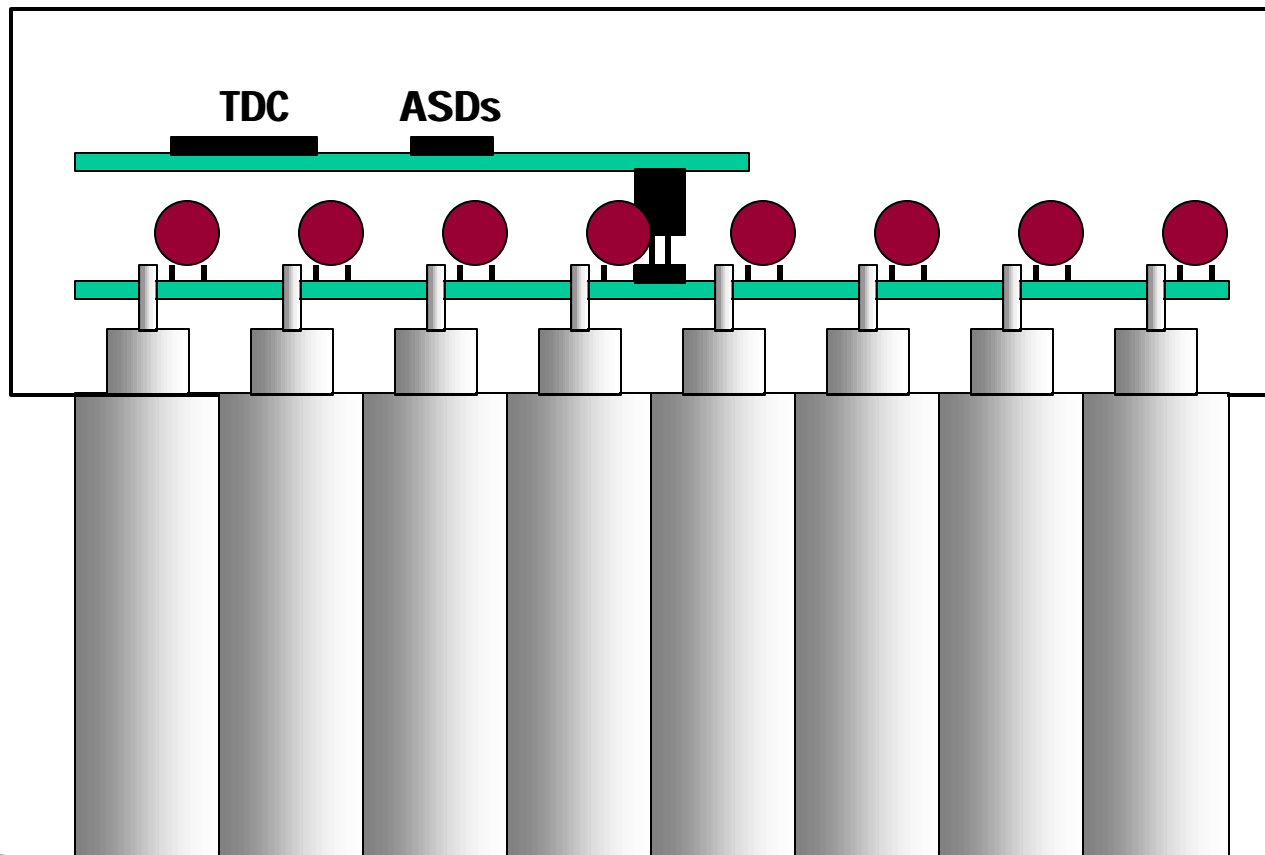
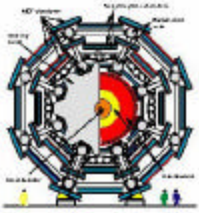


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MUON Week 28 Aug 00 J.Oliver

