

Model 4400 Optical Switch

Ultra Low-Loss, Fully-Reconfigurable Optical Switch

The 4400 is a compact and robust photonic switch with ultra-low insertion loss. The 1xN switch has loss of < 0.5 dB, loss repeatability of < 0.005, and PDL of < 0.02 dB typical. The NxN Matrix switch has loss of < 0.3 dB, loss repeatability of < 0.05 dB, and PDL of < 0.05 dB.

Scaleable 3D Matrix Architecture

The Matrix switches are based on a scalable 3D architecture and utilize Optical Beam Steering. This ensures that the optical loss is uniform across all paths between ports.

Nothing in the Optical Path

There is no intervening device in the optical path. This minimizes loss, loss variation and PDL. There are no splitters in the optical path (alternative technologies have these PDL and insertion loss inducing splitters to provide feedback for the beam steering). Our unique beam steering technology avoids these added error sources.

Flexible Configurations

The dBm Optics switch is available now in configurations from 8x8 to 16x16 ports, with port counts up to 256 ports under development. The fully configurable and bi-directional nature of the architecture allows the user to configure a 16x16 as 16 inputs, 16 outputs, or 1 input and 30 outputs, or any other combination of inputs and outputs.

Using alternative mechanical technology, we can configure this switch for 1xN switching, up to 1x32. Call the factory for more information on this low-loss, low-PDL mechanical switching configuration.

Summary

- Ultra-low insertion loss (< 0.3 dB typical)
- Ultra-low PDL (< 0.02 dB)
- Low insertion loss variation (< 0.005 dB)
- High optical power handling (up to 27 dBm)
- Low cross-talk/isolation (> 70 dB)
- Fast switching (< 13 ms)
- Bi-directional & fully non-blocking Matrix
- All-optical switch is protocol and bit-rate independent
- Completely flexible MxN switch or 1xN
- Very simple to use

Reliability

Our technology provides a dependable long-term solution to optical switching applications. Longevity tests have shown that MASS-based optical switches have successfully completed more than 2 billion switch cycles without failure.

Key Partnership

The Matrix version of the dBm Optics switch is based on key technology developed by our partner, Polatis, Ltd. The combination of the no-tap beam steering technology and the dBm instrumentation technology have yielded the top performing matrix switch on the market.

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Model 4400: Optical Switch Overview

In Matrix, connect from any input to any output, as many connections as needed

Setup stores configurations or automatic sequences

Data entry and instrument setup are easy with the built-in knob

High resolution 4"x6" display brings data to life

Fast 13 ms switching



Flexible channel configurations from 4x4 to 16x16 Matrix, and 1x2 to 1x32

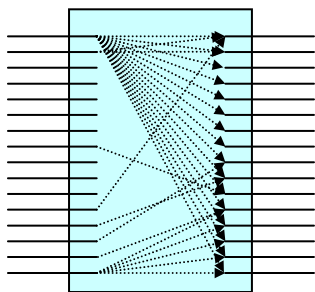
High-speed GPIB makes the 4900 simple to integrate into any automated test rack

Built-in Ethernet means accessibility over a network, from a desktop, from home or another remote location via a VPN

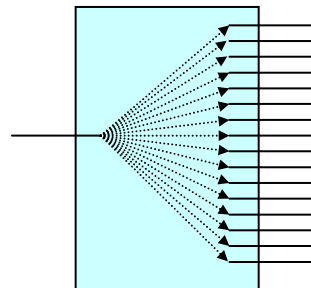
Optical quality is unparalleled:
 < 0.02 dB PDL
 < 0.05 dB insertion loss repeatability

Model 4400 Optical Switch Available Switch Topologies

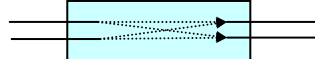
NxN Matrix
(any port to any port)



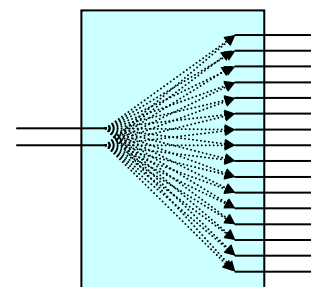
1xN or Nx1 Switch
(one port to any port)



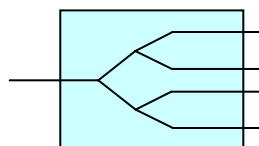
2x2 Switch
(Used for input/output reversal)



2xN or Nx2 Switch
(two ports to any port)



1xN Low PDSR Split Tree



Also available are simultaneous IL/PDL/ORL on multiple channels and multiple-fiber-type hybrid systems. Contact dBm Optics Applications Support for more information.

