



Jetpack 6.2 Kernel customization for USB-CAN

- 1) Create folder can_kernel_jetpack/
- 2) Download the below mentioned files (i) from link (a)
 - a) <https://developer.nvidia.com/embedded/jetson-linux-r3643>
 - i) [Driver Package \(BSP\)](#), [Sample Root Filesystem](#), [Driver Package \(BSP\) Sources](#)

Downloads and Links

	Jetson Orin Modules and Developer Kit
DRIVERS	Driver Package (BSP)
	Sample Root Filesystem
	Jetson Linux API Reference
SOURCES	Driver Package (BSP) Sources
	Sample Root Filesystem Sources
DOCS	Jetson AGX Orin Developer Kit User Guide
	Jetson Orin Nano Developer Kit User Guide
	Release Notes
	Jetson Linux Developer Guide (online version)
	Software License Agreement

- 3) Run the following commands:
Ref: [Go here](#)
 - a) `tar xf Jetson_Linux_R36.4.3_aarch64.tbz2`
 - b) `sudo tar xpf Tegra_Linux_Sample-Root-Filesystem_R36.4.3_aarch64.tbz2 -C Linux_for_Tegra/rootfs/`
 - c) `cd Linux_for_Tegra/`
 - d) `sudo ./tools/l4t_flash_prerequisites.sh`
 - e) `sudo apt-get install qemu-user-static`
 - f) `sudo ./apply_binaries.sh`
- 4) Create folder src inside folder can_kernel_jetpack/ cmd: `[mkdir -p src]`
- 5) `cd ~/can_kernel_jetpack`
- 6) `tar xf public_sources.tbz2 -C ~/can_kernel_jetpack/src` [do the tar expansion inside can_kernel_jetpack]



**ROVER
ROBOTICS**

- 7) `cd ~/can_kernel_jetpack/src/Linux_for_Tegra/source`
- 8) `tar xf kernel_src.tbz2`
- 9) `tar xf kernel_oot_modules_src.tbz2`
- 10) `tar xf nvidia_kernel_display_driver_source.tbz2`
- 11) `cd`
`~/can_kernel_jetpack/src/Linux_for_Tegra/source/kernel/kernel-jammy-src/arch/arm64/`
`onfigs/`
- 12) Add `CONFIG_CAN_GS_USB=y` in `defconfig` and `tegra_prod_defconfig`
- 13) `sudo apt install flex bison libssl-dev git-core build-essential bc sshpass abootimg`
`nfs-kernel-server`
- 14) `# avoid this if you are not building real-time kernel`
`./generic_rt_build.sh "enable" [inside cd can_kernel_jetpack/src/Linux_for_Tegra/source]`
- 15) Download this [Bootlin Toolchain gcc 11.3](https://developer.nvidia.com/embedded/jetson-linux)
[link: <https://developer.nvidia.com/embedded/jetson-linux>]
- 16) `mkdir $HOME/l4t-gcc`
- 17) `cd $HOME/l4t-gcc`
- 18) `tar xf aarch64--glibc--stable-2022.08-1.tar.bz2`
- 19) `export`
`CROSS_COMPILE=$HOME/l4t-gcc/aarch64--glibc--stable-2022.08-1/bin/aarch64-buildr`
`oot-linux-gnu-`
[inside `cd can_kernel_jetpack/src/Linux_for_Tegra/source`]
- 20) `make -C kernel`
- 21) `export INSTALL_MOD_PATH=~/can_kernel_jetpack/Linux_for_Tegra/rootfs/`
- 22) `sudo -E make install -C kernel`
- 23) `cp kernel/kernel-jammy-src/arch/arm64/boot/Image`
`~/can_kernel_jetpack/Linux_for_Tegra/kernel/Image`
- 24) `cd ~/can_kernel_jetpack/src/Linux_for_Tegra/source/`
- 25) `# avoid this if you are not building real-time kernel`
`export IGNORE_PREEMPT_RT_PRESENCE=1`
- 26) `export`
`CROSS_COMPILE=$HOME/l4t-gcc/aarch64--glibc--stable-2022.08-1/bin/aarch64-buildr`
`oot-linux-gnu-`
- 27) `export KERNEL_HEADERS=$PWD/kernel/kernel-jammy-src`
- 28) `make modules`
- 29) `export INSTALL_MOD_PATH=~/can_kernel_jetpack/Linux_for_Tegra/rootfs/`
- 30) `sudo -E make modules_install`
- 31) `cd ~/can_kernel_jetpack/Linux_for_Tegra`
- 32) `sudo ./tools/l4t_update_initrd.sh`



Check this link for suitable flashing target (the code mentioned below flashes the nvme mounted on the jetson nano):

<https://docs.nvidia.com/jetson/archives/r36.4/DeveloperGuide/IN/QuickStart.html>

33) **Example:** `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 internal`

Note: If you are using NVIDIA AGX ORIN AGX, CAN0 is already occupied by the internal CAN0 pins, that's why when you are using a USB-CAN module, change the CAN0 to CAN2 in the rover_install_scripts when you are setting up the services (This is not need if you are using JETSON ORIN NANO)

Important - For All the JETSON BOARD IRRESPECTIVE OF ITS TYPE:

- **sudo gedit /etc/modules-load.d/gs_usb.conf** and write the following lines and save the file:
#gs_usb module
gs_usb
- **sudo depmod**
- **sudo gedit /etc/systemd/system/can.service**
- **Paste the following and save can.service:**

```
[Unit]
Description=Bring up CAN interface
After=network.target
Wants=network.target
```

```
[Service]
Type=oneshot
ExecStart=/usr/sbin/enablecan
RemainAfterExit=true
TimeoutStartSec=30
Restart=on-failure
```

```
[Install]
WantedBy=multi-user.target
```

- **sudo systemctl daemon-reload**
- **sudo systemctl restart can.service**



Post flashing SEED NX(as it does not come with the wifi-modules or drives pre-installed):

- `sudo apt update`
- `sudo apt upgrade`
- No wifi drivers - so connect ethernet - in host system change ipv4 and ipv6 in wired connection -> shared to other computers
- `sudo apt install snap`
- `sudo snap install firefox`
- Clone the `rover_install_scripts_ros2` and follow the instruction for ROS installation and then the scripts for rover robots
- `sudo apt install backport-iwlwifi-dkms`

Reference links:

- 1) <https://docs.nvidia.com/jetson/archives/r36.4/DeveloperGuide/IN/QuickStart.html>
- 2) <https://forums.developer.nvidia.com/t/no-data-from-joystick-logitech-f710/290652/10>
- 3) <https://docs.nvidia.com/jetson/archives/r36.4/DeveloperGuide/SD/Kernel/KernelCustomization.html>
- 4) <https://developer.nvidia.com/embedded/jetson-linux-r3643>
- 5) <https://developer.nvidia.com/embedded/jetson-linux>