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HR-X Extreme Hi-Resolution Spectrometers

HR-X Hi-Res

HR-X Hi-Res Spectrometer Features

- Resolutions better than 0.05nm!
- Increased optical path provides 2x resolutions over regular HR models
- UV-VIS and NIR/WDM options
- Units are stackable for wide range analysis
- Best resolutions available over 800nm

- **HR-X Hi-Res Spectrometers Overview**

Our new **HR-X Hi-Res Spectrometer Series** consists of our highest resolution spectrometers yet with many models over the UV, VIS, & NIR wavelength range. Compared to our standard HR and BLUE-Wave series, our HR-X enclosures have 2x and 4x the optical path providing double and quadruple the potential optical resolving power. This enhancement does decrease the range and increase its physical size; however, the HR-X Hi Res spectrometers provide the best possible resolution of any modular spectrometer with no moving parts. Applications include laser wavelength monitoring and characterization for tunable lasers/LEDs and other sources such as elemental emissions from plasma, LIBS, or other high-powered optical emissions. Also, optical sensing of temperature, pressure, & position are enabled via Bragg grating technology.

Ruggedized – The detachable spectrograph assembly and control electronics are protected inside a rugged metal enclosure, suitable for portable, process, lab, and field applications.

Onboard Memory with pre-set calibrations and spectrometer settings and snap shot memory to provide instantaneous spectral image from the highly sensitive CCD with 2048.

High Speed Electronic Interface can be attached directly to a computers USB port for high speed data transfer. Options for Wifi/ethernet communication available as well as other interfaces. Contact us for more info.

- **Technical Specifications**

Dynamic Range:	2000:1 with 8 decades	Dimensions:	9″ x 10.5″ x 2.2″
Optical Resolution:	see model table – to 0.05 nm	Power Consumption:	100mA @ 5 VDC
Detector Type:	2048 pixel CCD, PDA opt.	Interface:	USB-2 or Wifi[2], RS232[3], SPI[3], 4-20mA[3] , Digital I/O[3] or ethernet[3]
Detector Range:	190-1600 nm	Data Transfer Speed:	30Hz or 1000Hz[1]
Pixel Size:	14 x 200 um	Detector Integration:	1 ms to 8 minutes
Diffraction Gratings:	Holographic & ruled	Slit Size Options:	7, 14, 25, 50, 100, 200 um
Grating g/mm:	300, 600, 1200, 1800, 2400	Stray Light:	<0.1% at 435nm; <0.05% at 600nm
Spectrograph:	f/4, SymX-Czerny-Turner	Fiber Optic Input:	SMA-905 0.22 NA single fiber
Order Sorting Filter:	Integrated & High Pass	Operating Systems:	Windows and Linux[2], Andriod[2], iOS[2]
Signal to Noise:	1000:1 CCD, PDA 2000:1	Software Included:	SpectraWiz Program, WinSDK (C,C#,VB, Delphi), Customizable LabVIEW, VBA for Excel (CRI & LED Report)
Digitizer:	16-bit		

[1] zAP1 Electronics Upgrade [2] zAP2 Wifi + Applications Processor Upgrade with SpectraWiz Mobile Software [3] SMART-Control Interface

- **HR-X Hi-Res Models**

CCD/PDA Detectors – Typical Response **Predicted Slit Resolving Resolutions**

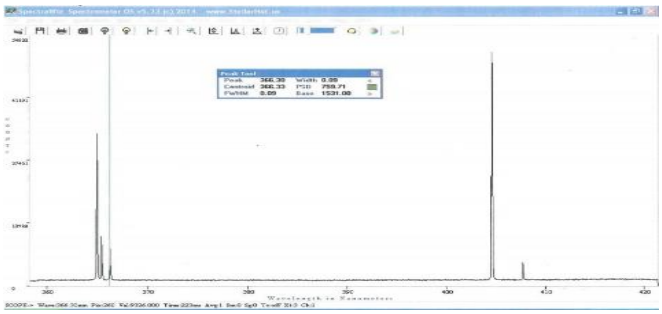
HR-X Models	Wavelength Range (nm)	Grating g / mm	Grating Range (nm)	Nm / pixel dispersion	Slit-7 nm res.
HR-X-UV1	240-300	2400	60	0.029	0.05
HR-X-UV2	300-360	2400	60	0.029	0.05
HR-X-UV3	360-420	2400	60	0.029	0.05
HR-X-VIS1	420-480	2400	60	0.029	0.05
HR-X-VIS2	480-540	2400	60	0.029	0.05
HR-X-VIS3	540-600	2400	60	0.029	0.05
HR-X-VIS4	600-650	2400	50	0.024	0.05
HR-X-VIS5	650-700	2400	50	0.024	0.04
HR-X-NIR1	700-800	1200	120	0.059	0.09
HR-X-NIR2	800-900	1200	120	0.059	0.09
HR-X-NIR3	900-1000	1200	120	0.059	0.09
HR-X-NIR4	1000-1100	1200	120	0.059	0.09

