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| **ECR Title: PSL frontend should handle a binary output ON/OFF request as true binary, not a 16 bit integer**  | DCC No: E1600204-v1 |
| Date: 2016/07/12 |
| **Requester: Keita KAWABE** | **Impacted Subsystem(s): PSL** |  |
| **Description of Proposed Change(s):** PSL uses one 16 bit DAC output as one binary output, but there’s no variable representing the state itself (ON or OFF). The input to the DAC is used as a poor man’s state and the users (e.g. MEDM and guardian) set large enough positive number for ON, small or negative number for OFF.This ECR will change the system such that the same EPICS channels that used to be used as inputs to the DAC will be used as binary states (0 for OFF and 1 for ON) via cdsEpicsBinIn in the frontend, leaving no ambiguity in the state variables and enforcing that the variables are always 0 or 1. Users will just request ON or OFF, the frontend sends zero for OFF or 32000 for ON to the corresponding DAC channel. |
| **Reason for Change(s):** Exposing the DAC itself to multiple users is a great source of confusion because different people have different assumption about what should be ON and what should be OFF. It already cost us more than necessary to just identify the issue (see [LHO alog 28294](https://alog.ligo-wa.caltech.edu/aLOG/index.php?callRep=28294)).Without this change, similar problem will pop up in the future. |
| **Estimated Cost:** Two days\*person to change the frontend, medm and guardian. |
| **Schedule Impact Estimate:** One maintenance day is good enough to test the above software change.  |
| **Nature of Change (check all that apply):****[ ]** **Safety****[ ]  Correct Hardware****[ ]  Correct Documentation** | **[ ]  Improve Hardware****[x]  Improve Software****[ ]  Improve/Clarify Documentation****[ ]  Change Interface****[ ]  Change Requirement** |
| **Importance:****[ ]  Desirable for ease of use, maintenance, safety****[ ]  Desirable for improved performance, reliability****[x]  Essential for performance, reliability****[ ]  Essential for function****[ ]  Essential for safety** | **Urgency:****[ ]  No urgency****[x]  Desirable by date/event: O2**\_\_\_\_\_\_\_\_\_\_\_\_**[ ]  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.):**Impacted Software** (list all that apply): psl frontend(s), PSL-related MEDM screens, ISC\_LOCK and IMC\_LOCK guardian. We need at least one PSL specialist to review what other software are impacted. |
| **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
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