



中国科学技术大学

University of Science and Technology of China

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# Design of a general scientific CCD simulation and test system

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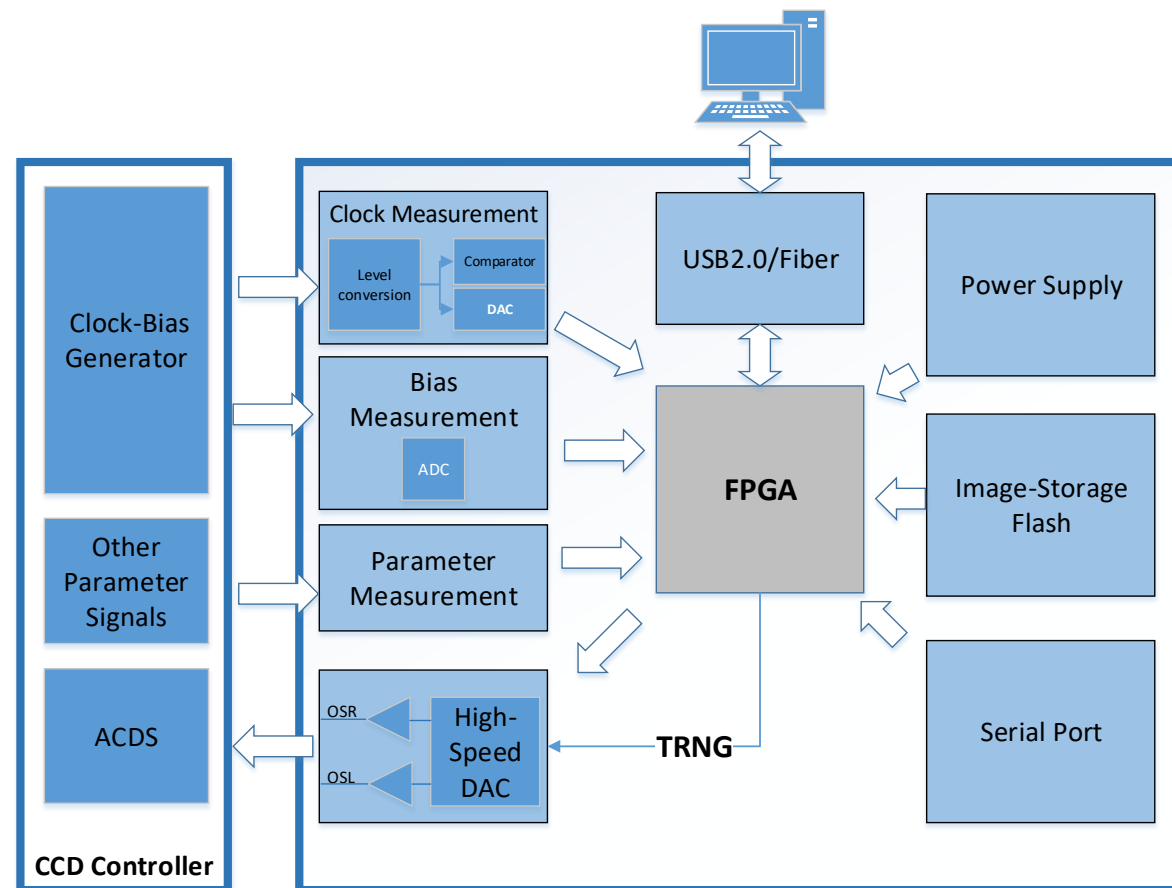
Yi Zhang

# Design of a general scientific CCD simulation and test system



A general scientific CCD simulation and test system can meet the test requirements of different types of CCD chips from E2V company, and it was successful used for the CCD controller which was designed for E2V CCD47-20 detector.

The simulation and test system can measure CCD controller including Clock-Bias Generator, ACDS circuit, and other parameter, such as power, fan, temperature control module, crystal oscillator and shutter.



