

A vertical, dark-colored spectrometer with a control panel on top featuring a red indicator light and a rotary knob. The text "Alpha Aria" is printed on the front panel.

Alpha Aria

A benchtop spectrometer with two detector modules on the left and a control panel on the right. The text "Alpha Duo" is printed on the front panel.

Alpha Duo

A large, modular spectrometer consisting of two rows of detector modules. The text "Alpha Ensemble" is printed on the front panel.

Alpha Ensemble

With the introduction of 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 ORTEC Alpha Suite consists of a single channel NIM, (the Alpha Aria), a dual channel benchtop system, (the Alpha Duo), and modular 2, 4, 6, or 8 input "Alpha Ensemble" systems for use in a rack or on a shelf. 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.

Alpha Suite

All-In-One Integrated Alpha Spectrometers

All Alpha Suite models feature the following:

- A complete instrument requiring vacuum, power and connection to a PC only
- Simple and fast USB 2.0 connection to computer
- Internal advanced DIGITAL MCA
- Digital Spectrum Stabilizer
- Calibration Pulser
- Computer controlled HV Supply
- High Quality Nickel-plated Brass Vacuum chamber, easily decontaminated
- Alpha Recoil protection system (optional)
- Compatibility with all previous ORTEC Alpha Spectrometer Systems

Alpha Aria

- Single channel
- 2 wide NIM module
- Manual vacuum control
- USB connectivity
- Recoil Protection Option

Many Counting Laboratories still use NIM instrumentation. The Alpha Aria requires only that a dual NIM slot be available to add it to an existing system. A simple to operate PUMP/HOLD/VENT control is mounted on the front panel.

Alpha Duo

- Dual channel, USB connectivity
- Neat, benchtop enclosure, small foot print
- Computer controlled chamber pressure monitoring and venting
- Inexpensive recoil protection option
- Can be upgraded as part of an Ensemble configuration

The Alpha Duo is conveniently packaged in a benchtop enclosure, requiring a vacuum connection, power, and a USB connection to the PC, only.

Alpha Ensemble

- Rack mounted or benchtop configuration of 1, 2, 3, or 4 Alpha Duo modules
- Initially 2, 4, 6 or 8 channels; expand with ALPHA-DUO-M1 modules, easily added in minutes
- Computer controlled chamber pressure monitoring and venting
- Inexpensive recoil protection option

The Alpha Ensemble is available in 2-, 4-, 6-, or 8-input models. Empty slots in the chassis are covered by easily removed blank panels. Expansion couldn't be easier. The ALPHA-DUO-M1 enclosure-less version of the Alpha Duo simply slides into any available space in the chassis, and after making a few simple connections, is ready for use. In the event of a contamination problem, a complete Alpha Duo unit is easily removed from an Ensemble, and the vacuum line is easily isolated with supplied hardware.

Alpha Suite

All-In-One Integrated Alpha Spectrometers

Alpha Suite Hardware

Vacuum Chambers

Each Alpha Suite member incorporates one or more high-quality modular vacuum chambers. These individually cast brass chambers are nickel plated for corrosion protection and ease of decontamination, and can be isolated and removed if necessary without affecting the operation of other chambers.

The chambers are sealed with a high-performance O-ring secured in a cleanly-machined groove in the face of each chamber.

Vacuum Chamber Capability and Flexibility

Samples sizes from 13 mm to 51 mm in diameter, with 4 mm to 44 mm detector spacing are accommodated.

ORTEC ULTRA-AS silicon ion implanted and R Series ruggedized surface barrier detectors with surface areas from 300 mm² to 1200 mm² are easily accommodated.



Electronics

Each Alpha Suite sample chamber is served by its own bias supply, preamplifier, DIGITAL SIGNAL PROCESSOR based (MCA) and pulser.

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. Each detector operates independently with completely adjustable energy ranges from 0 to 10 MeV.

