

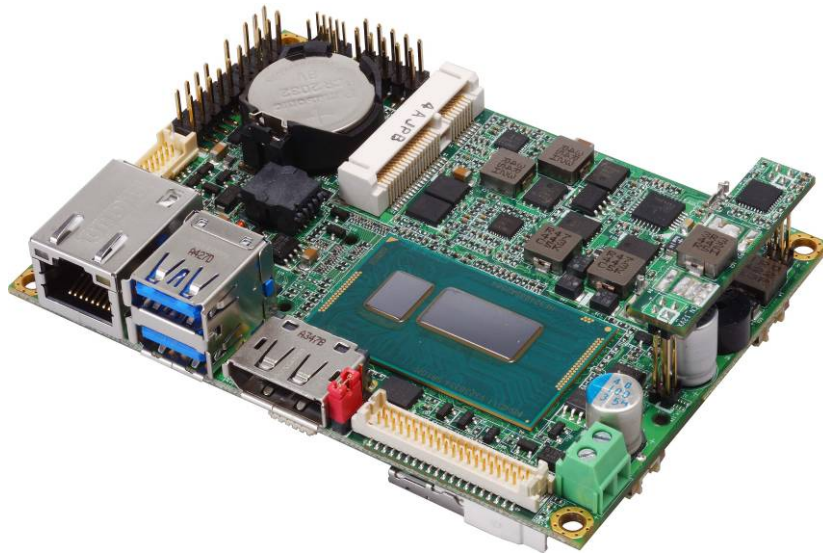
LP-174

Pico-ITX Motherboard

User's Manual

Edition 1.0

2015/07/21



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Packing List:

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



1 x LP-174 Pico-ITX Motherboard
(include Cooler Fan)



1 x SATA & SATA Power Cable
(OALSATA22B-PM15SH15 / 1040512)



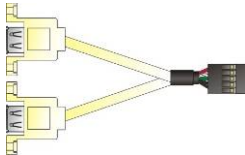
1 x PS/2 Keyboard & Mouse cable
(OALPS2/KM / 1040131)



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



1 x Audio cable
(OALPJ-HDUNB / 1040123)



1 xUSB2.0 Cable
(OALUSBA-3 / 1040173)



1 x Onboard DVI-D cable
(BADPDVI_A & OALDVI-DF13 /
4120008011 & 1040483)



1 x Dual COM Cable
(OALES-BKU2-H14NB / 1040379)

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Chapter 1 <Introduction>

1.1 <Product Overview>

LV-174 is Pico-ITX Motherboard which supports 5th/4th Generation Intel® Core™ U-series i7, i5, i3, Celeron Mobile Processor with Wildcat Point PCH-LP, integrated HD Graphics, DDR3L memory, Realtek High Definition Audio, Intel Gigabit LAN, Serial ATA3 with AHCI function for a system.

Intel Broadwell-U Processor with Wildcat Point PCH-LP

The 5th Generation Intel® Core™ U-series processor family is the next generation and compatible with Haswell-U, multi-core mobile processor built on 14/22 nanometer process with MCP technology.

The Broadwell-U has a lower TDP 15W and 28W, it provides new HD Graphics (GT2 and GT3 GPU) support triple display at the same time, maximum supported is up to 16GB of DDR3L, better performance, flexibility and more enhanced security that is suitable for a variety of intelligent systems the ideal choice.

All in One multimedia solution

The board provides high performance onboard graphics, 24-bit dual channel LVDS interface, DisplayPort, DVI-D, and High Definition Audio, to meet the very requirement of the multimedia application.

Flexible Expansion Interface

The board provides one MiniPCIe slot and support mSATA.

