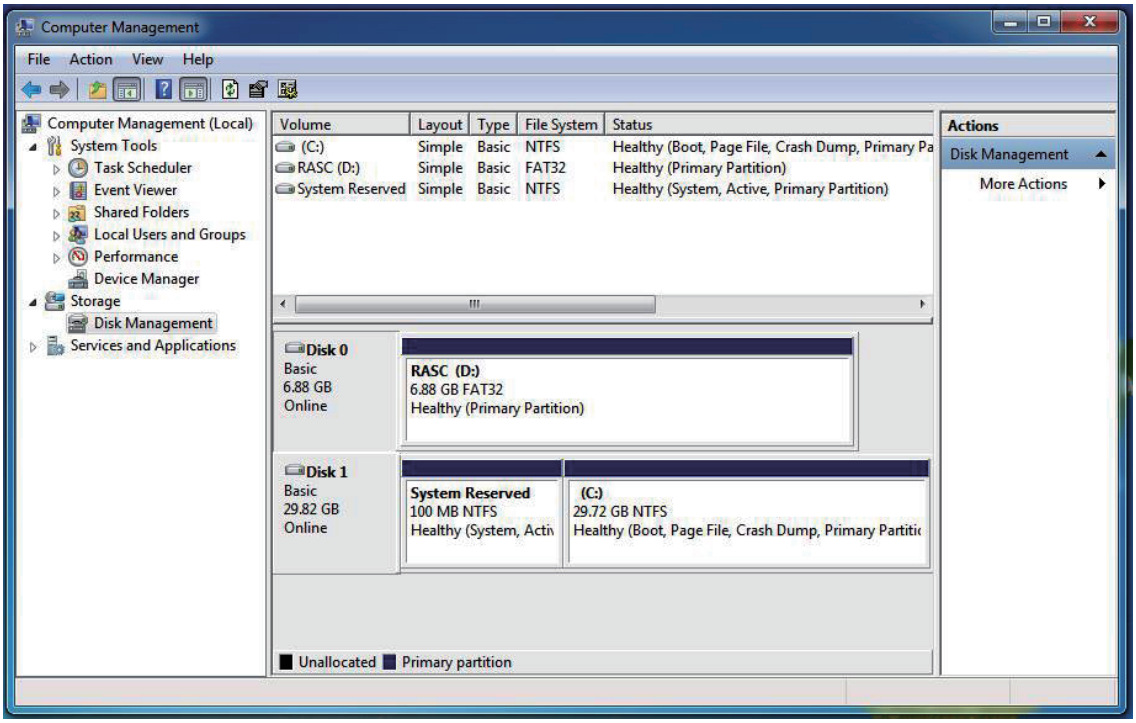
C.7 Disk Management : Partition the Disk

After RAID 1 volume created, you can see the figure of SATA device allocation.



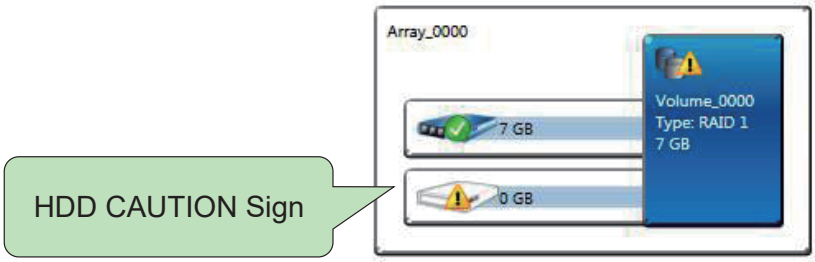
To start disk management tool, select "initialize disk".

Then add "Logical Device" for Windows access.

