A photograph of a university building at dusk, with a network diagram overlaying the scene. The building is a large, multi-story structure with a central tower and arched windows. The sky is dark blue with some clouds. The foreground shows a paved area and a reflecting pool. A network diagram with yellow nodes and lines is overlaid on the left side of the image.

# Optical testing solutions for universities and labs

Smarter  
network  
in sight.

**EXFO**

## About this brochure

Explore our industry-leading portfolio of optical testing solutions for universities and laboratory applications.

This brochure provides an overview of our comprehensive range of optical testing solutions including component test platforms, optical testing solutions, light sources, benchtop tunable lasers, passive component testers, optical spectrum analyzers, tunable filters with adjustable bandwidth, variable attenuators, switches and power meters.

Reach out to us to benefit from best-in-class products and from 35+ years of expertise and dedicated customer service.

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## About EXFO

EXFO develops smarter test, monitoring and analytics solutions for the global communications industry. We are trusted advisers to fixed and mobile network operators, hyperscalers and leaders in the manufacturing, development and research sector. They count on us to deliver superior visibility and insights into network performance, service reliability and user experience. Building on our 35+ years of innovation, EXFO's unique blend of equipment, software and services enable faster, more confident transformations related to 5G, cloud-native and fiber optic networks.

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### Glossary

<b>IL</b>	insertion loss
<b>RL</b>	return loss
<b>PDL</b>	polarization-dependent loss
<b>PMF</b>	polarization-maintaining optical fiber
<b>SMF</b>	singlemode fiber

# Automated probe stations

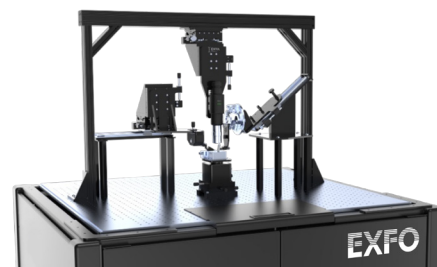
The [OPAL-SD](#) is a single-die automated probe station. The instrument delivers accurate, repeatable, traceable, fast and flexible testing required by integrated photonics research.

## Automated PIC testing

The OPAL single die test station for integrated photonics consists of a 4-axis stage and chuck with probe heads both for optical testing (optical fibre array) and electrical testing (DC/RF probes). The station includes a top and side vision system as well as a server-grade PC and a license to an automation software suite that links directly to a database.

It offers fully automated optical probe navigation at the die level, including algorithms for first-light search and coupling optimization, and manual electrical probing. When combined with the advanced optical measurements capabilities of EXFO's product line of optical instrumentation, this system provides an unmatched solution for optical spectrum analysis as well as electro-optic testing such as BER. Together with the PILOT automation software suite, the OPAL-SD station becomes a complete, flexible and scalable solution.

**The OPAL single-die station is part of a larger family of test stations and can be used as a stepping stone to increase throughput capabilities.** EXFO's multi-die and wafer stations share many of the OPAL-SD elements, particularly the probe heads, vision system and more importantly, the PILOT software—allowing flexible migration from single-die testing to wafer characterization.



### Key features

- Research-grade solution for PIC testing and characterization
- Flexible design with reconfigurable probes
- Software suite for measurement automation and data processing
- Ultra-precise optical heads—ideal for surface and edge coupling
- Precise DC and RF probing positioners

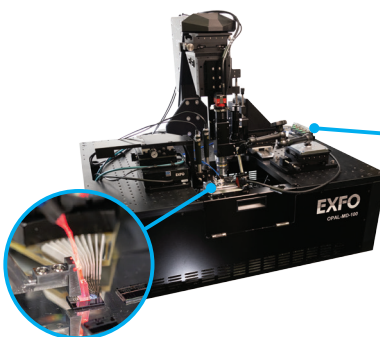
## Applications

- Integrated photonics die testing for R&D stage
- Optical and electronic characterization of PIC
- Transceiver optical sub-assembly development

PILOT software for automation and data repository



OPAL station for precise probing



Industry-leading EXFO testers for full optical characterization



+ Third-party instruments

Figure 1. OPAL platform as a characterization solution with PILOT software.

