

Venus Industrial Computer

User Manual

Model: Venus 20-US-4G-PCIE-M2

User Manual

| | | |
|-------------|--|----|
| Chapter I | Product Version List | 3 |
| Chapter II | Product Appearance Description | 4 |
| 2.1 | Top View of Product | 4 |
| 2.2 | Bottom View of Product | 4 |
| 2.3 | Product Front View | 5 |
| 2.4 | Rear View of Product | 5 |
| 2.5 | Three-Dimensional Product Ruler (unit mm) | 5 |
| 2.6 | Internal Product Description..... | 6 |
| 2.7 | Description of Product Keys and Indicator Lights | 7 |
| Chapter III | Interface Description | 8 |
| 3.1 | Power Supply | 8 |
| 3.2 | MFP | 8 |
| 3.3 | RELAY | 10 |
| 3.4 | RS485 | 10 |
| 3.5 | LOCK、EOB | 11 |
| 3.6 | LED | 12 |
| 3.7 | Product External Interface Description..... | 13 |
| Chapter IV | Function Declaration..... | 13 |
| 4.1 | System Information..... | 13 |
| 4.2 | System State..... | 14 |
| 4.3 | 4G Network..... | 15 |
| 4.4 | Wired Network Configuration Method..... | 16 |
| Chapter V | Tz_gpio Operating Instructions | 17 |
| 5.1 | 4G Function Module | 17 |
| 5.2 | USB Function Module | 19 |
| 5.3 | Communication Control Link Master Control | 19 |
| 5.4 | NX System Operation Lamp Module:..... | 20 |
| 5.5 | RS485 Peripheral Power Supply Control | 20 |
| Chapter VI | Usage Scenarios and Precautions | 21 |
| 6.1 | Usage Scenario..... | 21 |
| 6.2 | Peripheral Installation Schematic Diagram | 21 |
| 6.3 | Typical Installation Case | 22 |
| 6.4 | TF Card Insertion and Extraction Problem | 25 |

Chapter I Product Version List

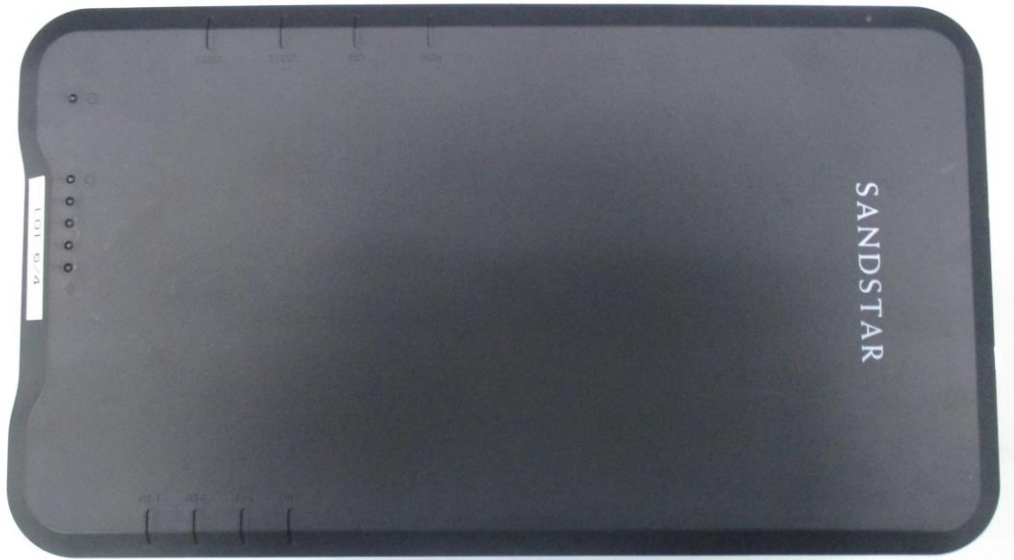
This chapter records all previous version changes.

| imprint | | | |
|-------------------|--------------|---------|---|
| Product version | V1.0 | 2020.12 | Used for the first batch of formal 20 sets of production. |
| MCU version | R1.0 | 2020.11 | |
| NX version | R1.0 | 2020.11 | |
| 4G module version | BVE12 Ee_WUS | | Xinke domestic version |
| Shell version | V3.0 | / | 3D printing |

| imprint | | | |
|-------------------|--------------|---------|---|
| Product version | V2.0 | 2021.1 | Used for the second batch of formal production of 180 sets. |
| MCU version | R1.0 | 2020.11 | |
| NX version | R1.0 | 2020.11 | |
| 4G module version | BVE12 Ee_WUS | | Xinke domestic version |
| Shell version | V4.0 | / | Screen printing content is only SANDSTAR, and S and Shida Chinese characters are cancelled. |

