

RSC-IMX61

Freescale i.MX6 Cortex-A9

User's Manual

2nd Ed – 19 September, 2018

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. Collect all the information about the problem encountered. (For example, CPU type and speed, Avalue's products model name, hardware & BIOS revision number, other hardware and software used, etc.) Note anything abnormal and list any on-screen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information available.
3. If your product is diagnosed as defective, obtain an RMA (return material authorization) number from your dealer. This allows us to process your good return more quickly.
4. Carefully pack the defective product, a complete Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Contents

1. Getting Started	6
1.1 Safety Precautions.....	6
1.2 Packing List.....	6
1.3 Document Amendment History	7
1.4 Manual Objectives.....	8
1.5 System Specifications	9
1.6 Architecture Overview – Block Diagram.....	11
2. Hardware Configuration	12
2.1 Product Overview.....	13
2.2 Jumper and Connector List.....	14
2.3 Setting Jumpers & Connectors	16
2.3.1 Boot set selector (SW1).....	16
2.3.2 Battery connector (JBAT1)	16
2.3.3 Can Bus connector (JCAN1)	17
2.3.4 Touch Panel connector (JTOUCH1).....	17
2.3.5 Speaker L connector (JSPL1)	18
2.3.6 Speaker R connector (JSPR1)	18
2.3.7 Line In, MIC connector (JMIC1).....	19
2.3.8 Serial ATA connector (JSATA1)	19
2.3.8 SATA power connector (JSATAP1).....	20
2.3.9 Serial Port 1 connector (JCOM1)	20
2.3.10 Serial Port 2 connector (JCOM2)	21
2.3.11 I2C connector (JI2C1).....	21
2.3.12 General purpose I/O connector (JGPIO1)	22
2.3.13 USB connector (JUSB4).....	22
2.3.15 LVDS connector (JLCD1)	23
2.3.16 LCD inverter connector (JBKLT1)	23
3. Build and install Android image	24
3.1 Setup Build Environment.....	25
3.2 Download source code and MFG tool	25
3.3 Compiler Android Source code.....	26
3.4 Install Android image into eMMC.....	27
4. Mechanical Drawing	30

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 RSC-IMX61 Module
- 1 x Debug cable



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

1.3 Document Amendment History

Revision	Date	Comment
1 st	November 2015	Initial Release
2 nd	September 2018	Update System Specifications

1.4 Manual Objectives

This manual describes in detail the Avalue Technology RSC-IMX61 Single Board.

We have tried to include as much information as possible but we have not duplicated information that is provided in the standard IBM Technical References, unless it proved to be necessary to aid in the understanding of this board.

We strongly recommend that you study this manual carefully before attempting to interface with RSC-IMX61 series or change the standard configurations. Whilst all the necessary information is available in this manual we would recommend that unless you are confident, you contact your supplier for guidance.

Please be aware that it is possible to create configurations within the CMOS RAM that make booting impossible. If this should happen, clear the CMOS settings, (see the description of the Jumper Settings for details).

If you have any suggestions or find any errors concerning this manual and want to inform us of these, please contact our Customer Service department with the relevant details.

1.5 System Specifications

System	
Processor	Freescale i.MX6 Cortex-A9 Dual Lite/Quad 1GHz CPU
Memory	1GB DDR3 (Optional 2GB)
Power Supply	12 ~ 26V DC input, typical 19V DC brownout detection Optional Powered LAN (IEEE 802.3at)
SSD	Onboard 4G eMMC
SD Card	1 x Micro SD Socket
Watchdog	RX8010SJ
Expansion	1 x Mini PCI Express Slot (include USB Signal) Supported WIFI & 3.5G Module Micro SD Socket x 1 (in System Access Window Area)
Ethernet	
LAN Chip	KSZ9031RNX
Ethernet Interface	1 x RJ45 Connector
Audio	
I2S Codec	WM8962
Audio Port	Audio Jack
OS Support	
Android	Ver.2.4.4
Rear I/O	
USB Port	USB2.0 Type A x2 (Double deck)
Video Port	HDMI with screw lock
LAN Port	10/100/1000 LAN RJ45 x 1, Optional Powered LAN support (IEEE 802.3at)
Switch	Hidden reset button x 1
Indicator Light	Power LED x 1, WIFI Status LED x 1
External I/R(Optional)	Optional Jack for I/R extender cable, co-design with on-board I/R sensor
Internal I/O	
USB Port	USB2.0 x 1 (wafer)
USB OTG	USB OTG x 1 (Mini USB connector)
DIO	2 x 5 GPIO connector x 1(10bit, wafer)
LVDS	LVDS 24bit x 2 (DF13-40DP-1.25)
B/L Inverter/Converter	Backlight driver control (12V, GND, ENBKL, PWM, 5V)
Audio Port	Line out (Audio Jack), speaker out & MIC in (wafer)
Expansion Slots	mPCIe socket x 1 (with PCIe & USB2.0 signal) SD socket x 1

