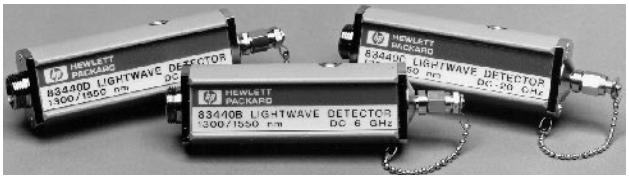
High-Speed DC-Coupled Lightwave Converter, Digital Source and Clock/Data Receiver

HP 11982A
HP 83430A
HP 83440B
HP 83440C
HP 83440D
HP 83446A

- DC-coupled optical-to-electrical converter
- Bandwidths from dc to 30 GHz
- Fast-pulse response
- Optical receiver for BERT or oscilloscope
- Clock and data recovery at 2488 Mb/s
- High sensitivity



HP 83440 Series

HP 11982A

HP 83446A

DC-Coupled Optical Converter

Optical communication systems that incorporate time-domain instruments often require optical-to-electrical (O/E) converters in order to make optical pulse and eye-diagram measurements. Whether to use an unamplified or an amplified O/E converter depends on the measurement application. If signal power levels are high enough, a simple photodiode-only converter such as the HP 83440 offers well-behaved pulse response performance. To measure low power signals, an RF-amplified O/E converter such as the HP 11982A may be required.

In frequency-domain applications, O/E converters allow frequency-domain instruments such as network and spectrum analyzers to accept optical signals for basic lightwave measurements. Users can measure, quantify, and model modulation characteristics such as spectral purity, harmonic content, and noise spectral density.

HP 83440 Series Unamplified Lightwave Converters

The HP 83440 series offers a variety of bandwidth options for converting incoming modulated optical power or optical pulses into electrical current. Ideal for optical pulse parameter measurements, these fully-integrated hermetic InGaAs photodetectors feature very low noise and pulse aberrations, fast, accurate O/E conversion, and a standard user-interface compatible with most electrical instruments. The converters mount directly on test-instrument front panels. Simple internal structure ensures low-signal distortion for improved output-signal fidelity, a novel optical launch ensures low optical reflection, and integral dc-bias regulation ensures stable frequency response performance.

The HP 83440 series can be used with high-speed digitizing oscilloscopes to accurately measure rise and fall time, overshoot, undershoot, ringing, peak power (pulse amplitude), pulse width, amplitude noise, and extinction ratio. The HP 83440 series also makes excellent mask measurements when sufficient optical power is available.

The HP 83440B Option 050 provides 50 Ω output required for use with external SDH Bessel-Thomson filters such as the HP 87441 family.

When using the HP 83440 with an ac-coupled instrument (except Option 050), a bias tee such as the HP 11612A or, alternatively, a 3 dB fixed attenuator on the output is required to provide a dc-bias return path.

HP 11982A Amplified Wide Bandwidth Lightwave Converter

A wide-bandwidth, sensitive O/E converter for characterizing lightwave systems and components, the HP 11982A combines a PIN photodetector with a low-noise dc-coupled preamplifier to create a general-purpose front end. It covers wavelengths from 1200 to 1600 nm and bandwidths from dc to 15 GHz. With 300 V/W conversion gain and 0.05 percent input optical reflections, it significantly improves the sensitivity of the measurement system. The converter comes with a calibration chart of instrument-specific data for making corrected frequency-response measurements.

Combine the HP 11982A with an HP 83480 series digital communications analyzer to make optical eye-pattern and impulse-response measurements. Use the results to verify optical and optoelectronic components and optical system level performance.

The HP 11982A can be used with an electrical spectrum analyzer to display optical modulation power as a function of frequency. Intensity modulation, distortion, and laser intensity noise are also measured. The Option 001 memory card programs an HP 8590 E series spectrum analyzer with frequency-response corrections, and menus for easy, accurate lightwave measurements to 22 GHz. Using this converter with the HP 11980A interferometer, you can measure linewidth (with a gateable modulation source), chirp, and frequency modulation of single-line lasers.

HP 83430A Lightwave Digital Source and HP 83446A Lightwave Clock/Data Receiver

With the HP 83430A and 83446A, Hewlett-Packard offers complete optical parametric test systems for test needs up to 2.5 Gb/s. A complete system includes the HP 71603B error performance analyzer as well and can perform measurements, such as optical receiver sensitivity and dispersion power penalty of single-mode fiber.

The HP 83430A is a modulatable DFB laser source that converts digital input signals to a preset optical output level that is SDH/SONET compliant. It is designed to evaluate the performance of high-speed TDM (time division multiplexed) and WDM (wavelength division multiplexed) optical receivers and systems to SDH/SONET OC-1 (51.84 Mb/s) through STM-16/OC-48 (2.488 Gb/s) standards. The HP 83430A can be combined with the HP 83480A digital communications analyzer to provide transceiver waveform testing, such as filtered conformance mask testing, extinction-ratio and eye-diagram measurements.

The HP 83446A lightwave clock/data receiver is used to extract clock and data signals from SDH/SONET optical signals operating at the 2488 Mb/s (STM-16/OC-48) rate. The HP 83446A operates over the full range of power levels specified in SDH/SONET standards (–27 dBm sensitivity) at both 1300 nm and 1550 nm wavelengths, using multimode or single-mode fiber. Designed for use with high-speed BERTs such as the HP 71603B bit-error rate tester, BER testing can now be performed directly on optical signals. A third port routes the high-gain avalanche photodiode output to the front panel, previous to clock/data regeneration for analysis of the optical waveform. An electrical input allows clock and data recovery from 2488 Mb/s.

For more complete information, order the Lightwave Test and Measurement Catalog. See detailed description on page 603.