

Characterize CCD Camera

Makes measuring gain and readout noise easy.

This is a special tool designed to enable you to determine the vital characteristics of your CCD camera quickly and efficiently. The theory behind these measurements is presented in the Errata to *The Handbook of Astronomical Image Processing, 2.0*, on the Willmann-Bell website. In the Errata, the test is described in Section 8.2.2.

Characterize CCD Camera

Select Bias and Flat Frames

Bias Frame #1
1x1Bias-20d-001BIAS.fit

Bias Frame #2
1x1Bias-20d-002BIAS.fit

Flat Frame #1
Flat.00000001.FIT

Flat Frame #2
Flat.00000002.FIT

Long-Exposure Dark Frame
1x1Dark8m-20d.00000038.DARK.FIT

Calculate Gain, Readout Noise, and Dark Current

Data

Bias Sum Mean: 973.162 ADUs
Bias Diff StdDev: 17.37089 ADUs
Flat Sum Mean: 73021.6 ADUs
Flat Diff StdDev: 287.7 ADUs
Dark Frame Mean: 623.997 ADUs

Conversion Factor and Readout Noise

Conversion Factor = 0.87 electrons/ADU
Readout Noise = 10.73 electrons RMS
Mean Dark Current = 0.250106 e/pix/sec @ -20.0 C

Generate Transfer and Linearity Data

Close

To characterize your CCD camera, you must first make two bias frames and two flat-field frames as described in Handbook. Save the files with the names suggested in the Handbook. Next, do the following:

1. Open the **Characterize CCD Camera Tool**.
2. Click the **Bias Frame #1** button and select the first bias frame.
3. Click the **Bias Frame #2** button and select the second bias frame.
4. Click the **Flat Frame #1** button and select the first flat-field frame.
5. Click the **Flat Frame #2** button and select the second flat-field frame.
6. Click the **Long Exposure Dark Frame** button and select a dark frame. The exposure must be long enough to produce significant dark current; typically 600 seconds or longer.
7. Click the **Calculate Conversion Factor, Readout Noise, and Dark Current** button.
8. The **Conversion Factor, Readout Noise, and Dark Current** will be displayed.

Results from this measurement are written to the Data Log.

Advanced CCD Testing (see Handbook section 8.3)

The **Generate Transfer and Linearity Data** button automates determining the linearity of your CCD as described in Handbook section 8.3.3.3. You must follow the directions precisely, and create a set of files with the same names described in the book. Place all of these files in one directory.

1. Open the **Characterize CCD Camera Tool**.
2. Click the **Generate Transfer and Linearity Data** button.
3. Select the directory containing the data.
4. Graphs showing the **Transfer Curve** (see Handbook figure 8.6) and **Linearity Curve** (see Handbook figure 8.7) will be displayed.
5. Results from this measurement are also written to the Data Log.

The bias, skim, and dark-frame measurements described in the Handbook are not implemented in this tool.