BFC-07R1

7" Freescale iMX6 Panel PC

Quick Reference Guide

3rd Ed – 19 September, 2018

Part No. E2017BF07A2R

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 UNDESIRED 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 INSTATLLED 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.

A Message to the Customer

Avalue Customer Services

Each and every Avalue's product is built to the most exacting specifications to ensure reliable performance in the harsh and demanding conditions typical of industrial environments. Whether your new Avalue device is destined for the laboratory or the factory floor, you can be assured that your product will provide the reliability and ease of operation for which the name Avalue has come to be known.

Your satisfaction is our primary concern. Here is a guide to Avalue's customer services. To ensure you get the full benefit of our services, please follow the instructions below carefully.

Technical Support

We want you to get the maximum performance from your products. So if you run into technical difficulties, we are here to help. For the most frequently asked questions, you can easily find answers in your product documentation. These answers are normally a lot more detailed than the ones we can give over the phone. So please consult the user's manual first.

To receive the latest version of the user's manual; please visit our Web site at:
http://www.avalue.com.tw/

CONTENT

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

- 1 x BFC-07R1
- 1 x 60W Power Adapter (12V/5A)
- 1 x Power cord

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

1.3 System Specifications

Component	
Mother Board	RSC-IMX6
CPU	Freescale i.MX6 Quad
CPU Cooler (Type)	Passive cooling
Memory	1GB DDR3 (Optional 2GB)
Power Supply	12~26V DC input, typical 12V DC brownout detection Optional Powered LAN (IEEE 802.3at)
Adapter	60W/ 12V
Wireless LAN	Optional mPCIe WIFI (RTL8188 with USB interface)
Operating System	Android 4.4.2 or 6.0 X & Linux
Expansion Card	mPCIe WIFI module (TBD)
Watchdog	I2C RTC ISL1208
Battery for RTC	CR2032x1
Audio codec	Optional Audio codec WM8962
Storage	
Solid State Drive	eMMC 4GB
Micro SD	Micro SD socket x1
Panel	
LCD Panel	7” 1280 x 800
Touch Screen	P-CAP Touch
External I/O	
Serial Port	RS232 x 1, or Optional Debug Port, or Optional Can Bus
USB Port	USB2.0 Type A x2 (Double deck)
OTG	Mini USB x1
SD Card	Micro SD Socket x1
Video Port	HDMI with screw lock
LAN Port	10/100/1000 LAN RJ45x1, Optional Powered LAN support (IEEE 802.3at)
Wireless LAN Antenna	Optional WIFI antenna x2
Switch	Hidden reset button x1 Power Off button x1
Mic	Analogy Mic x1
Speaker	Speaker
Mechanical	
Power Type	12~26V DC input, typical 12V input With brownout detection

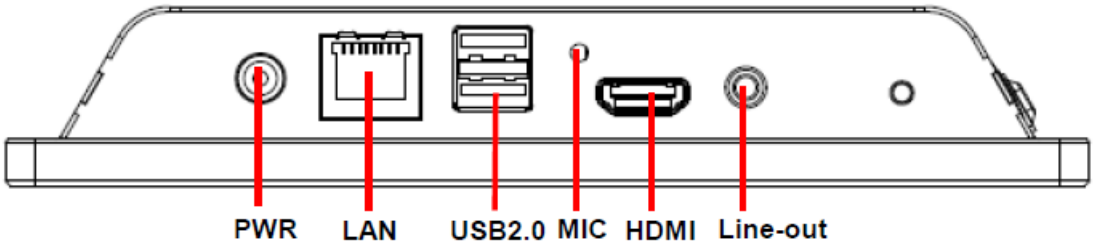
Power Connector Type	2.5mm DC Jack with lock
Dimension	L184.3*W 124.3*T30.5(MM)
Access Window	Access window for SD socket & mini-USB
Weight	0.675 KG
Color	BLACK
Fanless	Yes, with screw hole or hooker to fix heatsink on PCB
Others	Mount plate for VESA, just like ASUS Eeebox
OS Support	Android 4.4.2 or 6.0 Linux
Reliability	
EMI Test	CE/FCC Class B
Safety	As Avalue standard
Vibration Test	Ramdom Vibration Operation Reference IEC60068-2-64 Testing procedures Test Fh : Vibration boardband random Test 1 Test PSD : 0.00454G²/Hz , 1.5 Grms 2 Test frequency : 5~500 Hz 3 Test axis : X,Y and Z axis 4 Test time : 30 minutes each axis 5 System condition : operation mode 6 Test curve Sine Vibration Test Reference IEC60068-2-6 Testing procedures Test Fc : Vibration sinusoidal 1 Test Acceleration : 2G 2 Test frequency : 5~500 Hz 3 Sweep：1 Oct/ per one minute. (logarithmic) 4 Test axis : X,Y and Z axis 5 Test time :10 min. each axis 6 System condition : Non-Operating mode 7 Test curve Package Vibration Test: Reference IEC60068-2-64 Testing procedures Test Fh : Vibration boardband random Test 1 Test PSD : 0.026G²/Hz , 2.16 Grms 2 Test frequency : 5~500 Hz 3 Test axis : X,Y and Z axis 4 Test time : 30 minutes each axis

	5 Test curve
Mechanical Shock Test	With CF/SSD: 10Grms, IEC 60068-2-27, Half Sine, 11ms
Drop Test	Package drop test Reference ISTA 2A, Method : IEC-60068-2-32 Test:Ed Test Ea : Drop Test 1 Test phase : One corner, three edges, six faces 2 Test high : 3 Package weight : 4 Test drawing
Operating Temperature	-20~55 degree
Operating Humidity	0~90%
Storage Temperature	-30~70 degree

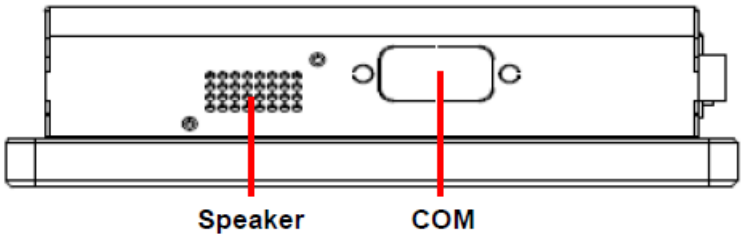
Note: Specifications are subject to change without notice.

