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Design of a Non-vacuum-cooling compact scientific CCD camera

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CCD was born in Bell Laboratories in 1969 and has been widely used in various fields. Its ultra-low noise and high quantum efficiency make it work well in particle physics, high energy physics, nuclear physics and astrophysics. Nowadays, more and more CCD cameras have been developed for medical diagnosis, scientific experiments, aerospace, military exploration and other fields. For the wide range of CCD cameras, a Non-vacuum-cooling compact scientific CCD camera has been developed, including FPGA-based low noise clock and bias driver circuit, data acquisition circuit, STM32-based temperature control design. At the same time, the readout noise of the imaging system is studied emphatically. The scheme to generate the CCD clock and the bias driving circuit through ultralow noise LDOs is proposed. The camera was tested in a variety of environments, and the test results show that the system can read at a maximum rate of 5M pixels/s and readout noise is as low as $9.29e^{-}$ when the CCD readout speed is 500K pixels/s. Finally, a series of stability tests were carried out on the camera system. The test showed that the system could work stably.

Minioral

Yes

Description

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