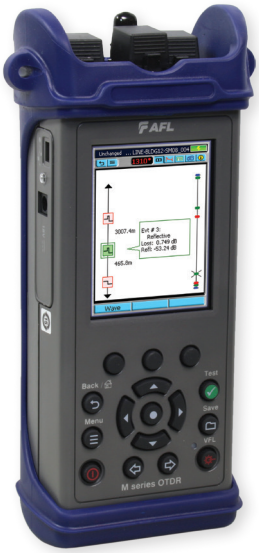
M310 Enterprise OTDR

Designed for Enterprise Network Testing, Troubleshooting and Documentation



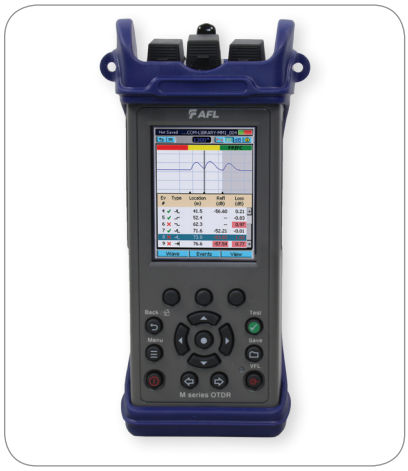
Features

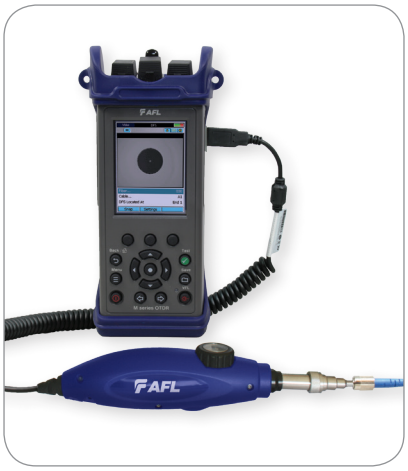
- Industry leading TruEvent™ analysis
- LinkMap™ for easy results interpretation
- Short dead zones provide precise testing of closely spaced events
- Front Panel and First Connector Check
- Live fiber detection
- Inspection ready with DFS1 Digital FiberScope
- Integrated Source, Power Meter and VFL

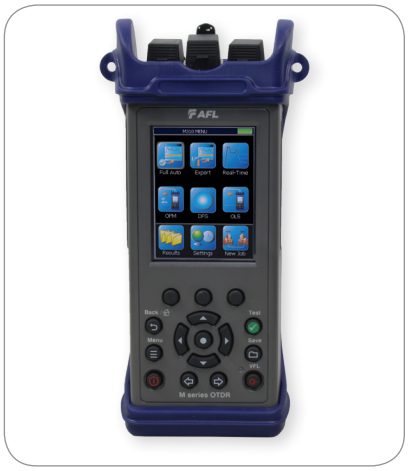
Applications

- Enterprise network
- Data Center
- LAN/WAN
- Campus and military fiber networks and more

Rugged, lightweight and easy to hold, the M310 has a Touch and Test user interface that makes it easy for experts and novices to test and document fiber networks accurately and quickly. TruEvent technology enables M310 to provide superior event analysis capability for user to verify and troubleshoot even the most complex fiber network. LinkMap visualizes test results for easy and quick interpretation. With dynamic range up to 38 dB, and 16 hour battery run time, M310 provides complete Tier 1 insertion loss and Tier 2 OTDR testing. Using pre-set Industry ISO/TIA standards or user set Pass/Fail thresholds, technicians are alerted to installation problems and failures in easy-to-interpret event table. Pass/Fail event table and trace are displayed on the same screen for easy correlation.







