

IB112

**Freescale I.MX536 ARM Cortex™-A8
Embedded BOARD**

USER'S MANUAL

Version 1.0

Acknowledgments

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Introduction

Product Description

The IB112 Embedded board is based on the Freescale I.MX536 Microprocessor. I.MX536 is a high-performance ARM Cortex-A8 microprocessor with speeds up to 800 MHz. The device offers 3D graphics acceleration while also supporting numerous peripherals, including DDR3 and USB OTG that are well suited for industrial applications.

The following subsystems are part of the device:

- Microprocessor unit (MPU) subsystem based on the ARM Cortex-A8 Microprocessor
- OpenGL ES 2.0 3D accelerator
- OpenVG 1.1 graphics accelerator
- Multi-format HD1080 video decoder
- Multi-format HD720 video encoder

IB112 FEATURES:

- Freescale I.MX536 800 MHz ARM Cortex-A8 Microprocessor
- 1G Byte DDR3 RAM
- 1 x 18 bit LVDS Connector
- 1 x 18 bit TTL LCD Connector
- 2 x COM Port Connector
- 1 x Mini-PCIE(x1) Slot (*w/ USB support Only*)
- 2 x 10/100 Based-T Ethernet (RJ-45) Connector
- 12V~ 30V DC-IN Power Connector
- 1 x SD Card Slot, 1x Micro SD
- 1 x emmc FLASH (Option)
- 1 x USB OTG
- 2 x USB Host(1 x USB A-Type, 1 x pin header)
- 1 x HDMI Port (Option)
- 1 x VGA Port (Option)
- 1 x SATA Port (Option)
- 8 Bits GPIO (Option)
- Resistive Touch Connector
- 2 x CANBUS Connector
- 1 x Microphone / 1 x Speaker

Specification Table:

Form Factor	3.5" Disk-Size SBC 102(W) x 147(H) (4" x 5.8")
MPU Type Operating Frequency	Freescale Industrial Grade i.MX536: 1GHz Cortex™-A8 65nm, LP/GP 19x19 0.8mm (TE-BGA)
System Memory	DDR3-800 Onboard 1GB
Data Memory	8/16 GB eMMC for Option MicroSD slot support up to 32GB
Display	Sil9022A HDMI Transmitter
Video codec	Decode : 1080p30 Encode : 720p30
LAN	1 st LAN : 10/100 Based-T Ethernet 2 nd LAN : 10/100 Based-T Ethernet (IB112S)
USB	USB 4x Host via USB HUB
Touch Controller	Via DA9053 (Resistive Touch Controller)
Audio	Pin Header for Speaker
Watchdog	By Hardware
Edge I/O	<ul style="list-style-type: none">• 1st 10/100 LAN x1• 2nd 10/100 LAN x1 (IB112S)• USB x 1 (USB Host. A-Type)• USB OTG x1 (mini USB B-Type) Default: Device mode• COM2 RS-232 x 1• SD x 1• MicroSD x 1• 12~30V DC-IN Jack x 1• Boot Switch (Boot Sequence eMMC/MicroSD)• HDMI Type A Connector• Reset Button

INTRODUCTION

Headers & Expansion Slots	<p>Headers:</p> <ul style="list-style-type: none">• GPIO x 8 (IB112F, IB112S)• COM (RS232) x 2 (COM1 / COM3 Debug port)• Audio Pin Header (MIC x 1, Speaker x1)• 2x5 Pin Pitch 2.0mm USB 2.0 x 2• FPC Connector for 4-wire Resistive Touch x1• CAN x2 (Pin Headers in IB112S, IB112T)• 18 bit LVDS Connector x1• VGA Pin Header x 1 (in IB112F, IB112S)• 32k NVRAM (in IB112F, IB112S) <p>Slots:</p> <ul style="list-style-type: none">• SATA connector x 1• Full-Mini PCIe(x1) slot 26.8mm x 30 mm via USB for WiFi module
Power	12~30V DC-IN
Communication Devices	GPRS / 3G Module (Optional)
Software Support	Ubuntu Linux 10.04 (kernel 2.6.35)/ Android 2.3/ Windows CE7

