TWOWIN TW-T906G USER MANUAL

Making the world smarter and making life better!

TWOWIN TECHNOLOGY CO. LTD

Content

Document Revision Table Content

Document Version

Version1.0

Document version number	Date of revision	Revisions
V1.0	2020/07/23	Initial release

Introduction

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Safety Warnings and Precautions for Use

- Safety Instructions

Before using this product, you must first consult this document to gain an initial understanding of the product and follow the safety instructions in this manual to ensure your personal safety and to avoid damage to the equipment, the manufacturer will not be responsible for any problems caused by the incorrect operation of the equipment or the safety of your life and property.

- Supply Voltage

The TW-906G edge computing platform has a stable and reliable power supply on the input side with typical power of 45W and maximum power of 75W;

Power supply range: 9 - 36v

- Environmental Requirements

Operating temperature: -20°C - 55°C

Ventilation requirements: The computing platform must be well ventilated around the installation.

- Grounding Requirements

The power supply of the power adapter must be well earthed, in exceptional cases the grounding screw on the computing platform must be installed.

- Electrostatic Protection

Electronic components and circuits are sensitive to electrostatic discharge. Although we design our circuit board card products to protect the main interfaces on the board against electrostatic discharge, it is difficult to protect all components and circuits against electrostatic discharge. It is therefore advisable to observe anti-static safety measures when handling any circuit board components. ESD safety protection measures include, but are not limited to, the following.

- The box should be placed in an anti-static bag during transport and storage until the board is installed and deployed;
- Static electricity should be discharged from the body prior to physical contact with the box: wear a discharge grounding wrist strap;
- Only operate the box in a safe area of the static discharge point;
- Avoid moving the box in carpeted areas.

- Operation and Maintenance

Operators or maintenance personnel must be trained and qualified before they can be involved in operation or maintenance.

Introduction

TW-906G is a computing platform based on NVIDIA® JETSON AGX ORIN™ series modules for driverless in-vehicle systems, with integrated AGX ORIN modules, pre-installed Ubuntu 20.04 operating system, 200 TOPS floating point AI processing capability, super strong solid lightweight aluminum alloy design, conductive passive heat dissipation, with excellent heat dissipation capability. It has excellent heat dissipation capability, light weight and novel appearance, supports USB, CAN, RS232, GPIO, synchronous signal and other rich IO interface types, built-in 4G communication module and WIFI module, supports synchronous signal input and output. The TW-906G is equipped with a built-in 4G communication module and WIFI module, and supports synchronous signal input and output. It has a strong computing capability, high reliability, high integration and low power consumption, which can be used in unmanned vehicles such as unmanned cleaning vehicles, unmanned delivery vehicles, intelligent inspection and AGV.

Overview of the TW-906G edge computing platform

- It is embedded with NVIDIA® JETSON AGX ORIN™
- It supports M.2 KEY M (PCIEX4 NVME 2280)
- It supports M.2 KEY E (PCIEX1 2230)

It supports 8 GMSL2 cameras

- It supports multiple interfaces (e.g. CAN/USB/Ethernet/Synchronous Signal/Serial/GPIO, etc.)
- It supports dual-band WIFI/Bluetooth/4G/5G module
- Japan JAE automotive grade IO plug (1xPOWER, 3xCAN, 2xGPIO)
- Fan and passive cooling design
- It has built-in ubuntu 20.04 system and JETPACK SDKS

Product Specifications

Processors and Core Modules

Processor	NVIDIA AGX ORIN
CPU	8-core NVIDIA Arm® Cortex A78AE v8.2 64-bit CPU 2MB L2 + 4MB L3
CPU Max Frequency	2.2 GHz
GPU	1792-core NVIDIA Ampere GPU with 56 Tensor Cores
GPU Max Frequency	939 MHz
Memory	32 GB 256-bit LPDDR5
DI accelerator	2 x NVDLA x 2.0
DLA Max Frequency	1.4 GHz
Storage	64GB eMMC 5.1 1 x m.2 key m nvme 2280 (optional installation)

Interface

	Interface	Quantity	Note	
Network	4G	1	Youfang N720/Yiyuan EC20/ Fibocom NL668 (optional installation)	
	5G	1	Fibocom FM150-AE/SIMComSIM7600CE (optional installation)	
	ETHERNET	2×RJ45 GIGABIT NETWORK PORT	ALTERNATIVE RJ45 AND WATERPROOF PORT(1000BASE-T)	
	WIFI	1	2.4G/5.8G 300MBPS	
Video output	HDMI	1×HDMI 2.0 TYPE A	No support for adapter signals (e.g. vga to hdmi format)	
USB	USB	4×USB 3.0TYPE A	USB 5V, 1A	
	TYPE-C	1xOTG	USB2.0	
I/O	GPIO	2xGPIO (Independent input and output)	3.3VTTLlevel	Japan JAE connector MX23A12SF1
	CAN	2xCAN	WITH CAN CHIP	
	UART	1x RS-232 D-SUB9	TYPE-C USB FORM UART DEBUG (BUILT IN USB-TO-UART CONVERTER)	
	TIME SYNC	1x Input synchronization signal D-SUB9	RS232 DB9 TERMINAL	
	M.2	1×M.2 M KEY 1X M.2 KEY E (2230)	1xPCIE NVME 2280 SSD (optional installation) 1xUSB 2230 WIFI (optional installation)	
Function key	Power key	1	Button	
	Reset key	1	Button	
	Recovery key	1	Button	

Codec

Video Encode	2x 4K60 (H.265) 4x 4K30 (H.265) 8x 1080p60 (H.265) 16x 1080p30 (H.265)
Video Decode	1x 8K30 (H.265) 3x 4K60 (H.265) 7x 4K30 (H.265) 11x 1080p60 (H.265) 22x 1080p30 (H.265)

Power Supply

Power supply	**Spec**
Input type	Japan JAE connector MX23A12SF1
Input voltage	Wide input 9-36v
Typical consumption	Typical power 45W Max.75W

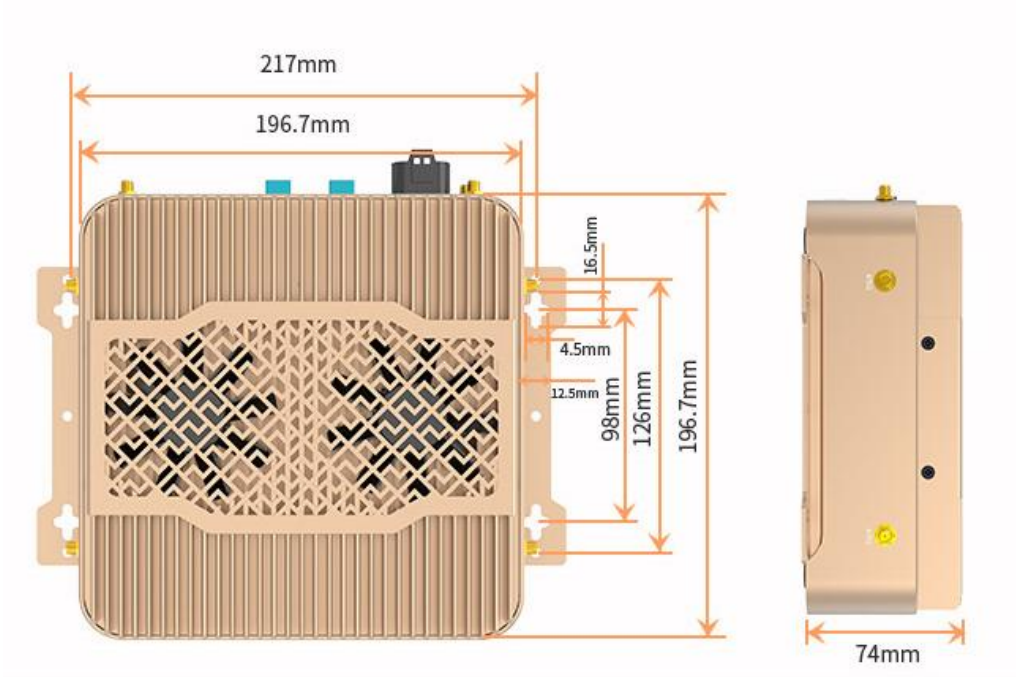
Structure

Mechanical	**Spec**
Dimensions (w×h×d)	170(w)mm×1(d)mm ×73.0(h)mm
Weight	2.5kg

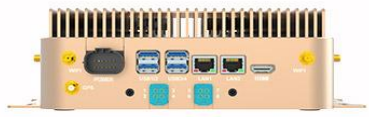
Environment

Environmental	Spec
Operating temperature	-20℃-55℃
Storage humidity	10%-90% non-condensing

Dimension



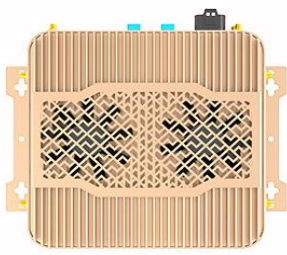
主视图



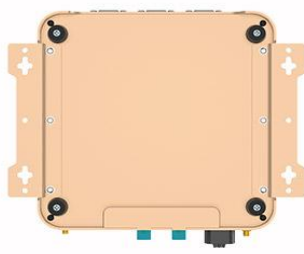
后视图

左视图

右视图



俯视图



仰视图

Service and Support

Technical Support

If you have a problem, or you think your product is defective, please visit our website with your question, browse our FAQ section to find solutions to common problems, or contact us by phone or WeChat. We will make the appropriate work arrangements to meet your needs and help you solve your problems.

Warranty

Warranty period: The warranty period for the pictured equipment is one year from the date of purchase. Warranty regulations: During the warranty period, if the product is not damaged by man, Twowin will provide a free warranty. Please contact customer service via the purchase platform and by phone for warranty assistance. (Please refer to the TWOWIN TECHNOLOGY CO. LTD warranty policy for details).

Description of Interface

Front Interface

Diagram of the TW-906G front interface

Interface	Name of interface	Description of interface
POWER	Power button	Press and hold to switch off, press to display the four relevant options
RES	Restore button	Use alone to reset and reboot, use with REC to enter RECOVER mode
REC	Reset button	Use alone for no effect, with the reset button to enter RECOVER mode
SIM	SIM card slot	Install the SIM card in the direction shown
DEBUG	Information debugging serial port	Debugging information can be output by connecting a TYPE-C cable
OTG	TYPE-C interface	Data exchange by connecting the device to the TYPE-C cable
AUDIO	Audio interface	External sound playback device
POWER_LED	Power status indicator	After power on: the indicator light is green and always on
RUN_LED	System status indicator	Power on: red light on
COM1	RS232	Standard RS232 serial port (corresponding to device number ttyTHS0)
COM2	RS232	Standard RS232 serial port (corresponds to device number

		ttyTHS1, if built-in GPS, this interface is occupied)
TIME SYNC	RS232	Standard RS232 serial port (corresponds to device number ttyTHS4)

Note: RECOVER mode: It refers to the download mode, which is mainly used to reinstall the system and install part of the SDK using SDK MANAGER, the device enters RECOVER mode by pressing and holding the REC button, then pressing and holding the RES button, releasing the RES button after 2 seconds, and finally releasing the REC button. Enter LSUSB into the host terminal to see if there is an NVIDIA CORP. If not, check if the TYPE-C cable is connected, if the host USB is connected, and if the key sequence and time duration are correct. The host USB interface is recommended to use USB3.0 interface.

Features

System Description

Twowin T906G device is powered by Ubuntu 20.04. Default username: nvidia Password: nvidia

We have not set the root user name and password, if you want to enter the root user, please execute the following command to do so:

sudo -s

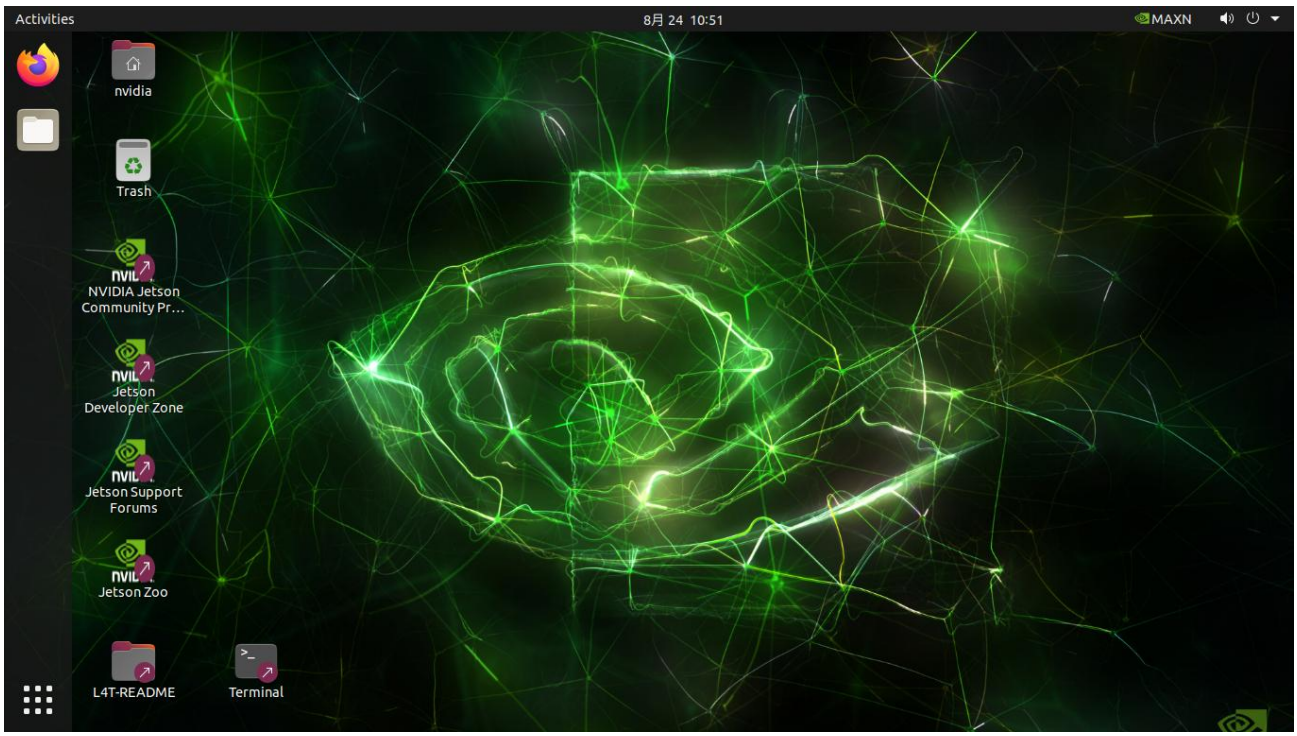
Enter the password: nvidia

System Re-flash

Please refer to the subsequent system installation section for details on how to refresh your system.

Switching On and Off

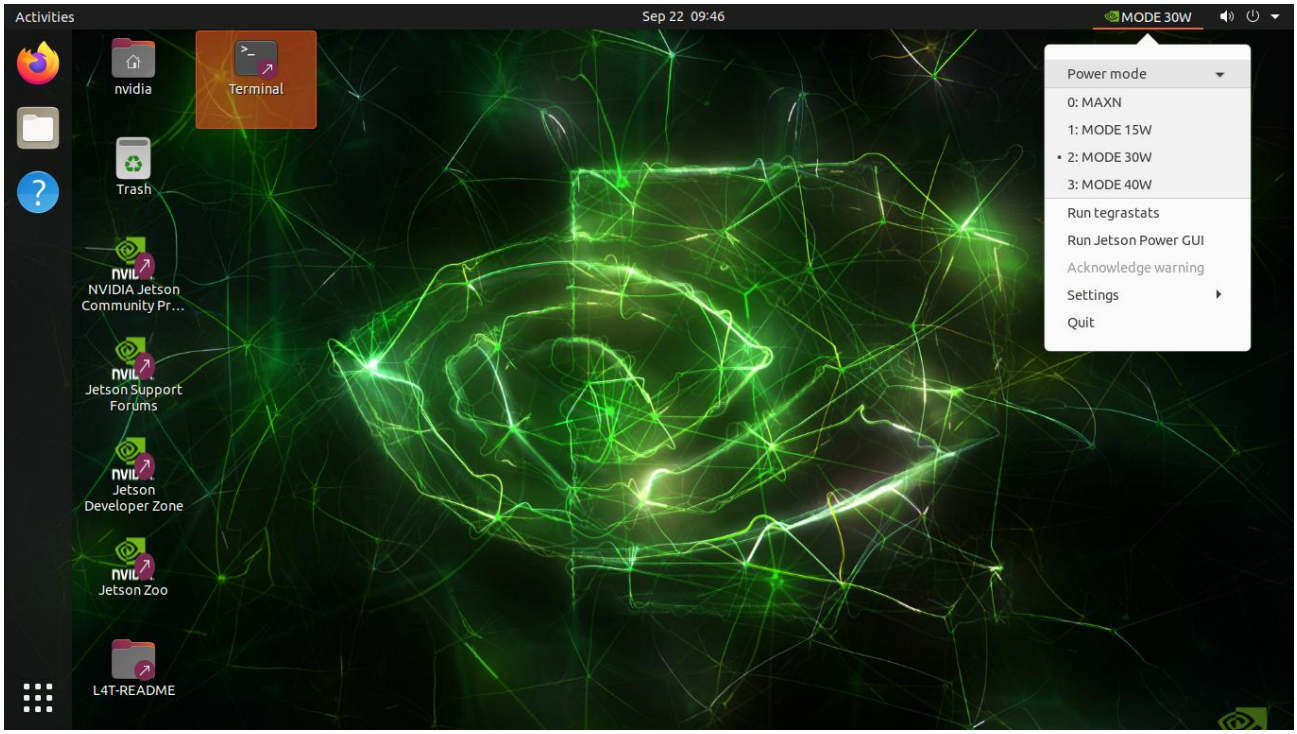
Power on: The default power on mode of the TW-T906G device is power on and self start. Plug in the power supply and connect the display to the device via HDMIinterface, the boot screen will be as shown in the picture.



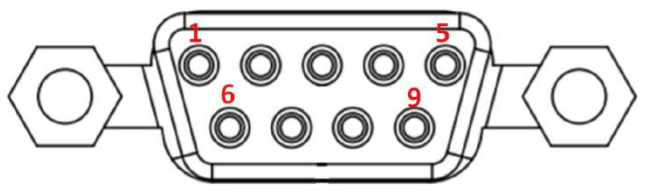
Start-up screen

Operating Mode Switching

Different operating modes use different cpu cores and power. You can choose according to your needs by clicking on the options indicated by the arrows to select the mode;



Serial Port Description



PIN sequence of the D-SUB connector

RS-232 Connector PIN Definition			
PIN#	Definition	PIN#	Definition
1	DCD	2	RXD
3	TXD	4	DTR
5	GND	6	DSR
7	RTS	8	CTS
9	RI		

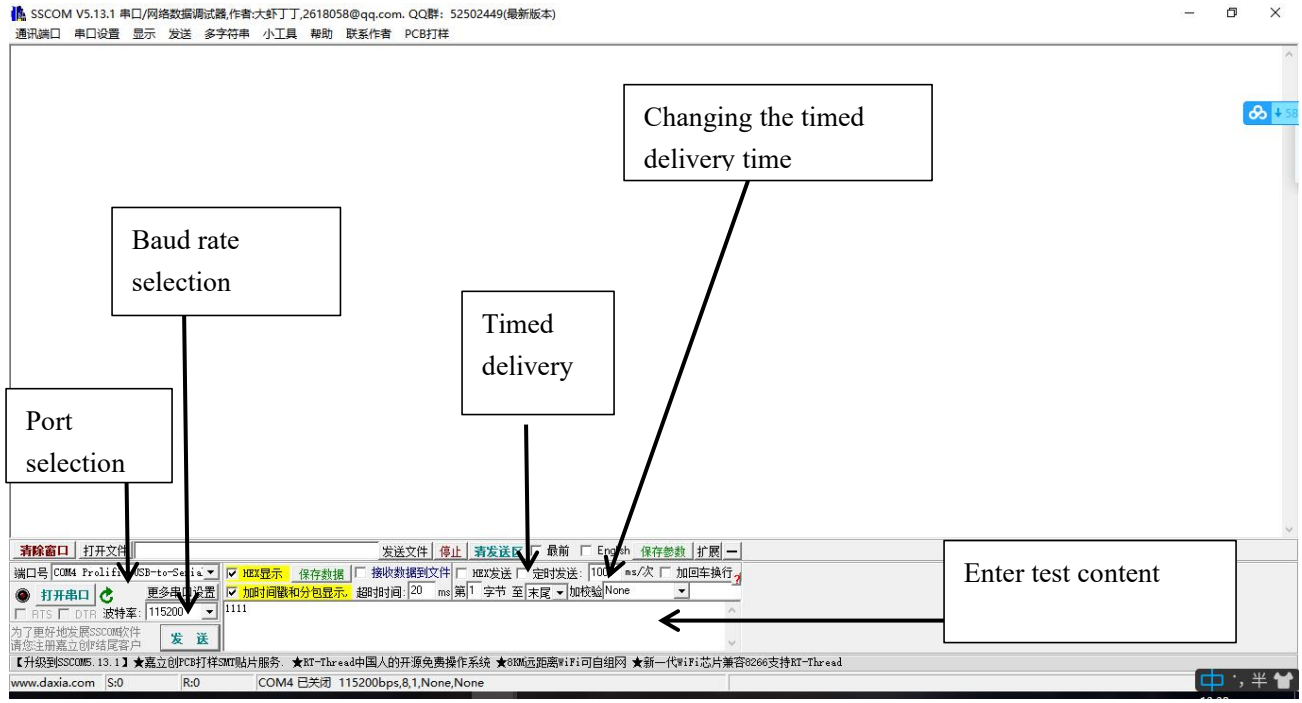
Test method of serial port:

We use the usb to serial cable as shown in the picture to test the TW-906G device accordingly. The serial port is a standard serial port, so you will need to purchase a standard usb to serial cable for this test. This cable is not included in our factory products.

USB-RS232

RS232 test:

Step 1: Connect the TW-906G device COM1 or COM2 with the female side of the usb-RS232 adapter cable, connect the usb side to the computer, and open the serial test tool sscom on the computer side (download link below).



Port number selection, baud rate selection 115200, input box to enter the test content, first modify the timed transmission time, and finally click the timed transmission

Step 2: Enter sudo cutecom in the TW-906G device terminal to open cutecom (the default setting can be set), and select ttyTHS1 (COM1) for the serial port number. Open the serial port and check if the correct information is received in the dialog box (in addition to Chinese garbled, garbled numbers or incorrect transmission data indicate that it is not normal, the transmission data is consistent, indicating that the serial port communication is normal)

Step 3: Refer to step 2, test COM2.COM3.

