

1.5 System Specifications

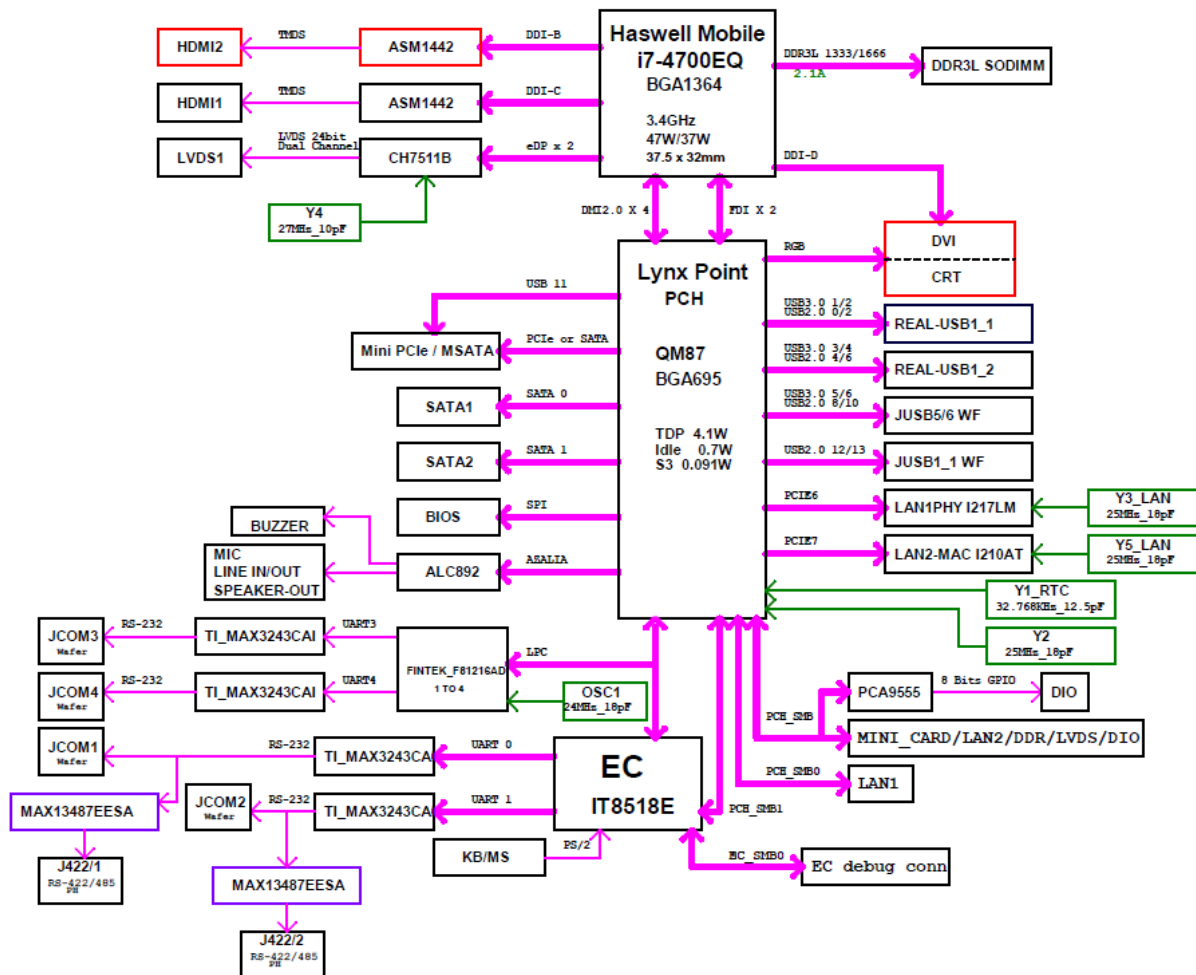
System	
CPU	Intel® 4th Generation Core™ BGA processors
BIOS	AMI uEFI BIOS, 128 Mbit SPI Flash ROM
System Chipset	Intel QM87 PCH
I/O Chip	EC(IT8518E)
System Memory	1 x 204-pin 1.35V DDR3L 1600/1333MHzSO-DIMM up to 8GB
SSD	1 x mSATA (from Mini PCIe slot)
Watchdog Timer	H/W Reset, 1sec. – 65535sec./min. 1sec. or 1min. step
H/W Status Monitor	CPU & system temperature monitoring Voltages monitoring
Expansion	1 x mini-PCIe (mSATA supported)
I/O	
MIO	2 x SATA III, 2 x RS232, 2 x RS232/422/485, LPC
IrDA	FINTEK 81216 (IR Supported)
USB	2 x USB3.0 , 2 x USB 2.0(Wafer),4 x USB 3.0 (Edge connectors)
DIO	4-bit GPI, 4-bit GPO
Display	
Chipset	Intel QM87
Resolution	Triple independent display Dual HDMI+LVDS/ HDMI+LVDS+DVI or Dual HDMI+CRT/ HDMI+LVDS+CRT
LVDS	Dual channel 18/24-bit LVDS
DVI	One DVI port co-lay with VGA
Ethernet	
Chipset	1 x Intel I210AT GbE controller 1 x Intel I217LMGbE PHY
Ethernet Interface	10/100/1000 Base-Tx compatible
Audio	
Chipset	Realtek ALC892 HD codec support 5.1 channel
Audio Interface	Mic-In, Line-In and Line-Out
Built-in Touch screen (optional)	
Chipset	PenMount 6000
Touch screen interface	With 9-pin 2.0mm Box Header (can be selected to support 4/5/8 wire touch screen)

EPI-QM87R/ EPI-QM87

Mechanical & Environmental	
Power Requirement	+12V~19V
Power Type	AT / ATX
ACPI	Single power ATX Support S0, S3, S4, S5 ACPI 3.0 Compliant
Operating Temp.	0°C ~60°C
Storage Temp.	-40°C ~75°C
Operating Humidity	0%~90% relative humidity, non-condensing
Size (L x W)	4.5" x 6.5" (115mm x 165mm)
Weight	0.41 lbs (0.18 Kg)

