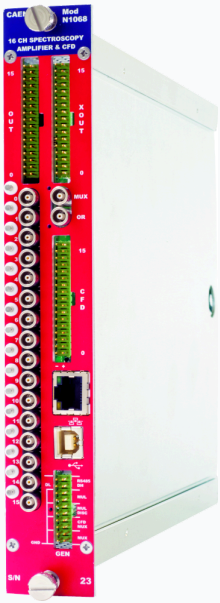
N1068

16 ch Programmable Spectroscopy Amplifier and 16ch CFD

NIM	16	2 ÷ 512
Package	No. of Channels	Gain

The N1068 is a 16-channel programmable spectroscopy amplifier with timing filter, constant fraction discriminator (CFD) and pile-up rejection in a single-width NIM module. It supports single-ended 50 Ω or differential 110 Ω inputs, selectable positive or negative polarity, ±4 V input dynamics, programmable CR-RC5 shaping, pole-zero compensation, 8-step coarse and 7-bit fine gain, and active baseline restoration. Each channel includes a CFD with 5-step delay selection and programmable 12-bit ECL output delay from 200–800 ns. N1068S, N1068DB and dedicated N1068GE versions are available.



Overview

Product Highlights

- 16 channels is a one unit wide NIM module
- Dedicated version for germanium detector
- Programmable positive or negative input polarity per each channel
- Active baseline restorer with programmable output offset
- 12-bit programmable delay on ECL CFD output (range: 200 – 800 ns)
- CFD, Energy or Timing filter multiplexed output
- Programmable 4 (5 for N1068GE) shaping time per channel
- 8 step coarse gain and 7-bit fine gain for energy amplifier
- Programmable 8-bit pole zero adjustment
- OR output and Multiplicity output
- Differential and Single ended versions available
- Pile-up rejection facility individually selectable
- ±4 V input dynamics on 50 Ω (SE) and 110 Ω (Differential)
- 16 channels CFD with 5 step delay individually jumper selectable
- Timing filter amplifiers with programmable differentiation and integration time
- Multiplicity trigger (NIM) with programmable threshold
- Programmable fast unipolar input mode for PMT and all fast charge detectors
- Low Noise
- Completely programmable via USB, Ethernet and RS485: Thresholds. shaping times, gains, Pole-Zero, etc.
- Low Power

Product Description

AT A GLANCE	
Package	**NIM**
No. of Channels	**16**
Gain	**2 ÷ 512**
Coupling	**DC**
Shaping	**Gaussian type**
Input Impedance (Ω)	**50 (SE) 110 (Diff.)**

The CAEN **Mod.N1068** is a **16 channel Programmable Spectroscopy Amplifier** with Time Filter, Constant Fraction Discriminator (CFD) and pile-up rejection, implemented in a single width NIM module. This module is designed to be used with Germanium, and many other detectors types connected to charge sensitive preamplifiers. Also adapted for fast input signal like PMT and all fast charge detectors. Available dedicated version for **germanium** detector (**N1068GE**). N1068 has the following input configurations:

- Single Ended (50 Ω Impedance): **N1068S** and **N1068GE**
- Differential (110 Ω impedance): **N1068DB**

 — © 2026 CAEN S.p.A. All rights reserved. Specifications are subject to change without notice.

Overview (continued)

The first stage of the Amplifier circuits is the polarity selector circuit which select the positive or negative input polarity. Follow two different sections which provide the **Energy** and **Timing** information. The Energy section is composed by a Spectroscopy amplifier with CR-RC^5 shaping type and different time constants: pole-zero compensation, an 8-step coarse gain (2, 4, 8, 16, 32, 64, 128, 256), a 7-bit fine gain (from 1 to 2) and a DC restorer circuit. The time constants have the following values:

- N1068DB, N1068S: 0.5, 1, 2, 4 µs
- N1068GE: 0.5, 1, 2, 4, 16 µs

The **Timing section** is composed by a Timing filter with a differential stage followed by an integration stage both with two-time constants. An amplifier stage provides 4 gain values. This timing signal is sent to a Constant Fraction Discriminator section (Constant Fraction = 30%). The CFD has an auto walk compensation and the delay time is selectable individually for each channel by 5 step jumpers. The width and delay of CFD OUT is individually programmable; the delay can be enabled or disabled. The trigger stage foresees a Programmable Multiplicity Trigger and Multiplicity signal, an analog sum output of every channel CFD out; Multiplicity signal can be daisy chained with those provided by other modules. Chaining with a Sum Output available as well. Pile-up rejection is configurable individually for each channel. When enabled each time a pile-up event occurs, the Energy output is set to the saturation value. The **USB 2.0**, **Ethernet** and **RS485** interfaces allow to handle all functional parameters.

The N1068 is supported by freely downloadable CAEN-CSA software, available for both Windows and Linux OS.

