

## Getting Started with GenICam for CSI-2

### Purpose and scope of this document

You can access Alvium 1800 C cameras via:

- V4L2 (Video for Linux 2) Access
- Direct Register Access
- **NEW:** GenICam for CSI-2 Access - enables camera access via Vimba's CSI-2 transport layer.

This document summarizes what you need to know to use Alvium CSI-2 cameras with Vimba:

- Compatibility
  - Required Vimba version
  - Supported Alvium CSI-2 camera models and firmware version
  - Compatible ARM boards and driver for Alvium CSI-2 cameras
- Installation
- Known issues and restrictions
- Questions and answers
- Further readings

This document covers software topics. For hardware installation instructions, see section [Further readings](#).

## Compatibility

### Vimba version

As of **version 6.0**, Vimba for **ARM64** contains a CSI-2 TL (transport layer). Additionally, the included *Vimba Firmware Updater* supports Alvium CSI-2 cameras.

### Supported Alvium CSI-2 camera models and firmware

As of this writing, the following Alvium camera models are supported:

- 1800 C 500 c/m
- 1800 C-507 c/m
- 1800 C-511 c/m
- 1800 C-1236 c/m
- 1800 C-2050 c/m

Supported firmware: Alvium\_CSI-2\_Camera\_ 00.08.00.6727174b

### Multiple camera support

You can connect and operate two Alvium cameras with CSI-2 interface.

## Compatible ARM boards and drivers

The Vimba 6.0 CSI TL is compatible with **NVIDIA Jetson AGX Xavier and Xavier NX developer kits** with JetPack 4.5.1 (L4T 32.5.1) and camera driver version 3.x.x.

## Installation

### Prerequisites

The following prerequisites are required for the driver installation:

- Host PC with Ubuntu 18.04 or 20.04 (required to install JetPack on the target board)
- NVIDIA Jetson AGX Xavier developer kit or Xavier NX developer kit

You can connect your Alvium CSI-2 camera to the Jetson board before or after the driver installation.



#### Backup of your Jetson board

Before starting the installation, create a backup of your Jetson board.



#### If JetPack 4.6 is already installed

NVIDIA doesn't provide the option to downgrade JetPack 4.6 to JetPack 4.5.1. If JetPack 4.6 is already installed, the board must be flashed to install JetPack 4.5.1. Therefore, install JetPack 4.5.1 first and then everything else.

### Step 1: Install JetPack

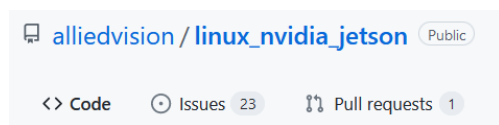
You can skip this step if JetPack 4.5.1 is already installed.

To install JetPack, we recommend using [NVIDIA SDK Manager](#).

1. Connect your Jetson board to the host PC as per NVIDIA's instructions.
2. Download NVIDIA SDK Manager to your host PC.
3. Install JetPack 4.5.1 (L4T 32.5.1), following the instructions of NVIDIA SDK Manager: <https://developer.nvidia.com/embedded/jetpack>. Higher JetPack versions are currently not supported.

### Step 2: Install the the Alvium CSI-2 driver

4. Go to [https://github.com/alliedvision/linux\\_nvidia\\_jetson](https://github.com/alliedvision/linux_nvidia_jetson).
5. The correct driver version is available in the master branch and tagged with l4t-32.5.1-3.0.0.



6. Follow the instructions of the README on GitHub.

### Step 3: Install Vimba

You can download and install [Vimba for ARM64](#) “as usual”.  
If you need instructions, please read: [Installing Vimba under Linux](#).

### Step 4: Check and update the camera firmware version

Check the camera firmware version of your Alvium CSI-2 camera with Vimba Firmware Updater. If it is < Alvium\_CSI-2\_Camera\_00.08.00.6727174b.avf, update the firmware to the latest version available at: <https://www.alliedvision.com/en/support/firmware-downloads/>

If you accidentally tried to use a lower firmware version with *GenICam for CSI-2* and an error occurred, reboot the board.

