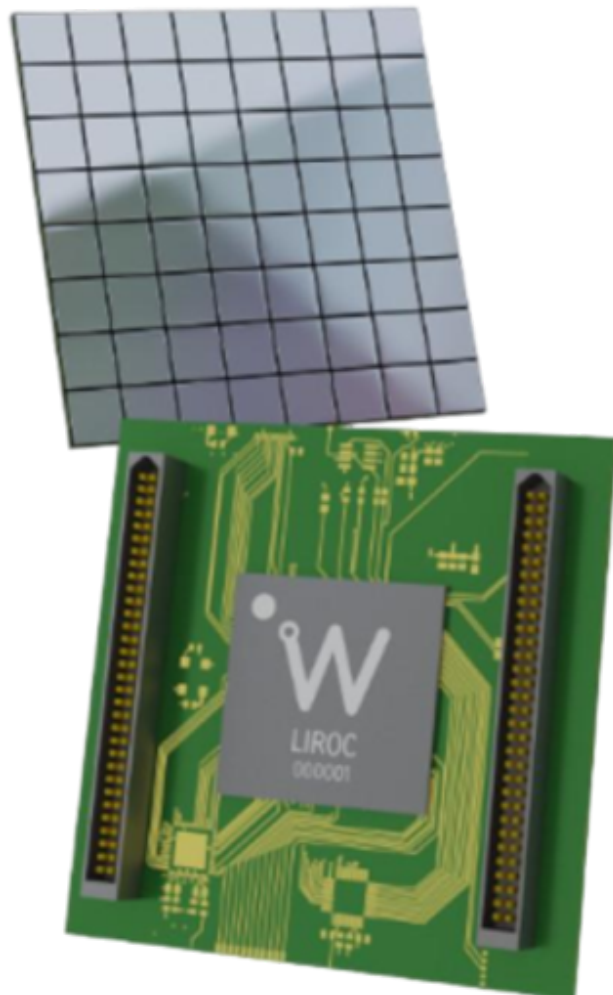


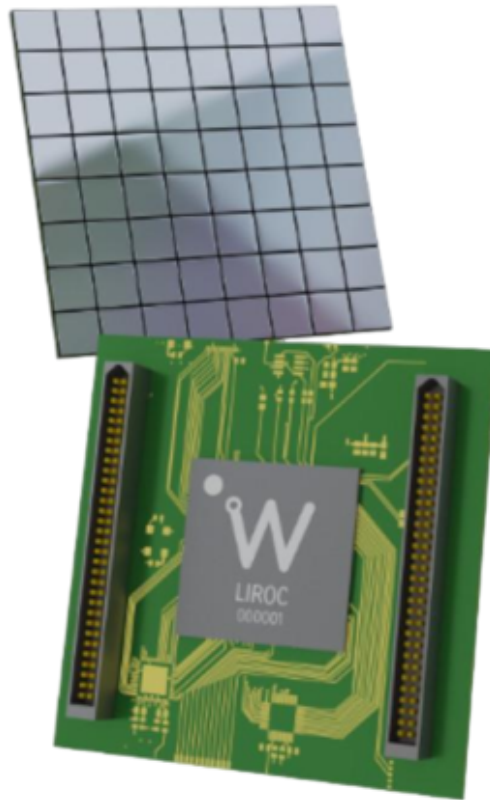
New

LIROC 1

**SiPM Analogue
Read-out Chip for
Lidar and Photon
Counting
Application**



Features



Optimized for

- SiPM
- **Number of channels:** 64
- **Outputs:** 64 LVDS triggers, 1 64-channel NOR
- **Input Polarity:** Positive, Negative

Description

Liroc is a 64-channel front-end ASIC designed to readout silicon photo-multipliers (SiPM) for LIDAR application.

Liroc allows triggering down to $1/3$ p.e. and provides low-voltage differential trigger output for each channel with an excellent timing resolution (better than 20ps FWHM) and excellent double-peak separation (100% efficiency on 5ns separated single photo-electrons). Liroc allows fast single photon counting over 300MHz per channel.

An adjustment of the SiPM high-voltage (gain) is possible using a channel-by-channel 6-bit DAC connected to the ASIC inputs. Channel-by-channel calibration on the trigger threshold is also possible thanks to 7-bit DACs. Liroc can be calibrated using the dark noise of the SiPM.