1.4 System Overview

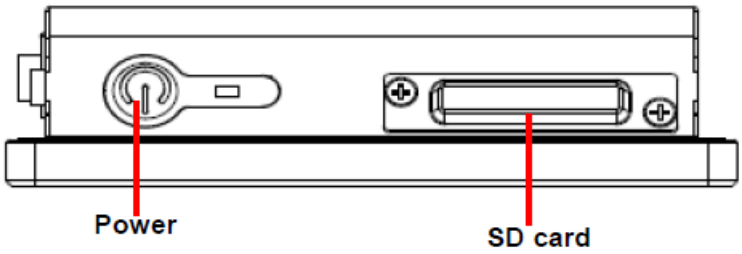
1.4.1 Bottom View

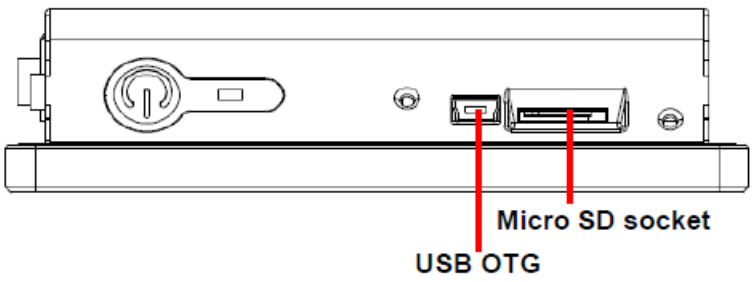


1.4.2 Right Side View



1.4.3 Left Side View



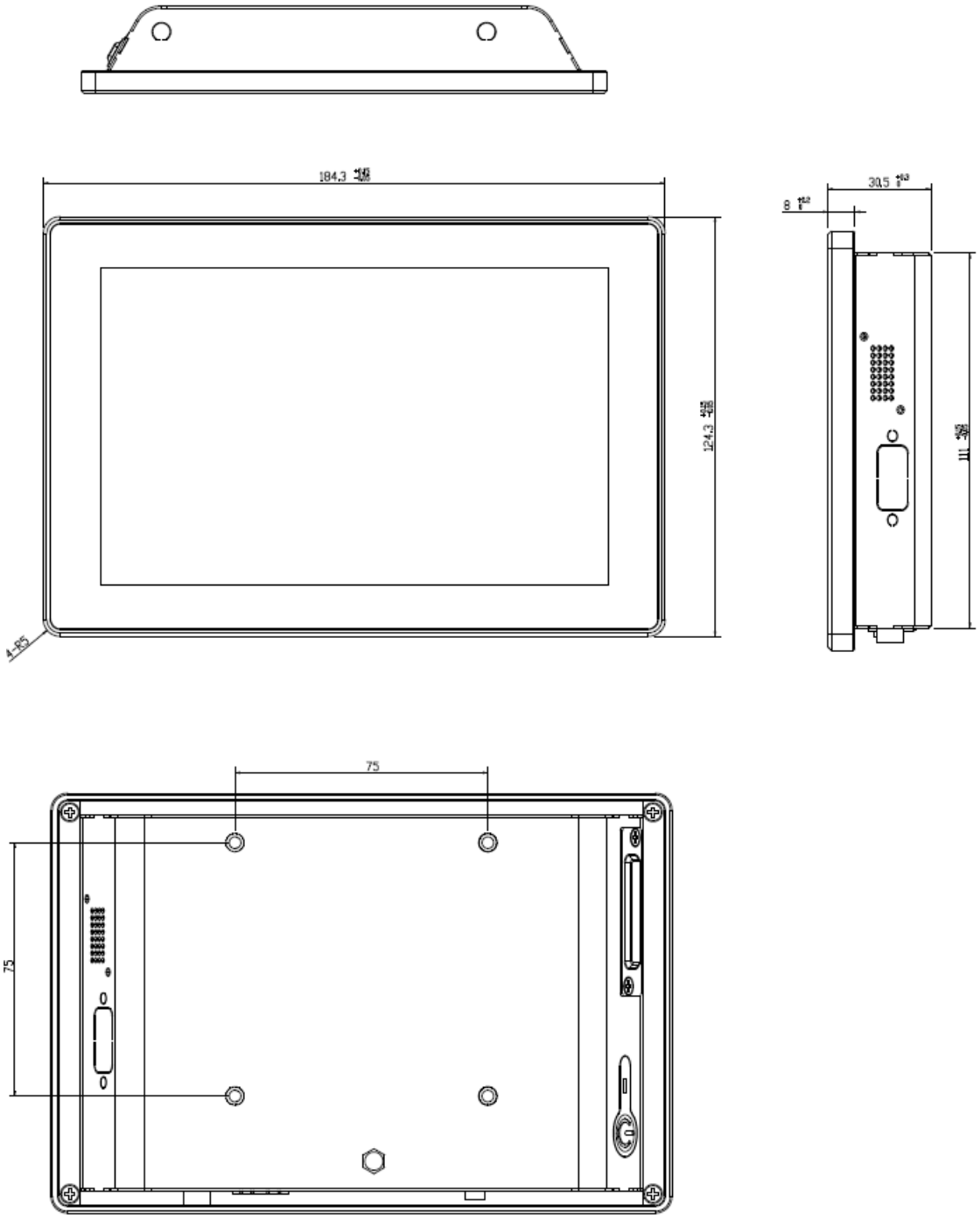


Connectors

Label	Function	Note
PWR	System power indicator	
LAN	RJ-45 Ethernet	
USB2.0	2 x USB2.0 connector	

HDMI	HDMI connector	
Line-out	Line-out audio jack	
MIC	Mic-in audio jack	
COM	Serial port connector	DB-9 male connector **Note:** Refer to RSC-IMX61 JCOM2.
Speaker	Speaker connector	
Power	Power on button	
SD card	SD card socket	
USB OTG	USB OTG connector	
Micro SD socket	Micro SD socket	

1.5 System Dimensions



(Unit: mm)

2. Hardware Configuration

For advanced information, please refer to:

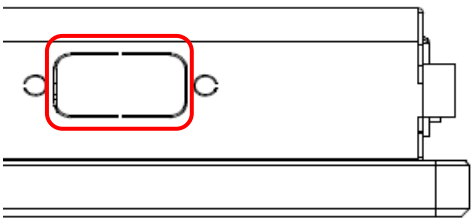
1- RSC-IMX61 included in this manual.

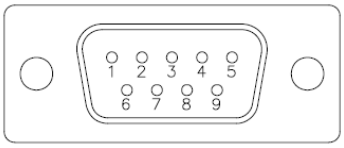
Note: If you need more information, please visit our website:

http://www.avalue.com.tw

2.1 BFC-07R1 connector mapping

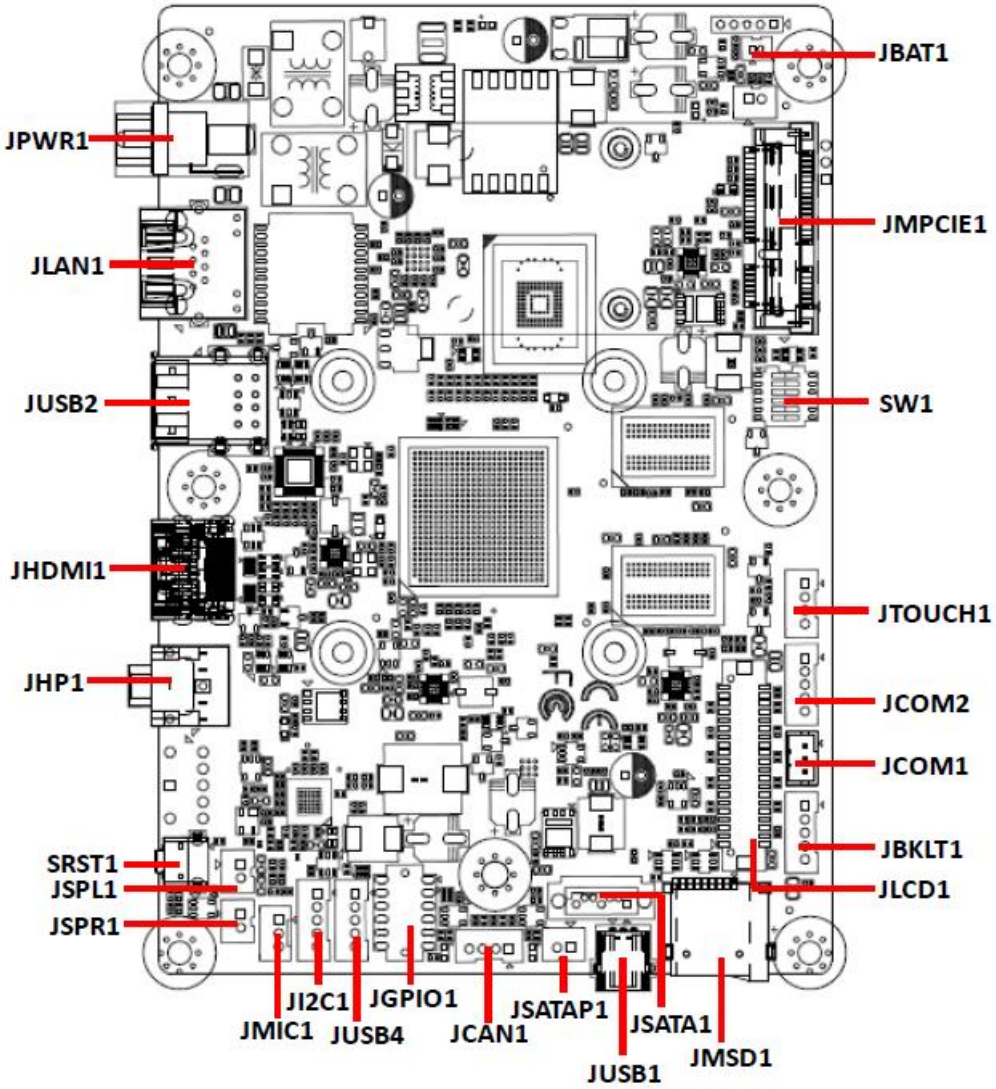
2.1.1 Serial port connector (COM)





Signal	PIN	PIN	Signal
NC	1	6	NC
RXD	2	7	RTS
TXD	3	8	CTS
NC	4	9	NC
GND	5		

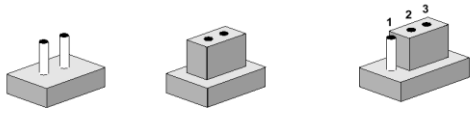
2.2 RSC-IMX61 Overview



2.3 RSC-IMX61 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.



Open Closed Closed 2-3

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

Open Closed Closed 2-3

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
SW1	Boot set selector	DIP switch 6pin

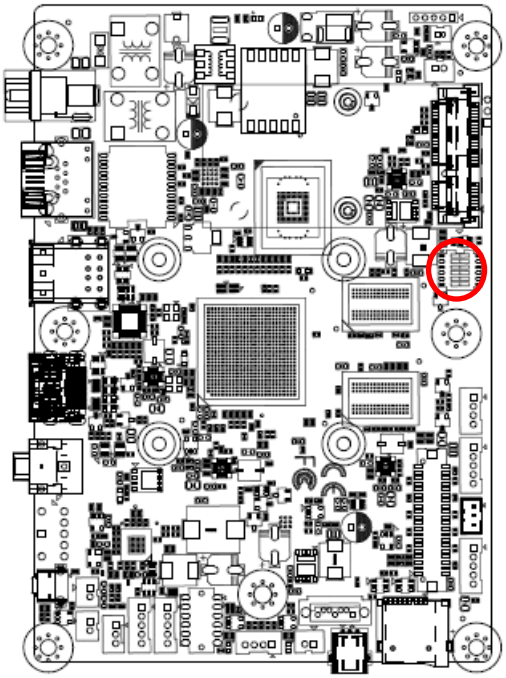
Connectors

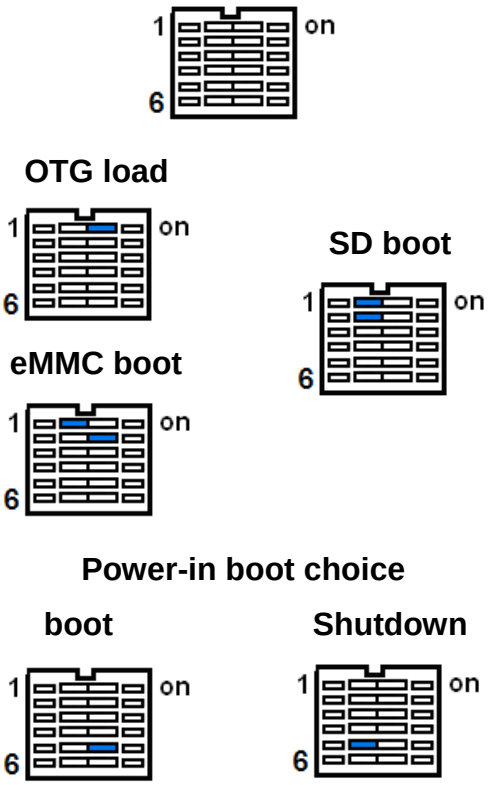
Label	Function	Note
JBAT1	Battery connector	2 x 1 wafer, pitch 1.25mm
JMPCIE1	Mini-PCI connector	Mini card
JPWR1	DC Power-in connector	
JMSD1	SD Memory Card Socket	SDCARD_9H, Push/Push Type
JCAN1	Can Bus connector	4 x 1 wafer, pitch 2.00mm
JTOUCH1	Touch Panel connector	4 x 1 wafer, pitch 2.00mm
JSPL1	Speaker L connector	2 x 1 wafer, pitch 2.00mm
JSPR1	Speaker R connector	2 x 1 wafer, pitch 2.00mm

JMIC1	Line In, MIC connector	3 x 1 wafer, pitch 2.00mm
JSATA1	Serial ATA connector	
JSATAP1	SATA power connector	2 x 1 wafer, pitch 2.00 mm
SRST1	Reset button	
JCOM1	Serial Port 1 connector	3 x 1 wafer, pitch 2.00mm
JCOM2	Serial Port 2 connector	5 x 1 wafer, pitch 2.00mm
JHP1	Audio line-out connector	
JI2C1	I2C connector	5 x 1 wafer, pitch 2.00mm
JLAN1	RJ-45 Ethernet	
JHDMI1	HDMI connector	
JGPIO1	General purpose I/O connector	6 x 2 wafer, pitch 2.00mm
JUSB1	Mini USB connector for Boot/Debug	MINI USB-MAB_5P
JUSB2	2 x USB2.0 connector	
JUSB4	USB connector	5 x 1 wafer, pitch 2.00mm
JLCD1	LVDS connector	20 x 2 wafer, pitch 1.25mm
JBKLT1	LCD inverter connector	5 x 1 wafer, pitch 2.00mm

