



IAC-IMX6-Kit Linux Function And
Test Manual

Version: V 1.0
2017.04

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Version Illustration:

Version	Hardware Platform	Description	Date	Revisor
1.0	Core Board: IAC-IMX6-CM V2.03 Carrier Board: IMX6_MB_V1.2	Launched	2017-04-25	hech

Preface

This Manual mainly introduce different interface function and testing method.

Please read carefully before using:

QY-IMX6-KIT Hardware Manual .pdf & QY-IMX6-KIT Linux User Manual. pdf

I . Preparation

Before testing, please read *QY-IMX6-KIT Linux User Manual. pdf*, and connect to the mainboard according to that manual.

Power on mainboard, after system starts, then input [root] user to enter into file system of the board, as the following picture shown:

```
Bus freq driver module loaded
Bus freq driver Enabled
mxc_dvfs_core_probe
DVFS driver module loaded
rtc-ds1307 1-0068: setting system clock to 2014-02-26 13:56:02 UTC (1393422962)
EXT4-fs (mmcblk0p1): warning: checktime reached, running e2fsck is recommended
EXT4-fs (mmcblk0p1): mounted filesystem with ordered data mode. opts: (null)
VFS: Mounted root (ext4 filesystem) on device 179:1.
Freeing init memory: 204K
init started: BusyBox v1.20.2 (2013-05-30 08:10:42 EDT)
EXT4-fs (mmcblk0p1): re-mounted. Opts: user_xattr,barrier=1,data=ordered
Setting hotplug handler: [ OK ]
Creating device files: Auto-mount of [/media/mmcblk0p1] successful
[ OK ]
modprobe: chdir(3.0.35-2508-g54750ff): No such file or directory
modprobe: chdir(3.0.35-2508-g54750ff): No such file or directory
modprobe: chdir(3.0.35-2508-g54750ff): No such file or directory
Setting timezone and system clock: [OK]
Starting system logging.
Configuring network interfaces: ifdown: interface lo not configured
done

Distribution built using LinuxLink by Timesys
Kernel 3.0.35-2508-g54750ff for armv7l
iMX6QSABRElite login: root

BusyBox v1.20.2 (2013-05-30 08:10:42 EDT) built-in shell (ash)
Enter 'help' for a list of built-in commands.
#
```

Mainboard test program is in [/usr/test] directory, please switch to this directory, the following testing operations will be done in this directory.

```
# cd /usr/test/
# ls
```

```
# cd /usr/test/  
# ls  
buzzer_test  can_test      gpio_test     rtc_test      serial_test   spi_test
```

II . Mainboard Test

2.1. Buzzer Test

IAC-IMX6-Kit mainboard use [GPIO 6_31] to control the buzzer on the board. When set to low level, buzzer does not work; when set to high level, buzzer works.

Test Principle:

This test is to realize the buzzer to work.

Test Process & Result:

Run buzzer test program [buzzer_test]

```
root@qiyang /usr/test$ ./buzzer_test  
Invalid arguments!  
Usage: ./buzzer_test <device> [0|1]  
<device> -- for example: /dev/qiyang_buzzer  
0        -- buzzer off.  
1        -- buzzer on.
```

Illustration: [Buzzer_test 0] buzzer does not work, close buzzer
[Buzzer_test 1] buzzer works.

1. Open buzzer, hear the buzzer is buzzing continuously on board.

Press [Ctrl+C] to exit the program.

```
./buzzer_test /dev/qiyang_buzzer 1
```

2. Close buzzer, press [Ctrl+C] to exit the program.

```
./buzzer_test /dev/qiyang_buzzer 0
```

Device Node:`/dev/qiyang_buzzer`**Test Code:**`CD/Test Code/ buzzer_test/buzzer_test.c`**Driver Code:**`linux-3.0.101/drivers/misc/buzzer.c`**The Kernel Options:**`Device Drivers --->``Misc devices --->``<*> BUZZER FOR QIYANG IMX6 BOARD`**FAQ:**

Debug UART prints information:

```
# ./buzzer_test 1
open device buzzer error: No such file or directory
# ./buzzer_test 0
open device buzzer error: No such file or directory
#
```

Please check the following items:

- (1) Whether [/dev] directory has [qiyang_buzzer] device node or not.
- (2) Whether the kernel configuration select <*> BUZZER FOR QIYANG IMX6 BOARD or not.
- (3) Whether the Device tree file enable [qiyang_buzzer]node or not.

2.2. RTC Test

IAC-IMX6-KIT mainboard adopts I2C2 connect to DS3231 Chip on

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the back plane as the external hardware clock. Please confirm you have already installed the battery on back plane before testing RTC.

Test Principle:

Set system time through [date] system command, and then write system time into hardware clock through [hwclock]command. Through [rtc_test]test program to read hardware clock and print it. After powering off, then restart it to check whether the time is accurate.

Test Process & Result:

1. Execute [date] command on the board and check the current system clock.

```
# date
```

```
root@qiyang /usr/test$ date  
Mon Apr 17 09:29:09 UTC 2017
```

2. Set system clock through [date] command, for example, to set according to the current PC time.

```
# date 022710412014 /* month day hour minute year */
```

```
root@qiyang /usr/test$ date 041709312017  
Mon Apr 17 09:31:00 UTC 2017
```

3. Use [hwclock] command to write system time into hardware clock chip.


```
# hwclock -w
```

4. Check system and hardware clock by [date] and [hwclock] command.

```
root@qiyang /usr/test$ ./rtc_test /dev/rtc0
RTC Driver Test Example.
Current RTC date/time is 2017/4/17, 11:07:15.
Current RTC date/time is 2017/4/17, 11:07:16.
Current RTC date/time is 2017/4/17, 11:07:17.
Current RTC date/time is 2017/4/17, 11:07:18.
Current RTC date/time is 2017/4/17, 11:07:19.
Current RTC date/time is 2017/4/17, 11:07:20.
Current RTC date/time is 2017/4/17, 11:07:21.
Current RTC date/time is 2017/4/17, 11:07:22.
Current RTC date/time is 2017/4/17, 11:07:23.
Current RTC date/time is 2017/4/17, 11:07:24.
*** Test complete ***
```

5. After setting successfully, execute [rtc_test] test program.

```
./rtc_test /dev/rtc0
```

```
root@qiyang /usr/test$ ./rtc_test /dev/rtc0

          RTC Driver Test Example.
Current RTC date/time is 2017/4/17, 11:07:15.
Current RTC date/time is 2017/4/17, 11:07:16.
Current RTC date/time is 2017/4/17, 11:07:17.
Current RTC date/time is 2017/4/17, 11:07:18.
Current RTC date/time is 2017/4/17, 11:07:19.
Current RTC date/time is 2017/4/17, 11:07:20.
Current RTC date/time is 2017/4/17, 11:07:21.
Current RTC date/time is 2017/4/17, 11:07:22.
Current RTC date/time is 2017/4/17, 11:07:23.
Current RTC date/time is 2017/4/17, 11:07:24.

          *** Test complete ***
```

The current program will print 10 pcs of hardware time, then exit. If you want to exit early, please press [Ctrl+C] to check whether the RTC clock works accurately, no losing seconds.

6. Power off, then power on to check system and hardware clock again.

To check whether the time is saved or not, whether the time is accurate.

```
root@qiyang ~$ date
Mon Apr 17 11:11:14 UTC 2017
root@qiyang ~$ hwclock
Mon Apr 17 11:11:15 2017 0.000000 seconds
```

7. After comparing with PC time, there is no error. If you need to test long time work's accuracy, you can power off and power on separately for aging test for several days or weeks or months to test the time error.

Before publishing, our board will be tested for aging test for 1 month, and the time error does not exceed 2S.

For our delivery goods, we will make it for aging test for more than 24 hours, and time error does not exceed 1S.

Device Node:

/dev/rtc
/dev/rtc0

Test Code:

CD/Source Code /Test Code/ rtc_test/rtc_test.c

Driver Code:

ds1338 Driver: linux-3.0.101/drivers/rtc/rtc-ds1307.c
i2c Driver: linux-3.0.101/drivers/i2c/busses/i2c-imx.c

The Kernel Options:**I2c2:**

I2c2:

Device Drivers --->

I2C support --->

[*] Enable compatibility bits for old user-space

< * > I2C device interface

< > I2C bus multiplexing support

[*] Autoselect pertinent helper modules

I2C Hardware Bus support --->

[] I2C Core debugging messages

[] I2C Algorithm debugging messages

[] I2C Bus debugging messages

```

rtc:
  Device Drivers --->
    [*] Real Time Clock --->
      [*] Set system time from RTC on startup and resume
        (rtc0) RTC used to set the system time
          [] RTC debug support
            *** RTC interfaces ***
              [*] /sys/class/rtc/rtcN (sysfs)
                [*] /proc/driver/rtc (procs for rtc0)
                  [*] /dev/rtcN (character devices)
                    [] RTC UIE emulation on dev interface
                      <*> Dallas/Maxim DS1307/37/38/39/40, ST M41T00, EPSON RX-8025
  
```

FAQ:

Situation: time can not be saved, time travel error is huge, can not check hardware clock

Debug UART prints the following information:

```

# ./rtc_test
/dev/rtc0: No such file or directory
  
```

Please check the following items:

(1) Whether BT1 on the base plane has installed the battery and whether the battery has the electricity.

