CAEN
Small details Great differences

REDEAGLE

Digital Multi-Channel Analyzer

with Quantus Gamma-Ray Quantitative Spectroscopy Software

WEB INTERFACE

USB 2.0

100 Mb

Highlights

Function

32k Digital MCA & Pulse Processor available in dual and single input versions

Applications

- Nuclear Physics Research
- Homeland Security
- Environmental (Real-Time) Monitoring
- Non-Destructive Analysis
- Nuclear Safety & Safeguards
- Labs and Educational
- Low background measurements through active shielding and inter-input coincidence logic

Operability

Ideally suited for high resolution spectroscopy applications using HPGe, CZT, Silicon and scintillation detectors such as NaI and $LaBr_3$

Supports:

- Resistive Feedback preamplifiers
- Transistor Reset preamplifiers
- PMT anode signals

User-selectable DC or AC coupling (includes three software-selectable time constants for acquisition rate matching)

Multiple operating modes:

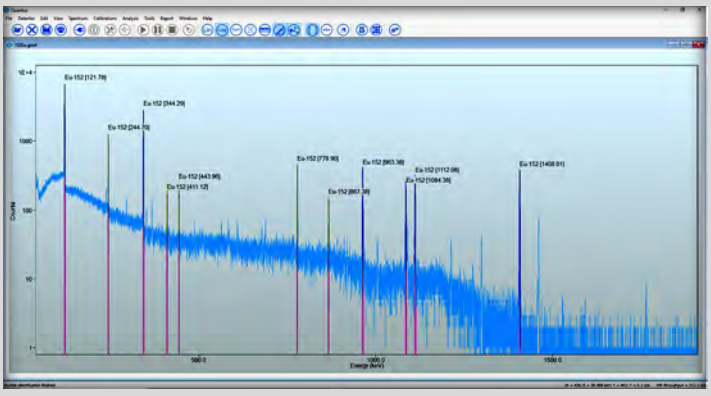
- Pulse Height Analysis (PHA)
- PHA advanced modes:
  - Multispectral Scaling (MSS)
  - Coincidence/Anti-Coincidence
- Time-stamped Lists
- Multichannel Scaling (MCS)

Features

- Digital I/Os (e.g. PHA Start/Stop, SCA, ICR, MCS Start/Stop, MCS Advance and Sweep)
- Dedicated BNC connector for TRP inhibit or ADC gate on each input
- Two triple-range hardware protected HVPS channels controlled by software to match bias to specific detector types (PTMs, HPGe, Silicon)
- Two DB9 connectors provide ±12 V and ±24 V to power preamplifiers as well as a dedicated input for Detector Temperature feedback
- Digital and analog signal (filters and waveforms) inspector for fast setup and multi-trace monitoring
- Auto-set trapezoid tail correction, baseline restore, pile-up rejection, and live time correction capabilities
- Fast system building and multi-board synchronization by SATA connectors
- Front panel OLED Display for diagnostics and statistics
- On-board SSD memory supports List and Spectrum data storage capability (up to 200,000+ spectra)
- On-board user-accessible ARM processor running Linux® OS enables user to develop custom routines and supports 100% unattended operations

Communication

- 10/100T Ethernet and USB 2.0 readout interfaces



Software

- Fully supported by Quantus software for Gamma-Ray spectrum analysis and radionuclide identification and quantification
- Open Source Software Development Kit (SDK) provided as LGPL-licensed C library (Windows®, Linux®) for both host PC environment and RedEagle embedded Linux environment
- Web Interface for quick retrieval of board details, firmware upgrading, and output data file browsing
- Compatible with MC²Analyzer (MC2A) multi-board and data acquisition software with basic spectrum analysis features

Overview

RedEagle is a high precision 32k MCA available in single and dual input channel versions. This compact, high performance desktop MCA includes features such as an input stage for signal conditioning, a fast analog-to-digital converter (ADC), digital signal processing algorithms, High Voltage and Preamplifier outputs for detector bias and preamp power. RedEagle is ideally suited for applications using high energy resolution semiconductor detectors such as HPGe, Silicon, CZT as well as scintillation detectors such as NaI and $LaBr_3$. It can manage both positive and negative signals from resistive feedback or transistor reset preamplifier detectors as well as signals coming from PMT anodes.

Operating Modes

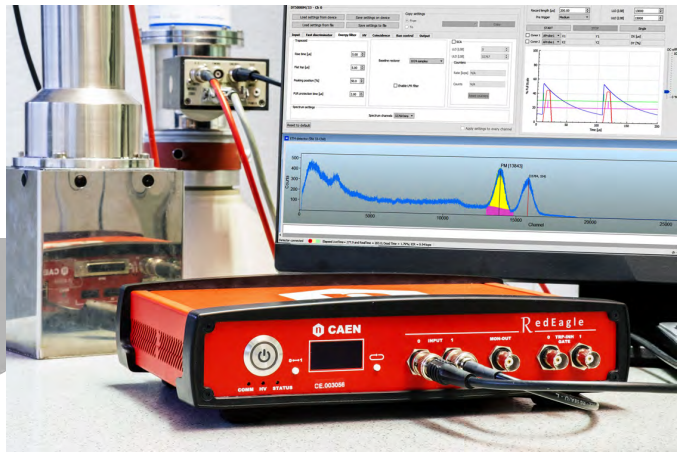
RedEagle can be configured to operate in Pulse Height Analysis (PHA) acquisition mode, in Multichannel Scaling (MCS) acquisition mode, or in both PHA and MCS modes simultaneously. Multiple PHA spectra can be collected using Multispectral Scaling (MSS) mode with no data loss when switching to a new spectrum. The Time-Stamped List mode permits time and energy events to be saved either to on-board memory or to the host PC for offline analysis and post-processing. Analog input signals and internal digital filter outputs can be inspected via the Signal Inspector mode. Additionally, Compton/AntiCompton data acquisition is supported by taking advantage of the 2-input version.

I/O Equipment and Additional Features

RedEagle is equipped with I/O connectors which support several features beyond the standard MCA functionality. A DB25 I/O connector supports PHA Start/Stop, SCA, MCS, Coincidence/Anticoincidence, Acquisition Start/Stop, ICR, Run Status, Sample Changer, and Sample Ready signals. The BNC connectors are reserved for Transistor Reset Preamp (TRP) inhibit, where the inhibit takes place on an external digital signal and can be extended in time via programming. Two SATA connectors allow for very precise multi-board synchronization, time stamp alignment, and system building via a simple daisy chain. Front Panel LED indicators inform the user as to board and I/O status, polarity of the power supply, and multi-board sync status. An OLED display provides general board information, real-time statistics on ICR, OCR, Real/Live/Dead Time, as well as details on the HVPS channel output.