EMI and shielding options

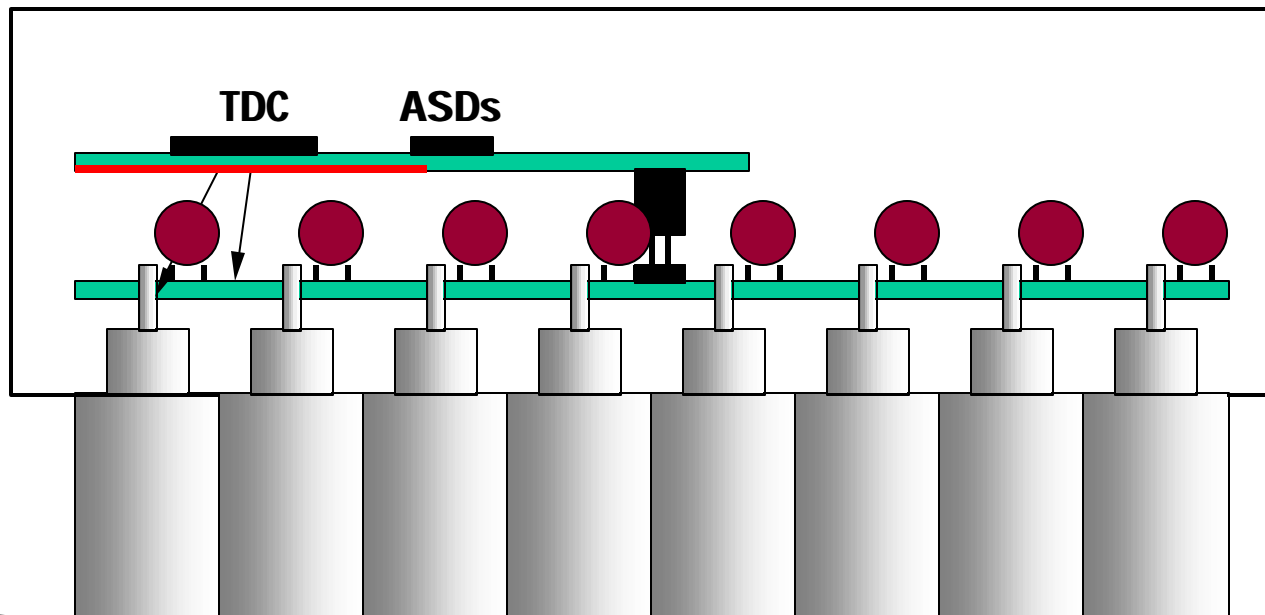


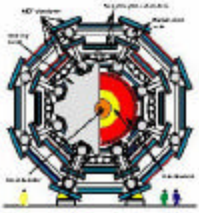


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Shielding options

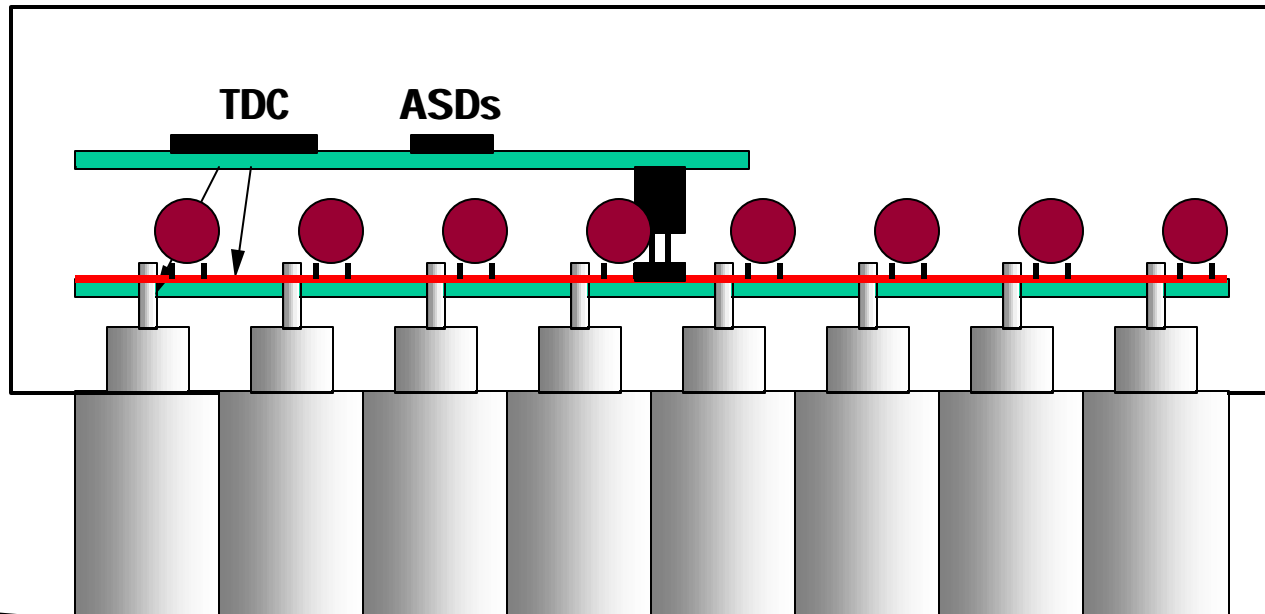
