



Staci STAr Color extinction Documentation

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1. Introduction

STAr Color extinction (Staci) is a Windows application for calculating RGB color adjustments for atmospheric extinction.

The program extracts the acquisition altitude for each red, green and blue FITS sub exposure. After determining the average altitude, for each color, the color corrections are determined. Additionally, the program applies these corrections to the image-train's standard color calibration.

IF You Normalize Your Color Sub Exposures

Use only one image for each color channel. Use the image that is the base for the normalization.

2. Program Features

- Staci is primarily designed for use with Mono CCD's using color filters. It will also work for Color CCD and DSLR cameras with software that creates FITS images.
- The image acquisition software must record the target's altitude in the FITS header.
- The user may define a basic color calibration for multiple image-trains.
- The program can use all of the sub exposures to determine an average color correction.
- Staci applies the color correction to the image-train's standard color calibration.
- The user may normalize the color correction to any one of the three primary colors.
- If necessary, the programs keyword searches may be adjusted to match "nonstandard" variables in the user's FITS images.
- A manual extinction calculation is provided.

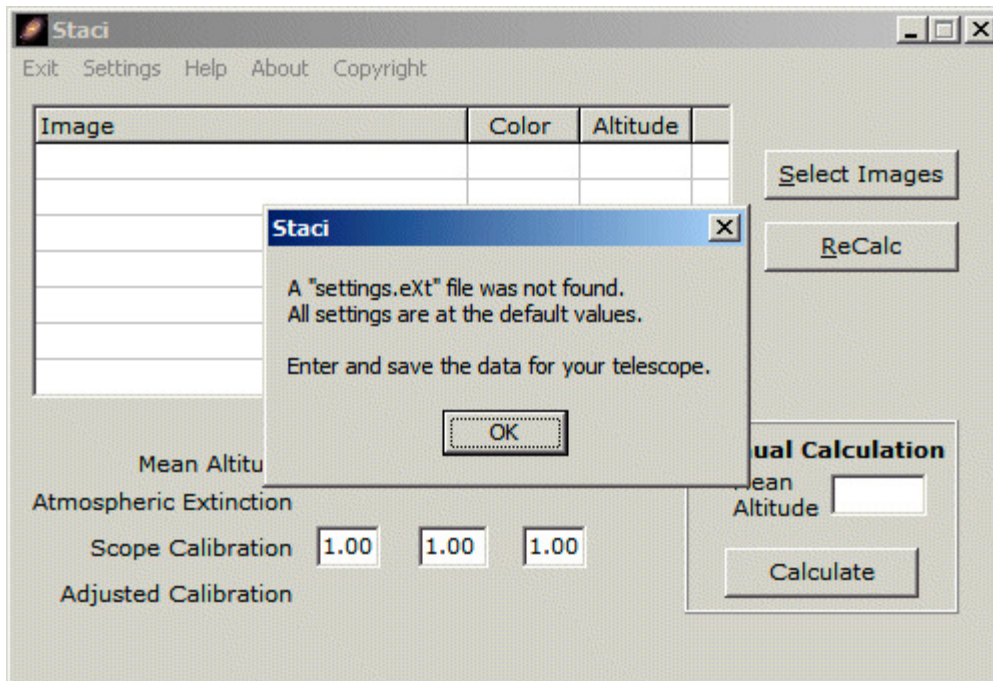
3. Program Installation

Simply unzip Staci.zip into the folder of your choice and create a desktop shortcut for Staci.exe. The zip package only has two files, the executable and this PDF documentation.

4. Using Staci

First Time Execution

Click "OK" to enter the settings for your telescope.