Test serial port tool download link: link: https://pan.baidu.com/s/1rdwcrghl_28_x6l20yjqxw

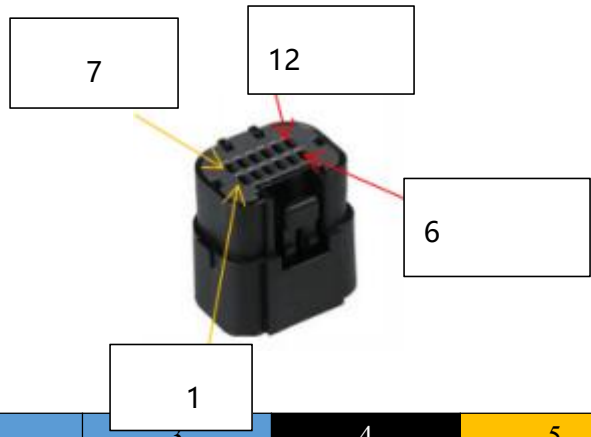
Extraction code: pf3d

Back interface

Diagram of the interface on the back of the TW-906G

Interface	Name of interface	Description of interface
WIFI	Interfaces for WIFI antennas	External WIFI antenna
GPS	Interfaces for GPS antennas	External GPS antenna
Multifunctional interfaces	Interfaces for multifunctional IO	It contains CAN0/CAN1, 4xGPIO and power supply inputs
USB×4	USB 3.0interface	USB3.1interface, backward compatible with USB2.0 interface
1 2 3 4 5 6 7 8	Interfaces for GMSL cameras	It supports super speed, high speed and low speed modes
LAN1	Ethernet 10 Gigabit Port	4-in-1GMSL2 camera interface
LAN2	Ethernet Gigabit port	10GbE interface
HDMI	HDMI interface	Gigabit Ethernet interface, backwards compatible with 100 Gigabit Ethernet interface

Multifunctional Interface



1	2	3	4	5	6
SPI-CAN-H0	CAN-H0	CAN-H1	GND	GPIO1	VCC-IN
7	8	9	10	11	12
SPI-CAN-L0	CAN-L0	CAN-L1	GND	GPIO2	VCC-IN

Definition of Interface

PIN Definition			
PIN#	Definition	PIN#	Definition
1	SPI-CAN-H0	7	SPI-CAN-L0
2	CAN_H0	8	CAN-L0
3	CAN-H1	9	CAN_L1
4	GND	10	GND
5	GPIO1 (GPIO-350 PA.02 0-1.8V) Default is output, low level	11	GPIO2 (GPIO-390 PG.07 0-3.3V) Default is output, low level
6	VDDIN(12-24V)	12	VDDIN(12-24V)

CAN Function Test

1. Content of can_test

The can_test directory contains the following files.

canSendTest : CAN communication send test executable file

canRecvTest : CAN communication receive test executable file

canUp.sh : CAN communication driver loading script

ko file: SPI-CAN driver module

2. Load the driver, set and enable the CANinterface

Run the command in the current directory

sudo . /canUp.sh

At the end of the run, "set can0 up success!!!" is printed. to indicate that the can0interface is set and enabled.

As shown below, after running, can0, can1 and can2 are available for use.

Note the bitrate baud rate.

```
nvidia@tegra-ubuntu:~/nfs$ sudo ./canUp.sh
[sudo] password for nvidia:
----------print arguments
bitrate = 500000
dbitrate = 2000000
spiCan = mcp251xfd
----------print end

----------set can down
set can0 down !!!
set can1 down !!!
set can2 down !!!

----------rmmoding CAN driver ...
rmmod: mcp251xfd
rmmod: mttcan
rmmod: can_raw
rmmod: can
----------rmmod CAN driver end

----------Loading CAN driver ...
modprobe: can
modprobe: can_raw
modprobe: mttcan
insmod: mcp251xfd
----------Loaded CAN driver end

----------set can up
set can0 up success!!!
set can1 up success!!!
set can2 up success!!!
bitrate=500000
dbitrate=2000000
spiCan=mcp251xfd
nvidia@tegra-ubuntu:~/nfs$
```

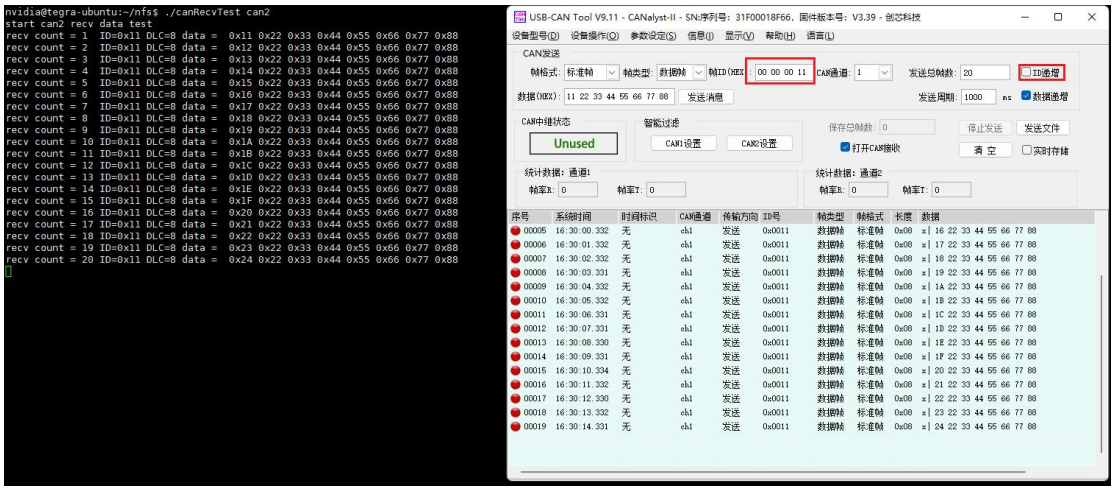
1. Reception test of can (take can2 test as an example)

Run the command . /The default receive frame ID for this test demo is 0x11.

After running the command wait for can2 to receive the data.

In the USB-CAN tool set the frame ID to "00 00 00 11" and uncheck the ID increment. Set the baud rate to the bitrate obtained in the previous step and click on the "Send message" button to send the data to the CAN bus.

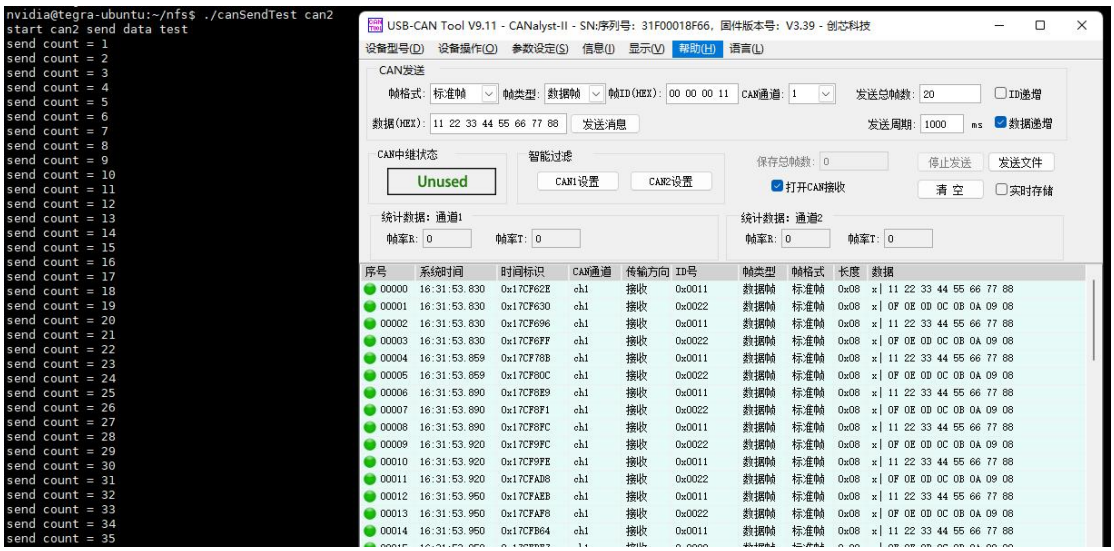
The data sent from the USB-CAN will be received in the terminal window.



2. Sending test of can (take can2 test as an example)

Run the command . /This test demo sends the data with frame IDs 0x11 and 0x22 alternately by default.

After running the command the USB-CAN receives the data sent by can2.



GPIO Test

1. Install the gpio python library

git clone https://github.com/vitiral/gpio.git

cd gpio/

sudo python3 setup.py install

2. Write and run the following Python reference example code

```
import time
import gpio
tst_gpio_pin = 326        #326 对应 T906G 扩展的 GPIO2
#tst_gpio_pin = 350       #350 对应 T906G 扩展的 GPIO1

gpio.setup(tst_gpio_pin, gpio.OUT)
gpio.set(tst_gpio_pin, 0)

print("Starting now! Press CTRL+C to exit")
try:
    while True:
        gpio.set(tst_gpio_pin, 1)
        print("TEST High.")
        time.sleep(5)
        gpio.set(tst_gpio_pin, 0)
        print("TEST Low")
        time.sleep(5)
finally:
    gpio.cleanup()
```

3. Set HI and LO by viewing the following

sudo cat /sys/kernel/debug/gpio| grep '326'

GPS Use

The GPS module is an optional module, not a standard product. Our GPS module is the HX-26-GN series, which is the general name of the 12X16 size high performance BDS/GNSS full constellation positioning navigation module series. This series of modules are all based on the fourth generation low-power GNSS SOC chip - AT6558, which supports a variety of satellite navigation systems. The AT6558 is a true six-in-one multi-mode satellite navigation chip with 32 tracking channels. It can receive GNSS signals from six satellite navigation systems simultaneously, and enables combined positioning, navigation and timing. The HX-26-GN series is a sensitive, low-power, low-cost module suitable for in-vehicle navigation, handheld positioning, wearable devices and as a direct replacement for Ublox NEO series modules.

Performance indicators

It is an excellent positioning and navigation solution for single-system positioning with BDS/GPS/GLONASS and multi-system positioning in any combination, as well as for QZSS and SBAS systems;

A-GNSS support;

Cold start capture sensitivity: -148dBm;

Tracking sensitivity: -162dBm;

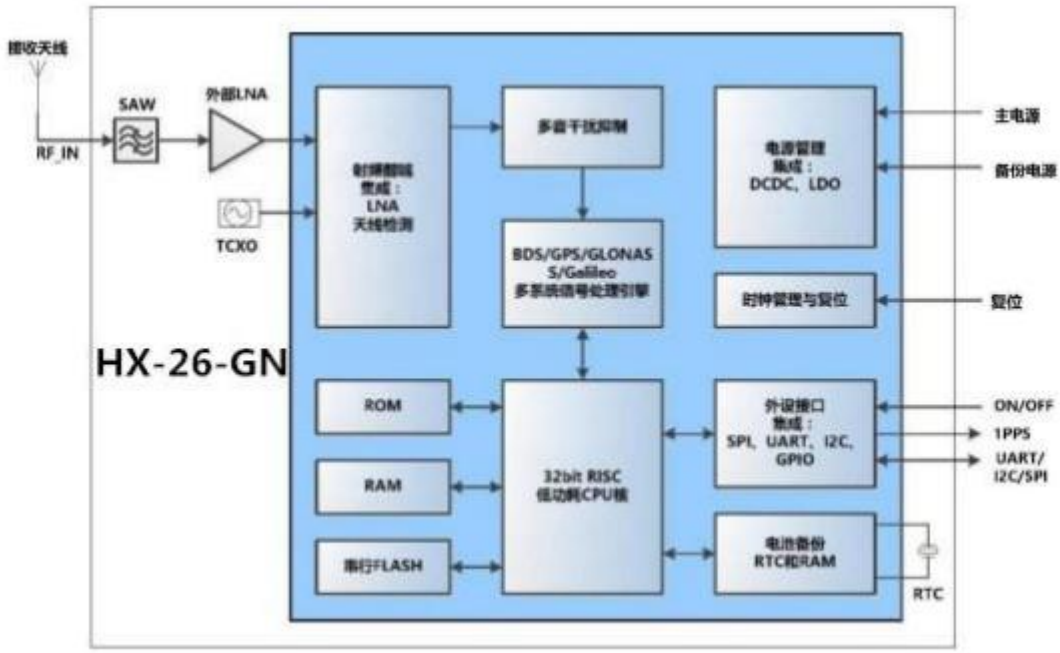
Positioning accuracy: 2.5m (CEP50);

First position time: 32 sec;

Low power consumption: <25mA continuous operation (@3.3V);

Built-in antenna detection and antenna short circuit protection .

Functional block diagram:



Technical Specifications

指标	技术参数
信号接收	BDS/GPS/GLONASS/GALILEO/QZSS/SBAS
射频通道数目	三通道射频，支持全星座BDS、GPS和GLONASS同时接收
冷启动TTFF	≤35s
热启动TTFF	≤1s
重捕获TTFF	≤1s
冷启动捕获灵敏度	-148dBm
热启动捕获灵敏度	-156dBm
重捕获灵敏度	-160dBm
跟踪灵敏度	-162dBm
定位精度	<2m（1σ）
测速精度	<0.1m/s（1σ）
授时精度	<30ns（1σ）
定位更新率	1Hz（默认），最大10Hz
串口特性	波特率范围：4800 bps ~115200 bps,默认9600bps, 8个数据位,无校验,1个停止位
协议	NMEA0183
最大高度	18000m
最大速度	515m/s
最大加速度	4g
后备电池	1.5V ~ 3.6V
电源供电	2.7V ~ 3.6V
GPS&BD典型功耗	<25mA @3.3V
工作温度	-40到+85摄氏度
存储温度	-45到+125摄氏度
尺寸	16.0mm×12.2mm×2.4mm
重量	1.6g

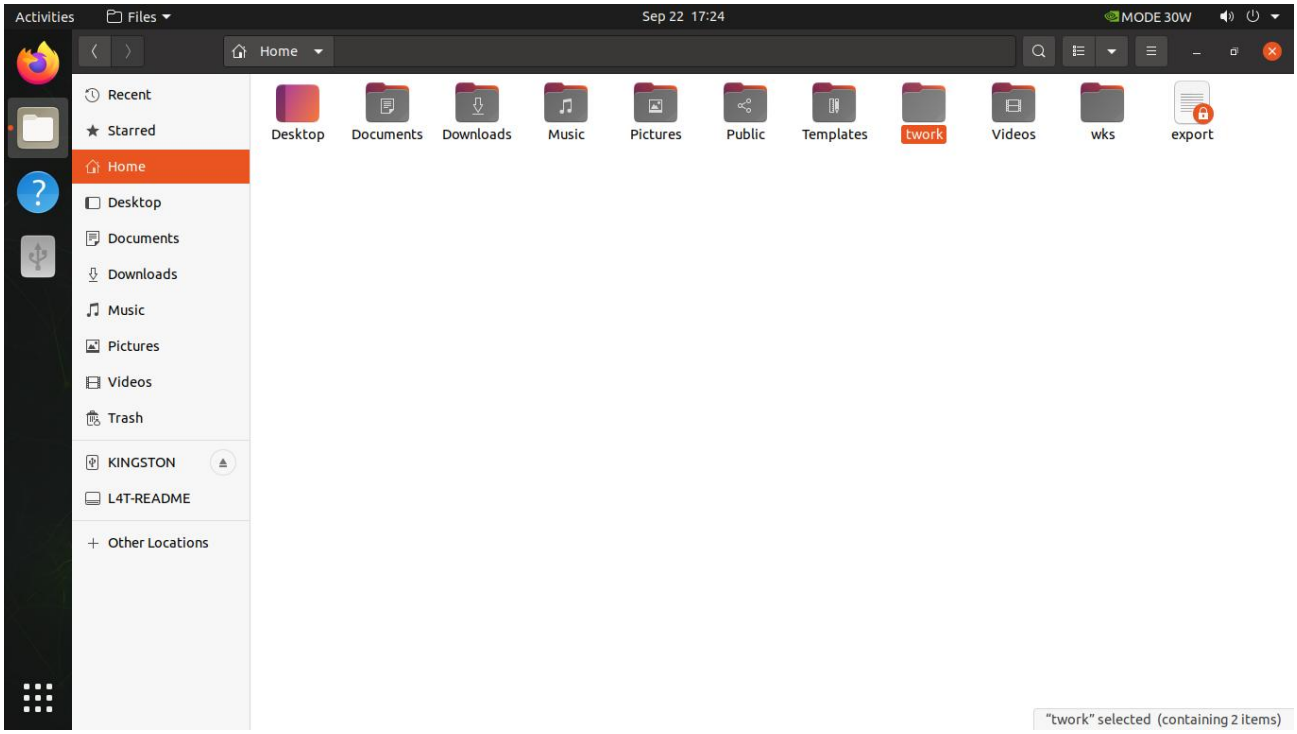
How to Use

Before using the GPS, you need to connect the GPS antenna (Fig. 1) to the peripheral antenna hole (Fig. 2). After confirming that the connection is correct, open the twork file that comes with the system and execute the reserved program to read the GPS information. The specific operation steps are shown in the figure below;

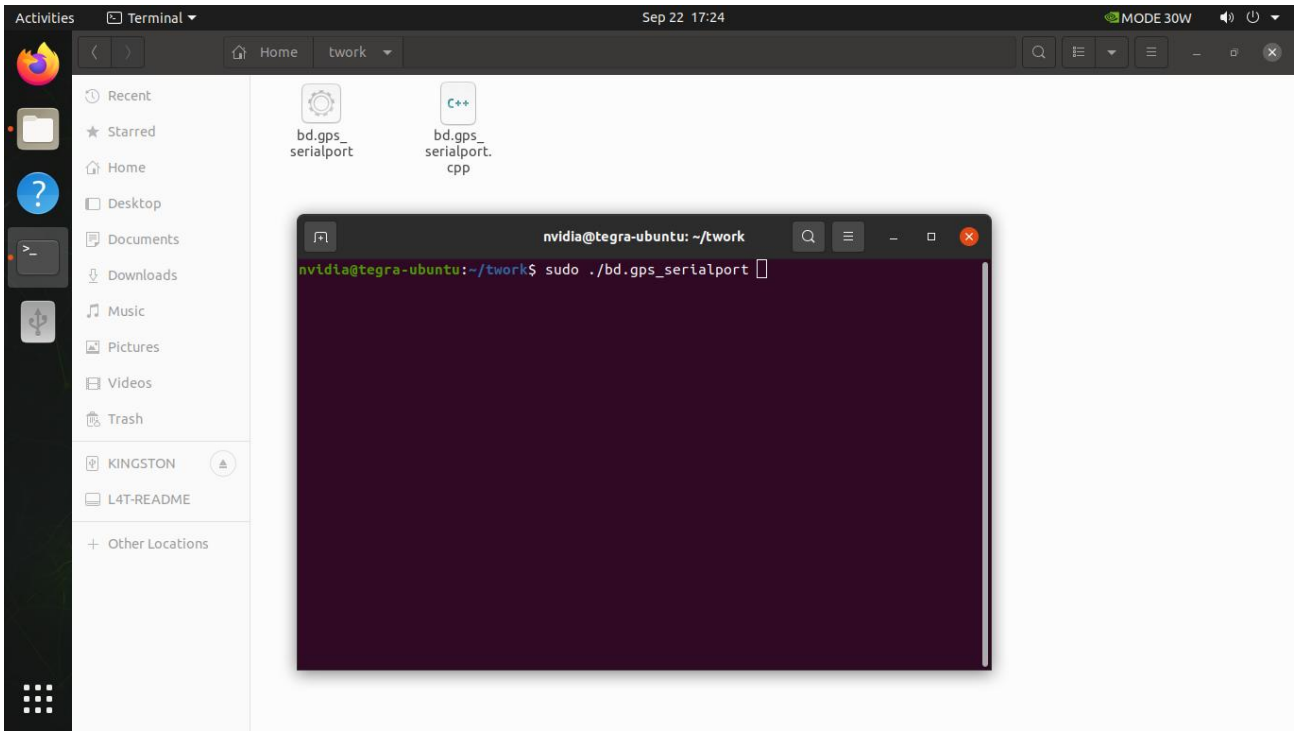
Figure 1

Figure 2

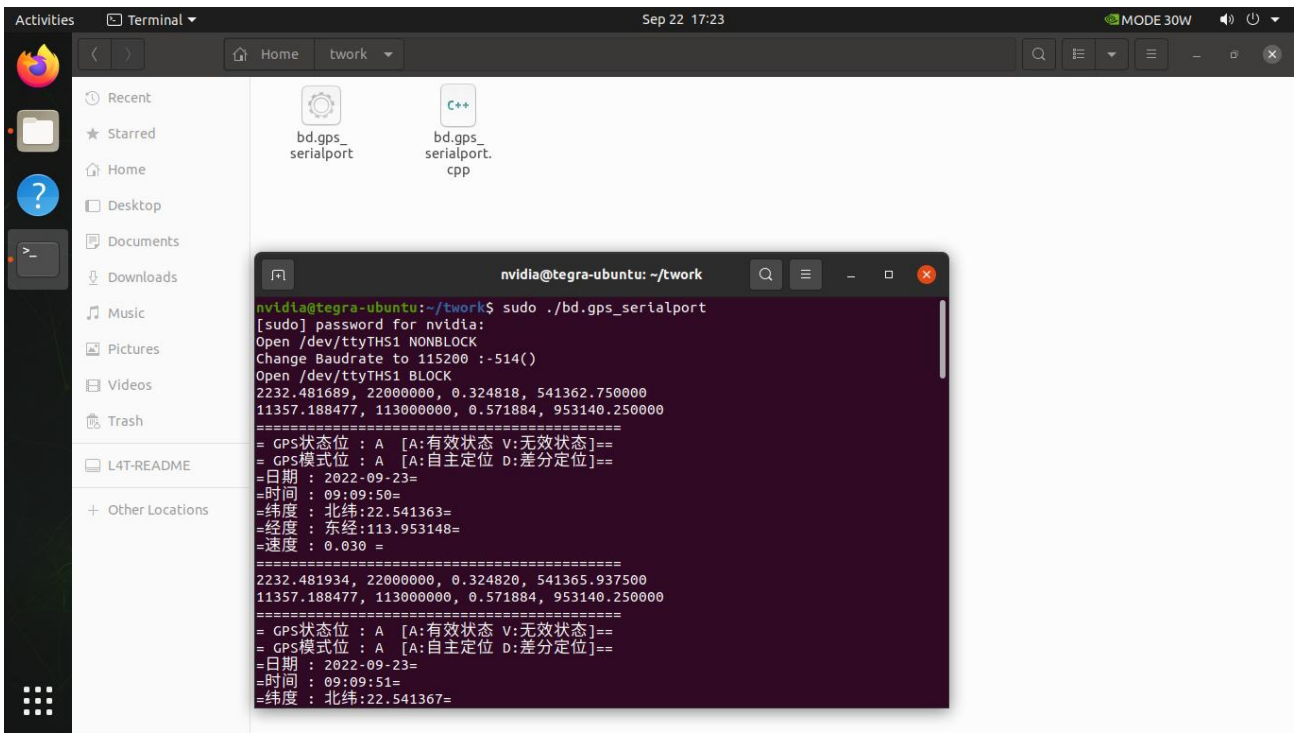
Find the twork file that comes with home and go to that folder.



