CUBIEBOARD
http://cubieboard.org

CubieBoard2-20151211-EMMC Linux Sdk Guide V1.0

TF BOOT & TF WRITE EMMC

Website:http://cubieboard.org/
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Version	Author	Modification	Check
V-1.0-20160423	Sam	Init version	Darren

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1. Overview

Cubieboard2-20151211-EMMC is called CB2-EMMC for short. Compared with Cubieboard2-20150909-Nand , it change the NAND FLASH to EMMC FLASH, and add RTC,Microphone. About how to distinguish cubieboard2 version, refer:

http://dl.cubieboard.org/model/CubieBoard2/How%20To%20Distinguish%20Your%20CubieBoard2%20Version%20.pdf

EMMC FLASH can be regarded as a Micro SD CARD. Compared with NAND FLASH,the advantage of EMMC FLASH is:

1).System on EMMC FLASH is no easy to be broken when shuting down the board.

2).EMMC FLASH driver is mmc drvier, which is open source.

3).You can build the image refer the SDK.

NOTICE: TSD FLASH is same with EMMC FLASH. You can regard them as a Micro SD Card. So the CB2-EMMC image is same with CB2-TSD image. You can flash their image each other. But CB2-Nand image can not be flash into CB2-EMMC.

2. Hardware requirements

- TF Card >= 4G ,class 10 suggeted
- CB2-EMMC
- Ubuntu12.04 PC Intel® Core™ i5-3470 CPU @ 3.20GHz × 4 Memory 8G tested

3. Software requirements

- The host operating system： Ubuntu12.04 64bit

- Cross-compilation environment

4. Cross-compilation environment set up

4.1. Install compilated environemnt library

$sudo apt-get update

$sudo apt-get upgrade

$sudo apt-get install ia32-libs

$sudo apt-get install ncurses-dev

$sudo apt-get install build-essential git u-boot-tools

$sudo apt-get install texinfo texlive ccache zlib1g-dev gawk bison flex gettext uuid-dev

$sudo apt-get install build-essential u-boot-tools uboot-mkimage

$sudo apt-get install binutils-arm-linux-gnueabihf gcc-arm-linux-gnueabi gcc-arm-linux-gnueabihf cpp-arm-linux-gnueabihf

$ sudo apt-get install libusb-1.0-0 libusb-1.0-0-dev git wget fakeroot kernel-package zlib1g-dev libncurses5-dev

4.2. Install fex2bin/bin2fex tools

This tool is implemented with script.bin and script.fex conversion

$ git clone https://github.com/cubieboard/sunxi-tools

$ cd sunxi-tools

$ make

$ sudo cp fex2bin bin2fex /usr/bin

5. Get source code

All source code can get from github

building a work space

$ mkdir linux-sdk-card

$ cd linux-sdk-card

1) kernel-source:

$ git clone https://github.com/cubieboard/linux-sdk-kernel-source.git

$ mv linux-sdk-kernel-source linux-sunxi

2) tools:

$ git clone https://github.com/cubieboard/linux-sdk-card-tools.git

$ mv linux-sdk-card-tools tools

3) products:

$ git clone https://github.com/cubieboard/linux-sdk-card-products.git

$ mv linux-sdk-card-products products

4) rootfs&u-boot:

$ git clone https://github.com/cubieboard/linux-sdk-binaries.git

$ mv linux-sdk-binaries binaries

Get file from:

http://dl.cubieboard.org/model/commom/linux-sdk-binaries

binaries-list (20160423):

u-boot-a20.tar.gz | a20 U-boot , please extract to linux-sdk-card/binaries

u-boot-v10.tar.gz | a10 U-boot , please extract to linux-sdk-card/binaries

cubieez-ct-20140916.tar.gz | Cubieboard2/Cubietruck Cubieez-rootfs,do not need extract

linaro-trusty-server-14.04-v1.0.tar.gz | linaro-server rootfs

linaro-desktop-trusty-14.04-no-mesa-egl-v1.1.tar.gz | linaro-desktop rootfs

6. Check you repo

repo	linux-sunxi	products	tools	binaries
function	kernel source	configuration	Packaging scripts	rootfs and u-boot
branch	master	master	master	no branch

