

EBM-945GSE B1.

5.25" Intel® 945GSE Atom™ N270 Mini Module

Quick Installation Guide



1st Ed – 22 March 2012

FCC Statement



THIS DEVICE COMPLIES WITH PART 15 FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:

- (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE.
- (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRE OPERATION.

THIS EQUIPMENT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS "A" DIGITAL DEVICE, PURSUANT TO PART 15 OF THE FCC RULES.

THESE LIMITS ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST HARMFUL INTERFERENCE WHEN THE EQUIPMENT IS OPERATED IN A COMMERCIAL ENVIRONMENT. THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND, IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTION MANUAL, MAY CAUSE HARMFUL INTERFERENCE TO RADIO COMMUNICATIONS.

OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE HARMFUL INTERFERENCE IN WHICH CASE THE USER WILL BE REQUIRED TO CORRECT THE INTERFERENCE AT HIS OWN EXPENSE.

Notice

This guide is designed for experienced users to setup the system within the shortest time. For detailed information, please always refer to the electronic user's manual.

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1. Getting Started

1.1 Safety Precautions

Warning!



Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges. Only experienced electronics personnel should open the PC chassis.

Caution!



Always ground yourself to remove any static charge before touching the CPU card. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components in a static-dissipative surface or static-shielded bag when they are not in the chassis.

1.2 Packing List

Before you begin installing your single board, please make sure that the following materials have been shipped:

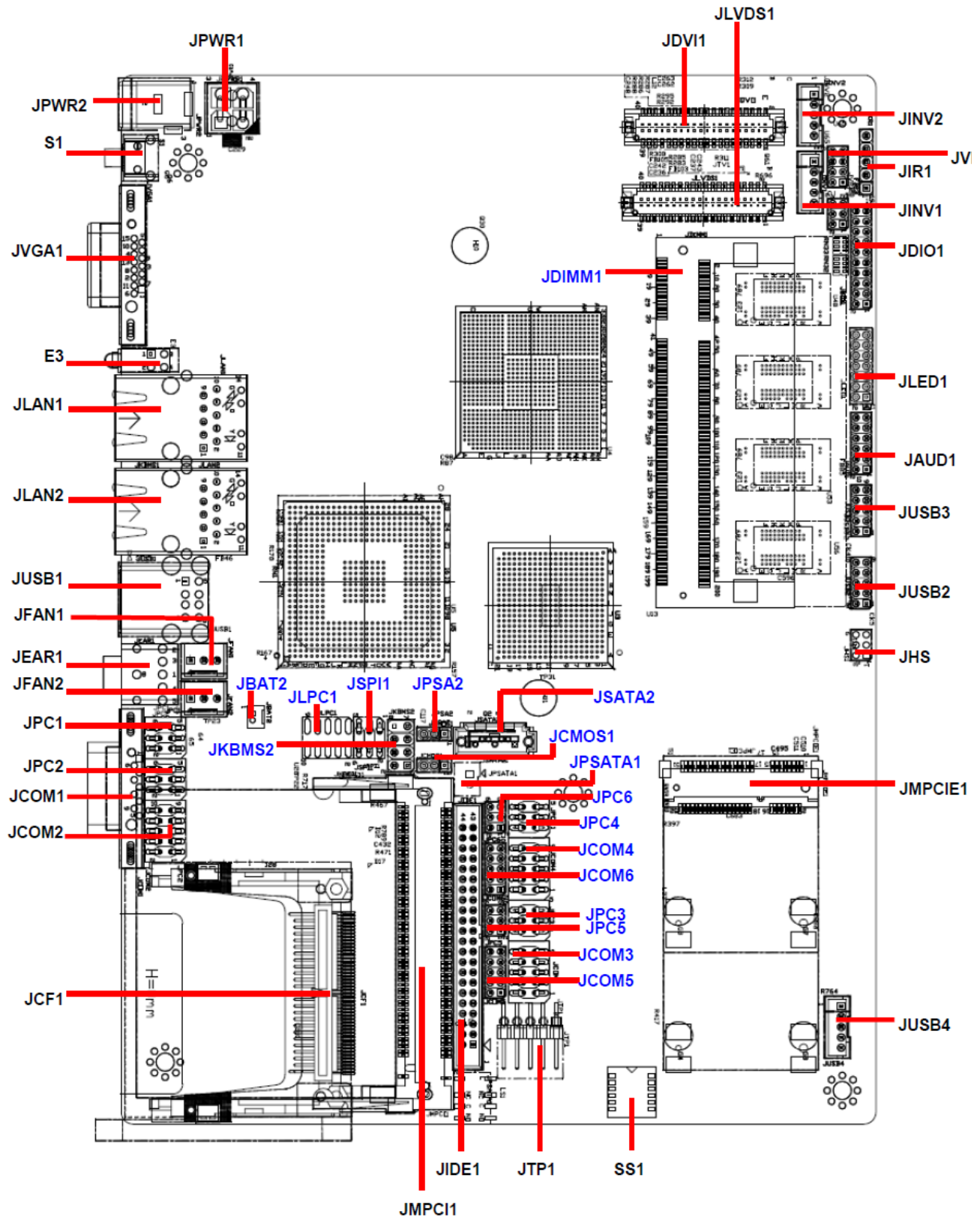
- 1 x EBM-945GSE Intel® 945GSE Atom™ N270 Mini Module
- 1 x Quick Installation Guide for EBM-945GSE
- 1 x DVD-ROM or CD-ROM contains the followings:
 - User's Manual (this manual in PDF file)
 - Ethernet driver and utilities
 - VGA drivers and utilities
 - Audio drivers and utilities
- 1 x Cable set contains the followings:
 - 1 x IDE HDD cable (44-pin, pitch 2.0mm)
 - 1 x Serial ATA cables (7-pin, standard)



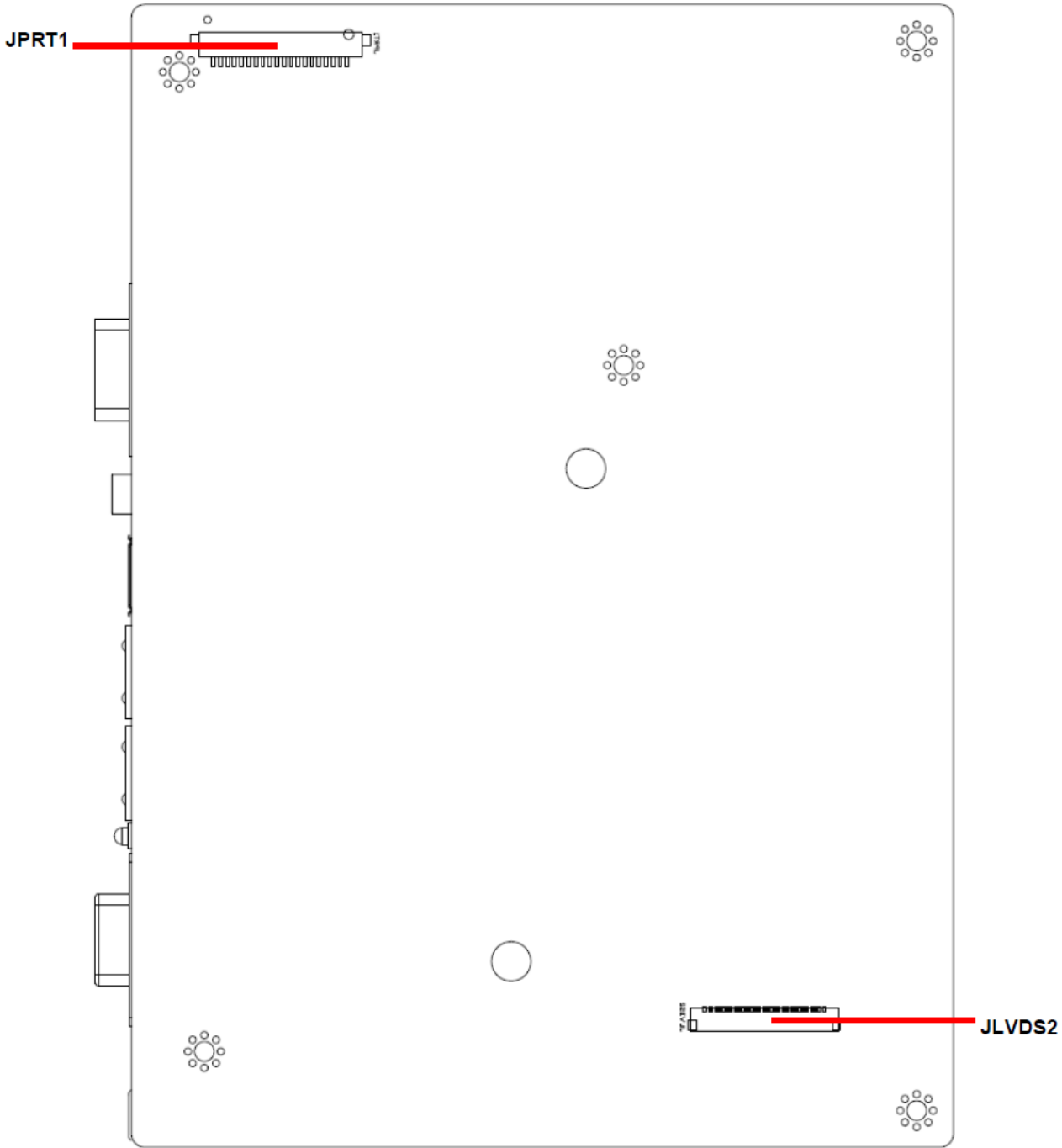
If any of the above items is damaged or missing, contact your retailer.

