

NVIDIA Jetson Linux

Release Notes

Version 39.2.2 GA

RN_10698-r39.2.2 | October 2026

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1. About This Release

The NVIDIA® Jetson® Linux 39.2.2 General Availability (GA) release includes the Linux Kernel 6.8, the UEFI-based Bootloader, the Ubuntu 24.04-based root file system, NVIDIA drivers, the necessary firmware, toolchain, and more. This release supports the NVIDIA Jetson Thor™ and Jetson Orin platforms™.



Note: This GA release can be used for production purposes.

1.1. Platform and Release Information

Description	Supported Version
Host machine Linux distribution for flashing software on the hardware platforms supported by this release.	Ubuntu 24.04 and 22.04
Sample rootfs that was derived from Ubuntu to run on Tegra devices that are supported in this release.	Ubuntu 24.04
Supported Linux kernel version.	6.8
Supported Arm® architecture.	aarch64
Name of the configuration file used in flashing. **Note:** When you flash a configuration file with `flash.sh`, specify the configuration's basename; for example, the file name without the `.conf` suffix.	For details, refer to Quick Start in the Jetson Linux Developer Guide.
Toolchain for cross-compilation.	GCC 13.2
Release tag on source server (https://gitlab.com/nvidia/nv-tegra).	jetson_39.2.2

1.2. Login Credentials

To create your login credentials, at the first boot, follow the system prompts.

1.3. What's New

Jetson Linux 39.2.2 is the latest Jetson Linux release that supports NVIDIA JetPack™ 7.2.2. With Jetson Linux 39.2.2, Jetson software aligns with the Server Base System Architecture (SBSA), positioning Jetson Thor alongside industry-standard ARM server design. The following are the highlights for this release:

- Support for Address Family for eXpress Data Path (AF_XDP), enabling high-performance network packet processing in user-space applications by bypassing the kernel networking stack, thus reducing per-packet processing overhead and latency.
- Camera support added for Sensing SNSA0VB1940 (GMSL stereo sensor).
- Camera support added for Sensing SHF3L (GMSL YUV sensor).
- Support added auto control sample plugin for nvsipl_camera sample app.
- Camera tools added Config to the NITO migration tool and reverted the default Argus tuning file from NITO to legacy Config.

For information about a variety of implementation details, refer to Implementation Details in these release notes.

1.4. OE Builds

Beginning with JetPack 7.2 and Jetson Linux 39.2, we are releasing official NVIDIA Open Embedded/Yocto recipes. These recipes use the sources of the same BSP as JetPack 7.2. You can use them to build customized targeted images for your application. Recipes will be posted at https://github.com/OE4T.

2. Using Jetson AGX Thor Developer Kit to Emulate T4000 Module

This section provides information on how to emulate the T4000 module by using the Jetson AGX Thor developer kit with this BSP.

1. On the Jetson AGX Thor dev kit, append `mem=64G` in the `Append` specification in `/boot/extlinux/extlinux.conf` to modify the memory size in the kernel command line. After modification, save the file and reboot the unit to reflect the change.
2. Depending on your needs, switch to 90W mode or 70W mode.

```
Shell
sudo nvpmodel -m 2 # to emulate MAXN mode of T4000
sudo nvpmodel -m 3 # to emulate 70W mode of T4000
```



Note: T4000 emulation using the Jetson AGX Thor dev kit is applicable for CPU, GPU, and memory performance emulation. The other engines, such as NVDEC and NVENC, are not emulated.

3. Known Issues

This section provides details about issues that were discovered during development and QA but have not yet been resolved in this release.

3.1. General System Usability

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

Issue	Description
6266271	When installing ISO on Orin devices with older QSPI images, it is important to allow Capsule update of the QSPI image. To trigger this, press “y” when prompted. ISO installation continues after Capsule update is complete. Skipping this step causes installation issues due to incompatibility of new ISO images with older QSPI images.
6379600	QSPI capsule update during ISO installation does not support updates from BSP 36.2/JetPack 5.0 DP release. For any Orin units on this version, update to any of the later releases before trying to ISO install to JP 7.2 or later releases.
6480645	When installing the r39.2.1 ISO image on a device running r38.2.0 or r38.2.1, you must confirm the firmware update again after the first capsule update completes. After the ISO installation finishes, the UEFI variable `TegraPlatformSpec` might not accurately reflect the actual board specification. After the system has booted into the OS, refer to the `TNSPEC` entry in `/etc/nv_boot_control.conf` for the correct board information.
5748062	The TPM-based hardware random-number generator (hwrng) contributes multiple hundreds of microseconds in real-time latencies. To mitigate this issue, choose one of the following options. Option 1: Disable the TMP-based hwrng kernel config by setting `CONFIG_HW_RANDOM_TPM=N`. If the kernel config `CONFIG_HW_RANDOM_OPTEE` is set either to `M` or `Y`, hwrng is replaced by the OP-TEE–based HWRNG.

