Version 2.0
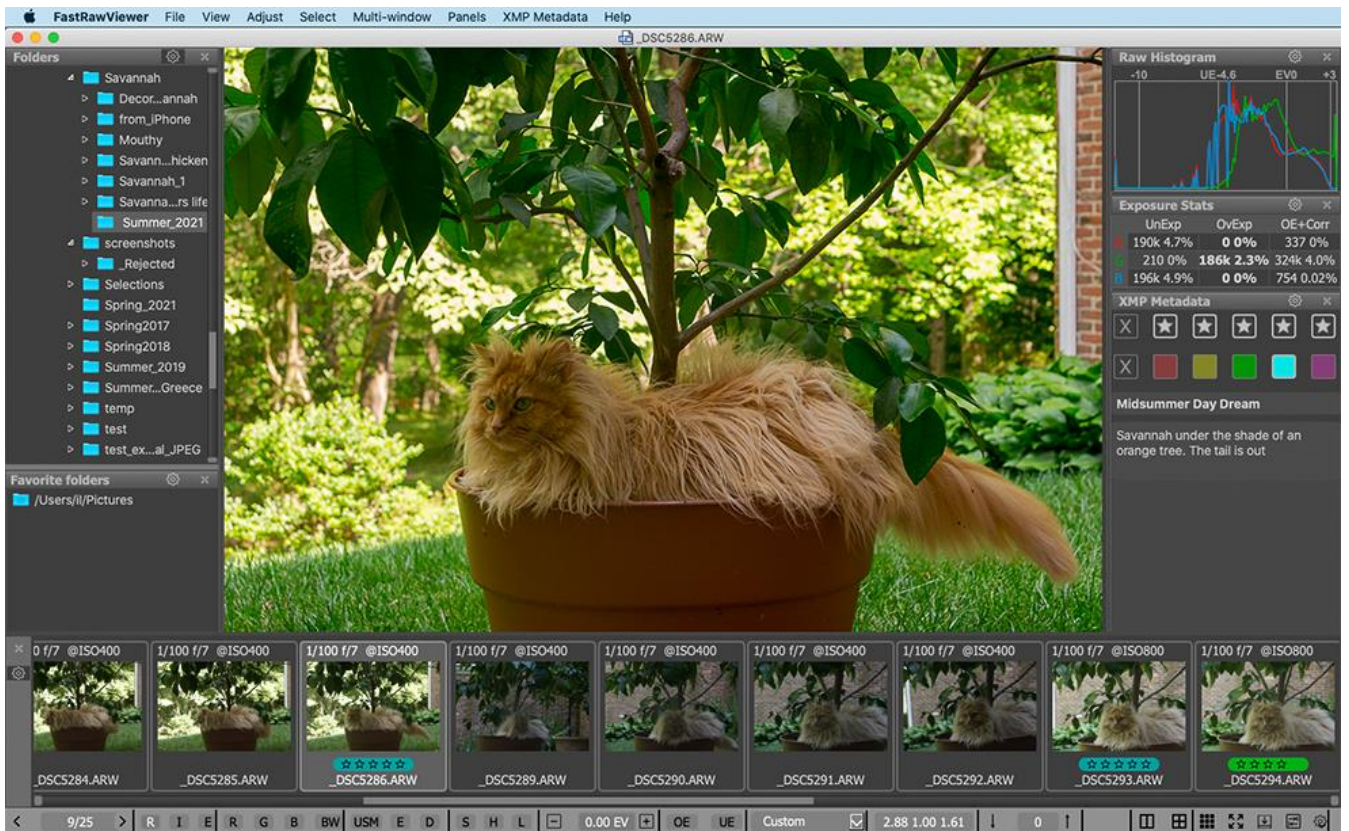*User Manual*

How FastRawViewer Helps You

FastRawViewer *is the first and the only dedicated application with the purpose of* ***extremely fast culling and pre-processing of RAW images:*** i.e. display, visual and technical analysis, applying basic corrections, sorting and setting aside or directly transferring the selected ones for further processing.

FastRawViewer (FRV) is the only solution for those who:

- Shoot in RAW and are tired of wasting hours or days on browsing through piles of shots and sorting them.
- Are tired of rendering all those RAWs into JPEGs to quickly browse through them with a client, CMO, senior designer, editor in chief; or to show them to your friends and family members.
- Are in constant need of very quick viewing, visually and technically analyzing, sorting through hundreds or thousands of RAW shots, and selecting the apt ones for further processing.
- Want to shoot in RAW, but don't, fearing to get mired in sorting RAW files.
- Are forced to use JPEG format, because your previous experiences tell you that it is impossible to quickly select and show your client the images taken in RAW.
- Are in need of tools to instantly adjust white balance and exposure *(lightness)* right while browsing through the shot.

FastRawViewer Strengths and Features

- Display of the **actual RAW** as well as the **actual RAW histogram**
- For the first time, a comfortable speed of RAW file viewing *(together with histograms),* provided by **FastRawViewer** using modern processors and video cards to process RAW images.
- Support of almost **every single existing RAW format** *(that is, almost every known digital camera)[1]*, including native out-of-camera **DNG** files as well as the files converted to DNG.
- Instant display of RAW files directly from any memory card or other file storage - without customary delays for importing, creating catalogs, libraries, and temporary databases.
- View **JPEGs** *(including embedded JPEG thumbnails)* – and also display the histograms.
- **Support for TIFF/BigTIFF, HEIC/HEIF and PNG formats** – with histogram and EXIF data display.
- The convenience of working with shots taken in RAW + JPEG mode, with two files being paired:
  a) While listing through files, you have the option to ignore the second file in the pair.
  b) JPEGs *(including embedded thumbnails)* are considered to be "additional images" and are immediately accessible for viewing.
  c) When you move a file from the RAW + JPEG pair to another folder, the other file follows.

---

[1] With only one significant exception: Foveon cameras are not supported.

d) And, of course, you can always switch this mode off, if you so choose, and treat the files as separate.

- The possibility of doing a quick visual and technical analysis by:
  a) Examining the **real RAW histogram.**
  b) Assessing the exposure based on:
     i. **Spotlighting of over- and underexposed areas** on the shot.
     ii. Over- and underexposure **statistics.**
  c) Outlining the **in-focus** and **highly detailed areas** on the shot.
  d) Assessing **per-channel exposure** and **acutance.**
  e) Assessing the **noise level in the shadows.**

- Time-saver: **exposure** and **white balance adjustments** can be **made while browsing RAW files** and **are saved in XMP** files so that they can be automatically applied when you open that shot in Adobe Lightroom or Adobe Camera Raw.

- Time-saver for series, including panoramas: propagation of white balance, exposure, and image orientation adjustments from one shot to the entire series.

- Highly compatible system of assigning **labels and ratings** to images, including the user-defined labels. Ratings and labels are written into XMP files and are read by Adobe software *(and others which acknowledge XMP sidecar files)*.

- **Copying and moving the selected shots** into folders chosen by the user.

- **Moving the rejected shots** into a special folder, which can be reviewed again later.

- **Single and batch file renaming.**

- 2- and 4-window mode with synchronous zoom positioning to compare images and select the best one.

- Transferring the selected shots for further processing to a user-selected RAW converter directly from **FastRawViewer.**

- Support for **black and white RAW,** including shots from cameras converted to b/w by removing the color filter array.

- Warnings when **FastRawViewer** comes across a damaged RAW file.

- Monitor color profile support, without the loss of image rendering speed.

- Modifying settings to suite your workflow
  a) You can set your own keyboard *(or keyboard + mouse)* shortcuts for every action.
  b) The settings panel allows you to turn off the ones you don't need, and change the others to your preferences.

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Conventions used in this Manual

The user manual is the same for Windows and Mac versions of *FastRawViewer*.

All of the standard keyboard shortcuts are given in Windows notation *(for example, Ctrl-O)*.

For macOS please use the following substitutions:

- **Ctrl** on Windows – is **Command** on Mac.
- **Alt** on Windows – is **Option** on Mac.

All keyboard shortcuts are fully customizable *(see below, the "Keyboard Shortcut Settings")*. Throughout this text we will be using default program settings for keyboard / mouse shortcuts.

System Requirements

Windows

- Recommended system: Windows 8.1 – 10, 64-bit, Windows 7 is supported.
- Processor with SSE3 support or later *(meaning released 2005+):*
- Video card with DirectX 11 or later, or with OpenGL 3.1 or later that is:
  - Intel *(integrated/CPU)*: Core 3rd generation *(i3/i5/i7-3xxx)* processors and newer
  - ATI/AMD: we recommend Radeon HD 5000 and newer.
  - NVIDIA: GeForce 400 series and newer
- With manual settings tune it is possible to use older video cards:
  - NVIDIA GeForce series 8000 and 200
  - AMD: Radeon HD 2000/HD 4000

Mac

- Intel or Apple Silicon based Mac.
- Processor with 64-bit support *(that's every Intel or Apple Silicon Mac, excluding models from 2005-2006, that use Intel Core Solo and Intel Core Duo processors).*
- macOS 10.12 or later.
- Video card supported by macOS.

"Recommended minimum" computer configuration

Unlike applications that display a relatively light-weighted *(in megabytes)* JPEG preview embedded in a RAW file, **FastRawViewer** reads RAW files in their entirety and processes all of the data in them; as a result, the hardware requirements are higher than for applications that deal with just JPEG previews.

For RAW files of different pixel counts, to achieve a comfortable browsing speed of 5-7 RAW files per second, we recommend the following configurations:

- For RAW files 6-16 Mpix *(typical file size is 5-20MB)* and without using multi-window mode:
  - A mechanical/magnetic HDD will work acceptably *(including an external one, with a USB3 interface)*.
  - 2-4 core processor
  - Minimum 4GB RAM
  - Integrated graphics processor *(IGPU)*.

- RAW files 20-35Mpix (typical file size is 20-45MB):
  - SATA SSD, including an external one with a USB3 interface
  - 4-core Intel Haswell *(i5-4xxx and newer)* or better
  - 8GB RAM
  - Generation nine *(Skylake)* IGPU or better *(i5-7xxx and newer)*, or a discrete video card with a price tag of around $100.

- RAW files 40-60Mpix *(files are 50-120MB)*:
  - Recommended SSD/NVME (M.2) disk or SATA SSD RAID0
  - 4-8 core processor, no less than Intel Haswell
  - 16 GB RAM.
  - Discrete video card with a price tag around $100.

- RAW files 60-150 Mpix *(RAW files are larger than 120MB)*:
  - SSD/NVME (M.2) storage
  - 8+ core processor
  - 32 GB RAM.
  - Discrete video card with a price tag around $200.

- DNG panoramas, PixelShift stitching, HDR-DNG files *(files are larger than 300MB)*:
  - These images tend be very large, and in those cases, we recommend using the maximal available configurations:
  - SSD NVME RAID
  - 12+ core processors
  - 64GB memory and more
  - Top-class video card *(the same class as NVIDIA GTX 1080 or newer in the same category)*

Network storage

The typical network storage, connected via 1Gbit Ethernet, guarantees productivity on a par with a local mechanical drive *(HDD).*

A fast network storage, connected via 5-10Gbit Ethernet, containing several (5-6+) magnetic/mechanical drives in an array and SSD caches, works with a speed comparable to a SATA SSD, best case – like a RAID0 made of SATA SSD *(don't use RAID0 arrangements as primary storage).*

In general, is not possible to guarantee an acceptable RAW browsing speed using a wireless (Wi-Fi) connection.

Software Installation

Windows Installation

The program installation starts by running the executable file of the distribution package (**FastRawViewer-2.0.x.xxx--Setup.exe).**

If you downloaded **FastRawViewer** from our site on the first program launch, current versions of Windows will display the following security warning:
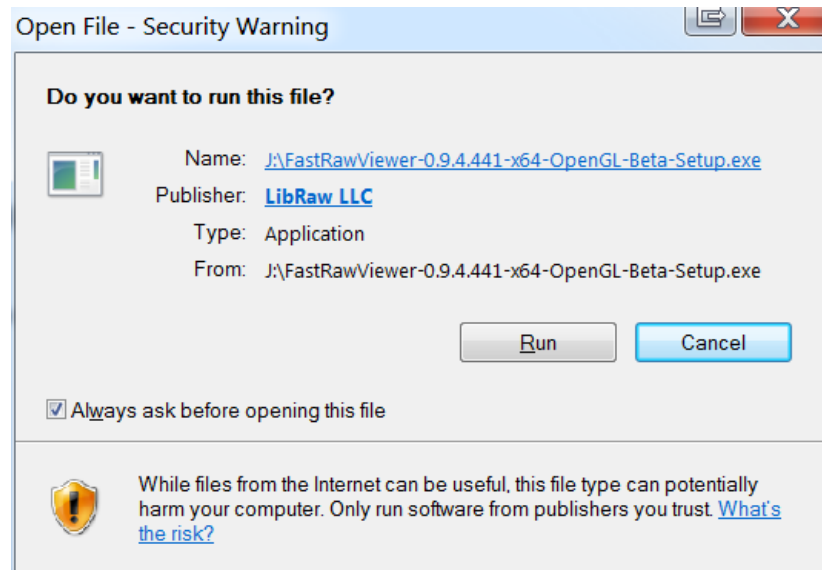
After the "Run" button is pressed, the UAC *(Windows User Access Control)* system will display a warning once again:
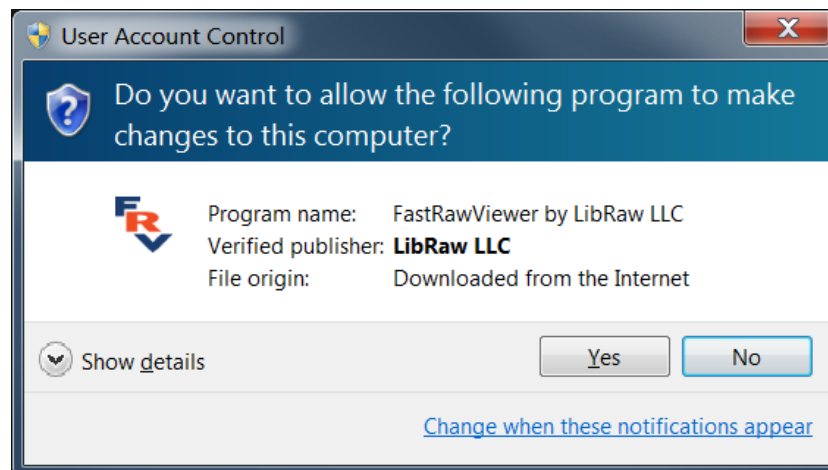
Both dialogs allow you to verify that the setup program is signed with unique LibRaw LLC electronic signature.

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To proceed with the installation, you must agree to the dialog above, and the usual Setup Wizard will be launched:

At the next screens of Setup Wizard:

The User License is displayed.

An installation folder is suggested; the user may select a different folder.

Creating a Group in the Programs menu is suggested.

A list of possible additional actions is shown: add **FastRawViewer** to desktop right-click menu, add icon to the desktop, add icon to the Quick Launch menu:
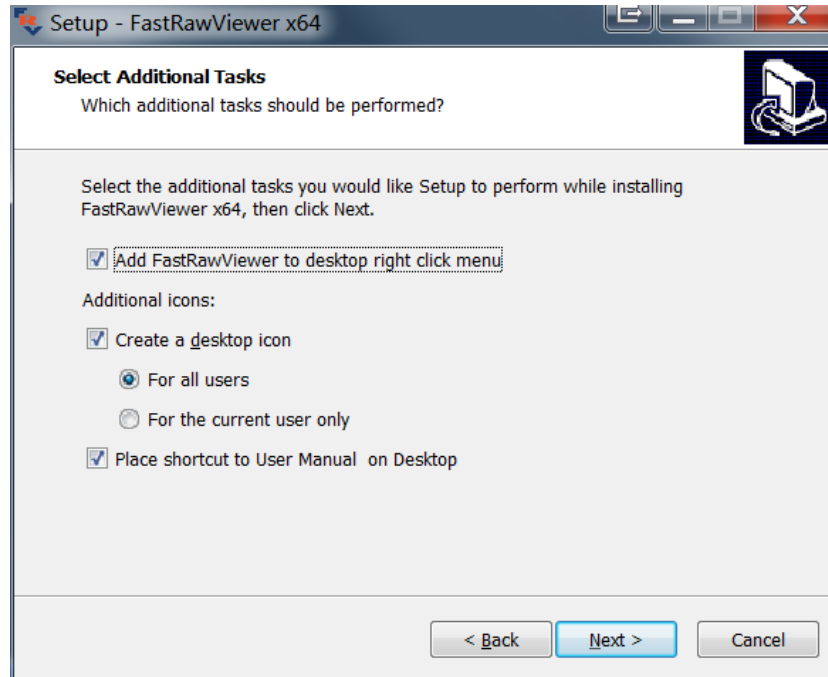
Afterwards, the installation takes place. Upon completion, the following screen appears:
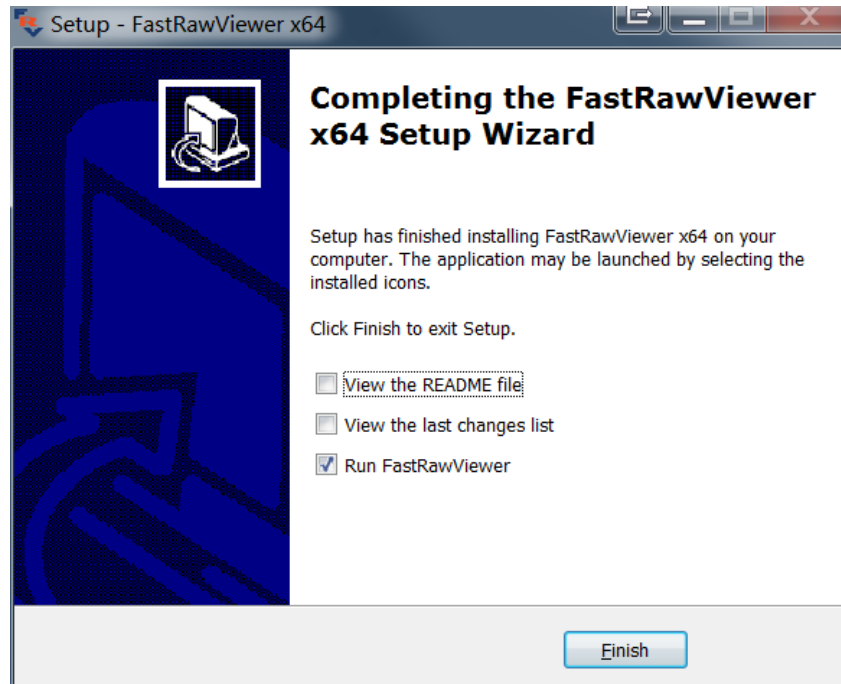
In case of any errors during installation, please contact us via www.fastrawviewer.com/contact or technical support forum at www.fastrawviewer.com/forum.

Unattended Windows installation

Use these installer command-line switches for unattended install:

- /SILENT – run Installer GUI, but do not ask for anything
- /VERYSILENT – do not run GUI
- /NOSTART – do not start FastRawViewer on installation last step.

Other installer command-line switches are explained in InnoSetup help.

macOS

Double click on FastRawViewer-2.x.x.dmg to mount the **FastRawViewer** disk image you've downloaded. The content of the disk image will appear like this:
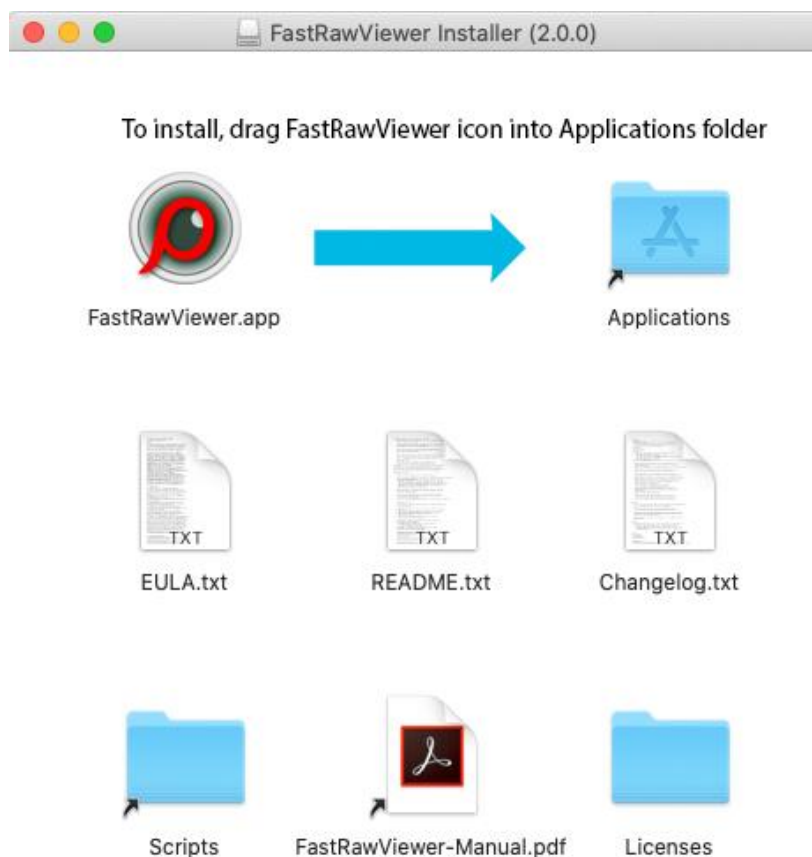
Drag **FastRawViewer** icon onto the **Applications** icon. The program will be copied to Applications folder and ready to run.

Other items contained in the disk image are:

- **FastRawViewer** Manual (FastRawViewer-manual.pdf).
- Brief description *(README.txt)* and Changelog *(Changelog.txt)*.
- End-User License Agreement *(EULA.txt),* Copyright Information *(Copyrights.txt).*

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- Licenses and Copyrights for libraries and components used in **FastRawViewer** *(Licenses folder)*.

- *Scripts folder* contains additional scripts used to set parameters that are not needed in a general case and therefore are not placed in the Settings menu. These scripts will be copied upon installation together with the application and are accessible through **FastRawViewer** menu.

If you are using macOS, you may receive a prompt saying that **FastRawViewer** can't be launched, as it was not downloaded from the Apple App Store, you can change the settings in System – Security to allow launching applications downloaded from **App Store and identified developers**:
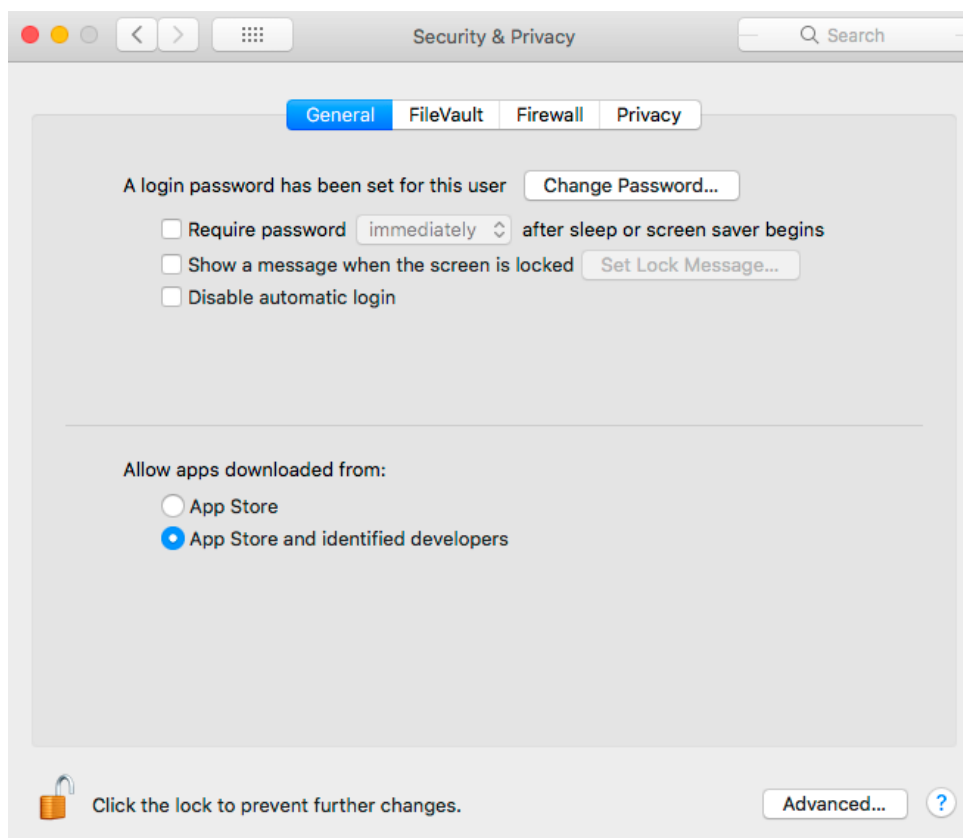
Unattended macOS installation

Use these (approximate) commands, adjust to specific version numbers:

```
sudo hdiutil attach FastRawViewer-A.b.c.dmg
sudo cp -Rp /Volumes/FastRawViewer\ Installer\ \(1.7.4\)/FastRawViewer.app /Applications
sudo hdiutil detach /Volumes/FastRawViewer\ Installer\ \(1.7.4\)/
```

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First Launch and Program Activation

Activating the Trial Version

During the first run **FastRawViewer** will display a splash screen suggesting the activation of the trial version.
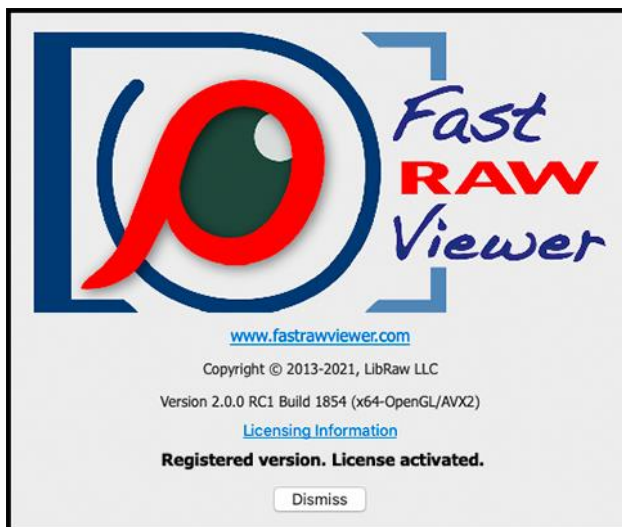
Immediately after that, with the main program screen being opened, **FastRawViewer** will try to connect to Internet to activate the trial version:

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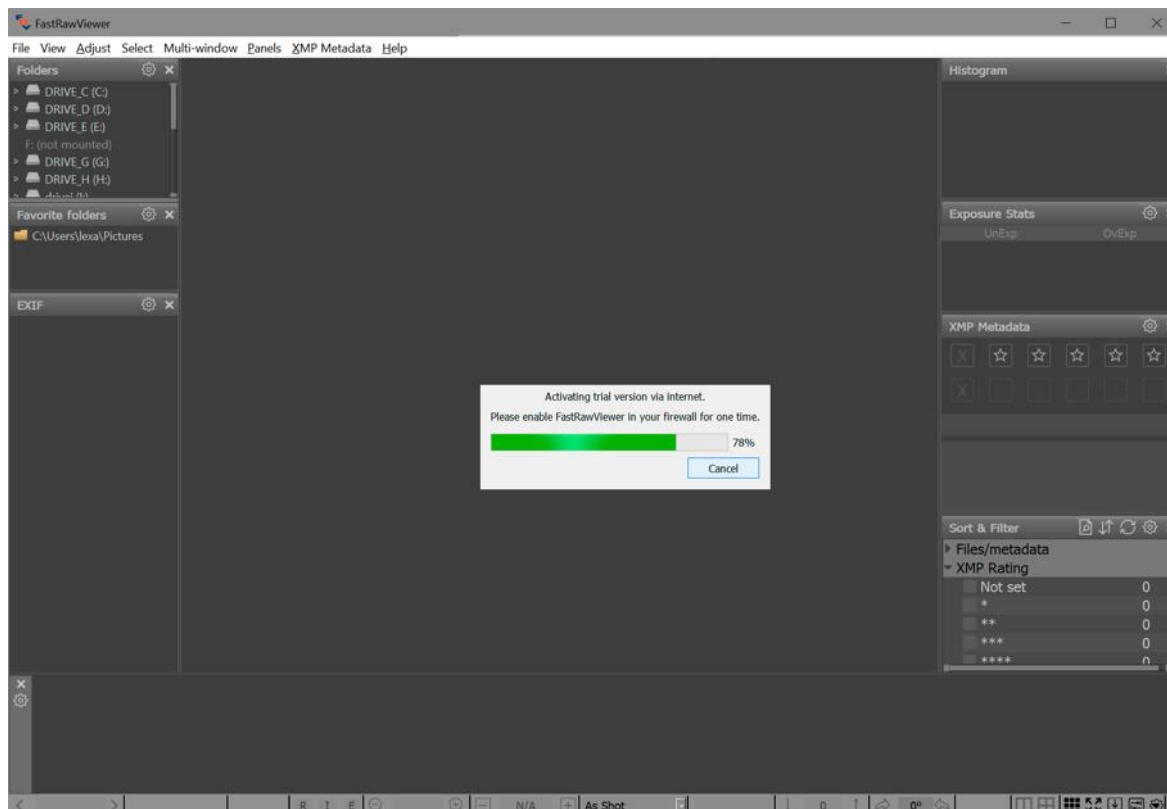
If you are connected to the Internet and **FastRawViewer** is not blocked by a firewall, the activation of the trial version happens automatically and nearly instantly, after which the 30-day trial period starts.

No private data is transferred during the activation process; the only data that is passed through the Internet is** FastRawViewer **version number and unique non-reversible 64-bit hash code identifying your computer; this code can't be decoded to extract any private or personal data.

After the successful automatic activation, the trial period begins; the trial time left is indicated in Help-About window and on the splash screen that pops up when **FastRawViewer** is started.

In case the automatic activation was impossible for some reason *(no Internet access, or* **FastRawViewer** *was blocked by firewall)*, then either in 30 seconds, or while opening a file for viewing you will be presented with the screen for manual activation:

Here you can allow **FastRawViewer** a one-time Internet access and press Activate Trial button to start 30-day free trial period.

