

# REV-SA01

SMARC Evaluation Carrier Board

## User's Manual

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3<sup>rd</sup> Ed – 24 January 2016

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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.

**Always note** that improper disassembling action could cause damage to the motherboard. We suggest not removing the heatsink without correct instructions in any circumstance. If you really have to do this, please contact us for further support.

## 1.2 Packing List

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

- 1 x REV-SA01 Micro Module



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

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### 1.3 Document Amendment History

Revision	Date	By	Comment
1st	December 2013	Avalue	Initial Release
2 <sup>nd</sup>	October 2014	Avalue	Update Linux User Guide
3 <sup>rd</sup>	January 2017	Avalue	Update System Specifications

### 1.4 Manual Objectives

This manual describes in details Avalue Technology REV-SA01 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 set up REV-SA01 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).

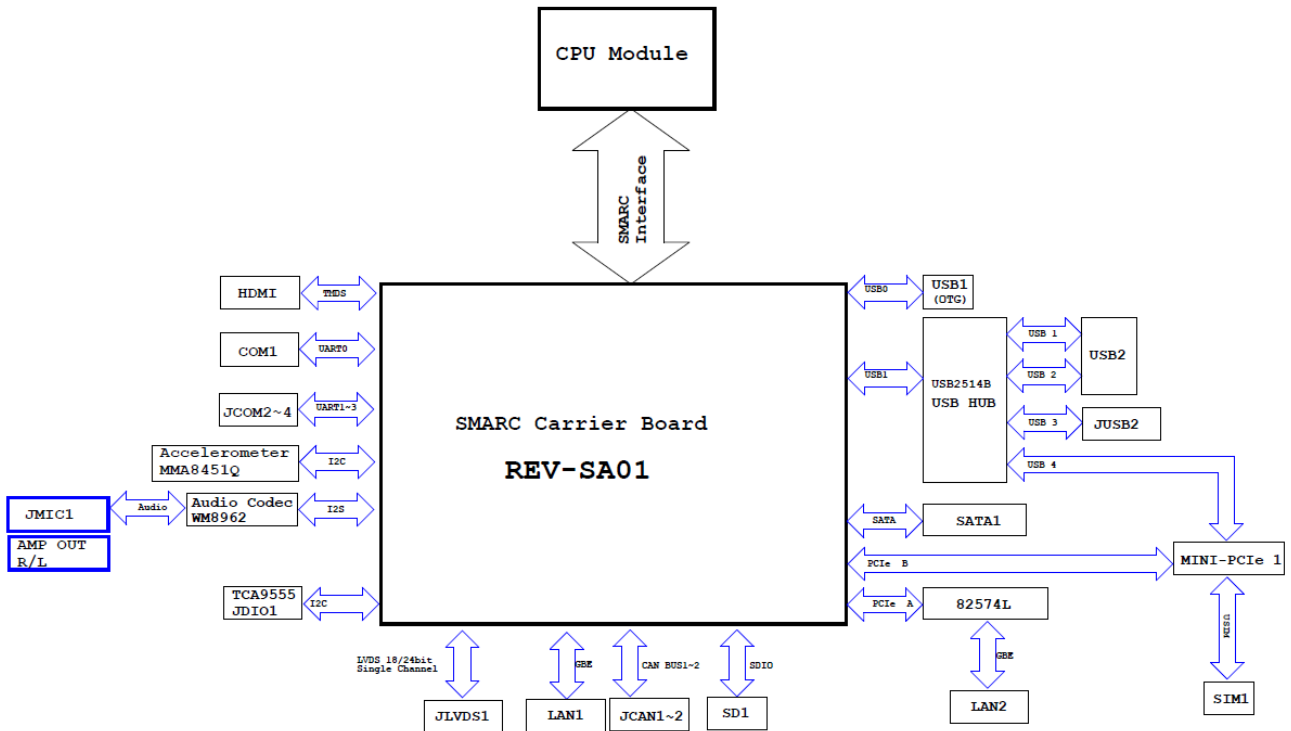
If you have any suggestions or find any errors regarding this manual and want to inform us of these, please contact our Customer Service department with the relevant details.

## 1.5 System Specifications

<b>System</b>	SMARC CPU Module socket: Accepts 82mm x 50mm SMARC Modules
<b>Edge conn</b>	DB9 x 1 DB15 x 1 HDMI x 1 Mini-USB x 1 USB Type A double deck x 1 RJ45 x 2 SD Socket x 1
<b>Backlight conn</b>	5V, GND, ENBKL, VR, PWM
<b>LVDS connector</b>	Hirose DF13-40DS-1.25, support 1 x 18/24bit LVDS
<b>HDMI</b>	HDMI connector
<b>VGA</b>	By Chrontel CH7055 (convert 24bit TTL signal to VGA)
<b>CAN BUS</b>	CAN BUS connector x 2 (JST PHR-4) (CAN PHY TJA1041)
<b>GPIO</b>	10bit GPIO(pin header)
<b>Audio connector</b>	Speaker out (L & R)
<b>USB</b>	USB Type A double deck x 1 USB signal for mPCIe (x1) USB 2.0 pin header (x1) Mini USB connector for USB OTG
<b>SATA</b>	SATA connector x 1, 2pin wafer with 5V, 1A for SATA power
<b>CAN Bus</b>	CAN bus pin header x 2
<b>PCIe</b>	mPCIe socket x 1 (with PCIe x 1 & USB2.0 & USIM signal)
<b>Ethernet</b>	RJ45 connector for GBE (with LED)
<b>2<sup>nd</sup> Ethernet</b>	INTEL 82574L
<b>Audio Codec</b>	WM8962, Line out, MIC in, Speaker out
<b>RTC battery</b>	CR2032, RTC chip is ISL1208
<b>Boot select</b>	8 pin 2.0mm jumper
<b>SD Socket</b>	SD Socket, support SDHC
<b>LED</b>	Power on LED

## 1.6 Architecture Overview—Block Diagram

The following block diagram shows the architecture and main components of REV-SA01.

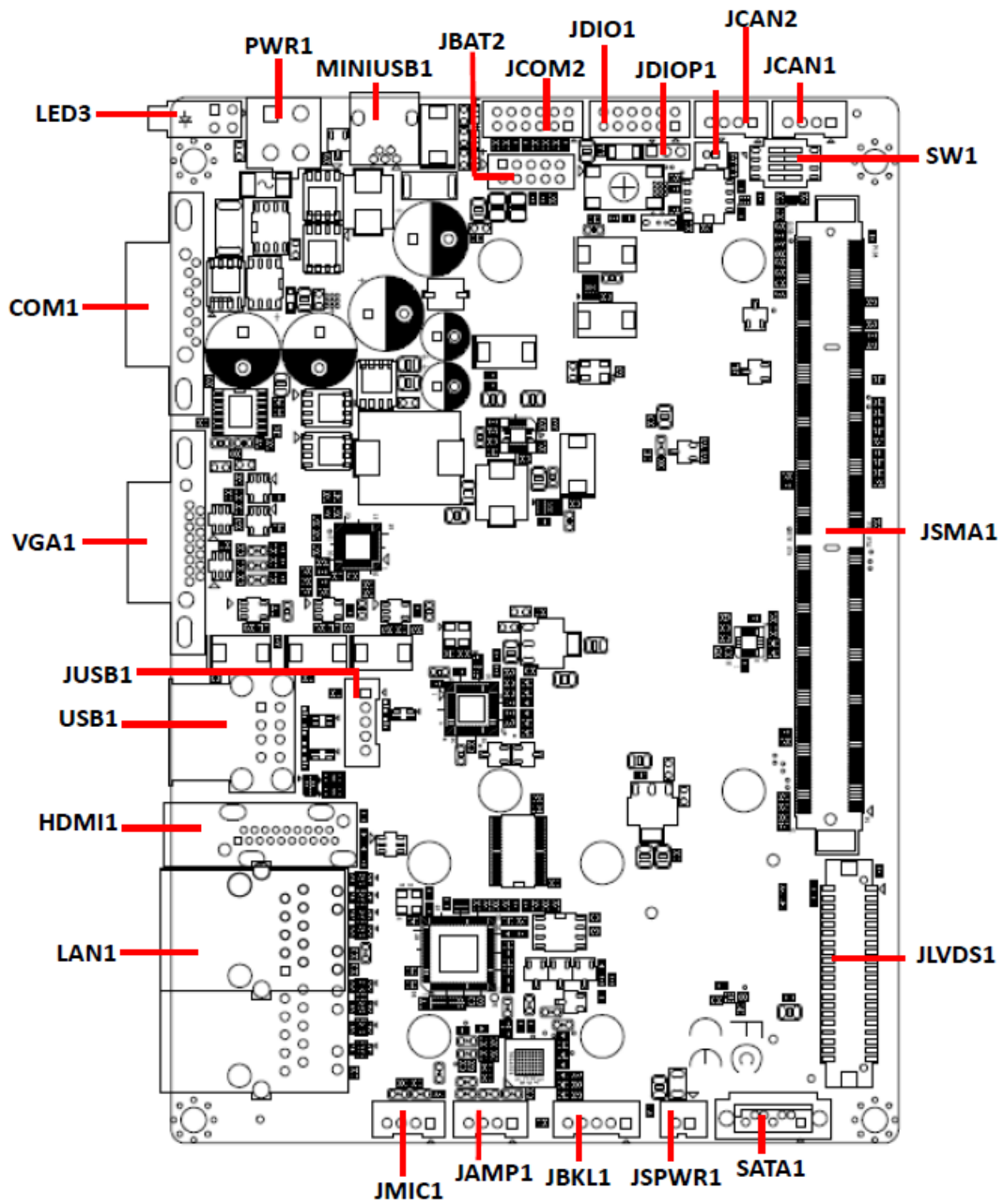


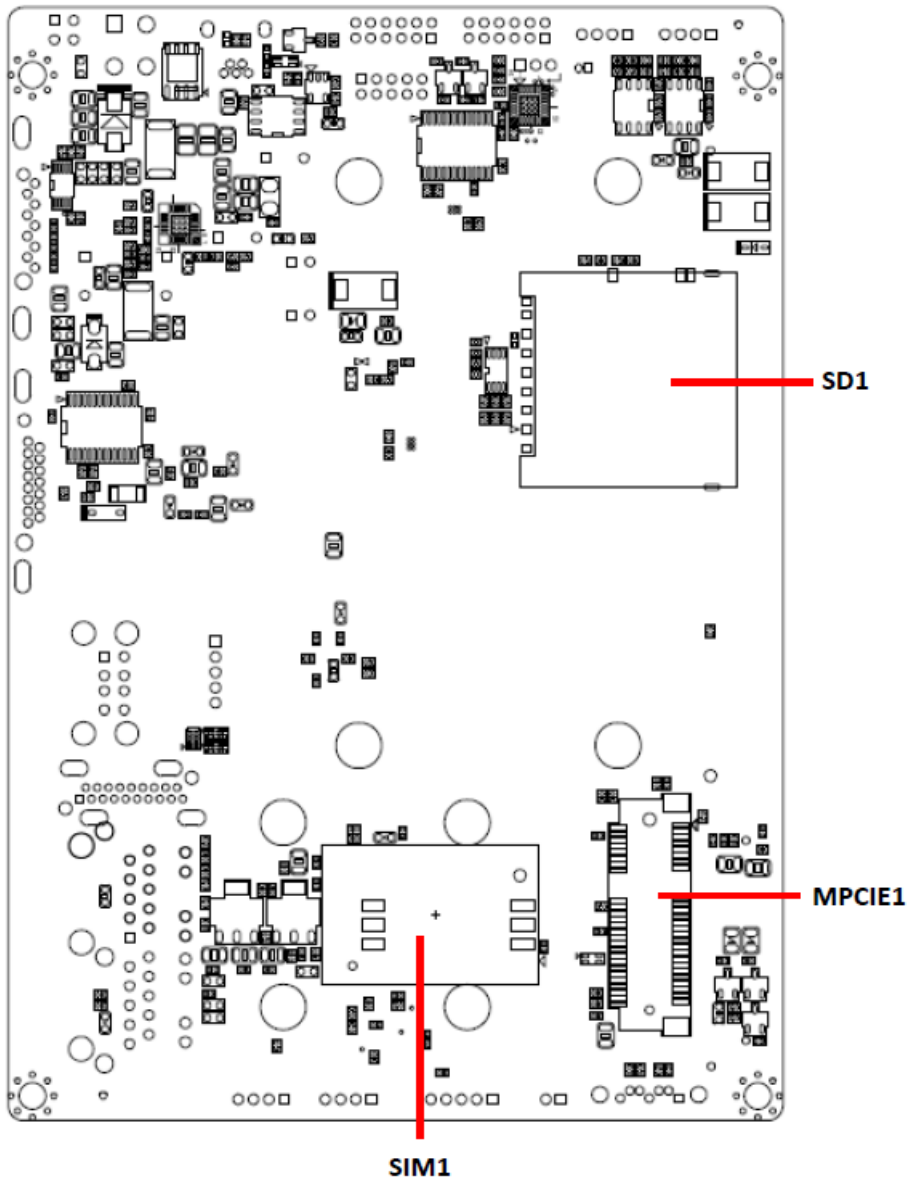


# 2. Hardware Configuration

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## 2.1 Product Overview

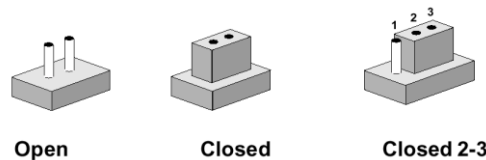




## 2.2 Jumper and Connector List

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 Mode selector	DIP Switch 4P
JDIOP1	General purpose I/O Power selector	3 x 1 header, pitch 2.00mm