Issue	Description

	Option 2:
	1. Identify the hwrng kernel thread PID:
	`ps aux | grep hwrng`
	2. Pin the thread to a non-RT CPU core. For example, if the PID of the hwrng kernel thread is 100, use the following:
	`taskset -p -c 0 100`
	The `-c 0` option specifies CPU core 0.

5733592	For Jetson Thor, BSP assumes that your NVMe is larger than 234 GiB. If your NVMe is smaller, do the following to avoid flashing failures. When you run the initrd flash script, add `EXT_NUM_SECTORS=<NVMe storage size in bytes> / 512` as an environment variable: `$ sudo EXT_NUM_SECTORS="<NVMe storage size in bytes> / 512" ./tools/kernel_flash/l4t_initrd_flash.sh`
5727037	We addressed the hardware issue "SMMU-3 Incomplete invalidation of TLB structures" by creating a software workaround. A side-effect of the workaround is degradation of SMMU UnMap performance. Any use case that includes SMMU UnMap in its performant path will see degradation in performance.
5437763	When a debug cable is removed and re-inserted, minicom becomes inaccessible. Restarting minicom fixes the issue.
5680083	USB Host mode does not work with a T4000 module on a Jetson AGX Thor baseboard with a USB Type-C RCM port.
5251623	On Jetson AGX Thor, some peripherals (like RealSense Camera or Ethernet adapter) do not get enumerated when plugged into a USB Type C port. To enable USB host mode on recovery port, do the following: 1. Enter `echo none > /sys/class/usb_role/usb2-0-role-switch/role`. 2. Connect the USB gadget to the port. 3. Set the data role to host by entering `echo host > /sys/class/usb_role/usb2-0-role-switch/role`.
5424568	ISO installation fails when a USB drive with the image is plugged into a “USB3.0 4-port Portable Hub Model UH400” USB hub. Other USB sticks or hubs work as expected.

Issue	Description
5437041	During the OEM configuration process, navigating back to previous pages to reenter the computer name can throw an error saying that the name is not unique even though the configuration is not yet saved.
5463861	When installing ISO in headless mode without a display connected, the UEFI console `/dev/ttyACM1` is filled with a lot of output, which makes the ISO installation difficult. This issue is resolved after QSPI is updated to GA (38.2) release. Issue is also not seen when a display is connected to the target.
5460707	Flashing to target sometimes fails when a Trendnet TU2-ET100 USB-to-Ethernet dongle is connected. We did not observe issues with other USB-to-Ethernet dongles.
5116642	For Jetson Thor, the OC event counter (reported by `/sys/class/hwmon/hwmon*/oc*event_cnt`) starts at 1 even when no OC event has occurred.
5406663	Currently, you can monitor GPU utilization by using `nvidia-smi dmon`. However, because of design changes, integration of GPU utilization in Jetson Power GUI is still under evaluation**.**
5130696	In Jetson Thor, ASPM for PCIe devices might not be enabled due to the low-power state exit latency of PCIe controllers, specifically Gen5 speed. To avoid the issue, configure the speed of the PCIe controller to lower Gen.
5661165	After stopping the vLLM/SGLang servers or stopping the Docker container, memory usage might stay high. Use the following command to free the cached memory: `sudo sh -c "sync; echo 3 > /proc/sys/vm/drop_caches"`
5699079	If excessively large CUDA memory allocation is attempted, the device might reboot. Ensure that CUDA or other applications do not request more memory than physically available. Another workaround is to launch CUDA processes with higher OOM scores to avoid killing of system processes.
5787211	The Vision model `RedHatAI/Llama-3.2-11B-Vision-Instruct-quantized.w4a16` fails to run on the latest NGC VLLM container because of incompatible packages.
6235055	Jetson Orin Nano sometimes sees DCE aborts during SC7 suspend/resume transitions, and triggers a system watchdog reset.
6229695	Flashing Jetson ISO over http devices is not currently supported.