HV and LV Power Supply

RedEagle can provide HV bias for up to two detectors. Three ranges of bias voltage and current, which are software configurable on a per-channel basis and hardware protected, allow the user to tailor the output V/I to specific detector types such as PMT (2 kV / 1 mA), HPGe (5 kV / 30 µA), and Silicon (500 V / 50 µA). The 2-input channel version of RedEagle allows the user to select the polarity configuration upon ordering: Positive-Positive, Negative-Negative, or Mixed. The 1-input channel version of RedEagle is provided with an HVPS configuration which includes 1-channel Positive Polarity and 1-channel Negative Polarity. HV inhibit is supported with both positive and negative polarity. RedEagle also integrates low voltage outputs (±12 V / 100 mA and ±24 V / 50 mA) to power preamplifiers. Detector Temperature and Nitrogen Levels may be monitored via external sensor interface.



Connectivity

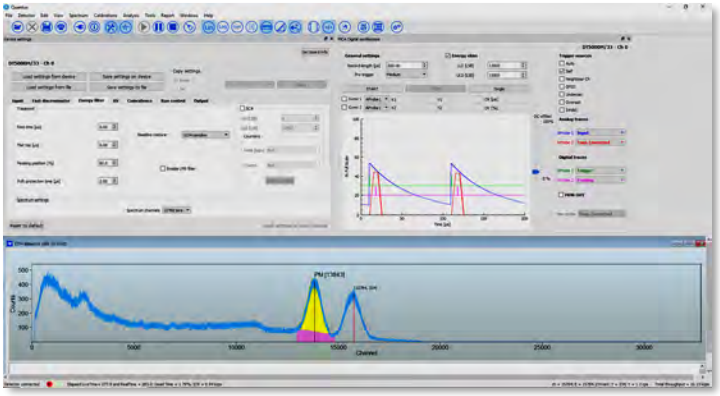
RedEagle can be controlled with a point-to-point direct connection through the USB 2.0 link and with a remote network connection by the Ethernet 10/100T port. The module also features a web interface that supports basic operations (sans spectroscopy software) by simply opening a web browser. The web interface is a quick and useful tool for finding basic board information (e.g. model type, serial number, firmware version, CPU load averages, real memory occupancy), for retrieving files saved on the on-board memory, for setting operational functions for each run (e.g. order, cut, copy/paste files, create and delete directories, user rights, etc.), and for managing network settings and upgrading firmware.

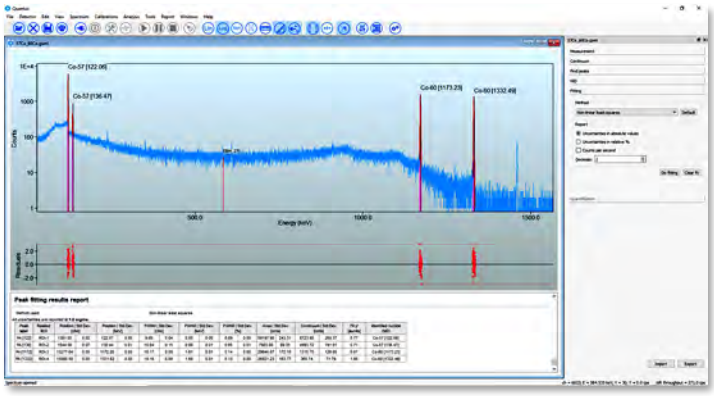
Quantus Analysis Software

RedEagle is supported by Quantus, a general purpose, comprehensive and extensive software package for gamma-ray spectrum analysis and radionuclide identification and quantification. Quantus is powerful and flexible enough to analyze any recorded gamma-ray spectrum independently of the detector, geometry or sample used. An advanced Graphical User Interface (GUI) incorporates tools for a wide range of analytical functions for performing the detailed analysis of complex gamma-ray spectra and the corresponding radionuclide quantification from the given sample. Quantus is a multi-document software making possible to analyze multiple spectra at the same time and/or acquire data from multiple connected detectors. Quantus software runs seamlessly on MS Windows® and Linux®.

Main Features

- Connects and controls the hardware for a correct data acquisition via detector-MCA setups
- Operable on Windows® and Linux® OS
- Manages and visualizes the data acquisition
- Import spectra from other file-formats
- Performs automatic peak search and peak class identification (singlets, multiplets)
- Provides peaks continuum subtraction
- Supports Region of interest (ROI) calculations with automatic and/or manual marking
- Performs ROI analysis
- Includes easy to perform energy, shape and efficiency calibrations for the gamma spectra
- Fits experimental data to mathematical models, including background subtraction, peak interference correction
- Supports Bayesian fitting and enhanced uncertainties estimation through covariance analysis
- Compliant with ISO11929 standard for MDA calculation
- Performs nuclide identification with separation from possible spectrum artefacts and structures
- Calculates radionuclide activity
- Supports advanced HTML reporting

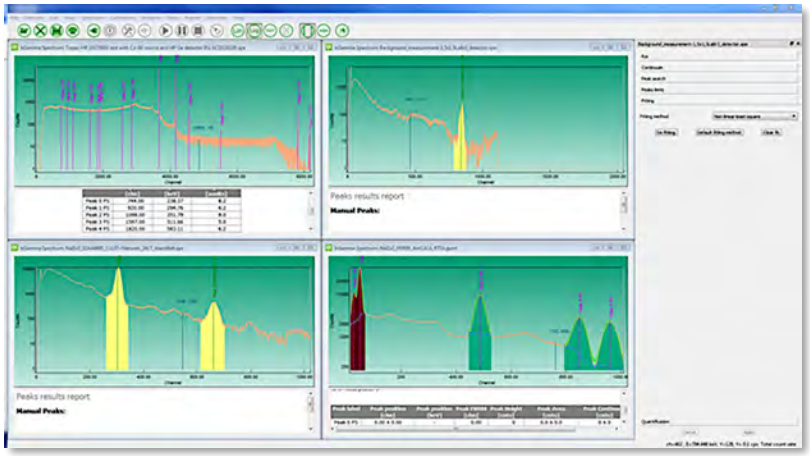




Quantus contains a powerful collection of calculation engines necessary for accurate gamma-ray spectrum analysis of any kind:

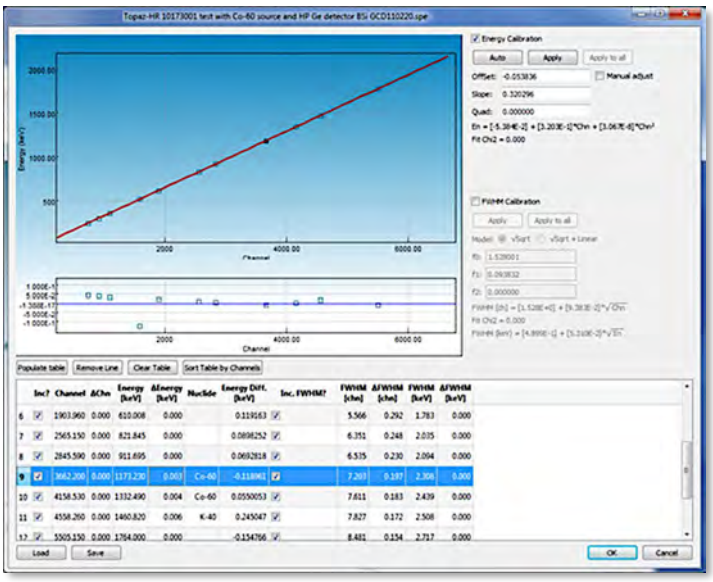
- ROI computations
- Continuum calculation methods
- Peak search engines
- Peak qualification methods and automatic ROI location
- Peak fitting algorithms
- Energy calibration methods
- FWHM calibration methods
- Efficiency calibration methods
- Nuclide identification techniques
- Activity calculation algorithms

Quantus offers all the necessary tools and functionalities to make any calibration in gamma-ray. The energy and shape (FWHM) calibrations are unified into one dialog. They contain a lot of hidden "know-how" for suggesting lines to be used for



calibrations according to the type of the spectrum and detector.

