Cubieboard2-dualcard-debian-server usage introduce

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1. Preface

1.1. Writing purpose

This document mainly introduced usage of Cubieboard2-dualcard debian-server system .

1.2. Using object

Cubieboard2-dualcard debian-server system and most of Cubieboard1、Cubieboard2、CubieTruck、Cubieboard4 linux system, include lubuntu and cubieez(debian-desktop) are applicable.

2. Ethernet

2.1. Connected to the Ethernet

Ethernet configuration of all cubieboard are settings for the DHCP by default .Make sure the the router or switches has no problem .Only need connecting Ethernet cable before plug power supply ,the system can get the IP automatically.If not connecting Ethernet cable or get out the cable when running system ,just plug the cable ,wait a few seconds ,the system will automatically connect the Ethernet.

Sometimes maybe need to use following command :

```
$sudo dhclient eth0
```

2.2. Gigabit network

Cubieboard2-dualcard cann't support gigabit network. Cubietruck and Cubieboard4 can gigabit network.

2.3. Static IP

Because the DHCP setting ,the IP maybe will change afert reboot. Type :

```
$sudo vi /etc/network/interfaces
```

Add the following content:

auto lo eth0
allow-hotplug eth0
iface lo inet loopback
iface eth0 inet static

address 192.168.1.x
gateway 192.168.1.1
netmask 255.255.255.0
network 192.168.1.0
broadcast 192.168.1.255

```
# interfaces(5) file used by ifup(8) and ifdown(8)
auto lo eth0
allow-hotplug eth0
iface lo inet loopback
iface eth0 inet static

address 192.168.1.88
gateway 192.168.1.1
netmask 255.255.255.0
network 192.168.1.0
broadcast 192.168.1.255
```

"x" change to IP you need ,ensure there is no IP conflict within LAN.Save and exit ,reboot the system .

3. Display

3.1. HDMI

Cubieboard2-dualcard only have HDMI displayed output interface. resolution is 720p50 by default .To modify the resolution for 1080p60

#mount /dev/mmcblk0p1 /mnt

#cd /mnt

#bin2fex script.bin sys_config.fex

vi sys_config.fex

"screen0_output_mode=4"change to "screen0_output_mode=10"，meaning 1080p60，save and exit.

```
;------------------------------------------------------------------------------
;disp init configuration
;
;disp_mode            (0:screen0<screen0,fb0> 1:screen1<screen1,fb0> 2:two_diff_screen_diff_contents<screen0,screen1,fb0,fb1>
;                      3:two_same_screen_diff_contets<screen0,screen1,fb0> 4:two_diff_screen_same_contents<screen0,screen1,fb0>)
;screenx_output_type  (0:none; 1:lcd; 2:tv; 3:hdmi; 4:vga)
;screenx_output_mode  (used for tv/hdmi output, 0:480i 1:576i 2:480p 3:576p 4:720p50 5:720p60 6:1080i50 7:1080i60 8:1080p24 9:1080p50 10:1080p60 11:pal 14:ntsc)
;screenx_output_mode  (used for vga output, 0:1680*1050 1:1440*900 2:1360*768 3:1280*1024 4:1024*768 5:800*600 6:640*480 10:1920*1080 11:1280*720)
;fbx format           (4:RGB655 5:RGB565 6:RGB556 7:ARGB1555 8:RGBA5551 9:RGB888 10:ARGB8888 12:ARGB4444)
;fbx pixel sequence   (0:ARGB 1:BGRA 2:ABGR 3:RGBA) --- 0 for linux, 2 for android
;lcd0_bright          (lcd0 init bright,the range:[0,256],default:197
;lcd1_bright          (lcd1 init bright,the range:[0,256],default:197
;------------------------------------------------------------------------------
[disp_init]
disp_init_enable        = 1
disp_mode               = 0

screen0_output_type     = 3
screen0_output_mode     = 4

screen1_output_type     = 0
screen1_output_mode     = 4

fb0_width = 1024
fb0_height = 768
fb0_framebuffer_num     = 2
fb0_format              = 10
fb0_pixel_sequence      = 0
fb0_scaler_mode_enable  = 1

fb1_width = 1024
fb1_height = 768
fb1_framebuffer_num     = 2
fb1_format              = 10
fb1_pixel_sequence      = 0
fb1_scaler_mode_enable  = 0
```

#cd /mnt

#fex2bin sys_config.fex script.bin

#cd ~

#umount /mnt

#reboot

Reboot the system ,the modification will effective.