RSC-IMX61

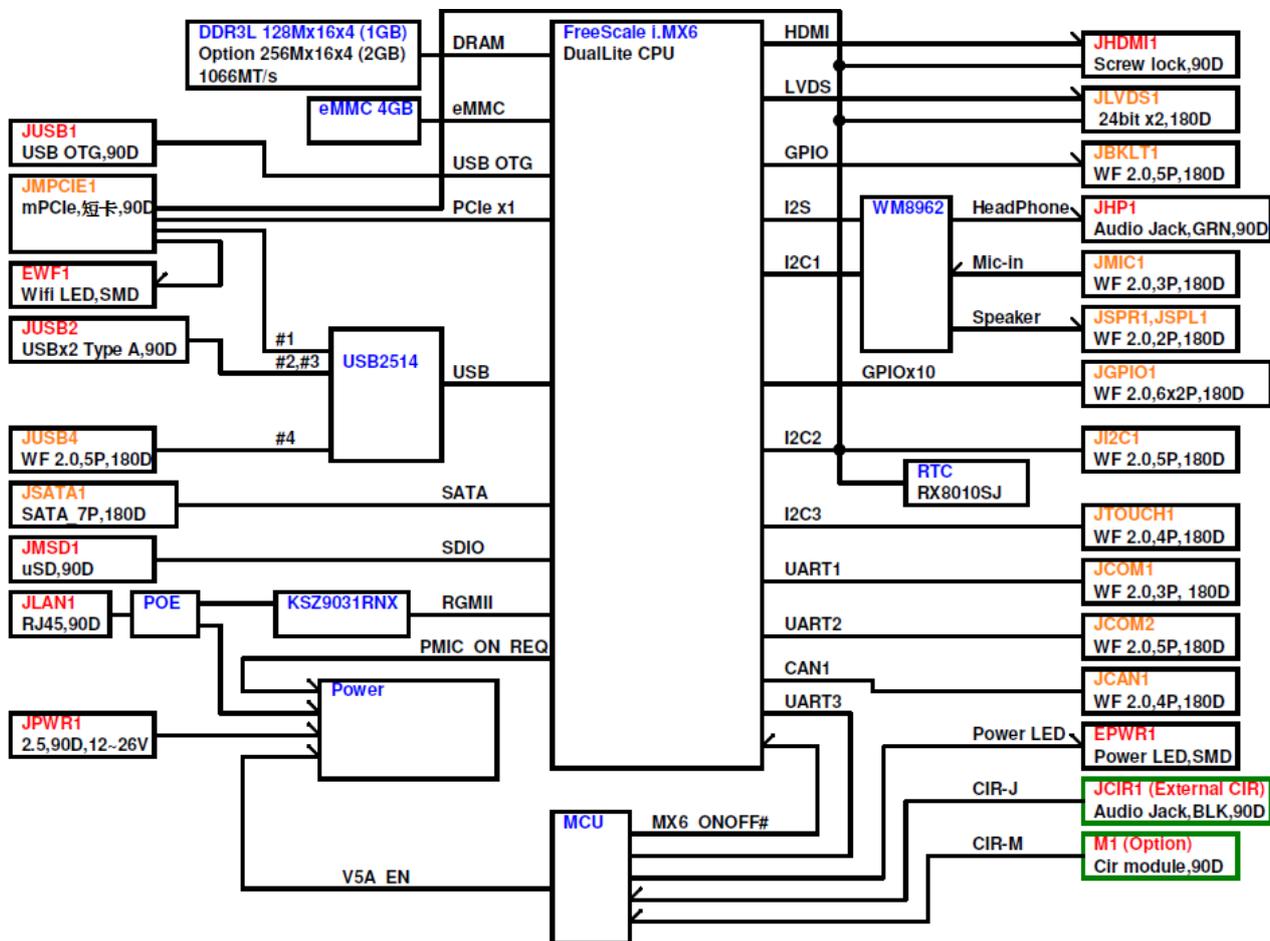
I2C	I2C interface (wafer) (VCC, I2C-Data, I2C-CLK, INT, GND)
SATA	Quad-Only DUAL-NA
Battery	Battery connector for RTC
Mechanical & Environmental	
Power Type	12 ~ 26V DC input, 2.5mm DC Jack, typical 19V input with brownout detection
Operating Temperature	-20 ~ 85 degree
Storage Temperature	-40 ~ 85 degree
Operating Humidity	0 ~ 90%
Dimensions	146mm x 102mm
Weight	TBD



Note: Specifications are subject to change without notice.

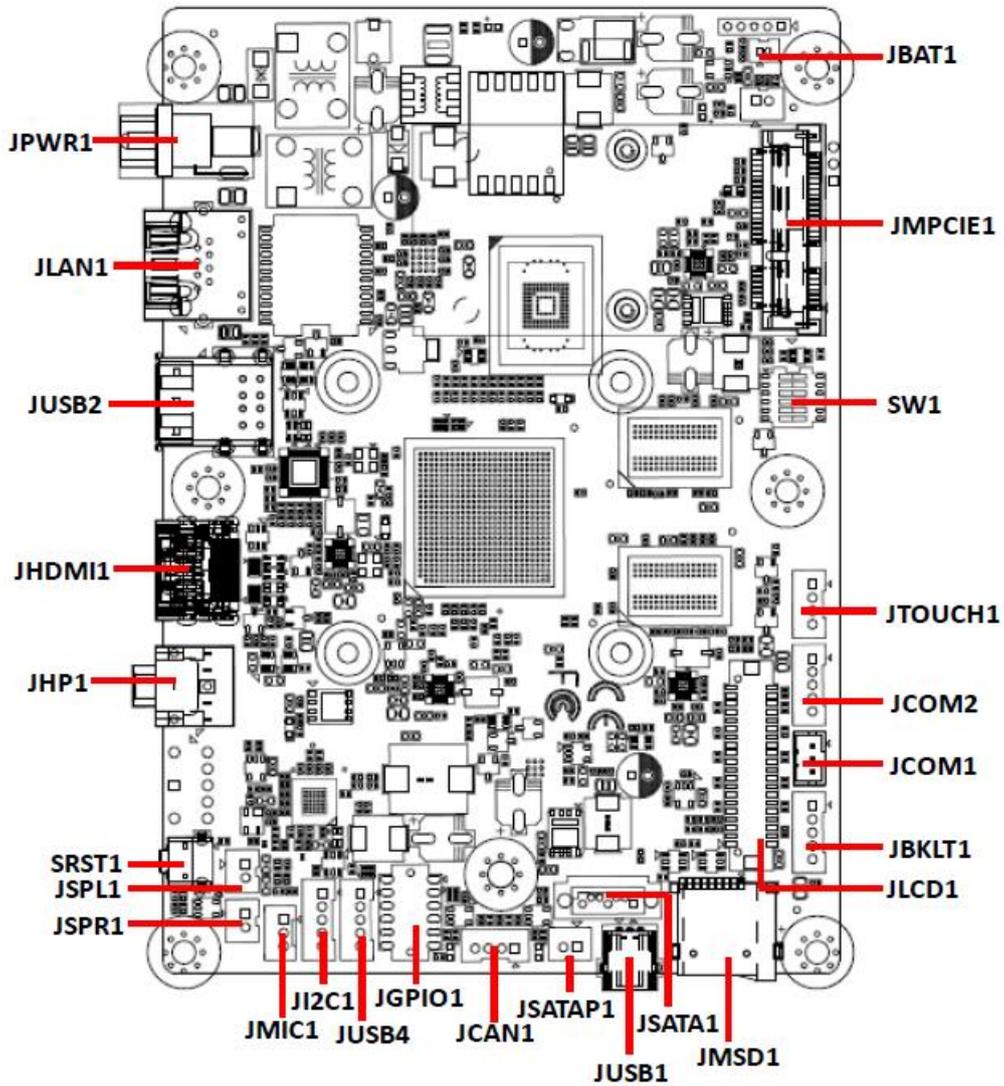
1.6 Architecture Overview – Block Diagram