### Connectors

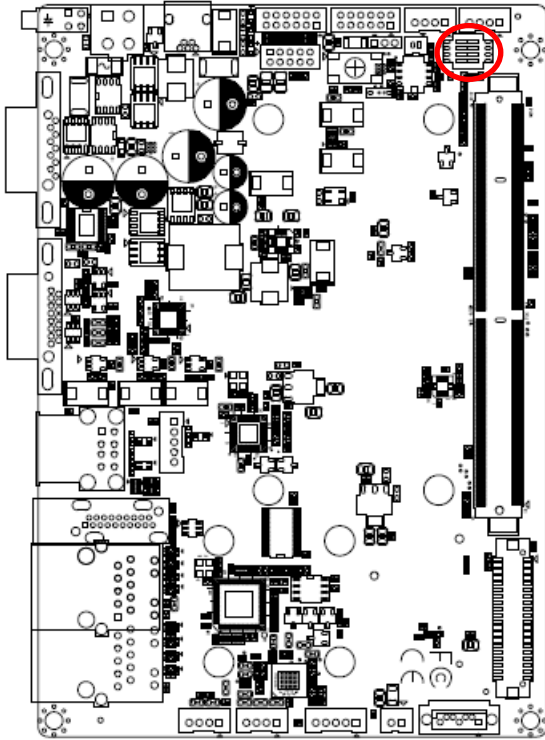
Label	Function	Note
JBAT1	Battery connector 1	2 x 1 wafer, pitch 1.25mm
JBAT2	Battery connector 2	2 x 5 wafer, pitch 2.00mm
JDIO1	General purpose I/O connector	2 x 6 wafer, pitch 2.00mm
JCAN1/2	Can Bus connector 1/2	4 x 1 wafer, pitch 2.00mm
JSMA1	Smart Mobility ARChitecture slot	
SATA1	Serial ATA connector 1	
JBKL1	LCD inverter connector	5 x 1 wafer, pitch 2.00mm

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<b>JAMP1</b>	AMPLIFIER connector	4 x 1 wafer, pitch 2.00mm
<b>JMIC1</b>	Line In, MIC connector	4 x 1 wafer, pitch 2.00mm
<b>LAN1</b>	RJ-45 Ethernet connector	
<b>VGA1</b>	VGA connector	
<b>LED3</b>	LED connector	
<b>MINIUSB1</b>	Mini USB connector for Boot/Debug	MINI USB-MAB_5P
<b>COM1</b>	Serial Port 1 connector	
<b>JCOM2</b>	Serial Port 2 connector	2 x 6 wafer, pitch 2.00mm
<b>HDMI1</b>	HDMI connector	HDMI_19P
<b>JLVDS1</b>	LVDS Interface connector	20 x 2 wafer, pitch 1.25mm
<b>PWR1</b>	Power connector	2 x 2 wafer, pitch 4.20mm
<b>USB1</b>	USB connector	
<b>JUSB1</b>	USB connector	5 x 1 wafer, pitch 2.00mm
<b>JSPWR1</b>	SATA Power connector	2 x 1 wafer, pitch 2.00mm
<b>MPCIE1</b>	Mini-PCI connector	
<b>SD1</b>	SD Card Slot	
<b>SIM1</b>	SIM Card Slot	SDCARD_9H, Push/Push Type

## 2.3 Setting Jumpers & Connectors

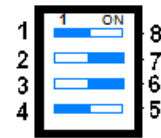
### 2.3.1 Boot Mode selector (SW1)



Booting from onboard eMMC



Boot from SD card

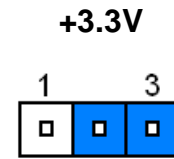
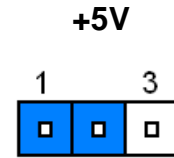
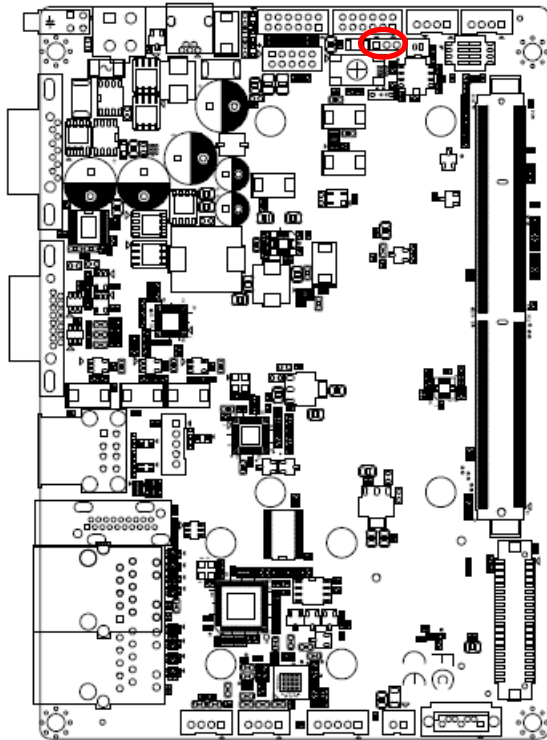


MFG tool mode mode(burning image file to onboard eMMC)

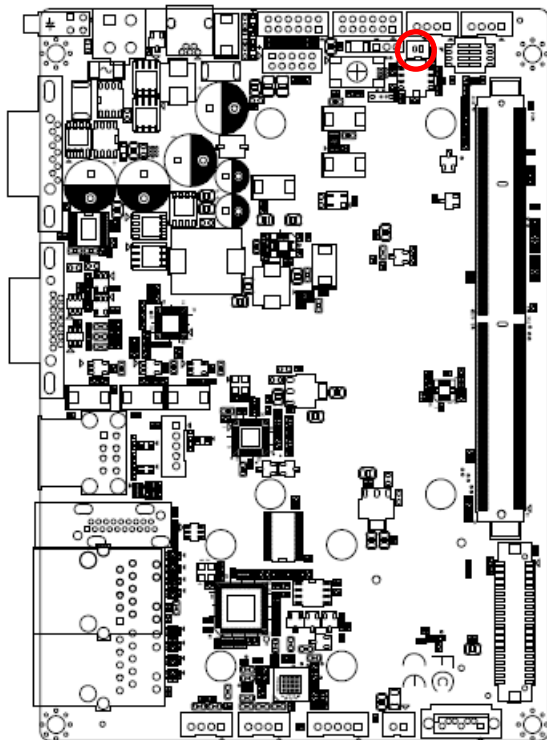


Signal	PIN	PIN	Signal
GND	1	8	BOOT_SEL0#
GND	2	7	BOOT_SEL1#
GND	3	6	BOOT_SEL2#
GND	4	5	FORCE_RECOV#

2.3.2 General purpose I/O Power selector (JDIOP1)

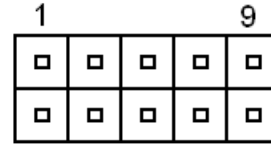
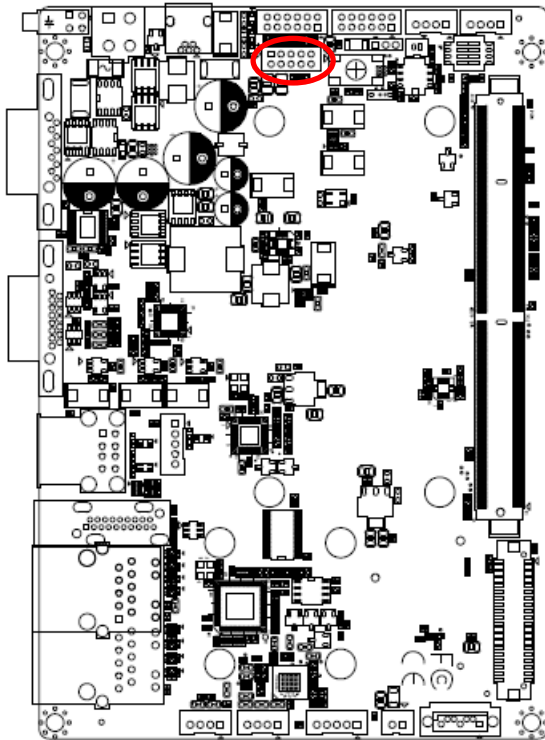


2.3.3 Battery connector 1 (JBAT1)



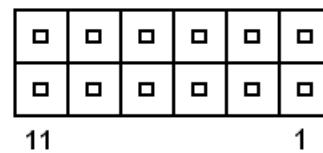
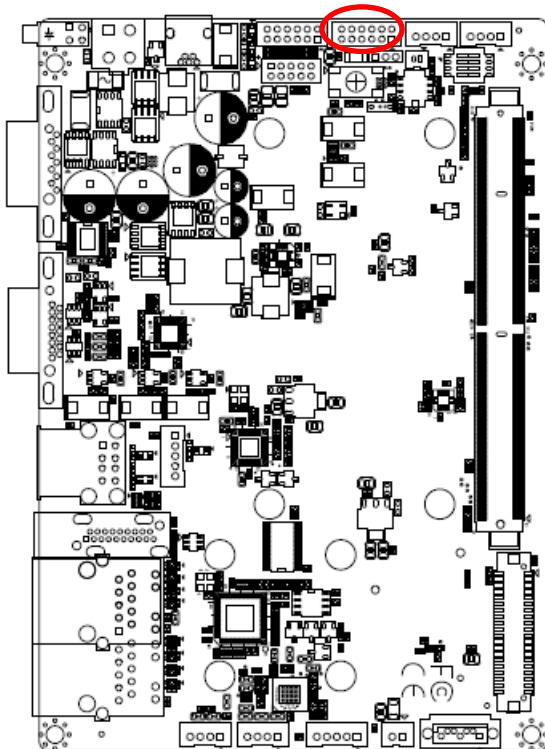
Signal	PIN
+V_BAT	1
GND	2

2.3.4 Battery connector 2 (JBAT2)



Signal	PIN	PIN	Signal
+V_BATTERY	1	2	+V_BATTERY
+V_BATTERY	3	4	GND
GND	5	6	BAT_DATA
BAT_TS	7	8	BAT_CLK
GND	9	10	GND

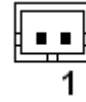
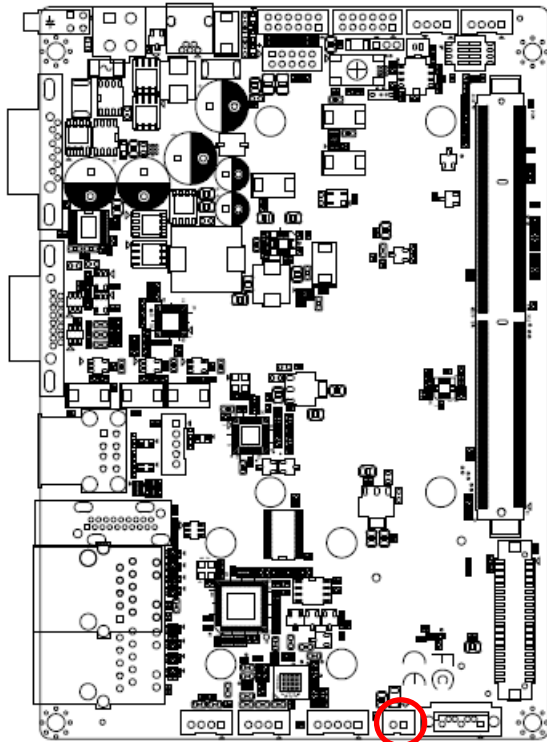
2.3.5 General purpose I/O connector (JDIO1)



