

# REV-SA01

SMARC Evaluation Carrier Board

## User's Manual

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2<sup>nd</sup> Ed – 16 October 2014

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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
- 1 x Quick Installation Guide for REV-SA01



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

### 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

### 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).

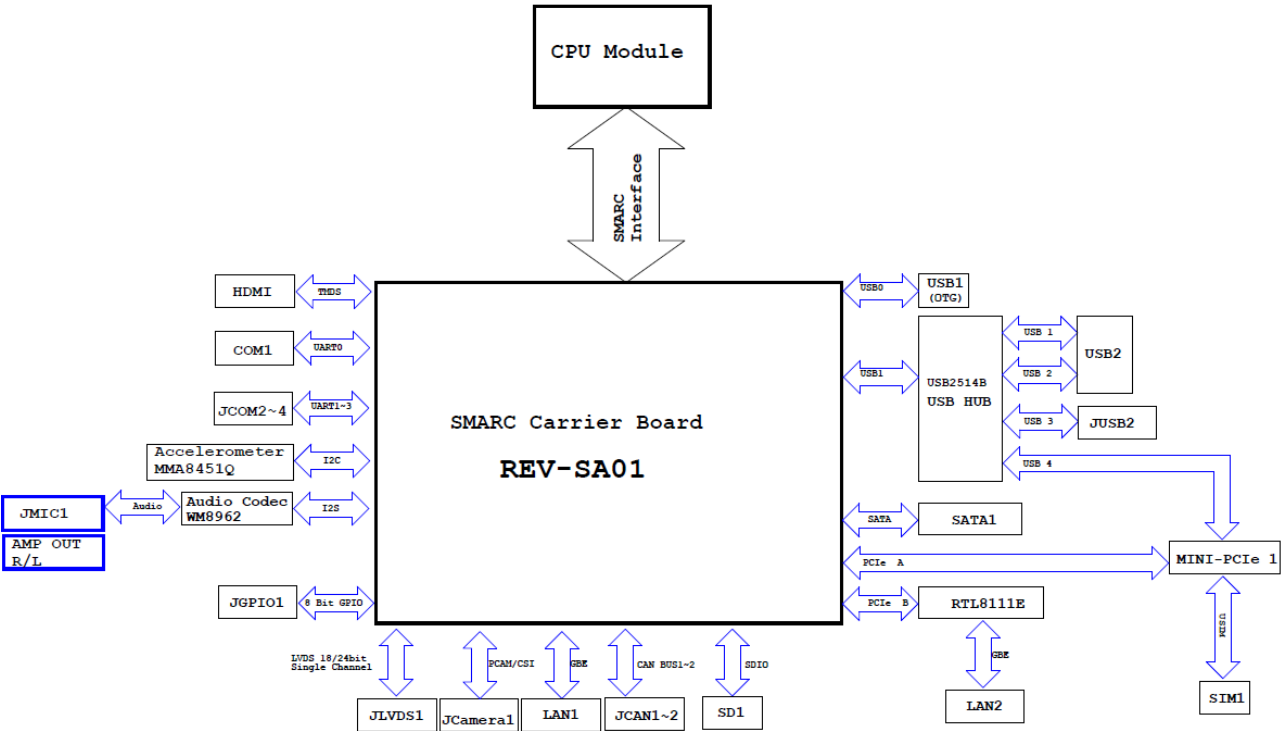
If you have any suggestions or find any errors regarding this manual and want to inform us of these, please contact our Customer Service department with the relevant details.

## 1.5 System Specifications

System	SMARC CPU Module socket: Accepts 82mm x 50mm SMARC Modules
Edge conn	DB9 x 1 DB15 x 1 HDMI x 1 Mini-USB x 1 USB Type A x 2 RJ45 x 2 SD Socket x 1
Backlight conn	5V, GND, ENBKL, VR, PWM
LVDS connector	Hirose DF13-40DS-1.25, support 1 x 18/24bit LVDS
HDMI	HDMI connector
VGA	By Chrontel CH7055 (convert 24bit TTL signal to VGA)
CAN BUS	CAN BUS connector x 2 (JST PHR-4) (CAN PHY TJA1041)
GPIO	10bit GPIO(pin header)
Audio connector	Speaker out (L & R)
USB	USB Type A double deck x 1 USB signal for mPCIe (x1) USB 2.0 pin header (x1) Mini USB connector for USB OTG
SATA	SATA connector x 1, 2pin wafer with 5V, 1A for SATA power
CAN Bus	CAN bus pin header x 2
PCIe	mPCIe socket x 1 (with PCIe x 1 & USB2.0 & USIM signal)
Ethernet	RJ45 connector for GBE (with LED)
2 <sup>nd</sup> Ethernet	From RTL8111E
Camera Connector	Camera connector with CSI-2 signals + I2C + GPIOx2 + 3.3V or 5V
Audio Codec	WM8962, Line out, MIC in, Speaker out
RTC battery	CR2032, RTC chip is ISL1208
Boot select	8 pin 2.0mm jumper
SD Socket	SD Socket, support SDHC
G-Sensor	MMA8451Q
LED	Power on LED

