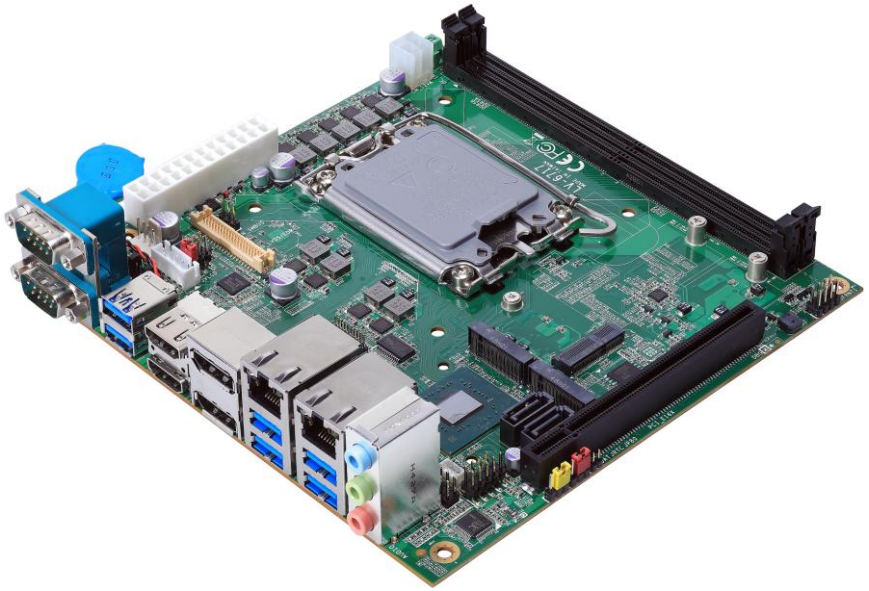
LV-6717

Mini-ITX Mobile Motherboard

User's Manual

Edition 1.0
2025/05/26



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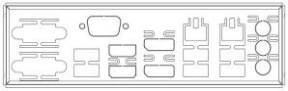
Packing List:

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

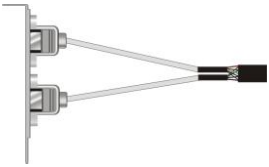
1 x LV-6717 Mini-ITX Motherboard



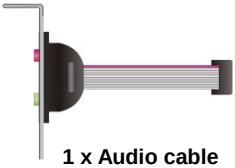
1 x I/O Shield
(OPLATE-CUHDLAT) / (1270077)

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

OPTIONAL:



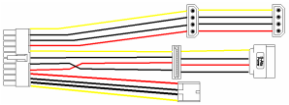
(OALUSBA-1) / (1040172)



1 x Audio cable
(OALPJ-HD) / (1040120)

1 x Dual COM PORT Cable
(OALES-BKU2) / (1040087)

1 x DC Input Power Cable
(OALDC-B / 1040513)



1 x Power Cable
(OALATX-P3S2 / 1040058)

Index

Chapter 1 <Introduction>

1.1 <Product Overview>

LV-6717 is a **Mini-ITX** Motherboard which supports Ultra Processor (Arrow Lake-S), integrated DDR5 memory, Realtek High Definition Audio, Intel Gigabit LAN, USB3.2 Gen2, SATA3 with AHCI function for a system.

New feature for Arrow Lake

Ultra Processor (Arrow Lake-S) Features up to 24 cores/24 threads, with built-in NPUs for AI, and Intel® Xe graphics, the chips are Intel's first consumer processors running on its TSMC N3B node, using the company's Foveros 3D hybrid architecture. Intel processors using neural processing units, or NPUs.

All in One multimedia solution

The board provides one M.2 2230 slot, two M.2 2280 slot (one PCIe Gen4 & one PCIe Gen5), and one PCIe x16 slot (PCIe Gen5).

Arrow Lake support Windows 11 64bit and Linux

Intel recommends using Windows 11 64bit. It may lose some drivers if you use other Windows version.

Note
Refer to OS Vendor site for more information regarding latest OS revision support.

