



NVIDIA JETSON LINUX

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Subject to Change

34.1 Developer Preview Release Notes



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1.0 About This Release

The NVIDIA® Jetson™ Linux 34.1 release supports development with NVIDIA® Jetson AGX Orin™, NVIDIA® Jetson Xavier™ NX, and NVIDIA® Jetson AGX Xavier™ developer kits and modules. This is a Developer Preview (DP) release, and should NOT be used for production purposes.

Platform and Release Information

Description	Supported version
Host machine Linux distribution for flashing software onto Jetson devices	Ubuntu x64 18.04 or 20.04 (x64 distribution)
Sample rootfs derived from Ubuntu operating system to run on Jetson devices	Ubuntu 20.04
Supported Linux kernel version	5.10 LTS
Supported ARM architecture	aarch64
<p>Name of the configuration file used in flashing.</p> <p>Note: When you flash a configuration file with <code>flash.sh</code>, specify the configuration's basename, i.e. the file name without the <code>.conf</code> suffix.</p> <p><i>For a complete description of supported platforms and configuration names, see the table "Jetson Modules and Configurations" in the section Environment Variables of NVIDIA Jetson Linux Developer Guide.</i></p>	<p><code>jetson-agx-orin-devkit.conf</code>: Flashes a Jetson AGX Orin module (P3701-0000) attached to a Jetson AGX Orin Developer Kit (P3730-0000) reference carrier board (P3737-0000).</p> <p><code>jetson-agx-orin-devkit-as-nx-16gb.conf</code>: Flashes a configuration that emulates a Jetson Orin NX 16GB module on a Jetson AGX Orin module (P3701-0000) attached to a Jetson AGX Orin Developer Kit (P3730-0000) reference carrier board (P3737-0000).</p> <p><code>jetson-agx-orin-devkit-as-nx-8gb.conf</code>: Flashes a configuration that emulates a Jetson Orin NX 8GB module on a Jetson AGX Orin module (P3701-0000) attached to a Jetson AGX Orin Developer Kit (P3730-0000) reference carrier board (P3737-0000).</p> <p><code>jetson-agx-orin-devkit-as-jao-40w.conf</code>: Flashes a configuration that emulates a Jetson Orin NX 32GB module on a Jetson AGX Orin module (P3701-0000)</p>

Description	Supported version
	<p>attached to a Jetson AGX Orin Developer Kit (P3730-0000) reference carrier board (P3737-0000).</p> <p><code>jetson-agx-xavier-devkit.conf</code>: Flashes a Jetson AGX Xavier module attached to a Jetson AGX Xavier Developer Kit reference carrier board.</p> <p><code>jetson-xavier-nx-devkit.conf</code>: Flashes QSPI-NOR and microSD card for Jetson Xavier NX (P3668-0000).</p> <p><code>jetson-xavier-nx-devkit-emmc.conf</code>: Flashes QSPI-NOR and eMMC for Jetson Xavier NX (P3668-0001).</p>
Board names, module names, and revision numbers	See the Jetson FAQ for a detailed list of Jetson device information.
Toolchain for cross-compilation	Bootlin GCC 9.3
Release source tag	jetson-r34.1.0

1.1 Log-In Credentials

Follow the system prompts at first boot to create your own log-in credentials.

1.2 What's New

- ▶ Support for Jetson AGX Orin Developer Kit
- ▶ Emulation support to emulate performance of Jetson Orin NX modules on Jetson AGX Orin Developer Kit
- ▶ Linux LTS Kernel 5.10
- ▶ Ubuntu 20.04 based reference file system
- ▶ OP-TEE Trusted Execution Environment
- ▶ UEFI Bootloader
- ▶ Support for NvSci: Provides utilities for streaming data packets between different applications and for inter process communication (IPC)
- ▶ New Jetson Power GUI: A tool for monitoring the power and thermal status of Jetson devices

1.3 What's Not Supported

This Developer Preview release of Jetson Linux does not support the following features. The next General Access release is expected to support these features.