2. Hardware Configuration

2.1 Product Overview



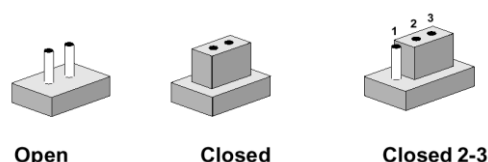
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2.2 Jumper and Connector List

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
JCMOS1	Clear CMOS	3 x 1 header, pitch 2.0mm
JPC1	COM1--Ring, +5V, +12V power select	3 x 2 header, pitch 2.0mm
JPC2	COM2--Ring, +5V, +12V power select	3 x 2 header, pitch 2.0mm
JPC3	COM3--Ring, +5V, +12V power select (Optional)	3 x 2 header, pitch 2.0mm
JPC4	COM4--Ring, +5V, +12V power select (Optional)	3 x 2 header, pitch 2.0mm
JPC5	COM5--Ring, +5V, +12V power select (Optional)	3 x 2 header, pitch 2.0mm
JPC6	COM6--Ring, +5V, +12V power select (Optional)	3 x 2 header, pitch 2.0mm
JPSA2	JSATA2 Pin7 select	3 x 1 header, pitch 2.0mm

Connectors

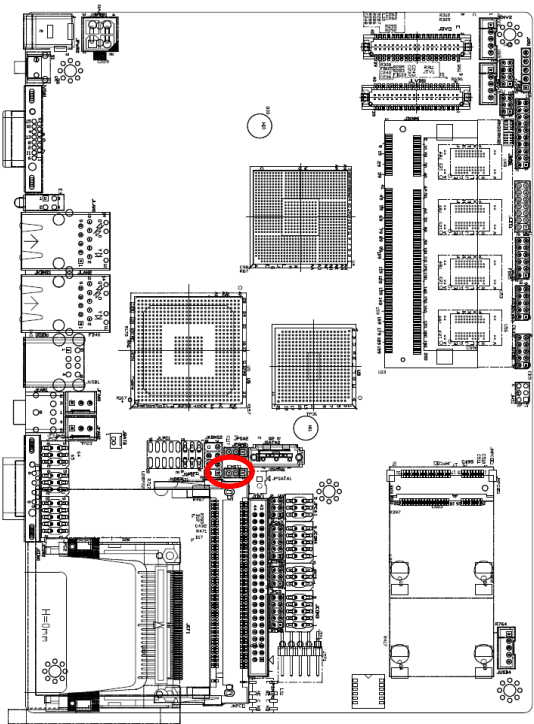
Label	Function	Note
E3	LED connector	
JAUD1	Audio connector	6 x 2 header, pitch 2.0mm
JBAT2	Battery connector 2	2 x 1 header, pitch 1.25mm
JCF1	Compact Flash card connector	
JCOM1	Serial Port 1 connector	
JCOM2	Serial Port 2 connector	5 x 2 header, pitch 2.0mm
JCOM3	Serial Port 3 connector (Optional)	5 x 2 header, pitch 2.0mm
JCOM4	Serial Port 4 connector (Optional)	5 x 2 header, pitch 2.0mm
JCOM5	Serial Port 5 connector (Optional)	5 x 2 header, pitch 2.0mm
JCOM6	Serial Port 6 connector (Optional)	5 x 2 header, pitch 2.0mm
JDIMM1	200-pin DDR2 SODIMM socket	
JDIO1	General purpose I/O connector	10 x 2 header, pitch 2.0mm
JDVI1	DVI Connector (Optional)	HIROSE DF13-40DP-1.25V
JEAR1	Audio Connector	
JHS	Handset connector	3 x 2 header, pitch 2.0mm
JIDE1	Primary IDE connector	22 x 2 header, pitch 2.0mm
JINV1	LCD Inverter Connector	5 x 1 wafer, pitch 2.0mm
JINV2	LCD Inverter Connector	5 x 1 wafer, pitch 2.0mm
JIR1	IrDA connector	5 x 1 header, pitch 2.54mm
JBMS2	PS/2 keyboard & mouse connector	4 x 2 header, pitch 2.54mm
JLAN1	RJ-45 Ethernet 1	
JLAN2	RJ-45 Ethernet 2	
JLED1	LED indicator connector	
JLPC1	Debug connector	5 x 2 header, pitch 2.00mm
JLVDS1	LVDS Connector 1	HIROSE DF13-40DP-1.25V
JLVDS2	LVDS Connector 2	HIROSE DF13-40DP-1.25V
JMPCI1	Mini-PCI connector	
JMPCIE1	Mini-PCIe slot	
JPSATA1	SATA1 power input	2 x 1 wafer, pitch 2.00mm
JPWR1	Power connector	2 x 2 wafer, pitch 4.2mm
JPWR2	Power connector	
JPRT1	Print port connector (Optional)	

Quick Installation Guide

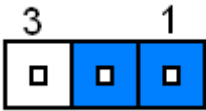
JSATA2	Serial ATA connector 2	Wafer 7P pitch 1.27mm
JSPI1	SPI interface connector	3 x 2 header, pitch 2.0mm
JFAN1&2	Fan connector	3 x 1 wafer, pitch 2.54mm
JTP1	Touch panel connector (Optional)	5 x 1 header, pitch 2.54mm
JUSB1	USB connector 0 & 1	
JUSB2	USB connector 2 & 3	5 x 2 header, pitch 2.0mm
JUSB3	USB connector 4 & 5	5 x 2 header, pitch 2.0mm
JUSB4	USB connector 7	5 x 2 header, pitch 2.0mm
JVGA1	VGA connector	
JVR1	LCD backlight brightness adjustment	4 x 2 header, pitch 2.0mm
S1	Reset/Power bottom	
SS1	4/5-wire Touch Screen Select & AT/ATX Select	DIP SW-6

2.3 Setting Jumpers & Connectors

2.3.1 Clear CMOS (JCMOS1)



Protect*

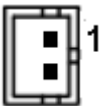
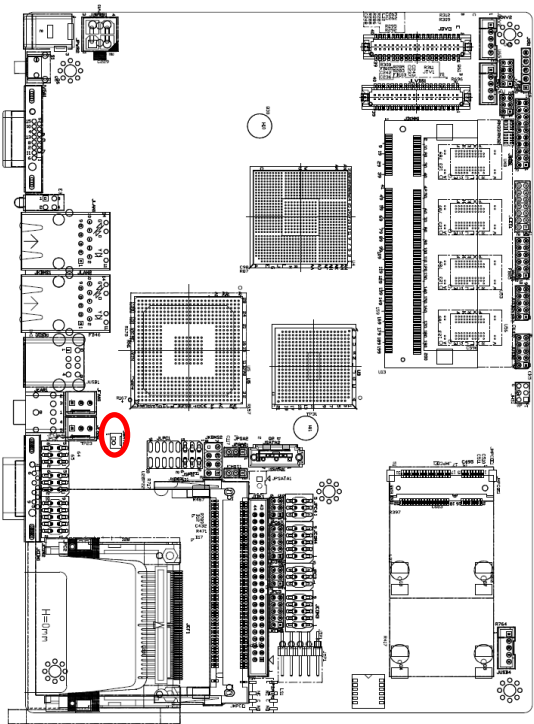