A) Shield plane in Mezzanine card

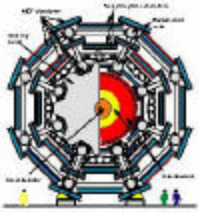




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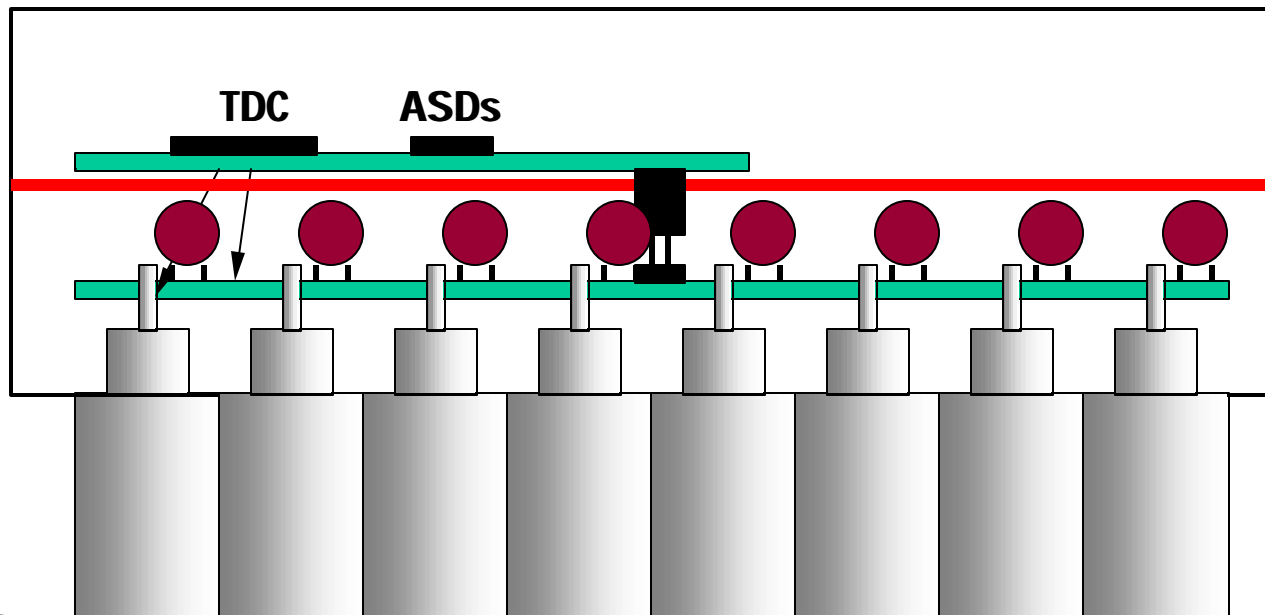
B) Shield plane in hedgehog card

