



Your Photonics Partner

Laser Solution

Comet™

Diode Pumped Solid-State (DPSS) Lasers

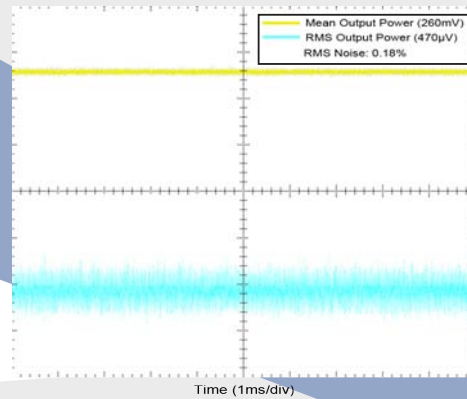


Features

- Blue (475 nm), Green (532 nm), Yellow (594 nm), and NIR (1064 nm)
- TEM₀₀ Beam Quality
- > 10,000 Hours Expected Lifetime
- Low Noise and Excellent Power Stability
- USB Software Interface Available
- Integratable into Larger OEM Systems

About the Comet™

The Comet™ laser series is a line of solid-state optically pumped lasers known as diode pumped solid-state lasers (DPSS). In this case, a diode laser is used to pump a solid-state gain material, such as Nd:YAG or Nd:YVO₄. Diode pumping is a very efficient method of pumping dielectric materials since the pump wavelength can be tuned to maximize the photon absorption into the gain material. DPSS lasers have many advantages over standard diode lasers, especially when it comes to beam quality (i.e. circularity and M²). Compact and self-contained, the Comet™ emits a pure TEM₀₀ beam with diffraction limited performance and a (typical) M² of 1.05. Available in blue (475 nm), green (532 nm), yellow (594 nm), and NIR (1064 nm). With variable power options, these modules are ideal for demanding applications such as metrology, photoluminescence, printing, illumination, scanning, inspection, particle counting, and a variety of bio-medical applications. These turnkey lasers maintain outstanding optical performance over a broad temperature range, guaranteeing minimal power fluctuations and virtually eliminating high frequency noise. Its OEM version utilizes the world's smallest OEM controller with power consumption < 20 Watts. It has been qualified for use in some of the most demanding high-end instruments, with deployments in the tens of thousands of units. The 475 nm systems replace bulky, expensive gas ion lasers for bio-medical and fluorescence applications, without sacrificing beam quality.

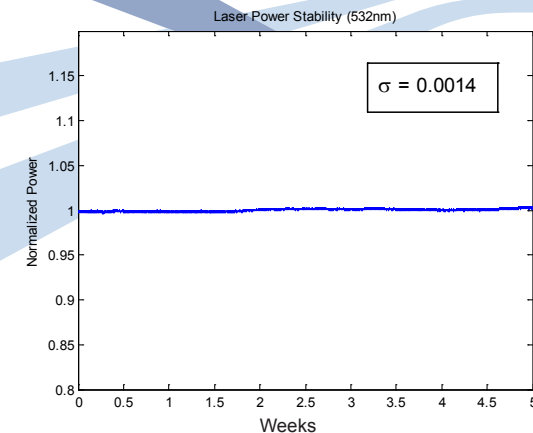


Low Noise

The Comet™ can be operated over a wide temperature range, 10°C to 35°C, with a stable and quiet laser output power at 532 nm. The Comet™ has a proven history of RMS noise stability < 0.5%. The combination of excellent beam characteristics, such as mode quality and low divergence and brightness, makes the Comet™ laser series suitable for beam focusing as well as long distance beam positioning.

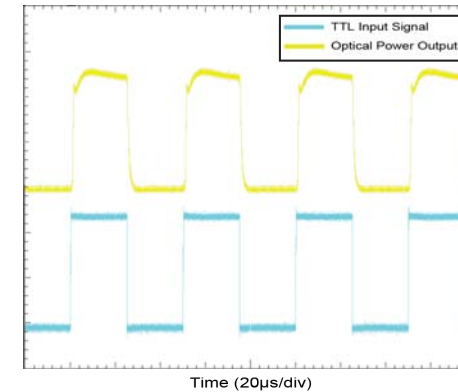
Excellent Power Stability

The Comet™ includes an external laser driver, thermoelectric cooling, and optical fiber-coupling with an expected lifetime > 10,000 hours. The Comet™ has a proven history of reliability up to a 3% peak-to-peak long term power stability rating.