(2) Please check whether [/dev/rtc0] and [/dev/rtc1] node are in

[/dev] directory.

(3)Whether the kernel configuration option has been configured.

2.3 Watchdog Test

Test Principle:

Hardware Watchdog, GPIO5_20 enable Watchdog, GPIO5_18 executing 'Feeding Dog' operations.

Test Process &Result:

1.Boot Watchdog, and execute 'feeding dog' operations. You can see the system will not reboot. Press [Ctrl+C] to exit the program.

```
./watchdog_feed_test /dev/qy_watchdog
```

2.Boot Watchdog, but do not execute 'feeding dog' operations, system reboot after 1.6 seconds later.

```
./watchdog_notfeed_test /dev/qy_watchdog
```

Device Node:

```
/dev/qy_watchdog
```

Test Code:

```
CD/Source Code /Test Code/watchdog_test/watchdog_feed_test.c
```

```
CD/Source Code /Test Code/watchdog_test/watchdog_notfeed_test.c
```

Driver Code:

```
linux-3.0.101/drivers/misc/watchdog.c
```

The Kernel Options:

```
Device Drivers --->
```

```
[*] Misc devices --->
```

```
[*] WATCH_DOG FOR QIYANG BOARD
```

FAQ:

1. The system did not reboot, after executing
[./watchdog_notfeed_test]. Please check the watchdog's chipset if
it is damaged.

2.4 GPIO Test

This test aim at the following 16 channel GPIO Definition:

J16[GPIO1_4、 GPIO1_7、 GPIO1_8、 GPIO1_9、 GPIO7_11、
GPIO7_12、 GPIO7_13、 GPIO4_5]

J31[GPIO4_24、 GPIO4_26、 GPIO4_28、 GPIO4_30、 GPIO5_5、
GPIO5_7、 GPIO5_9、 GPIO5_11]

Test Principle:

[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.

Test Process & Result:

1.Run[gpio]test program [gpio_test]

```
./gpio_test
```

It shows the following print information:

```
root@qiyang /usr/test$ ./gpio_test
Invalid arguments!
Usage: ./gpio_test <device> <0|1>
<device> -- for example: /dev/qiyang_imx6_gpio
0 -- set gpio level.
1 -- get gpio level.
```

Illustration: [gpio_test <device> 0] set [gpio] high level and low level
[gpio_test <device> 1] obtain gpio level

2. GPIO on J16, J31 is without external signal, execute:

```
./gpio_test /dev/qiyang_imx6_gpio 0
```

```
root@qiyang /usr/test$ ./gpio_test /dev/qiyang_imx6_gpio 0
set gpio 'IMX_GPIO1_4' level '0'
set gpio 'IMX_GPIO1_7' level '0'
set gpio 'IMX_GPIO1_8' level '0'
set gpio 'IMX_GPIO1_9' level '0'
set gpio 'IMX_GPIO7_11' level '0'
set gpio 'IMX_GPIO7_12' level '0'
set gpio 'IMX_GPIO7_13' level '0'
set gpio 'IMX_GPIO4_5' level '0'
set gpio 'IMX_GPIO4_24' level '0'
set gpio 'IMX_GPIO4_26' level '0'
set gpio 'IMX_GPIO4_28' level '0'
set gpio 'IMX_GPIO4_30' level '0'
set gpio 'IMX_GPIO5_5' level '0'
set gpio 'IMX_GPIO5_7' level '0'
set gpio 'IMX_GPIO5_9' level '0'
set gpio 'IMX_GPIO5_11' level '0'
Gpios is output low level, now you can measure each pin!
Press the ENTER after measure each pins!
```

As the above picture shown, set each [gpio] to low level, use

multimeter to measure each [gpio]'s actual level value to confirm whether the [gpio] is normal or not ,press [Enter], then set all [gpio] to high level to measure [gpio] actual level value to confirm whether [gpio] is normal or not.

```
set gpio 'IMX_GPIO1_4' level '1'  
set gpio 'IMX_GPIO1_7' level '1'  
set gpio 'IMX_GPIO1_8' level '1'  
set gpio 'IMX_GPIO1_9' level '1'  
set gpio 'IMX_GPIO7_11' level '1'  
set gpio 'IMX_GPIO7_12' level '1'  
set gpio 'IMX_GPIO7_13' level '1'  
set gpio 'IMX_GPIO4_5' level '1'  
set gpio 'IMX_GPIO4_24' level '1'  
set gpio 'IMX_GPIO4_26' level '1'  
set gpio 'IMX_GPIO4_28' level '1'  
set gpio 'IMX_GPIO4_30' level '1'  
set gpio 'IMX_GPIO5_5' level '1'  
set gpio 'IMX_GPIO5_7' level '1'  
set gpio 'IMX_GPIO5_9' level '1'  
set gpio 'IMX_GPIO5_11' level '1'  
Gpios is output high level, now you can measure each pin!  
Press the ENTER after measure each pins!
```

Press [Enter], it hints [OK]:

```
Gpio test OK!  
root@qiyang /usr/test$
```

3. Connect the pin by external 3.3V (Internal pin is weak pull-up)

```
./gpio_test /dev/qiyang_imx6_gpio 1
```

```

root@qiyang /usr/test$ ./gpio_test /dev/qiyang_imx6_gpio 1
get gpio 'IMX_GPIO1_4' level '1'
get gpio 'IMX_GPIO1_7' level '1'
get gpio 'IMX_GPIO1_8' level '1'
get gpio 'IMX_GPIO1_9' level '1'
get gpio 'IMX_GPIO7_11' level '1'
get gpio 'IMX_GPIO7_12' level '1'
get gpio 'IMX_GPIO7_13' level '1'
get gpio 'IMX_GPIO4_5' level '1'
get gpio 'IMX_GPIO4_24' level '1'
get gpio 'IMX_GPIO4_26' level '1'
get gpio 'IMX_GPIO4_28' level '1'
get gpio 'IMX_GPIO4_30' level '1'
get gpio 'IMX_GPIO5_5' level '1'
get gpio 'IMX_GPIO5_7' level '1'
get gpio 'IMX_GPIO5_9' level '1'
get gpio 'IMX_GPIO5_11' level '1'
Gpio test ok!
    
```

As above picture shown, obtain each [gpio]'s level status, users can change the actual connected [gpio] signal to confirm whether [gpio] signal is normal or not.

Device Node:

`/dev/qiyang_imx6_gpio`

Test Code:

`CD/Test Code/gpio_test/gpio_test.c`

Driver Code:

`linux-3.0.101/drivers/misc/qy_imx6_gpio.c`

The Kernel Options:

Device Drivers --->

Misc devices --->

<*> **IMX6 GPIO TEST FOR QIYANG BOARD**

FAQ:

Debug UART shows:

QY-IMX6S-v1.x Gpio Start Testing...

Please check the following items:

(1) Whether there is [/dev/qiyang_imx6_gpio] node in [/dev] directory

(2) Whether the kernel configuration select [<*> IMX6 GPIO TEST FOR QIYANG BOARD]option.

2.5. Serial Port Test

There are 3-ch serial ports on IAC-IMX6-KIT mainboard: 1-ch serial port is used for debug port(J6), other 2-ch serial port are regarded as common RS232 port or RS485.

This test program only aims at testing of common RS232.

Serial Port and hardware relations:

Serial Port	Hardware Position	Device Node
DBG (Debug UART)	J7 (Rx, Tx, GND To Pin 1, Pin2, Pin3)	/dev/ttymx0
COM1	J6(Rx, Tx, GND To Pin 1, Pin2, Pin5)	/dev/ttymx3
COM2	J31(Rx, Tx, GND To Pin3, Pin4, Pin6)	/dev/ttymx4

Test Principle:

Test program realized that one serial port send character data

[/dev/ttymxX" test string!] every one second, [X]is actual testing port number,

at the same time, through multithreading way, block read serial ports data and print.

Test Process & Result:

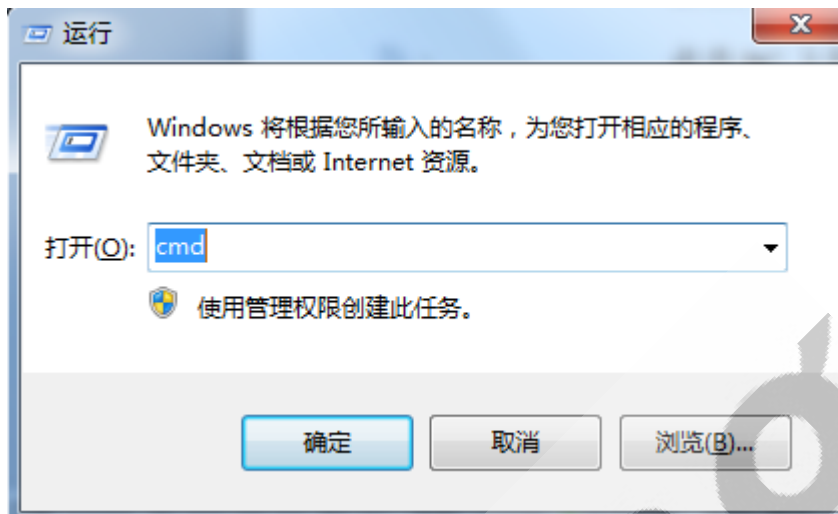
When testing, you may need to use 2-ch serial port on PC:

(1)1-ch is used for connecting the debugging serial port, it is used for interaction.

