45 YEARS OF INNOVATION 1979-2024

NEW PRODUCTS SELECTION 2024

CAEN
Electronic Instrumentation

We are proud of the high quality of our products.

ISO 9001

ISO 9001:2015 approved quality system ensures all our internal processes.

From R&D to the registration of the incoming purchase orders, through:
- Resource Planning
- Scheduling
- Production

Our quality system is responsible for the proper functioning of all our internal processes and is subject to regularly audits, carried out by the National Standards Authority.

From the initial product design and its development stages, till the delivery of the production batches, we follow documented procedures that cover every aspect of our business.

The quality of CAEN S.p.A. products is constantly monitored by the application of the UNI EN ISO 9001:2015 standard. CAEN S.p.A. is ISO 9001 certified since 1998.

ISO9001:2015
certified Company

Authorised
research laboratory
of the MIUR

Dear Friends,

we are so excited and proud to introduce you our latest instruments and electronics!

In these challenging years we didn't lose our enthusiasm in developing, designing and improving our "Tools for Discovery".

The updated 1.0 Digitizers Series and the brand new 2.0 family are the expression of our extensive effort to help your work with up-to-date technology: the 1.0 Series offers reliable and market reference digital pulse processing while the 2.0 comes with Open FPGA and a new revolutionary approach to firmware design through the Sci-Compiler tool, bringing custom developments at everyone's hand. The Sci-Compiler compatibility is also available for our Digital Pulse Processors like the DT5560 and this amazing tool will be gradually extended to other modules like logic units, MCA ad more.

Please welcome the new units based on the CERN picoTDC into the FERS-5200 family, the easy-scalable readout platform, now offering an enhanced suite of instruments for your experimental setup. And more cards for other applications are on their way …

Our latest power supplies extend further the offer of High/Low Voltage units suitable for any detector and front-end electronics: new multichannel board are now available in different form factors matching distinct set up and speeding up the integration process even in complex installation. And we did not forget more efficient Low voltage boards and power systems for Hostile Areas.

Wait! we are also introducing new pre-amplifiers, PCIexpress adapters, VME crate controllers, programmable logic units, educational kit, read-out systems…

Have a look! We hope these pages can transmit the efforts, knowledge and passion inspiring our work every single day!

With infinite gratitude,

Jacopo Givoletti
President

CAEN *Tools for Discovery* **Electronic Instrumentation**

CAEN SpA is a worldwide leading company provider of a comprehensive range of high/low voltage power systems and data acquisition/front-end modules compliant with IEEE standards for nuclear and particle physics.

Extensive research and development capabilities allowed **CAEN SpA** to play an important long-term role in this field. Thanks to years of close collaborations with the most important Research Centres of the world, CAEN strikes to deliver innovative products and services worldwide.

CAEN portfolio includes over a thousand products and solutions for nuclear measurements, whose quality is monitored throughout the entire production cycle and guaranteed by UNI EN ISO 9001:2015 standard. Its products appeal to a wide range of customers including engineers, scientists and technical professionals who all trust them to achieve their goals quickly and effectively.

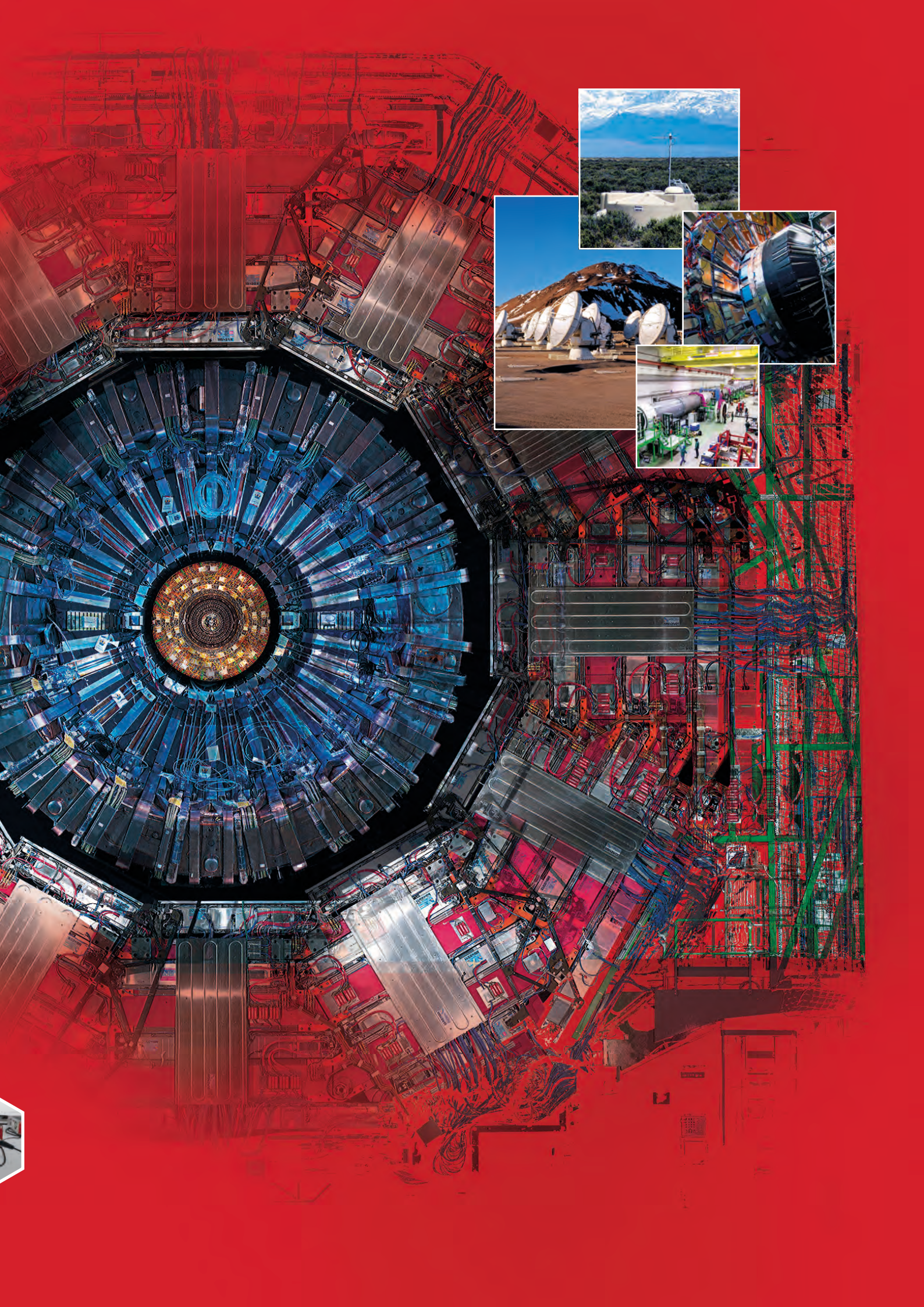
Thanks to plenty of experience in physics research, CAEN instruments are now used in several advanced industrial applications.

Products

Modular Pulse Processing Electronics
Waveform Digitizers
Digital Spectroscopy
Electronics for SiPM
Power Supplies
Digital Detector Emulators
Educational Kits

Applications

High Energy Physics
Astrophysics
Neutrino Physics
Dark Matter Investigation
Nuclear Physics
Material Science
Medical Imaging Applications
Homeland Security
Industrial Applications



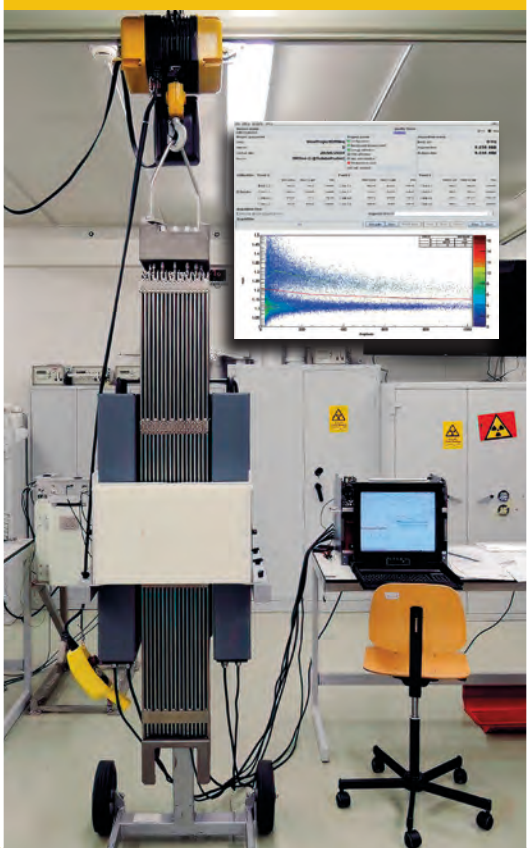
CAEN SyS

Systems & Spectroscopy Division

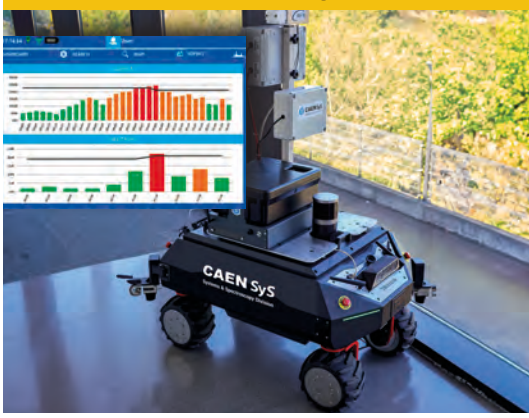
Nuclear Waste carachterization

Nuclear Waste Digitization of Radiological data

Nuclear Fuel verification



Radiation Monitoring Networks



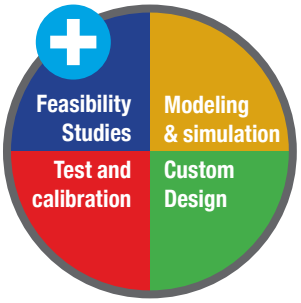
Environmental Radiation

CAEN SyS: Systems & Spectroscopy Division of CAEN SpA, is a worldwide leader in development of Radiation Measurements Systems and Spectroscopy Solutions for Nuclear Facilities, Nuclear Power Plants, Nuclear Security and Nuclear Safeguards Applications.

CAEN SyS is committed to delivering exceptional nuclear measurement instrumentation, expertise, offering radiation detection instrumentation and integrated turn-key solutions with added value and operational benefit, enhancing safety and security through nuclear measurements.

EXPERIENCE

Over 40 years of experience in design and manufacturing of Nuclear Electronics; executed several thousands of signal processing and data acquisition systems for fundamental research applications, particle accelerators, and nuclear applications, including extensive projects for CERN, USA DOE Laboratories (Oak-Ridge, Los Alamos, Sandia, Idaho,ARGONNE,Jefferson,Berkley, Fermi Laboratories; ENEA, INFN, IAEA, CEA, IRSN, PSI, AREVA, ORANO, SCK-CEN, EURATOM, and several International nuclear physics facilities such ITER, TOKAMAK…



CAPABILITIES

Full electronic design with customization also with Radiation Hardening MCNP and GEANT4 Modeling and simulation for gamma & Neutron system design support Irradiation Laboratory and Calibration Laboratory Static & Dynamic testing of Nuclear Measurement Systems Environmental testing & EMC verification of Instrumentation.

GAMON Platform

GLOBAL MEASUREMENT PLATFORM FOR NUCLEAR SAFETY AND SECURITY

The GAMON Platform is a uniquely innovative system, capable of empowering authorities and institutions with the ability to respond to a wide range of operational activities and complex radiological situations in a single, simple, reliable solution. The GAMON Platform combines a cloud database application for visualization and analysis from all GAMON systems for autonomous and real time measurements.

GAMON-S / GAMON-N

GAMMA RADIATION SPECTROSCOPY SYSTEM FOR REAL-TIME RADIATION MONITOR

The **GAMON-S** and **GAMON-N** spectrometer series have been designed for outdoor and indoor real-time radiation monitoring, for early environmental warning and emergency response.

The GAMON-S is dedicated to detection and identification of gamma radiation with ambient dose equivalent rate H*(10) measurement while GAMON-N is an environmental monitoring unit for measurements of H*(10) from neutrons, characterized by excellent measurement performance even in the presence of pulsed fields. They can both operate in harsh weather conditions and are protected from rain and moisture.

Operative Application

- Ring monitor systems around nuclear facilities
- Nationwide environmental monitoring networks
- Area monitor system in nuclear research laboratories
- Portable, mobile measurement stations for emergency response

GAMON-Drone

DOSE AND SPECTROMETRIC DETECTION UNIT, LIGHT WEIGHT

GAMON-Drone is a compact and light weight spectrometer specifically designed for UAV environmental radiation protection, inspection, and site remediation after the dispersion of radiological or nuclear material. The system can be used as a measurement device for first responders for the exploration of hazardous areas.

GAMON-Drone system is designed to offer the best combination of portability, low power consumption and performance. The unit is assembled in a lightweight enclosure that contains both the Scintillator Detector and the Digital Signal Processing Electronics.

Operative Application

- Emergency and first response applications for a prompt control of the contaminated area
- Location survey and control before, during and after public events
- Characterization of the NORM accumulated in Oil&Gas extraction and processing facilities, and pipes.
- Detection of orphan sources in scrap material of reprocessing plants.

GAMON-Diver

COMPACT UNDERWATER SYSTEM FOR RADIONUCLIDES IDENTIFICATION

The **GAMON-Diver** is a highly efficient spectroscopic measurement system designed to perform for underwater radiometric measurement. The system can be deployed in multiple scenarios for gamma radionuclide identification in case of accident mitigation, first emergency response or can be installed as a long term monitoring device for sensitive underwater locations as port access points, nuclear facilities and Oil&Gas infrastructures.

Operative Application

- Detection and monitoring of water reservoir, lakes, ports or sea.
- Dynamic underwater searches by diver operators
- Long term monitoring of the environmental conditions in rivers or after a nuclear power plant or before a water extraction point.
- Control of the NORM content in the Oil&Gas waste like accumulated sludge from the extraction process.
- Control of underwater Oil&Gas pipes
- Monitoring of underwater radioactive leakages

DT5485P - DIGITAL CONTROLLED SIPM POWER SUPPLY WITH USB

UP TO 85 V / 10 mA 2 CH - DESKTOP

The DT5485P power supply offers, in a single standalone box, a handy way to bias SiPMs: output voltage on LEMO 00 connector, high current drain for multidetector connection, temperature feedback, USB control are just some of the features that make the module convenient for R&D and laboratory needs.

SiPM

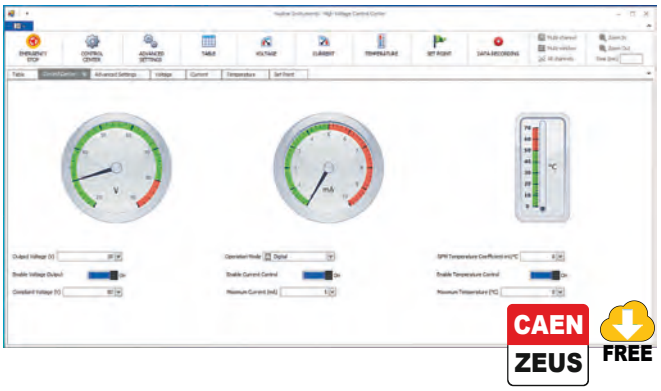
The DT5485P is a one-channel high voltage regulator specifically designed for SiPM bias. The unit can provide up to 10 mA and the output voltage could be regulated between 20 V and 85 V with a minimum step of 1 mV. It has a built-in temperature compensation controller with programmable coefficient and features a 3.5 mm audio socket for temperature probe input.

Two versions are available: DT5485P (powered and controlled via USB) and DT5485PB (USB-controlled, with external +12 V power supply).

The ZEUS control software is provided for free; ZEUS is a Windows compatible software that allows to control multiple DT5485P modules at the same time. The software is based on a user-friendly GUI that allows the parameters configuration and the data logging on file. It integrates real-time plot capabilities (voltage, current and temperature) with the possibility to superimpose measurements from several modules.

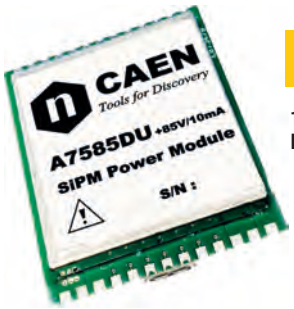
Features

- Single Desktop HV channel:
  - DT5485P: powered and controlled by USB
  - DT5485PB: controlled by USB, with +12 V external power supply
- 20 ÷ 85 V (10 mA) output range
- High current monitor resolution:
  - Low range: 100 nA
  - High range: 650 nA
- Very low ripple (<0.1 mVpp typical)
- Programmable temperature compensation
- ZEUS Software Tool for easy unit management



A7585D

1 Ch. 85 V/10 mA Digital Controlled SiPM Power Supply (with USB) - PCB Mount



A7585DU

1 Ch. 85 V/10 mA USB Controlled SiPM Power Supply (with USB) - PCB Mount

A7526 - HIGH EFFICIENCY HV DC/DC CONVERTER

UP TO 2.6 kV / 500 µA 1 CH - PCB MOUNT

Features

- Available with positive or negative polarity
- Analog V_{set} output voltage regulation
- Typical voltage ripple 5 mVpp (1 kHz ÷ 20 MHz)
- Imon and Vmon Output (positive analog monitor)
- Overcurrent protection
- Compact package: 29x54x16 mm³

The A7526 provides a 2.6 kV maximum voltage, and a maximum output current of 500 µA. It is available with either positive (P) or negative (N) output voltage, regulated by providing a 0 to +2.4 V external voltage (V_{set}). The board is provided with an overcurrent protection: if a current larger than the Iout maximum value is drawn, the module is not being damaged.

Thanks to its excellent stability and special design, A7526 power supply is engineered to work in harsh environment and under severe temperature variations.

A7526DB - HIGH EFFICIENCY HV POWER SUPPLY MODULE

UP TO 2.6 kV / 500 µA 1 CH - COMPACT DESKTOP

Features

- Available with positive or negative polarity
- SHV output connector
- Internal memory for permanent storage of calibration and configuration
- Imon and Vmon digital monitor
- Compact package: 63x36x170 mm³
- Typical voltage ripple smaller than 5 mVpp (1 kHz ÷ 20 MHz)
- Digital output voltage control
- RS485 digital control (allows to build daisy chain network of A75xxDB modules)
- Interlock logic for Module enable

The A7526DB Power Supply Module is a compact desktop solution to provide stable and low noise power supply for several kinds of detectors.

The module houses a digital controlled high voltage channel that provides a 2.6 kV maximum voltage with 100 mV monitor resolution. The maximum output current is 500 µA (Iset adjustable), with 10 nA (Imon) monitor resolution. It is available with either positive (P) or negative (N) output voltage. HV output is delivered through SHV connector.

Power supply control can be performed remotely via RS485, allowing to build a daisy chain network of A75xxDB modules.

Overcurrent detection: if the channel attempts to draw a current larger than I_{set}, the output voltage is automatically adjusted to keep the current below I_{set} limit. Under this condition, the channel behaves as a current generator.

The Module can be enabled or disabled through the interlock logic.

A7512DB - DIGITAL CONTROLLED POWER SUPPLY MODULE FOR MRPC

UP TO 12 kV / 20 µA 1 CH - COMPACT DESKTOP

Features

- Available with positive or negative polarity
- LEMO HV output connector
- LEMO 00 connector for preamplifier power supply
- Internal memory for permanent storage of calibration and configuration
- Typical voltage ripple smaller than 30 mVpp (1 kHz ÷ 20 MHz)
- Digital output voltage control
- RS485 digital control (allows to build daisy chain network of A75xxDB modules)
- Interlock logic for Module enable

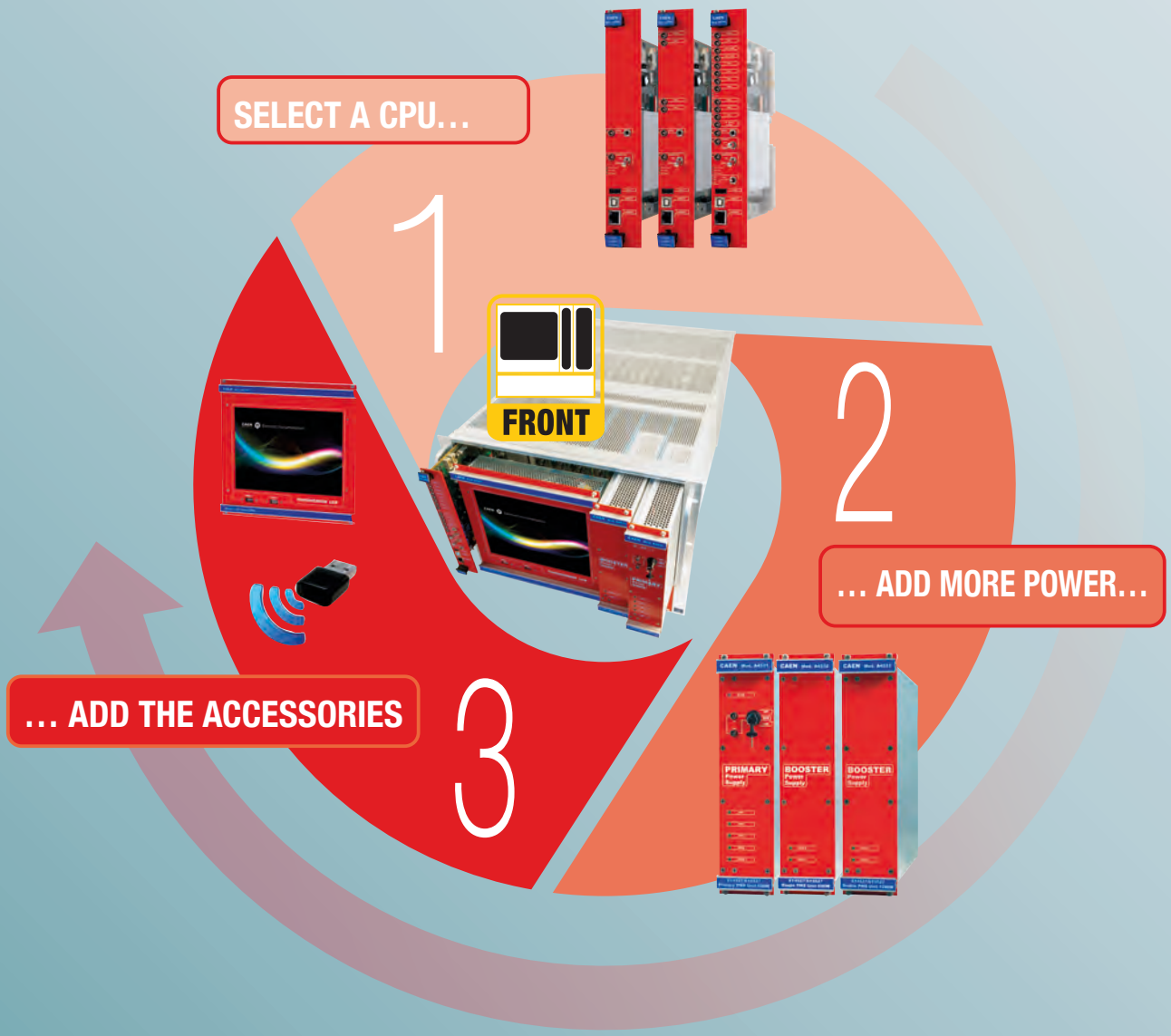
The A7512DB Power Supply Module is a compact desktop solution to provide stable and low noise power supply for single and multi-gap Resistive Plate Chamber (RPC) detectors.

The module houses a digital controlled high voltage channel that provides a 12 kV maximum voltage with 100 mV monitor resolution. The maximum output current is 20 µA, with 500 pA monitor resolution. It is available with either positive (P) or negative (N) output voltage. HV output is delivered through LEMO HV connector.

CAEN Universal Multichannel System

19" RACK MODULAR MAINFRAMES

Reliability, Modularity, Compatibility, Connectivity and User-Friendly: these are the concepts upon which the CAEN SYx527 and SYx527LC Mainframe Systems are developed. Our mainframe systems are specifically designed to provide ideal V/I output and monitoring for any detector technology employed in Modern Physics. Whether you are using SiPM or RCP, Wire Chambers or PMT, HPGe or GEM, our mainframes systems cover your needs.

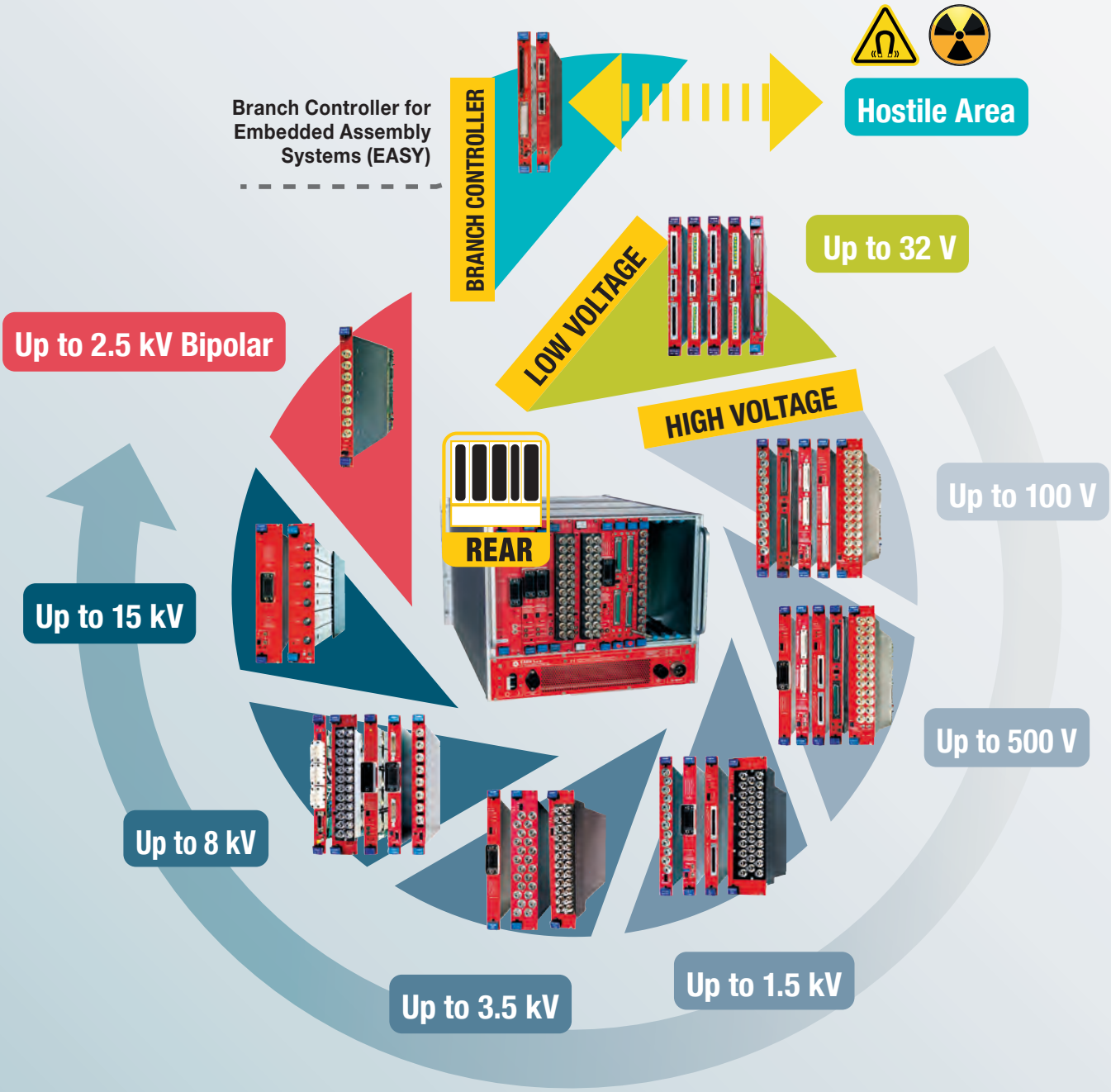


Manage, set, and monitor all System parameters and HV/LV channels thanks to the **GECO graphical control software**

PROVIDE HV BIAS, SUPPORT LV BOARDS FROM FRONT-END AND PERIPHERAL ELECTRONICS, HOUSE GENERIC I/O BOARDS

ALL AT THE SAME TIME!

