



| Applications: | Key features: |
|---------------------------------|---|
| Radar Calibration & Testing | Delays: 0.1-128 μ sec Progressive * |
| Signal & Phase Noise Processing | Frequency Range: 0.1-8 15 18GHz |
| Extension of radar range site | Delay accuracy: 1% |
| Clutter Canceler | Remote Control: RS-232 or Ethernet |
| EW Systems-Jammers | High Dynamic Range |
| Path Delay Simulation | Excellent Phase Noise |
| | Excellent Group Delay Variation |

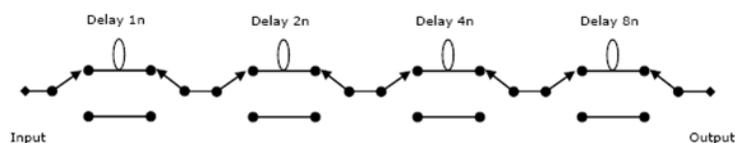
* Example: 7 state Progressive delay can provide: 1,2,3,4.....127 μ sec delays in one system.

RFOptic's optical delay line ODL series provide a high performance solution for testing and calibration of radar systems or for RF Communication. The ODL converts analog RF signals at different frequency ranges to optical signals and back, utilizing direct or indirect modulation ODL architecture. 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.

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 RS232 or Ethernet interfaces. RFOptic's ODL unit is a compact solution, which provides superb performance including accurate time delay, low spurious emission level, and with ultra silent operation.

Progressive Delay Configuration includes cascaded 2:2 optical matrixes with in-between various delays. The cascaded matrix selects the desired combination of delays to define the desired delay line. With such configuration the user may select any of the 16 combinations of possible delay values (see figure below). RFOptic supports Progressive Delay Configuration up to 256 states.

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



Progressive Delay Configuration

Table below describes the typical specifications ODL .

| Parameter | Unit | Specifications | Note |
|--|------|---|---|
| RF | | | |
| Frequency range [1] | GHz | L,C,S,X,Ku | |
| Delay time [2,3,4,5] | µsec | Up to 8 progressive optical delay line configuration. | providing up to 256 states. example: 0.1.2.3.4...256µsec |
| 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 and the progressive number of states. Gain control to a ~0 dB fixed gain is optional. |
| 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 | |
| Spurious [9] | dBc | <-100 | |
| Phase noise (at 10kHz offset) | dBc | <-100 | |
| RF Flatness (not including amplifier) [10] | dB | ± 2.0 2.5 3.0 | for 0.1 - 8 15 18 GHz Bands |
| VSWR | - | 2:1 | |
| Impedance | Ohm | 50 | |
| Mechanical | | | |
| 1550 nm laser CW optical power | mW | ≤ 20 | |
| Communication [11] | - | RS-232 | |
| RF connectors | - | SMA | N 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 versions are optional.
- (2) RF bypass is optional.
- (3) Dispersion compensator unit for long delay / high frequency is optional.
- (4) 0.1% accuracy is optional for long delay line.
- (5) Not including delay line loss which is about 1dB per 10 µsec delay.
- (6) 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.
- (7) ODL Gain Control to a fix value is optional.
- (8) Excluding in-band harmonics.
- (9) TTL or Ethernet are optional.
- (10) Full BIT is optional (using signal detection at the receiver).