

Upgrade to SUPER version

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This tutorial supports upgrading the Jetson Orin SUB kit to SUPER. After upgrading SUPER, only the pure system will be retained, and the tutorial motherboard case cannot be run.

Note: The startup system of the Jetson series motherboard is closely related to the Jetpack version of the motherboard. Different Jetpack versions may fail to start

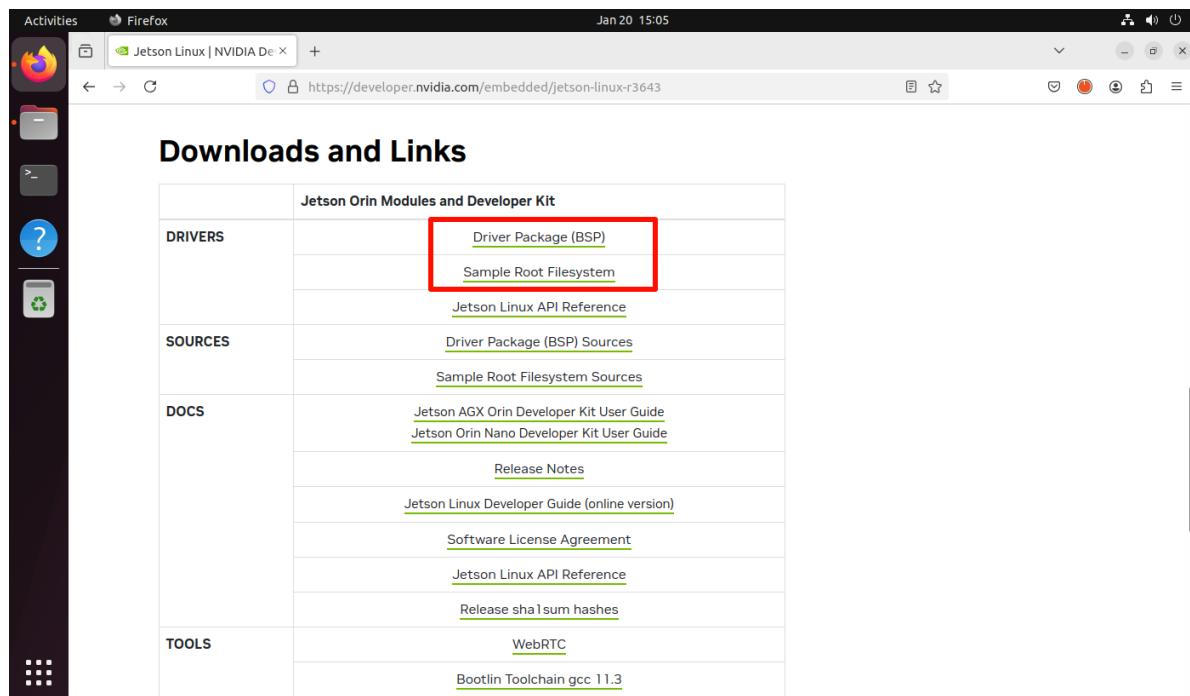
The tutorial uses VMware to start the Ubuntu22.04 virtual machine as a demonstration

