

SPACEWIRE MARGINS TESTER

Session: SpaceWire Test and Verification

Long Paper

Alex Kisin, Glenn Rakow

NASA GSFC

E-mail: alexander.b.kisin@nasa.gov; glenn.p.rakow@nasa.gov

ABSTRACT

During every SpaceWire link testing there is always a question: OK, it works now in a lab – but what are the worst physical layer conditions this link can tolerate for a desired error rate? To answer this question someone has to simulate the following conditions for various communication speeds: D and S skew, “eye pattern” opening span, LVDS receiver bias. The proposed LVDS Margins Tester is intended to simulate all these parameters to give test conductor an idea what SpaceWire node margins are. An operational principal of this Tester is: receiving good SpaceWire signal from a known Source and degrading it to a point when Device Under Test (DUT) receiver will start to experience errors. Two operational modes available: Pass mode – from external Source to DUT and Loop mode – from DUT transmitter back to DUT receiver; in Pass mode DUT transmission is passed to an external Source unaltered. Communication speed is transparent and can vary from 10 to 200 MHz. Skew for high speed links is 0 to 30 nS with 1 nS increments, or 0 to 120 nS with 4 nS increments for slow links. Eye span varies from 180 to 720 mV p-p, bias varies between $\pm 1V$ from nominal. All parameters are either individually adjustable, or can be changed by algorithm for concurrent run. Link errors are measured by monitoring dropouts from the DUT. The Tester will work in a stand-alone mode – controlled through front panel, or in a remote mode – controlled through an isolated RS-232 bus.