ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *Exfo FTB-300* at our website: ***Click HERE***

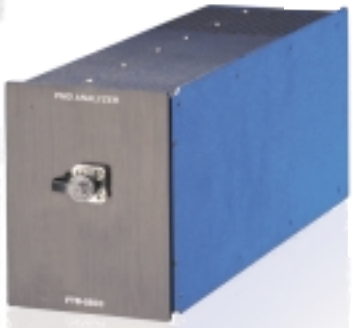
FTB-5500

PMD Analyzer

MODULE

- Best tool for characterizing PMD in the field
- Highest dynamic range on the market—more than 50 dB
- Greatest analysis range: 0.05 to 200 ps (typical)
- Second-order PMD calculation
- Part of the rugged and portable FTB-300 Universal Test System





Fiber-optic test and measurement equipement

EXFO

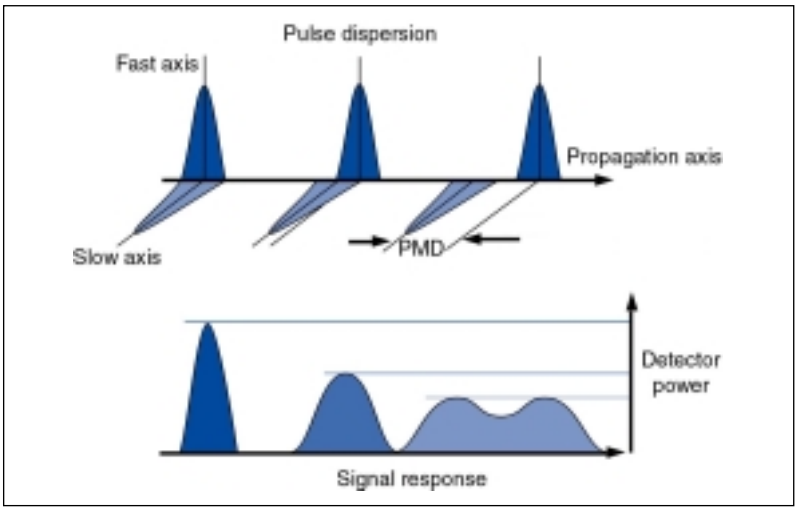
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

PMD Affects System Performance

Dispersion phenomenon

Polarization mode dispersion (PMD) affects system performance by spreading the pulse over the length of a fiber. Pulse spreading can be compared to power loss in the system, because it directly affects the loss safety margin.

PMD is caused by asymmetry in the fiber's geometry and/or by localized stress throughout the waveguide. Birefringence in the optical fiber, which causes light to be propagated along two polarization axes that are orthogonal to each other, produces slow and fast axes. The difference in propagation speed results in temporal spreading or dispersion as shown in the figure to the right. With a digital signal, PMD increases the BER, which, limits system bandwidth. With an analog signal, PMD creates distortion, limiting the number of channels.



A major concern for network planners

Network planners quickly realized the danger of this situation: an entire bandwidth upgrade could be jeopardized by PMD. Consequently, plenty of testing was carried out when the industry recognized the importance of characterizing PMD in existing networks.

The introduction of the interferometric method subsequently changed the reality of PMD measurement. The interferometric method, which was introduced by the GAP Optique team from the University of Geneva, quickly demonstrated its usefulness as a fast and secure way of measuring PMD, regardless of environmental conditions.

The interferometric method allows field measurement of PMD; this is not possible with conventional methods such as JME or wavelength scanning. The interferometric method is faster and almost immune to vibrations and adverse field conditions.

With the marketing of OC-192 (STM-64) and the advent of OC-768 (STM-256), fiber and cable manufacturers eventually acknowledged the importance of PMD and began guaranteeing specifications.
In light of these developments, however, companies who specialize in cable installation, maintenance, and troubleshooting still need to be concerned about PMD for a number of reasons:

- PMD is statistical in nature.
- Large variation in PMD values can be observed during the life cycle of a fiber.
- Additional stress can be applied to a fiber during transportation and cabling.
- Effects of temperature and vibration are still regarded as potential problems by operators.
- Cable can be crushed, stressed, or physically damaged during installation.
- Cable handling causes variations in PMD.