A powerful GUI provides visual feedback to the calibration results. Efficiency calibration uses a versatile fitting engine to derive the calibration coefficients in a polynomial function of the energy logarithm. The calibration dialog also provides a simple but still comprehensive GUI for immediate and visual feedback



of obtained efficiency calibration results.
Quantus incorporates the entire radionuclide decay emissions database. All nuclide data is available to any instance of the spectrum analysis and/or data visualization. The nuclide decay data is taken from the internationally well-known data file NuDat, which is produced, certified and maintained by the international Nuclear Data Committee.

Graphical User Interface

- Visual distinction and marking of ROIs and peaks in the spectrum; multiple peak labelling implementation
- Advanced graphical user interface (GUI) that can be set to user's preferences
- Advanced spectrum cursor showing satellite or spectrum artefacts
- Multi-document design with full data synchronization

Format Support

- Great traceability, saving all information into XML-formatted files (*.gxml)
- Import spectrum from other formats such as Ortec (*.chn) and Canberra (*.cnf) files
- Customizable analysis reports, including fully colored and HTML-formatted tables

Nuclide Quantification

- Quantification via different methods
- Provision of full radionuclide library based on internationally well-know and maintained "NuDat" nuclear data files

Requirements

Quantus is a multiplatform software and runs on the following OS:

- Microsoft Windows 10™ or later
- Linux®

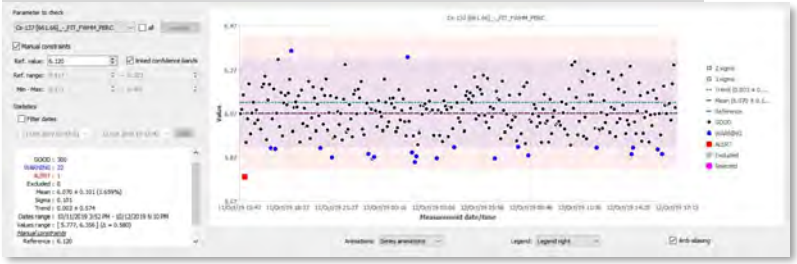
Quantus needs license key to unlock the software features:

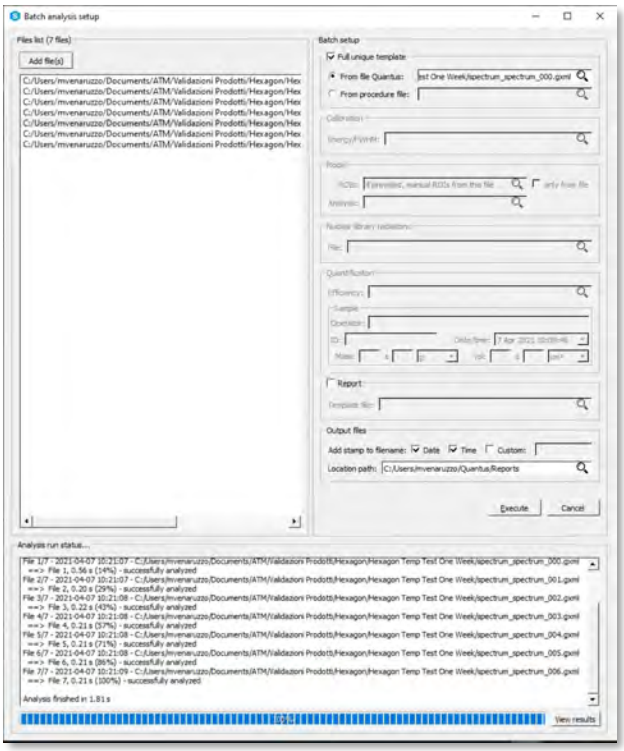
Add-on Quantus options

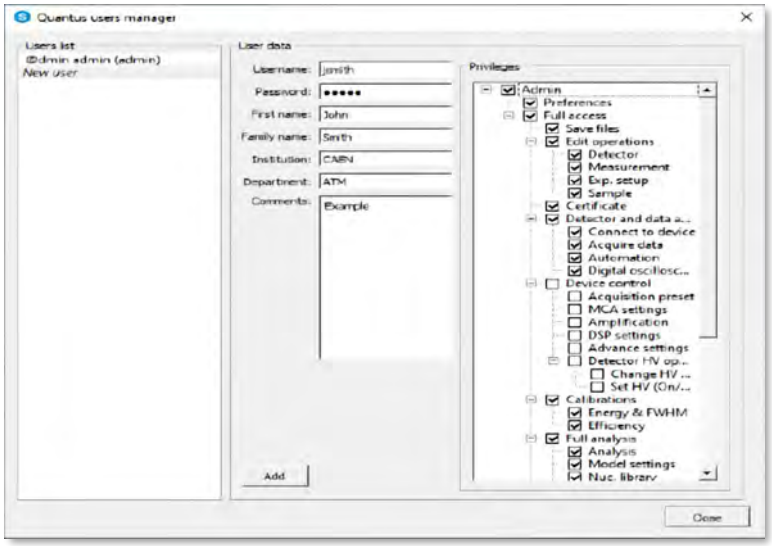
The premium features of Quantus software include the Procedures, File Browser and File Batch Analysis option, User Management option and QA/QC option, each offering advanced capabilities to enhance data analysis and management.

Procedures, File Browser and File Batch Analysis options

- Procedures Option: Offers automatic ROI analysis, peak search, automatic markings, reporting, and data management tools for tailored data analysis.
- File Browser Option: Enables efficient data extraction, exporting, and analysis with plotting and statistical tools, enhancing data interaction.
- File Batch Analysis Option: Allows for simultaneous analysis of multiple files, increasing efficiency for large datasets.





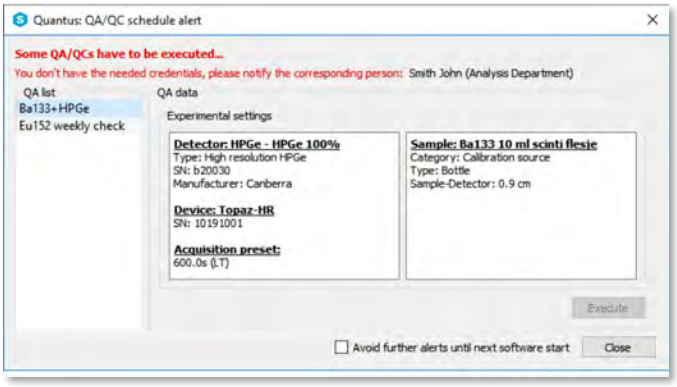


User Management option

- Multi-User Option Enablement: This feature allows administrators to activate the multi-user mode, enabling multiple individuals to access and use the software with distinct profiles.
- User Setup: Administrators can set up and manage user accounts within Quantus, ensuring each user has appropriate access levels and capabilities.
- Operational Logbook Review: This tool allows for the review and monitoring of user activities within the software, ensuring accountability and traceability of actions performed by different users.

