

# DT5761

## 1 Input Channel 10 bit 4 GS/s Digitizer



## Features



- 10 bit 4 GS/s ADC
- 1 input channel, single-ended
- 1 Vpp input range
- 16-bit programmable DC offset adjustment in the full range
- Trigger Time stamps
- Multi-Event Memory buffer: 7.2 MS/ch or 57.6 MS/ch divisible into 1 + 1024 buffers
- Programmable event size and pre-post trigger adjustment
- Front panel clock input/output available for multiboard synchronization (direct feed through or PLL-based synthesis)
- Optical Link interface (CONET proprietary protocol) Daisy-chainable through **A5818** (PCIe Gen 3) Controller or **A4818** (USB3-to-CONET)
- USB 2.0 communication interface
- Firmware upgradeable via USB/Optical Link
- Fully supported by **WaveDump** software

## Description

The **CAEN Mod. DT5761** is a Waveform Digitizer, in Desktop form factor, with the **highest sampling rate** Flash ADC (**10 bit @ 4GS/s**), designed for waveform recording.

The Digitizer is well suited for **fast signals** from fast organic, inorganic and liquid scintillators coupled to PMTs or Silicon Photomultipliers, Diamond detectors and others. The data stream is written in a circular memory buffer with independent read/write access, which reduces the dead-time of the acquisition process. Basing on the waveform recording mode, the events are saved upon the trigger arrival. Veto and gate functions can be applied. Multiple boards can be synchronized to build up complex systems.

The acquisition is fully controlled by **CAEN WaveDump** software, which manages the settings, plots and saves the waveforms. Libraries and demo software in C, Python, and LabView are available for integration and customization of specific acquisition systems.

The communication to and from the board is provided through **USB** and **Optical Link** interfaces.

# Technical Specifications

## GENERAL

- Weight: 670 g
- Form Factor: Desktop
- Dimension: 154x50x164 mm<sup>3</sup> (WxHxD)

## ANALOG INPUT

- Number of Inputs: 1, single-ended, DC coupled
- Bandwidth (-3dB): 1 GHz
- Impedance: 50 Ω
- Gain: x1, fixed
- Connector Type: MCX
- Full Scale Range: 1 Vpp
- 16-bit programmable DC offset adjustment in the full range
- Abs. Max. Voltage Rating: 3 Vpp (with Vrail max +3 V or -3 V for any DAC offset value)

## DIGITAL CONVERSION

- Resolution: 10 bits
- Sampling Rate: 4 GS/s

## DIGITAL I/O

### TRG-IN/GPO/GPI

- General-purpose digital I/Os
- Single-ended TTL/NIM
- LEMO 00 male connector
- Software programmable function (trigger, veto, busy, etc.)
- TRG-IN/GPI: Zin = 50 Ω (internally terminated)
- GPO requires Rt = 50 Ω

## ACQUISITION MEMORY

- 7.2 MS/ch (1.9 ms @ 4 GS/s) or 57.6 MS/ch (15 ms @ 4 GS/s) Multi-event Buffer divisible into 1 ÷ 1024 buffers
- Independent read and write access
- Programmable event size and pre/post-trigger

## COMMUNICATION INTERFACE

### USB

- USB 2.0 compliant
- Transfer Rate: up to 30 MB/s

### Optical Link

- CAEN proprietary CONET protocol
- Transfer Rate: up to 80 MB/s
- Daisy Capability: up to 8 ADC modules per single optical link by A5818 Controller or A4818 Adapter

## TRIGGER AND EVENT ACQUISITION

### Trigger Mode

The channel fires upon the trigger generated by the Central Logic Unit receiving the trigger source signals.

### Trigger Sources

- Software by register writing
- External upon the leading edge of The TRG-IN signal (TTL/NIM)
- Local (self-trigger) upon the channel discriminator with programmable threshold

### Trigger Timestamp - Waveform Rec. firmware

- Resolution: 16 ns
- Counter range: 31 bits (default); extendable to 48-bit by firmware
- Full-scale range: ~ 17 s @31-bit

## SYNCHRONIZATION

### Clock Generation

By default, the Digitizer's main clocks are generated upon a 50MHz reference frequency that can optionally be internal (50MHz local Oscillator) or external (CLK-IN). Onboard programmable PLL allows locking to different external frequencies.

