

*senSPure™* SDK

# **TOPPAN ToF SDK Development Environment Setup Guide**

TOPPAN 3D ToF Camera



**TOPPAN Holdings Inc.**

**Version 1.11**

April 18, 2025

## Contents

1. Overview .....	3
1-1. Purpose of this guide.....	3
1-2. TOPPAN TOF SDK structure diagram .....	3
1-3. Operating environment .....	3
1-3-1. Recommended environment for host computer.....	4
1-3-2. Programming language .....	4
2. Development environment setup .....	4
2-1. Provided software (Common) .....	4
2-2. For Windows environment .....	6
2-2-1. Required software .....	6
2-2-2. Installation Steps for execution environment.....	6
2-2-3. Build steps .....	7
2-2-3-1. CMake configuration.....	7
2-2-3-2. Build execution.....	8
2-3. For Linux/Ubuntu environment .....	9
2-3-1. Required software .....	9
2-3-2. Installation steps for execution environment.....	9
2-3-3. Build steps .....	10
2-3-3-1. Build execution.....	10
2-4. For Jetson AGX Orin environment .....	11
2-4-1. Required software .....	11
2-4-2. Installation steps for execution environment.....	11
2-4-3. Build steps .....	12
2-4-3-1. Build execution.....	12
3. Terms of Use and Disclaimer .....	13
4. Document history .....	13

# 1. Overview

## 1-1. Purpose of this guide

This manual describes how to build an environment when using the TOPPAN ToF SDK (Software Development Kit) for TOPPAN's 3D ToF cameras.

## 1-2. TOPPAN TOF SDK structure diagram

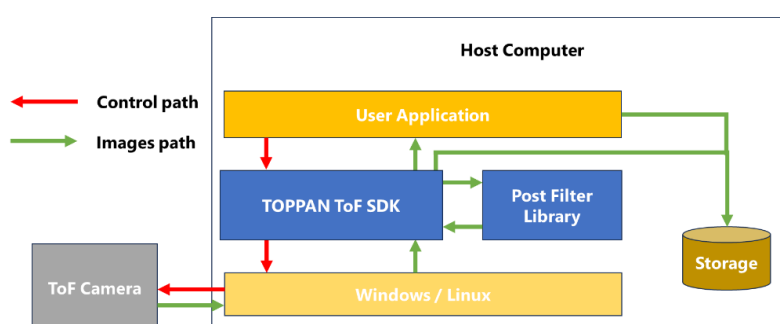


Figure 1. TOPPAN TOF SDK software structure diagram (Example)

Table 1. Description of each block

Block	Contents
User Application	Application that controls TOPPAN ToF SDK or a sample application provided in TOPPAN ToF SDK
TOPPAN ToF SDK (Library)	Libraries provided for this SDK
Post Filter (Library)	Libraries working in combination with TOPPAN ToF SDK C++ classes that provide image filtering functions

## 1-3. Operating environment

The following describes the operating environment of TOPPAN ToF SDK.

Table 2. Operating environment

環境		OS 種類	バージョン
PC		Windows	Windows 10/11 64bit
		Linux	Ubuntu 20.04LTS 64bit
SoC	NVIDIA Jetson AGX Orin	Linux	Ubuntu 20.04LTS 64bit / JetPack 5.0.1

### 1-3-1. Recommended environment for host computer

The recommended environment for the host computer running TOPPAN ToF SDK is as follows.

Table 3. Recommended environment (Performances)

Name	推奨環境
CPU	4-core 2GHz or higher
RAM	64-bit CPU
Interface	8GB or more

**Note:** If the Pipeline Framework requires multi-threaded configuration and high frame rate processing, a host PC with higher specifications in terms of CPU core count and frequency will be needed.

### 1-3-2. Programming language

This SDK is developed in C++ (C++17 standard). However, MISRA-C++ and CERT-C++ are not supported.

## 2. Development environment setup

### 2-1. Provided software (Common)

When the software provided with TOPPAN ToF SDK is extracted, the directory structure will appear as shown below. Any references to {SDK path} should be interpreted as the directory where the software is extracted (e.g., Windows: C:\Users\{User}\sdk\Windows, Linux: /home/{User}/sdk/Ubuntu, etc.).

