FLIM Data Acquisition Card

Our compact, USB-powered data acquisition card is designed for fluorescence lifetime imaging and spectroscopy measurements. It is portable and its features embody FLIM LABS expertise and mission.

KEY SPECS

- Portable
- Plug-n-play
- Customizable (FPGA-based technology)
- Desktop-size-compact (101x139x28 mm)
- USB-powered
- Light weight (only 120 g)
- Point scanner imaging capabilities
- USB 3.0 SuperSpeed interface
- B2C or B2B selling options

Included in the package:

– FLIM Data Acquisition Card
– USB 3.0 SuperSpeed micro-B cable
– Basic Software API for data acquisition and reconstruction (Rust, C, C++, C#, Python, node.js, .NET)

Main Applications

MAIN TECH-SPECS

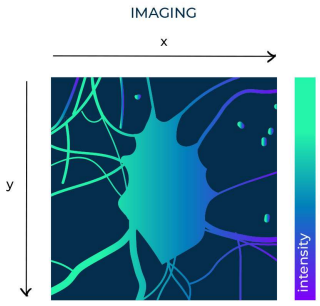
- < 300 ps single-shot precision (σ/√2)
- 24 or 48 ps minimum time bin resolution
- 1.5 ns deadtime
- 80MHz Max laser sync rate
- < 0.5% rms differential non-linearity
- Transfer rate up to 100 M counts/s
- Peak count rate per input channel up to 640 Mcounts/s
- 26 channels
- 11 SMA single-ended input for LVTTL 50 Ohm
- 1 SMA Laser trigger in (sync in) for LVTTL 50 Ohm signals
- 1 SMA Laser trigger out (sync out) LVTTL 50 Ohm for modulating external pulsed laser sources
- 13 USB-C LVDS input/output configurable

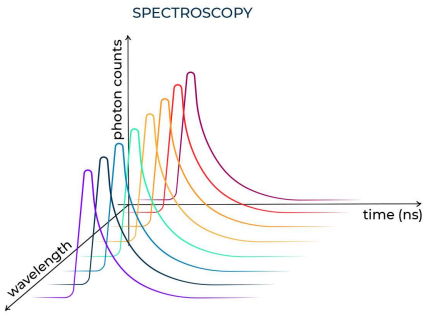
MAIN FEATURES

Our acquisition card is specifically designed for pursuing fluorescence lifetime imagin and spectroscopy measurements. It is conceived to introduce a new paradigm for fluorescence lifetime-based applications, where it can be used with minimal effort in any type of laboratory, from the bench to the optical table.

Compactness and portability

Dimension (101,3x139x28 mm) and lightweight (only 120 grams) allows for extreme portability. Furthermore, the USB-powered connection of our card enables its use in a portable setup or even outdoors.





Imaging and spectroscopy

Since the design of I/Os on our card is customizable, some of the channels can be configured for fluorescence sampling or imaging reconstruction signals such as pixel, line and frame clock. Moreover, channels can be used for synchronizing data acquisitions with other devices in use, such as acoustic-optics deflectors, piezo stages and other lab equipment in general.

Software

The card works as a passive plug-n-play device in conjunction with our data reconstruction and analysis software.

(Basic software license
included with FLIM Data Acquisition Card)

Multichannel

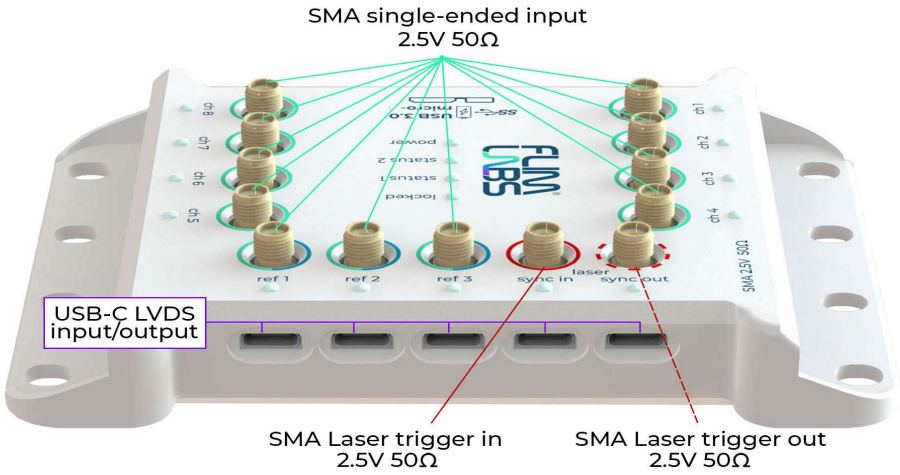
With a total of 26 I/O channels:

11 SMA single-ended input for LVTTL 50 Ohm

1 SMA Laser trigger in (sync in) for LVTTL 50 Ohm signals

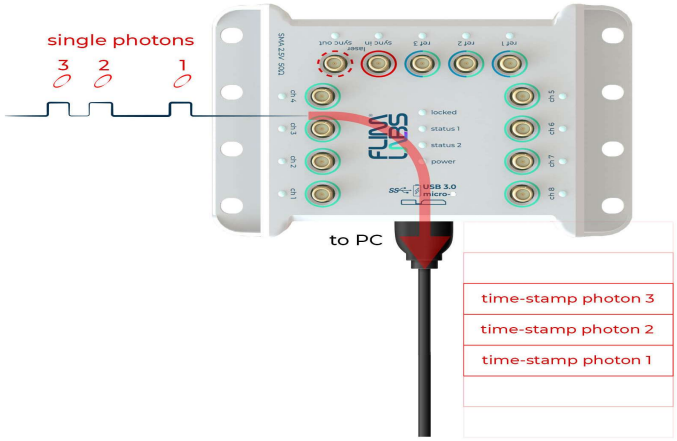
1 SMA Laser trigger out (sync out) LVTTL 50 Ohm for modulating external pulsed laser sources

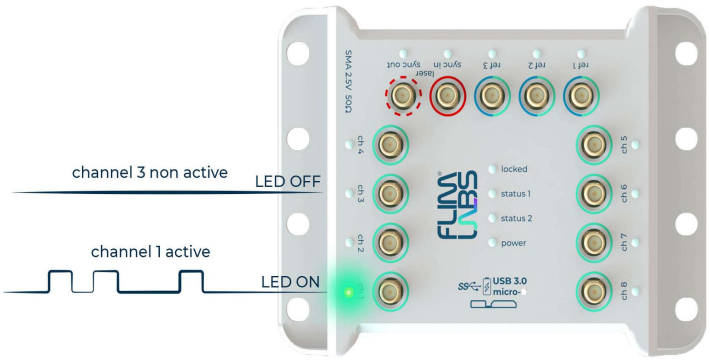
13 USB-C LVDS input/output configurable



Single-photon sampling

Single-photon sampling capabilities gives you access to plenty of information and allows you to perform a large variety of techniques such as Fluorescence Correlation Spectroscopy (FCS), Fluorescence Resonance Energy Transfer (FRET), Near Infrared Spectroscopy (NIRS).





Channel LEDs

A LED light is present on each channel and turns on whenever there is a signal on a specific port. This feature provides instant feedback to the user, who can be sure of the optimal data transfer to the card with no need of an oscilloscope.

DIY (Do-It-Yourself) philosophy

The card is conceived for a DIY-approach to biophotonics techniques. The unique features and specifications of FLIM LABS card can give users access to both traditional and still unexplored fields, being almost any setup compatible with our card.

Continuous wave lasers setup

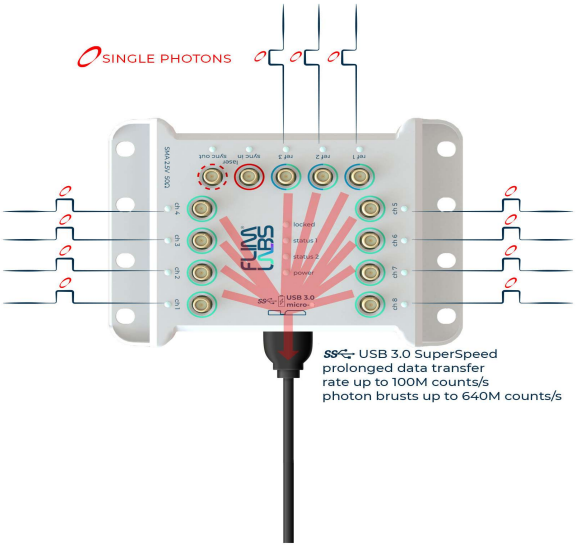
Our FLIM acquisition card can be coupled with continuous-wave laser sources as it is able to sample both the single-photon microtime (time delay of the photon in respect to the closest laser pulse) and its macrotime (time of arrival of the photon in respect of the overall experiment acquisition time).