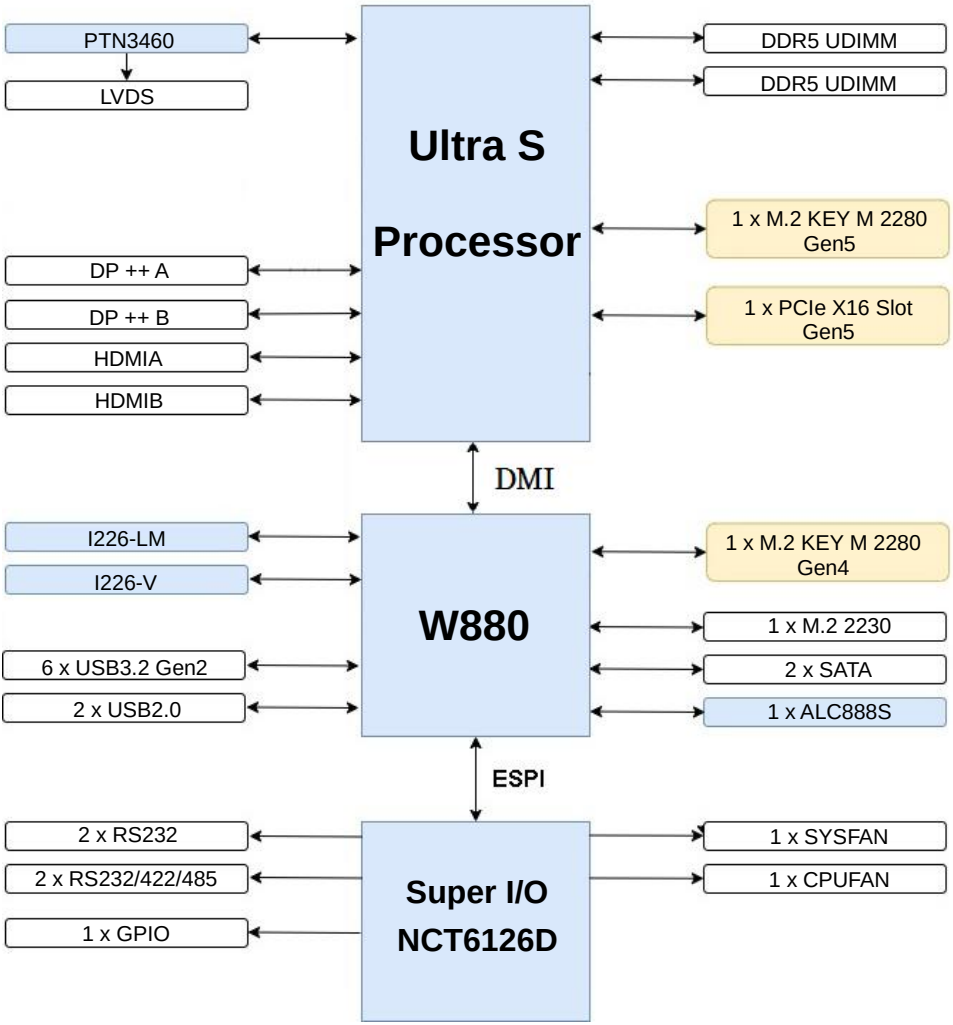
1.2 <Product Specification>

System	
Processor	Intel® Core™ Ultra Processor (Arrow Lake-S) FCLGA1851 package, up to 65W
Memory	2 x DDR5 UDIMM sockets up to 128GB, Support ECC and Non-ECC UDIMM / CUDIMM module up to 6400 MHz 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 M.2 (Key M 2280) support PCIe Gen4 for NVMe 1 x M.2 (Key M 2280) support PCIe Gen5 for NVMe 1 x M.2 2230 Key E for Wi-Fi and Bluetooth 1 x PCIe x16 Slot (support Gen5) (Note1)
Graphics	
GPU	Intel® Xe Graphics
Display Interface	1 x LVDS(Note2)/eDP, 2 x HDMI, 2 x DisplayPort ++
LAN	
Controller	1 x Intel® I226-LM Gigabit LAN (up to 2.5GbE) 1 x Intel® I226-V 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 USB2.0, 1 x GPIO ,1 x SMBus, 1 x Audio, 1 x LCD inverter, 1 x LVDS
Rear I/O	6 x USB3.2 Gen2, 2 x LAN, 2 x RS232/422/485, 1 x Audio 2 x HDMI, 2 x DisplayPort ++
Mechanical & Environmental	
Power Requirement	Standard 24-pin ATX power supply and 4-pin 12V, or DC input 12V
Size	170mm x 170mm (L x W)
Temperature	Operating within 0°C~60°C (32°F~140°F) Storage within -20°C~80°C (-4°F~176°F)
Relative Humidity	10%~90%, non-condensing

Note1: Support x16, x8/x8

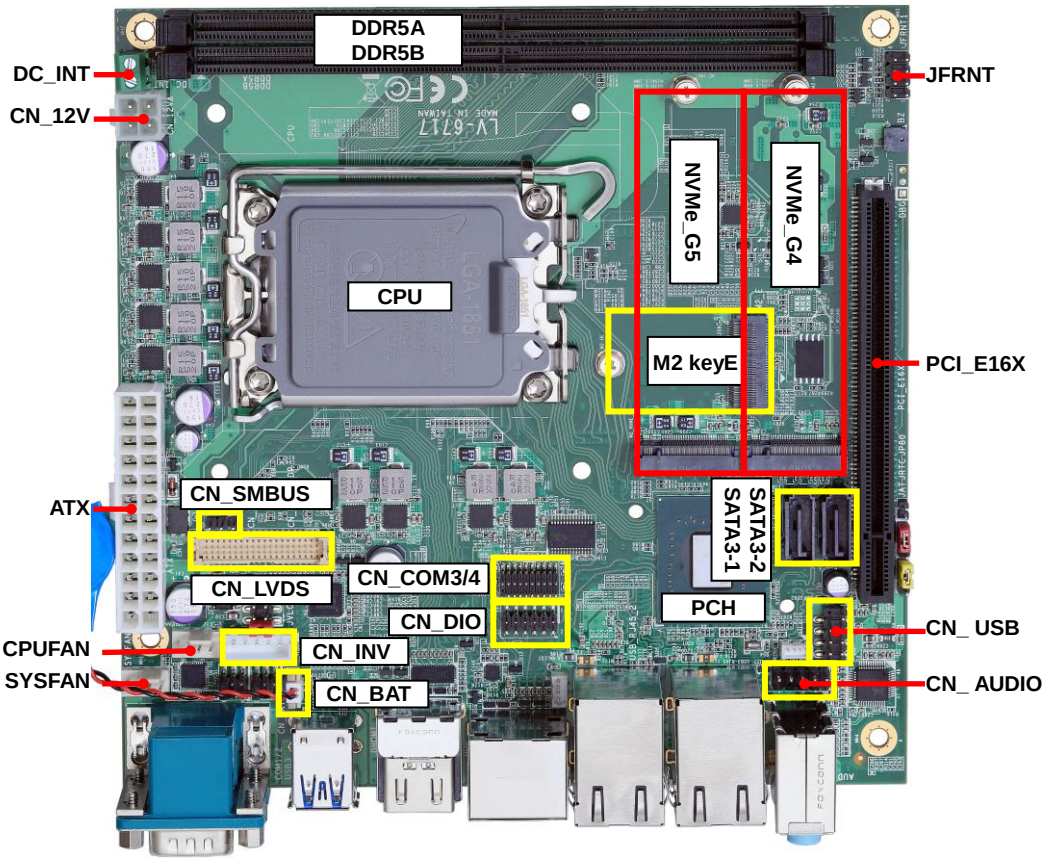
Note2: Onboard 18/24-bit single/dual channel +3.3V/ +5V/ +12V LVDS

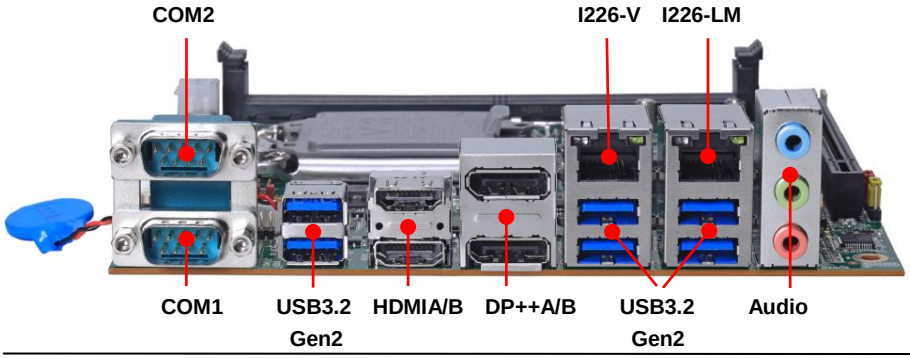
1.3 <Block Diagram>



Chapter 2 <Hardware setup>

2.1 <Connector Location and Reference>





2.1.1 <Internal connectors list>

Connector	Function
DDR5_A/B	288-pin DDR5 UDIMM slot
SATA1/2	7-pin SATA3 connector
CN_AUDIO	5 x 2-pin audio pin header
CN_LVDS/eDP	20 x 2-pin LVDS connector
CN_INV	5-pin LCD inverter connector
CN_SMBUS	3-pin SMBus 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	8-pin front panel switch/indicator connector
PCI_E16X	164-pin x16 PCIE slot (Support PCIe Gen5)
M2_KeyE	75-pin M.2 Key E slot
M2_NVMe_G4	75-pin M.2 Key M slot (Support PCIe Gen4)
M2_NVMe_G5	75-pin M.2 Key M slot (Support PCIe Gen5)
JLANLED 1/2	4-pin RJ45 LED connector
ATX	24-pin power supply connector
CN_12V	4-pin power supply connector
DC_INT	2-pin power input Terminal Block