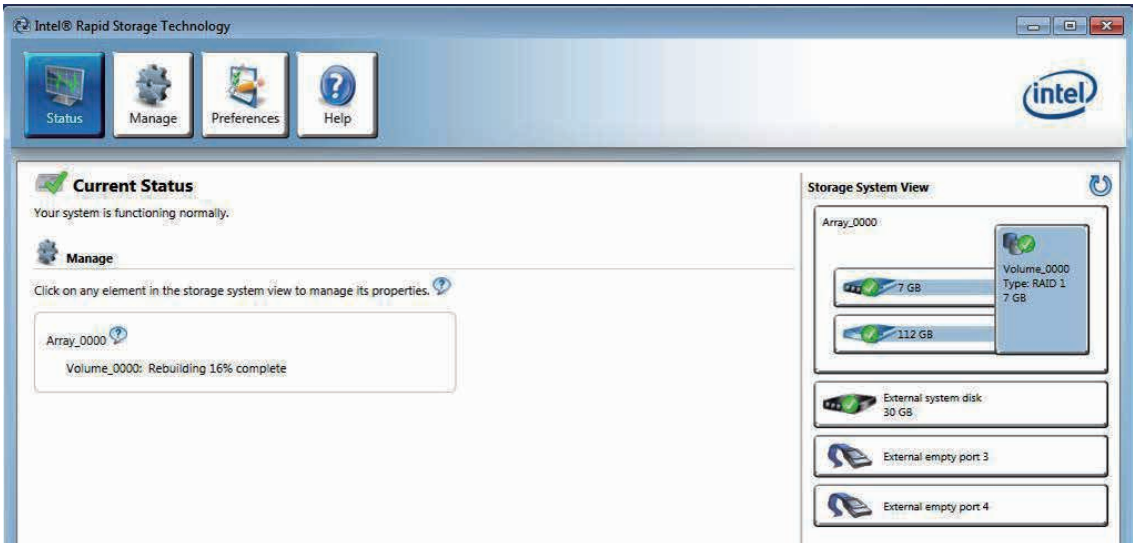


C.8 If One SATA HDD on RAID Volume is Out-of-use

After RAID 1 volume is created, you can see the figure of SATA device allocation.