# Benchtop tunable lasers

The T200S and T500S constitute the most advanced and cost-effective solution for all R&D and manufacturing environments.

These lasers can be used as part of a swept test system together with the CTP10 or CT440 component tester for swept IL, RL and PDL measurements. As an alternative, both lasers can be used as standalone lasers in stepped mode.

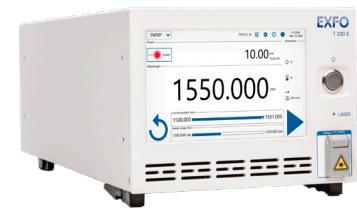
## Models available

### The T200S portfolio features 2 models

The /O and /CL lasers deliver 10 dBm of output power and are mainly dedicated to telecom applications.

### The T500S portfolio features 5 models

The /O, /ES, /SCL, /CL and /CLU lasers can be adjusted from 10 dBm to maximum available optical power of 13 dBm across specific wavelength ranges.



## Key features

- Power: 10 dBm (T500S) and 10 dBm (T200S)
- Tuning range: up to 180 nm
- Tuning speed: 200 nm/s
- Bidirectional sweep (T500S)
- Wavelength accuracy:  $\pm 5$  pm typical
- $< 25$  kHz typical linewidth
- Sweeping and stepping operation
- Full-band coverage with 3 lasers (T500S)
- Signal to noise ratio:  $> 90$  dB
- Compatible with the CTP10 and CT440 component testers
- Ethernet port and SCPI commands

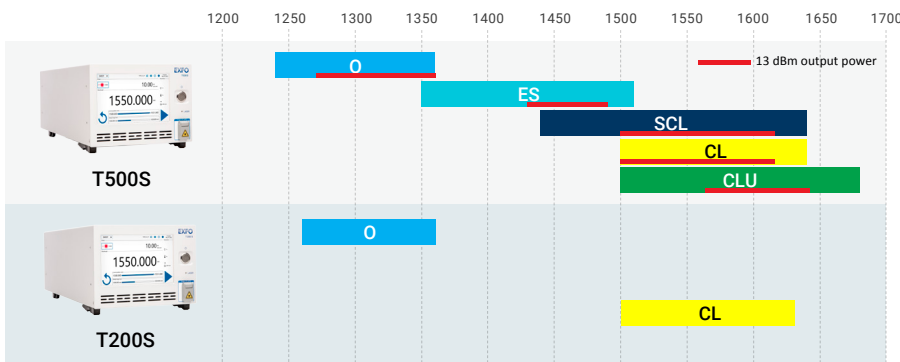


Figure 2. Spectral coverage of the various T200S-T500S models.

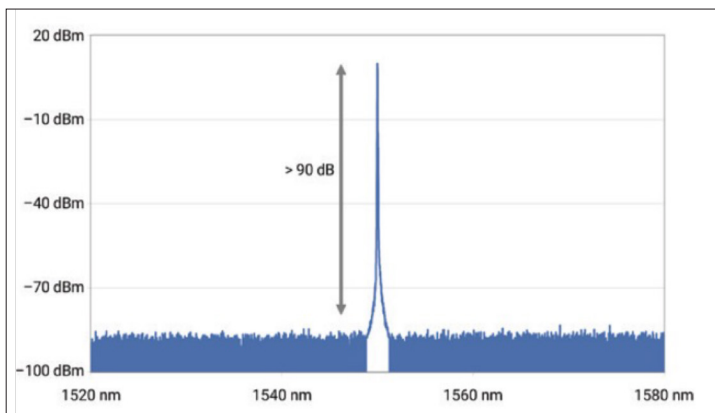


Figure 3. High power and high dynamic range.

# Component test platform

The CTP10 is a modular measurement platform for efficient testing of high port-count passive components in 24/7 operation. The CTP10 works with one or several of EXFO's sweeping tunable lasers to provide swept insertion loss (IL), polarization-dependent loss (PDL) and return loss (RL) measurements with unprecedented performance in the industry.

