

# GPC-1000 USER

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

# Manual

## Record of Revision

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Version	Date	Page	Description	Remark
0.10	2020/05/11	All	Preliminary Release	
1.00	2020/05/19		Official Release	
1.10	2020/11/30	1, 2, 62	Update	
1.20	2021/03/24	4, 12	Update	
1.30	2022/08/26	85-87	Update	
1.40	2023/06/06	v, 6, 21, 38, 74	Update	

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# Order Information

Part Number	Description
GPC-1000	GPC-1000, 4 GigE LAN, 2 PCIe x8, 1 PCIe x4, 1 PCIe x1, 2 SSD Tray, 4 USB 3.1, 4 COM, 1 SIM, 16 Isolated DIO

# 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	



## Optional Accessories

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Part Number	Description
DDR4 32G	Certified DDR4 32GB 2666MHz RAM
DDR4 16G	Certified DDR4 16GB 2666/2400/2133 MHz RAM
DDR4 8G	Certified DDR4 8GB 2666/2400/2133 MHz RAM
DDR4 4G	Certified DDR4 4GB 2666/2400/2133 MHz RAM
PWS-600W1	600W, 24V, 90V AC to 264V AC Power Supply
PWS-600W-WT	600W, 28.8V, 90 to 305V AC Power Supply, Wide Temperature -40°C to +70°C
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
4G Module	Mini PCIe 4G/GPS Module with Antenna
WiFi & Bluetooth	WiFi & Bluetooth Module with Antenna

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# 1

## GENERAL INTRODUCTION

### 1.1 Overview

Vecow GPC-1000 is the industry's first embedded system that offers workstation-grade performance with 9V to 55V DC power input and powered by dual graphics. Vecow GPC-1000 series is powered by 9th Generation Intel® Xeon®/Core™ processor, which offers 37% better performance compared to previous generation Intel® Kaby Lake platform. To address the growing AI applications such as autonomous vehicles, factory automation, public surveillance and traffic vision which requires high performance computing capability, Vecow GPC-1000 Series features dual GPUs with options of NVIDIA® or AMD graphics and brings the power of dual GPU to accelerate AI solutions development and deployment.

Vecow GPC-1000 Series provides highly flexible configuration with 4 PCIe slot including 2 PCIe x8, 1 PCIe x4 and 1 PCIe x1. Additionally, GPC-1000 Series, which runs on NVIDIA® or AMD platform, supports 1500W smart power budget management, with up to 750W for each of dual graphics in edge computing while keeping the system reliable. Designed to operate well in harsh industrial environments, Vecwo GPC-1000 Series supports a wide operating temperature range from -25°C to 60°C, anti-shock, anti-vibration tested EN50155, EN50121-3-2.

Featuring 9V to 55V wide range DC-in with 4 PCIe slots, 4 10G USB 3.1, 4 GigE LAN, 3 COM RS-232/422/485 and optional supporting 5G networks, 10G PoE+, for high-speed data transfer, Vecow GPC-1000 Series Expandable Dual GPU AI Computing System is your powerful embedded engine for Robotic Control, Public Surveillance, Autonomous Vehicles, Deep Learning and AI-oriented computing applications.

## 1.2 Features

- 8 cores 9th Generation Intel® Xeon®/Core™ i7/i5/i3 processor (Coffee Lake Refresh) with workstation-grade Intel® C246 Chipset
- Single 9V to 55V wide range DC power input
- 4 PCIe slots : 2 PCIe x8, 1 PCIe x4 and 1 PCIe x1, max 2 dual slot PCIe cards supported
- 1500W power budget supports max dual 750W NVIDIA® Tesla®/Quadro®/ GeForce® or AMD Radeon™ graphics card for AI computing
- 4 Independent GigE LAN, iAMT 12.0 supported
- 2 DDR4 2666MHz SO-DIMM, up to 64GB
- 4 External USB 3.1 support up to 10Gbps data transfer
- Supports WiFi/4G/3G/LTE/GPRS/UMTS
- 2 SATA III, 4 COM RS-232/422/485, 16 Isolated DIO
- Optional supports 5G Networks, 10G PoE<sup>+</sup>

## 1.3 Product Specification

### 1.3.1 Specifications of GPC-1000

System	
Processor	8 Cores 9th/8th Gen Intel® Xeon®/Core™ i7/i5/i3 processor (Coffee Lake Refresh)
Chipset	Intel® C246
BIOS	AMI
SIO	IT8786E
Memory	2 DDR4 2666MHz SO-DIMM, up to 64GB
I/O Interface	
Serial	4 COM RS-232/422/485 (ESD 8kV)
USB	4 USB 3.1
Isolated DIO	16 Isolated DIO : 8 DI, 8 DO
LED	Power, HDD
SIM Card	1 External SIM Card Socket
Expansion	
Mini PCIe	<ul style="list-style-type: none"> <li>• 1 Full-size for PCIe/USB/External SIM Card</li> <li>• 1 Full-size for PCIe/USB/mSATA</li> </ul>
PCIe	<ul style="list-style-type: none"> <li>• 2 PCIe x16 slot with PCIe x8 signal (at third and sixth slot)</li> <li>• 1 PCIe x16 slot with PCIe x4 signal (at first slot)</li> <li>• 1 PCIe x16 slot with PCIe x1 signal (at fourth slot)</li> </ul>
SUMIT A, B	2 SUMIT Slot (Optional)
Graphics	
Graphics Processor	<ul style="list-style-type: none"> <li>• Intel® UHD graphics 630</li> <li>• Independent Graphics 1 : By request</li> <li>• Independent Graphics 2 : By request</li> </ul>
Interface	Up to 11 Display interfaces : <ul style="list-style-type: none"> <li>• DVI-D : Up to 1920 x 1200 @60Hz</li> <li>• 2 DisplayPort : Up to 4096 x 2304 @60Hz</li> <li>• By requested Graphics Card</li> </ul>
Storage	
SATA	2 SATA III (6Gbps) support S/W RAID 0,1
mSATA	1 SATA III (Mini PCIe Type, 6Gbps)
Storage Device	2 internal 2.5" SSD/HDD bracket

<b>Audio</b>	
Audio Codec	Realtek ALC888S-VD, 7.1 Channel HD Audio
Audio Interface	1 Mic-in, 1 Line-out
<b>Ethernet</b>	
LAN 1	Intel® I219LM GigE LAN supports iAMT 12.0
LAN 2	Intel® I210 GigE LAN
LAN 3	Intel® I210 GigE LAN
LAN 4	Intel® I210 GigE LAN
<b>Power</b>	
Input Voltage	9V to 55V DC-IN
Power Interface	4-pin Terminal Block
Remote Switch	2-pin Terminal Block
<b>Others</b>	
TPM	Optional Infineon SLB9665, 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.
<b>Software Support</b>	
OS	Windows 10, Linux
<b>Mechanical</b>	
Dimension	242.7mm x 208.9mm x 369.2mm (9.56" x 8.22" x 14.54")
Weight	9 kg (19.8 lb)
Mounting	Wallmount by mounting bracket
<b>Environment</b>	
Operating Temperature	-25°C to 60°C (-6°F to 140°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	5% to 95% Humidity, non-condensing
Relative Humidity	95% at 60°C
Shock	<ul style="list-style-type: none"> <li>• IEC 61373 : 2010</li> <li>• Railway Applications : Rolling Stock Equipment, Shock and Vibration Test</li> </ul>
EMC	CE, FCC, EN50155, EN50121-3-2

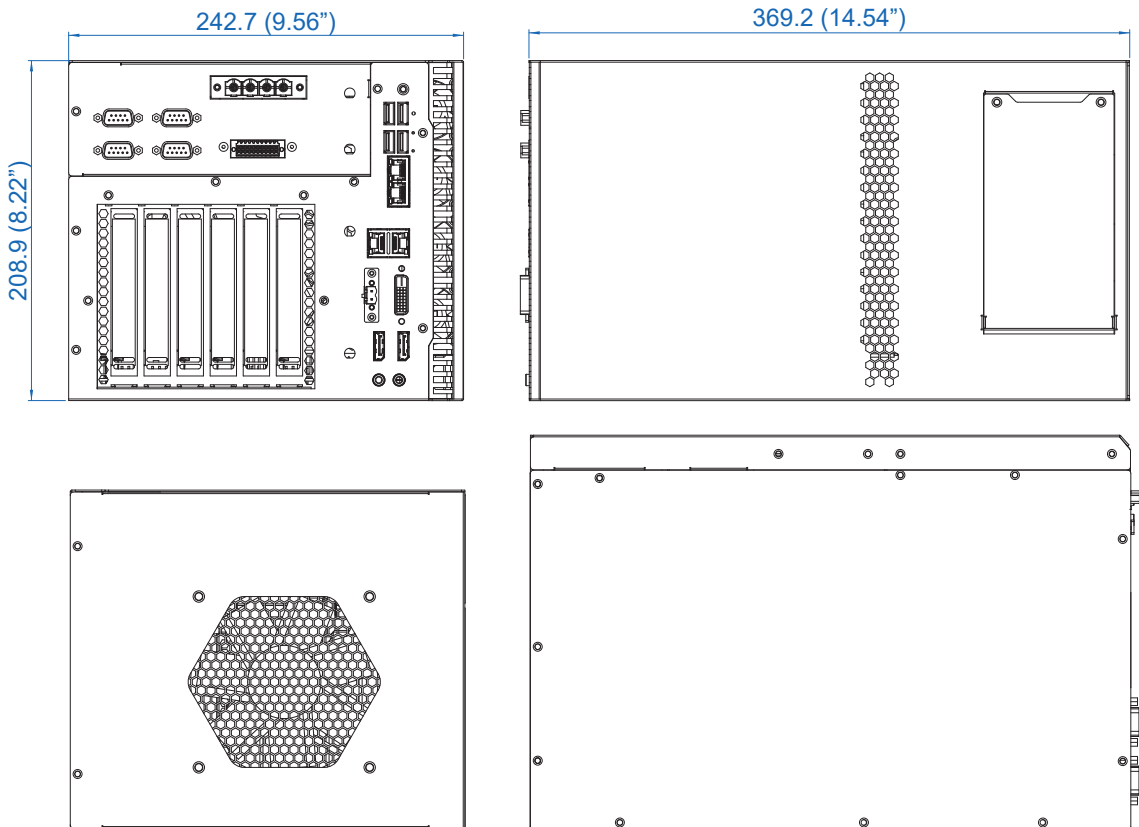
## 1.4 Supported CPU List

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-1000

Unit : mm (inch)





# 2

## GETTING TO KNOW YOUR GPC-1000

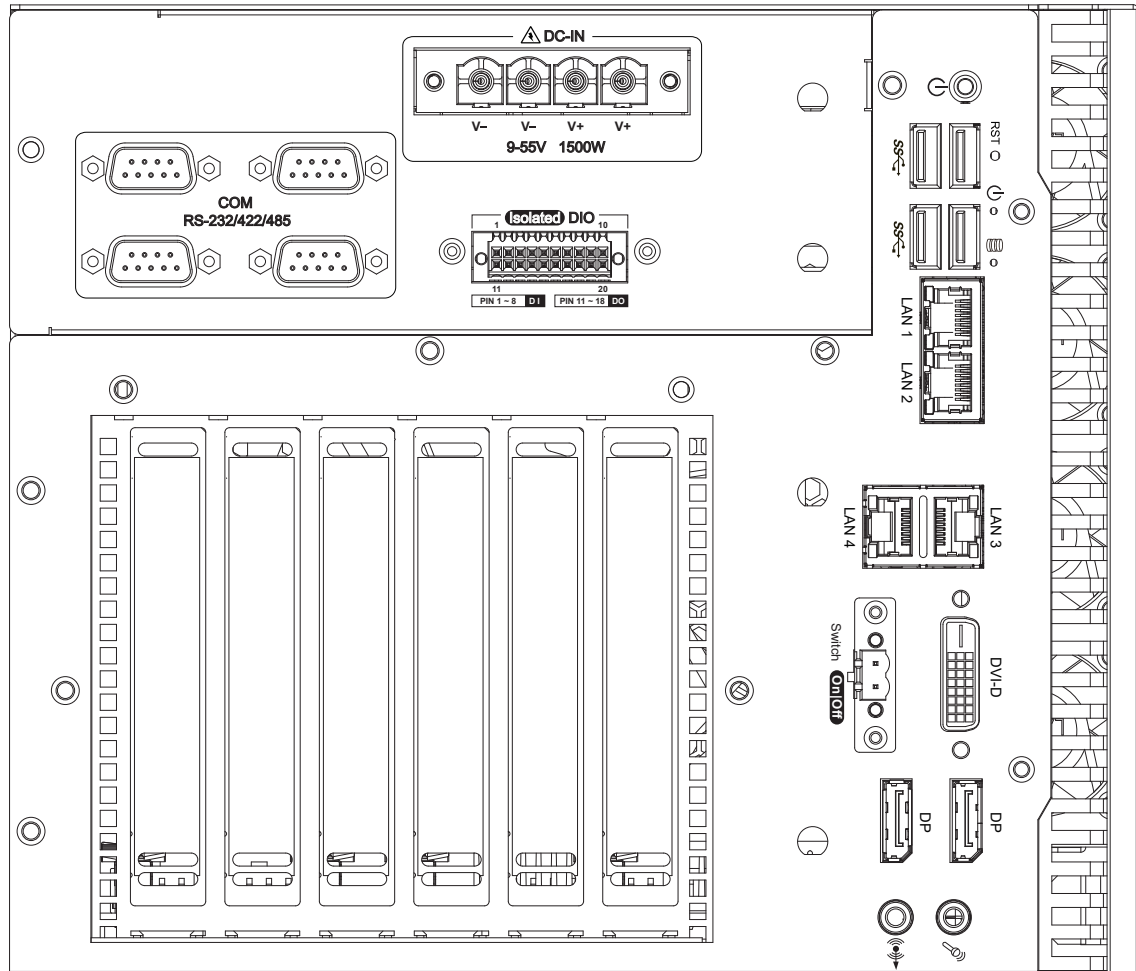
### 2.1 Packing List

Item	Description	Qty
1	GPC-1000	1

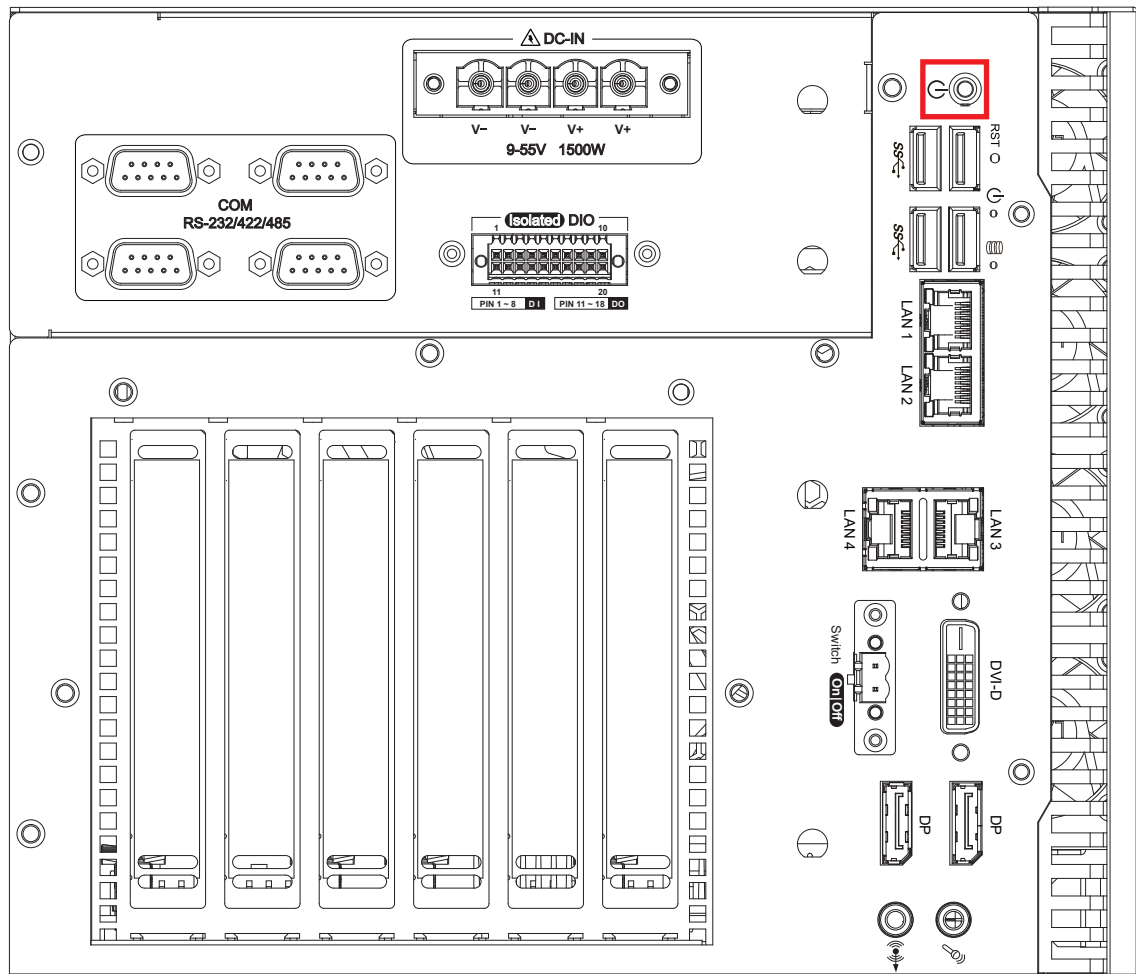
Item	Description	Outlook	Usage	P/N	Qty
1	PHILLPIS M4x16L with washer, Ni		Mount	53-24D6416-30B	4
2	PHILLPIS M2.5x6L, Ni		Mini PCIe slot	53-2426906-30B	2
3	KHS#6-32x6 screw for wall-mounting		Wall mount bracket	53-I000510-000	4
4	M3 x4 screw		HDD/SSD	53-2466204-30B	8
5	Terminal block 2-pin (3.5mm)		Switch	51-2411R02-S1B	1
6	4-pin TB Plug		Power	51-2711R04-S1Q	1
7	Terminal block 20-pin (2.54mm)		Isolated DIO/GPIO	51-2112R20-S1D	1
8	Wall-mounting bracket		Mount	62-00P0047-000	2

## 2.2 Front Panel I/O Functions

In Vecow GPC-1000 series family, all I/O connectors are located on the front panel. Most of the general connections to computer device, such as USB, LAN Jack, Audio, Display Port, DVI-D and other additional storage, are placed on the front panel.

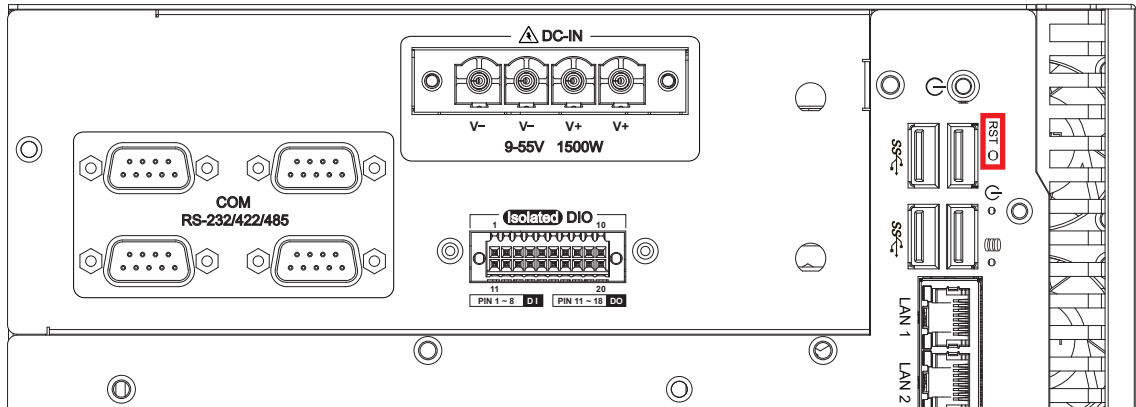


## 2.2.1 Power Button



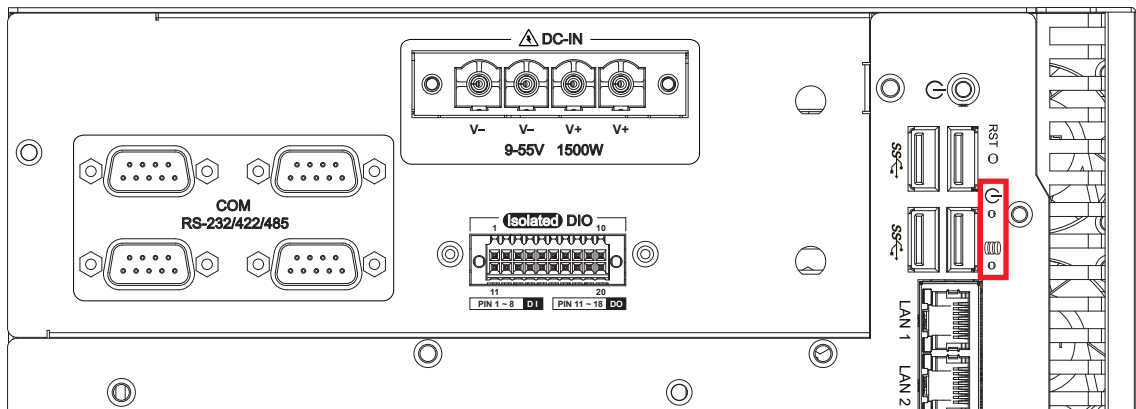
If system error, you can just press the power button for 4 seconds to shut down the machine directly. Please do note that a 4-second interval between each 2 power-on/power-off operation is necessary in normal working status. (For example, once turning off the system, you have to wait for 4 seconds to initiate another power-on operation.)

## 2.2.2 Reset Tact Switch



It is a hardware reset switch. Use this switch to reset the system without power off the system. Press the Reset Switch for a few seconds, and then reset will be enabled.

## 2.2.3 PWR & HDD LED Indicator

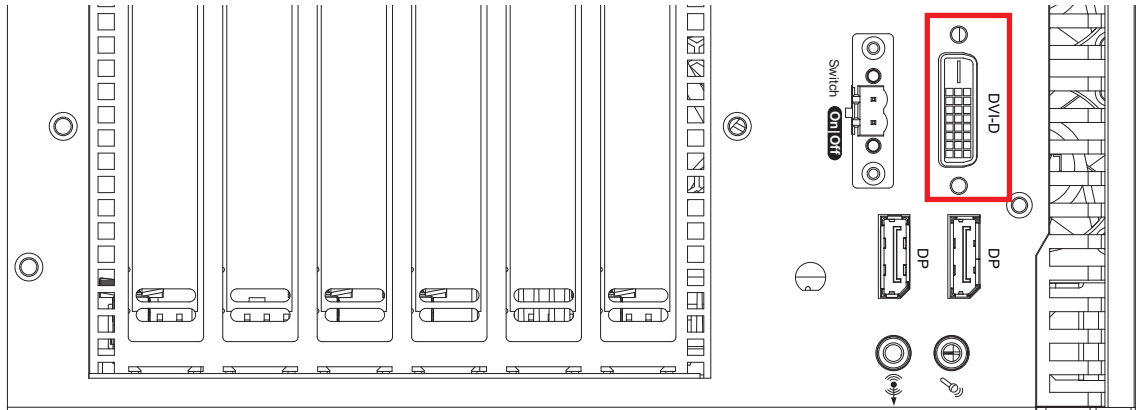


**HDD LED/Yellow** : A Hard Disk LED. If the LED is on, it indicates that the system's storage is functional. If it is off, it indicates that the system's storage is not functional. If it is flashing, it indicates data access activities.

**Power LED/Green** : If the LED is solid green, it indicates that the system is powered on.

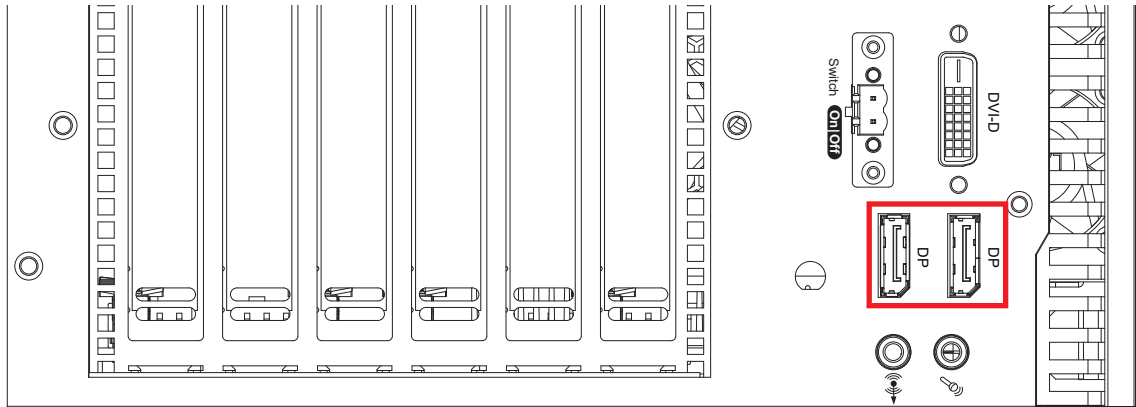
LED Color	Indication	System Status
Yellow	HDD	<ul style="list-style-type: none"> <li>On/Off : Storage status, function or not</li> <li>Twinkling : Data transferring</li> </ul>
Green	Power	System power status (on/off)

## 2.2.4 DVI-D Connector



The DVI-D connector on the front panel supports DVI display. This connector can either output DVI signal. The DVI output mode supports up to 1920 x 1200 resolution and output mode supports up to 1920 x 1200 resolution. The DVI is automatically selected according to the connected display. You will need a DVI-D cable when connecting to a display device.

## 2.2.5 DisplayPort

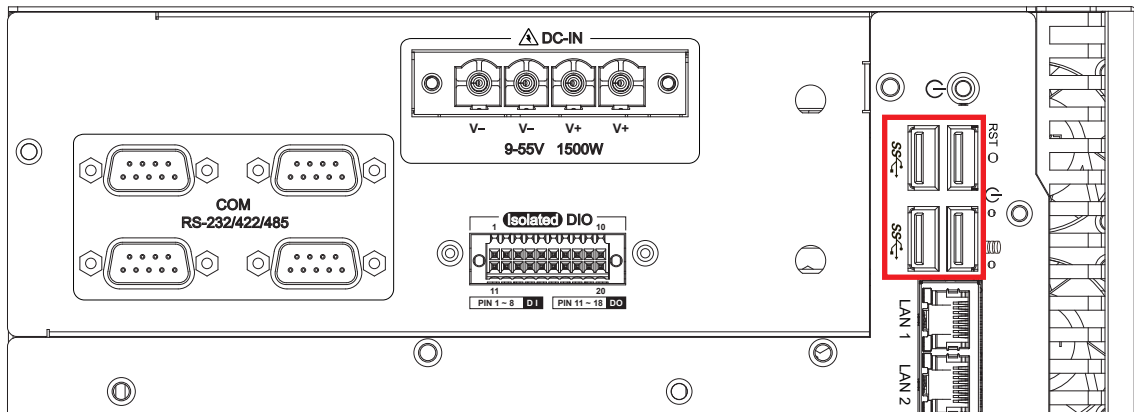


Onboard Display Port supports auxiliary channel dual mode, and the connection supports up to 4096x2304 resolution at 60Hz.

Multi-Stream Transport Display Resolutions Table :

Multi-Stream Transport Display	Max. Resolution
One panel Display	4096 x 2304 @60Hz
Two panel Displays concurrently	2880 x 1800 @60Hz
Three panel Displays concurrently	2304 x 1440 @60Hz

## 2.2.6 USB 3.1



There are 4 USB 3.1 connections available supporting up to 5GB per second data rate in the front side of GPC-1000. It is also compliant with the requirements of Super Speed (SS), High Speed (HS), Full Speed (FS) and Low Speed (LS).

## 2.2.7 Ethernet Port

There are dual 8-pin RJ-45 jacks supporting 10/100/1000 Mbps Ethernet connections in the front side. LAN 1 is powered by Intel® i219 Ethernet Phy and LAN 2 is powered by Intel® I210 Ethernet engine. When both LAN 1 and LAN 2 work at normal status, iAMT 11.0 function is enabled.

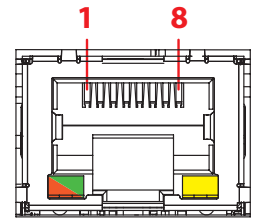
Using suitable RJ-45 cable, you can connect the system to a computer or to any other devices with Ethernet connection; for example, a hub or a switch. Moreover, both LAN 1 and LAN 2 support Wake on LAN and Pre-boot functions. The pin-outs of LAN 1 and LAN 2 are listed as follows :

Pin No.	10/100 Mbps	1000Mbps
1	E_TX+	MDI0_P
2	E_TX-	MDI0_N
3	E_RX+	MDI1_P
4	-----	MDI2_P
5	-----	MDI2_N
6	E_RX-	MDI1_N
7	-----	MDI3_P
8	-----	MDI3_N

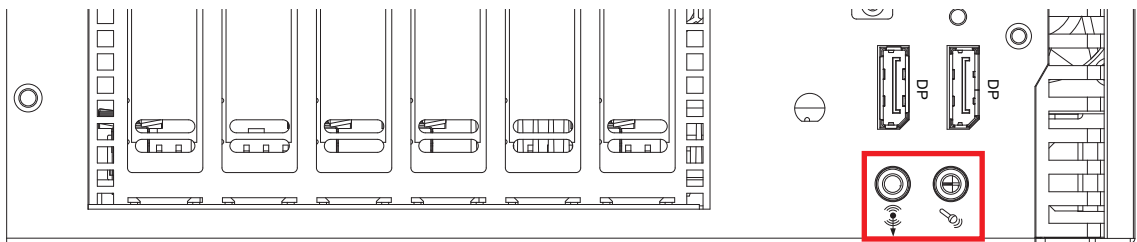
Each LAN port is supported by standard RJ-45 connector with LED indicators to present Active/Link/Speed status of the connection.

