

Install BSP & Patch via command

I. Introduction:

This Standard Operating Procedure (SOP) provides detailed guidance for installing a custom version of Board Support Package (BSP) and Patch on NVIDIA Jetson platforms. Designed for technicians and users familiar with Linux environments, this SOP covers the entire process from copying and extracting necessary files to flashing the BSP and Patch onto Aetina Jetson Nano/TX2/TX2-NX/NX/AGX Xavier/AGX Orin series product. Instructions are precise and include commands and visual references to ensure a smooth, error-free installation. Adherence to these guidelines is crucial for the successful setup of the custom software on the specified hardware configurations.

II. Version Control Table

Version	Date	Author	Changes Made
1.0	2022-09-20	Chris Luo	Initial SOP Creation
1.1	2024-01-03	Felipe Leiva	Doc Format Change
1.2	2024-01-30	Chris Luo	Content Modified
1.3	2024-04-29	Felipe Leiva	Required Tools update and Procedure enhancements
1.4	2024-05-15	Felipe Leiva	Inclusion of section V. Verification
1.5	2024-07-26	Chris Luo	Add DTS search command for Jetpack 6
1.6	2024-08-23	Chris Luo	Content modified

III. Required Tools/Software

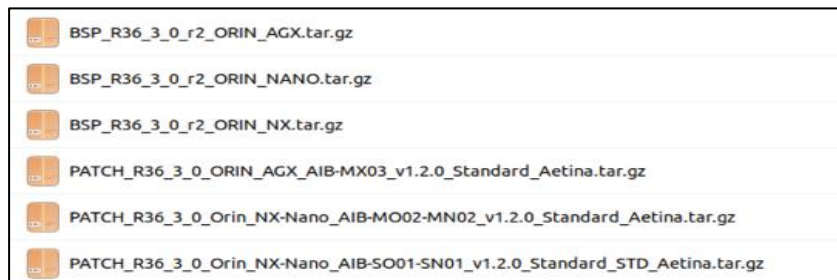
1. JetPack BSP + Aetina Patch
2. Aetina Jetson unit, e.g., AX720/AIB-MX13...etc
3. Host PC with Linux version 18.04 (JP 4.x), 20.04 (JP 5.x) or 22.04 (JP 6.0) ([learn more](#))
4. [NVIDIA SDK Manager](#) installed in the Host Linux PC
5. USB-A to USB-C OTG cable for Orin Series or USB-A to Micro-USB OTG cable for older series

IV. Procedure

1. Connect the USB-A to USB-C or Micro-USB cable from the USB-A port on the **Host Linux PC** to the OTG port on the **Aetina device**.
2. In the **Host Linux PC**, copy the BSP and Patch into the **/home/nvidia/nvidia_sdk** path.

Note: The path will exist only if the NVIDIA SDK Manager has been used to flash the system at least once.

The below version and image are just for example, please use the version you want to follow in this guide.



