

TECHNICAL SPECIFICATIONS

TOPAZ-Pico — a compact digital MCA

INTRODUCTION

TOPAZ-Pico is a compact, stand-alone digital Multi-Channel Analyzer (MCA), which is able to perform Pulse Height Analysis (PHA) of the signal produced by a standard scintillation detector such as NaI(Tl), LaBr₃(Ce), LaCl₃(Ce), etc.

The device is therefore useful for obtaining the energy spectrum from the photon radiation detected by the scintillator, and can be easily interfaced to a typical PC or notebook via a standard USB port for further data transfer and analysis.

The MCA is provided with a basic software package that allows to control the device, and to acquire and visualize the energy spectrum. The software incorporates an advanced and easy-to-use “discovery” function that can be used to detect automatically all the BrightSpec MCAs (bMCAs-USB, bMCA-Ethernet and TOPAZ-Pico) in the neighborhood of the PC that are available for connection.

A set of programming libraries is also offered, which makes the incorporation of the TOPAZ-Pico into existing radiation systems or setups very easy. The programming libraries are available for both MS Windows and Linux operating systems.

The device is available either in a rugged, pocket-size aluminum box with input and output connectors or as separate Printed-Circuit Board (PCB) for OEM distribution.

DESCRIPTION

The TOPAZ-Pico is an advanced, fully digital, compact Multi-Channel Analyzer. This device is used to process the electronic pulses produced by a photo-multiplier that is coupled to a scintillator detector. Such detectors are commonly used in the detection of gamma-ray radiation due to their high detection efficiency, medium energy resolution and relatively low price. This kind of MCA is able to produce an energy spectrum from the radiation events detected by the scintillator, storing it in the device's memory for further retrieval and analysis by the PC.

The MCA implements two modes of data acquisition: Pulse Height Analysis (PHA) and Multi-channel scaling (MCS)

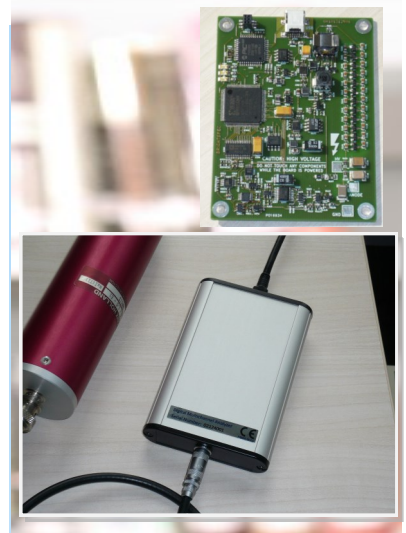
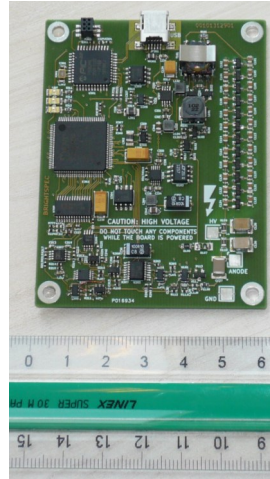
PHA mode is regularly used in nuclear spectrometry and radiometry, while MCS is a very useful feature for following photon detections in a particular specific energy regions in function of time. MCS acquisition mode is useful to both laboratory and industrial applications that make use of radioactive sources or seek for radioactive materials.

The TOPAZ-Pico design makes use of the latest advances in digital electronics. The MCA utilizes powerful digital processing techniques and algorithms to better separate the useful signal from noise and to maximize performance under high count rate conditions. It also contains a miniaturized high-voltage power supply optimized for low consumption that provides the necessary power for the PMT tube, including those used with large scintillator detectors. The device has a spectral memory size of up to 4096 channels and can perform MCS in addition to PHA.

