

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

Last Mile OTDR Module



Key Features

- Optimized for access/FTTx networks
- Tests up to three wavelengths in one module
- 32/30 dB Dynamic Range at 1310/1550 nm
- High resolution and short dead zone for distribution fiber qualification
- Automatic traffic detection
- Source and power meter through OTDR port (optional)
- In-service testing dedicated wavelengths (1625 or 1650 nm)
- Automatic macro-bend detection
- Field-replaceable without tools
- Can be combined with PON Power Meter Module in the same T-BERD/MTS-4000 unit

Applications

- Ideal for Access/FTTx networks construction, turn-up, and maintenance
- Allows 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/FTTx network test application.

As part of the T-BERD/MTS-4000 platform, the LM OTDR Module is ideal for conducting optical access/FTTx network testing. 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 LM OTDR Module is the ideal companion for field technicians for:

- Central Office installation to ensure network quality at OLT and fiber distribution frame levels
- Fiber plant characterization to ensure the continuity of the fiber route
- Network maintenance to quickly troubleshoot fiber networks

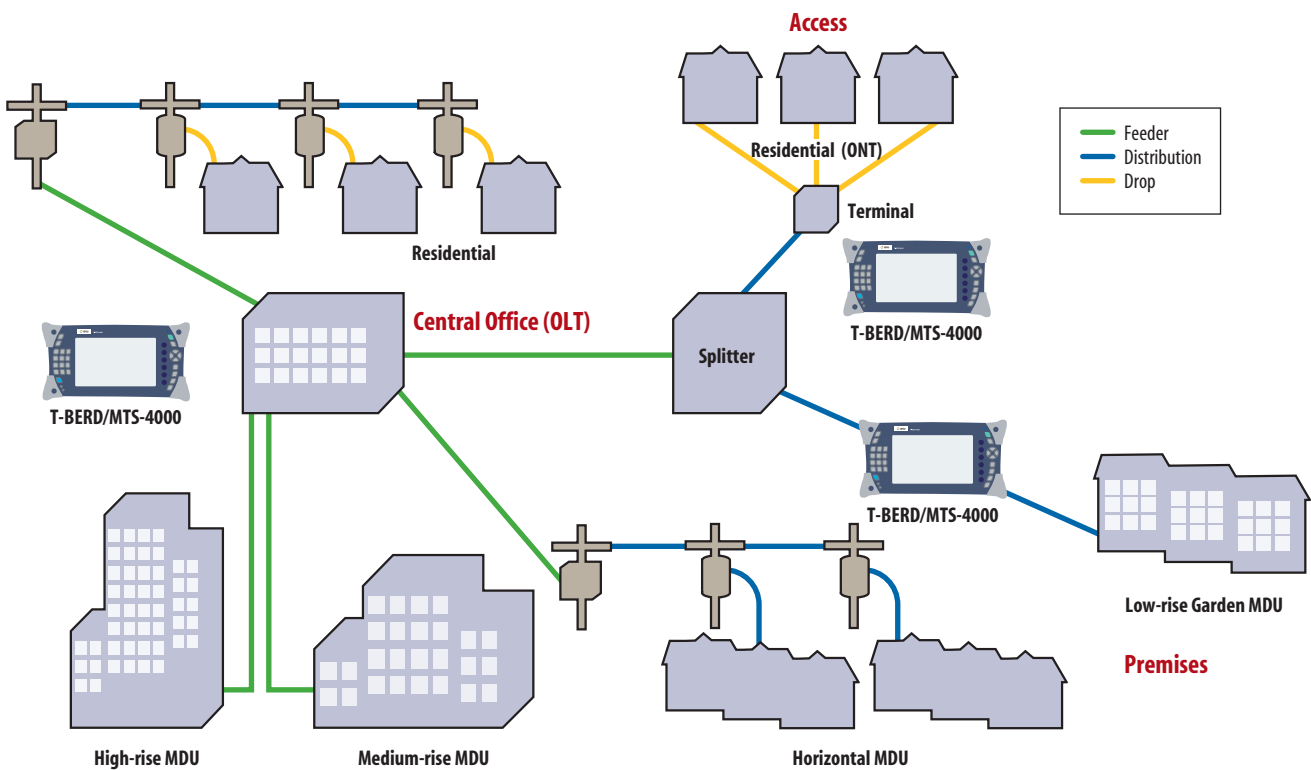


Figure 1 Typical FTTP Infrastructure

Traffic Detection

The automatic traffic detection capability verifies the presence of a signal in the optical fiber under test, which reduces the chance of conducting unwanted measurements on live fiber. Signals could damage the transmitter and OTDR receiver or affect the measurement itself. When a signal is detected, it displays an on-screen warning that prompts the technician to confirm or cancel the measurement.