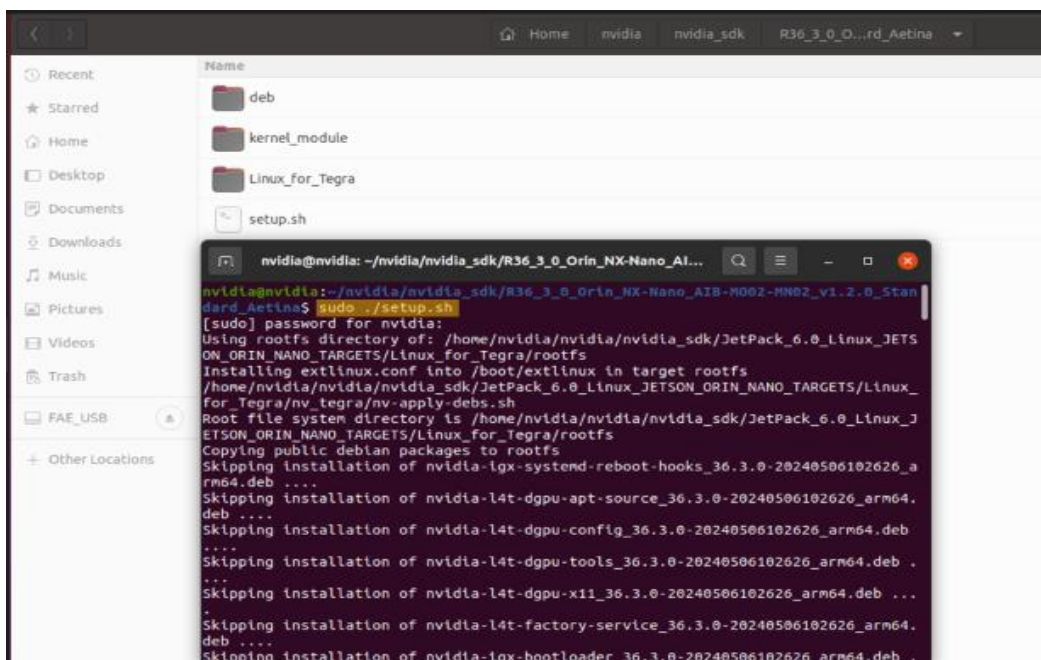
3. Unzip these two files on the path of the **Host Linux PC**.

BSP use this command: **sudo tar -xvpzf XXXXXXXX.tar.gz -C . --numeric-owner**

Patch use this command: **sudo tar zxvf XXXXXXXX.tar.gz**

or **sudo tar -zxvf XXXXXXXX.tar.gz**

4. Enter the Patch file folder and open a terminal window, then enter the command **./setup.sh** to update the patch up to BSP. Please, refer to the pictures below.



```
nvidia@nvidia: ~/nvidia/nvidia_sdk/R36_3_0_Orin_NX-Nano_AI...
Add /lib/modules/5.15.136-tegra/kernel/drivers/pci/controller/dwc/pcie-tegra194.ko
Add /lib/modules/5.15.136-tegra/kernel/drivers/phy/tegra/phy-tegra194-p2u.ko
Add /bin/sh
Add /lib/modules/5.15.136-tegra/kernel/drivers/usb/gadget/udc/tegra-xudc.ko
Add /lib/modules/5.15.136-tegra/kernel/drivers/usb/typec/ucsi/typec_ucsi.ko
Add /lib/modules/5.15.136-tegra/kernel/drivers/usb/typec/ucsi/ucsi_ccg.ko
Add /lib/modules/5.15.136-tegra/kernel/drivers/usb/typec/typec.ko
Cleaning up the temporary directory for updating the initrd..
Processing triggers for nvidia-l4t-kernel (5.15.136-tegra-36.3.0-20240506102626)
...
/home/nvidia/nvidia/nvidia_sdk/R36_3_0_Orin_NX-Nano_AIB-M002-MN02_v1.2.0_Standard_Aetina
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!
apply deb success!!
-e Update...
Updated successfully.
nvidia@nvidia:~/nvidia/nvidia_sdk/R36_3_0_Orin_NX-Nano_AIB-M002-MN02_v1.2.0_Standard_Aetina$
```

5. Please set up the **Aetina device** in recovery mode.

(Note: Ensure that the USB-A to USB-C OTG cable is connected to the Host Linux PC)

Physical Method ([learn more](#))

- a. When the **Aetina device** boots up.
- b. Press the reset button, then press the recovery button.
- c. Release the reset button, then release the recovery button.
- d. The device will get into recovery mode.

