DTL2751

4 Input Channel 14 bit 1 GS/s Digitizer

14	1000	4
Resolution (bits)	Max Sampling Rate (MS/s)	No. of Channels

The DTL2751 is a 4-channel desktop digitizer for high-speed acquisition and real-time digital pulse processing of radiation-detector signals. Each independent input provides 14-bit, 1 GS/s conversion with individual DC offset adjustment. A Kintex UltraScale+ FPGA supports triggered and streaming readout, waveform processing, timestamps and trigger IDs, with optional zero suppression and ROI definition in samples or time. Local, external and software triggers are supported. Readout is available through USB 3.0 Type-C or 1 Gigabit Ethernet; custom firmware can be developed using the Open FPGA architecture.

Overview

Product Highlights

- 4 independent input channels, 1 GS/s 14-bit, with individual DC offset adjustment
- Based on Kintex UltraScale+ FPGA
- Triggered and Streaming Readout modes supported
- Sci-Compiler, WaveDump2, and CoMPASS fully supported
- Front panel readout via USB-3.0 or 1Gb Ethernet
- Ready-to-Use Firmware solutions to get time-stamped waveforms and physical quantities
- SDK provided for Open FPGA cutomization

Product Description

AT A GLANCE	
Resolution (bits)	**14**
Max Sampling Rate (MS/s)	**1000**
No. of Channels	**4**
Package	**Desktop**

The **CAEN Mod. DTL2751** is a **4 channel desktop digitizer** designed for high-speed acquisition and real-time digital pulse processing of signals from radiation detectors. Part of the DTL series, it combines compactness and performance, making it ideal for small experimental setups and laboratory environments.

Each channel features a **14-bit, 1 GS/s ADC** capable of digitizing analog signals from detectors such as organic, inorganic, or liquid scintillators coupled to PMTs or SiPMs, as well as from Diamond detectors. The data are processed in real time by a Kintex UltraScale+ FPGA, where several firmware options can be loaded to suit specific experimental configurations. It covers a **range of applications** such as **nuclear and particle physics, high-timing-resolution measurements, Fast Neutron Spectroscopy, and Homeland Security.**

Data acquisition is managed through trigger generation and the definition of a Region of Interest (ROI) in samples or time. Trigger sources can be local (self-trigger), external, or software-controlled. Once acquired, the waveforms are processed in the FPGA, stored in high-speed memory with timestamp and trigger ID, and transferred via fast communication interfaces for further analysis.

The DTL2751 supports multiple acquisition modes to balance throughput, latency, and data efficiency:

- **Triggered mode**: All channels acquire simultaneously upon a global trigger generated by a central logic unit that processes local discriminators. External or software triggers can also serve as global sources. Optional zero-suppression can be applied to reduce data volume by removing non-significant samples.
- **Streaming readout mode**: Each channel operates independently with its own self-trigger, defining the ROI autonomously. This mode applies automatic zero-suppression (inactive channels are skipped), maximizing acquisition rate and enabling real-time parameter extraction for high-rate applications. In addition, a **Correlated streaming** configuration can be set to validate event acquisition through coincidence or anticoincidence logic between local and external triggers.

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Overview (continued)

The DTL2751 can operate using both pre-configured firmware developed by CAEN and custom user-generated firmware, offering flexibility for a wide range of applications. CAEN provides ready-to-use firmware solutions optimized for specific acquisition and processing needs:

- **Scope Firmware:** Based on full waveform recording in triggered acquisition mode. A zero suppression function is available to reduce unnecessary data readout.
- **DPP Firmware**[COMING SOON]**:** Special algorithms onboard making processing on the acquired waves to extract physical quantities, usually time and energy.

For users requiring custom acquisition and processing, the Open FPGA architecture enables firmware customization through **SCI-Compiler**. This graphical tool allows users to create personalized firmware solutions without HDL skills. In addition, **Sci-Compiler** automatically generates drivers and libraries and provides graphical utilities for developing custom DAQ software.

The Linux-based Arm processor embedded in the onboard CPU makes it possible to run automated user routines. Multi-board synchronization can be implemented via backplane or front panel easy-cabling options. Multiple communication interfaces offer flexible readout options: **USB 3.0** type-C and **1 Gigabit Ethernet**.

Ordering Information

ORDERING CODE	DESCRIPTION
WDTL2751XAAA	DTL2751 – 4 Ch. 14 bit 1 GS/s Digitizer, Open FPGA

1. Ordering codes and descriptions are reproduced from the product record. Availability is confirmed at order entry.

Accessories

A319A — Clock & Sync cable assembly for Digitizer Series 2.0 - 20 cm

A319B — Clock cable assembly from Digitizer Series 1.0 to Digitizer Series 2.0 - 20cm

Related Products

DT2751 — 16 Input Channel 14 bit 1 GS/s Digitizer with Programmable Input Gain

VX2751 — 16 Input Channel 14 bit 1 GS/s Digitizer with Programmable Input Gain

Software & Control Tools

CAEN FELib Library — High level library for CAEN Digitizers 2.0

CAEN Toolbox — Multi-Functional Software Suite for the Upgrade of Front-end Boards, Bridges and Power Supplies

WAVEDUMP2 — Open Source Software for Digitizer 2.0 and 1.0 Series

Firmware

D-SCOPE — Digitizer 2.0 Waveform Recording Firmware

DPP-SUP — Super Licence for CAEN Digitizers

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