SIMPLEX MODE IN SPACEWIRE TECHNOLOGY

Session: SpaceWire networks and protocols

Short Paper

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ABSTRACT

A very important task in developing SpaceWire interconnections is the development of the simplex mode. Reducing number of lines is a good solution for working with devices, which are not designed for working in full duplex. The simplex mode also reducing the number of lines, thus reducing square and weight, which is very useful on board of spacecraft. For example, simplex mode can be used working with video camera, the block will only receive information from camera. Simplex mode can be also used for control the block, for example moving source of light etc. All data will be transmitted using one Tx/Rx pair instead of two, thus decreasing the cost of the cable.

The SpaceWire controller can work in two possible directions of the simplex mode – transmitting and receiving. Transmitting part sends symbols due to standards and from time to time use the special mode of reconnection. The receiving part establishes connection and detects errors. The FCT symbols are not sending, so the receiving part is always ready to receive the symbol of data.

Due to changing the number of lines, however, several parts of the standard SpaceWire were changed. Sending FCT symbols for reserving eight words of buffer were not possible, so the credit system was not used. The problem of connection is very sufficient, transmitting part doesn't know if connection is established. If an error occurred during transmission, the receiver part was sent to reset state and after reset it had to establish connection again, whereas the connection had to be established on speed 10 MHz. These problems are solved in our SpaceWire controller.