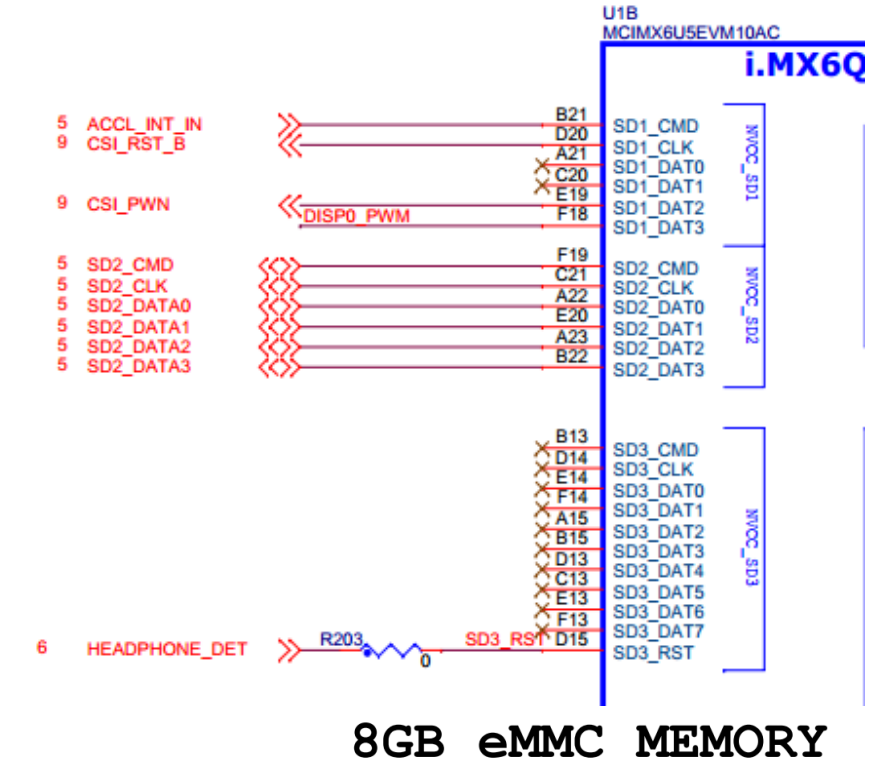
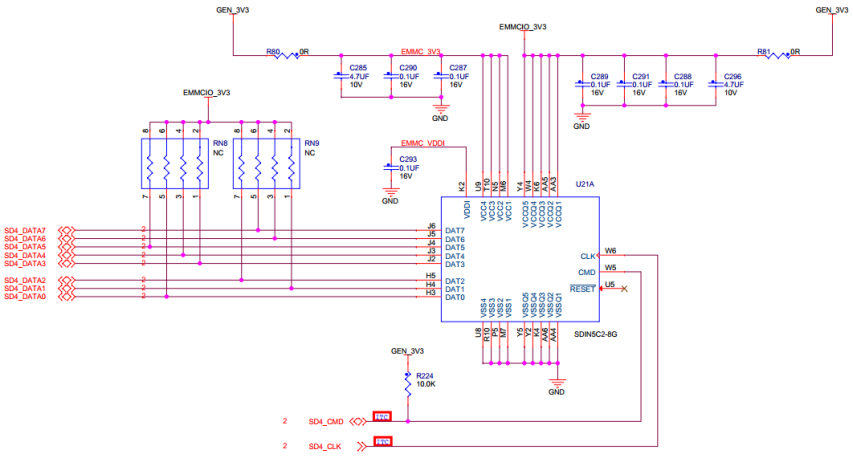
EMMC
DDR LCD LVDS LDB
FLASH UBOOT
V4L2 CALL FLOW
TS
CAMERA
ANDROID MARKDONW
KGDB
QEMU
KERNEL
UBOOT
MISC
UBUNTU
MEMORY BARRIER
FEC
WIFI

IMX6

EMMC

MX6SDL SABRESD U-Boot > mmc list //表示该芯片有4个SD接口,如下原理图所示：
FSL_USDHC: 0
FSL_USDHC: 1
FSL_USDHC: 2
FSL_USDHC: 3





从原理图上可以知道，EMMC接到的是第四个接口上，所以要操作EMMC的话需要切换到相应的接口：
MX6SDL SABRESD U-Boot > mmc dev 3 //UBOOT里从0开始计数
mmc3(part 0) is current device

```
MX6SDL SABRESD U-Boot > mmc part //显示EMMC上的分区情况：
Partition Map for UNKNOWN device 3 - Partition Type: DOS
Partition Start Sector Num Sectors Type
1 16384 16384 83
2 32768 16384 83
3 49152 2211840 5 Extd
4 2260992 13090816 83
5 49153 1048575 83
6 1097729 1048575 83
7 2146305 16383 83
8 2162689 16383 83

MX6SDL SABRESD U-Boot > mmcinfo // 显示EMMC的信息：
Device: FSL_USDHC
Manufacturer ID: 45
OEM: 100
Name: SEM08
Tran Speed: 25000000
Rd Block Len: 512
MMC version 4.0
Clock: 52000000
High Capacity: Yes
Capacity: 7818182656 Bytes
Bus Width: 8-bit DDR
Current Partition for boot: Boot partition 1 //从这里可以知道启动分区是在第一个分区上

所以要切换到启动分区的话：
MX6SDL SABRESD U-Boot > mmc dev 3 1
switch to partition #1, OK
mmc3(part 1) is current device
MX6SDL SABRESD U-Boot > mmc part // 可以看到BOOT分区没有逻辑分区

Partition Map for UNKNOWN device 3 - Partition Type: DOS

Partition Start Sector Num Sectors Type
bad MBR sector signature 0x0000

在第一个分区才能看到有逻辑分区，可以知道这个分区应该是UDA分区：
MX6SDL SABRESD U-Boot > mmc dev 3 0
switch to partition #0, OK
mmc3(part 0) is current device

参考文章http://blog.csdn.net/simonjay2007/article/details/43198353.

MX6SDL SABRESD U-Boot > mmc part

Partition Map for UNKNOWN device 3 - Partition Type: DOS

Partition Start Sector Num Sectors Type
1 16384 16384 83
```

2 32768 16384 83
3 49152 2211840 5 Extd
4 2260992 13090816 83
5 49153 1048575 83
6 1097729 1048575 83
7 2146305 16383 83
8 2162689 16383 83

内核中看到的分区表信息
major minor #blocks name
179 0 7634944 mmcblk0
179 1 8192 mmcblk0p1
179 2 8192 mmcblk0p2
179 3 1 mmcblk0p3
179 4 6504448 mmcblk0p4
179 5 524287 mmcblk0p5
179 6 524287 mmcblk0p6
179 7 8191 mmcblk0p7
259 0 8191 mmcblk0p8
179 16 2048 mmcblk0boot1
179 8 2048 mmcblk0boot0

UBOOT里看到的分区表信息
Partition Start Sector Num Sectors Type
1 16384 16384 83
2 32768 16384 83
3 49152 2211840 5 Extd
4 2260992 13090816 83
5 49153 1048575 83
6 1097729 1048575 83
7 2146305 16383 83
8 2162689 16383 83

分析烧写工具里脚本知道：boot.img烧写到了p1分区，对应UBOOT里的就是16384这个起始地址，转换为16进制就

```
dd if=$FILE of=/dev/mmcblk0p1
```

脚本里烧写IMX6DL ANDROID EMMC的内容:

clean up u-boot parameter:

```
dd if=/dev/zero of=/dev/mmcblk0 bs=512 seek=1536 count=16
```

从这里知道参数存在偏移地址1536的地方,
既后面的blk=1536的十六进制(600)，长度是16 * 512 = 2000(十六进制)

先要切换到part 0
MX6SDL SABRESD U-Boot > mmc dev 3 0

switch to partition #0, OK
mmc3(part 0) is current device
读参数分区（确保参数都已经写入到EMMC中了）：
*** Warning - bad CRC or MMC, using default environment //说明参数分区没有写入EMMC中
MX6SDL SABRESD U-Boot > save //保存参数分区到EMMC中

MX6SDL SABRESD U-Boot > mmc read 0x10800000 600 100 //这里最多读2000长度
显示： MX6SDL SABRESD U-Boot > md.b 0x10800000 100
10800000: 71 de d3 09 62 6f 6f 74 64 65 6c 61 79 3d 33 00 q…bootdelay=3.
10800010: 62 61 75 64 72 61 74 65 3d 31 31 35 32 30 30 00 baudrate=115200.
10800020: 69 70 61 64 64 72 3d 31 39 32 2e 31 36 38 2e 31 ipaddr=192.168.1
10800030: 2e 31 30 33 00 73 65 72 76 65 72 69 70 3d 31 39 .103.serverip=19
10800040: 32 2e 31 36 38 2e 31 2e 31 30 31 00 6e 65 74 6d 2.168.1.101.netm
10800050: 61 73 6b 3d 32 35 35 2e 32 35 35 2e 32 35 35 2e ask=255.255.255.
10800060: 30 00 6c 6f 61 64 61 64 64 72 3d 30 78 31 30 38 0.loadaddr=0x108
10800070: 30 30 30 30 30 00 72 64 5f 6c 6f 61 64 61 64 64 00000.rd_loadadd
10800080: 72 3d 30 78 31 31 30 30 30 30 30 30 00 6e 65 74 r=0x11000000.net
10800090: 64 65 76 3d 65 74 68 30 00 65 74 68 70 72 69 6d dev=eth0.ethprim
108000a0: 65 3d 46 45 43 30 00 73 70 6c 61 73 68 69 6d 61 e=FEC0.splashima
108000b0: 67 65 3d 30 78 33 30 30 30 30 30 30 00 73 70 ge=0x30000000.sp
108000c0: 6c 61 73 68 70 6f 73 3d 6d 2c 6d 00 6c 76 64 73 lashpos=m,m.lvds
108000d0: 5f 6e 75 6d 3d 31 00 62 6f 6f 74 61 72 67 73 3d _num=1.bootargs=
108000e0: 63 6f 6e 73 6f 6c 65 3d 74 74 79 6d 78 63 30 2c console=ttymxc0,
108000f0: 31 31 35 32 30 30 20 69 6e 69 74 3d 2f 69 6e 69 115200 init=/ini

write U-Boot to sd card:

```
dd if=$FILE of=/dev/mmcblk0 bs=512 seek=2 skip=2
```

跳过了前 2 * 512 字节 = 1024字节 既0x400
切换到UBOOT的分区：为什么知道这个分区里烧的是UBOOT？ MX6SDL SABRESD U-Boot > mmc bootpart Device 3: boot partition 1 is for boot //从这个信息得到，大胆猜测 part 1就是bootloader

切换到UBOOT的分区: MX6SDL SABRESD U-Boot > mmc dev 3 1 switch to partition #1, OK mmc3(part 1) is current device

