



# QUANTUM TECHNOLOGY, INC.

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## MODEL 307

### LASER NOISE EATERS DATA SHEET 723

## MODEL 307XT LASER NOISE EATERS

Quantum Technology's **Model 307** 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 reduces the laser intensity fluctuations or "noise" for the **Model 307HF** over a band width from DC to 5 MHz (DC to 600KHz for the **Model 307A**) to a level less than 0.05% (typical), over 10% to 90% in the input power range from 10 mW to 6W. Laser power supply line harmonics and other frequency fluctuations are also reduced up to 300 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 constant automatically over a 15-35 degree Celsius temperature range.



**307XT LASER NOISE EATER SYSTEM**  
(MTM Optical Mount Not included)

#### FEATURES:

1. Very Broad bandwidth (up to DC - 5 MHz 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, 400nm-750nm., 266-1064 nm on special order
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 with user optical mount or MTM mount (DS 737)

### MODEL 307XT SPECIFICATIONS

Model	307XT	Model 307HF
Transmission, depends on beamsplitter	>75%	>75%
Transmission Set Point Range	<10%-90%	10%-90%
Aperture	2.5 mm	2.5 mm
Stability, long term	< 0.1%, 0.05% typ	<0.1%
Laser Power Operating Range	10mw-6W with 2 types of beam splitters	10mw-6W with 2 types of beam splitters
AR Coating-standard, others avail.	400-800 nm, 266-400nm special, as well as Broader coverage	400-800 nm, 266-400nm special, as well as Broader coverage
Gain/Bandwidth	-45dB @ DC	-40dB @ DC
	-37 dB @ 10 KHz	-32dB @ 100 KHz
	-20 dB @ 100 KHz	-21dB @ 1 MHz
	0 dB @ 300 KHz	0dB @ 5 MHz
Spectral Range of E-O Head	266-750 nm, 800nm at lower transmission	300-750nm, 800nm at lower transmission
Power Requirements	100-240 VAC, 50W	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.

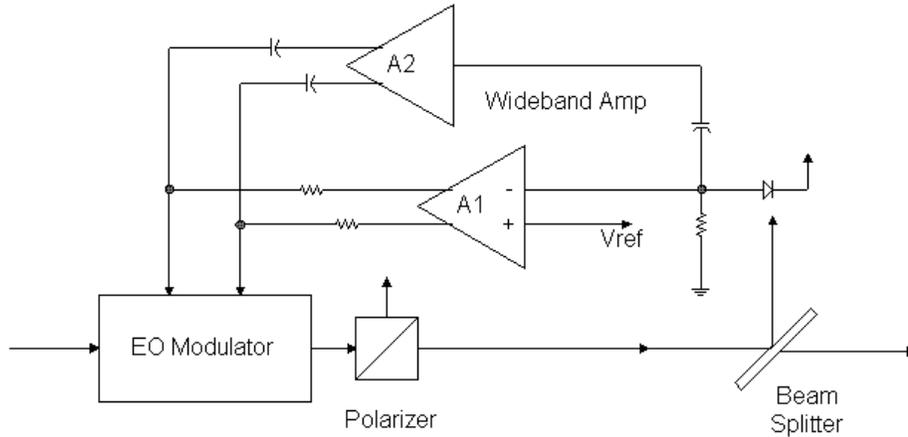
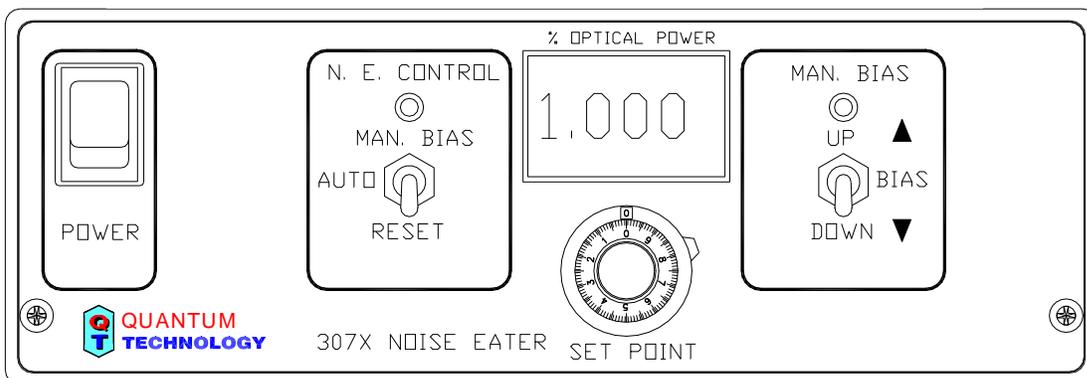


Fig 1

noise eater block diag

**Figure #1** is a block diagram of the 307HF and 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 or 5 MHz. Outputs of both amplifiers are summed at the modulator resulting in an overall bandwidth capability of DC through 5MHz.

**307X NOISE EATER CONTROLLER**



**TOP VIEW**  
**307XT NOISE EATER SYSTEM :**

Feedback Control Electronics: 9.0" L x 7.25" W x 2.5" H

307XT Power Supply: 9.5" L x 8.25" W x 2.5" H

Optical Head: 1.97" dia x 6.5"