UP TO 16 SLOT AND 768 CH PER CRATE



R6060

19" rack stand-alone solution branch controller for EASY remote crates, with the same functionalities of the A1676A board, but without the need of a Mainframe

(see p. 16)

NEW

A161x FAMILY - INDIVIDUAL FULL FLOATING CHANNEL DUAL RANGE BOARDS

A1612 UP TO 500 V / 1 mA - 100µA 16 CH - SYx527 MAINFRAMES
A1619 UP TO 250 V / 1 mA - 100µA 16 CH - SYx527 MAINFRAMES

Up to 500 V

The new generation of CAEN HV individual full floating power supplies, particularly suitable for silicon detectors

The A161x power supply boards family includes single width (5TE) boards housing 16 individual full floating channels, available with either 250 V / 0.1-1 mA (A1619) or 500 V / 0.1-1 mA (A1612) output, delivered through DB connectors.

The voltage ramp rates may be set independently for each channel.

The individual floating channels allow on-detector grounding, that reduces the noise level.

A global enable/disable connector allows to disable the channels.

Features include both current and voltage protections. If overcurrent occurs, the relevant channel is signalled to be in “overcurrent” and can be programmed either to turn off after a programmable trip time or to remain on and to provide the maximum allowed current; such feature allows the module to perform as a current generator.

The maximum output voltage (V_{MAX}) can be set, via front panel potentiometer, at the same common value for all the board channels. The V_{MAX} value can be read out via software.

Features

- 16 independently controllable individual full floating channels
- 250-500 V maximum output voltage
- Dual range current:

  A1612 / A1619
  - High Power: 1 mA (1 nA Current monitor resolution)
  - High Resolution: 0.1 mA (100 pA Current monitor resolution)
- 1 mV voltage monitor resolution
- Programmable voltage ramp up / down rates
- Typical voltage ripple:

  A1612
  - smaller than 5 mVpp (1 kHz ÷ 20 MHz)

  A1619
  - smaller than 3 mVpp (1 kHz ÷ 20 MHz)
- Overcurrent programmable protections
- Programmable TRIP parameter
- Current generator operation in overcurrent condition
- Configurable maximum output voltage via front panel potentiometer (common value for all board channels)

Control Software and Libraries

GECO

A1612

A1619

A162x FAMILY - INDIVIDUAL FLOATING CHANNEL DUAL RANGE BOARDS

A1625 UP TO 1 kV / 20-2 mA 8 CH - SYx527 MAINFRAMES
A1626 UP TO 1 kV / 10-1 mA 16 CH - SYx527 MAINFRAMES

COMING SOON

New and powerful HV individual floating power supplies, particularly suitable for high fluence silicon detectors

Up to 1 kV

The new and powerful HV individual floating power supplies; two single width (5TE) boards are available: A1625 and A1626, with 8 and 16 individual floating channels respectively (1 kV / 2-20 mA and 1 kV / 1-10 mA), delivered through DB connectors.

The voltage ramp rates may be set independently for each channel.

The individual floating channels allow on-detector grounding, that reduces the noise level. The channels have independent, but polarized, ground: the hot pole can assume values from 0 to 1000 V, positive or negative, with respect to earth, the cold pole is insulated up to 50 V, still with respect to earth.

If overcurrent occurs, channels can turn off after a programmable trip time, or remain on, and provide the maximum allowed current (current generator mode).

The maximum output voltage (V_{MAX}) can be set, via front panel potentiometer, at the same common value for all the board channels. The V_{MAX} value can be read out via software.

Features

- 8-16 independently controllable full floating channels
- 1 kV maximum output voltage
- Dual range current:

  A1625
  - High Power: 20 mA (100 nA Current monitor resolution)
  - High Resolution: 2 mA (10 nA Current monitor resolution)

  A1626
  - High Power: 10 mA (50 nA Current monitor resolution)
  - High Resolution: 1 mA (5 nA Current monitor resolution)
- Available with positive, negative or mixed polarity
- DB37 connector
- Programmable voltage ramp up / down rates
- Typical voltage ripple smaller than 10 mVpp (1 kHz ÷ 20 MHz)
- Overcurrent programmable protections
- Programmable TRIP parameter
- Current generator operation in overcurrent condition
- Configurable maximum output voltage via front panel potentiometer (common value for all board channels)

A1625

A1626

Control Software and Libraries

GECO

NEW

A1632H - INDIVIDUAL FLOATING CHANNEL DUAL RANGE BOARD

6 kV / 100-20 µA 8 CH - SYx527 MAINFRAMES

Up to 6 kV

High resolution 6 kV power supply board, particularly suitable for resistive plate chambers

The new high resolution HV individual floating power supply board: single width (5TE) board, with 8 individual floating channels (6 kV / 100-20 µA), delivered through SHV connectors.

The voltage ramp rates may be set independently for each channel.

The individual floating channels allow on-detector grounding, that reduces the noise level. The channels have independent, but polarized, ground: the hot pole can assume values from 0 to 6000 V, positive or negative, with respect to ground, the cold pole is insulated up to 50 V, still with respect to ground.

A global enable/disable connector allows to disable the channels.

If overcurrent occurs, channels can turn off after a programmable trip time, or remain on, and provide the maximum allowed current (current generator mode).

The maximum output voltage (V_{MAX}) can be set, via front panel potentiometer, at the same common value for all the board channels. The V_{MAX} value can be read out via software.

Features

- 8 independently controllable individual floating channels
- Global channels enable/disable connector
- 6 kV maximum output voltage
- Dual range current:
  - High Power: 100 µA (1 nA Current monitor resolution)
  - High Resolution: 20 µA (50 pA Current monitor resolution)
- 1 mV voltage monitor resolution
- Available with either positive or negative polarity
- Programmable voltage ramp up / down rates
- Typical voltage ripple:
  - smaller than 3 mVpp (1 kHz ÷ 20 MHz)
- Overcurrent programmable protections
- Programmable TRIP parameter
- SHV connectors
- Current generator operation in overcurrent condition
- Configurable maximum output voltage via front panel potentiometer (common value for all board channels)

Control Software and Libraries

GECO

A255x FAMILY - INDIVIDUAL FULL FLOATING CHANNEL BOARDS

UP TO 32 V / 12 A 8 CH - SYx527 MAINFRAMES

Individual full floating channel boards with the best noise performance, designed for front-end electronics

Up to 32 V

The power supplies A255x are a family of single width boards (5 TE wide) that house 8 independent Low voltage channels. The boards are available in different versions, equipped with D-Sub 8-pin or with DB37 connectors.

The individual floating channels are insulated from each other up to +/-500 V, and allow on-detector grounding, that reduces the noise level.

These modules provide up to 60 W output per channel, that can be also connected in parallel, with modularity 2x or 4x, to obtain even larger power.

The voltage drops over the cables can be recovered by using the featured Remote Sensing Lines, to be connected on the load.

A global enable/disable connector allows to disable the channels, and it is also possible to enable them individually via front panel logic signals.

Features include both current and voltage protections. If overcurrent occurs, the relevant channel is signalled to be in “overcurrent” and can be programmed either to turn off after a programmable trip time or to remain on and to provide the maximum allowed current; such feature allows the module to perform as a current generator.

Features

- 8 independently controllable Low Voltage channels
- Output voltage and maximum current:

  A2551 0÷8 V / 12 A (60 W)
  A2552 0÷16 V / 6 A (60 W)
  A2553 0÷32 V / 3 A (60 W)
- Individual Full Floating Channels
- DB37 or 8 pin D-Sub connectors
- Individual remote sense lines
- Typical voltage ripple smaller than 3 mVpp (1 kHz ÷ 20 MHz)
- Under/over-voltage alert, overcurrent and max. voltage protection
- Interlock logic for unit enable
- Software Tool for easy channel management
- Parallelable channels for increased current-handling capacity COMING SOON

Control Software and Libraries

GECO

R6060 - BRANCH CONTROLLER FOR AIR COOLED EASY6000/3000 SYSTEMS

48 V UP TO 200 W - 19" RACK

Hostile Area

Maximum flexibility in a NEW 19" rack form factor:
- **made for the NEW EASY6000** COMING SOON
- **back compatible with the EASY3000**

Building upon years of experience designing electronics for hostile areas (high radioactivity and/or strong magnetic fields), CAEN is proud to introduce the new R6060 EASY Branch Controller.

Conforming to standard 19" rack mechanics, the R6060 offers a reliable, high-performance, all-in-one solution which features fast communication speeds while eliminating the need for accessory CAEN HV Mainframes.

The R6060 functions as an interface between the detector control system and the CAEN EASY boards, and is compatible with both the new EASY6000 family of boards as well as the previous EASY3000 generation. CAEN also provides the **EASY Rack Builder**, a powerful software tool designed to configure EASY crates via the R6060. A single R6060 can control up to six EASY6000/3000 crates, and all EASY Channels can be configured and controlled directly via the Branch Controller.

Features

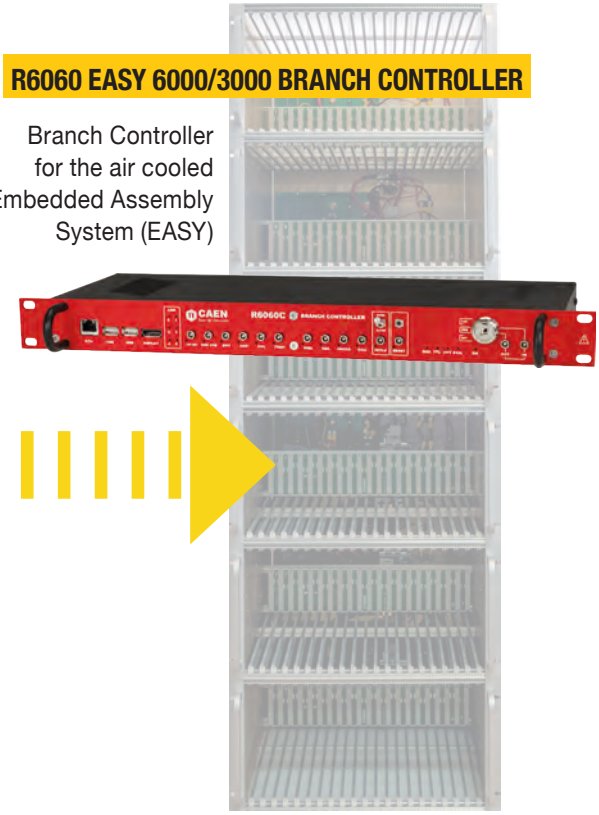
- Standalone 19" Rack mountable
- Up to 6 EASY3000 crate controlled
- 48 V, up to 200 W
- Fast communication speed

EASY 6000/3000 Power Supplies

Air cooled System
for Hostile Areas

R6060 EASY 6000/3000 BRANCH CONTROLLER

Branch Controller
for the air cooled
Embedded Assembly
System (EASY)



EASY BRIC - B AND RAD TOLERANT INTERMEDIATE CONVERTER FOR THE WATER COOLED EASY BRIC SYSTEM

UP TO 12 V / 16 A 8 CH - EASY BRIC SYSTEM

The first NEW module of the water cooled EASY BRIC System

Hostile Area

The EASY BRIC System is the new CAEN low voltage power supply system conceived for powering DC-DC converter stages in hostile environments. The system is made by a water-cooled crate which can host up to four EASY BRIC modules.

The new EASY BRIC module provides eight positive 10 ÷ 12 V / 16 A channels that can be set locally via trimmer and then monitored remotely through the A1660 branch controller. The A1660 operates in safe area inserted in a CAEN SYx527 mainframe, and can manage up to two EASY BRIC crates / 64 power supply channels.

The remote control, based on the robust RS-485 communication bus, is performed with a simple command-based protocol which allows the monitoring of output voltages and currents as well as the remote ON/OFF of each channel. An INTERLOCK port is also available to shut down the device in case of any safety issue in the experimental area occurs.

The EASY BRIC system has been designed to accept 270 ÷ 300 VDC input power, allowing for a reduced voltage drop / reduced cable diameter over long input power lines in case of AC/DC sources placed in safe area.

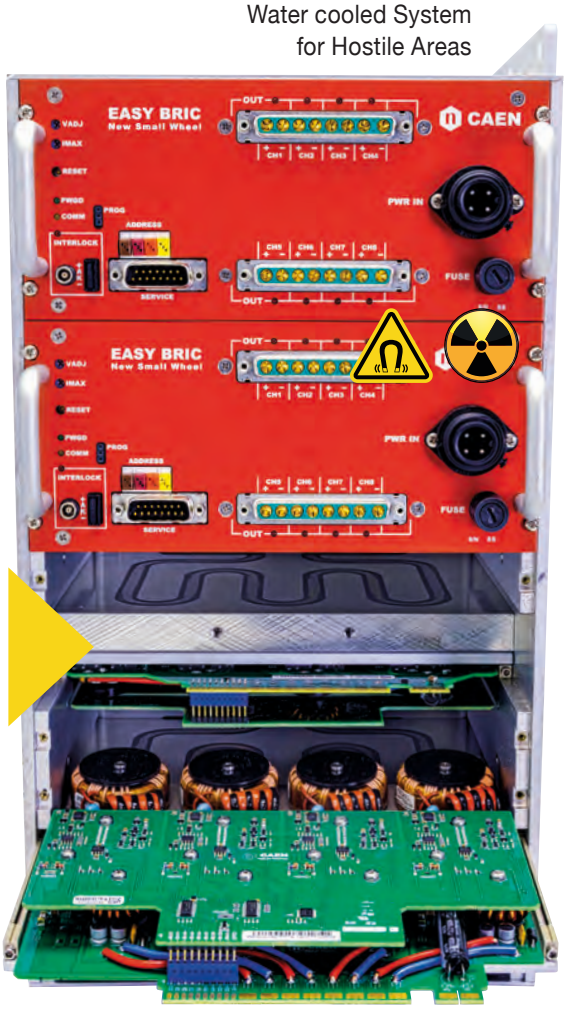
The EASY BRIC system has been extensively tested for radiation tolerant and magnetic field tolerant operations up to:

- Ionizing Radiation (Total Dose): 200 Gy
- Displacement Damage: 5.8×10^{12} 1-MeV Eq. n/cm^2
- Single Event Fluence: 1.0×10^{12} p/cm^2 (E > 20 MeV)
- Magnetic Field: 0.5 T

Thanks to the integration of the system in the SYx527, the EASY BRIC can be controlled with all SYx527 software and libraries (GECO2020, HiVoCS, OPC, EPICS and CAEN HV Wrapper).

EASY BRIC SYSTEM

Water cooled System for Hostile Areas



A1660 EASY BRIC BRANCH CONTROLLER

Branch Controller for the water cooled Embedded Assembly System (EASY)

NEW

x8034H FAMILY - HIGH RESOLUTION POWER SUPPLY UNITS

UP TO 6 kV / 20 µA 8-16 CH

The new high resolution HV family is available in NIM, 19" Rack or Desktop form factor.

The modules provide either 8 or 16 HV channels with 6 kV / 20 µA output full scale, through SHV connectors. The channels are positive or negative, and can be individually enabled.

The voltage ramp rates may be set independently for each channel.

If overcurrent occurs, the channels can turn off after a programmable trip time, or remain on, and provide the maximum allowed current (current generator mode).

All units can be controlled either locally, via LCD Touchscreen, or remotely, via USB and Ethernet. User friendly apps and software libraries for the devices control are available as well.

Suitable for germanium detectors

Features

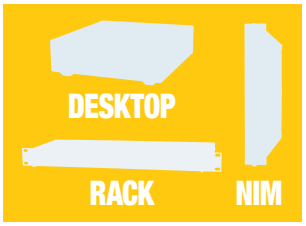
- NIM (2U), 19" Rack or Desktop unit
- 8 or 16 Independently controllable HV channels
- 6 kV maximum output voltage
- Positive or negative polarity
- 20 µA output current
- Individual channels enable
- 100 mV voltage monitor resolution
- 500 pA current monitor resolution (with x10 Imon ZOOM: 50 pA)
- Programmable voltage ramp up / down rates
- Typical voltage ripple smaller than 2 mVpp (1 kHz ÷ 20 MHz)
- Overcurrent programmable protections
- Programmable TRIP parameter
- SHV connectors
- Current generator operation in overcurrent condition
- Local control via 2.7" LCD Touchscreen
- Remote control via USB or Ethernet
- User friendly applications and software libraries available

R8034H DT8034H N8034H

Control Software and Libraries

GECO

Form Factor



µ-CRATE

DESKTOP SINGLE-SLOT VME64X CRATE

Move your VME board to your desk for a complete Lab experience!

The µ-Crate is a mains-powered desktop device integrating a low-noise cooling vents system. The desktop form factor can be optionally converted into a 19” rack thanks to the included metal brackets.

The single-slot backplane supports VME64 and VME64X CAEN boards of the Digitizer 1.0, Digitizer 2.0 Families, the V2495 Programmable Logic Unit, as well as other CAEN boards (see next pages).

Only VME Modules (one-unit, 6U x 160mm) with direct connection on the front panel (via USB-2.0/3.0, CONET optical link or 1/10 GbE) and/or not requiring VME bus control (VME protocols not supported) are compliant with the µ-Crate.

Features

- Mechanical compatibility: 1-unit VME 6U x 160 mm modules
- Standard Power
  +3.3 V 10.5 A, +5 V 10 A, +12 V 2 A, -12 V 2 A
- Fan speed control:
  - Manual by hardware button (high/low state)
  - Automatic only with Digitizer 2.0 series
- Mains powered 100 - 240 V AC (130 W) @ 50 / 60 Hz
- 19” rack mount kit adapter included

NEW

V5425

QUAD VME POWER DISTRIBUTOR

The Mod. V5425 is a 4-channel VME power distribution module; it converts the power supplies provided by a VME crate into ±6 V, ±12 V and ±24 V outputs, suitable for preamplifiers and other devices.

Output voltages are delivered through 4 Sub D9 female connectors. The total output power is 36W (24W for ±6 V and ±24 outputs).

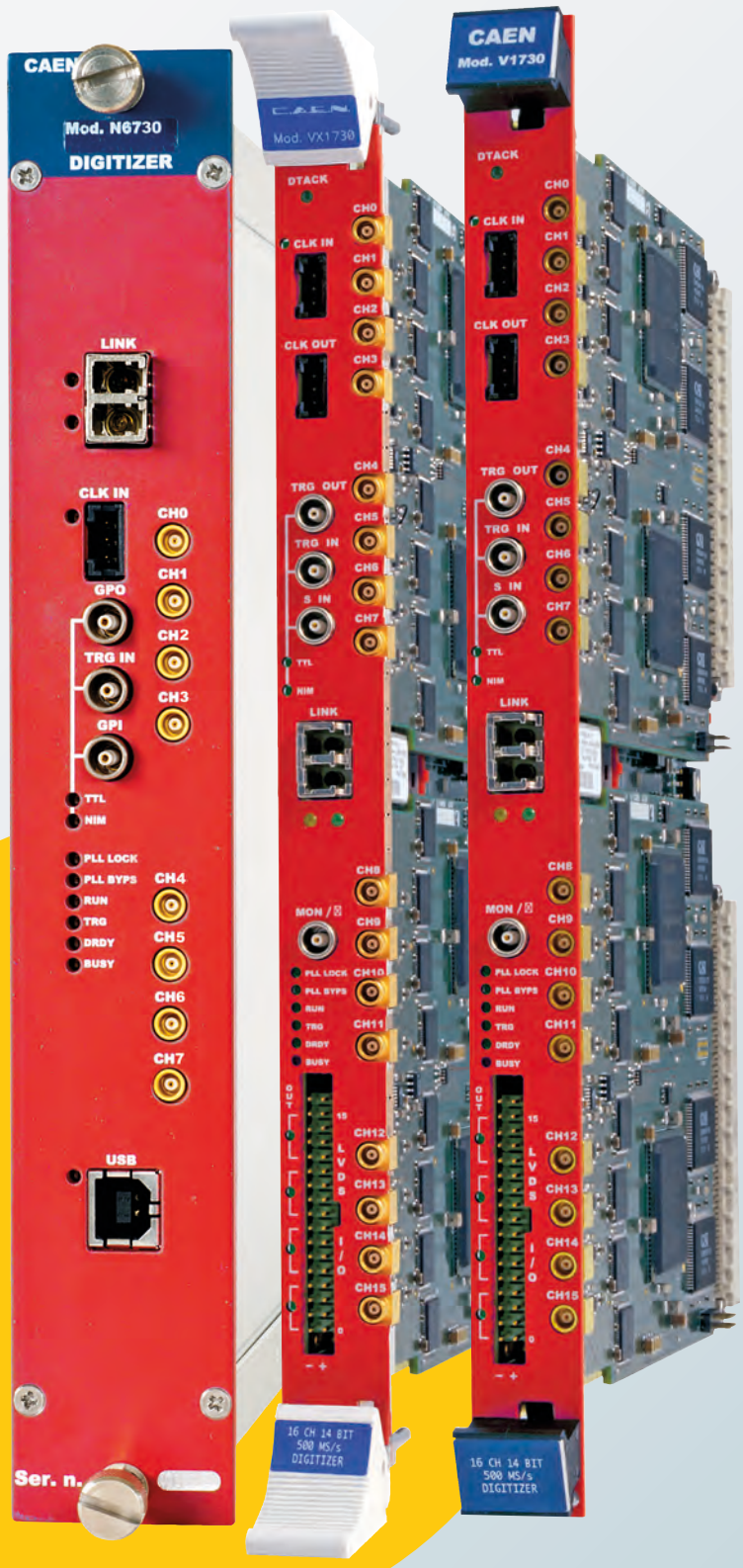
Features

- 1-unit wide VME 6U module
- Four DB9 connectors with ±6 V, ±12 V, ±24 V each
- Low Ripple
- Monitoring of all 6 voltages on each output
- Protection of all voltages by self-recovering electronical fuses
- Individually filtered outputs to ensure low noise operation
- Standard voltage output compatible with electronics by CAEN and many other manufacturers

DIGITIZER 1.0 GENERATION

MULTI-BOARD SYNC

CAEN Digitizer 1.0 series are platform independent instruments housing high-speed (up to 5 GS/s) multi-channel ADCs with local memory and FPGAs for real-time data processing.



Available in VME64, VME64X, NIM and Desktop form factors, they are the result of all the experiences collected by CAEN in signal processing and data acquisition systems and have been designed driven by physics and related applications as Medical Imaging, Homeland Security and Environmental Monitoring.

The digitizers come as waveform recorders (basing on Flash ADC or switching capacitors analog to digital converters) or digital pulse processors, complemented by different firmware types.

Dedicated CAEN software programs are available for configuration and data acquisition with the provided firmware, while libraries and demos help users with their customized developments.

Common Features

- A wide range of DPP algorithms available for CAEN highest flexibility digitizers!
- Multi-event channel memory (SRAM) with programmable event size and pre-/post-trigger
- Trigger source:
  - Self-trigger: channel over/under threshold for Common trigger generation or Individual (DPP firmware only)
  - External-trigger: Common trigger generation by LEMO connector or Individual by LVDS connectors (DPP firmware and VME form factor only)
  - Software Trigger: Common trigger generation on software command
- Single-ended analog input, 50Ω input impedance
- 3 programmable digital I/Os on single-ended LEMO connectors
- 16 general purpose LVDS I/Os on VME form factor controlled by the FPGA
- Analog monitor LEMO output on VME form factor programmable in Trigger Majority/Test Pulses/Memory Occupancy/Voltage Level mode
- Trigger distribution by LEMO (NIM/TTL) or LVDS I/Os (VME form factor only)
- DC Offset adjustment on each channel
- Synchronization of multiple boards for channel scalable systems
- Clock source: Internal/external
- USB-2.0, Optical Link, VME communication interfaces

APPLICATIONS

- **Nuclear and Particle Physics**
- **Neutrino Physics**
- **Dark Matter and Astroparticle Physics**
- **Fast Neutron spectroscopy**
- **Environmental monitoring**
- **Homeland Security**
- **X-ray and Gamma Spectroscopy with HPGe, Silicon detectors**
- **Segmented detectors, Medical Imaging, Material science**
- **High resolution Time of Flight**
- **Optical Physics**
- **Medical Imaging (PET)**

Digitizer Family

x720 DIGITIZER FAMILY
8/4/2 CH. 12-BIT 250 MS/S DIGITIZER - FLASH ADC

x724 DIGITIZER FAMILY
8/4/2 CH. 14-BIT 100 MS/S DIGITIZER - FLASH ADC

x725S/x730S DIGITIZER FAMILIES
16/8 CH. 14-BIT 250/500 MS/S DIGITIZER - FLASH ADC

x740 DIGITIZER FAMILY
64/32 CH. 12-BIT 62.5 MS/S DIGITIZER - FLASH ADC

x751 DIGITIZER FAMILY
8-4/4-2 CH. 10-BIT 1/2 GS/S DIGITIZER - FLASH ADC

x761 DIGITIZER FAMILY
2/1 CH. 10-BIT 4 GS/S DIGITIZER - FLASH ADC

x742 DIGITIZER FAMILY
32+2/16+1 CH. 12-BIT 5 GS/S DIGITIZER - SWITCHED CAPACITOR

x743 DIGITIZER FAMILY
16/8 CH. 12-BIT 3.2 GS/S DIGITIZER - SWITCHED CAPACITOR

Form factor: VME64 / VME64X / DESKTOP		Max Sampling Frequency (MS/s)	Resolution (bit)	Input Dynamic Range (Vpp)	Bandwidth (MHz)	Memory (MS/ch)
x720 Family	2/4 DT 8 VME64/VME64X	250	12	2	125	1.25/10

Flash ADC digitizer family well suited for mid-fast signals as the ones coming from liquid or inorganic scintillators coupled to PMTs or Silicon Photomultipliers.

According to the memory size, the waveform recording firmware allows a maximum record length of 40 ms and a timestamp resolution of 16 ns. Zero suppression methods can be enabled to reduce the data throughput. The DPP mode supports the DPP-PSD algorithm for the Pulse Shape Discrimination, providing energy, timestamp with a resolution of 4 ns, and PSD.

