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Design of a general scientific CCD simulation and test system based on FPGA

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With the rapid development of electronicsal technology, the scientific CCD detector has been widely used in many fields such as astronomy, medicine and industry due to its ultra-high quantum efficiency and ultra-low readout noise. In order to verifyfacilitate rapid the functions and performances test of the of the scientific CCD controller rapidly, a general simulation and test system based on FPGA is designed to test the overall function and performance of the CCD controller. The simulation and test system meets the test requirements of different types of CCD, such as detecting different signals of the CCD controller including power supply, fan, temperature control module, crystal oscillator, shutter and clock-bias generator. Furthermore, the video signal of the CCD detector can be simulated and superimposed with random noise to verify the performance of the video sampling circuit of the CCD controller. For generating a simulated video waveform of CCD detector, digital DDS waveform generation method was used and a high-speed TRNG generator based on oscillation ring in FPGA was designed and used as random noise data. The simulation and test system was successful used for the CCD controller which was designed for E2V CCD47-20 detector.

Minioral

Yes

Description

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