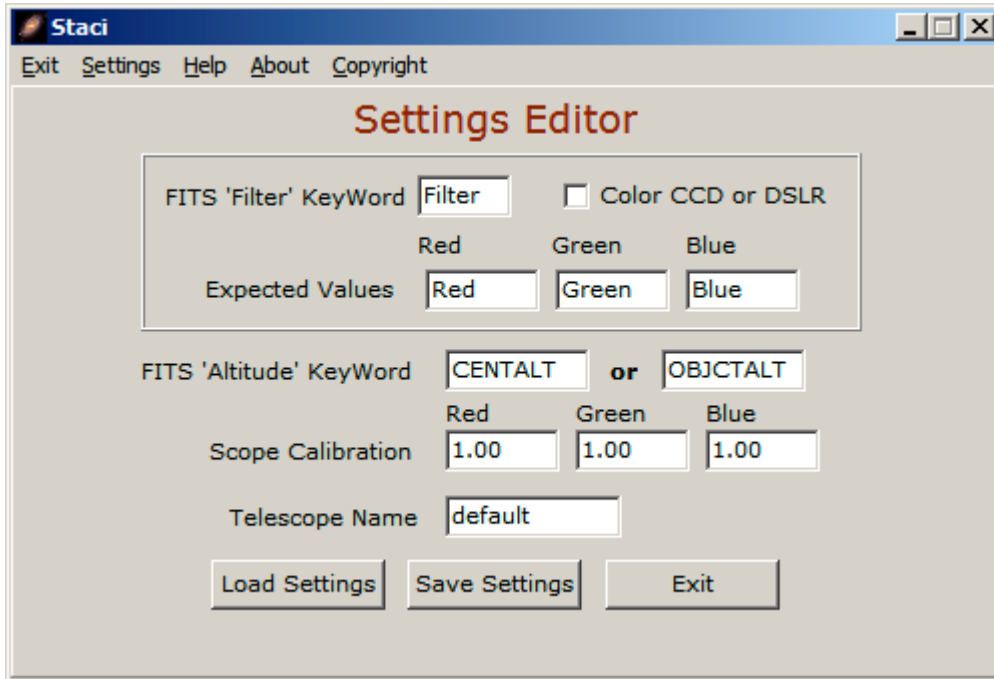


The Settings Editor

With the initial execution, the program populates the fields with default values used by most acquisition software. If your software inserts different KeyWords into the FITS header, modify this screen accordingly.

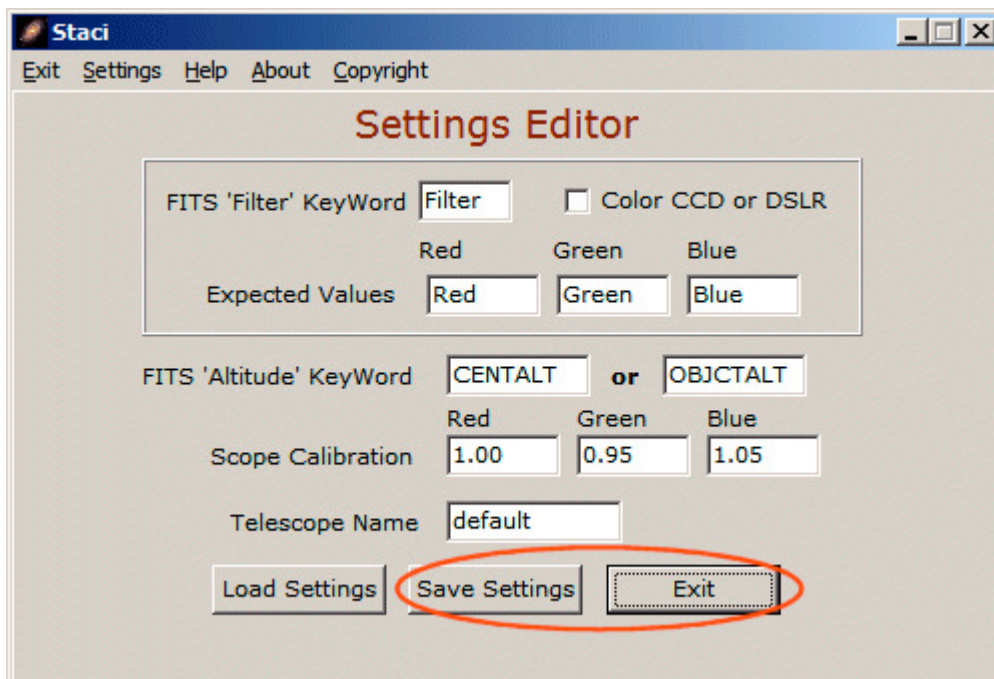
The Scope Calibration fields are the Red, Green and Blue color ratios for a specific image–train color calibration. The author's 12 1/2 inch RC with an STL-11000 camera and AstroDon filters uses ratios of 1.00, 0.95 and 1.05.

For Telescope Name, simply enter whatever name you want to identify this image–train.



