

$$\Theta = \pm 45^\circ \frac{\lambda^2}{\lambda_0^2} \left( \frac{\lambda_0^2 - F}{\lambda^2 - F} \right)^2$$



## Laser Noise Eaters



$$\Theta = \int_z^{z+L} H_1 dz$$



### Introduction

The LASS-II (Laser Amplitude Stabilization System) is an electro-optic feedback loop designed to reduce amplitude variations commonly associated with most gas lasers. This system is capable of significantly enhancing the signal/noise ratio of the laser over a much broader bandwidth than typical optically coupled current modulation of the plasma tube. Both an internal and external reference input are provided, allowing analog programming of the laser through-put. This is particularly convenient for use in recording systems where laser power must be varied as a function of position on the recording medium i.e., video disc, flat bed recorders, etc. The system is composed of three separable units; feedback electronics, power supply, and electro-optic modulator with integral beam splitter and photodiode amplifier.

### Performance Specifications

Operating Conditions (See Figure 1)

514 nm, laser power-50 mw,  $l_0 = .5 l_{max.}$ ,  
Beam dia 1.4 mm (1/e<sup>2</sup>) TEM00

### Noise Reduction (f).

1/1 @ 500 KHz (Int. Ref. Mode)

5/1 @ 100 KHz

18/1 @ 50 KHz

100/1 @ 10 KHz

200/1 @ 1 KHz

250/1 @ 200 hz

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**Noise Floor** - 458 nm - 100 db Relative to F.S.  
 D.C. Stability - Short Term, .1% Relative to Full Scale  
 (@ .5 I<sub>max</sub>), T = 0 - > 1 Hr.  
 Ext. Modulation Bandwidth (-3 db), Dc - > 50 KHz  
 (.2 - > .8 I<sub>max</sub>).  
 Ext. Input Impedance = 1 k nom  
 Ext. Input Voltage. 0 - > +1 V max  
 Electrical Input Power -20 W (100-230 Vac)

## Optical

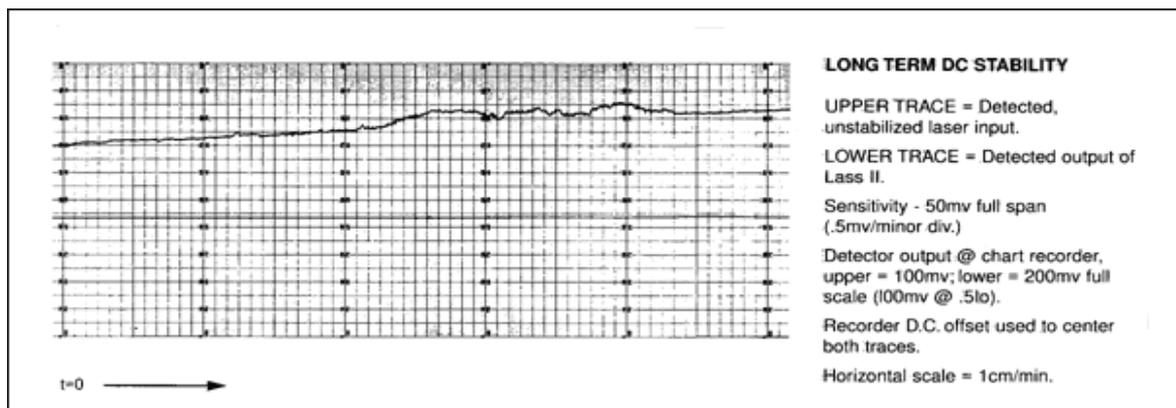
**Sensitivity** - (That amount of light required to calibrate feedback loop)  
 Output of beamsplitter to diode.

@ 633 nm - 300 uw  
 @ 514 nm - 450 uw  
 @ 488 nm - 540 uw  
 @ 458 nm - 820 uw

Two different types of beamsplitters are available so as to optimize both efficiency and finesse.

**Static Transmission** - 85% (excluding beamsplitter)  
**Useable Aperture** - 2.5 mm square\*  
**Optical Bandwidth** - 400 - 800 nm\*\*  
**Maximum Throughput Power** - 3.5w/mm<sup>2</sup> TEMOO

\*Large Aperture 3.5 mm available on special order (suggested for Large Frame Argon/Krypton Lasers).  
 \*\*Both UV & IR on special order.