3.2. VGA

Cubieboard2-dualcard can use Breadboard http://docs.cubieboard.org/addons#cubie_breadboard to extends

VGA displayed output, but need to modify the file script.bin

#mount /dev/mmcblk0p1 /mnt

#cd /mnt

#bin2fex script.bin sys_config.fex

vi sys_config.fex

"screen0_output_type=3"change to "screen0_output_type=4", meaning VGA display, save and exit.

```
;------------------------------------------------------------------------------
;disp init configuration
;
;disp_mode            (0:screen0<screen0,fb0> 1:screen1<screen1,fb0> 2:two_diff_screen_diff_contents<screen0,screen1,fb0,fb1>
;                      3:two_same_screen_diff_contets<screen0,screen1,fb0> 4:two_diff_screen_same_contents<screen0,screen1,fb0>)
;screenx_output_type  (0:none; 1:lcd; 2:tv; 3:hdmi; 4:vga)
;screenx_output_mode  (used for tv/hdmi output, 0:480i 1:576i 2:480p 3:576p 4:720p50 5:720p60 6:1080i50 7:1080i60 8:1080p24 9:1080p50 10:1080p60 11:pal 14:ntsc)
;screenx_output_mode  (used for vga output, 0:1680*1050 1:1440*900 2:1360*768 3:1280*1024 4:1024*768 5:800*600 6:640*480 10:1920*1080 11:1280*720)
;fbx format           (4:RGB655 5:RGB565 6:RGB556 7:ARGB1555 8:RGBA5551 9:RGB888 10:ARGB8888 12:ARGB4444)
;fbx pixel sequence   (0:ARGB 1:BGRA 2:ABGR 3:RGBA) --- 0 for linux, 2 for android
;lcd0_bright          (lcd0 init bright,the range:[0,256],default:197
;lcd1_bright          (lcd1 init bright,the range:[0,256],default:197
;------------------------------------------------------------------------------
[disp_init]
disp_init_enable        = 1
disp_mode               = 0

screen0_output_type     = 3
screen0_output_mode     = 4

screen1_output_type     = 0
screen1_output_mode     = 4

fb0_width = 1024
fb0_height = 768
fb0_framebuffer_num     = 2
fb0_format              = 10
fb0_pixel_sequence      = 0
fb0_scaler_mode_enable  = 1

fb1_width = 1024
fb1_height = 768
fb1_framebuffer_num     = 2
fb1_format              = 10
fb1_pixel_sequence      = 0
fb1_scaler_mode_enable  = 0
```

#cd /mnt

#fex2bin sys_config.fex script.bin

#cd ~

#umount /mnt

#reboot

Reboot the system ,the modification will effective.

4. TF CARD

TF card is mainly as the system boot card and memory card .

4.1. System boot card

See the make card system documentation .

4.2. Memory card

Using a 8G TF card as example

1. To find the device node.Because the system boot card has been plug into “BOOT CARD” card slot,the memory card should be plut into “ DATA CARD”, in the terminal ,type

#fdisk -l

If you are using ordinary user ,add "sudo " at the head of the command

$sudo fdisk -l

```
root@cubieboard2:~# fdisk -l

Disk /dev/mmcblk0: 15.9 GB, 15931539456 bytes
4 heads, 16 sectors/track, 486192 cylinders, total 31116288 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00000000

        Device Boot      Start         End      Blocks   Id  System
/dev/mmcblk0p1            2048       26623       12288   83  Linux
/dev/mmcblk0p2           26624    31116287    15544832   83  Linux

Disk /dev/mmcblk1: 7861 MB, 7861174272 bytes
4 heads, 16 sectors/track, 239904 cylinders, total 15353856 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00000000

        Device Boot      Start         End      Blocks   Id  System
/dev/mmcblk1p1            40960       65535       12288   83  Linux
/dev/mmcblk1p2            65536    15353855     7644160   83  Linux
root@cubieboard2:~#
```

