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Acterna MTS-8000 Tester

Optical Time Domain Reflectometer

November 2004 Edition

The optical time domain reflectometer (OTDR) is at the core of fiber optic characterization. Allowing measurement of 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 Acterna OTDR plug-in range is the industry's fastest, offering the highest performance solution of any OTDR field instrument on the market.

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

A wide range of field-interchangeable OTDR plug-ins, including medium haul (DR), long haul (HD), and very long haul (VHD) testing capabilities, at any wavelength between 1310/1480/1550/1625 nm.

To enhance the modularity among the platforms, all MTS-5100e/5200e plug-ins can be inserted into the MTS-8000 test platform.

With the MTS-8000's scalable design, companies can match their testing solutions of their unique network environments by purchasing only the features needed. This platform maximizes scalability, manageability, price/performance, and flexibility. As optical network technology changes, companies can easily upgrade the MTS-8000. 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 the OTDR plug-in with the MTS-8000 test platform offers a lightweight, handheld, and rugged field instrument suitable for any OTDR measurement requirements.

The powerful communication capability of the MTS-8000 test platform offers users the ability to remotely control the unit, send data directly to the office, or access the data via internet.

Highlights

- Field installable single slot plug-in module for the MTS-8000
- Impressive speed and high performance testing (up to 128,000 acquisition points with 0.1 s real time sweep)
- Shortest event dead zone of 1 m, highest dynamic range of 44 dB at 1550 nm
- Automatic and advanced functions for maximum user flexibility
- Complete fiber characterization solution combining chromatic dispersion, polarization mode dispersion, and spectral attenuation testing capability in the MTS-8000 test platform
- Powerful report generation facilities using FiberTrace and FiberCable PC software

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Rugged field solution

Housed in the field dedicated MTS-8000 test platform, OTDR measurements can be performed in OSP, CO, and harsh environmental conditions. A portable, battery-powered instrument, 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 video inspection scope check the quality of the front connector and visually locate faults on the fiber jumpers.

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

The MTS-8000 test platform offers a built-in talk set option allowing to communicate between both ends of the fiber while the tests are running. In addition to this function users can send orders or transfer results to the product at the other end for immediate comparison or remote control. Providing a permanent and cost effective solution to communicate where mobiles or telephone lines are not available. The data transfer function allows immediate far end results, performing bi-directional OTDR analysis saving a huge amount of transport time.

Enhanced testing time

Full dynamic range reached in less than 30 seconds measurement time, allows greater productivity in the field and faster return on investment with the reduction of measurement costs.

Easy to use solution from single to multiple measurement tests

An intuitive user interface, including predefined functions, for direct and easy access to the OTDR setup and results reading. One button testing means that technicians need no special training to carry out an OTDR test, suitable for novice and expert technicians. This allows the improvement of field productivity with error risk reduction due to repetitive tasks.

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 routing, cable structure can be different at each end, increasing difficulty in documenting both end measurements. With the extended cable management capability, the user saves both end information with each measurement,

offering detailed and exact cable documentation. Making it easy to manage the data in order to generate cable reports.

OTDR Bellcore/Telcordia trace format compatible

Complies with GR-196-CORE issue 2 OTDR data standard revision 1.0/1.1/2.0. Also fully compatible with a universal format to exchange files and to export to other tools.

Powerful Pass/Fail link manager

Ability to summarize OTDR results for a complete cable commissioning with pass/fail alarm. Saves time with a quick and intuitive overview of the complete set of results with fiber link and fiber cable management, and provides direct cable report generation.