The TIA standard

The inteferometric method is the fastest PMD measurement method. It was approved by the TIA in April 1999 (EIA/TIA-455-124). The test method documentation demonstrates the validity of the method and its limitation in accuracy for PMD values smaller than 0.12 ps using a standard LED source at 1550 nm. With this method, no end-to-end communication is required. This allows for less equipment and human intervention as well as faster, more efficient data collection.

Measuring PMD the Smart Way

Field-proof advanced technology

The FTB-5500 PMD Analyzer module uses a Michelson interferometer to accurately measure PMD delay. It performs a mean measurement over the entire wavelength range of a broad-spectrum polarized LED source. After fitting the Gaussian distribution curve, the analysis software calculates and displays the fiber's total PMD and second-order PMD value and coefficient.

Vibration-proof: The broad spectrum and short coherence time of the LED source used in the interferometric method renders the EXFO PMD analyzer almost immune to vibration. This characteristic is especially important when testing installed cables. Acquisition speed is also a factor with regard to vibration immunity.

Fast results: The interferometric method also provides fast results by automating the measurement process. The software typically completes the test cycle in 15 seconds.



High dynamic range

Averaging PMD over the entire source wavelength range (without filtering) preserves full power for PMD measurement. The standard 40 dB dynamic range remains available for testing long fiber spans. A high dynamic range option, using EXFO's M-2100 Broadband Light Source, a high-power EELED source, increases the dynamic range to more than 50 dB to measure fiber spans longer than 250 km.

Great measurement range

The interferometric method can handle high PMD values. An extended range option increases the instrument's analysis from 0.05 to 200 ps. The measurement range of the instrument goes from 0.1 to 115 ps, but users can obtain calculated values down to 0.05 ps and estimated values from 115 up to 200 ps.

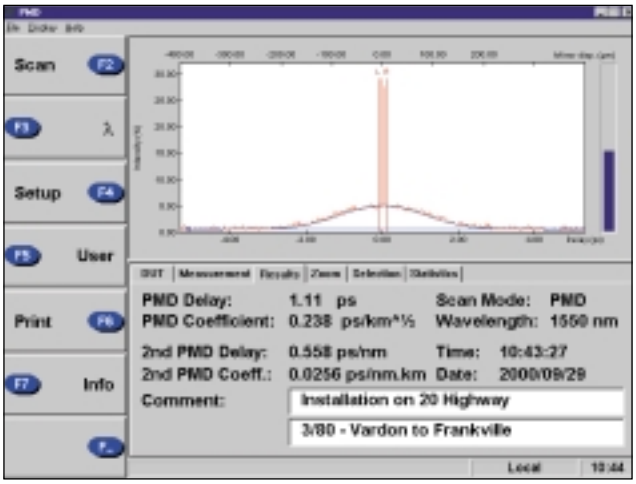
Second-order PMD

Second-order PMD is derived from the measured PMD value and is proportional to the link length, unlike first-order PMD. This means that second-order PMD is particularly important in long-distance links. Moreover, second-order PMD, because it is based on the mean variation in the slope of the first-order PMD curve, is wavelength-dependent.

EXFO's PMD software provides second-order PMD delay and coefficient values. These figures help to characterize fibers and cables more precisely than simple PMD, which makes for better control of transmission quality in both digital and analog high-bandwidth systems.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

PMD at the Touch of a Button



The PMD Analyzer quickly produces the results you need.

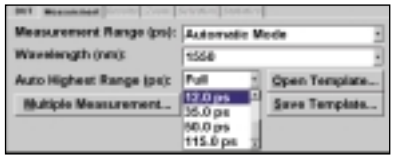
Simple step-by-step measurements

Step-by-step instructions make testing easy and virtually error-free. Due to the user-friendly software, novices and experts can obtain fast, accurate, and efficient PMD measurements with little training.

