ATC3xxx Series User Manual

Warning

***** DO NOT USE APT UPGRADE or DIST-UPGRADE on ATC series system. *****

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It may overwritten some files(bootloader,kernel,dtb...) by standard nvidia packages.

Histories:

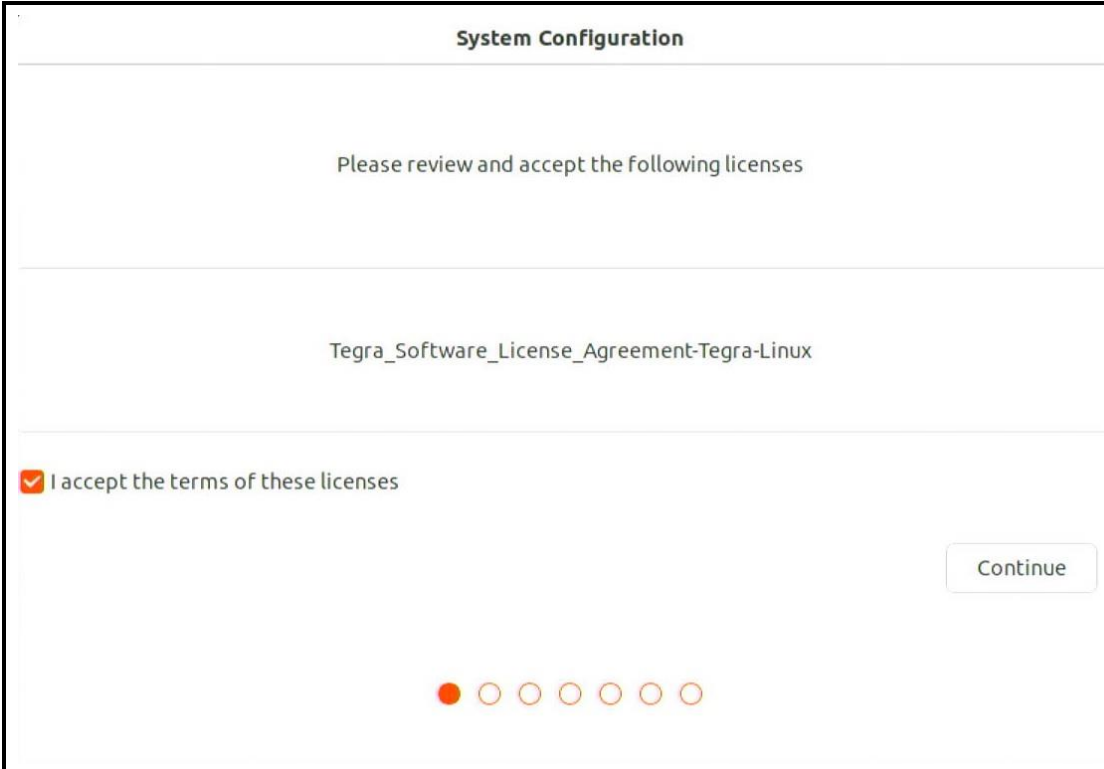| Version	Description
v1.1.1	1. Added "Update bootloader" instruction. (2025/11/4)
v1.1.0	2. Added "ATC Series OTA Update" instruction. (2025/10/29)
v1.0.10	1. Updated GMSL2 camera support list. (2025.10.03)
v1.0.9	1. Updated GMSL2 camera support list. (2025.08.26)
v1.0.8	1. Updated GMSL2 camera support list. (2025.07.22)
v1.0.7	1. Removed "switch root from NVMe" chapter. (2025.06.18)
	2. Added "ATC products tools" instruction. (2025.06.18)
v1.0.6	1. Modified recovery image of ATC series system. (2024.07.02)
v1.0.5	1. Added ATC3520 product. (2023.08.25)
v1.0.4	1. Added ATC3540 product. (2023.05.16)
	2. Corrected the errors in this document.
v1.0.3	1. Added ATC3750 product. (2023.01.07)
	2. Updated SDK and AI Demo Guide.
v1.0.2	1. Modified AI Demo. (2022.07.29)
v1.0.1	1. Modified Switch root and added install SDK component. (2022.07.28)
v1.0.0	1. First released. (2021.11.03)

Content

1. Introduction

Thank you for using the Nexcom ATC series Product. When you boot up the system first time, you need to do some settings, like selecting the time zone, setting a user account, etc. After finishing the setting, you have to install MUT package, then you can use all of the functions of ATC series Product.