(2)1-ch is to connect to the serial port which is under test, it is used for the date's receiving and transmitting.

If there is only 1-ch serial port on PC mainframe, the serial port is connected to the serial port under test, connect to the mainboard by network cable, log in mainboard system by [telnet], operate it as the debug UART.

The mainboard's default IP address: 192.168.1.71,click [Start] button on PC, select [Run], input [cmd],click [Confirm].

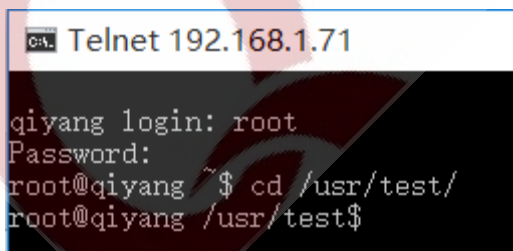


picture 1

Input [telnet 192.168.1.71] in running window.



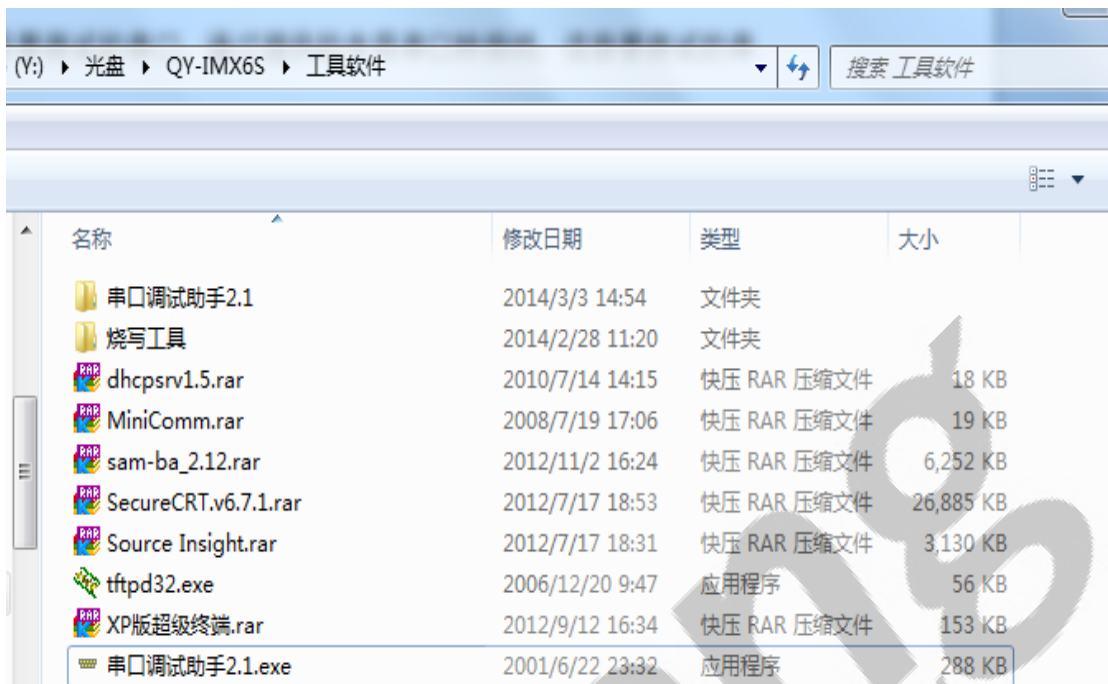
Input [root]user to enter into the console, enter into [/usr/test]test directory.



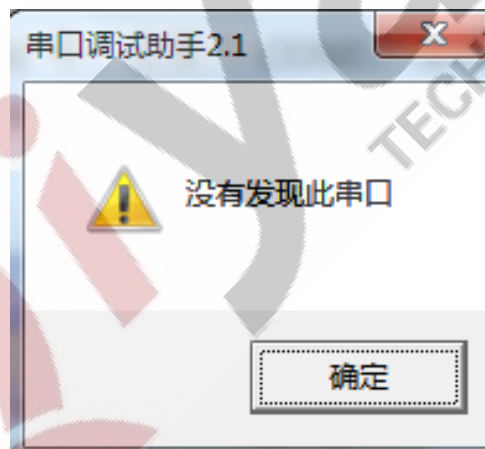
```
root@qiyang /usr/test$ ./rs232_test
Invalid arguments!
Invalid arguments!
Usage: ./rs232_test <device> <baudrate>
<device> -- for example: /dev/ttymx3
<baudrate> -- listed below:
                230400
                115200
                57600
                38400
                19200
                9600
                4800
                2400
                1800
                1200
```

According to the relation between serial port and hardware, select the serial port which needs test, through special serial port cable, to connect the serial port to the UART from PC.

Open Serial Assistant Tool in CD.



If it hints as follows:



picture 2

It means defaulted COM on the PC is occupied by terminal, close the terminal and then open serial debugging tool.

Set serial ports attribution, serial port is corresponding to COM

number on PC, here it is COM3, Baud Rate is [115200], Data Bit [8], Stop Bit [1], Parity Bit [NONE].



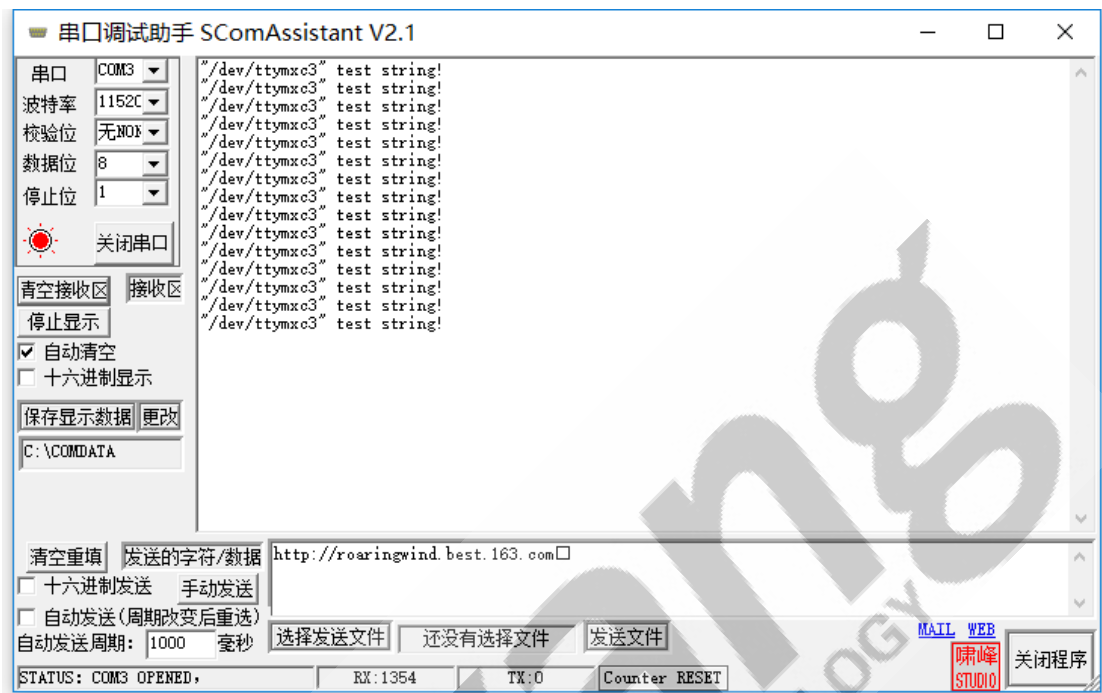
After the serial port is connected and set well, then we could do the test.

We tested [COM1,COM2,COM3,COM4].