There is some card information in log ,prove the system has identify card ."/dev/mmcblk1" is device node.Can be seen that TF card has been divide the 13M size sda1 and 7G size sda2 partition.Others is system boot card information.

2. The best you format the new card before use it .In the terminal type

#mkfs.vfat /dev/mmcblk1p1

The card have formatted as VFAT format that can be recognized by Windows system ,convenient be operated data .The operation format the card as FAT format can be do in the windows system use a card reader .The operation will damage data ,if the card hav used ,you can ignore this chapter .

3. Mount device .

#mount /dev/mmcblk1p1 /mnt

#df

```
root@cubieboard2:~# mount /dev/mmcblk1p1 /mnt
root@cubieboard2:~#
root@cubieboard2:~#
root@cubieboard2:~# df
Filesystem     1K-blocks    Used Available Use% Mounted on
rootfs          15318652  705996  13983600   5% /
/dev/root       15318652  705996  13983600   5% /
devtmpfs          390264       0    390264   0% /dev
tmpfs             131072     160    130912   1% /run
tmpfs               5120       0      5120   0% /run/lock
tmpfs             131072       0    131072   0% /run/shm
tmpfs            1048576       4   1048572   1% /tmp
/dev/root       15318652  705996  13983600   5% /var/log.hdd
ramlog-tmpfs      262144    1968    260176   1% /var/log
/dev/mmcblk1p1     12246    6606      5640  54% /mnt
root@cubieboard2:~#
```

If has no the wrong log ,prove mount successfully.The hardpoint can be read and write data now.

4. Unmount device .

#umount /mnt

5. USB

We often use the USB device include U disk , mouse and keyboard.

5.1. U disk

1. To find the device node,insert the USB disk into one of the four USB,in the terminal ,type

#fdisk -l

If you are using ordinary user ,add "sudo " at the head of the command

$sudo fdisk -l

```
Disk /dev/sda: 8040 MB, 8040480256 bytes
136 heads, 53 sectors/track, 2178 cylinders, total 15704063 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00000000

   Device Boot      Start         End      Blocks   Id  System
/dev/sda1   *     1244928    15704062     7229567+   c  W95 FAT32 (LBA)
```

There is some U disk information in the log ,prove the system has recognized U disk."/dev/sda" is device node.Can be seen that U disk has been divide the sda1partition.

2. Mount the first partition .

#mount /dev/sda1 /mnt
#df

```
root@cubieboard2:~# mount /dev/sda1 /mnt
root@cubieboard2:~#
root@cubieboard2:~#
root@cubieboard2:~#
root@cubieboard2:~# df
Filesystem     1K-blocks    Used Available Use% Mounted on
rootfs          15300564  840112  13683212   6% /
/dev/root       15300564  840112  13683212   6% /
devtmpfs          406648       0    406648   0% /dev
tmpfs             131072     172    130900   1% /run
tmpfs               5120       0      5120   0% /run/lock
tmpfs             131072       0    131072   0% /run/shm
tmpfs            1048576       4   1048572   1% /tmp
/dev/root       15300564  840112  13683212   6% /var/log.hdd
ramlog-tmpfs      262144    2488    259656   1% /var/log
/dev/sda1        7215440 5886852   1328588  82% /mnt
root@cubieboard2:~#
```

If has no the wrong log ,prove mount successfully.The hardpoint can be read and write data now.

