

CHAPTERS

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Linear Translation

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Optical Delay Line (Page 1 of 2)

Features

- Optical Delay Range: 1466 ps
- Delay Sensitivity: 0.67 fs
- Computer Control via APT Software
- Incorporates the DDS220 Long Travel Stage (See Page 523)
- Input Beam Height (Adjustable using Periscope): 2.4" – 6" (60 mm – 152 mm)
- Output Beam Height: 2.4"
- Software Interface Included



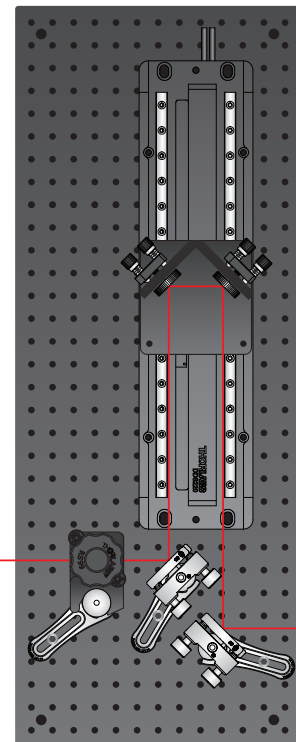
ODL220-FS
Breadboard Sold Separately

Thorlabs' ODL220-FS Free-Space Optical Delay Line Kit offers customers a tested set of Thorlabs components to build an optical delay line. The kit is based on our DDS220 long travel, low-profile direct drive stage, capable of tuning the optical delay up to 1466 ps. Repeatable delay shifts down to 0.67 femtoseconds are achievable. The high accuracy and long-term stability of the stage make this system a suitable choice for pump-probe spectroscopy, THz spectroscopy, interferometry, and related applications.

The direct-drive technology used in this delay line kit eliminates the need for a lead screw, which enables backlash-free operation. The absolute position of the stage is determined using a high-resolution, closed-loop optical feedback signal that provides bidirectional repeatability of 0.25 μm . The stage also features twin, precision-grooved linear bearings that provide superior linearity and on-axis accuracy, which makes the stage an ideal choice for a delay line setup.

The Optical Delay Line Kit includes a periscope assembly that can accommodate input beam heights from 2.4" - 6" (60 mm – 152 mm). By purchasing additional $\varnothing 1$ " RS Series Pillar Posts (see pages 102 – 103), the input beam height that can be accommodated is easily increased. The first POLARIS-K1 Mirror Mount is used to align the beam to be parallel to the translation axis of the DDS220 direct drive stage. The stage's V-block, containing two kinematic mirror mounts, facilitates alignment on the stage. Finally, a second POLARIS-K1 mount is then used to steer the output beam.

Six $\varnothing 1$ " protected silver mirrors, which provide an average reflectivity in excess of 96% over the entire 450 nm – 2 μm range, are included. If your application would benefit from gold, aluminum, broadband dielectric, dielectric laser line, or ultrafast mirrors, please contact technical support at techsupport@thorlabs.com to discuss the various options.



ODL220-FS
Optical Path

Optical Delay Line (Page 2 of 2)



DDS220
Direct Drive Stage

Kit Components

- Direct Drive, Linear Translation Stage (DDS220, See Page 523)
- Benchtop 3 Phase Brushless DC Servo Controller (BBD101, See Pages 628 – 629)
- Two Ultra Stable Kinetic Mirror Mounts (POLARIS-K1, See Pages 244 – 246)
- Periscope Assembly (RS99, See Page 262)
- Six 1" Protected Silver Mirrors (PF10-03-P01, See Page 772)
- Custom V-Block
- Thorlabs Software Included



BBD101
Controller Included

DDS220 STAGE*	
Travel Range	220 mm (8.6")
Speed (Max)	300 mm/s
Acceleration (Max)	5000 mm/s ²
Bidirectional Repeatability	±0.25 μm
Backlash**	N/A
Incremental Movement (Min)	0.1 μm
Absolute On-Axis Accuracy	±2.0 μm
Home Location Accuracy (Unidirectional)	±0.25 μm
Bearing Type	Precision Linear Bearing
Motor Type	Brushless DC Linear Motor
Dimensions	370 mm x 90 mm x 45 mm (14.6" x 3.5" x 1.77")

*See page 523 for more information.

**The stage does not exhibit backlash since it does not utilize a leadscrew.

BBD101 CONTROLLER*	
Control Algorithm	16-Bit Digital PID Servo Loop with Velocity and Acceleration Feedforward
Velocity Profile	Trapezoidal/S-Curve
Position Feedback	Incremental Encoder
Encoder Bandwidth	2.5 MHz (10 M Counts/sec)
Input Power Requirements	250 VA Volt: 85 to 264 VAC Freq: 47 to 63 Hz Fuse: 3.15 A
Dimensions	174 mm x 245 mm x 126 mm (6.85" x 9.65" x 4.96")

*See pages 628 – 629 for more information.

The optical delay line includes the apt™ software package for computer control of the stage. This apt™ software also allows for advanced custom control applications and sequences in various programming languages through Active X. Also included is software with a GUI (shown at right) to control timing changes to the stage. With this software, it is possible to precisely choose the optical delay you wish to add or subtract from your beam path. For interferometry experiments, the option to scan the stage continuously or in discrete steps with each step's position being held for a specific time period, is available.

Applications

- Pulsed Pump/Probe Experiments
- Auto-Correlation, Cross-Correlation, and Optical Sampling
- Pulse Synchronization
- Interferometric Sensors and Instruments (See Our FT-OSA Spectrometer on Pages 1600 – 1603)
- Coherent Communication Systems
- Reconfigurable Switching, Buffering, and Processing



ITEM #	\$	£	€	RMB	DESCRIPTION
ODL220-FS	\$ 7,500.00	£ 5,400.00	€ 6,525.00	¥ 59,775.00	Free-Space Optical Delay Line
ODL220-FS/M	\$ 7,500.00	£ 5,400.00	€ 6,525.00	¥ 59,775.00	Free-Space Optical Delay Line Metric