The LED indicator on the right bottom corner lightens in solid green when the cable is properly connected to a 100Mbps Ethernet network; The LED indicator on the right bottom corner lightens in solid orange when the cable is properly connected to a 1000Mbps Ethernet network; The left LED will keep twinkling/off when Ethernet data packets are being transmitted/received.

LED Location	10Mbps	100Mbps	1000Mbps	1000Mbps
Right Bottom LED	Off	Solid Green	Solid Orange	Solid Orange
Left Bottom LED	Flash Yellow	Flash Yellow	Flash Yellow	Twinkling Yellow



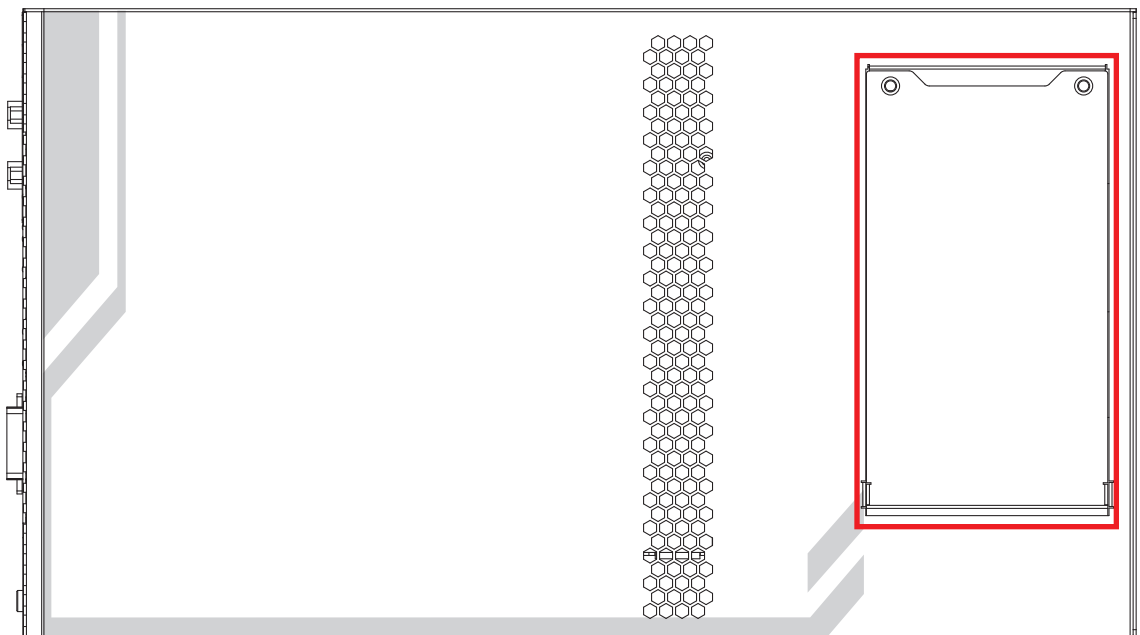
## 2.2.8 Audio Connector



There are 2 audio connectors, Mic-in and Line-out, in the front side of GPC-1000. Onboard Realtek ALC888S-VD audio codec supports 7.1 channel HD audio and fully complies with Intel® High Definition Audio (Azalia) specifications.

To utilize the audio function in Windows platform, you need to install the corresponding drivers for both Intel® C236 chipset and Realtek ALC888S-VD codec.

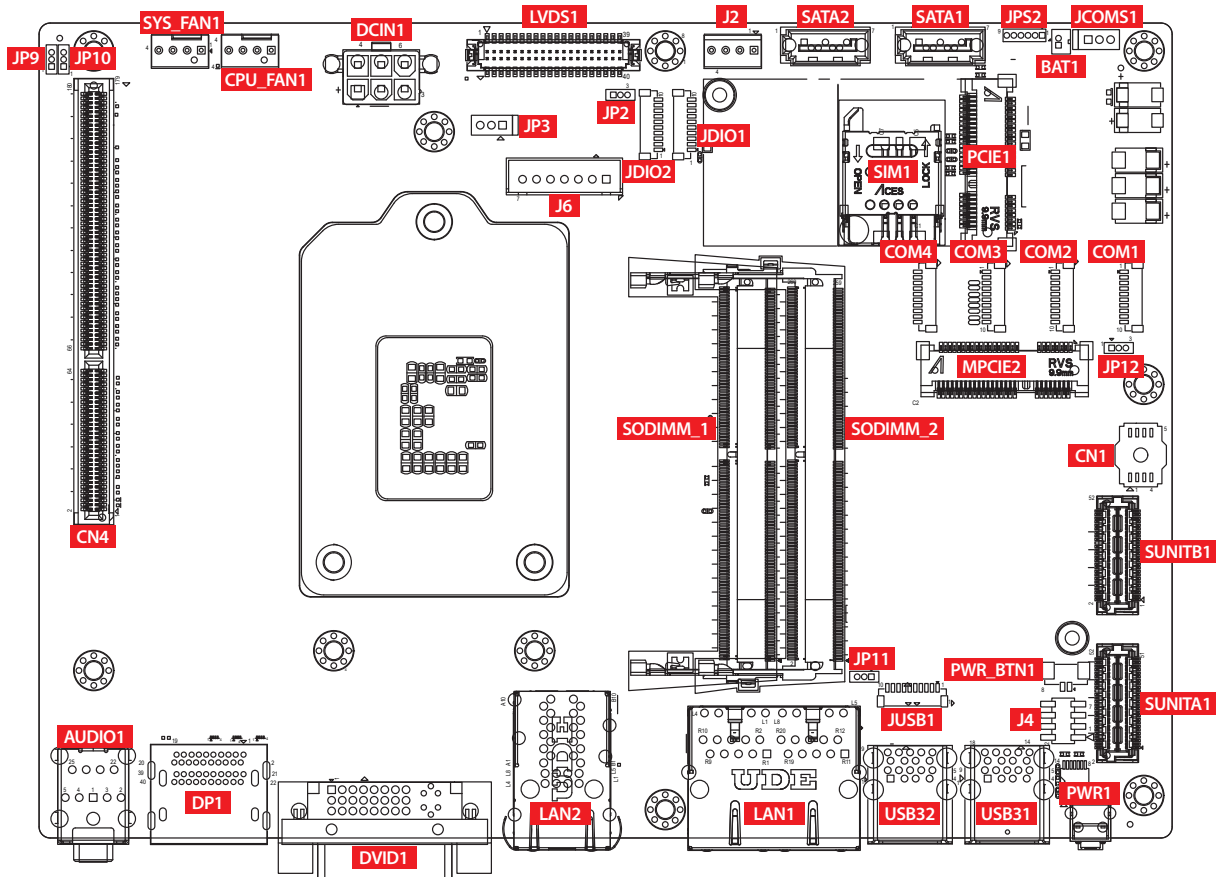
## 2.2.9 SSD/HDD Tray



There are 4 front-access 2.5" SSD/HDD trays in the front side of GPC-1000.

## 2.3 Main Board Expansion Connectors

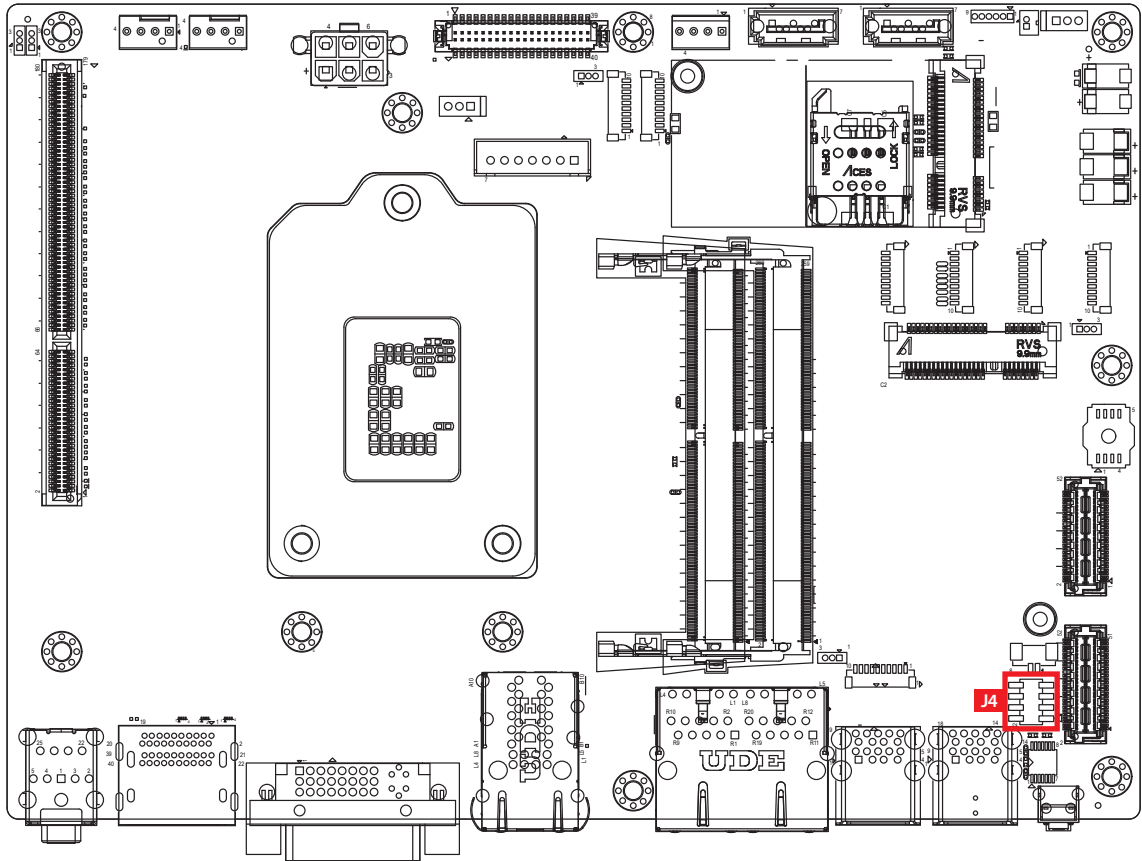
### 2.3.1 Inside View of GPC-1000 Main Board with Connector Location





### 2.3.2 J4 : Miscellaneous Pin Header

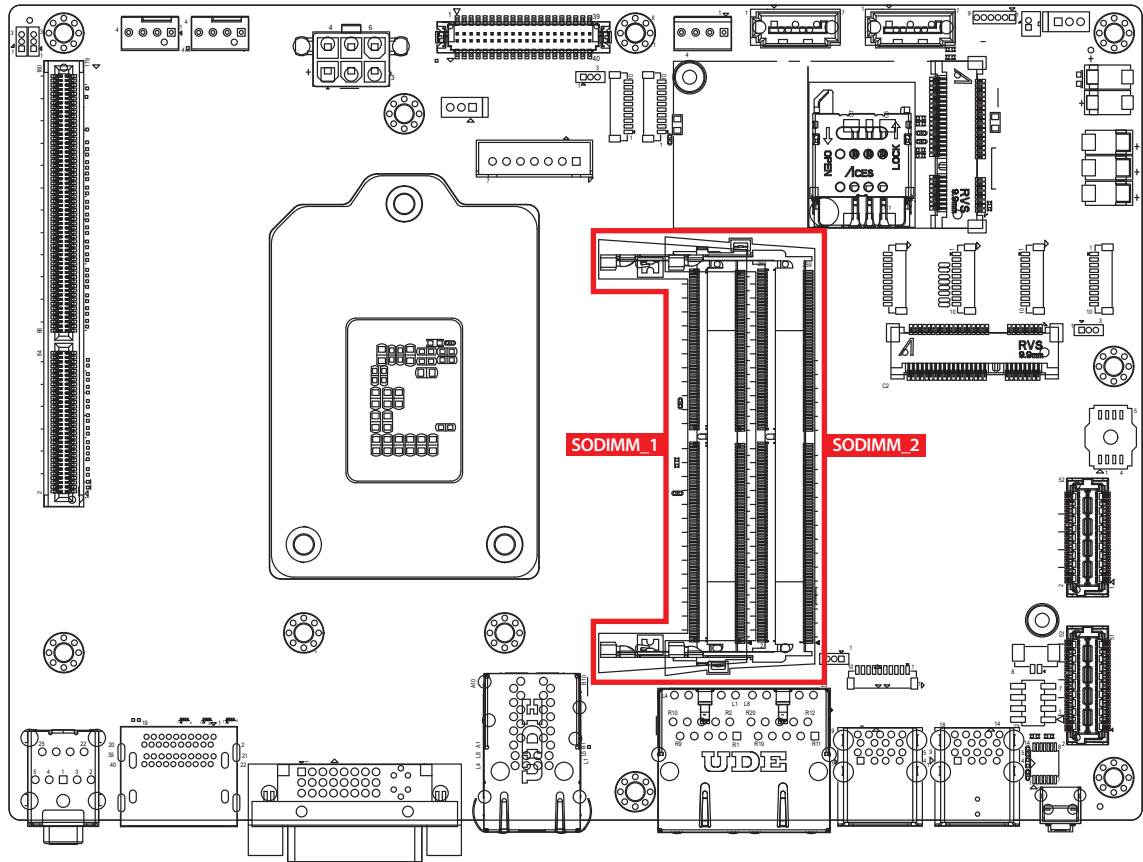
These pin headers can be used as a backup for the following functions : hard drive, LED indicator, reset button, power LED indicator, and power on/off buttons, which already can be accessed by front panel and top panel. The pinouts of Miscellaneous port are listed in following table :



	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	PWR_BTN_P
		8	Ground

### 2.3.3 DIMM1, DIMM2 : DDR4 Slot

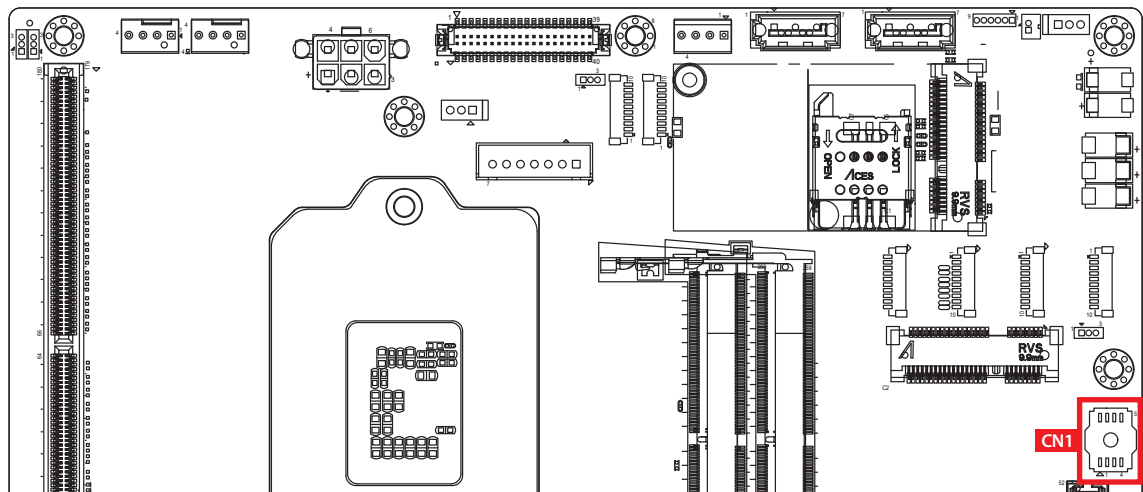
There are 2 DDR4 channel onboard supporting DDR4 2133/1866 and up to 32GB. (Each channel 16GB)



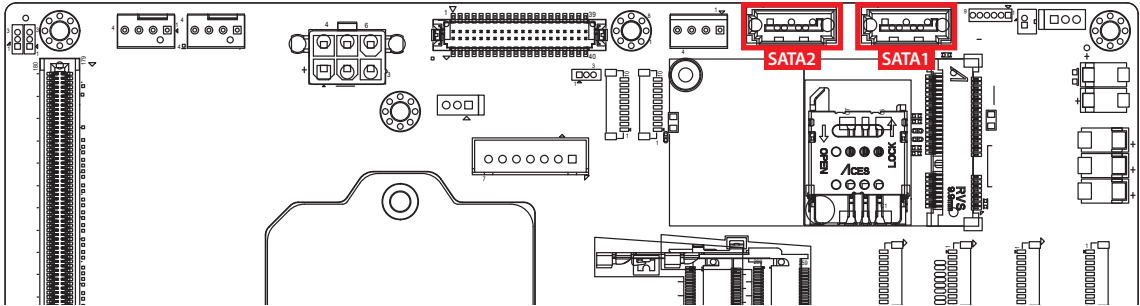
Slot	Description
SODIMM_1	DDR4 Channel A
SODIMM_2	DDR4 Channel B

### 2.3.4 CN1 : BIOS Socket

If the BIOS need to be changed, please contact the Vecow RMA service team.



### 2.3.5 SATA1, SATA2 : SATA III Connector

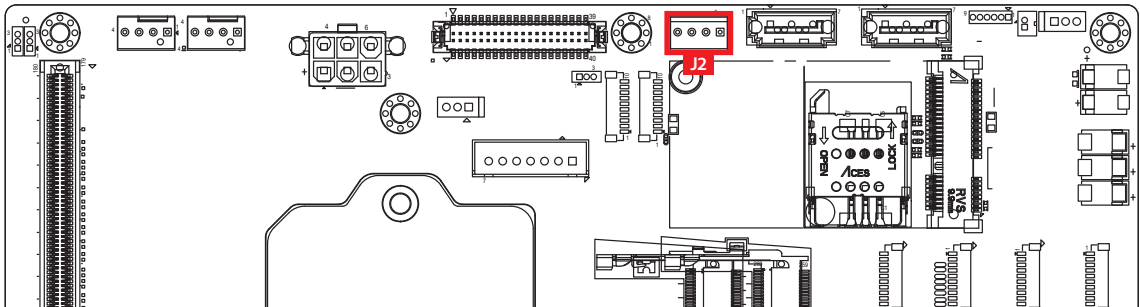


#### Standard 7 PIN SATA Connector

There are 2 onboard high performance Serial ATA III. It supports higher storage capacity with less cabling effort and smaller required space.

	Pin No.	Description	Pin No.	Description
	1	GND	2	TXP
	3	TXN	4	GND
	5	RXN	6	RXP
	7	GND		

### 2.3.6 J2 : SATA Power Connector



#### Standard, all form factor 1x4p power header

There are 2 HDD power header on board and each power header supports two 2.5" SATA HDD.

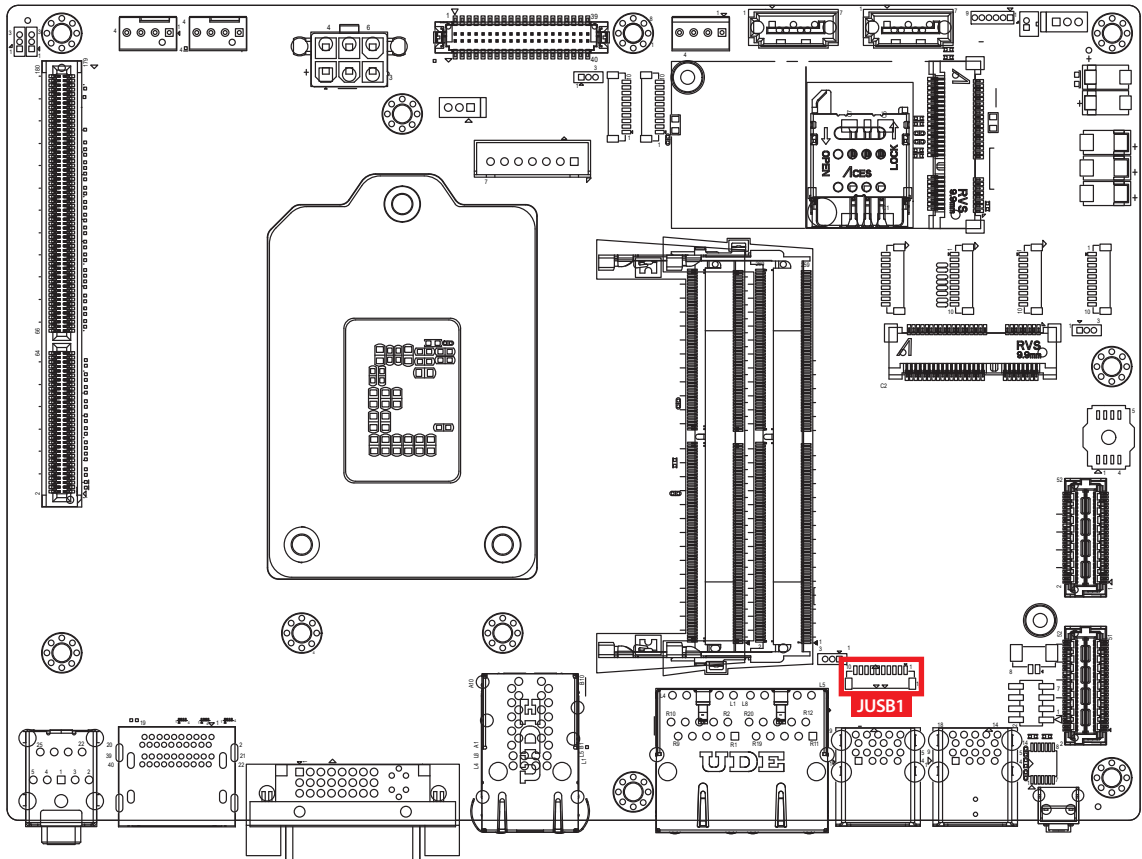
	Pin No.	Description	Pin No.	Description
	1	+12V	2	GND
	3	GND	4	+5V

### 2.3.7 JUSB1 : Internal USB 2.0 Connector

#### Standard Vertical USB 2.0 Connector

GPC-1000 main board provides one expansion USB port using plug-and-play for Dongle Key or LCD touch Panel. The USB interface supports 480Mbps transfer rate complied with high speed USB specification Rev. 2.0.

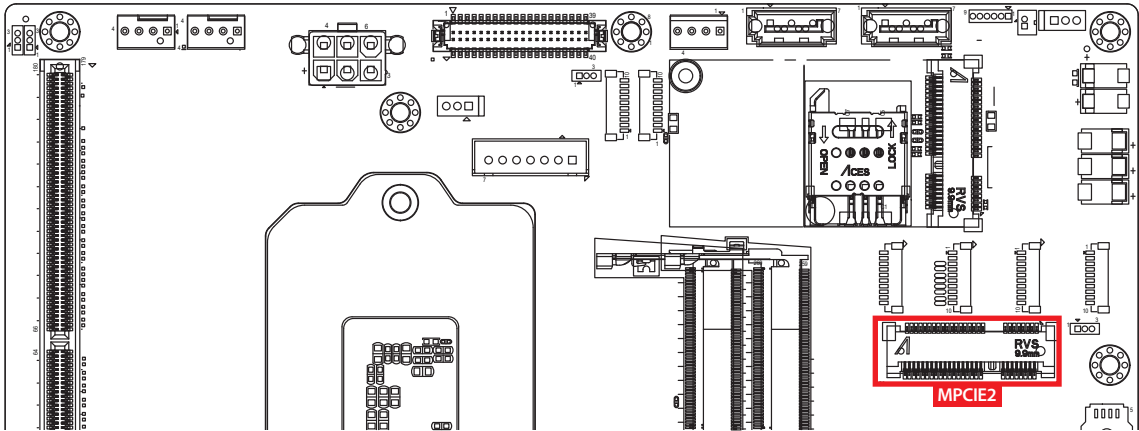
The USB interface is accessed through one standard USB 2.0 connector. This USB 2.0 does not support wake up function.



	Pin No.	Definition	Pin No.	Definition
	1	USB_VCC	2	USB_VCC
	3	USB_VCC	4	USBD1-
	5	USBD1+	6	USBD2-
	7	USBD2+	8	GND
	9	GND	10	GND

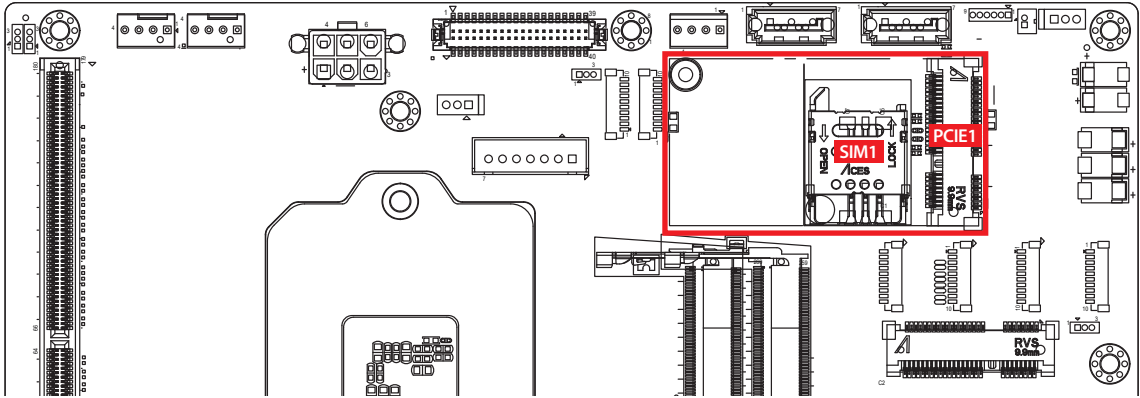
### 2.3.8 MPCIE2 : Mini PCIe, mSATA

Standard full length Mini PCIe slot :



Pin No.	Signal Name	Pin No.	Signal Name
51	Reserved	52	+3.3Vaux
49	Reserved	50	GND
47	Reserved	48	+1.5V
45	Reserved	46	Reserved
43	SATA_PCIE_SEL	44	Reserved
41	+3.3Vaux	42	Reserved
39	+3.3Vaux	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
25	PERp0	26	GND
23	PERn0	24	+3.3Vaux
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	3.3Vaux

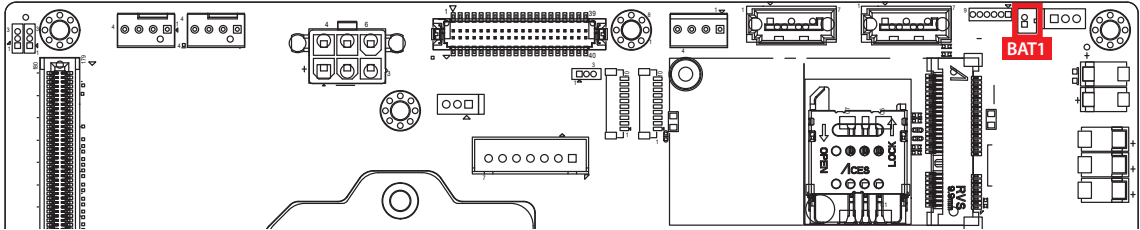
## 2.3.9 MPCIE1 : Mini PCIe, SIM



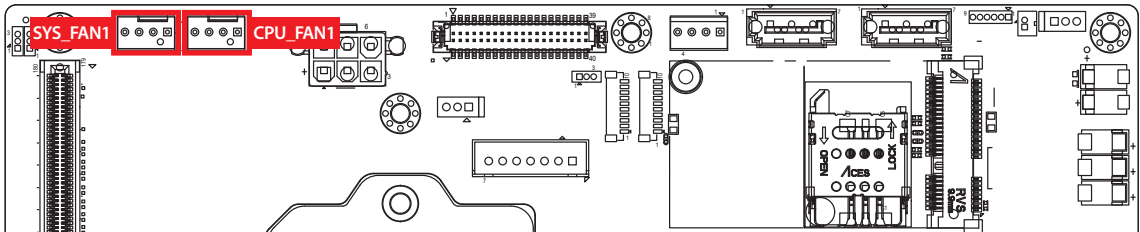
Pin No.	Signal Name	Pin No.	Signal Name
51	Reserved	52	+3.3Vaux
49	Reserved	50	GND
47	Reserved	48	+1.5V
45	Reserved	46	Reserved
43	GND	44	Reserved
41	+3.3Vaux	42	Reserved
39	+3.3Vaux	40	GND
37	GND	38	USB_D+
35	GND	36	USB_D-
33	PETp0	34	GND
31	PETn0	32	SMB_DATA
29	GND	30	SMB_CLK
27	GND	28	+1.5V
25	PERp0	26	GND
23	PERn0	24	+3.3Vaux
21	GND	22	PERST#
19	Reserved	20	reserved
17	Reserved	18	GND
<b>Mechanical Key</b>			
15	GND	16	UIM_VPP
13	REFCLK+	14	UIM_RESET
11	REFCLK-	12	UIM_CLK
9	GND	10	UIM_DATA
7	CLKREQ#	8	UIM_PWR
5	Reserved	6	1.5V
3	Reserved	4	GND
1	WAKE#	2	3.3Vaux

### 2.3.10 BAT1 : RTC Battery

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



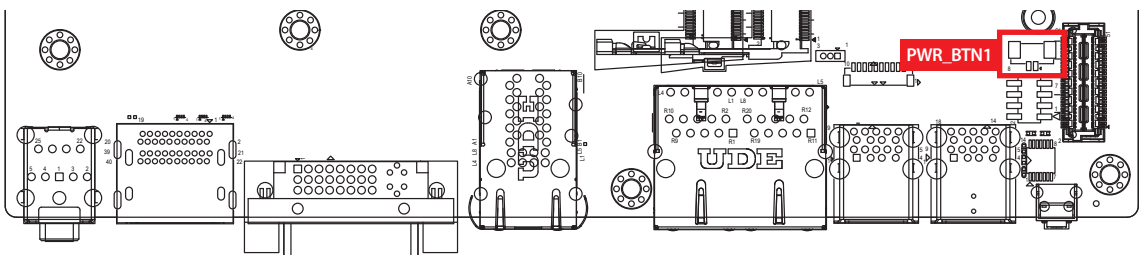
### 2.3.11 CPU\_FAN1, SYS\_FAN1 : FAN Connector



Fan power connector supports for additional thermal requirements. The pin assignments of FAN 1 and FAN 2 are listed in the following table.

