TEGRA LINUX DRIVER PACKAGE R28.1

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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 28.1 release supports development of platforms running on:

- NVIDIA® Jetson™ TX1 Developer Kit (P2371-2180)
- NVIDIA® Jetson™ TX2 Developer Kit (P2771-0000)

Platform and Release Information

Description	Supported Version
Host machine version required for flashing software onto Jetson TX1 or Jetson TX2. Ubuntu 16.04 is NOT recommended on the host machine.	Ubuntu 14.04 (arm64 distribution)
Sample rootfs Ubuntu operating system to run on Jetson TX1 or Jetson TX2.	Ubuntu 16.04 (arm64 distribution)
Supported Linux kernel version.	4.4.38
Supported ARM architecture.	aarch64
The board name, used in flashing and paths in the software.	Jetson TX1: jetson-tx1 Jetson TX2: jetson-tx2
The board and revision number.	Jetson TX1: p2371-2180 Jetson TX2: p2771-0000
The release tag name. Consult the kernel source to identify the tag name at: http://nv-tegra.nvidia.com/gitweb/?p=linux-4.4.git Kernel source are live across several repositories. Consult the topic Kernel Customization > Obtaining the Kernel Sources with Git in the *Development Guide* for details.	tegra-l4t-r28.1

1.1 Login Credentials

The default login credentials are:

- Username: `nvidia`
- Password: `nvidia`

Note: For security purposes and for best practices, NVIDIA recommends changing the default password.

1.2 Top Issues Fixed Since Last Release

These fixed issues apply to Jetson TX1 and Jetson TX2 devices unless otherwise specified.

1.2.1 Camera

Camera related issues resolved in this release are as follows.

Issue	Description
200191194	Error messages are displayed when running (successfully) the camera_recording sample application.

1.2.2 Communication

Communication related issues resolved in this release are as follows.

Issue	Description

200308543	The CAN bus driver module auto loading is disabled in this release. To enable and use CAN bus:
	• Manually load the mttcan driver with the command:
	$ sudo modprobe mttcan
	To automatically have the CAN bus driver module enabled:
	• Comment the "blacklist mttcan" with the command:
	$ cat /etc/modprobe.d/blacklist-mttcan.conf
	#blacklist mttcan

200276812	Unable to hit peak tput for Ch36_VHT80_TCP-UL and Ch36_VHT80_UDP-UL as expected.
1855363	The bcmdhd module cannot be unloaded and reloaded.

1.2.3 Graphics

Graphics related issues resolved in this release are as follows.

Issue	Description
200304360	The Ubuntu home screen becomes blank after changing the resolution from 1440x576 to any other resolution.
200186978	When X server is terminated (e.g., service lightdm stop), non X11 application display is unsuccessful.

1.2.4 Kernel

Kernel related issues resolved in this release are as follows.

Issue	Description
1878690	Shutdown/reboot does not work with realtek Ethernet PCI card.

1.2.5 Multimedia

Multimedia related issues resolved in this release are as follows.

Issue	Description
200277469	The OpenCV4Tegra provided in release 27.1 is not able to compile openCV programs and applications. This is resolved in 28.1 release.

2.0 IMPLEMENTATION NOTES

2.1 Prerequisite for video_decode_drm Multimedia Sample

`video_decode_drm` is a new sample in the Multimedia API that demonstrates how to render video stream or UI with the NVIDIA® Tegra® Direct Rendering Manager (DRM). [1843440]

Before running the sample, you must ensure the Ubuntu desktop is disabled.

To disable the Ubuntu desktop

1. Execute the command:

```
$ sudo systemctl stop lightdm.service
```

2. If there are two display outputs, unblank the second inactive display, as follows:

```
$ sudo sh -c 'echo 0 > /sys/class/graphics/fb1/blank'
```

2.2 Jetson TX1 HDMI Display Support

Jetson TX1 does not support 1152x864 display resolution on some HDMI display monitors. When the resolution is changed to 1152x864 the display may become blank after 30 seconds, but it can reset back to the previous resolution after 30 seconds. If the display does not reset back to previous resolution, you must perform a hard reset of the device to restore it to the original display configuration. [200327890]

2.3 Display Port and Embedded Display Port Support

Display port is not supported on Jetson TX1. For Jetson TX2, DP/eDP support is identified in the Jetson TX2 Software Feature List in the Kernel I/O Interfaces table of the *Development Guide*.

