

Guideline: Flash and Boot Jetson Nano from USB

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1 Flash Jetson Nano B01

1.1 Setup environment

- Computer or laptop with Ubuntu OS 18.04 or above.

Note: Have a disk on Ubuntu OS with at least 40 GB for SDK manager application.

- Install SDK manager on Ubuntu from below link and register a NVIDIA developer account: <https://developer.nvidia.com/sdk-manager>

The screenshot shows a web browser window with the URL <https://developer.nvidia.com/sdk-manager>. The page has a dark header with the NVIDIA logo and "NVIDIA DEVELOPER". Below the header, there's a navigation bar with links for Home, Blog, Forums, Docs, Downloads, and Training. A green banner at the top of the main content area reads "Learn the latest advancements in technology and get hands-on training at GTC 2024, March 18-21." and "Get Early-Bird Pricing Now". The main content is titled "SDK Manager" and features a section titled "Everything You Need to Set Up Your Development Environment". It describes the purpose of the SDK Manager and provides a summary of supported NVIDIA software stacks. To the right, there's a section titled "Download NVIDIA SDK Manager 2.0.0" with download links for ".deb" (Ubuntu), ".rpm" (CentOS/RHEL), Docker Image (Ubuntu 18.04, 20.04, 22.04), and a "Docker Image" for RHEL/CentOS.

Figure 1: Download .deb file from NVIDIA website

1.2 Setup Jetson Nano

- Removing the box of Jetson Nano as Figure 2.



Figure 2: Jetson Nano box after removing the outer box

- Adding Jump pin between pin GND and pin PC REC as Figure 3 and Figure 4.



Figure 3: Jump pin between pin GND and pin PC REC

- Connecting microUSB cable to PC and supply power for Jetson.

1.3 Flash Jetson Nano

- Open SDK manager application and choose Target hardware is Jetson Nano as in Fig. 5
- Choose JetPack version you want to flash into Jetson Nano. Then Click continue as Fig. 6.
- Click Continue and wait for Flashing process. **Note:** Set username and password during process as Fig. 7.
- After finishing process, you can remove jumping pin and restart Jetson Nano. Login with username and password you have set in previous step.

