

# AvaSpec-ULS2048 StarLine

## Versatile Fiber-optic Spectrometer

### AvaSpec-ULS2048



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.

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.

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<br>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)<br>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<br>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  |
| <b>OSC-UA</b>          | • Order-sorting coating with Linear Variable Filter for UA gratings  |
| <b>OSC-UB</b>          | • Order-sorting coating with 350 and 600 nm long-pass filter for UB or BB (<350 nm) gratings   |
| <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.