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Over 20 years ago, Photon Kinetics pioneered the 2500 Fiber Analysis System, the first commercially available test system for characterizing the differential mode delay (DMD) of first generation graded-index multimode fibers. At the time, DMD measurements were used by fiber manufacturers primarily as a process control tool.

Later, when second generation, laser optimized multimode fibers (OM3) were being developed for high speed Gigabit Ethernet applications, the 2500's DMD test capability was upgraded with a single-mode fiber launch and redesigned detection electronics that delivered both higher DMD spatial resolution and temporal resolution better than 100 ps.

Today, with fiber manufacturers producing multimode fibers with even higher bandwidth, DMD resolution higher than 100 ps has become essential. In response to this new requirement, Photon Kinetics developed the High Resolution SMLDMD Option for the 2500 Fiber Analysis System. The new option features a custom-engineered fiber laser capable of producing extremely short, highly stable optical pulses. In conjunction with next generation detection electronics, the 2500 is now capable of obtaining a system temporal response less than 30 ps FWQM.

Until now, 30 ps DMD resolution could only be obtained with Titanium:Sapphire laser sources, known for their ability to produce short, high power optical pulses. However, the bulk optic design and high output power of these lasers makes them less than ideal as a light source for multimode fiber production testing. The laser's optical design causes its output power to be particularly sensitive to changes in environmental conditions. This sensitivity, combined with the Ti:Sapphire laser's high optical power output, makes it necessary to install these lasers in a secure location that is also environmentally-controlled, i.e. not on the production test floor.

In contrast to the Ti:Sapphire laser, the mode-locked fiber laser included with the 2500 High Resolution SMLDMD Option is stable by design, and does not require extreme laser safety measures. The fiber laser can be located in any typical fiber production testing environment along with the 2500 control and optical units. For more information regarding the performance, pricing and availability of the 2500 High Resolution SMLDMD Option, contact your local PK sales representative.
Software Provides Complete Data Management Solution for Cable Test Data

OASYS.net OTDR Automation Software is currently being used by most of the world’s largest optical fiber cablers to automate OTDR measurements at various stages of the cable production process. OASYS.net gives cablers the ability to remotely control the OTDR, acquire signatures and store the cable data on the factory network, taking advantage of network capability to help minimize OTDR measurement time and cost.

A new companion application for OASYS.net, the OASYS.dat Data Management Software is now available to help cable manufacturers take their OTDR testing process to the next level. OASYS.dat is a fully compatible, configurable pre- and post-processor for the OASYS.net application. On the front end of the testing process, OASYS.dat can be used to gather important cable ID data, such as the reel number, customer name, PO number and even raw fiber ID information provided by the fiber supplier. OASYS.dat stores this data in a secure, SQL Server database along with the subsequently acquired OTDR signatures and analysis results. Besides collecting test information, OASYS.dat can also be used to set OTDR acquisition parameters based on product type, process stage or cable length.

After testing has been completed, OASYS.dat post-processes the measurement results to create customized and comprehensive hardcopy reports for internal or external customers. Further, search tools that can be used by quality assurance or customer support personnel to browse the SQL database and retrieve test results or signatures related to a specific purchase order, reel number, production stage, operator, test date or raw fiber ID. OASYS.dat provides the data management capability that is essential for high volume cable production testing.

50 um Optimization and New Wavelengths for Industry-Standard OTDR

Since its release, the 8000 OTDR has consistently demonstrated the advantage of its "platform" optical design. As new industry measurement requirements have emerged, the design has made it possible to configure the 8000 to address them. As new or higher performance optical components have become available, the design has often allowed them to be integrated, improving capability and/or performance. Continuous capability and performance improvement is one of the many reasons the 8000 has become the industry-standard OTDR for fiber and cable production testing.

Several new configurations of the 8000 continue this legacy. The new 88010 and 88020 Series configurations feature “50 µm optics” for more efficient, standards-compliant coupling to 50 µm, laser-optimized, multimode test fibers. This results in improved performance relative to 88000 configurations utilizing 62.5 µm optics. The 88010 Series is designed for manufacturers who produce only 50 µm fibers, while the 88020 Series is optimal for those customers who need to measure both 50 and 62.5 µm fibers, featuring two separate front panel optical connections for each fiber type.