If after pressing Activate Trial button **FastRawViewer** still can't access activation server an additional button for **Manual Activation** will appear:
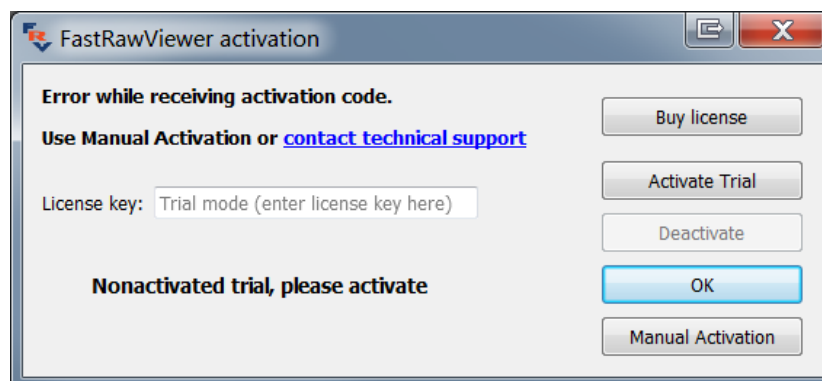
Pressing this **Manual Activation** button will take you to manual activation dialogue *(for more details, please see below, in "Manual Activation" section).*

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Activation of the License You've Purchased

To use **FastRawViewer** after the trial period, the user will need to obtain a full license.

To obtain the license, please click the **Buy License** button or open www.fastrawviewer.com/purchase in your browser. As a result of the transaction, you will be provided with the license key *(online and as a separate email)*.

This license key should be entered into the License Key field of the activation dialog, which is also available through **Menu-Help-Purchase/Activate**:
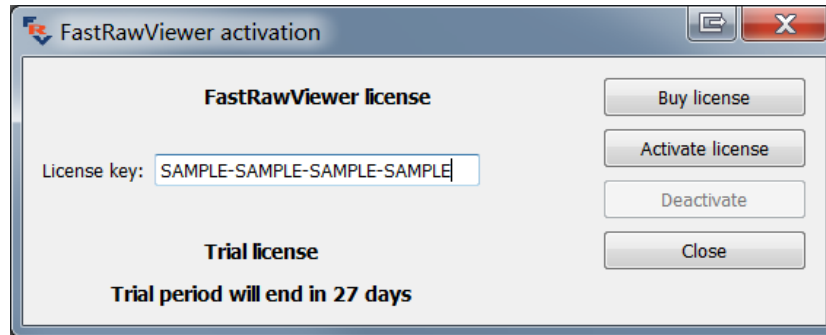
After the license key is entered, please click **Activate license** button. The license will be activated and you will be able to continue using the program.

The **Help-Purchase/Activate** menu item will now be renamed to **Help-Registration data**, and the respective dialog will show your registration data:
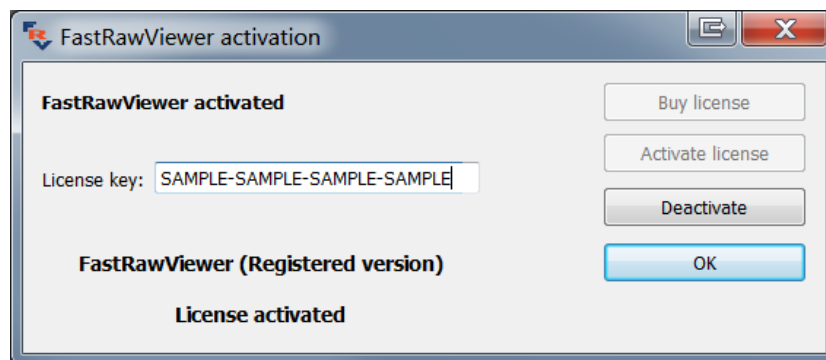
To complete the activation *(of both the trial and the fully licensed version)* the program needs a one-time access to the Internet. If you cannot grant the appropriate Internet access permissions, you can activate the program manually.

Major version upgrade

If you are upgrading **FastRawViewer** from version 1 to version 2 and version 1 has been installed on your computer, then the license activation window will display the message «FastRawViewer v1 License detected….»:
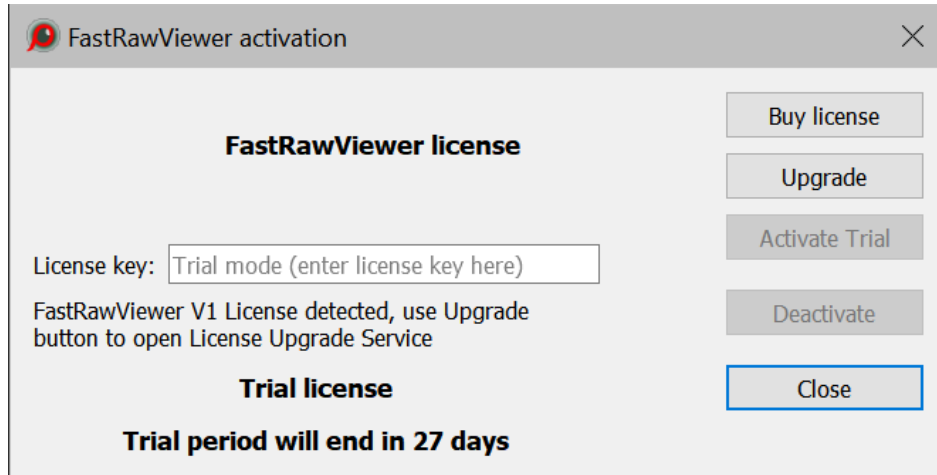
An analogous message (…License detected…), but in red, will be displayed upon an attempt to enter a license key from version 1 into a version 2 registration dialogue.

In both cases you can press the [Upgrade] button to open the FastRawViewer website in your browser and:

- Receive a key for version 2 if your license is eligible for a free upgrade (if you purchased less than six months before the release of version 2).
- Receive a coupon code to purchase version 2 with a discount if your license was bought before then.

Unpurchased licenses (for example licensed that were won in competitions) cannot be upgraded with a discount and/or for free.

If **FastRawViewer** did not find a license for version 1, then the [Upgrade] button will open a form in your browser where you can enter your information to receive an upgrade key or a discount coupon.

Manual Activation

If the program fails to connect with the activation server *(one-minute timeout happens)*, you will see a popup alert, with a **Manual Activation** button on the bottom right of the notification window.
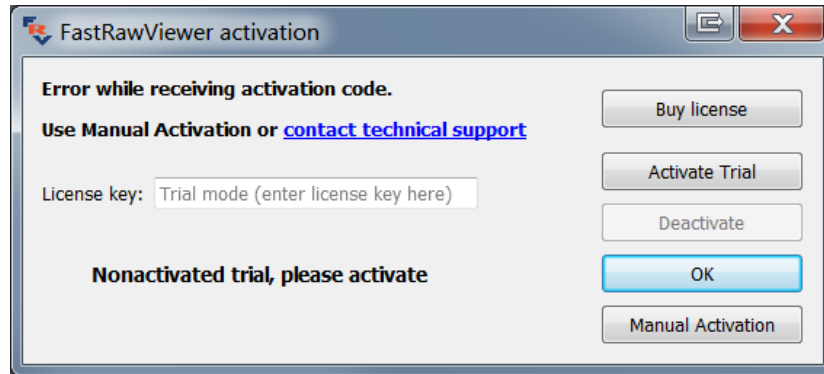
After clicking the **Manual Activation** button, a **Manual Trial Activation** window will pop up:
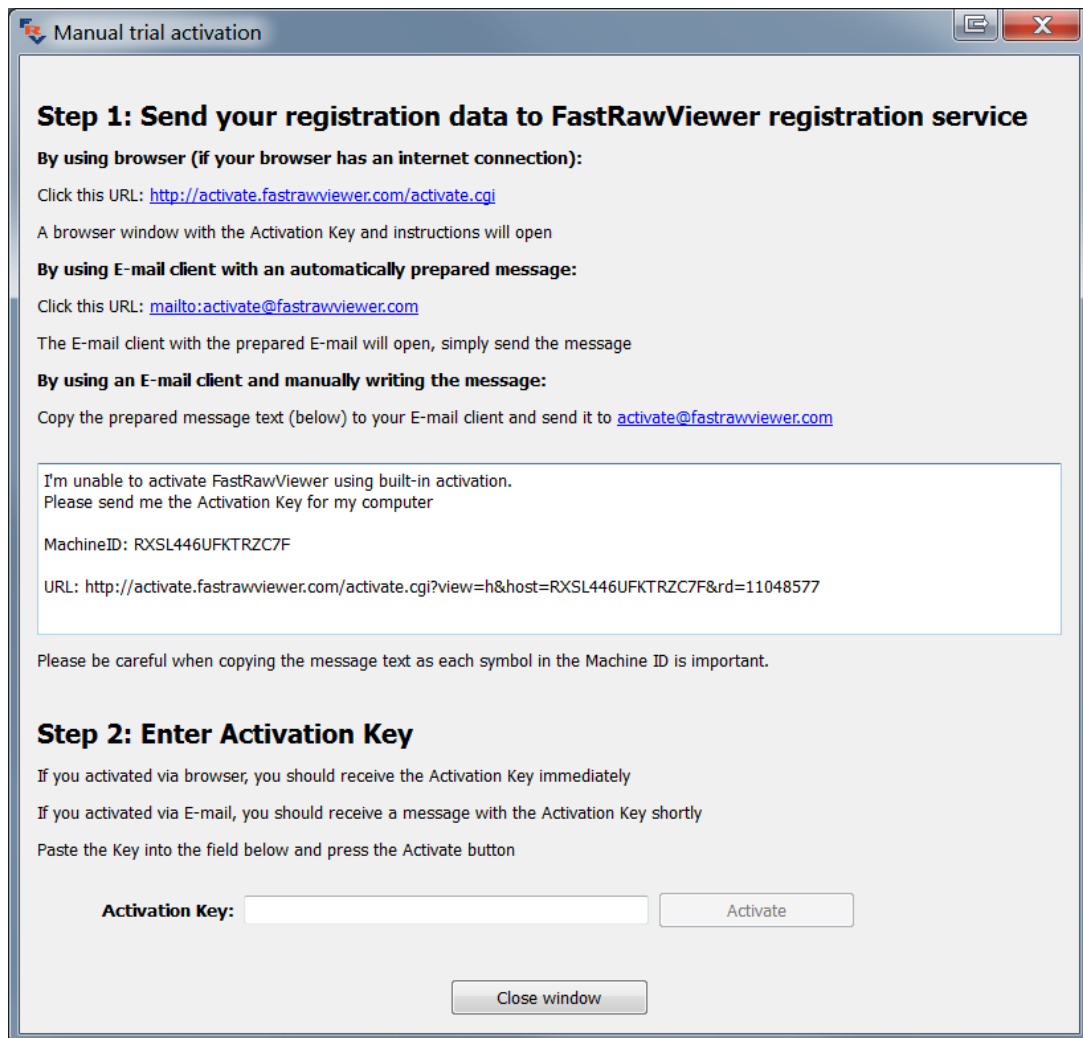
Depending on your Internet access, you can use one of the 3 ways to obtain the activation code:

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By using browser *(if your browser has an internet connection)* – use this if your browser can connect to the Internet.

Simply click this link: http://activate.fastrawviewer.com/activate2.cgi and you will see a browser window pop up with your unique activation key:

```
Thank you for activating FastRawViewer. The program activation key is:

MLZI3Z-HMXYBX-G7OU5I-VKOHAN

Paste it in Activation Key field of manual activation dialog and press Activate button.
Please copy Activation Key carefully, each symbol is significant.

Contact fastrawviewer support at www.fastrawviewer.com/contact if you have any questions.

=== MACHINE READABLE DATA BELOW ===
AK      MLZI3Z-HMXYBX-G7OU5I-VKOHAN
HK      1CA72AD473BEE48D
STATUS  OK
```

By using E-mail client with an automatically prepared message – click the mailto:activate@fastrawviewer.com link and your mail client will create a new pre-populated email to activate@fastrawviewer.com You will only need to click send.

By using an E-mail client and manually writing the message – you can send an email to activate@fastrawviewer.com using the text in the window below *("I'm unable to activate…").*

If you choose to obtain the activation key via email, you will receive a reply email with the text identical to that which you would see in the web browser *(the activation key, however, will be different).*

You can then use the **Activation Key** *(from the browser or email)* and enter it into the **Activation Key** field *(it is best to use Copy-Paste, as every character of the key is important)* and press **Activate**.

After clicking the **Close window** button, the window will close and the **FastRawViewer** activation window will display the registration status.

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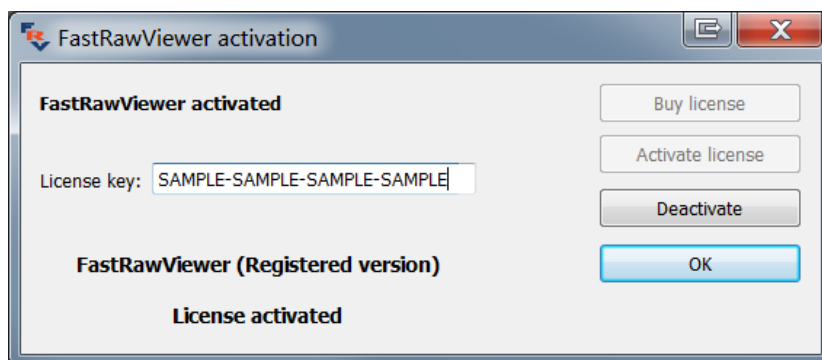
Frv-activate: Command-line Activation tool

If you are going to install FastRawViewer on several computers, you can use a utility to activate FastRawViewer from the command line:

- <u>Windows</u>: C:\Program Files\LibRaw\FastRawViewer\frv-activate.exe

- <u>Mac</u>: /Applications/FastRawViewer.app/Contents/Resources/frv-activate

When launching this utility without any parameters, you will get a list of all of the parameters with detailed explanations for each of them. The basic scenario is:

frv-activate -l license-key

This utility has more capabilities *(trial activation, deactivation)* and can also be used with HTTP proxies, including password-protected ones.

First launch: automatic search for RAW-capable applications

During the first launch, **FastRawViewer** performs a search for the applications, capable of processing RAW images that are known to **FastRawViewer**. If any of those are found, the following dialogue appears:
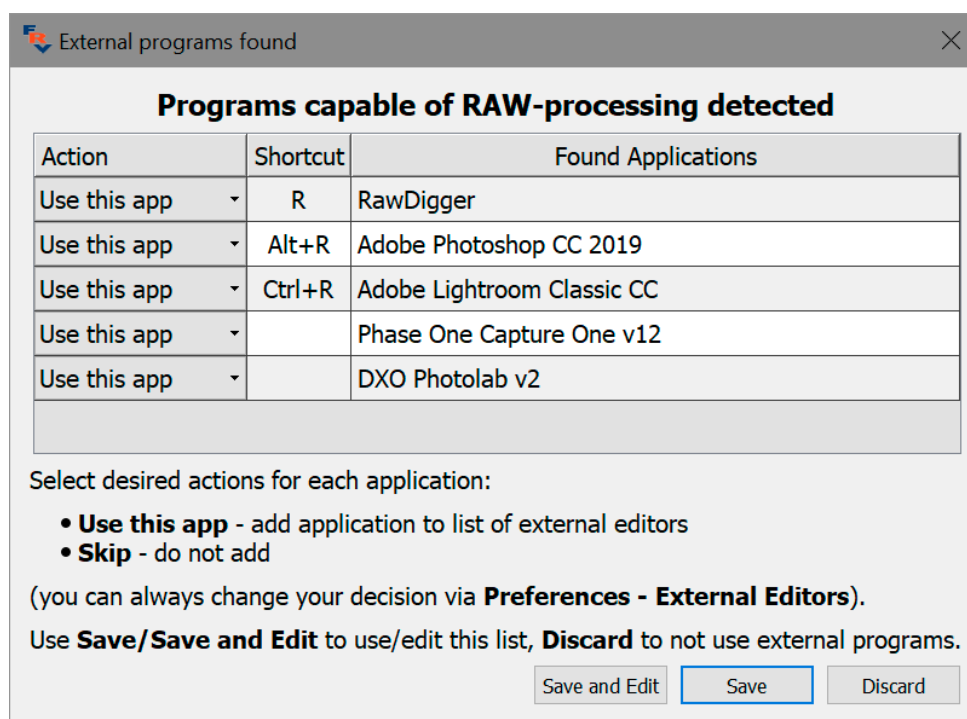
For each listed application, you can choose to use it *(Use this app)* or not *(Skip).*

Additional applications *(those that are not currently known to **FastRawViewer**, or some older versions of the known applications)* can be enabled through **Preferences – External Editors**.

Changing hotkeys *(Shortcuts)* is described below in **Setting the Keyboard Shortcuts.**

1st Run: Windows Hardware Acceleration Method Selection

FastRawViewer uses graphics acceleration for many operations. When working in Windows, the following graphics engines can be used:

- OpenGL
- DirectX 11

During **FastRawViewer's** first launch, an automatic selection of the graphics engine is made, depending on the operating system and the hardware you have:

- Computers with an Intel graphics adapters: DirectX 11 will be selected.

- Computers with two or more graphics adapters, or two or more monitors: OpenGL will be selected.

- All other cases: DirectX 11 will be selected.

The above-listed rules are sorted through "from top to bottom" and the first fitting one is used.

The choice of graphics engine is made once and stored in the Windows Registry, so that the process of the selection of the graphics engine is not repeated during subsequent launches of **FastRawViewer**.

The automatic selection of graphics hardware acceleration can be, however, changed by the user, either through the **FastRawViewer** Preferences *(see the "GPU Processing" section in the "Program settings" chapter)*, or by launching the Registry scripts *(see the "Setting the graphics acceleration manually" section in the "Troubleshooting" chapter)*.

In rare cases of problems, usually caused by a buggy old video driver, the automatically chosen graphics engine might not work with your hardware/drivers. In this case one of the following will take place:

- If in DirectX 11 mode: the program will switch to OpenGL mode *(so that OpenGL mode will be active when the user re-launches **FastRawViewer**)* and exits.

- If in OpenGL mode: the program will suggest switching to DirectX 11 mode and re-launching the program.

This is described in more detail in the "Troubleshooting" section.

Using the Program: First Steps

Launching FastRawViewer

To launch the program:

- Start it up the usual way *(Double-click the icon)*.
- Or drag any RAW or JPEG file onto the icon, then the program will open and display that file.
- Or drag a folder *(catalog)* onto the icon - the program will start and will open the first RAW file in the folder.

After start-up you will be presented with the program's main screen.

Main Screen

View modes: Grid and Single file

If **FastRawViewer** is launched without indicating a filename, if will start in **Grid** mode, displaying the content of a selected folder:
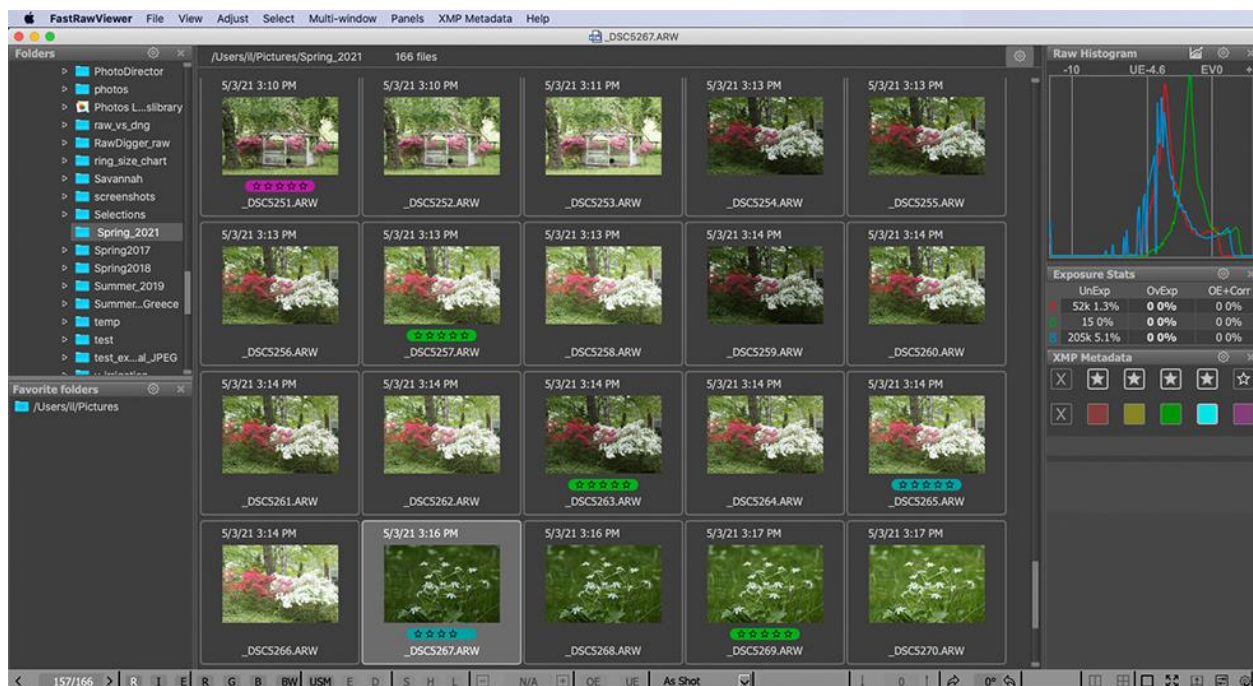
If **FastRawViewer** is launched over a specific file *(for example, by dropping a RAW file onto the program's icon, or by double-clicking a file which is associated with FastRawViewer)*, or by selecting one of the files from the "Grid" by:

- A double-click on the file.
- **Menu – View – Switch** to single image *(G key by default)*.
- Navigation by using the "arrow keys" in the main window or the bottom "**Filmstrip**" bar and pressing **Enter**.

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The program will switch to a **Single File View** mode:
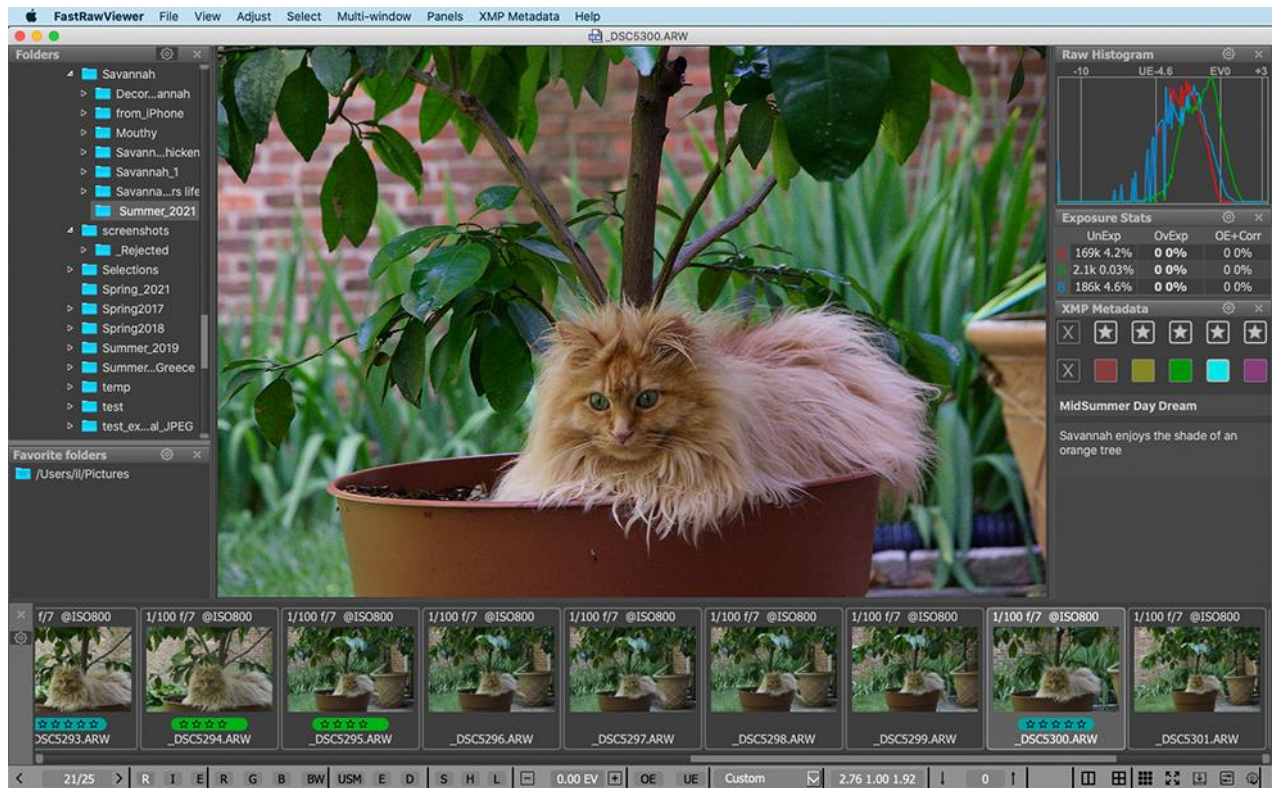
Switching back to **Grid** mode:

- **Menu – View – Switch** to image Grid *(or press G).*

- **Menu – View – Close** single image *(or Esc; Esc/close single image also exits full screen mode).*

On the program main screen:

- **On top**, as usual, there is the menu that allows access to almost all features, excluding those actions, which can only be performed with the mouse.

  o **File** – navigating through the files *(opening files and folders, moving to the next file, moving files to different folders, sending the currently displayed file to an external program / raw converter).*

  o **View** – controls image display mode *(full-color or per-channel viewing; outline the highly detailed areas and areas containing high-contrast edges - focus peaking, etc.).*

  o **Adjust** – actions that alter the XMP Sidecar files: changing exposure, white balance, and orientation.

  o **Select** – File selection.

  o **Multi-window** – operations with 2/4-window layout.

  o **Panels** – controls the visibility and layout of information panes; on the above screenshot, those panes are located to the right of the image.

  o **XMP Metadata** – allows to choose XMP Ratings / XMP Labels.

- o **Help** – the name says it.

- **Located in the central part of the window:**
  - o If in single file mode, the RAW image is displayed;
  - o If in "Grid" mode, the preview thumbnails of the current folder are displayed.

- **To the left, the following panels are displayed:**
  - o **Folder** tree and the **Favorite** folders panel *(those folders which were selected for quick access)*.
  - o **EXIF** data.

- **The following panes are located to the right:**
  - o **Histogram** (RAW for RAW files, RGB – for RGB files).
  - o **Over/Underexposure statistics**.
  - o **XMP Rating and XMP Label**.
  - o **Sort & Filter:** Panel for sorting and filtering the files in a current folder

- **The Filmstrip/Thumbnails panel** is placed below the window, showing the file previews for the current folder.

- Additional information and operational elements are placed in the **bottom** *(status)* **bar**. **Default elements:**
  - o **File open** icon.
  - o Buttons for **navigating through the current folder**: previous file, number of files in the file list and the length of the list, next file.
  - o Buttons for **switching between RAW, JPEG, and external JPEG**.
  - o Buttons for turning on **Screen Sharpening**, **Focus Peaking**, **Shadow Boost** and **Highlight Inspection.**
  - o **Exposure Correction** control button.
  - o **Overexposed** and **Underexposed** area display buttons.
  - o Preset **White Balance** choices drop-down menu.
  - o **Contrast Control** section: the up/down arrows and the current setting indication.
  - o **Multi-window mode controls**: switch to 2/4-window mode and back.
  - o Buttons for quick control: Fullscreen, hide/show Filmstrip panel/all panels, display and edit settings call-up.

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Aside from the aforementioned, if the window is wide enough, the following buttons will be displayed:

o **File name**

o **Brief EXIF** data for the shot *(Exposure settings, ISO setting, applied exposure compensation, use of flash, lens's focal length)*.

o **Manual White Balance** customization button.

o **Contrast Curve** selection menu.

o **Image Orientation** indicator and **Rotation** buttons.

Additionally, the following settings can be indicated if desired:

o The name of the **current folder**.

o Current **image zoom factor** and the control buttons.

o Time spent on the loading and decoding of the current file.

o **Per-channel display** *(R-G-B)* button and simulated conversion to **a black and white version**.

o XMP rating and label control buttons.

The elements shown in the bottom status bar can be customized according to your needs. For this, press the "**Customize FastRawViewer**" button on the lower right corner of the screen, choose "**Customize bottom bar**" and select the necessary display mode for each possible element. For more detail, see below in the "*Customizing the status bar*" section.

Workspace

The informational panels (*Histogram, EXIF, Folders etc.)* can be dragged from the main window of the program to the side (for instance, to a second monitor) and be made "floating". Panels can be turned on/off through the **Panel** menu *(or the F2-F8 hotkeys)*, the exposure statistics and XMP data panels are fixed in size, but the sizes of the other panels can be changed.

The header of every panel has a settings button *(gear icon, ⚙)*; when pressed, it brings forth a menu, allowing one to customize the panel.

Any floating panel can be made semi-transparent and placed in the workspace, above the image.

Setting **Preferences – Interface – Panels – Disable transparency for panels outside of main window** makes a floating panel completely non-transparent when it is placed outside the main program window.
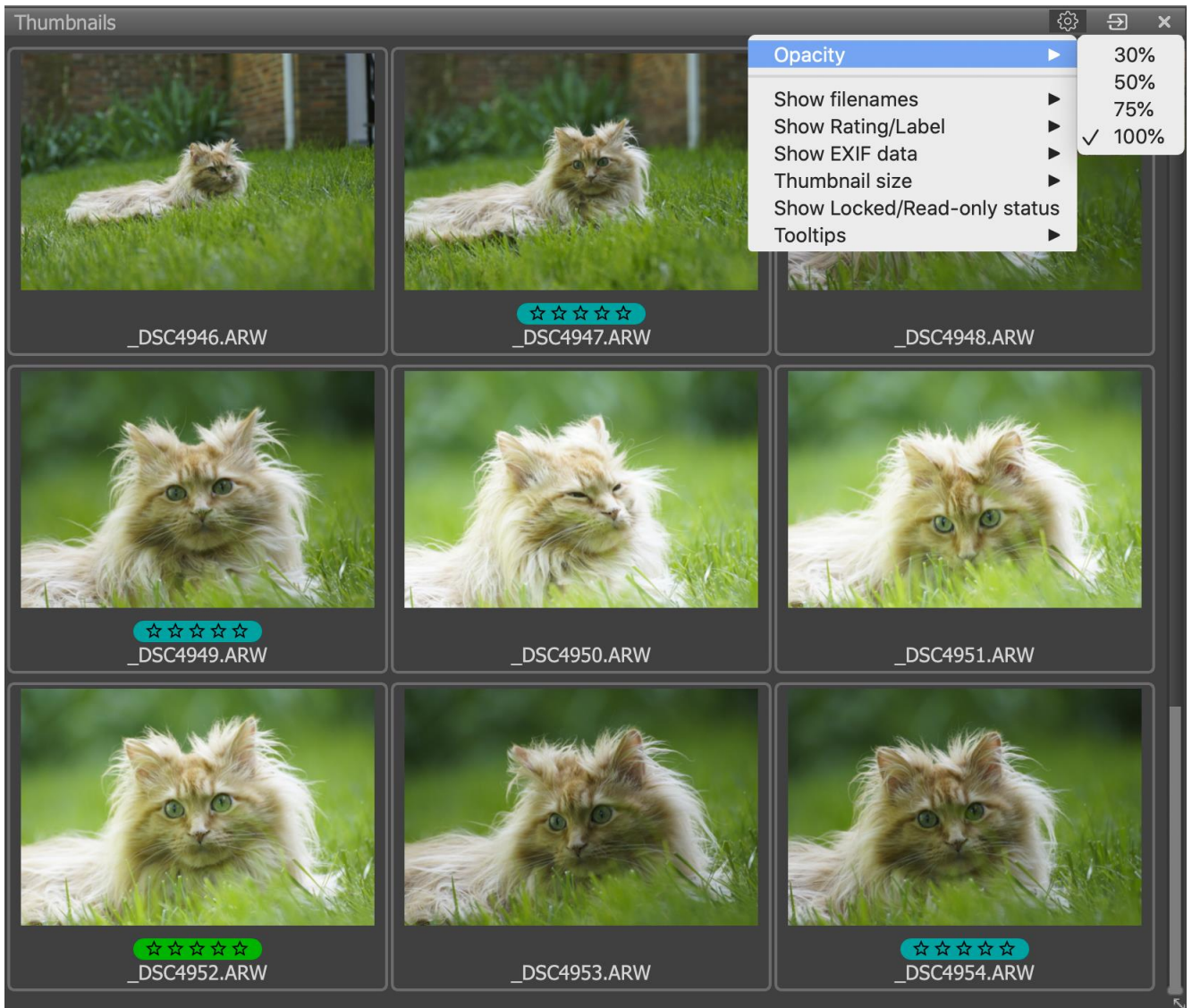
The other panel settings are individualized, and are described in the "*Informational Panel settings*" section.

