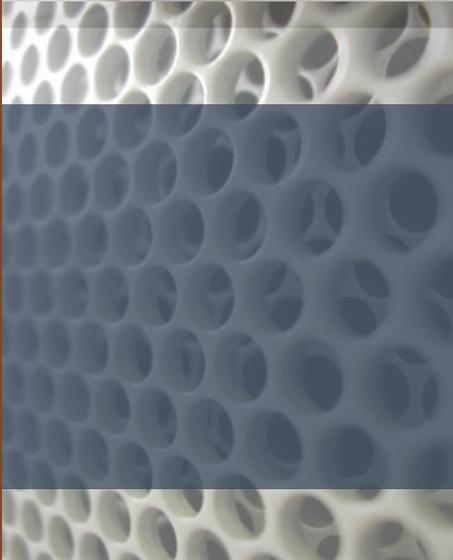
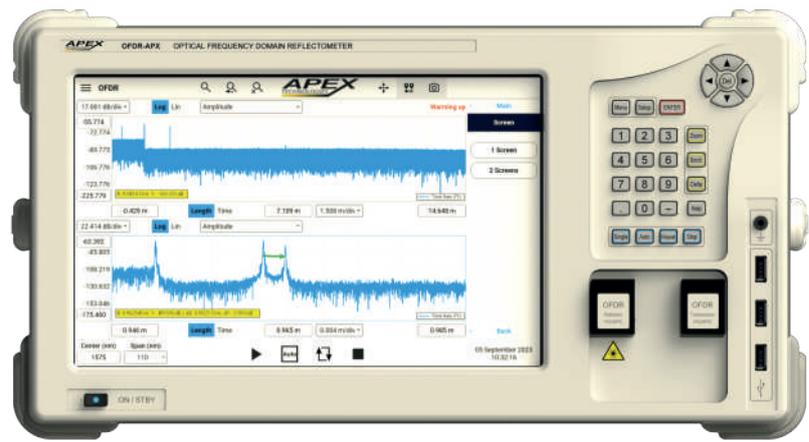


Optical Frequency Domain Reflectometer

OFDR-APX Model



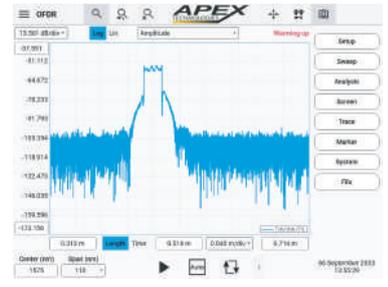
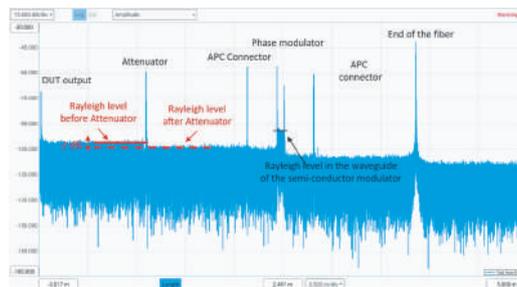
Optical Frequency Domain Reflectometer

Product description

APEX Technologies OFDR-APX series is an Optical Frequency Domain Reflectometer with high resolution $< 8 \mu\text{m}$, a dynamic range of 120 dB and a measurement range of up to 350 m. Our system is able to analyze the back reflection and transmission characteristics of fiber optic devices/components in the spatial domain. This allows the measurement of reflection, transmission, return loss, insertion loss and polarization effects of fiber components, in free space and with Photonics Integrated Circuits.

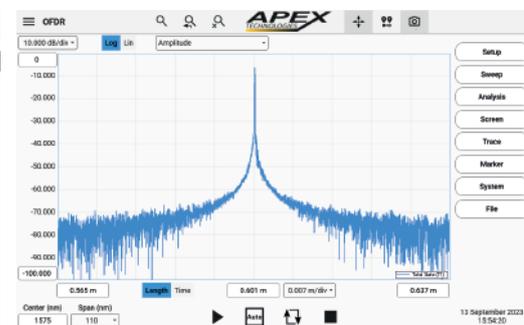
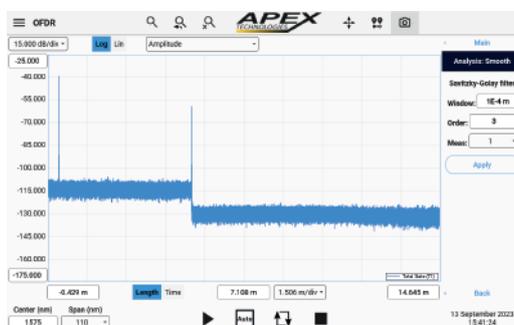
Physical principle

In an OFDR, a continuously tunable laser is injected into the device under test (DUT) and the frequency of the beating generated between the reflected signal and a reference signal issued from the same TLS is measured. The main advantage of this technology over other reflectometers is its high resolution without dead zones. Below are two examples of measurements of a phase modulator (SMF28 fiber) and a Bragg grating using $8 \mu\text{m}$ resolution.