Initialization

1.1. System Configuration

When you boot up ATC product first time, you will see these screens as follows:

Figure 1. Check the terms.

Figure 2. Select language

Figure 3. Select location

Figure 4. Enter name and password

Figure 5. Download and update

After system configuration, you need install another necessary packages.

2. Recovery image of ATC series system

2.1. Prepare materials

1. A computer (Host) and install the Ubuntu 18.04 or 20.04 system.
2. USB flash driver*1 (For images, the capacity depends on the size of the created image, and a minimum capacity of 3GB is required).
3. Micro USB cable.

2.2. Recovery

1. Boot up the ATC series system and check current image version.
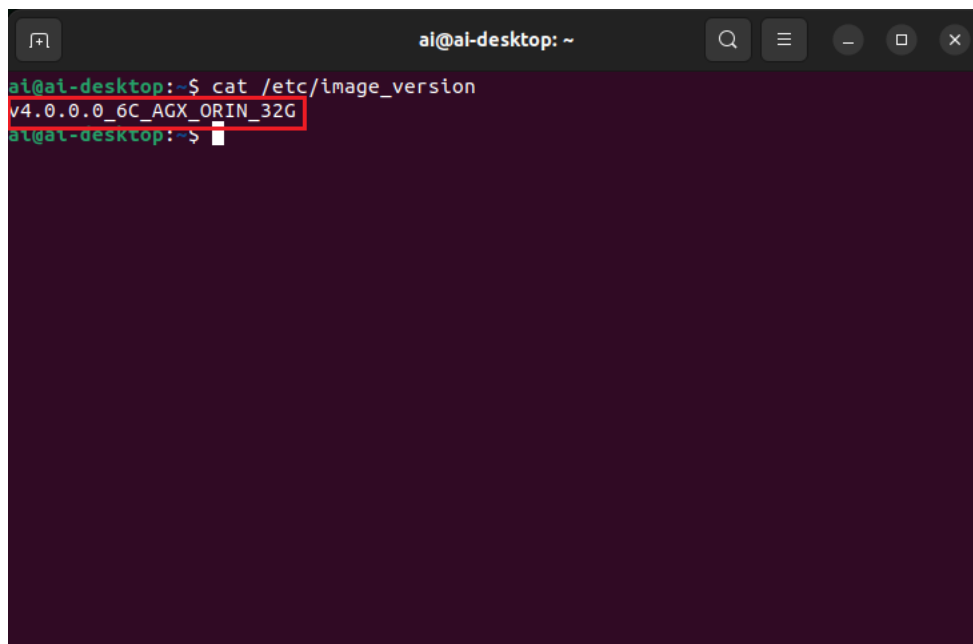
   $ cat /etc/image_version
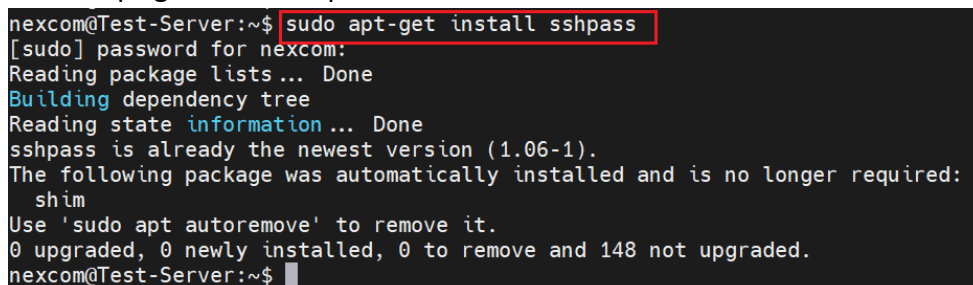
   ```
   ai@ai-desktop:~$ cat /etc/image_version
   v4.0.0.0_6C_AGX_ORIN_32G
   ai@ai-desktop:~$
   ```

2. Find out the corresponding new version, e.g.

   ATC3750-6C_mfi_v4.0.0.0_AGX_ORIN_32G.tar.gz
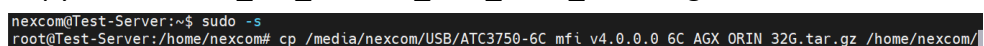
3. In host PC, install sshpass package.