External Modulation Available

Unlike most of the competition's DPSS lasers (which can not be modulated directly), the Comet™ laser series is specifically designed to allow modulation by both TTL and analog signals.



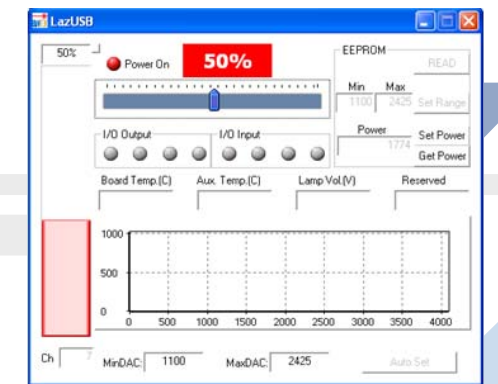
Using the TTL modulation option, the laser can be digitally pulsed in on/off mode up to 20 kHz with a modulation depth greater than 100:1. With a rise/fall time of < 20 µs, the TTL signal can be used in conjunction with the trigger signal of your detection system to control your measurement cycle and integration time. TTL modulation is ideal for Raman spectroscopy, fluorescence spectroscopy, and other applications where the source and the detector need to be precisely triggered.

With analog modulation (AM), the laser output power is controlled by applying an arbitrary 0 - 5 V input signal from a function generator. Using the AM option, the laser can be modulated up to 1 kHz with a modulation depth > 100:1.

Depending on your specific system's requirements for TTL and analog modulation, custom configurations to the laser might be needed. Please contact a B&W Tek Applications Specialist for help with your specific requirements.

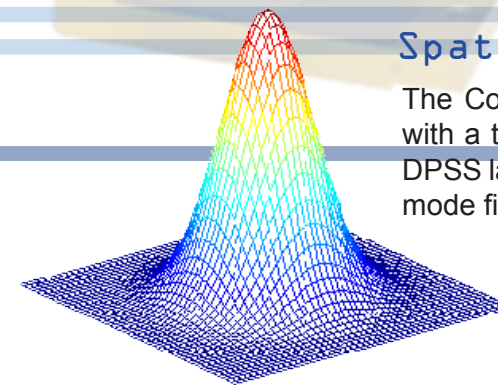
USB Software Interface Available

The Comet™ laser series can be equipped with an optional USB connection and our easy to use LazUSB™ software interface for laser power control and real time monitoring of internal laser conditions.



Spatial Mode Profile

The Comet™ laser series provides a single-mode (TEM₀₀) spatial beam profile, with a typical M² of 1.05. Such a high quality spatial mode profile is inherent to DPSS laser systems (but not to diode lasers); therefore, there is no need for spatial mode filtering, as in our other laser systems.



