



FIBER INSTRUMENT SALES, INC. | WWW.FIBERINSTRUMENTSALES.COM | 1-800-5000-FIS (347)

FTTH Network Testing: Optimized Test Equipment Can Reduce Installation & Maintenance Labor

By Kirk Donley / Senior Vice President, Sales

In this issue of FIS Communicator keeping with the Fiber to the Home theme focus shifts to the optical fiber testing of FTTH networks. To begin there remains a importance on technicians having the simplest of optical testing tools within reach such as a visual fault locator (red light) to verify continuity in patch cables, mechanical connectors or ensuring good fusion splices. Video inspection probes, handheld microscopes with built in laser filters are “must have” to confidently ensure clean connection is present to deliver the strongest signal strength to subscribers. Choose cleaning supplies intended for the cleaning of fiber connector end faces. Using over the counter cleaners often contain high volumes of water and when cleaner evaporates a film is left attenuating the signal strength. Lint-free wipes, auto-advancing end face cleaners and fast evaporating solvents provide the optimum results for cleaning fiber connector end faces.

multiplexing (WDM) are entwined and transmitted together over a single fiber. Using this technology for data transport can require special optical test equipment to separate wavelength signals in order to confirm optical power levels necessary to deliver intended bandwidth.

At the central office during new construction prior to activation the fibers go through testing parameters verifying attenuation and optical return loss are within range to deliver highest bandwidth possible. An Optical Loss Test Set (OLTS) is the optimal piece of equipment, the OLTS operates in pairs with one unit placed at the beginning of fiber link and the other unit at end point of continuous spliced or cross connected cable length which is normally at a pedestal or fiber management center before the “last mile” or subscriber’s home. The OLTS units communicate executing a bidirectional test providing documentation of optical return loss and attenuation that falls within Optical Loss Budget of equipment.

SIMPLEST TESTING TOOLS



Optical test equipment is optimized by several manufacturers for use in FTTH networks. Besides manufacturing and offering test equipment, FIS is an authorized distributor and leader in stocking the most recognizable brands in the industry including EXFO, Viavi, AFL, Anritsu, Fluke and Trend Networks. The featured Pictogram in this communicator will indicate the type of optical test equipment required at different points within a FTTH network.

The FTTH network consists of passive and active components that go all the way to the subscriber’s home, and therefore provides the maximum bandwidth. It starts with the Optical Line Terminals (OLT) located at the Central Office, here it’s interfaced with the broadband network and internet services to push data, voice and video services to subscribers. These services are carried simultaneously and bi-directionally at different wavelengths. In a Gigabit Passive Optical Network (GPON) pathways are upstream 1310nm and downstream 1490/1550nm. These wavelengths are modified for XGS-PON utilizing 1260nm or 1270nm for downstream. These wavelengths with the use of wavelength division

BASIC TESTING EQUIPMENT



At the Fiber Management Center or Fiber Drop Cabinet in the field where fiber cross connections, distribution splitters and sometimes electronics are located an OTDR optimized for PON or Metro testing is recommended. From this access point an OTDR can perform single ended testing in either direction and with sufficient dynamic range travel through optical splitters. Enhanced software within OTDR retrieves data points and can identify a splitter and its associated attenuation and ORL. These PON focused OTDRs can contain higher wavelengths such as 1625 or 1650nm with filtered ports so they can be used to troubleshoot amongst the live data traffic on the fiber without interfering with the active signal.

Testing from the Multi-Service Terminals (MSTs) for maintenance requires a PON/Metro OTDR or smaller range handheld OTDR that can test the optical fiber link back to fiber cabinet splitter or in opposite direction to side of subscriber’s house at Network Interface Device (NID) enclosure. Some handheld OTDRs don’t have the dynamic range to test through high count optical splitters or enhanced software to detect but are great for troubleshooting and providing verification to points in the FTTH network.

Article continued on back

Standard
U.S. Postage
PAID
Fiber Instrument
Sales, Inc.

Fiber Instrument Sales, Inc.
161 Clear Road, Oriskany, NY 13424
www.fiberinstrumentsales.com