Command Method ([learn more](#))

- a. In the **Aetina device**, access the Terminal and issue the command:

\$ sudo reboot --force forced-recovery



- Open the terminal and enter the command: **lsusb** please, refer to the picture below.
(To check the Nvidia device has connected.)

```

nvidia@nvidia: ~/nvidia/nvidia_sdk/R36_3_0_Orin_NX-Nano_AI...
nvidia@nvidia:~/nvidia/nvidia_sdk/R36_3_0_Orin_NX-Nano_AIB-M002-MN02_v1.2.0_Stand
ard_Aetina$ lsusb
Bus 004 Device 013: ID 0781:55ab SanDisk Corp. SanDisk 3.2Gen1
Bus 004 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 003 Device 105: ID 046d:c534 Logitech, Inc. Unifying Receiver
Bus 003 Device 002: ID 04f2:b6c0 Chicony Electronics Co., Ltd HP HD Camera
Bus 003 Device 003: ID 8087:0026 Intel Corp.
Bus 003 Device 106: ID 0955:7020 NVIDIA Corp. L4T (Linux for Tegra) running on Te
gra
Bus 003 Device 001: ID 1d6b:0002 Linux Founda Normal mode
Bus 002 Device 001: ID 1d6b:0003 Linux Founda
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
nvidia@nvidia:~/nvidia/nvidia_sdk/R36_3_0_Orin_NX-Nano_AIB-M002-MN02_v1.2.0_Stand
ard_Aetina$ lsusb
Bus 004 Device 013: ID 0781:55ab SanDisk Corp. SanDisk 3.2Gen1
Bus 004 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 003 Device 105: ID 046d:c534 Logitech, Inc. Unifying Receiver
Bus 003 Device 002: ID 04f2:b6c0 Chicony Electronics Co., Ltd HP HD Camera
Bus 003 Device 003: ID 8087:0026 Intel Corp.
Bus 003 Device 107: ID 0955:7323 NVIDIA Corp. APX
Bus 003 Device 001: ID 1d6b:0002 Linux Founda
Bus 002 Device 001: ID 1d6b:0003 Linux Founda Recovery mode
Bus 001 Device 001: ID 1d6b:0002 Linux Founda
nvidia@nvidia:~/nvidia/nvidia_sdk/R36_3_0_Orin_NX-Nano_AIB-M002-MN02_v1.2.0_Stand
ard_Aetina$

```

- Get into BSP folder **/home/nvidia/nvidia_sdk/Jetpack_4.5.../Linux_for_Tegra**
Open terminal window and enter command **sudo ./flash.sh jetson-xxxxxxx mmcblk0p1**
to start installation. Please, refer to the information below and picture.

