

SOM-3568-Q7_debian Software UserGuide

V1.2

Content

REVISION HISTORY	3
1. Debian on SOM-3568-Q7	4
2. Installing the image from a Host-pc	4
2.1 Installation preparation	4
2.2 Install driver	4
2.3 Firmware upgrade	5
3. Functional description	8
3.1 Hardware interface diagram	8
3.2 How to access the system	9
3.2.1 Serial port access	9
3.2.2 SSH access	11
4. Test in Uboot	12
4.1 How to go to Uboot	12
4.2 IO test	13
4.3 TF card	13
4.4 USB	14
4.5 GPIO29	15
4.6 GPIO30	15
5. Test in kernel	17
5.1 Ethernet	17
5.2 TF card	19
5.3 USB	20
5.4 RTC	22

REVISION HISTORY

时间	版本号	更改原因	修改人员	备注
2021/1/17	1.0	Create document	wj	
2023/3/31	1.1	Add content	wj	

1. Debian on SOM-3568-Q7

SOM3568 currently supports system:Debian 10

2. Installing the image from a Host-pc

2.1 Installation preparation

- USB-USB data cable
- Host-pc(Windos7,Windos10)
- 18V~24Vpower

2.2 Install driver

1) Download the driver ,double-click to open DriverInstall.exe

Download link: <https://mega.nz/folder/Be900Q7a#qm2Rb9kCM44KKD9HwgFMYQ>



2) Click “驱动安装”



3) Click “确定” after downloading



4) Download the burned firmware and extract it to the PC.

2.3 Firmware upgrade

1) Connect the core board to board 1(V3.2 board) and shift 1 to the on, as shown below.

PS: ①Dial "1" to "on" for burning mode, dial back to working mode, ("2" does not need to operate).

②This switch is only used for debugging, and will not be used in the following mass goods



2) Connect USB OTG of the board 1 and PC with USB-USB data cable



3) Download and open firmware. Open RKDevtool_Release->config.ini,change

“Selected=1” to “Selected=2”,that is to change the language of the burning tool to English

Download link:

<https://mega.nz/file/kat0TA5L#C0t9cUj7gfAjEt1ioHHY4fezfk89002cM7jINMwOp2w>



```
config.ini - 记事本
文件(F) 编辑(E) 格式(O) 查看(V) 帮助(H)
#选择工具语言:Selected=1(中文);Selected=2(英文)
[Language]
Kinds=2
Selected=2
LangPath=Language\

Lang1File=Chinese.ini
Lang1FontName=宋体
Lang1FontSize=9

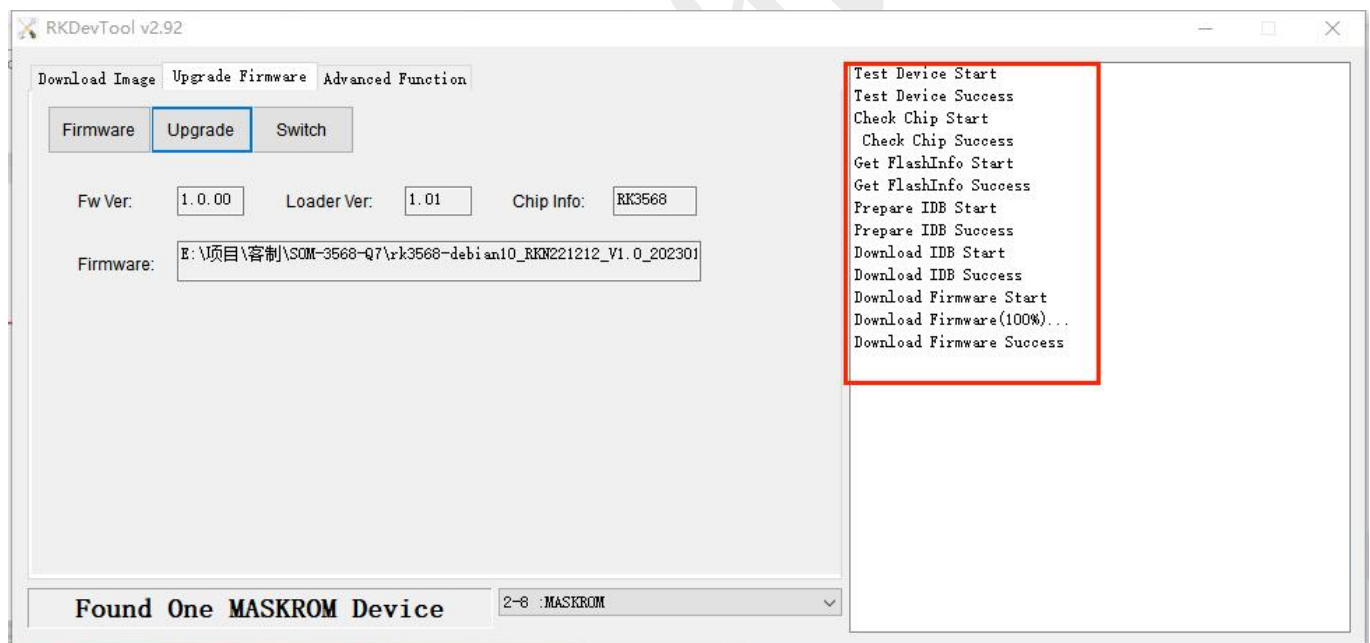
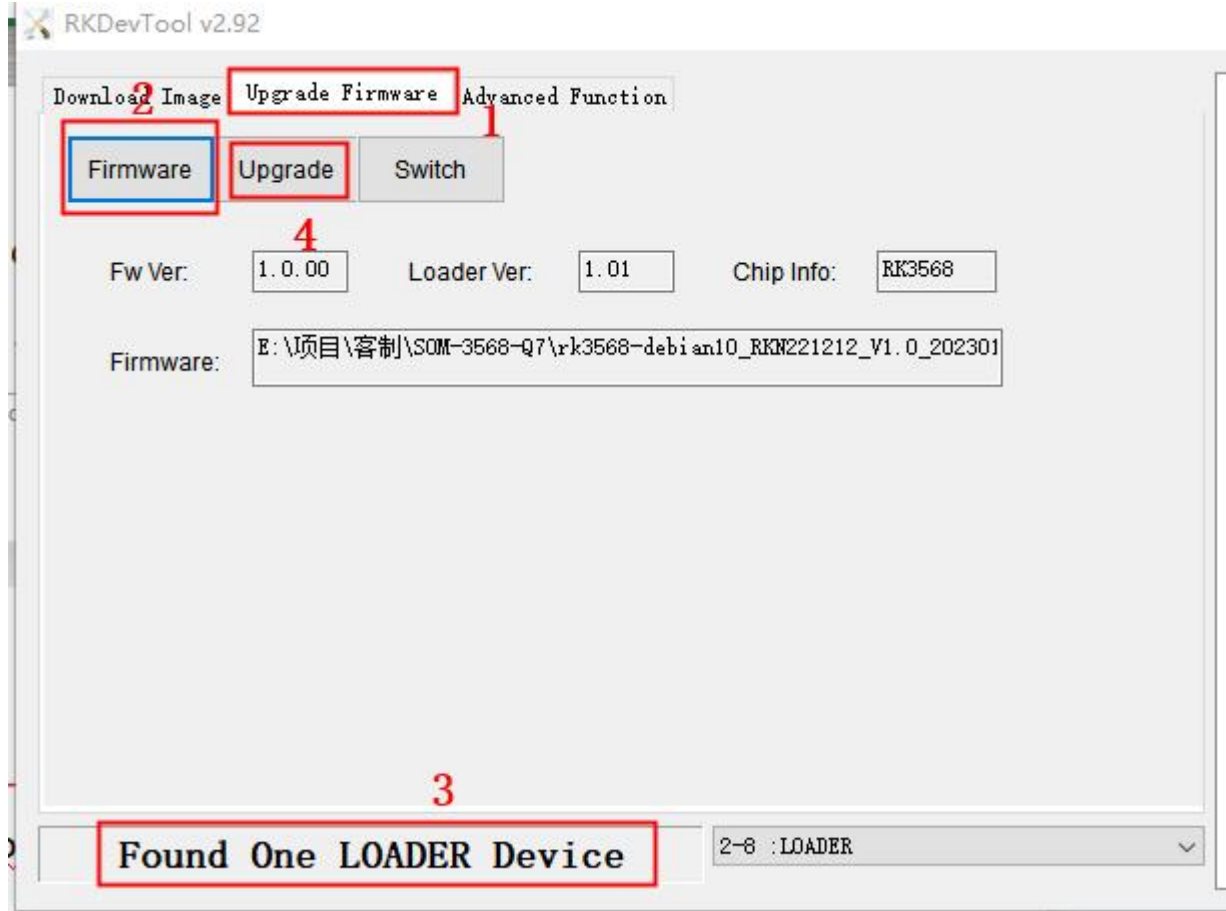
Lang2File=English.ini
Lang2FontName=Arial
Lang2FontSize=9

[System]
#自定义MSC,ADB,MTP和UVC设备的VID和PID,十六进制
#单个的情况,例:MSC_VIDPID=0BB4,0C01
#多个的情况,例:MSC_VIDPID=0BB4,0C01|0BB4,0C02
MSC_VIDPID=
ADB_VIDPID=
MTP_VIDPID=
UVC_VIDPID=
```