M310 Enterprise OTDR

M310 Models and Included Adapters

WAVELENGTHS (nm)				DYNAMIC RANGE (dB)	OTDR PORT ADAPTERS	OPM PORT ADAPTERS	AFL BASE MODEL NO.
850	1300	1310	1550				
		◆	◆	38/37	SC, LC	SC, 2.5 & 1.25 mm Universal	M310-20
◆	◆	◆	◆	30/30/38/37	SC, LC, ST	SC, 2.5 & 1.25 mm Universal	M310-25

All M310 OTDRs include a USB flash drive, AC adapter, UCI switchable test port adapters, TRM® 2.0 (Basic and Advanced License) and quick reference guide. For customer's convenience, AFL presents several kits options. For detailed contents of each kit, please see page 5.

LinkMap™

LinkMap with Pass/Fail simplifies network troubleshooting and enables even novice users to easily and accurately troubleshoot optical networks. LinkMap presents an icon-based view of the tested network clearly identifying fiber start, end, connectors, splices and macro-bends. A LinkMap Summary provides end-to-end link length, loss, loss per distance and ORL. Loss and reflectance of detected events is compared to industry-standard or user-settable pass/fail thresholds and displayed with clear pass/fail indications. Users can easily toggle between LinkMap, Trace view, and Event Table.

TruEvent™

The M310's TruEvent technology is the result of extensive research into the properties of fiber optic cable events and provides a new level of event detection accuracy and reliability in field test equipment. Taking full advantage of the unit's short dead zone and adding improved event accuracy, this is the best performing OTDR for enterprise and data center applications. With the push of a single button, users can be confident of obtaining accurate locations and measurements of all events, without the confusing introduction of false events.

Advanced Analysis (AA)

The AA option adds macro/microbend detection and bi-directional trace analysis to the M310 OTDR.

- **Macro/Microbend**
  Macro/Microbend detection helps technicians identify installation problems. Excessive bends or stress on fibers appear as increased attenuation at higher wavelengths. These bends or stresses are indicated on the Event Table with a special icon.
- **Bi-directional Trace Analysis**
  Bi-directional trace analysis, used to resolve splice loss measurement errors due to fiber mismatch, takes the measurement of the loss in both directions, then calculates a two-way average to provide a more accurate loss measurement.

Testing and Inspection

The M310 is easy to use (Touch and Test®) and comes standard with an integrated source, power meter, visual fault locator, and inspection capability. No surprise 'add-on' charges for these commonly needed support functions.

- **Wave ID Source and Power Meter**
  Enables multi-wavelength insertion loss testing with automatic wavelength synchronization, reducing test time and eliminating setup errors.
- **Source with Tone Generation**
  Use with Optical Fiber Identifier to reliably distinguish in-service fibers from out-of-service fibers carrying test tone.
- **Visual Fault Locator**
  Visibly locate far-end of specific fiber; precisely pinpoint macrobends or breaks in splice enclosures and cabinets.

Data storage and reporting

Thousands of test results may be stored internally or on the supplied USB drive. Test results are transferable, via USB cable or USB drive, to a computer for viewing, printing, and analyzing with the supplied Windows® compatible TRM® 2.0 Basic Analysis and Documentation Software (Test Results Manager). The supplied TRM® 2.0 Basic is licensed for installation on up to 5 PCs. With the Advanced Analysis standard feature, customer will also receive one copy of TRM 2.0 Advanced.

M310 Enterprise OTDR

Specifications [a]