Chapter II Product Appearance Description

2.1 Top view of product



2.2 Bottom view of product



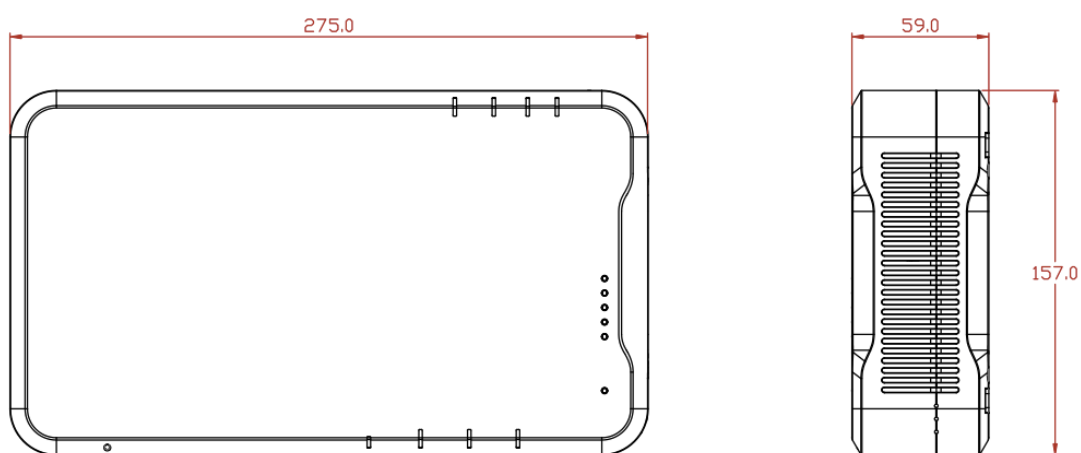
2.3 Product Front View



2.4 Rear View of Product



2.5 Three-Dimensional Product Ruler (Unit | mm)



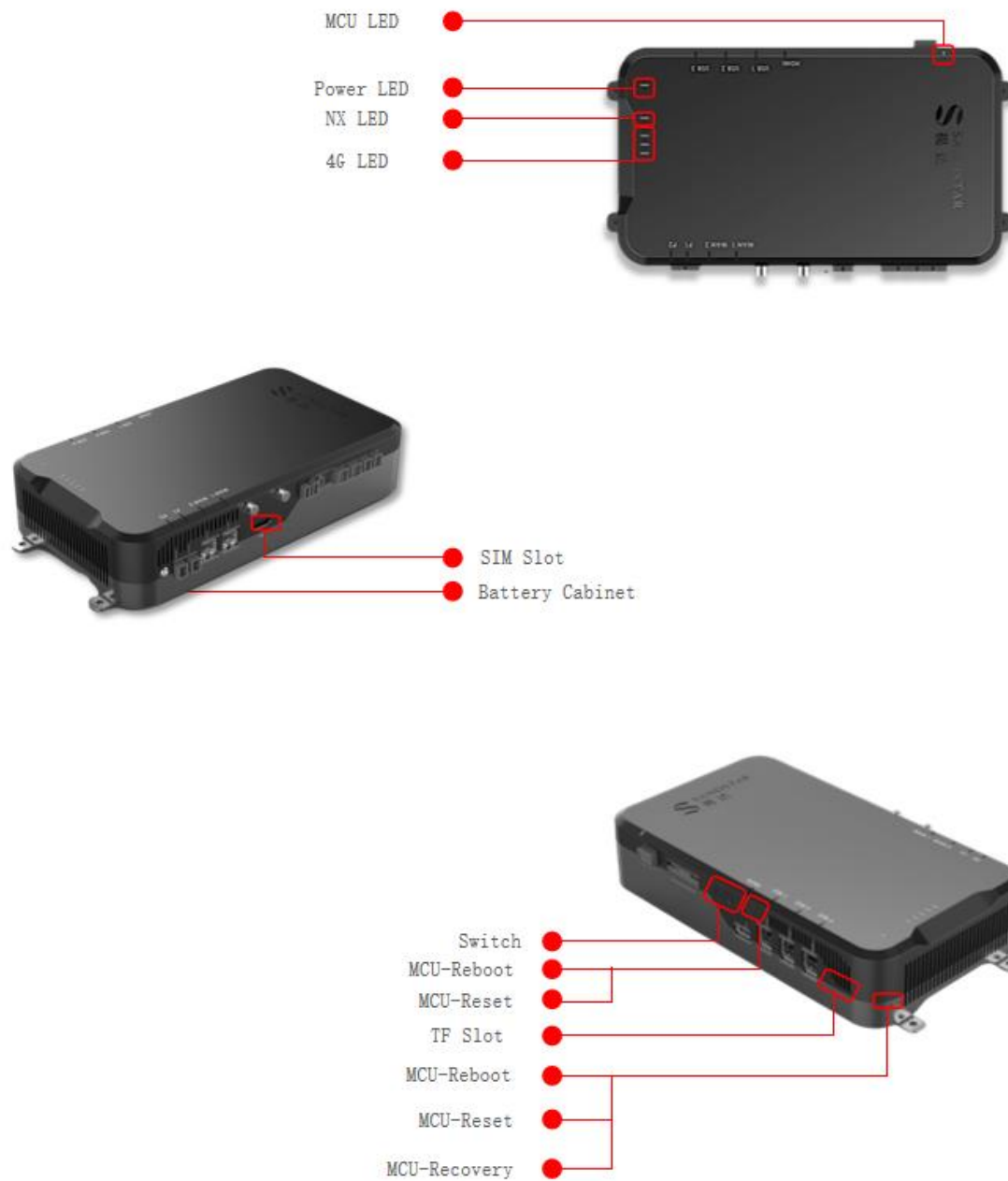
2.6 Internal product description



The parts are as follows:

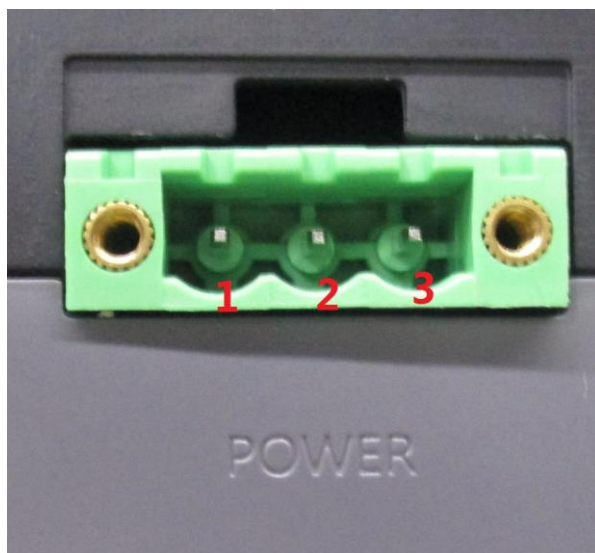
1. MCU control board
2. NX control board
3. NX core board with fan
4. 4G module

2.7 Description of Product Keys and Indicator Lights



Chapter III Interface Description

3.1 Power Supply



| Interface name | Pin serial number | Interface definition | Interface description |
|----------------|-------------------|----------------------|-----------------------|
| POWER | 1 | 12V_MAIN | PWR |
| | 2 | GND | GND |
| | 3 | PGND | PGND |

3.2 MFP



| Interface name | Pin serial number | Interface definition | Interface description |
|----------------|-------------------|----------------------|--|
| MFP | 1 | 12V | 3A, controllable 12V |
| | 2 | GND | land |
| | 3 | 5V | 3A, controllable 5V |
| | 4 | GND | land |
| | 5 | GPIO1 | 5V level |
| | 6 | GPIO2 | 5V level |
| | 7 | GPIO3 | 5V level |
| | 8 | GPIO4 | 5V level |
| | 9 | 12V | 1.5A peak, 12V controllable |
| | 10 | GND | land |
| | 11 | LOCK3_TRI | 12V level, dip switch can select high and low trigger. |
| | 12 | DOOR3_DTEC | Gate state detection pin |
| | 13 | DOOR3_LOCK | Lock state detection pin |
| | 14 | COM3 | land |
| | 15 | 12V | 1A |
| | 16 | RED1_CTL | Driving RGB decorative lamp cathode |
| | 17 | GREEN1_CTL | Driving RGB decorative lamp cathode |
| | 18 | BLUE1_CTL | Driving RGB decorative lamp cathode |
| | 19 | 12V | 1A |
| | 20 | RED2_CTL | Driving RGB decorative lamp cathode |
| | 21 | GREEN2_CTL | Driving RGB decorative lamp cathode |
| | 22 | BLUE2_CTL | Driving RGB decorative lamp cathode |
| | 23 | 12V | LED lamp power supply, max 30W |
| | 24 | PWM2_CTL | PWM control LED negative terminal |
| | 25 | GND | land |
| | 26 | GND | land |
| | 27 | MCU_SWDIO | I/o pin data line |
| | 28 | RS232_TX_DEBUG_CON | DEBUG |
| | 29 | MCU_SWCLK | Clock pin clock line |
| | 30 | RS232_RX_DEBUG_CON | DEBUG |

