SB52 Development Platform for Yocto Linux

Verification Guide

May. 2020

Version 0.2

Document Revisions

Date	Revision Number	Document Changes
05/2020	0.1	Draft version
08/2020	0.2	1. Add commands for BT pairing. 2. Add commands for playing back audio through headphone. 3. Add commands for recording from on-board digital microphones. 4. Add commands for adjusting volume 5. Update commands for playing back audio through speakers.

Table of Contents

1 Overview

This tutorial guides new developers how to test Yocto Linux with the MTK i500 based development platform – SB52 board.

2 Shell Command

- ADB

USB mode adb is enabled by default in Yocto system. Input "adb shell" in your terminal console.

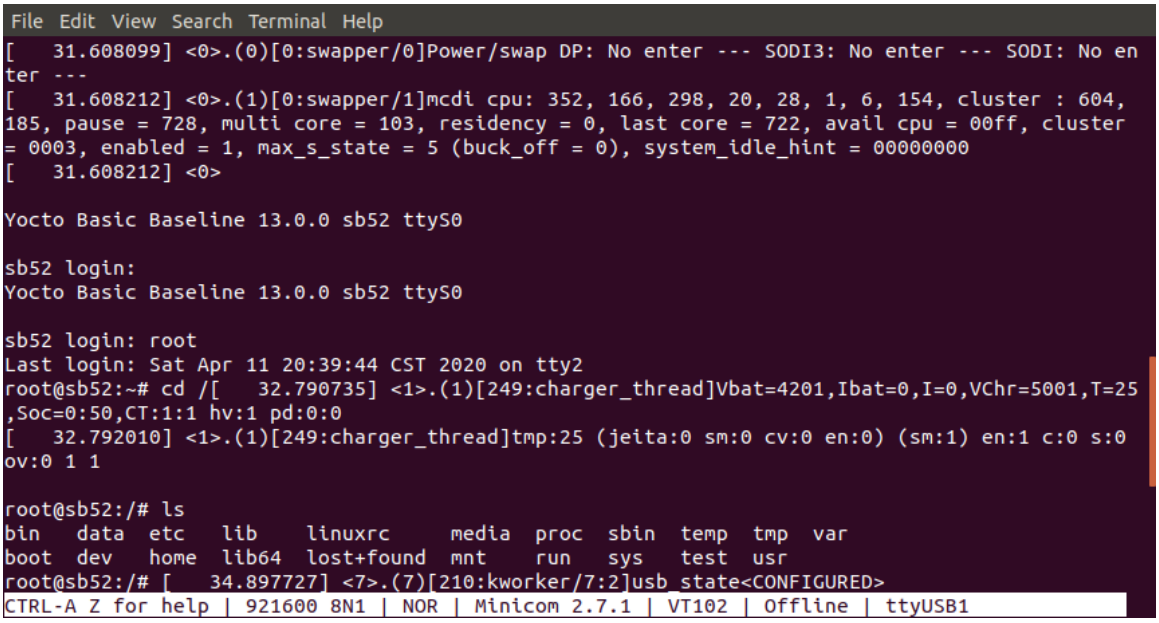
```
$ adb devices
List of devices attached
console=tty0    device

$ adb shell
sh-3.2# ls -l
total 65
drwxr-xr-x   3 root root  4096 Apr 17  2020 bin
drwxr-xr-x   2 root root  4096 Apr 13  2020 boot
drwxrwxr-x  12 root root  1024 Apr 11 20:39 data
drwxr-xr-x  14 root root  5360 Apr 11 20:39 dev
drwxr-xr-x  25 root root  4096 Apr 17  2020 etc
drwxr-xr-x   4 root root  4096 Apr 17  2020 home
drwxr-xr-x   7 root root  4096 Apr 17  2020 lib
drwxr-xr-x   5 root root  4096 Apr 12  2020 lib64
lrwxrwxrwx   1 root root    19 Apr 17  2020 linuxrc -> /bin/busybox.nosuid
drwx------   2 root root 16384 Apr 17  2020 lost+found
drwxr-xr-x   2 root root  4096 Apr 13  2020 media
drwxr-xr-x   2 root root  4096 Apr 13  2020 mnt
dr-xr-xr-x 309 root root     0 Jan  1  1970 proc
drwxr-xr-x   9 root root   320 Apr 11 20:39 run
drwxr-xr-x   2 root root  4096 Apr 17  2020 sbin
dr-xr-xr-x  14 root root     0 Jan  1  2010 sys
drwxr-xr-x   3 root root  4096 Apr 17  2020 temp
drwxr-xr-x   8 root root  4096 Apr 17  2020 test
drwxrwxrwt  10 root root   400 Apr 11 20:39 tmp
drwxr-xr-x  12 root root  4096 Apr 16  2020 usr
drwxr-xr-x   8 root root   220 Apr 11 20:39 var
sh-3.2#
```

- UART console

The i500 platform uses the UART0 and USB-RS232 cable to establish serial communication with a PC.

Login as root:

```
Sb52 login: root
```



3 Audio

- Following is the example of setting volume to level 200, please increase/decrease the level according to your requirement.

```
# amixer cset numid=80 200
numid=80,iface=MIXER,name='DAC Volume'
  ; type=INTEGER,access=rw---R--,values=1,min=0,max=255,step=0
  : values=200
  | dBscale-min=-12.75dB,step=0.05dB,mute=0
```

- Connect the speakers to the SPK R / SPK L pins. Input the following commands for audio playback.

```
# amixer cset numid=1 0
numid=1,iface=MIXER,name='Audio_Amp_R_Switch'
  ; type=ENUMERATED,access=rw------,values=1,items=2
  ; Item #0 'Off'
  ; Item #1 'On'
  : values=0
# amixer cset numid=2 0
numid=2,iface=MIXER,name='Audio_Amp_L_Switch'
  ; type=ENUMERATED,access=rw------,values=1,items=2
  ; Item #0 'Off'
  ; Item #1 'On'
  : values=0
# amixer cset numid=86 0
numid=86,iface=MIXER,name='I2S_Channel'
  ; type=INTEGER,access=rw------,values=1,min=0,max=3,step=0
  : values=0
# amixer cset numid=104 2
```

```
numid=104,iface=MIXER,name='Ch2 I2S_Channel'
  ; type=INTEGER,access=rw------,values=1,min=0,max=3,step=0
  : values=2
# aplay -D hw:0,7 /data/test.wav
Playing WAVE '/data/test.wav' : Signed 16 bit Little Endian, Rate 48000 Hz, Mono
```

