ACE Mate
Preamplifier, Amplifier, Bias Supply and SCA
925-SCINT



- Stand-alone instrument designed for bench-top operation.
- Interfaces directly to photomultiplier tube bases such as Models 266, 276, and 296.
- Protected against sudden positive or negative high-voltage spikes.
- Amplifier provides a 10-V linear output and features low input noise and a wide gain range to allow a variety of applications.
- Lower Level and Upper Level can be set over a 200:1 dynamic range from 50 mV to 9.99 V.
- Front-panel push-button selects setting in volts, or count rate in kcps, 3-digit display.
- High-voltage supply is continuously adjustable from 50 to 2000 V DC, and the output polarity is selectable.

The ACE Mate Preamplifier, Amplifier, Bias Supply, and SCA provides the link between scintillation detectors and most ORTEC Multichannel Analyzers. ACE Mate, a stand-alone instrument designed for bench-top operation, incorporates a low-noise preamplifier, a spectroscopy-type shaping amplifier, a single-channel analyzer, count-rate monitor, HV power supply, and a digital display to monitor these functions. The ACE Mate module interfaces directly to ORTEC photomultiplier tube bases such as the Models 266, 276, and 296, which can be coupled with the 905 series of scintillation detectors.

The preamplifier is noninverting and is intended for use with photomultiplier tubes. The input is AC-coupled and diode-protected against sudden positive or negative high-voltage spikes. A Printed Wiring Board (PWB) switch is provided to bypass the preamplifier when using external preamplifiers, thereby allowing the signal to be connected directly to the internal shaping amplifier.

The spectroscopy shaping amplifier provides a 10-V linear output and features low input noise and a wide gain range to allow a variety of applications. Semi-Gaussian bipolar shaping is used to eliminate baseline shift with count rate change. Bipolar pulse shaping also eliminates the need for pole-zero adjustments, thus simplifying the setup of the ACE Mate.

A single-channel analyzer (SCA) is incorporated in the ACE Mate. The input to the SCA is obtained from the amplifier output. The SCA operates in Windows mode; the Lower Level and Upper Level can be set over a 200:1 dynamic range from 50 mV to 9.99 V. The lower-level reference is selected by a PWB jumper for either the front panel potentiometer or an external signal.

A three-digit display on the front panel allows the user to monitor either the high voltage (in kV), the lower-level and the upper-level SCA discriminator settings (in volts), or the count rate (in kcps). A front-panel push-button selects among these three choices.

The high voltage supply provides the voltage necessary for the photomultiplier tubes. The output is continuously adjustable from 50 to 2000 V DC and internal PWB jumpers select the output polarity. Front-panel LEDs indicate the presence of high voltage and the polarity. The maximum load current is 1 mA to 2000 V. A front-panel On/Off switch controls the high voltage.

A preamp power connector provides power to tube bases with internal preamplifiers.

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Specifications

PREAMPLIFIER

INPUT Input stage is AC-coupled. Diode protected against sudden positive or negative voltage spikes.

IN/OUT PWB slide switch provides preamplifier selection. The IN position allows the internal preamplifier to function. The OUT position allows an external preamplifier to be directly connected to the amplifier using the Input BNC connector.

AMPLIFIER

GAIN RANGE Continuously adjustable from 5 to 1250 using six-position front-panel COARSE GAIN switch and a ten-turn direct reading FINE GAIN potentiometer.

PULSE SHAPE Peaking time equals 2 µs and is semi-Gaussian bipolar.

POS/NEG PWB slide switch selects either positive or negative input pulse polarity.

INPUT Accepts either the output of the internal preamplifier or a signal from the rear-panel BNC connector. External input signals can be positive or negative, with rise times <1 µs and decay times >40 µs; Z_{in} = 1000 Ω; AC-coupled; linear maximum input 2 V; absolute maximum 20 V.

OUTPUT Rear-panel BNC connector with Z_{out} <1 Ω is short-circuit proof and positive lobe leading, with a full-scale linear range from 0 to 10 V. Active filter shaping is incorporated.

PREAMP POWER Rear-panel standard ORTEC preamp power connector (Amphenol 17-10090) mates with captive and noncaptive power cords on all ORTEC preamplifiers.

SINGLE-CHANNEL ANALYZER

DYNAMIC RANGE 200:1.

UL Front-panel screwdriver-adjustable potentiometer determines the upper level (0.05–9.99 V). Control setting is read on the front-panel digital display.

LL Front-panel screwdriver-adjustable potentiometer determines the lower level (0.05–9.99 V). Control setting is read on the front-panel digital display.

LOWER LEVEL REFERENCE CONTROL A PWB jumper selects either the front-panel LL potentiometer or the positive voltage signal applied to the rear-panel EXT LL REF BNC connector. SCA INPUT is internally connected to the amplifier output.

SCA OUTPUT Rear-panel BNC connector provides TTL compatible signal; output amplitude >3 V, pulse width approximately 0.5 µs. Output occurs as the trailing edge of the amplifier output crosses the LL threshold.

SCA INPUT Internally connected to the output of the amplifier.

RATEMETER

INPUT Ratemeter input is internally connected to the SCA output.

OUTPUT Ratemeter output can be read on the front-panel 3-digit digital display. The range is from 0 to 99.9 kcps.

HIGH-VOLTAGE SUPPLY

OUTPUT PWB jumper selects either positive or negative high-voltage output and is available at rear-panel SHV connector.

OUTPUT RANGE 50 to 2000 V.

OUTPUT LOAD CAPACITY 1 mA to 2000 V.

HV CONTROL A front-panel HV ON/OFF switch provides control of the high-voltage supply when the main AC power switch is on.

OUTPUT ADJUST A 3-turn precision potentiometer adjusts the output from 0 to 2000 V.

REGULATION <0.02%.

OUTPUT RIPPLE <15 mV rms at 1 kV, 1 mA load.

STABILITY <0.01%/°C.

ELECTRICAL AND MECHANICAL

POWER REQUIRED 115 V AC or 230 V AC. Separate internal tap connection for 100 V AC or 200 V AC. AC power <50 VA at 2 kV, 1 mA load.

DIMENSIONS 9.2 X 30.5 X 27.9 cm (3.6 X 12 X 11 in.).

WEIGHT 4 kg (9 lb).

SHIPPING WEIGHT 5 kg (11 lb).

Ordering Information

Model	Description
925-SCINT	ACE Mate Preamplifier, Amplifier, Bias Supply, and SCA

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AMETEK®

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Specifications subject to change
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