OTDR	MULTIMODE	SINGLE-MODE
Emitter Type	Laser	Laser
Safety Class	Class I FDA 21 CFR 1040.10 and 1040.11; IEC 60825-1:2007-03	Class I FDA 21 CFR 1040.10 and 1040.11; IEC 60825-1:2007-03
Center Wavelengths	850/1300 nm	1310/1550 nm
Wavelength Tolerance	±20/±30 nm	±20/±30 nm
Launch Condition [k]	Controlled Launch at 850 nm [k]	N/A
Live Fiber Detection [j]	Yes	Yes
Dynamic Range (SNR = 1) [b]	30/30 dB	38/37 dB
Event Dead Zone [c]	0.8 m	0.8 m
Attenuation Dead Zone [d]	2.5/2.7 m	3.0 m
Pulse Widths	5, 10, 30, 100, 300 ns, 1 µs,	5, 10, 30, 100, 300 ns, 1, 3, 10 µs, 20 µs
Range Settings	250 m to 30 km	250 m to 240 km
Sampling Points	Up to 120,000	Up to 120,000
Minimum Data Point Spacing [e]	3 cm	3 cm
Group Index of Refraction (GIR)	1.4000 to 1.6000	1.4000 to 1.6000
Distance Uncertainty/Accuracy [f]	±(1 +0.005 % x distance + data point spacing)	±(1 +0.005 % x distance + data point spacing)
Linearity [g]	±0.05 dB/dB	±0.05 dB/dB
Loss Threshold	0.02 dB	0.02 dB
Loss Resolution	0.01 dB	0.01 dB
Reflectance Range [l, h]	850 nm: -14 to -58 dB (typical) 1300 nm: -14 to -63 dB (typical)	1310 nm -14 to -65 dB (typical) 1550 nm -14 to -65 dB (typical)
Reflectance Resolution	0.01 dB	0.01 dB
Reflectance Accuracy [h]	±2 dB	±2 dB
Real Time Refresh Rate [i]	>2 Hz	>2 Hz
Units	m, km, ft, kft, mi	
OTDR Modes	Full Auto, Expert, Real-Time	
Trace File Format	Bellcore GR-196 Version 1.1, Telcordia SR -4731 Issue 2	
Trace File Storage Medium	Internal and USB	
Trace File Storage Capacity	>1000 internal, 1000s on USB	
Trace File Transfer to PC	USB	

Notes:

a. All specifications valid at 23°C ±2°C (73.4°F ±3.6°F) unless otherwise specified.
b. Longest Range and Pulse Width, 3 minutes Averaging Time, normal resolution.
c. Typical distance between the two points 1.5 dB down each side of a reflective spike caused by a -40 dB (multimode) or -45 dB (single-mode) event using 10 ns pulse width.
d. Typical distance from event location to point where trace is within 0.5 dB of backscatter.
e. Range <8 km.
f. Does not include GIR uncertainty. Is based on the trace and user positioned cursors.
g. Typical.
h. For a non-saturated event.
i. 2 km Range, 100 ns.
j. Signals greater than -20 dBm MMF and -30 dBm SMF will trigger the Live Fiber Indication warning.
k. Comparable to Encircled Flux loss measurement on OM4 fiber networks.
l. For OM1 fiber typical Backscatter Coefficient @850 nm -68 dB, @1300 nm -76 dB and attenuation coefficient @850 nm 2.77 dB, @1300 nm 0.52 dB. For OS1-OS2 fiber typical Backscatter Coefficient @1310 nm -79.6 dB, @1550 nm -82 dB and attenuation coefficient @1300 nm 0.31 dB, @1550 nm 0.18 dB.

M310 Enterprise OTDR

Specifications [a]

OLS (Standard)	
Emitter Type	Laser, Class 1 (FDA 21 CFR 1040.10 and 1040.11, and IEC 60825-1:2007-03)
Center Wavelengths (nm)	SM – 1310/1550 ±20/30 nm; MM – 850/1300 ±20/30 nm
Spectral Width (FWHM)	5 nm max
Internal Modulation	270 Hz, 330 Hz, 1 KHz, 2 KHz, CW
Wavelength ID (Single/dual)	On/Off
Output Power Stability [b]	SM < ±0.1 dB, MM < ±0.2 dB
Output Power (CW) [c]	-3 dBm ±1.5 dB
OPM (Standard)	
Calibrated Wavelengths	850, 1300, 1310, 1490, 1550, 1625, 1650 nm (displays up to 3 simultaneously)
Detector Type	InGaAs 2 mm
Display Range [d]	+6 to -70 dBm
Accuracy @ -10 dBm	±0.25 dB
Resolution	0.01 dB
Measurement Units	dB, dBm, mW
Wavelength ID [e]	Wave ID™
Set Reference	Yes
Data Storage	Yes
Tone Detection [f]	270 Hz, 330 Hz, 1 kHz, 2 kHz
VFL (Standard)	
Emitter Type	Laser
Safety Class	Class II FDA 21 CFR 1040.10 and 1040.11; IEC 825-1:1993, 60825-1:2007-03
Wavelength	635 nm ±20 nm
Output Power [g]	0 dBm (1 mW)

