

PSO-100 Series

OPTICAL SAMPLING OSCILLOSCOPES



40G
100G

The fastest optical sampling oscilloscopes for 40G, 100G and beyond

KEY FEATURES

500 GHz bandwidth

Bit-rate and modulation format independent

No trigger needed

Polarization independent

Ultra-low timing jitter: ≤ 50 fs (typical)

COMPLEMENTARY PRODUCT



Optical modulation analyzer
PSO-200

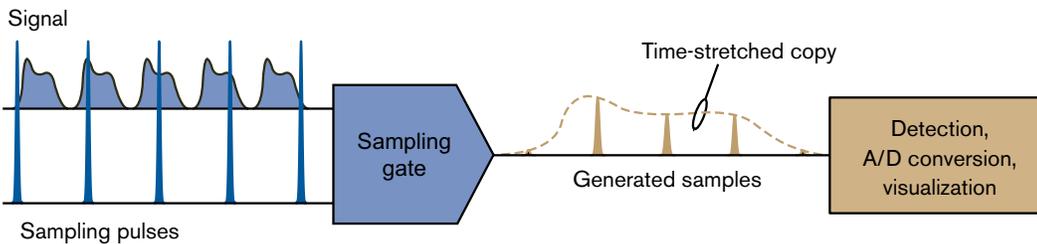
SPEC SHEET

EXFO

OPTICAL SAMPLING. UNMATCHED PERFORMANCE.

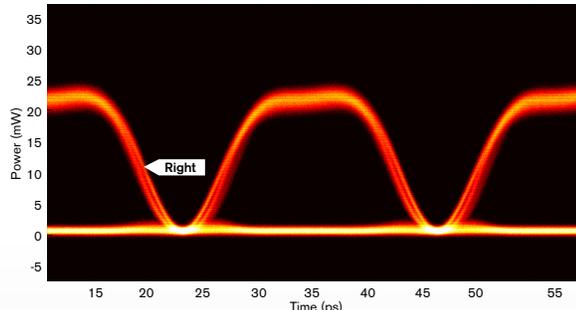
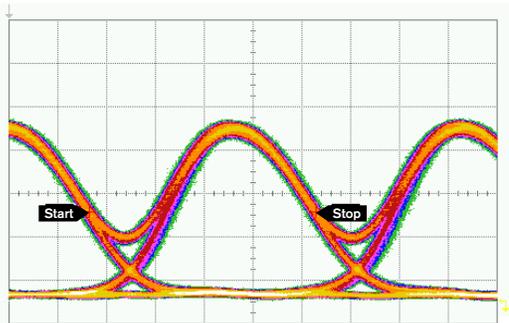
With bandwidth demand growing exponentially worldwide, the transmission rates of optical networks are increasing to 40 Gbit/s and, in the near future, to 100 Gbit/s. Thanks to advanced modulation schemes, ultra-high network speeds can be achieved using existing DWDM channel spacing, while maintaining resilience to chromatic and polarization dispersion phenomena. Full characterization of this ultra-high-speed encoding represents a significant challenge. This is where EXFO's PSO-100 Series comes in.

Based on a unique optical sampling approach, the PSO-101 and PSO-102 Optical Sampling Oscilloscopes eliminate almost all the limitations typically found in electrical sampling oscilloscopes. To do so, narrow sampling pulses open a sampling gate that generates a time-stretched version of the measured signal. The optical samples are then converted to electrical signals, which can be easily detected by low-speed electronics and digitally processed.



Distortion-Free Characterization of Signals at 40 Gbit/s, 100 Gbit/s and Beyond

The PSO-100 Series has a 500 GHz bandwidth allowing accurate measurement of rise/fall time, jitter, duty cycle distortion, mask hits, etc.—even with more complex modulation schemes such as CSRZ-DPSK.

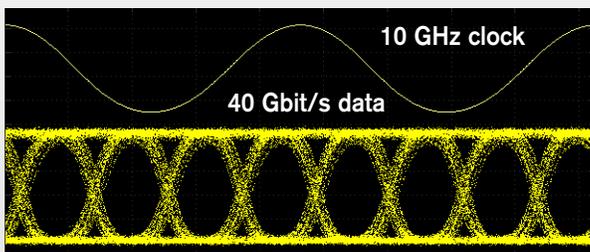


Comparison between a typical electrical sampling oscilloscope and the PSO-100 Series with a 43 Gbit/s CSRZ-DPSK signal—the rise/fall time and the pulse shape affected by the limited bandwidth of the electrical sampling oscilloscope are clearly shown.