   $ sudo apt-get install sshpass

   ```
   nexcom@Test-Server:~$ sudo apt-get install sshpass
   [sudo] password for nexcom:
   Reading package lists... Done
   Building dependency tree
   Reading state information... Done
   sshpass is already the newest version (1.06-1).
   The following package was automatically installed and is no longer required:
     shim
   Use 'sudo apt autoremove' to remove it.
   0 upgraded, 0 newly installed, 0 to remove and 148 not upgraded.
   nexcom@Test-Server:~$
   ```

4. Copy ATC3750-6C_mfi_v4.0.0.0_AGX_ORIN_32G.tar.gz to host.

   ```
   nexcom@Test-Server:~$ sudo -s
   root@Test-Server:/home/nexcom# cp /media/nexcom/USB/ATC3750-6C_mfi_v4.0.0.0_6C_AGX_ORIN_32G.tar.gz /home/nexcom/
   ```

5. Untar the ATC3750-6C_mfi_v4.0.0.0_AGX_ORIN_32G.tar.gz file.

$ sudo tar xpfv ATC3750-6C_mfi_v4.0.0.0_AGX_ORIN_32G.tar.gz

Note. The commands need to be modified according to different file names.

```
nexcom@Test-Server:~$ sudo tar xpfv ./ATC3750-6C_mfi_v4.0.0.0_6C_AGX_ORIN_32G.tar.gz
./ATC3750-6C_mfi_v4.0.0.0_6C_AGX_ORIN_32G/
./ATC3750-6C_mfi_v4.0.0.0_6C_AGX_ORIN_32G/p3701-atc3750-6C.conf.common
./ATC3750-6C_mfi_v4.0.0.0_6C_AGX_ORIN_32G/atc3540.conf.common
./ATC3750-6C_mfi_v4.0.0.0_6C_AGX_ORIN_32G/rootfs/
./ATC3750-6C_mfi_v4.0.0.0_6C_AGX_ORIN_32G/rootfs/dev/
./ATC3750-6C_mfi_v4.0.0.0_6C_AGX_ORIN_32G/rootfs/dev/null
./ATC3750-6C_mfi_v4.0.0.0_6C_AGX_ORIN_32G/rootfs/tmp/
./ATC3750-6C_mfi_v4.0.0.0_6C_AGX_ORIN_32G/rootfs/.gitkeep
./ATC3750-6C_mfi_v4.0.0.0_6C_AGX_ORIN_32G/rootfs/snap/
./ATC3750-6C_mfi_v4.0.0.0_6C_AGX_ORIN_32G/rootfs/srv/
./ATC3750-6C_mfi_v4.0.0.0_6C_AGX_ORIN_32G/rootfs/sys/
./ATC3750-6C_mfi_v4.0.0.0_6C_AGX_ORIN_32G/rootfs/bin
./ATC3750-6C_mfi_v4.0.0.0_6C_AGX_ORIN_32G/rootfs/var/
./ATC3750-6C_mfi_v4.0.0.0_6C_AGX_ORIN_32G/rootfs/var/lock
./ATC3750-6C_mfi_v4.0.0.0_6C_AGX_ORIN_32G/rootfs/var/crash/
./ATC3750-6C_mfi_v4.0.0.0_6C_AGX_ORIN_32G/rootfs/var/tmp/
./ATC3750-6C_mfi_v4.0.0.0_6C_AGX_ORIN_32G/rootfs/var/snap/
./ATC3750-6C_mfi_v4.0.0.0_6C_AGX_ORIN_32G/rootfs/var/mail/
./ATC3750-6C_mfi_v4.0.0.0_6C_AGX_ORIN_32G/rootfs/var/log/
```

6. Using Micro USB cable connects host to ATC series system otg usb port.

7. Power on ATC series system and press the reset button immediately, wait for the LED on then release the reset button, after release reset button, the system into recovery mode.

8. Open the terminal in the host PC and type "lsusb" to check, if system has into recovery mode, you will see the information about nvidia.
   If not, please do the step 7 again.

```
nexcom@Test-Server:~$ lsusb
Bus 004 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 003 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 002 Device 002: ID 0451:8440 Texas Instruments, Inc.
Bus 002 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 001 Device 003: ID 0451:82ff Texas Instruments, Inc.
Bus 001 Device 010: ID 0955:7223 NVIDIA Corp.
Bus 001 Device 002: ID 0451:8442 Texas Instruments, Inc.
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
```

2.3. Start Flashing

1. Open the terminal and enter the unzipped folder of ATC3750-6C_mfi_v4.0.0.0_AGX_ORIN_32G.tar.gz in host.

   $ cd ATC3750-6C_mfi_v4.0.0.0_AGX_ORIN_32G

   Note. The commands need to be modified according to different file names.

