


# Raw2Fits converter



The screenshot shows the 'RAW to FITS converter' application window. At the top, there are two buttons: 'Raw directory' and 'Output directory'. The 'Raw directory' is set to '/media/media\_disk/cr2' and the 'Output directory' is set to '/media/media\_disk/fits\_out'. To the right of these buttons is the 'RAW FITS' logo and an 'About' button. Below this is the 'Fits header data' section, which contains several input fields for metadata: Object (Antares), Telescope (Newton 150/750), Object RA (16:29:24.4592), Object DEC (-26:25:55.204), Instrument (empty), Observer (Kutkov), Filter (V), Notes (Clear), Exposure (empty), Date (empty), and Temperature (4.7). The next section is 'Image & color processing', which includes a 'Color channels' dropdown set to 'Convert RGB to Grayscale', and three checkboxes: 'Apply auto bright' (unchecked), 'Apply interpolation' (checked), and 'Apply autoscale' (checked). Below this is the 'Output properties' section, which has a 'File naming' dropdown set to '<RAW file name> .fits' and an 'Overwrite existing' checkbox (unchecked). At the bottom, there is a progress bar showing 27% completion, with 'Start' and 'Stop' buttons. The progress bar is currently at 27%.

RAW to FITS converter

Raw directory: /media/media\_disk/cr2

Output directory: /media/media\_disk/fits\_out

RAW FITS About

### Fits header data

Leave fields blank to use values from the Raw file (if present in)

Object: Antares Telescope: Newton 150/750

Object RA: 16:29:24.4592 Object DEC: -26:25:55.204

Instrument: Observer: Kutkov

Filter: V Notes: Clear

Exposure: Date:

Temperature: 4.7

### Image & color processing

Color channels: Convert RGB to Grayscale

☐ Apply auto bright ☒ Apply interpolation ☒ Apply autoscale

### Output properties

File naming: <RAW file name> .fits ☐ Overwrite existing

Pre-interpolating, step 1/2  
Pre-interpolating, step 2/2  
Interpolating, step 1013/3663  
Interpolating, step 2025/3663

Start Stop 27 %

## 1. Directories selection

Select directory with your RAW files by clicking «Raw directory» button.  
Select directory where you want to store generated FITS files by clicking «Output directory» button.

### 3. Fill up Fits header fields:

- \* **Object** — Observed object name, arbitrary text, max length — 73 symbols.
- \* **Object RA** — Object coordinates RA. You can enter angle degree value or sexagesimal string (h:m:s.ss). Program automatically identifies input type.
- \* **Object DEC** — Object coordinates DEC. You can enter angle degree value or sexagesimal string (h:m:s.ss). Program automatically identifies input type.
- \* **Instrument** — Camera name or any other used instrument that you want to note. You can leave this field blank to automatically use camera vendor and model values from the RAW file (if available in). Max length — 73 symbols
- \* **Exposure** — Exposure time in seconds, for example: 0.5, 15. You can leave this field blank to automatically use camera vendor and model values from the RAW file (if available in). This is preferable way.
- \* **Temperature** — Specify temperature condition when observations was made.
- \* **Telescope** — Telescope name or model.
- \* **Observer** — Observer name, arbitrary text, max length — 73 symbols. You can leave this field blank to automatically use camera vendor and model values from the RAW file (if available in).
- \* **Notes** - Additional notes, like sky condition, etc
- \* **Data** — Observations date and time. arbitrary text, max length — 73 symbols. You can leave this field blank to automatically use camera vendor and model values from the RAW file (if available in), this is most preferable way.

### 4. Image & color processing

#### Color channels

Select the way to process RGB channels:

- \* **Convert RGB to Grayscale** — convert color image to the averaged grayscale image.
- \* **R, G and B to the separate FITS's** — save Red, Green and Blue channels to the separate FITS's files with corresponding names.
- \* **R, G and B to the one FITS** — store Red, Green and Blue channels to the one FITS file as separate images.
- \* **Only R channel** — get and save only Red channel in separate FITS file.
- \* **Only G channel** — get and save only Green channel in separate FITS file.
- \* **Only B channel** — get and save only Blue channel in separate FITS file.