	Pin No.	Definition	Pin No.	Definition
	1	1	GND	2
	3	Fan speed sensor	4	Fan PWM

### 2.3.12 PWR\_BTN1 : Remote ON/OFF Connector

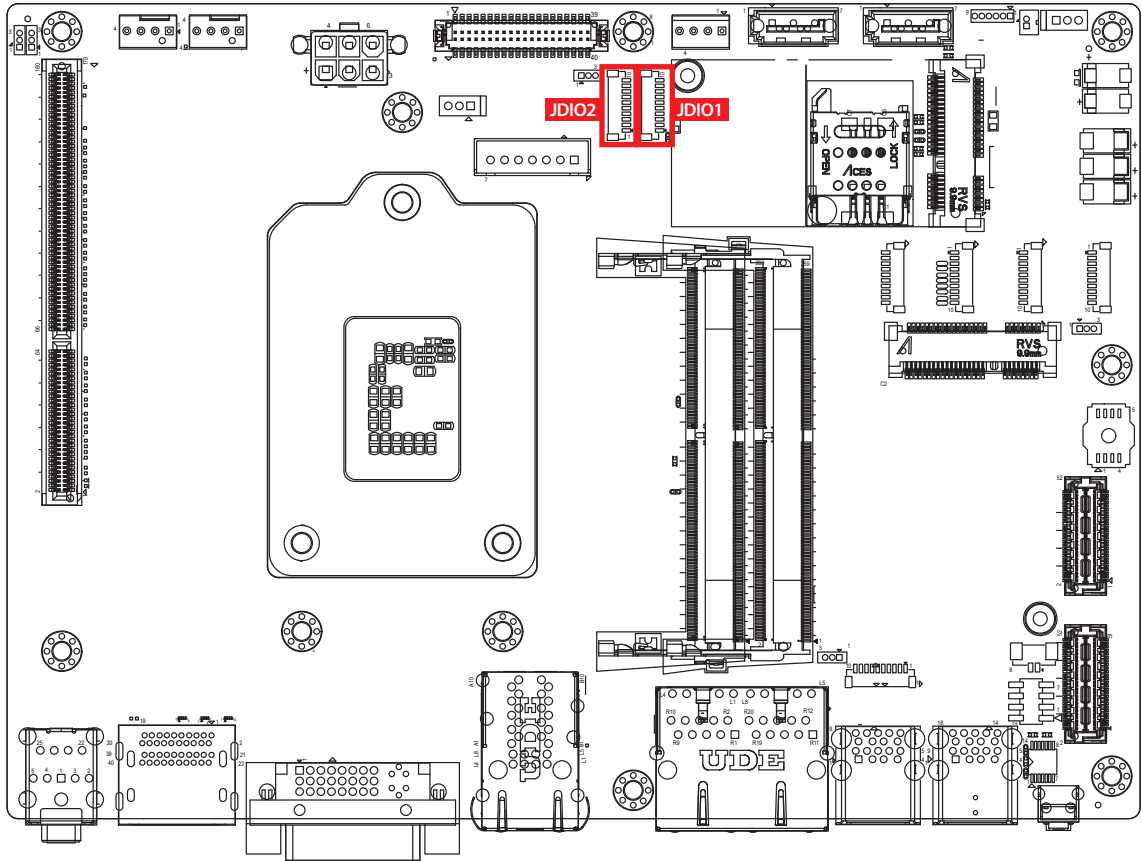


	Pin No.	Description
	1	1
	2	GND



### 2.3.13 JDIO1~JDIO2 : GPIO Connector

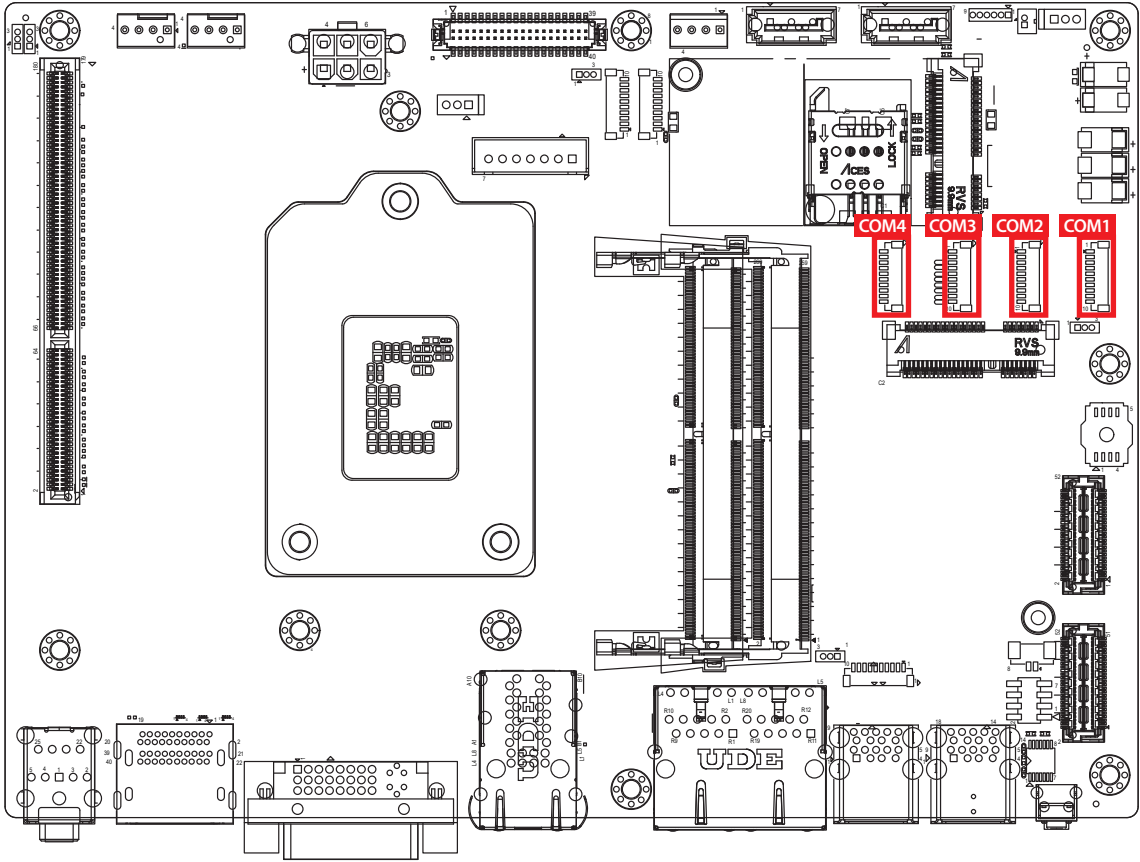
There is a 16-bit GPIO connector on the top side. Each GPIO channel can be configuration GPI or GPO. Detail setting see APPENDIX. JDIO1 and JDIO2 Pin define are as below.



	Pin No.	JDIO1 Definition	JDIO2 Definition
	1	SIO_GPO70	SIO_GPI80
	2	SIO_GPO71	SIO_GPI81
	3	SIO_GPO72	SIO_GPI82
	4	SIO_GPO73	SIO_GPI83
	5	SIO_GPO74	SIO_GPI84
	6	SIO_GPO75	SIO_GPI85
	7	SIO_GPO76	SIO_GPI86
	8	SIO_GPO77	SIO_GPI87
	9	+3.3V	+3.3V
	10	GND	GND



### 2.3.14 COM1~COM4 : Serial Port



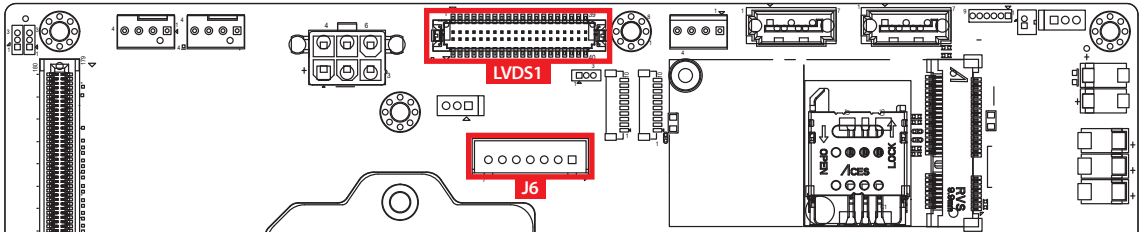
BIOS Setting	Function
COM1 COM2 COM3 COM4	RS-232
	RS-422 (5-wire)
	RS-422 (9-wire)
	RS-485
	RS-485 w/z auto-flow control

Pin Out :

COM Port	MB Connector	COM Port	MB Connector
COM1	COM1	COM2	COM2
COM3	COM3	COM4	COM4

CN	Pin No.	Signal Name	Pin No.	Signal Name
COM1 to 4	1	NC	2	GND
	3	RI	4	DTR
	5	CTS	6	TXD
	7	RTS	8	RXD
	9	DSR	10	DCD

### 2.3.15 LVDS1, J6 : LVDS



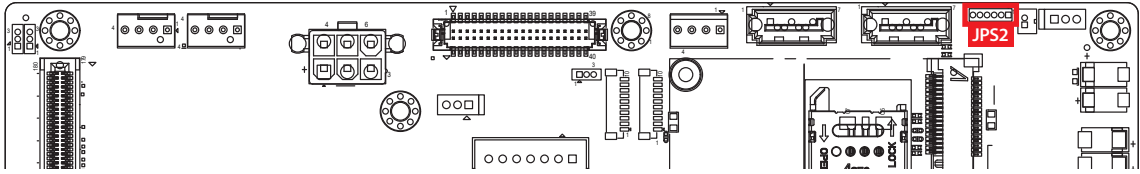
GPC-1000 supports dual-channel 24-bit LVDS display and up to 1920 x 1200 pixels resolution. The pin assignments of LVDS are listed in the following table :

Pin No.	Definition	Pin No.	Definition
1	PANEL_VDD	2	TX00-
3	PANEL_VDD	4	TX00+
5	PANEL_VDD	6	TX01-
7	GND	8	TX01+
9	GND	10	TX02-
11	GND	12	TX02+
13	GND	14	TXOC-
15	GND	16	TXOC+
17	GND	18	TX03-
19	GND	20	TX03+
21	GND	22	TXE0-
23	GND	24	TXE0+
25	GND	26	TXE1-
27	GND	28	TXE1+
29	GND	30	TXE2-
31	GND	32	TXE2+
33	GND	34	TXEC-
35	GND	36	TXEC+
37	GND	38	TXE3-
39	LVDS_DET#	40	TXE3+

The LCD inverter is connected to J6 via a JST 7-pin, 2.5mm connector providing +5V/+12V power to LCD display. The pin assignments are listed in the following table :

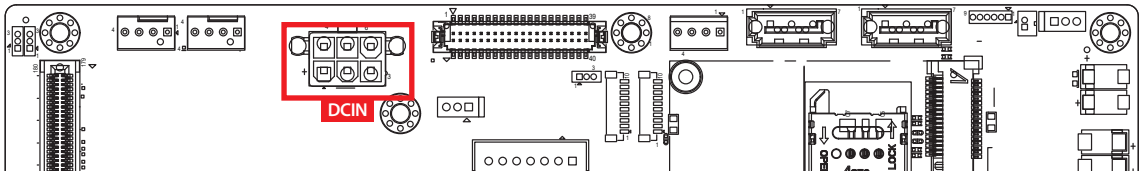
		Pin No.	Definition	Pin No.	Definition
1	+5V	2	+12V		
3	+12V	4	LBKLT_CTL		
5	GND	6	GND		
7	LBKLT_EN				

### 2.3.16 JPS2 : PS/2 Mouse Keyboard Pin Head



	Pin No.	Definition	Pin No.	Definition
	1	SIO_MCLK	2	SIO_MDAT
	3	GND	4	SIO_KCLK
	5	SIO_KDAT	6	VCC5_KBMS

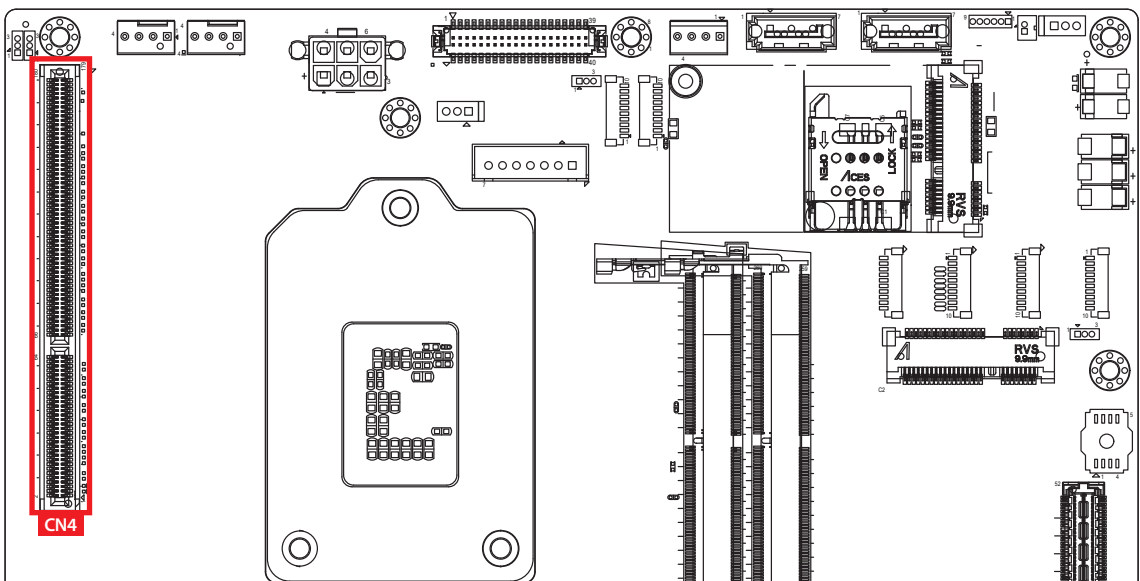
### 2.3.17 DCIN1 : DC INPUT Power Connector



GPC-1000 supports 12V DC power input by wire-to-board connector on the top side.

	Pin No.	Definition	Pin No.	Definition
	1	+12V	2	+12V
	3	+12V	4	GND
	5	GND	6	GND

### 2.3.18 CN4 : PCIe Riser Slot

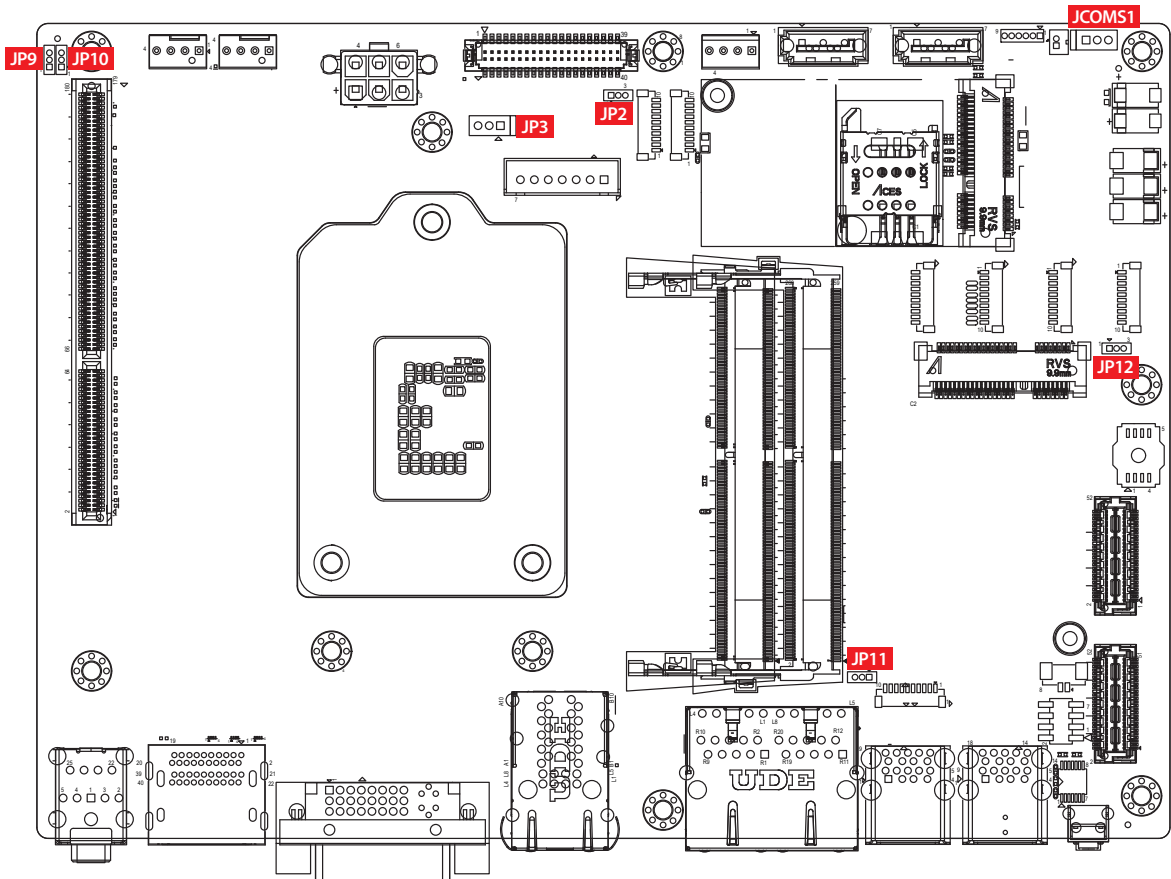


CN4 slot is used to connect with GPC-1000 Backplane.

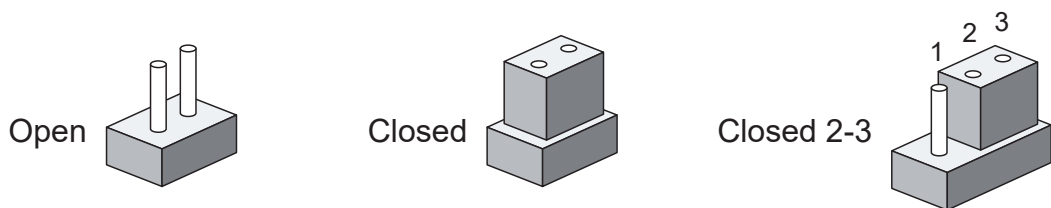
## 2.4 Jumper Settings

### 2.4.1 Board Top View of GPC-1000 Main Board With Jumper and DIP Switch

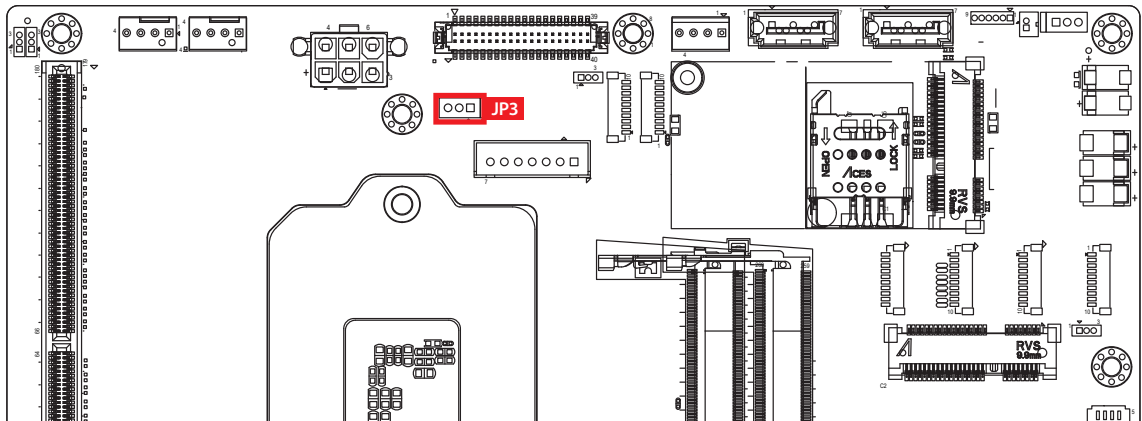
The figure below is the top view of GPC-1000 main board which is the main board. It shows the location of the jumpers and the switches.




You may configure your card to match the needs of your application by setting jumpers. A jumper is a metal bridge used to close an electric circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To "close" a jumper, you connect the pins with the clip. To "open" a jumper, you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2 and 3. In this case you would connect either pins 1 and 2, or 2 and 3.



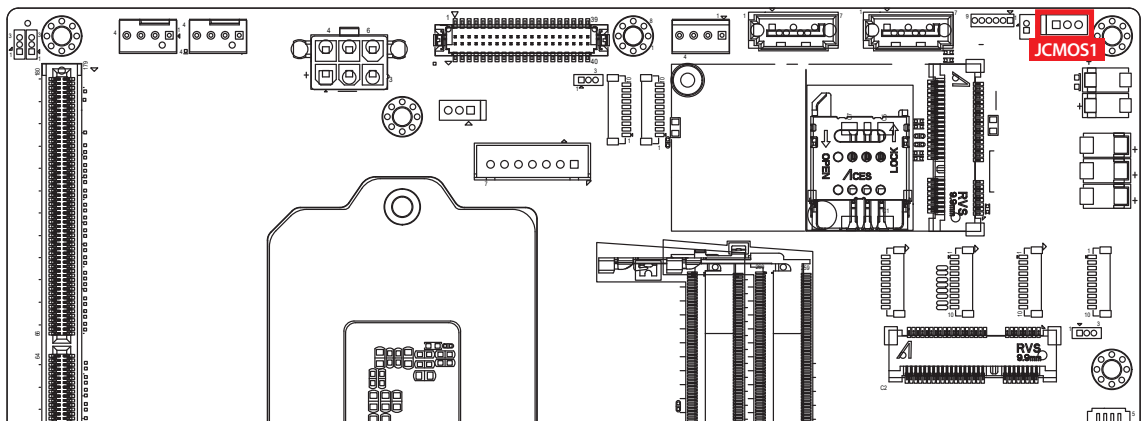
## 2.4.2 JP3 : LVDS Module, Power Selection




JP3 provides LVDS voltage selection function, Closing Pin 1 and Pin 2 is for 3.3V LVDS power input; closing Pin 2 and Pin 3 is for 5V LVDS power input.

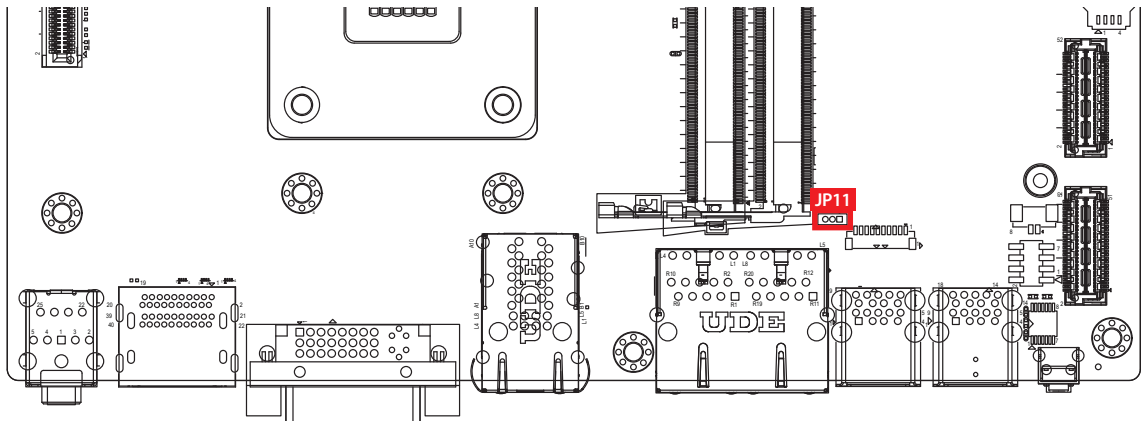
	Pin No.	Definition
	1-2	+3.3V (Default)
	2-3	+5V

## 2.4.3 JCMOS1 : Clear CMOS



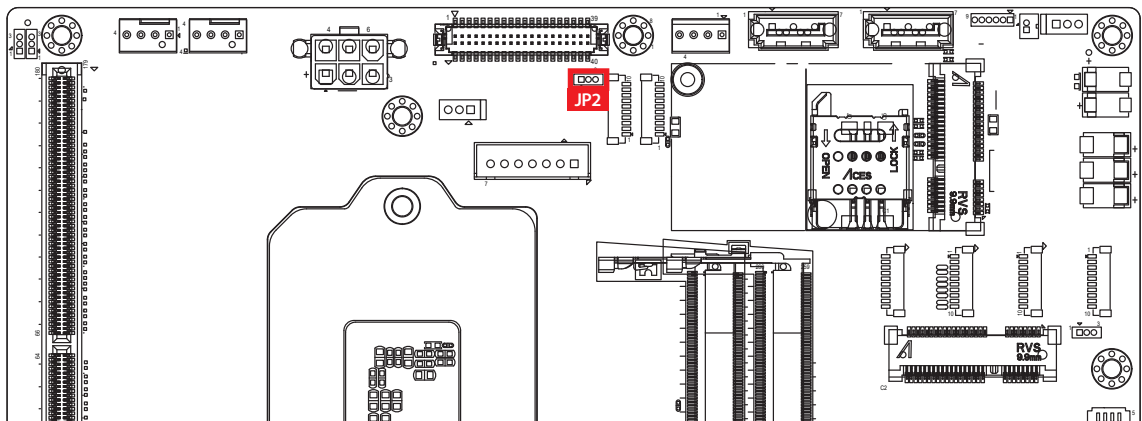
	CMOS	Header
	1-2	Normal
	2-3	Clear CMOS

## 2.4.4 JP11 : External USB 3.0/2.0 Power Select



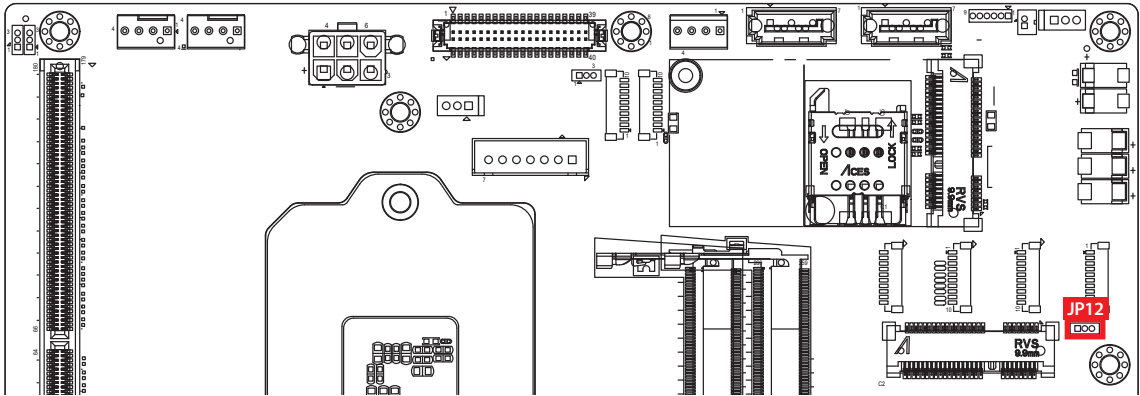
	Pin No.	Power
	1-2	+5V Standby Power
	2-3	+5V System Power

## 2.4.5 JP2 : Backlight Control Level Select



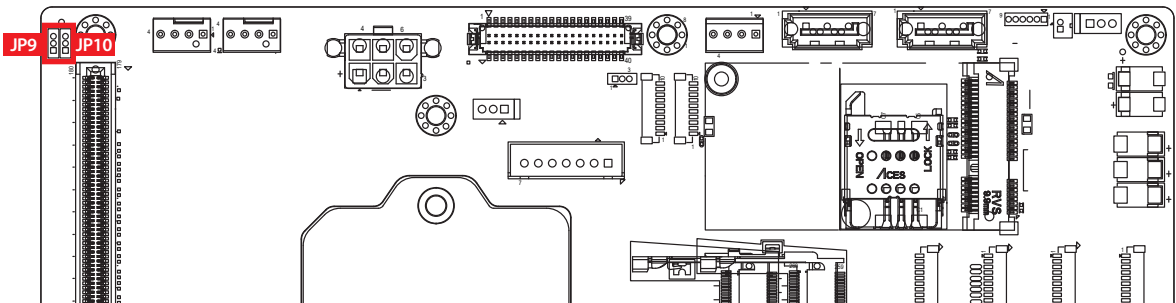
	Pin No.	Definition
	1-2	3.3V
	2-3	5V

## 2.4.6 JP12 : Mini PCIE mSATA, mPCIE Select



	Pin No.	Power
	1-2	Mini PCIE
	2-3	Auto
	OPEN	Mini SATA

## 2.4.7 JP9, JP10 : PCI Express\* Configuration



JP9, JP10 provide PCIe configuration function, Closing Pin 1 and Pin 2 is logic "0". Closing Pin 2 and Pin 3 is logic "1"

JP9, JP10 logic setting are listed in the following table.