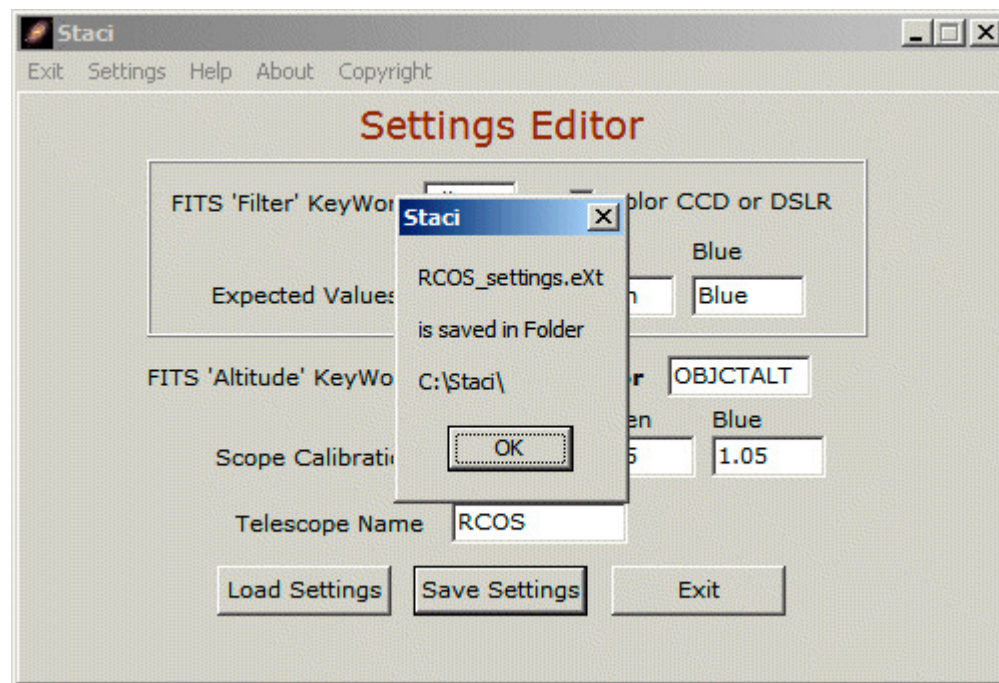
The screenshot shows the 'Staci' application window with the 'Settings Editor' dialog box open. The dialog has a menu bar with 'Exit', 'Settings', 'Help', 'About', and 'Copyright'. The title is 'Settings Editor'. It contains several input fields and a checkbox. The 'FITS 'Filter' KeyWord' field is set to 'Filter'. The 'Color CCD or DSLR' checkbox is unchecked. Below this, there are three columns for 'Expected Values' with headers 'Red', 'Green', and 'Blue'. The 'Red' field is set to 'Red', 'Green' to 'Green', and 'Blue' to 'Blue'. The 'FITS 'Altitude' KeyWord' has two options: 'CENTALT' and 'OBJECTALT', with 'CENTALT' selected. Below this, there are three columns for 'Scope Calibration' with headers 'Red', 'Green', and 'Blue'. The 'Red' field is set to '1.00', 'Green' to '1.00', and 'Blue' to '1.00'. The 'Telescope Name' field is set to 'default'. At the bottom, there are three buttons: 'Load Settings', 'Save Settings', and 'Exit'.

When you are finished, click "Save Settings" and then "Exit".



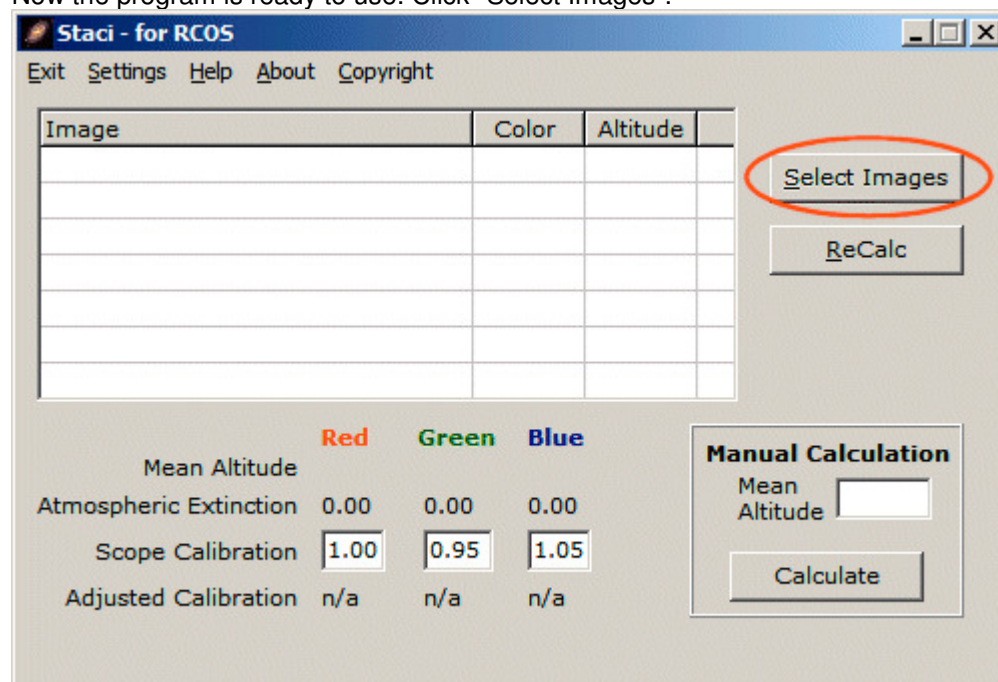
This screenshot is identical to the previous one, but with the 'Save Settings' and 'Exit' buttons at the bottom highlighted by a red oval. The 'Scope Calibration' values are still 1.00, 1.00, and 1.00.