Liroc features a GHz measurement line composed of an RF preamplifier with pole zero cancellation followed by a fast discriminator and low swing LVDS fast driver.

Technical Specifications

TRL (Technology Readiness Level)

4 - ASIC validated in lab environment

Available versions

Liroc : available June 2021

Detector Read-Out

SiPM

Number of Channel

64

Signal Polarity

Positive and Negative

Sensitivity

Trigger on 1/10 photo-electron

Timing Resolution

Better than 20 ps FWHM on single photo-electron, Better than 3ns double-peak separation on single photo-electron

Dynamic Range

Over 300MHz photon counting rate

Packaging & Dimension

BGA 516 - 20x20 mm²

Flip-Chip low inductance packaging technology

Power Consumption

210 mW - supply voltage 1.2V

Inputs

64 analogue inputs with independent SiPM HV adjustments

Outputs

- 64 LVDS triggers
- 1 64-channel NOR

Internal Programmable Features

- 64 HV adjustment for SiPM (64 x 6 bit), trigger threshold programming (10bits)
- 64 x 7 bit channel-wise threshold adjustment
- ASIC-wise polarity selector
- Channel-wise pole zero cancellation
- individual trigger masking and cell powering

Evaluation systems

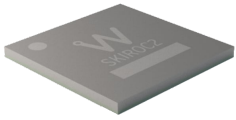
- Liroc Evaluation system
- Liroc PicoTDC read-out system

Ordering Options

Code	Description	
WWLIROC1BAAA	LIROC 1 SiPM Analogue Read-out Chip for Lidar and Photon Counting Application	RoHS
WWLIROC2BAAA	LIROC 2 SiPM Analogue Read-out Chip for Lidar and Photon Counting Application	RoHS

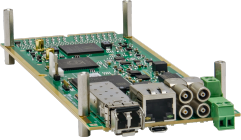
Related Products

SKIROC 2A



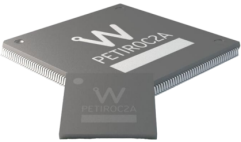
PIN Diode and Low Gain Silicium Detector Read-Out Chip

A5204



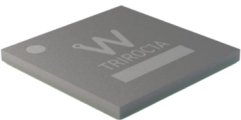
64 Channel Radioroc unit for FERS-5200

PETIROC 2A



SiPM read out for time of flight PET

TRIROC 1A



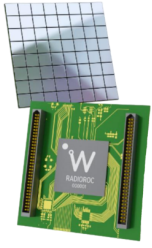
All in one SiPM read out for multimodal PET inserts

DT5204



64 Channel Radioroc unit for FERS-5200

RADIROC 2



Multi-purpose SiPM analogue read-out chip

PSIROC



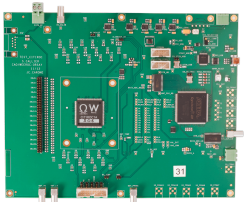
PIN Diodes, Silicon Strips amnd GEMs Read-Out Chip

CATIROC 1



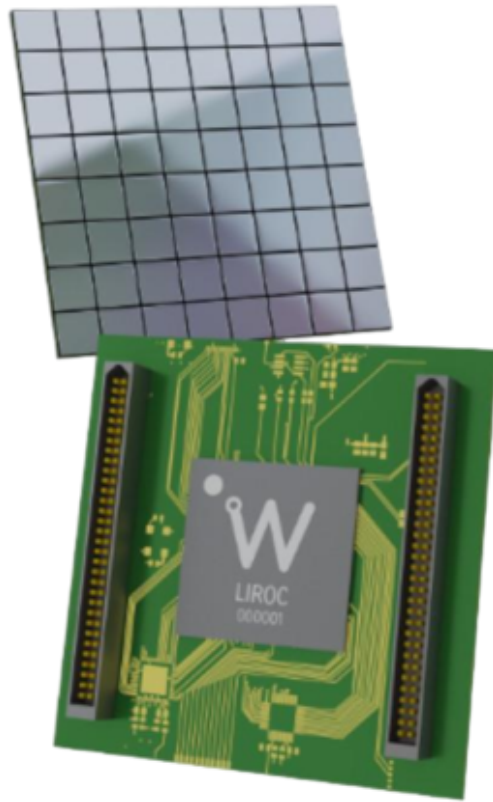
Large photomultiplier arrays read out chip

Weeroc Testboards



Control Systems for Weeroc ASICs

Gallery



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