Clear CMOS



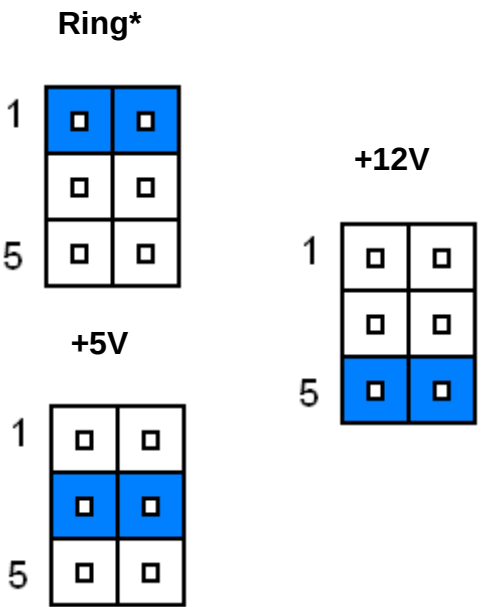
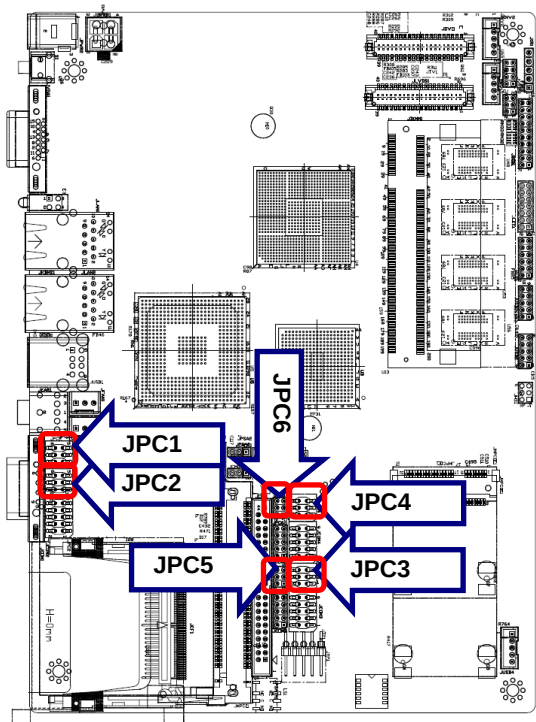
* Default

2.3.2 Battery connector (JABT2)



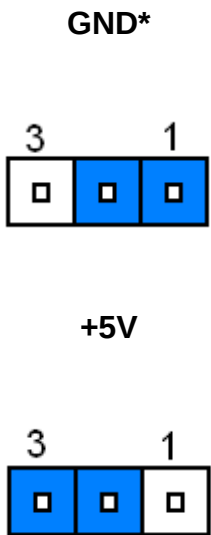
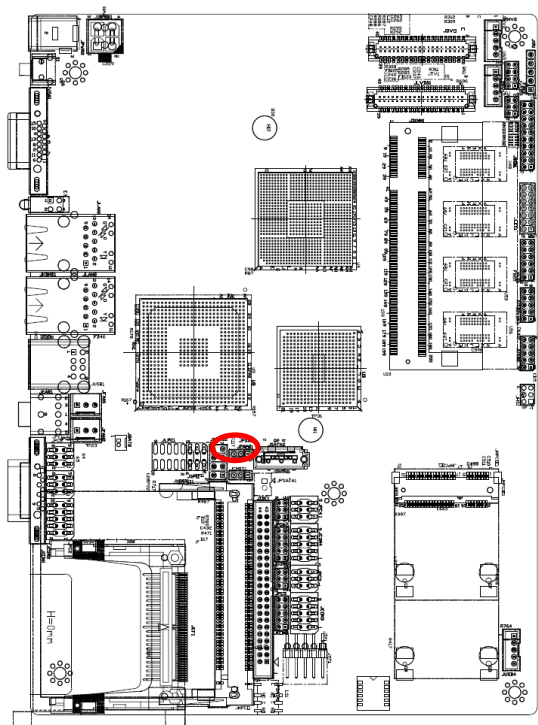
Signal	PIN
DUAL_ACZ	1
GND	2

2.3.3 COM1/2/3/4/5/6--Ring, +5V, +12V power select (JPC1/2/3/4/5/6, 3 to 6 are optional)



* Default

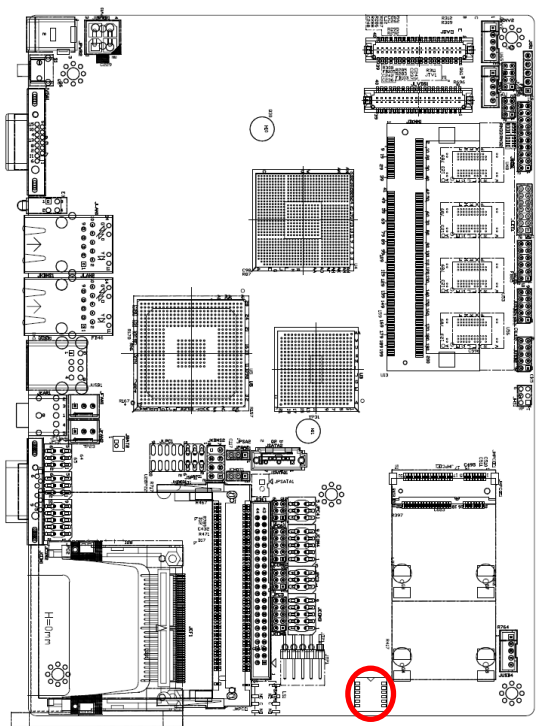
2.3.4 JSATA2 Pin7 select (JPSA2)



Default*

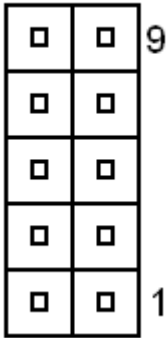
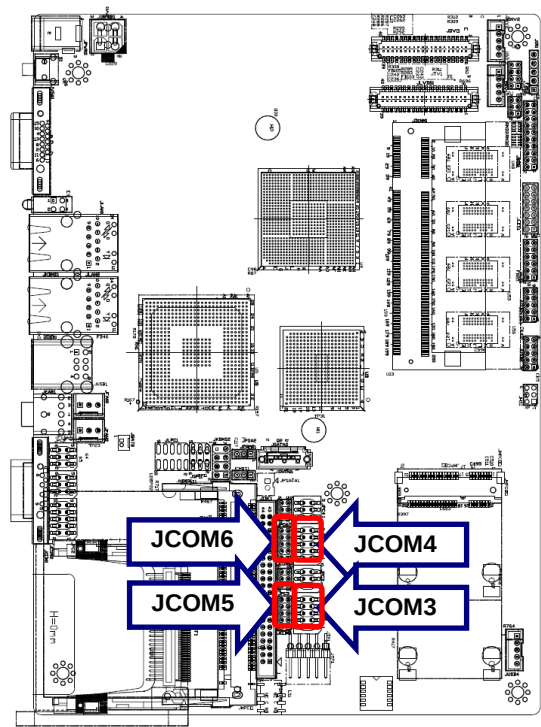
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2.3.5 4/5-wire Touch Screen Select & AT/ATX Select (SS1)