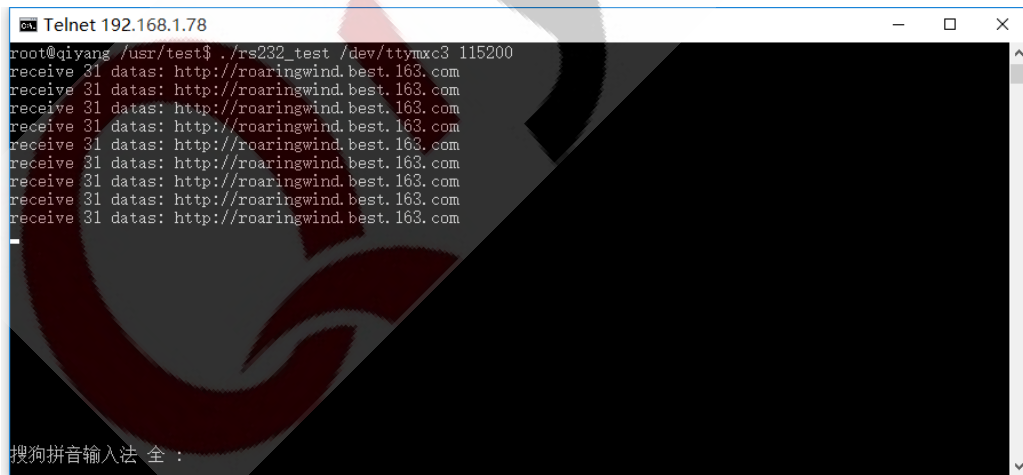
Here, we take [COM1] as an example, the other serial ports' test method are same.

```
./rs232_test /dev/ttymx3 115200
```

You can receive the date after running serial assistant tool.



Click [Send Ev] on serial assistant tool, you can receive the date from telnet.



[telnet] and Serial Debugging Assistant could also receive the data

and the data is correct, it means the serial function is normal.

After testing COM1, [Ctrl+C] to exit program, continue to test the other serial ports.

Device Node:

```
/dev/ttymx3
```

```
/dev/ttymx4
```

Test Code:

```
CD/Test Code//serial_test/rs232_test.c
```

Driver Code:

```
/linux-3.0.101/drivers/tty/serial/imx.c
```

The Kernel Options:

```
Device Drivers --->
```

```
Character devices --->
```

```
Serial drivers --->
```

```
[*] IMX serial port support
```

FAQ:

The debug port prints the following information:

```
open serial device /dev/ttymx3 error!
```

If the serial port's telecommunication is abnormal or could not communicate, please check the following items.

(1) Whether the connection wire is normal.

(2) Whether the PC port connected to ports debugging software configuration is correct or not.

(3) Whether serial port's hardware and testing program node are corresponded or not.

(4) Whether the node of [ttymxc1,ttymxc2,ttymxc3,ttymxc4] in [/dev] directory is existed or not.

(5) Whether the kernel configuration options are selected or not.

2.6. SPI Test

Test Principle:

There is 1-ch SPI on IAC-I.MX6-KIT mainboard, connect to nor flash N25Q032 chipset and ADS7846 chipset which can be exchanged to AD signal to connect 4-wire resistive touch panel. Here, we will test the nor flash, system splits norflash into 2 partitions. (Character device: mtd0、mtd1, block device: mtdblock0、 mtdblock1), size is 1MB and 3MB. It achieves write date and read date operations through mounting method.

Test Process & Result:

1. Mount partition 0 block device

```
mount -t jffs2 /dev/mtdblock0 /mnt
```

2. Write date

```
echo "test0" > /mnt/temp.txt
```

3. Read date

```
cat /mnt/temp.txt
```

```
root@qiyang /usr/test$ mount -t jffs2 /dev/mtdblock0 /mnt
root@qiyang /usr/test$ echo "test0" > /mnt/temp.txt
root@qiyang /usr/test$ cat /mnt/temp.txt
test0
root@qiyang /usr/test$
```

4. Unmount

```
umount /mnt
```

5. Partition 1 operation process follows above steps.

Device Node:

```
/dev/mtd0
```

```
/dev/mtd1
```

```
/dev/mtdblock0
```

```
/dev/mtdblock1
```

Driver Code:

```
linux-3.0.101/drivers/mtd/devices/m25p80.c
```

The Kernel Options:

```
Device Drivers --->
```

```
SPI support --->
```

```
<*> User mode SPI device driver support
```

```
Device Drivers --->
```

```
<*> Memory Technology Device (MTD) support --->
```

```
Self-contained MTD device drivers --->
```

```
<*> Support most SPI Flash chips (AT26DF, M25P, W25X, ...)
```

FAQ:

Mount unsuccessfully, please check the following items:

Any question, please send E-mail :supports@qiyangtech.com

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(1) Whether the current channel's device node is in [/dev] directory.

(2) Whether the kernel configuration option is selected.

2.7. CAN Test

Test Principle:

IAC-IMX6-Kit mainboard has 2-ch CAN, here, we provide the CAN testing method, use CAN tool to test.

can0 (H, L) -> Pin1 ,Pin2 on J4

can1 (H, L) -> Pin 3,Pin 4 on J4

Test Process & Result:

Take example of CAN0 test:

1. Prepare two mainboards, connect CAN0 (H,L) on board 1 to CAN0 (H,L)board 2.
2. Power on, configure two boards to CAN0.

```
ip link set can0 type can bitrate 125000
```

```
ifconfig can0 up
```

Debug UART prints information:

```
root@qiyang /usr/test$ ip link set can0 type can bitrate 125000
root@qiyang /usr/test$ ifconfig can0 up
flexcan imx6q-flexcan.0: writing ctrl=0x0e312005
root@qiyang /usr/test$ █
```

3. Use CAN test program to test:

```
./can_test
```

```
root@qiyang /usr/test$ ./can_test
Invalid arguments!
Usage: ./can_test <device> [01]
device -- for example: can0
0      -- test CAN recieve.
1      -- test CAN send.
```

Illustration: ①[can_test <device> 0] set CAN to receive data.
②[can_test <device> 1] set CAN to transmit date.

Here, we take the CAN on the mainboard 1 as the receiving terminal,
input command in serial terminal:

```
./can_test can0 0
```

```
root@qiyang /usr/test$ ./can_test can0 0
CAN Start Testing ...
```

Take the CAN on the mainboard 2 as the transmitting terminal, input
command in serial terminal:

```
./can_test can0 1
```



```

root@qiyang /usr/test$ ./can_test can0 1
CAN Start Testing ...
send can datas: can_id = 0x123,data_len = 8
data[0] = 0x0
data[1] = 0x1
data[2] = 0x2
data[3] = 0x3
data[4] = 0x4
data[5] = 0x5
data[6] = 0x6
data[7] = 0x7
Test Success.
    
```

At the moment, the debug UART on mainboard 1 will receive the transmitting CAN data which sent from the mainboard 2:

Then exchange them to test, take the CAN on mainboard 2 as receiving terminal, take the CAN on mainboard1 as transmitting terminal.

The test method is same.

Test Code:

CD/Test Code/can_test/can_test.c

Driver Code:

linux-3.0.101/drivers/net/can/ flexcan.c

The Kernel Options:

[*] Networking support --->

<*> CAN bus subsystem support --->

<*> Raw CAN Protocol (raw access with CAN-ID filtering)

<*> Broadcast Manager CAN Protocol (with content filtering)

CAN Device Drivers --->

<*> Virtual Local CAN Interface (vcan)

<*> Platform CAN drivers with Netlink support

[*] CAN bit-timing calculation

<*> Support for Freescale FLEXCAN based chips

FAQ:

The Debug UART prints the following information:

read can datas failed.

Or

send can datas failed.

Please check the following items:

(1)Use [ifconfig] to check whether the current [can0] is up.

```
# ifconfig
can0 Link encap:UNSPEC Hwaddr 00-00-00-00-00-00-00-00-00-00-00-00-00-00-00-00
-00
UP RUNNING NOARP MTU:16 Metric:1
RX packets:1 errors:0 dropped:0 overruns:0 frame:0
TX packets:0 errors:0 dropped:1 overruns:0 carrier:1
collisions:0 txqueuelen:10
RX bytes:8 (8.0 B) TX bytes:0 (0.0 B)
Interrupt:142

eth0 Link encap:Ethernet Hwaddr 1E:ED:19:27:1A:B3
inet addr:192.168.1.103 Bcast:192.168.1.255 Mask:255.255.255.0
UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
RX packets:142244 errors:0 dropped:4470 overruns:0 frame:0
TX packets:65321 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RX bytes:182872990 (174.4 Mib) TX bytes:5000990 (4.7 Mib)

lo Link encap:Local Loopback
inet addr:127.0.0.1 Mask:255.0.0.0
UP LOOPBACK RUNNING MTU:16436 Metric:1
RX packets:0 errors:0 dropped:0 overruns:0 frame:0
TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:0
RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)

#
```

(2)If using [ifconfig can0 up] failed, please check whether the kernel

configuration options enables [can0].

(3) If transmitting is successful, but the opposite terminal does not receive. Please check whether the two terminals [bitrate] is right.

(4) Please check whether the 2*CAN hardware connection is right.

2.8. Audio & Video Test

IAC-IMX6-Kit mainboard supports video display function by software decoding. The file system provides [GPLAY] tool to support audio & video play.

Test Principle:

Play the audio & video by [GPLAY] command.

Please connect to the LVDS or VGA displayer well before playing the video. Please make sure the earphone or amplifier are connected well on audio output interface(J18).

