TECHNICAL SPECIFICATIONS

bMCA-C — a compact Single Channel Analyzer

bPAD

INTRODUCTION

bMCA-C is a compact microcontroller-based Single Channel Analyzer. The device contains a Preamplifier-Amplifier-Discriminator with TTL digital output. The bMCA-C also includes its own high voltage power supply for operating standard 14-pin photomultiplier tubes, which are commonly used with scintillator-type radia-tion detectors (e.g. PVC, NaI(Tl), LaBr3, CeBr3, etc).

The device is therefore useful as a compact system to monitor the count rate in an energy region of interest. The detected signal is output as a TTL pulse, making it compatible with most industrial, environmental and laboratory counting systems. In contrast with traditional SCAs the bMCA-C is fully controlled by a microprocessor, providing easy setup and "smart" modes of operations. bMCA-C parameters can be conveniently set via USB with a PC and the provided configuration software.

DESCRIPTION

The bMCA-C is an advanced, microprocessor-based, compact electronic device that integrates a charge-sensitive preamplifier, a variable-gain amplifier and a window discriminator; all in a 14-pin photomultiplier tube base. This electronic device outputs a TTL pulse per photo-event detected by a scintillator detector in the energy range of interest. This type of device is also often referred to as a Single Channel Analyzer (SCA).

bMCA-C also includes a miniature, programmable and efficient high-voltage supply to provide the power necessary to operate the most widespread range of photomultipliers used with scintillator detectors. The output voltage can be set in the range from 0 to 1500 Volts with a resolution of 4096 steps.

Since the unit is a microprocessor-controlled device, it benefits from being easy to setup. The device con-nects to a PC via its USB interface, and by using the provided software all the operational settings can be configured and fine-tuned for any kind of scintillator detector. Once the setup is complete, all the settings are saved into the device's non-volatile memory.

The PC software also comes with a "pseudo-PHA" acquisition mode. In this mode, the software slides the single-channel window over the whole input range, constructing in such a way an energy spectrum. By using this spectrum, the user can visually identify the energy range of interest and immediately set the boundaries of the bMCA-C discriminator window. This represents a large improvement over the traditional "blind" meth-od used with most other SCAs.

bMCA-C has two modes of operation:

- Integral, where counts are output for signals above a single energy threshold level
- Differential, where counts are output for signals within a defined energy window (SCA)

The output pulses correspond to counted events in the energy window of interest. They are 5-volt TTL sig-nals with 2.5 µsec duration. The bMCA-C can be ordered to output pulses with a duration of 10 µsec instead.

The bPAD can be powered via the USB connection or by an external DC power supply of 6 to 36 volts. Three color LEDs are used for status indications: Red for detector high voltage, Yellow for incoming count rate (ICR) and Green for power and communication status.

The bPAD is a compact device with a size of 65 mm diameter by 71 mm high (60 mm not counting the TTL output connector) . bPAD weights less than 80 grams.

All the above-mentioned features make the bPAD a very attractive component for industrial and automated applications involving photon detection and counting.

FEATURES

- Compact Single Channel Analyzer with microproces-sor control on a 14-pin photomultiplier tube base

- Integrates Preamplifier-Amplifier-Discriminator and HV power supply

- TTL output

- USB communications

- Device can be powered from USB and/or an exter-nal supply of 6 to 36 Volts via a pluggable terminal block

- Compact size of 56mm (D) x 71mm (H)

- Very low power consump-tion, 1 watt maximum.

- Miniature and efficient high voltage power supply

- Configuration software for easy setup and visualiza-tion of device operation, also implements a "pseudo-PHA" mode of operation

- LED indicators for commu-nication status and device power, HV power and in-coming count rate (ICR)
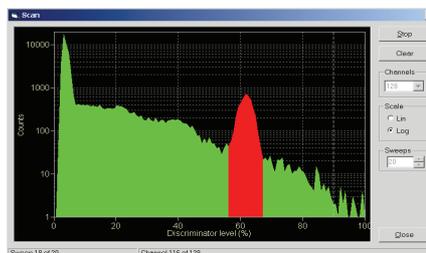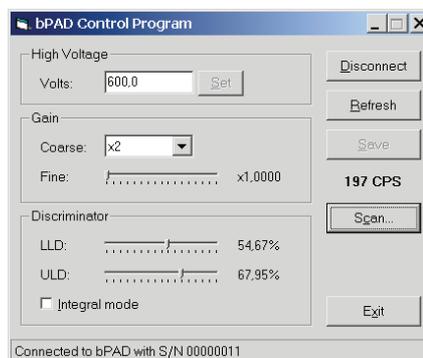
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bMCA-C TECHNICAL SPECIFICATIONS

Device and digital settings

♦ Acquisition modes: Integral and differential.

♦ Coarse gain: x1, x2, x4, x8 (optionally also x16, x32, x64, x128)

♦ Fine gain: x1...x2 in 4096 steps

♦ Upper and Lower Level discriminator resolution: 2048 steps

♦ Output: 5 Volts TTL signals of 2.5 μsec duration.

High Voltage Power Supply

♦ Miniature HV power supply embedded into the device assembly

♦ Voltage: 0 to 1 500 Volts in 4096 steps

Data communication

♦ USB 2.0, cable included.

♦ TTL output via SMA connector, cable included.

Physical

♦ USB connector: type mini B, used for PC communications or powering.

♦ Power connector: pluggable terminal block, 6 to 36 Volts, plug included.

♦ Power consumption: 1 watt maximum

♦ Size: Height 71 mm, Diameter 56 mm

♦ Weight: Approximately 80 grams

Indicators:

♦ Red LED for detector high voltage

♦ Yellow LED for incoming count rate (ICR)

♦ Green LED for power and communication status

Other

♦ The device is supplied with Windows™ PC software for setup and pseudo-PHA, the software can also display the CPS value for the defined SCA region

Certifications

♦ The device is CE compliant

An extended version **bMCA-C+** is also available which has 2 outputs:
- TTL signal
- analog output of the linear amplifier

CE
CERTIFIED