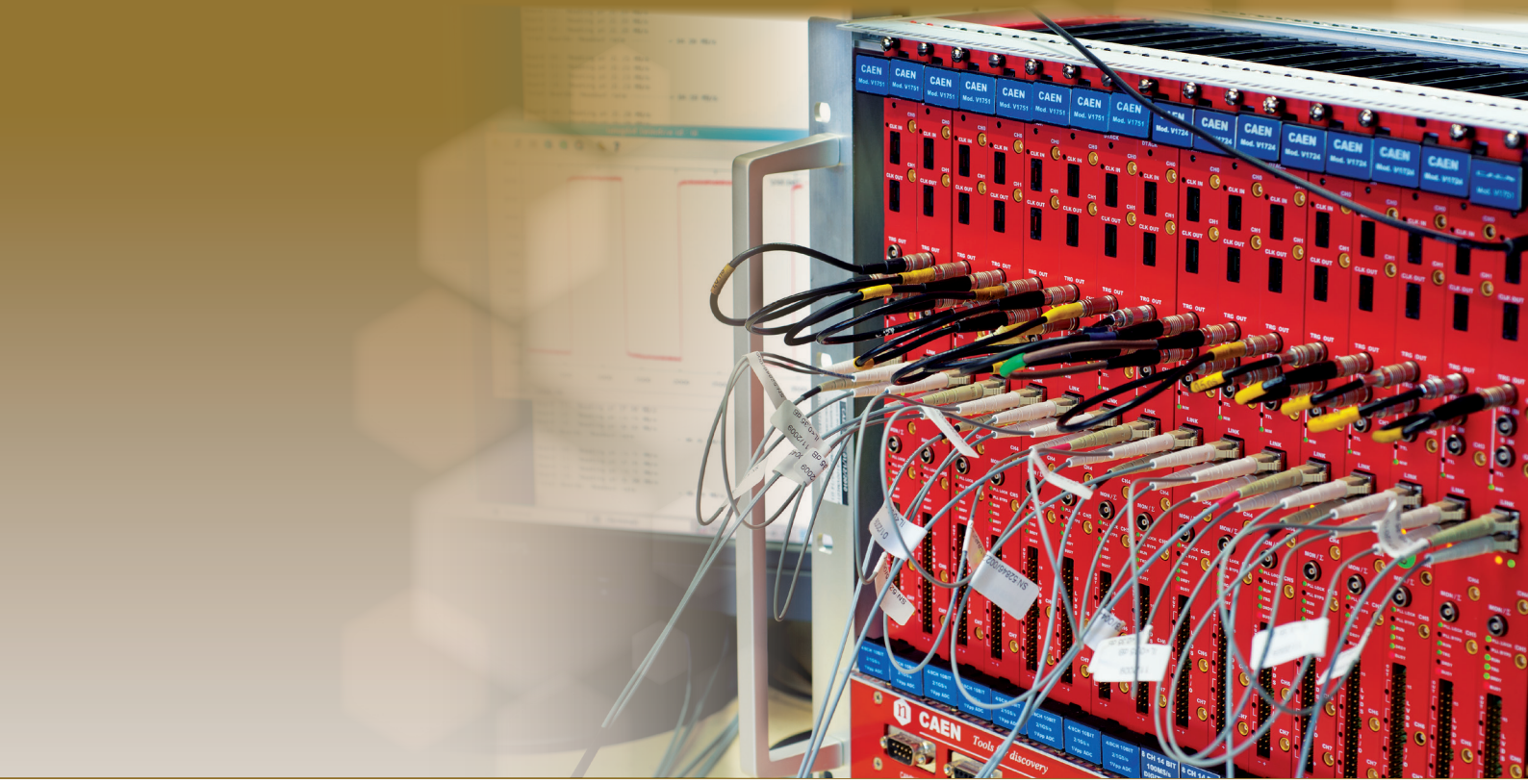
CAEN Electronic Instrumentation
Tools for Discovery

Digitizer Families



CAEN Waveform Digitizer Families: a complete selection of high speed multichannel ADCs, with local memory and FPGA for real-time data processing!

Features

- Up to 14 bit resolution
- VME, NIM and Desktop form factors
- VME64X, Optical Link, USB 2.0 Interfaces available
- Multi-board synchronization and trigger distribution
- Programmable PLL for clock synthesis
- Programmable digital I/Os
- Analog output with Trigger Majority (VME only)
- FPGA firmware for Digital Pulse Processing:
  - Zero Suppression
  - Pulse Height Analysis
  - Charge Integration
  - Pulse Shape Discrimination
  - Time measurement
  - Possibility of customization
- Software Tools for Windows and Linux

Available in different form factors: VME, NIM, Desktop.