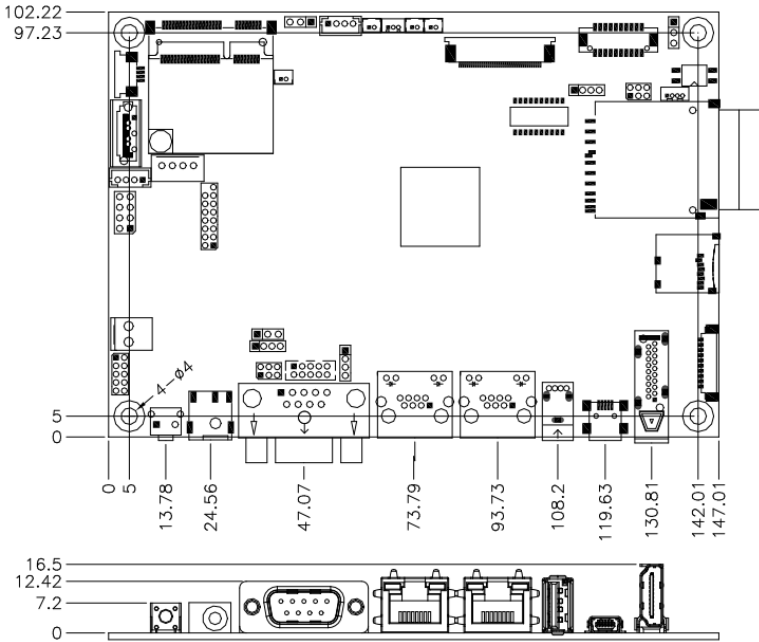
Checklist

Your IB112 package should include the items listed below.

- The IB112 Embedded board
- This User's Manual

Board Dimensions

Top Side



Units: mm

Installations

This section provides information on how to use the jumpers and connectors on the IB112 in order to set up a workable system. The topics covered are:

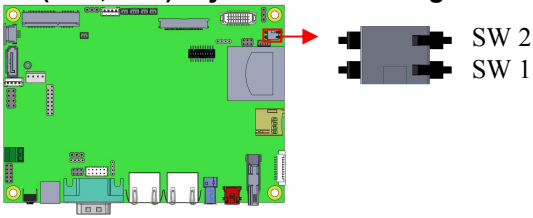
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Setting the Jumpers

Jumpers are used on IB112 to select various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your needs. The following lists the connectors on IB112 and their respective functions.

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S1 (sw1, sw2): System Boot Configuration



S1 (sw1, sw2)	Boot From
00	CN6 (SD1)
01	CN8(SD2)
10	EMMC NAND

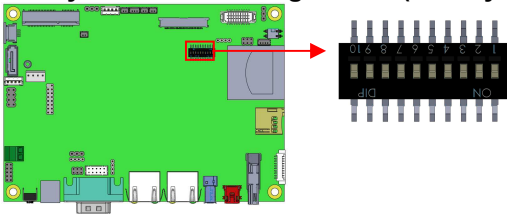
Note:

1: Switch On

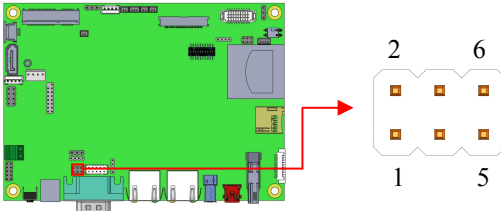
0: Switch Off

Default setting is 00 (sw1=0,sw2=0)

S2: System Boot Configuration (factory use only)



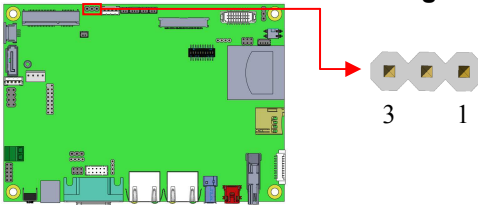
JP9: COM2 RS232, RS422, RS485 Selection



Mode	JP9
RS232	2-4 Short 3-5 Short
RS422	3-5 Short 4-6 Short
RS485	1-3 Short 4-6 Short

Default setting is RS232 mode.
JP9 setting for CN18.