- ▶ The Jetson AGX Xavier Industrial module

- ▶ Secure Boot and disk encryption
- ▶ OP-TEE on Jetson Xavier NX and Jetson AGX Xavier series (Jetson AGX Orin supports it)
- ▶ Jetson Xavier NX SD card updating the Xavier NX SPI components
- ▶ Flashing an SD card image for a Jetson Xavier NX Developer Kit out of the box (you can flash an SD card image after you have flashed the developer kit with SDK Manager)
- ▶ Image-based over-the-air updates tools
- ▶ Rootfs A/B

2.0 Known Issues

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

2.1 General System Usability

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

Issue	Description
3553875	Jetson AGX Xavier Industrial is not supported.
3591557	Jetson Xavier NX: SD card image only works with Jetpack 5.0 Developer Preview bootloader.
3580585	Jetson AGX Xavier: System crash when OP-TEE is in use: "Application nvhwkey-app has stopped unexpectedly."
3437699	Jetson Xavier NX: ThunderStrike BT controller events are not reflected in the <code>gstest-gtk</code> application.
3445976	Jetson Xavier NX: WiFi attachment points are not listed after headless installation with default <code>oem-config</code> options.
3490932	Jetson Xavier NX: USB keyboard activity fails to wake up a suspended device.
3490932 3515496	SC7 mode is not supported. Trying to enter SC7 may cause the system to crash or hang. Pressing keys on a USB keyboard fails to wake up device from suspend mode.
3499398	GPIO configuration utility does not work as expected in Linux 5.10 kernel included in Jetpack 5.0 DP release.
3505292	Jetson AGX Orin: Jetson device's USB ID may disappear when device is connected to an X86 host system. Use this script to reset the x86 host USB driver: <pre>#!/bin/bash shopt -s nullglob</pre>

	<pre> if [[\$EUID != 0]] ; then echo This must be run as root! exit 1 fi for xhci in /sys/bus/pci/drivers/?hci_hcd ; do if ! cd \$xhci ; then echo Weird error. Failed to change directory to \$xhci exit 1 fi echo Resetting devices from \$xhci... for i in ?????:?:??.? ; do echo -n "\$i" > unbind echo -n "\$i" > bind done done sleep 10 </pre>
3505292	Jetson AGX Orin: Operations that change the USB device's mode state cause the host's USB driver to crash and lose its connection.
3530928	Jetson AGX Orin: Changing power mode from desktop settings leads to kernel panic.
3536029	Jetson Xavier NX: When Linux is booted from an SD card, it does not recognize any commands entered after resume from SC7 state.
3573905	Monitors with a DP++ interface are not supported in this release.
3586140	Jetson AGX Orin: Shutdown doesnot trigger systemd shutdown on the target.
3591721	Jetson AGX Orin: NVIDIA logo displayed during shutdown is corrupted.

2.2 Bootloader

The following Bootloader related issues are noted in this release.

Issue	Description
3558324	Jetson AGX Orin: Reboot hangs after /dev/mtdblock0 is installed.
3562045	Jetson Xavier NX and Jetson AGX Xavier: No display during bootup. Display shows nothing until bootup is complete and desktop appears.
3581719	Jetson AGX Orin: Execution during reboot after DRM test.

200751862	Jetson AGX Orin: SoC has two SBSA-UART instances, intended for debug console access. Their UART clocks and resets must be configured in the Bootloader BPMP before the UEFI driver is loaded.
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2.3 Camera

The following camera related issues are noted in this release.

Issue	Description
3570293	<p>Jetson Xavier NX: <code>Jetson-IO</code> may fail to configure the IMX477 sensor.</p> <p>Workaround: To enable the IMX477 camera, remove the IMX219 camera's DTSI file from the main DTS file of the carrier board and enable the IMX477 camera's device tree nodes.</p> <p>See</p>
3578263	<p>Images and videos captured with certain cameras (specifically IMX185) may have pinkish color artifacts. The severity of these artifacts depends on the lighting conditions in the image capture environment,</p> <p>The IMX274 camera does not exhibit this issue.</p>
3586900	<p>Jetson AGX Xavier: When using the camera sensor on early boards (board ID lower than 2822-0000-500), the reset-GPIO pin <code>TEGRA_MAIN_GPIO(H, 3)</code> may not work, causing the corresponding sensor to fail probe and streaming.</p> <p>Board IDs 2822-0000-500 and above do not have this problem. To check your device's board ID, enter <code>cat /proc/device-tree/chosen/ids</code>.</p> <p>Workaround: Update the device-tree nodes for the sensor by replacing the original GPIO pin with <code>TEGRA_MAIN_GPIO(H, 4)</code>. For an example, see the DTB overlay for dual-imx274 sensor: <code>tegra194-p2822-camera-dual-imx274-overlay.dts</code>.</p>
3588692	<p>Jetson AGX Orin: with <code>argus_camera</code> image and video capture test running in loop, system issues the message:</p> <p>Warning: <code>/lib/aarch64-linux-gnu/libgomp.so.1: cannot allocate memory in static TLS block with camera preview/capture tests</code>.</p>
3589917	Jetson AGX Xavier: Failed to detect IMX390[GMSL] through Jetson-IO tool.
3590333	<p>Jetson AGX Orin: with <code>argus_camera</code> image and video capture test running in loop, system issues the message:</p> <p>Failed to create capture session in <code>argus_camera</code> multisession mode</p>
3503382	Jetson AGX Xavier: IMX318 camera fails streaming.