### Clock Synchronization

Default 50MHz frequency distributed by:

- Fan-in into CLK-IN (**DT4700**)

PLL programming files for supported custom frequencies can be generated and loaded by the CAEN Toolbox software.

### Run Synchronization (Acquisition Start/Stop)

Optionally, by Daisy chain or fan-in propagation through single-ended TRG-IN/GPO/GPI connectors (NIM/TTL).

### CLK-IN Connector

- Reference clock differential signal
- 2.54mm 3-pin AMPMODU Mod II male connector
- AC-coupled LVDS, ECL, PECL, LVPECL, CML (Zdiff = 100 Ω)

### Data Synchronization

Programmable Busy/Veto logic on single-ended NIM/TTL I/O for event building (external hardware required).

### Trigger Distribution

Optionally, by Daisy chain or fan-out propagation through single-ended TRG-IN/GPO connectors, NIM/TTL (global trigger).

## FPGA

Altera Cyclone III EP3C16

## CAEN FIRMWARE

### Waveform Recording Firmware (Freeware)

Designed for waveform recording.

### Upgrades (Free)

Web available CFA files for Waveform Recording firmware upgrade through the CAEN Toolbox software, via USB or Optical Link.

## SOFTWARE

### Readout Software for Waveform Rec. Firmware (Freeware)

- **CAEN WaveDump:** Digitizer 1.0 series support, single-board management, user-cu

### SDK and Tools (Freeware)

General-purpose libraries (C/Python, LabVIEW) with demo samples for host Windows® and Linux® PC.

## ENVIRONMENTAL

- **Environment:** Indoor use
- **Operating Temperature:** 0°C to +40°C
- **Storage Temperature:** -10°C to +60 °C
- **Operating Humidity:** 10% to 90% RH non condensing
- **Storage Humidity:** 5% to 90% RH non condensing
- **Pollution Degree:** 2
- **Overvoltage Category:** II
- **EMC Environment:** Commercial and light industrial
- **IP Degree:** Enclosure (desktop models), not for wet location

## REGULATORY COMPLIANCE

- EMC: CE 2014/30/EU Electromagnetic Compatibility Directive
- Safety: CE 2014/35/EU Low Voltage Directive

## POWER CONSUMPTIONS

- 1.8 A @ +12 V DC (Typ.)
- AC-DC 12 V / 45 W power unit included

## Ordering Options

Code	Description	
WDT5761XAAAA	DT5761 - 1 Ch. 10 bit 4 GS/s Digitizer: 7.2MS/ch,EP3C16, SE	RoHS

## Accessories

### AI2700



Optical Fiber Series

### DT4700



Clock Generator and FAN-OUT

### A654



Cable assembly LEMO 00 male to MCX male - 1 m

### A659



Cable assembly BNC male to MCX male - 1 m

### A317



Cable assembly for Clock distribution 3-pin AMPMODU IV female terminations - 18 cm / 25cm

### A318



Adapter for Clock signal FISCHER S101A004 male to 3-pin AMPMODU IV female - 10 cm

**A319B**



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

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## Related Software

### CAEN Toolbox



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

### WaveDump



Readout Application for CAEN Digitizer 1.0

## Related Firmware

### D-WAVE



Digitizer Waveform Recording Firmware

## Related Software Libraries

### CAENDigitizer Library



Library of functions for CAEN Digitizers high level management

### CAENComm Library



Interface library for CAEN Data Acquisition Modules

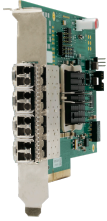
## Related Products

### VX1761



2 Input Channel 10 bit 4GS/s Digitizer

### A5818



CONET2 Controller based on PCI Express Gen 3 interface

### A4818



USB 3.0 to CONET2 Adapter

### V1761



2 Input Channel 10 bit 4GS/s Digitizer



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