2.1.2 <External connectors list>

Connector	Function
DDP	Dual DisplayPort ++ connector
DHDMI	Dual HDMI connector
USB3_RJ45_1	USB3.2 Gen2 and RJ45 connector (I226-LM)
USB3_RJ45_2	USB3.2 Gen2 and RJ45 connector (I226-V)
USB	USB3.2 connector
AUDIO	Audio connector
COM1/2	DB9 Serial port connector

2.2 < CPU and Memory Setup>

2.2.1 <CPU installation>

LV-6717 has a LGA1851 CPU socket onboard; please check following steps to install the processor properly.

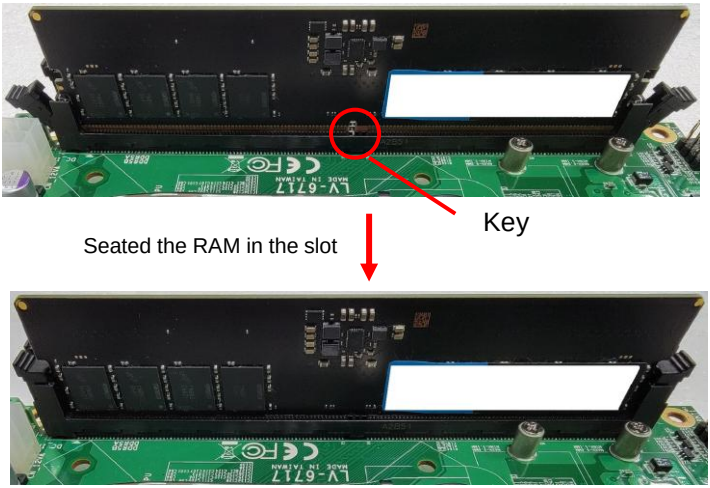
Attention If LV-6717 needs RMA please Keep CPU socket cover on the CPU Socket.

Warning If CPU Socket internal Pin damage We could not provide warranty.

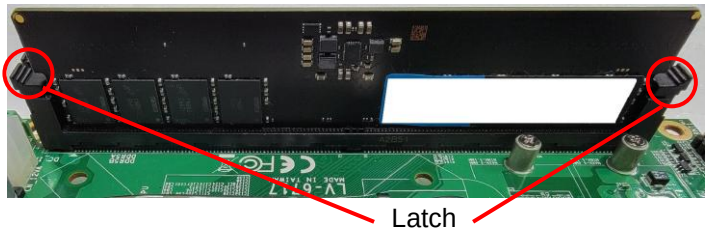
In the process, the board must be powered off.

2.2.2 <Memory Setup>

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.

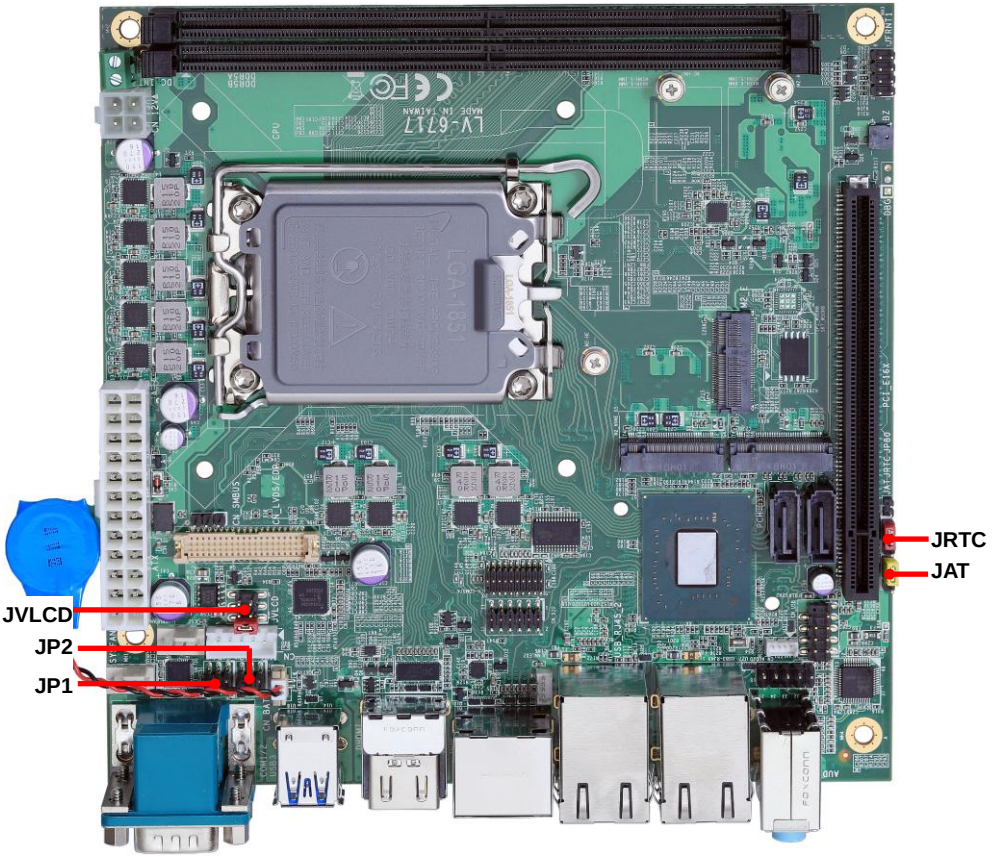


To remove the memory, push outward on both sides of the latch.



Please check the pin number to match the socket side well before installing memory module.

2.3 <Jumper Location and Reference>

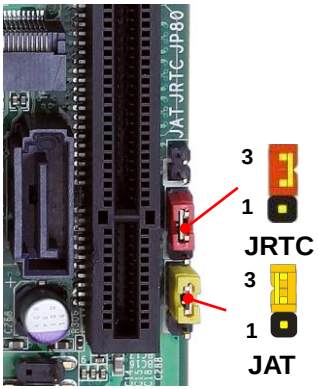


2.3.1 <Jumper list>

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

2.3.2 <Clear CMOS and Power on type selection>

The board's data of CMOS can be setting in BIOS. If the board refuses to boot due to inappropriate CMOS settings, here is how to proceed to clear (reset) the CMOS to its default values.



