

ACTIVE, STAND-ALONE, FULLY FEATURED MCA TUBE BASE FOR SCINTILLATION SPECTROSCOPY

γ STREAM

MAIN FEATURES

- Fully stand-alone MCA including high voltage power supply, preamplifier, battery and data-storage on SSD
- Compatible with scintillation detectors as NaI(Tl), LaBr₃(Ce), and CeBr₃, using standard 14-pin and 10-8
- stages PMTs
- Different acquisition modes available: signal inspector, time stamped list mode, PHA, SCA (coming soon), MCS (coming soon)
- Open access to embedded CPU for custom developments
- Available with embedded GPS for data geo-localization
- Gain stabilizer based on natural or calibration radioactivity
- Wire and wireless connectivity through USB, Ethernet, Bluetooth and Wi-Fi
- Front panel cover against dust and rain for outdoor operation
- Front panel auxiliary digital I/O connectors for synchronization, external trigger, coincidence/anticoincidence modes, veto, MCS, SCA
- Supported by CAEN **MC²Analyzer** software GUI, and **GammaTOUCH** application for smartphones and tablets with Android OS

DESCRIPTION

γ stream is a compact and portable system for gamma ray spectroscopy with scintillation detectors, which provides an active Multi-Channel Analyzer (MCA) integrated in a 14-pin photo-multiplier tube (PMT) base. **γ stream** fully integrates in a stand-alone device the high voltage to bias the PMT, the preamplifier to shape the signal from detector, and the MCA for a complete Pulse Height Analysis online.

γ stream makes easy the measurements with scintillation detectors, such as NaI(Tl), LaBr₃(Ce) and CeBr₃, with no need of additional cables.

Its socket and voltage divider can supply standard 14-pin and 10-stage (S2580 and S2580G models) or 8-stage (S2580LB and S2580LBG models) PMTs.



γ stream has been designed to work stand-alone, with no need of additional devices, cables, nor human assistance. **γ stream** features internal rechargeable Li-Ion battery providing long-term duration for unattended on-field acquisitions.

Once **γ stream** is programmed via computer or mobile phone, it then acquires and logs data in an internal SSD memory. An embedded CPU, running Linux OS, controls the acquisition and data recording, as well as the supported communication interfaces.

Multi-interface communication capability by Ethernet, USB 2.0, Bluetooth or Wi-Fi, makes possible the remote control via computer or smartphone.

It may acquire and record data in different modes: PHA, time stamped list mode and signal inspector. **γstream** can also operate outdoor thanks to a front panel cover protecting from water and dust. **γstream** is suited for a variety of environment thanks also to the software suites **GammaTOUCH** and **MC²Analyzer**, both provided with user-friendly GUIs. **GammaTOUCH** can run on smartphones or tablets with Android OSs, providing an immediate and easy data acquisition control. It provides georeferenced and time-stamped histograms logging the location of the integrated GPS system or the one embedded in the mobile device. On the other side **MC²Analyzer** can be run on recent Windows Os, providing the user with histogram analysis tools. Considering that scintillation detectors are usually sensitive to temperature changes, and advanced algorithm for gain stabilization is available. The user can select a specific range where the algorithm recognizes a peak and adjust its position according to peak and adjust its position according to the temperature variations.

γstream is provided with several scintillation detector assemblies. Our catalogue includes NaI(Tl), CsI(Tl), BGO and CeBr₃ detectors. Standard configurations with:

- NaI(Tl), CsI(Tl) and BGO, with cylindrical volume 2"x2" or 3"x3"
- CeBr₃ with cylindrical volume 1.5"x1.5"

Other scintillator types and volumes can be provided on request.

TECHNICAL SPECIFICATIONS

Mechanical structure

- Dimensions: 71,2 x 66,4 x 163,8 mm³ (W x H x L) (including connectors)
- Weight: 700 g

Detectors & PMT

- Scintillation detectors
- 14-pin 10-stage PMTs (S2580)
- 14-pin 8-stage (S2580LB)

Data signal processing:

- 12-bit and 62.5 MHz ADC
- Software selectable coarse gain: x1, x2, x4, x8
- Trapezoidal filter for the energy calculation with software adjustable rise time in the range 0÷16 μs and flat top in the range 0÷16 μs
- Trigger threshold software adjustment
- Software fine tuning of the Pole-Zero cancellation
- Digital fine gain

- Automatic gain stabilization
- Pile-up rejection and Live Time correction
- Baseline restorer with programmable averaging
- Time stamp: 16 ns resolution
- High frequency noise filter

Operating modes

- PHA (Pulse Height Analysis): pulse height histogram over 1k-2k channels
- List mode: pulse height and time stamp for each event
- Signal Inspector: input and internal filters waveforms

Communication interfaces:

- Ethernet
- USB
- Bluetooth
- Wi-Fi
- GPS (S2580G and S2580LBG only)

OPTIONS

In addition to standard supply, the following options are available upon request:

- **γstream**
- **γstream-GPS** includes the GPS receiver and the antenna for data georeferencing
- **γstream-LaBr** is dedicated for 8-dynode 14-pin PMT used with LaBr(Ce) detectors
- **γstream-LaBr-GPS** is dedicated for 8-dynode 14-pin PMT used with LaBr(Ce) detectors and includes the GPS receiver and the antenna for data georeferencing.

