Abstracts

Fiber-optic links supporting baseband data and subcarrier-multiplexed control channels and the impact of MMIC photonic/microwave interfaces

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We report experimental and analytical results of a fiber-optic link that supports simultaneous transmission of baseband data and subcarrier multiplexed control-data channels. A novel transmitter design is used to optoelectronically combine baseband and subcarrier channels onto the optical carrier using a differential Mach-Zehnder (MZ) interferometer modulator. Microwave direct detection of the subcarrier data channel simplifies the receiver design and network architecture. An approach to optimize the transmitter parameters for a given transmitter/receiver configuration is presented, A discrete component link is implemented and its performance compared to analytical results and discrete-time simulations. Insertion of monolithic-microwave integrated-circuit (MMIC) technology is investigated by utilizing a MMIC mixer for control-channel upconversion and envelope detection in the link transmitter and receiver, respectively. High signal-to-noise ratio (SNR) of the control channel demonstrates that MMIC technology is a viable approach to integration of subcarrier multiplexed fiber links.

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