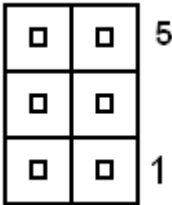
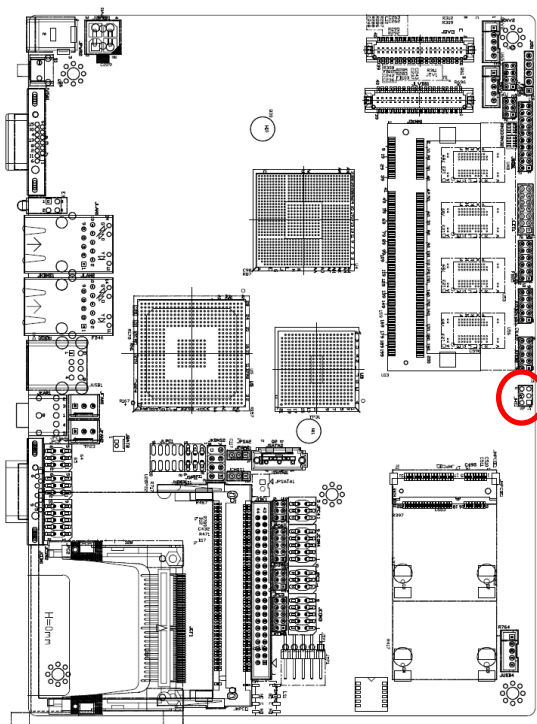
	OFF	ON
1	ATX	AT
2	CF-SLAVE	CF-MASTER
3	Touch On	Touch Off
4	Touch 5W	Touch4W
5	Gpio10: Hi	Gpio10: Lo
6	USBP: 5V	USBP: 5VSB

2.3.6 Serial port connector 3/ 4/ 5/ 6 (JCOM3/4/5/6, Optional)



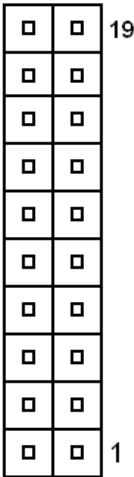
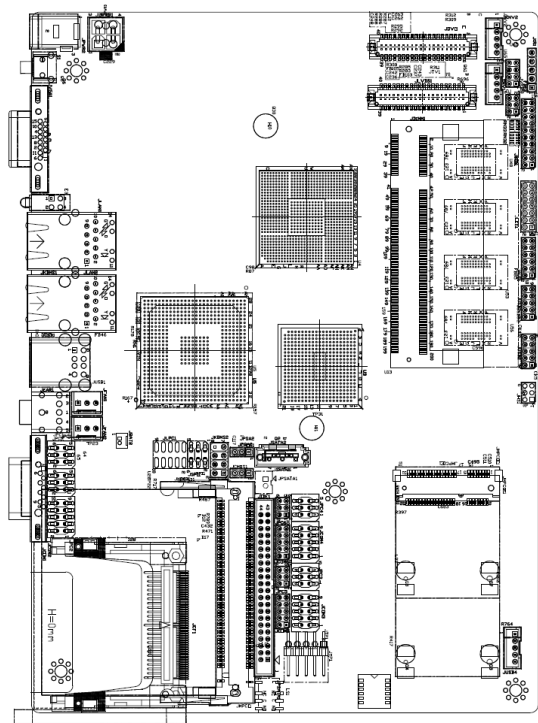
Signal	PIN	PIN	Signal
GND	10	9	RI
CTS	8	7	RTS
DSR	6	5	GND
DTR	4	3	TxD
RxD	2	1	DCD

2.3.7 Handset connector 3/ 4/ 5/ 6 (JHS)



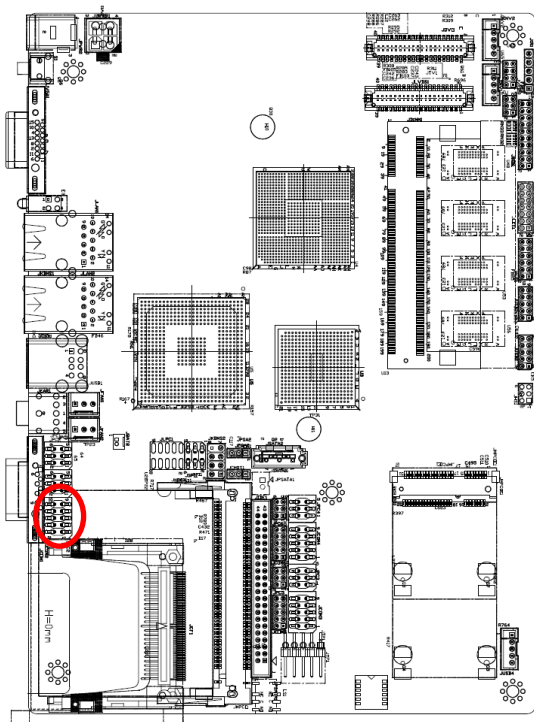
Signal	PIN	PIN	Signal
GND	6	5	HOOK
GND	4	3	HS_OUT+
HS_MIC-	2	1	HS_MIC+

2.3.8 General purpose I/O connector (JDIO1)

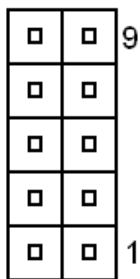


Signal	PIN	PIN	Signal
+5V	20	19	GND
SMB_DATA	18	17	SMB_CLK
GPIO37	16	15	GPIO27
GPIO36	14	13	GPIO26
GPIO35	12	11	GPIO25
GPIO34	10	9	GPIO24
GPIO33	8	7	GPIO23
GPIO32	6	5	GPIO22
GPIO31	4	3	GPIO21
GPIO30	2	1	GPIO20

2.3.9 COM2 Connector (JCOM2)



JCOM2



RS-232 Mode

Signal	PIN	PIN	Signal
GND	10	9	RI
CTS	8	7	RTS
DSR	6	5	GND
DTR	4	3	TxD
RxD	2	1	DCD

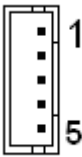
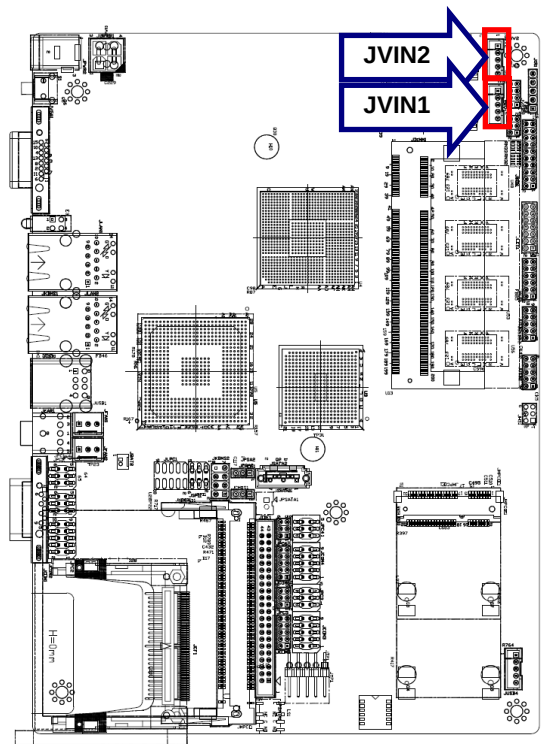
RS-422 Mode

Signal	PIN	PIN	Signal
GND	10	9	NC
RxD-	8	7	NC
TxD+	6	5	GND
NC	4	3	NC
RxD+	2	1	TxD-

RS-485 Mode

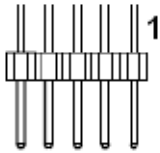
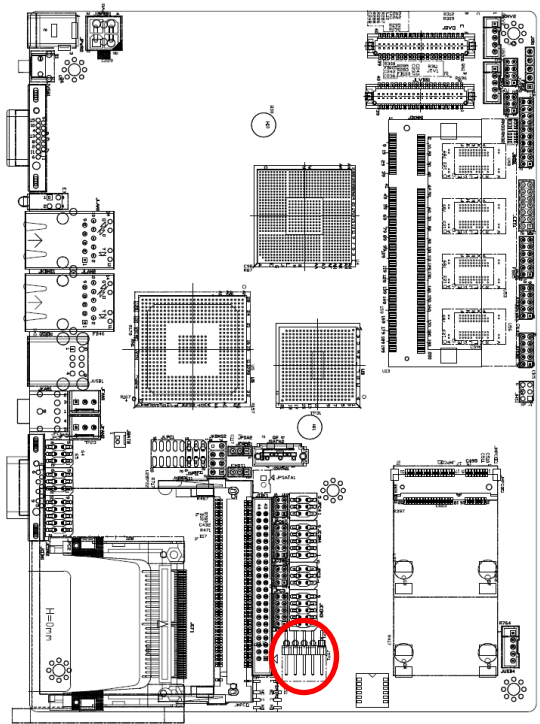
Signal	PIN	PIN	Signal
GND	10	9	NC
NC	8	7	NC
DATA+	6	5	GND
NC	4	3	NC
NC	2	1	DATA-

