

# LS-37K

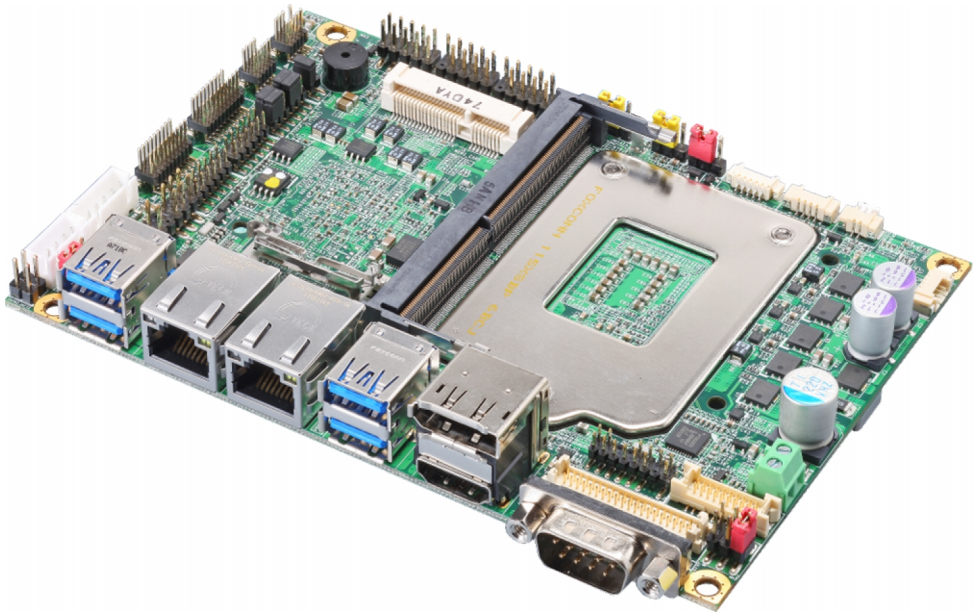
---

## 3.5 inch Desktop Miniboard

### User's Manual

Edition 1.5

2018/12/03



---

## Copyright

Copyright 2017, all rights reserved. This document is copyrighted and all rights are reserved. The information in this document is subject to change without prior notice to make improvements to the products.

This document contains proprietary information and protected by copyright. No part of this document may be reproduced, copied, or translated in any form or any means without prior written permission of the manufacturer.

All trademarks and/or registered trademarks contains in this document are property of their respective owners.

## Disclaimer

The company shall not be liable for any incidental or consequential damages resulting from the performance or use of this product.

The company does not issue a warranty of any kind, express or implied, including without limitation implied warranties of merchantability or fitness for a particular purpose.

The company has the right to revise the manual or include changes in the specifications of the product described within it at any time without notice and without obligation to notify any person of such revision or changes.

## Trademark

All trademarks are the property of their respective holders.

---

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 LS-37K 3.5 inch Miniboard



1 x Cooler Fan  
(OHSF-37K / 2181010029)



1 xDC Input Power Cable  
(OALDC-B / 1040513)



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



2 x SATA CABLE  
(OALSATA3-H10-L35 / 1040523)



1 x PS/2 Keyboard & Mouse cable  
(OALPS2/KM / 1040131)



1 x VGA Cable  
(OALVGA-SNB-7) / (1040557)



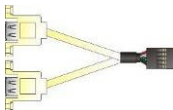
1 x DVI module  
(BADPDVI\_A & OALDVI-DF13)  
(4120008011 & 1040483)



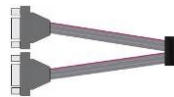
1 x Audio cable  
(OALPJ-HDUNB / 1040123)



1 x COM Cable  
(OALES-BKU1NB / 1040086)



1 xUSB2.0 cable  
(OALUSBA-3 / 1040173) (Optional)



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

## Printed Matters:

Driver CD (Including User's Manual) x 1

## Index

|  |           |
|--|-----------|
| <b>Chapter 1 &lt;Introduction&gt;</b> .....                  | <b>4</b>  |
| 1.1 <Product Overview>.....                                  | 4         |
| 1.2 <Product Specification> .....                            | 5         |
| 1.3 <Block Diagram>.....                                     | 6         |
| <b>Chapter 2 &lt;Hardware setup&gt;</b> .....                | <b>7</b>  |
| 2.1 <Connector Location and Reference> .....                 | 7         |
| 2.1.1 <Internal connectors list>.....                        | 8         |
| 2.1.2 <External connectors list>.....                        | 8         |
| 2.2 <CPU, Heatsink and Memory installation guide> .....      | 9         |
| 2.2.1 <CPU compatible list>.....                             | 9         |
| 2.2.2 <CPU installation> .....                               | 10        |
| 2.2.3 <Cooler Fan installation> .....                        | 11        |
| 2.2.4 <Memory Setup> .....                                   | 13        |
| 2.3 <Jumper Location and Reference> .....                    | 14        |
| 2.3.1 <Jumper list> .....                                    | 14        |
| 2.3.2 <Clear CMOS and Power on type selection>.....          | 15        |
| 2.4 <I/O interface> .....                                    | 15        |
| 2.4.1 <Serial ATA interface> .....                           | 15        |
| 2.4.2 <Ethernet interface>.....                              | 16        |
| 2.4.3 <Display interface> .....                              | 16        |
| 2.4.4 <Serial Port interface> .....                          | 19        |
| 2.4.5 <USB interface>.....                                   | 22        |
| 2.4.6 <Audio interface>.....                                 | 23        |
| 2.4.7 <Expansion slot>.....                                  | 24        |
| 2.4.8 <Front panel switch and indicator> .....               | 25        |
| 2.4.9 <GPIO and Other interface> .....                       | 26        |
| 2.5 <Power supply> .....                                     | 28        |
| 2.5.1 <Power input>.....                                     | 28        |
| 2.5.2 <Power output>.....                                    | 28        |
| <b>Appendix A &lt;Flash BIOS&gt;</b> .....                   | <b>29</b> |
| <b>Appendix B &lt;LCD Panel Type select&gt;</b> .....        | <b>29</b> |
| <b>Appendix C &lt;Programmable Watch Dog Timer&gt;</b> ..... | <b>31</b> |
| <b>Appendix D &lt;Hardware monitor &gt;</b> .....            | <b>32</b> |
| <b>Appendix E &lt;Programmable GPIO &gt;</b> .....           | <b>33</b> |
| <b>Appendix F &lt;RAID Setting&gt;</b> .....                 | <b>34</b> |
| <b>Appendix G &lt; Setup ADP-3355,ADP-3460 &gt;</b> .....    | <b>35</b> |
| Contact information .....                                    | 36        |

# Chapter 1 <Introduction>

## 1.1 <Product Overview>

**LS-37K** is 3.5 inch Miniboard which supports 6th & 7th Generation Intel® Core™ i7/ i5/ i3, S-series and Xeon® Processor with Intel® C236 Chipset, integrated HD Graphics , DDR4 memory, Realtek High Definition Audio, Intel Gigabit LAN, Serial ATA3

### **Intel Skylake-S & Kabylake-S Processor with Intel® C236 Chipset**

The 6th & 7th Intel® Core™ S-series and Xeon® processor family is new generation and multi-core processor built on 14 nanometer process.

It provide new HD Graphics support triple displays at the same time, maximum supported is up to 64GB of DDR4, better performance, flexibility and more enhanced security that is suitable for a variety of intelligent systems the ideal choice.

### **Flexible Expansion Interface**

It includes minicard slot, 6 x COM port, 4 x USB3.0, and 4 x USB2.0.

### **Skylake & Kabylake remove EHCI, all USB ports are xHCI**

When you install Windows7 with USB device(CDROM, Keyboard, Mouse...), Windows7 can not identify your usb device. You can use SATA CD-ROM and PS/2 to install Windows7.

### **Kaby Lake(7th gen CPU) only support Windows10 64bit**

Intel only support Windows 10 64bit. It may lose some drivers if you use other Windows version.

