

IMX93 Yocto System Software User Guide

V1.0

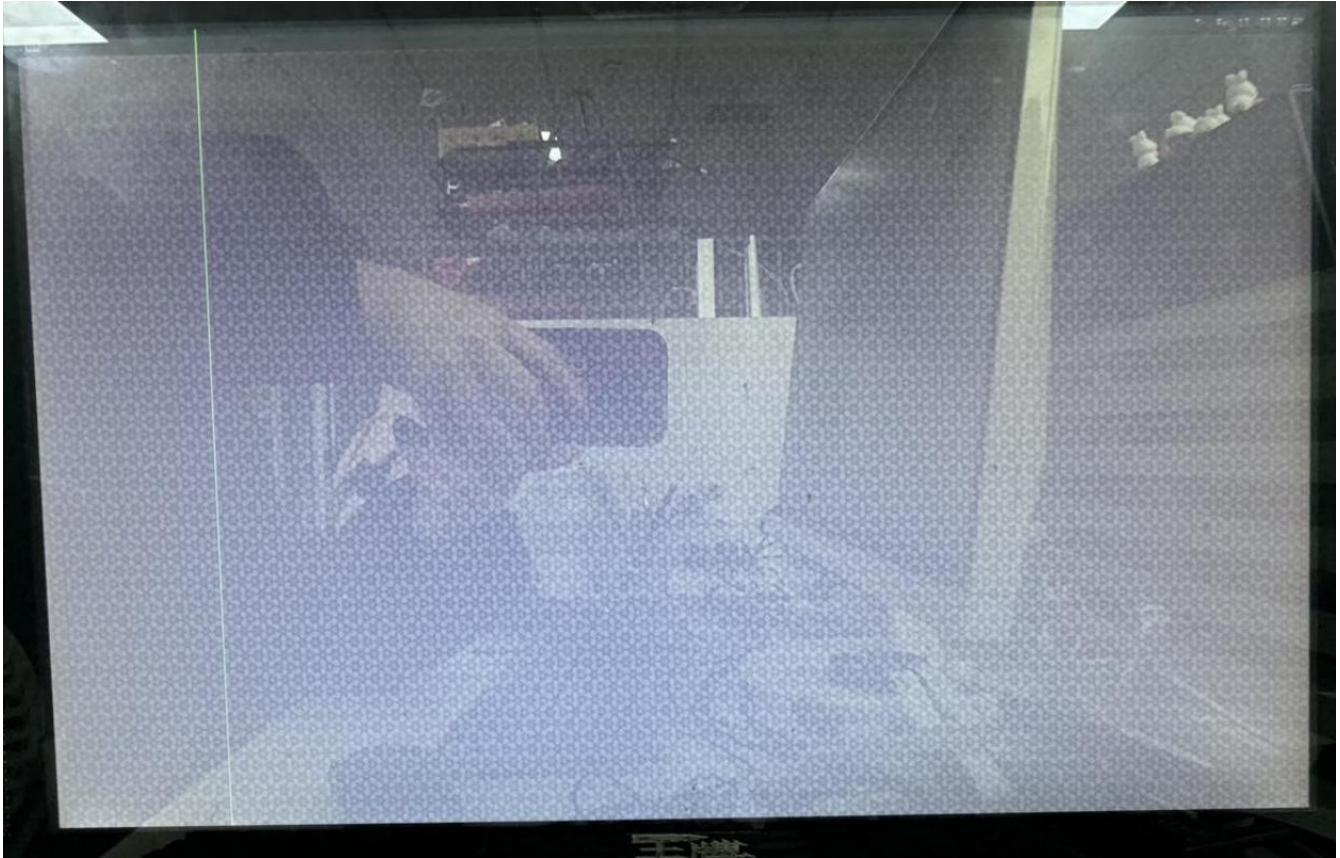
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Revision History:

Date	Version	Change Reason	Author	Note
2025/03/06	1.0	Initiation	YYT	

1.IMX93 Yocto System Overview

IMX93 currently supports the NXP i.MX Release Distro 6.6-scarthgap system

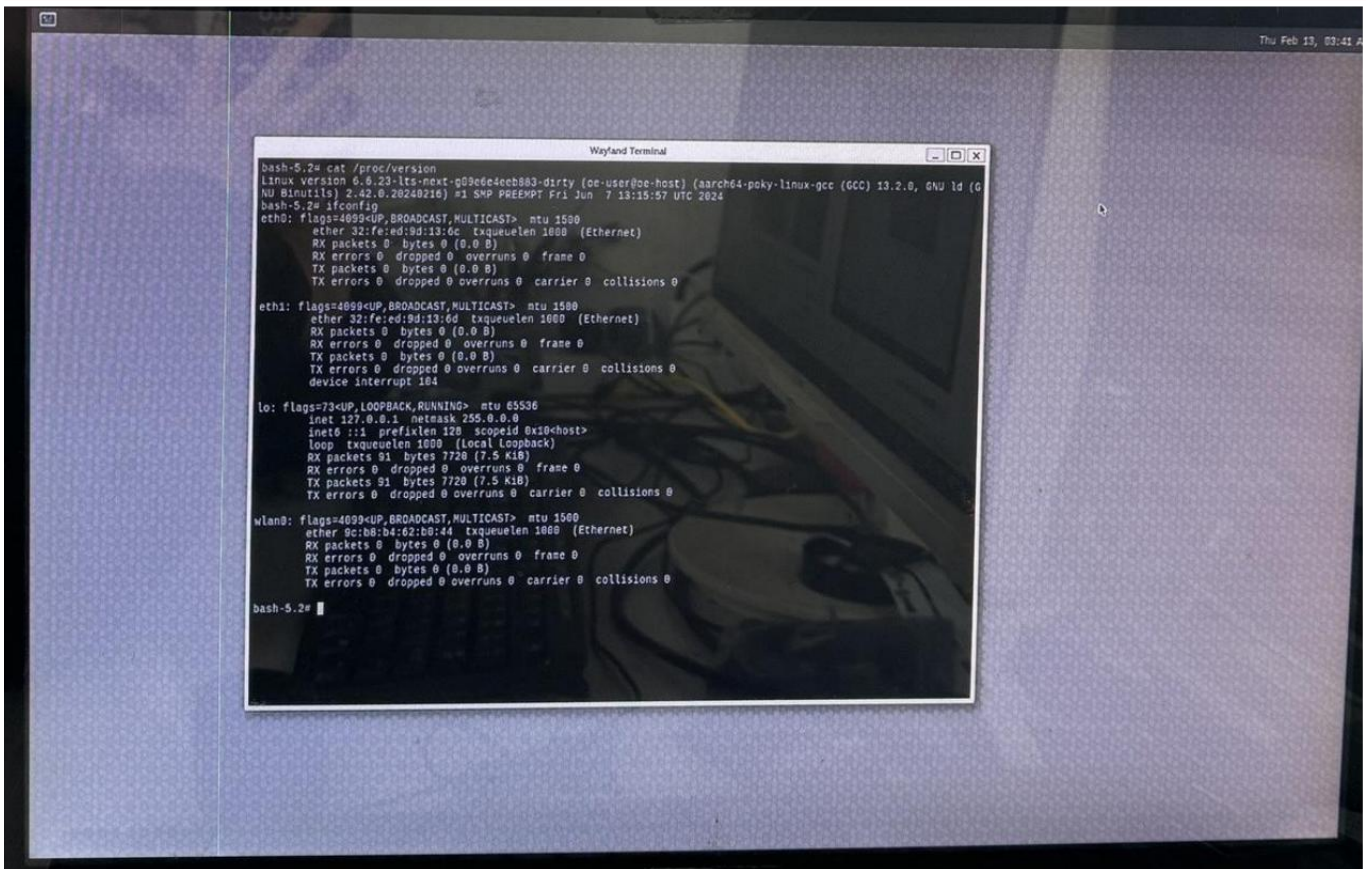


2.Features

2.1 How to Access the System

2.1.1 Interface Access

IMX93 Yocto supports HDMI OUT output display with a default resolution of 1920x1080. Connect HDMI OUT, power on, and wait for the system to boot. Once completed, connect a keyboard and mouse, then click the top-left icon to open the system's terminal application.



2.1.2 Remote Connection

Connect the PC and IMX93 to the same local area network, obtain the IP address, and use PuTTY to connect the PC to IMX93.

Login: root

The image shows a PuTTY terminal window titled "192.168.0.47 - PuTTY" with the following output:

```
login as: root
root@imx93evk:~# ifconfig
eth0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
    ether 32:fe:ed:9d:13:6c 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

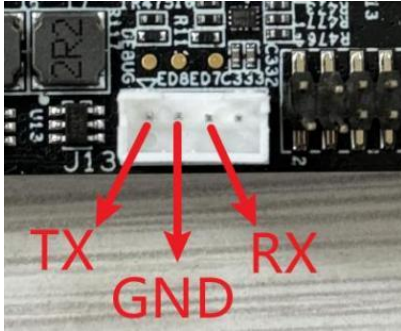
eth1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.0.47 netmask 255.255.255.0 broadcast 192.168.0.255
    inet6 fe80::4c14:d483:db04:e6c9 prefixlen 64 scopeid 0x20<link>
    ether 32:fe:ed:9d:13:6d txqueuelen 1000 (Ethernet)
    RX packets 61 bytes 9590 (9.3 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 61 bytes 13486 (13.1 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device interrupt 104

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 91 bytes 7720 (7.5 KiB)
```

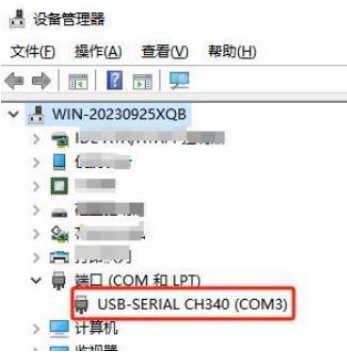
2.1.3 Serial Port Access

(1) Access the serial port via USB-to-UART. Connect the USB port to the computer and the other end to the DEBUG port on the board.

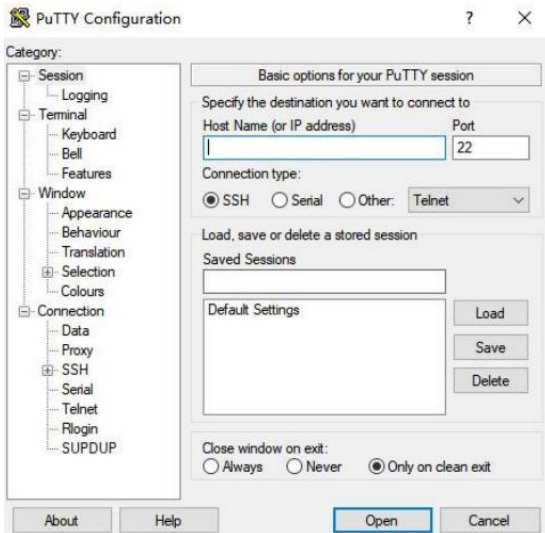
Note: Only connect TX, RX, and GND.



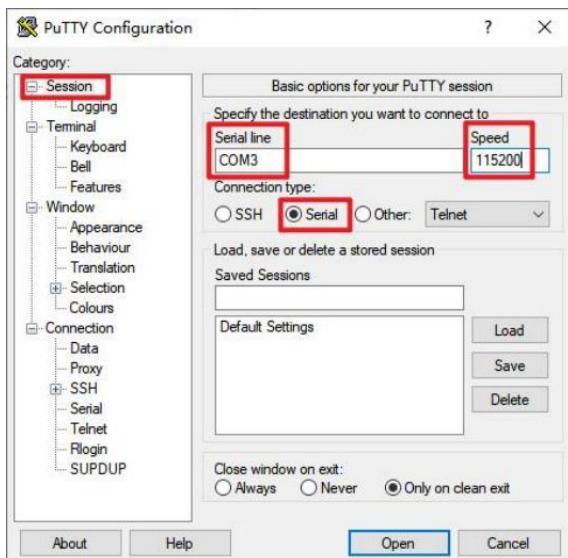
(2) In the PC's Device Manager, identify the port number of the USB-to-UART.



