

CamBoard pico flexx

Getting Started

Version

1.0.5

Technical information subject to change without notice.

This document may also be changed without notice.

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1. Introduction

This document is intended for specialists. These specialists are people who are qualified by their appropriate training and their experience to see risks and to avoid possible hazards that may be caused during operation or maintenance of the device. The document contains information about the correct handling of the device.

Read this document before use to familiarize yourself with operating conditions and installation. Keep this document at hand during the entire duration of use of the device.

All references to software package and viewer application are valid for revision 1.0.5. Changes in future revisions will be reflected in an updated corresponding getting started document.

2. Warnings / Recommendations

These instructions are part of the device. They contain texts and figures concerning the correct handling of the device and must be read before installation or use.

Note the safety instructions. Use the device in accordance with its designated use.

The installation and connection must comply with the applicable national and international standards. Responsibility lies with the person installing the device.

The unit may only be opened by the manufacturer or by a person authorized by the manufacturer.



Caution: Class I invisible laser radiation present.

Highly divergent laser radiation - Do not stare into the beam.

Do not attach any optics to the device! Do not open the enclosure



Attention: warning of hot surfaces.

During operation do not touch the device directly.





Only use the CamBoard flexx with the software delivered in this package.
Don't use this module with prior software versions!



Though profound testing we cannot guarantee seamless operation with all USB chipsets on the market. Utilize an active USB hub if problems occur with notebook or tablet operation

3. Items supplied

1.	CamBoard pico flexx	
2.	USB cable	
3.	USB - OTG cable adapter	
4.	Magnets (option for mounting the device)	
5.	Wooden stand (option for placing the device)	
6.	Getting Started Guide	

The software is provided via a download link sent by email.

4. Installation

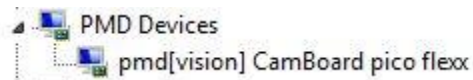
First download the libroyale.zip from the link you received by mail.

Unpack the ZIP file. You will find several packed files inside that correspond to the supported OS platforms.

Choose the file for your OS and unpack it to a location of your choice e.g. your desktop or a folder on your Android device.

4.1. Windows

- There are installers for installing software and drivers for the CamBoard pico flexx (libroyale-1.0.5.X-WINDOWS-64Bit.exe and libroyale-1.0.5.X-WINDOWS-32Bit.exe).
- Please follow the instructions of the installation assistant. Choose "Weiter"/"Continue" on the first screen, then accept the license agreement on the second screen ("Annehmen"/"Accept").
- Make sure that the checkboxes for Desktop icon and install of the drivers on the third screen are checked.
- On the fourth screen you may change the installation path.
- After successful installation you may
 - Connect the CamBoard pico flexx to your PC via USB.
 - Open the device manager (on a console or in the Win8-search type "mmc devmgmt.msc" and hit RETURN)
 - The CamBoard pico flexx should show up in the "PMD Devices" section. For each connected CamBoard pico flexx an entry should exist.



4.2. Linux

Please extract the Linux package (will result in a "libroyale-1.0.5.X-LINUX-64Bit" or "libroyale-1.0.5.X-LINUX-32Bit" folder). Then transfer the complete folder to your computer.

Make sure that you have proper permissions to the USB device. The installation package contains a proper rules file which can be used. It is located in the /driver/udev directory. Make sure to read the README file for more details.

4.3. Mac OSX

For Mac OS X please extract the tar.gz package (will result in a "libroyale-1.0.5.X-APPLE-64Bit" folder). Then transfer the complete folder to your computer. You will find the royaleviewer app in the /bin subfolder.

4.4. Android

For Android the software/driver is an APK installer. Please extract the Android package (will result in a “libroyale-1.0.5.X-ANDROID-32Bit” folder). Then either

- transfer the complete “libroyale-1.0.5.X-ANDROID-32Bit” folder to your device
- Execute libroyale-1.0.5.X-ANDROID-32Bit\bin\RoyaleViewer.apk
- Make sure that "installation from unknown sources" is enabled in your security settings

Or if you have an Android Development Kit installed,

- you can use “adb install ./RoyaleViewer.apk” in the folder “libroyale-1.0.5.X-ANDROID-32Bit\bin\”
- See also <http://developer.android.com/tools/help/adb.html>

The “royale viewer” app should show up in your applications now.