## 1.2 <Product Specification>

### System

|                 |  |
|-----------------|--|
| Processor       | Intel® 6th & 7th Core™ i7/ i5/ i3 and Xeon® E3-1200 v5/ v6 Processor, FCLGA1151 package  |
| Chipset         | Intel® C236 PCH-H  |
| Memory          | 1 x DDR4 DIMM 1866/2133 MHz up to 16GB, Support Non-ECC, unbuffered memory only<br>(Xeon® E3-1200 v5 Product 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 MiniPCle (support mSATA)   |

### Graphics

|                   |  |
|-------------------|--|
| Chipset           | Intel® 9th Gen integrated HD Graphics<br>(Some Xeon® E3-1200 v5 Product CPU not support) |
| Display Interface | 1 x DisplayPort, 1 x HDMI<br>1 x DVI, 1 x LVDS, 1 x VGA                                  |

### LAN

|      |   |
|------|---|
| Chip | 1 x Intel® I219-LM Gigabit PHY LAN (Support iAMT11.0)<br>1 x Intel® I210-AT Gigabit LAN |
|------|---|

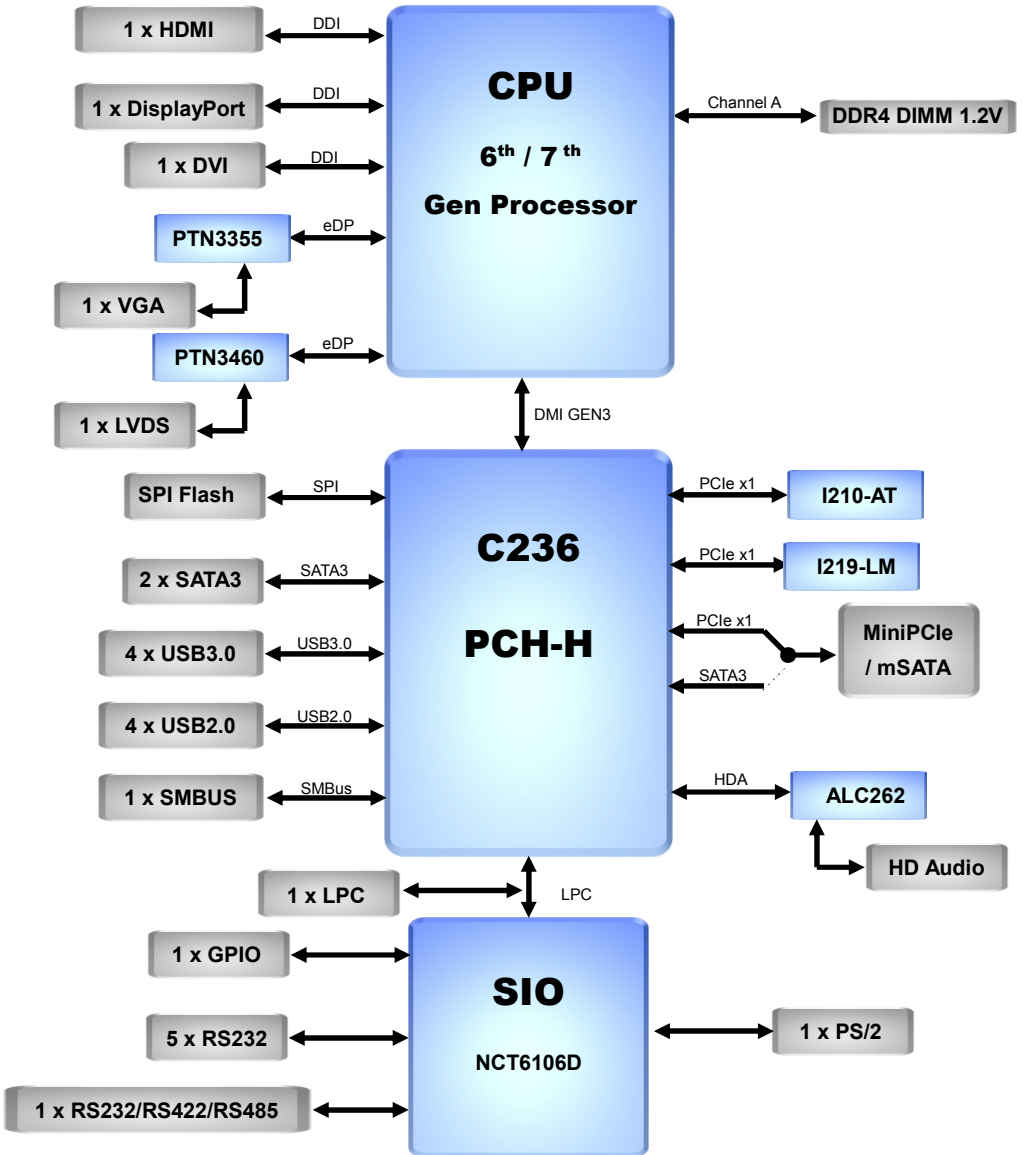
### I/O

|              |   |
|--------------|---|
| Serial ATA   | 2 x SATA3 interface with 600MB/s transfer rate  |
| Audio        | Realtek ALC262 HD Audio   |
| Internal I/O | 2 x SATA3, 4 x USB2.0, 4 x USB3.0<br>4 x RS232, 1 x RS232/485/422<br>1 x DVI, 1 x VGA, 1 x LVDS, 1 x LCD inverter,<br>1 x LPC, 1 x GPIO, 1 x Audio, 1 x PS/2, 1 x SMBUS |
| Rear I/O     | 1 x DisplayPort, 1 x HDMI<br>4 x USB3.0, 2 x LAN, 1 x RS232   |

### Mechanical & Environmental

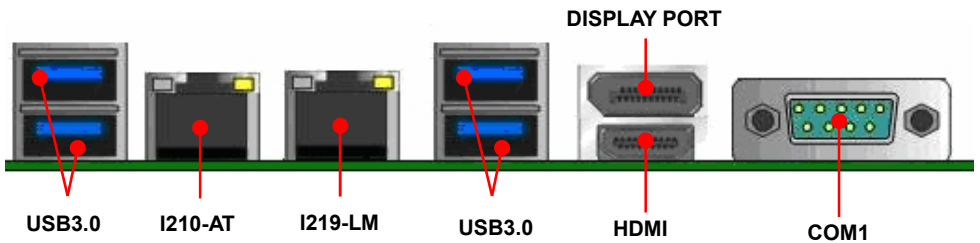
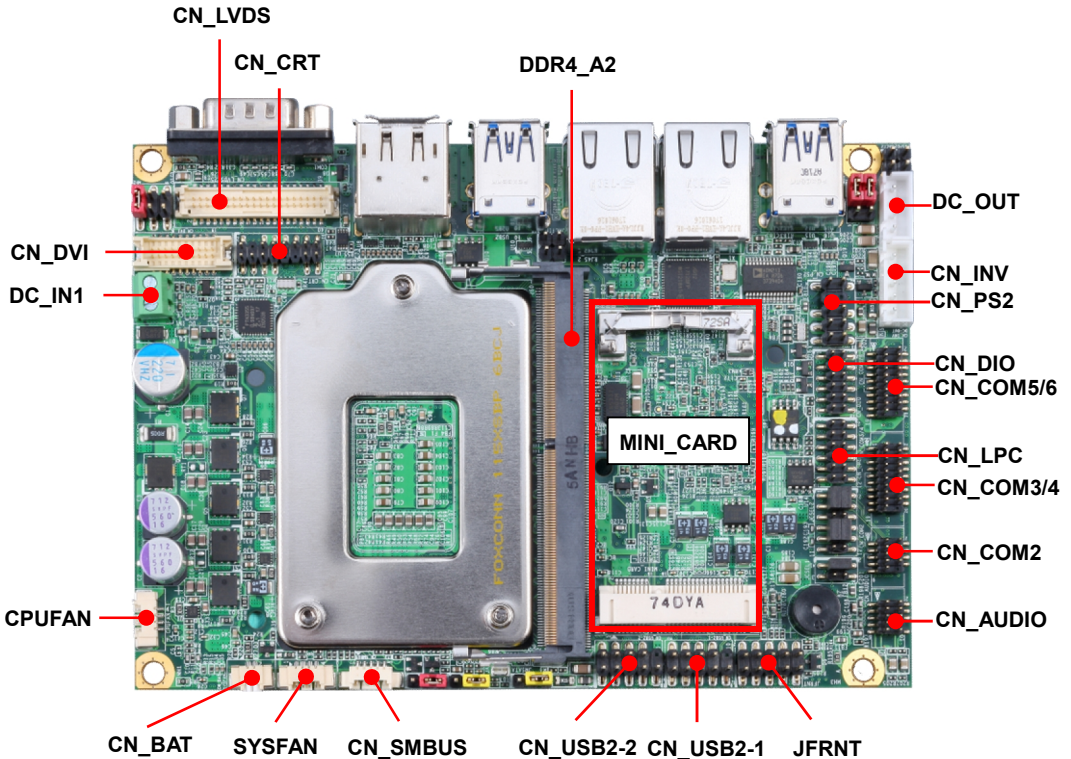
|                   |  |
|-------------------|--|
| Power Requirement | DC input 9~35V   |
| Size              | 146mm x 101mm (L x W)  |
| Temperature       | Operating within 0°C~60°C (32°F~140°F)<br>Storage within -20°C~80°C (-4°F~176°F) |
| Relative Humidity | 10%~90%, non-condensing  |