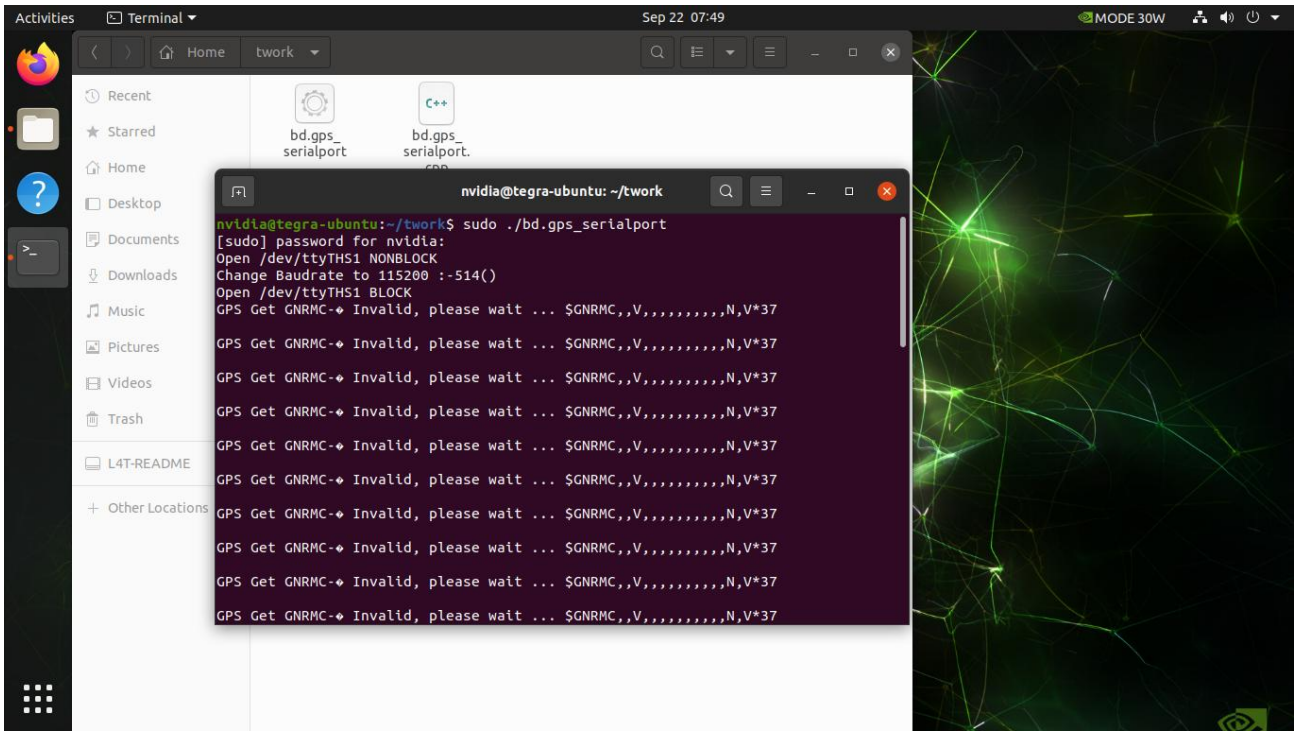
Select the blank space and click on the right mouse button and select "Open in Terminal", then execute the command "sudo . /bd.gps_serialport".



The result of the execution is shown in the figure, which indicates that the positioning information was obtained;



If the result is as shown below, it means that the location is not successful, which means that the signal is poor. It is recommended to switch to an open area to get a signal to compare the positioning information;



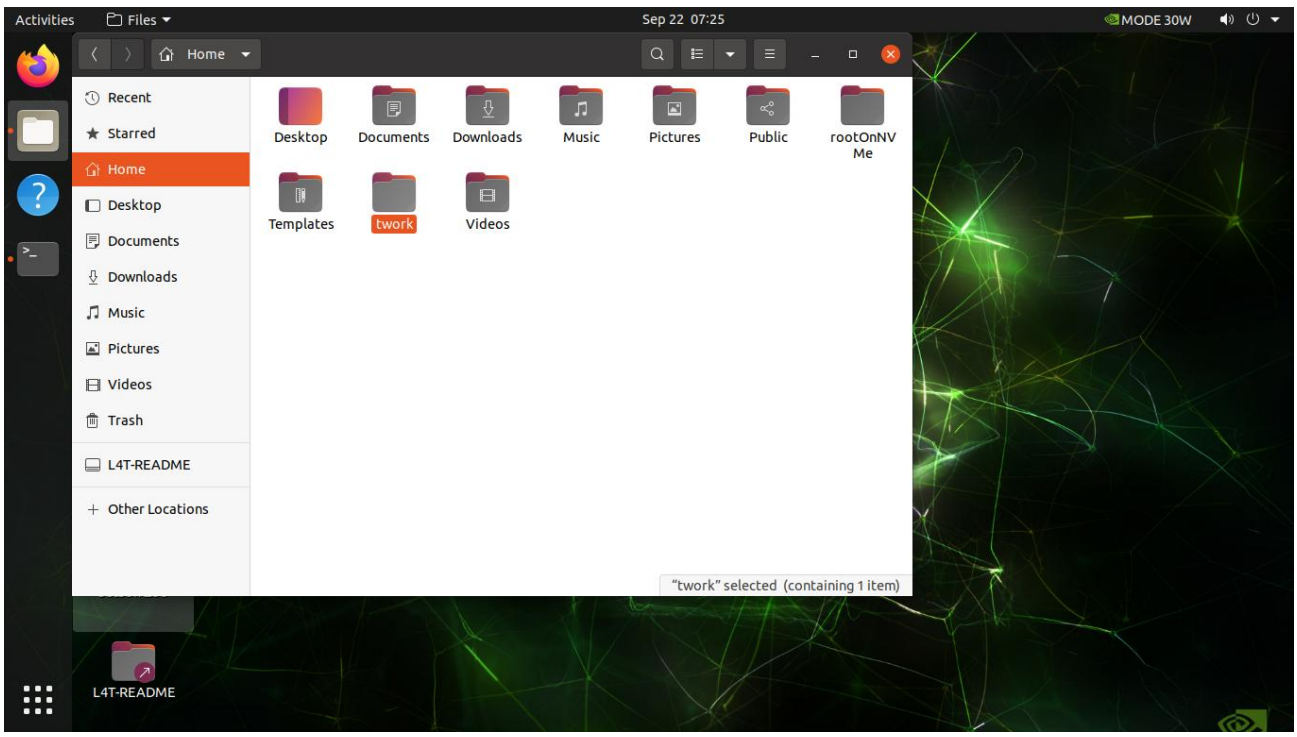
Use of GMSL Camera

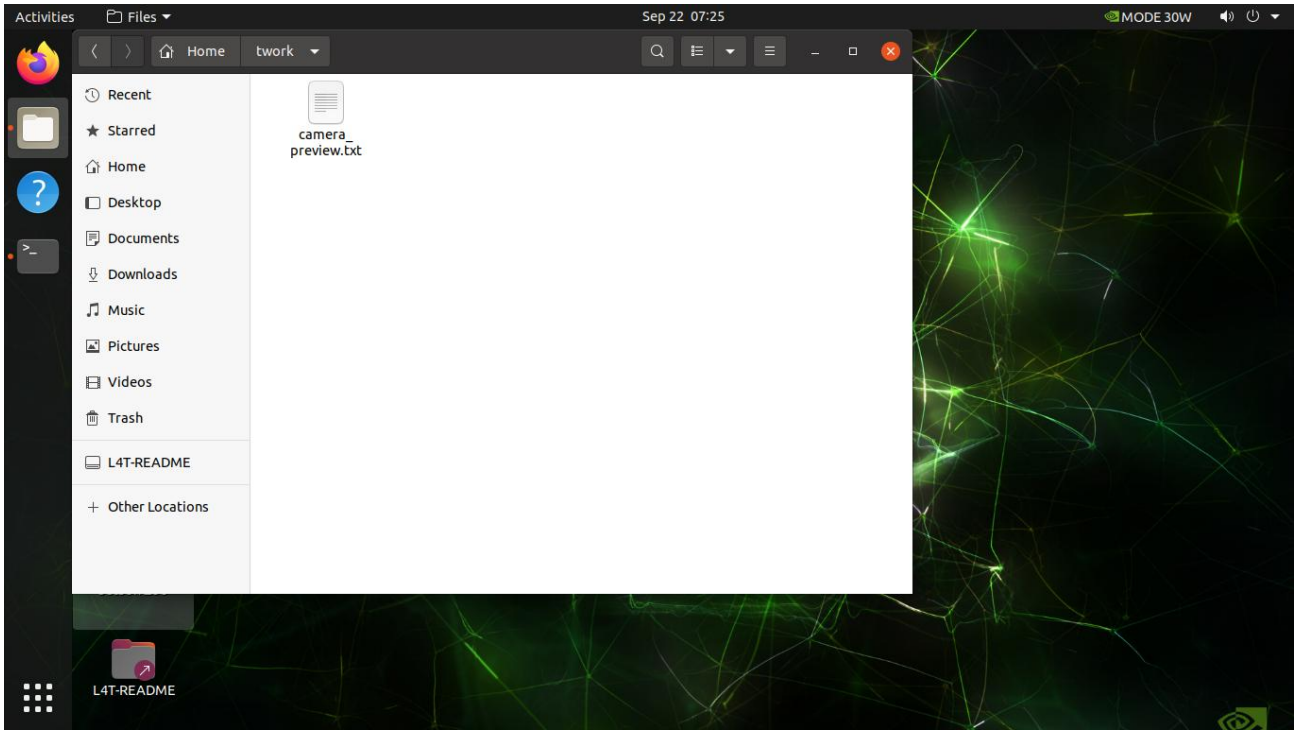
At present, according to the continuous efforts of our R&D staff, we are able to implement GMSL camera access on jetson-agx-orin devices. At the moment, our T906G only supports some cameras. Depending on the customer's needs, we will later equip the device with different camera drivers at the factory. Currently, our camera drivers are not the only compatible drivers, but only one driver for one camera. Each device is equipped with only one driver.

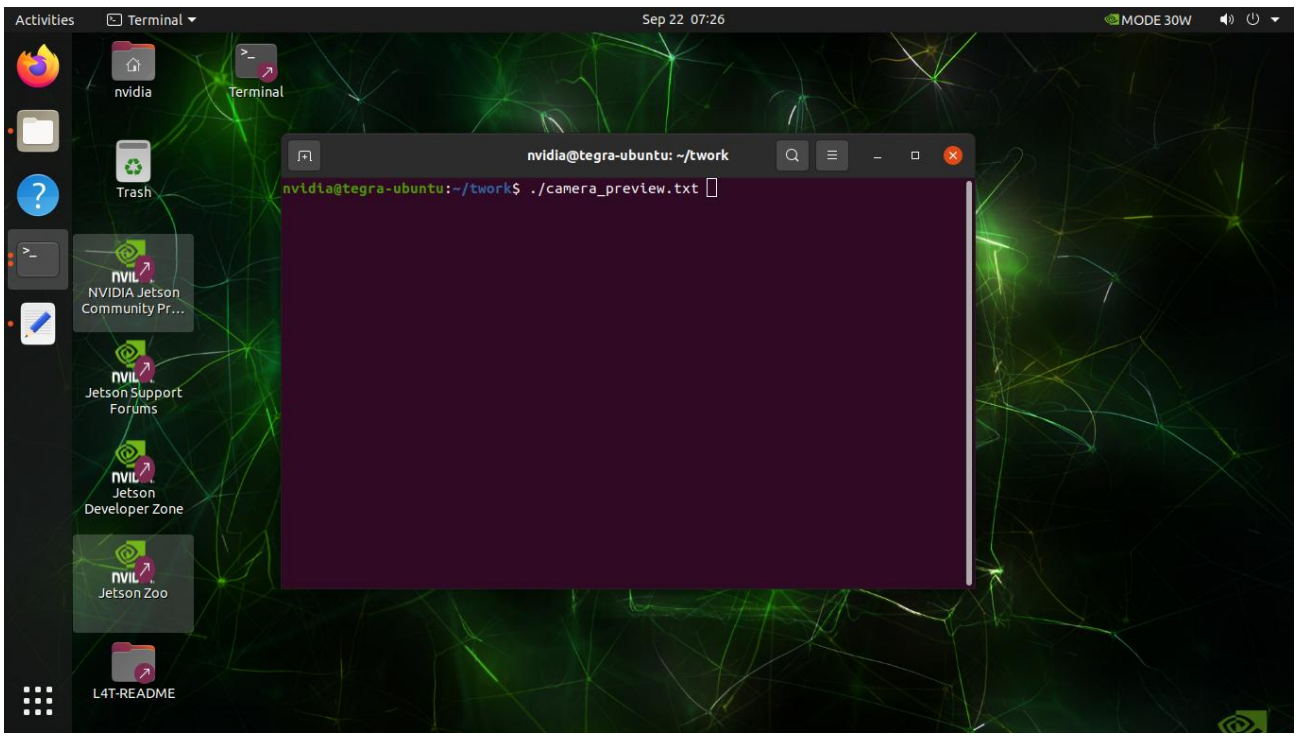
Camera preview command:

gst-launch-1.0 v4l2src device=/dev/video0 ! 'video/x-raw,format=UYVY,width=1920,height=1080' ! videoconvert ! fpsdisplaysink video-sink=xvimagesink sync=false &

gst-launch-1.0 v4l2src device=/dev/video1 ! 'video/x-raw,format=UYVY,width=1920,height=1080' ! videoconvert ! fpsdisplaysink video-sink=xvimagesink sync=false

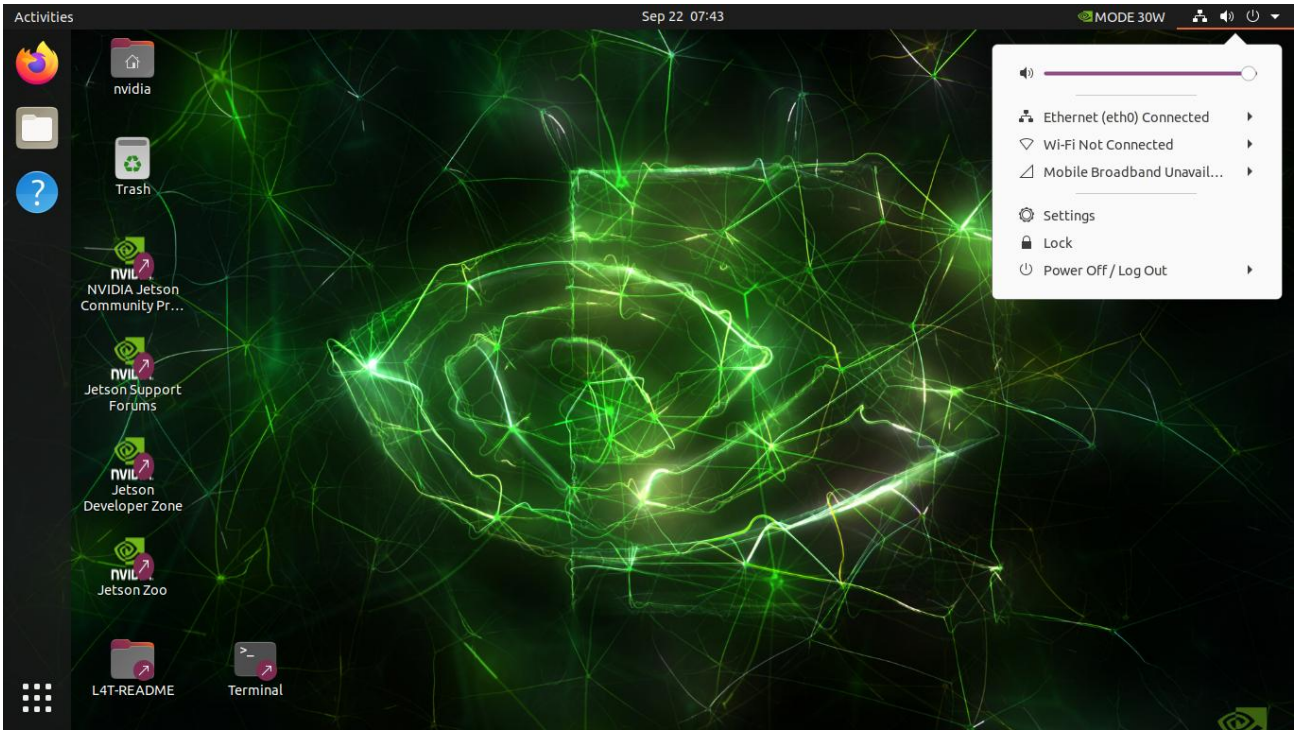



Activities
Files
Sep 22 07:25
MODE 30W
Home
twork
Recent
Starred
Home
Desktop
Documents
Downloads
Music
Pictures
Videos
Trash
L4T-README
Other Locations
camera_
preview.txt
L4T-README

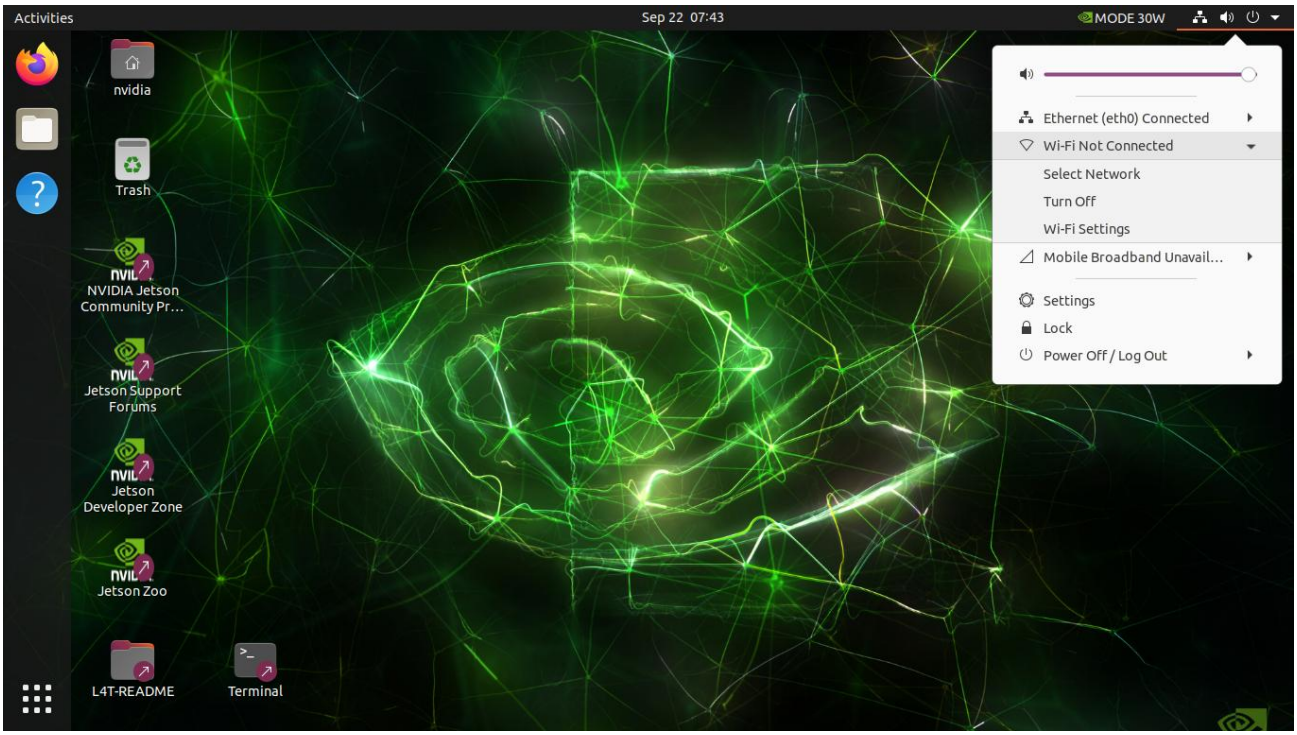

Activities
Terminal
Sep 22 07:26
MODE 30W
nvidia
Terminal
Trash
NVIDIA Jetson
Community Pr...
Jetson Support
Forums
Jetson
Developer Zone
Jetson Zoo
L4T-README
nvidia@tegra-ubuntu: ~/twork
nvidia@tegra-ubuntu:~/twork$ ./camera_preview.txt

WiFi Connection

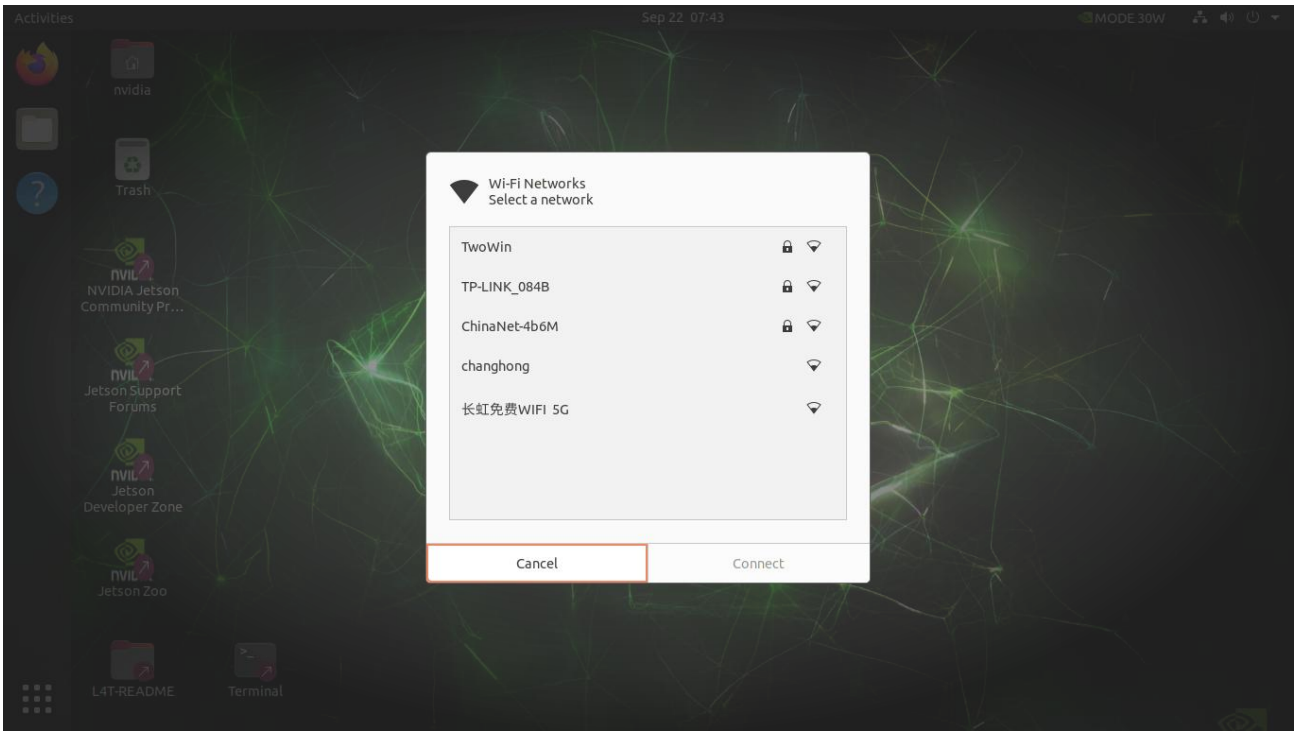
1. After clicking on the network icon shown by the arrow, the network settings will appear.

