T-BERD®/MTS-6000, -6000A, -8000 Platforms

Optical Time Domain Reflectometer (OTDR) Modules

Key features

- **Field-installable single-slot plug-in module for T-BERD/MTS platforms and the optical test unit (OTU-8000) for fiber monitoring system (ONMSi)**
- **Impressive speed and high-performance testing: up to 128,000 acquisition points with 0.1 s real-time sweep**
- **Shortest event dead zone of 0.8 m and attenuation dead zone of 4 m, highest dynamic range of 50 dB at 1550 nm**
- **Continuous wave (CW) functionality**
- **Powerful report-generation capabilities using FiberTrace and FiberCable PC software**
- **FTTx, 40 G, and ROADM network ready**

The OTDR is at the core of fiber optic characterization, measuring fiber-link attenuation, attenuation coefficient, reflection, splice/connector loss, and point of error, all as part of the fiber distance function.

OTDR advanced optical plug-ins for fiber characterization

The OTDR plug-in is the industry's fastest, offering the highest performance solution of any OTDR field instrument on the market.

The plug-in's automated and rapid-testing features offer impressive time savings for companies involved in commissioning and locating faults in optical fiber networks.

JDSU offers over forty different field-interchangeable OTDR plug-ins, covering both multimode and single-mode networks, from very short distance (FTTH) to ultra long haul, at any wavelength between 850/1300/1310/1383/1490/1550/1625/1650 nm.

To enhance modularity among platforms, all MTS-5100 plug-in modules can be inserted into T-BERD/MTS platforms. With the T-BERD/MTS scalable design, companies can match their testing solutions for their unique network environments by purchasing only the features they need. This platform maximizes scalability, manageability, price/performance, and flexibility. As optical network technology changes, companies can easily upgrade the T-BERD/MTS platform. This eliminates the need to purchase a new test set when testing more than one technology, and it reduces training time and costs. The combination of an OTDR plug-in with a T-BERD/MTS platform is a lightweight, handheld, and rugged field instrument suitable for any measurement requirements, including 40 G and ROADM networks.

The powerful communication capability of the T-BERD/MTS lets users remotely control the unit, send data directly to the office, or access data via the Internet.

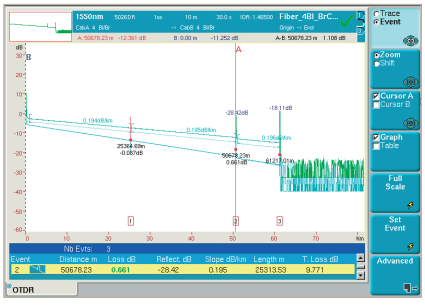

Figure 1. 3 wavelength OTDR trace display

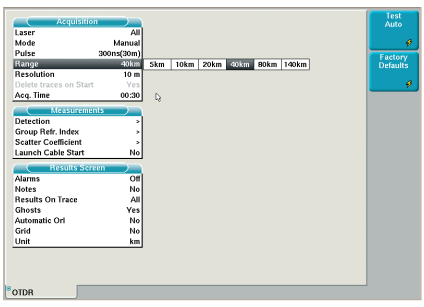

Figure 2. OTDR test setup

Rugged field solution

Housed in field-dedicated T-BERD/MTS platforms, OTDR measurements can be performed in outside plant, central office, and harsh environmental conditions. The portable, battery-powered instrument is shockproof and drop tested for complete reliability in the field.

Connection checks with VFL and fiber-microscope options

Serving as a complementary tool for physical-layer testing during installation and maintenance, the VFL and inspection scope check the quality of the front connector and visually locate faults on fiber jumpers.

Built-in talk set allowing communication along the fiber with data-transfer capability

T-BERD/MTS platforms offer a built-in talk set option for communicating between both ends of a fiber while tests are running. In addition, users can send orders or transfer results to the product at the other end for immediate comparison or remote control. This provides a permanent and cost-effective solution for communication where mobiles or telephone lines are not available. The data-transfer function provides immediate far-end results, performing bi-directional OTDR analysis and saving a huge amount of transport time.

Enhanced testing time

Reaching full dynamic range in less than 30 seconds, a fast measurement time delivers greater productivity in the field and a faster return on investment.

Easy-to -use solution from single to multiple measurement tests

An intuitive user interface, including predefined functions, provides direct and easy access to OTDR setup and results.

One-button testing means that technicians need no special training to carry out an OTDR test: it is suitable for both novice and expert technicians. This improves field productivity and reduces errors due to repetition.

Powerful pass/fail link manager

The OTDR modules summarize results for complete cable commissioning with a pass/fail alarm. They save time with a quick and intuitive overview of the complete set of results with fiber link and fiber cable management, and provide direct cable report generation.

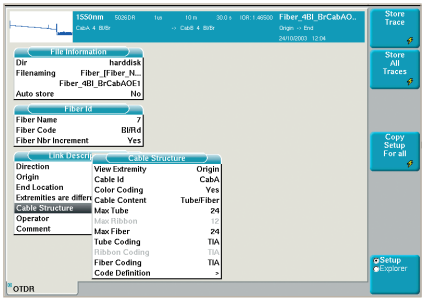

Figure 3. Advanced cable information for metro network

Test through a PON splitter with the best available performance

With the combination of an impressive acquisition time, event dead zone, and dynamic range, FTTx technicians are able to test through a splitter with unprecedented accuracy using the OTDR modules. In compliance with ITU-T G.983.3, the OTDR modules provide a three-wavelength version at 1310/1490/1550 nm, expanding its test capabilities to FTTx/PON.

The modules:

- provide splice and connector information at the three PON wavelengths
- combine a high dynamic range and short event resolution in order to characterize short fiber lengths and measure through splitters
- integrate splitter management data in the table results
- enable filtered 1625/1650 nm OTDR modules for in-service testing.

Detailed and dedicated cable manager from basic to complex link configurations

According to the link configuration and the cable structure, the user defines and stores information, allowing archiving at both ends of the cable with all details including identification, color coding, and fiber numbers. Given the complexity of metro and access networks resulting from rerouting, cable structure can be different at each end, increasing the difficulty of documenting measurements at both ends. With the extended cable management capability, the user saves information for both ends with each measurement, offering detailed and exact cable documentation. This makes it easy to manage data in order to generate cable reports.

OTDR Bellcore/Telcordia trace format compatible

The modules comply with GR-196-CORE issue 2 OTDR data standard revision 1.0/1.1/2.0. They are also fully compatible with a universal format to exchange files and to export to other tools.

FiberCable software solution

A PC-based software range, within a true Windows environment, offers complete and detailed generation of professional acceptance reports with bi-directional OTDR results.

Specifications

OTDR modules technical specifications (typical at 25°C)

	Central wavelength[1]	Pulse width	RMS dynamic range[2]	Event dead zone[3]	Attenuation dead zone[4]	Continuous wave output power	Application
Short range multimode (SRL)	850/1300 ±20 nm	3 ns to 300 ns	24 dB/24 dB	0.5 m	2 m	N/A	LAN
Short range multimode and singlemode (SRL)	850/1300 1310/1550/1625[5] ±20 nm	3 ns to 20 ms	24/24/40/38/37 dB	0.5 m (multimode) 0.8 m (single-mode)	2 m (multimode) 4 m (single-mode)	N/A (multimode) –3.5 dBm (single-mode)	LAN/access
Very short range singlemode (VSRe)	1310/1550 ±20 nm	10 ns to 10 ms	32 dB/30 dB	2 m	8 m	–3.5 dBm	FTTx/access
Short range singlemode (SRe)	1310/1550 ±20 nm	10 ns to 10 ms	34 dB/32 dB	3 m	25 m	N/A	FTTx/access
Medium range singlemode (MR)	1310 ±20 nm 1490 ±15 nm 1550 ±20 nm 1625 ±10 nm	3 ns to 20 ms	40 dB 40 dB 38 dB 37 dB	0.8 m	4 m	-3.5 dBm	FTTx through splitters/access/ metro
Long range singlemode (LR)	1310 ±20 nm 1490 ±15 nm 1550 ±20 nm 1625 ±10 nm 1650 ±10 nm	3 ns to 20 ms	43 dB 40 dB 41 dB 41 dB 41 dB	0.8 m	4 m	0 dBm N/A	FTTx through splitters/metro/ long haul
Very long range singlemode (VLR)	1310 ± 20 nm 1383 ±2 nm 1490 ±15 nm 1550 ±20 nm 1625 ±10 nm	3 ns to 20 ms	45 dB 44 dB 42 dB 43 dB 43 dB	0.8 m	4 m	0 dBm	FTTx through splitters/metro/ long haul
Ultra long range singlemode (UHD)	1310/1550 ±20 nm 1625 ±10 nm	10 ns to 20 ms	45.5 dB/50 dB 45.5 dB	4.5 m	15 m	N/A	Metro/long haul/ ultra long haul

1. Laser at 25°C and measured at 10 µs for singlemode and 50 µs for multimode.
2. 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 using the largest pulsewidth.
3. Measured at ±1.5 dB down from the peak of an unsaturated reflective event using the shortest pulsewidth.
4. Measured at ±0.5 dB from the linear regression using a FC/UPC reflectance and using the shortest pulsewidth.
5. ±10 nm at 1625 nm.

OTDR characteristics

Laser safety class (21 CFR)	Class1
Distance units	Kilometers, feet, and miles
Group index range	1,30000 to 1,70000 nm in 0,00001 steps
Number of data points	Up to 128,000 data points
Distance measurement	Automatic or dual cursor
Display range	From 2.6 m up to maximum range (80 km for multimode SRL module, 200 km for VSRe module 260 km for SRe module, 380 km for others)
Display resolution	1 cm
Cursor resolution	From 1 cm
Sampling resolution	From 4 cm
Distance accuracy	±1 m ±sampling resolution ±1.10-5 x distance (Excluding group index uncertainties)
Attenuation measurement	Automatic, manual, 2-point, 5-point and LSA
Display range	From 1.25 dB to 55 dB
Display resolution	0.001 dB
Cursor resolution	From 0.001 dB
Attenuation linearity	±0.03 dB/dB1
Reflectance accuracy	±2 dB
Threshold	0.01 to 5.99 dB in 0.01 dB step
Reflectance/ORL measurements	Automatic or manual
Display resolution	0.01 dB
Reflectance threshold	-11 to -99 dB in 1 dB step
Storage	Bellcore/Telcordia compatible

1. ±0.05 dB/dB for SRe and UHD.

Ordering Information

OTDR Module - Single-mode[1]

E8126VSRE	Very short range 1310/1550 nm
E8126SRE	Short range 1310/1550 nm
E8126MR	Medium range/high resolution 1310/1550 nm
E8126LR	Long range 1310/1550 nm
E8126VLR	Very long range 1310/1550 nm
E8126UHD	Ultra long range 1310/1550 nm

OTDR Module - Multimode[1]

E8123SRL	Short range 850/1300 nm

OTDR Module - Multimode & Single-mode

E8146SRL	Short range 850/1300/1310/1550 nm
E8156SRL	Short range 850/1300/1310/1550/1625 nm

Continuous Source Option

E810TDRLS

1. Other configurations are available. Please contact JDSU for additional references.

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