3. Unmount device.

#umount /mnt

5.2. Mouse and keyboard

debian-server support most USB mouse and keyboard.If appear garbled words , you can modify the keyboard configuration according to the following link.

http://docs.cubieboard.org/tutorials/common/set_keyboard_language

6. SATA

Access to the 2.5 inches HDD ,if the HDD make a sound ,prove it is power supply shortage , need to check the power adapter current more than 2A.

Access to the 3.5 inches HDD,need extra power supply 12V to hard disk .Refer to http://cubieboard.org/2013/09/24/how-to-support-3-5-inch-hdd-on-cubieboard/

The executable script "/root/sata-install.sh" can formatting SATA hard disk,and copy the rootfs to hard disk .Because the rootfs in the hard disk,the storage space become larger and boot time become fast start-up.

Note : The script will do formatting operation.

7. Audio

7.1. HDMI

Cubieboard2-dualcard debian-server audio ouput is HDMI the default.Can run the following commands to test the audio voice, also can use the player to test it.

```
$speaker-test -twav -c2
```

7.2. EARPHONE

1. Modify "/etc/asound.conf", switch the sound for earphone voice output.

```
# vi /etc/asound.conf
pcm.!default {
   type hw
   card 1
   device 0
  }
 ctl.!default {
   type hw
   card 1
  }
```

above all "card 1 "shoulde be changed to " card 0", and then reboot systerm.

2. use "speaker-test" test the audio voice

$speaker-test -twav -c2

```
root@cubieboard2:~# speaker-test -twav -c2

speaker-test 1.0.25

Playback device is default
Stream parameters are 48000Hz, S16_LE, 2 channels
WAV file(s)
Rate set to 48000Hz (requested 48000Hz)
Buffer size range from 4096 to 8192
Period size range from 1024 to 2048
Using max buffer size 8192
Periods = 4
was set period_size = 2048
was set buffer_size = 8192
 0 - Front Left
 1 - Front Right
```

8. WIFI

Cubieboard2-dualcard has no WIFI hardware module,but can insert a USB wireless network card

to board to connect the WIFI.

Use MERCURY MW150US 150M mini USB wireless network card as example

1. Loading WIFI driver.

When insert network card to board,system automatically loading WIFI driver.

```
root@cubieboard2:~# lsmod
Module                  Size  Used by
8188eu                502089  0
g_mass_storage         43190  0
bnep                   14265  2
rfcomm                 58449  0
cpufreq_stats           3675  0
bluetooth             265092  10 bnep,rfcomm
mali                  111408  0
ump                    51020  1 mali
lcd                     3630  0
pwm_sunxi               8987  0
gpio_sunxi              8910  0
```

In /lib/modules/3.4.79/kernel/drivers/net/wireless can see that many driver ofwireless network card, pay attention to the using network card whether has driver.

```
root@cubieboard2:/lib/modules/3.4.79/kernel/drivers/net/wireless# ls
at76c50x-usb.ko  libertas     rndis_wlan.ko  rtl818x    wl1251
ath              libertas_tf  rt2x00         rtl8192cu  wl12xx
hostap           mwifiex      rtl8188eu      rtl8723as  zd1201.ko
iwmc3200wifi     p54          rtl8189es      rtxx7x     zd1211rw
root@cubieboard2:/lib/modules/3.4.79/kernel/drivers/net/wireless#
```

2． Modify the network configuration ．

$sudo vi /etc/network/interfaces

Add the following content

auto wlan0
iface wlan0 inet dhcp
pre-up ip link set wlan0 up
pre-up iwconfig wlan0 essid your-ssid-here
wpa-ssid your-ssid-here
wpa-psk your-passwd-here

Note:

your-ssid-here: WIFI name

your-passwd-here： password

Use "ifconfig -a " can the network card information .If wireless network card is the corresponding wlan1 ,replace wlan0 for wlan1.

3． Disconnect the ethernet cable and reboot the systerm .If can't get the IP after reboot ,

#ifconfig wlan0 down

#ifconfig wlan0 up

#/etc/init.d/networking restart

Note： If wireless network card is the corresponding wlan1 ,replace wlan0 for wlan1.