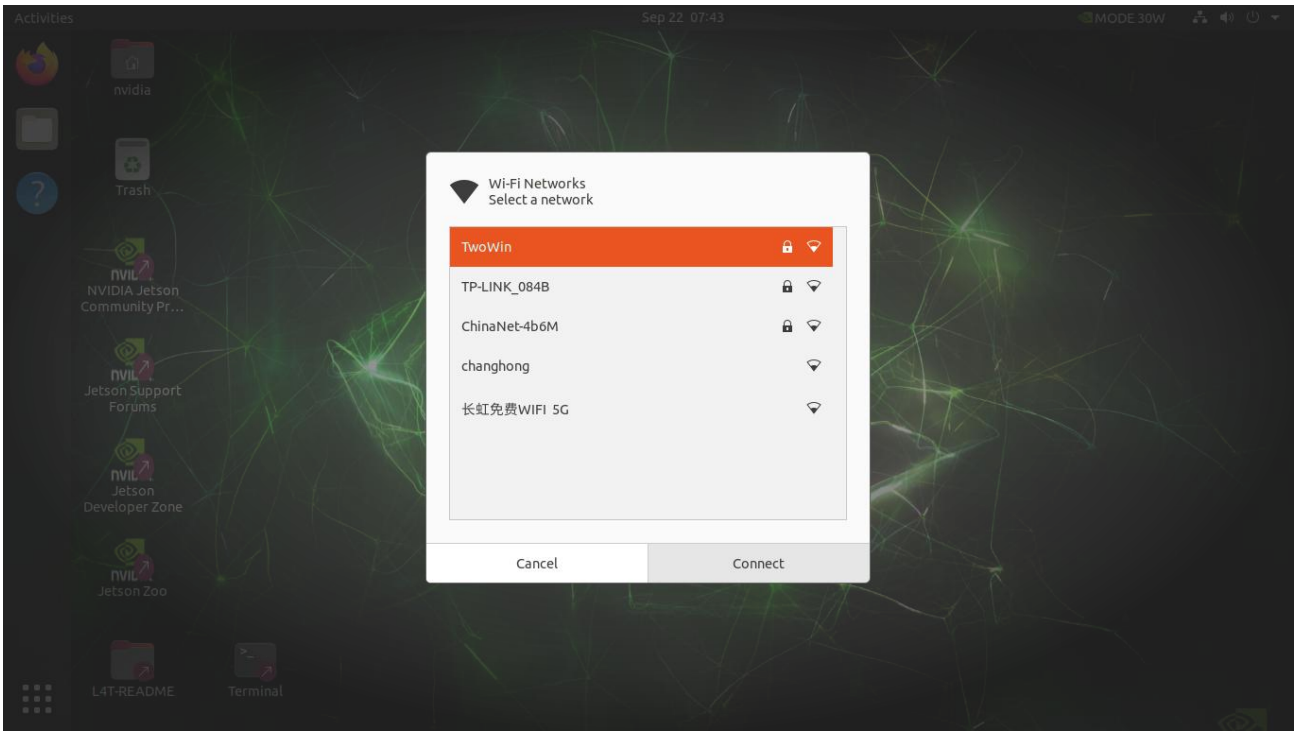


2. Select the third option, click on the network and select "Select Network".

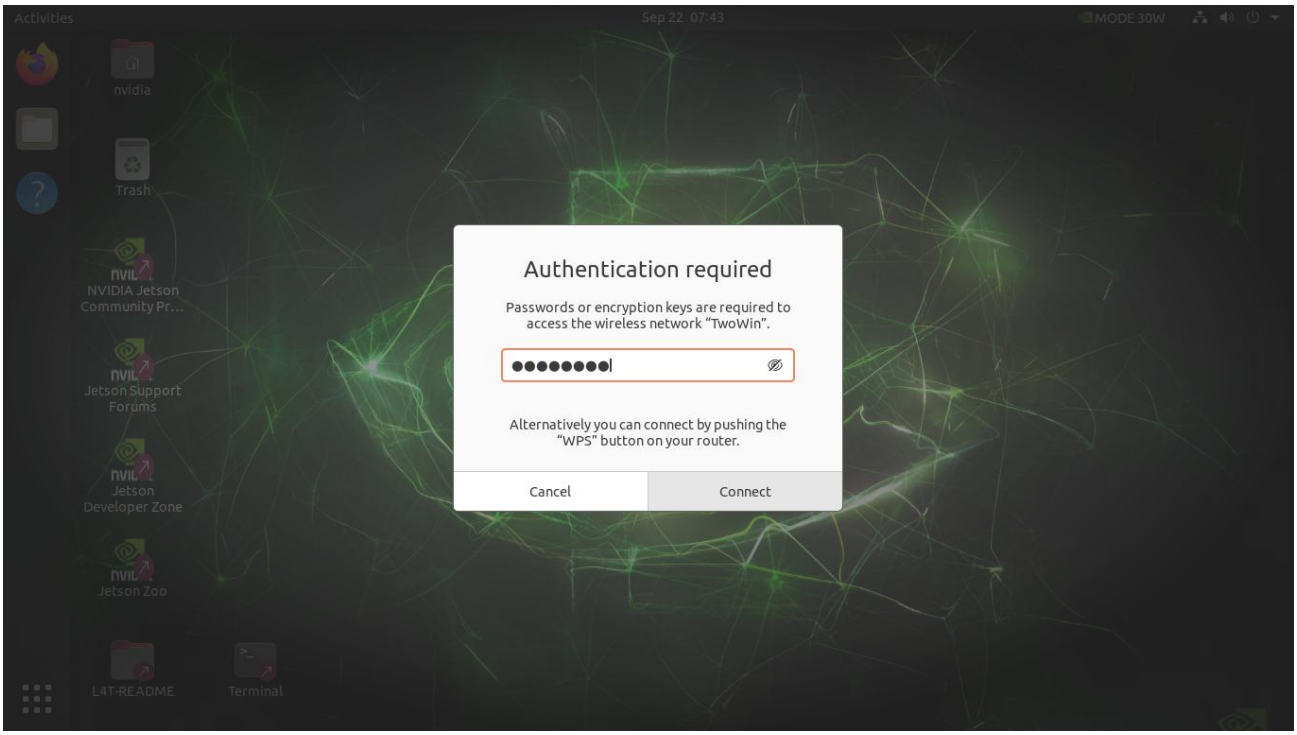


3. Select the available networks you are currently searching for, find a suitable wifi, select it and click on "Connect".

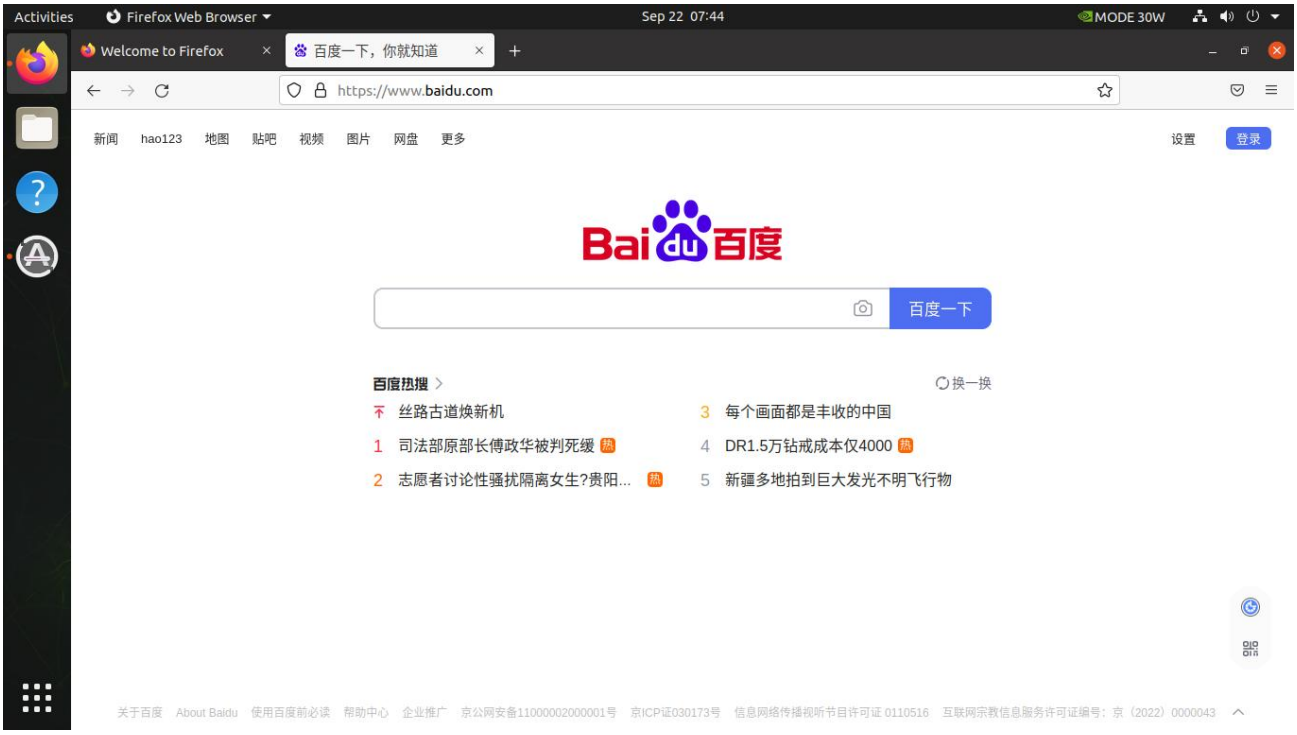




4. Enter the wifi password.



5. Open the web-page after networking to confirm that the network is working.



4G Dial-up Networking

Step 1: (The following is based on the Youfangn720 module as an example)

Unzip the zip file provided by Twowin and copy it to the Twowin Smartbox device, using the command to copy it to /etc/ppp/peers, the command is

The path to download the zip file:

Link: https://pan.baidu.com/s/1iF0iKqKTGYuNTDZ5w_I9Mg

Extraction code: 33sm

Execute the command as follows:

sudo cp -f 4g_dail/* /etc/ppp/peers

Step 2:

Go to the /etc/ppp/peers directory and find the n720-ppp-dial.sh script. The first time you execute it, you will need to grant execute permissions, as follows.

cd /etc/ppp/peers

sudo chmod +x n720-ppp-dial.sh

sudo ./n720-ppp-dial.sh

If you need to turn off dial-up, you can run the ppp-kill.sh script to end it.

If you want to implement the 4G auto-connect feature, you need to set up the rc.local startup script to increase the number of applications on system boot.

Step 1:

Add rc-local.service

sudo ln -fs /lib/systemd/system/rc-local.service /etc/systemd/system/rc-local.service

sudo vi /etc/systemd/system/rc-local.service

Add：

[Install]

WantedBy=multi-user.target

Alias=rc-local.service

Step 2:

Write the rc.local script

sudo touch /etc/rc.local

sudo chmod 755 /etc/rc.local

sudo gedit /etc/rc.local

To add content, simply paste and copy the text of the rc.local file we have provided, which is shown below.

#!/bin/bash

```
LOG_DIR=/var/log/twlog
mkdir -p $LOG_DIR

#4g auto dial if register on network. sleep 30s wait for 4g module prepared
TIME=`date +%Y%m%d%H%M`
echo $TIME >> $LOG_DIR/ppp-dial.log
echo "Auto dial" >>    $LOG_DIR/ppp-dial.log
nohup /etc/ppp/peers/n720-ppp-dial.sh >> $LOG_DIR/ppp-dial.log &

sleep 10
#Set default gateway
def_gw=`/sbin/ifconfig ppp0|grep destination|grep -v 127.0.0.1|grep -v inet6 | awk '{print $6}' | tr -d "addr:"`
#`route -n | grep ppp0 | grep UG | awk '{print $2}'`
echo $def_gw >> $LOG_DIR/ppp-dial.log
if [ -n "$def_gw" ]; then
        #Set default gateway using ppp0/4G
        sudo route add default gw $def_gw
else
        sleep 10
        def_gw=`/sbin/ifconfig ppp0|grep destination|grep -v 127.0.0.1|grep -v inet6 | awk '{print $6}' | tr -d "addr:"`
        if [ -n "$def_gw" ]; then
                sudo route add default gw $def_gw
        fi
fi
#Get ppp0 IP
fourg_ip=`/sbin/ifconfig ppp0|grep inet|grep -v 127.0.0.1|grep -v inet6 | awk '{print $2}' | tr -d "addr:"`
if [ -n "$fourg_ip" ]; then
        echo $fourg_ip >> $LOG_DIR/ppp-dial.log
else
        sleep 15
        if [ -n "$fourg_ip" ]; then
                echo $fourg_ip >> $LOG_DIR/ppp-dial.log
        else
                echo "4G no ip $fourg_ip" >> $LOG_DIR/ppp-dial.log
                echo $TIME"-Kill pppd and redial" >> $LOG_DIR/ppp-kill.log
                nohup /etc/ppp/peers/ppp-kill.sh >> $LOG_DIR/ppp-kill.log &
        fi
fi
#end 4g auto dial

#Running maxn mode
/usr/bin/jetson_clocks
```

exit 0

To test whether the 4G network is successfully connected, you can test by opening a web page or pinging Baidu.

Using SSD as a System Drive

SSD role

NVMe SSD is only used as the system disk (rootfs and user area), the system boot is still on the SD card or EMMC, e.g. the upgrade device tree dtb is still on the SD card or EMMC.

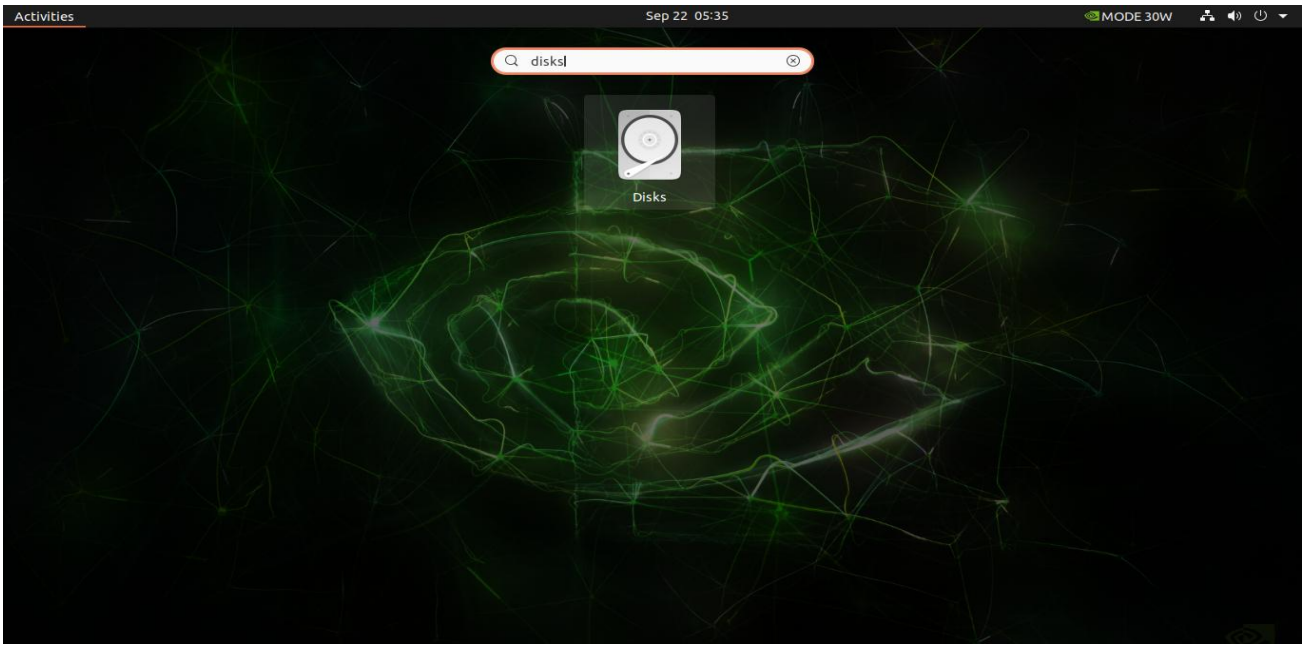
Step 1: Prepare the SSD and format it as GPT

1. Prepare the M.2 Key M SSD

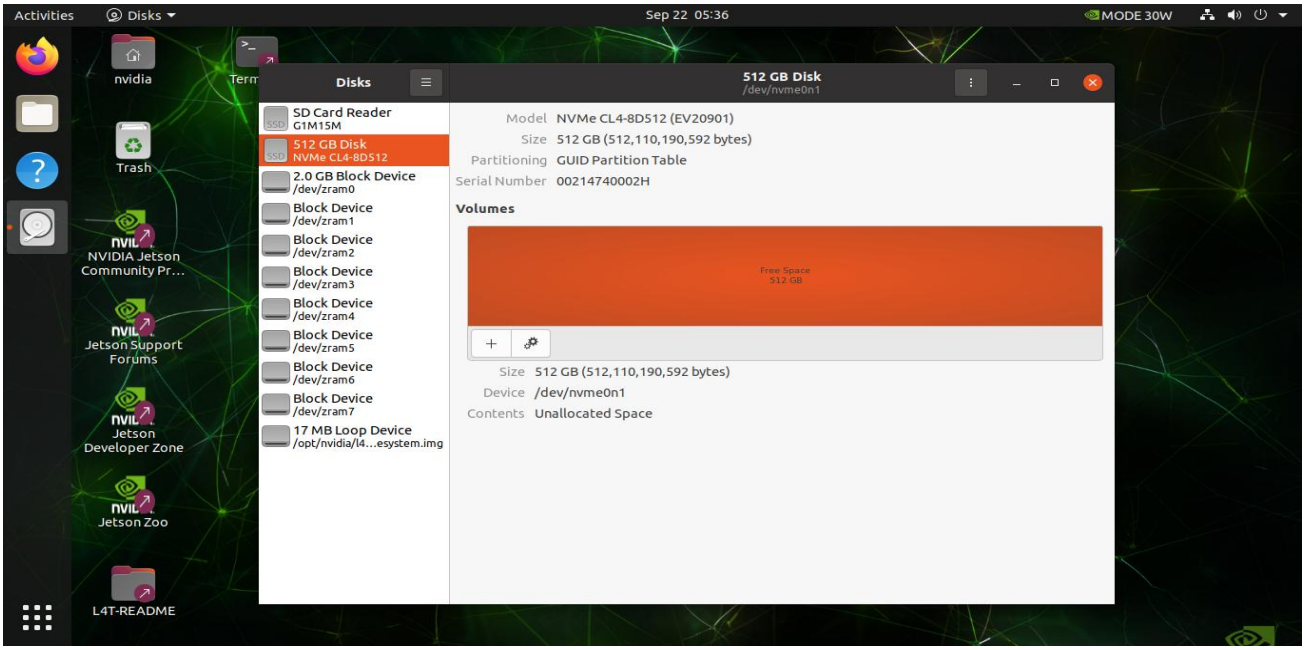
2. Open the Disks tool () that comes with Ubuntu 20.04, find the installed ssd drive, and first press "Ctrl+F" to quickly format it as.

3. Refer to the following diagram for details (you should strictly follow the instructions below to avoid making mistakes that may prevent the device from entering the desktop system):

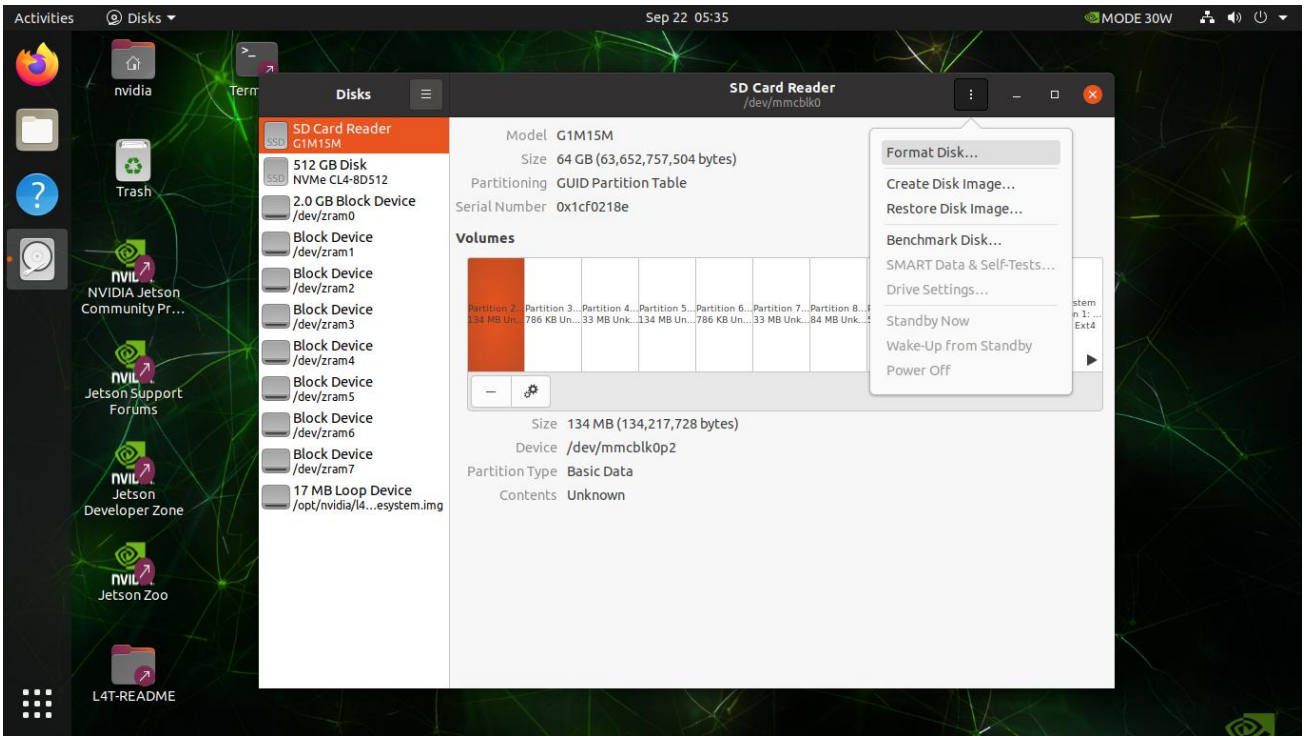
1) First of all, open the search box by pressing the Win key, and search for the "disks" tool;