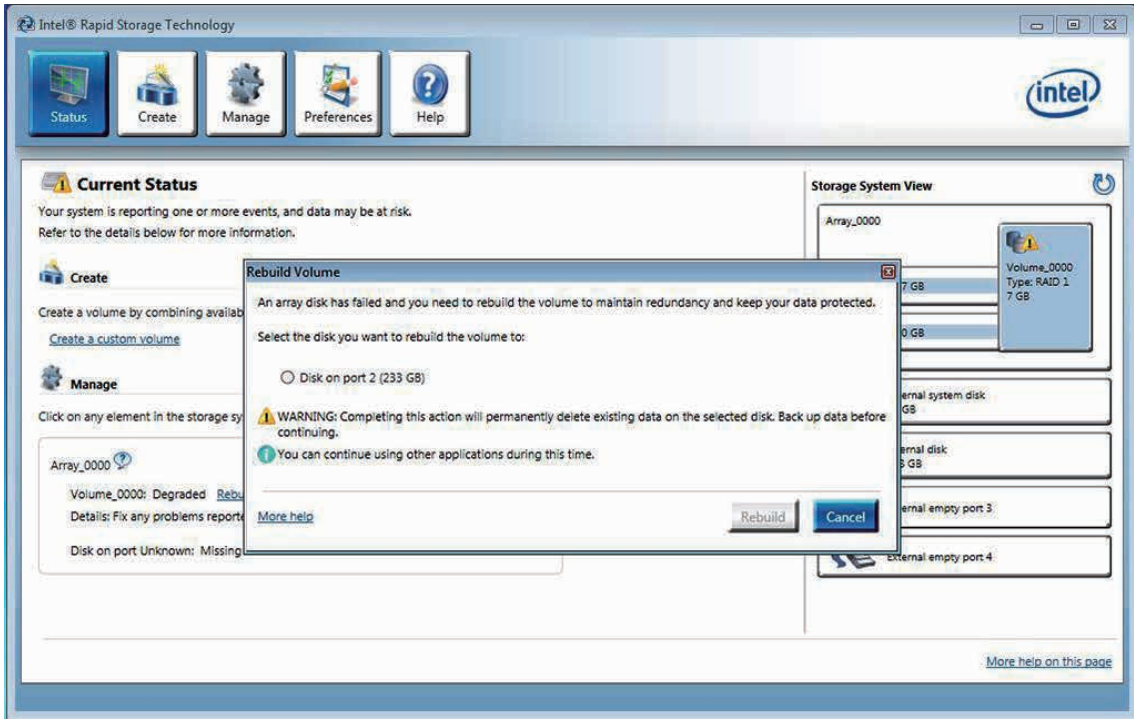


C.9 Recovery and Auto Re-build When Use the SAME RAID HDD



C.10 Recovery and Auto Re-build When Use DIFFERENT RAID HDD

A warning will pop-up to ask you if the disk is not a member of the original RAID volume.
If you press “Rebuild”, it will replace the broken SATA HDD to the last SATA HDD of RAID volume.



D

APPENDIX D : Power Consumption

Testing Board :	GPC-1000MX
RAM	32GB X 4
USB-1	USB Microsoft Wired Keyboard 600
USB-2	USB Mouse Logitech M105
USB-3	USB Flash Transcend 3.0 8GB
USB-4	USB Flash Transcend 3.0 8GB
SATA 0	Transcend SATA SSD420 128GB
SATA 1	WD WD5000BPVT 500GB
LAN 1 (i210)	1.0 Gbps
LAN 2 (i210)	1.0 Gbps
LAN 3 (i210)	1.0 Gbps
LAN 4 (i210)	1.0 Gbps
Graphics Output	DP
Power Plan	Balance(Windows 10 Power plan)
Power Source :	B&K Precision 9115-AT
Test Program-1	BurnInTest
Test Program-2	FurMark

D.1 Intel® Core™ i7-8700T (12M Cache, 2.40 GHz)

CPU	Power Input	Standby Mode		Power on and boot to Win 10 64-bit			
				Sleep Mode		idle status CPU usage less 3%	
		Max Current	Max Consumption	Max Current	Max Consumption	Max Current	Max Consumption
Intel® Core™ i7-8700T	12V	0.294A	03.53W	0.358A	04.30W	1.35A	16.20W
	24V	0.146A	03.50W	0.205A	04.92W	0.753A	18.07W
	36V	0.118A	04.25W	0.146A	05.26W	0.540A	19.44W
	55V	0.082A	04.51W	0.112A	06.16W	0.336A	18.48W

CPU	Power Input	Power on and boot to Win10 64-bit			
		Run 100% CPU usage without 2D		Run 100% CPU usage with 3D	
		Max Current	Max Consumption	Max Current	Max Consumption
Intel® Core™ i7-8700T	12V	3.264A	39.17W	5.773A	69.28W
	24V	1.751A	42.02W	2.779A	66.70W
	36V	1.235A	44.46W	2.036A	73.30W
	55V	0.884A	48.62W	1.428A	78.54W

D.2 Intel® Core™ i7-8700 (12M Cache, 3.20 GHz)

CPU	Power Input	Standby Mode		Power on and boot to Win10 64-bit			
				Sleep Mode		idle status CPU usage less 3%	
		Max Current	Max Consumption	Max Current	Max Consumption	Max Current	Max Consumption
Intel® Core™ i7-8700	12V	0.258A	03.10W	0.420A	05.04W	1.357A	16.28W
	24V	0.146A	03.50W	0.220A	05.28W	0.752A	18.05W
	36V	0.120A	04.32W	0.138A	04.97W	0.465A	16.74W
	55V	0.078A	04.29W	0.099A	05.45W	0.326A	17.93W

CPU	Power Input	Power on and boot to Win10 64-bit			
		Run 100% CPU usage without 2D		Run 100% CPU usage with 3D	
		Max Current	Max Consumption	Max Current	Max Consumption
Intel® Core™ i7-8700	12V	4.624	55.49W	7.126	85.51W
	24V	2.324	55.78W	3.522	84.53W
	36V	1.602	57.67W	2.668	96.05W
	55V	1.132	62.26W	1.782	98.01W

D.3 Intel® Xeon® E-2176G (12M Cache, 3.70 GHz)

