ORTEC®

AlphaSuite

All-In-One Integrated Alpha Spectrometers



"Advanced Digital Alpha Spectrometers
to Meet Every Counting Laboratory Need."

AMETEK®
ADVANCED MEASUREMENT TECHNOLOGY

AlphaSuite

With the Alpha Suite range of integrated Alpha Spectrometers, ORTEC is able to address the needs of ANY counting laboratory, large or small, upgrading or just starting out. The latest advanced digital design, together with a modular mechanical approach, aligns value and performance with unparalleled configuration flexibility. Any of these spectrometers may be added to existing ORTEC systems simply by installing the latest drivers included with the instrument.

All Alpha Suite models feature the following:

- A complete instrument requiring vacuum, power and connection to a PC only.
- Simple, high speed USB connection to computer.
- Internal advanced DIGITAL MCA.
- Digital Spectrum Stabilizer.
- Computer controlled preamplifier, HV supply, and calibration pulser.
- High Quality Nickel-plated Brass Vacuum chamber, easily decontaminated
- Optional Alpha Recoil protection system available.
- Compatible with all previous ORTEC Alpha Spectrometer Systems.
- MAESTRO® MCA Emulation Software.

Alpha Aria®



A single alpha spectroscopy channel in a 2-wide NIM chassis. The digital MCA is built right in, so a USB connection is all that is needed to start counting. A simple to operate PUMP/HOLD/VENT control is mounted on the front panel. The Alpha Aria is easy to add to existing NIM installations.



Alpha Duo®

Benchtop dual alpha spectrometer with two alpha spectroscopy channels. Each unit includes 100% fully computer controlled vacuum measurement, variable detector bias supply (switchable positive or negative), preamplifier, test pulse generator with variable amplitude, and a leakage current monitor. The Alpha Duo has dedicated independent MCAs to optimize processing time.

Alpha Mega®



Benchtop single alpha spectrometer with sample chamber designed for filters up to 4.18 inches (106 mm) in diameter. Based upon the Alpha Duo, but capable of sampling much larger samples and using large diameter detectors, it has all the same quality features and is fully computer controlled. The Alpha Mega is available in benchtop form, or as an option in our Alpha Ensemble chassis.



Alpha Ensemble®

Modular alpha spectroscopy system which may be configured with up to 4 modules in any combination of ALPHA-DUO-M1 and/or ALPHA-MEGA-M1 expansion modules. Each alpha spectroscopy module includes a vacuum gauge, variable detector bias supply (switchable positive or negative), preamplifier, test pulse generator with variable amplitude, self-controlled RCAP, and a leakage current monitor.

Each expansion module has a separate vacuum control within an Alpha Ensemble configuration. The Alpha Ensemble may be either rack mounted or left in the table-top mounting enclosure in which it is supplied. In the Alpha Ensemble configuration, an internal USB hub provides connection via a single cable to the user's PC. Each detection system has individual digital offset and conversion gain settings for maximum flexibility.

Specifications – Common to All Models

Vacuum Chamber

Construction	Cast brass, nickel-plated for ease of decontamination.
Maximum Sample Size	Aria and Duo: 51 mm (2.030 in.) Mega: 106 mm (4.18 in.)
Maximum Sample-to-Detector Spacing	44 mm, in increments of 4 mm.
Maximum Detector Size	Aria and Duo: 1200 mm^2. Mega: 3000 mm^2. (Consult Factory)
Detector Connector Type	Rear Microdot (ORTEC B mount).
Vacuum Manifold Connector	Aria, Duo, and Mega: 0.25" Swagelock tube fitting. Ensemble: NW25.
Vacuum Pump Requirements	Rotary vacuum pump, 6.7 CFM (190 L/min) displacement, with oil mist trap. The ORTEC ALPHA-PPS-115 (or -230) is available for this application.