Automated testing mode

The unique auto-range function scans all the measurement ranges and automatically provides the PMD range best suited for measurement. This option is extremely useful when testing a fiber in which the expected PMD value is unknown.

To reduce the auto-range measurement time, it is also possible to select a maximum Auto Highest Range. This reduces scanning time by eliminating the higher range.



Auto-diagnostic capabilities

In default mode, the software performs an auto-diagnosis on measured PMD and supplies the user with comments and suggestions.

Multiple-measurement possibilities

This software also features a multiple-measurement mode that allows users to average several PMD measurements taken over a long period of time.

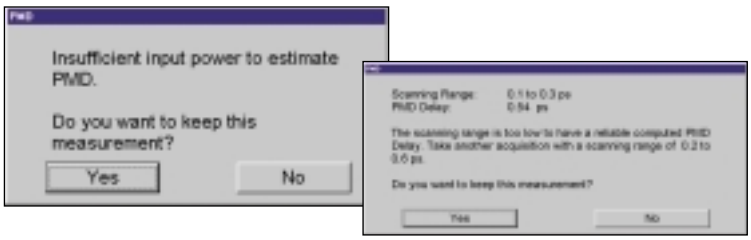
Statistical result tables

After completing multiple tests, the PMD analyzer automatically compiles the results in a table and provides statistical results:

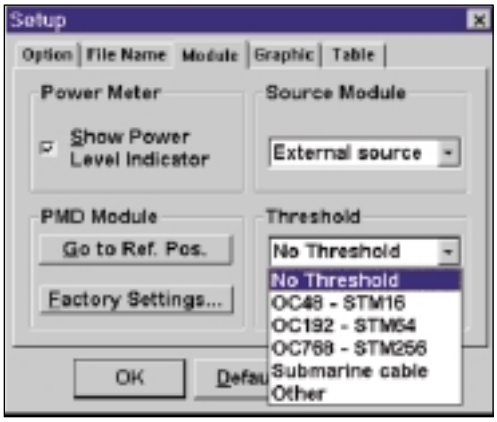
- mean PMD delay and coefficient
- standard deviation PMD delay and coefficient
- minimum and maximum PMD delay and coefficient

Several data management features

The software also includes a variety of data management features such as file auto-naming and statistical and table management.



Auto-diagnosis makes it easier to obtain accurate measurements.



The PMD Analyzer provides a threshold alarm with maximum recommended PMD values.

Get Ready for the Future



Leading the way

EXFO, a world leader in fiber-optic test equipment, has been working on PMD for many years. In fact, we were the first fiber-optic test and measurement company to introduce a PMD test instrument for the field.

The FTB-5500 PMD Analyzer module provides the user with instant access to all test modes in a true multitasking environment, thus increasing testing efficiency.This user-friendly software makes it easy to learn and work; ease-of-use reduces training costs. Combined with the Windows 95-based operating system, the PMD software offers an enhanced graphical user interface that definitely takes the guesswork out of testing.

Now more than ever, it is essential to test fiber-optic cables during manufacturing and after installation to ensure that a network can handle higher bit rates. When turning up bandwidth, PMD is a definite concern. The FTB-5500 PMD Analyzer helps you evaluate the potential to upgrade your network.

The platform advantage

The FTB-300 Universal Test System, which hosts the FTB-5500 PMD Analyzer, is a future-proof test platform featuring test modules than can be purchased or upgraded as needed. Here is a selection of the modules that perform advanced testing and monitoring tasks:

- FTB-7000 OTDR Series (including the 1625 nm OTDR)
- FTB-5240 Optical Spectrum Analyzer
- FTB-5320 Multi-Wavelength Meter
- FTB-9000 Optical Switch

EXFO's exclusive ToolBox 5 software suite runs the test module applications on the FTB-300 Universal Test System. The software's easy-to-read graphics and clear instructions simplify testing and increase productivity in the field. In addition, all applications have a common structure and graphical user interface (GUI)—once you've grasped one ToolBox application, learning another is smooth and simple. And to keep you in sync with the latest technology, we release frequent updates, upgrades, and new applications.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