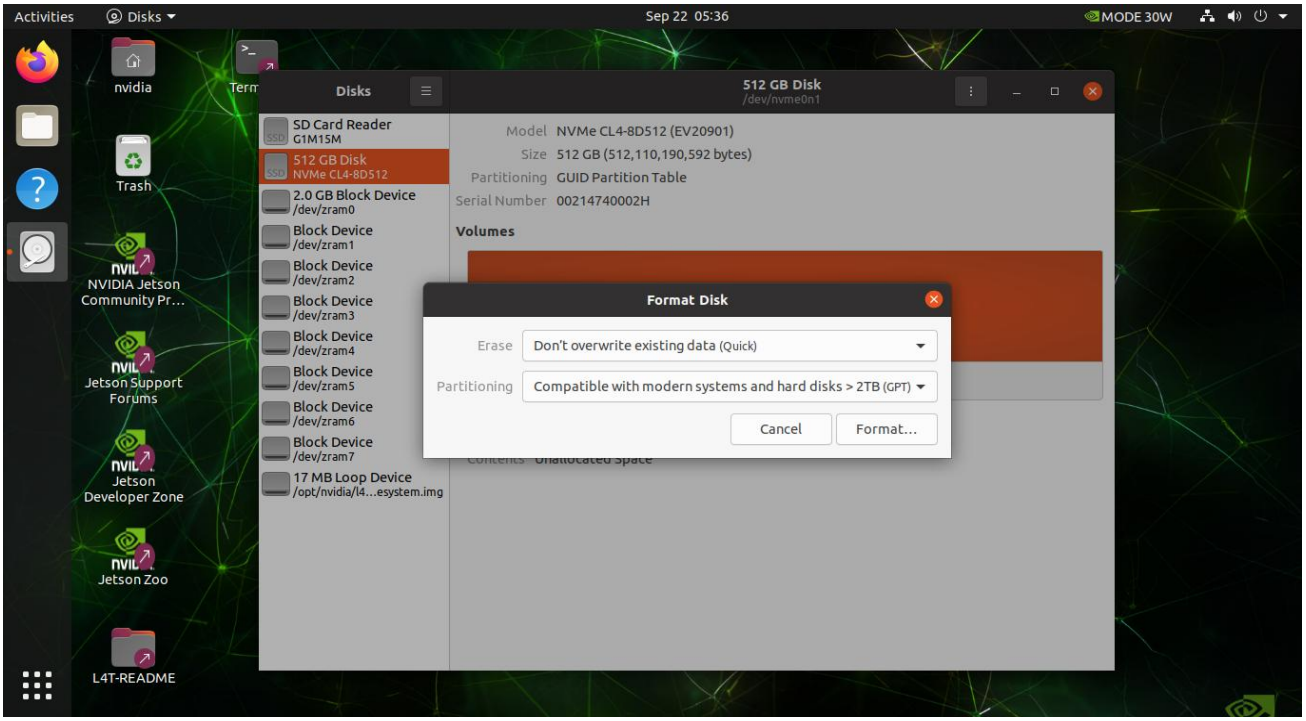


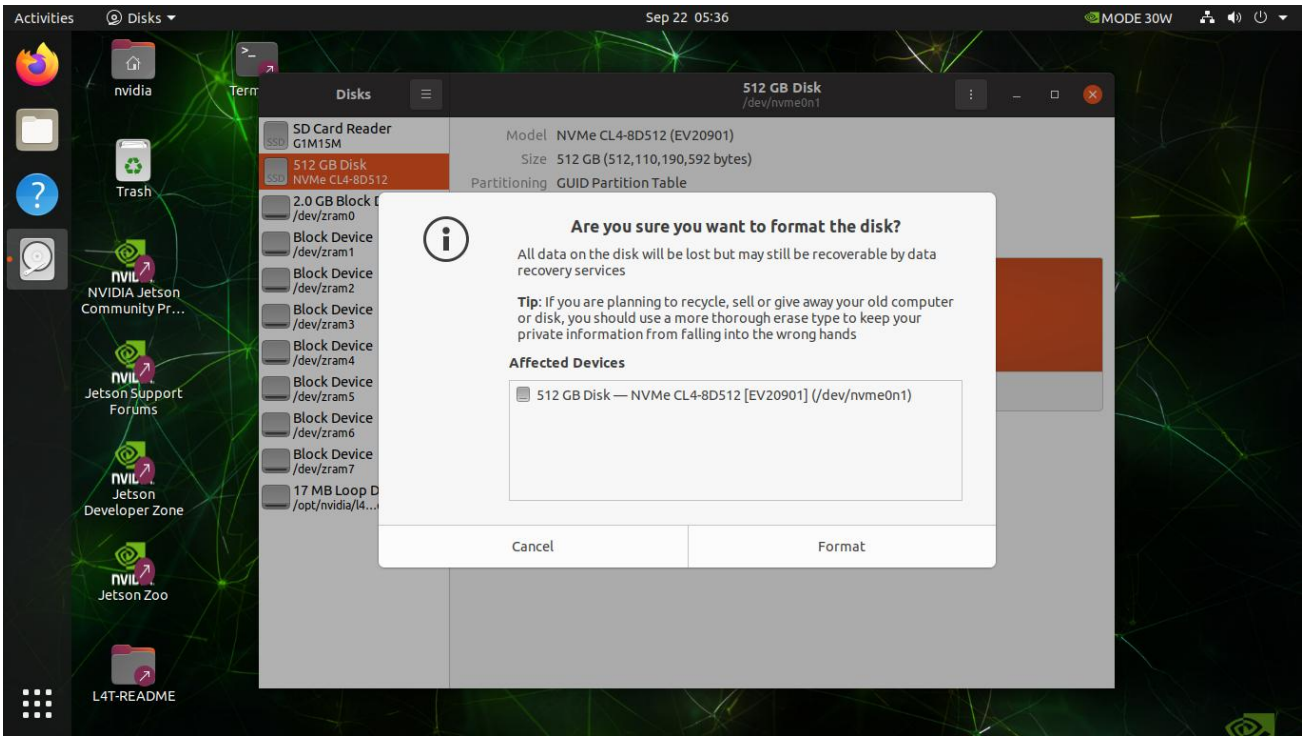
2) Go to disks and find the installed ssd;



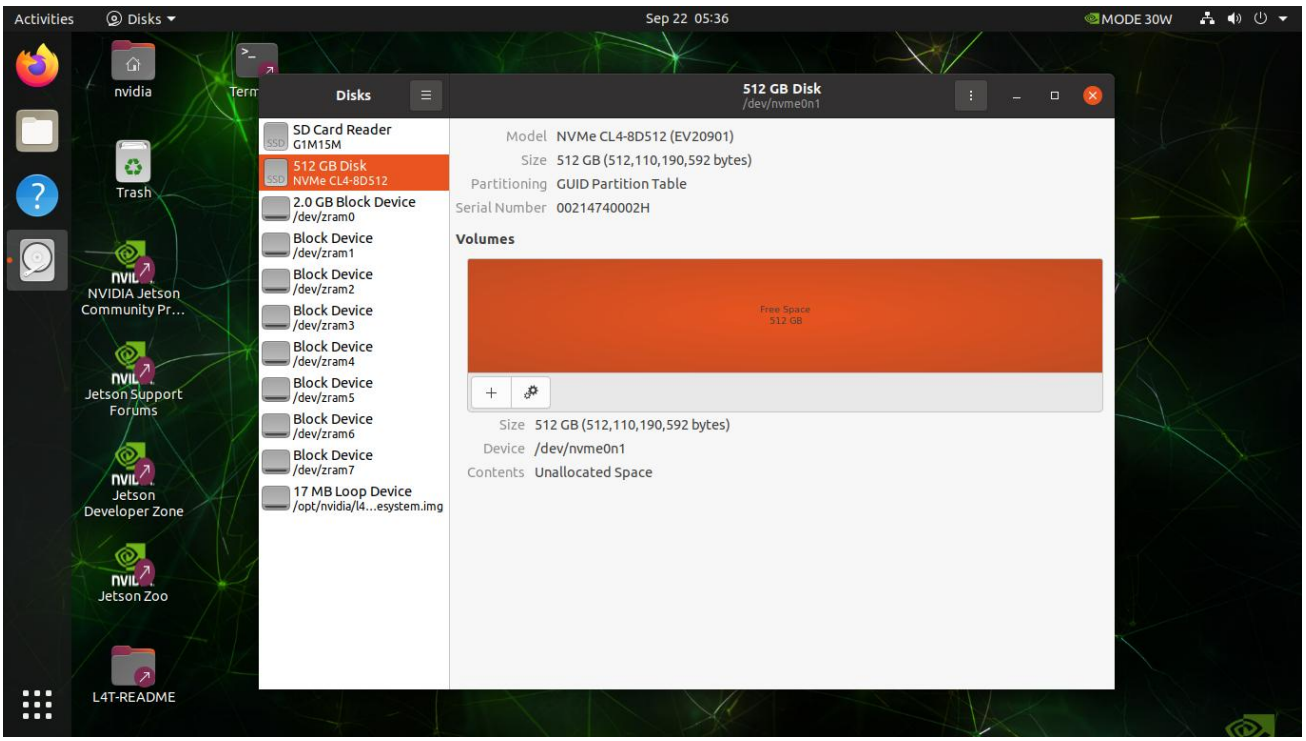
3) Click on ":" in the top right corner and continue to click on the first option "Format Disk", then a pop-up window will appear and click on "Format".



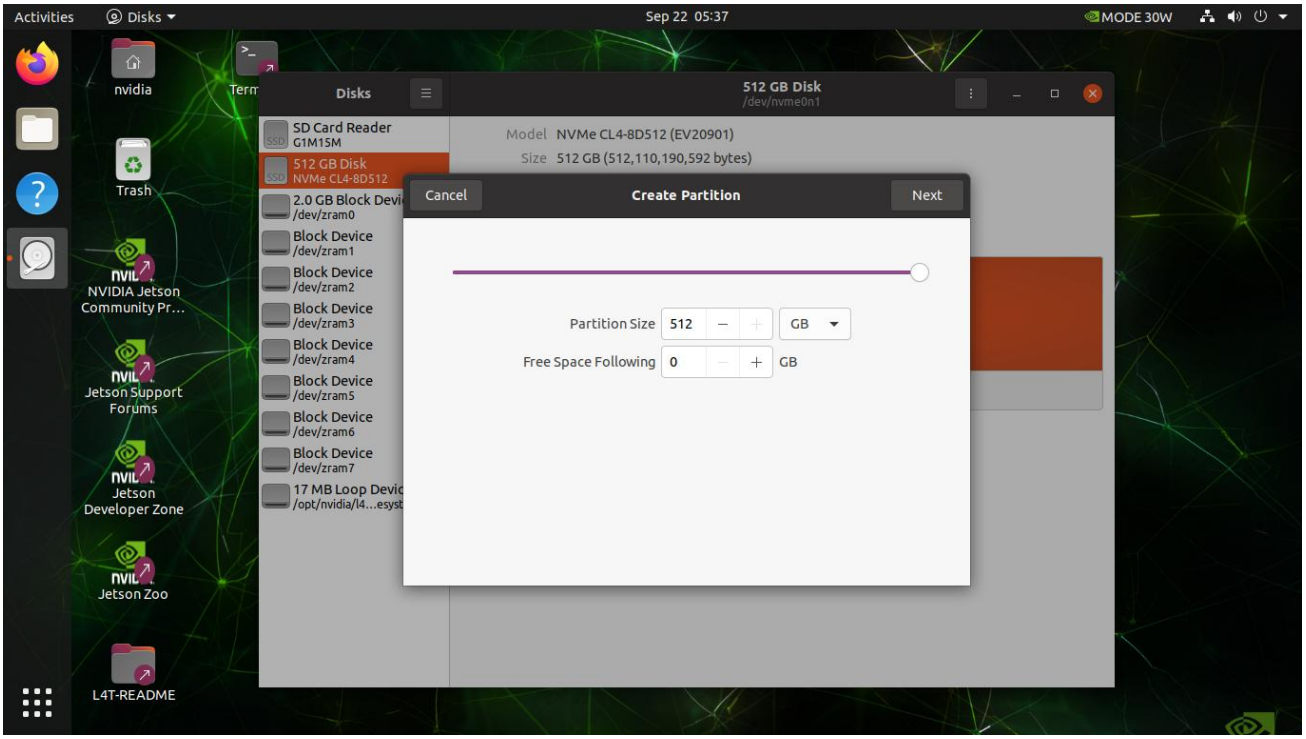




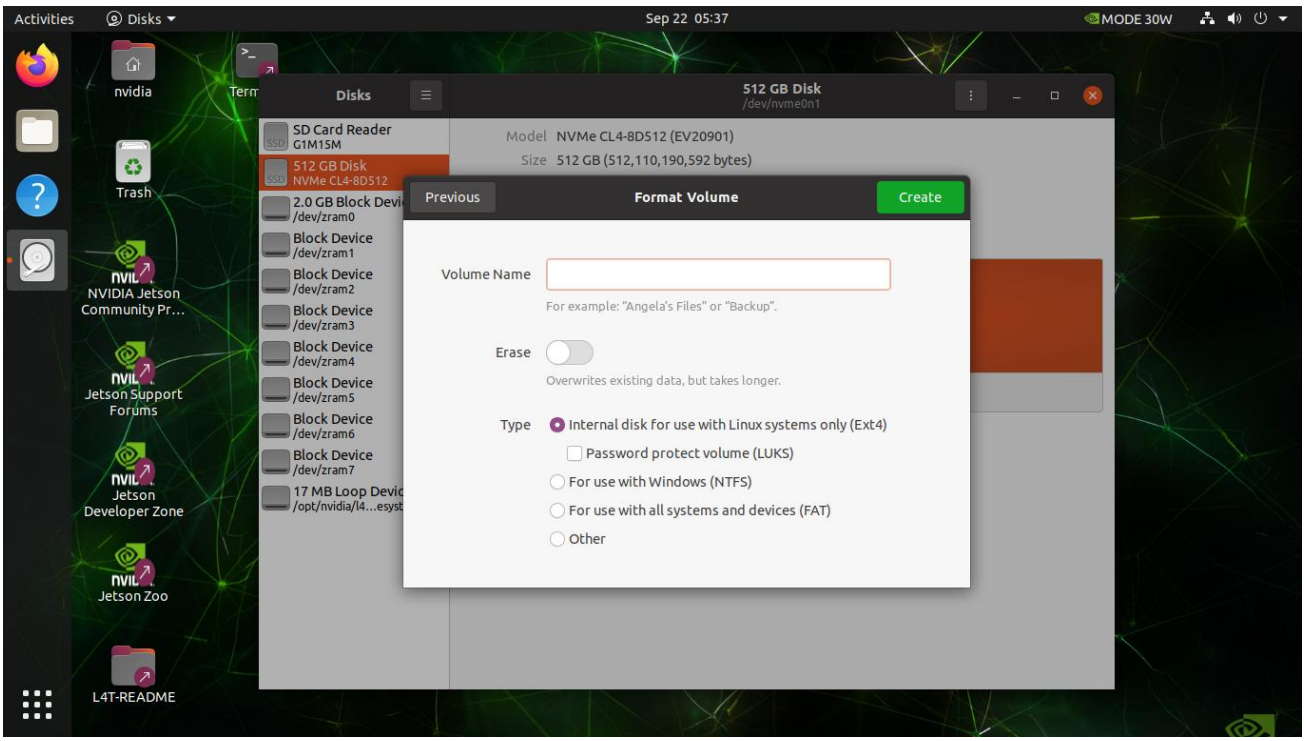
2) After formatting, click on the "+" button to create a new partition.



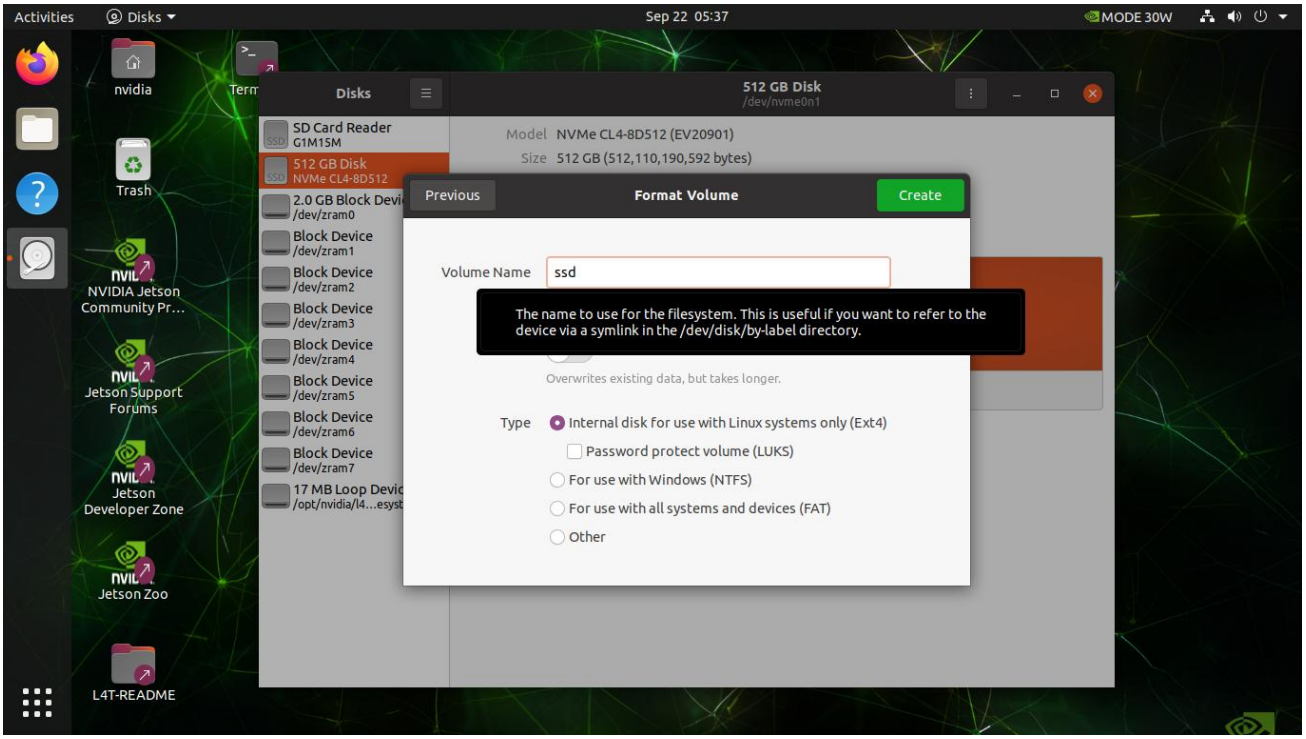
4) Divide the size of the new partition, the default is to allocate all of them, it is recommended that the default is good. If you need to change it, allocate it according to your needs and then click "Next".



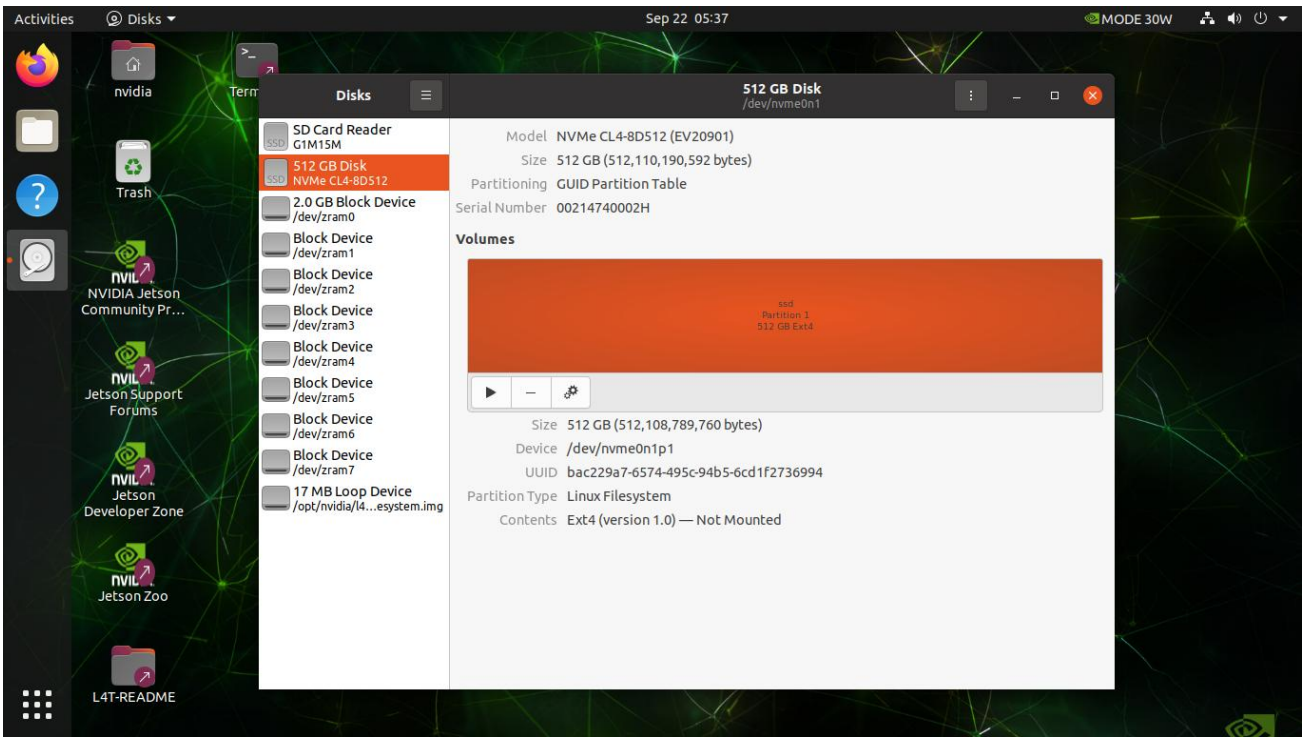
5) Select the file format, the default is "ext4", there is no need to change this;



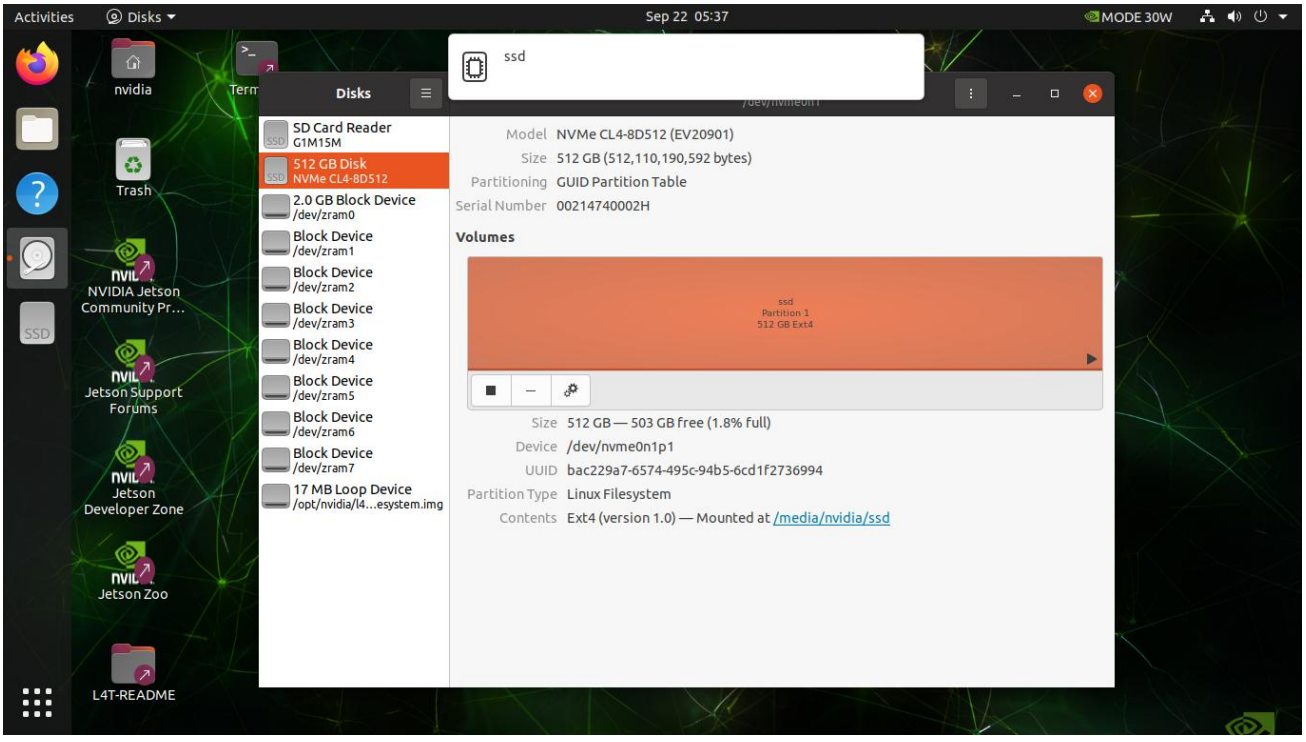
6) Name the new partition as you like;



7) When you have finished creating the partition, the screen shown below will appear.

