



TEGRA LINUX DRIVER PACKAGE R27.1

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Advance Information | Subject to Change

Release Notes



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1.0 ABOUT THIS RELEASE

The NVIDIA® Tegra® Linux Driver Package Developer Preview Release 27.1 supports development of platforms running NVIDIA® Tegra® X2 devices.

Note: □ This release of Tegra Linux Driver Package R27.1 is a release for the NVIDIA® Jetson™ TX2 Developer Kit (P2771).

Platform and Release Information

The following table specifies the release information.

Description	Supported Version
Host machine version required for flashing software onto Jetson TX2. Ubuntu 16.04 is NOT recommended on the host machine.	Ubuntu 14.04 (amd64 distribution)
Sample rootfs Ubuntu operating system to run on Jetson TX2.	Ubuntu 16.04 (arm64 distribution)
Supported Linux kernel version.	4.4.15
Supported ARM architecture. hardfp is NOT supported on Jetson TX2.	aarch64
The board name, used in flashing and paths in the software.	jetson-tx2
The Tegra SoC on the platform.	186
The release tag name	tegra-l4t-r27.1

1.1 LOGIN CREDENTIALS

The default login credentials are:

- ▶ Username: nvidia
- ▶ Password: nvidia

2.0 IMPLEMENTATION NOTES

2.1 SOFTWARE-BASED POWER CONSUMPTION MODELING

The Jetson TX2 module has 3-channel INA3221 power monitors at I2C addresses 0x40 and 0x41.

The information from the INA3221 power monitors can be read using sysfs nodes. The naming convention for sysfs nodes is as follows:

Command	Description
rail_name_<N>	Exports the rail name.
in_current<N>_input	Exports rail current in mA.
in_voltage<N>_input	Exports rail voltage in mV.
In_power<N>_input	Exports rail power in mW.
Where <N> is a channel number 0-2.	

Note: The INA driver may also present other nodes. Do not modify any INA sysfs node value. Modifying these values can result in damage to your device.

The Jetson TX2 module has 3-channel INA3221 power monitors at I2C address 0x40 and 0x41. The sysfs nodes to read for rail names, voltage, current, and power are at:

```
/sys/bus/i2c/drivers/ina3221x/0-0040/iio:device0  
/sys/bus/i2c/drivers/ina3221x/0-0041/iio:device1
```

The rail names for I2C address 0x40 are:

Rail Name	Description
Channel 0: VDD_SYS_GPU	GPU power rail.
Channel 1: VDD_SYS_SOC	SOC power rail.
Channel 2: VDD_4V0_WIFI	WIFI power rail.

The rail names for I2C address 0x41 are:

Rail Name	Description
Channel 0: VDD_IN	Main module power input.
Channel 1: VDD_SYS_CPU	CPU power rail.
Channel 2: VDD_SYS_DDR	DDR power rail.

The Jetson TX2 Developer Kit carrier board has 3-channel INA3221 power monitors at I2C addresses 0x42 and 0x43. The sysfs nodes to read rail name, voltage, current and power are at:

```
/sys/bus/i2c/drivers/ina3221x/0-0042/iio:device2
/sys/bus/i2c/drivers/ina3221x/0-0043/iio:device3
```

The rail names for I2C address 0x42 are:

Rail Name	Description
Channel 0: VDD_MUX	Carrier board power input.
Channel 1: VDD_5V_IO_SYS	Carrier board 5 V supply.
Channel 2: VDD_3V3_SYS	Carrier board 3.3 V supply.

The rail names for I2C address 0x43 are:

Rail Name	Description
Channel 0: VDD_3V3_IO_SLP	Carrier board 3.3 V sleep supply.
Channel 1: VDD_1V8_IO (Name on schematic is VDD_1V8)	Carrier board 1.8 V supply.
Channel 2: VDD_3V3_SYS_M2	3.3 V supply for M.2 Key E connector.