Data acquisition can be channel independent and it is possible to make coincidence/anti-coincidence logic among different channels and external veto/gating. The DPP data can be saved in time-stamped list mode to support higher input rates and improving the throughput performances.

Related software: WaveDump and CAENScope (waveform recording firmware); CoMPASS (DPP-PSD firmware); libraries and demo software in C and LabView.

SOFTWARE

Form factor: VME64 / VME64X / DESKTOP		Max Sampling Frequency (MS/s)	Resolution (bit)	Input Dynamic Range (Vpp)	Bandwidth (MHz)	Memory (MS/ch)
x724 Family	2/4 DT 8 VME64/VME64X	100	14	0.5/2.25/10	40	0.512/4

Flash ADC digitizer family well suited for high-resolution detectors as Silicon, HPGe or inorganic scintillators like NaI or CsI coupled with Charge Sensitive Preamplifiers.

According to the memory size, the waveform recording firmware allows a maximum record length of 40 ms and a timestamp resolution of 20 ns. The nominal sampling rate can be further reduced by a scaling factor [1:128] using the decimation feature. Zero suppression methods can be enabled to reduce the data throughput. In DPP mode, the DPP-PHA algorithm for the Pulse Height Analysis provides energy and timestamp with a resolution of 10 ns. The DPP-DAW algorithms improves the zero suppression capabilities of the basic wave recording, as it can dynamically adjust the record length of every triggered event according to its Time Over Threshold to fit the actual duration of the input pulses. Data acquisition can be channel independent and it is possible to make coincidence/anti-coincidence logic among different channels and external veto/gating. The DPP data can be saved in time-stamped list mode to support higher input rates and improving the throughput performances. Piled-up events can be rejected or saved for offline analysis

Related software: WaveDump and CAENScope (waveform recording); CoMPASS (DPP-PHA); WaveCut (DPP-DAW); libraries and demo software in C and LabView.

SOFTWARE

Form factor: NIM / VME64 / VME64X / DESKTOP		Max Sampling Frequency (MS/s)	Resolution (bit)	Input Dynamic Range (Vpp)	Bandwidth (MHz)	Memory (MS/ch)
x725S/x730S Family	8 DT/NIM 8/16 VME64/VME64X	250	14	0.5-2	125	0.64/5.12

The most versatile FLASH ADC digitizer families, well suited for mid-fast signals as the ones coming from liquid or inorganic scintillators coupled to PMTs or Silicon Photomultipliers, but also for high precision detectors as Silicon or HPGe coupled with charged sensitive preamplifier. With respect to the previous 725/730 series, the 725S/730S have been upgraded, introducing a larger FPGA to accommodate more complex DPP algorithms and a new A/D converter for better stability, which does not require temperature-related calibration According to the memory size, the waveform recording firmware allows a maximum record length of 20 ms (725S) or 10 ms (730S), and a timestamp resolution of 16 ns. Utilizing DPP-PHA and DPP-PSD Firmware, users can acquire quantitative physical parameters like energy (as Integrated Charge or pulse height), timestamp with a resolution of 4 ns (725S) or 2 ns (730S), and PSD parameter (DPP-PSD only). Subnanosecond time resolution can be achieved by the CFD function implemented in the DPP-PSD algorithm. The readout of waveforms can be improved with the automatic pulse identification (DPP-DAW) and baseline suppression on channel basis (DPP-ZLEplus). The wider selection of CAEN DPP algorithms makes these digitizers a “must-have” for any type of nuclear physics application.

Related software: WaveDump and CAENScope (waveform recording); CoMPASS (DPP-PHA and DPP-PSD); DPP-DAW Demo; DPP-ZLEplus Demo; libraries and demo software in C and LabView.

SOFTWARE

Form factor: VME64 / VME64X / DESKTOP		Max Sampling Frequency (MS/s)	Resolution (bit)	Input Dynamic Range (Vpp)	Bandwidth (MHz)	Memory (MS/ch)
x740 Family	32 DT 64 VME64/VME64X	62.5	12	2/10	30	0.192/1.5

Flash ADC digitizer family with the highest channel density, well suited for mid-slow signals as the ones coming from inorganic scintillators coupled to PMTs, gaseous detectors and others.

According to the memory size, the waveform recording firmware allows a maximum record length of 24 ms and a timestamp resolution of 16 ns. The nominal sampling rate can be further reduced by a factor of [1:128] using the decimation feature.

In DPP mode, the DPP-QDC algorithm performs the charge integration on all channels. making this board the digital replacement of a traditional QDC. The energy data and timestamp,with a resolution of 16 ns, can be saved in time-stamped list mode to support higher input rates and improving the throughput performances. The acquisition can be channel independent and externally vetoed/gated.

Related software: WaveDump (waveform recording); CoMPASS (DPP-QDC); libraries and demo software in C and LabView.

SOFTWARE

Form factor: VME64 / VME64X / DESKTOP		Max Sampling Frequency (MS/s)	Resolution (bit)	Input Dynamic Range (Vpp)	Bandwidth (MHz)	Memory (MS/ch)
x751 Family	2/4 DT 4/8 VME64/VME64X	1000/2000	10	1/0.2	500	1.8-3.6/ 14.4-28.8

FLASH ADC digitizer family supporting Dual Edge Sampling (2 GS/s in DES mode), well suited for fast signals as the ones coming from fast organic, inorganic and liquid scintillators coupled to PMTs or Silicon Photomultipliers, Diamond detectors and others.

According to the memory size, the waveform recording firmware allows a maximum record length of 14 ms and a timestamp resolution of 16 ns. The readout of waveforms can be compressed using the DPP-ZLE algorithm, performing an enhanced Zero Suppression on the input signals. The DPP-PSD algorithm provides pulse energy (as integrated charge), timestamp with a resolution of 1 ns, and PSD parameter. Subnanosecond time resolution can be achieved by the CFD function.. The acquisition can be channel independent and it is possible to make coincidence/ anti-coincidence logic among different channels and external veto/ gating. Multiple boards can be synchronized to build up complex systems. In case of DPP mode, data can be saved in time-stamped list mode to support higher input rates and improving the throughput performances. Piled-up events can be rejected or saved for offline analysis.

Related software: WaveDump and CAENScope (waveform recording); CoMPASS (DPP-PSD); DPP-ZLEplus Control Software; libraries and demo software in C and LabView.

SOFTWARE

Form factor: VME64 / VME64X / DESKTOP		Max Sampling Frequency (MS/s)	Resolution (bit)	Input Dynamic Range (Vpp)	Bandwidth (MHz)	Memory (MS/ch)
x761 Family	1 DT 2 VME/VME64X	4000	10	1	1000	7.2/57.6

Flash ADC digitizer family with the highest sampling rate, well suited for recording fast signals from fast organic, inorganic and liquid scintillators coupled to PMTs or Silicon Photomultipliers, Diamond detectors and others, and saving them with high efficiency and precision for advanced timing analysis.

According to the memory size, the waveform recording firmware allows a maximum record length of 14 ms and a timestamp resolution of 16 ns.

Related software: WaveDump (waveform recording); libraries and demo software in C and LabView.

SOFTWARE

Form factor: VME64 / VME64X / DESKTOP		Max Sampling Frequency (MS/s)	Resolution (bit)	Input Dynamic Range (Vpp)	Bandwidth (MHz)	Memory (MS/ch)
x742 Family	16+1 DT/NIM 32+2 VME64/VME64X	5000	12	1	500	0.128/1

Switching Capacitors ADC digitizer family, based on the DRS4 chip by PSI, with the high sampling frequency (5GS/s) and channel density. It can record very fast signals from scintillators coupled to PMTs, Silicon Photomultipliers, APD, Diamond detectors and others, and save them with high efficiency and precision for advanced timing analysis. An additional channel (two channels in case of VME boards) can be used as time reference for time of flight measurements. with a resolution of up to 50 ps.

The analog inputs are continuously sampled by the 1024 capacitive cells in the DRS4 chip at a frequency that is software selectable amongst 5 GS/s, 2.5 GS/s, 1 GS/s, and 750 MS/s. Once the trigger condition is met, the capacitors are released, data is converted by a 12-bit ADC at a lower frequency and stored into a digital memory buffer. As the sampling and the analog-to-digital conversion are not simultaneous, a dead-time is introduced, during which the board cannot accept other triggers.

Related software: WaveDump (waveform recording); libraries and demo software in C and LabView.

SOFTWARE

Form factor: VME64 / VME64X / DESKTOP		Max Sampling Frequency (MS/s)	Resolution (bit)	Input Dynamic Range (Vpp)	Bandwidth (MHz)	Memory (MS/ch)
x743 Family	8 DT 16 VME64/VME64X	3200	12	2.5	500	0.007

Switching Capacitors ADC digitizer family, based on the SAMLONG chip and developed in collaboration with CEA/IRFU & CNRS/IN2P3/ LAL, with a good compromise between high sampling frequency (3.2GS/s) and channel density. It can record very fast signals from scintillators coupled to PMTs, Silicon Photomultipliers, APD, Diamond detectors and others, and save them with high efficiency and precision for advanced timing analysis. The analog inputs are continuously sampled by the 1024 capacitive cells in the SAMLONG chip at a frequency that is software selectable amongst 3.2 GS/s, 1.6 GS/s, 0.8 GS/s, and 0.4 GS/s. Once the trigger condition is met, the capacitors are released, data is converted by a 12-bit ADC at a lower frequency and stored into a digital memory buffer.

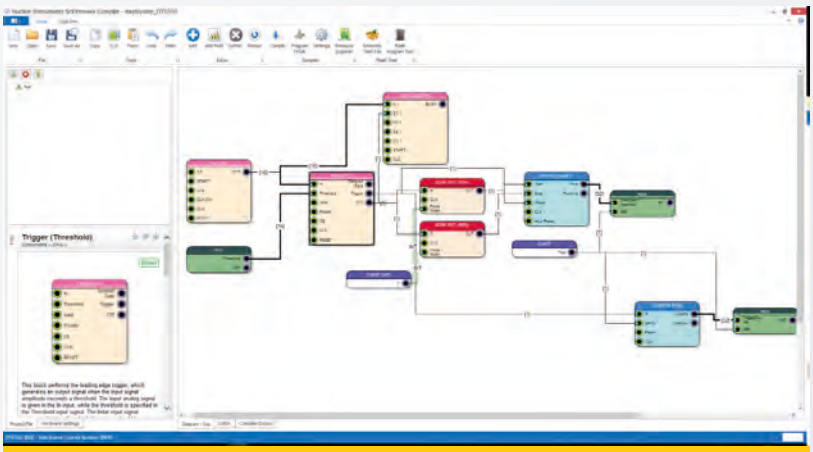
As the sampling and the analog-to-digital conversion are not simultaneous, a dead-time is introduced, during which the board cannot accept other triggers. The digitizer firmware allows enabling a charge mode for the charge integration over the digitizes pulses and fast histogramming. The acquisition can be in coincidence, majority mode and externally gated.

Related software: WaveCatcher and WaveDemo x743 (waveform recording and charge integration); libraries and demo software in C and LabView.

SOFTWARE

DIGITIZER 2.0 GENERATION

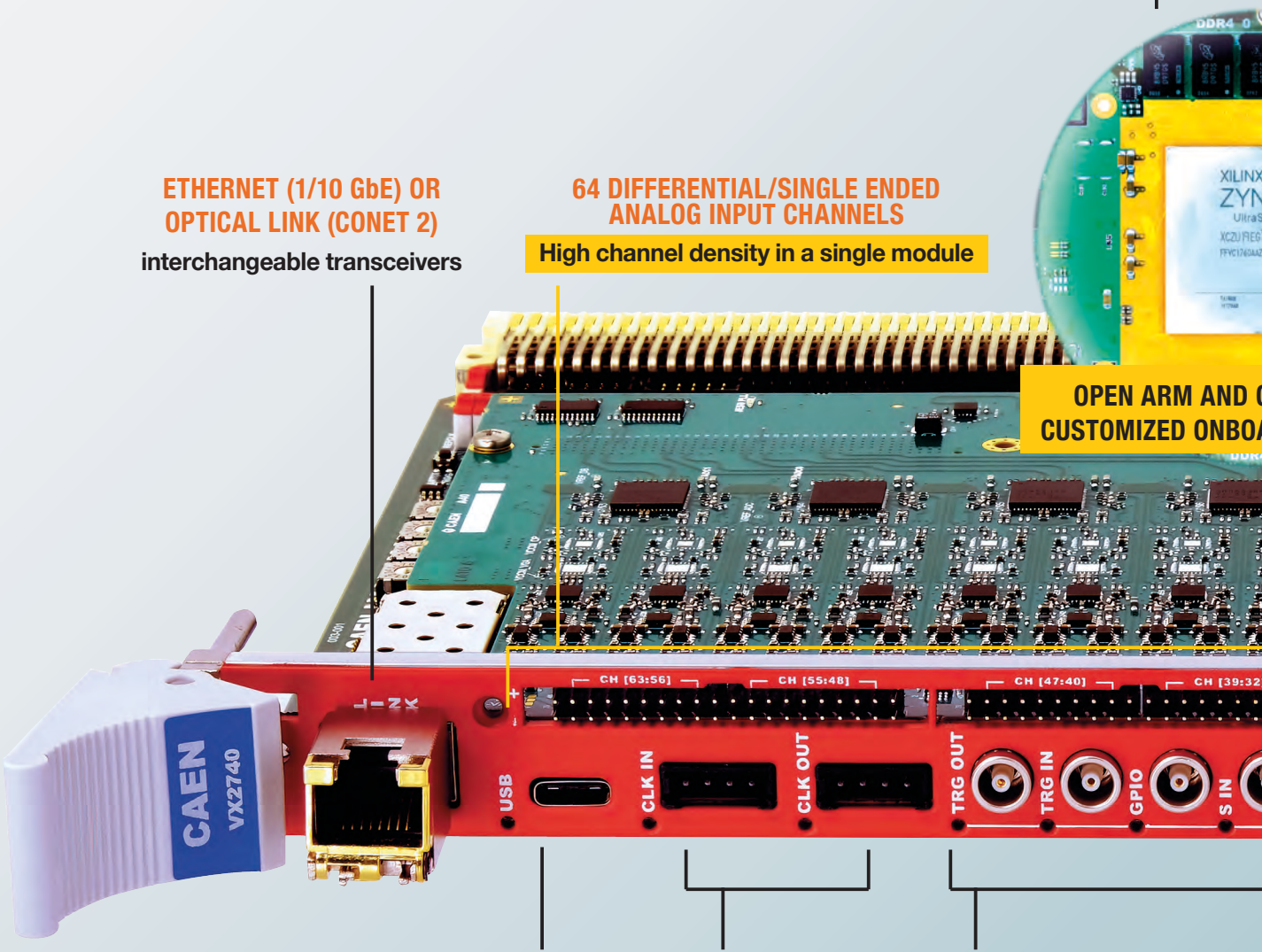
INNOVATIVE DESIGN, SAME RELIABILITY



Compatible with Sci-Compiler for easy FPGA programming

SCI-COMPILER Open FPGA

FREE TRIAL



ETHERNET (1/10 GbE) OR OPTICAL LINK (CONET 2)
interchangeable transceivers

64 DIFFERENTIAL/SINGLE ENDED ANALOG INPUT CHANNELS
High channel density in a single module

OPEN ARM AND C
CUSTOMIZED ONBOA

USB 3.0 TYPE C
connectors

CLK-IN/CLK-OUT & SYNC
Easy synchronization in one cable!

MULTIPURPOSE LEMO I/Os
for multi-boards data acquisition systems

Common Features

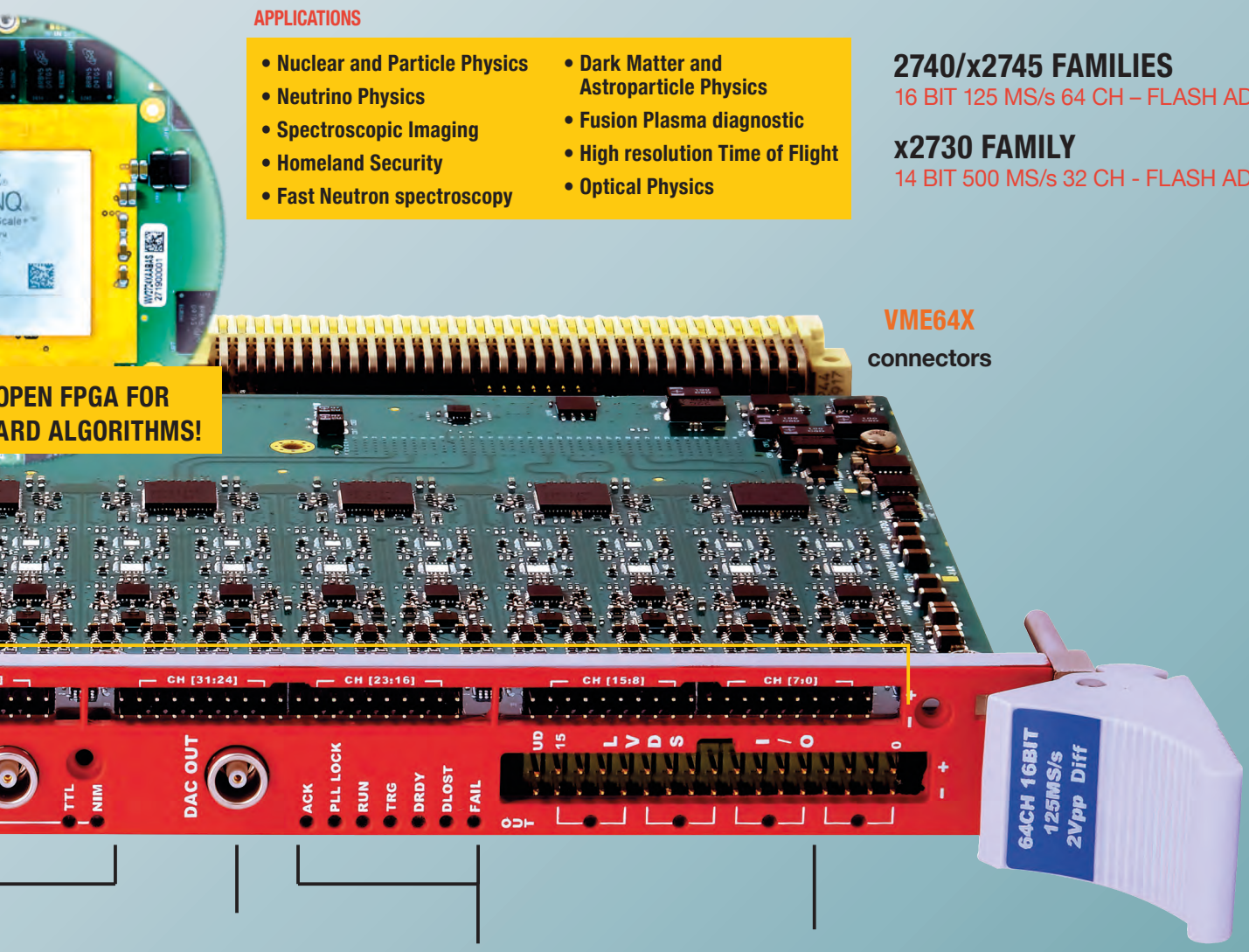
- Single-ended (50 Ω) or differential (100 Ω) analog input channels
- DC Offset adjustment on each channel
- Sampling frequency reduction by on-board decimation, software selectable
- On-board firmware selection for different acquisition modes:
  - Scope mode (simultaneous raw waveform acquisition on common trigger)
  - DPP mode: algorithms for advanced wave readout (Coming Soon) or the calculation of physical quantities on independent channel self-triggers
- Open FPGA and Open Arm
- Front panel fully programmable I/Os (4 LEMO TTL/NIM and 16 LVDS)
- Single DAC output (LEMO) for signal inspection, pulse generation, majority level
- DDR4 memories of GB size for the event acquisition
- Trigger distribution by LEMO or LVDS I/Os
- Synchronization of multiple boards for channel scalable systems
- Multi-interface: USB-3.0, 1 GbE, 10 GbE (Coming Soon), CONET optical link (available on request)
- Fully compatible with SCI-Compiler for easy FPGA programming

APPLICATIONS

- **Nuclear and Particle Physics**
- **Neutrino Physics**
- **Spectroscopic Imaging**
- **Homeland Security**
- **Fast Neutron spectroscopy**
- **Dark Matter and Astroparticle Physics**
- **Fusion Plasma diagnostic**
- **High resolution Time of Flight**
- **Optical Physics**

2740/x2745 FAMILIES
16 BIT 125 MS/s 64 CH – FLASH ADC

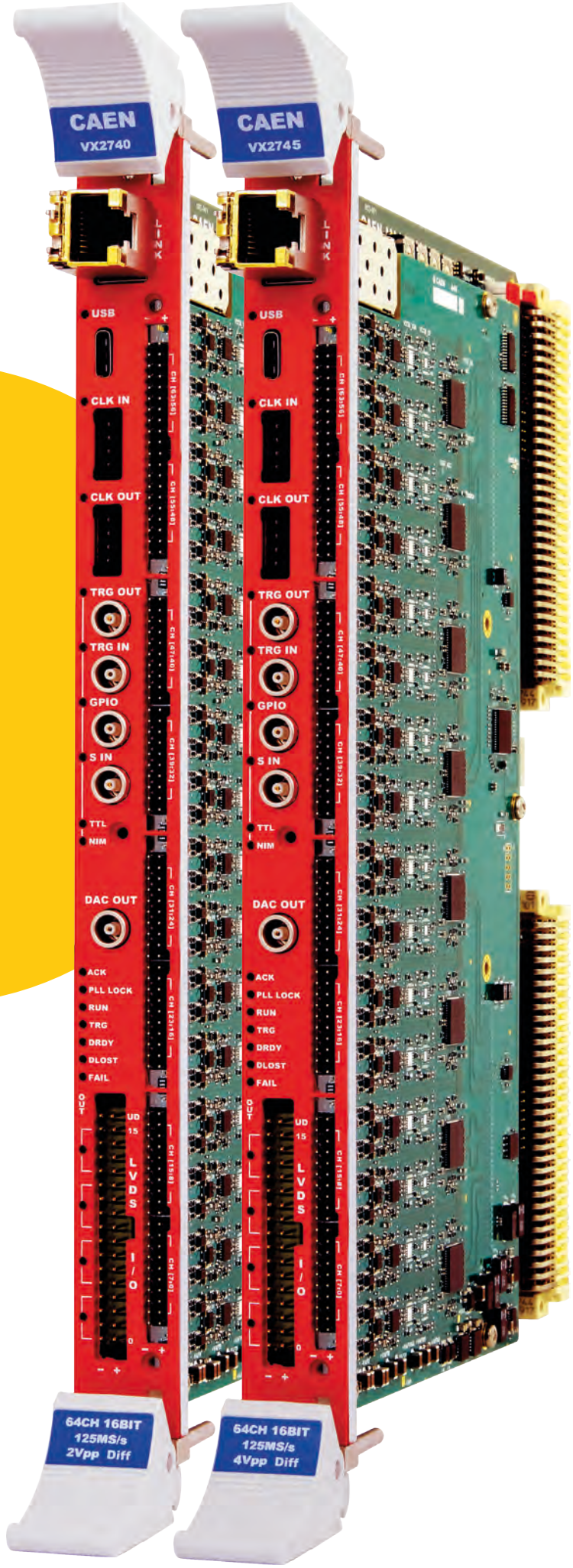
x2730 FAMILY
14 BIT 500 MS/s 32 CH - FLASH ADC



ANALOG OUTPUT
Signal inspection and pulse generation at your fingertips

DIAGNOSTIC LEDS
Board acquisition status at your sight

LVDS I/OS
Further I/Os for more complex systems



Features

- 64 analog inputs, differential or single-ended
- On-board firmware selection: Scope mode (common trigger), DPP mode (independent channel self-triggers)
- Open FPGA architecture for pulse analysis algorithm customization
- Multi-interface: USB-3.0, 1 GbE, 10 GbE (Coming Soon), CONET optical link (available on request)

Form Factor

SOFTWARE

SCI-COMPILER Open FPGA · CoMPASS CAEN · WAVE DUMP 2 CAEN

APPLICATIONS

- **Nuclear and Particle Physics**
- **Dark Matter and Astroparticle Physics**
- **Neutrino Physics**

V2740 VX2740 DT2740

V2745 VX2745 DT2745

The desktop versions (DT274x) are supplied with a mechanical kit that allows rack mounting.

x2740 Family

x2745 Family

x2740/x2745 FAMILIES - 16 BIT 125 MS/s

64 CH – FLASH ADC

The new generation of CAEN Digitizers: Open FPGA and Digital Pulse Processing algorithms for high-channel density experimental setups!

open FPGA | VGA | 1/10 GbE | USB 3.0 | OPTICAL LINK

The x2740 and x2745 Families are CAEN brand new Waveform Digitizers able to perform basic waveform recording and run real-time advanced Digital Pulse Processing (DPP). The user can easily customize the firmware of the open FPGA to use these digitizers in a wider range of applications.

The digitizers of the 2740 and 2745 families are 64-channel digital signal processors for radiation detectors available in different form factors: VME64, VME64X, and Desktop (convertible to 19" Rack form factor by the included kit). While the 2740 is fixed-gain, the 2745 offers a software programmable analog gain up to x100.

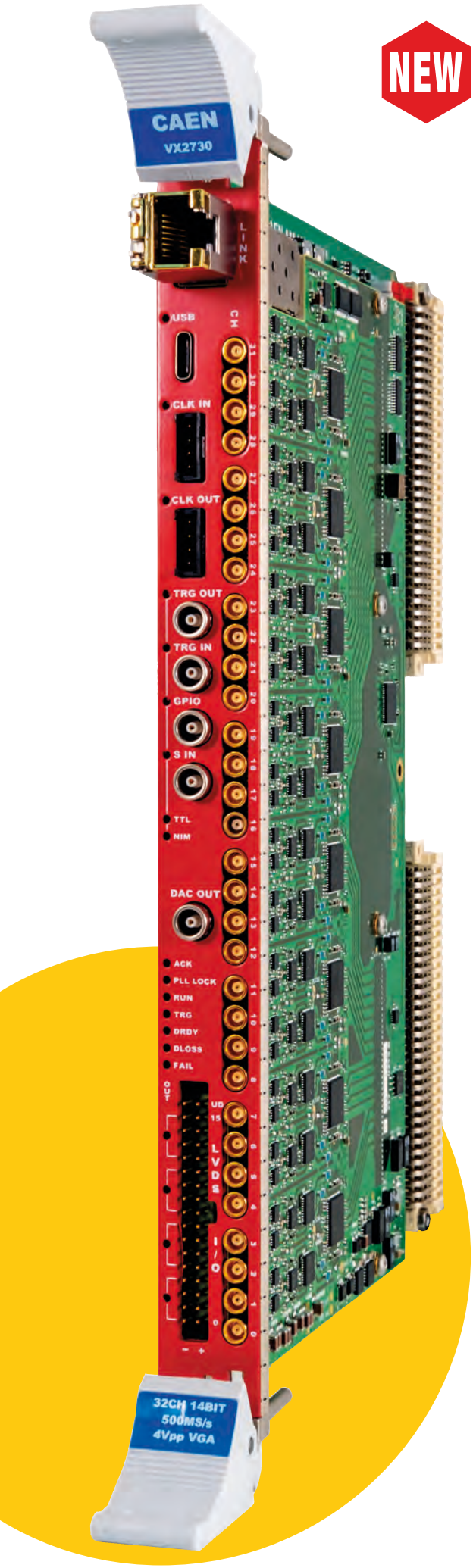
Their design makes them suited for Multi-Channel Analysis in nuclear spectroscopy using Silicon strip, segmented HPGe, Scintillation detector with PMTs, Wire Chambers, and others.