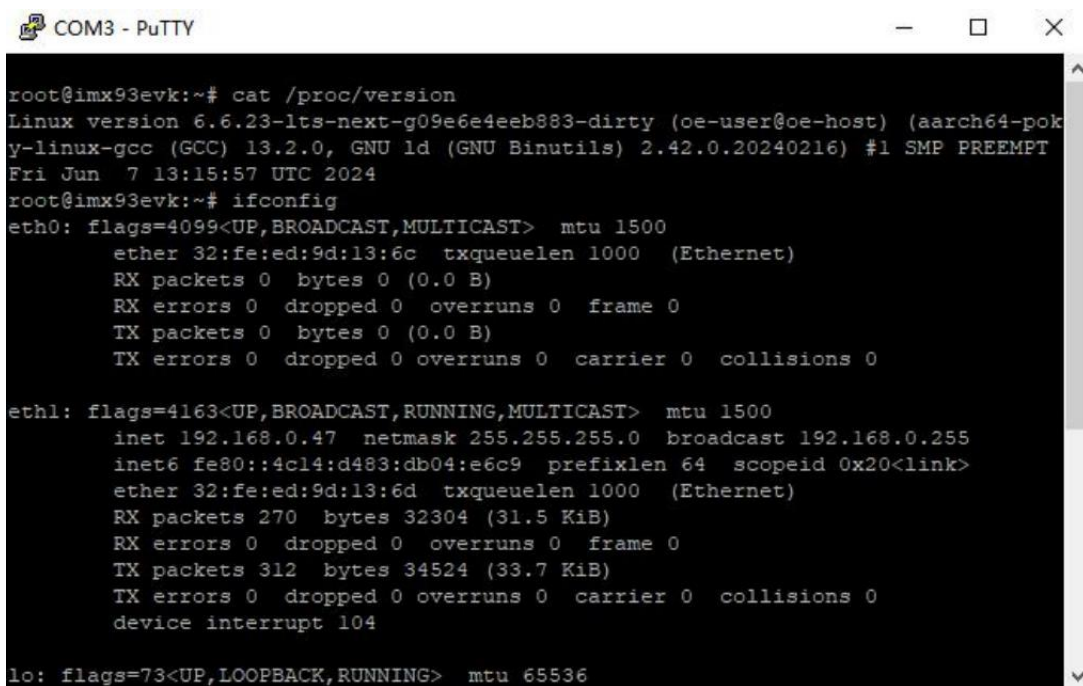
(3) Double-click to open the PuTTY serial port tool.



(4) Click "Session", select "serial" for the serial port, select the new COM port name (e.g., COMx) after the computer is connected to the UART, and set the corresponding serial baud rate.



(5) Click "Open" to start the tool.



2.2 Network Functions

2.2.1 WIFI

WiFi Connection: Execute the following commands to scan and connect to WiFi, check the acquired IP address, and verify normal network functionality by pinging Baidu.

```
nmcli dev wifi rescan // Scan for WiFi
```

```
nmcli dev wifi list // List scanned WiFi networks
```

```
nmcli dev wifi con ZTE-XYUSPs-5G password 12345678 // Connect to encrypted WiFi: ZTE-XYUSPs-5G with password 12345678
```

```
nmcli dev wifi con ZTE-XYUSPs // Connect to unencrypted WiFi: ZTE-XYUSPs
```

```
nmcli con show // View saved WiFi connections
```

```
nmcli con down ZTE-XYUSPs // Disconnect from the currently connected WiFi: ZTE-XYUSPs
```

```
nmcli con del ZTE-XYUSPs // Delete WiFi connection: ZTE-XYUSPs
```

```
ifconfig // View network interfaces
```

```

root@imx93evk:~# nmcli dev wifi rescan
root@imx93evk:~# nmcli dev wifi list
IN-USE BSSID SSID MODE CHAN RATE SIGNAL BARS S
SECURITY
2C:70:4F:64:04:49 ZTE-XYUSPs Infra 1 270 Mbit/s 100 ****
2E:70:4F:74:04:49 -- Infra 1 270 Mbit/s 97 ****
PAI WPA 2C:70:4F:64:04:4A ZTE-XYUSPs-5G Infra 36 405 Mbit/s 94 ****
PAI WPA 2E:70:4F:74:04:4A -- Infra 36 405 Mbit/s 94 ****
PAI WPA C4:17:0E:57:26:C4 HUAWEI-H10V21-5G Infra 161 270 Mbit/s 89 ****
C4:17:0E:57:26:C0 FRITZ!Box 6690 RR Infra 11 0 Mbit/s 84 ****
6C:B1:58:5E:20:F0 TP-LINK_5G_20EE Infra 161 540 Mbit/s 80 ***
72:B1:58:5E:20:F0 -- Infra 161 540 Mbit/s 80 ***
PAI WPA 6C:B1:58:5E:20:EE TP-LINK_20EE Infra 1 270 Mbit/s 79 ***
root@imx93evk:~# nmcli dev wifi con ZTE-XYUSPs-5G password 12345678
Device 'wlan0' successfully activated with '6de3a21c-51f3-4b15-8bd5-f35cb666d422'.
root@imx93evk:~# nmcli dev wifi con ZTE-XYUSPs
Device 'wlan0' successfully activated with '2b827992-7adc-4b0b-a731-f2c932e066fd'.
root@imx93evk:~# nmcli con show
NAME UUID TYPE DEVICE
Wired connection 2 b285b053-2abd-3fce-b828-d4b5ce5b5c3d ethernet eth1
ZTE-XYUSPs 2b827992-7adc-4b0b-a731-f2c932e066fd wifi wlan0
lo ad27f76c-d86b-473c-95b4-9fa42d31bbf0 loopback lo
Wired connection 1 af975b5c-faf3-34c2-bdad-846dc706444a ethernet --
ZTE-XYUSPs-5G 6de3a21c-51f3-4b15-8bd5-f35cb666d422 wifi --
root@imx93evk:~# nmcli con down ZTE-XYUSPs
Connection 'ZTE-XYUSPs' successfully deactivated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/4)
root@imx93evk:~# nmcli con del ZTE-XYUSPs
Connection 'ZTE-XYUSPs' (2b827992-7adc-4b0b-a731-f2c932e066fd) successfully deleted.
root@imx93evk:~# nmcli con show
NAME UUID TYPE DEVICE
Wired connection 2 b285b053-2abd-3fce-b828-d4b5ce5b5c3d ethernet eth1
ZTE-XYUSPs-5G 6de3a21c-51f3-4b15-8bd5-f35cb666d422 wifi wlan0
lo ad27f76c-d86b-473c-95b4-9fa42d31bbf0 loopback lo
Wired connection 1 af975b5c-faf3-34c2-bdad-846dc706444a ethernet --
root@imx93evk:~#

```

```
root@imx93evk:~# ifconfig
eth0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
    ether 32:fe:ed:9d:13:6c 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

eth1: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
    ether 32:fe:ed:9d:13:6d txqueuelen 1000 (Ethernet)
    RX packets 382 bytes 44370 (43.3 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 338 bytes 36465 (35.6 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device interrupt 104

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 91 bytes 7720 (7.5 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 91 bytes 7720 (7.5 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

wlan0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.0.49 netmask 255.255.255.0 broadcast 192.168.0.255
    inet6 fe80::9c82:cd94:b025:7bc prefixlen 64 scopeid 0x20<link>
    ether 9c:b8:b4:62:b0:44 txqueuelen 1000 (Ethernet)
    RX packets 40 bytes 9057 (8.8 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 87 bytes 11822 (11.5 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

root@imx93evk:~# ping www.baidu.com
PING www.baidu.com (36.152.44.132) 56(84) bytes of data:
64 bytes from 36.152.44.132: icmp_seq=1 ttl=50 time=13.5 ms
64 bytes from 36.152.44.132: icmp_seq=2 ttl=50 time=19.7 ms
64 bytes from 36.152.44.132: icmp_seq=3 ttl=50 time=19.9 ms
64 bytes from 36.152.44.132: icmp_seq=4 ttl=50 time=19.7 ms
64 bytes from 36.152.44.132: icmp_seq=5 ttl=50 time=19.7 ms
64 bytes from 36.152.44.132: icmp_seq=6 ttl=50 time=19.4 ms
64 bytes from 36.152.44.132: icmp_seq=7 ttl=50 time=20.1 ms
```