QA/QC option

- Creating QA Tasks: Users can create specific Quality Assurance tasks, with the ability to define detailed experimental settings for each task. This feature allows for precise and customized quality checks tailored to specific requirements or standards.
- Managing QA Tasks: The software provides options to easily delete or modify existing QA tasks, ensuring flexibility and adaptability in quality management.
- Executing and Scheduling QA Tasks: Users can execute QA tasks as needed and also have the option to schedule these tasks. This scheduling feature ensures regular and automated quality checks, maintaining high standards of data integrity and reliability over time.



Technical Specifications

Performance

Signal Processing	
Throughput	tested up to 200 kcps
Integral Non-Linearity (INL)	0.05% over the 99% of the full-scale range for Coarse Gain < 8; 0.1% for higher gains
Differential Non-Linearity (DNL)	< ±1% over the 99% of the full-scale range
Dynamics	down to 4 keV @ 3 MeV FSR (noise peak at the same height of Compton); measured with 7229P HPGe Canberra detector
Pile-up Rejection and Live Time Correction	
Pulse Pair Resolution:	*< 0.5 µs typical (depending on the fast discriminator shaping time)*
Dead-Time Correction	error < 5% on the net area of a static reference source offended by a variable rate source ranging from 1 to 100 Kcps (at fixed Live Time Preset)
Resolution	best result is 0.61 keV @ 122 keV, 1.63 keV @ 1332 keV, measured with Cryo-Pulse 5 Plus Electrically Refrigerated Cryostat HPGe Canberra detector, equipped with iPa Preamp

On-board CPU and Logging

CPU
1 ARM Cortex-A8 1 GHz (SDRAM Memory 512 MB DDR3L 800 MHz) running Linux Debian system
The embedded CPU is accessible for compiling customized routines and implementing unattended and automated operations by the provided SDK; 2 GB of space available for user installations
SSD Memory
32-GB microSD card, non-detachable; logging capability more than 200.000 spectra

Inputs

INPUT (front panel)	
Analog signal input connector; one unit in RedEagle single-input version;	BNC type
Accepts positive or negative signals from PMT anode or both Resistive Feedback and Transistor Reset detector preamplifier; 1 kΩ input impedance	
AC or DC coupling selectable by register with 5 µs, 11 µs or 33 µs AC time constant options; input range is 1 V_{pp} divided by the selected gain, 4 V_{pp} with x0.25 or 2 V_{pp} with x0.5 attenuation activated	
HV INH (rear panel)	
High voltage inhibit connector; two units;	BNC type
Inhibit function is duplicated on the rear PREAMP connector;	DB9 type

Polarity of the HV INH signal is software selectable

Positive polarity (default):
the enable condition (cold detector) is an open circuit or high level, which means +2 V to + 24 V; inhibit condition (warm detector) is ground or low level, that is -24 V to -2 V

Negative polarity:
the enable condition (cold detector) is ground or low level, which means -24 V to -2 V; inhibit condition (warm detector) is an open circuit or high level, that is +2 V to + 24 V

TRP INH / GATE (front panel)
Transistor Reset Preamp/Gate Input connector; two units; BNC type; software selectable compatible logic (TTL / NIM) and function

TRP-INH:
Transistor Reset Preamplifier Inhibit; the inhibit time value is determined by the longer of two conditions: either by the duration of the external signal or by the duration of an internal inhibit timer (maximum value is programmable up to 160 ms); signal processing is halted during the inhibit time

GATE:
Input signal acts as gate for coincidence/anticoincidence acquisition mode; event storage can be allowed/vetoed for the duration of the gate signal or for a programmable fixed time; programmable time ranges from 0.01 µs to 160 ms

DC POWER IN (rear panel)	
12V DC power jack; mechanically lockable for a safe connection;	Imax: 2.5 A
AC Adaptor (12 V, 3.75 A) included in the kit	

Outputs

HV (rear panel)			
Detector High Voltage power supply output connector; two units;		SHV type	
Software selectable Voltage/Current output range options:			
20 V to 2000 V @ 1 mA *suited for PMTs*	*20 V to 5000 V @ 30 µA* *suited for HPGe detectors*	*20 V to 500 V @ 50 µA* *suited for Silicon detectors*	*Ripple < 5 mVpp*
Voltage / Current range may be configured in the software on a per-channel basis, so that the user can simultaneously bias identical or separate detector types (PMT, HPGE, Silicon) with a single RedEagle module			
HVPS Polarity Output is selectable upon ordering (Positive-Positive, Positive-Negative, Negative-Negative); the single-input version of RedEagle includes Mixed (Positive-Negative) HVPS output			
Front Panel Polarity LED identifies positive or negative output for each channel by colour			
Preamp (rear panel)			
Preamplifier power supply output connector; two units;		DB9 type	
Two power rails:	±12 V (± 2%) @ 100 mA	±24 V (± 2%) @ 50 mA	
Ripple < 5 mVpp			
Includes pins for 0 ÷ +10 Vdc level output, for detector temperature (PT100/PT1000 compliant) or Nitrogen level sensor readout, and for HVPS external inhibit input (in OR with HV INH connector; BNC type)			
MON-OUT (front panel)			
Analog output;		BNC type	
Provides a selection (software selectable) of internal analog probes: *- A copy of the input signal (4 V_{pp} FSR)* *- The Trapezoid* *- The Trapezoid-Baseline* *- The Fast Trigger*			

General Purpose I/Os

GPIO (rear panel)	
Connector for TTL I/Os; one unit;	DB25 type (adapter to BNC available on request)

Inputs (LVTTL, Z_{in} 1 kΩ)

Trigger Timestamp Reset:
External reset of the timestamp counter; minimum pulse width 15 ns; software programmable polarity

Acquisition Start/Stop:
External Acquisition Start/Stop signal; minimum pulse width 15 ns; software programmable polarity; software programmable as edge sensitive (starts on first pulse and stops on second pulse) or level sensitive (starts on active signal and stops on inactive signal)

External Trigger:
External Trigger signal; minimum pulse width 15 ns; software programmable polarity; can be either a trigger for the channel or a trigger validation in case of acquisition in Coincidence mode

MCS Channel Advance:
External Multichannel Scaler Channel Advance signal; minimum pulse width 15 ns; software programmable polarity; MCS channel advances upon external pulse

MCS Sweep Advance:
External Multichannel Scaler Sweep Advance signal; minimum pulse width 15 ns; software programmable polarity; the sweep currently in progress can be reset by external pulse

