MIRION TECHNOLOGIES

Radiation Safety. **Amplified.**

Osprey®

Universal Digital MCA Tube Base for Scintillation Spectrometry

Nuclear | Healthcare | Homeland Security & Defense | Labs and Education | Industrial and Manufacturing

KEY FEATURES

- All-in-one HVPS, preamplifier, and digital MCA
- Compatible with standard 14-pin scintillation detectors using 10-stage PMTs, including NaI(Tl) and $LaBr_3$(Ce)
- Optional temperature-stabilized* NaI(Tl) and $CeBr_3$ probes
- USB 2.0 connection for PC plug-and-play
- Ethernet 10/100BaseTX (PoE) connection for network applications
- PHA, MCS, SCA, MSS, List, and Time-stamped List modes
- Fully supported by Genie™ 2000 software and programming libraries
- Optional software development kit with examples
- Diagnostic web GUI
- Compatible with Model 727 shield

*US Patents 7,005,646 B1 and 7,049,598 B1

OSPREY

DESCRIPTION

The Osprey® is a high-performance, fully-integrated multi-channel analyzer (MCA) tube base that contains everything needed to support scintillation spectrometry. Designed for both laboratory and field use, this one compact unit contains a high-voltage power supply (HVPS), preamplifier and a full-featured digital MCA. Osprey can be controlled through either USB or Ethernet with no need to purchase two separate units – an industry first. USB or Ethernet, there is only one cable connecting the Osprey to the control and data acquisition system.

For desk-top applications, power and all communications are handled by a USB 2.0 port. In situations where networking and/or remote access are desired, the Ethernet 10/100BaseTX port can be used which provides power and communications via power-over-Ethernet (PoE). An example of using Osprey's networking capabilities is setting up a radiation monitoring system with multiple unattended detectors in remote locations. (Ethernet can also be used in desk-top applications instead of USB if needed.) Coupled with the powerful Genie 2000 software suite, the Osprey takes scintillation spectrometry to a new level. Just connect probe and Osprey, connect the Osprey to an available USB or Ethernet port, start the Genie 2000 software, and you are ready to acquire the spectrum, making this a true "plug-and-play" solution.

The Genie 2000 software suite is a comprehensive environment for MCA control, data acquisition, display, and analysis. It provides independent support for multiple detectors, extensive networking capabilities, advanced data analysis, and comprehensive batch procedure capabilities. With the Genie 2000 programming libraries, the advanced user can develop custom applications using all available Genie 2000 features and user interfaces. An OS independent software development kit (SDK) with examples is available and can be used without Genie 2000. The SDK is similar to the comprehensive set of programming tools available with CANBERRA's Lynx® MCA. It allows expert users to develop platform independent applications for instrument control and data acquisition.

In addition, a diagnostic web graphical user interface (GUI) application is supplied with the Osprey, providing MCA and probe status information, network setup, and firmware upgrade functionalities.

CANBERRA

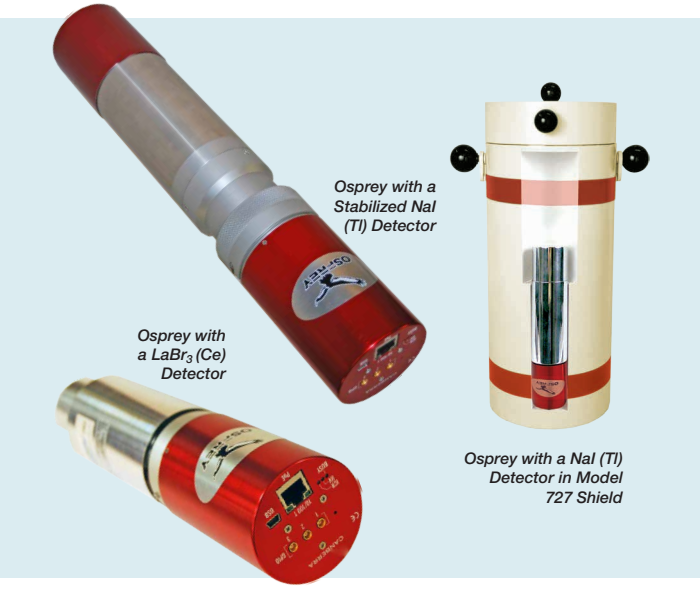
Osprey features support for all commonly used spectrometry modes – PHA, MCS, SCA, MSS, List, and Time-stamped List – unmatched by any other tube-base MCA on the market. Osprey provides a level of performance superior to many available desk-top MCAs.

The Osprey will accommodate standard 14-pin scintillation detectors using 10-stage PMTs. It also supports a suite of temperature-stabilized detectors designed specifically for the Osprey. The CANBERRA temperature-stabilized detectors use a patented* LED stabilization technique and features a robust locking mechanism for increased reliability. In most detector configurations, the Osprey is compatible with Model 727 laboratory lead shield.