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
+VDIO	11	12	GND

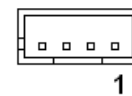
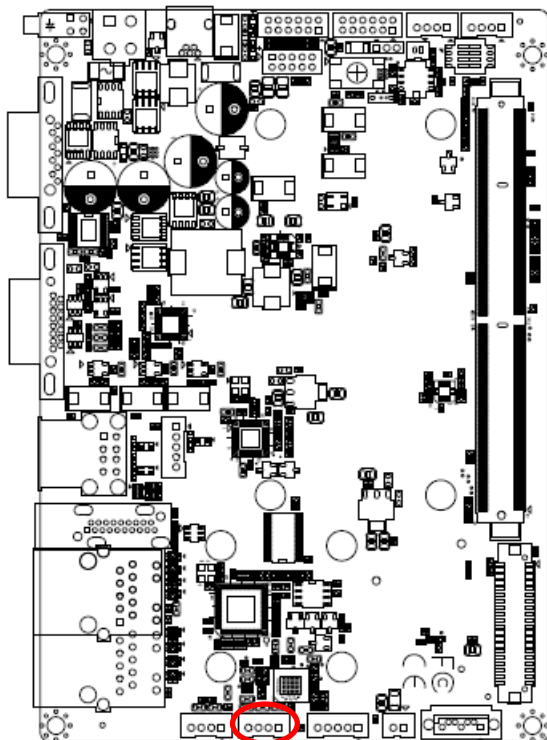


2.3.6 SATA Power connector (JSPWR1)



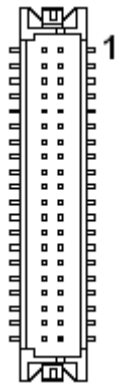
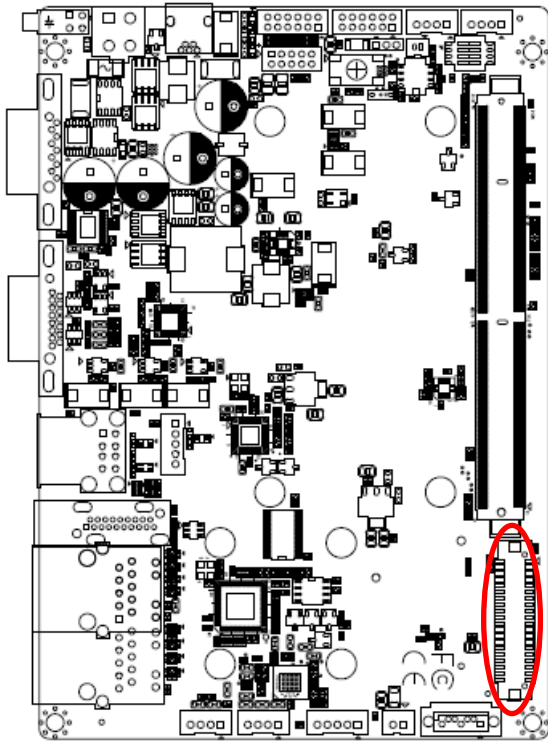
Signal	PIN
GND	1
+5V	2

2.3.7 AMPLIFIER connector (JAMP1)



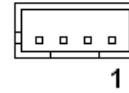
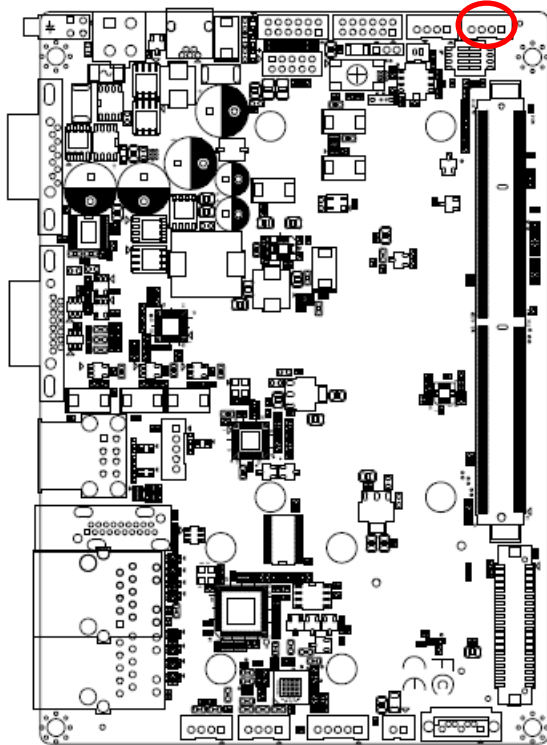
Signal	PIN
SPKL_P	1
SPKL_N	2
SPKR_P	3
SPKR_N	4

2.3.8 LVDS Interface connector (JLVDS1)



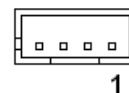
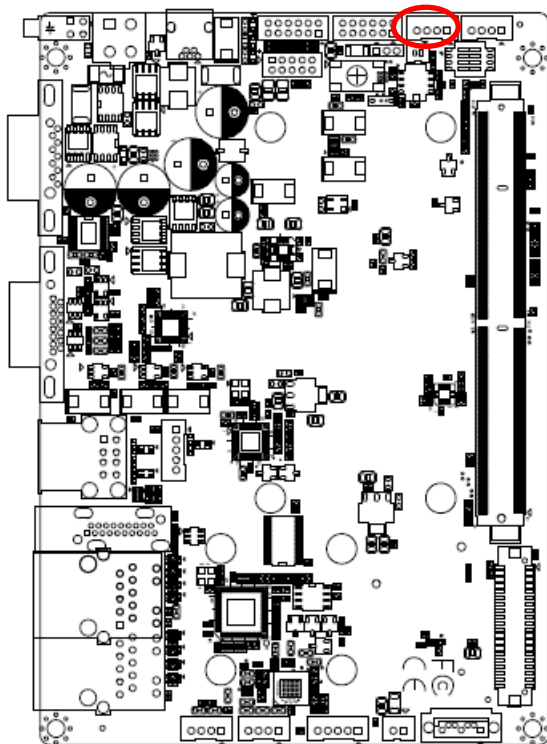
Signal	PIN	PIN	Signal
+5V	2	1	+3.3V
+5V	4	3	+3.3V
I2C_LCD_DAT	6	5	I2C_LCD_CK
GND	8	7	GND
LVDS0+	10	9	LVDS1+
LVDS0-	12	11	LVDS1-
GND	14	13	GND
LVDS2+	16	15	LVDS3+
LVDS2-	18	17	LVDS3-
GND	20	19	GND
NC	22	21	NC
NC	24	23	NC
GND	26	25	GND
NC	28	27	NC
NC	30	29	NC
GND	32	31	GND
LVDS_CK+	34	33	NC
LVDS_CK-	36	35	NC
GND	38	37	GND
NC	40	39	NC

2.3.9 Can Bus connector 1 (JCAN1)



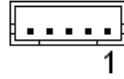
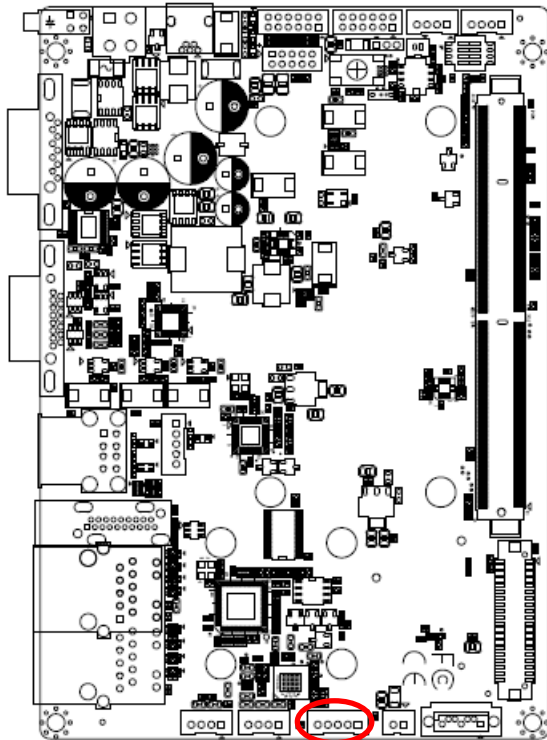
Signal	PIN
CAN0_H	1
GND	2
CAN0_L	3
GND	4

2.3.10 Can Bus connector 2 (JCAN2)



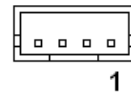
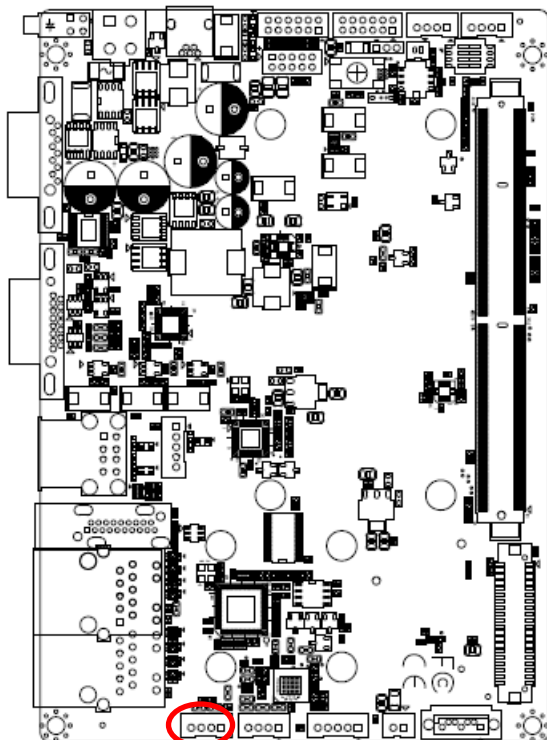
Signal	PIN
CAN1_H	1
GND	2
CAN1_L	3
GND	4

2.3.11 LCD inverter connector (JBKL1)



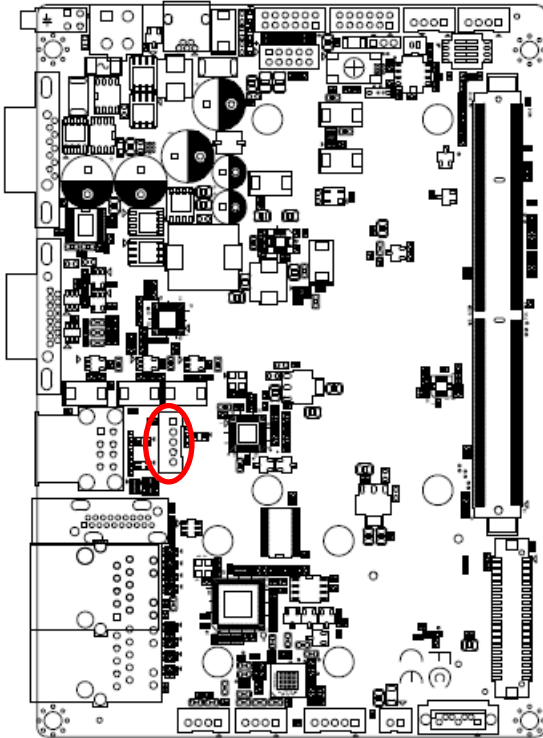
Signal	PIN
NC	1
GND	2
LCD_BKLT_EN	3
LCD_BKLT_PWM	4
+5V	5

2.3.12 Line In, MIC connector (JM1C1)



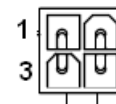
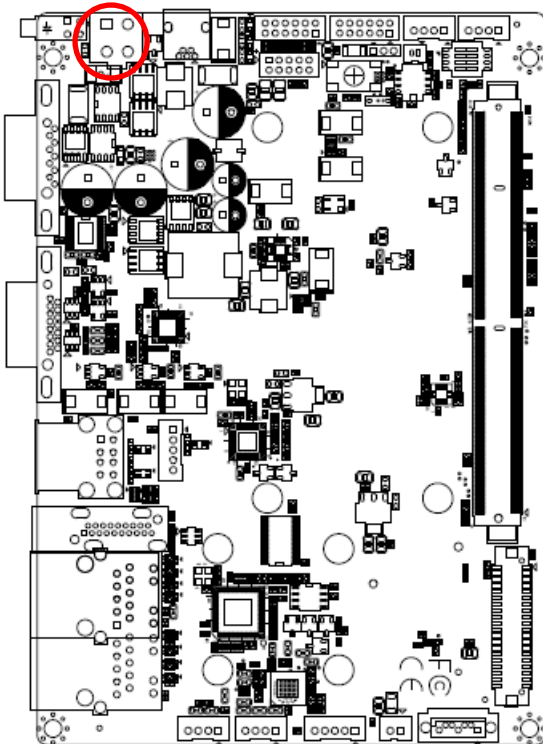
Signal	PIN
MICIN_DET	1
MIC_RAW	2
MICBIAS2_RAW	3
GND	4

2.3.13 USB connector (JUSB1)



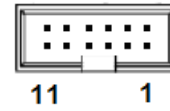
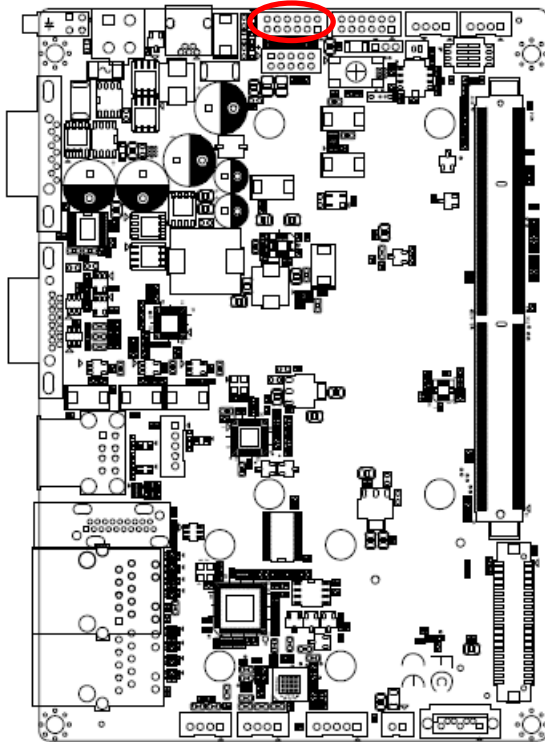
Signal	PIN
+4V	1
USB3_D-	2
USB3_D+	3
GND	4
GND	5

2.3.14 Power connector (PWR1)



Signal	PIN	PIN	Signal
RVSP_G	1	2	RVSP_G
+VIN	3	4	+VIN

2.3.15 Serial Port 2 connector (JCOM2)



Signal	PIN	PIN	Signal
RXDD3	1	2	RXDD2
TXDD3	3	4	TXDD2
GND	5	6	GND
CTS3	7	8	RXDD4
RTS3	9	10	TXDD4
GND	11	12	GND

# 3. Linux User Guide

---

### 3.1 Download Source code for building Ubuntu image file

Please make a folder for storing the source code first then typing the command below to get started for the source code download.

```
$ Sudo apt-get install git
```

```
$ git clone guest@202.55.227.57:freescall/core.git -b SMARC
```

About password, please check with Avalue Sales or PM to get it.

