

# LE-376

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## 3.5 Miniboard

### User's Manual

Edition 1.0

2010/08/03



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## Packing List:

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

### Hardware:

LE-376 "3.5 Miniboard" x 1

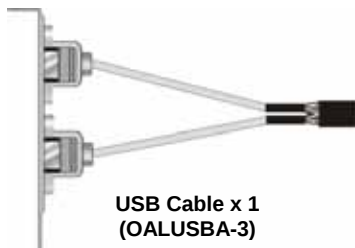
### Cable Kit:



DC Power Cable x 1  
(OALDC-2)



SATA Cable x 1  
(OALSATA-L)



USB Cable x 1  
(OALUSBA-3)



Audio Cable x 1  
(OALPJ-HDUNB)



1 to 3 power output cable x 1  
(OAL4P-2)



Dual COM PORT cable x 1  
(OALES-BKU2NB)

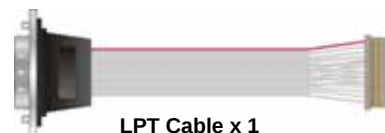


CN\_PS2 Cable x 1  
(OALPS2/KM)



COM Port Cable x 1  
(OALES-BKU1NB)

### Option:



LPT Cable x 1  
(OALLPT-DF-14)

### Printed Matters:

Driver CD x 1 (Including User's Manual)

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## Chapter 1 <Introduction>

### 1.1 <Product Overview>

LE-376G/H/A is the 3.5 miniboard, with Intel® Atom N450/D410/D510 processor, integrated GMA3150 graphics, Intel® ICH8M, DDR2 SO-DIMM memory, Realtek HD Audio, CF, SATAII, LVDS, LPT, IrDA, DIO, USB, CN\_PS2, DC\_OUT, SMBUS, CN\_INV and Intel® 82583V Gigabit LAN.

#### **Intel® Atom Processor**

The Intel® Atom N450 (D410/ D510) processor supports one channel of 667 MHz DDR2 SDRAM up to 2GB/4GB/4GB. The chipset features power-efficient graphics with an integrated 18-bit 3D graphics engine based on Intel® Graphics Media Accelerator 3150 architecture with LVDS, CRT display ports. The DMI is designed into the Pineview-M(D) processor to provide an efficient high-bandwidth communication channel between the processor and the ICH8M.

#### **Embedded Intel® ICH8M**

The board integrates Intel® ICH8M. It provides I/O capabilities and flexibility via high-bandwidth interfaces such as PCIE and Hi-Speed USB 2.0 connectivity. Serial ATA. HD Audio, Mini PCI, CF, LAN.

#### **Flexible Extension Interface**

The board also provides Compact Flash Type II socket and one PCIE mini card socket.

## 1.2 <Product Specification>

### General Specification

|                     |                                                                                                                                                                                  |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Form Factor         | 3.5 miniboard                                                                                                                                                                    |
| CPU                 | Intel® Atom N450 processor 1.66GHz (LE-376G)<br>Intel® Atom D410 processor 1.66GHz (LE-376H)<br>Intel® Atom D510 processor 1.66GHz (LE-376A)<br>Package type: FCBGA559           |
| Memory              | 1 x 200-pin DDR2 SO-DIMM 667MHz SDRAM up to 2GB (LE-376G Only)<br>1 x 200-pin DDR2 SO-DIMM 667MHz SDRAM up to 4GB (LE-376H/A Only)<br>Unbuffered, none-ECC memory supported only |
| Chipset             | Intel® ICH8M                                                                                                                                                                     |
| BIOS                | Phoenix-Award v6.00PG 8Mb SPI flash BIOS                                                                                                                                         |
| Power Management    | ACPI 2.0 compliant , supports power saving mode                                                                                                                                  |
| Watchdog Timer      | System reset programmable watchdog timer with 1 ~ 255 sec./min. of timeout value                                                                                                 |
| Real Time Clock     | Intel® ICH8M built-in RTC with lithium battery                                                                                                                                   |
| Integrated Graphics | Intel® integrated extreme GMA 3150(Graphic Media Accelerator) Technology                                                                                                         |
| Serial ATA          | 2 x Serial ATAII interfaces<br>Up to 300MB/s of transfer rate                                                                                                                    |
| Video Memory        | Up to 384MB shared with system memory                                                                                                                                            |
| LVDS interface      | Chipset Integrated 18-bit single channel LVDS with Hirose connector with +3.3V/5V supply                                                                                         |
| Solid State Disk    | 1 x Compact Flash Type II socket                                                                                                                                                 |
| Audio Interface     | Intel ICH8M integrated with Realtek ALC888 HD Codec                                                                                                                              |
| LAN Interface       | Intel 82583V Gigabit Ethernet controller                                                                                                                                         |
| Extended Interface  | 1 x PCIE Mini card socket , 1 x Mini PCI socket to support Mini PCI Type III B                                                                                                   |
| Internal I/O Port   | 1 x RS232/RS422/485 , 4 x RS232 , 1 x LVDS , 1 x CN_INV , 1 x LPT , 1 x IrDA , 4 x USB2.0 , 2 x SATAII , 1 x SMBUS , 1 x DC_OUT , 1 x CN_PS2 , 1 x DIO and 1 x HD Audio          |
| External I/O Port   | 3 x RJ45 , 1 x USB , 1 x VGA port , 1 x RS232 port                                                                                                                               |
| Power Requirement   | 9~24V DC Input                                                                                                                                                                   |
| Dimension           | 146mm x 101mm                                                                                                                                                                    |
| Temperature         | Operating within 0~60 centigrade<br>Storage within -20~85 centigrade                                                                                                             |

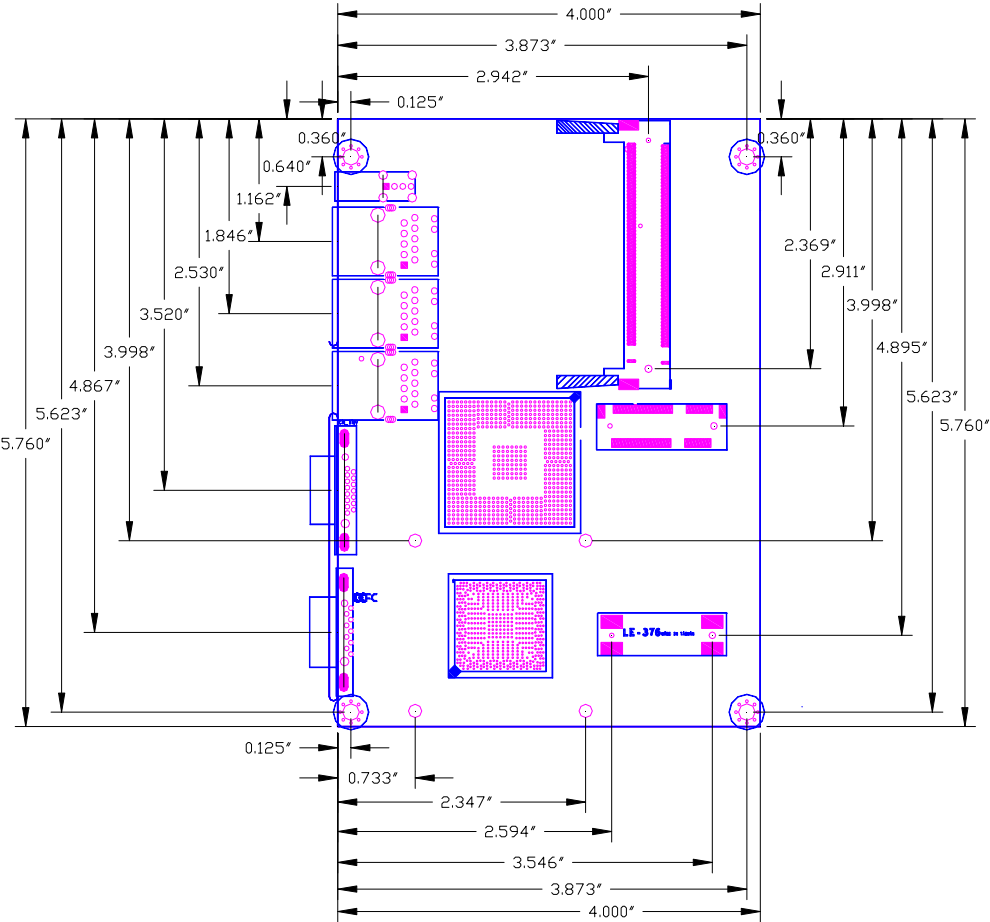
### Ordering Code

|         |                                                                                                                         |
|---------|-------------------------------------------------------------------------------------------------------------------------|
| LE-376G | Support Intel® Atom <b>N450</b> processor with onboard VGA, LVDS for 18bit, Audio, Giga LAN, USB2.0, CF, PCIE mini card |
| LE-376H | Support Intel® Atom <b>D410</b> processor with onboard VGA, LVDS for 18bit, Audio, Giga LAN, USB2.0, CF, PCIE mini card |
| LE-376A | Support Intel® Atom <b>D510</b> processor with onboard VGA, LVDS for 18bit, Audio, Giga LAN, USB2.0, CF, PCIE mini card |

The specifications may be different as the actual production.