GATE/Inhibit :
External Gate/Inhibit signal; minimum pulse width 15ns, software programmable polarity

Sample Ready:
Sample Ready signal; minimum pulse width 15 ns; software programmable polarity; acquisition begins on an inactive signal, while an active signal delays the start of acquisition

Outputs (LVTTL, do not require 50 Ω termination)

ICR:
Incoming Count Rate; generates a positive pulse 150 ns wide at each event acquisition

SCA:
Single Channel Analyzer; output pulse width 150 ns; software programmable polarity; a pulse is generated for each event whose energy stays between the Upper and Lower Level Discriminators (ULD, LLD)

Sample Changer:
Sample Changer signal; pulse width 140 ms; software programmable polarity; a pulse is generated for each sample advance command received by the instrument

LED Indicators

Front Panel LEDs
COMM: communication LED; colour green; active during data exchange on the internal local bus; continuous off means board fail
STATUS: Status LED; bi-colour red/green *Continuous green:* *the board is ready to start* — *Blinking green:* *the board is in RUN state* — *Continuous red:* *the board is in BUSY* state
HV: HVPS LED; red colour; turns on in event of an HV fail condition
INPUT: Trigger LED; colour green; turns on when a trigger is generated on the associated analog input channel
TRP-INH/GATE: Transistor Reset Preamplifier inhibit LED; colour green; turns on when the inhibit is active on the associated TRP input channel
Rear Panel LEDs
INH: HVPS channel inhibit LED; colour red; turns on when inhibit is active
OVC: HVPS channel over-current LED; colour red; turns on if the channel tries to draw more current than the programmed limit
ON: HVPS channel enable LED; colour red; turns on when the HVPS channel is active
POS: HVPS positive polarity LED; colour green; turns on in case of positive HVPS channel
NEG: HVPS negative polarity LED; colour yellow; turns on in case of negative HVPS channel
SYNC: Synchronization LED; colour green; turns on when the clock of the board is locked with the clock signal on SYNC IN

Acquisition Modes *(All settings are saved while the module is in power-off state; last configuration is automatically reloaded at power-on)*

Signal Inspection
The analog input and the outputs of the digital filters can be inspected and plotted to optimize the algorithm parameters to attain the best possible spectrum
PHA
By way of setting the programmable digital pulse processing parameters, the board will develop energy histograms that may be plotted and saved to file; spectrum can be binned at a configurable number of channels by the Conversion Gain control
PHA includes advanced modes for spectra management *MSS:* *Multispectral Scaling collects multiple PHA spectra; supports software or external TTL input Spectrum Advance command; not affected by dead-time while switching to a new spectrum* *Coincidence/Anticoincidence:* *configurable either for coincidence and anticoincidence between the board analog inputs (IN 0 and IN 1), or for external coincidence (GATE) and external anticoincidence (INH)*
Time-Stamped List
Raw energy and time tag data are provided and can be saved to file; 62-bit time tag counter; resolution of 10 ns; roll-over tracking event
MCS
Multichannel Scaler mode; counts on fast discriminator, SCA or external inputs; the Start/Stop, the Channel Advance and the Sweep Advance can be on software command or on external signal (GPIO connector)
Unattended
Local storage of lists and spectra on the internal microSD memory without need of external PC control

Controls

GAIN
Through a combination of coarse and fine gain, the overall gain can be continuously adjusted from x0.8 up to x563.2 with respect to the 1 V_{pp} input range. *Coarse Gain: x1, x2, x4, x8, x16, x32, x64, x128, x256* — *Fine Gain: from x0.8 up to x2.2 in steps of 0.001*
By selecting the gain attenuation, the input range can be extended to 2 V_{pp} or 4 V_{pp} preventing saturation conditions, particularly for preamp signals with large DC offsets or transistor reset preamplifiers with a large output ramp dynamic range *Gain Attenuation: x0.25, x0.5*
Configuring the conversion gain defines the number of channels for the acquired spectrum *Conversion Gain: 256, 512, 1024, 2048, 4096, 8192, 16384, 32768 channels*

Controls (continued)

DC Offset

The DC offset of the analog input is adjustable in the whole input range

Algorithm

Input Signal

Pulse Polarity: NEGATIVE or POSITIVE input polarity selection

Trapezoid Filter: serves for energy calculation; Trapezoid, Trapezoid-Baseline and Peaking signals can be displayed in Signal Inspection mode

Rise Time:
trapezoid rise time corresponds to the shaping time of the traditional analog chain; configurable values between 0.02 µs and 37 µs

Flat Top:
the flat region of the trapezoid, in which the energy is calculated; configurable values between 0.02 µs and 3 µs

Peak Delay:
adjusts the point of the flat top where the energy value is calculated; the peaking (peak position) signal can be displayed in Signal Inspection mode; configurable values between 0% and 100%

PUR Protection Time:
starts at the end of the flat top; plays a role in the pile-up rejection; configurable values between 0 µs and 81.84 µs

Trapezoid tail correction: exponential decay time fine adjustment to avoid trapezoid overshoot or undershoot for a correct evaluation of the energy value

Decay Time:
manually and automatically configurable between 0.1 µs and 650 µs

Baseline Restorer: operates on the trapezoidal filter output to calculate the baseline by averaging a programmable number of points before the start of the trapezoid

Fast, Medium, Slow:
manual setting of the baseline restorer to a fixed rate

Fast Discriminator: applies to time tagging and ICR; based on double triangular filter; manual and automatic setting of the threshold; time stamp resolution of 10 ns, 62-bit counter; trigger signal can be displayed in Signal Inspection mode

Fast TRG Shaping:
configurable values between 0.01 µs and 0.8 µs

Coupling & TRP: DC/AC coupling selection and Transistor Reset settings

Coupling:
DC coupling option for Charge Sensitive Preamplifiers; AC coupling option for Transistor Reset Preamplifier with three selectable shaping constants: 5 µs, 11 µs and 33 µs (the trapezoid Decay Time must then be set accordingly)

Reset Length:
inhibit time due to the reset discharge (AC coupling); applies to the Transistor Reset Preamplifier

MCS

Dwell Time:
1 µs up to 4000 µs with resolution of 1µs

ADC

Resolution:	14-bit	Sampling Rate:	100 MHz

Synchronization

SYNC IN (rear panel)

Input connector for the synchronization of multiple RedEagle boards; one unit; SATA type

Clock sync, time tag reset and list marker functions; daisy chainable to multiple boards in combination with SYNC OUT

SYNC OUT (rear panel)

Output connector for the synchronization of multiple RedEagle boards; one unit; SATA type

Daisy chainable to multiple boards in combination with SYNC IN

Active Buttons

POWER (front panel)
Power on/off button; blue LED is illuminated when the power is ON
RESET (rear panel)
Holding this button down for 3 seconds causes a global reset of the board (i.e. HVPS channels ramp-down and board resets)