Issue	Description
6244887	Flashing Jetson AGX Orin with Real-Time (RT) kernel with display connected could lead to a system crash. Updating to RT kernel using Over-the-Air (OTA) updates after flashing non-RT kernel resolves the issue. Working in headless mode (without display) also resolves the issue.

3.2. Camera

The following camera-related issues are noted in this release.

Issue	Description
5383804	Flashing of HSB FPGA FW might fail if setup is not properly configured. To prevent HSB FPGA FW failure, ensure the following steps are followed: 1. Verify that the camera is connected and that you can ping it. 2. Use `hololink-enumerate` to capture your current FPGA FW version. 3. Ensure that you are using the correct flash script and FW version for the type of camera you are using, per the user guide instructions. 4. When flashing starts, do not interrupt the process.
6241469	Jetson AGX Thor when connected to display via DP-alt over USBC could sometimes cause a kernel crash with the following errors `top-cbb-fabric@0x8100800000 TIMEOUT_ERR`
6786777	Argus has ~73.4 ms faster glass-to-glass latency vs SIPL.
6902738	Argus DOL WDR capture (mode 2) is visibly softer/less sharp than SDR (mode 0) at 3840x2160 in the same scene. Tuning with luma and chroma NR settings knobs can help improve the quality
6940333	IMX390 fails i2c probe even after Jetson IO overlay is applied.
6124492	The NR strength control issue persists in `nvargus_reprocess`. The HDR mode fix does not apply to reprocessing.

Issue	Description
6985502	In CoE use cases with Eagle camera (VB1940 CoE) initial frames with 4x HSB [4x camera/ 8x camera] are streamed with low FPS. FPS stabilizes to 30FPS over a few seconds.
6982908	`nvsipl_camera` in RAW/YUV write mode drops 50% of frames with Eagle VB1940
7042845	Stopping camera capture may intermittently report a camera deinit error (status 6). Capture functionality is unaffected, and the application can be safely rerun.

3.3. Multimedia

The following issues related to multimedia are noted in this release.

Issue	Description
5388059	USB camera preview fails with OSS Cheese application because of conflicts between OSS and NVIDIA JPEG library.
4506985	The `emc_log` tool is not showing correct memory bandwidth for iGPU-based NVJPG HW engine on Jetson Thor.
6676674	S56C sensor is not supported through the nvsiplsrc GStreamer plugin as the plugin does not support stereo configs
6982057	SHF3L (ISX031) YUV cameras are not supported in the nvsiplsrc GStreamer plugin

3.4. Graphics

The following issues related to graphics are noted in this release.

Issue	Description
—	—

3.5. Connectivity

The following connectivity issues are noted in this release.

Issue	Description
5392554	MGBE on the Jetson AGX Thor developer kit shows lower performance on the 25G interface. The 10G interface has been validated on copper cable; to increase 10G MGBE performance, switch to threaded mode. For example, for MGBE0, use the following command: `echo 1 > /sys/devices/platform/bus@0/a808a10000.ethernet/net/mgbe_0/threaded` Adjust the interface number as needed (0–3). The Jetson Thor T4000 module supports three interfaces of the MGBE (0–2).

3.6. Display

The following display issues are noted in this release.

Issue	Description
5525468	When the DCE is suspended, if a wake event tries to interrupt the suspend process before the device completely enters the suspend state, the device can hang or cause a system crash because the DCE can't reset and resume normally.

Issue	Description
5424504	UEFI menu is slow to respond during ISO installation on some 4K monitors. This issue does not affect the functionality.
5380828	Toggling fractional scaling options in display settings on desktop could lead to some flickering on the background.
5422032	In a dual-monitor setup, enabling desktop scaling might cause window corruption or visual artifacts because of a GNOME bug.

3.7. Compute Stack

The following issues related to various compute components are noted in this release.

Issue	Description

5092683	Fisheye Python samples fail to run because of OpenCV compatibility issues. To work around this issue, install the following:
	`sudo python3 -m pip install opencv-python==4.8.0.74;`
	`sudo python3 -m pip install pillow numpy==1.26;`

5228336 5462083	For details, refer to the VPI Release Note.