读出UBOOT到DDR中： MX6SDL SABRESD U-Boot > mmc read 0x10800000 2 100
显示读出的内容： MX6SDL SABRESD U-Boot > md.b 0x10800000 200 10800000: d1 00 20 40 e0 06 80 27 00 00 00 00 2c 04 80 27 .. @… ‘….,..’
10800010: 20 04 80 27 00 04 80 27 00 00 00 00 00 00 00 00 .. ‘…’ …….
10800020: 00 00 80 27 58 f5 06 00 00 00 00 00 d2 02 a0 40 …’ X……….@
10800030: cc 02 9c 04 02 0e 07 74 00 0c 00 00 02 0e 07 54 …….t…….T
10800040: 00 00 00 00 02 0e 04 ac 00 00 00 30 02 0e 04 b0 ……….0….
10800050: 00 00 00 30 02 0e 04 64 00 00 00 30 02 0e 04 90 …0…d…0….
10800060: 00 00 00 30 02 0e 07 4c 00 00 00 30 02 0e 04 94 …0…L…0….
10800070: 00 00 00 30 02 0e 04 a0 00 00 00 00 02 0e 04 b4 …0…….

```
10800080: 00 00 00 30 02 0e 04 b8 00 00 00 30 02 0e 07 6c ···0·······0···l
10800090: 00 00 00 30 02 0e 07 50 00 02 00 00 02 0e 04 bc ···0···P·····..
108000a0: 00 00 00 30 02 0e 04 c0 00 00 00 30 02 0e 04 c4 ···0·······0···.
108000b0: 00 00 00 30 02 0e 04 c8 00 00 00 30 02 0e 04 cc ···0·······0···.
108000c0: 00 00 00 30 02 0e 04 d0 00 00 00 30 02 0e 04 d4 ···0·······0···.
108000d0: 00 00 00 30 02 0e 04 d8 00 00 00 30 02 0e 07 60 ···0·······0··· ‘
108000e0: 00 02 00 00 02 0e 07 64 00 00 00 30 02 0e 07 70 ·······d···0···p
108000f0: 00 00 00 30 02 0e 07 78 00 00 00 30 02 0e 07 7c ···0···x···0···|
10800100: 00 00 00 30 02 0e 07 80 00 00 00 30 02 0e 07 84 ···0·······0···.
10800110: 00 00 00 30 02 0e 07 8c 00 00 00 30 02 0e 07 48 ···0·······0···H
10800120: 00 00 00 30 02 0e 04 70 00 00 00 30 02 0e 04 74 ···0···p···0···t
10800130: 00 00 00 30 02 0e 04 78 00 00 00 30 02 0e 04 7c ···0···x···0···|
10800140: 00 00 00 30 02 0e 04 80 00 00 00 30 02 0e 04 84 ···0·······0···.
10800150: 00 00 00 30 02 0e 04 88 00 00 00 30 02 0e 04 8c ···0·······0···.
10800160: 00 00 00 30 02 1b 08 00 a1 39 00 03 02 1b 08 0c ···0···..9·····
10800170: 00 1f 00 1f 02 1b 08 10 00 1f 00 1f 02 1b 48 0c ··············..H.
10800180: 00 1f 00 1f 02 1b 48 10 00 1f 00 1f 02 1b 08 3c ·····H·····..<
10800190: 42 48 02 48 02 1b 08 40 02 11 02 0b 02 1b 48 3c BH.H···@·····H<
108001a0: 41 7f 02 11 02 1b 48 40 01 5d 01 66 02 1b 08 48 A···..H@.].f···H
108001b0: 4b 4c 50 4d 02 1b 48 48 49 4c 4f 48 02 1b 08 50 KLPM..HHILOH···P
108001c0: 3f 3f 2e 31 02 1b 48 50 2b 35 38 2b 02 1b 08 1c ??.1..HP+58+····
108001d0: 33 33 33 33 02 1b 08 20 33 33 33 33 02 1b 08 24 3333··· 3333···$
108001e0: 33 33 33 33 02 1b 08 28 33 33 33 33 02 1b 48 1c 3333···(3333..H.
108001f0: 33 33 33 33 02 1b 48 20 33 33 33 33 02 1b 48 24 3333..H 3333..H$
```

对比烧写的镜像文件,这里有点要注意的是,我们烧写的时候是跳过了镜像文件的前skip * 512字节的
也就是跳过了u-boot-6dl.bin的前0x400字节，所以要从u-boot-6dl.bin文件的0x400开始对比：
发现有段数据不一致？目前不知道为什么？从0x590开始才一样 //这里目前有个疑点

```
0000400: 3f00 2040 3f06 3f27 0000 0000 2c04 3f27 ?. @?.?···.,.?’
0000410: 2004 3f27 0004 3f27 0000 0000 0000 0000 .?..?’·····..
0000420: 0000 3f27 583f 0600 0000 0000 3f02 3f40 ..?’X?·····?.?@
0000430: 3f02 3f04 020e 0774 000c 0000 020e 0754 ?.?···.t·····.T
0000440: 0000 0000 020e 043f 0000 0030 020e 043f ·····.?···0···?
0000450: 0000 0030 020e 0464 0000 0030 020e 043f ···0···d···0···?
0000460: 0000 0030 020e 074c 0000 0030 020e 043f ···0···L···0···?
0000470: 0000 0030 020e 043f 0000 0000 020e 043f ···0···?·····.?
0000480: 0000 0030 020e 043f 0000 0030 020e 076c ···0···?···0···l
0000490: 0000 0030 020e 0750 0002 0000 020e 043f ···0···P·····.?
00004a0: 0000 0030 020e 043f 0000 0030 020e 043f ···0···?···0···?
00004b0: 0000 0030 020e 043f 0000 0030 020e 043f ···0···?···0···?
00004c0: 0000 0030 020e 043f 0000 0030 020e 043f ···0···?···0···?
00004d0: 0000 0030 020e 043f 0000 0030 020e 0760 ···0···?···0··· ‘
00004e0: 0002 0000 020e 0764 0000 0030 020e 0770 ·····.d···0···p
00004f0: 0000 0030 020e 0778 0000 0030 020e 077c ···0···x···0···|
0000500: 0000 0030 020e 073f 0000 0030 020e 073f ···0···?···0···?
```

```
0000510: 0000 0030 020e 073f 0000 0030 020e 0748 ···0···?···0···H
0000520: 0000 0030 020e 0470 0000 0030 020e 0474 ···0···p···0···t
0000530: 0000 0030 020e 0478 0000 0030 020e 047c ···0···x···0···|
0000540: 0000 0030 020e 043f 0000 0030 020e 043f ···0···?···0···?
0000550: 0000 0030 020e 043f 0000 0030 020e 043f ···0···?···0···?
0000560: 0000 0030 021b 0800 3f39 0003 021b 080c ···0···.?9·····
0000570: 001f 001f 021b 0810 001f 001f 021b 480c ··············.·H.
0000580: 001f 001f 021b 4810 001f 001f 021b 083c ·····H·····.·<
0000590: 4248 0248 021b 0840 0211 020b 021b 483c BH.H···@·····H<
00005a0: 417f 0211 021b 4840 015d 0166 021b 0848 A···.·H@.].f···H
00005b0: 4b4c 504d 021b 4848 494c 4f48 021b 0850 KLPM.·HHILOH···P
00005c0: 3f3f 2e31 021b 4850 2b35 382b 021b 081c ??.1.·HP+58+····
00005d0: 3333 3333 021b 0820 3333 3333 021b 0824 3333··· 3333···$
00005e0: 3333 3333 021b 0828 3333 3333 021b 481c 3333···(3333.·H.
00005f0: 3333 3333 021b 4820 3333 3333 021b 4824 3333.·H 3333.·H$
```

u-boot-6dl.bin =+ (~\Desktop) - GVIM

```
0000400: 3f00 2040 3f06 3f27 0000 0000 2c04 3f27  ?. @?.?'....,.?'
0000410: 2004 3f27 0004 3f27 0000 0000 0000 0000   .?'..?'........
0000420: 0000 3f27 583f 0600 0000 0000 3f02 3f40  ..?'X?......?.?@
0000430: 3f02 3f04 020e 0774 000c 0000 020e 0754  ?.?....t.......T
0000440: 0000 0000 020e 043f 0000 0030 020e 043f  .......?...0...?
0000450: 0000 0030 020e 0464 0000 0030 020e 043f  ...0...d...0...?
0000460: 0000 0030 020e 074c 0000 0030 020e 043f  ...0...L...0...?
0000470: 0000 0030 020e 043f 0000 0000 020e 043f  ...0...?.......?
0000480: 0000 0030 020e 043f 0000 0030 020e 076c  ...0...?...0...l
0000490: 0000 0030 020e 0750 0002 0000 020e 043f  ...0...P.......?
00004a0: 0000 0030 020e 043f 0000 0030 020e 043f  ...0...?...0...?
00004b0: 0000 0030 020e 043f 0000 0030 020e 043f  ...0...?...0...?
00004c0: 0000 0030 020e 043f 0000 0030 020e 043f  ...0...?...0...?
00004d0: 0000 0030 020e 043f 0000 0030 020e 0760  ...0...?...0...`
00004e0: 0002 0000 020e 0764 0000 0030 020e 0770  .......d...0...p
00004f0: 0000 0030 020e 0778 0000 0030 020e 077c  ...0...x...0...|
0000500: 0000 0030 020e 073f 0000 0030 020e 073f  ...0...?...0...?
0000510: 0000 0030 020e 073f 0000 0030 020e 0748  ...0...?...0...H
0000520: 0000 0030 020e 0470 0000 0030 020e 0474  ...0...p...0...t
0000530: 0000 0030 020e 0478 0000 0030 020e 047c  ...0...x...0...|
0000540: 0000 0030 020e 043f 0000 0030 020e 043f  ...0...?...0...?
0000550: 0000 0030 020e 043f 0000 0030 020e 043f  ...0...?...0...?
0000560: 0000 0030 021b 0800 3f39 0003 021b 080c  ...0....?9......
0000570: 001f 001f 021b 0810 001f 001f 021b 480c  ..............H.
0000580: 001f 001f 021b 4810 001f 001f 021b 083c  ......H........<
0000590: 4248 0248 021b 0840 0211 020b 021b 483c  BH.H...@......H<
00005a0: 417f 0211 021b 4840 015d 0166 021b 0848  A.....H@.].f...H
00005b0: 4b4c 504d 021b 4848 494c 4f48 021b 0850  KLPM..HHILOH...P
00005c0: 3f3f 2e31 021b 4850 2b35 382b 021b 081c  ??.1..HP+58+....
00005d0: 3333 3333 021b 0820 3333 3333 021b 0824  3333... 3333...$
00005e0: 3333 3333 021b 0828 3333 3333 021b 481c  3333...(3333..H.
00005f0: 3333 3333 021b 4820 3333 3333 021b 4824  3333..H 3333..H$
```

Figure 1: uboot

write boot.img: dd if=$FILE of=/dev/mmcblk0p1 从烧写脚本里可以知道-boot.img是烧写到part 1 所以在UBOOT里的操作是： 先切换到eMMC对应的槽位MMC3: mmc dev 3

boot.img的偏移量是根据 1 16384 16384 83 里 16384 的十六进制0x4000得来的 读出boot.img前0x2000 * 512字节到DDR 0x10800000的地方 mmc read 0x10800000 4000 2000