General Specifications: Comet™

Model Number	BWB-475-4E	BWB-475-10E	BWB-475-20E	BWN-532-5E*	BWN-532-10E*	BWN-532-20E*	BWN-532-50E*	BWN-532-100E*	BWN-594-5E	BWN-594-10E	BWN-594-20E	BWR-1064-20E	BWR-1064-50E	BWR-1064-100E	BWR-1064-600E	BWR-1064-1200E	BWR-1064-2500E
Wavelength (nm)	475 +/- 2	475 +/- 2	475 +/- 2	532 +/- 1	532 +/- 1	532 +/- 1	532 +/- 1	532 +/- 1	594 +/- 1	594 +/- 1	594 +/- 1	1064 +/- 2	1064 +/- 2	1064 +/- 2	1064 +/- 2	1064 +/- 2	1064 +/- 2
Output Power (mW)	4	10	20	5	10	20	50	100	5	10	20	20	50	100	600	1200	2500
Spatial Mode	TEM ₀₀	TEM ₀₀	TEM ₀₀	TEM ₀₀	TEM ₀₀	TEM ₀₀	TEM ₀₀	TEM ₀₀	TEM ₀₀	TEM ₀₀	TEM ₀₀	TEM ₀₀	TEM ₀₀	TEM ₀₀	TEM ₀₀	TEM ₀₀	TEM ₀₀
M ²	< 1.4	< 1.4	< 1.4	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.2	< 1.2	< 1.2	< 1.4	< 1.4	< 1.4	< 1.5	< 1.5	< 2.0
Beam Diameter at 1/e ² (mm) (typical)	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.5	< 1.5	< 1.5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 3.0
Beam Divergence (mrad) (typical)	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Beam Asymmetry	< 1.5:1	< 1.5:1	< 1.5:1	< 1.2:1	< 1.2:1	< 1.2:1	< 1.2:1	< 1.2:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1
Mode of Operation	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated	CW / Modulated
Long-Term Power Stability (pk-pk)	< +/- 5%	< +/- 5%	< +/- 5%	< +/- 3%	< +/- 3%	< +/- 3%	< +/- 3%	< +/- 3%	< +/- 5%	< +/- 5%	< +/- 5%	< +/- 5%	< +/- 5%	< +/- 5%	< +/- 5%	< +/- 5%	< +/- 5%
Digital Modulation/External Trigger**																	
Maximum Bandwidth (kHz)	on/off only	on/off only	on/off only	> 20	> 20	> 20	> 20	> 20	on/off only	on/off only	on/off only	> 5	> 5	> 5	> 1	> 1	> 1
Rise Time (10% to 90%) (µsec)	-	-	-	< 20	< 20	< 20	< 20	< 20	-	-	-	< 50	< 50	< 50	< 100	< 100	< 100
Fall time (10% to 90%) (µsec)	-	-	-	< 20	< 20	< 20	< 20	< 20	-	-	-	< 50	< 50	< 50	< 100	< 100	< 100
Modulation Depth (extinction ratio)	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1
Analog Modulation**																	
Maximum Bandwidth (kHz)	set power only	set power only	set power only	> 1	> 1	> 1	> 1	> 1	-	-	-	> 1	> 1	> 1	> 1	> 1	> 1
Rise Time (10% to 90%) (µsec)	-	-	-	< 50	< 50	< 50	< 50	< 50	-	-	-	< 50	< 50	< 50	< 100	< 100	< 100
Fall time (10% to 90%) (µsec)	-	-	-	< 50	< 50	< 50	< 50	< 50	-	-	-	< 50	< 50	< 50	< 100	< 100	< 100
Modulation Depth (extinction ratio)	-	-	-	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	-	-	-	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1
Polarization Ratio	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1
Warm-Up Time (minutes)	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5
Beam Position (mm)	20 +/- 1	20 +/- 1	20 +/- 1	20 +/- 1	20 +/- 1	20 +/- 1	20 +/- 1	20 +/- 1	25 +/- 1	25 +/- 1	25 +/- 1	15 +/- 1	15 +/- 1	15 +/- 1	25 +/- 1	25 +/- 1	29 +/- 1
Beam Angle (mrad)	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5	< +/- 5
Pointing Stability (µrad/°C)	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
CDRH Laser Classification	IIIb	IIIb	IIIb	IIIb	IIIb	IIIb	IIIb	IIIb	IIIb	IIIb	IIIb	IIIb	IIIb	IIIb	IV	IV	IV
Ambient Temperature (°C)	10 - 35	10 - 35	10 - 35	10 - 35	10 - 35	10 - 35	10 - 35	10 - 35	10 - 35	10 - 35	10 - 35	10 - 35	10 - 35	10 - 35	10 - 35	10 - 35	10 - 35

Contact B&W Tek for linewidth information

* RMS Noise of < 0.5%

** External analog and digital modulation interface available

Quality Control

- ISO-9001 and ISO-13485 certified
- FDA/CDRH registration and compliance
- CE Mark and UL Mark
- Application of Six Sigma methodologies
- Mock FDA Quality Systems Inspection Technique (QSIT)
- Extensive Quality Control Check Points including Installation Qualifications (IQs), Operational Qualifications (OQs), Performance Qualifications (PQs), and Product Qualifications, as well as software verifications and validations



Enhancements

- Optional USB Controlled Graphical User Interface
- External analog (0-5 V) and digital (TTL) modulation interface available
- Multi-mode fiber coupling available

Ordering Info

DPSS Lasers	
BWB-475-4E	Turnkey DPSS laser system 475 4 mW
BWB-475-10E	Turnkey DPSS laser system 475 10 mW
BWB-475-20E	Turnkey DPSS laser system 475 20 mW
BWN-594-5E	Turnkey DPSS laser system 594 nm 5 mW
BWN-594-10E	Turnkey DPSS laser system 594 nm 10 mW
BWN-594-20E	Turnkey DPSS laser system 594 nm 20 mW
BWR-1064-20E	Turnkey DPSS laser system 1064 nm 20 mW
BWR-1064-50E	Turnkey DPSS laser system 1064 nm 50 mW
BWR-1064-100E	Turnkey DPSS laser system 1064 nm 100 mW
BWR-1064-600E	Turnkey DPSS laser system 1064 nm 600 mW
BWR-1064-1200E	Turnkey DPSS laser system 1064 nm 1200 mW
BWR-1064-2500E	Turnkey DPSS laser system 1064 nm 2500 mW