Communication Interfaces

USB (rear panel)	
USB connector; USB 2.0 compliant;	type mini-A
When connecting RedEagle to a host PC for the first time, the driver is automatically installed and is immediately recognized by the operating system (Windows® and Linux®), identifying the unit as an external storage device containing documentation and software	
USB cable included in the kit	
10/100 T (rear panel)	
Ethernet female connector;	RJ-45 type
Supports 10 or 100 Mbit/s connection to a PC or ETH hub	
FTP cable included in the kit	

Monitoring Display

Graphic Display (front panel)		
Monochrome 1.3" OLED display only for monitoring usage		
Screen 1: Time acquisition data		
Real Time [hh mm ss]	*Live Time [hh mm ss]*	*Dead Time [%]*
Screen 2: Readout data		
ICR [Hz], [kHz], [MHz]	*OCR [Hz], [kHz], [MHz]*	*Dead Time [%]*
Screen 3: HVPS data		
Vmon / Vset [V]	*Imon[µA]*	
Screen 4: Network addresses		
ETH / USB	*e1.e2.e3.e4 (ETH IP)*	*u1.u2.u3.u4 (USB IP)*
Screen 5: Board Information		
Model: DT400xx	*Serial Number*	*Firmware Version*
Browse Buttons (front panel)		
Channel Select Button (0 ↔ 1): switches between the two analog input channels (if Screen1 and Screen 2) or the two HPVS channels (if Screen 3)		
Screen Select Button: scrolls through the screen options		

Mechanical

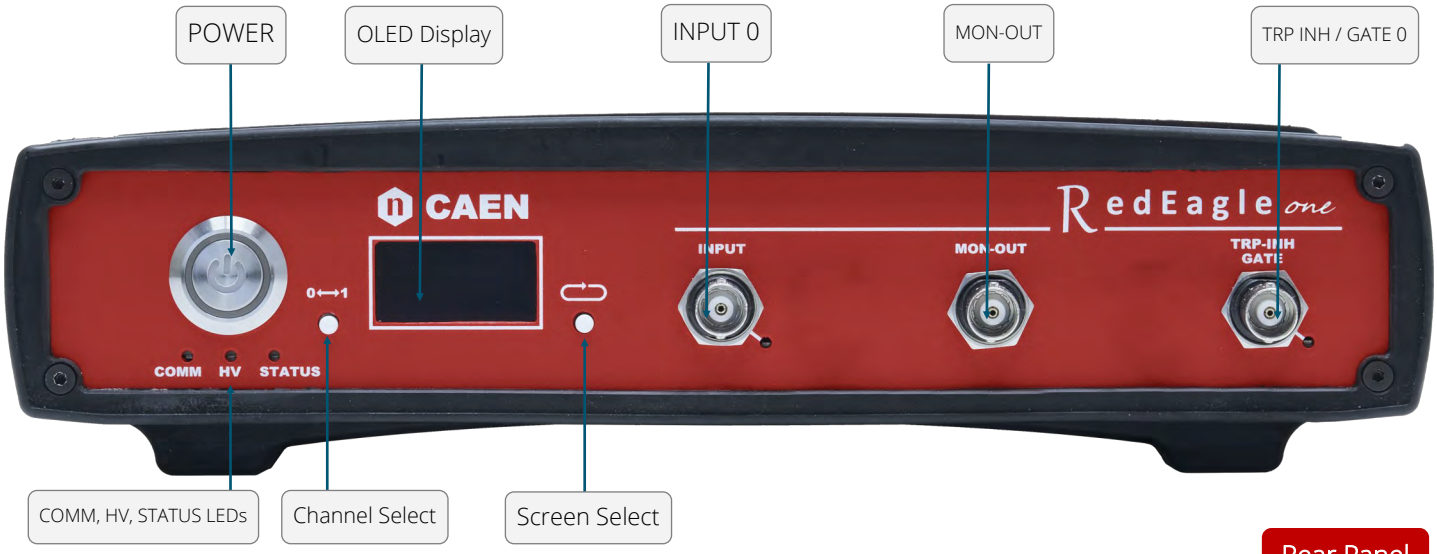
Enclosure:	Aluminium with durable rubber front and rear supports	Weight:	1400 g
Size:	262 W x 66.2 H x 195 L mm³ (including connectors)	262 W x 66.2 H x 171.6 L mm³ (without connectors)	

Firmware

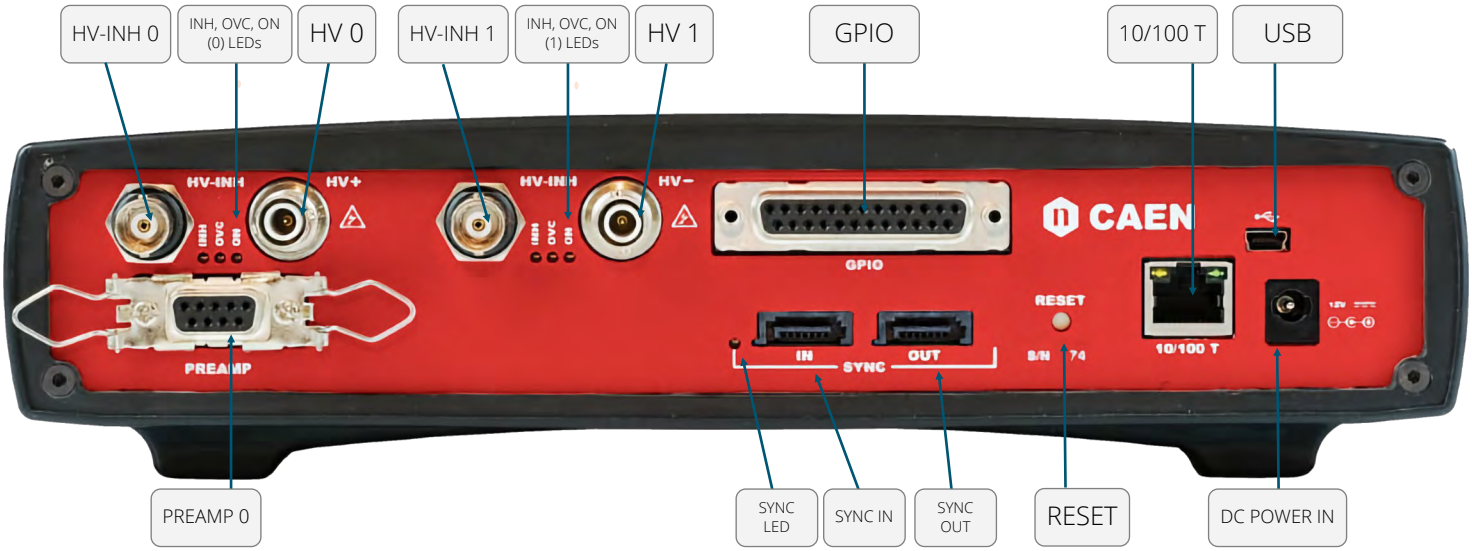
Updates:	Firmware updates are available for free download on CAEN website https://www.caen-india.in/products/redeagle
Upgrade:	Firmware can be upgraded via USB/ETHERNET through the Web Interface