- Connect headphone to **PHONE JACK**. Input following commands for audio playback.

```
# amixer cset numid=1 1
numid=1,iface=MIXER,name='Audio_Amp_R_Switch'
  ; type=ENUMERATED,access=rw------,values=1,items=2
  ; Item #0 'Off'
  ; Item #1 'On'
  : values=1
# amixer cset numid=2 1
numid=2,iface=MIXER,name='Audio_Amp_L_Switch'
  ; type=ENUMERATED,access=rw------,values=1,items=2
  ; Item #0 'Off'
  ; Item #1 'On'
  : values=1
# aplay -D hw:0,0 /data/test.wav
Playing WAVE '/data/test.wav' : Signed 16 bit Little Endian, Rate 48000 Hz, Mono
```

- Input following commands(one by one and **order should be kept unchanged**) for recording a 10 seconds long wave via on-board digital microphones.

```
# amixer cset numid=39 2
numid=39,iface=MIXER,name='Audio_MIC1_Mode_Select'
  ; type=ENUMERATED,access=rw------,values=1,items=5
  ; Item #0 'ACCMODE'
  ; Item #1 'DCCMODE'
  ; Item #2 'DMIC'
  ; Item #3 'DCCECMDIFFMODE'
  ; Item #4 'DCCECMSINGLEMODE'
  : values=2
# amixer cset numid=40 2
numid=40,iface=MIXER,name='Audio_MIC2_Mode_Select'
  ; type=ENUMERATED,access=rw------,values=1,items=5
  ; Item #0 'ACCMODE'
  ; Item #1 'DCCMODE'
  ; Item #2 'DMIC'
  ; Item #3 'DCCECMDIFFMODE'
  ; Item #4 'DCCECMSINGLEMODE'
  : values=2
# amixer cset numid=35 0
numid=35,iface=MIXER,name='Audio_MicSource1_Setting'
```

```
  ; type=ENUMERATED,access=rw------,values=1,items=4
  ; Item #0 'ADC1'
  ; Item #1 'ADC2'
  ; Item #2 'ADC3'
  ; Item #3 'ADC4'
  : values=0
# amixer cset numid=22 1
numid=22,iface=MIXER,name='Audio_ADC_1_Switch'
  ; type=ENUMERATED,access=rw------,values=1,items=2
  ; Item #0 'Off'
  ; Item #1 'On'
  : values=1
# amixer cset numid=23 1
numid=23,iface=MIXER,name='Audio_ADC_2_Switch'
  ; type=ENUMERATED,access=rw------,values=1,items=2
  ; Item #0 'Off'
  ; Item #1 'On'
  : values=1
# amixer cset numid=26 1
numid=26,iface=MIXER,name='Audio_Preamp1_Switch'
  ; type=ENUMERATED,access=rw------,values=1,items=4
  ; Item #0 'OPEN'
  ; Item #1 'IN_ADC1'
  ; Item #2 'IN_ADC2'
  ; Item #3 'IN_ADC3'
  : values=1
# amixer cset numid=44 3
numid=44,iface=MIXER,name='Audio_Preamp2_Switch'
  ; type=ENUMERATED,access=rw------,values=1,items=4
  ; Item #0 'OPEN'
  ; Item #1 'IN_ADC1'
  ; Item #2 'IN_ADC2'
  ; Item #3 'IN_ADC3'
  : values=3
#arecord -D hw:0,1 -r 16000 -c 2 -f S16_LE -d 10 /data/01.wav
Recording WAVE '/data/01.wav' : Signed 16 bit Little Endian, Rate 16000 Hz, Stereo
```

4 Wi-Fi

- Way 1:

Use **APP CLI** command

1. Input **app_cli**
2. Input **app.wifi.task 3 “ssid” “bssid” “password” Authmode**

Note: Leave **bssid** and **Authmode** as blank and -1 if unknown

```
sh-3.2# app_cli
```

```
...
Command>app.wifi.task 3 "NETGEAR55-5G" "" "PASSWORD" -1


<WIFI>[wifiCliSetWifiTask:182]:argv[1]:[3] argv[2]:[NETGEAR55-5G] argv[3]:[]
argv[4]:[PASSWORD] argv[5]:[-1]
<WIFI>[wifiCliSetWifiTask:183]:ssid:[NETGEAR55-5G] bssid:[] passwd:[PASSWORD] authmode:[-1]
<WIFI>[wifiCliSetWifiTask:186]:start to connect network by CLI, gTimerStart.tv_sec =
1575013734, gTimerStart.tv_usec = 534491
...
[WIFI_MW] Received event: <3>CTRL-EVENT-SCAN-STARTED
[WIFI_MW] Received event: <3>CTRL-EVENT-SCAN-RESULTS
...
[WIFI_MW] WPA association has started: ssid=NETGEAR55-5G, freq=5180
...
[WIFI_MW] Received event: <3>Associated with b0:39:56:8d:b7:10
[WIFI_MW] Received event: <3>CTRL-EVENT-SUBNET-STATUS-UPDATE status=0
wlan0: WPA: Key negotiation completed with b0:39:56:8d:b7:10 [PTK=CCMP GTK=CCMP]
wlan0: CTRL-EVENT-CONNECTED - Connection to b0:39:56:8d:b7:10 completed [id=0 id_str=]
[WIFI_MW] Received event: <3>WPA: Key negotiation completed with b0:39:56:8d:b7:10
[PTK=CCMP GTK=CCMP]
[WIFI_MW] Received event: <3>CTRL-EVENT-CONNECTED - Connection to b0:39:56:8d:b7:10
completed [id=0 id_str=]
...
<MISC_DHCP> cDhcpStart Success!
...
Sending discover...
Sending select for 172.16.1.5...
Lease of 172.16.1.5 obtained, lease time 86400
/etc/udhcpc.d/50default: Adding DNS 172.16.1.1
 OK
...
<ASSISTANT_STUB_APP> send msg is {
    "command":    "/system/network_status_change",
    "params":    {
        "quantity":    100,
        "status":    "connect",
        "ssid":    "NETGEAR55-5G",
        "bssid":    "b0:39:56:8d:b7:10"
    }
}
...
```

