JDSU

Application Note

JDSU's MTS/T-BERD platforms: Fully automated bi-directional OTDR data acquisition and data analysis test instruments

From the beginning, JDSU has understood the need for developing a test instrument that reduces both the testing time and the processing time of a large quantity of test results, maximizing quality assurance. With its 20 years of experience in OTDR measurement, JDSU has developed dedicated and powerful solutions in cooperation with experienced fiber installers in order to meet their requirements of an increase in productivity and a reduction in operating errors.

JDSU now offers a full range of MTS/T-BERD platforms, which are fully automated bi-directional OTDR data acquisition and data analysis test instruments. These innovative solutions save fiber installers and service providers both time and money.

The fiber optic cable acceptance test

Bi-directional analysis is a technique that is used to minimize the effect of back scattering coefficient differences along a fiber link, which in turn causes erroneous OTDR splice measurements. It is used when accurate baseline data is desired or during acceptance testing where splice measurements, often performed by subcontractors, are required. Complete commission of a network can only be accomplished using bi-directional OTDR techniques, taking into account the fiber section performance differences (core diameter, back scattering coefficient, etc.) on the link. These tests require two technicians, one at each end of the fiber.

The traditional bi-directional OTDR process

For fiber characterization, two technicians are required with two OTDR units, one at each end of the fiber link. Each technician measures and stores the results of all of the fibers. Then, the results of the two OTDRs are compiled in order to generate the acceptance report. In the event of problems, errors or incorrect results are usually only apparent by analyzing the averaged readings. Therefore, the technicians must go back and re-perform the OTDR data acquisition process. Subsequently, the field technicians must meet again to exchange the measurement results. In this case, high-performance OTDR, with a fast acquisition process and storage capability, is preferred.

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The drawbacks of the traditional bi-directional OTDR process

The traditional bi-directional OTDR process has the following drawbacks:

(1) Possible operator error

- Incorrect or different OTDR settings on one of the two units.
- No fiber continuity check, generating incorrect bi-directional testing from the technicians measuring two different fibers.
- A mismatch between the fiber number and the stored data, resulting from a file management error.

(2) Inefficient use of time

- A meeting (or access to an Ethernet point) is necessary in order to exchange data.
- No real-time problem detection. The technicians must usually return to the test sites the following day, introducing additional costs due to travel expenses and test setup.

The result is a lack of productivity, inefficiency, and an increase in the overall cost of the job.

Today's OTDR test platforms claim to solve these issues with LAN or modem connections. Unfortunately, though, they do not offer sufficient flexibility to the technician since the LAN or modem connections are often not available when needed.

