

# DT5770

## 1 Channel Digital MCA



## Features



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

## 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. NaI or CsI 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 **MC<sup>2</sup> 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**).

## Technical Specifications

### Mechanical

#### Dimensions

- 106 W x 38 H x 128 L mm<sup>3</sup> (without connectors)
- 106 W x 38 H x 150 L mm<sup>3</sup> (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  $\Omega$  / 1 k  $\Omega$  (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 ( $\tau_{\text{shaperAC}} \sim 600\text{ns}$ )

### 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
- $\pm 12$  V, 100 mA output (DB9/pin4/pin9)
- $\pm 24$  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)

## Analog / Digital I/O

Connector	Description	Options
<b>GP I/O 1 (LEMO, TTL)</b>	Digital Input	<ul style="list-style-type: none"><li>• <math>Z_{in} = 50 \Omega</math> : Veto, Gate, Ext. Trigger, Reset.</li><li>• <math>22 \Omega</math> terminated: Trigger, Energy probe, Pile-up inhibit, Event rejected, Baseline suspended, Acquisition run/stop, SCA (COMING SOON), Clock.</li></ul>
<b>GP I/O 2 (LEMO, TTL)</b>		
<b>GP I/O 2 (LEMO)</b>	Analog Output	<ul style="list-style-type: none"><li>• <math>50 \Omega</math> terminated: Input signal, Fast Trapezoid, Trapezoid, Energy data, Baseline, Trapezoid - Baseline.</li></ul>

## 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 MC<sup>2</sup> Analyzer spectroscopy Software
- For developers: general purpose C libraries with demo samples available

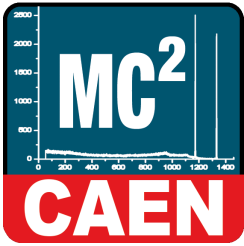
## Power Requirements

- **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)

## Related Software

### MC<sup>2</sup>Analyzer



Graphical software tool for digitizers running DPP-PHA firmware

---

## Related Products

### SP5701



Easypet Kit

---

### SP5600EMU



Emulation Kit

---

# Gallery



**This document, or parts thereof, may not be reproduced in any form or by any means without written permission from Caen S.p.A. Although every effort has been made to ensure the accuracy of information presented in this catalog, Caen S.p.A reserves the right to modify its products specifications without giving any notice; for up to date information please visit [www.caen.it](http://www.caen.it) © Caen S.p.A - 2024**

**CAEN S.p.A.**

Via Vetraia 11  
55049 - Viareggio  
Italy

**Phone +39.0584.388.398**

**Fax +39.0584.388.959**

**info@caen.it**

**www.caen.it**

**CAEN GmbH**

Brunnenweg 9  
64331 Weiterstadt, Germany

**Phone +49 (0)212.254.4077**

**Mobile +49 (0)151.16.548.484**

**info@caen-de.com**

**www.caen-de.com**

**CAEN Technologies, Inc.**

1 Edgewater Street - Suite 101  
Staten Island, NY 10305  
USA

**Phone +1.718.981.0401**

**Fax +1.718.556.9185**

**info@caentechnologies.com**

**www.caentechnologies.com**

**CAENspa India Private Limited**

B205, BLDG42, B Wing,  
Azad Nagar Sangam CHS,  
Mhada Layout, Azad Nagar, Andheri West  
Mumbai, Maharashtra 400053, India

**info@caen-india.in**

**www.caen-india.in**

