

# AvaSpec-ULS2048 StarLine Versatile Fiber-optic Spectrometer

## AvaSpec-ULS2048



The workhorse of our spectrometer line-up, the AvaSpec-ULS2048. Used in many applications in the UV/VIS-range, it is particularly useful in time-critical situations thanks to its exceptional response speed. Priced affordably, the AvaSpec-ULS2048 is the choice of many of our most demanding customers.

Options include deep-UV detector coating for better performance in the deep-UV-range, a detector collection lens to enhance sensitivity in the 200-1100 nm range and order-sorting filters to reduce 2<sup>nd</sup> order effects. Furthermore, the AvaSpec-ULS2048 is available with a wide range of slit sizes, gratings and fiber-optic entrance connectors.

The AvaSpec-ULS2048 is also available in dual or multi-channel versions (up to 10 spectrometers in a 19" rack), where all spectra are taken simultaneously.

Connection with your PC is done via USB2-connection, delivering a scan every 1.8 milliseconds. Integration time can be as short as 1.05 milliseconds up to a maximum of 10 minutes. It comes complete with AvaSoft-Basic software, USB cable and an extensive manual, including a quick start guide in four languages.

### Technical Data

<b>Optical Bench</b>	ULS Symmetrical Czerny-Turner, 75 mm focal length
<b>Wavelength range</b>	200-1100 nm
<b>Resolution</b>	0.05 -20 nm, depending on configuration (see table)
<b>Stray-light</b>	0.06-0.19%, depending on the grating
<b>Sensitivity</b>	310,000 counts/ $\mu$ W per ms integration time
<b>Detector</b>	CCD linear array, 2048 pixels
<b>Signal/Noise</b>	200:1
<b>AD converter</b>	16-bit, 2 MHz
<b>Integration time</b>	1.05 ms - 10 minutes
<b>Interface</b>	USB 2.0 high-speed, 480 Mbps RS-232, 115.200 bps
<b>Sample speed with store to RAM</b>	1.05 ms /scan
<b>Data transfer speed</b>	1.8 ms /scan (USB2) 430 ms/scan (RS-232)
<b>Digital IO</b>	HD-26 connector, 2 Analog in, 2 Analog out, 3 Digital in, 12 Digital out, trigger, sync.
<b>Power supply</b>	Default USB power, 350 mA Or with SPU2 external 12VDC, 150 mA
<b>Dimensions, weight</b>	175 x 110 x 44 mm (1 channel), 716 grams

Pre-configured spectrometers can be shipped within 24 hours

## Grating selection table for AvaSpec-ULS2048

Use	Useable range (nm)	Spectral range (nm)	Lines/mm	Blaze (nm)	Order code
UV/VIS/NIR	200-1100**	900**	300	350	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	300-1100**	800**	300	500	VA
VIS	360-1000	500	600	500	VB
VIS	300-800	250-200*	1200	500	VC
VIS	350-750	145-90*	1800	500	VD
VIS	350-610	75-50*	2400	VIS	VE
NIR	500-1050	500	600	750	NB
NIR	500-1050	220-150*	1200	750	NC
NIR	600-1100	350-300	830	800	SI
NIR	600-1100**	500**	300	1000	IA
NIR	600-1100	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-ULS2048

Grating (lines/mm)	Slit size (μm)					
	10	25	50	100	200	500
<b>300</b>	0.80 - 0.90*	1.10-1.20*	2.30	4.60	9.00	20.0
<b>600</b>	0.40 - 0.50*	0.63	1.15	2.31	4.50	10.0
<b>830</b>	0.28	0.40	0.80	1.60	3.20	8.0
<b>1200</b>	0.18 - 0.22*	0.29	0.61	1.18	2.20	5.4
<b>1800</b>	0.10 - 0.16*	0.19	0.35-0.42*	0.80	1.60	3.6
<b>2400</b>	0.08 - 0.11*	0.10 - 0.15*	0.28	0.55	1.10	2.7
<b>3600</b>	0.05 - 0.08*	0.10	0.18	0.38	0.75	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-ULS2048-USB2

- Fiber-optic Spectrometer, 75 mm AvaBench, 2048 pixel CCD detector, USB powered, high-speed USB2 interface, incl. AvaSoft-Basic, USB interface cable.  
Specify grating, wavelength range and options

## Options

<b>-SPU2</b>	• incl. switch for USB powered USB2 or external power for RS-232
<b>-RS</b>	• Replaceable slit
<b>DUV</b>	• Deep-UV detector coating >150 nm
<b>DCL-UV/VIS</b>	• Detector Collection Lens to enhance sensitivity, Quartz, 200-1100 nm
<b>SLIT-XX</b>	• Slit size, please specify XX = 5, 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-ULS2048-USB2-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 2 <sup>nd</sup> order effects please specify YYY= 305, 395, 475, 515, 550 or 600 nm
<b>OSC</b>	• Order-sorting coating with 600 nm long-pass filter for VA, BB (>350 nm) and VB gratings in AvaSpec-ULS2048
<b>OSC-UA</b>	• Order-sorting coating with 350 and 600 nm long-pass filter for UA gratings in AvaSpec-ULS2048
<b>OSC-UB</b>	• Order-sorting coating with 350 and 600 nm long-pass filter for UB or BB (<350 nm) gratings in AvaSpec-ULS2048
<b>-FCPC</b>	• FC/PC fiber-optic connector

To calibrate your spectrometer,  
take a look at the AvaLight-CAL calibration light source.  
Alternatively Avantes has in-house calibration possibilities.  
Contact an application specialist for more information.