

US101 RZ/G2

Quick Start Guide

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1. Document Description

This document provides following information for RZ/G2-M SMARC SOM DEMO PLATFORM: -

1. It describes and illustrates the following
 - a. Features of RZ/G2-M SMARC SOM DEMO PLATFORM.
 - b. Hardware connection method of various interfaces of RZ/G2-M SMARC SOM DEMO PLATFORM
2. It also describes procedure for running scripts for various interfaces.

2. Package Contents

2.1 Package contents

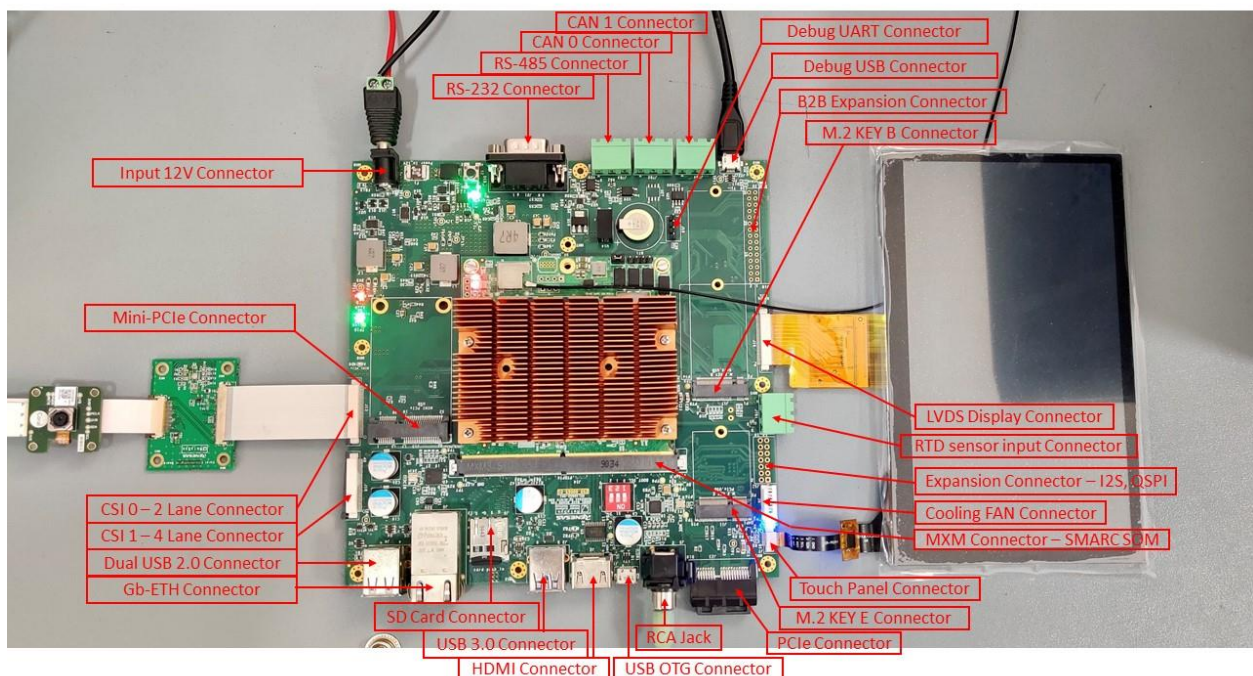
Package has following contents

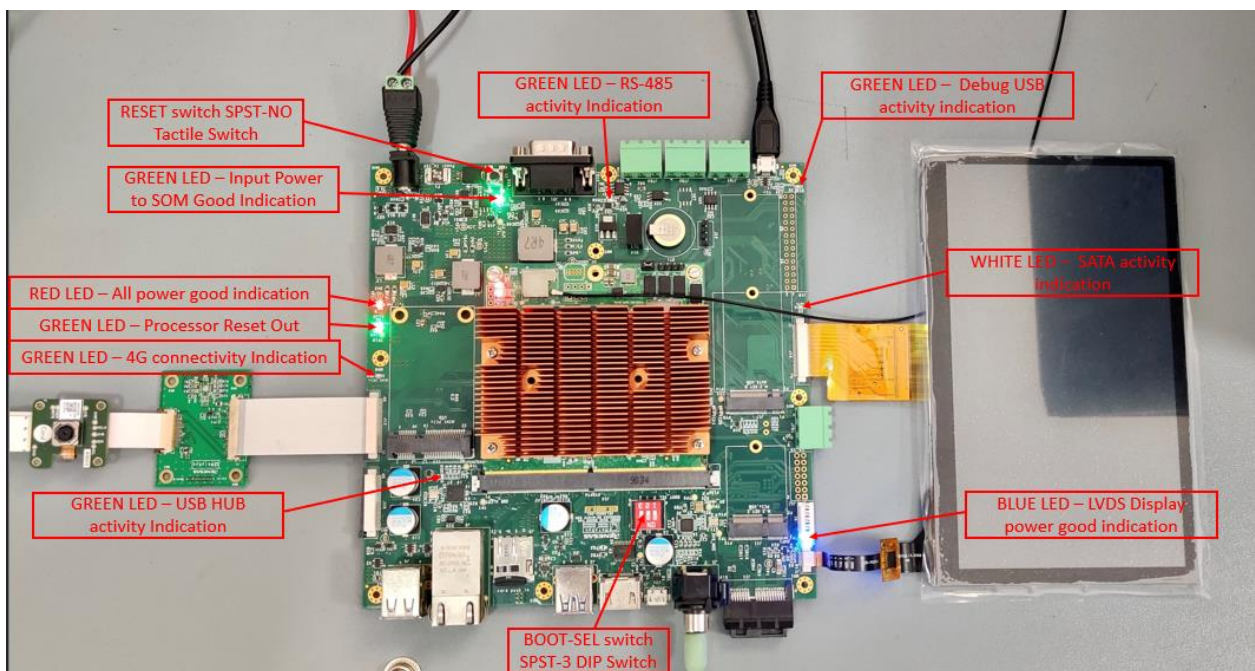
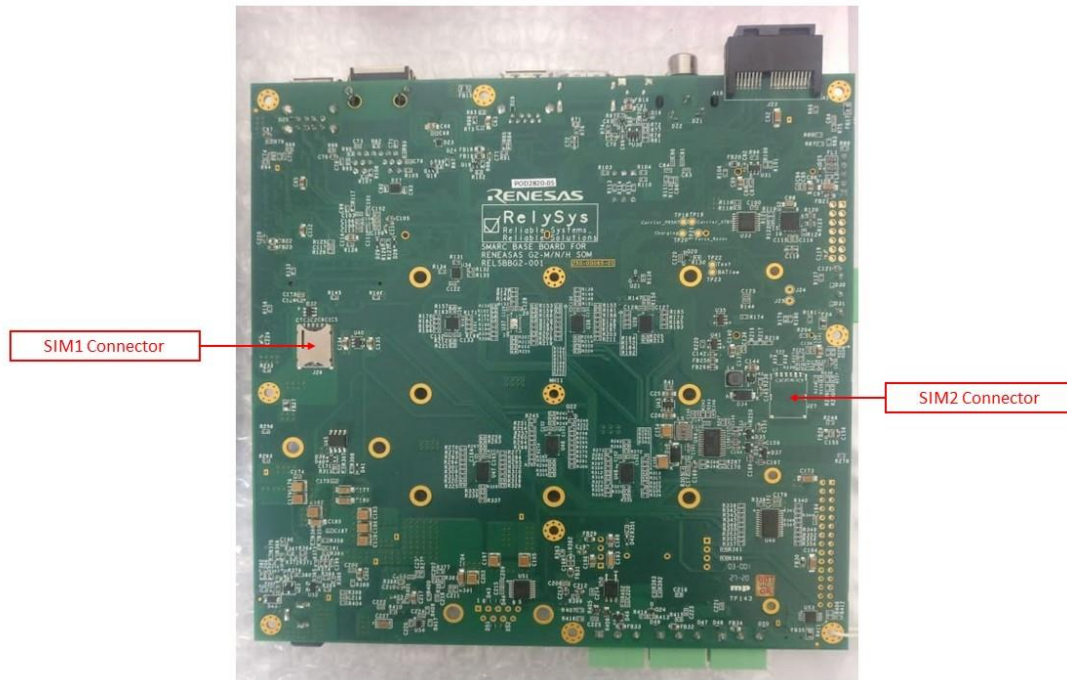
1. RZ/G2-M SMARC SOM DEMO PLATFORM – Qty 1 number
2. AC / DC adapter - Qty 1 number
3. HDMI Cable– Qty 1 number
4. 7-inch LCD with touch – Qty 1 number
5. Camera Adaptor Board – Qty 1 number
6. Micro USB cable – Qty 1 number

2.2 Additional Items for developing application software

- A Laptop / PC running Linux Ubuntu 16.04 or Windows to login and run scripts for RZ/G2-M SMARC SOM DEMO PLATFORM.

3. Interfaces and Setup Diagram





- Before powering ON the board make sure that Camera, HDMI, LCD are connected properly.
- Connect micro USB cable to HOST PC from Debug Connector.

3.1 Opening TTY Serial port in Linux machine

Type below commands in the host PC to set up serial port for debug console.