SPECIFICATIONS

PROGRAMMABLE CONTROLS

- GAIN
  - Coarse Gain
    - x1, x2, x4, x8 software programmable.
  - Fine Gain
    - x1 – x5 software programmable.
  - Total Gain
    - Product of Fine Gain and Coarse Gain, x1 – x40.
- ADC
  - ADC 14-Bit 20 MHz Sampling.
- LLD/ULD
  - ULD
    - 0% to 100% of Full Scale software programmable.
  - ULD
    - 0% to 100% of Full Scale software programmable.
- Detector Voltage – HVPS
  - 0 to +1300 V dc: 100 V/s ramping on power up and down.



- Shaping
  - DSP Based Trapezoidal shaping filter operating at 80 MHz.
  - Rise Time
    - 0.2 µs – 5 µs in 200 ns steps. Default: 1 µs for NaI probe.
  - Flat Top
    - 0 to 3 µs in 100 ns steps. Default: 1 µs for NaI probe.
- Digital Spectrum Stabilization
  - Support for a stabilization source for non-stabilized probes.
  - Support of temperature-stabilized probes.
- BASE LINE RESTORER – Automatic with provision for adjustable BLR.
- FAST DISCRIMINATOR THRESHOLD – Automatic with provision for adjustable FDisc.
- PUR GUARD – Programmable guard time 1.1 to 2.5 times shaping.

INPUTS/OUTPUTS

- Standard 14-pin PMT socket and CANBERRA proprietary 8-pin socket.
- USB 2.0.
- Ethernet 10/100BaseTX
- GPIO – Three freely assignable MCX connectors.
  - TTL compatible, minimum pulse width for inputs >50 ns, all inputs have software selectable polarity.
  - Coincidence/Anti-coincidence.
  - PHA External Start/Stop. Start/Stop Mode (Start Only, Stop Only, and Start and Stop) or Suspend and Resume Mode (can also be an output to control other devices).
  - MCS External Start/Stop. Start/Stop Mode (Start Only, Stop Only, and Start and Stop) or Suspend and Resume Mode (can also be an output to control other devices).
  - External Time Sync. (can also be an input or an output to control other devices) for the following modes:
    - List (Sync. rate from external source or master to sync. time stamps of events).
    - MSS (Sync. from external source or master to advance to next spectral group).
    - Aux Counters and SCA Counters (Sync. can be used to control the start of interval timer and synchronize the interval timer at each sync event).
  - Aux Counter In – Auxiliary Counter Input.
  - MCS Input: External MCS input, TTL pulse.
  - MCS Channel Advance – External MCS Channel Advance; TTL pulse.
  - MCS Sweep Advance – External MCS Sweep Advance input; TTL pulse.
  - SCA Outputs – Up to three; each of these outputs can be selected from one of the six internal SCAs.
  - ICR Out – Incoming count rate output.
  - Acquisition Out – Acquisition status.
  - General Purpose Input/Output – Output signal to drive external devices or input signal to monitor externals device's status.

ACQUISITION MODES

- PHA
  - PHA Channels 256 to 2048 Channels. Supports two memory groups of up to 2048 channels each.
  - Preset: ROI Counts (Integral), Real or Live Time timers.
  - Real and Live Time Resolution 0.01 s.
  - Preset Time 0 to >4 x 10^7 s.
  - Control: Internal or External Start/Stop control.
  - LTC accuracy 5% (3% typical) up to 50 kcps.
  - LTC method proprietary.
- MCS
  - Dwell range 1 µs to 999 seconds in 1 µs steps.
  - Sweep range 1 to 2^{32} -1.
  - Preset Sweep Counter 0 to 2^{32} -1 Sweeps. 0 implies "Forever".
  - MCS input selection: PHA ROI, external TTL or Fast Discriminator.
  - Dwell selection internal or external.
  - MCS Channels 256 to 2048 Channels. Supports two memory groups of up to 2048 channels each.

The following advanced modes of operation are accessible through the optional SDK.

- SCA
  - Channels 6.
  - Preset Modes Live Time, Real Time.
  - SCA Modes Automatic, Manual, AutomaticEx, External Sync.
  - Size of Counter for each SCA Channel 32-bits.
  - LLD and ULD for each SCA Channel 0% to 100% Full Scale Software Programmable.
  - SCA Signal Output for selected channel 200 ns output pulse for each event can be mapped to a GPIO connector.
- MSS
  - Data acquired into two memory groups, alternating between the two in a "ping-pong" fashion when a preset time parameter is reached.
  - Ability to use External Sync. to switch between groups.
- List/Time-Stamped List
  - Latency: 100 ms (Only when streaming mode is supported).
  - External time base support (Use of External Sync.).
  - Time-stamp resolution selection of 1 µs or 100 ns.
  - Maximum event rate 100 000 pulses/sec.
- AUX Counter
  - TTL compatible, minimum pulse width for input >50 ns.
  - AUX Counter Modes Automatic, Manual, AutomaticEx, External Sync.

