LIGO HANFORD OBSERVATORY

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# MEMORANDUM

DATE: March 1, 2019

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| TO: | ISC team |
| FROM: | Daniel Sigg |
| SUBJECT: | Modifications to the CM board (REFL SERVO) |
| Refer to: | LIGO-E1800338-v2 |

The common mode servo of the interferometer suffers from noise in the DAQ readbacks that are due to large high frequency signals. There is also a lack of boost filters to squash the low frequency noise below 100Hz. Capacitors need to be NP0/COG or metal film.

Change 1:

Change the first 2 boost stages to 10/500Hz.

C118 → 1 µF

R72 → 15 kΩ

R74 → 15 kΩ

C119 → 1 µF

R74 → 15 kΩ

R78 → 332 Ω

Change 2:

Add two ~15 kHz low pass and 5 times more gain to the error signal DAQ readback.

C78 → 1 nF

C79 → 3.3 nF

R56 → 665 Ω

Change 3:

Add a 500 Hz & 14kHz low pass to the slow DAQ readback.

C241 → 3.3 nF  
C243 → 10 nF

Change 4:

Add two ~15 kHz low pass to the fast DAQ readback.

C293 → 3.3 nF  
C295 → 330 pF

BOM (for 3 ifo):

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| **Qty** | **Item** | **Distributor** | **Description** |
| 3 | 81-GRM2165C1H332FA1J | Mouser | C79, 3.3 nF, 1% |
| 6 | 80-C322C332F5G | Mouser | C241/293, 3.3 nF, 1% |
| 3 | 581-08055A331FAT2A | Mouser | C295, 330 pF, 1% |
| 3 | 81-GRM2195C1H103FA1D | Mouser | C243, 10nF, 1% |
| 3 | 581-08055A102FAT2A | Mouser | C78, 1nF, 1% |
| 6 | WA2A105F | RTI | C118/C119, 1 μF |
| 3 | P15KDACT-ND | Digi-Key | R68, 15 kΩ |
| 3 | P332DACT-ND | Digi-Key | R68, 332 Ω |
| 3 | P665DACT-ND | Digi-Key | R56, 665 Ω |
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