Technical Specifications

Packaging	One unit wide NIM unit
Power requirements	6V 2.9 A; -6V 1.8 A; +12V 250 mA; -12V 250 mA

Input

- Positive or negative pulses, max. amplitude of ±4V
- 50 Ω impedance (SE), 110 Ω (Differential)
- Input polarity must be set via terminal

OUT

- Unipolar/Gaussian signal with a dynamic range of 0 ÷ ±8 V max (on 1 MΩ)
- 50 Ω output impedance
- Common offset adjust (-200 ÷ +200 mV) 8-bit resolution

XOUT

- Unipolar/Gaussian signal, further 10x fixed amplification of the OUT value, with a dynamic range of 0 ÷ ±8 V max (on 1 MΩ)
- 50 Ω output impedance
- Common offset adjust (-200 ÷ +200 mV) 8-bit resolution

CFD OUT

Diff. ECL output, width 65÷1430 ns ±5%, 5 bit adjustable

 — © 2026 CAEN S.p.A. All rights reserved. Specifications are subject to change without notice.

MUX

Output, on LEMO connector and on double row connector:
- Options: energy, timing, disabled; 0 ÷ ±8V max (on 1 MΩ)
- 50 Ω output impedance
- High Impedance when disabled

MUX CFD

CFD out of channel with MUX enabled. Standard NIM output on double row connector

MUL

Multiplicity output: analog sum of CFD OUT, -2 mA current output per hit; -100 mV on 50 Ω

MUL DISC

- Standard NIM output on double row connector
- Multiplicity Trigger Discriminator (Time over threshold) with Programmable Threshold

Integral non linearity	<± 0.02% in 10%÷90% of the full scale @ Gain=45 and 0.5 µs shaping time (<± 0.3% typ. for any shaping time)
OR	Logical OR of the CFD Output, on LEMO connector, standard NIM output, width 140÷1500 ns ±5%, 5 bit adjustable. Individually Enable
Temperature stability [0÷50°C]	Gain: < 70 ppm/°C. DC level Output: < 10 µV/°C
Equivalent Input Noise	< 15 µV RMS (Gain=100, 4 µs shaping time)
Interchannel Crosstalk	<-55 dB at max Gain, 4 µs shaping time and 4 V input on adjacent channel
Coarse Gain Range	Adjustable (2, 4, 8, 16, 32, 64, 128, 256)
Shaping Time	(0.5, 1, 2, 4) µs; 0.5 µs with fast unipolar input select (0.5F) GE version: (1, 4, 8, 16) µs; 1 µs with fast unipolar input select (1F)
Fine Gain Range	From 1 to 2 , 7-bit adjustable
Pole-zero Adjustment	Done via software on 256 steps to match preamp tails in the 20 to 2000 µs range
Timing Filter Time Constant	Diff. (100, 500 ns), Int. (20, 80 ns)
Timing Gain	Adjustable 1, 4
CFD Threshold	0 ÷ 2048 mV (12-bit resolution)
CFD Delay Time	Selectable by jumper (5 steps): 8 ns, 16 ns, 24 ns, 32 ns, 40 ns

CFD WALK

<±500 ps on 60 mV ÷ 2V input with 10 ns rise time, 50 µs duration

Delay on CFD ECL Output	18÷1380 ns ±5%, 5 bit adjustable. Individually Enable
Pile-up rejection	Individually selectable; when a pile-up event occurs an output saturation is forced

Interfaces

- USB: USB B type female connector; USB 2.0 compliant
- ETH: 10/100 Base-T female connector; TTL signals (TCP/IP)
- RS485 on 10+10 pin header General I/O

— © 2026 CAEN S.p.A. All rights reserved. Specifications are subject to change without notice.

Ordering Information

ORDERING CODE	DESCRIPTION
WN1068DBXAAA	N1068DB – 16 Ch Programmable Spectroscopy Amplifier & CFD Differential
WN1068GEXAAA	N1068GE – 16 Ch Programmable Spectroscopy Amplifier & CFD for Germanium Detector
WN1068SXAAAA	N1068S – 16 Ch Programmable Spectroscopy Amplifier & CFD SE

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

Accessories

A385 — Adapter 2.54mm 34-pin female to 16x LEMO 00 female (or MCX male) – 50 cm / 1 m

A952 — Cable assembly 2.54mm 34 pin female to 2.54mm 34 pin female - 50 cm

Related Products

A1442 — 16/32 Channel charge sensitive preamplifier

N1168 — 16 ch Fast Scintillator Programmable Signal Processor and 16 ch CFD

N6741 — 32 Ch Peak Sensing ADC

NIM8302 — 5U 10 slot 150 W Compact Crate

NIM8302P — 5U 5 slot 150 W Portable Crate

NIM8303 — 5U 12 slot 300/600 W Crate

NIM8304 — 7U 12 slot smart fan unit Switching 2000 W Crate

NIM8305 — 2 Slot Switching 450 W Mini Crate

NIM8306 — 2 Slot Switching 750 W Mini Crate

Software & Control Tools

CAEN-CSA — Spectroscopy Amplifier Control Software

 — © 2026 CAEN S.p.A. All rights reserved. Specifications are subject to change without notice.