ANDROID OS USER MANUAL

OS

1. OS Version

a) Name：Android 13.0
b) Kernel Version：5.10.157

2. OS Login

a) User ID：Owner
b) User Code：No

3. Note

The system is equipped with power-up protection, which requires pressing the Power button to power on the system.

CPU Setting

The RK3588 integrates four high-performance Arm Cortex-A76 CPU cores and four low-power Cortex-A55 CPU cores, along with a built-in high-frequency Mali-G52 GPU and an NPU co-processor.

1. CPU Temperature

a) Chip centre temperature soc-thermal

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

b) CPU big core A76_0/1; CPU4 和 CPU5 temp

```
cat /sys/class/thermal/thermal_zone1/temp
```

c) CPU big core A76_2/3; CPU6 和 CPU7 temp

```
cat /sys/class/thermal/thermal_zone2/temp
```

d) CPU little core A55_0/1/2/3; CPU0、CPU1、CPU2、CPU3 temp

```
cat /sys/class/thermal/thermal_zone3/temp
```

e) GPU temp

```
cat /sys/class/thermal/thermal_zone5/temp
```

f) NPU temp

```
cat /sys/class/thermal/thermal_zone6/temp
```

2. CPU Point Description

Point	Description
policy0	To set and CPU little core 0~3
policy4	To set and read CPU big core 4~5
policy6	To set and read CPU big core 6~7

3. CPU Working Mode

a)   CPU Mode Description.

Mode	Description
interactive	Runs at maximum frequency, gradually decreases depending on CPU compliance, disadvantage of high power consumption
conservative	Gradual and smooth CPU frequency adjustment, dynamic adjustment at upper and lower frequency limits
ondemand	The CPU switches to the highest frequency when it is performing calculations and drops to the lowest frequency at the end of the calculation.
userspace	Provide API for users to set CPU frequency independently.
powersave	CPU fixed at lowest frequency
performance	Fixed operation at maximum frequency
schedutil	The system automatically adjusts the frequency according to the load

b)   CPU operational mode reading.

```
cat /sys/devices/system/cpu/cpufreq/policy0/scaling_available_governors
cat /sys/devices/system/cpu/cpufreq/policy4/scaling_available_governors
cat /sys/devices/system/cpu/cpufreq/policy6/scaling_available_governors
```

c)   CPU operational mode setting.

```
echo "mode"> /sys/devices/system/cpu/cpufreq/policy0/scaling_governor
echo "mode"> /sys/devices/system/cpu/cpufreq/policy4/scaling_governor
echo "mode"> /sys/devices/system/cpu/cpufreq/policy6/scaling_governor
```

4. CPU Operating Frequency

The default CPU working mode is schedutil mode, which does not support frequency setting. To set the frequency, you need to set the CPU working mode to userspace mode first.

a)   Get the current CPU supported frequency.

```
cat /sys/devices/system/cpu/cpufreq/policy0/scaling_available_frequencies
cat /sys/devices/system/cpu/cpufreq/policy4/scaling_available_frequencies
cat /sys/devices/system/cpu/cpufreq/policy6/scaling_available_frequencies
```

b)   Set the CPU operating mode to usespace mode.

```
echo userspace > /sys/devices/system/cpu/cpufreq/policy0/scaling_governor
echo userspace > /sys/devices/system/cpu/cpufreq/policy4/scaling_governor
echo userspace > /sys/devices/system/cpu/cpufreq/policy6/scaling_governor
```

c)   Setting the CPU frequency.

```
echo xxx > /sys/devices/system/cpu/cpufreq/policy0/scaling_setspeed
echo xxx > /sys/devices/system/cpu/cpufreq/policy4/scaling_setspeed
echo xxx > /sys/devices/system/cpu/cpufreq/policy6/scaling_setspeed
```

d)   Check if the setup is successful.

```
cat /sys/devices/system/cpu/cpufreq/policy0/cpuinfo_cur_freq
cat /sys/devices/system/cpu/cpufreq/policy4/cpuinfo_cur_freq
cat /sys/devices/system/cpu/cpufreq/policy6/cpuinfo_cur_freq
```