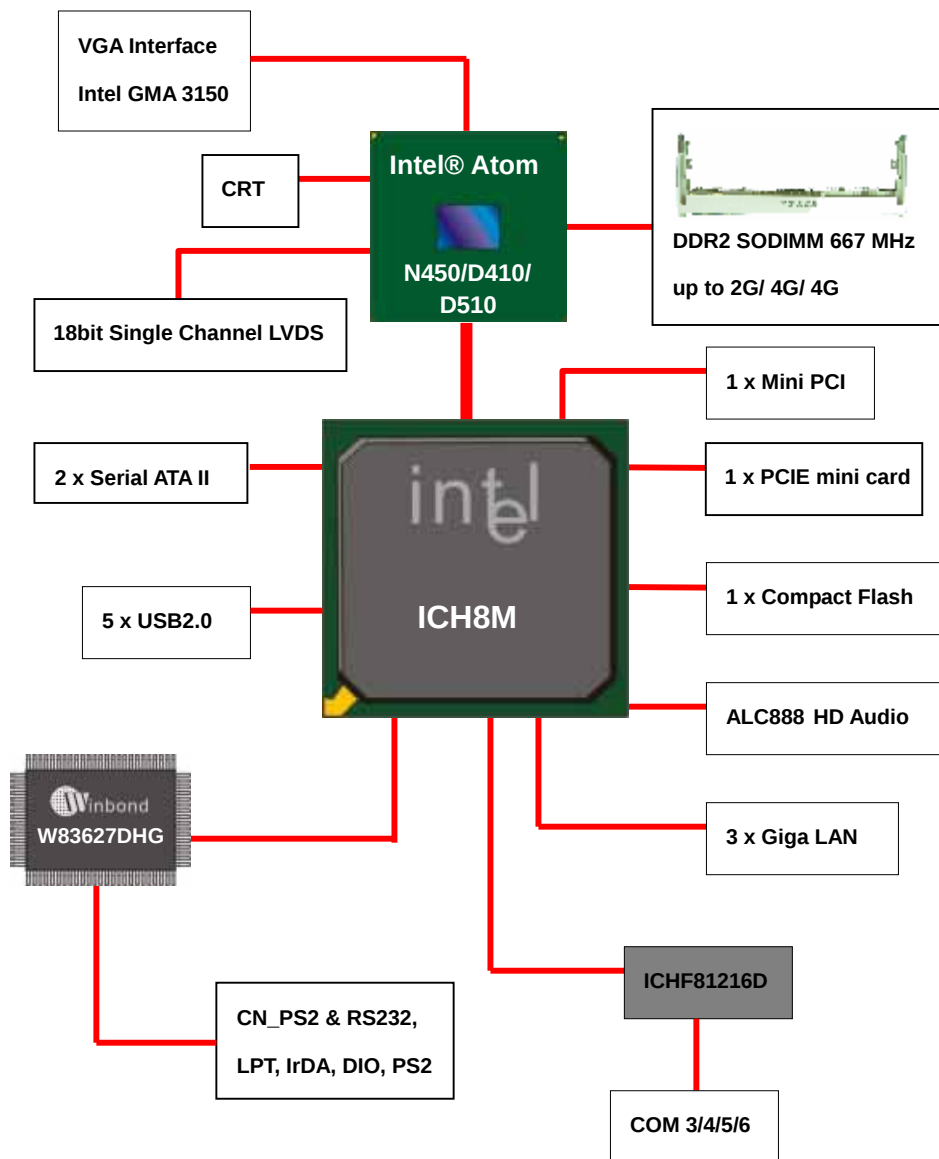
For further product information please visit the website at <http://www.comnell.com.tw>

1.3 <Mechanical Drawing>



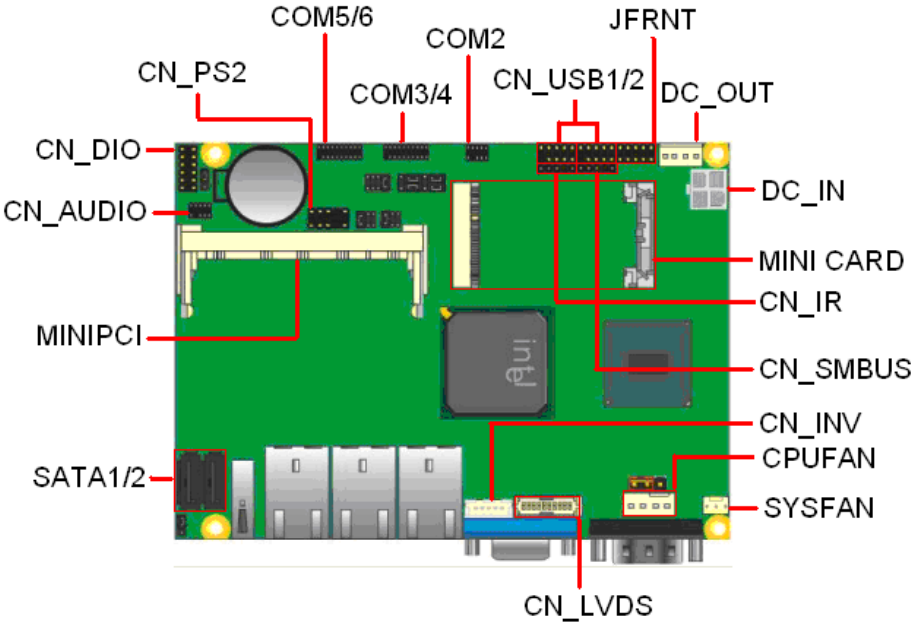
Unit: inch

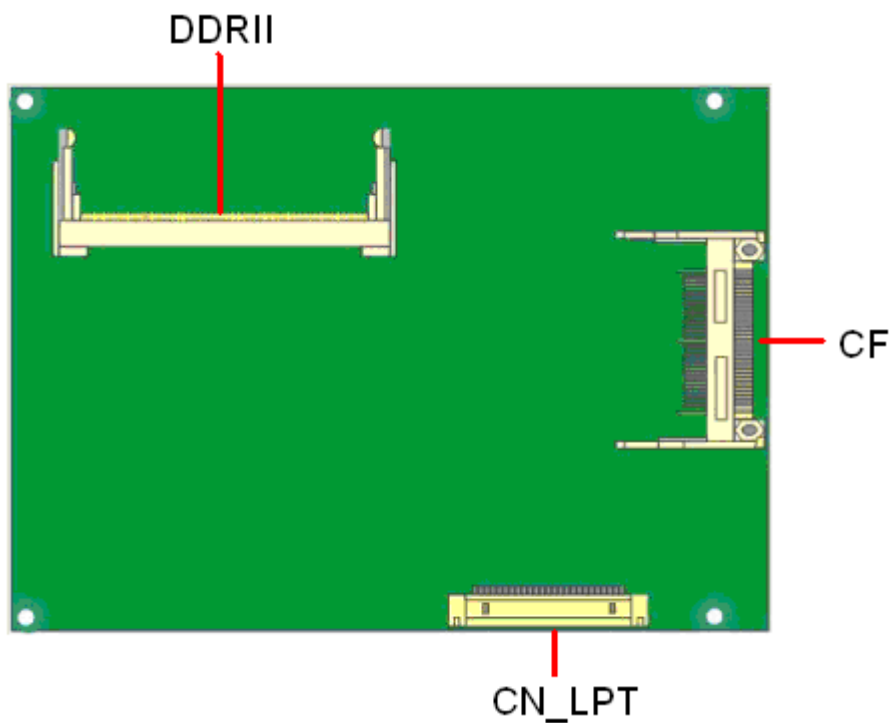
## 1.4 <Block Diagram>



## Chapter 2 <Hardware Setup>

### 2.1 <Connector Location>



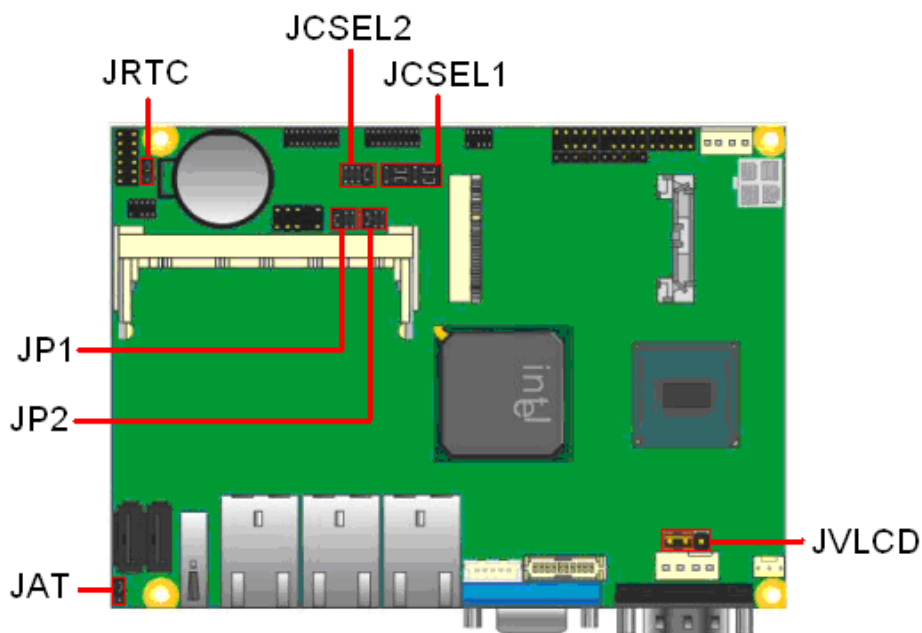


## LE-376G/H/A



## 2.2 <Jumper Reference>

| Jumper           | Function                                                |
|------------------|---------------------------------------------------------|
| JRTC             | CMOS Operating/Clear Setting                            |
| JVLCD            | Panel Voltage Setting                                   |
| JAT              | Power mode select                                       |
| JCSEL1<br>JCSEL2 | CN_COM2 RS-232 RS422 RS485 Setting / CN_IR IrDA Setting |
| JP1<br>JP2       | CN_COM3/4/5/6 RS-232                                    |