Note that the Settings (*.eXt) files are saved in Staci's installation folder.



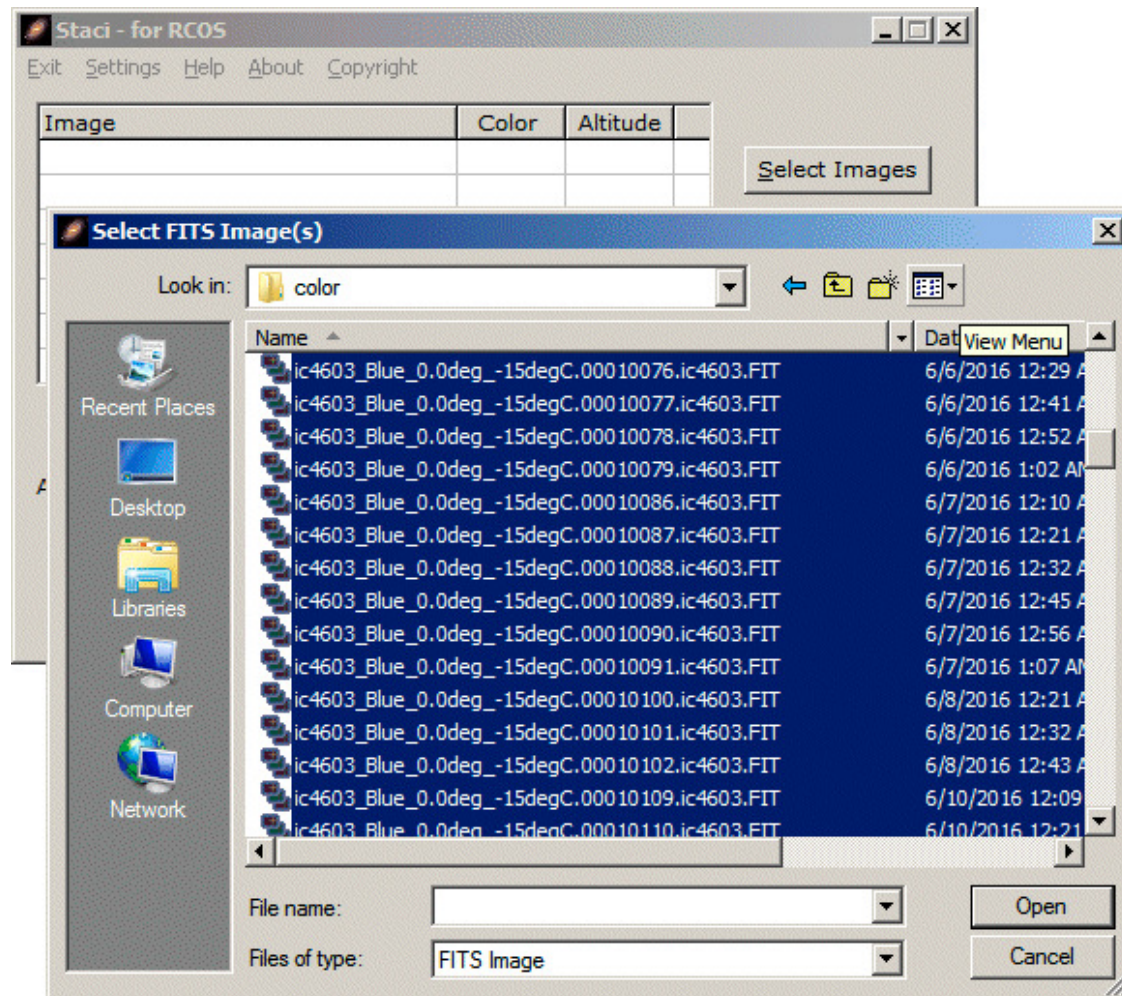
Selecting The Images

Now the program is ready to use. Click "Select Images".



