AvaSpec Multi-Channel Spectrometer

Do you need more precise measurements over a broad range? Or multiple measurements at the same moment for process control? AvaSpec multi-channel spectrometers fulfill your every need. You can select from our range of spectrometer detectors, choose different slits or gratings: anything is possible.

Two enclosure options are available: the 9" desktop housing for up to 4 channels and the 19" rack-mountable which holds a maximum of 10 spectrometers. For our USB2 version all channels are connected to the computer through a single USB2-cable.

For the EVO series a USB3 and a Ethernet version is available.
The Ethernet version (ETH) supports standard 4 channels. With the additional hub installed, it can handle up to 10 channels.

Benefits:
- Combine up to 10 channels in one enclosure
- Any channel fully configurable to your needs
- Different integration times and averaging settings possible for each channel
- Ideal for process control

AVS-RACKMOUNT

Technical Data

Housing	Desktop	Rack-mount
Max nr. Channels	4	10 (UV/VIS)
Dimensions	315 x 235 x 135 mm (d x w x h)	315 x 445 x 135 mm

Ordering Information

AVS-DESKTOP-USB2	• Desktop for USB2 platform multichannel AvaSpec, incl. channel synchronization, USB2-hub and 100-240VAC power supply, supports max. 4 Rack-mount spectrometer units.
AVS-RACKMOUNT-USB2	• 19" Rack-mount for USB2 platform multichannel AvaSpec, incl. channel synchronization, USB2-hub and 100-240VAC power supply, supports max. 10 Rack-mount spectrometer units.
AvaSpec-DDDD-USB2-RM	• Rack-mount Unit USB2 Fiber-optic Spectrometer, self powered high-speed USB2 interface, incl. AvaSoft-Basic software, USB cable and sync cable, specify detector type DDDD (ULS2048/ULS3648/ULS2048L/ULS2048XL/NIR256/512), grating, wavelength range and options. Desktop/Rack-mount needs to be ordered separately
AVS-DESKTOP-USB3	• Desktop for USB3 platform multichannel AvaSpec-EVO, incl. channel synchronization, USB3-hub and 100-240VAC power supply, supports max. 4 Rack-mount spectrometer units.
AVS-DESKTOP-ETH	• Desktop for ETH platform multichannel AvaSpec-EVO, incl. channel synchronization, ETH-hub and 100-240VAC power supply, supports max. 4 Rack-mount spectrometer units.
AVS-RACKMOUNT-EVO-USB3	• 19" Rackmount for USB3 platform multichannel AvaSpec-EVO, including channel synchronization, USB3-hub, one DB26-IO connector and 100-240VAC power supply, supports max 10 rackmount unit spectrometer channels.
AVS-RACKMOUNT-EVO-ETH	• 19" Rackmount for ETH platform multichannel, including channel synchronization, 4 channel ETH-hub, one DB26-IO connector and 100-240VAC power supply, supports max. 10 rackmount unit spectrometer channels (needs AVS-RM-ADDON-5-10ETH).
AVS-RM-ADDON-5-10ETH	• Extra Industrial Hub for extension of AVS-RACKMOUNT-EVO-ETH to 5-10 channels
AvaSpec-EEEE-EVO-RM	• Rack-mount EVO Fiber-optic Spectrometer, incl. AvaSoft-Basic software, USB cable and sync cable, specify detector type EEEE (ULS2048CL/ULS4096CL/ULS2048L/ULS2048XL/NIR256/512), grating, wavelength range and options. Desktop/Rack-mount needs to be ordered separately

Synchronize all channels easily with internal sync cables

Distributor

AZPECT
part of
amsTECHNOLOGIES
where technologies meet solutions

nordics@amstechnologies.com
azpect.amstechnologies.com

Contact us

AvaSpec-Fast StarLine Ultra-fast Spectrometer for High-speed Applications

AvaSpec-Fast

For ultra-fast spectral acquisition the AvaSpec-Fast offers the best solution. Up to 5637 spectra can be stored at 0.20 ms per scan using Avantes unique store-to-RAM functionality. Depending on the configuration chosen, between 1254 and 5637, spectra can be stored during one burst.

The AvaSpec-FAST series is available in five different configurations; the difference being the number of active pixels. More pixels provide higher resolution or more bandwidth, but slower minimum integration time. For all models, start/stop pixels can be set in our software to increase the number of scans stored on board over a shorter wavelength range.

The AvaSpec-FAST can be configured in CR or SS mode. CR, or continuous run mode, means a single external trigger (through the DB26-connector) results in a customer-set number of scans automatically to be measured. SS-mode, for single scan, means a single spectrum is acquired at every external trigger. CR or SS mode must be specified at the time of order.

Possible configurations are single or dual channel, desktop or Rack-mounted. The instrument is available with all the options and gratings of the AvaSpec-ULS2048. The AvaSpec Fast serie is based on the AvaSpec-ULS2048. Optional it can also be based upon the AvaSpec-ULS2048L.