1.6 Architecture Overview—Block Diagram

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

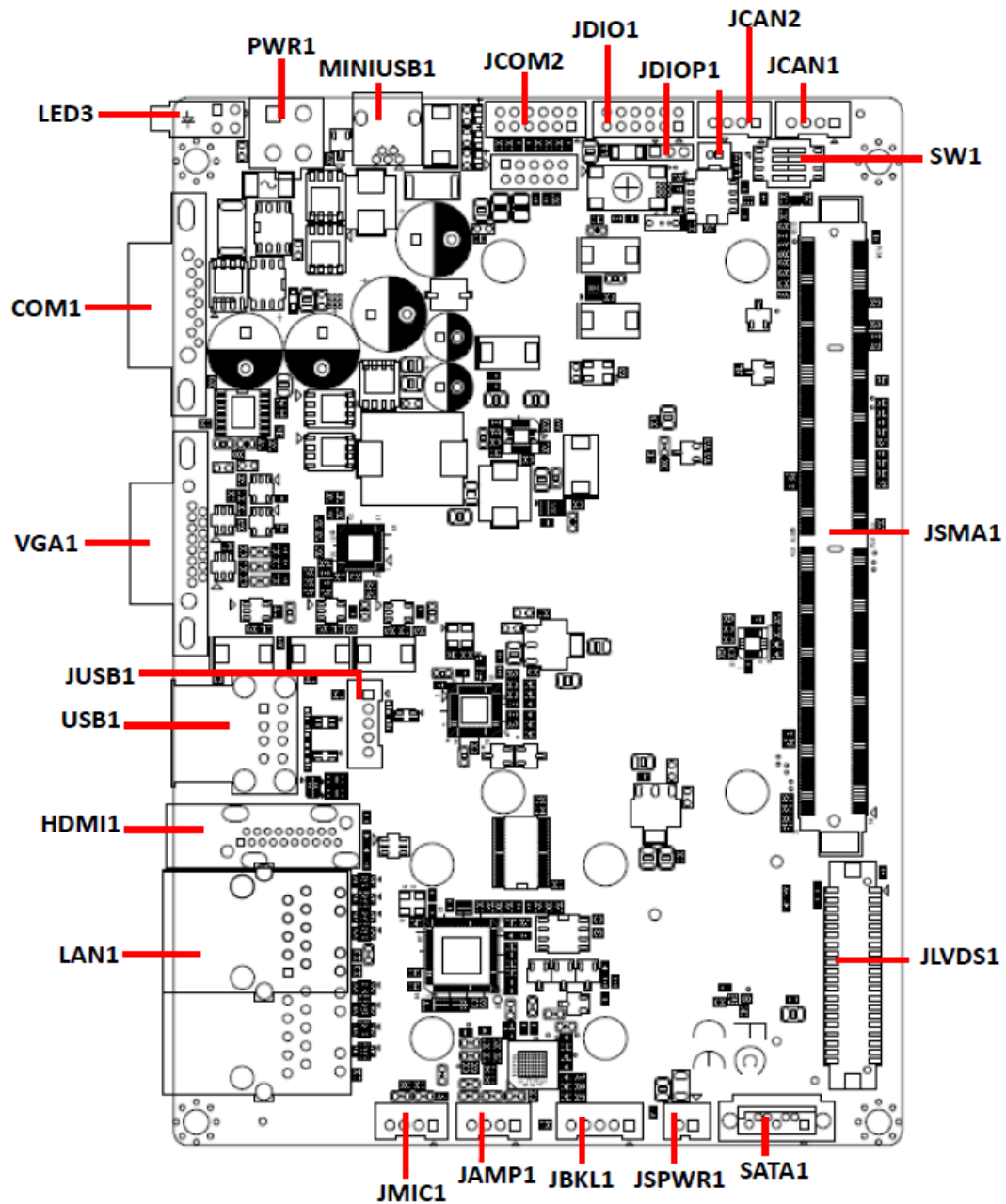


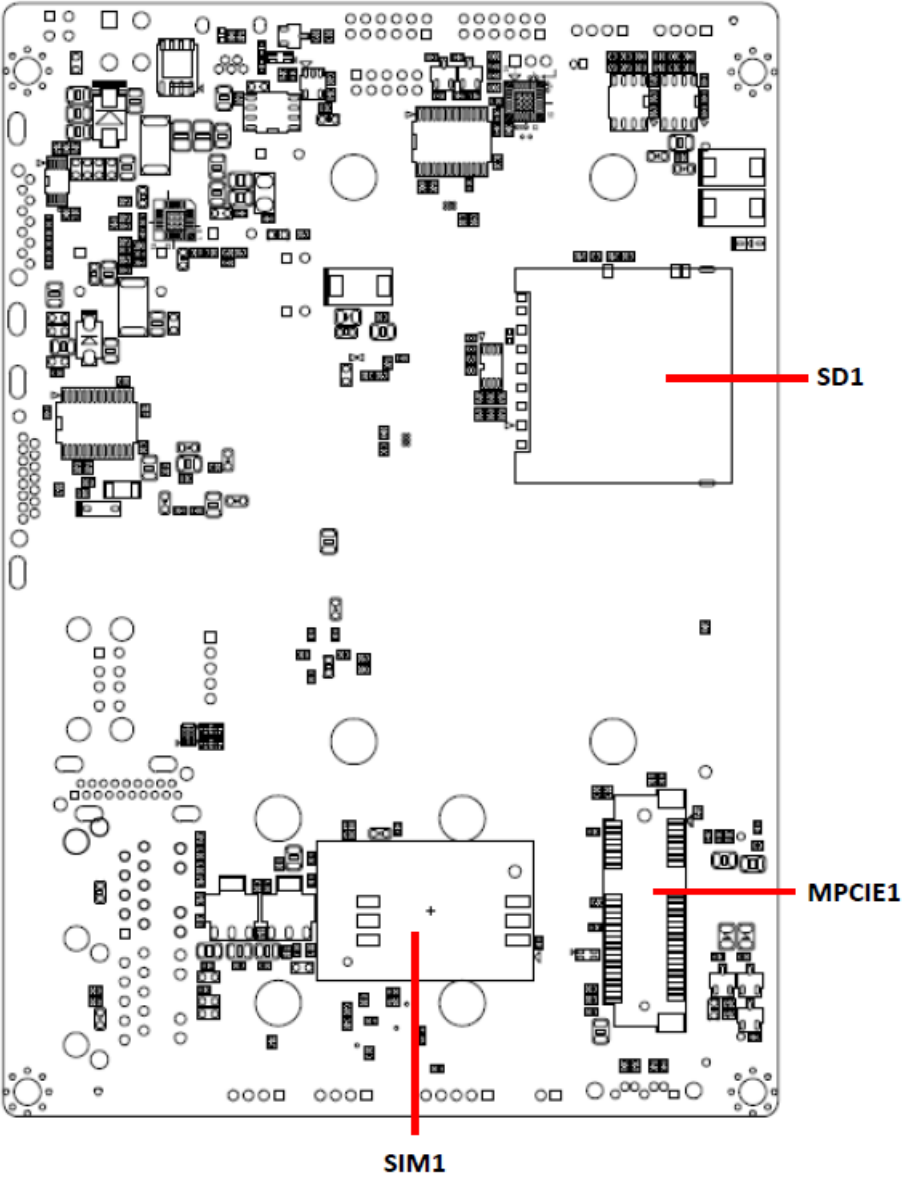


## 2. Hardware Configuration

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## 2.1 Product Overview

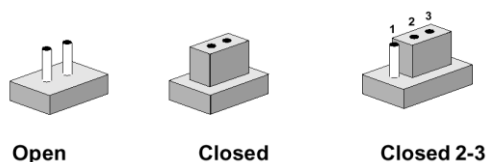




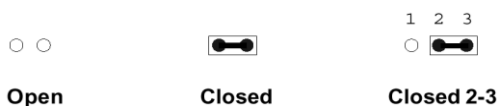
## 2.2 Jumper and Connector List

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
<b>SW1</b>	Boot Mode selector	DIP Switch 4P
<b>JDIOP1</b>	General purpose I/O Power selector	3 x 1 header, pitch 2.00mm

### Connectors

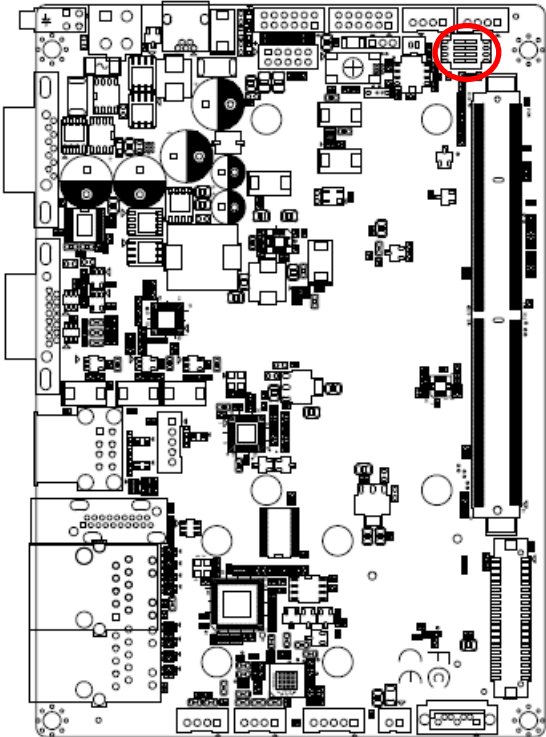
Label	Function	Note
<b>JBAT1</b>	Battery connector	2 x 1 wafer, pitch 1.25mm
<b>JDIO1</b>	General purpose I/O connector	2 x 6 wafer, pitch 2.00mm
<b>JCAN1/2</b>	Can Bus connector 1/2	4 x 1 wafer, pitch 2.00mm
<b>JSMA1</b>	Smart Mobility ARChitecture slot	
<b>SATA1</b>	Serial ATA connector 1	
<b>JBKL1</b>	LCD inverter connector	5 x 1 wafer, pitch 2.00mm
<b>JAMP1</b>	AMPLIFIER connector	4 x 1 wafer, pitch 2.00mm

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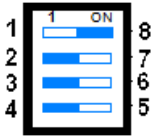
<b>JMIC1</b>	Line In, MIC connector	4 x 1 wafer, pitch 2.00mm
<b>LAN1</b>	RJ-45 Ethernet connector	
<b>VGA1</b>	VGA connector	
<b>LED3</b>	LED connector	
<b>MINIUSB1</b>	Mini USB connector for Boot/Debug	MINI USB-MAB_5P
<b>COM1</b>	Serial Port 1 connector	
<b>JCOM2</b>	Serial Port 2 connector	2 x 6 wafer, 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

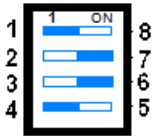
2.3.1 Boot Mode selector (SW1)



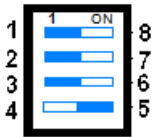
Booting from onboard eMMC



Boot from SD card

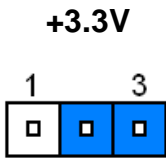
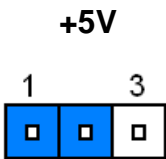
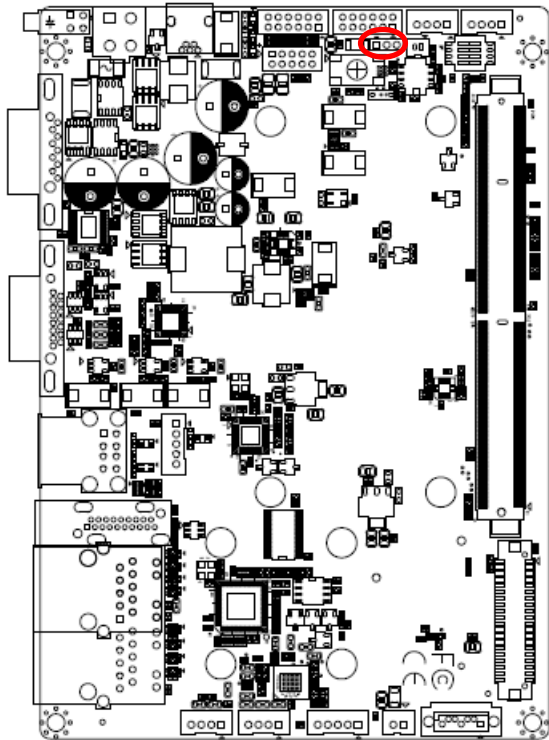


MFG tool mode mode(burning image file to onboard eMMC)

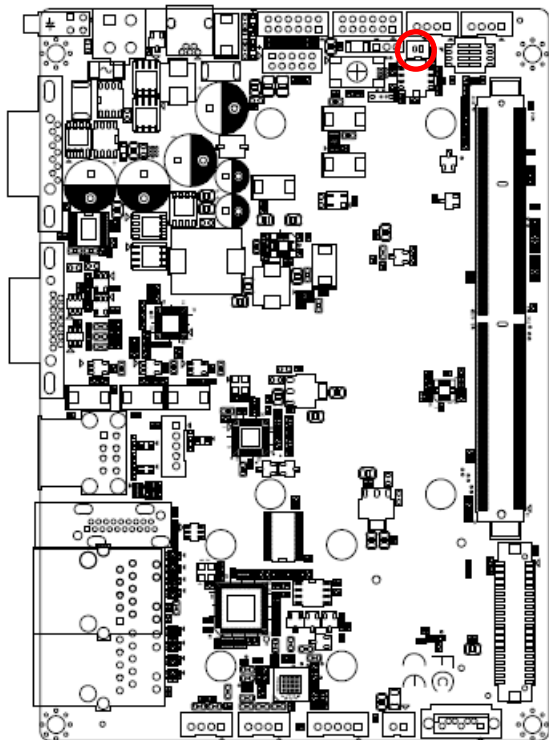


Signal	PIN	PIN	Signal
GND	1	8	BOOT_SEL0#
GND	2	7	BOOT_SEL1#
GND	3	6	BOOT_SEL2#
GND	4	5	FORCE_RECOV#

2.3.2 General purpose I/O Power selector (JDIOP1)

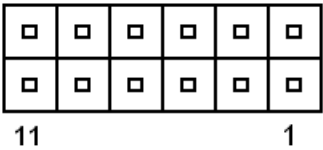
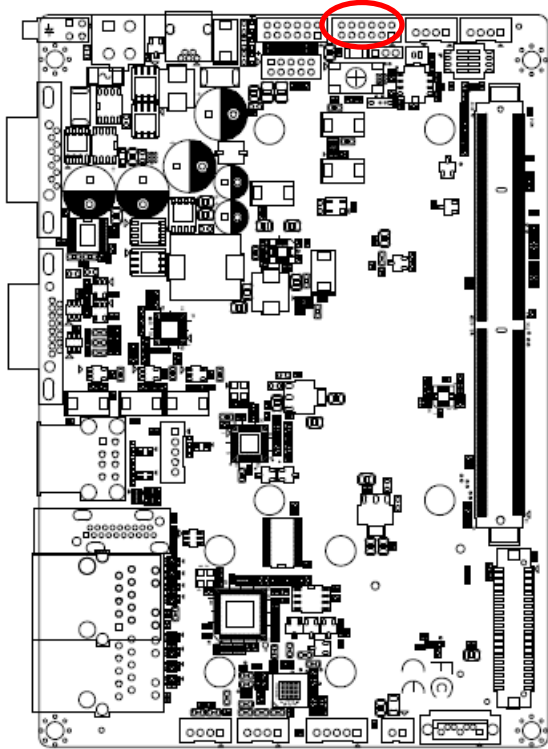