5. API documentation (Royale documentation)

The **Royale** software package provides a light-weight camera framework for time-of-flight (ToF) cameras. While being tailored to pmd cameras, the framework enables partners and customers to evaluate and/or integrate 3D TOF technology on/in their target platform. This reduces time to first demo and time to market.

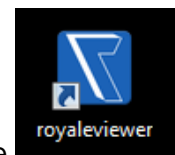
The full html documentation can be found within the doc subfolder in the installation path (Windows) or in the unpacked folder (Linux, Android, Mac OS X).

- *C:\Program Files\libroyale\1.0.5.X\doc\html\index.html*
- *libroyale-1.0.5.X-[platform]/doc/html/index.html*

6. Royale viewer

Once the CamBoard pico flexx is attached to a free USB port, and the drivers are in place, you may start the **Royale viewer** application which gives you a first indication, if the CamBoard pico flexx is working on your target system. The Royale viewer displays a 2D and a 3D representation of the captured depth data.

6.1. Starting the Royale viewer on Windows



The Royale viewer can be started using the “royaleviewer”- Desktop-icon or the “royaleviewer” entry in the start menu (Windows 7).

It is also accessible here: “C:\Program Files\libroyale\1.0.5.X\bin\royaleviewer.exe” where “Program Files\libroyale” is the default installation folder.

6.2. Starting the Royale viewer on Android

Just tap the „royale viewer“ app. The look and feel is the same like on the x86 based OS.

6.1. Starting the Royale viewer on Mac OS X

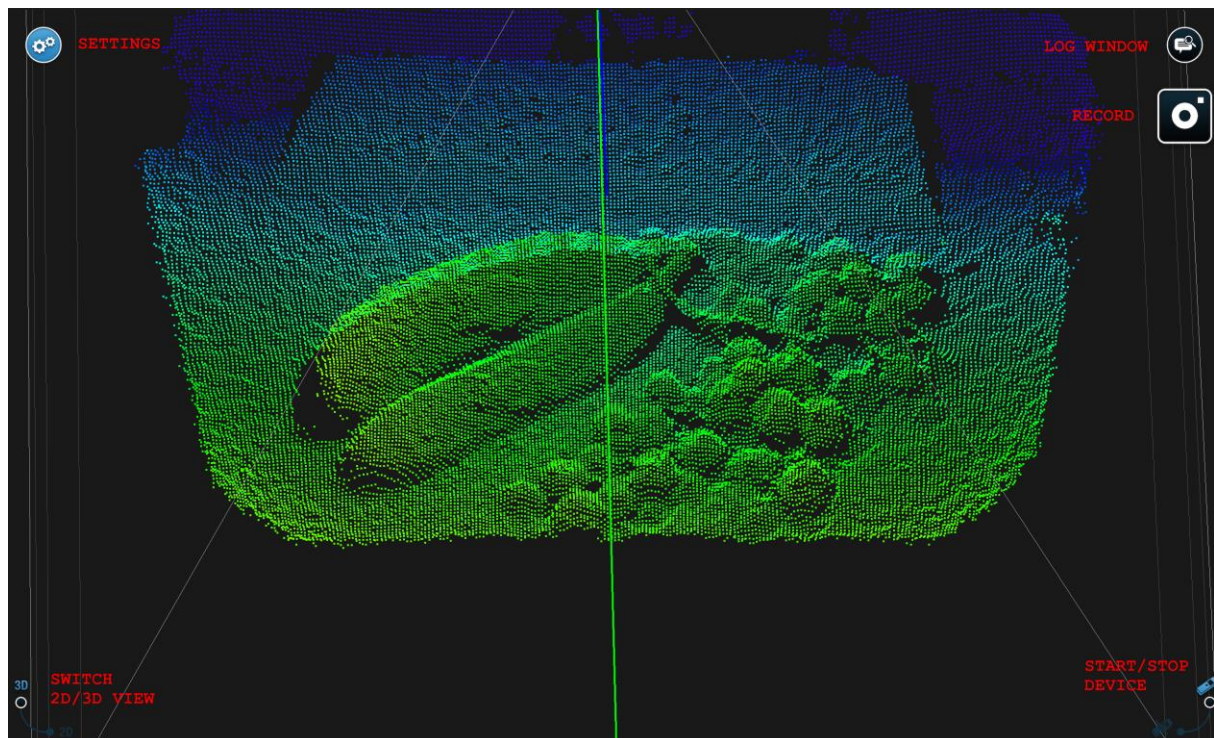
Click royaleviewer-app in the /bin subfolder of your extracted package.