5. GPU Operating frequency

a)   Get the frequency supported by the GPU.

```
cat /sys/class/devfreq/fb000000.gpu/available_frequencies
```

b)   Set GPU working mode.

```
echo userspace > /sys/class/devfreq/fb000000.gpu/governor
```

c)   Setting GPU frequency.

```
echo xxx > /sys/class/devfreq/fb000000.gpu/userspace/set_freq
```

d)   Check if the setup is successful.

```
cat /sys/class/devfreq/fb000000.gpu/cur_freq
```

6. NPU Operating Frequency

a)   Get the frequency supported by the GPU.

```
cat /sys/class/devfreq/fdab0000.npu/available_frequenciess
```

b)   Setting the GPU working mode.

```
echo userspace > /sys/class/devfreq/fdab0000.npu/governor
```
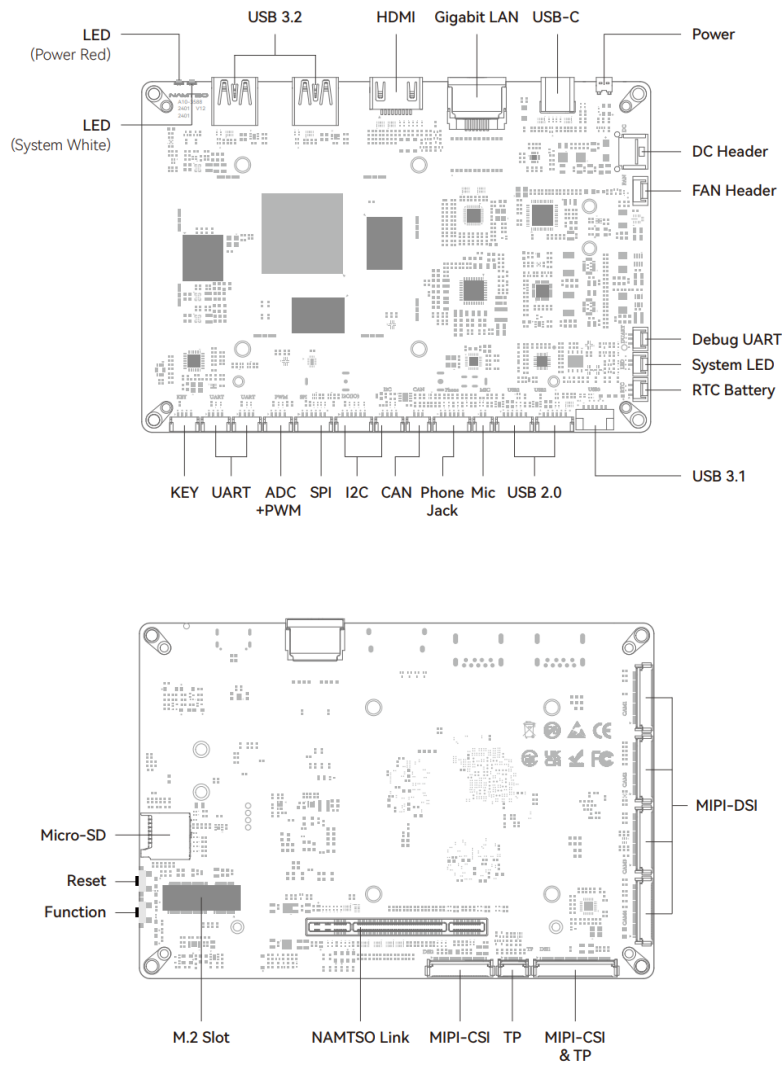
c)   Setting GPU frequency.

```
echo xxx > /sys/class/devfreq/fdab0000.npu/userspace/set_freq
```