No Need for an External Clock

The unique software-based clock recovery technique of the PSO-100 Series enables trigger-free and easy-to-use waveform visualization and analysis. If the signal-to-noise ratio (SNR) of the input signal is greater than 20 dB, you simply have to enter the transmission bit rate (within ± 8 MHz) for optimal synchronization without requiring an external clock.

An optional external clock input is available should you have to synchronize on noisy signals or low duty cycle return-to-zero (RZ) signals, get accurate clock jitter measurement, or enable time-stamping of optical samples. Any sub-rate of the input signal can be used as the synchronization clock.



External clock at 1/4 of signal rate.

Bit-Rate and Modulation-Scheme Independent

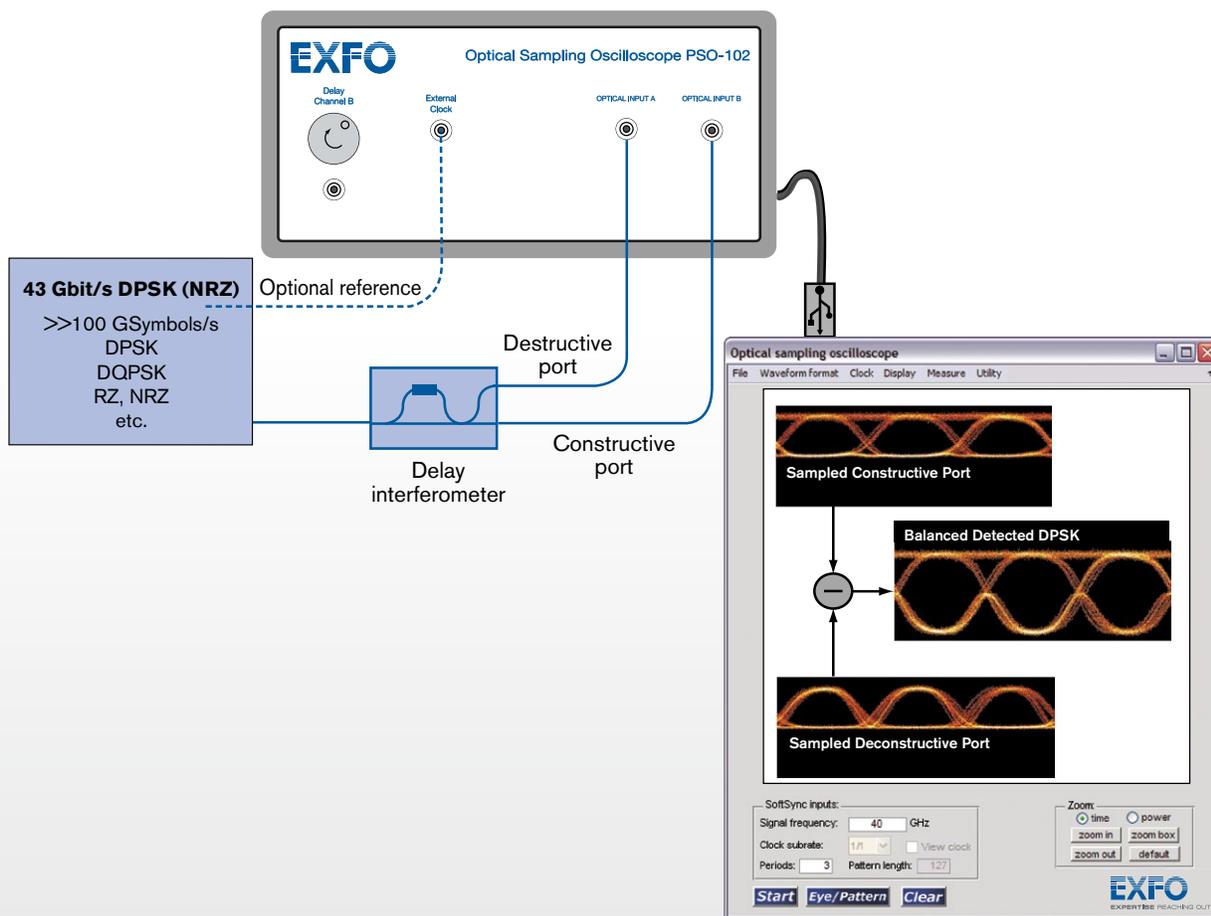
The unique design of EXFO's optical sampling oscilloscopes ensures a universal future-proof solution. Since the PSO-100 Series is an all-optical instrument, no bit-rate-dependent hardware is needed. The same oscilloscope can be used for any bit rate, up to 640 Gbit/s: just select the single-channel or the dual-channel version based on modulation schemes needed. Furthermore, both channels of the PSO-102 can be used independently or in differential mode for DPSK, DQPSK and D8PSK.