It would disconnected with AP once leaving **app_cli**

It will auto-connect AP connected last time after rebooting even doesn't enter **app_cli**

In this situation, if wanna disconnect with AP, need to enter then leave **app_cli**

If the following command is executed before leaving **app_cli**, then it won't auto-connect AP connected last time after rebooting

```
Command>app.wifi.task 5
```

Because the AP information is cleaned

- Way 2:

With binary **wpa_cli** and **dhcpc.script**, we could check wifi roughly

Check ifname as below, it is wlan0

```
sh-3.2# ifconfig
lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
...

wlan0     Link encap:Ethernet  HWaddr 00:08:22:C1:B9:2D
          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)
```

ex. wanna connect ssid **NETGEAR55-5G** with password **PASSWORD**

```
sh-3.2# wpa_cli -iwlan0
wpa_cli v2.6
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See README for more details.

Interactive mode

> list_networks
network id / ssid / bssid / flags
> add_network
0
> set_network 0 ssid "NETGEAR55-5G"
OK
> set_network 0 psk "PASSWORD"
OK
> enable_network 0
OK
<3>CTRL-EVENT-SCAN-STARTED
<3>CTRL-EVENT-SCAN-RESULTS
```

```
<3>WPS-AP-AVAILABLE

<3>Trying to associate with b0:39:56:8d:b7:10 (SSID='NETGEAR55-5G' freq=5180 MHz)
<3>Associated with b0:39:56:8d:b7:10
<3>CTRL-EVENT-SUBNET-STATUS-UPDATE status=0
<3>WPA: Key negotiation completed with b0:39:56:8d:b7:10 [PTK=CCMP GTK=CCMP]
<3>CTRL-EVENT-CONNECTED - Connection to b0:39:56:8d:b7:10 completed [id=0 id_str=]

> > quit
> sh-3.2#
sh-3.2# dhcpc.script start wlan0
[/sbin/dhcpc.script] all params: start wlan0
[Starting] dhcp client on interface wlan0 ... <dhcpc script>Cleaing up remaining udhcpc
process in the system.
<dhcpc script>no udhcpc pid can be killed, but udhcpc id is 4425
<dhcpc script>Invoke new udhcpc process.
<dhcpc script>/sbin/udhcpc -i wlan0 -s /usr/share/udhcpc/mtkdhcp.script -p /tmp/udhcpc-
wlan0.pid -n -t 20 -T 2... udhcpc: started, v1.29.3
udhcpc: sending discover
udhcpc: sending select for 192.168.24.22
udhcpc: lease of 192.168.24.22 obtained, lease time 3600
deleting routers
route: SIOCDELRT: No such process
cat: /etc/resolv.conf: No such file or directory
adding dns  192.168.16.202
adding dns  192.168.1.154
nameserver 192.168.16.202
nameserver 192.168.1.154
 OK
sh-3.2#
```

Then check its status and try pinging somewhere

```
sh-3.2# ifconfig
lo        Link encap:Local Loopback
...
wlan0     Link encap:Ethernet  HWaddr 00:08:22:C1:B9:2D
          inet addr:172.16.1.5  Bcast:172.16.1.255  Mask:255.255.255.0
          inet6 addr: fe80::208:22ff:fec1:b92d%lo/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:65 errors:0 dropped:0 overruns:0 frame:0
          TX packets:21 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:9876 (9.6 KiB)  TX bytes:2193 (2.1 KiB)

sh-3.2# ping www.google.com
```

```
PING www.google.com.tw (172.217.160.68): 56 data bytes
64 bytes from 172.217.160.68: seq=0 ttl=52 time=8.778 ms
64 bytes from 172.217.160.68: seq=1 ttl=54 time=9.271 ms
64 bytes from 172.217.160.68: seq=2 ttl=54 time=8.957 ms
...
```