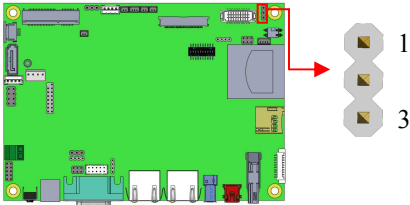
JP7: USB +3.3V/+5V Power Setting





JP7	Setting
 1 2 3	+3.3V
 1 2 3	+5V

Default setting is +5V.
JP7 setting for J1.

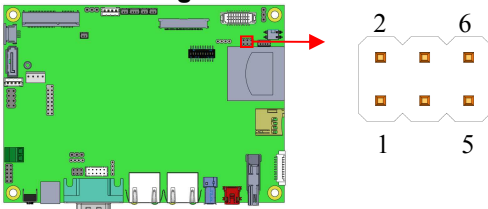
J14: LVDS +3.3V/+5V Power Setting




J14	Setting
 1 2 3	+3.3V
 1 2 3	+5V

Default setting is +3.3V.
J14 setting for LVDS1.

JP10: LED Brightness +5V/+9.6V/+12V Power Setting



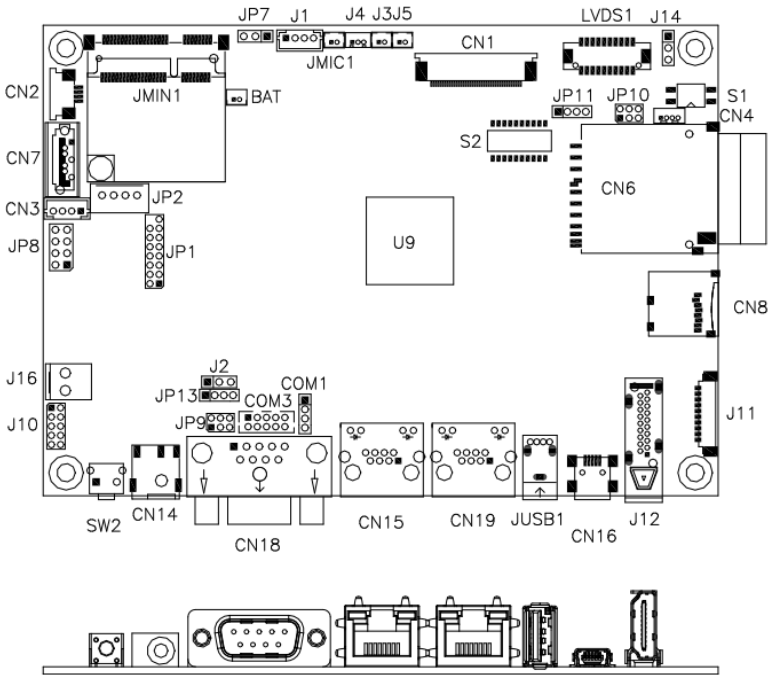
JP10	Setting	Function
	Pin 3-5 Short/Closed	+5V
	Pin 3-4 Short/Closed	+9.6V
	Pin 1-3 Short/Closed	+12V

Default setting is +5V.
JP10 setting for LVDS1.