3.3 RELAY



| Interface name | Pin serial number | Interface definition | Interface description |
|----------------|-------------------|----------------------|-----------------------|
| Relay1 | 1 | SW1_1 | 1-2 normally open |
| | 2 | SW1_2 | 2-3 normally closed |
| | 3 | SW1_3 | 2-3 normally closed |
| Relay2 | 1 | SW2_1 | 1-2 normally open |
| | 2 | SW2_2 | 2-3 normally closed |
| | 3 | SW2_3 | 2-3 normally closed |

3.4 RS485



| Interface name | Pin serial number | Interface definition | Interface description |
|----------------|-------------------|----------------------|-----------------------|
| 485(12V)@MCU | 1 | 12V_RS485 | 4A |
| | 2 | GND | land |
| | 3 | A/TX+/RX+ | I/O |
| | 4 | B/TX-/RX- | I/O |
| 485(5V)@MCU | 1 | 5V_RS485 | 4A |

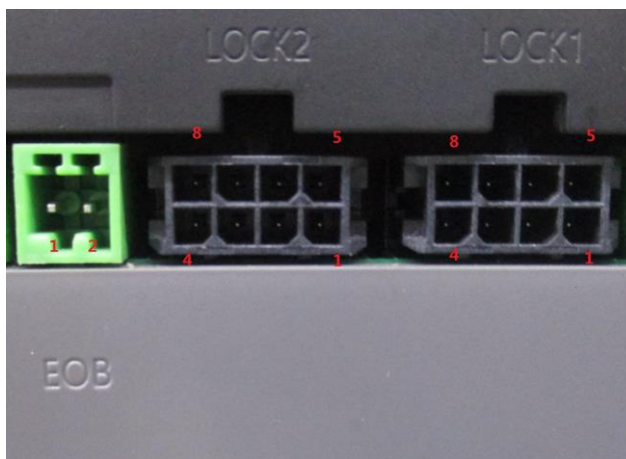
| | | | |
|-----------------|---|-----------|------------------------------|
| | 2 | GND | land |
| | 3 | A/TX+/RX+ | I/O |
| | 4 | B/TX-/RX- | I/O |
| 485-1@NX | 1 | 5V_RS485 | 4A |
| | 2 | GND | land |
| | 3 | A/TX+/RX+ | The terminal can be twisted. |
| | 4 | B/TX-/RX- | |
| 485-2@NX | 1 | 12V_RS485 | 4A |
| | 2 | GND | land |
| | 3 | A/TX+/RX+ | The terminal can be twisted. |
| | 4 | B/TX-/RX- | |

Remarks:

In the current software protocol, 485-1 of MCU corresponds to 12v of hardware and 485-2 corresponds to 5V of hardware.

Need to communicate with customers in the later period, named 485-1 to 485-4.

3.5 LOCK、EOB



| Interface name | Pin serial number | Interface definition | Interface description |
|----------------|-------------------|----------------------|--|
| L1 | 1 | COM1 | COM |
| | 2 | COM1 | COM |
| | 3 | NC | NC |
| | 4 | GND | GND |
| | 5 | DOOR1_DTEC | switching value |
| | 6 | DOOR1_LOCK | switching value |
| | 7 | LOCK1_TRI | 12V level, dip switch can select high and low trigger. |
| | 8 | 12V | 1.5A peak, 12V controllable |

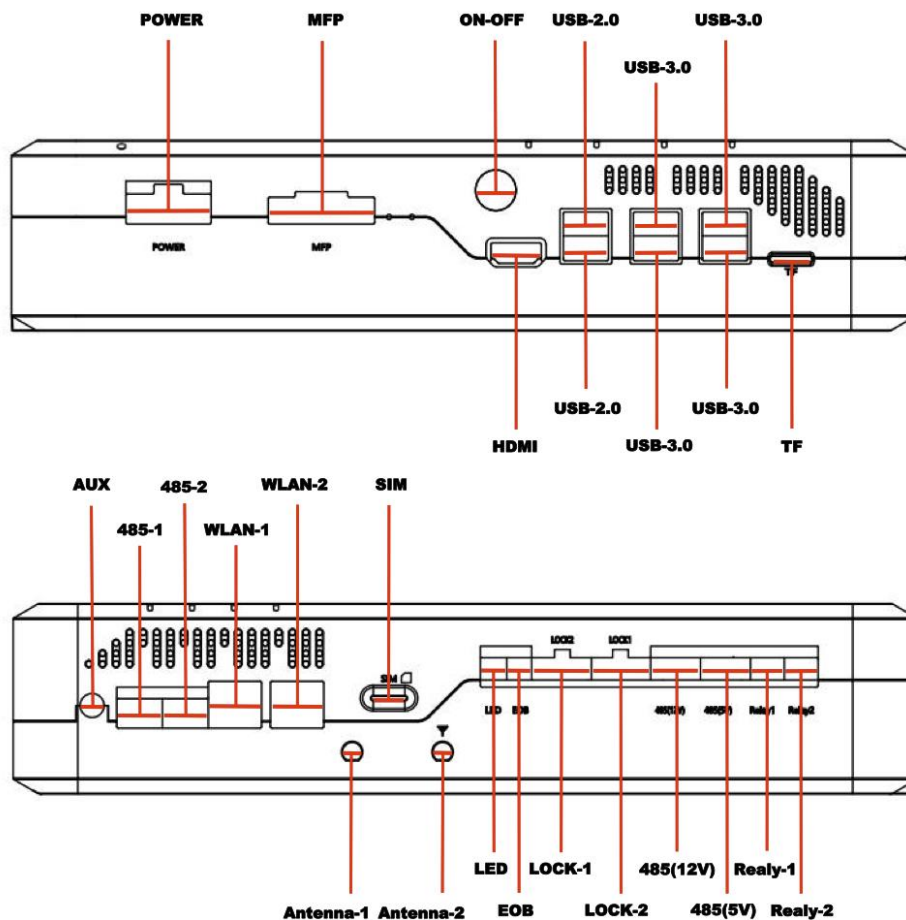
| | | | |
|------------|---|------------|--|
| L2 | 1 | COM2 | COM |
| | 2 | COM2 | COM |
| | 3 | NC | NC |
| | 4 | GND | GND |
| | 5 | DOOR2_DTEC | switching value |
| | 6 | DOOR2_LOCK | switching value |
| | 7 | LOCK2_TRI | 12V level, dip switch can select high and low trigger. |
| | 8 | 12V | 1.5A peak, 12V controllable |
| EOB | 1 | LOCK_CTL# | Emergency button to open 3 locks. |
| | 2 | GND | land |