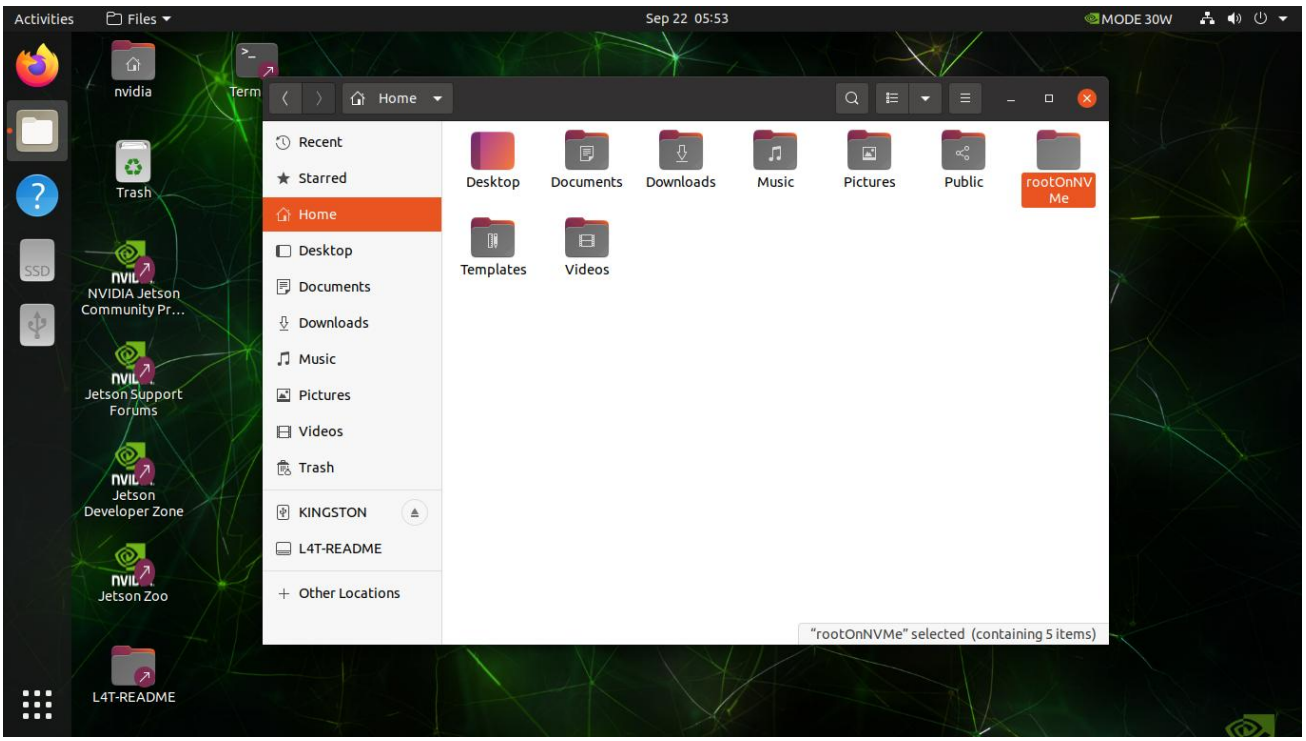


8) If the image below shows that the mount is successful.

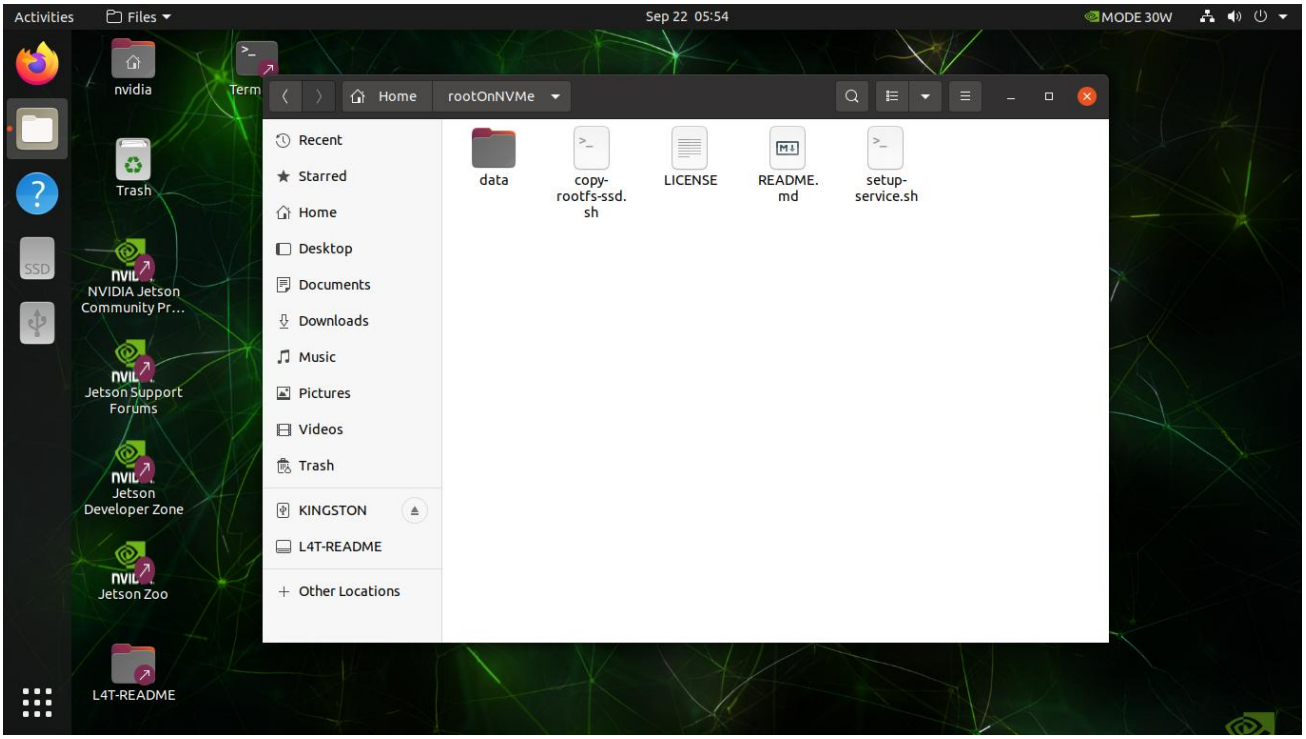


Step 2: (System Disk Conversion)

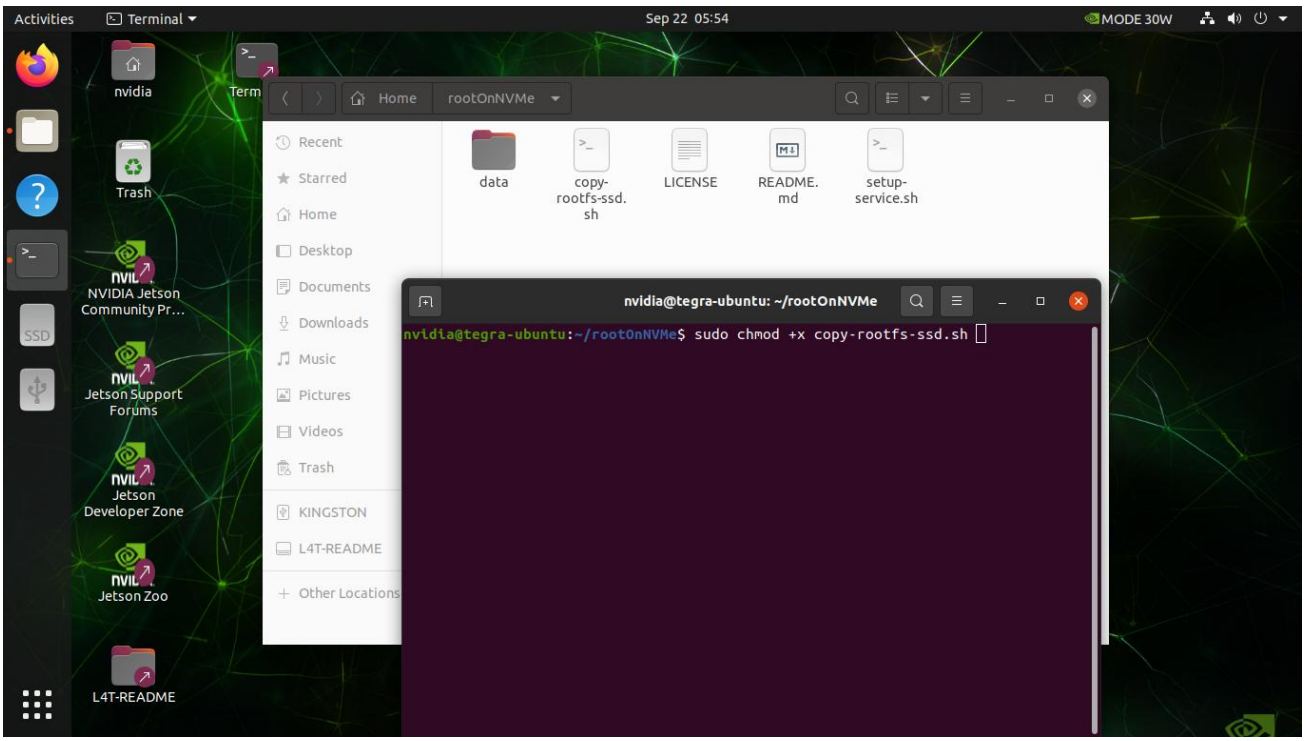
1) Go to the /home directory and find the rootOnNVMe file.



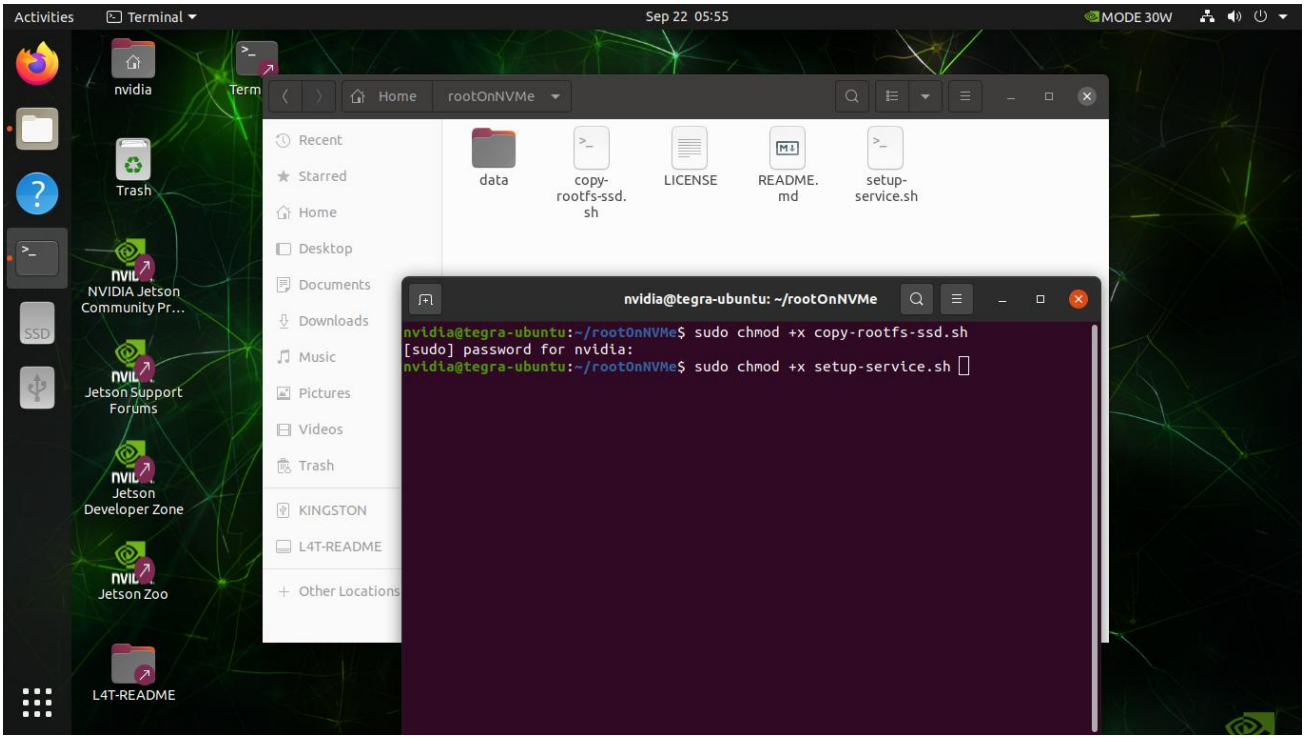
2) Go to this folder;



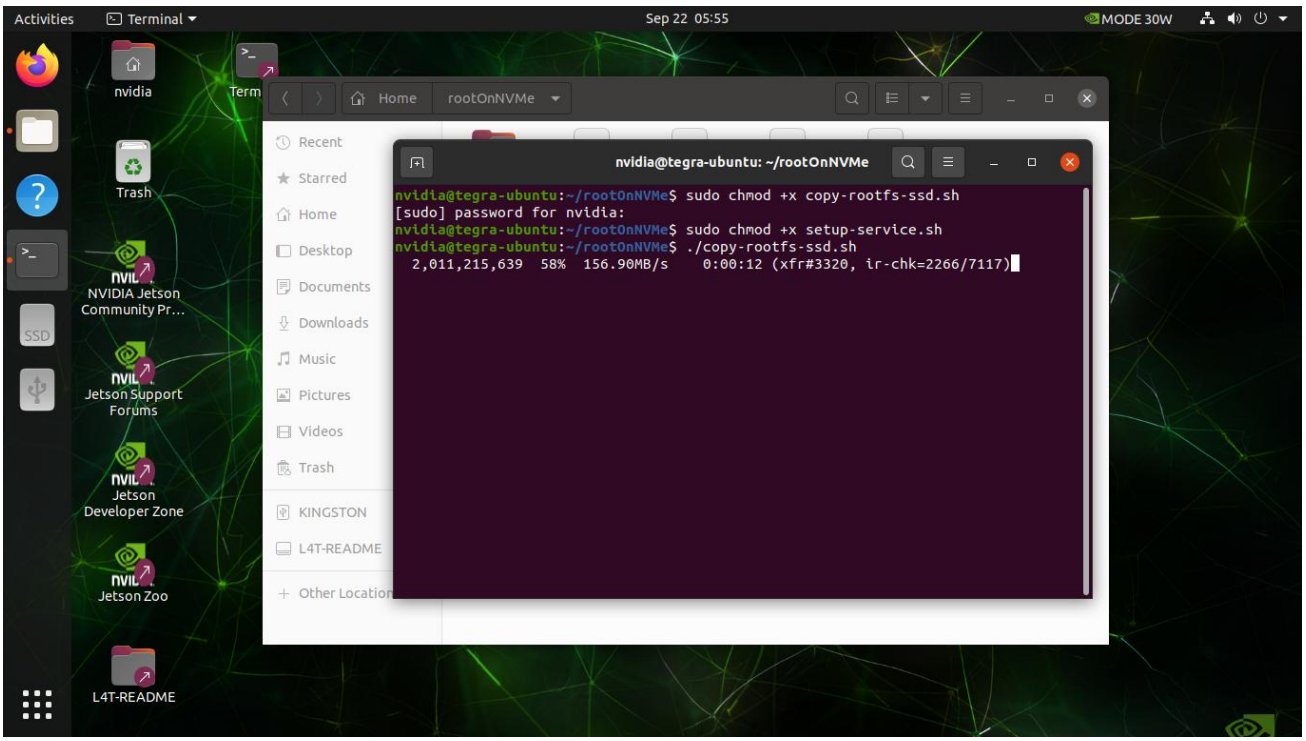
3) Right-click in the blank space of the folder and select "Open in Terminal" and execute the command "sudo chmod +x copy-rootfs-ssd.sh".

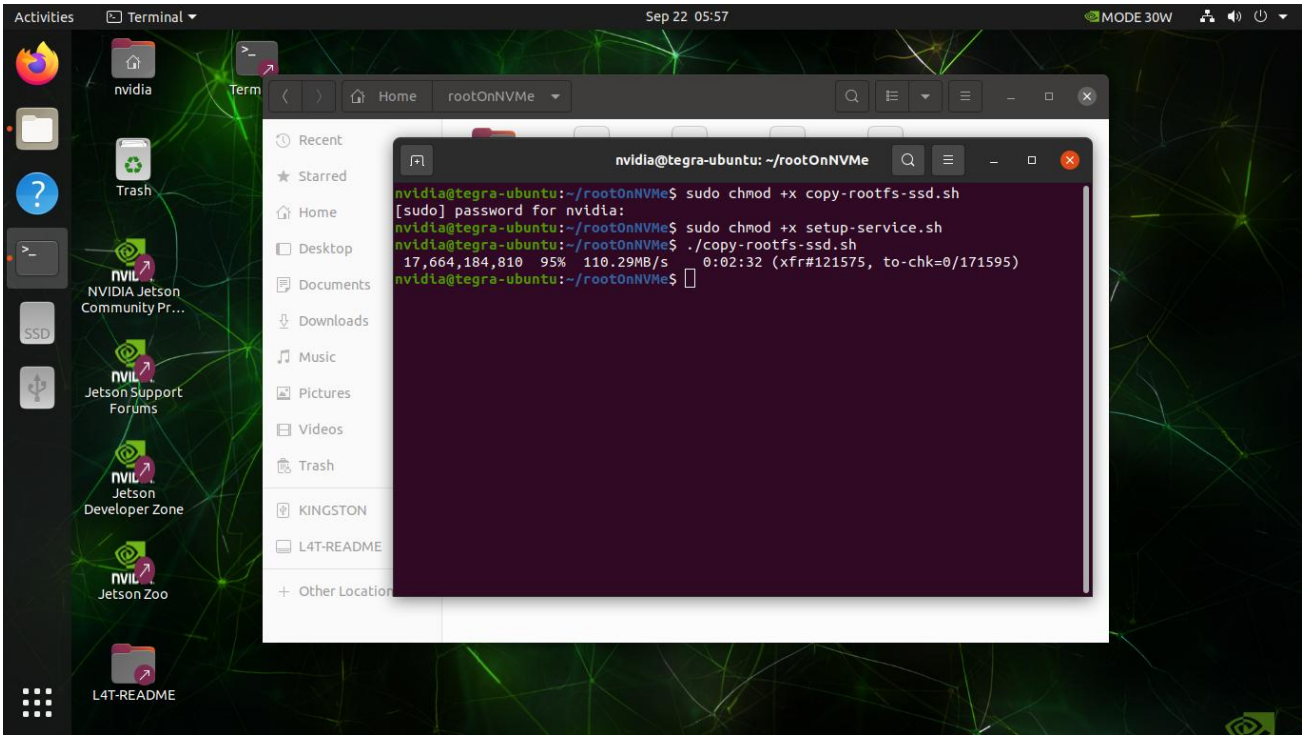


4) Execute the command: "sudo chmod +x setup-service.sh".

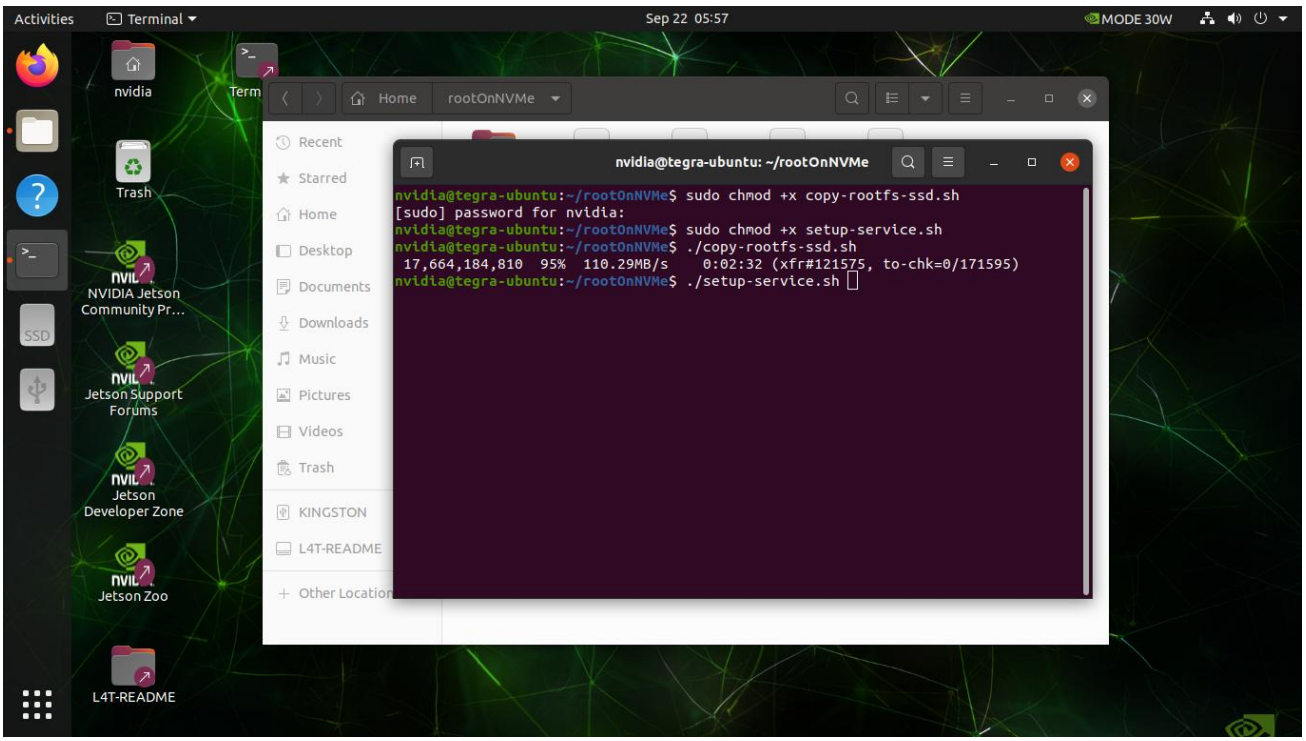


5) Execute the script: "copy-rootfs-ssd.sh"

