



DRIVE 5.0 LINUX PDK: DRIVE PX 2 PLATFORM

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5.0.10.3 Release Notes



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1.0 ABOUT THIS RELEASE

These release notes are for the following products:

- ▶ NVIDIA® DRIVE™ 5.0 Linux Platform Development Kit (PDK) and Software Development Kit (SDK) for NVIDIA DRIVE™ PX 2 AutoCruise
- ▶ NVIDIA® DRIVE™ 5.0 Linux Platform Development Kit (PDK) and Software Development Kit (SDK) for NVIDIA DRIVE™ PX 2 AutoChauffeur

Release Information

The following table describes attributes of this product release. When you encounter these variables, elsewhere in the release notes or in the *Development Guide*, use the provided value in place of the variable.

Variable	Value	Description
<os_ver_host>	16.04 (64-bit distribution)	Specifies the host Ubuntu operating system version.
<ubuntu_codename>	xenial	Specifies the code name for the host version of Ubuntu.
<os_ver_target>	16.04 (64-bit distribution)	Specifies the target (rootfs) Ubuntu operating system version.
<release_branch>	embedded/5.0.10.3	Specifies the NVIDIA Git release branch used for the release.
<branch>	5.0.10.3	Specifies the NVIDIA release branch number used for the release.
<build>	12606092	Specifies the build ID for the PDK releases.
<product>	drive-t186ref-linux	Specifies the product name.
<os>	linux	Specifies the operating system.

<aurix_version_autochauffeur>	Firmware Version 4.02.04 from Elektrobit	Specifies the version of firmware that runs on the AutoChauffeur AURIX MCU.
<aurix_version_autocruise>	Firmware Version 4.02.04 from Elektrobit	Specifies the version of firmware that runs on the AutoCruise AURIX MCU.

Platform Support with Quality Target

The following table lists the platforms supported in this release at the targeted quality level.

Platform	Quality Target
NVIDIA P3407-A01 NVIDIA DRIVE PX 2 AutoCruise	Beta
NVIDIA P2379-C01/C02 NVIDIA DRIVE PX 2 AutoChauffeur	Beta

Hardware Information

The following tables describe the hardware attributes of the development platforms for this release. When you encounter these variables, elsewhere in the release notes or in the *Development Guide*, use the provided value in place of the variable.

NVIDIA DRIVE™ PX 2 AutoCruise (P3407-a01)

Variable	Value	Description
<platform ver>	t186ref	Specifies the platform.
<board>	P3407	Specifies the board name.
<board_and_rev>	p3407-t186	Specifies the board and revision. This information is used in flashing.
<sku_id>	0000	Specifies the P3407 SKU. This variable appears in pathnames and may be a component in <SKUINFO>.
<SKUINFO>	699-63407-0000-100	Identifies the board variable component. This value is used when flashing the board with the bootburn -z option. Check the label on your board to verify this value.
<t-ver> or <t-arch>	186	Specifies the version of the NVIDIA® Tegra® architecture.

The NVIDIA DRIVE PX 2 AutoCruise (P3407-A01) platform includes NVIDIA P3407 A01. This board uses the NVIDIA® Tegra® Parker, and also supports:

- ▶ 8 GB LPDDR4, 64 GB eMMC, and 64 MB QSPI NOR memory
- ▶ Display outputs:
 - 1 mini-HDMI 2.0

- ▶ 8 GMSL camera inputs
- ▶ USB 2.0/3.0 Host ports
- ▶ Tegra – 2x CAN
- ▶ AURIX – 2x CAN, 2xLIN, and 2xFlexray ports

NVIDIA DRIVE™ PX 2 AutoChauffeur (P2379-C01/C02)

Variable	Value	Description
<platform ver>	t186ref	Specifies the platform.
<board>	p2379	Specifies the board name.
<board_and_rev>	p2379c01-t186a p2379c01-t186b	Specifies the board and revision. This information is used in flashing. The first expression is for flashing Tegra A; and the second is for flashing Tegra B.
<sku_id>	See table below.	Specifies the P2379 SKU. This variable appears in pathnames and may be a component in <SKUINFO>.
<SKUINFO>	699-62379-0000-400	SKUInfo identifies each variable component for a board. This value is used when flashing the board with the -z option. Check the label on your board to verify this value.
<t-ver> or <t-arch>	186	Specifies the Tegra version of Tegra architecture.

The NVIDIA DRIVE PX 2 AutoChauffeur (P2379-C01/C02) platform (as opposed to PCB) SKUs:

- ▶ P2379 C01 SKU 1001
- ▶ P2379-C02 SKU 1001
- ▶ P2379-C02 SKU 2001
- ▶ P2379-C02 SKU 2002
- ▶ P2379-C02 SKU 2121
- ▶ P2379-C02 SKU 2124

This board uses the NVIDIA® Tegra® Parker, and also supports:

- ▶ 8 GB LPDDR4, 64 GB eMMC, and 64 MB QSPI NOR memory per Tegra
- ▶ Display outputs:
 - 1 HDMI 2.0 per Tegra (2 total)
 - 1 DSI/FPDLink III (shared)
 - 1 HDMI/GMSL (shared)
- ▶ 12 GMSL camera inputs
- ▶ USB 2.0/3.0 Host ports
- ▶ Tegra – 1x CAN

- ▶ AURIX – 6x CAN, 4xLIN, and 2xFlexray ports
- ▶ NVIDIA P2779 Adapter Board to give access to Tegra and AURIX JTAG

1.1 NVIDIA SOFTWARE SECURITY UPDATES

NVIDIA is providing a security update to mitigate aspects of Google Project Zero's January 3, 2018 publication of novel information disclosure attacks that combine CPU speculative execution with known side channels.

