WT-EVK6ULX Linux system User Manual

Catalog

1. TF card test

EVK supports hot-plugging .Insert the TF card, the terminal will see the prompt information.

```
# [ 1955.657016] mmc0: host does not support reading read-only switch, assuming write-enable
[ 1955.672888] mmc0: new high speed SDHC card at address 1234
[ 1955.680589] mmcblk0: mmc0:1234 SA16G 14.6 GiB
[ 1955.710582]  mmcblk0: p1
[ 1955.766859] FAT-fs (mmcblk0p1): Volume was not properly unmounted. Some data may be corrupt. Please run fsck.

#
```

Mount TF card:

#mount /dev/mmcblk0p1 /mnt

View TF card content:

#ls /mnt

```
# mount /dev/mmcblk0p1 /mnt
# ls -l /mnt
total 352
drwxrwxrwx    2 root     root           32768 Jul 30  2014 ??
drwxrwxrwx    2 root     root           32768 Jul 30  2014 ??
drwxrwxrwx    2 root     root           32768 Sep 11  2013 ?????
drwxrwxrwx    2 root     root           32768 Sep 11  2013 ??????
drwxrwxrwx    3 root     root           32768 Jan 22 17:07 Android
drwxrwxrwx    9 root     root           32768 Jan  1  2010 Baidu_music
drwxrwxrwx    7 root     root           32768 Mar  8  2015 DCIM
drwxrwxrwx    2 root     root           32768 Jan 22 17:06 LOST.DIR
drwxrwxrwx    2 root     root           32768 Sep 10  2014 MTXX
drwxrwxrwx    2 root     root           32768 Dec 31  2014 System Volume Information
drwxrwxrwx    2 root     root           32768 Jan 22 17:29 videos huawei
#
```

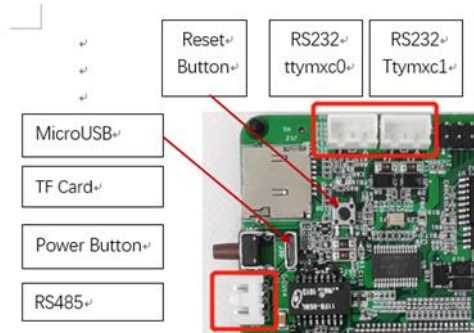Write "12345" into tftest.txt file:

#echo 12345 > /mnt/tftest.txt
#sync

View tftest.txt file:

#cat /mnt/tftest.txt

```
# cat /mnt/tftest.txt
12345
#
```

Write successfully.

2. UART Test

EVK supports two RS232 and one RS485.

The device name of UART1 in the system is /dev/ttymxc0,and UART2 is /dev/ttymxc1.UART1 is for debug. Here we take UART2 as an example.

EVK supports UART test application uart_test，method as follows：

Step 1：short TXD and RXD of UART2 (J9) by jumper:

Step 2:

```
#cat /dev/ttymxc1 &
#echo 11111 > /dev/ttymxc1
```

3. Ethernet test

EVK supports one 10/100M adaptive Eth，insert the network cable，shell terminal prompt information as follow.：

```
# [20618.138525] fec 2188000.ethernet eth0: Link is Up - 100Mbps/Full - flow control rx/tx
```

3.1 Check the Ethernet info：

```
#ifconfig eth0 up
#ifconfig
```

```
# ifconfig
eth0      Link encap:Ethernet  HWaddr 12:D9:BD:7F:DF:58
          inet addr:192.168.0.138  Bcast:192.168.0.255  Mask:255.255.255.0
          inet6 addr: fe80::90c2:bd0b:f32a:2a25/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:5722 errors:0 dropped:0 overruns:0 frame:0
          TX packets:104 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:541395 (528.7 KiB)  TX bytes:9613 (9.3 KiB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:12 errors:0 dropped:0 overruns:0 frame:0
          TX packets:12 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:1344 (1.3 KiB)  TX bytes:1344 (1.3 KiB)
```

3.2 Startup and shutdown ethernet ：

Shutdown:

```
#ifconfig eth0 down
```

Startup:

```
#ifconfig eth0 up
```

3.3 Set IP Address

#ifconfig eth0 192.168.0.137
#ifconfig

```
# ifconfig eth0 192.168.0.137
# ifconfig
eth0      Link encap:Ethernet  HWaddr 12:D9:BD:7F:DF:58
          inet addr:192.168.0.137  Bcast:192.168.0.255  Mask:255.255.255.0
          inet6 addr: fe80::90c2:bd0b:f32a:2a25/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:10591 errors:0 dropped:0 overruns:0 frame:0
          TX packets:125 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:1042611 (1018.1 KiB)  TX bytes:10381 (10.1 KiB)
```

