

Advanced LIGO Engineering Change Request (ECR)

ECR Title: Reduction of Bias Voltage Noise in OMC DCC No: E1600061-v1
DCPDs

Date: 26 February 2016

Requesters: Richard Abbott Impacted Subsystem(s): ISC

Description of Proposed Change(s): Referring to the schematic for D1300520, the ISC Split Whitening Board that serves as the interface to the OMC DCPDs, two capacitors will change for each of the two bias regulators. C7 and C9 are presently 1uF ceramic capacitors that exhibit microphonic behavior. Propose to change C7 and C9 to 10uF tantalum capacitors. Testing has revealed better noise performance by changing C1 and C2 from 10uF tantalum to 47uF tantalum.

Reason for Change(s):

Measurements have been made to measure the coupling of OMC DCPD photodiode bias voltage to DARM. While the exact coupling magnitude has some uncertainty, a relatively trivial change of component values can achieve an additional noise reduction of up to a factor of 10 with no known downside.

Estimated Cost: There is essentially no hardware cost associated with this change beyond a few 10s of dollars for the capacitors.

Schedule Impact Estimate: The time to remove the associated chassis, make the changes, and restore the system to normal operation is approximately 1 hour.

Nature of Change (check all that apply):

- Safety
- Correct Hardware
- Correct Documentation

- Improve Hardware
- Improve/Clarify Documentation
- Change Interface
- Change Requirement

Importance:

- Desirable for ease of use, maintenance, safety
- Desirable for improved performance, reliability
- Essential for performance, reliability
- Essential for function
- Essential for safety

Urgency:

- No urgency
- Desirable by date/event: before final acceptance
- Essential by date/event: Installation of HWWD hardware
- Immediately (ASAP)

Impacted Hardware (select all that apply):

Repair/Modify. List part & SNs: S1301540-S1301544, S1600137-S1500140

Scrap & Replace. List part & SNs: _____

Installed units? List IFO, part & SNs: _____

Future units to be built

1. Impacted Documentation D1300520

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Disposition of the proposed change(s):

The disposition of this proposed engineering change request is to be completed by Systems Engineering and indicated in the “Notes and Changes” metadata field in the DCC entry for this ECR. The typical dispositions are as follows:

- **Additional Information Required**: in which case the additional information requested is defined. The ECR requester then re-submits the ECR with the new information using the same DCC number for the ECR but with the next version number.
- **Rejected**: in which case the reason(s) for the rejection are to be given
- **Approved**
- **Approved with Caveat(s)**: in which case the caveat(s) are listed
- **TRB**: the ECR is referred to an ad-hoc Technical Review Board for further evaluation and recommendation. It is the System Engineer’s (or designee’s) responsibility to organize the TRB. The System Engineer (or designee) then makes a technical decision based on the TRB’s recommendation. Links to the TRB’s documentation (charge, memos, final report, etc.) are to be added to the “Related Documents” field for this ECR.
- **CCB**: a change request for approval of additional funds or schedule impact is to be submitted to the Configuration Control Board. Links to the CCB’s documentation (CR, etc.) are to be added to the “Related Documents” field for this ECR.

Concurrence by Project Management:

Acknowledgement/acceptance/approval of the disposition is to be indicated by the electronic “signature” feature in the DCC entry for this ECR, by one the following personnel:

- Systems Scientist
- Systems Engineer
- Deputy Systems Engineer