2.3.3 Battery connector (JBAT1)



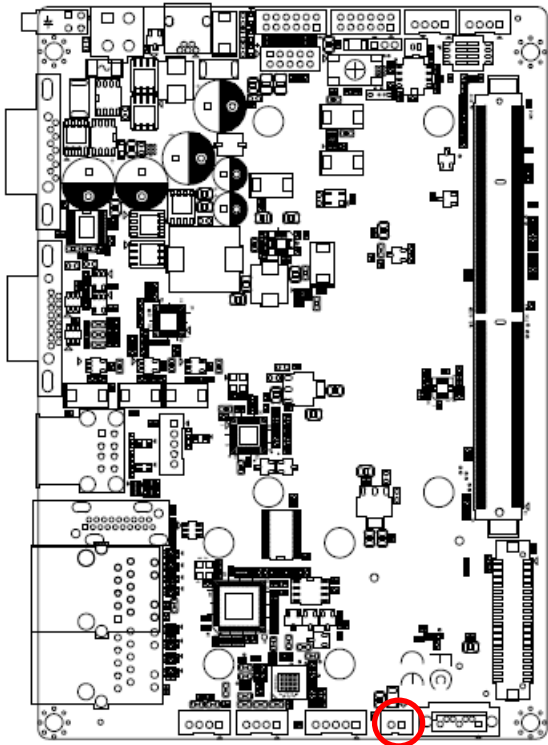
Signal	PIN
+V_BAT	1
GND	2

2.3.4 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

2.3.5 SATA Power connector (JSPWR1)

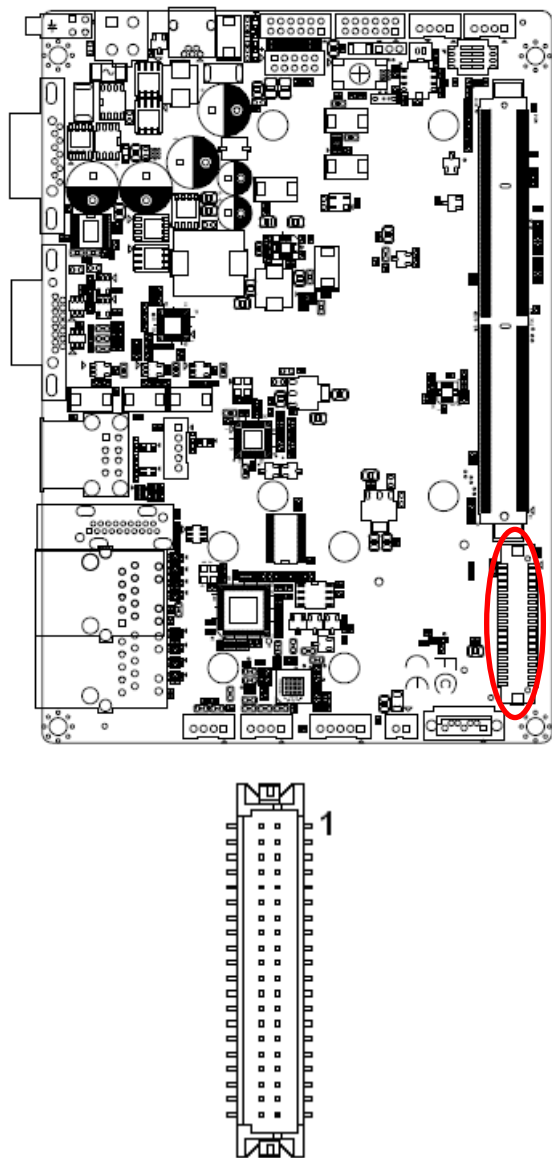


Signal	PIN
GND	1
+5V	2



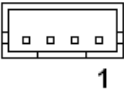
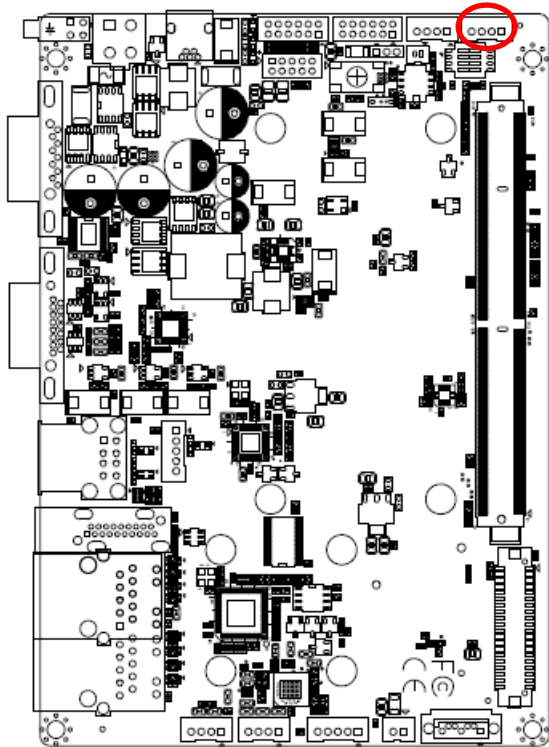
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2.3.6 LVDS Interface connector (JLVDS1)



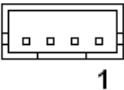
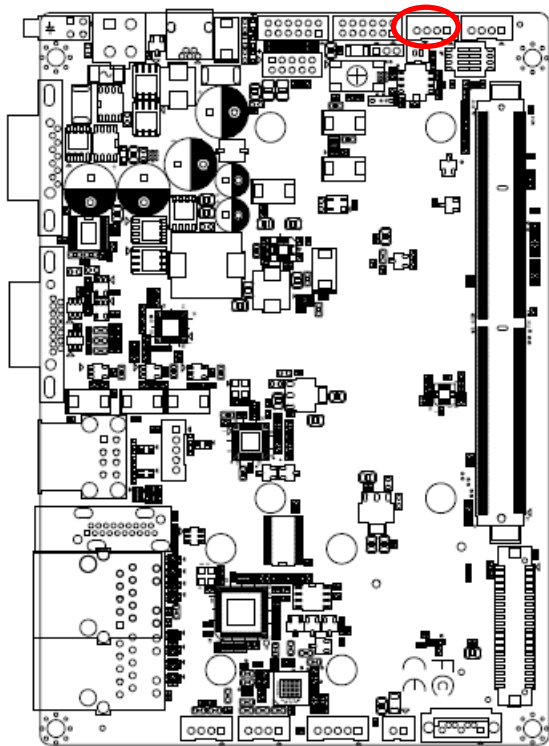
Signal	PIN	PIN	Signal
+5V	2	1	+3.3V
+5V	4	3	+3.3V
I2C_LCD_DAT	6	5	I2C_LCD_CK
GND	8	7	GND
LVDS0+	10	9	LVDS1+
LVDS0-	12	11	LVDS1-
GND	14	13	GND
LVDS2+	16	15	LVDS3+
LVDS2-	18	17	LVDS3-
GND	20	19	GND
NC	22	21	NC
NC	24	23	NC
GND	26	25	GND
NC	28	27	NC
NC	30	29	NC
GND	32	31	GND
LVDS_CK+	34	33	NC
LVDS_CK-	36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

2.3.7 Can Bus connector 1 (JCAN1)



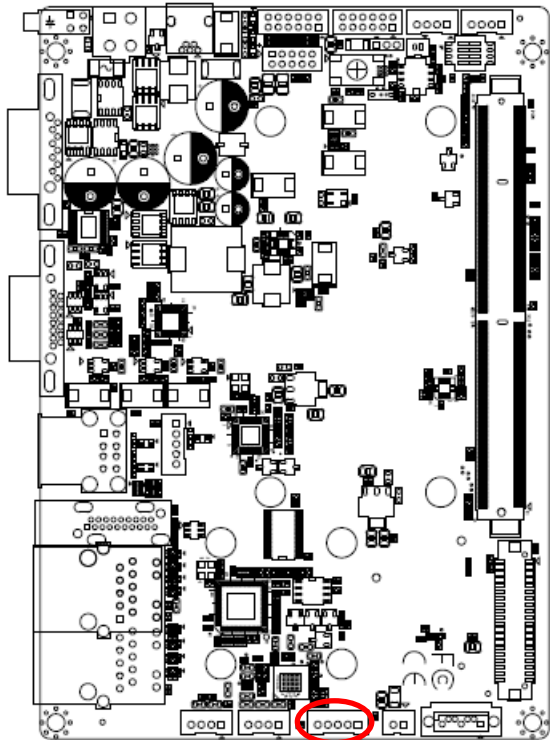
Signal	PIN
CAN0_H	1
GND	2
CAN0_L	3
GND	4

2.3.8 Can Bus connector 2 (JCAN2)



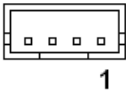
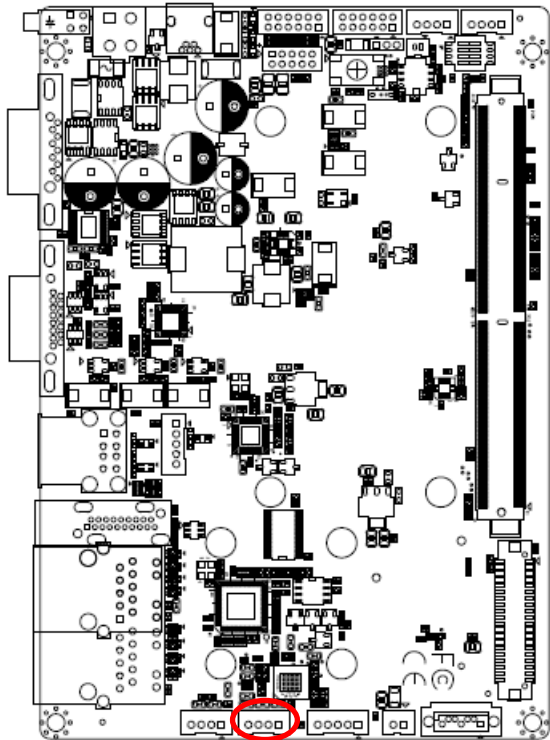
Signal	PIN
CAN1_H	1
GND	2
CAN1_L	3
GND	4

2.3.9 LCD inverter connector (JBKL1)



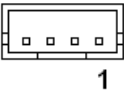
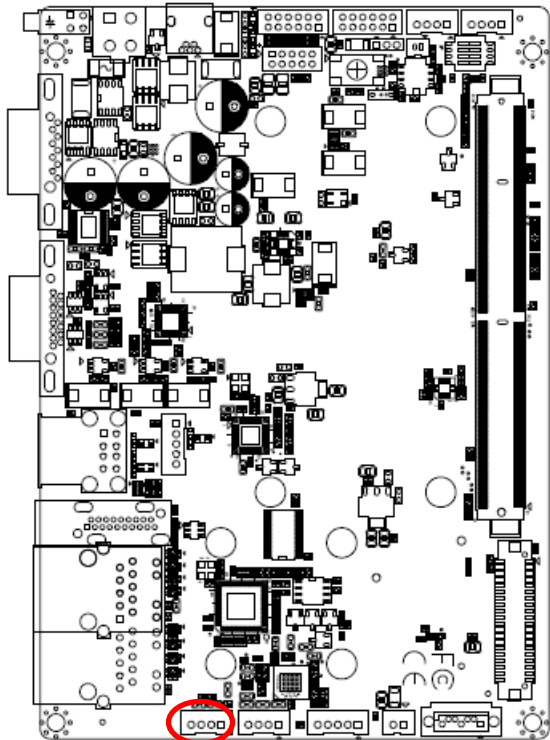
Signal	PIN
NC	1
GND	2
LCD_BKLT_EN	3
LCD_BKLT_PWM	4
+5V	5