The possibility of real-time switching between multiple firmware simultaneously stored on-board, makes these digitzers easily manage different acquisition modes: basic recording of digitized waves (Scope mode with record length up to 80 ms) and signal processing by algorithms (DPP mode) specialized for the pulse heigth measurements (DPP-PHA), pulse shape discrimination (DPP-PSD), advanced waveform readout (DPP-ZLE).

Thanks to the open FPGA architecture and Sci-Compiler tool, generating customized scope and DPP firmware is easily accessible also to users not expert in FPGA programming.

Related softwares: Sci-Compiler (p. 32); WaveDump2 (p. 34); CoMPASS (p. 35).

1:2 SCALE



NEW

x2730 FAMILY - 14 BIT 500 MS/s

32 CH - FLASH ADC

x2730 Family

High flexibility at hand with the next to come in the new series of CAEN digitizers!

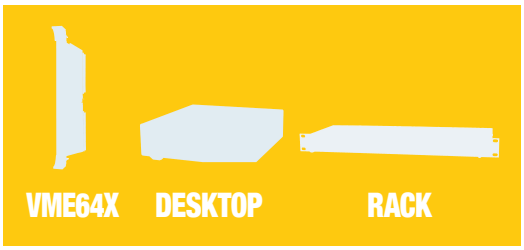
The x2730 Family is asked to add the ranks of the second generation of CAEN digitizers providing a suitable solution for a complete range of applications like nuclear and particle physics, dark matter and astroparticle physics, fast neutron spectroscopy and homeland security.

Compliant to mid-fast signals typically coming from liquid or inorganic scintillators coupled to PMTs or SiPMs, but also for high-precision detectors as Silicon or HPGe.

Features

- 32 analog inputs, single ended
- 4 Vpp input range with VGA
- On-board firmware live selection between scope mode (common trigger) and DPP mode (independent channel self-trigger)
- Wide selection of DPP algorithms (e.g. PHA, PSD, ZLE, DAW)
- Open FPGA architecture for pulse analysis algorithm customization
- Open Arm function to run automized user's software routines
- Flexible readout by multiple direct interfaces: USB-3.0, 1 GbE, 10 GbE (Coming Soon), CONET optical link (available on request)

Form Factor



SOFTWARE

SCI-COMPILER Open FPGA | CoMPASS CAEN | WAVE DUMP 2 CAEN

APPLICATIONS

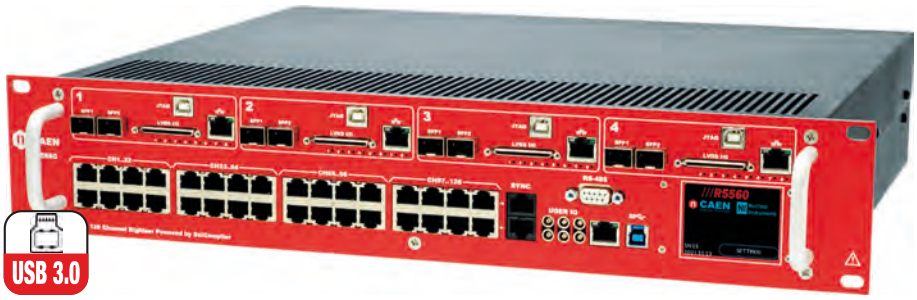
- **Nuclear and Particle Physics**
- **High Timing Resolution**
- **Fast Neutron spectroscopy**
- **Homeland Security**

open FPGA | VGA | 1/10 GbE | USB 3.0 | OPTICAL LINK

X5560 Family

x5560 FAMILY - 14 BIT 125 MS/s

32/128 CH - OPEN FPGA DIGITIZER



Features

- 128 or 32 channels in Rack or Desktop form factor
- Based on powerful Xilinx Zynq-7000 SoC
- Compatible with Sci-Compiler for easy FPGA programming
- Advanced analog frontend available on SE version
- Board-to-board synchronization
- Maximum flexibility: USB-3.0, Ethernet, and Optical Link (optional) connectivity

Develop your own pulse processing algorithm on a powerful and flexible hardware!

The x5560 Digitizer Family is designed to attain programmable data processing capabilities in R&D application as well as large experimental setups. The powerful open FPGA hosted onboard can be easily programmed with Sci-Compiler, a block-diagram-based software to generate and compile firmware running custom pulse processing algorithms.

SCI-COMPILER Open FPGA

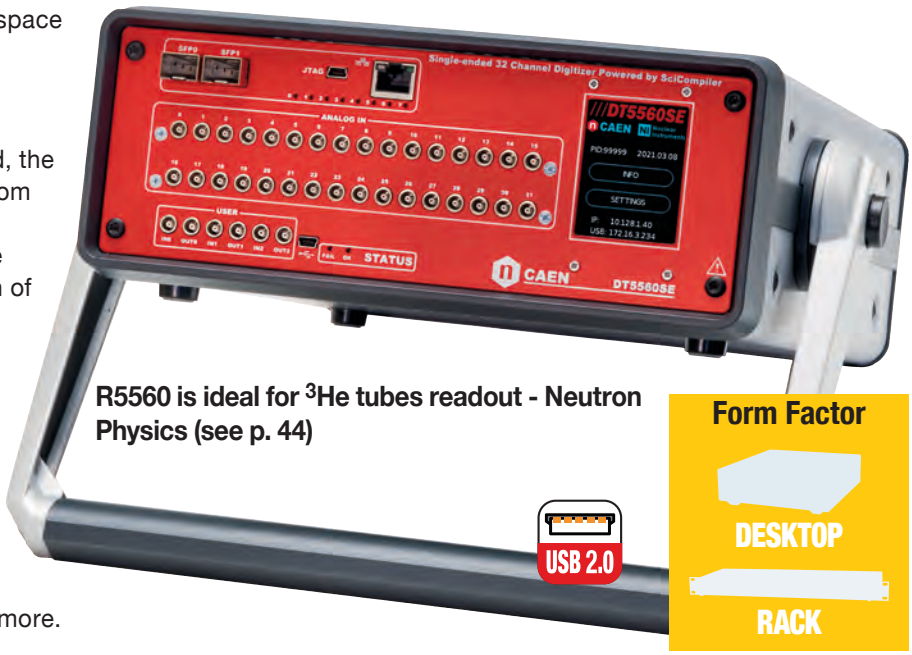
MULTI BOARD SYNC · Touchscreen · open FPGA · 1 GbE

The x5560 Digitizer Family is ideally suited to read out detectors commonly used in HEP and nuclear physics, exploiting the different available form factor and input stage features. The DT5560SE handy form factor and connectors type are an optimum for laboratory R&D, while R5560/R5560SE rack-mount simplifies the experimental setup, where an effective space management is often a constraint.

Critical to the x5560 Family design is an open-FPGA architecture. By taking advantage of the powerful SoC onboard, the user can quickly and easily design custom logic and pulse processing algorithms, as well as develop middleware/software which perfectly matches the application of interest.

Thanks to Sci-Compiler, no expertise in VHDL/Verilog is required! In few clicks, the user can combine several processing blocks to implement Pulse Height Analysis (PHA), highly accurate event timing and timestamping (TDC), mathematical operations (including data fitting), Pulse Shape Discrimination (PSD), and much more.

Free and open-source Sci-55x0 readout software is also provided. This open-source demo software is designed to manage the standard pulse height analysis firmware implementing energy measurements using a trapezoidal filter.



R5560 is ideal for ^{3}He tubes readout - Neutron Physics (see p. 44)

Form Factor

DESKTOP

RACK

Model Compare

Model	Analog Input	Connectors	Detector Frontend	Programmable Digital I/Os	Communication Interface	Form Factor
R5560	128	RJ45	No	128 + 6	USB 3.0, Optical Link, Ethernet	Rack
R5560SE	128	MCX	Programmable	128 + 6	USB 3.0, Optical Link, Ethernet	Rack
DT5560SE	32	LEMO	Programmable	32 + 6	Mini-USB 2.0, Optical Link, Ethernet	Desktop

Digitizer Series 1.0

WAVEFORM RECORDING AND DIGITAL PULSE PROCESSING

List of the features acronyms

ICH (Independent channels): the channels can trigger and acquire data independently and can be correlated using a user-defined (anti) coincidence logic criteria

WV (Waveforms): acquisition of a programmable number of ADC samples (raw waveforms)

TS (Timestamp): trigger coarse time stamp with low resolution (10-20 ns)

TDC (Time to Digital Converter): fine time stamp information from the interpolation fast digital discriminator filter with high resolution (sub-ns resolution)

QDC (Charge to Digital Converter): gated integrator (charge)

DC (Decimation): scalable sampling rate

CFD (Constant Fraction Discriminator): digital Constant Fraction Discriminator with programmable delay and fraction. Works in combination with TDC

PHA (Pulse Height Analysis): pulse height of any exponential signals or coming from charge sensitive preamplifier

PSD (Pulse Shape Discrimination): particle discrimination via double gated integration

ZS (Zero Suppression): acquisition of a programmable number of ADC samples with zero suppression

DAW (Dynamic Acquisition Window): acquisition of a dynamically adjusted number of ADC samples

Digitizer Family

FIRMWARE	x720	x724	x725S/x730S	x740	x751	x761	x742	x743
WAVEFORM RECORDING	WV TS ZS	WV TS ZS	WV TS	WV TS	WV TS	WV TS	WV TS	WV TS QDC
DPP PSD	ICH WV TS QDC PSD	-	ICH WV TS TDC QDC CFD PSD	-	ICH WV TS TDC QDC CFD PSD	-	-	-
DPP PHA	-	ICH WV TS PHA	ICH WV TS TDC PHA	-	-	-	-	-
DPP QDC	-	-	-	ICH WV TS QDC(*)	-	-	-	-
DPP ZLE PLUS	-	-	WV TS ZS	-	WV TS ZS	-	-	-
DPP DAW	-	ICH WV TS DAW	ICH WV TS DAW	-	-	-	-	-
SOFTWARE	**x720**	**x724**	**x725S/x730S**	**x740**	**x751**	**x761**	**x742**	**x743**
CoMPASS CAEN	●	●	●	●	●	-	-	-
SCOPE CAEN	●	●	●	-	●	-	-	-
WAVE DUMP CAEN	●	●	●	●	●	●	●	-
CAEN WAVECATCHER	-	-	-	-	-	-	-	●

Digitizer Series 2.0

WAVEFORM RECORDING AND DIGITAL PULSE PROCESSING

Compatible with Sci-Compiler for easy FPGA programming

SCI-COMPILER Open FPGA

FREE TRIAL

Digitizer Family

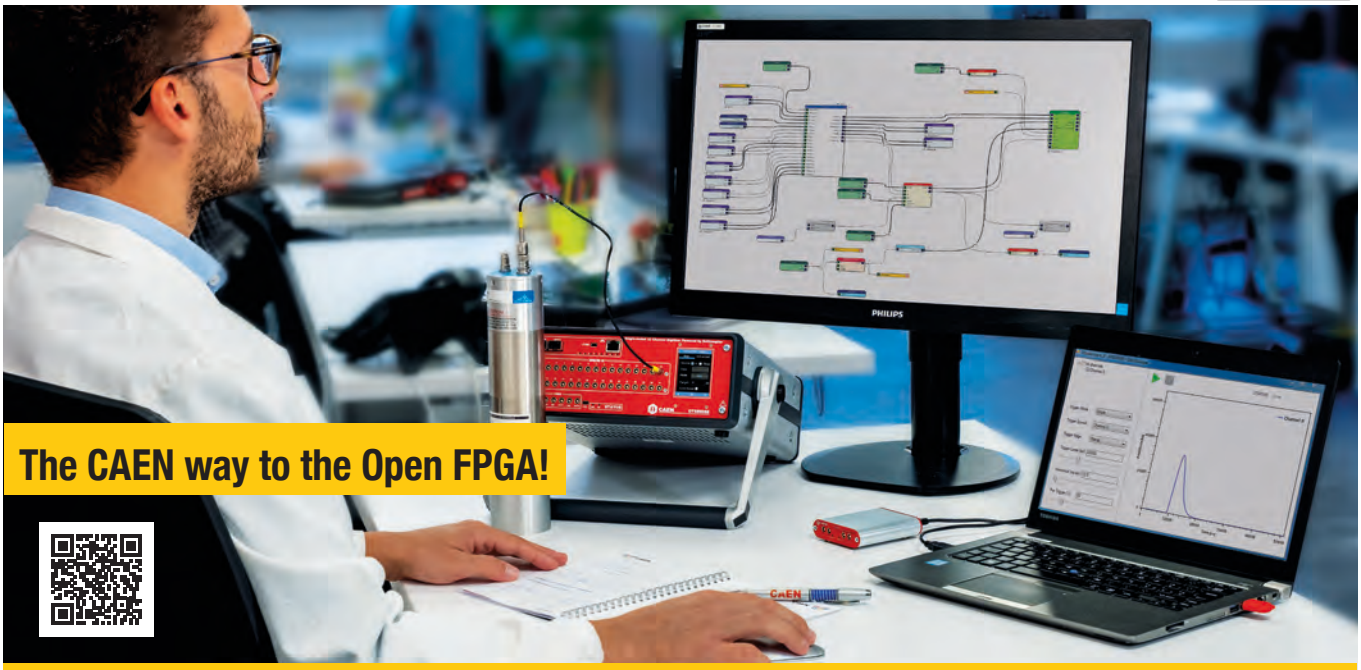
FIRMWARE	x2740 / 2745	x2730
SCOPE FIRMWARE	WV TS DC	WV TS
DPP PSD	ICH WV TS PSD CFD	ICH WV TS PSD CFD
DPP PHA	ICH WV TS PHA	ICH WV TS PHA
DPP ZLE PLUS	WV TS ZS	COMING SOON
SOFTWARE	**x2740 / 2745**	**x2730**
WAVE DUMP 2 CAEN	•	•
CoMPASS CAEN	•	•
SCI-COMPILER Open FPGA	•	COMING SOON
CAEN FELib	•	•

For more information, please visit the page dedicated to Firmwares, Library and Software developed for CAEN Hardware. We recommend signing up to download the demo software versions or the free full versions.
For any questions, visit the Support section "Device & Software Support".

Sci-Compiler

GRAPHICAL PROGRAMMING LANGUAGES FOR CAEN OPEN FPGA BOARDS

SCI-COMPILER
Open FPGA



An innovative programming software tool to generate custom firmware for open FPGA CAEN boards. Even accessible by non-experts of VHDL/Verilog languages. A unique tool to generate and compile FPGA firmware.

Sci(entific)-Compiler, is a graphical software tool designed to ease and accelerate the firmware implementation in physics for open FPGA CAEN boards. Drawing a block diagram, the software can automatically generate a firmware that can be directly deployed on the chosen compatible hardware. In this way, even a non-expert user can write his own firmware code without having any knowledge of VHDL/Verilog programming language. A unique tool to generate and compile FPGA, download it on the target device, and run the real-time solution acquiring data on a host computer.

Sci-Compiler tool includes 100+ virtual blocks implementing complex functions used in physics applications, like waveform recording, logic gates, TDC, spectrum reconstruction, pulse shape discrimination, and more.

In addition to the firmware, Sci-Compiler automatically also generates the related libraries and C++/Phyton software example codes for Windows® and Linux®.

Sci-Compiler supports the following Open FPGA CAEN boards (DT: Desktop / VX: VME64X / V: VME64 / R: Rack)

DT5495 - V2495 Programmable Logic Units

R5560 128 Ch.14 bit 125 MS/s Digitizer with differential inputs

R5560SE 128 Ch.14 bit 125 MS/s Digitizer with single-ended inputs

DT5560SE 32 Ch.14 bit 125 MS/s Digitizer

DT2740 - VX2740 - V2740 64 Ch.16 bit 125 MS/s Digitizer Single Ended (SE) or Differential (Diff)

DT2745 - VX2745 - V2745 64 Ch.16 bit 125MS/s Digitizer with Programmable Input Gain (SE/Diff)

DT5550 DAQ System with User Programmable FPGA and sequencer

DT5550W Weeroc ASICs Development system

Processing Algorithm

Navigate through hundreds of blocks designed for Digital Pulse Processing

Firmware

Generate your firmware starting from a block diagram

SCI-COMPILER

Open FPGA

DAQ

Use the automatically generated Software Development Kit to build your own DAQ

Resource Explorer Tool

Check the basic functionalities of your firmware using the Resource Explorer Tool

SERVICES

Upgrade

Stay up-to-date with the newest SCI-Compiler features

Remote Customization

Remote customization service allows to generate the firmware code with minimal local resources

Using a single Sci-Compiler license, it is possible to compile and deploy firmware for multiple compatible boards that have been activated through a runtime license*. A different runtime license is needed for each board.

*Firmware generated by SCI-Compiler runs for 30-minutes only if no runtime license is installed onboard

WANT TO START?

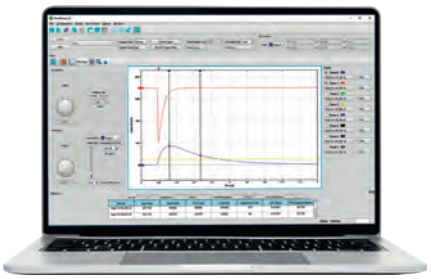
Evaluate the Sci-Compiler software with the **Smart Kit!**

Do you need to teach FPGA programming? Have a look at the **Sci-Compiler Educational Kit!**

WaveDump2

READOUT APPLICATION FOR CAEN DIGITIZER SERIES 2.0

Oscilloscope-like graphical software developed to fully support CAEN Digitizer series 2.0 (x27xx). Specialized in the acquisition of waves in different trigger and run modes, with a special toolbar dedicated to the readout of synchronized multi-board systems.



Available for Windows® and Linux® platforms.

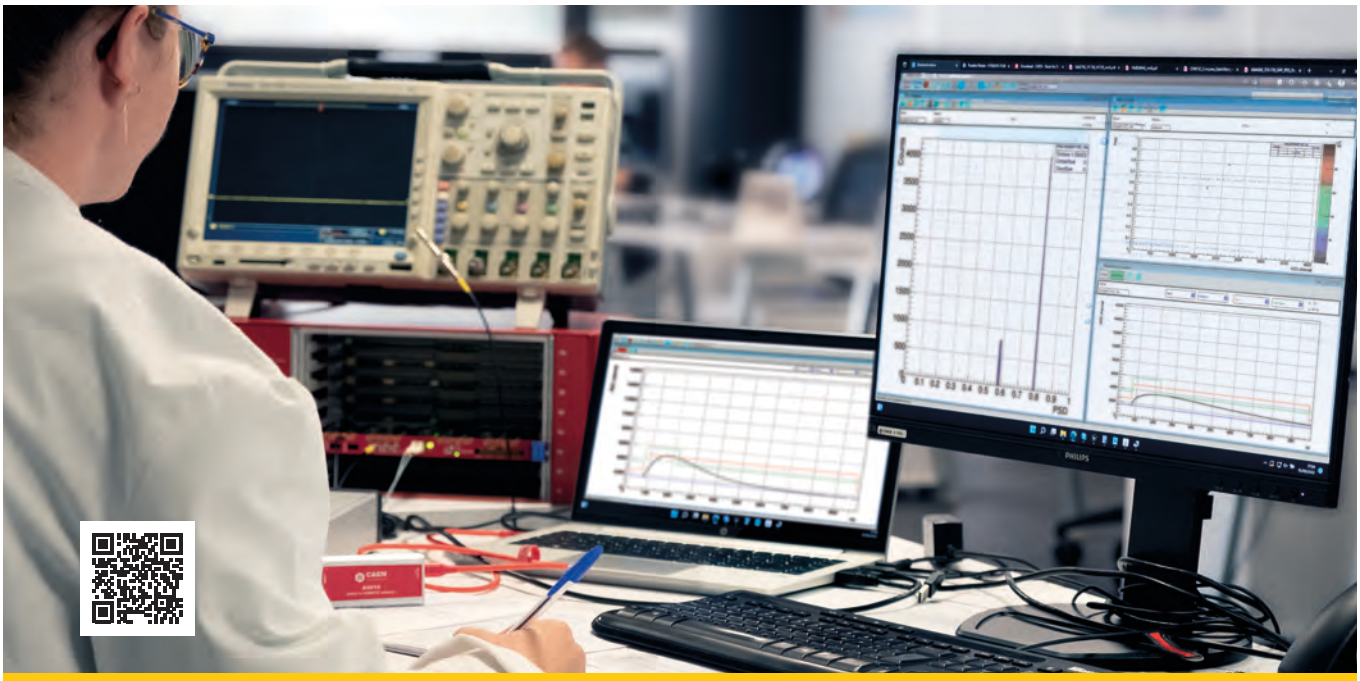
WaveDump2 is a C++ software supporting the Digitizer Series 2.0 running the scope firmware for the waveform recording provided by CAEN. Developed upon Qt cross-platform application development framework, the advanced and user-friendly configuration GUI provides all the necessary tools and functionalities for managing any hardware parameter from the basic ones to the most specific ones. The settings can be conveniently stored into or loaded from a configuration file. Data acquisition from multiple boards and multi-board synchronized systems are managed through a dedicated toolbar. The collected data can be saved to ASCII or binary files for offline analysis.

The program features a plot section which emulates an 8-channel digital oscilloscope. This tool allows reviewing the acquired waveforms, fine-tuning the device settings and/or troubleshooting potential problems. Cursors are available in the oscilloscope to make on-screen measurements, as well as marker lines to indicate the trigger position and the trigger threshold level. Traces can be individually enabled/disabled, and a legend is available to simply identify the displayed signals. The graphical tool offers a zooming control on both vertical and horizontal direction. Basic processing like FFT and samples histogramming is provided runtime.

WaveDump2 is available for Windows® and Linux® platforms.

CoMPASS

MULTIPARAMETRIC DAQ SOFTWARE FOR PHYSICS APPLICATIONS



CAEN DAQ software for Physics thought for physicists. A wide selection of tools and functionalities in a user-friendly GUI to configure all of CAEN digitizer series equipped with the DPP algorithms, acquire and record the data sources (e.g. waves, spectra of physical quantities) from single board and synchronized multi-board systems

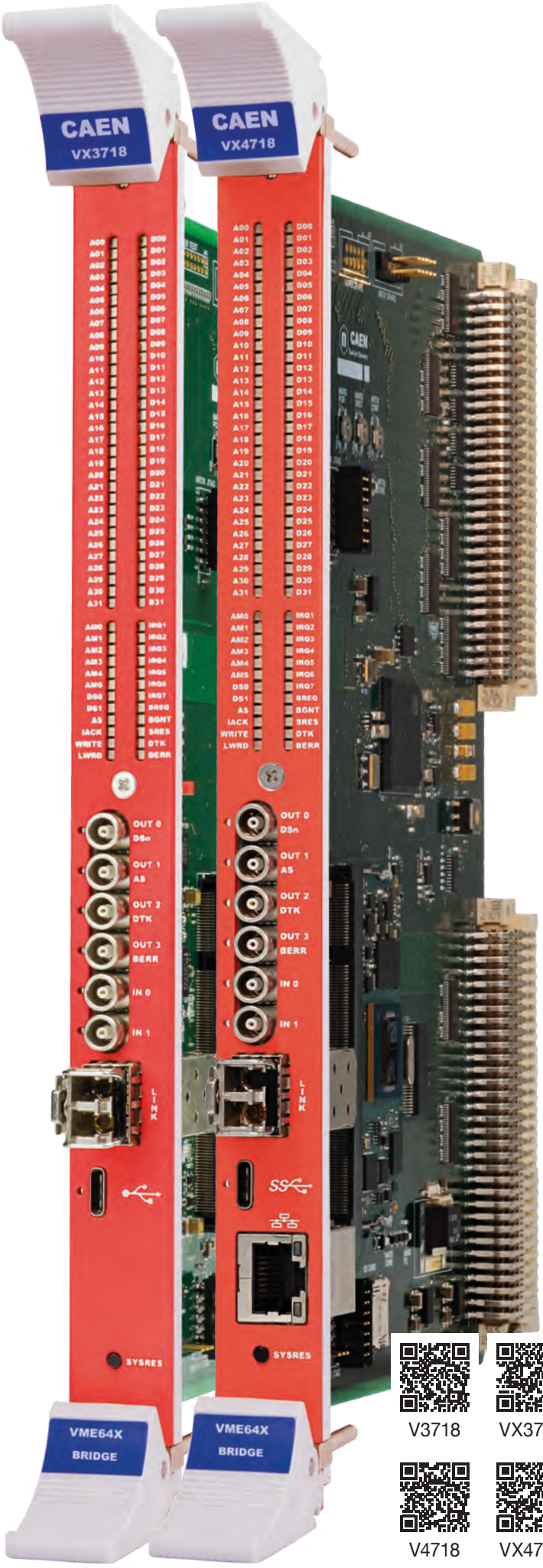
CAEN Multi-PArameter Spectroscopy Software (CoMPASS) is the DAQ software for both Digitizer Series 1.0 and 2.0 running the DPP firmware provided by CAEN. It implements a Multiparametric Data Acquisition for Physics Applications: the detectors can be connected directly to the digitizers/MCAs inputs and the software acquires energy, timing, and PSD spectra at the same time.

CoMPASS software has been designed as a user-friendly interface to manage the acquisition with all the CAEN DPP algorithms. It allows an easy setting of the acquisition parameters and to display up to six different plots and histograms at the same time.

CoMPASS can manage multiple boards and allows an easy synchronization of multiboard systems. Among the most important features, CoMPASS allows to implement event correlation between different channels (in hardware and/or software), apply energy, PSD and time selections, calculate and show the acquisition statistics (trigger rates, data throughput, percentage of discarded events due to the selections, etc.), perform a basic mathematical analysis of the recorded spectra (ROI selection, background subtraction, peak fitting, etc), save the output data files (raw data, lists, waveforms, spectra) and use the saved files to run offline with different processing parameters.

To users familiar with the ROOT Analysis Framework, CoMPASS provides the possibility of saving the output files (lists waveforms and spectra) in the ROOT TTree format for an easy post processing with customized analysis code.

Available for Windows® and Linux® platforms.



V/VX3718 – V/VX4718

CAEN VME CONTROLLERS

For the readout and the control of the vme devices, CAEN provides the V/VX3718 and the V/VX4718, a new generation of bridges capable to perform all the VME64 cycles (except those for 3U boards), as readout controllers. They implement all the characteristics of the discontinued V/VX1718 and V/VX2718 modules on a single board.

Multi-crate sessions can be easily performed thanks to the CONET daisy chain capability: up to 8 bridge units controlled by a single A4818 adapter or a single link of the A5818 adapter, both building a CONET Optical Network. Bridges can work as DAQ Master/ System Controller, bus arbiter, or requester in Multi-Master System.