SPECIFICATIONS *(FTB-5500 PMD ANALYZER)*

Model	FTB-5502	FTB-5503	FTB-5523
Wavelength (nm)	1310	1550	1310/1550
Analysis range[1] (ps)			
standard (typ.)	0.06 to 35	0.05 to 35	0.05[2] to 35
extended range (typ.) (ER option)	0.06 to 200	0.05 to 200	0.05[2] to 200
Dynamic range[3] (dB)	45 (50)[4]	40 (48)[4]	32 (40)[4]
Average measuring time (s)	15	15	15

GENERAL SPECIFICATIONS *(FTB-5500 PMD ANALYZER)*

Temperature	operating	5 to 40°C	41 to 104°F
	storage	–20 to 60°C	–4 to 140°F
Relative humidity	0 to 80% non-condensing		

NOTES

1. Measurement range is 0.1 to 115 ps with a calculated value lower than 0.1 ps and estimated value higher than 115 ps.
2. With the 1550 nm light source.
3. At 1 ps.
4. With the M-2100 Broadband Light Source.

SPECIFICATIONS *(FTB-300 UTS)*

Display	touchscreen, monochrome, 640x480 full dot LCD 9.4 in. touchscreen, active matrix color, 640x480 full dot LCD 8.4 in. (optional)
Interfaces	RS-232 parallel printer external VGA monitor external keyboard (PS/2) PCMCIA type II (optional, for fax modem card)
Memory	16 MB RAM, internal 2.1 GB hard drive internal 3.5 in. 1.44 MB floppy drive (optional)
Batteries	rechargeable NiMH battery pack (two batteries) Four hours of continuous operation as per Bellcore TR-NWT-001138
Power supply	AC input: 90 to 250 V, 50/60 Hz
Size (H x W x D)	22.9cm x 30.5cm x 10.1 cm 9 in. x 12 in. x 4 in.
Weight	6.52 kg 14.35 lb.

STANDARD ACCESSORIES

Instruction manual, PMD software, connector cleaners

ORDERING INFORMATION

FTB-300 Universal Test System

FTB-300-XX

Option code
D2 = Active color matrix touchscreen
M1 = 3.5 in. floppy disk
W1 = PCMCIA interface
W2 = PCMCIA interface and 14.4 kBds fax/modem card
N3 = 4 MB memory upgrade (total of 20 MB)
N4 = 16 MB memory upgrade (total of 32 MB)

PMD Analyzer module

FTB-55XX-XX-XX

02 = 1310 nm
03 = 1550 nm
23 = 1310/1550 nm
ER = extended range option

Connector type
89 = FC/UPC
90 = ST/UPC

Polarized light source

FLS-110-XXP-XX

02 = 1310 nm LED
03 = 1550 nm LED
P = polarized

Connector type
89 = FC/UPC
90 = ST/UPC

Broadband light source

M21XX-BP-XX-XXX

02 =1300 nm
03 =1545 nm

BP = Polarized EELED singlemode fiber source

Connector code
58 = FC/APC

Power code
115 V
220 V

1 800 663-3936
info@exfo.com
www.exfo.com

CORPORATE HEADQUARTERS 465 Godin Avenue, Vanier QC G1M 3G7 Canada Tel.: (418) 683-0211 Fax: (418) 683-2170
EXFO AMERICA 1201 Richardson Drive, Suite 260, Richardson, TX, 75080, USA Tel.: 1 800 663-3936 Fax: (972) 907-2297
EXFO EUROPE Centre d'Affaires Les Metz, 100, rue Albert Calmette, 78353, Jouy-en-Josas, France Tel.: +33 1 34 63 00 20 Fax: +33 1 34 65 90 93
EXFO ASIA Honkomagome 6-6-20 Bunkyo-Ku T-113 0021 Tokyo-To Japan Tel.: +81-3-5940-5410 Fax: +81-3-5940-5415

SPFTBPMDAnalyzer.4AN 00/09

© 2000 EXFO Electro-Optical Engineering Inc. All rights reserved.
Printed in Canada

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP