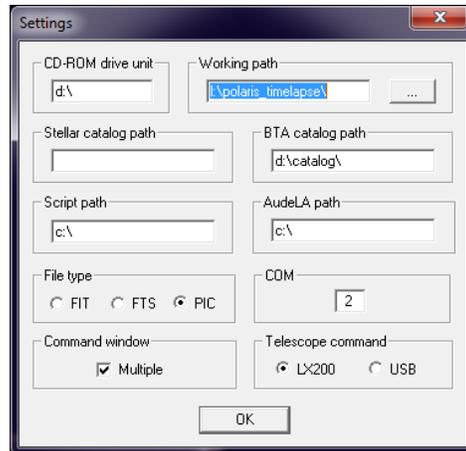


Detecting an Exoplanet Transit Using “Automatic Photometry” in IRIS.

This guide shows how generate a light curve of a known transiting exoplanet using IRIS software to perform photometry on a set of images you have taken. This guide assumes you are using a DSLR and have acquired the images in RAW format.

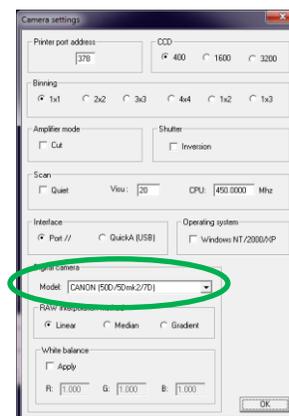
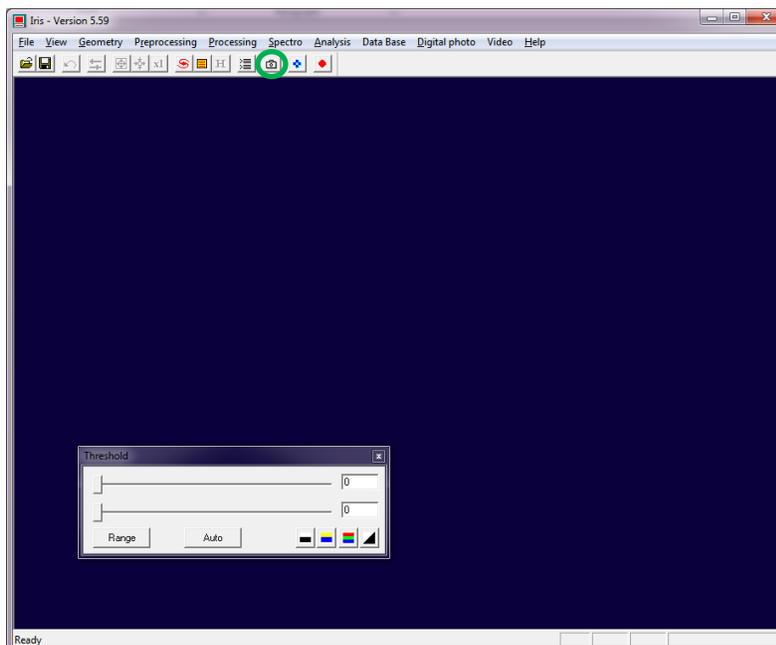
Step 1: Set working directory (Working path):

In the File→Settings dialog, set your working directory for this processing run.