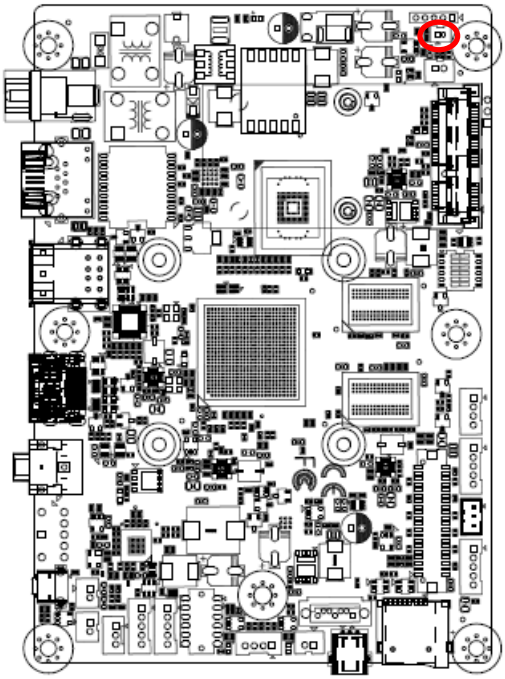
2.4 RSC-IMX61 Setting Jumpers & Connectors

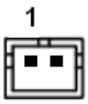
2.4.1 Boot set selector (SW1)





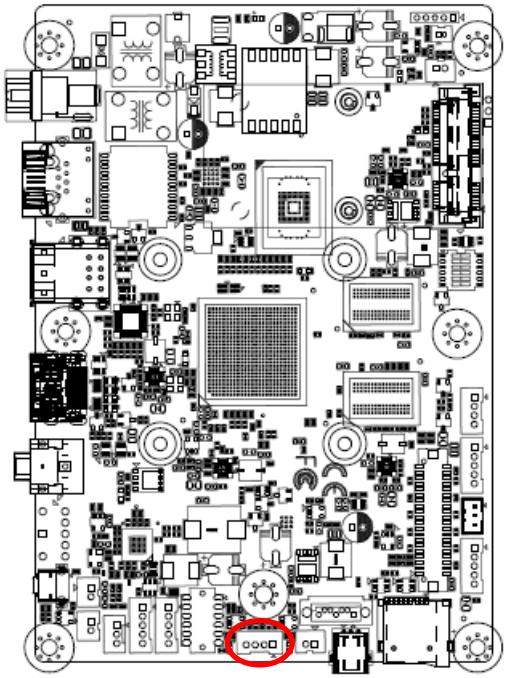
2.4.2 Battery connector (JBAT1)

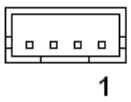




Signal	PIN
+V_BAT	1
GND	2

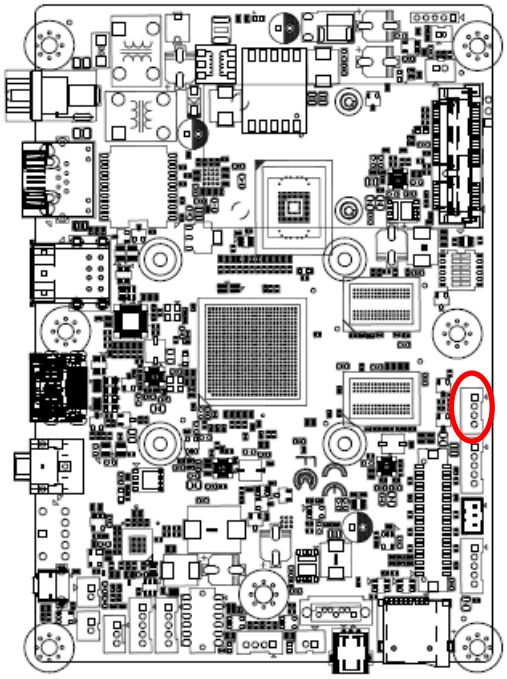
2.4.3 Can Bus connector (JCAN1)





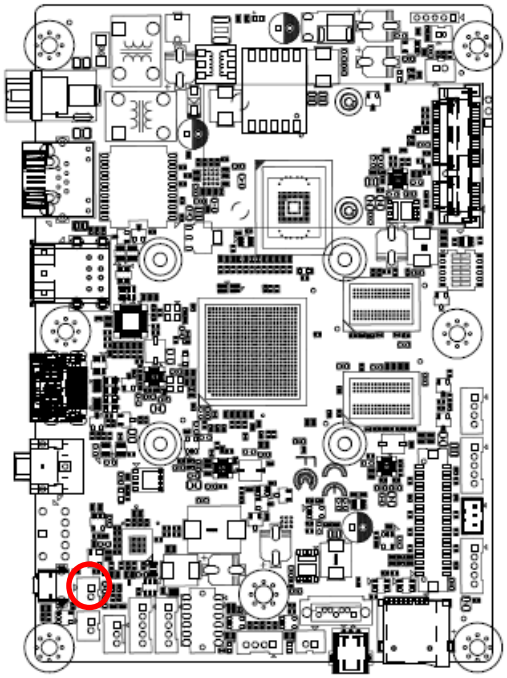
Signal	PIN
CAN_H	1
GND	2
CAN_L	3
GND	4

2.4.4 Touch Panel connector (JTOUCH1)



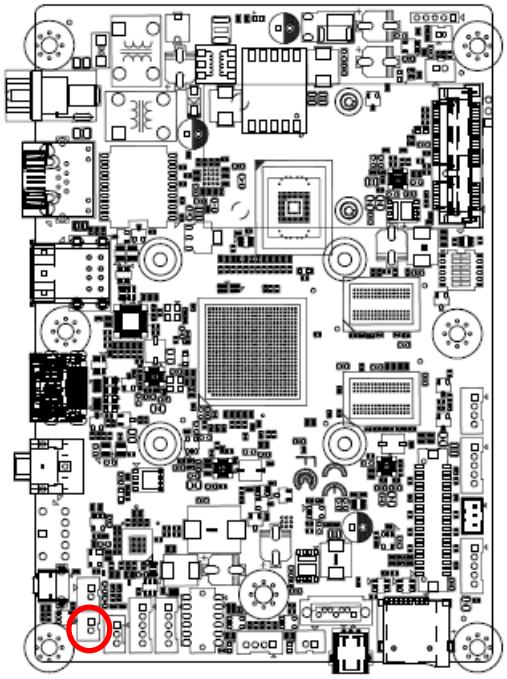
Signal	PIN
XP_A	1
YP_A	2
XM_A	3
YM_A	4

2.4.5 Speaker L connector (JSPL1)



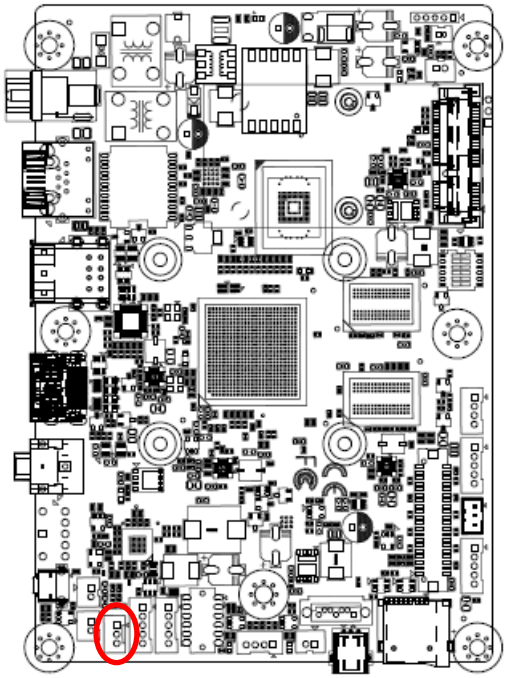
Signal	PIN
SPKL_N	1
SPKL_P	2

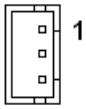
2.4.6 Speaker R connector (JSPR1)



