

# LE-37P

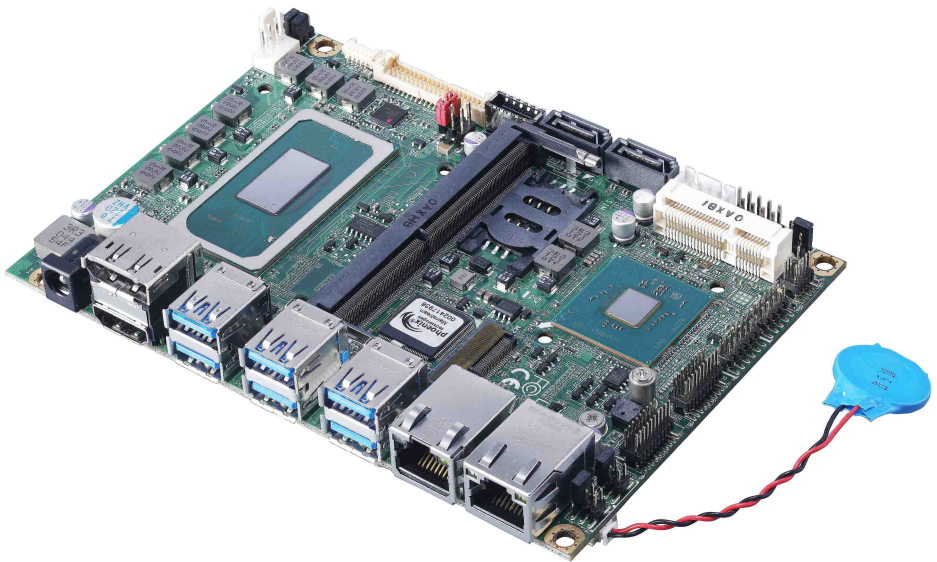
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3.5 inch Motherboard

**User's Manual**

**Edition 1.1**

**2021/11/18**



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Any questions please visit our website at <http://www.commell.com.tw>

## Packing List:

Please check the package content before you starting using the board.



1 x LE-37P 3.5 inch Miniboard  
(Include cooler fan)

[Appendix G](#)



1 x SATA Power Cable  
(OALSATA15-2PJ / 1040613)



1 x Dual COM cable  
(OALES-BKU2NB / 1040090)



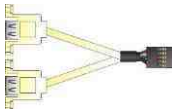
1 x Audio cable  
(OALPJ-HDUNB / 1040123)



2 x SATA Cable  
(OALSATA3-L) / (1040529)



1 x Driver CD  
(Including User's Manual)



1 x USB2.0 cable  
(OALUSBA-3 / 1040173) (Optional)



1 x USB3.2 Gen2 cable  
(OALUSBE-USBC-L30NB / 1040682) (Optional)  
(Type E to Type C)

## Index

Chapter 1 <Introduction>.....	4
1.1 <Product Overview>.....	4
1.2 <Product Specification> .....	5
1.3 <Block Diagram>.....	6
Chapter 2 <Hardware setup> .....	7
2.1 <Connector Location and Reference> .....	7
2.1.1 <Internal connectors list> .....	8
2.1.2 <External connectors list> .....	8
2.2 <Memory Setup>.....	9
2.3 <Jumper Location and Reference> .....	10
2.3.1 <Jumper list> .....	10
2.3.2 <Clear CMOS and Power on type selection>.....	11
2.4 <I/O interface> .....	12
2.4.1 <Serial ATA interface> .....	12
2.4.2 <Ethernet interface>.....	13
2.4.3 <Display interface> .....	13
2.4.4 <Serial Port interface> .....	15
2.4.5 <USB interface>.....	18
2.4.6 <Audio interface> .....	19
2.4.7 <Expansion slot>.....	20
2.4.8 <Front panel switch and indicator> .....	21
2.4.9 <GPIO and Other interface> .....	22
2.5 <Power supply> .....	24
2.5.1 <Power input> .....	24
2.5.2 <Power Output> .....	24
Appendix A <Flash BIOS>.....	25
Appendix B <LCD Panel Type select> .....	26
Appendix C <Programmable Watch Dog Timer>.....	27
Appendix D <Hardware Monitor> .....	29
Appendix E <Programmable GPIO> .....	30
Appendix F <RAID Setting> .....	31
Appendix G <Cooler fan>.....	32
Contact information .....	33

# Chapter 1 <Introduction>

## 1.1 <Product Overview>

**LE-37P** is a 3.5" Motherboard which supports Tiger Lake/11th Gen H Processors, integrated UHD Graphics, DDR4 memory, Realtek High Definition Audio, Intel Gigabit LAN, USB3.2 Gen2, SATA3 with AHCI function for a system.

### **New feature for Tiger Lake H**

Tiger Lake/11th Gen H Processors are based on the 10nm SuperFin process, and offer long-life availability. They have Intel UHD Graphics up to 32 EUs.

### **All in One multimedia solution**

The board provides one MiniPCIe slot ( support mSATA), one M.2 2230 slot, two M.2 2280 slot (PCIe Gen4).

### **Tiger Lake support Windows10 version 20H2 64bit and Linux kernel 5.8**

Intel recommends using Windows 10 version 20H2 64bit. It may lose some drivers if you use other Windows version.

## 1.2 <Product Specification>

### System

Processor	Tiger Lake/11th Gen H Processor FCBGA1787 package
Chipset	Intel® QM580E / RM590E (TGL-H Xeon CPUs have to use RM590E)
Memory	1 x DDR4 SO-DIMM 3200 MHz up to 32GB, Support Non-ECC, unbuffered memory (TGL-H Xeon CPUs can support ECC memory)
Watchdog Timer	Generates a system reset with internal timer for 1min/s ~ 255min/s
Real Time Clock	Chipset integrated RTC with onboard lithium battery
Expansion	1 x MiniPCIe with SIM Slot (support mSATA) 1 x M.2 2280 Key M support PCIe Gen4 and SATA (M.2_NVME1) 1 x M.2 2280 Key M support PCIe Gen4 (M.2_NVME2) 1 x M.2 2230 Key E for Wi-Fi and Bluetooth

### Graphics

Chipset	Intel® 11th Gen integrated UHD Graphics
Display Interface	1 x LVDS (Note1), 1 x HDMI, 1 x DisplayPort(Note2)

### LAN

Chip	1 x Intel® I219-LM Gigabit PHY LAN (Support iAMT 15.0) 1 x Intel® I225-LM Gigabit LAN (up to 2.5GbE)
------	---------------------------------------------------------------------------------------------------------

### I/O

Serial ATA	2 x SATA3
Audio	Realtek ALC888S HD Audio
Internal I/O	2 x SATA3, 2 x RS232, 2 x RS232/RS422/RS485 2 x USB2.0, 1 x Audio, 1 x SMBus, 1 x GPIO 1 x USB3.2 Gen2 (Type E), 1 x LVDS, 1 x LCD inverter connector, ,
Rear I/O	1 x HDMI, 1 x DisplayPort, 2 x LAN, 6 x USB3.2 Gen2, 1 x DC Jack