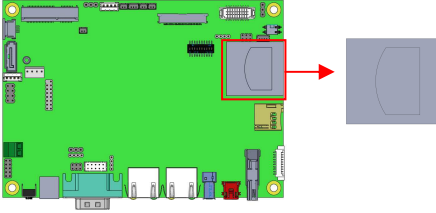
Connectors on IB112

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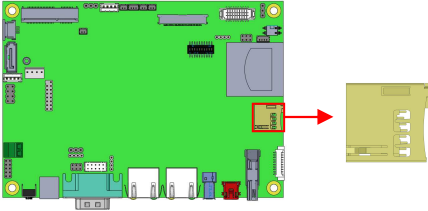
Connector Locations on IB112



CN6: SD Card Connector



CN8: Micro SD Card Connector

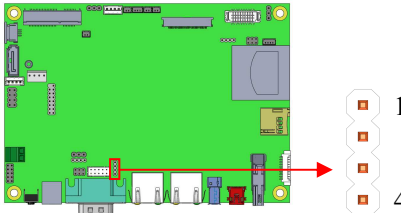


COM1 PORT: COM1 RS232 Connector

(Debug Port, factory use only)

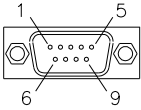
Part Number: 0195-01-200-040

Description: Pin Header 2.0*2.0mm S/T Single Row 4pin



Pin #	Signal Name
1	COM1 RX, Receive data
2	COM1 TX, Transmit data
3	GND, ground
4	NC

CN18: COM2 RS232/RS422/RS485 Serial Port



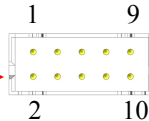
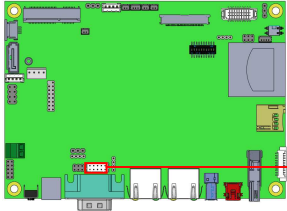
Pin #	Signal Name		
	RS-232	RS-422	RS-485
1	DCD	TX-	DATA-
2	RX	TX+	DATA+
3	TX	RX+	NC
4	DTR	RX-	NC
5	Ground	Ground	Ground
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	NC	NC	NC

Note: Please refer to JP9 setting for RS232, RS422 and RS485 mode selection.

COM3: COM3 RS232 Connector

Part Number: DF11-10S-PA66H

Description: 2mm DIP Mini 180D 10P 2R Male

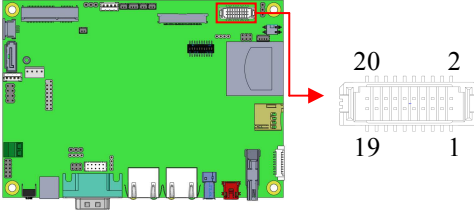


Pin #	Signal Name
1	RX, Receive data
2	TX, Transmit data
3	NC
4	NC
5	GND, ground
6	NC
7	RTS, Request To Send
8	CTS, Clear To Send
9	NC
10	NC

LVDS1: LVDS Display Connector

Part Number: DF13-20DP-1.25V(95)

Description: P1.25 SMD 20PIN Male 180D 2R



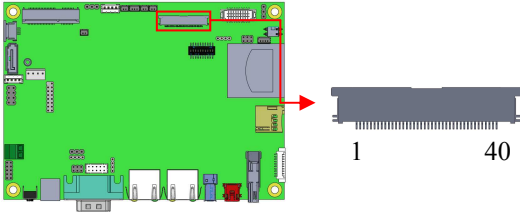
Signal Name	Pin #	Pin #	Signal Name
TX0+	1	2	TX0-
Ground	3	4	Ground
TX1+	5	6	TX1-
Ground	7	8	+5V/3.3V
TX3+	9	10	TX3-
TX2+	11	12	TX2-
Ground	13	14	Ground
TXC+	15	16	TXC-
Backlight ADJ	17	18	+5V/3.3V
+5V/+9.6V/+12V	19	20	+5V/+9.6V/+12V