2.4 Flashing

The following flashing related issues are noted in this release.

Issue	Description
3580125	Jetson AGX Orin: Error "Network autoconfiguration failed" when <code>eth0</code> is selected in a headless <code>oem-config</code> flow.

2.5 Multimedia

The following multimedia related issues are noted in this release.

Issue	Description
200696138	The <code>gst-nvcompositor</code> plugin for Accelerated GStreamer is not currently supported. The next General Access release is expected to support this feature.

2.6 TensorRT

The following TensorRT related issues are noted in this release.

Issue	Description
3532087	Deep Learning Accelerator (DLA): <code>trtexec</code> uses only <code>dla0</code> in inference time.

3.0 Implementation Details

3.1 Camera

Because UEFI boot is enabled in this release, Camera Auto Detection will not work if EEPROM ID is not configured for any camera sensor.

3.1.1 Device Registration

When you have finished driver development, you must add the new device's information to the system kernel device tree so it can be registered (instantiated) when the kernel boots. The following sections describe ways of registering a new device.

Prerequisites

You have obtained the kernel source files.

3.1.2 Device Tree Overlay

Because UEFI boot is enabled in this release, the plugin manager is no longer supported. You must create a device tree overlay (DTB overlay, or `.dtbo`) file to register the camera module.

If your camera module has on-board EEPROM and is programmed with a valid camera ID, you can use the device tree overlay file at to apply the overlay for a specific camera module and update the device tree entries with proper information at run time. Using a device tree overlay with an EEPROM ID allows a single system image to support multiple camera devices. To select a different camera, power down the device, replace the camera module, and then reboot. The new module works automatically.

To create and apply a device tree overlay file

1. Add the `.dtsi` file to the camera configuration `.dtsi` file.
2. Set the status of your device tree nodes to "disabled":

```
imx185_cam0: imx185_a01a {
    status = "disabled";
};
```

3. Add the overlay information as fragments below to a new `.dts` file like this:

```
<top>/hardware/nvidia/platform/t19x/common/kernel-dts/t19x-common-
modules/tegra194-camera-overlay-file.dts
```

You can also see the camera DTB overlay files provided with current release for examples.

4. Update the `.dts` file with proper overlay information and a compatible string:

```
/ {
    overlay-name = "Jetson Camera Dual-IMX274";
    jetson-header-name = "Jetson AGX Xavier CSI Connector";
    compatible = "nvidia,p2822-0000+p2888-0001";

    fragment@0 {
        target= "<imx185_cam0>";
        board_config {
            ids = "LPRD-dual-imx274-002" ;
            sw-modules = "kernel";
        };
        __overlay__ {
            status = "okay";
        };
        fragment@1 {
            . . .
        };
    };
};
```

5. Compile the `.dts` file to generate a `.dtbo` file. Move the `.dtbo` file to `flash_folder/kernel/dtb/` before flashing.
6. Add this line to the `<board>.conf` file, which is used for flashing the device:

```
OVERLAY_DTB_FILE="${OVERLAY_DTB_FILE},tegra194-camera-overlay-file.dtbo";
```

This line causes the following steps to be performed:

- If a specific camera board is found when the kernel boots, the override data is applied to that camera board's tree nodes.
- The tree nodes are made available for the system to use.

3.1.3 Using the Jetson-IO Tool

If your camera module does not have an on-board EEPROM, you can use same DTB overlay file to configure the board statically for the attached camera. When you attach the camera module, apply the camera module's DTB overlay using the Jetson-IO tool, then reboot. The new module works as soon as Jetson Linux starts.

For Jetson AGX Orin only, you must update the the file `Headers/csi-agx.py` before you start the Jetson-IO tool:

1. Go to the directory `/opt/nvidia/jetson-io/Headers`.
2. Open `csi-agx.py`.
3. Change Xavier to Orin.
4. Save and close the file.

Note: You may have to delete the `board_config{}` node from the fragments in DTB overlay file.

