

## DT5780

# Dual Digital Multi Channel Analyzer (HV & Preamplifier PS) - Desktop





Digital MCA  
 on digital nuclear Spectroscopy  
**COMPASS** Software  
 Wide dynamic Range and adjustable Digital Fine Gain  
 Outputs available in 3 options:  $\pm 5$  kV/300  $\mu$ A,  $\pm 500$  V/3 mA or  $\pm 4$  kV 3 mA  
 Preamplifiers power supply ( $\pm 12$  V,  $\pm 24$  V)  
 Software for energy and time stamp calculation  
 GUI for an easy setup and signal monitoring  
 Remote applications  
 Communication interfaces  
 OS: Windows and Linux 32/64-bit

is a compact desktop system integrating **2 Independent 16k Digital MCA** and featuring **HV/Preamp capabilities for digital nuclear Spectroscopy**. It is ideally suited for high energy applications, from a Charge Sensitive Preamplifier (CSP), but it can also properly work with PMT-based detectors like **NaI**, providing an exponential tail of at least few hundreds of ns.

has been designed specifically for Diamond and Silicon detectors coupled with a CSP, while **DT5780SC** is suited for Scintillators. All version houses:  
**Waveform digitizer (based on 724 series)** on single-ended inputs with BNC connectors, featuring 4-step software configurable input range and adjustable DC offset via a 16-bit DAC on each channel.

and  **$\pm 24$  V 50 mA bias outputs** for preamplifiers power supply through DB9 connectors. Available on SHV connectors. Output inhibit configuration logic selectable through dedicated external switches. NEGATIVE, POSITIVE or MIXED HV polarity selectable by ordering options. Available in three options:  $\pm 5$  kV/300  $\mu$ A,  $\pm 500$  V/3 mA or  $\pm 4$  kV 3 mA (4W limited)

DT5780SC are equipped with a **DPP-PHA Firmware**, that is a Digital Pulse Processing algorithm making the board a spectroscopy acquisition system providing energy (i.e. pulse height) and waveform and other traces for the fine tuning of the PHA settings.

For independent inputs of simultaneous acquisition, the module is able to manage coincidences and anticoincidence between a pair of detectors, allowing the user, for example, to easily take advantage of coincidence techniques.

Multiple boards can be synchronized to a common external clock working as a scalable multi-input, multi-board acquisition system.

**USB 2.0** and **Optical Link** interfaces. USB 2.0 allows data transfers up to **30 MB/s**. The Optical Link supports transfer rate of **80 MB/s** and offers Daisy-chain capability. Therefore, it is possible to connect multiple boards to a single Optical Link Controller (Mod. **A5818/A4818**).

Software: pulse height histogram (1k-2k-4k-8k-16k) built at software level. Time stamp for each event. Internal filters waveforms.

Temperature alarms (Kill or Ramp selectable esc modes) and dedicated BNC connectors, configurable logic by panel switch

Resolution software selectable with 20V resolution for DT5780 and DT5780SC models, 2V resolution for DT5780SD models<sup>1</sup>. Vmax resolution for DT5780SD is 20V.

**Windows and Linux):** all the different types of physical communication channels, a set of C and LabView libraries (**CAENComm**, **CAENDigitizer**, **CAENDPP**),

Utilities: a dedicated utility allowing users to update the firmware of digitizers, modify PLL settings, load licenses for paid firmware (when required), and access other useful features.

CAEN DAQ Software for Physics Applications designer for CAEN Digitizers running Pulse Shape Discrimination and Pulse Height Analysis, CAEN Pulse processors and MCAs.

**ations**

mm<sup>3</sup> (without connectors)  
 mm<sup>3</sup> (including connectors)

bled

signals accepted  
 analog coarse gain (x1, x3, x7, x16) corresponding to 9.5 Vpp-3.7 Vpp-1.4 Vpp-0.6 Vpp ranges  
 MHz - Programmable DC offset adjustment on each input in the full scale range

MS/s simultaneously on each channel

**ing**

energy calculation with adjustable rise time in the range 0 - 10 μs and flat top in the range 0 - 5 μs  
 trigger threshold adjustment  
 Pole-Zero cancellation; decay time up to 6.5 ms  
 steps of 2-4-8 allows to extend the time parameters range  
 x1 to x10 in steps of 0.01  
 ive Time correction  
 programmable averaging  
 er based on integrative-derivative component  
 olution, 31 bit and rollover tracking event  
 erage low pass filter to reduce the high frequency noise

**upply**

ut	<b>Extra Features</b>	<b>Preamp Outputs</b>
nce: 2%	<ul style="list-style-type: none"> <li>Aux. analog input: 0 ÷ 10 V</li> <li>Ext. input for detector's temperature readout</li> </ul>	2
pp		