### Mechanical & Environmental

Power Requirement	DC Jack 9~35V
Size	146mm x 101mm (L x W)
Temperature	Operating within 0°C~60°C (32°F~140°F) (Note3) Storage within -20°C~80°C (-4°F~176°F)
Relative Humidity	10%~90%, non-condensing

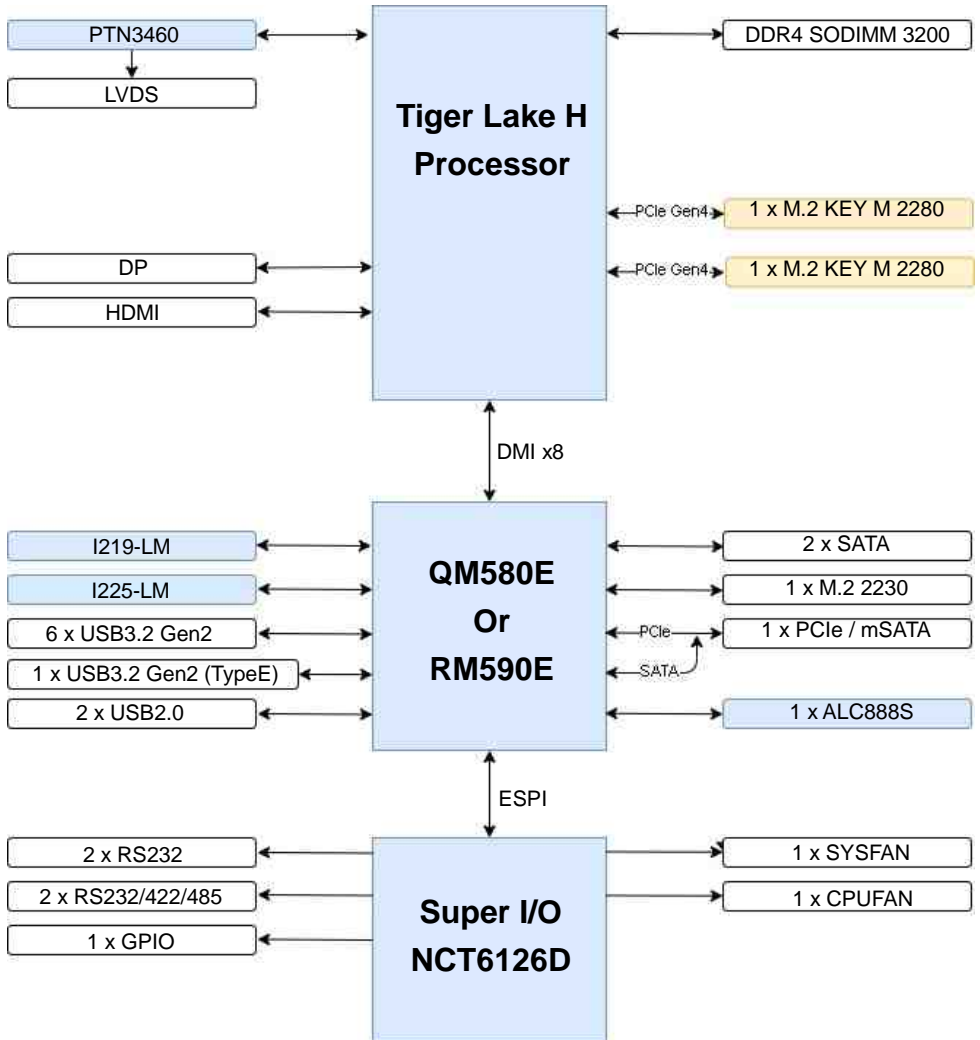
Note1: Onboard 18/24-bit single/dual channel +3.3V/ +5V/ +12V LVDS

Note2: Add ADP-3355 supports VGA or Add ADP-3460 supports 2nd LVDS.

Note3: W-11865MRE, W-11555MRE, W-11155MRE can operate within -40°C~85°C

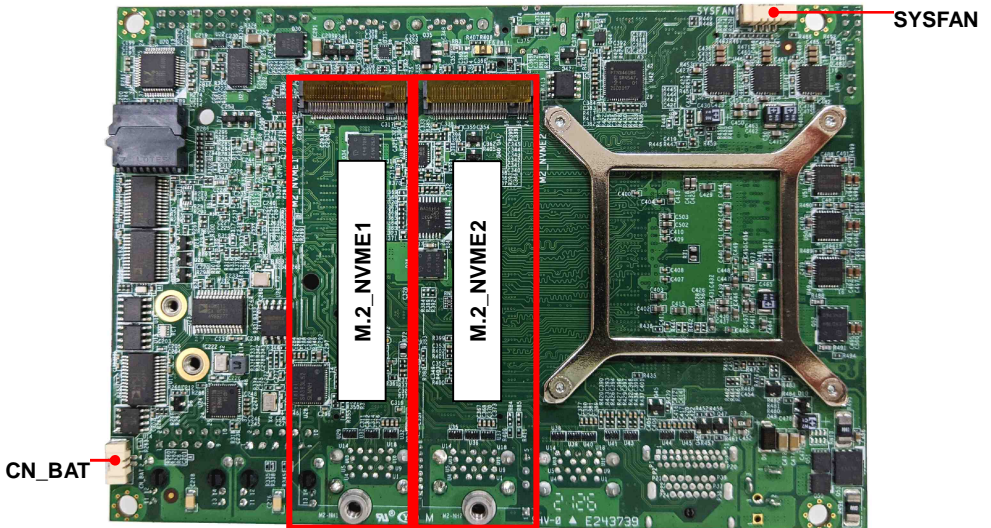
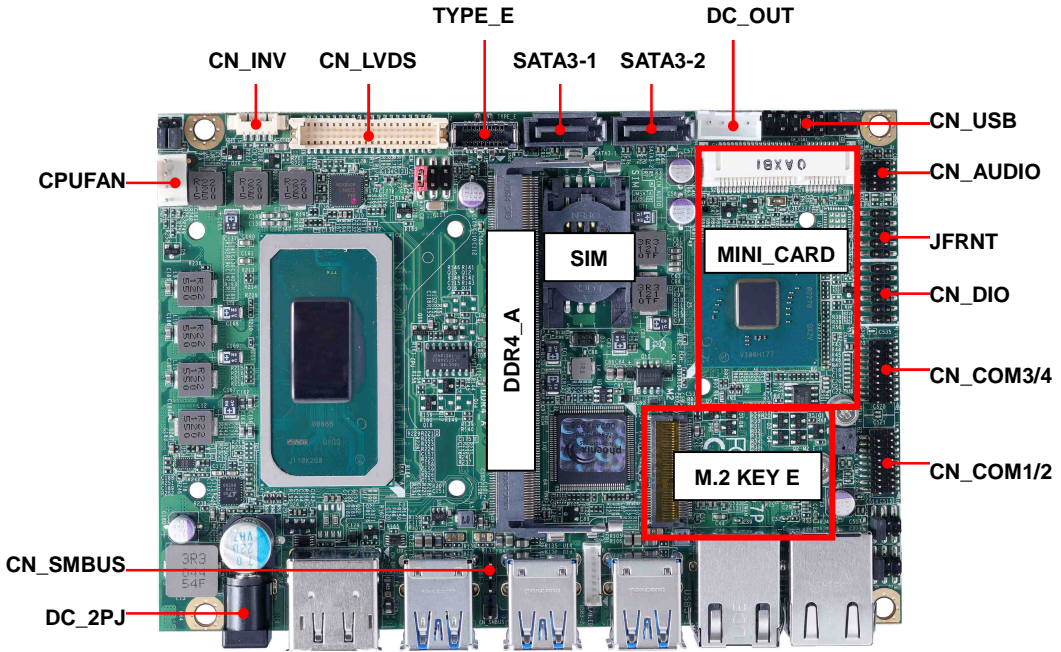
Note4: Please don't remove cooler fan, it will destroy thermal paste on CPU.