Fiber Cable software solution

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

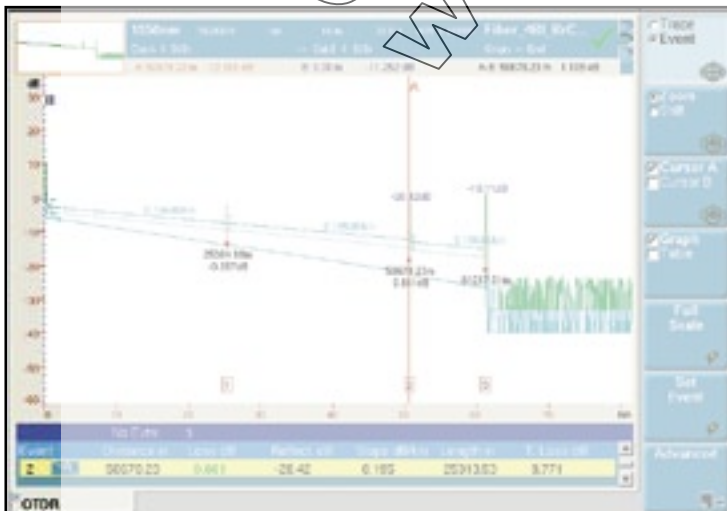


figure 1 3 wavelength OTDR trace display

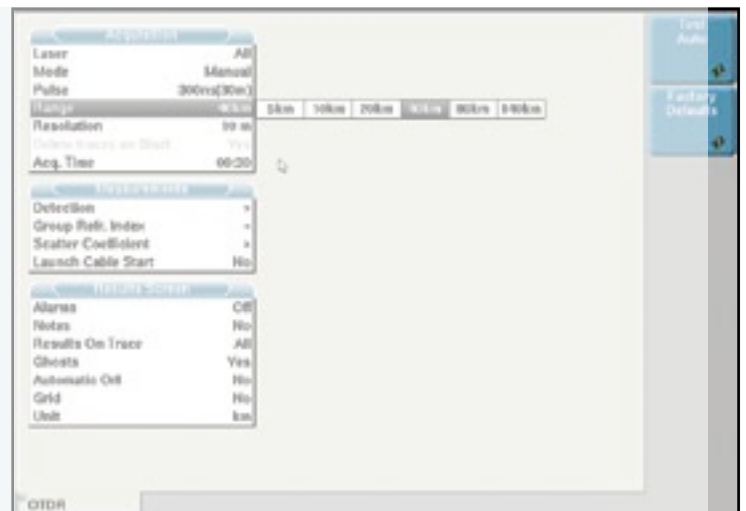


figure 2 OTDR test setup

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Technical specifications – MTS-8000
 Base unit (typical at 25°C)

Display TFT color, 10.4 inches, LCD 800 × 600
 TFT color, 10.4 inches, LCD 800 × 600,
 High visibility
 Touchscreen TFT color, 10.4 inches,
 LCD 800 × 600
 Touchscreen TFT color, 10.4 inches,
 LCD 800 × 600, high visibility

Storage
 Internal memory 8 Mb
 Hard disk (optional) min 10 Gb
 Floppy disk drive (optional) 3.5 inches,
 MSDOS compatible 250 traces typical
 CD read/write (optional)

Input/output interfaces RS232C, 2 × USB, VGA
 RJ11 modem (optional), R45 Ethernet,
 DIN external switch, compact flash

Optical interfaces
 Power meter (optional) +10 to -55 dBm,
 universal push/pull connector
 850, 1310, 1550 nm calibrated wavelengths
 Talk set (optional) >45 dB range,
 with data/file transfer,
 Class 1 laser, field interchangeable connector
 VFL (optional) <1 mW, Class 2 laser,
 universal push/pull connector

Video connector inspection scope
 (optional) 200× or 400×, through USB port

Power supply, battery
 Battery type internal standard removable
 Lilon batteries

Operation time up to 16 OTDR hours
 with two batteries and standard screen,
 Telcordia GR-196-CORE

Internal charger yes
 Charging time <3 hours per battery
 Trickle charge yes
 DC input 19 to 25 V

Power supply, AC/DC adapter Input 100-240 V,
 50-60 Hz, 1.8 A, output 19 V DC/3.1 A

Weight
 2.9 kg/6.39 lbs (mainframe)
 1.34 kg/2.97 lbs (battery pack)

Size (w x h x d) 320 × 265 × 55 mm
 (11.6 × 10.4 × 2.1 inches) for the mainframe
 320 × 265 × 90 mm (11.6 × 10.4 × 3.7 inches/
 for the mainframe + 1 plug-in

Temperature
 Operating on mains (no options) -20°C to +50°C
 (-4°F to 122°F)

Operating, all options 0°C to +40°C
 (32°F to 104°F)

Storage -20°C to +60°C (-4°F to 140°F)

Humidity 95% without condensing
EMI/ESD CE class B compliant

OTDR plug-in technical specifications
 (Typical at 25°C)

OTDR characteristics
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 measurements Automatic or dual cursor
 Display span From 2.6 m up to maximum range
 (380 km for HD and VHD modules)

Display resolution 1 cm
 Cursor resolution From 1 cm
 Sampling resolution From 4 cm
 Accuracy ± 1 m ± sampling resolution
 ± 1.10⁻⁵ × distance
 (excluding group index uncertainties)

Attenuation measurement Automatic, manual
 2-point, 5-point and LSA
 Display span From 1.25 dB to 55 dB
 Display resolution 0.001 dB
 Cursor resolution From 0.001 dB

Accuracy ± 0.05 dB ± 0.05 dB/dB
 Threshold 0.01 to 5.99 dB in 0.01 dB step

Reflectance/ ORL measurements Automatic
 or manual

Display resolution 0.01 dB
 Threshold -11 to -99 dB in 1 dB step
 Storage Bellcore/Telcordia compatible
 Version 1.1 and Version 2.0

OTDR plug-in technical specifications (typical at 25°C)