3.4 Set MAC address

#ifconfig eth0 down
#ifconfig eth0 hw ether 1A:1A:2B:4F:EF:D9
#ifconfig eth0 up

```
# ifconfig eth0 hw ether 1A:1A:2B:4F:EF:D9
# ifconfig
eth0      Link encap:Ethernet  HWaddr 1A:1A:2B:4F:EF:D9
          inet addr:192.168.0.137  Bcast:192.168.0.255  Mask:255.255.255.0
          inet6 addr: fe80::90c2:bd0b:f32a:2a25/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:11678 errors:0 dropped:0 overruns:0 frame:0
          TX packets:152 errors:0 dropped:0 overruns:0 carrier:0
```

3.5 Set netmask

#ifconfig eth0 netmask 255.255.255.0

3.6 Add/remove gateway

Add gateway:
#route add default gw 192.168.0.1
#route (查看当前路由)

```
# route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         192.168.0.1     0.0.0.0         UG    0      0        0 eth0
192.168.0.0     *               255.255.255.0   U     0      0        0 eth0
#
```

Remove gateway:
#route del gateway 192.168.0.1

3.7 Set DNS

Add your DNS address to the /etc/resolv.conf
#vi /etc/resolv.conf

```
nameserver 8.8.8.8
nameserver 122.122.122.122
```

3.8 Configure DHCP

The system uses DHCP mode by default, if you want to modify, please stop the /etc/init.d/S41dhcpd first, you can:

```
#mv /etc/init.d/S41dhcpd /etc/init.d/X41dhcpd
```

Modify the /etc/network/interfaces file like this:

```
#vi /etc/network/interfaces
auto lo
iface lo inet loopback

auto eth0
#iface eth0 inet static    #static mode
#address 192.168.3.128
#netmask    255.255.255.0

iface eth0 inet dhcp    #dhcp mode
```

4. USB

Use 16G Kingston usb ，larger storage is not test yet。Hot-pluggin supported.Insert the USB,shell terminal prints as follow，different brand models may have different info.

```
# [  885.337634] usb 1-1.1: new high-speed USB device number 4 using ci_hdrc
[  885.457591] usb 1-1.1: New USB device found, idVendor=0951, idProduct=1666
[  885.464653] usb 1-1.1: New USB device strings: Mfr=1, Product=2, SerialNumber=3
[  885.473025] usb 1-1.1: Product: DataTraveler 3.0
[  885.477864] usb 1-1.1: Manufacturer: Kingston
[  885.482326] usb 1-1.1: SerialNumber: 60A44C3FAC7DF2A069726FB4
[  885.491533] usb 1-1.1: new config #1 exceeds power limit by 200mA
[  885.510896] usb-storage 1-1.1:1.0: USB Mass Storage device detected
[  885.538786] scsi host0: usb-storage 1-1.1:1.0
[  885.551776] usb 1-1-port1: 300mA is over 100mA budget!
[  885.557000] usb 1-1-port2: 500mA is over 100mA budget!
[  885.593627] hub 1-1:1.0: 400mA over power budget!
[  886.549758] scsi 0:0:0:0: Direct-Access     Kingston DataTraveler 3.0     PQ: 0 ANSI: 6
```

4.1 Mount usb
```
#mount /dev/sda1 /mnt
```
4.2 View usb content
```
#ls /mnt
```
```
# ls /mnt
System Volume Information  test
safety.mp3
```
4.3 Write some string to file.

```
#echo 12345 > /mnt/test_usb.txt
#sync
#cat /mnt/test_usb.txt
```

```
# echo 12345 > /mnt/test_usb.txt
# sync
# cat /mnt/test_usb.txt
12345
#
```

5. Wifi

RTL8723bu WIFI-ble module default.

Step 1：Confirm RTL8723bu is OK on the EVK，and connect the antenna。

Step 2：EVK power on，check wifi device ：

```
#ifconfig wlan0
```

```
# ifconfig wlan0
wlan0     Link encap:Ethernet  HWaddr 18:BB:26:F5:CE:84
          UP BROADCAST MULTICAST  MTU:1500  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:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

Step 3：Startup WiFi