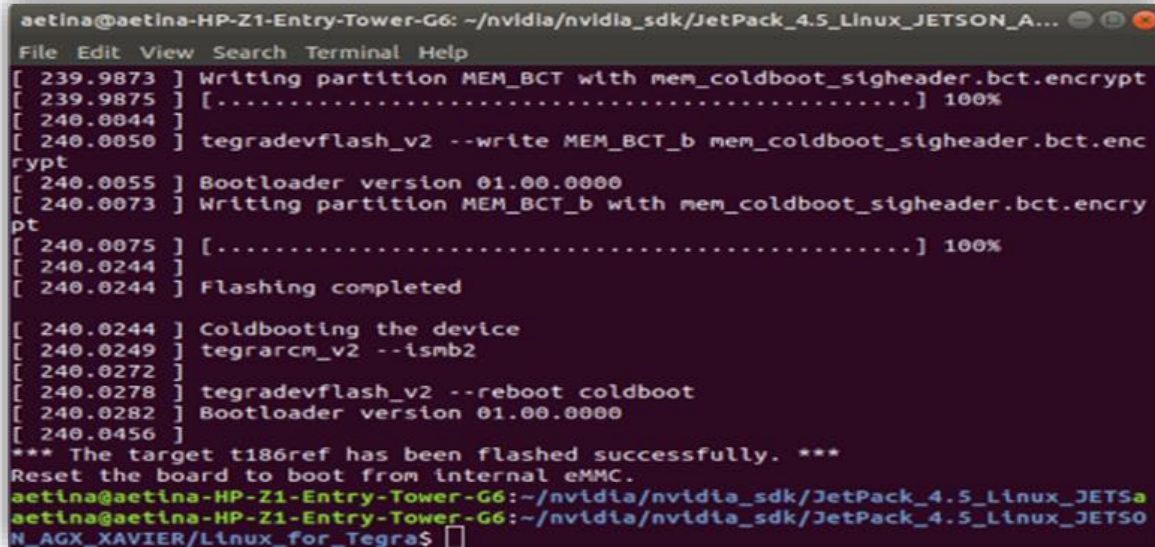
- Jetson Nano:** [jetson-nano-emmc](#)
- Jetson TX2:** [jetson-TX2](#)
- Jetson TX2-NX:** [jetson-nx-devkit-tx2-nx](#)
- Xavier NX:** [jetson-xavier-nx-devkit-emmc](#)
- Xavier AGX:** [jetson-xavier](#)
- Orin AGX:** [jetson-agx-orin-devkit](#)

```

aetina@aetina-HP-Z1-Entry-Tower-G6:~/nvidia/nvidia_sdk/JetPack_4.5_Linux_JETSON_
AGX_XAVIER/Linux_for_Tegra$ sudo ./flash.sh jetson-xavier mmcblk0p1
[sudo] password for aetina:
#####
# L4T BSP Information:
# R32 , REVISION: 5.0
#####
# Target Board Information:
# Name: jetson-xavier, Board Family: t186ref, SoC: Tegra 194,
# OpMode: production, Boot Authentication: NS,
# Disk encryption: disabled ,
#####
copying soft_fuses(/home/aetina/nvidia/nvidia_sdk/JetPack_4.5_Linux_JETSON_X
AVIER/Linux_for_Tegra/bootloader/t186ref/BCT/tegra194-mb1-soft-fuses-l4t.cfg)...
done.

```

8. When you see the below information shows the flashed successfully, the process is done. Please, refer to the picture below.



```
aetina@aetina-HP-Z1-Entry-Tower-G6: ~/nvidia/nvidia_sdk/JetPack_4.5_Linux_JETSON_A...
File Edit View Search Terminal Help
[ 239.9873 ] Writing partition MEM_BCT with mem_coldboot_sigheader.bct.encrypt
[ 239.9875 ] [.....] 100%
[ 240.0044 ]
[ 240.0050 ] tegradevflash_v2 --write MEM_BCT_b mem_coldboot_sigheader.bct.encrypt
[ 240.0055 ] Bootloader version 01.00.0000
[ 240.0073 ] Writing partition MEM_BCT_b with mem_coldboot_sigheader.bct.encrypt
[ 240.0075 ] [.....] 100%
[ 240.0244 ]
[ 240.0244 ] Flashing completed

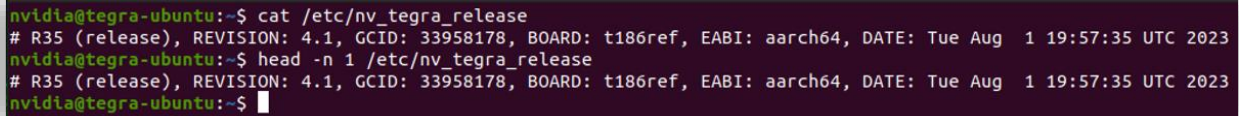
[ 240.0244 ] Coldbooting the device
[ 240.0249 ] tegrarcn_v2 --ismb2
[ 240.0272 ]
[ 240.0278 ] tegradevflash_v2 --reboot coldboot
[ 240.0282 ] Bootloader version 01.00.0000
[ 240.0456 ]
*** The target t186ref has been flashed successfully. ***
Reset the board to boot from internal eMMC.
aetina@aetina-HP-Z1-Entry-Tower-G6:~/nvidia/nvidia_sdk/JetPack_4.5_Linux_JETSO
aetina@aetina-HP-Z1-Entry-Tower-G6:~/nvidia/nvidia_sdk/JetPack_4.5_Linux_JETSO
N_AGX_XAVIER/Linux_for_Tegra$
```