4) Open RKDevTool_Release->RKDevTool.exe, select “upgrade firmware” , click “Firmware” to import the update.img in rockdev

5) Plug 18V~24Vpower is connected, the burning tool will display "a LOADER device has been identified". Click upgrade to start burning, and the burning will be displayed on the right after

completion

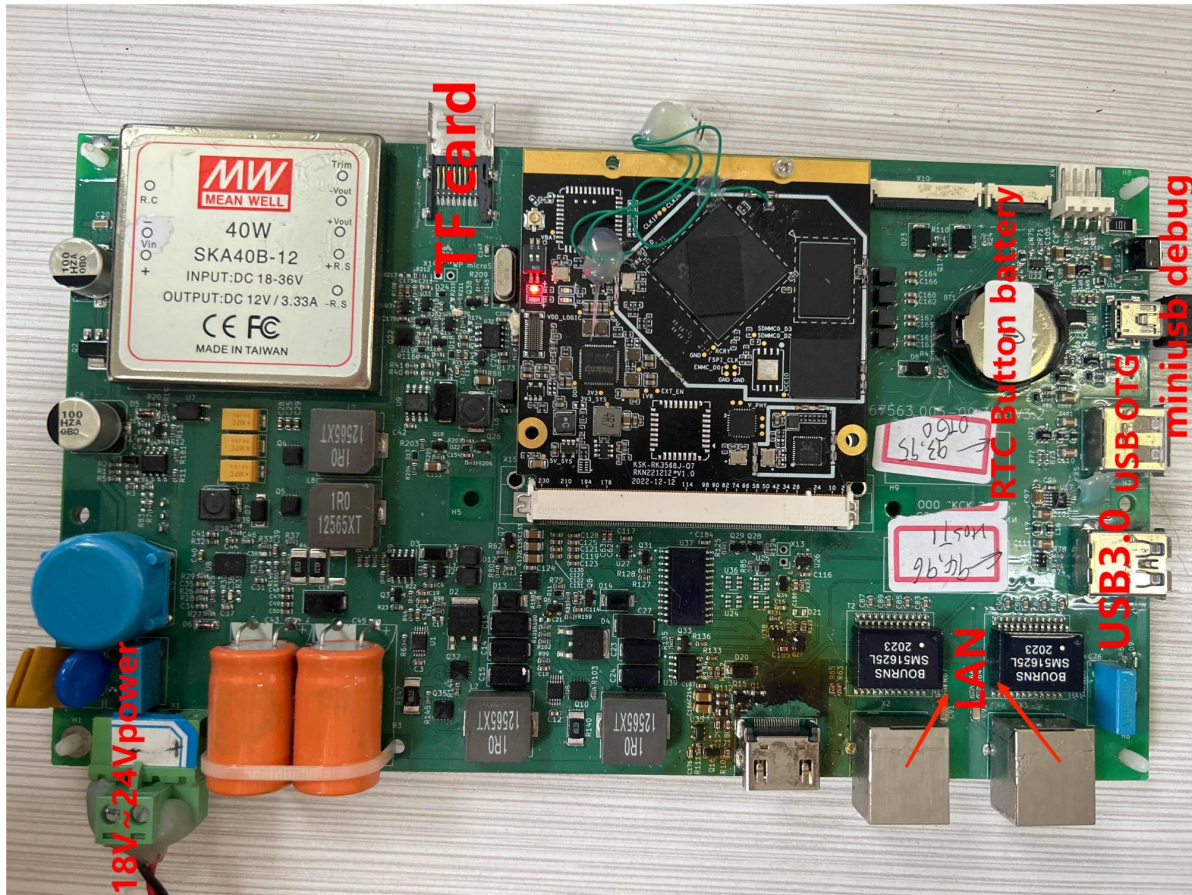


7) After the upgrade is completed, transfer 1 on the core board to its original place and enter the working mode

