

Some detailed information about JETI's spectroradiometric equipment

specbos 1201, 1301 and 1401 are the new spectroradiometers of JETI GmbH. The basic unit is **specbos 1201**, which can measure in radiance and irradiance mode. If the unit is combined with an integrating sphere (standard diameters 150 mm and 50 mm), it measures additionally in Radiant flux mode (**specbos 1301**) and if combined with a distance tube it measures additionally in Radiant intensity mode (**specbos 1401**).

The instruments cover the same wavelength range (380 ... 780 nm) but have a much better optical resolution (5 nm instead of 9 nm FWHM) than its predecessor specbos 1200. So new applications as the characterization of narrow bandwidth LEDs become of interest. The instrument has a 50 µm input slit instead of 100 µm. But the sensitivity of the units is comparable to that of specbos 1200, so the measuring times are the same (for a more detailed comparison between **specbos 1201** and specbos 1200 see application note 4).

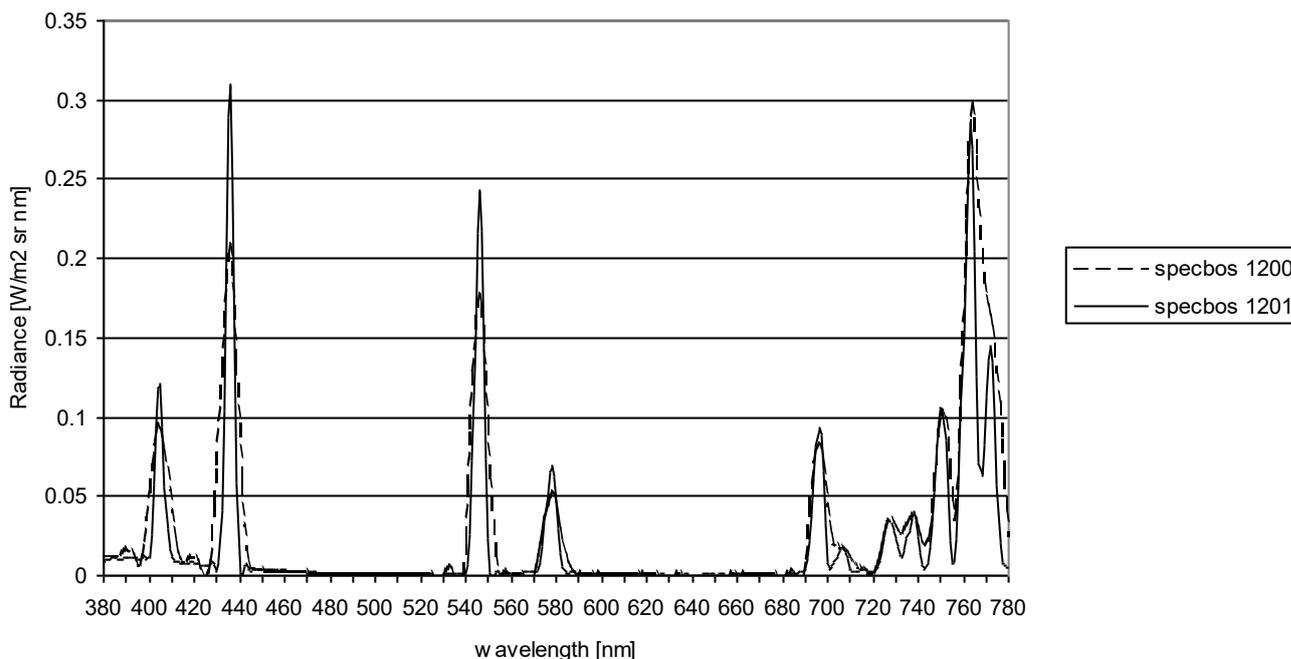


Figure 1: Spectrum of a HgAr lamp, measured with specbos 1201 and 1200

The PC software JETI LiMeS can be used for all four measuring modes. It has a similar main screen as the former spectroradiometric software and was extended by the following items:

- Photosynthetically active radiation (PAR) calculation
- Circadian metrics
- Observer 2°/ 10°
- Spectrally colored base line in spectrum
- better management of measured spectra/ reference spectra
- storage of screen as graphics file
- raw data mode

The next software version will include additional features:

- Switching between SI units and fL, fcd
- Pass/ fail function
- Peak wavelength/ centroid wavelength
- Preparation of customer specific protocols (templates)