1. File download

Official website: <https://developer.nvidia.com/embedded/jetson-linux-r3643>

Note: NVIDIA Jetson Linux 36.4.3 corresponds to Jetpack 6.2

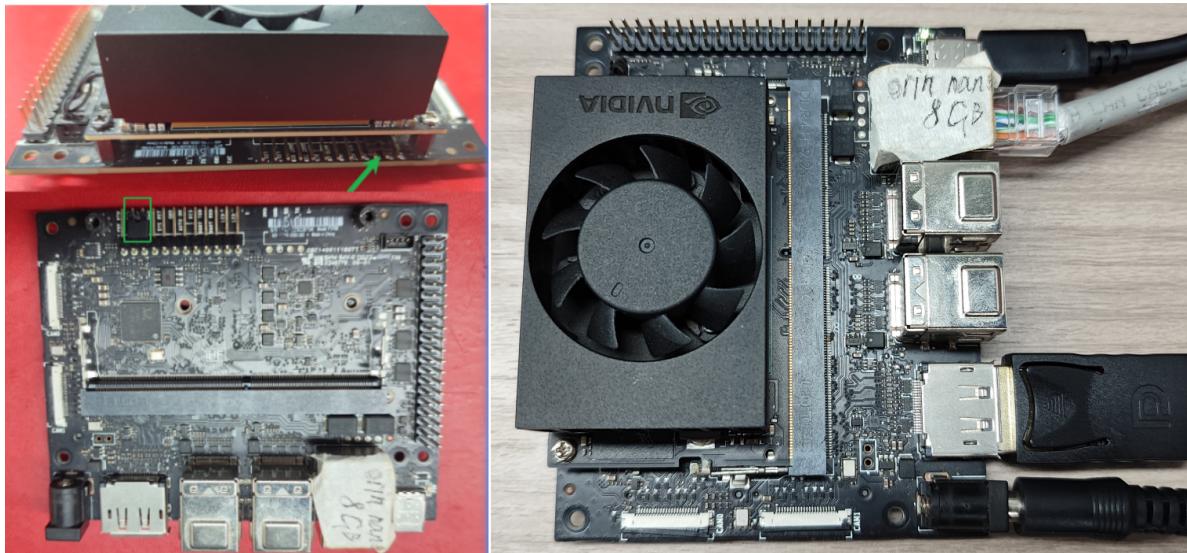
Download the compressed package files corresponding to `Driver Package (BSP)` and `Sample Root Filesystem`:



2. Flashing mode

2.1. Hardware connection

1. Use a jumper cap to short the FC under the core board REC and GND pins: You don't need to remove the core board, the picture is just for a clearer observation
2. The Jetson Orin motherboard needs to be connected to a DC power adapter, DP data cable, network cable and Type C data cable: Type C data cable connects to the computer



2.2. Software connection

The motherboard is successfully connected to the Ubuntu system, and the `lsusb` command will display the `NVIDIA Corp. APX` information:

```
Activities Terminal Jan 20 15:40
Home
yahboom@VM: ~
yahboom@VM: ~$ lsusb
Bus 004 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 003 Device 004: ID 0eef:0002 VMware, Inc. Virtual USB Hub
Bus 003 Device 003: ID 0eef:0002 VMware, Inc. Virtual USB Hub
Bus 003 Device 007: ID 0955:7523 NVIDIA Corp. APX
Bus 003 Device 002: ID 0eef:0003 VMware, Inc. Virtual Mouse
Bus 003 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 002 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 001 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
yahboom@VM: ~$
```

3, Burning system

3.1, Unzip the file

Enter the download folder and open the terminal, then unzip the file in the terminal and enter the specified folder:

```

tar xf Jetson_Linux_R36.4.3_aarch64.tbz2 sudo tar xpf Tegra_Linux_Sample-Root-
Filesystem_R36.4.3_aarch64.tbz2 -C Linux_for_Tegra/rootfs/ cd Linux_for_Tegra/
``` ! [image-20250120151802071] (image-20250120151802071.png) ### 3.2. Run the
script ``` sudo ./tools/l4t_flash_prerequisites.sh ``` ! [image-20250120151922577]
(image-20250120151922577.png) ``` sudo ./apply_binaries.sh

```

