

CCDBand-Aid & PixInsight Narrowband Images

By

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PixInsight is developed and maintained By Pleiades Astrophoto S.L

CCDOPS is developed and maintained By Santa Barbara Instrument Group

Working With Narrowband Images

Both CCDBand-Aid and CCDOPS usually fail to properly analyze and correct narrowband (NB) images. Even with 30-minute exposures, NB images are still noisy and difficult to process.

Here are the basic steps for working with narrowband images, followed by detailed instructions for PixInsight users.

- 1. Group your sub exposures by temperature and length of exposure. Apply the following steps to each group.
- 2. Without registering the images, normalize the sub exposures. This creates a set of images with similar background levels.
- 3. Mean combine the group of exposures and save this and the normalized images as 32-bit floating point FITS.
- 4. Processes the mean combined image with CCDBand-Aid to get the band pattern amplitude.
- 5. Use the acquired amplitude to repair the vertical bands in the normalized images.

In PixInsight, open the LocalNormalization dialogue and click the X on the lower right hand corner to select the default settings. For *Applied normalization*, select "Global execution only". Then uncheck *Generate normalization data*. Click *Add Files*, select the images to normalize and Click *Apply Global*. With this example, the images are saved in the same folder with "_n" added as the postfix.

The default settings seem to do a decent job of normalizing the images. Experimentation will no doubt produce better results.

LocalNormalization	≖ ×
Reference image: H-ALPHA0W_M101_02194.REDUCED	xisf File 🔻 🔻
Scale: 128	
Outlier rejection	
Hot pixel removal: 2	
Noise reduction: 0	
Background limit: 0.050	
Reference threshold: 0.500	
Target threshold: 0.500	
Apply normalization: Global execution only	
No scale component	
Generate normalization data	
Show background models	
Show rejection maps	
Plot functions: Palette 3D	
Target Images	\$
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4 🗸 💾 H-ALPHAOW_M101_02197.REDUCED.xisf	Toggle Selected
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Prefix: Postfix: _n	
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Open the ImageIntegration dialogue and again select the default settings. Click *Add Files* and select all the normalized images. Finally, click *Apply Global* to create the mean combined image. This image has a stronger signal-to-noise ratio, allowing CCDBand-Aid to successfully determine the amplitude of the band pattern.

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4	~	H-ALPHA360W_M101_02214.REDUCED_n.xisf	Clear E.Norm. Thes
5	~	H-ALPHA360W_M101_02215.REDUCED_n.xisf	Add Drizzle Files
6	1	H-ALPHA0W_M101_02197.REDUCED_n.xisf	Clear Drizzle Files
7	1	H-ALPHAOW_M101_02195.REDUCED_n.xist	Set Reference
9	Č.	H-ALPHASSOW_MID1_02212.REDUCED_N.XISI	Select All
10	1	H-ALPHA0W_M101_02196.REDUCED_n.xisf	Invert Selection
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Save the integrated (mean combined) image, as 32-bit floating point FITS.

Gray 1:14 integration <	– ≖ + ×
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FITS Options	?×
— Sample Format ———	
🔘 8-bit unsigned integer 🛛 🤇	• 32-bit IEEE 754 floating point
O 16-bit integer	O 64-bit IEEE 754 floating point
 O 32-bit integer ✓ Unsigned 16/32-bit integers 	
ICC Profile	Thumbnail Image
Properties	Fixed-precision keywords
	OK Cancel

Process the mean combined image with CCDBand-Aid to determine the band pattern amplitude. Do not be concerned with the very high value for the amplitude. CCDBand-Aid internally multiplies PixInsight data by 65535 and then divides by 65535 when the FITS image is saved.

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CCDBand-Aid only repairs vertical bar patterns in 32-bit floating point FITS images.

Execute the PixInsight BatchFormatConversion script and add all of the normalized .xisf images. Clear the *Input format hints* option. For the *Output extension* enter ".fits" and for the *Sample format* select 32-bit IEEE 754 floating point. Click OK and now you have a set of images suitable for processing with CCDBand-Aid.

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C:/aa/New f	older/Ha/west/H-A	ALPHA360W_M101_02214.	REDUCED_n.xisf
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In CCDBand-Aid, enter the previously determined amplitude and select the normalized FITS images. Below, we can see that CCDBand-Aid used the predetermined amplitude with all images. Also, note that the PixInsight default normalization values worked well with these images. The background levels are all very similar. Now you can stack the normalized sub exposures and produce a narrowband result with no vertical bars.



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...Bob Franke