System Performance

Based on use with a BU-017-450-100 ULTRA™ Series detector with a good-quality ^{241}Am point source.	
Energy Resolution	≤20 keV (FWHM) with a detector-to-source spacing equal to the detector diameter.
Detector Efficiency	≥25% is achievable with close detector-to-source spacing.
Background	Above 3 MeV, ≤1 count/hour based on a BU-020-450-AS detector.

Electronics

Bias Supply	
Range	0 ±100 V, 10 µA; voltage can be read by the computer.
Bias	Computer controlled, adjustable in 1 V increments.
Pos/Neg	Polarity can be selected independently with PWB slide switches (factory set for positive bias voltage).
Enable/Disable	By computer control.
Indicator	Front-panel, red LED for each channel shows if the bias is on.
Calibration Pulser	
Range	0 to 10 MeV.
Pulser	Computer controls the internal pulser amplitude with 12 bit (2.5 keV) level settings; set to a nominal 7-MeV pulse when shipped.
Frequency	100 Hz.
Frequency Stability	≤±50 ppm/°C.
Amplitude Drift	≤±150 ppm/°C.
Long Term Drift	≤±0.005% of full scale/24 hours at constant temperature.
ON/OFF	Computer controlled.
Indicator	Front-panel, BIAS red LED flashes when pulser is on.

Specifications – Common to All Models – continued

Electronics – continued

Detector Current Monitor	
Range	0 to 10,000 nA; read by computer.
Display Resolution	3 nA.
Preamplifier	
Charge Sensitive	Nominally 10 mV/MeV.
Pos/Neg	Polarity can be selected independently with PWB slide switches.
Digital MCA	
Digital Filter	1 µs unipolar equivalent.
Conversion Gain	Software-selectable as 256, 512, 1024, 2048, or 4096, independent for each segment.
Fine Gain	Software-selectable range from 0.25 to 1.
Digital Offset	Software-selectable range from 0 to conversion gain setting (4096 max) in 1 channel increments.
Display Channels	Software-selectable range from 0 to (conversion gain – digital offset).
Digital Spectrum Stabilizer	Controlled via computer.
Dead-Time Correction	Extended live-time correction according to the Gedcke-Hale method.
Software Controls	
ADC LLD	Computer controlled from 0 to 100% full scale.
ADC ULD	Computer controlled from 0 to 100% full scale.
Indicators (front panel)	
ADC Busy	Red LED flashes once for each digitized pulse.
Presets	
Real Time/Live Time	Multiples of 20 ms.
Region of Interest	Peak count/Integral count.
Data Overflow	Terminates acquisition when any channel exceeds 2^{31-1}.
Interface Connectors	
High Speed USB	Rear panel standard "B" type USB connector.

Computer Prerequisites

Any computer capable of running any of the following operating systems: Windows XP SP3 and Windows 7 32- or 64-bit.

Specifications – Model Specific

Alpha Aria

A single alpha spectroscopy channel in a NIM chassis. Each unit includes a variable detector bias supply (switchable positive or negative), a preamplifier, and a test pulse generator with variable amplitude.	
Vacuum Control	3-position Pump/Vent/Hold valve, front-panel mounted.
Recoil Protection (RCAP) Option	Includes biased sample holder and Granville-Philips gauge with solenoid vacuum controller.
Electrical and Mechanical	
Dimensions	2.7 in. W x 11.9 in. D x 8.7 in. H in a double-wide NIM chassis.
Net Weight	1.9 kg (4.2 lb).
Shipping Weight	2.3 kg (7.3 lb).
Power Input	NIM power. +6 V @ 315 mA, +12 V @ 50 mA, –12 V @ 75 mA, +24 V @ 50 mA.
Power Consumption	5 W input power.
Operating Environment	0° to 50°C. Up to 95% relative humidity, non-condensing.

Alpha Duo

Benchtop dual alpha spectrometer with two alpha spectroscopy channels. Each unit includes a vacuum gauge, variable detector bias supply (switchable positive or negative), preamplifier, test pulse generator with variable amplitude, and a leakage current monitor.	
Vacuum Control	Via computer for each Alpha Duo module.
Vacuum Gauge Range	10 mTorr to 20 Torr, read by computer.
Recoil Protection (RCAP) Option	Built-in pressure controller, requires addition of optional biased sample holders only.
RCAP Controller Range	<1 Torr to >13 Torr, read by computer. Regulation Target Pressure ±10%.
Electrical and Mechanical	
Dimensions	10.1 in. W x 14.4 in. D x 6.0 in. H enclosure.
Net Weight	7.1 kg (15.6 lb).
Shipping Weight	8.2 kg (18.0 lb).
Power Input	100/240 V ac, 50/60 Hz.
Power Consumption	10 W input power.
Operating Environment	0° to 50°C. Up to 95% relative humidity, non-condensing.

Specifications – Model Specific – continued

Alpha Mega

Benchtop single large alpha spectrometer. Includes a vacuum gauge, variable detector bias supply (switchable positive or negative), preamplifier, test pulse generator with variable amplitude, and a leakage current monitor.	
Vacuum Control	Via computer.
Vacuum Gauge Range	10 mTorr to 20 Torr, read by computer.
Recoil Protection (RCAP) Option	Built-in pressure controller.
RCAP Controller Range	<1 Torr to >13 Torr, read by computer. Regulation Target Pressure ±10%.
Electrical and Mechanical	
Dimensions	10.1 in. W x 14.4 in. D x 6.0 in. H enclosure.
Net Weight	8.3 kg (18.2 lb).
Shipping Weight	9.5 kg (21.0 lb).
Power Input	100/240 V ac, 50/60 Hz.
Power Consumption	10 W input power.
Operating Environment	0° to 50°C. Up to 95% relative humidity, non-condensing.

Alpha Ensemble

Modular alpha spectroscopy system which may be configured with up to 4 modules in any combination of ALPHA-DUO-M1 and/or ALPHA-MEGA-M1 expansion modules. Each alpha spectroscopy module includes a vacuum gauge, variable detector bias supply (switchable positive or negative), preamplifier, test pulse generator with variable amplitude, self-controlled RCAP, and a leakage current monitor. Each expansion module has a separate vacuum control within an Alpha Ensemble configuration.

The Alpha Ensemble may be either rack mounted or left in the table-top mounting enclosure in which it is supplied.

Each instrument is supplied with a full set of blank panels as needed to cover unoccupied expansion space.

Vacuum Control	Via computer for each module installed.
Vacuum Gauge Range	10 mTorr to 20 Torr, read by computer.
Recoil Protection (RCAP) Option	Built-in pressure controller. Requires addition of optional biased sample holders for use with ALPHA-DUO-M1 module.
RCAP Controller Range	<1 Torr to >13 Torr, read by computer. Regulation Target Pressure ±10%.
Electrical and Mechanical	
Dimensions	19.0 in. W x 19.4 in. D x 10.7 in. H enclosure
Net Weight	(with 4 expansion modules): 26.6 kg (58.4 lb).
Shipping Weight	(with 4 expansion modules): 29.5 kg (65.0 lb)
Power Input	100/240 V ac, 50/60 Hz.
Power Consumption	50 W input power.
Operating Environment	0° to 50°C. Up to 95% relative humidity, non-condensing.

Ordering Information

Step 1. Choose one or more Alpha Spectrometers.

Model	Description
ALPHA-ARIA	Single input NIM spectrometer. Includes ENS-ST-1, ENS-CG, MAESTRO Software and USB cable.
ALPHA-DUO	Dual input benchtop spectrometer. Includes 2 ea. ENS-ST-1, ENS-ST-KK, ENS-CG, MAESTRO Software and USB cable.
ALPHA-MEGA	Single input benchtop spectrometer for up to 4" samples. Includes MEGA-ST, MEGA-CG, MAESTRO Software and USB cable.
ALPHA-ENSEMBLE-2	2 input benchtop spectrometer (one ALPHA-DUO-M1 module). Includes 2 ea. ENS-ST-1, ENS-ST-KK, ENS-CG, MAESTRO Software and USB cable.
ALPHA-ENSEMBLE-4	4 input benchtop spectrometer (two ALPHA-DUO-M1 modules). Includes 4 ea. ENS-ST-1, ENS-ST-KK, ENS-CG, MAESTRO Software and USB cable.
ALPHA-ENSEMBLE-6	6 input benchtop spectrometer (three ALPHA-DUO-M1 modules). Includes 6 ea. ENS-ST-1, ENS-ST-KK, ENS-CG, MAESTRO Software and USB cable.
ALPHA-ENSEMBLE-8	8 input benchtop spectrometer (four ALPHA-DUO-M1 modules). Includes 8 ea. ENS-ST-1, ENS-ST-KK, ENS-CG, MAESTRO Software and USB cable.
ALPHA-ENSEMBLE-1M	Single input benchtop spectrometer (one ALPHA-MEGA-M1 module). Includes MEGA-ST, MEGA-CG, MAESTRO Software and USB cable.
ALPHA-ENSEMBLE-2M	2 input benchtop spectrometer (two ALPHA-MEGA-M1 modules). Includes 2 ea. MEGA-ST, MEGA-CG, MAESTRO Software and USB cable.
ALPHA-ENSEMBLE-3M	3 input benchtop spectrometer (three ALPHA-MEGA-M1 modules). Includes 3 ea. MEGA-ST, MEGA-CG, MAESTRO Software and USB cable.
ALPHA-ENSEMBLE-4M	4 input benchtop spectrometer (four ALPHA-MEGA-M1 modules). Includes 4 ea. MEGA-ST, MEGA-CG, MAESTRO Software and USB cable.
ALPHA-ENSEMBLE-1D-1M	3 input benchtop spectrometer (one ALPHA-DUO-M1 module and one ALPHA-MEGA-M1 module). Includes 2 ea. ENS-ST-1, ENS-ST-KK, ENS-CG, MEGA-ST, MEGA-CG, MAESTRO Software and USB cable.
ALPHA-ENSEMBLE-1D-2M	4 input benchtop spectrometer (one ALPHA-DUO-M1 module and two ALPHA-MEGA-M1 modules). Includes 2 ea. ENS-ST-1, ENS-ST-KK, ENS-CG, 2 ea. MEGA-ST, MEGA-CG, MAESTRO Software and USB cable.
ALPHA-ENSEMBLE-1D-3M	5 input benchtop spectrometer (one ALPHA-DUO-M1 module and three ALPHA-MEGA-M1 modules). Includes 2 ea. ENS-ST-1, ENS-ST-KK, ENS-CG, 3 ea. MEGA-ST, MEGA-CG, MAESTRO Software and USB cable.
ALPHA-ENSEMBLE-2D-1M	5 input benchtop spectrometer (two ALPHA-DUO-M1 modules and one ALPHA-MEGA-M1 module). Includes 4 ea. ENS-ST-1, ENS-ST-KK, ENS-CG, MEGA-ST, MEGA-CG, MAESTRO Software and USB cable.
ALPHA-ENSEMBLE-2D-2M	6 input benchtop spectrometer (two ALPHA-DUO-M1 modules and two ALPHA-MEGA-M1 modules). Includes 4 ea. ENS-ST-1, ENS-ST-KK, ENS-CG, 2 ea. MEGA-ST, MEGA-CG, MAESTRO Software and USB cable.
ALPHA-ENSEMBLE-3D-1M	7 input benchtop spectrometer (three ALPHA-DUO-M1 modules and one ALPHA-MEGA-M1 module). Includes 6 ea. ENS-ST-1, ENS-ST-KK, ENS-CG, MEGA-ST, MEGA-CG, MAESTRO Software and USB cable.

Ordering Information – continued

Step 2. For each spectrometer chosen, specify type and quantity of detectors from the following list:	
ENS-U300	300 mm² low-background ULTRA-AS detector for Alpha Suite spectrometer, installed and system tested. Order BU-019-300-AS for uninstalled detectors).
ENS-U450	450 mm² low-background ULTRA-AS detector for Alpha Suite spectrometer, installed and system tested. Order BU-020-450-AS for uninstalled detectors).
ENS-U490	490 mm² low-background ULTRA-AS detector for Alpha Suite spectrometer, installed and system tested. Order BU-020-490-AS for uninstalled detectors).
ENS-U600	600 mm² low-background ULTRA-AS detector for Alpha Suite spectrometer, installed and system tested. Order BU-024-600-AS for uninstalled detectors).
ENS-U900	900 mm² low-background ULTRA-AS detector for Alpha Suite spectrometer, installed and system tested. Order BU-029-900-AS for uninstalled detectors).
ENS-U1200	1200 mm² low-background ULTRA-AS detector for Alpha Suite spectrometer, installed and system tested. Order BU-037-1200-AS for uninstalled detectors).
ENS-R300	300 mm² low-background Ruggedized detector for Alpha Suite spectrometer, installed and system tested. Order BR-SNA-300-100 for uninstalled detectors).
ENS-R450	450 mm² low-background Ruggedized detector for Alpha Suite spectrometer, installed and system tested. Order BR-SNA-450-100 for uninstalled detectors).
ENS-R600	600 mm² low-background Ruggedized detector for Alpha Suite spectrometer, installed and system tested. Order BR-SNA-600-100 for uninstalled detectors).
ENS-R900	900 mm² low-background Ruggedized detector for Alpha Suite spectrometer, installed and system tested. Order BR-SNA-900-100 for uninstalled detectors).

STEP 3. Specify options and accessories if needed:

Model	Description
ALPHA-PPS-115	Portable Pump Station, 115 V.
ALPHA-PPS-230	Portable Pump Station, 230 V.
ENS-ST-1	Sample Tray for Aria and Duo. Fits 3/4 and 1 inch samples.
ENS-ST-2	Sample Tray for Aria and Duo. Fits 1/2 and 7/8 inch samples.
ENS-ST-3	Sample Tray for Aria and Duo. Fits 1.25 and 1.5 inch samples.
ENS-ST-4	Sample Tray for Aria and Duo. Fits 1.75 and 2 inch samples.
ENS-ST-KK	Set of Sample Trays for Aria and Duo. One each of all four (1/2 through 2 inch).
ENS-CG	Chamber Door O-Rings for Aria and Duo. Package of 10.
ENS-RACKMOUNT	Installed 19" Rackmount, must be ordered with ALPHA-ENSEMBLE.
ENS-RM-KIT	19" Rackmount Kit for ALPHA-ENSEMBLE, not installed.
MEGA-CG	Chamber Door O-Rings for Mega. Package of 5.
MEGA-ST	Sample Tray for Mega. Fits sample sizes up to 4.18 inches (106 mm). Includes Spring Loaded Filter Retainer.
RCAP-ST	Biased Sample tray assembly for recoil protection use. Fits Aria and Duo. (One per chamber required.)
A36-BW	AlphaVision® Alpha Analysis Software (primary single use license).
A36-NW	AlphaVision Network Copy (for networked systems in addition to the first).

Expansion Modules for Alpha Ensemble

ALPHA-DUO-M1	Dual input Alpha Ensemble expansion spectrometer. Includes ENS-ST-KK and ENS-CG.
ALPHA-MEGA-M1	Single input Alpha Ensemble expansion spectrometer for samples up to 4.18 inches (106 mm). Includes MEGA-ST and MEGA-CG.

Specifications subject to change
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