```
#ifconfig wlan0 up
```

Step 4：Scan wireless devices：

```
#iwlist wlan0 scan
Cell 01 - Address: 9E:D9:B3:A6:B8:7A
           ESSID:"wifi-net-ssid"
           Protocol:IEEE 802.11bgn
           Mode:Master
           Frequency:2.442 GHz (Channel 7)
            Encryption key:on
           Bit Rates:300 Mb/s
           Quality=36/100    Signal level=62/100
```

➢ **Router Encryption Using WPA-PSK**

Use wpa_supplicant other than iwconfig wlan0 key xxx，iwconfig key is suitable for WEP/WPA.

Step 5：Config wpa_supplicant file:

Create file: vi /etc/wpa_supplicant.conf

```
ctrl_interface=/var/run/wpa_supplicant
ap_scan=1

network={
  ssid="industio"
  psk="12345678"
}
```

Step 6：Connect wlan0 to router, run as deamon mode.

#wpa_supplicant –D nl80211 -i wlan0 -c   /etc/wpa_supplicant.conf –B &

```
# wpa_supplicant –D nl80211 -i wlan0 -c  /etc/wpa_supplicant.conf –B &
[1]-  Done(255)           wpa_supplicant –D nl80211 -i wlan0 -c /etc/wpa.conf –B
# Successfully initialized wpa_supplicant
[ 3316.119300] RTL871X: RTW_ADAPTIVITY_EN_AUTO, chplan:0x20, Regulation:3,3
[ 3316.126064] RTL871X: RTW_ADAPTIVITY_MODE_NORMAL
[ 3316.512609] RTL871X: nolinked power save leave
[ 3318.801891] RTL871X: nolinked power save enter
wlan0: Trying to associate with 8c:f2:28:16:73:86 (SSID='industio' freq=2472 MHz)
[ 3319.630054] RTL871X: RTW_ADAPTIVITY_EN_AUTO, chplan:0x20, Regulation:3,3
[ 3319.636821] RTL871X: RTW_ADAPTIVITY_MODE_NORMAL
[ 3320.022760] RTL871X: nolinked power save leave
[ 3320.249081] RTL871X: rtw_set_802_11_connect(wlan0)  fw_state=0x00000008
[ 3322.088282] RTL871X: start auth
[ 3322.093625] RTL871X: auth success, start assoc
[ 3322.101369] RTL871X: rtw_cfg80211_indicate_connect(wlan0) BSS not found !!
[ 3322.108509] RTL871X: assoc success
[ 3322.112492] IPv6: ADDRCONF(NETDEV_CHANGE): wlan0: link becomes ready
wlan0: Associated with 8c:f2:28:16:73:86
wlan0: CTRL-EVENT-SUBNET-STATUS-UPDATE status=0
[ 3322.390131] RTL871X: send eapol packet
[ 3322.410977] RTL871X: send eapol packet
[ 3322.415450] RTL871X: set pairwise key camid:4, addr:8c:f2:28:16:73:86, kid:0, type:AES
wlan0: WPA: Key negotiation completed with 8c:f2:28:16:73:86 [PTK=CCMP GTK=CCMP]
wlan0: CTRL-EVENT-CONNECTED - Connection to 8c:f2:28:16:73:86 completed [id=0 i[ 3322.438749] RTL871X: set group key camid:5, addr:8c:f2:28:16:73:86, kid:1, type:AES
d_str=]
```

Step 7：Set wifi IP address

#ifconfig wlan0 192.168.0.169

Step 8: Set gateway

#route add default gw 192.168. 0.1 dev wlan0

Step 9: ping router gateway, such as 192.168.0.1

#ping 192.168.10.1

```
# ping 192.168.0.1
PING 192.168.0.1 (192.168.0.1): 56 data bytes
64 bytes from 192.168.0.1: seq=0 ttl=64 time=36.516 ms
64 bytes from 192.168.0.1: seq=1 ttl=64 time=5.890 ms
64 bytes from 192.168.0.1: seq=2 ttl=64 time=20.592 ms
```

wlan0 is ok.

➢ **Router Encryption Using WPA/WEP**

Step 5: set essid

#iwconfig wlan0 essid "industio"

Step 6: config router password

#iwconfig wlan0 key "12345678"

Step 7: add gateway

#route add default gw 192.168.10.1 dev wlan0

6. Audio and headphone

Step 1: set volume

Set play volume

#amixer cset numid=11,iface=MIXER,name='Headphone Playback Volume' 127,127

#amixer cset numid=47,iface=MIXER,name='Left Output Mixer PCM Playback Switch' 1

#amixer cset numid=44,iface=MIXER,name='Right Output Mixer PCM Playback Switch' 1

#amixer cset numid=10,iface=MIXER,name='Playback Volume' 210
#amixer cset numid=13,iface=MIXER,name='Speaker Playback Volume' 127,127

Step 2： play audio file

Put an audio file to EVK system， for example:/opt， insert speaker.

#mplayer -ao alsa /opt/safety.mp3

