Optical testing solutions for government and agency labs

EXFO

About this brochure

This brochure helps government and agency labs quickly identify the optical test capabilities they need to support research programs, secure infrastructure, and set repeatable validation workflows.

Inside, you'll find solutions for circuit and component validation, including test platforms, benchtop tunable lasers, light sources, passive component testers, tunable filters, variable attenuators, switches or power meters.

Contact us for guidance on building a test setup that fits your requirements—from early characterization to mission-ready validation.

About EXFO

EXFO develops smarter test, monitoring, and analytics solutions for the global communications industry. We are trusted advisers to carriers, hyperscalers, and leaders in manufacturing, development and research. Building on 40+ years of innovation, EXFO's unique blend of equipment, software, and services enables faster, more confident transformations related to integrated photonics, 5G, cloud-native, and fiber-optic networks.

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Glossary

IL	insertion loss
RL	return loss
PDL	polarization-dependent loss
PMF	polarization-maintaining optical fiber
SMF	singlemode fiber

Automated probe stations

Introducing the OPAL series of automated probe stations—designed for industry-leading performance in testing wafers, multiple dies, or single dies in integrated photonics. With trench coupling capabilities and reconfigurable options, they ensure precise, repeatable, and fast measurements. Paired with the PILOT software suite, the OPAL series offer full test flow automation, integrating EXFO or third-party instruments seamlessly.

Flexible testing of photonic integrated circuits (PIC)

The OPAL series offers versatile solutions for PIC testing, with options designed for single-die, multi-die, and wafer-level edge-coupling applications.

OPAL-SD: An entry-level, semi-automated probe station for single-die testing. It offers flexible, cost-effective, and upgradeable performance, with automated optical alignment and traceable test results. Manual positioning of the die and electrical probes makes it a practical solution for precision testing.

OPAL-MD: A high-performance multi-die test station, delivering fast, accurate, and repeatable results. It's designed for advanced integrated photonics characterization and allows for flexible testing setups. Open to EXFO and third-party instruments, the OPAL-MD supports comprehensive, data-driven PIC testing.
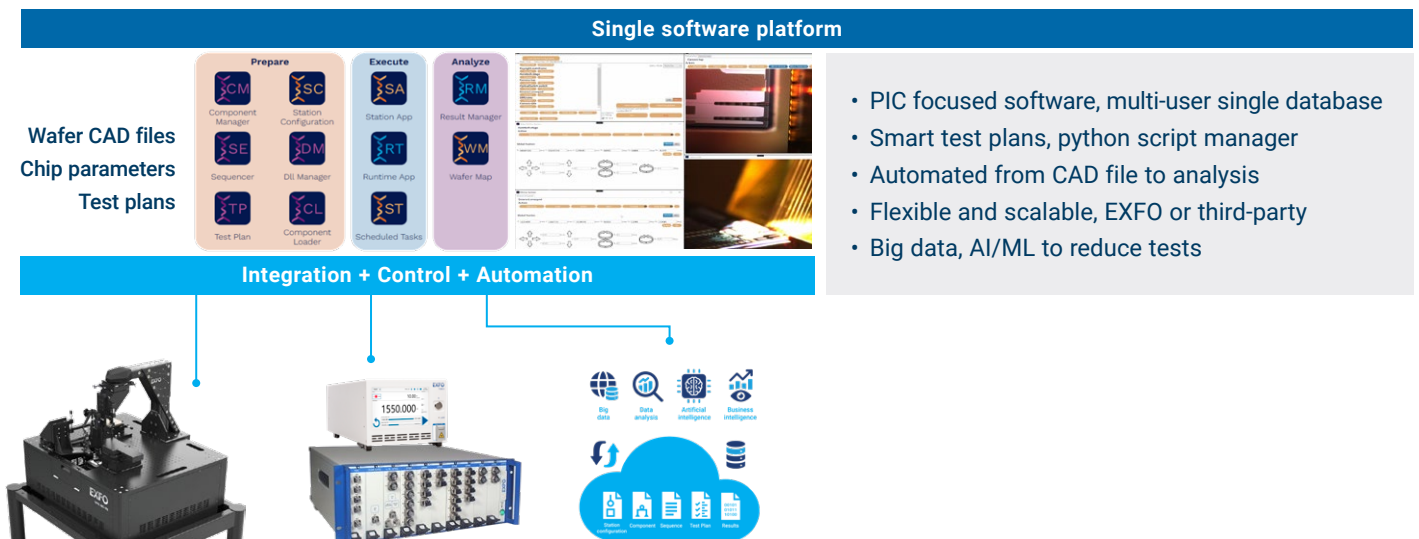

OPAL-EC   OPAL-MD   OPAL-SD

Applications

- From die to wafer testing integrated photonics
- From R&D, design verification and process development to pilot production
- Optical and electronic characterization of PIC
- Application-agnostic: telecom & datacom transceivers, quantum, LIDAR, sensors, AI, etc.