# 1.3 <Block Diagram>



# Chapter 2 <Hardware setup>

## 2.1 <Connector Location and Reference>





## 2.1.1 <Internal connectors list>

| Connector      | Function                                      |
|----------------|---|
| DDR4_A2        | 260-pin DDR4 SO-DIMM slot                     |
| CN_SATA3-1/2   | 10-pin Serial ATA3 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_DVI         | 10 x 2-pin DVI connector                      |
| CN_CRT         | 16-pin VGA connector                          |
| CN_COM 2       | 9-pin RS232/RS485/422 connector               |
| CN_COM 3/4/5/6 | 20-pin RS232 connector                        |
| CN_USB 2-1/2-2 | 5 x 2-pin USB2.0 pin header                   |
| CN_PS2         | 5 x 2-pin PS/2 pin header                     |
| CN_DIO         | 6 x 2-pin digital I/O connector               |
| CN_SMBUS       | 5-pin SMBus connector                         |
| CN_BAT         | 2-pin Battery connector                       |
| CPUFAN         | 4-pin CPU fan connector                       |
| SYSFAN         | 4-pin system fan connector                    |
| MINI_CARD      | 52-pin Half-MiniPCIe card slot                |
| JFRNT          | 14-pin front panel switch/indicator connector |
| DC_IN1         | 2-pin power input Terminal Block              |

## 2.1.2 <External connectors list>

| Connector   | Function                  |
|-------------|---------------------------|
| DisplayPort | DisplayPort connector     |
| HDMI        | HDMI connector            |
| USB3.0 1/2  | USB3.0 connector          |
| LAN-1/2     | RJ45 connector            |
| COM1        | DB9 Serial port connector |

## 2.2 <CPU, Heatsink and Memory installation guide>

### 2.2.1 <CPU compatible list>

Recommended TDP less than 45W, please refer to the following models

| Skylake-S and Kabylake-S compatible list |      |     |           |      |     |
|--|------|-----|-----------|------|-----|
| Skylake                                  | Core | TDP | Kabylake  | Core | TDP |
| E3-1268L v5                              | 4    | 35W | i7-7700T  | 4    | 35W |
| E3-1260L v5                              | 4    | 45W | i5-7600T  | 4    | 35W |
| E3-1240L v5                              | 4    | 25W | i5-7500T  | 4    | 35W |
| E3-1235L v5                              | 4    | 25W | i5-7400T  | 4    | 35W |
| i7-6700TE                                | 4    | 35W | i3-7300T  | 2    | 35W |
| i7-6700T                                 | 4    | 35W | i3-7101TE | 2    | 35W |
| i5-6600T                                 | 4    | 35W | i3-7100T  | 2    | 35W |
| i5-6500TE                                | 4    | 35W | G4600T    | 2    | 35W |
| i5-6500T                                 | 4    | 35W | G4560T    | 2    | 35W |
| i5-6400T                                 | 4    | 35W | G3930TE   | 2    | 35W |
| i3-6300TE                                | 2    | 35W | G3930T    | 2    | 35W |
| i3-6300T                                 | 2    | 35W | G3900TE   | 2    | 35W |
| i3-6100TE                                | 2    | 35W | G4400TE   | 2    | 35W |
| i3-6100T                                 | 2    | 35W |           |      |     |
| G4500T                                   | 2    | 35W |           |      |     |
| G4400T                                   | 2    | 35W |           |      |     |

**Note: Embedded processors have long-term support**

## 2.2.2 <CPU installation>

LS-37K has a LGA1151 CPU socket onboard; please check following steps to install the processor properly.

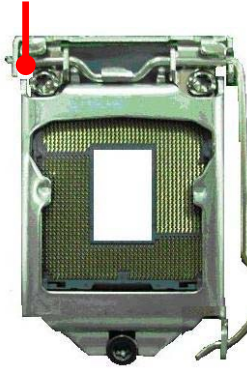
**Attention If LS-37K needs RMA, please Keep CPU socket cover on the CPU Socket.**

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

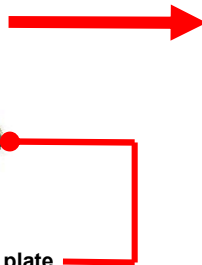


Intel® 6th & 7th Core™ i7/ i5/ i3 and Xeon® E3-1200 v5 Processor, FCLGA1151 package

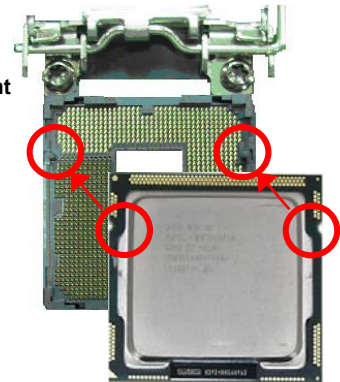
1. Lift this bar



2. Uncover this plate

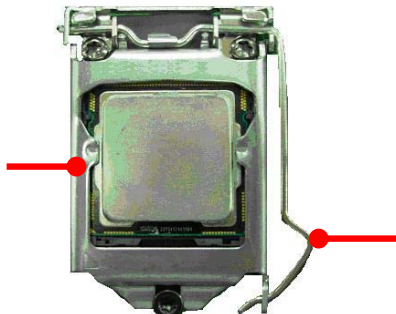


Checked point



3. Place the CPU on the top of the pins

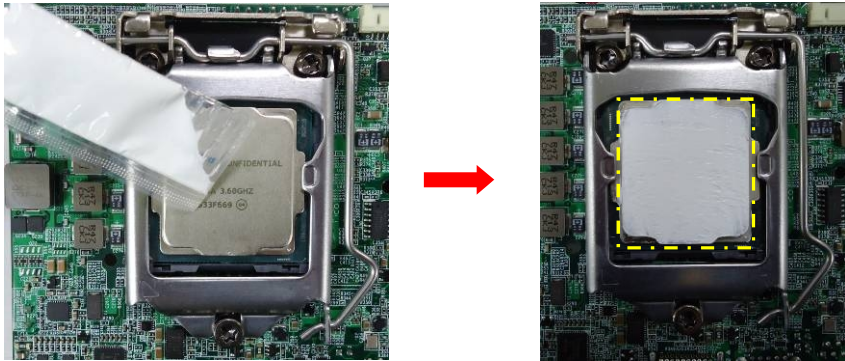
4. Cover this plate



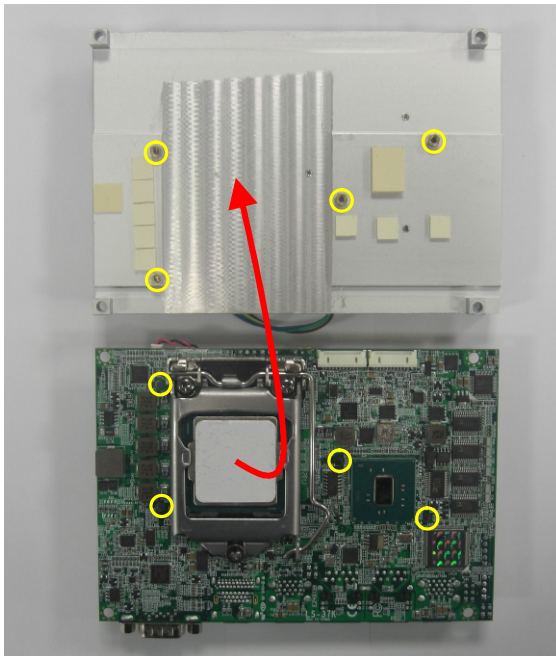
5. Lock this bar

## 2.2.3 <Cooler Fan installation>

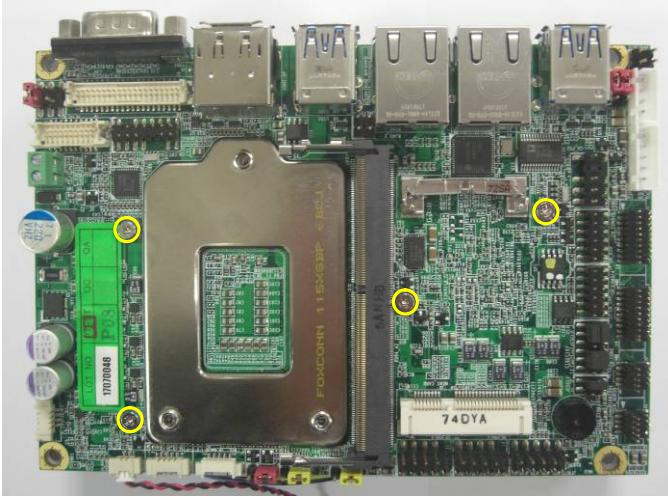
Step1. Apply Thermal Paste on the CPU.