The following block diagram shows the architecture and main components of RSC-IMX61.



2. Hardware Configuration

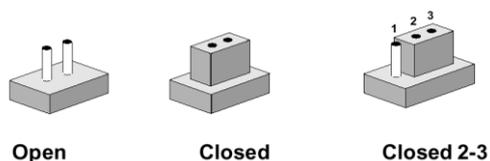
2.1 Product Overview



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
SW1	Boot set selector	DIP switch 6pin

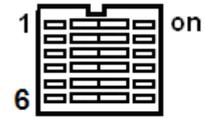
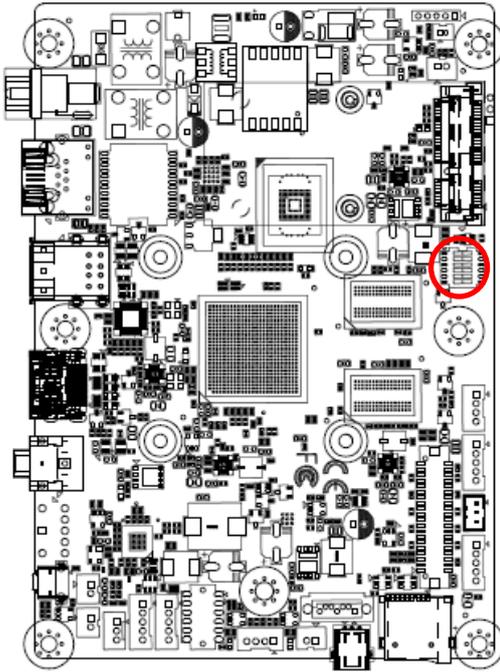
Connectors

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

2.3 Setting Jumpers & Connectors

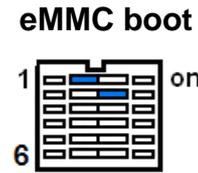
2.3.1 Boot set selector (SW1)



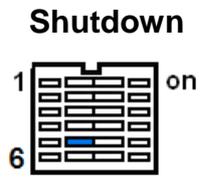
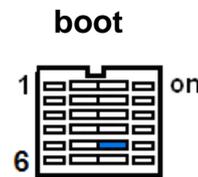
OTG load



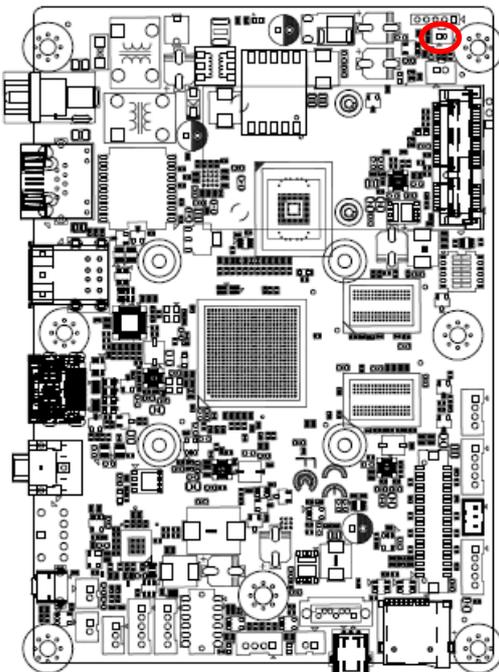
SD boot



Power-in boot choice

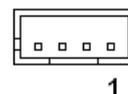
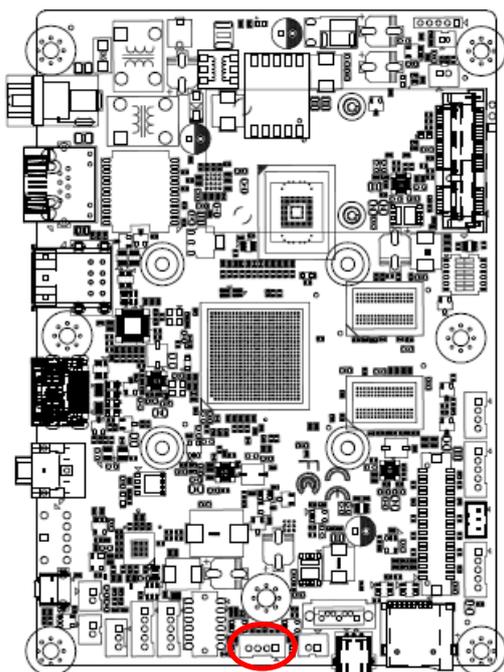