PERFORMANCE

- Channel Configurations
  - Total channels 8192.
  - Configurable as two groups of 2048, 1024, 512 or 256 channels for PHA and MCS (can be simultaneous).
  - Bits per channel 32.
- Integral Non-linearity
  - ±0.025% of full scale over the top 99% of the selected range.
- Differential Non-linearity
  - ±1% over the top 99% of the range including the effects from integral non-linearity.
- Gain Drift
  - <75 ppm/°C after 15 minutes of operation.
- Zero Drift
  - <3 ppm/°C after 15 minutes of operation.
- Incoming Count Rate (ICR)
  - >250 K cps ICR if not limited by probe/detector.

HIGH VOLTAGE POWER SUPPLY

- Output is current limited and short-circuit protected.
- HVPS.
  - OUTPUT – 0-1300 V at 50 µA max.
  - RIPPLE – 1 mV.
  - ACCURACY – 3% Full Scale.
  - SETTING RESOLUTION – 14-bit (1/16 384).

INDICATORS

- BUSY.
- STATUS – HV/Stabilized Probe.
- ICR.

DETECTORS

- 14-pin scintillation detector.
- CANBERRA temperature-stabilized probes.

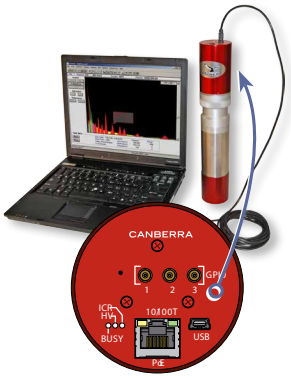
SOFTWARE & USER INTERFACE

- Genie 2000 Spectroscopy Software.
- Genie 2000 programming libraries.
- SDK – Optional software development kit that is OS independent, and independent of Genie 2000 programming libraries, Genie 2000 not required.
- Diagnostic Web GUI – OS and browser independent, Genie 2000 not required.

Osprey – Universal Digital MCA Tube Base for Scintillation Spectrometry

COMPUTER REQUIREMENTS

- The minimum computer requirements are those specified for the current version of the Genie 2000 software. See the Genie 2000 data sheet for more details.



POWER

- Main power will be supplied by either the USB port or IEEE 802.3af-compliant Power over Ethernet (PoE).
- Power consumption USB – <2 Watt.
- Power consumption PoE – <3 Watt.

PHYSICAL

- Size
  - 62 mm (2.44 in.) diameter.
  - 108 mm (4.25 in.) length.
- Weight
  - 280 g (9.9 oz).

ENVIRONMENTAL

- TEMPERATURE – -10 to +50 °C (+14 to +122 °F).
- HUMIDITY – 85% non-condensing.
- Meets the environmental conditions specified by EN 61010, Installation Category I, Pollution Degree 2.

COMPLIANCE

- EMC (Emissions and Immunity):
  - EN61326:2006
  - EN61000-3-2:2008
  - EN61000-3-3: 2008
  - EN61000-4-2: 2008
  - EN61000-4-3: 2008
  - EN61000-4-4: 2004
  - EN61000-4-5: 2005
  - EN61000-4-6: 2008
  - EN61000-4-11: 2004
  - EN61000-4-8:2001
- NRTL LISTED (Safety):
  - CAN/CSA C22.2 No. 61010-1-04
  - UL61010-1:2004
  - IEC61010-1:2001 2nd edition
  - EN61010-1:2001 2nd edition

ORDERING INFORMATION

- OSPREY-DTB – Digital tube-base MCA with 3 m (10 ft) USB cable, 3 m (10 ft) crossover Ethernet cable, 3 m (10 ft) Ethernet cable, PoE input injector (110/220), 1.2 m (4 ft) MCX-BNC cables, 3 pcs.
- OSPREY-PKG – Osprey with S504C Genie 2000 InSpector™ Basic Spectroscopy Software.
- OSPREY-PKG+ – Osprey with S504C Genie 2000 InSpector Basic Spectroscopy Software and S501C Gamma Analysis Option.
- OSPREY-SDK – OS independent Software Development Kit.
- OSPREY-STABLE – Osprey with NAIS-2x2 stabilized NaI and S504C Genie 2000 InSpector Basic Spectroscopy Software.
- OSPREY-E03L – 3 m (10 ft) Ethernet cable with a right angle plug for use with Model 727 laboratory lead shield.
- LABR-1.5x1.5 – 14-pin 1.5 x 1.5 in. non-stabilized $LaBr_3$ probe.
- NAIS-2x2 – 8-pin 2 x 2 in. LED temperature-stabilized NaI probe.
- NAIS-3x3 – 8-pin 3x3in. LED temperature-stabilized NaI probe.
- CEBRS-1.5x1.5 – 8-pin 1.5x1.5in. LED temperature-stabilized $CeBr_3$ probe.
- CEBRS-2x2 – 8-pin 2x2in. LED temperature-stabilized $CeBr_3$ probe.
- Model 802 – 14-pin 2 x 2 in. or 3 x 3 in. non-stabilized NaI probe.

Power-over-Ethernet (PoE) single port injector

CANBERRA