GENERAL	
Display Type	3.5-inch transflective color, high contrast, high reflectivity (20%) for optimum indoor/outdoor viewing with touchscreen
Display Resolution	QVGA 240 x 320
Size (in boot)	23 x 11 x 7 cm (8.8 x 4.3 x 2.8 in)
Weight	<1.0 kg (< 2.0 lb)
Drop Test	GR-196-CORE
Power	Removable Li-ion or AC/DC power adapter (input 100-240 V, ~1.5 A 47-63 Hz) output 18 V DC/3.6 A (can test while charging, can operate on AC with battery removed)
Battery Life [h]	16 hours
Recharge Time [i]	4 hours
Auto Shut Off	0-60 minutes
Connectivity	USB host/full speed 1.1
Operating Temperature	-18°C to +50°C
Storage Temperature	-30°C to +60°C
Relative Humidity	0 to 95 % RH (non-condensing)
DFS1 DIGITAL FIBERSCOPE SUPPORT	
Field of View	400 x 300 µm
Optical Resolution	4 µm
Detection Capability	2 µm

Notes:

a. All specifications valid at 23°C ±2°C (73.4°F ±3.6°F) unless otherwise specified.
b. Over 1 hour after 15 minute warmup of unit.
c. Single-mode: SMF-2 fiber; Multimode: 50 um fiber
d. Measurement Range: +3 to -65 dBm for 1300 to 1625 nm, and +3 to -60 dBm for 850 nm.
e. Wavelength ID Range: +3 to -50 dBm for 1300 to 1625 nm, and +3 to -40 dBm for 850 nm.
f. Tone Detect Range: +3 to -50 dBm 1300 to 1625 nm, and +3 to -40 dBm for 850 nm.
g. Typical output power.
h. Typical with new battery, per GR-196-Core Issue 2.
i. Typical, from fully discharged to fully charged state, unit may be operating.

M310 Enterprise OTDR

Ordering Information

M310 — NN | P — 01 — HC | O

Optical Configuration (NN)
25 = 850/1300 nm MM and 1310/1550 nm SM
20 = 1310/1550 nm SM

Packaging option (P)
U = Unit
K = Kit

Hard Case option (HC)
Select (HC) only if ordering hard case

Additional Option
blank = no additional hardware
1 = DFS1
2 = DFS1 and OLS

Example: M310-20K-01-HC2

This order is for the M310 single-mode OTDR with 1310/1550 nm optical configuration. It's a kit with hard case, DFS1, and OLS. DFS1 and OLS are additional hardware.

Below is the chart for your ordering convenience:

	INTEGRATED OPTION			ADDITIONAL OPTION		CASE OPTION		AFL NO. [a, c]
	VFL	OPM	OLS	DFS1	OLS	HARD	SOFT	
	◆	◆	◆				◆	M310-25U-01
	◆	◆	◆				◆	M310-20U-01
	◆	◆	◆			◆		M310-25U-01-HC
	◆	◆	◆			◆		M310-20U-01-HC
	◆	◆	◆	◆		◆		M310-25K-01-HC1 [b]
	◆	◆	◆	◆		◆		M310-20K-01-HC1 [b]
	◆	◆	◆	◆	OLS4	◆		M310-25K-01-HC2 [b]
	◆	◆	◆	◆	OLS2-Dual	◆		M310-20K-01-HC2 [b]

Notes:

a. Specify Language for OTDR Quick Reference Guide:
English,Chinese Simplified, Chinese Traditional,German, French, Italian, Polish, Portuguese, Spanish, Turkish and Japanese.

b. When ordering, specify DFS1 model. The DFS1 Digital FiberScope kit is available as either PC/UPC inspection kit (DFS1-00-04XU model) or APC inspection kit (DFS1-004XA model).

c. Specify Language for OTDR operating environment: English, Chinese (Simplified and Traditional), and Japanese.

