

OMC Length Driver -Quick Start Guide
LIGO- T060255-00-C
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Hardware Revision Applicability – Rev. A1

1. Overview

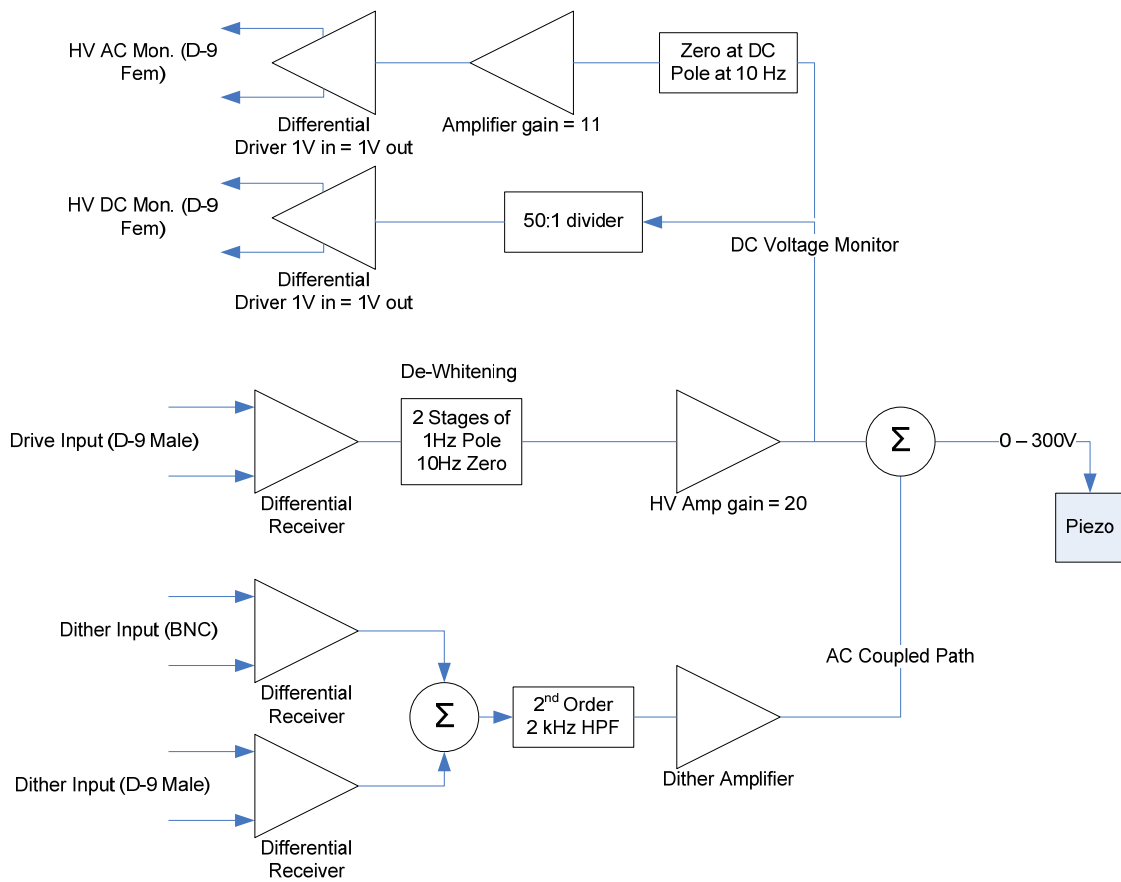
- 1.1. The OMC (Output Mode Cleaner) Length driver chassis (LIGO-D060283) provides the high voltage (0 to 300V) drive for the OMC. **This chassis contains potentially lethal voltages. Extreme care must be used.**
- 1.2. The piezo drive can be modulated for dither locking at frequencies from 2 to 20 kHz. Dither modulation can be applied from a DAC (Digital to Analog) interface, or from a front panel BNC.
- 1.3. The piezo output drive has two separate voltage monitors – a DC coupled monitor, and an AC coupled monitor.