9. OTG

9.1. Flash

The OTG port is use to re-flash image into the nand through a upgrade cable.The re-flash image can boot the system again when the system have been damaged .

Note : Cubieboard2-dualcard has no nand flash ,can't flash the nand image .

9.2. Host function

Using a extend data cable ,OTG port can be expanded into a USB port ,used for connect mouse、keyboard、U disk .

9.3. Device function

Using a OTG cable ,connect the OTG port and USB port of PC host ,can mount the storage partition on PC host like the U disk ,achieve read and write data . The default mount the first partition of storage partition ,can change the partition you want to mount .

To mount U disk or HHD ,type ：

#rmmod g_mass_storage

#modprobe g_mass_storage file=/dev/sda1 removable=yes stall=0

To mount partition 2 of mmcblk0 ,type ：

#rmmod g_mass_storage

#modprobe g_mass_storage file=/dev/ mmcblk0p2 removable=yes stall=0

Note :

1)When mount the //dev/mmcblk0p2 on PC host ,should insert the OTG cable before execute the command ,Otherwise will damage the rootfs (file system in /dev/mmcblk0p2),lead to fail mount operation .Mount the first partition （/ dev/mmcblk0p1 has no such problem.

2)To mount the storage partition on the Windows ,the storage partition should be formatting format that can be recognized by Windows system .

3)Don't execute the command : modprobe g_mass_storage file=/dev/* removable=y stall=0

which will damage the rootfs system .

4)When OTG cable be inserted the board ,it is maybe appear didn't reflect possible case in PC host .Keep inserting OTG cable ,use above command to unload the driver and reload the driver to solve the problem .Or try to dial the plug cable once or twice.

9.4. Power supply

Using a OTG cable ,connet the OTG port and USB port of PC host ,can play a role of temporary power supply .The current of USB port only a few hundred ma ,which mayby cause the system not stable and power supply shortage .So it is no recommend use OTG port power supply .

10. Keys

10.1. PWER key

Long press PWER key more than 6s will cause power outages when the system is running . Long press PWER key more than 1s will cause automatically boot when the system is power off."pmu1_para" configuration define the PWER key power outages and boot time in "sys_config.fex".

10.2. FEL key

When flash the nand flash image ,press the FEL key ,insert the OTG cable to enter the flash mode .For more ,see the flash image document.

11. IR

The IR driver has been loading by default . Tpye：

```
# keybinder /dev/input/event0
```

Press the infrared remote controler,print as the figure below：

```
root@cubieboard2:~# keybinder /dev/input/event0
Reading key input from /dev/input/event0 (sunxi-ir)
Loaded config items
Keycode 85 pressed
Keycode 85 pressed
```

By above may know,the keycode of pressed key is "85".Know the keycode ,you can use it to execute the command .For example :

#echo "85,shutdown -h now" >>/etc/keybinder.conf

The keycode of the key is "85", command is "shutdown -h now",or directly modify the "/etc/keybinder.conf" ,add several configuration in it .Press the keys ,can execute the command.

12. LED

12.1. Blue LED

Trigger of blue led is defined as "heartbeat",used for indicator system is running .

cat /sys/class/leds/blue\:ph21\:led2/trigger

none battery-charging-or-full battery-charging battery-full battery-charging-blink-full-solid ac-online usb-online mmc0 timer [heartbeat] backlight gpio cpu0 cpu1 default-on

Turn off LED

#echo none > /sys/class/leds/blue\:ph21\:led2/trigger

#echo 0 > /sys/class/leds/blue\:ph21\:led2/brightness

Turn on LED

#echo none > /sys/class/leds/blue\:ph21\:led2/trigger

#echo 1 > /sys/class/leds/blue\:ph21\:led2/brightness

12.2. Green LED

Trigger of greed led is defined as "none" and normally on .Users can custom.