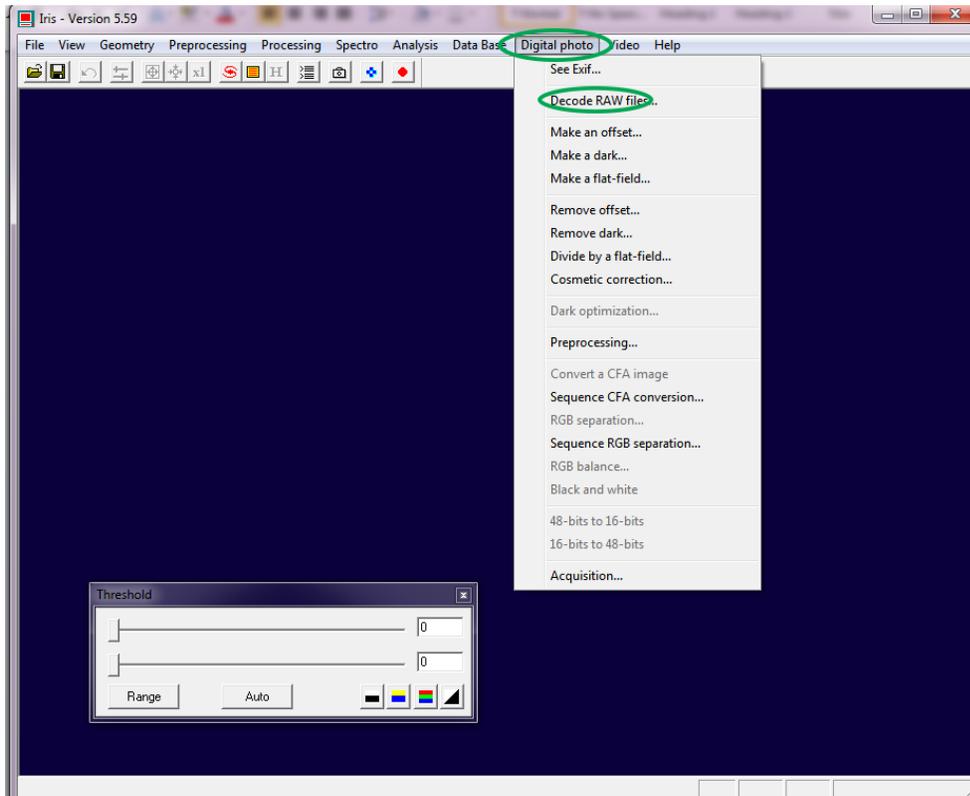


Step 2: Set your DSLR type

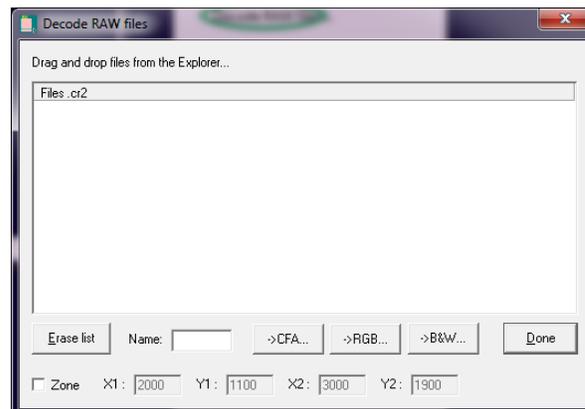
Set your DSLR type, by clicking the Camera icon on the tool bar.



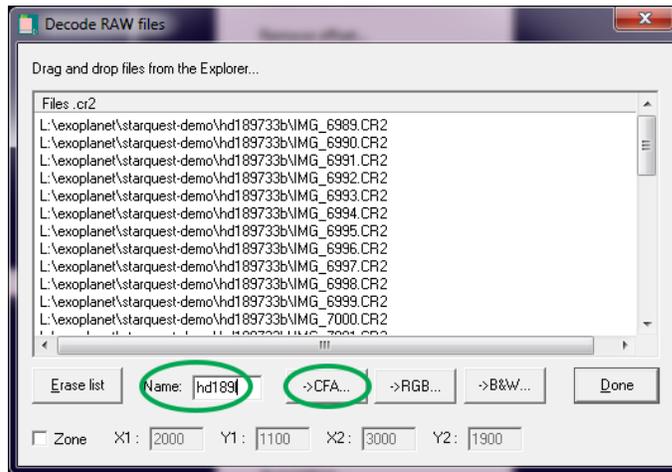
Step 3: Convert Raw images to Native IRIS images:
Select Digital Photo → Decode RAW files...



A dialog box should popup that looks like the following: (Note, IRIS automatically minimizes the main window, and sometimes the Decode RAW files window does not appear until you restore the main window)



Next open a File Explorer window to the folder holding your raw images. Select all images you intend to process, and Drag and Drop into the Decode RAW files window. Provide a file prefix in the “Name” field, and click the ->CFA button. This will convert your RAW files to native IRIS format. In this example, the output files will be named hd18911, hd18912, hd18913, etc...



When finished converting, click the “Done” button.