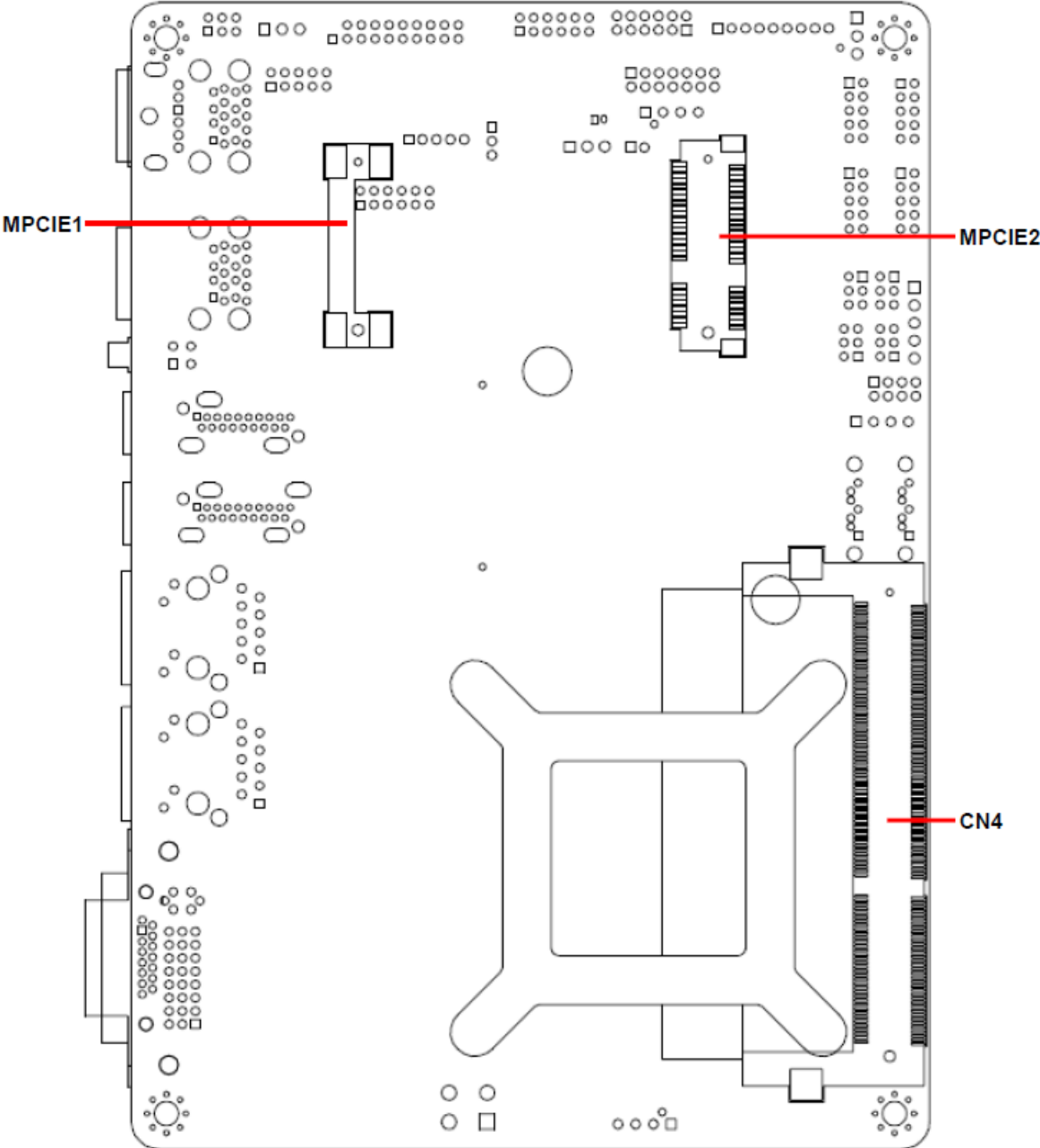
1.6 Architecture Overview – Block Diagram

The following block diagram shows the architecture and main components of EPI-QM87R/ EPI-QM87.



2. Hardware Configuration





2.2 Installation Procedure

This chapter explains you the instructions of how to setup your system.

1. Turn off the power supply.
2. Insert the SODIMM module (be careful with the orientation).
3. Insert all external cables for hard disk, keyboard, mouse, USB etc. except for flat panel. A CRT monitor must be connected in order to change NVRAM settings to support flat panel.
4. Connect power supply to the board via the ATXPWR.
5. Turn on the power.
6. Enter the BIOS setup by pressing the delete key during boot up. Use the "Save & Exit \ Restore Defaults" feature.
7. If TFT panel display is to be utilized, make sure the panel voltage is correctly set before connecting the display cable and turning on the power.

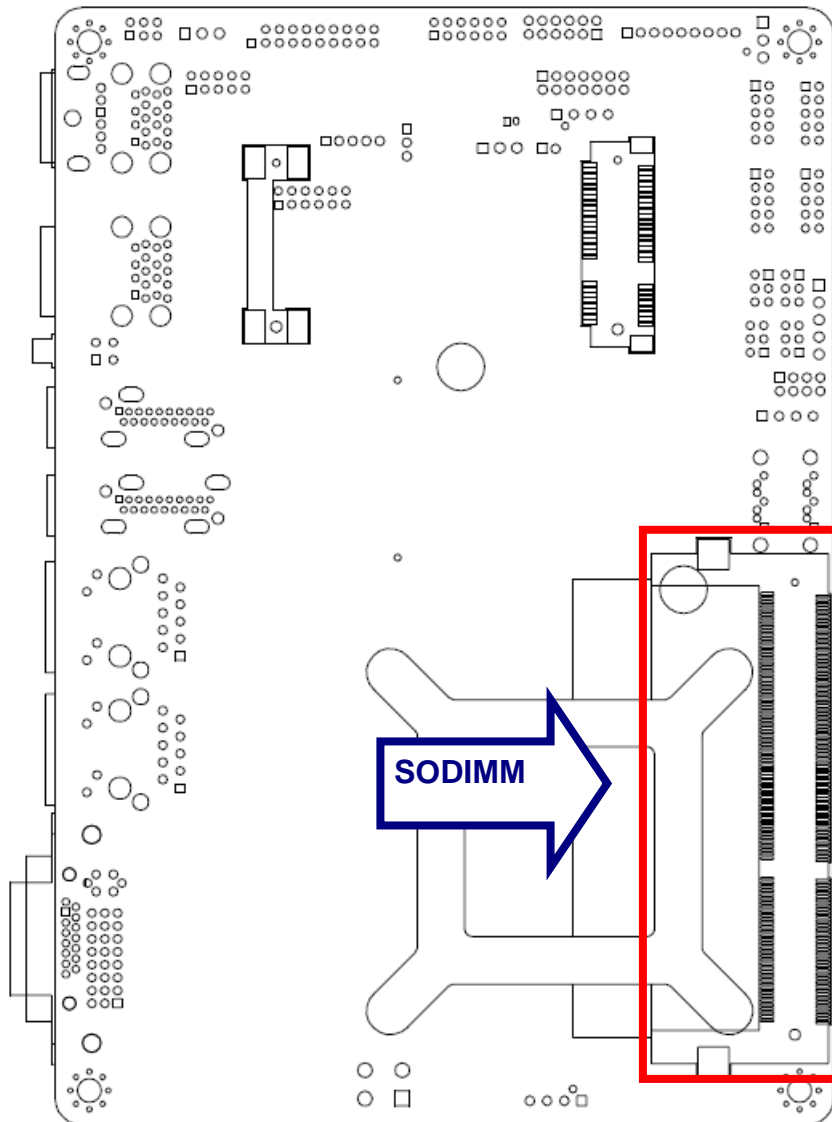


Note: Make sure the heat sink and the CPU top surface are in total contact to avoid CPU overheating problem that would cause the system to hang or unstable

EPI-QM87R/ EPI-QM87

2.2.1 Main Memory

EPI-QM87R/ EPI-QM87 provides one 204-pin DDR3L SODIMM socket, supports up to 8GB 1.35V DDR3L 1333/1600 SDRAM.



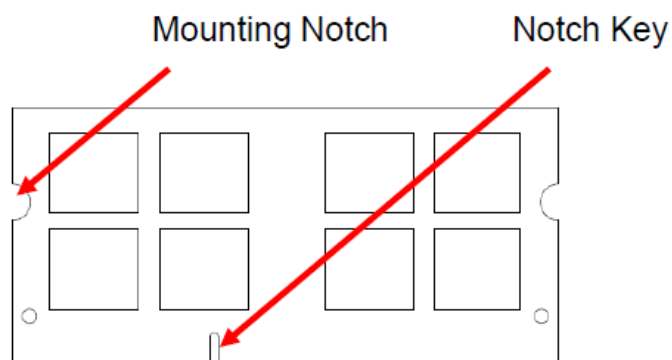
(Rear side)



Make sure to unplug the power supply before adding or removing SODIMMs or other system components. Failure to do so may cause severe damage to both the board and the components.