2.4 OpenCV4Tegra Deprecated

OpenCV4Tegra Version 2.4.13 is provided as deprecated in Release 28.1. OpenCV4Tegra provides CPU and GPU enabled acceleration for OpenCV Version 2.4.13. These improvements have been integrated into the OpenCV project in version 3.2. Users of OpenCV must upgrade to OpenCV Version 3.2 and obtain support from the OpenCV community.

2.5 GStreamer and nvgstcapture Support

`nvgstcapture` is provided as deprecated in Release 28.1. It will be replaced with a basic plugin built around libargus. The basic plugin will provide high-level camera control functionality. Any new applications requiring low-level control must be built using libargus.

2.6 WiFi Support

The software features includes the following supported WiFi modes:

Mode	Description	Jetson TX1	Jetson TX2
AP	AccessPoint (AP) Infrastructure Mode	Yes	Yes
STA	Station Infrastructure Mode	Yes	Yes

2.7 Wayland Support

Wayland is provided as an early access feature in release 28.1. Full support is targeted for a future release. [200138269]

2.8 Naming Inconsistencies in Ethernet Interface

By default, Ethernet devices are configured with device names of the format:

`eth<n>`

Where `<n>` is a unique number.

If you experience inconsistencies with the naming of Ethernet interfaces reverting to a name starting with `enx`, the udev package installed may be subject to a bug and requires updating to Version 229-4ubuntu17 or later. Install udev by executing the command: [200326204]

```
“apt-get install udev”
```

Additionally, make sure to enable the universe repositories in `/etc/apt/sources.list` and update the repositories using the command:

```
apt-get update
```

2.9 Documentation Corrections to TegraStats

In the *Development Guide* TegraStats Utility topic, the following updates are provided for the Reported Statistics table [200324723]:

- The entries for AVP and VDE are no longer applicable.
- EDP limit is applicable to Jetson TX1 only.
- NVDEC and NVENC utilization is shown when the hardware encoder/decoder engines are used.
- For Jetson TX1: to see the EDP limit, use --systrace, for example:

```
root@tegra-ubuntu:~# ./tegrastats --systrace
argv[1] = --systrace

RAM 1496/3983MB (lfb 427x4MB) cpu [0%,0%,0%,0%]@102 EMC 22%@68 APE 25 GR3D
0%@76 EDP limit 1734
RAM 1496/3983MB (lfb 427x4MB) cpu [32%,0%,0%,0%]@204 EMC 22%@68 APE 25 GR3D
0%@76 EDP limit 1734
RAM 1496/3983MB (lfb 427x4MB) cpu [5%,31%,0%,0%]@204 EMC 24%@68 APE 25 GR3D
0%@76 EDP limit 1734
```

- Audio Processing Engine (APE) entry is added with the following example output

```
nvidia@tegra-ubuntu:~$ sudo ./tegrastats
RAM 1242/7851MB (lfb 1117x4MB) cpu [0%@1881,off,off,0%@1882,0%@1881,0%@1881]
EMC 10%@1600 APE 150 NVDEC 1203 GR3D 35%@114
```

```
RAM 1243/7851MB (lfb 1117x4MB) cpu [19%@345,off,off,14%@345,11%@345,24%@345]
EMC 10%@1600 APE 150 NVDEC 1203 GR3D 39%@114
RAM 1243/7851MB (lfb 1117x4MB) cpu
[23%@2035,off,off,20%@2034,20%@2035,38%@2036] EMC 10%@1600 APE 150 NVDEC
1203 GR3D 28%@114
RAM 1243/7851MB (lfb 1117x4MB) cpu [11%@345,off,off,18%@345,13%@345,30%@345]
EMC 10%@1600 APE 150 NVDEC 1203 GR3D 37%@114
RAM 1243/7851MB (lfb 1117x4MB) cpu [18%@345,off,off,16%@345,19%@345,18%@345]
EMC 10%@1600 APE 150 NVDEC 1203 GR3D 35%@114
RAM 1243/7851MB (lfb 1117x4MB) cpu [17%@345,off,off,12%@345,13%@345,25%@345]
EMC 10%@1600 APE 150 NVDEC 1203 GR3D 46%@114
RAM 1243/7851MB (lfb 1117x4MB) cpu [17%@345,off,off,12%@345,17%@345,20%@345]
EMC 10%@1600 APE 150 NVDEC 1203 GR3D 53%@114
```

2.10 HDMI Audio Devices in 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.**

2.11 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.

2.12 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 must be used instead, `/usr/lib/<arch>/tegra-egl/libEGL.so`. This disrupts any client of EGL, including libraries 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.