Signal	PIN
SPKR_N	1
SPKR_P	2

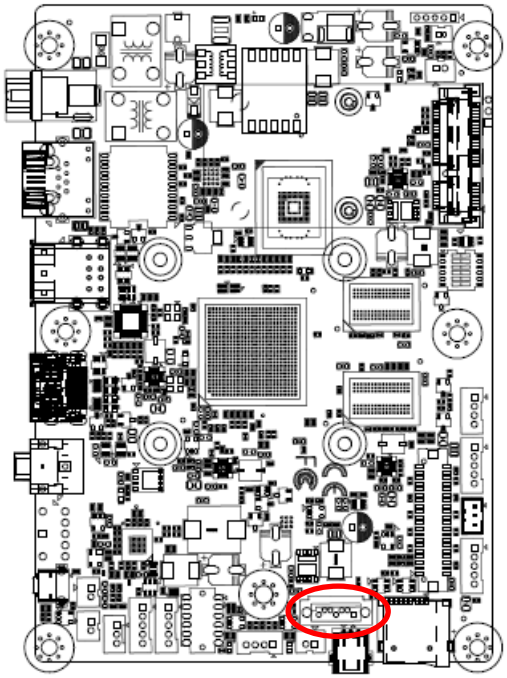
2.4.7 Line In, MIC connector (JMIC1)

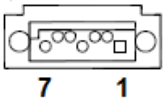




Signal	PIN
MIC_DET	1
MIC_IN	2
MIC_GND	3

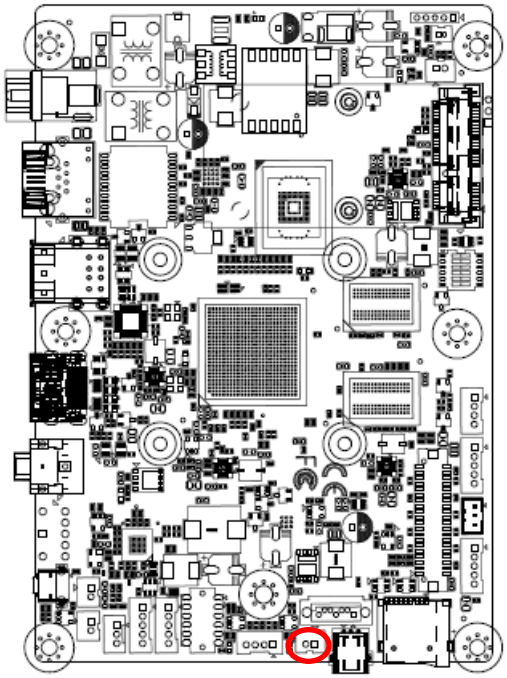
2.4.8 Serial ATA connector (JSATA1)





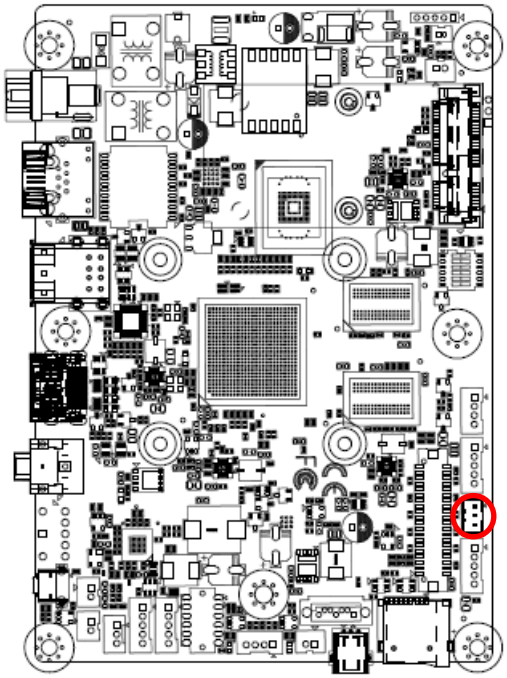
Signal	PIN
GND	1
TX+	2
TX-	3
GND	4
RX-	5
RX+	6
GND	7

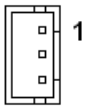
2.4.9 SATA power connector (JSATAP1)



Signal	PIN
+5V	1
GND	2

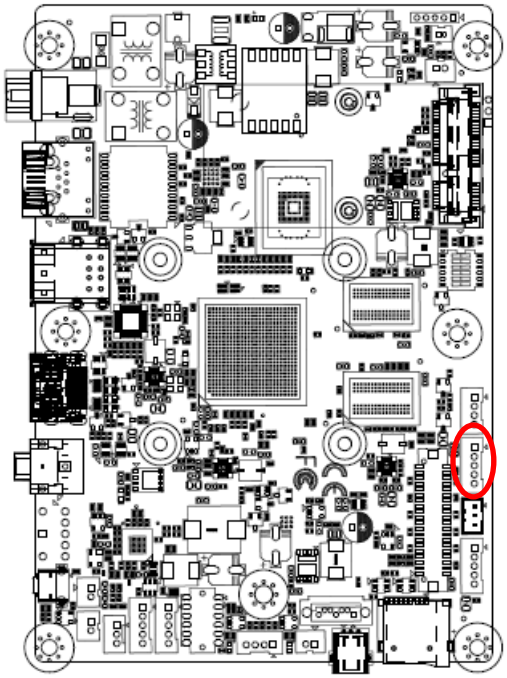
2.4.10 Serial Port 1 connector (JCOM1)

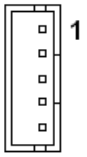




Signal	PIN
COM1_TX	1
COM1_RX	2
GND	3

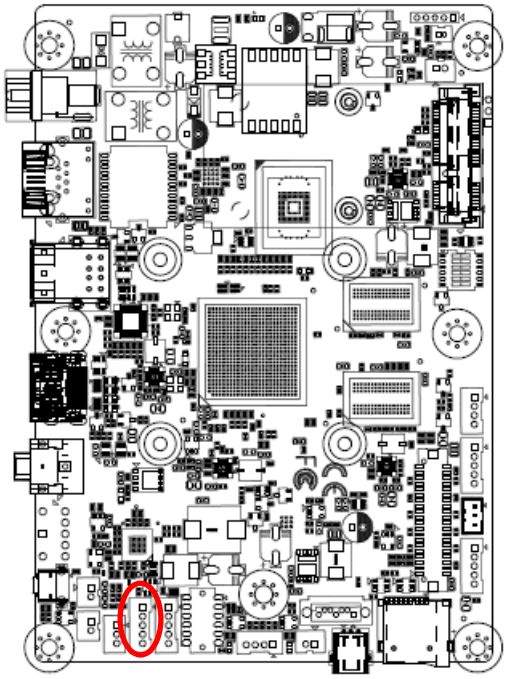
2.4.11 Serial Port 2 connector (JCOM2)