1.2 <Product Specification>

System

Processor	Intel® Haswell/Broadwell Core™ i7, i5, i3, Celeron U-series Processor FCBGA1168 with MCP
Chipset	Wildcat Point-LP
Memory	1 x DDR3L SO-DIMM 1333/1600 MHz up to 8GB Support Non-ECC, unbuffered memory only
Watchdog Timer	Generates a system reset with internal timer for 1min/s ~ 255min/s
Real Time Clock	Chipset integrated RTC with onboard lithium battery
Expansion	1 x MiniPCIe (support mSATA)

Graphics

Chipset	Intel® 5th/4th Gen integrated HD Graphics
Display Interface	1 x DVI-D, 1 x DisplayPort, 1 x LVDS

LAN

Chip	1 x Intel® I218-LM Gigabit LAN (Support iAMT10.0)
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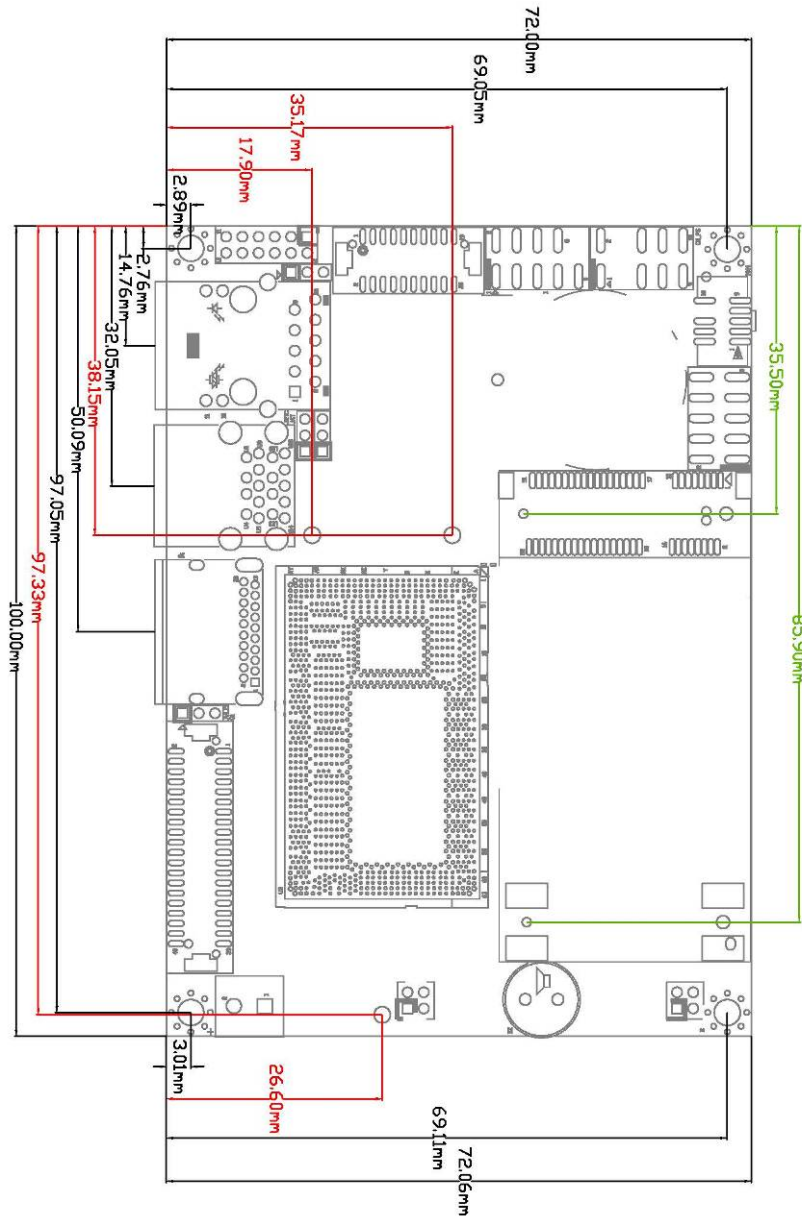
I/O

Serial ATA	1 x SATA3
Audio	Realtek ALC888 HD Audio
Internal I/O	1 x SATA3, 2 x RS232, 2 x USB2.0, 1 x LVDS, 1 x LCD inverter, 1 x LPC, 1 x SMBUS, 1 x Audio, 1 x DC Out, 1 x PS/2, 1 x DVI-D
Rear I/O	1 x DisplayPort, 2 x USB3.0, 1 x LAN

