

MALDI-TOF Mass Spectrometer

Profilers
MALDI-TOF Mass Spectrometer

Profiler MALDI-TOF Mass Spectrometry

- **Fully contained bench-top instrument**
- **Walk-up and automated operation**
- **Greater than 400 kDa mass range, 2000 resolution**
- **1.4 meter flight path**
- **Linear mode with time-lag focusing**
- **500 MS/sec digitizer, 1 GS/sec (opt)**
- **Dual polarity (opt)**
- **Built-in CCD camera**

MALDI - Matrix Assisted Laser Desorption Ionization

MALDI time-of-flight (TOF) mass spectrometry has rapidly become the measurement technique of choice for the analysis of proteins, peptides, oligonucleotides and synthetic polymers. MALDI delivers the sensitivity, mass resolution, accuracy and speed demanded by today's life scientist. Traditionally, the drawback of MALDI has been its prohibitive cost (typically several hundred thousand dollars). Now, that problem has been eliminated with the introduction of Profiler - the first truly affordable MALDI-TOF mass spectrometry system.

Profiler has the performance and features needed to meet the challenges in today's world of proteomics. And unlike many bench-top MALDI instruments, Profiler is fast and easy to use. Our intuitive Windows software lets you



point and click your way through instrument setup, data acquisition and mass peak detection. The end result is fast and accurate detection, identification and characterization of your biological samples.

Enabling Technology

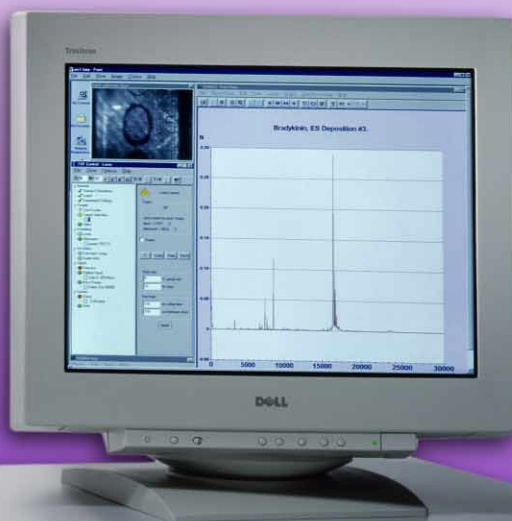
Profiler is designed to match the performance of instruments costing four or five times as much. Its 1.4 meter flight path, time-lag focusing capability and fast sampling digitizer bring high resolution (up to 2000) to MALDI measurements. Profiler's ultra-high sensitivity can detect very small quantities (femtomole) of your analyte, and with 100 ppm (0.01%) mass accuracy, it can handle your most demanding applications.

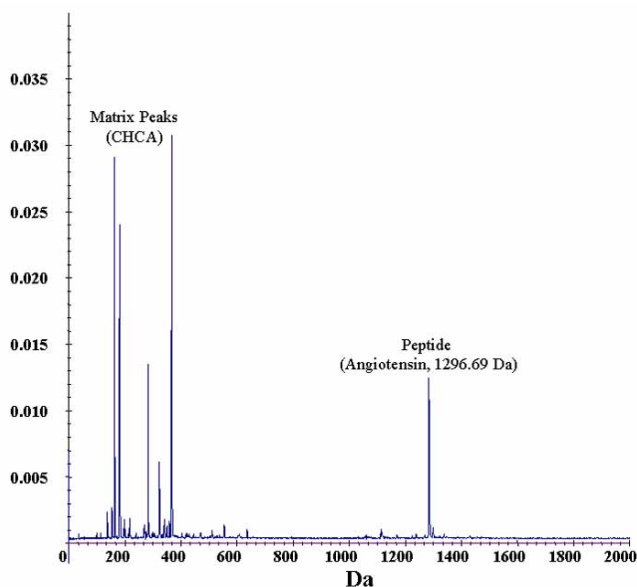
Profiler uses a discrete dynode detector that has a very large dynamic range. Matrix peaks, which are typically several orders of magnitude larger than the analyte, don't saturate the detector letting you measure analyte and matrix simultaneously. These rugged detectors eliminate the need for matrix blanking which is often necessary with other types of detectors.