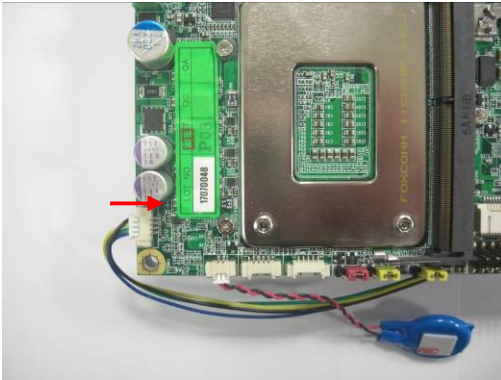
Step2. Mount the Heatsink after aligning.



Step3. Screw on the Heatsink.



Step4. Install Fan, finish.



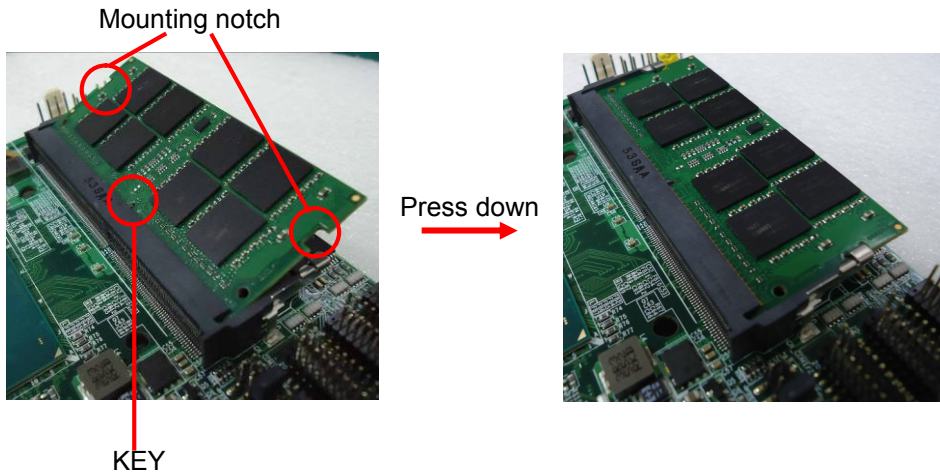
## 2.2.4 <Memory Setup>

LS-37K has 260-pin DDR4 DIMM support up to 16GB of memory capacity and 1.2 Voltage. The memory frequency supports 1866/2133 MHz. Only Non-ECC memory is supported.

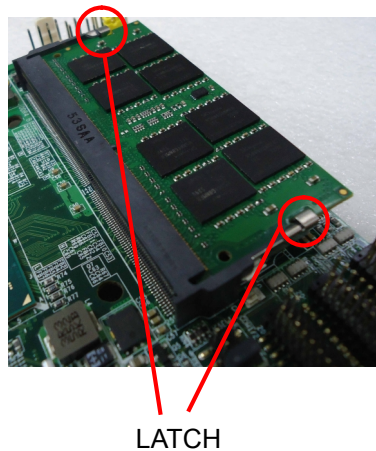
(Xeon® E3-1200 v5 / v6 Product support ECC memory)

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

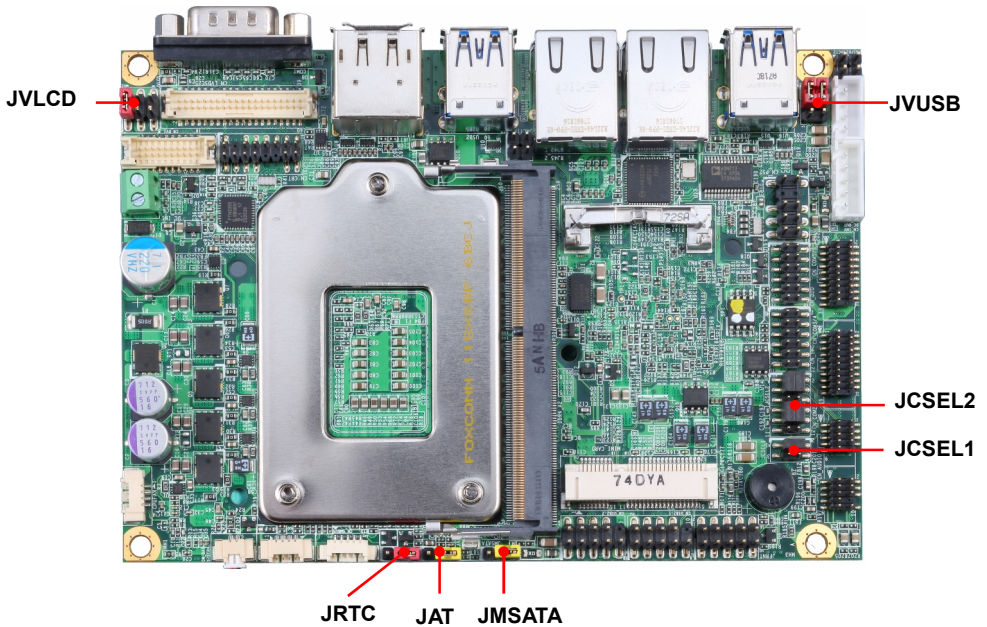
1. Put the memory tilt into the slot. Note the Memory notch key aligned slot key.
2. Then press down till lock into the mounting notch.



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          |
| JCSEL1 | COM2 RS-232 RS422 RS485 Setting |
| JCSEL2 | COM2 RS-232 RS422 RS485 Setting |
| JVUSB  | USB Voltage Setting             |

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

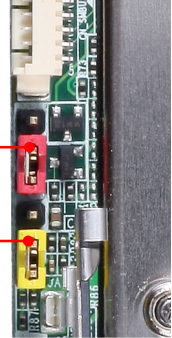
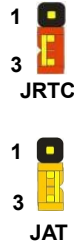
The board's data of CMOS can be setting in BIOS. If the board refuses to boot due to inappropriate CMOS settings, here is how to proceed to clear (reset) the CMOS to its default values.

**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) |

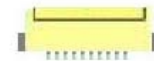


## 2.4 </I/O interface>

### 2.4.1 <Serial ATA interface>

**CN\_SATA3-1/2:** SATA3 10-pin connector

| Pin | Signal |
|-----|--------|
| 1   | GND    |
| 2   | TX+    |
| 3   | TX-    |
| 4   | GND    |
| 5   | NA     |
| 6   | NA     |
| 7   | GND    |
| 8   | RX-    |
| 9   | RX+    |
| 10  | GND    |



10 1  
CN\_SATA3-1/2

CN\_SATA3-2 CN\_SATA3-1





### 2.4.2 <Ethernet interface>

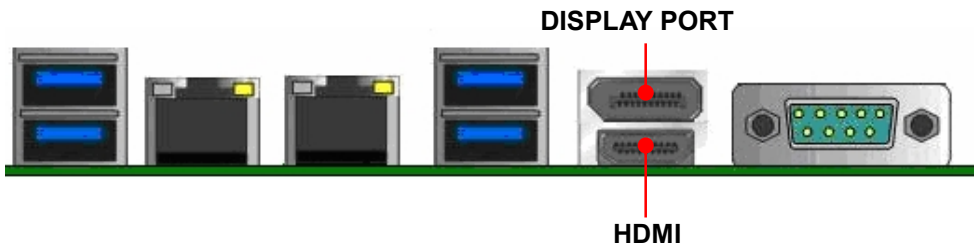
The board provide I219-LM PHY Gigabit Ethernet and I210-AT Gigabit Ethernet on rear I/O. Intel I219-LM and I210 supports operation at 10/100/1000 Mb/s data rates, with IEEE802.3 compliance and Wake-On-LAN supported.

