AvaSpec-ULS2048x64TEC SensLine Thermoelectrically Cooled Fiber-optic Spectrometer

AvaSpec-ULS 2048x64TEC

The AvaSpec-ULS2048x64TEC spectrometer is one of the newest spectrometers in the SensLine.

This instrument enhances the Sensline series. With a cooled, backthinned detector. The backthinned detecor has good sensitivity in the UV and IR region. The 64 pixelheight (0.89 mm) enables catching as many photons as possible while the cooling enables long integration times up to 500 seconds with low noise values.

The instrument features our re-designed three-stage Peltier cooling device integrated into our exclusive ultra-low stray-light optical bench, which can reduce the temperature of the CCD chip by -35 °C against ambient, improving the dark baseline and PRNU level by a significant factor. The detector cooling also reduces the dark noise by a factor of 2-3.

The AvaSpec-ULS2048x64TEC-USB2 uses a special low noise version of the 2048x64 detector .

All the features mentioned above make this instrument ideally suited for measuring low light applications like for instance fluorescence.
Optimal flexibility is guaranteed with the (optional) replaceable slit making the instrument suitable for different kind of applications.

The above mentioned make the AvaSpec-ULS2048x64TEC an excellent choice for low light-level applications, such as fluorescence and Raman measurements, where integration times of more than 5 seconds may be needed.

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	<1%, depending on the grating
Sensitivity	300,000 counts/µW per ms integration time
Detector	Backthinned CCD, 2048x64 pixels, Low Noise
Temperature cooled CCD	Max. ΔT = -35 ºC versus ambient. Optimal setting: 5 ºC
3-stage Peltier cooling internal Power supply @ ΔT=-35ºC	5VDC, 3.0A
Signal/Noise	550:1
AD converter	16-bit, 500 KHz
Integration time	9.7 ms – 500s
Interface	USB 2.0 high-speed, 480 Mbps RS-232, 115.200 bps
Sample speed with on-board averaging	9.7 ms /scan
Data transfer speed	9.7 ms /scan (USB2) 432 ms/scan (RS-232)
Digital IO	HD-26 connector, 2 Analog in, 2 Analog out, 3 Digital in, 12 Digital out, trigger, sync.
Power supply	100-240 VAC, 50W
Dimensions, weight	250 x 179 x 144 mm, 3.6 kg

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Grating Selection Table for AvaSpec-ULS2048x64TEC

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	145-90*	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-ULS2048x64TEC

	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-ULS2048x64TEC-USB2	• Thermo-Electric Cooled Fiber-optic Spectrometer, 75 mm Ultra-Low Stray-light AvaBench, 2048x64 pixel 3-stage TE-cooled and regulated CCD detector, USB2 high-speed interface, incl. AvaSoft-Basic, USB cable, desktop housing. Specify grating, wavelength range and options

Options

DCL-UV/VIS-200	• Detector Collection Lens to enhance sensitivity, Quartz, 200-1100 nm
SLIT-XX	• Slit size, please specify XX = 10, 25, 50, 100, 200 or 500 µm
SLIT-RS	• Replaceable slit with SMA connector. Specify slit size XX=25, 50, 100, 200 or 500 µm
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
OSC-UB	• Order-sorting coating with 350 and 600 nm long-pass filter for UB or BB (<350 nm) gratings
-RS	• Replaceable slit (recommended)
-FCPC	• FC/PC fiber optic connector

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