

# OEM spectrometer: AvaBench Optical Bench

AvaSpec optical benches are available with or without one of our electronics boards for integration into customer's systems. Avantes has developed four types of UV/VIS optical benches, especially for OEM customers. The optical benches AvaBench-75-ULS (used in both StarLine and SensLine), AvaBench-75-ULSTEC (SensLine) and AvaBench-37.5-HS and AvaBench-100-HSC (SensLine) are Czerny-Turner designs with fiber-optic entrance connectors (Standard SMA, others possible), collimating and focusing mirrors and a diffraction grating. A choice of different gratings with different dispersions and blaze angles enable applications in the 200-1100 nm range. The newly designed high numerical aperture AvaBench-37.5-HS has full mechanical compatibility for mounting holes with the AvaBench-75-ULS, so for OEM customers it is easy to upgrade to a higher-throughput optical bench.

Wavelength ranges, resolution tables, detector specifications and AvaBench options can be found in the instrument page corresponding to each spectrometer type. In the table below the detailed key specifications can be found. All AvaBench optical benches are fully compatible with Avantes electronics board or may be interfaced to customer specific electronics. Video output is handled through a separate mini-coax cable.

## AvaBench-75-ULS



### Technical Data

	AvaBench-75-ULS	AvaBench-75-MN	AvaBench-75-ULSTEC	AvaBench-37.5-HS	AvaBench-100-HSC
<b>Implemented in</b>	AvaSpec-ULS2048/3648/2048L/2048CL/4096CL/2048XL/2048x64(TEC)	AvaSpec-Mini2048CL/4096CL	AvaSpec-ULS2048LTEC	AvaSpec-HS1024x58/2048XL	AvaSpec-HERO
<b>Focal length</b>	75 mm	75 mm	75 mm	37.5 mm asym.	100 mm
<b>Numerical aperture</b>	0.07	0.07	0.07	0.22	0.13
<b>Wavelength range</b>	200-1160 nm	200-1100 nm	200-1100 nm	200-1160 nm	200-1160 nm
<b>Resolution (FWHM)</b>	0.05-20 nm	0.05-20 nm	0.05-20 nm	1.2-20 nm	0.18-5.50 nm
<b>Stray-light</b>	0.04-0.1%	0.2-1%	0.04-0.1%	<1%	<1%
<b>Gratings</b>	Different	Different	Different	Different	Different
<b>Slits</b>	10, 25, 50, 100, 250, 500 μm	10, 25, 50, 100, 250, 500 μm	10, 25, 50, 100, 250, 500 μm	25, 50, 100, 200, 500 μm	25, 50, 100, 250, 500 μm
<b>Detector</b>	SONY 2048(L) / TOSHIBA 3648 /HAM 2048CL/4096CL/2048XL/2048x64	HAM 2048CL/4096CL	SONY 2048L	HAM 2048XL	HAM 1024x58
<b>Detector lens</b>	UV/VIS	UV/VIS-200	UV/VIS-200	n.a.	n.a.
<b>Order-sorting filter</b>	See options	See options	See options	See options	See options
<b>Dimensions, weight</b>	120 x 91 x 21 mm, 350 gr.	95 x 68 x 20 mm, 175 gr	120 x 91 x 62 mm, 760 gr.	95 x 152 x 42 mm, 722 gr	120 x 125 x 109 mm, 1500 gr