3.8. Multi-Instance GPU (MIG)

Note that MIG is a technology preview feature. Support for MIG is still a work in progress in the current release, and the following known issues related to this feature have been identified.

Issue	Description
6230230 6230231	MIG is currently not supported on Jetson T4000 or on the Jetson Orin Series of products.

4. Fixed Issues

The following issues were fixed in this release.

<table>
<tr><th>Issue</th><th>Description</th></tr>
<tr><td>6236259</td><td>On Jetson Orin platforms, reducing the EMC to a value below Fmax (such as 3199 MHz) with the following power modes by using <code>nvpmodel.service</code> during systemd initialization can cause system crashes upon reboot. This issue is especially noticeable when a display is connected, regardless of its resolution. The following platforms and power modes are affected:
<table>
<tr><th>Platform Freq</th><th>MAXN EMC Freq</th><th>Power Mode</th><th>Its EMC Freq</th></tr>
<tr><td>AGX Orin 64GB</td><td>~3200 MHz</td><td>15W</td><td>2133 MHz</td></tr>
<tr><td>AGX Orin 32GB</td><td>~3200 MHz</td><td>15W</td><td>2133 MHz</td></tr>
<tr><td>AGX Orin Industrial</td><td>~3200 MHz</td><td>15W</td><td>2133 MHz</td></tr>
<tr><td>Orin NX 16GB</td><td>~3200 MHz</td><td>10W</td><td>2133 MHz</td></tr>
<tr><td>Orin NX 8GB</td><td>~3200 MHz</td><td>10W</td><td>2133 MHz</td></tr>
<tr><td>Orin Nano 8GB</td><td>~3200 MHz</td><td>7W</td><td>2133 MHz</td></tr>
</table>
To prevent this problem,
1. Switch to MAXN power mode that restores the EMC to Fmax before rebooting
2. After the system restarts, apply the desired power mode.
3. If the system is inadvertently rebooted while in a problematic power mode, disconnect the display before booting to allow the system to start with the selected mode, and reconnect the display after it finishes initializing.</td></tr>
<tr><td>5435196</td><td>Jetson Thor can sometimes get stuck during continuous boot stress cycles and will need a cold reset to recover.</td></tr>
</table>

Issue	Description

5656972	In some conditions, the following messages repeat in the kernel log:
	`[ 373.487744] nvethernet a808e10000.ethernet: [xpcs_lane_bring_up][808][type:0x4][loga-0x0] PCS block lock SUCCESS`
	`[ 374.543752] nvethernet a808e10000.ethernet: [xpcs_lane_bring_up][808][type:0x4][loga-0x0] PCS block lock SUCCESS`
	To stop them, bring down MGBEinterfaces that are not in use by using the following commands:
	`#sudo su`
	`#ifconfig mgbe0_0 down`
	`#ifconfig mgbe1_0 down`
	`#ifconfig mgbe2_0 down`
	`#ifconfig mgbe3_0 down`

5701579	Immediately after flashing, in case of any issues with connecting to 6 GHz in WPA3 mode, reset the device and try again.
5426982	Sometimes in a busy environment, not all Wi-Fi access points are observed due to limited buffer size for scan results. As a workaround, run `wpa_cli set bss_max_count 500` to increase the `wpa_supplicant` buffer size.

5748062	When building Real-Time Kernel with the sources, make the following changes to the `generic_rt_build.sh` script:
	`@@ -62,7 +62,10 @@ enable_rt()`
	`--enable PREEMPT_RT --disable DEBUG_PREEMPT\`
	`--disable KVM\`
	`--enable EMBEDDED\`
	`+ --enable EXPERT\`
	`--enable NAMESPACES\`
	`@@ -72,7 +75,10 @@ enable_rt()`
	`--enable PREEMPT_RT --disable DEBUG_PREEMPT\`
	`--disable KVM\`
	`--enable EMBEDDED\`
	`+ --enable EXPERT\`
	`--enable NAMESPACES\`
	Without this change, the built kernel does not have `PREEMT_RT` enabled.