- Locate the SODIMM socket on the board.
- Hold two edges of the SODIMM module carefully. Keep away of touching its connectors.
- Align the notch key on the module with the rib on the slot.
- Firmly press the modules into the socket automatically snaps into the mounting notch.

Do not force the SODIMM module in with extra force as the SODIMM module only fit in one direction.



204-pin DDR3 SODIMM

- To remove the SODIMM modules, push the two ejector tabs on the slot outward simultaneously, and then pull out the SODIMM module.



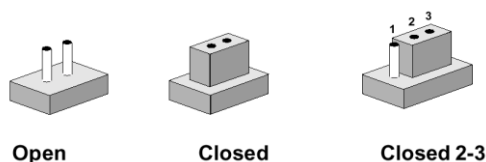
Note:

- (1) Please do not change any DDR3L SDRAM parameter in BIOS setup to increase your system's performance without acquiring technical information in advance.
- (2) Static electricity can damage the electronic components of the computer or optional boards. Before starting these procedures, ensure that you are discharged of static electricity by touching a grounded metal object briefly.

2.3 Jumper and Connector List

You can configure your board to match the needs of your application by setting jumpers. A jumper is the simplest kind of electric switch.

It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To “close” a jumper you connect the pins with the clip. To “open” a jumper you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2, and 3. In this case, you would connect either two pins.



The jumper settings are schematically depicted in this manual as follows:



A pair of needle-nose pliers may be helpful when working with jumpers.

Connectors on the board are linked to external devices such as hard disk drives, a keyboard, or floppy drives. In addition, the board has a number of jumpers that allow you to configure your system to suit your application.

If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes.

The following tables list the function of each of the board's jumpers and connectors.

Jumpers

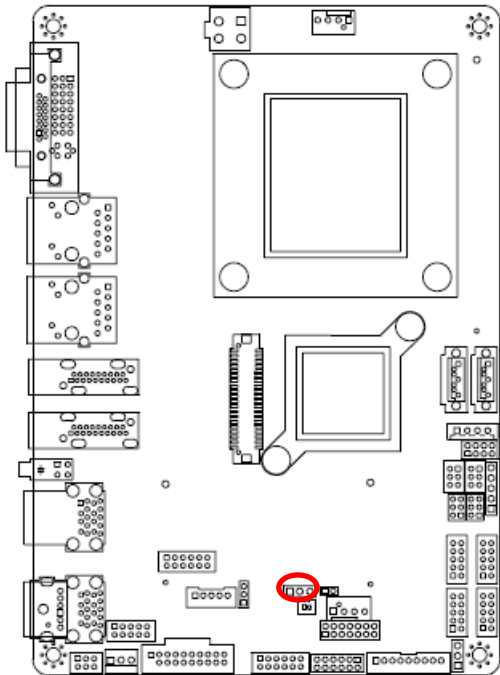
Label	Function	Note
JBAT	Clear CMOS	3 x 1 header, pitch 2.54mm
JFP	AT/ATX mode selector, Front panel & LED settings	6 x 2 header, pitch 2.00mm
JRI1/2	Serial port 1 - Ring, +5V, +12V power selector	3 x 2 header, pitch 2.00mm
JTOUCH_SEL	Touch panel connector	3 x 1 header, pitch 2.54mm
JVR	LCD Backlight brightness adjustment	3 x 1 header, pitch 2.00mm

Connectors

Label	Function	Note
BAT	Battery connector	2 x 1 wafer, pitch 1.25mm
CN2	DVI connector	
CN4	204-pin DDR3 SODIMM	
CPU_FAN	CPU Fan connector	4 x 1 wafer, pitch 2.54mm
HDMI1/2	HDMI connector	
SATA_PWR	SATA power connector	4 x 1 wafer, pitch 2.50mm
J422_1	Serial Port 1 connector	3 x 2 wafer, pitch 2.00mm
J422_2	Serial Port 2 connector	3 x 2 wafer, pitch 2.00mm
JAUDIO	Audio Connector	6 x 2 wafer, pitch 2.00mm
JBKL	LCD Inverter connector	5 x 1 wafer, pitch 2.00mm
JCOM1~4	Serial port 1~4 connector	5 x 2 wafer, pitch 2.00mm
JDIO	General purpose I/O connector	6 x 2 wafer, pitch 2.00mm
JIR	IrDA connector	5 x 1 header, pitch 2.54mm
JKBMS	PS/2 keyboard & mouse connector	3 x 2 wafer, pitch 2.00mm
JLPC	(Reversed for BIOS programming)	7 x 2 header, pitch 2.00mm
JLVDS	LVDS connector	DIN 40-pin wafer, pitch 1.25mm
JSPI	SPI connector	4 x 2 header, pitch 2.00mm
JTOUCH	Touch panel connector	9 x 1 wafer, pitch 2.00mm
JUSB1	USB 2.0 connector	5 x 2 wafer, pitch 2.00mm
JUSB2	USB 2.0 connector	10 x 2 wafer, pitch 2.00mm
LAN1	RJ-45 Ethernet connector 1	
LAN2	RJ-45 Ethernet connector 2	
LED3	Power & HDD indicator	
MPCIE1/2	Mini PCIEXPRESS connector	
PWR_SB	5VSB connector in ATX	3 x 1 wafer, pitch 2.54mm
PWR	Power connector	2 x 2 wafer, pitch 4.2mm
SATA1	Serial ATA connector 1	
SATA2	Serial ATA connector 2	
SYS_FAN	System Fan connector	4 x 1 wafer, pitch 2.54mm
USB1	USB 3.0 connector 0 & 1	
USB2	USB 3.0 connector 2 & 3	
JECDEG	EC SMB Reserve connector	2 x 1 header, pitch 2.00mm

2.4 Setting Jumpers & Connectors

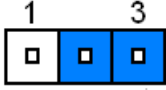
2.4.1 Clear CMOS (JBAT)



RTC Working*

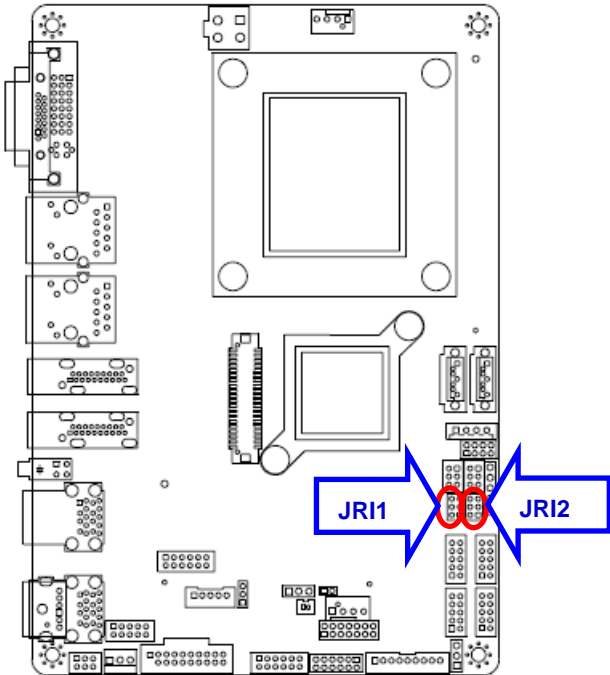


RTC Reset

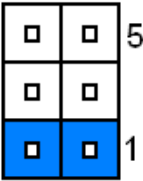


*Default

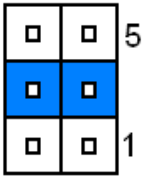
2.4.2 Serial port 1/2 - Ring, +5V, +12V power selector (JRI1/2)