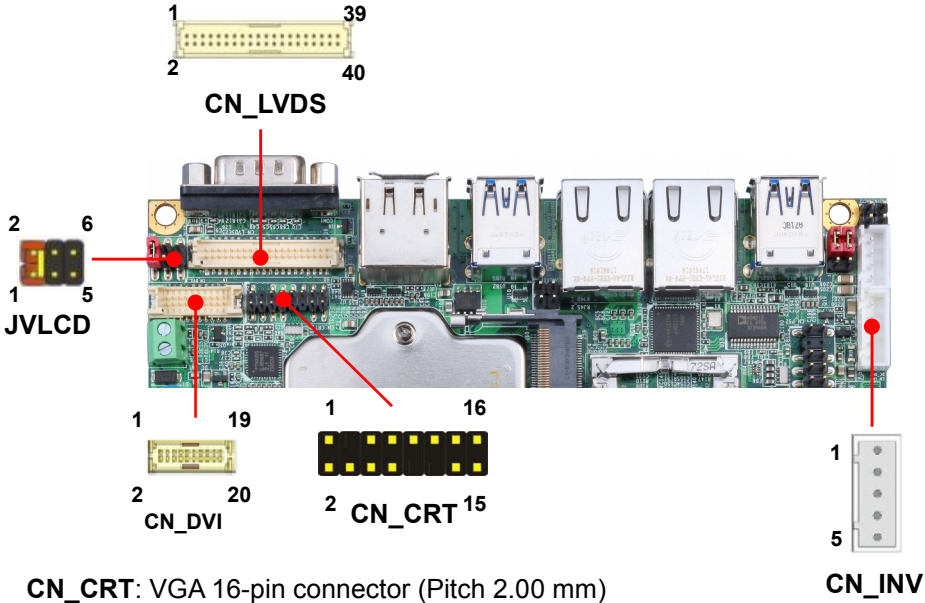


### 2.4.3 <Display interface>

Based on the 6th Gen CPU with built-in HD Graphics 530, VGA and DVI up to **1920x1080@60Hz**, DisplayPort up to **4096x2304@60Hz** , HDMI up to **4096x2304@24Hz** on rear IO. About the internal Display, LVDS (PTN3460) up to **1920x1200@60Hz** support 18/24-bit color depth and single/dual channel. About select LCD Panel Type in BIOS, please refer **Appendix B**.

The built-in HD Graphics support triple display function with clone mode and extended mode.




**CN\_CRT:** VGA 16-pin connector (Pitch 2.00 mm)

**CN\_INV**

| Pin | Signal | Pin | Signal |
|-----|--------|-----|--------|
| 1   | BR     | 2   | BG     |
| 3   | BB     | 4   | NC     |
| 5   | IOGND1 | 6   | IOGND1 |
| 7   | IOGND1 | 8   | IOGND1 |
| 9   | NC     | 10  | IOGND1 |
| 11  | NC     | 12  | 5VCDA  |
| 13  | 5HSYNC | 14  | 5VSYNC |
| 15  | 5VCLK  | 16  | NC     |

**CN\_DVI:** DVI onboard 20-pin connector

| Pin | Signal   | Pin | Signal   |
|-----|----------|-----|----------|
| 1   | +5V      | 2   | N/C      |
| 3   | HPD      | 4   | Ground   |
| 5   | TMDSTX0N | 6   | TMDSTX0P |
| 7   | Ground   | 8   | TMDSTX1N |
| 9   | TMDSTX1P | 10  | Ground   |
| 11  | TMDSTX2N | 12  | TMDSTX2P |
| 13  | Ground   | 14  | Ground   |
| 15  | TMDSTXCP | 16  | Ground   |
| 17  | DVI_DA   | 18  | DVI_SL   |
| 19  | N/C      | 20  | N/C      |

**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**

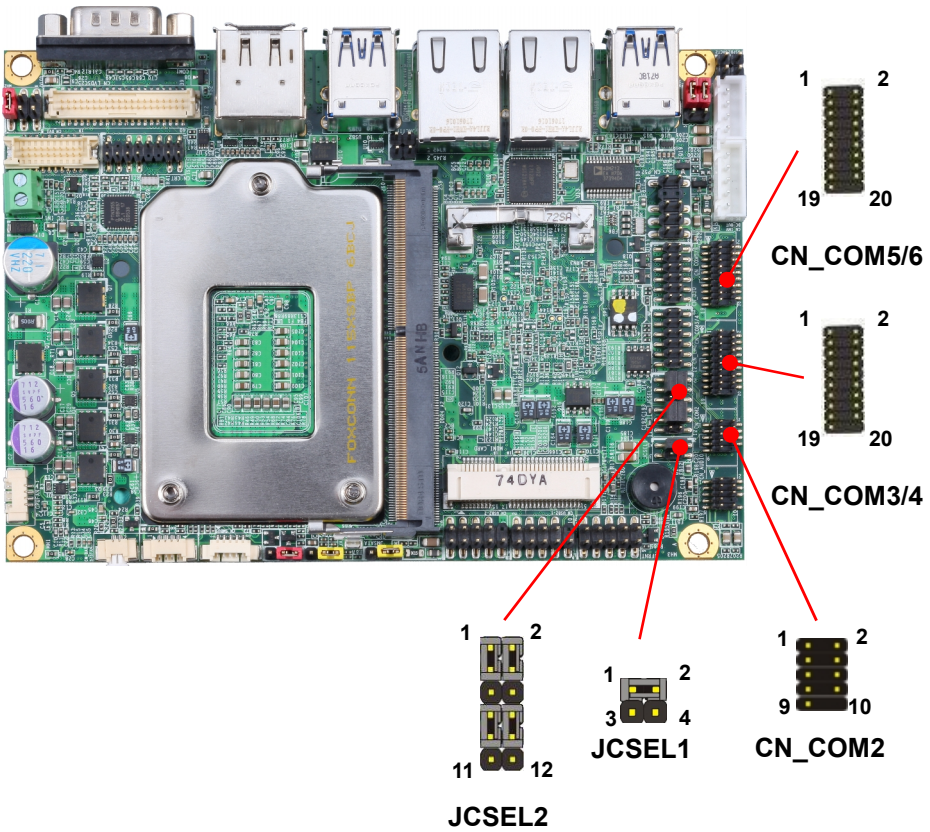
**CN\_INV:** LVDS 5-pin Backlight power connector

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

**JVLCD:** LVDS panel power select jumper

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

## 2.4.4 <Serial Port interface>



**COM1:** RS232 DB9 connector

| Pin | Signal     | Pin | Signal |
|-----|------------|-----|--------|
| 1   | DCD        | 2   | RXD    |
| 3   | TXD        | 4   | DTR    |
| 5   | GND        | 6   | DSR    |
| 7   | RTS        | 8   | CTS    |
| 9   | Set by JP1 |     |        |

**COM2:** RS232/422/485 9-pin header

| 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        |     |                   |

**Use JCSEL1 and JCSEL2 to select communication mode**


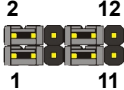

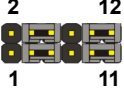


**COM3/4:** RS232 20-pin header (Pitch 2.54 x 1.27mm)

| 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  | Key    |

**COM5/6:** RS232 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  | Key    |

**JCSEL1, JCSEL2:** For configure COM2 communication mode

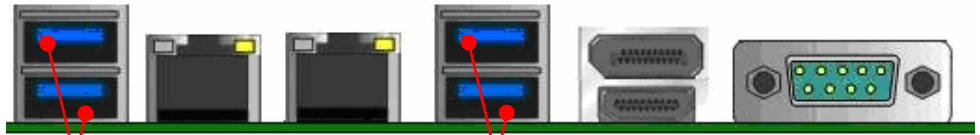
| Function | JCSEL1  | JCSEL2  |
|----------|---|---|
| RS232    |  |  |
| RS485    |  |  |
| RS422    |  |  |