Note: this way won't auto-connect to assigned AP after rebooting

5 BT

```
sh-3.2# app_cli
...
Command>app.bt.btinfo

<BT_CLI> bluetoothCliGetBtStatus.
<BT_AUD> bluetoothA2dpGetRole, current A2DP role is sink mode
<DEFAULT LOG><LOG /usr/bin/appmainprog, bt_rpc_do_op, #2703>YZ RPC DO OP
x_mtkapi_bt_gap_get_local_dev_info
<DEFAULT LOG><LOG /usr/bin/appmainprog, _get_sess, #667>[RPCIPC]_get_sess is called, t_id
is: 0
<DEFAULT LOG><LOG /usr/bin/appmainprog, _get_cur_id, #490>pv_key_sess=0x7f4c0057b0, t_id is:
0, thread=0x7f985eb1d0
<DEFAULT LOG><LOG /usr/bin/appmainprog, ipc_do_op, #2112>YZ pt_sess is NULL
<DEFAULT LOG><LOG /usr/bin/appmainprog, ipc_do_op, #2128>ipc_do_op
x_mtkapi_bt_gap_get_local_dev_info failed ret:-6
<DEFAULT LOG><LOG /usr/bin/appmainprog, bt_rpc_do_op, #2743>YZ RPC DO OP
x_mtkapi_bt_gap_get_local_dev_info DONE
Open client:a_mtkapi_bt_gap_get_local_dev_info #209 try to auto connect
YZ Open Client:mtk_bt_service
[RPCIPC]<Client>App(threadID=0x7f985eb1d0)call ipc_open_client
[YZ RPCIPC]<Client>create CT socket fd: 29
[RPCIPC]<Client>create it socket()
[RPCIPC]<Client>ipc_open_client create IT socket fd: 30
ct connect()...
[RPCIPC]<Client>ct connect Server IPC successful
check client 0x7f4c0081e0 server 0x7fb0001a10 for service mtk_bt_service
msg rx from fd: 107, cmd=0, svr_ref=0x7fb0001a10, ct_ref=0x7f4c0081e0
[RPCIPC]2 add_sess_t():t_id=6,i4_it_sock=107, i4_ct_sock=-1
[RPCIPC]<Server>alloc t_id =6 @line:1806
[RPCIPC]IPC Server thread(threadID=0x7f69ffb1e0:t_id:6)started
msg rx from fd: 13, cmd=6, svr_ref=0x7fb0001a10, ct_ref=0x7f4c0081e0
[RPCIPC]<Client> alloc t_id =5
[RPCIPC]2 add_sess_t():t_id=5,i4_it_sock=30, i4_ct_sock=29
[RPCIPC]<client>App Thread(0x7f985eb1d0) create ipc thread-----
<01:12:23.373189> <BT><COM><N>c_btm_get_local_dev_info@71 +++ Enter +++
[RPCIPC]IPC client thread started(ThreadID==0x7f1effd1d0 :t_id=5)
<01:12:23.373454> <BT><GAP><N>bt_mw_get_local_dev_info@901
addr:58:C0:7F:22:08:00,name:MT8516(08:00),power state:ON
Func:x_mtkapi_bt_gap_get_local_dev_info Line:312--->: c_btm_get_local_dev_info success
```

```
<BT_AUD> <BT_CLI> psDevInfo.name : MT8516(08:00)
<BT_AUD> <BT_CLI> acOldName : MT8516(08:00)
<BT_AUD> <BT_CLI> bluetooth audio status:
bt_init:TRUE
btStatus:IDLE
bt_forced_paring:FALSE
bt_track_idx:0
mIsBtPlay:FALSE
mFgContinueConnect:FALSE
mIsStickyPairingEnable:FALSE
mIsConnectableBackground:FALSE
current local A2DP role:SINK
BT name: MT8516(08:00)

Command>app.bt.btscan

<BT_CLI> bluetoothCliBtScan.
<BT_AUD> <BT_CLI> start bt inquiry scan...
<01:13:57.225357> <BT><COM><N>c_btm_start_inquiry_scan@126 +++ Enter +++
<01:13:57.225558> <BT><GAP><N>bt_mw_scan@1178 <<< call btstartDiscovery , filter_type= 0>>>
<01:13:57.225716> <BT><GAP><N>linuxbt_gap_start_discovery_handler@464 +++ Enter
<01:13:57.225930> <BT><COM><N>bt_mw_scan@1190 --- Exit ---

<01:13:57.226444> bt_btif: bta_dm_check_av:0
<01:13:57.234149> bt_btif: bte_scan_filt_param_cfg_evt, 1
<01:13:57.239757> <BT><GAP><N>linuxbt_gap_discovery_state_changed_cb@892  state: 1
<01:13:57.240016> <BT><GAP><N>bt_mw_gap_msg_handle@811 bluetooth gap msg handle , state
event
<01:13:57.240144> <BT><COM><N>bt_mw_gap_state_handle@690 +++ Enter +++
<01:13:57.240233> <BT><GAP><N>bt_mw_gap_state_handle@762 report inquiry state 1
<01:13:57.240492> <BT><COM><N>bt_mw_gap_nty_state_handle@827 +++ Enter +++
Command><BT_AUD> GAP event cb, btEvent.state = 108.
<BT_AUD> BLUETOOTH itselfMsg come, ptBtMsg->mUi4MsgType is : 1.
<BT_AUD> Bluetooth profile(GAP) msg come.
<BT_AUD> GAP_STATE_DISCOVERY_STARTED.
<BT_AUD> INQUIRY_START----send notification to ASSISTANT_STUB
<01:13:57.241559> <BT><COM><N>c_btm_get_local_dev_info@71 +++ Enter +++
<01:13:57.241678> <BT><GAP><N>bt_mw_get_local_dev_info@901
addr:58:C0:7F:22:08:00,name:MT8516(08:00),power state:ON
Func:x_mtkapi_bt_gap_get_local_dev_info Line:312--->: c_btm_get_local_dev_info success

<BT_AUD>  ====ASSISTANT_STUB=====psDevInfo.name : MT8516(08:00)
<BT_AUD> device addr length should be 17 !!
<BT_AUD>  ====ASSISTANT_STUB=====btStatusChange.bt_paired_name :
```

```
<BT_AUD>  ====ASSISTANT_STUB=====btStatusChange.bt_paired_mac :
<BT_AUD>  ====ASSISTANT_STUB=====btStatusChange.role : 1
<BT_AUD> bluetoothAppProcessMsg done.
<ASSISTANT_STUB_APP> assistantStubAppProcessMsg 1302 line begin
<ASSISTANT_STUB_APP> E_appMsg_TYPE_ASSISTANT_STUB
<ASSISTANT_STUB_APP> MSG_FROM_BT
<ASSISTANT_STUB_APP> assistantStubJsonHandleBtMsg 1143 line begin
<ASSISTANT_STUB_APP> assistantStubJsonHandleBluetoothStatusChange 663 line begin
<ASSISTANT_STUB_APP> command is /system/bluetooth_status_change
<ASSISTANT_STUB_APP> status is -1741192147
<ASSISTANT_STUB_APP> name is MT8516(08:00)
<ASSISTANT_STUB_APP> bt_paired_name is
<ASSISTANT_STUB_APP> bt_paired_mac is
<ASSISTANT_STUB_APP> role is 1
<ASSISTANT_STUB_APP> send msg is {
  "command":    "/system/bluetooth_status_change",
  "params":{
