

# Mid-IR Comb

## Mid-Infrared Optical Frequency Comb

**MenloSystems**

### KEY SPECIFICATIONS

- Repetition Rate 100 MHz or 250 MHz
- Spectral Range 3 - 5 and 5 - 14  $\mu\text{m}$
- High Output Power of up to 200 mW
- Large Spectral Bandwidth of 50  $\text{cm}^{-1}$  – 300  $\text{cm}^{-1}$

### APPLICATIONS

- Fourier-Transform Spectroscopy in the Mid-IR
- Spectroscopy in the “Fingerprint Region” of Molecular Science
- Chemical and Biomolecular Sensing of Molecules
- Fast and Precise Detection of Atmospheric Gases

### FEATURES

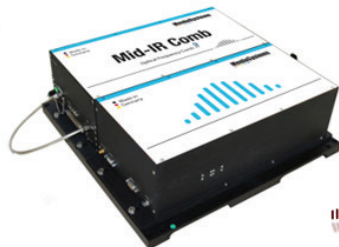
- CEP Offset-Free Frequency Comb
- fs Laser Pulses in the Mid-Infrared
- Phase-Locked Repetition Rate

### OPTIONS

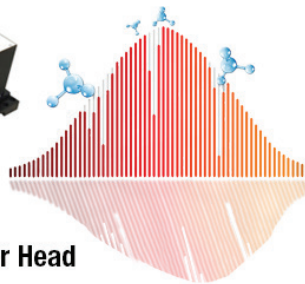
- **WAVELENGTH TUNING**



**Mid-IR Comb 3-5 Laser Head**



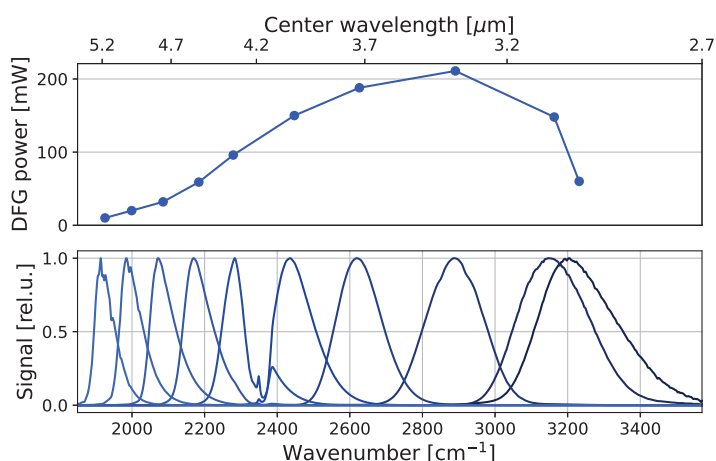
**Mid-IR Comb 5-8-14 Laser Head**



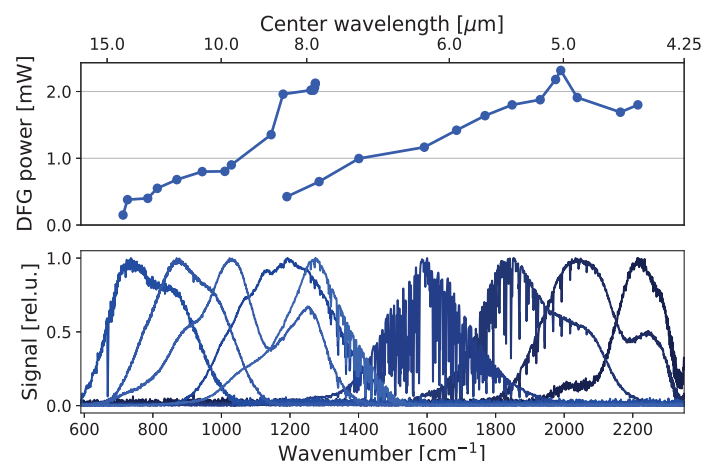
World-leading optical frequency comb technology is now available in the mid-infrared region. Taking advantage of Menlo Systems' proprietary figure 9<sup>®</sup> mode-locking technology, Menlo Systems' difference frequency generation (DFG) based Mid-IR combs provide access to the 3-14  $\mu\text{m}$  range. The reliable, turn-key mid-IR Comb is an enabling tool for applications in the important fingerprint region for high accuracy spectroscopy or nanoFTIR.

### PERFORMANCE DATA FOR MID-IR COMBS

**Average output power as function of center wavelength**



**Mid-IR Comb 3-5**



**Mid-IR Comb 5-8-14**

Spectra measured in ambient air showing absorption lines from atmospheric gases.

# Mid-IR Comb

## Mid-Infrared Optical Frequency Comb

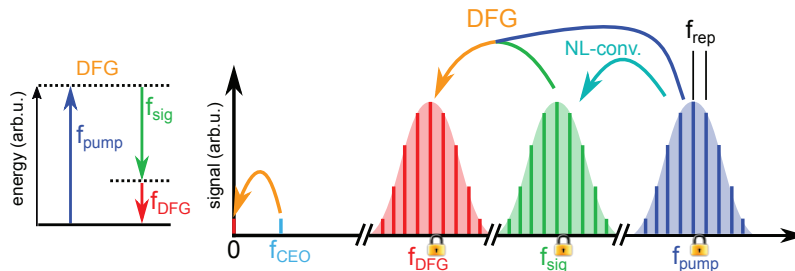
### SPECIFICATIONS

	MID-IR COMB 3-5	MID-IR COMB 5-8-14	
Center Wavelength	factory-set value selectable in the 3-5 $\mu\text{m}$ range	factory-set value selectable in the 5-8 $\mu\text{m}$ range	factory-set value selectable in the 8-14 $\mu\text{m}$ range
Average Output Power	>100 mW in range 3.2-4.2 $\mu\text{m}$ , above 4.2 $\mu\text{m}$ best effort	>0.5 mW	>0.5 mW
Wavelength Tuning (optional)	discrete, automated	continuous, manual	continuous, manual
Repetition Rate	100 MHz or 250 MHz	100 MHz	100 MHz

### REQUIREMENTS

Input Requirements	10 MHz frequency reference, power level +7 dBm
Operating Voltage	100/115/230 VAC
Frequency	50 to 60 Hz
Operating Temperature	22 $\pm$ 5 $^{\circ}\text{C}$

### OPTICAL SCHEME



Starting from Menlo's turn-key, reliable figure 9<sup>®</sup> fiber laser oscillators, a two-color femtosecond laser system is realized using spectral shifting in highly nonlinear fibers. The two branches of femtosecond pulses of different wavelengths are spatially and temporally overlapped and subsequently focused into a nonlinear crystal for difference frequency generation (DFG). This allows the generation of femtosecond pulses in the mid-IR covering the spectral range from 3  $\mu\text{m}$  to 14  $\mu\text{m}$  with high output power levels of up to 200 mW. Menlo offers a fully automated tuning for the 3-5  $\mu\text{m}$  comb. The comb system covering 5-8 and 8-14  $\mu\text{m}$  requires semi-manual tuning.

For accurate measurements, Menlo offers an easy to use stabilization of the comb repetition rate and carrier envelope offset, which can be phase locked to an RF reference or optical reference allowing to generate sub-Hz optical linewidth in the mid-IR.

### ORDERING INFORMATION

Product Code	Mid-IR Comb 3-5	Mid-IR Comb 5-8-14
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Please call for pricing. Specifications are subject to change without notice. Custom modifications are available, please inquire.