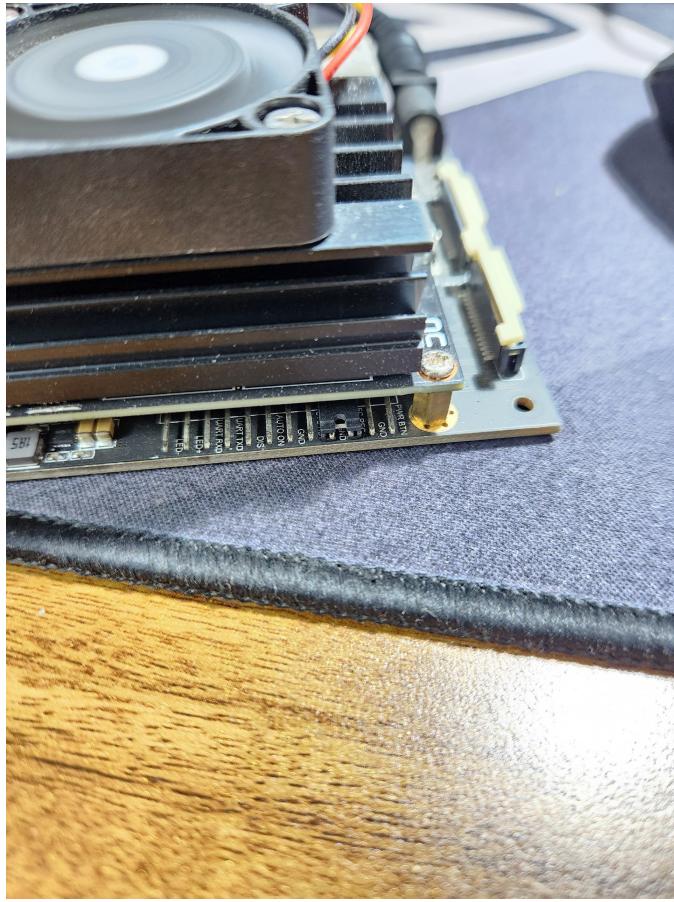


Figure 4: After adding Jump



Figure 5: Choose Jetson Nano kit

2 Setup to boot Jetson Nano from USB

Jetson Nano B01 is equipped with a limited amount of storage, which is about 16GB. After flash OS, the remaining available storage is about 500 MB. So you're not able to install anything in Jetson Nano. The only solution is using USB as a main storage for Jetson. In order to do that, OS and all current data must be clone to USB and also configure Jetson Nano to boot from USB, not from internal storage.

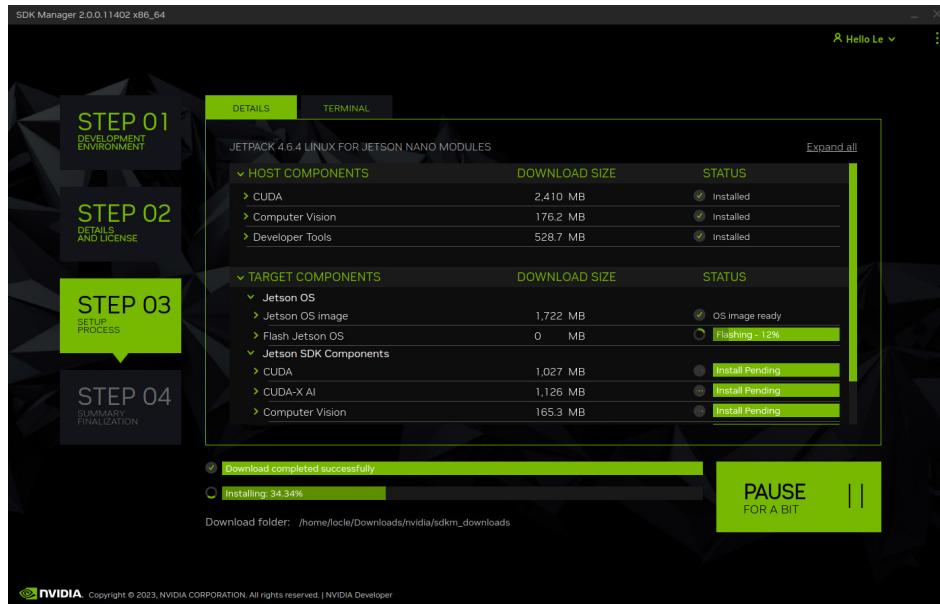


Figure 6:

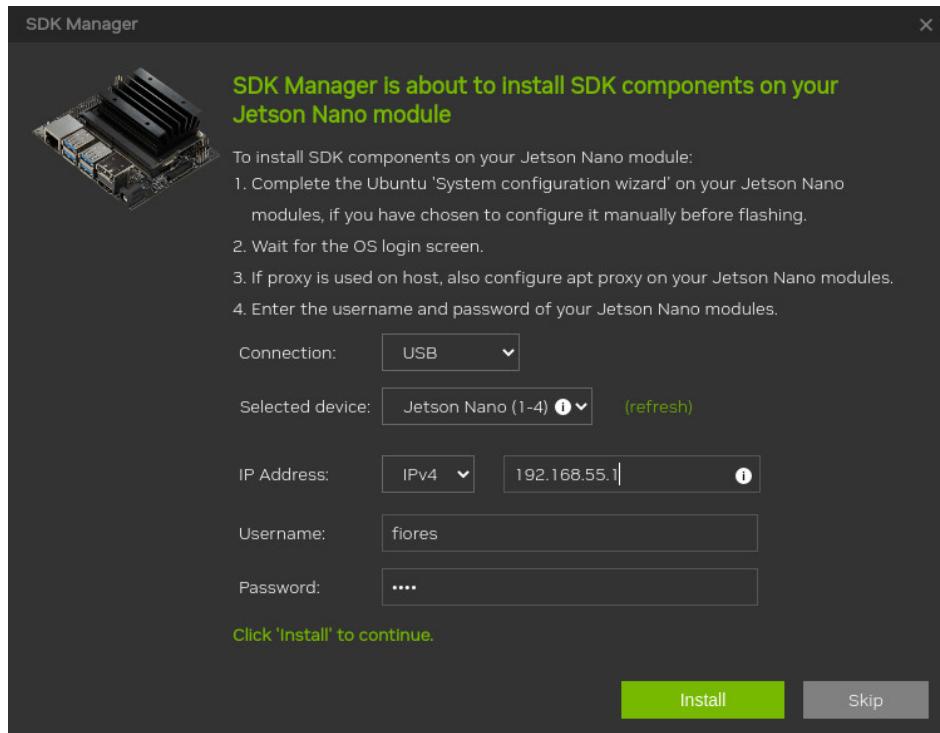


Figure 7: Set up password and username

2.1 Setup environment

- Must have an USB, recommend to use USB with greater or equal 64GB, since OS have already occupied 15GB.
- Have a HDMI Monitoring screen, keyboard, mouse to control Jetson during process.

2.2 Setup Boot from USB

- Step 1: open Disks application on Jetson Nano. Check out for USB Drive on the application.

Format the Disk with "Compatible with modern systems and hard disks > 2TB(GPT). Then Format