2.3.10 AMPLIFIER connector (JAMP1)



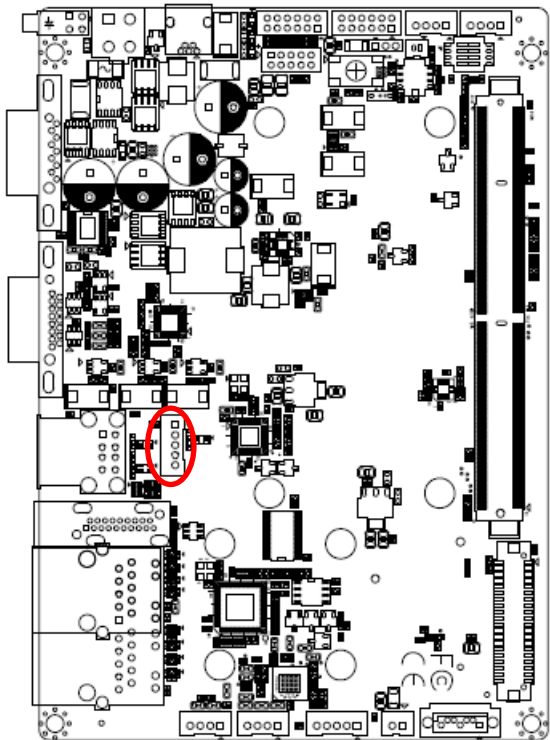
Signal	PIN
SPKL_P	1
SPKL_N	2
SPKR_P	3
SPKR_N	4

2.3.11 Line In, MIC connector (JM1C1)



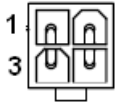
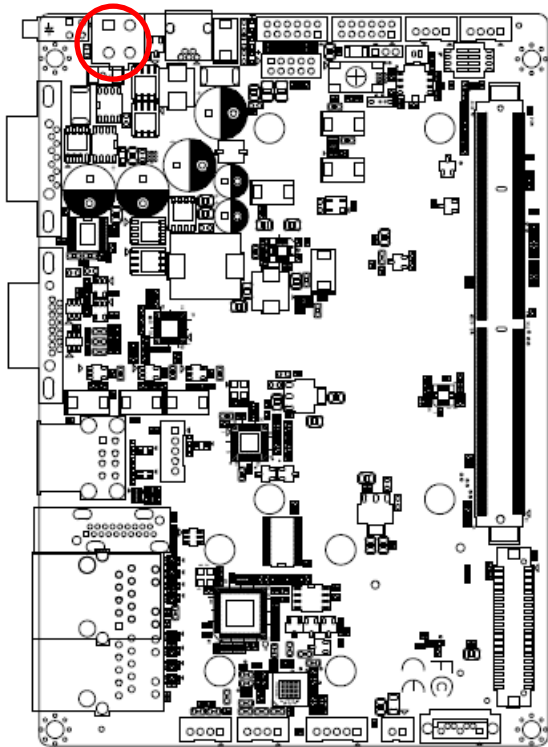
Signal	PIN
MICIN_DET	1
MIC_RAW	2
MICBIAS2_RAW	3
GND	4

2.3.12 USB connector (JUSB1)



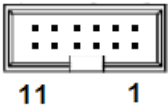
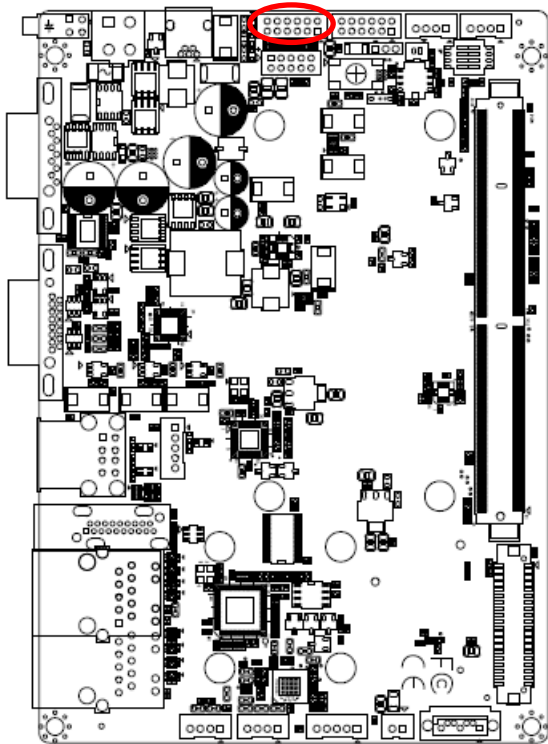
Signal	PIN
+4V	1
USB3_D-	2
USB3_D+	3
GND	4
GND	5

2.3.13 Power connector (PWR1)



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

2.3.14 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

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### 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:freescale/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 ).

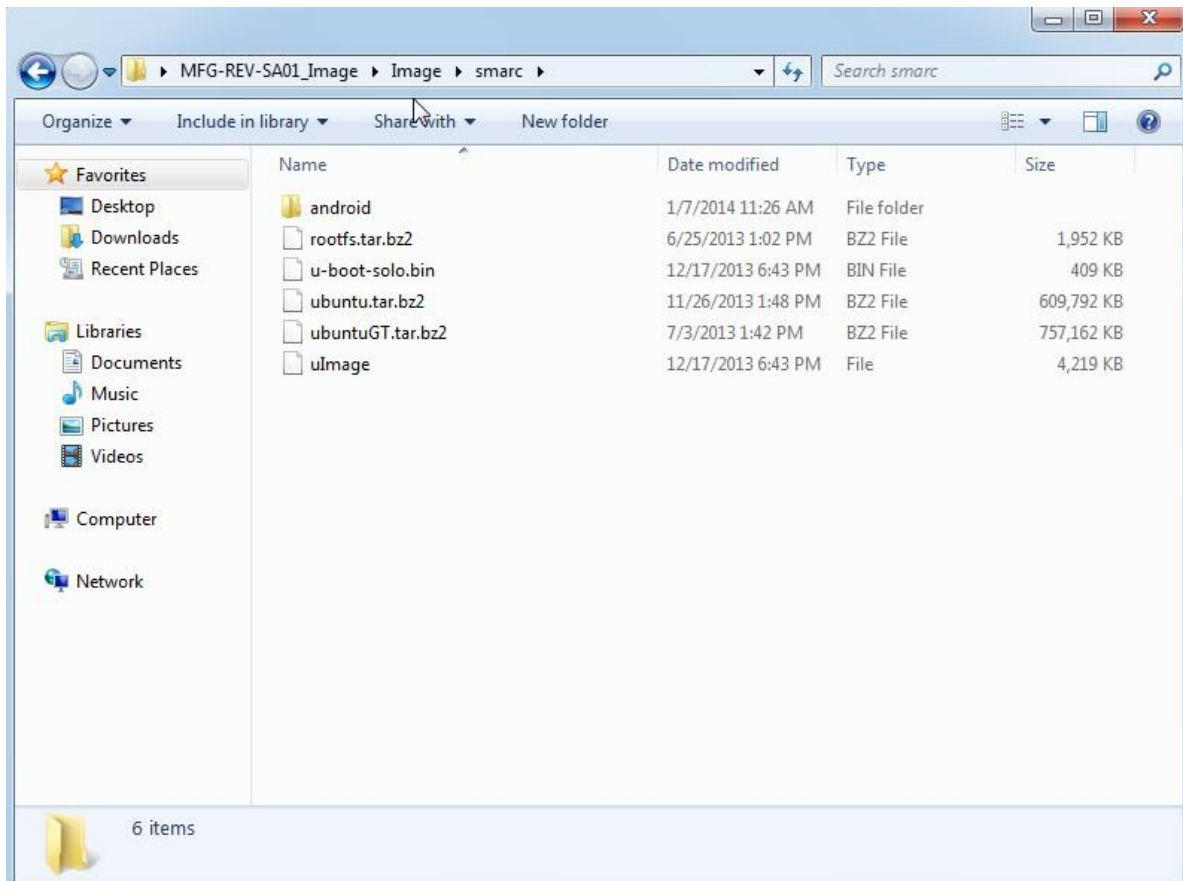
```
leo@ubuntu:~/imx6_core/core$ make rev-sa01 -j16
```

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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.



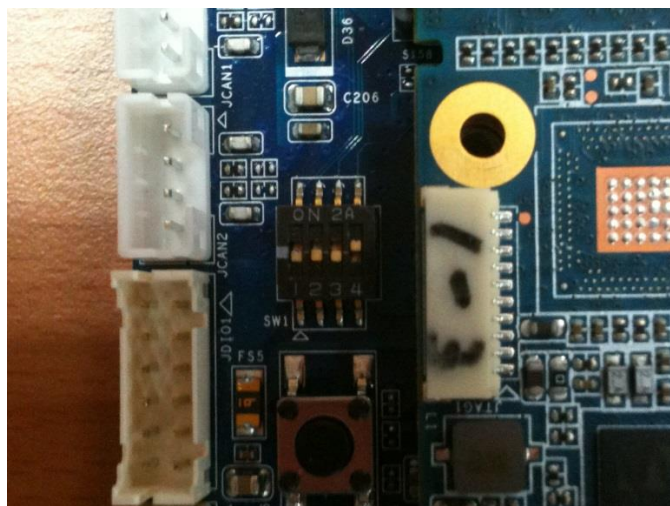


## 3.4 Use MfgTool to flash Ubuntu into onboard eMMC

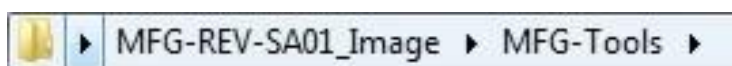
Manufacturing tool, a successor of ATK, provides a series of new features to power your mass production work. The features like windows style GUI, multiple devices support, explicit status monitoring, versatile functionalities and highly flexible architecture make it a best choice to meet your critical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



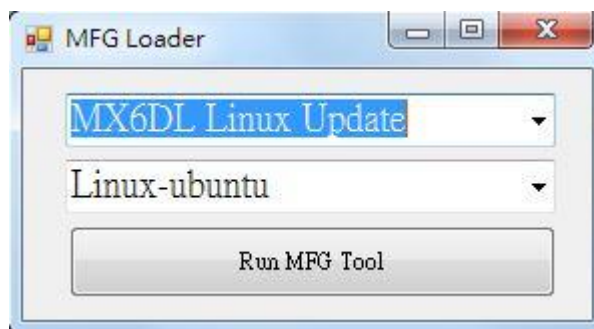
2. Power on the mainboard then plug the cable from OTG socket to PC.
3. Click the folder “~\MFG-Tools”, e.g. mine is D:\MFG-REV-SA01\_Image\MFG-Tools”



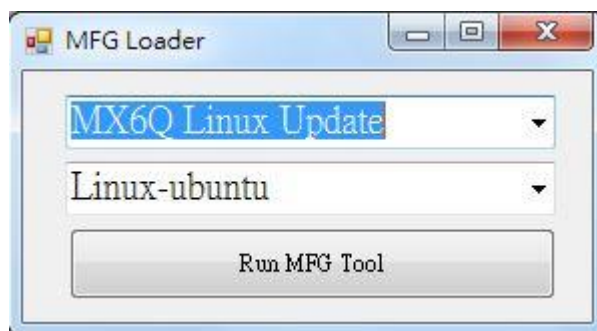
4. Click the “MfgLoader.exe”.