查看DDR地址0x10800000的内容 md.b 0x10800000 2000 MX6SDL SABRESD U-Boot > md.b 0x10800000 2000 10800000: 41 4e 44 52 4f 49 44 21 10 78 48 00 00 80 80 10 ANDROID!.xH…..
10800010: 7f a1 03 00 00 00 80 11 00 00 00 00 00 00 70 11 ……..p.
10800020: 00 01 80 10 00 08 00 00 00 00 00 00 00 00 00 00 …….
10800030: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 …….
10800040: 63 6f 6e 73 6f 6c 65 3d 74 74 79 6d 78 63 30 2c console=ttymxc0,
10800050: 31 31 35 32 30 30 20 69 6e 69 74 3d 2f 69 6e 69 115200 init=/ini
10800060: 74 20 76 69 64 65 6f 3d 6d 78 63 66 62 30 3a 64 t video=mxcfb0:d
10800070: 65 76 3d 6c 64 62 2c 62 70 70 3d 33 32 20 76 69 ev=ldb,bpp=32 vi
10800080: 64 65 6f 3d 6d 78 63 66 62 31 3a 6f 66 66 20 76 deo=mxcfb1:off v
10800090: 69 64 65 6f 3d 6d 78 63 66 62 32 3a 6f 66 66 20 ideo=mxcfb2:off
108000a0: 66 62 6d 65 6d 3d 31 30 4d 20 66 62 30 62 61 73 fbmem=10M fb0bas
108000b0: 65 3d 30 78 32 37 62 30 30 30 30 30 20 76 6d 61 e=0x27b00000 vma
108000c0: 6c 6c 6f 63 3d 34 30 30 4d 20 61 6e 64 72 6f 69 lloc=400M androi
108000d0: 64 62 6f 6f 74 2e 63 6f 6e 73 6f 6c 65 3d 74 74 dboot.console=tt
108000e0: 79 6d 78 63 30 20 61 6e 64 72 6f 69 64 62 6f 6f ymxc0 androidboo
108000f0: 74 2e 68 61 72 64 77 61 72 65 3d 66 72 65 65 73 t.hardware=frees
10800100: 63 61 6c 65 00 00 00 00 00 00 00 00 00 00 00 00 cale……

打开我没烧写的boot.img文件对比下： 0000000: 414e 4452 4f49 4421 1078 4800 003f 3f10 ANDROID!.xH..??.
0000010: 7f3f 0300 0000 3f11 0000 0000 0000 7011 .?….?…….p.
0000020: 0001 3f10 0008 0000 0000 0000 0000 0000 ..?…….
0000030: 0000 0000 0000 0000 0000 0000 0000 0000 …….
0000040: 636f 6e73 6f6c 653d 7474 796d 7863 302c console=ttymxc0,
0000050: 3131 3532 3030 2069 6e69 743d 2f69 6e69 115200 init=/ini
0000060: 7420 7669 6465 6f3d 6d78 6366 6230 3a64 t video=mxcfb0:d
0000070: 6576 3d6c 6462 2c62 7070 3d33 3220 7669 ev=ldb,bpp=32 vi
0000080: 6465 6f3d 6d78 6366 6231 3a6f 6666 2076 deo=mxcfb1:off v
0000090: 6964 656f 3d6d 7863 6662 323a 6f66 6620 ideo=mxcfb2:off
00000a0: 6662 6d65 6d3d 3130 4d20 6662 3062 6173 fbmem=10M fb0bas
00000b0: 653d 3078 3237 6230 3030 3030 2076 6d61 e=0x27b00000 vma
00000c0: 6c6c 6f63 3d34 3030 4d20 616e 6472 6f69 lloc=400M androi
00000d0: 6462 6f6f 742e 636f 6e73 6f6c 653d 7474 dboot.console=tt
00000e0: 796d 7863 3020 616e 6472 6f69 6462 6f6f ymxc0 androidboo
00000f0: 742e 6861 7264 7761 7265 3d66 7265 6573 t.hardware=frees
0000100: 6361 6c65 0000 0000 0000 0000 0000 0000 cale……

Sending and writting system.img:

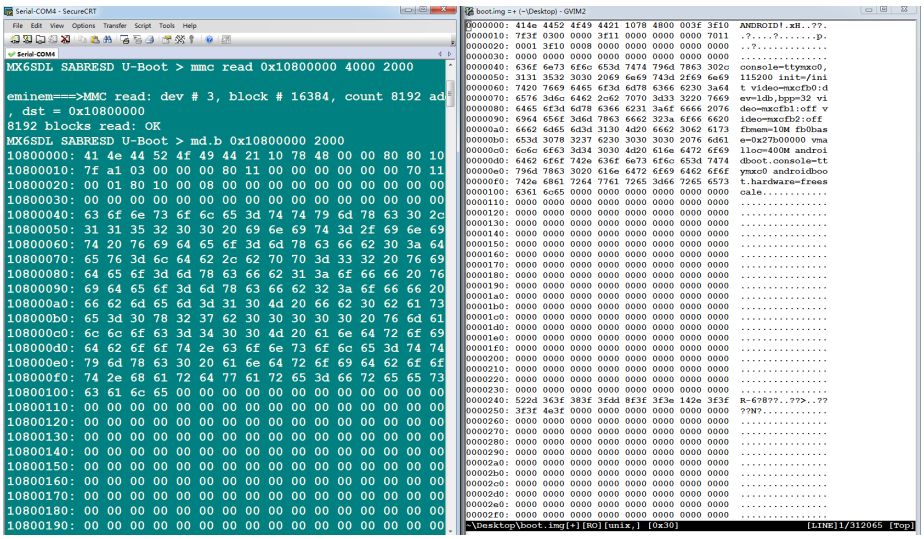


Figure 2: bootimage

pipe dd of=/dev/mmcblk0p5 bs=512” file=”files/android/system.img

根据上面的信息可以知道system.img烧写到滴5个分区
根据UBOOT里查看到的分区信息 ： 5 49153 1048575 83 可以知道第五个分区的偏移量是 49153 对应的十六进制就是 C001
所以切换到system所在分区：
MX6SDL SABRESD U-Boot > mmc dev 3 4
读到DDR中：
MX6SDL SABRESD U-Boot > mmc read 0x10800000 C001 200
在UBOOT中显示：
MX6SDL SABRESD U-Boot > md.b 0x10800000 2000
截取一段有数据的比对下：在DDR地址400的地方开始有数据

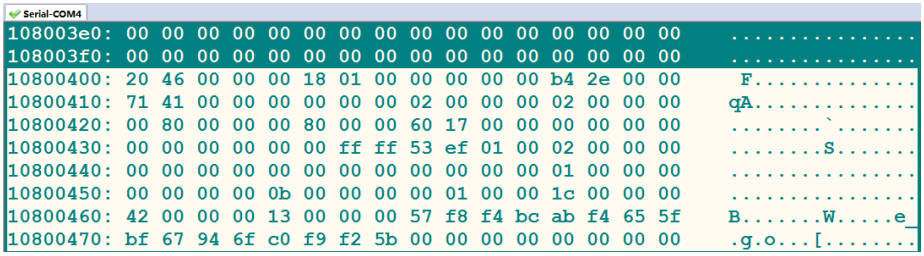
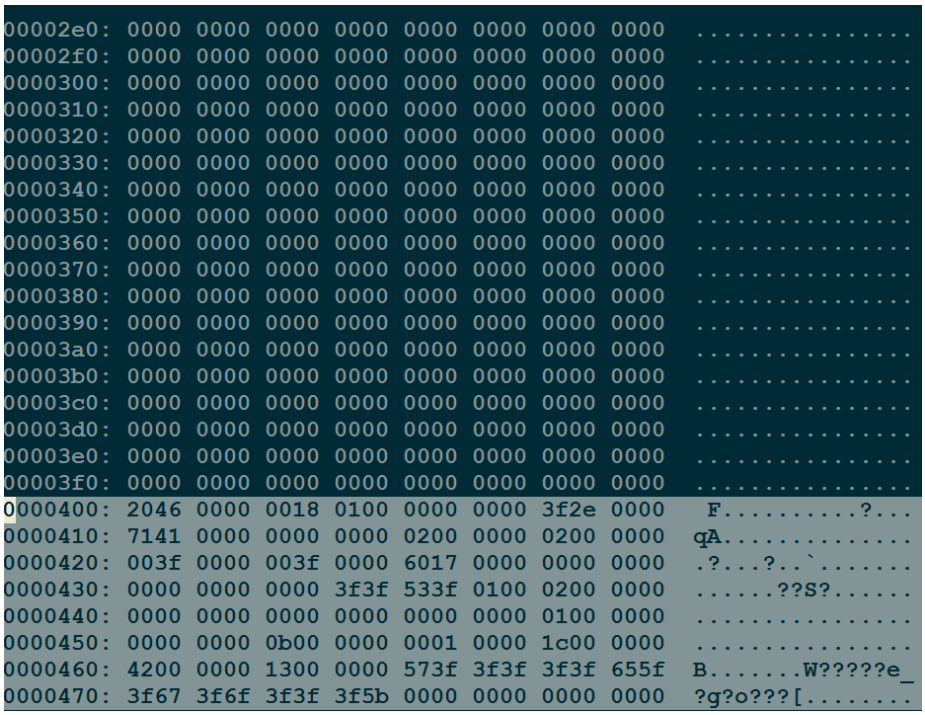


Figure 3: system_in_uboot

打开system.img也是在相同地址有相同的数据



Android fstab file.

The filesystem that contains the filesystem checker binary (typically /system) cannot
specify MF_CHECK, and must come before any filesystems that do specify MF_CHECK

/devices/platform/sdhci-esdhc-imx.1/mmc_host/mmc2 /mnt/extsd vfat defaults voldmanaged=sdcard:auto //SDCARD
/devices/platform/fsl-ehci /mnt/udisk vfat defaults voldmanaged=sdcard:auto //UDISK
/dev/block/mmcblk0p5 /system ext4 ro wait
/dev/block/mmcblk0p4 /data ext4 nosuid,nodev,nodiratime,noatime,nomblk_io_submit,noauto_da_alloc,er
wait,encryptable=footer
/dev/block/mmcblk0p6 /cache ext4 nosuid,nodev,nomblk_io_submit wait
/dev/block/mmcblk0p7 /device ext4 ro,nosuid,nodev wait
/dev/block/mmcblk0p1 /boot emmc defaults defaults
/dev/block/mmcblk0p2 /recovery emmc defaults defaults
/dev/block/mmcblk0p8 /misc emmc defaults defaults

MMC TEST

```
root@sabresd_6dq:/ # ./autorun-mmc-fdisk.sh
Checking for devnode: /dev/block/mmcblk0
autorun-mmc-fdisk.sh: PASS devnode found: /dev/block/mmcblk0

fdisk: WARNING: rereading partition table failed, kernel still uses old
table: Device or resource busy
MMC test passes

autorun-mmc-fdisk.sh: Exiting PASS

root@sabresd_6dq:/ # ./autorun-mmc-blockrw.sh
Checking for devnode: /dev/block/mmcblk0p6
autorun-mmc-blockrw.sh: PASS devnode found: /dev/block/mmcblk0p6

5+0 records in
5+0 records out
MMC test passes

autorun-mmc-blockrw.sh: Exiting PASS

root@sabresd_6dq:/ # ./autorun-mmc.sh
Checking for devnode: /dev/block/mmcblk0p6
autorun-mmc.sh: PASS devnode found: /dev/block/mmcblk0p6

10240+0 records in
10240+0 records out
5242880 bytes transferred in 3.837 secs (1366400 bytes/sec)
10240+0 records in
10240+0 records out
5242880 bytes transferred in 0.073 secs (71820273 bytes/sec)
10240+0 records in
10240+0 records out
5242880 bytes transferred in 0.072 secs (72817777 bytes/sec)
MMC test passes

autorun-mmc.sh: Exiting PASS

cat autorun-mmc.sh

#!/system/bin/sh

source /test-utils.sh

#
# Exit status is 0 for PASS, nonzero for FAIL
#
STATUS=0

run_mmc_case()
{
```

```
# Generate Test data
dd if=/dev/urandom of=/mmc_data bs=512 count=10240

dd if=/mmc_data of=/dev/block/mmcblk0p6 bs=512 count=10240
dd if=/dev/block/mmcblk0p6 of=/mmc_data1 bs=512 count=10240

cmp /mmc_data1 /mmc_data

if [ "$?" = 0 ]; then
    printf "MMC test passes \n\n"
    rm /mmc_data
    rm /mmc_data1
else
    STATUS=1
    printf "MMC test fails \n\n"
fi

}
# devnode test
check_devnode “/dev/block/mmcblk0p6”
if [ “$STATUS” = 0 ]; then
run_mmc_case
fi
print_status
exit $STATUS
```