CVE ID	NVIDIA Issue Number	Description
CVE-2017-5753	CVE-2017-5753	Computer systems with microprocessors utilizing speculative execution and branch prediction may allow unauthorized disclosure of information to an attacker with local user access via a side-channel analysis.

1.2 TOP ISSUES FIXED SINCE LAST RELEASE

The following issues have been resolved in this release.

Communication

The following communication-related issues are resolved in this release.

NVIDIA Bug Number	Description
200405124	VLAN ping to host successful even-though VLAN interface is down.
200405400	TCP_DL 1G throughput number is regressed when compared with the 5.0.7.2 release.
200405469	enp3s0 is up and gets an IP address even though the network cable is connected to 1G interface.
200310274	TCP bi-directional throughput of inter-Tegra is less when compared to single direction.
200310273	Bi-directional throughput of TCP_DL is ~200 Mbps less for T-A and ~300Mbps less for T-B when compared to single direction TP.
200295051	Observing low throughput numbers for UDP DL [TCID#93028].

CUDA

The following CUDA-related issues are resolved in this release.

NVIDIA Bug Number	Description
200359837	EGLStreams_CUDA_Interop CUDA sample does not run on the Target. It is only supported on igpu. When dgpu is connected to the board, the command to run the app is CUDA_VISIBLE_DEVICES=1 ./EGLStreams_CUDA_Interop.
200359830	fluidsGLES CUDA sample does not run on the Target. GL is disabled on dgpu. Some samples that use GL with CUDA on dgpu are not yet updated to choose igpu over dgpu. These samples can be run on igpu with the CUDA_VISIBLE_DEVICES=1 ./fluidsGLES command.
200359825	simpleGLES CUDA samples do not run and throws "Line 451: CUDA Error: operation not supported" error. Some samples that use GL with CUDA on dgpu are not yet updated to choose igpu over dgpu. These samples can be run on igpu with the CUDA_VISIBLE_DEVICES=1 ./fluidsGLES command.
200281902	The assert_drv test hangs on iGPU.
200256595	GLinterop_ogles terminated with a segmentation fault.

Embedded

The following embedded related issues are resolved in this release.

NVIDIA Bug Number	Description
200207987	AURIX stops receiving CAN messages if the inter-message delay is 5ms or less (PCAN in Tx) (AURIX with EB firmware).

Graphics

The following graphics related issues are resolved in this release.

NVIDIA Bug Number	Description
2098584	egldevice nvgl demos (gears, ctree, bubble, etc.) leak memory.
200262984	Unable to verify GPU preemption on EGLdevice.
200261540	Failed to initialize the NVIDIA kernel module error spews on X startup.
1487178	New EGL 1.5 API function eglCreateSync() should generate a EGL_BAD_PARAMETER error for the unsupported EGL_SYNC_CL_EVENT sync type, but incorrectly returns EGL_BAD_ATTRIBUTE.
1766396	An application destroying a Wayland window before destroying its associated EGLSurface can cause a hang or crash in EGL. Wayland is not designed to handle this situation and the Wayland developers consider this to be an application bug. NVIDIA is currently discussing this matter with the Wayland developers in the hopes of addressing this problem.

Multimedia

The following multimedia-related issues are resolved in this release.

NVIDIA Bug Number	Description
200420903	Error Print observed with IPP RAW Stress test "-nvmedia: ERROR: _GetError_max9286: Line buffer overflow detected on link 2" and "[ISCThreadFunc:183] NvMediaISCSetExposure failed".
200404611	"No VSYNC detected/No Link error detected" error observed during camera power control stress.
200402931	System hangs while running camera power control stress.
200367170	Segmentation fault is seen with crossprocess -producer 1 -consumer 3 pitchlinear.
200383552	Issue with IPP Capture + aggregate 4 + 1000 frames.
200383384	Nvmedia IPP Capture reprocessing raw file gives error spew with AR0231 RGGV V4 camera.
200381973	Target system hangs while running camera capture in loop using ipp_raw samples application.
200328459	NvMediaCPGetFrameEx timed out prints seen with OV10635 sensor (nvmimg_cap app) while launching ipp_raw with AR0231 RCCB sensors in another terminal.
200305756	"nvmedia: ERROR: _GetError_max9286: Line buffer overflow" spews seen while running the application for 12 cameras with vc_enable (master - slave combination)
200263812	VP9 playback jerky and sticks at first frame. Three frames are displayed for 1 minute streams.
200219176	LTM Frame drop with tiff & YUV format using nvmipp_capture.
200219172	ISP Frame drop with tiff format using nvmipp_capture.
200394955	Error Spew "[ISCThreadFunc:183] NvMediaISCSetExposure failed" & "nvmedia: ERROR: WriteRegister: sensor write failed: 0x3022, length 1".
200411415	Error Spews Observed "nvmedia: ERROR: WriteRegister: sensor write failed: 0x3022, length 1 [ISCThreadFunc:183] NvMediaISCSetExposure failed"
200417891	Cuda consumer test cases failing with "cuda acquire failed cuStatus=999".
200443162	Camera Stress test failed with "nvmedia: ERROR: IPPInit: Failed to initialize ISC devices""nvmedia: ERROR: main: Error in IPPInit""[NvMediaIPPMManagerDestroy:181] Bad parameter".

Resource Manager

The following resource manager-related issues are resolved in this release.

NVIDIA Bug Number	Description
200372481	Observing kernel spews "tegradc 15220000.nvdisplay: can't set parent_clk_safe for sor->ref_clk" with ToT stage-main.