3.6 LED



| Interface name | Pin serial number | Interface definition | Interface description |
|----------------|-------------------|----------------------|-----------------------------------|
| LED | 1 | 12V | LED positive terminal, 30W |
| | 2 | PWM1_CTL | PWM control LED negative terminal |

3.7 Product External Interface Description



Chapter IV Function Declaration

4.1 System Information

1.1.1 boot into the terminal and enter the command: `cat /proc/version` to check the current system software version.

```
sandstar@sandstar-desktop:~$ cat /proc/version
Linux version 4.9.140-tegra (tztek@build) #2 SMP PREEMPT Mon Dec 7 14:01:53 CST
2020 tztek_version:v1.0.0_T20I_751_release
sandstar@sandstar-desktop:~$ dmesg | grep DTB
[ 0.477803] DTB Build time: Dec 7 2020 14:01:45
[ 0.758298] DTB Build time: Dec 7 2020 14:01:45
```

The 1-1-1

1.1.2 check the local SN number.

Enter the command: `cat/sys/firmware/devicetree/base/serial-number`

```
sandstar@sandstar-desktop:~$ cat /sys/firmware/devicetree/base/serial-number
142222002704 sandstar@sandstar-desktop:~$
```

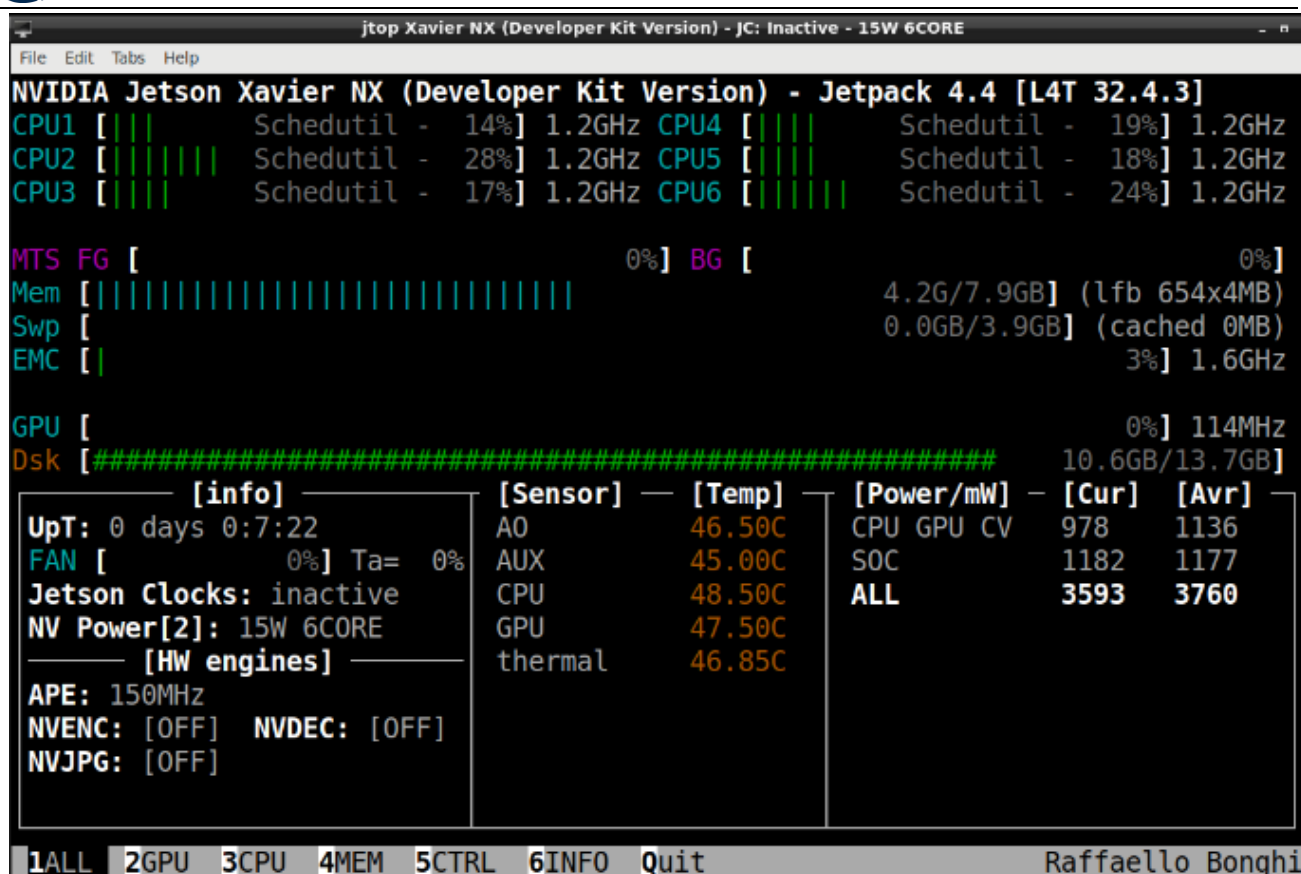
The 1-1-2

4.2 System State

Provide the system status check command to check the load information of the current system. The command description is shown in the following table:

| order | instruction | Test content |
|--------------|-------------|--|
| system state | jtop | Current operating frequency and maximum frequency of each CPU core |
| | | GPU current usage rate |
| | | Main board temperature |
| | | CPU temperature |

The execution results are shown in the following figure:



The 1-2-1

4.3 4G Network

Hardware supports 4G network, uses SINOCK 4G routing module, and supports 4G network services of China Mobile, China Unicom and China Telecom.