Recoil Protection System (optional)

Recoil protection is provided through the use of reverse biased sample holders and through the careful control of the vacuum pressure.

Alpha Aria models: The RCAP option includes a biased sample holder and a Granville-Philips gauge with solenoid vacuum controller.

Alpha Duo and Alpha Ensemble models: Addition of the biased sample holders are all that is required, the pressure control is built into every model (common to both chambers in a dual module).

Alpha Suite

All-In-One Integrated Alpha Spectrometers

Alpha Suite Software

MAESTRO-32 MCA Emulation Software (brochure on request)

MAESTRO-32 MCA software is included with Alpha Aria, Alpha Duo and Alpha Ensemble.

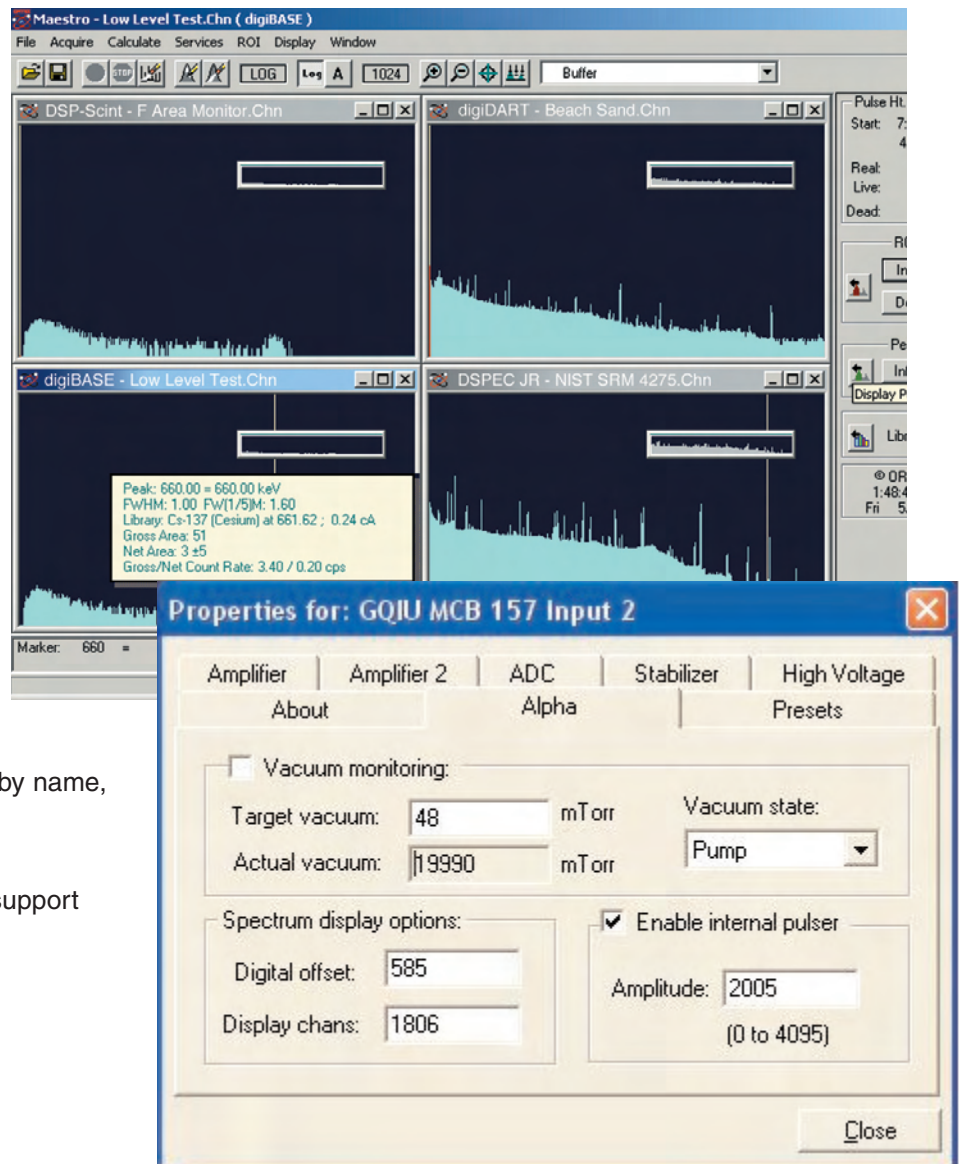
With the addition of a vacuum pump (and NIM Bin in the case of the Alpha Aria) all you need do is hook the spectrometer to your PC with a USB cable. The MAESTRO-32 MCA emulation software is included with all members of the Alpha Suite.