Issue	Description
5763680	When a display is connected (regardless of resolution), attempting to set the EMC clock frequency to a value other than Fmax (for example, 4266 MHz) via `nvpmodel.service` during the systemd initialization stage can fail and result in a system crash. To mitigate this issue, always configure the EMC clock to Fmax in the `/etc/nvpmodel.conf` file. After the system has fully booted to the Ubuntu console, you can then apply the desired EMC clock cap manually. Use the following command to set the EMC clock cap: `$ echo <val> > /sys/class/devfreq/bwmgr/max_freq`
5367003	Suspend/resume cycle could sometimes lead to reboot of the unit.
5451745	De-interlace decode is not supported.
5437402	When two displays are connected to target one over HDMI and another over DP, the NVIDIA logo gets clipped during boot up and reboot.
5416070	DVFS is not fully optimal for multimedia use cases
5226667 5465140	Wi-Fi 6-GHz routers that use MBSSID are not supported.
5456784	Using Jetson IO to configure Jetson Camera Hawk-Owl p3762 module could sometimes lead to the display being stuck.
4755448	Fix PCIe completion timeout issues during the PTP operation.
5406304	Fix issues related to UART where standard baudrates were not supported.
5440020	Bluetooth reconnections for LE keyboard and mice do not work on the initial pair. They will work after device reboot or Bluetooth reboot or toggling the connected device from settings page.
6945406	Change ISP configuration default method to CONFIG instead of NITO.
6903958	Fixed IMX185 module name for NITO to avoid argus error “No cameras available”
6893874	Fixed Unique camera selector with HSB_ID for multi HSB streaming use cases
6714879	Fixed segmentation fault during streaming with SIPL streaming for AGX Thor with GMSL HAWK Stereo [AR0234] Camera

Issue	Description
5426589 6448588 6428382	Noise Reduction Strength Control in HDR Mode: Fixed an issue with the noise reduction (NR) strength control in HDR mode. Increasing the NR strength value within the supported range of [0, 1.0] now increases noise filtering in the ISP-processed output image; decreasing the value reduces noise filtering.
6299259 6432310	Fixed NITO Conversion Utility failures from converting CFG to NITO
6252087	Fixed IQ Tuning based color inaccuracies and AWB-related issues for GMSL cameras HAWK [AR0234], IMX728, IMX623
6200081	Fixed failures related to compilation of argus_cuda samples
6449580	Improved CoE channel count per MGBe
6675689	Fixed intermittent out-of-sync issues with Stereo pair using nvsipl_camera

5. Implementation Details

This section provides information about implementation details.

5.1. Camera

The following are the camera integration changes for this release.

5.1.1. Argus ISP Configuration Default

In this release, L4T Argus uses text-based ISP settings files (CONFIG) as the default configuration method. CONFIG mode is the recommended approach. This reverses the default introduced in the previous JetPack release, where NITO was selected by default.

Applications already using NITO can continue using it by setting the NVCAMERA_NITO_PATH environment variable to NITO:

export NVCAMERA_NITO_PATH=NITO

To explicitly select text-based CONFIG mode, set the variable to CONFIG:

export NVCAMERA_NITO_PATH=CONFIG

Alternatively, unset the variable to use the default CONFIG mode:

unset NVCAMERA_NITO_PATH

Restart the Argus daemon after changing the configuration. Ensure that the environment variable is set or unset in the environment used to launch the daemon; exporting it in an interactive shell alone does not update the environment of a daemon managed by a system service.

We recommend using text-based CONFIG mode. For more information, refer to “Defining ISP Settings” in the Camera Development Guide included in the Partner Toolkit.

5.1.1. SIPL Framework for Camera Streaming

Jetson SIPL API Package 2.0.0 for JetPack 7.2 was a major Jetson SIPL API release. It introduces production GMSL driver support, unified camera sample applications, expanded UDDF interfaces, stereo pipeline support, and updated sensor/module configuration handling. This release contains breaking changes that affect API, ABI, JSON schema, package layout, and driver loading.

This is Jetson SIPL API Package 2.2.0 minor release for JP 7.2.2. This enhances support for GMSL and CoE drivers with updated configurations. More details below.