## Known issues and restrictions

Please note the following known issues and restrictions (valid for operating the camera with Vimba):

- Please use “alloc and announce” for best possible performance, see the AsynchronousGrab example (C++: Program.Config.h, optional parameter /x, C: Program.c, optional parameter /x, Python: optional parameter /x).
- If your application causes dropped frames, try to increase the number of frame buffers from 3 (default) to approximately 7.
- Maximum frame rate often increases after a few minutes of camera operation.
- Switching the camera from GenICam for CSI-2 to V4L2 or vice versa requires rebooting the board.
- Executing the Device Reset GenICam command leads to camera communication failures, please reboot the board.
- Exposure times greater than approx. 1 second: Stopping acquisition may cause an error. Please close and open the camera to start streaming again.
- Stream statistics don't contain dropped or incompleated frames (value is always 0).
- Issues that may occur occasionally:
  - AGX Xavier: Camera stays in locked state after camera handle is closed.
  - Python API: The first acquired images may get lost, especially with high frame rates.

Camera firmware issue:

With the camera firmware version mentioned above, the camera always opens with default settings when *GenICam for CSI-2* is used. You can find more details about the firmware in the [Firmware Release Notes](#).

## Questions and answers

**Question:** Are Vimba's CSI transport layer and Alvium 1800 C cameras GenICam-compliant?

**Answer:** In contrast to GigE Vision and USB Vision, MIPI CSI-2 is not officially designed for GenICam-compliance. The Vimba CSI-2 TL is compliant to the GenICam GenTL standard, so that Allied Vision CSI-2 cameras can be used like any other GenICam devices.

**Question:** Can I use Vimba Firmware Updater for firmware versions that are incompatible with *GenICam for CSI-2*?

**Answer:** Yes, you can use Vimba Firmware Updater for firmware versions that are incompatible with *GenICam for CSI-2* and continue using your camera with V4L2. You can even use the Vimba Firmware Updater with Alvium 1500 C cameras (if Vimba CSITL is installed).

**Question:** Can I use driver v3.0.0 with both V4L2 and Vimba?

**Answer:** Yes, you can use driver v.3.0.0 with V4L2 and Vimba, but not at the same time. Driver versions <3.0.0 are suitable for V4L2 only. To switch between V4L2 and *GenICam for CSI-2*, please reboot the board before using the cameras with Vimba. Without rebooting, image acquisition is not possible.

**Question:** If I set camera features with the V4L2 API and use the camera with *GenICam for CSI-2* later (or vice versa), are the settings retained ?

**Answer:** No, the settings are not retained, the camera opens with default settings.

**Question:** Does Vimba automatically find and list Alvimium 1800 C cameras?

**Answer:** Yes, Vimba finds and lists Alvimium 1800 C cameras automatically.

**Question:** Why are Jetson TX2 and Nano currently not supported by the latest driver version?

**Answer:** The purpose of driver version 3.0.0 is *GenICam for CSI-2* support. In this context, TX2 and Nano cause issues such as dropped images and unusable pixel formats. For Jetson TX2 and Nano, we currently recommend using the V4L2 API with driver version 2.1. Visit <https://github.com/alliedvision> for driver installation instructions, additional documentation, and examples.

**Question:** Can I use an Alvimium MIPI CSI-2 camera model that is currently not listed as supported?

**Answer:** Alvimium 1500 C cameras are designed for use with V4L2 only. If you want to use an Alvimium 1800 C model that is currently not listed as supported, please [contact us](#).

**Question:** With the V4L2 API, some custom Jetson pixel formats deviate from the standard. Is this also the case when I use the Vimba CSI TL?

**Answer:** No, the Vimba CSI TL represents GenICam/PFNC pixel formats without deviations.

**Question:** Can I prototype my vision application with an Alvimium USB camera on a PC and reuse the source code with an Alvimium CSI-2 camera and an ARM board?

**Answer:** Yes, Vimba is platform-independent and the Alvimium USB and MIPI CSI-2 camera feature behavior is designed in a consistent way. As always, check which features might be available on one camera interface only. To cross-compile your code, read [Cross-Compiling Vimba Source Code to ARM](#). If you have questions, our experienced [Technical Support](#) team is happy to help!

## Further readings

For **camera documentation**, visit:

<https://www.alliedvision.com/en/support/technical-documentation/alvimium-csi-2-documentation/>

The *Alvimium CSI-2 Camera User Guide* is the basis document. It provides camera specifications, hardware installation instructions, and links to other documents and webpages.

Alvimium USB and CSI-2 cameras share a common *Features Reference* document, which is also available from the link above.

### Software documentation:

Vimba documentation is contained in the [Vimba SDK](#).

Useful application notes:

- [Optimizing the Performance of Jetson](#)
- [Vimba Installation under Linux](#)
- [Cross-Compiling Vimba Source Code to ARM](#)