2.3.10 LCD Inverter Connector (JINV1/ JINV2)



Signal	PIN
+12V	1
GND	2
ENBKL	3
VR	4
+5V	5

2.3.11 Touch panel connector (JTP1, Optional)

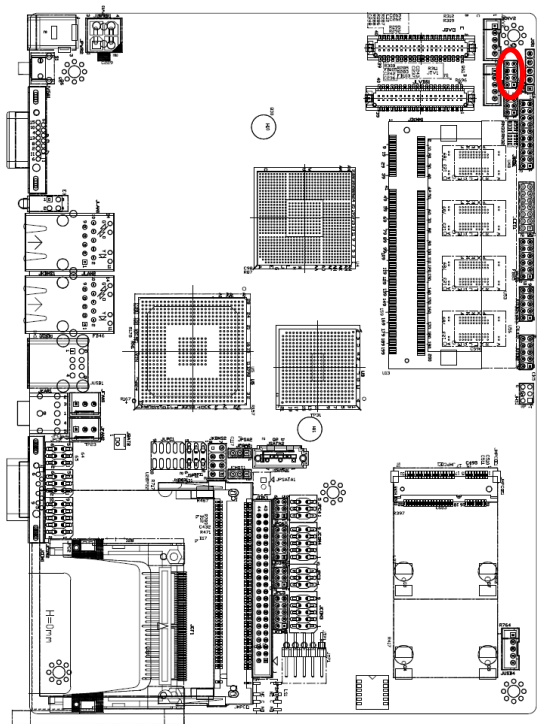


Signal	PIN	PIN	Signal
X+	1	2	Y+
PROBE	3	4	Y-
X-	5	6	GND
Y-	7	8	Y-2
X-	9	10	X-2

4/5-wire Touch Screen Select

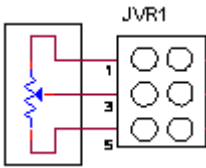
Wire	Select
4	1,2,4,5
5	1,2,3,4,5

2.3.12 Backlight brightness adjustment Connector (JVR1)



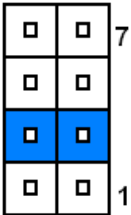
Mode1: VR type

Signal	PIN	PIN	Signal
L_BKLCTL	8	7	INV_ADJ
INV_PWM	6	5	pull-low 1K to GND
INV_ADJ	4	3	INV_ADJ
IN_DA	2	1	pull-high 1K to +5VS

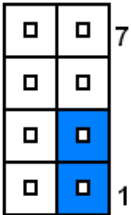


Variation Resistor
(Recommended: 4.7KΩ, >1/16W)

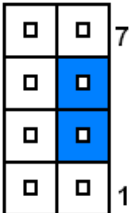
Default : (3-4)



Mode1: pull-high 1K to +5VS

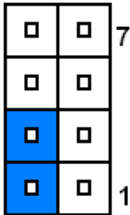


Mode2: pull-low 1K to GND

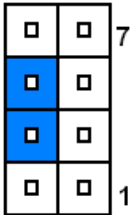


For inverters with adjustable Backlight function, it is possible to control the LCD brightness through the VR signal controlled by JVR1. Please see the JVR1 section for detailed circuitry information.

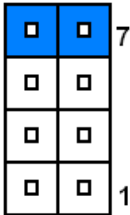
Mode3: Digital to Analogue type



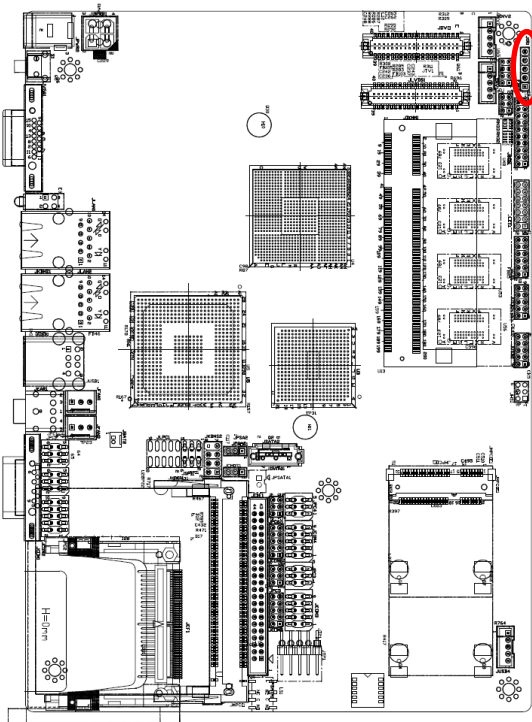
Mode4: Pulse-Width Modulated type
(23.43 KHz)



Mode5: Pulse-Width Modulated type
(200Hz)



2.3.13 IrDA Connector (JIR1)

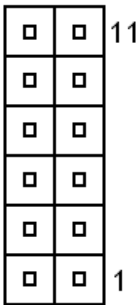
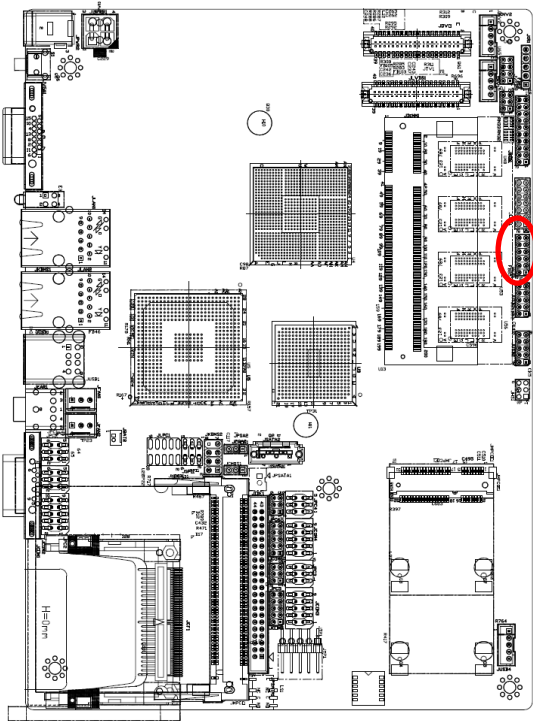


Signal	PIN
IRTX	5
GND	4
IRRX	3
NC	2
+5V	1



When using JIR1, it is necessary to give up JCOM3/ RS232 function.

2.3.14 Audio Connector (JAUD1)

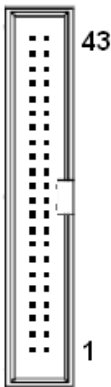
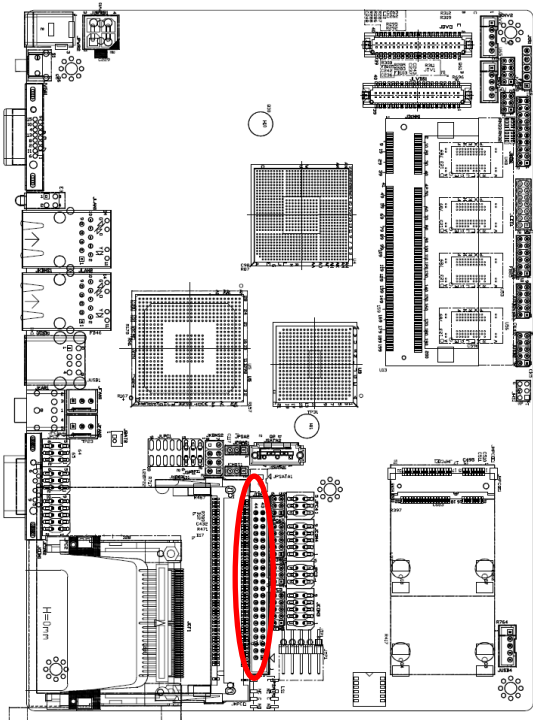


