

## T-BERD®/MTS-4000 Multiple Services Test Platform

### Last Mile OTDR Module



#### Key Features

- 34/32 dB Dynamic Range at 1310/1550 nm
- High resolution and short dead zone for distribution fiber qualification
- Instantaneous traffic detection when connecting live fiber
- First-to-market OTDR integrating a true Loss Test Set function
- In-service testing dedicated wavelengths (1625 or 1650 nm)
- Automated bend detection
- Field-replaceable without tools
- Possible combination with Triple-Play function, xDSL, Copper, and PON power meter modules

#### Applications

- Ideal for Short-Haul and premises networks construction as well as maintenance
- Allows point-to-point (P2P) FTTx feeder fiber characterization
- Performs FTTx distribution and drop cable verification and continuity check

In today's telecommunications market, optical time domain reflectometer (OTDR) test solutions must be cost-effective, easy-to-operate, and flexible for optimum use in all testing conditions. The JDSU Last Mile (LM) OTDR Module for the T-BERD/MTS-4000 Multiple Services Test Platform meets these challenges for both now and the future.

The LM OTDR Module provides the needed performance with maximum efficiency for any access and premises networks.

The small form factor of the T-BERD/MTS-4000 platform and lightweight design make it easy to carry in the field. Also, its large screen and comprehensive interface make results easy to interpret and understand even for novice technicians.

### Last Mile OTDR Applications

The Last Mile refers to the last part of a broadband network driving high-capacity services to the end-user, home and business area. The two main architectures are passive optical networks (PON) or point-to-multipoint using xPON technology and point-to-point (P2P) using active Ethernet technology.

Combining fast acquisition time, sharp resolution (1 m event dead-zone) and 34 dB dynamic range makes the LM OTDR module an ideal companion for:

- Central Office installation to ensure network quality at OLT and fiber distribution frame levels
- Detailed events commissioning of point-to-point fiber section links
- Troubleshooting faulty customers using out-of-band wavelengths (1625 or 1650 nm) without disturbing live traffic