A particle guide wire that stretches the length of the flight tube, along with Profiler's high ion acceleration voltage (up to 30 kV) maximize detection efficiency and contribute to an extended mass range of greater than 400 kDa. Negative ion operation, often used for the analysis of glycolipids, oligonucleotides and carbohydrates is available as an option.

Compact Design

Profiler's compact, fully contained, bench-top design will be appreciated in laboratories where space is an issue. The mass spectrometer fits on a standard six-foot table and has a stain-free Corian® top that can double as counter space when necessary. Profiler doesn't need process air or have any special electrical requirements - you just plug it in and turn it on.





Profiler's discrete dynode detector allows you to display matrix and analyte peaks simultaneously without the need for matrix blanking.

Unique Vacuum System Design

Profiler uses a differentially pumped vacuum system design that utilizes two 70 liter per second turbo pumps and an oil-free diaphragm pump. The pumps run maintenance-free and are housed inside Profiler, not in an external cabinet as found in other MALDI instruments. A unique sleep mode lowers the speed of the pumps during idle periods. This reduces wear on the pump bearings, lowers the operating temperature and more than doubles the life of the pumps. When it's time again to acquire data, it only takes about a minute to bring Profiler back up to full vacuum.

Reliable N₂ Laser

Profiler uses a nitrogen laser (337 nm) that delivers the ideal combination of power, wavelength and pulse width for MALDI measurements. The nitrogen laser's wavelength overlaps with the absorption band of many common matrix crystals and is the laser most often used in MALDI-TOF mass spectrometers. Profiler uses a neutral-density filter to constantly

adjust laser intensity optimizing experimental results.

Sample Preparation

MALDI-TOF mass spectrometry is known for its minimal sample preparation requirements. The technique is tolerant of large concentrations of impurities such as buffer salts and detergents. Simply choose the right matrix and the proper



matrix/analyte ratio and Profiler will do the rest. For complete details on MALDI sample preparation please visit our website at www.srsMALDI.com.

System Automation

Profiler makes MALDI measurements easy. Simply spot your analyte-matrix mixture onto a sample card, wait for the drops to dry and insert the card into the card entry slot. Inside the mass spectrometer, the card is transferred

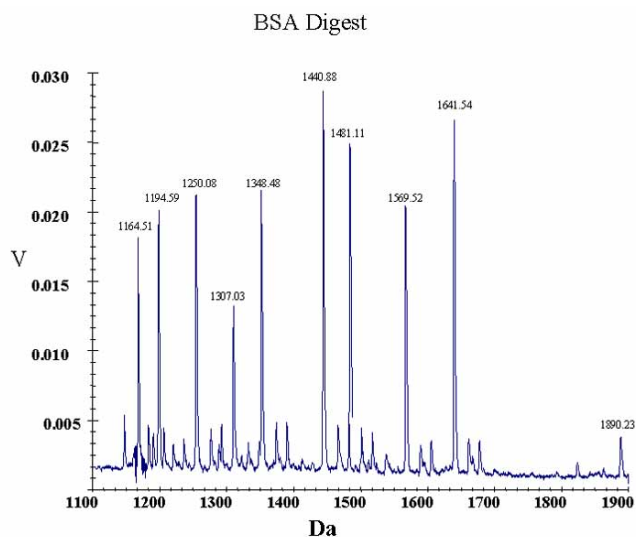
to a two dimensional positioning mechanism. The sample spot of interest is then positioned in line with the N_2 laser and data acquisition begins. A CCD camera constantly monitors the sample spot for optimal alignment. Using the Profiler software you view the resulting spectra. It's really that simple.

High Throughput

Profiler uses a 96 position (8x12 pattern, 6 mm spacing), reusable sample card. Each sample, or



batch of samples, can be analyzed in any particular order and with different protocols (mass range, extraction voltage, etc). Calibration standards can be distributed throughout the sample card and used to dynamically calibrate the mass axis during unattended data collection. A second type of