```

Activities Terminal Jan 20 15:21
yahboom@VM: ~/Downloads/Linux_for_Tegra
abooting is already the newest version (0.6-1build1).
lbzip2 is already the newest version (2.5-2.3).
sshpas is already the newest version (1.09-1)
xmlstarlet is already the newest version (1.6.1-2.1).
binutils is already the newest version (2.38-4ubuntu2.6).
cpio is already the newest version (2.13+dfsg-7ubuntu0.1).
libxml2-utils is already the newest version (2.9.13+dfsg-1ubuntu0.4).
nfs-kernel-server is already the newest version (1:2.6.1-1ubuntu1.2).
openssl is already the newest version (3.0.2-0ubuntu1.18).
rsync is already the newest version (3.2.7-0ubuntu0.22.04.4).
udev is already the newest version (249.11-0ubuntu3.12).
uuid-runtime is already the newest version (2.37.2-4ubuntu3.4).
qemu-user-static is already the newest version (1:6.2+dfsg-2ubuntu6.24).
0 upgraded, 0 newly installed, 0 to remove and 8 not upgraded.
yahboom@VM: ~/Downloads/Linux_for_Tegra$ sudo ./apply_binaries.sh
Using rootfs directory of: /home/yahboom/Downloads/Linux_for_Tegra/rootfs
Installing extlinux.conf into /boot/extlinux in target rootfs
/home/yahboom/Downloads/Linux_for_Tegra/nv_apply-debs.sh
Root file system directory is /home/yahboom/Downloads/Linux_for_Tegra/rootfs
Copying public debian packages to rootfs
Skipping installation of nvidia-igx-oem-config_36.4.3-20250107174145_arm64.deb ...
Skipping installation of nvidia-igx-systemd-reboot-hooks_36.4.3-20250107174145_arm64.deb ...
Skipping installation of nvidia-l4t-dgpu-apt-source_36.4.3-20250107174145_arm64.deb ...
Skipping installation of nvidia-l4t-dgpu-config_36.4.3-20250107174145_arm64.deb ...
Skipping installation of nvidia-l4t-dgpu-tools_36.4.3-20250107174145_arm64.deb ...
Skipping installation of nvidia-l4t-dgpu-x11_36.4.3-20250107174145_arm64.deb ...
Skipping installation of nvidia-l4t-factory-service_36.4.3-20250107174145_arm64.deb ...
Skipping installation of nvidia-igx-bootloader_36.4.3-20250107174145_arm64.deb ...
Skipping installation of nvidia-l4t-jetson-orin-nano-qspi-updater_36.4.3-20250107174145_arm64.deb ...
Start L4T BSP package installation
QEMU binary is not available, looking for QEMU from host system
Found /usr/bin/qemu-aarch64-static
Installing QEMU binary in rootfs
/home/yahboom/Downloads/Linux_for_Tegra/rootfs /home/yahboom/Downloads/Linux_for_Tegra
Host qemu-aarch64-static version: 6.2.0
Installing BSP Debian packages in /home/yahboom/Downloads/Linux_for_Tegra/rootfs
Selecting previously unselected package nvidia-l4t-core.
(Reading database ... 167181 files and directories currently installed.)
Preparing to unpack .../nvidia-l4t-core_36.4.3-20250107174145_arm64.deb ...
Pre-installing... skip compatibility checking.
Unpacking nvidia-l4t-core (36.4.3-20250107174145) ...

```

### 3.3, Burn the system to the SSD

```

sudo ./tools/kernel_flash/l4t_initrd_flash.sh --external-device nvme0n1p1 -c
tools/kernel_flash/flash_l4t_t234_nvme.xml -p "-c
bootloader/generic/cfg/flash_t234_qspi.xml" --showlogs --network usb0 jetson-
orin-nano-devkit-super internal

```

Description: jetson orin nano and jetson orin nx can use the same command to burn the system to the SSD