#### Additional options

- \* **Apply auto bright** — automatic increase of brightness by histogram.
- \* **Apply interpolation** — use interpolation algorithm to demosaic the image.
- \* **Apply autoscale** — automatically scale pixels values

You can experiment with this options to get most preferable result.

For example - \*\_AVG\_GRAY.fits in mode "Convert RGB to Grayscale" or \*\_RED.fits in «Only R channel».

## 5. Output properties

### File naming

Select the basic pattern for FITS's files naming:

- \* **<RAW file name>.fits** — generate file with name identical to the original RAW file but with .fits extension
- \* **<object>\_<datetime>.fits** — generate file with name which contains object name and observation time
- \* **<object>\_<filter>\_<datetime>.fits** - generate file with name which contains object name, used filter and observation time
- \* **<RAW file name>\_<datetime>.fits** - generate file with name identical to the original RAW plus observation time.

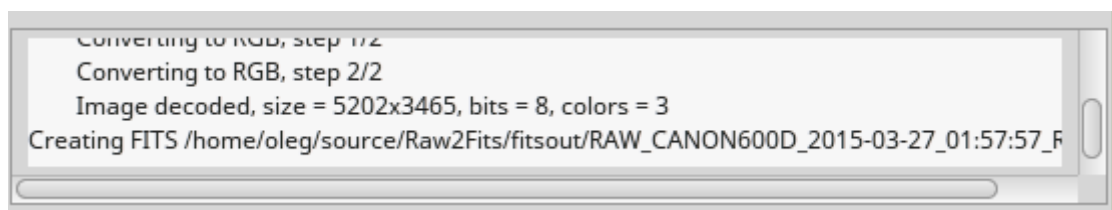
Additionally all filenames may contains postfix corresponing to selected color processing mode.

### Overwrite existing

Switch this checkbutton to enable overwriting of already existing files or to skip such files.

## 6. Conversion log

On the bottom of the application window special textarea displays all messages from converter.



## 6. Start and stop

Press «Start» button to begin conversion.

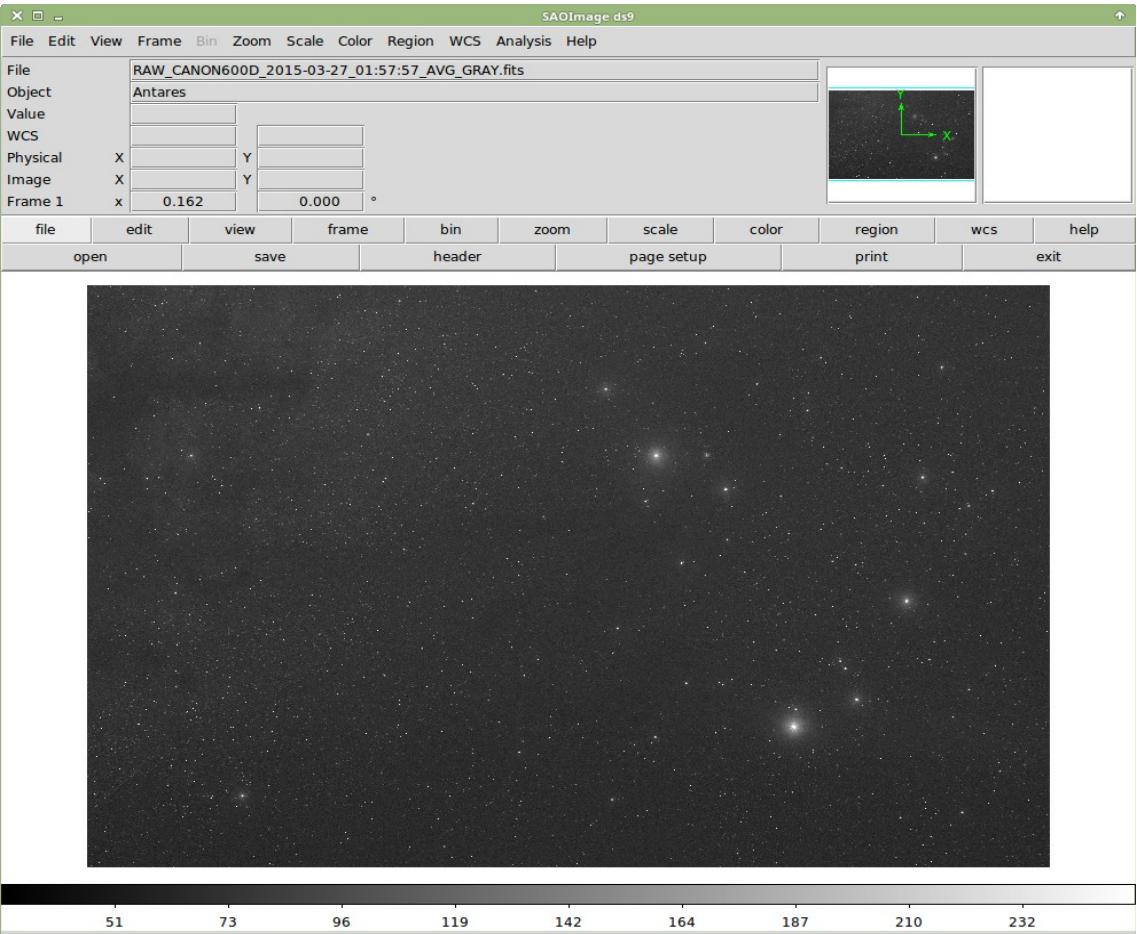
Press «Stop» button to stop conversion.

