

Quad Single-Channel Analyzer

- Four completely independent channels for counting selected energies from four detectors
- Dynamic range 500:1
- Integral, normal, and window modes
- DC-coupled input
- LED display of thresholds
- Provision for external baseline sweep



The ORTEC Model 850 Quad Single-Channel Analyzer (SCA) has the exceptionally wide dynamic range, the stability, and the high resolution necessary for use in high-resolution HPGe spectroscopy experiments. These same features provide more than adequate performance with scintillation counters and ionization chambers. DC-coupled input and integrated circuit discriminators, are employed to obtain these characteristics and to assure maximum performance at high counting rates.

The Model 850 consists of four completely independent SCA channels. Each channel is versatile, with three basic operating modes provided. In the Window mode, each channel operates as a high-resolution, narrow (0 to 10%) window, single-channel analyzer. For wide-window applications, the Normal mode is used. In this mode, the upper-level and lower-level controls of each channel are independently variable from 20 mV to 9.99 V, and an output is generated for pulses analyzed between the levels. A front-panel green LED indicates activity. Through the use of separate rear-panel LL OUT and UL OUT outputs, each channel can operate as a dual, wide-dynamic-range integral discriminator for leading-edge timing or for pulse routing.

For an application where it is desirable to scan an entire spectrum, an external baseline sweep input is provided via the rear-panel LL REF EXT BNC connector. Printed wiring board jumpers select which of the four channels will use the external baseline sweep. In this mode of operation, the baseline (lower-level threshold) on which a window is riding is swept through an energy range and the count rate is recorded as a function of energy.

The Model 850 has an easy-to-use, built-in digital voltmeter for setting the lower-level and upper-level thresholds of each channel. A front-panel push button selects which of the four channels is being read. A second front-panel push button selects either the lower-level or upper-level reading. The digital volt-meter display flashes on overrange.

Specifications

Specifications apply to each of the four independent channels.

PERFORMANCE

DYNAMIC RANGE 500:1.

PULSE-PAIR RESOLVING TIME 200 ns plus output pulse width.

THRESHOLD TEMPERATURE

INSTABILITY $< \pm 0.01\% / ^\circ\text{C}$ of full scale, 0 to 50°C using a NIM Class-A power supply (referenced to -12 V).

WINDOW WIDTH CONSTANCY $\leq \pm 0.1\%$ variation of full-scale window width over the linear 0- to 10-V input range.

DISCRIMINATOR NONLINEARITY $< \pm 0.25\%$ of full scale (integral) for both discriminators.

CONTROLS

WINDOW OR UPPER LEVEL Front-panel screwdriver potentiometer determines the window width (0 to 1 V) in the Window mode or the upper-level threshold (20 mV to 9.99 V) in the Normal mode. This control is disabled in the Integral mode. The built-in voltmeter is used to read the Window or upper-level setting.

LOWER LEVEL Front-panel screwdriver potentiometer adjustable from 20 mV to 9.99 V. When the printed wiring board (PWB) LL REF mode jumper is set on INT, this potentiometer determines the threshold setting for the lower-level discriminator. When the LL REF mode jumper is in the EXT position, the control is ineffective.

INTEGRAL/NORMAL/WINDOW Two printed wiring board jumpers select one of three operating modes:

Integral LL sets a single discriminator threshold (20 mV to 9.99 V) and UL is disabled.

Normal UL and LL are independently adjustable levels (20 mV to 9.99 V).

Window LL sets the baseline level (20 mV to 9.99 V) and UL sets the window width (2 mV to 0.999 V). The Digital Voltmeter reading must be divided by 10 to determine the Window setting.

LL REF MODE A printed wiring board jumper selects either the front-panel LL potentiometer or the voltage signal applied to the rear-panel LL REF EXT connector as the LL discriminator reference threshold.

DIGITAL VOLTMETER Channel Front-panel push button to select channel 1 through 4. Front-panel red LED indicates the selected channel.

LL/UL Front-panel push button selects lower-level or upper-level threshold for viewing on the Digital Voltmeter. Front-panel yellow LED indicates the selected threshold. **Inaccuracy** ± 1 digit.

INPUTS

SIGNAL INPUTS Front-panel BNC connector accepts positive, unipolar or bipolar signal, 0- to 10-V linear range. PWB jumper selects either dc- or ac-coupled input. For dc-coupled input, ± 12 V maximum; width > 100 ns; $Z_{in} = 1$ k Ω . For ac-coupled input, ± 100 V maximum, 0.2- to 10- μ s width; $Z_{in} = 1$ k Ω .

LL REF EXT When the PWB jumper is on Ext, the rear-panel BNC connector accepts the lower-level biasing. (An input of -20 mV to -9.99 V on this connector corresponds to a range of 20 mV to $+9.99$ V for the lower-level discriminator setting.) Input protected to ± 24 V.

OUTPUTS

SCA OUT Front-panel BNC connector provides positive NIM-standard output, nominally $+5$ V; 500 ns wide; $Z_o \leq 10$ Ω . Output occurs as the trailing edge of linear input crosses the LL threshold.

LL OUT Rear-panel BNC connector provides positive NIM-standard output, nominally $+5$ V; 500 ns wide; $Z_o \leq 10$ Ω . Output occurs as the leading edge of linear input crosses the LL threshold.

UL OUT Rear-panel BNC connector provides positive NIM-standard output, nominally $+5$ V; 500 ns wide; $Z_o \leq 10$ Ω . Output occurs as the leading edge of linear input crosses the UL threshold.

ELECTRICAL AND MECHANICAL

POWER REQUIRED $+12$ V, 145 mA; -12 V, 140 mA; $+6$ V, 400 mA.

WEIGHT

Net 0.91 kg (2.0 lb).

Shipping 2.27 kg (5.0 lb).

DIMENSIONS NIM-standard single-width module, 3.43 X 22.13 cm (1.35 X 4.714 in.) per DOE/ER-0457T.

Related Equipment

The Model 850 is compatible with all ORTEC amplifiers and other amplifiers having a 0- to 10-V positive, linear output range.

Ordering Information

To order, specify:

Model	Description
850	Quad Single-Channel Analyzer



Specifications subject to change
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