	JP9	Logic		JP10	Logic
	1-2	0		1-2	0
	2-3	1		2-3	1

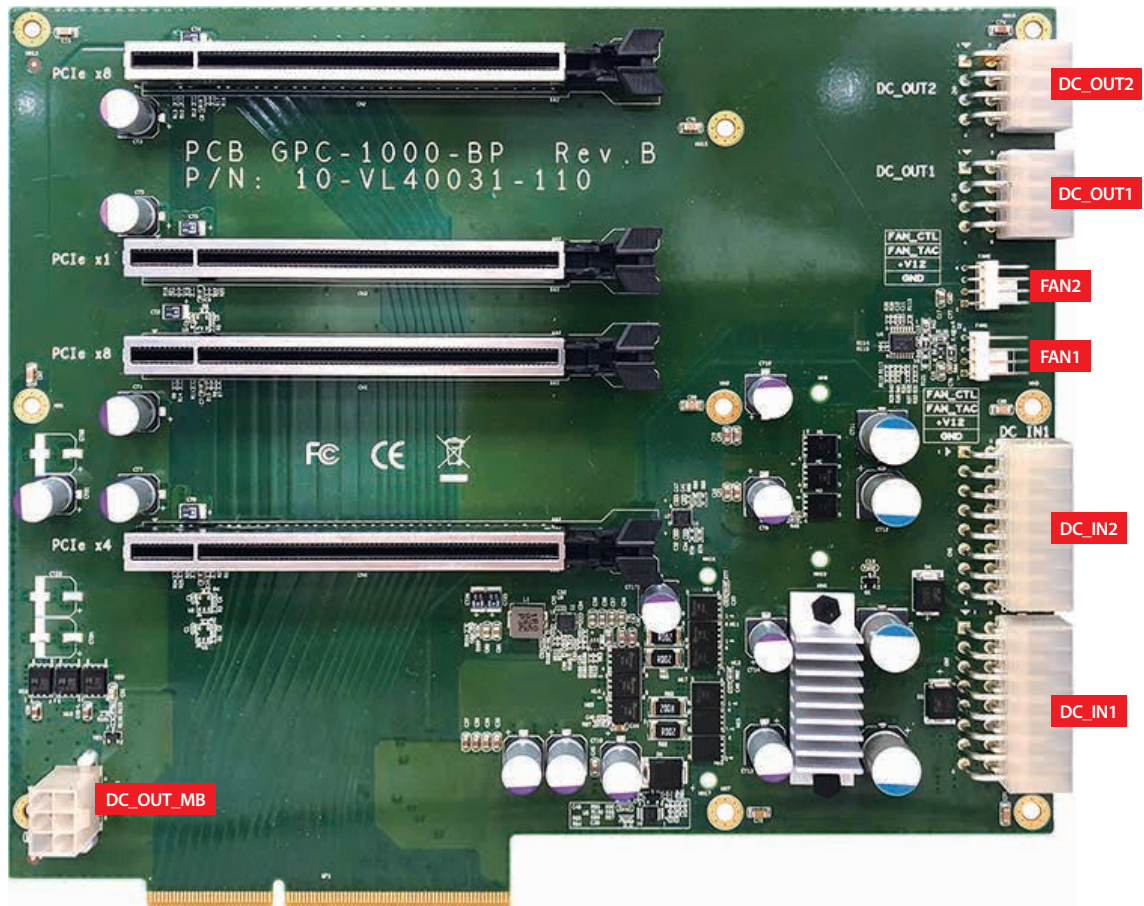
JP9, JP10 PCI Express configurations are listed in the following table.

JP10	JP9	PCI Express* Bifurcation
0	0	1 x8 PCI Express*
1	0	2 x8 PCI Express*
1	1	1 x16 PCI Express*




## 2.5 Riser Board Connectors

GPC-1000 BP support 12V DC power input by wire-to-board connector on the top side.




### 2.5.1 DC\_IN1, DC\_IN2 : DC INPUT Power Connector


				
	Pin No.	Definition	Pin No.	Definition
	1	GND	2	GND
	3	GND	4	GND
	5	+12V	6	+12V
	7	+12V	8	+12V
	9	GND	10	GND
	11	GND	12	GND
	13	+12V	14	+12V
	15	+12V	16	+12V



## 2.5.2 DC\_OUT1, DC\_OUT2 : DC OUTPUT for VGA card Power Connector

	Pin No.	Definition	Pin No.	Definition
	1	+12V	2	+12V
	3	+12V	4	+12V
	5	GND	6	GND
	7	GND	8	GND


## 2.5.3 DC\_OUT\_MB : DC OUTPUT for mother board power connector

	Pin No.	Definition	Pin No.	Definition
	1	+12V	2	+12V
	3	+12V	4	GND
	5	GND	6	GND


## 2.5.4 FAN1, FAN2 : FAN Header

Fan power connector supports for additional thermal requirements. The pin assignments of FAN 1 and FAN 2 are listed in the following table.

FAN1 :

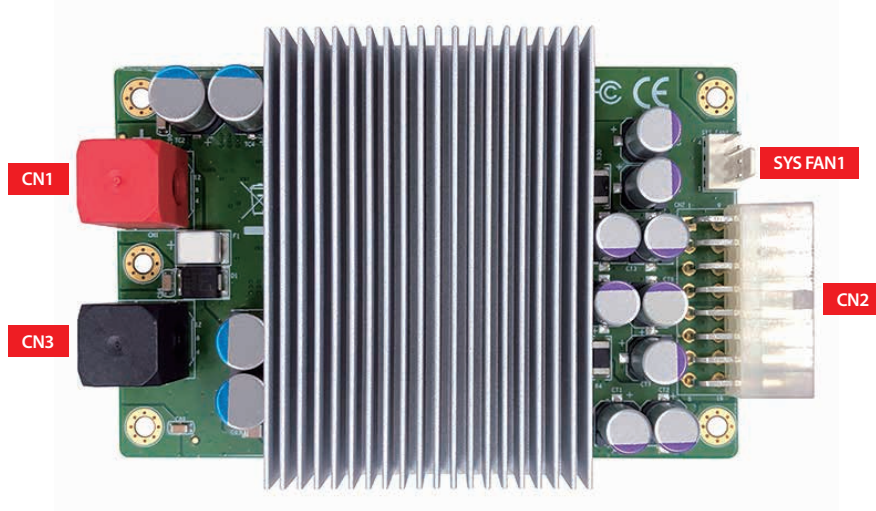
	Pin No.	Definition	Pin No.	Definition
	1	GND	2	+12V
	3	Fan speed sensor	4	FAN PWM

FAN2 :

	Pin No.	Definition	Pin No.	Definition
	1	GND	2	+12V
	3	NC	4	NC

## 2.6 Power Board Connectors

Wide range power module WPM-120 support 9V~55V DC Input power module, 12V output (750W).



### 2.6.1 CN1, CN3 : DC INPUT POWER CONNECTOR

Connector	Description
CN1	VIN +
CN3	VIN -

### 2.6.2 CN2 : DC OUTPUT Power Connector

Pin No.	Definition		Pin No.	Definition
	1	9		
1	GND	2	GND	GND
3	GND	4	GND	GND
5	+12V	6	+12V	+12V
7	+12V	8	+12V	+12V
9	GND	10	GND	GND
11	GND	12	GND	GND
13	+12V	14	+12V	+12V
15	+12V	16	+12V	+12V

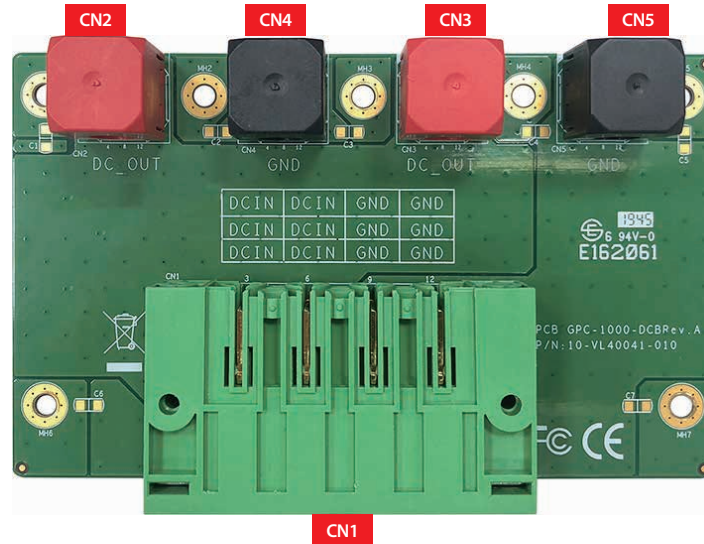
### 2.6.3 SYS FAN : Fan Connector

The pin assignments of SYS FAN is listed in the following table.

Pin No.	Definition		Pin No.	Definition
	4	1		
1	GND	2	NC	NC
3	NC	4	+12V	+12V

## 2.7 DC- IN Board Connectors

GPC-1000-DCB support 9V~55V DC power input by wire-to-board connector on the top side.



### 2.7.1 CN1 : DC INPUT POWER CONNECTOR

	Pin No.	Definition	Pin No.	Definition
	1	DCIN	2	DCIN
	3	GND	4	GND

### 2.7.2 CN2, CN3, CN4, CN5 : DC OUTPUT POWER CONNECTOR

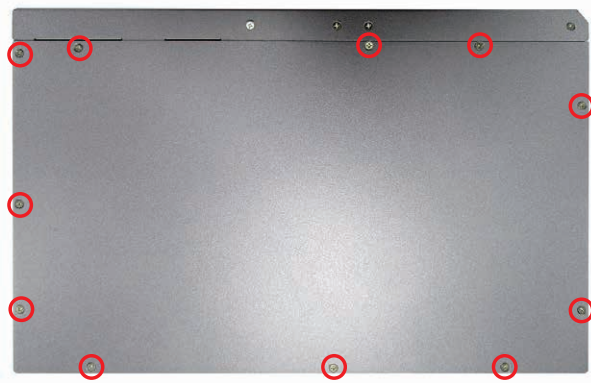
Pin No.	Definition	Pin No.	Definition
1	DC_OUT	2	GND
3	DC_OUT	4	GND

# 3

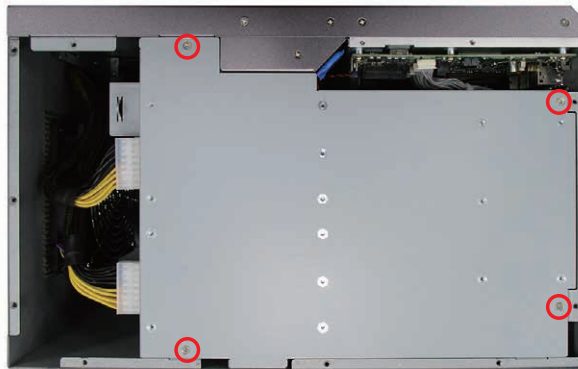
## SYSTEM SETUP

### 3.1 How to Open Your GPC-1000

**Step 1** Remove bottom eleven F#6-32.



**Step 2** Open bottom cover and remove power tray four F#6-32.

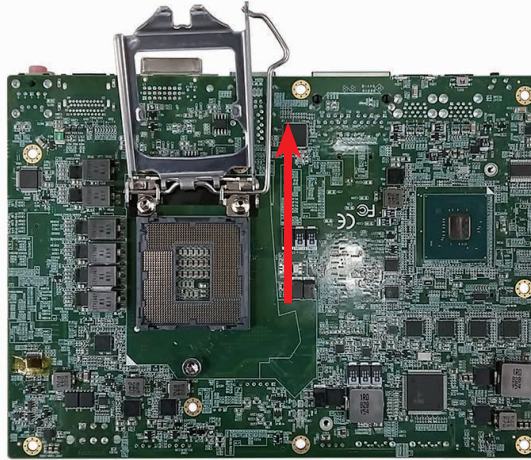


**Step 3** Finish.

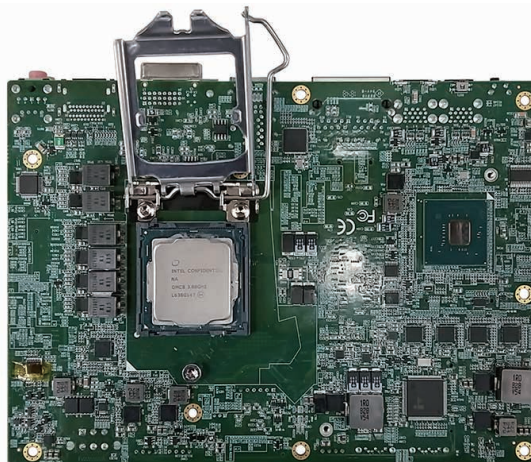


## 3.2 Installing CPU

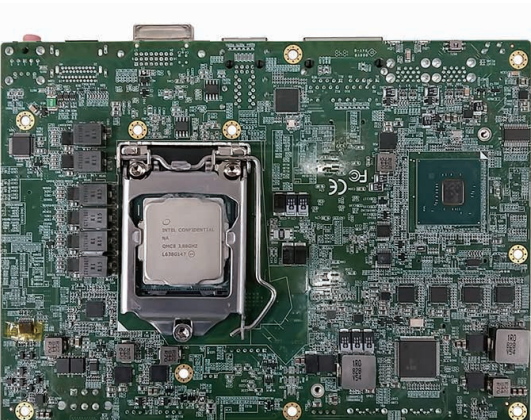
**Step 1** Open CPU Slot cover.



**Step 2** Install CPU into the CPU Slot.



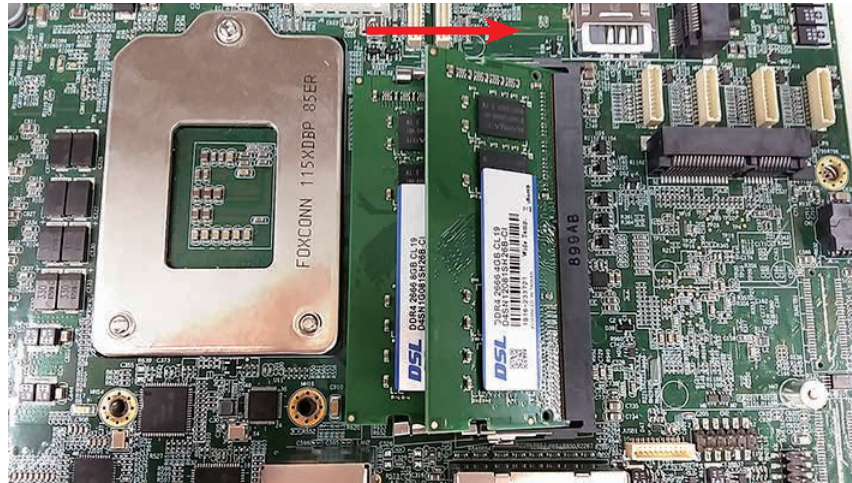
**Step 3** Close and lock CPU Slot cover.



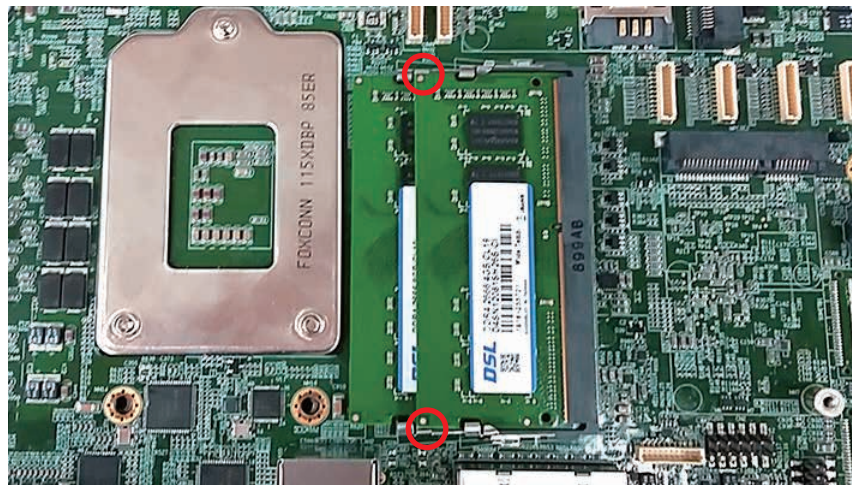


### 3.3 Installing DDR4 SO-DIMM Modules

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

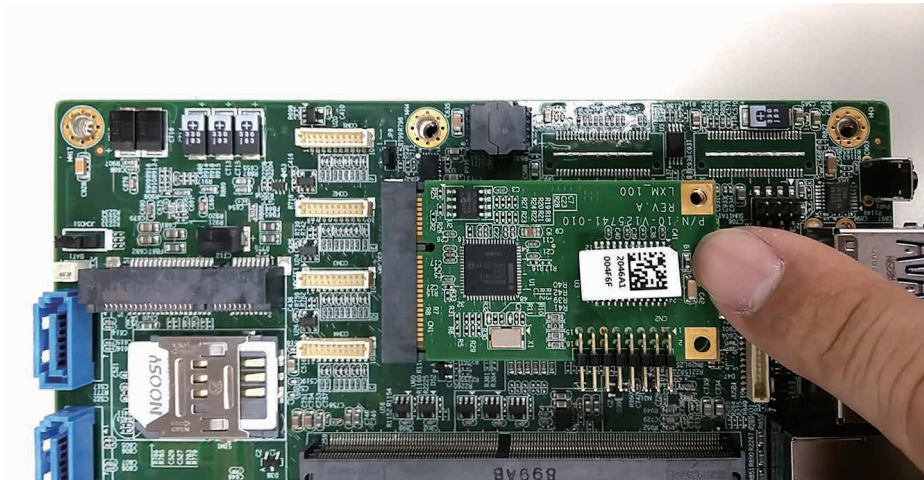


**Step 2** Make sure the RAM module is locked by the memory slot.

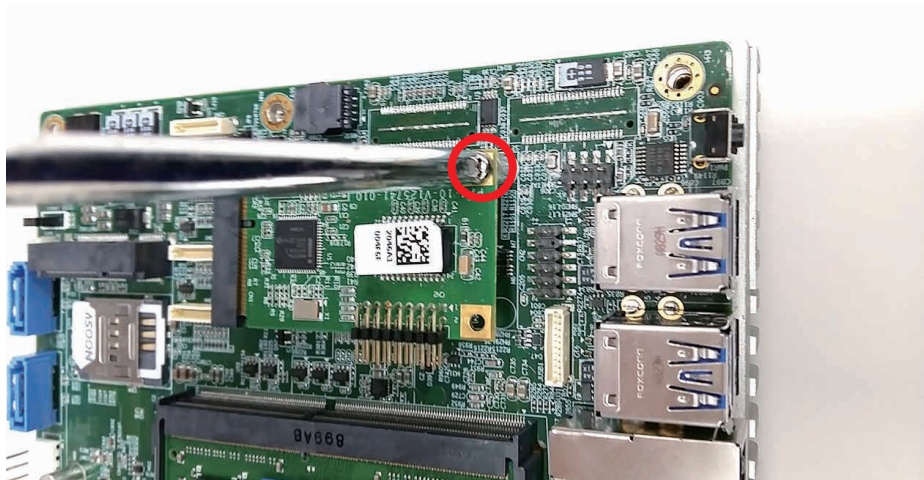


### 3.4 Installing Mini PCIe Card

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



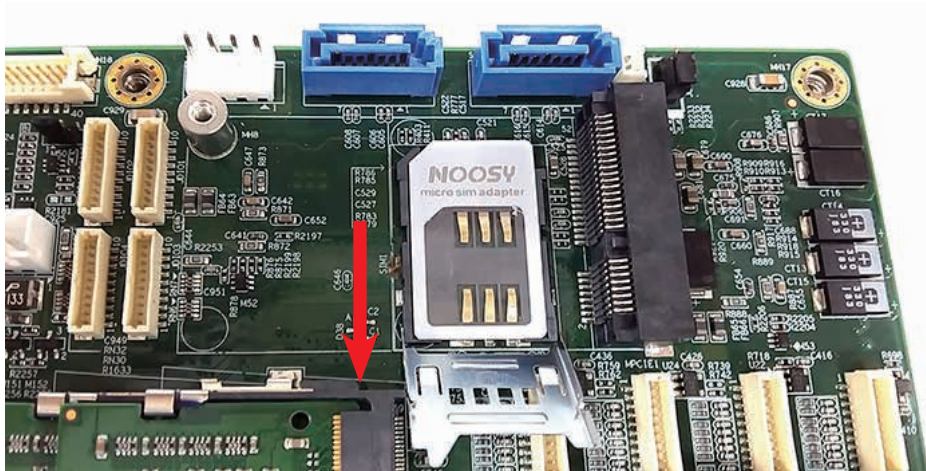
**Step 2** Fasten one M2.5 screw.



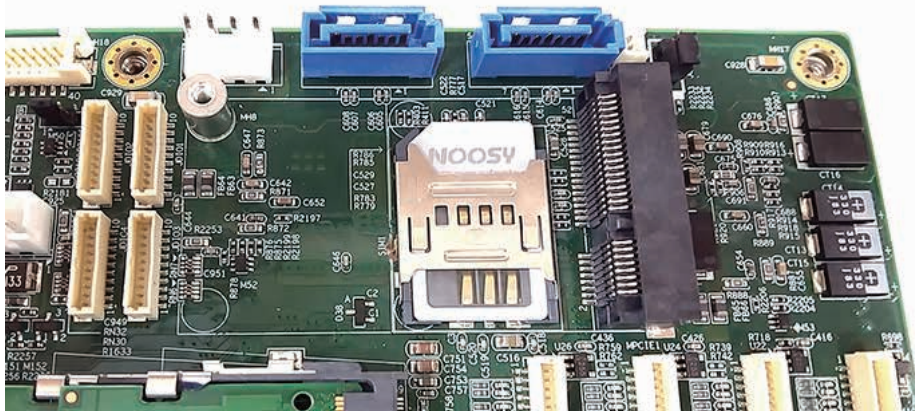


## 3.5 Installing SIM Card

**Step 1** Open the SIM card cover.



**Step 2** Install SIM card into the SIM card slot and then close and lock the SIM card cover.



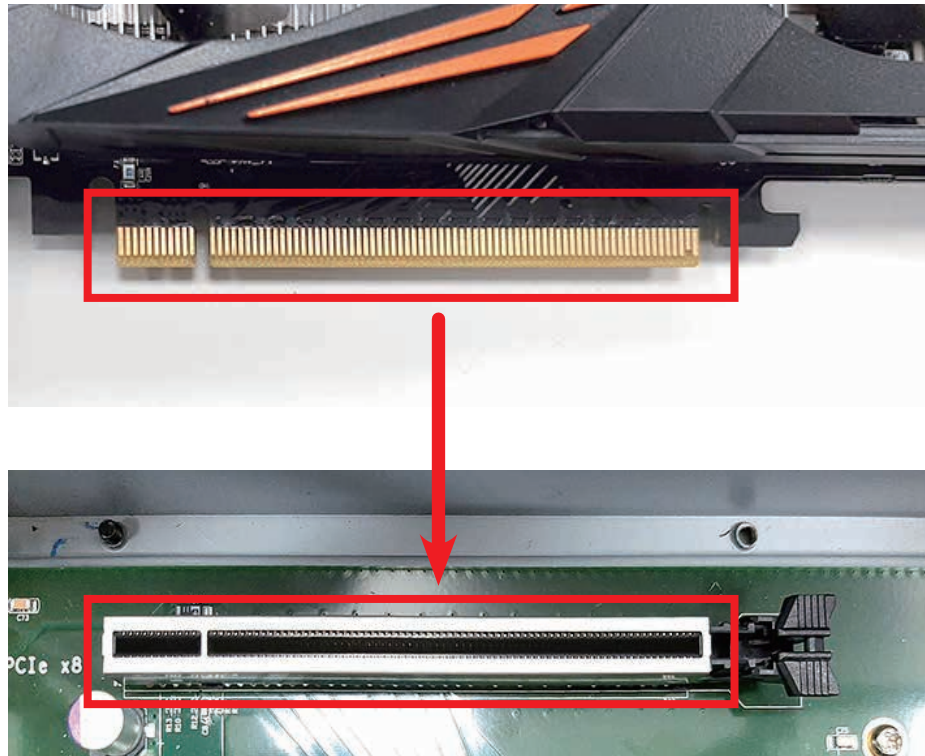


### 3.6 Installing PCI/PCIe Card

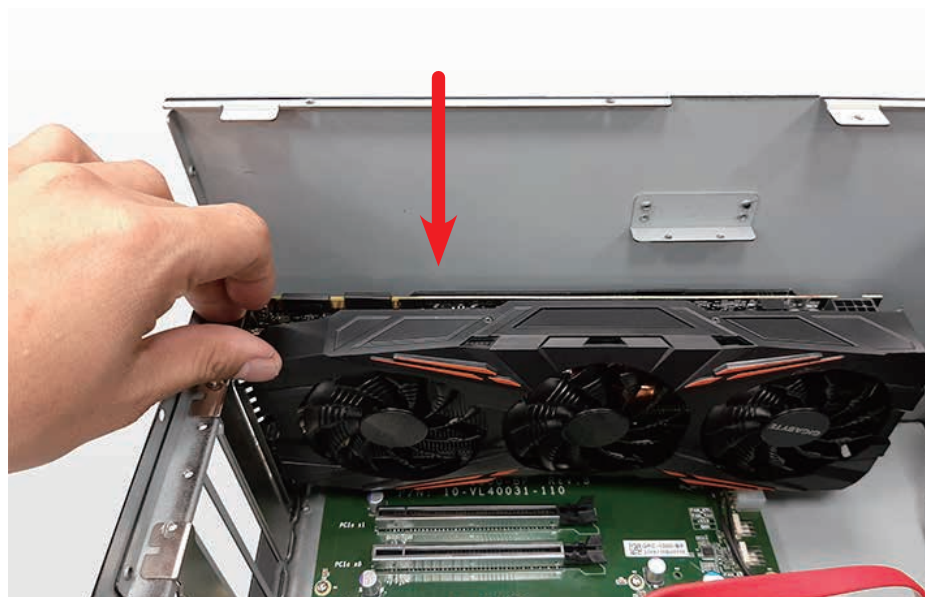
System designs will support 111.15 mm standard height, 168 mm maximum length (without the I/O bracket & power cable) expansion cards.

(\*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** Please align the gold finger of the PCIE card with the slot.



**Step 2** Press down the graphics card.



**Step 3** Lock screw.

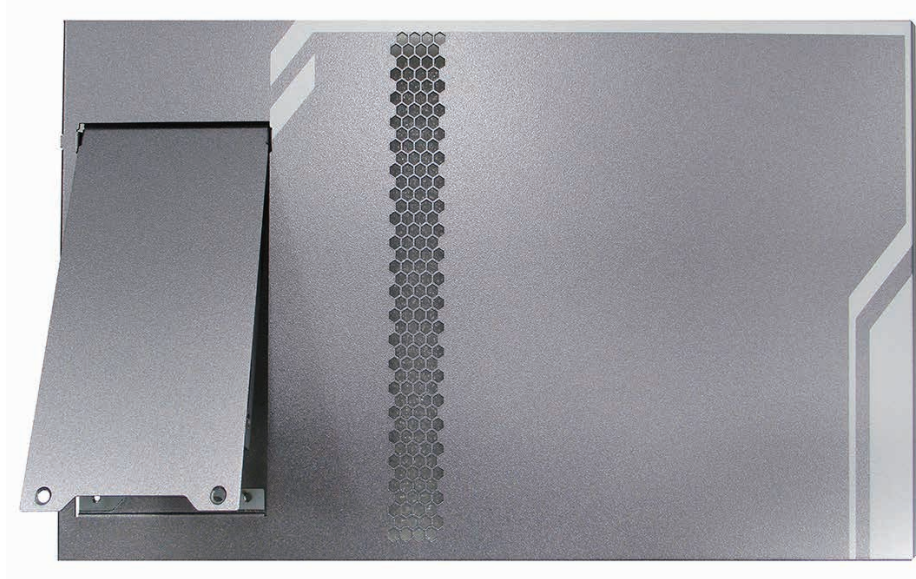


**Step 4** Finish.

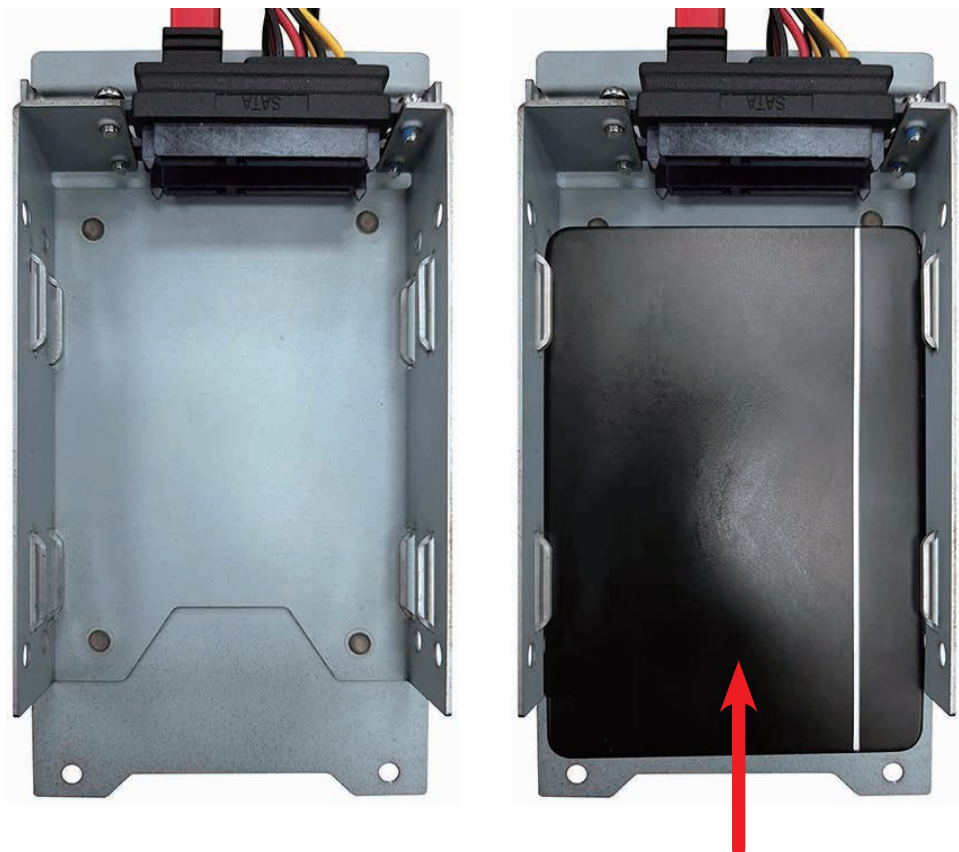


## 3.7 Installing SSD/HDD

**Step 1** Open HDD/SSD tray.

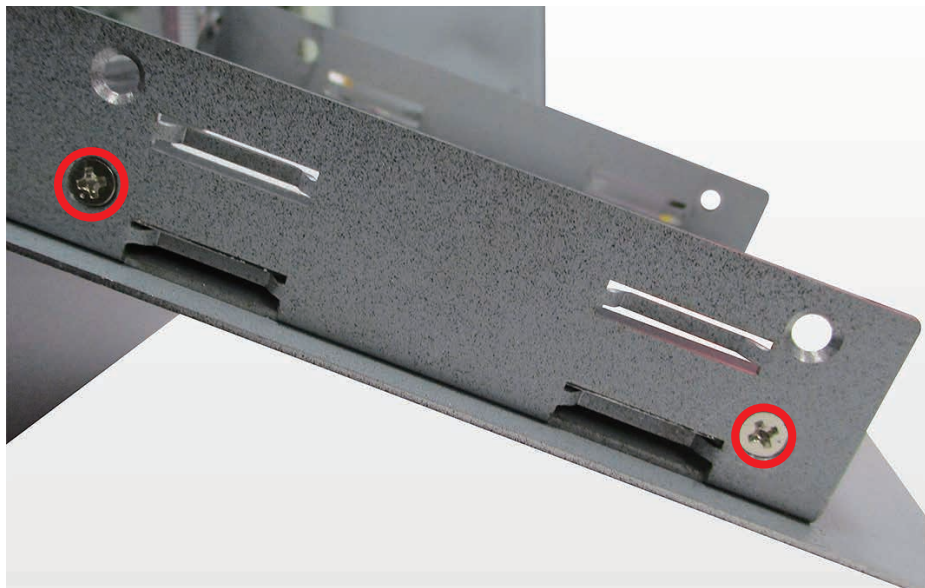
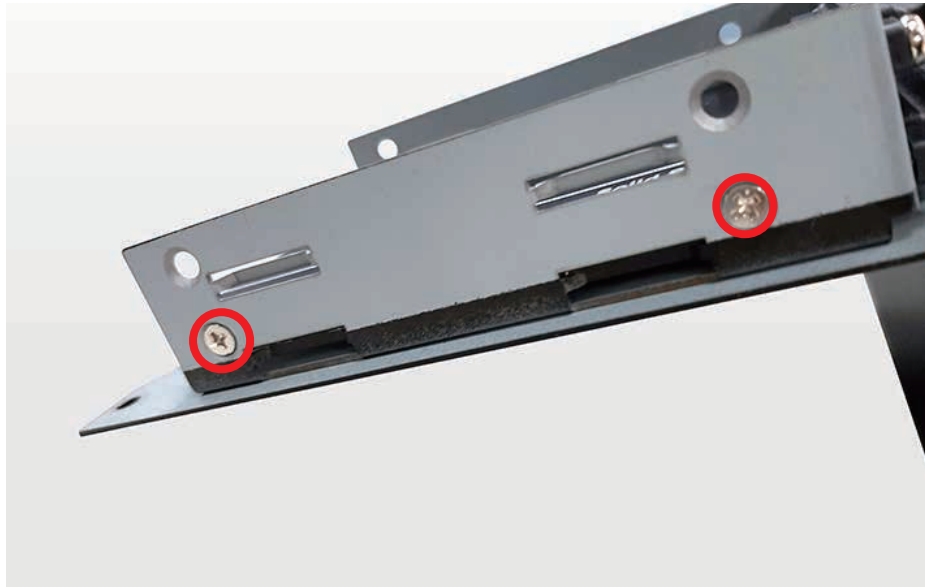