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## Ordering Information

<b>AvaBench-75-ULS2048-U2</b>	<ul style="list-style-type: none"> <li>• OEM ultra-low stray-light optical bench, 75 mm focal length, 2048 pixel CCD detector. Specify grating, wavelength range and options.</li> </ul>
<b>AvaBench-75-ULS3648-U2</b>	<ul style="list-style-type: none"> <li>• OEM ultra-low stray-light optical bench, 75 mm focal length, 3648 pixel CCD detector. Specify grating, wavelength range and options.</li> </ul>
<b>AvaBench-75-ULS2048L-U2/U3</b>	<ul style="list-style-type: none"> <li>• OEM ultra-low stray-light optical bench, 75 mm focal length, 2048 pixel CCD detector. Specify grating, wavelength range and options.</li> </ul>
<b>AvaBench-75-ULS2048CL-U2/U3</b>	<ul style="list-style-type: none"> <li>• OEM ultra-low stray-light optical bench, 75 mm focal length, 2048 pixel CMOS detector. Specify grating, wavelength range and options.</li> </ul>
<b>AvaBench-75-ULS4096CL-U3</b>	<ul style="list-style-type: none"> <li>• OEM ultra-low stray-light optical bench, 75 mm focal length, 4096 pixel CMOS detector. Specify grating, wavelength range and options.</li> </ul>
<b>AvaBench-75-ULS2048XL-U2/U3</b>	<ul style="list-style-type: none"> <li>• OEM ultra-low stray-light optical bench, 75 mm focal length, 2048XL pixel back-thinned CCD detector. Specify grating, wavelength range and options.</li> </ul>
<b>AvaBench-75-ULS2048x64-U3</b>	<ul style="list-style-type: none"> <li>• OEM ultra-low stray-light optical bench, 75 mm focal length, 2048x64 pixel back-thinned CCD detector. Specify grating, wavelength range and options.</li> </ul>
<b>AvaBench-75-ULS2048x64TEC-U3</b>	<ul style="list-style-type: none"> <li>• OEM ultra-low stray-light optical bench, 75 mm focal length, 2048x64 pixel back-thinned cooled CCD detector. Specify grating, wavelength range and options.</li> </ul>
<b>AvaBench-75-MN2048CL-U3</b>	<ul style="list-style-type: none"> <li>• OEM miniature optical bench, 75 mm focal length, 2048 pixel CMOS detector. Specify grating, wavelength range and options.</li> </ul>
<b>AvaBench-75-MN4096CL-U3</b>	<ul style="list-style-type: none"> <li>• OEM miniature optical bench, 75 mm focal length, 4096 pixel CMOS detector. Specify grating, wavelength range and options.</li> </ul>
<b>AvaBench-75-ULS2048LTEC-U2</b>	<ul style="list-style-type: none"> <li>• OEM ultra-low stray-light optical bench, 75 mm focal length, TE-cooled 2048 large pixel detector. Specify grating, wavelength range and options.</li> </ul>
<b>AvaBench-37.5-HS2048XL-U2/U3</b>	<ul style="list-style-type: none"> <li>• OEM High-sensitivity optical bench, 37.5 mm focal length, 2048XL pixel back-thinned CCD detector. Specify grating, wavelength range and options.</li> </ul>
<b>AvaBench-100-HSC 1024x58TEC-U3</b>	<ul style="list-style-type: none"> <li>• OEM High-sensitivity optical bench, 100 mm focal length, 1024x58 pixel TE-cooled back-thinned CCD detector. Specify grating, wavelength range and options.</li> </ul>

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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.

# AvaBench-75-MN2048CL/4096CL

## Small and Powerful OEM Spectrometer Bench

New: the AvaBench-75-MN optical bench!  
This miniature bench is used in the CompactLine (AvaSpec-Mini2048CL/4096CL) and is ideal for OEM integration in existing systems and handheld devices with the use of your own electronics.

In the tables below, the detailed key specifications can be found.  
The AvaBench optical bench is fully compatible with Avantes' AS-7010 electronics board or may be interfaced to customer specific electronics. Video output is handled through a separate mini-coax cable.

### AvaBench-75-MN



	AvaBench-75-MN2048CL-U3	AvaBench-75-MN4096CL-U3
<b>Optical Bench</b>	Symmetrical Czerny-Turner, 75 mm focal length, MK II	
<b>Wavelength range</b>	200-1100 nm	
<b>Stray-light</b>	0.2 - 1%	
<b>Detector</b>	HAM S11639 , CMOS linear array, 2048 pixels (14 x 200 $\mu\text{m}$ )	HAM S13496 , CMOS linear array, 4096 pixels (7 x 200 $\mu\text{m}$ )
<b>Signal/Noise</b>	330:1 (i.c.w. AS7010 electronics)	300:1 (i.c.w. AS7010 electronics)
<b>Dynamic Range</b>	3300 (i.c.w. AS7010 electronics)	
<b>Dark Noise</b>	16 cnts (i.c.w. AS7010 electronics)	
<b>Interface</b>	Coax, ZIF-8	
<b>Dimensions, weight</b>	94 x 67 x 19 mm, 164 grams	
<b>Temperature range</b>	0-55°C	

### Ordering Information

#### AvaBench-75-MN2048CL-U3

- OEM miniature optical bench, 75 mm focal length, 2048 pixel CMOS detector. Specify grating, wavelength range\* and options

#### AvaBench-75-MN4096CL-U3

- OEM miniature optical bench, 75 mm focal length, 4096 pixel CMOS detector. Specify grating, wavelength range\* and options

\*A set of defined ranges applies, contact us for assistance

### More Information

Grating options and resolution specifications are equal to the AvaSpec-Mini2048CL/4096CL. More details can be found in the AvaSpec-Mini-MKII OEM manual.