JAT: AT/ATX mode select jumper

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

JRTC: Clear CMOS data jumper

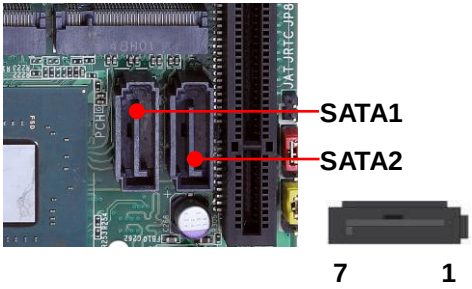
Jumper settings	Function
1-2	Clear CMOS
2-3	Normal (Default)

2.4 <I/O interface>

2.4.1 <Serial ATA interface>

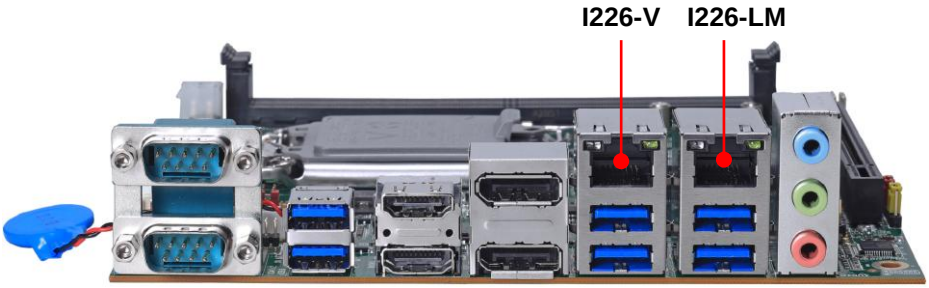
SATA 1/2: SATA3 7-pin connector

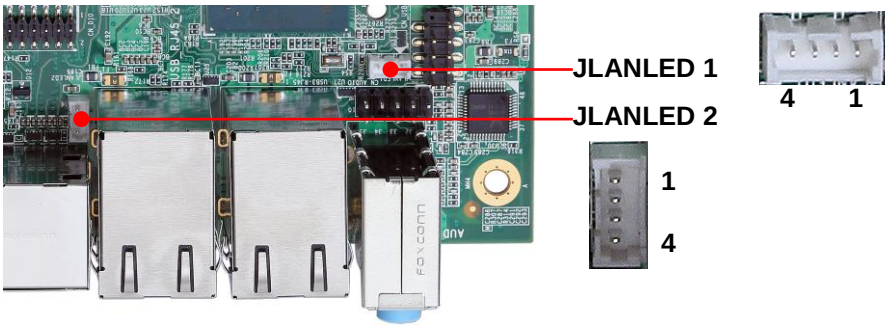
Pin	Signal
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND



2.4.2 <Ethernet interface>

The board provides I226-LM & I226-V 2.5Gigabit Ethernet which supports WOL on rear I/O.



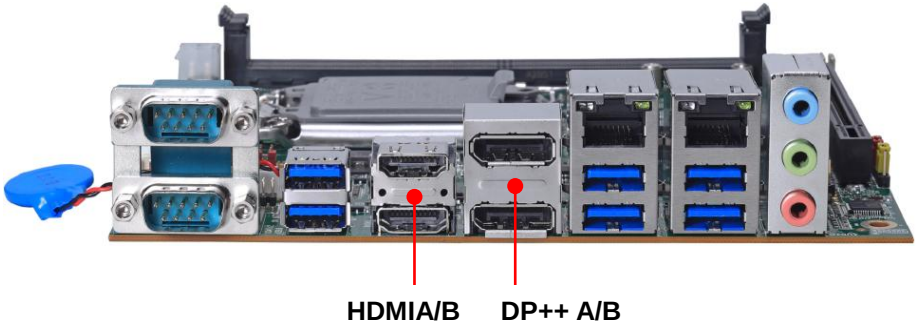


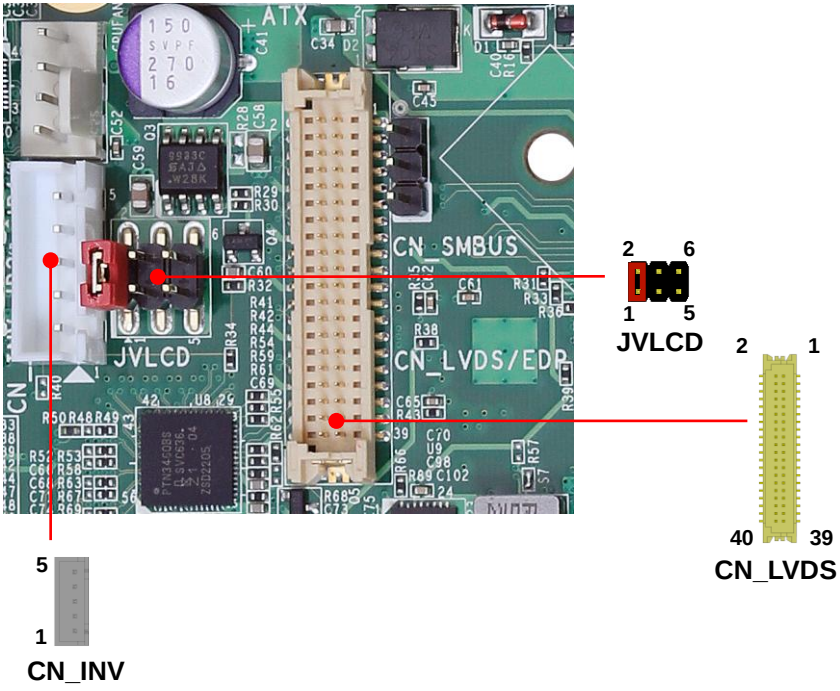
JLANLED 1 & 2: 4-pin RJ45 LED connector

Pin	Description
1	I226 SPEED LED+ (2.5G) / I226 SPEED LED- (1G)
2	I226 SPEED LED- (2.5G) / I226 SPEED LED+ (1G)
3	I226 ACT LED-
4	I226 ACT LED+

2.4.3 <Display interface>

Based on the Ultra CPU (Arrow Lake-S) with built-in Intel® Xe Graphics, the DisplayPort ++ resolution up to 4096 x2160 @ 60Hz, the HDMI up to 7680x4320 @ 60Hz 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 A.The built-in Xe 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

