CTP10

COMPONENT TEST PLATFORM

Efficiently test passive optical components in 24/7 operations. Perform insertion loss (IL), return loss (RL) or polarization dependent loss (PDL) measurements with unprecedented dynamic range, speed and resolution.

SPEC SHEET

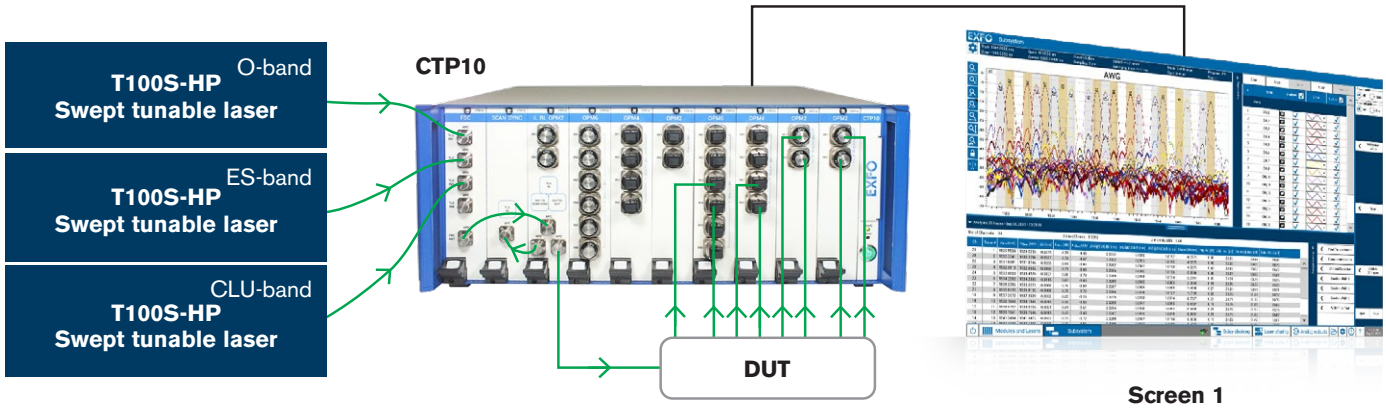
KEY FEATURES

- Industry's fastest swept wavelength measurements of IL, RL or PDL
- State-of-the-art electronics achieve full dynamic range IL characterization in a single sweep, ideal for components with high-contrast spectrum
- Hosts ten hot-swappable modules for testing components with up to 50 optical outputs or even 100+ by daisy chaining
- Powerful and intuitive graphical user interface (GUI) for easy test configuration and measurement analysis
- Full-band operational range for IL, RL and PDL measurement covering wavelengths from 1240 nm to 1680 nm
- Laser-sharing function enables sharing one or more lasers between up to 8 test stations

CTP10 PLATFORM

The CTP10 is a modular measurement platform for efficient testing of passive components in 24/7 operation. The platform directly controls one or several T100S-HP lasers to achieve high-resolution spectral characterization within seconds. Wavelength sweep, data collection and processing for IL, RL or PDL, trace display and analysis are all performed from a single instrument, making the CTP10 a compelling, easy-to-use test solution for passive component characterization. Single-sweep insertion loss measurements with up to 80 dB dynamic range can be performed with unprecedented speed and resolution. With up to 50 detectors per platform, it is the ideal instrument to characterize large port count components used in DWDM networks and photonic integrated circuits (PIC).

The platform runs a dedicated operating system with powerful data processing electronics to virtually eliminate any downtime due to data transfer. It also features a large internal hard drive for direct data storage and full remote control via SCPI-compatible commands.



NEXT-GEN MODULES

The CTP10 platform hosts up to 10 hot-swappable modules, providing a variety of optical tools to perform high-quality IL, RL or PDL measurements.

CTP10 OPTICAL MODULES

KEY MODULES

Insertion and polarization dependent loss

Featuring real-time power monitoring and an integrated polarization generator, the **IL PDL OPM2** performs IL & PDL measurements over 1240 nm - 1680 nm and has two optical detectors.

The **IL PDL** module enables high resolution IL & PDL measurement over the SCL band.

2-slot module

Insertion and return loss

Featuring real-time power monitoring, return loss measurement and two optical detectors, the **IL RL OPM2** enables high resolution IL & RL measurement over the full operating wavelength range.

1-slot module

WAVELENGTH CONTROL

Wavelength detection

Based on high-speed optical triggered wavelength detection, the **SCAN SYNC** module offers uncompromising wavelength accuracy and sampling resolution even for high-speed testing.

1-slot module

Full-band combiner

The **FBC** module offers automated testing across the full telecom range by combining up to 4 tunable lasers into a single output.