Flash Uboot

方法1使用dd
进入系统后:
一：UBOOT的烧写

1. 使能EMMC写操作:

   ```
   echo 0 > /sys/block/mmcblk0boot0/force_ro
   ```

2. 烧写u-boot://不能少了skip=2参数

   ```
   dd if=u-boot.bin of=/dev/block/mmcblk0boot0 bs=512 seek=2 skip=2;sync
   ```

二：BOOT.IMG的烧写
烧写boot.img

```
dd if=boot.img of=/dev/block/mmcblk0p1;sync
```

方法2使用mmc write
可先做个试验：
1.先切换到bootloader分区

```
mmc dev 3 1
```

2.把emmc里的uboot读出来到DDR 10000000 的地方

```
mmc read 10000000 2 381
```

这里的381是通过下载的时候算的

3.在把uboot下载到中

loady //通过串口发送过去 默认地址是10800000

比较下下载的和读出来的：

```
cmp.b 10000000 10800400 381
```

其中我们跳过了下载的时候前0x400（1KB）的大小,只有这样比对发现才是一样的

所以要想正确下载uboot到emmc里的话：

```
mmc write 10800400 2 381
```

解释下:
10800400: 我们用loady 把uboot下载到（默认）地址是10800000
我们烧写的时候跳过了uboot的前1KB的大小
2: 表示我们跳过emmc里的前1KB大小
318: 是我下载的时候看到的UBOOT的大小算出来的
用loady下载uboot到DDR中，默认下载地址是环境变量指定的，可以手工指定

```
MX6SDL SABRESD U-Boot > loady
## Ready for binary (ymodem) download to 0x10800000 at 115200 bps…
C
Starting ymodem transfer. Press Ctrl+C to cancel.
100% 448 KB 3 KB/s 00:02:01 0 Errors

xyzModem - CRC mode, 3594(SOH)/0(STX)/0(CAN) packets, 3 retries
## Total Size = 0x00070388 = 459656 Bytes //最总的大小是 459656 Byte = 897 *
512 Byte = 897个cnt 默认 1个cnt 是512 Byte, 897 == 0x381 (十进制转十六进制)
```

有下表可以知道bootloader位于1KB的偏移量开始的地方 1KB = 1024Byte = 2blk
默认1个blk事512Byte

所以读u-boot 是mmc read 10800000 2 100 这里的2是这么算出来的

Partition Type/Index	Name	Start Offset	Size	File System	Content
N/A	BOOT Loader	1 KB	1 MB	N/A	bootloader
Primary 1	Boot	8 MB	8 MB	boot.img format, kernel + ramdisk	boot.img
Primary 2	Recovery	Follow Boot	8MB	boot.img format, kernel + ramdisk	recovery.img
Logic 5 (Extended 3)	SYSTEM	Follow Recovery	512 MB	EXT4. Mount as / system	Android system files under / system/ dir.
Logic 6 (Extended 3)	CACHE	Follow SYSTEM.	512 MB	EXT4. Mount as / cache.	Android cache for image store of OTA.
Logic 7 (Extended 3)	Device	follow CACHE	8 MB	Ext4. Mount at /vender.	To Store MAC address files.
Logic 8 (Extended 3)	Misc	Follow Device	4M	N/A	For recovery store bootloader message, reserve.
Primary 4	DATA	Follow Misc.	Total - Other images	EXT4. Mount at / data.	Application data storage for the system application and for internal media partition in /mnt/sdcard/ dir.

对于为什么要跳过这前1KB的大小，从文档中看是预留给MBR使用的:
keep the first 512bytes 做为MBR使用，所以这里预留了前1KB

4.6.1 MMC/SD/SATA memory map

The MMC/SD/SATA memory scheme is different from the NAND and NOR flash, which are deployed in the BSP software. The MMC/SD/SATA must keep the first sector (512 bytes) as the Master Boot Record (MBR) in order to use MMC/SD as the rootfs.

Upon boot up, the MBR is executed to look up the partition table to determine which partition to use for booting. The boot loader should be after the MBR. The kernel image and rootfs may be stored at any address after the boot loader. By default, the the U-Boot boot arguments uses the first FAT partition for kernel and DTB, and the following ext3 partition for the root file system. Alternatively, users can store the kernel and the DTB in any raw memory area after the boot loader. The boot arguments must be updated to match any changed memory addresses.

The MBR can be generated through the fdisk command when creating partitions in MMC/SD cards on a Linux host server.

DDR

从下面的memory map 可以看出DDR的起始地址由DDR Memory Map Config配置决定：

2.3 DDR mapping to MMDC controller ports

The table found here lists the various DDR configuration modes, and how it is mapped to DDR channels.

Memory Mapping Mode	DDR Memory Map Config[1:0] fuse value	Start Address	End Address	Total Size	MMDC channel / ports
X32 / X64 bit, fixed mapping	'00'	1000_0000	FFFF_FFFF	3840MB	MMDC #0
Dual channel (2x 32-bit), Fixed mapping (LPDDR2)	'01'	8000_0000	FFFF_FFFF	2048MB	MMDC #0
		1000_0000	7FFF_FFFF	1792MB	MMDC #1
Dual channel (2x 32-bit), Interleaved mapping (LPDDR2) [1]	'10'	1000_0000	FFFF_FFFF	3840MB	MMDC #0 , MMDC #1 (interleaved data)
Illegal	'11'				

1. In the 4KB interleaving mode, the system bus, maps each consequitive 4KB region to a 4KB region in the other MMDC port, such that "Even" 4KB spaces are mapped to MMDC0, and "Odd" 4KB regions mapped to MMDC1.

下图可以看到如果是从EMMC启动的话这个配置是看寄存器BOOT_CFG3的值：

Fusemap

Table 5-7. MMC/eMMC Boot Fusemap

Addr	7	6	5	4	3	2	1	0
0x450[7:0] (BOOT_CFG1)	0	1	1	Fast Boot: 0 - Regular 1 - Fast Boot	SD/MMC Speed 0 - High 1- Normal	Reserved	Reserved	Reserved
0x450[15:8] (BOOT_CFG2)	Bus Width: 000 - 1-bit 001 - 4-bit 010 - 8-bit 101 - 4-bit DDR (MMC 4.4) 110 - 8-bit DDR (MMC 4.4) Else - Reserved			Port Select: 00 - eSDHC1 01 - eSDHC2 10 - eSDHC3 (eMMC4.4) 11 - eSDHC4		DLL Override: 0 - Boot ROM default 1 - Apply value per fuse field MMC_DLL_DLY[3:0]	Fast Boot Acknowledge Disable: 0 - Boot Ack Enabled 1 - Boot Ack Disabled	Override Pad Settings (using PAD_SETTINGS value)
0x450[23:16] (BOOT_CFG3)	L1 I-Cache DISABLE	BT_MMU_DISABLE	DDR Memory Map default config 00 - Single DDR channel 01 - Fixed 2x32 map 10 - 4KB Interleaving Enabled 11 - Illegal	Reserved		Boot Frequencies (ARM/DDR) 0 - 792 / 528 MHz 1 - 396 / 352MHz	Reserved	Reserved

上面这个启动模式的寄存器的值地址是0x20d8004：

59.5.2 SRC Boot Mode Register 1 (SRC_SBMR1)

The Boot Mode register (SBMR) contains bits that reflect the status of Boot Mode Pins of the chip. The reset value is configuration dependent (depending on boot/fuses/IO pads).

Address: 20D_8000h base + 4h offset = 20D_8004h

Bit	31 30 29 28 27 26 25 24	23 22 21 20 19 18 17 16	15 14 13 12 11 10 9 8	7 6 5 4 3 2 1 0
R	BOOT_CFG4[7:0]	BOOT_CFG3[7:0]	BOOT_CFG2[7:0]	BOOT_CFG1[7:0]
W				
Reset	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0

SRC_SBMR1 field descriptions

Field	Description
31–24 BOOT_ CFG4[7:0]	Please refer to fuse map.
23–16 BOOT_ CFG3[7:0]	Please refer to fuse map.
15–8 BOOT_ CFG2[7:0]	Please refer to fuse map.
7–0 BOOT_ CFG1[7:0]	Please refer to fuse map.

进入系统后用memtool查看BOOT_CFG3 是0 所以DDR的起始地址就是第一张图里的1000_0000：

```
root@sabresd_6dq:/ # memtool SRC.SBMR1
SOC is mx6dl

SRC Addr:0x20d8000
SRC.SBMR1 Addr:0x020D8004 Value:0x00005860 - The Boot Mode register (SBMR) contains bits that reflect the status of Boot Mode Pins of the chip.
SRC.SBMR1.BOOT_CFG1(0..7) :0x60
Please refer to fuse map.
SRC.SBMR1.BOOT_CFG2(8..15) :0x58
Please refer to fuse map.
SRC.SBMR1.BOOT_CFG3(16..23) :0x0
Please refer to fuse map.
SRC.SBMR1.BOOT_CFG4(24..31) :0x0
Please refer to fuse map.
```

现在用的板的DDR大小是1G的,即0x40000000：
所以DDR的映射地址是从1000_0000 到 4fff_ffff的地址空间

LCD LVDS LDB

LVDS

```
root@sabresd_6dq:/ # find -name “*disp_dev*”
./sys/devices/platform/mxc_sdc_fb.0/graphics/fb0/fsl_disp_dev_property
//ldb //BG
./sys/devices/platform/mxc_sdc_fb.0/graphics/fb1/fsl_disp_dev_property
//overlay //FG
“ldb=spl0/1” split mode on DI0/1
“ldb=dul0/1” dual mode on DI0/1
“ldb=sin0/1” single mode on LVDS0/1
“ldb=sep0/1” separate mode begin from LVDS0/1
there are two LVDS channels(LVDS0 and LVDS1) which can transfer video
datas, there two channels can be used as split/dual/single/separate mode.
split mode means display data from DI0 or DI1 will send to both channels
LVDS0+LVDS1.
dual mode means display data from DI0 or DI1 will be duplicated on LVDS0
and LVDS1, it said, LVDS0 and LVDS1 has the same content.
single mode means only work for DI0/DI1->LVDS0 or DI0/DI1->LVDS1.
separate mode means you can make DI0/DI1->LVDS0 and DI0/DI1->LVDS1 work
at the same time.
```

TS

goodix

CAMERA

V4L2 ioctl call flow

```
    ret_fast_syscall
        sys_ioctl
            do_vfs_ioctl
```

```
        v4l2_ioctl//v4l2-dev.c
            video_usercopy//v4l2-ioctl.c
           mxc_v4l_do_ioctl(struct file *file, //mxc_v4l2_capture.c
              mxc_v4l2_s_ctrl(cam_data *cam, struct v4l2_control *c) //mxc_v4l2_capture.c
                 vidioc_int_s_ctrl(cam->sensor, c); //mxc_v4l2_capture.c
                    v4l2_int_ioctl_0(vidioc_int_s_ctrl_num)//v4l2-int-device.c
                       /* Adapted from search_extable in extable.c. */
```

```
find_ioctl(d->u.slave, cmd, (v4l2_int_ioctl_func *)no_such_ioctl_0))
            while (first <= last) {
        const struct v4l2_int_ioctl_desc *mid;
             mid = (last - first) / 2 + first;
                if (mid->num < cmd)
                    first = mid + 1;
                else if (mid->num > cmd)
                    last = mid - 1;
                else
                    return mid->func;
            }
```

