IAC-IMX6UL-KIT Testing Manual

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QIYANG INTELLIGENTTECHNOLOGY Co., Ltd

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Preface

Welcome to use IAC-IMX6UL-Kit from Zhejiang Qiyang Intelligent Technology Co., Ltd.This Manual mainly introduce different interface functions and testing method.

Please read carefully before using IAC-IMX6UL board:

IAC-IMX6UL-Kit Hardware manual.pdf and ***IAC-IMX6UL-Kit User Manual.pdf***

Target User

This manual applies to the following engineer:

Test Engineer

Technical Support engineer

Software Development engineer

Version Illustration:

Model Name	Product version
IAC-IMX6UL-Kit	V1.0

Revision record:

The revision history accumulates a description of each document update. The latest version of the document contains updates to all previous of the document.

Revision Date	Version	Revision note
2016/10/20	V1.0	Release

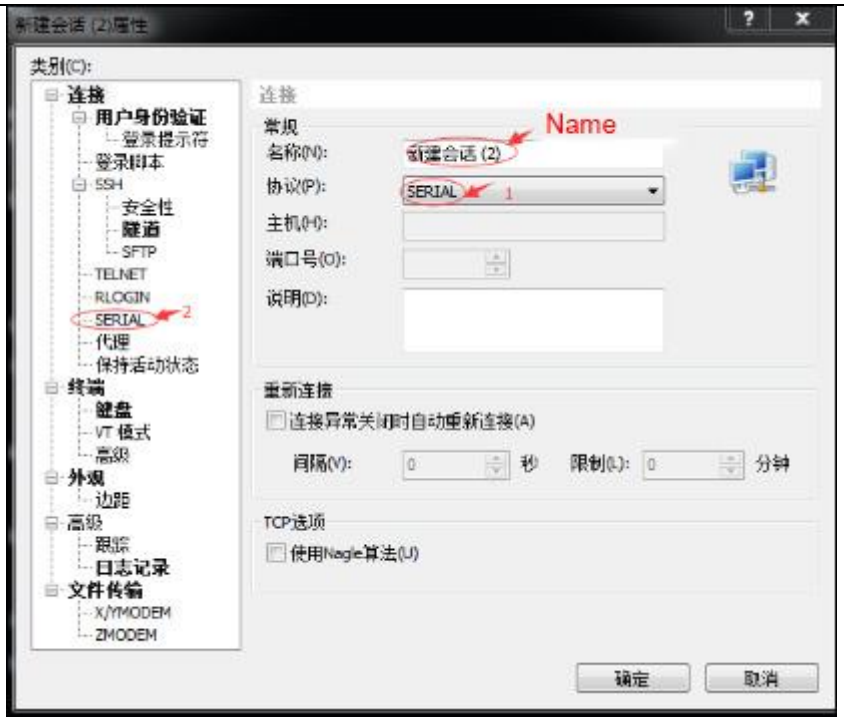
I. Preparation

- Connect the core board IAC-IMX6UL-CM-Beta-V1.01 and the base board IAC-IMX6UL-MB-Beta-V2.00
- Connect the 7 inch LCD module(with resistive touch) QY-AT070TN83-V1 to the J8 connector of IMX6UL base board.
- Serial connection: connect the J14 of base board with the PC by our matching serial port cable.

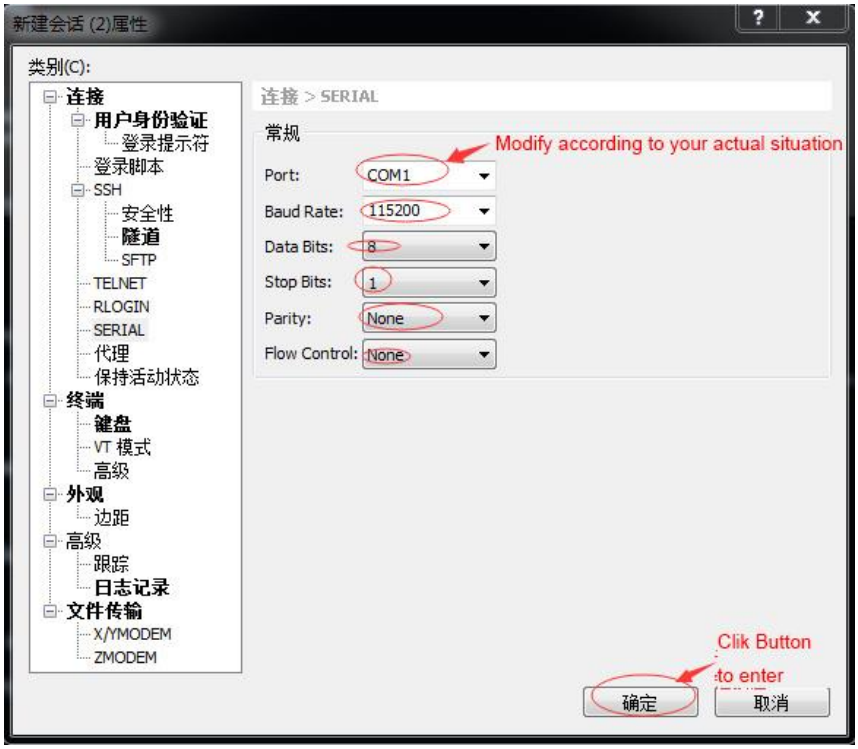
Networking：connect Ethernet port J2 of base board with the PC by the network cable.

- Serial port setting: Open the terminal communication software---Xshell（mini ternimal or hyper terminal from Windows），Choose the serial port and set as follow：Baud rate（115200）、data bits（8 bits）、stop bit（1 bit）、check bit（No）、data flow control（No），specific operation as follow picture 1-1，1-2:

Picture 1-1



Picture 1-2



Picture 1-3

- The testing program is in the content /usr/ test，please switch to the content，Command and reference diagram as follow table, the all testing operations are completed in this directory.

Command	**# cd /usr/test/**
Description	Enter /usr/ test
Test Phenomenon	After executing the command, we can see the application from the print information, please refer the following picture.
Reference	

```
root@imx6ulevk:~# cd /usr/test/
root@imx6ulevk:/usr/test# ls
8723bu.ko             backlight_test        gpio_test             rtc_test              watchdog_feed_test
QiYang_Imx6S_Qt_test  buzzer_test           keybutton             serial_test           watchdog_notfeed_test
ad_test.sh            can_test              rs485_test            shinian.mp3
```

. Board Testing

2.1 Buzzer Test

2.1.1 Overview

IAC-IMX6UL-KIT board use [GPIO3_4] to control the buzzer. When set [GPIO3_4] to low level, buzzer doesn't work; when set to high level, buzzer will buzzing.

2.1.2 Test Steps

Step 1：

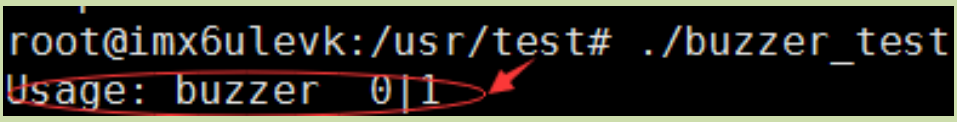
Command	**# ls /dev**
Description	Check whether there are available device nodes, if there is no buzzer device node, please check the manual 2.1.3
Test Phenomenon	After executing the command, we can see the application from the print information, please refer the following picture.

Reference

```
root@imx6ulevk:/usr/test# ls /dev
audio              loop5              ram1               tty11              tty36              tty60
autofs             loop6              ram10              tty12              tty37              tty61
block              loop7              ram11              tty13              tty38              tty62
bus                mem                ram12              tty14              tty39              tty63
char               memory_bandwidth   ram13              tty15              tty4               tty7
console            mmcblk1            ram14              tty16              tty40              tty8
cpu_dma_latency    mmcblk1boot0       ram15              tty17              tty41              tty9
disk               mmcblk1boot1       ram2               tty18              tty42              ttymxc0
dri                mmcblk1p1          ram3               tty19              tty43              ttymxc1
dsp                mmcblk1rpmb        ram4               tty2               tty44              ttymxc2
fb0                mtab               ram5               tty20              tty45              ttymxc3
fd                 mxc_asrc           ram6               tty21              tty46              ttymxc4
full               network_latency    ram7               tty22              tty47              ubi_ctrl
fuse               network_throughput ram8               tty23              tty48              urandom
hwrng              null               ram9               tty24              tty49              v4l
i2c-0              ppp                random             tty25              tty5               vcs
i2c-1              pps0               rtc                tty26              tty50              vcs1
initctl            pps1               rtc0               tty27              tty51              vcsa
input              ptmx               shm                tty28              tty52              vcsa1
kmsg               ptp0               snd                tty29              tty53              video0
log                ptp1               stderr             tty3               tty54              watchdog
loop-control       pts                stdin              tty30              tty55              watchdog0
loop0              pxp_device         stdout             tty31              tty56              zero
loop1              qiyang_buzzer      tty                tty32              tty57
loop2              qiyang_imx6_gpio   tty0               tty33              tty58
loop3              qy_watchdog        tty1               tty34              tty59
loop4              ram0               tty10              tty35              tty6
```

蜂鸣器设备节点

Step 2：

Command	# **./ buzzer_test**
Description	Run the testing program, do the next step according to the hint
Test Phenomenon	After executing the command, we can see the application from the print information, please refer the following picture.
Reference	

```
root@imx6ulevk:/usr/test# ./buzzer_test
Usage: buzzer  0|1
```

Remark: the red circle is the hint information, we need to add 0 or 1 after the buzzer to change the state.

Step 3：

Command	**# ./ buzzer_test 1**
Description	Output high level to control the buzzer to ring
Test Phenomenon	After executing the command, the buzzer ring"beep" until close the Buzzer
Reference	root@imx6ulevk:/usr/test# ./buzzer_test 1

Step 4：

Command	**# ./ buzzer_test 0**
Description	Output low level to control Buzzer to stop ringing
Test Phenomenon	After executing the command, the buzzer stop ringing
Reference	root@imx6ulevk:/usr/test# ./buzzer_test 0

2.1.3 FAQ

- [/dev] directory don't have [qiyang_buzzer] device node

solution：

1.Check whether add the drive program of Buzzer.

2.Check the kernel configuration(make menuconfig), whether it is same as the description of ***IAC-IMX6UL-Kit BSP development instruction*** .