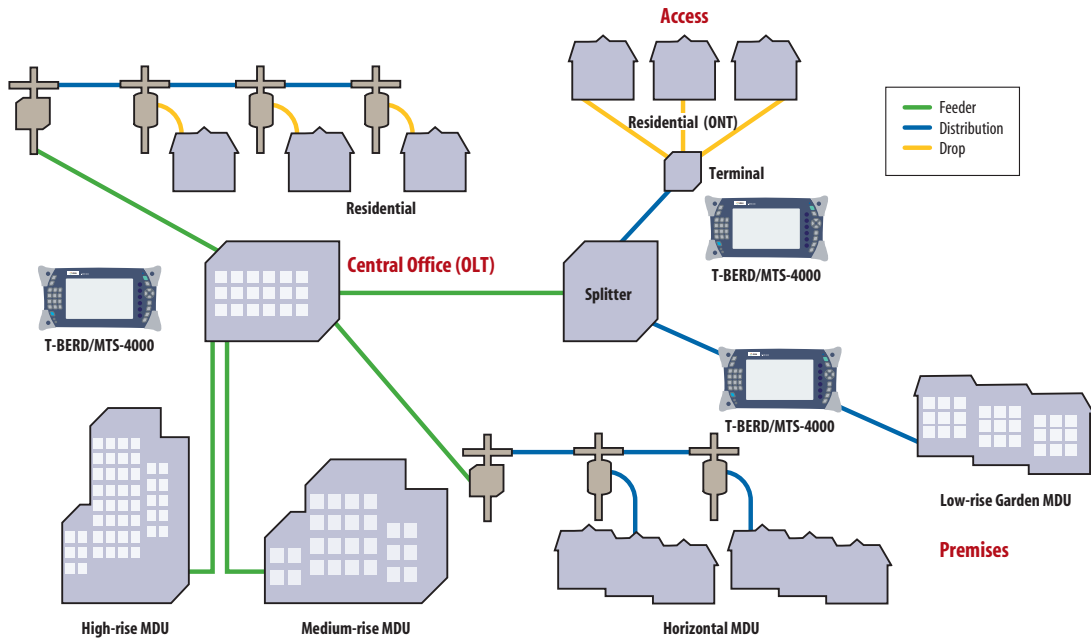


Figure 1 Typical FTTP Infrastructure

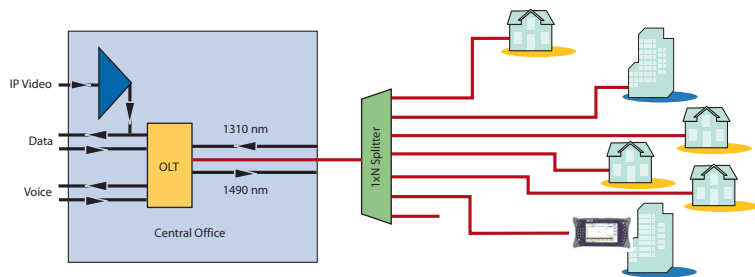


Figure 2 In service Pon Network troubleshooting

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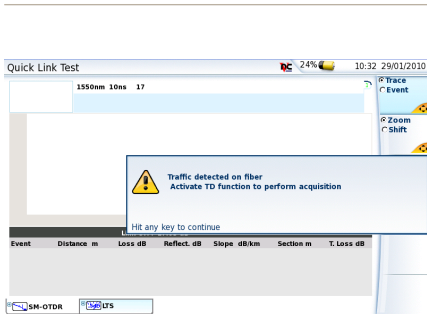


Figure 3 Result view -Traffic detection

**Enhanced User Interface for Improved Productivity**

**Traffic Detection**

The automatic traffic detection capability verifies the presence of a signal as soon as the fiber under test is connected to the OTDR port and reduces the chance of conducting unwanted measurements on live fiber. In one direction, the OTDR signal emission could affect the optical transmitter; and in the other direction, the transmission signal could affect the measurement quality and perhaps damage the OTDR receiver. To avoid these risks, the OTDR displays an on-screen warning when detecting a signal—or modulation—that prompts technicians to confirm or cancel the measurement.

**The Right Test Mode for the Right Job!**

The LM OTDR features four operating modes to meet the needs of technicians:

- A Fault Locator to boost productivity in the field with a fully automatic, one-button operating mode that requires no additional settings. It gives the location of the fiber end, total loss, and ORL of the link.
- The Quick-link Test combines automatic acquisition setup with detailed trace analysis, offering unmatched ease of use for novice or intermittent users.
- The Construction mode offers high-level trace analysis, making the LM OTDR a powerful instrument for fiber commissioning.
- The Real-time mode helps technicians achieve optimal setups by providing instant measurement values and feedback on changes with direct access to the acquisition parameters in the result view. This mode also offers an auto “Zoom to End” key that is useful when adjusting connectors or splicing.

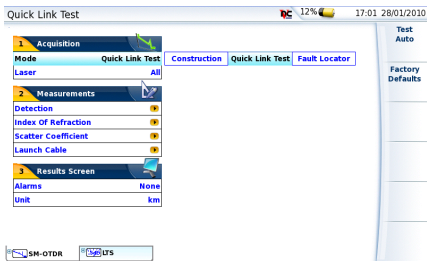


Figure 4 Quick link test

**Initial Fiber Connection Check**

At the beginning of an acquisition, a measurement of the front connection is provided with level indication so that field technicians perform measurements in optimal conditions.



Figure 5 Real time mode -Total loss measurement

**Macro-Bend Detection**

With its dual-wavelength testing capability, the LM OTDR automatically locates and displays macro-bends, shortening analysis time, especially when troubleshooting a fiber link.

Summary Table			
Laser nm	T. Loss dB	Total Ori dB	T.Length m
1550	5.759	< -9.00	1294.13
1625		< -9.00	

Bend Table		
	Bend dB	Distance m
1	0.652	1271.88
2	0.497	884.42

Figure 6 Summary table & bend table

## Innovative and Audacious Test Function Implementation

### In-Service Maintenance

The LM OTDR module supports in-service PON measurements based on the ITU-T L41 Recommendation: Maintenance Wavelength on Fibers Carrying Signals, which enables in-service measurements using out-of-band wavelengths (1625 or 1650 nm) to avoid interference with the optical link or CO laser transmitter performance. The LM OTDR module features filtered 1625 and 1650 nm out-of-band wavelengths (where traffic would not be distributed) allowing for rejection of unwanted signals (1310, 1490, and 1550 nm) that could interfere with the OTDR measurement.

### Integrated Loss Test Set

The OTDR port operates as a laser source to provide continuous wave and standard modulations, as well as integrating a power meter. These two functions enable a full-featured loss test set, reducing the cost of goods, the number of tools to carry in the field, and the time for testing Access/FTTx networks.

### Error-Free Professional Report

Featuring a PDF writer and reader, the T-BERD/MTS-4000 platform enables generating and recalling .pdf test reports directly from the built-in explorer without using an offline software program.

For more integrated reports, a PC-based software application within a true Microsoft Windows environment enables detailed generation of professional OTDR trace reports.