# Design of a general scientific CCD simulation and test system

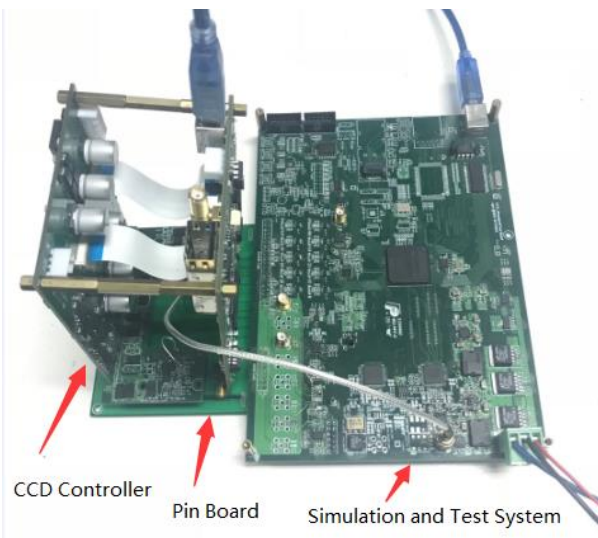
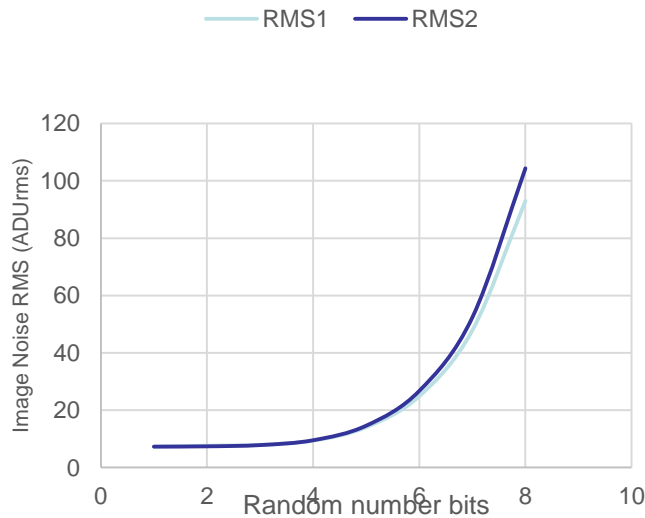


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The two figures on the right are test result of Clock-Bias Generator and the following figure is the measurement of performance of the video sampling circuit of the controller.

| CLOCK | FREQ/Hz | DUTY RT | UP LVL/V | LP LVL/V | OVERLAY/Hz | TM SIG FLAG | HOLD FLAG |
|-------|---------|---------|----------|----------|------------|-------------|-----------|
| Z1    | 12      | 50.2K   | 15.7     | 0.16     | 2.02       | ✓           | ✓         |
| Z2    | 12      | 50.2K   | 15.7     | 0.16     | 2.02       | ✓           | ✓         |
| Z3    | 12      | 50.2K   | 15.7     | 0.16     | 2.02       | ✓           | ✓         |
| D1    | 12      | 50.2K   | 15.9     | 0.16     | 2.02       | ✓           | ✓         |
| D2    | 12      | 50.2K   | 15.9     | 0.16     | 2.02       | ✓           | ✓         |
| D3    | 12      | 50.2K   | 15.9     | 0.16     | 2.02       | ✓           | ✓         |
| BG    |         |         | 12.6     | 0.16     |            |             |           |
| BL    | 10      | 10K     | 12.8     | 0.16     |            | ✓           | ✓         |
| BA    | 10      | 10K     | 12.6     | 0.16     |            | ✓           | ✓         |
| BIL   | 10      | 40K     | 10.7     | 1.24     | 0.06       | ✓           | ✓         |
| BLK   | 10      | 40K     | 10.7     | 1.24     | 0.06       | ✓           | ✓         |
| BCL   | 10      | 10K     | 10.7     | 1.24     | 0.06       | ✓           | ✓         |
| BCK   | 10      | 10K     | 10.7     | 1.24     | 0.06       | ✓           | ✓         |
| BUL   | 10      | 45.9K   | 10.7     | 1.24     | 0.06       | ✓           | ✓         |
| BUK   | 10      | 45.9K   | 10.7     | 1.24     | 0.06       | ✓           | ✓         |

| SAMPLE FREQ | VALUE   | QUALITY  | CLR |
|-------------|---------|----------|-----|
| OG          | 2.90508 | 0.823223 |     |
| SS          | 9.40359 | 1.0073   |     |
| OD          | 28.515  | 2.3029   |     |
| RD          | 17.4944 | 1.08397  |     |



We have fully tested the current CCD controlled based on CCD47-20, improving the test efficiency..