Advanced LIGO Engineering Change Request (ECR)

ECR Title: Additional gain needed in REFLAIR-B, 135MHz signal chain

DCC No: E1300789-v2

Date: 13 November, 2013

Requester: Richard Abbott   Impacted Subsystem(s): ISC

Description of Proposed Change(s): The 3F signal chain utilizes a broad band PD to simultaneously detect 27MHz and 135MHz sidebands. The detected signal level on the 135MHz sideband is too small. An amplifier is probably needed, and perhaps a frequency specific splitting network (diplexer) can be incorporated.

Reason for Change(s):

Signals of interest for which the amplitude is less than 100nVrms/rtHz are not appropriate for transmission over cables at LIGO. The addition of an amplifier will mitigate this situation.

Estimated Cost: $1500 for materials/supplies plus 80 to 120 labor hours (~50% technician and 50% engineer) to construct, test, and document the units. Total estimated cost = $8K

Schedule Impact Estimate: minimal, a temporary solution can be implemented that will permit commissioning to continue

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: _____
- ☐ 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.): ISC subsystem LVEA block diagram D1200666

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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