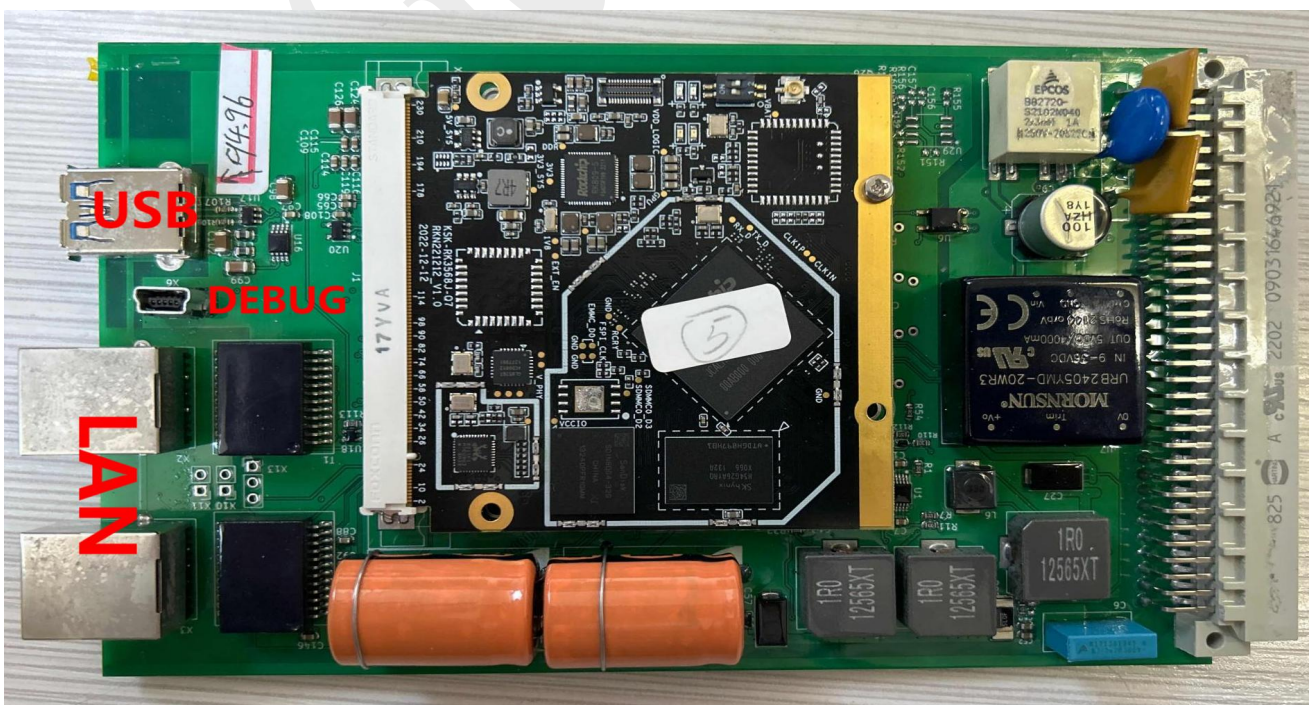
3. Functional description

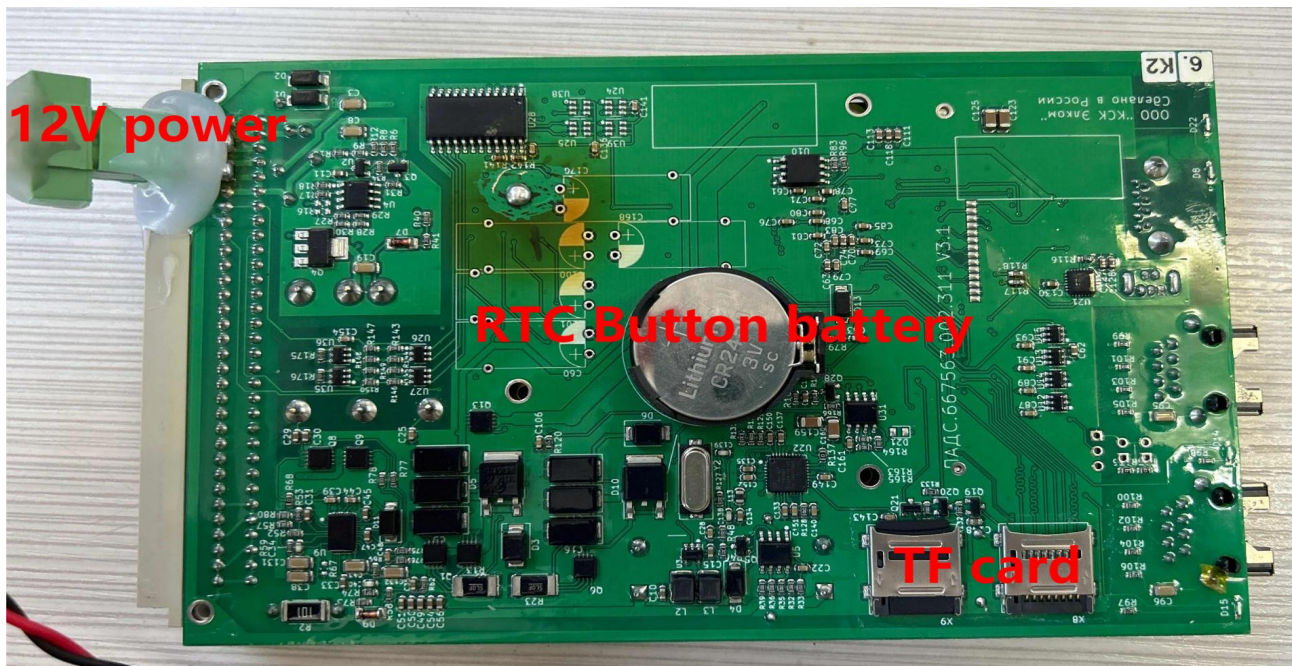
3.1 Hardware interface diagram

Board1:



Board 2:



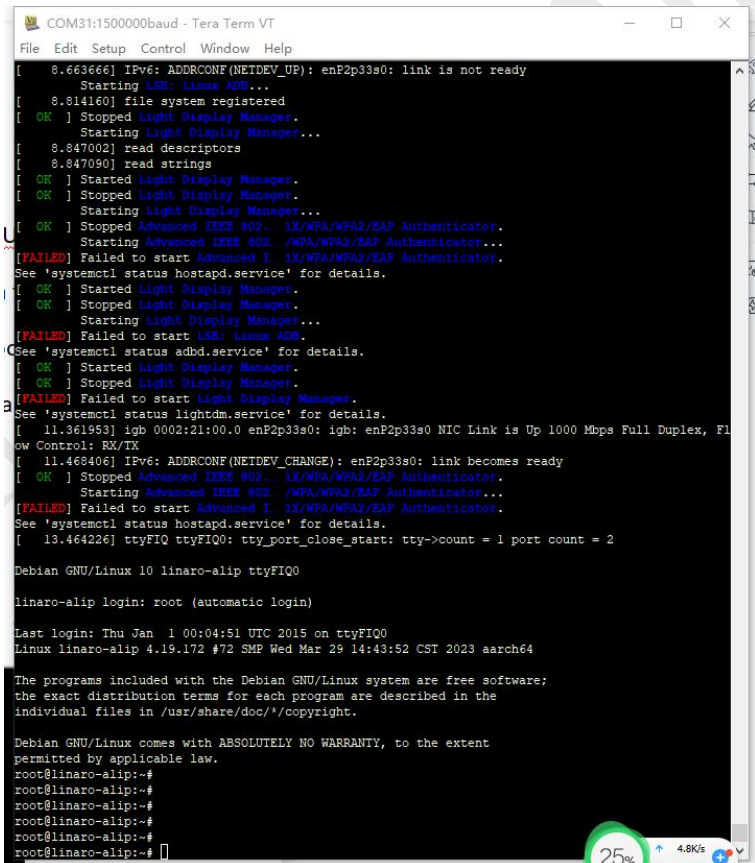
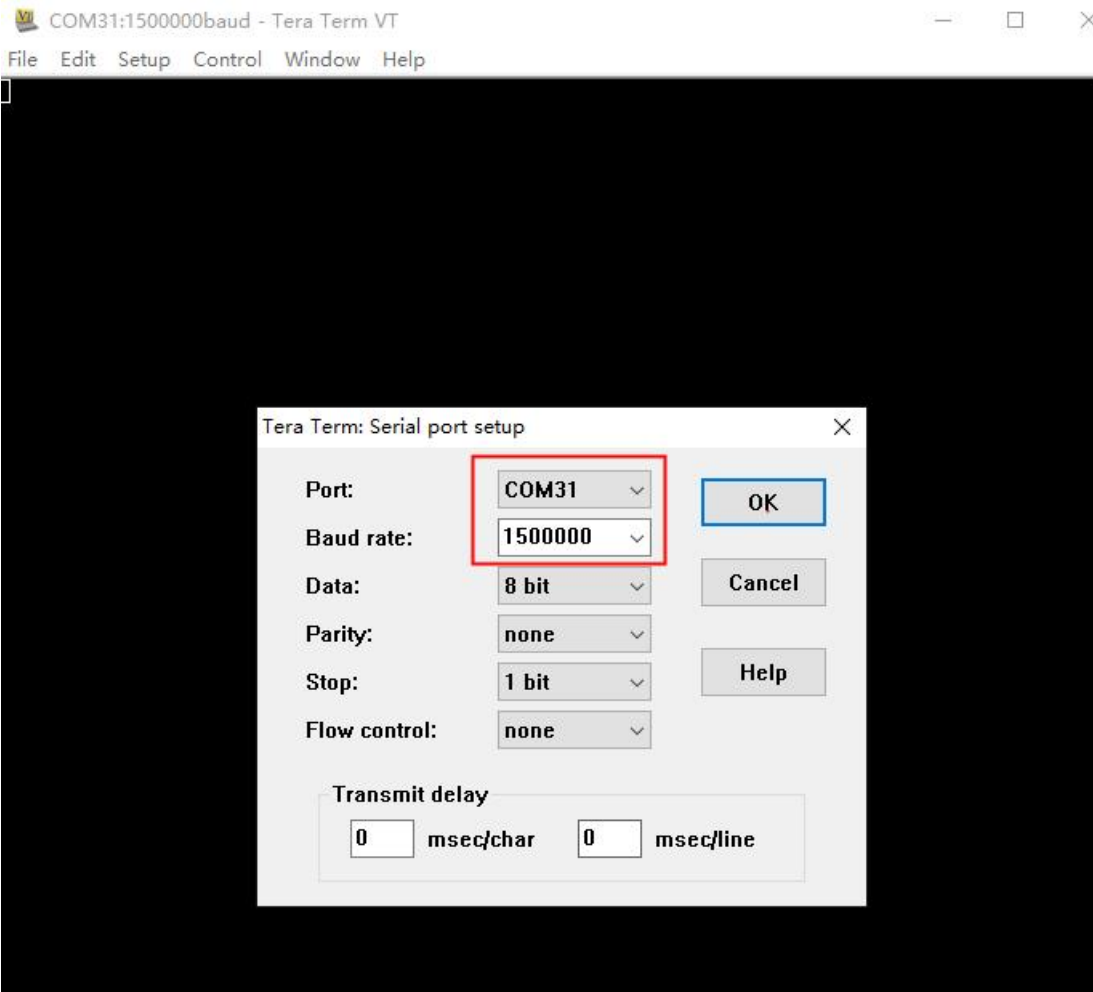


3.2 How to access the system

3.2.1 Serial port access

Prepare miniUSB*1 、 12V power *1 and 18V~24Vpower *1. Use miniUSB to connect the Debug port on the board to the PC. Choose Device Manager > Ports on the PC to view the port number identified by the system. Open the terminal debugging tool and select the corresponding port number and baud rate 1500000, then power on to access





3.2.2 SSH access

Connect the PC to the SOM-3568-Q7 on the same LAN, obtain the IP address, and use

Secure Shell (SSH) over the serial port

Tool (SecureCRT/TeraTerm) to connect.