## 1.3 <Block Diagram>

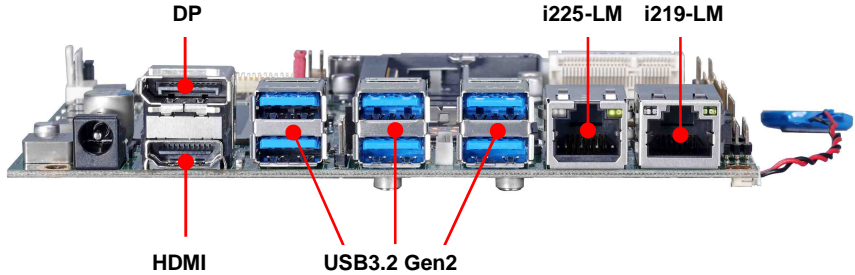


# Chapter 2 <Hardware setup>

## 2.1 <Connector Location and Reference>







### 2.1.1 <Internal connectors list>

Connector	Function
DDR4_A	260-pin DDR4 SO-DIMM slot
SATA3-1/2	7-pin SATA3 connector
CN_AUDIO	5 x 2-pin audio pin header
CN_LVDS	20 x 2-pin LVDS connector
CN_INV	5-pin LCD inverter connector
CN_SMBUS	5-pin SMBus connector
CN_COM 1/2	20-pin RS232/RS422/RS485 connector
CN_COM 3/4	20-pin RS232 connector
CN_USB	5 x 2-pin USB2.0 pin header
CN_DIO	6 x 2-pin digital I/O connector
CPUFAN	4-pin CPU fan connector
SYSFAN	4-pin system fan connector
JFRNT	10-pin front panel switch/indicator connector
TYPE_E	20-pin Type E USB3.2 Gen2 connector
MINI_CARD	52-pin MiniPCIe card slot
M2_E	75-pin M.2 Key E slot
M2_NVME1	75-pin M.2 Key M slot support PCIe Gen4 and SATA
M2_NVME2	75-pin X M.2 2280 Key M support PCIe Gen4
DC_2PJ	DC Jack

### 2.1.2 <External connectors list>

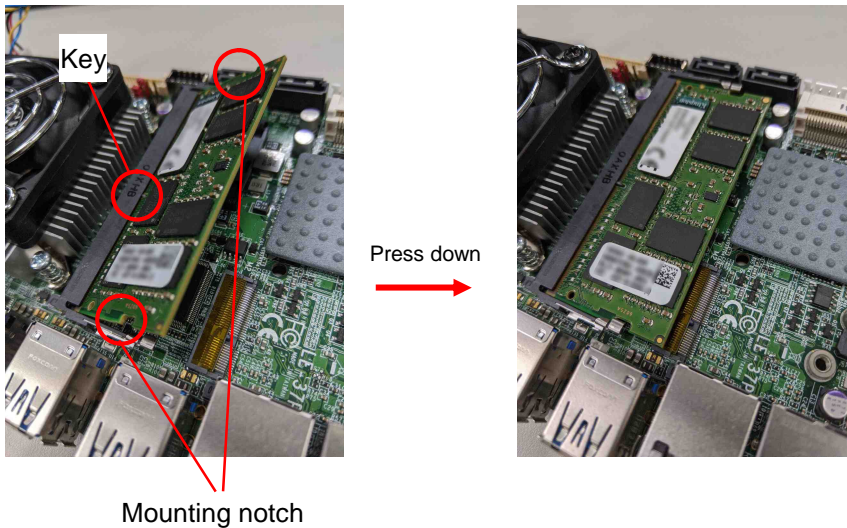
Connector	Function
HDMI-DP	DisplayPort and HDMI dual layer connector
USB3-1/3-2/3-3	2 x USB3.2 Gen2 connector
RJ45-1	RJ45 connector (I219-LM)
RJ45-2	RJ45 connector (I225-LM)

## 2.2 <Memory Setup>

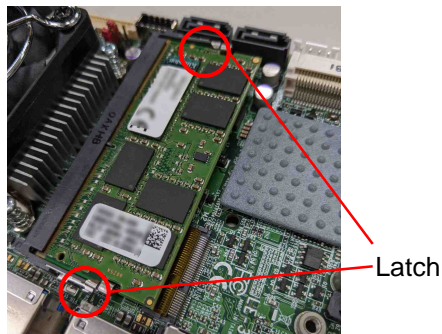
LE-37P has 260-pin DDR4 SODIMM support up to 32GB of memory capacity and 1.2 Voltage. The memory frequency supports 3200 MHz. Only Non-ECC memory is supported.