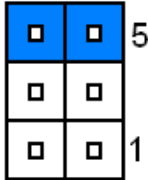
Ring*



+5V

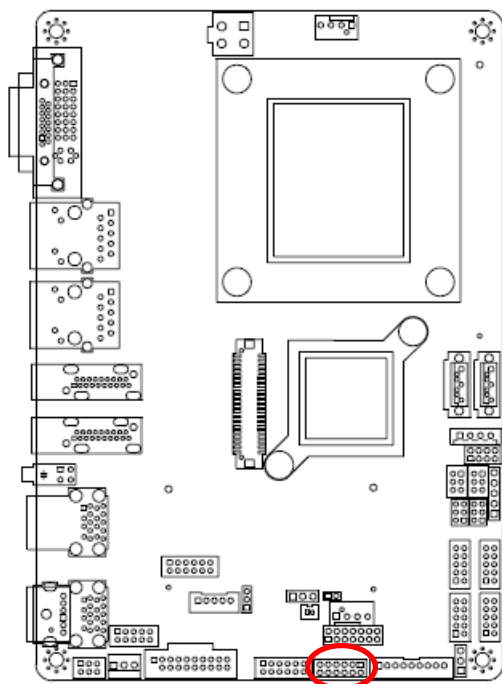


+12V



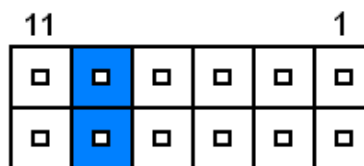
* Default

2.4.3 AT/ATX mode selector, Front panel & LED settings (JFP)

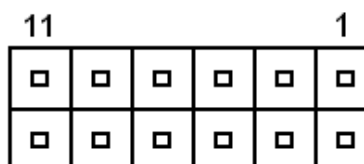


*Default

AT*

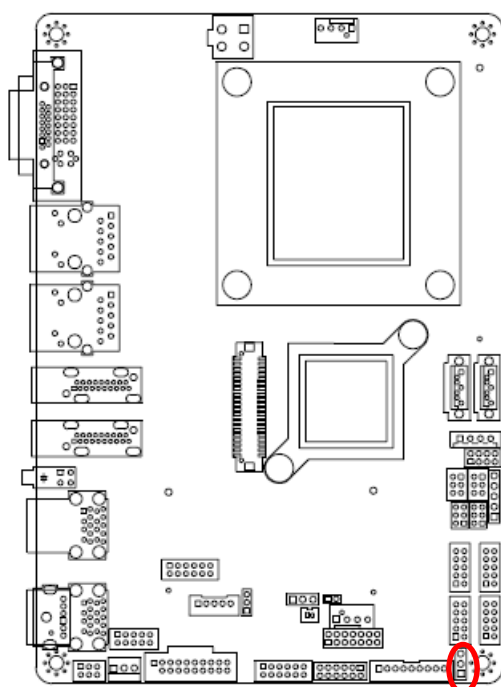


ATX



Signal	PIN
PWBT	1, 2
RST#	3, 4
PWR-LED	5, 6
HDD-LED	7, 8
Short: AT MODE Open: ATX MODE	9, 10
CASE_OPEN#	11, 12

2.4.4 Touch panel connector (JTOUCH_SEL)



* Default

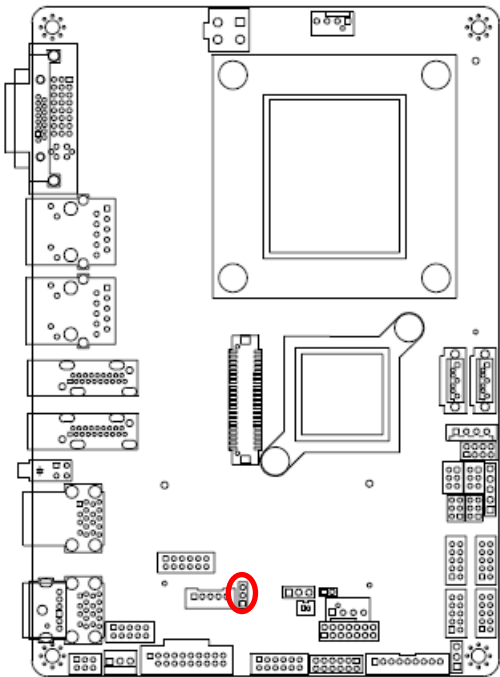
5W*



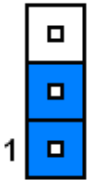
4/ 8W



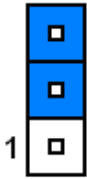
2.4.5 LCD Backlight brightness adjustment (JVR)



PWM mode*

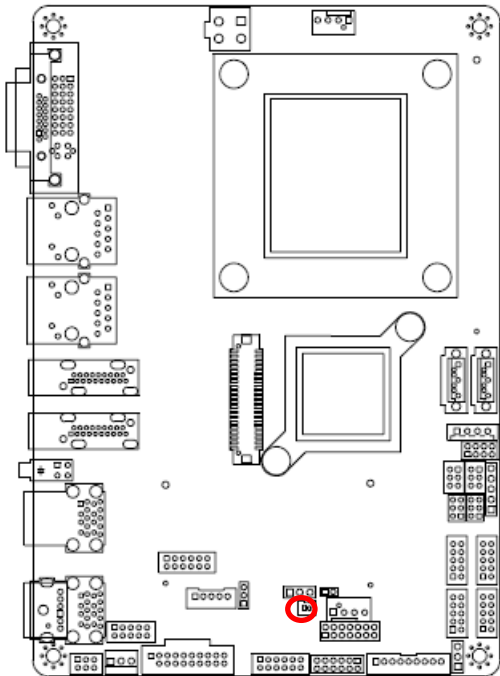


DC Mode



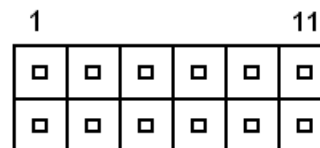
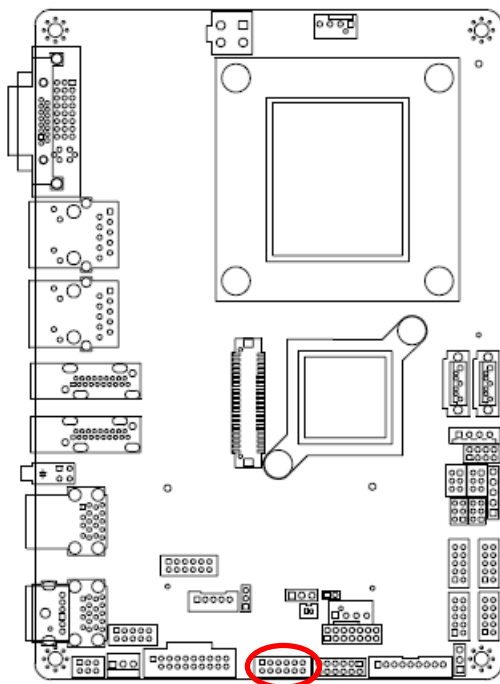
* Default