Protocol: SSH2

User name: linaro



✓ 192.168.1.122 (1) ✕

```
Linux linaro-alip 4.19.172 #72 SMP wed Mar 29 14:43:52 CST 2023 aarch64
The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Mon Apr 3 08:41:52 2023 from 192.168.1.107
linaro@linaro-alip:~$
```

4. Test in Uboot

Ps: Write only interface functions that have been debugged successfully

4.1 How to go to Uboot

- 1) Power up the board and quickly press “Ctrl+C”,if the serial port is displayed as follows, you have entered the Uboot.
- 2) To exit the Uboot, type the **reboot** command or power off to restart

[illegible]

4.2 IO test

1) Type the command to read the data, and the consecutively 0x10 data starting from the address 0x00c80000 is displayed.

md.l 0x00c80000 0x10 //Read operation. Display consecutive 0x10 data starting from address 0x00c80000.

```
=> md.l 0x00c80000 0x10
00c80000: cbefe7bf feaffb6e a2f9eefd bee76fee ....n.....O..
00c80010: 9eeff9ff a79e72e4 7clafaaf ee7e76fa ....r.....|.V~.
00c80020: afaaabee e676ee7e bfff787b 66cf6fe6 ....~.v.{x...O.f
00c80030: dabb9acf e6fe667e 9ebafb3d 6c7fee6f ....~f..=...O..l
```

2) Type the command to write the data. Assign the value 0x00c80000 to 0xffff0000

mw.l 0x00c80000 0xffff0000 //Write operation. Assign the value 0x00c80000 to 0xffff0000

3) Read back to check whether the data is written

md.l 0x00c80000 0x10 //Read back

```
=> mw.l 0x00c80000 0xffff0000
=> md.l 0x00c80000 0x10
00c80000: ffff0000 feaffb6e a2f9eefd bee76fee ....n.....O..
00c80010: 9eeff9ff a79e72e4 7clafaaf ee7e76fa ....r.....|.V~.
00c80020: afaaabee e676ee7e bfff787b 66cf6fe6 ....~.v.{x...O.f
00c80030: dabb9acf e6fe667e 9ebafb3d 6c7fee6f ....~f..=...O..l
```

4.3 TF card

1) After inserting the TF card, power up the board and into Uboot

2) Type command as following

mmc list //View the mmc list

mmc dev 1 //Switch to TF card

mmc info //Check whether to switch to TF card

```
=> mmc list
dwmmc@fe2b0000: 1
dwmmc@fe2c0000: 2
sdhci@fe310000: 0 (eMMC)
=> mmc dev 1
MMC error: The cmd index is 16, ret is -110
MMC error: The cmd index is 17, ret is -110
MMC error: The cmd index is 0, ret is -110
MMC error: The cmd index is 1, ret is -110
Card did not respond to voltage select!
mmc_init: -95, time 150
switch to partitions #0, OK
mmc1 is current device
=> mmc info
Device: dwmmc@fe2b0000
Manufacturer ID: 89
OEM: 303
Name: NCard
Timing Interface: Legacy
Tran Speed: 400000
Rd Block Len: 512
SD version 2.0
High Capacity: No
Capacity: 1.9 GiB
Bus Width: 1-bit
Erase Group Size: 512 Bytes
```

4.4 USB

1) Connect the USB flash drive, and power on the board to enter the Uboot

usb start //Open USB

usb dev //View usb Device

usb stop //close usb

```
=> usb start
starting USB...
Bus dwc3@fcc00000: usb maximum-speed not found
Register 2000140 NbrPorts 2
Starting the controller
USB XHCI 1.10
Bus dwc3@fd000000: Register 2000140 NbrPorts 2
Starting the controller
USB XHCI 1.10
Bus usb@fd800000: USB EHCI 1.00
Bus usb@fd840000: USB OHCI 1.0
Bus usb@fd880000: USB EHCI 1.00
Bus usb@fd8c0000: USB OHCI 1.0
scanning bus dwc3@fcc00000 for devices... 1 USB Device(s) found
scanning bus dwc3@fd000000 for devices... GUID Partition Table Header signature is wrong: 0x5EEB
= 0x5452415020494645
2 USB Device(s) found
scanning bus usb@fd800000 for devices... Device NOT ready
Request Sense returned 02 3A 00
3 USB Device(s) found
scanning bus usb@fd840000 for devices... 1 USB Device(s) found
scanning bus usb@fd880000 for devices... 1 USB Device(s) found
scanning bus usb@fd8c0000 for devices... 2 USB Device(s) found
scanning usb for storage devices... 2 Storage Device(s) found
=> usb dev

IDE device 0: Vendor: SanDisk Rev: 1.19 Prod: Cruzer
Type: Removable Hard Disk
Capacity: 7633.5 MB = 7.4 GB (15633408 x 512)
=> usb stop
stopping USB..
=> usb dev
USB is stopped. Please issue 'usb start' first.
```

