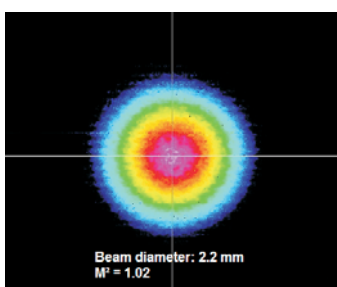


## Versatile Picosecond Laser Module



Beam profile VisIR-765 "STED"

- Center emission wavelength 766 and 1532 nm
- Pulse width typically 70 ps (FWHM) or 0.5 ns (FWHM)
- Average output power > 1.5 W or > 400 mW
- Repetition rates from single shot up to 80 MHz, external or internal triggering
- Collimated output



## Applications

- Time-resolved fluorescence spectroscopy/microscopy (FLIM, FRET, FCS)
- Stimulated Emission Depletion Microscopy (STED)
- Biochemical analytics
- Diffuse Optical Tomography (DOT)
- Quantum optics
- LIDAR, Ranging
- 3D polymerization

The VisIR laser is a versatile and flexible platform based on a Master Oscillator Fiber Amplifier (MOFA) concept with frequency conversion. The master oscillator generates infrared picosecond pulses at 1530 nm with variable repetition rates up to 80 MHz using the proven gain-switching techniques from PicoQuant. The output of this seed laser is directly connected to a multi-stage fiber amplifier, which boosts the output from the seed laser by several dB while maintaining the other characteristics of the seed laser beam like the emission wavelength, polarization and the pulse width.

**Average output power > 1.5 W**

The high pulse energies of the amplified 1530 nm infrared laser permit an efficient wavelength conversion using single pass second harmonic generation (SHG). In that way it is possible to generate picosecond pulses at 766 nm with an average output power of more than 1.5 W (VisIR-765 „STED“). The VisIR can be operated at 12 different internally selectable repetition rates between 31.25 kHz and 80 MHz and can also be triggered externally by TTL or NIM signals at any repetition rate between single shot and 80 MHz. This feature is extremely useful for a perfect synchronization of excitation and depletion laser in a stimulated emission depletion (STED) set-up.

**Flexible pulse duration**

The laser can be configured with a short pulse of 70 ps or an extended pulse duration of 0.5 ns (FWHM). The extended pulse duration of 0.5 ns is found to be ideal for e.g. STED microscopy since longer pulses or even continuous-wave excitation can expose the sample to an unnecessary amount of radiation that can lead to increased photobleaching.

**Excellent beam quality**

The VisIR features a nearly perfectly circular and gaussian shaped beam profile (TEM<sub>00</sub>) which can be specified as a value of M<sup>2</sup> < 1.1, with a typical figure of about M<sup>2</sup> ~ 1.02. That is an important parameter for further accurate beam shaping (e.g. “STED donut”).

**Compact stand alone device**

The VisIR is a stand alone device with a special design optimized for maximum heat dissipation. It includes all driving functions of the established PDL series laser driver such as choice of repetition rate and trigger source. An optional remote control for the VisIR allows to set the trigger source, the repetition rate, and the general output power of the laser.