2.3.2 Battery connector (JBAT1)



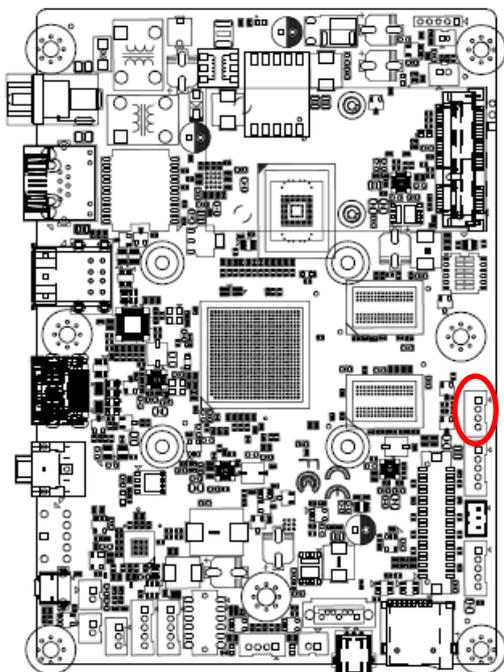
Signal	PIN
+V_BAT	1
GND	2

2.3.3 Can Bus connector (JCAN1)



Signal	PIN
CAN_H	1
GND	2
CAN_L	3
GND	4

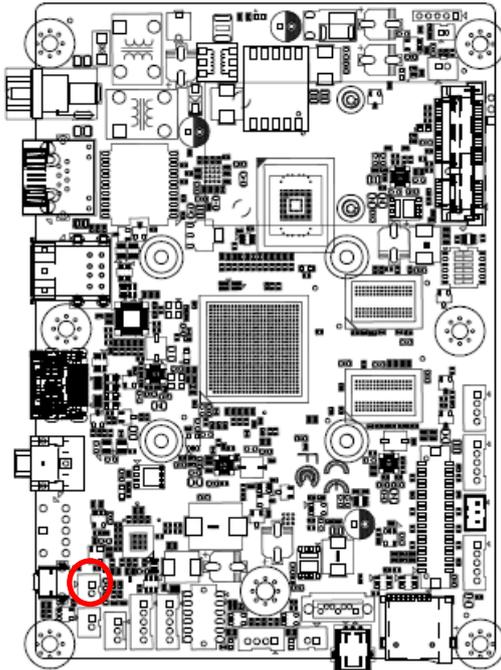
2.3.4 Touch Panel connector (JTOUCH1)



Signal	PIN
XP_A	1
YP_A	2
XM_A	3
YM_A	4

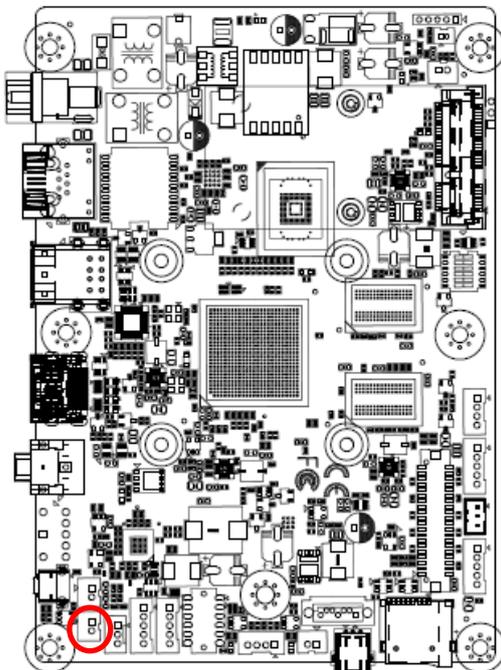
RSC-IMX61

2.3.5 Speaker L connector (JSPL1)



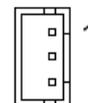
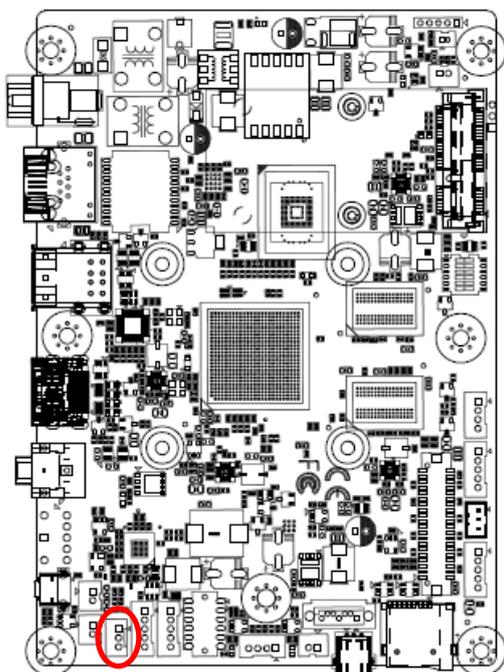
Signal	PIN
SPKL_N	1
SPKL_P	2

2.3.6 Speaker R connector (JSPR1)



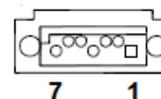
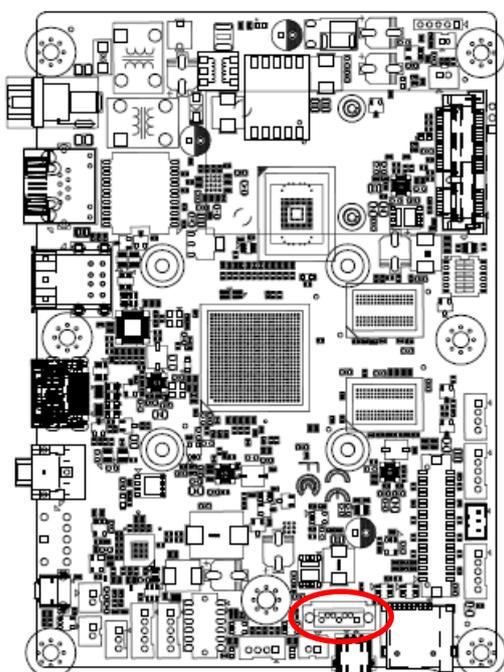
Signal	PIN
SPKR_N	1
SPKR_P	2