## Highest specifications at full speed

The CTP10 maintains industry-leading specifications even when used with a laser at 200 nm/s. You no longer have to compromise between speed and measurement accuracy as the CTP10 provides a dynamic range of 70 dB in a single scan together with a sampling resolution of 0.1 pm even at 100 nm/s.

The CTP10 is the ideal instrument to characterize advanced WDM components with high port-count, such as wavelength selective switches (WSS). It is also particularly well suited for optical testing of photonic integrated circuit (PIC), thanks to its best-in-class 20-fm sampling resolution.



### Key features

- Wavelength range: 1240-1680 nm
- Dynamic range: 70 dB in a single sweep
- Fast averaging time 1 us
- Up to 50 detectors per platform
- Wavelength accuracy:  $\pm 5$  pm
- Sampling resolution: 0.02 pm

## Next-gen platform and modules

The following modules are available:

- IL RL OPM2** Insertion loss and return loss module with two optical detectors
- IL PDL OPM2** Insertion loss and polarization dependent loss module operating across CTP10 spectral range and with two optical detectors
- SCAN SYNC** Optical sampling of swept wavelength lasers with optical sampling down to 20 fm
- OPMx** Optical detector module with 2, 4 or 6 detectors
- FBC & FBC-M** Full-band combiner module for broadband swept measurements of IL & RL or IL & PDL, respectively
- PCMx** Photo-current meter module with 2 or 6 inputs

## Powerful intuitive GUI

The embedded software offers a powerful and intuitive GUI to graphically configure the test setup, perform measurement and analysis.

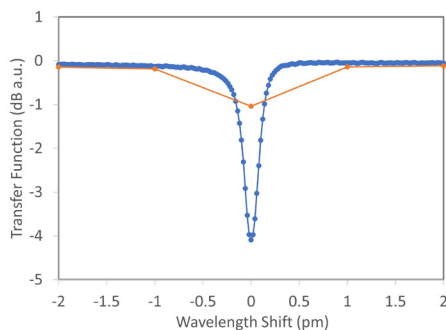


Figure 4. Ring resonator measurement at 20 fm resolution and 1 pm resolution.

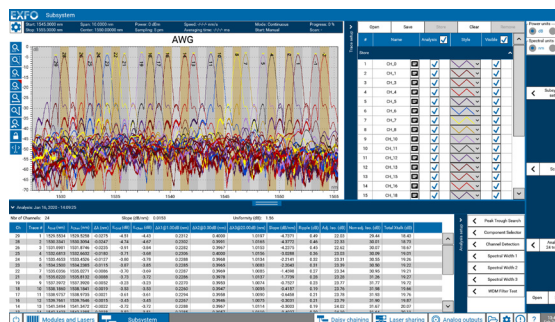


Figure 5. Measurement screen.

# Passive component tester

The CT440 is a versatile instrument for performing swept IL-PDL measurements of passive optical components. It works together with EXFO's line of sweeping tunable lasers to provide a 65-dB dynamic range with a wavelength accuracy of  $\pm 5$  pm. The CT440 is provided with a GUI software for direct operation from a PC.

Five CT440 models are available for various applications

Model	Wavelength range	Measurement	DUT type
CT440-SMF	1240-1680 nm	IL	SMF
CT440-PM13	1260-1360 nm	IL	PMF
CT440-PM15	1440-1640 nm	IL	PMF
CT440-PDL-PM13	1260-1360 nm	IL, PDL	SMF
CT440-PDL-PM15	1440-1640 nm	IL, PDL	SMF



## Key features

- Wavelength range: 1240 - 1680 nm
- Dynamic range in a single sweep: 65 dB
- Sampling resolution: 1 pm (even at 100 nm/s)
- Wavelength accuracy:  $\pm 5$  pm
- Up to 4 detectors

- The SMF model operates over the full band and performs IL measurements. Up to 4 lasers can be connected for seamless full-band swept measurements.
- The PM model offers a complete solution to characterize components with polarization-maintaining fiber.
- The PDL model is a turnkey solution for swept IL and PDL measurements.