MODULATION FORMAT	PSO-102	PSO-102
NRZ	•	•
RZ	•	•
CSRZ	•	•
DBT	•	•
DPSK		•
DQPSK		•
D8PSK		•

ALL COMPLEX APPLICATIONS COVERED

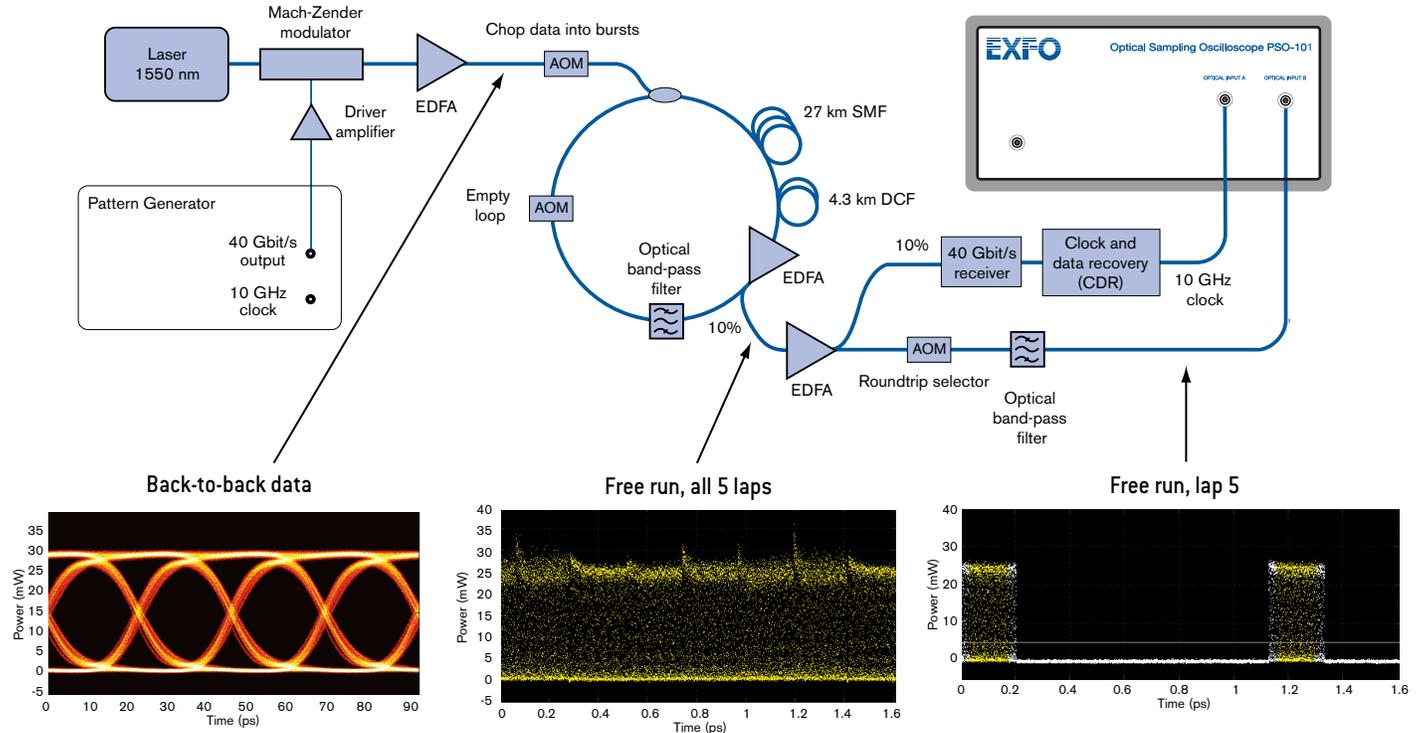
DxPSK Measurements

To perform DPSK, DQPSK or D8PSK characterization, simply add a demodulator to your PSO-102.