1-slot module

DETECTORS

Optical detectors

With a choice of 2, 4 or 6 high-speed InGaAs detectors per unit, the **OPMx** series module feature state-of-the-art electronics to enable full dynamic range measurement in a single laser sweep.

1-slot module

PASSIVE OPTICAL COMPONENT TESTING

TYPICAL COMPONENT CHARACTERIZATION SETUP	CTP10 CONFIGURATION
IL and RL Typical examples: › WDM components › Photonic integrated circuits (PIC)	**IL RL OPM2** **SCAN SYNC** **OPMx**
IL and RL, full band characterization Typical examples: › CWDM multiplexers › PON components › Thin film filters	**IL RL OPM2** **SCAN SYNC** **FBC** **OPMx**
IL and PDL, CL band Typical examples: › Wavelength selective switches › DWDM multiplexers	**IL PDL** **SCAN SYNC** **OPMx**
IL and PDL, O band Typical examples: › LANWDM multiplexers › Optical filters	**IL PDL OPM2** **SCAN SYNC** **OPMx**

Feel free to discuss your optical test requirements with our team of experts. They will be happy to assist in defining the system that is right for you.

FASTEST SWEPT IL, RL AND PDL

Fast and reliable IL, RL and PDL measurements are key to any R&D or manufacturing passive component test bench. Other parameters such as isolation, free spectral range or directivity all rely on a high-quality loss measurement.

Thanks to its state-of-the-art electronics, the CTP10 outperforms all existing instruments. It offers a 70 dB dynamic range for IL in a single sweep for a tunable laser speed at 100 nm/s with 10 dBm output power while maintaining a sampling resolution of 1 pm and eliminates the need for post-processing steps such as trace stitching and bandwidth correction.

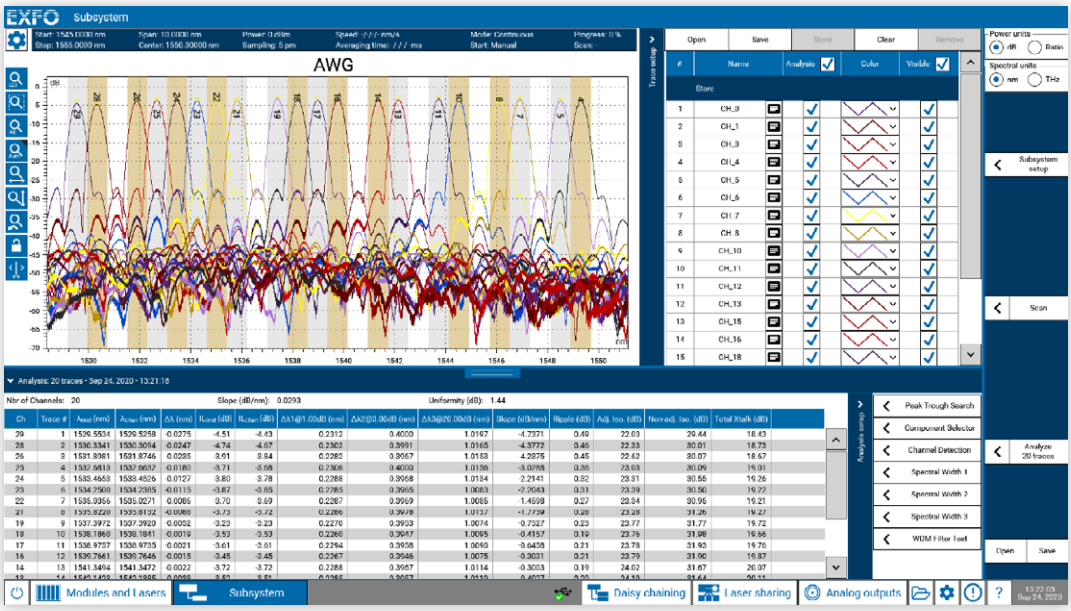
When performing IL & PDL measurements, the CTP10 will automatically generate known states-of-polarization (SOP), record all relevant spectra in each of those states and calculate both PDL and polarization-averaged IL using the Mueller method.

The IL PDL OPM2 measures high precision PDL anywhere over the operating spectral range of the CTP10 while the IL PDL module operates over the SCL band.

The CTP10 can test components with a high-contrast spectrum, such as wavelength selective switches or DWDM multiplexers, without compromising on the quality of optical power measurement. The module's detectors have no slew rate issues and can readily measure a change in insertion loss of more than 10 dB/pm at 100 nm/s scanning speed.

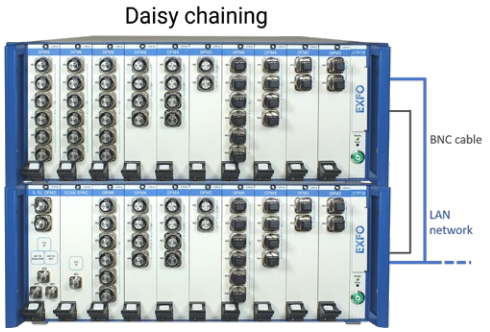
POWERFUL, INTUITIVE GUI

The feature-rich software offers a powerful and intuitive GUI to easily configure, reference the system and perform measurements. Built-in analysis functions are available to analyze components such as WDM filters or WSS.



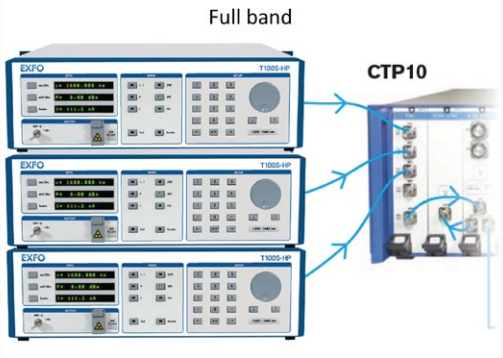
DAISY CHAINING MADE EASY

Testing high port-count components is as simple as connecting an additional CTP10 mainframe to an existing system. The daisy chaining function allows seamless configuration through the GUI to perform both reference and measurement on all detectors from one CTP10.



FULL-BAND READY

For IL and RL measurements, the CTP10 can operate between 1240 nm and 1680 nm and is fully compatible with EXFO's T100S-HP series of tunable lasers. The O, ES and CL models of T100S-HP lasers can be combined to cover the 1260-1630 nm range, and can be extended down to 1240 nm or up to 1680 nm using the O+ or CLU models. When combining several lasers with the FBC module, the CTP10 automatically switches between lasers for seamless, fast and reliable full-band testing.



LASER SHARING

The laser-sharing function allows the sharing of one or more lasers between up to 8 CTP10 platforms connected to the same LAN network. The sharing configuration can be easily set up using the graphical user interface of the various CTP10s and just requires an external coupler to split the light among the different test stations, thus reducing CAPEX in manufacturing environments.

WAVELENGTH REFERENCING GAS CELLS

Packaged external gas cells with NIST traceable absorption lines are available in the O and C bands. This accessory can be used to further improve the ±5 pm (typ.) accuracy of the SCAN SYNC module for excellent absolute wavelength accuracy.

The WLRM-NS270x accessories use a Hydrogen Cyanide (HCN) gas cell in the C band and a Hydrogen Fluoride (HF) gas cell in the O band.

SPECIFICATIONS[a]

OPTICAL MEASUREMENT

		With IL PDL	With IL PDL OPM2	With IL RL OPM2
Wavelength	Specified wavelength range	1510 nm–1620 nm	1260 nm–1620 nm	1250 nm–1630 nm
	Operating wavelength range[b]	1440 nm–1640 nm	1240 nm–1680 nm	
	Absolute wavelength uncertainty (typical)	±5 pm		
	Wavelength repeatability (typical)[c]	±1 pm		
	Wavelength display resolution	1 pm to 2000 pm		
Optical detectors	Sensor type	InGaAs		
	Compatible fiber type	SMF28		
	Compatible optical adaptors	FC or SC connectors		
	Maximum safe power	11 dBm		
	Averaging time	Manual: 1 µs to 1 s, automatic		
	Optical power acquisition resolution	< 0.0001 dB		
	Return loss (typical)	> 56 dB		
Optical interfaces	Optical connectors	FC type		
	Maximum safe power	TLS IN: 15 dBm SCAN SYNC: 14 dBm		
Insertion loss[d]	Dynamic range (typical at 10 nm/s)	> 80 dB		
	Dynamic range (typical at 100 nm/s)	> 70 dB		
	Insertion loss uncertainty (typical at 10 nm/s)[e]	±0.005 dB		
	Noise 2 σ (at 10 nm/s) (typical)	0 dB to 20 dB: ±0.005 dB 20 dB to 40 dB: ±0.005 dB 40 dB to 50 dB: ±0.010 dB 50 dB to 60 dB: ±0.035 dB		
	Noise 2 σ (at 100 nm/s) (typical)	0 dB to 20 dB: ±0.005 dB 20 dB to 40 dB: ±0.01 dB 40 dB to 50 dB: ±0.05 dB 50 dB to 60 dB: ±0.400 dB		
Polarization dependent loss	PDL measurement method	4-States Mueller		N/A
	PDL uncertainty (typical at 100 nm/s)[f]	±0.06 dB + 2% PDL	±0.06 dB + 1% PDL[g]	N/A
Return loss	Dynamic range (typical at 10 nm/s)	N/A		> 55 dB
	Return loss uncertainty (typical)[h]	N/A		±0.5 dB
Swept measurement	Measurable power variation (typical)[i]	>10 000 dB/nm at 100 nm/s		
	Optimum tunable laser sweep speed range	10 nm/s–100 nm/s		

a. After a 1-hour warm-up time (for the CTP10 mainframe and modules), at a constant temperature of 23 °C ±1 °C, SMF28 patchcord, FC/APC connector, T100S-HP laser used with SCAN SYNC module, unless otherwise specified.

b. When using SCAN SYNC, first and last 2.5 nm of the laser(s) wavelength scanning range are not usable.

c. Over one minute, within optimum tunable laser sweep speed range, laser optical power 10 dBm.

d. Tunable laser power 10 dBm, after zeroing of optical detector, averaging time set to Automatic.

e. For IL < 20 dB, after power referencing, not including connector uncertainty, degree of polarization < 5%.

f. For PDL <2 dB and IL <20 dB; 10 dBm TLS, auto avg. time, FC/PC connector to OPM. Higher PDL values can be displayed depending on measurement conditions.

g. ±0.04 dB + 1% PDL over spectral range 1490 nm – 1620 nm

h. For RL < 40 dB, degree of polarization < 5%.

i. For IL < 45 dB, tunable laser power +10 dBm.

SPECIFICATIONS—HARDWARE		
Interfaces (rear panel of mainframe)	Display ports	2x (HDMI + display port) Compatible with split screen display and touchscreen with multitouch control
	Remote	Ethernet, USB (Option: GPIB)
	Electrical inputs (hardware ready)	10x BNC
	Electrical outputs (hardware ready)	7x BNC
	Other inputs	2x USB 2.0 and 2x USB 3.0
Interfaces (front panel of mainframe)	Number of module slots	10
	Other inputs	3x USB-A 2.0
Data storage	Hard drive	HDD, 2 TB
General	Temperature Storage Operating	–20 °C to 65 °C (–4 °F to 149 °F) 5 °C to 40 °C (41 °F to 104 °F)
	Weight (mainframe)	8.5 kg (18.7 lb)
	Weight (module)	1 kg to 2.8 kg (2.2 lb to 6.2 lb)
	Dimensions (mainframe - H x W x D)	178 mm x 482 mm x 435 mm (7 in x 19 in x 17 in) 4U full rack with rackmount fixtures
	Power supply	100 V to 240 V AC (50/60 Hz)

ORDERING INFORMATION [a]

CTP10 mainframe — **CTP10-XX**

GPIB option
00 = Without GPIB
GPIB = With GPIB

Example: CTP10-GPIB

IL RL OPM2 module — **IL-RL-OPM2-58-XX**

Connector adaptor
FOA-322-EMC = FC ultra-low-reflection: FC (PC/SPC/UPC/APC)
FOA-354-EMC = SC ultra-low-reflection: SC (PC/SPC/UPC/APC)

Example: IL-RL-OPM2-58-FOA-322-EMC

IL PDL module (2-slot module) — **IL-PDL-CL-58**

Example: IL-PDL-CL-58

IL PDL OPM2 module (2-slot module) — **IL-PDL-OPM2-F-58-XX**

Connector adaptor
FOA-322-EMC = FC ultra-low-reflection: FC (PC/SPC/UPC/APC)
FOA-354-EMC = SC ultra-low-reflection: SC (PC/SPC/UPC/APC)

Example: IL-PDL-OPM2-F-58-FOA-322-EMC

SCAN SYNC module — **SCAN-SYNC-58**

Example: SCAN-SYNC-58

Full-band combiner module — **FBC-58**

Example: FBC-58

OPMx module — **OPMXX-XX**

Number of detectors
2 = 2 power meters
4 = 4 power meters
6 = 6 power meters

Connector adaptor
FOA-322-EMC = FC ultra-low-reflection: FC (PC/SPC/UPC/APC)
FOA-354-EMC = SC ultra-low-reflection: SC (PC/SPC/UPC/APC)

Example: OPM6-FOA-322-EMC

Wavelength reference gas cells — **WLRM-NS270X**

Spectral reference range
1 = C-band
2 = O-band

Example: WLRM-NS2701

a. All 1-slot module except for the 2-slot module IL PDL CL and IL PDL OPM2.

EXFO headquarters **T** +1 418 683-0211 **Toll-free** +1 800 663-3936 (USA and Canada)

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