

Update on the Radiation Testing of the Pentium III Microprocessor

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An investigation the radiation sensitivity of Pentium III microprocessors for both total ionizing dose (both Cobalt-60 and protons) and single event effects (both with protons and heavy ions) has been done. Our plan utilized the GSFC total dose facility for the Cobalt-60 exposure and external facilities for the proton and heavy-ion testing. Indiana University Cyclotron Facility was used for the proton testing and Texas A&M University Cyclotron was used for the heavy-ion testing, as it is the only currently available facility in the United States that can supply ion beams with sufficient energy to penetrate the die substrate.

Extensive data has been collected on the total dose and single event response of Intel Pentium III microprocessors. The data indicates that there is a high tolerance to total dose and there is no susceptibility to latchup from protons and low LET ions (high LET testing is still to be done). Single event upsets and functional interrupts are present for both protons and ions. Additional proton and heavy ion testing has been done since the last report in MAPLD 2001. These tests showed some important testing issues and results dependent of the test software. This new data integrated with all previous test data will be presented.

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