Built-In Power Meter And Light Source

The OTDR port functions as a laser source to provide continuous wave and standard modulations (270 and 330 Hz as well as 1 and 2 kHz), and it also integrates a power meter. These two features help to accomplish loss test measurements. When used with another JDSU power meter or light source, the units provide auto-wavelength and TWINtest capabilities.

OTDR, power meter, and laser source capabilities are available in a single module, thus reducing the number of tools and the time to install, commission, and maintain Access/FTTx networks.

Two-in-One—from Break Location to Fiber Qualification

The T-BERD/MTS-4000 platform combines a powerful, easy-to-use Fault Locator Mode with a completely automatic or fully configurable OTDR instrument. The LM OTDR Module allows technicians to test access/FTTx networks according to specific needs.

The Fault Locator boosts productivity in the field:



Break/Fault Location

- Completely automatic, no settings required
- One-button operation
- End of fiber, Loss, and ORL measurements

The Quick-link and Construction modes available with the LM OTDR Module offer high-level trace analysis, making the T-BERD/MTS-4000 platform a powerful instrument for commissioning and troubleshooting. Some features include:

- Automatic or manual settings (pulse, average time, events)
- Connector and splice characterization
- Pass/Fail analysis
- Macrobend detection
- Detailed event table

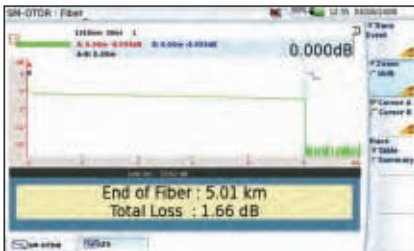
Reliable and Fast Measurements

The impressive performance, testing, and troubleshooting capabilities of the LM OTDR Module significantly reduces fiber network characterization time, which enables users to quickly establish a fiber link or network configuration. Benefits of the LM OTDR Module include:

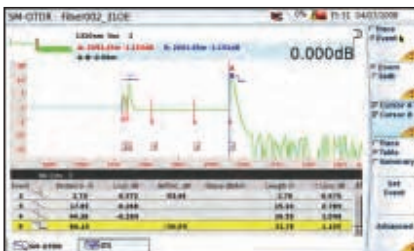
- Ability to self-configure with automated functionality and set acquisition parameters, including optimized acquisition time, as defined by the instrument.
- Ability to obtain the trace form with the correct auto zoom, evaluate the fiber link, and save results automatically or through one-button operation.
- Indicates pass/fail to minimize handling errors. Viewing a quick snapshot lets technicians easily identify values that overpass the pre-defined thresholds.

Integrated Macro-bend Detection

With its dual wavelength capability and the advanced features of the embedded software, the LM OTDR Module lets technicians quickly obtain an overview of possible macro-bend locations. This capability helps ensure higher quality of service and facilitates troubleshooting operations.



Precise Fault Location



Trace and Table displayed simultaneously

| 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 |

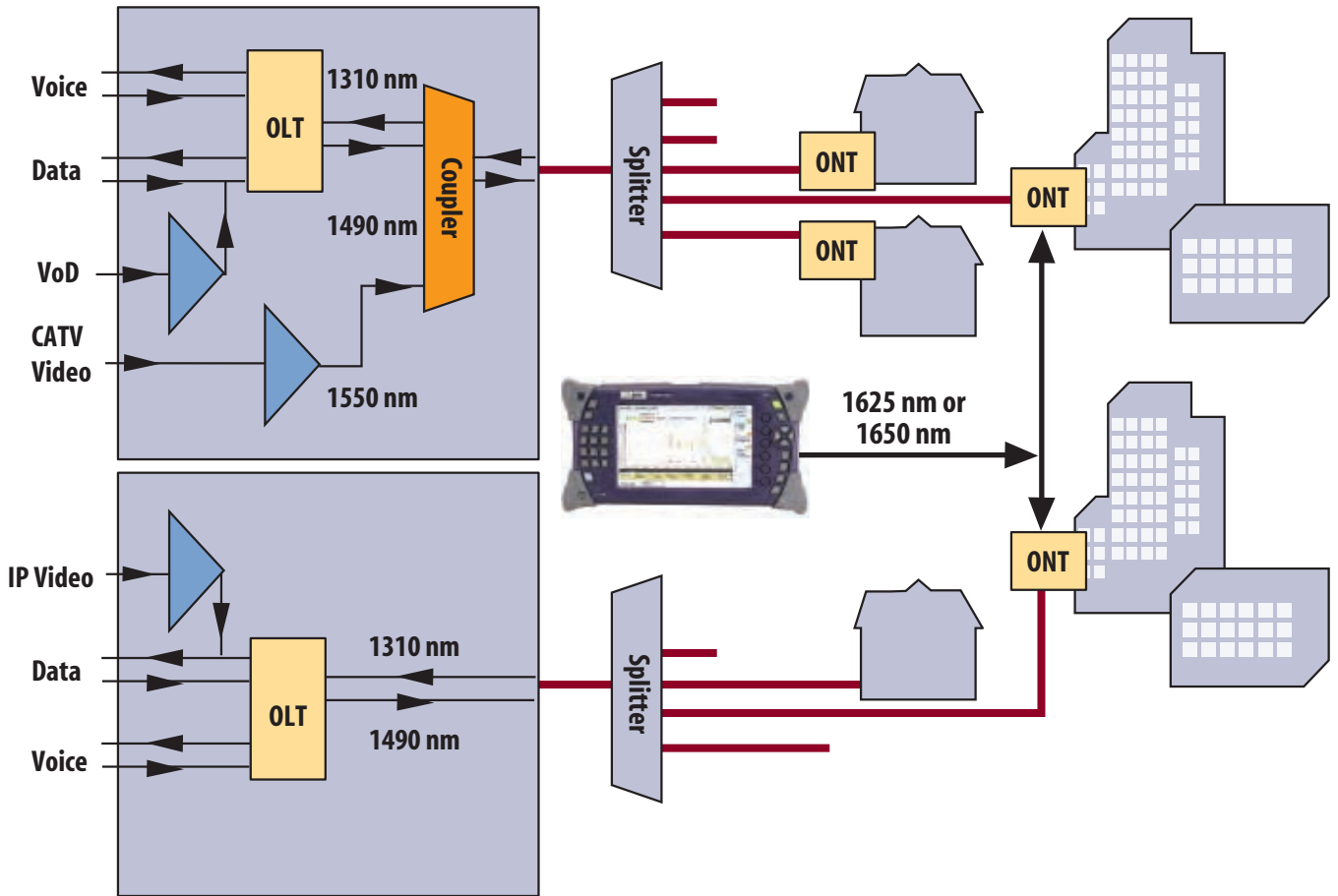
Summary screenshot with macro-bend auto-detection

