



TECHNICAL SPECIFICATIONS

bMCA-BOX – a compact digital MCA

INTRODUCTION

bMCA-BOX is a compact, digital Multi-Channel Analyzer (MCA), which is able to perform Pulse Height Analysis (PHA) of the signal produced by a scintillation detector such as NaI(Tl), LaBr₃(Ce), LaCl₃(Ce), CeBr₃, etc.

The bMCA-BOX is a particular model of our bMCA series for connecting a bMCA to odd-sized scintillator detectors or for sliding the acquisition system (MCA + detector) through wholes or tubes. The scintillator detectors connected to the bMCA-BOX must have an integrated high voltage divider. The connection to such detectors is via a single cable where both the detector signal and the PM high voltage are transmitted.



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 bMCA-BOX 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 bMCAs in the neighborhood of the PC that are available for connection.

DESCRIPTION

The bMCA is an advanced, fully digital, compact Multi-Channel Analyzer (MCA). 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 bMCA-BOX is a modified type of the bMCA series where the MCA is packed into a cylindrical container with a single detector connection using the scintillator voltage divider. Therefore this device uses a single connection to the detector for transmitting both: the scintillator high voltage and the signal. Therefore the scintillator connected to the bMCA-BOX must have a high voltage divider integrated into its photomultiplier.

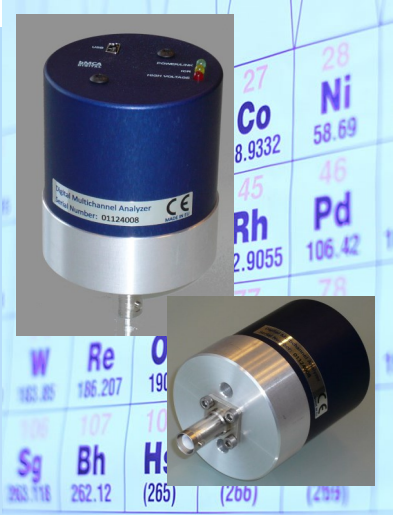
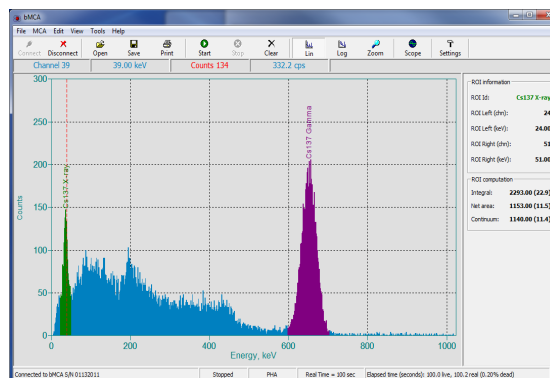
The bMCA-BOX implements two modes of data acquisition:

- Pulse Height Analysis (PHA)
- 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 bMCA design makes use of the latest advances in digital electronics. The device 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.

A basic acquisition software package is provided for managing such device operations as setup, control, data acquisition and visualization. A digital oscilloscope function allows monitoring the input and filtered pulses to aid in fine-tuning the MCA parameters. The program also includes a few spectrometry-related functions for processing the spectral data: calibration, ROI analysis and peak search, to mention a few.



FEATURES

- Fully digital Multi-Channel Analyzer (MCA) built into a compact round enclosure
- Useful for connecting to scintillators packed into odd-sized forms or enclosures, as well as for placing acquisition system (detector + MCA) inside tubes
- Connection to the scintillator detector with integrated voltage divider. Connection via a single cable
- Full Pulse-Height Analysis (PHA) and Multi-Channel Scaling (MCS) modes of data acquisition
- Up to 4096 channels for PHA and MCS acquisition
- Compact MCA with size of H 70 mm x D 55 mm
- USB 2.0 for data communication and device control
- Miniature design combining low-power consumption with low-noise
- LED indicators for communication status and device power, HV power and incoming count rate (ICR)
- Basic spectrum acquisition and device control software included
- Available programming libraries for Windows and Linux Operating System (upon request).

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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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
- ◆ PHA acquisition presets on:
 - ◆ Live time
 - ◆ Real time
 - ◆ To Counts on ROI
 - ◆ Or combination of both—time or ROI counts

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 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. Detector's high voltage supplied via voltage divider connection in the scintillator photomultiplier.
- ◆ Voltage: 0 to 1 500 Volts in 4096 steps

Data communication

- ◆ USB 2.0, cable included (standardly 3 meters long)

Physical

- ◆ Size, without high voltage connector: height 70 mm, diameter 55 mm.
- ◆ Size, with high-voltage connector: height 95 mm, diameter 55 mm.
- ◆ Weight: approximately 120 grams
- ◆ Connectors : USB type mini B
- ◆ 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.

Certifications

- ◆ The device is CE compliant

CE
CERTIFIED