200382645	"bios" file is missing from /sys/kernel/debug/0000\04\00.0/ node.
200385859	nvrn_channel --module=vi test fails.
200386061	DGPU memory clock runs at lower speed.
200294128	nvdisp_swap_timestamp fails with crc error.
200303161	Fails to set run time EDID.
200308529	dGPU Stress - Call trace observed while running cuda L0 tests, and bandwidth and kernelSubmitLatency apps.
200296689	nvdisp_csc test fails on HDMI.
200294128	nvdisp_swap_timestamp fails with crc error.
200215660	'gk20a 17000000.gp10b: fifo_error_isr: fifo bind error: 0x00000003' prints with startx.
200392999	Running nvgpu RM unit tests in loop throws Failed to init VGPU VM.
200413692	IPP Capture file write with 12 camera.
200421369	No-display observed after issuing "sudo reboot" command on the target system.
200431263	Tegra fails to boot during warm reboot stress on DPX2.
200372838	Kernel spews observed "nvgpu: 0000:04:00.0 gk20a_bus_isr:85 [ERR] NV_PBUS_INTR_0: 0x00000004 FECS_ERRCODE 0x80000000" with tot stage-main.
2080685	Due to "nvhost_get_syncpt: failed to find free syncpt" error, X crashes on DPX2-ACH which results in DISPLAY freezes on Tegra HDMI.
2100939	NvRmGetSyncpointForSemaphore-failed error during Driveworks application.
200412996	GPCCLK and MCLK minimum frequency can be set less than 300MHz.
200417869	Failed to move 10G interface(enp3s0) to tegra-B since echo 1 > /sys/bus/pci/devices/0000\00\01.0/remove command doesn't work & getting Response decoding error if skip echo.

System Software

The following system software related issues are resolved in this release.

NVIDIA Bug Number	Description
200442215	UART Muxer freezes and become unresponsive.
200439247	Failed to move 10G interface(enp3s0) to tegra-B since bash /root/move10GbePhy_B.sh cmd is giving error "I2c transaction failed: error code: -1"
200447311	Tegra B hangs with error "Fatal VM Fault: Failed to decode faulting instruction!"

200430509	After Setup wizard completion auto login fails to boot on Tegra-A/B.
200415245	Setup wizard text is broken on 4K display panel connected with target system.
200412053	"Tdiode_tegra driver not initialized" prints seen in boot logs.
200400149	Intermittently target system stuck to boot while issuing reboot command in loop.
200405229	Yocto builds may fail with undefined references to <code>NvMediaVideoXxxx</code> symbols. The <code>nv-git-07</code> version has been patched and a patch for the PDK is available from your NVIDIA technical representative.
200407703	SSD automount fails after SSD hotplug.
200406307	EFS partition is automounted only for first boot and not for subsequent boots.
200405789	The mount command shows an extra <code>/var/lib/docker/overlay2</code> directory on targetfs during nfs boot.
200405784	Missing libraries dependency for executables with RC-5.0.10.2 build.
200405249	USB error seen: "tegra-xusb 3530000.xhci: ERROR Transfer event for disabled endpoint or incorrect stream ring".
200372481	Kernel spews "tegradc 15220000.nvdisplay: can't set parent_clk_safe for sor->ref_clk" with ToT stage-main observed.
200381802	apt-get update fails with "GPG error: file:/var/cuda-repo-9-1-local Release".
200381771	DriveWorks package is not being installed on Tegra due dependency on cuda-toolkit-8-0.
200381255	Kernel spews observed in boot log "[FAILED] Failed to start board specific initialization.
200381254	SPI-TP not configured spews seen on first boot; camera capture does not work.
200379495	Drive-Setup scripts take a longer time to install during nfs boot.
200383163	Tegra fan <code>cur_pwm</code> is not changed when temperature is in rising state.
200383028	Sometimes fan speed is not synched between Tegra A and Tegra B.
200382219	"Fatal programming error: mutex already held" command error seen on Tegra console when "shutdown -h now" is issued.
200383896	PPC_files needed for flashing board using GR binaries is not packaged in PDK.
200385869	CONFIG_SERIAL_UBLOX_GPS module is not enabled in the kernel.
200386213	Tegra system profiler quits unexpectedly.
200368198	Chromium version 62.0.3202.62 is not compatible with embedded-5.0.7.0 SDK and may crash randomly and throw some tainted spews.
200350652	Extraction of <code>oss-src.run</code> package gets stuck and spews error messages.

200367191	Launching DriveWorks samples from Desktop spews out "eqos ioctl: HW PTP not running" on the Tegra console. ACR only supports software PTP to AURIX, so print must be disable software PTP and only enable hardware PTP on the Tegra.
200305982	Unable to assign IP address in recovery chain after using the device for a while.
200328462	Tegra B hangs after thermal shutdown.
200328496	During thermal shutdown of Tegra B "mc_err: EMEM address decode error!" error seen on HV console.
200330924	Observing packet loss if pinged from Tegra-B to Aurix while PTP sync is in progress between Tegra-A & Aurix [TCID#AdHoc]
200328327	Missing libraries for executables.
200328323	Unexpected messages received in dmesg when doing CAN transmission at 500kbps and 1Mbps.
200328436	Frame loss in CAN transmission between Tegra A to Tegra B @ 125 Kbps at 1 ms in CAN FD config.
200301121	Default login changed to nvidia@nvidia ; previously it was nvidia@tegra-ubuntu.
200294568	USB device re-enumerated while running stress test.
200292213	Linux crashes while running network stress tests with a USB 3.0 ethernet adapter.
200303149	RPMB provisioning Dummy operation fails.
200304888	Target system hangs while running LTP file system test [NVQM Test ID:77603].
200261572	Unprivileged access of DMAAPB_4 while dumping GIC causes Linux OS to halt.
200308222	Running memtester tool on the Linux system causes uart_muxer to hang.
200276264	Regression observed in cyclic test on Denver cores.
200258615	A few C02 DRIVE PX 2 boards fail to enumerate 10GigE on both Tegras.
200218645	Fan sync does not occur if one of the Tegras enters into thermal shutdown.

