



Applications:	Key features:
Radar Calibration & Testing	Delays: 0.1-500 $\mu$ sec (fixed)
Signal & Phase Noise Processing	Frequency Range: L, S, C, X, Ku,Ka radar bands (0.1-40GHz) ODL versions
Extension of radar range site	Delay accuracy: 1%
Clutter Canceler	Remote Control: RS-232 or Ethernet
BIT (built-in test)	High Dynamic Range
EW Systems - Jammers	Variety of configurations
Path Delay Simulation	Up to 15 $\mu$ sec can be housed in Mini enclosure

### Options:

- ODL with 2, 4, up to 12 switchable delays
- Delay accuracy of 0.1 % (not less than 25 nsec)
- RF Bypass
- Dispersion Compensator for long delay line
- Various Gain
- Control RS-232 or TTL or Ethernet
- Full BIT using signal detection at the receiver



**RFOptic's** optical delay line ODL series provides a high performance solution for testing and calibration of radar systems, or for RF communication. The ODL converts analog RF signals in the 0.1-20 GHz range to optical signals and back. The RF input signal is converted into an optical modulated signal, which is then transmitted into a single mode fiber, creating a fixed time delay defined by the fiber length. After passing the fiber, the optical signal is converted back into an electrical RF signal, which is identical to the input RF signal. Any fixed time delay between 0.1 and 300  $\mu$ sec can be provided to customers.

The ODL is operated as a standalone unit with no need for any intervention by the operator - it can be also controlled externally from a PC through various communication interfaces.

RFOptic's ODL unit is a compact solution, which provides superb performance including accurate time delay and with ultra silent operation. The ODL can be purchased with an integral switch unit supporting up to 8 predefined time delay values in a single ODL unit.

For some applications, RFOptic offers low cost ODL solution up to 5GHz based on direct modulation.

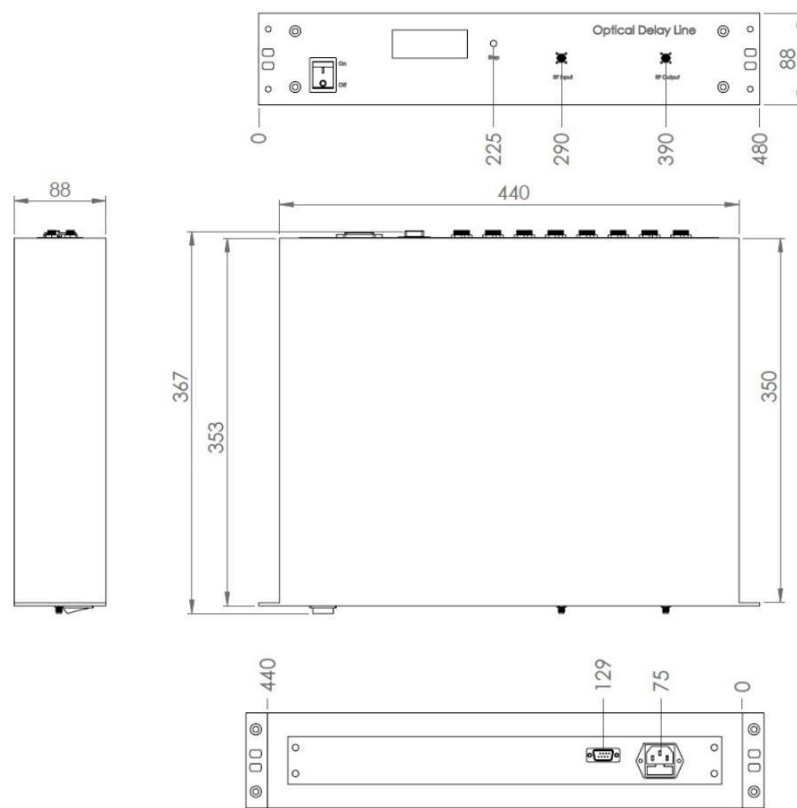
Table below describes the typical specifications ODL .

Parameter	Unit	Specifications	Note
<b>RF</b>			
Frequency range [1]	GHz	L,C,S,X,Ku	Up to 40GHz
Delay time [2,3,4,5]	µsec	0.1-300	pre-fixed delay defined by customer
Delay accuracy [6]	%	1	Minimum accuracy of 25 ns
Delay repeatability	%	<0.01	at +/- 5 °C variations
System RF gain [7,8]	dB	-30	Without the Delay Line loss
Noise Figure at 10GHz [7]	dB	40	Without the Delay Line loss
Group Delay Variation	psec	± 100	
1dB input Compression point	dBm	> 15	
Max input RF power	dBm	+23	
SFDR	dB/Hz <sup>2/3</sup>	≥100	
Phase noise (at 10kHz off set)	dBc	<-120	Limited by the measurement tool
RF Flatness (not including amplifier) [10]	dB	±1dB every 250MHz	For 0.1-40GHz frequency band
VSWR	-	2:1	
Impedance	Ohm	50	
<b>Mechanical</b>			
1550 nm laser CW optical power	mW	≤ 20	
Communication [11]	-	RS-232	
RF connectors	-	SMA	K type is available
Main AC supply	VAC	220/110	DC version is available
19" Rack mounting [12]	mm3	440 x 450 x 133	See mechanical drawing
Operating Temperature	°C	-20 ÷ +60	
Storage	°C	(-40) ÷ +85	

- (1) L, S, C, X, Ku,Kz versions are optional.
- (2) Any fixed delay between 0.1 to 500 µsec is optional.
- (3) Integrated switching unit allowing choosing between 2 to 12 predefined delay values is optional.
- (4) RF bypass is optional.
- (5) Dispersion compensator unit for long delay / high frequency is optional.
- (6) 0.1% accuracy for long delay line is optional.
- (7) Not including delay line loss which is about 1dB per 10 µsec delay and optical switches loss.
- (8) Pre-Amp may be added to improve the noise figure by about 15dB.  
Post-Amp may be added to improve the system ODL system gain.
- (9) Excluding in-band harmonics.
- (10) Additional ±0.5 dB deviation is considered within spec.
- (11) TTL or Ethernet are optional.
- (12) Variety of ODL enclosures are optional.
- (13) Full BIT is optional (using signal detection at the receiver).
- (14) 20GHz ODL is optional.

## Mechanical Layout: 2U/3U Layout

Note: 3U is similar with 133 mm height.



*Comment: An option for up to 8 ports rear panel for external delay line.*