JDSU's innovative automated bi-directional OTDR tester

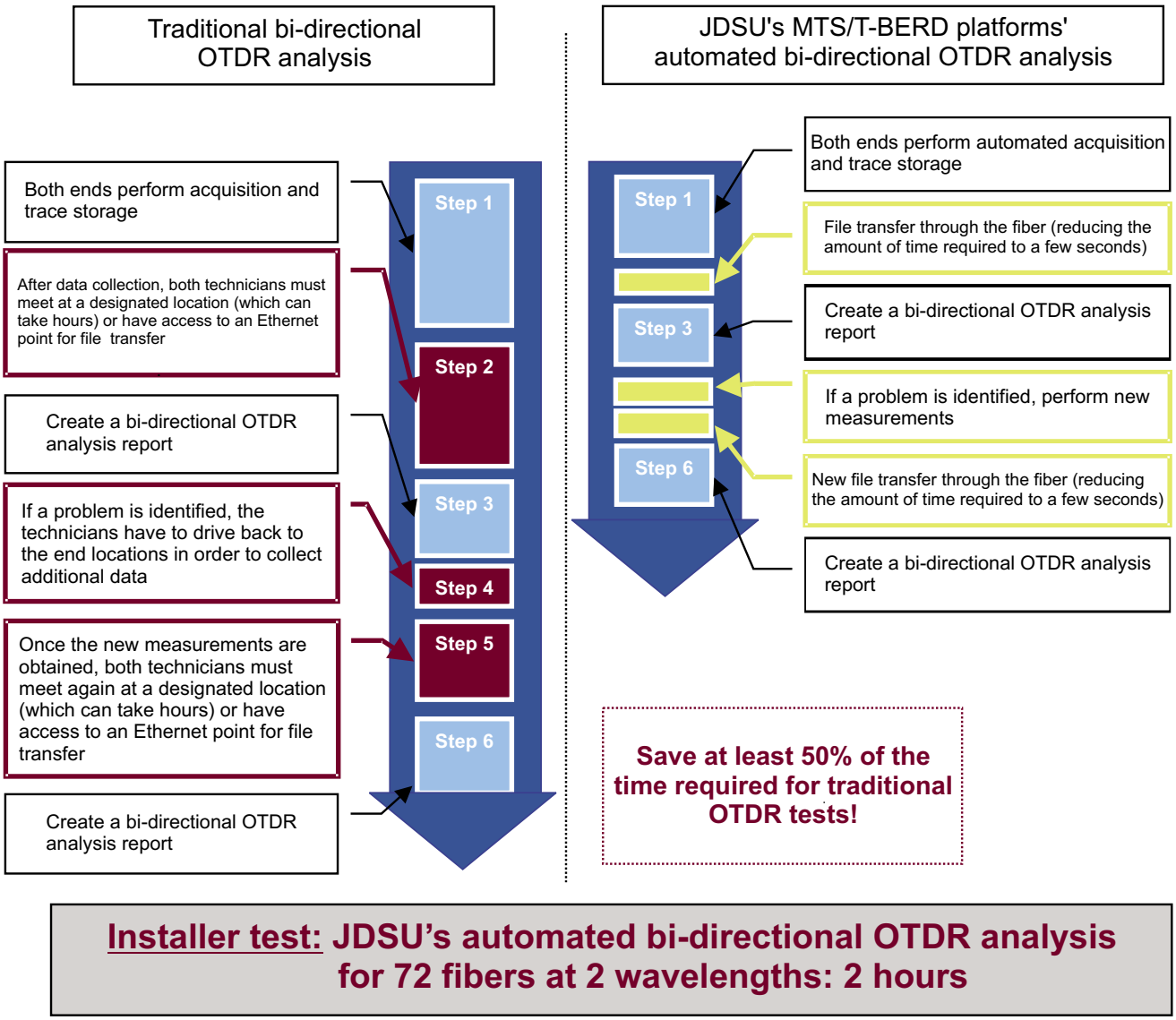
Testing time increases with the number of fibers. In order to expedite the installation phase or increase the number of fibers tested within a given period of time, the importance of having fully automatic tools, such as automated bi-directional OTDR testers, becomes clear.

JDSU now offers an automated bi-directional OTDR function in its MTS/T-BERD platforms that solves the issues of traditional bi-directional OTDR analysis as previously described.

JDSU's automated solution provides the following capabilities:

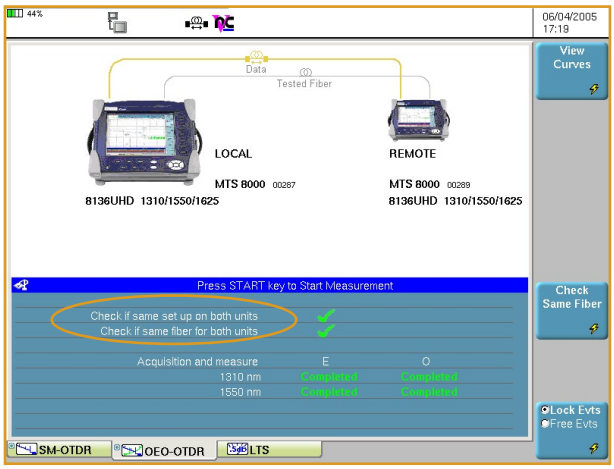
- Provides error-free operation by exchanging the master unit's OTDR test configuration if it differs from the remote unit's OTDR test configuration.
- Performs a fiber continuity check to ensure that both units are testing the same fiber.
- Performs data acquisition on the remote unit and transfers the trace to the master unit.
- Performs data acquisition on the master unit and transfers the trace to the remote unit.
- Performs bi-directional measurements on both units.
- Stores results in a single file or in two files.