Step 4: Align/Register the images:

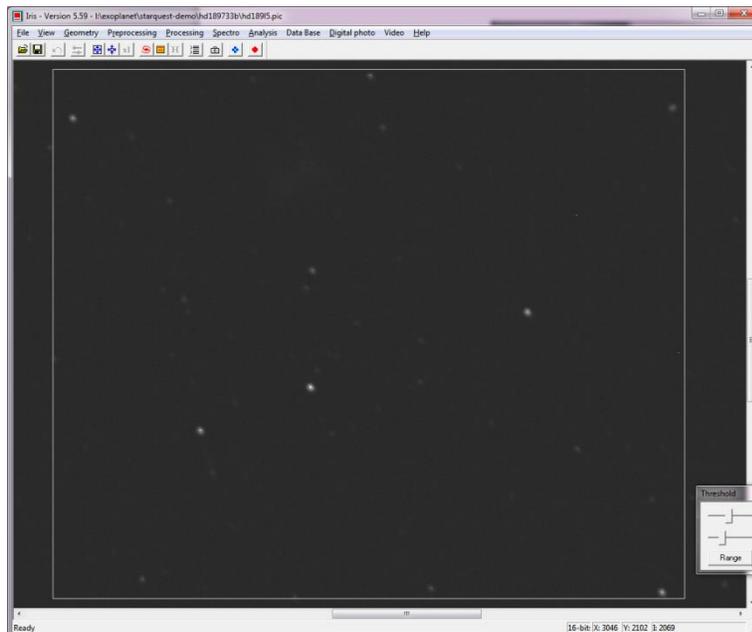
First, load one of the “pic” images you just converted from the previous step. File→Load

Once the image is loaded, click “Auto” on the “Threshold” popup, the small window with two sliders.

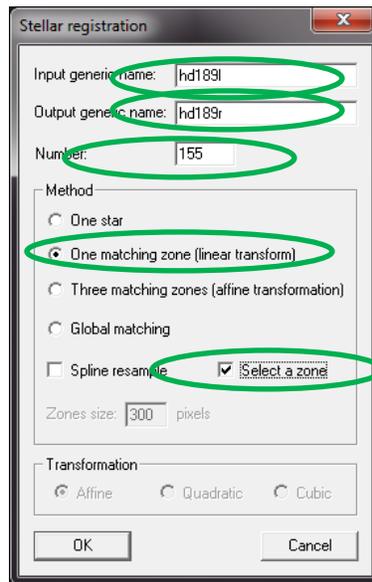
If you do not have the “Threshold” window, click the Threshold icon on the tool bar (4th from left).

The Auto setting will help you see the star field better. This does not affect the image.

Center your target star in the viewer. Draw a box around the target area, being sure you get a number of stars that will be used to register the images.



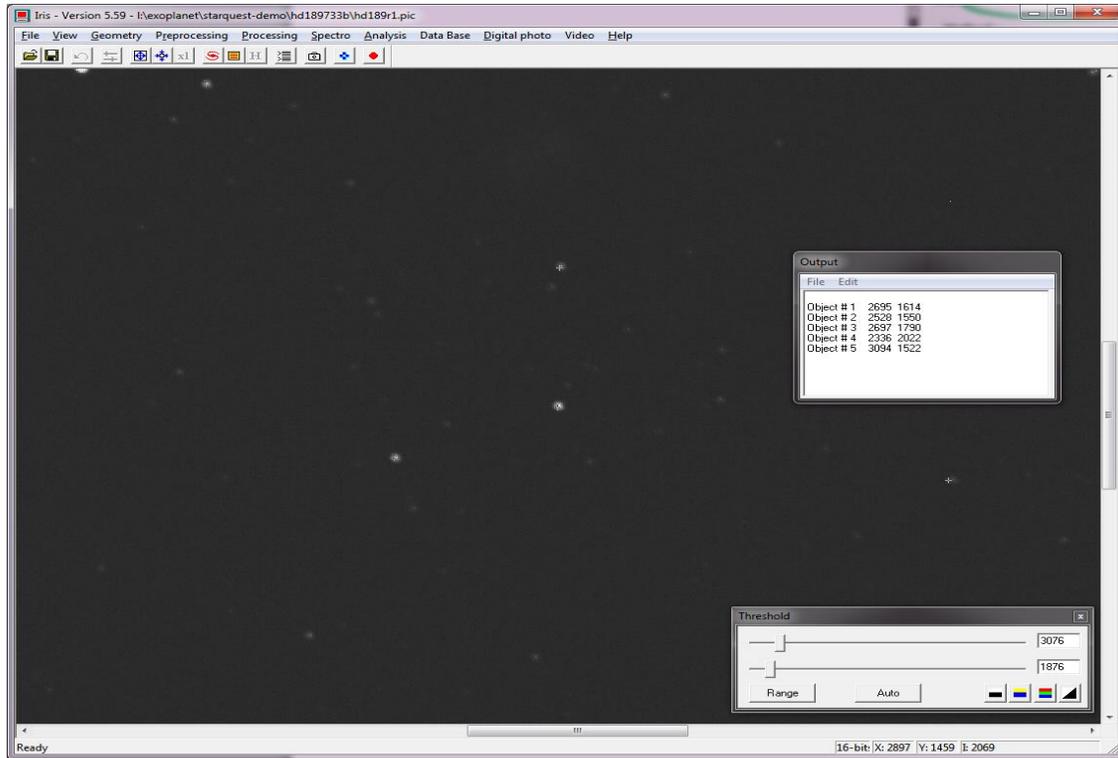
On the “Processing” Menu, select “Stellar Registration”. For the input files, enter the prefix for the converted raw images, in this example hd189l, for the output files, provide a prefix for the registered image names, in this example hd189r. Indicate the number of images to be registered. Select “One Matching Zone”, and check “Select a zone” then click OK. This step will create a new set of “registered/aligned” images. We will use the registered images for the Photometric Analysis.