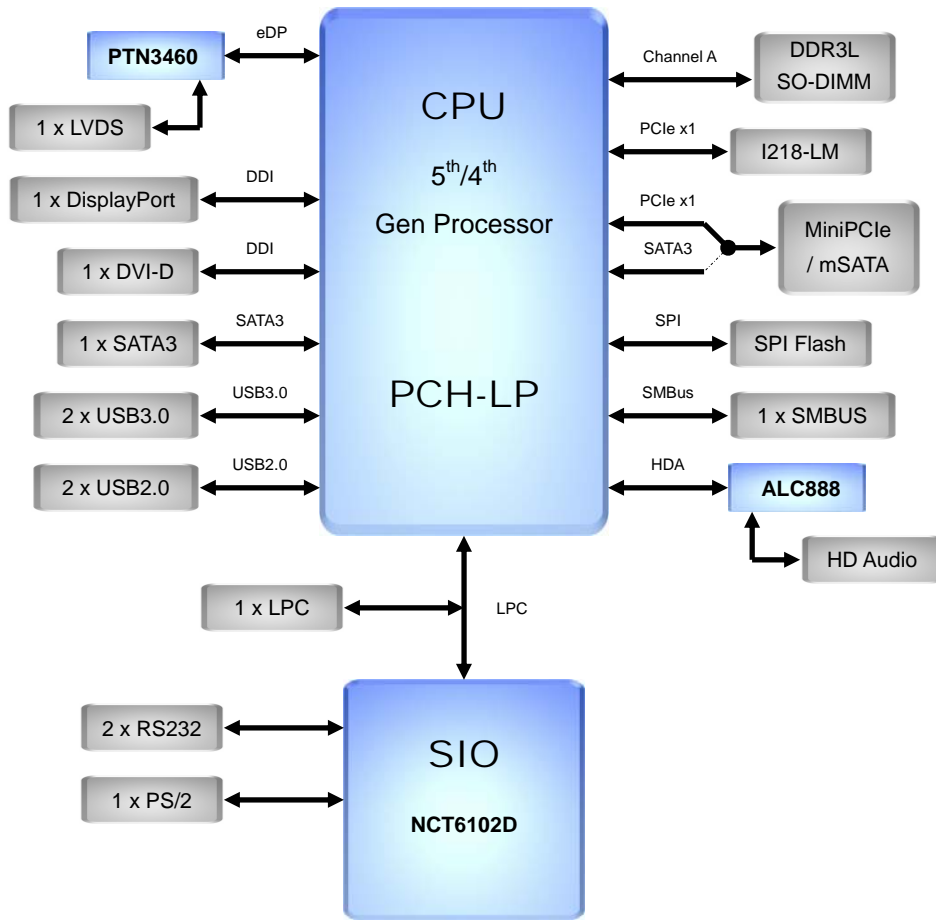
Mechanical & Environmental

Power Requirement	DC 9~24V or 12V (optional)
Size & Thickness	100mm x 72mm (L x W), 1.6mm
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