4.5 GPIO29

1) Check the pin status

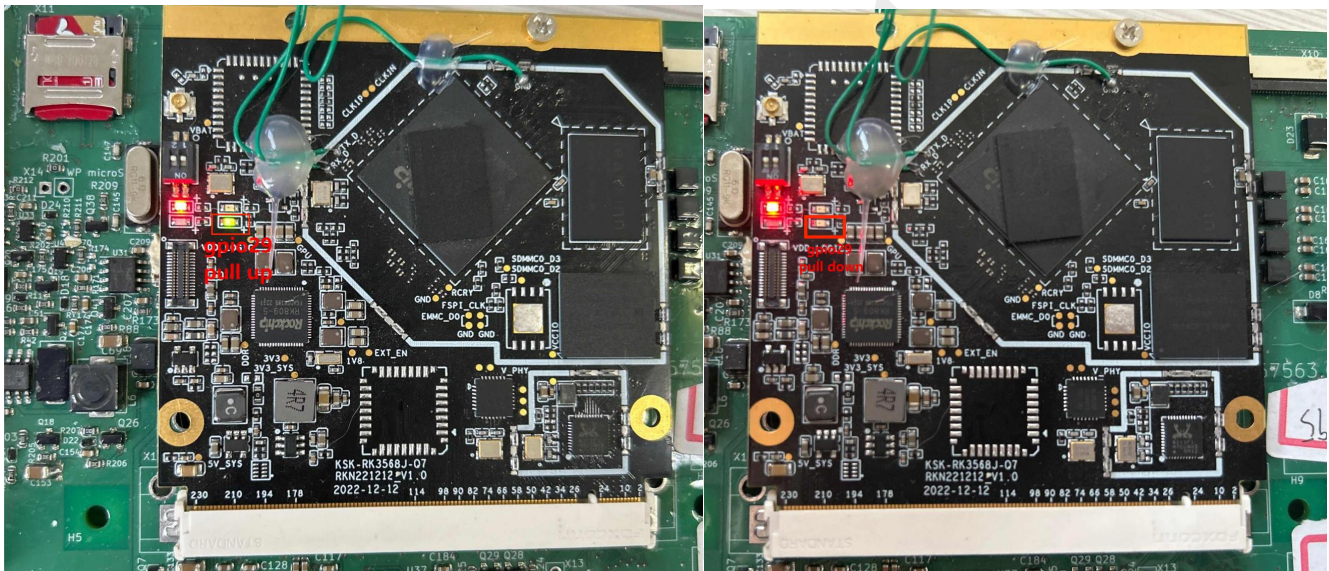
`gpio status -a`

2) Pull up the pin

`gpio s 29`

3) Pull down the pin

`gpio c 29`



4.6 GPIO30

1) Check the pin status

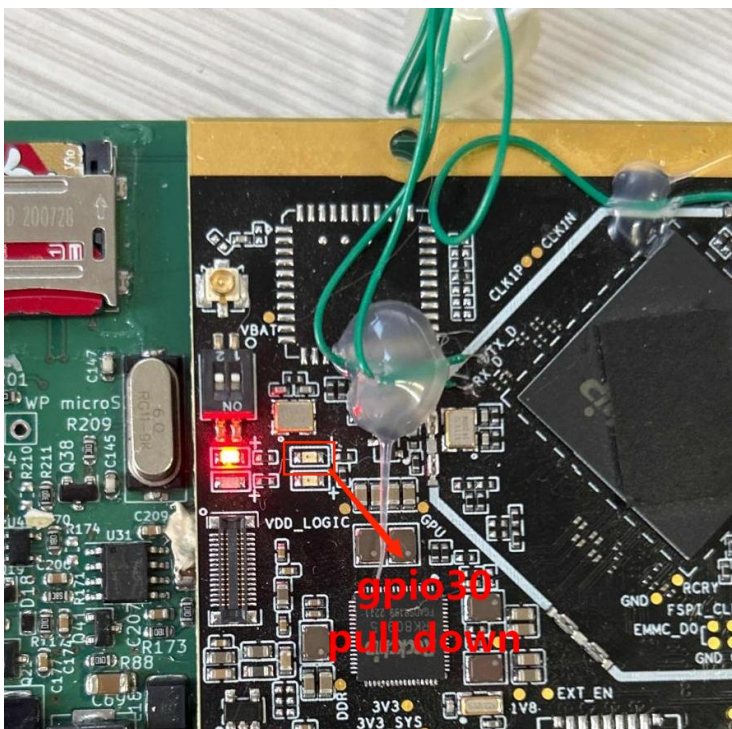
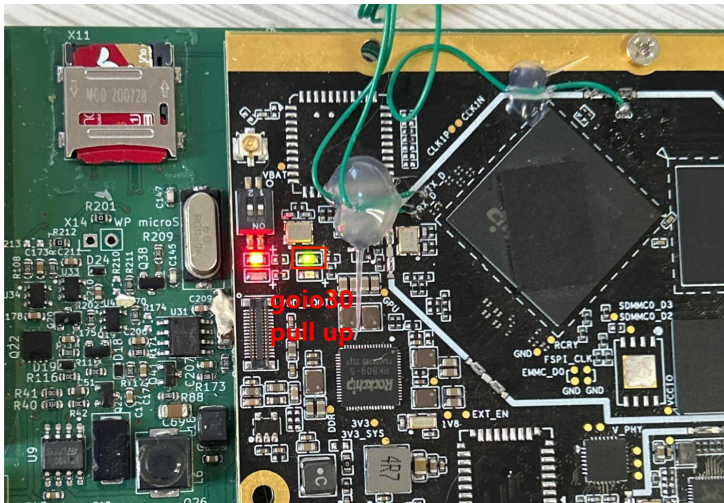
`gpio status -a`

2) Pull up the pin

`gpio s 30`

3) Pull down the pin

`gpio c 30`



4.7 i2c

1) Switch to i2c

i2c dev 0 //Switch

2) Read operation

i2c md 0x50 0x2e 0x20 //Read consecutively 0x20 starting with 0x2e

```
=> i2c dev 0
Setting bus to 0
=> i2c md 0x50 0x2e 0x20
002e: ff ff ff ff ff ff ff 41 51 31 32 33 34 35 36 .....AQ123456
003e: 37 38 39 30 31 32 38 00 ff ff ff ff ff ff ff 7890128.....
```

5. Test in kernel

Ps: Write only interface functions that have been debugged successfully

5.1 Ethernet

Test preparation: network cable*1

5.1.1 network test

1) Power on the board, connect network cable to LAN port, and enter command to check whether node eth has obtained an IP address

ifconfig //View IP

```
root@linaro-alip:~# ifconfig
enP2p33s0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
    ether 04:91:62:b7:e0:cb txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device memory 0x380900000-38097ffff

eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.6.101 netmask 255.255.255.0 broadcast 192.168.6.255
    inet6 fe80::5c9f:f6d7:84df:67a8 prefixlen 64 scopeid 0x20<link>
    ether 7e:55:fl:ff:86:af txqueuelen 1000 (Ethernet)
    RX packets 41 bytes 7155 (6.9 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 52 bytes 5240 (5.1 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device interrupt 49

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 6 bytes 458 (458.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 6 bytes 458 (458.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

2) Type following command to test the network

ping baidu.com //test network

