

## *NOYES*<sup>°</sup> M310 Data Center OTDR

## Designed for Data Center Testing, Troubleshooting and Documentation



M310 OTDR with DFS1 Digital FiberScope

#### Features

- Event Dead Zone 0.8 m
- Attenuation Dead Zone <3 m
- Front Panel and First Connector Check
- Touch and Test<sup>®</sup> intuitive user interface
- Inspection capable with DFS1 Digital FiberScope
- 16-hour battery life
- Rugged, hand-held, lightweight (<1 kg)
- Prepaid Calibration plans, Cal and Cal Plus (see page 6)

#### **Test Modes**

- Full Auto OTDR Auto set-up for quick and easy instrument set-up for fiber cable construction testing and fault location
- Expert OTDR Full function OTDR for precision test set-ups includes Auto and Auto-Once setup options
- Real-Time OTDR Fast fault location and splice verification
- Optical Power Meter Measure optical power or fiber loss
- Visual Fault Locator Red laser for fiber bend and break location

#### Languages supported

English
 Italian

• French

- Spanish
- Polish
  Turkish
- German Portuguese
  - uguese

The NOYES M310 is the only OTDR with controlled mode fill for multimode fiber testing without the need of an external mode controller. The controlled launch provides more accurate link loss measurements comparable to a mode conditioned light source and power meter loss measurement. Industry leading short dead zones, mode controlled launch, OPM, VFL and inspection capability combine to make this the most complete OTDR for Data Center testing and troubleshooting. Delivered in a rugged, lightweight, easy to hold package, the M310 has the easy-to-learn, easy-to-use Touch and Test user interface, which makes it easy for both experts and novices to perform tests and document data center and enterprise networks accurately and quickly.

The M310 is available in Multimode, Single-mode and QUAD models, each comes standards with an OPM, VFL and is Digital FiberScope ready. The M310 Single-mode and QUAD models can be ordered with Advanced Analysis software which includes; Macro/Microbend detection and Bi-directional trace analysis. Using the Advanced Analysis software and testing against industry ISO/ TIA standards or user set Pass/Fail thresholds, technicians are alerted of installation problems and failures. This reduces troubleshooting time and minimizes network downtime. Cut, Copy, Paste and Rename functionality has been added to allow technicians to quickly initiate testing and troubleshoot networks and provide the ability to adjust to the project naming after the results have been obtained.



# FAFL



M310 QUAD Certification Kit (Tier 1 and Tier 2)



M310 QUAD Test and Inspection Kit (Tier 2)



M310 OTDR in Hard Transit Case



## *NOYES*<sup>°</sup> M310 Data Center OTDR

## M310 OTDR Soft and Hard Case Options

The M310 micro OTDR is available as a single-mode, multimode or single-mode/ multimode model in either a soft or hard case and as part of a QUAD Certification kit or QUAD Test and Inspection kit. M310 OTDRs are optimized for testing, analyzing and troubleshooting enterprise, data center, LAN/WAN, campus and military single-mode and multimode (62.5 and 50 micron) fiber networks.

All M310 models support IEC 61300-3-35 fiber end-face visual inspection practices using a NOYES DFS1 Digital FiberScope. OTDR traces (.sor format), OPM measurement results and fiber end-face images can be saved together in a job. These results can be downloaded to a computer for analyzing and editing using the included companion, NOYES Test Results Manager, TRM<sup>®</sup> 2.0 Basic application software.

## M310 QUAD Certification Kit in Hard Transit Case

This kit is designed for integrated single-mode and multimode Tier 1 and Tier 2 testing with fiber end-face image capture. The M310 stores OTDR traces, loss readings and end-face images in a logical Job Structure for each fiber. Review results on the M310 and transfer to a PC for analysis and acceptance report documentation using included companion TRM 2.0 software. In TRM 2.0 Basic, apply standards and applications to loss readings to assure fibers meet the increasing bandwidth needs of fiber networks such as 10 GbE. This kit includes the QUAD M310, OLS4 LED/Laser Source, DFS1 Digital FiberScope and cleaning accessories in a compact hard transit case. The hard transit case is a rugged, injection molded ABS case with a full length hinge, padlock loops, secure latches and O-ring seal to protect the contents from dust and water. The case is large enough to hold test, inspection and cleaning accessories and small enough to carry on an airplane. See <u>page 3</u> for available accessories.