In-Service Maintenance

The LM OTDR Module supports in-service PON measurements as per the ITU-T L41 recommendation on Maintenance Wavelength on Fibers Carrying Signals. It conducts in-service measurements using out-of-band wavelengths (1625 or 1650 nm), which avoids interference with the optical link or Central Office laser transmitter performance.

The LM OTDR Module features both 1625 and 1650 nm out-of-band wavelengths (where traffic would not be distributed) either with or without an integrated filter. Filtered versions allow for rejection of unwanted signals (1310, 1490, and 1550 nm) that could disturb the OTDR measurement, which ensures accurate OTDR measurements at the filtered wavelength (1625 or 1650 nm).

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The LM OTDR performs in-service measurements



T-BERD/MTS-4000 with LM OTDR and PON Power Meter—an all-in-one FTTx unit

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Specifications

General Technical Specifications (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 μ m |
| 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 | 1 km to 160 km |
| Cursor resolution | 1 cm |
| Sampling resolution | 4 cm |
| Accuracy | $\pm 1 \text{ m} \pm \text{sampling resolution} \pm 1.10^{-5} \times \text{distance}$ (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 | $\pm 0.05 \text{ dB/dB}$ |
| Threshold | 0.01 to 5.99 dB in 0.01 dB steps |

Reflectance/ORL measurements

| | |
|----------------------|-----------------------------|
| Reflectance accuracy | $\pm 2 \text{ dB}$ |
| 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 ¹ | 1310, 1490, 1550, 1625, and 1650 nm |
| Calibrated wavelengths | 1310, 1550, 1625, and 1650 nm |
| Measurement accuracy | $\pm 0.5 \text{ dB}$ |

OTDR Module Technical Specifications (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 ¹ | 1310 \pm 20 nm | 1550 \pm 20 nm | 1625 \pm 10 nm | 1650 \pm 20 nm |
| Pulse width | 3 ns to 10 μ s | | | |
| RMS dynamic range ² | 32 dB | 30 dB | 30 dB | 28dB |
| Event dead zone ³ | 1 m | | | |
| Attenuation dead zone ⁴ | 4 m | | | |

Ordering information

| | |
|--|------------|
| 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 ² | E4138LM65 |
| Last Mile 1310/1550 nm and Filtered 1625 nm Module | E4136RLM |
| Last Mile 1625 nm OTDR Module | E4117LM |
| Last Mile 1650 nm OTDR Module | E4118LM65 |
| Last Mile Filtered 1650 nm OTDR Module | E4118RLM65 |
| Continuous and modulated source option | E410TDRLS |
| Power meter option | E410TDRPM |

Universal optical connectors

| | |
|----------------------|--|
| Straight connectors | EUNIPCF, EUNIPCSC, EUNIPCST, EUNIPCDIN, EUNIPCLC |
| 8° angled connectors | EUNIPAPCF, EUNIPAPCSC, EUNIPAPCDIN, EUNIPAPCLC |

- (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 μ s.
- (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 $\pm 1.5 \text{ dB}$ down from the peak of a -27 dB reflective event.
- (6) At 1310 nm and $\pm 0.5 \text{ dB}$ 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.

