TEGRA LINUX DRIVER PACKAGE R21.5

Release Notes

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1.0 ABOUT THIS RELEASE

The NVIDIA® Tegra® Linux Driver Package supports development of platforms running:

▶ NVIDIA® Tegra® K1 32 Bit series computer-on-a-chip
▶ Linux kernel 3.10.40
▶ Git tag for the release: tegra-l4t-r21.5

> 💬 **Note: This release of Tegra Linux Driver Package R21.5 is a release for: Tegra K1 32 Bit device code-named "Jetson TK1"**

1.1 LOGIN CREDENTIALS

The default Jetson TK1 login credentials are:

▶ Username: `ubuntu`
▶ Password: `ubuntu`

> 💬 **Note: A debug console is available via female-to-female NULL modem cable. The console is not password protected.**

1.2 WHAT'S NEW

This release fixes some issues that were found during continued testing and adds/enhances the following feature(s).

▶ Updates for CPU clock frequencies (UCM1 and UCM2), and CPU voltages (UCM2). See Updates to CPU Clock Frequencies and Voltages in this document.

▶ Added support for Hynix H5TC4G63CFR-RDA as an alternate DRAM for Jetson TK1. Updated BCT and EMC-DVFS tables are present to support this part. The updated BCT and kernel provide support for both DRAM based upon RAMCODE strapping options.

1.3 TOP ISSUES FIXED SINCE LAST RELEASE

The following issues have been resolved in this release. for a complete list of kernel fixes, see the following web site:

http://nv-tegra.nvidia.com/gitweb/?p=linux-3.10.git;a=shortlog;h=refs/heads/l4t/l4t-r21.5

System

▶ [200127047] cudaStreamAttachMemAsync bonds unified memory, memory consumption is accumulated until overflow

Kernel

▶ [200146488] OpenOCD JTAG debugging support needed
▶ [200141741] Kernel oops after rmmod g_ether.ko in device mode of OTG
▶ [1726087] xhci controller stops working after wireless dongle removal
▶ [1709814] Kernel crash during reboot stress with MSELECT error and kernel exception: "drivers/platform/tegra/hier_ictlr/hier_ictlr.c:54"

Multimedia

▶ [200208334] Windows created by video playback using URI option of nvgstplayer-0.10 are not automatically closed
▶ [1775740] H.264 support needed for Main and High Profile in omxh264enc (gstreamer plugin)

Camera

▶ [200215774] Low FPS at 1280x720 with USB camera (USB 2.0)
▶ [200204206] CSI preview launch is unsuccessful with first attempt on boot
▶ [200106274] Errors displayed while launching CSI camera

Power

▶ [200205110] Device shuts down when we wake up from Deep Sleep (LP0) by pressing power button
▶ [1679372] nvprof disables GPU rail gating

1.4 JETSON TK1-SPECIFIC RELEASES

For the latest releases and errata for the Jetson TK1 platform, visit (Registered Developer Program membership required):

```
http://developer.nvidia.com/jetson-tk1
```

1.5 SOURCES FOR INCLUDED LINUX DISTRIBUTION PACKAGES

Source files for open-source licensed Linux distribution packages included in the release flashed on Jetson TK 1 as shipped are located in the following directory:

```
./usr/src/
```

You can download updated sources, when available at the following Web site:

```
https://developer.nvidia.com/linux-tegra
```

2.0 KNOWN ISSUES

This section provides details about issues that were discovered during development and QA but not resolved prior to this release of the Tegra Linux Driver Package.

2.1 [200080783] X CRASHES DURING XRANDR SCALING

The X server crashes during 4 x 8 xrandr scaling, displaying log messages indicating out-of-memory process.

2.2 [200081682] DATA CRC ERRORS DISPLAYED WHEN USING SPECIFIC SD CARDS FOR FILE SYSTEM

Data CRC errors may display when using an "Ultra microSDHC UHS-I 32GB Class 10 Memory Card" for the root file system.

2.3 [200081729] ERRORS DISPLAY WHEN OVERRIDING GPU FREQUENCY BEFORE DISPLAY INITIALIZATION

The GPU frequency cannot be overridden until X11 is running.

