

# D2-250 Heterodyne Module

The D2-250 Heterodyne Module is newly re-designed to conveniently overlap two lasers to produce an optical beat note. New kinematic adjustment mounts make it easier and faster than ever to co-align master and slave lasers. The use of rotatable wave-plates at the inputs and polarizing beam splitters allows adjustment of pick off percentage for accepting a large range of powers.



After conversion of the optical beat note to an electrical signal by the D2-160 Beat Note Detector or other fast detector, the electrical signal is delivered to the D2-135 Offset Phase Lock Servo which compares the divided-down beat note with either an internal or user-supplied reference signal and phase locks the slave laser tightly to maintain the desired offset and phase coherence from the master. The D2-250 is easy to align and only requires a small percentage of the total laser power from the two lasers.

## Features:

- Kinematic adjustments for fast, easy alignment!
- Overlap master & slave lasers to produce optical beat note
- Large range of power input
- “Pass-through” beam input configuration
- Optical beat note delivered to detection module via fiber
- Free-space beat note monitor exit for easy alignment

## Applications:

- Atom & ion trapping, including BEC
- Frequency metrology and combs
- Laser stabilization and control

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## Performance Specifications

Parameter	Specification
In-coupling	Free space
Wavelength Range	700-1,000 nm
Input Power Range <sup>1</sup>	0.1 to 200 mW
Pick-off Percentage <sup>2</sup>	1-98%
Throughput <sup>3</sup>	>98%
Input polarization	Linear, horizontal or vertical
Minimum Power in Beat Note	50 $\mu$ W, optimally $\sim$ 200 $\mu$ W
Maximum Power at Detector <sup>4</sup>	$\leq$ 1 mW
Fiber Connector on Module <sup>5</sup>	FC/APC
Compatible Fiber Types	Multimode or Single Mode

All specifications subject to change without notice.

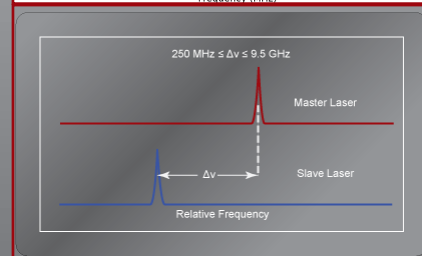
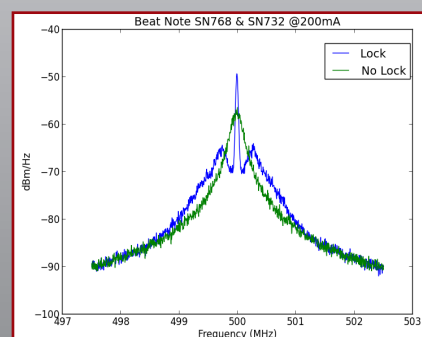
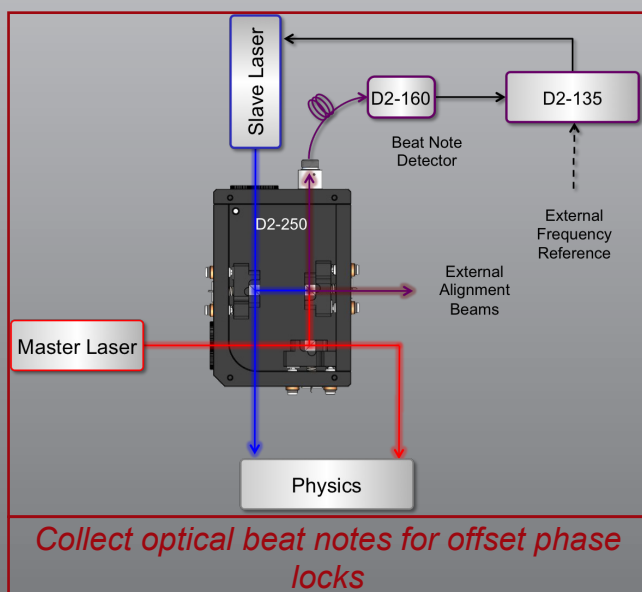
<sup>1</sup>Power in each laser beam

<sup>2</sup>Variable

<sup>3</sup>Depending on input beam power

<sup>4</sup>The maximum power incident upon the detector in the D2-160 Beat Note Detector from the sum total of the master and slave lasers must not exceed 1 mW. Damage to the detector can occur at average powers exceeding 1 mW.

<sup>5</sup>An FC/APC to SC/PC MM fiber is provided with the D2-160 Beat Note Detector.



The D2-250 allows you to conveniently create a heterodyne beat note between a master and a slave laser. Typically, this beat note is delivered via a MM fiber to the D2-160 Beat Note Detector for conversion to an electrical signal. From there, the signal is processed by the D2-135 Offset Phase Lock Servo. A servo signal is produced which will create a true phase lock between master and slave with user-adjustable offset frequency of between 250 MHz and over 9.5 GHz.