**upply**

	<b>DT5780</b>	<b>DT5780SD</b>	<b>DT5780SC</b>	<b>HV Outputs</b>
	5 kV	500 V	4 kV	2
	300 μA	3 mA	3 mA	
	0.1 V	0.01 V	0.1 V	
	10 nA	50 nA	50 nA	
yp	< 8 mVpp	< 3 mVpp	< 4 mVpp	
ax	< 10 mVpp	< 5 mVpp	< 10 mVpp	
Typ	< 2 mVpp	< 2 mVpp	< 2 mVpp	
Max	< 5 mVpp	< 5 mVpp	< 5 mVpp	

**Additional Features**

by ordering option  
 -Up/Ramp-Down rates independently for each channel: 1÷ 500 V/s range for DT5780 - DT5780SC, and 1÷100 V/S for DT5780SD, in steps of 1 V/s  
 rameters independently for each channel

**Safety Features**

ge alarms  
 rature alarms (Kill or Ramp selectable exit modes)  
 and dedicated BNC connectors, configurable logic by panel switch

(PHA): pulse height histogram (1k-2k-4k-8k-16k) built at software level  
 t and time stamp for each event  
 and internal filters waveforms

channel operates independently (based on channel self-trigger)  
e/anticoincidence among channels and/or an external trigger (TRG-IN)  
triggered by external trigger only (TRG-IN)

Input Clock: LVDS, ECL, PECL, LVPECL, CML (single  
by orderable cable);  
ed; can be used as external clock reference for single  
the clocks of multiple boards, provided through a Fan

#### **GPI (LEMO)**

General Purpose Input: NIM/TTL,  $Z_{in} = 50 \Omega$   
Can be used as SYNC/START in multi-board  
synchronization or Run ON/OFF Control.

#### **TRG-IN (LEMO)**

External Trigger Input: NIM/TTL,  $Z_{in} = 50 \Omega$   
Can be used to force the event acquisition from all the channels of the board, to  
channel triggers, or to propagate the common trigger in multi-board synchronization  
GPO).

: NIM/ TTL,  $Z_{in} = 50 \Omega$   
te the global trigger in multi-board synchronization (in  
), as output register or Run ON/OFF status.

#### **Face**

ONET proprietary protocol Up to 80 MB/s transfer rate Daisy chain capability: it is possible to connect up to 8 or 32 ADC modules to a single Optical Link Controller (**A4818** or **A5818** resp)  
nt Up to 30 MB/s transfer rate

aded via USB/Optical Link

#### **MPASS Software**

al purpose C libraries with demo samples available

#### **Stage**

#### **Consumptions (@ +12 VDC)**

3.3 A (Typ.) for DT5780 ( $\pm 10\%$  tolerance)  
3.5 A (Typ.) for DT5780SD and DT5780SC ( $\pm 10\%$  tolerance)

y external AC/DC stabilized power supply included in the kit (12 VDC, 45 W)

#### **ons**

Range - EMC compliant

**Description**

DT5780SCM - Dual Digital MCA - 1 HVPS +4kV/3mA, 1 HVPS -4kV/3mA, 2 LVPS  $\pm 12V/100mA$   $\pm 24V/50mA$

DT5780SCN - Dual Digital MCA - 2 HVPS -4kV/3mA, 2 LVPS  $\pm 12V/100mA$ ,  $\pm 24V/50mA$

DT5780SCP - Dual Digital MCA - 2 HVPS +4kV/3mA, 2 LVPS  $\pm 12V/100mA$ ,  $\pm 24V/50mA$

DT5780SDM - Dual Digital MCA - 1 HVPS +500V/3mA, 1 HVPS -500V/3mA, 2 LVPS  $\pm 12V/100mA$   $\pm 24V/50mA$

DT5780SDN - Dual Digital MCA - 2 HVPS -500V/3mA, 2 LVPS  $\pm 12V/100mA$ ,  $\pm 24V/50mA$

DT5780SDP - Dual Digital MCA - 2 HVPS +500V/3mA, 2 LVPS  $\pm 12V/100mA$ ,  $\pm 24V/50mA$

DT5780M - Dual Digital MCA - 1 HVPS +5kV/300uA, 1 HVPS -5kV/300uA, 2 LVPS  $\pm 12V/100mA$ ,  $\pm 24V/50mA$

DT5780N - Dual Digital MCA - 2 HVPS -5kV/300uA, 2 LVPS  $\pm 12V/100mA$ ,  $\pm 24V/50mA$

DT5780P - Dual Digital MCA - 2 HVPS +5kV/300uA, 2 LVPS  $\pm 12V/100mA$ ,  $\pm 24V/50mA$

coupler BNC female to BCN male

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

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w-Noise Fast-Rise-Time Charge-Sensitive Preamplifiers (Boxed)

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out Filter cable BNC female to BNC male - 25 cm

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intillation Preamplifier

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ock Generator and FAN-OUT

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

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

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Multiparametric DAQ Software for Physics Applications

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Digital Pulse Processing for the Pulse Height Analysis

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## Libraries

High level library for CAEN Digitizers running DPP firmware

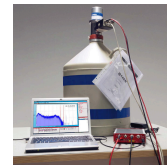
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USB 3.0 to CONET2 Adapter

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CONET2 Controller based on PCI Express Gen 3 interface

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