```
root@linaro-alip:~# ping baidu.com
PING baidu.com (39.156.66.10) 56(84) bytes of data.
64 bytes from 39.156.66.10 (39.156.66.10): icmp_seq=1 ttl=50 time=22.1 ms
64 bytes from 39.156.66.10 (39.156.66.10): icmp_seq=2 ttl=50 time=23.1 ms
64 bytes from 39.156.66.10 (39.156.66.10): icmp_seq=3 ttl=50 time=22.3 ms
64 bytes from 39.156.66.10 (39.156.66.10): icmp_seq=4 ttl=50 time=21.6 ms
64 bytes from 39.156.66.10 (39.156.66.10): icmp_seq=5 ttl=50 time=21.4 ms
64 bytes from 39.156.66.10 (39.156.66.10): icmp_seq=6 ttl=50 time=22.3 ms
64 bytes from 39.156.66.10 (39.156.66.10): icmp_seq=7 ttl=50 time=22.2 ms
64 bytes from 39.156.66.10 (39.156.66.10): icmp_seq=8 ttl=50 time=21.4 ms
64 bytes from 39.156.66.10 (39.156.66.10): icmp_seq=9 ttl=50 time=21.4 ms
^C
--- baidu.com ping statistics ---
9 packets transmitted, 9 received, 0% packet loss, time 23ms
rtt min/avg/max/mdev = 21.414/21.987/23.065/0.538 ms
```

5.1.2 Gigabit network test

1) Place the PC and the board in the same gigabit LAN

2) Type following commands to install iperf3 tool

apt-get update

apt-get install iperf3 -y //install iperf3

3) Type command to query IP

ifconfig //query IP

```
root@linaro-alip:~# ifconfig
enP2p33s0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
    ether ac:db:da:59:8a:e2 txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device memory 0x380900000-38097ffff

eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.1.135 netmask 255.255.255.0 broadcast 192.168.1.255
    inet6 fe80::6536:94cf:afc9:c3aa prefixlen 64 scopeid 0x20<link>
    ether ac:db:da:59:8a:e1 txqueuelen 1000 (Ethernet)
    RX packets 834647 bytes 1254103726 (1.1 GiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 104673 bytes 5784707 (5.5 MiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device interrupt 47

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 80 bytes 5360 (5.2 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 80 bytes 5360 (5.2 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

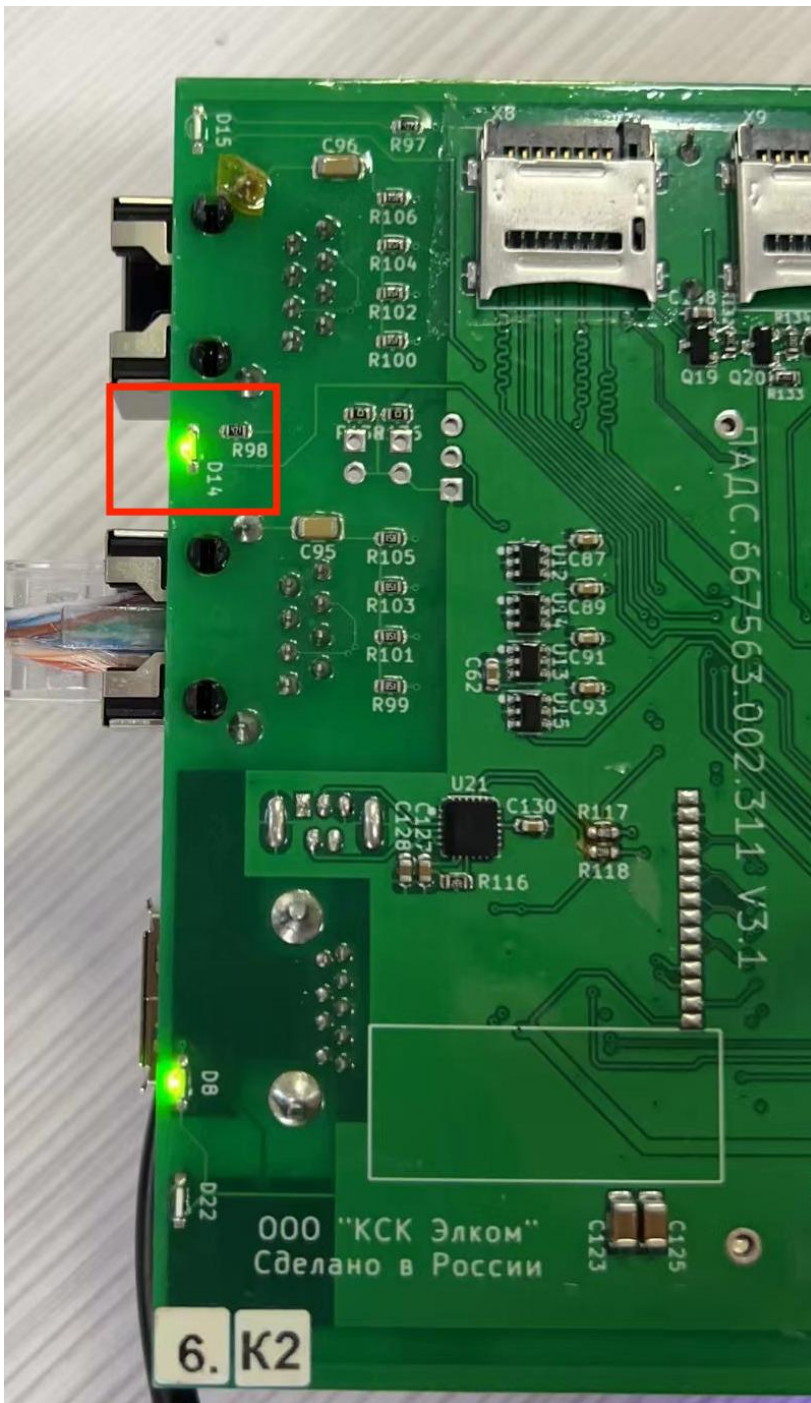
4) Execute iperf3

iperf3 -s //use iperf3

5) Download and extract the iperf-3.1.3-win64 file to the PC. Press "Win+R" and type "cmd" to enter command prompt