### 3.2 Set up a Linux host for building U-boot & Kernel Image

We support to compile u-boot & Kernel on Ubuntu 12.04 (64bit version), other version of Ubuntu is not currently supported and may have built issues.

Install host packages needed by building code. This document assumes you are using Ubuntu. Not a requirement, but the packages may be named differently and the method of installing them may be different.

```
sudo apt-get install ia32-libs  
sudo apt-get install uboot-mkimage
```

### 3.3 Building up U-boot & Kernel image

You can follow up the steps below to compile the u-boot & Kernel after downloading the source code.

1. Please move to folder "core" then start to compile both the u-boot & Kernel.

```
..~/ $ cd core/
```

```
leo@ubuntu:~/imx6_core$ ls  
core  
leo@ubuntu:~/imx6_core$ cd core/  
leo@ubuntu:~/imx6_core/core$
```

2. Type the command to compile both u-boot & Kernel.

```
$ make rev-sa01 -j number
```

(-j **number** means multi jobs for more efficient building, you can add it according to your CPU performance of PC, e.g. mine is "-j16" as below ).

```
leo@ubuntu:~/imx6_core/core$ make rev-sa01 -j16
```

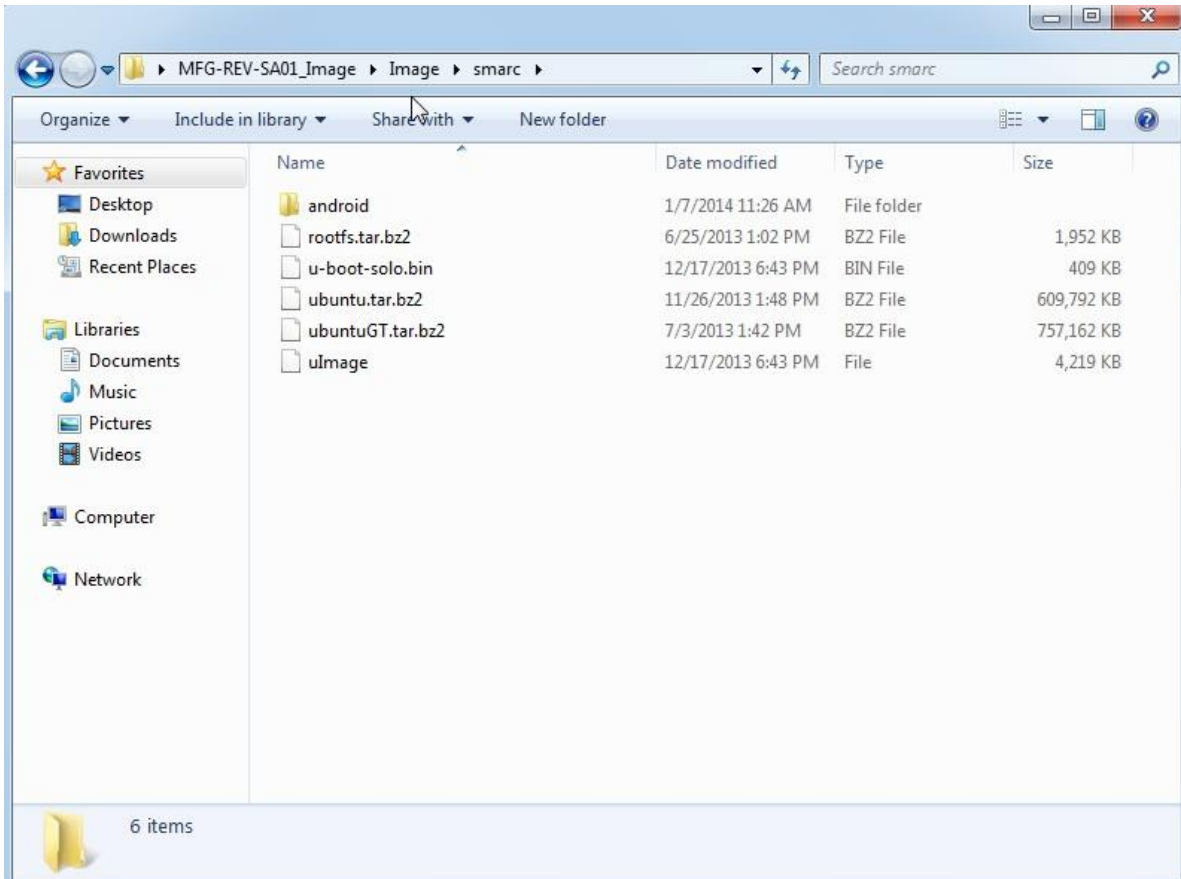


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3. You can find the u-boot(u-boot.bin) & Kernel(ulmage) under folder "core" as below after the compiling is finish.

```
leo@ubuntu:~/imx6_core/core$ ls
fsl kernel Makefile u-boot u-boot-quad.bin u-boot-solo.bin uImage
```

PS: If you would like to use **Mfgtool** for flashing image file, you must put the file **u-boot.bin** and **ulmage** under "~\Image\smarc" for right detected path.

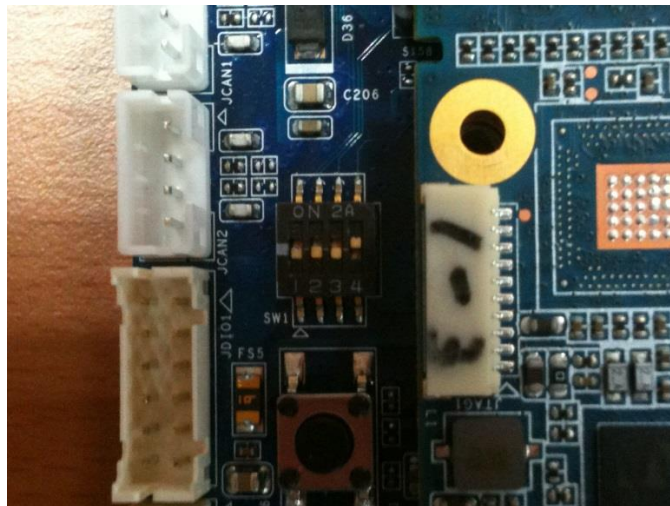


### 3.4 Use MfgTool to flash Ubuntu into onboard eMMC

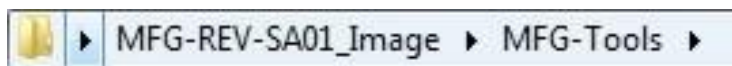
Manufacturing tool, a successor of ATK, provides a series of new features to power your mass production work. The features like windows style GUI, multiple devices support, explicit status monitoring, versatile functionalities and highly flexible architecture make it a best choice to meet your critical timing, cost and customization requirements.

For using Mfgtool to flash image file into onboard eMMC, please follow up the steps below

1. Please turn on the **Pin4** of the DIP switch as below into burning mode of Mfgtool.



2. Power on the mainboard then plug the cable from OTG socket to PC.
3. Click the folder “~\MFG-Tools”, e.g. mine is D:\MFG-REV-SA01\_Image\MFG-Tools”

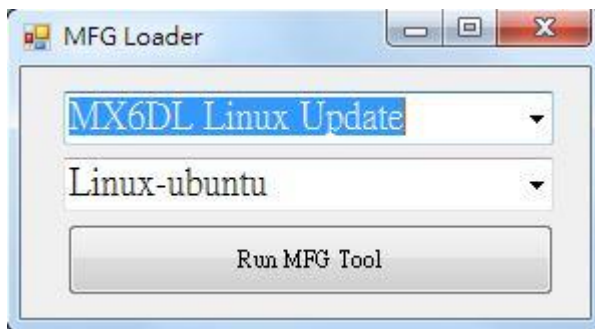


4. Click the “MfgLoader.exe”.

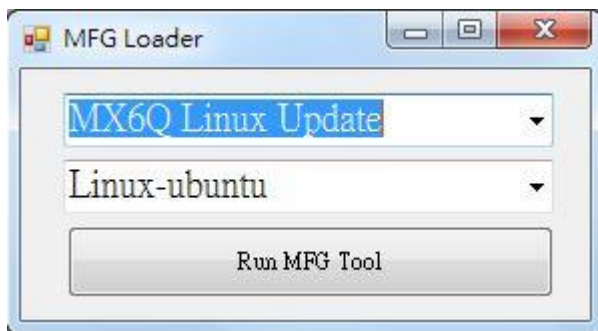
Name	Date modified	Type	Size
Profiles	1/7/2014 11:27 AM	File folder	
cfg	12/18/2013 10:21 ...	Configuration sett...	1 KB
MfgLoader	9/12/2013 2:08 PM	Application	68 KB
MfgTool	12/26/2013 5:44 PM	Text Document	1 KB
MfgTool2	8/30/2013 3:18 PM	Application	1,693 KB
MfgToolLib.dll	8/30/2013 3:17 PM	Application extens...	569 KB
MfgToolLib.lib	8/30/2013 3:17 PM	LIB File	8 KB

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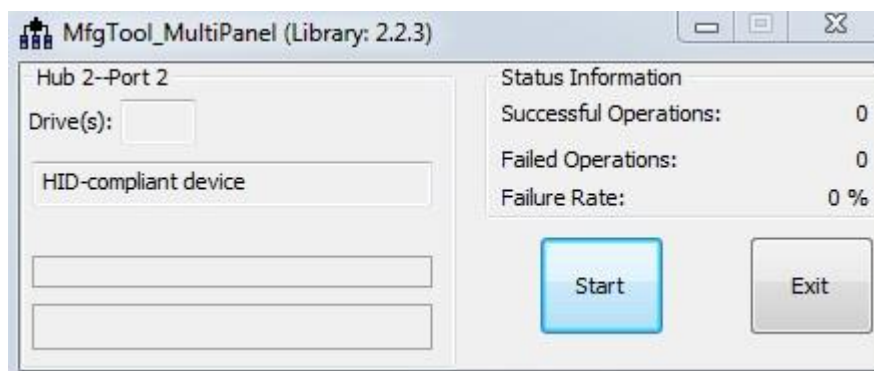
5. Select the MCU option by name, if the MCU of module board is “i.MX6 Solo”, please click “MX6DL Linux Update”, and click “Linux-ubuntu” (Ubuntu GUI version) for the OS of flashing, then click “Run MFG Tool”.



Or the if the MCU of module board is “i.MX6 Quad core”, please click “**MX6Q Linux Update**”, and click “**Linux-ubuntu**” (Ubuntu GUI version) for the OS of flashing, then click “**Run MFG Tool**”.



6. The second screen will show up after clicking “Run MFG Tool”, and please check whether it shows “HID-compliant device” as below, if not, please re-check the cable connection and DIP switch setting between mainboard and PC.





### 3.5 Create a bootable SD card with Ubuntu 12.04 file system

Please insert a SD card in the card reader on your Linux host PC

- 1) Check device node of your SD card by command below.

`$cat /proc/partitions` (for example, mine is /dev/sdd as below)

```

avalue@ubuntu:~/test/ltib$ cat /proc/partitions
major minor #blocks name
 8         0 104857600 sda
 8         1 100548608 sda1
 8         2          1 sda2
 8         5  4305920 sda5
 8        48  1000448 sdd
 8        49   996352 sdd1
avalue@ubuntu:~/test/ltib$

```

Create EXT3 partition for SD card

`$ sudo fdisk /dev/sdd`

Type the following parameters (each followed by <ENTER>):

d [delete the previous partition]

n [create a new partition]

p [create a primary partition]

1 [the first partition]

20480 [20480x512bytes=10MB, which leaves enough space for the kernel, the boot loader and its configuration data]

<enter> [using the default value will create a partition that spans to the last sector of the medium]

w [ this writes the partition table to the medium and fdisk exits]

- 2) Format new partition in EXT3 format

`$sudo umount /dev/sdd1`

`$sudo mkfs.ext3 /dev/sdd1`

- 3) Install bootloader on SD card by command below.

`$ sudo dd if=u-boot-solo.bin(u-boot-quad.bin) of=/dev/sdd bs=1k seek=1 skip=1 conv=fsync`

- 4) Install Linux kernel image on SD card by command below.

`$ sudo dd if=ulmage of=/dev/sdd bs=1M seek=1 conv=fsync`

- 5) Please find the Ubuntu file system from the path "CDROM\REV

Image\MFG-REV-SA01\_Image\Image\smarc\ ubuntu.tar.bz2" on User's CD-ROM and copy it to the partition then follow up the command below.

## REV-SA01 User's Manual

```
$ sudo umount /dev/sdd1  
$ sudo mount /dev/sdd1 /mnt  
$ cd /mnt  
$ sudo tar jxvpf ~/ubuntu.tar.bz2  
$ cd  
$ sudo umount /dev/sdd1
```

The Ubuntu file system content is now on the SD card. You can insert it to mainboard then turn on the DIP switch pin2&3 as below for booting.





### 3.6 Bootloader settings for booting from SD card

1) Please turn on the Pin 2&3 of the DIP switch as below for booting from SD card .



- 2) Insert SD card on SD socket. Connect RS232 cross over cable from **COM1** of mainboard to COM port of Host PC.
- 3) Run hyper terminal program on Host PC (teraterm on Windows or minicom on Linux)
- 4) Power on mainboard and press "space" key to get into bootloader menu.

```
U-Boot 2009.08 (Dec 11 2013 - 17:57:30)

CPU: Freescale i.MX6 family T01.1 at 792 MHz
Thermal sensor with ratio = 178
Temperature: 38 C, calibration data 0x5694e069
mx6q pll1: 792MHz
mx6q pll2: 528MHz
mx6q pll3: 480MHz
mx6q pll8: 50MHz
ipg clock      : 660000000Hz
ipg per clock  : 660000000Hz
uart clock     : 800000000Hz
cspi clock     : 600000000Hz
ahb clock      : 1320000000Hz
axi clock      : 1980000000Hz
emi_slow clock: 990000000Hz
ddr clock      : 3960000000Hz
usdhc1 clock   : 1980000000Hz
usdhc2 clock   : 1980000000Hz
usdhc3 clock   : 1980000000Hz
usdhc4 clock   : 1980000000Hz
nfc clock      : 240000000Hz
Board: i.MX6DL/Solo: SMARC Board: 0x61011 [POR ]
Boot Device: SD
DRAM: 1 GB
MMC: FSL_USDHC: 0, FSL_USDHC: 1, FSL_USDHC: 2, FSL_USDHC: 3
In: serial
Out: serial
Err: serial
Net: got MAC address from IIM: 00:00:00:00:00:00
FEC0 [PRIME]
Hit any key to stop autoboot: 0
MX6 Solo SMARC U-Boot >
```

- 5) Setup boot device  
SMARC U-Boot > print

## REV-SA01 User's Manual

6) Set boot device as below

→ SMARC U-Boot >setenv linux\_cmd 'setenv bootargs \${linux\_bootargs};mmc dev 1;mmc read \${loadaddr} 0x800 0x3000;bootm'

→ SMARC U-Boot > setenv linux\_bootargs 'console=tty0 console=ttymxc0,115200 root=/dev/mmcblk1p1 rootwait rw'

→SMARC U-Boot> saveenv

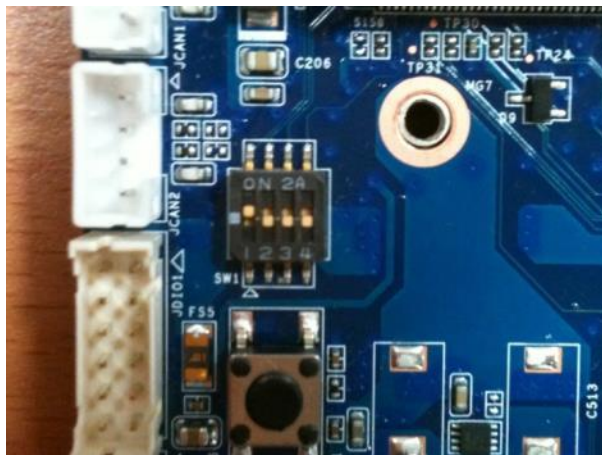
→SMARC U-Boot> boot

```
SMARC U-Boot > setenv linux_cmd 'setenv bootargs ${linux_bootargs};mmc dev 1;mmc read ${loadaddr} 0x800 0x3000;bootm'  
SMARC U-Boot > setenv linux_bootargs 'console=tty0 console=ttymxc0,115200 root=/dev/mmcblk1p1 rootwait rw'  
SMARC U-Boot > saveenv
```



### 3.7 Bootloader settings for booting from onboard eMMC

1) Please turn on the Pin 1 of the DIP switch as below for booting from onboard eMMC.



- 2) Insert SD card on SD socket. Connect RS232 cross over cable from **COM1** of mainboard to COM port of Host PC.
- 3) Run hyper terminal program on Host PC (teraterm on Windows or minicom on Linux)
- 4) Power on mainboard and press "space" key to get into bootloader menu.

```

U-Boot 2009.08 (Dec 11 2013 - 17:57:30)

CPU: Freescale i.MX6 family T01.1 at 792 MHz
Thermal sensor with ratio = 178
Temperature: 38 C, calibration data 0x5694e069
mx6q pll1: 792MHz
mx6q pll2: 528MHz
mx6q pll3: 480MHz
mx6q pll8: 50MHz
ipg clock      : 660000000Hz
ipg per clock  : 660000000Hz
uart clock     : 800000000Hz
cspi clock     : 600000000Hz
ahb clock      : 1320000000Hz
axi clock      : 1980000000Hz
emi_slow clock: 990000000Hz
ddr clock      : 3960000000Hz
usdhc1 clock   : 1980000000Hz
usdhc2 clock   : 1980000000Hz
usdhc3 clock   : 1980000000Hz
usdhc4 clock   : 1980000000Hz
nfc clock      : 240000000Hz
Board: i.MX6DL/Solo: SMARC Board: 0x61011 [POR ]
Boot Device: SD
DRAM: 1 GB
MMC: FSL_USDHC: 0,FSL_USDHC: 1,FSL_USDHC: 2,FSL_USDHC: 3
In: serial
Out: serial
Err: serial
Net: got MAC address from IIM: 00:00:00:00:00:00
FEC0 [PRIME]
Hit any key to stop autoboot: 0
MX6 Solo SMARC U-Boot >
    
```

- 5) Setup boot device  
SMARC U-Boot > print
- 6) Set boot device as below  
SMARC U-Boot >setenv linux\_cmd 'setenv bootargs \${linux\_bootargs};mmc dev 3;mmc read \${loadaddr} 0x800 0x3000;bootm'

## REV-SA01 User's Manual

- SMARC U-Boot > setenv linux\_bootargs 'console=tty0 console=ttyMxc0,115200  
root=/dev/mmcblk0p1 rootwait rw'
- SMARC U-Boot> saveenv
- SMARC U-Boot> boot

```
U-Boot > setenv linux_cmd 'setenv bootargs ${linux_bootargs};mmc dev 3;mmc read ${loadaddr} 0x800 0x3000;bootm'
U-Boot > setenv linux_bootargs 'console=tty0 console=ttyMxc0,115200 root=/dev/mmcblk0p1 rootwait rw'
U-Boot > saveenv
```

### 3.8 Display output application of IMX6

This section describes how to setup the display output for LVDS, HDMI, VGA of IMX6 module.

1. You can find the file of resolution setup of LVDS&VGA under the directory “~/core/kernel/drivers/video/mxc”, for LVDS is “ldb.c”, and for VGA is “mxc\_lcdif.c”.

```
leo@ubuntu: ~/imx6_core/core/kernel/drivers/video/mxc
97         int dl;
98         uint32_t ch_mask;
99         uint32_t ch_val;
100     } setting[];
101     struct notifier_block nb;
102 };
103
104 static int g_ldb_mode;
105 static struct i2c_client *ldb_i2c_client[];
106 static u8 g_edid[];
107
108 static struct fb_videomode ldb_modeb[] = {
109     {
110         "LVGA", 60, 800, 480, 14805,
111         40, 40, 10, 3,
112         0, 10,
113         0,
114         FB_VMODE_NONINTERLACED,
115         FB_MODE_IS_DETAILED,
116     },
117     {
118         "WVGA", 60, 1024, 600, 22742,
119         135, 25, 15, 0,
120         0, 10,
121         0,
122         FB_VMODE_NONINTERLACED,
123         FB_MODE_IS_DETAILED,
124     },
125     {
126         "LDB-VGA", 60, 1200, 800, 14805,
127         40, 40,
128         10, 3,
129         0, 10,
130         0,
131         FB_VMODE_NONINTERLACED,
132         FB_MODE_IS_DETAILED,
133     },
134     {
135         "LDB-XGA", 60, 1024, 768, 15385,
136         220, 40,
137         21, 7,
138         0, 10,
139         0,
140         FB_VMODE_NONINTERLACED,
141         FB_MODE_IS_DETAILED,
142     },
143     {
144         "LVGA", 60, 800, 480, 14805,
145         40, 40, 10, 3,
146         0, 10,
147         0,
148         FB_VMODE_NONINTERLACED,
149         FB_MODE_IS_DETAILED,
150     },
151     {
152         "WVGA", 60, 1024, 600, 22742,
153         135, 25, 15, 0,
154         0, 10,
155         0,
156         FB_VMODE_NONINTERLACED,
157         FB_MODE_IS_DETAILED,
158     },
159     {
160         "LDB-VGA", 60, 1200, 800, 14805,
161         40, 40,
162         10, 3,
163         0, 10,
164         0,
165         FB_VMODE_NONINTERLACED,
166         FB_MODE_IS_DETAILED,
167     },
168     {
169         "LDB-XGA", 60, 1024, 768, 15385,
170         220, 40,
171         21, 7,
172         0, 10,
173         0,
174         FB_VMODE_NONINTERLACED,
175         FB_MODE_IS_DETAILED,
176     },
177     {
178         "LVGA", 60, 800, 480, 14805,
179         40, 40, 10, 3,
180         0, 10,
181         0,
182         FB_VMODE_NONINTERLACED,
183         FB_MODE_IS_DETAILED,
184     },
185     {
186         "WVGA", 60, 1024, 600, 22742,
187         135, 25, 15, 0,
188         0, 10,
189         0,
190         FB_VMODE_NONINTERLACED,
191         FB_MODE_IS_DETAILED,
192     },
193     {
194         "LDB-VGA", 60, 1200, 800, 14805,
195         40, 40,
196         10, 3,
197         0, 10,
198         0,
199         FB_VMODE_NONINTERLACED,
200         FB_MODE_IS_DETAILED,
201     },
202     {
203         "LDB-XGA", 60, 1024, 768, 15385,
204         220, 40,
205         21, 7,
206         0, 10,
207         0,
208         FB_VMODE_NONINTERLACED,
209         FB_MODE_IS_DETAILED,
210     },
211     {
212         "LVGA", 60, 800, 480, 14805,
213         40, 40, 10, 3,
214         0, 10,
215         0,
216         FB_VMODE_NONINTERLACED,
217         FB_MODE_IS_DETAILED,
218     },
219     {
220         "WVGA", 60, 1024, 600, 22742,
221         135, 25, 15, 0,
222         0, 10,
223         0,
224         FB_VMODE_NONINTERLACED,
225         FB_MODE_IS_DETAILED,
226     },
227     {
228         "LDB-VGA", 60, 1200, 800, 14805,
229         40, 40,
230         10, 3,
231         0, 10,
232         0,
233         FB_VMODE_NONINTERLACED,
234         FB_MODE_IS_DETAILED,
235     },
236     {
237         "LDB-XGA", 60, 1024, 768, 15385,
238         220, 40,
239         21, 7,
240         0, 10,
241         0,
242         FB_VMODE_NONINTERLACED,
243         FB_MODE_IS_DETAILED,
244     },
245     {
246         "LVGA", 60, 800, 480, 14805,
247         40, 40, 10, 3,
248         0, 10,
249         0,
250         FB_VMODE_NONINTERLACED,
251         FB_MODE_IS_DETAILED,
252     },
253     {
254         "WVGA", 60, 1024, 600, 22742,
255         135, 25, 15, 0,
256         0, 10,
257         0,
258         FB_VMODE_NONINTERLACED,
259         FB_MODE_IS_DETAILED,
260     },
261     {
262         "LDB-VGA", 60, 1200, 800, 14805,
263         40, 40,
264         10, 3,
265         0, 10,
266         0,
267         FB_VMODE_NONINTERLACED,
268         FB_MODE_IS_DETAILED,
269     },
270     {
271         "LDB-XGA", 60, 1024, 768, 15385,
272         220, 40,
273         21, 7,
274         0, 10,
275         0,
276         FB_VMODE_NONINTERLACED,
277         FB_MODE_IS_DETAILED,
278     },
279     {
280         "LVGA", 60, 800, 480, 14805,
281         40, 40, 10, 3,
282         0, 10,
283         0,
284         FB_VMODE_NONINTERLACED,
285         FB_MODE_IS_DETAILED,
286     },
287     {
288         "WVGA", 60, 1024, 600, 22742,
289         135, 25, 15, 0,
290         0, 10,
291         0,
292         FB_VMODE_NONINTERLACED,
293         FB_MODE_IS_DETAILED,
294     },
295     {
296         "LDB-VGA", 60, 1200, 800, 14805,
297         40, 40,
298         10, 3,
299         0, 10,
300         0,
301         FB_VMODE_NONINTERLACED,
302         FB_MODE_IS_DETAILED,
303     },
304     {
305         "LDB-XGA", 60, 1024, 768, 15385,
306         220, 40,
307         21, 7,
308         0, 10,
309         0,
310         FB_VMODE_NONINTERLACED,
311         FB_MODE_IS_DETAILED,
312     },
313     {
314         "LVGA", 60, 800, 480, 14805,
315         40, 40, 10, 3,
316         0, 10,
317         0,
318         FB_VMODE_NONINTERLACED,
319         FB_MODE_IS_DETAILED,
320     },
321     {
322         "WVGA", 60, 1024, 600, 22742,
323         135, 25, 15, 0,
324         0, 10,
325         0,
326         FB_VMODE_NONINTERLACED,
327         FB_MODE_IS_DETAILED,
328     },
329     {
330         "LDB-VGA", 60, 1200, 800, 14805,
331         40, 40,
332         10, 3,
333         0, 10,
334         0,
335         FB_VMODE_NONINTERLACED,
336         FB_MODE_IS_DETAILED,
337     },
338     {
339         "LDB-XGA", 60, 1024, 768, 15385,
340         220, 40,
341         21, 7,
342         0, 10,
343         0,
344         FB_VMODE_NONINTERLACED,
345         FB_MODE_IS_DETAILED,
346     },
347     {
348         "LVGA", 60, 800, 480, 14805,
349         40, 40, 10, 3,
350         0, 10,
351         0,
352         FB_VMODE_NONINTERLACED,
353         FB_MODE_IS_DETAILED,
354     },
355     {
356         "WVGA", 60, 1024, 600, 22742,
357         135, 25, 15, 0,
358         0, 10,
359         0,
360         FB_VMODE_NONINTERLACED,
361         FB_MODE_IS_DETAILED,
362     },
363     {
364         "LDB-VGA", 60, 1200, 800, 14805,
365         40, 40,
366         10, 3,
367         0, 10,
368         0,
369         FB_VMODE_NONINTERLACED,
370         FB_MODE_IS_DETAILED,
371     },
372     {
373         "LDB-XGA", 60, 1024, 768, 15385,
374         220, 40,
375         21, 7,
376         0, 10,
377         0,
378         FB_VMODE_NONINTERLACED,
379         FB_MODE_IS_DETAILED,
380     },
381     {
382         "LVGA", 60, 800, 480, 14805,
383         40, 40, 10, 3,
384         0, 10,
385         0,
386         FB_VMODE_NONINTERLACED,
387         FB_MODE_IS_DETAILED,
388     },
389     {
390         "WVGA", 60, 1024, 600, 22742,
391         135, 25, 15, 0,
392         0, 10,
393         0,
394         FB_VMODE_NONINTERLACED,
395         FB_MODE_IS_DETAILED,
396     },
397     {
398         "LDB-VGA", 60, 1200, 800, 14805,
399         40, 40,
400         10, 3,
401         0, 10,
402         0,
403         FB_VMODE_NONINTERLACED,
404         FB_MODE_IS_DETAILED,
405     },
406     {
407         "LDB-XGA", 60, 1024, 768, 15385,
408         220, 40,
409         21, 7,
410         0, 10,
411         0,
412         FB_VMODE_NONINTERLACED,
413         FB_MODE_IS_DETAILED,
414     },
415     {
416         "LVGA", 60, 800, 480, 14805,
417         40, 40, 10, 3,
418         0, 10,
419         0,
420         FB_VMODE_NONINTERLACED,
421         FB_MODE_IS_DETAILED,
422     },
423     {
424         "WVGA", 60, 1024, 600, 22742,
425         135, 25, 15, 0,
426         0, 10,
427         0,
428         FB_VMODE_NONINTERLACED,
429         FB_MODE_IS_DETAILED,
430     },
431     {
432         "LDB-VGA", 60, 1200, 800, 14805,
433         40, 40,
434         10, 3,
435         0, 10,
436         0,
437         FB_VMODE_NONINTERLACED,
438         FB_MODE_IS_DETAILED,
439     },
440     {
441         "LDB-XGA", 60, 1024, 768, 15385,
442         220, 40,
443         21, 7,
444         0, 10,
445         0,
446         FB_VMODE_NONINTERLACED,
447         FB_MODE_IS_DETAILED,
448     },
449     {
450         "LVGA", 60, 800, 480, 14805,
451         40, 40, 10, 3,
452         0, 10,
453         0,
454         FB_VMODE_NONINTERLACED,
455         FB_MODE_IS_DETAILED,
456     },
457     {
458         "WVGA", 60, 1024, 600, 22742,
459         135, 25, 15, 0,
460         0, 10,
461         0,
462         FB_VMODE_NONINTERLACED,
463         FB_MODE_IS_DETAILED,
464     },
465     {
466         "LDB-VGA", 60, 1200, 800, 14805,
467         40, 40,
468         10, 3,
469         0, 10,
470         0,
471         FB_VMODE_NONINTERLACED,
472         FB_MODE_IS_DETAILED,
473     },
474     {
475         "LDB-XGA", 60, 1024, 768, 15385,
476         220, 40,
477         21, 7,
478         0, 10,
479         0,
480         FB_VMODE_NONINTERLACED,
481         FB_MODE_IS_DETAILED,
482     },
483     {
484         "LVGA", 60, 800, 480, 14805,
485         40, 40, 10, 3,
486         0, 10,
487         0,
488         FB_VMODE_NONINTERLACED,
489         FB_MODE_IS_DETAILED,
490     },
491     {
492         "WVGA", 60, 1024, 600, 22742,
493         135, 25, 15, 0,
494         0, 10,
495         0,
496         FB_VMODE_NONINTERLACED,
497         FB_MODE_IS_DETAILED,
498     },
499     {
500         "LDB-VGA", 60, 1200, 800, 14805,
501         40, 40,
502         10, 3,
503         0, 10,
504         0,
505         FB_VMODE_NONINTERLACED,
506         FB_MODE_IS_DETAILED,
507     },
508     {
509         "LDB-XGA", 60, 1024, 768, 15385,
510         220, 40,
511         21, 7,
512         0, 10,
513         0,
514         FB_VMODE_NONINTERLACED,
515         FB_MODE_IS_DETAILED,
516     },
517     {
518         "LVGA", 60, 800, 480, 14805,
519         40, 40, 10, 3,
520         0, 10,
521         0,
522         FB_VMODE_NONINTERLACED,
523         FB_MODE_IS_DETAILED,
524     },
525     {
526         "WVGA", 60, 1024, 600, 22742,
527         135, 25, 15, 0,
528         0, 10,
529         0,
530         FB_VMODE_NONINTERLACED,
531         FB_MODE_IS_DETAILED,
532     },
533     {
534         "LDB-VGA", 60, 1200, 800, 14805,
535         40, 40,
536         10, 3,
537         0, 10,
538         0,
539         FB_VMODE_NONINTERLACED,
540         FB_MODE_IS_DETAILED,
541     },
542     {
543         "LDB-XGA", 60, 1024, 768, 15385,
544         220, 40,
545         21, 7,
546         0, 10,
547         0,
548         FB_VMODE_NONINTERLACED,
549         FB_MODE_IS_DETAILED,
550     },
551     {
552         "LVGA", 60, 800, 480, 14805,
553         40, 40, 10, 3,
554         0, 10,
555         0,
556         FB_VMODE_NONINTERLACED,
557         FB_MODE_IS_DETAILED,
558     },
559     {
560         "WVGA", 60, 1024, 600, 22742,
561         135, 25, 15, 0,
562         0, 10,
563         0,
564         FB_VMODE_NONINTERLACED,
565         FB_MODE_IS_DETAILED,
566     },
567     {
568         "LDB-VGA", 60, 1200, 800, 14805,
569         40, 40,
570         10, 3,
571         0, 10,
572         0,
573         FB_VMODE_NONINTERLACED,
574         FB_MODE_IS_DETAILED,
575     },
576     {
577         "LDB-XGA", 60, 1024, 768, 15385,
578         220, 40,
579         21, 7,
580         0, 10,
581         0,
582         FB_VMODE_NONINTERLACED,
583         FB_MODE_IS_DETAILED,
584     },
585     {
586         "LVGA", 60, 800, 480, 14805,
587         40, 40, 10, 3,
588         0, 10,
589         0,
590         FB_VMODE_NONINTERLACED,
591         FB_MODE_IS_DETAILED,
592     },
593     {
594         "WVGA", 60, 1024, 600, 22742,
595         135, 25, 15, 0,
596         0, 10,
597         0,
598         FB_VMODE_NONINTERLACED,
599         FB_MODE_IS_DETAILED,
600     },
601     {
602         "LDB-VGA", 60, 1200, 800, 14805,
603         40, 40,
604         10, 3,
605         0, 10,
606         0,
607         FB_VMODE_NONINTERLACED,
608         FB_MODE_IS_DETAILED,
609     },
610     {
611         "LDB-XGA", 60, 1024, 768, 15385,
612         220, 40,
613         21, 7,
614         0, 10,
615         0,
616         FB_VMODE_NONINTERLACED,
617         FB_MODE_IS_DETAILED,
618     },
619     {
620         "LVGA", 60, 800, 480, 14805,
621         40, 40, 10, 3,
622         0, 10,
623         0,
624         FB_VMODE_NONINTERLACED,
625         FB_MODE_IS_DETAILED,
626     },
627     {
628         "WVGA", 60, 1024, 600, 22742,
629         135, 25, 15, 0,
630         0, 10,
631         0,
632         FB_VMODE_NONINTERLACED,
633         FB_MODE_IS_DETAILED,
634     },
635     {
636         "LDB-VGA", 60, 1200, 800, 14805,
637         40, 40,
638         10, 3,
639         0, 10,
640         0,
641         FB_VMODE_NONINTERLACED,
642         FB_MODE_IS_DETAILED,
643     },
644     {
645         "LDB-XGA", 60, 1024, 768, 15385,
646         220, 40,
647         21, 7,
648         0, 10,
649         0,
650         FB_VMODE_NONINTERLACED,
651         FB_MODE_IS_DETAILED,
652     },
653     {
654         "LVGA", 60, 800, 480, 14805,
655         40, 40, 10, 3,
656         0, 10,
657         0,
658         FB_VMODE_NONINTERLACED,
659         FB_MODE_IS_DETAILED,
660     },
661     {
662         "WVGA", 60, 1024, 600, 22742,
663         135, 25, 15, 0,
664         0, 10,
665         0,
666         FB_VMODE_NONINTERLACED,
667         FB_MODE_IS_DETAILED,
668     },
669     {
670         "LDB-VGA", 60, 1200, 800, 14805,
671         40, 40,
672         10, 3,
673         0, 10,
674         0,
675         FB_VMODE_NONINTERLACED,
676         FB_MODE_IS_DETAILED,
677     },
678     {
679         "LDB-XGA", 60, 1024, 768, 15385,
680         220, 40,
681         21, 7,
682         0, 10,
683         0,
684         FB_VMODE_NONINTERLACED,
685         FB_MODE_IS_DETAILED,
686     },
687     {
688         "LVGA", 60, 800, 480, 14805,
689         40, 40, 10, 3,
690         0, 10,
691         0,
692         FB_VMODE_NONINTERLACED,
693         FB_MODE_IS_DETAILED,
694     },
695     {
696         "WVGA", 60, 1024, 600, 22742,
697         135, 25, 15, 0,
698         0, 10,
699         0,
700         FB_VMODE_NONINTERLACED,
701         FB_MODE_IS_DETAILED,
702     },
703     {
704         "LDB-VGA", 60, 1200, 800, 14805,
705         40, 40,
706         10, 3,
707         0, 10,
708         0,
709         FB_VMODE_NONINTERLACED,
710         FB_MODE_IS_DETAILED,
711     },
712     {
713         "LDB-XGA", 60, 1024, 768, 15385,
714         220, 40,
715         21, 7,
716         0, 10,
717         0,
718         FB_VMODE_NONINTERLACED,
719         FB_MODE_IS_DETAILED,
720     },
721     {
722         "LVGA", 60, 800, 480, 14805,
723         40, 40, 10, 3,
724         0, 10,
725         0,
726         FB_VMODE_NONINTERLACED,
727         FB_MODE_IS_DETAILED,
728     },
729     {
730         "WVGA", 60, 1024, 600, 22742,
731         135, 25, 15, 0,
732         0, 10,
733         0,
734         FB_VMODE_NONINTERLACED,
735         FB_MODE_IS_DETAILED,
736     },
737     {
738         "LDB-VGA", 60, 1200, 800, 14805,
739         40, 40,
740         10, 3,
741         0, 10,
742         0,
743         FB_VMODE_NONINTERLACED,
744         FB_MODE_IS_DETAILED,
745     },
746     {
747         "LDB-XGA", 60, 1024, 768, 15385,
748         220, 40,
749         21, 7,
750         0, 10,
751         0,
752         FB_VMODE_NONINTERLACED,
753         FB_MODE_IS_DETAILED,
754     },
755     {
756         "LVGA", 60, 800, 480, 14805,
757         40, 40, 10, 3,
758         0, 10,
759         0,
760         FB_VMODE_NONINTERLACED,
761         FB_MODE_IS_DETAILED,
762     },
763     {
764         "WVGA", 60, 1024, 600, 22742,
765         135, 25, 15, 0,
766         0, 10,
767         0,
768         FB_VMODE_NONINTERLACED,
769         FB_MODE_IS_DETAILED,
770     },
771     {
772         "LDB-VGA", 60, 1200, 800, 14805,
773         40, 40,
774         10, 3,
775         0, 10,
776         0,
777         FB_VMODE_NONINTERLACED,
778         FB_MODE_IS_DETAILED,
779     },
780     {
781         "LDB-XGA", 60, 1024, 768, 15385,
782         220, 40,
783         21, 7,
784         0, 10,
785         0,
786         FB_VMODE_NONINTERLACED,
787         FB_MODE_IS_DETAILED,
788     },
789     {
790         "LVGA", 60, 800, 480, 14805,
791         40, 40, 10, 3,
792         0, 10,
793         0,
794         FB_VMODE_NONINTERLACED,
795         FB_MODE_IS_DETAILED,
796     },
797     {
798         "WVGA", 60, 1024, 600, 22742,
799         135, 25, 15, 0,
800         0, 10,
801         0,
802         FB_VMODE_NONINTERLACED,
803         FB_MODE_IS_DETAILED,
804     },
805     {
806         "LDB-VGA", 60, 1200, 800, 14805,
807         40, 40,
808         10, 3,
809         0, 10,
810         0,
811         FB_VMODE_NONINTERLACED,
812         FB_MODE_IS_DETAILED,
813     },
814     {
815         "LDB-XGA", 60, 1024, 768, 15385,
816         220, 40,
817         21, 7,
818         0, 10,
819         0,
820         FB_VMODE_NONINTERLACED,
821         FB_MODE_IS_DETAILED,
822     },
823     {
824         "LVGA", 60, 800, 480, 14805,
825         40, 40, 10, 3,
826         0, 10,
827         0,
828         FB_VMODE_NONINTERLACED,
829         FB_MODE_IS_DETAILED,
830     },
831     {
832         "WVGA", 60, 1024, 600, 22742,
833         135, 25, 15, 0,
834         0, 10,
835         0,
836         FB_VMODE_NONINTERLACED,
837         FB_MODE_IS_DETAILED,
838     },
839     {
840         "LDB-VGA", 60, 1200, 800, 14805,
841         40, 40,
842         10, 3,
843         0, 10,
844         0,
845         FB_VMODE_NONINTERLACED,
846         FB_MODE_IS_DETAILED,
847     },
848     {
849         "LDB-XGA", 60, 1024, 768, 15385,
850         220, 40,
851         21, 7,
852         0, 10,
853         0,
854         FB_VMODE_NONINTERLACED,
855         FB_MODE_IS_DETAILED,
856     },
857     {
858         "LVGA", 60, 800, 480, 14805,
859         40, 40, 10, 3,
860         0, 10,
861         0,
862         FB_VMODE_NONINTERLACED,
863         FB_MODE_IS_DETAILED,
864     },
865     {
866         "WVGA", 60, 1024, 600, 22742,
867         135, 25, 15, 0,
868         0, 10,
869         0,
870         FB_VMODE_NONINTERLACED,
871         FB_MODE_IS_DETAILED,
872     },
873     {
874         "LDB-VGA", 60, 1200, 800, 14805,
875         40, 40,
876         10, 3,
877         0, 10,
878         0,
879         FB_VMODE_NONINTERLACED,
880         FB_MODE_IS_DETAILED,
881     },
882     {
883         "LDB-XGA", 60, 1024, 768, 15385,
884         220, 40,
885         21, 7,
886         0, 10,
887         0,
888         FB_VMODE_NONINTERLACED,
889         FB_MODE_IS_DETAILED,
890     },
891     {
892         "LVGA", 60, 800, 480, 14805,
893         40, 40, 10, 3,
894         0, 10,
895         0,
896         FB_VMODE_NONINTERLACED,
897         FB_MODE_IS_DETAILED,
898     },
899     {
900         "WVGA", 60, 1024, 600, 22742,
901         135, 25, 15, 0,
902         0, 10,
903         0,
904         FB_VMODE_NONINTERLACED,
905         FB_MODE_IS_DETAILED,
906     },
907     {
908         "LDB-VGA", 60, 1200, 800, 14805,
909         40, 40,
910         10, 3,
911         0, 10,
912         0,
913         FB_VMODE_NONINTERLACED,
914         FB_MODE_IS_DETAILED,
915     },
916     {
917         "LDB-XGA", 60, 1024, 768, 15385,
918         220, 40,
919         21, 7,
920         0, 10,
921         0,
922         FB_VMODE_NONINTERLACED,
923         FB_MODE_IS_DETAILED,
924     },
925     {
926         "LVGA", 60, 800, 480, 14805,
927         40, 40, 10, 3,
928         0, 10,
929         0,
930         FB_VMODE_NONINTERLACED,
931         FB_MODE_IS_DETAILED,
932     },
933     {
934         "WVGA", 60, 1024, 600, 22742,
935         135, 25, 15, 0,
936         0, 10,
937         0,
938         FB_VMODE_NONINTERLACED,
939         FB_MODE_IS_DETAILED,
940     },
941     {
942         "LDB-VGA", 60, 1200, 800, 14805,
943         40, 40,
944         10, 3,
945         0, 10,
946         0,
947         FB_VMODE_NONINTERLACED,
948         FB_MODE_IS_DETAILED,
949     },
950     {
951         "LDB-XGA", 60, 1024, 768, 15385,
952         220, 40,
953         21, 7,
954         0, 10,
955         0,
956         FB_VMODE_NONINTERLACED,
957         FB_MODE_IS_DETAILED,
958     },
959     {
960         "LVGA", 60, 800, 480, 14805,
961         40, 40, 10, 3,
962         0, 10,
963         0,
964         FB_VMODE_NONINTERLACED,
965         FB_MODE_IS_DETAILED,
966     },
967     {
968         "WVGA", 60, 1024, 600, 22742,
969         135, 25, 15, 0,
970         0, 10,
971         0,
972         FB_VMODE_NONINTERLACED,
973         FB_MODE_IS_DETAILED,
974     },
975     {
976         "LDB-VGA", 60, 1200, 800, 14805,
977         40, 40,
978         10, 3,
979         0, 10,
980         0,
981         FB_VMODE_NONINTERLACED,
982         FB_MODE_IS_DETAILED,
983     },
984     {
985         "LDB-XGA", 60, 1024, 768, 15385,
986         220, 40,
987         21, 7,
988         0, 10,
989         0,
990         FB_VMODE_NONINTERLACED,
991         FB_MODE_IS_DETAILED,
992     },
993     {
994         "LVGA", 60, 800, 480, 14805,
995         40, 40, 10, 3,
996         0, 10,
997         0,
998         FB_VMODE_NONINTERLACED,
999         FB_MODE_IS_DETAILED,
1000    },
1001    {
1002        "WVGA", 60, 1024, 600, 22742,
1003        135, 25, 15, 0,
1004        0, 10,
1005        0,
1006        FB_VMODE_NONINTERLACED,
1007        FB_MODE_IS_DETAILED
```

