LASER INTERFEROMETER GRAVITATIONAL WAVE OBSERVATORY

LIGO Laboratory / LIGO Scientific Collaboration

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ISC Custom Photodetectors: Acceptance Documentation

R. Abbott, P. Fritschel

This is an internal working note
of the LIGO Laboratory.

California Institute of Technology
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1 Requirements documentation

The custom photodetectors included in this package are:

- LSC RF photodetectors
- Broadband photodetectors (BBPD)
- ASC RF photodetectors (WFS)
- In-Vacuum QPDs (quadrant photodetectors)
- Unamplified DC photodetectors

Documentation for all of the above is found in the DCC tree, under:

aLIGO Document Tree > aLIGO, ISC > aLIGO, ISC, Photodetectors and Sensors:

LIGO-E1200199

The requirements are found in the documentation as follows:

LSC RF PD	LIGO-T1100402, sections 2 and 2.1
ASC RF PD (WFS)	LIGO-T1100402, sections 2 and 2.2
In-vac QPD	LIGO-T0900423, sections 1 and 2
BBPD	LIGO-T1100467, section1

2 Design overview and detailed design documentation

a) Final Design Document (FDD):

The technical notes listed above are the final design documents for the detectors.

b) Review reports:

- Review report for BBPD: LIGO-L1100099
- Review report for In-vac QPD: LIGO-L1000094; response is found in the same file card—all comments were incorporated into the final design
- RF PDs were not formally reviewed (internal review only within ISC group)

c) Supporting design documents: Everything is in the DCC tree. The entry LIGO-E1400110 collects documents relevant to both the LSC and ASC RF PDs.

d) Drawings: Schematics and assembly drawings are all linked in the DCC tree.

e) Bill(s) of Materials (BOM):

- RF PDs: BOM found in the 'Schematic' file card
- BBPD: LIGO-E1100819
- In-vac QPD: LIGO-E1101004

f) Interface control: none

g) Software: none

h) Design source data:

- RF PDs: Design files (Altium) are found in the 'Schematic' file card
- BBPD: Design files (Altium) included in LIGO-D1002969
- In-vac QPD: Design files are in the SolidWorks vault

3 Materials and fabrication specification

The in-vacuum RF PD enclosures are processed by SRI Hermetics. This fabrication process is defined in LIGO-C1204586. The in-house cleaning procedure is in LIGO-E1300449.

4 Parts and in-process spares inventoried

Status of all RF PDs is tracked in LIGO-T1200506. All units are in ICS under the enclosure body D-number (e.g., D1101174 for the LSC In-air RF PD).

The in-vac QPDs status is tracked in LIGO-E1101174. The dual QPD assemblies are in ICS under their cable D-numbers.

BBPDs are in ICS, under D1002969.

5 Assembly procedures

None.

6 Installation procedures

None.

7 Test documents

LSC RF PD:

- Test procedure: LIGO-T1200335
- Datasheet template: LIGO-T1200334
- Test results: filed in the S-number entry for each unit

ASC RF PD (WFS):

- Test procedure: LIGO-T1200347
- Datasheet template: LIGO-T1200381
- Test results: filed in the S-number entry for each unit

BBPD: No written test procedure. All units were tested for proper DC and RF response, but results were not recorded.

In-vac QPD: Diode element test results are found in LIGO-T1200065 and LIGO-T1200063. Dual QPD assemblies were re-tested, though results were not recorded. The status document E1101174 includes QPD serial numbers that can be cross-referenced to the test results.

8 User interface software

None.

9 Operation Manual

Under LIGO-E1200199, see:

- LIGO-T1300488: Guide to Troubleshooting aLIGO RFPDs
- LIGO-T1300315: Notes on RFPD Signal Chain Measurements
- LIGO-T1300506: aLigo RFPD Spot Check Procedure

10 Safety

All ISC electronics is in conformance with the LIGO EEIP (Electrical Equipment Inspection Program). This program was implemented to protect personnel from electrical hazards.