## 2.3 <Connector Reference>

### 2.3.1 <Internal Connector>

| Connector        | Function                                                   | Remark |
|------------------|------------------------------------------------------------|--------|
| DDRII            | 200 –pin DDR2 SO-DIMM SDRAM slot                           |        |
| SATA1/2          | 7-pin Serial ATA connector                                 |        |
| CF               | Compact Flash Type II socket                               |        |
| MINI_CARD        | PCIE mini card socket                                      |        |
| CN_LVDS          | 10 x 2-pin LVDS connector                                  |        |
| CN_INV           | 5-pin LCD inverter connector                               |        |
| CN_USB1/2        | 5 x 2-pin USB connector                                    |        |
| CN_AUDIO         | 5 x 2-pin audio connector                                  |        |
| CN_COM2          | 5 x 2-pin com connector                                    |        |
| CN_COM3/4/5/6    | 10 x 2-pin com connector                                   |        |
| JFRNT            | 10-pin switch/indicator connector                          |        |
| FAN              | 3-pin system cooler fan connector                          |        |
| DC_OUT           | 4-pin power output connector                               |        |
| DC_IN            | DC 12V input connector                                     |        |
| CN_LPT           | 25-pin LPT connector                                       |        |
| CN_DIO           | 6 x 2-pin digital I/O connector                            |        |
| CN_IR            | 5-pin IrDA connector                                       |        |
| MINIPCI          | 124-pin Mini PCI socket Type IIIA                          |        |
| MINI_CARD        | 52-pin PCI Express mini card                               |        |
| JCSEL1<br>JCSEL2 | CN_COM2 RS-232 RS422 RS485 Setting /<br>CN_IR IrDA Setting |        |
| JRTC             | CMOS Operating/Clear Setting                               |        |
| CN_PS2           | 5 x 2-pin PS2 connector                                    |        |
| CN_SMBUS         | 5-pin SMBUS connector                                      |        |
| JAT              | Power mode select                                          |        |
| JRTC             | CMOS Operating/Clear Setting                               |        |

### 2.3.2 <External Connector>

| Connector | Function                         | Remark |
|-----------|----------------------------------|--------|
| CRT       | DB15 VGA connector               |        |
| USB       | USB keyboard and mouse connector |        |
| RJ45      | RJ45 LAN connector               |        |
| COM1      | DB9 RS232 COM Port               |        |

## 2.4 <CPU and Memory Setup>

Non-ECC, unbuffered memory is supported only.

**LE-376G** provides one 200-pin DDR2 SO-DIMM to support DDR2 667 memory modules support up to 2GB of capacity.

**Suggestion:**

DDR2 SO-DIMM Modules:

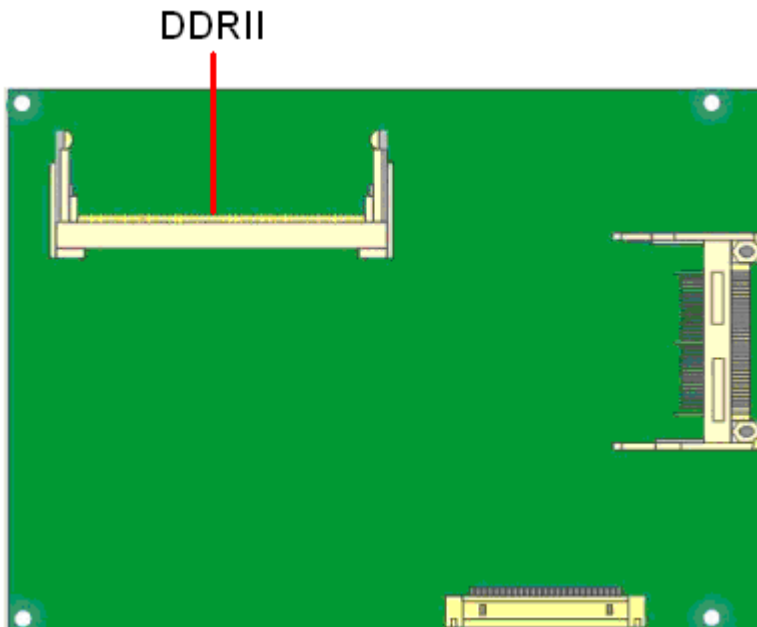
- Raw Card A = 2 Ranks of x16 SDRAMs (Double-sided)
- Raw Card C = 1 Rank of x16 SDRAMs (Single-sided)

**LE-376H/ A** provides one 200-pin DDR2 SO-DIMM to support DDR2 667 memory modules support up to 4GB of capacity.

**Suggestion:**

DDR2 SO-DIMM Modules:

- Raw Card C = 1 Rank of x16 SDRAMs (Single -sided)
- Raw Card D = 1 Rank of x8 SDRAMs (Single-sided)
- Raw Card E = 2 Ranks of x8 SDRAMs (Double -sided)



## 2.5 <CMOS & ATX Setup>

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.

Jumper: **JRTC**

Type: Onboard 3-pin jumper

| JRTC | Mode             |
|------|------------------|
| 1-2  | Clear CMOS       |
| 2-3  | Normal Operation |

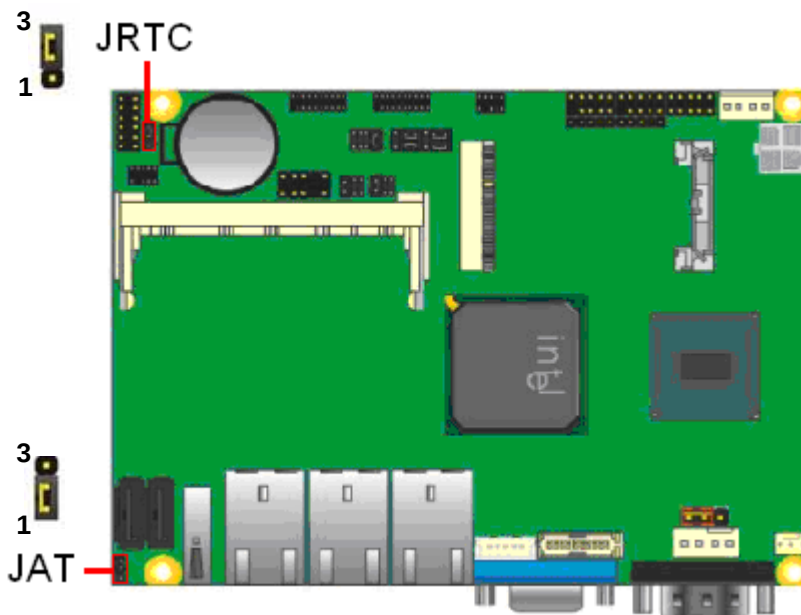
Default setting

Jumper: **JAT**

Type: onboard 3-pin jumper

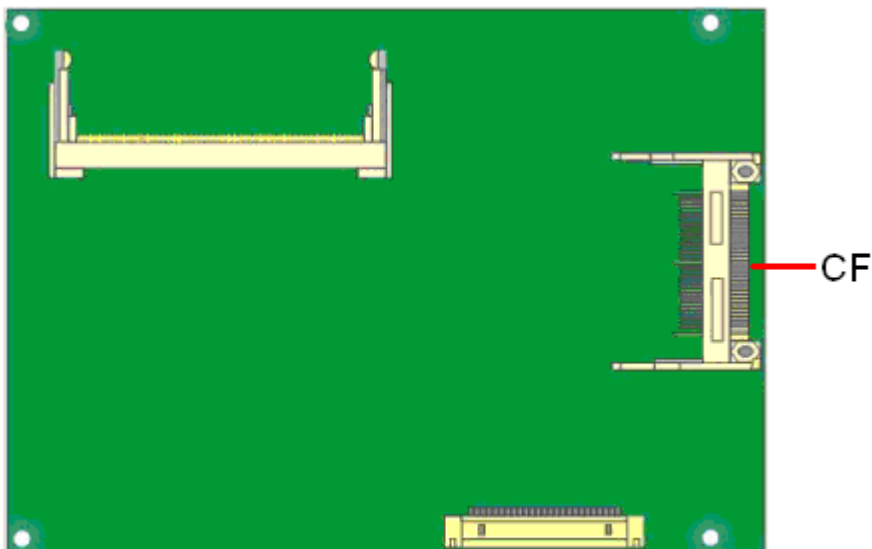
| JAT | Mode     |
|-----|----------|
| 1-2 | AT Mode  |
| 2-3 | ATX Mode |