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

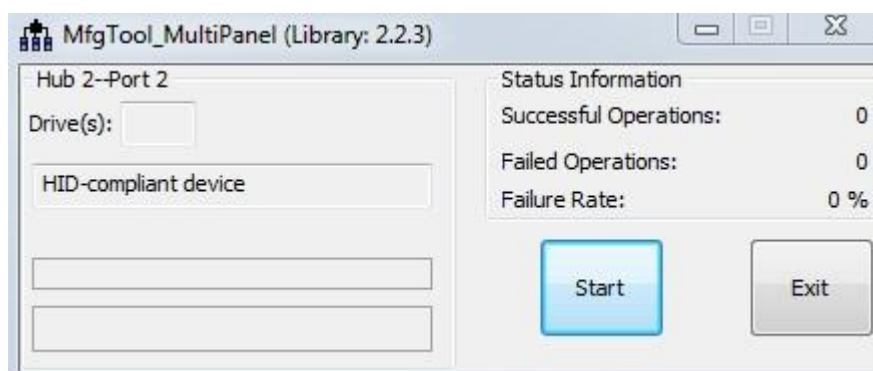
5. Select the MCU option by name, if the MCU of module board is “i.MX6 Solo”, please click “MX6DL Linux Update”, and click “Linux-ubuntu” (Ubuntu GUI version) for the OS of flashing, then click “Run MFG Tool”.



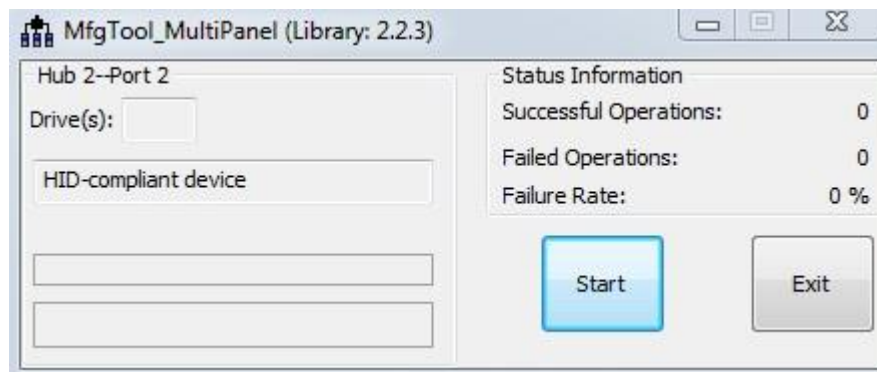
Or the if the MCU of module board is “i.MX6 Quad core”, please click “**MX6Q Linux Update**”, and click “**Linux-ubuntu**” (Ubuntu GUI version) for the OS of flashing, then click “**Run MFG Tool**”.



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.



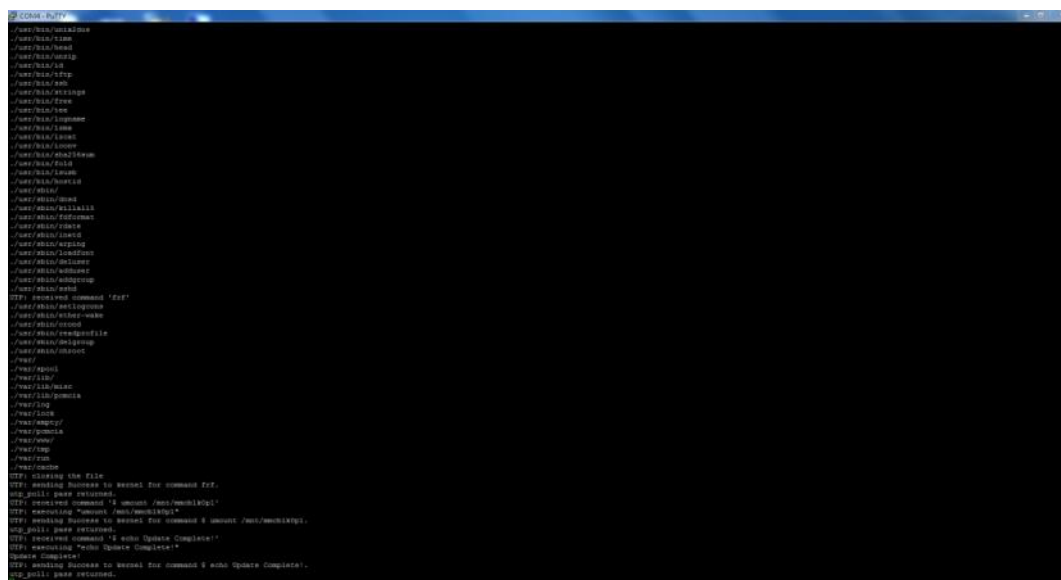
- Click **"Start"** to flash image file.



- It will show **"Done"** after flashing is finish, then click **"Stop"** and **"Exit"** to close the screen.



- You can also get the information from Terminal (debug port→COM1) after flashing is finish.



### 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

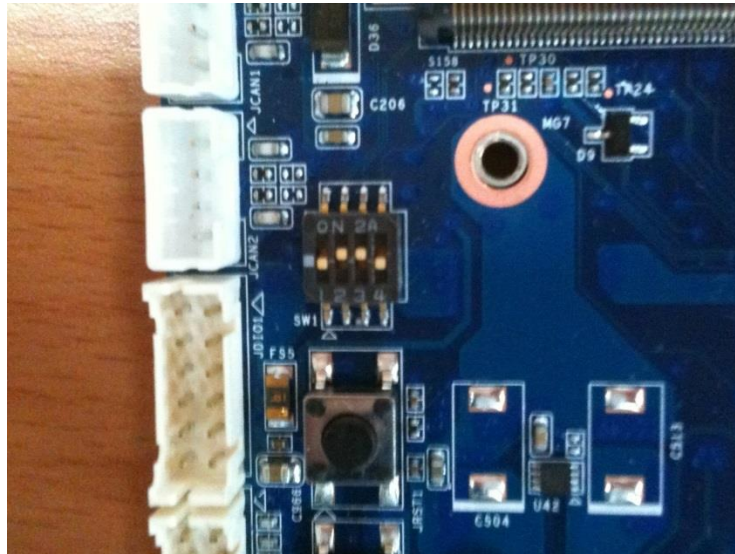
- 5) Please find the Ubuntu file system from the path "CDROM\REV

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'

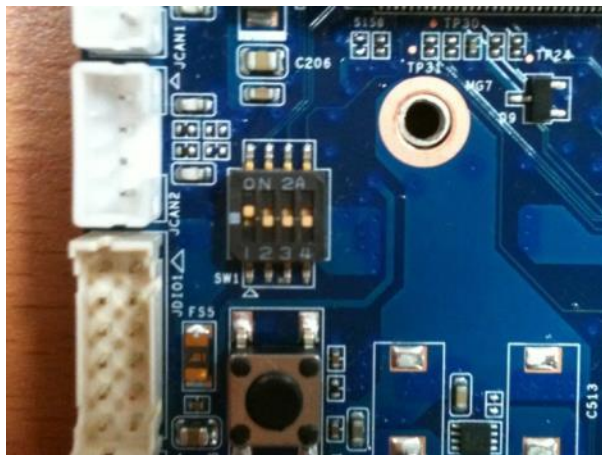
→ SMARC U-Boot > saveenv

→ 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      : 396000000Hz
usdhc1 clock   : 198000000Hz
usdhc2 clock   : 198000000Hz
usdhc3 clock   : 198000000Hz
usdhc4 clock   : 198000000Hz
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'



