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Feedback from the DCS ASICs review and SP Risk TF



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Review

- On 30.10.18
- Specification review Agenda:
<https://indico.cern.ch/event/772822/>
- Report on EDMS: [ATC-U-MR-0001](#)

Feedback regarding PSPP

- Need decision about bypass in PSPP asap
 - Is PSPP required if no bypass present?
 - See also TF
- Investigate SEU rate for PSPP
 - Safety vs unwanted bypass action
 - Reconfiguration of PSPP during operation?
- Noise immunity check for SCB signals

Feedback regarding DCS Controller

- CAN bus implementation
 - Grounding and shielding has to comply with ATLAS guidelines
 - Are there alternatives?
- Transition to optical for DCS readout
 - around PP2 or further inside the detector
- Shielding of CAN lines inside ITK volume
- Combined PDR/FDR in spring 2019 seems unrealistic

Summary from the SP Risk TF

- Talk by Maurice about FE chip
- Talk by Susanne about DCS requirements
- Talk by me about PSPP
- Agenda:
<https://indico.cern.ch/event/772822/>
- Following are summary of my notes for discussion

Maurice

- Important in SP:
 - No transients! i.e. no load or voltage fluctuations
- Early SLDO prototypes had that (FE-I4)
 - Improved with RD53A and further RD53B to prevent transients
 - Bypass brings back the transients
- FE protections:
 - Overcurrent protection: Limitation of current at input
 - Overvoltage protection foreseen in RD53B (voltage clamp)
- Damages in FE:
 - Mainly shorts → gate breaks through
 - Open are very unlikely
 - External failures possible (to be further understood)

Discussion

- What are the other failure modes?
 - Mechanical failures
 - Power only in one SLDO
- Module Switch off possibility?
- What transients are allowed?
 - Voltage clamp protects against these?
- Chain failure caused by PSPP?
 - Current fluctuations cause by PSPP?

Open points

- Voltage clamp in PSPP?
 - 4 in parallel if in FE → current sharing required
- SEUs in PSPP
 - One of the most important points
- CAN network
 - How to respect G&S?
 - Transition to optical

Backup



Alternative DCS without bypass

- Temperature and voltage monitoring is still required
 - Voltage only when FE are running → Use of diagnostics path
 - Temperature needed even during shutdown → Independent from readout path
- Option a) Use smaller PSPP to monitor temperature and maybe voltage, Controller stays as defined
 - Independent operation of SP chain → no AC coupling needed
 - Smaller and simpler chip or one chip for multiple modules
- Option b) Use DCS Controller to monitor temperature of each module in the chain
 - More lines on type 0 services
 - No electrical contact with SP chain necessary