- **sudo minicom -s**
- Select serial port setup
- Make the changes as shown in the below picture.

```

+-----+
| A -   Serial Device       : /dev/ttyUSB0
| B - Lockfile Location    : /var/lock
| C -   Callin Program     :
| D -   Callout Program    :
| E -   Bps/Par/Bits       : 115200 8N1
| F - Hardware Flow Control : No
| G - Software Flow Control : No
|
| Change which setting? █
+-----+
|
| Screen and keyboard
| Save setup as dfl
| Save setup as..
| Exit
| Exit from Minicom
+-----+

```

- After making changes, select save set up as..RZG2M and then select Exit.
- Connect Power cable to RZ/G2-M SMARC SOM DEMO PLATFORM Board and turn it ON.

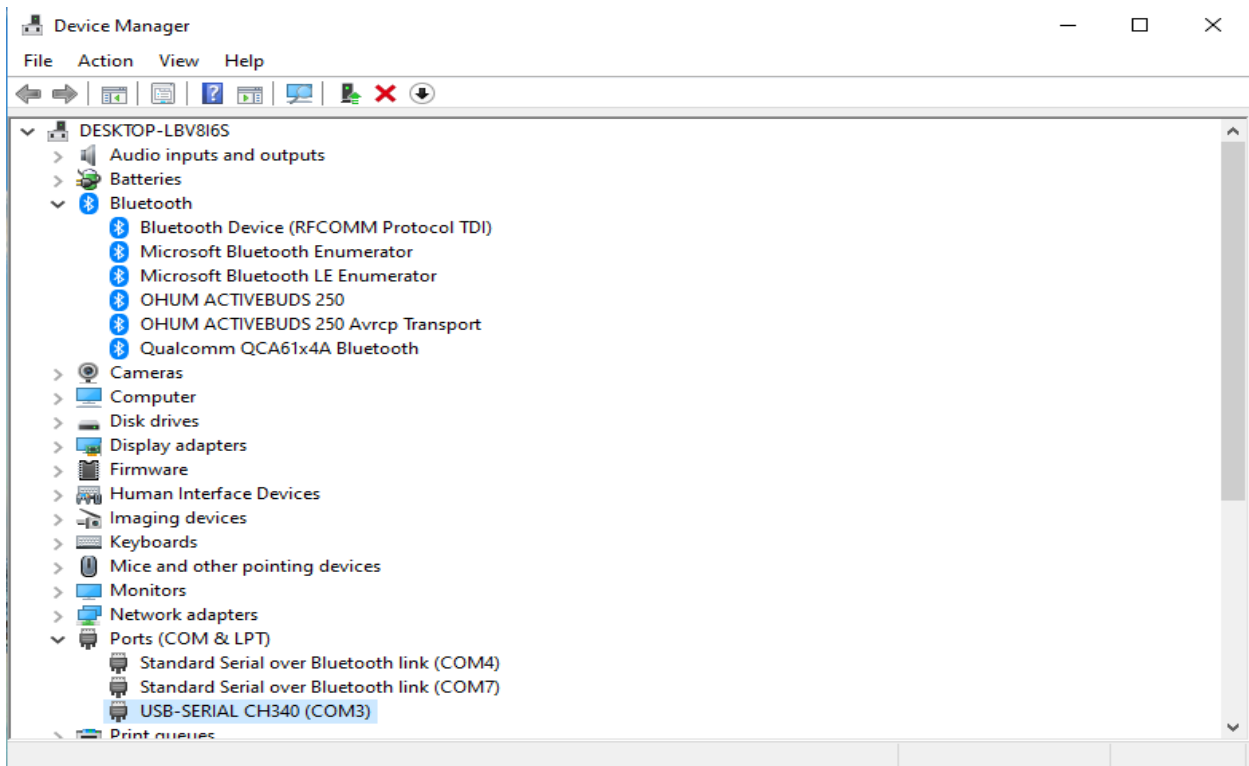
Note: Serial port setup should be done only for the first boot. For further boot-up via serial port enter the below command
sudo minicom RZG2M