V4L2 TEST

FSL-UT-V4L2-003:
overlay模式测试(overlay直接由CAMERA到LCD不经过CPU)：
mxc_v4l2_overlay.out -iw 640 -ih 480 -it 0 -il 0 -ow 160 -oh 160 -ot 20 -ol 20 -r 0 -t 50 -do 0 -fg -fr 30

调整输出为640X480：
mxc_v4l2_overlay.out -iw 640 -ih 480 -it 0 -il 0 -ow 640 -oh 480 -ot 20 -ol 20 -r 0 -t 50 -do 0 -fg -fr 30

调整输出为1024X768：
mxc_v4l2_overlay.out -iw 640 -ih 480 -it 0 -il 0 -ow 1024 -oh 768 -ot 20 -ol 20 -r 0 -t 50 -do 0 -fg -fr 30

FSL-UT-V4L2-006
TV-Out test:
./mxc_v4l2_output.out -iw 320 -ih 240 -ow 720 -oh 576
/mxc_v4l2_output.out -iw 320 -ih 240 -ow 12800 -oh 800 全屏输出

FSL-UT-V4L2-008 // 详细请参考该文档
MIPI CSI preview:
mxc_v4l2_overlay.out -iw 640 -ih 480 -ow 640 -oh 480 -m 0 -di /dev/video1 -fg

FSL-UT-V4L2-009 // 详细请参考该文档
MIPI CSI Capture:

使用下面的命令来测试：采集视频和播放视频
mxc_v4l2_capture.out -iw 2592 -ih 1944 -ow 640 -oh 480 -m 6 -r 0 -c 50 -fr 15 -d /dev/video1 test.yuv
mxc_v4l2_output.out -iw 640 -ih 480 -ow 640 -oh 480 -r 0 -fr 30 test.yuv

AUDIO

TINY ALSA

参考文章:http://blog.csdn.net/kangear/article/details/38139669

1.编译tinyalsa配套工具

$ mmm external/tinyalsa/

编译完后会产生tinyplay/tinymix/tinycap等等工具。
tinymix: 查看配置混音器
tinyplay: 播放音频
tinycap: 录音

2.查看当前系统的声卡
[python] view plaincopy在CODE上查看代码片派生到我的代码片

```
root@android:/ # cat /proc/asound/cards
 0 [RKRK616        ]: RK_RK616 - RK_RK616
                      RK_RK616
 1 [ROCKCHIPSPDIF  ]: ROCKCHIP-SPDIF - ROCKCHIP-SPDIF
                      ROCKCHIP-SPDIF
root@android:/ #
```

3.tinymix查看混响器

tinymix使用方法a.不加任何参数-显示当前配置情况 b.tinymix [ctrl id] [var]不加[var]可以查看该[ctrl id]可选选项。
[python] view plaincopy在CODE上查看代码片派生到我的代码片

```
root@android:/ # tinymix
Number of controls: 7
ctl type    num name                                value
0   ENUM    1   Playback Path                       OFF
1   ENUM    1   Capture MIC Path                    MIC OFF
2   ENUM    1   Voice Call Path                     OFF
3   ENUM    1   Voip Path                           OFF
4   INT 2   Speaker Playback Volume             0 0
5   INT 2   Headphone Playback Volume           0 0
6   ENUM    1   Modem Input Enable                  ON
```

例：将输出切换到扬声器

root@android:/ # tinymix 0 SPK

关于tinymix小结：

通过观察发现，Android系统的声音音量的调节并没有直接使用tinyalsa，而基于上层软件实现，因为无论上层

当通过蓝牙播放音乐的时候，已经不经过alsa了。tinymix查看得都处理关闭状态，因为Android4.2的蓝牙协议

4.使用tinyplay播放wav音乐

这个只是一个最基本的播放器，所以不支持播放MP3等等压缩过格式的音乐。没有学会使用前，网上都说很麻烦，
[python] view plaincopy在CODE上查看代码片派生到我的代码片

```
root@android:/ # tinyplay /sdcard/0_16.wav
Playing sample: 2 ch, 44100 hz, 16 bit
root@android:/ #
```

注：播放之前得首先使用tinymix把通道设置好，上文中已经给出了设置到扬声器中的例子;由于播放时使用的最

5.tinycap使用
root@android:/ # tinycap /sdcard/test.wav
可以进行录音

ANDROID

pack and unpack system.img

参考文章http://blog.csdn.net/free2o/article/details/8969291

用simg2img 工具把system.img 转为为ext4 文件格式,如果已经是EXT4格式的话就不需要这步
将EXT4格式的镜像挂在到一个目录下，该目录就是system里的东西

```
mount -t ext4 -o loop system.ext4.img  tmp_mount_dir
```

修改后就可以重新打包

```
mkuserimg.sh my_system_dir new_system.img ext4 system 293601280 op/root/file_contexts
```

mount sd card

ls /dev/block/mmcblk1
mmcblk1 mmcblk1p1

SD 格式为FAT16 / FAT32 / VFAT

```
mount -t vfat /dev/block/mmcblk1p1 test/
```

Stand alone compile for android

参考文章:http://blog.chinaunix.net/uid-22028680-id-3324714.html

直接使用NDK里的脚本生成standalone的工具链，因为目前使用的是ANDOIRD4.3所以就指定为android-4

/home/mobz/Downloads/android-ndk-r8b/build/tools/make-standalone-toolchain.sh
-platform=android-4 -install-dir=/home/mobz/Desktop/my_android_standalone_toolschain

/home/mobz/Downloads/android-ndk-r8b/build/tools/make-standalone-toolchain.sh
-platform=android-4 -install-dir=/home/mobz/standalone_toolchain

之后就可以直接用安装好的工具链里的交叉编译器来使用

NDK用的是下面这个：
wget http://dl.google.com/android/ndk/android-ndk-r8b-linux-x86.tar.bz2

Tablet Layout

The following figure shows the typical tablet layout:

- The device mode layout is aligned with the screen layout and front camera layout.
- The sensor does not report a rotation when the user holds the device as the mold layout. It reports the right Y rotation if the device has a Y rotation.

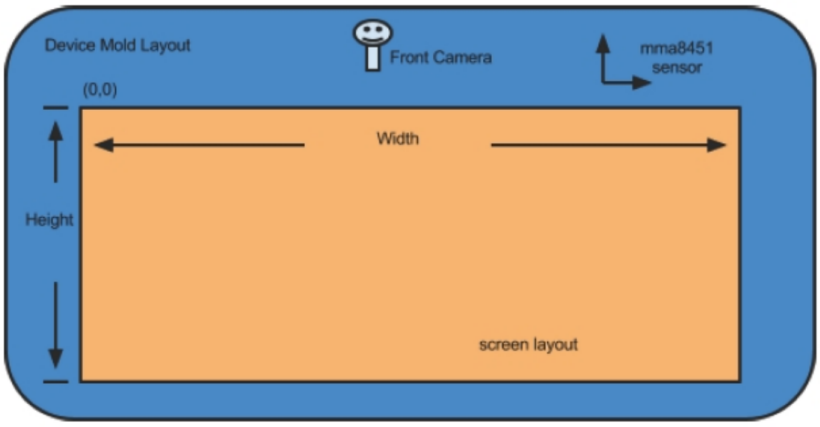


Figure 4: tablet layout

BusyBox

参考文章http://blog.csdn.net/skdev/article/details/45094637

BootChart

参考文章http://blog.csdn.net/andyhuabing/article/details/23669007

1、编译android中的bootchart(缺省时不被编译)
在android源码system/core/init/目录执行： mm INIT_BOOTCHART=true -B

或者直接修改 Android.mak文件
LOCAL_PATH:= $(call my-dir)
include $(CLEAR_VARS)
INIT_BOOTCHART := true

2、将新编译的android系统镜像烧录到android设备中。//烧写boot.img

3、在手机上创建文件/data/bootchart-start，其内容是bootchart的采样时间
adb shell ‘echo 120 > /data/bootchart-start’

4、重启设备，init运行时将自动创建文件夹/data/bootchart/
并在其中保存采样数据，采样数据由5个文件组
-rw-rw-rw- root root 732 1970-01-01 08:00 header
-rw-r--r-- root root 0 1970-01-01 08:00 kernel_pacct
-rwxr-xr-x root root 517150 2014-04-09 12:06 proc_diskstats.log
-rwxr-xr-x root root 2783967 2014-04-09 12:06 proc_ps.log
-rwxr-xr-x root root 152090 2014-04-09 12:06 proc_stat.log

5、文件打包
在/data/bootchart/目录下执行命令：

busybox tar -czf bootchart.tgz header proc_stat.log proc_ps.log proc_diskstats.log kernel_pacct

6.在电脑上安装bootchart工具

使用老版本的安装包bootchart_0.9-0ubuntu6_all.deb，
可以在此下载http://download.csdn.net/detail/sckgenius/7166477
先sudo apt-get install librsvg2-bin，
然后sudo dpkg -i bootchart_0.9-0ubuntu6_all.deb

7、执行下面的命令生成分析结果图表，缺省生成png格式的图像文件bootchart.png：

java -jar /usr/share/bootchart/bootchart.jar /path/to/bootchart.tgz

UBOOT

config:
make mx6dl_sabresd_android_config ARCH=arm CROSS_COMPILE= ‘pwd ‘/prebuilts/gcc/linux-x86/arm/arm-eabi-4.6/bin/arm-eabi- O=out

compile:
make ARCH=arm CROSS_COMPILE= ‘pwd ‘/prebuilts/gcc/linux-x86/arm/arm-eabi-4.6/bin/arm-eabi- O=out -j8

clean:
make ARCH=arm CROSS_COMPILE=‘pwd ‘/prebuilts/gcc/linux-x86/arm/arm-eabi-4.6/bin/arm-eabi- O=out distclean

uboot_i2c

有许多外设芯片都通过i2c总线接到主芯片上，主芯片通过i2c发命令去初始化外设芯片

1. I2c命令

1.1 i2c总线搜索
u-boot> i2c probe
搜索某条i2c（如i2c2）总线上连接的所有i2c设备。

1.2 读i2c外设
举例：读取i2c地址为0x20的外设芯片，从第0个寄存器开始读，共读16个寄存器。
u-boot> i2c md 0x20 0 16
md —— i2c 读
0x20 —— i2c外设的地址，每个i2c外设都有一个独立的地址，一般是外设芯片出厂时就已经定好。
0 —— 从外设芯片的第0号寄存器开始读
16 —— 总共读16个寄存器

1.3 写i2c外设
举例：写i2c地址为0x20的外设芯片，写它的第01号寄存器，将它第01号寄存器的值写为0x12。
u-boot> i2c mw 0x20 01 0x12
mw —— i2c 写
0x20 —— i2c外设的地址，每个i2c外设都有一个独立的地址，一般是外设芯片出厂时就已经定好。
01 —— 写外设芯片的第01号寄存器
0x12 —— 将它的值写为0x12

针对室内机IMX6DL:
在UBOOT里读I2C（电量计的值）
i2c md 62 0 a //其中绿色的表示的就是电量值，可以参考芯片手册
0000: 6f 05 34 04 63 4d 82 36 02 00

KERNEL

savedefconfig

make config配置：其中indoor_defconfig是用.config重新生成的文件，需要保存到arch/arm/configs/下面
make O=‘pwd ‘/out/target/product/sabresd_6dq/obj/KERNEL ARCH=arm CROSS_COMPILE=‘pwd ‘/prebuilts/gcc/linux-x86/arm/arm-eabi-4.6/bin/arm-eabi- indoor_defconfig -C kernel_imx

make distclea:
make O=‘pwd ‘/out/target/product/sabresd_6dq/obj/KERNEL ARCH=arm

CROSS_COMPILE=‘pwd‘/prebuilts/gcc/linux-x86/arm/arm-eabi-4.6/bin/arm-eabi- distclean -C kernel_imx