FIBER INSTRUMENTS

FTTH TESTING SOLUTIONS

Central Office / Head End

NEW
CONSTRUCTION
ACTIVATION

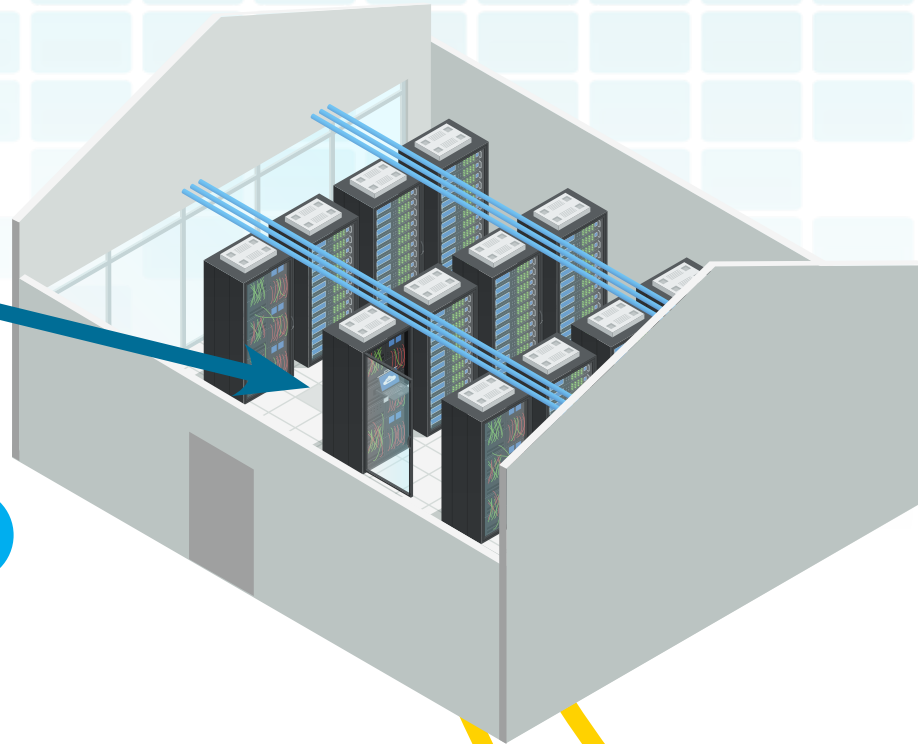


1

MAINTENANCE



2



Product Key

1

OLTS (Optical Loss Test Set)

This equipment works in pairs with one unit on each end of fiber under test, provides bi-directional test confirming acceptable optical insertion loss and optical return loss for service activation.

2

PON/Metro OTDR

Optical Time Domain Reflectometer (OTDR) is optimized with necessary dynamic range and software to identify and test thru optical splitters within FTTH network. Critical in the maintenance and troubleshooting of optical network with cross connect cabinets, splice enclosures and multi-service terminals within short distances representative of a Metro Network.

3

Handheld Optical Multimeter / OTDR

Short range optical tester is excellent in maintenance fiber to the home network to confirm throughput from single test point to the enclosure on side of the house, multi-service terminal or fiber management center. Each segment of the network can be verified without fault. Often power meter, visual fault locator or distance to fault options are included to enhance troubleshooting features.

4

PON Power Meters

Unique power meters that allows connection of the upstream and downstream path and provides optical power readings on multiple wavelengths simultaneously.

5

Service Activation PON Meter

Unique power meter optimized to provide only downstream optical power readings on multiple wavelengths. Does not provide passthru port network connection of optical network terminal (ONT) and optical line terminal (OLT).