CPU	Power Input	Standby Mode		Power on and boot to Win10 64-bit			
				Sleep Mode		idle status CPU usage less 3%	
		Max Current	Max Consumption	Max Current	Max Consumption	Max Current	Max Consumption
Intel® Xeon® E-2176G	12V	0.301A	03.61W	0.365A	04.38W	1.395A	16.74W
	24V	0.148A	03.55W	0.213A	05.11W	0.742A	17.81W
	36V	0.119A	04.28W	0.145A	05.22W	0.523A	18.83W
	55V	0.078A	04.29W	0.103A	05.67W	0.326A	17.93W

CPU	Power Input	Power on and boot to Win10 64-bit			
		Run 100% CPU usage without 2D		Run 100% CPU usage with 3D	
		Max Current	Max Consumption	Max Current	Max Consumption
Intel® Xeon® E-2176G	12V	6.135A	73.62W	9.362A	112.34W
	24V	3.551A	85.22W	4.843A	116.23W
	36V	2.325A	83.70W	3.353A	120.71W
	55V	1.531A	84.21W	2.153A	118.42W

D.4 Intel® Core™ i7-8700 Add One RTX 3090 Graphics Card

CPU	Power Input	Standby Mode		Power on and boot to Win10 64-bit			
				Sleep Mode		idle status CPU usage less 3%	
		Max Current	Max Consumption	Max Current	Max Consumption	Max Current	Max Consumption
Intel® Core™ i7-8700	12V	0.275A	03.30W	0.562A	06.74W	3.655A	43.86W
	24V	0.188A	04.51W	0.345A	08.28W	2.142A	51.41W
	36V	0.142A	05.11W	0.247A	08.89W	1.389A	50.00W
	55V	0.121A	06.66W	0.183A	10.07W	0.996A	54.78W

CPU	Power Input	Power on and boot to Win10 64-bit			
		Run 100% CPU usage without 2D		Run 100% CPU usage with FurMark	
		Max Current	Max Consumption	Max Current	Max Consumption
Intel® Core™ i7-8700	12V	8.175A	98.10W	35.661A	427.93W
	24V	4.152A	99.65W	17.441A	418.58W
	36V	2.769A	99.68W	11.962A	430.63W
	55V	1.962A	107.91W	8.0402A	442.21W

D.5 Intel® Core™ i7-8700 Add Two RTX 3090 Graphics Card

CPU	Power Input	Standby Mode		Power on and boot to Win10 64-bit			
				Sleep Mode		idle status CPU usage less 3%	
		Max Current	Max Consumption	Max Current	Max Consumption	Max Current	Max Consumption
Intel® Core™ i7-8700	12V	0.291A	03.49W	0.587A	07.04W	4.515A	54.18W
	24V	0.185A	04.44W	0.354A	08.50W	2.465A	59.16W
	36V	0.135A	04.86W	0.256A	09.22W	1.923A	69.23W
	55V	0.117A	06.44W	0.193A	10.62W	1.241A	68.26W

CPU	Power Input	Power on and boot to Win10 64-bit			
		Run 100% CPU usage without 2D		Run 100% CPU usage with FurMark	
		Max Current	Max Consumption	Max Current	Max Consumption
Intel® Core™ i7-8700	12V	9.535A	114.42W	74.851A	898.21W
	24V	4.872A	116.93W	33.539A	804.94W
	36V	3.438A	123.77W	25.625A	922.50W
	55V	2.524A	138.82W	16.789A	923.40W

APPENDIX E : Supported Memory & Storage List

E.1 Supported Memory List

Testing Board	GPC-1000MX
Memory Test	MemTest86 V8.2
BurnInTest	V8.1

E.1.1 Tset Item

Channel	Memtest	Bunin	Flash BIOS	Remove Battery
*2(Socket 1; Socket 2)	PASS	PASS	PASS	PASS
*2(Socket 3; Socket 4)	PASS	PASS	PASS	PASS
*1(Socket 1)	PASS	PASS	N/A	PASS
*1(Socket 2)	N/A	N/A	N/A	N/A
*1(Socket 3)	PASS	PASS	N/A	PASS
*1(Socket 4)	N/A	N/A	N/A	N/A

