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## *Finnigan™ LCQ™ Advantage MAX*



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

- 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 MS<sub>n</sub> 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 MS<sub>n</sub> 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<sup>-5</sup> 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 <1 µL/min to 1 mL/min without splitting
- APCI source compatible with liquid flow rates of 50 µL/min to 2 mL/min without splitting
- APPI/APCI combination source compatible with liquid flow rates of 50 µL/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  $\mu$ L/min

*\*Lower limit is dependent on gauge of needle used*

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



### ***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 MS<sub>n</sub> experiments on up to 25 ions
- MS<sub>n</sub> Browser software for viewing data generated by Data Dependent Ion Tree and Ion Mapping experiments

### ***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  $\mu\text{L}$  loop injection of a 5-pg/ $\mu\text{L}$  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  $\mu\text{L}$  loop injection of a 5-pg/ $\mu\text{L}$  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 x 65 cm x 76 cm (H x W x 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 MS<sub>n</sub>, for n = 1 to 10

#### **MS Communication Protocols**

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



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



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