

# C-SPD-NIR

NIR Single-Photon Detector

Centre for Development of Telematics (C-DOT)



## PRODUCT OVERVIEW

The C-SPD-NIR is a high-performance Near-Infrared Single-Photon Detector built around an internally cooled InGaAs/InP Geiger-mode Avalanche Photodiode (SPAD). Operating across 900–1700 nm, it delivers up to 30% photon detection efficiency, ultra-low dark count rates, and sub-150 ps timing jitter — engineered for quantum communication (QKD), LIDAR, and precision photonic applications.

## KEY FEATURES & BENEFITS

- ◆ **Dual Detection Modes** — Free-Running (FR) & Gated Mode (GM), selectable via GUI
- ◆ **High Detection Efficiency** — Up to 30% PDE at 1550 nm for superior single-photon sensitivity
- ◆ **Ultra-Low Dark Count Rate** — < 800 cps in free-running mode at 10% PDE — minimal false events
- ◆ **Sub-150 ps Timing Jitter** — Precision timing for time-correlated photon counting (TCSPC)
- ◆ **100 MHz Gated Operation** — External trigger up to 100 MHz, minimum gate pulse width of 1 ns
- ◆ **Variable Dead Time** — 1  $\mu$ s to 128  $\mu$ s (10 ns resolution) — fully configurable per application
- ◆ **Internal TEC Cooling** — Self-contained cooling; no external chiller required, < 1 min cool-down
- ◆ **GUI Control Interface** — Real-time monitoring of count rate, bias voltage, temperature & alarms

## TECHNICAL SPECIFICATIONS

<b>Spectral Range</b>	900 – 1700 nm
<b>Detection Efficiency</b>	Up to 30% @ 1550 nm
<b>Dark Count Rate</b>	< 800 cps (FR, 10% PDE)
<b>Timing Jitter</b>	< 150 ps FWHM
<b>Gate Frequency</b>	Up to 100 MHz
<b>Min Gate Pulse Width</b>	1 ns
<b>Dead Time (variable)</b>	1 $\mu$ s – 128 $\mu$ s
<b>Optical Interface</b>	FC/PC (SMF & MMF)
<b>Control Interface</b>	USB (UART)
<b>Power Supply</b>	+12V DC, 12W
<b>2RU Dimensions</b>	160 × 70 × 60 mm, ~400g
<b>1RU Dimensions</b>	165 × 82 × 41 mm, ~300g
<b>OS Support</b>	Windows / macOS / Linux

## APPLICATIONS

- Quantum Key Distribution (QKD)
- Quantum optics experiments
- Entangled photon detection
- LIDAR & Time-of-flight ranging
- High-resolution OTDR
- Fluorescence lifetime imaging (FLIM)
- Single-molecule spectroscopy
- Time-correlated photon counting (TCSPC)

## ORDERING GUIDE

Part Number	Description
C-SPD-00-NIR	FR only – 2RU
C-SPD-01-NIR	FR only – 1RU
C-SPD-10-NIR	FR + Gated – 2RU
C-SPD-11-NIR	FR + Gated – 1RU