Technical Data

FAST Series Model	Min Integration Time	Pixels	Max. Frequency (Hz) in CR-Store to RAM	Max amount of spectra Store to RAM
AvaSpec-ULS350F-USB2	0.20 ms	350	5000	5637
AvaSpec-ULS750F-USB2	0.40 ms	750	2500	2716
AvaSpec-ULS950F-USB2	0.50 ms	950	2000	2157
AvaSpec-ULS1350F-USB2	0.70 ms	1350	1400	1528
AvaSpec-ULS1650F-USB2	0.85 ms	1650	1100	1254

Grating Selection Table for AvaSpec-FAST

Grating	Lines/mm	Spectral range AvaSpec-ULS350F (nm)	Spectral range AvaSpec-ULS750F (nm)	Spectral range AvaSpec-ULS950F (nm)	Spectral range AvaSpec-ULS1350F (nm)	Spectral range AvaSpec-ULS1650F (nm)
Z	150	400	850	900	n.a.	n.a.
A	300	190	400	520	750	900
B	600	90	200	250	360	450
C	1200	45	100	120	180	210
D	1800	30	60	80	110	140
E	2400	20	45	50	80	100
F	3600	10	27	30	50	60

Ordering Information

AvaSpec-ULS350F-USB2	• Ultra-fast Fiber-optic Spectrometer, 75 mm low stray-light AvaBench, 350 pixel CCD detector, USB/RS-232 interface, incl. AvaSoft-Basic, USB2 cable. Specify grating, wavelength range and options
AvaSpec-ULS750F-USB2	• As AvaSpec-ULS350F-USB2, but 750 pixel CCD detector
AvaSpec-ULS950F-USB2	• As AvaSpec-ULS350F-USB2, but 950 pixel CCD detector
AvaSpec-ULS1350F-USB2	• As AvaSpec-ULS350F-USB2, but 1350 pixel CCD detector
AvaSpec-ULS1650F-USB2	• As AvaSpec-ULS350F-USB2, but 1650 pixel CCD detector

Options

• See AvaSpec-ULS2048-USB2

Distributor

AZPECT
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where technologies meet solutions

nordics@amstechnologies.com
azpect.amstechnologies.com

Contact us

AvaSpec-RS Replaceable-Slit Spectrometer

AvaSpec-RS

For most customers the choice between throughput and resolution is not an easy one. Avantes now offers the possibility for end-users to easily replace a slit through the introduction of our replaceable-slit feature. The replaceable slit option is available on ULS Ultra-low Stray-light AvaSpecs. On our AvaSpec-HERO & NIR spectrometers this is standard. The slit sets contain 25, 50, 100 and 200 µm slits along with a screwdriver tool to facilitate the change. Slit kits are available with SMA-905 connector, as well as FC/PC connectors. Slit sets can be ordered separately for the -RS spectrometer.

No recalibration of the spectrometer is needed when changing slit because of the high-precision slit positioning.

Technical Data

Slit set connectors	SMA-905 or FC/PC
Slit sizes	25, 50, 100, 200 or 500 µm (width) x 1 mm (height)
Material	Stainless steel
Fixing screws	Torx (included)

Ordering Information

-RS	• Replaceable slit, to be added to the product code of the AvaSpec-ULS
SLIT-XX-RS	• Replaceable slit with SMA connector. Specify slit size XX=25, 50, 100, 200 or 500 µm, in combination with AvaSpec-ULS-RS spectrometers
SLIT-XX-RS-FCPC	• as SLIT-XX-RS, but with FC/PC connector

Slit Kit

To fully utilize your AvaSpec-RS series spectrometer with replaceable slit, the Slit Kit is available. It features a complete set with four slits, of 25, 50, 100, 200 and 500 µm. Also included in the kit are the tools to easily change the slit in the spectrometer.

The Slit Kit is available in SMA (choice of 4 SMA slits), SMA/FCPC (combination of 2 SMA and 2 PCPC slits) and FC/PC (choice of 4 FCPC and/or SMA slits) versions.

All kits can be used on any spectrometer with the replaceable slit option installed. Slit sizes 5 and 10 um cannot be included in the kit , but can be ordered as a separate item (recalibration of spectrometer recommended).

Ordering Information

SLITKIT-SMA	• Slit kit containing of 4 SMA replaceable slits. Choice of 25, 50, 100, 200 and 500 µm slits (any combination), and the tools to replace the slit
SLITKIT-SMA/FCPC	• Slit kit containing of 2 SMA and 2 FCPC replaceable slits.. Choice of 25, 50, 100, 200 and 500 µm slits (any combination), and the tools to replace the slit
SLITKIT-FCPC	• Slit kit containing of 4 replaceable slits (FCPC and/or SMA). Choice of 25, 50, 100, 200 and 500 µm slits (any combination), and the tools to replace the slit.

Don't forget to order a fiber cable

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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 2nd 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

Optical Bench	ULS Symmetrical Czerny-Turner, 75 mm focal length
Wavelength range	200-1100 nm
Resolution	0.05 –20 nm, depending on configuration (see table)
Stray-light	0.06-0.19%, depending on the grating
Sensitivity	310,000 counts/µW per ms integration time
Detector	CCD linear array, 2048 pixels
Signal/Noise	200:1
AD converter	16-bit, 2 MHz
Integration time	1.05 ms – 10 minutes
Interface	USB 2.0 high-speed, 480 Mbps RS-232, 115.200 bps
Sample speed with store to RAM	1.05 ms /scan
Data transfer speed	1.8 ms /scan (USB2) 430 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	Default USB power, 350 mA Or with SPU2 external 12VDC, 150 mA
Dimensions, weight	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	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	300-1100**	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
300	0.80 – 0.90*	1.10-1.20*	2.30	4.60	9.00	20.0
600	0.40 – 0.50*	0.63	1.15	2.31	4.50	10.0
830	0.28	0.40	0.80	1.60	3.20	8.0
1200	0.18 – 0.22*	0.29	0.61	1.18	2.20	5.4
1800	0.10 – 0.16*	0.19	0.35-0.42*	0.80	1.60	3.6
2400	0.08 – 0.11*	0.10 – 0.15*	0.28	0.55	1.10	2.7
3600	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

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Options

-SPU2	• incl. switch for USB powered USB2 or external power for RS-232
-RS	• Replaceable slit
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 = 5, 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-ULS2048-USB2-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 please specify YYY= 305, 395, 475, 515, 550 or 600 nm
OSC	• Order-sorting coating with 600 nm long-pass filter for VA, BB (>350 nm) and VB gratings
OSC-UA	• Order-sorting coating with Linear Variable Filter for UA gratings
OSC-UB	• Order-sorting coating with 350 and 600 nm long-pass filter for UB or BB (<350 nm) gratings
-FCPC	• 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.

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EVO Series, with CMOS detector:
StarLine AvaSpec-ULS2048CL-EVO Spectrometer

Using CMOS technology instead of the conventional CCD technology, this spectrometer offers you the latest technology.
New technologies like CMOS have evolved and become a suitable alternative.

In combination with our latest AS-7010 electronics it offers you a versatile device including USB3.0 communication with 10x higher speed compared to USB2, and a second communication port which offers Gigabit Ethernet for integration in your company network and possibility for long distance communication.

Besides the high speed communication options, the EVO also offers a fast microprocessor and 50x more memory which can help you to store more spectra onboard and realise more functionality.

Options include a detector collection lens to enhance sensitivity in the 200-1100 nm range and order-sorting filter to reduce 2nd order effects. Furthermore, the AvaSpec-2048CL is available with a wide range of slit sizes, gratings and fiber-optic entrance connectors. It comes complete with AvaSoft-Basic software, USB cable and an extensive manual.

The AvaSpec-ULS2048CL-EVO is also available as OEM unit, Bench only or Rackmount version.

AvaSpec-ULS2048CL

Technical Data

Optical Bench	ULS Symmetrical Czerny-Turner, 75 mm focal length
Wavelength range	200-1100 nm
Resolution	0.06 –20 nm, depending on configuration (see table)
Stray-light	0.19-1.0%, depending on the grating
Sensitivity	375,000 counts/µW per ms integration time
Detector	CMOS linear Image Sensor
Signal/Noise	300:1
AD converter	16-bit, 6 MHz
Integration time	9 µs – 59s
Interface	USB 3.0 high-speed, 5 Gbps Gigabit Ethernet 1 Gbps
Sample speed with on-board averaging	0.38 ms /scan
Data transfer speed	0.38 ms/scan (USB3), 1.0 ms (ETH)
Digital IO	HD-26 connector, 2 Analog in, 2 Analog out, 13 Digital bidirectional, trigger, sync., strobe, laser
Power supply	Default USB3 power, 500 mA Or 12VDC, 300 mA

Ordering Information

AvaSpec-ULS2048CL-EVO

- Fiber-optic Spectrometer, 75 mm AvaBench, 2048 pixel CMOS detector 14 x 200 µm, USB powered, high-speed USB 3.0 and ETH interface, incl. AvaSoft-Basic, USB interface cable.
Specify grating, wavelength range and options.

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Grating Selection Table for AvaSpec-ULS2048CL-EVO

Use	Useable range (nm)	Spectral range (nm)	Lines/mm	Blaze (nm)	Order code
UV/VIS/NIR	200-1100**	891**	300	300	UA
UV/VIS/NIR	200-1100**	891**	300	300/1000	UNA-DB
UV/VIS	200-850	515	600	300	UB
UV	200-750	247-218*	1200	250	UC
UV	200-650	163-143*	1800	UV	UD
UV	200-580	113-69*	2400	UV	UE
UV	200-400	69-45*	3600	UV	UF
UV/VIS	250-850	515	600	400	BB
VIS/NIR	300-1100**	792**	300	500	VA
VIS	360-1000	495	600	500	VB
VIS	300-800	247-218*	1200	500	VC
VIS	350-750	142-89*	1800	500	VD
VIS	350-640	74-49*	2400	VIS	VE
NIR	500-1050	495	600	750	NB
NIR	500-1050	218-148*	1200	750	NC
NIR	600-1100	346-297	830	800	SI
NIR	600-1100**	495**	300	1000	IA
NIR	600-1100	495	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-ULS2048CL-EVO