2.3.7 Line In, MIC connector (JM1C1)



Signal	PIN
MIC_DET	1
MIC_IN	2
MIC_GND	3

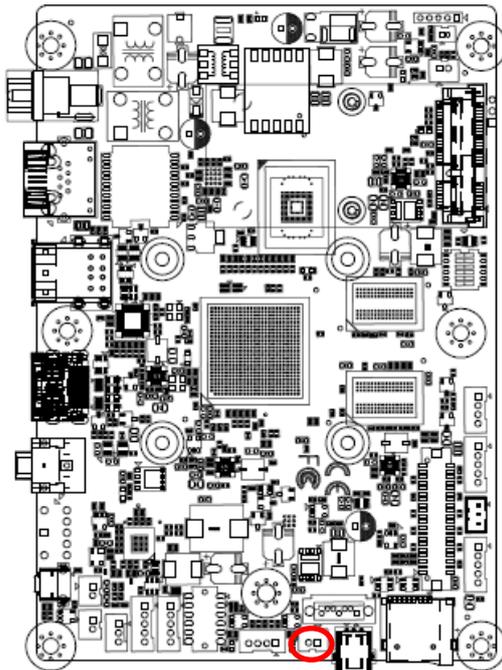
2.3.8 Serial ATA connector (JSATA1)



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

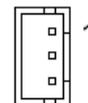
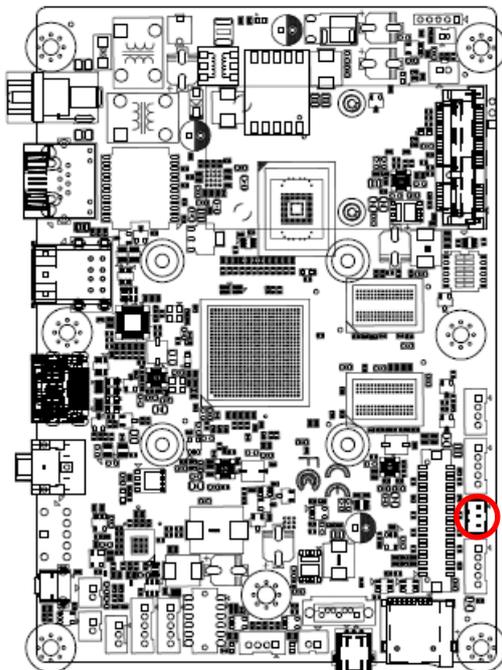
RSC-IMX61

2.3.8 SATA power connector (JSATAP1)



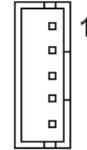
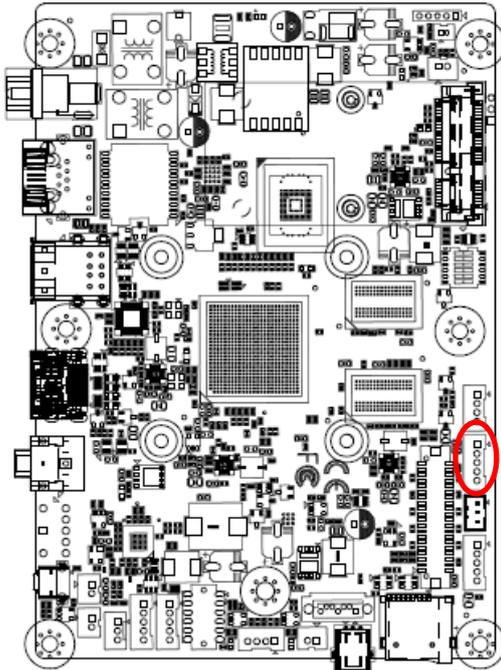
Signal	PIN
+5V	1
GND	2

2.3.9 Serial Port 1 connector (JCOM1)



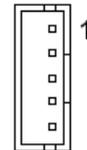
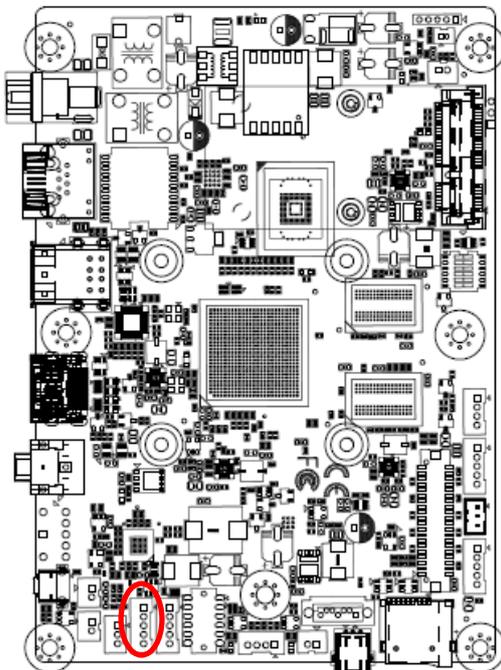
Signal	PIN
COM1_TX	1
COM1_RX	2
GND	3

2.3.10 Serial Port 2 connector (JCOM2)



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

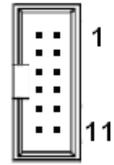
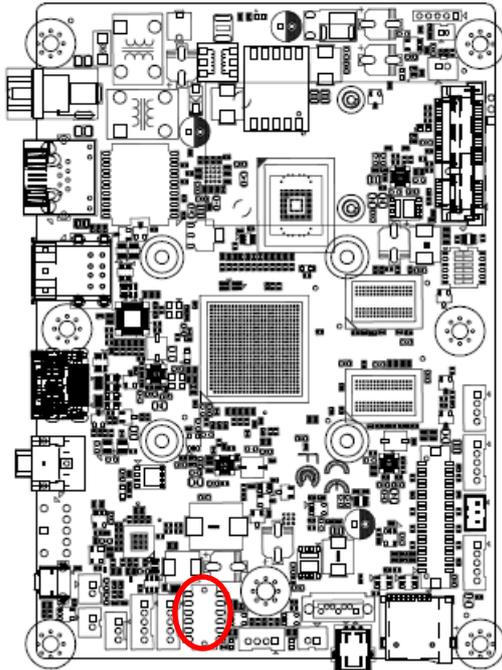
2.3.11 I2C connector (JI2C1)