2.2 RTC Test

2.2.1 Overview

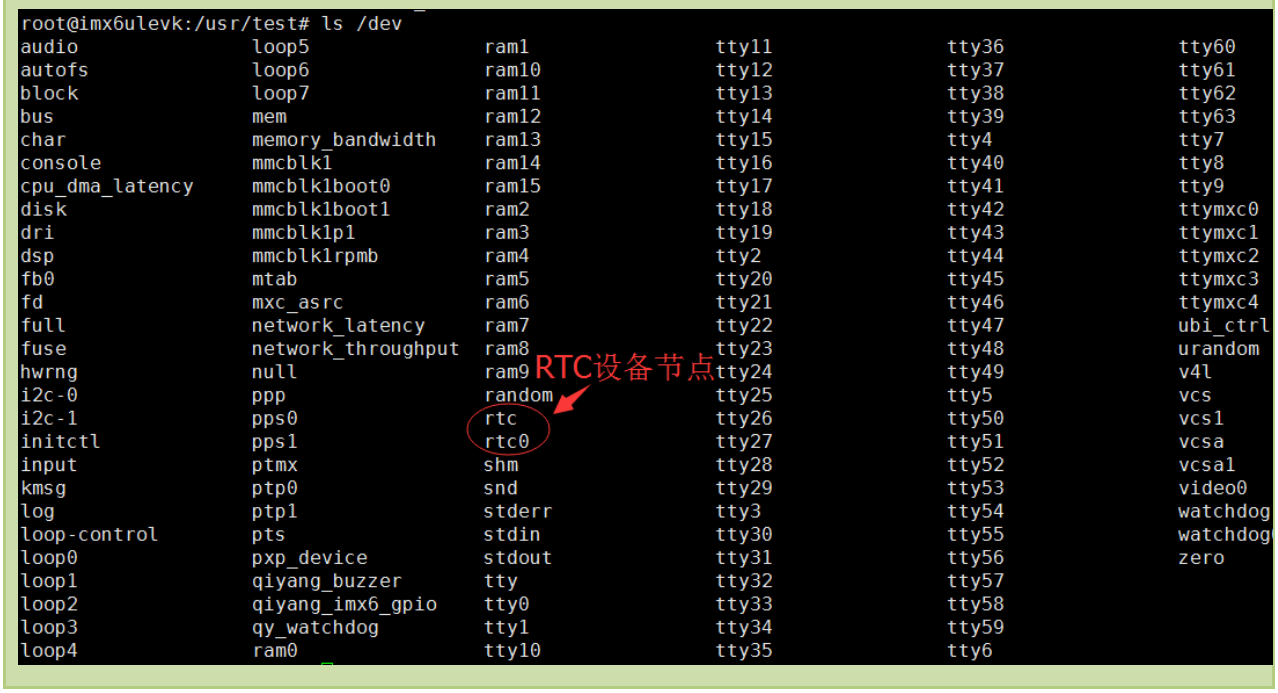
QY-IMX6-KIT mainboard connects DS3231 Chip on the back plane by I2C connector as the external hardware clock. Set system time through [date] system command, and then write system time into hardware clock through [hwclock]command. Read hardware clock and print information through [rtc_test]test program.

Power off , then restart the board to check whether the time is accurate.

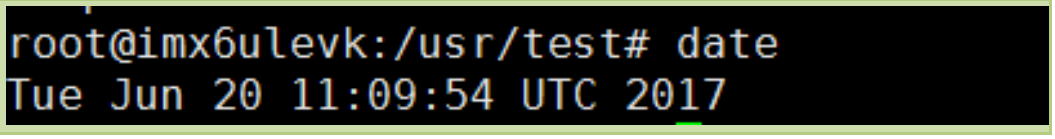
Please confirm you have already installed the battery on backplane (BT1)before testing RTC.

2.2.2 Test Steps

Step 1：

Command	# **ls /dev**
Description	Check whether there are available device nodes, if there is no RTC device node, please check the manual 2.2.3 .
Test Phenomenon	After executing the command, we can see the RTC device node from the print information, please refer to the following picture.
Reference	

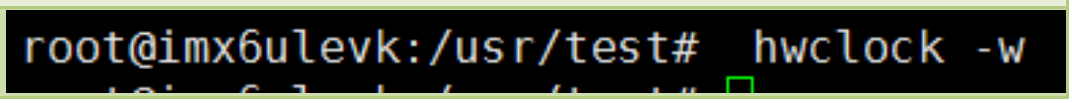
Step 2：

Command	# **date**
Description	Execute the [date] command, we can check the current system clock.
Test Phenomenon	After executing the command, we can see the current system clock from the print information, please refer to the picture.
Reference	

Step 3：

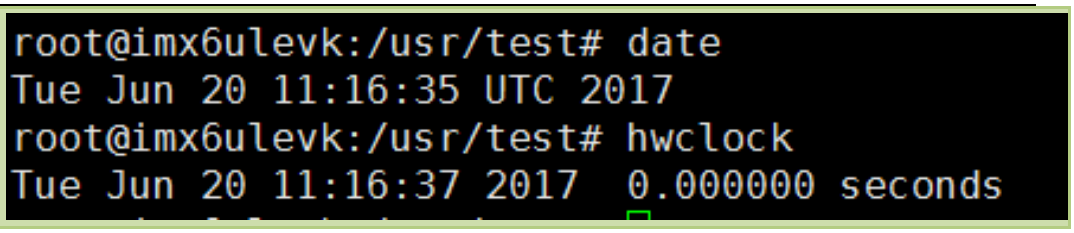
Command	**# date -s "2017-06-20 10:47:00"**
Description	Execute the [date] command to set RTC, such as set time as the PC time
Test Phenomenon	After executing the command, we can see the time from the print information, please refer the following picture.
Reference	

Step 4：

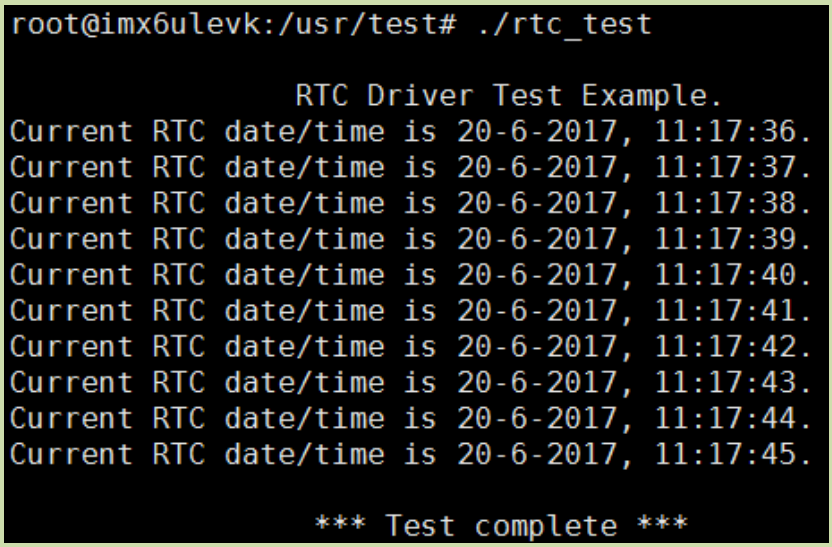
Command	**# hwclock -w**
Description	Write system time into hardware clock through [hwclock]command
Test Phenomenon	None
Reference	

Step 5：

Command	**# date** **# hwclock**
Description	Respectively use[date] command and [hwclock] command to check the system clock and hardware clock.
Test Phenomenon	After executing the command, we can see the system and hardware time from the print information, please refer the following picture.

Reference	

Step 6：

Command	**#./rtc_test**
Description	After setting successful, execute the [rtc_test] program
Test Phenomenon	After executing the command, we can see the RTC from the print information, it walks accurately and no loss on second. please refer the following picture.
Reference	

Step 7：

After power off, then restart it to check whether the time is saved and walk accurately.

2.2.3 FAQ

- [/dev] directory don’t have RTC device node.

Solution:

1.Check whether added the RTC drive program.

2.Check the kernel configuration [make menuconfig], whether it is same as the description of ***IAC-IMX6UL-Kit BSP development instruction.***

- Time can not be saved, time travel error is huge, can not check hardware clock.

Solution:

1.Whether installed the battery on BT1.

2.Whether the battery has the electricity.

2.3 Watchdog Test

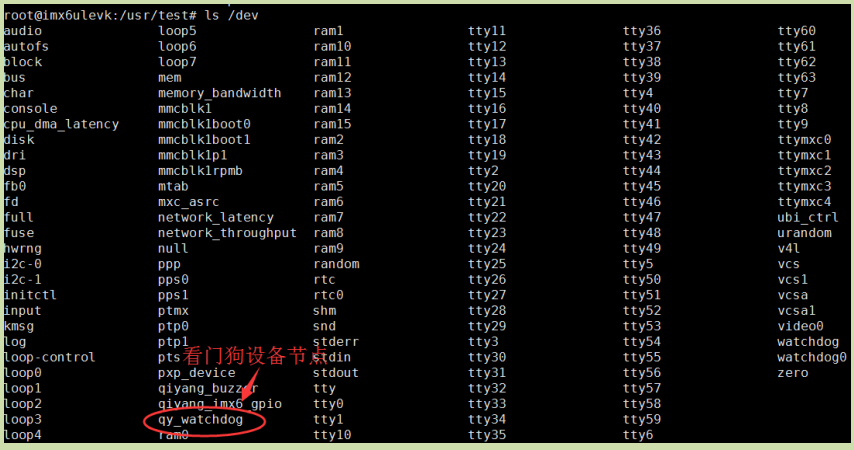
2.3.1 Overview

The mainboard IAC-IMX6UL-KIT has one Watchdog chip, which can restart the crashing system.

In testing process, enable Watchdag, to execute feeding or not feeding dog program, to check whether the system can reset normally.

2.3.2 Test steps

Step 1：

Command	# **ls /dev**
Description	Check whether there are available device nodes, if there is no Watchdog device node, please check the manual 2.3.3
Test Phenomenon	After executing the command, we can see the Watchdog device node from the print information, please refer the following picture.
Reference	

Step 2：

Command	**# ./watchdog_feed_test**
Description	Open the Watchdog and feed.
Test Phenomenon	After executing the command, we can see the Enable Watchdog from the print information, please refer the following picture.
Reference	root@imx6ulevk:/usr/test# ./watchdog_feed_test watchdog: enable watchdog

Step 3：

Command	**# ./watchdog_nofeed_test**
Description	Open Watchdog, not feed
Test Phenomenon	After Executing the command, the system reboots .
Reference	None

2.3.3 FAQ

- [/dev] directory don't have RTC device node.