3.2 Opening Serial port in Windows machine

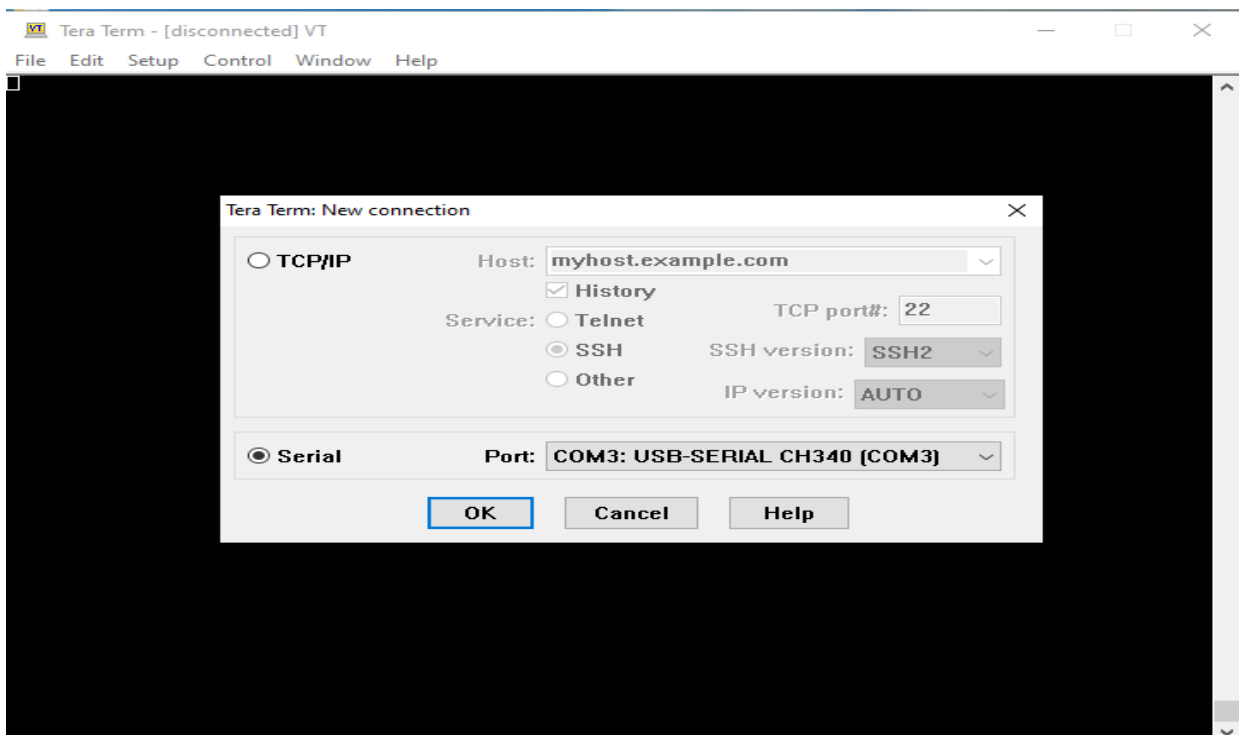
From the link given below, download the Windows CH340 Driver.

<https://sparks.gogo.co.nz/ch340.html>

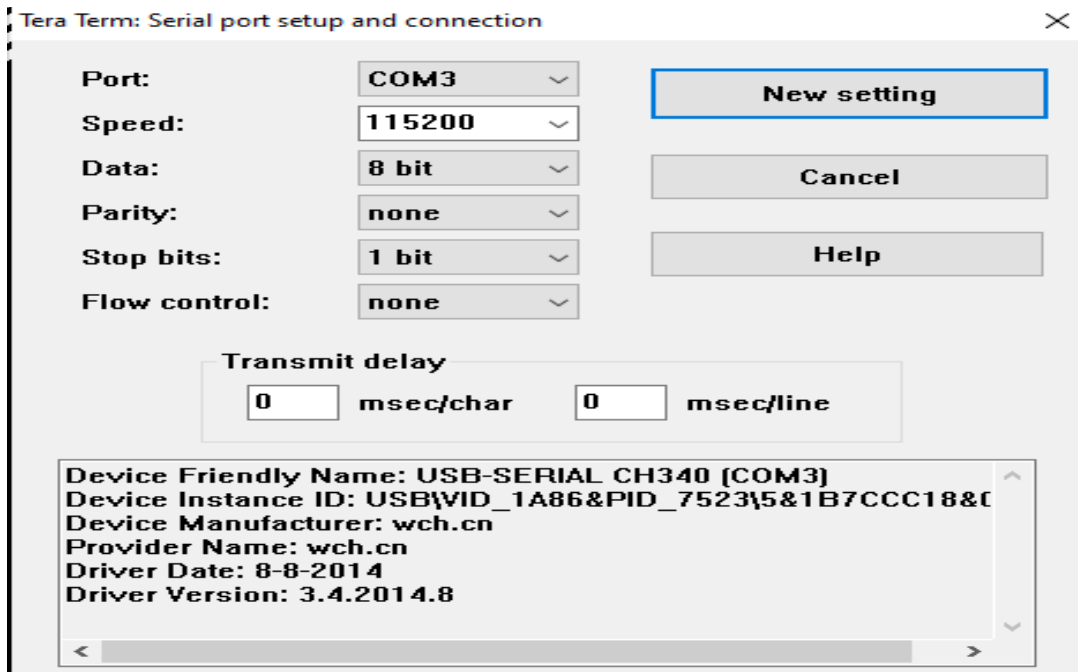
- Unzip the downloaded file.
- Open the .EXE file, then click uninstall, so that it will uninstall older versions and then click install.
- Once the driver is installed, go to the device manager in your PC and click on ports. You should see USB-SERIAL CH340 as shown in the figure below. The COM port associated with it is your required serial port.