Grating (lines/mm)	Slit size (µm)					
	10	25	50	100	200	500
300	1.0	1.4	2.5	4.8	9.2	21.3
600	0.40-0.53*	0.7	1.2	2.4	4.6	10.8
830	0.32	0.48	0.93	1.7	3.4	8.5
1200	0.20-0.28*	0.27-0.38*	0.52-0.66*	1.1	2.3	5.4
1800	0.10-0.18*	0.20-0.29*	0.34-0.42*	0.8	1.6	3.6
2400	0.09-0.13*	0.13-0.17*	0.26-0.34*	0.44-0.64*	1.1	2.7
3600	0.06-0.08*	0.10	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

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-ULS2048CL-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 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, recommended with OSF-305
OSC-UA	• Order-sorting coating Linear Variable 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
-FCPC	• FC/PC fiber-optic connector

AvaSpec-ULS2048L StarLine Versatile Fiber-optic Spectrometer

AvaSpec-ULS2048L

A close cousin to the AvaSpec-ULS2048 but with larger pixels, is the AvaSpec-ULS2048L. It provides enhanced sensitivity at an affordable price. The AvaSpec-ULS2048L has pixels that are almost four times higher than those in the AvaSpec-ULS2048. It gives you a better signal to noise ratio and 40% less dark noise.

Options include a 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 filter to reduce 2nd order effects. Furthermore, the AvaSpec-ULS2048L is available with a wide range of slit sizes, gratings and fiber-optic entrance connectors.

The AvaSpec-2048L is also available in dual or multi-channel versions (up to 10 spectrometers), where all spectra are taken simultaneously.

Connection to your PC is handled via USB2-connection, delivering a scan every 1.8 milli-seconds. 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

Optical Bench	ULS Symmetrical Czerny-Turner, 75 mm focal length
Wavelength range	200-1100 nm
Resolution	0.06 –20 nm, depending on configuration (see table)
Stray-light	0.16-0.28%, depending on the grating
Sensitivity	470,000 counts/µW per ms integration time
Detector	CCD linear array, 2048 pixels
Signal/Noise	300:1
AD converter	16-bit, 2 MHz
Integration time	1.05 ms – 10 minutes
Interface	USB 2.0 high-speed, 480 Mbps RS-232, 115.200 bps
Sample speed with store to RAM	1.05 ms /scan
Data transfer speed	1.8 ms/scan (USB2) 430 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	Default USB power, 350 mA Or with SPU2 external 12VDC, 150 mA
Dimensions, weight	175 x 110 x 44 mm (1 channel), 716 grams

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Grating selection table for AvaSpec-ULS2048L

Use	Useable range (nm)	Spectral range (nm)	Lines/mm	Blaze (nm)	Order code
UV/VIS/NIR	200-1100**	900**	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	300-1100**	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-ULS2048L

Grating (lines/mm)	Slit size (µm)					
	10	25	50	100	200	500
300	1.0	1.4	2.5	4.8	9.2	21.3
600	0.40-0.53*	0.7	1.2	2.4	4.6	10.8
830	0.32	0.48	0.93	1.7	3.4	8.5
1200	0.20-0.28*	0.27-0.38*	0.52-0.66*	1.1	2.3	5.4
1800	0.10-0.18*	0.20-0.29*	0.34-0.42*	0.8	1.6	3.6
2400	0.09-0.13*	0.13-0.17*	0.26-0.34*	0.44-0.64*	1.1	2.7
3600	0.06-0.08*	0.10	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-ULS2048L-USB2
- Fiber-optic Spectrometer, 75 mm AvaBench, 2048 pixel CCD detector 14 x 200 µm, USB powered, high-speed USB2 interface, incl. AvaSoft-Basic, USB interface cable. Specify grating, wavelength range and options

We can also calibrate your AvaSpec series spectrometer

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Options

-SPU2	• incl. switch for USB powered USB2 or external power for RS-232
-RS	• Replaceable slit
DUV	• Deep-UV detector coating >150 nm
DCL-UV/VIS-200	• Detector Collection Lens to enhance sensitivity, Quartz, 200-1100 nm
SLIT-XX	• Slit size, please specify XX = 5, 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-ULS2048L-USB2-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, 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, recommended with OSF-305
OSC-UA	• Order-sorting coating with Linear Variable Filter for UA, VA gratings
OSC-UB	• Order-sorting coating with Linear Variable Filter for UB or BB (<350 nm) gratings
-FCPC	• FC/PC fiber-optic connector

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EVO series: AvaSpec-ULS2048L

EVO Series: StarLine AvaSpec-ULS2048L-EVO Spectrometer

The first instrument in our EVO series: the AvaSpec-ULS2048L-EVO. Using the new electronics board AS 7010 this spectrometer has all the advantages of the current AvaSpec-ULS2048L-USB2 but offers USB3.0 communication as well, which means 10x higher speed compared to USB2.