2.4 [200049185] HUE CHANGES IF OBJECT IS CLOSE TO CAMERA LENS

When capturing images with Nvgstcapture-1.0 the hue of the image varies with the proximity of the subject to the camera lens.

2.5 [200074125] BUILT-IN SOUND DEVICES NOT LISTED IN SETTINGS WITH HDMI-DVI CONVERTOR CONNECTED

Sound is audible, but built-in sound devices are missing from settings when system is connected to a display with a HDMI-DVI converter.

2.6 [1499936] MOVING NAUTILUS WINDOW OVER WORKSPACE SWITCHER CAUSES GUI TO HANG

Dragging a Nautilus window so that it covers or partially covers the workspace switcher causes the desktop GUI to hang.

3.0 IMPLEMENTATION NOTES

3.1 GSTREAMER 1.0 SUPPORT

This release includes Gstreamer 1.0 support. The Nvgstplayer application defaults to Gstreamer 0.1. To run the 1.0 version, use the full path to the binary.

3.2 UPDATES TO CPU CLOCK FREQUENCIES AND VOLTAGES

CPU clock frequencies for UCM1 and UCM2, and CPU voltages for UCM2 are updated in this release to reflect guaranteed maximum frequencies for Tegra K1 processors over the operating lifetime of the product. There are no changes to other clocks, specifications, or voltages.

You must update the L4T software release to R21.5 (this release). See the *Jetson TK1 Datasheet* for more information about these specifications.

3.3 FUSE DEVICES AS LATE IN PROCESS AS POSSIBLE

Do not fuse for secure boot until the very end of the manufacturing process. Failure analysis by NVIDIA, as part of the RMA process, is not possible with fused devices.

4.0 ABOUT EARLIER RELEASES

21.4, 10 JUL 2015

What's New In this Release

This release fixes some issues that were found during continued testing and adds/enhances the following feature(s).

- [1566270] Enabled Tegra system profiler
- [1644596] Fixed gst-omx compile time errors, added README and source files
- [1551864] Updated Jetson TK1 pinmux configuration
- [1542346] Rework of modeswitch/vt-switch handling in X/OpenGL
- [1487603] xhci firmware cfgtbl and logging enhancements
- [888312] Enabled and tuned CPU frequency boost on input event
- [1568275] Adds support for X.org ABI 17, 18 and 19
- [1649593] Image rotation support documentation
- [1625262] Improved device tuning on Jetson TK1

Top Issues Fixed Since Last Release

The following issues have been resolved in this release.

System

- [200046014] X crashes due to segmentation fault
- [200081242] System does not wake from Suspend (LP1)
- [200094751] Issues with loading libcuda.so.1.1
- [200084665] "No space left on device" error displayed with enough space available on device
- [200077334] TegraK1 GPU error displays when GPU is locked at a high frequency

▶ [200062085] read_ahead_kb size of removable SDcards/MicroSDs resets to 128 from 2048 after hotplug, leading to proportional drop in read performance

▶ [200040915] "xHCI xhci_drop_endpoint called with disabled ep ea70d3c0" error displayed from xhci.c and connection is reset when connecting USB 3.0 hub to Belkin USB 3.0 hub

▶ [200036424] System becomes unresponsive when entering Deep Sleep (LP0) when HDMI is disconnected after boot

▶ [200032923] While pmu_destroy is running there is a possibility pmu init is scheduled in a different thread, causing exception

▶ [200006918] Incorrect board revision present in major_revision causing board specific services and settings to be unsuccessful

▶ [1640551] Long delays occur in nvmap during boot

▶ [1639229] Memory leak and performance degradation occur when changing EGL contexts

▶ [1599195] Need correct settings for VBR (constant QP) mode

▶ [1596489] No support for null buffers as arguments in glDeleteBuffers()

▶ [1581432] Need Tegra WDT FIQ function enabled

▶ [1580265] HDMI parent clock frequency calculation incorrect in some cases

Kernel

▶ Added Tegra Profiler support

▶ Enabled Watch Dog Timer support

▶ Fixed race condition in programming PTC flush registers. This race condition results in PTC flush not happening as intended and can cause either SMMU fault or previous stale mapping access