2.13 Installing Jetpack on non-English language Host Systems

The Jetpack installer 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 command:

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

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

```
sudo ./JetPack-L4T-3.1-linux-x64.run
```

3.0 KNOWN ISSUES

These known issues apply to Jetson TX1 and Jetson TX2 devices unless otherwise specified.

3.1 Boot

Boot related issues noted in this release are as follows.

Issue	Description
200150755 1809395	SATA Conair SSD does not enumerate as expected. The following error message is displayed: [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 **To workaround** Conair SATA drives must be used as storage devices and not boot devices.
N/A	Using NFS boot, the 16.04 Ubuntu desktop does not function correctly on the target. **To workaround** • At the target console, enter the following command: sudo apt-get install --reinstall ubuntu-desktop unity compiz-core upstart
200309057	Cloning the root file system on eMMC using the following command takes significantly longer to complete on Jetson TX1 than on Jetson TX2. sudo ./flash.sh -r -k APP -G app_part.img jetson-tx1 mmcblk0p1

3.2 Camera

Camera related issues noted in this release are as follows.

Issue	Description

1959620
200304835
	When running the argus_camera application, a memory leak of ~30 bytes per second is present. This issue is present in the open-source glib library used by the camera application, not within the camera application or camera library.
	NVIDIA is working with the open source community to address this issue. In the interim, use the following patch:
	• Navigate to line #148 for the poll_monitor timeout in the GPOL file monitor file at: https://github.com/GNOME/glib/blob/master/gio/gpollfilemonitor.c#L148
	`poll_monitor->timeout = FALSE;`
	• Replace that line with the following if statement:
	`if (poll_monitor->timeout)`
	`{`
	`g_source_destroy (poll_monitor->timeout);`
	`g_source_unref (poll_monitor->timeout);`
	`poll_monitor->timeout = NULL;`
	`}`

200316681	Performance may be degraded if there is an aspect ratio mismatch between the requested output resolution and the sensor mode resolution. For best results, the output resolution requested by the argus_camera application must match, as close as possible, theaspect ratio of the sensor mode. If there is a mismatch, low performance issues may result such not getting the desired frame rate due to frame drops for preview and video encode usecases with argus_camera. For example: sensor mode: 3864x2174, aspect ratio 1.77737 output resolution 3840x2160, aspect ratio 1.77777 Low performance: ./argus_camera -i --kpi --sensormode=0 --outputsize=3840x2160 --videoformat=h264 --videobitrate=20000000 --framerate=30 --outputpath=/dev/null -v3600 -x Good performance: ./argus_camera -i --kpi --sensormode=0 --outputsize=3864x2174 --videoformat=h264 --videobitrate=20000000 --framerate=30 --outputpath=/dev/null -v3600 -x
1851861	IMX185 WDR: AE has large noticeable steps during transition. Fixed ratio (16.0) of long/short exposure results in higher exposure steps available for long exposure may result in noticeable AE steps during transition; specially in High Dynamic Range scenes.

200247681	Systems using lens shading correction and dynamic falloff tuning produce an inconsistent response to exposure bracketing due to a rate limitation on the lens shading adaptation. This issue does not affect basic use of exposure bias or systems that do not use lens shading correction.
200310602	Sometimes a timeout occurs when launching the camera. If the camera is opened or closed in a loop, a crash may be observed after ~100 iterations. The system log shows the following error: [35691.253438] host1x 50000000.host1x: nvhost_get_syncpt: failed to find free syncpt.
200301535	Initially, a transient half-black frame is generated when switching between normal and WDR sensor modes with IMX-185. **To workaround:** Drop the first frame after switching modes.
200297610	When launching the argus_camera application with Piecewise Linear WDR sensor mode and changing the AWB mode, the preview hangs. Specifically, this occurs when changing from Auto to other modes such as Incandescent or fluorescent. A fix for this issue is targeted for a subsequent release.
200244333	Launching argus_camera with --awblock=on causes a black preview and capture image. This is due to an internal color correction matrix that is not populated until after the first frame is run with AWB. **To workaround:** For applications that require fixed gains, use the white balance gain controls instead without requesting lock.
200225662	Frames drops 1/ Hr for H264/H65 Video Recording.

3.3 Communication

Communication related issues noted in this release are as follows.

Issue	Description
200327384	WiFi Ad-Hoc networking is not supported and may cause a system crash if enabled.
200322448 200322528	If WiFi is enabled, the device fails to enter SC7 suspend using "echo mem". **To workaround:** • Execute the command. sudo systemctl suspend A ten second delay occurs while unregistering the P2P interface. However, suspend/resume will work as expected.
200273576	UDP downlink performance of the integrated Ethernet controller may be reduced when display is enabled.