1.3 <Mechanical Drawing>

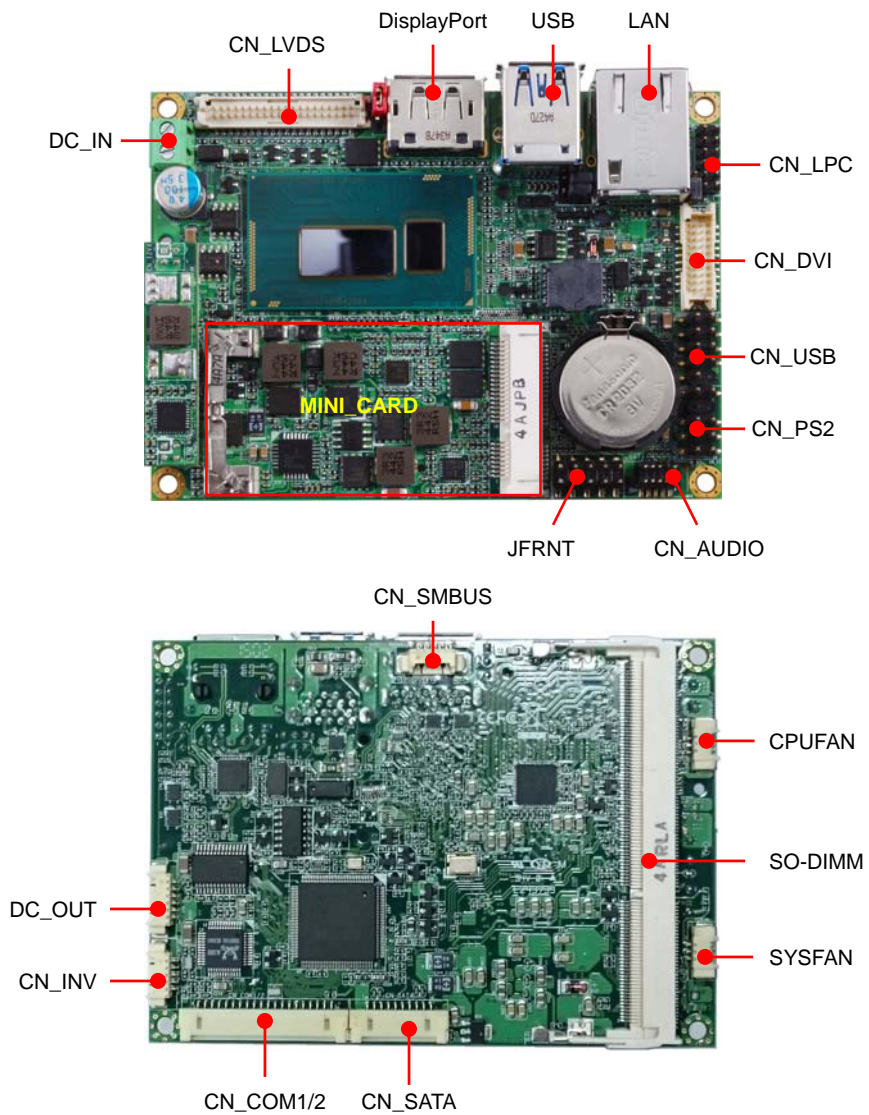


1.4 <Block Diagram>



Chapter 2 <Hardware setup>

2.1 <Connector Location and Reference>



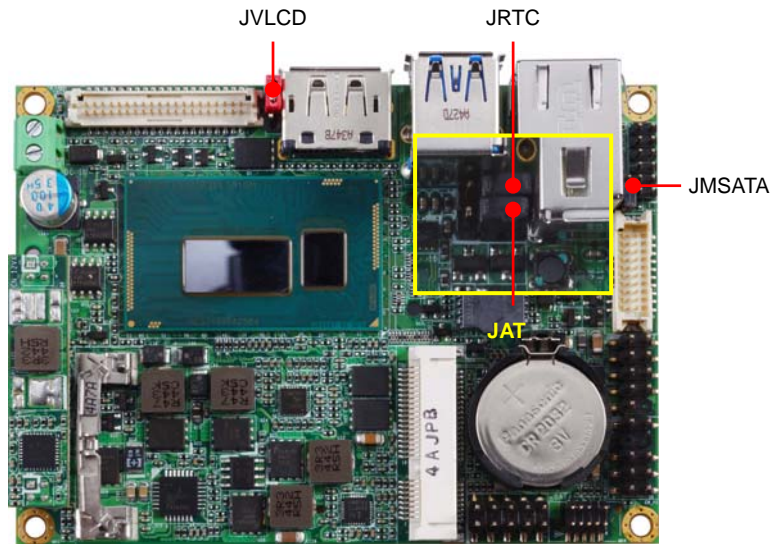
2.1.1 <Internal connectors list>

Connector	Function
SO-DIMM	204-pin DDR3 SO-DIMM slot
CN_SATA	10-pin Serial ATA3 connector
CN_AUDIO	5 x 2-pin audio pin header
CN_LPC	6 x 2-pin LPC pin header
CN_LVDS	20 x 2-pin LVDS connector
CN_INV	5-pin LCD inverter connector
CN_SMBUS	5-pin SMBus connector
CN_COM1/2	20-pin RS232 connector
CN_USB	5 x 2-pin USB2.0 pin header
CN_DVI	10 x 2-pin DVI connector
CN_PS2	5 x 2-pin PS/2 pin header
CPUFAN	3-pin CPU fan connector
SYSFAN	3-pin system fan connector
JFRNT	5 x 2-pin front panel switch/indicator pin header
MINI_CARD	52-pin MiniPCIe card slot
DC_OUT	6-pin SATA Power connector
DC_IN	2-pin power input Terminal Block