E.2 Supported Non-ECC Memory List

Brand	Info	Test Temp.(Celsius)
Innodisk 16G DDR4 2400 SO-DIMM	M4S0-AGS1OCSJ-H03	25ºC
		25ºC
Innodisk 16G DDR4 2666 SO-DIMM	M4S0-AGS1O5IK-H03	25ºC
		25ºC
SLINK 16GB DDR4-2666 SO-DIMM	J4AGSH1G8QHFC	25ºC
		25ºC
SLINK 32GB DDR4-2666 SO-DIMM	J4BGSS2G8QHXC	25ºC
		25ºC
Kingston 16GB DDR4-2666 SO-DIMM	KVR26S19D8/16	25ºC
		25ºC
Innodisk 32G DDR4 3200 SO-DIMM	M4S0-BGS2OCEM-H03	25ºC
		25ºC
Innodisk 16G DDR4 3200 SO-DIMM	M4S0-AGS1O5EM-H031	25ºC
		25ºC
SLINK 32GB DDR4 3200 SO-DIMM	J4BGSH2G8TMFC	25ºC
		25ºC
Kingston 32GB DDR4 3200 SO-DIMM	KVR32S2208/32	25ºC
		25ºC
Kingston 16GB DDR4 3200 SO-DIMM	KVR32S2208/16	25ºC
		25ºC

E.3 Supported ECC Memory List

Brand	Info	Test Temp.(Celsius)
Innodisk 4G DDR4 2400 SO-DIMM	M4D0-4GSSPCSJ-H03	25ºC
		25ºC
Innodisk 4G DDR4 2400 SO-DIMM	M4D0-4GSSP5IK-H03	25ºC
		25ºC
Innodisk 16G DDR4 2666 SO-DIMM	M4D0-AGS1QCIK-H03	25ºC
		25ºC
SLINK 16G DDR4 2666 SO-DIMM	J4AGDH1G8QHKC	25ºC
		25ºC
Innodisk 16G DDR4 3200 SO-DIMM	M4D0-AGS1Q5EM-H031	25ºC
		25ºC
SLINK 32G DDR4 3200 SO-DIMM	J4BGDH2G8TMKC	25ºC
		25ºC

E.4 Supported Storage Device List

Type	Vendor	Model	Capacity
mSATA	Transcend	mSATA TS64GMSA370	64GB
	Intel	Intel-310 SSDMAEMC080G2	80GB
	Innodisk	DEMSR-32GD06SW2QC	32GB
SATA SSD	Intel	SSD 530 SSDSC2BW120A4	120GB
		SSD E 5400s SSDSC2KR120H6	120GB
	Innodisk	3MG2-P DGS25-64GD81BC1QC	64GB
	MEMXPRO	M3A MI3MA1212802WN	128GB
	LITE-ON	K8-L1512	512GB
		K8-L1256	256GB
	Transcend	TS128GSSD420K	128GB
		SSD370 TS64GSSD370I	64GB
	Kingston	SUV400S37	120GB
	FORESEE	S903S128G	128GB
		S903S256G	256GB
	ADATA	ISSS332-128GM	128GB
		ISSS332-256GM	256GB
M.2 SSD (PIe)	ADATA	IM2P33F8-128GD	128GB
		IM2P33F8-256GD	128GB
	Toshiba	KXG50ZNV512G	512GB
	Phison	ESMP256GTB3C2-E12	256GB
	FORESEE	FSGMMC-256G	256GB
	Kingston	SA2000MB	500GB
	SAMSUNG	970 EVO PLUS MZ-V7S250	250GB
		980 EVO PRO MZ-V8P250BW	250GB
	INTEL	760P SSDPEKKW128G8	128GB
	Innodisk	M.2 (P80) 3TE6 DEM28-01TDD1ECAQF-H03	32GB
		M.2 (P80) 3TG3-P DGM28-02TDA1ECBEH-H03	2TB

** If more help is needed, please contact Vecow technical support.

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For further support information, please visit www.vecow.com