

The Finnigan LCQ Advantage MAX ion trap mass spectrometer delivers high productivity compound identification for the routine HPLC environment.

Finnigan™ LCQ™ Advantage MAX



- **Universal Ion Max™ source**
- **Reliability and ease of operation for high productivity LC/MS/MS**
- **Integrates seamlessly with LC systems**
- **Unequivocal identification of analytes from library searchable MS/MS spectra**
- **Optional MSⁿ capability**

The Finnigan LCQ Advantage MAX is the workhorse ion trap mass spectrometer for high productivity LC/MS/MS results and is easily upgraded to MSⁿ performance. The Finnigan LCQ Advantage MAX now features the universal Ion Max source that allows simple tool-less switching of ionization probes. Ion Sweep™ gas reduces chemical noise, while a removable ion capillary tube allows for vent-free source maintenance. Reliability, combined with ease-of-use, make the Finnigan LCQ Advantage MAX an ideal match for the routine HPLC environment. Library searchable MS/MS spectra facilitate unequivocal identification of analytes present in complex matrices. Seamless integration to the Finnigan Surveyor™ and other LC systems, and powerful data analysis capabilities ensure maximum productivity reducing analytical development time within your laboratory.





Hardware Features

Ion Max API Source

- Enhanced sensitivity and ruggedness
- Ion Sweep gas reduces chemical noise
- 60° interchangeable ion probe orientation
- Removable metal ion capillary tube provides vent-free maintenance

Standard Features

- Syringe pump for direct sample infusion
- Fully-automated tuning and signal optimization

Vacuum System

- Differentially-pumped vacuum system to 10^{-5} Torr
- “Dual flow” turbomolecular pump design controls vacuum in two regions
- High-performance roughing pump designed to back up turbomolecular pump
- Precision-engineered, high-vacuum cast aluminum analyzer chamber

Detection System

- Patented, post-acceleration conversion dynode with ± 15 kV applied voltage for efficient detection of positive or negative ions
- Off-axis continuous dynode electron multiplier with extended dynamic range
- Unique direct mounting of the multiplier to the electrometer PCB reduces electrical noise
- Digital electronic noise discrimination

Options

- ESI source compatible with liquid flow rates of <math><1\ \mu\text{L}/\text{min}</math> to 1 mL/min without splitting
- APCI source compatible with liquid flow rates of 50 $\mu\text{L}/\text{min}$ to 2 mL/min without splitting
- APPI/APCI combination source compatible with liquid flow rates of 50 $\mu\text{L}/\text{min}$ to 2 mL/min without splitting
- Metal needle option for high and low-flow analyses
- 96-position sample plate AP MALDI for automated and manual data acquisition
- NanoSpray source supports both static and dynamic nanospray experiments, compatible with liquid flow rates of 50 nL/min* to 2 $\mu\text{L}/\text{min}$

*Lower limit is dependent on gauge of needle used

Software Features

Data System

- Xcalibur™ processing and instrument control software
- LCQUAN™ quantitation package
- Microsoft® Office XP software package
- Microsoft Windows® XP operating system
- High-performance PC with Intel® Pentium® microprocessor
- High-resolution LCD color monitor

Scan Functions

- Full-scan feature provides full-scan mass spectra for rapid screening of unknown compounds
- Selected Ion Monitoring (SIM) monitors specified ions for target compound analysis
- Full-scan MS/MS produces full-scan product ion spectra with typically more than an order of magnitude higher sensitivity than traditional benchtop quadrupole MS/MS analyzers
- Selected Reaction Monitoring (SRM) for a traditional LC/MS/MS quantitative analytical experiment
- ZoomScan™ is a narrow mass range scan at higher resolution. This feature resolves the isotopic envelopes of multiply-charged ions, allowing unambiguous determination of charge state
- TurboScan™, an ultra-fast scan to improve signal to noise and sampling rate