Key Tech Specs

Single photon time tagging with <300 ps (σ/√2) single-shot precision. 24 or 48 ps time bin resolution with 1.5 ns deadtime. USB 3.0 SuperSpeed interface allows a prolonged data transfer rate up to 100 M counts/s and can cope with bursts up to 640 M counts/s. Our module can deal with any type of FLIM or fluorescence lifetime measurement/application/experiment.

Interface and connection type

Our card has SMA connectors for a LVTTL 50 Ohm interface, with orientation independent USB type-C ports working in a parallel and independent way, for communicating over a proprietary FLIM LABS protocol with FLIM LABS fiber-coupled SPAD detectors and picosecond-pulsed laser modules. USB type-C allows for user-friendly and low-cost interfacing. USB cables will also be color-coded depending on the port-usage type.



Raw data access

Accessing raw data is possible thanks to FLIM LABS proprietary file extension. Thanks to our dedicate SDK module, the user can read directly the data streamed by the device and writes her/his own software routines for processing them

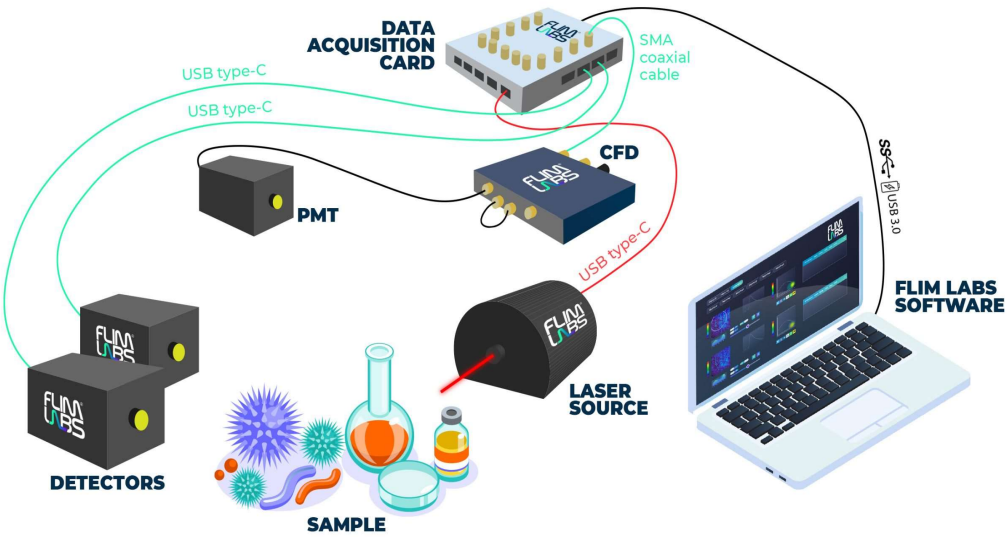
Color coded connections

With the aim of having a user-friendly hardware setup we introduced color-coded interface connections. The color and line style on the case matches the cable color associated to a specific connection type and scope:

Red: Lasers

Green: Fluorescence

Cyan: Synchronization/imaging signals



FULL SPECS

Minimum Resolvable Fluorescence Lifetime	50ps
Technology	Field-programmable gate array (FPGA)
Total number of channels	11 SMA single-ended input for LVTTL 50 Ohm 1 SMA Laser trigger in (sync in) for LVTTL 50 Ohm signals 1 SMA Laser trigger out (sync out) LVTTL 50 Ohm for modulating external pulsed laser sources 13 USB-C LVDS input/output configurable for detection channels as well as Laser sync in or sync out (FLIM LABS proprietary interface)
Channels interface	LVTTL 50 Ohm over the SMA connectors (5 V max input signal damage level) LVDS over the USB-type C ports (FLIM LABS proprietary interface)
Working principle	Single-photon time tagging
Input pulse width	> 1.5ns
Minimum time bin width	48ps
Timing precision (σ/√2)	300ps
Dead time	1.5ns
Differential non-linearity	< 0.5% rms
Acquisition length	not limited by hardware
Supported laser sync rates	from 1KHz up to 80MHz
Peak count rate per input channel	640 Mcounts/s
Total sustained count rate, sum over all input channels	100 Mcounts/s
Minimum pixel dwell time	1µs
Minimum period for external ref signal	1µs
PC interface	USB 3.0 SuperSpeed micro-B
PC requirements	min. 2 GHz CPU clock, min. 6 GB memory
Operating system	Windows, Mac, Linux
Power supply	USB powered
Dimensions	101.3x139x28 mm
Weight	120 g