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MODEL 307A NOISE EATER DATA SHEET 723

MODEL 307A LASER NOISE EATER

Quantum Technology's new **Model 307A** is a **Laser "Noise-Eater"** is a broad band electro-optic feedback loop designed to improve the amplitude stability of visible lasers. The system examines a sample of the throughput laser beam via a temperature stabilized, high-speed PIN photo-detector. specially designed to reduce the intensity noise on laser beams. The system quiets the laser's noise keeping it to less than 0.05% typical variation, keeping laser power supply fluctuation and drift to less than 0.05% control over 10% to 90% is accomplished over a 10 mW to 6W range line. Laser power supply line harmonics and other frequency fluctuations are also reduced up to 600 KHz. DC drift is kept to less than 0.1%. The system can be easily aligned to any laser. The power is easily adjusted by a 10 turn front panel knob and is read out on the system's digital built-in DVM. The calibration procedure is simple by the built-in testing that uses the system DVM. Since the system uses a high quality thermally compensated, stabilized detector, the output power is automatically over a 15-35 degree temperature range.

FEATURES:

1. Broad bandwidth (DC - 600 KHz unity gain).
2. Built in calibration electronics.
3. No electrical interface to laser.
4. Optical power handling capability 6 watts, single wavelength. (Special beam splitter may be required at low power levels).
5. Broad optical bandwidth, 300nm-750nm.
6. Output optical power adjustable from 10% -90% of input beam power.
7. Small package with self-contained, fully regulated power supplies.
8. Easily aligned to laser.

MODEL 307A SPECIFICATIONS

Transmission, depends on beamsplitter	>75%
Transmission Set Point Range	10%-90%
Aperture	2.5 mm
Stability	<0.05%
Laser Power Operating Range	10mw-6W with 2 types of beam splitters
AR Coating-standard, others avail.	450-650 nm
Gain/Bandwidth	-45dB @ DC
	-37 dB @ 10 KHz
	-20 dB @ 100 KHz
	0 dB @ 600 KHz
Spectral Range of E-O Head	300-750 nm, 800nm at lower transm.
Power Requirements	100-240 VAC, 50W

How It Works:

The resultant detected signal is compared to a noise free D.C. Reference via a split band amplifier. Errors existing between the reference and the detected signal are amplified and applied push-pull to a transverse field electro-optic light modulator. The modulator, in conjunction with an output polarizer, provides the required modulation capability. This push-pull error signal is applied (180° out of phase with the sample) to the modulator, resulting in a cancellation (limited by loop gain) of the original amplitude deviations.

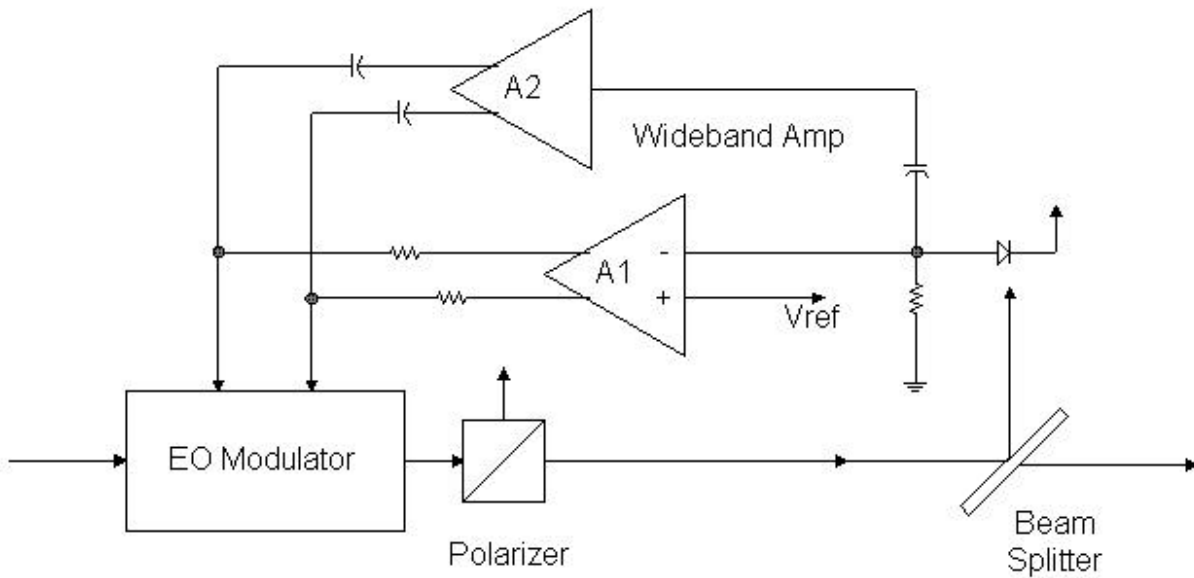


Fig 1

Figure #1 is a block diagram of the 307A laser noise reduction system. A1, a precision bipolar operational amplifier, with very low input offset drift, examines the DC And low frequency terms in the sample signal. A2, a high gain, broad band AC coupled amplifier, examines signals beyond the capability of the (A1) operational amplifier through 600 KHz. Outputs of both amplifiers are summed at the modulator resulting in an overall bandwidth capability of DC through 600 KHz.