**Note: Please refer to J14 for pin8 and pin18
refer to JP10 for pin19 and pin20**

CN1: LCD 18 Bit Parallel Signal Connector

Part Number: CSF-2881-401R

Description: 0.50mm ZIF FFC/FPC Downside Connector

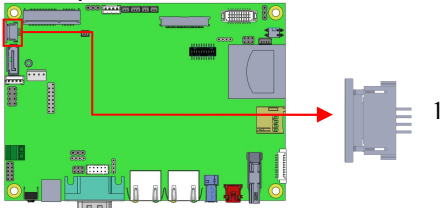


Signal Name	Pin #	Pin #	Signal Name
+5V	1	21	G5(MSB)
+5V	2	22	G4
Backlight ADJ	3	23	G3
GND	4	24	GND
GND	5	25	G2
+3.3V	6	26	G1
+3.3V	7	27	G0
Mode	8	28	GND
DE	9	29	R5(MSB)
VSYNC	10	30	R4
HSYNC	11	31	R3
GND	12	32	GND
B5(MSB)	13	33	R2
B4	14	34	R1
B3	15	35	R0
GND	16	36	GND
B2	17	37	DCLK
B1	18	38	GND
B0	19	39	L/R
GND	20	40	U/D

CN2: Resistive Touch Panel Connector

Part Number: CSF-0782-041R

Description: 1.00mm ZIF FPC/FFC Upside Contact

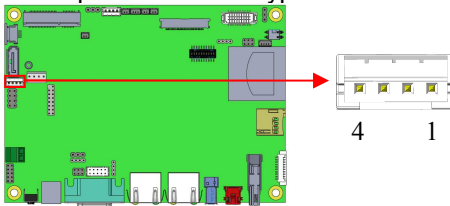


Pin #	Signal Name
1	Touch YP
2	Touch XP
3	Touch YM
4	Touch XM

CN3: Resistive Touch Panel Connector

Part Number: 0110-161-040

Description: JST-PH Type Wafer 2.0mm 4Pin



Pin #	Signal Name
1	Touch YP
2	Touch XP
3	Touch YM
4	Touch XM

Note: CN3 signals are same as CN2.

CN15: 10/100Mb LAN1 (From Freescale i.MX536)



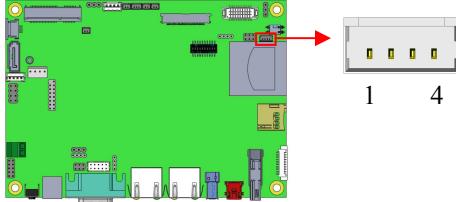
CN19: 10/100Mb LAN2 (USB to Ethernet)



CN4: LED Backlight Control Connector

Part Number: 0110-2610040

Description: MOLEX 53047 1.25mm Wafer S/T Type 4pin



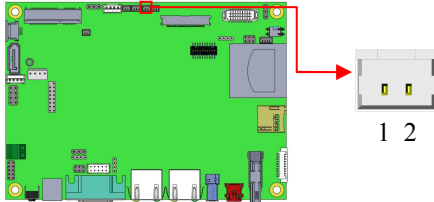
Pin #	Signal Name
1	+5V/+9.6V/+12V
2	Backlight ADJ
3	Backlight Enable
4	GND

Please refer to JP10 setting for +5V, +9.6V and +12V selection.

J3: Speaker Right Out Connector

Part Number: 0110-2610020

Description: Molex 53047 1.25mm Wafer S/T Type 2pin



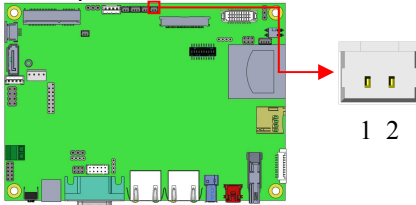
Pin #	Signal Name
1	SPEAKER_RIGHT-
2	SPEAKER_RIGHT+