Informational panels can be closed *('x' on the upper right corner of the panel or corresponding item in Menu – Panels)*, and re-opened through **Menu – Panels.** The same menu has the option **Move all panels to dock**, which will restore the standard layout of the program workspace.

Menu–Panels–Hide all panels *(or, press **Tab**)* – hides all informational panels:
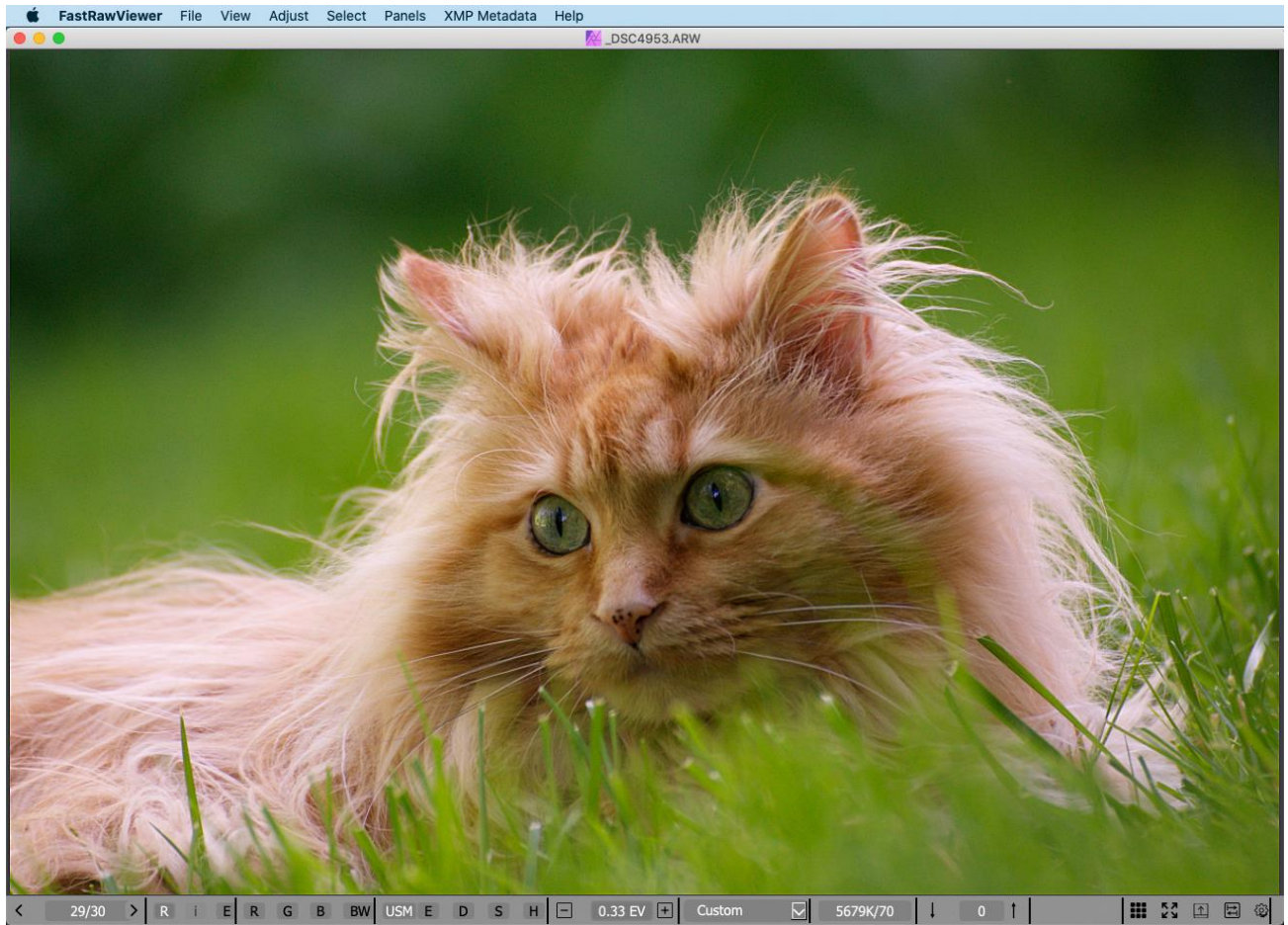
With this, the top menu bar is hidden as well *(this can be turned off through **Preferences – Interface – Panels – Hide menu bar when hiding information panels**)*. You may, also, hide bottom information bar *(status bar)* by setting **Preferences – Interface – Panels – Hide bottom window bar when hiding information panels**.

Pressing **Tab** key the second time returns everything to the way it was.

You can disable the hiding of informational panels that are outside the program window. This is useful when, for instance, you have moved them to a second monitor: **Preferences – Interface – Panels – Do not hide panels outside of main window.**

Menu – View – Fullscreen *(or the **F** key, or Fullscreen button on the bottom bar)* switches the full screen mode on/off. Choosing this item again or second press of the F key escapes from full screen mode.

Changing the Settings

To bring up the settings control window, use:

- <u>Mac:</u> **Menu – FastRawViewer – Preferences** or **Command-comma (,)**
- <u>Windows:</u> **Menu – File – Customize – Preferences** or *Ctrl-P*

You will be presented with the following dialog:
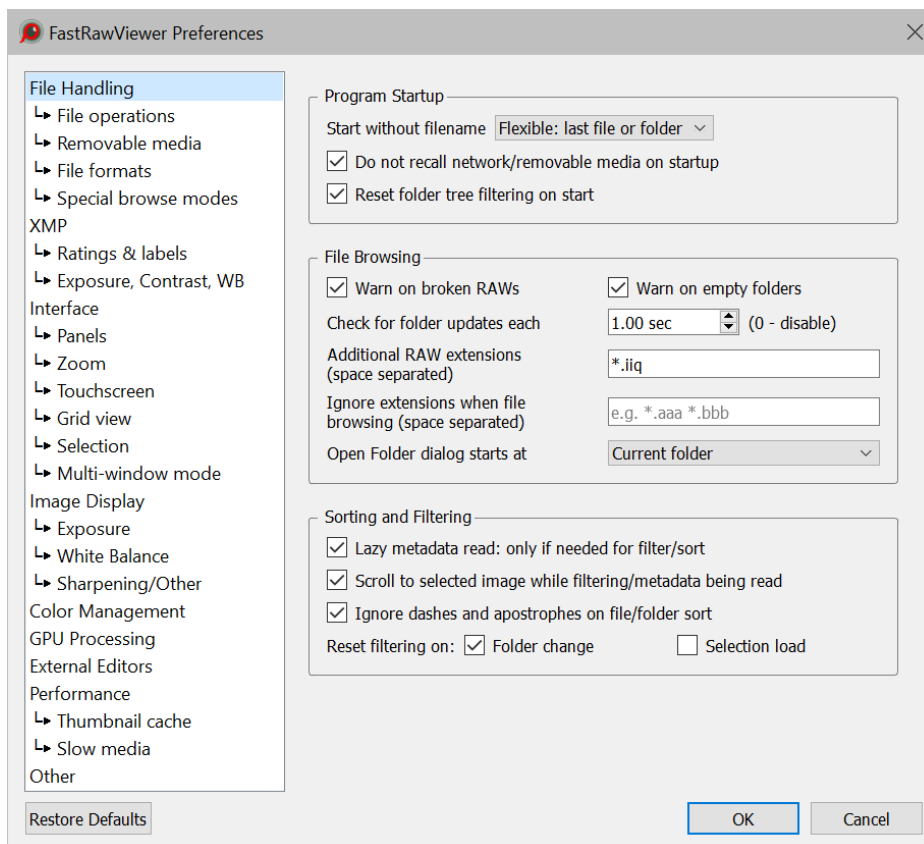
Further in the text, this settings control menu *(Preferences)* is mentioned many times, each time we refer to particular aspects and features of **FastRawViewer**. Furthermore, everything is described again in the "*Program Settings"* section.

Apart from general application settings *(Preferences),* each informational panel and the Grid panel has also its own settings menu, under the «gear» icon ⚙.

These panel settings allow changing different intrinsic parameters of this particular panel. The figure to the right shows an example of such settings, for the **Folders** panel.

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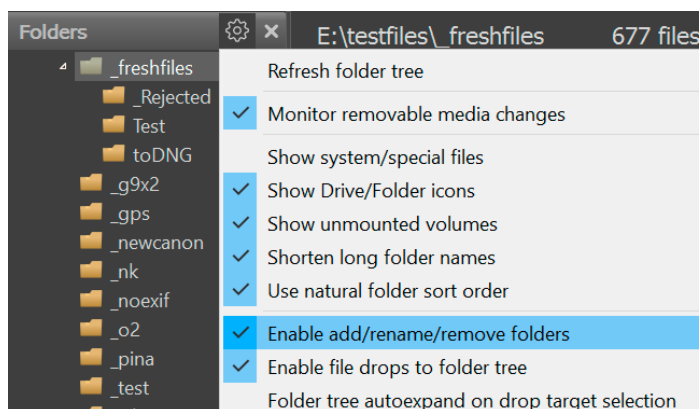
Help with the Keyboard Shortcuts

Every keyboard action can be seen in the **Keyboard Shortcuts Help** window, which can be reached by pressing **F1** function key or through **Menu–Help – Shortcuts help:**

All keyboard shortcuts can be changed and tuned to your taste. The instructions on how to do this are in the "*Adjusting the Keyboard Shortcuts*" section below. If the keyboard shortcuts are changed, the help window will show their current state.

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Supported file formats

Out-of-camera RAW files and DNG files

FastRawViewer supports RAW files from practically all consumer digital cameras. For a complete list of supported cameras, please see the **List of Supported Cameras** section at the end of this manual.

Furthermore, all versions of DNG files that comply with DNG 1.4 specifications are supported, including those recorded not by just cameras but also by video cameras *(CinemaDNG, if a standard compression method is used)*, mobile phones, and various applications *(panorama stitching software, programs for work with HDR compositing, etc.)*.

Previews are supported for RAW files *(in "Grid Mode" or in the Filmstrip)* that include JPEGs or bitmap previews in the RAW file. Such previews are commonly present in RAW files recorded by digital cameras, but they may be absent in CinemaDNG files, photos taken by phones, or DNG files that were recorded by some third-party applications. If there is no embedded preview in the RAW file (and no JPEG file if in RAW+JPEG mode, see below), then instead of the preview, you will see an icon that says *No preview available.*

For RAW files, *non-destructive, parametric editing* is supported: the rendering parameters *(such as white balance, exposure correction, contrast)* are recorded to XMP files and will be applied automatically the next time that the file is opened with **FastRawViewer** or one of the Adobe RAW converters.

JPEG files

FastRawViewer supports the following types of JPEG files: 8-bit, both RGB and monochrome.

PNG files

FastRawViewer supports 8/16-bit PNG files, both RGB and monochrome. Transparency and background color are not fully supported.

For PNG files, EXIF display is guaranteed only in Single File View Mode.

TIFF files

The following formats are supported:

- TIFF and BigTIFF
- RGB and Grayscale: 8/16-bit integer, 16/24/32-bit floating point
- LAB: 8/16-bit integer.
- CMYK: by default, any support for this format is turned off. One can turn it on, but only a conversion to grayscale will be displayed *(See the section on "Additional Settings")*.

The default file extensions for TIFF files are: .TIF and .TIFF. If one needs to process TIFF files with a different extension *(for example, .fff for Imacon/Hasselblad scanners)*, this can be enabled through the AdditionalTIFFExts script *(See the section on "Additional Settings")*.

HEIC/HEIF files

The following HEIC/HEIF file variants are supported:

- The file type (in the header) is heic or heix
  Other format variations (msf1, mif1, mif2) are not supported.
- 8 and 10 bits
- Color data support:
  - Embedded ICC profile (files originating in Apple devices)
  - Files from Canon cameras are recognized by the metadata, and ITUR_2100_PQ_FULL profile is assigned
  - For other metadata variants (RGB Primaries/Transfer curves), the sRGB color space will be assigned

The H.265 decoder embedded in **FastRawViewer** is launched only if the program is displaying HEIC/HEIF files.

Determining the file type

FastRawViewer can detect the file type both by the file header and by its extension. This is controlled by the setting in **Preferences: Other –> Determine the file type by its content**.

If this setting is turned on:

- Files having one of the known RAW extensions, such as DNG, CR2, ARW, RW2, PEF, NEF, etc., are considered to be RAW files, without any further analysis of the header;
- Files having one of the typical rendered image extensions, i.e. JPEG, PNG, TIFF, or HEIC, are checked for their specific type on the basis of their header;
- Files having a TIF extension may be subjected to further analysis to determine if they are in fact RAW files, because not only rendered image files, but also some RAW files have this extension; this is controlled by the following setting in Preferences: "File formats" –> "Check if .TIF files are RAW", you can find more details about this setting in the "Program settings" section of this Manual.

If the setting **Determine the file type by its content** is off, then the file type is determined solely by its extension:

- .JPG, .JPEG – JPEG file formats
- PNG – PNG file formats
- .TIF, .TIFF – TIFF file formats

  (because some older cameras used to record RAW files with the .TIF extension, before opening a .TIF file, FastRawViewer checks if that's actually a RAW file; if it is, it opens it as such).

- HEIC/HEIF format: the extensions are indicated in **Preferences – File Formats – HEIC/HEIF files support – HEIC/HEIF files extensions (types)**. Default list: *.HEIC *.HEIF *.HIF

- All other file extensions known to **FastRawViewer** are treated as RAW files.

File's extensions that are unknown to **FastRawViewer** are not displayed in the list of files *(Menu – File – Open, the list of files in the current folder)*.

If your RAW files have extensions not supported in **FastRawViewer** by default, you can list additional extensions through **Preferences – File Handling – Additional RAW extensions**.

If some files on your computer are not actually RAW files, but **FastRawViewer** is displaying them in the list of files, you can explicitly exclude the corresponding extensions through **Preferences – File Handling – Ignore Extensions when file browsing**.

Maximum file sizes

Because file *sizes (both in megapixels and megabytes)* can be very large, while **FastRawViewer** performs all of its actions on them in the RAM, the program allows one to set limits on these through **Preferences – Performance – File Size limits:**

- **Downscale JPEGs larger than .. Mpix**: if the JPEG file is larger than the limit set, the file will be downsized so as to not exceed the stated limit.
- **RAW files size limit: .. Mpix**: if the size of the RAW file is larger than this limit, the RAW data will not be unpacked, and only the preview *(if it exists)* will be displayed.
- **TIFF(/PNG/HEIC) single file display limit**: if the size of the file exceeds the limit, it will not be displayed in Single File View Mode.
- **TIFF(/PNG/HEIC) thumbnail limit**: for files larger than this limit, previews will not be displayed.

The default limits are set based on the assumption that 4-6 gigabytes of RAM is available to **FastRawViewer**. If you have more RAM installed on your computer, you can increase the default limits. Please take into account the following:

- TIFF/PNG/JPEG:
  o The number of files stored in RAM is set through **Preferences – Performance – JPEG/PNG/TIFF cache size**.
  o Each megapixel requires 4 MB of RAM

- RAW files
  o The number of files stored in RAM is set through **Preferences – Performance – Decoded RAW cache size**
  o Each megapixel in a RAW file requires from 2 *(Bayer and monochrome)* to 8 *(Linear DNG, 4-shot)* MB of RAM.
  o For processing, the program uses from 6 *(Bayer and monochrome)* to 24 MB per megapixel.

RAW+JPEG Mode

With default settings, **FastRawViewer** combines RAW and JPEG files with the same name.

For this operation, the extension of the JPEG file must be .JPG or .jpg.

In cases where one folder has several RAW files with the same name (but different extensions), the JPEG will be combined with the RAW file, the extension of which is alphabetically earliest.

One can switch off RAW+JPEG combining by turning off the setting **Preferences – File formats – Handle RAW+JPEG together.**

RAW+HEIC Mode

It works similarly to RAW+JPEG mode. RAW+HEIC mode is intended for use with Canon cameras that are set to HDR mode (in HDR mode, the camera will record HEIF files instead of JPEGs).

This mode is turned on by simultaneously switching on the following settings in Preferences – File Formats:

- Join RAW+JPEG
- HEIC/HEIF file support
- Joint RAW+HEIC

If the current folder has a RAW file, a JPEG file, and a HEIC file (all with the same filename), then the RAW and JPEG will be joined.

Preview and Metadata cache

FastRawViewer stores metadata *(EXIF, XMP)* and previews for files that have already been browsed in the RAM. The RAM size for these caching operations is set through **Preferences – Thumbnail cache**:

- Thumbnail cache size – how much is set aside for previews *(in MB).*
- Metadata cache size – how much is set aside for *metadata (in # of files; the metadata for one file takes up just a few KB).*

Disk cache for previews

Because TIFF and PNG files can be of any size and lacking in embedded previews, **FastRawViewer** implements preview storage using a special database file on the disk *(the file is in the SQLite format).*

Only previews for the files where the preview generation takes more time than is set through **Preferences – Thumbnail cache – Save cached thumbnail if image thumbnail extraction was longer than… msec** will be stored in this file. This allows for two things: first, there will be no rebuilding of previews that take a long time to create. Second, the database of previews won't grow uncontrollably fast.

The path to the file is set through **Preferences – Thumbnail cache – Thumbnail database path**. Defaults are:

- Mac: ~/Library/Application Support/libraw-llc/FastRawViewer

- Windows: $HOME/AppData/Local/LibRaw LLC/FastRawiewer

We strongly recommend that you select a fast *(SSD)* drive to store the preview *database (if such is available in your system)*.

When the parameters are set to default, the size of the previews stored in the database is the larger of the preview sizes set for the Grid and the Filmstrip. If you increase the size of the displayed previews, then **FastRawViewer** will offer to purge the saved preview database. Alternatively, the size of the previews being saved can be set through **Preferences – Thumbnail Cache – Stored thumbnail size** to be **Maximum thumbnail size**. In this case, no preview database purge is necessary when changing the size of the previews, but the database itself will take up more space.

Other database parameters are described in the section on "Program settings" section, under **Performance – Thumbnail cache**.

One can use the following menu elements to control the preview database:

- **Menu – File – Reload – Clear Thumbnail database** – purge all thumbnails from the database.

- **Menu – File – Reload – Fetch thumbnails for current folder – build all of the previews for the current folder**, and save those that took more time than the is set through **Preferences – Thumbnail cache – Save cached thumbnail if image thumbnail extraction was longer than… msec.**

Navigating the Files in a Folder while in Grid mode

In **Grid** mode, the main section of the window contains the **Thumbnail** previews of all of the supported files from the current folder.
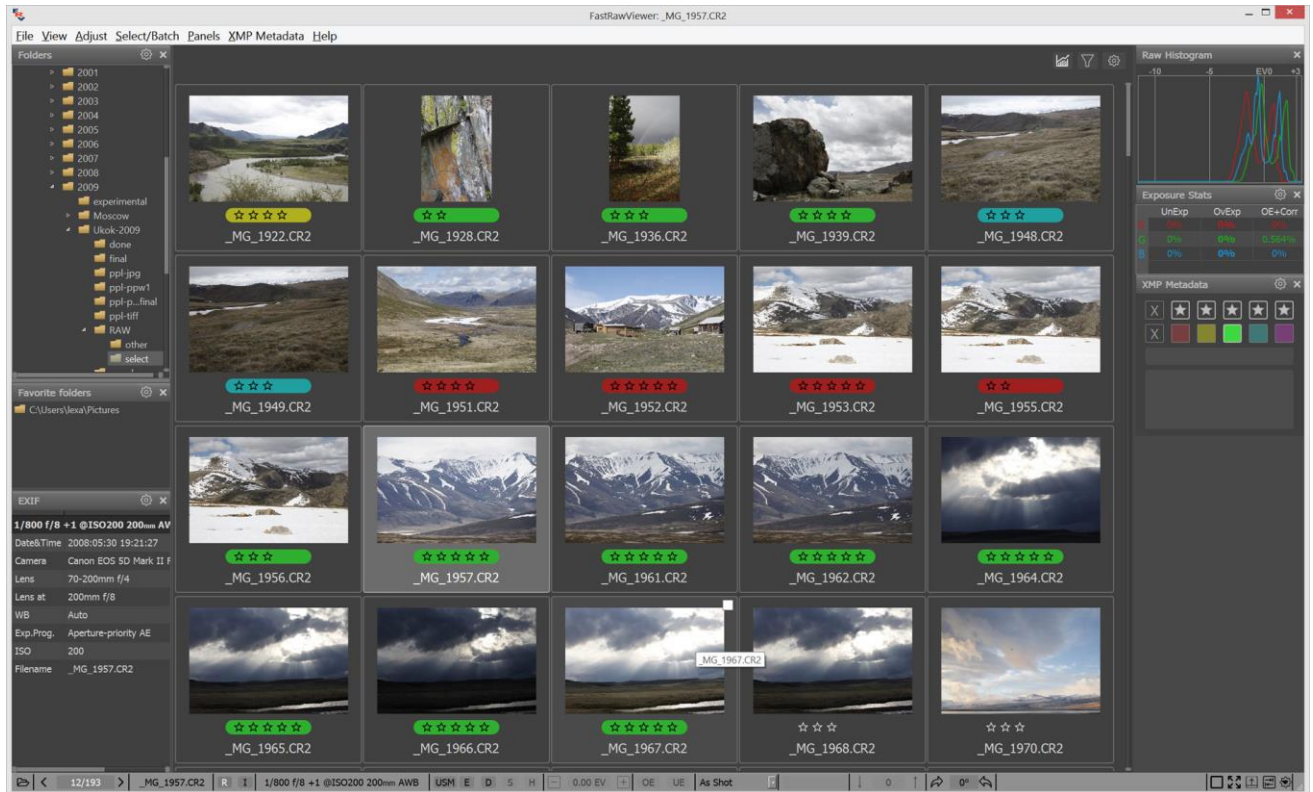
The following icons are placed at the title bar of this panel *(left to right):*

- Current folder
- Total number of files in the folder, number of files that passed through the filter, and number of selected files.
- Settings that control the file preview display *(see below).*

Navigation in **Grid** mode can be accomplished using the following:

- Keyboard: **arrow keys**, **PgUp/PgDn**, **Home/End**; also, you can use the keyboard shortcuts that you customized for **Next File/Prev File** and **First/Last File** in folder.
- Mouse: the **wheel scrolls** through the contents of the folder **up and down**.
- Menu**: File – Go To** – *menu item* (**First/Last**, **Next/Prev files**).

You can customize the file preview using the "gear" icon in the upper-right corner of the "Grid" mode window:
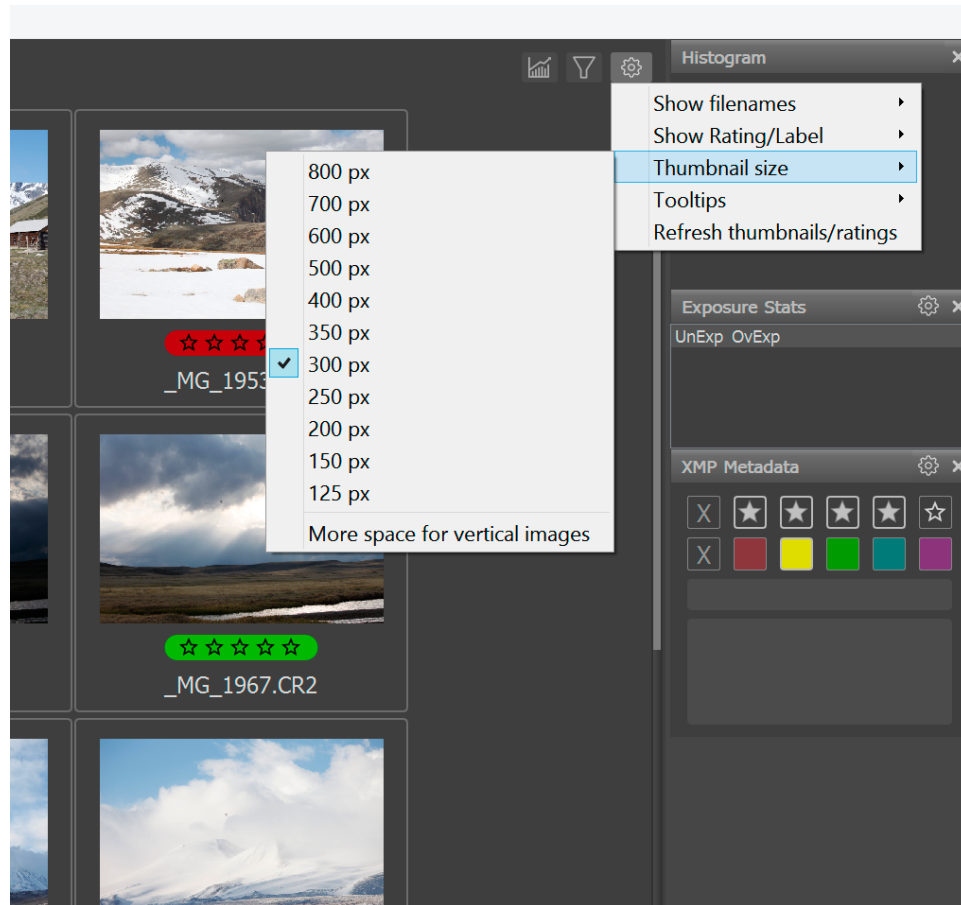
The following data can be found below, above, and overlaid over the image preview:

- EXIF data: date of the shot, or exposure parameters, or the camera name.

- XMP label *(color)* and XMP rating

- Filename

The displayed data and the positions of the said data are controlled through the "gear icon", separately for the Grid and Filmstrip modes.

A detailed description of the settings can be found in the "*Customizing Display Modes*" section below.

When working with very dark *(nighttime)* shots, the setting **Preferences – Thumbnail cache - Apply automatic brightening to thumbnails** can be useful, as it turns on the automatic brightening of previews.

Working with a Single File

While in **Grid** mode, the following operations can be carried out with a file:

- Switching to single file mode: double-click or **Menu – View – Switch to single image** or pressing **Enter** *(if the keyboard focus is on the window with the file previews).*

- Rotation (**Menu – Adjust – Rotate**), the new orientation data will be recorded in the XMP file *(see below).*

- Assigning a rating/label (**Menu – XMP Metadata**), if changed, the rating and label will be recorded into an XMP file.

- Copying (**Menu – File – Copy**), moving (**Menu – File – Move**), copying to the _Rejected files folder, which is for those, which you may want to delete at a later stage *(see below).*

- Sending a file for processing in an external program (**Menu – File – Pass *filename* to**).

- Display of a file in a system file manager (**Menu** – **File** – **Show in Explorer/Reveal in Finder**).

