Raman Discovery™

High Performance, Multi-Channel Imaging Spectrometer

- **Integrated, high performance spectrometer for OEMs**
- **High resolution imaging**
- **High optical throughput**
- **Tall input aperture**
- **Small instrument size**

The Raman Discovery™ family of compact, lightweight Raman spectrometers offers OEMs and system integrators a flexible spectral imaging platform that features exceptional signal throughput, optical efficiency, and spectral/spatial resolution. Utilizing Headwall's proprietary design, the Raman Discovery™ products are designed for demanding applications in harsh imaging environments. A key attribute of the Raman Discovery™ products is extremely low image distortion over the full CCD array which yields exceptionally high signal to noise efficiency and high signal throughput.

At the heart of every Raman Discovery™ imaging spectrometer is one of Headwall's proprietary resonance domain, aberration-corrected diffraction gratings. Unlike typical diffraction gratings, Headwall's application-specific gratings produce only one diffracted order which propagates the wavelength region of interest. As a result, one hundred percent of the diffracted light energy within this single dispersed order is captured yielding industry-leading optical efficiency and performance. This is particularly important in applications such as Raman spectroscopy that are characterized by low signal strength.

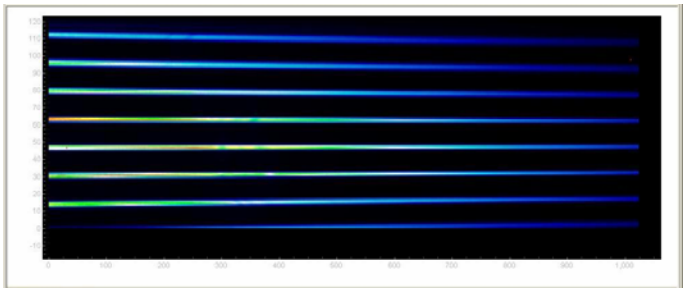
Headwall's Raman Discovery™ imaging spectrometers are built on a totally reflective, *f/3* optical design with no moving components. Available for 532nm and 785nm laser excitation, the small instrument size provides multi-channel functionality without sacrificing performance. Dense fiber bundles can be arranged within the tall entrance aperture yielding superb photometric accuracy for mission-critical applications.

Imaging Performance	Raman Discovery™ 532	Raman Discovery™ 785
Spectral Range	3650 cm-1	2000 cm-1
	~ 540 – 660 nm	~ 785 – 931 nm
Spectral FWHM Resolution	< 10 cm-1	< 10 cm-1
	< 0.36 nm	< 0.68 nm
Spatial FWHM Resolution	3 pixels	3 pixels
Spatial 20% of Peak FW Resolution	4 pixels	4 pixels
Horizontal Row Deviation (Spectral)	1 pixel	1 pixel
Vertical Column Deviation (Spatial)	1 pixel	1 pixel

Configuration: Input fiber 50µ core with 10µ cladding, 1024 x 58 CCD array with 24µ square pixels
With certain configurations, resolution broadens slightly at longest wavelengths

Raman Discovery™

With high performance imaging properties, the Raman Discovery™ accurately reproduces micro-scale features entering at the entrance aperture as spectrally and spatially resolved images on the CCD array with remarkable accuracy. The highly resolved spectral and spatial content of each individual input feature will be dispersed across the CCD, and can be read out simultaneously with no channel crosstalk.



The Raman Discovery™ spectrometer provides exceptional throughput and image resolution across the entire CCD focal plane array.

This superb imaging performance enables several key opportunities including:

- Highest spectral resolution possible with no curvature of input image (entrance slit or stack of fibers)
- Wide assortment of individual fibers or bundles are accepted over the 3 mm tall entrance aperture including signals through single fiber, multiple fiber, multi-channel fiber bundles, and calibration light sources for true multi-channel Raman performance

Optimized Scientific Grade CCD Cameras:

Headwall's Raman Discovery™ standard detection electronics are based on front or back illuminated high performance CCD sensors, and provide optimized performance, sensitivity, controllability, configurability, size, and cost.

Features:

- High-performance scientific grade CCD
- Integrated digital signal processor
- Designed for low-light applications
- Single and dual stage TE cooling
- Requires no interface card
- Flexible communication options
- Customizable

Feature	Description
Operating System	Windows XP, 2000
CCD ROI selection	Standard
Binning	User configurable
Integration time	20ms and higher (limited by dark current)
Dynamic range	16 bit
Voltage	110V / 220 VAC (50Hz/60Hz)
Interface	MS Visual C++, Visual Basic, Lab Windows, Borland C++ Builder

Binning:

- DSP performs binning operations on-board, minimizing amount of data that must be transferred from the camera
- Any number of lines can be binned in the CCD, and/or in the DSP
- Combination of CCD and DSP binning can provide optimum performance
- Simple DLL interface allows complete flexibility in binning and reading out camera

Communications:

- Ethernet 10/100, USB 1.1/2.0, RS232 Serial port

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Performance For Any Application

Configurability beyond expectations! Available with many other application-specific configurations, Headwall offers a spectral imaging system optimized for performance and budget.

Headwall application engineers are available to help select the best system for your application.

All specifications are subject to change without notice.