# OEM spectrometer: AvaBench NIR Optical Bench

For OEM applications in the NIR range, Avantes offers our line of AvaBench NIR optical benches.

The AvaBench-50 optical bench is available in the 1000-1750 nm range for uncooled detectors.

The AvaBench-100TEC is developed for the NIR range from 1000-2500 nm with thermoelectric cooling. The AvaBench-100TEC supports two different TE-cooled detectors with 256 pixels and two TE-cooled detectors with 512 pixels. The 100 nm focal length optical bench provides the optimal balance between optical throughput and resolution. To keep the size as compact as possible, this bench features a unique folding mirror. New in the NIR line of optical benches is the AvaBench-75-MN, offering a unique small form factor in the NIR range.

All AvaBench NIR optical benches have symmetrical Czerny-Turner designs with a fiber-

optic entrance connector (standard SMA, other options available), collimating and a special designed focusing mirror and diffraction grating. A choice of different NIR gratings can be selected for all models.

Wavelength ranges, resolution tables, detector specifications and AvaBench options can be found on the pages corresponding to each spectrometer type.

In the table below, the key specifications of the NIR optical benches are listed.

The NIR AvaBenches are fully compatible with Avantes electronic boards or may be interfaced to customer specific electronics. The NIR optical benches have a separate video output through a mini-coax cable. The TEC NIR benches have a heatsink and additional electrical connections for both temperature sensor and power for the 2-stage Peltier cooling.

## AvaBench-50



### Technical Data

	AvaBench-50	AvaBench-75-MN	AvaBench-100TEC
<b>Implemented in</b>	AvaSpec-NIR256-1.7	AvaSpec-Mini-NIR	AvaSpec-NIR256-1.7TEC AvaSpec-NIR512-1.7TEC AvaSpec-NIR256-2.5-HSC-EVO AvaSpec-NIR512-2.5-HSC-EVO
<b>Focal length</b>	50 mm	75 mm	100 mm
<b>Numerical aperture</b>	0.24	0.07	0.14
<b>Wavelength range</b>	1000-1750 nm	900-1750 nm	1000-2500 nm
<b>Resolution (FWHM)</b>	2-50 nm	2-50 nm	1.5-90 nm
<b>Stray-light</b>	< 1%	< 1%	< 0.5%
<b>Gratings</b>	different	different	different
<b>Slits</b>	50, 100, 200, 500 $\mu$ m	50, 100, 200, 500 $\mu$ m	25, 50, 100, 250, 500 $\mu$ m
<b>Detector</b>	HAM-NIR256-1.7	HAM-NIR256-1.7	SU-NIR256/512-1.7 HAM-NIR256-2.5 HAM-NIR512-2.5
<b>TE Cooling</b>	No	No	Yes
<b>Order-sorting filter</b>	OSF-850-3/OSF-1000-3	OSF-850-3/OSF-1000-3	OSF-1000-3 and OSC-NIR
<b>Dimensions, weight</b>	100 x 130 x 40 mm, 875 gr.	95 x 68 x 20 mm, 175 gr	185 x 145 x 185 mm, 3.5 kg.

### Ordering Information

- AvaBench-50-NIR256-1.7**
  - OEM optical bench, 50 mm focal length, 256 pixel InGaAs detector. Specify grating, wavelength range and slit, OSF-850-3 or OSF-1000-3.
- AvaBench-Mini-NIR256-1.7**
  - OEM optical bench, 75 mm focal length, 256 pixel InGaAs detector. Specify grating, wavelength range and slit, OSF-850-3 or OSF-1000-3.
- AvaBench-100-NIR256-1.7TEC**
  - OEM optical bench, 100 mm focal length, 256 pixel TE-cooled InGaAs detector. Specify grating, wavelength range and slit, OSF-850-3 or OSF-1000-3.
- AvaBench-100-NIR512-1.7TEC**
  - OEM optical bench, 100 mm focal length, 512 pixel TE-cooled InGaAs detector. Specify grating, wavelength range and slit, OSF-850-3 or OSF-1000-3.
- AvaBench-100-NIR256-2.5TEC**
  - OEM optical bench, 100 mm focal length, 256 pixel TE-cooled InGaAs detector 2.5  $\mu$ m. Specify grating, wavelength range and slit, OSF-1000-3, OSC-NIR.
- AvaBench-100-NIR512-2.5TEC**
  - OEM optical bench, 100 mm focal length, 512 pixel TE-cooled InGaAs detector 2.5  $\mu$ m. Specify grating, wavelength range and slit, OSF-1000-3, OSC-NIR.