- Now Connect micro USB cable to HOST PC from Debug Connector and power ON the board.
- Open tera term and select serial. Use the COM port of USB-SERIAL CH340 as shown in the figure below.



- Now, in tera term window, go to Setup -> serial port. Change the speed to 115200 and then click new setting as shown in the figure below.



Note: Every time the tera term is launched, make sure that speed is set to 115200.

4. Device Specific Items

- Once the board boots up, to login, type **root** and press enter as shown below.

```
Starting WPA supplicant...
[ OK ] Started DNS forwarder and DHCP server.
[ OK ] Started Target Communication Framework agent.
[ OK ] Started dhcp-server.service.
[ OK ] Started WPA supplicant.
[ OK ] Started Berkeley Internet Name Domain (DNS).
[ OK ] Started bind.service.
[ OK ] Reached target Host and Network Name Lookups.

Poky (Yocto Project Reference Distro) 2.4.3 hihope-rzg2m ttySC0

BSP: RZG2M/HIHOPE-RZG2M/1.0.4
LSI: RZG2M
Version: 1.0.4
hihope-rzg2m login: root
```

4.1 Connecting to access point mode

Access point is enabled on bootup. You can connect to the board using SSID and password given below.

- SSID for G2M: Relsys_G2M_AP
- Password: relsys123
- SSID for G2N: Relsys_G2N_AP
- Password: relsys123

After HOST PC gets connected to Relysys_G2M_AP or Relysys_G2N_AP, you can ssh using the below
 – ssh root@192.168.20.1

```

build-pc@buildpc:~$ ssh root@192.168.20.1
amixer: Unable to find simple control 'DVC In',1

Simple mixer control 'DVC Out',1
  Capabilities: pvolume
  Playback channels: Front Left - Front Right
  Limits: Playback 0 - 8388607
  Mono:
  Front Left: Playback 1677722 [20%]
  Front Right: Playback 1677722 [20%]
Extreme Low Power mode has already been disabled.
root@relysys-rzg2m:~#
root@relysys-rzg2m:~# █
  
```

4.2 Setup station mode

- Add **ssid** and **psk** before starting the station mode service.
- Go to **vi /etc/wpa_supplicant.conf** and add your router's ssid and password in place of **xxxx** and **yyyy** respectively. Then save it by first pressing **Esc** key then by typing **":wq"**

```

ctrl_interface=/var/run/wpa_supplicant
ctrl_interface_group=0
update_config=1

network={
    ssid="xxxx"
    psk="yyyy"
}
~
~
  
```

- Run the below commands for starting station mode service –
systemctl start relysys_station
- To enable station mode during next bootup without having to enable the service manually after bootup, give the below command –
systemctl enable relysys_station
- To stop the service, use the stop command as shown below-
systemctl stop relysys_station
- To disable the service so that it does not start on bootup, give the below command –
systemctl disable --now relysys_station

- **ifconfig** gives mlan0 ip address as shown below. Now, board is connected to the internet via mlan0.

```

root@hihope-rzg2m:~# ifconfig
docker0  Link encap:Ethernet  HWaddr 02:42:67:3D:32:3C
         inet addr:172.17.0.1  Bcast:0.0.0.0  Mask:255.255.0.0
         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:0
         RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

lo       Link encap:Local Loopback
         inet addr:127.0.0.1  Mask:255.0.0.0
         inet6 addr: ::1%4822560/128 Scope:Host
         UP LOOPBACK RUNNING  MTU:65536  Metric:1
         RX packets:4 errors:0 dropped:0 overruns:0 frame:0
         TX packets:4 errors:0 dropped:0 overruns:0 carrier:0
         collisions:0 txqueuelen:1000
         RX bytes:156 (156.0 B)  TX bytes:156 (156.0 B)

mlan0    Link encap:Ethernet  HWaddr 00:19:88:5E:2A:F1
         inet addr:192.168.43.26  Bcast:192.168.43.255  Mask:255.255.255.0
         inet6 addr: 2402:3a80:ce2:c0eb:219:88ff:fe5e:2af1%4822560/64 Scope:Global
         inet6 addr: fe80::219:88ff:fe5e:2af1%4822560/64 Scope:Link
         UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
         RX packets:6 errors:0 dropped:0 overruns:0 frame:0
         TX packets:45 errors:0 dropped:0 overruns:0 carrier:0
         collisions:0 txqueuelen:1000
         RX bytes:904 (904.0 B)  TX bytes:9436 (9.2 KiB)

root@hihope-rzg2m:~# █

```

4.3 Setup Bluetooth

- Type the below command for scanning the bluetooth devices -
hcitool scan

```

root@hihope-rzg2m:~# hcitool scan
Scanning ...
    04:EA:56:3B:96:DC          sourab-pc
    C8:3D:DC:F2:A6:F3          c4774564
    7C:6B:9C:25:1D:E6          2ec60ccd
    98:09:CF:14:CE:15          OnePlus 6T
    80:91:33:9D:52:BC          KARTHIK
root@hihope-rzg2m:~# █

```

◦ Note: The result displays all

visible Bluetooth devices nearby.

