

## High Frequency X Band Optical Delay Lines



### Key Features:

- Delays 1ns to 1000 $\mu$ s or more
- Supports frequencies – from DC to X
- Delay accuracy <0.5%
- Displays Delay, Round-trip Distance, Range, and Altitude
- Customized solution; short delivery time
- High Dynamic Range
- Excellent Phase noise
- USB API for automatic testing

### Options:

- Pre and Post Amplifiers
- Delay expansion
- RF and Optical Bypass
- Faster switching <100 $\mu$ s, or <1 $\mu$ s
- Amplitude Control
- Dual ODL; 2-way signal transmission
- DC Power
- Doppler modulation

### Monitoring:

- Managed remotely by software or locally through a navigation switch

### ODL Configurations:

- Single Delay ODL
- Multi Delay ODL
- Progressive Variable ODL forming up to 2<sup>24</sup> delay combinations
- Bidirectional ODL
- Multipath ODL
- Mini ODL up to 32 $\mu$ s

### Applications:

- Radar Calibration testing
- Signal and Phase Noise processing
- Extension of radar range site
- Clutter Canceler
- EW systems
- Altimeter

RFOptic's high-frequency X Optical Delay Line (ODL) series provides a high-performance solution for testing and calibrating of radar systems or for RF communication.

The Optical Delay Line (ODL) provides a true time delay of wideband RF signals using low-loss optical fiber. The Input RF signal is converted to an optical signal, delayed by one or more single-mode optical fiber sections, and is converted back into an RF signal at the output.

The ODL can be configured to form up to 2<sup>24</sup> delays using up to 24 predefined time delay values in a single ODL unit.

As listed on the left, RFOptic provides various Optical Delay Line configurations that can support from 1ns up to 500 $\mu$ s; more than 500 $\mu$ s can be provided upon request.

Each RFOptic Optical Delay Line operates as a standalone unit with no need for any intervention by the operator. It can be managed remotely by software or locally through a navigation switch and LCD display.

RFOptic's Optical Delay Line solutions offer accurate time delays and an ultra-silent operation.

RFOptic ODL provides investment protection by allowing the addition of external spool(s). Additional options include RF and optical bypass and fast switching <100 $\mu$ s, very fast switching, <1 $\mu$ s, amplitude control, bi-directional ODL (2-way signal transmission), and DC power (for e.g., altimeter applications).

RFOptic's Mini ODL solution offered in a compact, robust enclosure is recommended when a short delay, up to 32 $\mu$ s is required.

RFOptic's Optical Delay Lines are used in a wide range of EW applications, such as Radar and altimeter testing, calibration, and simulation with Doppler modulation that simulates target movement.

## High Frequency X Band Optical Delay Line

Electrical	Unit	Specifications (Typical)
Frequency Range <sup>[1]</sup>	GHz	0.1 - 12
Delay Range <sup>[2]</sup>	μs	0.001 to 1000
Delay steps	-	Up to 2 <sup>24</sup> delay steps
Delay Accuracy <sup>[3]</sup>	%	0.5
Delay Repeatability at +/- 5°C variations	%	0.05
Switching time	ms	< 10
1dB Compression Point	dBm	> 15
SFDR	dB/Hz <sup>2/3</sup>	105
Gain Flatness	dB	±2.5
Maximum Input No damage	dBm	20
Spurious	dBm	-80
Phase Noise at 6 GHz at 10KHz offset	dBc/Hz	-130
VSWR Input / Output	-	2:1
Input / Output impedance	Ohm	50

Optical and Electrical		
Main AC Supply	VAC	220/110
RF Connectors		SMA
Fiber Connectors <sup>[4]</sup>	-	FC/APC or SC/APC
Control – Manual (front panel)		Navigation Switch
Control – Remote (rear panel)		USB / Ethernet (HTML, REST, SNMP)

Mechanical and Environmental Parameters		
Operating Temperature	°C	0 to +60
Storage Temperature	°C	-45 to +85
19" Rack Mounting	mm	440*500*133

[1] Other frequencies upon request.

[2] Other ODL configurations available upon request.

[3] For delay segments longer than 0.5μs, 1% standard accuracy, 0.1% accuracy optional.

[4] For external fiber spools.

To order or for more information, please contact your local RFOptic distributor or send an email to [sales@rfoptic.com](mailto:sales@rfoptic.com)