Please insert the 4G card before using the 4G network. Check eth0 IP address through ifconfig command after normal power-on:

```
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.150.100 netmask 255.255.255.0 broadcast 192.168.150.255
    inet6 fe80::3989:3df6:e155:a6ca prefixlen 64 scopeid 0x20<link>
    ether 48:b0:2d:07:69:aa txqueuelen 1000 (Ethernet)
    RX packets 1076 bytes 190830 (190.8 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 1922 bytes 197518 (197.5 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device interrupt 37
```

The 1-3-1

Note: Under normal circumstances, eth0 gets the IP address of 192.168.150.100 assigned by 4G routing module.

Note: plugging and unplugging the 4G card after power-on, you need to power up again before you can use 4G to access the Internet.

4.4 Wired Network Configuration Method

Hardware supports access to external wired networks. If the 4G network needs to be turned off, the following methods are provided:

1. use nx_4G_power_enable interface in tz_gpio operation instruction in the next chapter to disconnect the power supply of 4g module, and then connect the external network cable;

Usage instruction: `sudo ifconfig eth0 down`

`sudo ifconfig eth0 up`

Re-acquire the IP address of eth0 port. Note that this IP address is the IP address dynamically allocated by the superior route of the network cable to which the equipment is connected, and the IP address is no longer 192.168.150.100.

```
sandstar@sandstar-desktop:~$ ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
    inet 192.168.34.30  netmask 255.255.255.0  broadcast 192.168.34.255
    inet6 fe80::3989:3df6:e155:a6ca  prefixlen 64  scopeid 0x20<link>
    ether 48:b0:2d:07:69:aa  txqueuelen 1000  (Ethernet)
    RX packets 297  bytes 80584 (80.5 KB)
    RX errors 0  dropped 0  overruns 0  frame 0
    TX packets 332  bytes 50667 (50.6 KB)
    TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
    device interrupt 37
```

The 1-4-1

Chapter V Tz_gpio Operating Instructions

After the machine is started, find the tz_gpio directory in the file system /sys/class/ directory, which is the control interface of each module function provided by the bottom layer to the application layer, as follows:

```
sandstar@sandstar-desktop:/sys/class/tz_gpio$ ls
4g_led_1      nx_heartb_rx  rs485_ctrl1   usb3_1_enable
4g_led_2      nx_heartb_tx  rs485_ctrl2   usb3_2_enable
4g_led_3      nx_recovery_mcu sdc_card_enable usb3_3_enable
4g_led_4      nx_reset_mcu  spi_uart_reset usb3_4_enable
mcu_power_enable nx_transfor_enable usb2_1_enable
nx_4g_power_enable power_led      usb2_2_enable
```

Figure 2-1

5.1 4G Function Module

As shown in the above figure: 4G_LED_1 \ 4G_LED_2 \ 4G_LED_3 \ 4G_LED_4 are the signal indicator control interfaces of 4G module respectively. If you need to control each LED separately, please refer to the following operation steps:

1. switch to 4g_led_1 directory: `cd 4g_led_1/;`
2. direction and value respectively correspond to the input and output direction and level of the GPIO at the back end of the LED (high level lighting);
3. Considering the security of user layer, it is necessary to change the permissions of direction and value before using the corresponding control interface, such as:

```
sudo chmod 777 direction
```

```
sudo chmod 777 value
```

4. After the permission is changed, it can be controlled by the echo command. For the LED lamp control in this example, the direction is output by default, and there is no need to change it.

Sudecho1 > value can light LED lamp 1;

```
sandstar@sandstar-desktop:/sys/class/tz_gpio/4g_led_1$ ls
dev direction power subsystem uevent value
sandstar@sandstar-desktop:/sys/class/tz_gpio/4g_led_1$ sudo chmod 777 direction
sandstar@sandstar-desktop:/sys/class/tz_gpio/4g_led_1$ cat direction
output
sandstar@sandstar-desktop:/sys/class/tz_gpio/4g_led_1$ sudo chmod 777 value
sandstar@sandstar-desktop:/sys/class/tz_gpio/4g_led_1$ cat value
0
sandstar@sandstar-desktop:/sys/class/tz_gpio/4g_led_1$ sudo echo 1 > value
```

The 2-1-1

5. Nx_4g_power_enable is the power control interface of 4G module, which can be used to power up and down 4G module! Operation mode can refer to figure 2-1-2:

```
sandstar@sandstar-desktop:/sys/class/tz_gpio$ cd nx_4g_power_enable
sandstar@sandstar-desktop:/sys/class/tz_gpio/nx_4g_power_enable$ ls
dev direction power subsystem uevent value
sandstar@sandstar-desktop:/sys/class/tz_gpio/nx_4g_power_enable$ sudo chmod 777
value
sandstar@sandstar-desktop:/sys/class/tz_gpio/nx_4g_power_enable$ cat value
0
sandstar@sandstar-desktop:/sys/class/tz_gpio/nx_4g_power_enable$ sudo echo 1>val
ue
```

The 2-1-2

After the 4g module is turned off, it can be observed that the 4G module power indicator lamp and the network signal lamp are off and the module is powered off.



The 2-1-3

Power up the 4g module again as follows:

```
sandstar@sandstar-desktop:/sys/class/tz_gpio/nx_4g_power_enable$ sudo echo 0 > v
alue
```

The 2-1-4

It can be observed that the power indicator lights up (Figure 2-1-5). After waiting for a period of time, the 4g module successfully dials in the network, and the blue indicator lights up (Figure 2-1-6)



The 2-1-5



The 2-1-6

6.Venus 20-US-4G-PCIE-M2, Venus 20-CN-4G-NA-M2, Venus 20-CN-NA-NA-M2 and Venus 20-US-4G-NA-M2 are Engineering control equipments in the GSM/UMTS/LTE system. The GSM frequency band includes GSM850 and GSM900 and DCS1800 and PCS1900. but only GSM850/1900 test data included in this report. The UMTS frequency band are band I /II /IV/V/VI/VIII/XVIII, but only band II and Band IV and Band V test data included in this report. The LTE frequency band is Band I/II/III/IV /V/VII/VIII/XII/XIII/XVIII/XVIII/XX/XXV/XXVI/XXVIII/XXXVIII/XXXVIII/XXXX/XXXXI, but only Band II/IV /V/VII/XII/XIII/XXV/XXVI/XXXVIII/XXXXI test data included in this report. The Engineering control equipments implements such functions as RF signal receiving/transmitting, LTE/UMTS and GPRS/EDGE protocol. Externally it provides micro SD card interface and USIM card interface. The EUT is powered by DC 12V/12.5A. For more detailed features description, please refer to the user's manual.