**Step 2** Push the HDD/SSD into the slot.





**Step 3** Fasten four M3 screw.



## 3.8 Installing Antenna Cable

**Step 1** Check Antenna cable and washers.

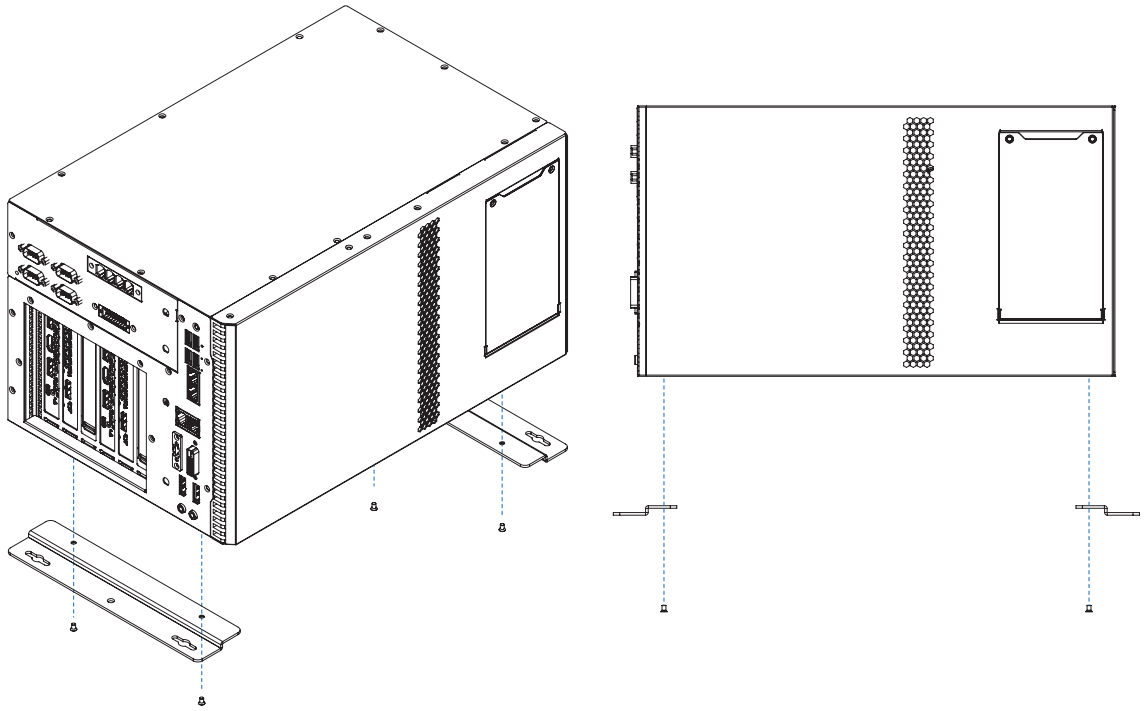


**Step 2** Put Antenna cable connector into the hole on rear panel and fasten the washer 1, washer 2 and washer 3 on Antenna cable connector.

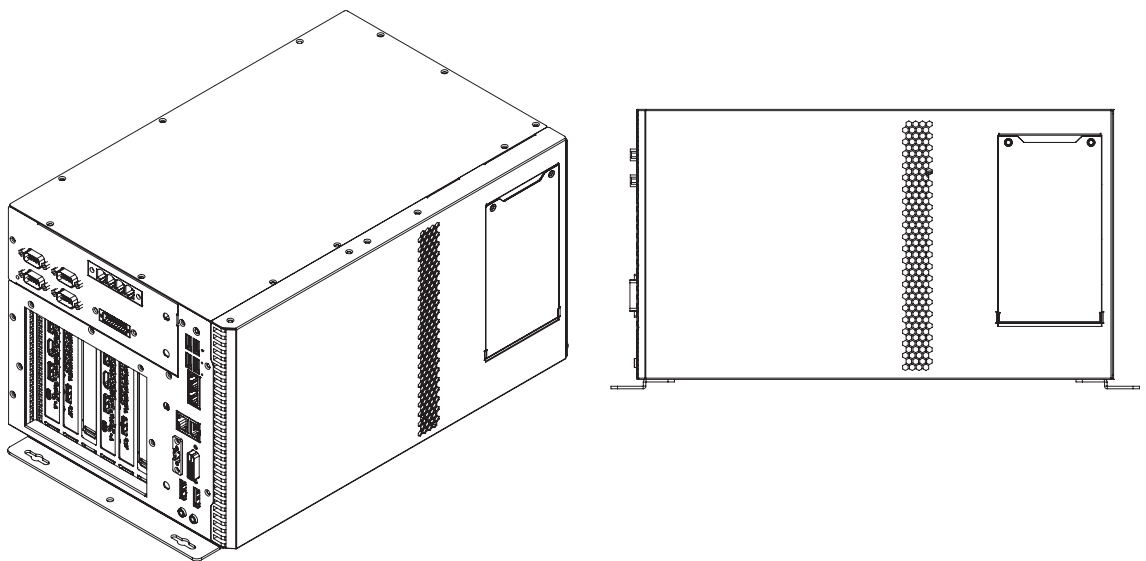


### 3.9 Mount Your GPC-1000

**Step 1** Ensure the screw holes on the right and left side of upper case match the ones on GPC-1000 wall mount bracket.



**Step 2** Fasten four #6-32 screws then finish.

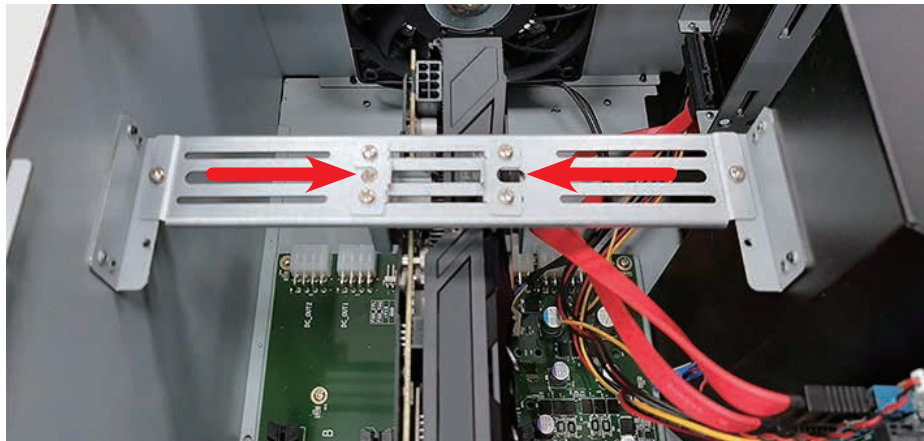


### 3.10 Installing Hold-down Kit

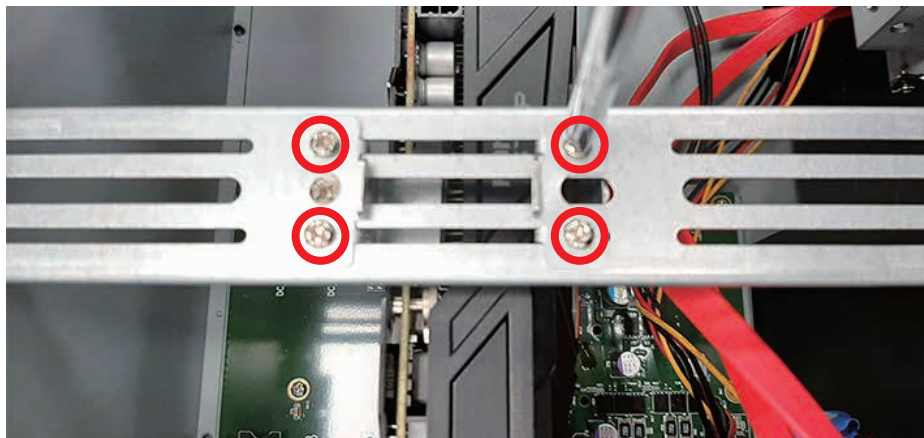


Hold-down Kit

**Step 1** Hold two brackets to the graphics card.



**Step 2** Fasten four M3 screws.



# 4

## BIOS SETUP

### 4.1 Entering BIOS Setup

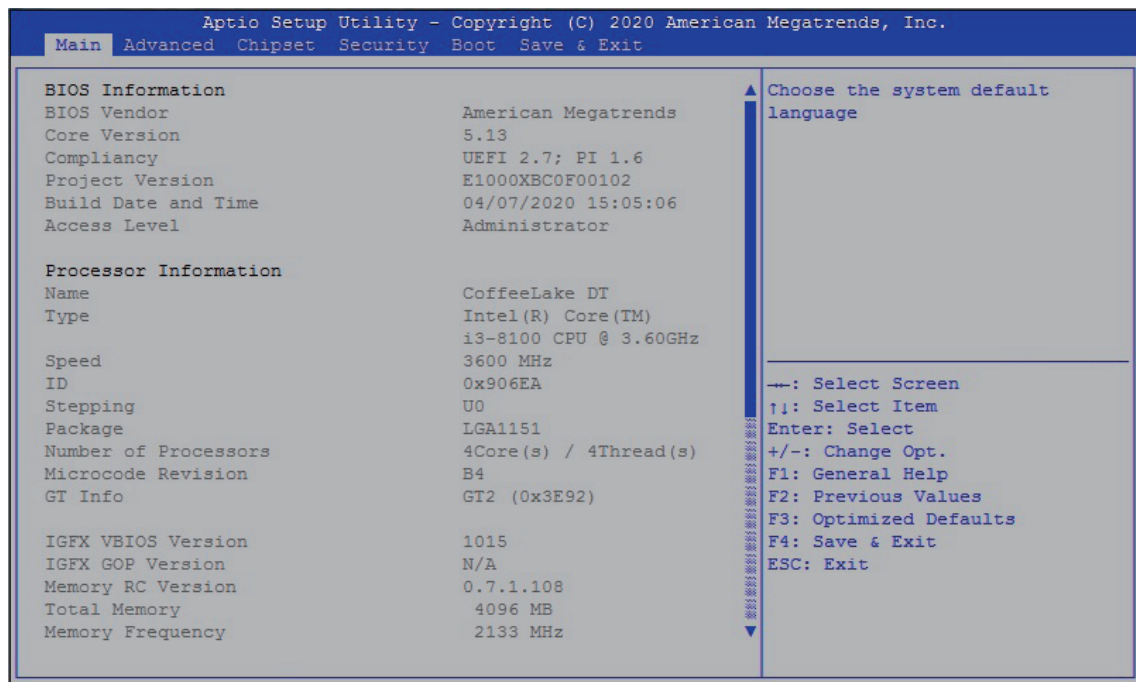


Figure 4-1 : Entering Setup Screen

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

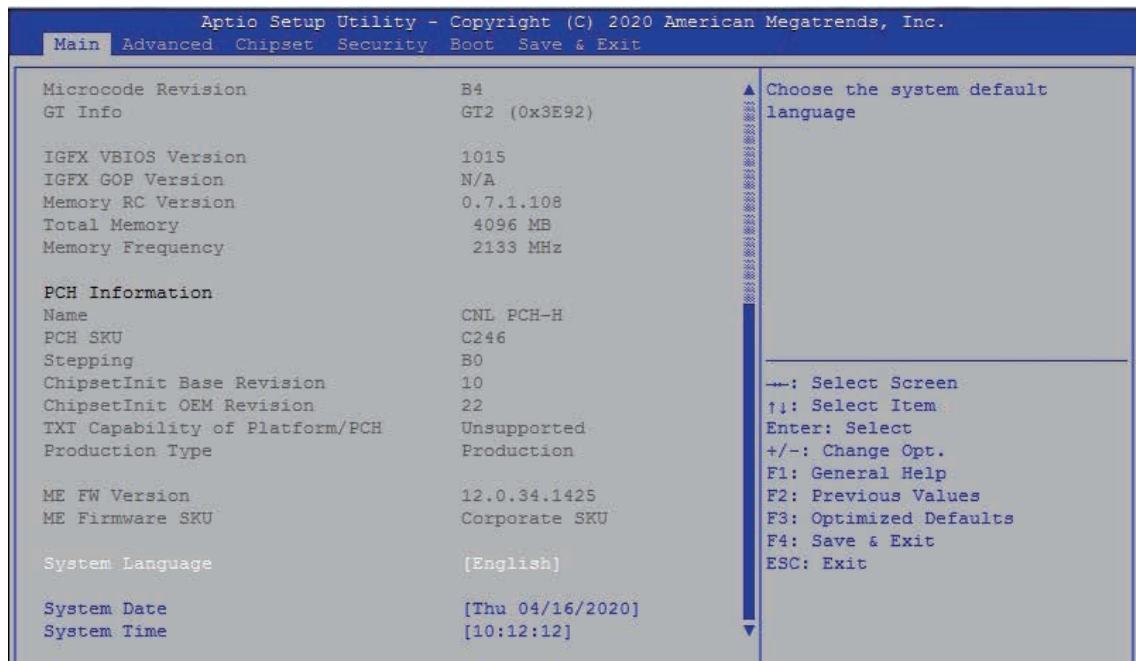


Figure 4-2 : BIOS Main Menu

The main menu displays BIOS version and system information. There are two options on Main menu.

### 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

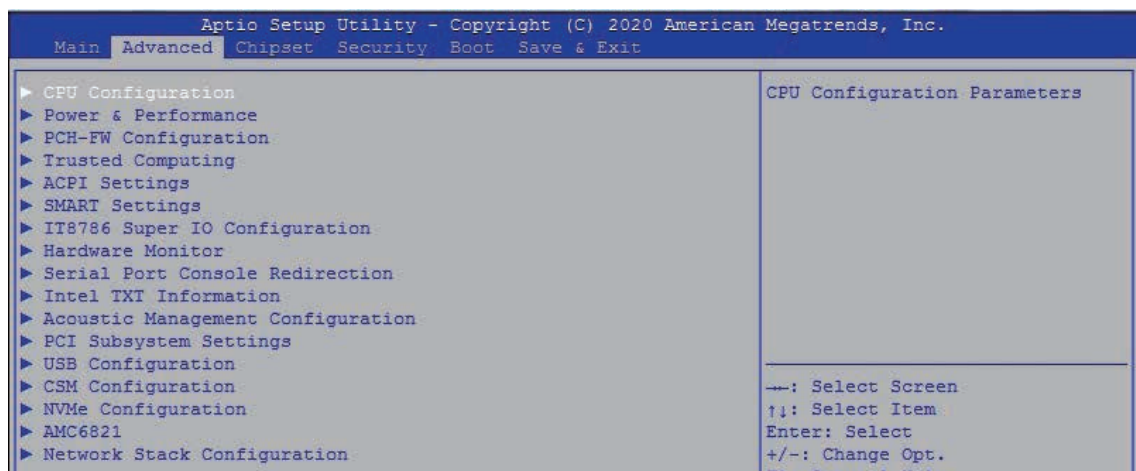


Figure 4-3 : BIOS Advanced Menu

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

### 4.3.1 CPU Configuration

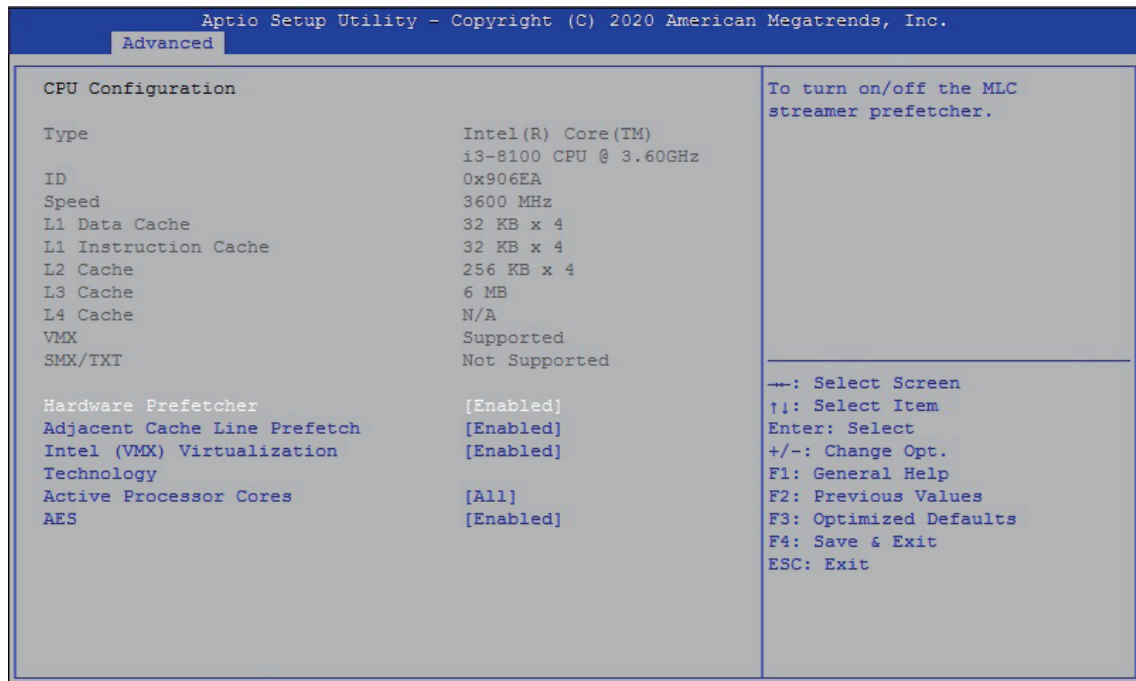


Figure 4-3-1 : CPU Configuration

#### 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.

#### Hyper-threading

Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and disabled for other OS (OS not optimized for Hyper-Threading Technology). When disabled only one thread per core is enabled.

#### AES

Enable/disable CPU Advanced Encryption Standard instructions.

#### Intel Trusted Execution Technology

Enables utilization of additional hardware capabilities provided by Intel® Trusted Execution Technology.

Changes require a full power cycle to take effect.

## 4.3.2 Power & Performance

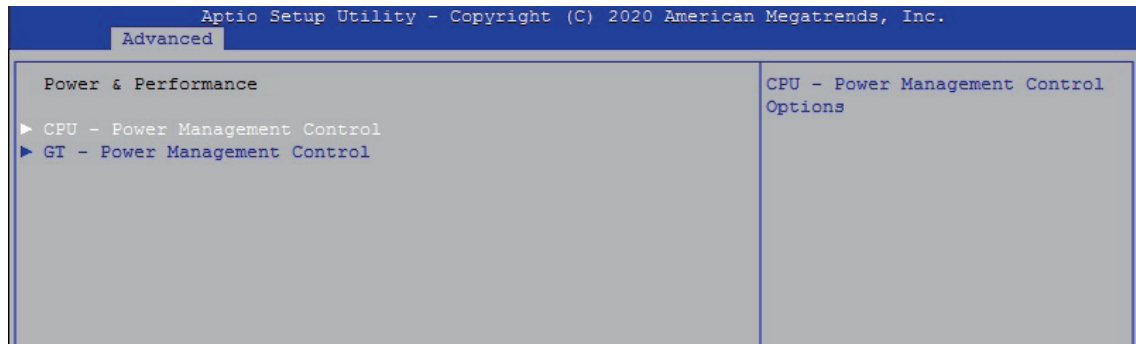


Figure 4-3-2 : Power & Performance

### 4.3.2.1 CPU – Power Management Control

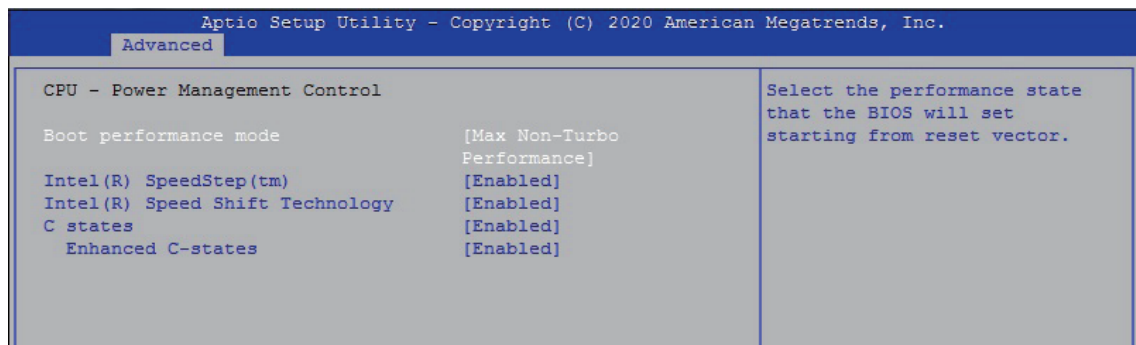


Figure 4-3-2-1 : CPU – Power Management Control

#### Boot performance mode

Select the performance state that the BIOS will set before OS handoff.

#### Intel(R) SpeedStep(tm)

Allows more than two frequency ranges to be supported.

#### Intel(R) Speed shift Technology

Enable/Disable Intel® Speed Shift Technology support. Enabling will expose the CPPCv2 interface to allow for hardware controlled P-states.

#### Turbo Mode

Turbo Mode.

#### C states

Enable or disable CPU C states.

#### 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

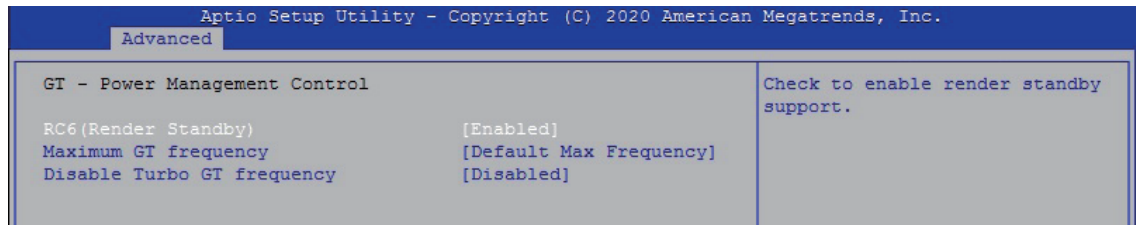


Figure 4-3-2-2 : GT – Power Management Control

#### RC6(Render Standby)

Check to enable render standby support.

#### Maximum GT frequency

Maximum GT frequency limited by the user. Choose between 350MHz (RPN) and 1150MHz (RP0). Value beyond the range will be clopped to min/max supported by SKU

#### Disable Turbo GT frequency

Check to enable render standby support.

### 4.3.3 PCH-FW Configuration

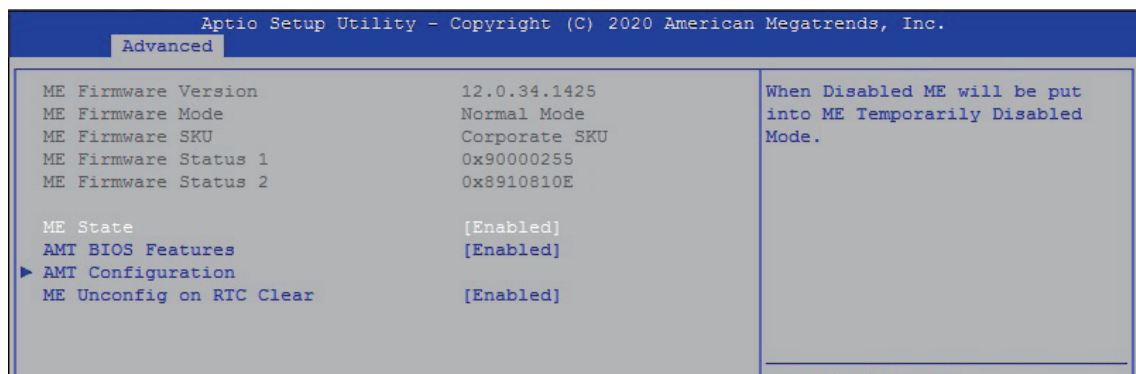


Figure 4-3-3 : PCH-FW Settings

#### ME State

Set ME to Soft temporarily disabled.

#### AMT BIOS Features

When disabled AMT BIOS Features are no longer supported and user is no longer able to access MEBx Setup.

#### AMT Configuration

Configure Intel® Active Management Technology Parameters.

#### ME Unconfig on RTC Clear State

Disabling this option will cause ME not to unconfigure on RTC clear.

### 4.3.4 Trusted Computing

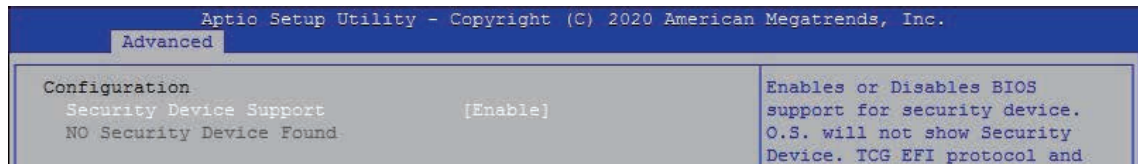


Figure 4-3-4 : Trusted Computing

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

### 4.3.5 ACPI Settings

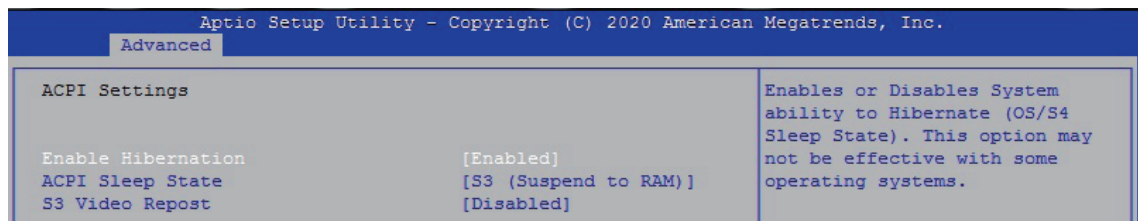


Figure 4-3-5 : ACPI Settings

#### Enable Hibernation

Enables or disables system's ability to hibernate (OS/S4 sleep state). This option may not be effective with some OS.

#### ACPI Sleep State

Selects the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.

#### S3 Video Repost

Enables or disables S3 video repost.

### 4.3.6 SMART Settings

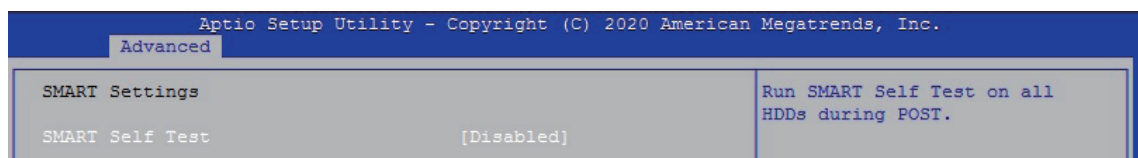


Figure 4-3-6 : SMART Settings

#### SMART Self Test

Run SMART self test on all HDDs during POST.