Signal	PIN	PIN	Signal
GND	12	11	MIC_JD
LINEIN_JD	10	9	LINEOUT_JD
AUD_MICL	8	7	AUD_MICR
AUD_LINEL	6	5	AUD_LINER
GND	4	3	GND
AUD_OUTL	2	1	AUD_OUTR

Pin9: Internal enable (Default)

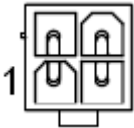
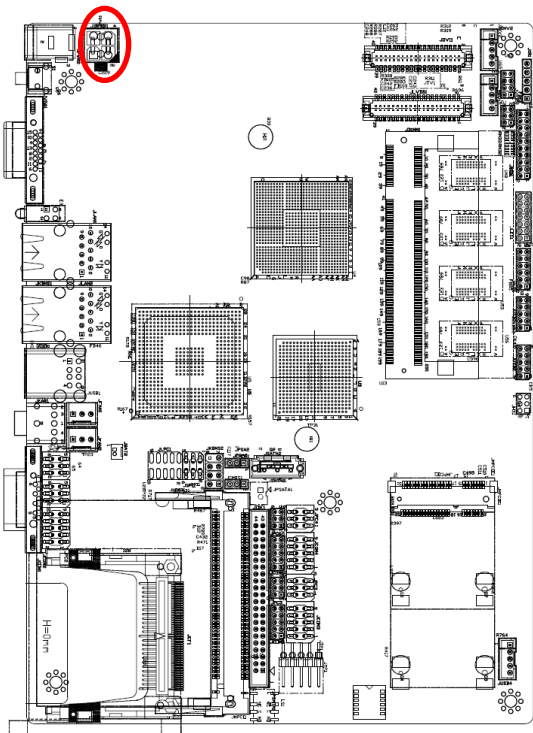
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2.3.15 IDE Connector (JIDE1)



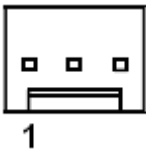
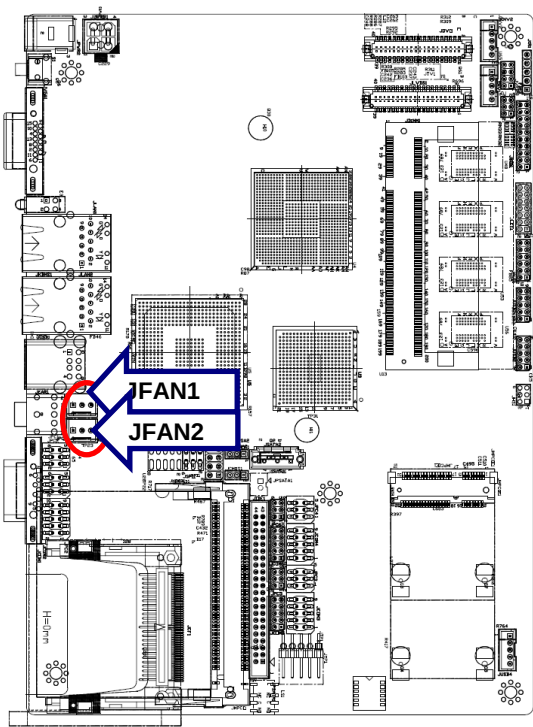
Signal	PIN	PIN	Signal
RESET#	1	2	GND
PDD7	3	4	PDD8
PDD6	5	6	PDD9
PDD5	7	8	PDD10
PDD4	9	10	PDD11
PDD3	11	12	PDD12
PDD2	13	14	PDD13
PDD1	15	16	PDD14
PDD0	17	18	PDD15
GND	19	20	NC
PDREQ	21	22	GND
PDIOW#	23	24	GND
PDIOR#	25	26	GND
PIORDY	27	28	NC
PDA1	29	30	GND
IRQ	31	32	NC
PDA1	33	34	LID
PDA0	35	36	PDA2
PDCS1#	37	38	PDCS3#
HD_LED1	39	40	GND
+5V	41	42	+5V
GND	43	44	NC

2.3.16 Power Connector (JPWR1)



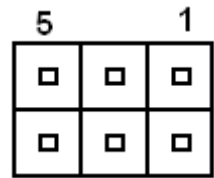
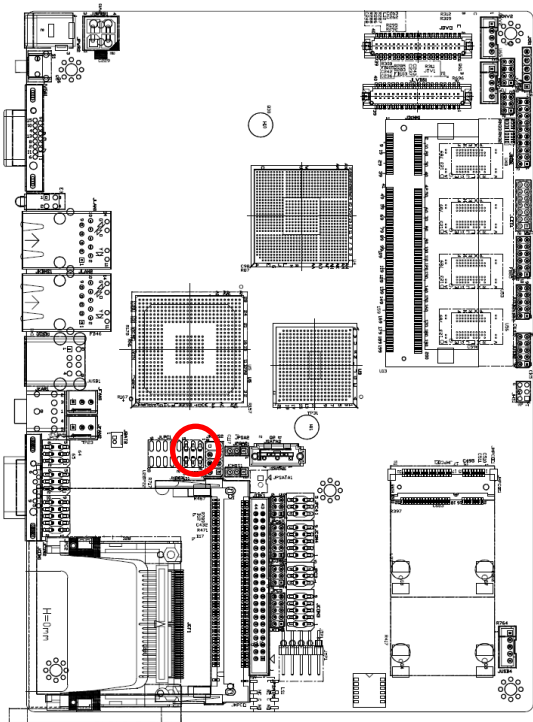
Signal	PIN	PIN	Signal
GND	3	4	GND
VIN	1	2	VIN

2.3.17 Fan Connector (JFAN1/ JFAN2)



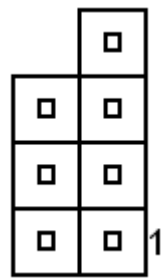
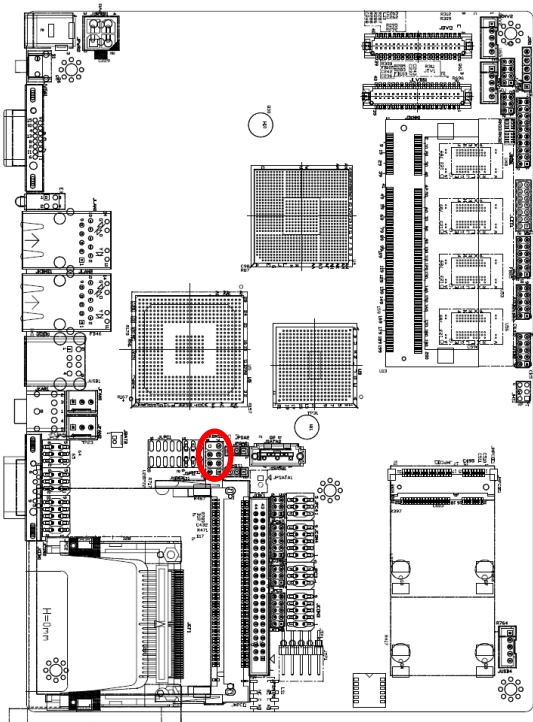
Signal	PIN
GND	1
+12V	2
FAN_TAC1/ FAN_TAC2	3