**In the process, the board must be powered off.**

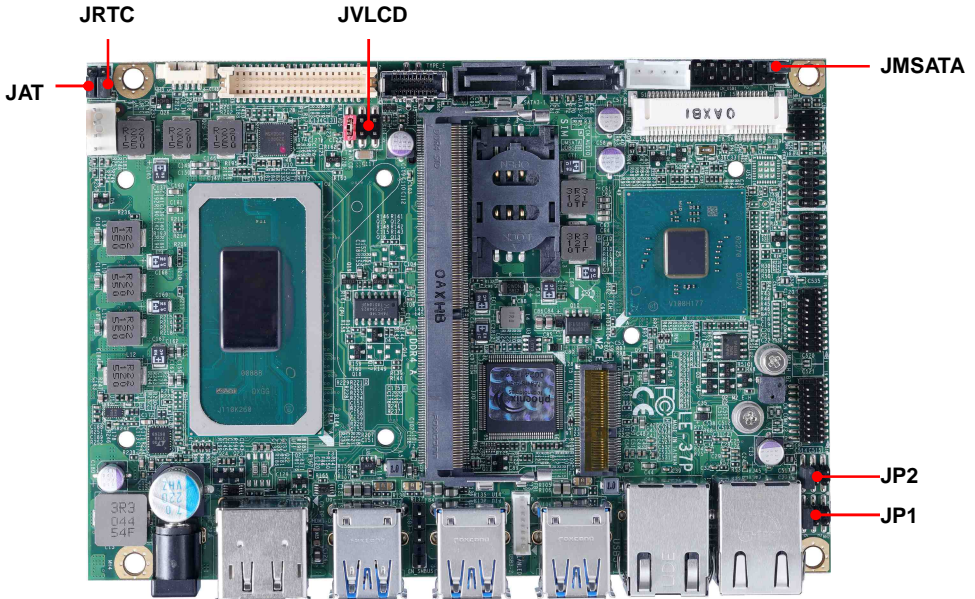
1. Put the memory tilt into the slot. Note the Memory notch key aligned slot key.
2. Then press down till lock into the mounting notch.



3. To remove the memory, push outward on both sides of the latch.



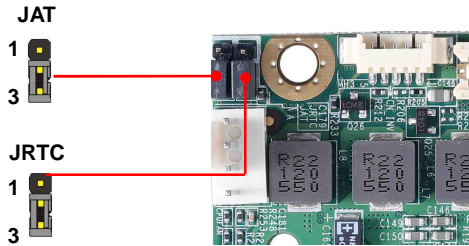
## 2.3 <Jumper Location and Reference>



### 2.3.1 <Jumper list>

Jumper	Function
JAT	Power mode select
JRTC	CMOS Normal/Clear Setting
JVLCD	Panel Voltage Setting
JMSATA	MiniCard mSATA Setting
JP1	COM1 Voltage Setting (For Pin 9)
JP2	COM2 Voltage Setting (For Pin 9)

### 2.3.2 <Clear CMOS and Power on type selection>



**JAT:** AT/ATX mode select jumper

Jumper settings	Function
1-2	AT mode
2-3	ATX mode (Default)

**JRTC:** Clear CMOS data jumper

Jumper settings	Function
1-2	Clear CMOS
2-3	Normal (Default)

## 2.4 <I/O interface>

### 2.4.1 <Serial ATA interface>

SATA 1/2 : SATA3 7-pin connector

Pin	Signal
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

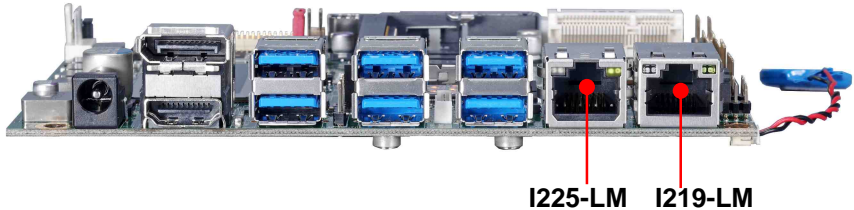
SATA3-1    SATA3-2



## 2.4.2 <Ethernet interface>

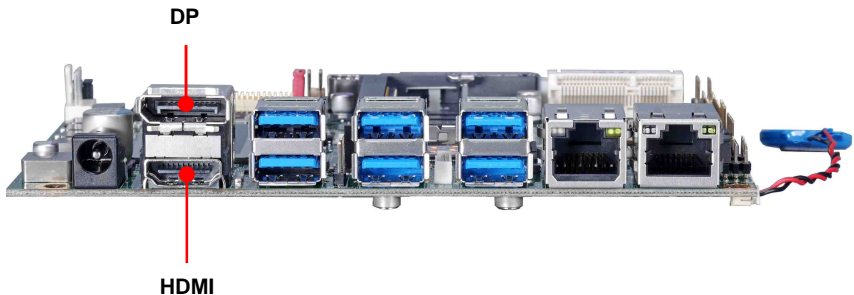
The board provides I219-LM Gigabit Ethernet which supports WOL on rear I/O. It supports Intel® AMT 15.0 feature on I219-LM.

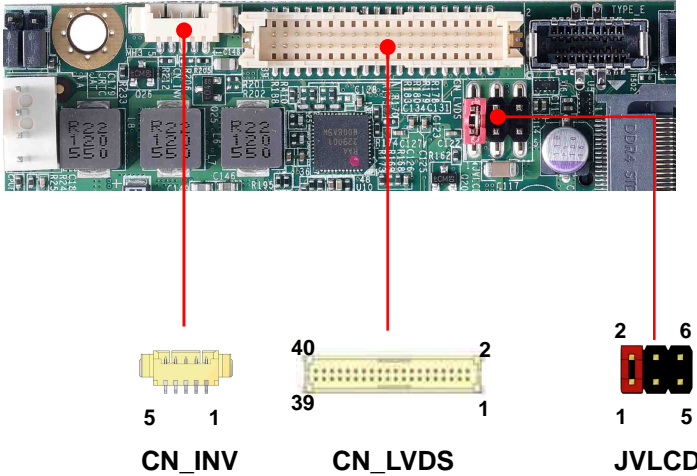
(Note that the CPU must support vPro technology.)



## 2.4.3 <Display interface>

Based on the 11th Gen CPU with built-in Intel® UHD Graphics, the DisplayPort resolution up to 3840x2160 @ 60Hz or 4096x2304 @ 60Hz, the HDMI up to 4096x2304 @ 24Hz and LVDS up to 1920x1200 @ 60Hz supports single bus or dual bus LVDS signaling with color depths of 18 bits or 24 bits. About select LCD Panel Type in BIOS, please refer [Appendix B](#). The built-in UHD Graphics support Quad display function with clone mode and extended mode.