   ```
   nexcom@Test-Server:~$ cd ATC3750-6C_mfi_v4.0.0.0_6C_AGX_ORIN_32G
   ```

2. Type commands to start flash.

   $ sudo ./tools/kernel_flash/l4t_initrd_flash.sh –flash-only --massflash **\<x\>**

   Note. Where **\<x\>** is the highest possible number of devices to be flashed concurrently. (minimum = 1, maximum = 5)

   ```
   nexcom@Test-Server:~/ATC3750-6C_mfi_v4.0.0.0_6C_AGX_ORIN_32G$ sudo ./tools/kernel_flash/l4t_initrd_flash.sh --flash-only --massf
   lash 1
   ```

3. In host pc, it will keep flashing until log show success.

   ```
   Writing qspi_bootblob_ver.txt (parittion: A_VER) into /dev/mtd0
   Sha1 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 (parittion: secondary_gpt) into /dev/mtd0
   Sha1 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
   [ 271]: l4t_flash_from_kernel: Successfully flash the qspi
   [ 271]: l4t_flash_from_kernel: Flashing success
   [ 271]: l4t_flash_from_kernel: The device size indicated in the partition layout xml is smaller than the actual size. This utili
   ty will try to fix the GPT.
   Flash is successful
   Reboot device
   Cleaning up ...
   Log is saved to Linux_for_Tegra/initrdlog/flash_1-5_0_20240702-161215.log
   ```

4. Configure finished, the system will reboot into OS and <u>start system configuration.</u>

   ※ The AGX Orin SoM(ATC3750-6C/8M) also provides a firmware package for flashing to NVMe.

   e.g.   ATC3750-8M_mfi_v4.1.5.0_NVMe_AGX_ORIN_32G_NVMe.tar.gz

   ATC3750-8M_mfi_v4.1.5.0_NVMe_AGX_ORIN_64G_NVMe.tar.gz
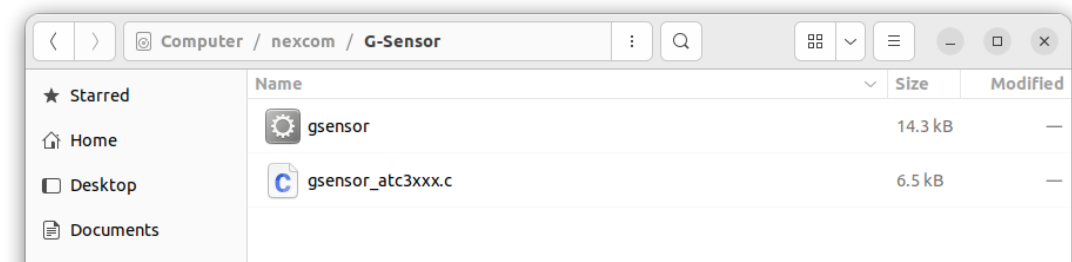
3. ATC products tools

Open the terminal, there are installation packages and documents in the path as following: /nexcom/

3.1. MUT SDK

MUT SDK is a service to control the MCU of ATC series products, you can refer to the MUT SDK User Manuel document " MUT_SDK_User_Manual_for_Linux.pdf " in the MUT folder.
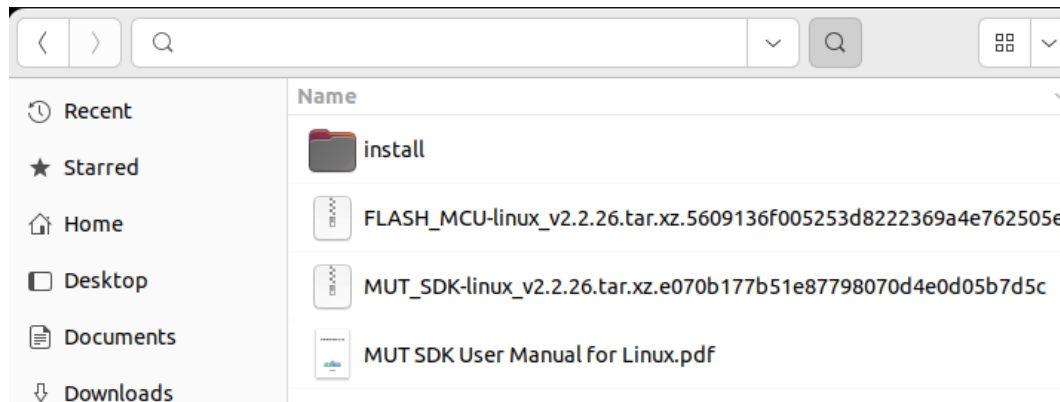
3.2. G-Sensor

The ATC series use ST LSM6DSL, which supports a 3D digital accelerometer and a 3D digital gyroscope. "gsensor_atc3xxx.c" is a sample code that can read accelerometer and gyroscope data.