The VME bus activity can be monitored in detail both locally (on the 88-LED DataWay Display) and remotely.

The V/VX4718 integrating MPSoC offers the possibility to run custom software directly on board and load the Web Interface, which can be used to perform basic VME Bus operations, upgrade the device firmware, and other many options.

Features

- USB, Optical link, and 1 Gb Ethernet (only for V/VX4718) interfaces
- CONET proprietary protocol compliant with A4818 and A5818 Optical Controllers
- Onboard MPSoC: Xilinx Zynq UltraScale+ (only for V/VX4718)
- CONET Daisy Chain capability: up to eight crates by a single link
- DAQ Master/System Controller (arbiter or requester)
- RW, RMW, BLT, MBLT, IACK, ADO, and ADOH cycles
- D8, D16, D32, and D64 data widths
- Interrupt handler
- Front panel DataWay display for quick VMEbus monitoring
- Six programmable front panel LEM TTL/NIM I/Os
- Fully integrable in Windows and Linux computers

V3718 VX3718

V4718 VX4718

V/VX3718

USB 2.0

OPTICAL LINK

V/VX4718

1GbE

USB 3.0

OPTICAL LINK

WEB INTERFACE

Form Factor

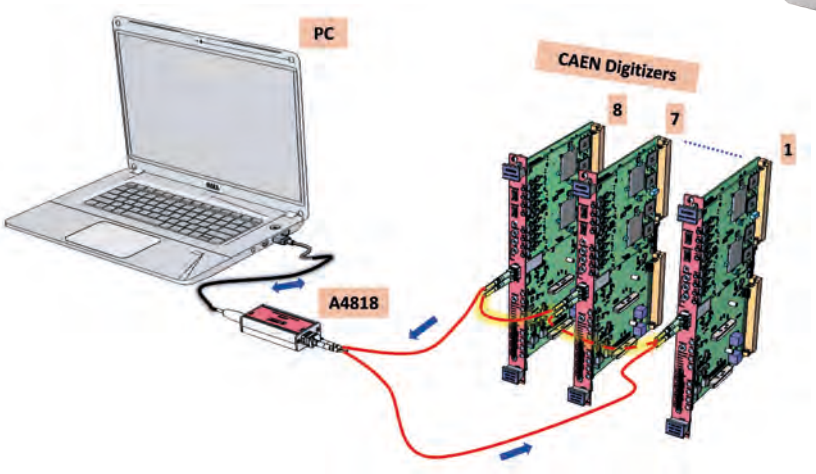
VME64 VME64X

A4818

CONET2 OPTICAL LINK ADAPTERS

A portable and easy-to-use USB-3 to CONET adapter for your PC!

The A4818 is a CAEN USB-3 to CONET adapter, USB powered. CONET is the CAEN proprietary protocol for optical link, which is able to communicate with Digitizers and VME Controllers by direct connection or in daisy chain of up to 8 boards simultaneously. The A4818 is compliant with the USB-3.1 Gen1 speed protocol and can be connected to the USB port of the PC running Windows or Linux OS. The optical link maximum transfer rate is 80 MB/s, which is shared within the boards connected in daisy chain.

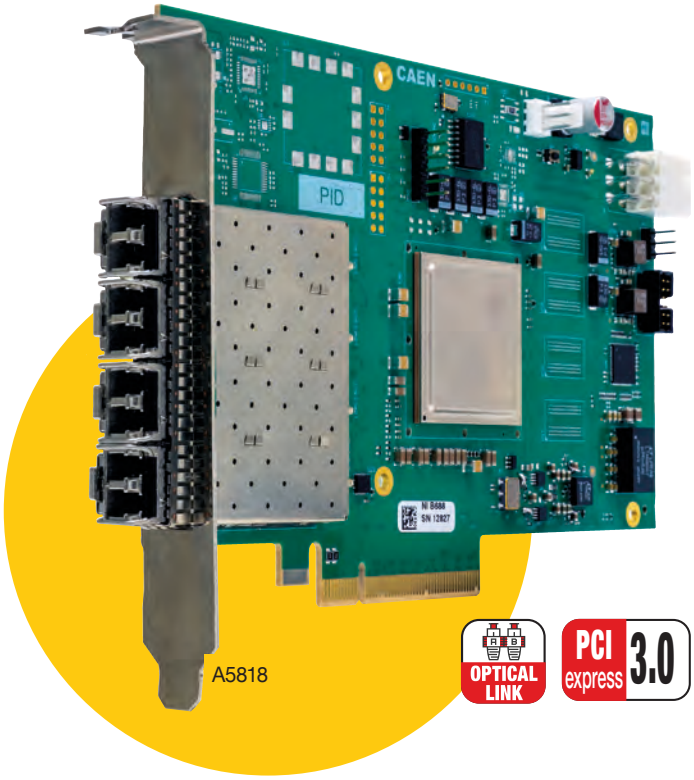


Features

- Compact aluminum box 41x94x20 mm³ (WxLxH)
- 80 MB/s transfer rate by the optical link
- Up to 8 boards in Daisy Chain on the optical link
- Suitable for Windows 10 and Linux (all kernels)
- CAEN USB driver required for Windows only

A5818

CONET2 OPTICAL LINK ADAPTERS



The A5818 is a PCI Express Gen 3 x8 card that can plug into x8 or x16 PCI Express slots, which allows the User to control up to 4 CONET2 independent networks (each network can be made of up to 8 CONET2 slaves). The device is also able to manage the Interrupt VME protocol and is fully compatible with CAEN Libraries.

The optical link maximum transfer rate is 80 MB/s, which is shared amongst the boards connected in daisy chain.

Features

- PCI Express Gen 3 x8
- 4 optical links available
- CONET 2 CAEN Proprietary Optical Link Compatible
- Up to 32 CAEN CONET2-compliant Optical Slave Cards controlled by a single A5818
- 80 MB/s transfer rate per single link by the optical link
- Interrupt VME protocol supported
- Drivers for Linux and Windos OS
- Supported by CAEN Libraries (CAENDigitizer, CAENComm, CAENVMELib)

N1081B-DT1081B

FOUR-FOLD PROGRAMMABLE LOGIC UNIT

N1081B DT1081B

The N1081B and DT1081B are laboratory tools that incorporate in a single unit the most common functionalities that you need to implement the logic capabilities of your experiment. The board provides a wide range of user-selectable functions such as AND, OR, MAJORITY, COUNTER, and even more complex operations like event time tagging or Poisson distribution operation generation.

The N1081B and DT1081B are organized in four sections, with 6 inputs and 4 outputs each accepting TTL/NIM signals, with the possibility to feed in analog signals and process them through a leading-edge discriminator. Each input features a Gate&Delay stage with 5 ns resolution, while the output stage offers the possibility to use an asynchronous Monostable. This allows the user to trim at best the needed parameters and to perform accurate measurements using the available logic functions.

Each section is configurable independently, according to one of the available pre-programmed functions. The board configuration can be performed using the 2.8'' touch screen display or via web interface, accessible via USB or Ethernet.

On the touch screen interface, each function is associated with a widget, meant to be used for configuration and monitor purposes.

Features

- Desktop and NIM form factor
- Wide range of User-selectable functionalities
- 4 programmable independent sections
- Input stage: Gate&Delay and Leading Edge Discriminator
- Output stage with Monostable capability
- 2.8'' touch screen display with user-friendly widgets for configuration and monitoring
- Ethernet (1 Gbps) and USB2.0 connectivity
- Web-based Graphical User Interface
- USB 2.0

FERS-5200

Modular, scalable and synchronized set of electronics surrounding your experiment and reading out thousands of detectors!

FERS-5200 is a Front-End Readout System designed to read out large arrays of detectors, such as SiPMs, multi-anode PMTs, Silicon Strip detectors, Wire Chambers, GEM, Gas Tubes and others.

FERS is a distributed and easy-scalable platform, where each unit is a small card that houses 64 or 128 channels with Front End electronics (in most cases based on ASIC chips), synchronization, local memory and readout interface.

Multiple FERS units can be connected in a tree network thanks to the DT5215 Concentrator Board, that exploits the optical TDlink (a CAEN proprietary protocol that can perform synchronization and exchange data at the same time) as the unique physical connection that guarantees high throughput data readout, slow control and accurate timing synchronization.

FERS has been created keeping flexibility in mind: a single user-interface and readout infrastructure has been designed to support and perform a wide range of front-end tasks suitable for a large variety of detector types.

SCALABLE From Small Systems to Large Experiments | MULTI BOARD SYNC | ALLinONE system | Modular | 1/10 GbE | USB 3.0

MAIN FEATURES

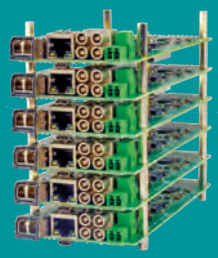
- Platform for the readout of large arrays of detectors (SiPM, MA-PMTs, Gas Tubes, Si detectors, ...)
- Versatility: a family of Front-End cards (FERS units) tailored for different detectors
- Scalability: from a single standalone FERS unit for prototyping to many thousands of channels, with simple tree network structure
- Modularity: multiple FERS units can be distributed on a large detector volume and managed by a single Concentrator board
- Flexibility: possibility to fit different front-end in the same architecture
- Compactness: front-end cards with high channel density ASICs and effective connection to the detector backplane
- Easy-synch: optical link (TDlink) daisy-chain for data readout, slow control and boards synchronization
- Concentrator Board with 8 TDlink
- Boxed FERS unit for desktop use or naked for customizable mechanical frames

JANUS

Software for FERS 5200 units control and data acquisition:
- **x5202 version**
- **x5203 version**

FERS-5200

Flexible and scalable network



A5202/DT5202

Front end readout unit:
- **preamplifier**
- **slow shaper with pulse height detectors**
- **fast shaper and discriminator**

DT5215

Concentrator board for FERS 5200 units synchronization and alignement with external systems.

TDlink protocol (CAEN proprietary)

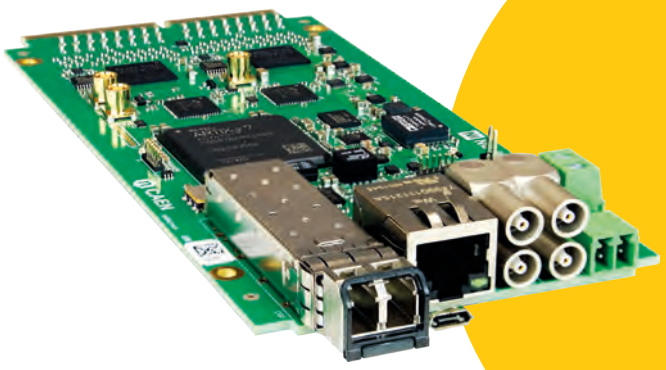
A5203(B)/DT5203

CERN picoTDC timing unit:
- **Time Of Arrival**
- **Time Over Threshold**

A5202/DT5202

64 CH READOUT AND BIAS FOR SILICON PHOTOMULTIPLIERS

A5202 DT5202



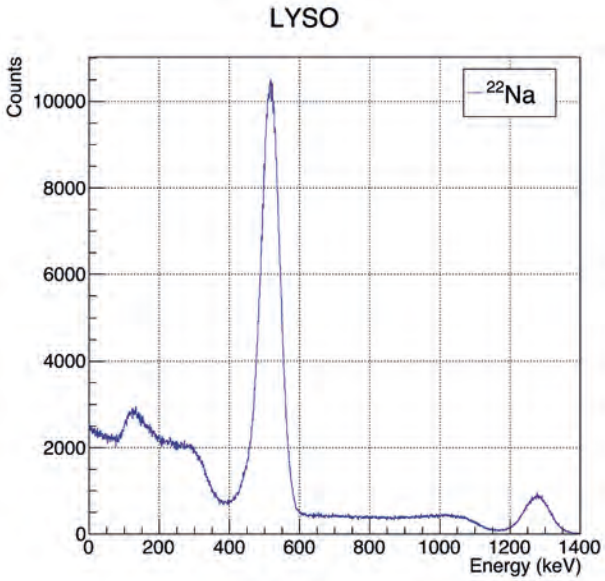
SiPM 10/100 MbE TDLINK USB 2.0 WEB INTERFACE

Ideal to read out large arrays of SiPM. Full compatibility with 64-pixel matrices

The A5202 is a small board (~ 7 cm x 17 cm) housing two Citiroc-1A chips (64 readout channels). Each readout channel is composed of a Preamplifier, a Slow Shaper with pulse height detector, and a Fast Shaper followed by a discriminator. Pulse height values from each Citiroc-1A are converted sequentially by a 13-bit ADC to perform energy measurements. The 64 channel self-triggers (discriminator outputs) can be used for counting, time stamping, to determine the Time over Threshold (ToT) information, and also to generate the board bunch trigger that starts the ADC conversion. The A5202/DT5202 board also integrates the A7585D power supply module necessary for biasing the SiPMs, and the interfaces for readout, synchronization, and control.

The Janus software, allowing to completely manage the A5202/DT5202 module and the data acquisition, is also provided for free by CAEN.

The offer is completed by a useful set of cables and adapters to connect different kind of SiPMs and possibly remote them, to enable easy fitting into any real setup.



Landau distribution of cosmic rays measured with the A5202 using coincidence trigger logic.

ACCESSORIES

Input adapters:

- A5250 - 2.54 mm pin header adapter (included with DT5202 model)
- A5251 - Hamamatsu MPPC adapter
- A5253 - 3-pin adapter for single-pixel SiPMs
- A5254 - SensL ArrayJ adapter

Cables:

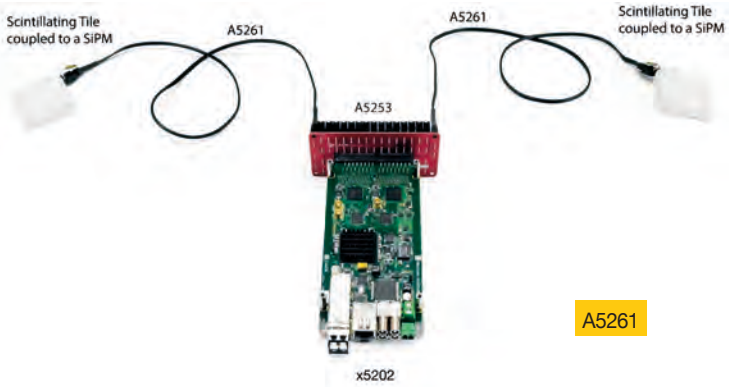
- A5260 - Remotization cable for FERS-5200 boards - 50 cm
- A5260B - Remotization cable for FERS-5200 boards - 100 cm
- A5261 - SiPM remotization cable (70 cm) for A5253

FAN

- A5270 - FERS cooling fan

REMOTIZATION KITS AND ADAPTERS available for maximum flexibility!

A5260

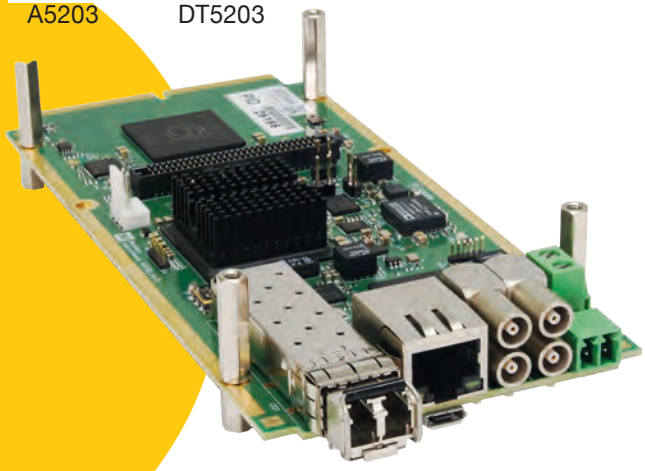


A5261

A5203 DT5203

A5203/DT5203

64/128 CH TDC WITH 3.125 ps LSB RESOLUTION



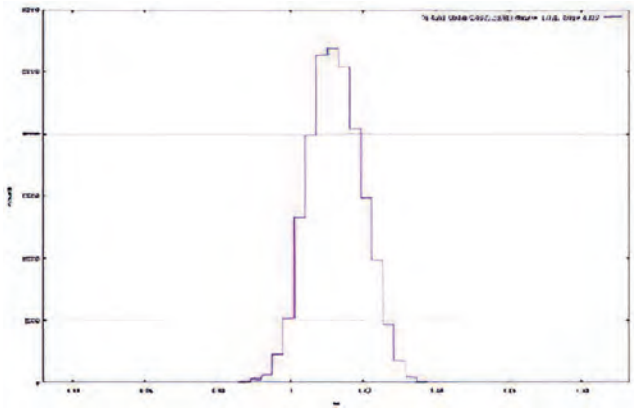
The best achievable timing resolution in a compact form factor and optional dual-threshold discriminators

The A5203 is a small board (~ 7 cm x 17 cm) housing a CERN picoTDC ASIC, featuring 64/128 digital inputs for time measurements. Each readout channel can accept LVDS signals and measure their rising/falling edge timestamps. In this way, the unit is able to reconstruct Time of Arrival of signals as an absolute timestamp or as a deltaT with respect to a common Tref pulse, as well as the Time over Threshold that allows for amplitude estimation or walk correction.

Typical RMS resolution is 7 ps(*).

The Janus software, allowing to completely manage the A5203/DT5203 module and the data acquisition, is also provided for free by CAEN.

The offer is completed by a useful set of adapters to easily connect signals with flat cables to the high-density input edge-connector of the A5203. Moreover, the A5256 adapter allows to use 16+1 analog/digital single-ended signals on LEMO connectors and discriminate them thanks to the embedded fast voltage comparators with programmable threshold.



(*) Spectrum of ΔT between ch1 and ch0 in Common Start Mode, measured with a pulse generator, 1 V single-ended pulse, 0.8 ns rising edge using the A5255 adapter. The RMS resolution is nearly 7 ps.

ACCESSORIES

Input adapters:

- A5255 - Quad 17x4 Header Adapter (included with DT5203 model)
- A5256 - 16+1 ch. Pos/Neg Discriminator for A5203

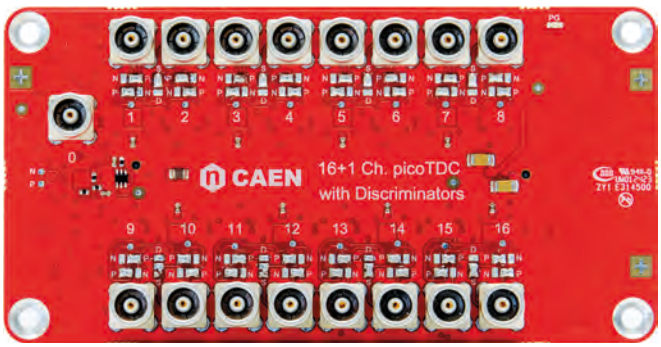
Cables:

- A5260 - Remotization cable for FERS-5200 boards - 50 cm
- A5260B - Remotization cable for FERS-5200 boards - 100 cm

FAN

- A5270 - FERS cooling fan

A5256

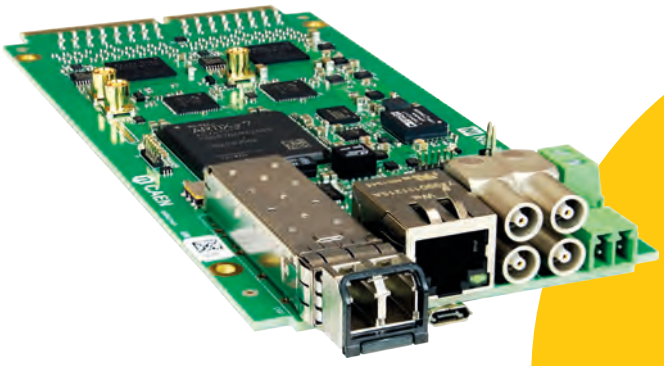


16+1 channel single threshold, or 8+1 channel dual threshold, leading edge discriminator for analog signals available!

A5204/DT5204

64 CHANNEL RADIOROC UNIT FOR FERS-5200

A5204 DT5204



SiPM 10/100 MbE TDLINK USB 2.0 WEB INTERFACE

SiPM, 10/100 MbE, TDlink, USB 2.0, Web Interface

The A5204 is a small board (~7x20 cm²) housing one Weeroc Radioroc ASIC and one CERN picoTDC chip, featuring 64 analog inputs.

Besides a slow shaper with a pulse height detector for the data acquisition, the Radioroc ASIC includes configurable fast pre-amplifiers followed by fast shapers and discriminators that can output 64 individual channel triggers with jitter as low as 55 ps FWHM on a single p.e. The individual channel triggers are connected to the FPGA, for photo-counting up to 200 MHz as well as for the implementation of coincidences, majority and topological acquisition triggers. The individual triggers are also connected to the picoTDCchip, thet allows for very precise timing measurements thanks to the 3.125 ps LSB. Time Over Threshold (ToT) can also be used to estimate the pulse height, making it possible to acquire time stamp and PHA with very low dead time and extremely high rate, without the need of the multiplexed A/D conversion.

The A5204/DT5204 integrates the A7585D power supply module for the SiPM biasing, and the interfaces for readout, synchronization and control.

Janus 5204 Open Source software on Windows® and Linux® is provided for free by CAEN for an easy management of the board configuration and data acquisition.

As for the other FERS-5200 units, the A5204/DT5204 present a wide range of accessories: adapters and cables specifically designed to provide versatility of choice and the ability to remotely operate the detectors.

ACCESSORIES

Input adapters:

- A5250 - 2.54 mm pin header adapter for A5202/DT5202 & A5204/DT5204
- A5251 - Hamamatsu MPPC header adapter for A5202/DT5202 & A5204/DT5204
- A5253 - 3-pin header adapter for A5202/DT5202 & A5204/DT5204
- A5254 - OnSemi (ex SensL) ARRAY J/C header adapter for A5202/DT5202 & A5204/DT5204

Cables:

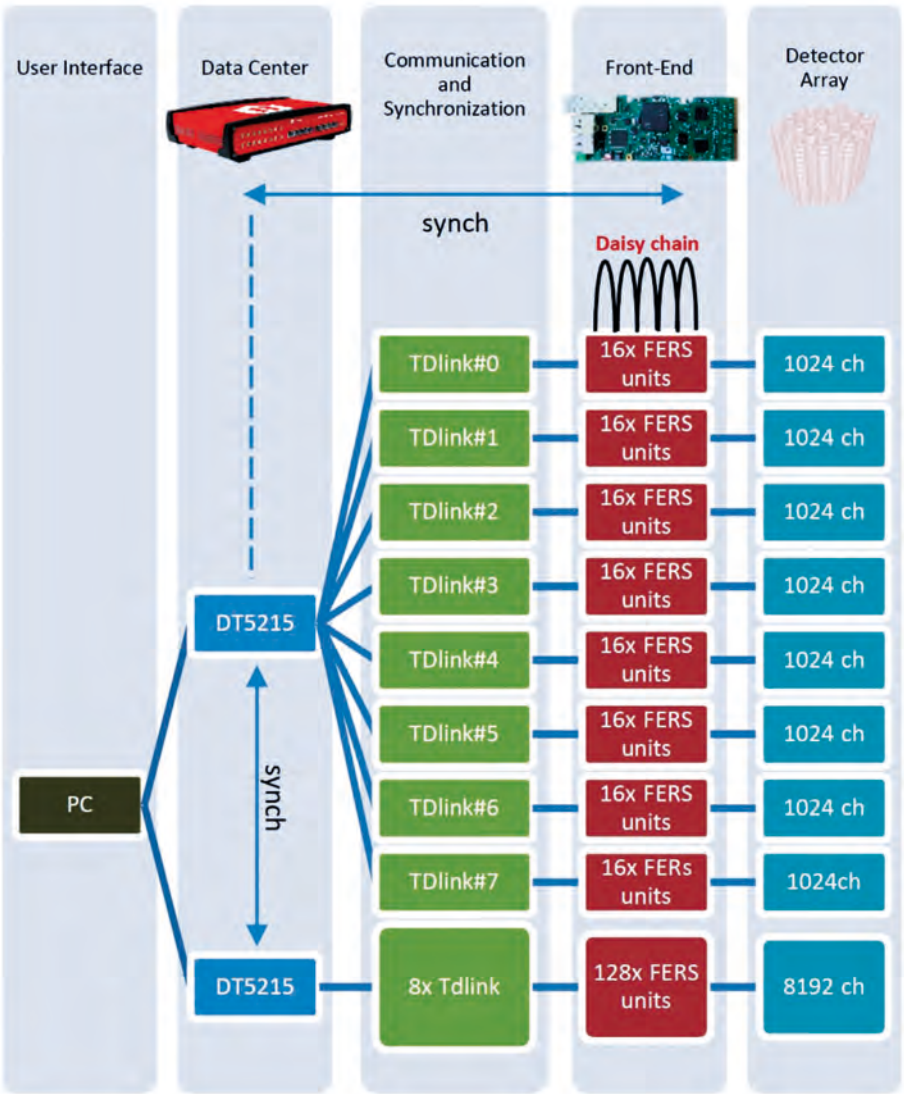
- A5260 - Remotization cable for FERS-5200 boards
- A5261 - SiPM remotization cable (0.7 m) for A5253

FAN

- A5270 - FERS cooling fan

DT5215

CONCENTRATOR BOARD FOR FERS-5200



The DT5215 Concentrator Board is responsible for synchronization and data collection from multiple FERS units. It features 8 optical TDLink connectors, each with the possibility of controlling up to 16 FERS units in daisy-chain, for a total of 128 cards per concentrator. Multiple concentrator boards can be synchronized in order to further extend the total number of channels.

The Concentrator is the core of DAQ, picking up the fragments acquired by each unit and sending them sorted and merged to the host PC. A Linux-based Single Board Computer is embedded in the Concentrator board. It manages the data readout from the network of FERS units and the event data building according to the time stamp and/or trigger ID of the event fragments acquired by each unit. Sorted and merged data packets are then stored in the local memory and finally sent to the host computers through a fast 10 GbE or USB 3.0 link. Custom algorithms for data processing and reduction can be easily uploaded by the user into the embedded CPU.

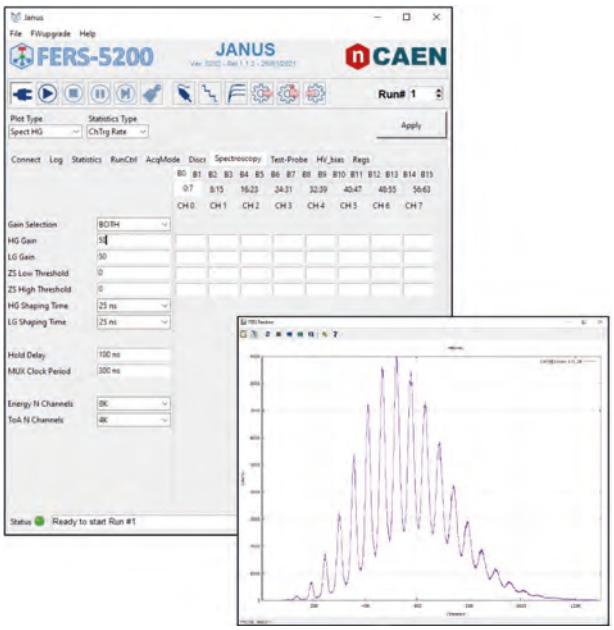
JANUS

FERS-5200 DAQ SOFTWARE

A single DAQ software to control the FERS-5200 board family. Available in Console and GUI Mode, it allows the user to customize the DAQ, and offers an easy way to approach multi-boards and high-channel density FERS-5200 systems.