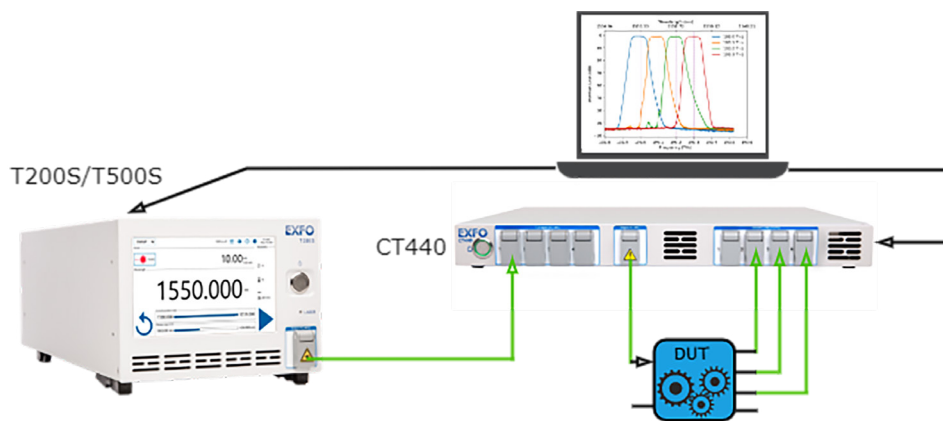


Figure 6. Typical measurement configuration using the CT440 component tester with a T200S/T500S tunable laser.

# Optical spectrum analyzer

The OSA20 is EXFO's most advanced optical spectrum analyzer for R&D and manufacturing.

## Fast

For applications where speed is essential, the OSA20 offers a maximum sweep speed of 2000 nm/s.

## High performance

The OSA20 features a state-of-the-art monochromator that yields a resolution bandwidth of 20 pm, steep edges and low stray light. This allows for full analysis of even extremely complex signals such as novel modulation formats, superchannels, flex-grid and DWDM signals down to 12.5 GHz spacing. Moreover, the instrument has a high wavelength accuracy over the full wavelength range with  $\pm 10$  pm specified over 1500-1640 nm.

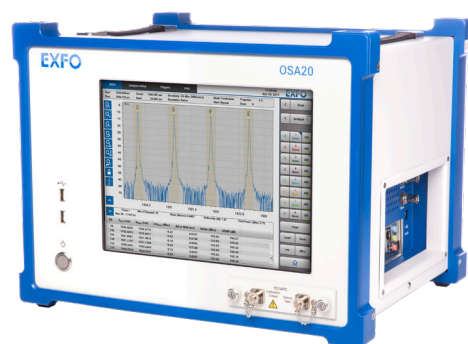
## User-friendly interface

Navigation, scrolling and zooming using an intuitive 12-in color touchscreen, an industry first.

## Target application analysis

Select from 8 different analysis modes available as standard:

- OSA** Optical spectrum analyzer for general purpose analysis
- WDM** Wavelength division multiplexing for CWDM or DWDM analysis
- OFA** Optical fiber amplifier for EDFAs, SOAs, etc.
- SML** Singlemode laser for DFB Lasers and external cavity lasers
- MML** Multilongitudinal mode laser for Fabry-Perot lasers
- BBS** Broadband source for SLEDs and fiber-based ASE sources
- PCT** Passive component test for couplers and thin-film filters
- RLT** Recirculating loop transmission for longhaul system evaluation



## Key features

- Scan speed: up to 2000 nm/s
- Wavelength range: 1250-1700 nm
- Resolution bandwidth:
  - 20 pm native
  - Adjustable over 50-2000 pm
- Wavelength accuracy:
  - $\pm 10$  pm over 1500-1640 nm
  - $\pm 25$  pm over 1250-1700 nm
- Sampling resolution: 2 pm
- Modern interfaces

# Tunable filters

The XTA-50 and XTM-50 are wavelength tunable and bandwidth adjustable filters. The use of bulk optics in combination with diffraction gratings leads to high selectivity, low insertion losses and dispersion. Thanks to the adjustable bandwidth and very steep edges, the XTx filters are a reference for precise filtering of a channel or even of a subdivision of a channel.