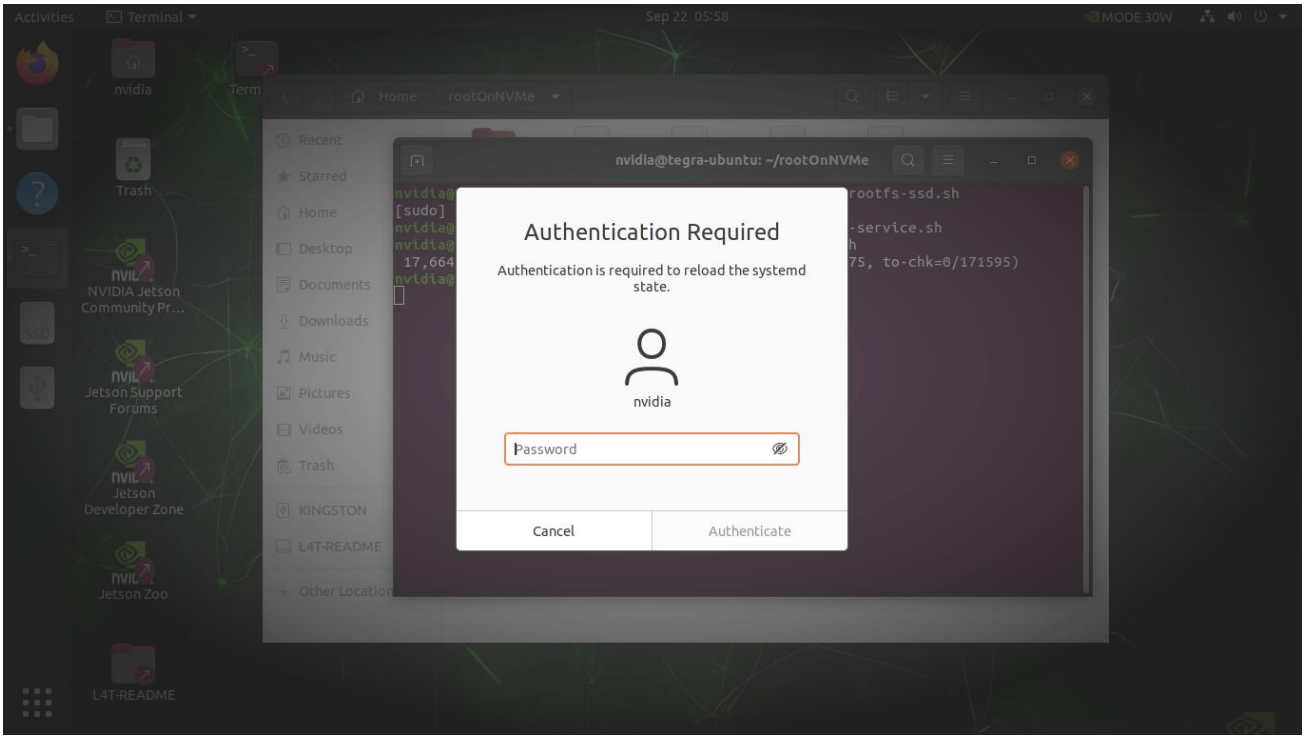


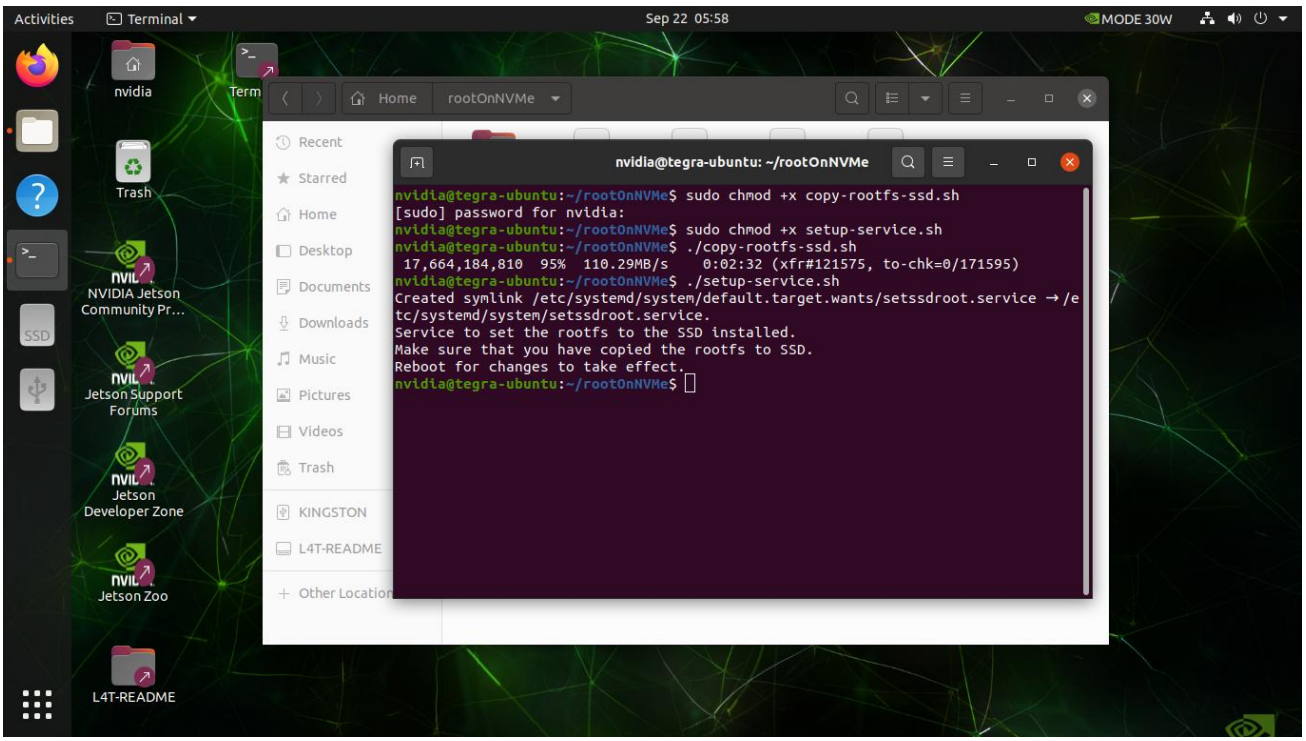


6) Execute the script:"setup-service.sh"

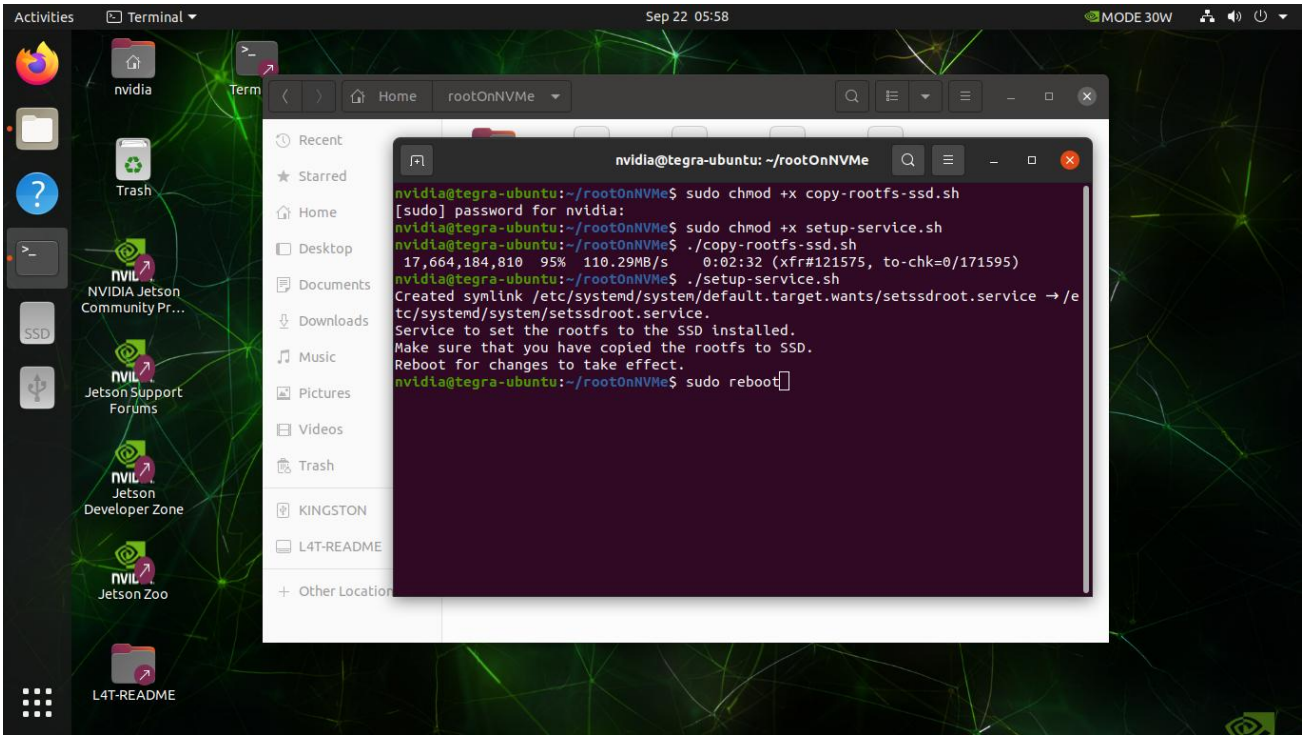


7) Enter your password, the default is "nvidia".

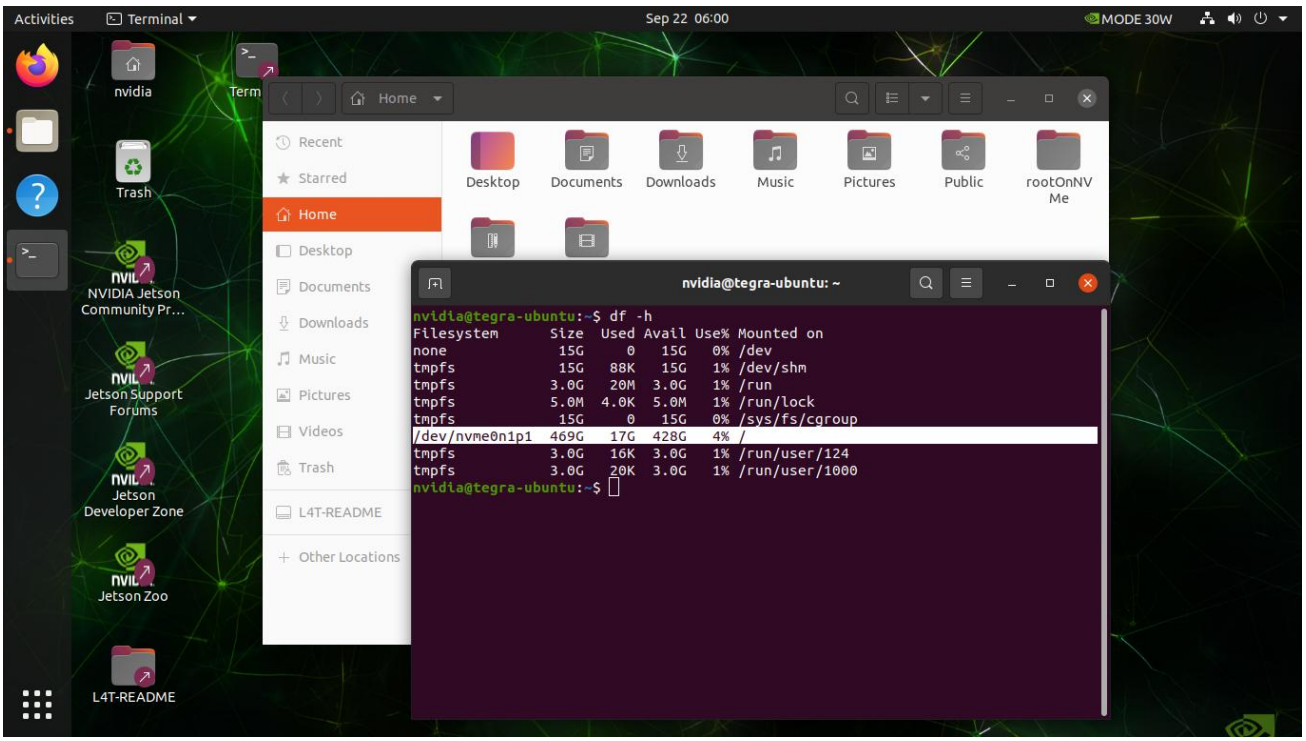




8) Enter the command "sudo reboot"



9) Wait for the reboot to complete, then open the terminal and enter the command "df -h" to check the storage distribution. The image below shows success.


Activities
Terminal
Sep 22 06:00
MODE 30W
nvidia
Trash
NVIDIA Jetson Community Pr...
Jetson Support Forums
Jetson Developer Zone
Jetson Zoo
L4T-README
Term
Home
Recent
Starred
Home
Desktop
Documents
Downloads
Music
Pictures
Videos
Trash
L4T-README
Other Locations
Desktop
Documents
Downloads
Music
Pictures
Public
rootOnNVMe
nvidia@tegra-ubuntu: ~
nvidia@tegra-ubuntu:~$ df -h
Filesystem Size Used Avail Use% Mounted on
none 15G 0 15G 0% /dev
tmpfs 15G 88K 15G 1% /dev/shm
tmpfs 3.0G 20M 3.0G 1% /run
tmpfs 5.0M 4.0K 5.0M 1% /run/lock
tmpfs 15G 0 15G 0% /sys/fs/cgroup
/dev/nvme0n1p1 469G 17G 428G 4% /
tmpfs 3.0G 16K 3.0G 1% /run/user/124
tmpfs 3.0G 20K 3.0G 1% /run/user/1000
nvidia@tegra-ubuntu:~$

System Installation

Our T906G products are self-developed motherboard with nvidia agx orin core board, supporting software drivers are also developed and designed by our staff. If you need to re-flash or change other configurations in the process of using the product and the usb and other interfaces cannot be used normally, you need to download the driver package provided by our company and install our driver to make the external interface work normally.

Prepare for download

1 computer with Ubuntu 18.04 or 20.04 (virtual machine is also acceptable)

1 type-c usb cable

Set the download mode

Nvidia jetson is upgraded via usb type-cinterface, the T906G needs to be in recovery mode before the update.

Steps to enter recovery mode on the T906G:

1) Connect the T906G to the system power supply;

2) Connect the jetson to the ubuntu host using a usb type-c cable (one end is plugged into the OTG port of the T906G and one end is plugged into the usb 3.0 socket of the ubuntu host).

3) Power up the system using the power supply configured on the T906G.

4) Press recovery and then press and hold the reset button.

5) Release the reset button after 2 seconds and finally release the recovery button, at this point the T906G enters recovery brushing mode (you can check if there is an nvidia corp device by running the command: Lsusb on the ubuntu host (different jetson modules have different usb vid/pid) to confirm if it enters (normal)

Note: When entering usb recovery mode, the system will not boot and there will be no debug information output from the serial port.

Software upgrade steps

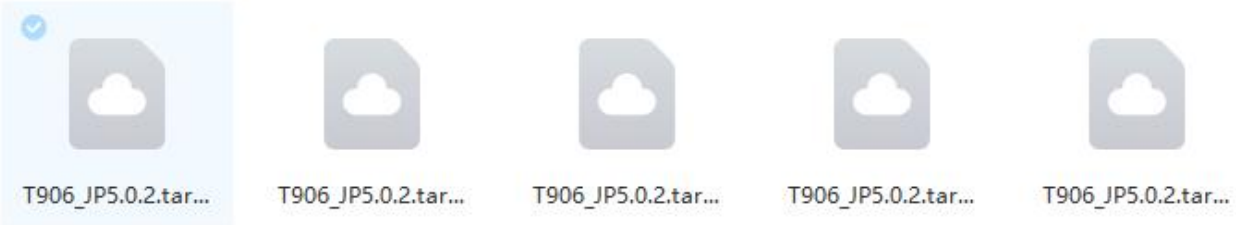
Step 1:

Download the system image from Baidu.com and copy the image file to your ubuntu computer;

Link: https://pan.baidu.com/s/10kWqcxHHCGCMTl5Pbsnmpg

Extraction code: ht5h

The link will open as shown in the picture, you need to download all of them.



Step 2:

Execute the following command on your ubuntu computer:

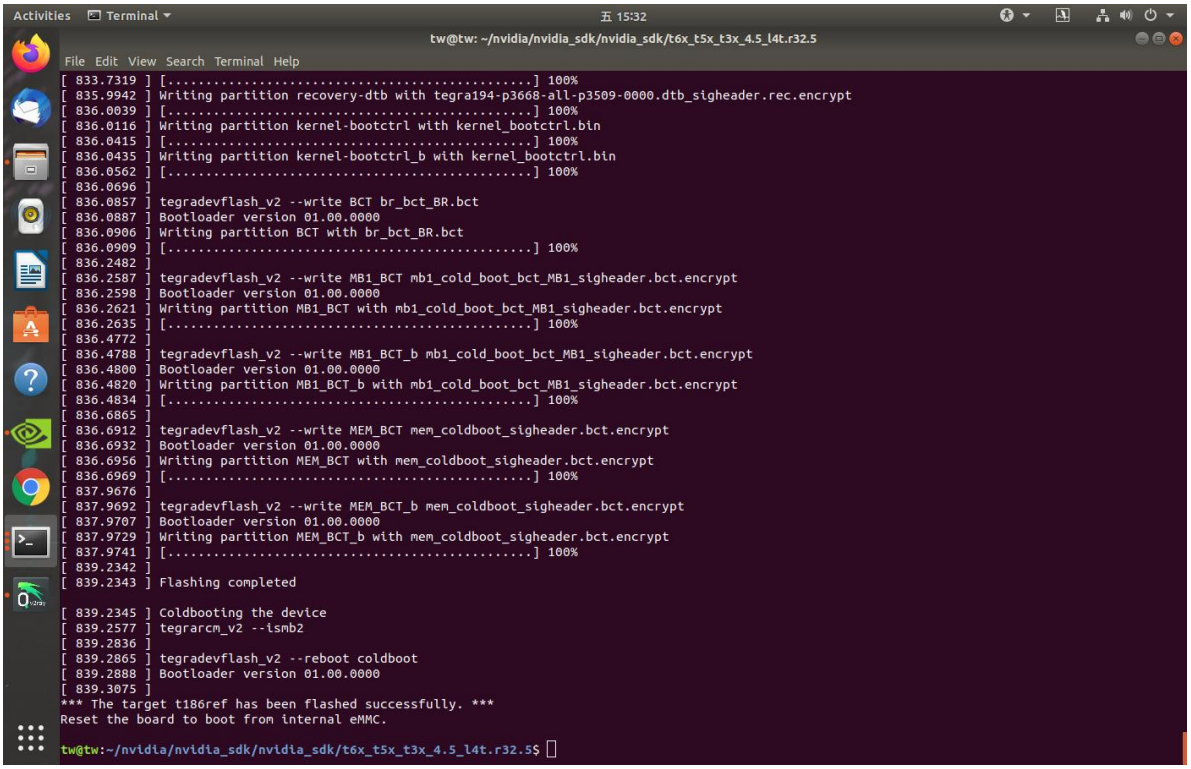
Merge the archive: cat T906G_JP5.0.2.tar.gz* > T906G_JP5.0.2.tar.gz

Unzip:sudo tar -zxvf T906G_JP5.0.2.tar.gz

cd Linux_for_Tegra

Execute the flash script sudo . /flash.sh jetson-agx-orin-devkit mmcblk0p1

When the flash is complete, as shown in the image below, wait until the flash is complete and reboot. Plug in the monitor to determine if the flush is fully successful.



Jtop Installation

jtop (a system monitoring utility that can be run from a terminal and view and control the status of the nvidia jetson in real time) is also very easy to install. If the jetpack sdk is already installed on the jetson product, you can follow the steps below to install and run it.

