



TEGRA LINUX DRIVER PACKAGE R24.2

RN_05071-R24 | September 12, 2016
Advance Information | Subject to Change

Release Notes



TABLE OF CONTENTS

1.0	ABOUT THIS RELEASE	3
1.1	What's New	4
1.2	Login Credentials	4
1.3	Sources for Included Linux Distribution Packages	5
1.4	Top Issues Fixed Since Last Release	5
2.0	IMPLEMENTATION NOTES	6
2.1	Multimedia API Included in this Release	6
2.2	HDMI Audio Devices in the Audio Settings Application.....	6
2.3	New Users Must be Added to Video Group	7
2.4	Using the Leopard Imaging IMX185 Camera Module	7
2.5	Symlinks Changed by Mesa Installation.....	8
2.6	Gstreamer-0.10 Removed	9
2.7	Installing Jetpack on non-English lanugage Host Systems	9
2.8	Maximizing Tegra X1 Performance	10
2.9	32-bit hardfp Support Removed	11
2.10	Media Controller Support Included in V4L2 for CSI Camera	11
3.0	KNOWN ISSUES	12
4.0	ABOUT EARLIER RELEASES	16
	11 Jun 2016, 24.1	16

1.0 ABOUT THIS RELEASE

The NVIDIA® Tegra® Linux Driver Package supports development of platforms running the NVIDIA® Tegra® X1 series computer-on-a-chip.



Note: This release of Tegra Linux Driver Package R24.2 is a release for the NVIDIA® Jetson™ Developer Kit (P2371-2180).

Release Information

The following table describes attributes of this product release. When you encounter these variables, in these *Release Notes* or in the *Developer Guide*, use the provided value in place of the variable.

Variable	Value	Description
<os_ver_host>	14.04 (amd64 distribution)	Specifies the host Ubuntu operating system version.
<os_ver_target>	16.04 (arm64 distribution)	Specifies the target (rootfs) Ubuntu operating system version.
<lnx_ver>	3.10.96	Specifies the version of the Linux kernel.
<tag_name>	tegra-l4t-r24.2	Specifies the Git tag for the release.
<release>	R24.2	Specifies the release.
<release_num>	24.2.0	Specifies the complete release number for use in file and path names.
<release_type>	aarch64	Specifies the supported ARM architecture.
<EGL GL_ver>	362.24.18.0	Specifies the EGL or OpenGL version.

Platform Information

The following table describes attributes of the Jetson TX1 platform.

Variable	Value	Description
<platform ver>	t210ref	Specifies the platform.
<board_and_rev>	jetson-tx1	Specifies the board and revision. This information is used in flashing and paths.
<t-arch>	210	Specifies the Tegra SoC on the platform.

1.1 WHAT'S NEW

- ▶ Multimedia API
- ▶ CUDA 8.0
- ▶ Ubuntu 16.04-derived sample rootfs
- ▶ Chromium browser
- ▶ Previously deprecated features removed:
 - hardfp support
 - CSI driver
 - Gstreamer 0.10

See “Software Features” in the *Tegra Linux Driver Package Developer Guide* for more information about the features of this release.

For a complete list of kernel changes in this release see the following website:

<http://nv-tegra.nvidia.com/gitweb/?p=linux-3.10.git;a=shortlog;h=refs/heads/14t/14t-r24.2>

1.2 LOGIN CREDENTIALS

The default login credentials are:

- ▶ Username: ubuntu
- ▶ Password: ubuntu

The release also includes the following credentials:

- ▶ Username: nvidia
- ▶ Password: nvidia



Note: This release of Tegra Linux Driver Package R24.2 is planned to be the last

release where the ubuntu default login credentials are provided. The nvidia user credentials are planned to be the default login credentials for the next release.

1.3 SOURCES FOR INCLUDED LINUX DISTRIBUTION PACKAGES

Visit the Jetson Embedded Platform website for source code provided subject to the terms of open source licenses that require source code availability, such as the GNU General Public License.

