DT5770

1 Channel Digital MCA

OBSOLETE

The DT5770 is a compact, portable 16k Digital MCA for high-resolution gamma spectroscopy. It integrates an analog front-end with programmable coarse and fine gain and possible AC coupling, supporting continuous and pulsed reset charge-sensitive preamplifiers, as well as PMTs with inorganic scintillators such as NaI or CsI, provided exponential pulses with decay time above 200 ns. FPGA-based Pulse Height Analysis firmware provides real-time energy calculation and 1k–16k histograms, while an oscilloscope mode displays input and internal-filter waveforms. USB 2.0 and Ethernet interfaces are provided.

Overview

Product Highlights

- Compact portable 16k Digital MCA
- Support continuous and pulsed reset preamplifiers
- DB9 connector for preamplifier power supply
- Different acquisition modes available: PHA and signal inspector for an easy setup and signal monitoring
- Supported by MC^{2}Analyzer software GUI for configuration, acquisition, and data plotting
- Suited for high resolution Gamma Spectroscopy
- Software selectable coarse and fine gain
- Features Pulse Height Analysis firmware for energy calculation
- USB and Ethernet communication interfaces

Product Description

The CAEN **Mod.DT5770** is a compact portable **16k Digital MCA** for **Gamma Spectroscopy**, integrating analog front-end with programmable gain and possible AC coupling. It is ideally suited for high energy resolution semiconductor detectors, like HPGe and Silicon, connected to a Charge Sensitive Preamplifier (CSP). The unit can also properly operate directly connected to a **PMT with inorganic scintillators** (e.g. Nal or Csl scintillators), provided exponential pulse shape and decay time above 200 ns.

The DT5770 is equipped with a FPGA featuring the real-time Digital Pulse Processing for Pulse Height Analysis (**PHA**) making the module a data acquisition system for Nuclear Physics and other applications involving radiation detection.

The DT5770 houses **USB 2.0** and **Ethernet** interfaces. The module is powered by a provided external AC/DC power supply.

Two ways of operation are foreseen:

- **Pulse Height Analysis (PHA):** pulse height histogram (1k-2k-4k-8k-16k) built at board level.
- **Oscilloscope:** input and internal filters waveforms.

Software available

- PHA settings, acquisition and basic mathematical analysis are performed through the **MC² Analyzer** software GUI (*Windows only*), providing energy spectra in ASCII or N42.42 compliant files.
- CAEN provides moreover drivers for the supported communication links, DT5770 Upgrader tool and C libraries (**CAENDPP library**).

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Technical Specifications

Mechanical

Dimensions
- 106 W x 38 H x 128 L mm³ (without connectors)
- 106 W x 38 H x 150 L mm³ (including connectors)

Weight
- 300 g

Environmental

- 0 – 50°C Temperature Range – EMC compliant

Analog Input

Input Features
- BNC connector
- Single ended, DC/AC coupled
- Both continuous and pulsed reset preamplifiers supported
- Impedance: 50 Ω / 1 k Ω (sw selectable)
- Positive and negative signals accepted
- Programmable 4-step analog coarse gain corresponding to 1.25 Vpp, 2.5 Vpp, 5 Vpp, 10 Vpp ranges
- Bandwidth: DC to 30 MHz
- Programmable fine gain: 1…100
- Programmable DC offset adjustment on the input in the full scale range

Number of Inputs
1

TRP Features

Transistor Reset Preamplifier Support
- Selectable gains in the range [2:110] in 12 steps
- AC coupling software selectable (τ_{shaper}AC ~600ns)

ADC

- **Resolution**: 14 bits
- **Sampling rate**: 150 MS/s

Digital Signal Processing

- Manual and automated trigger threshold adjustment
- Manual and automated PoleZero cancellation; decay time up to 0.65 ms
- Digital decimation in programmable steps: 248
- Digital fine gain
- Pileup rejection and Live Time correction
- Baseline restorer with programmable averaging
- Adjustable moving average low pass filter to reduce the high frequency noise

Preamplifier Power Supply

Preamp Features
- DB9 connector
- ± 12 V, 100 mA output (DB9/pin4/pin9)
- ± 24 V, 50 mA output (DB9/pin6/pin7)
- Output voltage tolerance: 2%
- Voltage ripple < 5 mVpp

Extra Features
- Aux. analog input: 0 ÷ 10 V (DB9/pin3)
- Ext. input for detector's temperature readout (DB9/pin8)

Preamp Outputs
1

Operating Modes
- Pulse Height Analysis (PHA): 16k-channel pulse height histogram internally built up; 1k-2k-4k-8k-16k rebin options at software level
- Oscilloscope mode for waveforms monitoring

Trigger Modes
- Internal trigger
- External: channel is triggered by external trigger only (GP I/O 1 or GP I/O 2)

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Technical Specifications (continued)

Analog / Digital I/O

Connector	Description	Options
GP I/O 1 (LEMO, TTL) **GP I/O 2 (LEMO, TTL)**	Digital Input	• Zin = 50 Ω : Veto, Gate, Ext. Trigger, Reset. • 22 Ω terminated: Trigger, Energy probe, Pile-up inhibit, Event rejected, Baseline suspended, Acquisition run/stop, SCA (COMING SOON), Clock.
GP I/O 2 (LEMO)	Analog Output	• 50 Ω terminated: Input signal, Fast Trapezoid, Trapezoid, Energy data, Baseline, Trapezoid – Baseline.

Display	• OLED display for online monitoring (e.g. ICR, dead time, measurement time)
Communication interface	• Ethernet connection: 10/100BT • USB: USB 2.0 compliant
Firmware	• Firmware can be upgraded via USB/Ethernet
Software	• Fully controlled by MC² Analyzer spectroscopy Software • For developers: general purpose C libraries with demo samples available

Power Requirements

- **Operating Supply Voltage**
  +5 VDC
- **Absolute Max. Rating**
  +5.5 VDC
- **Consumptions (Typ. @ +5 VDC)**
  1.5 A

The module can be powered by an external AC/DC stabilized power supply included in the kit (5 VDC, 3.5 A)

Ordering Information

ORDERING CODE	DESCRIPTION	STATUS
WDT5770AXAAA	DT5770 – Digital MCA – 1 LVPS ±12V/100mA ±24V/50mA	Obsolete

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

Related Products

SP5600EMU — Emulation Kit

SP5701 — Easypet Kit

Software & Control Tools

MC²Analyzer — Graphical software tool for digitizers running DPP-PHA firmware

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