Note: The maximum output power is 2 W with 4 Ω speaker or 1.4 W with 8 Ω speaker

J5: Speaker Left Out Connector

Part Number: 0110-2610020

Description: Molex 53047 1.25mm Wafer S/T Type 2pin



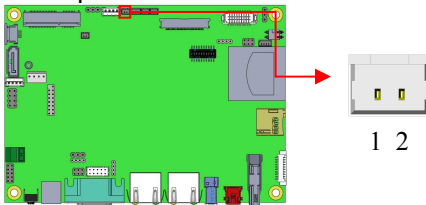
Pin #	Signal Name
1	SPEAKER_LEFT-
2	SPEAKER_LEFT+

Note: The maximum output power is 2 W with 4 Ω speaker or 1.4 W with 8 Ω speaker

JMIC1: Microphone Connector

Part Number: 0110-2610020

Description: Molex 53047 1.25mm Wafer S/T Type 2pin

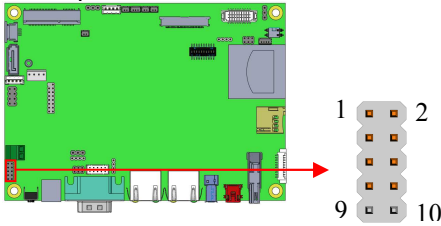


Pin #	Signal Name
1	GND
2	MIC_IN

J10: Digital I/O 4 In/4 Out Connector

Part Number: 0196-01-200-100

Description: Pin Header 2.0*2.0mm S/T Dual Rows 2*5pin



Signal Name	Pin #	Pin #	Signal Name
GND	1	2	+3.3V
OUT3 (U46.P17)	3	4	OUT1 (U46.P15)
OUT2 (U46.P16)	5	6	OUT0 (U46.P14)
IN3 (U46.P13)	7	8	IN1 (U46.P11)
IN2 (U46.P12)	9	10	IN0 (U46.P10)

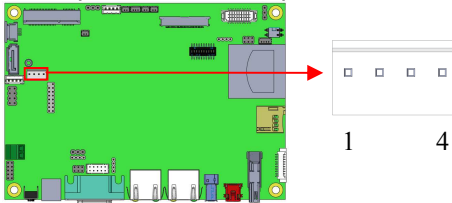
Note: All In/Out signals level are 3.3V .

U46 is TCA6416PAW IC. The IC connects with i.MX535 CPU via I2C port.

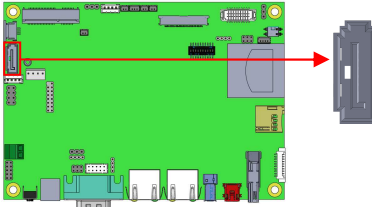
JP2: SATA Power

Part Number: WAFER25-104S-2442-ST

Description: 2.5 wafer 4pin 180D



Pin #	Signal Name
1	+5V
2	GND
3	GND
4	NC

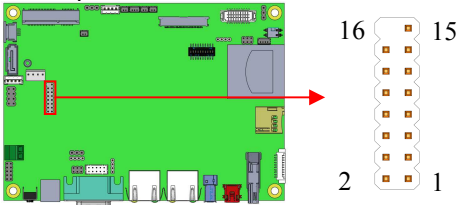
CN7: SATA Bus

Pin #	Signal Name
1	GND
2	SATA_TXP
3	SATA_TXN
4	GND
5	SATA_RXN
6	SATA_RXP
7	GND

JP1: VGA Port

Part Number: 0196-01-2811615

Description: Pin Header 2.0mm S/T Dual Row 2*8pin

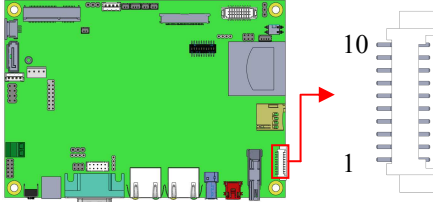


Pin #	Signal Name
1	VGA_R
2	+5V
3	VGA_G
4	GND
5	VGA_B
6	NC
7	NC
8	VGA_I2C_SDA
9	NC
10	VGA_HSYNC
11	GND
12	VGA_VSYNC
13	NC
14	VGA_I2C_SCL
15	GND