TensorRT

The following TensorRT related issues are resolved in this release.

NVIDIA Bug Number	Description
200300767	Unable to compile TensorRT samples individually.

1.3 CONTENTS OF THIS RELEASE

This release includes PDK installer files archived in 7Zip files and additional platform-specific run files. Replace the <branch> and <build> variables below with the values shown in Section 1.0 above.

PDK Releases

For the PDK release, the *DRIVE 5.0 Linux PDK for DRIVE PX2 Development Guide* and *DRIVE 5.0 Foundation PDK for DRIVE PX 2 Development Guide* and References are available in the following ZIP archive. For guidance on installing the documentation, see [To access the References content](#) in these notes.

```
NVIDIA_DRIVE_5.0_Linux_DPX_PDK_References.zip
```

The Open Source PDK target/host-dev component/tools installer run file:

```
drive-t186ref-linux-5.0.10.3-<build_id>-oss-minimal-pdk.run
```

The Ubuntu rootfs run file:

```
drive-t186ref-linux-5.0.10.3-<build_id>-xenial-ubuntu-rootfs.run
```

The Yocto built intramfs-rootfs image file:

```
drive-t186ref-linux-5.0.10.3-<build_id>-yocto.run
```

The NVIDIA specific PDK target/host-dev component installer run file:

```
drive-t186ref-linux-5.0.10.3-<build_id>-nv-minimal-pdk.run
```

The Open Source target/host-dev source files for kernel, boot loader, flashing utilities, and sample applications:

```
drive-t186ref-linux-5.0.10.3-<build_id>-oss-src.run
```

The NVIDIA® CUDA® 64-bit Toolkit installer run file:

```
drive-t186ref-cuda-5.0.10.3.run
```

The Tegra Graphics Debugger package:

```
NVIDIA_Tegra_Graphics_Debugger_2.6.18134.2341_Release_NDA_tgd-l4t_linux-  
v4l_l4t-egl.run
```

The Tegra PerfWorks package:

```
PerfWorks-0.104.18098.2009-linux-v4l_l4t-egl-t210-a64.tar.gz
```

An additional file, included in a separate RUN file, is required for the NVIDIA DRIVE PX platform and must be installed after `nv-minimal`:

```
drive-t186ref-linux-5.0.10.3-<build_id>-dpx.run
```

The following new RUN files install an application to update the AURIX firmware from the Tegra device.

```
drive-t186ref-linux-5.0.10.3-<build_id>-tegra2aurix_updater.run
```

1.4 SOFTWARE VERSIONS

This release includes the following software versions:

Software	Version
Reference target Ubuntu root file system	16.04
Elektrobit AURIX for AutoChauffeur	4.02.04
Elektrobit AURIX NVIDIA for AutoCruise	4.02.04
CUDA on both the host and the target	9.2.78
GCC Cross-compiler Toolchain for user applications and libraries	4.9.2
OpenGL ES	3.2
OpenGL Provided for development purposes only. Production systems are expected to use OpenGL ES.	4.5

1.5 FEATURES

This section lists features supported in this release and features planned for later releases.

System SW

- ▶ Kernel 4.9 with PREEMPT RT patches
- ▶ eMMC
- ▶ USB 2.0/3.0 Host
- ▶ USB 2.0 Device
- ▶ QSPI
- ▶ SPI Master and Slave
- ▶ I2C Master
- ▶ 8250 UART
- ▶ Gigabit Ethernet
- ▶ 10 Gigabit Ethernet interface
- ▶ LinuxPTP for gPTP support in Tegra devices
- ▶ NVIDIA DRIVE PX 2 AutoCruise (P3407-A01) support
- ▶ NVIDIA DRIVE PX 2 AutoChauffeur (P2379-C01/C02) support
- ▶ Elektrobit (AutoChauffeur) and NVIDIA (AutoCruise) firmware for Infineon® AURIX™ ASIL-D MCU

Display

- ▶ HDMI2.0 output for each Tegra device
- ▶ DSI via FPDLinkIII interface (AutoChauffeur)
- ▶ HDMI via GMSL interfaces (AutoChauffeur)

Graphics

- ▶ Tegra Graphics Debugger

1.6 DOCUMENTATION IN THIS RELEASE

The following lists the documentation included in this release.

Document	Description
NVIDIA_DRIVE_5.0_Linux_DPX2_Release_Notes_5.0.10.3.pdf	This document.
NVIDIA_DRIVE_5.0_Linux_DPX_PDK_References.zip	In the PDK release, this ZIP file contains HTML-based API documentation, the <i>Development Guide</i> , and as needed additional PDF documents including open-source and 3rd party license information.
drive-t186ref-linux-5.0.10.3-<build_id>-oss-src.run	Contains HTML based Open Source licensing information and source rebuild instructions.

Document	Description
drive-t186ref-linux/ubuntu-rootfs-licenses.txt	Contains the full text of the common licenses of the Ubuntu 16.04 root file system (based on Ubuntu Core).

To access the *References* content in the PDK release

Expand the `NVIDIA_DRIVE_5.0_Linux_DPX_PDK_References.zip` file.

