Using the Optical Vector Analyzer for Component Evaluation in a Production Environment

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Introduction

Luna Technologies' Optical Vector Analyzer (OVA) fully analyzes the optical properties of fiber optic components, modules, and subsystems, providing comprehensive characterization based on a complete transfer function measurement. The OVA uses a complete vector model of the optical field, including polarization state and optical phase, to characterize the device under test.

In a single measurement, the OVA will make the following measurements:

1. Insertion Loss
2. Group Delay
3. Chromatic Dispersion
4. Polarization Dependent Loss
5. Polarization Mode Dispersion
6. Linear Phase Deviation
7. Quadratic Phase Deviation
8. Jones Matrix Element Amplitudes
9. Jones Matrix Element Phases
10. Time Domain (Amplitude)
11. Time Domain (Wavelength)
12. Min/Max Loss
13. Second Order Polarization Mode Dispersion
14. Phase Ripple Linear
15. Phase Ripple Quadratic

The linear transfer function may be stored for computation of component characteristics that may be established by industry in the future, thus negating the need for component re-characterization.

OVA Setup for Production Line Component Characterization

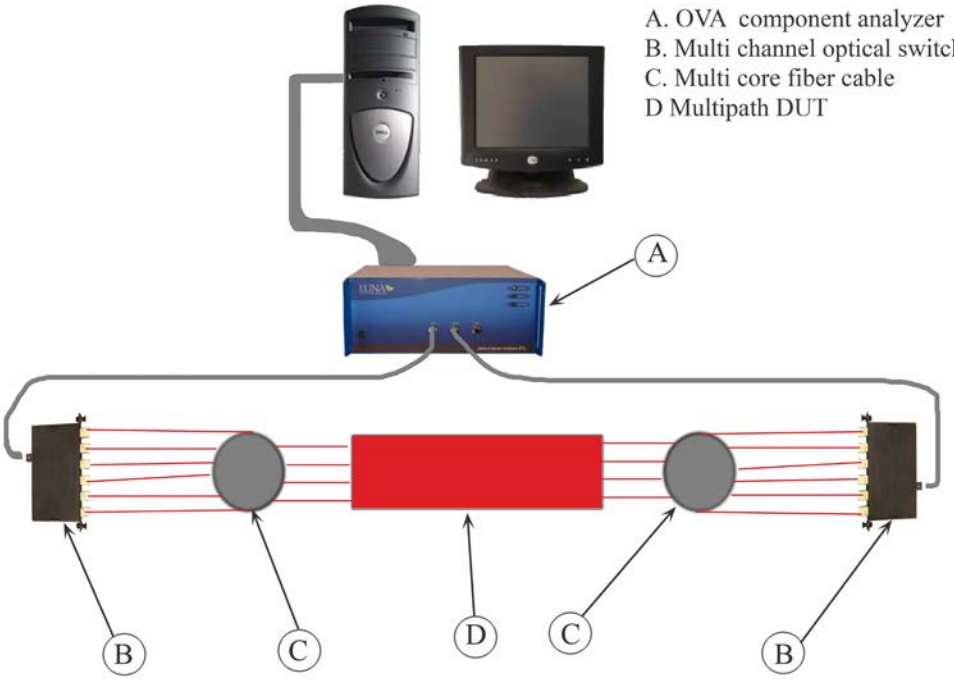
The OVA may be used in a production line setting to characterize components currently up to a device length of no greater than 150 meters in transmission, 75 meters in reflection. This may be accomplished using either the OVA remote commands or the OVA Software Development Kit (SDK). The remote commands may be transmitted to the instrument via GPIB or TCP/IP protocols. The use of the remote commands enable the user to send instructions to the OVA to perform certain tasks such as “scan”, “set the wavelength”, and “fetch data”, all of which will be communicated via the selected protocol. TCP/IP is recommended for faster communication with the device.

In order to use the remote commands, the OVA software Graphical User Interface (GUI) has to be running. When communication is established, the GUI switches to ‘remote mode’ where various GUI features are turned off to optimize device performance.

The SDK provides access to the dynamic link libraries (DLL’s) that may be used in various software applications including, but not limited to, C, C++, LabView, Visual Basic and any programming software that uses the “C” calling convention.

The use of the Luna SDK will enable the user to integrate the OVA command library into a custom GUI that may control the instrument and perform other secondary functions. In this instance, the OVA GUI is not required to be running. The software will have to reside in the control computer attached to the OVA mainframe.

The OVA has a maximum test length of 150 meters in transmission, 75 meters in reflection. To facilitate component testing, it is necessary that the total length, from the OVA source port to detector port stay within these limits. This may be accomplished by selecting the appropriate length fiber jumpers or trimming the sacrificial spools to a length within the specification. The figure below illustrates a setup for measuring a DUT with multiple input and output fibers. Two optical switches are used to cycle through each permutation of input to output fibers.


A. OVA component analyzer
B. Multi channel optical switch
C. Multi core fiber cable
D Multipath DUT
A
B
C
D
C
B

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