Product	I2C-BUS	Addr
ATC35xx	i2c-7	0x6b
ATC37xx	i2c-0	0x6b

Usage : $ sudo -s

$ ./gsensor <save_output_as_file> <i2c-bus(only bus number)>

$ ./gsensor output.log 0

```
root@ai-desktop:/nexcom/G-Sensor# ./gsensor ./output.log 0
/dev/i2c-0
Initalize LSM6DSL successfully
ACC X:-0.01G    Y:-0.01G       Z:1.02G
GYRO X:94       Y:FE99  Z:FFEF
Left the machine for 3 seconds...
ACC X:-0.02G    Y:-0.01G       Z:1.03G
GYRO X:95       Y:FE96  Z:FFED
Shut down LSM6DSL successfully
```
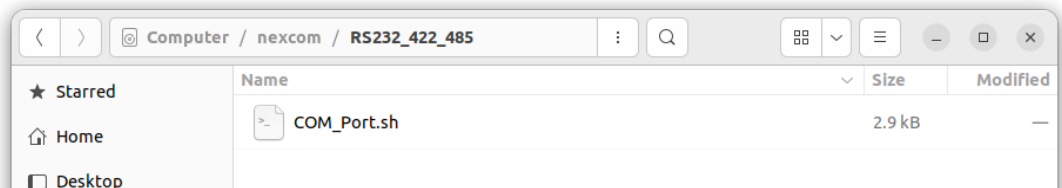
3.3. quectel_modules_USBmode

The ATC series supports several LTE/5G modules. This script is intended for Quectel modules(e.g. RM520N-GL, EM05-G) that require USB mode switching when running on linux OS.
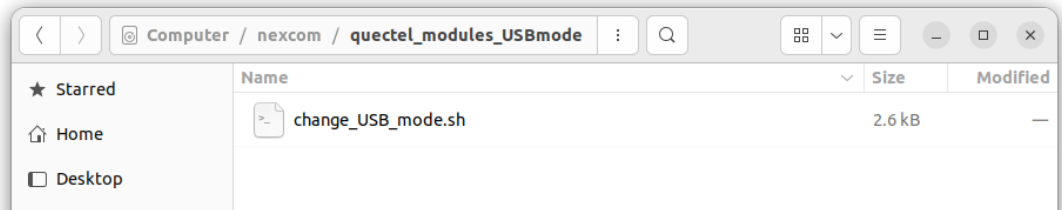
Usage : $ sudo -s
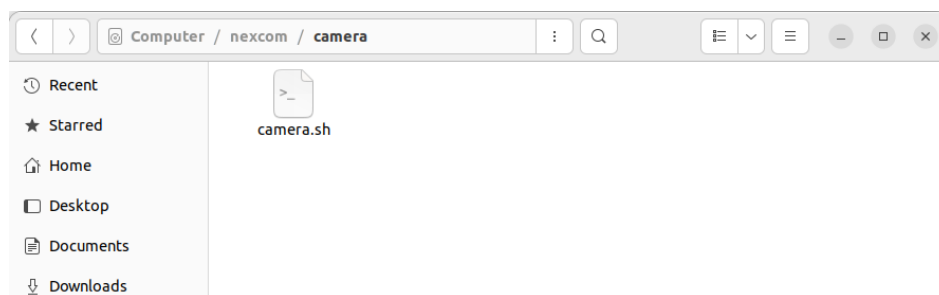$ bash ./change_USB_mode.sh 0

3.4. RS232_422_485

This script only can run on the **ATC3750-8M**. COM1 supports RS232/422/485 conversion.
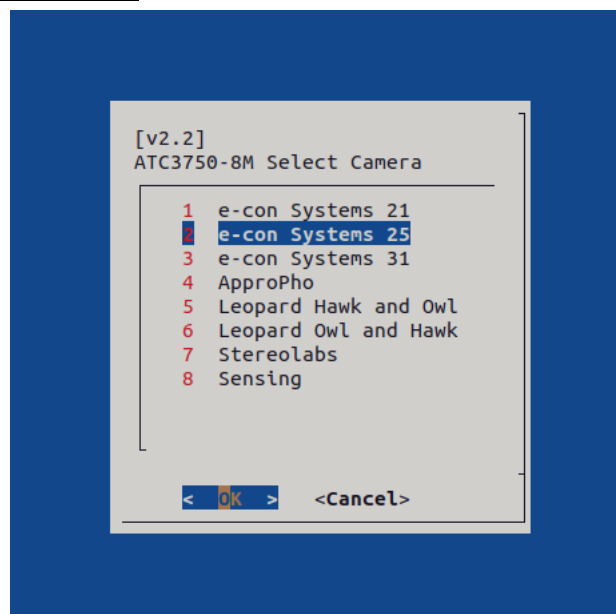

