ORTEC®

digiBASE

14-Pin PMT Tube Base with Integrated Bias Supply, Preamplifier, and MCA (with Digital Signal Processing) for NaI Spectroscopy

USB Interface. . . All In One. . . Digital Signal Processing

GO DIGITAL. . . Power Up With digiBASE!

AMETEK®
ADVANCED MEASUREMENT TECHNOLOGY

digiBASE

- **Full featured digital MCA and gain stabilizer for ultimate stability**
- **Fast data acquisition for maximum throughput**
- **The ultimate in Fine Time Resolution with "List Mode"**
- **Multi-detector arrays made simple with USB Connection**
- **0 to +1200-V Detector Bias Voltage**
- **Includes MAESTRO advanced MCA software.**

The digiBASE is a 14-pin photomultiplier tube base for gamma-ray spectroscopy applications with NaI(Tl) scintillation detectors. The unique concept of the digiBASE combines a miniaturized preamplifier and detector high voltage (0 to +1200 V bias) with powerful digital signal processing, multichannel analyzer, and special features for fine time resolution measurements — all contained in a low-power (<500 mA), lightweight (10 oz, 280 g), small-size (63 mm diameter x 80 mm length) tube base with a USB connection. Everything you need to connect to your NaI(Tl) detector is included in the tube base. Furthermore, there is no need to open your computer to install an interface card, or for using external NIM-based components. The digiBASE includes MAESTRO MCA emulation software and is available with A66SV-BW GammaVision Gamma Spectroscopy for Scintillation Detectors for complete quantitative analysis.

Simple Installation

Installation is simple via the USB interface of the PC. Just load the software, establish communications using ORTEC CONNECTIONS software and begin making measurements. It's that simple!

MCA Emulation and Spectral Analysis

MAESTRO MCA Emulator Included

The MAESTRO software provides a graphical user interface for all the controls needed to adjust the acquisition parameters, acquire the data and save the spectra. MAESTRO is a member of the CONNECTIONS family of ORTEC products, thus providing full networking with other ORTEC spectrometers and supporting computers.

MAESTRO includes features for identifying peaks, editing libraries, and creating, printing and saving Regions of Interest (ROI), performing energy calibrations, automating tasks via using simple "Job Streams," AND MORE!

MAESTRO is simply the finest MCA emulator that you can buy — and it is included with digiBASE.

Spectral Analysis Made Simple with A66SV-BW GammaVision Gamma Spectroscopy for Scintillation Detectors

For applications requiring isotope identification and activity quantification, the optional A66SV-BW GammaVision Gamma Spectroscopy for Scintillation Detectors can be added easily. GammaVision offers all the features of the MAESTRO MCA emulator, including automation of tasks through Job Streams, but adds the power of peak search and fit spectral analysis engines for more complex analysis needs for NaI gamma-ray spectra. You need only a minimum input for maximum output with GammaVision! After analysis, results can be reviewed easily and quickly using a variety of on-screen, informative, interactive plotting routines.
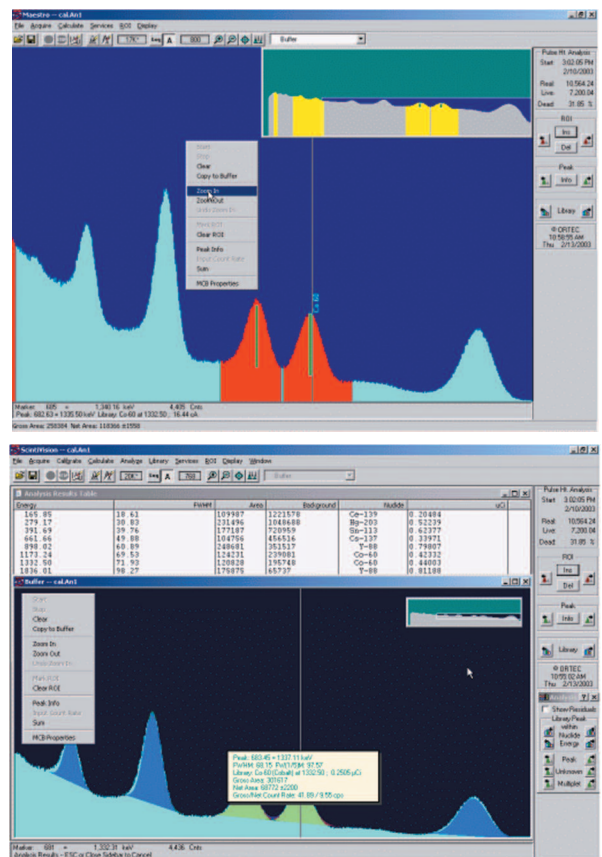
Automate complex spectral analysis with GammaVision

digiBASE

Not only does GammaVision provide extensive menus and controls for the operation of all acquisition and analysis features, it also includes the Quality Assurance features that you need to monitor system performance — all stored conveniently in a Microsoft Access® database for easy retrieval and review.

GammaVision combines the features of a MCA emulator with a complete spectral analysis and Quality Assurance package for the complex needs of today's counting laboratory. Combine that with the digiBASE for the most up-to-date complete solution for NaI measurements available!

Create Your Own Custom Software with the A11 Toolkit

The A11 CONNECTIONS Programmer's Toolkit is also available for those who wish to integrate the digiBASE into their own software systems. The Toolkit offers ActiveX Controls to simplify programming with LabVIEW, Visual C++, and Visual Basic. For more information on the Toolkit, ask for copies of the A11 Programmer's Toolkit brochure.

