

# Space Wire Intellectual Property Core Abstract

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Space Wire is an emerging specification that may be used for networking satellite instruments and subsystems in high bandwidth applications with point-to-point data rates 200 Mbps or greater. Space Wire is derived from enhancement to IEEE-1355-1995 with the use of LVDS drivers. Such a specification is very attractive because of its simplicity and flexibility. This is particularly true in satellite systems that have widely varying requirements between missions and where redundancy may be an issue. These problems are solvable because of the flexible topology of the Space Wire network and the multiplicity gain of the data throughput in the Space Wire router. Space Wire places no restrictions on packet length or format nor does it define commands. It uses wormhole routing to pass packets between routers and handles flow control to prevent data loss. Space Wire packets are broken up into characters that detect parity errors at the byte level. The signaling mechanism uses Data Strobe (DS) encoding which extracts the clock at the receiver.

In order to enable the wide spread use of this standard, Space Wire Intellectual Property (IP) Cores need to be developed and made available. These cores will be more useful to larger number of users if they are technology independent, i.e. written in Register Transfer Language (RTL) High Definition Language (HDL), and independent from particular applications, i.e., not integrated into a specific product. The initial application for the Space Wire IP Core that was developed at Goddard is for the SWIFT mission. The core is used in two different subsystems each with different chip designs and chip technologies. One design is integrated with logic to use the PCI bus to move packets to DRAM bulk memory storage using a DMA controller. The same IP core is used on the other end of the interface that is a processor-less interface to the sensor. In SWIFT there are 16 of these links and this application does not require the routing capability

of the Space Wire protocol. However, the same design could be used to network 25 processors together as was the case for the initial GLAST instrument proposal.