OFDR highest dynamic range in the market > 120 dB

The main limitation of OFDR equipment is amplitude saturation and the inability to measure signals with high reflectivity due to the limited dynamic range. Thanks to our unmatched sensitivity of -135 dB and our detection method, our equipment can analyze signals with reflectivities of up to -10 dB^* .



*Custom sensitivity/saturation

Configuration	Saturation level (dB)	Sensitivity (dB)
0	-10	-135
1	-5	-125
2	No Saturation	-110

Benchtop version: OFDR-APX

Features

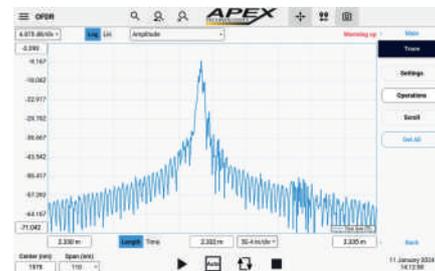
- C+L & O bands
- Resolution $< 8 \mu\text{m}$
- Measurement range up to 244 m
- High dynamic range $> 120 \text{ dB}$
- Reflection and transmission
- Sensitivity: -135 dB

Applications

- Photonic Integrated Circuit (PIC)
- Optical communication (data center)
- Passive optical components (Switches, waveguides, filters...)
- Verify the quality of fiber connectors
- Optical cable maintenance and construction
- Civil Engineering
- Aeronautics

Multi-mode OFDR fiber characterization

Analysis on multimode fiber is possible, but care must be taken to use a mode converter to obtain the most significant results possible. However, after various tests, we were able to demonstrate that measurements on 50/125 μm and 62.5/125 μm fibers were possible and of good quality.



APEX Technologies OFDR features

	OFDR-AP6-CL	OFDR-AP6-O
Wavelength range	1520 to 1630 nm	1265 to 1345 nm
Spectrum linewidth (@3dB)	< 280 kHz	< 300 kHz
Length mode		
Two-point sampling resolution (μm)	8; 16; 32; 42	
Reflection mode*	2; 11; 45; 90; 181; 244	
Transmission mode*	4; 22; 90; 180; 362; 488	
Wavelength absolute accuracy (pm)	+/- 1.5	
Wavelength relative accuracy (pm)	< 0.5	
Maximum optical power (dBm)	6	
Measurement time	See next table	
Reflection mode		
Return loss dynamic range (dB)	122	
Insertion loss dynamic range (dB)	18	
Sensitivity (dB)	-135	
Total range (dB)	-10 to -132	
Resolution (dB)	+/- 0.2	
Accuracy (dB)	+/- 0.4	
Length repeatability (μm)	+/- 12 (std @3*sigma)	
Transmission mode		
Insertion loss dynamic range (dB)	115	
Sensitivity (dB)	-118	
Total range (dB)	0 to -115	
Resolution (dB)	+/-0.2	
Accuracy (dB)	+/-0.4	
Repeatability (μm)	+/- 24 (std @3*sigma)	
Interface		
Remote control by Ethernet		
FC/APC connector		

Length mode (m)	Measurement time (s) @ 8 μm	Measurement time (s) @ 16 μm	Measurement time (s) @ 32 μm	Measurement time (s) @ 42 μm
2	3	2	1.4	X
11	6.5	5	3	X
45	21	12	7	X
90	X	21	12.5	X
181	X	X	22	X
244	X	X	X	22

* The customer must choose 3 of the 6 length modes shown in the table.

** Transmission mode is optional

How to select your OFDR model

Select the OFDR wavelength range

-OFDR-AP6-CL: OFDR for the C+L band for reflection measurement with internal Tunable Laser

-OFDR-AP6-O: OFDR for the O band for reflection measurement with internal Tunable Laser

