ORTEC®

DSP^{EC} LF

High-Performance, Digital Signal Processor for Gamma Spectroscopy

RT 3360.7   LT 3358.5
RTP123456.0   LTP 3554654.0

DT 0.1   CR 5
GainStab 0   ZeroStab 0

HV 3000 / ON   / SMART
SMART 42-N217   / 95 K
MCB ID 1
DSPEC LF

ORTEC® DSPEC LF™

ON OFF

AMETEK®
ADVANCED MEASUREMENT TECHNOLOGY

DSP*EC* LF

- Full-featured, digital spectrometer for HPGe and NaI detectors
- Automatic optimization for best detector performance (patented)
- ORTEC SMART-1™ intelligent HPGe support
- Continuous display of detector status and state-of-health information
- Fast data transfer for live spectrum display
- Easy installation with true plug-and-play on USB 2.0
- Excellent temperature and count rate stability
- MAESTRO MCA Emulation Software included
- Full computer control of every function

. . . in a compact package at an economical price.

DSPEC LF is a member of the DSPEC USB family of digital technology gamma-ray spectrometers from ORTEC. It provides the same rock solid spectral stability with variation in temperature and count rate and retains many of the valuable attributes of the other two models. Many environmental and radiochemistry laboratories will find this instrument to be the best MCA for day-to-day sample counting with laboratory HPGe or NaI detector systems.

SMART-1™ Support for Quality Data — all the time, every time
ORTEC's unique SMART-1 detectors are indeed smart. They monitor and store the detector state-of-health (detector temperature, preamp power, bias over range, bias on/off state). A single check by the DSPEC LF will verify the detector is ready and remains ready to perform acquisition. During acquisition, the SMART-1 detector continually monitors the state-of-health (SOH) to ensure the integrity of the acquired data. At the end of acquisition a quick check of the SOH flag in the SMART-1 detector shows if any parameters deviated from specification during the measurement. This is vitally important for environmental samples that must be counted for long periods of time and regulatory-driven samples where data integrity is important.

Another big advantage is the SMART-1 detectors have the recommended bias value preset at the factory. You no longer have to look through paperwork or for tags on the detector to find the right bias setting. Simply turn on the DSPEC LF and the SMART-1 detector automatically senses the detector temperature, determines the right high voltage bias, and turns it on.

Fast PC Interface
The DSPEC LF gives you high speed control over standard USB. The plug-and-play feature makes installation simple. A nearly unlimited number of DSPEC LFs can be connected simultaneously using USB hubs. As an ORTEC CONNECTIONS compatible instrument, the DSPEC LF works in a networked and in a stand-alone configuration. ORTEC CONNECTIONS means: any hardware, any software, anywhere in the laboratory with full seamless control and built-in security.

Simple, Single-Cable Connection to Detectors
The DSPEC LF uses the unique ORTEC DIM (Detector Interface Module) to connect the DSPEC LF and the detector with only a single cable. The DIM provides for bias close to the detector so that only signal and low voltage power are carried in the cable. No longer is high voltage bias and the dangers associated with it carried over long distances.

Monitor Vital Values
The DSPEC LF shows the values you need on the front panel LCD display. The DSPEC LF displays the instrument ID, name, serial number, preset count conditions, current live and real time, dead time percentage, input count rate, HV status and value, and the serial number for SMART-1 detectors.

Small Size
Smaller than a sheet of paper, the DSPEC LF sits right on the desktop. Lightweight and rugged, multiple DSPEC LFs can be stacked on top of one another via their interlocking cases without fear of sliding or tipping.

DSP^{EC} LF

Mix-and-Match with Your Existing MCBs

ORTEC CONNECTIONS software supports any combination and number of USB devices connected to any computer. For example, two digiDARTs may be combined with two DSPEC LFs connected to the same PC using a USB hub. And any number of other ORTEC MCBs can be connected to the same system by network, printer port, RS-232, or Dual Port Memory.

System Specifications

Display: 240 x 160 pixel backlit LCD provides status information, instrument ID, bias information, live and real time.

Concurrent Connections: Limited by the computer and supporting USB hubs. ORTEC CONNECTIONS software supports up to 127 USB connected devices per computer.

Throughput: Maximum system throughput >100,000 cps.

System Gain Settings:
Coarse Gain: 1, 2, 4, 8, 16, or 32.
Fine Gain: 0.45 to 1.

The available range of gain settings supports all types of HPGe detectors. Specifically the following maximum energy values are achievable using the standard ORTEC preamplifier (max. gain to min. gain):

COAX	187 keV to 12 MeV
LO-AX	94 keV to 6 MeV
GLP/SLP	16.5 keV to 1 MeV

Preamplifiers: Computer selectable as either resistive or TRP preamplifier.

System Conversion Gain: The system conversion gain is software controlled from 512 to 16k channels.

Digital Filter Shaping-Time Constants:
Rise Times: 0.8 µs to 23 µs in steps of 0.2 µs.
Flat Tops: 0.3 to 2.4 in steps of 0.1 µs.

Dead-Time Correction: Extended live-time correction according to Gedcke-Hale method.

Accuracy: Area of reference peak changes <±3% from 0 to 50,000 counts per second.