You can always restart conversion from the previous point or with other parameters/other files. No need to restart whole application.

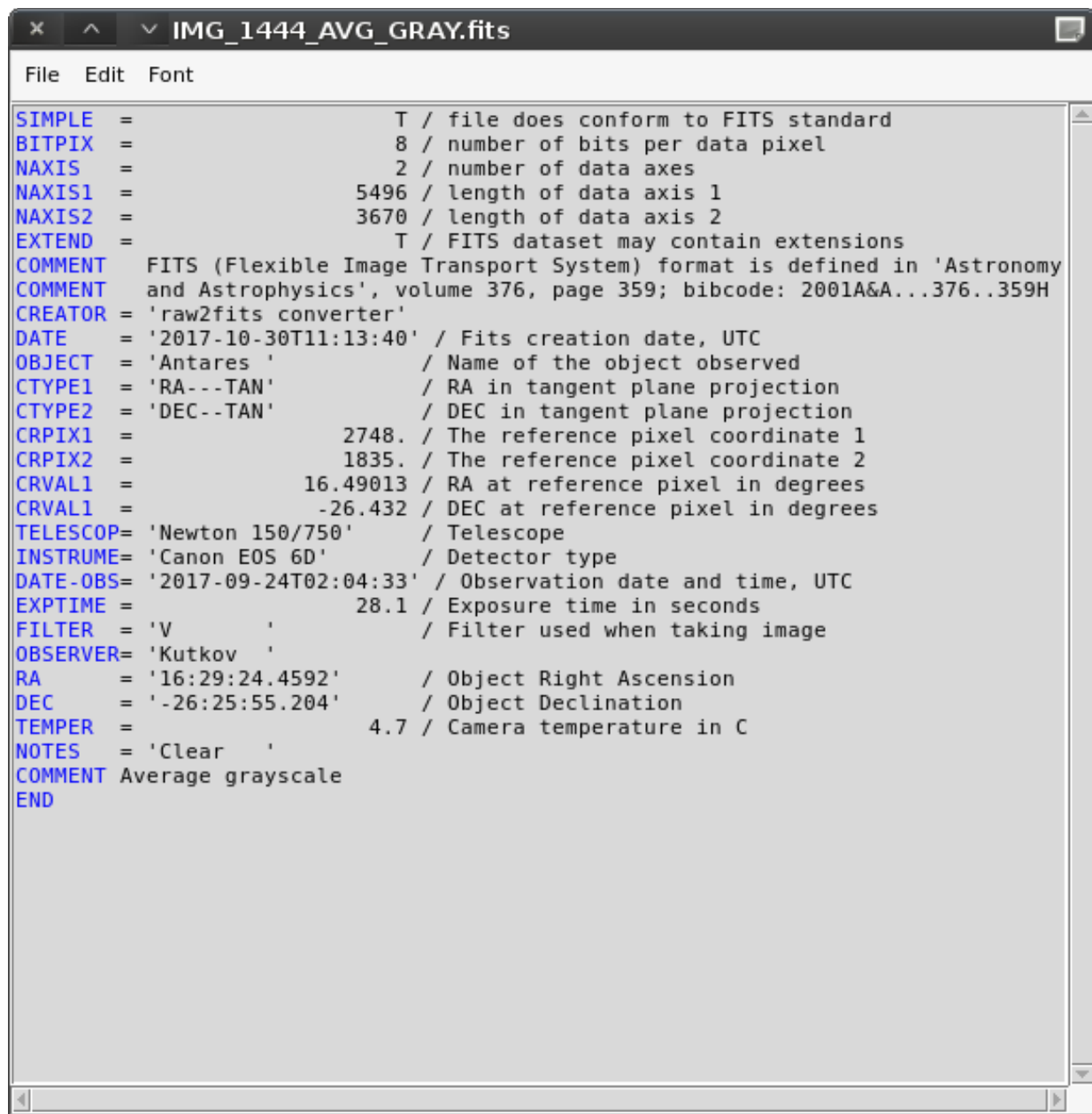
# Examples



Original RAW file.



Generated FITS in «Convert to Grayscale» mode.

A screenshot of a text editor window titled "IMG\_1444\_AVG\_GRAY.fits". The window has a menu bar with "File", "Edit", and "Font". The main text area displays a FITS header in a monospaced font. The header consists of key-value pairs, each with a blue label on the left, an equals sign, and a value and comment on the right. The keys include SIMPLE, BITPIX, NAXIS, NAXIS1, NAXIS2, EXTEND, COMMENT, CREATOR, DATE, OBJECT, CTYPE1, CTYPE2, CRPIX1, CRPIX2, CRVAL1, CRVAL2, TELESCOP, INSTRUME, DATE-OBS, EXPTIME, FILTER, OBSERVER, RA, DEC, TEMPER, NOTES, and END. The comments provide details about the file format, observation parameters, and the object being observed (Antares).

```
SIMPLE = T / file does conform to FITS standard
BITPIX = 8 / number of bits per data pixel
NAXIS = 2 / number of data axes
NAXIS1 = 5496 / length of data axis 1