6.2. Starting the royale viewer on Linux

To run the Royale viewer, please execute royaleviewer.sh in the /bin directory of the extracted Linux package. It will automatically set the right path to the necessary libraries.

6.3. Operating the CamBoard pico flexx with the Royale viewer

>> The application screen will open blank with the control buttons as shown below:








To start the data acquisition press “Start” in the lower right corner and wait for the camera to initialize.

To check if the camera was found and started click on the info button in the upper right corner. The Info-box can be closed by clicking on the Info button again.

At first you will see a color coded 2D visualization of the depth data.

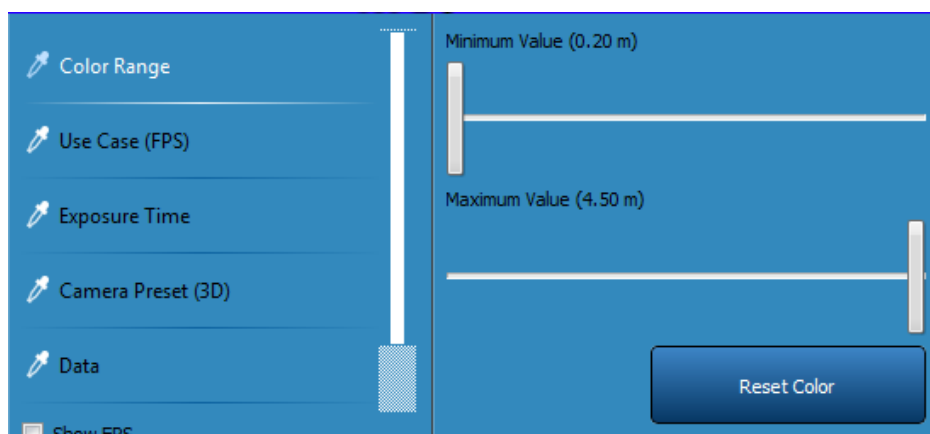
You can switch to the 3D visualization by clicking on the button in the lower left corner.

Button	Function
	Switch to start/stop the processing and display of 3D data from the CamBoard pico flexx
	Switch the visualization of 3D data between color coded 2D or 3D point-cloud view
	Settings for visualization and operation modes.
	Log Window: Status and history info.
	<p>Record (→ turns red if active) Records royale recording format (.rrf) as default or single 3D point cloud (.ply) and a screenshot of the current view (.png) if selected in settings</p> <p>Output folders depend on OS: Windows : DocumentsFolder/royale Linux : homefolder/royale MacOSX : homefolder/royale Android : /storage/sdcard0/royale</p>

6.3.1. Settings

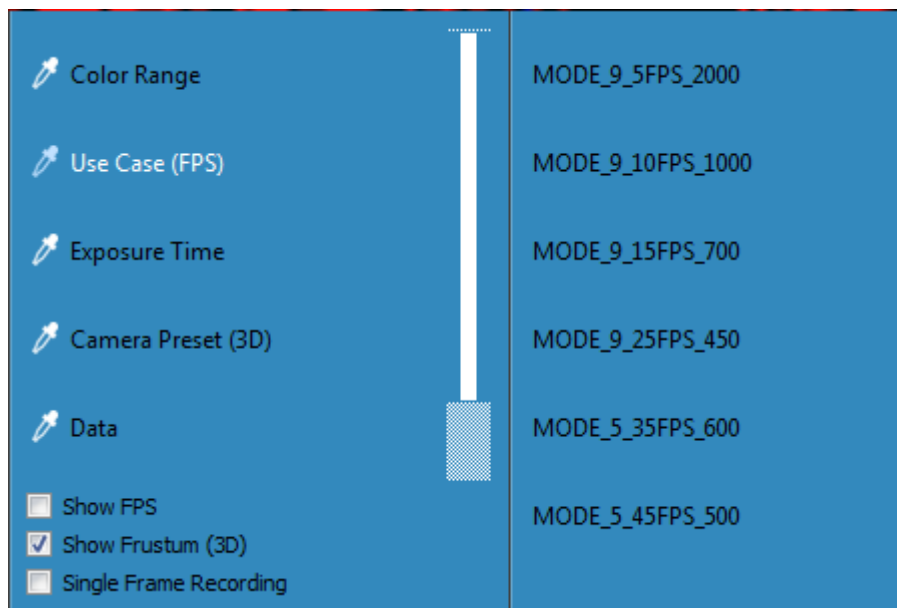
6.3.1.1. Settings > Color Range:

The color scale can be adjusted and reset (auto-scale between min and max range).