Janus is an open source software for the control and readout of FERS-5200 boards. Available in two versions (Ver. 5202, Ver. 5203), it can be used as a platform for the development of custom DAQ, tailored to the specific application. Indeed, the user can change the data treatment, the acquired statistics and the output file format.

Janus can manage up to 16 FERS units connected via Ethernet or USB directly as well as the readout of the DT5215 Concentrator Board, so that a single user interface is available for the whole system.



Janus is composed of two parts, one written in C, which is the real heart of the application, one written in Python which manages the user interface. The plots are executed through Gnuplot. All the configuration parameters are written in a textual configuration file.

It is possible to launch and use Janus in 2 different modes:

- **Console Mode.** In this case, the Python part of the software is not used. The user can edit the configuration file with any text editor and save the proper values for the desired parameters. Then, the user can launch a purely textual console window. The application writes a series of messages (which are also saved in a log file) and, during the run, prints statistics on the screen. The only graphical part is the plot, which is managed by Gnuplot.
- **GUI Mode**: In this case, the user only have to run the Python program which calls the C program and connects to it via a socket to send commands and receive messages which are then displayed in the Python GUI.

Features

- Model-dependent GUI for a quick and easy start
- Open-Source for user customization
- Management of the acquisition parameters of all connected boards
- Multi parametric Jobs and Runs with time or counts preset
- Data saving of lists in .bin, .txt format
- Statistics and Plots visualization

R1443

PREAMPLIFIER UNIT FOR ^{3}HE TUBES

Preamplifier unit with up to 64 channels for neutron detectors as ^{3}He or BF_3 tubes.

Features

- Specifically designed for neutron detectors as ^{3}He or BF_3 tubes
- 19” rack unit (height = 2U)
- Total Gain: 2.5 V/pC
- External HV input on SHV connector (feeding the internal decoupling circuits)
- Detector inputs on SHV connectors
- Inpit bias voltage: +/- 2 kV Max
- Test input on BNC (1 pF charge injection capacitors)
- Differential outputs on RJ45 connectors
- Three available versions:
  - 32 channels
  - 64 channels
  - 32 channels with 16 independent HV inputs (1 per tube)
- Full position-sensitive ^{3}He acquisition system in combination with the R5560 digitizer

R1443 is a 32/64 channels Charge Sensitive Preamplifier in a 19″ rack unit (120/230 V 50/60 Hz AC Powered). It has been developed in collaboration with Institut Laue-Langevin in Grenoble, France, and it is specifically designed for operating with neutron detectors as ^{3}He or BF_3 tubes. Given the number of input channels, it can handle up to 16/32 position-sensitive tubes, each tube having two outputs, one for each end.

The output signal of each channel has an RC of 1 µs. This guarantees excellent performances even at high rates exceeding 100 kcps. The output of this preamplifier is typically readout by ADC and Digital Pulse Processing electronics in order to perform specific filtering to achieve the best charge, timing and axial position measurements.

Developed in collaboration with Institut Laue-Langevin in Grenoble

A1421

PREAMPLIFIER AND DISCRIMINATOR FOR ^{3}HE TUBES

Features

- Specifically designed for neutron detectors as ^{3}He or BF_3 tubes in counting applications
- Total Gain: 28 V/pC
- Discriminator with adjustable threshold
- Analog and TTL output
- Compact size
- External HV input on SHV connector (feeding the internal decoupling circuits)
- Detector inputs on SHV or HN connectors
- Inpit bias voltage: +/- 3 kV Max
- Test input on LEMO (1 pF charge injection capacitors)
- Full counting acquisition system in combination with R7771 Neutron Pulse Train Recorder or R7780 Shift Register

The A1421 is a charge sensitive preamplifier, shaper and discriminator providing both analog and TTL output designed to be used with neutron detector tubes in counting application together with monitor counters (like the R7771 and R7780). Thanks to its compact size it can be mounted very close to the detector and, due to the fast recovery time, it is suitable for passive as well as for active interrogation measurements. It is equipped with detector inputs on SHV or HN connectors, and external HV inputs on SHV connectors (feeding the internal decoupling circuits). Two LV IN/OUT connectors are available to power the preamplifier also in daisy chain mode. It features two trimmers to adjust the discriminator threshold and TTL output width. A digital input is available on a LEMO connector for the daisy chain of the discriminator signals.

Developed in collaboration with Institut Laue-Langevin in Grenoble

A1429

64 CH CHARGE SENSITIVE PREAMPLIFIER

High CHANNEL DENSITY

SEGMENTED DETECTOR

Ultra high density preamplifier for big size segmented silicon and gas detector arrays

The A1429 is a 64 ch. highly integrated charge preamplifier, suitable for single or double sided multi-strip silicon detectors as well as for multi-channel detectors with common bias. Its compact size and low power consumption make it ideal for direct detector coupling in high vacuum systems. It is equipped with two LEMO Bias inputs, one input for channels from 0 to 31 and a second for channels from 32 to 63.

The A1429 is available in different sensitivities:
20, 45, 90, 200, 400 mV / MeV (Si).

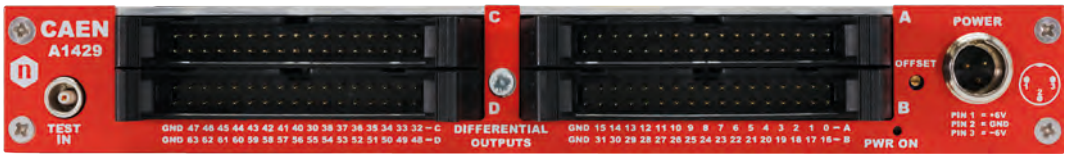
The preamplifier output signals are in true differential supporting low-cost twisted flat cables for the output connection.

This feature allows to easily couple the A1429 with the new generation digitizer x2740/x2745, creating a complete chain for the readout of segmented detector arrays.

Features

- Max. output voltage: +/- 4.5 V differential on 100 Ω termination
- Sensitivities: 20, 45, 90, 200, 400 mV / MeV (Si)
- Dimension: 180x105x25 mm^3 (WxLxH)
- Input bias voltage: +/- 400 V Max (2 LEMO 00 connectors)
- ESD input protection
- TEST pulse input (1 LEMO 00)
- Low power consumption (< 50 mW for ch.)

BACK PANEL



Complete and full digital acquisition chain with x2740 and x2745 family, Pulse Heigh Analysis firmware and CoMPASS

A1442

16/32 CH CHARGE SENSITIVE PREAMPLIFIER

Is your setup big but not that big? Is the compact size and the low power an important requirement but the flexibility in selecting the full scale range is crucial as well? The A1442 is the perfect compromise!

Features

- 16 channel or 32 channel
- x1 or x5 switchable sensitivity
  - 20 mV/MeV (Si) @ 1X
  - 100 mV/MeV (Si) @ 5X
- Differential output (with 100 Ohm back termination)
- Maximum output voltage +/- 4.5 V
- Input bias voltage (+/- 400 V Max)
- ESD input protection
- Low power consumption for in vacuum use (< 1000 mW for 16 ch. version)
- Noise < 5 keV on 0 pF input and < 23 eV/pF slope
- Rise Time < 10 ns @ 0 pF, < 20 ns @ 200 pF

The A1442 is ideally suited for single or double sided multi-strip silicon detectors as well as for multi-channel detectors with common Bias. Its compact size and low power consumption make it ideal for direct detector coupling in a high vacuum system. It is available in both 16-channel (A1442A) and 32-channel (A1442B) versions.

Preamplifier output signals are true differential supporting low-cost twisted flat cables for the output connection.

The preamplifier also provides a SUM output of the 16-channel, allowing the user to calculate the timing of pulse shape measurements of the complete strip from a single signal. Preamplifier sensitivity can be easily changed by a factor of 5 by means of a simple jumper on the front panel. The 32-channel version (A1442B) can be operated as two independent 16-channel preamplifiers with separate Voltage-Bias and Test inputs, and two separate SUM outputs.

Complete acquisition analog or digital chain with:

- **N1068 spectroscopy amplifier and N6741 Peak sensing ADC**
- **x2740 and x2745 new digitizer and Pulse Height Analysis firmware**

SP5630ENP - ENVIRONMENTAL KIT PLUS

GAMMA RADIATION AND SHIELDING LABORATORY

Features

- Embedded web interface with spectrum analysis tools
- Based on Silicon Photomultipliers (SiPM) matrix coupled to a CsI Scintillator
- Well suited for:
  - Detecting γ-Radiation
  - System Calibration: Linearity and Resolution
  - γ-Radiation Absorption
  - Comparison of different Shielding Materials
  - Photonuclear cross-section/Compton Scattering cross-section
  - Passive Radon measurements
  - Environmental Sample identification & measurements

CAEN designed a new dedicated Educational kit, the SP5630ENP – Environmental kit Plus, to guide the users towards the development of complementary measurement techniques based on counting and on the analysis of the spectrum.

SP5620CH - COSMIC HUNTER

IMPROVE THE ANALYSIS AND COMPREHENSION OF COSMIC RAYS!

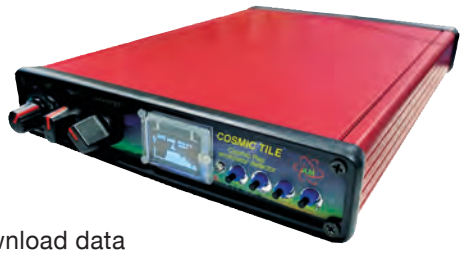
Features

- Based on SiPM detectors and plastic scintillating tiles
- Up to 3 scintillating tiles management
- Flexible system geometry
- No Needs SW interface
- Embedded E Ink Display
- SD card to download data
- A new software for data taking is under development

Cosmic Hunter is a new educational tool developed to inspire young students and guide them towards the analysis and comprehension of cosmic rays. Cosmic Hunter, Silicon Photomultipliers (SiPM) based, is composed of one detection coincidence unit together with up to three plastic scintillating tiles.

SP5622B

Detection System Plus



Features

- Standalone
- Fully compatible with SP5620CH Cosmic Hunter
- Based on SiPM detectors and plastic scintillating tile
- External trigger system for several laboratory setups
- Analog and digital outputs
- No need of SW interface
- SD card to download data

SiPM

The Detection System Plus, SP5622B, is a user-friendly system for cosmic-ray detection. It can be used as a didactic instrument or as an external trigger system for another experimental setup. The simple design makes it suitable for not only university-level physics labs, but also for high school level physics programs.

SP5660 RockyRAD Educational Kit

γ ENVIRONMENTAL RADIOACTIVITY INDOOR AND OUTDOOR

With RockyRAD, looking at a rock will never be the same again!

Purpose of the experiment

From geology to daily life, RockyRAD bridges the gap: discover the fascinating world of rock radioactivity and then expand your horizon to detect the unseen radiation in our everyday surroundings.

Fundamentals

Natural radioactivity is all around us, and thanks to RockyRAD, high school students now have the opportunity to approach this mysterious world in an innovative and engaging manner.

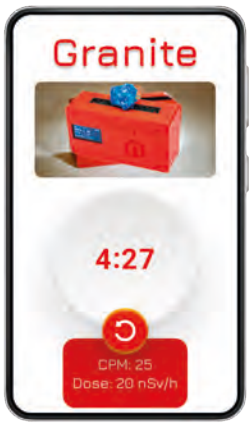
RockyRAD is not just a learning tool, but a bridge between the ancient allure of rocks and the tangible realities of everyday life. It allows students to go beyond what they see, exploring the nuclear radiations present in our environment.

Its operation is remarkably simple: by placing a material on the device, RockyRAD detects its radioactivity level. Due to its lightweight and portability, it can be used both in the classroom and during outdoor learning sessions.

For those who love an interdisciplinary approach, RockyRAD is an invaluable resource. Not only does it promote exciting **STEM** activities, but it also acts as a catalyst for projects that merge various subjects, such as Physics, Mathematics, Earth Sciences, Statistics, Computer Science, and Geography, creating a comprehensive educational experience.

Each RockyRAD kit is enhanced with a set of rock samples from different origins, allowing students to immediately begin their detection experiments.

Now, every stone tells a story, a story of radiation and energy. And this story is ready to be explored. We invite all Physics teachers to dive into this adventure and take their students on a journey through the unseen.



- Detector: Geiger-Müller Tube
- Display Information: Total Counts, Counts Per Minute, Equivalent Dose Rate
- Wi-Fi for data download
- Bluetooth connection
- Rechargeable Battery (USB-C)
- Android App (coming soon)

SP5640 - GAMMAEDU

BACKPACK RADIATION DETECTOR

Just one tablet click to perform radioactive measurements outdoor!

A portable detection backpack for revealing the presence of radioactive materials in the environment. The high efficiency of the scintillation crystal allows the user to perform a measurement in few minutes.

GammaEDU can identify industrial, medical, and naturally occurring radioactive isotopes in static and dynamic acquisition

The GammaEDU detection backpack includes NaI(Tl) scintillator crystal (0.3 L) coupled with a Photomultiplier Tube (PMT) and the S2580 - GammaStream. The GammaStream integrates High Voltage Power Supply, Preamplifier, and digital Multi-Channel Analyzer for scintillation spectroscopy. The GammaEDU has high detection efficiency, low power consumption, and the data taking can be uninterrupted up to 6 hours, very suitable for outdoor gamma radiation measurements.

A 10'' tablet including CAEN GammaEDU application is part of the product.

With the GammaEDU Android application the students can acquire and analyze in real time a γ-ray spectrum to get the K, U and Th abundances, keep track of the surrounding environment, take the GPS coordinates, and shoot a picture of the on-going measurements. The data are saved in a .kmz file ready to be visualized on Google Earth and shared on Google Drive for producing a radioactivity map of the area.

- Environmental Gamma detection and spectroscopy
- Mapping of potential radon-prone areas
- Environmental monitoring in land field
- Geochemical and mineral exploration
- Statistics
- Customs protection and border control
- Scenario of emergency services
- Homeland security

NBrick

32 CH NEUTRON POSITION SENSING SYSTEM

A complete readout chain and DAQ for position-sensing $^3He/BF_3$ tubes

Control Software and Libraries

^3He ^3He ^3He ^3He Tubes

10/100 MbE

ALLinONE system

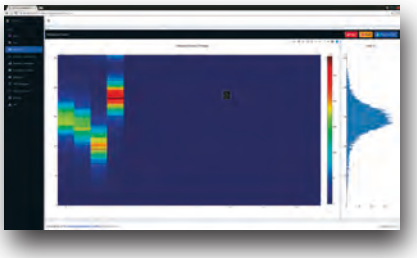
The NBrick is a rackmount system composed of three boards:

- R1443C Charge Sensitive Preamplifier specifically designed for $^3He/BF_3$ tubes (32-ch / independent HV)
- R5560C 32 channels 14-bit 125 MS/s Pulse Processor
- R8033 High Voltage board (Mod. R8033DP: 16-ch +4kV/3mA)

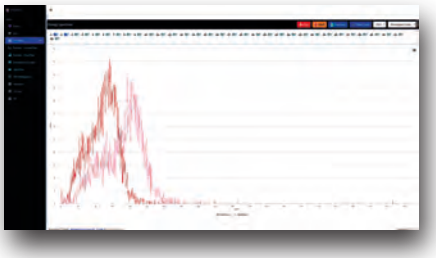
The three units combined together build a complete readout system for neutron detection applications, allowing for the readout of up to 16 position-sensing $^3He/BF_3$ tubes.

It provides High Voltage up to 4 kV for $^3He/BF_3$ tubes bias and a proper preamplification stage with a total gain of 0.85 to 19 V/pC and sensitivity 2 mV/fC. Thanks to the architecture based on Flash ADC, the Pulse Processor can sustain event rates up to 100 kcps per channel. The firmware onboard performs Resistive Charge Division for position reconstruction and outputs energy/timing data.

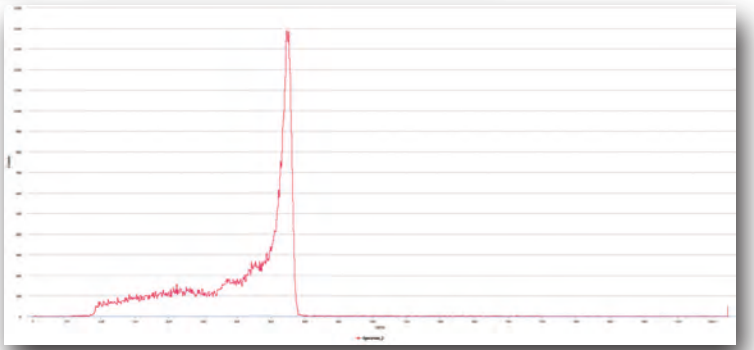
CAEN provides the **Thanos** DAQ software, that allows the user to remotely manage the High Voltage and Digitizers, to acquire waveforms, energy spectra, ToF spectra, and to perform position reconstruction. The figures below show some examples of measurements performed using 4 ^3He tubes and a ^{252}Cf source. The emitted neutrons were moderated by using a polyethylene shielding, therefore thermal neutrons were detected.



Position heatmap (counts over position) corresponding to four different ^3He tubes and 2D-projection of counts onto the y-axis of a single tube.



Energy spectrum measured at the two ends of one ^3He tube – x-axis is not-calibrated energy.



Typical thermal neutron spectrum acquired with the Thanos DAQ, collecting charge from just one end of a ^3He tube.

R7771

32 CH NEUTRON PULSE TRAIN RECORDER

10/100 MbE | USB 2.0

The R7771 is a Neutron Pulse Train Recorder for the acquisition of signals from 32 neutron detectors. It provides the time-stamped list of TTL pulses from neutron detector front-end electronics with 10 ns pulse pairs resolution independently per each channel. The R7771 provides the most complete information on neutron counting, giving the capability to characterize nuclear material in passive mode and to analyse the transients in active nuclear material interrogation. The 32 independent inputs allow for the acquisition from big volume assay systems composed by multiple neutron detectors.

R7780

UNATTENDED MONITORING SYSTEM

WEB INTERFACE | 1 GbE | DATA LOG | USB 2.0 | USB 3.1

The R7780 is a complete readout, acquisition and analysis module for up to 8 neutron detectors that can work in unattended mode. It can be operated rack mount or as a standalone unit. The device combines the functions of a Shift Register and a Pulse Train Recorder. The eight single-ended TTL inputs (LEMO) feature independent counting capability. Moreover, adjustable input thresholds give the possibility to compensate TTL signal voltage drops in case of long-distance use. Redundant storing mechanisms are available to ensure reliability during unattended operation.

DT7790

UNATTENDED DUAL CURRENT MONITOR

WEB INTERFACE | 10/100 MbE | DATA LOG | USB FLASH

The DT7790 is a Desktop Dual Current Monitor for Nuclear Safeguards applications such as ion chamber gamma monitoring. The DT7790 has two independent inputs detecting currents in three user-selectable ranges that span from -100 fA to -800 µA. Data can be retrieved via an Ethernet connection or by monitoring the frequency of the TTL pulse stream on dedicated SMA connectors. In this way, the DT7790 can simplify instrumentation needs by enabling the use of a simple pulse counter for both neutron and gamma measurements. For added reliability, data are stored on dual redundant micro-SD cards and automatically downloaded onto a USB flash drive. The UDCM also features a programmable negative HV power supply providing detector bias voltages from 0 to -1 kV.

The DT7790 is compliant with IAEA RAINSTORM and it is equipped with a redundant operating system (OS), back-up data storage, state of system health information as well as temperature, humidity and power monitors for tracking conditions in variety of operating environments.

HEXAGON

DIGITAL MCA MULTICHANNEL ANALYZER

The best digitial MCA suitable for laboratory and in situ applications. Compact, flexible, and best performoring for Nuclear Physics Research, Homeland Security, Environmental (Real-Time) Monitoring, Non-Destructive Analysis, Nuclear Safety & Safeguards, Labs and Educational application

Hexagon is a single or dual digital 32k MCA in a compact desktop form factor. It is suitable for semiconductor detectors, such as HPGe, Silicon, and CZT detectors, but also for scintillation detectors as NaI and LaBr3. It accepts signals from resistive feedback or transistor reset preamplifier detectors as well as from PMT anodes.

Hexagon can operate in Pulse Height Analysis (PHA) and in MultiChannel Scaling (MCS) mode. Multiple PHA spectra can be collected using MultiSpectral Scaling (MSS) mode with no data loss when switching to a new spectrum. Time-Stamped List mode is also available. Additionally, AntiCompton data acquisition is supported by taking advantage of the 2-input channel version.

Hexagon is equipped with I/O connectors for TRP inhibit and additional functionalities (PHA Start/Stop, SCA, MCS, Coincidence/AntiCoincidence, Acquisition Start/Stop, ICR, Run Status, Sample Changer, and Sample Ready signals).

Easy multi-Hexagon synchronization and system building can be made via a simple daisy cable. An OLED display provides general board information, ICR, OCR, Real/Live/Dead Time, as well as details on the HVPS channel output. Three selectable ranges of bias voltage and current are configurable on per-channel basis and hardware protection: 2 kV / 1 mA for PMTs, 5 kV / 30 µA for HPGe, and 500 V / 50 µA for Silicon detectors.

Hexagon is controlled by Quantus, a general-purpose gamma-ray quantitative spectroscopy software. The embedded Linux-based ARM processor makes Hexagon well suited for unattended operations. Taking advantage of the available SDK tool, the user can customize the software (running embedded or on an external PC).

Hexagon can be controlled with a point-to-point direct connection through the USB 2.0 link and with a remote network connection by the Ethernet 10/100T port. A web interface that supports basic service operations is also available.

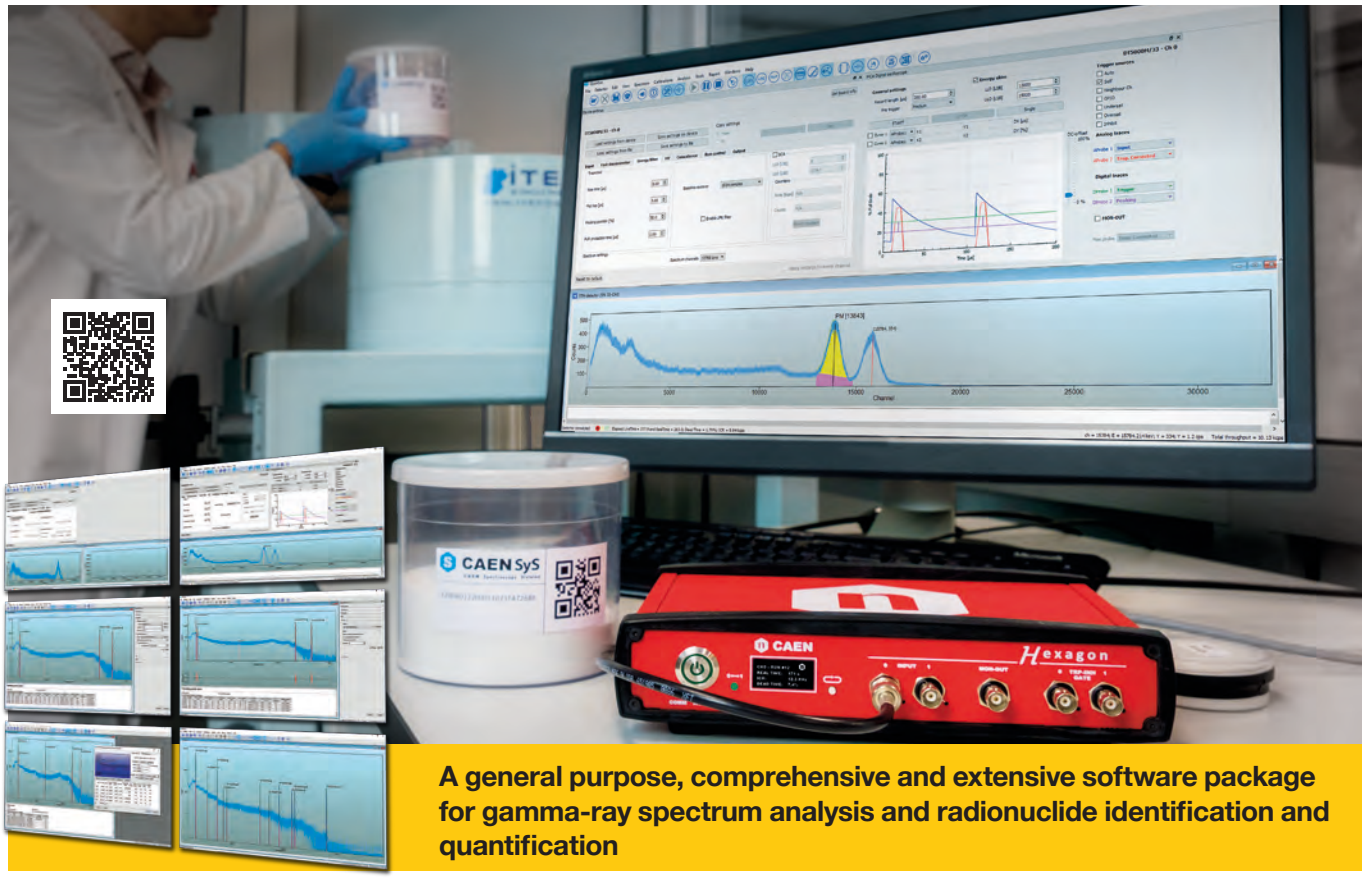
Features

- Single and Dual 32k Digital MCA
- Fully supported by Quantus Spectrometry Software
- Provides Pulse Height Analysis (PHA with MSS and coinc/antocoinc), Time-stamped Lists and Multichannel Scaling (MCS) modes
- Ideally suited for semiconductor detector like HPGe, CZT, Silicon, and scintillation detectors
- Supports Resistive Feedback and Transistor Reset preamplifiers as well as PMT anode signals
- On-board SSD memory for List and Spectrum data storage
- Web interface for board details retrieval firmware upgrading, and output data file browsing

Single and dual input 32k digital MCA

Quantus

QUANTITATIVE SPECTROMETRY SOFTWARE



A general purpose, comprehensive and extensive software package for gamma-ray spectrum analysis and radionuclide identification and quantification

Features

- Data acquisition control via detector-MCA setups
- Spectrum analysis through a powerful collection of calculation engines:
  - ROI computations
  - Continuum calculation methods
  - Peak search engines and Peak fitting algorithms
  - Peak qualification methods and automatic ROI location
  - Energy, FWHM and Efficiency calibration methods
  - Activity and MDA calculation algorithms
  - Advanced uncertainites evaluation
- Radionuclide identification and quantification:
  - Different quantification methods
  - Complete radionuclide library based on NuDat nuclear database
- Additional functionalities:
  - Multilanguage support
  - Procedures
  - User's Management
  - File Batch Analysis
  - File Explorer
  - QA/QC
  - Efficiency calculation based on full MonteCarlo method

Quantus is the CAEN high performance software to make Quantitative Spectrometry with Hexagon digital MCA. It is powerful and flexible enough to support an enormous range of sample types and detector geometries, and can analyze any recorded gamma-ray spectrum for radionuclide identification and quantification.

