Abstracts

Differential precoder IC modules for 20-and 40-Gbit/s optical duobinary transmission systems

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This paper reports on 20- and 40-Gbit/s differential precoder modules for optical duobinary transmission systems. These precoder modules overcome the speed limit of a conventional precoder by parallel processing. The proposed precoders handle two or four parallel signals before multiplexing with data rates of one-half or one-quarter the transmission bit rate, and the final preceded signal is obtained by multiplexing the precoder output bit by bit, production-level 0.2-/spl mu/m gate-length GaAs MESFET's were used to fabricate the precoders. The precoders are mounted in an RF package. They successfully performed 20- and 40-Gbit/s precoding for the first time, and the 20-Gbit/s precoder achieved a maximum precoding rate of 22 Gbit/s, which is 76% faster than that of the conventional circuit using the same MESFETs. The 40-Gbit/s precoder performs 40-Gbit/s precoding when combined with a 40-Gbit/s multiplexer unit. Twenty-Gbit/s optical duobinary transmitter and receiver circuits using the 20-Gbit/s precoder module successfully generate fully encoded optical duobinary signal at this rate for the first time. These circuits show a receiver sensitivity of -28.6 dBm for a bit error rate of 1/spl times/10/sup -9/.

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