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- SMARC U-Boot > setenv linux\_bootargs 'console=tty0 console=ttymx0,115200  
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=ttymx0,115200 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[][40];
107
108 static struct fb_videomode ldb_mode_db[] = {
109     {
110         "WVGA", 60, 800, 480, 14865,
111         40, 40, 10, 3,
112         80, 10,
113         0,
114         FB_VMODE_NONINTERLACED,
115         FB_MODE_IS_DETAILED,
116     },
117     {
118         "WVGA", 60, 1024, 600, 22742,
119         135, 25, 15, 4,
120         20, 10,
121         0,
122         FB_VMODE_NONINTERLACED,
123         FB_MODE_IS_DETAILED,
124     },
125     {
126         "LDB-WVGA", 60, 1280, 800, 14865,
127         40, 40,
128         10, 3,
129         80, 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         80, 10,
139         0,
140         FB_VMODE_NONINTERLACED,
141         FB_MODE_IS_DETAILED,
142     },
143     {
144         "LDB-XGA", 60, 1024, 768, 15385,
145         220, 40,
146         21, 7,
147         80, 10,
148         0,
149         FB_VMODE_NONINTERLACED,
150         FB_MODE_IS_DETAILED,
151     },
152     {
153         "LDB-XGA", 60, 1024, 768, 15385,
154         220, 40,
155         21, 7,
156         80, 10,
157         0,
158         FB_VMODE_NONINTERLACED,
159         FB_MODE_IS_DETAILED,
160     },
161     {
162         "LDB-XGA", 60, 1024, 768, 15385,
163         220, 40,
164         21, 7,
165         80, 10,
166         0,
167         FB_VMODE_NONINTERLACED,
168         FB_MODE_IS_DETAILED,
169     },
170     {
171         "LDB-XGA", 60, 1024, 768, 15385,
172         220, 40,
173         21, 7,
174         80, 10,
175         0,
176         FB_VMODE_NONINTERLACED,
177         FB_MODE_IS_DETAILED,
178     },
179     {
180         "LDB-XGA", 60, 1024, 768, 15385,
181         220, 40,
182         21, 7,
183         80, 10,
184         0,
185         FB_VMODE_NONINTERLACED,
186         FB_MODE_IS_DETAILED,
187     },
188     {
189         "LDB-XGA", 60, 1024, 768, 15385,
190         220, 40,
191         21, 7,
192         80, 10,
193         0,
194         FB_VMODE_NONINTERLACED,
195         FB_MODE_IS_DETAILED,
196     },
197     {
198         "LDB-XGA", 60, 1024, 768, 15385,
199         220, 40,
200         21, 7,
201         80, 10,
202         0,
203         FB_VMODE_NONINTERLACED,
204         FB_MODE_IS_DETAILED,
205     },
206     {
207         "LDB-XGA", 60, 1024, 768, 15385,
208         220, 40,
209         21, 7,
210         80, 10,
211         0,
212         FB_VMODE_NONINTERLACED,
213         FB_MODE_IS_DETAILED,
214     },
215     {
216         "LDB-XGA", 60, 1024, 768, 15385,
217         220, 40,
218         21, 7,
219         80, 10,
220         0,
221         FB_VMODE_NONINTERLACED,
222         FB_MODE_IS_DETAILED,
223     },
224     {
225         "LDB-XGA", 60, 1024, 768, 15385,
226         220, 40,
227         21, 7,
228         80, 10,
229         0,
230         FB_VMODE_NONINTERLACED,
231         FB_MODE_IS_DETAILED,
232     },
233     {
234         "LDB-XGA", 60, 1024, 768, 15385,
235         220, 40,
236         21, 7,
237         80, 10,
238         0,
239         FB_VMODE_NONINTERLACED,
240         FB_MODE_IS_DETAILED,
241     },
242     {
243         "LDB-XGA", 60, 1024, 768, 15385,
244         220, 40,
245         21, 7,
246         80, 10,
247         0,
248         FB_VMODE_NONINTERLACED,
249         FB_MODE_IS_DETAILED,
250     },
251     {
252         "LDB-XGA", 60, 1024, 768, 15385,
253         220, 40,
254         21, 7,
255         80, 10,
256         0,
257         FB_VMODE_NONINTERLACED,
258         FB_MODE_IS_DETAILED,
259     },
260     {
261         "LDB-XGA", 60, 1024, 768, 15385,
262         220, 40,
263         21, 7,
264         80, 10,
265         0,
266         FB_VMODE_NONINTERLACED,
267         FB_MODE_IS_DETAILED,
268     },
269     {
270         "LDB-XGA", 60, 1024, 768, 15385,
271         220, 40,
272         21, 7,
273         80, 10,
274         0,
275         FB_VMODE_NONINTERLACED,
276         FB_MODE_IS_DETAILED,
277     },
278     {
279         "LDB-XGA", 60, 1024, 768, 15385,
280         220, 40,
281         21, 7,
282         80, 10,
283         0,
284         FB_VMODE_NONINTERLACED,
285         FB_MODE_IS_DETAILED,
286     },
287     {
288         "LDB-XGA", 60, 1024, 768, 15385,
289         220, 40,
290         21, 7,
291         80, 10,
292         0,
293         FB_VMODE_NONINTERLACED,
294         FB_MODE_IS_DETAILED,
295     },
296     {
297         "LDB-XGA", 60, 1024, 768, 15385,
298         220, 40,
299         21, 7,
300         80, 10,
301         0,
302         FB_VMODE_NONINTERLACED,
303         FB_MODE_IS_DETAILED,
304     },
305     {
306         "LDB-XGA", 60, 1024, 768, 15385,
307         220, 40,
308         21, 7,
309         80, 10,
310         0,
311         FB_VMODE_NONINTERLACED,
312         FB_MODE_IS_DETAILED,
313     },
314     {
315         "LDB-XGA", 60, 1024, 768, 15385,
316         220, 40,
317         21, 7,
318         80, 10,
319         0,
320         FB_VMODE_NONINTERLACED,
321         FB_MODE_IS_DETAILED,
322     },
323     {
324         "LDB-XGA", 60, 1024, 768, 15385,
325         220, 40,
326         21, 7,
327         80, 10,
328         0,
329         FB_VMODE_NONINTERLACED,
330         FB_MODE_IS_DETAILED,
331     },
332     {
333         "LDB-XGA", 60, 1024, 768, 15385,
334         220, 40,
335         21, 7,
336         80, 10,
337         0,
338         FB_VMODE_NONINTERLACED,
339         FB_MODE_IS_DETAILED,
340     },
341     {
342         "LDB-XGA", 60, 1024, 768, 15385,
343         220, 40,
344         21, 7,
345         80, 10,
346         0,
347         FB_VMODE_NONINTERLACED,
348         FB_MODE_IS_DETAILED,
349     },
350     {
351         "LDB-XGA", 60, 1024, 768, 15385,
352         220, 40,
353         21, 7,
354         80, 10,
355         0,
356         FB_VMODE_NONINTERLACED,
357         FB_MODE_IS_DETAILED,
358     },
359     {
360         "LDB-XGA", 60, 1024, 768, 15385,
361         220, 40,
362         21, 7,
363         80, 10,
364         0,
365         FB_VMODE_NONINTERLACED,
366         FB_MODE_IS_DETAILED,
367     },
368     {
369         "LDB-XGA", 60, 1024, 768, 15385,
370         220, 40,
371         21, 7,
372         80, 10,
373         0,
374         FB_VMODE_NONINTERLACED,
375         FB_MODE_IS_DETAILED,
376     },
377     {
378         "LDB-XGA", 60, 1024, 768, 15385,
379         220, 40,
380         21, 7,
381         80, 10,
382         0,
383         FB_VMODE_NONINTERLACED,
384         FB_MODE_IS_DETAILED,
385     },
386     {
387         "LDB-XGA", 60, 1024, 768, 15385,
388         220, 40,
389         21, 7,
390         80, 10,
391         0,
392         FB_VMODE_NONINTERLACED,
393         FB_MODE_IS_DETAILED,
394     },
395     {
396         "LDB-XGA", 60, 1024, 768, 15385,
397         220, 40,
398         21, 7,
399         80, 10,
400         0,
401         FB_VMODE_NONINTERLACED,
402         FB_MODE_IS_DETAILED,
403     },
404     {
405         "LDB-XGA", 60, 1024, 768, 15385,
406         220, 40,
407         21, 7,
408         80, 10,
409         0,
410         FB_VMODE_NONINTERLACED,
411         FB_MODE_IS_DETAILED,
412     },
413     {
414         "LDB-XGA", 60, 1024, 768, 15385,
415         220, 40,
416         21, 7,
417         80, 10,
418         0,
419         FB_VMODE_NONINTERLACED,
420         FB_MODE_IS_DETAILED,
421     },
422     {
423         "LDB-XGA", 60, 1024, 768, 15385,
424         220, 40,
425         21, 7,
426         80, 10,
427         0,
428         FB_VMODE_NONINTERLACED,
429         FB_MODE_IS_DETAILED,
430     },
431     {
432         "LDB-XGA", 60, 1024, 768, 15385,
433         220, 40,
434         21, 7,
435         80, 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         80, 10,
445         0,
446         FB_VMODE_NONINTERLACED,
447         FB_MODE_IS_DETAILED,
448     },
449     {
450         "LDB-XGA", 60, 1024, 768, 15385,
451         220, 40,
452         21, 7,
453         80, 10,
454         0,
455         FB_VMODE_NONINTERLACED,
456         FB_MODE_IS_DETAILED,
457     },
458     {
459         "LDB-XGA", 60, 1024, 768, 15385,
460         220, 40,
461         21, 7,
462         80, 10,
463         0,
464         FB_VMODE_NONINTERLACED,
465         FB_MODE_IS_DETAILED,
466     },
467     {
468         "LDB-XGA", 60, 1024, 768, 15385,
469         220, 40,
470         21, 7,
