Keysight Technologies
N77-Series Optical Switches

Data Sheet

KEYSIGHT TECHNOLOGIES

The Keysight Technologies, Inc. N77-Series optical switches are available for both single-mode and multimode fiber test applications. The excellent repeatability, compact format and flexible control interfacing support high-performance automated setups. The multimode switch has excellent mode fidelity.

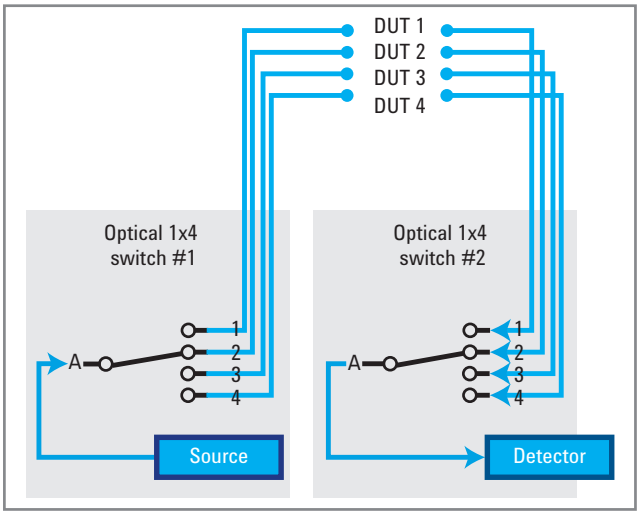
- N7731A: dual 1x4 switch
- N7734A: 1x13 switch

Key Features

Wide wavelength range	Single mode	1250 nm to 1650 nm
	Multimode	600 nm to 1700 nm
Excellent repeatability	±0.01 dB, ±0.004 dB typical (maximum variation over 10,000 random cycles)	
N77xx Viewer	GUI software for manual setting	
Automation interfaces	USB, LAN, GPIB	

Compact Stand-Alone Switches

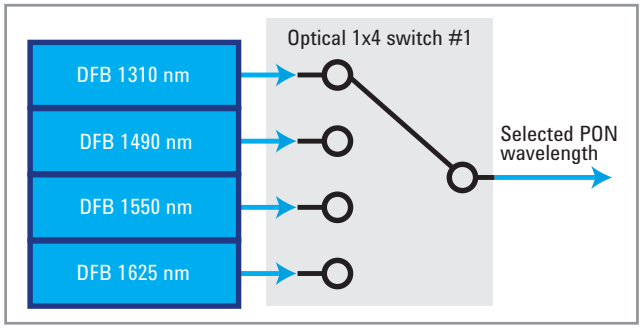
These instruments are used for automatic routing of optical signals for testing devices like tranceivers, amplifiers, and passive components. Optical switches optimize the investment in automated test equipment by improving repeatability and throughput and supporting parallel measurements of multiport and multiple devices.

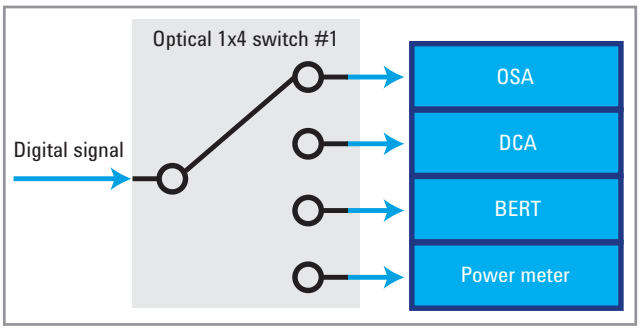


Switching Reduces Uncertainty from Connections and Eases Automation

Test Automation

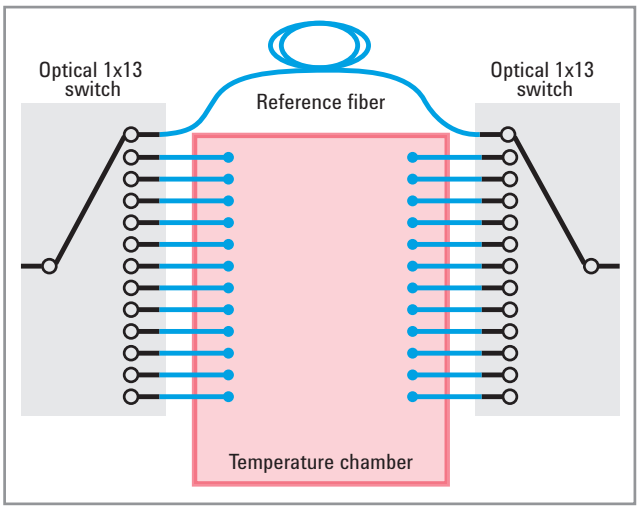
These switches can be used to avoid repeated reconnections during your measurements and are critical to automated procedures. The excellent switching repeatability assures that the signal level is constant from cycle to cycle. The low IL and PDL and high repeatability assure minimum impact of the switch on measurement accuracy. A typical setup may use a 1x4 switch to select among several source wavelengths in a test, while avoiding the time delay for power stabilization if each source must be cycled on and off. Or the same digital signal may be switched among several instruments, like a power meter, DCA or BERT.