2.2.2 Bluetooth

Prerequisite: After each system restart, execute the following command to manually enable the Bluetooth interface.

```
hciconfig // View Bluetooth interfaces
```

```
hciconfig hci0 up // Enable Bluetooth interface hci0
```

```
root@imx93evk:~#
root@imx93evk:~# hciconfig
hci0: Type: Primary Bus: UART
    BD Address: F6:EA:BF:50:40:1F ACL MTU: 1021:8 SCO MTU: 64:1
    DOWN
    RX bytes:749 acl:0 sco:0 events:43 errors:0
    TX bytes:467 acl:0 sco:0 commands:43 errors:0

root@imx93evk:~# hciconfig hci0 up
root@imx93evk:~# hciconfig
hci0: Type: Primary Bus: UART
    BD Address: F6:EA:BF:50:40:1F ACL MTU: 1021:8 SCO MTU: 64:1
    UP RUNNING
    RX bytes:1569 acl:0 sco:0 events:96 errors:0
    TX bytes:1288 acl:0 sco:0 commands:96 errors:0

root@imx93evk:~#
```

Connecting Bluetooth: Execute the following commands to pair and connect Bluetooth devices.

```
bluetoothctl // Enter Bluetooth mode
```

```
power on
```

```
agent on
```

```
default-agent
```

```
scan on
```

```
pair F4:F5:DB:72:B8:17 // Pair with Bluetooth device: F4:F5:DB:72:B8:17
```

```
connect F4:F5:DB:72:B8:17 // Connect to Bluetooth device: F4:F5:DB:72:B8:17
```

```
exit // Exit Bluetooth mode
```

```
root@imx93evk:~# bluetoothctl
hci0 new_settings: powered bondable ssp br/edr le secure-conn
Agent registered
[CHG] Controller F6:EA:BF:50:40:1F Pairable: yes
[bluetooth]# power on
Changing power on succeeded
[bluetooth]# agent on
Agent is already registered
[bluetooth]# default-agent
Default agent request successful
[bluetooth]# scan on
SetDiscoveryFilter success
hci0 type 7 discovering on
Discovery started
[CHG] Controller F6:EA:BF:50:40:1F Discovering: yes
[NEW] Device 7B:D3:8B:97:B5:09 7B-D3-8B-97-B5-09
[NEW] Device F4:3C:3B:3A:E9:05 RTK_BT_4.1
[NEW] Device 09:01:01:02:1B:31 CMB590762-1B31
[NEW] Device 46:64:B3:53:6D:60 46-64-B3-53-6D-60
[NEW] Device 64:8A:82:CD:2B:3E 64-8A-82-CD-2B-3E
[NEW] Device 6C:6E:CC:A0:3D:C5 6C-6E-CC-A0-3D-C5
hci0 type 7 discovering off
hci0 type 7 discovering on
[CHG] Device 7B:D3:8B:97:B5:09 ManufacturerData.Key: 0x004c (76)
[CHG] Device 7B:D3:8B:97:B5:09 ManufacturerData.Value:
 10 07 26 1f 8d 8e 18 ee 78 ..&.....x
```

```

[bluetooth]# pair F4:F5:DB:72:B8:17
Attempting to pair with F4:F5:DB:72:B8:17
hci0 device_flags_changed: F4:F5:DB:72:B8:17 (BR/EDR)
  supp: 0x00000000 curr: 0x00000000
hci0 type 7 discovering off
hci0 F4:F5:DB:72:B8:17 type BR/EDR connected eir_len 10
[CHG] Device F4:F5:DB:72:B8:17 Connected: yes
Request confirmation
[agent] Confirm passkey 372366 (yes/no): yes
hci0 new_link_key F4:F5:DB:72:B8:17 type 0x08 pin_len 0 store_hint 1
[CHG] Device F4:F5:DB:72:B8:17 Bonded: yes
[CHG] Device F4:F5:DB:72:B8:17 Modalias: bluetooth:v038Fp1200d1436
[CHG] Device F4:F5:DB:72:B8:17 UUIs: 00001105-0000-1000-8000-00805f9b34fb
[CHG] Device F4:F5:DB:72:B8:17 UUIs: 0000110a-0000-1000-8000-00805f9b34fb
[CHG] Device F4:F5:DB:72:B8:17 UUIs: 0000110c-0000-1000-8000-00805f9b34fb
[CHG] Device F4:F5:DB:72:B8:17 UUIs: 00001112-0000-1000-8000-00805f9b34fb
[CHG] Device F4:F5:DB:72:B8:17 UUIs: 00001115-0000-1000-8000-00805f9b34fb
[CHG] Device F4:F5:DB:72:B8:17 UUIs: 00001801-0000-1000-8000-00805f9b34fb
[CHG] Device F4:F5:DB:72:B8:17 ServicesResolved: yes
[CHG] Device F4:F5:DB:72:B8:17 Paired: yes
Pairing successful
hci0 F4:F5:DB:72:B8:17 type BR/EDR disconnected with reason 2
[CHG] Device F4:F5:DB:72:B8:17 ServicesResolved: no
[CHG] Device F4:F5:DB:72:B8:17 Connected: no
[bluetooth]# connect F4:F5:DB:72:B8:17
Attempting to connect to F4:F5:DB:72:B8:17
hci0 F4:F5:DB:72:B8:17 type BR/EDR connected eir_len 10
[CHG] Device F4:F5:DB:72:B8:17 Connected: yes
Connection successful
[CHG] Device F4:F5:DB:72:B8:17 ServicesResolved: yes
hci0 type 7 discovering on
[NEW] Device 52:96:0E:81:4E:B2 52-96-0E-81-4E-B2
[CHG] Device 7B:D3:8B:97:B5:09 RSSI: 0xfffffb4 (-76)
[abc]# exit
root@imx93evk:~#

```

2.2.3 Wired Connection

Wired Connection: Connect an Ethernet cable, check the acquired IP address, and verify normal network functionality by pinging Baidu.

