CubieTruck-debian-server usage introduce

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1. Preface

1.1. Writing purpose

This document mainly introduced usage of CubieTruck debian-server system .

1.2. Using object

CubieTruck 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

CubieTruck support gigabit network. Make sure that bandwidth is gigabit network and the switches support gigabit network,just let CubieTruck connected to the Ethernet ,it will automaticall use gigbit network.

2.3. Static IP

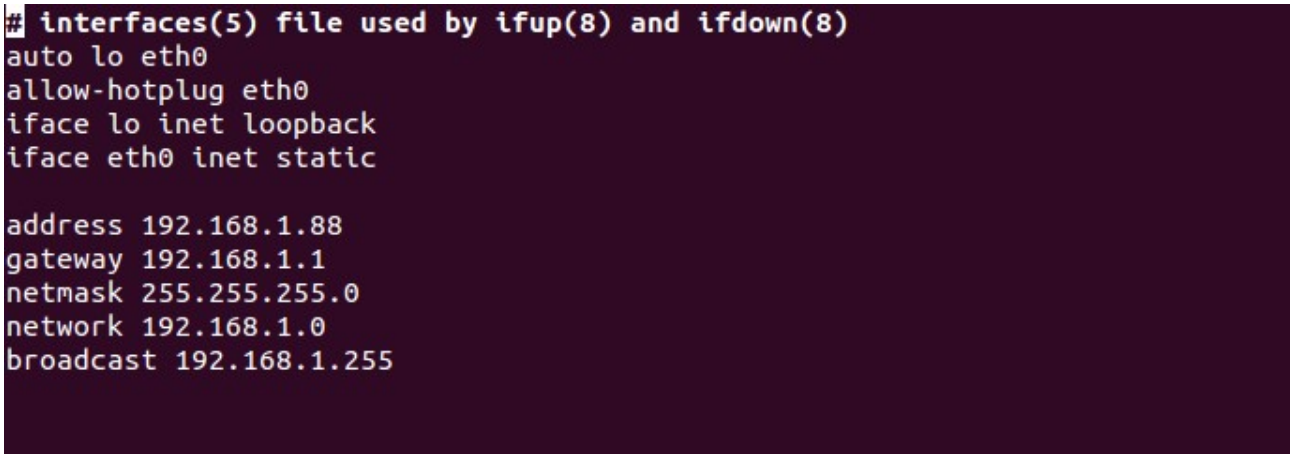
Because the DHCP setting ,the IP maybe will change afert reboot. Type :

```
$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



"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

The resolution of HDMI display output image is 720p50 by default .To modify the resolution for 1080p60

If the system in the nand， type

#mount /dev/nanda /mnt

#cd /mnt

#bin2fex script.bin sys_config.fex

If the system in the TF card， type

#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.

If switch the VGA display output ,"screen0_output_type=3"change to "screen0_output_type=4"

3.2. VGA

The resolution of VGA display output image is 1024*768 by default.To switch the HDMI display output

If the system in the nand， type
#mount /dev/nanda /mnt

#cd /mnt

#bin2fex script.bin sys_config.fex

If the system in the TF card， type

#mount /dev/mmcblk0p1 /mnt

#cd /mnt

#bin2fex script.bin sys_config.fex

vi sys_config.fex

"screen0_output_type=4"change to "screen0_output_type=3"， meaning HDMI 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.

3.3. HDMI and VGA dual display

dual display need to modify the file script.bin ,configuration as

[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

Note :some display monitor happen cut the screen case ,try use command to adjust :fbset -left 10
The command is not necessarily effective ,and invalid after reboot .

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 16G TF card as example

1. To find the device node,TF card insert in the card slot, in the terminal ,type

#fdisk -l

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

$sudo fdisk -l

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

Disk /dev/nand: 7700 MB, 7700742144 bytes
255 heads, 63 sectors/track, 936 cylinders, total 15040512 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

Disk /dev/nand doesn't contain a valid partition table

Disk /dev/nanda: 67 MB, 67108864 bytes
255 heads, 63 sectors/track, 8 cylinders, total 131072 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

Disk /dev/nandb: 7516 MB, 7516192768 bytes
255 heads, 63 sectors/track, 913 cylinders, total 14680064 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

Disk /dev/nandb doesn't contain a valid partition table

Disk /dev/nandc: 100 MB, 100663296 bytes
255 heads, 63 sectors/track, 12 cylinders, total 196608 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: 0xffffffff

Disk /dev/nandc doesn't contain a valid partition table

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
root@cubietruck:~#
```