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

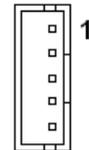
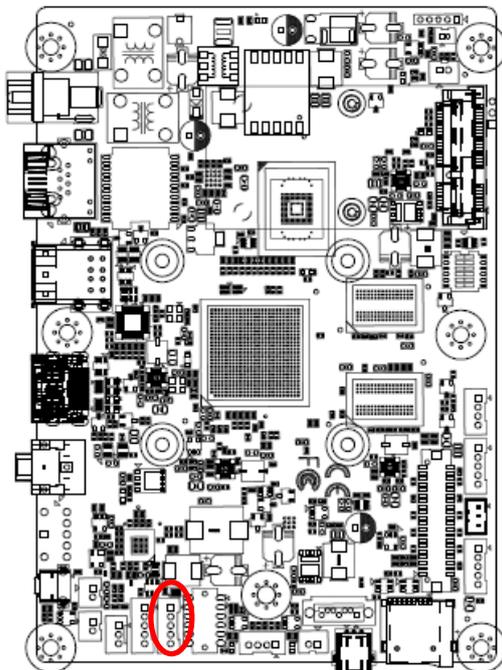
RSC-IMX61

2.3.12 General purpose I/O connector (JGPIO1)



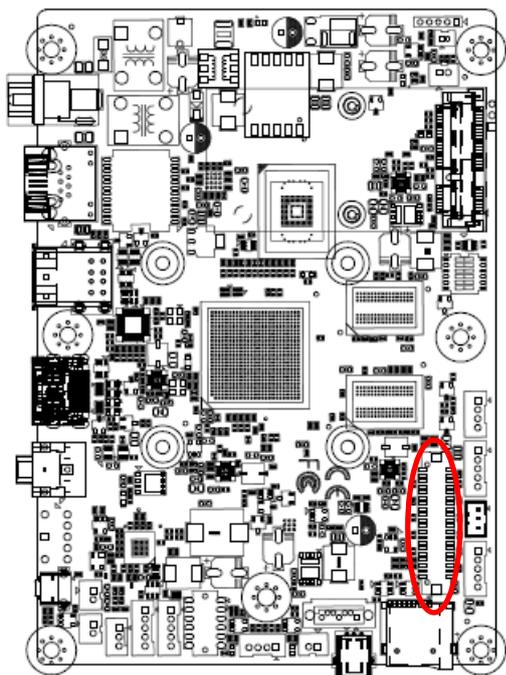
Signal	PIN	PIN	Signal
GPIO2	2	1	GPIO1
GPIO4	4	3	GPIO3
GPIO6	6	5	GPIO5
GPIO8	8	7	GPIO7
GPIO10	10	9	GPIO9
GND	12	11	+3.3V

2.3.13 USB connector (JUSB4)



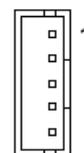
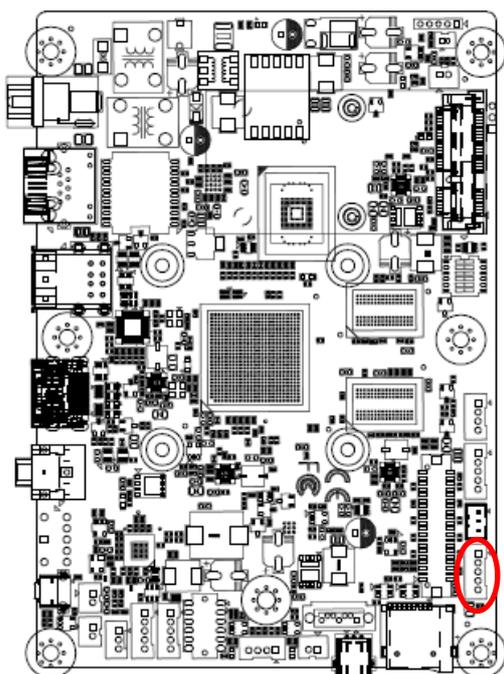
Signal	PIN
+5V	1
USB_NP4	2
USB_PP4	3
GND	4
GND	5