- From 1 to 64 channels
- Up to 5 GS/s sampling rate
- FPGA firmware for Digital Pulse Processing

CAEN has developed a complete family of digitizers that consists of several models differing in sampling frequency, resolution, number of channels, form factor, memory size and other parameters. The following table lists all models currently available. In parallel with the hardware development, CAEN has made a big effort in developing algorithms for the Digital Pulse Processing (DPP); the user can install a DPP algorithm on the FPGA of the digitizer (firmware upgrade), run it on-line and implement new acquisition methods that go beyond the simple waveform recording. A digitizer with DPP becomes a new instrument that represents a fully digital replacement of most traditional modules such as Multi and Single-Channel Analyzers, QDCs, TDCs, Discriminators and many others.

Model [1]	Form Factor	N. of ch. [2]	Max. Sampling Frequency (MS/s) [2]	N. of Bits	Input Dynamic Range (Vpp) [2]	Bandwidth (MHz) [2]	Memory (MS/ch) [2]	DPP firmware [3]
x720	VME	8	250	12	2	125	1.25 / 10	PSD
	Desktop/NIM	4 / 2						
x724	VME	8	100	14	0.5 / 2.25 / 10	40	0.5 / 4	PHA, DAW
	Desktop/NIM	4 / 2						
x725	VME	16 / 8	250	14	0.5 - 2	125	0.64 / 5.12	PHA, PSD, ZLEplus, DAW
	Desktop/NIM	8						
x730	VME	16 / 8	500	14	0.5 - 2	250	0.64 / 5.12	PHA, PSD, ZLEplus, DAW
	Desktop/NIM	8						
x740	VME	64	62.5	12	2 / 10	30	0.19 / 1.5	QDC
	Desktop/NIM	32						
x751	VME	8 - 4	1000 - 2000	10	1 / 0.2	500	1.8 - 3.6 / 14.4 - 28.8	PSD, ZLEplus
	Desktop/NIM	4 - 2						
x761	VME	2	4000	10	1	1000	7.2 / 57.6	n.a
	Desktop/NIM	1						
SWITCHED CAPACITOR **x742**	VME	32+2	5000 [4]	12	1	500	0.128 / 1	n.a
	Desktop/NIM	16+1						
SWITCHED CAPACITOR **x743**	VME	16	3200 [4]	12	2.5	500	0.007	n.a
	Desktop/NIM	8						

(1) The x in the model name is V1 for VME64, VX1 for VME64X, DT5 for Desktop and N6 for NIM

(2) The indication "size 1/ size 2" denotes different model versions while "size 1 - size 2" denotes different model operating modes

(3) Digital Pulse Processing (DPP) firmware:
- DPP-PHA: Pulse Height Analysis (Trapezoidal Filter);
- DPP-PSD: Pulse Shape Discrimination;
- DPP-ZLEplus: Digital Pulse Processing for the Zero Length Encoding (enhanced Zero Suppression algorithm);
- DPP-DAW: Digital Pulse Processing for Dynamic Acquisition Window
- DPP-QDC: Digital Pulse Processing for Charge to Digital Converter

Note: DPP-CI is no longer supported. To perform Charge Integration, please refer to the DPP-PSD.

(4) Sampling frequency of the analog memory (switched capacitor array); A/D conversion takes place at lower speed (thus generating a Dead Time.)

Digital Pulse Processing firmware: turn your CAEN digitizer into complete acquisition system!

DPP-PHA Digital Pulse Processing for Pulse Height Analysis

724, 725 and 730 digitizers running DPP-PHA firmware accept signals directly from Charge Sensitive Preamplifiers and implement a digital replacement of Shaping Amplifier plus Peak Sensing ADC (Multi-Channel Analyzer).

DPP-PSD Digital Pulse Processing for Pulse Shape Discrimination

The 720, 725, 730 and 751 digitizers running DPP-PSD firmware accept signals directly from the detector and implement a digital replacement of dual gate QDC, discriminator and gate generator.

DPP-ZLEplus Digital Pulse Processing for the Zero Length Encoding

A new and enhanced version of the Zero Suppression (Zero Length Encoding) algorithm with improved readout performances is available for 751, 725 and 730 families).

DPP-QDC Digital Pulse Processing for Charge to Digital Conversion

740 digitizers running the DPP-QDC firmware accept signals directly from the detector and implement a digital Gated Integrator for high density systems.

DPP-DAW Digital Pulse Processing for Dynamic Acquisition Window

724, 725, 730 digitizers running the DPP-DAW firmware implement zero suppression with trigger-less acquisition systems.

40 YEARS OF INNOVATION 1979-2019

Experience and competence always at your side

CAEN *Tools for Discovery*

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