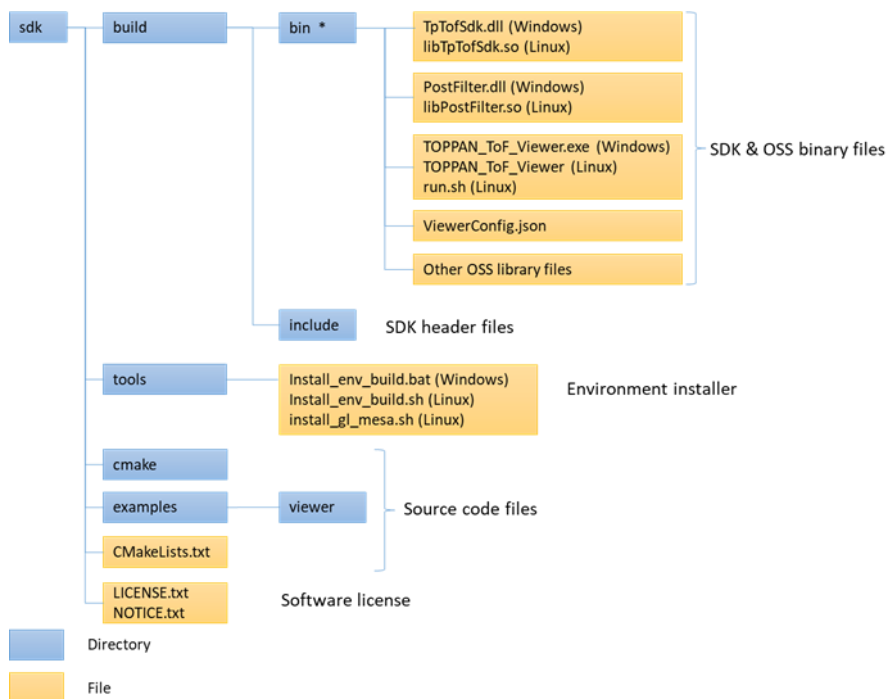


Figure 2. Directory structure of the provided software

**Note:** Use single-byte alphanumeric characters for directory paths and file names. If other characters are included, the software may not operate correctly.

**Note:** In the Windows OS environment, the SDK & OSS binary files are stored under “bin\Release”.

The contents of each file are as follows:

Table 4. TOPPAN ToF SDK Software contents

Directory path		Description
<b>build</b>		Directory for build files
	<b>bin</b>	Location for built binary files
	<b>TopTofSdk.dll</b> <b>libTpTofSdk.so</b>	Library file for this SDK
	<b>PostFilter.dll</b> <b>libPostFilter.so</b>	Extension library file integrated with this SDK
	<b>TOPPAN_ToF_Viewer.exe</b> <b>run.sh</b>	Executable file or script for evaluation using this SDK
	<b>ViewerConfig.json</b>	Configuration file for TOPPAN ToF Viewer
	<b>Other OSS library files</b>	Binary files for open-source software used
	<b>include</b>	Library files for this SDK
<b>tools</b>		
	<b>install_env_build.bat</b> <b>install_env_build.sh</b> <b>install_gl_mesa.sh</b>	Files for environment installation
<b>cmake</b> <b>CMakeLists.txt</b>		Configuration files for rebuilding the TOPPAN ToF Viewer using CMake.
<b>examples</b>		Source code for sample software using TOPPAN ToF SDK
	<b>viewer</b>	Source code for the TOPPAN ToF SDK Sample Viewer
<b>LICENSE.txt</b>		License terms
<b>NOTICE.txt</b>		Third-party notices: OSS License terms

## 2-2. For Windows environment

### 2-2-1. Required software

The following software is required for the Windows environment when using TOPPAN ToF SDK.