Solution:

1.Check whether add the Watchdog Drive program.

2.Check the kernel configuration [make menuconfig], whether it is same as the description of ***IAC-IMX6UL-Kit BSP development instruction***.

2.4 Serial Port Test

2.4.1 Overview

There are 5-ch serial ports :J14 is as the debug UART. The other 4-ch could be used as the common RS232 serial port, including:

COM2(J17), COM3(J16) and COM5(J15) are 5- wire serial port.

COM4(J12) is RS485.

This test program only aims at testing of common RS232.

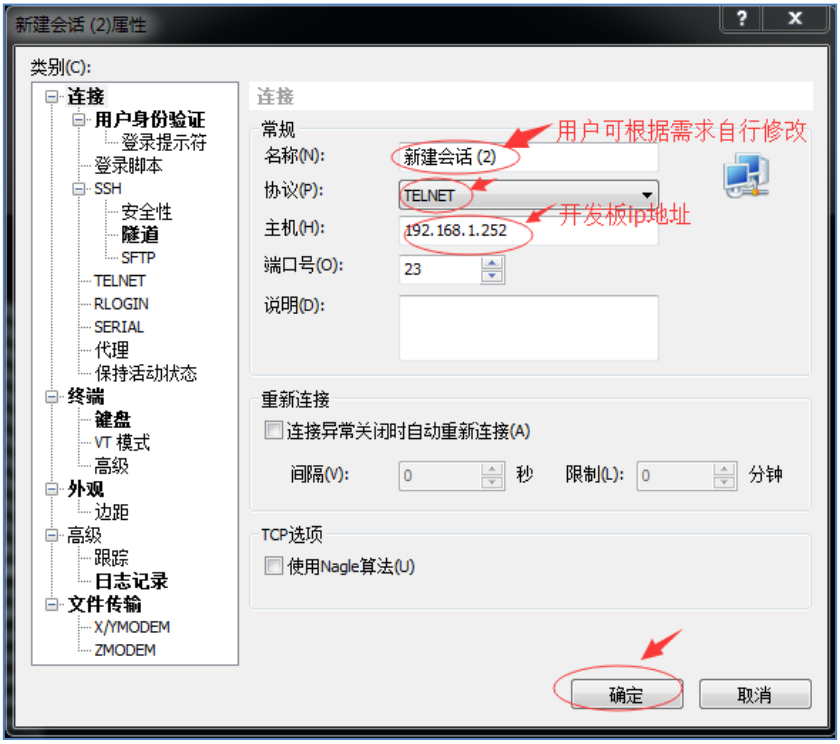
When do serial ports testing, the PC needs 2-ch serial ports.

1.One connect to debugging port for interaction

2.One connect to under test ports to transmit and receive data

If there is only 1-ch serial port, connect to under test port and connect to development board by network cable. Log in development system as debugging ports through hyper terminal xshell telent.

- Log in the development board through PC as follows:

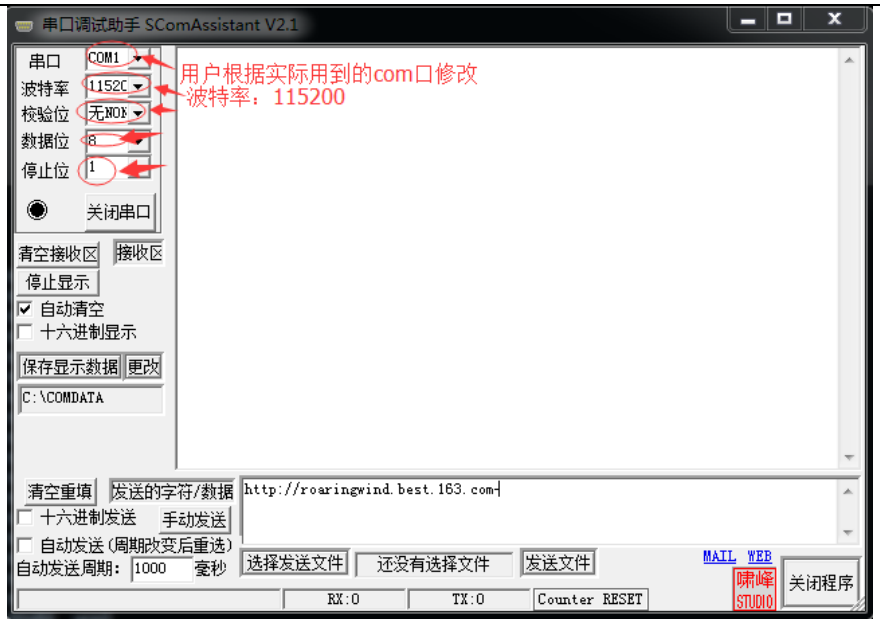


Testing the program, one serial port will send the character data [Comx RS232 test string!] on every second, X is the serial number of the actual test, it could block the serial data and prints through multithreading.

2.4.2 Test steps

Here is introduction on the COM2(J17) as a sample, other serial ports testing is the same.

Step 1: Open the serial debugging assistant and set



Step 2(From now on, these steps are operated under the telent of super terminal)

Command	# **ls /dev**
Description	Check whether there are available device nodes, if there is no Serial ports device node, please check the manual 2.4.3
Test Phenomenon	After executing the command, we can see the serial ports device node from the print information, please refer the following picture.
Reference	root@imx6ulevk:/usr/test# ls /dev/ audio loop1 ptp0 random tty21 tty42 tty63 autofs loop2 ptp1 rtc tty22 tty43 tty7 block loop3 pts rtc0 tty23 tty44 tty8 bus loop4 pxp_device shm tty24 tty45 tty9 char loop5 qiyang_buzzer snd tty25 tty46 ttymxc0 console loop6 qiyang_imx6_gpio stderr tty26 tty47 ttymxc1 cpu_dma_latency loop7 qy_watchdog stdin tty27 tty48 ttymxc2 disk mem ram0 stdout tty28 tty49 ttymxc3 dri memory_bandwidth ram1 tty tty29 tty5 ttymxc4 dsp mmcblk1 ram10 tty0 tty3 tty50 ubi_ctrl fb0 mmcblk1boot0 ram11 tty1 tty30 tty51 urandom fd mmcblk1boot1 ram12 tty10 tty31 tty52 v4l full mmcblk1p1 ram13 tty11 tty32 tty53 vcs fuse mmcblk1rpmb ram14 tty12 tty33 tty54 vcs1 hwrng mtab ram15 tty13 tty34 tty55 vcsa i2c-0 mxc_asrc ram2 tty14 tty35 tty56 vcsa1 i2c-1 network_latency ram3 tty15 tty36 tty57 video0 initctl network_throughput ram4 tty16 tty37 tty58 watchdog input null ram5 tty17 tty38 tty59 watchdog0 kmsg ppp ram6 tty18 tty39 tty6 zero log pps0 ram7 tty19 tty4 tty60 loop-control pps1 ram8 tty2 tty40 tty61 loop0 ptmx ram9 tty20 tty41 tty62

Step 3：

Command	# **./serial_test**
Description	Run the testing program of serial port

Test Phenomenon	After executing the command, we can see the serial ports hint information from the printed, please refer the following picture.
Reference	root@imx6ulevk:/usr/test# ./serial_test Invalid arguments! Usage: ./serial_test [0123] 0 --/dev/ttymxc1 com2 test, used as rs232. 1 --/dev/ttymxc2 com3 test, used as rs232. 2 --/dev/ttymxc3 com4 test, used as rs232. 3 --/dev/ttymxc4 com5 test, used as rs232.

Remark:

Com2 -> J17 -> /dev/ttymxc1

Com3 -> J16 -> /dev/ttymxc2

Com4 -> J12 -> /dev/ttymxc3

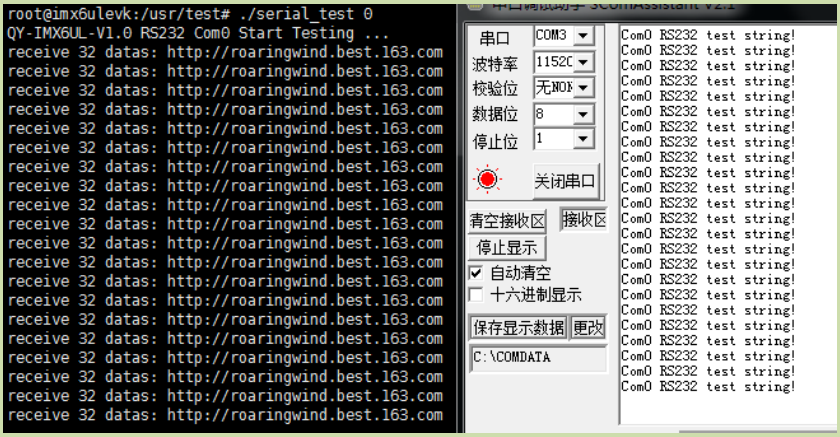
Com5 -> J15-> /dev/ttymxc4

Step 3：

Command	# **./serial_test 0**①
Description	Run the serial port application program
Test Phenomenon	After executing the command, the telent terminal receive and print the information from the serial debugging terminal, and the serial debugging assistant receive and print the information from the serial ports. Please refer the following picture.

Remark L

① /serial_test 0 means test com2。

Reference	

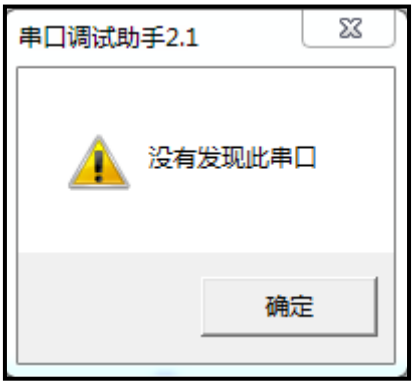
Telnet and Serial Debugging Assistant both can receive data and the data shows no error, it means ports function work normally.

After testing COM2, [Ctrl+C] to quit from the program, and then continue other ports' testing. The testing method is same.

t

2.4.3 FAQ

- Open the serial debugging assistant, it shows a window as below:



Solution:

1.Check whether the serial cable is connected normally or not.

2. Check whether the serial of hyper terminal has disconnected.

- The communication of serial ports is abnormal or can not be communicated.

Solution:

1.Check the serial cable is normal or not.

2.The debugging software configuration is correct or not.

2.5 USB Testing

2.5.1 Overview

There are 4-ch USB ports on the IAC-IMX6UL-KIT mainboard.