RedEagle Single–Input Version

Front Panel

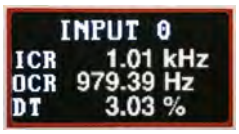


Rear Panel



Screen 1..5 Examples

Screen 1



Screen 2

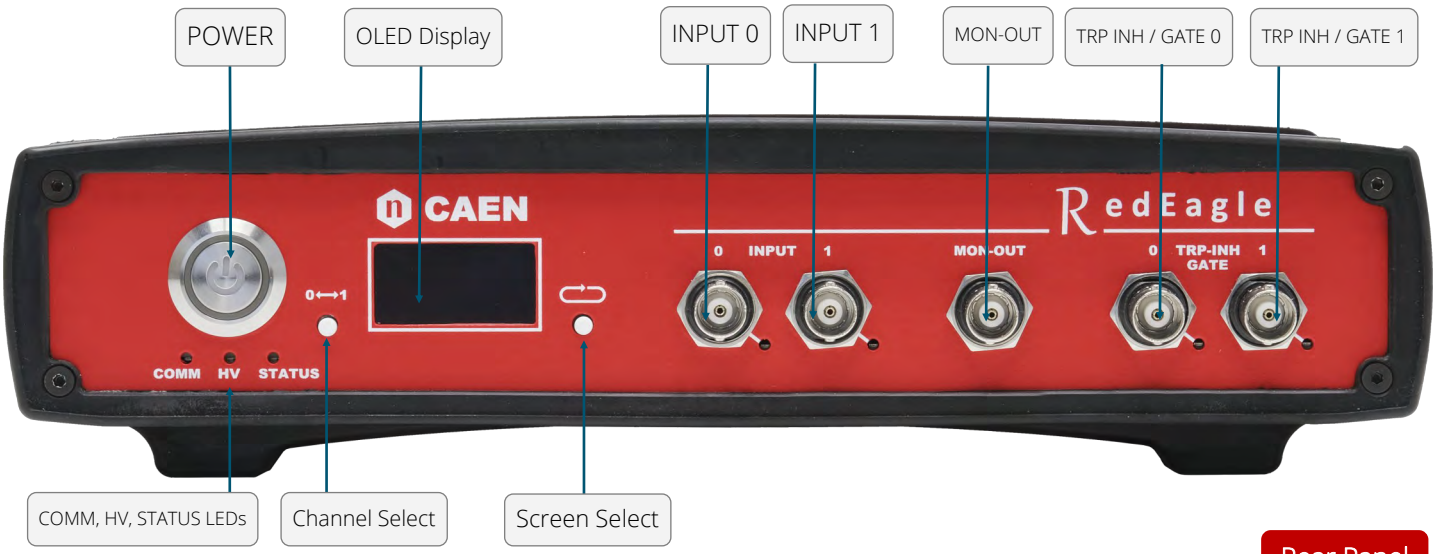
Screen 3

Screen 4

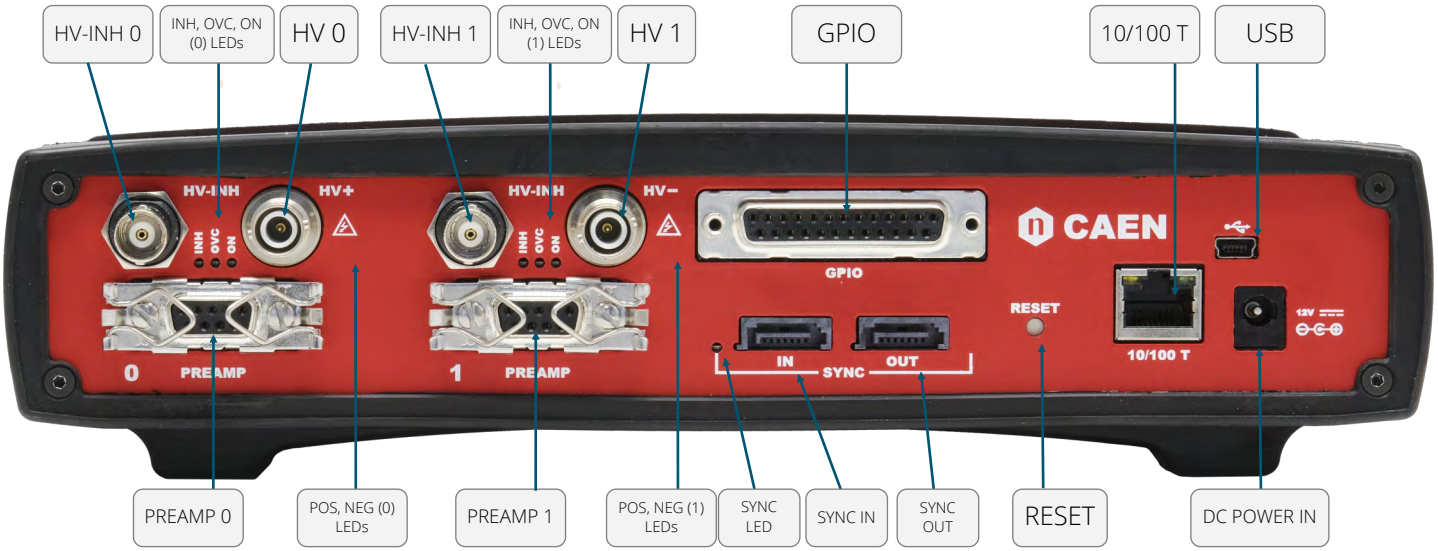
Screen 5

RedEagle Dual–Input Version

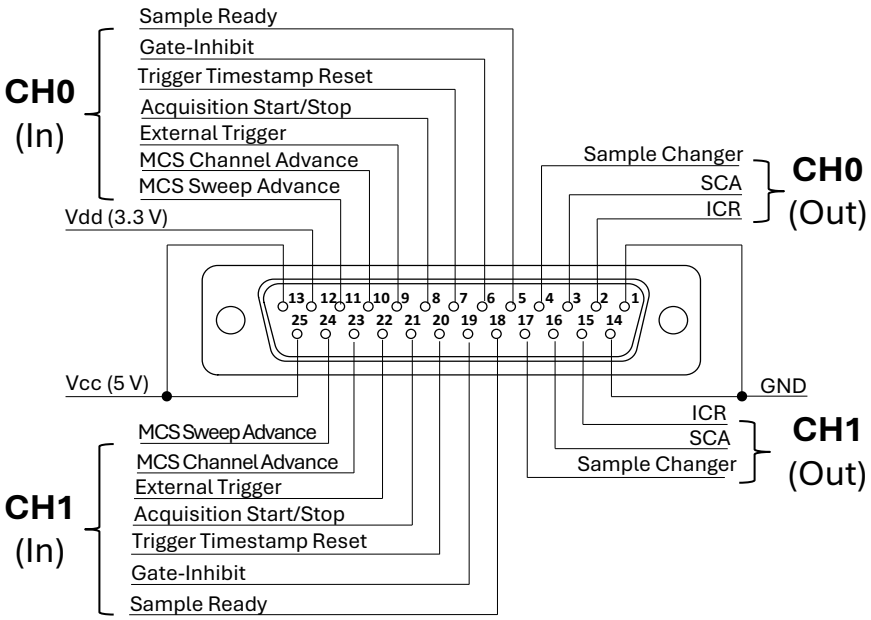
Front Panel



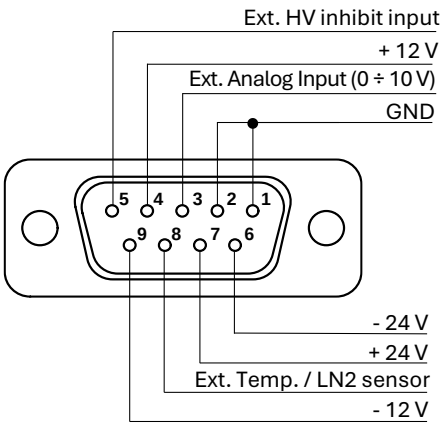
Rear Panel



GPIO Pinout

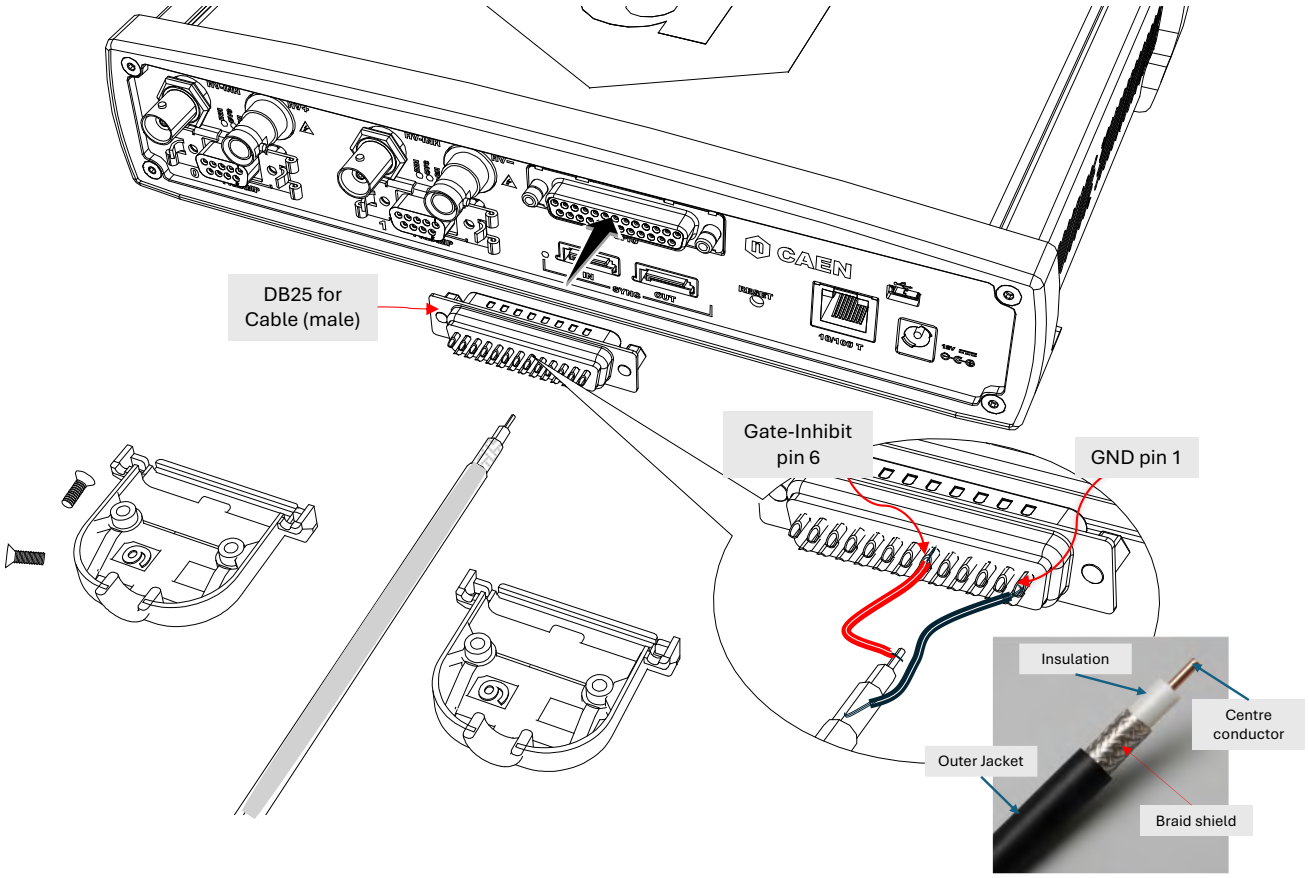


PREAMP Pinout



How to Connect a Signal Using a Coaxial Cable (e.g., BNC or LEMO) to the RedEagle Device

This image provides an example of how to connect a signal carried by a coaxial cable (e.g., RG58) to the Gate-Inhibit pin (pin 6) of the DB25 male GPIO connector on the RedEagle model. The centre conductor of the coaxial cable is routed to pin 6, while the braid shield is connected to pin 1 (GND).



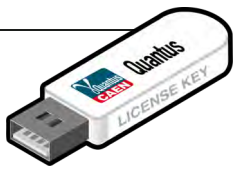
Accessories

A998 - SATA cable for RedEagle synchronization

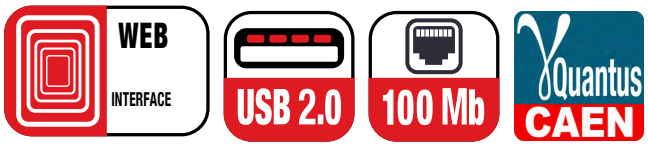
The A998 SATA cable is required to synchronize a system composed by two or more RedEagle.

Ordering Option