2.4.6 Battery connector (BAT)



Signal	PIN
+3.3V	1
GND	2

2.4.7 Audio connector (JAUDIO)

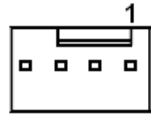
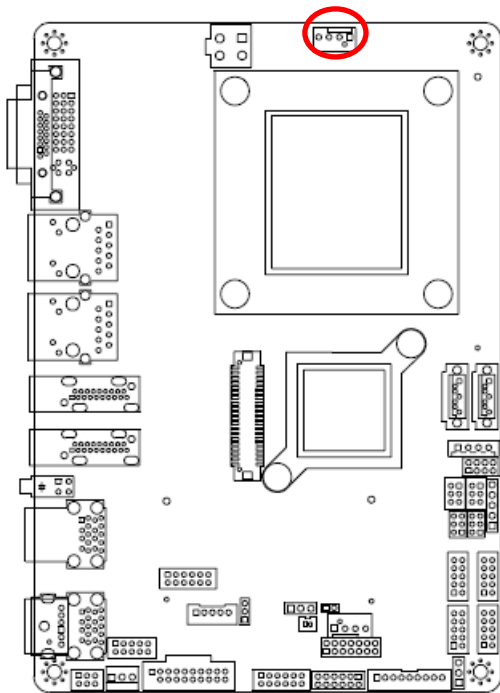


Signal	PIN	PIN	Signal
FRONT-L-OUT	1	2	FRONT-R-OUT
GND	3	4	GND
LINE1-L-IN	5	6	LINE1-R-IN
MIC1-L-IN	7	8	MIC1-R-IN
LINE1_JD	9	10	FRONT_JD
GND	11	12	MIC1_JD

2.4.7.1 Signal Description – Audio connector (JAUDIO)

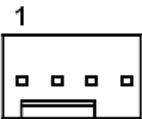
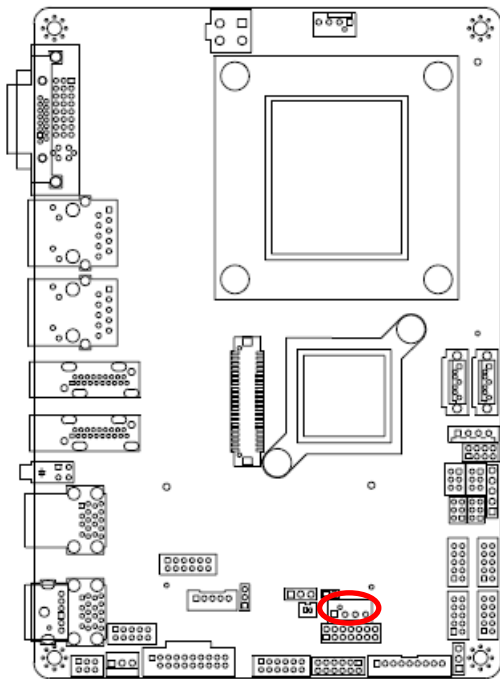
Signal	Signal Description
LINE1_JD	Jack detection for line1
MIC1_JD	Jack detection for mic1

2.4.8 CPU fan connector (CPU_FAN)



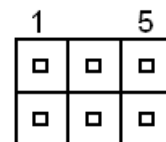
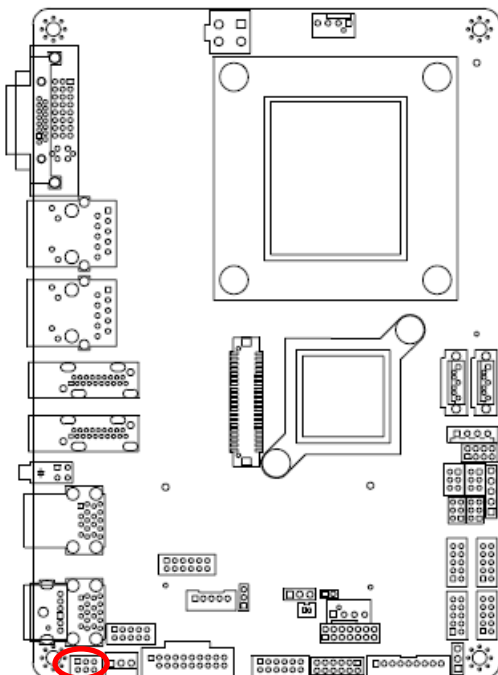
Signal	PIN
GND	1
+12V	2
EC_TACH0	3
FAN_PWM0	4

2.4.9 System fan connector (SYS_FAN)



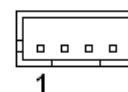
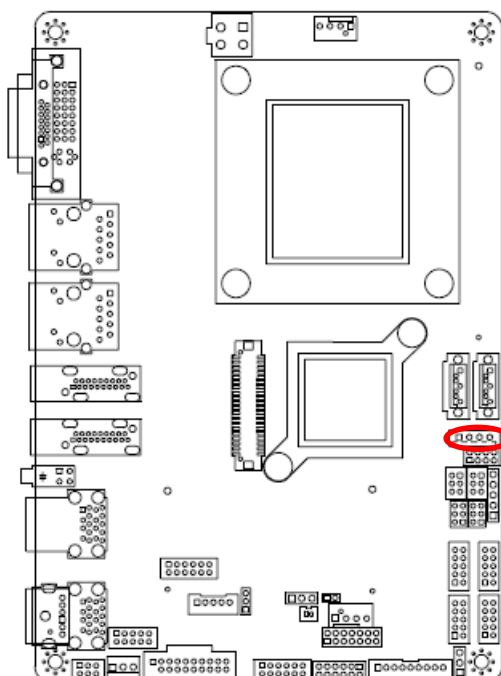
Signal	PIN
GND	1
+12V	2
EC_TACH1	3
FAN_PWM1	4

2.4.10 PS/2 keyboard & mouse connector (JKBMS)



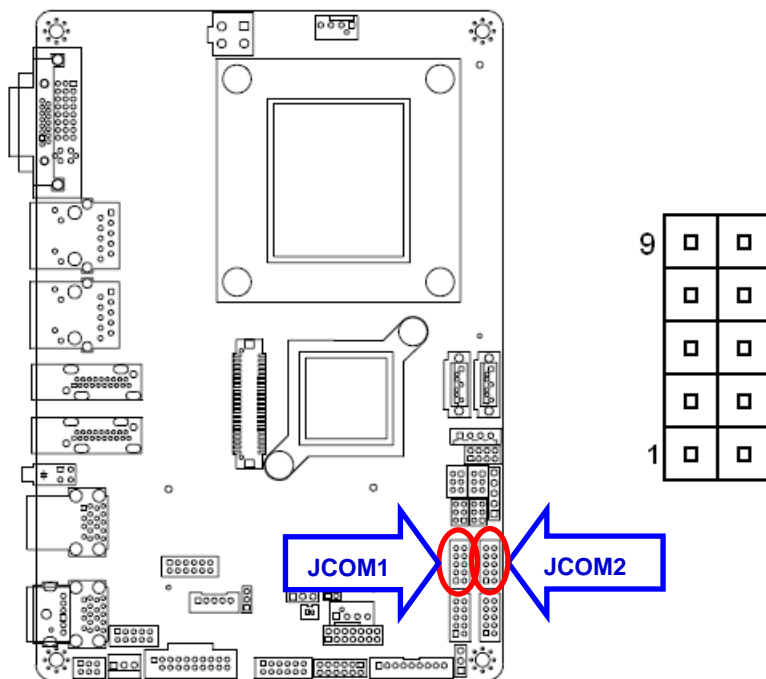
Signal	PIN	PIN	Signal
KBCK	1	2	KBDT
KBVCC	3	4	GND
MSCK	5	6	MSDT