These same actions *(except for switching to single file mode)* are accessible through the context menu, which is activated with a right-click:

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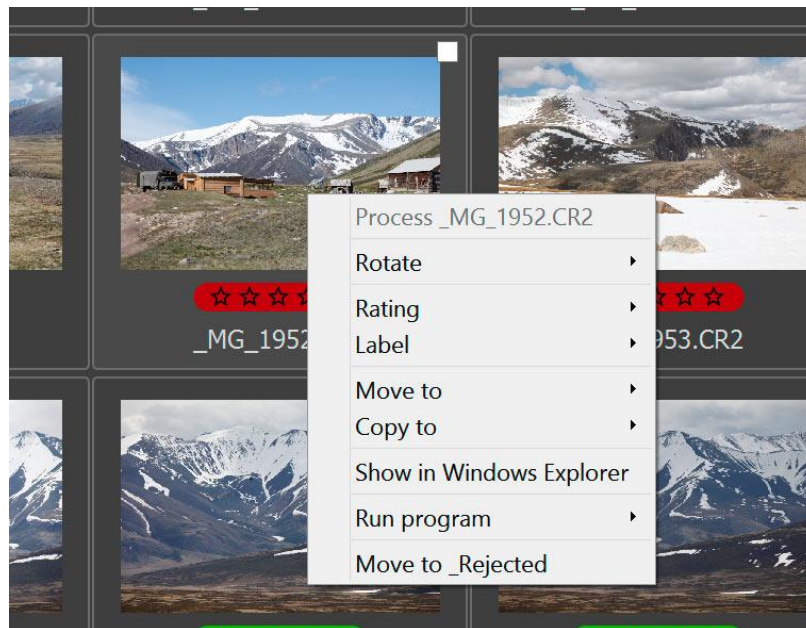
Copying and Moving Single Files

The current *(highlighted)* file in the Grid View can be copied to another folder with **Menu – File – Copy *filename* to – [Select Folder]** *(or pressing C)*. The dialog to select the destination folder will appear, and after the destination folder is selected the file will be copied.
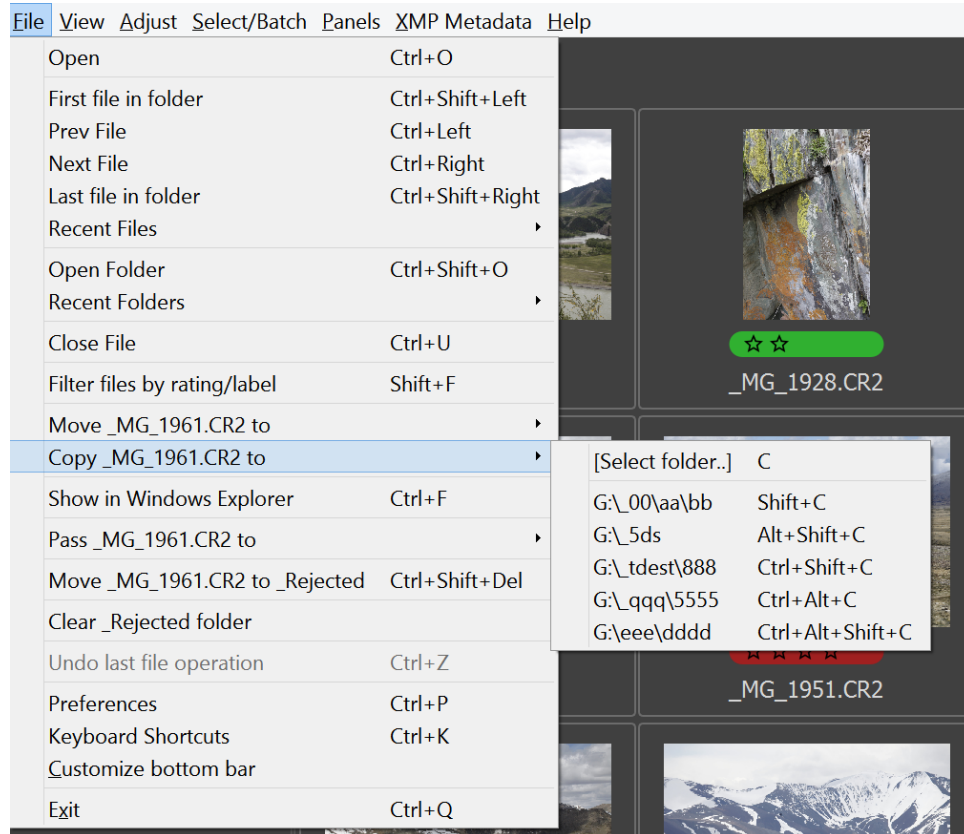
The names of the folders which were used for copy operations are stored in the menu items below **Menu – File – Copy ... to – [Select folder]**. The most recent copy destination is at the top of this list, below are the folders which were used earlier. The list can contain up to five folders.

All of the folders in this list can be accessed through the keyboard *(C, Shift-C, etc.)*, which allows one to conveniently copy to those destinations without accessing the menu.

Moving files works much the same way: after a file is moved to a destination via the (**Menu – File – Move ... to – [Select folder]** or pressing **M**) the path to this destination folder will be stored as an element of the menu under **[Select folder],** and can be used in the future without subsequently choosing the destination, using the following dialog:
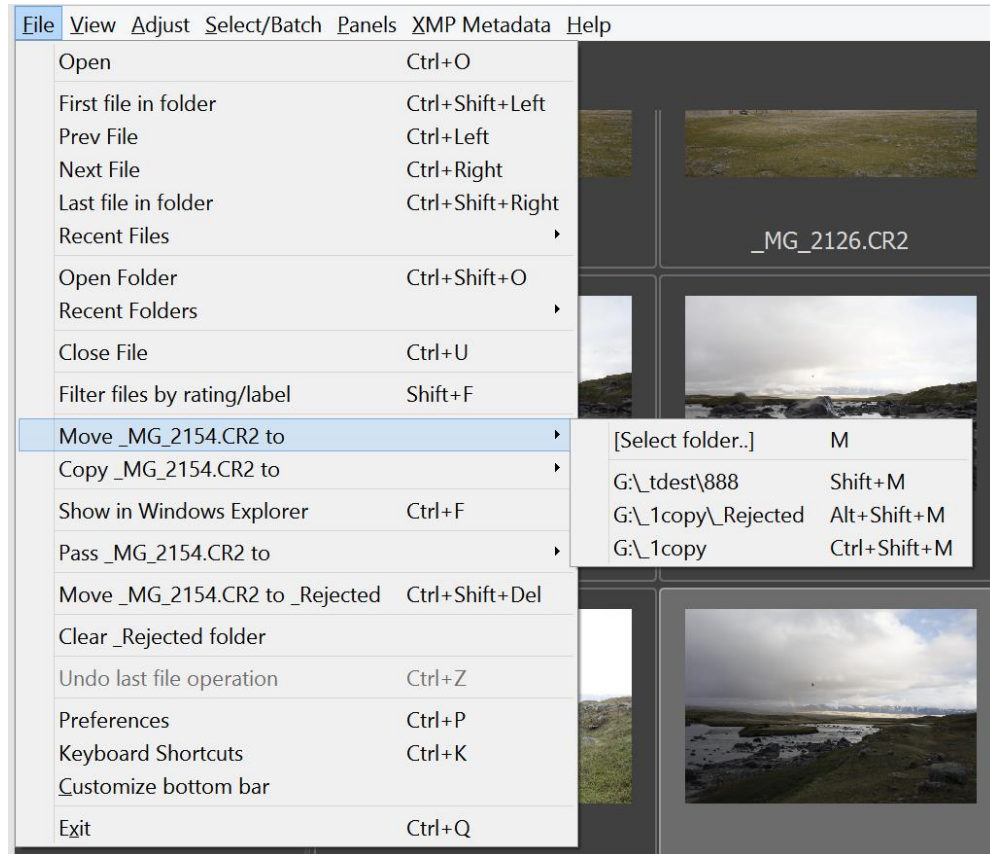
The lists for copy and move destinations are kept separately.

Copy and move operations work not only over the RAW file, but also copy/move the following to the same destination:

- External JPEG file *(in RAW+JPEG mode)*.
- XMP sidecar file *(if it exists).*
- .rpps sidecar file *(if .rpps sidecar file recording is turned on)*.
- Other files according to the setting **Preferences – File Operations – Additional file extensions to copy/move with file**.
  This setting is described in more detail in the section **Program Settings – File Handling – File Operations.**

When doing sensitive work and/or using unreliable media, the **Preferences** – **File Handling – File Operations - Verify file contents after copy** setting may come in handy, as it turns on data verification after copying.

Resetting the lists of recently used folders

The folders that served as destinations for copy and move operations (and also file rename patterns, see below) are organized in lists that are accessible through **Menu – File – Move/Copy** *(and are also accessible through context menus).*

To reset those lists, use **Menu – File – Customize – Clean "recently used" lists**. If this action is requested, **FastRawViewer** will issue a prompt asking to select which lists to reset:
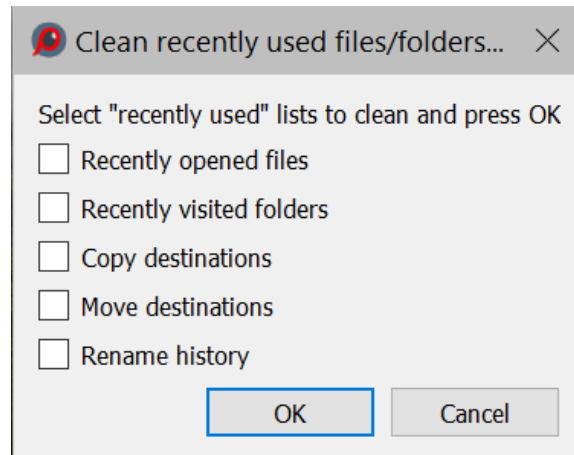
Please put checkmarks next to the names of the lists you want to reset.

Fast Copying/Moving into a subfolder in the current folder

FastRawViewer supports a separate mode to **quickly copy/move a file** *(or files, see below)* **into a subfolder in the current folder.**

To use this mode, it first has to be turned on via the setting **Preferences – File Operations – Enable Quick copy-move to subfolder.** After being turned on:

- A new element will appear in **Menu – File – Copy**, **Menu – File – Move** [called **New Subfolder**]
- The same element will appear in the **Copy** and **Move** context menus
- This action will also be accessible through the **Alt-C** hotkey *(Copy)* / **Alt-M** hotkey *(Move)*

When using one of the menu points listed above/hotkeys, a dialog to enter the name of the subfolder into which the file is to be moved or copied will pop up:
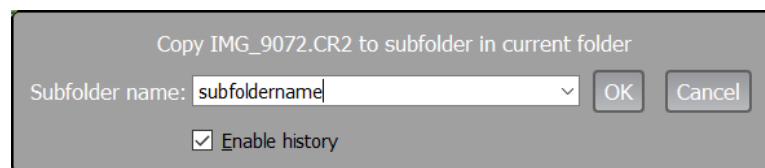
After entering the subfolder name:

- If it doesn't exist, it will be created in the current folder;

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- The selected file will be copied or moved into it *(if it's a group of files, see below)*.

If one leaves Enable history checked, then the folder names that were used are remembered for the current session *(but not between the sessions)* and when pressing the "arrow down" key, are available for selection for the subsequent copy/move actions:
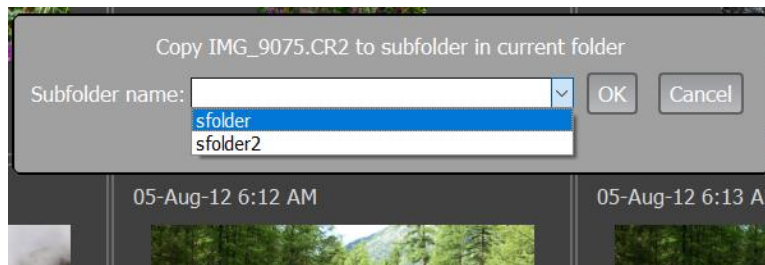
The history of used subfolders is the same for copying and for moving.

Deleting Files: the _Rejected folder

FastRawViewer doesn't allow one to delete files directly from the current folder. Instead, the files you intend to delete can be moved to a _Rejected subfolder, located in the current folder. This folder is created the first time a user requests that a file be moved to said folder. This is intentional, and exists to ensure that no shots are accidentally deleted:

- There are many situations when the system "trashbin" can't be used *(removable drives, network folders and drives)*; also, in certain cases the operational system may delete part of the content of the system trashbin *(for example, when the size of the trashbin is over the limit)* without even requesting confirmation from the user.

- Flash cards and card readers are prone to hardware malfunctions, and moving a file into a subfolder is the safest file operation.

To delete files, after you are sure nothing is in to the _Rejected folder, which shouldn't be *(the _Rejected folder can be browsed with FastRawViewer as any folder)*, you can use the Clear _Rejected Folder operation *(see below)*

By default, the _Rejected folder is a subfolder of the current folder *(i.e., each folder has its own **_Rejected** subfolder)*. In certain cases, this may be inconvenient. To address this, you can use a global _Rejected folder by changing the preferences in **Preferences – File Handling – File Operations**:

- Use global rejected folder – **Check**.
- Select the path for the **Global Rejected Folder**.

Clearing out the _Rejected Folder

To delete the contents of the _Rejected folder, use **Menu – File – Clear _Rejected folder**.

Clearing the folder with rejected files is irreversible, so

- You cannot set a hotkey for **the Clear _Rejected** action.
- When choosing this action, an additional, un-turn-off-able warning will be displayed:
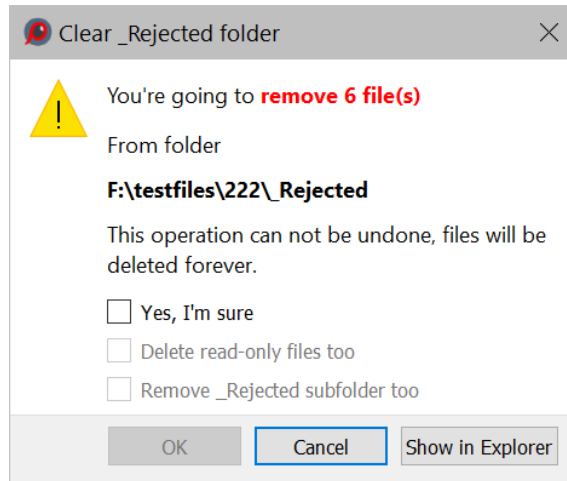
The **OK** button will only be accessible after checking *Yes, I'm sure* checkbox.

The additional **Delete read-only files too** checkmark allows one to delete files with the Read-Only attribute; if this checkmark is not set then those files will be ignored and will remain in **_Rejected**.

The additional Remove **_Rejected subfolder too** checkbox allows one to delete the **_Rejected** folder itself as well.

Show in Explorer button *(Mac: Reveal in Finder)* allows one to look at the content of **_Rejected** folder using the file manager.

If **Preferences - File Operations - Show detailed _Rejected folder stats before clearing the folder** setting is checked, then a more detailed statistics for the files to be deleted is displayed *(number of RAW files, number of RAW+JPEG pairs, etc.)*:
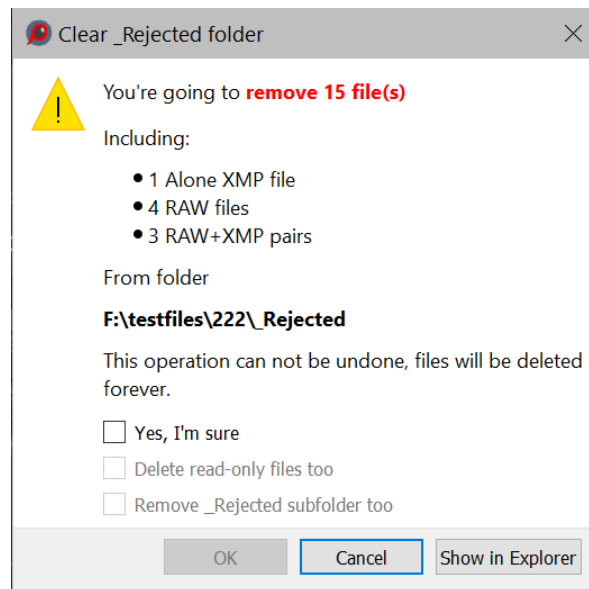
Attention: in macOS, the read-only attribute from FAT/FAT32/exFAT file systems *(used in memory cards)* **is translated as locked** *(blocked)*. **When checking 'Delete read-only files too,' such blocked files will also be deleted.**

Note: Menu – File – Clear _Rejected is not available if global rejected folder is used.

Undelete: move from _Rejected

The following elements have been added to the context menu:

- **Menu – File – Move** *file(s)* **from _Rejected**
- **Right click – Menu – Undelete: move one level up**
- **Menu – Select/Batch – Move NN files from _Rejected** *(Only if the option "Single file keys work for multiple files too" is turned on in Preferences – Grid/Filmstrip.)*

All three options appear only when the two following conditions are met:

- A local *(not global)* _Rejected folder is configured
- The name of the current (sub)folder corresponds to the name of the folder for Rejected.

All three options do the same thing – they move the selected file one level up. This is a standard move operation, which is recorded from the Undo list as a separate action.

File selection: _Selected Folder

The **_Selected Folder** is a way to quickly move the selected files into a sub-folder (analogous to the _Rejected subfolder, except the purpose is the opposite). Here are the differences between the familiar _Rejected folder mechanisms, and the new _Selected folder mechanisms:

- By default, this feature is turned off; it needs to be turned on through **Preferences – File Operations – Enable move to _Selected folder**; this is the same place where the name of the subfolder is set.

- The hotkey for moving files to _Selected is not set by default, it needs to be manually assigned through the hotkey editor in the **File Copy/Move/Reject** section for *hotkeys (see the section on "Setting the keyboard shortcuts" in this Manual).*

- The _Selected folder is always a subfolder in the current folder *(if you want to use a global folder for this type of operation, you should opt for **File – Move To** – and select the last used folder, or use the hotkey Shift-M).*

- There is no operation analogous to **Clear _Rejected Folder**.

Integration with External Programs

FastRawViewer can start external programs, passing them the current RAW file as a parameter. This way any program that takes the file name as a command line parameter can be launched, be it a RAW converter, different image viewer, or whatever program you may need.

On the first run, **FastRawViewer** performs a search and automatically configures itself to use the following programs:

- RawDigger
- Adobe Photoshop
- Adobe Lightroom
- Raw Photo Processor
- Capture One
- DXO Optics Pro

If, on the first run, **FastRawViewer** was unable to find the program you need, it can be added to the list of external programs manually through **Preferences – External Editors**.

To launch an external program to process the currently displayed image you can use **Menu – File – Run – necessary program** or with press one of **R** for the first external program, **Alt-R** for the second, and **Ctrl-R** for the third.

Display of the current file in Windows Explorer *(on Windows)* /Finder *(on Mac)* can be done through **Menu – File – Show in Windows Explorer / - Reveal in Finder.** Default keyboard combination – **Ctrl-F**.

Metadata: Ratings, Labels, Title, and Description

Creating and Reading XMP Files

FastRawViewer records all "changes" into separate sidecar XMP files *(analogous to Adobe Bridge)*. The following can be saved/is read from these files:

- **Image orientation** *(see below, the "Changing Image Orientation" section)*.

- **White Balance** in **FastRawViewer** and Adobe formats *(see below "White Balance")*.

- **Exposure adjustment** in the **FastRawViewer** and Adobe formats *(see below, "Working with Exposure")*.

- **Ratings** and **marks** *(please see below)*.

- **Title** *(title)* and **description** *(description)* of an image *(see below)*.

If a folder contains files with the same name *(for example, the source CR2 file and the result of its conversion to DNG)*, then, while recording an XMP file, a naming conflict may happen: it is necessary to record **filename.XMP** for **filename.CR2** file, but a **filename.XMP** already exists in the folder, for **filename.DNG** file. In this case, **FastRawViewer** will issue a warning:
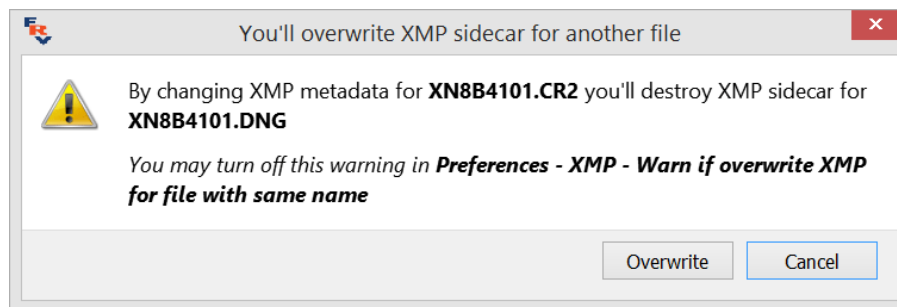
To switch this warning off, unset the setting: XMP - Warn if overwrite XMP for file with same name.

If the default settings are in use:

- When the file is displayed in **Grid View** mode, the sidecar XMP files *(those having the same name as the current by with a .XMP extension)* and XMP blocks embedded in RAW/JPEG files *(if such exist)* are read.

- Only manual changes are recorded into XMP files *(for instance, image orientation or exposure are changed from automatic to something else)*.

This behavior can be changed with the following settings:

- **Preferences – XMP – Use XMP** – turning off these settings leads to a complete disregard of XMP files: they are not read, written, and not moved together with RAW files.

- **Preferences – XMP – Read Only XMP –** blocks any recording of XMP files. Data *(ratings, labels, white balance, exposure correction)* will be read and used for display, but any changes to it will not be saved.

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- **Preferences – XMP – Force XMP file creation for RAW files** – turns on the creation of XMP files, even if nothing was changed manually. The parameters that were *(automatically)* set up when opening the file *(in **Single View** mode)* will be set as the parameters in the XMP file. XMP files are forcibly created for RAW files only, because such creation is useless for other file types (JPEG, TIFF, etc.).

Exposure compensation and white balance are written to newly created XMP files according to the setting of Adobe Process Version in **Preferences – XMP – Exposure, Contrast, WB – Adobe process version for newly created XMP files**.

To set color labeling scheme to be compatible with CaptureOne, set **Preferences – XMP – Ratings & Labels – Write photoshop:Urgency tag with color labels** *(for PhaseOne C1)*. This setting turns on the recording of the XMP tag photoshop:Urgency, which is used by CaptureOne to recognize and set color labels.

XMP sidecars and embedded XMP blocks

XMP data can be found both in an external file *(a sidecar, with the .XMP extension)* and in files of certain formats *(DNG, CR2, JPEG)*. If both ways, a sidecar as well as an embedded block, are used for a certain image file, then **FastRawViewer** picks the newer one, using the xmp:MetadataDate tag (with default settings).

Unfortunately, several programs, ignoring the standard, do not record that tag. In this case, one can set the preferences to always select the XMP sidecar by using **Preferences – XMP – If both embedded and sidecar XMP exists: Always use sidecar**.

When working with JPEG files, XMP data can be recorded not just as separate sidecar files, but also in the form of data blocks embedded into the JPEG files themselves *(this setting has been added because certain programs, for example, Adobe Bridge, ignore XMP sidecars for JPEG files)*.

As with any operation that modifies image files, recording XMP could theoretically damage the file *itself (if, for example, a bad card reader is being used)*, so when turning on the above-described setting, the user is given an additional warning. When using this option, if the JPEG file previously had an XMP sidecar file, said sidecar will be deleted after recording an XMP block inside the JPEG.

When using RAW+JPEG mode, one can turn on the setting **RAW+JPEG mode: embed XMP block into JPEG**. If it's turned on, then aside from writing XMPs for RAW *(as an XMP sidecar)*, the same XMP block will be written into the associated JPEG file *(if there was a different XMP block in the JPEG file, it will be replaced, not combined)*.

XMP sidecar files are supported for file formats other than RAW (TIFF, PNG, HEIC)

The overwhelming majority of applications that work with graphic formats do not support XMP sidecar files for TIFF, PNG, HEIC/HEIF files.

Because of this, XMP support for the above-listed formats in **FastRawViewer** is turned off by default. To turn it on, use the following settings in Preferences – XMP:

- Use XMP for TIFF files
- Use XMP for PNG files
- Use XMP for HEIC/HEIF files

When turning on these settings, **FastRawViewer**:

- Will read both embedded XMP blocks and Sidecar files (with priority set by the setting **If both embedded and sidecar XMP exists**).
- Will record XMP sidecar files.
- Will allow file rotation (the orientation will be recorded in the XMP: Orientation tag).
- Rating and color labels will work, including using them for sorting and filtering.

Rules for naming XMP sidecar files

In operating systems that are supported by **FastRawViewer**, the most common file systems are usually case-*insensitive (filename.ext and filename.EXT are considered to be the same file)*; however, in some instances this is not true, and then files with the same names typed in characters of different case are considered to be different files.

Under **FastRawViewer**'s default settings, **FastRawViewer** tries to find an XMP sidecar as a file named Filenane.xmp, then Filename.XMP; if such a file is found, then the rendering parameters that were set / adjusted in FastRawViewer will be recorded back into it. If such a file is absent, then while recording the rendering parameters an XMP sidecar file with the name Filename.xmp will be created.

To support compatibility with other applications, which write either Filename.xmp or Filename.ext.XMP *(.ext.xmp)*, there is a setting called **Preferences – XMP – XMP Files naming scheme**, which controls the selection of both a unique naming system *(Filename.XMP or Filenam.ext.XMP)* and an order for searching for an existing file *(.XMP, then .xmp or vice versa)*.

What happens when you use several applications simultaneously to modify XMP files

FastRawViewer, when it's running, stores XMP data in memory cache. If the XMP data was modified by some external application, the changes will not be automatically recognized in **FastRawViewer**.

To make such changes visible in **FastRawViewer**, you need to explicitly trigger the re-reading of XMP data:

- **Menu – File – Reload – Reload current file** *(by default assigned to Ctrl-F4 hotkey)* – will re-read the current file or selected files (according to the context of the operation, see the section "Operations with multiple files" below).
The same function is available through the context file menu.

- **Menu – File – Reload – Reload current folder** *(by default Ctrl-Shift-F4)* – will re-read the contents of the current folder, including the XMP and EXIF data, and will also reload the current file, if it exists.

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Under the default settings, **Menu – File – Reload** re-reads only XMP files, while image files will be taken from the internal **FastRawViewer** cache. To "see" the changes made in an edited file by some external program *(this is applicable, primarily, to JPEG/TIFF/PNG files)*, the setting **Preferences – Performance – Flush decoded RAW/JPEG cache on file/folder refresh** will have to be turned on.

FastRawViewer records any changes to XMP data immediately, without any delay. For other applications to recognize those changes you may need to perform some extra actions.

In particular, when using **Adobe Lightroom** with **FastRawViewer**, one needs to take the following into account:

1. Adobe Lightroom ignores XMP files while importing from a flash card (whether it is through card reader or by directly connecting a camera to a computer).

   Should you need to import changes made in **FastRawViewer** to Adobe Lightroom, please copy the files to a hard drive first *(you can do this using FastRawViewer and selecting only the images you need to copy; corresponding sidecar files, if present, will be copied automatically)*. Nevertheless, we suggest copying the files to a hard drive before setting ratings, labels, and/or changing any RAW processing parameters, to avoid any corruption of the data on the card caused by sudden losses of power, disconnections, or hardware malfunctions. Again, you do not need to copy everything from the card: you can use **FastRawViewer** to select the images that you want to copy.

2. Adobe Lightroom ignores XMP sidecar files for JPEG files. In the case of JPEG files, for Adobe Lightroom to acknowledge changes made to XMP data it needs to be embedded into the JPEGs. To do so, please use **Write XMP blocks to JPEG files** mode, as described above.

   a. If RAW files are already imported into an Adobe Lightroom catalog, you will require an additional XMP sidecar export setting in Lightroom, and you will need to explicitly trigger synchronization while importing XMP files.

      To import changes to XMP files, made in other programs, including **FastRawViewer**:

      - Select a file or a group of files for which you want to refresh XMP data in a Lightroom catalog.
      - Use **Menu – Metadata – Read** metadata from files, or the context menu which appears on the right-click, selecting *Metadata – Read metadata from files*.

   b. To automatically record the XMP data changes you've made in Adobe Lightroom to sidecar XMP files, please use the Adobe Lightroom setting **Catalog Settings – Metadata – Automatically write changes into XMP**

   c. If the above setting in Adobe Lightroom is off, or the XMP file has been changed by an external application, Lightroom will not record XMP files automatically. To trigger synchronization manually, please use **Menu – Metadata – Save Metadata to files** or the respective choice from the context menu.

Compatibility with RawPhotoProcessor (.rpps files)

FastRawViewer can create basic .rpps *files (those contain conversion settings for RawPhotoProcessor).*

The following parameters are recorded:

- Exposure compensation.
- White Balance.

This option is controlled through **Preferences – Other – Write RPPS files** checkbox. Another checkbox, **Preferences – Other – Force RPPS files creation**, forces the creation of .rpps files immediately after a RAW file is opened in **FastRawViewer**, with automatic exposure compensation and current white balance recorded as initial settings.

To import such .rpps files for further use, while in RawPhotoProcessor navigate to **Menu - Settings - Import Multiple settings** and select both RAW and .rpps files in the folder that you wish to process. The settings in .rpps files will be imported into RawPhotoProcessor History and the corresponding RAW files will be opened using the parameters you've set in .rpps files.

FastRawViewer behavior while creating or updating .rpps files:

1. If .rpps file exists, and exposure compensation and/or white balance are changed in **FastRawViewer**, the values for white balance and/or exposure are replaced in .rpps file with the new ones. Also, if **Force RPPS files creation** is checked, those values in .rpps file are replaced upon opening the raw file.

2. If .rpps file does not exist, and **Preferences - Other – RPPS files – RPPS Template** field points to some readable file, this template will be used to create specific .rpps file for the current raw file; once again, current **FastRawViewer** settings will be used for exposure compensation and / or white balance fields.

Ratings and Labels

FastRawViewer can set XMP ratings and XMP labels that are compatible with Adobe products *(and other programs which support XMP)*.

Ratings are set as a number from 1 to 5. The setting is changed via **Menu– XMP Metadata,** or by pressing the buttons 1…5 in the **XMP Metadata** panel, or with the hotkeys *(default keys are Alt-1...Alt-5)*.

To clear the rating, please press [X] button in the upper row of the **XMP Metadata** panel, or you can also use **Menu – XMP Metadata – No Rating** or the hotkey *(Alt-0).*

For the compatibility with Adobe Bridge **FastRawViewer** supports Reject rating (-1). To enable this, set **Preferences – XMP – Ratings & Labels – Use XMP Reject rating** to **ON** *(this is also switched on automatically if **XML Label style: Adobe Bridge** is selected)*.

As the result, the button [R] is displayed in the row for setting the rating, and the action **Reject** appears in the Label menu.

Color labels are named with text, and 4 styles of labels are supported:

1. Adobe Bridge style (Select, Second, Approved, Review, To Do).

2. Adobe Lightroom style, color marks *(Red, Yellow, Green, Blue, Purple).*

3. Adobe Lightroom 'Review Status' style (To Delete, Color Correction Needed, Good to Use, Retouching Needed, To Print).

4. Custom user labels.

You can select the appropriate label style through **Preferences – XMP – Ratings & Labels – XMP Label Style** section. For the Custom style, you can also edit the names for the labels.

Setting and changing the label for the image is performed through **Menu– XMP Metadata,** or by pressing the colored squares in the **XMP Metadata** panel, or using hotkeys *(Alt-6 … Alt-9).* To delete the label, press the [X] button in the row for setting the label, or use **Menu – XMP Metadata – Clear Label**.

When turning on the **Read Only XMP** mode, labels and ratings are read from XMP files, but the program prevents any changes to them.

In **Preferences** – **XMP - Ratings & Labels** one can turn on the **Visual Feedback on rating/label change** setting**.** If this is done, visual feedback will be given in the form of a contrasting notification when changing a rating/label, occurring for about 1 second.

Title and Description

FastRawViewer can record the title and description of the image in XMP files.

