

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

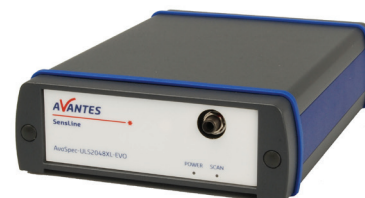
Combining exceptional quantum efficiency with high-speed is the value proposition of the AvaSpec-ULS2048XL-EVO spectrometer. Unlike many back-thinned CCD spectro-meters, which have two dimensional arrays, the ULS2048XL-EVO has large monolithic pixels of 14x500 microns with exceptional efficiency in the 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

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

Grating (lines/mm)	Slit size (μm)					
	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

PS-12V / 1.0A

- 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
- 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.

## Options

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