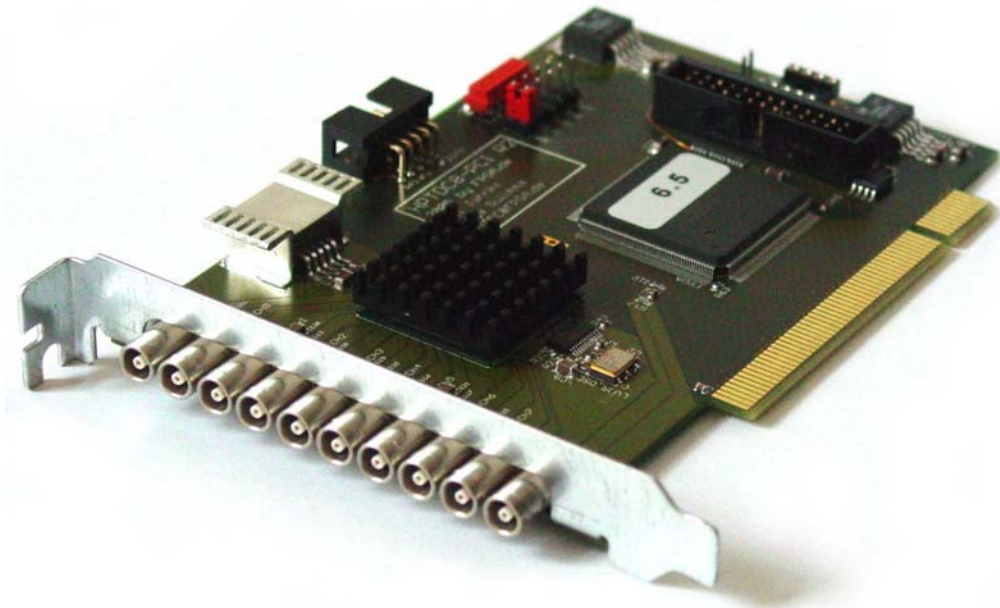


# The new **RoentDek** TDC8HP eight-channel high-resolution multi-hit Time-to-Digital Converter

The **TDC8HP** is the successor module of the well-established TDC8-series (<http://roentdek.com>). It is similar in function but has superior performance characteristics:

- time resolution < 100 ps with 25 ps LSB
- number of hit registers not limited <sup>1</sup>
- range between -209  $\mu$ s to +209  $\mu$ s <sup>2</sup>
- throughput up to 500 000 particles/s <sup>3</sup>
- double hit dead-time < 10 ns <sup>4</sup>



The **TDC8HP** has 8 high-resolution multi-hit inputs for NIM signals and an extra “common” trigger input. The common trigger input has a precision of 12.8 ns with respect to the other 8 channels.\* Alternatively, any of the 8 other channels can be defined as trigger with < 100 ps time precision. A 10<sup>th</sup> input channel is reserved for an external clock signal to synchronize several **TDC8HP** cards (currently supported up to 3).

Notes:

<sup>1</sup> the standard **CoboldPC** data acquisition software limits the hit number to 16, but it can be expanded.

<sup>2</sup> hits within one event can be 209  $\mu$ s before or after the trigger signal, this window is adjustable. In a special “wrap-around” mode, the maximum range can be expanded to 2 hours (not yet supported by **CoboldPC**).

<sup>3</sup> this is an upper limit, which depends on the computer hardware and data acquisition mode.

<sup>4</sup> the dead-time between two hits may be as low as 5 ns, but once more than four hits are registered, every 100 ns only four additional hits can be collected (with 100 ps time precision).

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\* in previous **RoentDek** TDC series the common signal has the same time precision than the other input channels