1.4 TOP ISSUES FIXED SINCE LAST RELEASE

The following issues are resolved in this release.

- ▶ [1747157] Support disabling suspend-to-ram and cpu-idle kernel configurations
- ▶ [200203807] Installing libegl1-mesa or updating the corresponding package overwrites libEGL.so.1
- ▶ [1794309] Nvcamera daemon is unsuccessful on multiple image capture runs
- ▶ [200196911] Intermittently unable to boot the kernel due to PCIe errors
- ▶ [1691314] LP switching is unsuccessful when SATA is connected to the Jetson TX1 target (firmware version 50.11).
- ▶ [1736102] Camera preview becomes non-responsive during stress testing of video/image recording
- ▶ [200122163] Disabled (DSI-0) Primary HDMI display causes the following error to display in logs: "vgaarb: this pci device is not a vga device"
- ▶ [200151236] The Camera app (NvGstPlayer-1.0) invokes an out of memory killer because of memory leak when playing multiple images in a loop
- ▶ [200174822] Corrupted pixels occur after the image shows up on the preview for a few minutes

2.0 IMPLEMENTATION NOTES

2.1 MULTIMEDIA API INCLUDED IN THIS RELEASE

This release includes the Multimedia API as `Tegra_Multimedia_API_R24.2.0_aarch64.tbz2`. This package can be installed with Jetpack. For information about installation of the API see the README in the `tegra_multimedia_api` folder.

The README provides instructions about how to build the included samples. For full documentation of the Multimedia API, see the *Multimedia API Reference*, included with the *Developer Guide*.

The P3326 camera module is included with the development kit for use with this API.

2.2 HDMI AUDIO DEVICES IN THE AUDIO SETTINGS APPLICATION

The HDMI audio output device is not getting 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 correctly and function correctly.

2.4 USING THE LEOPARD IMAGING IMX185 CAMERA MODULE

The Tegra® Linux Tegra Driver Package (L4T) provides a sample configuration file (Linux kernel device tree) to enable the Leopard Imaging IMX185 camera module.

The file, `tegra210-jetson-cv-camera-li-mipi-adpt-a01-devkit.dtb`, enables standard developer kit features along with the IMX185 camera module. The file enables the standard operating mode (UCM1); for 24x7 operation. For UCM2, additional changes by the end-user are required.

Prerequisites

- ▶ Jetson TX1 Developer Kit
- ▶ Leopard Imaging IMX185 camera module (not included in Developer Kit)

To use the configuration file

1. If not already done, download and unpack the Linux for Tegra release R24.2 software
2. Create a copy of the flashing configuration file with the following command:

```
cp jetson-tx1.conf jetson-tx1-imx185.conf
```

3. Change the following line the configuration file entry for DTB:

```
DTB_FILE=tegra210-jetson-cv
```

to

```
DTB_FILE=tegra210-jetson-cv-camera-li-mipi-adpt-a01-devkit.dtb
```

4. In the root file system image, modify the boot loader configuration file to load the modified device tree file by changing the following line in `bootloader/t210ref/p2371-2180-devkit/extlinux.conf*`

```
FDT xxx (TODO: provide proper name)
```

to

```
FDT /boot/tegra210-jetson-cv-camera-li-mipi-adpt-a01-devkit.dtb
```

5. Flash the device, following the documented process, specifying the newly-created configuration file. For example:

```
flash.sh jetson-tx1-imx185 mmcblk0p1
```

After flashing, the developer kit should reboot with support for IMX185 enabled.