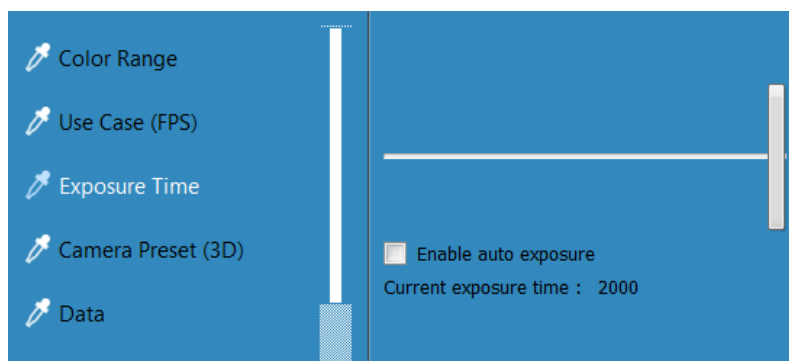
6.3.1.2. Settings > Use Case (FPS)

Selection of pre-defined operation modes. Please refer to the Royale documentation (HTML document in subfolder “doc”) for further details on operation modes.



6.3.1.3. Settings > Exposure time

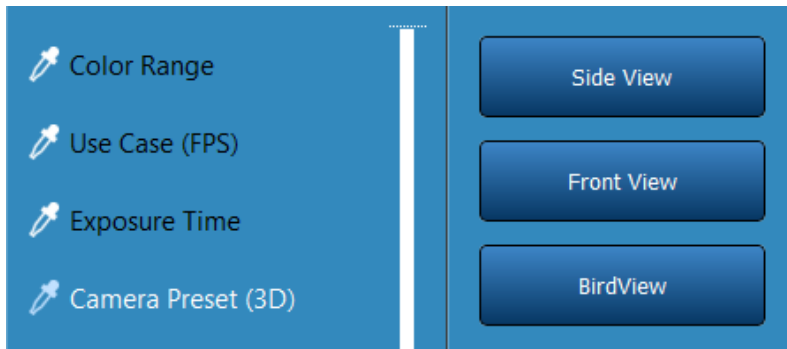
Setting the exposure time between max (default) and min exposure time for the chosen operation mode.



If “Enable auto exposure” is selected, the exposure time will automatically be adapted to the current scene.

6.3.1.4. Settings > Camera Preset (3D)

Affects 3D visualization only. If the 3D point cloud visualization is active (can be activated by the button in the lower left corner) the view can be switched to front view, side view or bird view here.



6.3.1.5. Settings > Data

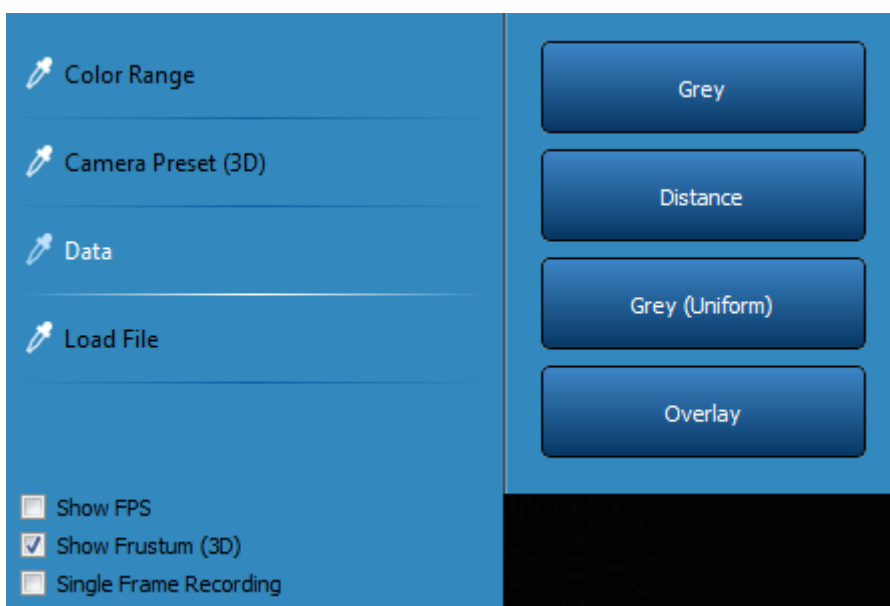
Visualization can be switched between the color coded 3D data and Greyscale data formats.

