

Internship 2008

Design of a laser diode driver at 1 Gb/s for high-speed optical data link in 0.35 μ m CMOS technology.



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A. Bibliographical Study :

The bibliographical study concerns the review of the state of art of integrated circuits used for the electrical to optical conversion for high-speed optical communication applications.

B. Abstract :

The CMOS group develops Monolithic Active Pixels Sensors (MAPS) intended to equip the vertex detector of high energy physics experiments. This technology can answer to the specific needs of this application: granularity, low consumption, radiation tolerant and fast readout of the image. The CMOS sensor integrates on the same substrate: the sensitive volume to the electrical charged particles, signal processing microcircuits, A/D conversion, data flux reduction circuit including zero suppression logic and memories. Depending of physic hypothesis, the digital data transfer can reach several Gb/s.

The aim of the stage is the design of 1 Gb/s laser diode driver in 0.35 μ m CMOS technology. The VCSEL diode (Vertical-Cavity Surface-Emitting Laser) is largely used for optical data transmission at short and medium distance (10 cm to 100m).

The laser driver contains a circuit which converts the input digital signal into a modulation current and a control loop that keeps constant the mean optical output power in order to compensate the VCSEL temperature changes. The circuit might use a feedback control loop to adjust the bias current of the diode laser.

The student will study the architecture of the laser driver, will do the simulations and layout of the circuit in 0.35 μ m CMOS technology.

Supervisory authority



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