2.3.15 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

2.3.16 LCD inverter connector (JBKLT1)



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

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
```

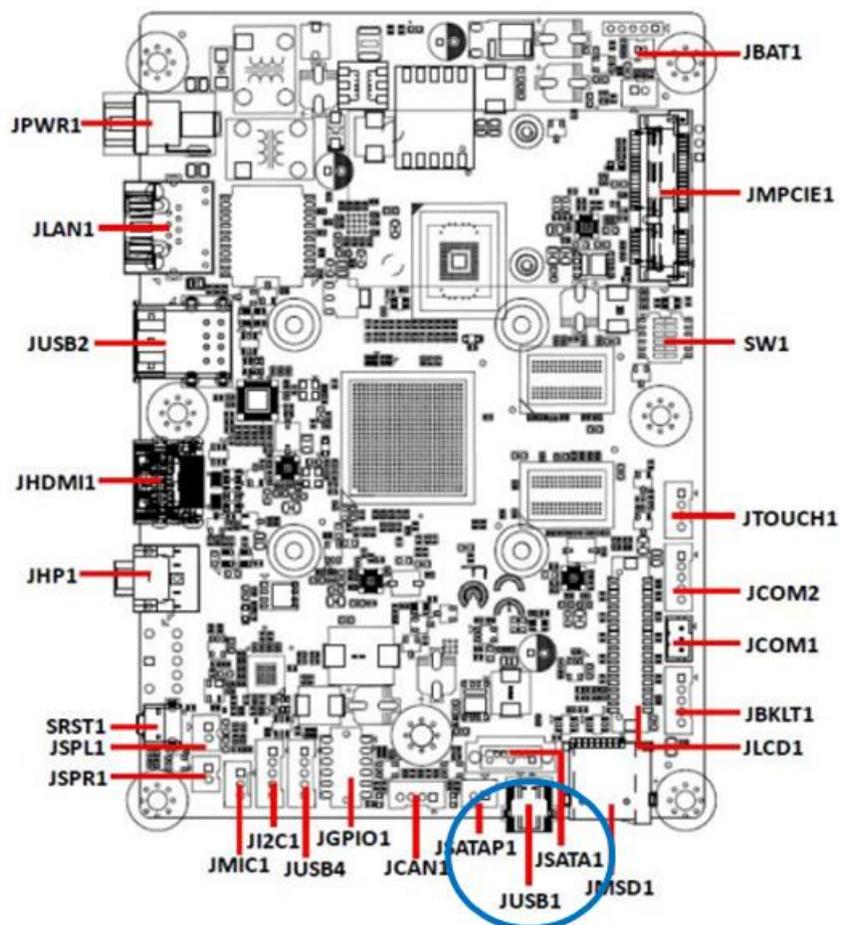
You can find all image files in path FSL-Android/out/target/product/imx6

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

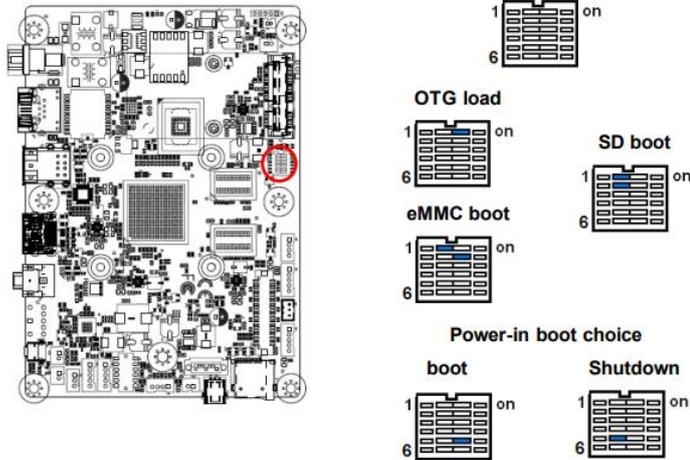
1. Connect RSC-IMX61 to computer through **JUSB1** by mini USB.



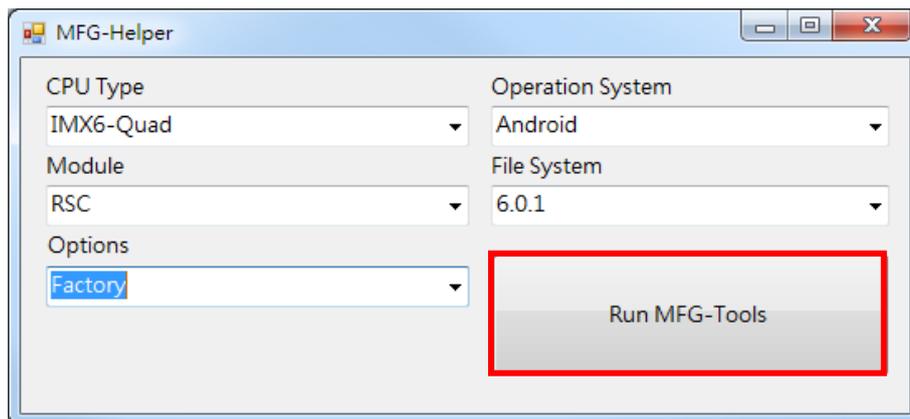
RSC-IMX61