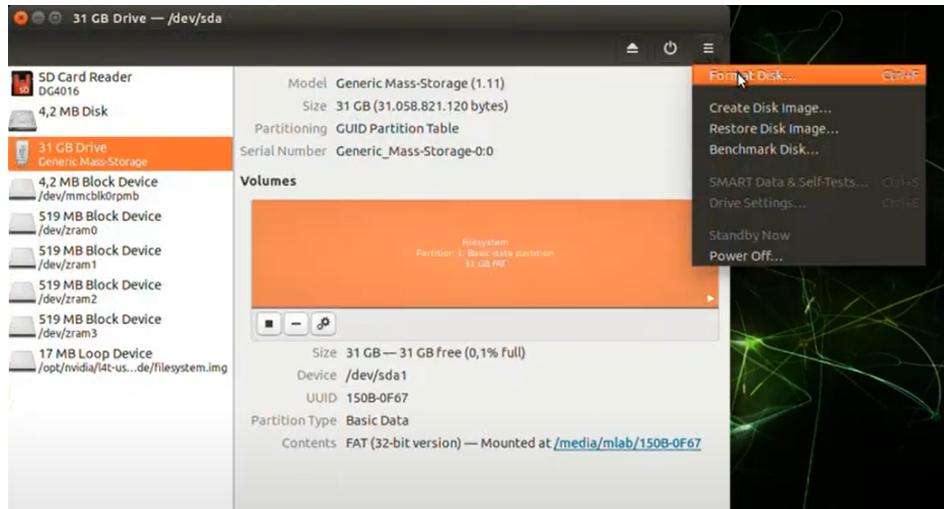


Figure 8: Format USB Drive

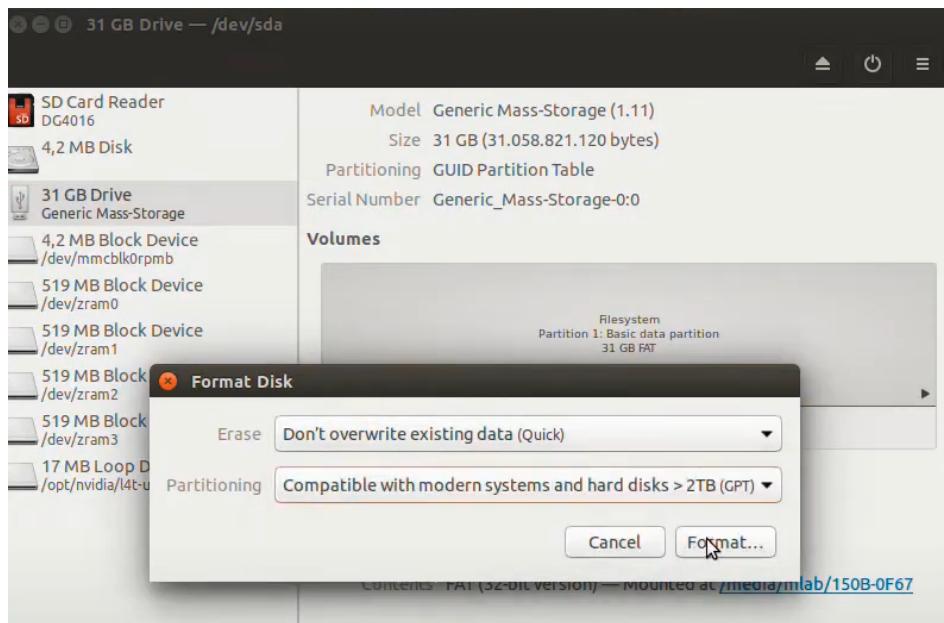


Figure 9: Choose option Compatible with modern systems and hard disks > 2TB(GPT)

- Step 2: Select Create partition and config Patition Size, FreeSpace Following (recommend to set 3GB free only).

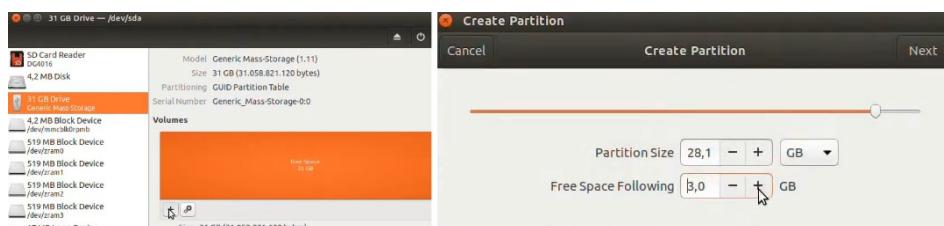


Figure 10: Create partition for USB Drive

Set Volume Name and Type "Internal disk for use with Linux systems only (Ext4). Then Click "Create"