1763058	Bluetooth scanning causes Audio corruption in A2DP playback.

3.4 CUDA

CUDA related issues noted in this release are as follows.

Issue	Description
200303394	While using the autostep feature of CUDA Debugger (cuda-gdb) on Jetson TX2, the autostep can intermittently miss a MMU FAULT (e.g NULL pointer dereference) and does not report it. This leads to a hang of cuda-gdb.

3.5 JetPack

Issue	Description
200330397	While installing with JetPack installer, an out of space message may occur. Jetpack installation requires 12 GB of free disk space. **To workaround:** 1. Ensure the required disk space is available. 2. Restart the JetPack installer.

3.6 Kernel

Kernel related issues noted in this release are as follows.

Issue	Description

200276225	After flashing the device using Ubuntu 16.04 on the host machine and rebooting, unable to install software applications from the Ubuntu Application Center.
	To workaround:
	Change the group ownership from lighdm to messagebus for the following file:
	`/usr/lib/dbus-1.0/dbus-daemon-launch-helper`
	The commands are as follows:
	`$ ls -l /usr/lib/dbus-1.0/dbus-daemon-launch-helper`
	`-rwsr-xr-- 1 root lightdm 38824 Jul 12 18:17 /usr/lib/dbus-1.0/dbus-daemon-launch-helper`
	`sudo chown root:messagebus /usr/lib/dbus-1.0/dbus-daemon-launch-helper`
	`sudo chmod 4754 /usr/lib/dbus-1.0/dbus-daemon-launch-helper`

	Note: NVIDIA supports Ubuntu 14.04 as the host operating system.
200328365	Suspend-to-Idle state is not supported in Tegra, for example: #echo freeze > /sys/power/state Use Suspend to RAM instead, for example: echo mem > sys/power/state Ubuntu may enter Suspend-to-Idle state when: 3. Selecting system menu >suspend. 4. Changing power button default action to suspend and then pressing power button to suspend the device. 5. If autosuspend, when device is inactive, is enabled from System setttings > Power > Suspend when inactive for. **To workaround and prevent Ubuntu from entering Suspend-to-Idle state:** • Add the following configuration to the /etc/systemd/sleep.conf file: [Sleep] SuspendState=mem

200275736	If suspend/resume operations occur during video playback, video playback may not resume properly.
	This occurs if pulseaudio is installed and running. Pulseaudio is installed as part of the ubuntu-desktop package.
	To verify that the problem is caused by pulseaudio, run the following command after resuming from suspend to allow audio/video playback to continue:
	`$ /usr/bin/pasuspender /bin/true`
	If pulseaudio is not required, then workaround by uninstalling or disabling pulseaudio.
	To disable pulseaudio execute the following commands:
	`$ mkdir ~/.pulse`
	`$ echo autospawn=no > ~/.pulse/client.conf`
	`$ pulseaudio -k`
	To re-enable pulseaudio, delete the ~/.pulse/client.conf file.
	Note: pulseaudio is used by various applications. For example, pulseaudio is used by the ubuntu-desktop GUI for controlling audio (eg. volume control) and for audio mixing to allow the overlaying of audio from more than one application. Consequently, disabling pulseaudio may prevent these various applications from operating as expected.

3.7 Multimedia

Multimedia related issues noted in this release are as follows.