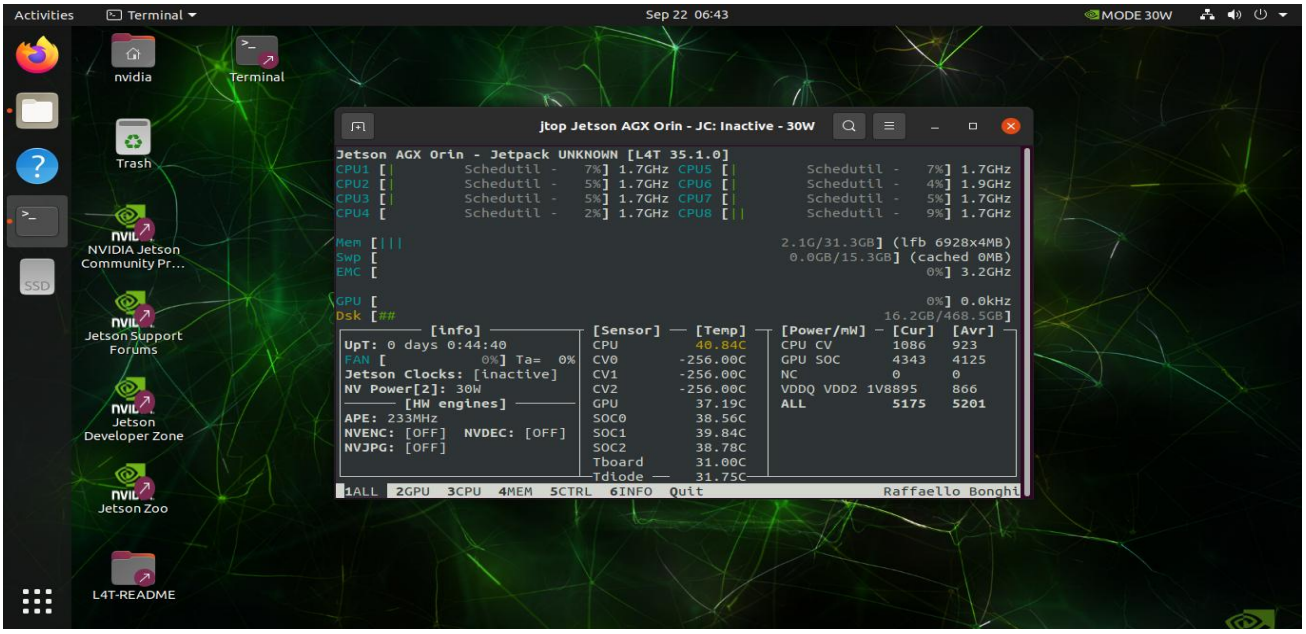
Installing and running

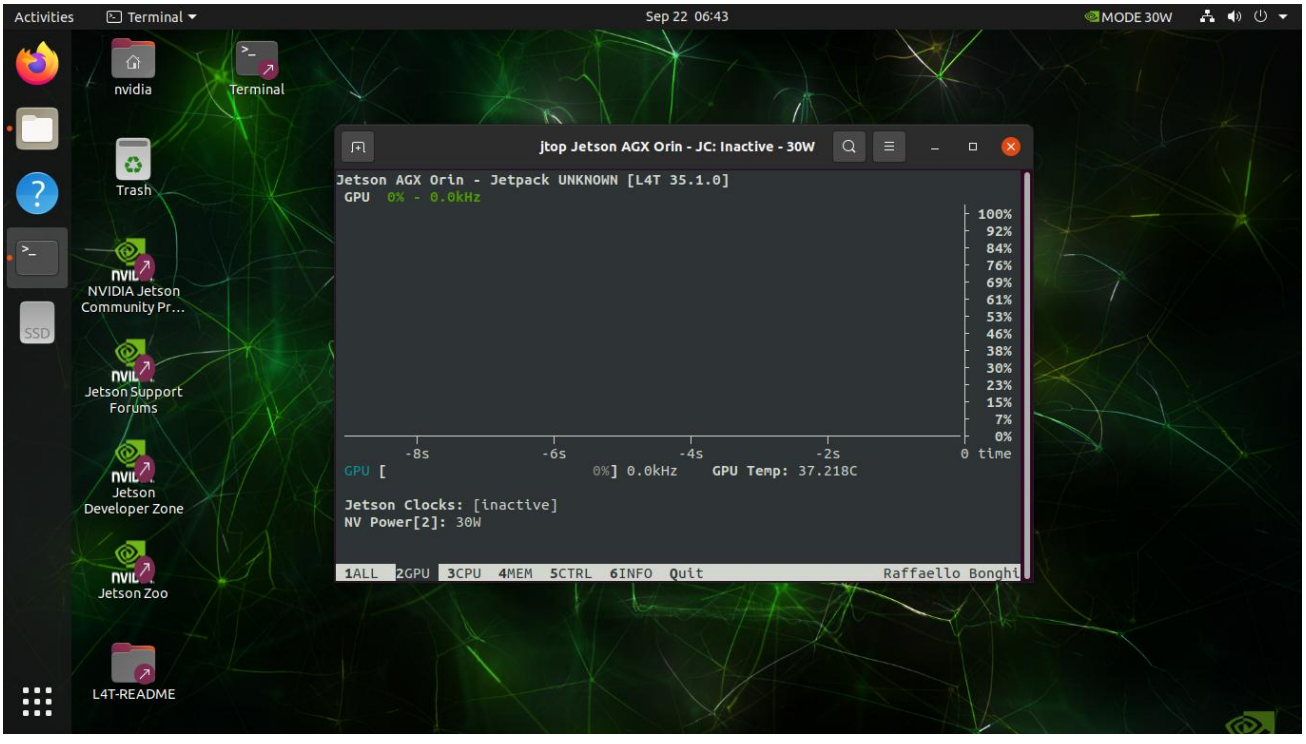
sudo apt install python3-pip

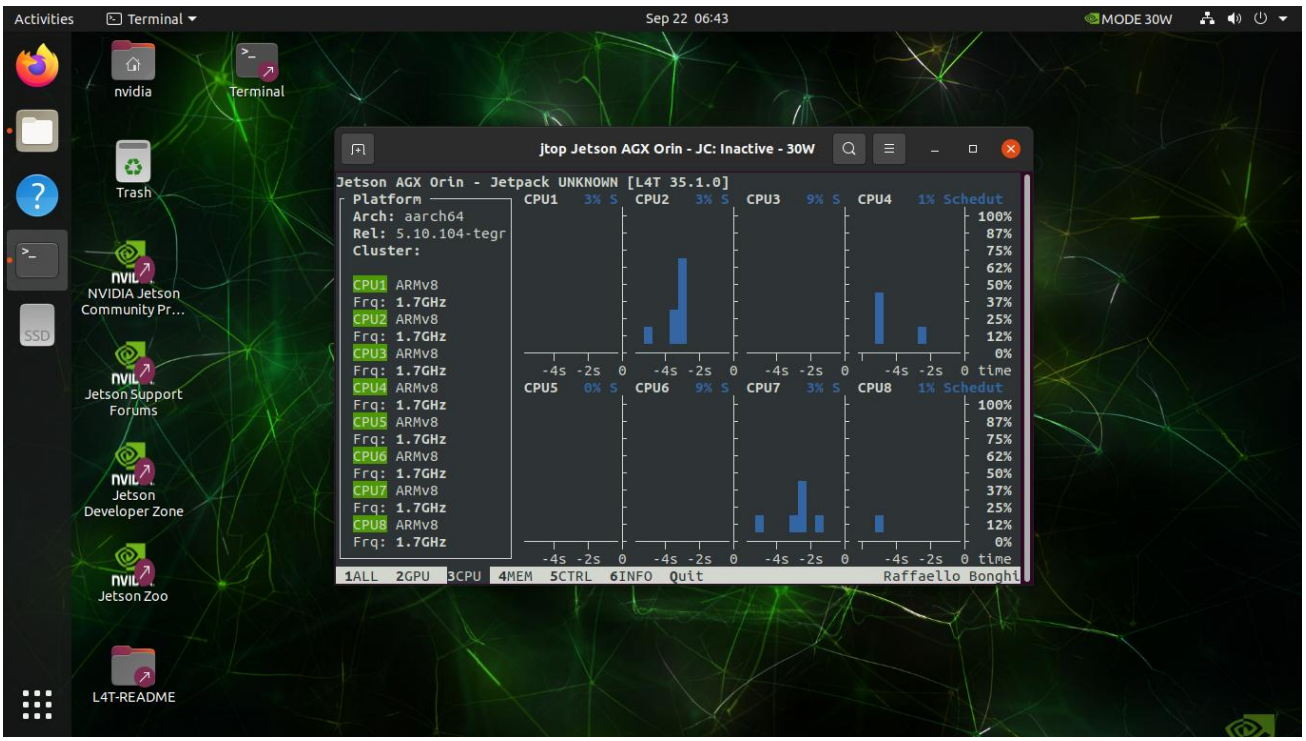
sudo -H pip3 install -U pip

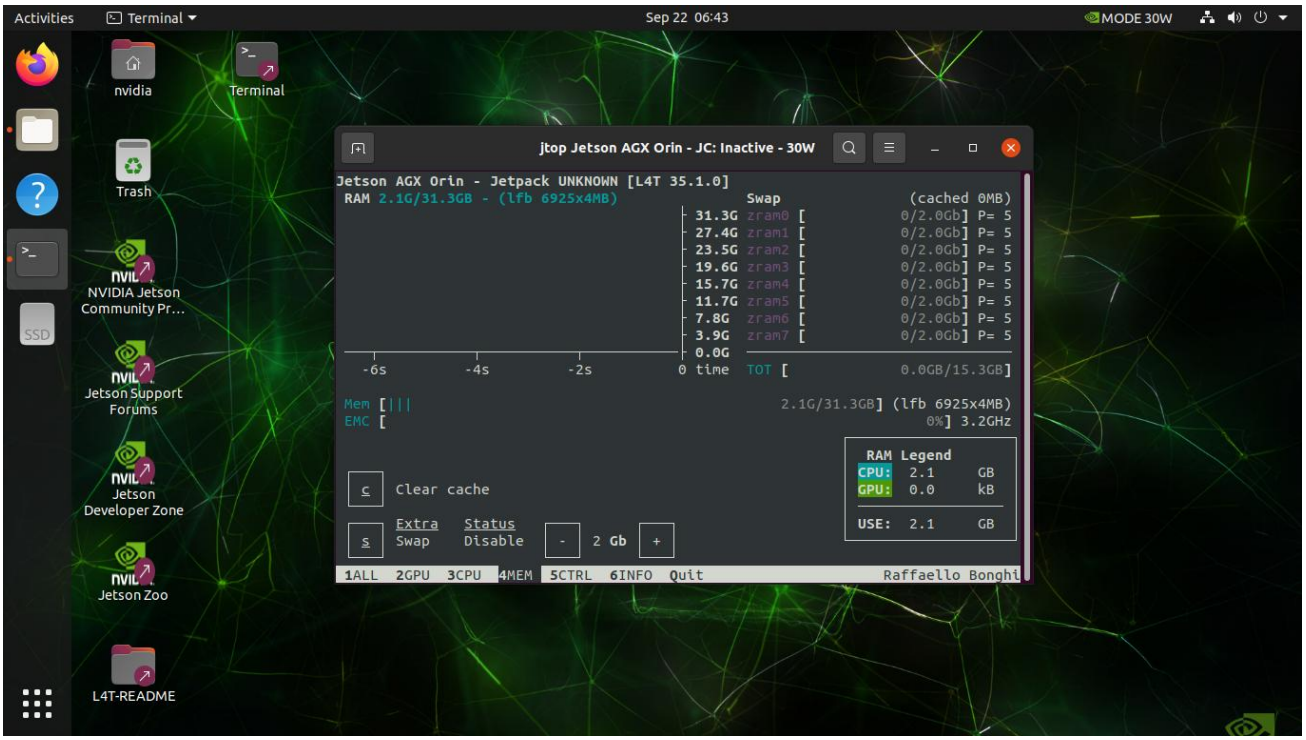
sudo -H pip install jetson-stats==4.0.0rc2

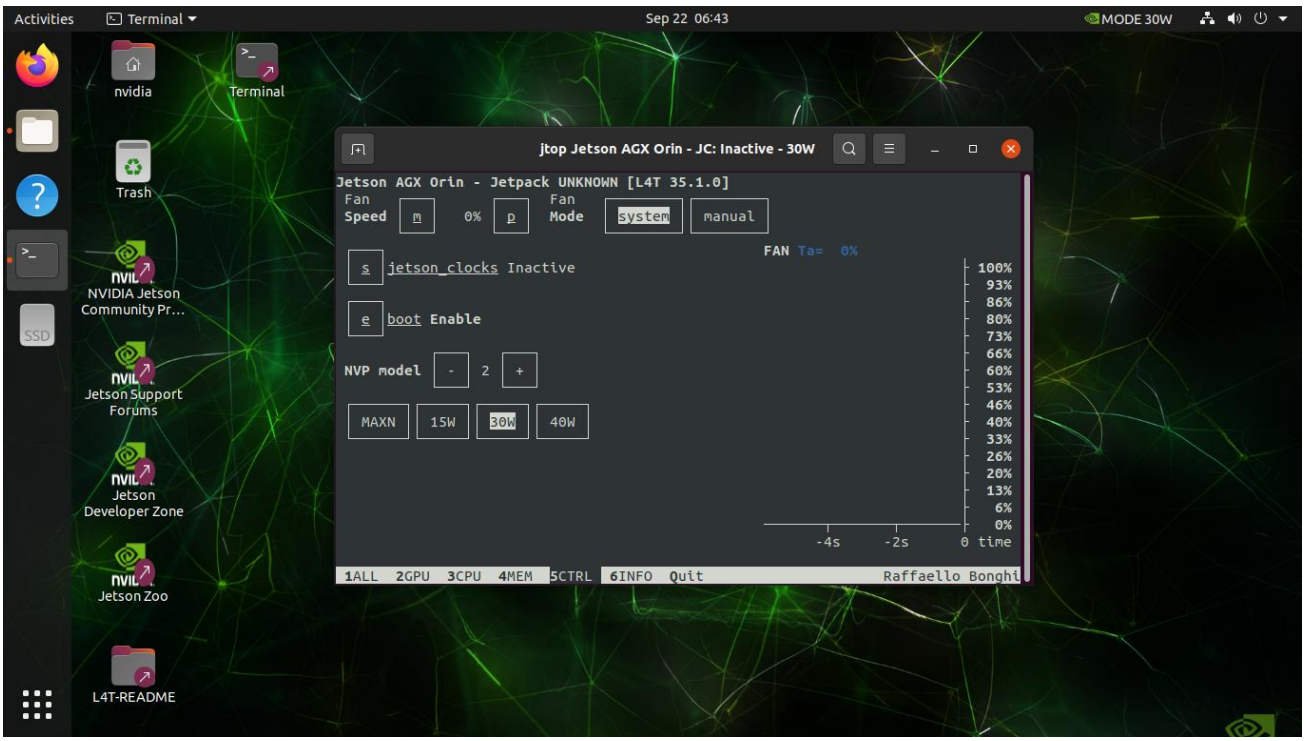
Press the number keys 1 2 3 4 5 6 to switch between pages, and Q to exit.

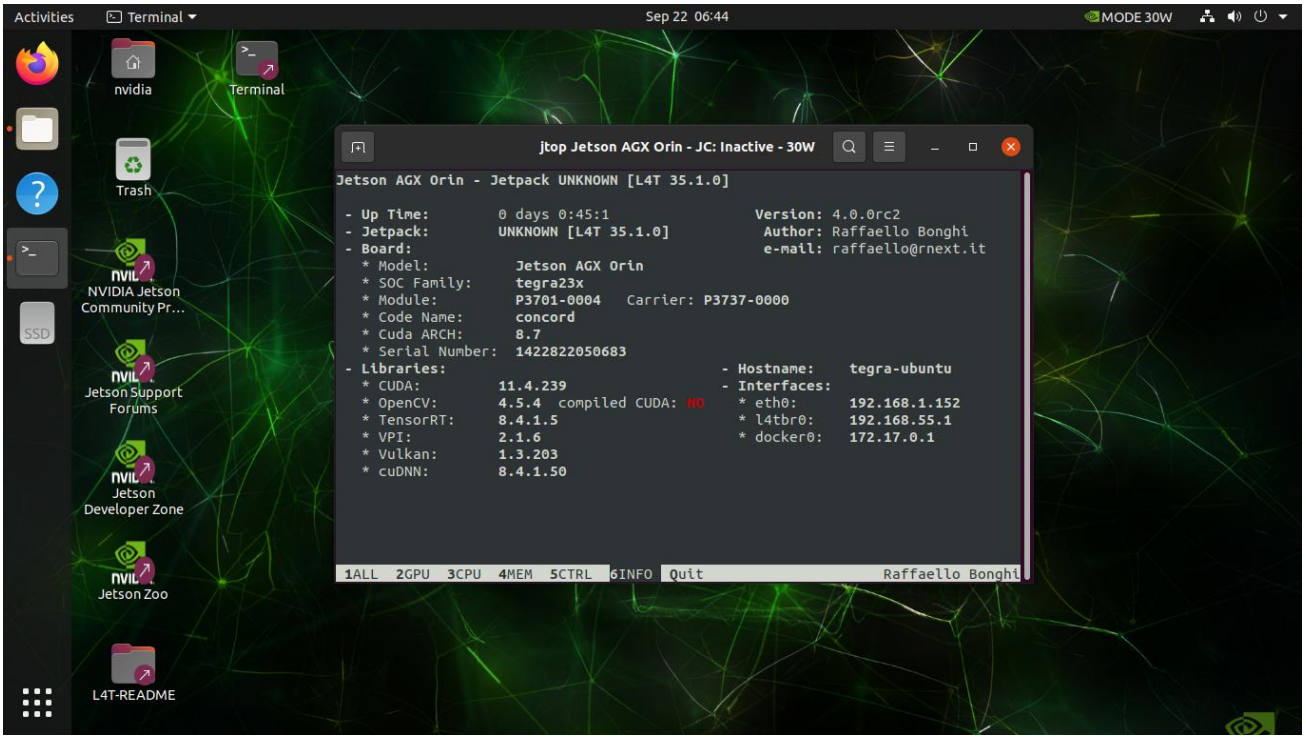





Activities
Terminal
Sep 22 06:43
MODE 30W
nvidia
Terminal
Trash
NVIDIA Jetson Community Pr...
Jetson Support Forums
Jetson Developer Zone
Jetson Zoo
L4T-README
jtop Jetson AGX Orin - JC: Inactive - 30W
Jetson AGX Orin - Jetpack UNKNOWN [L4T 35.1.0]
Platform
Arch: aarch64
Rel: 5.10.104-tegr
Cluster:
CPU1 ARMv8
Frq: 1.7GHz
CPU2 ARMv8
Frq: 1.7GHz
CPU3 ARMv8
Frq: 1.7GHz
CPU4 ARMv8
Frq: 1.7GHz
CPU5 ARMv8
Frq: 1.7GHz
CPU6 ARMv8
Frq: 1.7GHz
CPU7 ARMv8
Frq: 1.7GHz
CPU8 ARMv8
Frq: 1.7GHz
CPU1 3% S CPU2 3% S CPU3 9% S CPU4 1% Schedut
CPU5 0% S CPU6 9% S CPU7 3% S CPU8 1% Schedut
100%
87%
75%
62%
50%
37%
25%
12%
0%
-4s -2s 0 time
1ALL 2GPU 3CPU 4MEM 5CTRL 6INFO Quit
Raffaello Bonghi


Activities
Terminal
Sep 22 06:43
MODE 30W
nvidia
Terminal
Trash
NVIDIA Jetson Community Pr...
Jetson Support Forums
Jetson Developer Zone
Jetson Zoo
L4T-README
jtop Jetson AGX Orin - JC: Inactive - 30W
Jetson AGX Orin - Jetpack UNKNOWN [L4T 35.1.0]
RAM 2.1G/31.3GB - (lfb 6925x4MB)
Swap (cached 0MB)
31.3G zram0 [0/2.0Gb] P= 5
27.4G zram1 [0/2.0Gb] P= 5
23.5G zram2 [0/2.0Gb] P= 5
19.6G zram3 [0/2.0Gb] P= 5
15.7G zram4 [0/2.0Gb] P= 5
11.7G zram5 [0/2.0Gb] P= 5
7.8G zram6 [0/2.0Gb] P= 5
3.9G zram7 [0/2.0Gb] P= 5
0.0G
-6s -4s -2s 0 time
TOT [0.0GB/15.3GB]
Mem [||| 2.1G/31.3GB] (lfb 6925x4MB)
EMC [0%] 3.2GHz
RAM Legend
CPU: 2.1 GB
GPU: 0.0 kB
USE: 2.1 GB
c Clear cache
s Extra Swap Status Disable - 2 Gb +
1ALL 2GPU 3CPU 4MEM 5CTRL 6INFO Quit
Raffaello Bonghi





It is very easy to see the complete range of information currently available on the jetson machines. You can usually read a wealth of data information on the first page.

1) all

This contains information about the module's operation, including cpu, memory, gpu, disks, fans, jetson_clock status, nvpmodel, etc.

2)gpu

Real-time gpu status

3)cpu

Real-time cpu status

4)mem

Memory status

5)ctrl

It can control the status of the fan speed and the power mode selection;

6)info

lib library, cuda, serial number, interface and other information, **comes with opencv does not support cuda. If you need to support cuda, you need to uninstall comes with opencv and compile opencv manually;**

It can use the following keyboard commands to control the nvidia jetson related configuration.

In the mem on page 3:

c : Clear cache

s : enable/disable additional swaps

+/-: Increase and decrease swap size

On page 4 ctrl :

Start / stop jetson_clocks service (note: only jetson_clocks starts after 60 seconds from time)

e: enable/disable jetson_clocks at startup

+/-: Increase and decrease nvp models

f: manual/ jetson_clocks mode for fans

p/m: increase and decrease fan speed

1. jetson_release command shows the status of nvidia jetson and all information

2. tegrastats command line to view information about each resource

$ tegrastatsram 1778/7763mb (lfb 986x4mb) swap 0/3882mb (cached 0mb) cpu [20%@1190,5%@1190,5%@1190,5%@1190,4%@1190,4%@1190] emc_freq 0% gr3d_freq 0% ao@37.5c gpu@37.5c pmic@100c aux@37.5c cpu@38.5c thermal@38c vdd_in 3913/3877 vdd_cpu_gpu_cv 440/429 vdd_soc 1198/1198

ram : memory occupancy cpu : occupancy of each core of the cpu emc : external memory controller, external memory controller, unit bus%@mhzgr3d : gpu occupied%thermal : temperature data of each module

Vnc Viewer Installation (Remote GUI Tool)

Set up a vnc server on the jetson to allow other devices to access the jetson's linux GUI over the network to work remotely and avoid the need to connect an hdmi monitor, usb keyboard or mouse.

The following is the process for building a vnc server, which can be accessed remotely via viewvnc once the build is complete.

Step 1: Install vino

sudo apt update

sudo apt install vino

Step 2: Enable vnc service (you can turn on vnc server manually at this point)

Enable the vnc server every time you log in.

sudo ln -s ../vino-server.service /usr/lib/systemd/user/graphical-session.target.wants

Configure the vnc server:

gsettings set org.gnome.vino prompt-enabled false

gsettings set org.gnome.vino require-encryption false

Add additional and manually start vnc service：-1) edit the org.gnome.vino schema to restore the missing "enabled" parameter

sudo vi /usr/share/glib-2.0/schemas/org.gnome.vino.gschema.xml add this key: （End）

```
<key name='enabled' type='b'>
  <summary>enable remote access to the desktop</summary>
  <description>
    if true, allows remote access to the desktop via the rfb
    protocol. users on remote machines may then connect to the
    desktop using a vnc viewer.
  </description>
  <default>false</default>
</key>
```

-2) compile the schemas for gnome:

sudo glib-compile-schemas /usr/share/glib-2.0/schemas

Step 3: Set vnc login password ('12345678' modified as your own password)

gsettings set org.gnome.vino authentication-methods "['vnc']"

gsettings set org.gnome.vino vnc-password $(echo -n '12345678'|base64)

Step 4: Reboot the machine to verify that vnc is set up successfully

sudo reboot

Step 5: Set the vnc server to start from the boot

the vnc server is only available after you have logged in to jetson locally. if you wish vnc to be available automatically, use the system settings application to enable automatic login.

gsettings set org.gnome.vino enabled true

mkdir -p ~/.config/autostart

vi ~/.config/autostart/vino-server.desktop

```
[desktop entry]
type=application
name=vino vnc server
exec=/usr/lib/vino/vino-server
nodisplay=true
```

Warranty Regulations of TWOWIN TECHNOLOGY CO. LTD

Important notes

TWOWIN TECHNOLOGY CO. LTD warrants that each embedded product supplied is, to the best of its knowledge, free from defects in material and workmanship and is in full conformity with the specifications of the original manufacturer as shipped.

The TWOWIN TECHNOLOGY CO. LTD warranty covers all original products, but in the event of failure of dealer supplied parts, please consult with your dealer for a solution. For products repaired within the warranty period, the warranty will be extended by 12 months for the repaired part. Unless otherwise notified by Twowin Technology, the date of your original delivery note is the date of delivery.

How to obtain warranty service

If your product does not function properly during the warranty period, please contact Twowin Technology or your dealer to obtain warranty service and present proof of purchase invoice (this is proof of your entitlement to warranty service).

Warranty resolution measures

When you request warranty service, you will need to follow the problem identification and resolution procedures set out by Twowin Technology. You will be contacted by a technician by telephone or email for an initial diagnosis, where you will be required to complete all questions on the repair form provided to ensure that we can accurately determine the cause of the fault and the location of the damage (we will also provide a charge sheet for out-of-warranty products, which you will need to confirm). If a product is "replaced" or "repaired", the "faulty" product being replaced or the "faulty" part being replaced after repair will be returned to Twowin Technology. The "faulty" part will be returned to Twowin Technology. As some of the repaired products have to be shipped to the original factory, Twowin Technology recommends that you take out shipping insurance to avoid accidental loss. If the user waives the insurance, then Twowin Technology is not responsible for damage or loss of the item sent in transit. For products within the warranty period, the user is responsible for shipping costs when the repaired product is returned to the manufacturer and Twowin Technology is responsible for shipping costs when the repaired product is returned to the user.

The following cases are not covered by the warranty .

1. Improper installation, misuse, misapplication or abuse of the product (e.g. exceeding the working load, etc.)
2. Improper maintenance (e.g. fire, explosion, etc.) or natural disasters (e.g. lightning, earthquake, typhoon, etc.) resulting in product failure or damage.
3. Modifications to the product (e.g. circuit characteristics, mechanical characteristics, software characteristics, triple protection treatment, etc.)
4. Other faults apparently caused by improper use (e.g. high voltage, low voltage, high floating ground voltage, reversed polarity, bent or broken pins, wrong bus connection, dislodged devices, electrostatic breakdown, external crushing, fallen fall, high temperature, high humidity, poor transport, etc.).
5. The logo and part number on the product have been altered or removed.
6. The product has exceeded the warranty period.

Special notes

If multiple products have the same fault or the same fault or damage occurs repeatedly in the same equipment, in order to find the cause to confirm the responsibility. We reserve the right to require the user to provide physical or technical information on peripheral equipment, such as monitors, i/o devices, cables, power supplies, connection diagrams, system structure diagrams, etc. Otherwise, we reserve the right to refuse to honour the warranty and to charge the market price for the repair and to charge a repair deposit.