#cat /sys/class/leds/green\:ph20\:led1/trigger

[none] battery-charging-or-full battery-charging battery-full battery-charging-blink-full-solid ac-online usb-online mmc0 timer heartbeat backlight gpio cpu0 cpu1 default-on

Turn off LED

echo none > /sys/class/leds/green\:ph20\:led1/trigger

echo 0 > /sys/class/leds/green\:ph20\:led1/brightness

Turn on LED

#echo none > /sys/class/leds/green\:ph20\:led1/trigger

#echo 1 > /sys/class/leds/green\:ph20\:led1/brightness

Other trigger: "timer "(timing flashing)、"mmc0"（flashing once when insert the TF card)、"battery-charging"、" battery-full " and so on .

Warning :the modification will change to the default configuration after the reboot ,you can write the above command into "/etc/init.d/rcS " ,or modify "leds_para" section in the file name "sys_config.fex ".

13. RTC

Cubieboard2-dualcard has no hardware RTC on the . After reboot, the time starts from the default time to go.Connected to Internet the system time will automatically update the calibration.

Manually update the system time :

Change to 11 o 'clock 11 minutes 11 seconds

#date -s 11:11:11

Change the date on November 11, 2011

#date -s 20111111

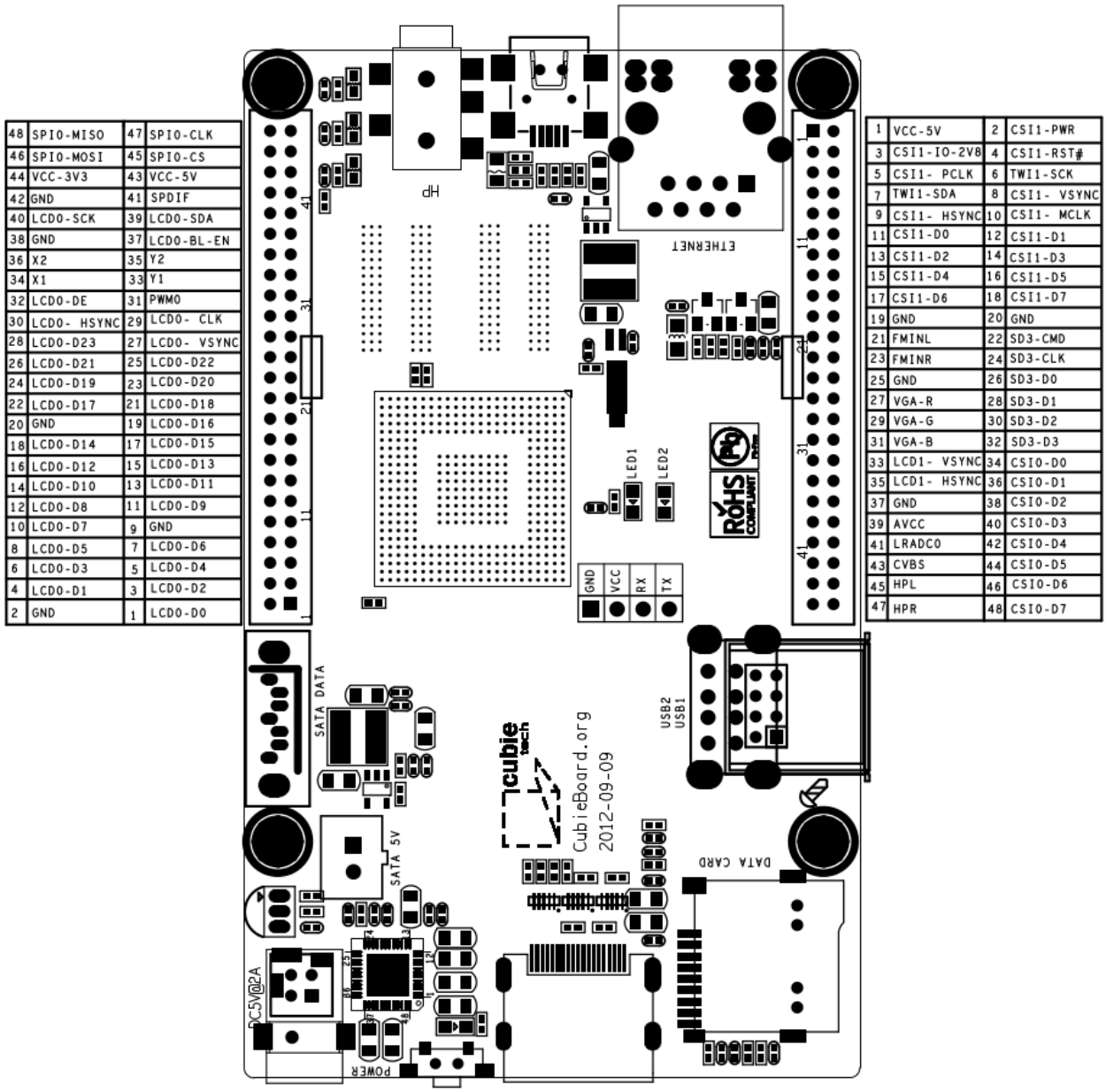