2.1.2 <External connectors list>

Connector	Function
DisplayPort	DisplayPort connector
USB	2 x USB3.0 connector
LAN	RJ45 connector

2.2 <Jumper Location and Reference>



2.2.1 <Jumper list>

Jumper	Function
JAT	Power mode select
JRTC	CMOS Normal/Clear Setting
JVLCD	Panel Voltage Setting
JMSATA	MiniCard mSATA Setting

2.2.2 <Clear CMOS and Power on type selection>

JRTC: Clear CMOS data jumper

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

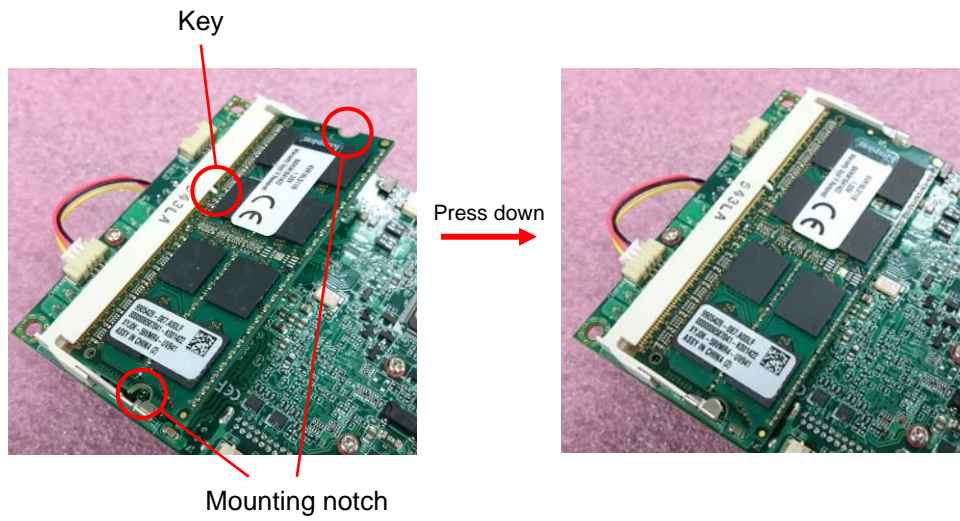
JAT: AT/ATX mode select jumper

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

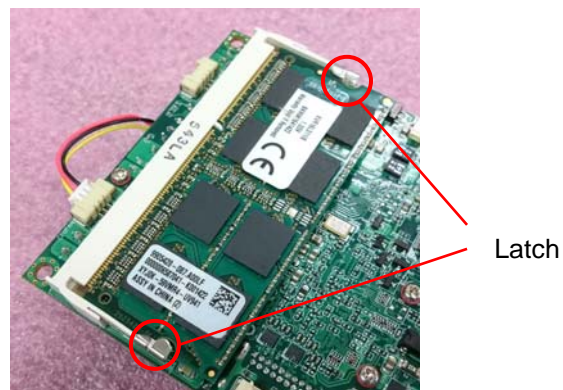
2.3 <Installing the Memory>

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.