**CN\_LVDS:** LVDS 40-pin connector (Model: HIROSE DF13-40DP-1.25V compatible)

Pin	Signal	Pin	Signal
2	Set by JVLCD	1	Set by JVLCD
4	Detect (Active low)	3	GND
6	A_LVDS_0-	5	B_LVDS_0-
8	A_LVDS_0+	7	B_LVDS_0+
10	GND	9	GND
12	A_LVDS_1-	11	B_LVDS_1-
14	A_LVDS_1+	13	B_LVDS_1+
16	GND	15	GND
18	A_LVDS_2-	17	B_LVDS_2-
20	A_LVDS_2+	19	B_LVDS_2+
22	GND	21	GND
24	A_LVDS_CLK-	23	B_LVDS_3-
26	A_LVDS_CLK+	25	B_LVDS_3+
28	GND	27	GND
30	A_LVDS_3-	29	B_LVDS_CLK-
32	A_LVDS_3+	31	B_LVDS_CLK+
34	GND	33	GND
36	LVDS_DDCSCL	35	NC
38	LVDS_DDCSDA	37	NC
40	NC	39	NC

**Pin4 only need to be connected to GND**

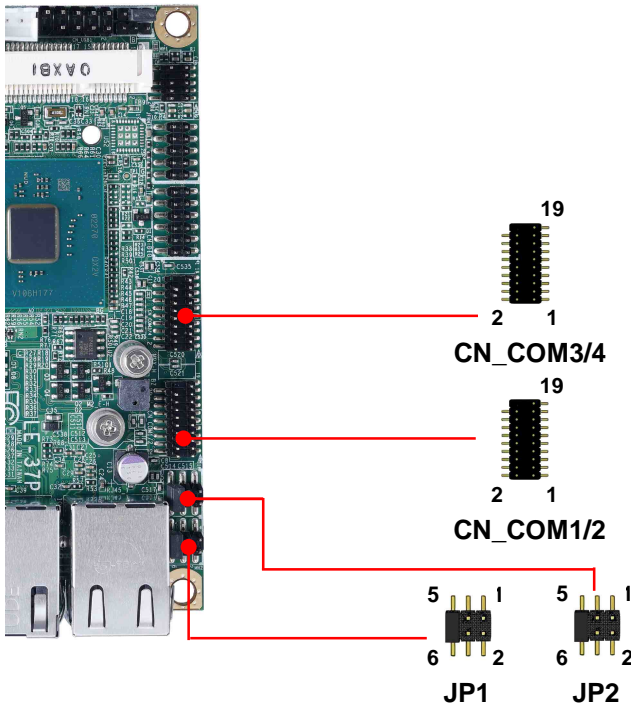
**CN\_INV:** LVDS 5-pin Backlight power connector

Pin	Signal
1	12V
2	Backlight Control
3	5V
4	GND
5	Enable Backlight

**JVLCD:** LVDS panel power select jumper

Jumper settings	Function
1-2	3.3V (Default)
3-4	5V
5-6	12V

### 2.4.4 <Serial Port interface>





**COM1/2:** RS232/422/485 20-pin header (Pitch 2.54 x 1.27mm)

Pin	Signal	Pin	Signal
1	DCD1/ 422TX-/ 485-	2	RXD1/ 422TX+/ 485+
3	TXD1	4	DTR1
5	GND	6	DSR1/ 422RX+
7	RTS1	8	CTS1/ 422RX-
9	RI1	10	NC
11	DCD2/ 422TX-/ 485-	12	RXD2/ 422TX+/ 485+
13	TXD2	14	DTR2
15	GND	16	DSR2/ 422RX+
17	RTS2	18	CTS2/ 422RX-
19	RI2	20	Key

**COM1 & COM2**

RS-232/422/485 can set by BIOS.

You can find the setting from

Advanced-> Motherboard Advanced menu-> Super IO configuration->

Serial Port configuration->Interface

**If you want to use RS485, please follow below step before connection. .**

COM1 RTX- Data- : short Pin1& Pin8

COM1 RTX+ Data+ : short Pin2& Pin6

COM2 RTX- Data-: short Pin1& Pin8

COM2 RTX+ Data+: short Pin2& Pin6

**JP1, JP2:** COM1, COM2 pin-9 setting

Jumper settings	Function
1-2	5V
3-4	12V
5-6	RI (Default)

**Effective patterns of connection:**

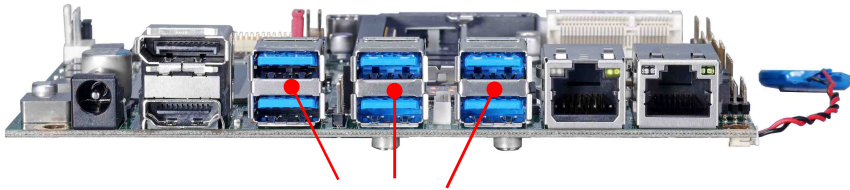
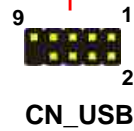
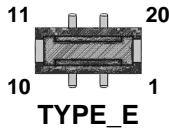
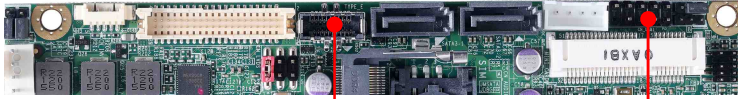
**1-2 / 3-4 / 5-6**

**Other may cause damage**

**COM3/4: RS232 20-pin header (Pitch 2.54 x 1.27mm)**

<b>Pin</b>	<b>Signal</b>	<b>Pin</b>	<b>Signal</b>
1	DCD1	2	RXD1
3	TXD1	4	DTR1
5	GND	6	DSR1
7	RTS1	8	CTS1
9	RI1	10	NC
11	DCD2	12	RXD2
13	TXD2	14	DTR2
15	GND	16	DSR2
17	RTS2	18	CTS2
19	RI2	20	Key

## 2.4.5 <USB interface>



**USB3.2 Gen2**

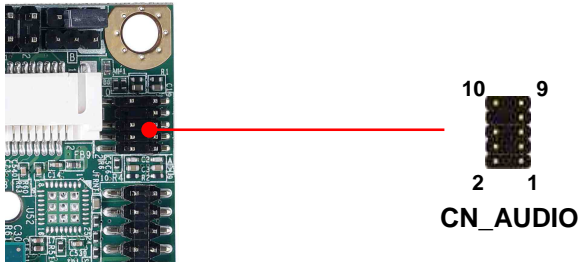
**CN\_USB:** USB2.0 10-pin header (Pitch 2.54 mm)

Pin	Signal	Pin	Signal
1	5VSB	2	5VSB
3	DATA0-	4	DATA1-
5	DATA0+	6	DATA1+
7	GND	8	GND
9	GND	10	Key

**TYPE\_E:** USB3.2 Gen2 20-pin header (Cable optional)

Pin	Signal	Pin	Signal
1	5V	20	N/A
2	USB3.2_Gen2_TX1+	19	USB2.0_DATA+
3	USB3.2_Gen2_TX1-	18	USB2.0_DATA-
4	GND	17	GND
5	USB3.2_Gen2_RX1+	16	USB3.2_Gen2_RX2-
6	USB3.2_Gen2_RX1-	15	USB3.2_Gen2_RX2+
7	5V	14	GND
8	N/A	13	USB3.2_Gen2_TX2-
9	N/A	12	USB3.2_Gen2_TX2+
10	N/A	11	5V

