

STAR-Dundee

Supporting SpaceWire Applications

SpaceWire Conformance Tester

The SpaceWire Conformance Tester provides a wide range of tests to probe the compliance of SpaceWire devices against the SpaceWire ECSS standard. It is supplied as a single instrument specifically designed to support hardware and software engineers developing and using SpaceWire systems. The Conformance Tester comprises a SpaceWire interface pod (Figure 1) and software running on a host PC. The interface pod is connected to the host PC using a USB 2.0 cable which provides communications and power to the interface pod.



Figure 1: SpaceWire Conformance Tester

The SpaceWire Conformance Tester provides the following groups of tests and facilities for the unit under test (UUT):

- **Link/bit-level:** Link initialisation testing, disconnection timeout measurement, link start-up speed and waveform analysis, link shut-down analysis and simultaneous D/S transition detection.
- **Exchange-level:** Validate the response to parity and escape errors in ErrorWait, Ready, Started, Connecting and Run along with the response to FCT, NCHAR and time codes in those states. Estimates of the 12.8 μ s Started/Connecting timeouts can be made.
- **Credit-level:** Validate the UUT response to excess FCTs and NCHARs, empty packet testing and monitoring UUT signals for credit errors.
- **Time-codes:** Determine whether time-codes are accepted, probe the response to valid and invalid time-codes and measure the UUT time-code generation frequency.
- **Empty packets:** Investigate the effect of sending empty EOP and EEP packets.
- **Packet-level:** Test the transmission and reception of packets with different types of UUT: loop-back, data-sink, data-source, command-sender and command-receiver.
- **Waveform trace:** A waveform display of the UUT data and strobe signals sampled over a period of 45.5 μ s at 1.4 ns intervals is provided.

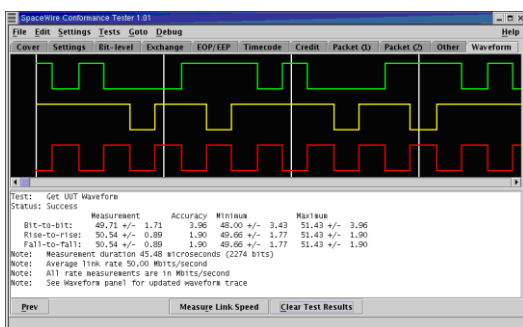


Figure 2: Waveform trace and rate analysis

The key benefits that the SpaceWire Conformance Tester provides are:

- **Ease of use:** The user interface is on a host PC attached to the Conformance Tester hardware by a USB interface. The graphical user interface has been designed with SpaceWire users in mind.
- **Detailed test reports:** Each of the 59 tests provides a simple pass/fail indication along with details of the expected and measured UUT response. The results can be saved to a text file for future reference and/or analysis.
- **Loop-back operation:** One of the SpaceWire links on the device can be used as a data/time-code sink or as a data/time-code loop-back.
- **Flexible packet generation:** A separate tool uses the Conformance Tester as a high speed, flexible, packet generator without overheads from the host PC or operating system. High data rates can be sustained with back-to-back packet transmission possible (no NULL characters sent between packets).
- **Link to ECSS Standard:** Each test in the user manual specifies the clauses in the SpaceWire ECSS standard that it is designed to check. A separate table provides a mapping between SpaceWire ECSS standard clauses and tests performed by the Conformance Tester.

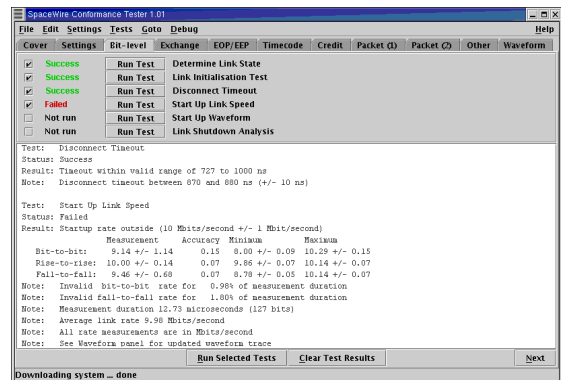


Figure 3: Example bit-level test results

Physical Specifications

Size: 100 x 43 x 31 mm (approx.)

Power: +5V DC, supplied via USB cable

SpaceWire Ports:

- ECSS-E50-I2A compliant
- Maximum Speed: 200 Mbits/s

USB Port:

- USB 2.0

Trace Memory:

- 32k/45.5 μ s D/S samples for trace display

EMC: CE/FCC certified.

Operates under Windows (Windows 7, Vista, XP, 2000) and Linux.

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