### 4.3.7 IT8786 Super IO Configuration

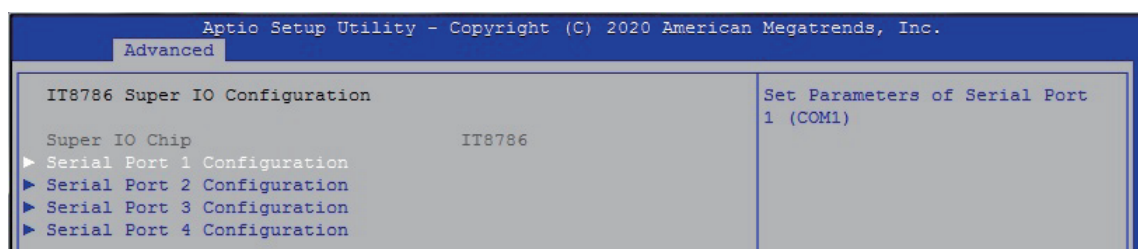


Figure 4-3-7 : IT8786 Super IO Settings

### 4.3.7.1 Serial Port X Configuration

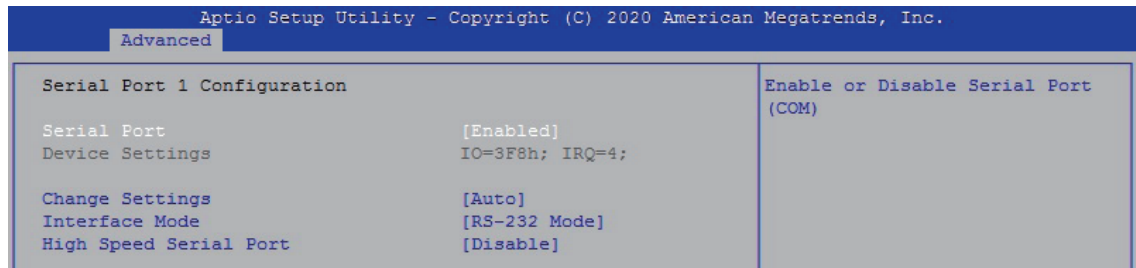


Figure 4-3-7-1 : Serial Port X Configuration

### Serial Port 1 to port 4 Configuration

Options for Serial Port 1 to Serial Port 4.

Entering the corresponding Port option then end user can change the settings such as I/O resource and UART mode (High Speed Serial Port is Port 1 only).

### 4.3.8 Hardware Monitor

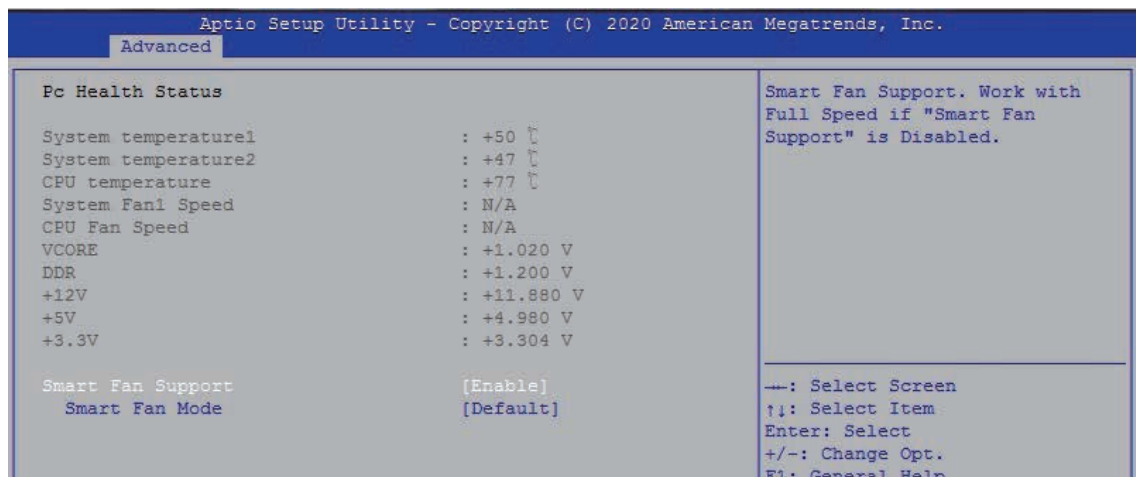


Figure 4-3-8 : Hardware Monitor Settings

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

#### Smart Fan Support

Smart Fan Support. Work with Full Speed if "Smart Fan Support" is Disabled.

#### Smart Fan Mode

Default : Using the default smart fan table.

User : Setting parameters by user.

#### Start Temperature

Temperature Limit value of Fan Start (Degree C).

(Range : 10~80)

#### PWM Start Value (%)

Default PWM Value of Fan.

(Range : 15%~100%)

#### Full Speed Temperature

Temperature Limit value of Fan Full Speed (Degree C). (Range : 50~90)



### 4.3.9 Serial Port Console Redirection

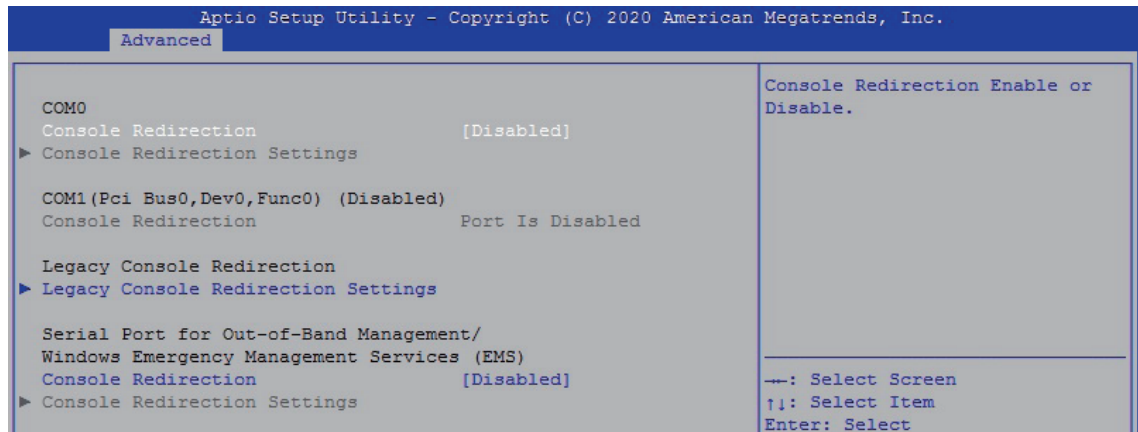


Figure 4-3-9 : Serial Port Console Redirection Settings

#### Console Redirection

Console redirection enable or disable.

#### Console Redirection Settings

These 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.

#### Serial Port for Out-of-Band Management/Windows Emergency Management Services (EMS)

Console redirection enable or disable.

### 4.3.10 Intel TXT Information

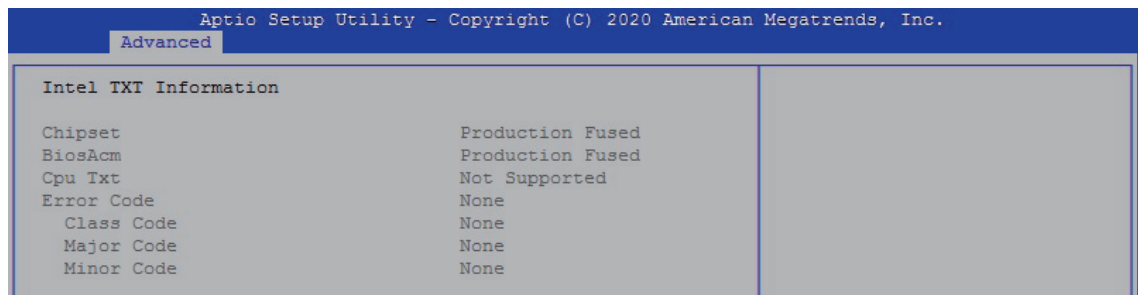


Figure 4-3-10 : Intel TXT Information

Display Intel TXT information.

### 4.3.11 Acoustic Management Configuration

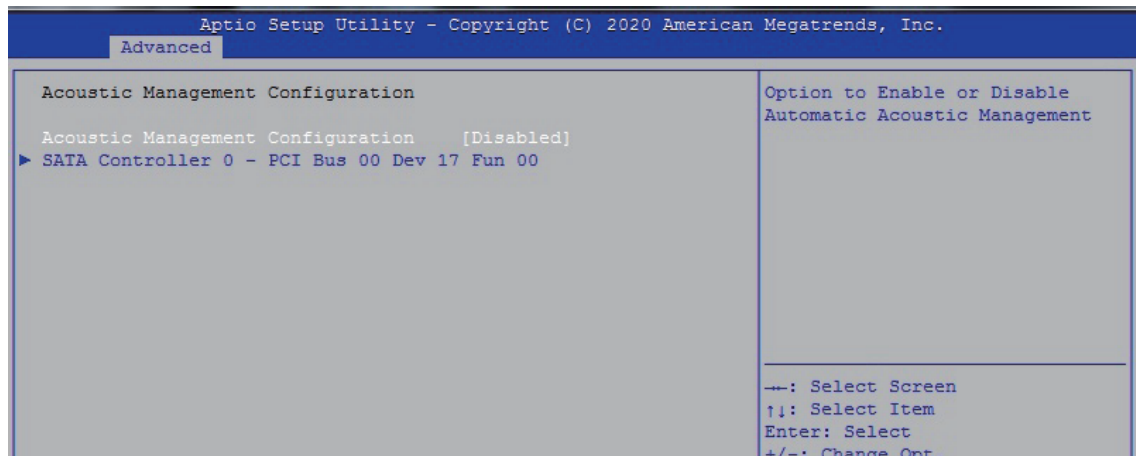


Figure 4-3-11 : Acoustic Management Configuration

#### Acoustic Management Configuration

Option to enable or disable automatic acoustic management.

### 4.3.12 PCI Subsystem Setting

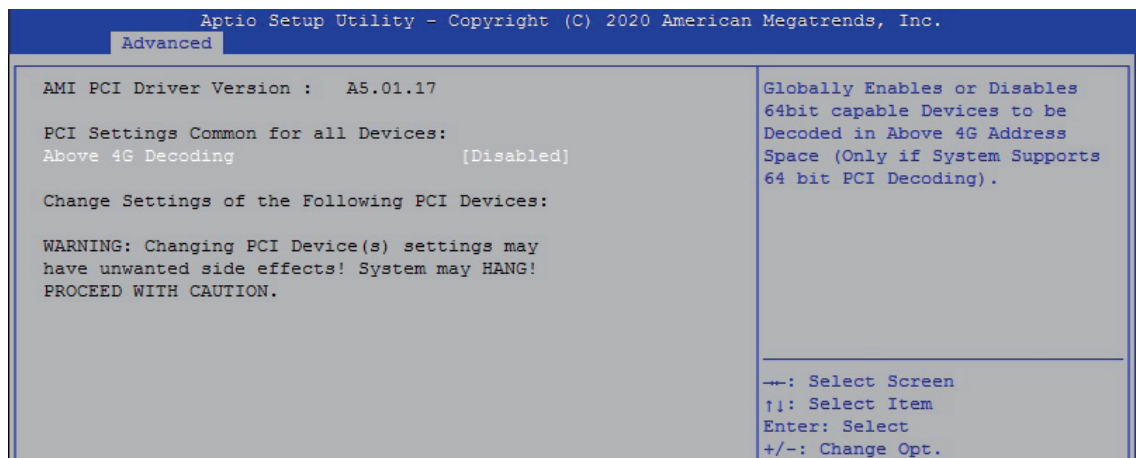


Figure 4-3-12 : PCI Subsystem Settings

#### Above 4G Decoding

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



### 4.3.13 Network Stack Configuration

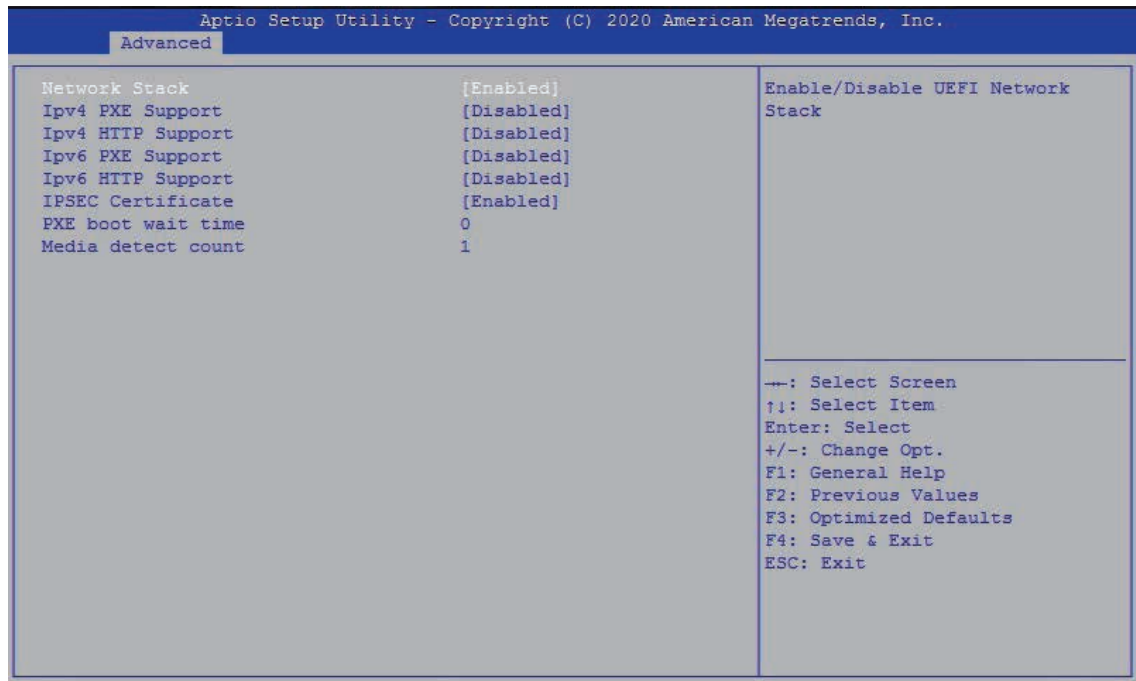


Figure 4-3-13 : Network Stack Settings

#### **Network Stack**

Enable/Disable UEFI Network Stack.

#### **Ipv4 PXE Support**

Enable/Disable IPv4 PXE boot support.

#### **Ipv4 HTTP Support**

Enable/Disable IPv4 HTTP boot support.

#### **Ipv6 PXE Support**

Enable/Disable IPv6 PXE boot support.

#### **Ipv6 HTTP Support**

Enable/Disable IPv6 HTTP boot support.

#### **IP6 Configuration Policy**

Set IP6 Configuration Policy.

#### **PXE boot wait time**

Wait time to press ESC key to abort the PXE boot.

#### **Media detect count**

Number of times presence of media will be checked.

### 4.3.14 CSM Configuration

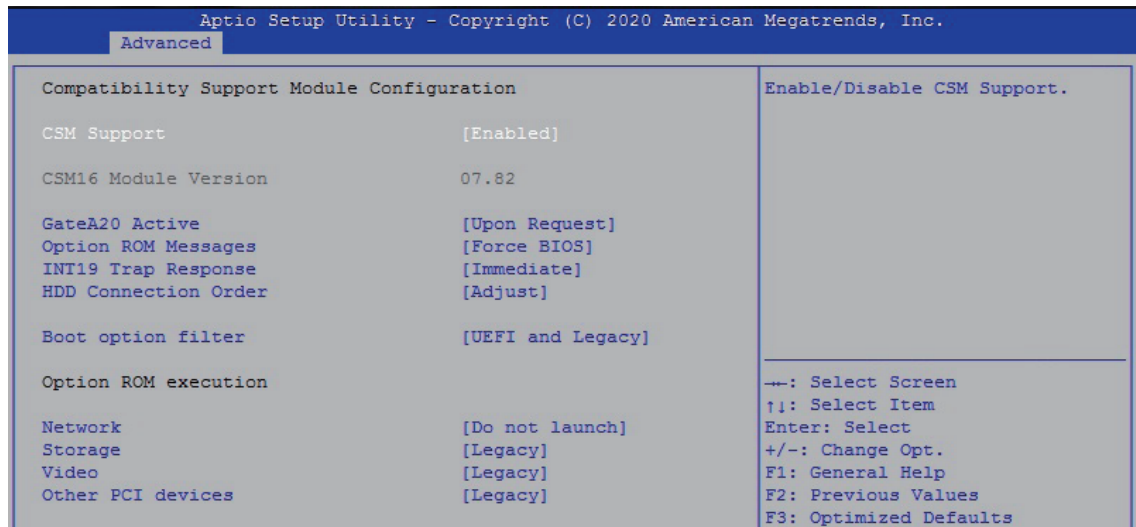


Figure 4-3-14 : CSM Settings

#### CSM Support

Enable/disable CSM support.

#### GateA20 Active

UPON REQUEST - GA20 can be disabled using BIOS services.

ALWAYS - do not allow GA20 to be disabled; 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 ROM's priority.

#### Network

Controls the execution of UEFI and Legacy PXE OpROM.

#### Storage

Controls the execution of UEFI and Legacy Storage OpROM.

#### Video

Allows more than two frequency ranges to be supported.

#### Other PCI devices

Determines OpROM execution policy for devices other than network, storage, or video.

### 4.3.15 NVMe Configuration

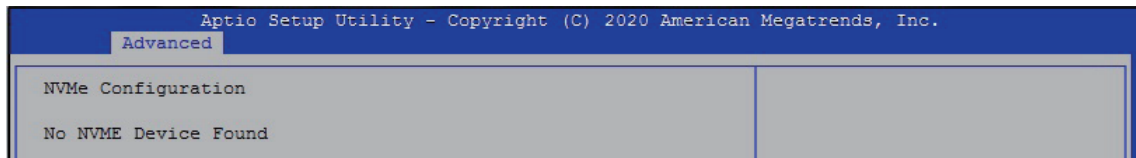


Figure 4-3-15 : NVMe Settings

Display NVMe controller and Drive information.

### 4.3.16 USB Configuration

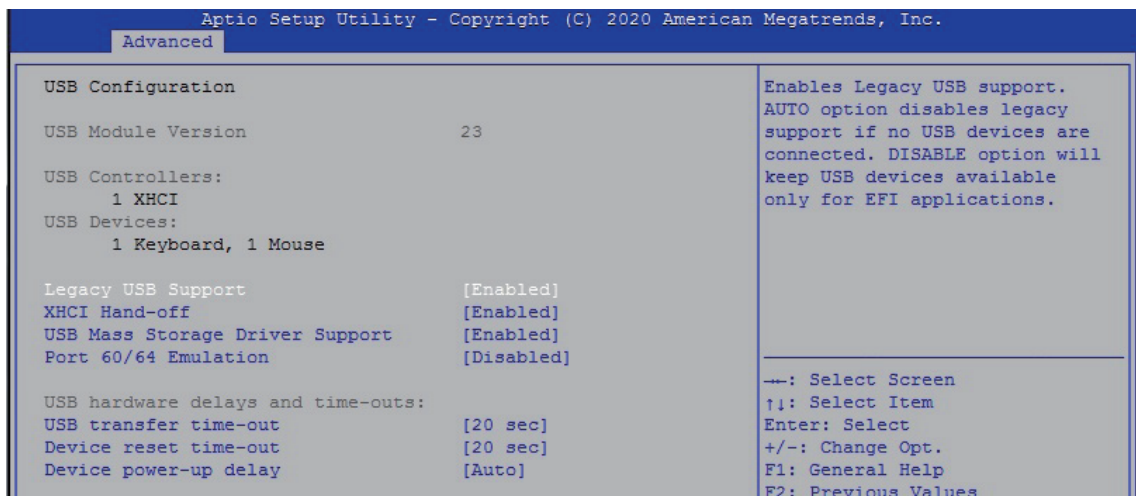


Figure 4-3-16 : USB Settings

#### 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 OS-es 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 the hub descriptor.

### 4.3.17 AMC6821 Configuration

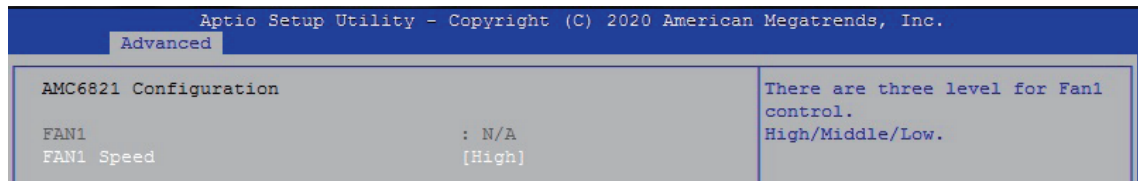


Figure 4-3-17 : AMC6821 Configuration

The AMC6821 features a hardware monitor providing fan speed monitoring.

#### FAN1 Speed

There are three levels for Fan1 control. High/Middle/Low.

## 4.4 Chipset

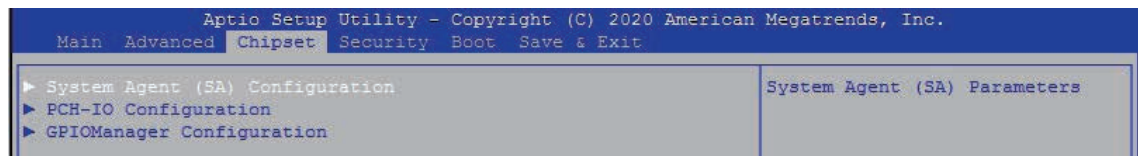


Figure 4-4 : BIOS Chipset Menu

### System Agent (SA) Configuration

System Agent (SA) parameters.

### PCH-IO Configuration

PCH parameters.

### GPIOManager Configuration

GPIOManager Configuration.

### 4.4.1 System Agent (SA) Configuration



Figure 4-4-1 : System Agent Settings

#### VT-d

VT-d capability.

#### Above 4GB MMIO BIOS assignment

Enable/disable above 4GB Memory Mapped-IO BIOS assignment. This is disabled automatically when aperture size is set to 2048MB.

### 4.4.1.1 Memory Configuration

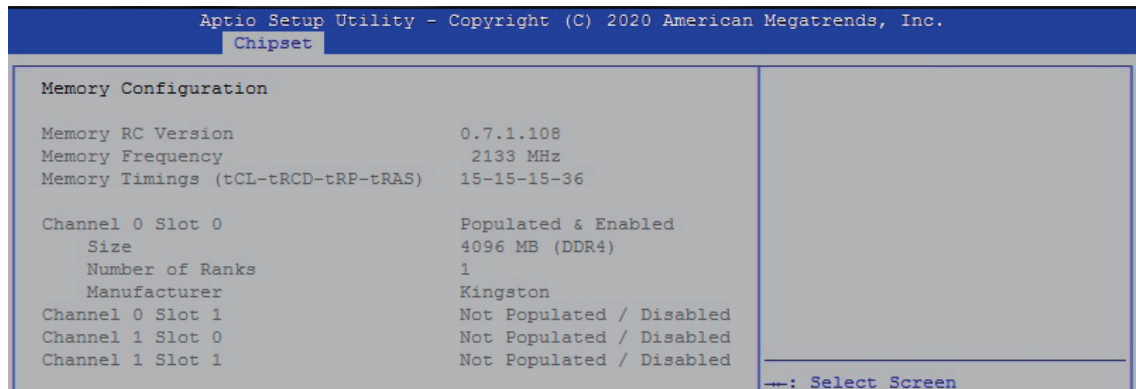


Figure 4-4-1-1 : Memory Information

Displays memory information.

### 4.4.1.2 Graphics Configuration

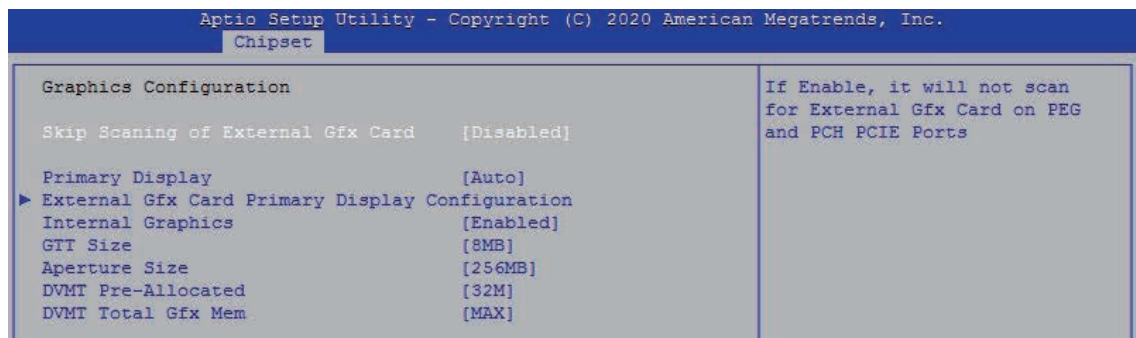


Figure 4-4-1-2 : Graphics Settings

#### 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.

#### 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

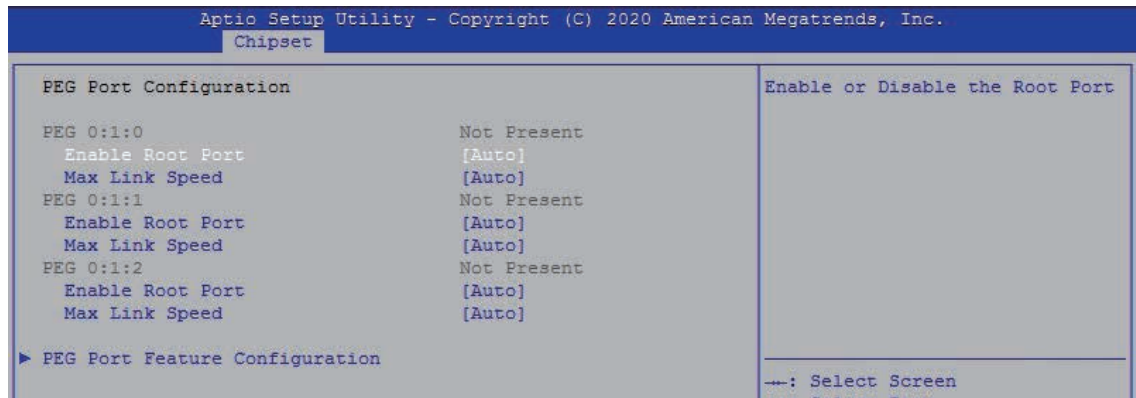


Figure 4-4-1-3 : PEG Port Configuration

PEG port options for PCIe device.

### 4.4.2 PCH-IO Configuration

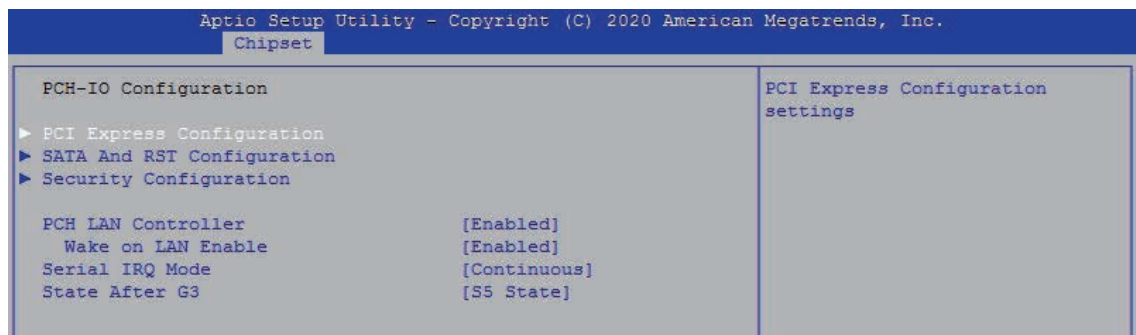


Figure 4-4-2 : PCH-IO Settings

#### PCH LAN Controller

Enable or disable onboard NIC.

#### Wake on LAN

Enable or disable integrated LAN to wake the system. (The wake On LAN cannot be disabled if ME is on at Sx state.)

#### 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).

S0 State : Always turn-on the system when power source plugged-in.

S5 State : Always turn-off the system when power source plugged-in.



## 4.4.2.1 PCI Express Configuration of PCH-IO

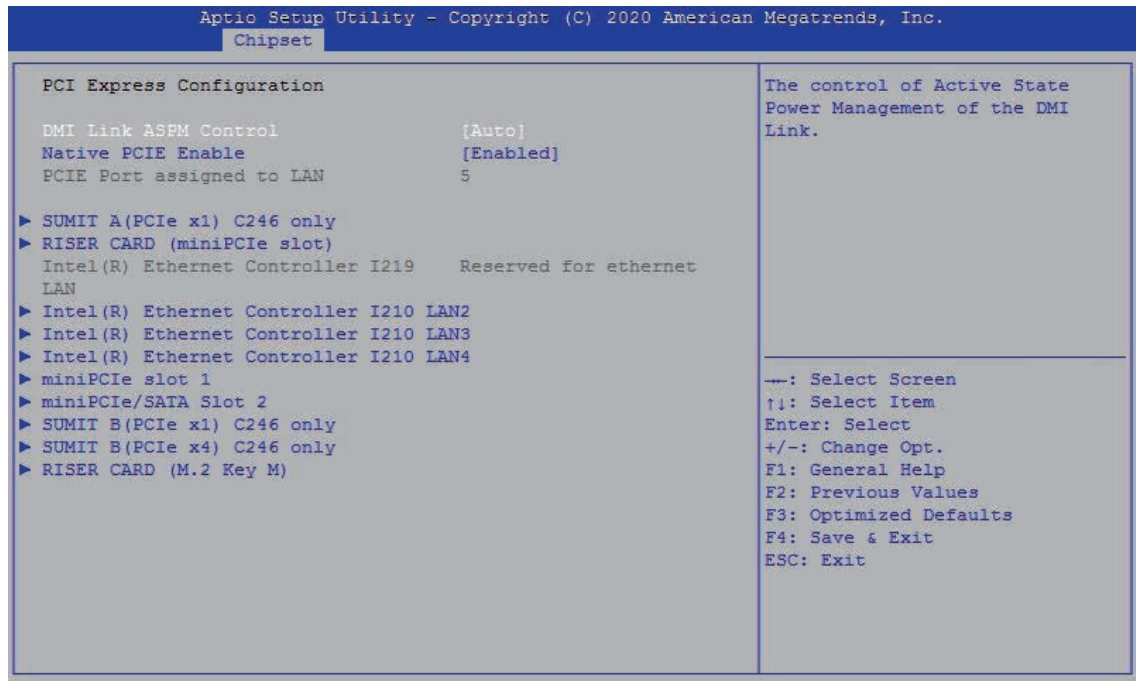


Figure 4-4-2-1 : PCI Expression Settings

### DMI Link ASPM Control

Enable/Disable the control of Active State Power Management on SA side of the DMI Link.

### Native PCIE Enable

PCIE Express Native Support Enable/Disable.

### PCI Express device settings

Bios options for PCI Express device setting.