Staci uses the standard Windows open files dialog window. Browse to your folder, select all of the color sub exposures and click "Open".

Some software delete much of the original data from the FITS header. This may necessitate using the raw, uncalibrated, images.



Staci quickly reads the FITS header for each image and computes the average altitude and atmospheric extinction for each color. The result is then applied to the image-train's basic color calibration. These are the values, for setting the color balance, when creating the RGB image.

The screenshot shows the 'Staci - for RCOS' window. It features a menu bar (Exit, Settings, Help, About, Copyright), a table of image data, and a section for manual calculations. The table lists seven images with their respective colors and altitudes. Below the table, there are fields for Mean Altitude, Atmospheric Extinction, Scope Calibration, and Adjusted Calibration for Red, Green, and Blue channels. The 'Adjusted Calibration' row shows values 1.11 for Red, 1.17 for Green, and 1.34 for Blue, which are circled in red. To the right, there are buttons for 'Select Images', 'ReCalc', and a 'Manual Calculation' section with a 'Calculate' button.

Image	Color	Altitude
ic4603_Blue_0.0deg_-10degC.00010	Blue	29.48
ic4603_Blue_0.0deg_-10degC.00010	Blue	28.81
ic4603_Blue_0.0deg_-10degC.00010	Blue	28.02
ic4603_Green_0.0deg_-10degC.0001	Green	25.98
ic4603_Green_0.0deg_-10degC.0001	Green	24.87
ic4603_Red_0.0deg_-10degC.000101	Red	27.41
ic4603_Red_0.0deg_-10degC.000101	Red	26.50

	Red	Green	Blue
Mean Altitude	26.46	25.43	28.77
Atmospheric Extinction	1.11	1.23	1.28
Scope Calibration	1.00	0.95	1.05
Adjusted Calibration	1.11	1.17	1.34

Normalizing the Result

It may be desirable to normalize the color ratios to one color. This sets the selected color to 1.00 and the values of the other two are adjusted accordingly. Simply double-click on the Adjusted Calibration text for the desired color. For PixInsight users, double-click the color with the highest value. In this case, it is "1.34" in the above blue column.

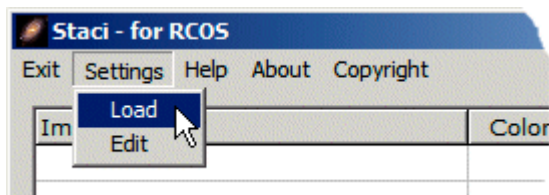
Here is the result.

This screenshot shows the same 'Staci - for RCOS' window after normalization. The 'Adjusted Calibration' row now shows values 0.83 for Red, 0.88 for Green, and 1.00 for Blue, which are circled in red. All other values in the table and the 'Manual Calculation' section remain the same as in the previous screenshot.

Image	Color	Altitude
ic4603_Blue_0.0deg_-10degC.00010	Blue	29.48
ic4603_Blue_0.0deg_-10degC.00010	Blue	28.81
ic4603_Blue_0.0deg_-10degC.00010	Blue	28.02
ic4603_Green_0.0deg_-10degC.0001	Green	25.98
ic4603_Green_0.0deg_-10degC.0001	Green	24.87
ic4603_Red_0.0deg_-10degC.000101	Red	27.41
ic4603_Red_0.0deg_-10degC.000101	Red	26.50

