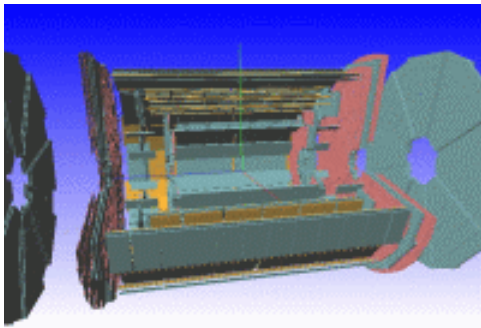


ATLAS MDT Electronics

Mezzanine PCB

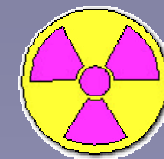
Radiation Hardness Assurance

Eric Hazen – *Boston University*



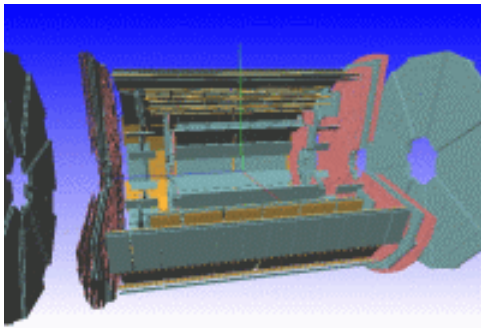
ATLAS MDT Electronics

Mezzanine PCB Rad Test Status

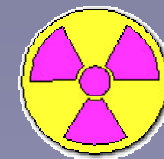


- MDT-ASD custom CMOS IC
 - Test program underway – no problems expected (some details from C. Posch?)
- AMT-2 TDC
 - Preliminary TID and SEE testing completed (results are ok)
 - Neutron test to be scheduled
- LDO Voltage Regulators
- LVDS “repeater”
- Linear temperature sensor

