*LIGO Laboratory / LIGO Scientific Collaboration*

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*ISC Signal Conditioning Electronics:*

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

***SCOPE:*** ISC signal conditioning electronics consists of: Whitening/Variable-Gain Amplifiers (VGA); Quad Photodetector Transimpedance Amplifiers; Anti-alias (AA) and Anti-image (AI) amplifiers. The AA/AI amplifiers are a common design across aLIGO; their design was done within DAQ, and is not covered here. Only the production information for the ISC AA/AI units is included here.

Requirements documentation:

* Whitening/VGA. Req’s found in section 2 of the design doc: [LIGO-T1000321](https://dcc.ligo.org/LIGO-T1000321)
* QPD Amp. Req’s found in section 6.1/6.2 of the design doc: [LIGO-T0900423](https://dcc.ligo.org/LIGO-T0900423)

# Design overview and detailed design documentation

1. *Final Design Document (FDD):*

|  |  |
| --- | --- |
| Type | DCC |
| Whitening/VGA | [LIGO-T1000321](https://dcc.ligo.org/LIGO-T1000321) |
| QPD Transimpedance Amp | [LIGO-T0900423](https://dcc.ligo.org/LIGO-T0900423) |

*b) Review reports:*

* FDR report relevant to Wh/VGA: [LIGO-T1000334](https://dcc.ligo.org/LIGO-T1000334); see p10 – review comments were all acted on
* FDR report for QPD: LIGO-L1000094-v1 (no actions)

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

aLIGO Document Tree > aLIGO, ISC > aLIGO, ISC, Electronics > aLIGO, ISC, Electronics, Analog:

* aLIGO, ISC In-vacuum, QPD: [LIGO-E1200539](https://dcc.ligo.org/LIGO-E1200539)
* aLIGO, ISC, Electronics, Whitening/VGA Module: [LIGO-E1200425](https://dcc.ligo.org/LIGO-E1200425)
* ISC AA chassis: [LIGO-D0902783](https://dcc.ligo.org/LIGO-D0902783)
* ISC AI chassis, included in: [LIGO-D070081](https://dcc.ligo.org/LIGO-D070081)

*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:* TwinCAT Library for ISC Whitening Chassis, [LIGO-E1200424](https://dcc.ligo.org/LIGO-E1200424)

*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** |
| Whitening/VGA: D1002559 | 88 | 81 | 7 |
| QPD TransAmp, D1002481 | 35 | 30 | 5 |
| ISC AA, D0902783 | 48 | 45 | 3 |
| ISC AI, D070081 | 19 | 15 | 4 |

# Assembly procedures

See assembly drawings for each chassis type (listed above).

# Installation procedures

None.

# Test documents

*Test procedures:*

Whitening/VGA: [LIGO-T1100291](https://dcc.ligo.org/LIGO-T1100291)

QPD TransAmp: [LIGO-T1100160](https://dcc.ligo.org/LIGO-T1100160)

*Test reports:*

Test reports are filed in the S-number file card for each serial number.

# User interface software

Not applicable.

# Operation Manual

Not applicable.

#  Safety

Not applicable*.*