Examples

- ▶ To read INA3221 at 0x41, the channel-0 rail name (i.e., VDD_IN), execute the command:

```
cat /sys/bus/i2c/drivers/ina3221x/0-0041/iio:device1/rail_name_0
```

- ▶ To read VDD_IN voltage, current, and power, execute the commands:

```
cat /sys/bus/i2c/drivers/ina3221x/0-0041/iio:device1/in_current0_input
cat /sys/bus/i2c/drivers/ina3221x/0-0041/iio:device1/in_voltage0_input
cat /sys/bus/i2c/drivers/ina3221x/0-0041/iio:device1/in_power0_input
```

Note: In terms of accuracy, assume a 5% guard band for INA measurements greater than 200 mW. Below that, accuracy can deviate by as much as 15%.

2.2 HDMI AUDIO DEVICES IN THE AUDIO SETTINGS APPLICATION

The HDMI audio output device is not listed for some televisions and monitors including the following:

- ▶ Samsung TV 1080p LA40M81BM/XTL
- ▶ LG Flatron W2363D
- ▶ Samsung UA21ES5000RLXL
- ▶ LG 25UM65-p

The issue is inconsistent and sometimes occurs on subsequent reboots.

To workaround

- ▶ If the HDMI audio output device is not listed in audio settings, restart the pulseaudio daemon by killing the running instance as a normal user with the following command:

```
pulseaudio --kill
```

or register the systemd pulseaudio service to start the pulseaudio daemon at every boot:

```
systemctl --user enable pulseaudio.service
```

Note: Do not run pulseaudio as a root user.

2.3 NEW USERS MUST BE ADDED TO VIDEO GROUP

When adding users to the system you must add them to the `video` group for the Linux desktop to appear and function correctly.

2.4 SYMLINKS CHANGED BY MESA INSTALLATION

Installation of Mesa EGL may create a `/usr/lib/<arch>/libEGL.so` symlink, overwriting the symlink to the implementation library that should be used instead, `/usr/lib/<arch>/tegra-egl/libEGL.so`. This disrupts any client of EGL, including libraries in the release that use it for EGLStreams.

In this release, the symlink is replaced when the system is rebooted, fixing this issue on reboot. Similar workarounds are applied in previous releases for other libraries such as `libGL` and `libglx`.

2.5 INSTALLING JETPACK ON NON-ENGLISH LANGUAGE HOST SYSTEMS

The Jetpack installer in this release does not correctly detect a 64-bit CPU (and operating system) on the host unless English is the default language.

To workaround

1. On the host system, install (or verify installation of) the English language package with the following command:

```
sudo apt-get install language-pack-en
```

2. Open `/etc/default/locale` for editing with the following command:

```
sudo nano /etc/default/locale
```

3. Comment out the language specification in `/etc/default/locale` and add the following:

```
LANG="en_US.UTF-8"
```

4. Reboot the host.
5. Launch Jetpack with the following command:

```
sudo ./JetPack-L4T-3.0-linux-x64.run
```

2.6 MAXIMIZING TEGRA X2 PERFORMANCE

This release includes a script (`jetson_clocks.sh`) able to maximize performance by disabling DVFS, CPU Idle, and CPU Quiet. JetPack installer or the flashing script places the script in the home directory on the target at:

```
$HOME/jetson_clocks.sh
```

On the host system, the script is delivered in the TAR file at:

```
Linux_for_Tegra/nv_tegra/nv_tools.tbz2
```

For more information on power and performance management, see the following website:

```
http://elinux.org/Jetson/Performance
```

Note: Wait 1 minute after booting L4T to use this script, to avoid settings being overridden by the Ubuntu initialization script.