Default setting



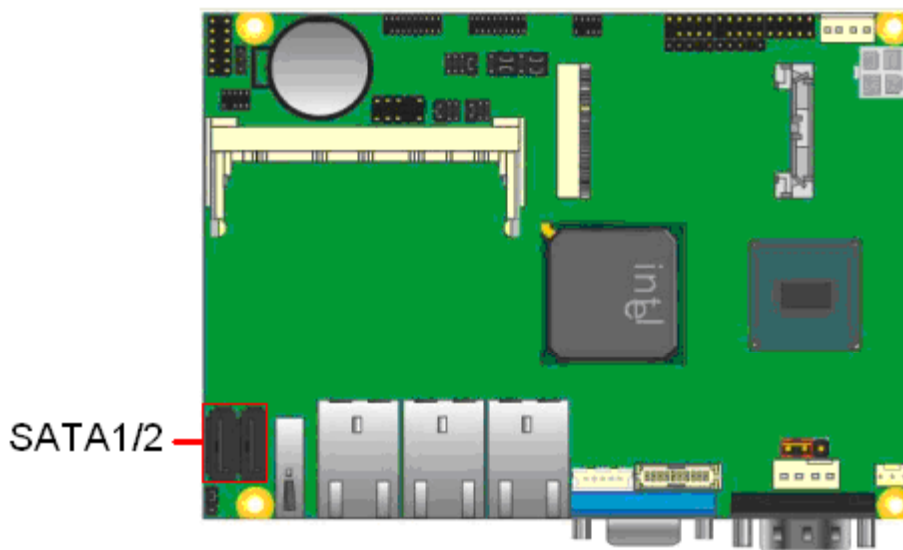
## 2.6 <CF Interface>

The board has one Compact Flash Type II socket on the solder side.



## 2.7 <Serial ATA Interface>

Based on Intel ICH8M, the board provides one Serial ATAII interfaces with up to 300MB/s of transfer rate.



## 2.8 <LAN Interface>

The Intel® 82583v supports triple speed of 10/100/1000Base-T, with IEEE802.3 compliance.



**LAN**

## 2.9 <Onboard Display Interface>

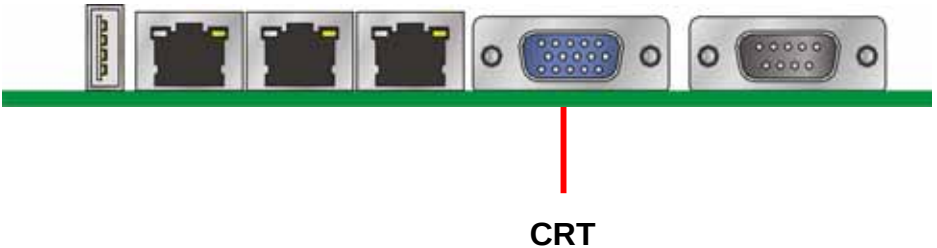
Based on Intel® Atom N450/D410/D510 with built-in GMA (Graphic Media Accelerator) 3150 graphics, the board provides one DB15 on real external I/O port, and one 20-pin LVDS interface with 5-pin LCD backlight inverter connector. The board provides dual display function with clone mode and extended desktop mode for CRT and LVDS.

### 2.9.1 <Analog VGA Interface>

Please connect your CRT or LVDS monitor with DB15 male connector to the onboard DB15 female connector on rear I/O port.

LE-376G supports 1400 x 1050 (WUXGA) resolution displays.

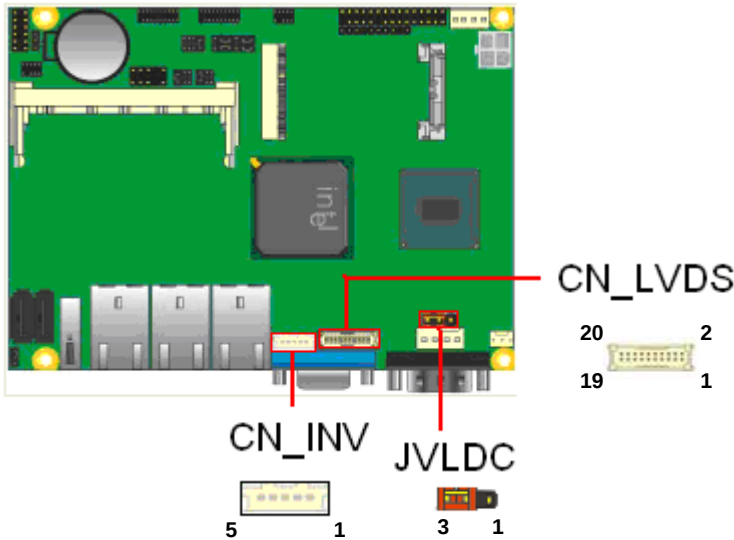
LE-376H/ A supports 2048 x 1536 (WUXGA) resolution displays.



2.9.2 <Digital Display>

The board provides one 20-pin LVDS connector for 18 bit single channel panels,  
LE-376G supports 1280 x 800 (WUXGA) resolution displays.

LE-376H/A supports 1366 x 768 (WUXGA) resolution displays, with one LCD backlight  
inverter connector and one jumper for panel voltage setting



Connector: **CN\_INV**

Type: 5-pin Inverter power connector

Connector model: **molex\_53261-5pin**

| Pin | Description |
|-----|-------------|
| 1   | +12V        |
| 2   | GND         |
| 3   | GND         |
| 4   | GND         |
| 5   | ENABKL      |

Jumper: **JVLCD**

Type: 3-pin Power select jumper

| Pin | Description |
|-----|-------------|
| 1-2 | +5V         |
| 2-3 | +3.3V       |

**Default: 2-3**Connector: **CN\_LVDS**

Type: onboard 20-pin connector for LVDS connector

Connector model: **HIROSE DF13-20DP-1.25V**

| Pin | Signal  | Pin | Signal |
|-----|---------|-----|--------|
| 2   | LCDVCC  | 1   | LCDVCC |
| 4   | GND     | 3   | GND    |
| 6   | TXL0P   | 5   | TXL0N  |
| 8   | TXL1N   | 7   | GND    |
| 10  | GND     | 9   | TXL1P  |
| 12  | TXL2P   | 11  | TXL2N  |
| 14  | TXLCKN  | 13  | GND    |
| 16  | GND     | 15  | TXLCKP |
| 18  | SMBDATA | 17  | SMBCLK |
| 20  | SPDIFO  | 19  | GND    |

## LE-376 User's Manual

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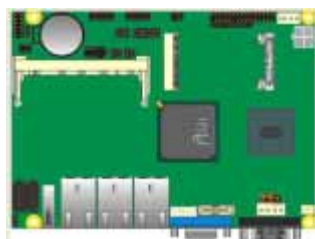
To setup the LCD, you need the component below:

1. A panel with LVDS interfaces.
2. An inverter for panel's backlight power.
3. A LCD cable and an inverter cable.

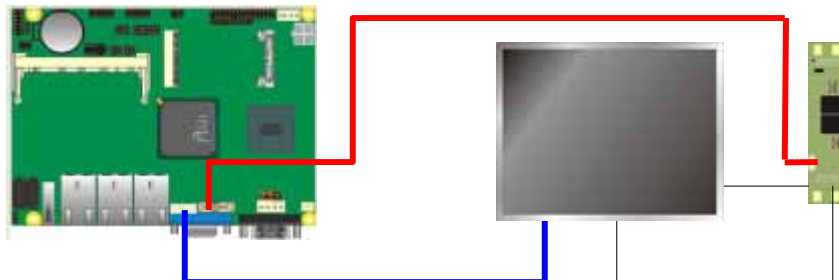
For the cables, please follow the pin assignment of the connector to make a cable, because every panel has its own pin assignment, so we do not provide a standard cable; please find a local cable manufacture to make cables.

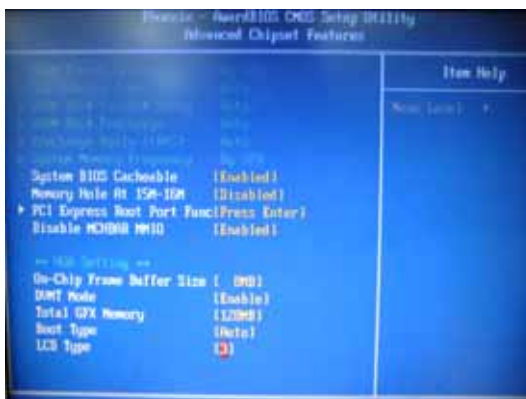
### LCD Installation Guide:

1. Preparing the LE-376, LCD panel and the backlight inverter



2. Please check the datasheet of the panel to see the voltage of the panel, and set the jumper **JVLCD** to +5V or +3.3V.
3. You would need a LVDS type cable.