*** HR-X-NIR** models are all built with **center range X00 to Y00 with 5-10nm on either side** unless otherwise specified
* Most models can be shifted at no charge. Contact us for more info or custom request

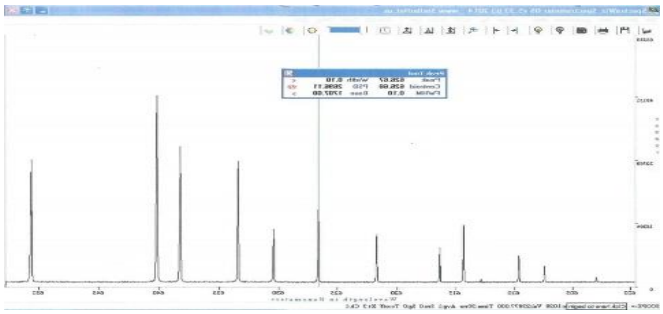
InGaAs PDA Detectors **Predicted Slit Resolving Resolutions**

HR-X Models	Wavelength Range (nm)	Pixel #	Grating Range (nm)	Slit-7 nm res.
HR-X-NIR-InGaAs	1500-1600	1024	100	0.2

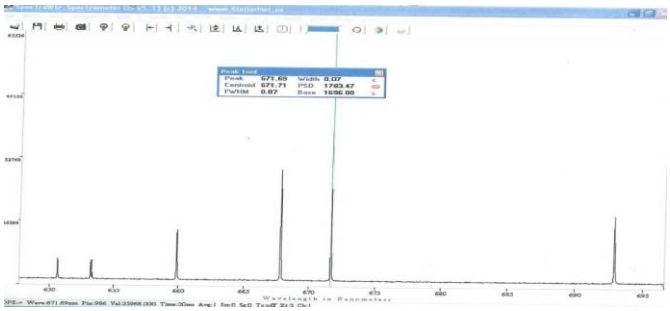
High-Res Sample Spectra



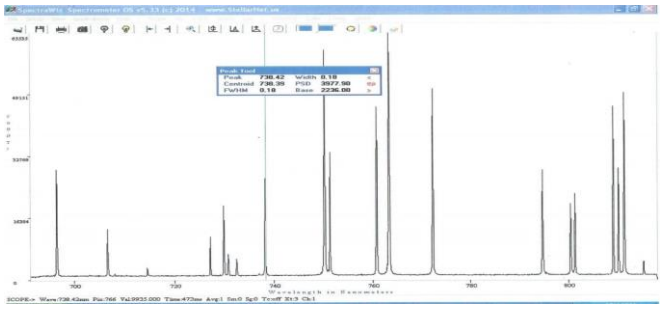
HR-X-UV3 – Hi-Res taking HgAr Emission Spectrum 360-420nm with <0.05nm resolution



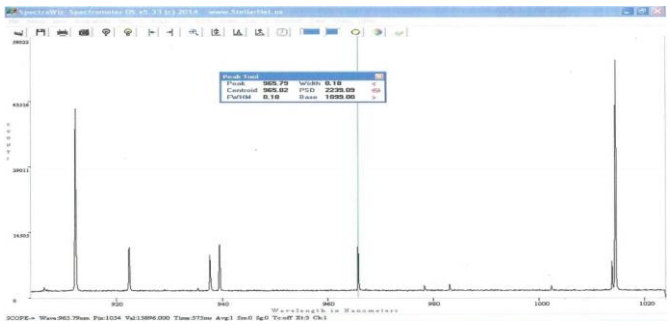
HR-X-VIS4 – Hi-Res taking Neon Emission Spectrum 600-650nm with <0.05nm resolution