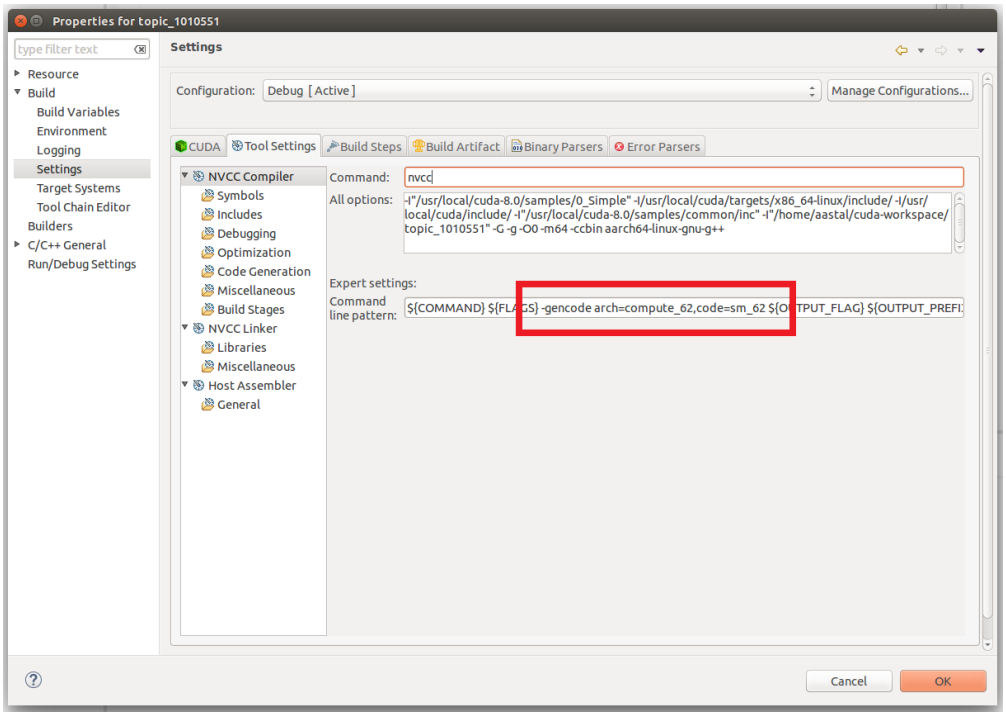
Issue	Description
200329420	VP9 hardware-accelerated decode is not supported on Jetson TX1, and if requested using GStreamer hardware-accelerated decode plugins results

	in continuous error messages to the console and GStreamer multimedia pipeline failure. Use software-accelerated GStreamer plugins for VP9.
200316541	OpenCV fails to use on-board camera E3326. Consult the NVIDIA Developer forums for information on how the on-board camera can be used from OpenCV.
200292197	The public key to verify the OpenCV4Tegra dpkg-format package is not provided, consequently warning messages are seen during installation and during subsequent package management updates.

3.8 General System Usability

General system usability related issues noted in this release are as follows.

Issue	Description
200330275	The Jetson TX1 device does not wake up from suspend state with USB peripherals connected to micro USB port using OTG cable (Specific to TX1). **To workaround:** Resume device from suspend state using Power on key or use USB peripherals connected to USB type A port.
200307657	Red screen is observed while playing H264/H265 4K video with overlaysink. NVIDIA recommends that you do NOT run X11 with other display clients such as overlaysink, and libdrm applications simultaneously.
200270895	User may be unable to flash the Tegra developer kit using Linux host that runs distribution where the loop device does not exist by default. Note: NVIDIA supports Ubuntu 14.04 as the host operating system.
200196882	Logging in to GNOME desktop (gnome-shell) is unsuccessful, accompanied by display corruption. NVIDIA recommends using the Unity desktop enabled by default with the Development Kit.
1877926	When users operate a system between 5.5V - 5.75V, it is recommended to disable OC1 to prevent over-current throttling. **To disable OC1** • Remove the properties that define SOCTHERM_THROT_VEC_OC1 and SOCTHERM_EDP_OC1 from the device. These properties can be found under the /soctherm/throttlectl and /soctherm/edp_oc nodes. For example, in the device tree, these properties may appear as follows: throttlectl_oc1 = <SOCTHERM_THROT_VEC_OC1 7 7 100>; oc 1 = <SOCTHERM_EDP_OC1 1 SOCTHERM_EDP_OC_MODE_BRIEF 2 3 0 0xffffffff>

	.... In this example, throttlectl_oc1 and oc1 properties must be completely removed. These are the properties that define SOCTHERM_THROT_VEC_OC1 and SOCTHERM_EDP_OC1 behavior.
200322307	NVIDIA NSight does not provide an option to compile for SM 6.2 GPU architecture implemented on Jetson TX2. To workaround: 1. Use the Expert setting to add the following option to both NVCC compiler and Linker. -gencode arch=compute_62,code=sm_62 2. In the NVCC Compiler, navigate to Properties -> Settings -> Tool Settings -> NVCC Compiler -> Expert Setting: ${COMMAND} ${FLAGS} -gencode arch=compute_62,code=sm_62 ${OUTPUT_FLAG} ${OUTPUT_PREFIX} ${OUTPUT} ${INPUTS} 3. In the NVCC Linker, navigate to Properties -> Settings -> Tool Settings -> NVCC Linker -> Expert Setting: ${COMMAND} ${FLAGS} -gencode arch=compute_62,code=sm_62 ${OUTPUT_FLAG} ${OUTPUT_PREFIX} ${OUTPUT} ${INPUTS} Consult the image for details: 

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