Ch-1 and Ch-4 (J6) are regarded as device port, it is used for downloading firmware program by USB. Ch-2 and Ch-3 are used as USB- Host, including ,1-ch is to multiplex with WIFI port, 1-ch is to multiplex with miniPCIE interface. This test aims at testing of host port.

Development board USB HOST support hot plug, plug USB flash Disk, system will automatically recognize and print USB Flash Disk information. After recognizing, it generates the device node [/dev/sda] and partition node [/dev/sdal] in [/dev] directory.(If there are several partitions, then number parts will be increased step by step) Finally, system will automatically mount all partition to [/media/] directory, judge whether the interface is normal or not through reading and writing corresponded file of directory.

2.5.2 Test steps

Test the USB Flash Disk with only 1 partition as a sample.

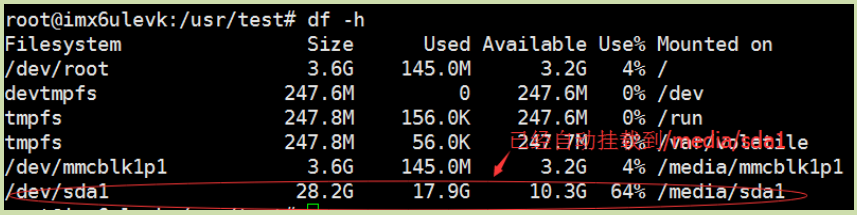
Step 2: Plug normal USB Flash Disk to USB host, debug port prints the following information:

```
root@imx6ulevk:/usr/test# usb 1-1.2: new high-speed USB device number 5 using ci_hdrc
usb-storage 1-1.2:1.0: USB Mass Storage device detected
scsi host1: usb-storage 1-1.2:1.0
scsi 1:0:0:0: Direct-Access     SMI      USB DISK         1100 PQ: 0 ANSI: 6
sd 1:0:0:0: [sda] 60416000 512-byte logical blocks: (30.9 GB/28.8 GiB)
sd 1:0:0:0: [sda] Write Protect is off
sd 1:0:0:0: [sda] Write cache: enabled, read cache: enabled, doesn't support DPO or FUA
 sda: sda1
sd 1:0:0:0: [sda] Attached SCSI removable disk
```

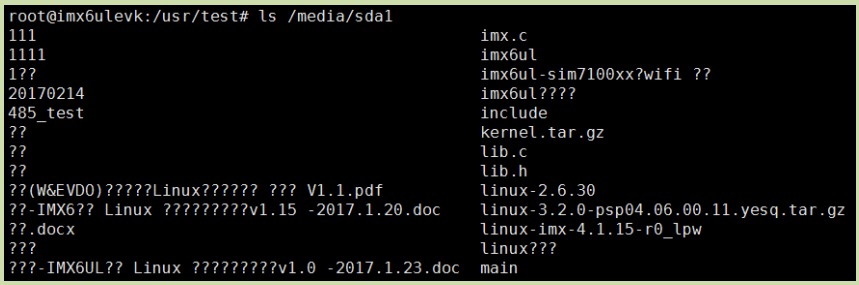
Step 2：

Command	**# fdisk -l /dev/sda**
Description	Check the USB Flash Disk by [fdisk] command
Test Phenomenon	After executing the command, we can see the USB Flash Disk device node from the printed, please refer to the following picture.
Reference	root@imx6ulevk:/usr/test# fdisk -l /dev/sda Disk /dev/sda: 30.9 GB, 30932992000 bytes 185 heads, 8 sectors/track, 40821 cylinders Units = cylinders of 1480 * 512 = 757760 bytes Device Boot Start End Blocks Id System /dev/sda1 911 40822 29534336 c Win95 FAT32 (LBA)

Step 3：

Command	#df -h
Description	Check whether the USB Flash Disk be automatically mounted.
Test Phenomenon	After executing the command, we can see the mounting information from the printed information.
Reference	

Step 4:

Command	# ls /media/sda1
Description	Check the contents in USB Flash Disk
Test Phenomenon	After executing the command, we can see the contents of TF card from the mounted directory of the printed information , please refer to the following picture.
Reference	

2.5.3 FAQ

● After inserting USB Flash Disk, without any printed information , it can recognize but shows reading and writing error,

Solution:

1.Check the kernel configuration [make menuconfig], whether it is same as the description

of ***IAC-IMX6UL-Kit BSP development instruction***.

2.Maybe the USB Flash Disk is damaged, we can formatting it in the PC, then try again.

3.Change another USB Flash Disk to test.

2.6 TF card testing

2.6.1 Overview

IAC-IMX6UL-KIT provides 1-ch TF Card interface (J11) for users to use.

On board TF card interface support hot plug, after plugging in TF card, system will recognize TF card and print the relative information of TF Card.

Generate device node and partition node in [/dev] directory. Then system will automatically mount all partition to [/media/] directory. Through read and write corresponded file of directory to judge whether the interface is normal or not.

2.6.2 Test steps

The following test process will take example of TF card with only one partition. If several partitions, please use the same test method.

Step 1：

Plug in a 64G TF card and generate device node [/dev/mmcblk0]. (Partition [N] corresponds to partition device node [/dev/mmcblk0pN]) , it prints information as follow:

```
root@imx6ulevk:/usr/test# mmc0: host does not support reading read-only switch, assuming write-enable
mmc0: new high speed SDXC card at address 0007
mmcblk0: mmc0:0007 SD64G 58.2 GiB
 mmcblk0: p1
```

Step 2：

Command	**# fdisk -l /dev/mmcblk0**
Description	Check the TF information by [fdisk] command and mount.
Test Phenomenon	After executing the command, we can see the contents of TF card information from the printed information, please refer to the following

	picture.
Reference	root@imx6ulevk:/usr/test# fdisk -l /dev/mmcblk0 Disk /dev/mmcblk0: 62.5 GB, 62537072640 bytes 255 heads, 63 sectors/track, 7603 cylinders Units = cylinders of 16065 * 512 = 8225280 bytes Device Boot Start End Blocks Id System /dev/mmcblk0p1 1 7603 61071066 7 HPFS/NTFS

Step 3:

Command	# **df –h**
Description	Check the specific mount directory
Test Phenomenon	After executing the command, we can see the mount directory of TF card from the printed information, please refer to the following picture.
Reference	root@imx6ulevk:/usr/test# df -h Filesystem Size Used Available Use% Mounted on /dev/root 3.6G 145.0M 3.2G 4% / devtmpfs 247.6M 0 247.6M 0% /dev tmpfs 247.8M 152.0K 247.7M 0% /run tmpfs 247.8M 52.0K 247.8M 0% /var/volatile /dev/mmcblk1p1 3.6G 145.0M 3.2G 4% /media/mmcblk1p1 /dev/mmcblk0p1 58.2G 297.1M 58.0G 0% /media/mmcblk0p1

Step 4:

Command	# **ls /media/mmcblk0p1**
Description	Check the contents of TF card
Test Phenomenon	After executing the command, we can see the contents of TF card from the printed information, please refer the following picture.
Reference	root@imx6ulevk:/usr/test# ls /media/mmcblk0p1 ntfs: (device mmcblk0p1): ntfs_ucstonls(): Unicode name contains characters that cannot be u might want to try to use the mount option nls=utf8. ntfs: (device mmcblk0p1): ntfs_filldir(): Skipping unrepresentable inode 0x31. Android README.txt.txt rootfs.yaffs2 uEnvz.txt DCIM Records u-boot uImage LOST.DIR System Volume Information u-boot-spl.bin MLO log u-boot.bin MLO.spi proudlink u-boot.img

2.6.3 FAQ

- After plugging in SD Card, without any print information, it can recognize but shows reading

and writing error.

Solution:

1.Maybe the USB Flash Disk is damaged, we can formatting it in the PC, then try again.

2.Change another USB Flash Disk to test.

3.Check the kernel configuration [make menuconfig],whether it is same as the description of ***IAC-IMX6UL-Kit BSP development instruction.***

2.7 GPIO testing

2.7.1 Overview

This test aims at the following GPIO PIN Definition:

J20[IMX_GPIO4_23, IMX_GPIO4_24, IMX_GPIO4_25 IMX_GPIO4_26, IMX_GPIO4_27, IMX_GPIO4_28, IMX_GPIO1_18]

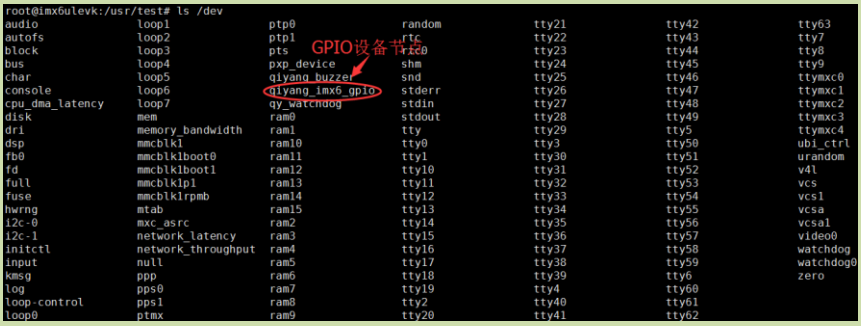
[Gpio_test 0] test the situation when gpio do not have external connection.set all pin to low level, then set them to high level, through external measure [gpio] actual level to confirm whether gpio is normal or not.

[Gpio_test 1] will read external level signal directly, user can compare read level data and connected level data to confirm whether [gpio] is normal or not.

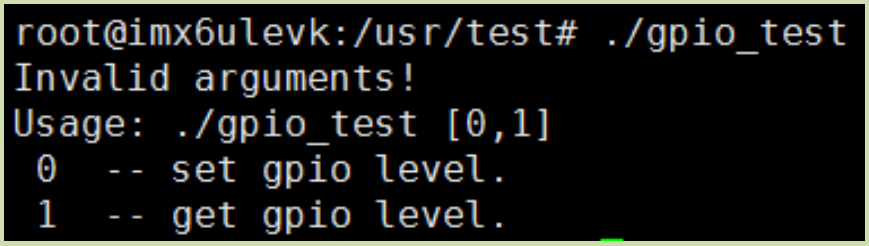
2.7.2 Test steps

Step 1 :

Command	# **ls /dev**
Description	Check whether there are available device nodes, if there is no GPIO device node, please check the manual 2.7.3
Test Phenomenon	After executing the command, we can see the GPIO device node from the printed information, please refer the following picture.