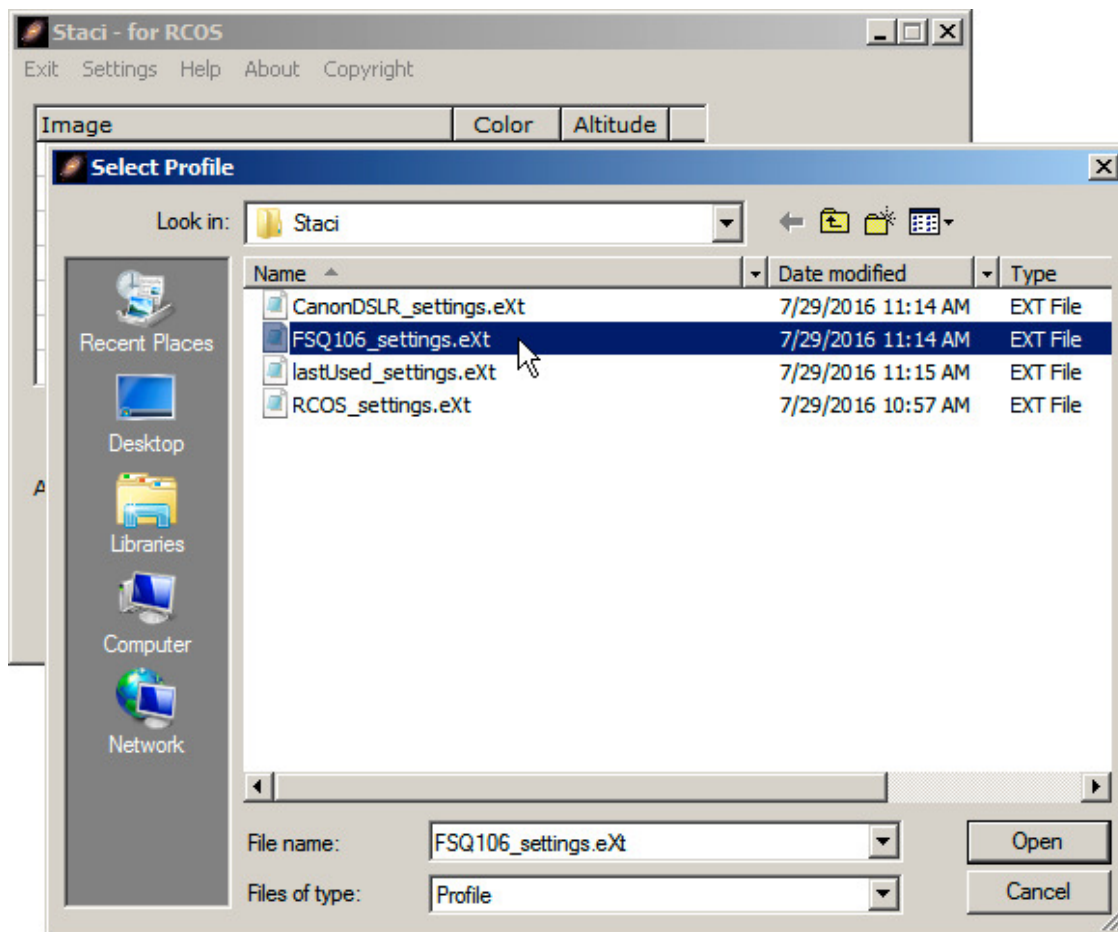
	Red	Green	Blue
Mean Altitude	26.46	25.43	28.77
Atmospheric Extinction	0.83	0.93	0.95
Scope Calibration	1.00	0.95	1.05
Adjusted Calibration	0.83	0.88	1.00

The Settings Menu



Load

Use this option to load the settings (*.eXt) for the desired image-train. Browse to Staci's installation folder, select the file and then click "Open". Alternately, double-click the desired file.