2.3.18 SPI interface Connector (JSPI1)



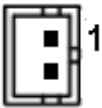
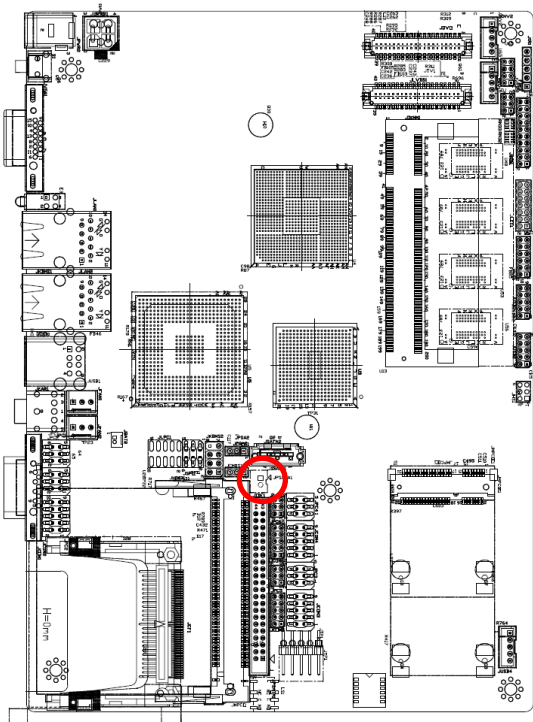
Signal	PIN	PIN	Signal
+5V	1	2	GND
SSPI_CE#	3	4	SSPI_SCK
SSPI_SO	5	6	SSPI_SI

2.3.19 PS/2 keyboard & mouse connector (JKBMS2)



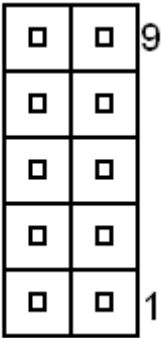
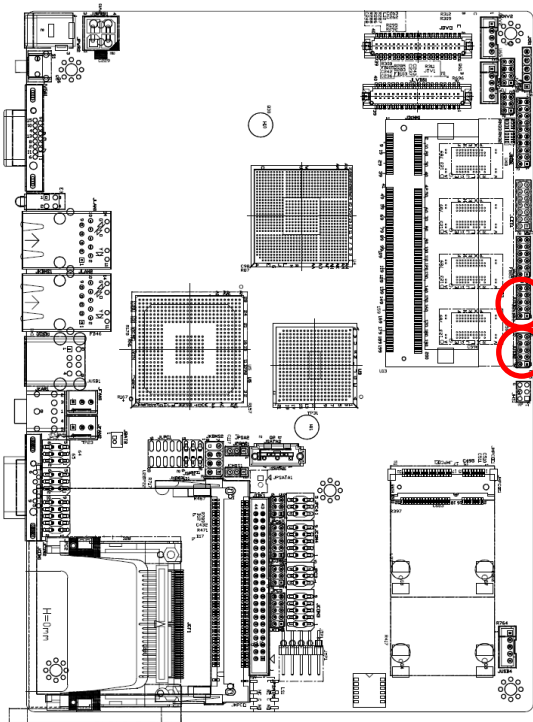
Signal	PIN	PIN	Signal
		7	NC
MS_CK	6	5	MS_DT
+KBVCC	4	3	GND
KB_CK	2	1	KB_DT

2.3.20 SATA1 power input (JPSATA1)



Signal	PIN
GND	1
+5V	2

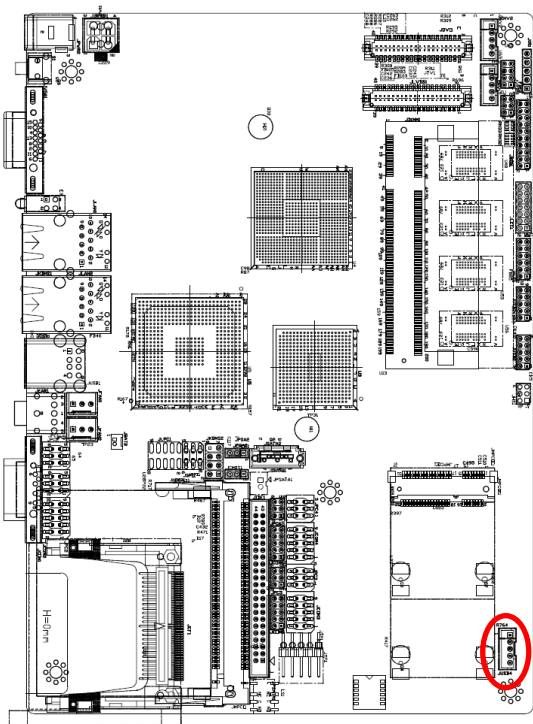
2.3.21 USB connector (JUSB2/ 3)



Signal	PIN	PIN	Signal
+5V	10	9	GND
USBD_T2-/ USBD_T4-	8	7	GND
USBD_T2+/ USBD_T4+	6	5	USBD_T3+/ USBD_T5+
GND	4	3	USBD_T3-/ USBD_T5-
GND	2	1	+5V

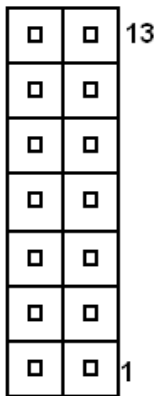
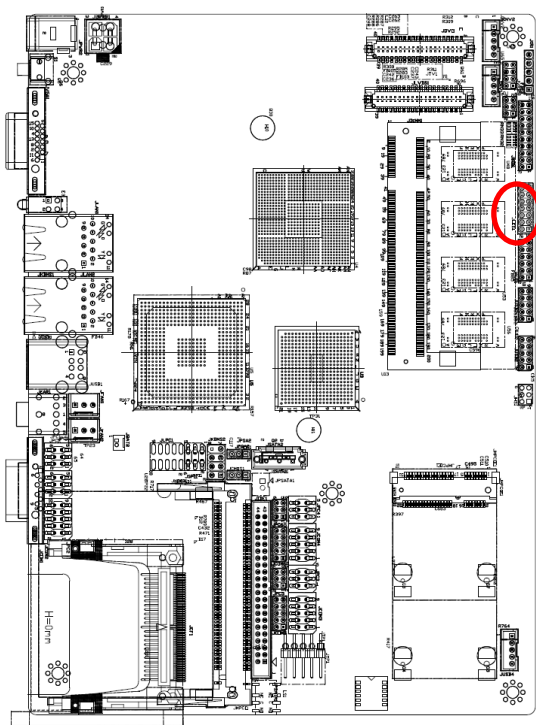
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2.3.22 USB connector (JUSB4)



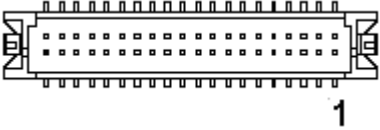
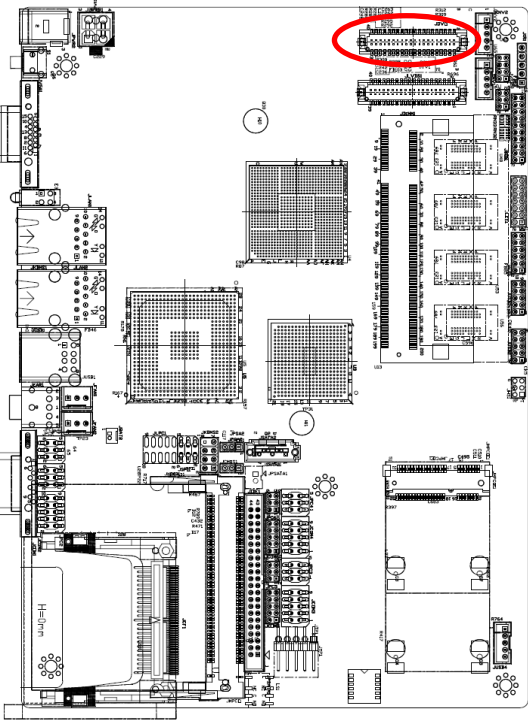
Signal	PIN
+3.3V	1
USBD_T7-	2
USBD_T7+	3
GND	4
GND	5

2.3.23 LED indicator connector (JLED1)



Signal	PIN	PIN	Signal
GND	14	13	PWRBTN#_IN
SP_OUTL+	12	11	SP_OUTL-
SP_OUTR+	10	9	SP_OUTR-
LAN2_LED+	8	7	LAN2_LED-
LAN1_LED+	6	5	LAN1_LED-
HDD_LED+	4	3	HDD_LED-
PWR_LED+	2	1	PWR_LED-

2.3.24 24-bit LVDS/DVI Connector (JDVI1, Optional)