Parallel testing for test throughput and efficient use of instruments

In many cases, valuable signal source and analysis instrumentation can be used more effectively in a parallel-test configuration. For example, multiple cables or components can be tested together during temperature cycling. On the other hand, an increasing use of inherently parallel components, as for optical interconnections for 40G or 100G using 10 Gb/s components, calls for identical testing in multiple paths. These are well supported by the 1x13 switch configuration and the 13th path can often be used as a permanent reference path.



Modal Fidelity for Multimode Fiber Systems

Signals in multimode fibers are distributed over a range of mode groups that can have different loss and delay in a link. For dependable multimode transceiver testing, the instrument used to set the power level should not change this modal distribution. The Keysight multimode switches are designed with very short collimated paths between fiber, so signals propagate in practically the same distribution as through uninterrupted multimode fiber.

Optical Switch Specifications

N7731A		
Switch type	Dual 1x4	
Fiber interface	# 009 single mode	# 062 multimode
Fiber type	9/125 µm SMF	62.5/125 µm MMF [1]
Connectivity	FC/APC – angled, narrow key	FC/PC straight
Wavelength range	1250 nm to 1650 nm	600 nm to 1700 nm
Repeatability [2]	±0.01 dB, ±0.004 dB typical	±0.01 dB [1], ±0.004 dB typical
Insertion loss	< 2.0 dB, < 1.5 dB typical [3]	< 1.0 dB [1], < 0.5 dB typical [4]
Polarization dependent loss	Typical 0.07 dB_{pp}	NA
Return loss	Typical 55 dB	Typical 35 dB
Crosstalk	Typical –65 dB	Typical –65 dB [4]
Switching time	< 20 ms	
Lifetime	> 1 billion cycles	
Maximum input power	+23 dBm	
General characteristics		
Dimensions (D x W x H)	1U half-rack, 460 mm x 212 mm x 43 mm (excluding front and back rubber cushions and handle)	
Weight	Approx. 3 kg	
Recommended recalibration period	24 months	
Operating temperature	+5 °C to +40 °C	
Operating humidity	15% to 95%, non-condensing	
Altitude	The maximum operating altitude is 2000 m.	
Pollution protection	The Keysight N773xA is designed for pollution degree 2.	
Warm-up time	20 minutes	
Interfaces	The instruments can be controlled via LAN, USB or GPIB interfaces	
Power consumption	Line power: AC 100 to 240 V ± 10%, 50/60 Hz, 60 VA max.	
Ordering information		
Fiber type option		
-009	9/125 µm single-mode fiber and FC/APC connectors	
-062	62.5/125 µm multimode fiber and FC/PC connectors	
Accessories		
N7744-100	Rack mount kit for 1 or 2 units	
Warranty		
Select coverage		
Included	3-year warranty (return to Keysight), standard	
R-51B-001-5Z	5-year warranty assurance plan (return to Keysight): Priority warranty service includes one-time coverage for an EOS/ESD failure.	
Calibration		
Select Keysight Calibration Plan		
R-50C-011-3	3-year calibration assurance plan (return to Keysight): Priority calibration service covering all calibration costs for 3 years; 15% cheaper than buying stand-alone calibrations.	
R-50C-011-5	5-year calibration assurance plan (return to Keysight): Priority calibration service covering all calibration costs for 5 years; 20% cheaper than buying stand-alone calibrations.	

1. Specifications are typical with 50/125 µm multimode fiber.
2. Worst case measurement deviation over 10,000 random switching cycles.
3. At (1310 ±15) and (1550 ±15) nm.
4. At (850 ±15) and (1310 ±15) nm and for mode launch conditions from IEEE 802.3 : Encircled flux < 25% in 4.5 µm radius and > 75% inside 15 µm for 62.5/125 µm fiber.

Optical Switch Specifications

N7734A		
Switch type	1x13	
Fiber interface	# 009 single mode	# 062 multimode
Fiber type	9/125 µm SMF	62.5/125 µm MMF [1]
Connectivity	FC/APC – angled, narrow key	FC/PC straight
Wavelength range	1250 nm to 1650 nm	600 nm to 1700 nm
Repeatability [2]	±0.01 dB, ±0.004 dB typical	±0.01 dB [1], ±0.004 dB typical
Insertion loss	< 2.5 dB, < 2.2 dB typical [3]	< 1.2 dB [1], < 0.7 dB typical [4]
Polarization dependent loss	Typical 0.12 dB_{pp}	NA
Return loss	Typical 55 dB	Typical 30 dB
Crosstalk	Typical –60 dB	Typical –55 dB [4]
Switching time	< 20 ms	
Lifetime	> 1 billion cycles	
Maximum input power	+23 dBm	
General characteristics		
Dimensions (D x W x H)	1U half-rack, 460 mm x 212 mm x 43 mm (excluding front and back rubber cushions and handle)	
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Interfaces	The instruments can be controlled via LAN, USB or GPIB interfaces	
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-009	9/125 µm single-mode fiber and FC/APC connectors	
-062	62.5/125 µm multimode fiber and FC/PC connectors	
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Warranty		
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R-51B-001-Z	3-year warranty (return to Keysight), standard	
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