This test procedure is fully automated, and all of the test results are immediately accessible on both units. In addition, unprecedented data acquisition speeds and fully automated bi-directional capabilities significantly reduce test times. Field tests on cables with 72 fibers have shown that JDSU's MTS/T-BERD platforms perform the process in less than 50% of the time required for other traditional bi-directional OTDRs.



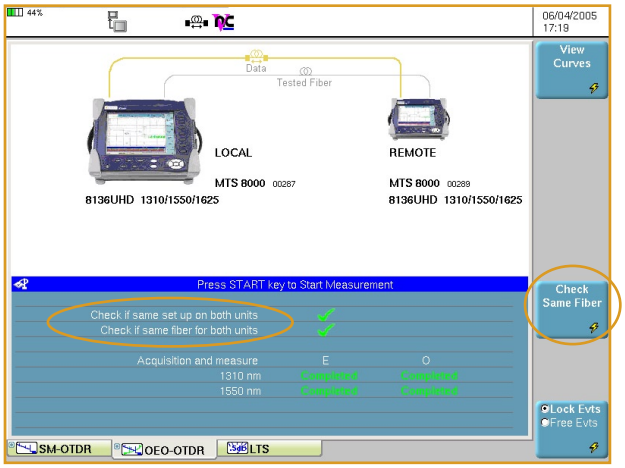
Installer test: JDSU's automated bi-directional OTDR analysis for 72 fibers at 2 wavelengths: 2 hours

Automated bi-directional OTDR specifications using JDSU's MTS/T-BERD platforms



Verification of test configurations

A warning indicator may appear if the test configurations of the two units are different. In this case, the master unit transfers and applies the master configuration to the remote unit. The process can then proceed to the fiber continuity check.



Fiber continuity check

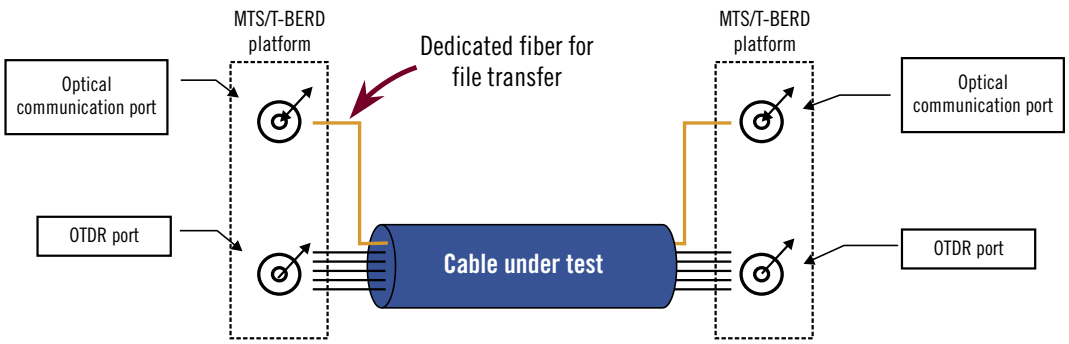
An automatic fiber continuity check is performed to ensure that the two units are connected to the same fiber under test.

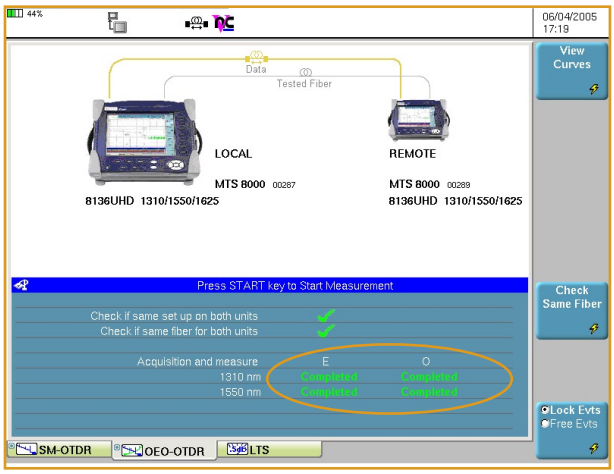
If the master unit successfully detects the far end remote unit, OTDR acquisition starts. Otherwise, the process is halted.

Acquisition

The MTS/T-BERD platforms' innovative file transfer solution through the fiber allows the technician to have a permanently available communication media. There is no need to meet to perform file transfer nor is there a need to obtain a modem or LAN connection!

