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LiPico

64-channel SiPM Read-Out with Integrated TDC

LiPico is a 64-channel system designed to readout silicon photo-multipliers (SiPM) for scientific instrumentation application. LiPico is a stack of two boards. The front-end board house on the top side the 64-channel detector (SiPM are interchangeable) and the readout ASIC (Liroc) followed by the PicoTDC (CERN). PicoTDC will convert triggers from Liroc into a digital time of arrival(TOA) and a time over threshold (TOT).
Time resolution of the board is 12ps with a 700ps dead time. LiPico is connected to a Xilinx Evalutation (ZC702) board for data acquisition and the data is transmitted via an Ethernet to a computer. A CAEN high-voltage module can be provided in the kit.
The supplied software allows system calibration, ASIC programming and data acquisition with a graphical user interface providing various time information.

All firmware and software are open-source, allowing for customer modifications.

Detector Read-Out	64 channels SiPM, customer choice. Already available: S13361-1350AE-08 (Hamamatsu) ; AFBR-S4K11P6425B (Broadcom)
Number of Channels	64
Signal Polarity	Positive
Sensitivity	Trigger on 1/3 photo-electron with a 10^6 PM gain or 50 fC
High Voltage	CAEN A7585DU – 85V – 10mA max. Temperature compensation
Dynamic Range	Up to 100 photo-electron
Single Photon Time Resolution (SPTR)	58 ps (FWHM)
Maximum Double pulse separation within same pixel	3 ns
Power Consumption	FrontEnd Board : 1,5A @ 5V ; ZC702 : External power supply
Outputs	2 USB output Ethernet Link
Internal Programmable Features (Python Software)	64 HV adjustement for SiPM (64x8bits), trigger threshold adjustement (10bits), channel by channel gain tuning, 64 triggers masks, high voltage setpoint, number of acquisitions, staircase, TDC binning configuration, t0 controlled by trigger, output trigger available for Laser control

They are using LiPico

CNES – Mescalidar project
ISRO – LIDAR application
INFN – CERN Beam measurements

More about LiPico

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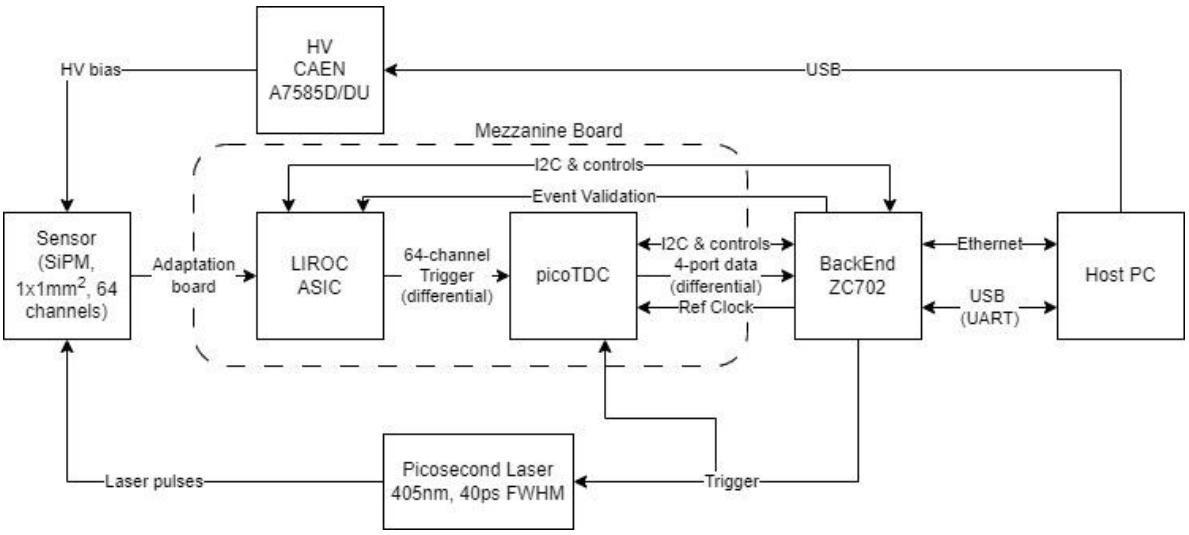
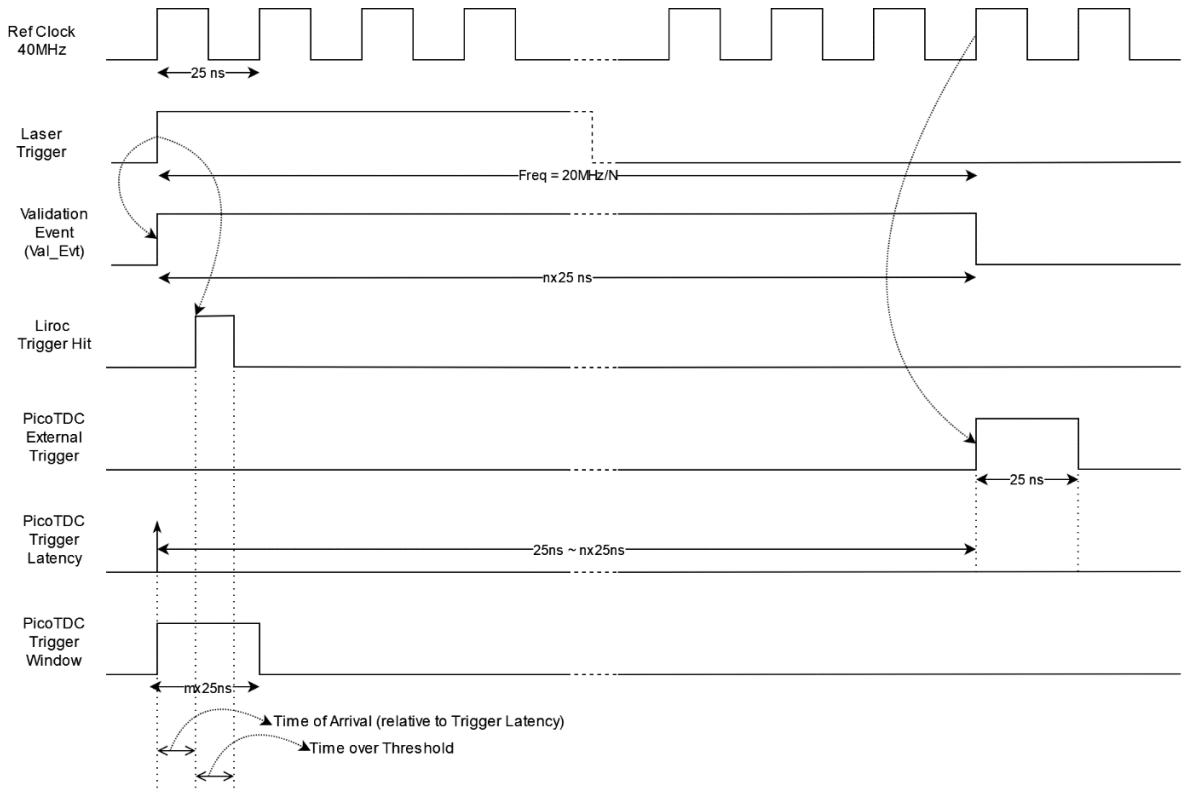


Measurement Setup



Measurement Setup Timing Diagram