RS-485 cable modification:

CN\_COM2 RTX- Data- : short Pin1& Pin4

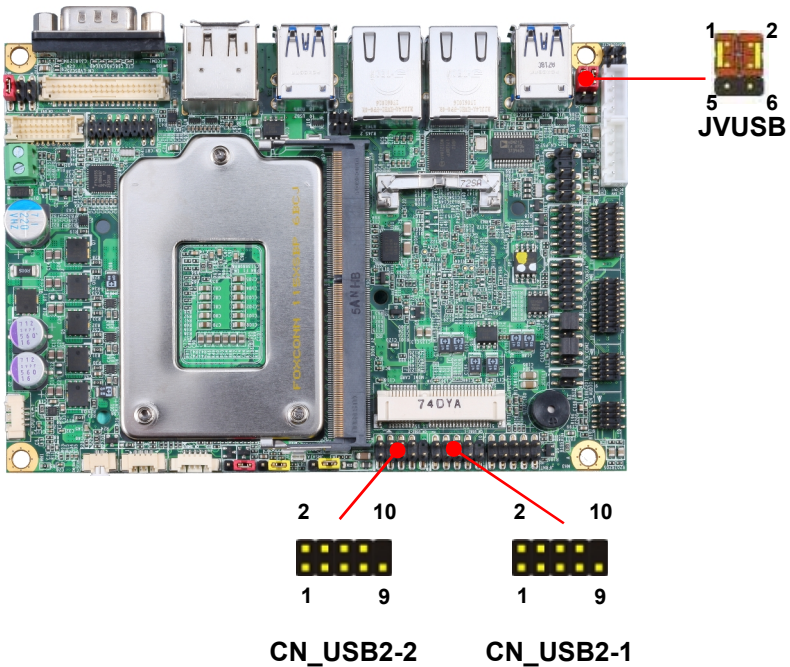
CN\_COM2 RTX+ Data+ : short Pin2& Pin3

## 2.4.5 <USB interface>



**USB3.0  
(LEFT)**

**USB3.0  
(RIGHT)**



**1 2  
5 6  
JVUSB**

**2 10  
1 9**

**2 10  
1 9**

**CN\_USB2-2**

**CN\_USB2-1**

**CN\_USB 2-1/2-2:** 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    |

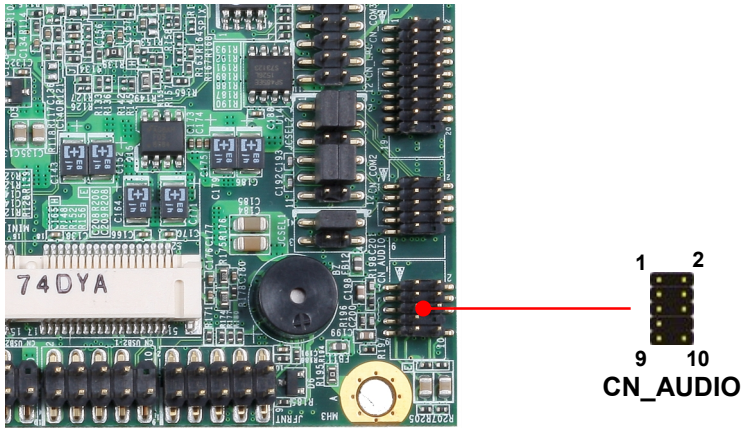
**Install USB3.0 Driver If you want to use CN\_USB 2-1/2-2 in Windows7.**

**JVUSB: 6-pin Power select jumper**

| Pin       | Description     |
|-----------|-----------------|
| 1-3 & 2-4 | 5V_SB (Default) |
| 3-5 & 4-6 | 5V              |

Effective patterns of connection: 1-3 & 2-4 or 3-5 & 4-6

JVUSB can control USB3.0(RIGHT) power.

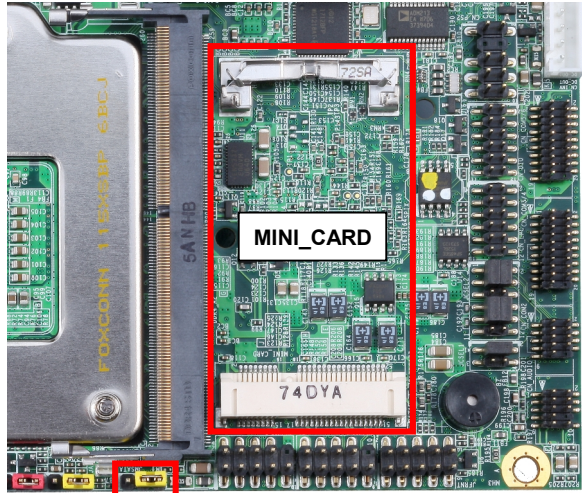
**2.4.6 <Audio interface>**


**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   | Key           |
| 9   | FP_OUT_L | 10  | FP_OUT_DETECT |



## 2.4.7 <Expansion slot>



1 3



**JMSATA**

MINI\_CARD have some special design to compatible our mini-PCIe card.

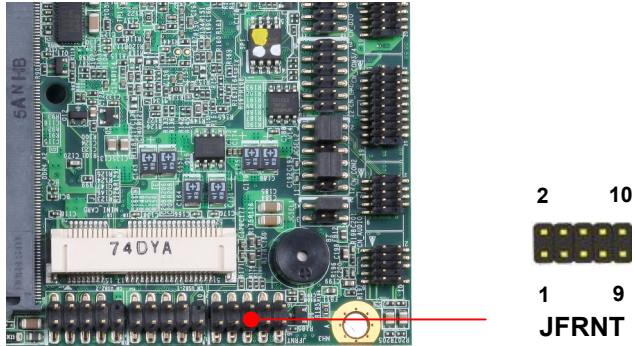
(ex: MPX-574D2, MPX-210D2 etc)

MINI\_CARD support mSATA by JMSATA

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

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

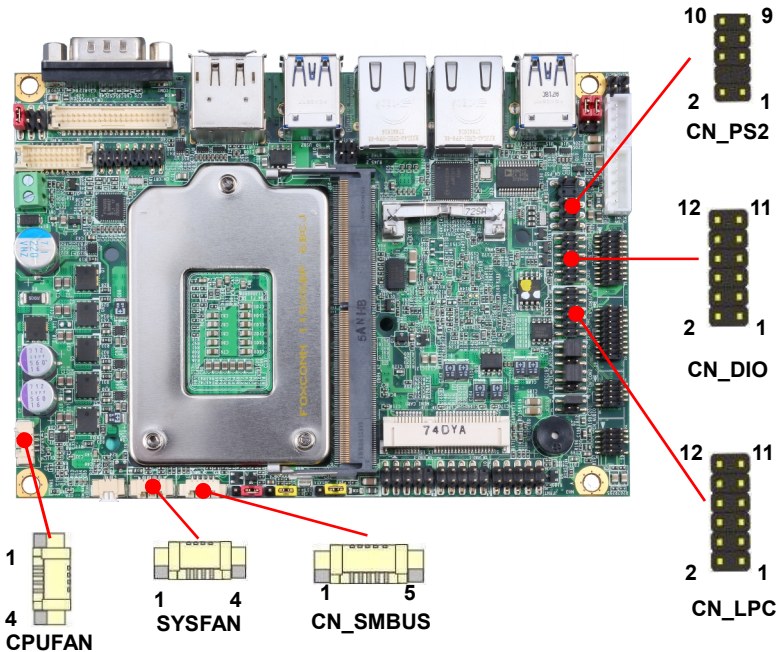
## 2.4.8 <Front panel switch and indicator>