The panel type mapping is list below:

| LE-376 BIOS panel type selection form |               |
|---------------------------------------|---------------|
| On board Single channel LVDS          |               |
| 18bit                                 |               |
| NO.                                   | Output format |
| 1                                     | 640 x 480     |
| 2                                     | 800 x 480     |
| 3                                     | 800 x 600     |
| 4                                     | 1024 x 600    |
| 5                                     | 1024 x 768    |
| 6                                     | 1280 x 768    |

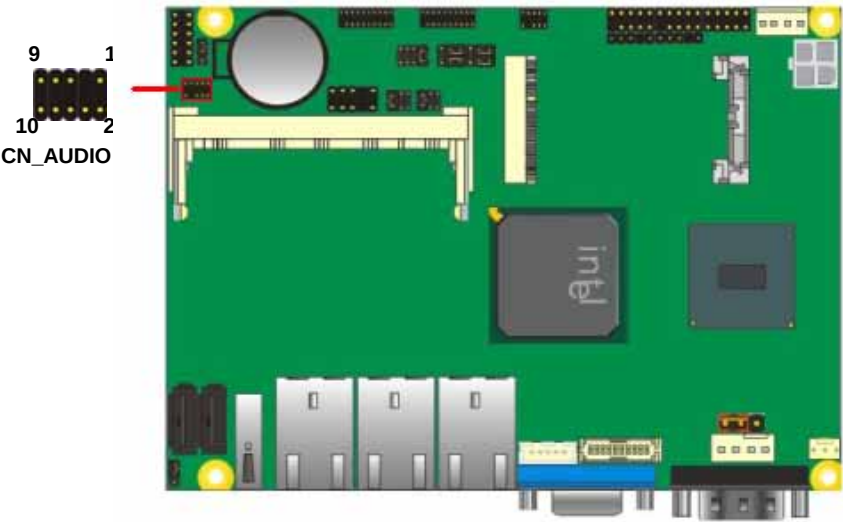
## 2.10 <Onboard Audio Interface>

The board provides the onboard high definition audio with Realtek ALC888

**Connector: CN\_AUDIO**

Type: 10-pin (2 x 5) 1.27mm x 2.54mm-pitch header

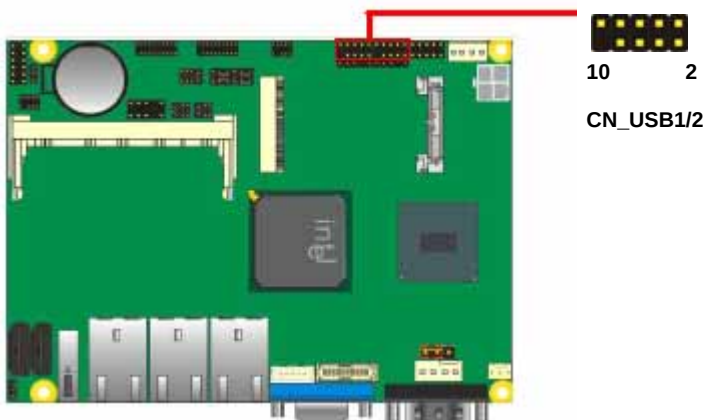
| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | MIC2_L      | 2   | AGND        |
| 3   | MIC2_R      | 4   | AVCC        |
| 5   | FRO_R       | 6   | MIC2_JD     |
| 7   | F_IO_SEN    | 8   | N/C         |
| 9   | FRO_L       | 10  | LINE2_JD    |



## 2.11 <USB2.0 Interface>

Based on Intel® ICH8M , the board provides 4 USB2.0 ports. The USB2.0 interface provides up to 480Mbps of transferring rate.

| Interface      | USB2.0        |
|----------------|---------------|
| Controller     | ICH8M         |
| Transfer Rate  | Up to 480Mb/s |
| Output Current | 500mA         |



Connector: **CN\_USB**

Type: 10-pin (5 x 2) header for USB Port

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | VCC         | 2   | VCC         |
| 3   | Data0-      | 4   | Data1-      |
| 5   | Data0+      | 6   | Data1+      |
| 7   | Ground      | 8   | Ground      |
| 9   | Ground      | 10  | N/C         |

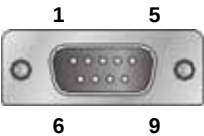
PS: The USB2.0 will be only active when you connecting with the USB2.0 devices, if you insert an USB1.1 device, the port will be changed to USB1.1 protocol automatically. The transferring rate of USB2.0 as 480Mbps is depends on device capacity, exact transferring rate may not be up to 480Mbps.

2.12 <Serial Port Jumper Setting >

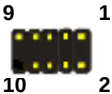
The board provides two RS232 serial ports, with jumper selectable RS422/485/IrDA for COM2.

Connector: **CN\_COM1**

Type: 9-pin D-sub male connector



| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | MDCD1-      | 6   | MDSR1-      |
| 2   | MSIN1-      | 7   | MRTS1-      |
| 3   | MSO1-       | 8   | MCTS1-      |
| 4   | MDTR1-      | 9   | MRI1-       |
| 5   | Ground      |     |             |



Connector: **CN\_COM2**

Type: 9-pin header connector (pitch = 2.54x1.27 mm)

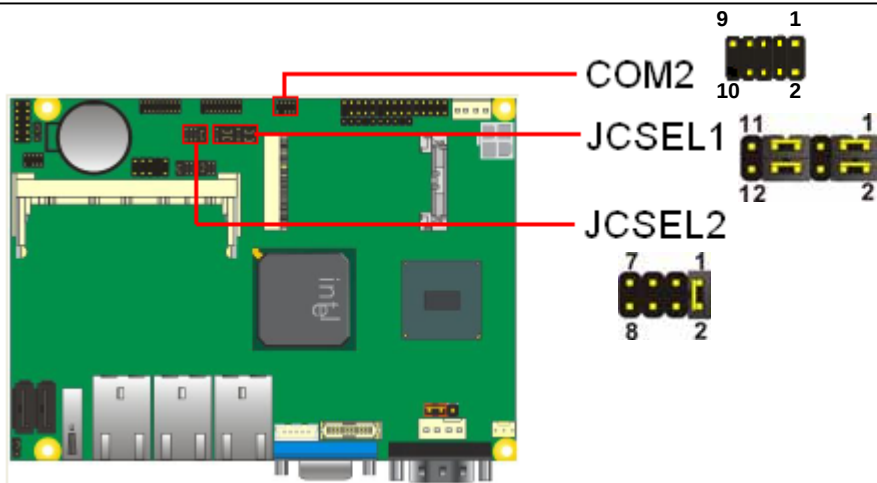
| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | DCDBTXC-    | 2   | SINBTXC     |
| 3   | SOUTBRXC    | 4   | DTRBRXC-    |
| 5   | Ground      | 6   | MDSR2-      |
| 7   | MRTS2-      | 8   | MCTS2-      |
| 9   | MRI2-       |     |             |

Jumper: **JCSEL1,JCSEL2**

Type: 12-pin (6 x 2) & 8-pin (4 x 2) for set COM2 mode jumper

|        | RS232 | RS485 | RS422 | IrDA |
|--------|-------|-------|-------|------|
| JCSEL1 |       |       |       |      |
| JCSEL2 |       |       |       |      |

Default: **RS232**



Connector: **CN\_COM3/4**

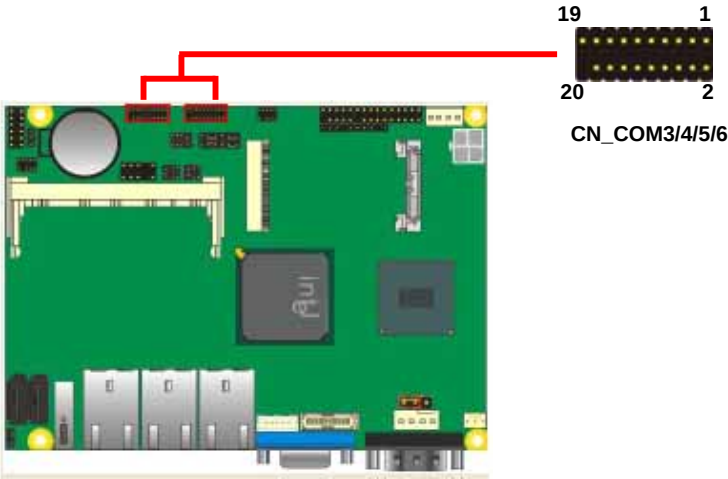
Type: 20-pin (10 x 2) 1.27mm x 2.54mm-pitch header for COM3/4

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | HS_DCD1-    | 2   | HS_RXD1     |
| 3   | HS_TXD1     | 4   | HS_DTR1-    |
| 5   | GND         | 6   | HS_DSR1-    |
| 7   | HS_RTS1-    | 8   | HS_CTS1-    |
| 9   | COM39       | 10  | NC          |
| 11  | HS_DCD2-    | 12  | HS_RXD2     |
| 13  | HS_TXD2     | 14  | HS_DTR2-    |
| 15  | GND         | 16  | HS_DSR2-    |
| 17  | HS_RTS2-    | 18  | HS_CTS2-    |
| 19  | COM49       | 20  | NC          |