Thanks to its multi-document design, Quantus can manage simultaneous multi-spectrum analysis as well as multi-detector data acquisition. The advanced Graphical User Interface (GUI) is highly configurable for user needs: it incorporates tools for a wide range of analytical functions such as peak search, continuum subtraction, peak qualification, automatic ROI location, energy calibration with visual interaction, FWHM calibration, efficiency calibration, nuclide identification, and activity calculation; permits visual distinction and marking of ROIs and peaks in the spectrum as well as multiple peak labelling implementation; provides advanced spectrum cursor showing satellite or spectrum artifacts.

Quantus supports high data management and great traceability. All information is saved into XML-formatted files (*.gxml). A spectrum can be imported from other formats like Ortec (*.chn) and Canberra (*.cnf) files, .spe, and N42.42 standard as well. The user can customize analysis reports, including fully colored and HTML-formatted tables.

Quantus is a multi-platform software compatible with Windows® and Linux® operating systems.

I-SPECTOR FAMILY

INTELLIGENT SILICON PHOTOMULTIPLIER TUBE

Tube-like compact units for Gamma Spectroscopy and Neutron detection

LoRa Wireless | WEB INTERFACE | 100 MbE | SiPM

i-Spector products are full-featured radiation detection systems based on SiPMs. The unit's profile makes it ideal for many portable applications where size, weight and power consumption are important constraints. It is suitable for applications ranging from R&D to Security monitoring.

i-Spector is an all-in-one unit based on a scintillating crystal (CsI or EJ-276) coupled to Silicon Photomultipliers. Different models are available, covering applications in gamma spectroscopy and neutron detection.

The i-Spector integrates in a compact tube-like mechanics the detection stage, frontend electronics, an integrated power supply for SiPM biasing and, eventually, a digital chain to process onboard the incoming data.

The i-Spector can be controlled via 100 Mb Ethernet. A web-based GUI allows the user to set the acquisition parameters, see results on plot and perform basic data analysis.

The unit is available as OEM electronics, to encourage integration in more complex detection systems, or in ASSEMBLY version, with a scintillation crystal coupled to the SiPM area. Different crystal sizes are available as well.

Features

- All-in-one detector, frontend electronics and signal processing
- Possible replacement for PMTs
- Compact form factor: Ø 60 mm, h 90/135 mm
- 20-80 V Integrated High Voltage for SiPM biasing Different models covering Multi Channel Analyzer, TDC and Pulse Shape Discrimination
- C# and Python open-source libraries available

i-Spector

i-Spector S2560 is the basic version that can replace existing systems based on PMTs. Light pulses collected by the SiPM pixels are processed by a preamplifier stage and summed to obtain a single fast analog signal that can be digitized or processed with a common Digitizer, MCA or discriminator/TDC chains.

i-Spector PLUS

i-Spector PLUS S2560T model integrates an additional Timing Unit that is able to perform event timestamping, ToF measurements, coincidence between multiple i-Spector modules, and photon counting.

i-Spector Digital

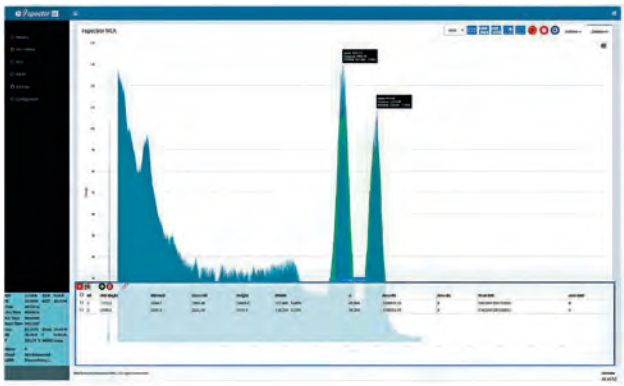
i-Spector Digital S2570 is a Gamma Spectrometry unit. It embeds a digital MCA, based on 80 MSps 12-bit ADC and charge integration algorithm. The unit provides as output an analog amplified signal and a 4k channels energy spectrum calculated onboard and displayed into the Web-Interface.

i-Spector PSD

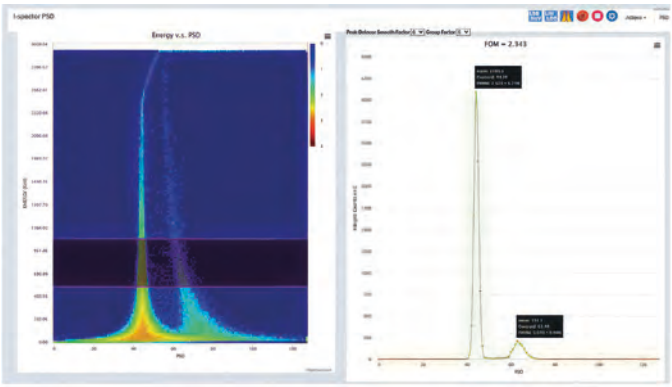
i-Spector PSD uses the EJ-276 crystal to detect gamma and neutrons and provides separation between them using a pulse shape discrimination algorithm. The PSD plot is accessible on the Web Interface.

Model Compare

	i-Spector S2560	i-Spector PLUS S2560T	i-Spector Digital S2570	i-Spector PSDS2590
Main Application	PMT replacement	Timing/Coinc. measurements	Gamma Spectroscopy	Gamma/Neutron discrimination
Form factor	OEM, ASSEMBLY	OEM, ASSEMBLY	OEM, ASSEMBLY	ASSEMBLY
Size	OEM: Ø 60 mm, h 90 mm ASSEMBLY: Ø 60 mm, h 135 mm	OEM: Ø 60 mm, h 90 mm ASSEMBLY: Ø 60 mm, h 135 mm	OEM: Ø 60 mm, h 90 mm ASSEMBLY: Ø 60 mm, h 135 mm	ASSEMBLY: Ø 60 mm, h 135 mm
SiPM Area	24x24 or 30x30 mm^2	24x24 or 30x30 mm^2	24x24 or 30x30 mm^2	24x24 mm^2
Scintillation Crystal	CsI, others on request	CsI, others on request	CsI, others on request	EJ-276
Analog Output	Yes	Yes	Yes	Yes
Digital I/Os	-	Yes	-	-
MCA	-	-	4k	4k
TDC	-	Yes	-	-
PSD	-	-	-	Yes
Connectivity	Ethernet	Ethernet	Ethernet	Ethernet
Software	Web GUI	Web GUI	Web GUI	Web GUI



Energy Resolution (FWHM) S2570:
<6 % @ 662 keV (=5.5% with T < 28°C)
< 4.5 % @ 1332 keV



PSD performances S2590:
FoM ~ 2.60 in 1÷1.5 MeV range and FoM > 2.3 in 500÷1000 keV range.

WEEROC

FRONTEND ASICS FOR PARTICLE PHYSICS

CAEN carries the worldwide distribution agreement with Weeroc, the microelectronics company designing front-end readout ASICs for many photodetectors commonly used in physics applications. Weeroc offers a complete range programmable readout chips and associated support for a fast and succesfull integration in the final system.

Wide variety of detectors

Suitable for SiPM, GEMs, Si strip, MA-PMTs and other

RADIOROC
Radioroc is a 64-channel front-end ASIC designed to readout silicon photo-multipliers (SiPM).

Up to 64 channels

High channel density in BGA or QFP form factor, allowing for an ultra-compact and cost-effective design of your experiment

LIROC
Liroc is a 64-channel front-end ASIC designed to readout silicon photomultipliers (SiPM) for LIDAR/fast photon counting.

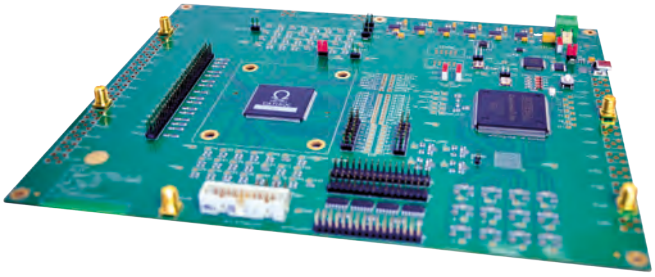
PSIROC
Psiroc is a 64-channel front-end ASIC designed to readout PIN diodes, silicon strips and GEMs, handling detector capacitances ranging from 0 up to few hundreds of pF.

Testboard available for each ASIC, to evaluate its performances easily and quickly, allowing a versatile use with real detectors

CAEN-Weeroc synergies

CAEN develops readout systems taking advantage of Weeroc ASICs.

Have a look at:
- FERS-5200
- DT5550W
- A1702/DT5702



Testboard

For each of the available ASIC, Weeroc offers a testboard designed to test and characterize the chip. This tool is suited to easily evaluate the performances of the ASIC and, thanks to its features, allows a versatile use with real detectors.

Model Compare

	Maroc	Catiroc	Gemroc	Skiroc	Citiroc	Petiroc	Triroc	Radioroc NEW	Psiroc NEW	Liroc NEW	Temproc NEW
TRL	9	8	9	8	9	6	8	4	4	4	4
Package	TFBGA353	TQFP208*	PQFP160*	BGA400	PQFP160* TFBGA353	TQFP208* TFBGA353	TFBGA353	BGA516**	BGA516**	BGA516**	BGA516**
Detector Compatibility	- MA-PMT - PMT - SiPM - SiPM array	- MA-PMT - PMT	- micromegas - GEMs	- Si PIN diodes - Silicon strips	- SiPM - SiPM array	- SiPM - SiPM array	- SiPM - SiPM array	- SiPM - SiPM array	- PIN diode - Silicon strips - GEMs	- SiPM - SiPM array	- SiPM - SiPM array
Optimized readout	MA-PMT	PMT	GEMs	Si PIN diodes	SiPM	SiPM	SiPM	SiPM	PIN diode	SiPM	SiPM
Channel	64	16	64	64	32	32	64	64	64	64	64
Measurements and operations	- Free running trigger - External trigger - Charge (shaper) - Photon Counting - Time (trigger)	- Free running trigger - External trigger - Charge (shaper) - Time (TDC)	- Free running trigger - External trigger - Charge (shaper) - Data 3-level trigger	- Free running trigger - External trigger - Charge (shaper) - Time (TDC)	- Free running trigger - External trigger - Charge (shaper) - Time (trigger)	- Free running trigger - Charge (shaper) - Time (trigger) - Time (TDC)	- Free running trigger - Charge (shaper) - Time (TDC)	- Free running trigger - External trigger - Charge (shaper,ToT) - Time and Charge (trigger) - Photon Counting	- Free running trigger - External trigger - Charge (shaper,ToT) - Time (trigger)	- Free running trigger - Time (trigger) - Photon Counting - Charge (ToT)	- Free running trigger - Charge (shaper) - Time (trigger) - Time (TDC)
Outputs	- 64 Triggers - Trigger OR - 1 analog multiplexer (charge) - ADC (8/10/12-bit)	- 16 Triggers - 16 Shapers - Trigger OR - ADC (10-bit) - TDC (10-bit)	- 1 analog multiplexer (charge)	- 1 analog multiplexer (charge)	- 32 triggers - 1 analog multiplexer (charge)	- 32 triggers - Trigger OR - 1 analog multiplexer (charge) - 1 digital multiplexer (trigger) - ADC (10-bit) - TDC (10-bit)	- 1 analog multiplexer (charge) - 1 digital multiplexer (trigger) - ADC (10-bit) - TDC (10-bit)	- selectable per channel: • 1 LVDS trigger • 2 single ended triggers • 2 shaper outputs - 2 analog multiplexers (charge)	- selectable per channel: • 1 LVDS trigger • 2 single ended triggers • 2 shaper outputs - 2 analog multiplexers (charge)	64 LVDS trigger outputs	- Trigger OR - 1 analog multiplexer (charge) - 1 digital multiplexer (trigger) - ADC (10-bit) - TDC (50 ps)
Input Polarity	Negative	Negative	Negative	Positive	Positive	Negative (optimized) Positive	Negative (optimized) Positive	Positive	Both	Both	Positive
Applications Main features	- Energy meas. - SPE application - Photon counting rate < 30MHz - MA-PMT gain adj.	- Energy meas. - Time stamping - Low dead time - Zero suppress data	- Energy meas. - Time stamping - Data readout: 3-level trigger	- Energy meas. - Time stamping	- Energy meas. - Time of light - Photon Counting - Calibration input - SPE spectrum - Input DAC - SiPM HV adjust.	- Energy meas. - Time of light - Time stamping - Photon Counting - Input DAC - SiPM HV adjust.	- Energy meas. - Time of light - Time stamping - Zero suppress data - Input DAC - SiPM HV adjust.	- Energy meas. - Time of light - Photon Counting rate ~100MHz - Dual time thresholds - SPE spectrum - SiPM HV adjustment	- Energy meas.	- Time of light - Photon Counting rate ~300MHz - SPE spectrum - Energy meas. - SiPM HV adjustment	- Energy meas. - Time of light - Time stamping - Photon Counting - Input DAC - SiPM HV adjust.

*QFP packaging will be phased out and replaced with equivalent BGA packaging.

**BGA516 20x20mm2 – Pin-to-pin compatible

POWER SUPPLIES

DT5845P p. 8

Code	Description	Form Factor
WDT5485XPAAA	DT5485P - Digital Controlled Power Supply for SiPM +85V 10mA	Desktop
WDT5485PBXAA	DT5485PB - Digital Controlled Power Supply for SiPM +85V 10mA ,external power	Desktop
WA7585DUXAAA	A7585DU - USB Controlled Power Supply for SiPM +85V 10mA	
WA7585DXAAAA	A7585D - Digital Controlled Power Supply for Sipm +85V 10mA	

A7526 p. 9

Code	Description	Form Factor
WA7526NXAAAA	A7526N - -2.6 kV 500µA High Efficiency HV Power Supply Module	PCB Mount
WA7526PXAAAA	A7526P - +2.6 kV 500µA High Efficiency HV Power Supply Module	PCB Mount

A7526DB p. 9

Code	Description	Form Factor
WA7526DNBAAA	A7526DNB -2.6 kV 500µA Digital Interface HV Power Supply Module BOXED	Desktop
WA7526DPBAAA	A7526DPB +2.6 kV 500µA Digital Interface HV Power Supply Module BOXED	Desktop

A7512DB p. 9

Code	Description	Form Factor
WA7512DBNXAA	A7512DNB -12 kV 20µA HV Power Supply Module - BOXED	Desktop
WA7512DBPXAA	A7512DPB +12 kV 20µA HV Power Supply Module - BOXED	Desktop

A161X Family p. 12

Code	Description	Form Factor
WA1612XAAAAA	A1612 – Syx527 H.V. Channels 500V 1mA - individual Floating (16CH)	System
WA1619XAAAAA	A1619 – Syx527 H.V. Channels 250V 1mA - individual Floating (16CH)	System

A162X Family p. 13

Code	Description	Form Factor
WA1625MXAAAA	A1625M -SYx527 mixed polarity individual floathing 8 ch 1 kV/ 20 mA (20 W) board	System
WA1625NXAAAA	A1625N -SYx527 negative individual floathing 8 ch 1 kV/ 20 mA (20 W) board	System
WA1625PXAAAA	A1625P -SYx527 positive individual floathing 8 ch 1 kV/ 20 mA (20 W)	System
WA1626MXAAAA	A1626M - SYx527 mixed polaryty individual floating16ch 1 kV/10mA (10W) board	System
WA1626NXAAAA	A1626N - SYx527 negative individual floating 16ch 1 kV/10mA (10W) board	System
WA1626PXAAAA	A1626P - SYx527 positive individual floating 16ch 1 kV/10mA (10W) board	System

A1632H p. 14

Code	Description	Form Factor
WA1632HNAAAA	A1632HN - SYx527 negative H.V. -6 kV 100 µA - SHV Connector Individual floating (8 ch)	System
WA1632HPAAAA	A1632HP - SYx527 positive H.V. +6 kV 100 µA - SHV Connector Individual floating (8 ch)	System

A255x Family p. 15

Code	Description	Form Factor
WA2551AXAAAA	A2551A - individual floating 8 ch 8 V/12 A (60 W) board - DB37 conn.	Mainframes
WA2551XAAAAA	A2551 -individual floating 8 ch 8 V/12 A (60 W) board	Mainframes
WA2552AXAAAA	A2552A - individual floating 8 ch 16 V/6 A (60W) board - DB37 conn.	Mainframes
WA2552XAAAAA	A2552 - individual floating 8 ch 16 V/6 A (60W) board	Mainframes
WA2553AXAAAA	A2553A - individual floating 8 ch 32 V/3 A (60 W) board - DB37 conn.	Mainframes
WA2553XAAAAA	A2553 - individual floating 8 ch 32 V/3 A (60 W) board	Mainframes

R6060 p. 16

Code	Description
WR6060CXAAAA	R6060C - EASY 6000/3000 Branch Controller (up to 6 EASY crates controlled)

EASY BRIC p. 17

Code	Description
WEASY6000NSW	EASY BRIC - Water Cooled Box for EASY BRIC PowerSupply System - NSW version
WA1660XNSWAA	A1660 - EASY BRIC Branch Controller with RS-485NSW version
WE6001XNSWAA	EASY BRIC - 300Vdc to 12Vdc (8ch x 200W) Converter - No internal cooling

x8034H Family p. 18

Code	Description	Form Factor
WDT8034HXMAA	DT8034HM - 8CH Desktop Programmable HV Power Supply (4ch +6 kV 20 µA, 4ch -6 kV 20 µA) 50 pA res -SHV con	Desktop
WDT8034HXNAA	DT8034HN - 8CH Desktop Programmable HV Power Supply (-6 kV 20 µA) 50 pA res -SHV conn. - Common Gnd	Desktop
WDT8034HXPAA	DT8034HP - 8CH Desktop Programmable HV Power Supply (+6 kV 20 µA) 50 pA res -SHV conn. - Common Gnd	Desktop
WN8034HXMAAA	N8034HM - 8 Channel NIM Programmable High Voltage Power Supply (4ch -6 kV 20 µA, 4ch +6 kV 20 µA) 50 pA	NIM
WN8034HXNAAA	N8034HN - 8 Channel NIM Programmable High Voltage Power Supply (-6 kV 20 µA) 50 pA res.- SHV Common Gnd	NIM
WN8034HXPAAA	N8034HP - 8 Channel NIM Programmable High Voltage Power Supply (+6 kV 20 µA) 50 pA res.- SHV Common Gnd	NIM
WR8034HDXMAA	R8034HDM - 16CH Rack-mount Programmable HV P.S. (8ch-6 kV 20 µA,8ch +6 kV 20 µA) 50 pA res - SHV conn. -	Rack 19"
WR8034HDXNAA	R8034HDN - 16CH Rack-mount Programmable HV Power Supply (-6 kV 20 µA) 50 pA res - SHV conn. - Common Gnd	Rack 19"
WR8034HDXPAA	R8034HDP - 16CH Rack-mount Programmable HV Power Supply (+6 kV 20 µA) 50 pA res - SHV conn. - Common Gnd	Rack 19"
WR8034HXMAAA	R8034HM - 8CH Rack-mount Programmable HV P.S. (4ch -6 kV 20 µA,4ch +6 kV 20 µA) 50 pA res - SHV conn.	Rack 19"
WR8034HXNAAA	R8034HN - 8CH Rack-mount Programmable HV Power Supply (-6 kV 20 µA) 50 pA res - SHV conn. - Common Gnd	Rack 19"
WR8034HXPAAA	R8034HP - 8CH Rack-mount Programmable HV Power Supply (+6 kV 20 µA) 50 pA res - SHV conn. - Common Gnd	Rack 19"

V5425 p. 19

Code	Description
WV5425XAAAAA	V5425 - Quad VME Power Distributor

POWERED CRATES

µ-CRATE p. 19

Code	Description	Form Factor
WUCRATEX001A	VME64X micro crate	Desktop/ Rack 19"

ORDERING OPTION

DIGITIZERS 1.0

x720 Family p. 22

Code	Description	Form Factor
WDT5720BXAAA	DT5720B - 4 Ch. 12 bit 250 MS/s Digitizer: 1.25MS/ch, C20, SE	Desktop
WDT5720CXAAA	DT5720C - 2 Ch. 12 bit 250 MS/s Digitizer: 1.25MS/ch, C20, SE	Desktop
WDT5720DXAAA	DT5720D - 4 Ch. 12 bit 250 MS/s Digitizer: 10MS/ch, C20, SE	Desktop
WDT5720EXAAA	DT5720E - 2 Ch. 12 bit 250 MS/s Digitizer: 10MS/ch, C20, SE	Desktop
WV1720EXAAAA	V1720E - 8 Ch. 12 bit 250 MS/s Digitizer: 1.25MS/ch, C20, SE	6U-VME64
WV1720GXAAAA	V1720G - 8 Ch. 12 bit 250 MS/s Digitizer: 10MS/ch, C20, SE	6U-VME64
WVX1720EXAAA	VX1720E - 8 Ch. 12 bit 250 MS/s Digitizer: 1.25MS/ch, C20, SE	6U-VME64X
WVX1720GXAAA	VX1720G - 8 Ch. 12 bit 250 MS/s Digitizer: 10MS /ch, C20, SE	6U-VME64X
WFWDPPNGAA20	DPP-PSD - Digital Pulse Processing for Pulse Shape Discrimination (8ch x720)	6U-VME64 VME64X
WFWDPPNGAD20	DPP-PSD Digital Pulse Processing for Pulse Shape Discrimination (4/2ch x720)	Desktop NIM

x724 Family p. 22

Code	Description	Form Factor
WDT5724BXAAA	DT5724B - 4 Ch. 14 bit 100 MS/s Digitizer: 512kS/ch, C20, SE	Desktop
WDT5724CXAAA	DT5724C - 2 Ch. 14 bit 100 MS/s Digitizer: 512kS/ch, C20, SE	Desktop
WDT5724FXAAA	DT5724F - 4 Ch. 14 bit 100 MS/s Digitizer: 4MS/ch, C20, SE	Desktop
WDT5724GXAAA	DT5724G - 2 Ch. 14 bit 100 MS/s Digitizer: 4MS/ch, C20, SE	Desktop
WV1724EXAAAA	V1724E - 8 Ch. 14 bit 100 MS/s Digitizer: 4MS/ch, C20, SE	6U-VME64
WV1724GXAAAA	V1724G - 8 Ch. 14 bit 100 MS/s Digitizer: 512KS/ch, C20, SE	6U-VME64
WVX1724EXAAA	VX1724E - 8 Ch. 14 bit 100 MS/s Digitizer: 4MS/ch, C20, SE	6U-VME64X
WPERS0172401	724 Customization - 10Vpp Input Range, SE	ALL
WPERS0172402	724 Customization - 500mVpp Input Range, SE	ALL
WFWDPPTFAAAA	DPP-PHA - Digital Pulse Processing for Pulse Height Analysis (8ch x724)	6U-VME64 VME64X
WFWDPPDAWXEA	DPP-DAW - Digital Pulse Processing with Dynamic Acquisition Window (8ch x724)	6U-VME64 VME64X
WFWDPPTFAD24	DPP-PHA - Digital Pulse Processing for Pulse Height Analysis (4/2ch x724)	Desktop NIM
WFWDPPDAWXED	DPP-DAW - Digital Pulse Processing with Dynamic Acquisition Window (4/2ch x724)	Desktop NIM

x725 Family p. 22

Code	Description	Form Factor
WDT5725SXAAA	DT5725S - 8 Ch. 14 bit 250 MS/s Digitizer: 640kS/ch, CE30, SE	Desktop
WDT5725SBXAA	DT5725SB - 8 Ch. 14 bit 250 MS/s Digitizer: 5.12MS/ch, CE30, SE	Desktop
WN6725SXAAAA	N6725S - 8 Ch. 14 bit 500 MS/s Digitizer: 640kS/ch, CE30, SE	NIM
WN6725SBXAAA	N6725SB - 8 Ch. 14 bit 500 MS/s Digitizer: 5.12MS/ch, CE30, SE	NIM
WV1725SXAAAA	V1725S - 16 Ch. 14 bit 250 MS/s Digitizer: 640kS/ch, CE30, SE	6U-VME64
WV1725SBXAAA	V1725SB - 16 Ch. 14 bit 250 MS/s Digitizer: 5.12MS/ch, CE30, SE	6U-VME64
WV1725SCXAAA	V1725SC - 8 Ch. 14 bit 250 MS/s Digitizer: 640kS/ch, CE30, SE	6U-VME64
WV1725SDXAAA	V1725SD - 8 Ch. 14 bit 250 MS/s Digitizer: 5.12MS/ch, CE30, SE	6U-VME64
WVX1725SXAAA	VX1725S - 16 Ch. 14 bit 250 MS/s Digitizer: 640kS/ch, CE30, SE	6U-VME64X
WVX1725SBXAA	VX1725SB - 16 Ch. 14 bit 250 MS/s Digitizer: 5.12MSch, CE30, SE	6U-VME64X
WVX1725SCXAA	VX1725SC - 8 Ch. 14 bit 250 MS/s Digitizer: 640kS/c, CE30, SE	6U-VME64X

x725 Family - continuous p. 22

Code	Description	Form Factor
WVX1725SDXAA	VX1725SD - 8 Ch. 14 bit 250 MS/s Digitizer: 5.12MS/ch, CE30, SE	6U-VME64X
WFWDPPTFAA25	DPP-PHA - Digital Pulse Processing for Pulse Height Analysis (16 ch x725)	6U-VME64 VME64X
WFWDPPTFAD25	DPP-PHA - Digital Pulse Processing for Pulse Height Analysis for (8ch x 725)	ALL
WFWDPPNGAA25	DPP-PSD - Digital Pulse Processing for Pulse Shape Discrimination (16 ch x725)	6U-VME64 VME64X
WFWDPPNGAD25	DPP-PSD - Digital Pulse Processing for Pulse Shape Discrimination (8ch x725)	ALL
WFWDPPTWAA25	DPP-DAW - Digital Pulse Processing with Dynamic Acquisition Windows (16ch x725)	6U-VME64 VME64X
WFWDPPTWAD25	DPP-DAW - Digital Pulse Processing with Dynamic Acquisition Windows (8ch x725)	ALL
WFWDPPZLAA25	DPP-ZLEplus - Digital Pulse Processing Zero Length Encoding for (16ch x725)	6U-VME64 VME64X
WFWDPPZLAD25	DPP-ZLEplus - Digital Pulse Processing Zero Length Encoding for (8ch x725)	ALL
WFWDPPS2501A	DPP-SUP - Super License for 16ch x 725 Digital Pulse Processing	6U-VME64 VME64X
WFWDPPS2501D	DPP-SUP - Super License for 8ch x 725 Digital Pulse Processing	ALL