## M310 QUAD Test and Inspection Kit in Hard Transit Case

This kit is designed for performing Tier 2 OTDR testing and troubleshooting and end-face inspection. This kit includes the QUAD M310, DFS1 Digital FiberScope and cleaning accessories in a compact rugged hard transit case. See <u>page 3</u> for available accessories.

## M310 OTDR in Hard Transit Case

Available in SM, MM or QUAD OTDR models. The hard transit case is large enough for optional test, inspection and cleaning accessories. See <u>page 3</u> for available accessories.

## M310 OTDR in Soft Case

Available in SM, MM or QUAD OTDR models. The soft case has a shoulder strap and a large pocket to simplify carrying equipment in the field. The pocket is large enough to accommodate cleaning and test accessories. See <u>page 3</u> for available accessories.



## *NOYES*° M310 Data Center OTDR

## Test Results Manager 2.0 Basic Software

Using TRM<sup>®</sup> 2.0 Basic (Test Results Manager), the companion PC software included with all M310 OTDRs, users can create acceptance reports conforming to industry guidelines. TRM allows users to create customized cover pages with their company logos and generate results pages showing dual wavelength traces and event tables, end-face image, Event Map and loss data for each fiber.



TRM® 2.0 (Test Results Manager) OTDR Certification report page

## Test Results Manager 2.0 Advanced Software

TRM 2.0 Advanced Software includes Bi-directional and Macro/ Microbend advanced features for analyzing OTDR events better in case of change in fiber type and ruled out events that would be requested to fix and identify excessive bends or stress.

## Test, Inspection and Cleaning Accessories





DFS1 FiberScope Inspection Kit





Ultra 2.5 Mini-100 SC, ST, FC, LC/MU

**One-Click Cleaner Series** 

## **Accessories Ordering Information**

DESCRIPTION	AFL NO.
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 Ring, 50/125 µm multimode, 150 m	FR1-M5-150-x1-x2 ª
Fiber Ring, Laser Optimized, 50 µm multimode, 150 m	FR1-L5-150-x1-x2 ª
Fiber Ring, 62.5/125 mm multimode, 150 m	FR1-M6-150-x1-x2 a
Fiber Ring, single-mode, 150 m	FR1-SM-150-y1-y2 a
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 <sup>®</sup> Cleaner (MPO-CLK-B)	CS000710

#### Note:

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



## *NOYES*<sup>°</sup> M310 Data Center OTDR

### **Specifications** <sup>a</sup>

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 "	Controlled Launch at 850 nm <sup>n</sup>	<u>N/A</u>	
Live Fiber Detection <sup>m</sup>	Yes	Yes	
Dynamic Range (SNR = 1) <sup>b</sup>	30/30 dB	38/37 dB	
Event Dead Zone <sup>c</sup>	0.8 m	0.8 m	
Attenuation Dead Zone <sup>d</sup>	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 <sup>e</sup>	3 cm	3 cm	
Group Index of Refraction (GIR)	1.4000 to 1.6000	1.4000 to 1.6000	
Distance Uncertainty/Accuracy f	$\pm$ (1 +0.005 % x distance + data point spacing)	$\pm$ (1 +0.005 % x distance + data point spacing)	
Linearity <sup>9</sup>	±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 <sup>p, h</sup>	850 nm: -14 to -58 dB (typical) 1310 nm -14 to -65 dB (typical)		
	1300 nm: -14 to -63 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 <sup>j</sup>	>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  $\pm 2^\circ\text{C}$  (73.4°F  $\pm 3.6^\circ\text{F})$  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.
- j. 2 km Range, 100 ns.
- m. Signals greater than -20 dBm MMF and -30 dBm SMF will trigger the Live Fiber Indication warning.
- n. Comparable to Encircled Flux loss measurement on OM4 fiber networks.
- p. For OM1 fiber typical Backscatter Coefficient @ 850 nm -68 dB, @ 1300nm -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.