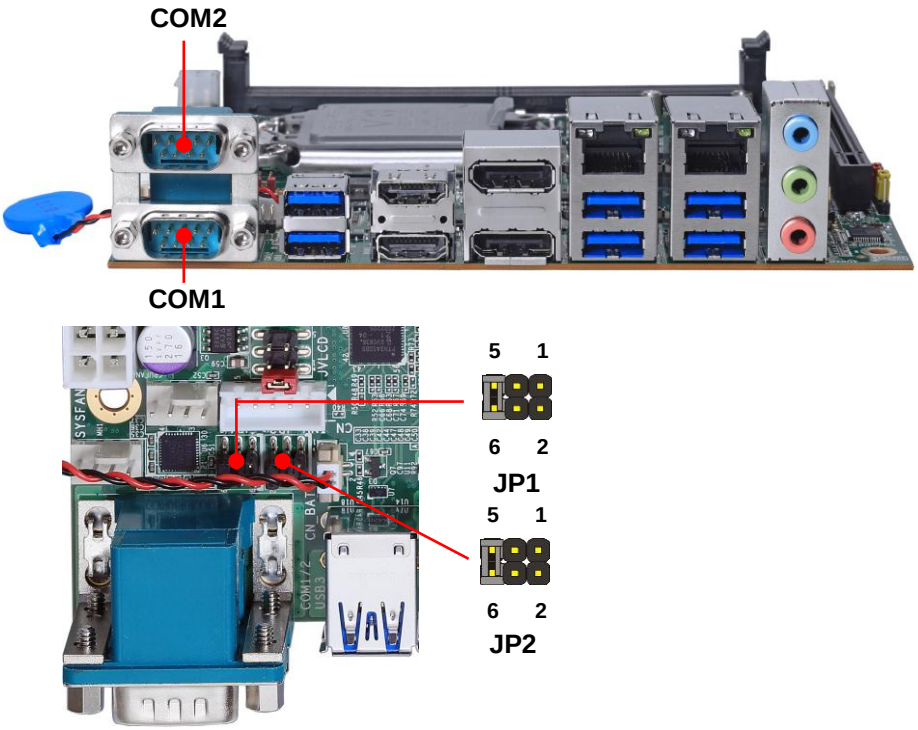
CN_INV: LVDS 5-pin Backlight power connector

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: RS232/422/485 DB9 connector

Pin	Signal	Pin	Signal
1	DCD/ 422TX-/ 485-	2	RXD/ 422TX+/ 485+
3	TXD/ 422RX+	4	DTR/ 422RX-
5	GND	6	DSR
7	RTS	8	CTS
9	Set by JP2		

COM2: RS232/422/485 DB9 connector

Pin	Signal	Pin	Signal
1	DCD/ 422TX-/ 485-	2	RXD/ 422TX+/ 485+
3	TXD/ 422RX+	4	DTR/ 422RX-
5	GND	6	DSR
7	RTS	8	CTS
9	Set by JP1		

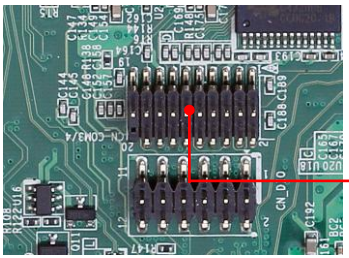
COM1 & COM2

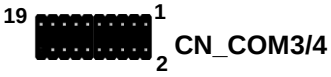
RS-232/422/485 can set by BIOS.

You can find the setting from
Advanced-> Motherboard Advanced menu-> Super IO configuration->
Serial Port configuration->Interface

JP1, JP2: COM1, COM2 pin-9 setting

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

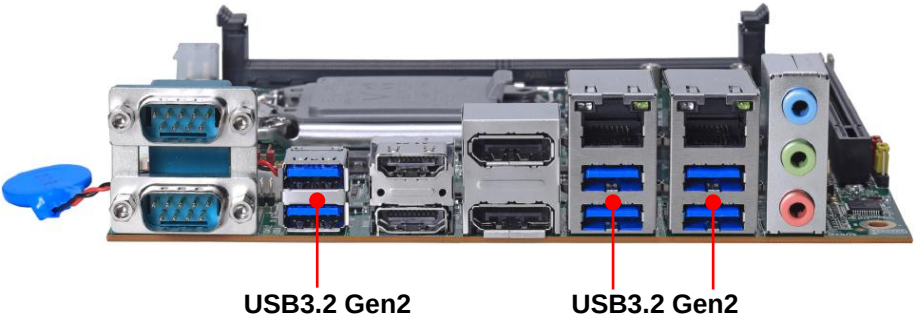


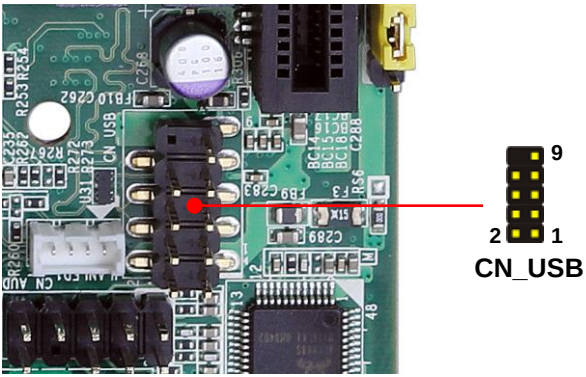


COM3/4: COM 20-pin header (Pitch 2.54 x 1.27mm)

Pin	Signal	Pin	Signal
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**	N/A

2.4.5 <USB interface>

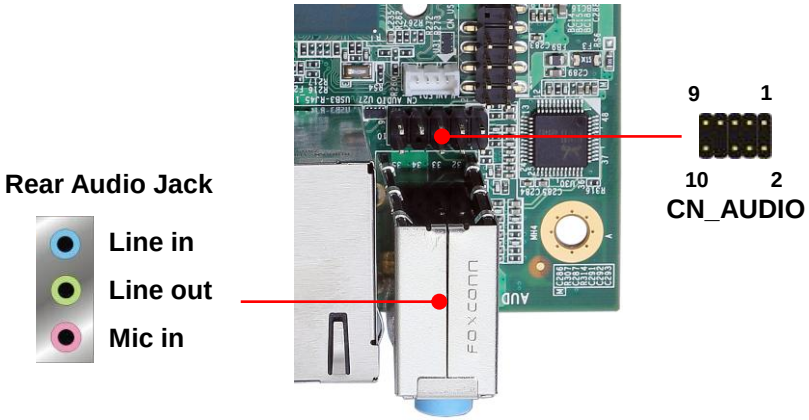




CN_USB: USB2.0 10-pin header (Pitch 2.54 mm)

Pin	Signal	Pin	Signal
1	5VSB	**2**	5VSB
3	DATA0-	**4**	DATA1-
5	DATA0+	**6**	DATA1+
7	GND	**8**	GND
9	GND	**10**	N/A