To call up the editing dialog, use **Menu – Metadata – Edit Title/Description** or the corresponding macro *(Alt-D),* or double-click on the title or description field in the XMP Metadata panel; this summons the editing dialog:
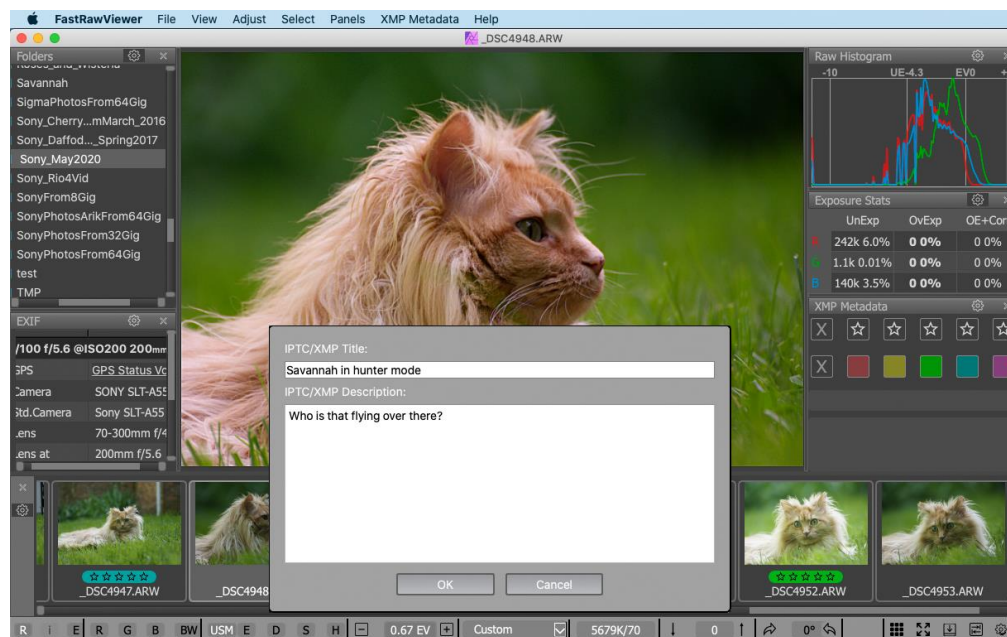
After editing the name and description they are shown in:
1. The floating tooltip in the Filmstrip/Thumbnails panel.
2. The **XMP Metadata** panel:
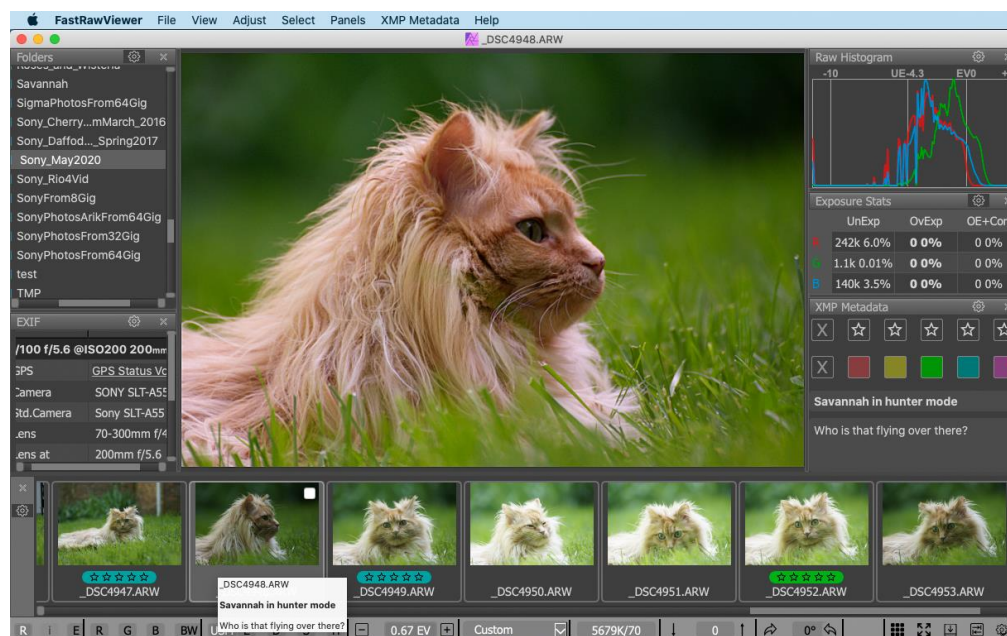
Sorting and filtering files in a folder

The sorting and filtering of files is controlled via the **Sort & Filter** panel, which, by default, is located in the right-hand column of panels.

The following icons are placed at the title bar of this panel *(left to right)*:

- Filter files by name/mask
- File Sorting
- Re-reading the current folder
- Panel Settings.

The panel displays filtering parameters, which extend the filtering over ratings/labels that we had in previous versions.
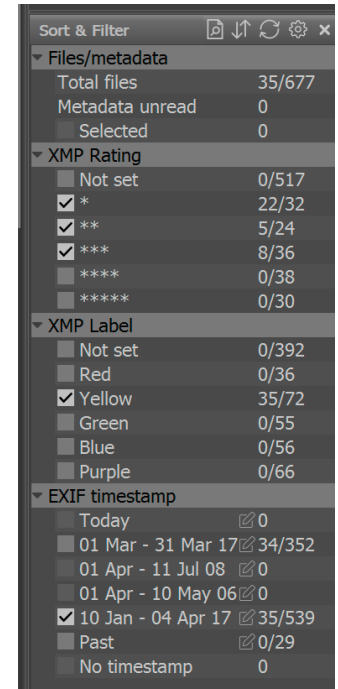
File Sorting

The sorting of files can be set in the menu that appears when pressing the sorting icon *(second from the left in the panel header).*

The following sorting methods are supported:

- By filename, natural *(meaning that numeric components will be sorted by value)*
- By filename, alphanumerically *(meaning that 11 will precede 2)*
- By file type *(extension)*
- By file modification time
- By file size
- By shooting date *(EXIF Timestamp)*
- By XMP rating
- Reverse sorting order
- Read-only/Locked/Protected first – see the section *Working with Read-Only/Locked Files* below
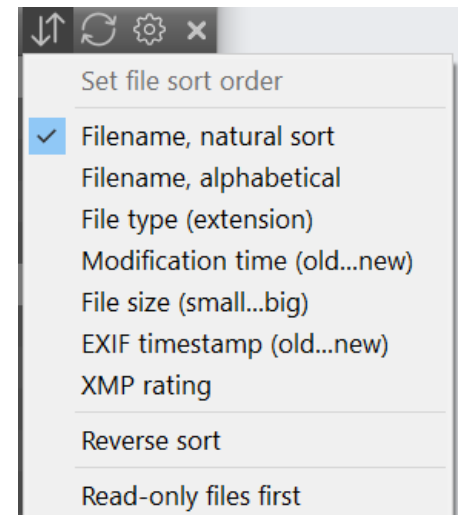
In cases when two files have the same value for the category by which they are being sorted, the natural filename is used as an additional "sorting key" *(when sorting by filename, the file extension is the second key).*

To sort by metadata, which needs to be read from the file *(EXIF, XMP)*, the sorting occurs dynamically and is animated, synchronously with the reading of the current folder.

File Filtering

Filtering is controlled by the rest of the **Sort & Filter** panel. The panel displays the types of *parameters (XMP Rating, XMP Label, EXIF Timestamp)* and value options. You can check the checkbox to the left of the sorting and filtering parameter, and only files that pass the filtering conditions will be displayed.

In the **EXIF Timestamp** group, you can select the necessary ranges of dates. You can edit those ranges if necessary, changing the standard Today/Yesterday/This Week/… tailoring them to your current needs. The number of ranges is fixed. The first value for the range is always "from;" the last one is always "to."
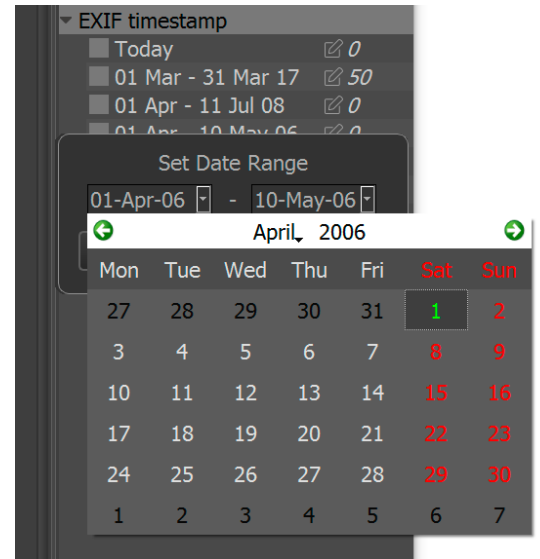
Aside from setting 'fixed' date ranges, using calendar days, date ranges can also be set in the form "last NN days." In this case, the boundaries for the date range are calculated as "from NN days ago to today." Last "1 days" is a synonym for "today."

The boundaries of the range of dates for Last NN days is set:

- At the moment of pressing the "OK" button, when editing the range.
- At the moment of launching the program, when applying a date range that is already defined in the settings.

This way the "Last NN days" range will not change the actual range of absolute calendar dates even if during the course of work the current date has changed.

If there are any selected files in the folder *(see the next section)*, you can check the checkbox to the left of the word **Selected in the Files/Metadata** group**,** and only the selected files will be displayed. In this case, if you deselect some file, it will be excluded from the display, which means that in order to have it displayed again, you need to uncheck **Selected** and select the file again, after which you can check **Selected** once more.

The filtering inside one group is of OR-type. The filtering among groups is AND-type. That is, if, for example, you select XMP Label Yellow and XMP Label Green, files that have either of those two labels will be displayed. If, however, you checked XMP Rating: 3, XMP Label: Green, and EXIF Timestamp: This week, only the files which conform to all three conditions simultaneously will be displayed.

The numbers in the respective lines indicate how many files there are with a given parameter value. If the numbers are in the form nn/mm, *mm indicates how many files with the given parameter value are present, while nn indicates how many of those passed through the filters. If only one number is indicated, then all of the files passed through the filters.* If the numbers are displayed in italics, the reading of the metadata is still in progress.

With standard settings, the metadata *(EXIF, XMP)* is read only when this data is needed – for Icon display, or when filtering is on. This accelerates the browsing. This can be changed in the preferences by switching off **File Handling - Sorting and Filtering - Lazy metadata read.**

File Filtering: saving, cancelling, and restoring

To save, cancel, and restore filters, use the new **File - File filtering in folder** submenu, or use the corresponding hotkeys.
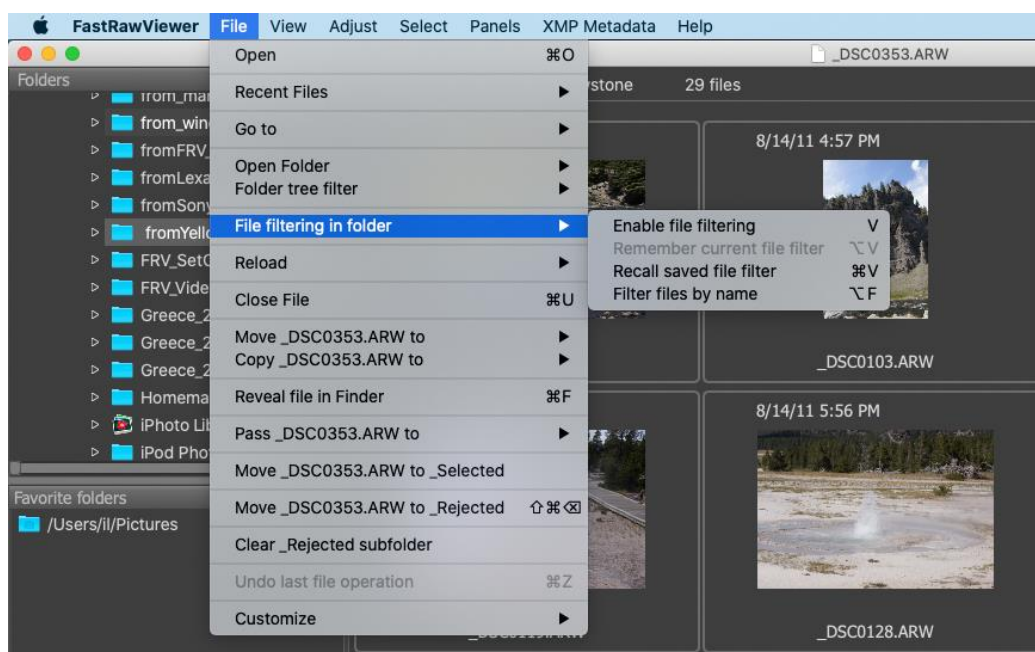
- **Disable/Enable file filtering** *(assigned to V by default)* flips the status of filtering. If it's on, it's switched off; the filtering conditions are temporarily stored so that when the filtering is re-enabled, the previous filtering conditions are automatically applied.

- **Remember current file filter** *(assigned to Alt-V by default)*. This action stores the filtering conditions in a non-volatile fashion. Filtering settings are preserved and can be recalled through Recall saved filter even after program restart:

- **Recall saved file filter (Ctrl-V)** – restores the non-volatile saved filter settings.

- **Filter files by name** – turns on/off the filtering of files by filename *(please see below)*

If the setting **File Handling - Reset filtering on folder change** is on, *Disable file filtering* will be automatically triggered when the folder is changed while the filtering is on; the filter settings will be preserved and recallable through the V hotkey.

Filtering by filename

Filtering by filename is switched on and off through **Menu - File - File filtering in folder - Filter files by name** (**Alt-F**) or the "page with magnifying glass" button, located in the **Sort & Filter** panel's title bar.

When this filtering is on, an edit line appears that allows one to enter:

- a substring of any symbols that are contained in the filenames of the images that you want to be displayed
- a mask for the filename *(this condition is recognized by the presence of the * symbol in the edit)*
- A regular expression in PCRE syntax; this is recognized by the / symbol in the first position of the edit line; this symbol will be ignored when evaluating a regular expression.
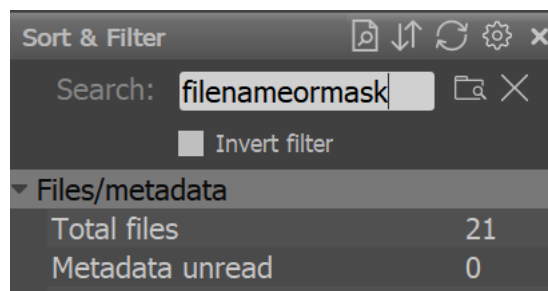
The **Invert filter** checkbox inverts filtering: only non-matching filenames will be shown.

After pressing **Enter** (or the *folder-with-magnifying-glass* icon located to the right of the edit line), the files in the current folder will be filtered, i.e., only the names of the files that meet the condition in the edit line will be displayed. Any other present filtering conditions such as label/rating/date/etc., are also applied.

Name filtering precedes metadata filtering. This filter isn't cancelled/restored/saved/recalled by the Disable/Enable/Remember/Recall actions *(see above)* and isn't switched off when moving to a different folder.

Other parameters and properties of the Sort & Filter panel

The **Refresh** button in the title bar opens a menu with two items:

- **Re-read current folder** – the current folder will be re-read as if it has just been opened with **Menu – File – Open Folder – Open Folder** *(but the current file will still be displayed or highlighted)*. To re-read the current folder you can also use **Menu – File – Reload – Reload current folder**.
- **Forced full metadata read** – the metadata of all files will be re-*read (as if Lazy metadata read were turned off)*.
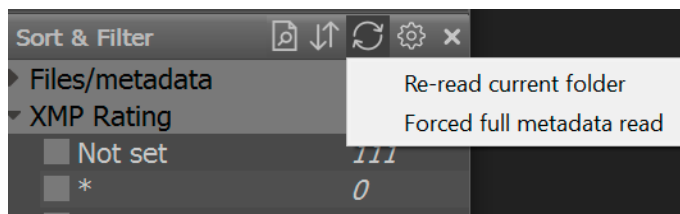
Panel settings (gear icon)

- **Show Files/Metadata status** – turns on the display of this group in the statistics/selection table
- **Show Selected files** – turns on the display of the Selected line in the current group.

- **Show zero values for completely fetched data** – if this setting is off, then the table display the lines that do not don't correspond to any of the files in the current folder. Display is only turned off when the metadata for all of the files in the folder has been read.

- **Hide groups with only one value** – if the corresponding group *(XMP Rating, Label, EXIF Timestamp)* contains the same data; in other words, all of the files in the current folder fall into the same line in the group, the entire group will be hidden.

Additional sorting and filtering settings are described in the "Program Settings" section below.

Working with Read-Only/Locked Files

Most digital cameras allow one to set the ***Protected*** or ***Locked*** attribute for files picked by the photographer. When importing *(copying)* RAW files from a memory card, this is translated as:

- Windows: Read-Only attribute
- macOS: **uchg** (UF_IMMUTABLE) flag, which is translated in the Finder as *locked (padlock symbol)*.

These attributes are kept when copying/moving files using standard system methods.

FastRawViewer works with such files in the following way:

1. In **Grid View** mode, **Locked** files are displayed with a "padlock" symbol.

   Displaying the "padlock" is turned on or off through the Show Read-only status *(Locked/Read-only on Mac)* in the Grid/Filmstrip settings, by default turned on for Grid, off for Filmstrip.
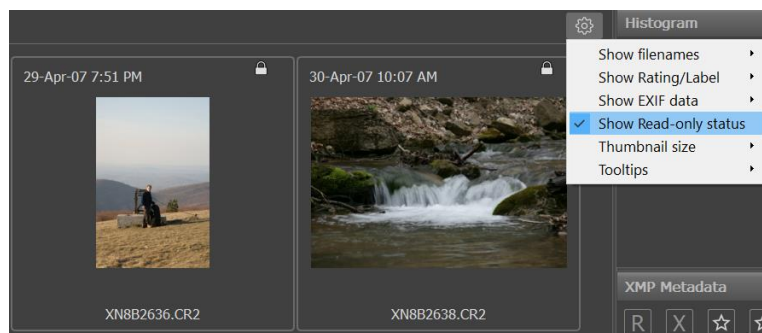
2. If there are one or more Read-only/locked file in the folder, then the line Read-only files *(Locked/Read-only on Mac)* appears in the Files/Metadata section of the file filtering panel. If it's checked with a checkmark, then only Read-only/Locked files will be displayed.

3. In the sorting preferences *(see to the right)*, one can set the Read-only files first *(Locked/Read-only on Mac)* setting, and then such files will be displayed at the beginning of the list in Filmstrip/Grid *(the order within the RO/Locked group, and others, is set by the other sorting settings)*.
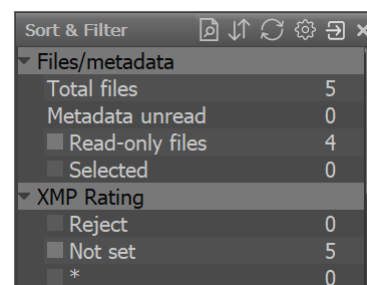
4. When copying/moving files using **FastRawViewer**, the attributes are kept.

5. On Mac, with default settings, the moving of locked files is forbidden. The **File Operations - Allow move/reject for locked files** setting allows for the moving of such files and placing them in _Rejected.

Operations with Multiple Files

Selecting/marking files

While developing **FastRawViewer** we realized that the standard way of selecting files is not to our liking:

- An accidental mouse click destroys the whole selection
- The currently displayed file is always included in the selection, and that is not necessarily convenient

- Activating the context menu or using drag-n-drop makes the file *current*; it's opened in the main window (if in Grid Mode, you simply move to that file).

Because of this, in **FastRawViewer** we use a different, free of those inconveniences, method for selecting files – **Advanced selection mode**; there is a thing with it, however: **to add a file to selection one needs either to use Ctrl-Click, or to click on a checkbox in the upper right corner of the thumbnail**.

Aside from the advanced selection mode to select (highlight) files, we also support the standard method of selecting files, the same as the one used in Windows Explorer/Mac Finder. To switch to the standard selection mode, uncheck the box in **Preferences – Selection – Advanced selection mode: single click does not ruin selection**.

Advanced selection mode (enabled by default)

To mark a file for group operations in **Grid View** *(or in the Filmstrip)*, you can do one of the following:

- **Ctrl-Click** on the file preview thumbnail.

- Set a **checkmark in a checkbox** in the upper-right corner of the preview thumbnail *(the checkbox appears for the files that are currently unmarked when you hover a mouse over its preview; the checkbox is permanently visible for those files which are already marked)*.

- **Shift-Click** in **Grid View/Filmstrip** selects a consecutive group of images, with standard default settings:
  - the images selected start from the last one whose selection status was changed *(using Ctrl-Click or the keyboard)*, and go up to the one that was **Shift-Clicked**
  - if there is no image whose selection status was changed *(like it is in the cases when the file was moved, or a new working folder was selected)*, the **Shift-Click** operation uses the first file instead; the selected range starts with the first file and goes to the one that was **Shift-Clicked.**
    Shift-Click behavior is tunable, see below.

- Through the actions in **Menu – Select**
  - (**De)select and move to next** – reverses the mark status and navigates to the next file.
  - **Move to prev. and (de)select** – navigates to previous file and reverses its mark status.
  - **Select All**, **Invert Selection**, **Deselect All**.
  - **Save Selection to file** – saves the list of marked files to a text file on the disk.
  - **Load/Append selection from file** – loads the list of marked files from the previous bullet and marks the corresponding files for the load operation or adds to the list of the currently-marked files for the append operation.

Shift-Click behavior is tunable via two Preferences – Interface – Selection settings:

1. **Shift-Click: start of selection range**, with possible values:
   a. **Last Checked or unchecked**: the selection range for Shift-Click will start from the last file for which the selection status was changed *(whether by the checkmark or Ctrl-Click)*.
   b. **Last checked**: the selection range will start from the last file for which the selection status was changed, but only if it was set to **selected.**
   c. **Active (current) file**: the range starts with the current file *(if it was not Shift-Clicked)*
   d. **Active file/last selection changed**: the range starts with the current file, but if it was shift-clicked then with the last checked or unchecked.

   In case it is impossible to determine where the range starts *(there is no current file, there is no file whose selection status has changed, etc.)* then the selection will start with the first file in the folder.

2. **Shift-Click: range expansion**: sets the mode for range expansion:
   e. **Create new selection**: the old selection is cleared, a new one is created
   f. **Expand existing selection**: a new selection is added to the existing one.

   This parameter can be temporarily inverted using Ctrl-Shift-Click: if "Create new selection" is in effect, Ctrl-Shift-Click causes the expansion of the existing selection, and vice versa.

This parameter can be temporarily inverted using Ctrl-Shift-Click: if "Create new selection" is in effect, Ctrl-Shift-Click causes the expansion of the existing selection, and vice versa.

The previews of the marked files have a different background color:
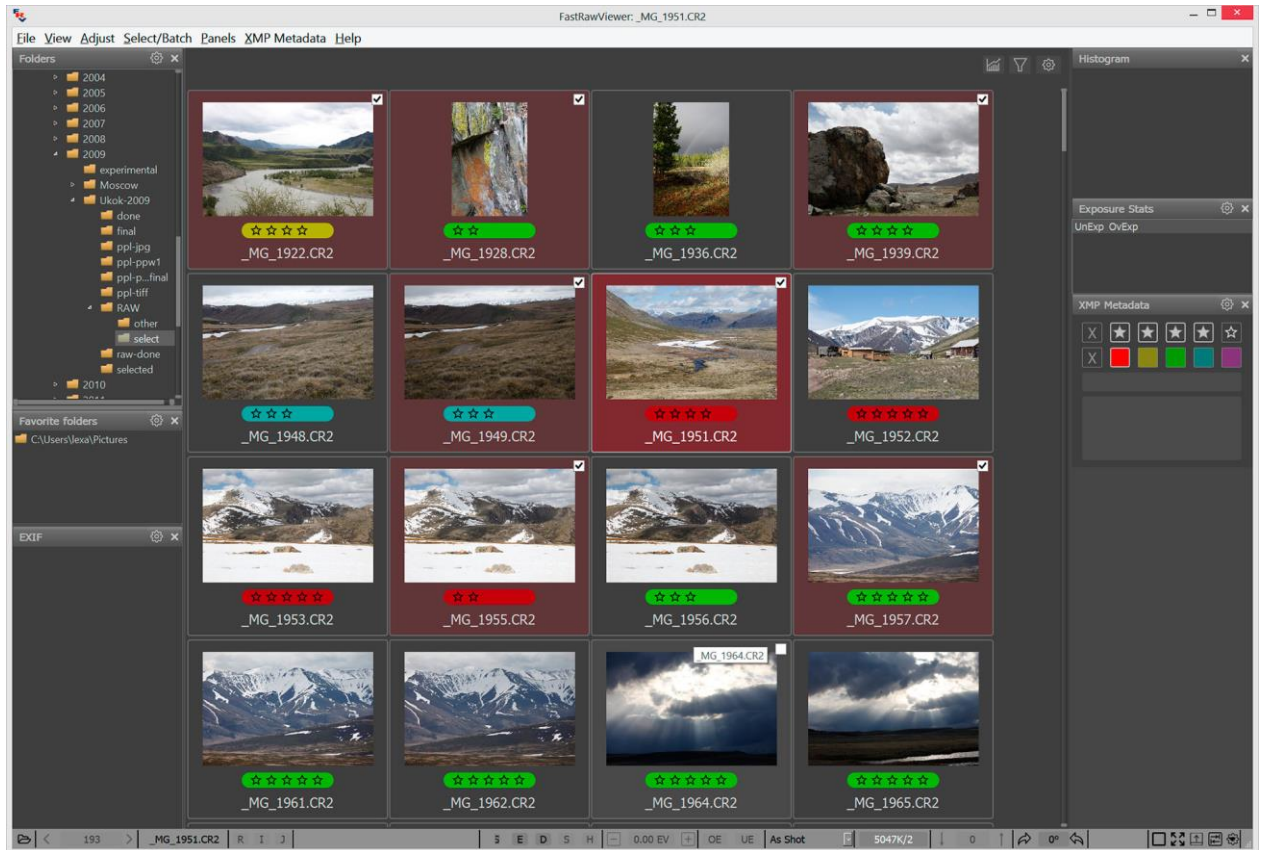
This color can be changed through **Preferences – Interface – Selected files background**.

If some files with the same name *(but different extensions, such as CR2 / DNG pair)* are highlighted, then the operations to change the orientation or to change / set ratings or labels will be disabled: it is impossible to apply such operations over a pair of files with the same name and different extensions, because for such a pair only one XMP file can exist:
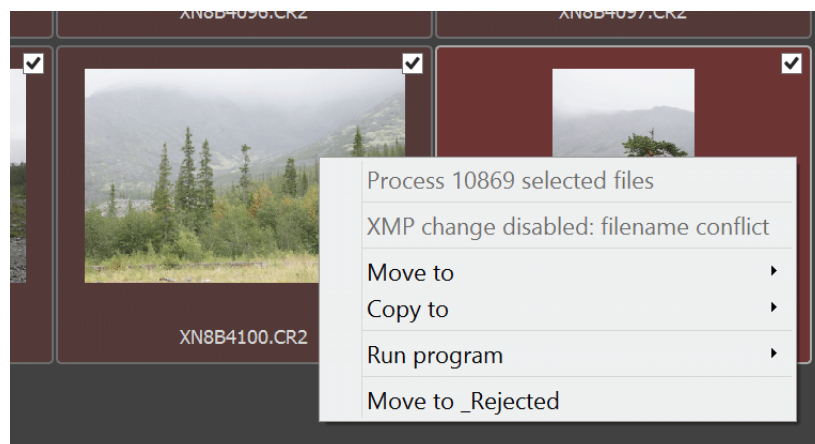
To allow XMP operations, disable the setting "**XMP settings - Disable batch XMP operations if files with same name are selected**". If it is turned off, the XMP files will be created for all selected files, but because of the naming conflict only the last recorded file will contain actual data.

Standard Selection mode

Standard selection mode can be turned on by unchecking the checkbox at **Preferences – Selection – Advanced selection mode…**

The standard mode of selecting files works the same way as selecting files in Windows Explorer/Mac Finder does:

- Mouse click *(without pressing any additional keys / modifiers)* leaves only the «clicked» file selected

- **Ctrl-Click** – switches the file selection mode

- **Shift-Click**, **Shift-arrow** – extends the selected area.

Actions on marked/selected files

Context menus

When clicking on any of the selected files, a context menu that displays possible actions over the group appears.
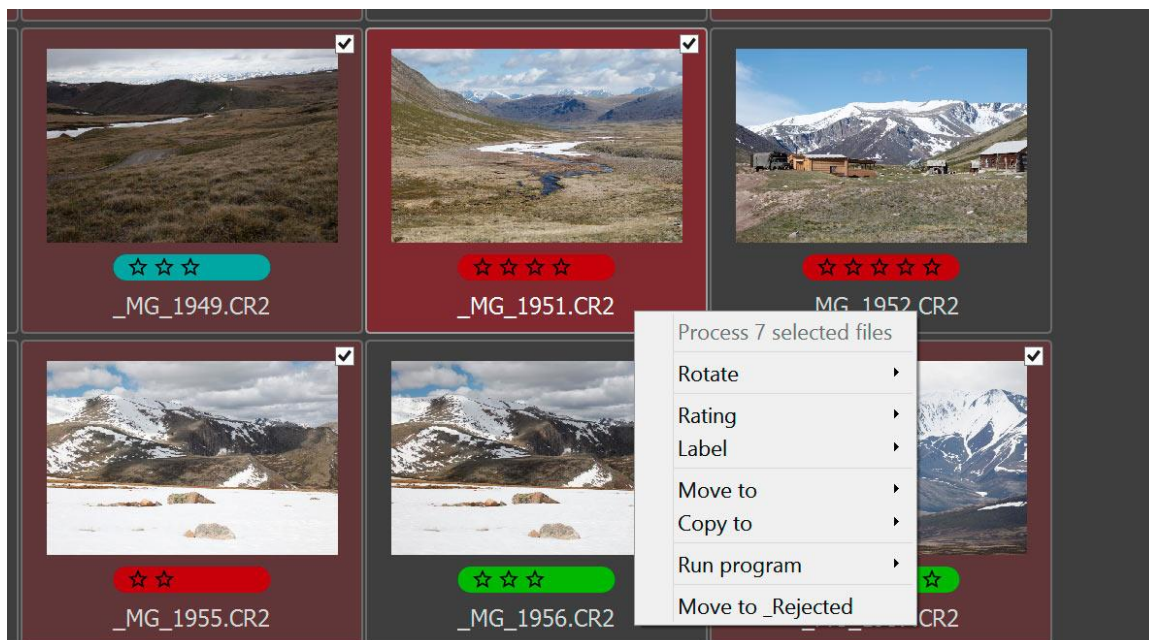
Program menus/hotkeys

With default settings, **FastRawViewer** uses the same hotkeys/menu items for operations with multiple files as for single files.

This mode can be turned off by turning on the setting: **Preferences – Interface – Selection – Single file keys work for multiple files too**, in which case **FastRawViewer** will work in a mode that is compatible with older versions, when operations over separate files and over groups of selected files is performed via separate hotkeys/menu items.