```
# mplayer -ao alsa  /opt/safety.mp3
MPlayer 1.3.0-4.9.4 (C) 2000-2016 MPlayer Team

Playing /opt/safety.mp3.
libavformat version 57.25.100 (internal)
Audio only file format detected.
Clip info:
 Title:
 Artist:
 Album:
 Year:
 Comment:
 Genre: Blues
Load subtitles in /opt/
=======================================================================
Opening audio decoder: [ffmpeg] FFmpeg/libavcodec audio decoders
libavcodec version 57.24.102 (internal)
AUDIO: 16000 Hz, 1 ch, floatle, 128.0 kbit/25.00% (ratio: 16000->64000)
Selected audio codec: [ffmp3float] afm: ffmpeg (FFmpeg MPEG layer-3 audio)
=======================================================================
AO: [alsa] 16000Hz 1ch floatle (4 bytes per sample)
Video: no video
Starting playback...
A:   3.2 (03.1) of 3.0 (03.0)  2.4% $<50>


Exiting... (End of file)
```

Step 3： Recording test

Amixer config:

#amixer cset numid=26,iface=MIXER,name='ALC Function' 3
#amixer cset numid=51,iface=MIXER,name='Left Input Mixer Boost Switch' 1
#amixer cset numid=36,iface=MIXER,name='ADC PCM Capture Volume' 230
#amixer cset numid=1,iface=MIXER,name='Capture Volume' 60

Insert CTIA headphone (with mic):

#arecord -D hw:0 -f S16_LE temp.wav -d 5

```
# arecord -D hw:0 -f S16_LE temp.wav -d 5
Recording WAVE 'temp.wav' : Signed 16 bit Little Endian, Rate 8000 Hz, Mono
```

Step 4： play record file

#aplay temp.wav

```
# aplay temp.wav
Playing WAVE 'temp.wav' : Signed 16 bit Little Endian, Rate 8000 Hz, Mono
#
```

7. CPU temperature

Check CPU temperature:

```
#cat /sys/class/thermal/thermal_zone0/temp
# cat /sys/class/thermal/thermal_zone0/temp
51836
```

Current CPU temperature is 51.836°C.

8. LCD backlight adjustment

Step 1: check the max LCD backlight:

```
#cat /sys/class/backlight/backlight/max_brightness
# cat /sys/class/backlight/backlight/max_brightness
7
```

Step 2: get current LCD backlight:

```
#cat /sys/class/backlight/backlight/brightness
# cat /sys/class/backlight/backlight/brightness
6
#
```

Step 3: set LCD backlight

```
#echo 3 > /sys/class/backlight/backlight/brightness
```

Recheck:

```
#cat /sys/class/backlight/backlight/brightness

# cat /sys/class/backlight/backlight/brightness
3
#
```

9. Sqlite3 database test

Sqlite3 is supported on EVK, useage：

```
#sqlite3
# sqlite3
SQLite version 3.21.0 2017-10-24 18:55:49
Enter ".help" for usage hints.
Connected to a transient in-memory database.
Use ".open FILENAME" to reopen on a persistent database.
sqlite>
```

Create database table:

```
#sqlite> create table testtb1 (one varchar(20),two int);
#sqlite> insert into testtbl1 values('WT-EDKSOM6ULX',255);
#sqlite> insert into testtbl1 values('hello',256);
#sqlite>select * from testtbl1;
```

Do select operation:

```
sqlite> select * from testtbl1;
WT-EDKSOM6ULX|255
hello|256
sqlite>
```

Quit sqlite3:

sqlite>.quite

or

sqlite>.exit

```
sqlite> .exit
#
```

10. Sleep and wakeup test

1) Enter deep sleep mode:

#echo enabled > /sys/class/tty/ttymxc0/power/wakeup

#echo mem > /sys/power/state

```
# echo enabled > /sys/class/tty/ttymxc0/power/wakeup
# echo mem > /sys/power/state
[ 6398.172208] PM: Syncing filesystems ... done.
[ 6398.202188] Freezing user space processes ... (elapsed 0.001 seconds) done.
[ 6398.203351] Freezing remaining freezable tasks ... (elapsed 0.001 seconds) done.
[ 6398.203363] Suspending console(s) (use no_console_suspend to debug)
```

Press any key in console, wakeup the system:

```
[ 6398.226606] RTL871X:  suspend start
[ 6398.226714] RTL871X: rtw_cmd_thread(wlan0) stop_req:1, break
[ 6398.241588] RTL871X: rtw_suspend_normal: ### ERROR #### driver in IPS ####ERROR###!!!
[ 6398.241647] RTL871X: rtw_dev_unload: driver in IPS-FWLPS
[ 6398.871326] RTL871X: rtw suspend success in 650 ms
[ 6399.497284] PM: suspend of devices complete after 1271.531 msecs
[ 6399.497294] PM: suspend devices took 1.270 seconds
[ 6399.499977] PM: late suspend of devices complete after 2.655 msecs
[ 6399.502439] PM: noirq suspend of devices complete after 2.438 msecs
[ 6399.502448] Disabling non-boot CPUs ...
[ 6399.503885] PM: noirq resume of devices complete after 1.328 msecs
[ 6399.505487] PM: early resume of devices complete after 1.350 msecs
[ 6399.506737] gpmi-nand 1806000.gpmi-nand: mode:4 ,failed in set feature.
[ 6399.590364] RTL871X: resume start
[ 6400.324457] RTL871X: RTW_ADAPTIVITY_EN_AUTO, chplan:0x20, Regulation:3,3
[ 6400.324464] RTL871X: RTW_ADAPTIVITY_MODE_NORMAL
[ 6400.912961] IPv6: ADDRCONF(NETDEV_CHANGE): wlan0: link becomes ready
[ 6400.913176] IPv6: ADDRCONF(NETDEV_CHANGE): wlan1: link becomes ready
[ 6401.122699] RTL871X: rtw_resume_common:0 in 1530 ms
[ 6401.123047] PM: resume of devices complete after 1617.540 msecs
[ 6401.124082] PM: resume devices took 1.620 seconds
[ 6401.241382] Restarting tasks ... done.
#
#
```

2) Enter standby mode:

#echo standby > /sys/power/state

```
# echo standby > /sys/power/state
[  347.500045] PM: Syncing filesystems ... done.
[  347.532112] Freezing user space processes ... (elapsed 0.001 seconds) done.
[  347.533316] Freezing remaining freezable tasks ... (elapsed 0.001 seconds) done.
[  347.533328] Suspending console(s) (use no_console_suspend to debug)
```

Press any key in console, wakeup the system:

```
[   33.516068] RTL871X:  suspend start
[   33.516203] RTL871X: rtw_cmd_thread(wlan0) stop_req:1, break
[   33.530845] RTL871X: rtw_suspend_normal: ### ERROR #### driver in IPS ####ERROR###!!!
[   33.530907] RTL871X: rtw_dev_unload: driver in IPS-FWLPS
[   34.160705] RTL871X: rtw suspend success in 650 ms
[   34.787006] PM: suspend of devices complete after 1271.773 msecs
[   34.787016] PM: suspend devices took 1.270 seconds
[   34.789708] PM: late suspend of devices complete after 2.664 msecs
[   34.792181] PM: noirq suspend of devices complete after 2.446 msecs
[   34.792190] Disabling non-boot CPUs ...
[   34.793598] PM: noirq resume of devices complete after 1.307 msecs
[   34.795205] PM: early resume of devices complete after 1.352 msecs
[   34.796443] gpmi-nand 1806000.gpmi-nand: mode:4 ,failed in set feature.
[   34.880307] RTL871X: resume start
[   35.614267] RTL871X: RTW_ADAPTIVITY_EN_AUTO, chplan:0x20, Regulation:3,3
[   35.614273] RTL871X: RTW_ADAPTIVITY_MODE_NORMAL
[   36.202824] IPv6: ADDRCONF(NETDEV_CHANGE): wlan0: link becomes ready
[   36.202979] IPv6: ADDRCONF(NETDEV_CHANGE): wlan1: link becomes ready
[   36.412644] RTL871X: rtw_resume_common:0 in 1530 ms
[   36.412992] PM: resume of devices complete after 1617.767 msecs
[   36.414027] PM: resume devices took 1.620 seconds
[   36.531336] Restarting tasks ... done.
#
#
# [   38.231599] RTL871X: nolinked power save enter
```

11. Resistive touch panel calibration

Tslib is already ported on EVK, and ts_calibrate can be used to calibrate the resistive touch panel。Connect LCD(J14 or J31) and resistive touch panel (J15) before calibration.
Export tslib environment variable first：

```
#export TSLIB_TSDEVICE=/dev/input/event0
#export TSLIB_CONFFILE=/etc/ts.conf
#export TSLIB_PLUGINDIR=/usr/lib/ts
#export TSLIB_CALIBFILE=/etc/pointercal
```

Run ts_calibrate :

```
#ts_calibrate
```

Click the cursor position according to the screen prompt to complete the calibration.
Run sync and reboot.