MAESTRO-32 utilizes the Windows 2000/XP Professional or VISTA operating systems, dialog protocols using the latest Windows standards, and on-line and context-sensitive help. MAESTRO-32 uses the common Windows Explorer dialogs for importing and exporting files. No advanced training or programming skills are required.

MAESTRO-32 is a CONNECTIONS-32 product, providing advanced connectivity features within the Windows Network environment.

MAESTRO-32 features include:

- MCA Emulation for Alpha Suite and other ORTEC MCA hardware
- Multi-Detector Interface
- Seamless Networking for Remote Detectors Systems
- Secure Data with Personal Password Protection
- Advance Peak Analysis features
- Complete Interactive Control of all MCB Hardware features, including Alpha Duo and Alpha Ensemble vacuum controls
- Mariscotti fast peak search, with nuclide identification by library lookup
- Activity, net and gross areas (with uncertainty), centroid and shape for peaks
- Data protection with “detector locking” by name, not by workstation
- Comprehensive JOB STREAMING
- Integrated Local Area Network (LAN) support



Alpha Suite

All-In-One Integrated Alpha Spectrometers

AlphaVision-32 Quantitative Analysis Software (option, brochure on request)

AlphaVision-32 is the ORTEC data management and analysis software for alpha spectroscopy in the "production environment". The design of such a solution requires that it be as easy as possible to make the "same" analysis over and over with replicate samples, but with built-in flexibility for a wide variety of sample types. AlphaVision-32 incorporates flexibility in analysis methods and reporting formats, industry standard data structures and connectivity to LIMS systems, as well as the ability to control multiple (up to 256) detector systems from a single screen operating in the Windows 2000/XP environment.

While the flexibility of AlphaVision-32 is immense, a set-and-forget design philosophy means that this flexibility is not a hindrance to simple routine operation. According to current Windows convention, the analysis processes are easily customized using a batch "wizard". Once this has been done, analysis sequences are initiated at the click of a mouse.

Complete Sample Management

Key AlphaVision-32 features include:

- Powerful detector control and status for up to 256 detectors on a single display
- Intuitive "point and click" operations for all features; familiar Windows menu and command operations
- "Set and Forget" analysis setups for reliable, consistent analyses
- Dynamic detector, chamber, calibration, and process QA monitoring
- Integrated online help with built-in searchable index
- Flexible reporting capability through Access and Seagate Crystal Reports®
- Unique count-to-MDA preset capability
- Multiple dilution options:

Add tracer to whole sample; analyze whole sample

Add tracer to whole sample; analyze aliquot

Add tracer to whole sample and make up to 2 dilutions

Add tracer to aliquot and analyze aliquot



Alpha Suite

All-In-One Integrated Alpha Spectrometers

Alpha Suite Hardware Specifications Common to All Models

VACUUM CHAMBER

Cast brass, nickel-plated for ease of decontamination. Each chamber is supplied with one ENS-ST-1 sample tray, others may be ordered as accessories.

Maximum Sample Size: 51 mm (2.030 in.).

Maximum Sample-to-Detector Spacing: 44 mm, in increments of 4 mm.

Maximum Detector Size: 1200 mm².