2.4.11 SATA power connector (SATA_PWR)



Signal	PIN
GND	1
GND	2
+5V	3
+5V	4

2.4.12 Serial port 1/ 2 connector (JCOM1/ JCOM2)

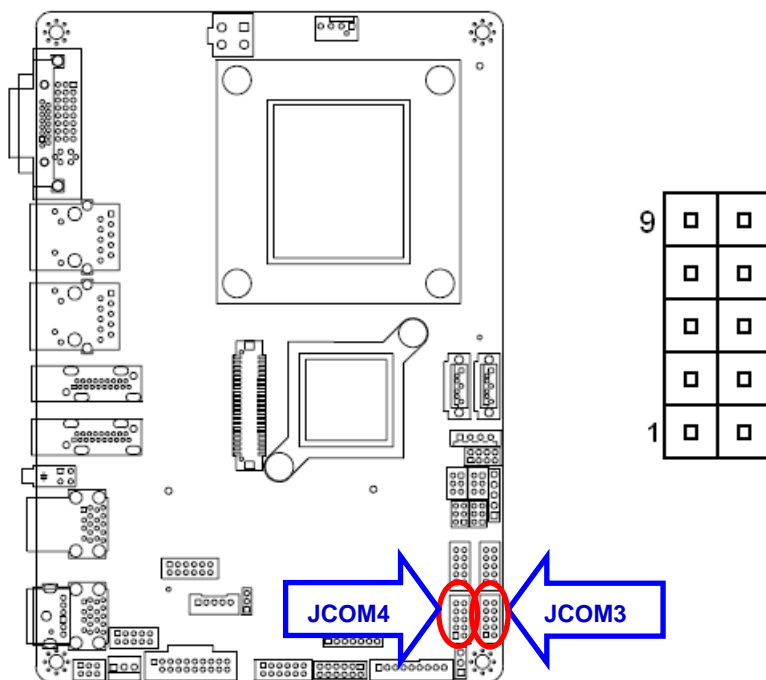
**JCOM1**

Signal	PIN	IN	Signal
RI#_1	9	10	NC
RTS#1	7	8	CTS#_1
GND	5	6	DSR#_1
TXD_1	3	4	DTR#_1
DCD#_1	1	2	RXD_1

JCOM2

Signal	PIN	IN	Signal
RI#_2	9	10	NC
RTS#2	7	8	CTS#_2
GND	5	6	DSR#_2
TXD_2	3	4	DTR#_2
DCD#_2	1	2	RXD_2

2.4.13 Serial port 3/ 4 connector (JCOM3/ JCOM4)

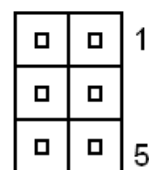
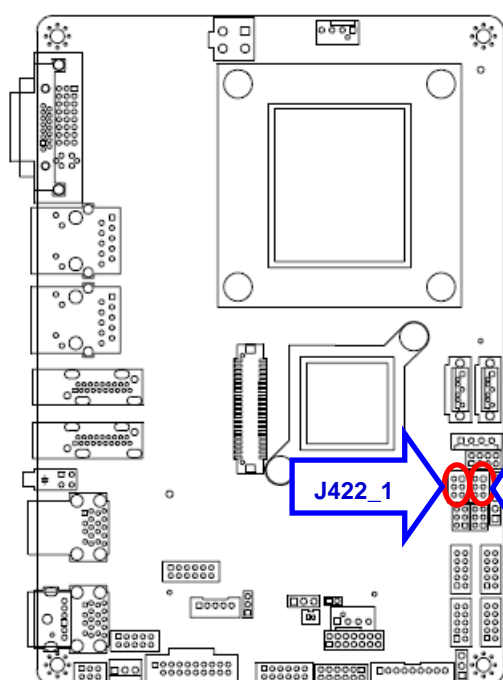
**JCOM3**

Signal	PIN	IN	Signal
NRIC#	9	10	NC
NRTSC#	7	8	NCTSC#
GND	5	6	NDSRC#
NTXDC	3	4	NDTRC#
NDCDC#	1	2	NRXDC

JCOM4

Signal	PIN	IN	Signal
NRID#	9	10	NC
NRTSD#	7	8	NCTSD#
GND	5	6	NDSRD#
NTXDD	3	4	NDTRD#
NDCDD#	1	2	NRXDD

2.4.14 Serial Port 1/2 RS-422-485 mode (J422_1 / J422_2)

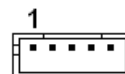
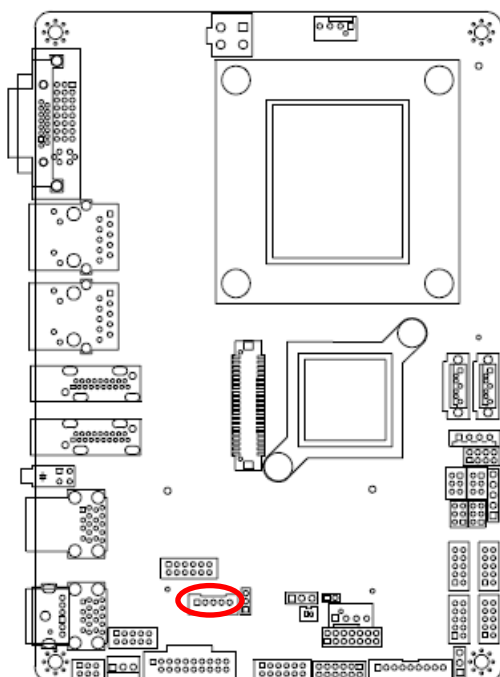


Signal	PIN	PIN	Signal
485_422TX1-	2	1	422RX1-
485_422TX1+	4	3	422RX1+
+5V	6	5	GND

Note:

J422/485 is available after modify the mode of COM1/2 in BIOS setting

2.4.15 LCD Inverter Connector (JBKL)

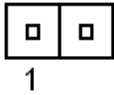
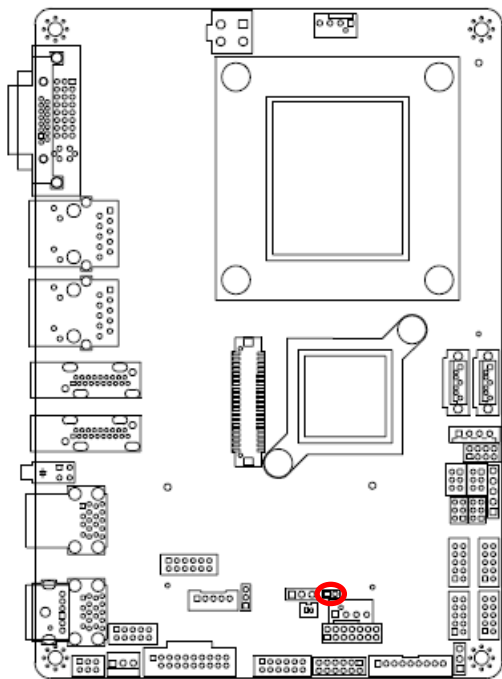


Signal	PIN
+12V	1
GND	2
BKLEN	3
VBRIGHT	4
+5V	5

2.4.15.1 Signal Description – LCD Inverter Connector (JBKL)

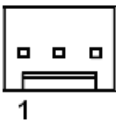
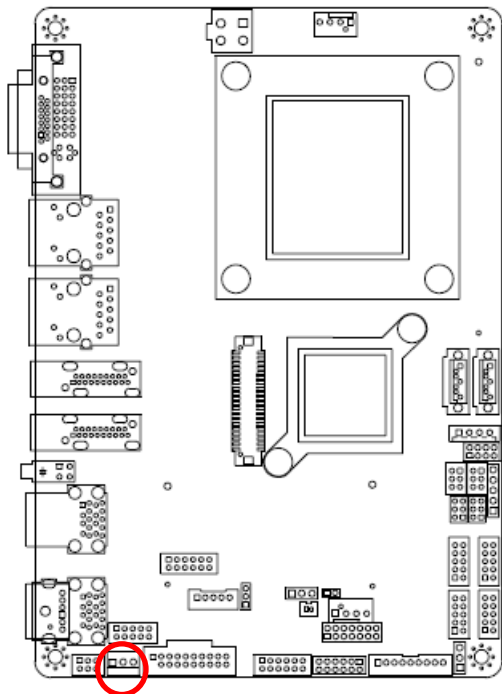
Signal	Signal Description
VBRIGHT	Vadj = 0.75V ~ 4.25V (Recommended: 4.7KΩ, >1/16W)
BKLEN	LCD backlight ON/OFF control signal