Table 5. Required software (Windows)

Purpose	Software	Note
Package Management	chocolatey <a href="https://chocolatey.org/install#individual">https://chocolatey.org/install#individual</a>	Development environment setup
Build Tool	Cmake (Ver:3.23.3) <a href="https://cmake.org/">https://cmake.org/</a>	SDK build
Compiler	Visual Studio 2019	SDK compilation
Image Processing	OpenCV (Ver: 4.5.5) <a href="https://opencv.org/">https://opencv.org/</a>	Used within the provided SDK library
C++ Extension	boost (Ver: 1.74) <a href="https://www.boost.org/">https://www.boost.org/</a>	Used within the provided SDK library
USB Driver	Windows SDK	Used within the provided SDK library
Image Reception	EWCLIB (Ver: 2.8) <a href="http://insubaru.g1.xrea.com/ewclib">http://insubaru.g1.xrea.com/ewclib</a>	Used within the provided SDK library
	Windows SDK 6.1 <a href="https://www.microsoft.com/en-us/download/details.aspx?id=14477">https://www.microsoft.com/en-us/download/details.aspx?id=14477</a>	
Runtime Environment	Visual C++ Redistributable Package <a href="https://learn.microsoft.com/ja-jp/cpp/windows/latest-supported-vc-redist?view=msvc-170">https://learn.microsoft.com/ja-jp/cpp/windows/latest-supported-vc-redist?view=msvc-170</a>	Execution in non-Microsoft Visual Studio environments
Graphics	GLFW (Ver: 3.3.2) <a href="https://www.glfw.org/">https://www.glfw.org/</a>	Used in TOPPAN ToF Viewer
GUI Tool	Dear ImGui (Ver: 1.88) <a href="https://github.com/ocornut/imgui">https://github.com/ocornut/imgui</a>	Used in TOPPAN ToF Viewer
	imgui-filebrowser (Commit ID: cfccc2a) <a href="https://github.com/AirGuanZ/imgui-filebrowser">https://github.com/AirGuanZ/imgui-filebrowser</a>	
Japanese Font	IPA Font (Ver: 003.03) <a href="https://moji.or.jp/ipafont/">https://moji.or.jp/ipafont/</a>	Used in TOPPAN ToF Viewer

### 2-2-2. Installation Steps for execution environment

#### STEP1. Package Management - chocolatey

Chocolatey is used as the package management tool on Windows. Access the following link and install chocolatey according to the instructions:

<https://chocolatey.org/install#individual>

**Note<sup>1</sup>:** Typically, select "Individual" and follow the steps for installation.

**Note<sup>2</sup>:** After selecting "Individual", launch Windows PowerShell with administrator privileges. Copy the command provided in the installation steps and paste it into the Windows PowerShell console. Press [Enter] to execute.

### STEP2. OSS(boost)

Using chocolatey, install the open-source software (OpenCV, boost) referenced by TOPPAN ToF SDK. Launch the command prompt with administrator privileges and execute the following command to install:

```
cd {SDK path}
.\tools\install_env_build.bat
```

### STEP3. Visual Studio 2019 Setup

If rebuilding the evaluation viewer, install Visual Studio 2019. Since TOPPAN ToF SDK is implemented in C++, enable "Desktop development with C++" during installation.

### STEP4. Visual C++ Redistributable Package

If the Visual C++ 2019 Redistributable Package (X64) is not installed, download and install it from the following Microsoft website:

<https://learn.microsoft.com/ja-jp/cpp/windows/latest-supported-vc-redist?view=msvc-170>

**Note**<sup>1</sup>: Architecture (X64) Download URL [[https://aka.ms/vs/17/release/vc\\_redist.x64.exe](https://aka.ms/vs/17/release/vc_redist.x64.exe)]

## 2-2-3. Build steps

The steps for building TOPPAN ToF SDK in a Windows environment are as follows:

### 2-2-3-1. CMake configuration

Launch the installed CMake (cmake-gui), set the source code directory to the SDK directory ({SDK path}), and the build output directory to the desired location (e.g., {SDK path}\build). Then, execute Configure.

