

V2730B

16 Input Channel 14 bit 500 MS/s Digitizer with Programmable Analog Gain



Features

- **16** independent input channels, 500 MS/s 14-bit, with individual DC offset adjustment and Software selectable analog gain (VGA)
- Front panel readout via **USB-3.0** or **1/10Gb** Ethernet
- On-board Zynq® UltraScale+™ FPGA with embedded Linux-based ARM® processor
- **5GB** of total acquisition memory (DDR4)
- **Open FPGA** architecture fully supported by **SCI-Compiler** tool
- **Ready-to-Use** Firmware solutions to get time-stamped waveforms and physical quantities (**check here** for the available options)
- **Triggered** and **Streaming Readout** modes supported
- **System features:** Multi-board synchronization, digital I/Os for trigger logic, on-board storage of multiple firmware images, 125MS/s 14-bit DAC output and integrated web interface
- **Software ecosystem:**
 - GUI-based readout software available for multiparametric spectroscopy (**CoMPASS**) or waveform recording (**WaveDump2**)
 - Firmware/software generator and compiler for the Open FPGA (**Sci-Compiler**), eliminating the need for FPGA programming skills
 - Libraries (**FELib**) and demo codes are provided for software customization
- Wide range of applications (from Nuclear and Particle Physics to High Timing Resolution, Fast Neutron Spectroscopy, and Homeland Security)
- Suited for signals from liquid or inorganic scintillators coupled to PMTs or SiPMs
- Special 125MS/s 14-bit DAC output (LEMO) for signal inspection or trigger sum
- Fully compliant with CAEN **μ-crate** module

Description

The **VX2730B** Digitizer is a **16 input channel digital signal processor** for radiation detectors in the VME64 form factor. It offers not only waveform digitization and recording but also Multi-Channel Analysis for a complete range of applications like nuclear and particle physics, high-timing resolution, Fast Neutron Spectroscopy, and Homeland Security. It is compliant with mid-fast signals typically coming from liquid or inorganic scintillators coupled to PMTs or SiPMs.

Each input channel is able to independently digitizing detector signals through a 14-bit ADC at 500 MS/s. Data acquisition is driven by trigger signal generation and the identification of a Region of Interest (ROI), defined in terms of sample count or time duration. Trigger sources can be local (channel self-trigger), external, or software-based. Once acquired, the digitized data is processed within the FPGA, stored in high-speed memory as events—including Trigger ID and Timestamp tags—and then transferred via high-bandwidth communication interfaces for further analysis.

The digitizer supports different acquisition modes, designed to balance throughput, latency, and data efficiency according to experimental requirements:

- **Triggered Mode:** All channels acquire data simultaneously upon a global trigger generated by a Central Logic Unit, which processes local triggers from individual channels. External and software triggers can also be configured as sources for the global trigger. Zero suppression algorithms can be applied to remove non-significant data and reduce the readout payload.
- **Streaming Readout Mode:** Each channel autonomously identifies its ROI using the self-trigger mechanism, acquiring data independently of the other channels. This mode includes automatic zero suppression (non-triggered channels are not acquired), maximizes acquisition rates, and is ideal for applications requiring real-time parameter extraction. In addition, correlation logics can be configured to validate event acquisition upon **coincidences or anticoincidences** between local and external triggers.

The VX2730B can operate using both **pre-configured firmware** developed by CAEN and custom user-generated firmware, offering flexibility for a wide range of applications. Multiple firmware images can be stored simultaneously in the digitizer's FLASH memory and quickly activated when needed. CAEN provides ready-to-use firmware solutions optimized for specific acquisition and processing needs:

- **Scope Firmware:** Based on full waveform recording in triggered acquisition mode. A zero suppression function is available to reduce unnecessary data readout.
- **DPP-PSD Firmware:** Implements Digital Pulse Processing algorithms for charge integration and pulse shape discrimination. Physical parameters such as pulse height, charge, timestamp, and PSD are extracted from waveforms acquired in streaming readout. It is yet possible to save both raw waves and parameters.

For users requiring custom acquisition and processing, the Open FPGA architecture enables firmware customization through **SCI-Compiler**. This graphical tool allows users to create personalized firmware solutions without HDL skills. In addition, **Sci-Compiler** automatically generates drivers and libraries and provides graphical utilities for developing custom DAQ software.

The Linux-based Arm processor embedded in the onboard CPU makes it possible to run automated user routines. Multi-board synchronization can be implemented via backplane or front panel easy-cabling options. Multiple communication interfaces offer flexible readout options: **USB 3.0** type-C and **1/10 Gigabit Ethernet**.

For detailed information on available firmware for the 2730 family and the structure of programming files (.CUP), please refer to the following [page](#).

This product is compatible with the following third-party software:

- **PKUCAENDAQ**

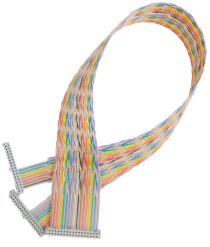
Moreover, you can check [this FAQ](#) to see which CAEN VME crates are suitable for this product.

Ordering Options

Code	Description	
WV2730BXAAAA	V2730B - 16 Ch. 14 bit 500MS/s Digitizer with Programmable Input Gain	RoHS

Accessories

A953



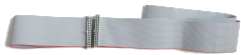
Cable assembly 2.54mm 34 pin female to two 2.54mm 34 pin female - 50 cm

A319A



Clock & Sync cable assembly for Digitizer Series 2.0 - 20 cm

A952



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

A954



Cable assembly 2.54mm 34 pin female to two 2.54mm 16 pin female - 50 cm

A319B



Clock cable assembly from Digitizer Series 1.0 to Digitizer Series 2.0 - 20cm

A316



Cable assembly 2.54mm 2-pin header female - 5 cm

Related Software

WAVEDUMP2



Open Source Software for Digitizer 2.0 and 1.0 Series

COMPASS



Multiparametric DAQ Software for Physics Applications

CAEN Toolbox



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

Related Firmware

DPP-PSD



Digital Pulse Processing for Charge Integration and Pulse Shape Discrimination

DPP-PHA



Digital Pulse Processing for the Pulse Height Analysis

DPP-SUP



Super Licence for CAEN Digitizers

Related Software Libraries

CAEN FELib Library



High level library for CAEN Digitizers 2.0

Related Products

NV8020A



7U CRATE VME/NIM 8 slot VME64 365W, 5 slot NIM 150W

VME8008X



4U 8 Slot VME64X Mini Crate

Sci-Compiler



Graphical Programming Language for CAEN Open FPGA Boards

VME8008B



4U 8 Slot VME64 Mini Crate

VME8004X



2U 4 Slot VME64X Mini Crate

VME8011



7U 21 Slot VME64 Low Cost Crate

VME8100



8U 21 Slot VME64/64X Enhanced Crate Series

VME8200



9U 21 Slot VME64X Enhanced Crate series

μ-crate



Desktop single-slot VME64X Crate

VME8010



7U 21 Slot VME64 Low Cost Crate

VME8004B



2U 4 Slot VME64 Mini Crate

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