High-Performance O-Ring Seal: Spare package of 10 seals (ORTEC part OCT-CG) included.

Detector Connector Type: Rear Microdot (ORTEC B mount).

Vacuum Manifold Connector: 0.25" Swagelock tube fitting for Alpha Aria and Alpha Duo, NW25 for Alpha Ensemble.

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 ²⁴¹Am point source.

Energy Resolution: ≤ 20 keV (FWHM) with a detector-to-source spacing equal to the detector diameter.

Detector Efficiency: $\geq 25\%$ is achievable with close detector-to-source spacing.

Background: Above 3 MeV, ≤ 1 count/hour based on a BU-020-450-AS detector.

ELECTRONICS PERFORMANCE

Bias Supply

Range: 0 ± 100 V, 10 μ A; 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.

Amplitude Drift: < 50 ppm/ $^{\circ}$ 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.

Detector Current Monitor

Range: 0 to 10,000 nA; read by computer.

Display Resolution: 3 nA.

Preamplifier

Shaping: 1 μ s unipolar, dc restored.

Pos/Neg: Polarity can be selected independently with PWB slide switches.

Digital MCA

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).

Conversion Time Per Event: < 2 μ s dead time.

Gain Instability: ≤ 150 ppm/ $^{\circ}$ C.

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 231^{-1} .

Interface Connectors

USB 2.0 Rear panel standard "B" type USB connector.

COMPUTER PREREQUISITES

Any computer capable of running any of the following operating systems: Windows 2000/XP or VISTA.

Model Specific Hardware Specifications

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): Built-in pressure controller, requires addition of optional biased sample holders only.

RCAP Controller Range: 10 mTorr to 20 Torr, read by computer. Regulation Target Pressure $\pm 10\%$

ELECTRICAL AND MECHANICAL

Dimensions: 10.1 in. W x 14.4 in. D x 6.0 in. H enclosure.

Net Weight: 3.9 kg (8.5 lb).

Shipping Weight: 5.0 kg (11.0 lb).

Power Input: 120/240 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

A modular alpha spectroscopy system with configurations of 2, 4, 6, or 8 total chambers. 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. Configurations of less than 8 can be expanded through the use of ALPHA-DUO-M1 dual modules. Each Alpha Duo dual 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.

Vacuum Control: Via computer for each dual module installed.

Vacuum Gauge Range: 10 mTorr to 20 Torr, read by computer.

Recoil Protection (RCAP): Built-in pressure controller, requires addition of optional biased sample holders only.

RCAP Controller Range: 10 mTorr to 20 Torr, read by computer. Regulation Target Pressure $\pm 10\%$.

ELECTRICAL AND MECHANICAL

Dimensions: 19.0 in. W x 19.4 in. D x 10.7 in. H enclosure.

Net Weight (with 8 complete chambers): 26.6 kg (58.4 lb).

Shipping Weight (with 8 complete chambers): 29.5 kg (65.0 lb).

Power Input: 120/240 V ac, 50/60 Hz.

Power Consumption: 50 W input power.

Operating Environment: 0° to 50°C. Up to 95% relative humidity, non-condensing.

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

Alpha Suite

All-In-One Integrated Alpha Spectrometers

Ordering Information: How to order your Alpha Suite product.

Step 1. Choose one or more Alpha Spectrometers. Each spectrometer includes one ENS-ST-1 sample tray per chamber. More may be ordered from the accessories list below.