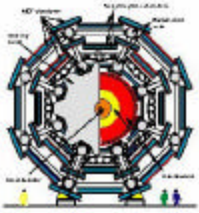




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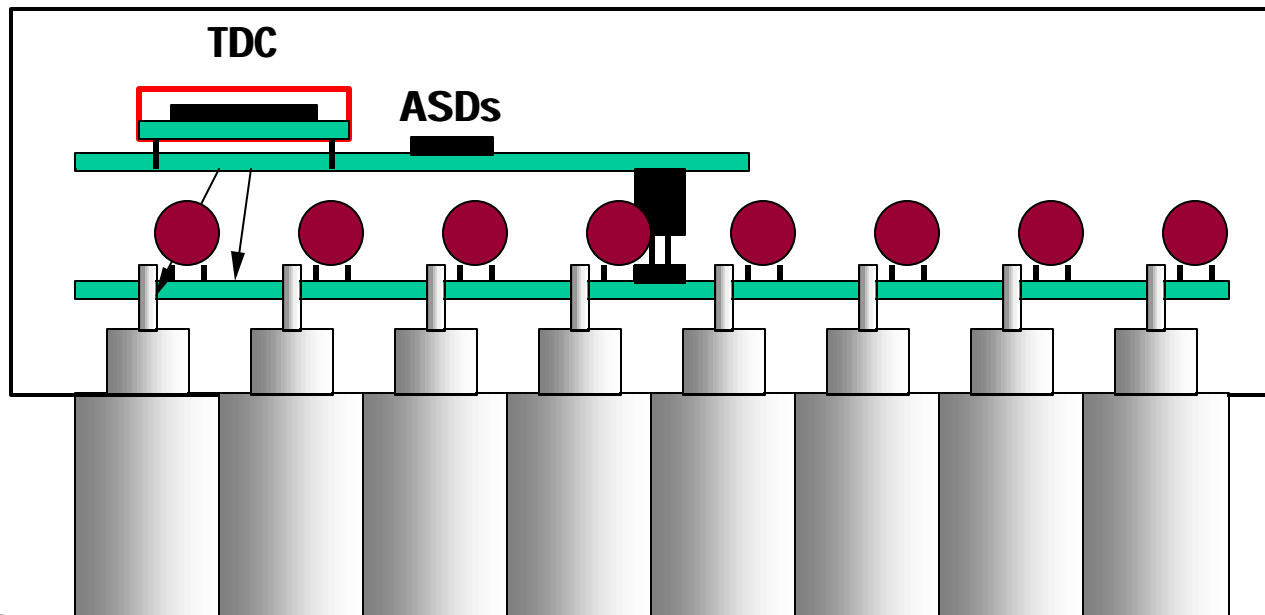
c) Aluminum shield plane attached to faraday cage

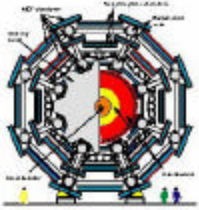




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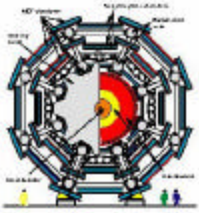
d) Fully enclosed packaging (module) for digital electronics





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| Option | Pros | Cons |
|----------------------------------|---|--|
| A) Shield in mezz card | Cheap | Has been tried and doesn't work very well |
| B) Shield plane in hedgehog card | Cheap | ~1 skin depth Cu, lots of holes, not "complete" Does not shield "laterally" in stepped chambers |
| C) Aluminum shield plane | Cheap enough but somewhat more than B) 10 -20 skin depths of material Completely seals MTDs <u>and</u> Hedgehogs from noise coupling, Tested and works very well! | |
| D) Modular packaging for digital | | Not cheap LVDS lines and cables still not protected |



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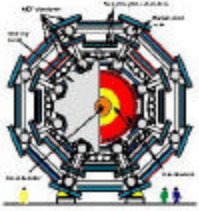
Conclusions

Aluminum shield plane

Has been tested and known to work well. Will be developed mechanically for End Cap chambers (cost and production issues) Should be seriously considered for all chambers.

Shield plane in hedgehog (multilayer)

Should be fabricated and tested independently both for shielding effectiveness and HV feasibility. If ok, offers the cheapest and most painless solution



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ASD Power reduction (~30%) C.Posch, J.Oliver , June -July '00

| Submission | On-chip power | On-board power (+ ~20%) |
|------------|---------------------------|---------------------------|
| • ASD99c | 15 ma/ch@3.3 V = 50 mW/ch | 15 ma/ch @ 4 V = 60 mW/ch |
| • ASD00a | 10 ma/ch@3.3V = 33 mW/ch | 10 ma/ch @ 4V = 40 mW/ch |

Details

- Reduction of excess bias currents in most sub-circuits
- Redesign of discriminator circuits for greater efficiency with no loss of performance (simulations)