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## **Specifications** <sup>a</sup>

OPM (STANDARD)				
Calibrated Wavelengths	850, 1300, 1310, 1490, 1550, 1625, 1650 nm (displays up to 3 simultaneously)			
Detector Type	InGaAs 2mm			
Display Range <sup>b</sup>	+6 to -70 dBm			
Accuracy @ -10 dBm	±0.25 dB			
Resolution	0.01 dB			
Measurement Units	dB, dBm, mW			
Wavelength ID <sup>c</sup>	Wave ID <sup>™</sup>			
Set Reference	Yes			
Data Storage	Yes			
Tone Detection <sup>d</sup>	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 9	0 dBm (1mW)			
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 <sup>e</sup>	16 hours			
Recharge Time <sup>f</sup>	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  $\pm$ 2°C (73.4°F  $\pm$ 3.6°F) unless otherwise specified.
- b. Measurement Range:
- +3 to -65 dBm for 1300 to 1625 nm, and +3 to -60 dBm for 850 nm.
- c. Wavelength ID Range:
- +3 to -50 dBm for 1300 to 1625 nm, and +3 to -40 dBm for 850 nm.
- d. Tone Detect Range: +3 to -50 dBm 1300 to 1625 nm, and +3 to -40 dBm for 850 nm.
- e. Typical with new battery, per GR-196-Core Issue 2.
- f. Typical, from fully discharged to fully charged state, unit may be operating.
- g. Typical output power.



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#### **M310 Models and Included Adapters**

V	VAVELEN	GTHS (nn	n)	DYNAMIC OTDR PORT		DYNAMIC OTDR PORT OPM PORT	
850	1300	1310	1550	RANGE (dB)	ADAPTERS	ADAPTERS	MODEL NO.
		•	•	38/37	SC, FC	SC, 2.5 mm Universal	M310-20
•	•			30/30	SC, ST	SC, 2.5 mm Universal	M310-22
•	•	•	•	30/30/38/37	SC, FC, ST	SC, 2.5 mm Universal	M310-25

All M310 OTDRs include a USB flash drive, AC adapter, UCI switchable adapters for OTDR and OPM ports, trace analysis and documentation software, and quick reference guide.

## **Ordering Information**

DESCRIPTION	AFL NO.
M310 QUAD Certification Kit (Tier 1 and 2): M310 QUAD, OLS4, DFS1* in hard case	M310-25K-01-HC2*
M310 QUAD Test and Inspection Kit (Tier 2): M310 QUAD, DFS1* in hard case	M310-25K-01-HC1*

\* 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).

DESCRIPTION	AFL NO.
M310 OTDR, SM (1310/1550), OPM, VFL in hard case	M310-20U-01-HC
M310 OTDR, MM (850/1300) OPM, VFL in hard case	M310-22U-01-HC
M310 OTDR, QUAD (850/1300/1310/1550), OPM, VFL in hard case	M310-25U-01-HC
M310 OTDR, SM (1310/1550) OPM, VFL in soft case	M310-20U-01
M310 OTDR, MM (850/1300) OPM, VFL in soft case	M310-22U-01
M310 OTDR, QUAD (850/1300/1310/1550), OPM, VFL in soft case	M310-25U-01

When ordering, select options as follows: Optical Configuration (NN), (U) for UPC connection and Language (LL). Add (HC) only if ordering the hard case option.

Example: M310-25U-01-HC -> This model number indicates M310 QUAD with the English/European language pack in the optional hard case.

\* When ordering, specify Language Preference for OTDR Quick Reference Guide.