       "status":"inquiry_start",
       "name":  "MT8516(08:00)",
       "bt_paired_name":  "",
       "bt_paired_mac":   "",
       "role":  1
  }
}
<ASSISTANT_STUB_APP>enter hubSend = ctx->client_sockfd = 14
<ASSISTANT_STUB_APP> cmd send fail! errno=2
<ASSISTANT_STUB_APP> assistantStubJsonHandleBluetoothStatusChange 714 line end
<ASSISTANT_STUB_APP> assistantStubJsonHandleBtMsg 1183 line end
<ASSISTANT_STUB_APP> assistantStubAppProcessMsg 1429 line end
<01:13:57.593867> bt_btif_dm: btif_dm_search_devices_evt cod is 0, set as unclassified
<01:13:57.594490> <BT><GAP><N>linuxbt_gap_device_found_cb@760 device found
<01:13:57.594591> <BT><GAP><N>linuxbt_gap_parse_device_properties@587 +++ Enter
============Propertie num : 5================
<01:13:57.594665> <BT><GAP><N>linuxbt_gap_parse_device_properties@614 bdaddr =
68:5A:7E:89:38:60
<01:13:57.594727> <BT><GAP><N>linuxbt_gap_parse_device_properties@618 cod = 0x1f00
<01:13:57.594790> <BT><GAP><N>linuxbt_gap_parse_device_properties@627 devtype = ble
<01:13:57.594867> <BT><GAP><N>linuxbt_gap_parse_device_properties@622 rssi = -93
<01:13:57.594941> <BT><GAP><N>linuxbt_gap_parse_device_properties@662 service = 0x0
<01:13:57.595004> <BT><GAP><N>linuxbt_gap_parse_device_properties@691
============Properties End================
<01:13:57.595363> <BT><GAP><N>bt_mw_gap_msg_handle@816 bluetooth gap msg handle , device
properties event
<01:13:57.595476> <BT><COM><N>bt_mw_gap_device_info_handle@580 +++ Enter +++
<01:13:57.595545> <BT><GAP><N>bt_mw_gap_device_info_handle@609 get scan device
addr:68:5A:7E:89:38:60,name:, cod:0x1f00, service:0x0
```

```
<01:13:57.595623> <BT><GAP><N>bt_mw_gap_device_info_handle@638 add 68:5A:7E:89:38:60 to
scan list

<01:13:57.595840> <BT><GAP><N>bt_mw_gap_device_info_handle@653 cod filter device
addr:68:5A:7E:89:38:60, name:, cod:0x1f00, service:0x0

<01:14:07.227224> bt_btif: discovery_timeout

<01:14:07.228482> <BT><GAP><N>linuxbt_gap_discovery_state_changed_cb@892  state: 0

<01:14:07.228757> <BT><GAP><N>bt_mw_gap_msg_handle@811 bluetooth gap msg handle , state
event

<01:14:07.228870> <BT><COM><N>bt_mw_gap_state_handle@690 +++ Enter +++

<01:14:07.228966> <BT><GAP><N>bt_mw_gap_state_handle@783 report inquiry state 0

<01:14:07.229128> <BT><COM><N>bt_mw_gap_nty_state_handle@827 +++ Enter +++

<BT_AUD> GAP event cb, btEvent.state = 109.

<BT_AUD> BLUETOOTH itselfMsg come, ptBtMsg->mUi4MsgType is : 1.

<BT_AUD> Bluetooth profile(GAP) msg come.

<BT_AUD> GAP_STATE_DISCOVERY_STOPED.

<BT_AUD> INQUIRY_END----send notification to ASSISTANT_STUB

<01:14:07.230233> <BT><COM><N>c_btm_get_local_dev_info@71 +++ Enter +++

<01:14:07.230345> <BT><GAP><N>bt_mw_get_local_dev_info@901
addr:58:C0:7F:22:08:00,name:MT8516(08:00),power state:ON

Func:x_mtkapi_bt_gap_get_local_dev_info Line:312--->: c_btm_get_local_dev_info success


<BT_AUD>  ====ASSISTANT_STUB=====psDevInfo.name : MT8516(08:00)

<BT_AUD> device addr length should be 17 !!

<BT_AUD>  ====ASSISTANT_STUB=====btStatusChange.bt_paired_name :

<BT_AUD>  ====ASSISTANT_STUB=====btStatusChange.bt_paired_mac :

<BT_AUD>  ====ASSISTANT_STUB=====btStatusChange.role : 1

<BT_AUD> bluetoothAppProcessMsg done.

<ASSISTANT_STUB_APP> assistantStubAppProcessMsg 1302 line begin

<ASSISTANT_STUB_APP> E_appMsg_TYPE_ASSISTANT_STUB

<ASSISTANT_STUB_APP> MSG_FROM_BT

<ASSISTANT_STUB_APP> assistantStubJsonHandleBtMsg 1143 line begin

<ASSISTANT_STUB_APP> assistantStubJsonHandleBluetoothStatusChange 663 line begin

<ASSISTANT_STUB_APP> command is /system/bluetooth_status_change

<ASSISTANT_STUB_APP> status is -1741192147

<ASSISTANT_STUB_APP> name is MT8516(08:00)

<ASSISTANT_STUB_APP> bt_paired_name is

<ASSISTANT_STUB_APP> bt_paired_mac is

<ASSISTANT_STUB_APP> role is 1

<ASSISTANT_STUB_APP> send msg is {
  "command":    "/system/bluetooth_status_change",
  "params":{
       "status":"inquiry_end",
       "name":  "MT8516(08:00)",
       "bt_paired_name":  "",
       "bt_paired_mac":   "",
       "role":  1
```

```
    }
}
<ASSISTANT_STUB_APP>enter hubSend = ctx->client_sockfd = 14
<ASSISTANT_STUB_APP> cmd send fail! errno=2
<ASSISTANT_STUB_APP> assistantStubJsonHandleBluetoothStatusChange 714 line end
<ASSISTANT_STUB_APP> assistantStubJsonHandleBtMsg 1183 line end
<ASSISTANT_STUB_APP> assistantStubAppProcessMsg 1429 line end


[Help]
exec:                   execute linux command
app:                    Application
mw:                     Middleware
setbaudrate(setbr):     Set uart baudrate

Command>app.bt.btmac


<BT_AUD> <BT_CLI> bluetoothCliGetBtMacAddr.
<01:15:47.727973> <BT><COM><N>c_btm_get_local_dev_info@71 +++ Enter +++
<01:15:47.728162> <BT><GAP><N>bt_mw_get_local_dev_info@901
addr:58:C0:7F:22:08:00,name:MT8516(08:00),power state:ON
Func:x_mtkapi_bt_gap_get_local_dev_info Line:312--->: c_btm_get_local_dev_info success


<BT_AUD> <BT_CLI> BT MAC : 58:C0:7F:22:08:00 .
```