## Models available

Model	Wavelength range	Bandwidth	Slope
Standard	1450–1650 nm	50–950 pm (6.25–120 GHz)	500 dB/nm
Ultrafine	1480–1620 nm	32–650 pm (4–80 GHz)	800 dB/nm
Wide	1525–1610 nm	50–5000 pm (6.25–625 GHz)	350–500 dB/nm
O-band	1260–1360 nm	50–900 pm (8–160 GHz)	500 dB/nm

## Manual and automated versions

**XTA-50** Automated wavelength tuning and bandwidth adjustment

**XTM-50** Manual wavelength tuning and bandwidth adjustment



## Key features

- Wavelength and bandwidth adjustable
- Manual (XTM-50) and automated (XTA-50) versions
- IL: < 5 dB
- Sharp roll-off and excellent crosstalk specifications
- SMF and PMF versions
- O-band model available

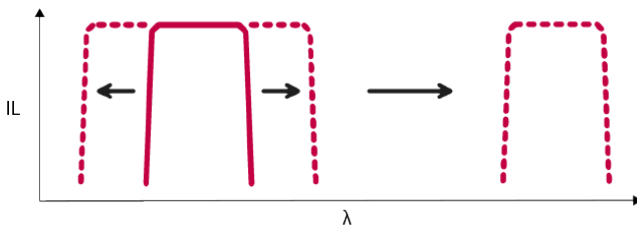


Figure 7. Bandwidth and wavelength tuning.

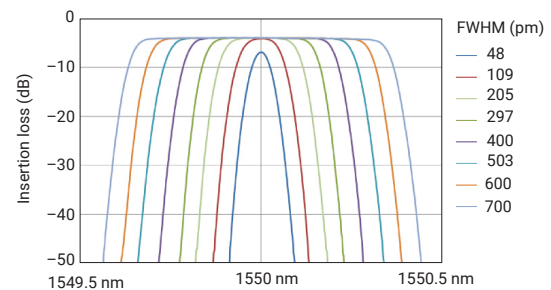


Figure 8. Bandwidth tuning.



# Modular optical test solutions

Compatible with both rackmount and portable platforms, EXFO's modular optical test solutions were meticulously engineered to optimize the testing of a variety of technologies and ensure simplicity and efficiency in laboratory settings. Test solutions cover photonic integrated circuits (PIC), WSS, ROADM, passive optical components and more.

## Rackmount platforms



### LTB-2, LTB-8 and LTB-12

Rackmount modular test platforms with 2, 8 or 12 slots

## Portable platforms



### FTB-1v2, FTB-2 Pro and FTB-4 Pro

Portable modular test platforms with 1, 2 or 4 slots

## Power meter



### FTBx-1750

High performance power meter (1-slot module)

## Light sources



### FTBx-2250

Broadband light source (1-slot module)



### FTBx-2850

μTLA tunable light source (1-slot module)

## Variable attenuators



### FTBx-3500

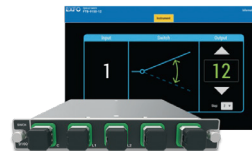
Variable attenuator (1-slot module)



### MOA-3800

Variable optical attenuator (rackmount)

## Switches



### FTBx-9160

MEMS optical switch (1-slot module)



### MXS-9100

MEMS matrix optical switch (rackmount)

## Optical spectrum analyzers



### FTBx-5245

Optical spectrum analyzer (2-slot module)



### FTBx-5243-HWA

High wavelength accuracy OSA (3-slot module)



### FTBx-5255

High-end OSA – (2-slot module)



# Sales and customer service

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