Unique is the second communication port which offers Gigabit Ethernet for integration in your company network and possibility for long distance communication at an affordable price.Besides the high speed communication options, the EVO also offers a fast microprocessor and 50x more memory which can help you to store more spectra onboard and realise more functionality.

This unique, first to the market combination enables you to create high speed multichannels systems, perfectly suited for most industrial applications.

Options include a 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 filter to reduce 2nd order effects. Furthermore, the AvaSpec-2048L is available with a wide range of slit sizes, gratings and fiber-optic entrance connectors.

It comes complete with AvaSoft-Basic software, USB cable and an extensive manual.

Technical Data

Optical Bench	ULS Symmetrical Czerny-Turner, 75 mm focal length
Wavelength range	200-1100 nm
Resolution	0.06 –20 nm, depending on configuration (see table)
Stray-light	0.04-0.1%, depending on the grating
Sensitivity	470,000 counts/µW per ms integration time
Detector	CCD linear array, 2048 pixels
Signal/Noise	300:1
AD converter	16-bit, 2 MHz
Integration time	1.11 ms – 10 minutes
Interface	USB 3.0 high-speed, 5 Gbps Gigabit Ethernet 1 Gbps
Sample speed with on-board averaging	1.1 ms /scan
Data transfer speed	1.1 ms/scan (USB3), 3.8 ms (ETH)
Digital IO	HD-26 connector, 2 Analog in, 2 Analog out, 13 Digital bidirectional, trigger, sync., strobe, laser
Power supply	Default USB3 power, 500 mA Or 12VDC, 300 mA
Dimensions, weight	177 x 127 x 44,5 mm (1 channel), 1135 grams

EVOlutionary spectroscopy:
- SPEED
- NETWORK INTEGRATION
- MULTICHANNEL BENEFITS

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Grating selection table for AvaSpec-ULS2048L-EVO

Use	Useable range (nm)	Spectral range (nm)	Lines/mm	Blaze (nm)	Order code
UV/VIS/NIR	200-1100**	900**	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	300-1100**	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	350-640	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	600-1100**	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-ULS2048L-EVO

Grating (lines/mm)	Slit size (µm)					
	10	25	50	100	200	500
300	1.0	1.4	2.5	4.8	9.2	21.3
600	0.40-0.53*	0.7	1.2	2.4	4.6	10.8
830	0.32	0.48	0.93	1.7	3.4	8.5
1200	0.20-0.28*	0.27-0.38*	0.52-0.66*	1.1	2.3	5.4
1800	0.10-0.18*	0.20-0.29*	0.34-0.42*	0.8	1.6	3.6
2400	0.09-0.13*	0.13-0.17*	0.26-0.34*	0.44-0.64*	1.1	2.7
3600	0.06-0.08*	0.10	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-ULS2048L-EVO
- Fiber-optic Spectrometer, 75 mm AvaBench, 2048 pixel CCD detector 14 x 200 µm, USB powered, high-speed USB 3.0 and ETH interface, incl. AvaSoft-Basic, USB interface cable.
  Specify grating, wavelength range and options. (See for options AvaSpec-ULS2048CL-EVO.

PS-12V/1.0A
- External power supply, needed for operation in ETH mode

This first to the market combination enables you to create high speed multichannel systems

AvaSpec-ULS3648 StarLine High-resolution Fiber-optic Spectrometer

When you're looking for high-resolution, then take a look at the AvaSpec-ULS3648. Featuring an electronic shutter, it can support integration times as short as 10 microseconds, making it also ideal for CW laser measurements.
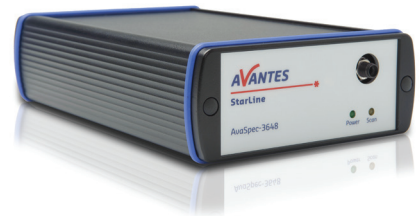
Options include order-sorting filters to prevent 2nd order effects, deep-UV detector coating for better sensitivity in the deep-UV-range, and a detector collection lens to enhance overall sensitivity. Also, a wide range of slit sizes, gratings and fiber-optic entrance connectors are available.

Configurations with two to ten channel spectrometers are available. These give you the possibility for multiple simultaneous

readouts or higher optical resolution in which several spectrometers are arrayed with each covering a short range with high-resolution. For more information, see pages 62 and 63.

The connection to your computer is done through USB2 at 480 Mbps. This translates into 3.7 ms per scan data transfer speed. Of course it's supplied with AvaSoft-Basic, USB cable and an extensive manual, including a quick start guide in four languages.