- Pairing is initiated by Android device

On SB52 side

1. `# app_cli`
2. `command>app.bt.btpair`

On Android device side

3. Turn on BT and find “MT8516(xxx)” then pair it, the paring should be success.

- Pairing is initiated by SB52 side

On Android device

1. Turn on BT

On SB52 side

2. `# app_cli`
3. `command>app.bt.btscan`

(Check the **btaddr** of remote device from scan result)

4. `command>app.bt.pair 04:92:26:76:F2:2B 0`

(Format of command: `app.bt.pair <btaddr of remote device> <transport, 0:edr/br | 1:ble >`)

On Android device

5. Accept the pairing request then the pairing should be success.

6 Camera

Main(Rear) Camera: /dev/video**3**, which is connected to CAMERA1 connector.

Sub(Front) Camera:/dev/video**5**, which is connected to CAMERA2 connector

- Camera Capture (If you want to interrupt the capture, press **CTRL+C** to exit)

```
# gst-launch-1.0 -v v4l2src device="/dev/video3" io-mode=mmap ! video/x-raw, format=YUY2,
width=1280, height=720 ! jpegenc ! multifilesink location="/data/jj%d.jpg"


(gst-plugin-scanner:6708): GLib-GObject-WARNING **: 19:39:38.459: cannot register existing
type 'GstWlShmAllocator'


(gst-plugin-scanner:6708): GLib-CRITICAL **: 19:39:38.460: g_once_init_leave: assertion
'result != 0' failed


(gst-plugin-scanner:6708): GLib-GObject-CRITICAL **: 19:39:38.460:
g_object_new_with_properties: assertion 'G_TYPE_IS_OBJECT (object_type)' failed


(gst-plugin-scanner:6708): GStreamer-CRITICAL **: 19:39:38.460: gst_allocator_register:
assertion 'allocator != NULL' failed


(gst-plugin-scanner:6708): GLib-GObject-WARNING **: 19:39:38.460: cannot register existing
type 'GstWaylandVideo'


(gst-plugin-scanner:6708): GLib-GObject-CRITICAL **: 19:39:38.460:
g_type_interface_add_prerequisite: assertion 'G_TYPE_IS_INTERFACE (interface_type)' failed


(gst-plugin-scanner:6708): GLib-CRITICAL **: 19:39:38.460: g_once_init_leave: assertion
'result != 0' failed


(gst-plugin-scanner:6708): GLib-GObject-CRITICAL **: 19:39:38.460:
g_type_add_interface_static: assertion 'g_type_parent (interface_type) == G_TYPE_INTERFACE'
failed
Setting pipeline to PAUSED ...
Pipeline is live and does not need PREROLL ...
Setting pipeline to PLAYING ...
New clock: GstSystemClock
/GstPipeline:pipeline0/GstV4l2Src:v4l2src0.GstPad:src: caps = video/x-raw,
format=(string)YUY2, width=(int)1280, height=(int)720, framerate=(fraction)30/1,
colorimetry=(string)bt709, interlace-mode=(string)progressive
/GstPipeline:pipeline0/GstCapsFilter:capsfilter0.GstPad:src: caps = video/x-raw,
format=(string)YUY2, width=(int)1280, height=(int)720, framerate=(fraction)30/1,
colorimetry=(string)bt709, interlace-mode=(string)progressive
/GstPipeline:pipeline0/GstJpegEnc:jpegenc0.GstPad:sink: caps = video/x-raw,
format=(string)YUY2, width=(int)1280, height=(int)720, framerate=(fraction)30/1,
colorimetry=(string)bt709, interlace-mode=(string)progressive
```

```
/GstPipeline:pipeline0/GstCapsFilter:capsfilter0.GstPad:sink: caps = video/x-raw,
format=(string)YUY2, width=(int)1280, height=(int)720, framerate=(fraction)30/1,
colorimetry=(string)bt709, interlace-mode=(string)progressive

/GstPipeline:pipeline0/GstJpegEnc:jpegenc0.GstPad:src: caps = image/jpeg, sof-marker=(int)0,
width=(int)1280, height=(int)720, pixel-aspect-ratio=(fraction)1/1,
framerate=(fraction)30/1, interlace-mode=(string)progressive, colorimetry=(string)bt709

/GstPipeline:pipeline0/GstMultiFileSink:multifilesink0.GstPad:sink: caps = image/jpeg, sof-
marker=(int)0, width=(int)1280, height=(int)720, pixel-aspect-ratio=(fraction)1/1,
framerate=(fraction)30/1, interlace-mode=(string)progressive, colorimetry=(string)bt709

^Chandling interrupt.

Interrupt: Stopping pipeline ...

Execution ended after 0:00:03.585872615

Setting pipeline to PAUSED ...

Setting pipeline to READY ...

Setting pipeline to NULL ...

Freeing pipeline ...
```

- Camera Video Record

The following command records a 10secs video. To increase or decrease the length of video, just change the value of `num-buffers`, for example, recording a 20 secs video, please specify `num-buffers=600` in the command.

```
# gst-launch-1.0 v4l2src device=/dev/video3 io-mode=dmabuf num-buffers=300 ! video/x-
raw,format=YUY2, width=1280, height=720 ! v4l2video2convert capture-io-mode=dmabuf output-
io-mode=dmabuf-import ! video/x-raw,format=NV12, width=1280, height=720 ! v4l2h264enc
output-io-mode=dmabuf-import ! avimux ! filesink location=/data/h264_720p.avi

(gst-plugin-scanner:1305): GLib-GObject-WARNING **: 19:31:49.188: cannot register existing
type 'GstWlShmAllocator'


(gst-plugin-scanner:1305): GLib-CRITICAL **: 19:31:49.189: g_once_init_leave: assertion
'result != 0' failed


(gst-plugin-scanner:1305): GLib-GObject-CRITICAL **: 19:31:49.189:
g_object_new_with_properties: assertion 'G_TYPE_IS_OBJECT (object_type)' failed


(gst-plugin-scanner:1305): GStreamer-CRITICAL **: 19:31:49.189: gst_allocator_register:
assertion 'allocator != NULL' failed


(gst-plugin-scanner:1305): GLib-GObject-WARNING **: 19:31:49.189: cannot register existing
type 'GstWaylandVideo'


(gst-plugin-scanner:1305): GLib-GObject-CRITICAL **: 19:31:49.189:
g_type_interface_add_prerequisite: assertion 'G_TYPE_IS_INTERFACE (interface_type)' failed


(gst-plugin-scanner:1305): GLib-CRITICAL **: 19:31:49.189: g_once_init_leave: assertion
'result != 0' failed


(gst-plugin-scanner:1305): GLib-GObject-CRITICAL **: 19:31:49.189:
g_type_add_interface_static: assertion 'g_type_parent (interface_type) == G_TYPE_INTERFACE'
failed

Setting pipeline to PAUSED ...

Pipeline is live and does not need PREROLL ...
```

```
Setting pipeline to PLAYING ...
New clock: GstSystemClock
Redistribute latency...
Got EOS from element "pipeline0".
Execution ended after 0:00:10.738401308
Setting pipeline to PAUSED ...
Setting pipeline to READY ...
Setting pipeline to NULL ...
Freeing pipeline ...
```

7 Ethernet

Because Ethernet function is accomplished by an Axis USB to Ethernet bridge IC, so it is necessary to switch the only one USB from device mode to host mode to testing Ethernet, and meanwhile the adb over USB is not available.