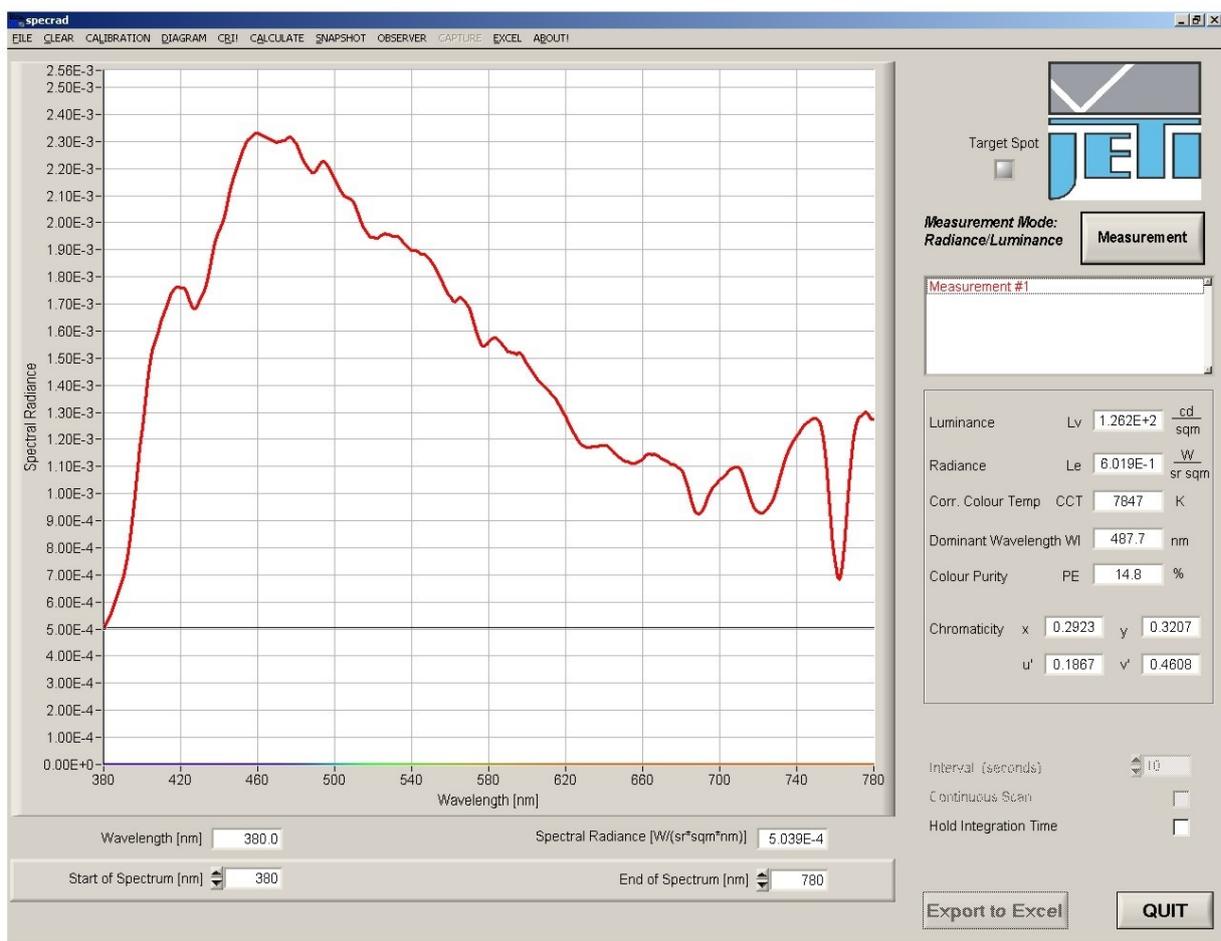


Figure 2: Screen shot of the new software

The instruments have a USB port. It acts as a virtual COM port. So, the instruments can be used after installation of the driver similarly to a unit with serial interface. During installation the instruments will get a COM port number, which can be checked (and changed) in the device manager of the PC. **specbos 1201/ 1301/ 1401** are powered by the USB connection and does not need an additional power supply.

All photometric and radiometric calculations can be done by the micro processor of the instruments. So, they can also be used without the PC software in case of implementations into customers own application software. It is possible to use the serial commands for operation of the instrument. These commands are SCPI syntax compatible and include the following main categories:

*PARAMeter	Get and set general parameters
*CONfigure	Get and set configuration data
*INITiate	Start a configured measurement
*FETCh	Get data from previous measurement
*READ	Start a configured measurement and get the data (combination of *INIT and *FETCh)
*MEASure	Configure, start the measurement and get the data (combination of *CONF, *INIT and *FETCh)
*CONTRol	Control peripheral components
*CALCulate	Calculate data from the previous measurement
*CALIBrate	Calibrate the unit and get calibration data

The following quantities can be obtained directly from the instruments:

- spectral radiometric values in wavelength steps down to 1 nm
- integrated radiometric and photometric values
- Chromaticity x,y and u',v'
- Dominant wavelength and color purity
- Correlated Color Temperature
- Color Rendering Indexes with selectable reference illuminant
- Peak wavelength and FWHM