Usage : $ sudo -s

RS232 : $ bash ./COM_Port.sh RS232

RS422 : $ bash ./COM_Port.sh RS422

RS485 – receive **:** $ bash ./COM_Port.sh RS485-R

RS485 – transmit **:** $ bash ./COM_Port.sh RS485-W

3.5. GMSL2_camera

GMSL2 Script Version	GMSL2 Camera Support List				
v1.0					
v1.1					
v2.0	**e-con Systems** STURDeCAM21 STURDeCAM25 STURDeCAM31	**ApproPho** AP-AR0234 AP-IMX335 AP-IMX415			
v2.1			**Leopard Imaging** LI-AR0234-OWL LI-AR0234-HAWK	**Stereolabs** ZED X	
v2.2					**Sensing** ISX031C-GMSL2F

Usage : `$ sudo -s`
`$ bash ./camera.sh`

After the driver and dts have been successfully updated, you need to power off the system and install the GMSL2 camera on CAM1~CAM8.

4. Install SDK component

Location: `/nexcom/nvidia_SDK_components/install_sdk.sh` Free disk space required: 10.6 GB (SDK 9924MB, Deepstream 733MB). The script will install SDK automatically following:

1. TensorRT
2. cuDNN
3. CUDA
4. Multimedia API
5. Computer Vision
6. Developer Tools (Nvidia Nsight System and Graphics)
7. Deepstream

`$ sudo ./install_sdk.sh`

4.1. How to check the SDK version:

`$ sudo apt install python3-pip`
`$ sudo pip3 install jetson_stats`
`$ sudo jtop(Figure 8.)`

Move the cursor to "6INFO" and you can see the library version.

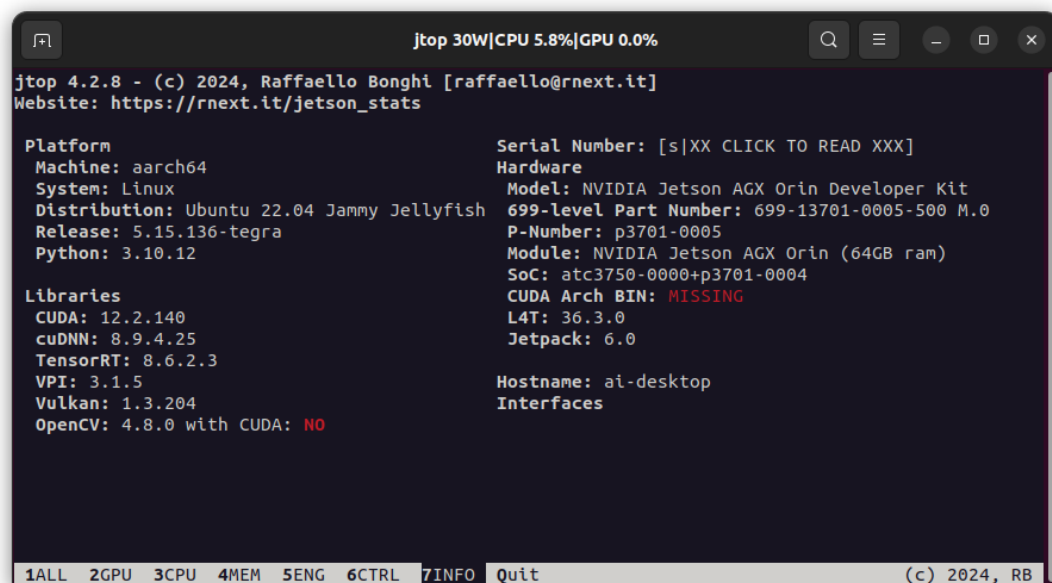You can also use another command: (Figure 9)

`$ jetson_release`

Figure 8. Info tab on jtop

Figure 9. Info of jetson_release

5. AI Demo

5.1. Installation

Use the install_sdk.sh (Chapter 5) to install deepstream and other SDK.