J11: External Key Port

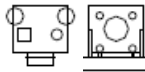
Part Number: 0110-3221100

Description: Molex 53398 1.25mm Wafer R/A 10pin



Pin #	Signal Name
1	GND
2	USER_KEY1
3	USER_KEY2
4	NC
5	RESET#
6	NC
7	NC
8	NC
9	+3.3V
10	+5V

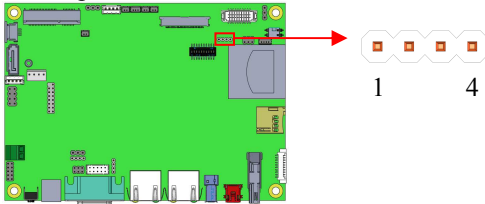
Note: USER_KEY1 is used as RETURN key for Android OS.
USER_KEY2 is used as HOME key for Android OS.

SW2: Push Button for Hardware Reset

JP11: Pin Header for Hardware Reset

Part Number: 0195-01-200-040

Description: PIN HEADER 2.0*2.0mm S/T SINGLE ROW 4PIN

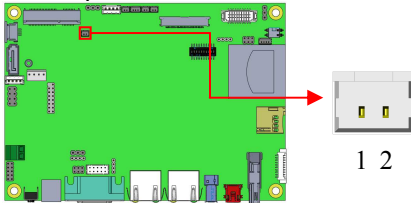


Pin #	Signal Name
1	SW_RST
2	GND
3	GND
4	NC

BAT: 3.0V Lithium Battery Connector

Part Number: 0110-2610020

Description: Molex 53047 1.25mm Wafer S/T Type 2pin

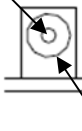


Pin #	Signal Name
1	+VCC
2	GND

CN14: 12V~30V Power Connector

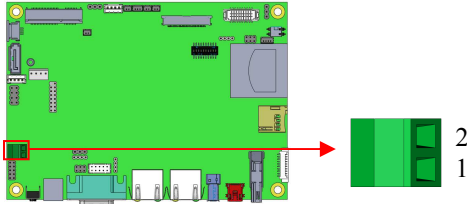
This connector supplies the system board operating voltage.

Pin 1



Pin 2

Pin #	Signal Name
1	+12V ~ +30V
2	GND

J16: 12V~30V Power Connector

Pin #	Signal Name
1	+12V ~ +30V
2	GND

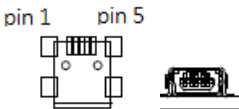
Note: J16 signals are same as CN14.

JUSB1: USB2.0 Type A Connector



Pin #	Signal Name
1	+5V
2	D-
3	D+
4	GND

CN16: Mini USB OTG Connector



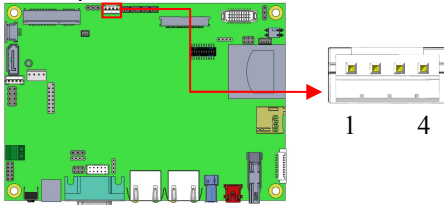
Pin #	Signal Name
1	+5V
2	D-
3	D+
4	ID
5	GND

Note: CN16 used as USB device while ID is floating.
(CN16 support USB device only.)

J1: USB2.0 Connector

Part Number: B4B-PH-K-S(LF)(SN)

Description: Mini Base;DIP S 2mm 4P



Pin #	Signal Name
1	+5V / +3.3V
2	D-
3	D+
4	GND

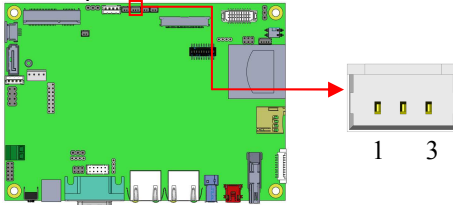
Default setting is +5V.