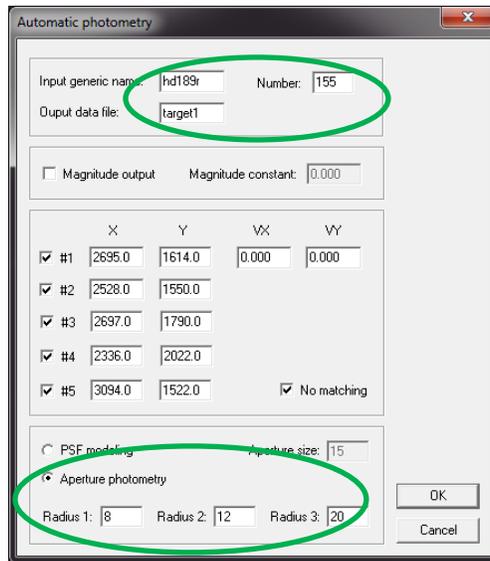
Step 5: Perform Photometric Analysis

On the “File” menu, load one of the newly registered images, for example hd189r1.pic. Click “Auto” on the “Threshold” window. Center the target star.

On the “Analysis” menu, click on “Select Objects”. You will get an “output” window, and a new cursor. We need to select 5 stars. The first one **HAS** to be the target star with the exoplanet transit. The next four stars are reference stars. The “output” window gives you the object’s X-Y coordinates.

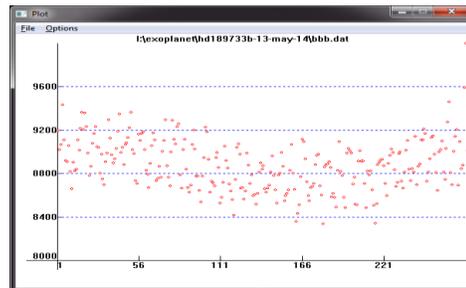


Once you have select 5 stars, select “Automatic Photometry” from the “Analysis” menu. Input the file prefix of your registered images (ie hd189r), the number of images to process, the filename for the output data, and select the “Aperture photometry” option. You can adjust the radii values as needed based on your image. The defaults work fine with a 300mm lens with the HD189733 images. Click “OK”.



Step 6: Plotting the light curve

When finished, a file named `verif.dat` in the working directory will contain the photometry data for the target star. You can then plot this data using the “View” menu “Plot” utility. You can also import this data into Excel or Numbers to generate scatter diagrams with trendlines. Be sure to rename the `verif.dat` file to a permanent name, because the next run will overwrite the `verif.dat` file.



Also, run reference plots by selecting 5 reference stars, being sure not to select the exoplanet target.