The output to the general measuring command *MEAS:ALLVAlues in irradiance mode is shown as an example:

```

irradiance[W/m^2]:      1.458
illuminance[lx]:      393.628
x:      0.3214
y:      0.3428
u':      0.1987
v':      0.4768
dominant wavelength[nm]:      502.9
colour purity:      3.6
color temperature[°K]:      5997
CRI_DC: 2.816058e-03
CRI_Ra:      91.7
CRI_R01:      95.9
.....
CRI_R12:      81.6
CRI_R13:      96.3
CRI_R14:      89.0
    
```

Furthermore, Virtual Instruments (VIs) for LabView are available. A radiometric DLL is in preparation. Both software packages allow an easy implementation of **specbos 1201/ 1301/ 1401** into customer written application software.

specbos 1201 comes in a similar housing as specbos 1200. It has the same cross section and is only 20 mm longer. So, it can easily replace its predecessor.

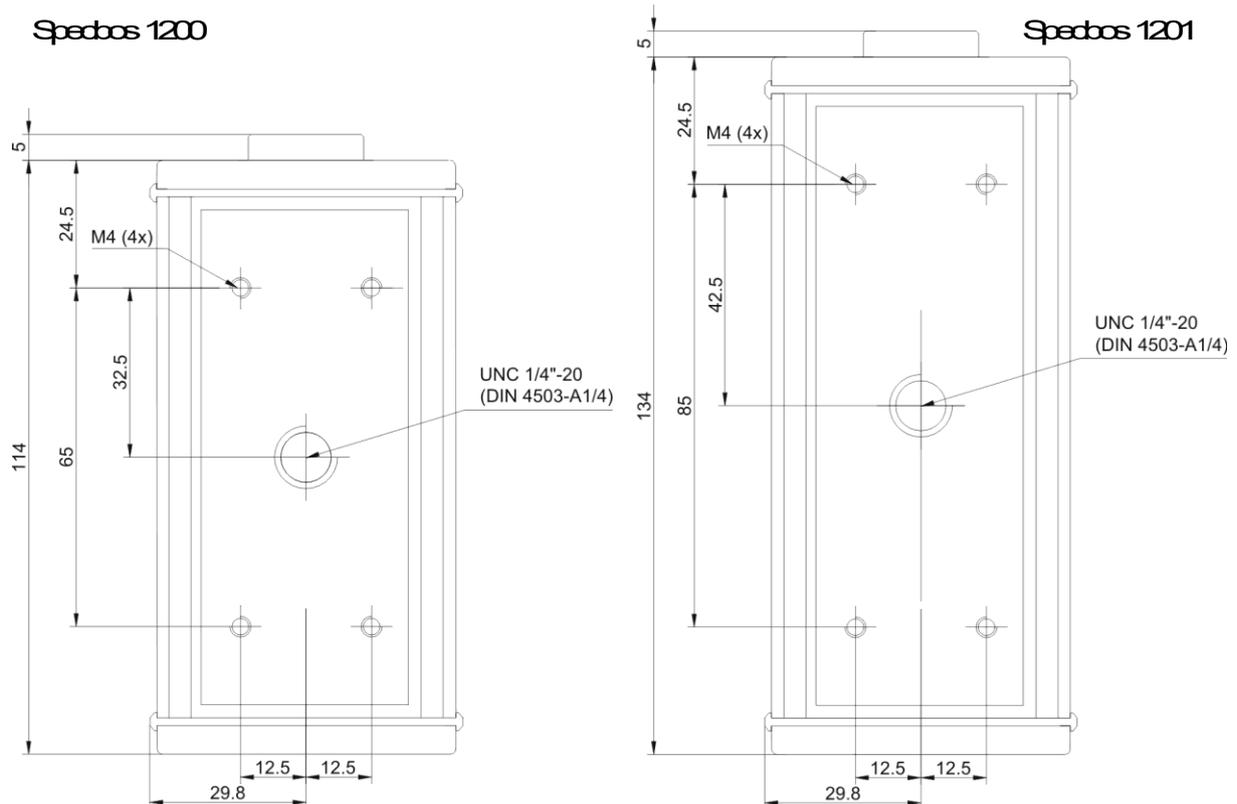


Figure 3: Fixing holes of specbos 1201 and specbos 1200

Summary:

specbos 1201/ 1301/ 1401 are very versatile and economic miniature spectroradiometers for all four basic light measuring quantities (radiance, irradiance, radiant flux and radiant intensity). They have several advantages compared with the predecessor, especially the better optical bandwidth, the extended software capabilities and the direct control from user written software by simple command syntax.