

## EOM/AOM Driver

DCC: [E1400445](#)

### Description

The AOM/EOM driver is a high power RF amplifier which provides the necessary power level to drive an eletro-optical modulator (EOM) or an acousto-optical modulator (AOM). This driver needs to provide up to 2W of RF power adjustable over a 24dB range. The EOM driver also has the option of an amplitude stabilization circuit to minimize oscillator AM noise in the optical field leaving the EOM.

The amplitude stabilization circuit requires a low noise RF detector. The presented design uses a combination of series and shunt diode detectors in a differential arrangement to effectively quadruple the response. A parallel chain of diodes is used to both compensate for temperature drifts and to remove a bias. Under nominal RF load this detector then has zero output and can directly be used in a compensation network to control a variable RF attenuator ahead of the detector. A relatively high bias current is applied to the diodes to minimize Johnson and flicker noise.

Two modules are envisioned: (i) a unit to accurately measure the RF AM noise, and (ii) a unit to stabilize the RF AM. These units are closely related by sharing the RF detector chain. Two RF detectors are implemented per unit. For the RF AM stabilization one serves as a in-loop and one serves as an out-of-loop measurement. The out-of-loop detector servos its bias and is therefore AC coupled. The bias of the in-loop detector is adjusted externally which is used to set the RF level at the output.

The RF chain consists of a voltage-controlled attenuator, a high power amplifier and two in series directional couplers which feed the two RF detectors. The attenuator is used to control the RF power up to a 100kHz bandwidth.

A report describing the measured performance can be found in [T1000574-v1](#).

### Specifications

Frequency range:

- 5 MHz - 150 MHz minimum

Input:

- 10 dBm nominal
- N female

High power output:

- 33 dBm max.
- N female
- 20 dB attenuation min.
- 1 dB step size
- enable switch/LED

Phase noise:

Frequency	Phase noise spec
10 Hz	-120 dBc/Hz
100 Hz	-155 dBc/Hz
1 kHz	-165 dBc/Hz
10 kHz	-165 dBc/Hz

Amplitude noise:

Frequency	AM noise spec
10 Hz	-160 dBc/Hz
100 Hz	-170 dBc/Hz
1 kHz	-170 dBc/Hz
10 kHz	-170 dBc/Hz

Amplitude stabilization:

- AC coupled or fixed DC bias
- +/-0.5dB range
- Bandwidth: approximately 100 kHz

AC coupled monitors (2):

- in-loop and out-of-loop power monitor
- Single-ended
- +/-10V
- Bandwidth: 200 kHz
- BNC female

DC coupled monitors (2):

- in-loop and out-of-loop power
- Single-ended
- 0V to +10V
- Bandwidth: 1 kHz
- BNC female

Test input:

- AM stabilization circuit error point offset
- Differentially sensed
- +/-10V
- Bandwidth: 200 kHz
- on/off switch
- BNC female

Test outputs (3):

- Before and after excitation point
- Control signal
- Single-ended
- +/-10V
- Bandwidth: 100 kHz
- BNC female

DAQ outputs (4):

- in-loop and out-of-loop power, AC coupled
- in-loop and out-of-loop power, DC coupled
- Differential
- +/-20V
- Bandwidth: 100 kHz
- D-Sub, female, 9-pin

Remote controls:

- Power adjust either local or remote
- Binary inputs for power adjust and excitation switch
- Binary readbacks for supply voltages in range, internal/external switch, RF enabled, excitation enabled
- Analog readbacks for DC power and control signal

Physical:

- stand-alone
- 2U half-width enclosure
- 8"(W) x 3.5"(H) x 14.7"(D)

Power supply:

- $\pm 24V$  and  $\pm 18V$