**Note:** CMake variable names are case sensitive and may only contain alphanumeric characters and underscores.

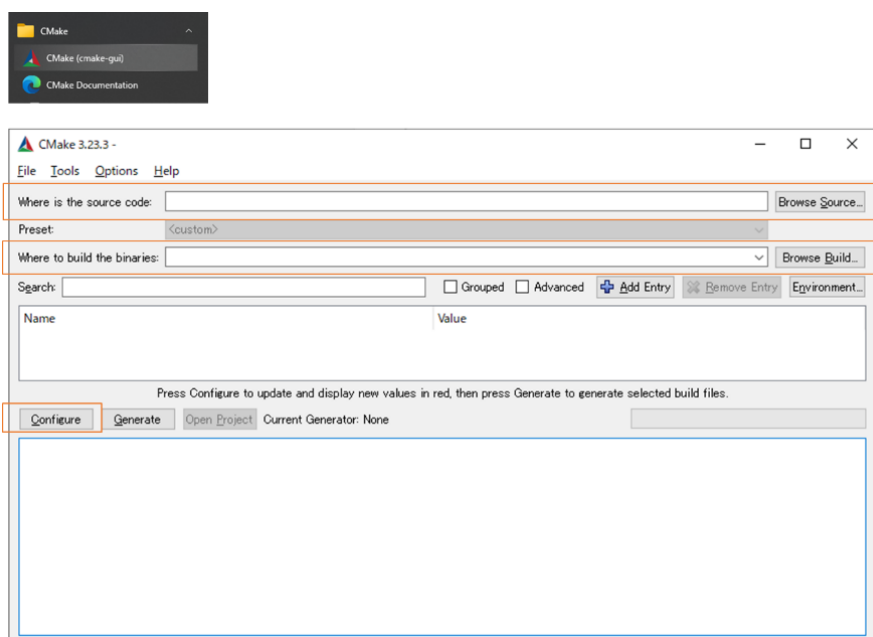


Figure 3. CMake configuration-1

For the generator, select "Visual Studio 16 2019" and platform "x64", then click "Finish".

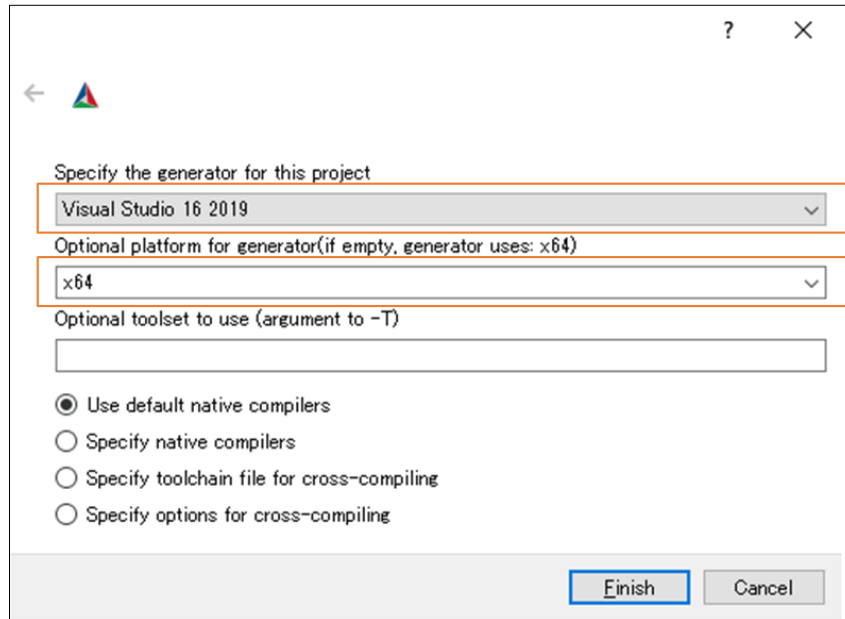


Figure 4. CMake configuration-2

Without changing any compile options, execute "Generate". After that, click "Open Project" to launch Visual Studio 2019.

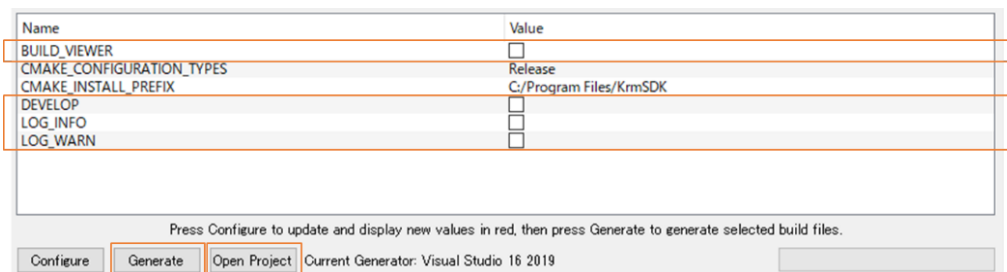


Figure 5. CMake configuration-3

### 2-2-3-2. Build execution

Launch Visual Studio 2019 and execute the build. The binary files generated from the build will be stored in "{SDK path}\build\bin".