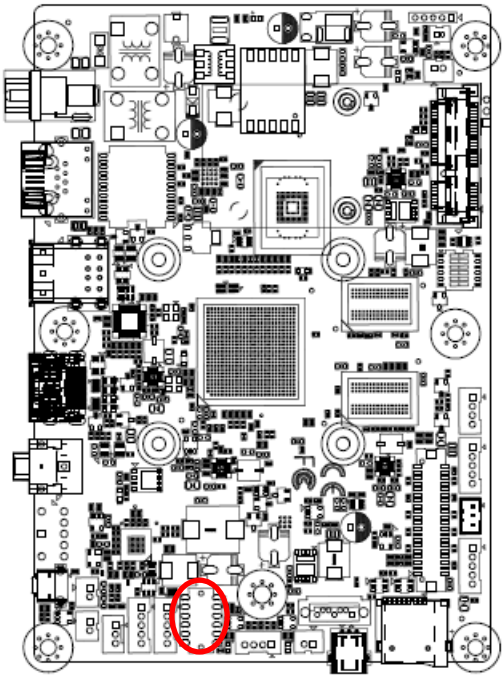
Signal	PIN
COM2_TX	1
COM2_RX	2
COM2_RTS	3
COM2_CTS	4
GND	5

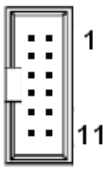
2.4.12 I2C connector (JI2C1)



Signal	PIN
+3.3V	1
JI2C_SCL	2
JI2C_SDA	3
JI2C_INT#	4
GND	5

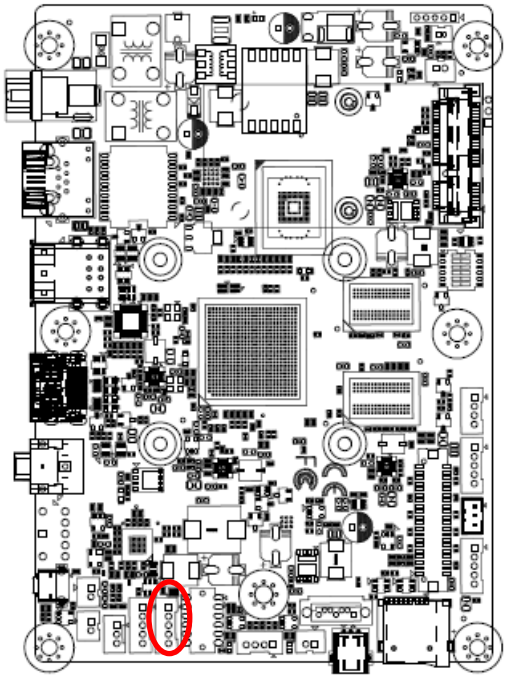
2.4.13 General purpose I/O connector (JGPIO1)





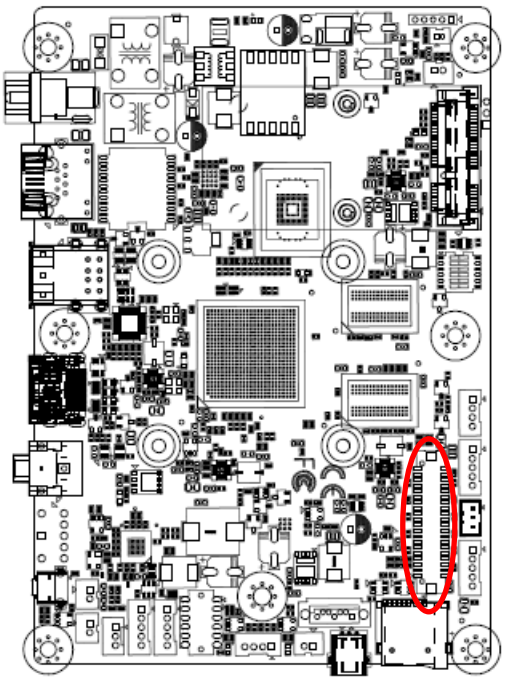
Signal	PIN	PIN	Signal
GPIO2	2	1	GPIO1
GPIO4	4	3	GPIO3
GPIO6	6	5	GPIO5
GPIO8	8	7	GPIO7
GPIO10	10	9	GPIO9
GND	12	11	+3.3V

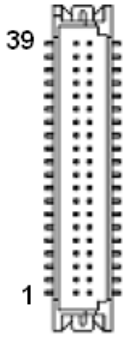
2.4.14 USB connector (JUSB4)



Signal	PIN
+5V	1
USB_NP4	2
USB_PP4	3
GND	4
GND	5

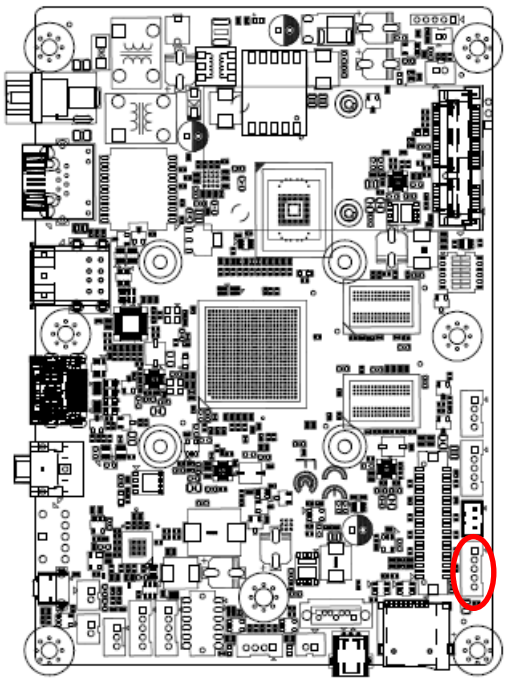
2.4.15 LVDS connector (JLCD1)

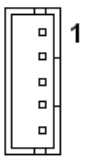




Signal	PIN	PIN	Signal
+12V	39	40	+12V
GND	37	38	GND
LVDS1_CLK_N	35	36	LVDS0_CLK_N
LVDS1_CLK_P	33	34	LVDS0_CLK_P
GND	31	32	GND
LVDS1_TX3_N	29	30	LVDS1_TX2_N
LVDS1_TX3_P	27	28	LVDS1_TX2_P
GND	25	26	GND
LVDS1_TX1_N	23	24	LVDS1_TX0_N
LVDS1_TX1_P	21	22	LVDS1_TX0_P
GND	19	20	GND
LVDS0_TX3_N	17	18	LVDS0_TX2_N
LVDS0_TX3_P	15	16	LVDS0_TX2_P
GND	13	14	GND
LVDS0_TX1_N	11	12	LVDS0_TX0_N
LVDS0_TX1_P	9	10	LVDS0_TX0_P
GND	7	8	GND
LVDS_DDC_CLK	5	6	LVDS_DDC_DATA
+3.3V	3	4	+5V
+3.3V	1	2	+5V

