Advanced LIGO Engineering Change Request (ECR)

ECR Title: PI Readbacks for OMC DCPDs **DCC No: E1600192-v1**

Date: 27 June 2016

Requester: Daniel Sigg **Impacted Subsystem(s):** **ISC (OMC)**

Description of Proposed Change(s):

Phase 1: Connect unused channels 7/8 to current DCPD channels 5/6. Remove poles from whitening channels 7/8. In detail: On D1300520 remove R9,10,17,18 and add jumpers on J3 pins 1-3, 9-11, 2-4 and 10-12. On D1001530 board #2 change C37,38,39 from 5.6nF to 560pF NPO on channels 3 and 4.

Phase 2: Make a new interface board incorporating the jumper patch, add AC coupling for channels 7/8, and two SE BNC/SMA analog monitor outputs with a bandwidth up to 500 kHz.

Model changes: Add new DAQ channels to OMC PI model.
TwinCAT: Activate whitening for OMC PI channels.

Reason for Change(s): There are two poles at 14kHz and 18kHz in the whitening path of the DCPD readouts. For the readbacks of PI modes we would like to have a much higher bandwidth in order to improve the SNR at frequencies > 10kHz. Analog front panel monitors for each DCPD are highly desirable to check for PIs at very high frequencies with a scope or spectrum analyzer.

Estimated Cost: Phase 1: trivial. Phase 2: New interface board and front panels, ~$3000

Schedule Impact Estimate:

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: _____
- ☐ Essential by date/event: _____
- ☒ Immediately (ASAP)

Impacted Hardware (select all that apply):
- ☐ Repair/Modify. List part & SNs: _____
- ☐ Scrap & Replace. List part & SNs: _____
- ☐ Installed units? List IFO, part & SNs:
- ☐ Future units to be built

Impacted Documentation (list all dwgs, design reports, test reports, specifications, etc.):

D1002559 (chassis), D1300520 (interface), D1001530 (whitening), D1300547 (panel), T1100472 (DAQ), E1300079 (TwinCAT)

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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