```

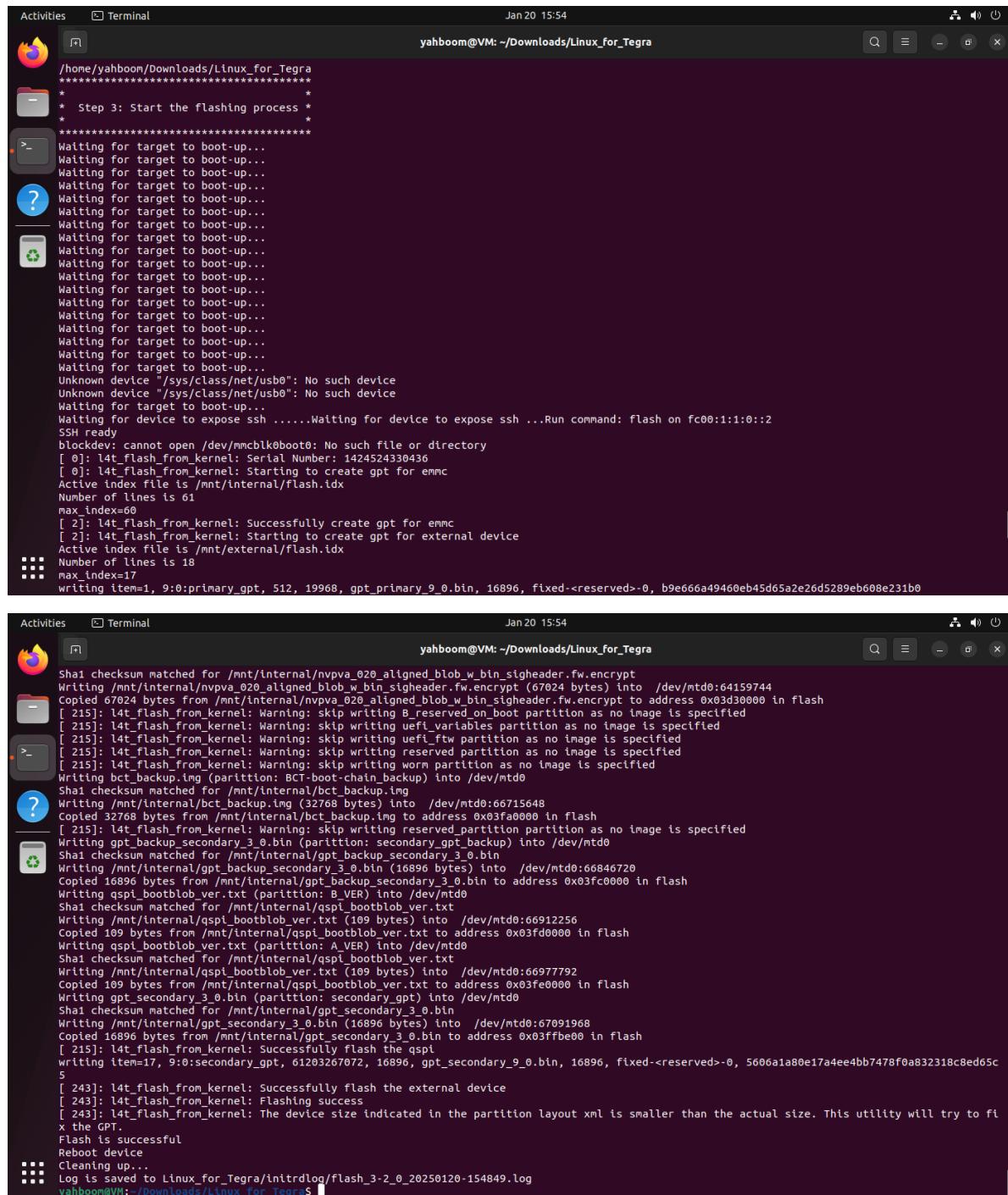
Activities Terminal Jan 20 15:22
yahboom@VM: ~/Downloads/Linux_for_Tegra
Add config /lib/modprobe.d/aliases.conf
Add config /lib/modprobe.d/fbdev-blacklist.conf
Add config /lib/modprobe.d/systemd.conf
Cleaning up the temporary directory for updating the initrd..
/home/yahboom/Downloads/Linux_for_Tegra
Removing QEMU binary from rootfs
Removing stashed Debian packages from rootfs
L4T BSP package installation completed!
Disabling NetworkManager-wait-online.service
Disable the ondemand service by changing the runlevels to 'K'
Success!
yahboom@VM: ~/Downloads/Linux_for_Tegra$ sudo ./tools/kernel_flash/l4t_initrd_flash.sh --external-device nvme0n1p1 -c tools/kernel_flash/flash_l4t_t234_nvme.xml -p "-c bootloader/generic/cfg/flash_t234_qspi.xml" --showlogs --network usb0 jetson-orin-nano-devkit-super internal
Please install the Secureboot package to use initrd flash for fused board
Entry added by NVIDIA initrd flash tool
/home/yahboom/Downloads/Linux_for_Tegra/tools/kernel_flash/tmp 127.0.0.1(rw,nohide,insecure,no_subtree_check,async,no_root_squash)
rpcbind: another rpcbind is already running. Aborting
Export list for localhost:
/home/yahboom/Downloads/Linux_for_Tegra/tools/kernel_flash/tmp 127.0.0.1
/home/yahboom/Downloads/Linux_for_Tegra/tools/kernel_flash/l4t_initrd_flash_internal.sh --no-flash --external-device nvme0n1p1 -c tools/kernel_flash/flash_l4t_t234_nvme.xml -p "-c bootloader/generic/cfg/flash_t234_qspi.xml" --showlogs --network usb0 jetson-orin-nano-devkit-super internal

