USB3.0 超高速

CMOS 制御・超高速分光器

AvaSpec -ULS2048CL-EVO

最新の CMOS 技術を駆使した CMOS ディテクタが開発されました。
2015 年に新開発のエレクトロニクスボード（AS7010）を採用した USB3.0, ギガビットイーサネット搭載の超高速分光器 EVO シリーズが登場し、ノイズの少ない革命的な次世代型の超高パフォーマンスが実現しました。
そして超高速・高分解能分光器に CMOS ディテクターを搭載した
CMOS 制御・超高速分光器が新登場しました。COMS イメージセンサはブルーミングやスミア現象が生じることなく、低ノイズで高度な信号処理により、
CCD センサと同等の感度や波長分解能が得られます。

特長

- CMOSセンサ制御（ブルーミングやスミア現象が生じない）
- USB3.0 超高速5Gbps通信処理（USB2.0の10倍速）
- 1GbpsでLAN経由で直接遠距離データ伝送可能
- マルチチャンネルの構築が可能で産業用に最適
- メモリー機能：100Mpixel を高速で内部保存し、PCへ直接伝送可能
- 最小波長分解能： >0.06nm
- スリット交換型（-RS)も選択可能→ユーザーが現場で
  スリットサイズ(25,50,100,200μm)を交換可能なタイプ

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超高速ギガビット伝送 4K 高解像度 CMOS 分光器

AvaSpec-ULS4096CL-EVO

2016 年に新開発のエレクトロニクスボード (AS7010) により USB3.0 高速通信＆ギガビット伝送を実現した EVO シリーズが登場し、 革命的な次世代型の超高パフォーマンスが実現しました。
またそれと同時に最新の CMOS 技術を駆使した CMOS ディテクタが開発され、 CMOS 制御・超高速分光器 AvaSpec-ULS2048CL-EVO が登場しました。

この度， 最新の 4096 ピクセル 4K 高解像度 CMOS リニアーイメージセンサを搭載したディテクターが開発され、 最短露光時間 : 9μs を実現しました。 さらに高波長分解能 : 0.05nm・高 S/N 値、高パフォーマンスが実現し、 プラズマ計測用途などに最適な最先端の次世代進化型分光器と言えます。

特長

- CMOS センサ制御(ブルーミングやスミア現象が生じない)
- USB3.0 超高速5Gbps 通信
- 1Gbps でLAN 経由で直接遠距離データ伝送可能
- メモリー機能:100Mpixel を高速で内部保存し、PC へ直接伝送可能
- 外部トリガー機能
- 最小波長分解能: >0.05nm
- 最小露光時間:9μs
- 漏れ光:<0.19%
- ダイナミックレンジ :> 4000 : 1
- スリット交換型(-RS)も選択可能→ユーザーが現場でスリット交換可能
- 産業用プロセス管理などにマルチチャンネル対応
- 波長域: 200～1100nm

◆光分析　◆環境計測　◆化学実験

◆ラマン分光　◆LIBS　◆プラズマ計測

◆産業用プロセスコントロール （マルチチャンネル）

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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.

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

	Slit size (µm)					
Grating (lines/mm)	**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

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

AVANTES
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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
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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

	Slit size (µm)					
Grating (lines/mm)	**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!