V. Verification

1. Verify the installation of the Jetpack ([learn more](#))

Accessing the Terminal through your **Aetina Jetson Unit**, e.g. pressing keys Ctrl + Alt + T, you can issue one of the following commands:

```
$ cat /etc/nv_tegra_release  
$ head -n 1 /etc/nv_tegra_release
```



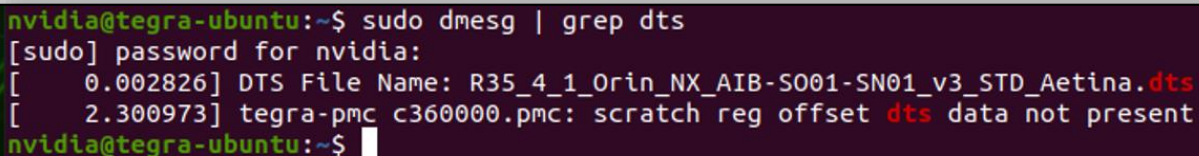
```
nvidia@tegra-ubuntu:~$ cat /etc/nv_tegra_release  
# R35 (release), REVISION: 4.1, GCID: 33958178, BOARD: t186ref, EABI: aarch64, DATE: Tue Aug 1 19:57:35 UTC 2023  
nvidia@tegra-ubuntu:~$ head -n 1 /etc/nv_tegra_release  
# R35 (release), REVISION: 4.1, GCID: 33958178, BOARD: t186ref, EABI: aarch64, DATE: Tue Aug 1 19:57:35 UTC 2023  
nvidia@tegra-ubuntu:~$
```

To interpret the release information, e.g. L4T R35.4.1, which refers to Jetpack version 5.1.2, please visit the [NVIDIA Jetpack Archive](#)

2. Verify the installation of the Aetina's Patch ([learn more](#))

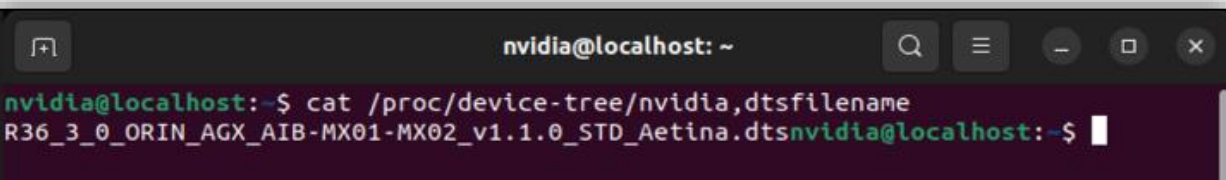
Accessing the Terminal through in your **Aetina Jetson Unit**, e.g. pressing keys Ctrl + Alt + T, you can issue the command as soon as you start your unit, after finishing the booting process:

```
$ sudo dmesg | grep dts
```



```
nvidia@tegra-ubuntu:~$ sudo dmesg | grep dts  
[sudo] password for nvidia:  
[ 0.002826] DTS File Name: R35_4_1_Orin_NX_AIB-S001-SN01_v3_STD_Aetina.dts  
[ 2.300973] tegra-pmc c360000.pmc: scratch reg offset dts data not present  
nvidia@tegra-ubuntu:~$
```

```
$ cat /proc/device-tree/nvidia,dtsfilename
```



```
nvidia@localhost: ~  
nvidia@localhost:~$ cat /proc/device-tree/nvidia,dtsfilename  
R36_3_0_ORIN_AGX_AIB-MX01-MX02_v1.1.0_STD_Aetina.dtsnvidia@localhost:~$
```

The DTS file name with 'Aetina' at the end indicates that the Patch is loaded on the unit. To verify which Jetpack version the Patch is for, like NVIDIA's version R35.4.1, check the [NVIDIA Jetpack Archive](#)