OPAL-EC: A leading-edge wafer-level test station optimized for edge-coupling. It provides industry-leading accuracy, speed, and flexibility for integrated photonics characterization. The OPAL-EC is ideal for precise wafer-level PIC testing, combining EXFO's optical measurement capabilities with compatibility for third-party instruments.

The **EXFO Pilot software suite** enhances all OPAL stations by automating the test flow from setup to results analysis, turning high-quality measurements into actionable data for efficient and data-driven decision-making.

Single software platform

Prepare — Execute — Analyze

Wafer CAD files
Chip parameters
Test plans

Integration + Control + Automation

- PIC focused software, multi-user single database
- Smart test plans, python script manager
- Automated from CAD file to analysis
- Flexible and scalable, EXFO or third-party
- Big data, AI/ML to reduce tests

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.

Figure 1. Spectral coverage of the various T200S-T500S models.

Figure 2. High power and high dynamic range.

Key features

- Power: T500S up to 14 dBm, T200S nominal 10 dBm
- Tuning range: up to 180 nm
- Tuning speed: 200 nm/s
- Bidirectional sweep (T500S)
- Wavelength accuracy: ±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
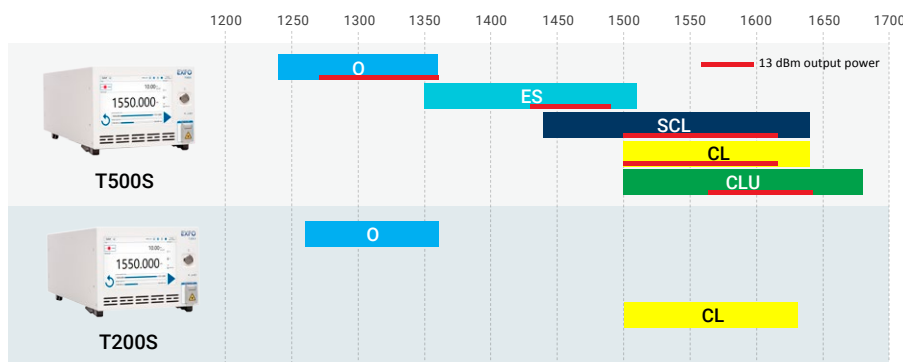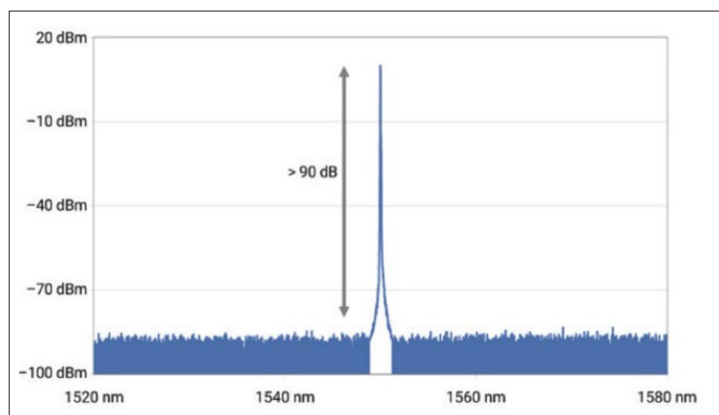- Ethernet port and SCPI commands

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: ±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

OPMLite — Entry-level optical detector module for electrical trigger spectral testing

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.
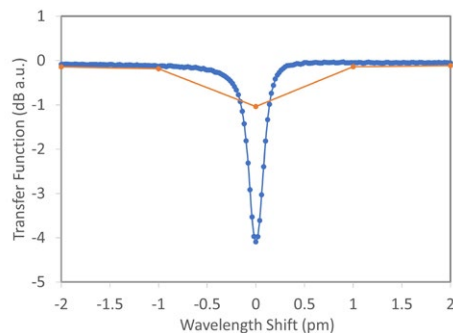
Figure 3. Ring resonator measurement at 20 fm resolution and 1 pm resolution.