- Set the jumper to OTG mode.

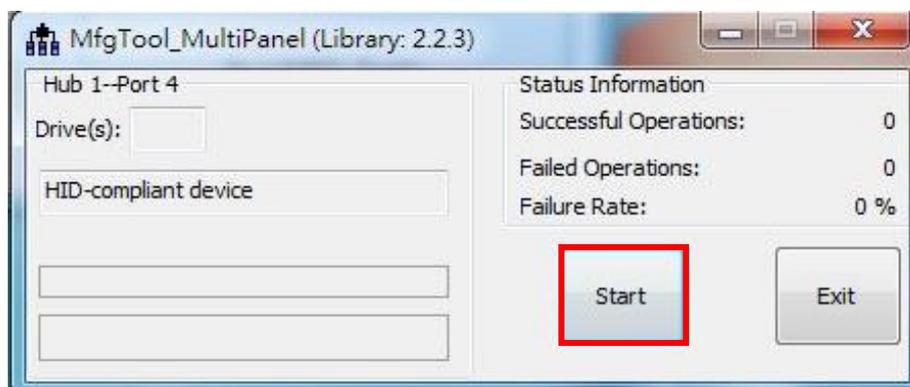
2.3.1 Boot set selector (SW1)



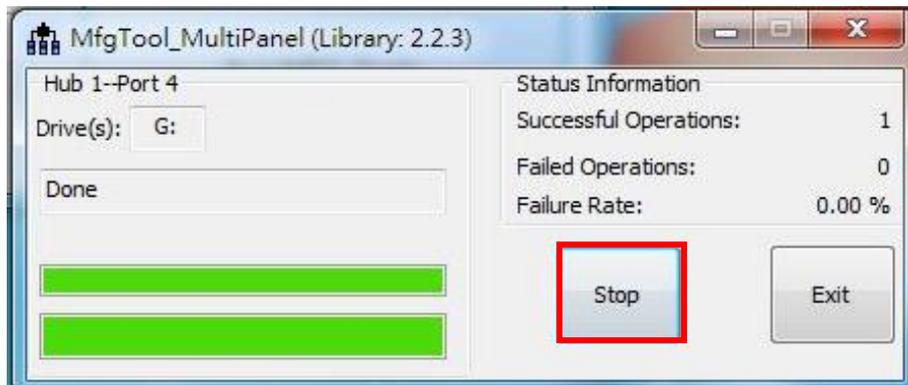
- Execute "MFG-Helper.exe".
Select the items as the blow picture and click "Run MFG-Tools".



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

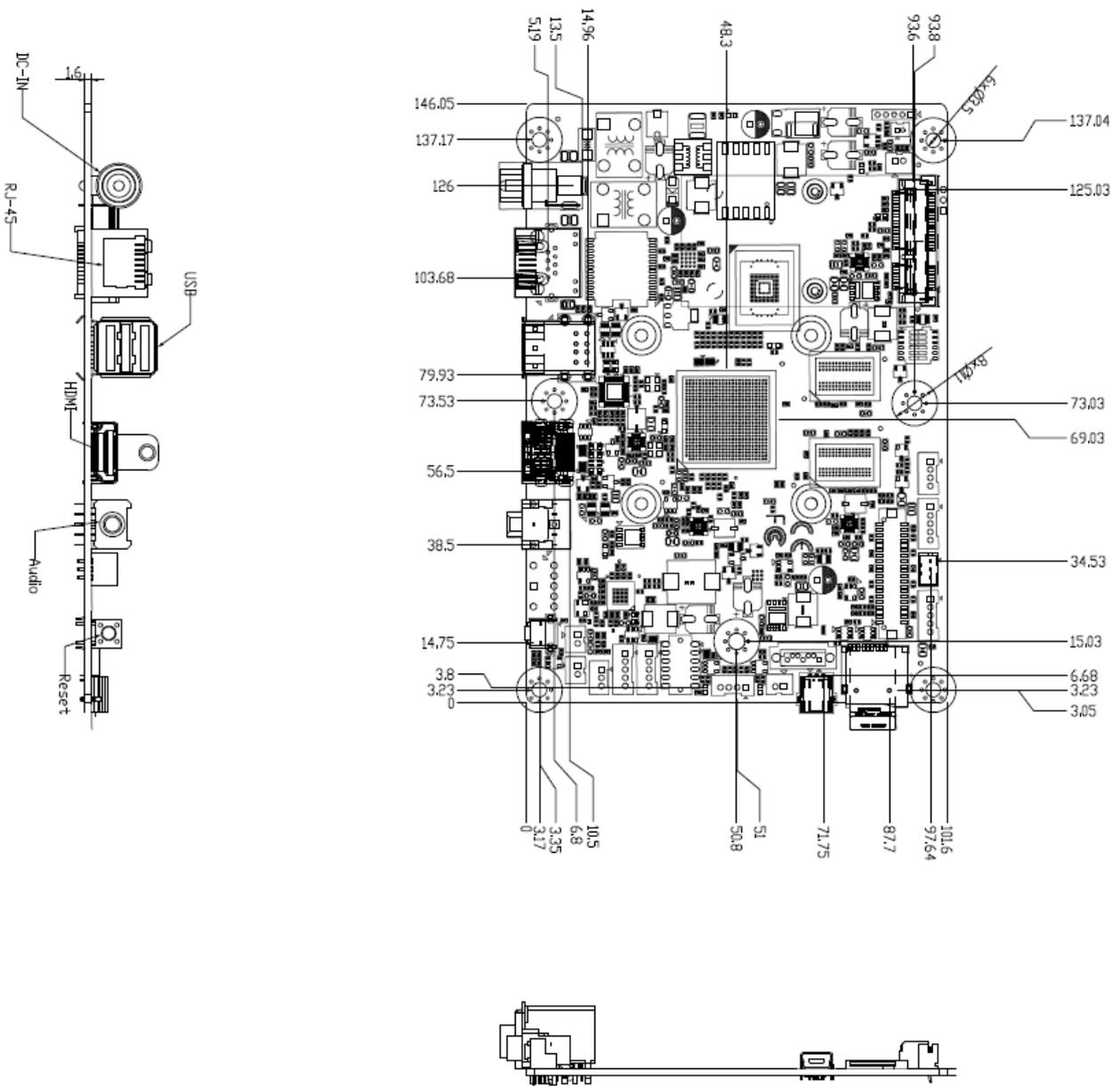


5. When it show “Done”, click “Stop” and “Exit” to finish.

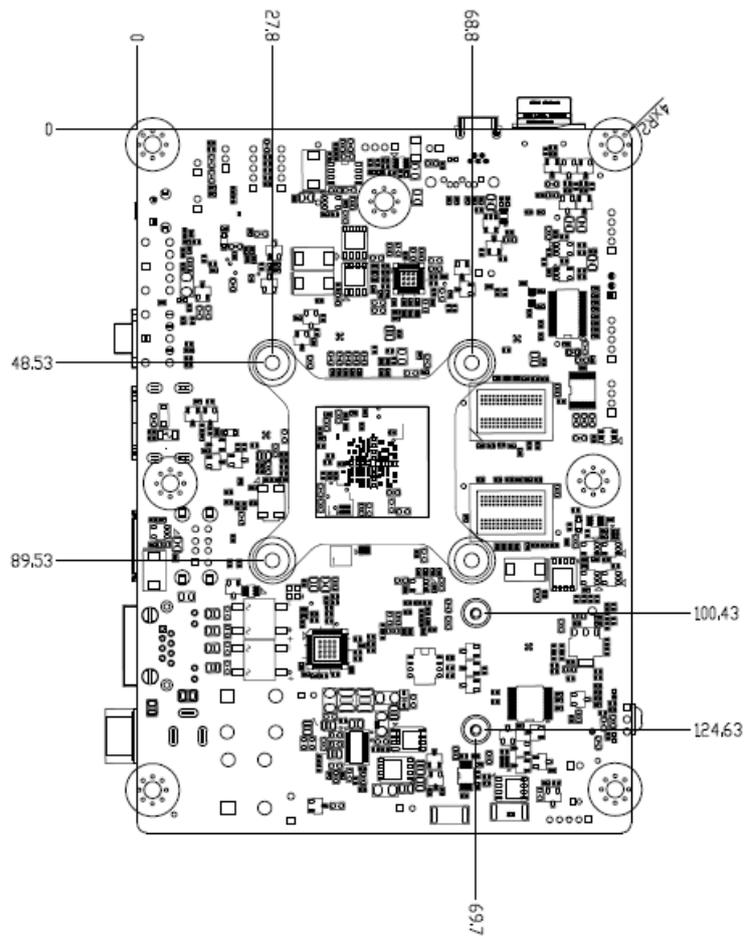


6. Turn off the power.
7. Set the jumper to “eMMC boot” and power on to boot Android.

4. Mechanical Drawing



Unit: mm



Unit: mm