471         80, 10,
472         0,
473         FB_VMODE_NONINTERLACED,
474         FB_MODE_IS_DETAILED,
475     },
476     {
477         "LDB-XGA", 60, 1024, 768, 15385,
478         220, 40,
479         21, 7,
480         80, 10,
481         0,
482         FB_VMODE_NONINTERLACED,
483         FB_MODE_IS_DETAILED,
484     },
485     {
486         "LDB-XGA", 60, 1024, 768, 15385,
487         220, 40,
488         21, 7,
489         80, 10,
490         0,
491         FB_VMODE_NONINTERLACED,
492         FB_MODE_IS_DETAILED,
493     },
494     {
495         "LDB-XGA", 60, 1024, 768, 15385,
496         220, 40,
497         21, 7,
498         80, 10,
499         0,
500         FB_VMODE_NONINTERLACED,
501         FB_MODE_IS_DETAILED,
502     },
503     {
504         "LDB-XGA", 60, 1024, 768, 15385,
505         220, 40,
506         21, 7,
507         80, 10,
508         0,
509         FB_VMODE_NONINTERLACED,
510         FB_MODE_IS_DETAILED,
511     },
512     {
513         "LDB-XGA", 60, 1024, 768, 15385,
514         220, 40,
515         21, 7,
516         80, 10,
517         0,
518         FB_VMODE_NONINTERLACED,
519         FB_MODE_IS_DETAILED,
520     },
521     {
522         "LDB-XGA", 60, 1024, 768, 15385,
523         220, 40,
524         21, 7,
525         80, 10,
526         0,
527         FB_VMODE_NONINTERLACED,
528         FB_MODE_IS_DETAILED,
529     },
530     {
531         "LDB-XGA", 60, 1024, 768, 15385,
532         220, 40,
533         21, 7,
534         80, 10,
535         0,
536         FB_VMODE_NONINTERLACED,
537         FB_MODE_IS_DETAILED,
538     },
539     {
540         "LDB-XGA", 60, 1024, 768, 15385,
541         220, 40,
542         21, 7,
543         80, 10,
544         0,
545         FB_VMODE_NONINTERLACED,
546         FB_MODE_IS_DETAILED,
547     },
548     {
549         "LDB-XGA", 60, 1024, 768, 15385,
550         220, 40,
551         21, 7,
552         80, 10,
553         0,
554         FB_VMODE_NONINTERLACED,
555         FB_MODE_IS_DETAILED,
556     },
557     {
558         "LDB-XGA", 60, 1024, 768, 15385,
559         220, 40,
560         21, 7,
561         80, 10,
562         0,
563         FB_VMODE_NONINTERLACED,
564         FB_MODE_IS_DETAILED,
565     },
566     {
567         "LDB-XGA", 60, 1024, 768, 15385,
568         220, 40,
569         21, 7,
570         80, 10,
571         0,
572         FB_VMODE_NONINTERLACED,
573         FB_MODE_IS_DETAILED,
574     },
575     {
576         "LDB-XGA", 60, 1024, 768, 15385,
577         220, 40,
578         21, 7,
579         80, 10,
580         0,
581         FB_VMODE_NONINTERLACED,
582         FB_MODE_IS_DETAILED,
583     },
584     {
585         "LDB-XGA", 60, 1024, 768, 15385,
586         220, 40,
587         21, 7,
588         80, 10,
589         0,
590         FB_VMODE_NONINTERLACED,
591         FB_MODE_IS_DETAILED,
592     },
593     {
594         "LDB-XGA", 60, 1024, 768, 15385,
595         220, 40,
596         21, 7,
597         80, 10,
598         0,
599         FB_VMODE_NONINTERLACED,
600         FB_MODE_IS_DETAILED,
601     },
602     {
603         "LDB-XGA", 60, 1024, 768, 15385,
604         220, 40,
605         21, 7,
606         80, 10,
607         0,
608         FB_VMODE_NONINTERLACED,
609         FB_MODE_IS_DETAILED,
610     },
611     {
612         "LDB-XGA", 60, 1024, 768, 15385,
613         220, 40,
614         21, 7,
615         80, 10,
616         0,
617         FB_VMODE_NONINTERLACED,
618         FB_MODE_IS_DETAILED,
619     },
620     {
621         "LDB-XGA", 60, 1024, 768, 15385,
622         220, 40,
623         21, 7,
624         80, 10,
625         0,
626         FB_VMODE_NONINTERLACED,
627         FB_MODE_IS_DETAILED,
628     },
629     {
630         "LDB-XGA", 60, 1024, 768, 15385,
631         220, 40,
632         21, 7,
633         80, 10,
634         0,
635         FB_VMODE_NONINTERLACED,
636         FB_MODE_IS_DETAILED,
637     },
638     {
639         "LDB-XGA", 60, 1024, 768, 15385,
640         220, 40,
641         21, 7,
642         80, 10,
643         0,
644         FB_VMODE_NONINTERLACED,
645         FB_MODE_IS_DETAILED,
646     },
647     {
648         "LDB-XGA", 60, 1024, 768, 15385,
649         220, 40,
650         21, 7,
651         80, 10,
652         0,
653         FB_VMODE_NONINTERLACED,
654         FB_MODE_IS_DETAILED,
655     },
656     {
657         "LDB-XGA", 60, 1024, 768, 15385,
658         220, 40,
659         21, 7,
660         80, 10,
661         0,
662         FB_VMODE_NONINTERLACED,
663         FB_MODE_IS_DETAILED,
664     },
665     {
666         "LDB-XGA", 60, 1024, 768, 15385,
667         220, 40,
668         21, 7,
669         80, 10,
670         0,
671         FB_VMODE_NONINTERLACED,
672         FB_MODE_IS_DETAILED,
673     },
674     {
675         "LDB-XGA", 60, 1024, 768, 15385,
676         220, 40,
677         21, 7,
678         80, 10,
679         0,
680         FB_VMODE_NONINTERLACED,
681         FB_MODE_IS_DETAILED,
682     },
683     {
684         "LDB-XGA", 60, 1024, 768, 15385,
685         220, 40,
686         21, 7,
687         80, 10,
688         0,
689         FB_VMODE_NONINTERLACED,
690         FB_MODE_IS_DETAILED,
691     },
692     {
693         "LDB-XGA", 60, 1024, 768, 15385,
694         220, 40,
695         21, 7,
696         80, 10,
697         0,
698         FB_VMODE_NONINTERLACED,
699         FB_MODE_IS_DETAILED,
700     },
701     {
702         "LDB-XGA", 60, 1024, 768, 15385,
703         220, 40,
704         21, 7,
705         80, 10,
706         0,
707         FB_VMODE_NONINTERLACED,
708         FB_MODE_IS_DETAILED,
709     },
710     {
711         "LDB-XGA", 60, 1024, 768, 15385,
712         220, 40,
713         21, 7,
714         80, 10,
715         0,
716         FB_VMODE_NONINTERLACED,
717         FB_MODE_IS_DETAILED,
718     },
719     {
720         "LDB-XGA", 60, 1024, 768, 15385,
721         220, 40,
722         21, 7,
723         80, 10,
724         0,
725         FB_VMODE_NONINTERLACED,
726         FB_MODE_IS_DETAILED,
727     },
728     {
729         "LDB-XGA", 60, 1024, 768, 15385,
730         220, 40,
731         21, 7,
732         80, 10,
733         0,
734         FB_VMODE_NONINTERLACED,
735         FB_MODE_IS_DETAILED,
736     },
737     {
738         "LDB-XGA", 60, 1024, 768, 15385,
739         220, 40,
740         21, 7,
741         80, 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         80, 10,
751         0,
752         FB_VMODE_NONINTERLACED,
753         FB_MODE_IS_DETAILED,
754     },
755     {
756         "LDB-XGA", 60, 1024, 768, 15385,
757         220, 40,
758         21, 7,
759         80, 10,
760         0,
761         FB_VMODE_NONINTERLACED,
762         FB_MODE_IS_DETAILED,
763     },
764     {
765         "LDB-XGA", 60, 1024, 768, 15385,
766         220, 40,
767         21, 7,
768         80, 10,
769         0,
770         FB_VMODE_NONINTERLACED,
771         FB_MODE_IS_DETAILED,
772     },
773     {
774         "LDB-XGA", 60, 1024, 768, 15385,
775         220, 40,
776         21, 7,
777         80, 10,
778         0,
779         FB_VMODE_NONINTERLACED,
780         FB_MODE_IS_DETAILED,
781     },
782     {
783         "LDB-XGA", 60, 1024, 768, 15385,
784         220, 40,
785         21, 7,
786         80, 10,
787         0,
788         FB_VMODE_NONINTERLACED,
789         FB_MODE_IS_DETAILED,
790     },
791     {
792         "LDB-XGA", 60, 1024, 768, 15385,
793         220, 40,
794         21, 7,
795         80, 10,
796         0,
797         FB_VMODE_NONINTERLACED,
798         FB_MODE_IS_DETAILED,
799     },
800     {
801         "LDB-XGA", 60, 1024, 768, 15385,
802         220, 40,
803         21, 7,
804         80, 10,
805         0,
806         FB_VMODE_NONINTERLACED,
807         FB_MODE_IS_DETAILED,
808     },
809     {
810         "LDB-XGA", 60, 1024, 768, 15385,
811         220, 40,
812         21, 7,
813         80, 10,
814         0,
815         FB_VMODE_NONINTERLACED,
816         FB_MODE_IS_DETAILED,
817     },
818     {
819         "LDB-XGA", 60, 1024, 768, 15385,
820         220, 40,
821         21, 7,
822         80, 10,
823         0,
824         FB_VMODE_NONINTERLACED,
825         FB_MODE_IS_DETAILED,
826     },
827     {
828         "LDB-XGA", 60, 1024, 768, 15385,
829         220, 40,
830         21, 7,
831         80, 10,
832         0,
833         FB_VMODE_NONINTERLACED,
834         FB_MODE_IS_DETAILED,
835     },
836     {
837         "LDB-XGA", 60, 1024, 768, 15385,
838         220, 40,
839         21, 7,
840         80, 10,
841         0,