Sample Script Usage

1. Show the current (initial) settings with the following command:

```
sudo ${HOME}/jetson_clocks.sh --show
```

2. Store the current settings with the following command:

```
sudo ${HOME}/jetson_clocks.sh --store
```

3. Maximize Jetson TX2 performance with the following command:

```
sudo ${HOME}/jetson_clocks.sh
```

4. Restore the previous settings with the following command:

```
sudo ${HOME}/jetson_clocks.sh --restore
```

2.7 PINMUX CONFIGURATION

The pinmux configuration for the Jetson Developer Kit baseboard expansion header is configured as special-function I/O. The Jetson TX1 release configures these pins differently, primarily as GPIO. If you are not using the Jetson Developer Kit baseboard or if you have an expansion module attached, you must review the Jetson TX2 Developer Kit pinmux for compatibility with your baseboard.

2.8 DOCUMENTATION CORRECTIONS

The following corrections are noted in the *Tegra Linux Driver Package Development Guide 27.1* Release:

- ▶ The Software Feature List included in the HTML version of the *Development Guide* is superseded by the PDF version provided in the release package.

3.0 KNOWN ISSUES

This section provides details about issues discovered during development and QA but not resolved in this release.

3.1 CAMERA

The following camera related issues are noted in this release.

Issue	Description
200271360	Multi-session, multi-camera operation may result in hangs. Issue reproduces with argus_conformance MultiSessionTest cases. Basic operation of up to six cameras through argus_camera is working however.
200244333	Launching argus_camera with the --awblock=on commandline option results in a black image due to AWB not running before locking.
200225662	Frames drops up to 100/ Hr for H264/H65 Video Recording.
200262729	libargus Camera latency is 67 mS.
200263197	Low FPS and stuttering is observed in preview and capture with argus_gstvideoencode.
200206942	The libargus implementation does not support USB cameras in this release.
200191194	Error messages are displayed when running (successfully) the camera_recording sample application.

3.2 MULTIMEDIA

The following multimedia related issues are noted in this release.

Issue	Description
200285125	The TX2 Development Kit that is flashed with the 27.0 version of the factory default image has a screen tearing issue with video playback using nvgstplayer-1.0 with nveglless sink. The issue is fixed in this L4T 27.1 release. However, there is a raised memory clock frequency and power consumption for video playback.
200286673	The video is rendered upside down when running the Camera Capture with TensorRT and Multi-Channel Encoding sample.

3.3 GRAPHICS

The following graphics related issues are noted in this release.

Issue	Description
200284210	Users are not able to use the Tegra Graphics Debugger for EGL applications. There is no workaround at this time.
200186978	When X server is terminated (e.g., service lightdm stop), non X11 application display is unsuccessful. To workaround <ul style="list-style-type: none"> As super user, run the following command: echo 0 > /sys/devices/platform/host1x/tegradc.1/graphics/fb0/blank
200232589	Graphics Debugger is unsuccessful when loading a remote binary if the file name of the binary includes spaces.
200127594	After a first reboot, there is a residue of the commands menu even after pressing the windows key.
200224553	MC_STAT restriction breaks several tools such as: emc_log, tegrastats, and powersig.
200168814	Display is blank after switching to virtual terminal from desktop with Alt+Ctrl+F1-F6. To workaround <ul style="list-style-type: none"> As super user, run the following command: echo 0 > /sys/devices/platform/host1x/tegradc.1/graphics/fb0/blank

3.4 DISPLAY

The following display related issues are noted in this release.

NVIDIA Bug Number	Description
200175128	Resolution goes to 1440 x 576 at 52.1 Hz with warnings from tegra_dc upon idle timeout resume.
200190234	<p>Supporting display overlays requires more display bandwidth which increases the idle power for typical use cases that don't use overlay, for example ubuntu-desktop. At startup the software sets the display bandwidth by considering display overlays that are not used.</p> <p>To use multiple overlays</p> <ol style="list-style-type: none"> 1. Navigate to the nv.sh available at: /et/systemd/nv.sh 2. Override the startup display bandwidth settings by removing the code block after "display bw setting for 3-head config" as follows: <pre data-bbox="532 842 1430 1188"># display bw setting for 3-head config if [-d "/sys/class/graphics/fb0/device/bw_settings"]; then echo 8363500 > /sys/class/graphics/fb0/device/bw_settings/common/iso_bw echo 7603200 > /sys/class/graphics/fb0/device/bw_settings/common/req_bw echo 244940000 > /sys/class/graphics/fb0/device/bw_settings/common/hubclk echo 332800000 > /sys/class/graphics/fb0/device/bw_settings/common/emc_floor echo 1 > /sys/class/graphics/fb0/device/bw_settings/activate</pre> 3. Reboot the device.

