

DFB Laser Module

Model No. D2-100

1.1. Description

The DFB module outputs a collimated and circularized laser beam designed for rubidium hyperfine spectroscopy. It is a complete laser module containing the DFB laser, two stages of temperature control, beam collimation and circularization optics, and an optical isolator. The DFB subassembly and isolator subassembly sit on a common baseplate. Temperature control of the DFB assembly (stage 1) gives added insulation of the laser diode temperature control against room temperature changes.

The temperature controllers use an 8-pin circular connector on the back of the DFB subassembly. The injection current connection to the laser diode is through an SMA connector also on the back of the DFB subassembly.

The DFB laser chip is contained in a hermetically sealed package. The chip can be replaced independently if it exceeds its lifetime, thereby avoiding a costly system repurchase. This module contains no moving parts or piezo-electrics and is therefore inherently robust and rugged.

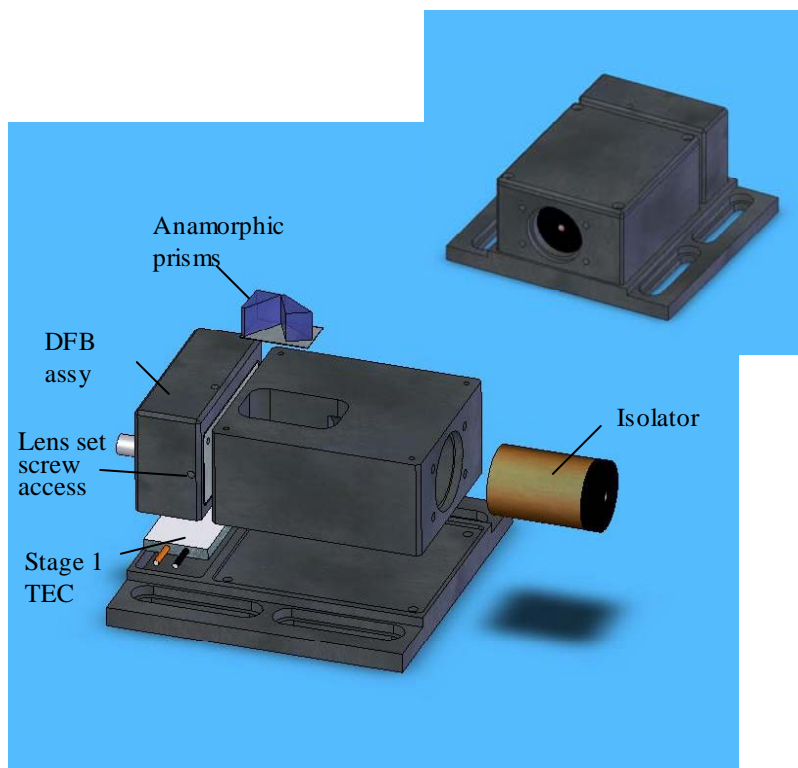


Figure 1. DFB laser module.

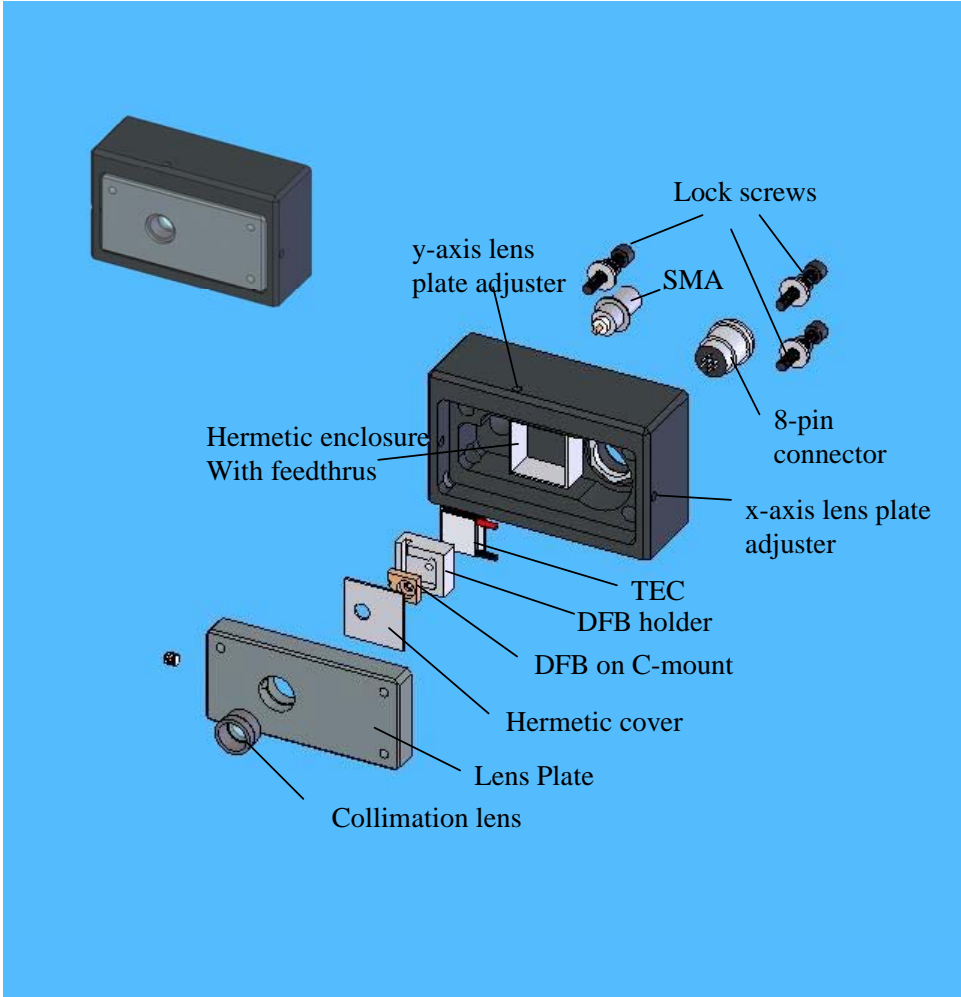
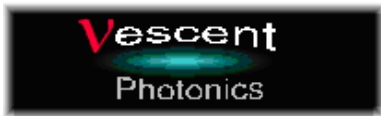