2. Electrical Interfaces

- 2.1. All **front panel inputs** are true-differential, bipolar +/- 10 volt range. The input impedance is 10k ohms on all inputs. Inputs voltages should be limited to +/- 15 volts to avoid damage.
- 2.2. All **front panel outputs** are fully differential +/- 10 volt range. Load impedances should be greater than 1k ohm.
- 2.3. The required **low voltage power supply** is nominally +/- 18 VDC @ 0.2 amps. A range of voltages from +/-16 to +/- 24 is acceptable.
- 2.4. The required **high voltage power supply** is 300 VDC +/- 5% with a current capacity of at least 10mA.
- 2.5. The nominal **piezo load capacity** is 0.22 uF +/- 20%
- 2.6. Detailed **electrical schematics** are available in LIGO document D060283

3. **Figure 1** shows an overview of the OMC Length Driver

Figure 1



4. Figure 2 and Figure 3 show the front and rear of the OMC Length driver chassis. A functional description of each connector is provided.

4.1. Front Panel diagram

Figure 2, Front Panel



4.2. Front Panel Functions

4.2.1. **Piezo Voltage Mon** – Monitoring for the high voltage output. 1V at the DC monitor is 50V at the HV output. The AC path has a zero at DC, a pole at 10 Hz and a gain of 11 amplifier. No internal filtering of signal on DC path.

4.2.2. **Alt. Dither IN** – A BNC input that provides an alternate path for injecting a 2 kHz to 20 kHz modulation signal used to dither-lock a particular axis. Path includes a second order, 2 kHz high-pass filter.

Drive Frequency	Maximum Peak-to-peak Input Voltage	Output across 0.22uF Piezo
5 kHz	10.5 Vp-p	7.6 Vp-p
10 kHz	5.8 Vp-p	3.8 Vp-p
20 kHz	3.7 Vp-p	2 Vp-p

4.2.3. **Piezo Drive** – A D-9, male input for differential voltage drive to the OMC Length Piezo. Two DAC output channels are interfaced by this connector.

4.2.3.1. One channel is used for the length-control function, and other channel is used for a dither function at higher frequencies (identical to section 4.2.2 for the BNC dither input).

4.2.3.2. A 1 volt signal at this input changes the voltage across the piezo by 20 volts. The quiescent high voltage output voltage drive rests at 150V +/-5% when there is no input (0V).

4.2.3.3. A de-whitening filter consisting of 2 poles at 1 Hz and 2 zeros at 10 Hz is included in this path.

4.2.3.4. The current at each HV output is limited internally to 4mA +/- 5%, and is short-circuit-protected.

4.3. Rear Panel Diagram

Figure 3, Rear Panel



4.4. Rear Panel Functions

- 4.4.1. **DC IN** – A three terminal input in a D-15 shell. This input supplies the DC power to the chassis. The nominal input is +/- 18 VDC @ 0.2 amps, but a range from +/- 16 to +/- 24 VDC is acceptable. This range allows sufficient overhead for the internal low-dropout regulators, but is not so high as to cause a thermal dissipation issue with the regulators.
- 4.4.2. **+15 & -15 volt LEDs** – When lit, indicate the presence of DC power at the output of the internal regulator board. The power regulator has Poly-fuses that are rated at 2 amps. Cycling power to the chassis via the DC On/Off switch will reset the Poly-fuse provided the fault condition is clear
- 4.4.3. **DC On/Off** – Switch to turn power on and off. Switch removes power from the input of the power regulator board.
- 4.4.4. **To OMC** – D-25, female connector providing interface to the OMC length piezo. **Potentially lethal high voltages (150VDC) are present on this connector.** Extreme care must be employed when working with this connection.
- 4.4.5. **HV Input** – This is the high voltage power supply input to the chassis. 300 VDC @ ≥ 10 mA is required.