Download link:

6) Go to the path where the iperf-3.1.3-win64 file is stored



5.2 TF card

1) Test preparation: TF card*1

2) Insert the TF card into the card slot (see the hardware diagram), power on and start

3) Type following commands to view the partition

fdisk -l //view the partition

```
root@linaro-alip:~# fdisk -l
Disk /dev/ram0: 4 MiB, 4194304 bytes, 8192 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
I/O size (minimum/optimal): 4096 bytes / 4096 bytes

Disk /dev/mmcblk1: 1.9 GiB, 1999110144 bytes, 3904512 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0x00000000

Device            Boot Start      End Sectors  Size Id Type
/dev/mmcblk1p1                129 3904511 3904383    1.9G  6 FAT16

Disk /dev/mmcblk0: 29.1 GiB, 31268536320 bytes, 61071360 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: gpt
Disk identifier: 74490000-0000-4C2E-8000-216100007762

Device            Start      End Sectors  Size Type
/dev/mmcblk0p1    16384     24575     8192    4M unknown
/dev/mmcblk0p2    24576     32767     8192    4M unknown
/dev/mmcblk0p3    32768     98303    65536   32M unknown
/dev/mmcblk0p4    98304    163839    65536   32M unknown
/dev/mmcblk0p5    163840    229375    65536   32M unknown
/dev/mmcblk0p6    229376    5472255  5242880  2.5G unknown
/dev/mmcblk0p7    5472256    5734399   262144   128M unknown
/dev/mmcblk0p8    5734400    5750783   16384     8M unknown
/dev/mmcblk0p9    5750784   61071295 55320512 26.4G unknown
```

7) Type the command to view the mounting

df -h //View the mount

```
root@linaro-alip:~# df -h
Filesystem      Size  Used Avail Use% Mounted on
udev            93M   0    93M   0% /dev
tmpfs           33M   2.2M  31M   7% /run
/dev/mmcblk0p9  26G   2.4G  23G  10% /
tmpfs           162M   0   162M   0% /dev/shm
tmpfs           5.0M   0    5.0M   0% /run/lock
tmpfs           162M   0   162M   0% /sys/fs/cgroup
/dev/mmcblk1p1  1.9G   32M   1.9G   2% /mnt/sd1
tmpfs           33M   0    33M   0% /run/user/0
```

5.3 USB

1) Test preparation: Usb flash disk*1

2) Insert the USB disk into the USB port, type command

fdisk -l //view the partition

df -h //View the mount

```
root@linaro-alip:~# fdisk -l
Disk /dev/ram0: 4 MiB, 4194304 bytes, 8192 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
I/O size (minimum/optimal): 4096 bytes / 4096 bytes

Disk /dev/mmcblk0: 29.1 GiB, 31268536320 bytes, 61071360 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: gpt
Disk identifier: DD560000-0000-4029-8000-3A2C0000058F

Device            Start      End  Sectors  Size Type
/dev/mmcblk0p1     16384     24575     8192    4M unknown
/dev/mmcblk0p2     24576     32767     8192    4M unknown
/dev/mmcblk0p3     32768     98303    65536   32M unknown
/dev/mmcblk0p4     98304    163839    65536   32M unknown
/dev/mmcblk0p5    163840    229375    65536   32M unknown
/dev/mmcblk0p6    229376   12812287  12582912  6G unknown
/dev/mmcblk0p7   12812288  13074431    262144  128M unknown
/dev/mmcblk0p8   13074432  13090815     16384    8M unknown
/dev/mmcblk0p9   13090816  61071295  47980480 22.9G unknown

Disk /dev/sda: 7.5 GiB, 8004304896 bytes, 15633408 sectors
Disk model: Cruzer
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0x00000000

Device  Boot  Start      End  Sectors  Size Id Type
/dev/sda1 *    1695744  15633407  13937664  6.7G  b W95 FAT32
```

```
root@linaro-alip:~# df -h
Filesystem      Size  Used Avail Use% Mounted on
udev            93M   0    93M   0% /dev
tmpfs           33M   2.2M  31M   7% /run
/dev/mmcblk0p6  5.9G  2.5G  3.2G  45% /
tmpfs           162M   0   162M   0% /dev/shm
tmpfs           5.0M  4.0K  5.0M   1% /run/lock
tmpfs           162M   0   162M   0% /sys/fs/cgroup
/dev/sda1       6.7G  4.9G  1.8G  74% /media/USB1
/dev/mmcblk0p9  23G   45M   23G   1% /media/linaro/2023
tmpfs           33M   0    33M   0% /run/user/0
```

8) Viewing USB Content

ls /media/USB1 //View the contents of the USB flash drive

```
root@linaro-alip:~# ls /media/USB1
485
Alarms
Android
Audiobooks
ConsoleAppDemo2
ConsoleAppDemo2.zip
DCIM
'DSR SGW Provisioning 20220114 副本'
Documents
Download
LOST.DIR
Movies
```

5.4 RTC

- 1) Disconnect the network
- 2) Type commands to set date and time

date -s "2022-12-30 23:58:00" //set date and time ,you can also set any other time

hwclock -w //Time to synchronize to hardware

hwclock -r //View hardware time

- 3) Wait for one minute or more and disconnect the power supply
- 4) After the status indicator is completely off, wait for more than one minute. Connect the power supply to the system,type commands to see if the time is progressing normally

date //View date and time

hwclock -r //View hardware time

```
root@linaro-alip:~# date -s "2023-1-16 23:58:00"
Mon Jan 16 23:58:00 UTC 2023
root@linaro-alip:~# hwclock -w
[ 141.254942] rtc_pt7c4337 : write the rtc time, time is 1673913483
[ 141.254967] 2023-01-16 23:58:03-tm_mon:00,tm_year:123
[ 141.254973] write time 2023-01-16 23:58:03
root@linaro-alip:~# hwclock -r
2023-01-16 23:58:06.691287+00:00
root@linaro-alip:~# date
Mon Jan 16 23:58:09 UTC 2023
root@linaro-alip:~#
root@linaro-alip:~# date
Tue Jan 17 00:01:41 UTC 2023
root@linaro-alip:~# hwclock -r
2023-01-17 00:01:43.104448+00:00
```

Geniatech