3.5 CUDA

The following CUDA related issues are noted in this release.

Issue	Description
200227653	NVIDIA CUDA Visual Profiler is unable to login using ssh to the target from a Windows host system.

3.6 KERNEL

The following kernel related issues are noted in this release.

Issue	Description
1878690	Shutdown/reboot does not work with realtek Ethernet PCI card.
200275736	System crash while playing video, and performing system suspend and resume operation.
1777740	A boot issue occurs when the system is booted with VDD_IN 5.5V input.

3.7 BOOT

The following boot related issues are noted in this release.

Issue	Description
200150755 1809395	<p>SATA Conair SSD does not enumerate as expected.</p> <p>The following error message is displayed:</p> <pre>[17.233087] ata1: softreset failed (1st FIS failed) [27.243085] ata1: softreset failed (1st FIS failed) [62.253086] ata1: softreset failed (1st FIS failed) [62.257959] ata1: limiting SATA link speed to 1.5 Gbps [67.463156] xhci-tegra 3530000.xhci: can't find firmware [67.473082] ata1: softreset failed (device not ready) [67.478133] ata1: reset failed, giving up</pre> <p>To workaround Conair SATA drives must be used as storage devices and not boot devices.</p>
N/A	<p>Using NFS boot, the 16.04 Ubuntu desktop does not function correctly on the target.</p> <p>To workaround</p> <ul style="list-style-type: none"> At the target console, enter the following command: <pre>sudo apt-get install --reinstall ubuntu-desktop unity compiz-core upstart</pre>

3.8 COMMUNICATION

The following communication related issues are noted in this release.

Issue	Description
200276812	Unable to hit peak tput for Ch36_VHT80_TCP-UL and Ch36_VHT80_UDP-UL as expected.
1763058	Bluetooth scanning causes Audio corruption in A2DP playback.
200153200	Unblocking Bluetooth using rfcill (while using an NFS-based file system) causes 70006300.serial FIFO errors.
200157186	The CPU hangs when using Bluetooth and an NFS file system.
200153200	Errors display when using rfcill to unblock Bluetooth, when also using an NFS file system.
1855363	The bcmhd module cannot be unloaded and reloaded.

3.9 GENERAL SYSTEM USABILITY

The following general system usability related issues are noted in this release.

Issue	Description
1877926 1833202	<p>When users operate a system between 5.5V - 5.75V, it is recommended to disable OC1.</p> <p>A known issue of VCOM_ALERT is being triggered when VDD_IN is less than or equal to 5.75V. The software must disable OC throttling on "VCOM_ALERT" to avoid failure on GPU initialization, which causes graphical desktop not to appear at the end of boot.</p> <p>To workaround</p> <p>Use the following sample patch to disable OC1:</p> <pre># This is to remove support for OC1 by removing the OC1 throttle control DT nodes in # \$TEGRA_TOP/platform/bpmp/tegra186-platforms/tegra186-quill- sotherm.dtsi. - throttlect1_oc1 = <SOCTHERM_THROT_VEC_OC1 7 7 100>; - oc_1 = <SOCTHERM_EDP_OC1 1 SOCTHERM_EDP_OC_MODE_BRIEF 2 3 0 0xffffffff>;</pre>
200270895	User is unable to flash the Tegra developer kit using Linux host that runs distro, where loop device does not exist by default. Ubuntu 14.04 MUST be used on the Linux host to avoid problems with flashing."
1486981	When a new user is created after a Jetson installation, the newly created user interface is blank.
200196882	Logging in to GNOME desktop (gnome-shell) is unsuccessful, accompanied by display corruption.

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