

TileCal Summing Amplifier FDR/PRR, 10 December 2001

Draft 2 of report (21/12/01)

Abstract

The design is sound but the selection of gain for both the calorimeter and the muon trigger must be revisited. Radiation tests must be done as specified in this report.

REVIEW OUTCOME

- The L1 trigger specification of dynamic range of 250 GeV in E_T is not met in the current design for the tiles at large η . This can be accomplished by lowering slightly the gain from 8 to about 6–7 at high η . This implies having circuits with two different gains, but otherwise the L1 treatment for saturated signals will need to depend on both η and on calorimeter type, which is very unfortunate. This problem may be resolved by a redefinition of the relationship between the observed energy and the quantity used for the L1 trigger in Tilecal, which requires further study*. Once an agreement on this relationship is reached between Tilecal and L1 Calorimeter Trigger groups, the Tilecal group should verify that the dynamic range requirement specified by the L1 trigger is met at all values of η .
NOTE (not in report): R. Leitner argues that losses in dead material reduce the variation of visible signal with η . So far, his simulations (jets, single pions) are quite interesting but done at too high E_T (1 TeV).
- The possibility of increasing the gain for the signal going to the muon trigger should be examined. Unless there are substantive technical reasons not to do it, the gain should be increased substantially to avoid deterioration of the signal/noise ratio in transmission/reception of the signal in USA15. ...
- A complete documentation for the production must be put in EDMS. It includes all fabrication files, bill of material, assembly and test procedures.
- The documentation for the adder circuit should be collected together into a single document which gives the specifications, a description of the circuit, and measurements made to demonstrate its performance. The document should be placed in EDMS.

- The table 1 below summarises the radiation tests performed on the active components from the Adder boards. All pre-selection tests were skipped. TID qualification test completed for the first batch of MAX485CSD; to be done for all other the batches. NIEL qualification test probably completed for the first and second batch of MAX485CSD; to be done for all the other batches. SEE qualification tests to be done for all the batches for both MAX485CSD and OPA485OU. See ... appendix I.

ASIDE

The two following points are not part of the PRR itself but require some actions (as defined in the ASSO report).

- A responsible person for the cables from the Tile to USA15 must be identified. A document defining the pin-out of the cable connector must be made available. The cable used for the liquid trigger sum transmission could be used, however the possibility of getting less pair in a cable could be pursued. The review committee reminds that the validation of the cables is a very long process and hence should start as soon as possible.
- A specification of the receiver module must be done. The possibility of having a prototype adaptation of the liquid argon receiver must be studied.