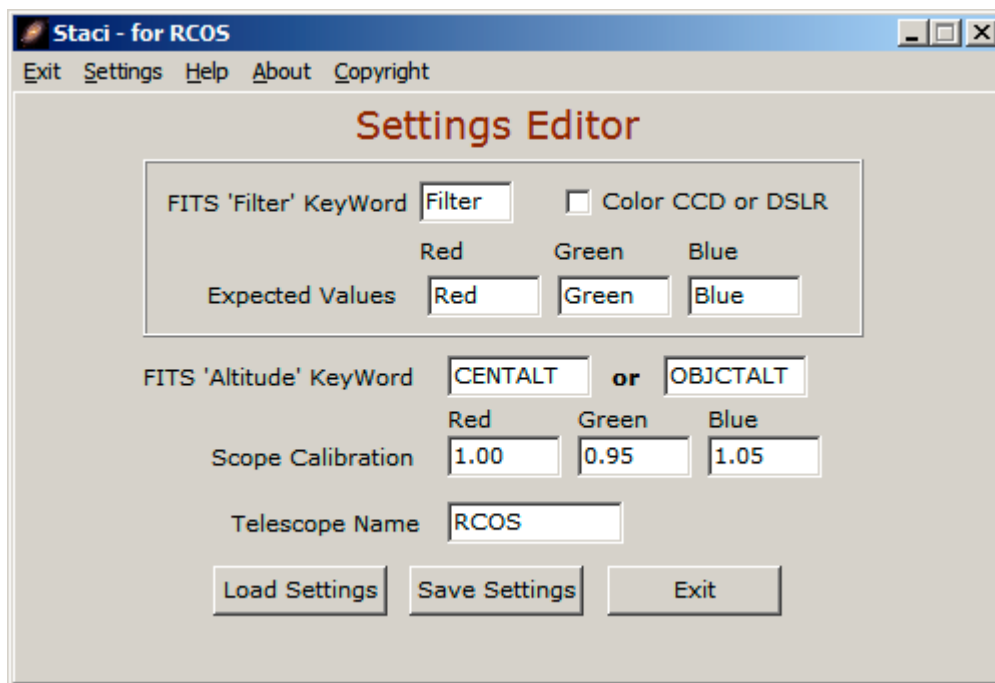


Edit

This option displays the Settings Editor panel. Here you may load a different settings file or edit the current one. If the Telescope Name is changed, clicking the "Save Settings" button creates a new file. Otherwise, the current file is updated.

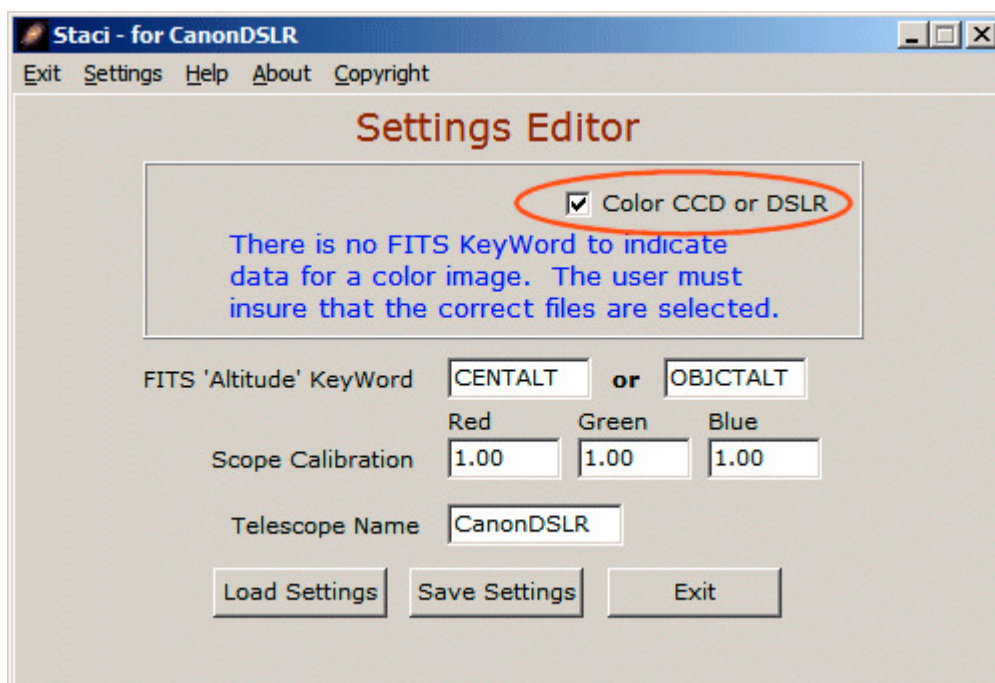
- *Mono CCD With Color Filters*

The below screenshot shows the default settings for the "filter" and "altitude" keywords and their respective expected values. These settings will work for almost all users.



- *Color CCD or DSLR Camera*

The FITS digital file format has no provisions to store data for color images. With Color CCD or DSLR images, Staci only searches for altitude data. The user must correctly select the color files.