## 4.4.2.2 SATA and RST Configuration

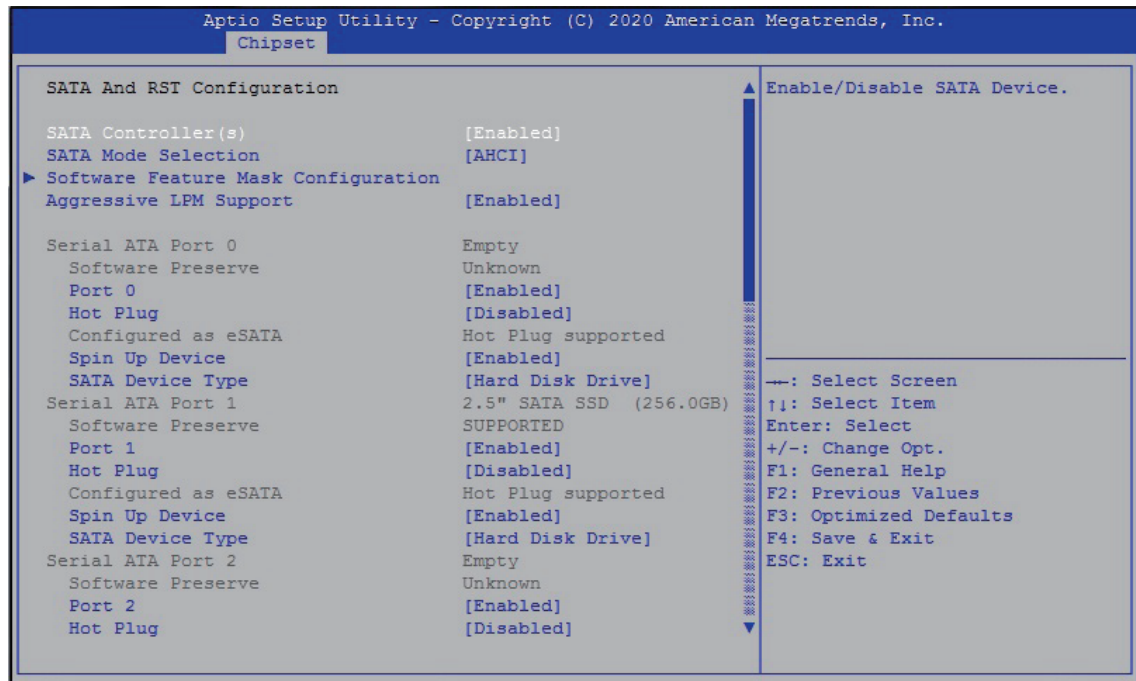


Figure 4-4-2-2 : SATA and RST Settings

### SATA Controller(s)

Enable or disable SATA Device.

### SATA Mode Selection

Determines how SATA controller(s) operate.

### Software Feature Mask Configuration

RAID OROM/RST driver will refer to the SWFM configuration to enable or disable the storage features.

### Aggressive LPM Support

Enable PCH to aggressively enter link power state.

### Options for each SATA port :

Port n

Enable or disable SATA Port.

### Hot Plug

Designated this port as Hot Pluggable.

### Spin Up Device

On an edge detect from 0 to 1, the PCH starts a COMRESET initialization sequence to the device.

### SATA Device Type

Identifies that the SATA port is connected to solid state drive or hard disk drive.



### 4.4.2.3 Security Configuration

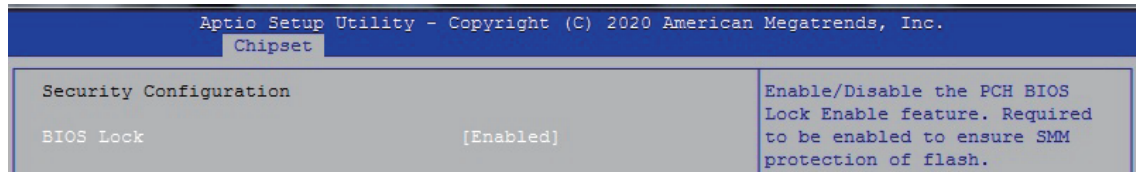


Figure 4-4-2-3 : Security Settings

#### BIOS Lock

Enable/disable the PCH BIOS Lock Enable (BLE bit) feature.

### 4.4.3 GPIO Manager

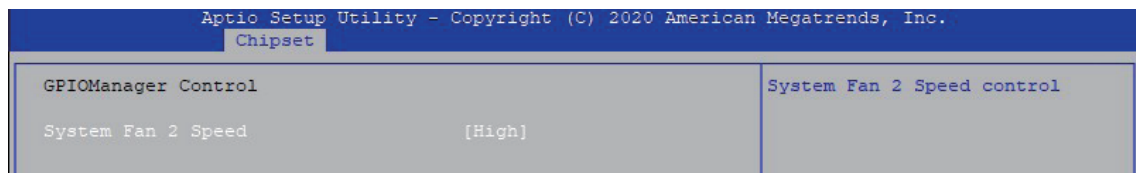


Figure 4-4-3 : GPIO Manager

#### System Fan 2 Speed

System Fan 2 Speed control.

## 4.5 Security

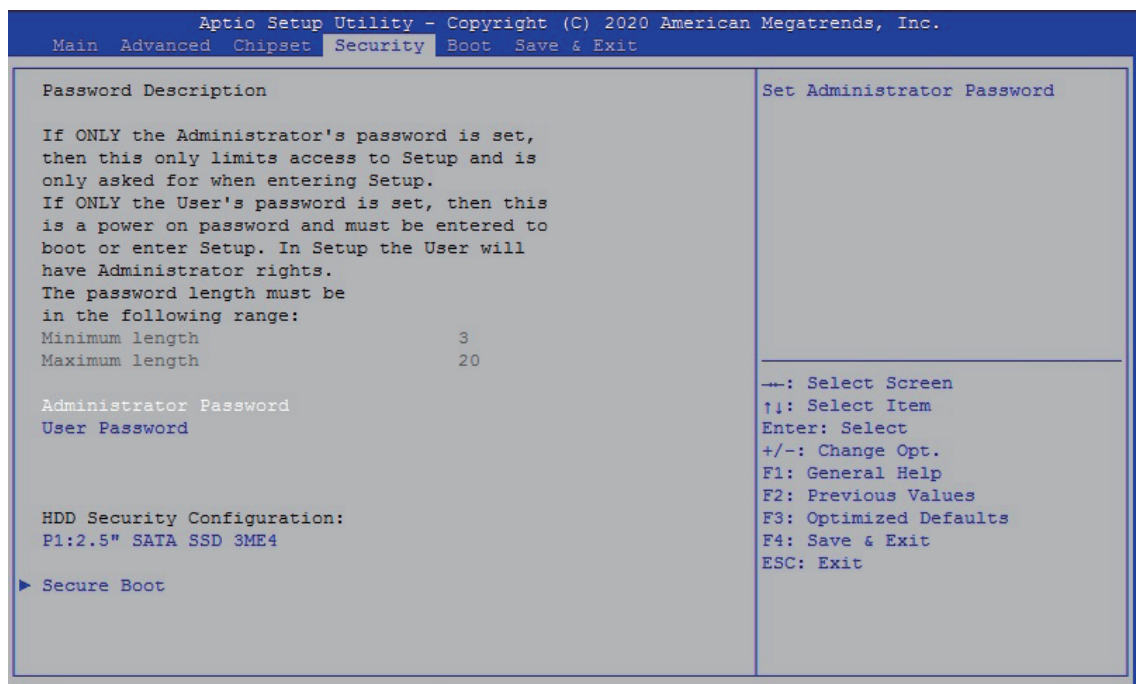


Figure 4-5 : BIOS Security Menu

#### Administrator Password

Set administrator password.

#### User Password

Set user password.

#### Secure Boot

Customizable Secure Boot Settings.

## 4.5.1 HDD Security Configuration

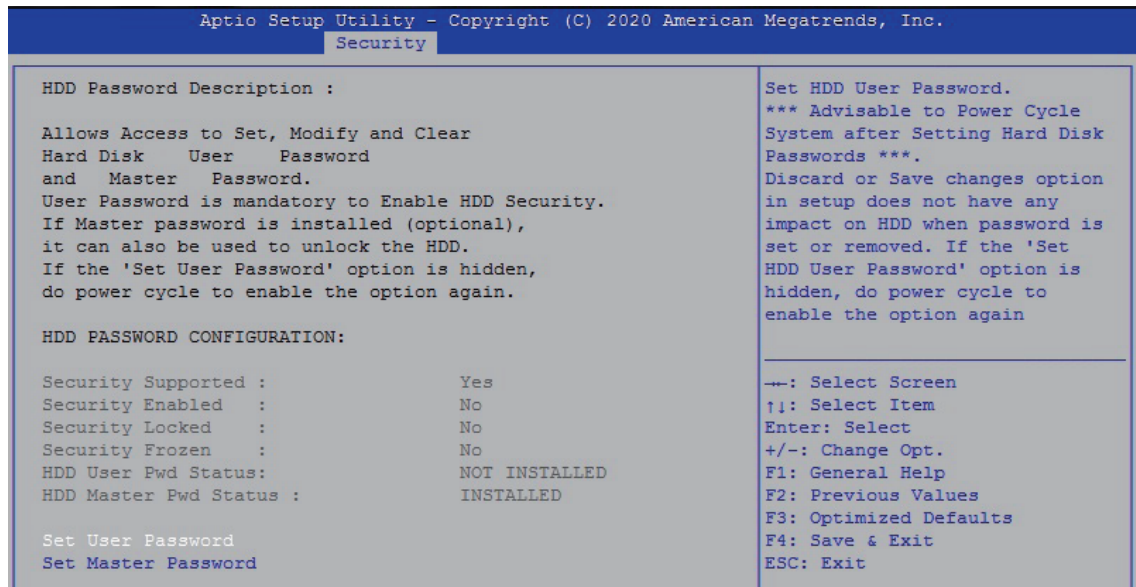


Figure 4-5-1 : HDD Security Settings

### 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 gray, do power cycle to enable the option again.

## 4.5.2 Security Boot

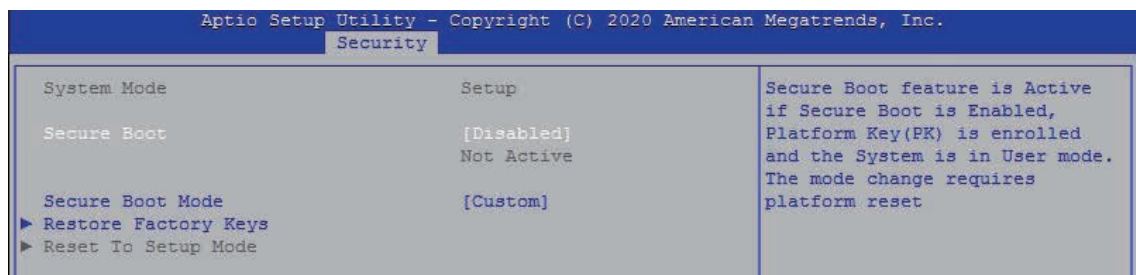


Figure 4-5-2 : Security Boot Settings

### 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 selector Standard/Custom.

In custom mode Secure Boot Variables can be configured without authentication.

### Key Management

Enables expert users to modify Secure boot policy variables without full authentication.

## 4.6 Boot

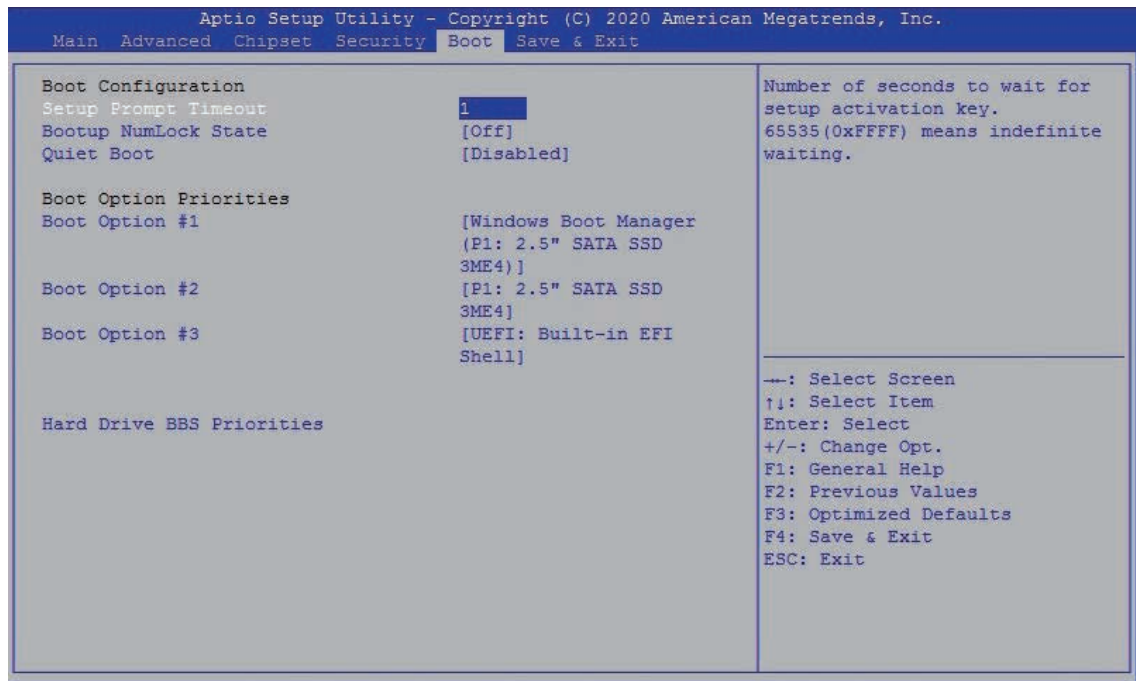


Figure 4-6 : BIOS Boot Menu

### 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

Sets the system boot order.

### New Boot Option Policy

Controls the placement of newly detected UEFI boot options.

### Hard Drive BBS Priorities

Set the order of the Legacy devices in this group.

## 4.7 Save & Exit

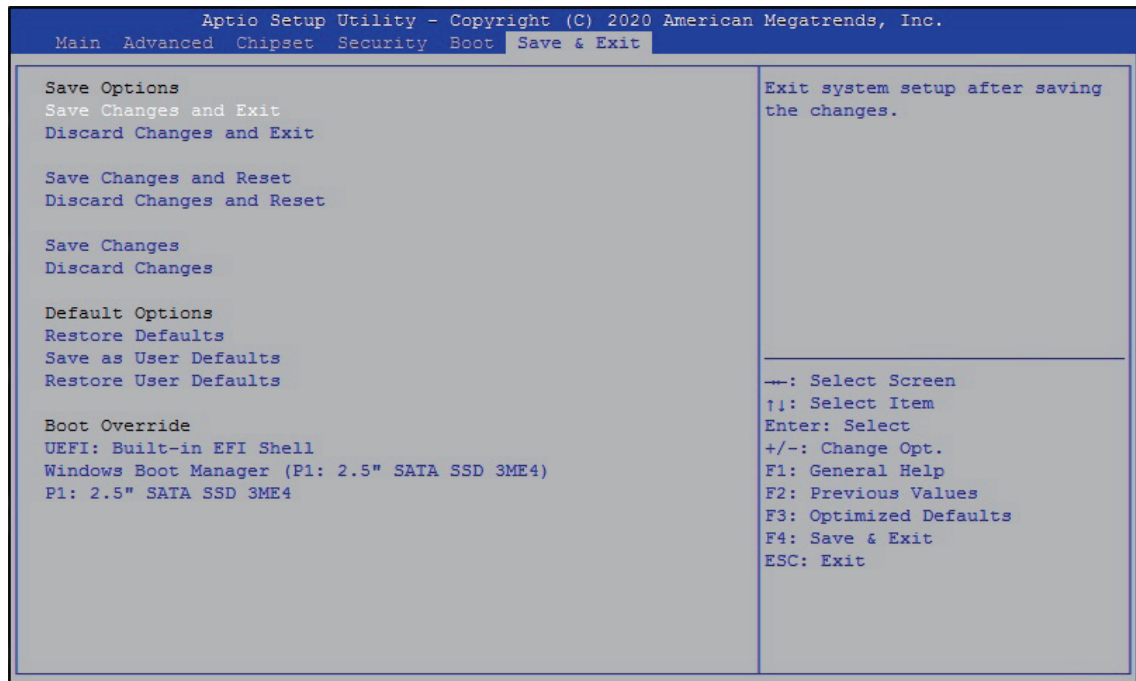


Figure 4-7 : BIOS Save and Exit Menu

### 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.

Default 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.

# A

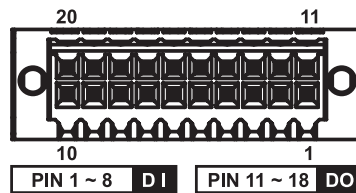
## APPENDIX A : Isolated DIO Guide

### A.1 Function Description

The GPC-1000 offers two 16-bit Isolated DIO 20-pin terminal block connector and a watchdog timer.

Isolated DIO pins are fix by Hardware design that cannot change in/out direction in runtime process.

DIO definition is shown below :

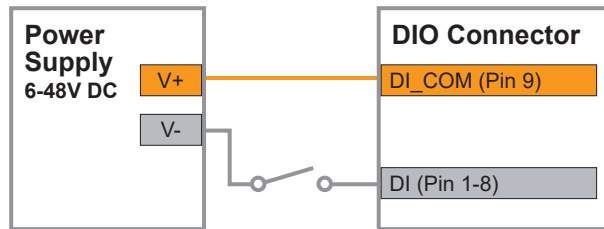


Pin No.	Isolated DIO Definition	Non-Isolated DIO Definition	Pin No.	Isolated DIO Definition	Non-Isolated DIO Definition
1	DI 0	DIO 0	11	DO 0	DIO 8
2	DI 1	DIO 1	12	DO 1	DIO 9
3	DI 2	DIO 2	13	DO 2	DIO 10
4	DI 3	DIO 3	14	DO 3	DIO 11
5	DI 4	DIO 4	15	DO 4	DIO 12
6	DI 5	DIO 5	16	DO 5	DIO 13
7	DI 6	DIO 6	17	DO 6	DIO 14
8	DI 7	DIO 7	18	DO 7	DIO 15
9	DI COM	NC	19	DIO_GND	DIO_GND
10	DIO_GND	DIO_GND	20	External VDC	NC

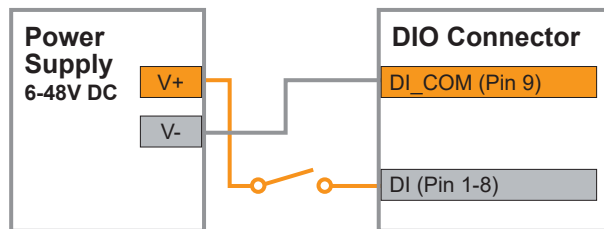
## A.2 Isolated DIO Signal Circuit

DI reference circuit :

Sink Mode  
(NPN)

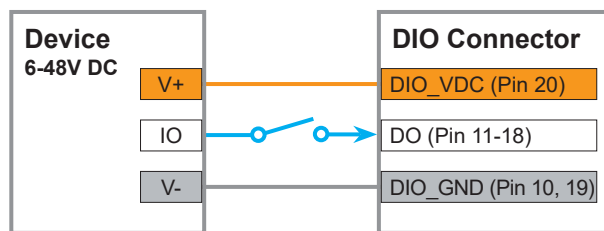


Source Mode  
(PNP)

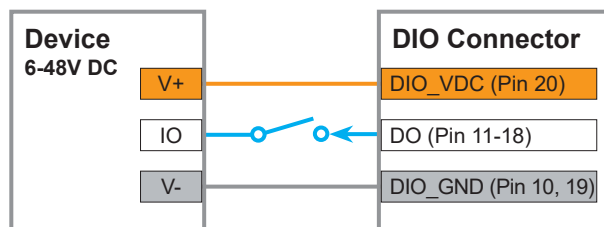


DO reference circuit :

Sink Mode  
(NPN, Default)



Source Mode  
(PNP)



## A.3 Software Package Contain

Distribution folder include x32 and x64 versions, use batch file for installation.

There are included as followed :

Win7\_32.bat :

Installation for 32-bit driver

Win7\_64.bat :

Windows update package which driver required (need to restart), and Installation for 64-bit driver

Win8\_32.bat, Win8\_64.bat :

Installation for driver, and guideline to Framework 3.5 distribution for sample

Win10\_32.bat, and Win10\_64.bat :

Installation for driver, and installation to Framework 3.5 distribution for sample

Uninstall\_32.bat, and Uninstall\_64.bat :

Uninstallation for driver

Run batch file as Administrator.

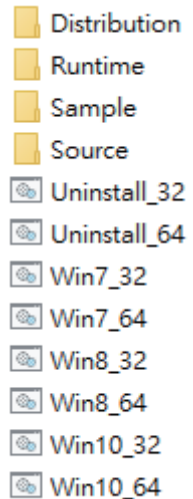
Support Windows 7 above.

Make sure it is Windows version before installation.

Runtime folder includes head file for software developer or System Integration.

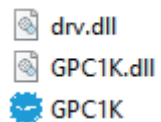
Sample folder includes sample program, driver library, and API library. Source

folder includes sample program source code that compile on Visual Studio 2008.

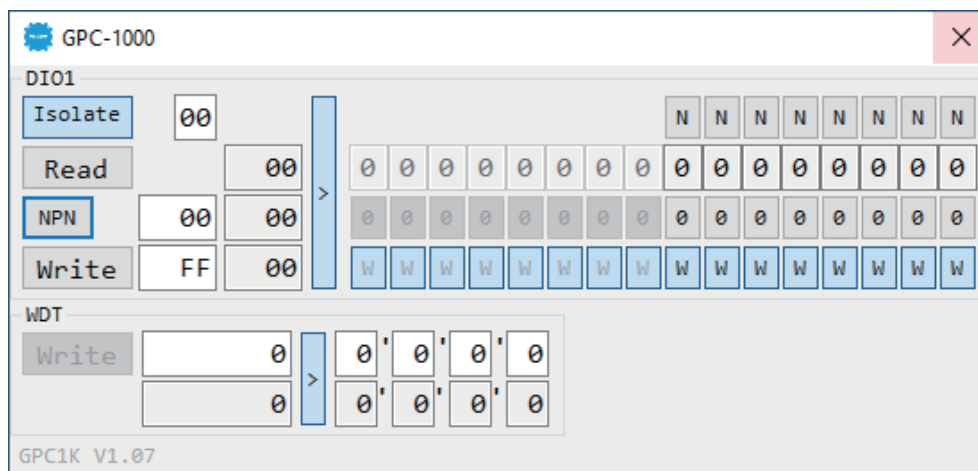


## A.4 Sample

Sample folder includes x32 and x64 versions, as shown right :



Sample GPC1K.exe, as shown below :





## **DIO1 group :**

Isolate check button :

DIO type of DIO configuration, isolated/non-isolated.

Read button :

Set DIO configuration to get DI/DIO input state.

DO type check button :

User setting, DO type of DIO configuration to setup 8 pins - Source/Sink.

Use for Write (DO) button activation.

Write button :

Set DIO configuration to set DO/DIO output state.

DI preference text :

User setting, DI type of DIO configuration by hexadecimal bitmask - Source/Sink.

Use for Read (DI) button activation.

DO/DIO output text :

User setting, DO/DIO output state by hexadecimal bitmask - on/off.

Use for Write button activation.

DO/DIO writable text :

User setting, DO/DIO writable of DIO configuration by hexadecimal bitmask-yes/no.

Use for Read (DIO)/Write button activation.

DI/DIO input text (read only) :

DI/DIO input state by hexadecimal bitmask - on/off.

Use for Read button activation.

DO/DIO text (read only) :

DO/DIO output state with input state (DIO) and configuration.

Use for Write button activation.

DO/DIO output text (read only) :

DO/DIO output state with configuration.

Use for Write button activation.

DI type pin check button(pin 8 ~ pin 1) :

User setting, DI pin type of DIO configuration - Source/Sink.

DI/DIO input pin texts (read only, pin 8 ~ pin 1/pin 18 ~ pin 11, pin 8 ~ pin 1):

DI/DIO input pin state

Use for Read button activation.

DO/DIO output pin check button(pin 18 ~ pin 11/pin 18 ~ pin 11, pin 8 ~ pin 1) :

User setting, DO/DIO output pin state

Use for Write button activation.

DO/DIO pin writable check button(pin 18 ~ pin 11/pin 18 ~ pin 11, pin 8 ~ pin 1) :

User setting, DO/DIO pin writable of DIO configuration.

Use for Read (DIO)/Write button activation.

**WDT group :**

Write button :

Set WDT when WDT setup text is valid.

Stop button :

Cancel WDT and counting.

Use after Write button action.

WDT setup text :

User setting, WDT value, unit : second.

Use for Write button activation.

WDT counting text (read only) :

WDT counting by program timer after set WDT.

Shown after Write button action.

WDT setup day format texts (user setting) :

User setting, WDT value, format : day'hour'minute'second.

WDT counting day format text (read only) :

WDT counting, format : day'hour'minute'second.

# B

## APPENDIX B : Software Functions

### B.1 Driver API Guide

In Runtime folder, on GPC1K.h :

\_DLL\_IMPORT\_ definition is used on LoadLibrary API for GPC1K.dll.  
GPC1K\_EXPORTS definition is used on GPC1K.dll building.

#### **BOOL Initial (BYTE Isolate\_Type, BYTE DIO\_NPN)**

Initial machine for DIO, watchdog timer, and POE

Isolate\_Type : DIO type

1 : Isolated DIO;

0 : Non-Isolated DIO

DIO\_NPN : DI/DO type

1 : PNP (Source) mode for European rule;

0 : NPN (Sink) mode for Japanese rule

Return :

TRUE (1): Success;

FALSE (0): Fail (Driver not exists, or initial error (version is too old, or machine not match))

#### **BOOL GetDIO1Config (BYTE \*Isolate\_Type, BYTE \*DI\_NPN, BYTE \*DO\_NPN, WORD \*Mask)**

Get DIO configuration (by variable)

Isolate\_Type : DIO type

1 : Isolated DIO;

0 : Non-Isolated DIO

DI\_NPN ([7:0]) : DI type, pin setting by hexadecimal bitmask

1 : PNP (Source) mode for European rule;

0 : NPN (Sink) mode for Japanese rule

DO\_NPN : DO type

1 : PNP (Source) mode for European rule;

0 : NPN (Sink) mode for Japanese rule

Mask ([15:0]) : In/Out, pin setting by hexadecimal bitmask

1 : Output;

0 : Input

Return :

TRUE (1) : Success;

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

**BOOL SetDIO1Config (BYTE Isolate\_Type, BYTE DI\_NPN, BYTE DO\_NPN, WORD Mask)**

Set DIO configuration

Isolate\_Type : DIO type

1 : Isolated DIO;

0 : Non-Isolated DIO

DI\_NPN ([7:0]) : DI type, pin setting by hexadecimal bitmask

1 : PNP (Source) mode for European rule;

0 : NPN (Sink) mode for Japanese rule

DO\_NPN : DO type

1 : PNP (Source) mode for European rule;

0 : NPN (Sink) mode for Japanese rule

Mask ([15:0]) : In/Out, pin setting by hexadecimal bitmask

1 : Output;

0 : Input

Return :

TRUE (1) : Success;

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

**BOOL GetDI1 (BYTE \*DI)**

Get isolated DIO input (DI)

DI ([7:0]) : Input state, pin setting by hexadecimal bitmask

1 : High;

0 : Low

Return :

TRUE (1) : Success;

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

**BOOL GetDO1 (BYTE \*DO)**

Get isolated DIO output (DO)

DO ([7:0]) : Output state, pin setting by hexadecimal bitmask

1 : High;

0 : Low

Return :

TRUE (1) : Success;

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

**BOOL SetDO1 (BYTE DO)**

Set isolated DIO output (DO)

DO ([7:0]) : Output state, pin setting by hexadecimal bitmask

1 : High;

0 : Low

Return :

TRUE (1) : Success;

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

**BOOL GetDIO1 (WORD \*DI)**

Get non-isolated DIO input (DIO input)

DI ([15:0]) : Input state, pin setting by hexadecimal bitmask

1 : High;

0 : Low

Return :

TRUE (1) : Success;

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

**BOOL SetDIO1 (WORD DO)**

Set non-isolated DIO output (DIO output)

DO ([15:0]) : output state, pin setting by hexadecimal bitmask

1 : High;

0 : Low

Return :

TRUE (1) : Success;

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

**BOOL GetWDT (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 SetWDT (DWORD WDT)**

Set watchdog timer setup

WDT : watchdog timer setup

Unit : second. (Range : 1 ~ 65535 sec, 1093 ~ 65535 min (=65580 ~ 3932100 sec))

Return :

TRUE (1) : Success;

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

**BOOL CancelWDT ()**

Cancel watchdog timer

Return :

TRUE (1) : Success;

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

# C

## 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

Main	Advanced	Chipset	Boot	Security	Save & Exit
SATA Controller(s) [Enabled]					Item Specific Help
SATA Model Selection [AHCI]					

### C.2 OS Installation

GPC-1000 is featured with two SATA ports.

You can select one of 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 Graphic driver
3. Install Network driver
4. Install ME driver (if available)
5. Install Audio driver

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

You can get the latest information and the software directly from Intel website.

[http://www.intel.com/p/en\\_US/support/highlights/chpsts/imsm](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.

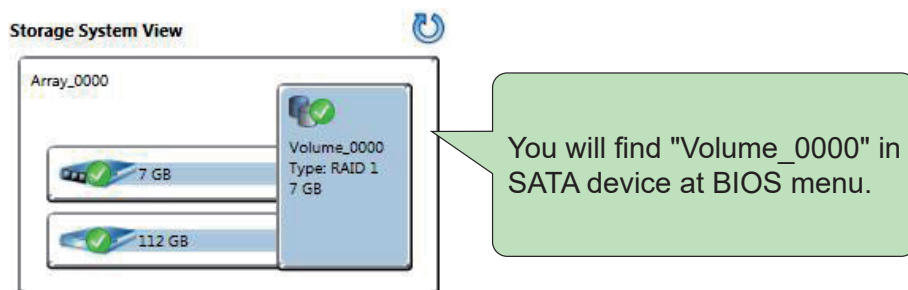
## C.6 Create RAID Volume

GPC-1000 is featured with two SATA HDDs for RAID volume, so there are three options for choose on this page. Let's take RAID 1 as example, please select "RAID 1".