Connector: **CN\_COM5/6**

Type: 20-pin (10 x 2) 1.27mm x 2.54mm-pitch header for COM5/6

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | HS_DCD3-    | 2   | HS_RXD3     |
| 3   | HS_TXD3     | 4   | HS_DTR3-    |
| 5   | GND         | 6   | HS_DSR3-    |
| 7   | HS_RTS3-    | 8   | HS_CTS3-    |
| 9   | HS_RI3-     | 10  | NC          |
| 11  | HS_DCD4-    | 12  | HS_RXD4     |
| 13  | HS_TXD4     | 14  | HS_DTR4-    |
| 15  | GND         | 16  | HS_DSR4-    |
| 17  | HS_RTS4-    | 18  | HS_CTS4-    |
| 19  | HS_RI4-     | 20  | NC          |



## 2.13 <Power & FAN Connector >

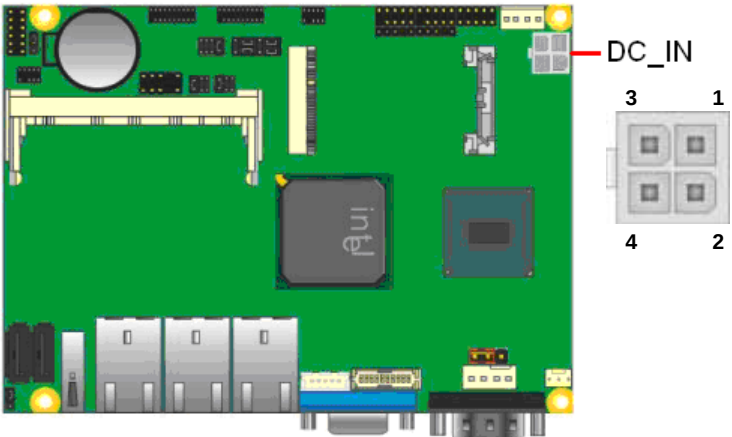
The board requires DC input with 4-pin header, the input voltage is 9V to 24V, for the input current, please take a reference of the power consumption report on appendix.

### 2.13.1 <Power Input>

**Connector: DC\_IN**

Type: 4-pin header

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | Ground      | 3   | +12V        |
| 2   | Ground      | 4   | +12V        |



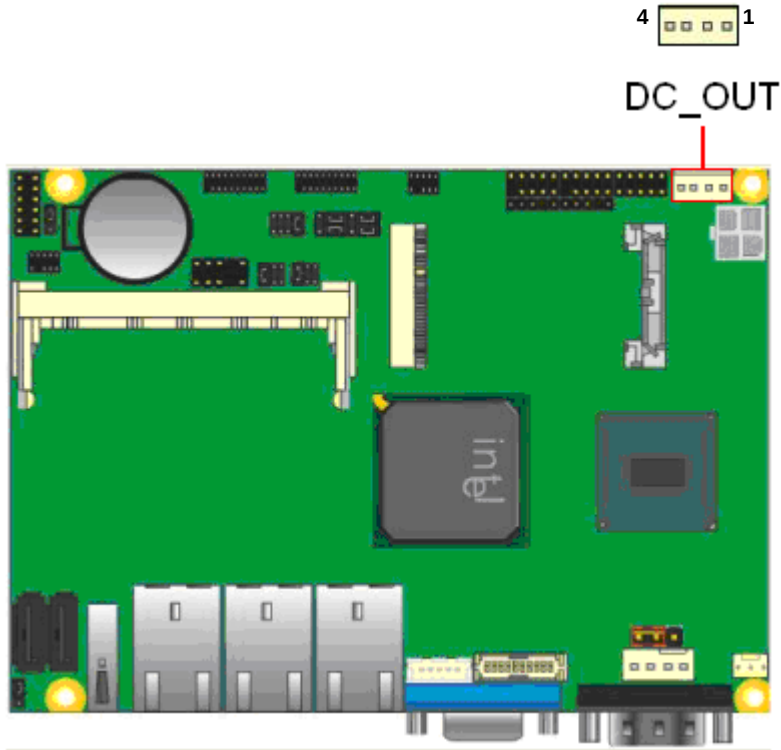
2.13.2 <Power Output>

Connector: **DC\_OUT**

Type: 4-pin connector for +5V/+12V output

| Pin | Description |
|-----|-------------|
| 1   | +12V        |
| 2   | GND         |
| 3   | GND         |
| 4   | +5V         |

Note: Maximum output current **12V/1A, 5V/1A**



2.13.3 <Fan Connector>

Connector: **SYSFAN**

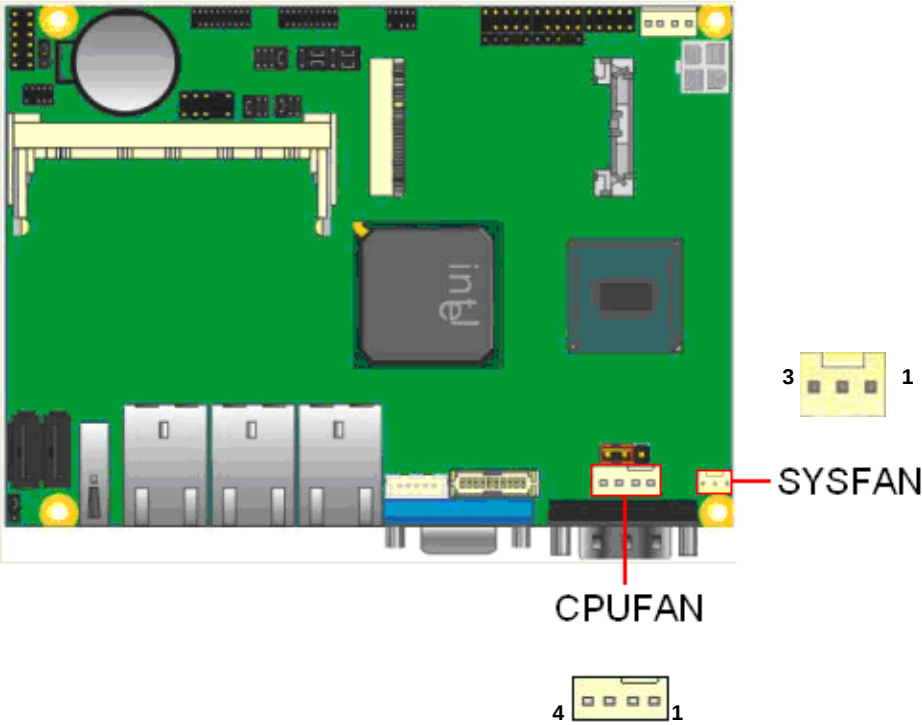
Type: 3-pin fan wafer connector

| Pin | Description | Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|-----|-------------|
| 1   | Ground      | 2   | +12V        | 3   | CSFAN       |

Connector: **CPUFAN**

Type: 4-pin fan wafer connector

| Pin | Description |
|-----|-------------|
| 1   | Ground      |
| 2   | +12V        |
| 3   | P1FAN       |
| 4   | +5V         |



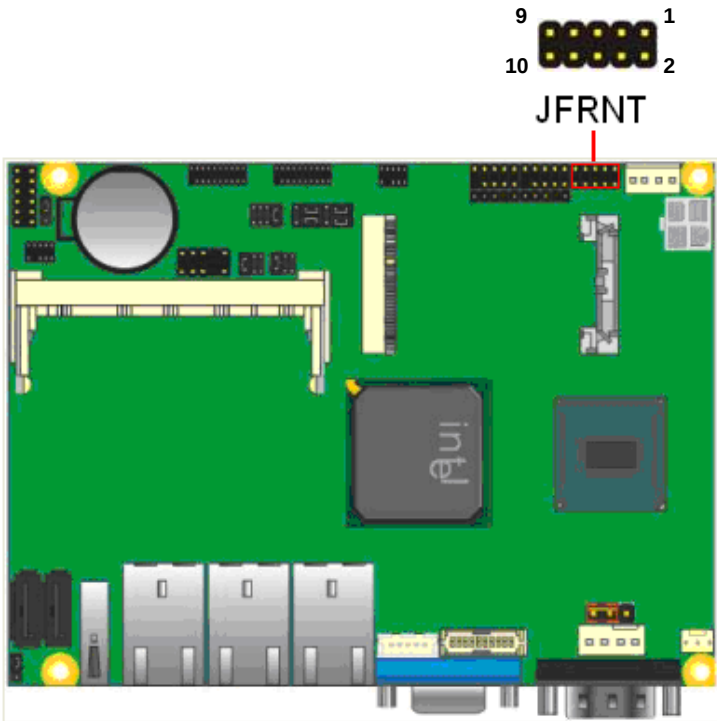
## 2.14 <Indicator and Switch>

The **JFRNT** provides front control panel of the board, such as power button, reset and beeper, etc. Please check well before you connecting the cables on the chassis.