Model 4400: Optical Switch Specifications

1xN Optical Switch

| Parameter | Specifications | | |
|--|---|---|--------------------------------|
| | High Performance | Mid Performance | Multi Mode |
| Number of ports ¹ | 1x2; 1x3; 1x6; 1x8; 1x10; 1x12; 1x16; 1x30; 1x24; 1x28; 1x32; 1x48; 1x64 | 1x2; 1x4; 1x8; 1x12; 1x16; 1x32; 2x4; 2x8 | 1x2; 1x4 |
| Wavelength range | 1270-1670 nm | 1260-1650 nm | 400-1750 nm |
| Insertion loss ² | < 0.5 db typical; < 0.7 dB max | < 0.7 dB typical; < 1.0 dB max | < 0.7 dB typical; < 1.0 dB max |
| Polarization dependent loss ² | < 0.02 dB typical; < 0.04 dB max | < 0.05 dB | N/A |
| Repeatability ² | < 0.005 dB typical; < 0.01 dB max | < 0.005 dB | < 0.03 dB |
| Return loss ² | > 62 dB typical; > 57 dB max | > 65 dB | > 45 dB typical |
| Crosstalk (isolation) ² | < -80 dB | < -70 dB | < -55 dB |
| Switching time | < 25 ms for first channel; < 15 ms additional channel | 2 ms | < 5 ms |
| Input optical power | < 24 dBm | < 23 dBm | < 23 dBm |
| Enclosure size | 16.8" wide x 16.4" deep x 5.25" high (42.6 cm x 41 cm x 10.5 cm) | | |
| Warranty period | Standard mainframe warranty is 4 years. All switch modules carry a one-year warranty. | | |

¹ Additional configurations available upon request

² For 1xN, N < 25

NxN Matrix Switch

| Parameter | Specifications |
|-----------------------------|--|
| Number of ports | 4x4; 4x8; 4x12; 4x16; 8x8; 8x12; 8x16; 12x12; 12x16; 16x16 |
| Wavelength range | 1260-1675 nm |
| Insertion loss | 1530-1625 nm: < 0.30 dB typical; < 1.0 dB max 1260-1675 nm: < 0.35 dB typical; < 1.2 dB max |
| Polarization dependent loss | < 0.05 dB max |
| Repeatability | < 0.05 typical; < 0.1 dB max |
| Return loss | > 65 dB |
| Crosstalk (isolation) | < -70 dB |
| Switching time | < 13 ms (90%) |
| Input optical power | < 27 dBm |
| Enclosure size | 16.8" wide x 16.4" deep x 5.25 " high 42.6 cm wide x 41 cm deep x 10.5 cm high) |
| Warranty period | Standard mainframe warranty is 4 years.. All switch modules carry a one-year warranty. |

Model 4400: Optical Switch Options and Ordering Information

| Part Number | Description |
|-------------|---|
| 4400-8 | Optical switch mainframe up to 8 connections |
| 4400-16 | Optical switch mainframe up to 16 connections |
| 4400-32 | Optical switch mainframe up to 32 connections |
| 301 | Real-time power reference |
| 310 | Optical shutter/automatic dark calibration |
| 705 | Rack ear kit |
| 706 | Swivel handle |
| 921 | Built-in variable attenuator; 0-20 dB |
| 982-cc/ccc | Built-in source split for 2 DUTs |
| 983-cc/ccc | Built-in source split for 3 DUTs |
| 990-0108 | 1x8 switch; mid performance |
| 990-0108H | 1x8 switch; high performance |
| 990-0112 | 1x12 switch; mid performance |
| 990-0112H | 1x12 switch; high performance |
| 990-0116 | 1x16 switch; mid performance |
| 990-0116H | 1x16 switch; high performance |
| 990-0132 | 1x32 switch; mid performance |
| 990-0404 | 4x4 switch engine |
| 990-0408 | 4x8 switch engine |
| 990-0412 | 4x12 switch engine |
| 990-0416 | 4x16 switch engine |
| 990-0808 | 8x8 switch engine |
| 990-0812 | 8x12 switch engine |
| 990-0816 | 8x16 switch engine |
| 990-1216 | 12x16 switch engine |
| 990-0132H | 1x32 switch; high performance |
| 990-1212 | 12x12 switch engine |
| 990-1616 | 16x16 switch engine |
| 992-cc/ccc | Built-in 1x2 switch for 2 DUTs |
| 993-cc/ccc | Built in 1x3 switch for 3 DUTs |



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