

## Data

### Always shoot everything in RAW!

Raw is the camera's native format and retains the maximum amount of data. JPEG is massively compressed and all detail is lost.

*Lights* are your data images. Take lots.

*Darks* must have the same temperature, ISO and exposure time as the lights.

Take them when you have finished imaging by putting the end-cap on your scope, covering the camera viewfinder, and taking a minimum of twenty images but ideally up to half as many darks as lights. More will give you a better average. Darks should ideally be captured at the same time as lights and without moving the camera, so that they capture any effects of the telescope. But in general you can keep a library of darks, labelled by ISO, shutter speed, camera and temperature if known. I keep mine in a folder structure eg for 3 minute exposures at 3200 ISO with my Canon 1100D, I have the raw files in

*My Pictures\Astro\1100D\Darks\3200\180 .*

*Flats* must be taken on the scope at the same ISO, temp, camera orientation and time as lights, This is so that they have the same defects - dust, hairs etc - in the same place on the sensor. When you've done your darks, point the scope at your laptop screen, bring up a blank white document (eg in Word), then set the exposure so the histogram is about 50% and run off at least ten but ideally fifty or so images.

*Note: You must recreate your lights every time you clean your camera sensor or anything else in the imaging train (eyepieces, barlows, mirrors, etc). If you use old flats, you will create fake dust artefacts on your images, as well as the real ones!*

*Biases* can be taken any time and kept in a library. Set your camera to the fastest shutter speed, any ISO will do, leave the lens cap on, cover the viewfinder and take a hundred or so shots.

*Masters:* When you register files, DSS will create a MASTER from each set of darks, flats and biases in the folder where the input files were. You can move the master Dark and Bias to your library and use them in future instead of the individual files. Label them with the method used to create them (eg median, average, aawa, whatever) as well as the ISO, exposure time and camera (if you have more than one camera). For example my Darks are named like this

*MasterDark\_3200\_180\_Median.tiff*

. Master lights can also be used but bear in mind the points mentioned above about new dust bunnies.

## Good DSS Settings

Disclaimer: these work for me today but your mileage may vary and the best settings also depend on your data, camera, and a bunch of other stuff. I strongly recommend you play around with things. I have found that altering the method of flat stacking can drastically alter quality for instance.

The below assumes you've added lights, darks, flats and biases, have visually checked each image to make sure its useable - no aircraft, clouds etc - clicked 'check all', and are ready to process & check quality.

### Register Pictures

#### Actions

- Reregister ON
- Automatic detection of Hot Pixels OFF
- Stack after registering OFF

#### Advanced

- Star threshold to get approx between 50 and 200 but ideally 100 stars
- reduce noise ON

#### Recommended Settings

- Use bilinear debayer ON
- Reset all white balance ON
- Black point zero ON
- sigma clipping method
- RGB background calibration ON

#### Stacking Parameters

- Dark median ON
- Dark hot pixels OFF
- Dark Optimisation ON
- Factor 1.0000
- Flat Maximum ON
- Bias/Offset Median ON
- Intermediate create calibrated files ON
- Intermediate create debayered files OFF
- Intermediate type tiff

### Compute offsets

No settings here, but once done you should check how many lights are included and check each light to make sure it really is good. Untick any that are dodgy.

### Stack checked pictures

You have access to more settings than during registration. Extra settings covered here.

#### Stacking parameters

- stacking mode standard
- stacking align RGB channels ON
- stacking drizzle OFF
- lights Kappa Sigma ON, use defaults
- Alignment AUTO
- Cosmetic applied to hot pixels
- Cosmetic applied to cold pixels
- (defaults are fine, Filter = 2 px, Detection Threshold = 50.0%)
- Output create file ON
- Output create HTML description ON - useful to check settings later
- Output save name < file list >

## Comet Mode

To stack in comet modes, you will need to check that DSS has correctly identified the nucleus.

- In stacking parameters, choose the comet mode you want.
- Register pictures as normal
- Examine each picture. The comet should be circled in red.
- If not, click the comet image on the RH toolbar, hold down shift, place the mouse cursor over the nucleus, and click on it.
- Repeat for each checked image
- You can zoom in/out using your mouse scroll wheel or page-up/down if you want to get a more accurate location.
- When done with a light, click the disk image to save

## Adding Stars

Sometimes DSS does not find all the stars and it won't stack with less than about 20 stars per picture. You can add them manually though.

- Select a light then click on the red star image on the RH toolbar
- Move the cursor over the image, and move it around.
- Addable stars will be identified with green markers. Click to add.
- Avoid bright saturated stars.
- When done with a light, click the disk image to save