Advanced LIGO Engineering Change Request (ECR)

ECR Title: Add sensor channel from EOM driver to science frames

DCC No: E1500343-v1

Date: 12 August 2015

Requester: Peter Fritschel

Impacted Subsystem(s): LSC, DAQ

Description of Proposed Change(s):

Add the channel `H1:LSC-MOD_RF45_AM_AC` to the science frames (for H1), at 16384 Hz. This is the out-of-loop sensor signal from the recently installed EOM driver for the 45 MHz phase modulation.

Reason for Change(s):

The aLIGO EOM driver was recently installed on H1 for the 45 MHz modulation drive, to reduce the noise coming from AM on these sidebands. The EOM driver has an internal amplitude stabilization servo, which significantly suppresses the noise that was coming from the 45 MHz source (harmonic generator). The driver also includes an out-of-loop AM sensor; given the sensitivity of the interferometer (DARM) to this noise, it makes sense to add this sensor channel to the science frames. The coupling of 45 MHz AM to DARM is broadband, so the channel should be stored at the full rate.

Estimated Cost: None (just the time required to modify and reload the model).

Schedule Impact Estimate: Will likely be implemented at LHO on Tuesday, Aug 18, 2015.

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.):

LSC channel list document, T1500014.

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