Connector: **JFRNT**

Type: onboard 10-pin (2 x 5) 2.54-pitch header

| Function  | Signal | PIN |    | Signal |
|-----------|--------|-----|----|--------|
| Power     | PWRBT- | 1   | 2  | PWRBT+ |
| Speaker   | SPK-   | 3   | 4  | SPK+   |
| HDD LED   | HLED-  | 5   | 6  | HLED+  |
| Power LED | GND    | 7   | 8  | PWLED+ |
| Reset     | Reset- | 9   | 10 | GND    |





# Appendix A <I/O Port Pin Assignment>

## A.1 <LPT Port>

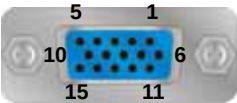
Connector: **CN\_LPT**

Type: 25-pin header for LPT Port



| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | -PSTB       | 2   | AFD-        |
| 3   | PRD0        | 4   | ERR-        |
| 5   | PRD2        | 6   | INIT-       |
| 7   | PRD2        | 8   | SLIN-       |
| 9   | PRD3        | 10  | Ground      |
| 11  | PRD4        | 12  | Ground      |
| 13  | PRD5        | 14  | Ground      |
| 15  | PRD6        | 16  | Ground      |
| 17  | PRD7        | 18  | Ground      |
| 19  | ACK-        | 20  | Ground      |
| 21  | BUSY        | 22  | Ground      |
| 23  | PE          | 24  | Ground      |
| 25  | SLCT        |     |             |

## A.2 <CRT Port >



Connector: CRT

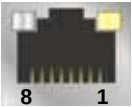
Type: 15-pin D-sub female connector on rear panel

| Pin | Description | Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|-----|-------------|
| 1   | RED         | 6   | Ground      | 11  | N/C         |
| 2   | GREEN       | 7   | N/C         | 12  | 5VCD A      |
| 3   | BLUE        | 8   | Ground      | 13  | 5HSYNC      |
| 4   | N/C         | 9   | N/C         | 14  | 5VSYNC      |
| 5   | -CRTATCH    | 10  | -CRTATCH    | 15  | 5VCLK       |

### A.3 <LAN Port>

Connector: **RJ45**

Type: RJ45 connector with LED on rear panel



| Pin         | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Description | TRD0+ | TRD0- | TRD1+ | TRD2+ | TRD2- | TRD1- | TRD3+ | TRD3- |

### A.4 <IrDA Port>

Connector: **CN\_IR**

Type: 5-pin header for SIR Port



| Pin | Description |  |  |
|-----|-------------|--|--|
| 1   | +5V         |  |  |
| 2   | N/C         |  |  |
| 3   | IRRXD       |  |  |
| 4   | Ground      |  |  |
| 5   | IRTXD       |  |  |

### A.5 <SMBUS Port>

Connector: **CN\_SMBUS**

Type: 5-pin header for SMBUS Port



| Pin | Description |  |  |
|-----|-------------|--|--|
|     | +5V         |  |  |
| 2   | N/C         |  |  |
| 3   | SMDATA      |  |  |
| 4   | SMCLK       |  |  |
| 5   | Ground      |  |  |

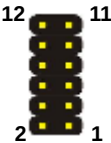
## A.6 <Serial Port>



Connector: **COM1**  
Type: 9-pin D-sub male connector on rear panel

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | MDCD1-      | 6   | MDSR1-      |
| 2   | MSIN1-      | 7   | MRTS1-      |
| 3   | MSO1-       | 8   | MCTS1-      |
| 4   | MDTR1-      | 9   | MR1-        |
| 5   | Ground      |     |             |

## A.7 <DIO Port>



Connector: **CN\_DIO**  
Type: 12-pin D-sub male connector on rear panel

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | Ground      | 7   | GP12        |
| 2   | Ground      | 8   | GP16        |
| 3   | GP10        | 9   | GP13        |
| 4   | GP14        | 10  | GP17        |
| 5   | GP11        | 11  | +5V         |
| 6   | GP15        | 12  | +12V        |

## A.8 <PS2 Port>



Connector: **CN\_PS2**  
Type: 10-pin D-sub male connector on rear panel

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | KBDA        | 6   | Ground      |
| 2   | MDA         | 7   | BVCC        |
| 3   | N/C         | 8   | BVCC        |
| 4   | N/C         | 9   | KBCL        |
| 5   | Ground      | 10  | MCL         |

## Appendix B <Flash BIOS>

### B.1 BIOS Auto Flash Tool

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

<http://www.award.com>

<http://www.commell.com.tw/support/support.htm>

File name of the tool is "awdflash.exe", it's the utility that can write the data into the BIOS flash ship and update the BIOS.

### B.2 Flash Method

1. Please make a bootable floppy disk.
2. Get the last .bin files you want to update and copy it into the disk.
3. Copy awardflash.exe to the disk.
4. Power on the system and flash the BIOS. (Example: C:/ awardflash XXX.bin)
5. Re-star the system.

Any question about the BIOS re-flash please contact your distributors or visit the web-site at below:

<http://www.commell.com.tw/support/support.htm>

## Appendix C <System Resources>

### C.1 <Direct memory access(DMA)> (LE-376A)

 4 Direct memory access controller

### C.2<Input/output(IO)> (LE-376A)

|                                                                                    |                                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
|    | [00000000 - 0000000F] Direct memory access controller                         |
|    | [00000000 - 00000CF7] PCI bus                                                 |
|    | [00000010 - 0000001F] Motherboard resources                                   |
|    | [00000020 - 00000021] Programmable interrupt controller                       |
|    | [00000022 - 0000003F] Motherboard resources                                   |
|    | [00000040 - 00000043] System timer                                            |
|    | [00000044 - 0000005F] Motherboard resources                                   |
|    | [00000060 - 00000060] Standard 101/102-Key or Microsoft Natural PS/2 Keyboard |
|    | [00000061 - 00000061] System speaker                                          |
|    | [00000062 - 00000063] Motherboard resources                                   |
|    | [00000064 - 00000064] Standard 101/102-Key or Microsoft Natural PS/2 Keyboard |
|    | [00000065 - 0000006F] Motherboard resources                                   |
|    | [00000070 - 00000073] System CMOS/real time clock                             |
|    | [00000074 - 0000007F] Motherboard resources                                   |
|    | [00000080 - 00000090] Direct memory access controller                         |
|    | [00000091 - 00000093] Motherboard resources                                   |
|    | [00000094 - 0000009F] Direct memory access controller                         |
|   | [000000A0 - 000000A1] Programmable interrupt controller                       |
|  | [000000A2 - 000000BF] Motherboard resources                                   |
|  | [000000C0 - 000000DF] Direct memory access controller                         |
|  | [000000E0 - 000000EF] Motherboard resources                                   |
|  | [000000F0 - 000000FF] Numeric data processor                                  |
|  | [000001F0 - 000001F7] Primary IDE Channel                                     |
|  | [00000274 - 00000277] ISAPNP Read Data Port                                   |
|  | [00000279 - 00000279] ISAPNP Read Data Port                                   |
|  | [00000280 - 00000287] Communications Port (COM5)                              |
|  | [00000288 - 0000028F] Communications Port (COM6)                              |
|  | [000002A0 - 000002A7] Communications Port (COM3)                              |
|  | [000002A8 - 000002AF] Communications Port (COM4)                              |
|  | [000002F8 - 000002FF] Built-in Infrared Device                                |
|  | [00000378 - 0000037F] Printer Port (LPT1)                                     |
|  | [000003B0 - 000003BB] Intel(R) Graphics Media Accelerator 3150                |
|  | [000003C0 - 000003DF] Intel(R) Graphics Media Accelerator 3150                |
|  | [000003F6 - 000003F6] Primary IDE Channel                                     |
|  | [000003F8 - 000003FF] Communications Port (COM1)                              |

|                                                                                   |                                                                                  |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
|   | [00000400 - 000004BF] Motherboard resources                                      |
|  | [000004D0 - 000004D1] Motherboard resources                                      |
|  | [00000500 - 0000051F] Intel(R) ICH8 Family SMBus Controller - 283E               |
|  | [00000778 - 0000077B] Printer Port (LPT1)                                        |
|  | [00000880 - 0000088F] Motherboard resources                                      |
|  | [00000A79 - 00000A79] ISAPNP Read Data Port                                      |
|  | [00000D00 - 0000FFFF] PCI bus                                                    |
|  | [0000C000 - 0000CFFF] Intel(R) ICH8 Family PCI Express Root Port 3 - 2843        |
|  | [0000CF00 - 0000CF1F] Intel(R) 82583V Gigabit Network Connection #3              |
|  | [0000D000 - 0000DFFF] Intel(R) ICH8 Family PCI Express Root Port 2 - 2841        |
|  | [0000DF00 - 0000DF1F] Intel(R) 82583V Gigabit Network Connection #2              |
|  | [0000E000 - 0000EFFF] Intel(R) ICH8 Family PCI Express Root Port 1 - 283F        |
|  | [0000EF00 - 0000EF1F] Intel(R) 82583V Gigabit Network Connection                 |
|  | [0000F300 - 0000F30F] Intel(R) ICH8M 3 port Serial ATA Storage Controller - 2828 |
|  | [0000F400 - 0000F40F] Intel(R) ICH8M 3 port Serial ATA Storage Controller - 2828 |
|  | [0000F500 - 0000F503] Intel(R) ICH8M 3 port Serial ATA Storage Controller - 2828 |
|  | [0000F600 - 0000F607] Intel(R) ICH8M 3 port Serial ATA Storage Controller - 2828 |
|  | [0000F700 - 0000F703] Intel(R) ICH8M 3 port Serial ATA Storage Controller - 2828 |
|  | [0000F800 - 0000F807] Intel(R) ICH8M 3 port Serial ATA Storage Controller - 2828 |
|  | [0000F900 - 0000F90F] Intel(R) ICH8M Ultra ATA Storage Controllers - 2850        |
|  | [0000FA00 - 0000FA1F] Intel(R) ICH8 Family USB Universal Host Controller - 2832  |
|  | [0000FB00 - 0000FB1F] Intel(R) ICH8 Family USB Universal Host Controller - 2831  |
|  | [0000FC00 - 0000FC1F] Intel(R) ICH8 Family USB Universal Host Controller - 2830  |
|  | [0000FD00 - 0000FD1F] Intel(R) ICH8 Family USB Universal Host Controller - 2835  |
|  | [0000FE00 - 0000FE1F] Intel(R) ICH8 Family USB Universal Host Controller - 2834  |
|  | [0000FF00 - 0000FF07] Intel(R) Graphics Media Accelerator 3150                   |