- Initiate a ping command to the found MAC Address as shown below -
!2ping <Remote Bluetooth device MAC Address>


```
root@hihope-rzg2m:~# hcitool scan
Scanning ...
    04:EA:56:3B:96:DC      sourab-pc
    C8:3D:DC:F2:A6:F3      c4774564
    7C:6B:9C:25:1D:E6      2ec60ccd
    98:09:CF:14:CE:15      OnePlus 6T
    80:91:33:9D:52:BC      KARTHIK
root@hihope-rzg2m:~# l2ping 04:EA:56:3B:96:DC
Ping: 04:EA:56:3B:96:DC from 00:19:88:5E:2A:F2 (data size 44) ...
44 bytes from 04:EA:56:3B:96:DC id 0 time 27.99ms
44 bytes from 04:EA:56:3B:96:DC id 1 time 28.12ms
44 bytes from 04:EA:56:3B:96:DC id 2 time 28.51ms
44 bytes from 04:EA:56:3B:96:DC id 3 time 27.50ms
44 bytes from 04:EA:56:3B:96:DC id 4 time 28.20ms
44 bytes from 04:EA:56:3B:96:DC id 5 time 29.17ms
44 bytes from 04:EA:56:3B:96:DC id 6 time 29.26ms
44 bytes from 04:EA:56:3B:96:DC id 7 time 29.40ms
44 bytes from 04:EA:56:3B:96:DC id 8 time 22.93ms
```

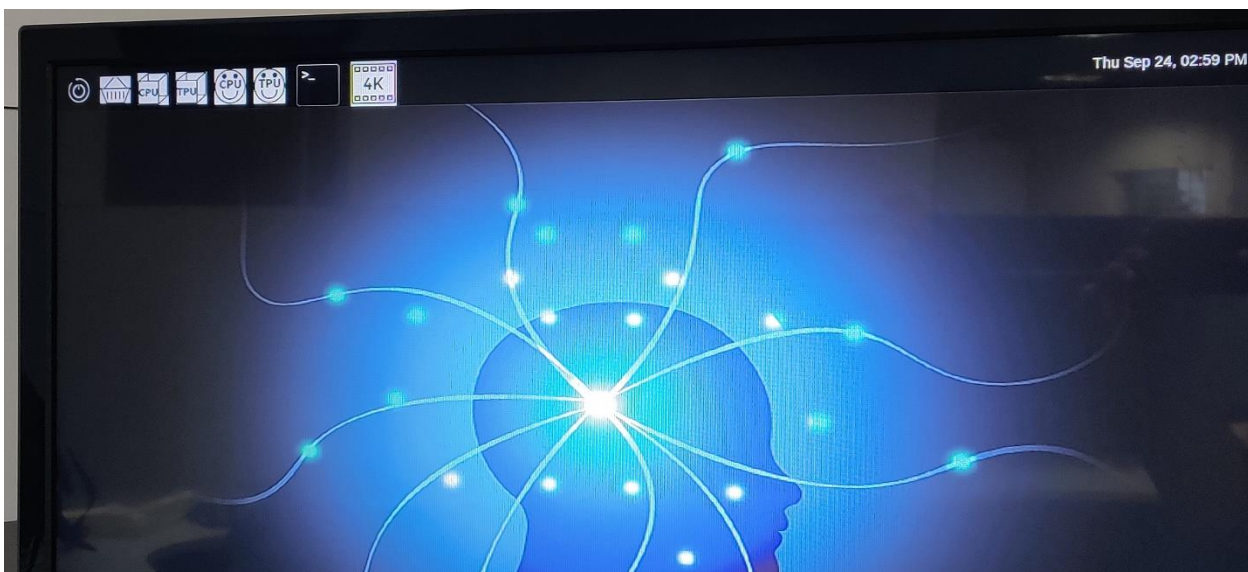
4.4 Display ON/OFF

- Run the below script to turn the HDMI ON or OFF respectively -
`/opt/relysys/Lvds_Hdmi_Selection.sh hdmi on`
`/opt/relysys/Lvds_Hdmi_Selection.sh hdmi off`
- Run the below script to turn the LVDS touchscreen ON or OFF respectively -
`/opt/relysys/Lvds_Hdmi_Selection.sh lvds on`
`/opt/relysys/Lvds_Hdmi_Selection.sh lvds off`

Note: Turn off the HDMI for the touch to work properly on LVDS.