## **Calibration Plans**

MODEL	2 YR CAL PLAN	2 YR CAL PLUS PLAN
	AFL NO.	AFL NO.
M310-25K-HC2	CAL2-00-M310-25K-HC2	CAL2-01-M310-25K-HC2
M310-22K-HC2	CAL2-00-M310-22K-HC2	CAL2-01-M310-22K-HC2
M310-20K-HC2	CAL2-00-M310-20K-HC2	CAL2-01-M310-20K-HC2
M310-25U-01, -HC, -HC1	CAL2-00-M310-25	CAL2-01-M310-25
M310-22U-01, -HC, -HC1	CAL2-00-M310-22	CAL2-01-M310-22
M310-20U-01, -HC, -HC1	CAL2-00-M310-20	CAL2-01-M310-20

AFL recommends annual calibrations on NOYES Test and Inspection products. Prepaid Cal plans offer two annual calibrations at a discounted price, a convenient calibration expiration email service, express calibration services and access to the NOYES product knowledge base. Cal Plus plans offer the same services as the Cal plans with the addition of a two year extended warranty (three years total coverage).



## **NOYES**<sup>•</sup> M310 Data Center OTDR with Advanced Analysis

Advanced Analysis includes Macro/Microbend detection and Bi-directional trace analysis, which can be performed in the M310 or using TRM 2.0 Advanced Analysis. Macro/Microbend detection helps technicians find installation problems. Excessive bends or stress on fibers will show up as excessive attenuation at higher wavelengths. These bends or stresses are indicated on the event table with a special icon. Bi-directional trace analysis, used to resolve errors due to mis-matched single-mode fibers, measures the loss of events in the End 1 to End 2 and End 2 to End 1 directions, then calculates a two-way average of the OTDR's loss measurements, which is the true loss of the event. For accessories ordering information see page 3, for calibration plans see page 6.

## **Ordering Information**

DESCRIPTION	AFL NO.
M310 OTDR, QUAD, DFS, ENG/EU, OPM, VFL, ADV SW, Hard Case	M310-25K-01-HC1-AA *
M310 OTDR, SM, DFS, ENG/EU, OPM, VFL, ADV SW, Hard Case	M310-20K-01-HC1-AA *
M310 OTDR, QUAD, DFS, OLS4, ENG/EU, OPM, VFL, ADV SW, Hard Case	M310-25K-01-HC2-AA
M310 OTDR, SM, DFS, OLS2-DUAL, ENG/EU, OPM, VFL, Hard Case	M310-20K-01-HC2-AA

\* When ordering, specify DFS model. The DFS FiberScope kit is available as either PC/UPC inspection kit (DFS-00-04XU) or APC inspection kit (DFS-00-04XA) and language option for Quick Reference Guides.

DESCRIPTION	AFL NO.
M310 OTDR, QUAD, ENG/EU, OPM, VFL, ADV SW	M310-25U-01-AA *
M310 OTDR, SM, ENG/EU, 1310/1550, OPM, VFL, ADV SW	M310-20U-01-AA *
M310 OTDR, QUAD, ENG/EU, OPM, VFL, ADV SW, Hard Case	M310-25U-01-HC-AA *
M310 OTDR, SM, ENG/EU, 1310/1550, OPM, VFL, ADV SW, Hard Case	M310-20U-01-HC-AA *
OTDR Advanced Analysis Software	SOFT-00-AAS
OTDR and TRM Advanced Analysis Software	SOFT-00-AAPK

\* When ordering specify Language Preference for OTDR Quick Reference Guide

## TRM 2.0 Basic and Advanced Analysis and Documentation Software

TRM 2.0 Basic Software will enable customers to easily analyze OTDR, OLTS and OPM results, create certification and professional acceptance reports. TRM 2.0 Advanced Software includes Bi-directional and Macro/Microbend advanced features for analyzing OTDR events better in case of change in fiber type and ruled out events that would be requested to fix and identify excessive bends or stress. It includes comprehensive reports with details on Bi-directional and Macro/Microbend events. TRM 2.0 Basic Software is bundled with M310 OTDR (one seat included at no additional charge).

## **Ordering Information**

When ordering, select options as follows:

DESCRIPTION	AFL NO.
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

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#### **NOYES International Sales and Service Contact Information**

Available at <a href="http://www.AFLglobal.com/NOYES/Contacts">www.AFLglobal.com/NOYES/Contacts</a>