x730 Family p. 22

Code	Description	Form Factor
WDT5730SXAAA	DT5730S - 8 Ch. 14 bit 500 MS/s Digitizer: 640kS/ch, CE30, SE	Desktop
WDT5730SBXAA	DT5730SB - 8 Ch. 14 bit 500 MS/s Digitizer: 5.12MS/ch, CE30, SE	Desktop
WN6730SXAAAA	N6730S - 8 Ch. 14 bit 500 MS/s Digitizer: 640kS/ch, CE30, SE	NIM
WN6730SBXAAA	N6730SB - 8 Ch. 14 bit 500 MS/s Digitizer: 5.12MS/ch, CE30, SE	NIM
WV1730SXAAAA	V1730S - 16 Ch. 14 bit 500 MS/s Digitizer: 640kS/ch, CE30, SE	6U-VME64
WV1730SBXAAA	V1730SB - 16 Ch. 14 bit 500 MS/s Digitizer: 5.12MS/ch, CE30, SE	6U-VME64
WV1730SCXAAA	V1730SC - 8 Ch. 14 bit 500 MS/s Digitizer: 640kS/ch, CE30, SE	6U-VME64
WV1730SDXAAA	V1730SD - 8 Ch. 14 bit 500 MS/s Digitizer: 5.12MS/ch, CE30, SE	6U-VME64
WVX1730SXAAA	VX1730S - 16 Ch. 14 bit 500 MS/s Digitizer: 640kS/ch, CE30, SE	6U-VME64X
WVX1730SBXAA	VX1730SB - 16 Ch. 14 bit 500 MS/s Digitizer: 5.12MS/ch, CE30, SE	6U-VME64X
WVX1730SCXAA	VX1730SC - 8 Ch. 14 bit 500 MS/s Digitizer: 640kS/ch, CE30, SE	6U-VME64X
WVX1730SDXAA	VX1730SD - 8 Ch. 14 bit 500 MS/s Digitizer: 5.12MS/ch, CE30, SE	6U-VME64X
WFWDPPTFAA30	DPP-PHA - Digital Pulse Processing for Pulse Height Analysis (16 ch x730)	6U-VME64 VME64X
WFWDPPNGAA30	DPP-PSD - Digital Pulse Processing for Pulse Shape Discrimination (16ch x730)	6U-VME64 VME64X
WFWDPPTFAD30	DPP-PHA - Digital Pulse Processing for Pulse Height Analysis for (8ch x 730)	ALL
WFWDPPNGAD30	DPP-PSD - Digital Pulse Processing for Pulse Shape Discrimination (8ch x730)	ALL
WFWDPPDWAA30	DPP-DAW - Digital Pulse Processing with Dynamic Acquisition Windows (16ch x730)	6U-VME64 VME64X
WFWDPPDWAD30	DPP-DAW - Digital Pulse Processing with Dynamic Acquisition Windows (8ch x730)	ALL
WFWDPPZLAA30	DPP-ZLEplus - Digital Pulse Processing Zero Length Encoding for (16ch x730)	6U-VME64 VME64X
WFWDPPZLAD30	DPP-ZLEplus - Digital Pulse Processing Zero Length Encoding for (8ch x730)	ALL
WFWDPPS3001A	DPP-SUP - Super License for 16ch x 730 Digital Pulse Processing	6U-VME64 VME64X
WFWDPPS3001D	DPP-SUP - Super License for 8ch x 730 Digital Pulse Processing	ALL

x740 Family p. 22

Code	Description	Form Factor
WDT5740XAAAA	DT5740 - 32 Ch. 12 bit 62.5 MS/s Digitizer: 192kS/ch, EP3C16, SE	Desktop
WDT5740CXAAA	DT5740C - 10Vpp input 32 Ch. 12 bit 62.5MS/s Digitizer: 192kS/ch, EP3C16, SE	Desktop
WDT5740DXAAA	DT5740D - 32 Ch. 12 bit 62.5 MS/s Digitizer: 192kSch, EP3C40, SE	Desktop
WV1740XAAAAA	V1740 - 64 Ch. 12 bit 62.5 MS/s Digitizer: 192kS/ch, EP3C16, SE	6U-VME64
WV1740AXAAAA	V1740A - 10Vpp input 64ch 12bit 62.5MS/s Digitizer: 1.5 MS/ch, EP3C16, SE	6U-VME64
WV1740BXAAAA	V1740B - 64 Ch. 12 bit 62.5 MS/s Digitizer: 1.5 MS/ch, EP3C16, SE	6U-VME64
WV1740CXAAAA	V1740C - 10Vpp input 64ch 12bit 62.5MS/s Digitizer: 192kS/ch, EP3C16, SE	6U-VME64
WV1740DXAAAA	V1740D - 64 Ch. 12 bit 62.5 MS/s Digitizer: 192kS/ch, EP3C40, SE	6U-VME64
WVX1740XAAAA	VX1740 - 64 Ch. 12 bit 62.5 MS/s Digitizer: 192kS/ch, EP3C16, SE	6U-VME64X
WVX1740AXAAA	VX1740A - 10Vpp input 64 Ch. 12 bit 62.5 MS/s Digitizer: 1.5 MS/ch, EP3C16, SE	6U-VME64X
WVX1740BXAAA	VX1740B - 64 Ch. 12 bit 62.5 MS/s Digitizer: 1.5 MS/ch, EP3C16, SE	6U-VME64X
WVX1740CXAAA	VX1740C - 10Vpp input 64 Ch. 12 bit 62.5 MS/s Digitizer: 192 KS/ch, EP3C16, SE	6U-VME64X
WVX1740DXAAA	VX1740D - 64 Ch. 12 bit 62.5 MS/s Digitizer: 192kSch, EP3C40, SE	6U-VME64X
WFWDPPQDCAAA	DPP-QDC- Digital Pulse Processing for Time Stamped Digital QDC (64ch x740D)	6U-VME64 VME64X
WFWDPPQDCAAA	DPP-QDC - Digital Pulse Processing for Time Stamped Digital QDC (32ch x740D)	Desktop NIM
WFWDPPZLAA30	DPP-ZLEplus - Digital Pulse Processing Zero Length Encoding for (16ch x730)	6U-VME64 VME64X
WFWDPPZLAD30	DPP-ZLEplus - Digital Pulse Processing Zero Length Encoding for (8ch x730)	ALL
WFWDPPS3001A	DPP-SUP - Super License for 16ch x 730 Digital Pulse Processing	6U-VME64 VME64X
WFWDPPS3001D	DPP-SUP - Super License for 8ch x 730 Digital Pulse Processing	ALL

x751 Family p. 23

Code	Description	Form Factor
WDT5751XAAAA	DT5751 - 2/4 Ch. 10 bit 2/1 GS/s Digitizer: 3.6/1.8MS/ch, EP3C16, SE	Desktop
WV1751XAAAAA	V1751 - 4/8 Ch. 10 bit 2/1 GS/s Digitizer: 3.6/1.8MS/ch, EP3C16, SE	6U-VME64
WV1751CXAAAA	V1751C - 4/8 Ch. 10 bit 2/1 GS/s Digitizer: 28.8/14.4MS/ch, EP3C16, SE	6U-VME64
WVX1751XAAAA	VX1751 - 4/8 Ch. 10 bit 2/1 GS/s Digitizer: 3.6/1.8MS/ch, EP3C16, SE	6U-VME64X
WVX1751CXAAA	VX1751C - 4/8 Ch. 10 bit 2/1 GS/s Digitizer: 28.8/14.4MS/ch, EP3C16, SE	6U-VME64X
WPERS0175102	751 Customization - 200 mVpp Input Range, SE	ALL
WFWDPPNGAA51	DPP-PSD - Digital Pulse Processing for Pulse Shape Discrimination (8ch x751)	6U-VME64 VME64X
WFWDPPNGAD51	DPP-PSD - Digital Pulse Processing for Pulse Shape Discrimination (4ch x751)	Desktop NIM
WFWDPPZLAA51	DPP-ZLE - Digital Pulse Processing Zero Length Encoding for (8ch x751)	6U-VME64 VME64X
WFWDPPZLAD51	DPP-ZLE - Digital Pulse Processing Zero Length Encoding for (4ch x751)	Desktop NIM

X761 Family p. 23

Code	Description	Form Factor
WDT5761XAAAA	DT5761 - 1 Ch.10 bit 4 GS/s Digitizer: 7.2MS/ch, EP3C16, SE	Desktop
WV1761XAAAAA	V1761 - 2 Ch.10 bit 4 GS/s Digitizer: 7.2MS/ch, EP3C16, SE	6U-VME64
WV1761CXAAAA	V1761C - 2 Ch. 10 bit 4 GS/s Digitizer: 57.6MS/ch, EP3C16, SE	6U-VME64
WVX1761XAAAA	VX1761 - 2 Ch.10 bit 4 GS/s Digitizer: 7.2MS/ch, EP3C16, SE	6U-VME64X
WVX1761CXAAA	VX1761C - 2 Ch. 10 bit 4 GS/s Digitizer: 57.6MS/ch, EP3C16, SE	6U-VME64X

X742 Family p. 23

Code	Description	Form Factor
WDT5742XAAAA	DT5742 - 16+1 Ch. 12 bit 5 GS/s Switched-Capacitor Digitizer: 128 events/ch (1kS/event), EP3C16, SE	Desktop
WDT5742BXAAA	DT5742B - 16+1 Ch. 12 bit 5 GS/s Switched-Capacitor Digitizer: 1024 events/ch (1kS/event), EP3C16, SE	Desktop
WV1742XAAAAA	V1742 - 32+2 Ch. 12 bit 5 GS/s Switched-Capacitor Digitizer: 128 events/ch (1kS/event), EP3C16, SE	6U-VME64
WV1742BXAAAA	V1742B - 32+2 Ch. 12 bit 5 GS/s Switched-Capacitor Digitizer: 1024 events/ch (1kS/events), EP3C16, SE	6U-VME64
WVX1742XAAAA	VX1742 - 32+2 Ch. 12 bit 5 GS/s Switched-Capacitor Digitizer: 128 events/ch (1kS/event), EP3C16, SE	6U-VME64X
WVX1742BXAAA	VX1742B - 32+2 Ch. 12 bit 5GS/s Switched-Capacitor Digitizer: 1024 events/ch (1kS/event), EP3C16, SE	6U-VME64X
WPERS0174201	X742 Customization - 2 Vpp Input Range	ALL

X743 Family p. 23

Code	Description	Form Factor
WDT5743XAAAA	DT5743 - 8 Ch. 12 bit 3.2GS/s Switched-Capacitor Digitizer: 7 events/ch (1kS/event), EP3C16, SE	Desktop
WV1743XAAAAA	V1743 - 16 Ch. 12 bit 3.2GS/s Switched-Capacitor Digitizer: 7 events/ch (1kS/event), EP3C16, SE	6U-VME64
WVX1743XAAAA	VX1743 - 16 Ch. 12 bit 3.2GS/s Switched-Capacitor Digitizer: 7 events/ch (1kS/event), EP3C16, SE	6U-VME64X
WVX1761XAAAA	VX1761 - 2 Ch.10 bit 4 GS/s Digitizer: 7.2MS/ch, EP3C16, SE	6U-VME64X
WVX1761CXAAA	VX1761C - 2 Ch. 10 bit 4 GS/s Digitizer: 57.6MS/ch, EP3C16, SE	6U-VME64X

ORDERING OPTION

DIGITIZERS 2.0

x2740 - x2745 Families p. 26

Code	Description	Form Factor
WDT2740XAAAA	DT2740 - 64 Ch 16 bit 125MS/s Digitizer, Diff	Desktop
WDT2740BXAAA	DT2740B - 64 Ch. 16 bit 125 MS/s Digitizer, SE	Desktop
WDT2745BXAAA	DT2745B - 64 Ch. 16 bit 125 MS/s Digitize with Programmable Input Gain, SE	Desktop
WDT2745XAAAA	DT2745 - 64 Ch. 16 bit 125 MS/s Digitizer with Programmable Input Gain, Diff	Desktop
WV2740XAAAAA	V2740 - 64 Ch 16 bit 125MS/s Digitizer, Diff	VME64
WV2740BXAAAA	V2740B - 64 Ch. 16 bit 125 MS/s Digitizer, SE	VME64
WVX2740XAAAA	VX2740 - 64 Ch 16 bit 125MS/s Digitizer, Diff	VME64X
WVX2740BXAAA	VX2740B - 64 Ch. 16 bit 125 MS/s Digitizer, SE	VME64X
WV2745BXAAAA	V2745B - 64 Ch. 16 bit 125 MS/s Digitizer with Programmable Input Gain, SE	VME64
WV2745XAAAAA	V2745 - 64 Ch. 16 bit 125 MS/s Digitizer with Programmable Input Gain, Diff	VME64
WVX2745BXAAA	VX2745B - 64 Ch. 16 bit 125 MS/s Digitizer with Programmable Input Gain, SE	VME64X
WVX2745XAAAA	VX2745 - 64 Ch. 16 bit 125 MS/s Digitizer with Programmable Input Gain, Diff	VME64X
WA372FXAAAAA	A372F - 64 channel Adapter to 2.54mm Male Header Connector for Digitizer Series 2.0	-
WA372MXAAAAA	A372M - 64 channel Adapter to MCX Coax Connector for Digitizer Series 2.0	-

X2730 Family p. 28

Code	Description	Form Factor
WDT2730XAAAA	DT2730 - 32CH 14BIT 500MS/s Digitizer withProgrammable Input Gain	Desktop
WVX2730XAAAA	VX2730 - 32CH 14BIT 500MS/s Digitizer with Programmable Input Gain	VME64X

X5560 Family p. 29

Code	Description	Form Factor
WDT5560SEXAA	DT5560SE 32 Ch. 14 bit 125 MS/s Digitizer single-ended	Desktop
WR5560AXAAAA	R5560A 128 Ch. 14 bit 125 MS/s Digitizer-7030	Rack 19"
WR5560BXAAAA	R5560B 128 Ch. 14 bit 125 MS/s Digitizer-7035	Rack 19"
WR5560SEXAAA	R5560SE 128 Ch. 14 bit 125 MS/s Digitizer single-ended	Rack 19"
WR5560SEBXAA	R5560SEB 128 Ch. 14 bit 125 MS/s Digitizer single-ended	Rack 19"

Sci-Compiler p. 32

Code	Description
WSW555PROXAA	SW555 - Sci-Compiler PRO License
WSW55RUNTIME	SCI-Compiler Runtime license for Digitizers
WSW55RCSXAAA	1 year SCI-Compiler remote customization service + upgrade
WSW55RCSX5YA	5 years SCI-Compiler remote customization service + upgrade
WK5650XAAAAA	SP5650 - Open FPGA Kit

CONTROLLERS

V/VX3718 - V/VX4718 p. 36

Code	Description	Form Factor
WV3718XAAAAA	V3718 - VME-USB Bridge	VME64
WVX3718XAAAA	VX3718 - VME-USB Bridge	VME64X
WV4718XAAAAA	V4718 - VME64-USB 3.0, Ethernet and Optical Link Bridge	VME64
WVX4718XAAAA	VX4718 - VME64-USB 3.0, Ethernet and Optical Link Bridge	VME64X

A4818 p. 37

Code	Description	Form Factor
WA4818XAAAAA	A4818 - USB 3.0 to CONET Adapter	Desktop

A5818 p. 37

Code	Description	Form Factor
WA5818XAAAAA	A5818 - PCI Express CONET Controller - 4 Links	PCIexpress

LOGIC UNITS

x1081B p. 38

Code	Description	Form Factor
WN1081BXAAAA	N1081B - Four Fold Programmable Logic Unit	NIM
WDT1081BXAAA	DT1081B- Desktop Four-Fold Programmable Logic Unit	Desktop

FERS

A5202/DT5202+Adapters&Cables p. 40

Code	Description
WA5202XAAAAA	A5202 - 64 Channel Citiroc unit for FERS-5200
WDT5202XAAAA	DT5202 - Desktop 64 Channel Citiroc unit for FERS-5200
WA5250FHAXAA	A5250 - 2.54 mm pin header adapter for FERS-5200
WA5251FMAXAA	A5251 - MPPC header adapter for A5202/DT5202
WA5253F3AXAA	A5253 - 3-pin header adapter for FERS-5200
WKA5253X64AA	A5253 Kit - A5253 adapter and 64 SiPM remotization CABLES
WA5254FSAXAA	A5254 - SensL ArrayJ Adapter for A5202/DT5202
WA5260XAAAAA	A5260 - Remotization cable for FERS-5200 boards - 50 cm
WA5260BXAAAA	A5260B - Remotization cable for FERS-5200 boards - 100 cm
WA5261XAAAAA	A5261 - SiPM remotization cable (0.7 m) for A5253
WA5270FANXAA	A5270 - FERS cooling fan

A5203/DT5203+Adapters&Cables p. 41

Code	Description
WA5203XAAAAA	A5203 - 64 Channel pico-TDC unit for FERS-5200
WA5203BXAAAA	A5203B - 128 Channel pico-TDC unit for FERS-5200
WDT5203XAAAA	DT5203 - Desktop 64 Channel pico-TDC unit for FERS-5200
WA5255XAAAAA	A5255 - Quad 17x4 Header Adapter
WA5256XAAAAA	A5256 - 16+1 ch pos/neg Discriminator for A5203
WA5260XAAAAA	A5260 - Remotization cable for FERS-5200 boards - 50 cm
WA5260BXAAAA	A5260B - Remotization cable for FERS-5200 boards - 100 cm
WA5270FANXAA	A5270 - FERS cooling fan

A5204/DT5204 p. 42

Code	Description
WDT5204BXAAA	DT5204B – Desktop 64 channel Radioroc unit for FERS
WDT5204XAAAA	DT5204 – Desktop 64 channel Radioroc unit for FERS-5200 with picoTDC

DT5215 p. 43

Code	Description	Form Factor
WDT5215XAAAA	DT5215 - Collector Board for FERS-5200	Desktop

PREAMPLIFIERS

R1443 p. 45

Code	Description	Form Factor
WR1443XAAAAA	R1443A 32 channels Preamplifier unit for He3 tubes	Rack 19"
WR1443XBAAAA	R1443B 64 channels Preamplifier unit for He3 tubes	Rack 19"
WR1443XCAAAA	R1443C 32 channel Preamplifier unit for He3 tubes with independent HV	Rack 19"

A1421 p. 45

Code	Description
WA1421AHXAAA	A1421AH - Preamp. and discriminator for He3 Tubes for passive measurements (HN Det. In Conn.)
WA1421ASXAAA	A1421AS - Preamp. and discriminator for He3 Tubes for passive measurements (SHV Det. In Conn.)
WA1421BHXAAA	A1421BH - Preamp. and discriminator for He3 Tubes for active measurements (HN Det. In Conn.)
WA1421BSXAAA	A1421BS - Preamp. and discriminator for He3 Tubes for active measurements (SHV Det. In Conn.)

A1429 p. 46

Code	Description
WA1429X020AA	A1429x020 - 64 Ch. Charge Sensitive Preamplifier 20 mV/MeV
WA1429X045AA	A1429x045- 64 Ch. Charge Sensitive Preamplifier 45 mV/MeV
WA1429X090AA	A1429x090- 64 Ch. Charge Sensitive Preamplifier 90 mV/MeV
WA1429X200AA	A1429x200 - 64 Ch. Charge Sensitive Preamplifier 200 mV/MeV
WA1429X400AA	A1429x400- 64 Ch. Charge Sensitive Preamplifier 400 mV/MeV

A1442 p. 47

Code	Description
WA1442A020XA	A1442A020 - 16 Ch. Charge Sensitive Preamplifiers 20 mV/MeV
WA1442B020XA	A1442B020 - 32 Ch. Charge Sensitive Preamplifiers 20 mV/MeV

EDUCATIONAL (SAMPLES PRODUCTS)

SP5630ENP p. 49

Code	Description
WSP5630ENAAA	SP5630ENP - Environmental Kit Plus

SP5620CH p. 49

Code	Description
WK5620CHAAAA	SP5620CH - Cosmic Hunter

SP5622B p. 49

Code	Description
WSP5622BXAAA	SP5622B - Detection System Plus

SP5660 p. 50

Code	Description
WK5660XAAAAA	SP5660 – RockyRAD

SP5640 p. 51

Code	Description
WSP5640XAAAAA	SP5640 - GammaEDU

READOUT ELECTRONICS

NBrick p. 52

Code	Description
WKNBRICKXAAA	NBrick - 32-ch Neutron Position Sensing System

R7771 p. 53

Code	Description	Form Factor
WR7771XAAAAA	R7771 - 32 Channel Neutron Pulse Train Recorder	Rack 19"

R7780 p. 53

Code	Description	Form Factor
WR7780XXAAAA	R7780 - CAEN Shift Register Multiplicity and Time Recorder	Rack 19"

DT7790 p. 53

Code	Description	Form Factor
WDT7790XAAAA	DT7790 - Unattended Current Monitor Module (UCM1)	Desktop

ORDERING OPTION

DIGITAL SPECTROSCOPY

Hexagon p. 54

Code	Description	Form Factor
WDT5000XMAAA	DT5000M - HEXAGON Dual Dig. MCA - 1 HVPS +5 kV/30 µA, 1 HVPS -5 kV/30 µA, 2 LVPS ±12V/100mA, ±24V/50mA	Desktop
WDT5000XNAAA	DT5000N - HEXAGON Dual Dig. MCA - 2 HVPS -5 kV/30 µA, 2LVPS +/-12V/100mA, +/-24V/50mA	Desktop
WDT5000XPAAA	DT5000P - HEXAGON Dual Dig. MCA - 2 HVPS +5 kV/30 µA, 2LVPS +/-12V/100mA, +/-24V/50mA	Desktop
WDT5001XMAAA	DT5001M - HEXAGON-one Dig. MCA - 1 HVPS +5 kV/30 µA, 1 HVPS -5 kV/30 µA, 1 LVPS ±12V/100mA, ±24V/50mA	Desktop

Quantus p. 55

Code	Description
WSWGQUANX1AA	GQuantus 1ch general purpose Gamma Ray Quantitative Spectrometry software (1ch dongle)
WSWGQUANX2AA	GQuantus 2ch general purpose Gamma Ray Quantitative Spectrometry software (2ch dongle)
WSWGQPRFBXAA	Procedure option, File Browser option and File Batch Analysis option
WSWGQUSERMXA	User Management option
WSWGQAQCXAAA	QA/QC options (includes Procedure option)
WSWGQUANTALL	Quantus all AddOn options

i-Spector Family p. 56

Code	Description
WS25X0ASSBXA	Assembly kit and service for i-Spector OEM
WS2560EX0AAA	S2560E i-Spector 1" (24x24 mm) - OEM
WS2560FX0AAA	S2560F i-Spector 1.5" (30x30 mm) - OEM
WS2560TEX0AA	S2560TE i-Spector PLUS 1" (24x24 mm)- OEM
WS2560TFX0AA	S2560TF i-Spector PLUS 1.5" (30x30 mm)- OEM
WS2560EXAAAA	S2560E i-Spector 1" (24x24 mm) – CsI ASSEMBLY
WS2560FXAAAA	S2560F i-Spector 1.5" (30x30 mm) – CsI ASSEMBLY
WS2560TEXAAA	S2560TE i-Spector PLUS 1" (24x24 mm) – CsI ASSEMBLY
WS2560TFXAAA	S2560TF i-Spector PLUS 1.5" (30x30 mm) – CsI ASSEMBLY
WS2570EX0AAA	S2570E i-Spector Digital 1" (24x24 mm) - OEM
WS2570FX0AAA	S2570F i-Spector Digital 1.5" (30x30 mm) - OEM
WS2570EXAAAA	S2570E i-Spector Digital 1" (24x24 mm) - CsI ASSEMBLY
WS2570FXAAAA	S2570F i-Spector Digital 1.5" (30x30 mm) - CsI ASSEMBLY
WS2590CXAAAA	S2590C i-Spector PSD 24x24mm - ASSEMBLY

WEEROC

Weeroc p. 58

Code	Description
WWMAROC3ABAA	MAROC 3A - Photomultiplier tubes read out chip - BGA (Ball Grid Array)
WWCATIROC1QA	CATIROC 1 - Large photomultiplier arrays read out chip - QFP (Quad Flat Pack)
WWCITIROC1AB	CITIROC 1A - Scientific instrumentation SiPM read out chip - BGA (Ball Grid Array)
WWCITIROC1AQ	CITIROC 1A - Scientific instrumentation SiPM read out chip - QFP (Quad Flat Pack)
WWPETIROC2AB	PETIROC 2A - SiPM read out for time of flight PET - BGA (Ball Grid Array)
WWPETIROC2AQ	PETIROC 2A - SiPM read out for time of flight PET- QFP (Quad Flat Pack)
WWTRIROC1ABA	TRIROC 1A - All in one SiPM read out for multimodal PET inserts - BGA (Ball Grid Array)
WWSKIROC2ABA	SKIROC 2A - PIN diode and low gain silicium detector read out - BGA (Ball Grid Array)
WWGEMROC1QAA	GEMROC 1 - Micromegas and GEMs semi digital read out chip - QFP (Quad Flat Pack)
WWLIROC1BAAA	LIROC 1 SiPM Analogue Read-out Chip for Lidar and Photon Counting Application
WWRADIO2BAAA	RADIOROC 2 Dual Read-Out(Photon Counting & Charge Integration) Multi-Purpose SiPM Analogue Chip
WWPSIROC1BAA	PSIROC 1 - PIN Diodes, Silicon Strips amnd GEMs Read-Out Chip
WWTBCATIROC1	Testboard for CATIROC 1 QFP chip
WWTBCITIROC1	Testboard for CITIROC 1A BGA chip
WWTBGEMROC1A	Testboard for GEMROC 1 QFP chip
WWTBMAROC3AA	Testboard for MAROC 3A BGA chip
WWTBPETIROC2	Testboard for PETIROC 2A BGA chip
WWTBTRIROC1A	Testboard for TRIROC 1A BGA chip
WWTBSKIROC2A	Testboard for SKIROC 2A BGA chip
WWTBLIROC1BA	Testboard for LIROC 1 BGA chip
WWTBRADIO2BA	Testboard for RADIOROC 2 BGA chip
WWTBPSIROC1B	Testboard for PSIROC 1 BGA chip

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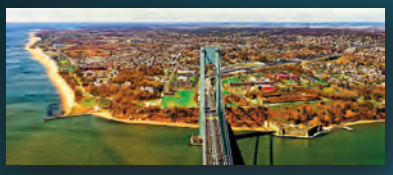

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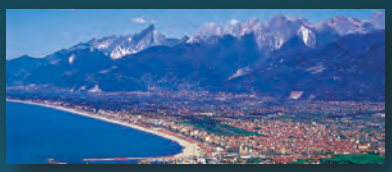

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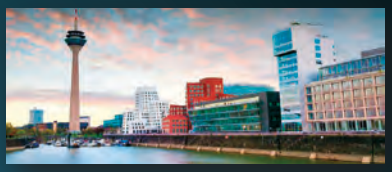

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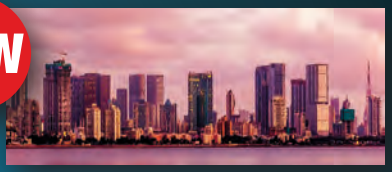

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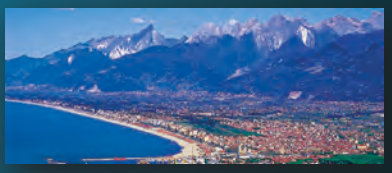

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