NAXIS2 = 3670 / length of data axis 2
EXTEND = T / FITS dataset may contain extensions
COMMENT FITS (Flexible Image Transport System) format is defined in 'Astronomy
COMMENT and Astrophysics', volume 376, page 359; bibcode: 2001A&A...376..359H
CREATOR = 'raw2fits converter'
DATE = '2017-10-30T11:13:40' / Fits creation date, UTC
OBJECT = 'Antares ' / Name of the object observed
CTYPE1 = 'RA---TAN' / RA in tangent plane projection
CTYPE2 = 'DEC--TAN' / DEC in tangent plane projection
CRPIX1 = 2748. / The reference pixel coordinate 1
CRPIX2 = 1835. / The reference pixel coordinate 2
CRVAL1 = 16.49013 / RA at reference pixel in degrees
CRVAL2 = -26.432 / DEC at reference pixel in degrees
TELESCOP = 'Newton 150/750' / Telescope
INSTRUME = 'Canon EOS 6D' / Detector type
DATE-OBS = '2017-09-24T02:04:33' / Observation date and time, UTC
EXPTIME = 28.1 / Exposure time in seconds
FILTER = 'V ' / Filter used when taking image
OBSERVER = 'Kutkov '
RA = '16:29:24.4592' / Object Right Ascension
DEC = '-26:25:55.204' / Object Declination
TEMPER = 4.7 / Camera temperature in C
NOTES = 'Clear '
COMMENT Average grayscale
END
```

Fits header