## 2-3. For Linux/Ubuntu environment

### 2-3-1. Required software

The following software is required for the Linux/Ubuntu environment when using TOPPAN ToF SDK.

Table 6. Required software (Linux/Ubuntu)

Purpose	Software	Note
Package Management	Advanced Package Tool	Development environment setup
Build Tool	CMake (Ver:3.16.3) <a href="https://cmake.org/">https://cmake.org/</a>	SDK build
Compiler	GNU G++ (Ver:9.3.0)	SDK compilation
Image Processing	OpenCV (Ver:4.2.0) <a href="https://opencv.org/">https://opencv.org/</a>	Used within the provided TOPPAN ToF SDK library
C++ Extension	boost (Ver:1.71) <a href="https://www.boost.org/">https://www.boost.org/</a>	Used within the provided TOPPAN ToF SDK library Used in TOPPAN ToF Viewer
Image Reception	Video for Linux2 (V4L2) <a href="https://www.linuxtv.org/">https://www.linuxtv.org/</a>	Used within the provided TOPPAN ToF SDK library
USB driver	libusb (Ver:1.0.23) <a href="https://libusb.info/">https://libusb.info/</a>	Used within the provided SDK library
Graphics	GLFW (Ver:3.3.2) <a href="https://www.glfw.org/">https://www.glfw.org/</a>	Used in TOPPAN ToF Viewer
OpenGL	Mesa 3D (Ver:9.0.1) <a href="https://mesa3d.org/">https://mesa3d.org/</a>	Used in TOPPAN ToF Viewer
GUI Tool	Dear ImGui (Ver:1.88) <a href="https://github.com/ocornut/imgui">https://github.com/ocornut/imgui</a> imgui-filebrowser (Commit ID: cfccc2a) <a href="https://github.com/AirGuanZ/imgui-filebrowser">https://github.com/AirGuanZ/imgui-filebrowser</a>	Used in TOPPAN ToF Viewer
Japanese Font	IPA Font (Ver:003.03) <a href="https://moji.or.jp/ipafont/">https://moji.or.jp/ipafont/</a>	Used in TOPPAN ToF Viewer

### 2-3-2. Installation steps for execution environment

#### STEP1. OSS

Install the OSS (OpenCV, boost, libusb, CMake, GLFW, IPA Font) referenced by this SDK. Launch the terminal and execute the following commands to install.

```
cd {SDK path}
./tools/install_env_build.sh
```

#### STEP2. OSS OpenGL Driver

If the OpenGL driver is not installed on the host PC, install it using the following command.

```
./tools/install_gl_mesa.sh
```

After executing the command, the file "99-usb-C11U.rules" will be generated in the directory of "/lib/udev/rules.d/".

### 2-3-3. Build steps

The following are the steps for building this SDK in a Linux/Ubuntu environment.

#### 2-3-3-1. Build execution

Launch the terminal and execute the following commands to build.

```
cd {SDK path}/build  
cmake ..  
make
```

To perform a parallel build, specify the -j option as shown below (N: number of parallel builds).

```
make -jN
```

The binary files generated from the build will be stored in "build/bin".

## 2-4. For Jetson AGX Orin environment

### 2-4-1. Required software

The following software is required for the Jetson AGX Orin environment when using this SDK.