AvaSpec-ULS3648

Technical Data

Optical Bench	ULS Symmetrical Czerny-Turner, 75 mm focal length
Wavelength range	200 - 1100 nm
Resolution	0.05 –20 nm, depending on configuration (see table)
Stray-light	0.38-0.53%, depending on the grating
Sensitivity	160,000 counts/µW per ms integration time
Detector	CCD linear array, 3648 pixels
Signal/Noise	350:1
AD converter	16-bit, 1 MHz
Integration time	10 µs – 10 minutes
Interface	USB 2.0 high-speed, 480 Mbps RS-232, 115.200 bps
Sample speed with store to RAM	3.7 ms /scan
Data transfer speed	3.7 ms /scan (USB2) 750 ms/scan (RS-232)
Digital IO	HD-26 connector, 2 Analog in, 2 Analog out, 3 Digital in, 12 Digital out, trigger, synchronization
Power supply	Default USB power, 350 mA Or with SPU2 external 12VDC, 150 mA
Dimensions, weight	175 x 110 x 44 mm (1 channel), 716 grams

Grating selection table for AvaSpec-ULS3648

Use	Useable range (nm)	Spectral range (nm)	Lines/mm	Blaze (nm)	Order code
UV/VIS/NIR	200-1100**	900**	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	300-1100**	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
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 3648 pixels will be used for the useable range*

Resolution table (FWHM in nm) for AvaSpec-ULS3648

Grating (lines/mm)	Slit size (µm)					
	10	25	50	100	200	500
300	0.60 – 0.70*	1.10-1.30*	2.20-2.40*	4.60	9.00	20.0
600	0.30 – 0.36*	0.58-0.68*	1.17	2.20	4.50	10.0
830	0.25	0.48	0.93	1.70	3.40	8.0
1200	0.14 – 0.18*	0.30	0.62	1.08	2.20	5.0
1800	0.09 – 0.11*	0.18	0.36-0.40*	0.78	1.50	3.7
2400	0.07 – 0.09*	0.13 – 0.15*	0.26-0.32*	0.52-0.64*	1.10	2.7
3600	0.05 – 0.06*	0.10	0.19	0.40	0.80	2.0

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

Ordering Information

AvaSpec-ULS3648-USB2
- Fiber-optic Spectrometer, 75 mm AvaBench, 3648 pixel CCD detector, USB powered, high-speed USB2 interface, incl. AvaSoft-Basic, USB interface cable. Specify grating, wavelength range and options

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Options

-SPU2	• incl. switch for USB powered or external power for RS-232
-RS	• Replaceable slit
DUV	• Deep-UV detector coating >150 nm
DCL-UV/VIS-200	• Quartz Detector Collection Lens (200-1100 nm)
SLIT-XX	• Slit size, please specify XX = 5, 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-ULS3648-USB2-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 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, recommended with OSF-305
OSC-UA	• Order-sorting coating with Linear Variable 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
-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.

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EVO Series, with 4k CMOS detector:
StarLine AvaSpec-ULS4096CL-EVO

Another new member in our EVO series: the AvaSpec-ULS4096CL-EVO.
Using CMOS technology instead of the conventional CCD technology, this spectrometer offers you the latest technology; ready for the next decade.
The dominant position of CCD detectors in the spectrometer field is fading and new technologies like CMOS have evolved and become a suitable alternative. The AvaSpec-ULS4096CL-EVO offers you this latest technology ensuring a spectrometer platform for the coming years.
In combination with our latest AS-7010 electronics it offers you a versatile device including USB3.0
Communication with 10x higher speed compared to USB2, and a second communication port which offers Gigabit Ethernet for integration in your company network and possibility for long distance communication at an affordable price.

Besides the high speed communication options, the EVO also offers a fast microprocessor and 50x more memory which can help you to store more spectra onboard and realise more functionality.

Options include a detector collection lens to enhance sensitivity in the 200-1100 nm range and order-sorting filter to reduce 2nd order effects. Furthermore, the AvaSpec-4096CL is available with a wide range of slit sizes, gratings and fiber-optic entrance connectors.
It comes complete with AvaSoft-Basic software, USB cable and an extensive manual.

The AvaSpec-ULS4096CL-EVO is also available as OEM unit, Bench only or Rackmount version.
With the 4096 pixels these spectrometers are tailored for high resolution applications like Plasma and LIBS.

AvaSpec-ULS4096CL

Technical Data

Optical Bench	ULS Symmetrical Czerny-Turner, 75 mm focal length
Wavelength range	200-1100 nm
Resolution	0.05 –20 nm, depending on configuration (see table)
Stray-light	0.19-1.0%, depending on the grating
Sensitivity	218.000 counts/µW per ms integration time
Detector	CMOS linear Image Sensor
Signal/Noise	335:1
AD converter	16-bit, 6 MHz
Integration time	9 µs – 40s
Interface	USB 3.0 high-speed, 5 Gbps Gigabit Ethernet 1 Gbps
Sample speed with on-board averaging	0.70 ms /scan
Data transfer speed	0.70 ms/scan (USB3), 1.31 ms (ETH)
Digital IO	HD-26 connector, 2 Analog in, 2 Analog out, 13 Digital bidirectional, trigger, sync., strobe, laser
Power supply	Default USB3 power, 532 mA Or 12VDC, 300 mA
Dimensions, weight	177 x 127 x 44,5 mm (1 channel), 1155 grams

EVOlutionary spectroscopy:
- Speed
- Network integration
- Multi-channel benefits