- Since in Advanced selection mode the current file may be not a part of the selection, we introduced a special setting to make the behavior determined:

  Preferences – Interface – Selection - If the current file is not in the group of selected files, single-file shortcuts will work with, with the options:

  o **Current file** - the buttons to act on files work on the current file

  o **Selected group** - works with the selected group

  o **Both** - the current file is implicitly added to the selected group. When turning on **Single file keys works for multiple...**:

- **Default actions**, specifically:

  o **Menu – File – Copy**, **Move**, **Pass to** *(program)*, **Move to Rejected**

  o **Menu – Adjust – Rotate/Flip**

  o **Menu – XMP Metadata**

  can work with one file or with several, depending on the context:

- In **Single file View Mode**, the actions always work with the current file, not the group.

- In **Grid View Mode**, if there are selected files, the actions will work with the group:

  o If the current file is not present *(e.g. folder just opened)* or is in the group of selected files

  o If the current file isn't in the group of selected files, but the setting *If the current file...* is set to **Selected group** or **Both**.

- **Group mode** is indicated in the menu:

  o **File**: Move, Copy, "Move to Rejected", Run - instead of the filename, you will see "Move *(Copy, Pass to)* NN files to"

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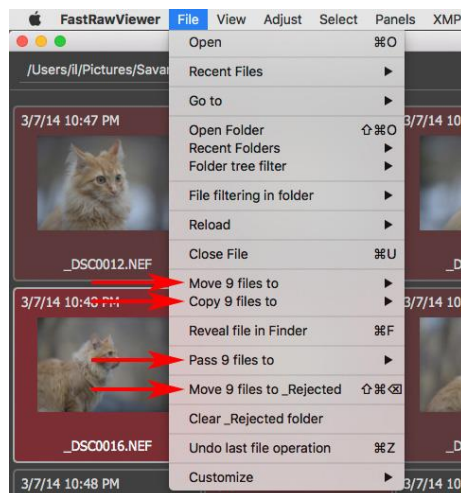
o **Adjust**: the header "Rotate NN selected files" appears above the Rotate group; and "Adjust filename" above the edit single file *(In Single file View Mode)* group.

o **XMP Metadata**: the first line of the menu becomes the "Rate/Label nn selected files" header
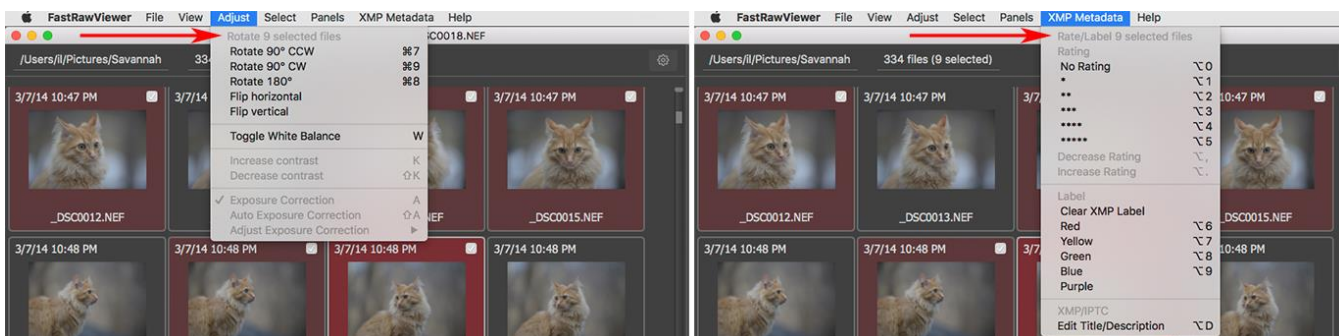
- **Group mode** is indicated in the XMP Metadata panel and in the application's bottom bar *(please see the picture below: single mode - the left part, group mode - the right part):*

o The panel header changes to XMP Batch change: NN files

o The asterisks change to snowflakes

o The filled-in square marks change to colored borders

On the picture below, work with a single file is displayed on the left, work with multiple files is displayed on the right:
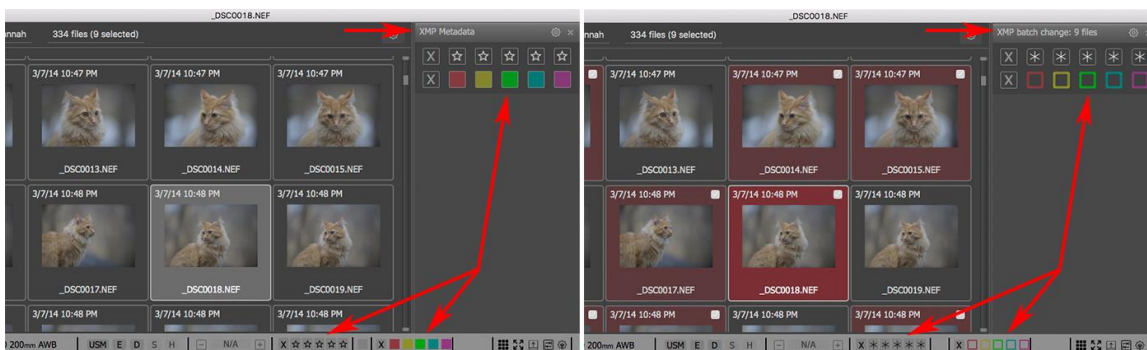
- If the selected group has **identical ratings/labels**, then the corresponding snowflakes/borders will be highlighted *(picture below, on the left)*, if they're non-identical *(or unknown, see the next point)*, then they won't be *(on the right)*.

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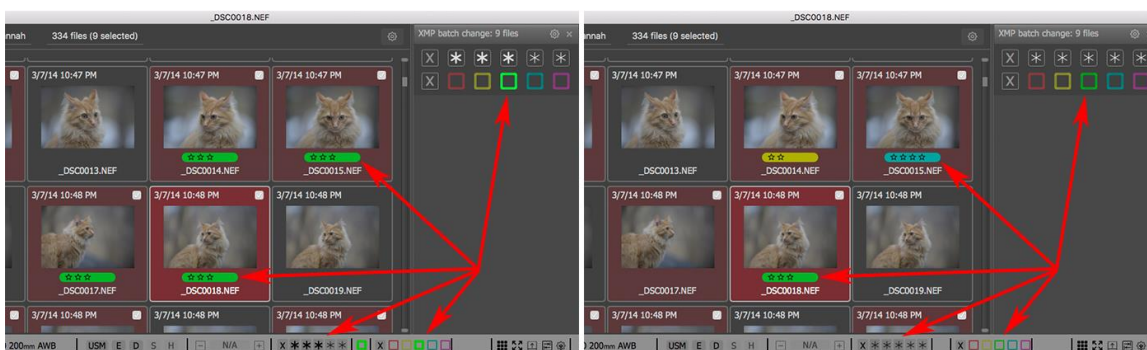
- If for part of the files, the metadata hasn't been read yet, then if there are fewer than 30 such files, they will be read. If there are more, then the "common rating/common label" will be unknown.

The **Title/Description** fields are displayed the same as for ratings/labels:

- If they are the same for all selected files, then a field that matches the contents of all of the files will be displayed in the XMP/Metadata panel.

- If they are different *(or unknown because the metadata hasn't been read)*, *multiple values* is displayed there instead.

If, when working with a group of files, with the setting **XMP -> Disable batch XMP operations if files with same name are selected** turned on *(default value)*, then if in the group of selected files there are files with identical names *(for example **file.CR2** and **file.DNG**)*, then XMP operations *(rotation, rating, label, title, description)* will be restricted *(in fact, disabled)*.

XMP operation restriction mode *(due to a naming conflict)* is indicated:

- In the Adjust and XMP menu, with the header *'XMP change disabled: filename conflict'*

- In the header of the XMP Metadata panel *(XMP Change disabled)*, and textually in place of the Title/Description fields.

When turning on **Single file keys works for multiple files too** mode, the *(old)* buttons for group actions disappear from:

- The keyboard shortcuts editor (Ctrl-K)
- Current keyboard macros help (F1)

The check for *one button is assigned to several actions* happens at the start of the application.

Batch editing of Title/Description

Title/Description for a group of files is changed through the standard menu *(**XMP Metadata**)* and/or the standard hotkey (**Alt-D**), or through the context menu for the group of files, or by clicking on the Title/Description field in the **XMP Metadata panel**.

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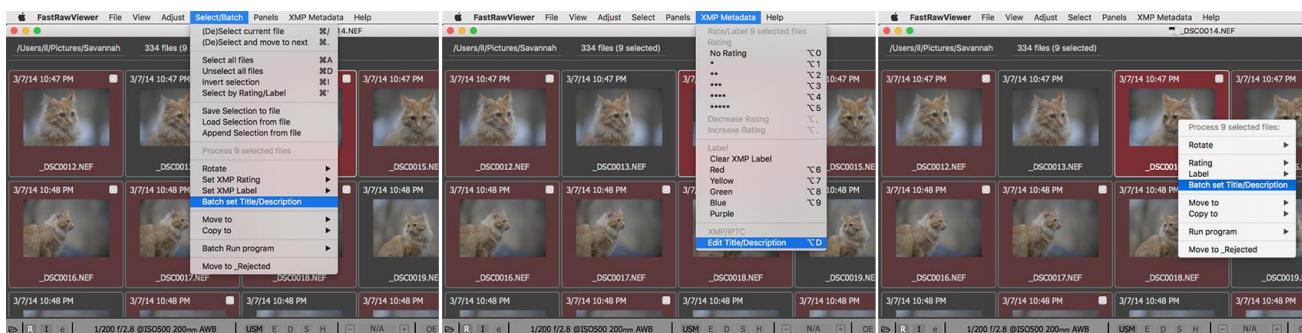
The Batch editing dialogue differs from Title/Description editing for a single file:

- Each of the two fields has an additional *checkbox (when first used, it's not checked - afterwards, it's saved for the duration of one session)*

- If the checkbox isn't checked, then the corresponding field can't be edited and it won't be changed for file groups.
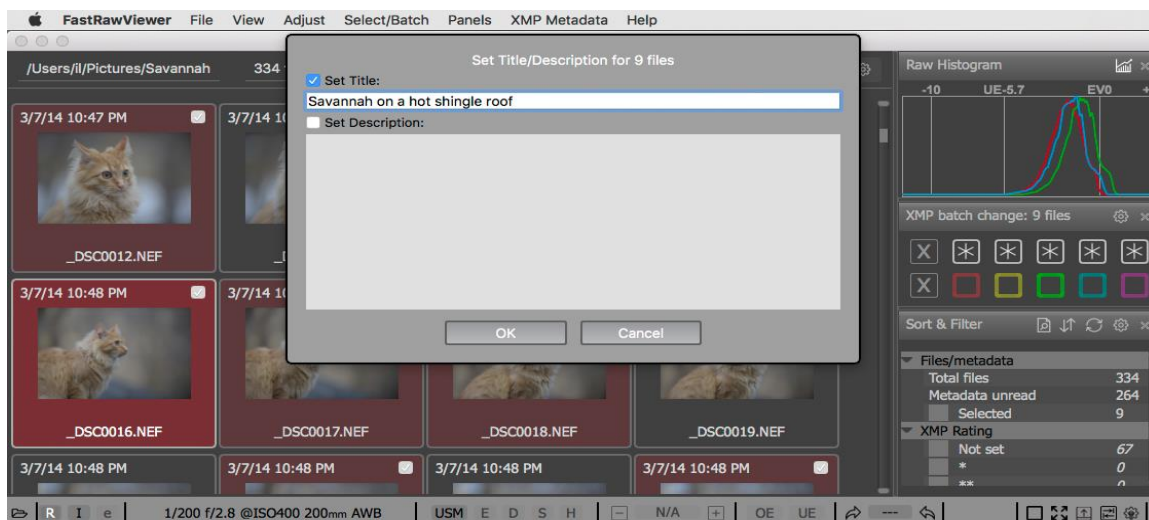
If a group of selected files has the same Title/Description, then they will be displayed in the editing dialog. If different, then it will say in the dialog *(as a gray text in the editing panels)* that the values are different.
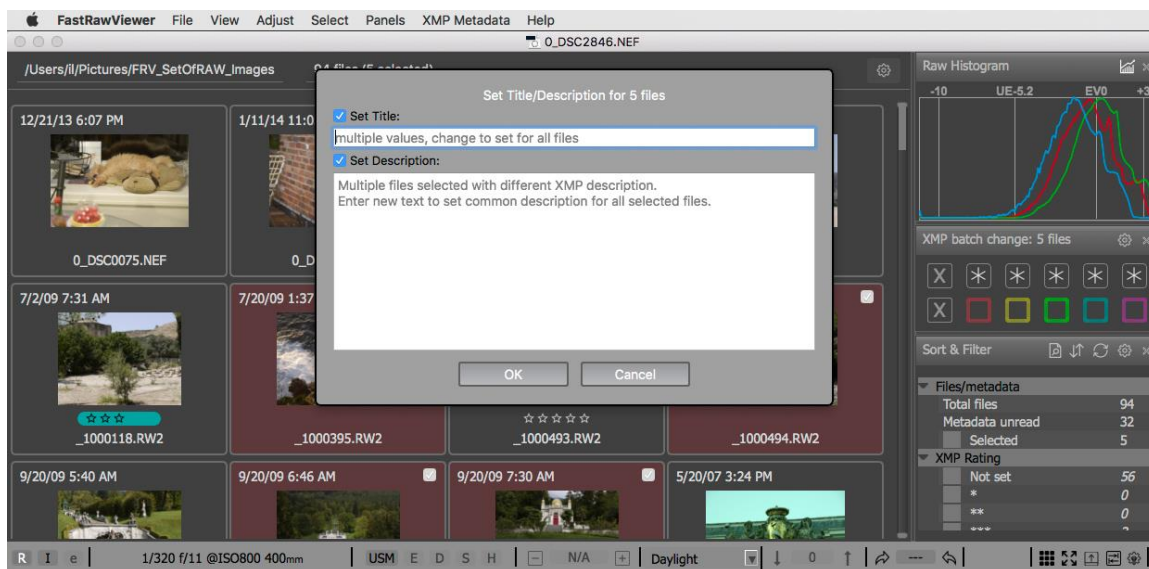
When applying changes of Title/Description to a group of files, Undo works.

Operations with selected files: separate shortcus

When turning off the setting **Preferences – Interface – Selection – Single file keys work for multiple files too**, **FastRawViewer** will use separate shortcuts/menus for batch operations:

If, however, one turns on **Single file keys works for multiple files too** mode:

- **Menu - Select** is renamed to **Menu - Select/Batch**
- Actions over groups of files appear in the menu.
- The corresponding actions appear in:
  - Hotkey settings (**Ctrl-K**)
  - Help with current hotkeys (**F1**)
  - The "one button is assigned to several actions" check that runs at program start.

- Under default settings, no group action has any hotkey, they will need to be set manually.
- The behavior of context menus doesn't change.

Undo: Reversing File Operations

The **Menu – File – Undo** can reverse the last file operation *(in reverse order of their completion)*.

The undo is possible for:

- Setting a rating and/or label;
- Copy operation;
- Move operation;
- Moving to a _Rejected subfolder *("deletion")*.

It is also possible to undo the rotation of the group of marked files *(there is no undo for the rotation of a single file – you can simply rotate it back)*.

After cancelling a move operation *(to another folder or into _Rejected)* for a group of files, the original rating for that group will be restored. When cancelling other operations, the rating will not be restored.

Drag and Drop

Drag and Drop from out of the program

A selected file, or a group of files, can be dragged with the mouse *(Drag and Drop)* into other programs that accept the file list.

If a selected file is dragged, then all selected files will be dragged to the same destination.

Dragging a file opened in single window mode works in the case that:

- If, for the action "left mouse click without modifiers," either no action is set

- Or, the default action is set to the standard "drag the image in the window" but the current zoom is such that the image fits within the window completely.

Drag-and-Dropping happens in copy mode, so files don't disappear from the program window.

Drag and Drop within FastRawViewer

Inside FastRawViewer, files can be dragged both into the folder tree, and into the main window (whether viewing a single file at a time, or 2/4 files). The ability to drag-n-drop into the Folders panel can be turned off by unchecking "Enable file drops to folder tree" in the settings of the Folders panel.
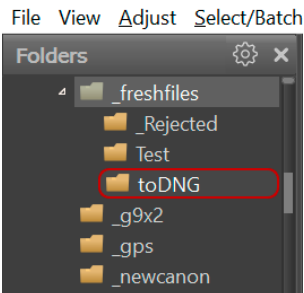
In the same Folders panel settings, one can turn on **Folder tree autoexpand on drop target selection** – in this case, folders will automatically open upon dragging a cursor with files "attached" to it.
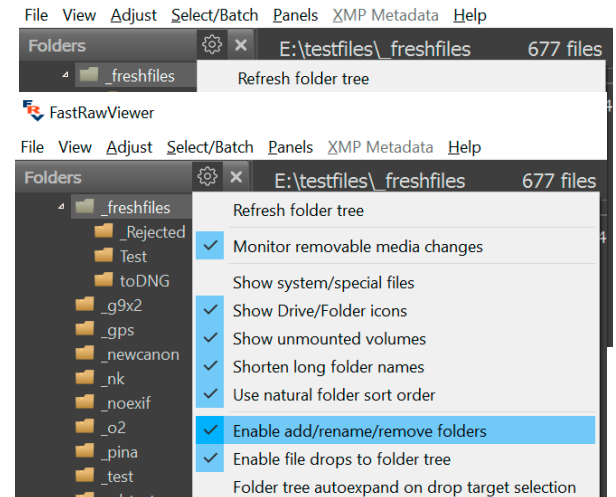
The folder that is currently under the drop cursor is automatically highlighted in red.

You can not only drop files into the Folders panel, but also into the Favorite Folders panel.

With default settings, the dropped file is copied, not moved. **FastRawViewer Preferences – File Handling – File Operations – Drop file(s) to folders tree** allows one to select one of the following drop modes:

- **Copy w/o prompt** – the file is copied; no user confirmation is requested.

- **Select copy or move** – at each drop action, the user will be prompted to select what to do with the file *(copy, move, cancel the action)*.

- **Move files** – the files will be moved and the request for confirmation is set by the **Confirm file move** checkbox in the same **Copy/Move/Reject** pane.

  If this option is selected, and **Confirm file move** is not set to **Always**, the user will be additionally warned about the potential problems of moving files with the drop action, and will suggest choosing among following options:

  o Proceed with the operation

  o Additionally, switch on Move confirmation

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o   Switch back to select drop mode each time

Setting **File Operations - Remember drop targets in last used copy/move lists** affects adding the folder that was the target for the drop operation to the lists of Copy/Move to … last used folder.

When dragging a file into the application window in Single File View mode, it is opened normally (like if it were opened through the window). Drag-n-dropping a file in Multi-window view mode, where you are viewing 2/4 files at a time, is described in the corresponding section.

If several files are selected, drag-n-dropping while pressing the Alt button leads to *only* the file under the cursor being dragged, *not* the whole group.

Histogram, and Exposure statistics in Grid Mode

The defaults for the **Grid** mode are optimized for speed. Only preview and XMP data are read for a file, the decoding of the RAW data is not preformed. Thus, the **Histogram and Exposure Statistics** panels remain empty:
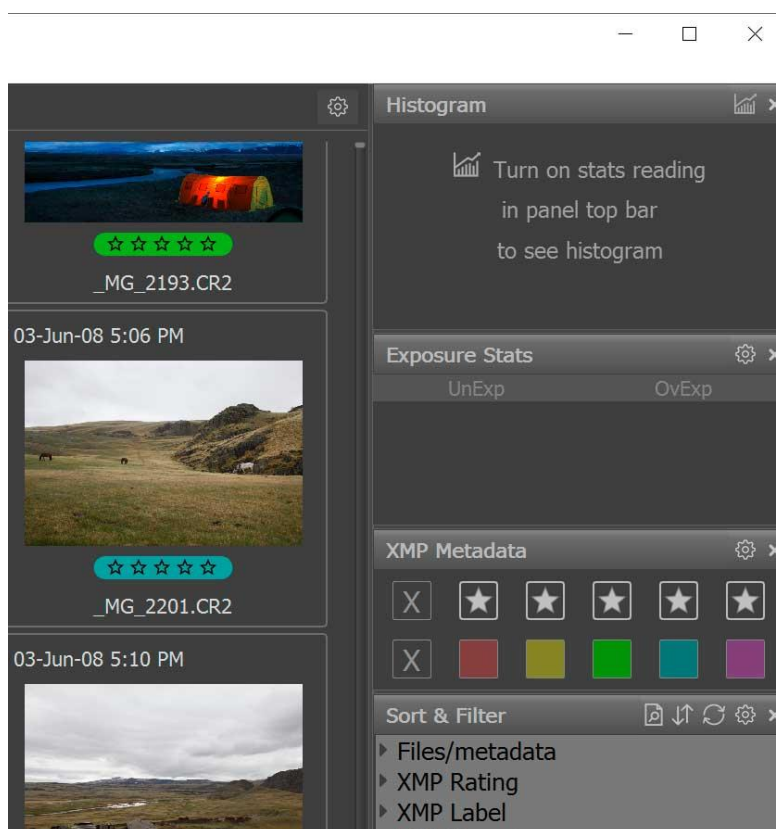
To switch decoding of RAW data on, press the "statistics" (📊) button in the in the upper bar of the Histogram panel.

When you click this icon, it brightens up and the decoding of the RAW data is turned on, thus enabling the display of the **Histogram**, **Statistics**, and **EXIF data**:
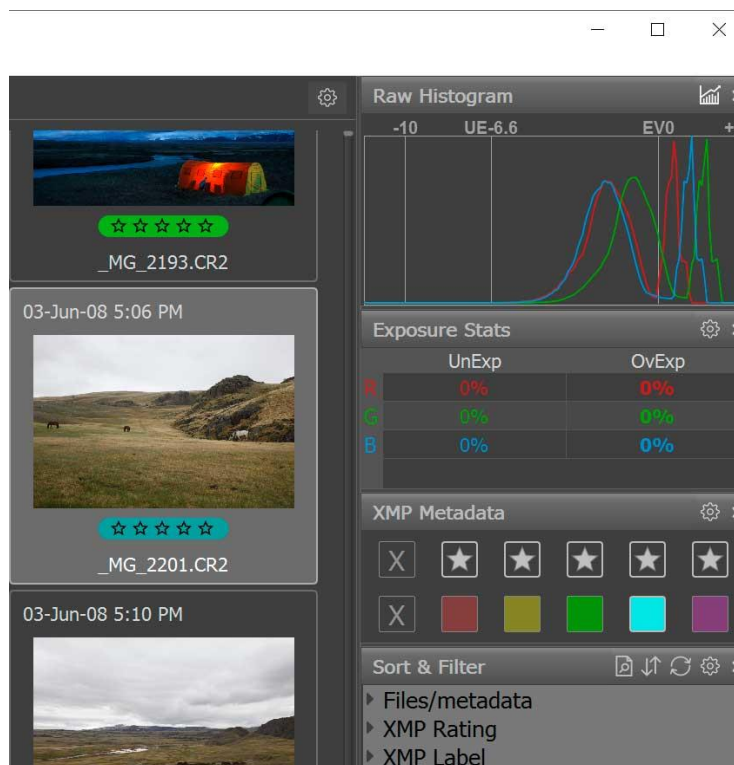
RAW data decoding takes some time; during the decoding the active file *(for which the RAW data is read and decoded)* is highlighted with a red frame:
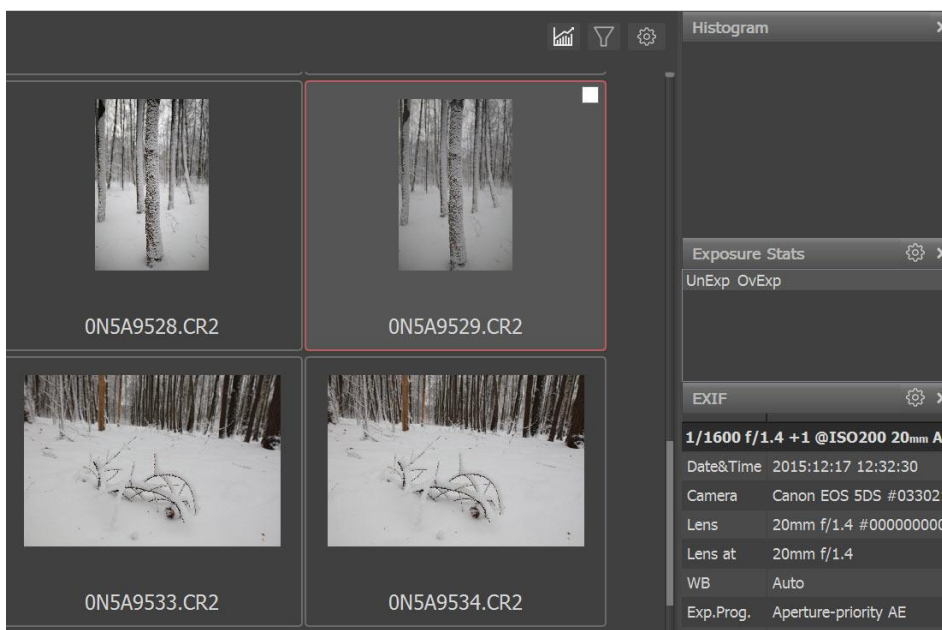
Renaming Files

How It Works

To rename files, you can use:

- **Menu – File – Rename File(s)** or the shortcut Shift-F2
- **Context menu** *(Rename file(s))*:
    - In Grid view mode
    - In Filmstrip
    - In Single file view mode
    - In secondary windows *(in Multi-window mode)*
- If the setting "**Single File keys works for multiple files too**" is turned off, then use **Menu – Select/Batch – Rename Files**

The context menu acts:

- On the group of selected files in Grid/Filmstrip, when the menu is called up for a file within the group of selected files
- On one file in all other cases.

The default Shortcut or calling up renaming options through **Menu – File** also acts depending on context:

- On one file in Single view mode *(in both single and multi-window modes)*
- On one file in Grid/Filmstrip mode if the current file is not part of a selected group.
- On the group of selected files when in Grid/Filmstrip mode and the current file belongs to the selected group.

Generating Names for Rename

When **renaming one file,** a *simplified* renaming dialogue pops up on the screen:

There, you can simply type the new filename, press Enter or the button GO, and the file will be renamed.

The first lines of the dialogue show the name of the file being renamed and the number of associated files *(JPEG in a RAW+JPEG pair, XMP, additional connected files)*.

The **Sample** line shows an example of *"before -> after"* file name change.

When **renaming several files,** or when the **Extended Parameters** checkbox is checked when renaming a single file, the *full* renaming dialogue will be displayed:
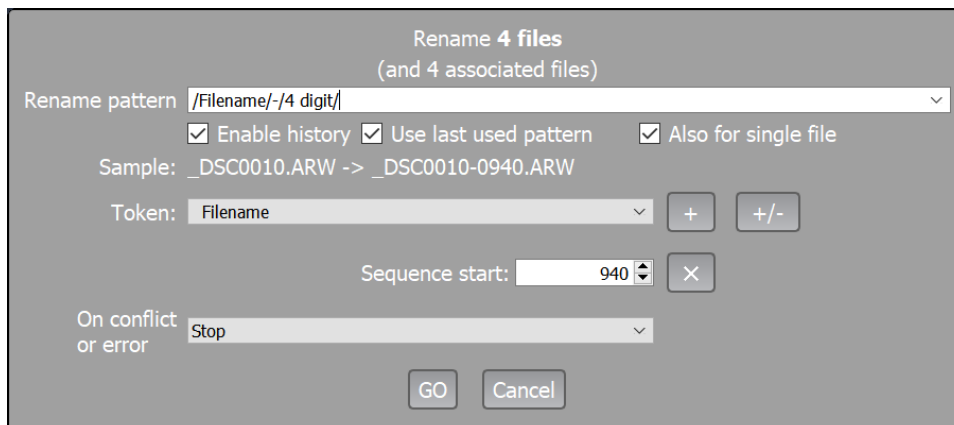
When renaming several files, they cannot have identical names; therefore, the filename will be generated from **tokens** *(the keyword is enclosed in slashes, such as /Filename/)* and arbitrary symbols between tokens.

Tokens can be composed through a **drop-down Token list** *(the [+] button can add a token to the current input bar, the [+/-] button replaces the entire contents of the bar with the token), and can also be manually composed (there is an abridged form for this).*

List of tokens:

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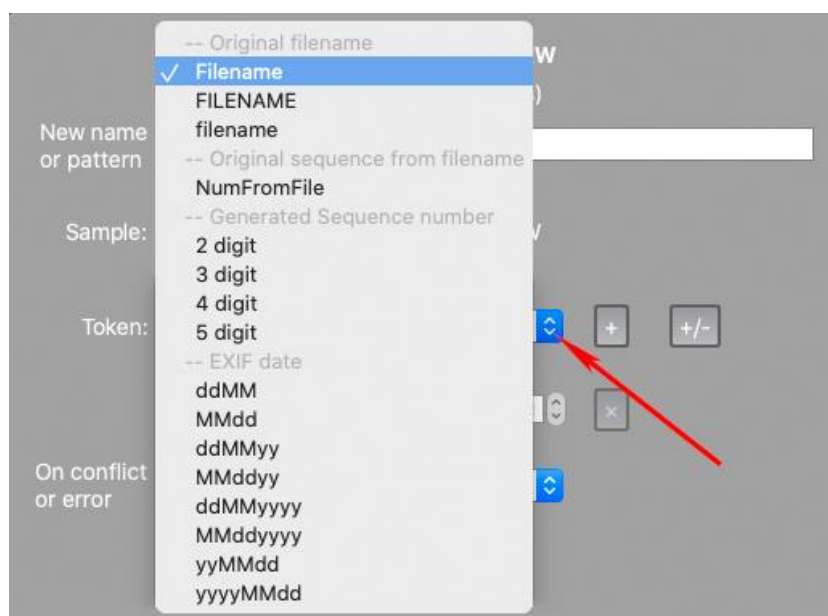
- /Filename/ or /Fn/ - the name of the source file that is being renamed, with the case being maintained.

- /FILENAME/ or /FN/, /filename/ or /fn/ - the filename entirely upper/lowercase

- /NumFromFile/ or /NFF/ - sequence of digits *(one or more digits in a train)* extracted from the filename.
  If filename has no numeric in it, the token is empty.
  One can manually enter /NFF1/ /NFF2/ etc., which means first numeric sequence in the filename, second numeric sequence in the filename, and so on. For example, if the filename is IMG123_456_7, then NFF1 is 123, NFF2 – 456, NFF3 – 7, NFF4 – to empty.

- /2 digit/ or /2d/, /3 digit/ or /3d/, /4 digit/ or /4d/, /5 digit/ or /5d/ - counter to be incremented by one for each consequent file.
  The "**Sequence start**" field in the next line of the dialogue sets the starting value.
  The options listed here can be selected through the **Token** drop-down list, or entered manually.