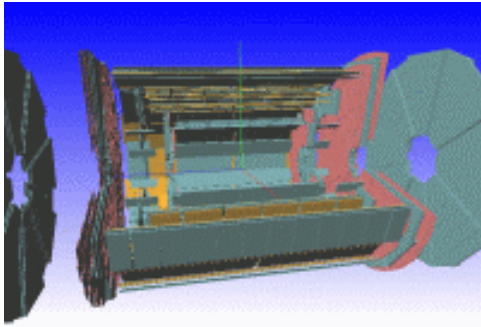
More Details in
This presentation



LDO Voltage Regulator



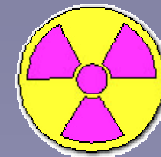
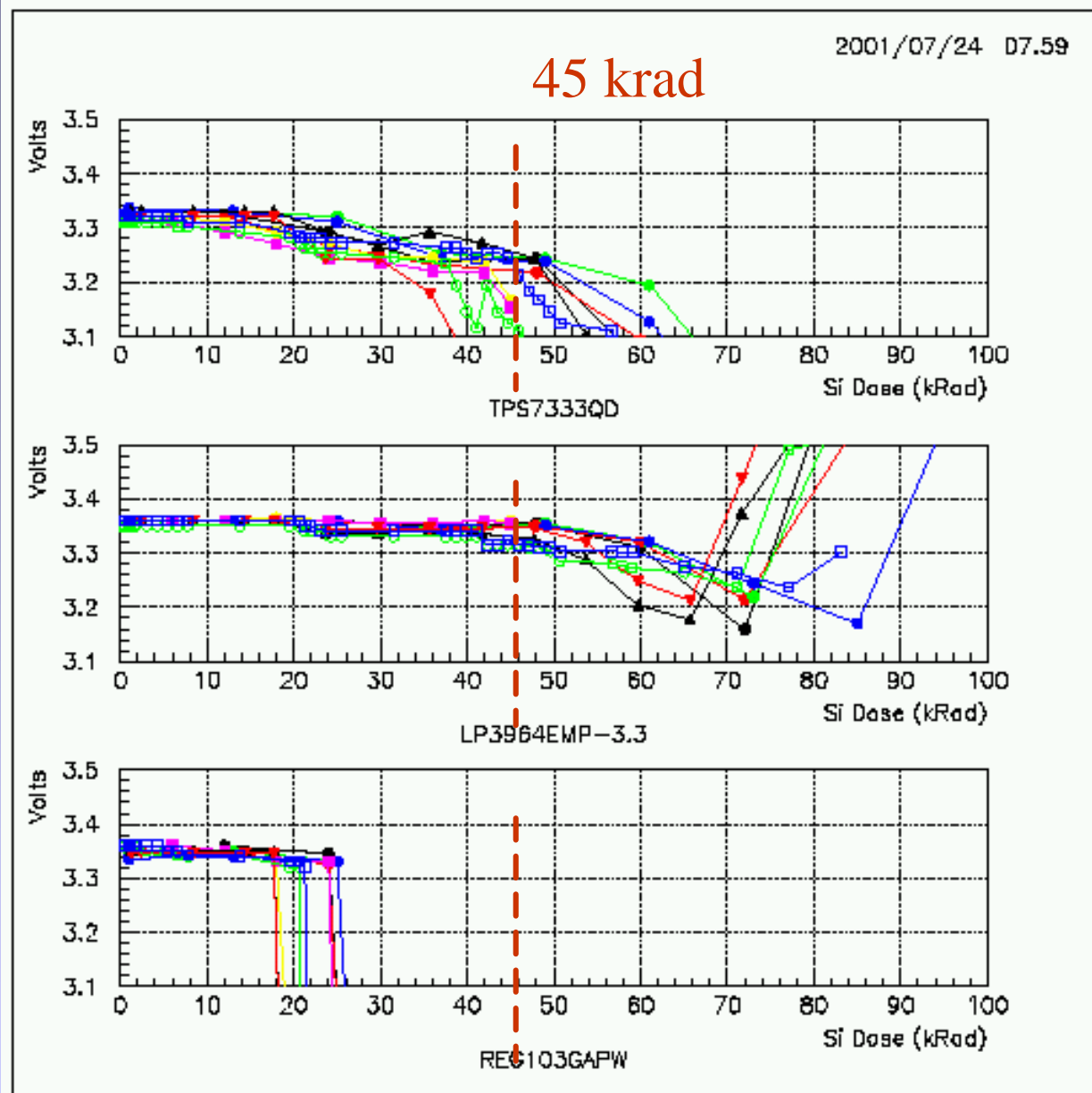
- SEE/TID Test performed at Harvard Cyclotron
 - 165 MeV Protons / devices powered and monitored
 - Tested to 1.4×10^{12} h/cm² per device (ATLAS SRL_{SEE} = 4.8×10^{10})
 - No latch-up or transient events seen
 - TID to 100 krad per device (ATLAS SRL_{TID} w/SF = 45 krad)
 - All devices failed at various doses (see plot)
- Further TID testing at BNL ⁶⁰Co Source
 - Planned for late 2001
- Neutron (NIEL) test done at Prospero (October 2001)
 - Just waiting for return of irradiated devices...



TPS7333QD
Voltage droop
30-45 krad
marginal

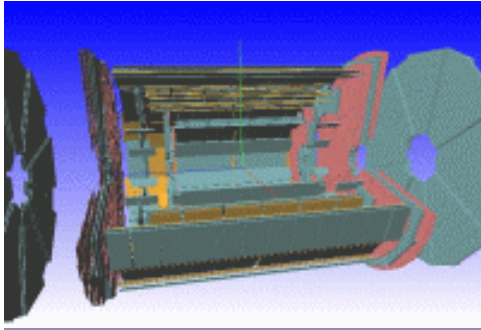
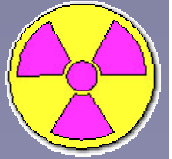
TPS7333QD
Short-circuit Failure
55-60 krad
passed

REG103GAPW
Open-circuit Failure
18-25 krad
failed

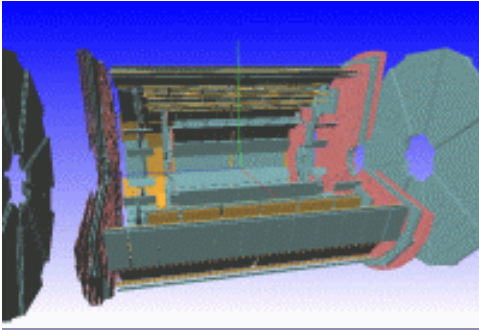


Regulator output (volts) vs Ionizing Dose
Powered, under nominal load for MDT use

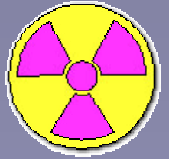
LVDS Repeater



- Single LVDS Rx / Tx needed for test pulse injection
- No candidates found which have already been tested!
- Full test program required:
 - NIEL (Neutron) – PROSPERO
 - TID (Brookhaven)
 - SEE (Harvard Cyclotron)



Linear Temperature Sensor



- Various tested candidates exist... studying the data now.
- AD590 is an expensive but apparently rad-tolerant option
- What are others using?? This must be a common problem across the LHC.