TEGRA LINUX DRIVER PACKAGE (R15.BETA)

Release Notes

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1.0 ABOUT THIS RELEASE

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

- ▶ NVIDIA® Tegra® 3 series computer-on-a-chip
- ▶ NVIDIA® Tegra® 2 series computer-on-a-chip
- ▶ Linux kernel 3.1
- ▶ Git tag for the release: tegra-l4t-r15-beta

> 💬 **Note: This release of Tegra Linux Driver Package (R15.BETA) is a release for:**
>
> - **Tegra 2 devices code-named "Ventana"**
> - **Tegra 3 devices code-named "Cardhu"**
>
> **The NVIDIA binaries provided for Ventana devices may be able to support Tegra 2 devices code-named "Harmony". Please note however that Harmony support has been deprecated. The Harmony package is available in this release but is provided as-is and is not supported.**

1.1 WHAT'S NEW

This release fixes some issues that were found during continued testing and adds/enhances the following features.

- ▶ Preliminary U Boot support. For more information, see <u>U-Boot support is preliminary in this release</u> in the Implementation Notes section.
- ▶ The multimedia streaming and capture applications `nvgstplayer` and `nvgstcapture` are included in the release file instead of being provided as a separate downloadable package.
- ▶ The Tegra X Driver ABI 12 is supported.

▶ A version checking file has been included in `/etc/nv_tegra_release`. For more information, see "Determining the Success of a Driver Update" in *NVIDIA Tegra Linux Driver Package Developers' Guide*. [959325]

1.2 TOP ISSUES FIXED SINCE LAST RELEASE

The following issues are assumed to have been resolved in this release but are still being verified.

System

▶ [961258] VDD regulator errors observed during initialization
▶ [935225] Cardhu device reboots with thermal throttle
▶ [946328] Driver probes fail during boot on Cardhu
▶ [946330] Kernel chip initialization fails with "uninitialized object…" error on Cardhu
▶ [915638] Volume keys are not working on Cardhu and Ventana

I/O

▶ [932023] USB host/device mode functionality does not work after plug-in/plug-out of USB devices to USB-1 on Cardhu

Multimedia

▶ [931180] Display flickers or corruption occurs during nvgstplayer video playback on Ventana
▶ [893571] "Non-secure read" error message may display during multimedia playback on Cardhu
▶ [963995] System crash observed when changing resolution to 1080p in both Video and Still mode

Power and Performance

▶ [942490] Suspend/resume cycles leads to file system instability on Cardhu and Ventana
▶ [933291] Resume after Deep Sleep or Suspend does not succeed on Harmony
▶ [947673] Resume fails after Deep Sleep or Suspend with dock installed on Cardhu
▶ [941531] Intermittent warning message after Resume from Deep Sleep (LP0) on Cardhu

2.0 IMPLEMENTATION NOTES

This section provides additional implementation and support information specific to this release of the Tegra Linux Driver Package.

2.1 MUST SET EXECUTABLE BIT TO USE NVGSTPLAYER AND NVGSTCAPTURE APPLICATIONS

The executable bit must be turned on before the `nvgstplayer` and `nvgstcapture` applications can be invoked. [963378]

> 💬 Note: The commands below must be run on the booted target board. If you try to execute them on the host machine, for example, they will not do anything since the nvgst applications will not be in **/usr/bin/** on the host.

Execute the following commands to do so:

```
$ sudo chmod +x /usr/bin/nvgstplayer
$ sudo chmod +x /usr/bin/nvgstcapture
```

2.2 U-BOOT SUPPORT IS PRELIMINARY IN THIS RELEASE

Support for U-Boot is preliminary in this R15 beta release. U-Boot boot loader booting is currently only working on Cardhu. The `u-boot.bin` boot loader is provided for Cardhu, Ventana, and Harmony but, because of known kernel failures, Ventana and Harmony do not boot using `u-boot.bin`.