When USB is in host mode, the commands could be issued via one of following interfaces.

1. UART0(recommend to disable logs so that your commands or the response of commands are not messy with logs)
2. WIFI if adb over tcpip is enabled.

- Disable UART log via adb

```
sh-3.2# echo 1 > /sys/module/printk/disable_uart
or
sh-3.2# echo 0 > /proc/mtprintk
```

- Switch to USB host mode

```
sh-3.2# yprop set usbhostmode 1
sh-3.2# usbhostmode.sh
<adb connection over USB is terminated now>
Or
root@sb52:~# yprop set usbhostmode 1
root@sb52:~# usbhostmode.sh
```

- Disable UART log via UART console(if logs are not disabled yet)

```
root@sb52:~# echo 1 > /sys/module/printk/disable_uart
or
root@sb52:~# echo 0 > /proc/mtprintk
```

- Query Ethernet Current Status:

```
root@sb52:~# ifconfig eth0
```

```
root@sb52:~# yprop set usbhostmode 1
root@sb52:~# usbhostmode.sh
Enable USB host mode
root@sb52:~# mount: /proc/bus/usb: mount point does not exist.

root@sb52:~# ifconfig eth0
eth0      Link encap:Ethernet  HWaddr 00:0E:C6:87:72:01
          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)

root@sb52:~#
```

- Activate the interface eth0

```
root@sb52:~# ifconfig eth0 up
```

```
root@sb52:~# ifconfig eth0 up
root@sb52:~# <DM>dm broadcast network connect msg
<BLE_MESH> <BT_HFP> bluetoothHfpAppProcessMsg, msgtype=65539.
<BT_AUD> AMB_BROADCAST msg come.
bleMeshAppProcessMsg, msgtype=65539.
<BT_HFP> AMB_BROADCAST msg come.
<BT_AUD> bluetoothAppProcessMsg done.
<BLE_MESH> <BT_HFP> bluetoothHfpAppProcessMsg done.
<user_interface>am broadcast message
AMB_BROADCAST msg come.
<BLE_MESH> bleMeshAppProcessMsg done.
<ASSISTANT_STUB_APP> assistantStubAppProcessMsg 1302 line begin
<MISC> miscAppProcessMsg 137 line begin
<WIFI_SETTING> wifiProcessMsg 330 line begin
<ASSISTANT_STUB_APP> assistantStubAppProcessMsg 1429 line end
<MISC>other AM broadcast message
<MISC> miscAppProcessMsg 205 line end
<WIFI_SETTING> wifiProcessMsg 421 line end
<ACFG>[acfgAppProcessMsgFct:624]:ACFG get msg, type=65539.
<LED_MANAGER> ledManagerAppProcessMsg 83 line begin
<LED_MANAGER> msg ui4Type = 65539, ui4_led_class = 1
<MISC>other AM broadcast message
<LED_MANAGER> ledManagerAppProcessMsg 148 line end
```

- Set Ethernet IP address via DHCP

```
root@sb52:~# dhcpc.script start eth0
```

```
root@sb52:~# dhcpc.script start eth0
[/sbin/dhcpc.script] all params: start eth0
[Starting] dhcp client on interface eth0 ... <dhcpc script>Cleaing up remaining udhcpc process i
n the system.
<dhcpc script>kill udhcpc pid : 896
<dhcpc script>Invoke new udhcpc process.
<dhcpc script>/sbin/udhcpc -i eth0 -s /usr/share/udhcpc/mtkdhcp.script -p /tmp/udhcpc-eth0.pid -
n -t 20 -T 2... udhcpc: started, v1.29.3
udhcpc: sending discover
udhcpc: sending select for 192.168.19.44
udhcpc: lease of 192.168.19.44 obtained, lease time 86400
deleting routers
route: SIOCDELRT: No such process
cat: /etc/resolv.conf: No such file or directory
adding dns  192.168.16.202
nameserver 192.168.16.202
 OK
```

- Test Ethernet Connection

```
ping 8.8.8.8 and www.google.com
```

```
root@sb52:~# ping -c 4 8.8.8.8
PING 8.8.8.8 (8.8.8.8): 56 data bytes
64 bytes from 8.8.8.8: seq=0 ttl=54 time=5.836 ms
64 bytes from 8.8.8.8: seq=1 ttl=52 time=6.404 ms
64 bytes from 8.8.8.8: seq=2 ttl=54 time=9.956 ms
64 bytes from 8.8.8.8: seq=3 ttl=52 time=9.673 ms

--- 8.8.8.8 ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max = 5.836/7.967/9.956 ms
root@sb52:~# ping -c 4 www.google.com
PING www.google.com (172.217.160.68): 56 data bytes
64 bytes from 172.217.160.68: seq=0 ttl=55 time=6.958 ms
64 bytes from 172.217.160.68: seq=1 ttl=55 time=8.475 ms
64 bytes from 172.217.160.68: seq=2 ttl=55 time=5.657 ms
64 bytes from 172.217.160.68: seq=3 ttl=55 time=6.311 ms

--- www.google.com ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max = 5.657/6.850/8.475 ms
root@sb52:~#
```

- Deactivate the interface eth0

```
root@sb52:~# ifconfig eth0 down
```

- Switch to USB device mode

```
root@sb52:~# yprop set usbhostmode 0
root@sb52:~# usbhostmode.sh
```