- /6 digit/ or /6d/, /7 digit/ or /7d/, /8 digit/ or /8d/ - 6, 7, or 8-digit counter.
  These options are not in the drop-down list because they are rarely used, and so they must be entered manually.

- /ddMMyy/, /MMddyy/ and so on – the date part of EXIF timestamp *(specifically, just the date) of the file in the indicated format (dd – day, MM – month, yy/yyyy – two/four digit year number)*.
  When entering this manually, it's case-insensitive - /ddmmyyyy/ works as expected.

- /hhmm/ and /hhmmss/ – the time part of EXIF timestamp.

- Date and Time tokens *(following EXIF timestamp)* in an arbitrary format *(only manual entry)*; the format itself is described below:
  - /Dformat/ - date in local format *(User Locale)*
  - /DIformat/ - date in International format *(DI: from Date International)*.

When manually entering the tokens, we recommend immediately closing the token with the slash *(e.x., /DI /)* and only after that to start typing out the contents of the token. In this case, the effect of the token is immediately displayed in the **Sample** line.

Sequence start field – the initial counter setting from which the incrementing starts, from 1 to 999999999. When the counter reaches 999999999 it restarts from 1.

The [X] button to the right of the **Sequence start** field resets its value to 1.

With standard settings the initial value of the sequence is set to 1 when FastRawViewer is launched; it increments as used during the session, but it's not saved on exit from FastRawViewer.

However, **Preferences – File Operations – Keep sequence numbers for rename between session** saves the counter globally:

- The counter is retrieved from the FastRawViewer system settings right before opening the **Rename Files** dialog

The counter is saved in the FastRawViewer system settings right after the rename is complete.

As a result, unique numbers are ensured even if multiple instances of FastRawViewer are running concurrently *(so long as the renaming dialogs are not launched simultaneously)*.

The '**On conflict or error'** line determines behavior when a naming conflict and/or an error when renaming occurs:

- "**Stop**" – Stop
- "**Skip**" – Skip the files with renaming conflicts or errors
- "**Try –(NN) suffix, then stop**" – try adding a suffix –(nn) /two-digit number/, if this doesn't work (files …-(01)…-(99) already exist) – then stop.
- "**Try –(NN) suffix, then skip**" – try adding a suffix, if it doesn't work then skip.
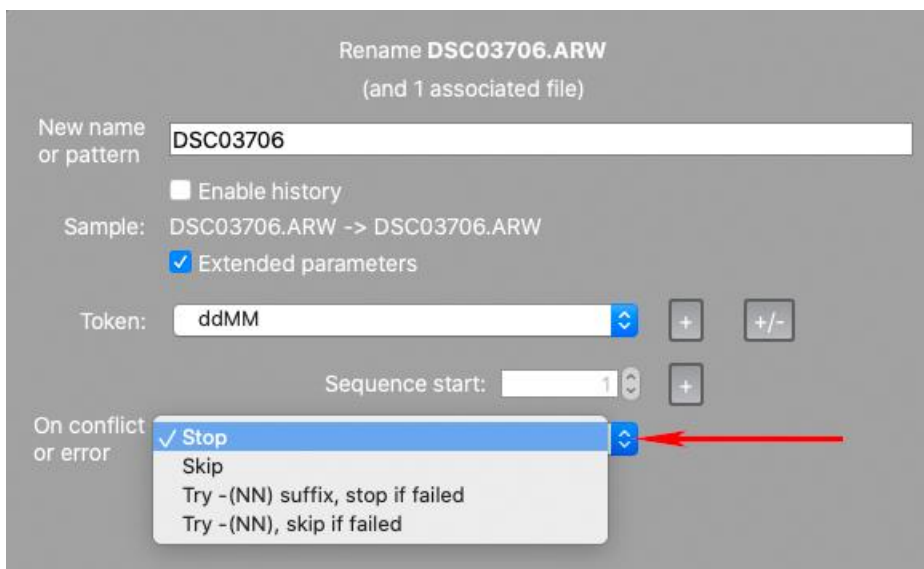
The '**Enable history'** checkbox toggles rename history log:

- When the log is on, the input line becomes a drop-down list, and the elements of the list can be reused.
- This list stores the last 20 rename patterns *(only the ones that contain tokens)*.
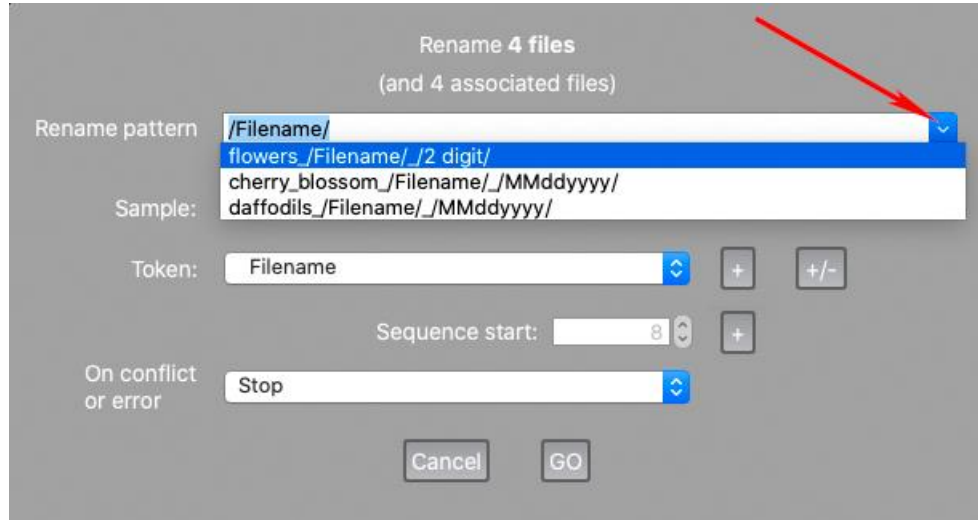
To clear the log, use **Menu – File – Customize – *"Clean Recently used lists" – "Rename history"***.
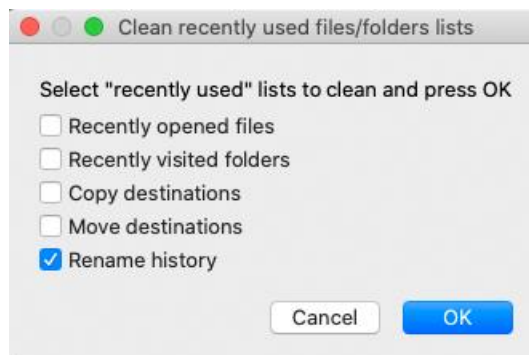
Use last used pattern: for multi-file rename: will restore the rename pattern that was applied right before.

Also for single file: the same for single file (only if [ ] Extended parameters is checked).

Associated files: renaming files works for a group of associated files *(with the same name)*, specifically:

- The "main" file – the one visible in the FastRawViewer interface
- Associated JPEG/HEIC file *(if RAW+JPEG/RAW+HEIC mode is turned on and a JPEG/HEIC file with the same name exists)*.

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- XMP file: if XMP support is not turned off and an XMP file with the same name and correct photoshop:SidecarForExtension tag exists.

- .rpps file, if support for RawPhotoProcessor is turned on and an rpps-sidecar exists.

- Additional files indicated in **Preferences – File Operations – Additional file extensions to copy/move/rename with file**.

In other words, groups of associated files are created the same way as when copying or moving.

If an error or conflict occurs when renaming a single file in such a group *(for example: file.cr2 + file.jpg + file.xmp)*, the entire group is returned to the initial name set.

If at least one error or naming conflict happens, then after renaming the following message pops up:
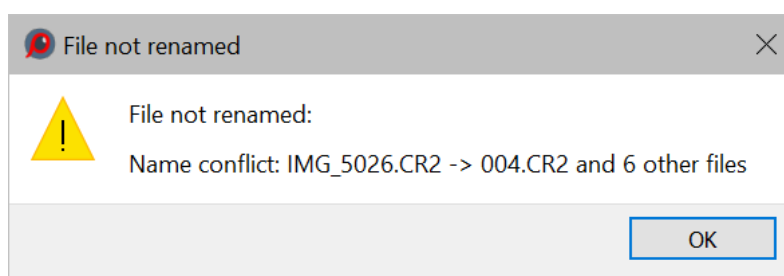
This message indicates that a naming conflict occurred for the indicated file and for 6 other files, and they were skipped.

When the "stop" option is selected, the error notification will only be for the first file:
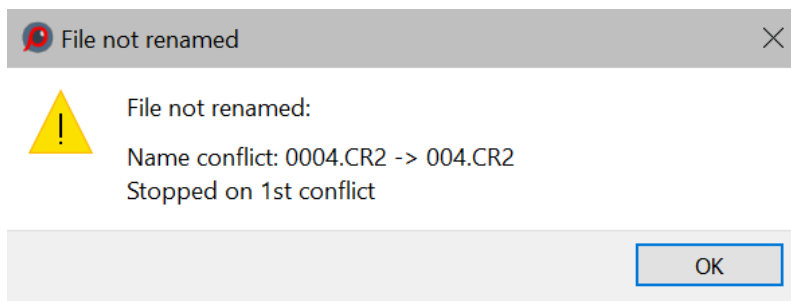
Specifying the date in arbitrary format

Date format codes:

- d – day of the month:
    - d – day number without the leading zero *(1,2…31)*
    - dd – day number with leading zero *(01, 02…31)*
    - ddd – abridged name of the day of the week
    - dddd – full name of the day of the week

- M – month *(the upper-case letter is obligatory, the lower-case letter is reserved for minutes, see below)*
  - M – month number without leading zero *(January is 1)*
  - MM – month number with leading zero *(January is 01)*
  - MMM – abridged name of the month
  - MMMM – full name of the month

- y – year
  - yy – only last two digits
  - yyyy – all four digits

- h,hh – hour *(with and without the leading zero)*

- m,mm – minute *(with and without the leading zero)*

- s,ss – second *(with and without the leading zero)*

- z,zzz – millisecond *(non-zero only if your camera records sub-second timestamp in EXIF)*

- a *(or ap)*/ A *(or AP)* – indicating before or after noon *(am/pm)* in lower- or upper-case. If your local time settings do not have AM/PM, the line will be empty.

- t – system name for the timezone.

- Any other symbol, except the codes listed above, is displayed "as-is".

- If it is necessary to display one of the codes listed above "as-is", enclose it in single quotes.

- If it is necessary to display a single quote, type it twice.

On the screenshot below, you can see an example of how to manually set the date in an arbitrary format:

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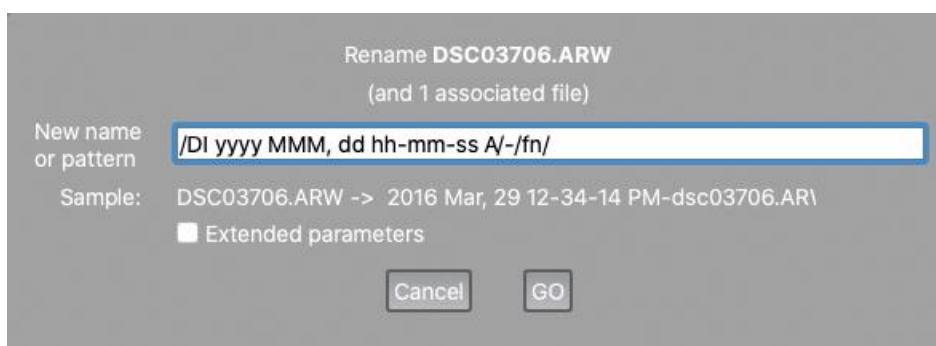
Folder Navigation

Folders can be navigated via the **Folders** panel, the standard location of which is to the left of the main program window:
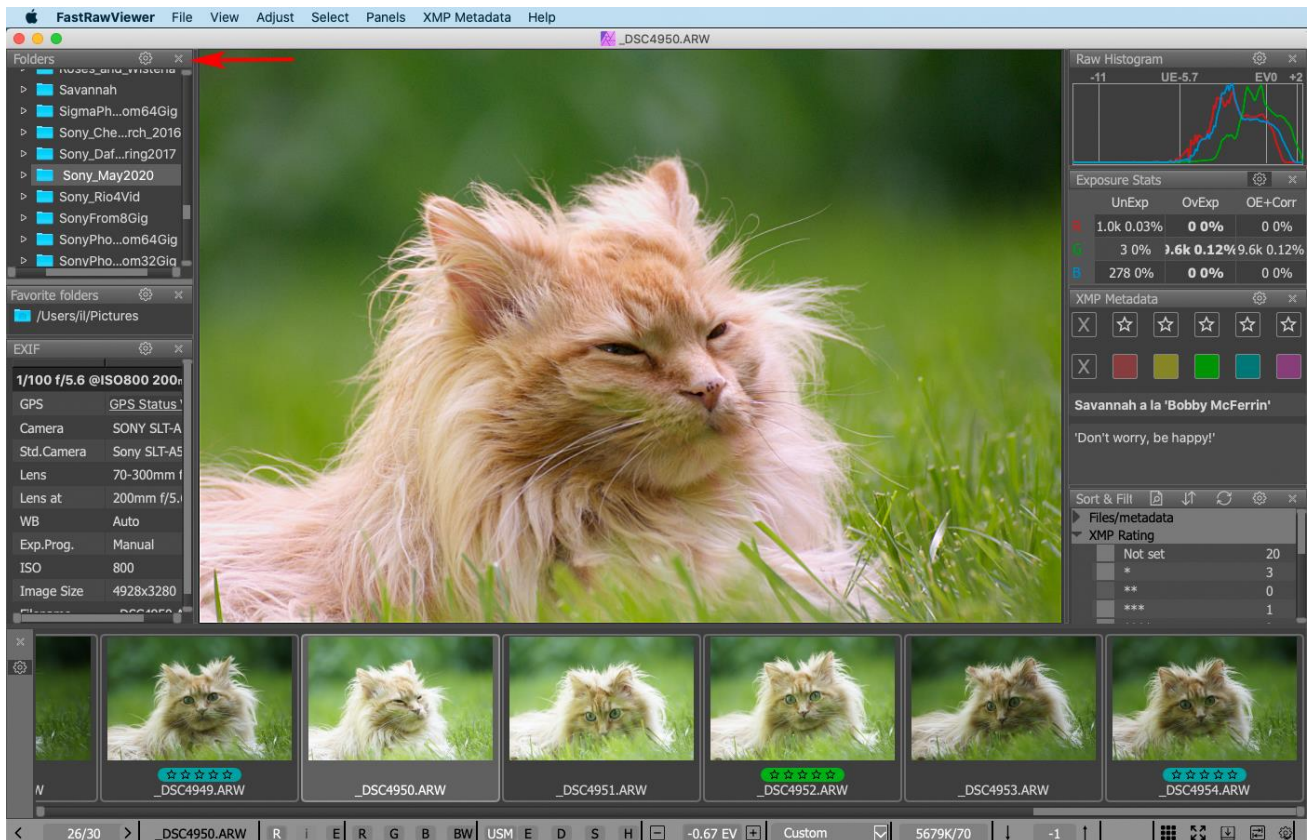
The folders can be navigated with the:

1. Mouse:

   a. Clicking on the triangle to the left of the folder name opens the subfolder tree.
   A second click on the triangle closes the subfolder tree.

   b. Clicking once on the folder name loads the first preview in the Filmstrip panel.

   c. A double-clock on the folder name loads the first preview and opens the first file of the folder in the main program window.

2. Keyboard:

   a. The up/down arrows, PgUp/PgDn keys, and Home-End move across the list while loading the previews into the Filmstrip.

   b. Right/Left arrows open/close subfolders.

   c. Enter loads previews and opens the first file in the folder.

If folders tree has changed outside of FastRawViewer one may refresh folders tree in Folders panel by using Menu – File – Reload – Refresh (sub/full) folders tree or corresponding shortcut.

Limiting the displayed folder tree

For convenience of browsing, the folder tree, displayed in **Folders** panel, can be limited using **File – Folder tree filter** menu or corresponding keyboard shortcuts:

- **Start Folder tree at current folder** *(Ctrl-T)* – the folder tree will be limited to the current folder and its sub-folders.

- **Start Folder tree at one level up** *(Ctrl-Shift-T)* – the folder tree is limited with the folder one level up and its subfolders *(includes the current folder)*.

- **Move folder filter one level up** *(Shift-T)* – the filtering point is moved to one level up on the folder tree.

- **Reset folder filtering** *(Alt-T)* – resets the filters.
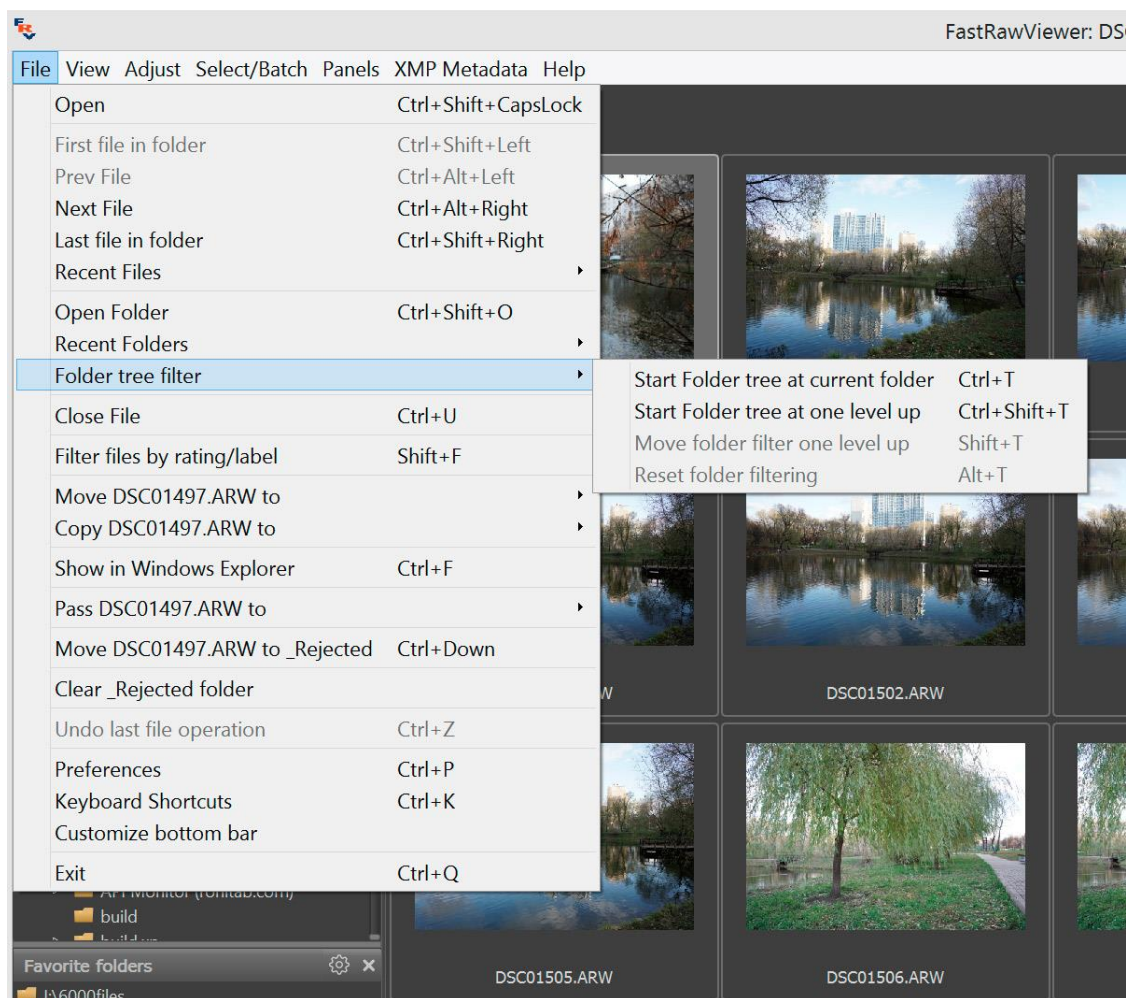
Upon choosing **Start folder tree at *folder name***, that folder will serve as the root of the folder tree, with its subfolders also being displayed:
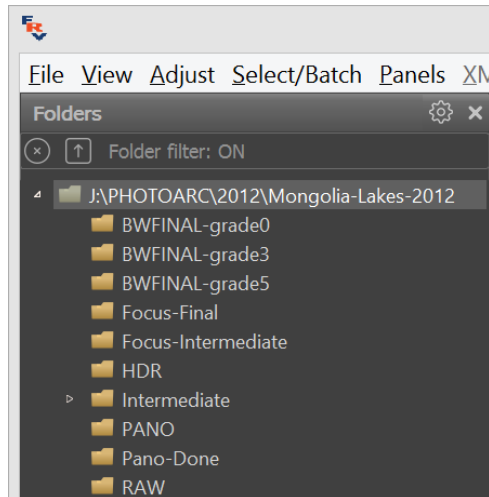
Also, an informational panel appears at the top of the tree with two icons and a **Folder filter: ON** message. The buttons/icons work in the following manner:

- (x) – turns off the filtering, and displays the entire folder tree again *(same way as Reset folder filtering in menu)*

- [↑] –moves the "root" of the filtering one level up (same way as Move folder filter one level up in menu).

Furthermore, the folder filtering will cease when opening a file or a folder outside of the current ***tree branch** (for example, when opening something through **File - Open** or by Drag-and-Dropping something into the program window).*

Apart from **Menu – File – Folder tree filter** *(and corresponding hot-keys)*, the filtering of the folder tree can be switched on with the mouse:

- ***Ctrl+Left Click*** in **Folders** panel *(or in the **Favorite Folders**, please see below)* makes the folder clicked on the top-level folder in the folder tree *(same as **Ctrl-T**)*

- ***Ctrl+Shift+Left Click*** – limits the folder tree "by one level above" *(same as **Ctrl-Shift-T**)*

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Folder filtering can also be set through **Folders** panel context menu *(mouse right-click)*:
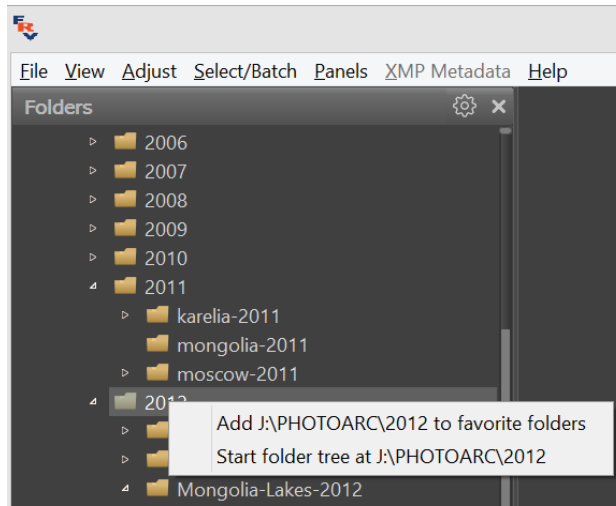
With default settings, folder filtering is not re-applied when re-launching the program. This can be changed by turning off **File Handling – Startup – Reset folder tree filtering on start**.

Editing the folder tree

The Folder panel settings now contain a setting to **Enable add/rename/remove folders**.
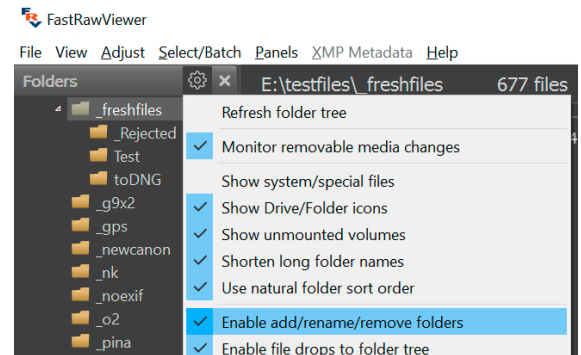
When this setting is on, the following appears in the context menu for the folders:

- **Create subfolder** – creates a new folder and immediately suggests renaming it to something sensible.

- **Rename folder** – allows one to rename a folder.

- **Delete folder** – allows one to delete a folder *(but only if it's empty and not the current one)*
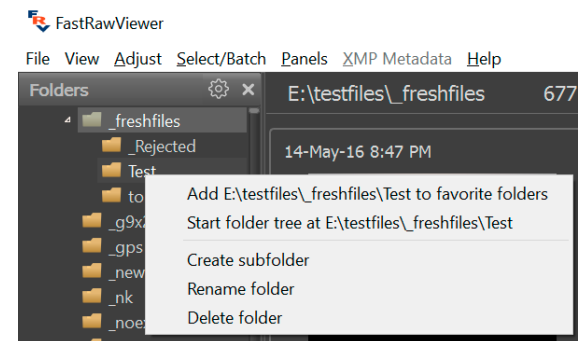
If a folder is currently in use by some other folder, renaming or deleting it may not be possible; in this case, an appropriate message will be displayed.

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Working with Removable Media (Flash Cards, etc.)

Automatic Recognition of Inserted Media

Under default settings, **FastRawViewer** recognizes the removable media *(memory card, USB flash drive)*, and, having recognized it, shows the following dialog:
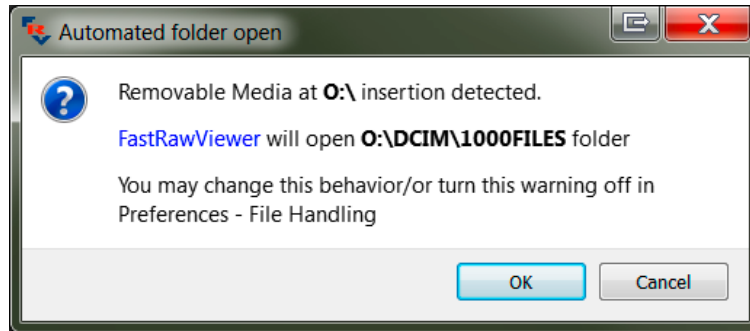
*"Removable Media insertion detected, **FastRawViewer** will open the newest folder found on it under the DCIM folder".*

The action resulting from detecting removable media can be changed in **Preferences – File Handling – Removable Media** to one of the following variants:

- Do nothing *(Do nothing)*;

- Open predetermined folder *(by default, \DCIM);*

- Opens the most recent *(by date of modification)* folder in the predetermined folder.

- Opens a predetermined folder in "browse nested subfolders" view mode *(see below the section on "Working with subfolders")*.

You can also turn off the above-shown warning in the same **Preferences** section.

Unmounting (Ejecting) Removable Media

If the removable media doesn't use any application except **FastRawViewer,** then it can be ejected without closing the program.

For this, one needs to right-click the respective media icon in the Folders panel and to select in the context menu the *(only)* item, **Unmount MediaName:**
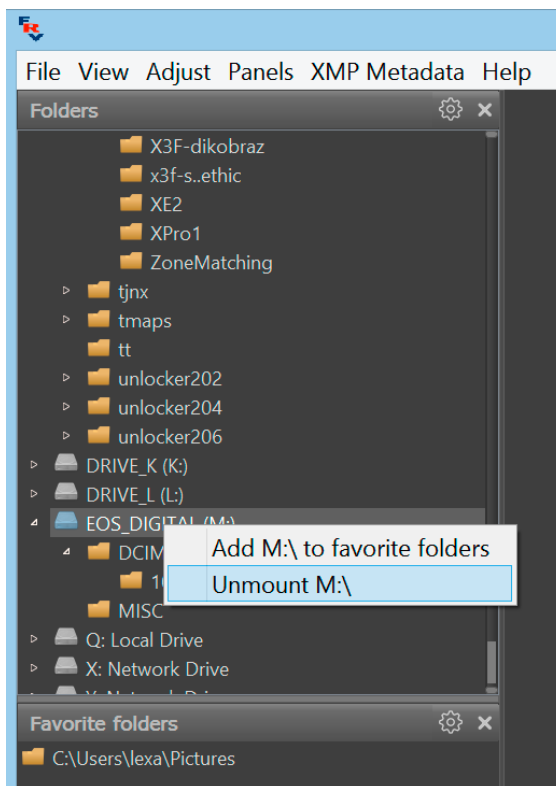
After a successful unmount operation, the media will be freed up without additional messages. If there are any problems, then the following error message will be displayed:
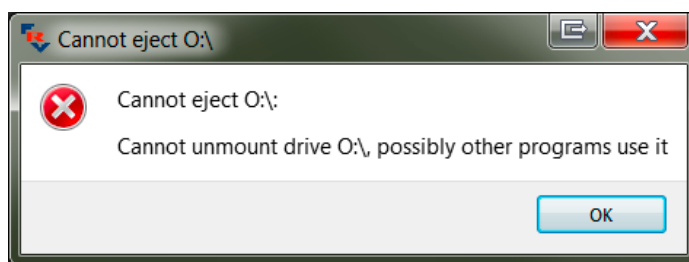
This message means that the removable media is in use by some other program as well, and **FastRawViewer** cannot safely unmount it.

Favorite Folders Panel: Easy Access to Select Folders

An additional **Favorite Folders** panel can be found at the bottom of the **Folders** panel. **Favorite Folders** panel is intended to be used to store a list of select folders in the file system, for easy and fast access.
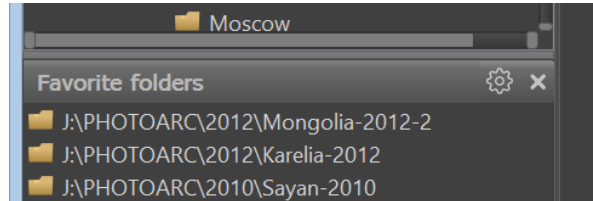
The "behavior" of the elements in this panel is analogous to that of the **Folders** panels:

- **One click**: The Thumbnails panel will be populated with the previews of the files in the chosen folder.

- **Double-click**: opens the first file in the folder.

- **Ctrl-Click/Ctrl-Shift-Click** – opens the selected folder, while the folder tree in the **Folder** panel will be limited by the selected folder/one folder above selected.