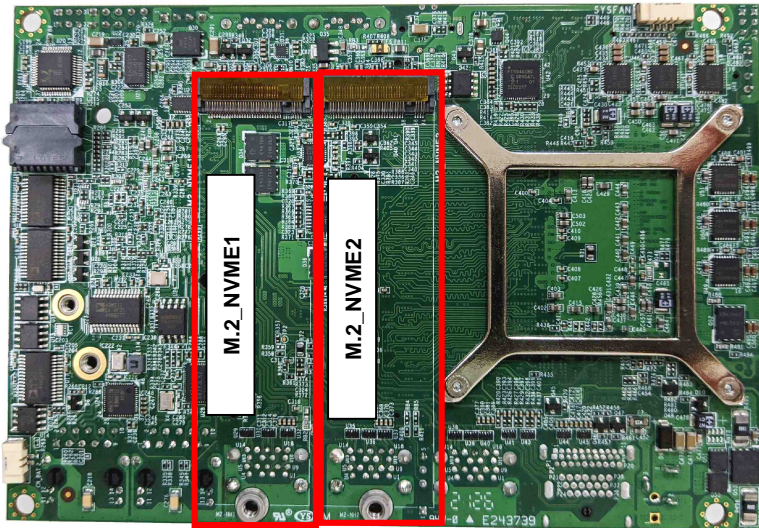
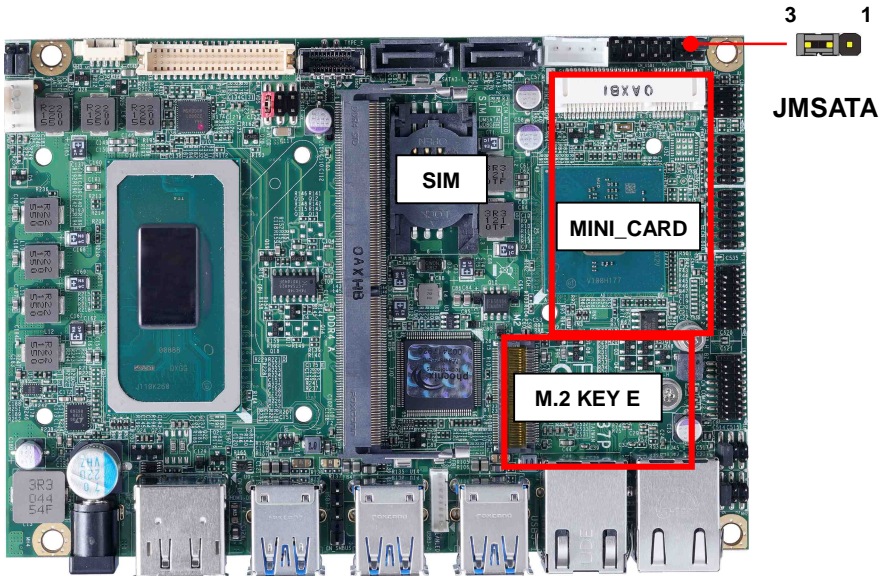
## 2.4.6 <Audio interface>



**CN\_AUDIO:** Front panel audio 10-pin header (Pitch 2.54\*1.27mm)

Pin	Signal	Pin	Signal
1	MIC_L	2	GND
3	MIC_R	4	NC
5	FP_OUT_R	6	MIC_DETECT
7	SENSE	8	Key
9	FP_OUT_L	10	FP_OUT_DETECT

### 2.4.7 <Expansion slot>

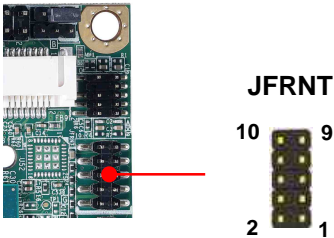


MINI\_CARD support mSATA by JMSATA, and connect SIM card  
 M.2\_NVME1 support PCIe Gen4 and SATA  
 M.2\_NVME2 support PCIe Gen4

**JMSATA:** Setting MINI\_CARD to support PCIe/mSATA

Jumper settings	Function
1-2	Support mSATA
2-3	Normal operation (Default)

## 2.4.8 <Front panel switch and indicator>

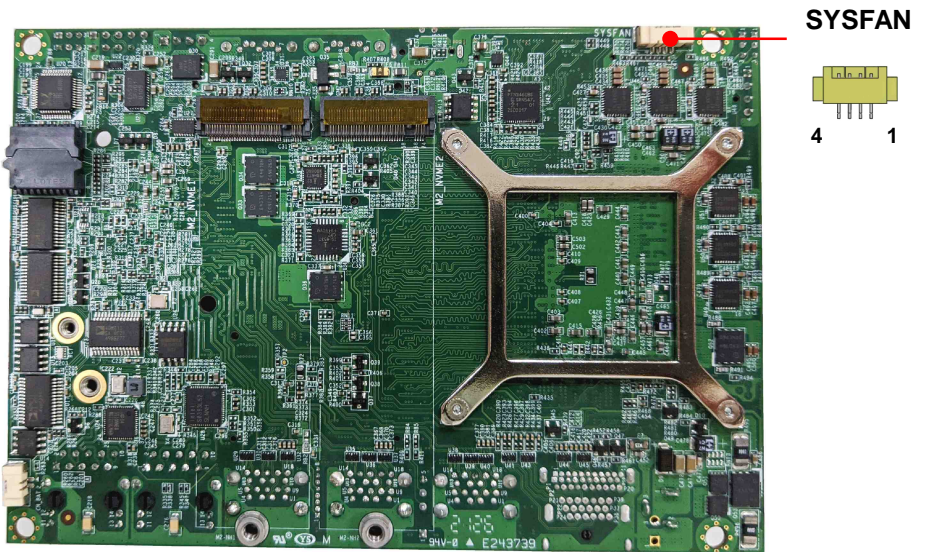
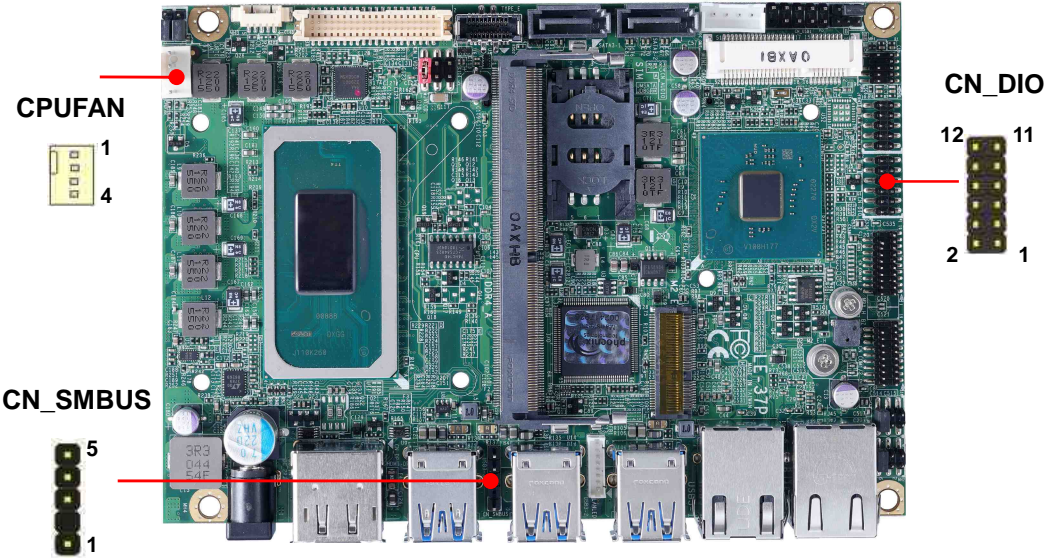


**JFRNT:** Front panel switch and indicator 10-pin header

Pin	Signal	Pin	Signal
1	Power_ON-	2	Power_ON+
3	Speaker-	4	Speaker+
5	HDD_LED-	6	HDD_LED+
7	Power_LED-	8	Power_LED+
9	Reset+	10	Reset-



### 2.4.9 <GPIO and Other interface>



When using GPIO function, please note:

As Output: **Open-drain**, most applications need use an external pull up resistor.