**JFRNT:** Front panel switch and indicator 14-pin header (Pitch 2.54mm)

| 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

| Parameter   | SYM       | MIN | TYP | MAX | UNIT    | Conditions    |
|---|-----------|-----|-----|-----|---------|---------------|
| Input Low Voltage                                       | $V_{t-}$  | 0.5 | 0.8 | 1.1 | V       | $V_{IN}=3.3V$ |
| Input High Voltage                                      | $V_{t+}$  | 1.6 | 2.0 | 2.4 | V       | $V_{IN}=3.3V$ |
| Hysteresis  | $V_{TH}$  | 0.5 | 1.2 |     | V       | $V_{IN}=3.3V$ |
| Input High Leakage                                      | $I_{LIH}$ |     |     | +10 | $\mu A$ | $V_{IN}=3.3V$ |
| Input Low Leakage                                       | $I_{LIL}$ |     |     | -10 | $\mu A$ | $V_{IN}=0V$   |
| <b>Open-drain output pin with 12-mA sink capability</b> |           |     |     |     |         |               |
| Output Low Voltage                                      | $V_{OL}$  |     |     | 0.4 | V       | $I_{OL}=12mA$ |

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

| Pin | Signal | Pin | Signal |
|-----|--------|-----|--------|
| 1   | GND    | 2   | GND    |
| 3   | GPIO0  | 4   | GPIO4  |
| 5   | GPIO1  | 6   | GPIO5  |
| 7   | GPIO2  | 8   | GPIO6  |
| 9   | GPIO3  | 10  | GPIO7  |
| 11  | 5V     | 12  | 12V    |

**CN\_LPC: LPC 12-pin header (Pitch 2.00mm)**

| Pin | Signal  | Pin | Signal |
|-----|---------|-----|--------|
| 1   | CLK     | 2   | RST    |
| 3   | -LFRAME | 4   | LAD3   |
| 5   | LAD2    | 6   | LAD1   |
| 7   | LAD0    | 8   | 3.3V   |
| 9   | SERIRQ  | 10  | GND    |
| 11  | 3.3VSB  | 12  | NC     |

**CN\_PS/2: PS/2 10-pin header (Pitch 2.54mm)**

| Pin | Signal  | Pin | Signal |
|-----|---------|-----|--------|
| 1   | KB_DATA | 2   | M_DATA |
| 3   | NC      | 4   | NC     |
| 5   | GND     | 6   | GND    |
| 7   | VCC     | 8   | VCC    |
| 9   | KB_CLK  | 10  | M_CLK  |

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

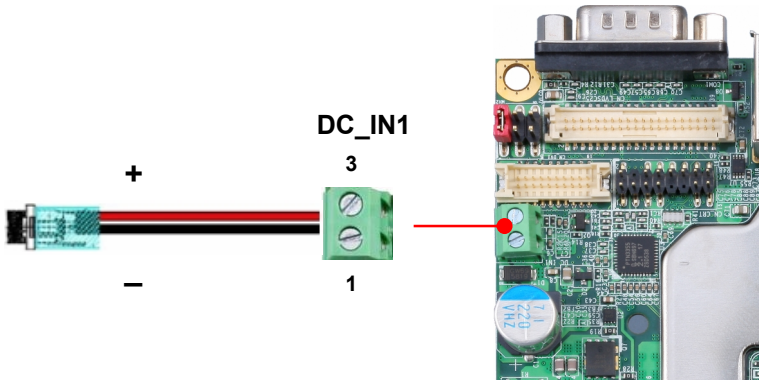
| Pin | Signal |
|-----|--------|
| 1   | 5V     |
| 2   | NC     |
| 3   | SMBDAT |
| 4   | SMBCLK |
| 5   | GND    |

**CPUFAN & SYSFAN: cooler fan 4-pin connector**

| Pin    | 1   | 2   | 3      | 4       |
|--------|-----|-----|--------|---------|
| Signal | GND | 12V | Sensor | Control |

## 2.5 <Power supply>

### 2.5.1 <Power input>

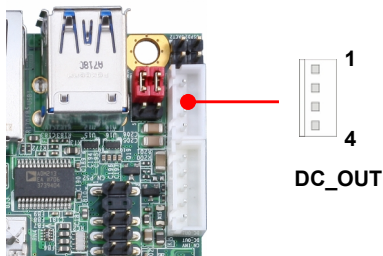


DC\_IN1: Terminal Block 2-pin power connector

| Pin | Signal | Pin | Signal   |
|-----|--------|-----|----------|
| 1   | GND    | 3   | Power in |

The power support 9~35V wide voltage input.

### 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. Please make a bootable UFD which can boot into DOS environment.
2. Unzip the flash tool and copy it into bootable UFD.
3. Add a bin file to the same folder..
4. Power on the system and flash the BIOS under the DOS environment.  
(Command: fpt -savemac -f xxx.bin)
5. Power off the system and then power on.

## Appendix B <LCD Panel Type select>

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

You can find the setting from

Advanced→Intel Advanced Menu

SA configuration→Graphics configuration→LCD control→LCD Panel Type

| Phoenix SecureCore Technology Setup  |                                 |
|--|---------------------------------|
| Advanced   |                                 |
| Intel Advanced Menu  | Item Specific Help              |
| PCI Subsystem Settings<br>ACPI Settings<br>CPU Configuration<br>Power & Performance<br>System Agent (SA) Configuration<br>PCH-IO Configuration<br>Manageability Application Configuration<br>Super IO Chip | System Agent (SA)<br>Parameters |
| <b>F1</b> Help <b>+</b> / <b>-</b> Change Values <b>F9</b> Setup Defaults<br><b>Esc</b> Exit <b>&lt;&gt;</b> Select Menu <b>Enter</b> Select Sub-Menu <b>F10</b> Save and Exit                             |                                 |

| Phoenix SecureCore Technology Setup  |                    |
|--|--------------------|
| Advanced   |                    |
| Graphics Configuration   | Item Specific Help |
| Internal Graphics      [Auto]<br>GTT Size                      [8MB]<br>Aperture Size                [256MB]<br>DUMT Pre-Allocated        [32M]<br>DUMT Total Gfx Mem        [256M]<br>Gfx Low Power Mode        [Enabled]<br>UDD Enable                    [Enabled]<br>HDCP Support                [Enabled]<br>Algorithm                      [One-time]<br>PM Support                    [Enabled]<br>PAUP Enable                  [Enabled]<br>Cd Clock Frequency         [675 Mhz]<br>IUER Button Enable         [Disabled]<br>LCD Control<br>Intel(R) Ultrabook Event Support | LCD Control        |
| <b>F1</b> Help <b>+</b> / <b>-</b> Change Values <b>F9</b> Setup Defaults<br><b>Esc</b> Exit <b>&lt;&gt;</b> Select Menu <b>Enter</b> Select Sub-Menu <b>F10</b> Save and Exit   |                    |

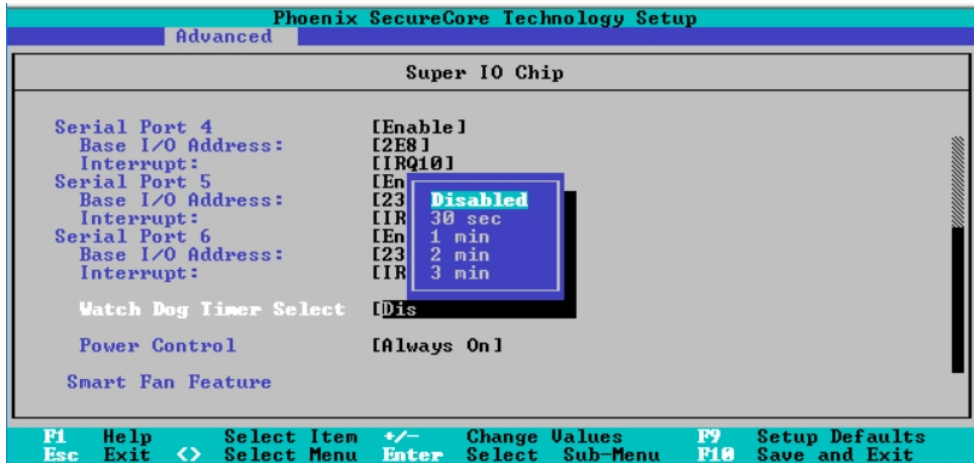
| BIOS panel type selection form (BIOS Version:1.0) |                                  |                       |             |
|---|----------------------------------|-----------------------|-------------|
| Single / Dual channel                             |                                  | Single / Dual channel |             |
| NO.   | Type                             | NO.                   | Type        |
| 1   | VBIOS DEFAULT                    | 9                     | 1366 x 768  |
| 2   | 640 x 480                        | 10                    | 1680 x 1050 |
| 3   | 800 x 600                        | 11                    | 1920 x 1200 |
| 4   | 1024 x 768                       | 12                    | 1400 x 900  |
| 5   | 1280 x 1024                      | 13                    | 1600 x 900  |
| 6   | 1400 x 1050 Reduced Blanking     | 14                    | 1024 x 768  |
| 7   | 1400 x 1050 non-Reduced Blanking | 15                    | 1280 x 800  |
| 8   | 1600 x 1200                      | 16                    | 1920 x 1080 |
|   |                                  | 17                    | OEM         |