Test Process & Result:

1. In mainboard directory[/usr/test], execute the following command to display:

```
gplay bbb_short_1080p.avi
```

```
[INFO] bitstreamMode 1, chromaInterleave 1, maptype 0, tiled2LinearEnable 0
>>V4L_SINK: Actually buffer status:
    hardware buffer : 10
    software buffer : 0
full screen size:800x600
[V4L Update Display]: left=0, top=0, width=800, height=600
fsl_player_play()

FSL_PLAYER_01.00_LINUX build on May 30 2013 12:27:16
[h]display the operation Help
[p]Play
[s]Stop
[e]Seek
[a]Pause when playing, play when paused
[v]Volume
[m]Switch to mute or not
> Play next file
< Play previous file
[r]Switch to repeated mode or not
[f]set full screen or not
[z]resize the width and height
[t]Rotate
[c]Setting play rate
[i]Display the metadata
[x]exit
get GST_MESSAGE_ELEMENT playbin2-stream-changed, uri=(string)file:///mnt/bbb_sho
rt_1080p.avi;
FOUND GST_MESSAGE_TAG!
minimum bitrate: 448000
maximum bitrate: 448000
[Playing ] [Vol=01][00:00:02/00:00:30][fps:32]
```

After executing, we can see 1080P HD demo displaying on LCD
displayer.

Video play format supports [avi,mp4,flv,3gp,mov,ts,vob,mpg,dat].

2. There is an audio test file [shinian,mp3] in [/usr/test] directory, you
can play this audio file to test.

```
gplay shinian.mp3
```

```

bitrate: 128000
maximum bitrate: 128012
FOUND GST_MESSAGE_TAG!
number of channels: 2
bitrate: 128000
sampling frequency (Hz): 44100
audio codec: MPEG-1 Layer 3
FOUND GST_MESSAGE_TAG!
minimum bitrate: 127706
get GST_MESSAGE_ELEMENT playbin2-stream-changed, uri=(string)file:///usr/test/sh
inian.mp3;
fsl_player_play()

FSL_PLAYER_01.00_LINUX build on May 30 2013 12:27:16
[h]display the operation Help
[p]Play
[s]Stop
[e]Seek
[a]Pause when playing, play when paused
[v]Volume
[m]Switch to mute or not
>]Play next file
<]Play previous file
[r]Switch to repeated mode or not
[f]Set full screen or not
[z]resize the width and height
[t]Rotate
[c]Setting play rate
[i]Display the metadata
[x]exit
[Playing] [Vol=01][00:00:02/00:03:24][fps:0]

```

You will hear the MP3 music from the audio output interface.

[GPLAY] support [mp2,mp3,m4a,aac,wav,ogg,amr] audio formats.

[GPLAY] integrates powerful play control function, we could debug serial input to control:

Button	Function
p	Play
s	Stop
e	Seek
a	Pause when playing, play when paused
v	Volume

m	Switch to mute or not
>	Play next file
<	Play previous file
r	Switch to repeated mode or not
f	Set full screen or not
z	resize the width and height
t	Rotate
c	Setting play rate
i	Display the metadata
x	eXit

We will take an example by adjusting the volumes.

```
FSL_PLAYER_01.00_LINUX build on May 30 2013 12:27:16
[h]display the operation Help
[p]Play
[s]Stop
[e]Seek
[a]Pause when playing, play when paused
[v]Volume
[m]Switch to mute or not
>]Play next file
<]Play previous file
[r]Switch to repeated mode or not
[f]Set full screen or not
[z]resize the width and height
[t]Rotate
[c]Setting play rate
[i]Display the metadata
[x]eXit
[Playing ] [Vol=01] [00:00:03/00:03:24] [fps:0]v
Set volume [0-1.0]:0.3
[Playing ] [Vol=00] [00:00:50/00:03:24] [fps:0]
```

After executing [gplay bbb_short_1080p.avi] or [gplay shinian.mp3]

command.

Input [V], it hints [Set volume[0-1.0]], input range [0~1.0],input [0.3]

here. You will hear the voice turns light from the audio port.

Audio Record Test:

Use microphone to connect J17, then input the following command in terminal for recording:

```
arecord -d 10 -D plughw:1 test.wav
```

It generates a [test.wav] in terminal, then use the following command to play the recording.

```
aplay test.wav
```

Test Code:

```
/Test Code/video bbb_short_1080p.avi
```

Tool: gplay

FAQ:

(1)If there is a problem on display, please refer to LCD display chapter 2.13 and 2.14.

(2)Please use the LCD' resolution which is greater than the current film. Or there will be some abnormal status.

2.9 LAN Test

Test Principle:

Set Board's network, use [ping] to check whether the network is connected well.

Test Process & Result:

Network eth0 is J8

1. Connect J8 to Router (Switcher) by a network cable, use another network cable to connect computer and Router (Switcher), ensure it could access the network.

2. Set board network

Configure automatically, input:

```
udhcpd -i eth0
```

Configure manually, input:

```
ifconfig eth0 192.168.1.71 (Default setting)
```

```
echo nameserver 114.114.114.114 > /etc/resolv.conf
```

```
route add default gw 192.168.1.1 dev eth0
```

3. Test internal network, input;

```
ping 192.168.1.1 -I eth0
```

If it prints the below information correctly, input [Ctrl+C] to exit.

```
root@qiyang ~$ ping 192.168.1.1 -I eth0
PING 192.168.1.1 (192.168.1.1): 56 data bytes
64 bytes from 192.168.1.1: seq=0 ttl=64 time=1.548 ms
64 bytes from 192.168.1.1: seq=1 ttl=64 time=0.306 ms
64 bytes from 192.168.1.1: seq=2 ttl=64 time=0.324 ms
64 bytes from 192.168.1.1: seq=3 ttl=64 time=0.312 ms
```

4、 Test Internet, input:

```
ping www.baidu.com -I eth0
```

If it prints the below correct information ,please input [Ctrl+C] to exit.

```
root@qiyang ~$ ping www.baidu.com -I eth0
PING www.baidu.com (119.75.218.70): 56 data bytes
64 bytes from 119.75.218.70: seq=0 ttl=53 time=57.250 ms
64 bytes from 119.75.218.70: seq=1 ttl=53 time=57.098 ms
64 bytes from 119.75.218.70: seq=2 ttl=53 time=57.178 ms
64 bytes from 119.75.218.70: seq=3 ttl=53 time=56.903 ms
64 bytes from 119.75.218.70: seq=4 ttl=53 time=56.971 ms
```

FAQ:

If there is issue, please check the below items:

- ① Check whether Network LAN is working.
- ② Check whether the router is working.

2.10. USB Test

It supports 3 formats:fat32,exFAT,NTFS.

There are 5-ch USB on IAC-I.MX6-KIT mainboard:

(1)1-ch (J13) is as device port, download firmware program by [usb] mode.

(2)1-ch (J14) is to connect the external wifi module;

(3)1-ch integrate into miniPCIe port(U19);

(4)2- ch(J15) are as host port, this test aims at host port.

Test Principle:

Mainboard USB HOST supports hot plug, insert 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 the [/dev] directory.(If there are several partitions, then number parts will increase accordingly)

Finally, 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.

Test Process & Result:

Here, take example of USB Flash Disk which has only 1 partition.

1. Insert USB Flash Disk to J15.

Debug port prints the following information:

```
# usb 2-1.2: new high speed USB device number 3 using fsl-ehci
scsi0 : usb-storage 2-1.2:1.0
scsi 0:0:0:0: Direct-Access          sanDisk  Cruzer Blade      1.26 PQ: 0 ANSI: 6
sd 0:0:0:0: [sda] 15633408 512-byte logical blocks: (8.00 GB/7.45 GiB)
sd 0:0:0:0: [sda] write Protect is off
sd 0:0:0:0: [sda] write cache: disabled, read cache: enabled, doesn't support D
O or FUA
sda: sda4
sd 0:0:0:0: [sda] Attached SCSI disk
Auto-mount of [/media/sda4] successful
```

As the above picture shown, it shows some information of USB Flash Disk, USB Flash Disk recognize device node as [sda], child node is [sda4].

2. We can also check USB Flash Disk information through [fdisk]

command:

```
fdisk -l /dev/sda
```

```
# fdisk -l /dev/sda
Disk /dev/sda: 8004 MB, 8004304896 bytes
255 heads, 63 sectors/track, 973 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes

   Device Boot      Start         End      Blocks   Id  System
/dev/sda4  *           1           974     7816672+   c   Win95 FAT32 (LBA)
Partition 4 has different physical/logical endings:
   phys=(972, 254, 63) logical=(973, 34, 21)
#
```

Here, it has automatically mounted USB Flash Disk to [/media/sda4]

directory, you can check the USB Flash Disk content.

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3. Check contents in USB Flash Disk

```
ls /media/sda4
```

```
# ls /media/sda4/  
$recycle.bin  dlbs_c~1      qy-imx6s      system~1      usb?232      ??????~1  
1234          qt-eve~1.gz   recycled      ubi.img        xp??~1.rar   ?????A4?  
#
```

4.Can test USB Flash Disk read - write, by creating , copying and deleting file.