7. Prepare tf card

Please backup your TF data, compilation will format you tf card,make sure that your pc can write your tf card.When you insert your card to pc ,ubuntu will mount it auto.

```
$ df -h
/dev/sdb        7.5G  4.0K  7.5G   1% /media/2C4A-0AF3
```

/dev/sdb is my tf card device,please umount it before compilation:

```
$ sudo umount /dev/sdb
```

You can check you tf card device :

```
$ sudo fdisk -l
```

Disk /dev/sdb: 7990 MB, 7990149120 bytes

8. SDK Introduce

We can build different version image in this sdk

Chosse products to compile:

```
$ cd  linux-sdk-card
$ source tools/scripts/envsetup.sh
```

Choose the board and systerm. You will get a readme：

```
* Building Micro-sd Card Image Step:
0.Insert Micro-sd Card into host PC
!!!!! WARNNING !!!!!
The below steps will format your Micro-sd Card
Please make sure your Micro-sd Card label
$ sudo fdisk -l
$ sudo umount /dev/sdx

1.Micro-sd Card Image packing:
(1)$ cb_build_card_image
(2)$ cb_part_install_tfcard nand/tfx2/tsd/emmc sdx pack
(3)$ cb_install_tfcard nand/tfx2/tsd/emmc sdx [pack]

2.Micro-sd Card flash EMMC/TSD:
(1)$ cb_build_flash_card_image
(2)$ cb_part_install_flash_card emmc/tsd sdx
(3)$ cb_install_flash_card emmc/tsd sdx [pack]


* Explanation of parameters
- nand:   Nand flash storage version for cbs
- tfx2:   Cubieboard2-dualcard version
- emmc:    EMMC flash storage version for cbs
- tsd:    Tsd flash storage version for cbs
- sdx:    Micro-sd Card label on host PC
- pack:   Calculation Micro-sd Card  partition size
- [pack]: Optional parameters,backup and release image


* Building example for NAND version board Micro-sd Card Image
$ cb_build_card_image
$ cb_part_install_tfcard nand sdc pack
$ cb_install_tfcard nand sdc pack

* Building example for EMMC version board Micro-sd Card Image
$ cb_build_card_image
$ cb_part_install_tfcard emmc sdc pack
$ cb_install_tfcard emmc sdc pack
```

Micro-sd Card Image packing : tf booting card image

Micro-sd Card flash EMMC/TSD : tfcard image of flashing to emmc/tsd , which can flashing systerm to emmc. After that, systerm can boot from emmc/tsd.

The following we will analyze compilation process:

1)Micro-sd Card Image packing:

$ cb_build_card_image

It will take about 5-10 Minutes to compile kernel and pack overlay file

$ cb_part_install_tfcard emmc sdx pack

sdx : your tf card device in your pc

emmc:Flash storage type on board,CB2-EMMC use emmc flash

pack : backup and create your image

This procedure aims to partition and format the card to 2 partition, it may fail sometime ,

so,check this step to make sure your pc can distinguish the 2 patition ,if you faill ,plug the tf card, and try again .

$ cb_install_tfcard emmc sdx pack

sdx : your tf card device in your pc

emmc: Flash storage, CB2-EMMC use emmc flash

pack : backup and create your image

This step is to write the boot files into device and move rootfs into it.

2)**Micro-sd Card flash EMMC/TSD**

This is same like above, no more detailed describe.

9. Detail compilation step

Here take build cb2-linaro-server as a example.

