*LIGO Laboratory / LIGO Scientific Collaboration*

LIGO-T1600605-v6 Advanced LIGO December 13, 2018

Monitor Photodiodes for SQZ

Rich Abbott, Lisa Barsotti, Daniel Sigg

Distribution of this document:

LIGO Scientific Collaboration

This is an internal working note

of the LIGO Laboratory.

|  |  |
| --- | --- |
| **California Institute of Technology****LIGO Project – MS 18-34****1200 E. California Blvd.****Pasadena, CA 91125**Phone (626) 395-2129Fax (626) 304-9834E-mail: info@ligo.caltech.edu | **Massachusetts Institute of Technology****LIGO Project – NW22-295****185 Albany St****Cambridge, MA 02139**Phone (617) 253-4824Fax (617) 253-7014E-mail: info@ligo.mit.edu |
| **LIGO Hanford Observatory****P.O. Box 159****Richland WA 99352**Phone 509-372-8106Fax 509-372-8137 | **LIGO Livingston Observatory****P.O. Box 940****Livingston, LA 70754**Phone 225-686-3100Fax 225-686-7189 |

http://www.ligo.caltech.edu/

List of RF Photodiodes

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Location** | **Type** | **RF Chain** | **Comment** |
| **Newport 1611FS-AC:** | [Commercial](https://www.newport.com/p/1611FS-AC) |
| FIBR\_MIXER | ISCT6/FSS1 | 1611 | TTFSS | Laser/fiber locking PD |
| **Broadband Photodetectors:** | [E1200428](https://dcc.ligo.org/LIGO-E1200428) |
| SHG\_TRANS\_RF35 | ISCT6/SHG | BBPD | 2ch demod | SHG locking (IR) |
| **LSC RF Photodetectors:** | [E1400099](https://dcc.ligo.org/LIGO-E1400099) |
| CLF\_REFL\_RF6 | SQZT6/CLF | ALIGO | 2ch demod | CLF phase. locking |
| OPO\_REFL\_RF80 | SQZT6/OPO | ALIGO | 2ch demod | OPO locking |
| **Existing OMC DCPD:** | [E1300521](https://dcc.ligo.org/LIGO-E1300521) |
| OMC\_TRANS\_RF3 | In-vac | ALIGO | 2ch demod | Squeeze angle locking |
| **Homodyne Photodetector:** | [E1700135](https://dcc.ligo.org/LIGO-E1700135) |
| HD\_DIFF\_RF3 | SQZT6/HD | ALIGO | 2ch demod | LO locking/diagnostics |

List of DC monitor photodiodes

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Name** | **Location** | **Type** | **S** | **F** | **W** | **Comment** |
| **4-chn Generic PD interface (ISCT6):** |
| FIBR\_PD\_DC/LF | ISCT6/FSS1 | 1611 | × | × | × | DC of laser/fiber locking PD |
| SHG\_TRANS\_ DC/LF | ISCT6/SHG | BBPD | × | × | × | DC of SHG locking (IR) |
| LASER\_IR\_ DC/LF | ISCT6/PD1 | PDA100A | × | × | × | Power of SQZ laser |
| SHG\_GR\_ DC/LF | ISCT6/PD2 | PDA100A | × | × | × | SHG green power (GR) |
| **4-chn Generic PD interface (SQZT6):** |
| CLF\_TRIG\_DC | SQZT6/PD3 | PDA100A | × | × |  | Trigger PD CLF path |
| OPO\_IR\_PD\_LF | SQZT6/IR | PDA100A | × | × |  | DC of OPO transmitted (IR) |
| CLF\_REFL\_DC | SQZT6/CLF | ALIGO | × |  |  | DC of CLF refl. Locking |
| OPO\_REFL\_DC | SQZT6/OPO | ALIGO | × |  |  | DC of OPO refl. Locking (GR) |
| **DC Outputs of LSC RF PD interface:** |
| CLF\_REFL\_LF | SQZT6/CLF | ALIGO |  | × | + | DC of CLF refl. locking |
| OPO\_REFL\_LF | SQZT6/OPO | ALIGO |  | × | + | DC of OPO refl. Locking (GR) |
| **Homodyne interface:** |
| HD\_B\_DC | SQZT6/HD | ALIGO |  | × | + | PD B of homodyne |
| HD\_DIFF\_DC | SQZT6/HD | ALIGO |  | × | + | Difference of homodyne PDs |
| HD\_A\_DC | SQZT6/HD | ALIGO |  | × | + | PD A of homodyne |
| **Unamplified DC Monitors:** |
| SHG\_FIBR\_REJECTED\_DC | In-vac | PD | × |  |  | Rejected pump power |
| CLF\_FIBR\_ REJECTED \_DC | In-vac | PD | × |  |  | Rejected CLF power |
|  |  |  |  |  |  |  |
| FIBR\_TRANS \_ DC/LF | ISCT6/DC1 | SM1PD1A | × | × | × | Transmitted by laser fiber |
| FIBR\_REJECTED\_DC | ISCT6/DC2 | SM1PD1A | × |  |  | Rejected after laser fiber |
| CLF\_LAUNCH\_DC | ISCT6/DC4 | SM1PD1A | × |  |  | Injected into CLF fiber |
| CLF\_REJECTED\_DC | ISCT6/DC3 | SM1PD1A | × |  |  | Rejected before injection |
| SHG\_LAUNCH\_DC | ISCT6/DC7 | SM1PD1A | × |  |  | Injected into pump fiber |
| SHG\_REJECTED\_DC | ISCT6/DC6 | SM1PD1A | × |  |  | Rejected before injection |
| SEED\_LAUNCH\_DC | ISCT6/DC5 | SM1PD1A | × |  |  | Seed beam injection |
| LO\_LAUNCH\_DC | ISCT6/DC8 | SM1PD1A | × |  |  | LO beam injection |
| OPO\_REFL\_REJECTED\_ DC | SQZT6/DC9 | SM1PD1A | × | × | × | Rejected OPO refl. power |
| OPO\_ TRANS\_ DC/LF | SQZT6/DC10 | SM1PD1A | × | × | × | Trans. green OPO power (GR) |
| SPARE\_A\_DC | TBD | TBD | × |  |  | Spare (ISCT6) |
| SPARE\_B\_DC/LF | TBD | TBD | × | × | × | Spare (SQZT6) |
| **Trigger PD:** |
| SYS-MOTION\_C\_SHUTTER\_H\_TRIGGER | SQZT6/PD3 | PDA100A | × |  |  | Trigger PD CLF path |

S: Slow controls readback; F: Fast DAQ readback; W: Whitened readback (×: standard whitening, +: custom whitening)