5.2 USB Function Module

As shown in Figure 2-1, USB2_1_enable\ USB2_2_enable\ USB3_1_enable\ USB3_2_enable\ USB3_3_enable\ USB3_4_enable is the power control interface of two USB2.0 and four USB3.0 terminals respectively.

The control mode can refer to 4g module function control in 2.1, and the default value of USB terminal is 1(USB port is available). The operation example diagram is as follows:

```
sandstar@sandstar-desktop:/sys/class/tz_gpio$ cd usb2_1_enable
sandstar@sandstar-desktop:/sys/class/tz_gpio/usb2_1_enable$ ls
dev direction power subsystem uevent value
sandstar@sandstar-desktop:/sys/class/tz_gpio/usb2_1_enable$ sudo chmod 777 value
[sudo] password for sandstar:
sandstar@sandstar-desktop:/sys/class/tz_gpio/usb2_1_enable$ cat value
1
sandstar@sandstar-desktop:/sys/class/tz_gpio/usb2_1_enable$ sudo echo 0 > value
```

The 2-2-1

5.3 Communication Control Link Master Control

Nx_transfor_enable: It involves the control with MCU, as shown below:

- MCU power control: mcu_power_enable;
- MCU reset: nx_reset_mcu;
- MCU rollback: nx_recovery_mcu;
- Heartbeat MCU-> NX: NX_heartbeat_rx;
- Heartbeat NX-> MCU: NX_heartbeat_tx;

Only when NX_transmit_enable is turned on can the control signal to MCU be received by MCU.

Examples: such as controlling mcu reset


```
sandstar@sandstar-desktop:/sys/class/tz_gpio/nx_transfor_enable$ cat value
1
sandstar@sandstar-desktop:/sys/class/tz_gpio/nx_transfor_enable$ cd ../
sandstar@sandstar-desktop:/sys/class/tz_gpio$ ls
4g_led_1      nx_heartb_rx  rs485_ctrl1  usb3_1_enable
4g_led_2      nx_heartb_tx  rs485_ctrl2  usb3_2_enable
4g_led_3      nx_recovery_mcu sdcard_enable usb3_3_enable
4g_led_4      nx_reset_mcu  spi_uart_reset usb3_4_enable
mcu_power_enable nx_transfor_enable usb2_1_enable
nx_4g_power_enable power_led      usb2_2_enable
sandstar@sandstar-desktop:/sys/class/tz_gpio$ cd nx_reset_mcu
sandstar@sandstar-desktop:/sys/class/tz_gpio/nx_reset_mcu$ ls
dev direction power subsystem uevent value
sandstar@sandstar-desktop:/sys/class/tz_gpio/nx_reset_mcu$ sudo chmod 777 value
sandstar@sandstar-desktop:/sys/class/tz_gpio/nx_reset_mcu$ cat value
0
sandstar@sandstar-desktop:/sys/class/tz_gpio/nx_reset_mcu$ echo 1 > value
sandstar@sandstar-desktop:/sys/class/tz_gpio/nx_reset_mcu$ echo 0 > value
sandstar@sandstar-desktop:/sys/class/tz_gpio/nx_reset_mcu$
```

The 2-3-1

5.4 NX System Operation Lamp Module:

When you enter the system, the LED light will always be on. If you need to control at the system level, you can control it according to the 4g module LED control mode. For details, please refer to the control of 4G signal lamp in 2.1.

5.5 RS485 Peripheral Power Supply Control:

Rs485_ctrl1\ rs485_ctrl2 are the transceiver control interfaces of two RS485 peripheral sensors respectively. If it is necessary to control the transceiver of peripheral 485. Reference can be made as follows:

```
sandstar@sandstar-desktop:/sys/class/tz_gpio/rs485_ctrl1$ ls
dev direction power subsystem uevent value
sandstar@sandstar-desktop:/sys/class/tz_gpio/rs485_ctrl1$ sudo chmod 777 value
sandstar@sandstar-desktop:/sys/class/tz_gpio/rs485_ctrl1$ cat value
0
sandstar@sandstar-desktop:/sys/class/tz_gpio/rs485_ctrl1$ echo 1 > value
sandstar@sandstar-desktop:/sys/class/tz_gpio/rs485_ctrl1$ cat value
1
```

The 2-5-1

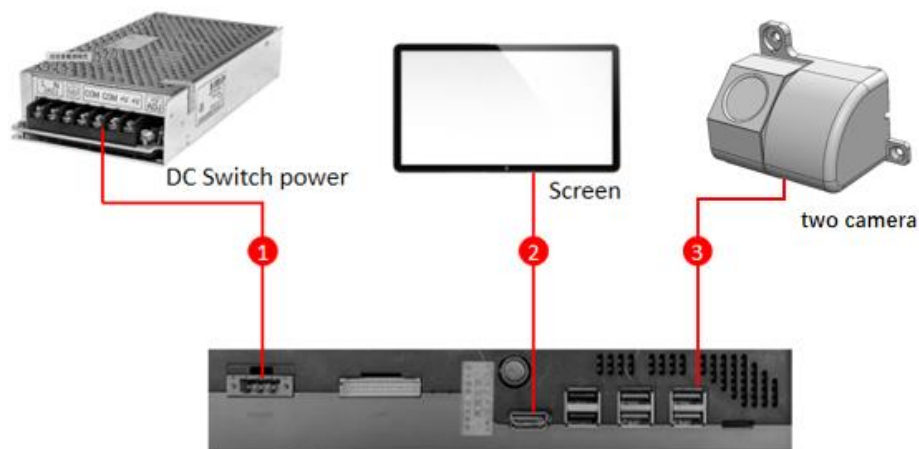
Chapter VI Usage Scenarios and Precautions