2.4.16 EC SMB Reserve connector (JECDEG)



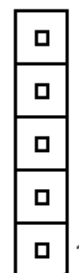
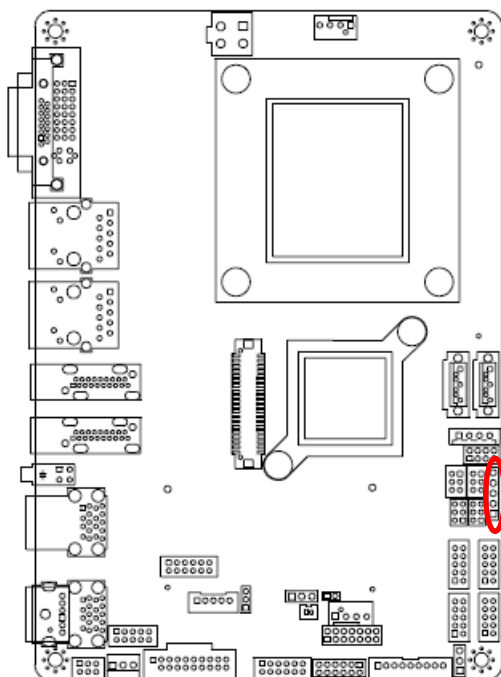
Signal	PIN
EC_SMCLK_DEBUG	1
EC_SMDAT_DEBUG	2

2.4.17 5VSB connector in ATX (PWR_SB)



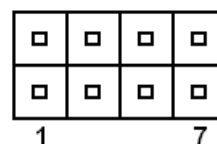
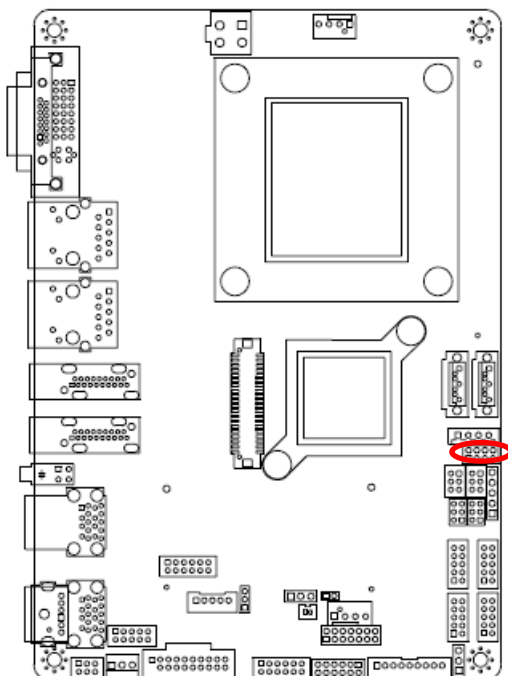
Signal	PIN
PSON_ATX#	1
GND	2
+ATX5VSB	3

2.4.18 IrDA connector (JIR)



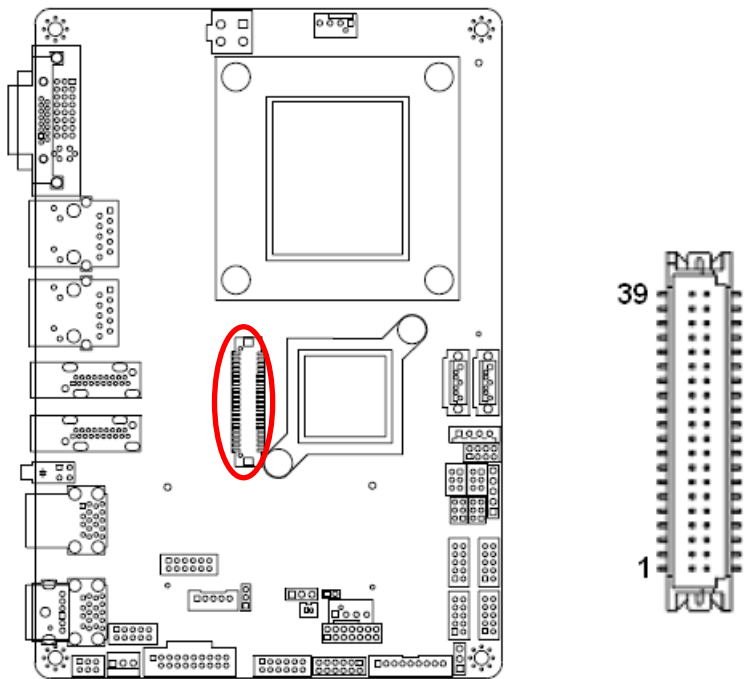
Signal	PIN
IR_TX	5
GND	4
IR_RX	3
NC	2
+5V	1

2.4.19 SPI connector (JSPI)



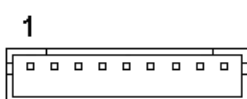
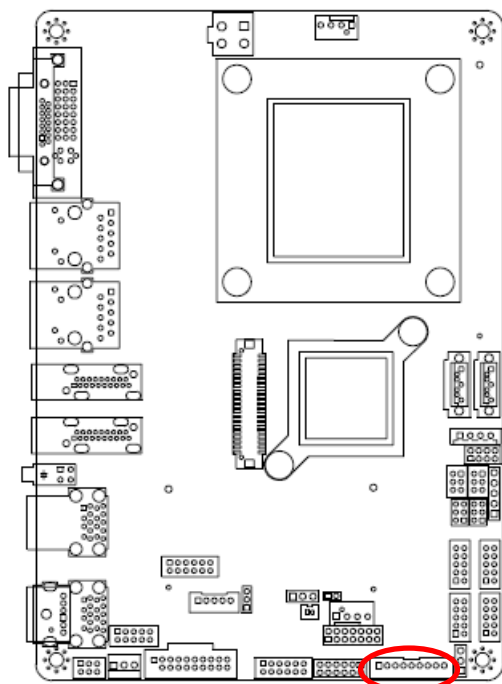
Signal	PIN	PIN	Signal
+3.3V	1	2	GND
SPI_CS0#	3	4	SPI_CLK
SPI_SO	5	6	SPI-SI
HOLD#	7	8	SPI_WP#

2.4.20 LVDS connector (JLVDS)



Signal	PIN	PIN	Signal
+12V	39	40	+12V
GND	37	38	GND
LVDS_CLK2_N	35	36	LVDS_CLK1_N
LVDS_CLK2_P	33	34	LVDS_CLK1_P
GND	31	32	GND
LVDS_DATA7_N	29	30	LVDS_DATA6_N
LVDS_DATA7_P	27	28	LVDS_DATA6_P
GND	25	26	GND
LVDS_DATA5_N	23	24	LVDS_DATA4_N
LVDS_DATA5_P	21	22	LVDS_DATA4_P
GND	19	20	GND
LVDS_DATA3_N	17	18	LVDS_DATA2_N
LVDS_DATA3_P	15	16	LVDS_DATA2_P
GND	13	14	GND
LVDS_DATA1_N	11	12	LVDS_DATA0_N
LVDS_DATA1_P	9	10	LVDS_DATA0_P
GND	7	8	GND
NC	5	6	NC
+3.3V	3	4	+5V
+3.3V	1	2	+5V

