Optical Delay Lines

Features

- Precise Variation of Optical Path Length
- Delays up to 4000 ps Available
- Computer-Controlled Stages Provide Repeatable, Sub-Femtosecond Resolution
- Internal and External Triggering Modes
- Includes Low-Dispersion Silver-Coated Optics and Translation Stage Controller

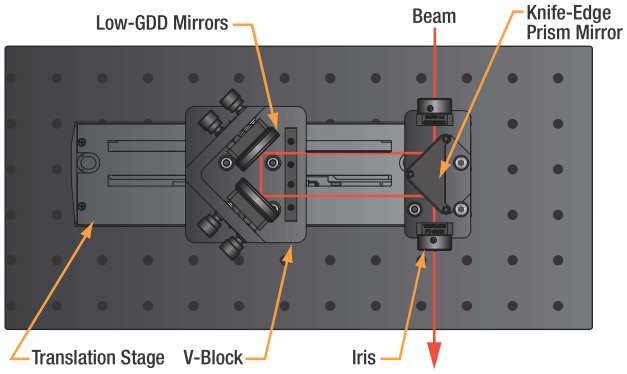
Applications

- Pulsed Pump-Probe Experiments
- Autocorrelation, Cross Correlation, and Optical Sampling
- Pulse Synchronization
- Wavemeters and Other Interferometric Sensors

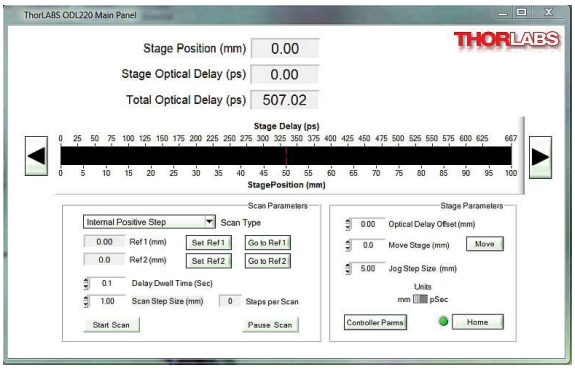
Thorlabs' Free-Space Optical Delay Lines (ODL) enable computer-controlled variation of the optical path length. Each system includes a DC servo stage, controller, and retroreflector optics with mounts. Each system also includes two drop-in irises with four mounting positions for alignment.

These delay lines use direct drive stages that eliminate the need for lead screws and enable backlash-free operation. The absolute position of the stage is determined using a high-resolution, closed-loop optical feedback signal that provides superior bidirectional repeatability. This makes our optical delay systems ideal for high-repetition-rate experiments, where stability during measurements is desired.

The stages also provide long travel ranges and can be driven at higher speeds than stepper motor stages. High-speed measurements can also be used to minimize the effects of slow changes in a system (such as thermal drifts) on experimental data.



The precise positioning and stability of the low-dispersion mirrors on the direct drive stage enables sub-femtosecond delay resolution.



Thorlabs' ODL software includes a GUI for reading and controlling the stage position, speed, and acceleration, as well as executing scan sequences. Scans at discrete steps over a user-defined range can be initiated from the software or by using an external trigger signal supplied to the motor controller.

Specifications

Item #	ODL100(/M)	ODL220(/M)	ODL300(/M)	ODL600(/M)
Optical Delay (Max)	666.6 ps	1466 ps	2000 ps	4000 ps
Minimum Delay Shift[a]	3.3 fs	0.67 fs	0.67 fs	0.67 fs
Stage Velocity (Max)	500 mm/s	300 mm/s	400 mm/s	400 mm/s
Absolute On-Axis Accuracy	±5.0 µm	±2.0 µm	±7.5 µm	±12.0 µm
Beam Height	2.36" (60.0 mm)	3.22" (81.7 mm)	3.45" (87.7 mm)	3.45" (87.7 mm)

a. Based on the minimum incremental motion of the stage.