After you compile the `.dts` file to generate a `.dtbo` file, move the `.dtbo` file to `/boot` on the Jetson device, so that the Jetson-IO tool can recognize it. Launch the Jetson-IO tool and configure the DTB overlay.

3.1.4 jetson-io Does Not Recognize IMX477 Camera

On Jetson Xavier NX, Jetson-IO may fail to configure the IMX477 sensor. This failure is reported as [Known Issue 3570293](#).

To work around this issue and enable the IMX477 camera, remove the IMX219 camera's DTSI file from the main DTS file of the carrier board and enable the IMX477 camera's device tree nodes.

The following change is provided for reference.

```
diff --git a/common/tegra194-p3509-0000-a00.dtsi b/common/tegra194-p3509-0000-a00.dtsi
index 6f411e3..10cd7bf 100644
--- a/common/tegra194-p3509-0000-a00.dtsi
+++ b/common/tegra194-p3509-0000-a00.dtsi
@@ -17,7 +17,6 @@
    #include "tegra194-audio-p3668.dtsi"
    #include "tegra194-super-module-e2614-p3509.dtsi"
    #include "tegra194-camera-jakku-rbpcv3-imx477.dtsi"
-   #include "tegra194-camera-jakku-rbpcv2-imx219.dtsi"
  / {
      gpio-keys {
          compatible = "gpio-keys";
```

```
diff --git a/common/tegra194-camera-jakku-rbpcv3-imx477.dtsi
b/common/tegra194-camera-jakku-rbpcv3-imx477.dtsi
index 2cc928e..ffa3165 100644
--- a/common/tegra194-camera-jakku-rbpcv3-imx477.dtsi
+++ b/common/tegra194-camera-jakku-rbpcv3-imx477.dtsi
@@ -33,7 +33,7 @@
        #address-cells = <1>;
        #size-cells = <0>;
        rbpcv3_imx477_a@1a {
-       status = "disabled";
+       status = "okay";
        reset-gpios = <&tegra_main_gpio CAM0_PWDN
GPIO_ACTIVE_HIGH>;
        };
@@ -42,7 +42,7 @@
        #address-cells = <1>;
        #size-cells = <0>;
        rbpcv3_imx477_c@1a {
-       status = "disabled";
+       status = "okay";
        reset-gpios = <&tegra_main_gpio CAM1_PWDN
GPIO_ACTIVE_HIGH>;
        };
};
```

3.1.5 Important Note

The following camera related issues are noted in this release.

Because UEFI boot is enabled in this release, the camera plugin manager is no longer supported. For the present, IMX274 Dual is the default camera for Jetson AGX Orin Developer Kit.

To change the default camera type on Jetson AGX Orin Developer Kit

1. Update the parent DTS file with the relevant camera DTSL.

For example, to enable an IMX185, modify this file:

```
hardware/nvidia/platform/t23x/concord-dts/ tegra234-p3701-0000-p3737-
0000.dts
```

2. Make the change described by the following patch (the changed line is highlighted):

```
diff --git a/tegra234-p3701-0000-p3737-0000.dts b/tegra234-p3701-0000-
p3737-0000.dts
index belf6bc..4b79476 100644
--- a/tegra234-p3701-0000-p3737-0000.dts
+++ b/tegra234-p3701-0000-p3737-0000.dts
```

```

@@ -19,7 +19,7 @@
#include "tegra234-power-tree-p3701-0000-p3737-0000.dtsi"
#include "tegra234-dcb-p3701-0000-a02-p3737-0000-a01.dtsi"
#include <tegra234-soc/mods-simple-bus.dtsi>
-#include "cvb/tegra234-p3737-0000-camera-imx274-dual.dtsi"
+#include "cvb/tegra234-p3737-0000-camera-imx185-a00.dtsi"
#include <t234-common-cvm/tegra234-thermal.dtsi>
#include <t234-common-cvm/tegra234-thermal-cooling.dtsi>
#include <tegra234-soc/tegra234-cpuidle.dtsi>

```

3. The DTB is recompiled with the changes and then flashed on the jetson device.

3.2 Multimedia

Buffer management and buffer transform related API based on `nvbuf_utils`, defined in `nvbuf_utils.h`, are deprecated in this release. From Jetson Linux release 34.0.1 EA forward, NVIDIA recommends using the new API based on `nvutils`, defined in `nvbufsurface.h` and `nvbufsurfttransform.h`.

See the *`nvbuf_utils` to `NvUtils` Migration Guide* for information to facilitate your migration to the new API.

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