

LIGO HANFORD OBSERVATORY

PO BOX 159

RICHLAND WA 99352

TEL: 509.372.8106

FAX: 509.372.8137

# MEMORANDUM

DATE: March 15, 2017

|  |  |
| --- | --- |
| TO: | ISC |
| FROM: | Daniel Sigg |
| SUBJECT: | Phase Frequency Discriminator Modifications |
| Refer to: | LIGO-E1700100-v1 |

The table-top frequency stabilization servo (TTFSS) is using the phase frequency discriminator (PFD) for laser locking. The standard circuit board variant has a bandwidth of no more than 500 kHz. For laser locking an overall bandwidth around 1 MHz is desirable and we require the PFD to introduce no more than 20° of phase at 1 MHz. The schematics can be found under [D1002471](https://dcc.ligo.org/LIGO-D1002471).

|  |  |  |  |
| --- | --- | --- | --- |
| Parameters | Standard | High Frequency | Unit |
| Pole frequency (Q) | 0.463.0 (1.5)3.0 (1.5)5.3 | 5.77.1 (1.4)7.1 (1.4)17 | MHz |
| Phase at | 0.10.51.02.0 | MHz | −15−59−90−135 | −2−10−19−38 | ° |
| 3-dB bandwidth | 0.48 | 7.7 | MHz |
| Capacitor C15 | 150 | 47 | pF |
| Capacitor C16 | 1000 | 47 | pF |
| Capacitors C26 & C43 | 15 | 4.7 | pF |