DT4000P - RedEagle dual-input digital MCA with Positive-Positive HV	ordering code: WDT4000XPAAA
DT4000N - RedEagle dual-input digital MCA with Negative-Negative HV	ordering code: WDT4000XNAAA
DT4000M - RedEagle dual-input digital MCA with Mixed HV	ordering code: WDT4000XMAAA
DT4001M - RedEagle single-input digital MCA with Mixed HV	ordering code: WDT4001XMAAA
A998 - SATA cable for RedEagle synchronization - 50cm	ordering code: WA998XAAAAAA
Quantus 1–channel Gamma Ray Quantitative Spectrometry software (dongle)	ordering code: WSWGQUANX1AA
Quantus 2-channel Gamma Ray Quantitative Spectrometry software (dongle)	ordering code: WSWGQUANX2AA
Quantus - User Management option	ordering code: WSWGQUSERMXA
Quantus - QA/QC options (includes Procedure and File Browser option)	ordering code: WSWGQAQCXAAA
Quantus - Procedures option, File Browser option and File Batch Analysis option	ordering code: WSWGQPRFBXAA
Quantus - all AddOn options	ordering code: WSWGQUANTALL



REDEAGLE
Digital Multi-Channel Analyzer
with Quantus Gamma-Ray Quantitative Spectroscopy Software



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