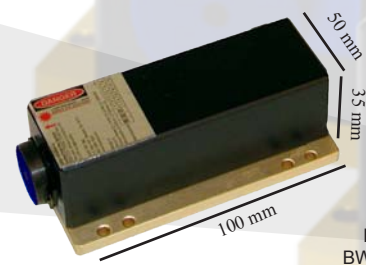
Low Noise DPSS Lasers	
BWN-532-5E	Turnkey low noise DPSS laser system 532 nm 5 mW
BWN-532-10E	Turnkey low noise DPSS laser system 532 nm 10 mW
BWN-532-20E	Turnkey low noise DPSS laser system 532 nm 20 mW
BWN-532-50E	Turnkey low noise DPSS laser system 532 nm 50 mW
BWN-532-100E	Turnkey low noise DPSS laser system 532 nm 100 mW

Modulation Options*	
BWN**-USB	USB based power control software interface.
BWN**-TTL	External digital TTL modulation interface.
BWN**-AM	External analog 0-5 V modulation.
BWN**-MMF	Multi-mode fiber coupling

*See Specifications Chart for Applicability
**Specify BWR or BWB when Applicable

Form Factor

- **Laser Heads**
 BWB-475/ BWN-532: 100 x 50 x 35 mm
 BWN-594: 120 x 90 x 60 mm
 BWR (≤ 100 mW): 72 x 30 x 30 mm
 BWR (600 mW/1200 mW): 120 x 90 x 60 mm
 BWR (2500 mW): 155 x 77 x 60 mm
- **Control Box**
 OEM (≤ 100 mW) 105 x 80 x 25 mm
 End User (< 600 mW): 125 x 105 x 55 mm
 End User (≥ 600 mW): 155 x 89 x 255 mm
- **Power Supply**
 End User (< 600 mW): 91 x 38 x 35 mm



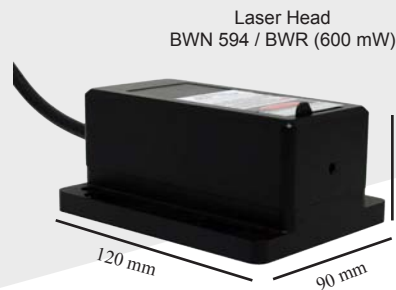
Laser Head
BWB / BWN 475



Laser Head
BWR (2500 mW)



Laser Head
BWR (≤ 100 mW)



Laser Head
BWN 594 / BWR (600 mW)

OEM Power Consumption

Since the OEM control box (≤ 100 mW) does not come with an external power supply, it requires a 5 V input at 3 A. For OEM applications requiring more than 100 mW please contact a B&W Tek application Specialist with your specific requirements.

Applications

- Optical Trapping
- Material Processing
- Metrology
- Wafer Inspection
- Printing
- Medicine
- Particle Counting
- Photoluminescence
- Illumination
- Pointing
- Bio Instrument
- Spectroscopy
- Signal Transmission

Additional Laser Products

- **High Power Lasers**
Up to 200 W with wavelengths from 635 nm - 2000 nm
- **Solid-State Lasers**
TEM₀₀ beam quality from 4 mW - 2500 mW
- **Fiber Coupled Lasers**
Multi-mode or single-mode fiber coupled lasers up to 20W with wavelengths from 635 nm - 2000 nm
- **Multi-Channel Lasers**
Custom configurations 960 nm -1650 nm



BWF5
High Power Laser



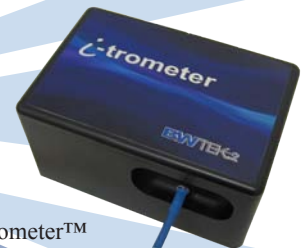
CleanLaze®
Turnkey End User Package

Additional Spectroscopy Products

- **UV-Vis-NIR Spectrometer Modules**
Compact, USB interface, plug-and-play
- **i-Spec Spectrophotometers**
Models from 190 nm - 2500 nm
- **Raman Spectrometer Systems**
Portable systems: 785 nm, 532 nm, & custom
- **Sampling Accessories**
Cuvette holders, optical fibers, fiber probes, etc.



innoRam™
Lab Grade Raman System



i-trometer™
Back-thinned CCD
Array Spectrometer

To find out more:

Contact our Application Team for your unique solution.