* Step 1: Generate flash packages *
*

Create folder to store images to flash
Generate image for internal storage devices
Generate images to be flashed
ADDITIONAL_DTB_OVERLAY="" /home/yahboom/Downloads/Linux_for_Tegra/flash.sh --no-flash --sign -c bootloader/generic/cfg/flash_t234_qspi.xml jets
on-orin-nano-devkit-super internal
#####
L4T BSP Information:
R36 , REVISION: 4.3
User release: 0.0
#####
ECID is 0x8001234705D1D76C00000001D8140
copying device_config(/home/yahboom/Downloads/Linux_for_Tegra/bootloader/generic/BCT/tegra234-mbi-bct-device-p3767-0000.dts)... done.
copying misc_config(/home/yahboom/Downloads/Linux_for_Tegra/bootloader/generic/BCT/tegra234-mbi-bct-misc-p3767-0000.dts)... done.
copying enc_fuse_dev_params(/home/yahboom/Downloads/Linux_for_Tegra/bootloader/generic/BCT/tegra234-br-bct-diag-boot.dts)... done.

```

Note: During the burning process, the user needs to connect the device to the virtual machine in time, otherwise it will cause the link to time out!



```
Activities Terminal Jan 20 15:54
yahboom@VM: ~/Downloads/Linux_for_Tegra
/home/yahboom/Downloads/Linux_for_Tegra