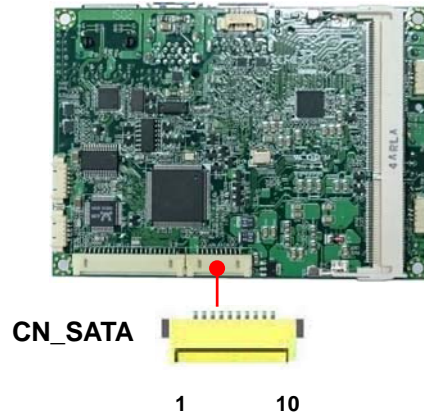


2.4 <I/O interface>

2.4.1 <Serial ATA interface>

CN_SATA: SATA3 10-pin connector

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

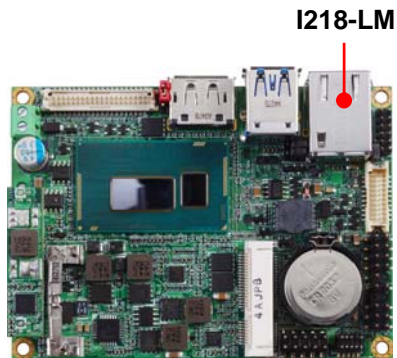


2.4.2 <Ethernet interface>

The board provide I218-LM Gigabit Ethernet which supports WOL on rear I/O.

It supports Intel® AMT 10.0 feature.

(Note that the CPU must support vPro technology, ex: [i7-5650U](#))

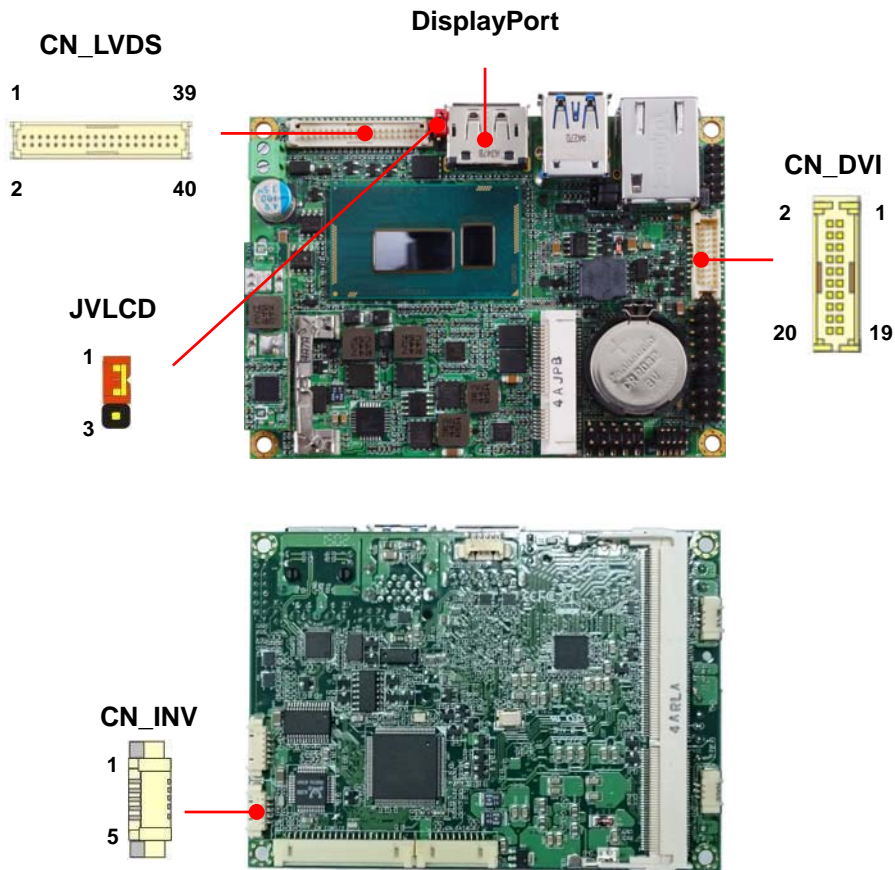


2.4.3 <Display interface>

Based on the 5th/4th Gen CPU with built-in HD Graphics, the DisplayPort up to **3840x2160 @ 60Hz** on rear I/O.

About the internal Display, the DVI-D resolution up to **1920x1200 @ 60Hz** and LVDS (PTN3460) up to **1920x1200 @ 60Hz** support 24-bit color depth and dual channel.

