Radiation Testing of Two High Speed Communication Networks

Jim Howard[1], Steve Buchner[2], Paul Marshall[3], Ken LaBel[4], Hak Kim[2], Marty Carts[5], Christina Seidleck[5], Ron Stattel[5], Charlie Rogers[5], and Tim Irwin[2]

1. Jackson & Tull Chartered Engineers
2. QSS, Inc.
3. Consultant
4. NASA GSFC
5. Raytheon ITSS

Two versions of the IEEE 1394 serial bus (FireWire) were tested with protons and heavy ions for possible space applications. One part from Analog Devices was sensitive to latchup and no further testing was done. The other part from Texas Instruments exhibited a variety of failure modes that were broadly classified into hard and soft errors. The hard errors were further classified according to how communications were restored. There were fourteen different kinds of hard errors, some of them relatively simple that involved a simple software restart whereas the most complex involved cold rebooting the entire system. The soft errors had their origins in the PCI and OHCI registers on the LINK chip. A full radiation characterization will be presented.

As part of the Remote Exploration and Experimentation Project (REE), work was performed to do a proton SEE evaluation of the Myricom network protocol system (Myrinet). This testing included the evaluation of the Myrinet crossbar switch and the Network Interface Card (NIC). To this end, two crossbar switch devices and five components in the NIC were exposed to the proton beam at the University of California at Davis Crocker Nuclear Laboratory (CNL). No indication of latchup was observed. Functional interrupts and data loss upsets were observed and their cross sections determined. Complete proton test results will be presented.

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First Author:
Dr. James W. Howard Jr.
J&T, Manager Radiation Eng. Group
Goddard Space Flight Center
Code 561.4, Bldg 22 Room 056
Greenbelt, MD 20771

Phone: 301-286-1023
Fax: 301-286-4699
Cell: 301-523-8275
Email:jim.howard@gsfc.nasa.gov