SPACEWIRE-CPCI VXWORKS SUPPORT SOFTWARE

Session: SpaceWire test and verification

Short Paper

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ABSTRACT

STAR-Dundee provides both PCI and cPCI boards based on the SMCS-SpW-FPGA (Field Programmable Gate Array) device from Astrium. This FPGA is functionally representative of a radiation tolerant chip created by Astrium/Atmel [1]. These PCI and cPCI devices are therefore ideally suited to support the development and testing of on-board SpaceWire components and systems intending to use the SMCS chip. VxWorks from WindRiver is a widely used real-time operating system (RTOS) in the embedded industry and is an important tool within the space industry. VxWorks driver and support software have therefore been developed for the SpaceWire-cPCI and PCI-2 boards. This paper presents the SpaceWire VxWorks driver architecture, discusses integration with Board Support Packages (BSPs) and describes the support software.

The SpaceWire vxWorks driver API is a custom interface VxWorks driver in the form of a compiled C library. Board initialisation support is provided as customisable source code with full working examples for Intel x86 and PowerPC 750 targets. Test software is provided as source code and can be used as a template to develop data transfer applications. The software interface is similar to the SpaceWire PCI-2 Windows and Linux drivers but contains differences specific to an RTOS. The SpaceWire-USB RMAP [2] and Router Configuration libraries, have been ported to VxWorks and a routing table download example is shown.

The driver performance is given by showing packet transfer rates with varying packet size and an example of a real-time application of jitter measurement using the SpaceWire-cPCI as a time code master is also presented.

REFERENCES

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