

## 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 <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                       | $\pm 20/\pm 30$ nm  | $\pm 20/\pm 30$ nm  |
| Launch Condition <sup>k</sup>              | Controlled Launch at 850 nm <sup>k</sup>                              | N/A   |
| Live Fiber Detection <sup>j</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 $\mu$ s                                     | 5, 10, 30, 100, 300 ns, 1, 3, 10 $\mu$ s, 20 $\mu$ s                  |
| 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 <sup>f</sup> | $\pm(1 + 0.005\% \times \text{distance} + \text{data point spacing})$ | $\pm(1 + 0.005\% \times \text{distance} + \text{data point spacing})$ |
| Linearity <sup>g</sup>                     | $\pm 0.05$ dB/db  | $\pm 0.05$ dB/db  |
| Loss Threshold                             | 0.02 dB   | 0.02 dB   |
| Loss Resolution                            | 0.01 dB   | 0.01 dB   |
| Reflectance Range <sup>i, h</sup>          | 850 nm: -14 to -58 dB (typical)<br>1300 nm: -14 to -63 dB (typical)   | 1310 nm -14 to -65 dB (typical)<br>1550 nm -14 to -65 dB (typical)    |
| Reflectance Resolution                     | 0.01 dB   | 0.01 dB   |
| Reflectance Accuracy <sup>h</sup>          | $\pm 2$ dB  | $\pm 2$ dB  |
| Real Time Refresh Rate <sup>i</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.
- 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 <sup>a</sup>

| <b>OLS (Standard)</b>               |   |
|-------------------------------------|---|
| 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;<br>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 <sup>b</sup> | SM < ±0.1 dB, MM < ±0.2 dB  |
| Output Power (CW) <sup>c</sup>      | -3 dBm ±1.5 dB  |
| <b>OPM (Standard)</b>               |   |
| Calibrated Wavelengths              | 850, 1300, 1310, 1490, 1550, 1625, 1650 nm<br>(displays up to 3 simultaneously) |
| Detector Type                       | InGaAs 2 mm   |
| Display Range <sup>d</sup>          | +6 to -70 dBm   |
| Accuracy @ -10 dBm                  | ±0.25 dB  |
| Resolution                          | 0.01 dB   |
| Measurement Units                   | dB, dBm, mW   |
| Wavelength ID <sup>e</sup>          | Wave ID™  |
| Set Reference                       | Yes   |
| Data Storage                        | Yes   |
| Tone Detection <sup>f</sup>         | 270 Hz, 330 Hz, 1 kHz, 2 kHz  |
| <b>VFL (Standard)</b>               |   |
| 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 <sup>g</sup>           | 0 dBm (1 mW)  |

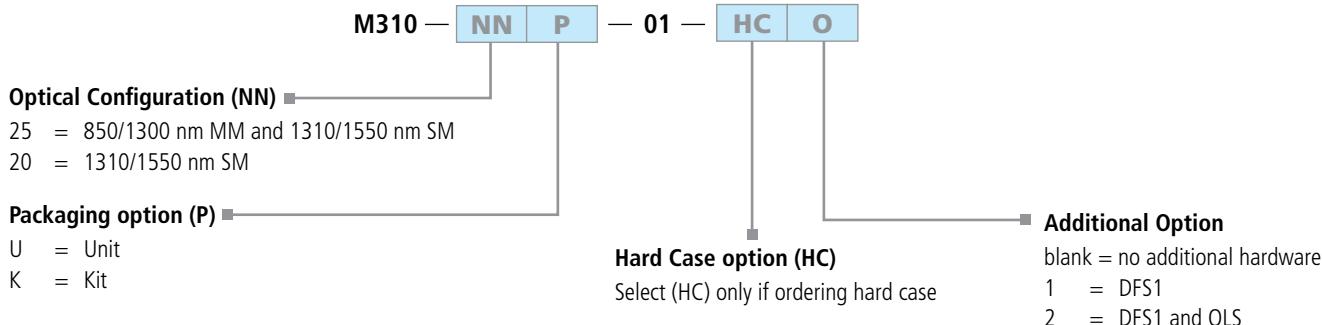
| <b>GENERAL</b>                         |   |
|--|---|
| Display Type                           | 3.5-inch transreflective color, high contrast, high reflectivity (20%) for optimum indoor/outdoor viewing with touchscreen  |
| Display Resolution                     | QVGA 240 x 320  |
| Size (in boot)                         | 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>h</sup>              | 16 hours  |
| Recharge Time <sup>i</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)   |
| <b>DFS1 DIGITAL FIBERSCOPE SUPPORT</b> |   |
| 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 μm 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



### 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. <sup>a,c</sup>       |
|---|-------------------|-----|-----|-------------------|-----------|-------------|------|------------------------------|
|   | 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 <sup>b</sup> |
|   | ◆                 | ◆   | ◆   | ◆                 |           | ◆           |      | M310-20K-01-HC1 <sup>b</sup> |
|  | ◆                 | ◆   | ◆   | ◆                 | OLS4      | ◆           |      | M310-25K-01-HC2 <sup>b</sup> |
|   | ◆                 | ◆   | ◆   | ◆                 | OLS2-Dual | ◆           |      | M310-20K-01-HC2 <sup>b</sup> |

### 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.                       |
|--|-------------------------------|
| <b>Inspection</b>  |                               |
| 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                   |
| <b>Fiber Rings</b>   |                               |
| 50/125 $\mu$ m multimode, 150 m  | FR1-M5-150-x1-x2 <sup>a</sup> |
| Laser Optimized, 50 $\mu$ m multimode, 150 m   | FR1-L5-150-x1-x2 <sup>a</sup> |
| 62.5/125 mm multimode, 150 m   | FR1-M6-150-x1-x2 <sup>a</sup> |
| Single-mode, 150 m   | FR1-SM-150-y1-y2 <sup>a</sup> |
| <b>Cleaning</b>  |                               |
| 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.              |
|---|----------------------|
| <b>Reporting software add-on</b>  |                      |
| 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        |
| <b>Calibration Plan (2 years Calibration plan) <sup>b</sup></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      |
| <b>Calibration and Warranty plan (2 years Calibration Plus plan) <sup>c</sup></b> |                      |
| 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:

- When ordering Fiber Rings, specify connector types (x1, x2, y1, y2).
- Prepaid Cal plans offer two annual calibrations at a discounted price, calibration expiration email service and express calibration.
- Cal Plus plans offer the same services as the Cal plans with the addition of a two year extended warranty (three years total coverage).

