*LIGO Laboratory / LIGO Scientific Collaboration*

LIGO-E1300827-v1 *LIGO* November 11, 2013

*ISC Demodulators and Phase-Frequency Discriminators:* Acceptance Documentation

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This is an internal working note

of the LIGO Laboratory.

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| **California Institute of Technology**  **LIGO Project** | **Massachusetts Institute of Technology**  **LIGO Project** |
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# Requirements documentation

The requirements for the RF demodulators and phase-frequency discriminators are included in the overall design documentation; see below.

# Design overview and detailed design documentation

1. *Final Design Document (FDD):*

|  |  |  |
| --- | --- | --- |
| Type | DCC | aLIGO Wiki page:  https://awiki.ligo-wa.caltech.edu/aLIGO/ |
| 4-channel I/Q demodulator | [LIGO-T1000044](https://dcc.ligo.org/LIGO-T1000044) | IQ\_Demodulator |
| 2-channel I/Q demodulator | [LIGO-E1100044](https://dcc.ligo.org/LIGO-E1100044) | IQ\_Demodulator\_2-chn |
| Phase-frequency discriminator | [LIGO-E1000450](https://dcc.ligo.org/LIGO-E1000450) | PhaseFrequencyDiscriminator |

*b) Review reports:*

* FDR report: LIGO-L1000094-v1
* Response to FDR report: included as attached file in the above.

*c) Supporting design documents:* Everything is in the DCC tree, under the nodes:

aLIGO Document Tree > aLIGO, ISC > aLIGO, ISC, Electronics > aLIGO, ISC, Electronics, RF System:

* E1200112 (4-ch I/Q)
* E1200113 (2-ch I/Q)
* E1200114 (PFD)

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

*e) Bill(s) of Materials (BOM):* The assembly file card for each module type includes the bill of materials.

*f) Interface control:* none

*g) Software:* not relevant

*h) Design source data:* Altium project files are included in the DCC file card for each board.

# Materials and fabrication specification

No special materials.

# Parts and in-process spares inventoried

All modules are entered in ICS. Quantities:

|  |  |  |  |
| --- | --- | --- | --- |
| **Module** | **Qty in ICS** | **Needed for 3 IFO** | **Spares** |
| 4-ch I/Q: D0902796 | 66 | 45 | 21 |
| 2-ch I/Q: D1000181 | 20 | 12 | 8 |
| PFD: D1002476 | 15 | 9 | 6 |

# Assembly procedures

Chassis assembly procedure for I/Q demods: [LIGO-T1000453](https://dcc.ligo.org/LIGO-T1000453)

Modifications for 2-ch units: [LIGO-E1100044](https://dcc.ligo.org/LIGO-E1100044)

PFD assembly: [LIGO-D1002476](https://dcc.ligo.org/LIGO-D1002476)

# Installation procedures

None.

# Test documents

*Test procedures:*

I/Q demods: [LIGO-T1100062](https://dcc.ligo.org/LIGO-T1100062)

2-ch version: [LIGO-E1100114](https://dcc.ligo.org/LIGO-E1100114)

PFD: [LIGO-E1100102](https://dcc.ligo.org/LIGO-E1100102)

*Test reports:*

4-ch I/Q demods: test reports are filed in the S-number file card for each serial number (using form F1100004).

2-ch I/Q demod (all units): [LIGO-E1200074](https://dcc.ligo.org/LIGO-E1200074)

PFD (all units): [LIGO-E1100977](https://dcc.ligo.org/LIGO-E1100977)

# User interface software

Not applicable.

# Operation Manual

Not applicable.

# Safety

All ISC electronics is in conformance with the LIGO [EEIP](https://galaxy.ligo.caltech.edu/EEIF/html/) (Electrical Equipment Inspection Program). This program was implemented to protect personnel from electrical hazards.