▶ Improved SATA stability

▶ Improved vic frequency scaling tuning parameter

▶ Modified the way we load nvhost firmware

▶ [200057068] Removed invalid gk20a memory allocation error message

▶ [200087363] Linux kernel headers include x86 ELF files causing unsuccessful on-board module compilation

Display

▶ [200102860] Display is blank after hot plugging HDMI after boot

▶ [1467960] oom-killer invocation occurs with heavy graphical corruption and screen blanking in low memory situations when stress testing screen orientation changes

▶ [200080781] Mode setting unsuccessful for some refresh rates

▶ [200081502] MSELECT error and kernel exception display during reboot stress testing

Graphics

▶ [200101677] Race condition in omx-il while loading EGL library

▶ [1617701] Using EGLImage for fast CPU read/write access on textures and framebuffers causes segmentation fault

- ▶ [200036737] X crashes due to invalid event

Multimedia

- ▶ [200116564]Audio corruption from first aplay playback after reboot
- ▶ [200107328] Added DRC support in gst-omx 1.0
- ▶ [200106354] Nvgstplayer-1.0 video playback windows (created with URI option) not automatically closed
- ▶ [200102340] Sequential image capture using run time command (j:<count>) with a USB camera is unsuccessful with nvgstcapture-0.10
- ▶ [200100485] Decoding interlace video crashes when POC=2
- ▶ [200100179] Playback of captured video (using H.264 encode and AVI container) is unsuccessful
- ▶ [200099694] No audio heard from nvgstplayer-1.0 playback of 00001.MTS
- ▶ [200098386] Support for resizing and positioning of the overlay screen with gstreamer-1.0 needed
- ▶ [200091380] Playback of low bit-rate WAV audio files with nvgstplayer-0.10 and aplay is unsuccessful
- ▶ [200087353] Need insertion of SPS/PPS at IDR/I frame
- ▶ [1612520] Audio corruption occurs when playing video through some applications
- ▶ [200078535] Multi channel audio file playback with nvgstplayer-0.10 is unsuccessful
- ▶ [200078609] "Creation of video pipeline failed" message displays when stopping and resuming RTSP streams that include both audio and video
- ▶ [200077258] Corruption displayed during playback of video captured with a USB camera with MPEG4 encoder and MP4 container
- ▶ [200071832] Loop-forever functionality is not working in nvgstplayer-1.0
- ▶ [200062801] Audio corruption heard from long-duration MP3 RTSP streaming
- ▶ [200040752] Audio plays through HDMI when audio output device selected is Speakers (tegra-rt5639), after reboot
- ▶ [200025919] Need support for setting width, height and position of window in nvgstplayer
- ▶ [200003429] Multi-channel audio playback through audio receiver via HDMI is not properly rendered
- ▶ [1646878] omxh264dec plugin may cause decode pipeline deadlock
- ▶ [1645989J PEG Decoding to NVMM type yuv needed
- ▶ [1640447] Image rotation support needed
- ▶ [1628974] Memory leak in gstreamer pipeline
- ▶ [1628147] Auto MIPI calibration in V4L2 driver needed
- ▶ [1618581] Nvmap buffer leak occurs in nvgstreamer decode plugin
- ▶ [1611835] Need support for iframeinterval parameter in gst-omx plugin for gstreamer
- ▶ [1503770] USB headset not automatically listed as audio output device in sound settings
- ▶ [1458105] RTSP stream playback unsuccessful
- ▶ [1456080] nvvidconv-1.0 code cleanup and replacement for deprecated implementation

▶ [200077151] Fixed caps negotiation in case of nvmm to raw conversion for nvcamerasrc in gst-nvvidconv-1.0

▶ [200074271] Segmentation fault occurs when switching to video mode in Nvgstcapture-1.0

Camera

▶ [200111272] No discernable difference between preview and capture with AEROI selected

▶ [200081357] Capture with nvgstcapture-1.0 inside a sudo user created directory causes segmentation fault