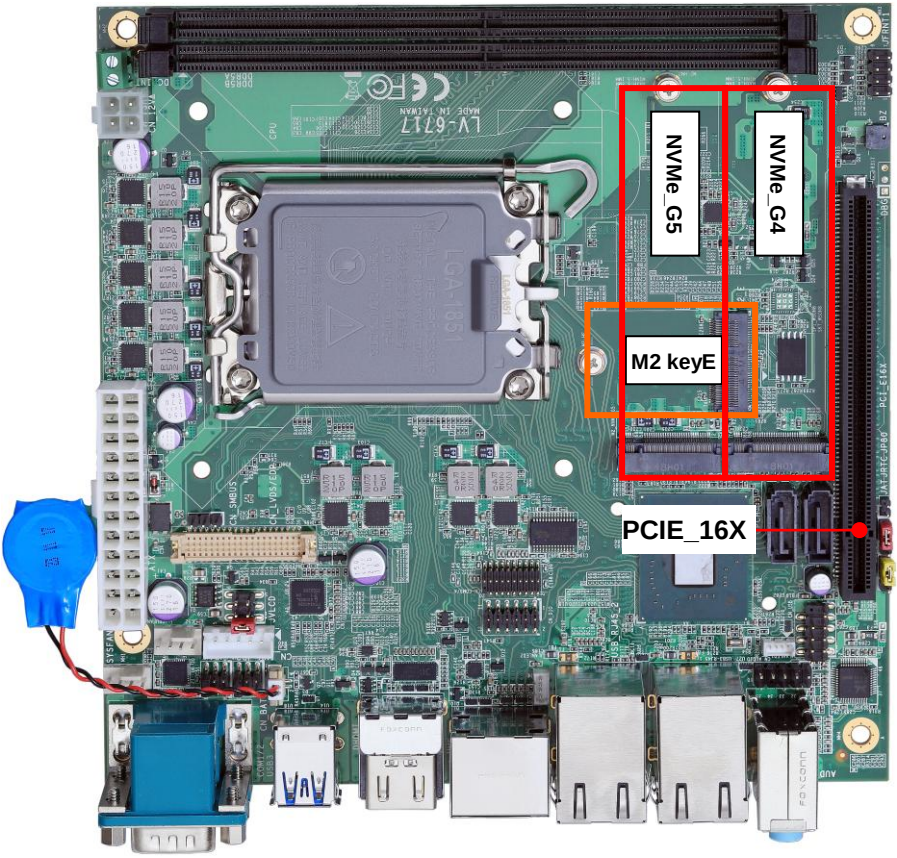
2.4.6 <Audio interface>



CN_AUDIO: Front panel audio 10-pin header (Pitch 2.54mm)

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

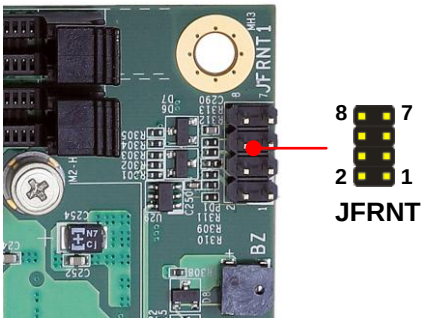
2.4.7 <Expansion slot>



M.2 keyE with 1 x PCI Express x1 support WI-FI and Bluetooth Module
NVMe_G4 with 4 x PCIe Gen4 support NVMe SSD
NVMe_G5 with 4 x PCIe Gen5 support NVMe SSD

PCIE_16X: 164-pin PCIE slot (PCIe Gen5)
(Support x16, x8/x8)

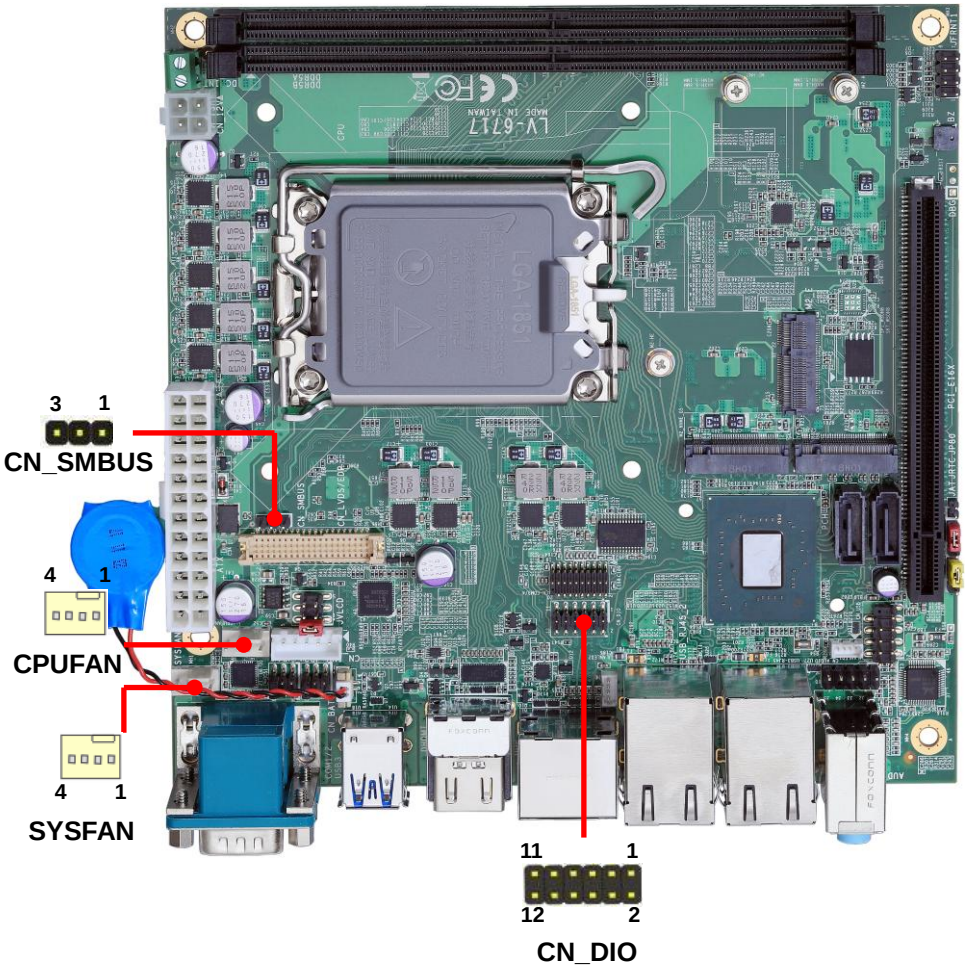
2.4.8 <Front panel switch and indicator>