5.Use the same method to test 2* Host USB ports, after finishing test, pull out USB Flash Disk, print information as follows:

```
# usb 2-1.1: USB disconnect, device number 5
```

Device Node:

USB Flash Disk: [/dev/sda]

First Partition in USB Flash Disk:[/dev/sda1]

If there are several partitions, like this method, the [n] partition corresponds to [/dev/sdan]

Test Code:

Test Command:[fdisk]

Driver Code:

```
linux-3.0.101 /drivers/usb/host/ehci-hcd.c
```

The Kernel Options:

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Device Drivers --->

USB support --->

<*> EHCI HCD (USB 2.0) support

[*] Support for Freescale controller

[*] Support for DR host port on Freescale controller

[*] Root Hub Transaction Translators

<*> USB OTG pin detect support

FAQ:

After inserting USB Flash Disk, without any print information or can recognize but shows read and write error, it may because of USB Flash Disk damaged. You can try again after formatting on PC, and also you can change a USB Flash Disk to try testing again.

2.11. SD Card Test

It supports 3 formats:fat32,exFAT,NTFS.

IAC-I.MX6-KIT mainboard provides 1-ch SD card interface (J20) for user use.

Test Principle:

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

Generate device node and partition node in [/dev] directory. Then system will automatically mount all partition to [/media/] directory. Through read and write the corresponding directory files, you can judge whether interface is normal or not.

Test Process & Result:

The following test procedures will take example of SD card with only one partition. If several partitions, please use the same test method .Plug in SD card and generate device node [/dev/mmcblk0]. Partition [n] corresponds to partition device node [/dev/mmcblk0pn].

Here, insert a Kingston 8G SD card, print information as follows:

```
# mmc2: new high speed SDHC card at address e624
mmcblk1: mmc2:e624 SU08G 7.40 GiB
mmcblk1: p1
Auto-mount of [/media/mmcblk1p1] successful
```

As the above picture shown, it will show some SD card basic information, here the device node is [mmcblk1], partition is [p1].

You can also use [fdisk] command to check SD information.

```
fdisk -l /dev/mmcblk1
```

```
# fdisk -l /dev/mmcblk1
Disk /dev/mmcblk1: 7948 MB, 7948206080 bytes
81 heads, 10 sectors/track, 19165 cylinders
Units = cylinders of 810 * 512 = 414720 bytes

   Device Boot      Start         End      Blocks   Id  System
/dev/mmcblk1p1            11         19166     7757824    b   win95 FAT32
#
```

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Here, it will automatically mount SD Card to [/media/mmcblk0p] directory, you can check SD card information directly.

```
ls /media/mmcblk1p1
```

```
# ls /media/mmcblk1p1
alpu_test          key_test          ubi.img
buzzer_test       pwm_test         vedio
can_test           rtc_test         watchdog_feed_test
gpio_test         serial_test      watchdog_notfeed_test
hotelcalifornia.mp3 spi_test
#
```

It can test SD card read and write through creating, copying, deleting files.

Pull out the SD Card, it prints information as shown:

```
# mmc2: card e624 removed
```

Test Code:

Test Tool: fdisk

Driver Code:

```
linux-3.0.101/drivers/mmc/host/sdhci-esdhc-imx...
```

The Kernel Options:

```
Device Drivers --->
```

```
<*> MMC/SD/SDIO card support --->
```

```
[*] Assume MMC/SD cards are non-removable(DANGEROUS)
```

```
<*> MMC block device driver
```

```
(8) Number of minors per block device
```

```
[*] Use bounce buffer for simple hosts
```

```
<*> SDHCI support on the platform specific bus
```

[*] SDHCI platform support for the Freescale eSDHC i.MX contr

FAQ:

(1)After insertting a SD Card, without any printed information or can recognize but shows read and write error, it may because of SD Card damage. You can try again after formatting on PC, and also you can change a SD Card to try testing again.

(2)After plugging in SD Card, can recognize but hint write protection, please confirm whether the SD Card hardware write protection been dialed to [lock] setting or not.

2.12 SATA Test**Test Principle & Result:**

1. Connect SATA (J28) to hardware disk, and provide power connector on J30 12V and 5V
- 2.Power on, use command to check hardware disk's content:

```
fdisk -l
```

```

root@qiyang ~$ fdisk -l

Disk /dev/sda: 160.0 GB, 160041885696 bytes
255 heads, 63 sectors/track, 19457 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes

   Device Boot      Start         End      Blocks   Id  System
/dev/sda1                1         19457    156288321   7   HPFS/NTFS

Disk /dev/mmcblk0: 3959 MB, 3959422976 bytes
4 heads, 16 sectors/track, 120832 cylinders
Units = cylinders of 64 * 512 = 32768 bytes

   Device Boot      Start         End      Blocks   Id  System
/dev/mmcblk0p1          321        120832    3856384    83   Linux
    
```

df

```

root@qiyang ~$ df
Filesystem            1k-blocks      Used Available Use% Mounted on
/dev/root              3795720    322776  3280128   9% /
tmpfs                 384632         64   384568   0% /dev
/dev/mmcblk0p1        3795720    322776  3280128   9% /media/mmcblk0p1
/dev/sda1             156288320  92560  156195760  0% /media/sda1
shm                  384632         0   384632   0% /dev/shm
rwfs                   512          16     496    3% /mnt/rwfs
rwfs                   512          16     496    3% /tmp
rwfs                   512          16     496    3% /var
    
```

Here, we have mounted the hardware disk to [/media/sda1] directory, you can check the content from the hardware disk directly.

ls /media/sda1

```

root@qiyang ~$ ls /media/sda1
tedfdsf  temp.txt
    
```

You can test SD Card read and write by creating, coping ,deleting file.

3、Hardware disk read and write test:

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```
hdparm -t /dev/sda1
```

If it can measure the hardware disk's read and write speed, it means the SATA connector can work.

```
root@qiyang ~$ hdparm -t /dev/sda1
/dev/sda1:
Timing buffered disk reads: 222 MB in 3.00 seconds = 75664 kB/s
```

2.13 HDMI Test

J23 is HDMI interface on board, it supports two kinds of resolutions: 1920x1080 and 1280x720.

Powering on, input in the u-boot command line.

If using 1920x1080 resolution, power on, then input the following command in u-boot command line.

```
set bootargs_mmc 'setenv bootargs ${bootargs} root=/dev/mmcblk0p1 rootwait
video=mxcfb0:dev=hdmi,1920x1080M@60,if=RGB24 video=mxcfb1:off video=mxcfb2:off
video=mxcfb3:off video=mxcfb4:off'
```

If using 1280 x 720 resolution, power on, then input in the u-boot command line.

```
set bootargs_mmc 'setenv bootargs ${bootargs} root=/dev/mmcblk0p1 rootwait
video=mxcfb0:dev=hdmi,1280X720M@60,if=RGB24 video=mxcfb1:off video=mxcfb2:off
video=mxcfb3:off video=mxcfb4:off'
```

Save and boot system.

```
saveenv;boot
```

Test Principle:

Set frame buffer in uboot and start HDMI driver, set resolution.

Booting development board, video output is HDMI.

Test Process & Result:

Connect HDMI cable to J23 on board.

Show output information on HDMI displayer, users can modify the resolution and output format to adapt different screens.

2.14 LVDS Test

2-CH LVDS Interface (J9&J10). QY-HJ070NA , 7 inch LCD resolution:
1024x600.

After powering on, input in the u-boot command line:

```
setenv bootargs_mmc 'setenv bootargs ${bootargs} root=/dev/mmcblk0p1 rootwait rw  
video=mxcfb0:dev=ldb,LDB-WSVGA,if=RGB666 ldb=dul0'
```



```
saveenv;boot
```

Load to kernel

Test Principle:

Set frame buffer in uboot and boot HDMI driver, set resolution. Boot development board, video output is HDMI. System boots, it shows penguin picture which kernel owns.

Test Process & Result:

Connect LVDS cable to J9 onboard, touch panel cable to J12 onboard, backlight powering cable to J11 onboard.

Please make sure that the configured kernel resolution and current connected LCD or VGA required resolution are same.

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



Solo core shows 1 logo, dual core shows 2 logos, quad core shows 4 logos.

To check whether the logo picture is distortion or jitter, to confirm

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whether display normal or not. You can also run qt program to test LCD and VGA according to this chapter 2.9.

After executing, you will see the demo with 1080P video on LCD or VGA.

2.15、 QT Test

QY-IMX6S mainboard standard configuration file system has [4.8.4 qt] library, this program will take you to QT world.

Test Principle:

Execute [Imx6_qt_test] program, on the LCD monitor, it shows QT Image. Through touch panel or mouse, Users can move cursor to interact with QT

Test Process & Result:

System supports usb mouser and touch panel operation, the specific environmental variables could be set in [/etc/profile].