There is some card information in log ,prove the system has identify card ."/dev/mmcblk0" is device node.Can be seen that TF card has been divide the 13M size sda1 and 15G size sda2 partition.Others is nand flash information.

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

#mkfs.vfat /dev/mmcblk0p1

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/mmcblk0p1 /mnt

#df

```
root@cubietruck:~# mount /dev/mmcblk0p1 /mnt
<4>EXT2-fs (mmcblk0p1): warning: mounting unchecked fs, running e2fsck is recommended
EXT2-fs (mmcblk0p1): warning: mounting unchecked fs, running e2fsck is recommended
root@cubietruck:~#
root@cubietruck:~#
root@cubietruck:~# df
Filesystem     1K-blocks   Used Available Use% Mounted on
rootfs            955016 613896    292608  68% /
/dev/root         955016 613896    292608  68% /
devtmpfs         1023636      0   1023636   0% /dev
tmpfs             131072    176    130896   1% /run
tmpfs               5120      0      5120   0% /run/lock
tmpfs             131072      0    131072   0% /run/shm
tmpfs            1048576     88   1048488   1% /tmp
/dev/root         955016 613896    292608  68% /var/log.hdd
ramlog-tmpfs      262144   3176    258968   2% /var/log
/dev/mmcblk0p1     11895   5046      6235  45% /mnt
root@cubietruck:~#
```

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@cubietruck:~# mount /dev/sda1  /mnt
root@cubietruck:~#
root@cubietruck:~# df
Filesystem     1K-blocks    Used Available Use% Mounted on
rootfs            955016  614056    292448  68% /
/dev/root         955016  614056    292448  68% /
devtmpfs         1023636       0   1023636   0% /dev
tmpfs             131072     212    130860   1% /run
tmpfs               5120       0      5120   0% /run/lock
tmpfs             131072       0    131072   0% /run/shm
tmpfs            1048576      88   1048488   1% /tmp
/dev/root         955016  614056    292448  68% /var/log.hdd
ramlog-tmpfs      262144    3316    258828   2% /var/log
/dev/sda1        7215440 5886852   1328588  82% /mnt
```

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

CubieTruck debian-server can't support HDMI sound card at present.

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@cubietruck:~# 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 32768
Period size range from 1024 to 8192
Using max buffer size 32768
Periods = 4
was set period_size = 8192
was set buffer_size = 32768
 0 - Front Left
 1 - Front Right
Time per period = 2.400074
 0 - Front Left
 1 - Front Right
```

8. WIFI

The WIFI driver has been load .If no , manual load

1. Loading WIFI driver.

$sudo modprobe bcmdhd

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 .

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 HDD ,type ：

#rmmod g_mass_storage

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

To mount partition 2 of nand flash ,type :

#rmmod g_mass_storage

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

Note :

1)When mount the /dev/nandb or /dev/mmcblk0p2 on PC host ,should insert the OTG cable before execute the command ,Otherwise will damage the rootfs (file system in / dev/nandb or /dev/mmcblk0p2),lead to fail mount operation .Mount the first partition （/dev/nanda or / 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. REST key

Press, hardware immediately restart.