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Grating Selection Table for AvaSpec-ULS4096CL-EVO

Use	Usable range (nm)	Spectral range (nm)	Lines/mm	Blaze (nm)	Order code
UV/VIS/NIR	200-1100**	891**	300	300	UA
UV/VIS/NIR	200-1100**	891**	300	300/1000	UNA-DB
UV-VIS	200-850	515	600	300	UB
UV	200-750	247-218*	1200	250	UC
UV	200-650	163-143*	1800	UV	UD
UV	200-580	113-69*	2400	UV	UE
UV	200-400	69-45*	3600	UV	UF
UV/VIS	250-850	515	600	400	BB
VIS/NIR	300-1100**	792**	300	500	VA
VIS	360-1000	495	600	500	VB
VIS	300-800	247-218*	1200	500	VC
VIS	350-750	142-89*	1800	500	VD
VIS	350-640	74-49*	2400	VIS	VE
NIR	500-1050	495	600	750	NB
NIR	500-1050	218-148*	1200	750	NC
NIR	600-1100	346-297	830	800	SI
NIR	600-1100**	495**	300	1000	IA
NIR	600-1100	495	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 4096 pixels will be used for the useable range

Resolution Table (FWHM in nm) for AvaSpec-ULS4096CL-EVO

Grating (lines/mm)	Slit size (µm)					
	10	25	50	100	200	500
300	0.50-0.70	1.20-1.30*	2.17	4.6	9.00	20.0
600	0.30-0.36*	0.58-0.60	1.17	2.20	4.5	10.0
830	0.25	0.48	0.93	1.7	3.4	8.0
1200	0.14-0.18*	0.30	0.62	1.08	2.2	5.0
1800	0.09-0.11*	0.18	0.36-0.40*	0.78	1.5	3.7
2400	0.07-0.09*	0.13-0.15*	0.26-0.32*	0.40-0.64*	1.1	2.7
3600	0.05-0.06*	0.10	0.19	0.4	0.8	2.0

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

**expected resolution gain with a 5 micometer slit will be a factor 0.8

Ordering Information

AvaSpec-ULS4096CL-EVO	• Fiber-optic Spectrometer, 75 mm AvaBench, 4096 pixel CMOS detector 7 x 200 µm, USB powered, high-speed USB 3.0 and ETH interface, incl. AvaSoft-Basic, USB interface cable. Specify grating, wavelength range and options.
PS-12V/1.0A	• External power supply, needed for operation in ETH mode or with USB2 ports.

Options

-RS	• Replaceable slit
DCL-UV/VIS-200	• Quartz Detector Collection Lens (200-1100 nm)
SLIT-XX	• Slit size, please specify XX = 5, 10, 25, 50, 100, 200 or 500 μm
SLIT-XX-RS	• Replaceable slit with SMA connector , specify slit size XX=25, 50, 100 or 200 μm. Only in combination with AvaSpec-ULS4096CL-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 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, recommended with OSF-305
OSC-UA	• Order-sorting coating with Linear Variable 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
-FCPC	• FC/PC fiber-optic connector

Using **CMOS technology** instead of conventional CCD technology, this spectrometer offers you the latest technology,ready for the next decade!

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AvaSpec-UV/VIS/NIR: Broadband Spectrometer

AvaSpec-UV/VIS/NIR

Avantes introduces this versatile broad-band spectrometer, suited for various measurements in the complete UV/VIS/NIR area. This all comes in one package, no seperate units necessary. This dual spec-trometer is suited for 200-1700 nm.

This solution for versatile needs is an ideal companion in the areas Bioscience, Medical Diagnoses, Semiconductor & Solar Industry, Food & Agriculture, Geology & Mineralogy, Pharmaceutical Industry, Environmental Science, Forensic analysis,

and many more.

The first channel is based on a AvaSpec-ULS2048L. The second channel is based on Avaspec-NIR256-1.7 (uncooled version). Both with replaceable slit option. Available configurations are similar to the options of both spectrometer models mentioned. Detailed info please check these data-sheets.

Technical Data

Connections	2 x USB2.0 2 x DB26 (DIO/RS232) 2 x SMB (synch)
Dimensions, weight	250 x 144 x 179 mm, 4.1 kg
Power supply	Default USB power, 250/350 mA

Ordering Information

AvaSpec-UV/VIS/NIR	• Dual Channel Broad Band Spectrometer consisting of: Channel 1: UV/VIS Spectrometer based on the 2048L detector with replaceable slit Channel 2: NIR Spectrometer based on the uncooled 1.7 detector with replaceable slit Incl.: USB cables, Sync cable, Avasoft-Basic Excl.: Options for both channels (grating, settings, slit, etc.) For both channels specify grating, wavelength range and options
Ordering Example	• AvaSpec-UV/VIS/NIR Channel 1: Grating – UA set for 200-1100nm, DUV, OSC-UA, Slit-25-RS Channel 2: Grating NIR200-1.5 set for 950-1700nm, Slit-50-RS Avasoft-Full

Note: This model will soon be replaced for an EVO version

Preconfigured Spectrometers (In Stock)

For customers with urgent needs and general flexibility in their specifications, Avantes offers a variety of preconfigured spectrometers. We keep these spectrometers in stock so they are readily available, which makes for a significant decrease in shipping time.