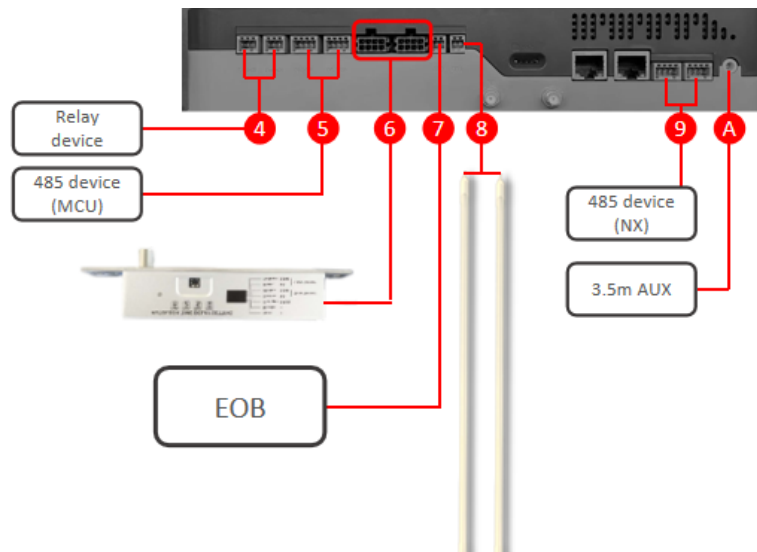
6.1 Usage Scenario

As the terminal brain of the intelligent container, the device is mainly installed on commercial containers of various models and different functions. The device, together with other peripherals such as cameras and plug locks, forms an intelligent container with the cabinet body. Based on the solution of visual deep learning, the device realizes the quick identification of goods at the edge of the device, and combines the confidential payment or POS payment system. Bring customers a minimalist shopping experience.

After being combined with the container, the equipment is converted into an unattended intelligent container, which is widely used in retail scenes such as shopping malls, schools, hospitals, office buildings and airports.

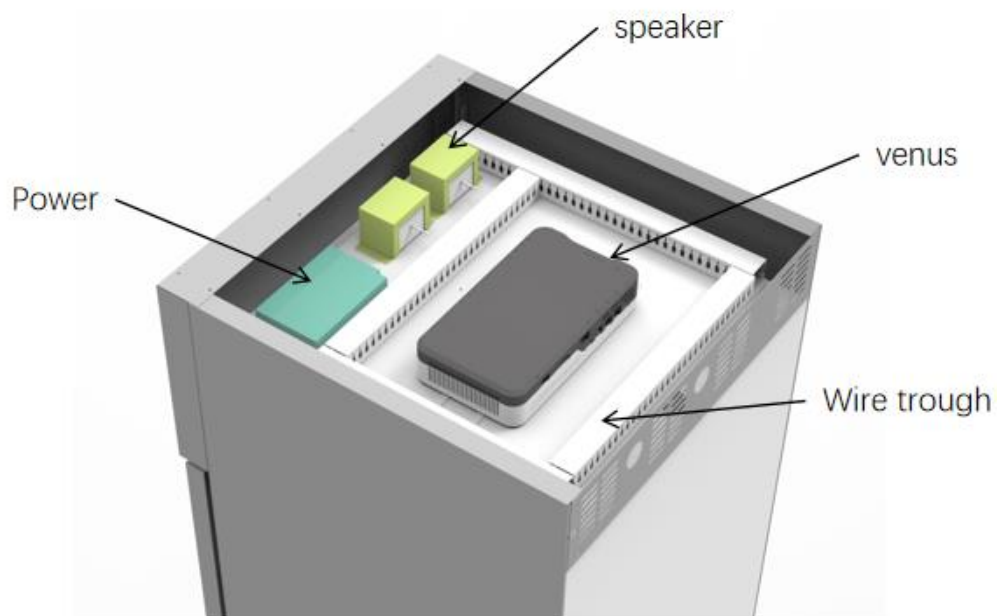
6.2 Peripheral Installation Schematic Diagram





6.3 Typical Installation Case

- (1) Typical location of industrial control computer installed on container



Case cabinet model

- (2) Guidance on proper use of SIM card

First, prepare a SIM card, with the side with the chip facing down and the side with the gap facing to the upper left corner. As shown in the figure below, insert the SIM card into the card slot, which will make a "pop" sound, then push it in, and the card will automatically pop up and take it out.



The 3-1-1

(3) SIM card insertion demonstration



The 3-1-2



The 3-1-3



The 3-1-4



The 3-1-5

Remarks:

Figure 3-1-1 Figure 3-1-2: SIM is inserted correctly.

Figure 3-1-3-1-3 SIM card has not been inserted yet, so the illustration is wrong.

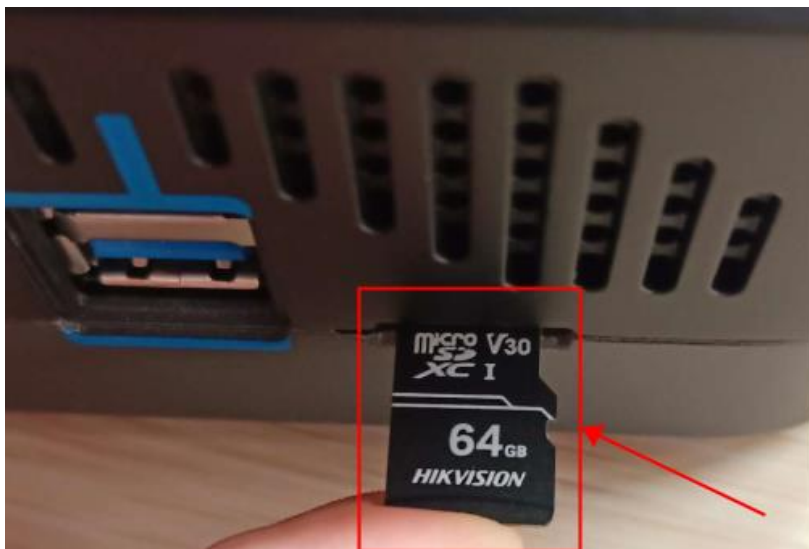
Figure 3-1-4 The SIM card should be chip down, so the illustration is wrong.

Figure 3-1-5 The notched side of the SIM card should face the upper left corner, so the illustration is wrong.

6.4 TF Card Insertion and Extraction Problem

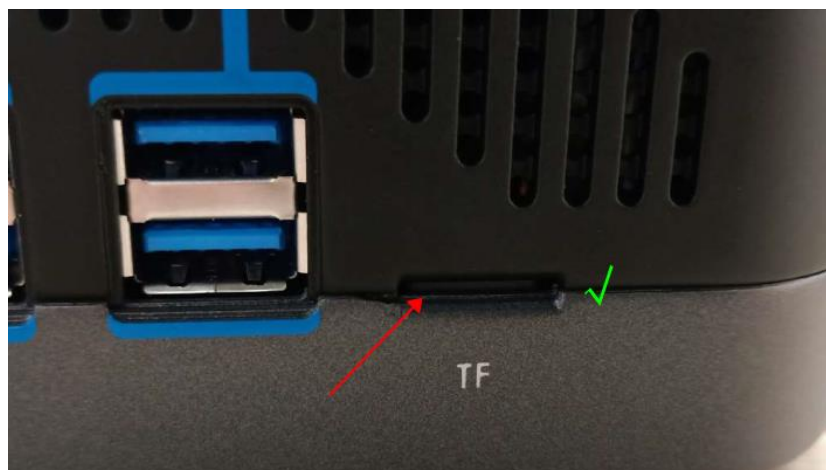
(1) Guidance on proper use of TF card

First, prepare a TF card, with the side with the chip facing down and the uneven side on the right. As shown in the figure below, insert the TF card into the card slot, which will make a "pop" sound, then push it in, and the card will automatically pop up and take it out.