Choose additional common options

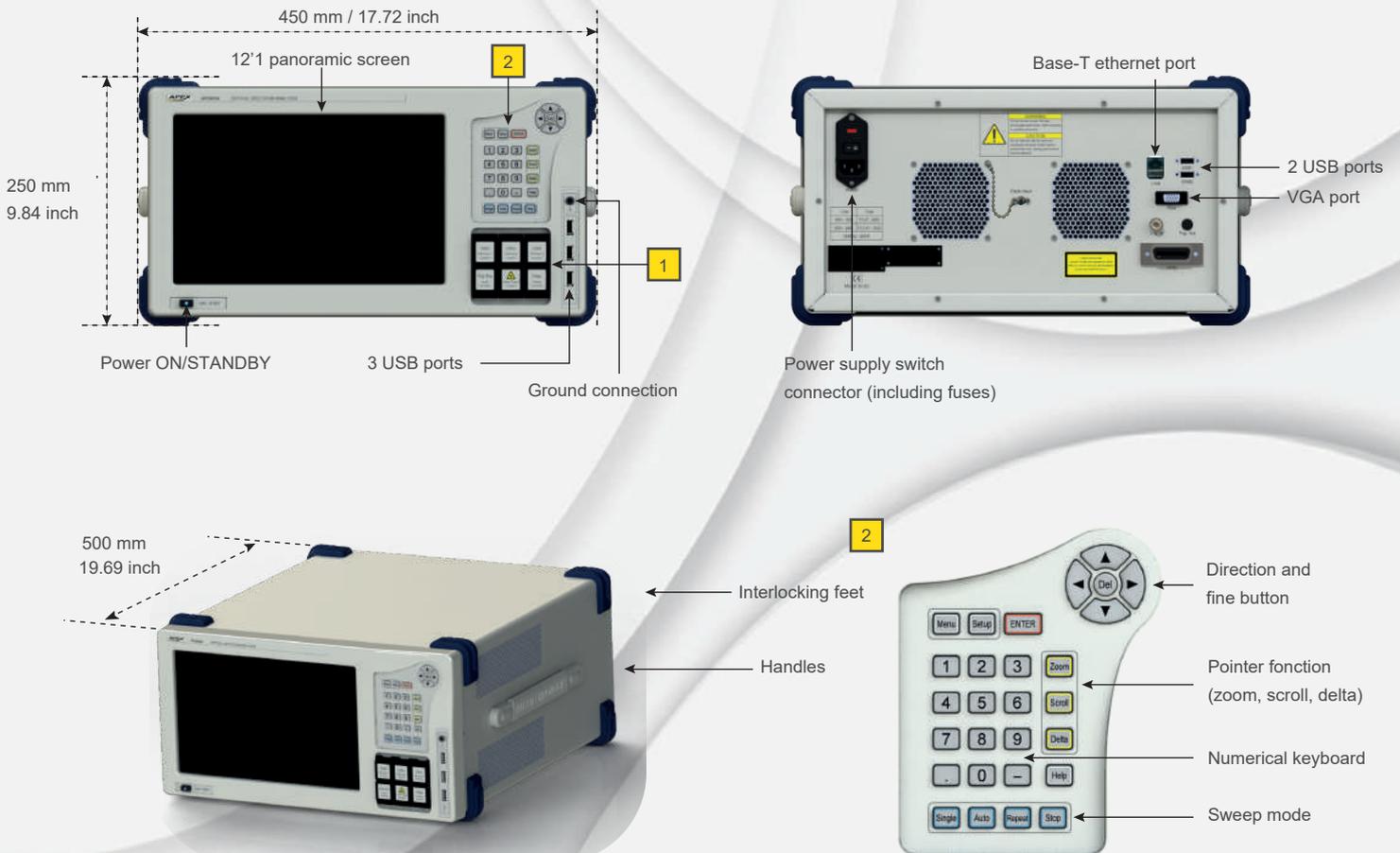
-Option-OFDR-APX-1: Tunable Laser Source in external Benchtop

-Option-OFDR-APX-2: Reflection and transmission measurements

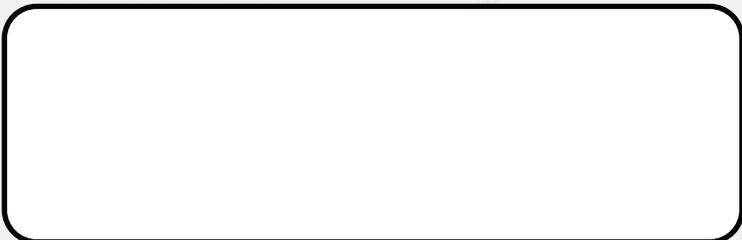
Stand-alone OFDR Source Benchtop

APEX Technologies now proposes compact stand-alone benchtop optical instruments including Optical Frequency Domain Reflectometer, High Resolution Optical Spectrum Analyzer, Optical Complex Spectrum Analyzer with a choice of wavelength ranges. All these equipment are based on the TLS-AP(B)X model. This TLS can be integrated inside the equipment or into an external benchtop as an option. These optical instruments come with many possibilities of remote control technologies and user-friendly interface.

FULL OPTIONS OFDR-APX



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