- Proof-of-performance
- Full-customizable report
- Dedicated tables for each test result
- Out-of-range value summary with Pass/Fail indicators
- Analysis of macro-bends

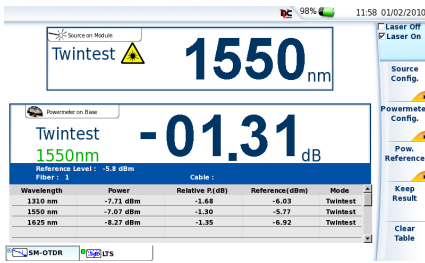


Figure 7 Loss Test Set results

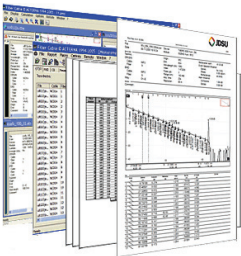


Figure 8 Reports

**General Technical (Typical at 25°C)**

Weight	0.35 kg (0.77 lb)
Dimensions (W x H x D)	128 x 134 x 40 mm (5.04 x 5.28 x 1.58 in)
Storage	Bellcore/Telcordia-compatible (Version 1.1 and Version 2.0)

**Optical interfaces**

Applicable fiber	SMF 9/125 µm
Interchangeable optical connectors	FC, SC, DIN, LC (PC or APC) and ST (PC)

**Technical characteristics**

Laser safety class (21 CFR)	Class 1
Distance units	Kilometers, feet, and miles
Group index range	1.30000 to 1.70000 in 0.00001 steps
Number of data points	Up to 128,000 data points
Distance measurement	Automatic or dual cursor
Display range	0.5 km to 160 km
Cursor resolution	1 cm
Sampling resolution	4 cm
Accuracy	±1 m ±sampling resolution ±1.10 <sup>-5</sup> x distance (Excluding group index uncertainties)

**Attenuation measurement**
**Automatic, manual, 2-point, 5-point, and LSA**

Display range	1.25 to 55 dB
Display resolution	0.001 dB
Cursor resolution	0.001 dB
Linearity	±0.04 dB/dB
Threshold	0.01 to 5.99 dB in 0.01 dB steps

**Reflectance/ORL measurements**

Reflectance accuracy	±2 dB
Display resolution	0.01 dB
Threshold	-11 to -99 dB in 1 dB steps

**Power meter (optional)**

Power level	-2 to -50 dBm
Measurement wavelengths <sup>1</sup>	1310, 1490, 1550, 1625, and 1650 nm
Measurement accuracy	±0.5 dB

**OTDR Module Technical (Typical at 25°C)**

These are standard specifications, representing only a selection of the JDSU offerings. For specific requirements, please contact your local JDSU representative.

Central wavelength <sup>3</sup>	1310±20 nm	1550±20 nm	1625±10 nm	1650±20 nm
Pulse width	3 ns to 20 µs			
RMS dynamic range <sup>4</sup>	34 dB	32 dB	32 dB	30 dB
Event dead zone <sup>5</sup>	1 m			
Attenuation dead zone <sup>6</sup>	4 m			

**Ordering Information**

Description	Product Number
Last Mile 1310/1550 nm OTDR Module	E4126LM
Last Mile 1310/1550/1625 nm OTDR Module	E4136LM
Last Mile 1310/1550/1650 nm OTDR Module <sup>2</sup>	E4138LM65
Last Mile 1310/1550 nm and Filtered 1625 nm Module	E4136RLM
Last Mile Filtered 1650 nm OTDR Module	E4118RLM65
Continuous and modulated source option	E410TDRLS
Power meter option	E410TDPRM

**Universal optical connectors**

Straight connectors	EUNIPCF, EUNIPCSC, EUNIPCST, EUNIPCDIN, EUNIPCLC
8° angled connectors	EUNIAPCF, EUNIAPCSC, EUNIAPCDIN, EUNIAPCLC

- (1) Modules with filtered wavelengths allow power measurement at same wavelengths as OTDR.
- (2) Source feature not available at 1650 nm with the tri-wavelength version 1310/1550/1650 nm.
- (3) Laser at 25°C and measured at 10 µs.
- (4) The one-way difference between the extrapolated backscattering level at the start of the fiber and the RMS noise level, after 3 minutes averaging and with a high dynamic resolution.
- (5) At 1310 nm and ±1.5 dB down from the peak of a -27 dB reflective event.
- (6) At 1310 nm and ±0.5 dB from the linear regression using an unsaturated -55 dB reflective event.

For more information on the T-BERD/MTS-4000 test platform, please refer to the separate datasheet and brochure.

**Test & Measurement Regional Sales**

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