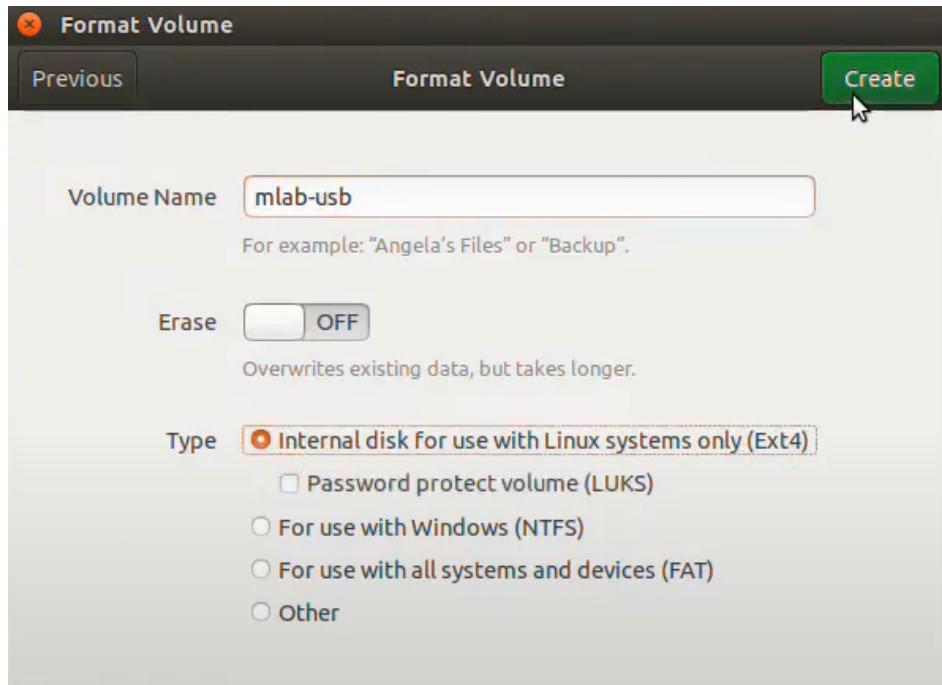


Figure 11: Create partition for USB Drive

- Step 3: Open terminal and Clone <https://github.com/jetsonhacks/bootFromUSB.git> with command:

```
git clone https://github.com/jetsonhacks/bootFromUSB.git
```

- Step 4: Change working directory to bootFromUSB and type command:

```
./copyRootToUSB.sh -p /dev/sda1
```

- Step 5: Wait about 15 minutes and type command:

```
./partUUID.sh
```

Copy the PARTUUID

```
[sudo] password for Mlab:  
PARTUUID of Partition: /dev/sda1  
620ea24c-0c42-4b2d-af83-9b59670b0458  
  
Sample snippet for /boot/extlinux/extlinux.conf entry:  
APPEND ${cbootargs} root=PARTUUID=620ea24c-0c42-4b2d-af83-9b59670b0458 rootwait  
rootfstype=ext4
```

Figure 12: Copy the PARTUUID

- Step 6: Use the file browser to navigate to the USB drive, find the boot/extlinux directory, and then open a terminal from the context menu. Open terminal in boot/extlinux directory and open file extlinux.conf with command:

```
sudo gedit extlinux.conf
```

- Step 7: Modify the extlinux.conf file. Copy the default *LABEL primary* part and change to *LABEL emmc*. Paste *LABEL primary* and modify *root=PARTUUID* which have been copied from previous step.
- Step 8: Wait for copy process to Finish and then reboot the Jetson Nano. Check for storage of new Computer.

```

TIMEOUT 30
DEFAULT primary

MENU TITLE L4T boot options

LABEL primary
  MENU LABEL primary kernel
  LINUX /boot/Image
  INITRD /boot/initrd
  APPEND ${cbootargs} quiet root=PARTUUID=620ea24c-0c42-4b2d-af83-9b59670b0458 rw rootwait
rootfstype=ext4 console=ttyS0,115200n8 console=tty0 fbcon=map:0 net.ifnames=0
sdhci_tegra.en_boot_part_access=1

LABEL emmc
  MENU LABEL primary kernel
  LINUX /boot/Image
  INITRD /boot/initrd
  APPEND ${cbootargs} quiet root=/dev/mmcblk0p1 rw rootwait rootfstype=ext4
console=ttyS0,115200n8 console=tty0 fbcon=map:0 net.ifnames=0 sdhci_tegra.en_boot_part_access=1

# When testing a custom kernel, it is recommended that you create a backup of
# the original kernel and add a new entry to this file so that the device can
# fallback to the original kernel. To do this:
#
# 1, Make a backup of the original kernel
#     sudo cp /boot/Image /boot/Image.backup
#
# 2, Copy your custom kernel into /boot/Image
#
# 3, Uncomment below menu setting lines for the original kernel
#
# 4, Reboot

# LABEL backup
#   MENU LABEL backup kernel
#   LINUX /boot/Image.backup
#   INITRD /boot/initrd
#   APPEND ${cbootargs}
Saving file "/boot/extlinux/extlinux.conf"...

```

Figure 13: Modify extlinux.conf file

Note: when you reboot Jetson, there could be error "cannot find mounted" which means Jetson Nano cannot find USB Drive. Check again USB port if it plugged or not. If it still not working, which means you have edit file extlinux.conf with wrong PARTUUID. You must Re-Flash Jetson as in previous Section.

3 Reference

- Youtube guidline video: <https://www.youtube.com/watch?v=2KAU33SiPyQ>
- Guideline <https://jetsonhacks.com/2021/03/10/jetson-nano-boot-from-usb/>