(If not may cause damage)

As Input: **TTL-level**.

### GPIO DC characteristics (open drain mode)

Parameter	SYM	MIN	TYP	MAX	UNIT	Conditions
Input Low Voltage	$V_{IL}$			0.8	V	
Input High Voltage	$V_{IH}$	2.0			V	
Output Low Voltage	$V_{OL}$			0.4	V	$I_{OL} = 12\text{mA}$
Input High Leakage	$I_{LH}$			+10	$\mu\text{A}$	$V_{IN} = 3.3\text{V}$
Input Low Leakage	$I_{LL}$			-10	$\mu\text{A}$	$V_{IN} = 0\text{V}$

Please refer to [Appendix E](#) to program the configuration register

### CN\_DIO: GPIO 12-pin header (Pitch 2.00mm)

Pin	Signal	Pin	Signal
1	GND	2	GND
3	GP40	4	GP44
5	GP41	6	GP45
7	GP42	8	GP46
9	GP43	10	GP47
11	5V	12	12V

### CN\_SMBUS: SMBus 5-pin connector (Pitch 2.54mm)

Pin	1	2	3	4	5
Signal	5V	NC	SMBDAT	SMBCLK	GND

### CPUFAN: CPU cooler fan 4-pin connector

Pin	1	2	3	4
Signal	GND	12V	Sensor	Control

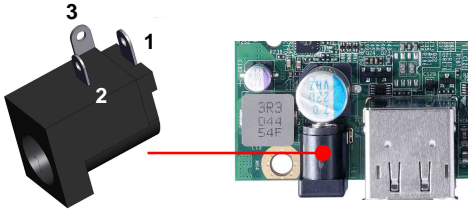
### SYSFAN: System cooler fan 4-pin connector

Pin	1	2	3	4
Signal	GND	12V	Sensor	Control



## 2.5 <Power supply>

### 2.5.1 <Power input>

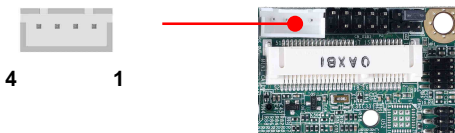


DC\_2PJ

DC\_2PJ: 3-pin 9~35V connector

Pin	Signal	Pin	Signal
1	9~35V	2	GND
3	GND		

### 2.5.2 <Power Output>



DC\_OUT: SATA power 4-pin connector

Pin	Signal
1	12V
2	GND
3	GND
4	5V

# Appendix A <Flash BIOS>

## A.1 <Flash tool>

The board is based on Phoenix BIOS and can be updated easily by the BIOS auto flash tool. You can download the tool online at the address below:

### [FPT Tool](#)

The tool's file name is "FPT.exe", it's the utility that can write the data into the BIOS flash chip and update the BIOS.

## A.2 <Flash BIOS process>

- 1.Extract the zip file(re-flash tool and BIOS file) to root of the USB flash drive.
- 2.Insert your USB flash drive in USB port of the board and power on the system.
- 3.Press F5 in the Phoenix Logo screen
- 4.Click the Internal Shell, then input the "fs0:" command to switch to the root of the USB flash drive.
5. Type the " fpt -savemac -f xxx.bin" command to start flash BIOS processes. ( xxx.bin means the BIOS file that you want to update)
6. When it finished all update processes, restart the system.

```

UEFI Interactive Shell v2.2
EDK II
UEFI v2.70 (Phoenix Technologies Ltd., 0x12345678)
Mapping table
  FS0: Alias(s): HD0g0b::BLK1:
        PeiRoot(0x0)/Pci(0x14,0x0)/USB(0x6,0x0)/HD(1,MBR,0x00260119,0x000,0x1DD1000)
  BLK0: Alias(s):
        PeiRoot(0x0)/Pci(0x14,0x0)/USB(0x6,0x0)
Press ESC in 1 seconds to skip startup.nsh or any other key to continue.
Shell> fs0:
FS0:\> fpt -savemac -f 671310.bin_
  
```

## Appendix B <LCD Panel Type select>

Accordinging your panel, it needs to select the correct resolution in the BIOS. If there is no fit your panel type, please feedback for us to make OEM model.

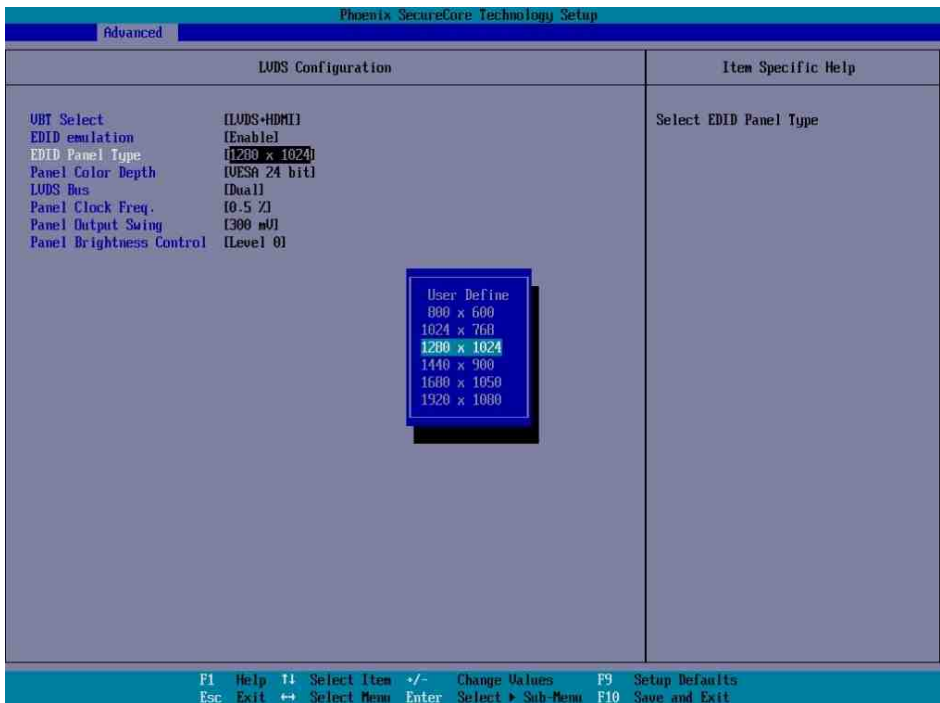
Find the setting from

Advanced->Motherboard Advanced menu->LVDS Configuration

**EDID Panel type:** There are 7 resolutions in LCD Panel Type, if your panel is not in the list, please contact [tech@commell.com.tw](mailto:tech@commell.com.tw)