## 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 → Intel Advanced Menu → Super IO Chip



### Timeout value range

1 to 255 Minute and Second

### 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 NCT6106D datasheet

## Appendix D <Hardware monitor >

Find the setting from Misc-→SIO NCT6106D Hardware Monitor

| Phoenix SecureCore Technology Setup |            |                    |      |
|-------------------------------------|------------|--------------------|------|
|                                     |            |                    | Misc |
| Hardware Monitor                    |            | Item Specific Help |      |
| System Temperature                  | [30.5 C]   |                    |      |
| CPU Temperature                     | [29.5 C]   |                    |      |
| System Fan Speed                    | [0 RPM]    |                    |      |
| CPU Fan Speed                       | [6585 RPM] |                    |      |
| AUX Fan Speed                       | [0 RPM]    |                    |      |
| Battery 3V (VBAT)                   | [3.000 V]  |                    |      |
| CPU VCORE                           | [1.000 V]  |                    |      |
| 12V                                 | [11.985 V] |                    |      |
| 5V                                  | [5.000 V]  |                    |      |

|            |      |                |       |                 |            |                |
|------------|------|----------------|-------|-----------------|------------|----------------|
| <b>F1</b>  | Help | Select Item    | +/-   | Change Values   | <b>F9</b>  | Setup Defaults |
| <b>Esc</b> | Exit | <> Select Menu | Enter | Select Sub-Menu | <b>F10</b> | Save and Exit  |

## Appendix E <Programmable GPIO >

The GPIO' can be programmed with the MS-DOS debug program using simple IN/OUT commands.

The DC characteristics please refer to GPIO paragraph (Page20).

|             |   |   |   |   |   |   |   |   |
|-------------|---|---|---|---|---|---|---|---|
| <b>GPIO</b> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| <b>bit</b>  | 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

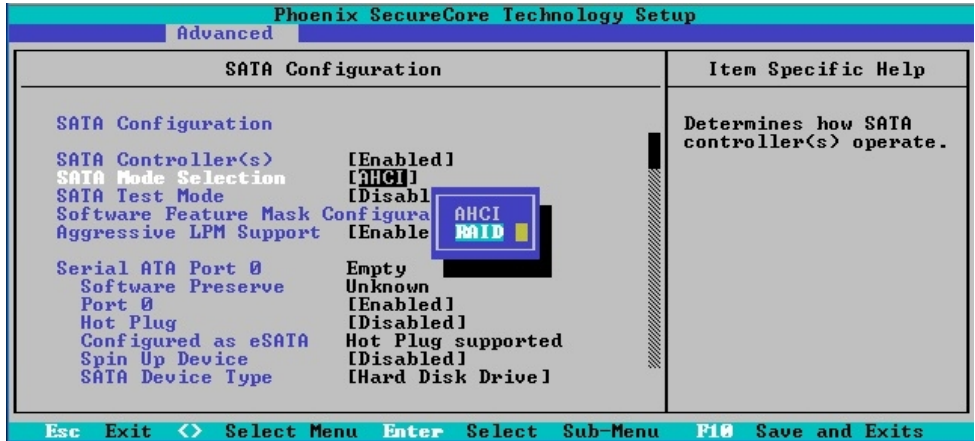
- o 4E F2
- o 4F XX ;set "01", the respective bit are inverted (Both input and output)
- ;set "00", the respective bit are normal

For further information, please refer to Nuvoton NCT6106D datasheet

## Appendix F <RAID Setting>

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

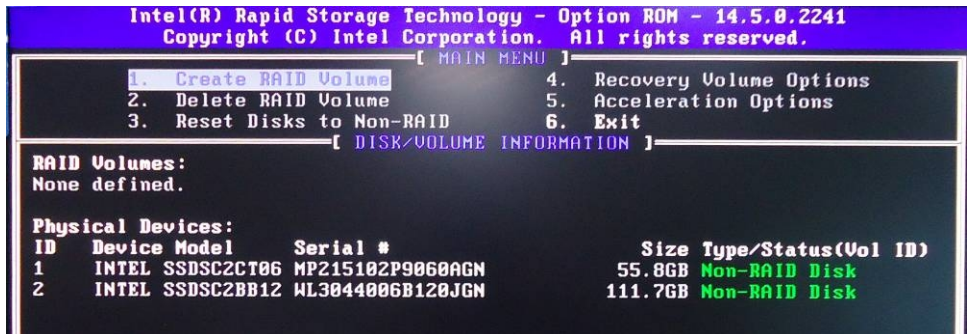
[Advanced] → [Intel Advanced Menu] → [PCH-IO Configuration]  
 → [SATA Configuration] → [SATA Mode Selection]



If this screen stop time is too short, it can be set in the BIOS.

[Advanced] → [Intel Advanced Menu] → [PCH-IO Configuration]  
 → [SATA Configuration] → [Software Feature Mask Configuration]  
 → [OROM UI Normal Delay] → [ 8 sec] (Need to set RAID mode first)

At boot time, press <CTRL + I> to enter the RAID configuration menu.



## Appendix G < Setup ADP-3355,ADP-3460 >

LS-37KT series have a 2nd CRT or 2nd LVDS, it's no need install extra driver.

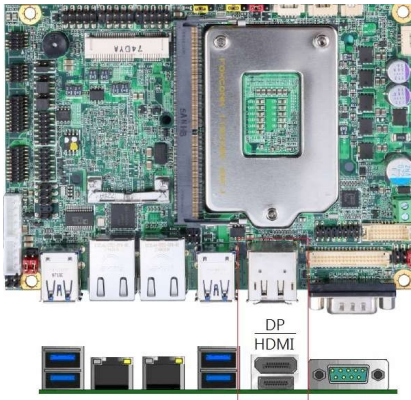
For further information, please refer to the manual.

ADP-3355 manual [Link](#)

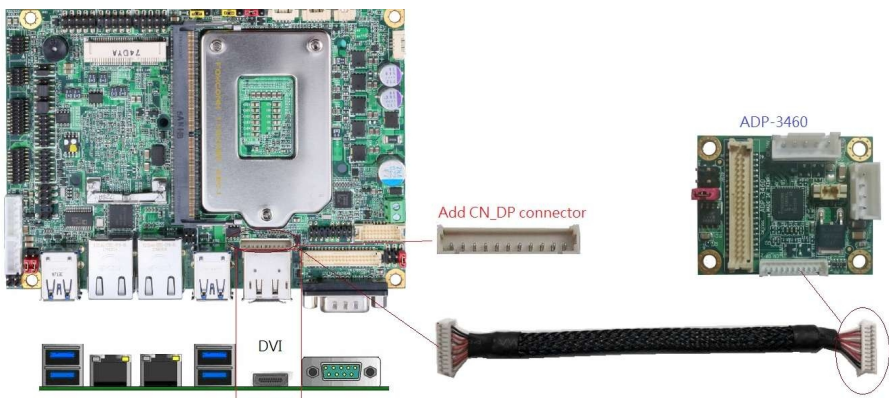
ADP-3460 manual [Link](#)

Please refer the pictures below, they show the difference between LS-37K and LS-37KT.

### LS-37K



### LS-37KT



## 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.

### Taiwan Commate computer Inc.

|                |  |
|----------------|--|
| <b>Address</b> | 19F., NO.94, Sec. 1, Xintai 5 <sup>th</sup> Rd., Xizhi Dist., New Taipei<br>City 22102, Taiwan.  |
| <b>TEL</b>     | +886-2-26963909  |
| <b>FAX</b>     | +886-2-26963911  |
| <b>Website</b> | <a href="http://www.commell.com.tw">www.commell.com.tw</a>   |
| <b>E-mail</b>  | <a href="mailto:info@commell.com.tw">info@commell.com.tw</a> (General information)<br><a href="mailto:tech@commell.com.tw">tech@commell.com.tw</a> (Technical Support) |

**Commell is a brand name of Taiwan Commate computer Inc.**