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



CN_DVI: DVI 20-pin connector

Pin	Signal	Pin	Signal
1	5V	2	NC
3	HPD	4	GND
5	TMDS_TX0-	6	TMDS_TX0+
7	GND	8	TMDS_TX1-
9	TMDS_TX1+	10	GND
11	TMDS_TX2-	12	TMDS_TX2+
13	GND	14	TMDS_CLK-
15	TMDS_CLK+	16	GND
17	SDA	18	SCL
19	NC	20	NC

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

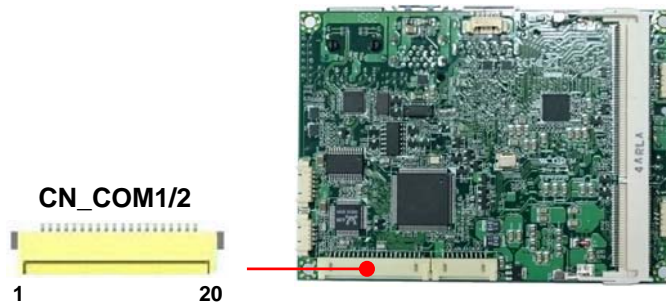
CN_INV: LVDS 5-pin Backlight power connector

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)
2-3	5V

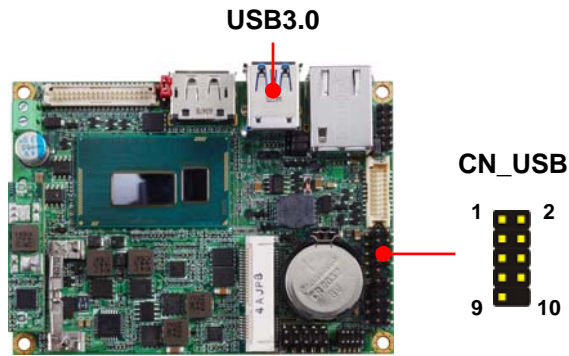
2.4.4 <Serial Port interface>



CN_COM1/2: RS232 20-pin connector

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

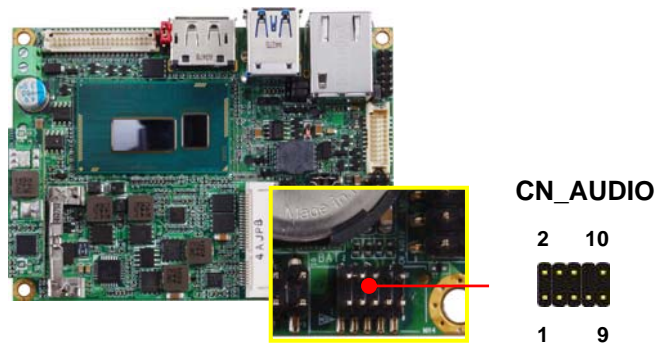
2.4.5 <USB interface>



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

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

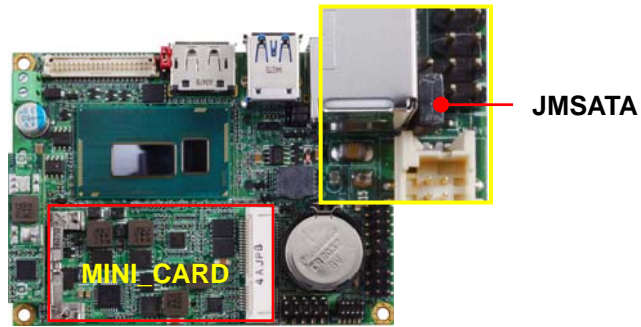
2.4.6 <Audio interface>



CN_AUDIO: Front panel audio 10-pin header (Pitch 1.27mm x 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>

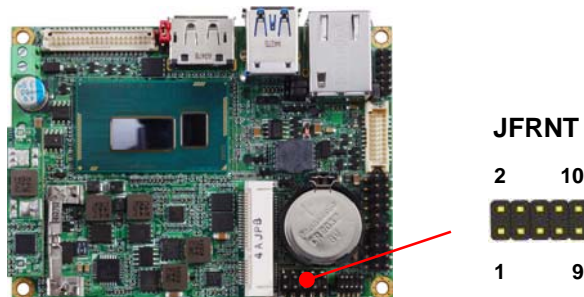


MINI_CARD have some special design to compatible our MiniPCIe card (ex: MPX-574D2, MPX-210D2 etc) and support mSATA set by JMSATA