M310 Enterprise OTDR

Accessories, Upgrades, and Calibration Plans

DESCRIPTION	AFL NO.
Inspection	
DFS1 Digital FiberScope PC/UPC inspection kit	DFS-00-04XU
DFS1 Digital FiberScope APC inspection kit	DFS-00-04XA
DFS1 Digital FiberScope kit without adapters	DFS-00-04XN
Fiber Rings	
50/125 µm multimode, 150 m	FR1-M5-150-x1-x2 [a]
Laser Optimized, 50 µm multimode, 150 m	FR1-L5-150-x1-x2 [a]
62.5/125 mm multimode, 150 m	FR1-M6-150-x1-x2 [a]
Single-mode, 150 m	FR1-SM-150-y1-y2 [a]
Cleaning	
Wet Cleaning kit for SC/FC/ST/LC connectors	8500-20-0900
Dry Cleaning kit	8500-20-0901
Basic Cleaning kit with carry case (includes One-Clicks, FCC2 cleaning fluid, FiberWipes, Cletop SB)	FCP2-00-0900
Basic Cleaning kit with MPO Cleaners and carry case (includes One-Clicks, FCC2 cleaning fluid, FiberWipes, Cletop SB, MPO/MTP Cleaner)	FCP2-00-0901
One-Click Cleaner SC, ST, FC (500+ cleans)	8500-05-0001MZ
One-Click Cleaner LC/MU (500+ cleans)	8500-05-0002MZ
One-Click Mini-100 SC, ST, FC (100+ cleans)	8500-05-0005MZ
One-Click Mini-100 LC/MU (100+ cleans)	8500-05-0006MZ
One-Click Cleaner Ultra 2.5 SC, ST, FC (enlarged cleaning)	8500-05-0007MZ
One-Click Ultra Cleaner D-LC (Duplex LC, 500 cleans x 2)	8500-05-0008MZ
MPO/MTP® Cleaner (MPO-CLK-B)	CS000710

DESCRIPTION	AFL NO.
Reporting software add-on	
TRM 2.0 Basic Software (OTDR Trace/OLTS Viewer, Batch Editor & Reports)	TRM-00-0900PR
TRM 2.0 Advanced Software (Basic TRM plus Advanced Features & Reports)	TRM-00-0910PR
TRM 2.0 upgrade from Basic to Advanced Software	TRM-00-0920PR
Calibration Plan (2 years Calibration plan) [b]	
M310-25K-HC2	CAL2-00-M310-25K-HC2
M310-20K-HC2	CAL2-00-M310-20K-HC2
M310-25U-01, -HC, -HC1	CAL2-00-M310-25
M310-20U-01, -HC, -HC1	CAL2-00-M310-20
Calibration and Warranty plan (2 years Calibration Plus plan) [c]	
M310-25K-HC2	CAL2-01-M310-25K-HC2
M310-20K-HC2	CAL2-01-M310-20K-HC2
M310-25U-01, -HC, -HC1	CAL2-01-M310-25
M310-20U-01, -HC, -HC1	CAL2-01-M310-20

Note:

a. When ordering Fiber Rings, specify connector types (x1, x2, y1, y2).

b. Prepaid Cal plans offer two annual calibrations at a discounted price, calibration expiration email service and express calibration.

c. Cal Plus plans offer the same services as the Cal plans with the addition of a two year extended warranty (three years total coverage).

International Sales and Service Contact Information

Available at www.AFLglobal.com/Test/Contacts