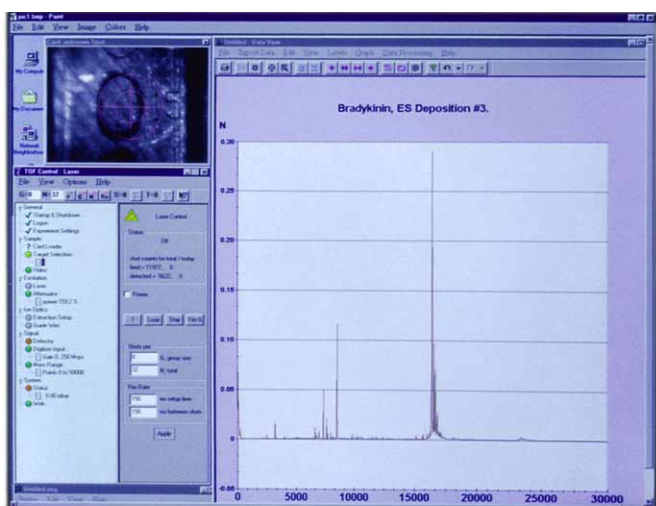


sample card is also available that allows placement of electrophoresis gels directly onto the card. Profiler's software has a sophisticated video imaging algorithm that maps the target area of each sample so laser shots aren't wasted on blank areas of the sample plate. This translates directly into high throughput. Firing 64 laser shots per sample spot, Profiler can acquire data on a card of 96 sample spots in about a half hour.

Profiler's Software

The system is controlled by Profiler's intuitive Windows software. You can pick between continuous extraction or time-lag focusing mode giving you flexibility for different experiments. Instrument setup is easy. You simply choose from a list of operating conditions (mass range, resolution, sensitivity, etc.), then begin data acquisition. System hardware parameters (extraction voltage, detector voltage, number of shots per sample point, etc.) can be set to their default values or adjusted individually.

Profiler has a built-in CCD camera that displays the sample that is currently being analyzed. The



laser pulse in relation to the sample - all in real time.

The data viewer shows the resulting mass spectra. Peaks are clearly identified and their intensity and mass to charge ratio are displayed. There are a number of analysis capabilities including peak detection, labeling, baseline subtraction and digital filtering that help interpret results. Multiple spectra can be viewed simultaneously for easy comparison with other runs. Data can be saved in a variety of formats for use with third party software like MS Fit, Mascot, Grams, etc.

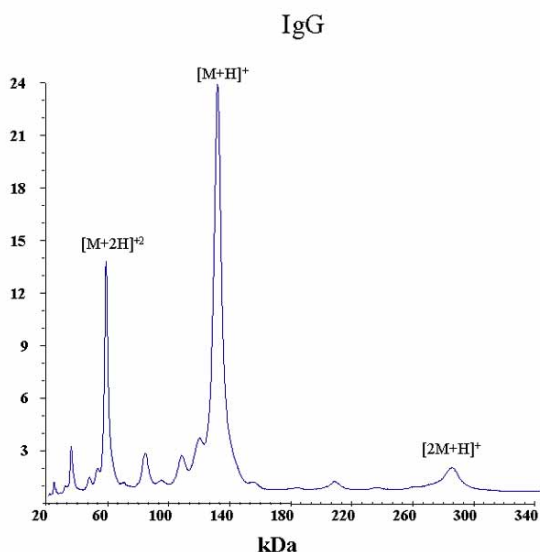
Profiler is also fully web ready. All you need is a computer with a browser and an internet connection and you can monitor your instrument from your office, home or anywhere in the world.

Maintenance and Technical Support

Profiler is designed to be a very low maintenance mass spectrometry system. Its modular approach makes servicing easy and something many users will wish to do themselves. Of course, SRS offers a variety of servicing options that can be tailored to your particular needs.

Our staff of MALDI experts is available to assist you with your experiments. Call our MALDI hotline (408-744-9040) and talk to an applications specialist and find out more about Profiler. Our website www.srsMALDI.com contains application notes, details on sample preparation, and is an excellent reference guide for MALDI measurements.

image of the spot is magnified to allow detailed viewing of the sample area. A cross-hair marker shows the exact location of the laser pulse on the sample. You can use the mouse cursor to click on a specific point in the sample that you wish to analyze, or place Profiler into auto-sampling mode where any or all of the 96 samples can be measured with a preset number of laser shots. Profiler is the only MALDI-TOF mass spectrometer that uses its video camera to compute the position of the sample card, map a preset number of laser shots within the target sample, and display the location of the



Profiler's high mass range capability is demonstrated by this mass spectrum of 1 pmole of Immunoglobulin G antibody. The dimer ($2M+H$)⁺ ions is clearly visible at 300 KDa.

