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Electrical-to-Optical and Optical-to-Electrical Converter Measurements

As fiber and free-space optical communication bandwidths increase, the need for very high speed optical modulators and detectors has also increased. The frequency response characterization of these electrical-to-optical (E/O, modulators sometimes integrated with lasers) and optical-to-electrical (O/E, photo detectors and receivers) converters can be important in terms of such parameters as bandwidth, flatness, phase linearity and group delay. This application note covers some of the measurements of interest, setup considerations, possible measurement performance, and examples of measurement procedures.

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Application Note
Electrical-to-Optical and Optical-to-Electrical (E/O and O/E) converter measurements
MS4640B Series Vector Network Analyzer, VectorStar
MS4652XB Series Vector Network Analyzer, ShockLine
MS46322B Series Vector Network Analyzer, ShockLine
MS46122B Series Vector Network Analyzer, ShockLine

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Figure 1: A general 2-port O/E or O/E measurement setup is shown here. In some cases, the laser and modulator may be one assembly. The photodiode may be integrated with amplifiers or other components into a photoreceiver.*

* The connections to the VNA test ports are the same for ShockLine Vector Network Analyzers.

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