```
vi /etc/profile
```

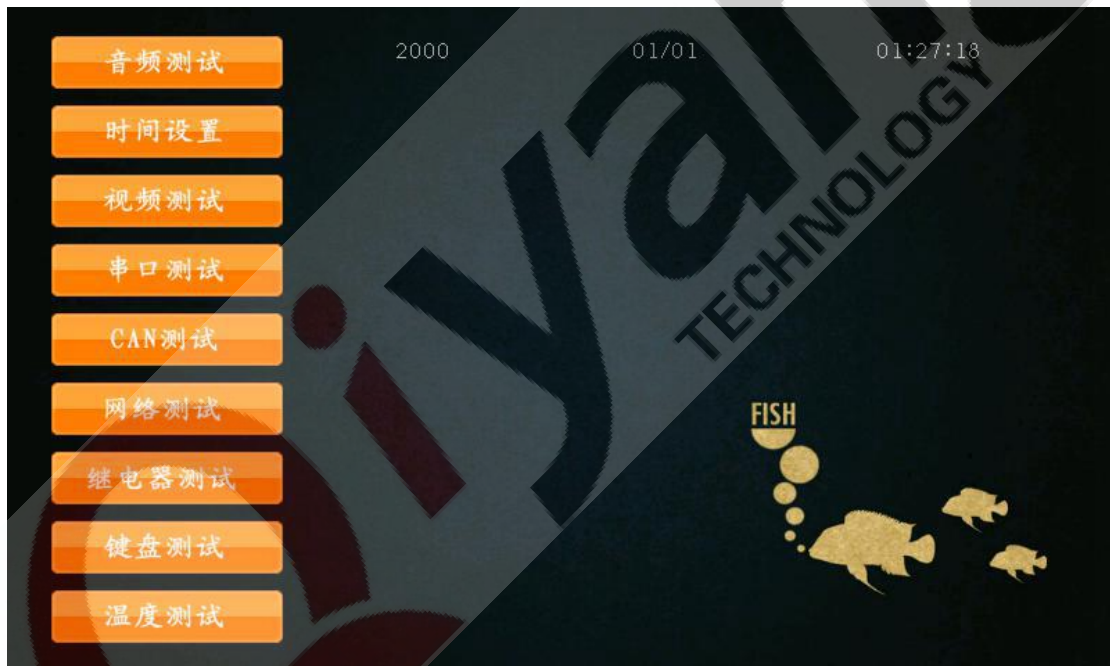
```
export TSLIB_TSDEVICE=`cat /etc/ts.dev`  
export QWS_MOUSE_PROTO="Tslib:$TSLIB_TSDEVICE Intellimouse:/dev/mouse1"  
export TSLIB_CALIBFILE=/etc/pointercal  
export TSLIB_CONFFILE=/etc/ts.conf
```

If using touch panel operation, please use [ts_calibrate] to calibrate the touch panel before running QT program. After calibration, then execute [Imx6_qt_test]program.

```
cd /usr/test/
```

```
./Imx6_qt_test -qws
```

After running, system will load and show QT program image, as shown:



Operate QT image through touch panel or USB mouse

Device Tree File:

None

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Driver Code:

None

The Kernel Options:

None

FAQ:

Please refer to touch panel and LCD display questions.

2.16. Touch Panel Test

Touch panel supports resistive touch panel and capacitive touch panel, resistive touch panel pairs with LCD screen. The capacitive touch panel pairs with LVDS screen. The resolution must be same as the LCD resolution in uboot.

If using capacitive touch panel, please refer to Chapter 2.14 to connect.

Test Principle:

Use [Tslib] touch panel test tool to calibrate touch panel, after calibrating, use test tool to drag and draw line. You can see the cursor is moving around the current touch point, and it moves after the touch point position.

Test Process & Result:

1. The default environmental variables match capacitive touch panel, if you want to use the resistive touch panel, please modify:

`vi /etc/QtEnv`

Change[event2] to [event1]

```
export set QT_QWS_FONTPATH=/usr/lib/fonts
export set LD_LIBRARY_PATH=/usr/lib/:$LD_LIBRARY_PATH
export set TSLIB_CONFIGFILE=/etc/ts.conf
export set TSLIB_PLUGINDIR=/usr/lib/ts
export set TSLIB_CALIBFILE=/etc/pointerca1
export set TSLIB_FBDEVICE=/dev/fb0
export set TSLIB_TSDEVICE=/dev/input/event1
export set QWS_MOUSE_PROTO="TSLIB:$TSLIB_TSDEVICE IntelliMouse:/dev/input/mouse2"
```

Take environment variables effect:

`source /etc/QtEnv`

2. Execute touch panel calibration program [ts_calibrate]:

`ts_calibrate`

It shows the cross figure in left up corner, the serial terminal prints the current cross figure's coordinate point.

Click this cross figure, it skips to another corner. After finishing four corners calibration and central point's calibration, the touch panel calibration is finished.

3. After calibration, execute [ts_test] to test touch panel's precision.

`ts_test`

You can click the drag button or drawing button to test, you can see the mouser or line will be moving as your touch point.

Test Code:Test Tool: `ts_calibrate, ts_test`

Relative tool source: CD/Test Code/tslib

Driver Code:`linux-3.0.101/drivers/input/touchscreen/ads7846.c`**The kernel options:**`Device Drivers --->``Input device support --->``[*] Touchscreens --->``<*> ADS7846/TSC2046/AD7873 and AD(S)7843 based touchscreens`**FAQ:**

- ①.If LCD shows the image unnormal, please confirm whether LCD resolution configuration match the current display.
- ②.After clicking touch panel, cursor display position has a little error and jitter with clicking position, this situation is normal.
- ③ .If other questions, please check [tslib] environmental variables ,
- ④ comparing the following environment variables is the same or not.


```
root@qiyang /usr/test$ cat /etc/QtEnv
export set QT_QWS_FONTDIR=/usr/lib/fonts

export set LD_LIBRARY_PATH=/usr/lib/:$LD_LIBRARY_PATH
export set TSLIB_CONFFILE=/etc/ts.conf
export set TSLIB_PLUGINDIR=/usr/lib/ts
export set TSLIB_CALIBFILE=/etc/pointercal
export set TSLIB_FBDEVICE=/dev/fb0
export set TSLIB_TSDEVICE=/dev/input/event2
export set QWS_MOUSE_PROTO="TSLIB:$TSLIB_TSDEVICE IntelliMouse:/dev/input/mouse2"
```

2.17、CAMERA Test

Test Principle:

The board supports OV5640 camera, run command, test camera.

The board has camera interface J25. We use the OV5640 camera.

Connect OV5640 to J25.

Test Principle & Result:

1. J25 connect OV5640
2. Display, refer to Chapter 2.13,2.14.
3. Input command:

```
gst-launch -v mfw_v4lsrc ! mfw_v4lsink
```

It shows image on LCD which captured from camera.

Driver Code:

```
linux-3.0.101\drivers\media\video\mxc\capture\mxc_v4l2_capture.c
```

The Kernel Options:

```
<*> Device Drivers --->
```

<*> Multimedia support --->

<*> Video capture adapters --->

<*> MXC Video For Linux Camera --->

<> CSI camera support

<*> OmniVision ov5640 camera support

-*- camera clock

<*> Select Overlay Rounting (Queue ipu device for overlay

library)--->

<*> Pre-processor Encoder library

<*> IPU CSI Encoder library

FAQ:

The debug UART prints following information:

```
# gst-launch -v mfw_v4lsrc ! mfw_isink
```

```
MFW_GST_V4LSRC_PLUGIN 3.0.5 build on May 30 2013 12:26:32
```

```
MAX resolution 1024x768
```

```
MFW_GST_ISINK_PLUGIERROR: v4l2 capture: slave not found!
```

```
N 3.0.5 build on May 30 2013 12:27:13
```

```
Setting pipeline to PAUSED ...
```

```
ERROR: Pipeline doesn't want to pause.
```

```
Setting pipeline to NULL ...
```

```
Freeing pipeline ...
```

```
[--->FINALIZE isink
```

```
#
```

Please check the following items:

- ① Whether cable connection is correct.

Any question, please send E-mail :supports@qiyangtech.com

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- ② Whether kernel configuration option is selected.
- ③ Whether the kernel be downloaded correctly.



2.18、3G/4G Test

IAC-IMX6-Kit 开发板引出 U30 miniPCI 接口，可以接 3G 模块及其可以接 3G 卡的 u20

支持全网通模块：SIM7100CE、SIM7600CE

支持移动 3G、联通 3G 模块：UC15

抽屉式卡槽，插上模块和模块支持的手机卡，上电，可以看到打印的信息。

IAC-I.MX6-KIT brings U30 miniPCI interface. It can connect to other 3G cards. It supports module: SIM7100CE, SIM7600CE.

It supports China mobile 3G,Unicom 3G: UC15

Inserting SIM card on SIM socket, power on , you can get the printed information.

