NVIDIA JETSON LINUX

RN_10698-003 | May 19, 2022
Subject to Change

34.1 Developer Preview Release Notes
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1.0 About This Release

The NVIDIA® Jetson™ Linux 34.1.1 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

<table>
<thead>
<tr>
<th>Description</th>
<th>Supported version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Host machine Linux distribution for flashing software onto Jetson devices</td>
<td>Ubuntu x64 18.04 or 20.04 (x64 distribution)</td>
</tr>
<tr>
<td>Sample rootfs derived from Ubuntu operating system to run on Jetson devices</td>
<td>Ubuntu 20.04</td>
</tr>
<tr>
<td>Supported Linux kernel version</td>
<td>5.10 LTS</td>
</tr>
<tr>
<td>Supported ARM architecture</td>
<td>aarch64</td>
</tr>
</tbody>
</table>

Name of the configuration file used in flashing.

Note: When you flash a configuration file with flash.sh, specify the configuration's basename, i.e. the file name without the .conf suffix.

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.

<table>
<thead>
<tr>
<th>Configuration File Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>jetson-agx-orin-devkit.conf</td>
<td>Flashes a Jetson AGX Orin module (P3701-0000) attached to a Jetson AGX Orin Developer Kit (P3730-0000) reference carrier board (P3737-0000).</td>
</tr>
<tr>
<td>jetson-agx-orin-devkit-as-nx-16gb.conf</td>
<td>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).</td>
</tr>
<tr>
<td>jetson-agx-orin-devkit-as-nx-8gb.conf</td>
<td>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).</td>
</tr>
<tr>
<td>jetson-agx-orin-devkit-as-jao-40w.conf</td>
<td>Flashes a configuration that emulates a Jetson AGX Orin 32GB module on a Jetson AGX Orin module (P3701-0000) attached to a Jetson AGX Orin Developer Kit (P3730-0000) reference carrier board (P3737-0000).</td>
</tr>
<tr>
<td>Description</td>
<td>Supported version</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>0000) attached to a Jetson AGX Orin Developer Kit (P3730-0000) reference carrier board (P3737-0000).</td>
<td>jetson-agx-xavier-devkit.conf: Flashes a Jetson AGX Xavier module attached to a Jetson AGX Xavier Developer Kit reference carrier board.</td>
</tr>
<tr>
<td></td>
<td>jetson-xavier-nx-devkit.conf: Flashes QSPI-NOR and microSD card for Jetson Xavier NX (P3668-0000).</td>
</tr>
<tr>
<td>Board names, module names, and revision numbers</td>
<td>See the Jetson FAQ for a detailed list of Jetson device information.</td>
</tr>
<tr>
<td>Toolchain for cross-compilation</td>
<td>Bootlin GCC 9.3</td>
</tr>
<tr>
<td>Release source tag</td>
<td>jetson-r34.1.1</td>
</tr>
</tbody>
</table>

1.1 Log-In Credentials

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

1.2 What’s New

34.1.1 is a minor update for 34.1 developer preview release.

- Support for Deepstream 6.1.
- Support for HDMI to active or passive DP adapter for Jetson AGX Orin.

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 AGX Orin (Jetson Xavier NX and Jetson AGX Xavier series support 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.

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

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.

3586140 Jetson AGX Orin: Shutdown does not trigger systemd shutdown on the target.

3591721 Jetson AGX Orin: NVIDIA logo displayed during shutdown is corrupted.

### 2.2 Flashing

The following flashing related issues are noted in this release.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3580125</td>
<td>Jetson AGX Orin: Error &quot;Network autoconfiguration failed&quot; when eth0 is selected in a headless oem-config flow.</td>
</tr>
<tr>
<td>3586898</td>
<td>For development work with a Jetson Xavier NX production module and Jetson Linux 34.1.1 Developer Preview release, NVIDIA recommends that you flash to an SD card instead of eMMC.</td>
</tr>
</tbody>
</table>

To flash an SD card for this module, use the following command:

```
$ NO_ROOTFS=0 sudo ./tools/kernel_flash/l4t_initrd_flash.sh --external-device mmcblk1p1-c tools/kernel_flash/flash_l4t_external.xml --showlogs --network usb0 jetson-xavier-nx-devkit-qspi internal
```
3601114 Minimum SD card size recommended for flashing to an SD card for Jetson Xavier NX Developer Kit is 64 GB.

2.3 Bootloader

The following Bootloader related issues are noted in this release.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3558324</td>
<td>Jetson AGX Orin: Reboot hangs after /dev/mtdblock0 is installed.</td>
</tr>
<tr>
<td>3562045</td>
<td>Jetson Xavier NX and Jetson AGX Xavier: No display during bootup. Display shows nothing until bootup is complete and desktop appears.</td>
</tr>
<tr>
<td>3581719</td>
<td>Jetson AGX Orin: Execution during reboot after DRM test.</td>
</tr>
<tr>
<td>200751862</td>
<td>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.</td>
</tr>
</tbody>
</table>

2.4 Camera

The following camera related issues are noted in this release.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3570293</td>
<td>Jetson Xavier NX: Jetson-IO may fail to configure the IMX477 sensor. 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. See</td>
</tr>
<tr>
<td>3578263</td>
<td>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, The IMX274 camera does not exhibit this issue.</td>
</tr>
<tr>
<td>3586900</td>
<td>Jetson AGX Xavier: When using the camera sensor on early boards (board ID lower than 2822-0000-500), the reset-GPIO pin TEGRA_MAIN_GPIO(H, 3) may not work, causing the corresponding sensor to fail probe and streaming. Board IDs 2822-0000-500 and above do not have this problem. To check your device’s board ID, enter cat /proc/device-tree/chosen/ids. Workaround: Update the device-tree nodes for the sensor by replacing the original GPIO pin with TEGRA_MAIN_GPIO(H, 4). For an example, see the DTB overlay for dual-imx274 sensor: tegra194-p2822-camera-dual-imx274-overlay.dts.</td>
</tr>
</tbody>
</table>
3.588692  Jetson AGX Orin: with argus_camera image and video capture test running in loop, system issues the message:
   Warning: /lib/aarch64-linux-gnu/libgomp.so.1: cannot allocate memory in static TLS block with camera preview/capture tests.