▶ [200080744] No nvgstcapture option to select a specific USB camera when multiple USB camera devices are connected

▶ [200081334] Unable to stop image capture with user interrupt on first attempt

▶ [200080743] Corruption and grey areas occur in video and image preview and capture at 1280x720 resolution with USB HD camera

▶ [200074282] Running out of memory during 25000 image capture stress testing with nvgstcapture-1.0, USB camera, and hdmioverlaysink results in segmentation fault

▶ [1581879] Camera timeout occurs with suspend and resume when the lock screen is disabled

21.3, 26 FEB 2015

What's New In this Release

This release fixes some issues that were found during continued testing and adds/enhances the following feature(s).

▶ Implemented skip-frames and disable-dpb properties for gst-omx plugin. See *L4T Multimedia User Guide* for more information.

▶ Added encoding and scaling support in gst-nvvidconv-1.0. See *L4T Multimedia User Guide* for more information.

▶ Tegra watchdog support

▶ Enabled ramoops debugging support

▶ CSI_B/CSI_C support in Tegra V4L2/soc_camera driver

Top Issues Fixed Since Last Release

The following issues have been resolved in this release.

System

▶ [1506870] Unnecessary debug messages from NVAVP kernel code display

▶ [1549799] Improved flashing tools compatibility with additional eMMC devices where boot partition size differ from Jetson TK 1

- ▶ [1561360] Intermittent "azx_get_response" kernel warning displays during system testing
- ▶ [1582388] Intermittent "kernel_warning: "hda-intel azx_get_response timeout" warning displays during system testing
- ▶ [200015967] The error "gk20a gk20a.0: gk20a_fifo_handle_sched_error: fifo is waiting for ctx switch for 100 ms,ch = 3" may occur when running WebGL applications
- ▶ [200054390] Support RAM sizes for 4GB or greater in U-Boot
- ▶ [1551864] Updated pinmux for Jetson TK 1 devices
- ▶ [200046876] Resolved memory leak in gst-openmax
- ▶ [200067410] Resolved issues related to use of Tegra-profiler
- ▶ [200072946] Improved system stability during extended reboot stress testing
- ▶ [200020671, 200031813] Improved compatibility with HDMI TVs and resiliency for unsupported modes
- ▶ [1577947, 1435870] Improved stability of gk20a GPU driver
- ▶ [200048667] Removed debug messages when loading VIC firmware
- ▶ [200055546] Resolved gk20a stability issues regarding "gk20a_pmu_isr: pmu halt intr not implemented"
- ▶ [200016313] Resolved gk20a stability issues regarding "gk20a_pmu_enable_elpg(): possible elpg refcnt mismatch"
- ▶ [1557711] Enabled devsleep functionality only for mSATA connectors (disable devsleep on Jetson TK 1 SATA). This resolved issues on detection of certain SATA drives
- ▶ [1566598] Improved stability of Jetson TK1 on-board Ethernet

Camera

- ▶ [200074274] Resolved preview resolution switching with USB cameras in Nvgstcapture-1.0
- ▶ [200063275] Fixed issue with 1080p encoding in Nvgstcapture-0.10
- ▶ [200060263] Corrected preview resolution in Nvgstcapture-0.10
- ▶ [200062376] Changed default preview sink in Nvgstcapture-1.0
- ▶ [200049907] Resolved pauses during video recording specific to USB webcam in Nvgstcapture-0.10
- ▶ [200074237] Resolved cosmetic error messages when using USB cameras in Nvgstcapture-1.0

Multimedia

- ▶ [200053327] Resolved errors in continuous encoding and decoding in libjpeg-8b hardware acceleration
- ▶ [200067781] Fixed crash in port audio
- ▶ [200045113] Improved H.264 decode latency
- ▶ [1575862, 1576116] Resolved crash in H.264 decoder when video stream contains multiple segments with different resolutions.
- ▶ [200057071] Resolved infrequent error of "X Error of failed request: BadIDChoice" in Nvgstplayer

Power and Performance

▶ [200070160] 792 megahertz (Mhz) BCT needs to be updated has incorrect memory swizzle

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