AvaSpec-ULS2048XL-EVO SensLine High UV- and NIR-sensitivity back-thinned CCD Spectrometer

Combining exceptional quantum efficiency with high-speed is the value proposition of the AvaSpec-ULS2048XL-EVO spectrometer. Unlike many back-thinned CCD spectro-meters, which have two dimensional arrays, the ULS2048XL-EVO has large monolithic pixels of 14x500 microns with exceptional efficiency in the UV, from 200-400 nm, and the NIR, from 950-1160 nm. The instrument also has an electronic shutter, which enables integration times as low as 2 microseconds. To further enhance sensitivity, a detector collection lens is available which improves sensitivity up to 60% when combined with larger core fibers.

Options include order-sorting filter, to reduce 2nd order effects and purge ports for deep-UV measurements. The AvaSpec-ULS2048XL-EVO comes with a wide range of slit sizes, gratings and may be configured with SMA or FC/PC fiber-optic entrance connectors.

The AvaSpec-ULS2048XL-EVO uses the AS7010 electronics board offering USB3 (10 times faster than USB2), Gigabit Ethernet and better signal processing.

Connection to your PC is handled via a USB3-connection or Ethernet, delivering a scan every 2 milliseconds. The instrument comes complete with AvaSoft-basic software, USB cable and an extensive manual.

AvaSpec-ULS2048XL-EVO

Technical Data

Optical Bench	ULS, Symmetrical Czerny-Turner, 75 mm focal length
Wavelength range	200 - 1160 nm
Resolution	0.09 -20 nm, depending on configuration (see table)
Stray-light	< 0.5%
Sensitivity	460,000 counts/µW per ms int. time
UV Quantum efficiency	60% (200-300 nm)
Detector	Back-thinned CCD image sensor 2048 pixels
Signal/Noise	525:1
AD converter	16-bit, 1 MHz
Integration time	2 µs – 20 seconds
Interface	USB 3.0 high-speed, 5 Gbps Gigabit Ethernet 1 Gbps
Sample speed with store to RAM	2.44 ms /scan
Readout Noise	9.8 cnt RMS
Dark Noise	4.5 cnt RMS
Dynamic Range	13.700
Data transfer speed	2.44 ms /scan (USB3)
Digital IO	HD-26 connector, 2 Analog in, 2 Analog out, 3 Digital in, 12 Digital out, trigger, synchronization
Power supply	Default USB power, 700 mA. Or external 12VDC, 360 mA
Dimensions, weight	175 x 127 x 44,5 mm (1 channel), 1180 grams

Grating selection table for AvaSpec-ULS2048XL-EVO

Use	Useable range (nm)	Spectral range (nm)	Lines/mm	Blaze (nm)	Order code
UV/VIS/NIR	200-1160**	960**	300	300	UA
UV/VIS/NIR	200-1100**	900**	300	300/1000	UNA-DB
UV/VIS	200-850	520	600	300	UB
UV	200-750	250-220*	1200	250	UC
UV	200-650	165-145*	1800	UV	UD
UV	200-580	115-70*	2400	UV	UE
UV	200-400	70-45*	3600	UV	UF
UV/VIS	250-850	520	600	400	BB
VIS/NIR	300-1160**	860**	300	500	VA
VIS	360-1000	500	600	500	VB
VIS	300-800	250-200*	1200	500	VC
VIS	350-750	145-100*	1800	500	VD
VIS	350-640	75-50*	2400	VIS	VE
NIR	500-1050	500	600	750	NB
NIR	500-1050	220-150*	1200	750	NC
NIR	600-1160	350-300	830	800	SI
NIR	600-1160**	560**	300	1000	IA
NIR	600-1160	500	600	1000	IB

** depends on the starting wavelength of the grating; the higher the wavelength, the bigger the dispersion and the smaller the range to select.*
*** please note that not all 2048 pixels will be used for the useable range*

Resolution table (FWHM in nm) for AvaSpec-ULS2048XL-EVO

	Slit size (µm)					
Grating (lines/mm)	**10**	**25**	**50**	**100**	**200**	**500**
300	1.40	1.50	2.5	4.8	9.2	21.3
600	0.70 - 0.80*	0.75-0.85*	1.2	2.4	4.6	10.8
830	0.42 - 0.48*	0.50-0.58*	0.93	1.7	3.4	8.5
1200	0.25 – 0.31*	0.37 – 0.43*	0.52-0.66*	1.1	2.3	5.4
1800	0.17 – 0.21*	0.26 – 0.32*	0.34-0.42*	0.8	1.6	3.6
2400	0.12 – 0.18*	0.18 – 0.24*	0.26-0.34*	0.44-0.64*	1.1	2.7
3600	0.09 – 0.12*	0.11 – 0.15*	0.19	0.4	0.8	1.8

** depends on the starting wavelength of the grating; the higher the wavelength, the bigger the dispersion and the better the resolution*

Ordering Information

AvaSpec-ULS2048XL-EVO	• Ultra-low Stray-light Fiber-optic Spectrometer, 75 mm AvaBench, 2048 large 500 µm pixel back-thinned CCD detector, USB powered, high-speed USB3.0 and ETH interface, incl. AvaSoft-Basic, USB interface cable. Specify grating, wavelength range and options
PS-12V / 1.0A	• External power supply, needed for use in ETH mode

Why is the XL so sensitive?
We're using back-illuminated detectors.
They have the electronics on the backside of the detector,
allowing more light to be caught by the front side.

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Options

-RS	• Replaceable slit
DCL-UV/VIS-200	• Quartz Detector Collection Lens (200-1100 nm)
SLIT-XX	• Slit size, please specify XX = 10, 25, 50, 100, 200 or 500 µm
SLIT-XX-RS	• Replaceable slit with SMA connector , specify slit size XX=25, 50, 100, 200 or 500 µm. Only in combination with AvaSpec-ULS2048XL-EVO-RS
SLIT-XX-RS-FCPC	• as SLIT-XX-RS, but with FC/PC connector
OSF-YYY	• Order-sorting filter for reduction of 2nd order effects, 1 mm thick, please specify YYY= 305, 395, 475, 515, 550 or 600 nm
OSC	• Order-sorting coating with 600 nm long-pass filter for BB (>350 nm) and VB gratings in AvaSpec-2048XL, recommended with OSF-305
OSC-UA	• Order-sorting coating with 350 and 600 nm long-pass filter for UA, VA gratings in AvaSpec-ULS2048XL
OSC-UB	• Order-sorting coating with 350 and 600 nm long-pass filter for UB or BB (<350 nm) gratings in AvaSpec-ULS2048XL
-FCPC	• FC/PC fiber-optic connector

The grating can only be changed by Avantes.
Therefore, choose your grating wisely.
Our application specialists are available to support you with your choice.
In general, a higher resolution means a lower bandwidth.
By combining multiple spectrometers
in our AvaSpec-Dual or rack-mountable versions,
you can create one virtual spectrometer with high-resolution
and high bandwidth.