SPACEFIBRE – HIGH SPEED FIBRE OPTIC DATA LINKS

Session: SpaceWire Components

Short Paper

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ABSTRACT

SpaceFibre is a proposed very high speed serial data link intended to complement the existing SpaceWire high-speed data link standard. This paper describes development of two types of high performance fibre optic transmitter-receiver modules for SpaceFibre data links. Both solutions use mainly the same electrical and optoelectronic components but they have different mechanical designs.

On type 1 by VTT the transceiver electronics uses low temperature co-fired ceramic substrates and the module is hermetically sealed in Kovar housing. Transceiver has a power consumption of 230 mW, dimensions of $17 \times 17 \times 5$ mm^3 and its mass without fibre pigtails is 2 grams. The transmitter has an optical output power of −1 dBm and the receiver sensitivity is -18 dBm for 10^{-12} BER at 10 Gbps.

On type 2 by D-Lightsys, integrated ceramic package with fibre hermetic feed through has been developed in conjunction with a high performance optical sub assembly to provide operation at 10 Gbps with a link budget better than 12 dB over -40 to +85°C. Integrated self-test have been added also to the design to enhance the overall module performances allowing the application to monitor in real-time the link status.

On both types the transmitter side is based on high speed 850nm GaAs Vertical Cavity Surface Emitting Lasers (VCSEL) and receiver part on high speed GaAs PIN photodiode. The interface to and mounting on the circuit board has been designed taking into account the high frequency operation and the modules have fibre optic cables with connectors.