JFRNT: Front panel switch and indicator 8-pin header (Pitch 2.54mm)

Pin	Signal	Pin	Signal
1	Power_ON-	**2**	Power_ON+
3	HDD_LED-	**4**	HDD_LED+
5	Power_LED-	**6**	Power_LED+
7	Reset+	**8**	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} =12mA
Input High Leakage	I_{LIH}			+10	µA	V_{IN} =3.3V
Input Low Leakage	I_{LIL}			-10	µA	V_{IN} =0V

Please refer to **Appendix D** to program the configuration register

CN_DIO: GPIO 12-pin header (Pitch 2.00mm)

Pin	Signal	Pin	Signal
1	GND	2	GND
3	GP0	4	GP4
5	GP1	6	GP5
7	GP2	8	GP6
9	GP3	10	GP7
11	5V	12	N/A

CN_SMBUS: SMBus 3-pin connector

Pin	1	2	3
Signal	SMBCLK	GND	SMBDAT

CPUFAN: CPU cooler fan 4-pin connector

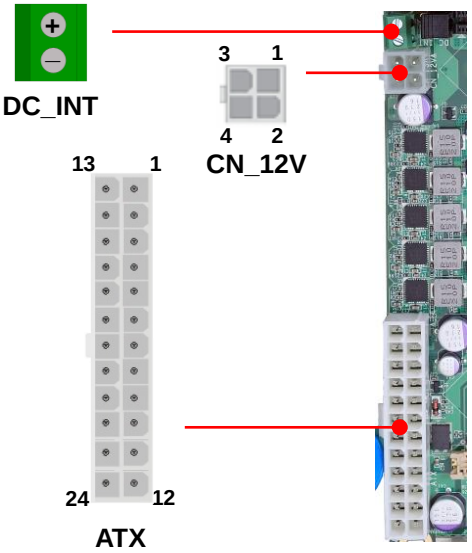
Pin	1	2	3	4
Signal	GND	12V	Sensor	Control

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>



CN_12V: ATX12V 4-pin connector

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

ATX: main power 24-pin connector
(It also can become Output when DC_INT be used)

Pin	Signal	Pin	Signal
1	3.3V	**13**	3.3V
2	3.3V	**14**	NC
3	GND	**15**	GND
4	5V	**16**	-PSON
5	GND	**17**	GND
6	5V	**18**	GND
7	GND	**19**	GND
8	Power_OK	**20**	NC
9	5VSB	**21**	5V
10	12V	**22**	5V
11	12V	**23**	5V
12	3.3V	**24**	GND

DC_INT: 2-pin 12V connector

Pin	Signal	Pin	Signal
1	12V	**2**	GND

Attention:

1. **When DC_INT had power supplied, the ATX become output!**
2. **If the Current than 10A, the DC_INT and CN_12V do use at the same time.**

Appendix A <LCD Panel Type select>

According 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.

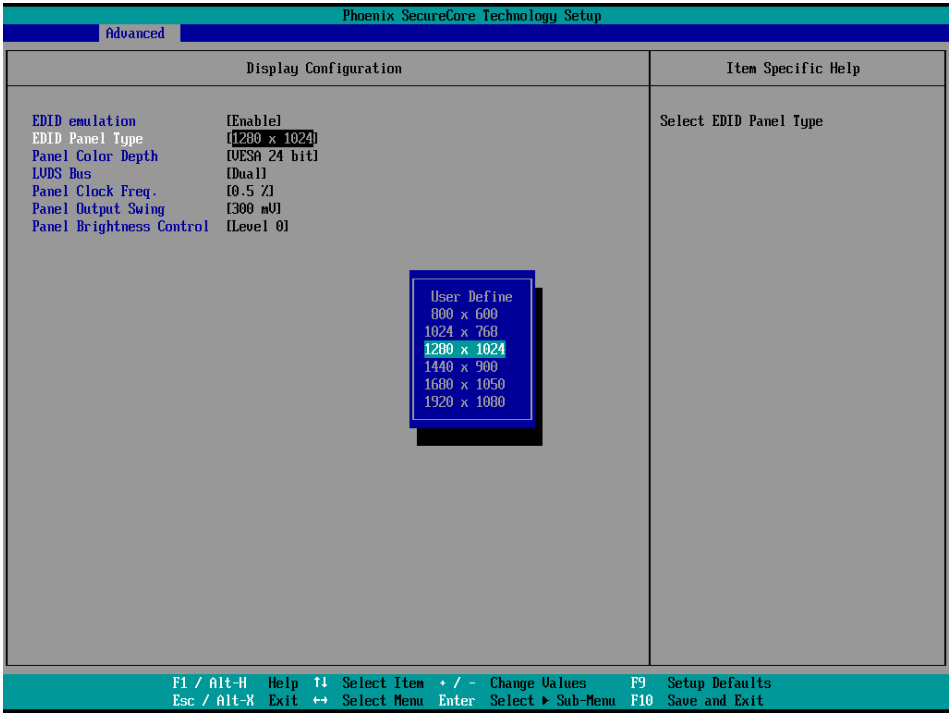
Find the setting from

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

LVDS Bus: Select Single / Dual channel

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



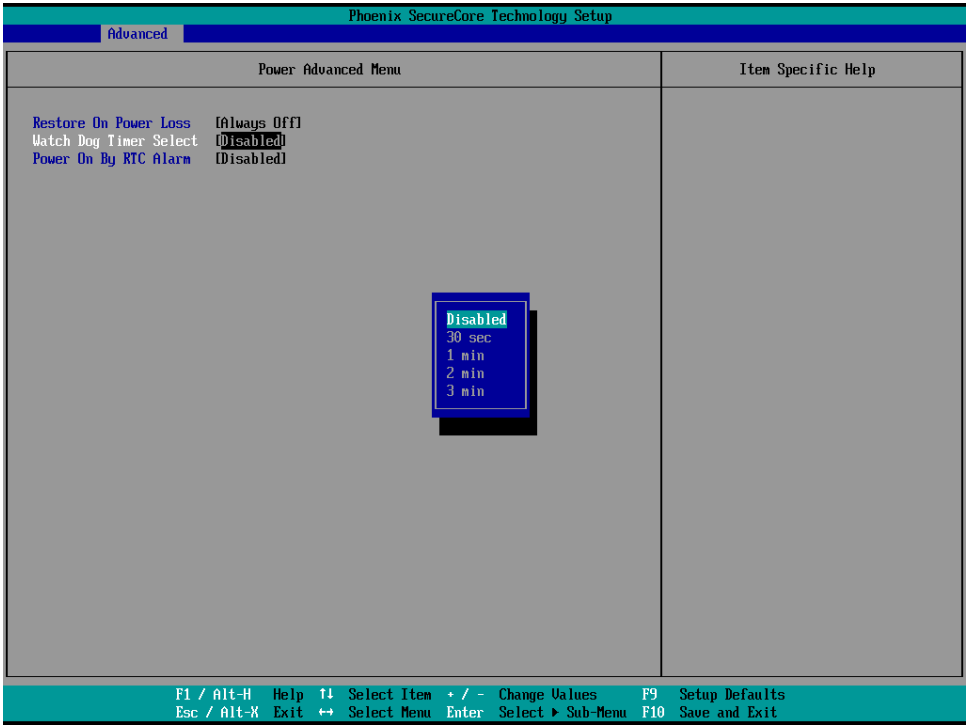
Appendix B <Programmable Watch Dog Timer>