Grey will show a grey scale IR image (2D) or be overlaid to the 3D point cloud)

Distance will show a color coded depth map (2D) or point cloud (3D)

Grey (uniform) will be the same as Grey for the 2D visualization or show a uniform grey point cloud for the 3D visualization

Overlay shows a combination of a color coded depth and the grey image



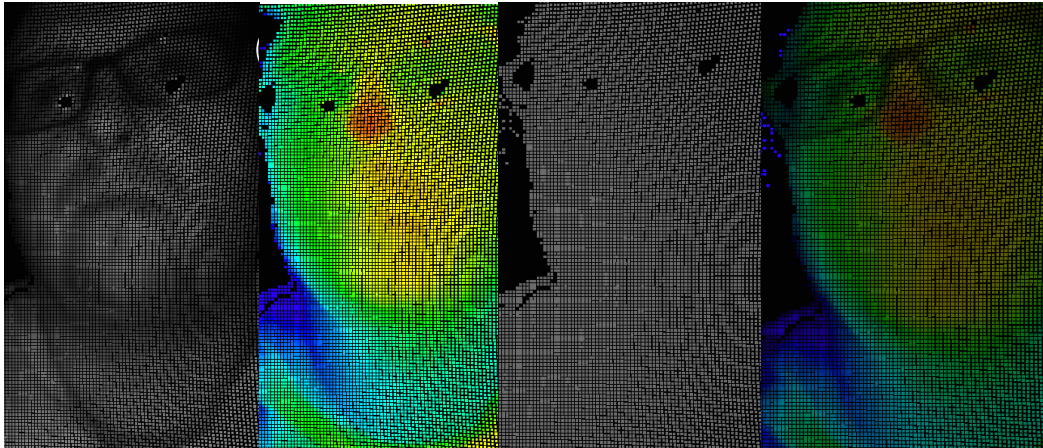


Figure 1: Grey, Distance, Grey (uniform), Overlay

6.3.1.6. Settings > Load File

Loads .rrf (Royale recording files) files from default storage location that can be played with the viewer. Clicking the connect button during a playback will unload the current file. Afterwards you can connect to a live camera again.

6.3.1.7. Settings > Show FPS

Shows current FPS rate if checked.

6.3.1.8. Settings > Show Frustum (3D)

Enables/Disables the viewing frustum in the 3D visualization.

6.3.1.9. Setting > Single Frame Recording

Toggle if a single frame and a screenshot or a rrf file is recorded.

7. Troubleshooting/ Known Bugs/ Errata

Problem	Possible solution
Camera not recognized ("FX3" in device manager)	Install drivers as described in chapter 4.
Camera not functional on USB2 port	Possibly power-supply of USB port out of spec. <ul style="list-style-type: none"> Try another port closer to your supply plug. Try using an active USB-HUB
Camera not functional on USB3 port	Try using another USB cable. (Recommended: USB-to-microUSB3).
Camera not recognized on Android device	<ul style="list-style-type: none"> Check connection of the USB cable(s) Try using an active USB-HUB
Nothing happens after pressing start in the royale viewer.	Starting the visualization might take a few seconds. Please click the "Info" Button to check if the camera

	was found. If the camera was not found please install drivers as described in chapter 4.
Android: application is not quitting correctly	Please tap your home button to return to your home screen. Then hold your home button (or tap your app list button) to show your recent apps. Slide the "royale viewer" app to remove from the list
Android: Settings > Use Case (FPS) dialog to small	The default mode is 5 fps (long range) We recommend devices >7" for the best user experience
Low FPS on ARM based Android device	Code is not yet optimized for special ARM platforms but should work on most. Please report your device/used application processor.

8. Tested configurations

OS	Comment
Android 4.4.2	Working devices <ul style="list-style-type: none"> • Samsung Galaxy S4 • Samsung Galaxy Note 10.1(SM-P605) • LGE G Pad 8.3" Devices not working <ul style="list-style-type: none"> • Samsung Galaxy Note Pro 12.2" Wifi
Windows 7	No special action required
Windows 8	No special action required
Windows 8.1	No special action required
Linux (Ubuntu 15.04, Ubuntu 14.04 +Qt5.4)	Tested with Ubuntu 15.04 32/64 bit
Mac OSX	No special action required