Out of the seven available models, five are configured to be used for measurements in the UV-VIS-NIR range (200 to 1100 nm), one

for the VIS-NIR range (360 to 1100 nm), and one just for the visible range (360 to 880 nm).

Several models are equipped with a replaceable slit (RS). All preconfigured spectrometers are available at discount pricing and include an upgrade to AvaSoft-Full. The full specifications are listed below.

Technical Data

Name	AvaSpec-ULS2048L-USB2-UA-RS	AvaSpec-ULS2048CL-EVO-RS-UA	AvaSpec-ULS2048XL-EVO-RS-UA	AvaSpec-ULS4096CL-EVO-UA-10	AvaSpec-ULS2048CL-EVO-UA-50	AvaSpec-ULS2048CL-EVO-VA-50	AvaSpec-ULS2048CL-EVO-RS-BB
Uses	UV/VIS/NIR					VIS/NIR	VIS
Range	200 - 1100 nm		200 - 1160 nm	200 - 1100 nm		360 - 1100 nm	360 - 880 nm
Slit/Connector	25 µm/SMA-RS			10 µm SMA-905	50 µm/SMA-905		25 µm/SMA-RS
Resolution (FWHM)	1.4 nm			0.5-0.7 nm	2.5 nm		0.7 nm
A/D Convertor	16 bit						
Interface	USB 2.0	USB 3.0/ETH					
Included options	Detector collecting lens, deep-UV coating, order-sorting coating, slit kit SMA	Detector collecting lens, order-sorting coating, slit kit SMA		Detector collecting lens, order sorting coating, slit			Detector collecting lens, order-sorting coating, slit kit SMA
Applications	Absorbance, emission, irradiance measurements		High-sensitivity applications (fluorescence, irradiance from very low intensity sources)	High-resolution measurements from high-intensity sources (lasers, powerful light sources, plasma)	Absorbance, emission, irradiance measurements	Color measurements, visible irradiance measurements	
AvaSoft-Full	Included						

Ordering Information

AvaSpec-ULS2048L-USB2-UA-RS	Ultra-low stray light fiber optic UV/VIS/NIR spectrometer with replaceable slit, 2048 pixel/14x200 µm CCD detector, grating UA (200-1100 nm), DCL-UV/VIS-200, OSC-UA, DUV, USB2 powered, USB2 high speed interface. Includes AvaSoft-Full and slit kit SMA (slit 25-RS preinstalled; 50, 100 and 200 µm in box).
AvaSpec-ULS2048CL-EVO-RS-UA	Ultra-low stray light fiber optic UV/VIS/NIR spectrometer with replaceable slit, 2048 pixel/14x200 µm CMOS detector, grating UA (200-1100 nm), DCL-UV/VIS-200, OSC-UA, USB3 powered, high speed USB3 and ETH interface. Includes AvaSoft-Full and slit kit SMA (slit 25-RS preinstalled; 50, 100 and 200 µm in box).
AvaSpec-ULS2048XL-EVO-RS-UA	Ultra-low stray light fiber optic UV/VIS/NIR spectrometer with replaceable slit, 2048 pixel/14x500 µm back thinned CCD detector, grating UA (200-1100 nm), DCL-UV/VIS-200, OSC-UA, USB3 powered, high speed USB3 and ETH interface. Includes AvaSoft-Full and slit kit SMA (slit 25-RS preinstalled; 50, 100 and 200 µm in box).
AvaSpec-ULS4069CL-EVO-UA-10	Ultra-low stray light fiber optic UV/VIS/NIR spectrometer, 4069 pixel CMOS detector, slit 10, grating UA (200-1100 nm), OSC-UA, DCL-UV/VIS-200, USB3 powered, high speed USB3 and ETH interface. Includes AvaSoft-Full.
AvaSpec-ULS2048CL-EVO-UA-50	Ultra-low stray light fiber optic UV/VIS/NIR spectrometer, 2048 pixel CMOS detector, grating UA (200-1100 nm), slit 50, OSC-UA, DCL-UV/VIS-200, USB3 powered, high speed USB3 and ETH interface. Includes AvaSoft-Full.
AvaSpec-ULS2048CL-EVO-VA-50	Ultra-low stray light fiber optic VIS/NIR spectrometer, 2048 pixel CMOS detector, grating VA (360-1100 nm), slit 50, OSC, DCL-UV/VIS-200, USB3 powered, high speed USB3 and ETH interface. Includes AvaSoft-Full.
AvaSpec-ULS2048CL-EVO-RS-BB	Ultra-low stray light fiber optic VIS spectrometer, 2048 pixel CMOS detector, grating BB (360-880 nm), OSF-305, OSC, USB3 powered, high speed USB3 and ETH interface. Includes AvaSoft-Full and slit kit SMA (slit 25-RS preinstalled; 50, 100 and 200 µm in box).