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3. Finally, you should fill the parameter for booting on the file "mx6\_smarc.h" under the directory "~/core/u-boot/include/configs/".

Please add "video=mxcfb0:dev=display name" on the column 132

"rootwait rw \0" to enable display output function when booting.

```
103
104 #define CONFIG_BOOTDELAY 3
105
106 #define CONFIG_PRIME "FEC0"
107
108 #define CONFIG_LOADADDR 0x1000000 /* loadaddr env var */
109 #define CONFIG_RD_LOADADDR (0x1000000)
110
111 #define CONFIG_EXTRA_ENV_SETTINGS
112     "netdev=eth0"
113     "ethpr=fe0"
114     "ethaddr=98:9f:98:ea:d3"
115     "fec_addr=98:9f:98:ea:d3"
116     "uboot=boot.bin"
117     "kernel=Image"
118     "nfsroot=/opt/ldk/arm"
119     "network=dhcp"
120     "bootargs_base=system bootargs console=ttyMxc0,115200"
121     "bootargs_nfs=system bootargs ${bootargs} root=/dev/nfs "
122     "ipdhcp nfsroot=${serverIp}:${nfsroot},v3,scp"
123     "bootcmd_network bootargs_base bootargs_nfs"
124     "ifipboot ${loadaddr} ${kernel}; boot"
125     "bootargs_mmc=system bootargs ${bootargs} ${network} "
126     "root=/dev/mmcblk0p1 rootwait"
127     "bootcmd_mmc=run bootargs_base bootargs_mmc; "
128     "mmc dev 1;"
129     "mmc read ${loadaddr} 0x00 0x3000; boot"
130     "linux_bootargs=console=ttye console=ttyMxc0,115200 "
131     "root=/dev/mmcblk0p1"
132     "rootwait rw video=mxcfb0:dev=LCD video=mxcfb0:dev=LD \0"
133     "linux_bootcmd=run bootargs_base linux_bootargs; "
134     "mmc dev 1;"
135     "mmc read ${loadaddr} 0x00 0x3000;"
136     "boot"
137     "bootcmd=run linux_cmd"
138
139
140 #define CONFIG_ARP_TIMEOUT 200UL
141 #define CONFIG_MX6_SMARC "SMA-IMX6_A0_0423"
142
143 /*
144  * Miscellaneous configurable options
145  */
146 #define CONFIG_SYS_LONGHELP /* undef to save memory */
147 #define CONFIG_AUTO_COMPLETE
148 #define CONFIG_SYS_CBSIZE 1024 /* Console I/O Buffer Size */
```

4. Please refer ch1.3 to re-build the u-boot & Kernel binary file for booting.

```
leo@ubuntu:~$ cd
leo@ubuntu:~$ cd imx6_core/core/
leo@ubuntu:~/imx6_core/core$ make rev-sa01 -j8
rm -f u-boot-solo.bin u-boot-quad.bin
rm -f uImage
make ARCH=arm CROSS_COMPILE=/home/leo/imx6_core/core/arm-eabi-4.6/bin/arm-eabi-
-C u-boot/ distclean
make ARCH=arm CROSS_COMPILE=/home/leo/imx6_core/core/arm-eabi-4.6/bin/arm-eabi-
-C kernel/ imx6_rev_sa01_defconfig
make[1]: Entering directory '/home/leo/imx6_core/core/u-boot'
make[1]: Entering directory '/home/leo/imx6_core/core/kernel'
make[1]: Leaving directory '/home/leo/imx6_core/core/u-boot'
make ARCH=arm CROSS_COMPILE=/home/leo/imx6_core/core/arm-eabi-4.6/bin/arm-eabi- -C u-boot/ mx6q_rev_sa01_config
make[1]: Entering directory '/home/leo/imx6_core/core/u-boot'
Configuring for mx6q_rev_sa01 board...
make[1]: Leaving directory '/home/leo/imx6_core/core/u-boot'
make ARCH=arm CROSS_COMPILE=/home/leo/imx6_core/core/arm-eabi-4.6/bin/arm-eabi- -C u-boot/
make[1]: Entering directory '/home/leo/imx6_core/core/u-boot'
Generating include/autoconf.mk
Generating include/autoconf.mk.dep
make[1]: Leaving directory '/home/leo/imx6_core/core/u-boot'
make[1]: Entering directory '/home/leo/imx6_core/core/u-boot'
fatal: No annotated tags can describe '9d88f9a3acacfea29f1171d4005758b0abc35fc'.
However, there were unannotated tags: try --tags.
#
# configuration written to .config
#
make[1]: Leaving directory '/home/leo/imx6_core/core/kernel'
make ARCH=arm CROSS_COMPILE=/home/leo/imx6_core/core/arm-eabi-4.6/bin/arm-eabi- -C kernel/ uImage
make[1]: Entering directory '/home/leo/imx6_core/core/kernel'
scripts/kconfig/conf --silentoldconfig Kconfig
make[1]: Leaving directory '/home/leo/imx6_core/core/kernel'
make[1]: Entering directory '/home/leo/imx6_core/core/kernel'
CHK include/linux/version.h
CHK include/generated/utsrelease.h
make[2]: 'include/generated/mach-types.h' is up to date.
```

**Note:** If you need to use double display output in Ubuntu, you should setup the "rev\_sa01.c" file first then add the content "video=mxcfb0:dev=first display name

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video=mxcfb1:dev=second display neme" to mx6\_smarc.h, but for this application, you also need to write a program for controlling the second diplay first or the second display will not enable after you follow up all the setting above.