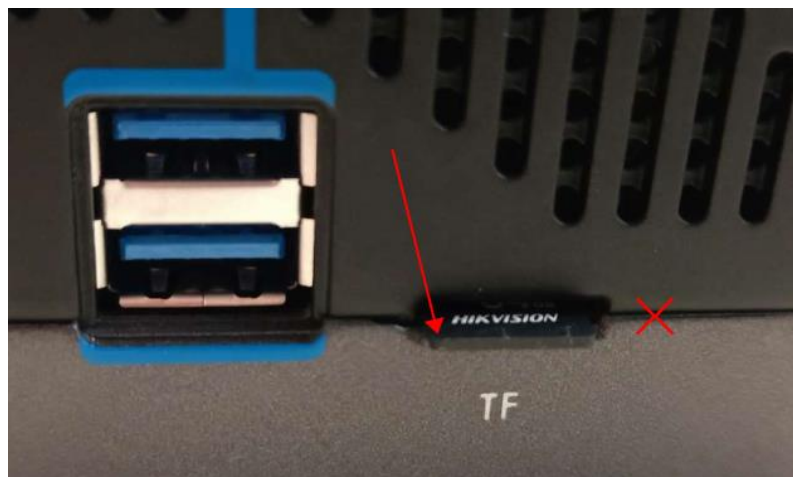


The 3-2-1

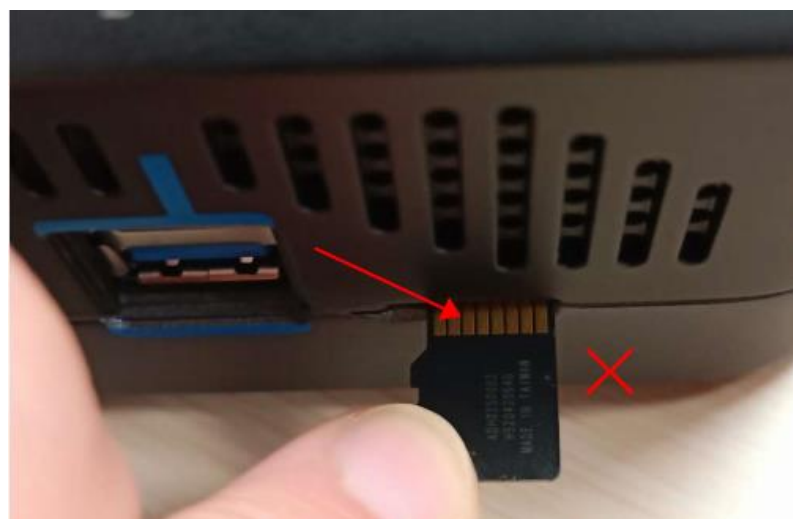
(2) TF card insertion demonstration



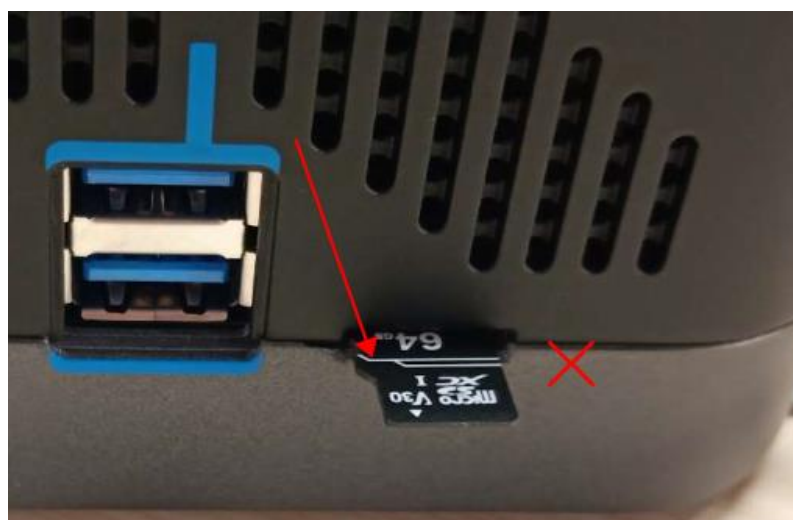
The 3-2-2



The 3-2-3



The 3-2-4



The 3-2-5

Remarks:

Figure 3-2-1 3-2-2: TF card is inserted correctly.

Figure 3-2-3 TF card has not been inserted yet, so the illustration is wrong.

Figure 3-2-4 TF card should be chip down, so the illustration is wrong.

Figure 3-2-4 The uneven side of TF card should be on the right side, so the illustration is wrong.

6.5 Antenna Specification and Parameters

Note: The installation and after-sales maintenance of this equipment need professional engineers to operate, and ordinary consumers can't touch this product.



| Physical Parameters | |
|---------------------|-------------------------|
| Bandwidth | 4G/LTE |
| | 698-960MHz,1710-2700MHz |
| Gain | 6dBi |
| SWR | ≤1.5 |
| Polarization | Vertical |
| Radiation Direction | Omnidirectional |
| Input Impedance | 50Ω |
| Power Capacity | 20W |
| Other Parameters | |
| Height | 306mm |
| Base Diameter | 30mm |
| Total Weight | 56g |
| Cable Length | 3m |
| Cable Material | RG174 |
| Connector | SMA male |
| Working Temperature | -40℃~+85℃ |
| Storage Temperature | -40℃~+85℃ |



Warning: Any Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Warning:

1. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.
2. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
 - (1) this device may not cause harmful interference, and
 - (2) this device must accept any interference received, including interference that may cause undesired operation.

3. RF Exposure Information:

"FCC RF Radiation Exposure Statement Caution: To maintain compliance with the FCC's RF exposure guidelines, place the product at least 20cm from nearby persons."