Linearity
Integral Nonlinearity: <±0.025% over top 99.5% of spectrum, measured with a mixed source (^{55}Fe @ 5.9 keV to ^{88}Y @ 1836 keV).

Differential Nonlinearity: <±1% (measured with a BNC pulser and ramp generator). Over top 99% of range.

Digital Spectrum Stabilizer: Controlled via computer, stabilizes gain and zero errors.

System Temperature Coefficient
Gain: <50 ppm/°C. [Typically 30 ppm/°C.]

Offset: <3 ppm/°C of full scale, with Rise and Fall times of 12 µs, and Flat Top of 1 µs. (Similar to analog 6 µs shaping.)

Pulse Pile-Up Rejector: Automatically set threshold.

Automatic Digital Pole-Zero Adjustment: Computer controlled. Can be set automatically or manually. Remote diagnostics via InSight Oscilloscope mode. (Patented.)

Digital Gated Baseline Restorer: Computer controlled adjustment of the restorer rate (High, Low, and Auto). (Patented.)

LLD: Digital lower level discriminator set in channels. Hard cutoff of data in channels below the LLD setting.

ULD: Digital upper level discriminator set in channels. Hard cutoff of data in channels above the ULD setting.

Ratemeter: Count-rate display on MCA and/or PC screen.

Battery: Internal battery-backed up memory to maintain settings in the event of a power interruption.

Inputs and Outputs

Detector: Multi pin connector (13W3) with the following:
Preamp Power: 1 W maximum (+12 V, –12 V, +24 V, –24 V, 2 GND).
Amp In: Normal amplifier input.
TRP Inhibit.
Power for SMART-1 or DIM.
Control of HV and SMART-1 Detector (2 wires).

USB: Universal serial bus for PC communications.

Power: Connection to supply power from a wall mounted dc supply. (+12 V dc <1.25 A).

Electrical and Mechanical

Dimensions:
DSPEC LF: 8.1 H x 20.3 W x 24.9 D cm
  (3.2 H x 8 W x 9.8 D in.)
DIM: 11.2 x 3.13 x 6.5 W cm (4.4 x 1.25 x 2.6 W in.)

Weight:
DSPEC LF: 1.0 kg (2.2 lb)
DIM: <240 g (0.5 lb)

Operating Temperature Range: 0 to 50°C, including LCD display.

U.S. Patents No.s: 5,872,363, 5,912,825, 5,821,533.

DSP*EC* LF

Detector High Voltage Supplies

DSPEC LF offers high voltage supply flexibility in the form of a microprocessor controlled module, which connects the specific detector to the MCA. On a SMART-1 HPGe detector, the HV module is integral with the detector itself. For "legacy" or "non-SMART-1" detectors, the HV supply is in the form of a Detector Interface Module or "DIM" with 2 m cables. The DIM has a mating connector for the traditional detector cable set: 9-pin D preamp power cable, Analog In, Shutdown In, Bias Out, and Inhibit In.

DIMS for non-SMART-1 detectors are available with the following high voltage options:

DIM-POSGE   Detector Interface Module for ANY Non-SMART-1 positive bias HPGe detector.
DIM-NEGGE   Detector Interface Module for ANY Non-SMART-1 negative bias HPGe detector.
DIM-POSNAI   Detector Interface Module for ANY positive bias NaI detector.
DIM-296   Detector Interface Module with Model 296 ScintiPack tube base/preamplifier/bias supply for NaI detectors with 14-pin, 10 stage photomultiplier tubes.

In all cases, Bias Voltage Setting and Shutdown polarity are set from the computer. The DSPEC LF can monitor the output voltage and shutdown state; Detector high voltage value (read only); and Detector high voltage state (on/off) (read/write) which are displayed on the front panel LCD. In addition, the SMART-1 detector provides additional state-of-health information by monitoring the following functions: Detector element temperature (read only); Detector overload state; Detector authentication code (read/write); and Detector serial number (read only).

Ordering Information

Model	Description
DSPEC LF	DSPEC LF with MAESTRO Software, No DIM, for use with SMART-1 equipped detector.
DSPEC LF-POSGE	DSPEC LF with MAESTRO Software and DIM-POSGE for use with Non-SMART-1 detector.
DSPEC LF-NEGGE	DSPEC LF with MAESTRO Software and DIM-NEGGE for use with Non-SMART-1 detector.
DSPEC LF-POSNAI	DSPEC LF with MAESTRO Software and DIM-POSNAI for use with NaI detector.
DSPEC LF-296	DSPEC LF with MAESTRO Software and DIM-296 for use with NaI detector.

Additional DIMS

DIM-POSGE	Detector Interface Module for ANY Non-SMART positive bias HPGe detector
DIM-NEGGE	Detector Interface Module for ANY Non-SMART negative bias HPGe detector
DIM-POSNAI	Detector Interface Module for ANY positive bias NaI detector
DIM-296	Detector Interface Module with Model 296 ScintiPack tube base/preamplifier/bias supply for NaI detectors with 14-pin, 10 stage photomuliplier tubes.

Example System Order:
DSPEC LF
GEM80P4-95-SMP
MOBIUS-PT

Specifies a DSPEC LF; 80% GEM PopTop detector with SMART-1 technology; and a MOBIUS LN$_2$ Recycler.

ORTEC®

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