The device is cased into a rugged aluminum box of pocket sizes with one input connector (detector signal together with high voltage) and output/control connector (USB mini type B). Optionally, the MCA can have an extra input connection for TTL signal count, quite useful to connect the input of a neutron counter.

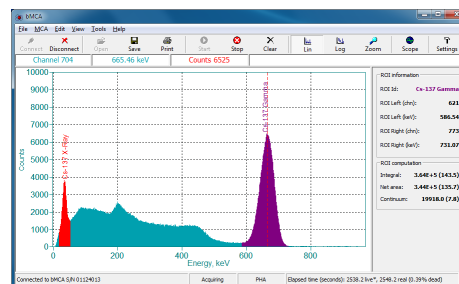
This device is also available as a separate PCB only, which makes it attractive to the OEM market. The programming libraries for Windows and Linux OS are available as well.

A basic acquisition software package is provided for managing such device operations as setup, control, data acquisition and visualization.



FEATURES

- Fully digital Multi-Channel Analyzer (MCA), suitable for medium-energy resolution detectors.
- **PCB available for OEMs !!!**
- Full Pulse-Height Analysis (PHA) and Multi-Channel Scaling (MCS) modes of data acquisition
- Up to 4096 channels for PHA and MCS acquisition
- Advanced electronic noise reduction algorithms
- Compact MCA with size of 80 mm x 60 mm (PCB) and 107x72x19 mm in the aluminum case, weight < 150 grams (with case).
- USB 2.0 for data communication and device control
- Miniature design combining low-power consumption with low-noise
- Basic spectrum acquisition and device control software included
- Available programming libraries for Windows and Linux Operating System (upon request).
- (Optional) TTL counter input, suitable for connection of a, e.g. neutron counter.



BRIGHTSPEC

is a dynamic engineering company providing novel designs and innovative solutions in the field of nuclear electronics and software development for radiation detection.

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TECHNICAL SPECIFICATIONS

PHA acquisition mode

- ◆ Spectral memory size of 256, 512, 1024, 2048 and 4096 channels
- ◆ Coarse gain with amplification factors of 1, 2, 4 and 8. Fine gain from 1 to 2 in steps of 1/4096
- ◆ Upper and Lower Level Discriminator settings given in channels

MCS acquisition mode

- ◆ Spectral memory size of 256, 512, 1024, 2048 and 4096 channels
- ◆ Dwell time from 0.1 sec to “count-forever”
- ◆ Easy to setup from ROIs or nuclide information.

Digital Settings

- ◆ Rise Time: from 0.1 to 12 µsec in steps of 0.2 µsec
- ◆ Flat Top: from 0.1 to 8.0 µsec in steps of 0.1 µsec
- ◆ Threshold: 1 to 255
- ◆ Digital Base Line Restorer (BLR)
- ◆ Pile-Up Rejector (PUR)

High Voltage Power Supply

- ◆ Miniature HV power supply embedded into the MCA assembly
- ◆ Voltage: (positive) 0 to 1 500 Volts in 4096 steps

Data communication

- ◆ USB 2.0, cable included

Physical

- ◆ Sizes:
 - ◆ MCA box: height 107 mm, width 72 mm, height 19 mm
 - ◆ PCB only: 80 mm x 60 mm
- ◆ Weight: less than 150 grams (including box)
- ◆ Connectors :
 - ◆ USB type mini B (to computer)
 - ◆ Lemo connector. Type ERA oS 403 CLL (for both detector HV Bias and Signal)
- ◆ Indicators:
 - ◆ Red LED for detector high voltage
 - ◆ Yellow LED for incoming count rate (ICR)
 - ◆ Green color LED for power and communication status

Other

- ◆ The device is supplied with a basic software to control operation, data acquisition and visualization.
- ◆ (upon request) necessary programming libraries for Microsoft Windows and Linux

Optional

- ◆ The MCA can be supplied with extra input connector for TTL signal counting

Certifications

- ◆ The device is CE compliant

CE
CERTIFIED