Release Highlights

- Added support for the ISX031 YUV sensor family, including the ISX031 sensor driver and the SGWISX031 and SHF3LISX031 CoSerDes modules.
- Added sample platform configurations sgw_isx031 and shf3l_isx031 for ISX031 modules, and snsa0vb1940 for the SNSA0VB1940 (VB1940) CoE stereo module.
- Added support for a second external GMSL deserializer on CSI-EF for Kenari and Concord platform configurations.
- Added CoE support for 802.1Q VLAN-tagged AVTP frames.
- Added sensor selection (-S/--sensor-id) and a packed RAW12TP pixel-format override (-P raw12tp) to the nvsipl_reprocess sample tool.
- Added a sample auto-control plugin under samples/plugin/.

New Public APIs and Interfaces

- Added VirtualChannelInfo::embeddedDataOffset, an optional byte offset to the first active pixel for sensors whose embedded data is not width-aligned. The default is 0, which keeps the previous behavior.
- Added CoeSettings::vlan_enable in NvFusaCaptureExternalStructs.hpp. Set it to true when incoming AVTP frames carry an 802.1Q VLAN tag. The default is false (untagged frames). Tagged frames from any VLAN ID are accepted; no per-VID filtering is applied.
- Added UDDF module configuration interfaces config::IFsyncConfig, config::IMipiPhyConfig, and config::IPostPipelineCsiOutput.
- Added PIX_PACK_YUV422_8 and PIX_PACK_YUV422_10 to uddf::ddi::PixPackingType for YUV422 output.

Breaking Changes and Migration Notes

- IGmslModuleControl::GetModuleFsyncTxId() has been removed. Module drivers now provide per-link FSYNC, PHY, and CSI configuration through the new config-object interfaces.
- Module drivers that overrode GetModuleFsyncTxId() must be migrated to config::IFsyncConfig, IMipiPhyConfig, and IPostPipelineCsiOutput.
- All UDDF module drivers must be rebuilt against JetPack 7.2.2 headers. Drivers that did not override GetModuleFsyncTxId() need only a rebuild.

Important Driver and Configuration Changes

- INvSIPLCameraQuery::ApplyMask() now accepts fewer masks than the number of transports in the configuration. Missing masks default to 0, which enables no links. Passing more masks than transports is still an error.
- MAX9295 modules now verify the serializer variant before writing any register. Added MAX9295Config::expectedModel. SGWISX031 and SHF3LISX031 expect MAX9295A. AR0234HAWK and SNSA0VB1940 expect MAX9295D. Other modules continue to accept either variant. If a different variant is found, the module is rejected and the link is left untouched.
- CoE transport settings are now identified by name and hsb_id. Multi-HSB CoE configurations in which several boards share one transport name now parse successfully. A repeated name and hsb_id pair is still rejected.
- Kenari and Concord platform configurations now describe two deserializers. Enable masks and platform descriptions were extended accordingly.

Bug Fixes

- Fixed ParseJsonFile() failing with "Duplicate transport settings name" for multi-HSB CoE configurations.
- Fixed an image artifact on the ISP0 output of VB1940 CoE stereo.
- Fixed HSB mask validation for sparse and stereo slot selection on VB1940 CoE stereo.
- Fixed the SNSA0VB1940 stereo pair occasionally starting out of phase.
- Fixed a sensor-start failure on VB1940 (GMSL) after SetSensorCharMode().
- Fixed nvsipl_camera -E (sensor characterization mode) failing on the Camera HAL HSB/CoE path.
- Fixed the embedded-data bytes-per-line calculation for packed Bayer 12-bit (RAW12TP) formats.
- Fixed the AR0234 analog-gain register calculation.
- Fixed VB1940 exposure updates not latching.

5.1.2. Camera Use Cases for CoE and GMSL and SIPL Example Applications

All Implementation details for Camera-over-Ethernet (CoE) use cases are available in CoE Camera Development Guide in the Jetson Linux Developer Guide.

5.2. Device Tree Change for nvethernet

In the previous release, JetPack 7.0, the restart lane bring-up logic was controlled through the device tree flag `nvidia,pcs-rx-eq-sw-ovrd`.

Beginning with JetPack 7.1, the flag is renamed `nvidia,force-restart-lane-bringup`. To maintain backward compatibility with older device trees, the driver now checks for both flags. If either flag is present, restart lane bring-up is executed.

The legacy flag `nvidia,pcs-rx-eq-sw-ovrd` is deprecated and will be removed in a later release. If applicable, update the device tree in the QSPI firmware to use `nvidia,force-restart-lane-bringup`.

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