<Please plug-out then plug-in USB cable to make adb over USB work>

8 Keys

Monitor input events by **evtest** utility

```
sh-3.2# evtest
No device specified, trying to scan all of /dev/input/event*
Available devices:
/dev/input/event0:      ACCDET
/dev/input/event1:      mtk-kpd
Select the device event number [0-1]: 1
Input driver version is 1.0.1
Input device ID: bus 0x19 vendor 0x2454 product 0x6500 version 0x10
Input device name: "mtk-kpd"
Supported events:
  Event type 0 (EV_SYN)
  Event type 1 (EV_KEY)
    Event code 102 (KEY_HOME)
    Event code 114 (KEY_VOLUMEDOWN)
    Event code 115 (KEY_VOLUMEUP)
    Event code 116 (KEY_POWER)
    Event code 139 (KEY_MENU)
    Event code 158 (KEY_BACK)
Properties:
Testing ... (interrupt to exit)
Event: time 1586608871.761883, type 1 (EV_KEY), code 116 (KEY_POWER), value 1
Event: time 1586608871.761883, ---------- SYN_REPORT ------------
Event: time 1586608871.901495, type 1 (EV_KEY), code 116 (KEY_POWER), value 0
Event: time 1586608871.901495, ---------- SYN_REPORT ------------
Event: time 1586608872.754514, type 1 (EV_KEY), code 114 (KEY_VOLUMEDOWN), value 1
Event: time 1586608872.754514, ---------- SYN_REPORT ------------
Event: time 1586608873.040536, type 1 (EV_KEY), code 114 (KEY_VOLUMEDOWN), value 0
Event: time 1586608873.040536, ---------- SYN_REPORT ------------
Event: time 1586608873.823629, type 1 (EV_KEY), code 115 (KEY_VOLUMEUP), value 1
Event: time 1586608873.823629, ---------- SYN_REPORT ------------
Event: time 1586608874.009674, type 1 (EV_KEY), code 115 (KEY_VOLUMEUP), value 0
Event: time 1586608874.009674, ---------- SYN_REPORT ------------
Event: time 1586608874.727813, type 1 (EV_KEY), code 102 (KEY_HOME), value 1
Event: time 1586608874.727813, ---------- SYN_REPORT ------------
Event: time 1586608874.928226, type 1 (EV_KEY), code 102 (KEY_HOME), value 0
Event: time 1586608874.928226, ---------- SYN_REPORT ------------
Event: time 1586608875.651022, type 1 (EV_KEY), code 158 (KEY_BACK), value 1
Event: time 1586608875.651022, ---------- SYN_REPORT ------------
Event: time 1586608875.814498, type 1 (EV_KEY), code 158 (KEY_BACK), value 0
Event: time 1586608875.814498, ---------- SYN_REPORT ------------
Event: time 1586608876.604870, type 1 (EV_KEY), code 139 (KEY_MENU), value 1
Event: time 1586608876.604870, ---------- SYN_REPORT ------------
Event: time 1586608876.732429, type 1 (EV_KEY), code 139 (KEY_MENU), value 0
Event: time 1586608876.732429, ---------- SYN_REPORT ------------
```

9 SPI

Short pin 19(MOSI) and 21(MISO) of J2301 connector on SB52 carrier board, and perform the loopback test with **spidev_test** utility

```
sh-3.2# spidev_test -D /dev/spidev32766.0 -s 26000000 -v -I 1

spi mode: 0x0

bits per word: 8

max speed: 26000000 Hz (26000 KHz)

TX | FF FF FF FF FF FF 40 00 00 00 00 95 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF F0 0D  |......@.......................|

RX | FF FF FF FF FF FF 40 00 00 00 00 95 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF F0 0D  |......@.......................|
```

10 RS232

- Loopback test

Loopback test Plug a RS232 loopback plug/connector to the RS232 DTE connector of SB52 and perform the test with **linux-serial-test** utility.

```
sh-3.2# linux-serial-test -c -o 1 -i 2 -e -p /dev/ttyS1 -b 115200"
```

```
Linux serial test app
Openning /dev/ttyS1 without tty line discipline
Error setting RS-232 mode: Inappropriate ioctl for device
Stopped transmitting.
Stopped receiving.
/dev/ttyS1: count for this session: rx=11791, tx=11791, rx err=0
/dev/ttyS1: TIOCGICOUNT: ret=0, rx=11791, tx=11791, frame = 0, overrun = 0, parity = 0, brk = 0, buf_overrun = 0
```

- PC ← → SB52

The **serialcheck** utility is available in http://git.breakpoint.cc/cgit/bigeasy/serialcheck.git/.

Before building **serialcheck** for PC side on Ubuntu, please apply patch **meta/meta-openembedded/meta-oe/recipes-devtools/serialcheck/serialcheck/0001-Open-serial-port-without-tty-line-discipline-involve.patch** in SB52 source code to support binary data transferring/receiving.

Generate 1048576 bytes binary for transmitting/receiving test and push to SB52.

```
$ dd if=/dev/urandom of=binary count=1 bs=1048576&&adb push binary /tmp/
```

Notice: The command on receiver side must be issued before transmitter side, this is to ensure the receiver side ready for receiving data.

- PC to SB52

SB52(receiver)

```
sh-3.2# serialcheck -h -b 115200 -d /dev/ttyS1 -m r -f /tmp/binary -l 3
Openning /dev/ttyS1 without tty line discipline
Needed 15887 reads 0 writes loops 3 / 3
cts: 0 dsr: 0 rng: 0 dcd: 0 rx: 3145728 tx: 0 frame 0 ovr 0 par: 0 brk: 0 buf_ovrr: 0
```

PC(transmitter)

```
$ ./serialcheck -h -b 115200 -d /dev/ttyUSB3 -m t -f ./binary -l 3
Openning /dev/ttyUSB3 without tty line discipline
Needed 0 reads 1 writes loops 3 / 3
HINT: the serial driver does not support TIOCGICOUNT
```

- PC to SB52

PC(receiver)

```
$ ./serialcheck -h -b 115200 -d /dev/ttyUSB3 -m r -f ./binary -l 3
Openning /dev/ttyUSB3 without tty line discipline
Needed 16381 reads 0 writes loops 3 / 3
HINT: the serial driver does not support TIOCGICOUNT
```

SB52(transmitter)

```
sh-3.2# serialcheck -h -b 115200 -d /dev/ttyS1 -m t -f /tmp/binary -l 3
Openning /dev/ttyS1 without tty line discipline
Needed 0 reads 1 writes loops 3 / 3
cts: 0 dsr: 0 rng: 0 dcd: 0 rx: 0 tx: 3145232 frame 0 ovr 0 par: 0 brk: 0 buf_ovrr: 0
```

11 Reference

SB52_Yocto_Linux_User_Guide