Superb Spectral Stability

NaI(TI) detectors have a gain that is sensitive to changes in the ambient temperature and magnetic fields. DigiBASE incorporates a gain stabilizer to significantly diminish this sensitivity. It works by monitoring the centroid of a designated peak in the energy spectrum. The fine gain is automatically and continuously adjusted to maintain the centroid of the peak at its desired position. If you are interested in superb gain stability, the digiBASE is your answer!

Specifications

Performance

Conversion Gain: 1024 channels

Coarse Gain: Gain settings of 1, 3 and 9 (controlled by jumper)

Fine Gain: 0.4–1.2

Integral Non-Linearity: ≤±0.05% over the top 99% of the range

Differential Non-Linearity: ≤±1% over the top 99% of the range

Dead Time Accuracy: <5% error up to 50k cps input count rate. Deadtime is measured with a Gedcke-Hale Livetime clock.

Detector Voltage: 0 to +1200 V dc in steps of 1.25 V under computer control. Readback of High voltage is available.

Offset Drift: <50 ppm of Full-scale range per °C

Gain Drift: <150 ppm per °C

Shaping Time: Bipolar shaping adjustable under computer control from 0.75 to 2 µs in steps of 0.25 µs

Special Performance Features

The Ultimate in Fine Time Resolution

List Mode Acquisition: If you need the ultimate in fine time resolution, the digiBASE features "List Mode" operation, in which each valid input signal is converted to a digital value and that value is transmitted to the computer along with the time that the event occurred. Time is measured to the nearest microsecond. Each event causes a 32-bit word to be transmitted to the computer. The bits of the word are decoded as follows:

Bit	Description
31(msb)	TimeStampFlag (0=Normal Data, 1=Time Stamp)
30–21	Amplitude of the event
20–0	Time event arrived in units of microseconds

In addition, every second a "time stamp" word is transmitted. This time stamp word is used to track rollovers in the 21-bit time stamp in the normal data word.

Bit	Description
31 (msb)	TimeStampFlag (0=Normal Data, 1=Time Stamp)
30–0	Current time in microseconds

Number of List Mode Units per Computer: When multiple units are used in a list mode application, the limited bandwidth of the USB bus sets a practical limit on the number of units that can send data to a single computer. The total data rate of all units should be kept less than 200k cps. The following chart gives typical maximum pulse rates for various numbers of units.

Number of digiBASEs	Maximum Pulse rate (typical)
4	50k cps
5	40k cps
6	33k cps
8	25k cps

Histogram Mode Acquisition: Data is histogrammed inside the digiBASE. Data channels are 31-bits. Most significant bit is ROI bit.

Presets:
  Livetime: up to 8.5 x 10^7 seconds in steps of 20 ms
  Realtime: up to 8.5 x 10^7 seconds in steps of 20 ms

Flawless Spectrum Stabilizer: The digiBASE features built-in gain and offset stabilization circuitry. Stabilization is performed by providing a reference peak in the spectrum, which the MCA can monitor, should drift be detected, the gain and offset of the system are adjusted automatically to correct for the drift. The stabilizer can correct for 10% of FSR error in offset and uses the full-range of the Fine Gain to correct for gain errors.

ENABLE Input: The SMA connector accepts a TTL signal, whose function depends on the GATE setting on ADC tab under Adjust Controls in MAESTRO. When set to "Enable" when input is low, realtime, livetime, and data acquisition is stopped — left open, or high realtime, livetime, and data acquisition is enabled. If set to "Coincidence," when input is low, realtime and livetime operate normally, but no counts are stored in memory. When high, normal acquisition occurs, if set to "Event," rising edges are counted by a 32-bit event counter. The contents of the counter can be monitored on the Status tab under Adjust Controls in MAESTRO. Input impedance is 1-kΩ to +5 V protected to ±10 V.

Interface: Full-speed (12 Mbps) USB 1.1 Interface. The unit is powered from the USB cable.

Computer Controls

Fine Gain
Spectrum Stabilizer Setup
Enable and Set HV
Real and Live Presets
Pulse Width
Upper and Lower level Discriminators
Enable Input function

Electrical, Mechanical and Environmental

Dimensions: 63.8 mm diameter x 80 mm length

Weight:
  Net (digiBASE only): 10 oz, 280 g
  Shipping: 5 lb, 2.27 kg

Power Requirements: <500 mA from USB connection

Ambient Operating Environment: –10 to 50°C at 0 to 80%; non-condensing humidity. Note: Unit will operate at –10°C, however, at power on, it should be at least 0°C for proper startup.

CE: Conforms to CE standards for radiated and conducted emissions, susceptibility and low-voltage power directives.

NRTL: Certification verifies, through OSHA-approved NRTL certification authority TÜV SÜD, that the product meets U.S. electrical safety standards (UL/ANSI).

Ordering Information

Model	Description
DIGIBASE	digiBASE with MAESTRO MCA Emulator Software
DIGIBASE-PKG-1	digiBASE with MAESTRO and A66SV-BW Software

Optional Software/Hardware

A66SV-BW GammaVision Gamma Spectroscopy for Scintillation Detectors: Advanced analysis software for identification and quantitative analysis of radioisotopes using NaI(Tl) detectors.

A11-BW CONNECTIONS Programmer's Toolkit with ActiveX Controls: Write your own special software to control the digiBASE from LabView, Visual C++, or Visual Basic. List mode operations are available only using your own custom software.

USB HUB: Powered USB hub includes connections for up to seven digiBASE inputs. Configuration functions are the same as any other CONNECTIONS device. Available in 4-input and 7-input models.

Specify:

C-USB-HUB-4B	4 Port USB Hub
C-USB-HUB-7B	7 Port USB Hub
USBEXT	USB Active Extension Cable (powered by USB)

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