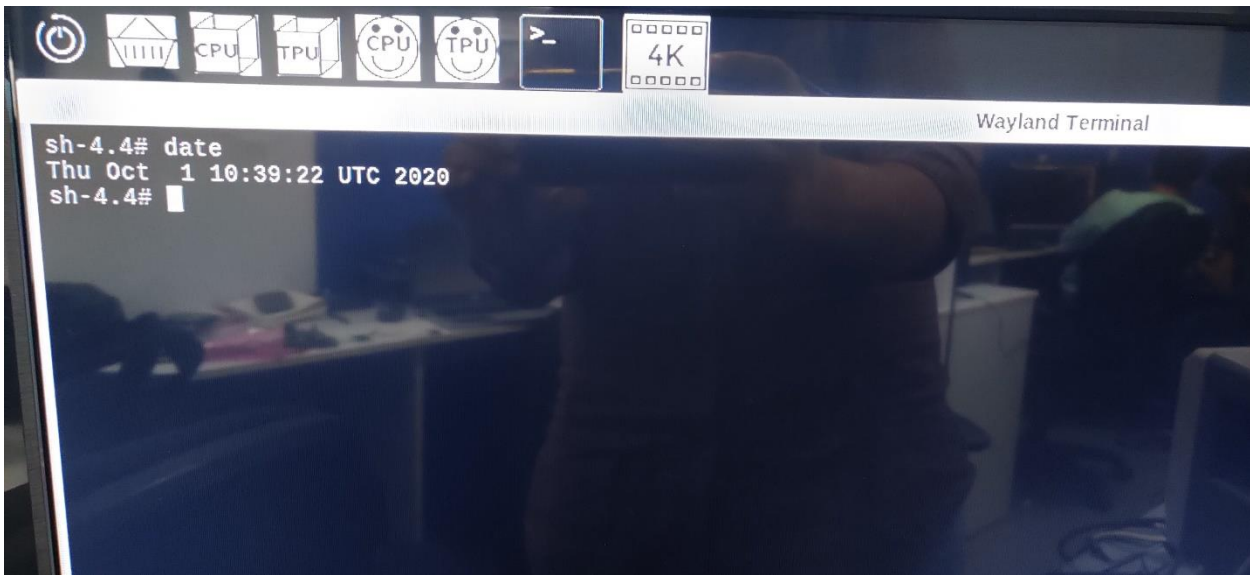
4.5 4k video playback

As shown below, click on the 4k icon to view the 4k video.



4.6 Wayland terminal

Connect a keyboard and a mouse to the board and then click on the terminal icon to access the wayland terminal, so that you can interact with the board without host PC.



4.7 Display camera video on HDMI

- For single camera –
 - Run the below script to display single camera –
`/opt/relsys/camera1.sh`
- For both the cameras –
 - Stop board bootup at u-boot by pressing any key as soon as the board is powered on, as shown below.

```
CPU: Renesas Electronics R8A774B1 rev 1.1
Model: Relsys Technologies Relsys RZ/G2N platform (relsys-rzg2n)
DRAM: 1.9 GiB
Bank #0: 0x048000000 - 0x0bfffffff, 1.9 GiB

Watchdog: Not found by seq!
WDT:   watchdog@e6020000
Watchdog: Started!
MMC:   sd@ee100000: 0, sd@ee160000: 1
Loading Environment from MMC... OK
In:    serial@e6e88000
Out:   serial@e6e88000
Err:   serial@e6e88000
Net:
Error: ethernet@e6800000 address not set.
eth-1: ethernet@e6800000
Hit any key to stop autoboot:  0
=>
=>
=>
=>
```

- Run the below command to get both the cameras working during the current bootup –
`run bootcmd_cam2`
- To allow the board to bootup with 2 cameras during further bootups, save the environment as shown below.

(Note: Both the cameras should be connected to the board before running the below commands. Run these commands only if you want both the cameras to work on EVERY bootup.)

```
setenv bootcmd 'run bootcmd_cam2'
```

```
saveenv
```

```
run bootcmd
```

- After bootup, run the below script to display both the cameras simultaneously –
`/opt/relysys/camera2.sh`

5. SDK Installation

- SDK needs to be installed on a PC running Linux Ubuntu 16.04 to develop any application and run on RZ/G2 SMARC SOM DEMO PLATFORM. Following is the procedure:
- Download SDK from the link given below:
<https://drive.google.com/file/d/1y9gS9qq0F8mWV-0yhXpuX-O7YgcEEKpV8/view?usp=sharing>
- Go to the folder to which the script has been downloaded from the above link and provide permission to the script.

```
cd <path to the folder>
```

```
chmod +x poky-glibc-x86_64-core-image-weston-sdk-aarch64-toolchain-2.4.3.sh
```

- Run the script as shown below:

```
./poky-glibc-x86_64-core-image-weston-sdk-aarch64-toolchain-2.4.3.sh
```

Let the installation directory be the default target directory: `/opt/poky/2.4.3`. When asked for confirmation, press enter and then Y to proceed.

