

AvaSpec-2048 Fiber Optic Spectrometer

The AvaSpec-2048 Fiber Optic Spectrometer is based on the AvaBench-75 symmetrical Czerny-Turner design with 2048 pixel CCD Detector Array. The spectrometer has a fiber optic entrance connector (standard SMA, others possible), collimating and focusing mirror and diffractive grating. A choice of 15 different gratings with different dispersion and blaze angles enable applications in the 200-1100nm range. The AvaSpec-2048 can be delivered with 2 platforms of electronics with 14 bit AD converter; either with USB1.1 or the new USB2.0 interface. The AvaSpec-2048 is especially suitable for low light level and high resolution applications. An optional detector coating enhances the CCD performance for the UV range and a detector collection lens offers high sensitivity. Digital I/O ports enable external triggering and control of shutter and pulsed light sources from the Avantes line of instruments.

The AvaSpec-2048 is also available as dual channel or multiple channel instrument (up to 8 channels), where all spectra are taken simultaneously.

The AvaSpec-2048 comes with AvaSoft-basic, a complete manual, USB interface cable and a PS-12V/1.0A power supply. AvaSoft-full and application software can be ordered separately. Alternatively the AvaSpec-2048-SPU is available as an option to run on USB power and does not need an

AvaSpec-2048



additional power supply.

The new AvaSpec2048-USB2 has a USB2 interface with ultra-fast datasampling of 500 spectra per second and data transfer in 2msec and supports analog in-and outputs as well. Optional Bluetooth® (-BT) communication and an SDRAM card for on-board saving of spectra can be added. The AvaSpec-2048-USB2 runs on USB power and comes with AvaSoft-basic, a complete manual and USB interface cable. Multiple (up to 128) USB2 spectrometers with different detectors can be externally coupled (see section multichannel spectrometers, page 30).

Technical Data



Spectrometer platform	AvaSpec-2048	AvaSpec-2048-USB2
Optical Bench	Symmetrical Czerny-Turner, 75 mm focal length	
Wavelength range	200-1100 nm	
Resolution	0.04 –20 nm, depending on configuration (see table)	
Stray light	< 0.1%	
Sensitivity (AvaLight-HAL, 8 µm fiber)	5000 counts/µW -per ms integration time	
Detector	CCD linear array, 2048 pixels	
Signal/Noise	250:1	
AD converter	14 bit, 1.33 MHz	14 bit, 2 MHz
Integration time	2 msec – 60 seconds	1.1 msec – 10 minutes
Interface	USB 1.1, 12 Mbps RS-232, 115.200 bps	USB 2.0 high speed, 480 Mbps RS-232, 115.200 bps
Sample speed with on-board averaging	17 msec / scan	1.8 msec /scan
Data transfer speed	14-31 ms / scan (depending on # pixels transferred)	2.0 ms / scan
Digital IO	DB-15 connector, 2 Digital in, 12 Digital out	HD-26 connector, 2 Analog in, 2 Analog out, 3 Digital in, 12 Digital out, trigger, sync.
Power supply	12 VDC, reverse polarity protection, 160 mA (PS-12V/1.0A) or 5VDC USB power	Default USB power, 440 mA. Or with SPU2 external 12VDC, 440 mA
Dimensions, weight	175 x 110 x 44 mm (1 channel), 716 gr. 175 x 165 x 85 mm (2 channels), 1700 gr.	175 x 110 x 44 mm(1 channel), 716 grams

Grating selection table for AvaSpec-2048

Use	Useable range	Spectral range (nm)	Lines/mm	Blaze (nm)	Order code
UV/VIS/NIR	200-1100**	900**	300	300	UA
UV/VIS	200-850	520	600	250	UB
UV	200-750	250-220*	1200	250	UC
UV	200-650	165-145*	1800	250	UD
UV	200-580	115-70*	2400	250	UE
UV	220-400	75-50*	3600	250	UF
UV/VIS	250-850	520	600	370	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	145-100*	1800	500	VD
NIR	500-1050	500	600	750	NB
NIR	500-1050	220-150*	1200	750	NC
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) for AvaSpec-2048

Grating (lines/mm)	Slit size (µm)					
	10	25	50	100	200	500
300	0.8	1.4	2.4	4.3	8.0	20.0
600	0.4	0.7	1.2	2.1	4.1	10.0
1200	0.1-0.2*	0.2-0.3*	0.4-0.6*	0.7-1.0*	1.4-2.0*	3.3-4.8*
1800	0.07-0.12*	0.12-0.21*	0.2-0.36*	0.4-0.7*	0.7-1.4*	1.7-3.3*
2400	0.05-0.09*	0.08-0.15*	0.14-0.25*	0.3-0.5*	0.5-0.9*	1.2-2.2*
3600	0.04-0.06*	0.07-0.10*	0.11-0.16*	0.2-0.3*	0.4-0.6*	0.9-1.4*

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

ORDERING INFORMATION

AvaSpec-2048	Fiber Optic Spectrometer, 75 mm Avabench, 2048 pixel CCD detector, USB1.1/RS-232 interface, incl AvaSoft-Basic, USB cable and PS-12V/1.0A power supply, specify grating, wavelength range and options
AvaSpec-2048-USB2	Fiber Optic Spectrometer, 75 mm Avabench, 2048 pixel CCD detector, self powered high speed USB2 interface, incl AvaSoft-Basic, USB interface cable, specify grating, wavelength range and options
AvaSpec-2048-2	Dual channel Fiber Optic Spectrometer, 2 * 75 mm Avabench, 2048 pixel CCD detector, USB1.1/RS-232 interface, incl AvaSoft-Basic, USB cable and PS-12V/1.0A power supply, for both channels specify grating, wavelength range and options
Options	
-SPU	incl. switch for self powered USB1 or external power for RS232
-SPU2	incl. switch for self powered USB2 or external power for RS232
BT	Bluetooth® interface for USB2 platform only, including antenna
SDXXX	Internal XXX MB SD card for on board data saving, for USB2 platform only
DUV	Deep UV detector coating >150 nm
DCL-UV/VIS	Detector Collection lens to enhance sensitivity, Quartz, 200-1100 nm
SLIT-XX	Slit size, please specify XX = 10, 25, 50, 100, 200, 500 µm
OSF-YYY	Order sorting filter for reduction of 2 nd order effects, please specify YY= 385, 475, 515, 550, 590 nm
OSC	Order sorting coating with 590nm long pass filter for VA, BB and VB gratings in AvaSpec-2048
OSC-UA	Order sorting coating with 350 and 590nm longpass filter for UA gratings in AvaSpec-2048
OSC-UB	Order sorting coating with 350 and 590nm longpass filter for UB gratings in AvaSpec-2048