

NEW APPROACH AND TECHNIQUES FOR TESTING AND DIAGNOSIS OF SPACEWIRE NETWORKS

Session: Protocol test and verification

Short Paper

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ABSTRACT

In this paper, we present a new testing approach and techniques for SpW devices and networks. This approach is based on the emulation principle by using both physical and virtual devices. The conducted work has been done with the collaboration of CEA and ASIC company. Most of today's integration remaining issues or bugs are usually discovered due to incompatible hardware or software misunderstandings between engineering distant teams, a common situation in space projects. The idea here is to introduce a new concept for emulating SpW networks based on physical and/or virtual nodes and routers. Each of them could be located either in the same laboratory or at different location of a continent or on the globe. By this way, troubleshooting is expected to be more efficient and can be performed at early stages of the development and therefore ensure successful flight modules.

The main element of our testbench is the smartCable^{4SpW} product. It's a single USB SpW node miniaturized device, which can act as node-to-node analyzer as well, using a dedicated plug (spy mode). This provides us oscilloscope and logical analyzer capability, in addition to eye diagram features already present in the default mode electronics. The smartCable driver can actually handle enough bandwidth for most of the projects constraints. By using this solution, interconnecting SpW devices and in particular smartCables locally or distantly through local area networks or internet has become possible. By this way, we could setup a reconfigurable emulated SpW network using multiple nodes dispatched between Saclay (CEA), Toulouse (Skylab) and Tunis (ASIC) geographical sites. The software aspect of the testbench uses TrafficController^{4SpW}. It gave us flexibility enough, again, to be able to configure subnetworks using virtual routers within the overall network.

The paper will introduce in details basic elements, configurations, performances and statistical results of the testbench so that we could extract from them some major features and conditions for SpW early troubleshooting.