Ultra-Long-Haul and Submarine Circulating Loops

The PSO-100 Series also offers an optional Gated mode, which eliminates the need to manage long and expensive fiber spools to simulate links that can be thousands of kilometers long. You just have to use a short fiber spool and configure your test setup to perform accurate measurements after the required number of loops in order to match the simulated link.



MEASUREMENTS PERFORMED WITH A PSO-100		
One level	Rise time	Eye width
Zero level	Fall time	Duty cycle distortion
SNR	Extinction ratio	Pulse width
Jitter (root mean square)	Eye height	Contrast ratio
Jitter (peak to peak)	Eye amplitude	Duty cycle
Crossing	Eye opening factor	

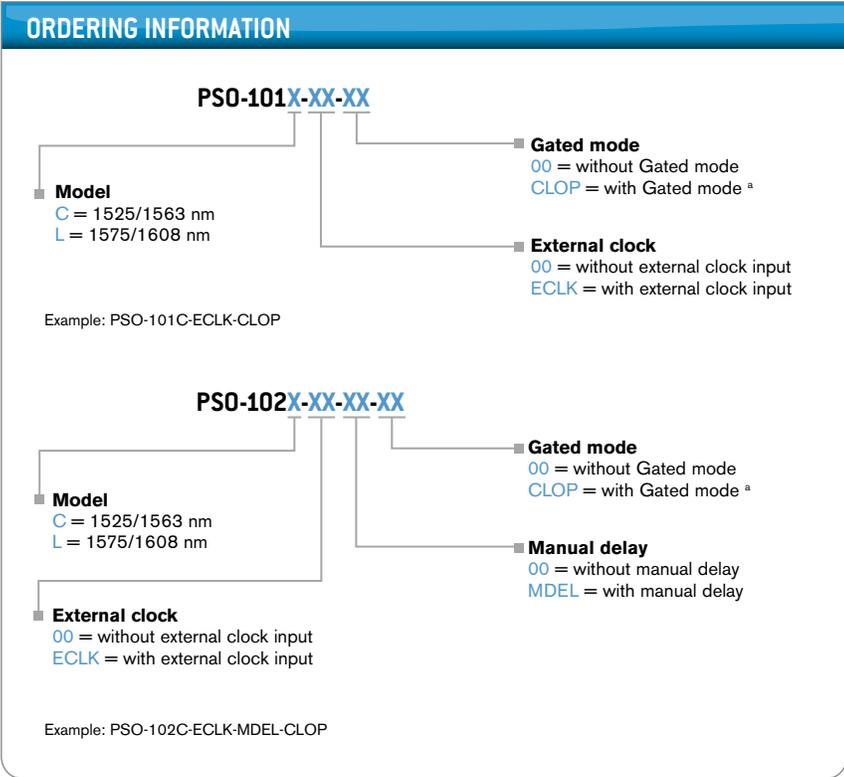
SPECIFICATIONS ^a		
	PSO-101	PSO-102
Number of channels	1	2
Wavelength range (nm) ^b	C: 1525/1563 L: 1575/1608	
Optical bandwidth (GHz)	≥500	
Polarization dependence (dB)	≤1	
Timing jitter (fs) ^c	≤100, 50 ^b	
Signal sensitivity (mW) ^{b,d}	2	
Power uncertainty (dB)	1	
Maximum input peak power without damage (mW)	200	
Maximum input average power without damage (mW) ^e	100	
Minimum signal duty cycle without external clock (%)	1	
Frequency holes due to asynchronous sampling (%)	≤1	
External clock frequency range (GHz)	0.001 to 12.5	
External clock input level at 10 GHz (V)	0.8 to 2	
External clock duty cycle (%)	≥10, ≤90	
Connectors	fiber input external clock	FC/PC SMA

GENERAL SPECIFICATIONS		
Weight	4.7 kg (10.3 lb)	5.5 kg (12.1 lb)
Size (H x W x D)	128 mm x 238 mm x 373 mm (5 in x 9.4 in x 14.7 in)	
Temperature	operating storage	
	18 °C to 28 °C (64 °F to 82 °F) 0 °C to 50 °C (32 °F to 122 °F)	
Power consumption (V4)	20	

SAFETY	
21 CFR 1040.10 and IEC 60825-1:2007	
CLASS 1 LASER PRODUCT	

Notes

- a. At 1550 nm.
- b. Typical.
- c. Timing jitter measurement depends on the signal SNR and slope rise time.
- d. Peak power required to obtain 10 dB OSNR.
- e. Input connector may be damaged if contacts are dirty.



Note
a. ECLK option required.

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