

DEBUGGING SPACEWIRE DEVICES USING THE CONFORMANCE TESTER

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Long Paper

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ABSTRACT

The SpaceWire Conformance Tester is a device developed by the University of Dundee for ESA to perform black-box testing of SpaceWire devices against the SpaceWire ECSS-E-50-12A standard. The tests performed by the Conformance Tester are those which can be performed over a single SpaceWire link to the unit under test without needing co-operation from the unit under test. Thus link initialisation behaviour and the response to data and control characters can be investigated while PCB layout and connector compliance cannot. The tests to be performed are launched from easy-to-use software running on the host PC with concise test results providing useful feedback on how the unit under test performed.

This paper examines a number of errors and issues which have been identified in different SpaceWire devices through the use of the SpaceWire Conformance Tester. The errors and issues described relate to link start-up speed, link state machine time-outs, FCT counting, empty packet processing and time code handling.

This paper also introduces a novel test procedure which measures the speed at which the unit under test recovers from link errors at different points of the link initialisation process. The graphical output of this test can be used to identify anomalous behaviour of a SpaceWire device which might be hard to detect in other ways and to provide measurements of the link initialisation timing parameters.