Table 7. Required software (Jetson AGX Orin)

Purpose	Software	Note
Package Management	Advanced Package Tool	Development environment setup
Build Tool	CMake (Ver:3.16.3) <a href="https://cmake.org/">https://cmake.org/</a>	SDK build
Compiler	GNU G++ (Ver:9.3.0)	SDK compilation
Image Processing	OpenCV (Ver:4.5.4) <a href="https://opencv.org/">https://opencv.org/</a>	Used within the provided TOPPAN ToF SDK library
C++ Extension	boost (Ver:1.71) <a href="https://www.boost.org/">https://www.boost.org/</a>	Used within the provided TOPPAN ToF SDK library Used in TOPPAN ToF Viewer
Image Reception	Video for Linux2 (V4L2) <a href="https://www.linuxtv.org/">https://www.linuxtv.org/</a>	Used within the provided TOPPAN ToF SDK library
USB driver	libusb (Ver:1.0.23) <a href="https://libusb.info/">https://libusb.info/</a>	Used within the provided TOPPAN ToF SDK library
Graphics	GLFW (Ver:3.3.2) <a href="https://www.glfw.org/">https://www.glfw.org/</a>	Used in TOPPAN ToF Viewer
GUI Tool	Dear ImGui (Ver:1.88) <a href="https://github.com/ocornut/imgui">https://github.com/ocornut/imgui</a>	Used in TOPPAN ToF Viewer
	imgui-filebrowser (Commit ID: cfccc2a) <a href="https://github.com/AirGuanZ/imgui-filebrowser">https://github.com/AirGuanZ/imgui-filebrowser</a>	
Japanese Font	IPA Font (Ver:003.03) <a href="https://moji.or.jp/ipafont/">https://moji.or.jp/ipafont/</a>	Used in TOPPAN ToF Viewer

### 2-4-2. Installation steps for execution environment

#### STEP1 OSS

Install the OSS (boost, libusb, CMake, GLFW, IPA Font) referenced by this SDK. Launch the terminal and execute the following commands to install.

```
cd {SDK path}
./tools/install_env_build.sh
```

After executing the command, the file "99-usb-C11U.rules" will be generated in the directory of "/lib/udev/rules.d/".

### 2-4-3. Build steps

#### 2-4-3-1. Build execution

Launch the terminal and execute the following commands to build.

```
cd {SDK path}/build  
cmake ..  
make
```

To perform a parallel build, specify the -j option as shown below (N: number of parallel builds).

```
make -jN
```

The binary files generated from the build will be stored in "build/bin".

### 3. Terms of Use and Disclaimer

Please refer to the "C11U User's Guide", "TOPPAN ToF SDK API Reference Manual", and other related documents for the terms and conditions of use for products from TOPPAN Holdings Inc. and TOPPAN Inc. (hereinafter referred to as "the Company").

- Unauthorized copying, reproduction, or reprinting of any part or all of this document is strictly prohibited.
- The contents of this document are subject to change without notice.
- While the Company takes every measure to provide accurate information, it does not assume responsibility for errors or omissions. Furthermore, the Company is not liable for any damages resulting from the use of the information contained in this document.
- The Company shall not be liable for any damages, including but not limited to data loss, loss of opportunity, loss of profit, and other incidental, indirect, or consequential damages, arising from the use of this product.
- Product names and company names, and other proper nouns mentioned in this document and related documents, belong to their respective companies or individuals. In this document, the TM (™) and R (®) marks may be omitted. These names are used for identification and explanation purposes within this document only. The Company has no intention to infringe on any of these rights.

### 4. Document history

Date	Version	Comment
2024/09/03	1.00	Initial release
2025/03/19	1.10	Initial release For ES Version
2025/04/18	1.11	1. Corrected software version; Table 5, 6, 7: Required software 2. Corrected Figure 2: Directory structure of the provided software 3. Corrected minor typos 4. Revised Table 2. Operating environment: JetPack 5.0.1

**TOPPAN**

**TOPPAN ホールディングス株式会社**  
**TOF Business Development Division, TOPPAN Holdings Inc.**

**TOPPAN 株式会社 エレクトロニクス事業本部**  
**Electronics Division, TOPPAN Inc.**

## Location

(日本語) 〒108-8539 東京都港区芝浦 3-19-26 トッパン芝浦ビル

(English) 3-19-26, Shibaura, Minato-ku, Tokyo, 108-8539

E-mail [electronics@toppan.co.jp](mailto:electronics@toppan.co.jp)

Website <https://www.toppan.com/en/electronics/device/tof/> (TOPPAN Inc.)

## ToF camera product support center

For support related to ToF camera products, please contact the designated support center.

E-mail [btop\\_support@toppan.co.jp](mailto:btop_support@toppan.co.jp)