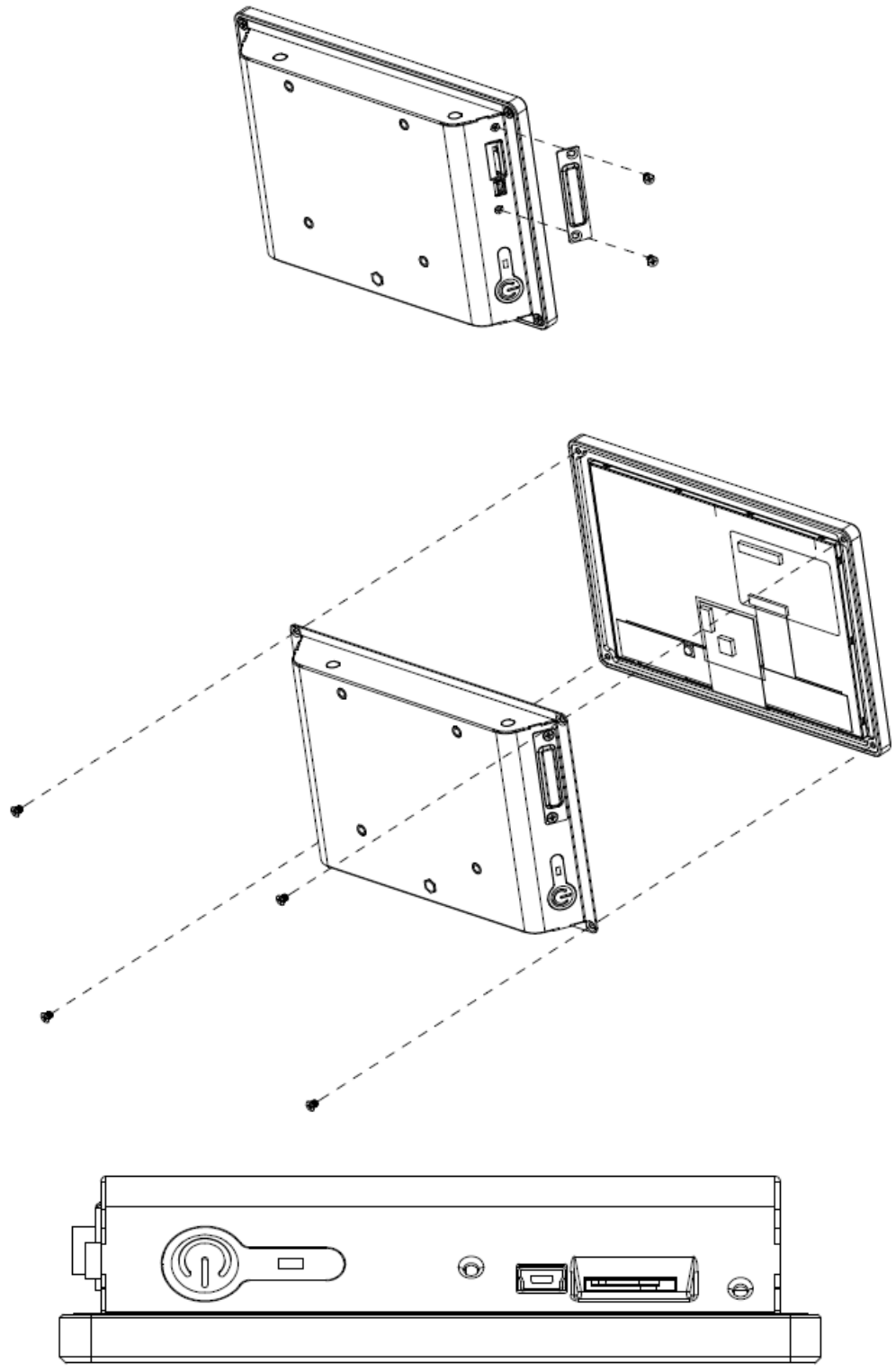
2.4.16 LCD inverter connector (JBKLT1)





Signal	PIN
+12V	1
GND	2
BKLT_EN	3
INV_PWM	4
+5V	5

2.5 OTG(Mini USB) update (BFC-07R1)



- Remove the 6 screws to disassemble SD card cover and back cover.

3. Build and install Android image

Here you can find instruction to setup development environment for Android source code for RSC-IMX61 and the way to install it on eMMC. With this guideline, user will be able to setup the system easily and test all the functions with the system.

3.1 Setup Build Environment

Please following command below to install OpenJDK7 on Ubuntu 16.04.

sudo add-apt-repository ppa:openjdk-r/ppa
sudo apt-get update
sudo apt-get install openjdk-7-jdk

Open /etc/profile.

sudo gedit /etc/profile

Enter below in the end of file.

```
export JAVA_HOME=/usr/lib/jvm/java-7-openjdk-amd64
export JRE_HOME=${JAVA_HOME}/jre
export CLASSPATH=.:${JAVA_HOME}/lib:${JRE_HOME}/lib
export PATH=${JAVA_HOME}/bin:$PATH
```

source /etc/profile

Please refer to hyperlink below to setup development environment
Initializing a Build Environment

3.2 Download source code and MFG tool

Please connect to Avalue FAE(jerry_lee@avalue.com.tw)

3.3 Compiler Android Source code

Please follow the instructions below to compile Android source code.

cd FSL-Android

./run.sh -j4

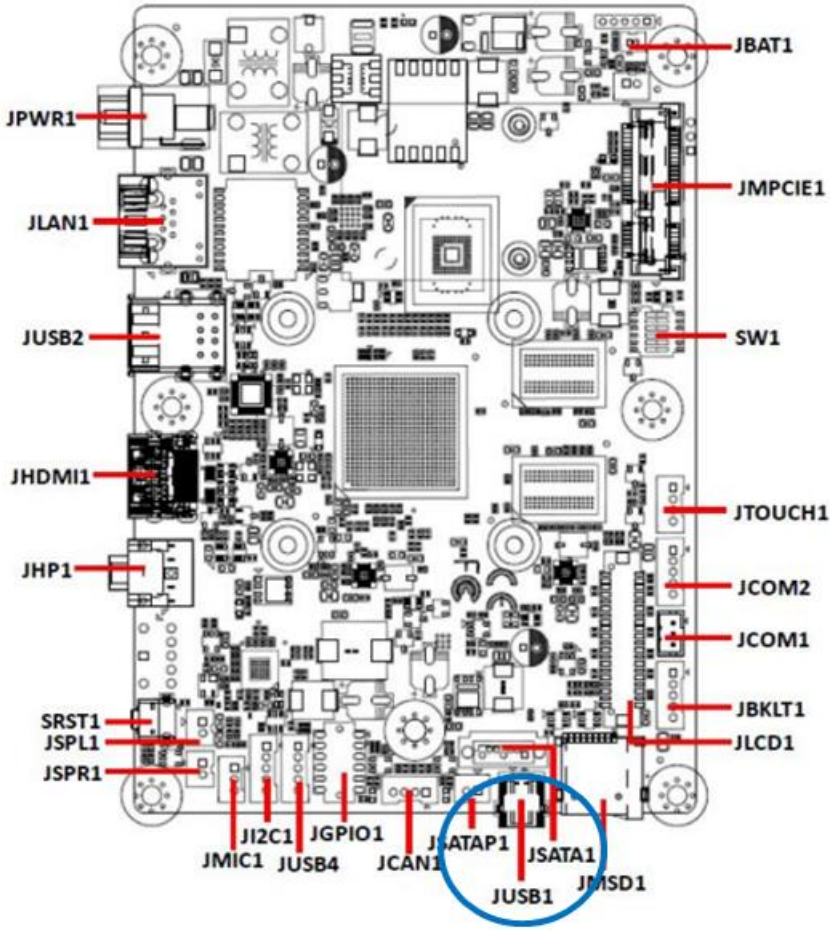
You can find all image files in path FSL-Android/out/target/product/imx6