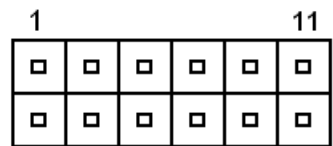
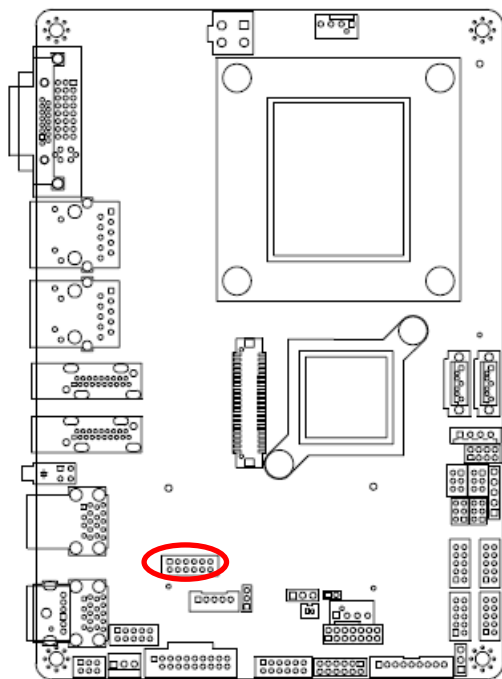
2.4.21 Touch panel connector (JTOUCH)



Signal	PIN
X+	1
X-	2
Y+	3
SENSE	4
X+	5
X-	6
Y+	7
Y-	8
TOUCH_GND	9

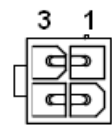
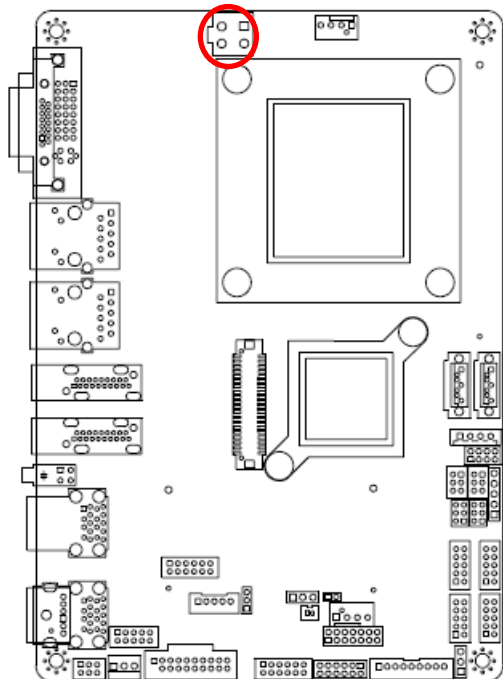
PIN	4-WIRE	5-WIRE	8-WIRE
1	N/A	N/A	Right Sense
2	N/A	N/A	Left Sense
3	N/A	N/A	Bottom Sense
4	N/A	Sense	Top Sense
5	Right	LR	Right Excite
6	Left	LL	Left Excite
7	Bottom	UR	Bottom Excite
8	Top	UL	Top Excite
9	GND	GND	GND

2.4.22 General purpose I/O connector (JDIO)



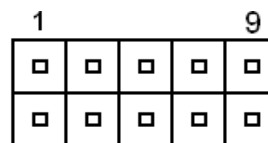
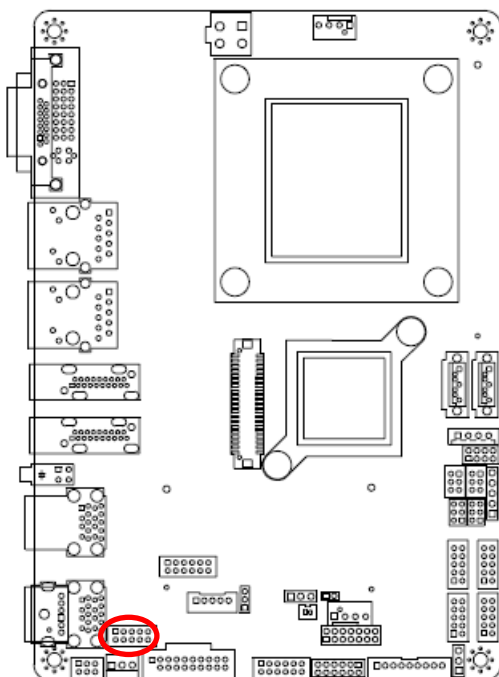
Signal	PIN	PIN	Signal
DIO_GP10	1	2	DIO_GP20
DIO_GP11	3	4	DIO_GP21
DIO_GP12	5	6	DIO_GP22
DIO_GP13	7	8	DIO_GP23
SMB_DATA_9555	9	10	SMB_CLK_9555
+5V	11	12	GND

2.4.23 Power connector (PWR)



Signal	PIN	PIN	Signal
+DC_IN	3	1	GND
+DC_IN	4	2	GND

2.4.24 USB 2.0 connector (JUSB1)

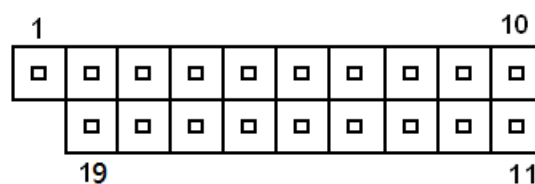
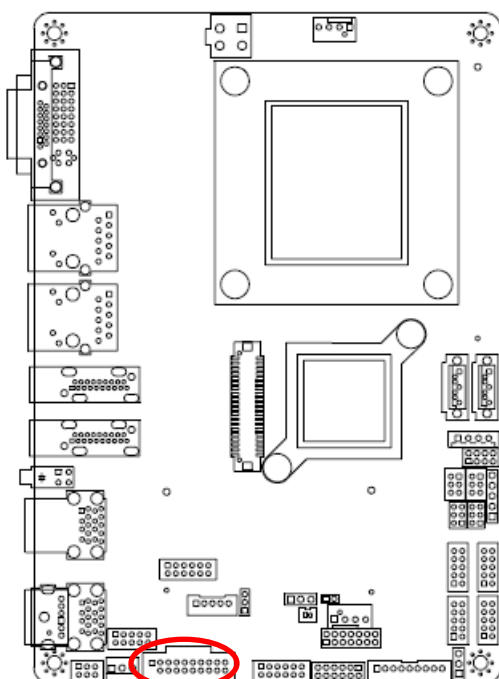


Signal	PIN	PIN	Signal
USBVCC6	1	2	USBVCC6
USB_PN_Z_12	3	4	USB_PN_Z_13
USB_PP_Z_12	5	6	USB_PP_Z_13
GND	7	8	GND
GND	9	10	GND



Note: Wrong USB cable configuration with USB devices might damage USB devices.

2.4.25 USB 2.0 connector (JUSB2)



Signal	PIN	PIN	Signal
USBVCC4	1		
USB3_RXN5_L	2	19	USBVCC5
USB3_RXP5_L	3	18	USB3_RXN6_L
GND	4	17	USB3_RXP6_L
USB3_TXN5_L	5	16	GND
USB3_TXP5_L	6	15	USB3_TXN6_L
GND	7	14	USB3_TXP6_L
USB_PN_Z_8	8	13	GND
USB_PP_Z_8	9	12	USB_PN_Z_10
NC	10	11	USB_PP_Z_10