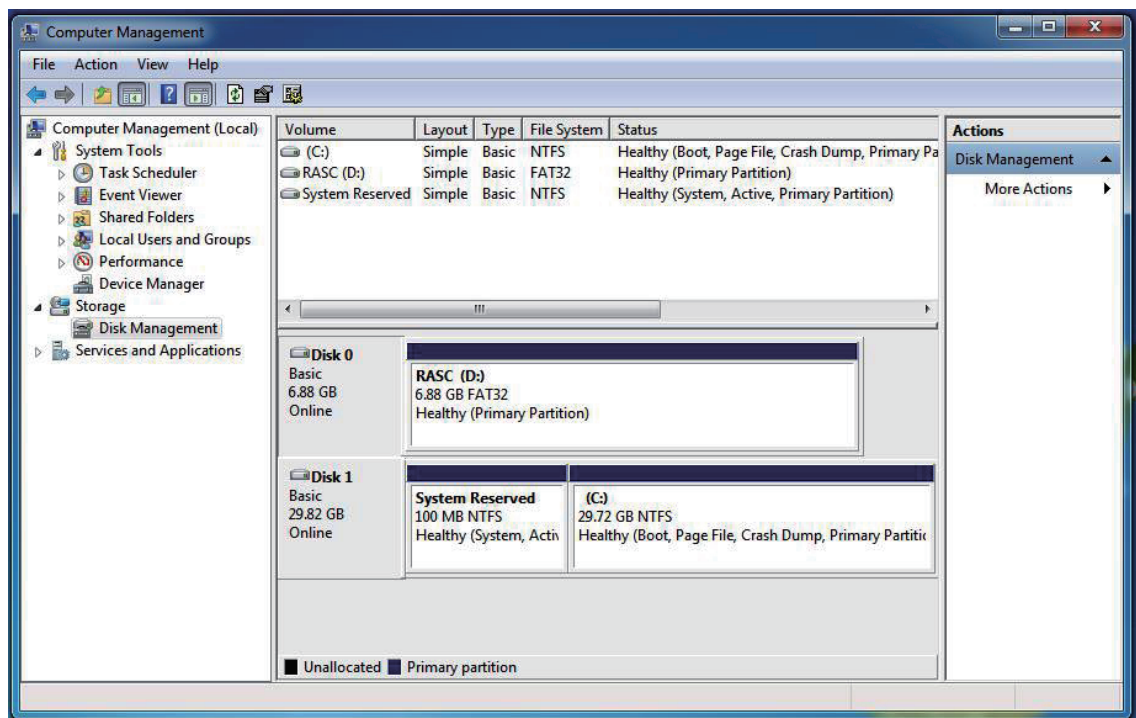
## C.7 Disk Management : Partition the Disk

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



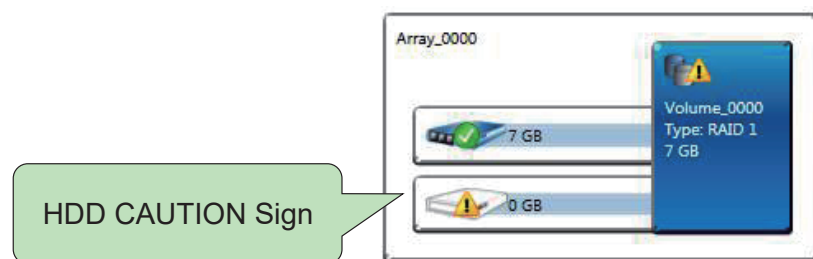
To start disk management tool, select "initialize disk".

Then add "Logical Device" for Windows access.

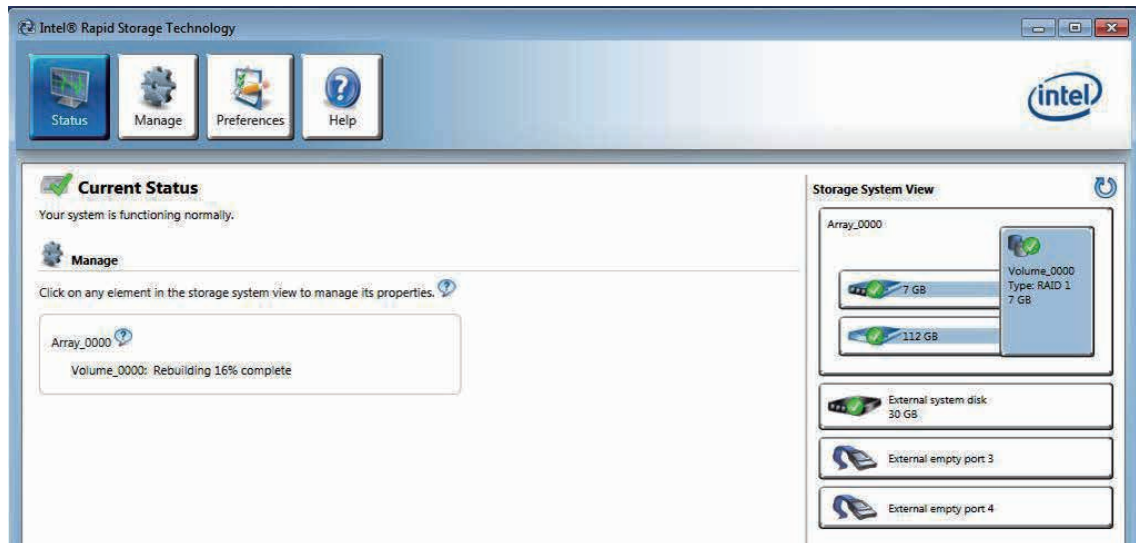


## C.8 RAID HDD Fail

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



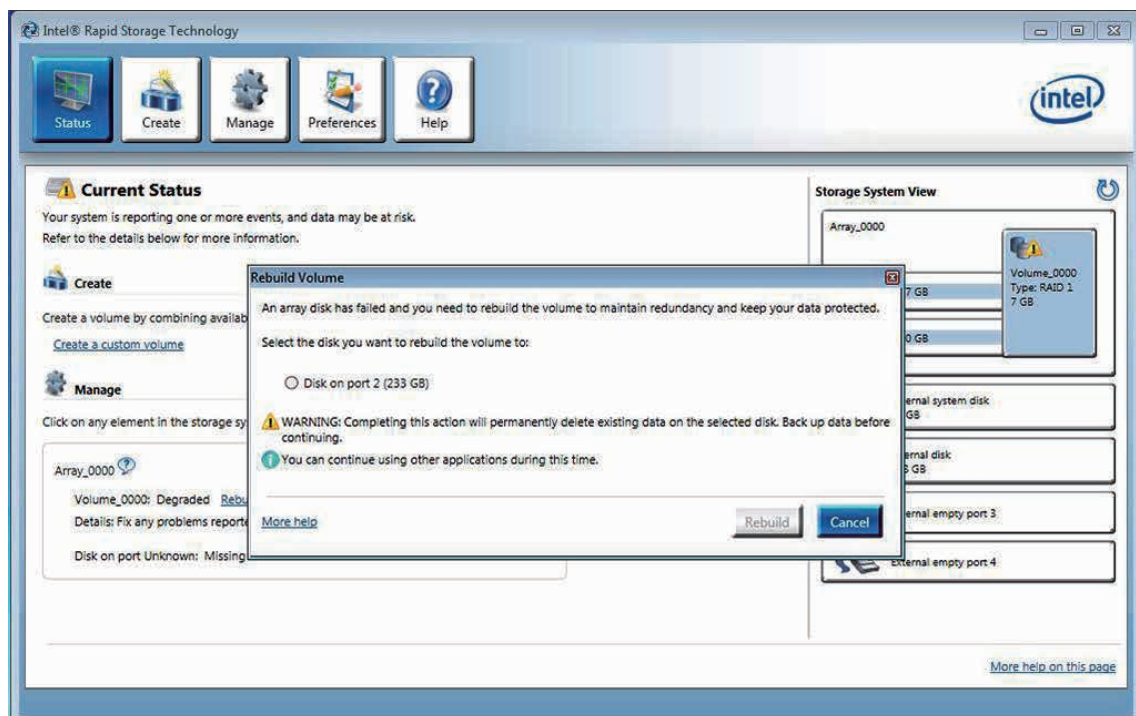
## C.9 Original HDD Recovery



## C.10 New HDD Recovery

There is a warning that will pop up to ask you if the disk is not a member of original RAID volume.

If you press "Rebuild", it will replace the broken SATA HDD to the last one SATA HDD of RAID volume.



# D

## APPENDIX D : Power Consumption

Testing Board	GPC-1000
RAM	16GB X 2
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 (i219)	1.0 Gbps
LAN 2 (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® Xeon® E-2176G (12M Cache, 3.70GHz)

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	9V	0.374A	3.366W	0.449A	4.041W	1.725A	15.525W
	12V	0.298A	3.576W	0.360A	4.320W	1.392A	16.704W
	24V	0.144A	3.456W	0.201A	4.824W	0.735A	17.640W
	36V	0.117A	4.212W	0.140A	5.040W	0.513A	18.468W
	48V	0.092A	4.416W	0.107A	5.136W	0.351A	16.848W
	55V	0.073A	4.015W	0.096A	5.280W	0.312A	17.160W

CPU	Power Input	Power on and boot to Win10 64-bit			
		Run 100% CPU usage without 3D		Run 100% CPU usage with 3D	
		Max Current	Max Consumption	Max Current	Max Consumption
Intel® Xeon® E-2176G	9V	9.125A	82.125W	12.723A	114.507W
	12V	6.124A	73.488W	9.358A	112.296W
	24V	3.512A	84.288W	4.837A	116.088W
	36V	2.325A	83.700W	3.323A	119.628W
	48V	1.861A	89.328W	2.312A	110.976W
	55V	1.521A	83.655W	2.141A	117.755W

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

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	9V	0.340A	3.060W	0.454A	4.086W	1.720A	15.48W
	12V	0.252A	3.024W	0.370A	4.440W	1.334A	16.01W
	24V	0.142A	3.408W	0.200A	4.800W	0.713A	17.11W
	36V	0.114A	4.104W	0.134A	4.824W	0.461A	16.60W
	48V	0.092A	4.416W	0.111A	5.328W	0.364A	17.47W
	55V	0.073A	4.015W	0.097A	5.335W	0.319A	17.55W

CPU	Power Input	Power on and boot to Win10 64-bit			
		Run 100% CPU usage without 3D		Run 100% CPU usage with 3D	
		Max Current	Max Consumption	Max Current	Max Consumption
Intel® Core™ i7-8700	9V	6.103A	54.927W	9.303A	83.727W
	12V	4.602A	55.224W	7.105A	85.260W
	24V	2.305A	55.320W	3.503A	84.072W
	36V	1.595A	57.420W	2.604A	93.744W
	48V	1.306A	62.688W	2.103A	100.944W
	55V	1.125A	61.875W	1.765A	97.075W



### D.3 Intel® Core™ i7-8700T (12M Cache, 2.40GHz)

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™ i7-8700T	9V	0.374A	3.366W	0.448A	4.032W	2.125A	19.125W
	12V	0.294A	3.528W	0.352A	4.224W	1.310A	15.720W
	24V	0.146A	3.504W	0.201A	4.824W	0.712A	17.088W
	36V	0.118A	4.248W	0.143A	5.148W	0.532A	19.152W
	48V	0.093A	4.464W	0.110A	5.280W	0.352A	16.896W
	55V	0.082A	4.510W	0.098A	5.390W	0.312A	17.160W

CPU	Power Input	Power on and boot to Win10 64-bit			
		Run 100% CPU usage without 3D		Run 100% CPU usage with 3D	
		Max Current	Max Consumption	Max Current	Max Consumption
Intel® Core™ i7-8700T	9V	4.310A	38.790W	6.120A	55.080W
	12V	3.253A	39.036W	5.745A	68.940W
	24V	1.732A	41.568W	2.754A	66.096W
	36V	1.201A	43.236W	2.031A	73.116W
	48V	0.923A	44.304W	1.452A	69.696W
	55V	0.825A	45.375W	1.424A	78.320W

## D.4 Intel® Core™ i7-8700 Add Two RTX-2080 Graphics Cards

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	0.250A	3.00W	0.354A	4.30W	1.058A	35.0W
	24V	0.145A	3.48W	0.200A	4.80W	1.500A	36.0W
	36V	0.110A	3.90W	0.135A	4.86W	1.200A	43.2W
	48V	0.087A	4.18W	0.105A	5.04W	0.850A	40.8W
	55V	0.072A	3.96W	0.095A	5.23W	0.750A	41.3W
	55V	0.073A	4.015W	0.097A	5.335W	0.319A	17.55W

CPU	Power Input	Power on and boot to Win10 64-bit	
		Run 100% CPU usage with FurMark	
		Max Current	Max Consumption
Intel® Core™ i7-8700	12V	39.2A	470.4W
	24V	17.0A	408.0W
	36V	11.5A	414.0W
	48V	8.70A	417.6W
	55V	7.50A	412.5W

# E

## APPENDIX E : Supported Memory & Storage List

### E.1 Supported Memory List

Testing Board	GPC-1000
Memory Test	version : 5.1
BurnInTest	V8.1

### E.2 Supported Non-ECC Memory List

Brand	Info	Test Temp.(Celsius)
Innodisk 4GB DDR4 2666 SODIMM	M4S0-4GSSNCIK-H03	25°C
		25°C
innodisk 8GB DDR4 2666 SODIMM	M4S0-8GSSOCIK-H03	25°C
		25°C
Innodisk 8GB DDR4 2666 SODIMM	M4S0-8GS1NCIK-H03	25°C
		25°C
innodisk 16GB DDR4 2666 SODIMM	M4S0-AGS1OCIK-H03	25°C
		25°C
Innodisk 16GB DDR4 2666 SODIMM	M4S0-AGS1O5IK-H03	25°C
		25°C
Innodisk 4GB DDR4 2666 W/T SODIMM	M4S0-4GSSN5IK-H03	25°C
		25°C

### E.3 Supported Storage Device List

Type	Brand	Model	Capacity
mSATA	Intel	Intel-310 SSDMAEMC080G2	80GB
SSD	Intel	SSD 530 SSDSC2BW120A4	120GB
		SSD E 5400s SSDSC2KR120H6	120GB
	LITE-ON	K8-L1512	512GB
	MEMXPRO	2.5" SSD M3A 128GB	128GB
	FORESEE	2.5" 256GB SSD SATA6.0 S903S256G	256GB
		2.5" 128GB SSD SATA6.0 S903S128G	128GB

\*\* If more help is needed, please contact Vecow Technical Support.

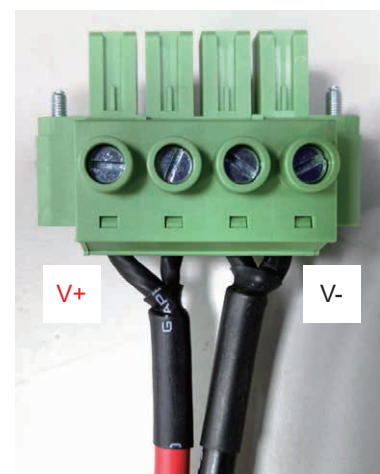
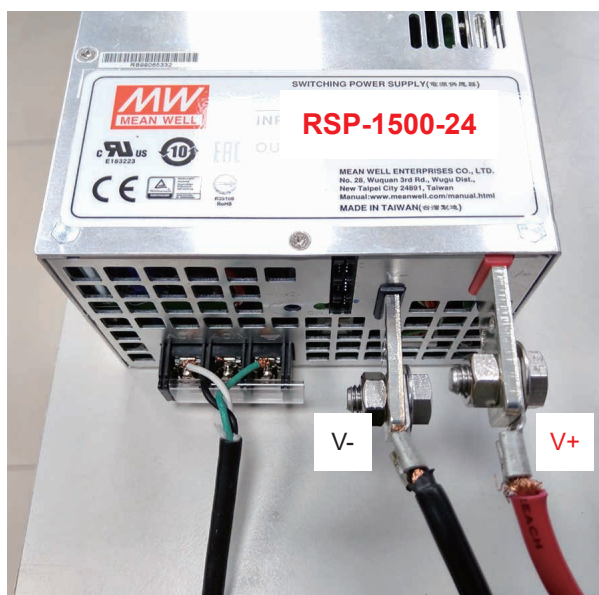
# F

## APPENDIX F : How to Install Power Supply

### F.1 RSP-1500-24 Adapter AC Cable



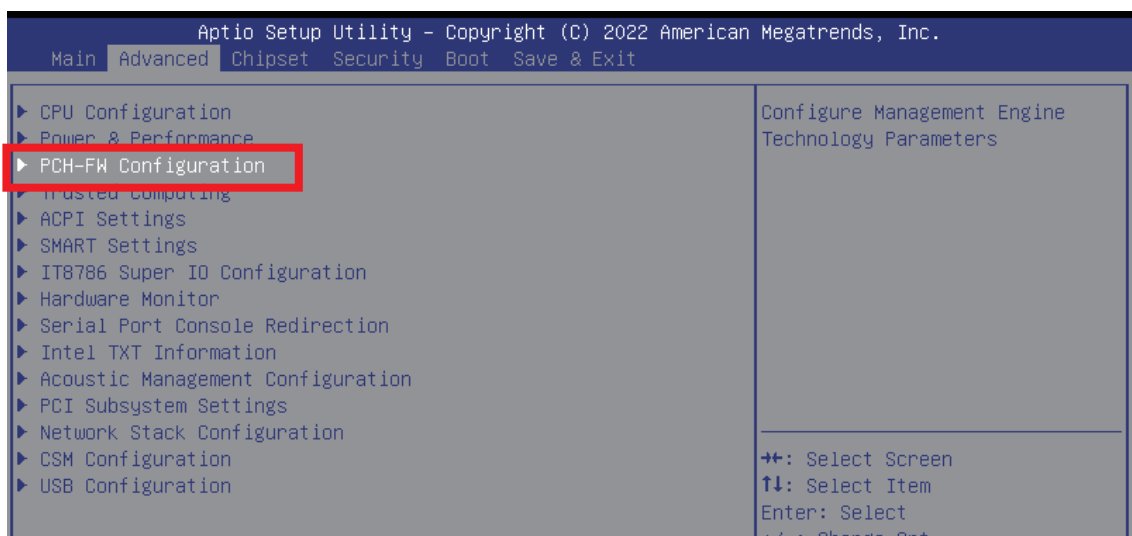
### F.2 RSP-1500-24 Adapter DC Cable



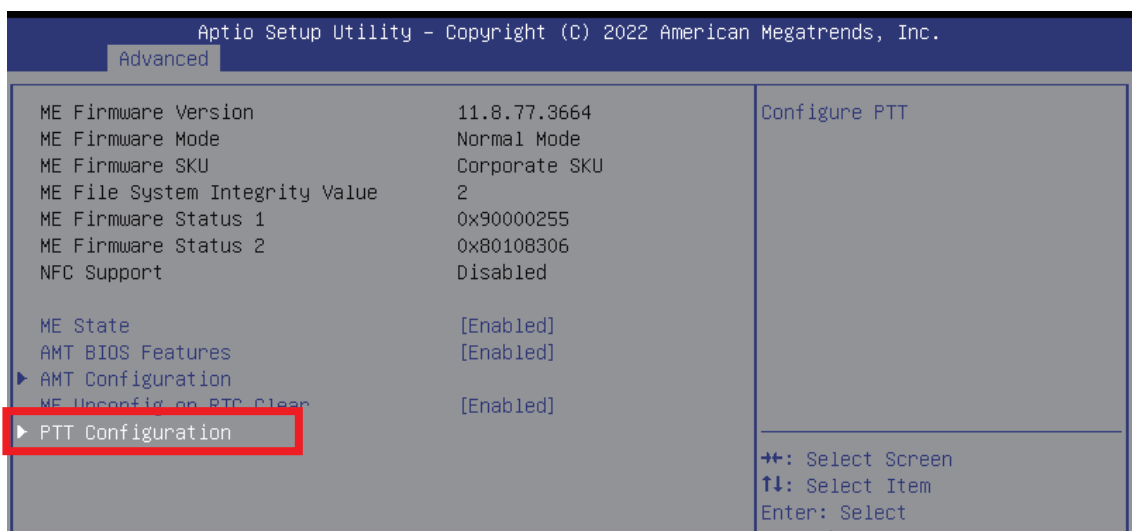


## APPENDIX G : Install Win11 (BIOS TPM Setting)

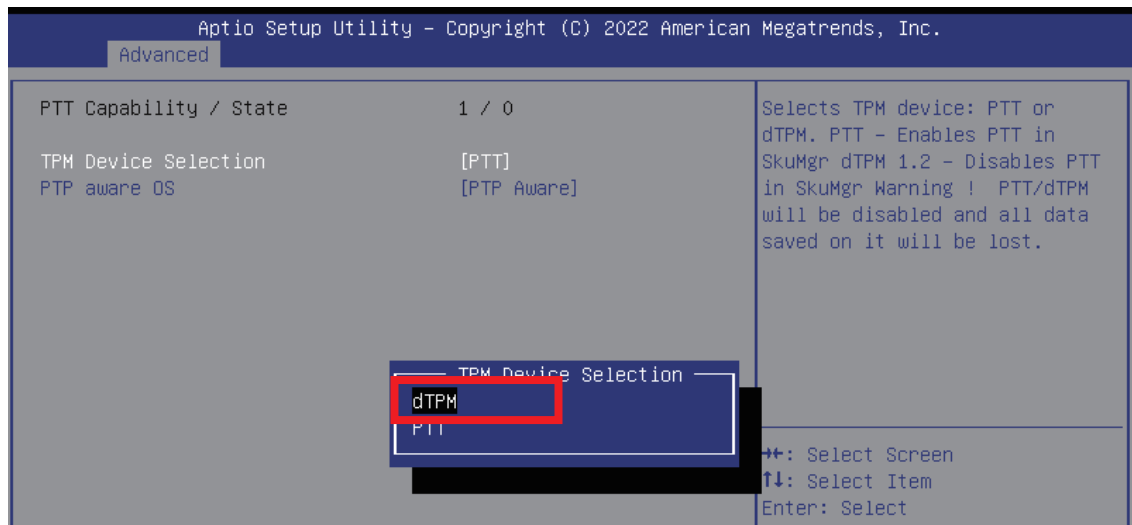
**Step 1** Click on “Advanced”, then click on “PCH-FW Configuration”



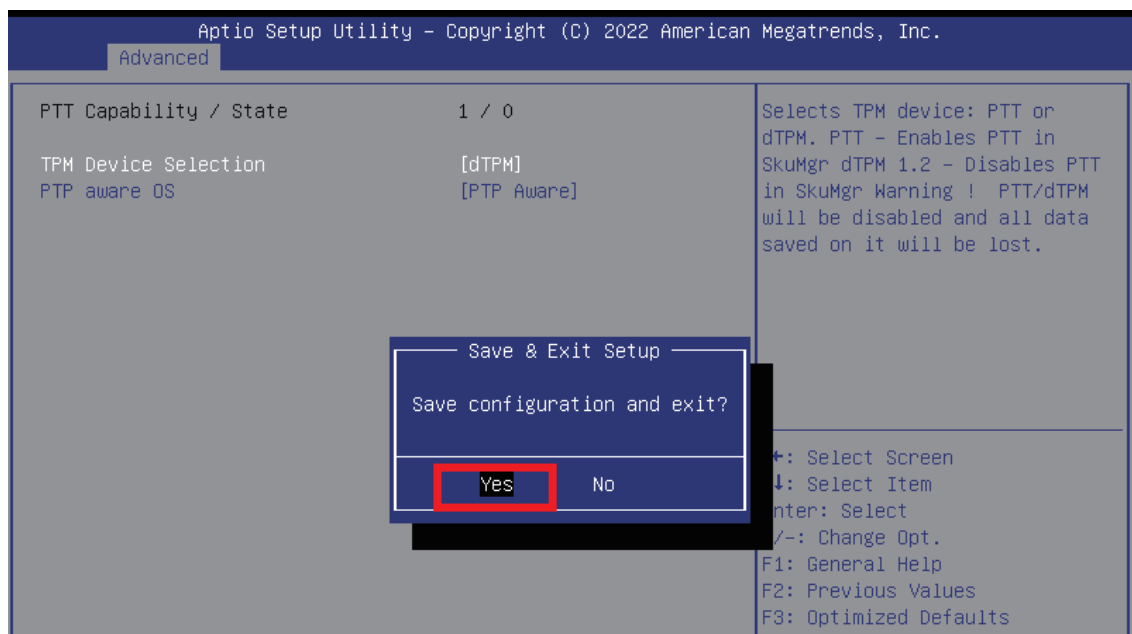
**Step 2** Click on “PTT Configuration”



**Step 3** Click on “dTPM” (TPM Device Selection)

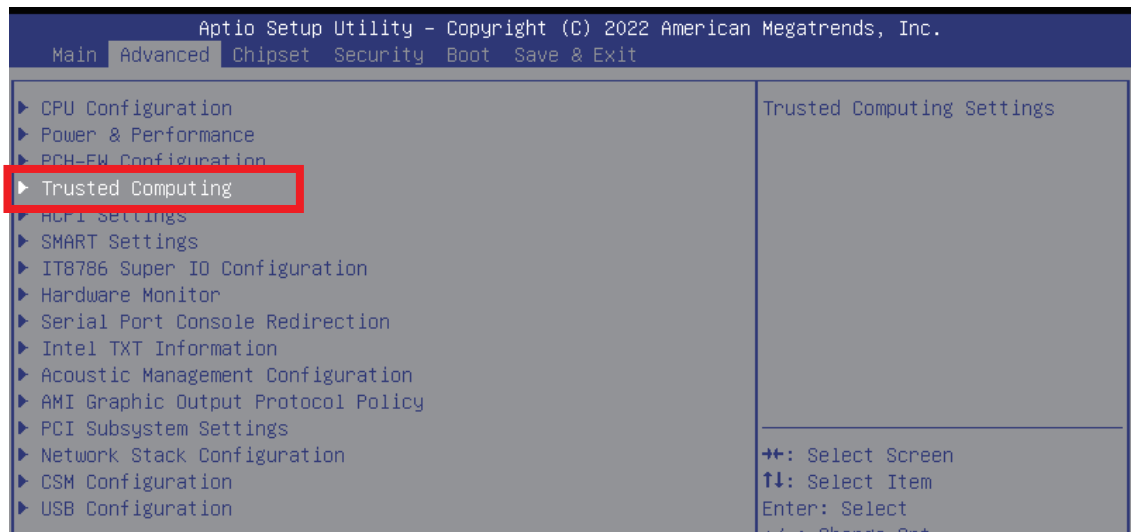


**Step 4** Please save the BIOS settings by pressing F4. Please press Enter when the pop-up window which asks “Save configuration and exit?” appears. The computer will then restart.

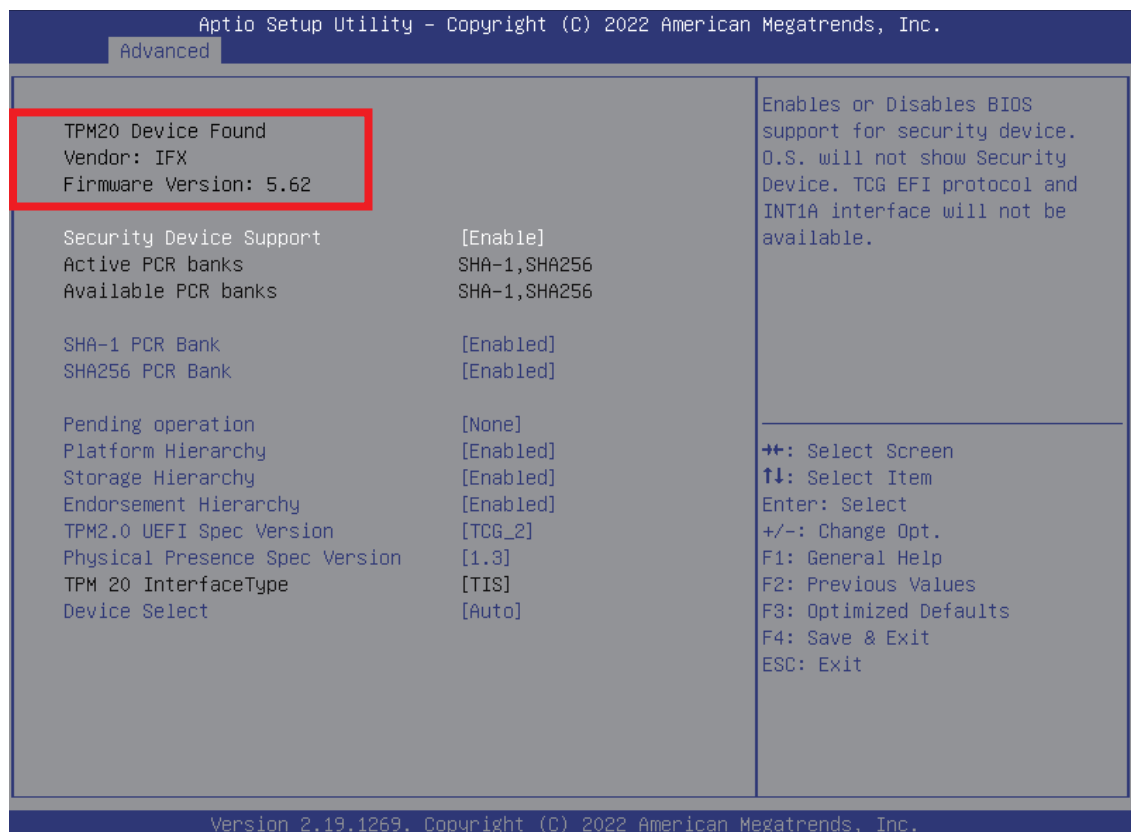




### Step 5 Click on “Trusted Computing”



### Step 6 If the window shows “TPM2.0 Device Found Firmware Version:5.62”, then the setting is completed.



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



For further support information, please visit [www.vecow.com](http://www.vecow.com)

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