将生成的.config文件从新生成defconfig文件，注意，因为.config 内容包含def-config里的所有内容外加平台相关的 make savedefconfig:
make O=‘pwd‘/out/target/product/sabresd_6dq/obj/KERNEL ARCH=arm CROSS_COMPILE=‘pwd‘/prebuilts/gcc/linux-x86/arm/arm-eabi-4.6/bin/arm-eabi- savedefconfig

MISC

tmux

LIBEVENT:
[libevent-2.0.22-stable]#./configure -prefix=/home/mobz/Downloads/all_tmp
[libevent-2.0.22-stable]# make && make install

NCURSES:
[ncurses-5.9]# ./configure -prefix=/home/mobz/Downloads/all_tmp
[ncurses-5.9]# make && make install

编译tmux时的配置方法

其中，把libevetn 和 ncurses编译生成的东西都装在了all_tmp里了
./configure LDFLAGS=“-L/home/mobz/Downloads/all_tmp/lib” -prefix=$PWD/tmp CPPFLAGS=“-I/home/mobz/Downloads/all_tmp/include”

这里不能用多线程编译，只能用单线程，否则会有错误
cp ../all_tmp/include/ncurses/* ../all_tmp/include/

pandoc

指定xelatex 和字体
pandoc x.md -o x.pdf -latex-engine=xelatex -V mainfont=“SimSun”
参考文章http://www.cnblogs.com/loongfee/archive/2013/07/29/3223957.html

memtool

编译该工具直接使用mmm在android顶层目录编译即可

root@sabresd_6dq:/ # ./memtool
Usage:

Read memory: memtool [-8 | -16 | -32]
Write memory: memtool [-8 | -16 | -32] =

List SOC module: memtool . or memtool . //查看系统内存映射关系
Read register: memtool UART1.

memtool UART1.UMCR
memtool UART1.UMCR.MDEN
memtool UART1.-
Write register: memtool UART.UMCR=0x12
memtool UART.UMCR.MDEN=0x1
Default access size is 32-bit.

Address, count and value are all in hex.

使用方法举例：
例子1：
原理图中有一个GPIO2接了USR_DEF_RED_LED

在代码里搜索可知，当GPIO_1_2作为GPIO模式的时候是第一组GPIO，对应GPIO1

```
#define MX6DL_PAD_GPIO_2__GPIO_1_2
        IOMUX_PAD(0x05F4, 0x0224, 5, 0x0000, 0, NO_PAD_CTRL)
#define MX6DL_PAD_GPIO_2__USDHC2_WP
        IOMUX_PAD(0x05F4, 0x0224, 6, 0x0000, 0, MX6DL_USDHC_PAD_CTRL)
#define MX6DL_PAD_GPIO_2__MLB_MLBDAT
        IOMUX_PAD(0x05F4, 0x0224, 7, 0x08E0, 1, MX6DL_MLB150_PAD_CTRL)

#define MX6DL_PAD_GPIO_3__ESAI1_HCKR
        IOMUX_PAD(0x05F8, 0x0228, 0, 0x0834, 1, NO_PAD_CTRL)
~/indoor/imx6dl/kernel_imx/arch/arm/plat-mxc/include/mach/iomux-mx6dl.h[
```

在数据手册里如下：

GPIO memory map

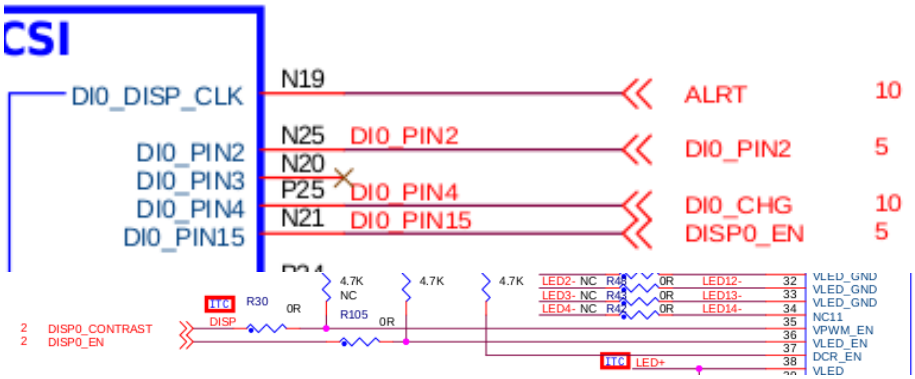
Absolute address (hex)	Register name	Width (in bits)	Access	Reset value	Section/ page
209_C000	GPIO data register (GPIO1_DR)	32	R/W	0000_0000h	28.4.1/1380

所以要使用memtool来操作的话只要读或写这个寄存器相应的值即可
先读出来看下是多少：
root@sabresd_6dq:/ # ./memtool -32 GPIO1.DR
SOC is mx6dl
GPIO1 Addr:0x209c000
GPIO1.DR Addr:0x0209C000 Value:0x211C087D - The 32-bit GPIO_DR register stores data that is ready to be driven to the output lines.
GPIO1.DR.DR(0..31) :0x211c087d 现在BIT2是高，LED是亮的
Data bits.

给相应的位写值：
root@sabresd_6dq:/ # ./memtool -32 GPIO1.DR=211C0879 BIT2写0，LED灭了

SOC is mx6dl
write 0x211C0879 to 0x0209C000

例子2：
原理图上DI0_PIN15需要配置成GPIO模式使用GPIO4_17这个引脚



根据代码可以知道DI0_PIN15对应的GPIO是BANK4 的地17根，即GPIO4

```
#define MX6DL_PAD_DI0_PIN15__GPIO_4_17
        IOMUX_PAD(0x03B4, 0x00A0, 5, 0x0000, 0, NO_PAD_CTRL)
#define MX6DL_PAD_DI0_PIN15__MMDC_MMDC_DEBUG_1
        IOMUX_PAD(0x03B4, 0x00A0, 6, 0x0000, 0, NO_PAD_CTRL)
#define MX6DL_PAD_DI0_PIN15__PL301_SIM_MX6DL_PER1_HSIZE_0
        IOMUX_PAD(0x03B4, 0x00A0, 7, 0x0000, 0, NO_PAD_CTRL)
#define MX6DL_PAD_DI0_PIN15__LCDIF_RD_E
        IOMUX_PAD(0x03B4, 0x00A0, 8, 0x0000, 0, NO_PAD_CTRL)

#define MX6DL_PAD_DI0_PIN2__IPU1_DI0_PIN2
        IOMUX_PAD(0x03B8, 0x00A4, 0, 0x0000, 0, MX6DL_DISP_PAD_CLT)
~/indoor/imx6dl/kernel_imx/arch/arm/plat-mxc/include/mach/iomux-mx6dl.h
```

先查看DI0_PIN15模式，发现不是我们需要的GPIO模式
root@sabresd_6dq:/ # ./memtool -32 IOMUXC.SW_MUX_CTL_PAD_DI0_PIN15
SOC is mx6dl
IOMUXC Addr:0x20e0000
IOMUXC.SW_MUX_CTL_PAD_DI0_PIN15 Addr:0x020E00A0 Value:0x00000000 -
IOMUXC.SW_MUX_CTL_PAD_DI0_PIN15.MUX_MODE(0..3) :0x0
MUX Mode Select Field.
IOMUXC.SW_MUX_CTL_PAD_DI0_PIN15.SION(4..4) :0x0
Software Input On Field.

配置DI0_PIN15为GPIO模式，对应的GPIO为GPIO4_17
root@sabresd_6dq:/ # ./memtool -32 IOMUXC.SW_MUX_CTL_PAD_DI0_PIN15
SOC is mx6dl
IOMUXC Addr:0x20e0000
IOMUXC.SW_MUX_CTL_PAD_DI0_PIN15 Addr:0x020E00A0 Value:0x00000005 -
IOMUXC.SW_MUX_CTL_PAD_DI0_PIN15.MUX_MODE(0..3) :0x5
MUX Mode Select Field.
IOMUXC.SW_MUX_CTL_PAD_DI0_PIN15.SION(4..4) :0x0

Software Input On Field.

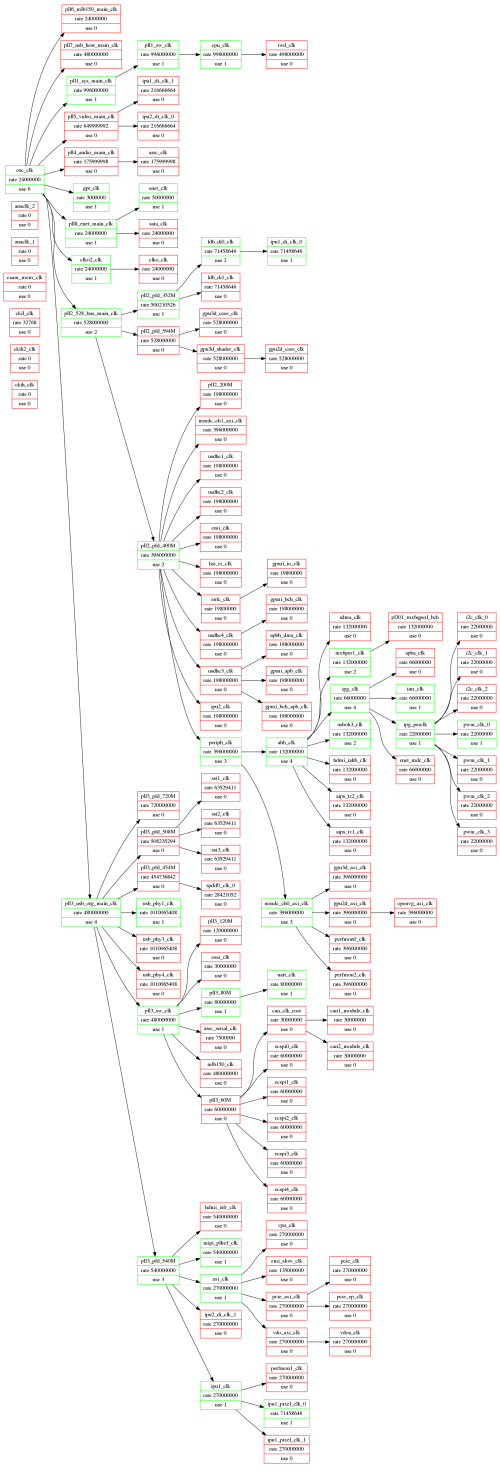
配置GPIO4_17为输出信号：
root@sabresd_6dq:/ # ./memtool GPIO4.GDIR=624600
SOC is mx6dl
write 0x00624600 to 0x020A8004

拉高GPIO4_17:
root@sabresd_6dq:/ # ./memtool -32 GPIO4.DR=63820
SOC is mx6dl
write 0x00063820 to 0x020A8000