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.)
```

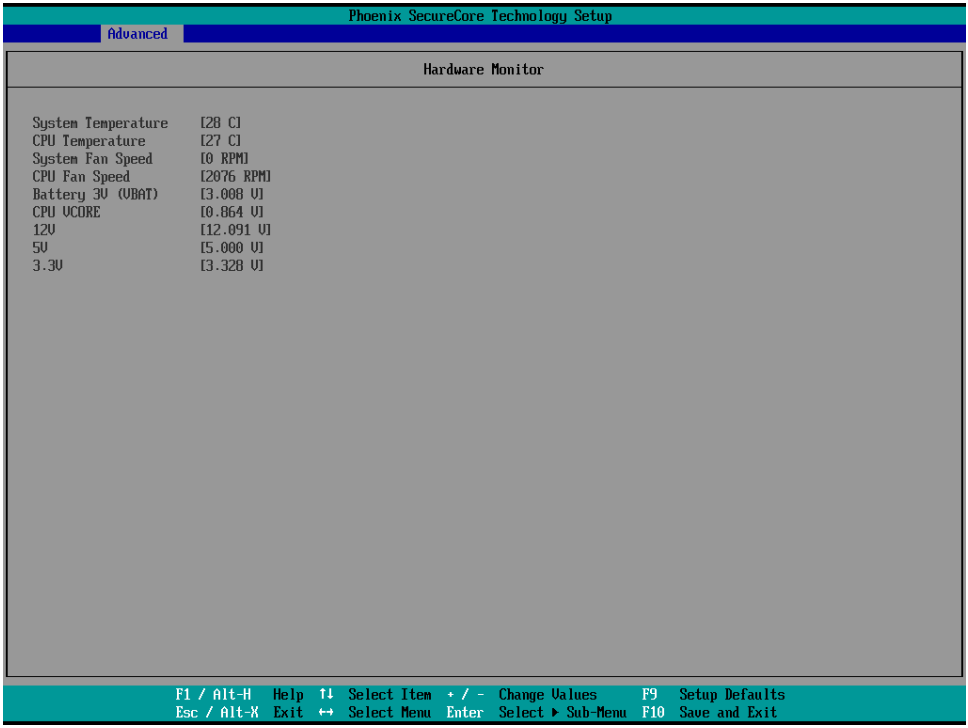
For further information, please refer to Nuvoton NCT6126D datasheet

Appendix C <Hardware Monitor>

Find the setting from

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

→Hardware Monitor



Appendix D <Programmable GPIO>

The GPIO can be programmed with the MS-DOS debug program 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 18 ;activate GPIO function (The board use GPIO3)

-o 4E EC

-o 4F XX ;set "01" GPIO as input, set "00" GPIO as output

-o 4E ED

-o 4F XX ;if set GPIO as output, this register's value can be set "00~ FF"

Optional

-o 4E EE

-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

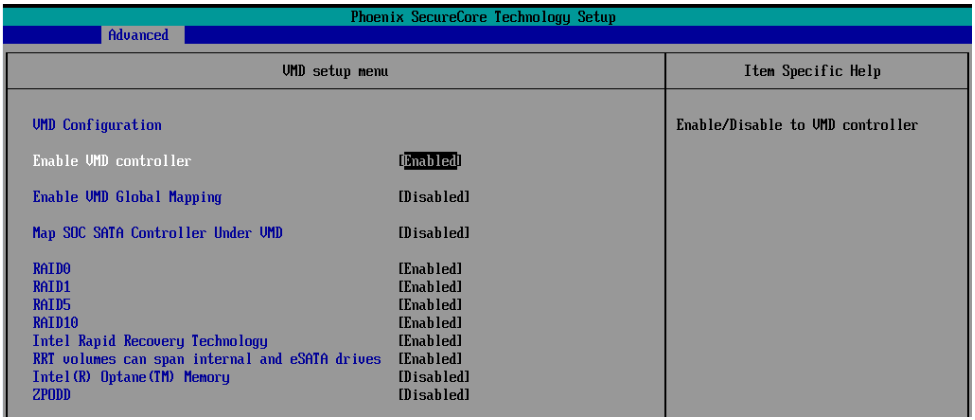
Appendix E <RAID Setting>

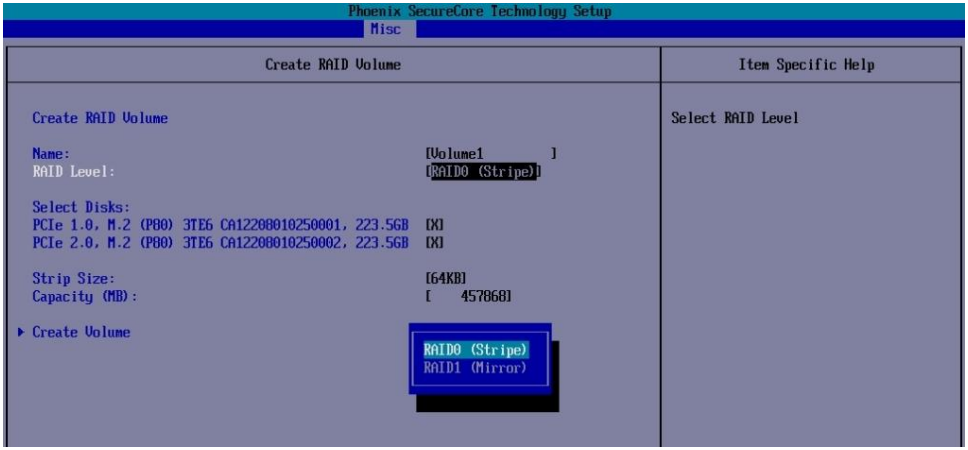
When use RAID function, it need to enter the BIOS set RAID mode first.

Advanced → Intel Advanced menu →SA Configuration → VMD Configuration→

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", and then choose two disks to create.

Attention: Create RAID need Driver





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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