10.3. 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@cubietruck:~# keybinder /dev/input/event0
Reading key input from /dev/input/event0 (sunxi-ir)
Loaded config items
Keycode 85 pressed
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. Battery

Connect a lithium-ion battery， use the following command， can see respectively: battery capacity (100 for filling), the current battery voltage, the current voltage.

```
root@cubietruck:~# cat /sys/class/power_supply/battery/capacity
99
root@cubietruck:~#
root@cubietruck:~# cat /sys/class/power_supply/battery/voltage_now
4105000
root@cubietruck:~#
root@cubietruck:~# cat /sys/class/power_supply/battery/current_now
342000
root@cubietruck:~#
```

13. LED

13.1. 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

13.2. Orange LED

Trigger of orange led is defined as "cpu0" , used for indicator load status of cpu0 .

#cat /sys/class/leds/orange\:ph20\:led2/trigger

none rfkill0 battery-charging-or-full battery-charging battery-full battery-charging-blink-full-solid ac-online usb-online mmc0 mmc1 timer heartbeat [cpu0] cpu1 default-on

Turn off LED

#echo none > /sys/class/leds/orange\:ph20\:led2/trigger

#echo 0 > /sys/class/leds/orange\:ph20\:led2/brightness

Turn on LED

#echo none > /sys/class/leds/orange\:ph20\:led2/trigger

#echo 1 > /sys/class/leds/orange\:ph20\:led2/brightness

13.3. White LED

Trigger of white led is defined as "cpu1" , used for indicator load status of cpu1 .

13.4. Green LED

Trigger of green led is defined as "mmc0" , flashing once when a TF card insert on the board .

Other trigger： "timer "(timing flashing)、"battery-charging"、" battery-full " and so on .

Note :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 ".

14. RTC

If connect the Ethernet ,the system time updates automaticly.Sometimes you need update system time manually :

Change to 11 o 'clock 11 minutes 11 seconds

#date -s 11:11:11

Change the date on November 11, 2011

#date -s 20111111

Make sure the battery has 2.5 V voltage at least,reboot or shutdown by use command ,the system time updates to hardware time automaticly .After power outages , it can't updates .So you will find the hardware time is old after boot .

Common commands :

Check the hardware time

#hwclock --show

Set the hardware time

#hwclock --set --date="11/11/14 11:11"

The hardware clock and system clock synchronization

hwclock --hctosys

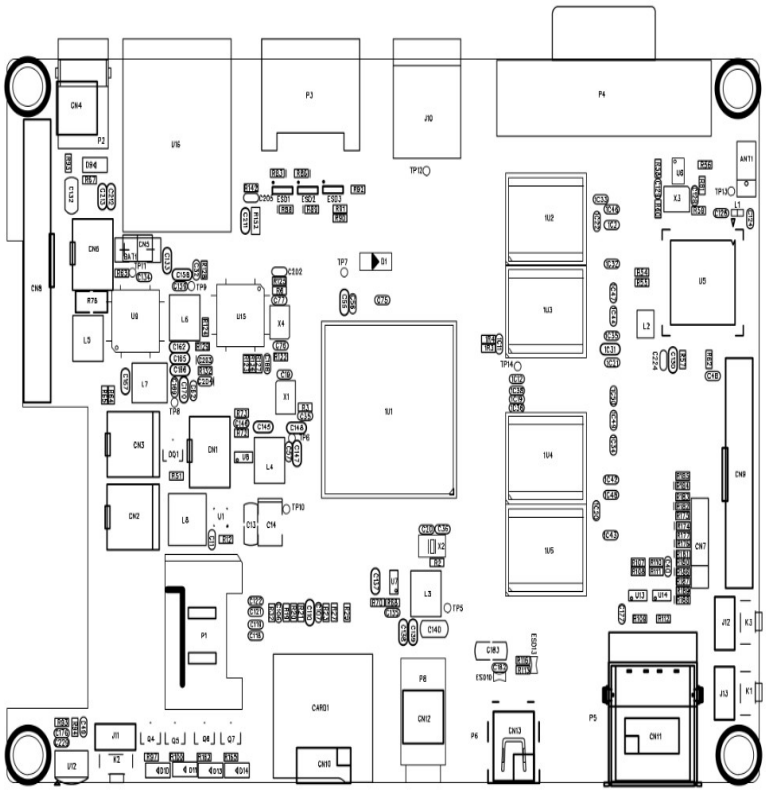
The system clock and hardware clock synchronization