14. Extension PIN

http://docs.cubieboard.org/cubieboard1_and_cubieboard2_gpio_pin

The extension PIN of Cubieboard2-dualcard is as same as Cubieboard1 and Cubieboard2 .

48	SPI0-MISO	47	SPI0-CLK
46	SPI0-MOSI	45	SPI0-CS
44	VCC-3V3	43	VCC-5V
42	GND	41	SPDIF
40	LCD0-SCK	39	LCD0-SDA
38	GND	37	LCD0-BL-EN
36	X2	35	Y2
34	X1	33	Y1
32	LCD0-DE	31	PWM0
30	LCD0- HSYNC	29	LCD0- CLK
28	LCD0-D23	27	LCD0- VSYNC
26	LCD0-D21	25	LCD0-D22
24	LCD0-D19	23	LCD0-D20
22	LCD0-D17	21	LCD0-D18
20	GND	19	LCD0-D16
18	LCD0-D14	17	LCD0-D15
16	LCD0-D12	15	LCD0-D13
14	LCD0-D10	13	LCD0-D11
12	LCD0-D8	11	LCD0-D9
10	LCD0-D7	9	GND
8	LCD0-D5	7	LCD0-D6
6	LCD0-D3	5	LCD0-D4
4	LCD0-D1	3	LCD0-D2
2	GND	1	LCD0-D0

1	VCC-5V	2	CSI1-PWR
3	CSI1-IO-2V8	4	CSI1-RST#
5	CSI1- PCLK	6	TWI1-SCK
7	TWI1-SDA	8	CSI1- VSYNC
9	CSI1- HSYNC	10	CSI1- MCLK
11	CSI1-D0	12	CSI1-D1
13	CSI1-D2	14	CSI1-D3
15	CSI1-D4	16	CSI1-D5
17	CSI1-D6	18	CSI1-D7
19	GND	20	GND
21	FMINL	22	SD3-CMD
23	FMINR	24	SD3-CLK
25	GND	26	SD3-D0
27	VGA-R	28	SD3-D1
29	VGA-G	30	SD3-D2
31	VGA-B	32	SD3-D3
33	LCD1- VSYNC	34	CSI0-D0
35	LCD1- HSYNC	36	CSI0-D1
37	GND	38	CSI0-D2
39	AVCC	40	CSI0-D3
41	LRADC0	42	CSI0-D4
43	CVBS	44	CSI0-D5
45	HPL	46	CSI0-D6
47	HPR	48	CSI0-D7



U14 (Next to SATA connector)