5.2. Run the deepstream demo

Run the demo as following command:

```
$ cd /opt/nvidia/deepstream/deepstream/samples/configs/deepstream-app
$ deepstream-app –c
source4_1080p_dec_inferresnet_tracker_sgie_tiled_display_int8.txt
```

The result

Figure 10. deepstream-app demo

6. ATC Series OTA Update

⚠ **Updates are only provided within the same Jetpack, (nexcom OS currently does not support Jetpack upgrades e.g., upgrading from Jetpack 6.1 to Jetpack 6.2 ✖)**

OTA payload package name	rootfs update block	nexcom OS version	Support status
ATC3750_6C_v4.1.10.0_ ota_payload_package.tar.gz	eMMC	v4.1.x.x -> v4.1.10.0	✔
ATC3750_8M_v4.1.10.0_ ota_payload_package.tar.gz	eMMC	v4.1.x.x -> v4.1.10.0	✔
ATC3750_NVMe_6C_ v4.1.10.0_ota_payload_package.tar.gz	NVMe	v4.1.x.x -> v4.1.10.0	✔
ATC3750_NVMe_ 8M_v4.1.10.0_ota_payload_package.tar.gz	NVMe	v4.1.x.x -> v4.1.10.0	✔
ATC356x_v4.2.5.0_ ota_payload_package.tar.gz	NVMe	v4.2.x.x -> v4.2.5.0	✔

* Nexcom OS **v4.1.x.x** corresponds to **JetPack 6.1** BSP, **v4.2.x.x** corresponds to **JetPack 6.2** BSP.

6.1. Preparing the OTA payload package

- Contact the Nexcom FAE Team to obtain the files
  "<atc_rel>_ota_payload_package.tar.gz" and "ota_tools_<rel>_aarch64.tbz2".

⚠ **Do not download the ota_tools_<rel>_aarch64.tbz2 from nvidia jetson linux, as this may result in an incomplete update!!**

- Set the <WORKDIR> environment variable to the absolute path of your working directory.
  ```
  $ mkdir -p /home/${USER}/work_dir
  $ export WORKDIR=/home/${USER}/work_dir
  ```

- Unpack "ota_tools_<rel>_aarch64.tbz2" into ${WORKDIR}
  ```
  $ sudo tar -C $WORKDIR -xvf ota_tools_<rel>_aarch64.tbz2
  ```

- Create /ota/ directory and place the <atc_rel>_ota_payload_package.tar.gz OTA payload package inside it.
  ```
  $ sudo mkdir -p /ota/
  $ sudo mv /home/${USER}/<atc_rel>_ota_payload_package.tar.gz /ota/
  ```

6.2. Backing up and restoring files

- Before starting the OTA update, edit the configuration file ota_backup_files_list.txt (located at $WORKDIR/Linux_for_Tegra/tools/ ota_tools/version_upgrade/) to add the paths of files/directories that must be preserved after the OTA update.

📌 **NVIDIA's OTA update overwrites the rootfs in place. If you have data that needs to be kept, be sure to add those paths to avoid data loss. We have pre-populated a subset of essential items [Figure 11.]**
(e.g., user configuration files, power-mode settings, GMSL2 camera DTBOs, etc.).

```
# SPDX-FileCopyrightText: Copyright (c) 2020-2022 NVIDIA CORPORATION & AFFILIATES. All rights reserved.
# SPDX-License-Identifier: MIT
#
# Permission is hereby granted, free of charge, to any person obtaining a
# copy of this software and associated documentation files (the "Software"),
# to deal in the Software without restriction, including without limitation
# the rights to use, copy, modify, merge, publish, distribute, sublicense,
# and/or sell copies of the Software, and to permit persons to whom the
# Software is furnished to do so, subject to the following conditions:
#
# The above copyright notice and this permission notice shall be included in
# all copies or substantial portions of the Software.
#
# THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR
# IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY,
# FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL
# THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER
# LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING
# FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER
# DEALINGS IN THE SOFTWARE.

# This file contains a list of files/directories in the APP partition
# that are to be backed up and restored during OTA.

# This file is used by the script "nv_ota_preserve_data.sh"

# All the files or directories should be listed with absolute path
# Example:
# etc/passwd
# opt/nvidia
etc/passwd
etc/shadow
etc/group
etc/gshadow
home/
etc/hostname
etc/hosts
etc/default/locale
etc/timezone
etc/sudoers
etc/sudoers.d/
etc/systemd/resolved.conf
etc/NetworkManager/system-connections/
var/lib/AccountsService/users/
var/lib/nvpmodel/
nexcom/camera/nexcom_cam_setting
```