$ source tools/scripts/envsetup.sh

Choose the board and systerm. We chosse “1” → Enter → “3” → Enter

```
sam@cubie:/work/linux-sdk-card$ source tools/scripts/envsetup.sh
Products
   0 - cb
   1 - cb2
   2 - ct
   3 - cubieaio
please select a board:1
   0 - cb2-cubieez
   1 - cb2-cubieez-cs
   2 - cb2-debian-server
   3 - cb2-linaro-server
please select a system:3
Creating working dirs
```

And you can choose build **Micro-sd Card Image packing** or **Micro-sd Card flash EMMC/TSD**image according to your need.

9.1. Micro-sd Card Image packing

$ cb_build_card_image

$ cb_part_install_tfcard emmc sdb pack

$ cb_install_tfcard emmc sdb pack

This step almost take 8 minutes, the time is depend on the writing speed of your card, class 10 tf card was suggusted.Now ,you get a bootable tf card ,you can insert this card to you CB2-EMMC tf card slot to start Linux system.

If have use "**pack**" parameter the You can find your creating image :

output/c2/cb2-linaro-server/cb2-linaro-server-emmc-tfcard.img

Connect the Cubietruck Plug with HDMi monitor , mouse and keyboard, power on , For a moment, monior has display output and LED shining . The first time 's booting will do some initalization , it will take longer time to boot .

Matters needing attention:

- Monitor can't display, maybe it can't support the resolution of the system default ,have compatibility problems. The default HDMI resolution is 720p50.

- If found the LEDs have no blinking , please check whether the card had been partition into two partitions .The first partition has uImage file and the second partition has rootfs files .
- If you don't need the backup image, in order to save time, when executing the command, don't add "**pack**'' parameter.
- In order to reduce the flash time,recommend use class -10 card .
- The creating image only can be flash using Win32diskimager tools or use Linux dd command , Phoenixsuit or Livesuit is no OK.

9.2. Micro-sd Card flash EMMC/TSD

Note: Here will create a tfcard image of flashing to emmc . You can flash the image to tfcard. Inert the tfcard, poweron and the systerm will flashed to emmc automatically. After successfully flashing, the system will power off. Take out the tfcard, power on, systerm will start from emmc.

$ cb_build_flash_card_image

$ cb_part_install_flash emmc sdb pack

$ cb_install_flash_card emmc sdb pack

This step will take less time then builing card boot image . If you use "**pack**"parameter**,**you can find your creating image: output/c2/cb2-linaro-server/cb2-linaro-server-emmc_flash.img

Afer these steps , you can put your tfcard into CB2-EMMC slot, and start flashing systerm to emmc. The detaild step you can refer following steps:

The step of flashing systerm to emmc:

1.Insert card into card slots on board.

2.With official standard dc power supply or batteries on electric start .

3. Green LEDs and Blue LEDS blinking prove that flash process normal. If it fails , Green LEDs will become keeping bright.

4.Wait a few minutes ,all LEDs does not light,prove the system automatically shut down.It mean the flash operation is complete.

5.Pull out the card ,connect HDMI monitor,mouse and keyboard, power on .Wait a moment, monitor begin to display and LEDs blinking . It will execute initialization for the first time, so slow boot.

Matters needing attention :

- Monitor can't display, maybe it can't support the resolution of the system default ,have compatibility problems. The default HDMI resolution is 1080p50.
- If found the LEDs have no blinking , please check whether the card had been partition into two partitions .The first partition has uImage file and the second partition has rootfs files .
- Don't power outages when flashing process . The board will automatic shutdown will after complete the flash operation .
- If you don't need the backup image, in order to save time, when executing the command, don't add "**pack**" parameter.
- In order to reduce the flash time,recommend use class -10 card .
- The creating image only can be flashd using Win32diskimager tools or use Linux dd command , Phoenixsuit or Livesuit is no OK.

10. Compilation issue

- If you compile fail ,please check your cross-compilation environment.It is recommended to use Ubuntu12.04 64 bit.
- Please clean sdk when swith to the other boot type

  $ cd ct_plus-linux-sdk/linux-3.4

  $ make mrproper

  $ cd ..

  $ sudo rm -rf build output
- Please Email me when you in trouble : support@cubietech.com