置低GPIO4_17:
root@sabresd_6dq:/ # ./memtool -32 GPIO4.DR=43820
SOC is mx6dl
write 0x00043820 to 0x020A8000

imx6dl clocks

在平板上执行：
root@sabresd_6dq:/ # ./dump-clocks-dot.sh > d.txt
得到d.txt数据后在LINUX PC上执行(其中dot需要安装软件sudo apt-get install graphviz获得)：
dot -Tpng -O d.txt


pl00_usb150_main_clk
rate 24000000
use 0
osc_clk
rate 24000000
use 6
pl07_usb_host_main_clk
rate 480000000
use 0
pl01_sys_main_clk
rate 996000000
use 1
pl05_video_main_clk
rate 649999992
use 0
pl04_audio_main_clk
rate 175999968
use 0
apll_clk
rate 3000000
use 1
armclk_2
rate 0
use 0
armclk_1
rate 0
use 0
count_mcnts_clk
rate 0
use 0
clk1_clk
rate 32768
use 0
clk2_clk
rate 0
use 0
clk3_clk
rate 0
use 0
pl01_sys_clk
rate 996000000
use 1
ipu1_di_clk_1
rate 216666664
use 0
ipu2_di_clk_0
rate 216666664
use 0
asrc_clk
rate 175999968
use 0
ecspi_clk
rate 60000000
use 1
sata_clk
rate 24000000
use 0
ahb2_clk
rate 24000000
use 1
ahbc_clk
rate 24000000
use 0
pl02_pfd_352M
rate 300233926
use 1
pl02_pfd_594M
rate 528000000
use 0
pl02_528_bus_main_clk
rate 528000000
use 2
ldb_di0_clk
rate 71459846
use 2
ldb_di1_clk
rate 71459846
use 0
gpu3d_core_clk
rate 528000000
use 0
gpu3d_shader_clk
rate 528000000
use 0
ipu1_di_clk_0
rate 71459846
use 1
gpu3d_core_clk
rate 528000000
use 0
pl02_pfd_393M
rate 198000000
use 0
mmdc_ch1_axi_clk
rate 396000000
use 0
usdhc1_clk
rate 198000000
use 0
usdhc2_clk
rate 198000000
use 0
emi_clk
rate 198000000
use 0
pl02_pfd_400M
rate 396000000
use 2
bus_clk
rate 198000000
use 0
emi_clk
rate 198000000
use 0
usdhc4_clk
rate 198000000
use 0
usdhc3_clk
rate 198000000
use 0
ipu2_clk
rate 198000000
use 0
pwm1_clk
rate 198000000
use 0
gpu3d_clk
rate 198000000
use 0
gpu3d_shader_clk
rate 198000000
use 0
qspi4_data_clk
rate 198000000
use 0
gpu3d_mem_clk
rate 198000000
use 0
gpu3d_hcls_mem_clk
rate 198000000
use 0
ahb_clk
rate 132000000
use 4
pl03_pfd_720M
rate 720000000
use 0
pl03_pfd_508M
rate 508235294
use 0
pl03_pfd_454M
rate 454736842
use 0
pl03_sw_clk
rate 48000000
use 1
usdhc_clk
rate 198000000
use 0
mmdc_ch0_axi_clk
rate 396000000
use 3
pwm1_clk
rate 66000000
use 0
pwm2_clk
rate 66000000
use 0
pwm3_clk
rate 66000000
use 0
pwm4_clk
rate 66000000
use 0
ipu1_di0_clk
rate 66000000
use 0
ipu1_di1_clk
rate 66000000
use 0
ipu2_di0_clk
rate 66000000
use 0
ipu2_di1_clk
rate 66000000
use 0
hsi_tx_clk
rate 66000000
use 0
pcie_axi_clk
rate 250000000
use 0
sata_clk
rate 250000000
use 0
usb_otg_ahb
rate 125000000
use 0
usboh3_clk
rate 125000000
use 2
ecspi_root_clk
rate 60000000
use 0
can_root_clk
rate 60000000
use 0
gpt_ipg_clk
rate 66000000
use 0
spdif_ipg_clk
rate 66000000
use 0
sai1_ipg_clk
rate 66000000
use 0
sai2_ipg_clk
rate 66000000
use 0
sai3_ipg_clk
rate 66000000
use 0
eim_slow_clk
rate 132000000
use 0
vdo_axi_clk
rate 270000000
use 0
vdoa_clk
rate 270000000
use 0
ipu1_clk
rate 270000000
use 1
ipu2_clk
rate 270000000
use 1
ldb_di0_clk
rate 71459846
use 1
ldb_di1_clk
rate 71459846
use 1
ipu1_di0_clk
rate 71459846
use 1
ipu1_di1_clk
rate 71459846
use 1
ipu2_di0_clk
rate 71459846
use 1
ipu2_di1_clk
rate 71459846
use 1
pl03_pfd_540M
rate 540000000
use 1
pl03_pfd_720M
rate 720000000
use 0
pl03_pfd_508M
rate 508235294
use 0
pl03_pfd_454M
rate 454736842
use 0
pl03_sw_clk
rate 48000000
use 1
pl03_120M
rate 120000000
use 0
emi_clk
rate 30000000
use 0
pl03_80M
rate 80000000
use 1
asrc_serial_clk
rate 7500000
use 0
asrc_clk
rate 7500000
use 0
asrc_clk
rate 7500000
use 0
asrc

uboot logo bmp

烧写BMP文件
dd if=denx.bmp of=/dev/block/mmcblk0 bs=1 seek=1048576 skip=54

CONFIG_FB_BASE = 27b00000
uboot会吧BMP读到FB上：其中已经去掉了钱54byte的头部信息
md.b 27b00000 100

制作一个24bpp的BMP文件
jpegtopnm logo.jpg | ppmquant 31 | ppmtobmp -bpp 24 > logo.bmp

QEMU

启动QEMU： ./arm-softmmu/qemu-system-arm -M arm-generic-fdt-plnx -machine linux=on -serial /dev/null -serial mon:stdio -display none -kernel ./uImage -dtb ./devicetree.dtb - initrd ./uramdisk.image.gz

下载QEMU git clone git://github.com/Xilinx/qemu.git

下载pixman,解压到qemu的相应目录，这里其实可以直接用git下载，不需要手工去下载 tar xzvf pixman_0.30.2.orig.tar.gz -C pixman/ ./configure && make && sudo make install

下载libcrypt: tar jxvf libgcrypt11_1.5.3.orig.tar.bz2 ./configure && make && sudo make install

下载libgpg: tar jxvf libgpg-error_1.12.orig.tar.bz2 ./configure && make && sudo make install

下载dtc: git submodule update - init dtc

配置QEMU： ./configure - target-list=“arm-softmmu” - enable-fdt - disable-kvm make -j8

KGDB

开发板上的设置：
bootargs设置：
setenv bootargs kgdboc=ttymxc0,115200 kgdbwait init=/init video=mxcfb0:dev=ldb,LDBXGA,if=RGB24, bpp=18 ldb=sin0 video=mxcfb1:off video=mxcfb2:off fbmem=10M fb0base=0x27b00000 vmalloc=400M
androidboot.console=ttymxc0 androidboot.hardware=freescale

设置后就可以在UBOOT下执行run bootcmd 让系统启动了：
MX6SDL SABRESD U-Boot > run bootcmd

启动后会卡在：
[4.977516] kgdb: Registered I/O driver kgdboc.
[4.982200] kgdb: Waiting for connection from remote gdb…

此时就可以在HOST主机上连接该开发板了，接下来是在HOST上的操作：

这里因为需要访问到/dev/ttyUSB0，而我当前用户是mobz使用GDB后就没有权限用该设备了，所以切换到了root用户：
su //切换到root用户

root@mobz-lenovo:/home/mobz/Desktop/new_indoor/imx6dl# source build/envsetup.sh
Which would you like? [aosp_arm-eng] sabresd_6dq-eng

使用GDB调试vmlinux
root@mobz-lenovo:/home/mobz/Desktop/new_indoor/imx6dl# arm-eabi-gdb kobj/vmlinux
进如后设置相关的参数：

(gdb) set remotebaud 115200
(gdb) target remote /dev/ttyUSB0

另外一种方法进入KGDB调试模式：
不在bootargs里设置kgdb的参数，而是进入系统后设置：
进入（开发板）系统后：
设置参数：
echo “ttymxc0,115200” > /sys/module/kgdboc/parameters/kgdboc
输出成功后有下面的信息：
kgdb: Registered I/O driver kgdboc.

开启调试：
echo g > /proc/sysrq-trigger
进入后的信息：
SysRq : DEBUG
Entering KGDB

在HOST机器上连接：
root@mobz-lenovo:/home/mobz/Desktop/new_indoor/imx6dl# arm-eabi-gdb kobj/vmlinux
(gdb) set remotebaud 115200
(gdb) target remote /dev/ttyUSB0

内核里关于KDB的文档：

参考https://www.kernel.org/pub/linux/kernel/people/jwessel/kdb/index.html

MARKDOWN

加粗

this is a normal line

this is a bord line 4 space ahead

this is anormal line

换行

空格+空格+回车换行，所以在每行最后需要有两个空格

My Ubuntu

firefox flash player

安装方法：
1. 下载Adobe Flash Player:
请从Adobe官方下载，也可以从这个URL下载，这个URL也是官方的链接：
http://fpdownload.macromedia.com/get/flashplayer/pdc/11.2.202.235/install_flash_player_11_linux.x86_64.tar.gz

(1) 将libflashplayer.so拷贝到Firefox的Plugin目录：
cp libflashplayer.so /usr/lib/mozilla/plugins/

(2) 将usr目录下的所有文档拷贝到系统的/usr目录下：
cp -r ./usr/* /usr/

上网配置

step 1 :
[~]# cat /etc/network/interfaces
interfaces(5) file used by ifup(8) and ifdown(8)
auto eth0
iface eth0 inet static
address 192.168.1.44
netmask 255.255.255.0
gateway 192.168.1.1

step 2:
[~]# cat /etc/resolvconf/resolv.conf.d/base
nameserver 192.168.1.1

step 3:
删除/etc/NetworkManager/system-connections

VirtulBox

sudo dpkg -i virtualbox-5.0_5.0.4-102546$_{\text{Ubuntu}}$trusty_amd64.deb.0

Pandoc入门

参考文章http://www.360doc.com/content/13/0319/22/11644963_272572233.shtml

Linux下安装TeXLive 2015

参考文章http://seisman.info/install-texlive-under-linux.html
$ sudo apt-get install libdigest-perl-md5-perl perl-tk
官方镜像: http://mirrors.ctan.org/systems/texlive/Images/texlive2015.iso
USTC镜像：http://mirrors.ustc.edu.cn/CTAN/systems/texlive/Images/texlive2015.iso
Linux下可以用wget、axel，windows下可以用迅雷，怎么快怎么来。
挂载ISO镜像
$ su
# mount -o loop texlive2015.iso /mnt/
# cd /mnt
# ./install-tl

出现选项后，输入I直接安装（也可以更改选项）。不出意外的话，5分钟应该就OK了，然后退出root用户。
环境变量

在当前用户的~/.bashrc中加入如下语句：

```
# TeX Live 2015
export MANPATH=${MANPATH}:/usr/local/texlive/2015/texmf-dist/doc/man
export INFOPATH=${INFOPATH}:/usr/local/texlive/2015/texmf-dist/doc/info
export PATH=${PATH}:/usr/local/texlive/2015/bin/x86_64-linux
```

卸载ISO镜像
$ cd
$ sudo umount /mnt/
更新TeXLive
可以使用如下命令更新TeXLive宏包：
$ su
# 更新TeXLive包管理器tlmgr
# tlmgr update -self
# 更新TeXLive的全部包
# tlmgr update -all
默认情况下，会自动搜索合适的镜像来更新，也可以使用-repository选项指定了要使用哪一个CTAN镜像
比如USTC镜像:
tlmgr update -self -repository http://mirrors.ustc.edu.cn/CTAN/systems/texlive/tlnet/
tlmgr update -all -repository http://mirrors.ustc.edu.cn/CTAN/systems/texlive/tlnet/
比如阿里云镜像:
tlmgr update -self -repository http://mirrors.aliyun.com/CTAN/systems/texlive/tlnet/
tlmgr update -all -repository http://mirrors.aliyun.com/CTAN/systems/texlive/tlnet/