Note:

The documentation is also installed on the NVIDIA DRIVE PX 2 target system and can be opened from the DRIVE Linux Dashboard application on the target.

- Click the following HTML file to open the documentation page:

```
Start_DRIVE_5.0_Docs.html
```

The references open in your default browser, and all documents are accessible from within the same browser window.

1.6.1 Searching for Terms

You can search the *Development Guide* for a term by entering it in the Search field at the upper-right of the guide window. By default, you can search for whole words that are longer than two characters. By enclosing a term in asterisks (*), you can also find the term embedded in longer strings, even if the term is less than three characters.

For information on searching for APIs, see the Welcome page in the *API Reference*.

1.6.2 Issues Viewing References Documentation

Browser-related issues can affect your ability to view the *References* and *Development Guide* in this release.

1.6.2.1 References Require ActiveX on Internet Explorer

The following message can appear you open the *References* or *Development Guide* on Internet Explorer:

```
Internet Explorer restricted this webpage from running scripts or ActiveX controls.
```


This message is due to Internet Explorer security restrictions that require approval to execute scripts and ActiveX and the *Development Guide's* use of JavaScript and ActiveX controls to provide navigation and search features.

To workaround

- In response to the Internet Explorer message, select the Allow blocked content button.

1.6.2.2 Cannot Open PDF Files in Internet Explorer 8

The following message can appear when you try to open PDF files in Internet Explorer 8.

Internet Explorer has stopped working. A problem caused the program to stop working correctly. Windows will close the program and notify you if a solution is available.

To workaround

1. Close your web browser.
2. Start Acrobat or Adobe Reader.
3. In the Edit tab, select Preferences.
4. Select Internet in the list on the left.
5. Deselect Display PDF in Browser.
6. Restart Internet Explorer.

2.0 IMPORTANT INFORMATION

This section provides information about PDK updates and specific issues for this release. Workarounds are provided where possible.

2.1 ERROR SPEW UPON TEGRA REBOOT

Tegra safety Cluster Engine (SCE) fails to obtain HSP mailbox pair with CCPLEX with "sudo reboot" command. The following message appears on linux console:

```
error "tegra186-safety-ivc b040000.sce: failed to obtain cmd mbox pair: - 517" seen in boot logs
```

This message is due to non-safety use case, where Tegra SCE is not prepared for abrupt 'Tegra reboot'. [200390223]

To workaround:

Reboot Tegra from MCU.

2.2 SUB-FIELDS OF IVC IN PLATFORM_CONFIG.H

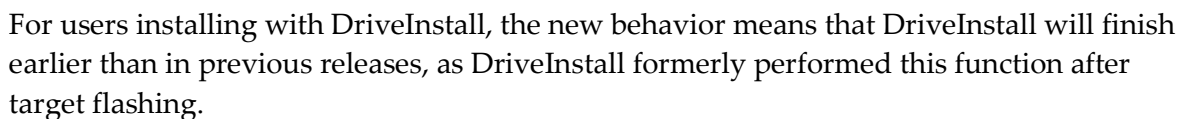
The following sub-fields of ivc in platform_config.h (which is part of the PCT) have been deprecated.

```
.ivc = {  
    .mem_size = SZ_4MB,  
    .irq_start = 320,  
    .irq_size = 24,  
    ....  
};
```

Setting mem_size has no effect.

You must remove or comment out these lines from your PCTs. [2051864]

Behavior of the SetupWizard, which executes on the target on first boot after flashing, was changed in an earlier (4.1.8.0/Beta 3.0) release. The SetupWizard now first installs packages to the target using the `drive-setup.sh` script, as shown on the screenshot below. In addition, the Tegra console prompt is blocked until the SetupWizard is successfully completed.



After SetupWizard is complete, the Aurix updater service starts automatically, and the system must reset twice to complete the Aurix FW update.

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DRIVE 5.0 Linux PDK: DRIVE PX 2 Platform

2.4 AURIX FIRMWARE

In 5.0.10.2, Aurix firmware OTA service will automatically start after SetupWizard service is complete and the Aurix firmware will be updated to version 4.02.04.

2.4.1 AURIX Versions

AutoChauffeur

AURIX 4.02.04 is supported and has been tested with this software release. If you do not have this version of the firmware, update to AURIX 4.02.04.

AutoCruise

AURIX 4.02.04 is supported and has been tested with this software release. If you do not have this version of the firmware, update to AURIX 4.02.04.

For both boards, see "Flashing and Using the Platform -> Flashing AURIX" in the *Development Guide* for more information about checking and flashing the AURIX firmware from the Tegra and Windows host.

2.4.2 AURIX and Tegra Known Limitations

1. If you changed the Tegra A IP address from the default of 10.42.0.28 to any other address on AURIX using the `set ip` command and on Tegra in `/etc/tacp/tacp.cfg`, the Tegra to AURIX firmware update will not work. Other cases like gPTP and Camera Power Control will still work. To successfully perform the AURIX FW update from the Tegra, it is necessary to set the AURIX and Tegra IP addresses back to the defaults at both the AURIX and Tegra A.
2. In this release, it is not necessary to change the AURIX or Tegra TACP IP address to avoid conflicts between PX boards as in previous releases. In fact, NVIDIA recommends **not** changing these addresses. [200330224]

2.5 INSTALLATION AND SETUP

This topic provides installation and setup related updates and issues specific to this release.

2.5.1 NFS Mount of Single Targetfs

Using the same `targetfs` folder for both Tegra A and Tegra B can result in the following issues:

- ▶ Ethernet interface renaming which can lead to camera capture failure.
- ▶ Tegra A wallpaper is visible on Tegra B and vice-versa.

- ▶ Failure in case of Mac ID based NFS rootfs selection.

When you execute the RUN files, they produce a default `targetfs` directory. Later, when you run bootburn, it creates files in the `targetfs` directory that can adversely affect the following distinct flash activities within the same `targetfs` directory:

- ▶ Flashing for NFS boot on Tegra A and then Tegra B—The files created for Tegra A can affect behavior on Tegra B.
- ▶ Flashing for NFS boot followed by flashing for eMMC boot—The files created for NFS boot can affect flashing eMMC.

The default location of the `targetfs` directory is:

```
<top>/drive-t186ref-linux/targetfs
```

To Workaround

1. After running all RUN files, create two copies of the default `targetfs` in the same directory.

To preserve permissions while creating copies of `targetfs`, execute the following commands:

```
sudo cp -rp <TOP>/drive-t186ref-linux/targetfs <TOP>/drive-t186ref-  
linux/targetfs_TA  
sudo cp -rp <TOP>/drive-t186ref-linux/targetfs <TOP>/drive-t186ref-  
linux/targetfs_TB
```

The above commands produce these directories:

- For NVIDIA DRIVE PX 2 AutoChaufeur Tegra A:

```
<top>/drive-t186ref-linux/targetfs_TA
```

- For NVIDIA DRIVE PX 2 AutoChaufeur Tegra B:

```
<top>/drive-t186ref-linux/targetfs_TB
```

2. Change the NFS related settings in `dhcpcd.conf`, `/etc/exports`, etc. to reflect the new paths.

2.6 CAMERAS (GMSL)

This topic provides camera related updates and issues specific to this release.

2.7 PERIPHERALS

This topic provides I/O CAN, GMSL, Gig Ethernet, USB, and 10 Gig Ethernet updates issues specific to this release.

2.7.1 PEX Design Limitations

On Tegra B, the PEX hierarchy is by design dependent on Tegra A. This design limitation can lead to:

No PCIe device detection on Tegra B if Tegra A is not booted

- ▶ No PCIe device detection on Tegra B if Tegra A is not booted
- ▶ No PCIe device detection on Tegra B if Tegra A is booted after Tegra B

Tegra A filesystem on slower media, such as USB and Tegra A on eMMC [200245090]

- ▶ Tegra B crashes when resetting Tegra A
- ▶ Asynchronous reboots for Tegra A and Tegra B are not supported
- ▶ Tegra B crashes in case of Tegra A thermal shutdown

2.7.1.1 No PCIe Device on Tegra B if Tegra A is not Booted

This is a known limitation. No workaround is available at this time.

2.7.1.2 PCIe Disabled on Tegra B if Tegra A Boots after Tegra B

To workaround

- ▶ Soft reboot Tegra B to initiate PCIe enumeration along with the devices connected to it.

2.7.1.3 Tegra B Crashes When Resetting Tegra A

Due to NVIDIA DRIVE PX 2 PEX design limitation, Tegra A reset/reboot resets the PLX switch which causes Tegra B to be unstable if booted. [200254495]

Do not enter the following command when Tegra B is booted:

```
"tegrareset a" from aurix console  
"sudo reboot" on Tegra A console
```

Tegra A reboot, using any of the above commands, can lead to unexpected behavior such as hanging or rebooting on Tegra B.

Note:

Tegra B reset from AURIX console or from the Tegra console is only supported while Tegra A is up.

To workaround

- ▶ Reset Tegra B from AURIX console using the “`tegra reset b`” command after Tegra A reboots.

OR

- ▶ Remove PEX hierarchy from Tegra B before Tegra A resets or reboots. Then, rescan PCIe after Tegra A reboot.

Note: The following commands must be run as root user.

To remove the PEX hierarchy

- ▶ Execute the following command.

```
echo 1 > /sys/bus/pci/devices/0000\:00\:01.0/remove
```

To rescan the PEX hierarchy

- ▶ Execute the following command.

```
echo 1 > /sys/bus/pci/rescan
```

Consult the *DRIVE 5.0 Linux PDK Development Guide*, *Flashing and Using the Platform > Using the AURIX Console* for details on all the AURIX commands.

2.7.1.4 Asynchronous Reboots for Tegra A and Tegra B are Not Supported

Tegra B side PEX hierarchy is, by design, dependent on Tegra A. This is a known design limitation. No workaround is available at this time.

2.8 APPLICATIONS AND MIDDLEWARE

This topic provides applications and middleware updates and issues specific to this release.

2.8.1 VisionWorks is Deprecated

The VisionWorks package is no longer provided with the DRIVE PX 2 platform. Contact your NVIDIA support representative for more information.

2.9 XGPU

This topic provides xGPU updates and issues specific to this release.

2.9.1 Rail Gating Limitation for GPU

To achieve deterministic GPU job submission latencies, GPU rail-gating has been disabled by default.

2.10 PDK FUNCTIONS

This topic provides functional updates and issues for PDK modules specific to this release.

2.10.1 Graphics

This topic provides functional updates and issues for the graphics module specific to this release.

2.10.1.1 Producer Must Leave EGLStream with at Least one Image

This topic describes a requirement that EGLStream producers must satisfy. After streaming starts, the producer must post at least two images to EGLStream before getting an image.

For more information see the *DRIVE 5.0 Linux PDK for DRIVE PX 2 References* describes the EGLStream API at: API Modules > NvMedia API for Tegra > EGL Stream API

2.10.1.2 Workaround for Window Option Not Working in `nmvid_play`

When you play a video file using `nmvid_play`, by default it plays on window 1. This is not visible as reported because of another bug.

The file is visible on window 1 assuming you have played it once on window 0, or after you run any graphics EGL application.