Model	Description
ALPHA-ARIA	Single input NIM spectrometer. Includes MAESTRO-32 MCA Emulation Software.
ALPHA-DUO	Dual input benchtop spectrometer. Includes one each of all four sample trays, package of 10 chamber door o-rings, MAESTRO-32 MCA Emulation Software, and USB cable.
ALPHA-ENSEMBLE-2	2 input benchtop spectrometer, expandable to 8 inputs. Includes one each of all four sample trays, package of 10 chamber door o-rings, MAESTRO-32 MCA Emulation Software, and USB cable.
ALPHA-ENSEMBLE-4	4 input benchtop spectrometer, expandable to 8 inputs. Includes one each of all four sample trays, package of 10 chamber door o-rings, MAESTRO-32 MCA Emulation Software, and USB cable.
ALPHA-ENSEMBLE-6	6 input benchtop spectrometer, expandable to 8 inputs. Includes one each of all four sample trays, package of 10 chamber door o-rings, MAESTRO-32 MCA Emulation Software, and USB cable.
ALPHA-ENSEMBLE-8	8 input benchtop spectrometer. Includes one each of all four sample trays, package of 10 chamber door o-rings, MAESTRO-32 MCA Emulation Software, and USB cable.

Step 2. For each spectrometer chosen, specify type and quantity of detectors from the list below:

ENS-U300	300 mm ² low-background ULTRA-AS detector for Alpha Suite spectrometer, installed and system tested. Order BU-019-300-AS for uninstalled detectors).
ENS-U450	450 mm ² low-background ULTRA-AS detector for Alpha Suite spectrometer, installed and system tested. Order BU-020-450-AS for uninstalled detectors).
ENS-U490	490 mm ² low-background ULTRA-AS detector for Alpha Suite spectrometer, installed and system tested. Order BU-020-490-AS for uninstalled detectors).
ENS-U600	600 mm ² low-background ULTRA-AS detector for Alpha Suite spectrometer, installed and system tested. Order BU-024-600-AS for uninstalled detectors).
ENS-U900	900 mm ² low-background ULTRA-AS detector for Alpha Suite spectrometer, installed and system tested. Order BU-029-900-AS for uninstalled detectors).

ENS-U1200	1200 mm ² low-background ULTRA-AS detector for Alpha Suite spectrometer, installed and system tested. Order BU-037-1200-AS for uninstalled detectors).
ENS-R300	300 mm ² low-background Ruggedised detector for Alpha Suite spectrometer, installed and system tested. Order BR-SNA-300-100 for uninstalled detectors).
ENS-R450	450 mm ² low-background Ruggedised detector for Alpha Suite spectrometer, installed and system tested. Order BR-SNA-450-100 for uninstalled detectors).
ENS-R600	600 mm ² low-background Ruggedised detector for Alpha Suite spectrometer, installed and system tested. Order BR-SNA-600-100 for uninstalled detectors).
ENS-R900	900 mm ² low-background Ruggedised 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:

ALPHA-PPS-115	Portable Pump Station, 115 V.
ALPHA-PPS-230	Portable Pump Station, 230 V.
ENS-ST-1	Sample Tray, fits 3/4 and 1 inch samples.
ENS-ST-2	Sample Tray, fits 1/2 and 7/8 inch samples.
ENS-ST-3	Sample Tray, fits 1.25 and 1.5 inch samples.
ENS-ST-4	Sample Tray, fits 1.75 and 2 inch samples.
ENS-ST-KK	Set of Sample Trays, one each of all four (1/2 through 2 inch).
ENS-CG	Chamber Door O-Rings, package of 10.
ENS-RACKMOUNT	19" Rackmount Kit installed onto Ensemble.
RCAP-ST	Biased Sample tray assembly for recoil protection use. (One per chamber required.)
A36-B32	AlphaVision-32 Alpha Analysis Software (primary single use license).
A36-N32	AlphaVision-32 Network Copy (for networked systems in addition to the first).

How to order EXPANSION Modules for Alpha Ensemble:

Step 1. Choose one or more Dual Alpha Ensemble Expansion Modules (max 8 chambers per Alpha Ensemble chassis):

ALPHA-DUO-M1	Dual input Alpha Ensemble expansion spectrometer.
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Step 2. Choose suitable options and accessories as described above.

Specifications subject to change
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