For manufacturers who need to test single-mode fibers destined for GPON, EPON and other FTTH networks, a range of new test wavelengths for the 86000 and 87000 Series OTDRs is now available. In addition to the current standard wavelengths of 1310, 1360, 1383, 1410, 1550 and 1625 nm, and current custom wavelengths including 1064, 1240 and 1650 nm, Photon Kinetics has added 1260, 1270, 1490 and 1580 nm capability. If you need OTDR measurement capability at these or any other wavelengths, contact your local Photon Kinetics sales representative.
**EnvirOTDR Measurement System Delivers Automated, High Precision Cable Qualification**

Environmental and mechanical testing is performed on virtually every optical cable design. These tests typically involve subjecting cable samples to temperature extremes and cycling, to high humidity or water immersion, or bending, tensioning or impacting the samples. During the application of these environmental and mechanical stresses the optical loss of the test sample is monitored to detect any changes.

While specifications for the allowable change in loss depend on the specific test being performed and the type of fiber being tested, a typical limit is 0.05 dB. The problem for cable manufacturers is that the instruments they currently use for this testing (e.g. a light source/power meter (LSPM) or OTDR) have measurement precisions that are similar in magnitude to the change in loss specification. Optical switches that are often part of the test setup further degrade measurement repeatability because of their inherent loss instability. The bottom line is that with current measurement systems and setups cable manufacturers are effectively blind to changes in fiber loss that are only marginally smaller than the specification limit.

The EnvirOTDR Cable Qualification System from Photon Kinetics gives manufacturers a more effective and more comprehensive solution for environmental and mechanical testing. The system, consisting of an 8000 OTDR driven by customizable environmental and mechanical test automation software, delivers optical loss measurement precision better than 0.004 dB (4 sigma, 40 days), over 10X better than current test solutions. It is also immune to the effects of optical switch loss drift. The system’s comprehensive software package enables users to setup multiple tests for simultaneous execution, controlling the OTDR and any optical switches. It is also designed to interface with environmental chambers and mechanical test fixtures.

**Upgrade Offers Improved Multimode Core Geometry Measurement Capability**

Many fiber manufacturers today have come to rely on the 2400’s near field imaging technique, not just for characterizing single-mode and multimode fiber cladding geometry, but also for measuring the core diameter of graded-index multimode fibers.

In 2010, Photon Kinetics upgraded the 2400 to improve the precision of these multimode core diameter measurements as well as all other fiber geometry metrics, both single-mode and multimode. An optics upgrade is now available for 2400s manufactured before 2010 to enable these systems to achieve the same unprecedented performance of today’s systems. Contact your Photon Kinetics sales representative for more information.

**New Attenuation Option Matches 17.6 km DMD and Bandwidth Capability**

The 2500 Fiber Analysis System is the industry-standard test system for characterizing three of the most critical transmission properties of today’s high performance multimode fibers: bandwidth, single-mode launch differential mode delay (SMLDMD) and attenuation. For those manufacturers who have found it necessary to characterize long lengths of these fibers, options have been available for several years that increase the 2500’s bandwidth and/or SMLDMD measurement range to enable characterization of fibers over 17.6 km long.

Now a third option is available 2500 that extends the 2500’s attenuation measurement capability as well, making complete characterization of all three transmission properties possible even on long multimode fibers. The new Ultra-long 850 nm Attenuation Option provides the high dynamic range necessary to measure 50 µm fibers over 17.6 km long with standards compliant 70/70 launch conditions. The option is also available as an upgrade for 2500s already in use.
Long Range and Dual-mode Configurations Meet New Test Requirements

The true value of a test instrument lies not just in its measurement performance, but also in its ability to adapt to changing measurement requirements. The 2800 Fiber Analysis System has proven over the years that it excels at both.

One example is the new ultra-long length configuration of the 2800 that enables measurement of fibers over 200 km long, with precision equivalent to or better than standard 2800 specs. While 200 km chromatic dispersion measurements have been possible in the 1550 nm window for some time, measurements in the 1310 nm window have been problematic due to higher fiber attenuation. However, with the industry-leading improvements employed in the long range configuration, high precision 200 km measurements are now possible in both operating windows.

Another new configuration of the 2800 allows manufacturers to characterize both single-mode and multimode fibers with a single test system. The "dual-mode" 2800 provides two, independent optical paths, both of which not only provide high measurement performance, but also the appropriate, standards-compliant launch conditions for the fiber type being tested. A single 2800 system can now be configured to measure CD, strain, power, PMD and bend loss on single-mode fibers AND CD, strain, power and bend loss on both 50 and 62.5 μm multimode fibers.