d)   Check if the setup is successful.

```
cat /sys/class/devfreq/fdab0000.npu/cur_freq
```
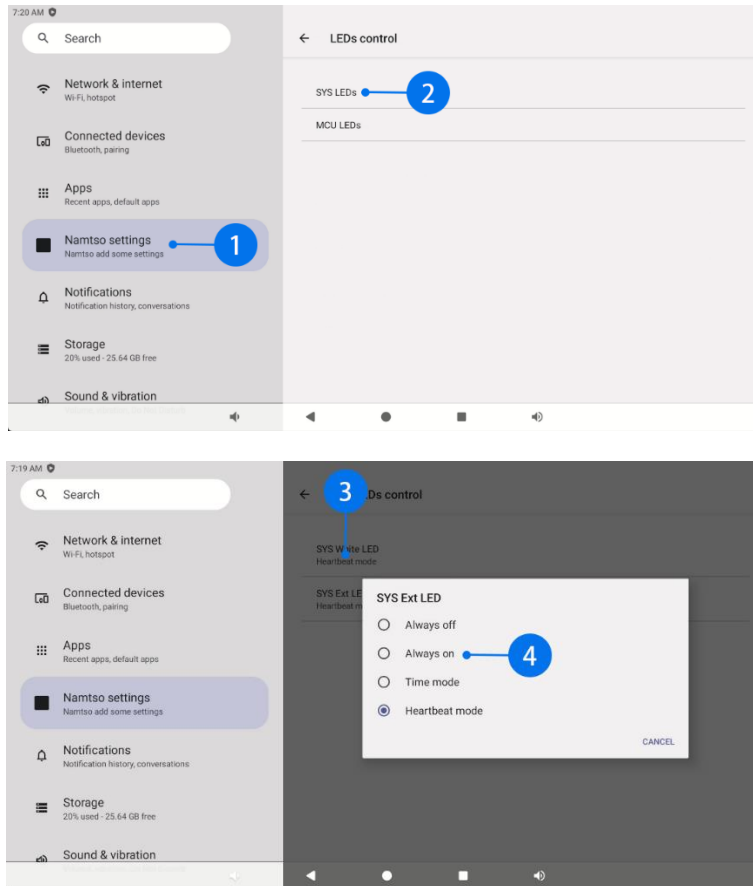
Board Setup

1. LED Setting

After power on, the red LED is light, press power button to switch on, the white LED is light after the system starts.
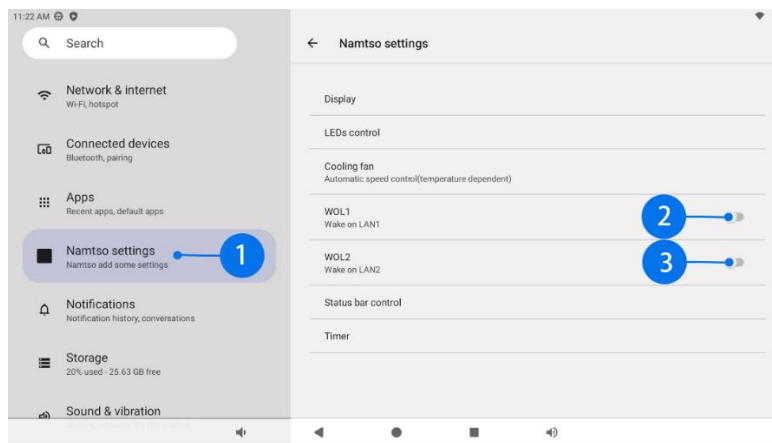
a) White LED Adjustment

Just customize the status in NAMTSO Settings setting:

2. Gigabit Ethernet Port

a) Access to the network cable can be used.
b) WOL function setting.

    i.   WoL1 is the main board LAN.

   ii.   WoL2 is the LAN for ACC-A9A10 Expansion Board.

3. Button Setting

a) Switch gear preparation

    i.   After powering up the device, press the Power button briefly to switch on the device.

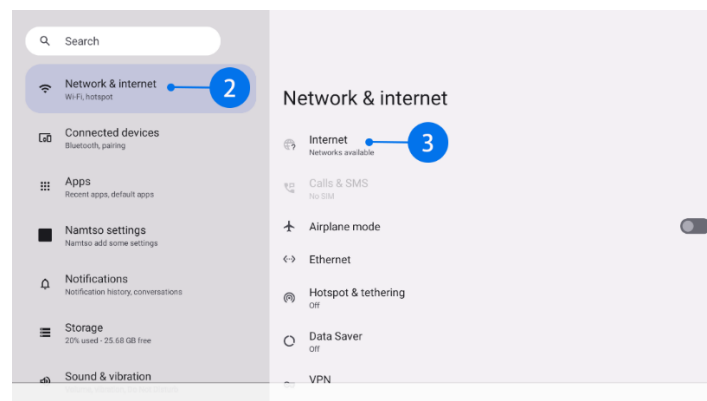   ii.   Press and hold the Power button to turn off the power.

b) Equipment reset

   Short press Reset button, system reset directly reboot.

c) Firmware burning mode

   Press the Function button 3 times in quick succession, the device enters the Maskrom burning mode.
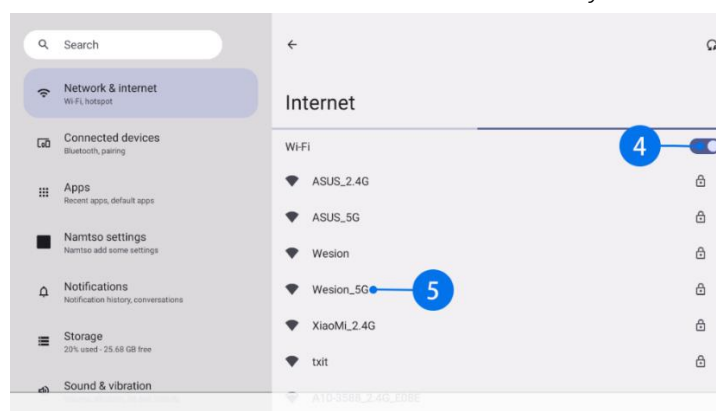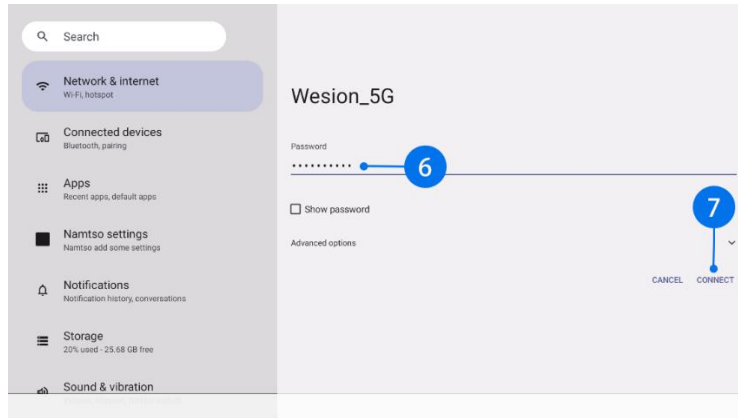
4. Wi-Fi Setting

a) Click to enter Settings.
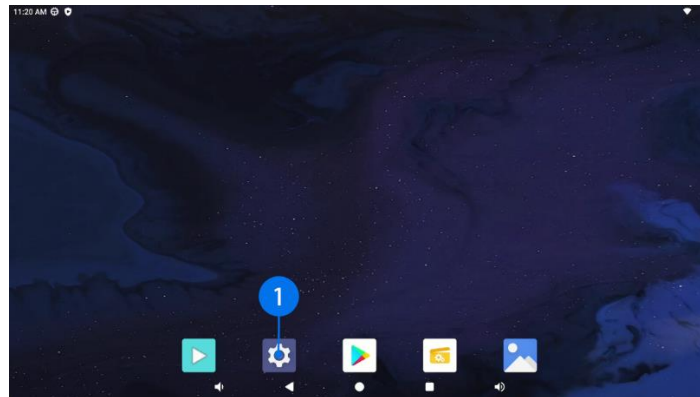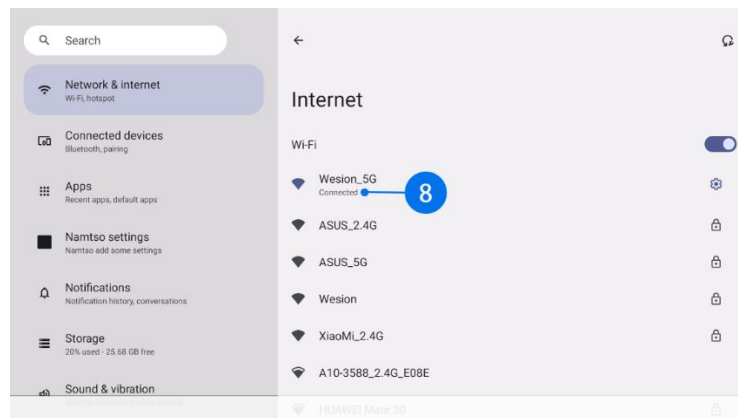

b) Select Network & internet and click on Internet.

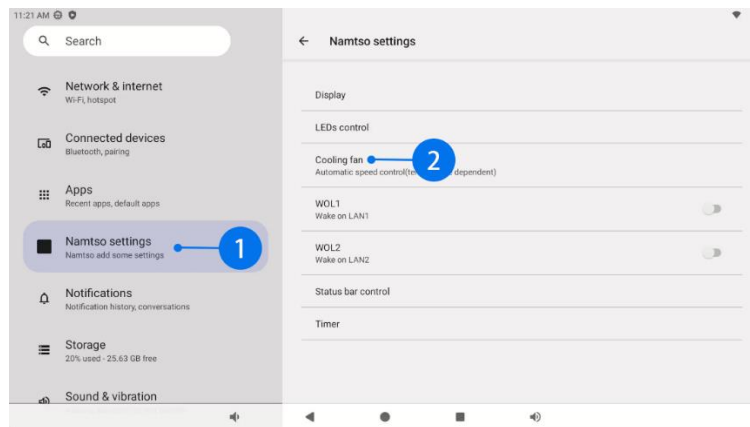c) Turn on the Wi-Fi switch and scan for Wi-Fi nodes around you.

d) Select the Wi-Fi you need to connect to, the password input screen shown below will pop up, click CONNECT to connect!
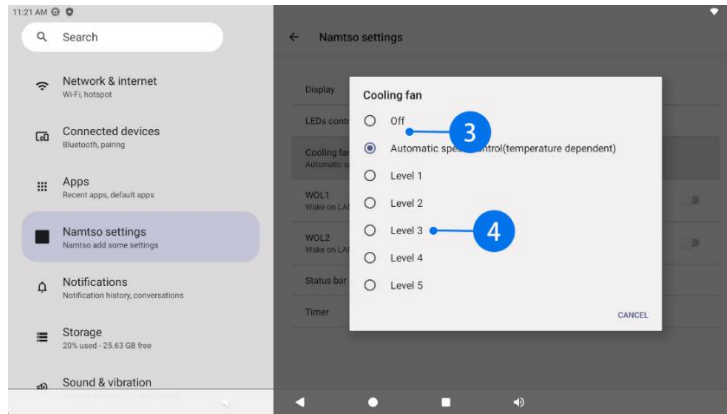
e) Connected means the Wi-Fi connection is successful.
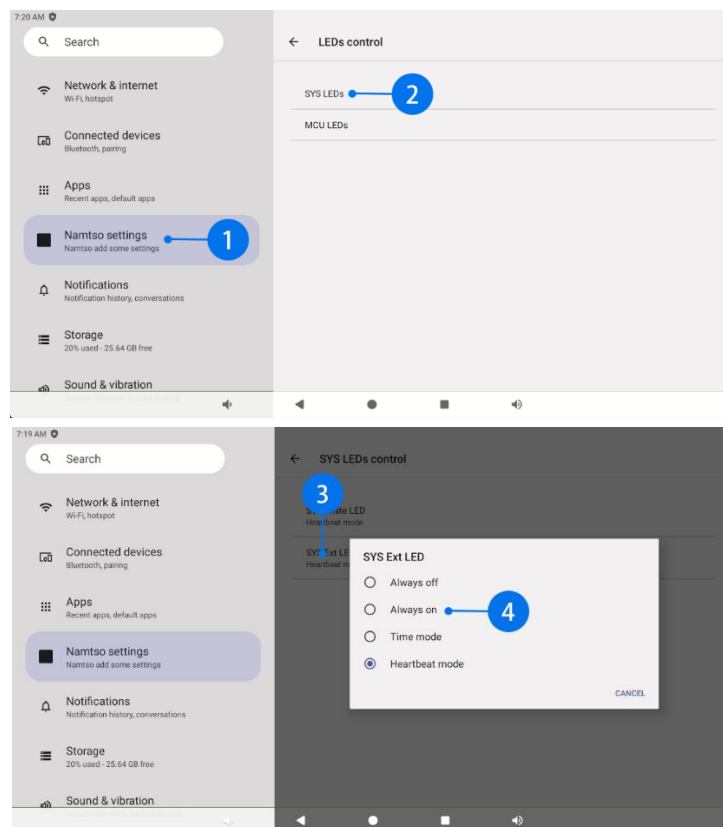

5. FAN Setting

Expansion Header

1. Expansion LED

Extension LEDs, set in SYS Ext LEDs in SYS LEDs control.

2. CAN

a) Open CAN.

```
ip link set can0 up
```

b) Close CAN.

```
ip link set can0 down
```

c) View CAN configuration information.

```
ifconfig -a
```

d) Setting the Baud Rate.

```
ip link set can0 type can bitrate 250000
```

e) Receive CAN Messages.

```
candump can0
```

f) Sending Messages.

```
cansend can0 123#1122334455667788
```

3. I2C 和 I2C-IO

a) If "/dev/i2c-2" and "/dev/i2c-4" exist, you can use i2c-tools to operate this I2C interface. Connect the device to the PC via USB-C or Debug UART using i2c-tools. the following section describes the use of the I2C bus via the ADB method, the Debug UART method is similar.

b) open windows terminal tool "cmd".

c) View the number of devices that can be controlled by the adb command and the corresponding device names.

```
adb devices
```

d) Enter the device shell environment by shell command. For multiple devices, specify the device with "-s".

```
adb shell
adb -s [device-name] shell
```

e) List out all available I2C buses

```
i2cdetect -l
```

f) Retrieve devices on I2C 4

```
i2cdetect -y -r 4
```

g) For example, the "0x0d" register of a device with a slave address of "0x1d"

```
i2cget -f -y 4 0x1d 0x0d
```

h) Take the example of changing the value of the 0x0d register of a device with a slave device address of "0x1d" to "0x02".

```
i2cset -f -y 4 0x1d 0x0d 0x02
```

4. SPI

Just use "ls /dev/spidev3.0" to confirm that the SPI BUS is turned on.

5. UART

a) Equipment nodes

The left serial port is UART0 and the right serial port is UART1:

```
/dev/ttyWCH0
/dev/ttyWCH1
```

b) Baud rate setting

Take UART0 as an example:

```
stty -F /dev/ttyWCH0 ispeed 115200 ospeed 115200 cs8
stty -F /dev/ttyWCH0 speed 115200 cs8 -parenb -cstopb  -echo
```

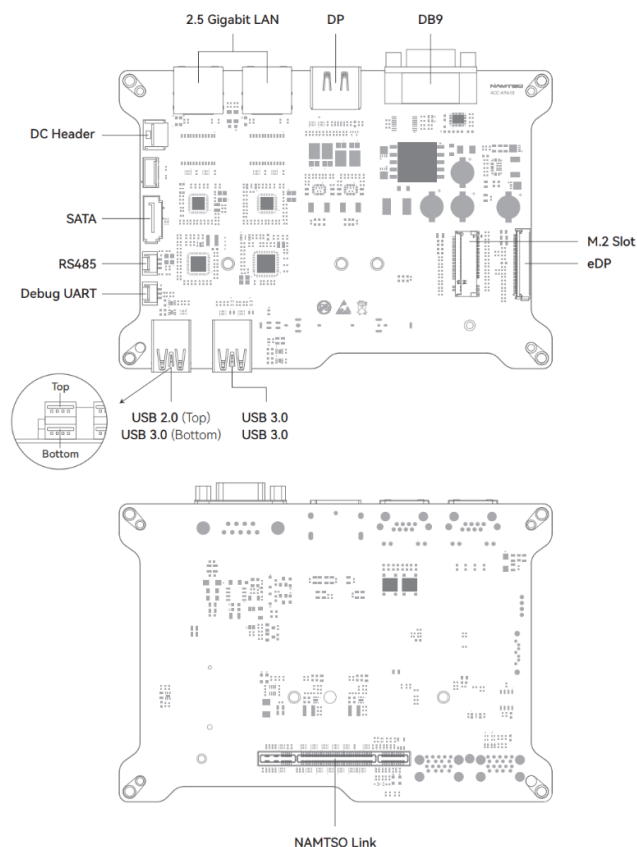c) Send data

```
echo "aaa" > /dev/ttyWCH0
```

d) Reading data

```
cat /dev/ttyWCH0
```

6. Power KEY

Same function as Power Button for external expansion of power buttons.

Accessories

1. Expansion Board A9A10

a) RS485

Refer to the UART section of the motherboard for usage. The device node is:

```
/dev/ttyWCH2
```

b) SATA

No need to mount, just plug in a SATA HDD.

c) 2.5 Gigabits LAN

No need to set up to use, WOL function is only available on the left LAN port, refer to the motherboard for usage.

d) RS232

Refer to the UART section of the motherboard for usage. Device node is:

```
/dev/ttyWCH3
```

e) M.2 Slot

Plug in the M.2 SSD and boot it up again to use it directly, no need to mount it.