2.3 VENTANA AND HARMONY RELEASES DO NOT HAVE APPROPRIATE .HUSH SCRIPTS

The Ventana and Harmony releases are missing the appropriate .hush script files. They are incorrectly named `cardhu_emmc.hush` and `cardhu_net.hush` in all releases. [918980]

2.4 IDLE SCREEN BLANKS OUT EVEN WHEN AN APPLICATION IS RUNNING

Linux kernel 3.1 adds a power saving feature that blanks an idle system display, even when an application is running. The feature is called console blank (screen saver). For information on preventing the screen from blanking, see "FAQs" in the *Tegra Linux Driver Package Developers' Guide*.

2.5 MUST SYNC TO THE CORRECT TAG TO USE THE KERNEL_SYNC.SH AND UBOOT_SYNC.SH SCRIPTS

In the release, the supplied kernel_sync.sh and uboot_sync.sh scripts need to be provided a tag name to sync to the sources that were used to create the kernel `zImage` and `u-boot.bin` binary files that are included in the release. To sync to the correct sources that the sample provided kernel and u-boot binaries were built from, use the `tegra-l4t-r15-beta` tag.

▶ Execute the above mentioned scripts and use the following tag when prompted :

```
tegra-l4t-r15-beta
```

2.6 FILE SYSTEM BECOMES READ-ONLY ON RESUME IF SD CARD IS IN CARD READER DEVICE

If the device resumes from suspend (LP1) while an SD card is in a connected card reader device, the file system is mounted as read-only resulting in a card reader read/write error and a system reboot is required. The workaround is to install the `udisks` utility (Debian package name `udisks_1.0.2-4ubuntu_armel.deb`). [869780]

2.7 SD CARD NOT DETECTED IF CARD READER IS PLUGGED IN WITHOUT SD CARD ALREADY INSERTED

If the user connects the card reader to the device before inserting the SD card into the card reader, the SD card is not detected. The SD card and card reader must be connected to the device simultaneously. The workaround is to install the udisks utility (Debian package name `udisks_1.0.2-4ubuntu_armel.deb`). [869780]

2.8 ENABLING POWER SAVING FEATURES REQUIRES CONFIGURATION COMMANDS

To enable the hotplug driver and the LP2 power state for power savings on the target board, you must use specific configuration commands. Previously, these features were automatically enabled. For more information, see "Setting Power Saving Options" in *NVIDIA Tegra Linux Driver Package Developers' Guide*.

2.9 INTERNAL MEMORY PARTITION SIZE FOR ROOTFS SET TO 1 GB BUT CAN BE CHANGED

The 1 GB reserved in internal memory for the `rootfs` partition is insufficient if additional packages are installed. The installation of ubuntu-desktop, gst, and other gnome plug-ins are some examples of packages that may require additional space. The "-S <size-in-bytes>" argument to `flash.sh` can be used to change the partition size. [918265].

The suggested rootfs partition size for Ventana and Cardhu is 1073741824 bytes and is specified by default in the `flash.sh` script.

To flash for a larger partition

▶ Execute the following command:

```
$ sudo ./flash <tegra_device> -S <size-in-bytes> <boot device>
```

Where:

- <tegra_device> is either `cardhu` or `ventana`
- <boot_device> is the rootfs partition's internal memory, for example `mmcblk0p1`.

2.10 INSTALLING UBUNTU-DESKTOP

The default sample file-system that is provided with the release was created with minimal packages pre-installed. For more information on which packages are present, see "Setting Up Your File System" in *NVIDIA Tegra Linux Driver Package Developers' Guide*. Please note the possible space constraints with the default partition size specified in the flash.sh that is referenced in this document. To install the full ubuntu desktop, first follow the instructions from "Installing Additional packages" in the Developers' Guide. Then:

▶ Execute the following command:

```
$ sudo apt-get install ubuntu-desktop
```

> 💬 Note: For the default username and password, see "About the Root File System" in the Developers' Guide.