24-bit LVDS

Signal	PIN	PIN	Signal
+5V	2	1	+3.3V
+5V	4	3	+3.3V
I ² C_DAT	6	5	I ² C_CLK
GND	8	7	GND
Txout0	10	9	Txout1
Txout0#	12	11	Txout1#
GND	14	13	GND
Txout2	16	15	Txout3
Txout2#	18	17	Txout3#
GND	20	19	GND
E_Txout0	22	21	E_Txout1
E_Txout0#	24	23	E_Txout1#
GND	26	25	GND
E_Txout2	28	27	E_Txout3
E_Txout2#	30	29	E_Txout3#
GND	32	31	GND
Txclk	34	33	E_Txclk
Txclk#	36	35	E_Txclk#
GND	38	37	GND
+12V(Optional)	40	39	+12V(Optional)

DVI

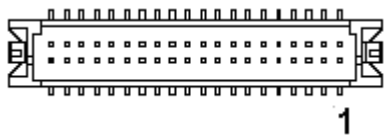
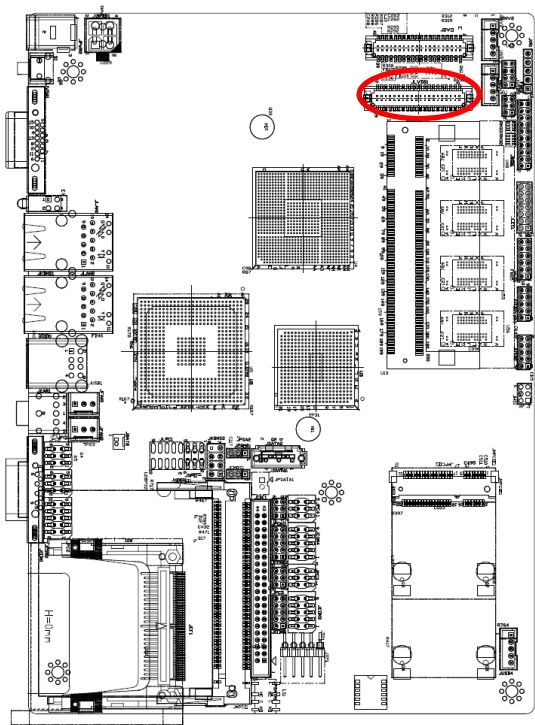
Signal	PIN	PIN	Signal
+5V	2	1	+3.3V
+5V	4	3	+3.3V
--	6	5	--
GND	8	7	GND
TLC	10	9	TDC0
TLC#	12	11	TDC0#
GND	14	13	GND
TDC1	16	15	--
TDC1#	18	17	--
GND	20	19	GND
--	22	21	--
--	24	23	--
GND	26	25	GND
--	28	27	--
--	30	29	--
GND	32	31	GND
TDC2	34	33	--
TDC2#	36	35	--
GND	38	37	GND
DVI/DAT	40	39	DVI/CLK



NOTE:
Customized VBIOS is necessary for dual LVDS display function; please contact us for advanced information.

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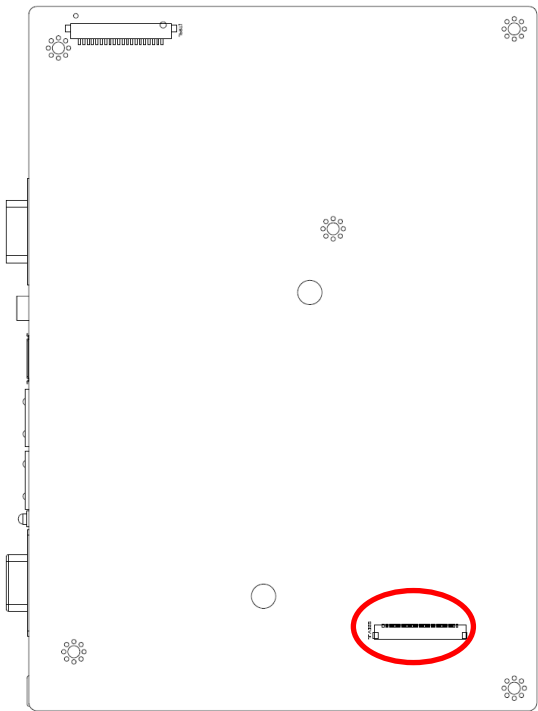
2.3.25 18-bit LVDS Connector (JLVDS1)



18-bit LVDS

Signal	PIN	PIN	Signal
+5V	2	1	+3.3V
+5V	4	3	+3.3V
DDC_DATA	6	5	DDC_CLK
GND	8	7	GND
LA_DATAP0	10	9	LA_DATAP1
LA_DATAN0	12	11	LA_DATAN1
GND	14	13	GND
LA_DATAP2	16	15	NC
LA_DATAN2	18	17	NC
GND	20	19	GND
LB_DATAP0	22	21	LB_DATAP1
LB_DATAN0	24	23	LB_DATAN1
GND	26	25	GND
LB_DATAP2	28	27	NC
LB_DATAN2	30	29	NC
GND	32	31	GND
LA_CLKP	34	33	LB_CLKP
LA_CLKN	36	35	LB_CLKN
GND	38	37	GND
+12V/NC	40	39	+12V/NC

2.3.26 18-bit LVDS Connector (JLVDS2)



(Rear side)



Signal	PIN
NC	1
+3.3V	2
+3.3V	3
+3.3V	4
NC	5
SMB_DATA_S	6
SMB_CLK_S	7
LA_DATAN0	8
LA_DATAP0	9
GND	10
LA_DATAN1	11
LA_DATAP1	12
GND	13
LA_DATAN2	14
LA_DATAP2	15
GND	16
LA_CKLN	17
LA_CLKP	18
GND	19
LB_DATAN0	20

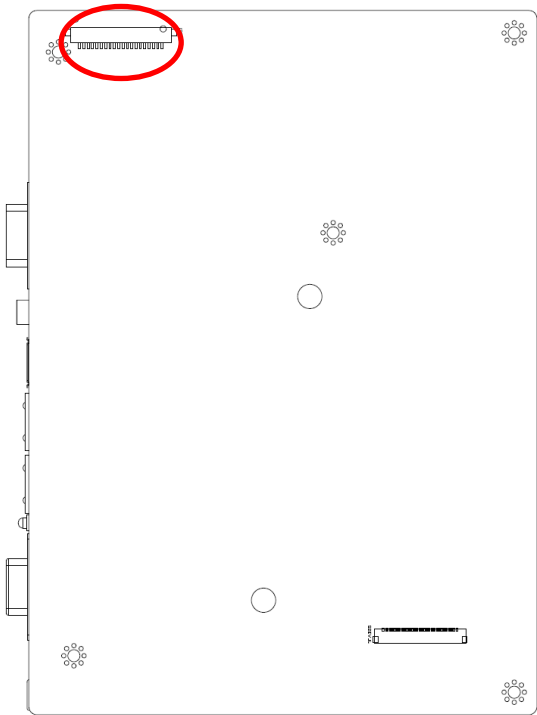
Signal	PIN
LB_DATAP0	21
GND	22
LB_DATAN1	23
LB_DATAP1	24
GND	25
LB_DATAN2	26
LB_DATAP2	27
GND	28
LB_CKLN	29
LB_CLKP	30
GND	31
GND	32
GND	33
NC	34
INV_ADJ	35
INV_ON	36
NC	37
+5V	38
+5V	39
+5V	40



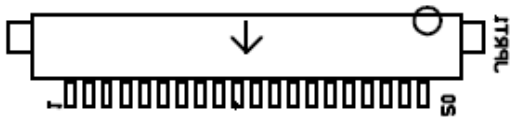
NOTE:
For using JLVDS2, please set up either JINV1 (jumper 4-6) or JLVDS1.

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2.3.27 Print port Connector (JPRT1)



(Rear side)



Signal	PIN
P_-STBT	1
P_PRD0T	2
P_PRD1T	3
P_PRD2T	4
P_PRD3T	5
P_PRD4T	6
P_PRD5T	7
P_PRD6T	8
P_PRD7T	9
P_-ACK	10
P_BUSY	11
P_PE	12
P_SLCT	13
P_-AFD	14
P_-ERR	15
P_-INIT	16
P_-SLIN	17
GND	18
GND	19
GND	20



NOTE:

JPRT1 is optional. For using JPRT1, please perform BIOS set up.