Figure 11. ota_backup_files_list.txt

6.3. Start the OTA update

- Trigger the OTA update

```
$ cd ${WORKDIR}/Linux_for_Tegra/tools/ota_tools/version_upgrade
$ sudo ./nv_ota_start.sh /ota/<atc_rel>_ota_payload_package.tar.gz
```

📌 **For AGX Orin SoM (supports ATC3750-6C / ATC3750-IP7-8M), there are two different OTA payload packages: one is for NVMe and the other is for eMMC. After trigger the OTA update, if you see a message indicating a storage-type mismatch [Figure 12.], it means the wrong <atc_rel>_ota_payload_package .tar.gz was used.**

```
ai@ai-desktop:~/version_upgrade$ sudo ./nv_ota_start.sh /ota/ATC3750_NVMe_8M_v4.1.10.0_ota_payload_package.tar.gz
Command: ./nv_ota_start.sh /ota/ATC3750_NVMe_8M_v4.1.10.0_ota_payload_package.tar.gz
/usr/bin/efibootmgr
/usr/bin/efibootdump
/usr/sbin/nvme
cam model : Jetson Camera STURDeCAM25-AR0234
write backup config to /nexcom/camera/nexcom_cam_setting
Current rootfs is on /dev/mmcblk0
init_ota_log /ota_log
Create log file at /ota_log/ota_20251029-145337.log
OTA_LOG_FILE=/ota_log/ota_20251029-145337.log
Extract /ota/ATC3750_NVMe_8M_v4.1.10.0_ota_payload_package.tar.gz
update_nv_boot_control_in_rootfs /ota_work
Warning: Cannot get compatible board name.
3701--0004--1--atc3750-8M-orin-
TNSPEC 3701-500-0004-G.0-1-1-atc3750-8M-orin-
COMPATIBLE_SPEC 3701--0004--1--atc3750-8M-orin-
TEGRA_BOOT_STORAGE mmcblk0
TEGRA_CHIPID 0x23
TEGRA_OTA_BOOT_DEVICE /dev/mtdblock0
TEGRA_OTA_GPT_DEVICE /dev/mtdblock0
Info: Write TegraPlatformCompatSpec with 3701--0004--1--atc3750-8M-orin-.
Info: The esp is already mounted to /boot/efi.
check_prerequisites
decompress_ota_package ota_package.tar /ota_work
decompress_ota_package: start at 公曆 20廿五年 十月 廿九日 週三 十四時54分十秒
Sha1 checksum for /ota_work/ota_package.tar (678751d37d787e16909625faa1b5fd7b0add9cce) matches
decompress_ota_package: end at 公曆 20廿五年 十月 廿九日 週三 十四時54分廿六秒
Rootfs and OTA payload image mismatch detected, aborting the OTA update process!!
```

Figure 12. indicate storage-type mismatch

6.4. Update bootloader (For Orin-NX & Orin-Nano)

- If you are using Orin-NX or Orin-Nano and want to update the UEFI, please execute the following command:

```
sudo nv_bootloader_capsule_updater.sh -q /<ota_payload>/TEGRA_BL.Cap
```

- For AGX Orin, the bootloader update is already included in nv_ota_start.sh, so there's no need to execute nv_bootloader_capsule_updater.sh.

6.5. Reboot system

- After trigger the OTA update, reboot the system to begin the system update.

Figure 13. reboot the system to begin the system update

```
$ sudo reboot -h now
```

6.6. Updating bootloader and rootfs

- If you want to observe the update status, you can connect the serial console port to host PC. 📌 **There is no console port on the ATC3750-IP7-8M.**

⚠ **DO NOT POWER OFF the device or interrupt the process during the update!!**
⚠ **Any unexpected shutdown can cause update failure and data loss!!**

Figure 14. Update progress done

6.7. Check OTA update result

- All update logs are saved under /last_ota_update_log directory. You can check these logs to confirm that the update was successful.
  You can also verify the result by checking /etc/image_version and confirming that it matches the version in <atc_rel>_ota_payload_package.tar.gz

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⬙ Reference : OTA Update NVIDIA online documentation

https://docs.nvidia.com/jetson/archives/r36.4.3/DeveloperGuide/SD/SoftwarePackagesAndT
heUpdateMechanism.html#steps-performed-on-the-jetson-device