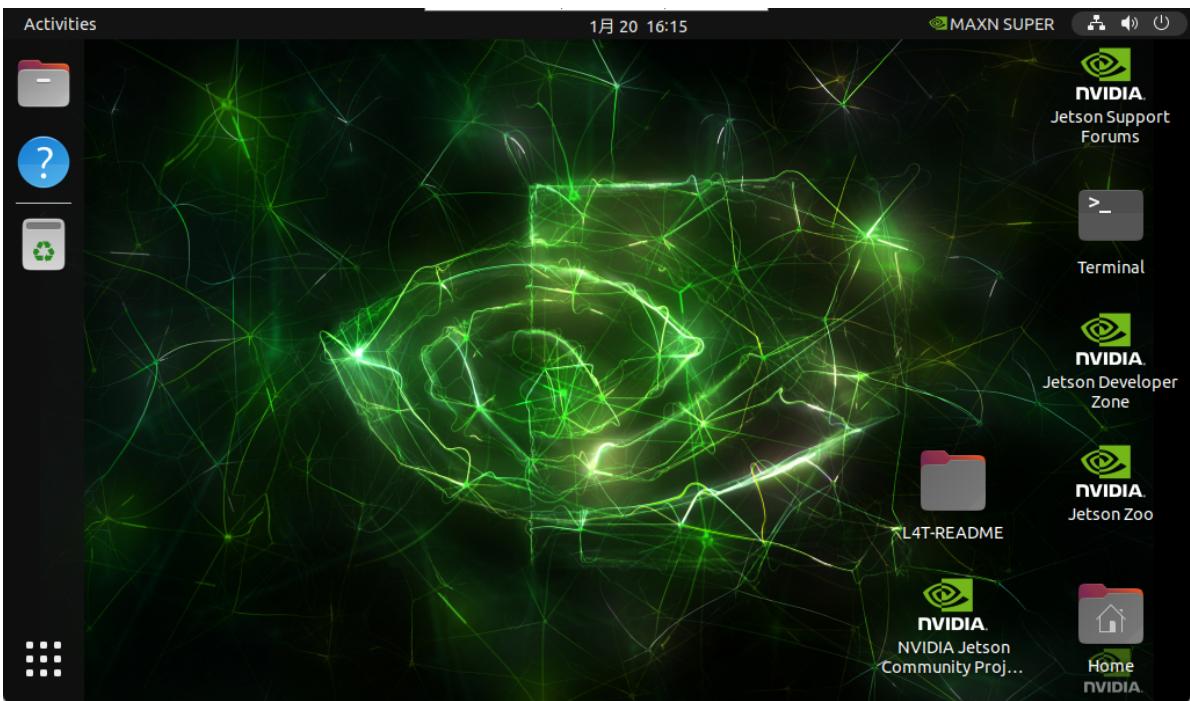
* Step 3: Start the flashing process *

Waiting for target to boot-up...
Unknown device "/sys/class/net/usb0": No such device
Unknown device "/sys/class/net/usb0": No such device
Waiting for target to boot-up...
Waiting for device to expose sshWaiting for device to expose ssh ...Run command: flash on fc00:1:1:0::2
SSH ready
blockdev: cannot open /dev/mmcblk0boot0: No such file or directory
[0]: l4t_flash_from_kernel: Serial Number: 1424524330436
[0]: l4t_flash_from_kernel: Starting to create gpt for emmc
Active index file is /mnt/internal/flash.idx
Number of lines is 61
max_indexe60
[2]: l4t_flash_from_kernel: Successfully create gpt for emmc
[2]: l4t_flash_from_kernel: Starting to create gpt for external device
Active index file is /mnt/external/flash.idx
Number of lines is 18
max_index=17
writing item=1, 9:0:primary_gpt, 512, 19968, gpt_primary_9_0.bin, 16896, fixed-<reserved>-0, b9e666a49460eb45d65a2e26d5289eb608e231b0

Activities Terminal Jan 20 15:54
yahboom@VM: ~/Downloads/Linux_for_Tegra
Shai checksum matched for /mnt/internal/nvpva_020_aligned_blob_w_bin_sigheader.fw.encrypt
Writing /mnt/internal/nvpva_020_aligned_blob_w_bin_sigheader.fw.encrypt (67024 bytes) into /dev/mtd0:64159744
Copied 67024 bytes from /mnt/internal/nvpva_020_aligned_blob_w_bin_sigheader.fw.encrypt to address 0x03d30000 in flash
[215]: l4t_flash_from_kernel: Warning: skip writing B_Reserved_on_boot partition as no image is specified
[215]: l4t_flash_from_kernel: Warning: skip writing uefi_variables partition as no image is specified
[215]: l4t_flash_from_kernel: Warning: skip writing uefi_ftw partition as no image is specified
[215]: l4t_flash_from_kernel: Warning: skip writing reserved partition as no image is specified
[215]: l4t_flash_from_kernel: Warning: skip writing worm partition as no image is specified
Writing bct_backup.img (partition: BCT-boot-chain_backup) into /dev/mtd0
Shai checksum matched for /mnt/internal/bct_backup.img
Writing /mnt/internal/bct_backup.img (32768 bytes) into /dev/mtd0:66715648
Copied 32768 bytes from /mnt/internal/bct_backup.img to address 0x03fa0000 in flash
[215]: l4t_flash_from_kernel: Warning: skip writing reserved_partition partition as no image is specified
Writing gpt_backup_secondary_3_0.bin (partition: secondary_gpt_backup) into /dev/mtd0
Shai checksum matched for /mnt/internal/gpt_backup_secondary_3_0.bin
Writing /mnt/internal/gpt_backup_secondary_3_0.bin (16896 bytes) into /dev/mtd0:66846720
Copied 16896 bytes from /mnt/internal/gpt_backup_secondary_3_0.bin to address 0x03fc0000 in flash
Writing qspi_bootblob_ver.txt (partition: B_VER) into /dev/mtd0
Shai checksum matched for /mnt/internal/qspi_bootblob_ver.txt
Writing /mnt/internal/qspi_bootblob_ver.txt (109 bytes) into /dev/mtd0:66912256
Copied 109 bytes from /mnt/internal/qspi_bootblob_ver.txt to address 0x03fd0000 in flash
Writing qspi_bootblob_ver.txt (partition: A_VER) into /dev/mtd0
Shai checksum matched for /mnt/internal/qspi_bootblob_ver.txt
Writing /mnt/internal/qspi_bootblob_ver.txt (109 bytes) into /dev/mtd0:66977792
Copied 109 bytes from /mnt/internal/qspi_bootblob_ver.txt to address 0x03fe0000 in flash
Writing gpt_secondary_3_0.bin (partition: secondary_gpt) into /dev/mtd0
Shai checksum matched for /mnt/internal/gpt_secondary_3_0.bin
Writing /mnt/internal/gpt_secondary_3_0.bin (16896 bytes) into /dev/mtd0:67091968
Copied 16896 bytes from /mnt/internal/gpt_secondary_3_0.bin to address 0x03ffbe00 in flash
[215]: l4t_flash_from_kernel: Successfully flush the qspi
writing item=17, 9:0:secondary_gpt, 61203267072, 16896, gpt_secondary_3_0.bin, 16896, fixed-<reserved>-0, 5606a1a80e17a4ee4bb7478f0a832318c8ed65c
5
[243]: l4t_flash_from_kernel: Successfully flush the external device
[243]: l4t_flash_from_kernel: Flashing success
[243]: l4t_flash_from_kernel: The device size indicated in the partition layout xml is smaller than the actual size. This utility will try to fix the GPT.
Flash is successful
Reboot device
Cleaning up...
Log is saved to Linux_for_Tegra/initrdlog/flash_3-2_0_20250120-154849.log
yahboom@VM: ~/Downloads/Linux_for_Tegra
```

## 4. Start the system

After the system is successfully burned, disconnect the mainboard power supply (disconnect the DC power adapter and Type-C data cable), and then unplug the jumper cap that shorts FC REC and GND under the core board; after confirming that the above operations are completed, reconnect the DC power adapter and DP data cable (connect the display) to start the system.



Activities Terminal Jan 17 11:46 MAXN SUPER

jtop MAXN SUPER|CPU 7.6%|GPU 0.0%

