

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...**

- 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
- Software included: ORTEC's MAESTRO-32 advanced MCA software. ScintiVision or InterWinner (optional)



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-32 MCA emulation software and is available with ScintiVision-32 and InterWinner 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-32 software and begin making measurements. It's that simple!

## MCA Emulation and Spectral Analysis

### **MAESTRO-32 MCA Emulator Included**

The MAESTRO-32 software provides a graphical user interface for all the controls needed to adjust the acquisition parameters, acquire the data and save the spectra. MAESTRO-32 is a member of the *CONNECTIONS* family of ORTEC products, thus providing full networking with other ORTEC spectrometers and supporting computers.

MAESTRO-32 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-32 is simply the finest MCA emulator that you can buy — and it is included with digiBASE.

### **Spectral Analysis Made Simple with ScintiVision-32**

For applications requiring isotope identification and activity quantification, the optional ScintiVision-32 advanced gamma-ray analysis software can be added easily. ScintiVision-32 offers all the features of the MAESTRO-32 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 ScintiVision-32! After analysis, results can be reviewed easily and quickly using a variety of on-screen, informative, interactive plotting routines.

Not only does ScintiVision-32 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.

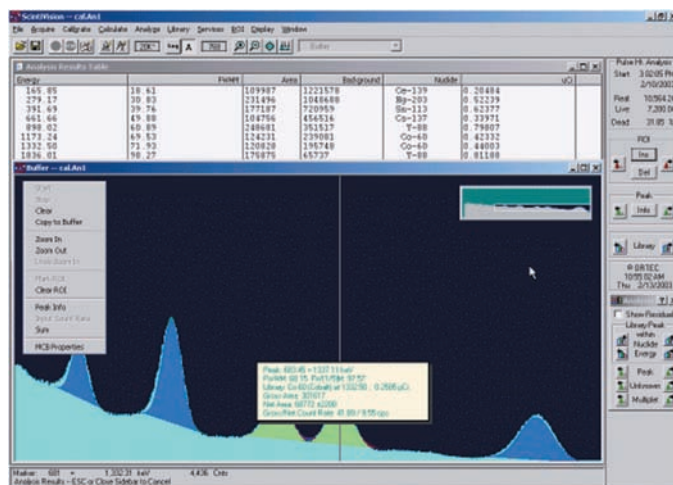
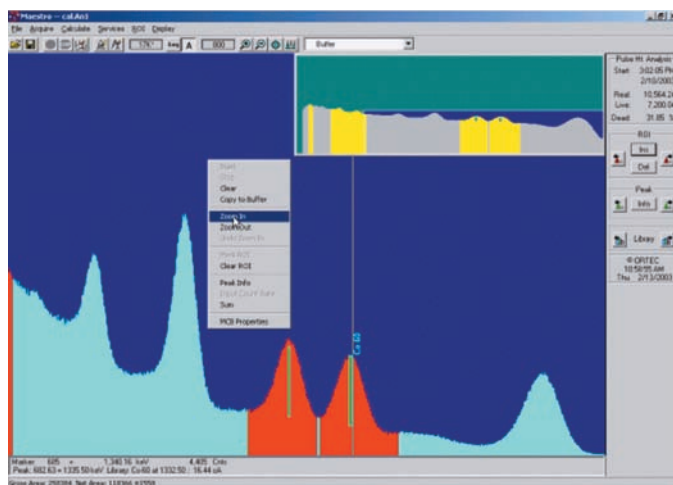
ScintiVision-32 combines the features of the finest MCA emulator with a complete spectral analysis and Quality Assurance package for the complex needs of today's counting laboratory. Combine that with the digiBASE for the most up-to-date complete solution for NaI measurements available!

### **Create Your Own Custom Software with the A11-B32 Toolkit**

The A11-B32 *CONNECTIONS*-32 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-B32 Programmer's Toolkit brochure.

## Superb Spectral Stability

NaI(Tl) 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!



Automate complex spectral analysis with ScintiVision

### 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:**  $\leq \pm 0.05\%$  over the top 99% of the range

**Differential Non-Linearity:**  $\leq \pm 1\%$  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  $\mu$ s in steps of 0.25  $\mu$ s

#### 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 200 kcps. The following chart gives typical maximum pulse rates for various numbers of units.

Number of digiBase's	Maximum Pulse rate (typical)
4	50 kcps
5	40 kcps
6	33 kcps
8	25 kcps

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

#### Presets:

Livetime: up to  $8.5 \times 10^7$  seconds in steps of 20 ms

Realtime: up to  $8.5 \times 10^7$  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-32. 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-32. Input impedance is 1-k $\Omega$  to +5 V protected to  $\pm 10$  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 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.

### Computer Requirements and Recommendations

IBM-compatible PC with:  
USB Connection required  
Minimum 400 MHz processor recommended  
At least 64 MB of memory  
Hard drive (at least 20 MB on disk; 1 GB recommended)  
CD-ROM (software is supplied on CD)  
Windows 2000, XP

### Ordering Information

Model	Description
DIGIBASE	digiBASE with A65-B32 MAESTRO-32 MCA emulator
DIGIBASE-PKG-1	digiBASE with A65-B32 MAESTRO-32 and A35-B32 ScintiVision-32 software

### Optional Software/Hardware

**A35-B32 ScintiVision-32:** advanced analysis software for identification and quantitative analysis of radioisotopes using NaI(Tl) detectors.

**IW-B32 InterWinner:** advanced analysis software for identification and quantitative analysis of radioisotopes using NaI(Tl) detectors.

**A11-B32 CONNECTIONS-32 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-32 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)

Specifications subject to change  
050707

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