	SPI0		
48	PI13 (SPI0-MISO/UART6-RX/EINT25)	47	PI11 (SPI0-CLK/UART5-RX/EINT23)
46	PI12 (SPI0-MOSI/UART6-TX/EINT24)	45	PI10 (SPI0-CS/UART5-TX/EINT22)
	LCD		
44	3.3V (nc in 2012-08-08)	43	VCC-5V
42	Ground	41	SPDIF
40	PB10 (LCD0-SCK/LCD-PIO1)	39	PB11 (LCD0-SDA/LCD-PIO2)
38	Ground	37	PH7 (LCD0-BL-EN/LCD-PIO0/UART5-RX/EINT7)
36	XN_TP (TP-X2)	35	YN_TP (TP-Y2)
34	XP_TP (TP-X1)	33	YP_TP (TP-Y1)
32	PD25 (LCDDE)	31	PB2 (PWM0)
30	PD26 (LCDHSYNC)-VGA-HSYNC	29	PD24 (LCDCLK)
28	PD23 (LCDD23)	27	PD27 (LCDVSYNC)-VGA-VSYNC
26	PD21 (LCDD21)	25	PD22 (LCDD22)
24	PD19 (LCDD19/LVDS1N3)	23	PD20 (LCDD20)
22	PD17 (LCDD17/LVDS1NC)	21	PD18 (LCDD18/LVDS1P3)
20	Ground	19	PD16 (LCDD16/LVDS1PC)
18	PD14 (LCDD14/LVDS1P2)	17	PD15 (LCDD15/LVDS1N2)
16	PD12 (LCDD12/LVDS1P1)	15	PD13 (LCDD13/LVDS1N1)
14	PD10 (LCDD10/LVDS1P0)	13	PD11 (LCDD11/LVDS1N0)
12	PD8 (LCDD8/LVDS0P3)	11	PD9 (LCDD9/LVDS0N3)
10	PD7 (LCDD7/LVDS0NC)	9	Ground
8	PD5 (LCDD5/LVDS0N2)	7	PD6 (LCDD6/LVDS0PC)
6	PD3 (LCDD3/LVDS0N1)	5	PD4 (LCDD4/LNVS0P2)
4	PD1 (LCDD1/LVDS0N0)	3	PD2 (LCDD2/LVDS0P1)
2	Ground	1	PD0 (LCDD0/LVDSP0)

U15 (Between Ethernet port and USB ports)

		CSI1/TS	
1	VCC-5V	2	PH15 (CSI1-PWR/EINT15)
3	CSI1-IO-2V8	4	PH14 (CSI1-RST#/EINT14)
5	PG0 (CSI1-PCLK/SDC1-CMD)	6	PB18 (TWI1-SCK)
7	PB19 (TWI1-SDA)	8	PG3 (CSI1-VSYNC/SDC1-D1)
9	PG2 (CSI1-HSYNC/SDC1-D0)	10	PG1 (CSI1-MCLK/SDC1-CLK)
11	PG4 (CSI1-D0/SDC1-D2)	12	PG5 (CSI1-D1/SDC1-D3)
13	PG6 (CSI1-D2/UART3-TX)	14	PG7 (CSI1-D3/UART3-RX
15	PG8 (CSI1-D4/UART3-RTS)	16	PG9 (CSI1-D5/UART3-CTS)
17	PG10 (CSI1-D6/UART4-TX)	18	PG11 (CSI1-D7/UART4-RX)
19	Ground	20	Ground
Analog		**SDIO3**	
21	FMINL	22	PI4 (SDC3-CMD)
23	FMINR	24	PI5 (SDC3-CLK)
25	Ground	26	PI6 (SDC3-D0)
27	VGA-R	28	PI7 (SDC3-D1)
29	VGA-G	30	PI8 (SDC3-D2)
31	VGA-B	32	PI9 (SDC3-D3)
		CSI0/TS	
33	LCD1-VSYNC	34	PE4 (CSI0-D0)
35	LCD1-HSYNC	36	PE5 (CSI0-D1)
37	Ground	38	PE6 (CSI0-D2)
39	AVCC	40	PE7 (CSI0-D3)
41	LRADC0	42	PE8 (CSI0-D4)
43	CVBS	44	PE9 (CSI0-D5)
45	HPL	46	PE10 (CSI0-D6)
47	HPR	48	PE11 (CSI0-D7)