Please refer to JP7 setting for +5V and +3.3V selection.

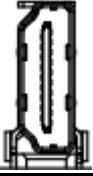
J4: Line Out Connector

Part Number: 0110-2610030

Description: Molex 53047 1.25mm Wafer S/T Type 3pin

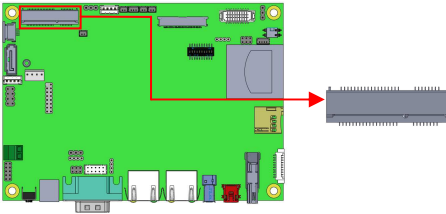


Pin #	Signal Name
1	LINE_OUTL
2	GND
3	LINE_OUTR

J12: HDMI connector

Pin #	Signal Name
1	TX2+
2	GND
3	TX2-
4	TX1+
5	GND
6	TX1-
7	TX0+
8	GND
9	TX0-
10	TXC+
11	GND
12	TXC-
13	NC
14	NC
15	NC
16	NC
17	GND
18	+5V
19	NC

JMINI1: Mini PCIE Connector

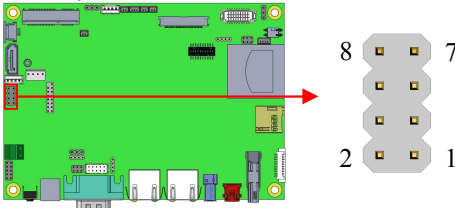


Signal Name	Pin #	Pin #	Signal Name
NC	1	2	+3.3V
NC	3	4	GND
NC	5	6	NC
NC	7	8	NC
GND	9	10	NC
NC	11	12	NC
NC	13	14	NC
GND	15	16	NC
NC	17	18	GND
NC	19	20	+3.3V
GND	21	22	RESET#
NC	23	24	+3.3V
NC	25	26	GND
GND	27	28	NC
GND	29	30	I2C2_SCL
NC	31	32	I2C2_SDA
NC	33	34	GND
GND	35	36	USB2.0 D-
GND	37	38	USB2.0 D+
+3.3V	39	40	GND
+3.3V	41	42	NC
GND	43	44	NC
NC	45	46	NC
NC	47	48	NC
NC	49	50	GND
NC	51	52	+3.3V

JP8: CANBUS Connector

Part Number: 0126-01-203-080

Description: 2.54*2.54mm S/T Dual Rows 2*4pin



Signal Name	Pin #	Pin #	Signal Name
GND_ISO	1	2	GND_ISO
CAN1_H	3	4	CAN2_H
CAN1_L	5	6	CAN2_L
GND	7	8	GND

IB112 View:



Ordering Information:

IB112	3,5-inch SBC w/ Industrial-Grade Freescale i.MX536 (800Mhz), DDR3 1GB, 10/100 LAN, SD, Micro-SD, 3 COM Ports, Mini-PCle(x1) slot
IB112F	3,5-inch SBC w/ Industrial-Grade Freescale i.MX536 (800Mhz), DDR3 1GB, 10/100 LAN, SD, Micro-SD, 3 COM Ports, Mini-PCle(x1) slot, <i>HDMI, GPIO x8, VGA, 32K NVRAM, SATA</i>
IB112S	3,5-inch SBC w/ Industrial-Grade Freescale i.MX536 (800Mhz), DDR3 1GB, 10/100 LAN, SD, Micro-SD, 3 COM Ports, Mini-PCle(x1) slot, <i>HDMI, GPIO x8, CAN x2, 2nd LAN, 32K NVRAM, 16GB eMMC</i>
IB112T	3,5-inch SBC w/ Industrial-Grade Freescale i.MX536 (800Mhz), DDR3 1GB, 10/100 LAN, SD, Micro-SD, 3 COM Ports, Mini-PCle(x1) slot, <i>HDMI, CAN x2, 8GB eMMC</i>