hwclock --systohc

15. Extension PIN

http://docs.cubieboard.org/a20-cubietruck_gpio_pin

CN8			
PIN	DEF	PIN	DEF
30	LRADC1	29	VCC-5V
28	LRADC0	27	CVBS
26	LINEINR	25	PB19
24	LINEINL	23	PB18
22	IR-RX	21	PB2
20	IR-TX	19	PI3
18	PI15	17	PI21
16	PI14	15	PI20
14	GND	13	GND
12	SPI0-MISO	11	SPI0-CLK
10	SPI0-MOSI	9	SPI0-CS
8	PC22	7	PC20
6	PC21	5	PC19
4	RESET#	3	AVCC
2	VCC-3V	1	GND



CN9			
PIN	DEF	PIN	DEF
1	VCC-3V	2	VCC-3V
3	PG0	4	PG3
5	PG2	6	PG1
7	PG4	8	PG5
9	PG6	10	PG7
11	PG8	12	PG9
13	PG10	14	PG11
15	GND	16	GND
17	XP	18	TVIN0
19	XN	20	TVIN1
21	YP	22	TVIN2
23	YN	24	TVIN3

CN8 (Near Ethernet connector)
2x15 Header

30	LRADC1	29	VCC-5V
28	LRADC0	27	CVBS
26	LINEIN-R	25	PB19(TWI1-SDA)
24	LINEIN-L	23	PB18(TWI1-SCK)
22	PB4 (IR0-RX)	21	PB2 (PWM0)
20	PB3 (IR0-TX))	19	PI3 (PWM1)
18	PI15 (PS2SDA1/EINT27)	17	PI21 (FMIN-R/PS2SDA0/UART7-RX/HSDA)
16	PI14 (PS2SCLK1/EINT26)	15	PI20 (FMIN-L/PS2SCLK0/UART7-TX/HSCL)
14	GND	13	GND
12	PB17 (SPI2-MISO/JTAG_DI0)	11	PB15(SPI2-CLK/JTAG_CK0)
10	PB16 (SPI2-MOSI/JTAG_DO0)	9	PB14 (SPI2-CS0/JTAG_MS0)
8	PC22 (SPI2-MISO/EINT15)	7	PC20 (SPI2-CLK)
6	PC21 (SPI2-MOSI/EINT14)	5	PC19 (SPI2-CS0)
4	RESET#	3	AVCC
2	3.3V	1	GND

CN9 (Near USB Ports)

CSI1/TS/TP/TVIN

1	3.3V	2	3.3V
3	PG0 (TS1_CLK/CSI1-PCLK)	4	PG3 (TS1_ERR/CSI1-VSYNC)
5	PG2 (TS1_SYNC/CSI1-HSYNC)	6	PG1 (TS1_DVLD/CSI1-MCLK)
7	PG4 (TS1_D0/CSI1-D0)	8	PG5 (TS1_D1/CSI1-D1)
9	PG6 (TS1_D2/CSI1-D2/UART3-TX)	10	PG7 (TS1_D3/CSI1-D3/UART3-RX)
11	PG8 (TS1_D4/CSI1-D4/UART3-RTS)	12	PG9 (TS1_D5/CSI1-D5/UART3-CTS)
13	PG10 (TS1_D6/CSI1-D6/UART4-TX)	14	PG11 (TS1_D7/CSI1-D7/UART4-RX)
15	GND	16	GND

Analog

17	XP-I2SDO1	18	TVIN0-I2SMCLK
19	XN-I2SDO2	20	TVIN1-BTPCMCLK
21	YP-I2SDO3	22	TVIN2-BTPCMSYNC
23	XN-BTPCMIN	24	TVIN3-BTPCMOUT