2.10.1.3 Graphics Developer Tools Limitation

The Tegra Graphics Debugger and Perfworks developer tools provide reliable output for single contexts at a time.

2.10.1.4 Messages Displayed When Exiting X11 Applications

The recommended command for starting the X11 server is:

```
sudo -b X -ac -noreset -nolisten tcp
```


Using this recommended command, object allocation messages are seen after each X11 application exits.

To eliminate these messages, silence stderr output from X11 with the following:

```
sudo -b X -ac 2>/dev/null -noreset -nolisten tcp
```

2.10.1.5 Using Vsync Functionality on X11

To use Vsync functionality on X11, perform the following steps.

1. Stop the `lightdm` service, which uses `startx`:

```
chmod -x /usr/sbin/lightdm
```

2. Enter the following command to start X11:

```
sudo -b X -ac -noreset -nolisten tcp
```

By default, Vsync is enabled, i.e. the command sets `export __GL_SYNC_TO_VBLANK=1`.

To disable VSync

Enter this command:

```
export __GL_SYNC_TO_VBLANK=0
```

2.10.2 Audio

This topic provides functional updates and issues for the audio module specific to this release.

2.10.2.1 AutoCruise Audio Modules Loaded by Default

On the NVIDIA DRIVE PX 2 AutoCruise platform, audio modules are loaded by default. This has no effect on the overall functionality of the platform.

2.10.2.2 Working of Audio Applications With camRTC

When APE is used as camRTC (RTCPU for camera), camRTC firmware uses `ADMA_CH0` for its operation. Consequently, due to this firmware limitation, `ADMA_CH0` in CCPLEX are not functional (ex: Audio).

To workaround

- Use a different ADMA_CH.

In future releases, camRTC will use ADMA_CH31 by default to allow CCPLEX to use ADMA_CH0.

2.10.3 System Software

This topic provides functional updates and issues for the system software module specific to this release.

2.10.3.1 GCC Version

The DRIVE 5.0 Linux PDK uses GCC version 4.9.2 to compile all DRIVE PX 2 platform components (i.e., kernels and drivers). This version is used to enable a uniform compilation environment for all DRIVE 5.0 Linux platforms and root file systems.

2.10.3.2 Tegra Thermal Sensor

Since the Tegra_shutdown pin on NVIDIA DRIVE PX 2 is not connected to the PMIC, the software configuration to enable the Tegra internal thermal sensor to trigger the Tegra_shutdown signal, is removed.

2.10.3.3 Obtaining the Latest Linux Headers in Toolchain

The Linux headers in the toolchain located at:

```
<top>/toolchains/tegra-4.9-nv/usr/sysroot/usr/include/linux/*
```

These headers are not synchronized with the kernel headers located at:

```
<top>/drive-oss-src/kernel/include/uapi
```

To obtain the latest version of kernel-uapi headers into the toolchain, re-build the toolchain using the procedure in *DRIVE 5.0 Foundation PDK Development Guide* section at:

System Programming -> Building Yocto Components

3.0 CATALOG OF KNOWN ISSUES

This topic provides details about issues discovered during development and QA but not resolved prior to this release.

Note: If an issue in the list below cites a board name or number, the issue has been observed only on the listed devices. If no board name is cited, you may assume the issue is expected to be present on all devices.

In the following Known Issues tables, a check mark (✓) appearing in either the New or Past columns means:

New	Indicates issues found in this release.
Past	Indicates issues present in (and continuing to be present in) the last release of DRIVE PX 2.

3.1

3.1 COMMUNICATION

The following communication related issues are noted in this release.

Issue Number	Issue	New	Past
200303175	Observing variation in 10G throughput numbers when collected between DPX 2/Ubuntu Host(10G NIC) & DPX2/DPX2(10G ports).		✓

3.2 CUDA

The following CUDA related issues are noted in this release.

Issue Number	Issue	New	Past
200377221	CUDA is unable to allocate whole memory in one chunk.	✓	
N/A	<p>Occasionally, inconsistent event and metric values may occur when using the following CUDA profiling tools:</p> <ul style="list-style-type: none"> • Visual Profile • Nvprof • CUPTI <p>To workaround, set the environment variable <code>CUDA_ENABLE_PM_CTXSW_MODE =0</code> to disable PM context switching.</p>		✓

3.3 EMBEDDED

The following embedded related issues are noted in this release.

Issue Number	Issue	New	Past
200449196	Multiple issues observed after upgrading system packages	✓	
200431771	Package is not getting installed on Tegra due dependency on cuda-cublas-9-1.	✓	
200300240	Chromium browser pop-up choose keyword for new keyring.		✓
200219137	Need to define AURIX action when Tegra enters into thermal shutdown.		✓
200219396	System gets reset during the reception of simultaneous CAN messages on AURIX (DPX2-EB-AURIX-1.01-snapshot-3).		✓

3.4 GRAPHICS

The following graphics related issues are noted in this release.

Issue Number	Issue	New	Past
200422304	nvm_egl_dgu application doesn't exit.	✓	
1487182	EGL_KHR_gl_image completeness requirements were relaxed in EGL 1.5, the NVIDIA EGL driver still follows EGL 1.4 requirements.		✓
1487182	New EGL 1.5 API function eglWaitSync() should return an EGLBoolean, but incorrectly returns EGLint.		✓
200217981	Crash related to libX11.so.6.3.0 seen during soft reboot.		✓

3.5 MULTIMEDIA

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

Issue Number	Issue	New	Past
200418993	IPP Cppture stress test failed with "nvmmedia: ERROR: Start: Video Link(0) is not detected" and System hung	✓	

Issue Number	Issue	New	Past
200447465	Illegal instruction (core dumped is seen while running valgrind with eglstream.	✓	

3.6 RESOURCE MANAGER

The following resource manager related issues are noted in this release.