如果希望在图形界面下升级，可以使用如下命令调出tlmgr的中文图形界面：
$ su
# tlmgr -gui -gui-lang zh_CN
安装额外的字体
TeXLive 2015在使用xeLaTeX处理中文时，有自己的默认字体。大多数Linux发行版下，都使用自带的Fandol字体
如果想要使用Windows字体，可以将字体文件复制到~/.fonts目录下，并在tex源码中指定字体选项即可

ubuntu下安装宋体simsun 参考文章http://blog.sina.com.cn/s/blog_54dd80920101bar7.html

```
sudo cp simsun.ttc /usr/share/fonts
cd /usr/share/fonts
sudo chmod 644 simsun.ttc
```
更新字体缓存:
```
sudo mkfontscale
sudo mkfontdir
sudo fc-cache -fsv
```

电脑基本配置

参考文章http://blog.codinglabs.org/articles/getting-started-with-ubuntu.html

免密码输入登入

在mobz主机端生成公钥和私钥对
```
ssh-keygen -t rsa
```
把公钥拷贝到远程服务器上：
```
scp /home/mobz/.ssh/id_rsa.pub zhangt@192.168.1.135:/home/zhangt/.ssh/authorized_keys
```

设置默认网关

```
sudo route add default gw 10.1.3.1
```

火狐浏览器VIMPER

1. 生成配置文件
   :mkv 能够在用户目录下生成相应的配置文件，比如/home/mobz/ .vimpera-torrc
   目前使用的配置文件内容：

```
source! /home/mobz/.vimperatorrc.local
```
```
set runtimepath=/home/mobz/.vimperator
let mapleader = “,”
```
```
nmap ls :ls
nmap bd :bd
nmap bn :bn
nmap bp :bp
```

Memory Barrier

参考文章http://name5566.com/4535.html

参考文章http://en.wikipedia.org/wiki/Memory_barrier
参考文章http://en.wikipedia.org/wiki/Out-of-order_execution
参考文章https://www.kernel.org/doc/Documentation/memory-barriers.txt

FEC DRIVER

参考文章http://blog.163.com/thinki_cao/blog/static/839448752014630845062O/

WIFI

RTL8192EU

- 支持的两种模式
  1. STA/AP - Switch between STA mode and AP mode
  2. (STA+P2P)/AP - Switch between STA+P2P(Wi-Fi Direct) concurrent mode and AP mode
- 代码移植
  1. 将SDK里的代码拷贝到android相应的目录中
  2. 平台相关文件修改BoardConfig.mk (device/fsl/sabresd_6dq/BoardConfig.mk)

```
BOARD_WLAN_VENDOR            := REALTEK
#BOARD_WIFI_VENDOR        := realtek
# for Realtek RTL8723CUS
#ifeq ($(BOARD_WLAN_VENDOR), REALTEK)

BOARD_WIFI_VENDOR := realtek
ifeq ($(BOARD_WIFI_VENDOR), realtek)
WPA_SUPPLICANT_VERSION           := VER_0_8_X
BOARD_WPA_SUPPLICANT_DRIVER      := NL80211
CONFIG_DRIVER_WEXT := y
BOARD_WPA_SUPPLICANT_PRIVATE_LIB := lib_driver_cmd_rtl
BOARD_HOSTAPD_DRIVER                 := NL80211
BOARD_HOSTAPD_PRIVATE_LIB          := lib_driver_cmd_rtl
BOARD_WLAN_DEVICE                        := rtl8192eu

WIFI_DRIVER_MODULE_NAME             := "8192eu"
WIFI_DRIVER_MODULE_PATH              := "/system/lib/modules/8192eu.ko"
WIFI_DRIVER_MODULE_ARG               := "ifname=wlan0 if2name=p2p0"

WIFI_FIRMWARE_LOADER                   := ""
WIFI_DRIVER_FW_PATH_STA              := ""
WIFI_DRIVER_FW_PATH_AP                := ""
WIFI_DRIVER_FW_PATH_P2P              := ""
WIFI_DRIVER_FW_PATH_PARAM         := ""
endif
TARGET_KERNEL_MODULES        := \
                                kernel_imx/drivers/net/wireless/rtl8192eu/8192eu.ko:system/lib/modules/8192eu.ko \
                                kernel_imx/drivers/bluetooth/rtk_btusb.ko:system/lib/modules/rtk_btusb.ko \
                                kernel_imx/net/wireless/cfg80211.ko:system/lib/modules/cfg80211.ko
BOARD_WPA_SUPPLICANT_DRIVER  := NL80211
BOARD_HOSTAPD_DRIVER         := NL80211
```

  3. 相关宏解释
     BOARD_WIFI_VENDOR := realtek
     为了和其它厂商的芯片区别开定义的这个宏

WPA_SUPPLICANT_VERSION := VER_0_8_X
JB 使用的是wpa_supplicant_8
BOARD_WPA_SUPPLICANT_DRIVER := NL80211
BOARD_WPA_SUPPLICANT_PRIVATE_LIB := lib_driver_cmd_ rtl
BOARD_HOSTAPD_DRIVER := NL80211
BOARD_HOSTAPD_PRIVATE_LIB := lib_driver_cmd_rtl
NL80211是wpa_supplicant和hostapd跟驱动通信的接口
lib_driver_cmd_rtl作为私有库
WIFI_DRIVER_MODULE_NAME
WIFI_DRIVER_MODULE_PATH
WIFI_DRIVER_MODULE_ARG
这三个宏是给libhardware_legacy (wifi.c/wifi_realtek.c)用来插入和卸载模块

4. init.xxx.rc(device/fsl/imx6/etc/init.rc)
   wpa_supplicant

```
service rtw_suppl_con /system/bin/wpa_supplicant \
    -ip2p0 -Dnl80211 -c /data/misc/wifi/p2p_supplicant.conf -e/data/misc/wifi/entropy.bin -N \
    -iwlan0 -Dnl80211 -c/data/misc/wifi/wpa_supplicant.conf
    class main
    socket wpa_wlan0 dgram 660 wifi wifi
    disabled
    oneshot


service rtw_suppl /system/bin/wpa_supplicant -iwlan0 -Dnl80211
-c/data/misc/wifi/wpa_supplicant.conf
    socket wpa_wlan0 dgram 660 wifi wifi
    class main
    disabled
    oneshot
```

dhcpcd

```
service dhcpcd_wlan0 /system/bin/dhcpcd -aABKL
        class main
        disabled
        oneshot

service dhcpcd_p2p /system/bin/dhcpcd -aABKL
        class main
        disabled
        oneshot

service iprenew_wlan0 /system/bin/dhcpcd -n
        class main
        disabled
        oneshot

service iprenew_p2p /system/bin/dhcpcd -n
        class main
        disabled
        oneshot
```

5. 其它设置device.mk
   设置wifi.interface
   PRODUCT_PROPERTY_OVERRIDES += wifi.interface=wlan0

添加android.hardware.wifi.direct.xml 如果想要使用Wi-Fi Direct (P2P)
功能
PRODUCT_COPY_FILES += frameworks/native/data/etc/android.hardware.wifi.direct.xml
:system/etc/permissions/android.hardware.wifi.direct.xml
需要确保开启了STA+P2P concurrent mode

5. 系统资源配置
板级相关的资源
device/fsl/sabresd_6dq/overlay/frameworks/base/core/res/res/values/config.xml
全局相关的资源
frameworks/base/core/res/res/values/config.xml
网络属性

```
<string-array translatable="false" name="networkAttributes">
    <item>"wifi,1,1,1,-1,true"</item>
    <item>"bluetooth,7,7,0,-1,true"</item>
    <item>"ethernet,9,9,2,-1,true"</item>
    <item>"wifi_p2p,13,1,0,-1,true"</item>
</string-array>
```

广播属性

```
<string-array translatable="false" name="radioAttributes">
    <item>"1,1"</item>
    <item>"7,1"</item>
    <item>"9,1"</item>
</string-array>
```

config_tether_wifi_regexs

```
<string-array translatable="false" name="config_tether_wifi_regexs">
    <item>"wlan0"</item>
</string-array>
```

config_tether_upstream_types

```
<integer-array translatable="false" name="config_tether_upstream_types">
    <item>1</item>
    <item>9</item>
</integer-array>
```

libhardware_legacy

```
ifeq ($(BOARD_WIFI_VENDOR), realtek)
LOCAL_SRC_FILES += ../realtek/wlan/libhardware_legacy/wifi/wifi_realtek.c
else
LOCAL_SRC_FILES += wifi/wifi.c
endif
```

6. Android JB 驱动配置
STA/AP - Switch between STA and AP mode
(STA+P2P)/AP - Switch between STA+P2P concurrent and AP mode

MACRO	STA/AP	(STA+P2P)/AP	Kernel ver.
CONFIG_IOCTL_CFG80211	Defined	Defined	ver. >= 2.6.35
RTW_USE_CFG80211_STA_EVENT	Defined	Defined	ver. >= 3.2.0
CONFIG_CONCURRENT_MODE	Undefined	Defined	-
CONFIG_P2P_IPS	Don't Care	Defined	-
CONFIG_WFD	Don't Care	Must for Miracast	-
RTW_ENABLE_WIFI_CONTROL_FUNC	Must for platform device/driver mechanism		

- FAQ

  1. Wi-Fi 无法打开
     Please check in sequence:
     网络接口是否创建
     驱动是否加载成功
     WIFI是否别识别
     wlan0 (and p2p0)是否创建成功
     wpa_supplicant是否正常运行
     wpa_supplicant.conf (and p2p_supplicant.conf)是否存在且配置正确
     wpa_supplicant服务是否配置正确
     wpa_supplicant程序是否可执行
     是否创建socket链接
     /data/misc/wifi/wpa_supplicant.conf

  2. Wi-Fi hotspot无法打开
     网络接口是否创建
     模块是否加载成功
     驱动是否正确识别
     netd和hostapd是否运行成功
     /data/misc/wifi/hostapd.conf配置成功 netd和hostapd是否可执行
     dnsmasq是否运行成功

wpa_supplicant usage

- 加载驱动：
  insmod /system/lib/modules/8192eu.ko
- 启动WPA_SUPPLICANT服务端：
  /system/bin/wpa_supplicant -iwlan0 -Dnl80211 -c/data/misc/wifi/wpa_supplicant.conf -B
- 开启网卡，开始扫描网络：
  ifconfig wlan0 up
  wpa_cli -iwlan0 scan
  wpa_cli -iwlan0 scan_results

- 添加和连接AP：
  wpa_cli -iwlan0 add_network
  这里会产生一个新的网络号给下面使用
  就是下面password 0 和 enable_network 0里的这个数字0
  iwconfig wlan0 essid “tp845” //iwconfig wlan0 essid “EnGenius32BDD9_1-2.4GHz”
  wpa_cli -iwlan0 password 0 “kszhineng”
  没有密码可以省略这一步wpa_cli -iwlan0 password 2 “1234567890”
  wpa_cli -iwlan0 enable_network 0

- 手动设置IP地址：
  ifconfig wlan0 192.168.2.101 netmask 255.255.255.0 up

- 使用DHCP方式设置IP地址：
  /system/bin/dhcpcd -ABKL -f /system/etc/dhcpcd/dhcpcd.conf -h android-959a25686c0ee6f6 wlan0