To enable IMX185 supporting 24x7 operation (UCM2)

- Edit `arch/arm64/boot/dts/tegra210-jetson-cv-camera-li-mipi-adpt-a01-devkit.dts` to include `tegra210-power-dvfs-override-ucm2c.dtsi` by making the changes shown in the following patch:

```
diff --git a/arch/arm64/boot/dts/tegra210-jetson-cv-camera-li-mipi-adpt-a01-devkit.dts b/arch/arm64/boot/dts/tegra210-jetson-cv-camera-li-mipi-adpt-a01-devkit.dts
index 514b30f..7245512 100644
--- a/arch/arm64/boot/dts/tegra210-jetson-cv-camera-li-mipi-adpt-a01-devkit.dts
+++ b/arch/arm64/boot/dts/tegra210-jetson-cv-camera-li-mipi-adpt-a01-devkit.dts
@@ -115,3 +115,4 @@
     };
 };
 #include "tegra210-platforms/tegra210-jetson-cv-camera-li-mipi-adpt-a00.dtsi"
+#include "tegra210-platforms/tegra210-overrides/tegra210-power-dvfs-override-ucm2c.dtsi"
```

2.5 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 have been applied in previous releases for other libraries such as libGL and libglx.

2.6 GSTREAMER-0.10 REMOVED

Gstreamer version 0.10 is removed from this release. Use of Gstreamer version 1.0 is required for development.

2.7 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

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

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

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

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

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

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

9. Reboot the host.
10. Launch Jetpack with the following command:

```
sudo ./JetPack-L4T-2.1-linux-x64.run
```

2.8 MAXIMIZING TEGRA X1 PERFORMANCE

This release includes a script (`jetson_clocks.sh`) able to maximize performance by disabling DVFS, CPU Idle, and CPU Quit. JetPack installer places the script in the home directory. Or, see “Downloads” in the *Tegra Linux Driver Package Developer Guide* for the script file.

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 ./jetson_clocks.sh --show
```

2. Store the current settings with the following command:

```
sudo ./jetson_clocks.sh --store
```

3. Maximize Jetson TX1 performance with the following command:

```
sudo ./jetson_clocks.sh
```

4. Show the current settings with the following command:

```
sudo ./jetson_clocks.sh --show
```

5. Restore the previous settings with the following command:

```
sudo ./jetson_clocks.sh --restore
```

6. Show the current settings with the following command:

```
sudo ./jetson_clocks.sh --show
```

2.9 32-BIT HARDFP SUPPORT REMOVED

The L4T R24.2 release only supports aarch64. The R24.1 release was the last release that the hardfp BSP for 32-bit user space support was also provided.

2.10 MEDIA CONTROLLER SUPPORT INCLUDED IN V4L2 FOR CSI CAMERA

Support for the `soc_camera` driver is disabled in the R24.2 release.

3.0 KNOWN ISSUES

This section provides details about issues that were discovered during development and QA but not resolved prior to this release.

In the following Known Issues tables, a check mark (✓) appearing in either the New or Past columns means:

New	Indicates issues found in this release.
Past	Indicates issues present in (and continuing to be present in) the last release.

Issue	New	Past
<p>1. When X server is terminated (e.g., service lightdm stop), non X11 application display is unsuccessful.</p> <p>To workaround</p> <ul style="list-style-type: none">As super user, run the following command: <pre>echo 0 > /sys/devices/platform/host1x/tegradc.1/graphics/fb0/blank</pre> <p>[200186978]</p>	✓	

Issue	New	Past
<p>2. Display is blank after switching to virtual terminal from desktop with Alt+Ctrl+F1-F6.</p> <p>To workaround</p> <ul style="list-style-type: none"> As super user, run the following command: <pre data-bbox="342 443 1109 554">echo 0 > /sys/devices/platform/host1x/tegradc.1/graphics/fb0/ blank</pre> <p>[200168814]</p>	✓	
<p>3. HDMI audio output device is not listed in system settings application. For a workaround see HDMI Audio Devices in the Audio Settings Application in this document. [1794670]</p>	✓	
<p>4. Graphics Debugger is unable to debug CUDA graphics samples. [200232592]</p>	✓	
<p>5. NVIDIA Visual Profiler is unable to login via ssh to the target from a Windows host system. [200232602]</p>	✓	
<p>6. Graphics Debugger is unsuccessful when loading a remote binary if the file name of the binary includes spaces. [200232589]</p>	✓	
<p>7. VisionWorks samples cannot be successfully built with the 16.04 compiler. [1806888]</p>	✓	
<p>8. The Firefox browser is not supported in this release.</p> <p>To workaround</p> <ul style="list-style-type: none"> At the target console, enter the following command: <pre data-bbox="342 1247 1109 1304">/usr/bin/chromium-browser</pre> <p>To launch a chromium based browser included in the release.</p> <p>[1796833]</p>	✓	
<p>9. Error messages are displayed when running (successfully) the camera_recording sample application. [200191194]</p>	✓	
<p>10. The libargus implementation does not support USB cameras in this release. [200206942]</p>	✓	
<p>11. Camera preview functions correctly but the following kernel error is displayed in logs:</p> <pre data-bbox="297 1692 1109 1803">tegra_camera_dev_mfi_clear [p] \xffffffffe5\xffffffff\xffffffc0\xxffffffff\xffffff\xffffff\xffffffe8\xffffffcejl c8982126-0072] force clear Q pending writes</pre> <p>[2002144749]</p>	✓	

Issue	New	Past
<p>12. 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>	✓	
<p>13. Bluetooth scanning causes Audio corruption in A2DP playback. [1763058]</p>	✓	
<p>14. Unhandled level 3 translation fault occurs during Bluetooth data transfer. [200152749]</p>	✓	
<p>15. Connected Bluetooth headset audio sink shows mode as "mono." [200194792]</p>	✓	
<p>16. Unblocking Bluetooth using rfcmmio (while using an NFS-based file system) causes 70006300.serial FIFO errors. [200153200]</p>	✓	
<p>17. The device occasionally becomes non-responsive during reboot (u-boot) stress loop testing. [200165179]</p>	✓	
<p>18. EDID read is unsuccessful using read-edid package. [200089362]</p>	✓	
<p>19. Corruption is displayed in camera preview for USB 3.0 camera. [200143368]</p>	✓	
<p>20. Register dump/data CRC error occurs on mmc3/mmcblk1p1 during LP switching. [200159844]</p>	✓	
<p>21. CUDA sample compilation on device is unsuccessful. [200199690]</p> <p>To workaround</p> <ol style="list-style-type: none"> In the Makefile, modify the FILTER_OUT line as follows: <pre>FILTER_OUT := 0_Simple/cdpSimplePrint/Makefile 0_Simple/cdpSimpleQuicksort/Makefile 2_Graphics/bindlessTexture/Makefile 6_Advanced/cdpBezierTessellation/Makefile 6_Advanced/cdpQuadtree/Makefile 6_Advanced/cdpLUdecomposition/Makefile 6_Advanced/cdpAdvancedQuicksort/Makefile 7_CUDAlibraries/simpleDevLibCUBLAS/Makefile 2_Graphics/simpleGLSL_EGLOutput/Makefile 2_Graphics/simpleGLSL/Makefile 5_Simulations/nbody_opengles/Makefile 5_Simulations/fluidsGLSL/Makefile 0_Simple/simpleMPI/Makefile</pre> <ol style="list-style-type: none"> Compile the samples with the following command: <pre>GLLINK=-L/usr/lib/aarch64-linux-gnu/tegra make</pre>		✓

Issue	New	Past
22. Multimedia playback and camera preview corruption may occur when using the Gstreamer eglimagesink component on 64-bit X11. [1762118]		✓
23. Video files received via RTSP streaming from CSI camera sources display slight corruption and stutter. [200197840]		✓
24. Unhandled level 3 translation fault occurs during Bluetooth data transfer. [200152749]		✓
25. Register dumps and data CRC errors are displayed on mmc2/mmcblkp1 during LP switching. [200159844]		✓
<p>26. The first run of the nvgs capture 1.0 test application causes errors to be displayed similar to the following:</p> <pre data-bbox="297 674 1109 814">GStreamer-WARNING **: Failed to load plugin '/usr/lib/aarch64-linux-gnu/gstreamer- 1.0/libgstegllessink.so'</pre> <p>The OSS version of EGL sink does not function correctly in this case. [1751872]</p>		✓
27. The CPU hangs when using Bluetooth and an NFS file system. [200157186]		✓
28. Errors display when using rkill to unblock Bluetooth, when also using an NFS file system. [200153200]		✓
29. Connected Bluetooth headset incorrectly displays “mono” mode. [200194792]		✓
30. Logging in to GNOME desktop (gnome-shell) is unsuccessful, accompanied by display corruption. [200196882]		✓
31. System intermittently becomes non-responsive during reboot stress testing with <code>reboot</code> or <code>init 6</code> . [200134773]		✓
32. Resolution goes to 1440 x 576 at 52.1 Hz with warnings from <code>tegra_dc</code> upon idle timeout resume. [200175128]		✓

4.0 ABOUT EARLIER RELEASES

11 JUN 2016, 24.1

What's New

- ▶ Support for 64-bit user space and runtime libraries
- ▶ Vulkan support
- ▶ V4L2 media-controller driver support for camera sensors (bypassing ISP)

See “Software Features” in the *Tegra Linux Driver Package Developer Guide* for more information about the features of this release.

For a complete list of kernel changes in this release see the following website:

```
http://nv-tegra.nvidia.com/gitweb/?p=linux-3.10.git;a=shortlog;h=refs/heads/l4t/l4t-r24.1
```

Top Issues Fixed Since Last Release

The following issues are resolved in this release.

- ▶ [1723265] Hard resetting the TX1 board while it is above 44°C will cause boot failure due to default system shut down value is set to 44°C. The system will boot up once cooled down to below 44°C. This issue does not occur upon warm reset.
- ▶ [1723265] Hard resetting the TX1 board while it is above 44°C will cause boot failure due to default system shut down value is set to 44°C.
- ▶ [200170514] OSidle power consumption is around 185mW higher when eth0 is disabled.
- ▶ [1708129] GStreamer unable to set FPS rate to rate supported by sensor.

Notice

ALL NVIDIA DESIGN SPECIFICATIONS, REFERENCE BOARDS, FILES, DRAWINGS, DIAGNOSTICS, LISTS, AND OTHER DOCUMENTS (TOGETHER AND SEPARATELY, "MATERIALS") ARE BEING PROVIDED "AS IS." NVIDIA MAKES NO WARRANTIES, EXPRESS, IMPLIED, STATUTORY, OR OTHERWISE WITH RESPECT TO THE MATERIALS, AND ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS AND WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OR CONDITION OF TITLE, MERCHANTABILITY, SATISFACTORY QUALITY, FITNESS FOR A PARTICULAR PURPOSE AND ON-INFRINGEMENT, ARE HEREBY EXCLUDED TO THE MAXIMUM EXTENT PERMITTED BY LAW.

Information furnished is believed to be accurate and reliable. However, NVIDIA Corporation assumes no responsibility for the consequences of use of such information or for any infringement of patents or other rights of third parties that may result from its use. No license is granted by implication or otherwise under any patent or patent rights of NVIDIA Corporation. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. NVIDIA Corporation products are not authorized for use as critical components in life support devices or systems without express written approval of NVIDIA Corporation.

Trademarks

NVIDIA and the NVIDIA logo are trademarks or registered trademarks of NVIDIA Corporation in the United States and other countries. Other company and product names may be trademarks of the respective companies with which they are associated.

Copyright

© 2016 NVIDIA Corporation. All rights reserved.