### 3.9 Download Android Source Code for building image file

Please make a folder for storing the source code first then typing the command below to get started for the source code download.

```
$ sudo apt-get install git
```

```
$ git clone quest@202.55.227.57:freescala/imx6/Android.git -b 4.4.2-SMARC _
```

About password, please check with Avalue Sales or PM to get it.

### 3.10 Set up for building Android image file

We support to compile u-boot & Kernel on Ubuntu 12.04 (64bit version), other version of Ubuntu is not currently supported and may have built issues.

Install host packages needed by building code. This document assumes you are using Ubuntu. Not a requirement, but the packages may be named differently and the method of installing them may be different.

- 1) Please follow up the commands below to install "Oracle JDK6.0" first for building up Android image file.

```
$ sudo apt-get install python-software-properties
```

```
$ sudo add-apt-repository ppa:webupd8team/java
```

```
$ sudo apt-get update
```

```
$ sudo apt-get install oracle-java6-installer
```

- 2) Please follow up the commands below to install the necessary package for build image file.

```
$ sudo apt-get install git-core gnupg flex bison gperf build-essential \  
zip curl libc6-dev libncurses5-dev x11proto-core-dev \  
libx11-dev:i386 libreadline6-dev:i386 \  
libgl1-mesa-dev g++-multilib mingw32 openjdk-6-jdk tofrodos \  
python-markdown libxml2-utils xsltproc zlib1g-dev:i386 \  
ia32-libs u-boot-tools minicom lib32ncurses5-dev \  

```



### 3.11 Building up Android image file

You can follow up the steps below to compile Android image file after download the source code.

1. Please move to the folder "Android" then start to compile image file.

```
leo@ubuntu:~/imx6_Android$ ls
Android
leo@ubuntu:~/imx6_Android$ cd Android/
leo@ubuntu:~/imx6_Android/Android$
```

2. Type the command to compile image file.

```
$ ./run.sh -j16
```

(-j **number** means multi jobs for more efficient building, you can add it according to your CPU performance of PC, e.g. mine is "-j16" as below ).

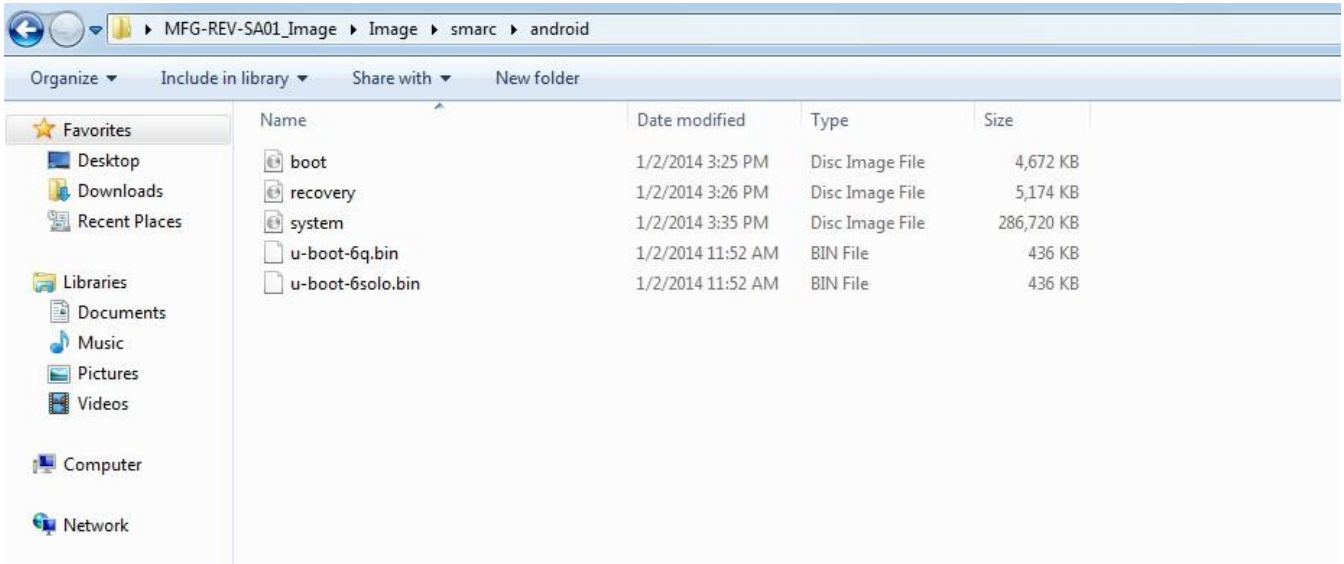
```
~/imx6_Android/Android$ ./run.sh -j16
```

3. You can find the finished image file(**u-boot-6q.bin**, **u-boot-6solo.bin**, **system.img**, **recover.img**, **boot.img**) as below after compiling on the directory **~/Android/out/target/product/smarc**.

```
leo@ubuntu:~/imx6_Android/Android/out/target/product/smarc$ ls -al
total 314160
drwxrwxr-x  9 leo leo      4096 Jan  2 23:44 .
drwxrwxr-x  3 leo leo      4096 Jan  2 22:09 ..
-rw-rw-r--  1 leo leo        12 Jan  2 22:47 android-info.txt
-rw-r--r--  1 leo leo    4784128 Jan  2 23:34 boot.img
-rw-rw-r--  1 leo leo     29030 Jan  2 22:45 clean_steps.mk
drwxrwxr-x  4 leo leo      4096 Jan  2 23:36 data
-rw-rw-r--  1 leo leo     53886 Jan  2 23:44 installed-files.txt
-rwxr-xr-x  1 leo leo    4593124 Jan  2 22:52 kernel
drwxrwxr-x 14 leo leo      4096 Jan  2 23:44 obj
-rw-rw-r--  1 leo leo       373 Jan  2 22:45 previous_build_config.mk
-rw-rw-r--  1 leo leo    186407 Jan  2 23:34 ramdisk.img
-rw-rw-r--  1 leo leo    701522 Jan  2 23:34 ramdisk-recovery.img
drwxrwxr-x  3 leo leo      4096 Jan  2 23:34 recovery
-rw-r--r--  1 leo leo    5298176 Jan  2 23:34 recovery.img
drwxrwxr-x  8 leo leo      4096 Jan  2 23:33 root
drwxrwxr-x  5 leo leo      4096 Jan  2 23:33 symbols
drwxrwxr-x 12 leo leo      4096 Jan  2 23:33 system
-rw-r--r--  1 leo leo  293601280 Jan  2 23:44 system.img
drwxrwxr-x  3 leo leo      4096 Jan  2 23:19 test
-rwxr-xr-x  1 leo leo    445804 Jan  2 22:47 u-boot-6q.bin
-rwxr-xr-x  1 leo leo    445556 Jan  2 22:46 u-boot-6solo.bin
-rwxr-xr-x  1 leo leo    445804 Jan  2 22:47 u-boot.bin
-rwxr-xr-x  1 leo leo    4593188 Jan  2 22:52 uImage
-rw-r--r--  1 leo leo  134217728 Jan  2 23:37 userdata.img
```

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PS: If you would like to use **Mfgtool** for flashing image file, you must put all the files **u-boot-6q.bin**, **u-boot-6solo.bin**, **system.img**, **recover.img**, **boot.img** under “~\Image\smarc\android” for right detected path.



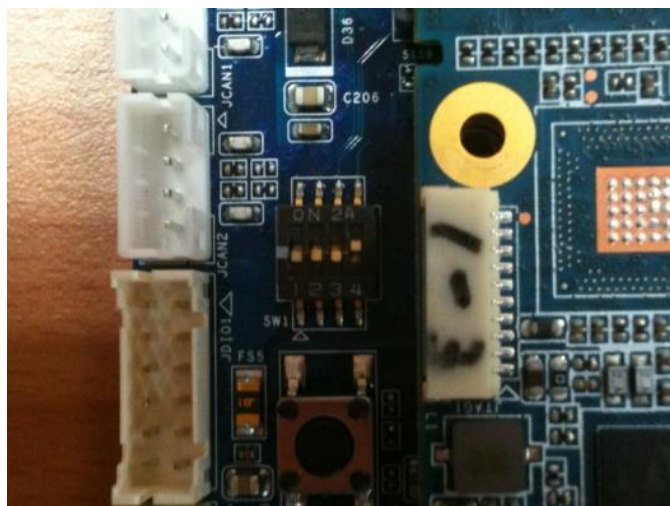


### 3.12 Use MfgTool to flash Android into onboard eMMC

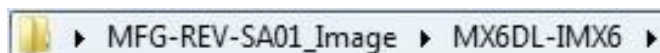
Manufacturing tool, a successor of ATK, provides a series of new features to power your mass production work. The features like windows style GUI, multiple devices support, explicit status monitoring, versatile functionalities and highly flexible architecture make it a best choice to meet your critical timing, cost and customization requirements.

For using Mfgtool to flash image file into onboard eMMC, please follow up the steps below

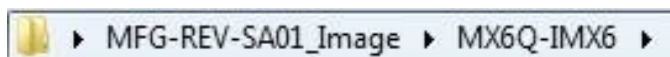
- 1) Please turn on the **Pin4** of the DIP switch as below into burning mode of Mfgtool.



- 2) Power on the mainboard then plug the cable from OTG socket to PC.
- 3) Select the right folder by MCU name, if the MCU of module board is “**i.MX6 Solo**”, please click the folder “~\ **MX6DL-IMX6**” to flash image file, e.g. mine is D:\ MFG-REV-SA01\_Image\**MX6DL-IMX6**”



On the other hand, if the MCU of module board is “**i.MX6 Quad core**”, please click the folder “~\ **MX6Q-IMX6**” to flash image file, e.g. mine is D:\ MFG-REV-SA01\_Image\**MX6Q-IMX6**”

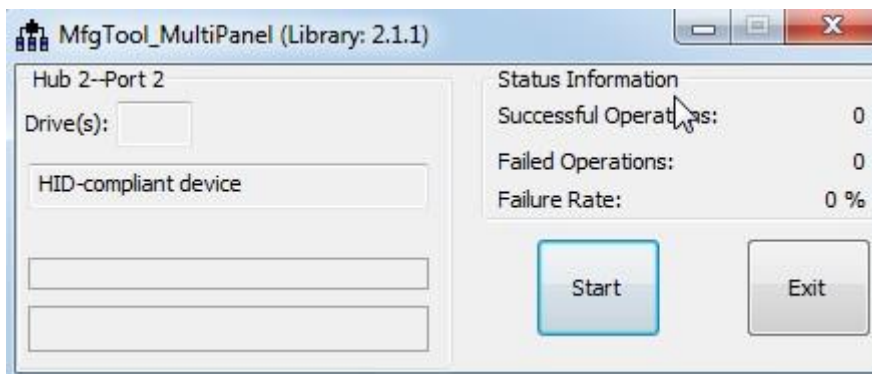


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4) Click “MfgTool2.exe” to flash image file into smarc module.

Name	Date modified	Type	Size
Document	1/7/2014 11:27 AM	File folder	
Profiles	1/7/2014 11:27 AM	File folder	
Utils	1/7/2014 11:27 AM	File folder	
cfg	9/18/2013 3:54 PM	Configuration sett...	1 KB
i.MX 6 DQ Profiles Included readme	1/17/2013 2:42 AM	Text Document	2 KB
InternalParam	1/6/2014 4:52 PM	Configuration sett...	1 KB
MfgTool	1/6/2014 4:53 PM	Text Document	2 KB
MfgTool2 release notes	11/22/2012 6:27 AM	Text Document	3 KB
MfgTool2 user guide	11/22/2012 6:27 AM	Text Document	4 KB
MfgTool2	12/18/2012 8:39 PM	Application	1,661 KB
MfgToolLib.dll	12/18/2012 8:39 PM	Application extens...	600 KB
UICfg	12/18/2012 8:39 PM	Configuration sett...	1 KB

5) Click “**Start**” to flash image file.



6) It will show “Done” after flashing is finish, then click “Stop” and “Exit” to close the screen.