## Specifications

### 765 nm

	VisIR-765	VisIR-765 “STED“
<b>Optical output</b>		
Center wavelength. . . . .	766 ± 3 nm. . . . .	766 ± 3 nm
Maximum average output power . . . . .	> 400 mW . . . . .	> 1.5 W
Pulse width (FWHM) . . . . .	typ. 70 ps. . . . .	typ. 0.5 ns
Spectral width. . . . .	<< 1 nm . . . . .	<< 1 nm
Output . . . . .	collimated beam . . . . .	collimated beam
Beam diameter. . . . .	2.2 mm ± 0.2 mm. . . . .	2.2 mm ± 0.2 mm
Beam quality . . . . .	M <sup>2</sup> < 1.1 (typical ~ 1.02), TEM <sub>00</sub> . . . . .	M <sup>2</sup> < 1.1 (typical ~ 1.02), TEM <sub>00</sub>
PER . . . . .	> 30 dB . . . . .	> 30 dB
Power stability (12 hours, ΔT <sub>ambient</sub> < 0.5 K). . . . .	< 3 % rms . . . . .	< 3 % rms
<b>Repetition rates</b>		
<i>Internal</i>		
Range . . . . .	user selectable: 80, 40, 20, 10, 5 or 2.5 MHz (80 MHz base frequency) 1000, 500, 250, 125, 62.5 or 31.25 kHz (1 MHz base frequency)	
<i>External via NIM input</i>		
Range . . . . .	< 10 Hz to 80 MHz	
Trigger level . . . . .	fixed trigger level at -400 mV	
Connector . . . . .	NIM-CAMAC	
<i>External via TTL input</i>		
Range . . . . .	< 10 Hz to 80 MHz	
Amplitude. . . . .	- 5 V to + 5 V (maximum limits)	
Trigger level . . . . .	adjustable between -1 V and +1 V	
Connector . . . . .	BNC	
<b>Synchronization output</b>		
Amplitude	< -800 mV into 50 Ohms (NIM)	
Connector	SMA	
<b>Delays</b>		
Trigger in (NIM) to sync out . . . . .	typ. 9 ± 1 ns	
Trigger in (NIM) to optical out . . . . .	typ. 80 ns	
Sync out to optical out . . . . .	typ. 70 ns	
<b>Dimensions</b>		
Size (l × w × h). . . . .	352 × 336 × 82.5 mm	
Weight . . . . .	7.5 kg	
<b>Operation</b>		
Temperature range. . . . .	10 °C - 30 °C	
Maximum power consumption. . . . .	115 W	

## 1530 nm

	VisIR-1530	VisIR-1530-HP
<b>Optical output</b>		
Center wavelength	1531 ± 3 nm	1531 ± 3 nm
Maximum average output power	> 750 mW	> 1.3 W
Pulse width (FWHM)	typ. 70 ps	typ. 0.5 ns
Spectral width	<< 1 nm	<< 1 nm
Output	collimated beam	collimated beam
Beam diameter	0.5 mm ± 0.1 mm	0.5 mm ± 0.1 mm
Beam quality	$M^2 < 1.1$ , TEM <sub>00</sub>	$M^2 < 1.1$ , TEM <sub>00</sub>
PER	> 20 dB	> 20 dB
Power stability (12 hours, T <sub>ambient</sub> < 0.5 K)	< 3 % rms	< 3 % rms
<b>Repetition rates</b>		
<i>Internal</i>		
Range	user selectable: 80, 40, 20, 10, 5 or 2.5 MHz (80 MHz base frequency) 1000, 500, 250, 125, 62.5 or 31.25 kHz (1 MHz base frequency)	
<i>External via NIM input</i>		
Range	< 10 Hz to 80 MHz	
Trigger level	fixed trigger level at -400 mV	
Connector	NIM-CAMAC	
<i>External via TTL input</i>		
Range	< 10 Hz to 80 MHz	
Amplitude	- 5 V to + 5 V (maximum limits)	
Trigger level	adjustable between -1 V and +1 V	
Connector	BNC	
<b>Synchronization output</b>		
Amplitude	< -800 mV into 50 Ohms (NIM)	
Connector	SMA	
<b>Delays</b>		
Trigger in (NIM) to sync out	typ. 9 ± 1 ns	
Trigger in (NIM) to optical out	typ. 80 ns	
Sync out to optical out	typ. 70 ns	
<b>Dimensions</b>		
Size (l × w × h)	352 × 336 × 82.5 mm	
Weight	7.5 kg	
<b>Operation</b>		
Temperature range	10 °C - 30 °C	
Maximum power consumption	115 W	



INVISIBLE LASER RADIATION  
 AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION  
 CLASS IV LASER PRODUCT  
Complies with IEC 60825-1:2007 / 21 CFR 1040.10 and 1040.11  
 except for deviations pursuant to Laser Notice No. 50, dated 24-Jun-07  
 MAXIMUM OUTPUT < 10 W / WAVELENGTH = 766 nm  
 SEE MANUAL

All Information given here is reliable to our best knowledge. However, no responsibility is assumed for possible inaccuracies or omissions. Specifications and external appearances are subject to change without notice. Trademarks or corporate names are used for explanation and identification, to the owner's benefit and without intent to infringe.

© PicoQuant GmbH, January 2017



PicoQuant GmbH  
 Rudower Chaussee 29 (IGZ)  
 12489 Berlin  
 Germany

Phone +49-(0)30-6392-6929  
 Telefax +49-(0)30-6392-6561  
 Email [info@picoquant.com](mailto:info@picoquant.com)  
 WWW <http://www.picoquant.com>