Figure 2. Exploded view of the DFB subassembly.



1.2. Specifications

	Min.	Typical	Max.	Units
Wavelength	780.24			nm
Output power	30	40	50	mW
Beam diameter	0.8	1.1	1.7	mm (1/e ² dia.)
Polarization	Horizontal			
Optical isolation		35		dB
Operating current		150	180	mA
Threshold Current	40	50	70	mA
Temperature range Stage 1, housing Stage 2, laser	15 5		50 40	°C
Temperature stability	See Laser Controller, Model No. D2-105			
Safety Class	3B			
Beam height	0.95			inches
Total package Size (L x W x H)	3.75 x 4 x 2			inches

1.3. Inputs, Outputs, and Controls

Vertical and horizontal pointing

The vertical and horizontal alignment of the laser system is factory set and should not need adjustment. However, if your specific application requires it or the system has otherwise been misaligned the DFB subassembly has adjustments to steer the beam for alignment to the spectroscopy module or other modules. The beam pointing is adjusted by loosening the three lock screws ½ turn past the crack point and adjusting the x and y positioning set screws on the top and left side (facing out along the laser beam) of the module (see Figure 2). Finally, retighten the lock screws.

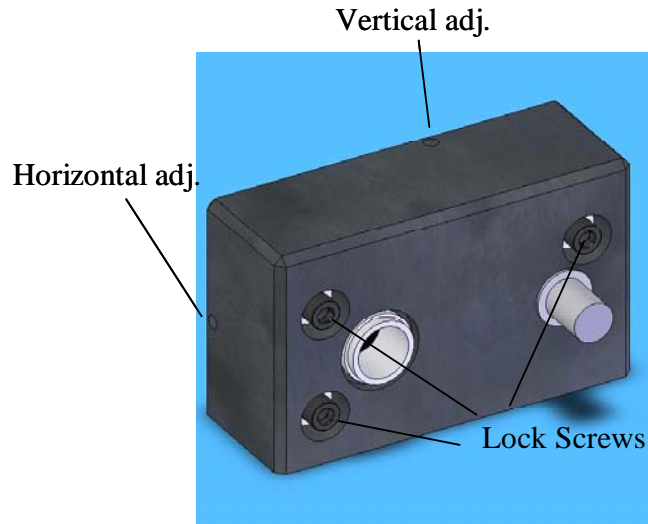


Figure 3. Lock screws and beam pointing controls

Collimation

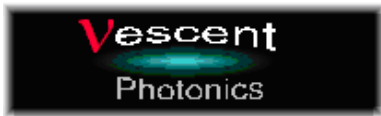
The collimation of the output beam is set at the factory and should not be adjusted unless absolutely necessary. Remove the isolator subassembly from the baseplate with the 4 screws accessible from the bottom. The locking set screw on the right side of the DFB subassembly (Figure 1) can then be loosened and the lens repositioned with a 9 mm spanner wrench (Thorlabs, SPW301). Tighten the locking screw and reattach the isolator subassembly.

Cable Connector

The connections to the TECs and thermisters are made to an 8-pin circular connector. The pin definitions are:

Pin	Signal
1	TEC1+
2	TEC1-
3	Rth-1
4	Rth1-RTN
5	TEC2+
6	TEC2-
7	Rth2
8	Rth2-RTN

NOTE: Earlier models use a push-pull connector for the 8-pin connector to the DFB module. To remove take care to apply opposition forces with the thumb and forefinger knuckles against the housing. Excessive force could displace the output beam requiring realignment.



Laser Current (SMA)

Current is provided to the DFB chip through an SMA connector. The central conductor of the SMA connects to the laser anode, and the shield connects to the laser cathode. This is a direct, unprotected connection to the DFB chip, so extreme care must be taken to avoid ESD damage.

1.4. Aligning the DFB Laser Module

Follow the quick Setup procedure (available as a download from <http://www.vescentphotonics.com/Downloads.html>) for the initial setup of the laser module. The module should not need adjustments, but if necessary the following procedure can be used to fine tune the beam positioning.

1. Loosen the three locking screws on the back of the DFB module ½ turn past the crack point.
2. Adjust the vertical adjustment 4-40 set screw on the top of the DFB housing to level the beam.
3. Adjust the horizontal adjustment 4-40 set screw on the left side of the DFB housing (facing outward from the module).
4. Alternatively, use the spectroscopy module as a beam target. Place the spectroscopy module as far down the table as possible, bolt it down, and center the beam to the input hole.
5. Gently retighten the three locking screws.