Figure 4. 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 ±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: ±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.
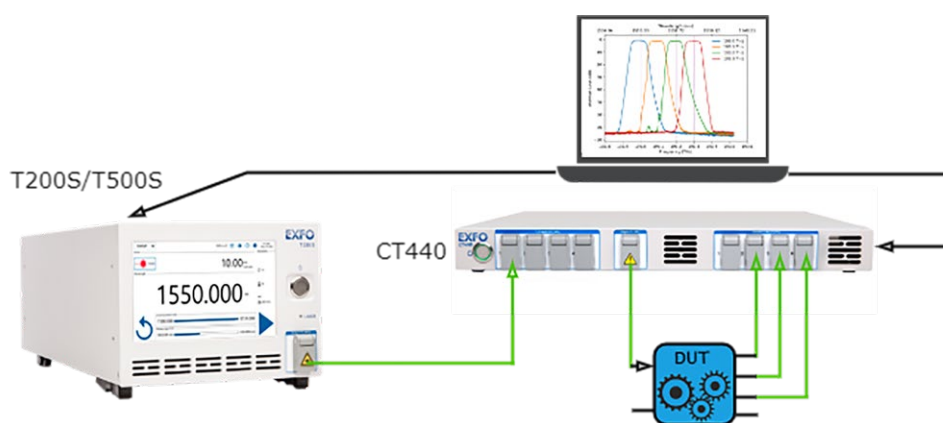
Figure 5. Typical measurement configuration using the CT440 component tester with a T200S/T500S tunable laser.

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
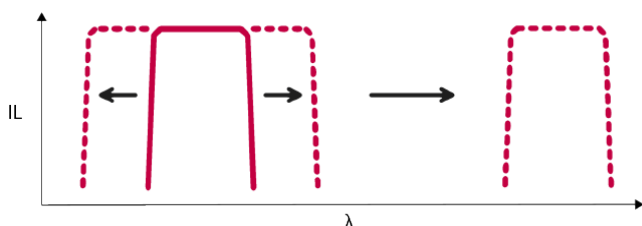- SMF and PMF versions
- O-band model available

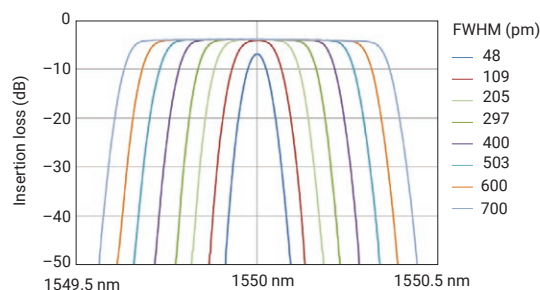

Figure 6. Bandwidth and wavelength tuning.

Figure 7. Bandwidth tuning.

Modular optical test solutions

Compatible with both rackmount and portable platforms, EXFO's modular optical test solutions let you build a custom setup that fits your workflow—and scale it as needed. Mix and match testing modules to streamline validation.

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)

OHS-1700
High performance optical head

Light sources

FTBx-2150/FTBx-2250
Broadband light source (1-slot module)

FTBx-2850
µITLA tunable light source (1-slot module)

Variable attenuators

FTBx-3500
Variable attenuator (1-slot module)

Switches

FTBx-9160
Singlemode, multimode and polarization maintaining optical switches

Inspection probes

FIP-500
Fiber inspection scope

FIP-400B
Fiber inspection scope series

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)