Profiler Specifications

Ionization Source

Type	MALDI ionization, two stage ion source with high transmission grids.
Ion extraction	Time-lag focusing for enhanced resolution

Analyzer

Mass range	Useful mass range extends to >400 kDa
Mass accuracy	100 ppm for internal calibration, 0.1% for external calibration, using average mass.
Resolution	500 in linear mode, 2000 with time-lag focusing.
Sensitivity	Optimum sample loading of 10 femtomole to 1 picmole for most peptide and protein samples.
Ion accel. energy	30 kV, variable
Acquisition time	<10 minutes after the card is inserted. Approximately 30 minutes for 96 samples, 64 shots per sample.
Flight path	1.4 m (linear). Electrostatic particle guide for high sensitivity. Differentially pumped for ultra-high vacuum

Laser Nitrogen (N₂), 337 nm, 3 ns pulse width. Computer controlled, 0 - 2.0 OD, linear neutral density filter for laser power attenuation.

Detector Discrete dynode electron multiplier with high dynamic range

Digitizer 500 MS/sec w/1 Mbyte RAM, 1 GS/sec (opt) w/2 Mbyte RAM

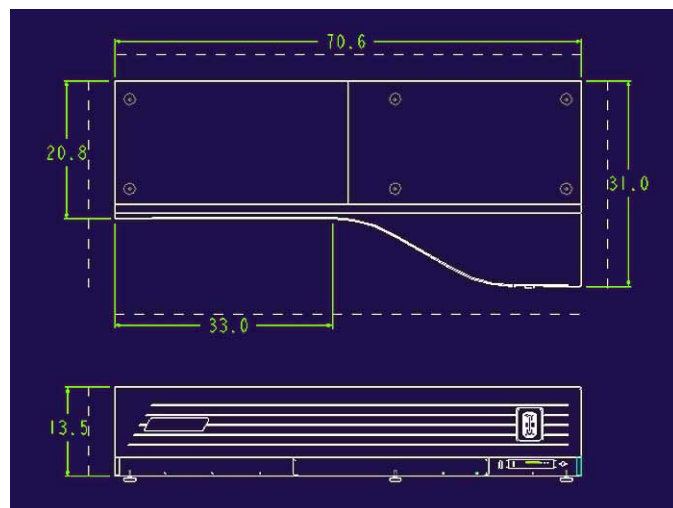
Pumps Two 70 l/s hybrid turbomolecular pumps. One oil-free diaphragm pump.

Sample Handling

Sample card loading	Fully automated
Sample plate	4.5"x2.5". Accomodates up to 96 samples (8 x 12 grid std)
Sample manipulator	X-Y translation
CCD camera	Internal, allows on-screen viewing of the sample and automated mapping of sample spots

General

Dimensions	31"x14"x71" (WxHxL)
Weight	400 lbs.
Interface	GPIB (IEEE-488.2), data transfer rate >600 kbyte/sec.
Power	7 amps, 110 VAC (50-60 Hz). No need for water cooling, vacuum, or air.
Warranty	One year (limited) parts and labor



MALDI-TOF Applications

Profiler provides a fast, simple and accurate way of detecting, identifying, and characterizing minute amounts of samples including:

Peptides
Proteins
Oligonucleotides
Oligosaccharides
Synthetic Polymers
and more...

Specific applications routinely supported by Profiler MALDI-TOF include:

Molecular Weight Screening
Protein Identification
Peptide Mapping
Identification of Post-translational Modifications
Protein Biomarker Discovery
2D Electrophoresis Gel Analysis
Microorganism Identification
Proteomics Projects
DNA and RNA Sequencing and Analysis
Mutation Studies
Combinatorial Chemistry
Profiling of Bacterial, Cellular and Viral Proteins.
Forensic Investigations
Pharmaceutical and Biotech QC/QA
Characterization of Oligosaccharides
Analysis of Polydisperse Polymers and Blends
Fundamental MALDI Research

Ordering Information

- PRO100** Profiler MALDI-TOF mass spectrometer with software, blank sample plate and test sample
- Opt. 01** Negative ion mode
- Opt. 02** 1 GHz transient digitizer upgrade
- O100CSP** Complete computer system, factory preloaded with software and interface cards. (Includes Pentium PC, Profiler software, video camera card, GPIB card and GPIB cable.)



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