- To check if the sdk has been installed correctly, open the terminal on host PC and set the environment as shown below:

```
source /opt/poky/2.4.3/environment-setup-aarch64-poky-linux
```

- To verify the installation:

```
echo $CC
```

The output should be as follows:

```
aarch64-poky-linux-gcc          -march=armv8-a          -mtune=cortex-a57          --
sysroot=/opt/poky/2.4.3/sysroots/aarch64-poky-linux
```

6. Cross Compiling C application

- To cross compile a c file run the below commands on host PC.

```
cd <path to the C file>
```

```
source /opt/poky/2.4.3/environment-setup-aarch64-poky-linux
```

```
$CC XXX.c -o YYY
```

Where XXX.c is the C source file and YYY is the binary file generated.

- Power on the board and connect to Relysys_G2N_AP or Relysys_G2M_AP and copy the binary file to the board by doing scp to the below ip address.

```
scp <path to the YYY binary file> root@192.168.20.1:
```

- To run, give the below command on board:

```
./YYY
```

Revision History

| Rev. | Date | Description | |
|------|------------|-------------|------------------|
| | | Page | Summary |
| 0.1 | 02.18.2021 | | Initial version. |
| | | | |
| | | | |
| | | | |

General Precautions in the Handling of Microprocessing Unit and Microcontroller Unit Products

The following usage notes are applicable to all Microprocessing unit and Microcontroller unit products from Renesas. For detailed usage notes on the products covered by this document, refer to the relevant sections of the document as well as any technical updates that have been issued for the products.

1. Precaution against Electrostatic Discharge (ESD)

A strong electrical field, when exposed to a CMOS device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop the generation of static electricity as much as possible, and quickly dissipate it when it occurs. Environmental control must be adequate. When it is dry, a humidifier should be used. This is recommended to avoid using insulators that can easily build up static electricity.

Semiconductor devices must be stored and transported in an anti-static container, static shielding bag or conductive material. All test and measurement tools including work benches and floors must be grounded. The operator must also be grounded using a wrist strap. Semiconductor devices must not be touched with bare hands. Similar precautions must be taken for printed circuit boards with mounted semiconductor devices.

2. Processing at power-on

The state of the product is undefined at the time when power is supplied. The states of internal circuits in the LSI are indeterminate and the states of register settings and pins are undefined at the time when power is supplied. In a finished product where the reset signal is applied to the external reset pin, the states of pins are not guaranteed from the time when power is supplied until the reset process is completed. In a similar way, the states of pins in a product that is reset by an on-chip power-on reset function are not guaranteed from the time when power is supplied until the power reaches the level at which resetting is specified.

3. Input of signal during power-off state

Do not input signals or an I/O pull-up power supply while the device is powered off. The current injection that results from input of such a signal or I/O pull-up power supply may cause malfunction and the abnormal current that passes in the device at this time may cause degradation of internal elements. Follow the guideline for input signal during power-off state as described in your product documentation.

4. Handling of unused pins

Handle unused pins in accordance with the directions given under handling of unused pins in the manual. The input pins of CMOS products are generally in the high-impedance state. In operation with an unused pin in the open-circuit state, extra electromagnetic noise is induced in the vicinity of the LSI, an associated shoot-through current flows internally, and malfunctions occur due to the false recognition of the pin state as an input signal become possible.

5. Clock signals

After applying a reset, only release the reset line after the operating clock signal becomes stable. When switching the clock signal during program execution, wait until the target clock signal is stabilized. When the clock signal is generated with an external resonator or from an external oscillator during a reset, ensure that the reset line is only released after full stabilization of the clock signal. Additionally, when switching to a clock signal produced with an external resonator or by an external oscillator while program execution is in progress, wait until the target clock signal is stable.

6. Voltage application waveform at input pin

Waveform distortion due to input noise or a reflected wave may cause malfunction. If the input of the CMOS device stays in the area between V_{IL} (Max.) and V_{IH} (Min.) due to noise, for example, the device may malfunction. Take care to prevent chattering noise from entering the device when the input level is fixed, and also in the transition period when the input level passes through the area between V_{IL} (Max.) and V_{IH} (Min.).

7. Prohibition of access to reserved addresses

Access to reserved addresses is prohibited. The reserved addresses are provided for possible future expansion of functions. Do not access these addresses as the correct operation of the LSI is not guaranteed.

8. Differences between products

Before changing from one product to another, for example to a product with a different part number, confirm that the change will not lead to problems. The characteristics of a microprocessing unit or microcontroller unit products in the same group but having a different part number might differ in terms of internal memory capacity, layout pattern, and other factors, which can affect the ranges of electrical characteristics, such as characteristic values, operating margins, immunity to noise, and amount of radiated noise. When changing to a product with a different part number, implement a system-evaluation test for the given product.

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