JMSATA: Setting MINI_CARD to support PCIe/mSATA

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

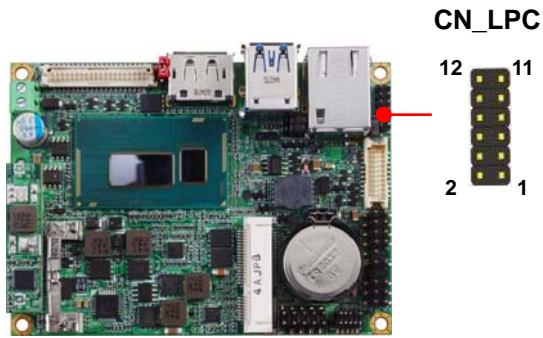
2.4.8 <Front panel switch and indicator>



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 <Other interface>



CN_LPC: LPC 12-pin header (Pitch 2.00mm)

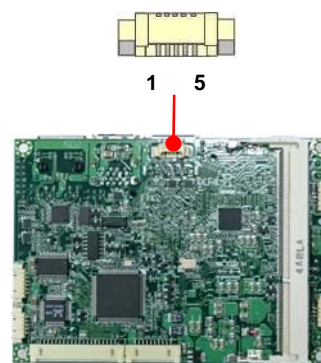
Pin	Signal	Pin	Signal
1	CLK	2	RST
3	-LFRAME	4	LAD3
5	LAD2	6	LAD1
7	LAD0	8	3.3V
9	SERIRQ	10	GND
11	3.3VSB	12	NC

CN_LPC support TPM module.

CN_SMBUS: SMBus 5-pin connector

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

CN_SMBUS



CPUFAN: CPU cooler fan 3-pin connector

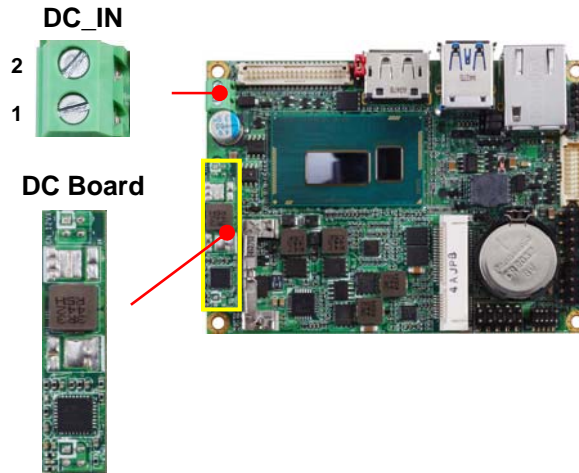
Pin	1	2	3
Signal	GND	12V	Sensor

SYSFAN: System cooler fan 3-pin connector

Pin	1	2	3
Signal	GND	12V	Sensor

2.5 <Power supply>

2.5.1 <Power input>



The DC Board support 9~24V wide voltage input.

If the board doesn't have DC Board, the power only support 12V input.

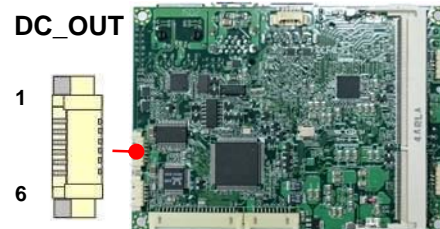
DC_IN: Terminal Block 2-pin power connector

Pin	Signal	Pin	Signal
1	GND	2	Power in

2.5.2 <Power output>

DC_OUT: SATA power 6-pin connector

Pin	Signal
1	12V
2	12V
3	GND
4	GND
5	5V
6	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:

<http://www.commell.com.tw/Download/BIOS/FPT10.rar>

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 <Programmable Watch Dog Timer>

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 F5
-o 4F 00      ;set "00" is second mode, set "04" is minute mode
-o 4E F6
-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 NCT6102D datasheet

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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