*Centerfold was Co-Authored with EXFO

Receive Your **FREE FIS Catalog Today!**

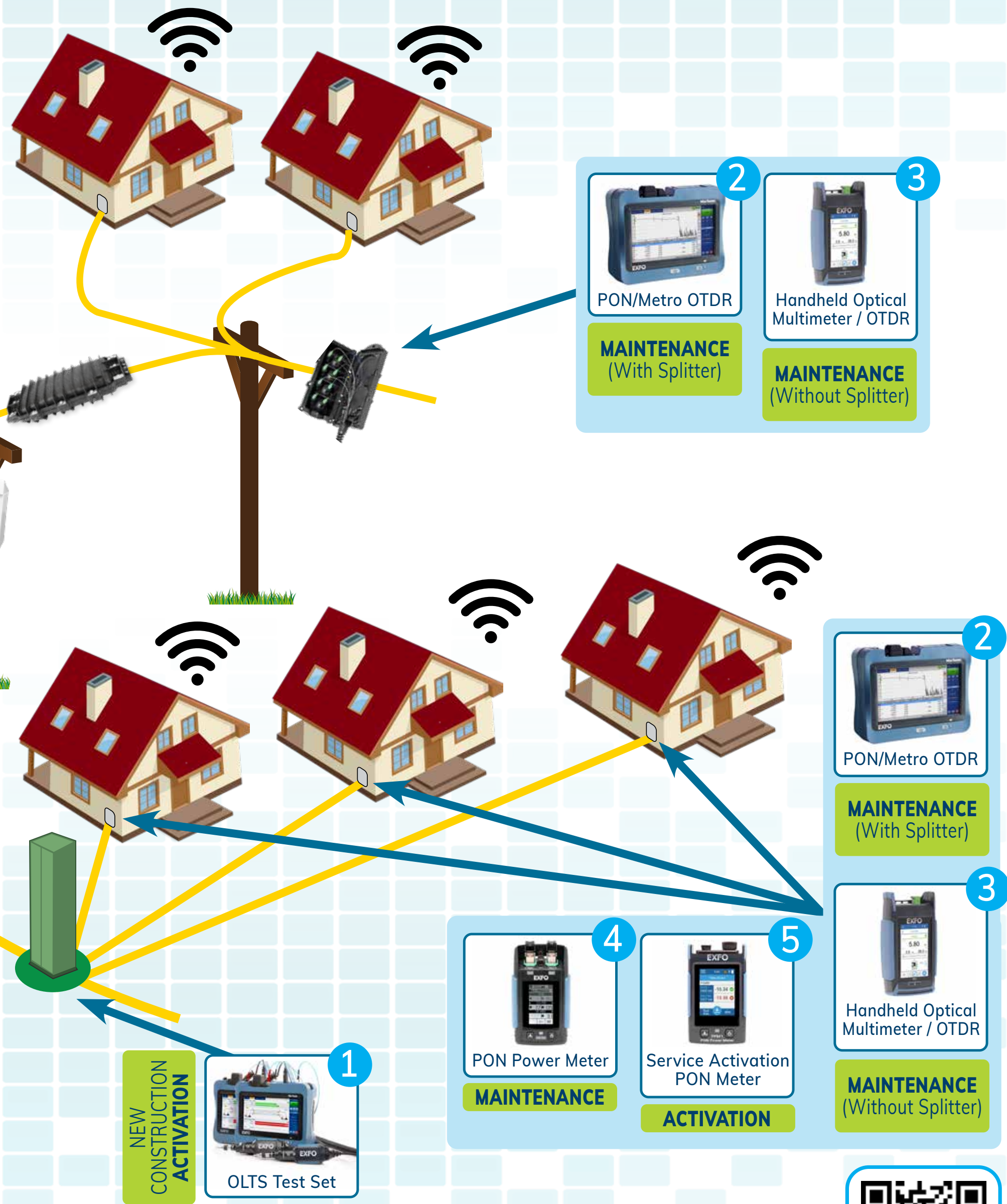
Call **1-800-500-0347**



UMENT SALES

UTIONS PICTOGRAM

EXFO



Shop Us Online At:

www.fiberinstrumentsales.com



Scan Me



Article continued from front cover

SPECIALIZED TESTING EQUIPMENT



PON Power Meter



Service Activation PON Meter



PON/metro OTDR

The NID enclosure at the side the house is where a drop cable from a nearby pole or handhole will need to be terminated with an SC/APC connector. Once the connector or pigtail is installed a cable is run from the NID enclosure to inside the house and plugged into the optical network terminal (ONT). Some providers will have the ONT inside the NID box and just feed the cable inside the house to a wired or WiFi router for internet services. During the activation stage the use of a PON power meter verifies optical power. There are two types of PON Power meters, one can provide readings on downstream and upstream optical power level, the other will just display downstream signal levels. Handheld OTDRs can test through the installed connector or spliced pigtail back to MST or back to optical splitter or filter. PON/METRO OTDRs can test further back from the house box to a splitter location and below to a fiber management cabinet. There are choices in equipment to use at the house so budget constraints or level of service technician training may determine the best tool.

The task of a technician within the FTTH network will determine the necessary equipment they will need to accomplish activation or troubleshooting activities. Lower cost equipment is often used in the activation segment where technicians may be less trained on troubleshooting fiber issues and more focused on identified pass and fail criteria. When bandwidth service fails this is when more expensive equipment is called on to identify and repair faults quickly so paid services are back on line with subscribers.

Product Spotlight FIS AC7 (Clad Alignment) Fusion Splicer Kits

Available in Standard and Pro Kits



Starting At
\$3,495

"Made In Japan"

The FIS AC7 Active Clad Fusion Splicer kit is an affordable, performance driven solution for all of your splicing needs – including the FIS line of Cheetah and Armordillo 2.0/3.0mm Splice on Connectors. With the new, enhanced onboard oven, the AC7 can perform all of the FIS 900um Cheetah Splice on Connectors, including ST and FC, without the need for any external tooling. The AC7 splicer kit is the perfect option for the budget minded buyer.

For more information call to speak with a sales representative

1-800-5000-FIS(347)

fis UNIVERSITY
PREMIER FIBER OPTIC EDUCATION

BRIGHTSIDE IS NOW OPEN!

1.800.5000.FIS(347)
www.fiberinstrumentsales.com

UPCOMING Brightside Training

June 10-12

July 8-10

July 22-24

August 5-7

To Register or for More Dates Visit Us Online!

Ask Bruno

Vice President of Technical Services



What's the difference between a regular OTDR and PON-Optimized OTDR?

Typical PON networks deploy splitters in their topology. This is considered a point-to-multi-point network, vs. a point-to-point network, which does not deploy splitters. In short, splitters provide a significant loss point for power, meaning that an OTDR will need a larger dynamic range to shoot through a splitter and see events on the span after the splitter. In addition to that, the larger pulse width of power needed to shoot through a splitter will create a very large dead zone after the splitter, where the OTDR cannot detect events. With a PON-optimized OTDR, distortion after the splitter drop is greatly reduced and the result is highly repeatable and reliable. The user can measure the loss of the splitter and the cumulative link loss, as well as identify whether any unexpected physical event occurred before—or after—the splitter. The PON-optimized OTDR also has a high value in construction: testing at 1310/1550 nm can significantly reduce the number of problems that occur after customer activation by certifying end-to-end link integrity.

Visit Us Online
For Information About
Fiber Optic Training



Scan Me



Scan Me

fis
Fiber Optic Solutionists™