Reference	

Step2：

Command	**# ./gpio_test**
Description	Run the test program [gpio_test].
Test Phenomenon	After executing the command, we can see the hint of how to set and get the GPIO information from the printed information. please refer the following picture
Reference	

Remark:

Refer to step2, /gpio_test 0 is to set the gpio level, /gpio_test 1 is to get the gpio level.

Step3 ：

Command	**# ./gpio_test 1**
Description	Get the GPIO level on the information from Step1
Test Phenomenon	After executing the command, we can see the GPIO status from the printed information, please refer to the following pictur.

Reference	root@imx6ulevk:/usr/test# ./gpio_test 1 QY-IMX6UL-v1.x Gpio Start Testing####################pin = 119, level = 0 ... get gpio 'IMX_GPIO4_23' level '0'####################pin = 120, level = 0 get gpio 'IMX_GPIO4_24' level '0'####################pin = 121, level = 0 get gpio 'IMX_GPIO4_25' level '0'####################pin = 122, level = 0 get gpio 'IMX_GPIO4_26' level '0'####################pin = 123, level = 0 get gpio 'IMX_GPIO4_27' level '0'####################pin = 124, level = 0 get gpio 'IMX_GPIO4_28' level '0'####################pin = 18, level = 0 get gpio 'IMX_GPIO1_18' level '0'

Step4：

Command	# **./gpio_test 0**
Description	Set the GPIO level according to the hinted information from Step1
Test Phenomenon	After executing the command, we can see the GPIO setting information from the printed information. please refer to the following picture.
Reference	root@imx6ulevk:/usr/test# ./gpio_test 0 QY-IMX6UL-v1.x Gpio Start Testing ... set gpio 'IMX_GPIO4_23' level '0' set gpio 'IMX_GPIO4_24' level '0' set gpio 'IMX_GPIO4_25' level '0' set gpio 'IMX_GPIO4_26' level '0' set gpio 'IMX_GPIO4_27' level '0' set gpio 'IMX_GPIO4_28' level '0' set gpio 'IMX_GPIO1_18' level '0' Gpios is output low level, now you can measure each pin! Press the ENTER after measure each pins! set gpio 'IMX_GPIO4_23' level '1' set gpio 'IMX_GPIO4_24' level '1' set gpio 'IMX_GPIO4_25' level '1' set gpio 'IMX_GPIO4_26' level '1' set gpio 'IMX_GPIO4_27' level '1' set gpio 'IMX_GPIO4_28' level '1' set gpio 'IMX_GPIO1_18' level '1' Gpios is output high level, now you can measure each pin! Press the ENTER after measure each pins! Gpio test OK!

Remark: as the step4, set the every GPIO to low level, after pressing the enter, set all the GPIO to high level, press enter again, show testing is ok.

2.7.3 FAQ

- [/dev] direcotry don't have the [qiyang_imx6_gpio] nod.

Solution:

1、 Check whether add the GPIO drive program.

2、 Check the kernel configuration [make menuconfig], whether it is same as the description of ***IAC-IMX6UL-Kit BSP development instruction*** .

2.8 Ethernet test

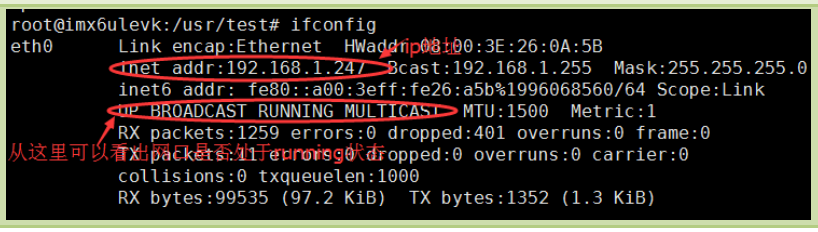
2.8.1 Overview

IAC-IMX6UL-KIT development board has 2-ch 100Mbps Ethernet network onboard(J2, J3). Using [ping] command to test whether it could communicate with network.

2.8.2 Test steps

Here is testing the eth0 as a sample. Others testing is the same.

Step1： Connect network cable to [eth0](J2)

Command	# **ifconfig**
Description	Check whether the eth0 is in RUNNING status
Test Phenomenon	After executing the command, we can see the eth0 status from the printed information. please refer to the following picture.
Reference	

Step 2：

Command	#**ping –I eth0 www.baidu.com**

Description	Communicate with external network
Test Phenomenon	After executing the command, we can see the communication information with outer network from the printed information. please refer to the following picture.
Reference	root@imx6ulevk:/usr/test# ping -I eth0 www.baidu.com PING www.baidu.com (119.75.216.20): 56 data bytes 64 bytes from 119.75.216.20: seq=0 ttl=53 time=60.302 ms 64 bytes from 119.75.216.20: seq=1 ttl=53 time=60.900 ms 64 bytes from 119.75.216.20: seq=2 ttl=53 time=60.308 ms 64 bytes from 119.75.216.20: seq=3 ttl=53 time=60.258 ms 64 bytes from 119.75.216.20: seq=4 ttl=53 time=60.197 ms 64 bytes from 119.75.216.20: seq=5 ttl=53 time=60.165 ms 64 bytes from 119.75.216.20: seq=6 ttl=53 time=60.607 ms 64 bytes from 119.75.216.20: seq=7 ttl=53 time=60.514 ms 64 bytes from 119.75.216.20: seq=8 ttl=53 time=60.110 ms 64 bytes from 119.75.216.20: seq=9 ttl=53 time=60.629 ms 64 bytes from 119.75.216.20: seq=10 ttl=53 time=60.936 ms --- www.baidu.com ping statistics --- 11 packets transmitted, 11 packets received, 0% packet loss round-trip min/avg/max = 60.110/60.447/60.936 ms

Remark: Take a reference of step2, it means the Eth 1 works normally. Packet loss means lost data/transmitting data.

2.8.3 FAQ

- After connecting the network LAN, there is no information of eth0 or eth1 become ready

Solution:

1、Check the kernel configuration [make menuconfig], whether it is same as the description of ***IAC-IMX6UL-Kit BSP development instruction***.

2、Check ***IAC-IMX6UL-Kit BSP development instruction*** whether has been modified into the actual situation.

2.9 3G/4G Module Test

2.9.1 Overview

PCIE interface（J7）of IAC-IMX6UL-KITcould connect to 3G/4G module

By dial-up networking, check whether it could communicate with external network.

2.9.2 Test steps

Step1：

Connect the 3G/4Gmodule to the J7. The printed information are as follows:

```
usb 1-1.3: GSM modem (1-port) converter now attached to ttyUSB0
usb-storage 1-1.3:1.1: USB Mass Storage device detected
option 1-1.3:1.1: GSM modem (1-port) converter detected
usb 1-1.3: GSM modem (1-port) converter now attached to ttyUSB1
usb-storage 1-1.3:1.2: USB Mass Storage device detected
option 1-1.3:1.2: GSM modem (1-port) converter detected
usb 1-1.3: GSM modem (1-port) converter now attached to ttyUSB2
usb-storage 1-1.3:1.3: USB Mass Storage device detected
option 1-1.3:1.3: GSM modem (1-port) converter detected
usb 1-1.3: GSM modem (1-port) converter now attached to ttyUSB3
usb-storage 1-1.3:1.4: USB Mass Storage device detected
option 1-1.3:1.4: GSM modem (1-port) converter detected
usb 1-1.3: GSM modem (1-port) converter now attached to ttyUSB4
```

Step 2：

Insert the according mobile phone card to slot(J30) on back of development board. (Here use telecom card as a sample)

Note: the testing way is same for 3G or 4G. Before testing, Please confirm the model of the 3G/4G module, such as Unicom, CMCC or Telecom. Then insert the SIM card to slot(J30), after preparation, we start to connect.

Step3：

Command	# **route del default**
Description	Delete the default routing
Test Phenomenon	After executing the command, we can see the hinted information of deleting routing from the printed information. Please refer to the following picture
Reference	`root@imx6ulevk:/usr/test# route del default`

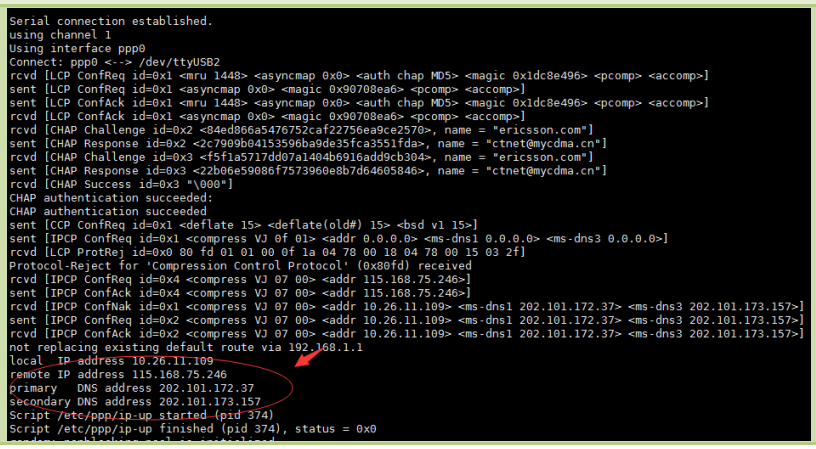
Remark: If appear route:SIOCDELRT: No such process, Ignore it, and do next step.

Step 4：

Command	# **ln -sf /etc/ppp/resolv.conf /etc/resolv.conf**

Description	Let /etc/resolv.conf soft link to /etc/ppp/resolv.conf
Test Phenomenon	None
Reference	root@imx6ulevk:/usr/test# ln -sf /etc/ppp/resolv.conf /etc/resolv.conf

Step 5：

Command	# **pppd call evdo &**
Description	Dial-up, show the following picture, then it is successful.
Test Phenomenon	After executing the command, we can see the Dial-up process and 3G information from the printed information. Please refer to the following picture.
Reference	

Remark: the way of Dial-up is different:

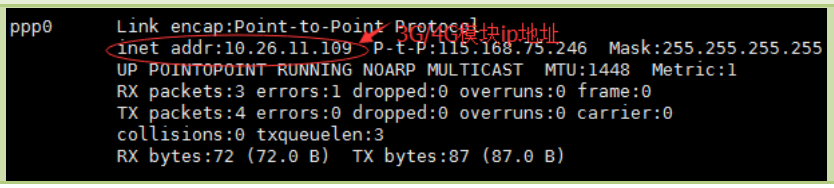
Unicom:# pppd call wcdma &

CMCC: # pppd call tdscdma &

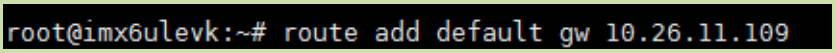
Telecom:# pppd call evdo &

Step 6：

Command	# **ifconfig**
Description	Check the ppp0 network node
Test Phenomenon	After executing the command, we can see the information of ppp0 protocol from the printed information. Please refer to the following

	picture.
Reference	

Step 7：

Command	**# route add default gw 10.26.11.109**①
Description	Add the default gateway
Test Phenomenon	None
Reference	

Step8：

Command	**# ping –I ppp0 www.baidu.com**
Description	Connect with external network
Test Phenomenon	After executing the command, we can see the information of external network communication from the printed information. Please refer to the following picture.

Remark: ① This IP address is same as the printed ip address of the 3G/4G which uses [ifconfig] command from Step 6 of this Charter.

Reference

```
^Croot@imx6ulevk:~# ping -I ppp0 www.baidu.com
PING www.baidu.com (115.239.211.112): 56 data bytes
64 bytes from 115.239.211.112: seq=0 ttl=51 time=62.872 ms
64 bytes from 115.239.211.112: seq=1 ttl=51 time=60.964 ms
64 bytes from 115.239.211.112: seq=2 ttl=51 time=59.313 ms
64 bytes from 115.239.211.112: seq=3 ttl=51 time=58.727 ms
64 bytes from 115.239.211.112: seq=4 ttl=51 time=78.255 ms
64 bytes from 115.239.211.112: seq=5 ttl=51 time=65.461 ms
64 bytes from 115.239.211.112: seq=6 ttl=51 time=63.704 ms
64 bytes from 115.239.211.112: seq=7 ttl=51 time=63.159 ms
64 bytes from 115.239.211.112: seq=8 ttl=51 time=62.638 ms
64 bytes from 115.239.211.112: seq=9 ttl=51 time=61.951 ms
64 bytes from 115.239.211.112: seq=10 ttl=51 time=61.551 ms

--- www.baidu.com ping statistics ---
11 packets transmitted, 11 packets received, 0% packet loss
round-trip min/avg/max = 58.727/63.508/78.255 ms
```

2.9.3 FAQ

- When 3G/4G module is connected to PCIE interface, there is no reaction.

  Solution

1、Check the kernel configuration[make menuconfig], whether it is same as the description of ***IAC-IMX6UL-Kit BSP development instruction***.

2、Check whether add the node data of 3G/4G module in kernel directory [drivers/usb/serial/option.c].

- When dial-up, the serial port interrupt and appears below information

```
root@QY-IMX6S:~# pppd call evdo
timeout set to 15 seconds
abort on (DELAYED)
abort on (BUSY)
abort on (ERROR)
abort on (NO DIALTONE)
abort on (NO CARRIER)
timeout set to 15 seconds
send (AT^M)
expect (OK)
```

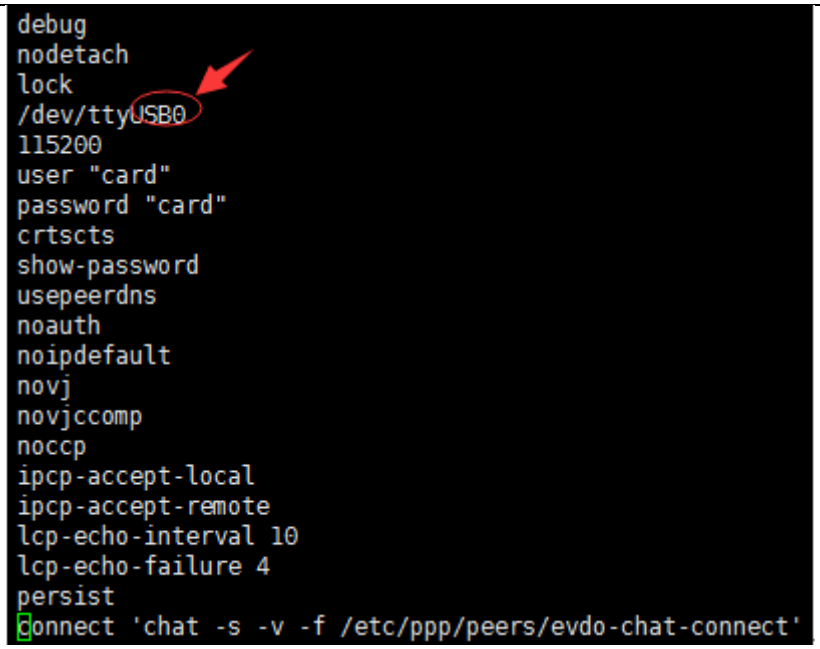
Picture 9-1

```
send (ATDT#777^M)
expect (CONNECT)
^M
^M
NO CARRIER
 -- failed
Failed (NO CARRIER)
Connect script failed
```

Picture 9-2

Solution:

1.Modify [vi /etc/ppp/peers/evdo] as follow:



Picture 9-3

Modify the red circle on Picture 9-3 into ttyUSB0~ttyUSB4, then redial until find the correct node.

2.10 Wifi Test

2.10.1 Overview

IAC-IMX6UL-KIT supports RTL8723BU(USB wifi module.) Communicate with network through the Wifi module.

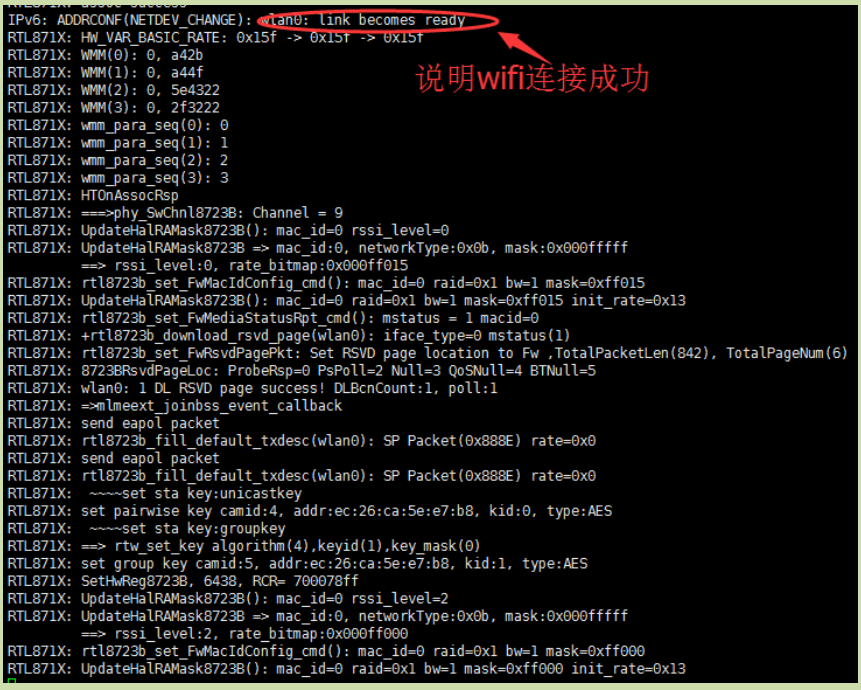
2.10.2 Test steps:

Step1：

Command	**#insmod 8723bu.ko**
Description	Load 8723bu, add wifi module to support
Test Phenomenon	After executing the command, we can see the process and information of loading RTL8723BU USB wifi module from the printed information. (If not successful, please check the manual 2.10.3) Please refer to the following picture.

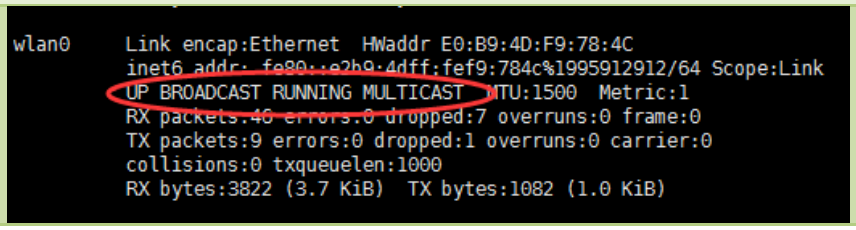
Reference	

Step 2：

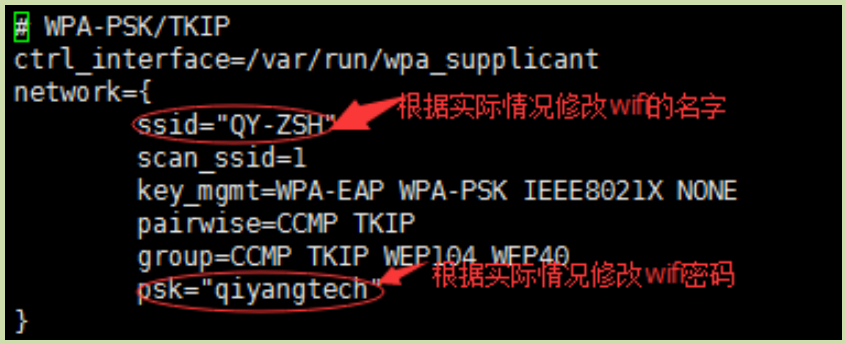
Command	**#wpa_supplicant –B –i wlan0 –D wext –c /etc/wpa_supplicant.conf**
Description	Connect WIFI
Test Phenomenon	After executing the command, we can see whether successfully connect WIFI from the printed information. Please refer to the following picture.
Reference	

Step3：

Command	# **ifconfig**

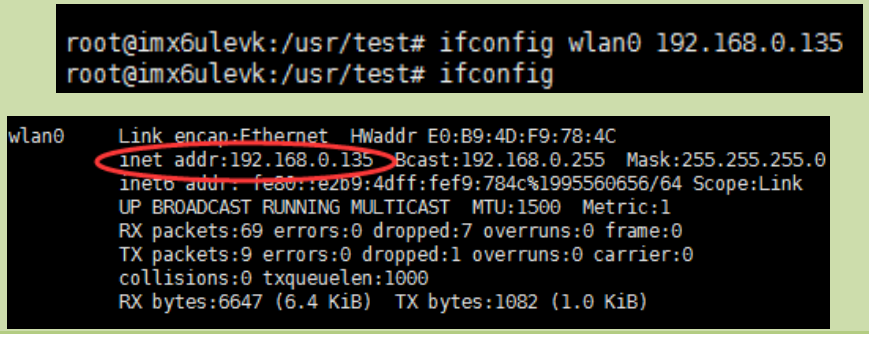
Description	up Check whether the wlan0 is up.
Test Phenomenon	After executing the command, we can see whether wlan0 is running from the printed information. Please refer to the following picture.
Reference	

Step 4：

Command	# **vi /etc/wpa_supplicant.conf**
Description	Modify the WIFI configuration files
Test Phenomenon	After executing the command, we can see the related information of WIFI from the printed information. Please refer to the following picture.
Reference	

Step 5：

Command	**# ifconfig wlan0 192.168.0.135** **# ifconfig**
Description	Configure wlan IP, and check whether successful
Test Phenomenon	After executing the command, we can see the configuration IP address from the printed information. Please refer to the following

	picture.
Reference	

Step 6 :

Command	# **route add default gw 192.168.0.1**
Description	Set the gateway
Test Phenomenon	None
Reference	

Step 7 :

Command	# **ping 192.168.0.1**
Description	Ping gateway
Test Phenomenon	After executing the command, we can see the communication information with outer network from the printed information. Please refer to the following picture.

Reference

```
root@imx6ulevk:/usr/test# ping 192.168.0.1
PING 192.168.0.1 (192.168.0.1): 5RTL871X: rtl8723b_fill_default_txdesc(wlan0): SP Packet(0x0806)
6 data bytes
64 bytes from 192.168.0.1: seq=0 ttl=64 time=85.156 ms
RTL871X: OnAction_back
RTL871X: OnAction_back, action=0
RTL871X: issue_action_BA, category=3, action=1, status=0, rxbuf_sz=64
64 bytes from 192.168.0.1: seq=1 ttl=64 time=32.904 ms
64 bytes from 192.168.0.1: seq=2 ttl=64 time=42.271 ms
64 bytes from 192.168.0.1: seq=3 ttl=64 time=5.871 ms
64 bytes from 192.168.0.1: seq=4 ttl=64 time=8.122 ms
64 bytes from 192.168.0.1: seq=5 ttl=64 time=8.566 ms
RTL871X: rtl8723b_fill_default_txdesc(wlan0): SP Packet(0x0806) rate=0x0
64 bytes from 192.168.0.1: seq=6 ttl=64 time=2.660 ms
64 bytes from 192.168.0.1: seq=7 ttl=64 time=11.403 ms
64 bytes from 192.168.0.1: seq=8 ttl=64 time=6.302 ms
64 bytes from 192.168.0.1: seq=9 ttl=64 time=4.340 ms
64 bytes from 192.168.0.1: seq=10 ttl=64 time=7.254 ms
64 bytes from 192.168.0.1: seq=11 ttl=64 time=3.858 ms
^C
--- 192.168.0.1 ping statistics ---
12 packets transmitted, 12 packets received, 0% packet loss
round-trip min/avg/max = 2.660/18.225/85.156 ms
```

2.10.3 FAQ

- Load 8723bu, but not successful.

  Solution

1.Check the kernel configuration[make menuconfig], whether it is same as the description of ***IAC-IMX6UL-Kit BSP development instruction***.

- After inserting the WIFI module, shows: link is not ready

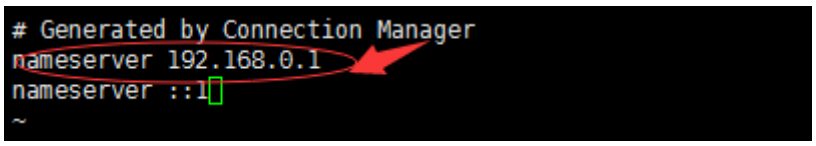
  Solution:

  1.Plug and insert the WIFI module, or restart the development board and then insert the WIFI module.

- When # ping www.baidu.com, show bad address.

  Solution:

  1.Fail to parse the DNS domain name, modify the file /etc/resolv.conf, modify nameserver IP to gateway IP 192.168.0.1.



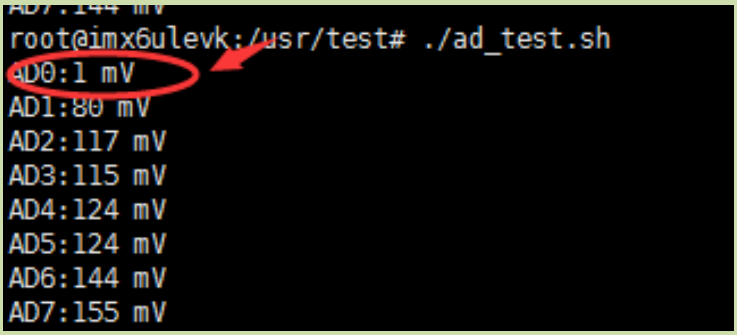
2.11 AD Test

2.11.1 Overview

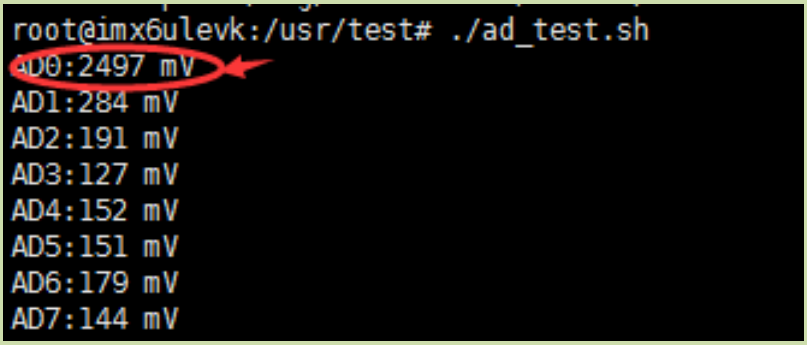
IAC-IMX6UL-KIT has 8-ch AD input [J13], 12 bit precision, the range of input voltage is 0-2.5V

2.11.2 Test Steps

Step 1：AD1 connect the ground, other hung up.

Command	# **./ad_test.sh**
Description	Run AD application program
Test Phenomenon	After executing the command, we can see the voltage values of AD1 channel from the printed information. Please refer tothe following picture.
Reference	

Step 2: AD1 channel connect the 2.5V, others hung up.

Command	# **./ad_test.sh**
Description	Run AD application program
Test Phenomenon	After executing the command, we can see the voltage values of AD1 channel from the printed information. Please refer to the following picture.
Reference	

2.11.3 FAQ

- Run ad_test.sh program, but with error.

  Solution:

1.Check the kernel configuration [make menuconfig], whether it is same as the description of ***IAC-IMX6UL-Kit BSP development instruction.***

2.12 Button Test

2.12.1 Overview

[SW2] is used as key button on the ***IAC-IMX6UL-KIT development board***.

2.12.2 Test steps

Command	# **./keybutton**
Description	Run AD application program
Test Phenomenon	After executing the command, we can see the information of keybutton test from the printed information. Please refer to the following picture.
Reference	

2.12.3 FAQ

- Run the keybutton program, but with Error.

  Solution:

  1.Check the kernel configuration[make menuconfig], whether it is same as the description of ***IAC-IMX6UL-Kit BSP development instruction***.

2.13 CAN Test

2.13.1 Overview

IAC-IMX6UL-KIT mainboard brings out 2-ch CAN(J18 J19) to test the CAN0 and CAN1. We need to open two terminals, one is telnet terminal(for opening method of telnet terminal

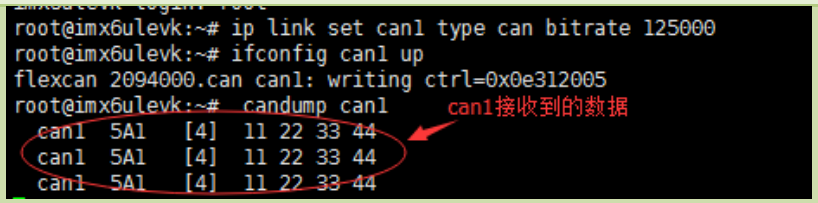
could refer to above chapter 2.4.1), the other is serial terminal(for opening method of serial terminal could refer to above chapter1. preparation). Test the CAN0 and CAN1, check whether the transmitting and receiving is normal.

2.13.2 Test steps

Step 1 ：

Connect [1] pin of [J18] with [1] pin of [J19], connect [2] of [J18] with [2] pin of [J19]. Then, one CAN actions as sending end and the other CAN actions as receiving end, then switch to each other to test again.

Step 2: Terminal 1：

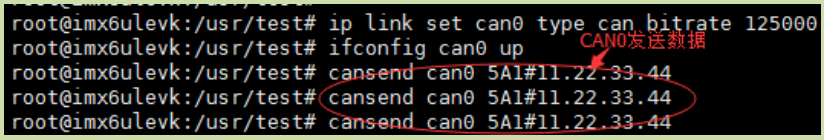
Command	**# ip link set can1 type can bitrate 125000** **# ifconfig can1 up** **# candump can1①**
Description	Configure the related parameters of CAN1
Test Phenomenon	After executing the command, we can see the data information sent from CAN1 from the printed information. Please refer to the following picture.
Reference	

Terminal 2：

Command	**# ip link set can0 type can bitrate 125000** **# ifconfig can0 up** **# cansend can0 5A1#11.22.33.44**

Remark: ① If there is no printed information after command executing, please check whether can0 is configured well, whether CAN0 has transmitted the data.

。

Description	Configure the related parameters of CAN0
Test Phenomenon	None
Reference	

Here we could see terminal 1 could receive the data which transmitted from terminal 2. Then switch to each other, that is, CAN0 receive the data which is transmitted from CAN1.

2.13.3 FAQ

- CAN cannot receive and transmit normally

Solution:

1、 Use [ifconfig] to check whether [can0] is [up]

2、 Check whether the 2* CAN hardware connection is right.

- If using [ifconfig can0 up], but failed.

Solution

1、Please check whether kernel configuration option enables [can0] function.

- If transmit successfully, but the opposite terminal cannot receive.

Solution

1、Please check whether [bitrate] two CAN are set consistently.

2.14 Audio Test

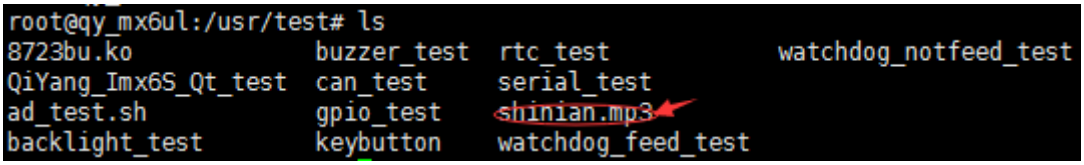
2.14.1 Overview

IAC-IMX6UL-KIT mainboard supports audio function by software decoding. The file system provides [GPLAY] tool to support audio play.

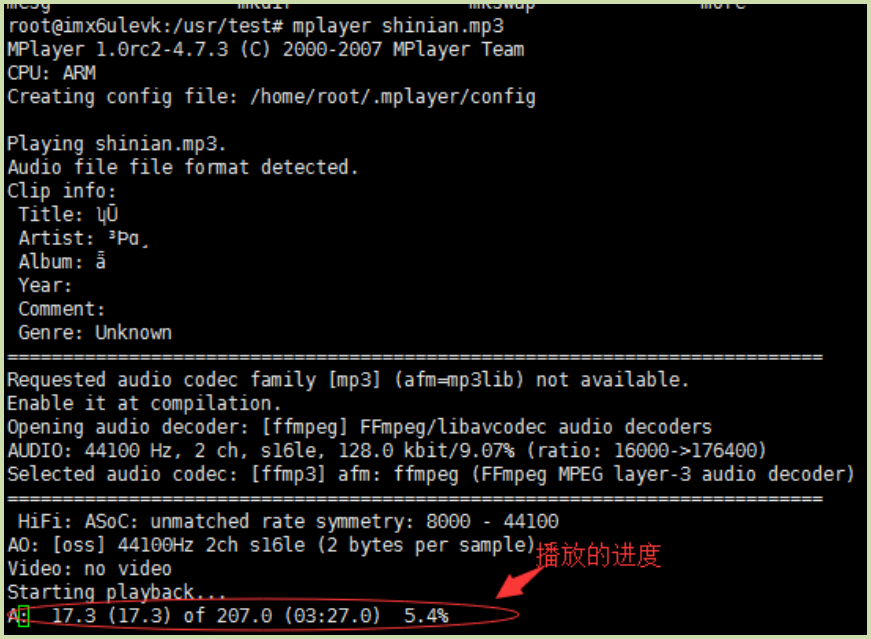
Play the audio by [gplay-1.0] command, please connect external earphone or sound equipment to [J4]

2.14.2 Test Steps

We provide you an audio test file[shinian.mp3], It is in [/usr/test] directory. It could be directly played to make test.



Step 1：

Command	# **mplay shinian.mp3**
Description	Play the Audio file
Test Phenomenon	After executing the command, we can see the related information of Audio play from the printed information. Please refer to the following picture.
Reference	

You will hear music from MP3 through audio input interface.

Step 2 :

Command	# **arecord test.wav**

Description	After command, insert the Microphone in J5 and speak to it, Then use [ctrl+c] to end
Test Phenomenon	Please refer to the picture
Reference	root@imx6ulevk:/usr/test# arecord /usr/test/test.wav Recording WAVE '/usr/test/test.wav' : Unsigned 8 bit, Rate 8000 Hz, Mono

Step 3：

Command	**# aplay test.wav**
Description	Insert headphone in J4, check whether it has sound.
Test Phenomenon	Please refer to the picture.
Reference	root@imx6ulevk:/usr/test# aplay test.wav Playing WAVE 'test.wav' : Unsigned 8 bit, Rate 8000 Hz, Mono

2.14.3 FAQ

- Can't play the Audio

Solution

1、Check the kernel configuration(make menuconfig), whether it is same as the description of IAC-IMX6UL-Kit BSP development instruction.

2.15 LCD Display and VGA Test

2.15.1 Overview

IAC-IMX6UL-KIT mainboard provides 1-ch LCD TFT display interface(J8), 1-ch VGA interface(J9).

After system boots, LCD Display or VGA will show its own penguin picture from kernel.

2.15.2 Test steps

Step 1：

Connect LCD or VGA according to hardware manual.

Step 2：

Power on to mainboard, after system boots. LCD or VGA will display the following picture on the left up side corner:

We can check whether the logo picture is distortion or jitter to confirm whether display normal or not, and can also run qt program to test LCD and VGA according to this chapter 2.17.

Note: Please ensure that the resolution of kernel configuration is same as the current resolution of connected LCD or VGA.

Remark: Please ensure that the configured kernel resolution is same as the current connected LCD and VGA.

2.15.3 FAQ

- Display image position and size don’t match the lcd monitor

Solution

1、 Please confirm whether current kernel resolution is the same as current using LCD monitor data. The default resolution is 800*480.

- LCD Display has no image

Solution:

1、Check the kernel configuration [make menuconfig], whether it is same as the description of ***IAC-IMX6UL-Kit BSP development instruction*** .

1、 Please check the LCD module is normal.

2、 Please check the connect cable is normal.

2.16 Touch Panel Test

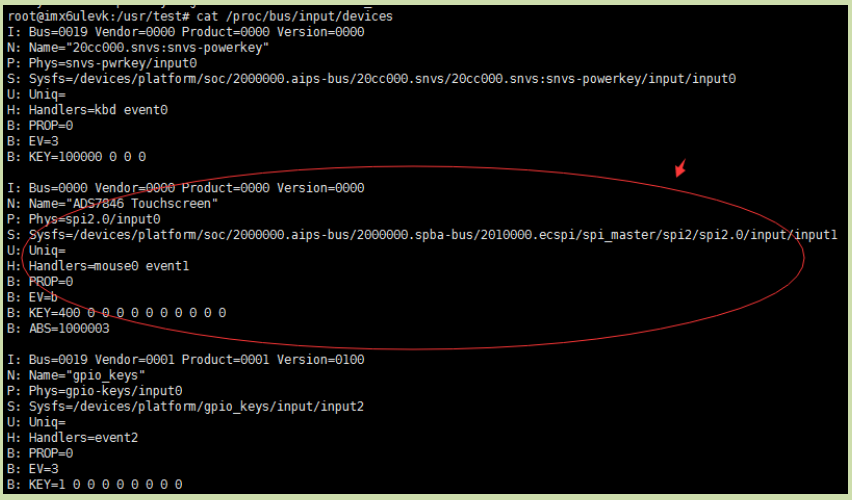
2.16.1 Overview

Connect Touch panel well, used LCD screen resolution must be the same as uboot configured LCD resolution. Our common use is 7 inch LCD touch panel, resolution is 800*480.

Use [Tslib] touch panel test tool to calibrate touch panel, after calibrating to use test tool to drag and draw line. You can find the cursor will show current touch point nearby. And it could be moved as touch panel moved.

2.16.2 Test Steps

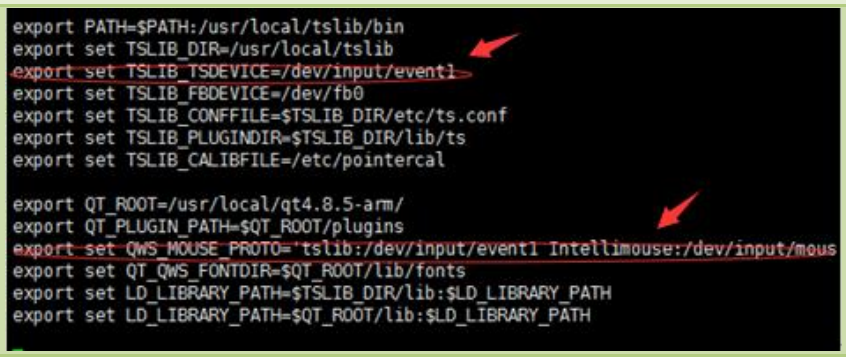
Step 1：

Command	**#cat /proc/bus/input/devices**
Description	Check the configuration of touch Panel
Test Phenomenon	After executing the command, we can see the configuration information of touch panel from the printed information. Please refer to the following picture.
Reference	

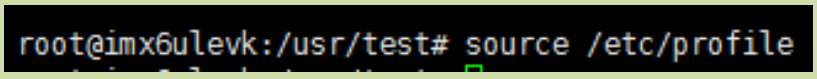
Remark: As the picture of Step 1, the device node of 7 inch resistive touch panel is [/dev/input/event1].

Modify [/etc/]profile file base on your touch panel.

Step 2：

Command	# **vi /etc/profile**
Description	Modify /etc/profile file, modify the following sentence according to the actual event node export set TSLIB_TSDEVICE=/dev/input/**event1** export set QWS_MOUSE_PROTO='tslib:/dev/input/**event1**Intellimouse: /dev/input/mouse1'
Test Phenomenon	After executing the command, we can see the contents of profile from the printed information. Please refer to the following picture.
Reference	

Step 3：

Command	# **source /etc/profile**
Description	Save environment variables
Test Phenomenon	None
Reference	

Step 4：

Command	# **ts_calibrate**
Description	Perform the touch screen calibration program.

Test Phenomenon	After executing the command, we can see the hinted information from touch panel.
Reference	None

Remark: After executing this command, finish the calibration according to the display

Step 5：

Command	# **ts_test**
Description	Test the precision of touch, we can click on the drag button or line drawing button to test. The Mouse or line will move along the touch point trajectory.
Test Phenomenon	After executing the command, we can see the hinted information from touch panel.
Reference	None

2.16.3 FAQ

- There is no any image and information when testing.

  Solution:

  1、 Check the kernel configuration [make menuconfig], whether it is same as the description of IAC-IMX6UL-Kit BSP development instruction.

  2、 Please check the touch panel is normal or not.

  3、 。Please check the connection between touch panel and development board.

2.17 QT Test

2.17.1 Overview

IAC-IMX6UL-KIT mainboard configuration file system owns 4.8.5 QT library and our company's demo program, this program will bring you into QT world. It loads acquiescently LVDS When using LVDS to start, this QT test program aims at 1024x600 resolution ratio display.

Execute [QiYang_Imx6_qt_test]program, it shows QT interface on LCD screen. It could do interaction with QT by moving cursor through touch panel or mouse.

2.17.2 Test steps

Step 1：

Command	# **vi /etc/profile**
Description	Modify [/etc/profile]file, please refer to the Step 2 of 2.16.3
Test Phenomenon	Please refer to the Step 2 of 2.16.2
Reference	None

Step 2：

Command	# **./QiYang_IMX6UL_Qt_test -qws**
Description	Execute [QiYang_IMX6UL_Qt_test] program
Test Phenomenon	After executing the command, we can see the following picture from touch panel.
Reference	

Remark: If use touch, please use [ts_calibrate] before running QT application. Calibrate the touch panel, then execute the [Imx6_qt_test] program.

2.17.3 FAQ

Please refer to chapter 2.15.3 of this manual.