ifconfig // View network interfaces

```

root@imx93evk:~# ifconfig
eth0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
  ether 02:22:0e:cd:71:79 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

eth1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
  inet 192.168.0.52 netmask 255.255.255.0 broadcast 192.168.0.255
  inet6 fe80::6ba1:c87f:3daa:cea0 prefixlen 64 scopeid 0x20<link>
  ether 02:22:0e:cd:71:7a txqueuelen 1000 (Ethernet)
  RX packets 7 bytes 1594 (1.5 KiB)
  RX errors 0 dropped 0 overruns 0 frame 0
  TX packets 28 bytes 4782 (4.6 KiB)
  TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
  device interrupt 104

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 10 bytes 1582 (1.5 KiB)
  RX errors 0 dropped 0 overruns 0 frame 0
  TX packets 10 bytes 1582 (1.5 KiB)
  TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

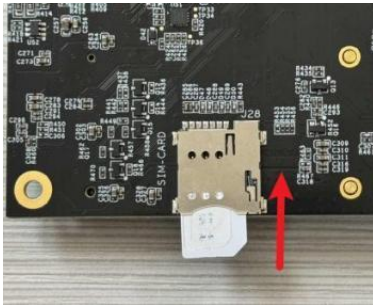
wlan0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
  ether 9c:b8:b4:62:b0:44 txqueuelen 1000 (Ethernet)
  RX packets 87 bytes 6104 (5.9 KiB)
  RX errors 0 dropped 0 overruns 0 frame 0
  TX packets 84 bytes 8326 (8.1 KiB)
  TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

root@imx93evk:~# ping www.baidu.com
PING www.baidu.com (36.152.44.132) 56(84) bytes of data:
64 bytes from 36.152.44.132: icmp_seq=1 ttl=50 time=12.6 ms
64 bytes from 36.152.44.132: icmp_seq=2 ttl=50 time=12.2 ms
64 bytes from 36.152.44.132: icmp_seq=3 ttl=50 time=12.2 ms
64 bytes from 36.152.44.132: icmp_seq=4 ttl=50 time=12.1 ms
64 bytes from 36.152.44.132: icmp_seq=5 ttl=50 time=11.6 ms

```

2.2.4 LTE Module

(1) Preparation: With the board powered off, connect the LTE 4G module (e.g., EC25) and the 4G antenna. Insert the SIM card (notch outward).



(2) Power on the board. Once the system boots, you can query the ppp0 interface and IP address. Verify normal network functionality by pinging Baidu

(3) ifconfig // View network interfaces

```

root@imx93evk:~#
root@imx93evk:~# ifconfig
eth0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
    ether ac:db:da:64:ac:15 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

eth1: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
    ether ac:db:da:64:ac:16 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 interrupt 104

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 10 bytes 1582 (1.5 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 10 bytes 1582 (1.5 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

ppp0: flags=4305<UP,POINTOPOINT,RUNNING,NOARP,MULTICAST> mtu 1500
    inet 100.109.210.235 netmask 255.255.255.255 destination 10.64.64.64
    ppp txqueuelen 3 (Point-to-Point Protocol)
    RX packets 29 bytes 2586 (2.5 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 50 bytes 2859 (2.7 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

wlan0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
    ether 9c:b8:b4:62:b0:38 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

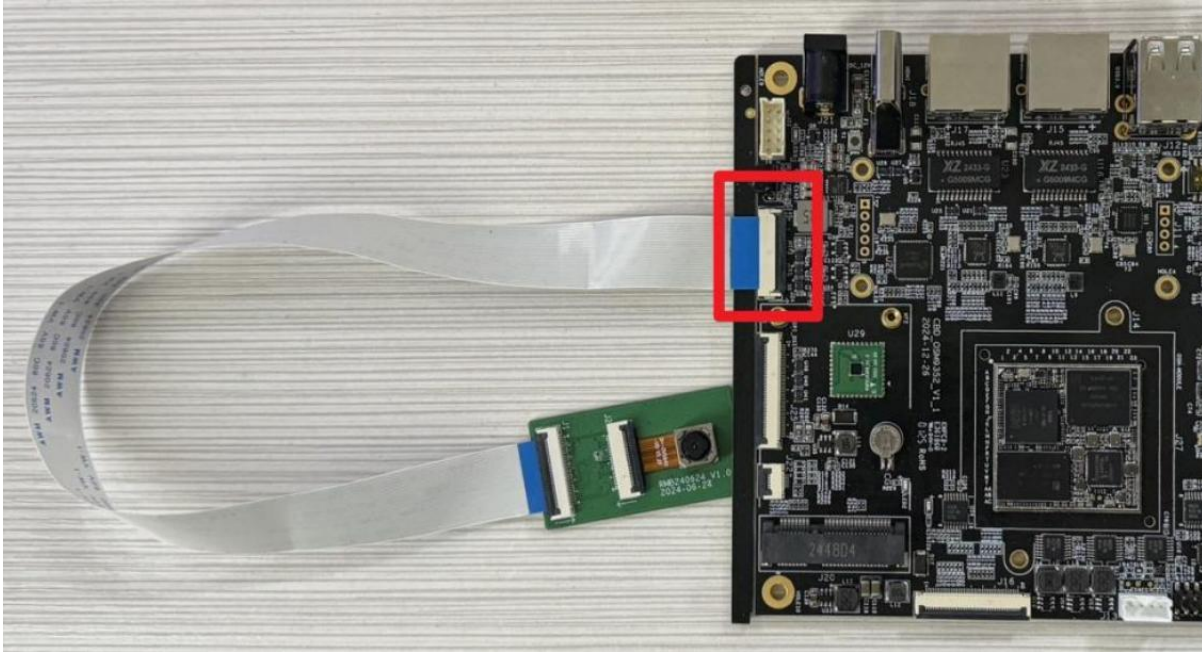
root@imx93evk:~# ping baidu.com
PING baidu.com (110.242.68.66) 56(84) bytes of data:
64 bytes from 110.242.68.66: icmp_seq=1 ttl=50 time=98.3 ms
64 bytes from 110.242.68.66: icmp_seq=2 ttl=50 time=62.4 ms
64 bytes from 110.242.68.66: icmp_seq=3 ttl=50 time=76.4 ms
64 bytes from 110.242.68.66: icmp_seq=4 ttl=50 time=74.0 ms
64 bytes from 110.242.68.66: icmp_seq=5 ttl=50 time=70.7 ms
64 bytes from 110.242.68.66: icmp_seq=6 ttl=50 time=70.8 ms
64 bytes from 110.242.68.66: icmp_seq=7 ttl=50 time=65.8 ms
64 bytes from 110.242.68.66: icmp_seq=8 ttl=50 time=66.8 ms

```

2.3 MIPI Camera

2.3.1 Hardware Preparation:

Connect the MIPI camera as shown in the diagram below.:



2.3.2 Testing Setups:

Execute the following commands to open the camera display.:

```
v4l2-ctl --list-devices // View camera devices
gst-launch-1.0 v4l2src device=/dev/video0 ! video/x-raw,width=1920,height=1080 ! autovideosink sync=false
// Open camera display
```

```
root@imx93evk:~# v4l2-ctl --list-devices
FSL Capture Media Device (platform:42800000.bus:camera):
  /dev/media0

mxm-isi-cap_v1 (platform:4ae40000.isi:cap_devic):
  /dev/video0

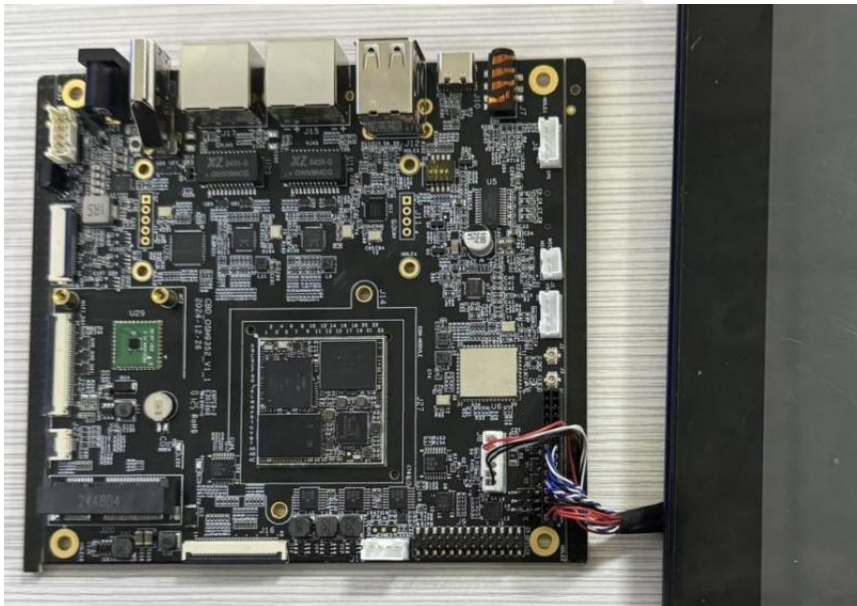
root@imx93evk:~# gst-launch-1.0 v4l2src device=/dev/video0 ! video/x-raw,width=1
! autovideosink sync=false
Setting pipeline to PAUSED ...
Pipeline is live and does not need PREROLL ...
Pipeline is PREROLLED ...
Setting pipeline to PLAYING ...
New clock: GstSystemClock
Redistribute latency...
00:20.4 / 99:99:99.
```



2.4 External Displays

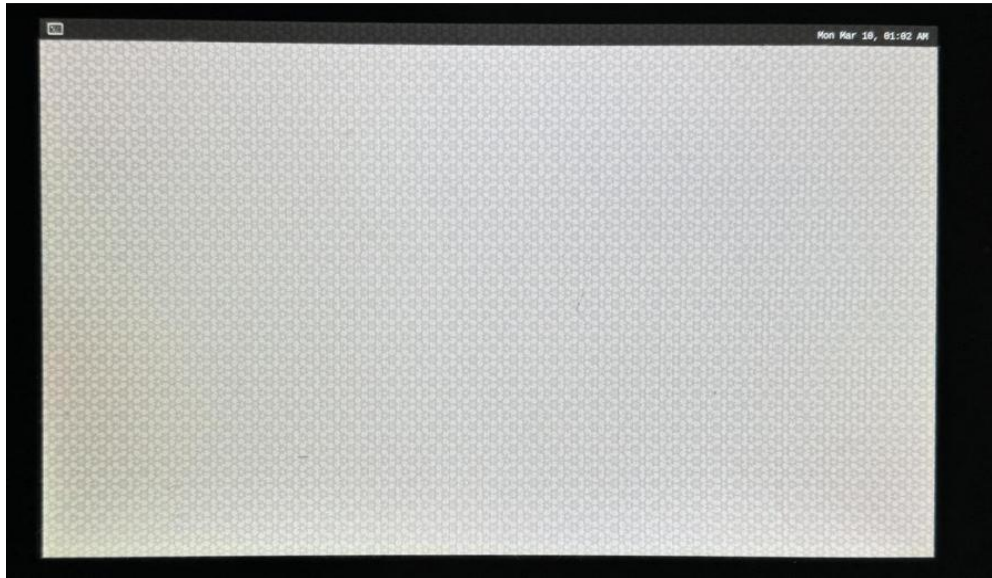
2.4.1 LVDS Screen (10.1 inches)

(1) Connect the board to the LVDS screen. Jump the hat on J6 to pin 6, as shown in the diagram below.:



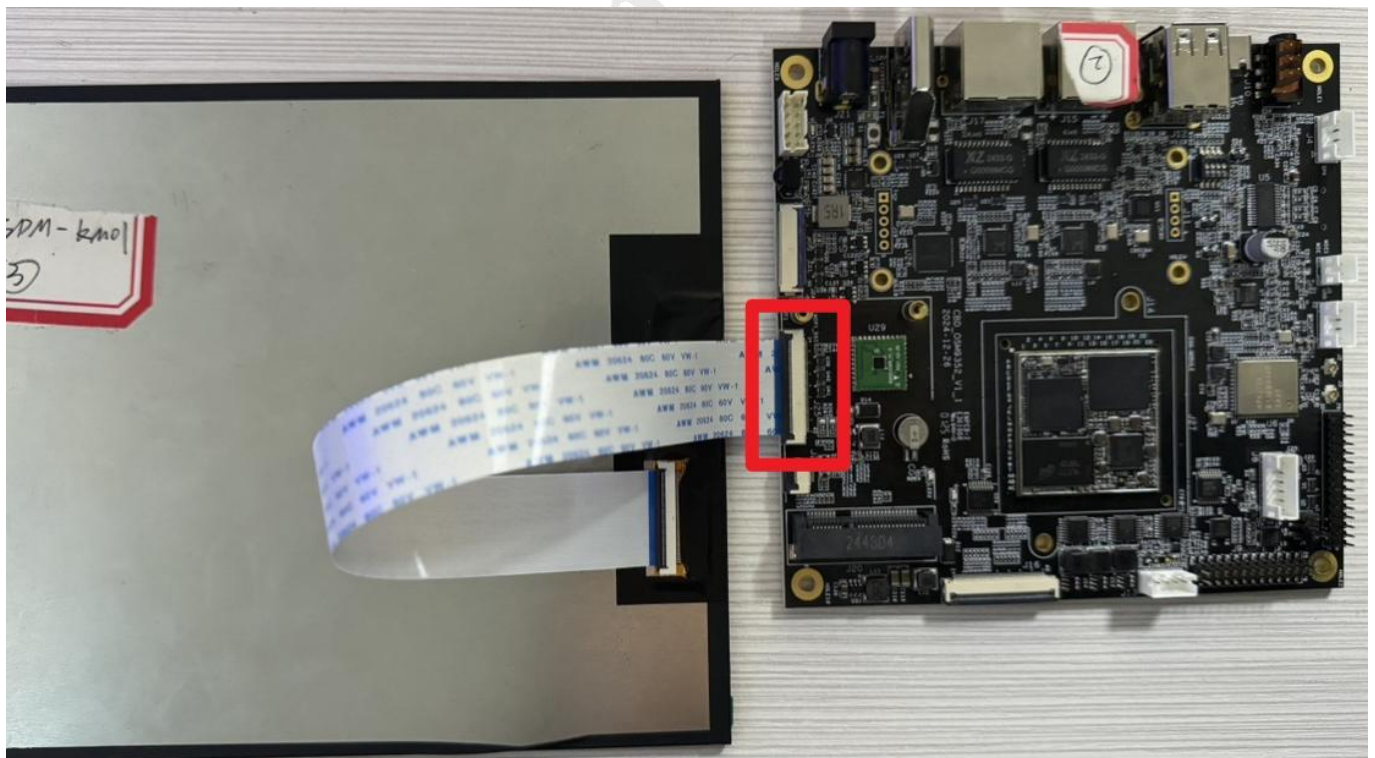
连接

```
u-boot>
u-boot=>
u-boot=> setenv fdtfile imx93-llx11-evk-boe-wxga-lvds-panel.dtb
u-boot=> saveenv
Saving Environment to MMC... Writing to MMC(0)... OK
u-boot=> run bootcmd
Working FDI set to 83000000
libfdt fdt_path_offset() returned FDT_ERR_NOTFOUND
libfdt fdt_path_offset() returned FDT_ERR_NOTFOUND
libfdt fdt_path_offset() returned FDT_ERR_NOTFOUND
libfdt fdt_path_offset() returned FDT_ERR_NOTFOUND
libfdt fdt_path_offset() returned FDT_ERR_NOTFOUND
libfdt fdt_path_offset() returned FDT_ERR_NOTFOUND
switch to partitions #0, OK
mmc0(part 0) is current device
```



2.4.2 MIPI Screen (10.1 inches)

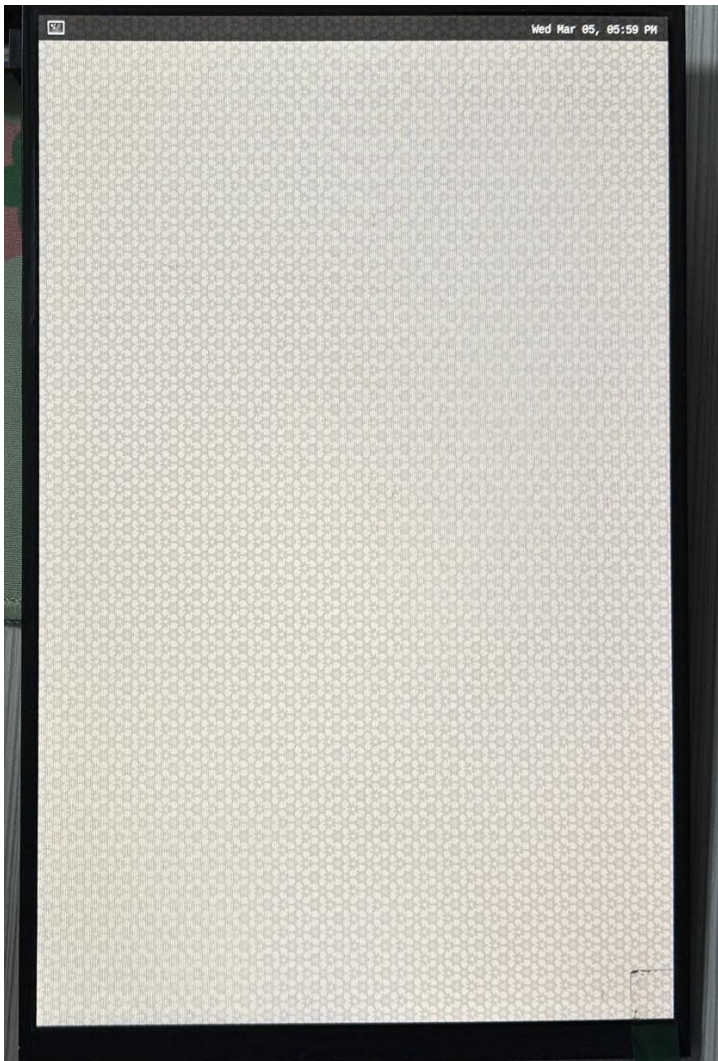
(1) Connect the board to the MIPI screen as shown in the diagram below.



(2) In Uboot mode, execute the following commands to switch to MIPI screen display. The MIPI interface will display normally.

Note: Press Enter or Ctrl+C during boot to enter Uboot mode.

```
u-boot>
u-boot>
u-boot> setenv fdtfile imx93-11x11-evk-rm67199.dtb
u-boot> saveenv
Saving Environment to MMC... Writing to MMC(0)... OK
u-boot> run bootcmd
Working FDT set to 83000000
libfdt fdt_path_offset() returned FDT_ERR_NOTFOUND
libfdt fdt_path_offset() returned FDT_ERR_NOTFOUND
libfdt fdt_path_offset() returned FDT_ERR_NOTFOUND
libfdt fdt_path_offset() returned FDT_ERR_NOTFOUND
libfdt fdt_path_offset() returned FDT_ERR_NOTFOUND
libfdt fdt_path_offset() returned FDT_ERR_NOTFOUND
switch to partitions #0, OK
mmc0(part 0) is current device
Scanning mmc 0:1...
71140 bytes read in 7 ms (9.7 MiB/s)
MMC: no card present
```



2.5 Audio Devices

2.5.1 Microphone (J5)

- (1) Connect the microphone to the board.
arecord -l // View audio input devices

```
root@imx93evk:~# arecord -l
**** List of CAPTURE Hardware Devices ****
card 0: rockchip8388c [rockchip,es8388-codec], device 0: 443b0000.sai-ES8388 HiFi ES8388 HiFi-0 [443b0000.sai-ES8388 HiFi ES8388 HiFi-0]
  Subdevices: 1/1
  Subdevice #0: subdevice #0
card 1: imxaudiocxvr [imx-audio-cxvr], device 0: XCVR PCM snd-soc-dummy-dai-0 [XCVR PCM snd-soc-dummy-dai-0]
  Subdevices: 1/1
  Subdevice #0: subdevice #0
root@imx93evk:~#
```