**LVDS Bus:** Select Single / Dual channel

**Panel Color Depth:** Select VESA 24 bit / JEIDA 24 bit / VESA and JEIDA 18 bit



## Appendix C <Programmable Watch Dog Timer>

The watchdog timer makes the system auto-reset while it stops to work for a period. The integrated watchdog timer can be setup as system reset mode by program. You can select Timer setting in the BIOS, after setting the time options, the system will reset according to the period of your selection.

Find the setting from

Advanced → Motherboard Advanced Menu → Power Advanced menu →

Watch dog timer select



## Program sample

Watchdog timer setup as system reset with 5 second of timeout

```
-o 4E 87      ;enter configuration
-o 4E 87
-o 4E 07
-o 4F 08      ;select Logical Device
-o 4E 30
-o 4F 01      ; activate WDTO# function
-o 4E F0
-o 4F 00      ;set "00" is second mode, set "08" is minute mode
-o 4E F1
-o 4F 05      ;00h: Timeout Disable
                ;01h: Timeout occurs after 1 minute only
                ;02h: Timeout occurs after 2 second/minute
                ;03h: Timeout occurs after 3 second/minute
                ;
                ;FFh: Timeout occurs after 255 second/minute
                (The deviation is approx 1 second.)
```

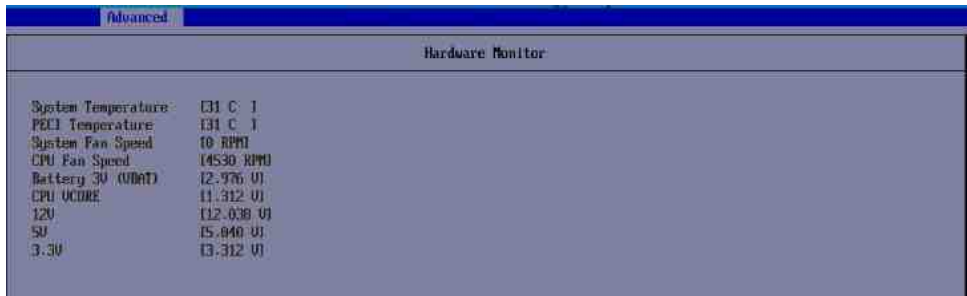
For further information, please refer to Nuvoton NCT6126D datasheet

## Appendix D <Hardware Monitor>

Find the setting from

Advanced-> Motherboard Advanced menu-> Super IO configuration->

└ Hardware Monitor



The screenshot shows the 'Advanced' BIOS menu with the 'Hardware Monitor' option selected. The screen displays the following hardware monitoring data:

Hardware Monitor	
System Temperature	C31 C: 1
PECI Temperature	C31 C: 1
System Fan Speed	10 RPM
CPU Fan Speed	14530 RPM
Battery SV (VBAT)	12.976 V
CPU VCCORE	11.312 V
V20	12.038 V
V5	15.040 V
V3.30	13.312 V

## Appendix E <Programmable GPIO>

The GPIO can be programmed using simple IN/OUT commands.

GPIO	0	1	2	3	4	5	6	7
bit	0	1	2	3	4	5	6	7

- o 4E 87 ;enter configuration
- o 4E 87
- o 4E 07
- o 4F 07 ;select Logical Device
- o 4E 30
- o 4F 10 ;activate GPIO function (The board use GPIO4)
- o 4E F0
- o 4F XX ;set "01" GPIO as input, set "00" GPIO as output
- o 4E F1
- o 4F XX ;if set GPIO as output, this register's value can be set "00~ FF"

Optional

- o 4E F2
- o 4F XX ;set "01", the respective bit are inverted (Both input and output)
- ;set "00", the respective bit are normal

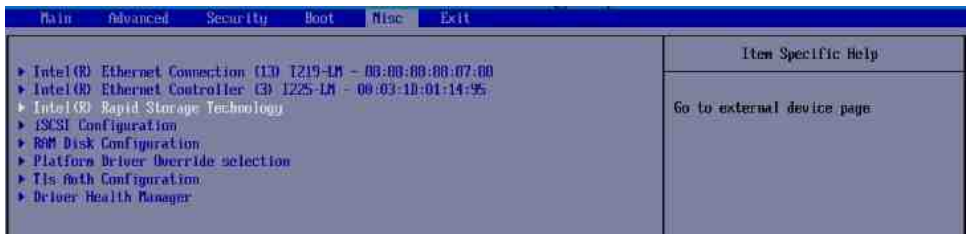
For further information, please refer to Nuvoton NCT6126D datasheet

## Appendix F <RAID Setting>

When use RAID function, it need to enter the BIOS set RAID mode first.

Advanced  $\rightarrow$  Intel Advanced menu  $\rightarrow$  SA Configuration  $\rightarrow$  VMD Configuraion  $\rightarrow$

1. Find VMD controller, and set to enable
2. Set "Map this Root port under VMD" to enable.
3. Set "Intel Optane memory to disabled
4. Press F10 to save.
5. In Misc page, you can find Intel® Rapid Storage Technology,
6. You can see "Create RAID Volume", then choose two disks to create.



Note: if you use two M.2 2280 SSD to create RAID, you have to load driver when install Windows 10.



## Appendix G <Cooler fan>

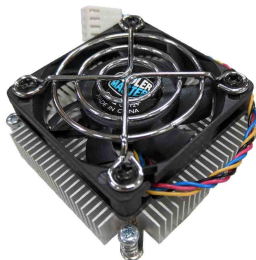
You will see two different cool fans on CPU.

OHS-P-M-L is for high power CPU (Core™ i7-11850HE, Core™ i5-11500HE, Xeon® W-11865MRE, Xeon® W-11555MRE, Xeon® W-11155MRE)



OHS-P-M-L

OHS-P-M-K is for low power CPU (Core™ i3-11100HE, Celeron® 6600HE, Xeon® W-11865MLE, Xeon® W-11555MLE, Xeon® W-11155MLE)



OHS-P-M-K

## Contact information

Any advice or comment about our products and service, or anything we can help you please don't hesitate to contact with us. We will do our best to support you for your products, projects and business.

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