```
Model: NVIDIA Jetson Orin NX Engineering Reference Developer Kit Super - Jetpack 6.2 [L4T 36.4.3]
1 [||] 11.0% 2.0GHz 3 [||] 8.0% 2.0GHz 5 [||] 14.1% 2.0GHz 7 [||] 8.0% 2.0GHz
2 [] 3.0% 2.0GHz 4 [] 1.0% 2.0GHz 6 [] 5.9% 2.0GHz 8 [] 6.0% 2.0GHz
Mem [|||||] 1.4G/15.3G] FAN [|||||||||||||] 37.3% 2046RPM
Swp [] 0k/7.6G] Jetson Clocks: running
Enc [204MHz:::::::::::::::::::3.2GHz] 3.2GHz 0% NV Power[0]: MAXN_SUPER
Uptime: 0 days 0:1:35
0.0% 1.2GHz
7.8G/232G]

GPU [##]
Dsk [##]
PID USER GPU TYPE PRI S CPU% MEM% [GPU MEM] Command
2185 jetson I G 20 S 14.7 74.1M 86.7M gnome-shell
1486 jetson I G 20 S 2.4 15.3M 41.0M Xorg
2131 jetson I G 20 S 7.2 14.9M 2.9M gnome-remote-de
2337 jetson I G 20 S 0.3 11.1M 1.5M xdg-desktop-por

[HW engines] [Sensor] [Temp] [Power] — [Inst] [Avg]
APE: [OFF] PVA0a: [OFF] cpu 58.69C CPU GPU CV 3.2W 3.3W
DLA0c: [OFF] DLA1c: [OFF] cv0 54.78C SOC 3.1W 3.1W
NVENC: [OFF] NVDEC: [OFF] cv1 54.69C VDD_IN 10.1W 10.2W
NVJPG: [OFF] NVJPG1: [OFF] cv2 49.81C
SE: [OFF] VIC: [OFF] gpu 55.56C
soc0 54.91C
soc1 53.16C
soc2 52.69C
tj 58.69C

(c) 2024, RB
```

```
jtop 4.3.1 - (c) 2024, Raffaello Bonghi [raffaello@rnext.it]
Website: https://rnext.it/jetson_stats

Platform
Machine: aarch64
System: Linux
Distribution: Ubuntu 22.04 Jammy Jellyfish
Release: 5.15.148-tegra
Python: 3.10.12

Libraries
CUDA: MISSING
cuDNN: MISSING
TensorRT: MISSING
VPI: MISSING
Vulkan: 1.3.204
OpenCV: 4.5.4 with CUDA: NO

Serial Number: [s|XX CLICK TO READ XXX]
Hardware
Model: NVIDIA Jetson Orin NX Engineering Reference Developer Kit Super
699-level Part Number: 699-13767-0000-300 M.1
P-Number: p3767-0000
Module: NVIDIA Jetson Orin NX (16GB ram)
Soc: tegra234
CUDA Arch BIN: 8.7
L4T: 36.4.3
Jetpack: 6.2
Hostname: yahboom
Interfaces
enPBps0: 192.168.2.96

1ALL 2GPU 3CPU 4MEM 5ENG 6CTRL 7INFO Quit
(c) 2024, RB
```

## 5. Component environment

The above is only to complete the burning of the pure system. If you need `CUDA`, `TensorRT` and other environments, users also need to refer to [Chapter 2 Jetson basic course: Installing Jetson environment]!