842         FB_VMODE_NONINTERLACED,
843         FB_MODE_IS_DETAILED,
844     },
845     {
846         "LDB-XGA", 60, 1024, 768, 15385,
847         220, 40,
848         21, 7,
849         80, 10,
850         0,
851         FB_VMODE_NONINTERLACED,
852         FB_MODE_IS_DETAILED,
853     },
854     {
855         "LDB-XGA", 60, 1024, 768, 15385,
856         220, 40,
857         21, 7,
858         80, 10,
859         0,
860         FB_VMODE_NONINTERLACED,
861         FB_MODE_IS_DETAILED,
862     },
863     {
864         "LDB-XGA", 60, 1024, 768, 15385,
865         220, 40,
866         21, 7,
867         80, 10,
868         0,
869         FB_VMODE_NONINTERLACED,
870         FB_MODE_IS_DETAILED,
871     },
872     {
873         "LDB-XGA", 60, 1024, 768, 15385,
874         220, 40,
875         21, 7,
876         80, 10,
877         0,
878         FB_VMODE_NONINTERLACED,
879         FB_MODE_IS_DETAILED,
880     },
881     {
882         "LDB-XGA", 60, 1024, 768, 15385,
883         220, 40,
884         21, 7,
885         80, 10,
886         0,
887         FB_VMODE_NONINTERLACED,
888         FB_MODE_IS_DETAILED,
889     },
890     {
891         "LDB-XGA", 60, 1024, 768, 15385,
892         220, 40,
893         21, 7,
894         80, 10,
895         0,
896         FB_VMODE_NONINTERLACED,
897         FB_MODE_IS_DETAILED,
898     },
899     {
900         "LDB-XGA", 60, 1024, 768, 15385,
901         220, 40,
902         21, 7,
903         80, 10,
904         0,
905         FB_VMODE_NONINTERLACED,
906         FB_MODE_IS_DETAILED,
907     },
908     {
909         "LDB-XGA", 60, 1024, 768, 15385,
910         220, 40,
911         21, 7,
912         80, 10,
913         0,
914         FB_VMODE_NONINTERLACED,
915         FB_MODE_IS_DETAILED,
916     },
917     {
918         "LDB-XGA", 60, 1024, 768, 15385,
919         220, 40,
920         21, 7,
921         80, 10,
922         0,
923         FB_VMODE_NONINTERLACED,
924         FB_MODE_IS_DETAILED,
925     },
926     {
927         "LDB-XGA", 60, 1024, 768, 15385,
928         220, 40,
929         21, 7,
930         80, 10,
931         0,
932         FB_VMODE_NONINTERLACED,
933         FB_MODE_IS_DETAILED,
934     },
935     {
936         "LDB-XGA", 60, 1024, 768, 15385,
937         220, 40,
938         21, 7,
939         80, 10,
940         0,
941         FB_VMODE_NONINTERLACED,
942         FB_MODE_IS_DETAILED,
943     },
944     {
945         "LDB-XGA", 60, 1024, 768, 15385,
946         220, 40,
947         21, 7,
948         80, 10,
949         0,
950         FB_VMODE_NONINTERLACED,
951         FB_MODE_IS_DETAILED,
952     },
953     {
954         "LDB-XGA", 60, 1024, 768, 15385,
955         220, 40,
956         21, 7,
957         80, 10,
958         0,
959         FB_VMODE_NONINTERLACED,
960         FB_MODE_IS_DETAILED,
961     },
962     {
963         "LDB-XGA", 60, 1024, 768, 15385,
964         220, 40,
965         21, 7,
966         80, 10,
967         0,
968         FB_VMODE_NONINTERLACED,
969         FB_MODE_IS_DETAILED,
970     },
971     {
972         "LDB-XGA", 60, 1024, 768, 15385,
973         220, 40,
974         21, 7,
975         80, 10,
976         0,
977         FB_VMODE_NONINTERLACED,
978         FB_MODE_IS_DETAILED,
979     },
980     {
981         "LDB-XGA", 60, 1024, 768, 15385,
982         220, 40,
983         21, 7,
984         80, 10,
985         0,
986         FB_VMODE_NONINTERLACED,
987         FB_MODE_IS_DETAILED,
988     },
989     {
990         "LDB-XGA", 60, 1024, 768, 15385,
991         220, 40,
992         21, 7,
993         80, 10,
994         0,
995         FB_VMODE_NONINTERLACED,
996         FB_MODE_IS_DETAILED,
997     },
998     {
999         "LDB-XGA", 60, 1024, 768, 15385,
1000        220, 40,
1001        21, 7,
1002        80, 10,
1003        0,
1004        FB_VMODE_NONINTERLACED,
1005        FB_MODE_IS_DETAILED,
1006    },
1007    {
1008        "LDB-XGA", 60, 1024, 768, 15385,
1009        220, 40,
1010        21, 7,
1011        80, 10,
1012        0,
1013        FB_VMODE_NONINTERLACED,
1014        FB_MODE_IS_DETAILED,
1015    },
1016    {
1017        "LDB-XGA", 60, 1024, 768, 15385,
1018        22
```

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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 0x10000000 /* loadaddr env var */
109 #define CONFIG_RD_LOADADDR (0x1000000)
110
111 #define CONFIG_EXTRA_ENV_SETTINGS
112     "netdev=eth0"
113     "ethprline=FEC0"
114     "ethaddr=08:04:9f:00:ea:d3"
115     "fec_addr=08:04:9f:00:ea:d3"
116     "uboot-u-boot.bin"
117     "kernel=uImage"
118     "nfsroot=/opt/eldk/arm"
119     "network=ip-dhcp"
120     "bootargs_base=setenv bootargs console=ttyMxc0,115200"
121     "bootargs_nfs=setenv bootargs ${bootargs} root=/dev/nfs "
122     "ip-dhcp nfsroot=${serverip}:${nfsroot},v3,tcp"
123     "bootcmd_net=run bootargs_base bootargs_nfs; "
124     "tftpboot ${loadaddr} ${kernel}; bootm"
125     "bootargs_mmc=setenv bootargs ${bootargs} ${network} "
126     "root=/dev/mmcblkp1 rootwait"
127     "bootcmd_mmc=run bootargs_base bootargs_mmc; "
128     "mmc dev 3; "
129     "mmc read ${loadaddr} 0x000 0x3000; bootm"
130     "linux_bootargs=console=ttye console=ttyMxc0,115200 "
131     "root=/dev/mmcblkp1 "
132     "rootwait rw video=mxcfb0:dev=LCD video=mxcfb01:dev=LCD"
133     "linux_mmc=run bootargs_base bootargs_mmc linux_bootargs; "
134     "mmc dev 3; "
135     "mmc read ${loadaddr} 0x000 0x3000; "
136     "bootm"
137     "bootcmd=run linux_cmd"
138
139
140 #define CONFIG_ARP_TIMEOUT 200UL
141 #define CONFIG_MX6_SMARC "SMA-MX6_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 mx6_core/core/
leo@ubuntu:~/mx6_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/mx6_core/core/arm-eabi-4.6/bin/arm-eabi-
-C u-boot/ distclean
make ARCH=arm CROSS_COMPILE=/home/leo/mx6_core/core/arm-eabi-4.6/bin/arm-eabi-
-C kernel/ mx6_rev_sa01_defconfig
make[1]: Entering directory '/home/leo/mx6_core/core/u-boot'
make[1]: Entering directory '/home/leo/mx6_core/core/kernel'
make[1]: Leaving directory '/home/leo/mx6_core/core/u-boot'
make ARCH=arm CROSS_COMPILE=/home/leo/mx6_core/core/arm-eabi-4.6/bin/arm-eabi- -C u-boot/ mx6q_rev_sa01_config
make[1]: Entering directory '/home/leo/mx6_core/core/u-boot'
Configuring for mx6q_rev_sa01 board...
make[1]: Leaving directory '/home/leo/mx6_core/core/u-boot'
make ARCH=arm CROSS_COMPILE=/home/leo/mx6_core/core/arm-eabi-4.6/bin/arm-eabi- -C u-boot/
make[1]: Entering directory '/home/leo/mx6_core/core/u-boot'
Generating include/autoconf.mk
Generating include/autoconf.mk.dep
make[1]: Leaving directory '/home/leo/mx6_core/core/u-boot'
make[1]: Entering directory '/home/leo/mx6_core/core/u-boot'
fatal: No annotated tags can describe '9d88f9a3acacfea29f1171d4005758b0abc35cfc'.
However, there were unannotated tags: try --tags.
#
# configuration written to .config
#
make[1]: Leaving directory '/home/leo/mx6_core/core/kernel'
make ARCH=arm CROSS_COMPILE=/home/leo/mx6_core/core/arm-eabi-4.6/bin/arm-eabi- -C kernel/ uImage
make[1]: Entering directory '/home/leo/mx6_core/core/kernel'
scripts/kconfig/conf --silentoldconfig Kconfig
make[1]: Leaving directory '/home/leo/mx6_core/core/kernel'
make[1]: Entering directory '/home/leo/mx6_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 ).

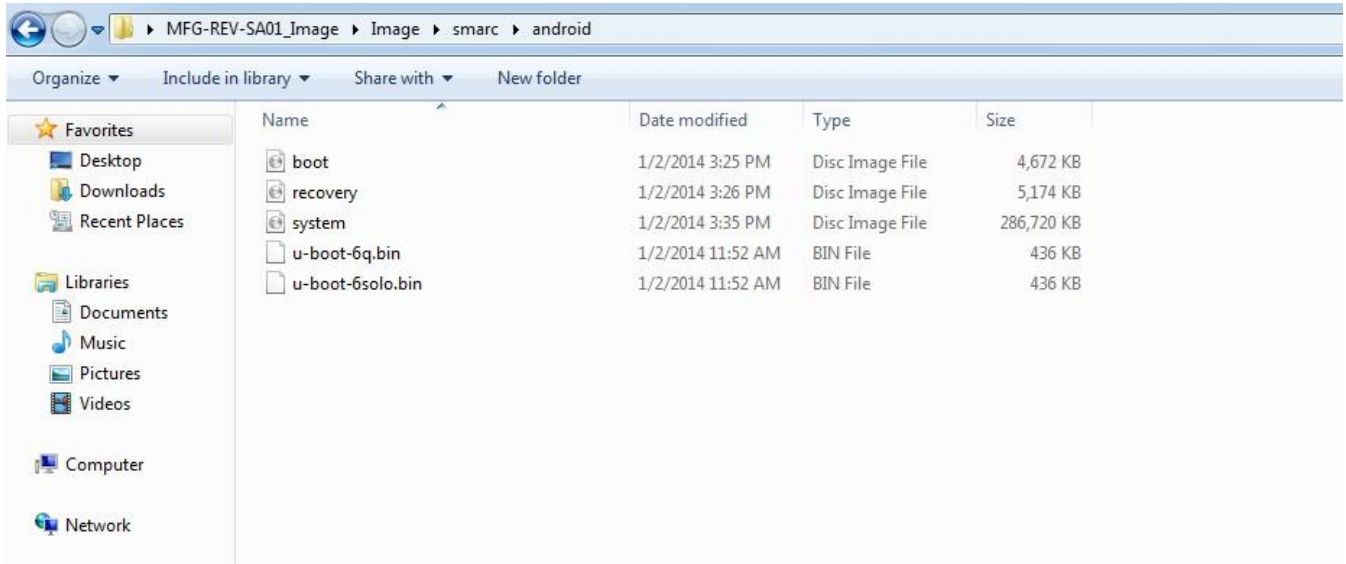
```
~/imx6_Android/Android$ ./run.sh -j16
```

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.

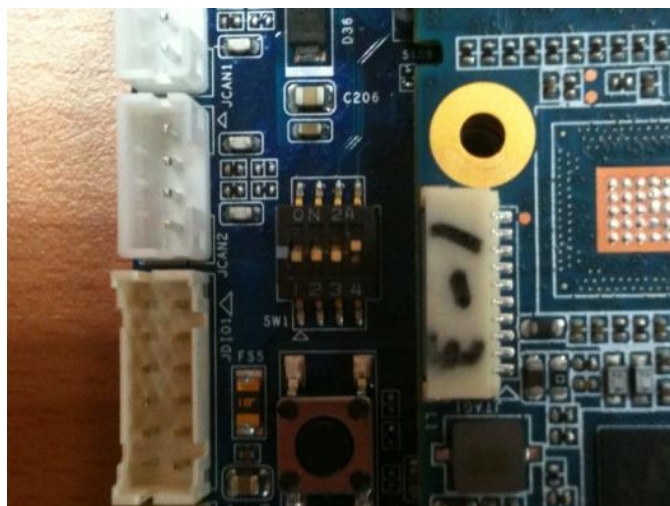


### 3.12 Use MfgTool to flash Android into onboard eMMC

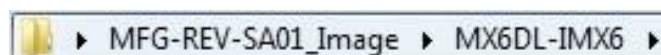
Manufacturing tool, a successor of ATK, provides a series of new features to power your mass production work. The features like windows style GUI, multiple devices support, explicit status monitoring, versatile functionalities and highly flexible architecture make it a best choice to meet your critical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

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

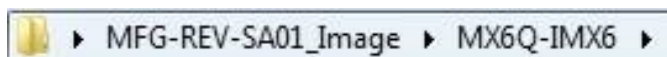
- 1) Please turn on the **Pin4** of the DIP switch as below into burning mode of Mfgtool.



- 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**”

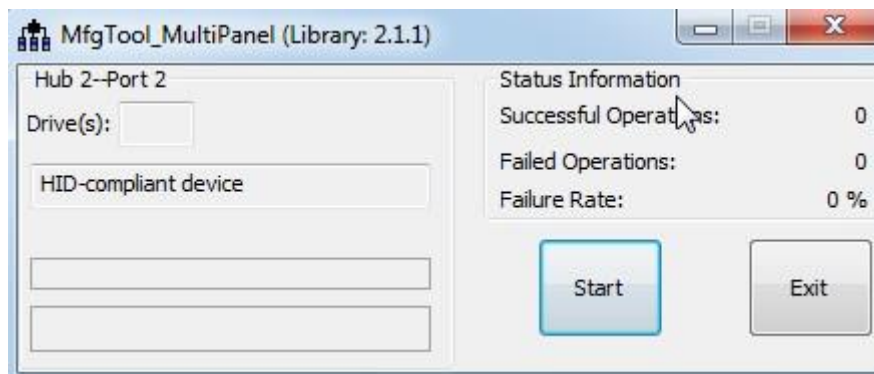




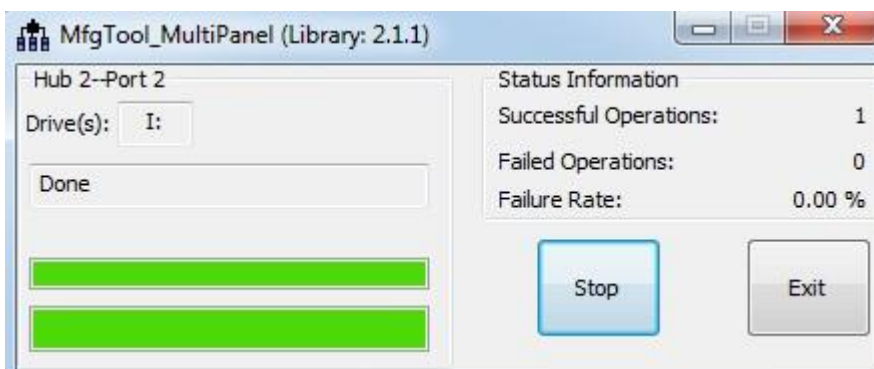
4) Click “MfgTool2.exe” to flash image file into smarc module.

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.



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7) You can also get the information from Terminal (debug port→COM1) after flashing is finish.

[illegible]