Issue Number	Issue	New	Past
200448597	Kernel MemLeak "Xorg" "unity_support_t" "gnome-session-c" "check_gl_textur" "chromium-browse"	✓	
200421352	Error in `nvgpu_ctxsw_trace_gpmu': double free or corruption (!prev): 0x0000000000418410.	✓	
200379044	Unit tests nvgpu_submit_gpmu fails on DDPX.	✓	
200391054	Unit test nvgpu_submit_dbg_ops fails on DPX2 boards.	✓	
200388554	gk20a_channel_alloc_gpfifo error seen during scheduler stress.	✓	
200413692	IPP Capture file write errors with 12 cameras.	✓	
200382567	Intermittent error spews observed during "Memory Clock(mclk) switching stress" test.		✓
200302330	Invalid channels and contexts observed on sysfs entry for dGPU status.		✓
200309490	Bubble invokes oom-killer while running memtester, ctree, nvmmid_play, and nvmmid_enc simultaneously.		✓
200280117	Syncpoint errors and corruption while running nvmmipp_raw with other stress apps.		✓
20026193	[AutoCruise] TegraStast does not report GR3D and EMC usage with NVIDIA hypervisor.		✓

3.7 SDK MANAGER

The following SDK Manager related issues are noted in this release.

Issue Number	Issue	New	Past
200446764	'License agreements' tab lists Autocruise packages as	✓	

Issue Number	Issue	New	Past
	well, while Flashing for Autochauffeur.		
200447039	While flashing device using SDKM, '_temp_dump' folder pops up [<install location>/flashtools/bootburn/_temp_dump]	✓	

3.8 SYSTEM SOFTWARE

The following system software related issues are noted in this release.

Issue Number	Issue	New	Past
200434045	Character re-ordering is seen on DPX2 while sending data from Host to Target serially.	✓	
2166859	BUG: scheduling while atomic: swapper/0/1/0x00000000.	✓	
200390318	Intermittently target system stuck for a while to boot when reboot command issued from Tegra consol	✓	
200390011	Intermittently automount of USB device fails to mount on the target system.	✓	
200439418	Intermittently target system stuck to boot after issuing aurix reset command.	✓	
200416460	LTP file system test failed on DPX2.	✓	
200385777	kernel panic observed during out of memory test.	✓	
200350395	SPE Free RTOS CAN IVC Driver "Cannot find device CAN0.	✓	
200238117	64 bit- LTP MM test failing. [NVQM TCID: 73996].	✓	
200447443	SERR prints are observed in hypervisor terminal when DRAM ECC is enabled(intermittent).	✓	
2123928	tegra186-safety-ivc b040000.sce: failed to setup ivc: -110.	✓	
200390223	error "tegra186-safety-ivc b040000.sce: failed to obtain cmd mbox pair: -517" seen on linux console.	✓	
200390011	Intermittently automount of USB device fails to mount on the target system.		✓
200390785	Stage-main 10Gig Ethernet throughput numbers are regressed compares to earlier releases.		✓

200390223	Error "tegra186-safety-ivc b040000.sce: failed to obtain cmd mbox pair: -517" on console.		✓
200412932	CAN messages are getting dropped at app (candump) level.		✓
200350395	SPE Free RTOS CAN IVC driver "Cannot find device CAN0".		✓
200406547	Intermittently, Tegra B fails to reboot with an error "[FAILED] Failed to start Raise network interfaces".		✓
200405436	Warnings are seen intermittently after flashing the target.		✓
200274613	Kernel warning message "NOHZ: local_softirq_pending 80" on running EasyCAN stress.		✓
200370663	Unable to start TGD on 16.04 Host.		✓
200383589	Reboot from recovery chain to primary chain takes more than 5 minutes.		✓
200330224	AurixOTA is failing with Tegra A IP changed to non-default value.		✓
200303890	System hangs during warm reboot triggered by update_sample.		✓
200294574	USB 3.0 network adapter stopped working with "Rx status -71" message followed by call trace.		✓
200306757	System hangs with "i2c: pio xfer timed out addr" & "bpmp_trywait() wait_for_completion_timeout" prints while running nvmmpp_raw and gears in a loop.		✓
200302708	GDB debugging fails to continue debug session [Test Case ID:77550].		✓
200311668	nv_aurix_update app throws segmentation fault with -i option		✓
200312944	kdb prompt does not appear on triggering kernel panic		✓
20028279	In the shutdown window, selected is misspelled as elected.		✓
200275073	mttcan c310000.mttcan can0: Bit1 error detected.		✓
200274613	Kernel warning message "NOHZ: local_softirq_pending 80" on running EasyCAN stress.		✓
200260776	Task tracking bug for performance improvement investigation for 10GbE NAS storage device.		✓
200202137	Tegra A reboot causes Tegra B to hang when Tegra B owned PEX Switch and was rebooting.		✓

3.9 TEGRA GRAPHICS DEBUGGER

The following Tegra Graphics Debugger related issues are noted in this release.

Issue Number	Issue	New	Past
200370663	<p>Tegra Graphics Debugger requires the libstreamer0.10-0 and libgstreamer-plugins-base0.10-0 packages on the host side to run properly. These packages can be installed using the following commands:</p> <pre>sudo apt-get install libgstreamer0.10-0 sudo apt-get install libgstreamer-plugins-base0.10-0</pre>		✓
200204579	Queries on PerfWorks Tool validation.		✓

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