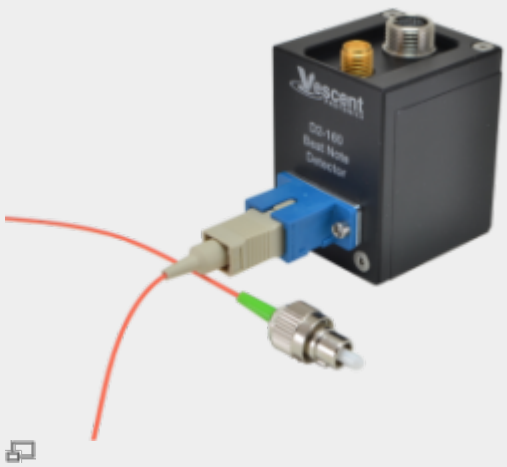
High Speed Beat Note Detector


D2-160 Beat Note Detector

Model No. D2-160

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Please read Limited Warranty and General Warnings and Cautions prior to operating the D2-160. All specifications subject to change without notice.

Description

The Vescent Photonics D2-160 high-speed detector has a full 9.3 GHz bandwidth for capturing beat notes between lasers of different frequencies. Simply overlap the master and slave lasers and launch into the included multimode fiber for measuring the relative frequencies of the two lasers. The D2-160 is compatible with both the Vescent D2-150 Heterodyne Module and the D2-135 Offset Phase Lock Servo. In combination, a true phase lock between a pair of lasers with a user-defined frequency offset can be established. The D2-160 is also compatible with the new ICE™ (Integrated Control Electronics) architecture. The D2-160 can also capture fast rising edges of laser pulses for timing, triggering, and pulse synchronization.This digitizing high-speed pre-amplified detector converts an oscillating optical signal (a beat note) into an electrical high/low signal. It works great for measuring beat note frequencies or high-speed timing. It is not suitable for measuring optical power or other amplitude characteristics due to the digitized output.

Purchase Includes

- D2-160 Beat Note Detector
- 18 GHz RF SMA Cable (6 ft)
- VPN00460 FC/APC to SC MM patch cord (6 ft)

Also look for:

- VPN00410 Hirose-to-D Sub 9-pin (shipped under separate line item; specify for use with D2) or
- VPN00475 Hirose-to-Hirose power cord (shipped under separate line item; specify for use with ICE)

Absolute Maximum Ratings

Note: All modules designed to be operated in laboratory environment

Parameter	Rating
Environmental Temperature	>15°C and <30°C
Environmental Humidity	<60%
Environmental Dew Points	<15°C

Specifications

	Value	Units
Input Type	SC multimode fiber or free space	
Wavelength Response	770 ≤ λ ≤ 855	nm
Bandwidth	0.25 to >9.3	GHz
Input Power Range[1)]	50 minimum 200 optimal	µW
Output Connection	SMA	
Pulse Rise Time	<25	ps
Power Requirements	+5V (pin 4), GND (pin 6)	Hirose
For Hirose to DB9 Power Cable	+5V (pin 4 on Hirose to pins 6 & 7 on DB9), GND (pin 6 on Hirose to pins 1 & 2 on DB9)	Hirose
Dimensions	1.38 x 1.25 x ~1.7	inches

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Operating Instructions

Do not put more the 1mW of optical power into the D2-160, as this can damage the device.

Powering the D2-160

The D2-160 requires +5 VDC and ground to operate. The power input is via a female 6-pin Hirose connector HR10A-7TR-6SA(73). If you are making your own power cable, pin 4 is +5 V and pin 6 is ground. Use a 6-pin male Hirose connector HR10A-7TP-6P(73). Depending on your order configuration, you should have received a power cable with this connector on one end and either the same on the other (typically for using with ICE products) or a DB-9 connector (with D2-products).

If you are using the supplied DB9-to-Hirose cable, but not a Vescent D2-005 power supply, the table above details which pins on the DB9 require which voltages. The figure below may be useful.

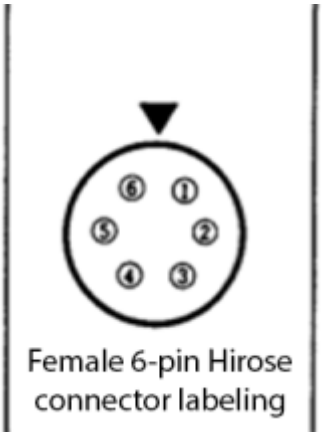

Fig. 1: Pin numbering on female Hirose 6-pin connector

Detector Description

Unlike high-speed analog photo-detectors, the output of the D2-160 is not proportional to the input signal strength. The output of the D2-160 is digitized, which makes its output largely independent of the input signal strength. You cannot use the output to calculate the input power. The output is CML, which will have a DC output value of ~2.8V both with and without input signal. The best way to look at the output from the D2-160 is on a spectrum analyzer (or with the D2-135). Take care you put a DC-block in front of the spectrum analyzer as the D2-160 outputs a DC voltage. On the spectrum analyzer, you will be able to see the spectrum of the optical beat-note input into the detector.

Because the D2-160 uses multi-mode fiber, it is possible to couple light from two lasers into the fiber, but not have the two laser beams overlapped in the fiber and thus producing a weak (or no) beat note form the D2-160. If you are not seeing a beat note from the D2-160, please check the following:

1. The input polarization of two input lasers is the same when coupled into the fiber
2. The two laser inputs at the fiber are spatially overlapped (check that they are well overlapped at two distant points)
3. The lasers are close (<10 GHz) in frequency, so they produce a beat note within the range of the detector. Make sure they are at least 250 MHz apart.
4. The D2-160 is properly powered, as indicated by blue power LED being on.

Mounting

Although the D2-160 does not need to be mounted as its inputs and outputs are flexible cables and fiber, the bottom of the D2-160 contains a threaded 8-32 and M4 holes for mounting.

[1)]

In the optical beat note. Since the beat note is delivered through a multi-mode fiber for ease of alignment, the power at the detector is not necessarily the same as the power in the beat note. Damage may occur to the optical element if >1 mW of overall optical power is delivered to the detector.

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