2.11 INSTALLING ADDITIONAL NVIDIA BINARY PACKAGES

Note that additional NVIDIA packages may be posted alongside the release that may include the codec files, sample test applications, and possibly other packages. To make full use of the features in the release, and mentioned across this document and the developers' guide, these additional packages must be installed. [941404]

3.0 KNOWN ISSUES

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

3.1 SYSTEM

The following system-related issues were noted in this release.

3.1.1 [965154] I2C device registration fails on Ventana

Attempting to register an I2C device does not succeed on Ventana.

To reproduce

1. Flash and boot the device.
2. Execute the following command to display the system log:

```
$ dmesg | grep -i fail
```

The following error message will display:

```
[1.735518] i2c i2c-4: Failed to register i2c client akm8975 at 0x0c (-16)
[1.742421] i2c i2c-4: Can't create device at 0x0c
```

3.1.2 [954564] Cardhu cannot resume after USB device is changed during LP1

Changing the USB device while Cardhu is in the OS Suspend state (LP1) does not succeed on Cardhu.

To reproduce

1. Flash and boot the device.
2. Bring up the X server by executing the following commands:

```
# export DISPLAY=:0.0
# xinit &
```

3. Connect a USB keyboard.
4. Execute the following commands to enter LP1:

```
$ echo lp1 > /sys/power/suspend/mode
$ echo mem > /sys/power/state
```

5. Disconnect the USB keyboard and connect a USB flash drive.
6. Resume the device.

3.1.3 [937902] Kernel command line parameter should make serial console the default console

The current L4t kernel command line specifies `console=tty1` after `console=ttyS0`, which establishes `tty1` as the default console for user space logs. The default console should be the serial console `ttyS0`. Therefore, when multiple consoles are enabled, the last kernel command line "`console=`" parameter should be `console=ttyS0`.

3.1.4 [961259] VDD voltage regulator initialization error on Ventana

A VDD voltage regulator error occurs when the camera focuser is called on Ventana. The following error message appears in the boot logs:

```
sh532u_pm_regulator_get err for regulator
```

The error message is expected because `sh532u` is the camera focuser and it does not use a separate VDD regulator with Ventana.

3.1.5 [946922] Voltage regulator configuration does not succeed on Ventana

Voltage regulator configuration intermittently fails on Ventana. The following error message occurs:

```
reg-fixed-voltage reg-fixed-voltage.1: Could not configure regulator
enable GPIO 235 direction: -121
```

The configuration of a fixed register voltage regulator fails during sanity testing on Ventana. The device must be rebooted to recover. Regulator failure can lead to hardware damage. This issue reproduces with all boot methods: mmcblk0p1, mmcblk1p1, sda1, and nfs mount.

3.1.6 [932086] Second modprobe of a Wi-Fi module does not succeed

The second modprobe of a valid kernel module fails with the message "FATAL: Error inserting bcm4329 (/lib/modules/3.1.10/kernel/drivers/net/wireless/bcm4329/bcm4329.ko): Invalid argument".

To reproduce

▶ Execute the following commands:

```
# modprobe bcm4329
# modprobe bcm4329 -r
# modprobe bcm4329
```

3.2 BOOT LOADER/BDK

The following boot loader-related issues were noted in this release.

3.2.1 [959318] U-Boot debug messages about warnings/errors from GPT and bootm are expected on Cardhu

U-Boot debug error messages and warnings regarding the GUID Partition Table (GPT) and bootm are expected and can be ignored. U-Boot functions fine on this device.

1. Extract the L4T package.
2. Execute the following flash.sh command:

```
$ sudo ./flash.sh -L bootloader/cardhu/u-boot.bin cardhu mmcblk0p1
```

3. Boot off the internal MMC.

   Error and warning messages like the following will appear:

```
** Block device usb 0 not supported
Wrong Image Format for bootm command
ERROR: can't get kernel image!
```

3.2.2 [930663] I2C bus errors observed during and after boot

Many Inter IC (I2C) bus errors are consistently observed both during, and after, the device boots.