```
Apr 18 17:14:01 login[2722]: root login on 'ttyMXC0'
root@qiyang ~$ usb 2-1.3: new high speed USB device number 4 using fsl-ehci
option 2-1.3:1.0: GSM modem (1-port) converter detected
usb 2-1.3: GSM modem (1-port) converter now attached to ttyUSB0
option 2-1.3:1.1: GSM modem (1-port) converter detected
usb 2-1.3: GSM modem (1-port) converter now attached to ttyUSB1
option 2-1.3:1.2: GSM modem (1-port) converter detected
usb 2-1.3: GSM modem (1-port) converter now attached to ttyUSB2
option 2-1.3:1.3: GSM modem (1-port) converter detected
usb 2-1.3: GSM modem (1-port) converter now attached to ttyUSB3
option 2-1.3:1.4: GSM modem (1-port) converter detected
usb 2-1.3: GSM modem (1-port) converter now attached to ttyUSB4
option 2-1.3:1.5: GSM modem (1-port) converter detected
usb 2-1.3: GSM modem (1-port) converter now attached to ttyUSB5
PHY: 1:01 - Link is Up - 100/Full
```

Execute on terminal:

```
pppd call 3g4gnet &
```

It prints following information , it means to connect Internet

successfully.

```
rcvd [LCP ProtRej id=0x38 80 fd 01 01 00 0f 1a 04 78 00 18 04 78 00 15 03 2f]
Protocol-Reject For 'Compression Control Protocol' (0x80fd) received
rcvd [IPCP ConfReq id=0x24]
sent [IPCP ConfNak id=0x24 <addr 0.0.0.0>]
rcvd [IPCP ConfRej id=0x1 <compress VJ 0f 01>]
sent [IPCP ConfReq id=0x2 <addr 0.0.0.0> <ms-dns1 0.0.0.0> <ms-dns3 0.0.0.0>]
rcvd [IPCP ConfReq id=0x25]
sent [IPCP ConfAck id=0x25]
rcvd [IPCP ConfNak id=0x2 <addr 10.63.183.16> <ms-dns1 221.12.1.227> <ms-dns3 221.12.33.227>]
sent [IPCP ConfReq id=0x3 <addr 10.63.183.16> <ms-dns1 221.12.1.227> <ms-dns3 221.12.33.227>]
rcvd [IPCP ConfAck id=0x3 <addr 10.63.183.16> <ms-dns1 221.12.1.227> <ms-dns3 221.12.33.227>]
Could not determine remote IP address: defaulting to 10.64.64.64
Script /etc/ppp/ip-pre-up started (pid 5119)
Script /etc/ppp/ip-pre-up finished (pid 5119), status = 0x0
local IP address 10.63.183.16
remote IP address 10.64.64.64
primary DNS address 221.12.1.227
secondary DNS address 221.12.33.227
Script /etc/ppp/ip-up started (pid 5122)
Script /etc/ppp/ip-up finished (pid 5122), status = 0x0
```

Visit Internet, press [Ctrl+C] to exit:

```
ping www.baidu.com -I ppp0
```

```
root@qiyang /usr/test$ ping www.baidu.com -I ppp0
PING www.baidu.com (61.135.169.125): 56 data bytes
64 bytes from 61.135.169.125: seq=0 ttl=53 time=63.815 ms
64 bytes from 61.135.169.125: seq=1 ttl=53 time=96.488 ms
64 bytes from 61.135.169.125: seq=2 ttl=53 time=63.461 ms
64 bytes from 61.135.169.125: seq=3 ttl=53 time=76.268 ms
64 bytes from 61.135.169.125: seq=4 ttl=53 time=76.294 ms
64 bytes from 61.135.169.125: seq=5 ttl=53 time=76.265 ms
64 bytes from 61.135.169.125: seq=6 ttl=53 time=76.042 ms
```

2.19、Wifi Test

IAC-I.MX6 brings J14 connector or J15 connector to connect wifi, the module supports RTL8188CUS. Inserting RTL8188CUS on J14 or J15.

Output in terminal:

`ifconfig -a`

It prints [wlan0]

```

root@qiyang ~$ ifconfig -a
can0    Link encap:UNSPEC  HWaddr 00-00-00-00-00-00-00-00-00-00-00-00-00-00-00-00
        NOARP  MTU:16  Metric:1
        RX packets:0 errors:0 dropped:0 overruns:0 frame:0
        TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:10
        RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
        Interrupt:142

can1    Link encap:UNSPEC  HWaddr 00-00-00-00-00-00-00-00-00-00-00-00-00-00-00-00
        NOARP  MTU:16  Metric:1
        RX packets:0 errors:0 dropped:0 overruns:0 frame:0
        TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:10
        RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
        Interrupt:143

eth0    Link encap:Ethernet  HWaddr 1E:ED:19:27:1A:B3
        inet addr:192.168.1.71  Bcast:192.168.1.255  Mask:255.255.255.0
        UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
        RX packets:1843 errors:0 dropped:634 overruns:0 frame:0
        TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:1000
        RX bytes:144436 (141.0 KiB)  TX bytes:0 (0.0 B)

lo      Link encap:Local Loopback
        inet addr:127.0.0.1  Mask:255.0.0.0
        UP LOOPBACK RUNNING  MTU:16436  Metric:1
        RX packets:0 errors:0 dropped:0 overruns:0 frame:0
        TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:0
        RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

wlan0   Link encap:Ethernet  HWaddr E8:4E:06:35:35:C2
        UP BROADCAST MULTICAST  MTU:1500  Metric:1
        RX packets:0 errors:0 dropped:56 overruns:0 frame:0
        TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:1000
        RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
    
```

Modify configuration file [/etc/wpa_supplicant.conf], modify [ssid] and

[psk] to the corresponding user name and password.

```
# WPA-PSK/TKIP
ctrl_interface=/var/run/wpa_supplicant
network={
    ssid="QY-ZSH"
    scan_ssid=1
    key_mgmt=WPA-EAP WPA-PSK IEEE8021X NONE
    pairwise=CCMP TKIP
    group=CCMP TKIP WEP104 WEP40
    psk="qiyangtech"
}
```

Input [sync], power on the board , wait for seconds, input :

`ifconfig`

```
root@qiyang ~$ ifconfig
eth0      Link encap:Ethernet  HWaddr 1E:ED:19:27:1A:B3
          inet addr:192.168.1.71  Bcast:192.168.1.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:65 errors:0 dropped:19 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:5019 (4.9 KiB)  TX bytes:0 (0.0 B)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

wlan0     Link encap:Ethernet  HWaddr E8:4E:06:35:35:C2
          inet addr:192.168.0.101  Bcast:192.168.0.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:86 errors:0 dropped:34 overruns:0 frame:0
          TX packets:5 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:10832 (10.5 KiB)  TX bytes:1350 (1.3 KiB)
```

If it shows [wlan0], it means the module has been loaded successfully.

Test Internet

`ping www.baidu.com -I wlan0`

```
root@qiyang ~$ ping www.baidu.com -I wlan0
PING www.baidu.com (119.75.218.70): 56 data bytes
64 bytes from 119.75.218.70: seq=0 ttl=52 time=102.937 ms
64 bytes from 119.75.218.70: seq=1 ttl=52 time=88.400 ms
64 bytes from 119.75.218.70: seq=2 ttl=52 time=66.692 ms
64 bytes from 119.75.218.70: seq=3 ttl=52 time=101.722 ms
64 bytes from 119.75.218.70: seq=4 ttl=52 time=134.392 ms
```

If it shows the above information, it means the module works normally.

2.20、RS485 Test

On IAC-I.MX6S development board, it has reserved 2-ch RS485, multiplex with RS232.

RS485, RS232 exists at same time.

Relation Chart Between RS485 and Hardware:

UART	Hardware Location	Device Node
COM1	J6 (A、B TO Pin7, Pin8)	/dev/ttymx3
COM2	J6 (A、B TO Pin9, Pin10)	/dev/ttymx4

Test Principle:

Test program can achieve RS485 transmitting and receiving function, need to use two boards. Take RS485 as receiving end, another RS485 as transmitting end. Check the date whether it is correct.

Test Process & Result:

Here, we take example of testing RS485 on COM1:

1. Use 2 boards, Board 1 and Board 2. Connect PIN A, PINB on J6 by Dupont Line separately.

2. Power on, when in Uboot, press [Enter], input the following command:

```
set bootargs_base 'setenv bootargs console=ttyMXC0,115200 imx6_feature=rs485:2'
```

```
saveenv;boot
```

3. After system boots, Board 1 as RS485 receiving end, input:

```
/usr/test/rs485_test /dev/ttyMXC3 115200 0
```

4. Board 2 as RS485 transmitting end, input:

```
/usr/test/rs485_test /dev/ttyMXC3 115200 1
```

5. Check the printed information from Board 1, you can see the below information after every one second.

```
receive 28 datas: "/dev/ttyMXC2" test string!
```

6. Exchange the command in Step 3 and Step 4 to test, to see the Board 2 transmitting and receiving data.

III. Test Summary

IAC-IMX6-Kit mainboard's function tests are finished. If any problems, please use the test code to check.

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