Fully compatible with the MTS-5100e/5200e and MTS-8000 OTDR plug-ins

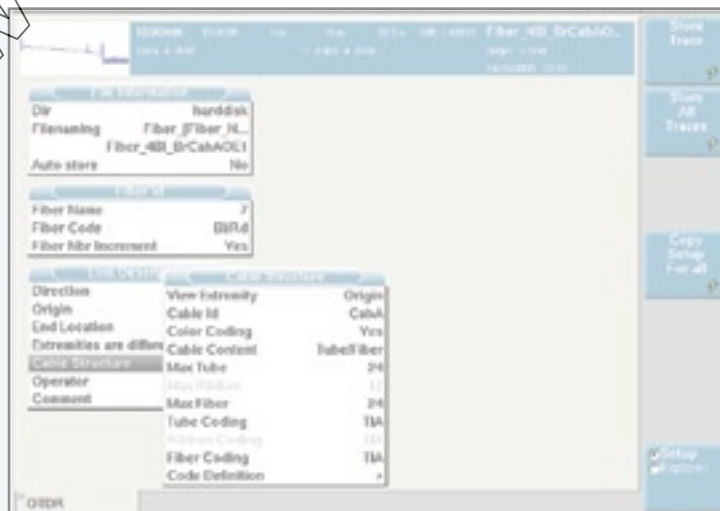
	High performance multimode MM	Short range singlemode SR	Medium range singlemode DR	Long range singlemode HD	Very long range singlemode VHD
Central wavelength ⁽¹⁾	850/1300 nm ± 20 nm	1310/1550 nm ± 20 nm	1310/1550 nm ± 20 nm	1310/1550/1625 nm ± 20 nm ± 10 nm for 1625 nm	1310/1550/1625 nm ± 20 nm ± 10 nm for 1625 nm
Laser safety class (21 CFR)	Class 1	Class 1	Class 1	Class 1	Class 1
Pulse width	3 ns to 200 ns	10 ns to 10 μs	5 ns to 10 μs	10 ns to 20 μs	10 ns to 20 μs
Distance range	Up to 80 km	Up to 260 km	Up to 260 km	Up to 380 km	Up to 380 km
RMS dynamic range ⁽²⁾	25 dB/23 dB	35 dB/33 dB	37 dB/35 dB	42 dB/40 dB/40 dB	44 dB/44 dB/44 dB
Event dead zone ⁽³⁾	1.5 m	3 m	1 m	4 m	6 m
Attenuation dead zone ⁽⁴⁾	5 m	15 m	8 m	15 m	20 m

⁽¹⁾ Central wavelength: Laser at 25°C and measured at 10 μs for singlemode and 50 ns for multimode

⁽²⁾ RMS dynamic range: The one way difference between the extrapolated backscattering level at the start of the fiber and the RMS noise level, after 3 minutes averaging.

⁽³⁾ Event dead zone: Measured at ± 1.5 dB down from the peak of an unsaturated reflective event.

⁽⁴⁾ Attenuation dead zone: Measured at ± 0.5 dB from the linear regression using a FC/PC type reflectance.



NIST, ISO, IEC, ANSI, NCSL, MIL-STD by www.raeservices.com
 figure 3 Advanced cable information for metro network

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Ordering information

Base instrument options

Hard disk drive	E80Hdisk
Extractable floppy disk drive	E80FD
Extractable R/W CD ROM drive	E80CDRW
Built-in PSTN modem	E80MDM
Standard touchscreen TFT color screen	E80StCol
High visibility TFT color display	E80HVCol
High visibility touchscreen	
TFT color display	E80HVTCol
VFL with UPP connector	E80VFL
Optical talk set	E80TS
Optical power meter with UPP connector (2.5 mm and 1.25 will be provided as standard)	E80PM

Main accessories

External keyboard	E80keyB
Additional Li-Ion rechargeable battery	E80LilIon
Soft carrying case for MTS-8000 and 2 plug-ins receptacle configuration	E80Scase1
Soft carrying case for long configuration	E80Scase2
Hard transit case for long configuration	E80Hcase
Cigarette lighter power adapter	E80Lighter
Qwerty USB keyboard	E80keyB
USB mouse	E80Mouse

Singlemode OTDR plug-in

Short range 1310/1550 nm	E8126SR
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Multimode OTDR plug-in

High resolution 850/1300 nm	E8123MM
Medium range/high res. 1310/1550 m	E8126DR
Long range 1310/1550 nm	E8126HD
Long range 1625 nm	E8127HD
Long range 1310/1550/1625 nm	E8136HD
Very long range 1310/1550 nm	E8126VHD
Very long range 1625 nm	E8127VHD
Very long range 1550/1625 nm	E8129VHD

Application software

Optical fiber trace software for post-analysis	E0FS100
Optical fiber cable software for cable acceptance report generation	E0FS200

Optical connectors

Standard single mode
 FC/PC, SC, ST, DIN, E2000, EC, VFO,
 FC/APC, SC/APC, DIN/HRL, E2000HRL
 Universal singlemode connectors
 EUNIPCFC, EUNIPCSC, EUNIPCST, EUNIPCIN,
 EUNAPCFC, EUNAPCSC, EUNAPCST, EUNAPCIN

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Acterna is the world's largest provider of communications test solutions for telecommunications and cable network operators. A trusted communications test partner for more than eight decades, Acterna offers an unmatched portfolio of award-winning instruments, systems, software and services that help its customers reduce network costs while improving performance and reliability. Headquartered in Germantown, Maryland, USA – with European and Asia-Pacific operations based in Eningen, Germany and Hong Kong – Acterna serves nearly every major communications service provider and equipment manufacturer around the world through a skilled sales and support organization in 31 countries.

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