To reproduce

4. Flash and boot the device.
5. Execute the following command to display the system log:

```
$ dmesg | grep -i fail
```

The following error messages will display:

```
[0.482662] i2c-core: driver [max8907c] using legacy suspend method
[0.482672] i2c-core: driver [max8907c] using legacy resume method
[2.854827] tegra-i2c tegra-i2c.4: I2c error status 0x0000000a
[2.860653] tegra-i2c tegra-i2c.4: no acknowledge from address 0x69
```

3.3 DISPLAY

The following display-related issues were noted in this release.

3.3.1 [959676] Tegra user space graphics driver lists more video modes than are supported

The Tegra user space graphics driver, which runs in the Xserver process context, displays some video modes which are not supported by the HDMI driver. This may cause display distortion when a non-supported mode is applied at runtime.

3.3.2 [946409] DVI display is corrupted on Cardhu and Ventana

Corruption occurs when using HDMI-to-DVI converter. Black and white lines appear.

To reproduce

1. Flash the Cardhu device.
2. Connect the DVI monitor using the HDMI-DVI connector.
3. Start X windows.

3.4 MULTIMEDIA

The following multimedia-related issues were noted in this release.

3.4.1 [966041] nvgstcapture does not run successfully when flashed with U-Boot on Cardhu

The `nvgstcapture` application crashes with a NULL pointer when the device is flashed with U-Boot. The problem does not occur if the device is flashed using `fastboot.bin`.

To reproduce

1. Flash the device using U-boot.
2. Start the `nvgstcapture` application.

3.4.2 [955196] Corruption observed with nvgstplayer on Ventana

Corruption due to overlapping buffers has been observed when the `nvgstplayer` is used with the Native Platform Graphics Interface (EGL). The issue is only reproducible with EGL, not with overlays.

3.5 POWER AND PERFORMANCE

The following power and performance-related issues were noted in this release.

3.5.1 [964626] Display corruption observed when device enters and resumes from LP0 on Ventana

Display corruption (white horizontal lines) and glitches are observed when the device resumes from the Deep Sleep (LP0) state.

To reproduce

1. Flash and boot the device.
2. Check the LP state of the device by executing the following command:

```
$ cat /sys/power/suspend/mode
```

If it shows LP0, run Step 3.

3. Put the device into LP0 mode by executing the following command:

```
$ echo mem > /sys/power/state
```

4. Press the Power key to resume the device.

3.5.2 [964400] Audio corruption heard when WAV file is played after device resumes from LP0

A cracking sound is heard when any audio file, including MP4 , is played after the device resumes from Deep Sleep (LP0). The audio plays without problem if played when the device has not entered LP0 or before it first enters LP0.

To reproduce

1. Flash and boot the device.
2. Execute the following commands to enter LP0:

```
$ echo lp0 > /sys/power/suspend/mode
$ echo mem > /sys/power/state
```

3. After the device resumes, play a WAV file by executing the following commands:

```
$ amixer cset numid=45 1
$ aplay <some_wav_file>
```

where <some_wav_file > is the filename of the WAV file you want to play.

3.5.3 [961907] Harmony is unable to enter LP0

Attempts to put the Harmony device into Deep Sleep (LP0) do not succeed. Instead, the device turns off for 1 second and then displays a "Write error: device or resource busy" message on the X terminal.

To reproduce

1. Flash and boot the device.
2. Bring up the X server by executing the following commands:

```
$ export DISPLAY=:0.0
$ xinit &
```

3. Execute the following command to enter LP0:

```
$ echo mem > /sys/power/state
```

4.0 ABOUT EARLIER RELEASES

12 MAR 2012

What's New in Linux Driver Package R15.ALPHA

This release fixes some issues that were found during continued testing and adds/enhances the following features:

▶ Linux kernel 3.1
▶ Camera support + capture application

TOP ISSUES FIXED SINCE LAST RELEASE

The following issues are assumed to have been resolved in this release but are still being verified.

System

▶ [931120] Race condition prevents kernel boot completion on Cardhu

17 FEB 2012

What's New in Linux Driver Package R15.ER2

This release fixes some issues that were found during continued testing and adds/enhances the following features:

▶ Camera capture application (nvgstcapture) provided.

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