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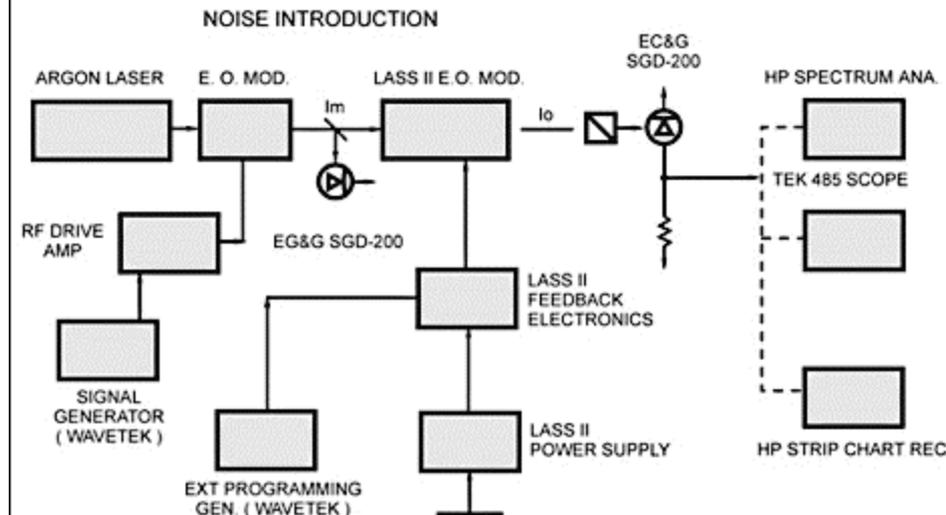
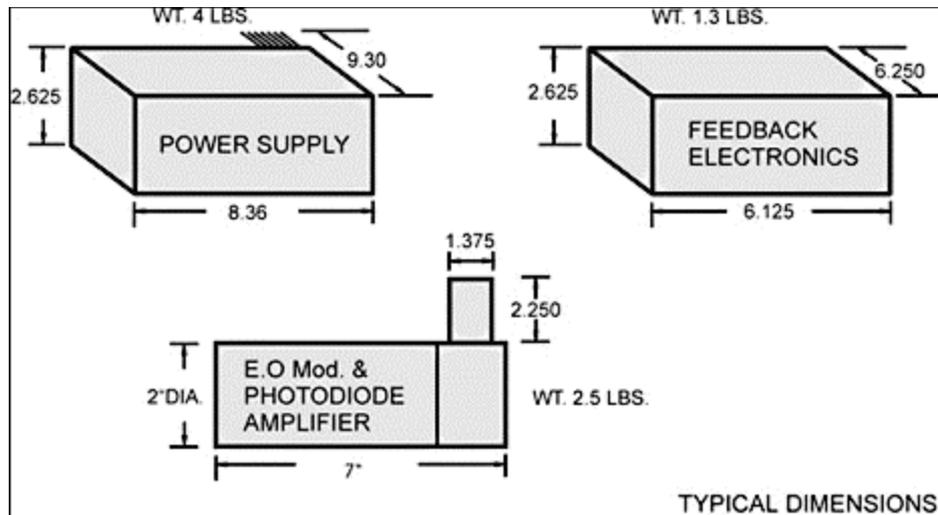
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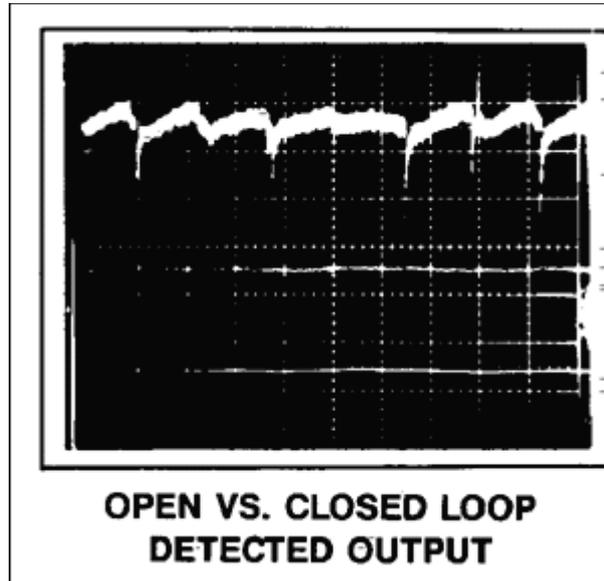
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## Laser Noise Eaters



$$\Theta = V \int_{z_0}^{z_0+L} H_1 dz$$



$I_{dc} = 1.0V$   
TOP TRACE \* AC COUPLED  
10mv/DIV; 1 msec/DIV.

MIDDLE TRACE \* CLOSED LOOP  
AC COUPLED 5mv/DIV

BOTTOM TRACE \* DETECTOR  
WITHOUT LASER

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