HR-X-VIS5 – Hi-Res taking Neon Emission Spectrum 650-700nm with <0.05nm resolution



HR-X-NIR1 – Hi-Res taking HgAr Emission Spectrum 700-800nm with <0.09nm resolution



HR-X-NIR3– Hi-Res taking HgAr Emission Spectrum 900-1000nm with <0.09nm resolution

- **HR-X Hi-Res Models**
  - **Standard Interface**
    The system includes a high-speed plug & play interface using USB-2 connection.
    USB 2.0
  - **zAP2+ WiFi Interface Upgrade**
    zAutomation Processor 2 (zAP2) electronics upgrade provides integrated wireless cpu with Wifi access to spectrometer. Programmable memory allows customization using popular python language. zAP2+ comes pre-programmed with the latest Spectroscopy Mobile App software and StellarNet Linux Driver set.
  - **SMART-Control Interface Upgrade**
    The SMART-Control device offers communication flexibility and application specific customization for any StellarNet spectrometer. This add-on interface includes an integrated CPU with 1GB RAM and many communication protocols such as **RS232, SPI, 4-20mA Analog for PLCs, Digital I/O, Ethernet, Wifi** and many other options. The SMART-Control allows customers to move their spectrometers into process or OEM environments and stream their selected real world data.
  - More SMART-Control: Contact us for more info.

- **HR-X Spectrometer Options**
  - **JACK 1-In Trigger**
    TTL input trigger to enable spectrometer scan
  - **zAP1 Electronics Upgrade**
    zAutomation Processor 1 upgrade provides auto and user controllable spectral baseline and gain for maximized dynamic range and burst mode for high speed consecutive spectral capture. $350 (available currently on new spectrometers)
  - **zAP2+ Electronics Upgrade**
    zAutomation Processor 2 upgrade provides an integrated wireless cpu with Wifi access to spectrometer and/or control of application from smart phone. Programmable memory allows customization using popular python language. zAP2 upgrade can be added to new and most old spectrometers in the field. Once added the spectrometer runs as normal receiving power from the computer's USB; if 5VDC power is connected directly to the SILVER-Nova the zAP2 CPU initializes and wireless communication begins. zAP2 comes pre-programmed with the latest Spectroscopy Mobile App software and StellarNet Linux Driver set.
  - **Optional Configurations**
    Units may be daisy chained via USB-2 hub allowing simple configurations for dual and multi-beam process applications. 8 HR-X spectrometers can be operated at once!

- **SpectraWiz Software**

Free SpectraWiz Software

The powerful SpectraWiz® spectrometer software is provided free of charge with every spectrometer instrument. This includes drivers and customizable software for Windows. The SpectraWiz software is considered the "Swiss Army Knife of Spectroscopy" and may be used to accurately measure wavelength emissions, reflectance, transmission, absorption, concentrations, and absolute intensities. In addition to real-time spectroscopy, SpectraWiz® has built-in applications for SpectroRadiometry, SpectroColorimetry, ChemWiz chemistry lab concentration analyzer, and UV level monitors.

SpectraWiz Mobile™ App Software

StellarNet introduces the new SpectraWiz Mobile Application Software designed to run directly on the zAP2 or SMART-Control spectrometer interfaces and connect directly to mobile devices. Using the local access point or Wifi you can easily log in and run applications for ***General Spectroscopy, Radiometry, Colorimetry, and Concentration analysis***.

The easy to use applications are written in python and provided free with purchase of a zAP2 or SMART-Control spectrometer upgrades. In-app purchases allow users to download source codes, which can be further customized to suite each user's requirements. OEM customers can add their logos or additional computations and industrial customers can set their spectrometer and stream their data to PLCs or other process monitoring platforms. SMART-Control devices support RS232, 4-20mA Analog, 26 pin digital I/O, Ethernet, I^2C and other options available upon request.