- (2) Record a WAV format audio file.
arecord -D hw:0,0 --period-size=1024 --buffer-size=4096 -r 44100 -c 2 -f s16_le r.wav

Note: If "es8388-codec" is found on card0 in step (1), then "hw:0,0" in step (2) has 0 as the first digit.

```
root@imx93evk:~# ls
101.wav 11.mp4
root@imx93evk:~# arecord -D hw:0,0 --period-size=1024 --buffer-size=4096 -r 44100 -c 2 -f s16_le r.wav
Warning: rate is not accurate (requested = 44100Hz, got = 48000Hz)
please, try the plug plugin
Recording WAVE 'r.wav' : Signed 16 bit Little Endian, Rate 48000 Hz, Stereo
^CAborted by signal Interrupt...
root@imx93evk:~#
root@imx93evk:~# ls -l
total 49388
-rwxr-xr-x 1 root root 50047532 May  2 03:09 101.wav
drwxr-xr-x 2 root root      4096 May  2 03:06 11.mp4
-rw-r--r-- 1 root root   516140 May  2 08:38 r.wav
root@imx93evk:~#
```

2.5.2 Headphones (J7)

(1) Connect the headphones to the board.

aplay -l // View audio output devices

arecord -l // View audio input devices

```
root@imx93evk:~# aplay -l
**** List of PLAYBACK Hardware Devices ****
card 0: rockchip-es8388c [rockchip,es8388-codec], device 0: 443b0000.sai-ES8388 HiFi ES8388 HiFi-0 [443b0000.sai-ES8388 HiFi ES8388 HiFi-0]
  Subdevices: 1/1
  Subdevice #0: subdevice #0
card 1: imxaudiocxvr [imx-audio-cxvr], device 0: XCVR PCM snd-soc-dummy-dai-0 [XCVR PCM snd-soc-dummy-dai-0]
  Subdevices: 1/1
  Subdevice #0: subdevice #0
root@imx93evk:~# arecord -l
**** List of CAPTURE Hardware Devices ****
card 0: rockchip-es8388c [rockchip,es8388-codec], device 0: 443b0000.sai-ES8388 HiFi ES8388 HiFi-0 [443b0000.sai-ES8388 HiFi ES8388 HiFi-0]
  Subdevices: 1/1
  Subdevice #0: subdevice #0
card 1: imxaudiocxvr [imx-audio-cxvr], device 0: XCVR PCM snd-soc-dummy-dai-0 [XCVR PCM snd-soc-dummy-dai-0]
  Subdevices: 1/1
  Subdevice #0: subdevice #0
root@imx93evk:~#
```

(2) Play and record audio.

Play an audio file: aplay -D hw:0,0 101.wav (only supports WAV format audio files).

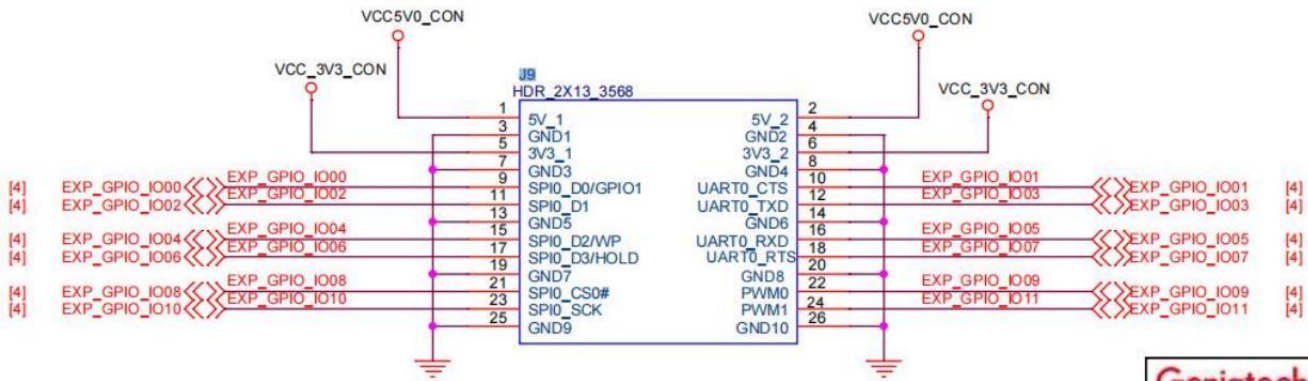
Record a WAV format audio file: arecord -D hw:0,0 --period-size=1024 --buffer-size=4096 -r 44100 -c 2 -f s16_le r.wav (only supports recording with standard headphones).

Note: If "es8388-codec" is found on card0 in step (1), then "hw:0,0" in step (2) has 0 as the first digit.

```
root@imx93evk:~# aplay -D hw:0,0 101.wav
Playing WAVE '101.wav' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
Warning: rate is not accurate (requested = 44100Hz, got = 48000Hz)
please, try the plug plugin
^CAborted by signal Interrupt...
root@imx93evk:~#
root@imx93evk:~# arecord -D hw:0,0 --period-size=1024 --buffer-size=4096 -r 44100 -c 2 -f s16_le r.wav
Warning: rate is not accurate (requested = 44100Hz, got = 48000Hz)
please, try the plug plugin
Recording WAVE 'r.wav' : Signed 16 bit Little Endian, Rate 48000 Hz, Stereo
^CAborted by signal Interrupt...
root@imx93evk:~#
```

2.6 GPIO*12

2.6.1 Hardware Diagram The GPIO port numbers corresponding to the PIN pins on J9 are shown in the diagram below.



2.6.2 Terminal Operations

Enter the following commands to control the voltage level of GPIO ports (measurable with a multimeter).

```
echo 660 > /sys/class/gpio/export
```

```
echo out > /sys/class/gpio/gpio660/direction
```

```
echo 1 > /sys/class/gpio/gpio660/value //Pull up GPIO660 voltage to 3.3V
```

```
echo 0 > /sys/class/gpio/gpio660/value //Pull up GPIO660 voltage to 3.3V
```

Note: The testing method for GPIO661 to GPIO671 is the same.

2.7 RTC

Excute below command to Read and Write Time

```
date -s "2025-05-01 12:00:00" //Set system time
```

```
hwclock -w //Synchronize system time to hardware RTC
```

```
date //Display current system time
```

```
hwclock -r //Read hardware Real-Time Clock (RTC) value
```

```
root@imx93evk:~# date -s"2025-05-01 12:00:00"
Thu May 1 12:00:00 UTC 2025
root@imx93evk:~#
root@imx93evk:~# hwclock -w
root@imx93evk:~# hwclock -r
2025-05-01 12:00:12.764553+00:00
root@imx93evk:~# date
Thu May 1 12:00:13 UTC 2025
root@imx93evk:~#
```