### C.3<Interrupt request(IRQ)> (LE-376A)

|                                                                                    |          |                                                            |
|------------------------------------------------------------------------------------|----------|------------------------------------------------------------|
|    | (ISA) 0  | High precision event timer                                 |
|    | (ISA) 1  | Standard 101/102-Key or Microsoft Natural PS/2 Keyboard    |
|    | (ISA) 3  | Built-in Infrared Device                                   |
|    | (ISA) 4  | Communications Port (COM1)                                 |
|    | (ISA) 5  | Communications Port (COM3)                                 |
|    | (ISA) 7  | Communications Port (COM4)                                 |
|    | (ISA) 8  | High precision event timer                                 |
|    | (ISA) 9  | Microsoft ACPI-Compliant System                            |
|    | (ISA) 10 | Communications Port (COM5)                                 |
|    | (ISA) 11 | Communications Port (COM6)                                 |
|    | (ISA) 13 | Numeric data processor                                     |
|    | (ISA) 14 | Primary IDE Channel                                        |
|    | (PCI) 15 | Intel(R) ICH8 Family SMBus Controller - 283E               |
|    | (PCI) 16 | Intel(R) 82583V Gigabit Network Connection                 |
|    | (PCI) 16 | Intel(R) Graphics Media Accelerator 3150                   |
|    | (PCI) 16 | Intel(R) ICH8 Family PCI Express Root Port 1 - 283F        |
|    | (PCI) 16 | Intel(R) ICH8 Family PCI Express Root Port 5 - 2847        |
|    | (PCI) 16 | Intel(R) ICH8 Family USB Universal Host Controller - 2834  |
|    | (PCI) 17 | Intel(R) 82583V Gigabit Network Connection #2              |
|    | (PCI) 17 | Intel(R) ICH8 Family PCI Express Root Port 2 - 2841        |
|    | (PCI) 18 | Intel(R) 82583V Gigabit Network Connection #3              |
|    | (PCI) 18 | Intel(R) ICH8 Family PCI Express Root Port 3 - 2843        |
|    | (PCI) 18 | Intel(R) ICH8 Family USB Universal Host Controller - 2832  |
|    | (PCI) 18 | Intel(R) ICH8 Family USB2 Enhanced Host Controller - 283A  |
|    | (PCI) 19 | Intel(R) ICH8 Family USB Universal Host Controller - 2831  |
|    | (PCI) 19 | Intel(R) ICH8M 3 port Serial ATA Storage Controller - 2828 |
|    | (PCI) 21 | Intel(R) ICH8 Family USB Universal Host Controller - 2835  |
|   | (PCI) 22 | Microsoft UAA Bus Driver for High Definition Audio         |
|  | (PCI) 23 | Intel(R) ICH8 Family USB Universal Host Controller - 2830  |
|  | (PCI) 23 | Intel(R) ICH8 Family USB2 Enhanced Host Controller - 2836  |

## C.4<Memory> (LE-376A)

|                                                                                     |                                                                                 |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
|    | [00000000 - 0009FFFF] System board                                              |
|    | [000A0000 - 000BFFFF] Intel(R) Graphics Media Accelerator 3150                  |
|    | [000A0000 - 000BFFFF] PCI bus                                                   |
|    | [000C0000 - 000DFFFF] PCI bus                                                   |
|    | [000E0000 - 000EFFFF] System board                                              |
|    | [000F0000 - 000FFFFF] System board                                              |
|    | [00100000 - BF58FFFF] System board                                              |
|    | [BF590000 - BF5FFFFF] System board                                              |
|    | [BF600000 - BF6FFFFF] System board                                              |
|    | [BF700000 - FEBFFFFF] PCI bus                                                   |
|    | [D0000000 - DFFFFFFF] Intel(R) Graphics Media Accelerator 3150                  |
|    | [E0000000 - EFFFFFFF] Motherboard resources                                     |
|    | [FD300000 - FD3FFFFF] Intel(R) ICH8 Family PCI Express Root Port 1 - 283F       |
|    | [FD400000 - FD4FFFFF] Intel(R) ICH8 Family PCI Express Root Port 1 - 283F       |
|    | [FD4C0000 - FD4DFFFF] Intel(R) 82583V Gigabit Network Connection                |
|    | [FD4FC000 - FD4FFFFF] Intel(R) 82583V Gigabit Network Connection                |
|    | [FD700000 - FD7FFFFF] Intel(R) Graphics Media Accelerator 3150                  |
|    | [FD800000 - FD8FFFFF] Intel(R) ICH8 Family PCI Express Root Port 5 - 2847       |
|    | [FD900000 - FD9FFFFF] Intel(R) ICH8 Family PCI Express Root Port 5 - 2847       |
|    | [FDA00000 - FDAFFFFF] Intel(R) ICH8 Family PCI Express Root Port 3 - 2843       |
|    | [FDB00000 - FDBFFFFF] Intel(R) ICH8 Family PCI Express Root Port 3 - 2843       |
|    | [FDBC0000 - FDBDFFFF] Intel(R) 82583V Gigabit Network Connection #3             |
|    | [FDBFC000 - FDBFFFFF] Intel(R) 82583V Gigabit Network Connection #3             |
|    | [FDC00000 - FDCFFFFF] Intel(R) ICH8 Family PCI Express Root Port 2 - 2841       |
|    | [FDD00000 - FDDFFFFF] Intel(R) ICH8 Family PCI Express Root Port 2 - 2841       |
|    | [FDDC0000 - FDDDFFFF] Intel(R) 82583V Gigabit Network Connection #2             |
|   | [FDDFC000 - FDDFFFFF] Intel(R) 82583V Gigabit Network Connection #2             |
|  | [FDE80000 - FDEFFFFF] Intel(R) Graphics Media Accelerator 3150                  |
|  | [FDFF8000 - FDFFBFFF] Microsoft UAA Bus Driver for High Definition Audio        |
|  | [FDFFD000 - FDFFD0FF] Intel(R) ICH8 Family SMBus Controller - 283E              |
|  | [FDFFE000 - FDFFE3FF] Intel(R) ICH8 Family USB2 Enhanced Host Controller - 2836 |
|  | [FDFFF000 - FDFFF3FF] Intel(R) ICH8 Family USB2 Enhanced Host Controller - 283A |
|  | [FEB80000 - FEBFFFFF] Intel(R) Graphics Media Accelerator 3150                  |
|  | [FEC00000 - FEC00FFF] System board                                              |
|  | [FED00000 - FED000FF] System board                                              |
|  | [FED00000 - FED003FF] High precision event timer                                |
|  | [FED13000 - FED1FFFF] System board                                              |
|  | [FED20000 - FED9FFFF] System board                                              |
|  | [FEE00000 - FEE00FFF] System board                                              |
|  | [FFB00000 - FFB7FFFF] System board                                              |
|  | [FFB80000 - FFBFFFFF] Intel(R) 82802 Firmware Hub Device                        |
|  | [FFF00000 - FFFFFFFF] System board                                              |

## Appendix E <Watch Dog timer Setting >

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.

### Timeout Value Range

- 1 to 255
- Second or Minute

### Program Sample

Watchdog timer setup as system reset with 5 second of timeout

|        |                  |
|--------|------------------|
| 2E, 87 |                  |
| 2E, 87 |                  |
| 2E, 07 |                  |
| 2F, 08 | Logical Device 8 |
| 2E, 30 |                  |
| 2F, 01 | Activate         |
| 2E, F5 |                  |
| 2F, 00 | Set as Second*   |
| 2E, F6 |                  |
| 2F, 05 | Set as 5         |

\* Minute: bit 3 = 1; Second: bit 3 = 0

You can select Timer setting in the BIOS, after setting the time options, the system will reset according to the period of your selection.



## 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.

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|         |                                                                                                                                                                        |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Address | 19 F No. 94, Sec. 1, Shin Tai Wu Rd., Shi Chih<br>Taipei Hsien, Taiwan                                                                                                 |
| TEL     | +886-2-26963909                                                                                                                                                        |
| FAX     | +886-2-26963911                                                                                                                                                        |
| Website | <a href="http://www.commell.com.tw">http://www.commell.com.tw</a>                                                                                                      |
| E-Mail  | <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) |

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