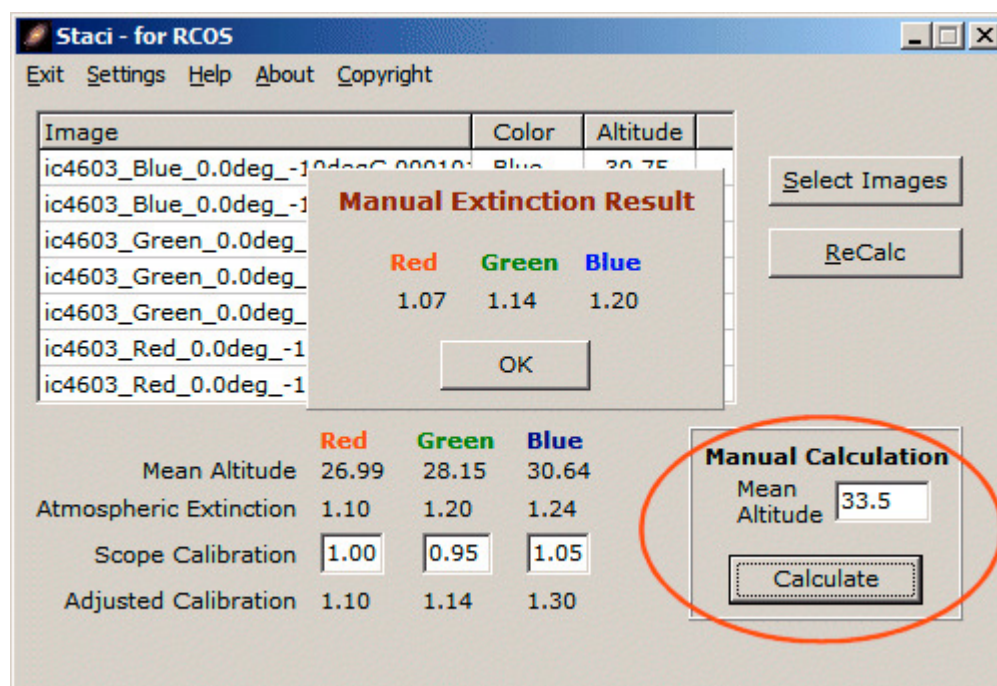


ReCalc Button

This button simply recalculates the data with the currently loaded files.

Manual Calculation

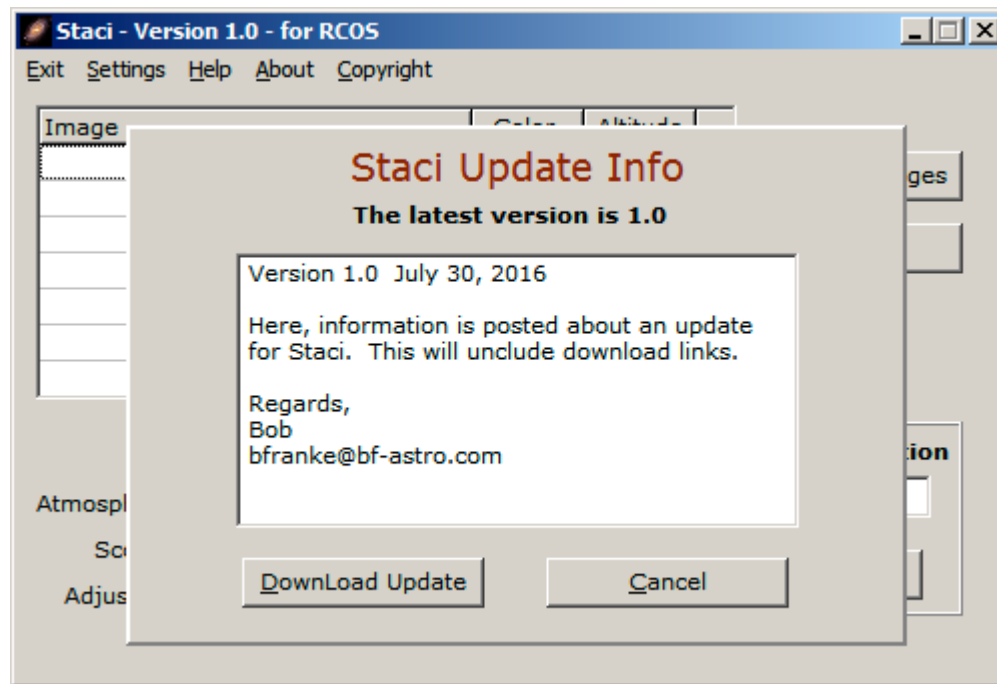
Enter an altitude from 15 to 90 degrees, click "Calibrate" and Staci displays the red, green and blue extinction factors.



5. Program Updates

On startup, Staci downloads a small text file with update information. The program displays an update panel, if a new version is available. After downloading, close Staci to unzip and install the new executable.

If necessary, go to the Staci web page to download a new documentation (PDF) file.
See URL: <http://bf-astro.com/extinction/staci.htm>



6. Disclaimer, and Copyright

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Staci is provided as-is, and although I will attempt to make changes and fixes as they become necessary, I provide no guarantees about its suitability for any purpose whatsoever.

...Bob Franke

End of document