Image File	Description
boot-imx6dl.img	Kernel image file for Dual Lite
boot-imx6q.img	Kernel image file for Quad core
recovery-imx6dl.img	Recovery image file for Dual Lite
recovery-imx6q.img	Recovery image file for Quad core
system.img	System image file
recovery.img	Recovery image file
u-boot-imx6dl.imx	Bootloader for 1G Dual Lite
u-boot-imx6dl2g.imx	Bootloader for 2 G Dual Lite
u-boot-imx6q.imx	Bootloader for Quad core

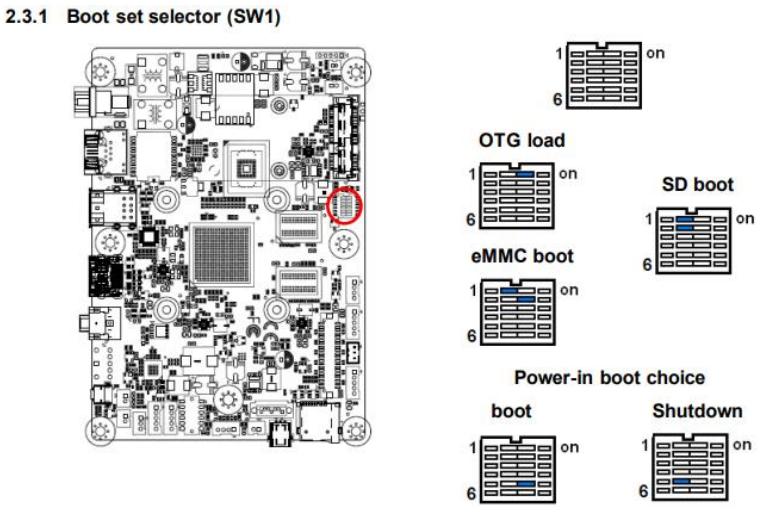
Please copy all of them to path RSC-IMX61-6.0.1\Image\RSC-IMX6\android\6.0.1\Factory

3.4 Install Android image into eMMC

1. Connect RSC-IMX61 to computer through JUSB1 by mini USB.

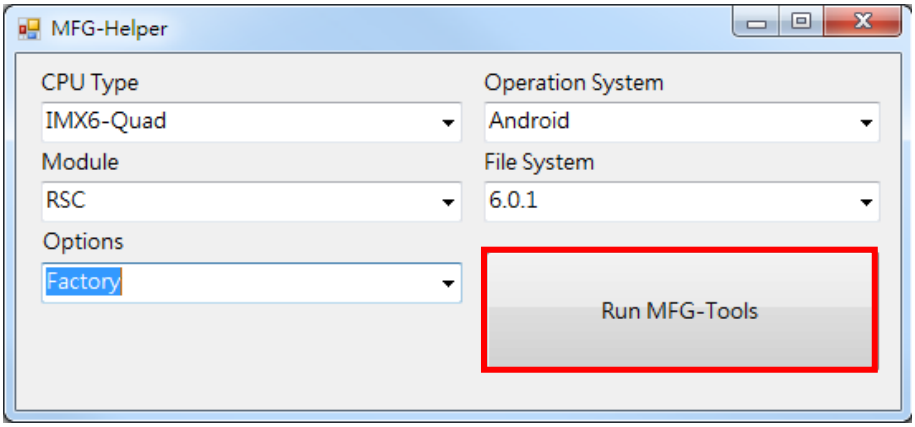


2. Set the jumper to OTG mode.

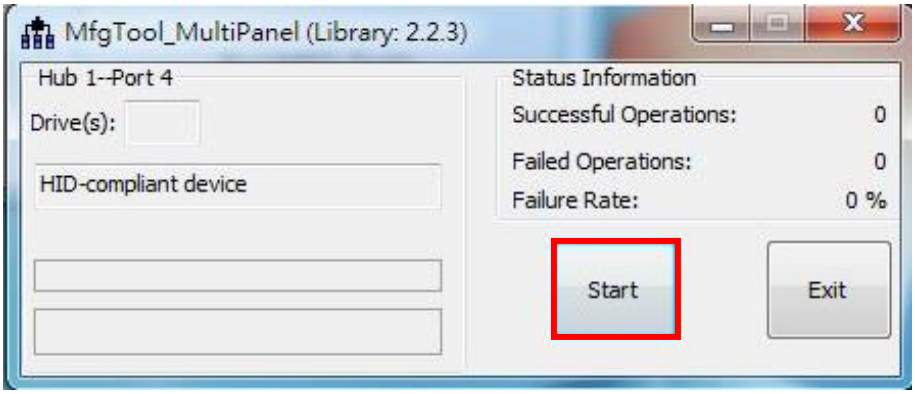


3. Execute “MFG-Helper.exe”.

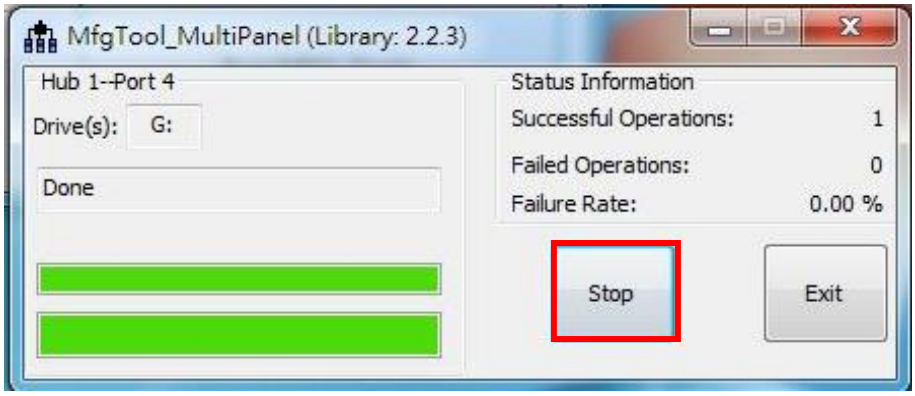
Select the items as the blow picture and click “Run MFG-Tools”.



4. When MFG tool show “HID-compliant device”, click “Start” to start to flash image.



5. When it show “Done”, click “Stop” and “Exit” to finish.



6. Turn off the power.
7. Set the jumper to “eMMC boot” and power on to boot Android.