

SPACEWIRE STANDARD: LOW SPEED SIGNALLING RATES

Session: SpaceWire Standardisation

Short Paper

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ABSTRACT

The SpaceWire standard defines the start-up speed link speed of a SpaceWire link shall be 10 Mbit/s +/- 10%. Therefore part of the SpaceWire interface logic and the LVDS drivers and receivers must be capable of operating at a clock speed of 10 MHz and a 10 MHz clock source must be available on the PCB (or 5 MHz for double data rate).

When lower clock speeds are required for lower power applications the 10 Mbit/s start-up speed requirement poses a significant problem. At 10 Mbit/s it takes 800 ns to transmit one NULL character therefore approximately 14 can be transmitted during the minimum Started timeout period of 11.64 μ s. This gives enough time to receive and decode the SpaceWire NULLs at the other end of the link. At 2 Mbit/s it takes 4 μ s to transmit one NULL character and at most two complete NULL characters can be transmitted during the minimum Started timeout. This does not give enough time for NULLs to be exchanged between SpaceWire interfaces and link start-up cannot occur.

This short paper shows a worked example of the University of Dundee/ESA SpaceWire IP core operating at 2 Mbit/s and the exchange level changes required to ensure that a link connection occurs.