3.590333  Jetson AGX Orin: with argus_camera image and video capture test running in loop, system issues the message:
   Failed to create capture session in argus_camera multisession mode

3.503382  Jetson AGX Xavier: IMX318 camera fails streaming.

2.5 Multimedia

The following multimedia related issues are noted in this release.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>200696138</td>
<td>The \texttt{gst-nvcompositor} plugin for Accelerated GStreamer is not currently supported. The next General Access release is expected to support this feature.</td>
</tr>
</tbody>
</table>

2.6 TensorRT

The following TensorRT related issues are noted in this release.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3532087</td>
<td>Deep Learning Accelerator (DLA): \texttt{trtexec} uses only \texttt{dla0} in inference time.</td>
</tr>
</tbody>
</table>

2.7 Display

The following TensorRT related issues are noted in this release.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
</table>
### 3.0 Fixed Issues

This section provides details about the issues that were resolved in this release.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3603552</td>
<td>Flashing a custom carrier board with Jetson Xavier modules fails.</td>
</tr>
<tr>
<td>3605453</td>
<td>Flashing Jetson Orin Developer Kit with custom carrier board with no EEPROM fails.</td>
</tr>
<tr>
<td>3573905</td>
<td>Monitors with a DP++ interface are not supported.</td>
</tr>
<tr>
<td>3623353</td>
<td>Flashing Jetson Xavier NX 16GB fails on Jetpack 5.0</td>
</tr>
</tbody>
</table>
4.0 Implementation Details

4.1 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.

4.1.1 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.

4.1.2 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":

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

3. Add the overlay information as fragments below to a new .dts file.

```plaintext
<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:

```plaintext
/ {
    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:

```plaintext
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.

4.1.3 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 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.

4.1.4 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
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";
```
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4.1.5 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 DTSI.

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

```bash
cat 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):

```bash
diff --git a/tegra234-p3701-0000-p3737-0000.dts b/tegra234-p3701-0000-p3737-0000.dts
index b1f6bbc..4b79476 100644
--- a/tegra234-p3701-0000-p3737-0000.dts
@@ -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. The DTB is recompiled with the changes and then flashed on the Jetson device.

### 4.2 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 `nvbufsurftransform.h`.

See the [*nvbuf_utils to NvUtils Migration Guide*](https://developer.nvidia.com/embedded/jetson-linux-r3411) for information to facilitate your migration to the new API.

### 4.3 UEFI

For fixes that were made in the UEFI sources after the release, go to the UEFI GitHub at [https://github.com/NVIDIA/edk2-nvidia/pulls](https://github.com/NVIDIA/edk2-nvidia/pulls).

### 4.4 Display

Use the following steps to enable HDMI on custom carrier boards with Jetson ABX Orin. This information is specific for modifying the device tree file and building a customized carrier board. This information does not apply when you use the Developer Kit carrier board.

1. Download the example HDMI DTS file.

2. Modify kernel DTS with HDMI connector support.

   The JetPack5.0-DP release kernel sources includes a dtsi file that sets DCB with DP connector support by default. To enable HDMI setting, users need to replace the dtsi file provided by NVIDIA with the dtsi file that they previously downloaded.

   Here is the path to download the latest dtsi file:

   <Kernel_Sources>/hardware/nvidia/platform/t23x/concord/kernel-dts/

3. Modify your board dts to replace the default DCB dtsi:

   ```diff
   --- a/tegra234-p3701-0000-p3737-0000.dts
   +++ b/tegra234-p3701-0000-p3737-0000.dts
   @@ -17,7 +17,7 @@
   #include "cvm/tegra234-p3701-0000.dtsi"
   #include "cvb/tegra234-p3737-0000-a00.dtsi"
   #include "tegra234-power-tree-p3701-0000-p3737-0000.dtsi"
   -#include "tegra234-dcb-p3701-0000-a02-p3737-0000-a01.dtsi"
   +#include "tegra234-dcb-p3701-0000-a02-p3737-0000-a01_hdmi.dtsi"
   #include <tegra234-soc/mods-simple-bus.dtsi>
   #include "cvb/tegra234-p3737-camera-modules.dtsi"
   ```

4. Recompile the Kernel by completing the instructions in Kernel Customization in the Jetson Developer guide.

5. Reflash your board with the updated kernel and kernel DTB.

   **Known Limitation**

   Here is a known limitation for this procedure:

   The display driver firmware present in the JP5.0-DP release only supports HDMI HPD on Main GPIO controller, Port M, pin 0:: (TEGRA234_MAIN_GPIO(M, 0))

   Support to customize by using HDMI HPD on different a GPIO controller/pin/port will be provided in the JetPack 5.0 GA release.
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