Performance

FTBx-5255
FTBx-5243-HWA
FTBx-5245
FTBx-5235

OTDR Series

FTBx-720D
LAN/WAN access OTDR

FTBx-730D
PON FTTx/MDU OTDR

FTBx-735D
PON/metro FTTx/MDU OTDR

FTBx-740C
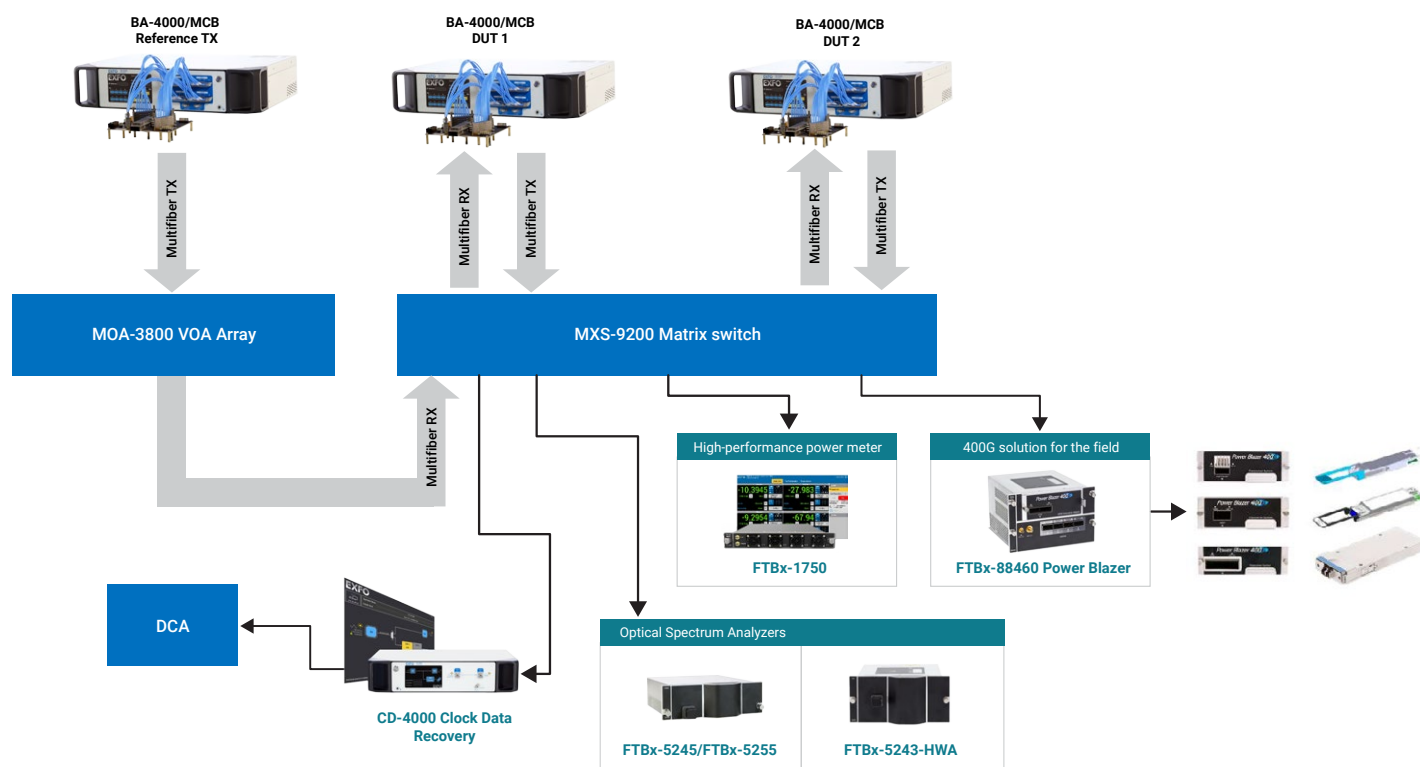xWDM OTDR Series

FTBx-750C
Metro/longhaul OTDR

FTBx-570
Single-ended dispersion analyzer

High-density rackmount switching and signal conditioning products

The accelerating production of multilane and multi-fiber components poses significant challenges to manufacturing workstations where the aim is to rapidly qualify and test multiple devices, while sharing certain high-cost test equipment and infrastructure.

To meet these requirements, EXFO offers standard and customized solutions for high-density routing (MEMs switches) of the optical signal as well as high-density variable optical attenuator (VOA) arrays.

High-density rackmount switching and signal conditioning products

Optical signal conditioning

MOA-3800

Variable optical attenuator (VOA) Array

Key features

- Singlemode or multimode fiber
- 4, 8 or 16 VOAs as standard
- Higher count VOA arrays available on request
- Self-adjusting power option
- Linear response
- Protocol and bit rate independent
- SCPI over ethernet remote control

Common applications

- Transceiver Testing
- System and component BER testing
- WDM power balancing

Optical signal routing

MXS-9200

3D MEMs optical switch

This latest generation in the MXS optical switch series, the MXS-9200 is a laboratory grade, high -performance optical switch optimized for use with EXFO LTB solutions. The MXS-9200 enhanced platform utilizes DiCon Fiberoptics' industry proven MEMS optical switch technology to reliably connect fibers together in a fully automated and open loop operation.

Available configurations

Configurations		Switch size		Fiber type
#	Type	Min	Max	
1	MxN Matrix	2x8	192x192	Singlemode
2	MxN Matrix	2x8	32x32	SM Polarization Maintaining
3	MxN Matrix	2x8	64x64	Multimode
4	1xN Array	1x4	1x8	Singlemode
5	1xN Array	1x4	1x4	SM Polarization Maintaining
6	1xN Array	1x4	1x8	Multimode

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