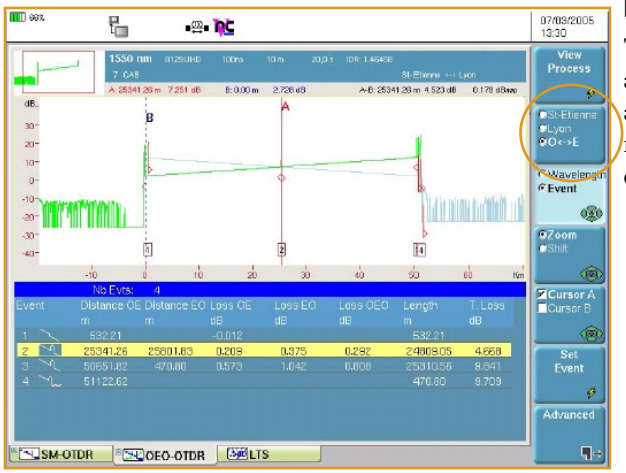
The file transfer solution through the fiber is easy to use. There is no modem configuration and no problem with passing through a firewall in order to establish the communication to the server. The technician simply selects the files and transfers them through the fiber to the far end test unit. Regardless of location, the technician can immediately react when faced with incorrect measurement analysis without having to re-visit the test site later.





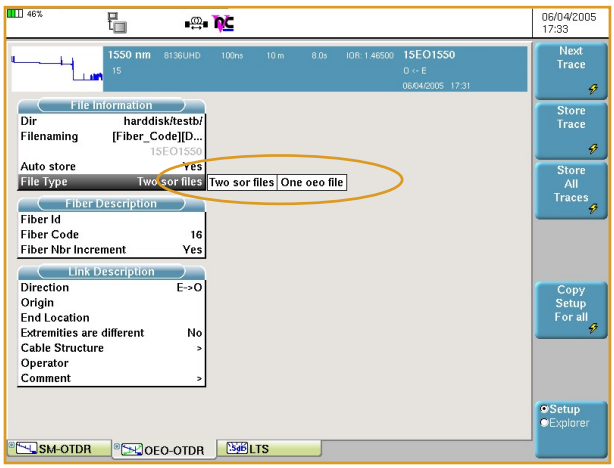
This eliminates both additional travel time and additional costs.

The master unit performs the acquisition using the first wavelength in the list. When the measurement is finished, the trace is transferred to the remote unit. The remote unit performs the same acquisition and transfers the trace to the master unit. The bi-directional measurement is complete.



Display

The MTS/T-BERD platform displays the traces and results, performing bi-directional data analysis. It is possible to view the local trace, the remote trace, or both traces superimposed on each other.



Storage

The master unit performs the acquisition using the first wavelength in the list. When the measurement is finished, the trace is transferred to the remote unit. The remote unit performs the same acquisition and transfers the trace to the master unit. The bi-directional measurement is complete.

Conclusion

In the past, OTDR speed improvement has been the focus of many fiber optic test and measurement companies. Currently, it is a matter of seconds to test a fiber! For traditional bi-directional OTDR analysis, though, test instrument companies have forgotten to take into consideration the time that technicians spend in their vans travelling from one end of a cable to the other and then back again to exchange data.

JDSU's MTS/T-BERD platforms bridge the gap between fast OTDR acquisition and fast report generation by bringing speed-of-light data transfer through the fiber in order to fully automate the bi-directional OTDR acquisition process.

Moreover, the MTS/T-BERD platforms offer a built-in talk set option that allows for communication between the technicians at both ends of the fiber while the tests are running. The talk set establishes a hands-free bi-directional communication over a single, unused optical fiber, providing a permanent and cost-effective communication solution where mobile phones or telephones are not available or are prohibited. In addition to this function, technicians can also send orders to the unit at the other end for remote control purposes.

JDSU's fully automated bi-directional OTDR data acquisition and data analysis test instrument dramatically reduces the amount of time required for complete cable commission and report generation. Combining the MTS/T-BERD platforms with JDSU's OFS-200 FiberCable Software, technicians are entirely equipped to test fiber, analyze data, and report results, efficiently characterizing the fiber under test.

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