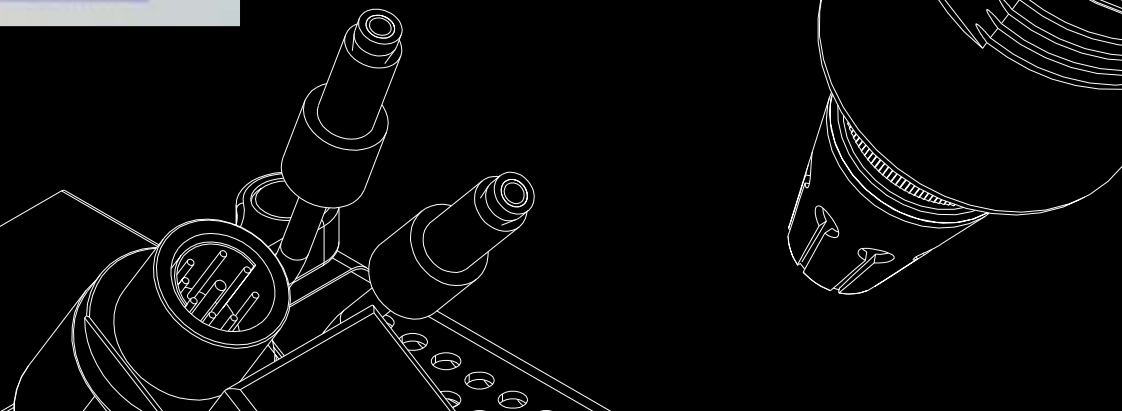
Exclusive Technologies

- Unique, patented Automatic Gain Control (AGC) ensures that the ion trap is always filled with the optimum number of ions for any scan type
- WideBand Activation™ fragments the water loss ion within an MS/MS spectrum, generating more structurally informative spectra
- Dynamic Exclusion™ allows acquisition of MS/MS spectra from lower intensity ion species
- Normalized Collision Energy™ selects optimal collision energy to generate reproducible data from instrument to instrument

Advanced Data Dependent™ Experiments

- Data Dependent features trigger acquisition of MS/MS spectra only when a compound of interest is detected
- Isotopic Data Dependence performs MS/MS only when a user-defined isotopic pattern is detected
- Triple Play determines the charge state and MS/MS spectrum of a multiply-charged ion
- Ion Mapping™ automatically generates a 3-dimensional MS/MS map, yielding product ion, parent ion, and neutral loss information
- Ion Mapping Browser software for viewing data generated by Ion Mapping experiments
- Data Dependent Zoom Map generates sequential MS/MS experiments with a ZoomScan for charge state determination prior to each MS/MS experiment
- Nth Order Triple Play allows the number of ions undergoing a Triple Play to be defined
- Data Dependent Ion Tree performs MSⁿ experiments on up to 25 ions
- MSⁿ Browser software for viewing data generated by Data Dependent Ion Tree and Ion Mapping experiments

The Xcalibur home page is divided into six convenient task-related icons.



Optional Application-Specific Software

- BioWorks™/SEQUEST®/TurboSEQUEST™ – protein identification tools
- Mass Frontier™ – spectral interpretation and classification software to identify unknowns
- Metabolite ID – rapid review and reporting of drug metabolism data
- Discovery™ – software for combinatorial chemistry
- NIST Library software

System Specifications

MS/MS Sensitivity

Electrospray Ionization (ESI) – A 2 μL loop injection of a 5-pg/ μL solution of reserpine (10 picograms [16 femtomoles] total sample) at a flow of 350 $\mu\text{L}/\text{min}$ of 50% isopropyl alcohol/50% water will produce a minimum signal-to-noise ratio of 10:1 for the transition of the unit isolated protonated molecular ion at m/z 609 to the largest product ion, when the mass spectrometer is operated at unit resolution in the full-scan MS/MS mode, scanning the product ion spectrum from m/z 165-615.

Atmospheric Pressure Chemical Ionization (APCI) – A 2 μL loop injection of a 5-pg/ μL solution of reserpine (10 picograms [16 femtomoles] total sample) at a flow of 400 $\mu\text{L}/\text{min}$ of 50% isopropyl alcohol/50% water will produce a minimum signal-to-noise ratio of 10:1 for the transition of the unit isolated protonated molecular ion at m/z 609 to the largest product ion, when the mass spectrometer is operated at unit resolution in the full-scan MS/MS mode, scanning the product ion spectrum from m/z 165-615.

Installation Requirements

Power

- One 230 Vac \pm 10.0%, 50/60 Hz, single phase, with earth ground dedicated to the instrument
- Mechanical pump powered from Finnigan LCQ Advantage
- 120 or 230 Vac single phase, with earth ground for the data system

Gas

- One high-purity (99% pure) nitrogen gas supply for the API source
- One ultra-high-purity helium gas supply (99.998% pure) with less than 1 ppm each of water, oxygen, and total hydrocarbons for the mass analyzer

Environment

- System averages 8000 Btu/h (2300 W) output when considering air conditioning needs
- Operating environment must be 15-27 °C (59-80 °F) and relative humidity must be 40-80% with no condensation
- Optimum operating temperature is 18-21 °C (65-70 °F)

Dimensions/Weight

- MS: 56 cm \times 65 cm \times 76 cm (h \times w \times d)
- MS: ~113 kg
- Roughing Pump: 38.6 kg

Performance Specifications

Mass Range

- m/z 50 – 2000

Scan Power

- MS and MS/MS standard
- Upgradeable to MSⁿ, for $n = 1$ to 10

MS Communication Protocols

- Ethernet
- Contact Closure
- Start In/Out
- Ready In/Out

International Offices

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The Finnigan Surveyor LCQ Advantage MAX LC/MS/MS system provides fully integrated analyses using the powerful Xcalibur operating system.