You can add to the **Favorite Folders** list in two ways:

1. The **Favorite Folders** panel's menu *(the "gear" icon at the head of the panel),* **Add current folder to favorites** adds the current panel to the list of favorites.
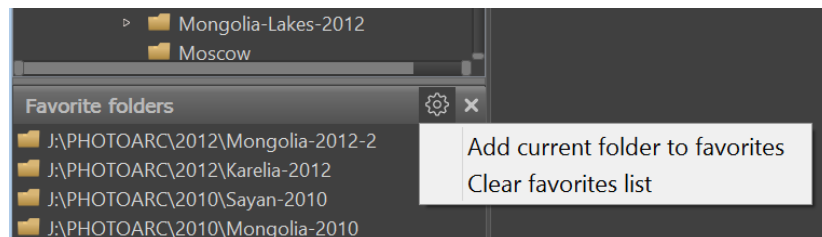
2. The context menu in the Folders panel allows you to do the same with a chosen folder *(Add *folder name* to favorite folders)*:
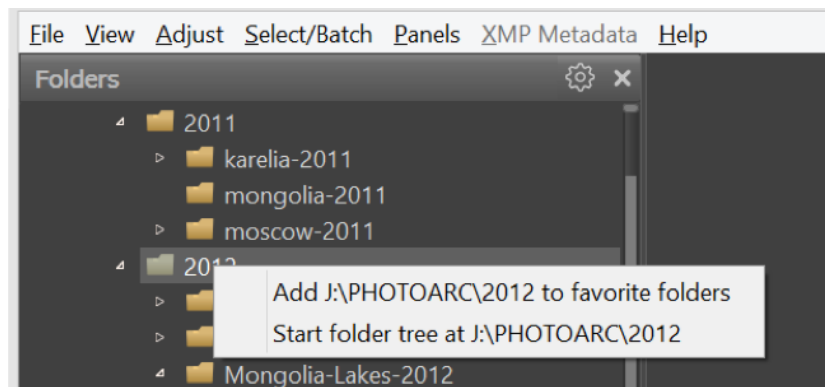
Clearing the list:

1.	Panel menu: **Clear favorites list** *(see above)* clears the entire list.

2.	The context menu for a single item on the list allows you to delete that one item:
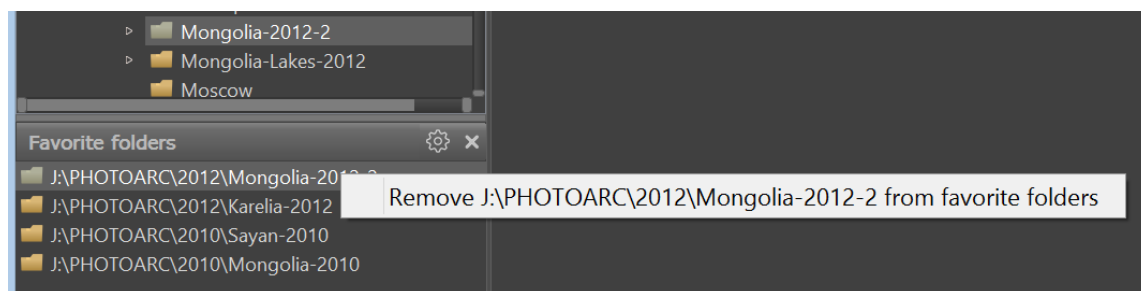
"Close" File/Folder

FastRawViewer background process scans files and receives system signals upon folder updates. This prevents safe ejecting of removable media, including flash memory cards and cameras connected to the computer via a cable.

Menu – File – Close File *(or Ctrl-U)* «closes» the currently opened file:

- All background processes are stopped as fast as possible.

- The monitoring of the current folder is cancelled.

- The current file display is cancelled.

- The current / working folder is changed to %HOME%/Pictures, or, if that one is not present, to %HOME%.

- Upon the completion of the **Close File** command the removable media can be safely unmounted and ejected, as usual.

Unmounting a portable media through the context menu in the Folder panel automatically preforms the **Close File** action.

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Special view modes for folders

Working with subfolders (nested folders)

FastRawViewer allows one to view folders not only in the current folder, but also in its nested folders *(subfolders)*. In this mode, some constraints on the functions available to the program are in effect *(see the section "Constraints while working with subfolders" below)*.

Switching to the mode where you can view a folder with its subfolders can be done by:

- **Menu – File – Open Folder – Open Folder with subfolders** *(Alt-O/Option-O)*

- The folder's context menu in the panel Folders – **Open in subfolder mode**
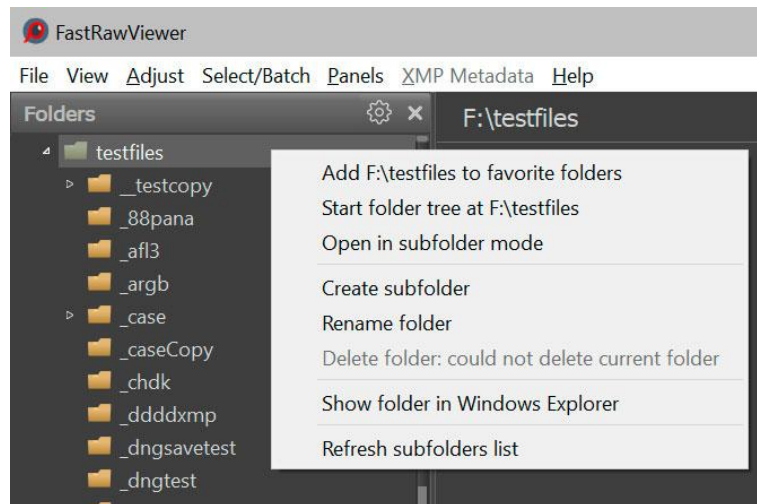
After this, a dialog for scanning the subfolders will appear:
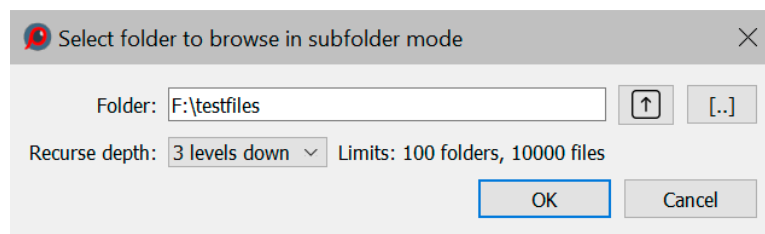
In this dialog:

- Folder: the current folder, which you are opening

- Arrow up: go one level up

- […] button: select a folder through the standard folder selection dialog

- Recurse depth: how many levels down should the file search be implemented

- Limits: the ultimate depth of scanning, in subfolders and files *(which limit to hit first)*.
  The limits are set through **Preferences – Special browse mode – Subfolder browse** – limit fetched file/subfolder count group.

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After pressing OK, **FastRawViewer** will perform a scan of the subfolders and files, and the resulting list of files will be displayed in the program window.

When first switching to this mode, **FastRawViewer** will display a warning with a detailed description of the constraints that are active when in subfolder browsing mode.
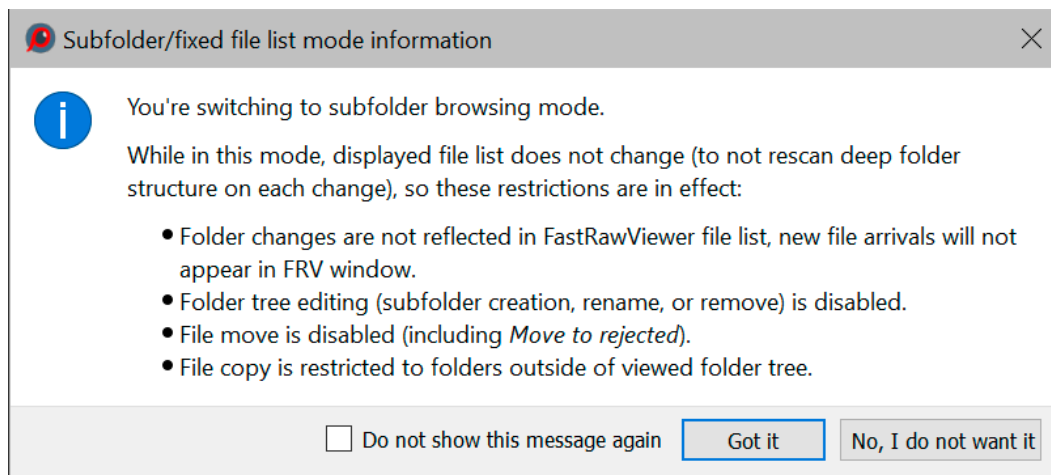
To turn off displaying this warning, check the checkbox *Do not show this message again,* before closing the window.

The order of sorting the files by name is set through the **Preferences – Special browse modes – Subfolder browse – Filename sort in subfolder browse mode** setting, which allows one to turn on/off accounting for folder name *(as in "full path")* with such sorting.

Subfolder browse mode is indicated in the upper bar of the program in **Grid View** mode; **Subfolder browse** will be written before the name of the most upper-level folder:
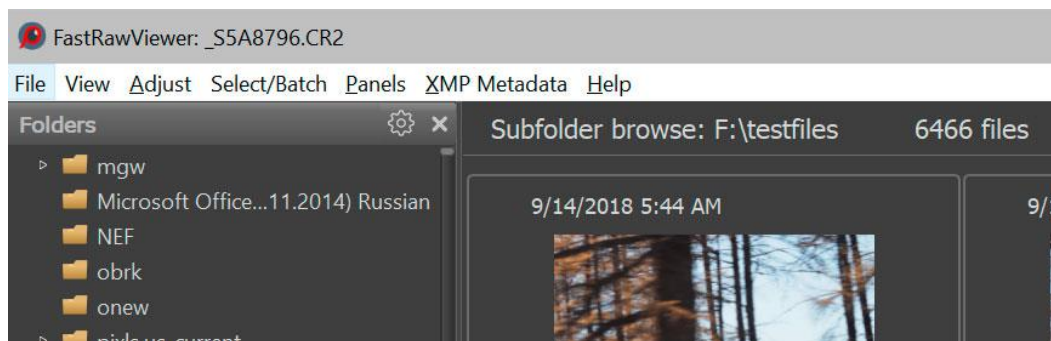
If while scanning the nested folder tree duplicates are discovered, then under the default settings the following warning will be displayed:
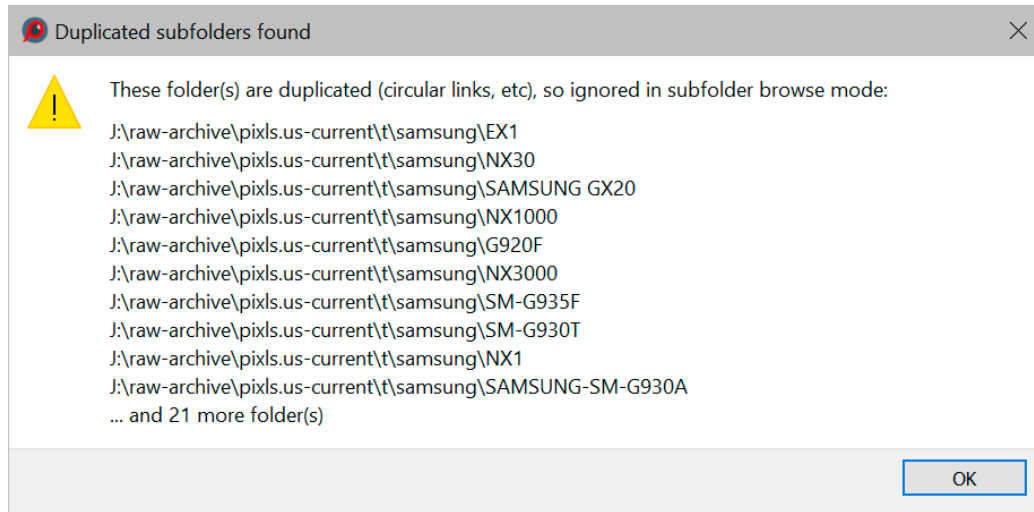
This warning can be turned off through **Preferences – Special browse modes – Subfolder browse – Warn if duplicated subfolders were found in subfolder tree**.

Duplicated subfolders are detected in two cases:

1.   Cyclic symbolic links *(symlinks)* in the file system.

2.   Subfolders with identical names, differing only in letter case: **FastRawViewer** *(purposefully)* is insensitive to character case in file names; accordingly, it cannot display two subfolders with identical names in different cases.

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Constraints in Subfolder browse mode

In Subfolder browse mode, the following constraints on **FastRawViewer's** functionality are active:

- The list of displayed files is fixed at the moment of "opening" the subfolder tree.
    - If, because of other programs working, new folders or files are added/deleted to the tree, **FastRawViewer** ignores these changes: the new files/folders will not be visible, and if a file/folder is deleted then when accessing them a barrage of messages warning of impossibility of access will appear.

- Within **FastRawViewer,** actions that modified the current list of files are banned, specifically:
    - Moving files
    - (including) moving files to the _Selected/_Rejected subfolders
    - Copying files to the displayed subfolder tree
    - Clearing the _Rejected subfolder
    - Editing the folder tree.

- The files are displayed in a flat list; the current file's folder is shown only in the Folders panel.

These constraints are related to the fact that:

a. Monitoring a large number of (sub)folders for changes *(adding/deleting files)* is a very resource-intensive operation, especially on slow carriers *and (even moreso)* over a network.

b. Rebuilding the current *(large)* list of files can also lead to a substantial slowdown of the application.

c. Moving files in the tree being examined looks very strange in the interface: either nothing changes *(if files are sorted by name or by metadata, such as date of shooting or XMP rating)*, or the files simply change order *(if the sorting is done by the full path of the file)*.

Exiting Subfolder browse mode

Exiting subfolder browse mode into regular *(default)* mode can be done two ways, explicit and implicit:

- Explicit exit *(through the explicitly-indicated desire of the user)* can be done through the *basic* opening of a file or folder
    - **Menu – File – Open**
    - **Menu – File – Open Folder – Open Folder**

- Implicit exit: all additional methods of opening a file or folder:
    - ***Opening a file*** through:
        - **Menu – File – Recent files – selecting a file**
        - Drag and Drop a file into the program window

- Opening a file through the command line, the context menu in the file manager, etc. *(Windows: only if the Single Instance mode is on, Mac: always)*

  o ***Opening a folder*** through:

  - **Menu – File – Open Folder – recent folders – selecting a folder**

  - Drag and Drop a folder into the program window

  - Selecting a folder in the Folders panel or Favorite folders

When *implicitly exiting* subfolder browse mode, **FastRawViewer** will display a warning *(see below)*
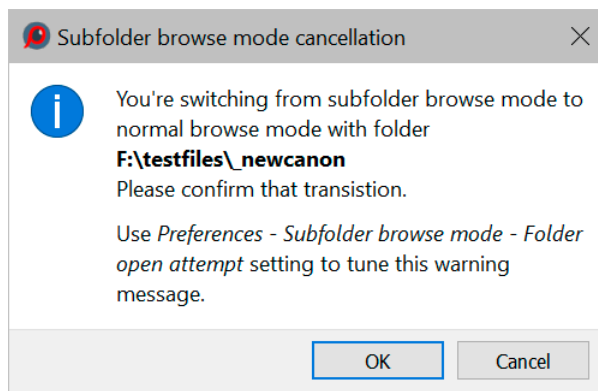
This can be turned off through **Preferences – Special browse modes – Subfolder browse – File (folder) open attemp**t:

- **Ignore** – stay in subfolder browse mode *(with this setting, one can only **explicitly** switch to regular browse mode, see above)*.

- **Ask** – request confirmation.

- **Open w/o confirmation** – switches to regular browse mode without asking.

Viewing a set list of files (virtual folder mode)

FastRawViewer supports working with a list of files *(in text format, one full filename per line)*, the work mode is fully analogous to working with nested folders *(the same constraints for accessible actions: only copying, and only to those folders where none of the files being viewed are located)*.

To open a list of files, use:

- **Menu – File – Open Folder – Open filelist** *(Alt-Shift-O)*

- Drag and Drop a list of files into the program window; the list file should have the extension indicated in **Preferences – Special browse modes – Subfolder browse – Treat files with these extensions as file lists**.

In this mode, the same features and constraints as for subfolder browse mode are active.

To create a file list, one can save a list of selected files through **Menu – Select – Save selection to file**.

Hotfolder mode: monitoring the current folder

The Hotfolder mode is intended for use together with programs for the remote control of cameras *(Tethered shooting)*, when:

- Another program is controlling the shooting and downloads the just-taken shots from the camera onto the computer's local drive into a folder

- **FastRawViewer**

  o Monitors this folder and finds new files in it

  o Upon finding them, moves to the last-found new file.

  To switch to this mode, one must:

  o Point **FastRawViewer** to the folder where the files will appear

  o Select the mode via **Menu – File – Open Folder – Hotfolder mode** *(Alt-Shift-H)*

When <u>first switching</u> to this mode, the following warning with a description of the mode will be displayed:
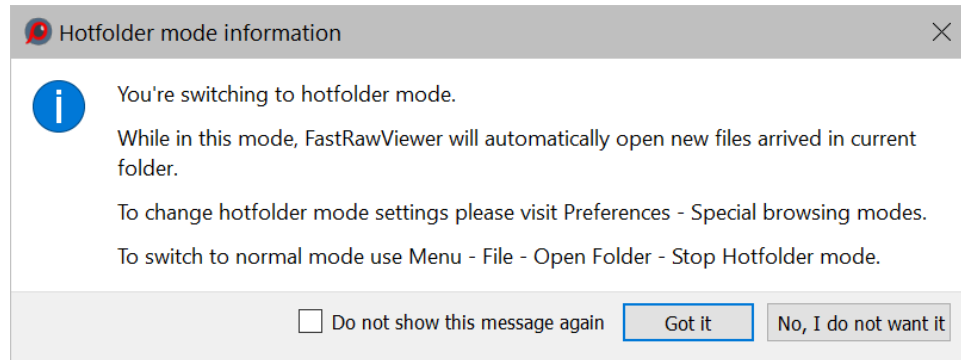
This can be turned off via the checkbox *Do not show this message again*.

After turning on this mode, **FastRawViewer** will regularly re-scan the current folder and when new files appear in it, will open them.

In RAW+JPEG mode, one can set whether there ought to be expected a pair of files, or any file *(default)*, or a RAW file. The other settings of this mode are described in the section «***Program settings – Special browsing modes***»

<u>Exiting</u> Hotfolder **mode** can be done through one of the following methods:

- **Menu – File – Open Folder – Stop hotfolder mode**

- <u>Explicitly opening a folder or file</u> *(Menu – File – Open, Menu – File – Open Folder – Open Folder)*

- <u>Implicitly opening a file or folder</u> *(reaction to an implicit opening can be set in the corresponding settings section)*.

Slideshow Mode

FastRawViewer has a basic "slideshow" mode, which is to say automatically moving from one file to the next.

To turn on this mode, use **Menu – File – Open Folder – Slideshow** *(Alt-Shift-S)*, when doing this the following dialog, for setting the slideshow settings, will be shown:
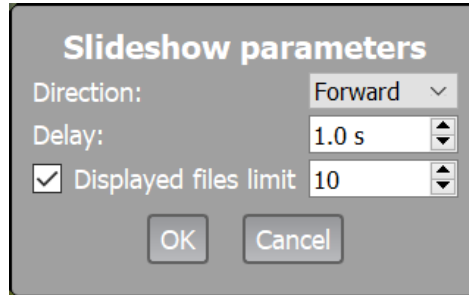
This dialog sets:

- The direction of file flipping *(forwards, backwards)*
- Time delay while changing files
- The maximal number of displayed files.

Essentially, slideshow mode is just pressing **Next File** *(or **Prev File**)* with set intervals.

Slideshow mode ends:

- Explicitly, through **Menu – File – Open Folder – Slideshow**
  *(or by pressing the hotkey **Alt-Shift-S** a second time)*
- Implicitly, if the current file does not correspond to the expected file
  (that is to say, some sort of navigation through folders and/or files was used).

Slideshow mode is compatible with subfolder browsing.

Single File View Mode and the Filmstrip Panel

When activating one of the files in the **Grid View** mode *(double-click,* press **Enter** *on the file, Menu –*
View – Switch to single image) the program switches to **Single File View** mode.

With default settings, the **Filmstrip** panel appears under the main window. The **Filmstrip** panel
contains the thumbnail previews of the files in the current folder:

When choosing a file from this panel *(using the mouse, arrow keys on the keyboard, Menu – File –*
Next/Prev File and Last/First file) the selected file is displayed in the main window, and the controls
of exposure, white balance, and contrast will act over this active RAW file *(see below the "Working*
with a single image" section).

You can use the same file operations in the filmstrip as those described previously for the Grid View
mode:

- Copy, move, move to _Rejected;
- Editing metadata *(ratings, labels, title and description)*;
- Orientation;
- Passing the file to external programs;
- Selecting a group of files and group file operations *(copying, moving, labels, ratings, passing*
  to external programs) is also possible.

Additional Methods of Navigating Folder Files

Aside from visual navigation through folders and files, **FastRawViewer** also supports additional methods of opening files or folders.

Opening a File/Folder Using the Menu

To open a file, you can use one of the following:

- **Menu – File – Open** *(or **Ctrl-O**).*
- Through the list of recently opened files (**Menu – File – Recent Files**).
- Drag-n-Drop the file onto the program icon.
- Drag-n-Drop the file onto the program window.

A folder *(catalog)* can be opened in similar ways:

- **Menu – File – Open Folder – Open Folder** (**Ctrl-Shift-O**).
- **Menu – File – Open Folder – Recent Folders** – a list of recently visited folders.
- Drag-n-Drop folders onto the icon of the program.
- Drag-n-Drop folders onto the program window.

When opening a folder:

- With default settings, the first *(in current sort order)* RAW or JPEG/PNG/TIFF/HEIC file in the folder is displayed.

Drag and Drop

Files and Folders can be "dropped" onto the window of the program, as well as on the icon on the desktop or the macOS Dock. If so:

1. If you dropped several files, then the first one opens *(the order follows the order of the file selection in the file manager)*. All others will be ignored.

2. If you dropped several folders, then the first one opens. The others will be ignored.

3. If you dropped a mix of files and folders, then the first folder will be opened, while the separate files will be ignored.

macOS: it is recommended that files/folders *(if there are a lot of them)* be dropped on the opened window, rather than the icon; this way it works a lot faster.

Program Start Modes

During the launch of **FastRawViewer**, one can additionally pass a filename or a folder to the program through one of the following methods:

- A file can be opened through the **Open With** menu, accessible through the right-click in the Windows Explorer/macOS Finder.

- **FastRawViewer** can be installed as a "default" program *(through Set Default Program in Windows or Get Info – Open With – Change All for macOS)* – in this case **FastRawViewer** will start when double-clicking on any file of the associated type.

- Drag-Drop of a file or a folder onto the **FastRawViewer** program icon.

- Start using the command line.

The same as with Dragging and Dropping into the program window *(see above),* the first file/folder will be opened.

Launching Several Instances of FastRawViewer

macOS: a single instance of the program is started. Second click on the icon in Applications, or drag-n-drop of the file or folder on the application icon activates the already started instance of the application.

You can start a second instance of **FastRawViewer** through the Terminal Utility with the command `/Applications/FastRawViewer.app/Contents/MacOS/FastRawViewer`

Windows: Several instances of the program can be started by (double-)clicking the icon or performing a drag-n-drop operation. With the start of each instance, a new window *(displaying a new file, if started with a drag-n-drop operation)* will be opened.

If you prefer to use "single instance" mode in Windows, you may do so by switching on **Preferences – Other – Run single program instance** setting. While this setting is on: clicking on a file, which is associated with **FastRawViewer**, will result in displaying the file in the existing program window.

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Starting without a Filename

If **FastRawViewer** is started without a filename to view *(like with double-clicking on the program icon)* and the settings under **Preferences – File Handling – Start without filename are at defaults** no RAW file will be initially opened. To change this default behavior, please go to **Preferences – File Handling – Start without filename**:

- **Empty Screen** – **FastRawViewer** starts up "without file".

- **Last opened file** – opens the top *(last)* file from the Recent Files list.

- **Last visited folder** – opens the folder from the list of Recent Folders*.*

- **Specified folder** – allows you to set a "start folder".

In the case of **FastRawViewer** being started up over a particular file *(through any method; drag-n-drop on the icon, clicking on the file, associated with FastRawViewer),* this setting is, of course, ignored.

This setting is also ignored in the **Single instance** mode, if the second **FastRawViewer** copy is started up without selecting the name of a file/folder, then nothing happens.

Under default settings, **FastRawViewer** doesn't "recall" files/folders from portable and network media. This behavior can be changed by un-checking **Preferences – File Handling – Do not recall removable media on startup**.

Working with Touchscreen

FastRawViewer for Windows 7 – 10 supports the Touchscreen interface. This support is disabled by default; one can enable it via **Preferences – Interface – Touchscreen – Enable Touchscreen features**.

This support includes the following:

1. Toolbars for the main action: file navigation, interface mode switching, zoom, setting XMP ratings and labels, RAW data inspection, setting exposure compensation, contrast, and white balance.

2. Support for basic gestures on the touchscreen.
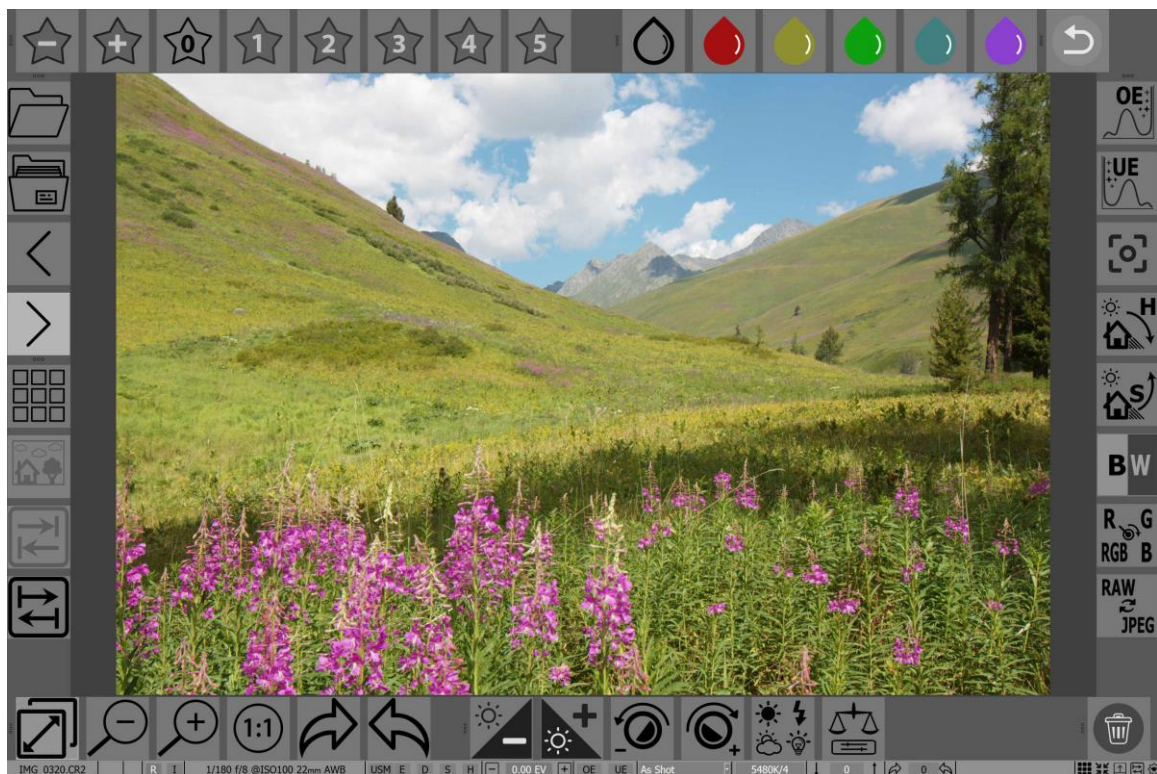
When this interface is switched on, the following settings become accessible:

- **Enable toolbars, Toolbars size** – switches Toolbars on, and allows one to adjust the size of the Toolbars. Toolbars can be switched on for desktops as well, however in this case you may want to change the size down from the default Large. Each Toolbar can be switched on and off via **Menu – Panels – Toolbars**.

- **Highlight toolbar items under mouse** – turns on backlighting for the "button under the mouse" *(mouse hover):* under the default settings *(turned on)*, the button in the toolbar where the mouse is located changes its background color. When navigating with one's fingertip, this setting may be a bit inconvenient, as moving one's fingertip outside the screen is not tracked – the last "mouse position" will just be the last button that was pressed. If this is irritating to the user, then this setting ought to be turned off.

- **Image Display - Dim image while switching to next** – turns down the brightness of the current image while the program is preparing the display of the new image (decoding it and loading it into the video card). This gives visual feedback if working on a slower tablet to indicate that switching between images is in progress.

  Options

  - o **Do not dim** – works as previous; no brightness decreases while switching between images

  - o **While switching to next file** – decreases the brightness by 40% while in the process of switching to another image. This is the default.

  - o **Next file or RAW/JPEG switch** – the same as previous, plus a 25% decrease in brightness when switching between RAW and JPEG.

- The **White Balance dialog size** setting allows one to increase the size of the dialog that manually sets the white balance in Touch screen mode, so as to make it easier to shift with one's fingers.

Other checkboxes control touch features:

- **Single finger filmstrip scroll/grid scroll** – the scroll is performed with a single figure gesture.

- **Double tap to switch grid/single mode** – switches between Grid Mode and displaying a Single File with a double-tap.

- Gesture support in **Single File View**:

  - o **Single finger pan to switch** – allows one to switch images with one finger gesture from left to right. If the zoom is larger than Fit to Screen, instead of switching images the current image is scrolled.

  - o **Pinch to zoom/unzoom** – change the zoom level of the image with a pinch.

  - o **Double tap to unzoom** *(if zoomed):* if the image zoom level is larger than Fit to Screen, a double-tap will bring it to Fit to Screen.

    If **Double tab to switch grid/single mode** is turned on, another double tap will return to Grid Mode.

If there is a need to frequently switch to Touchscreen mode and back *(for example, when disconnecting-connecting a keyboard)*, a button for just this function can be activated in the bottom bar.

- To do so, in the settings for the program's bottom bar (**Menu – File – Customize – Customize bottom bar**) one needs to turn on Toggle touchscreen functions element:
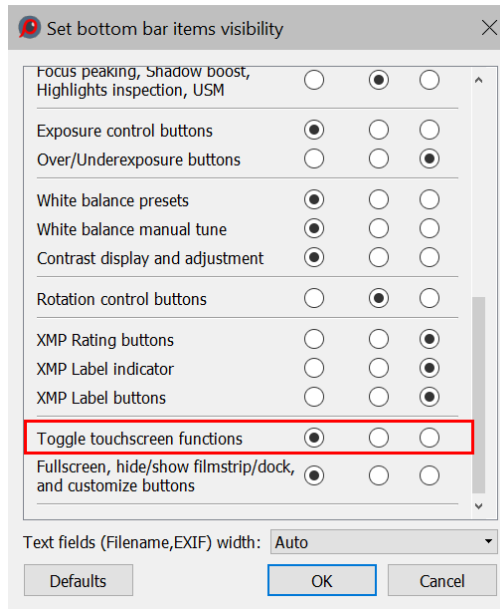
- After it has been turned on, an icon/button for changing touchscreen mode will appear in the bottom bar:
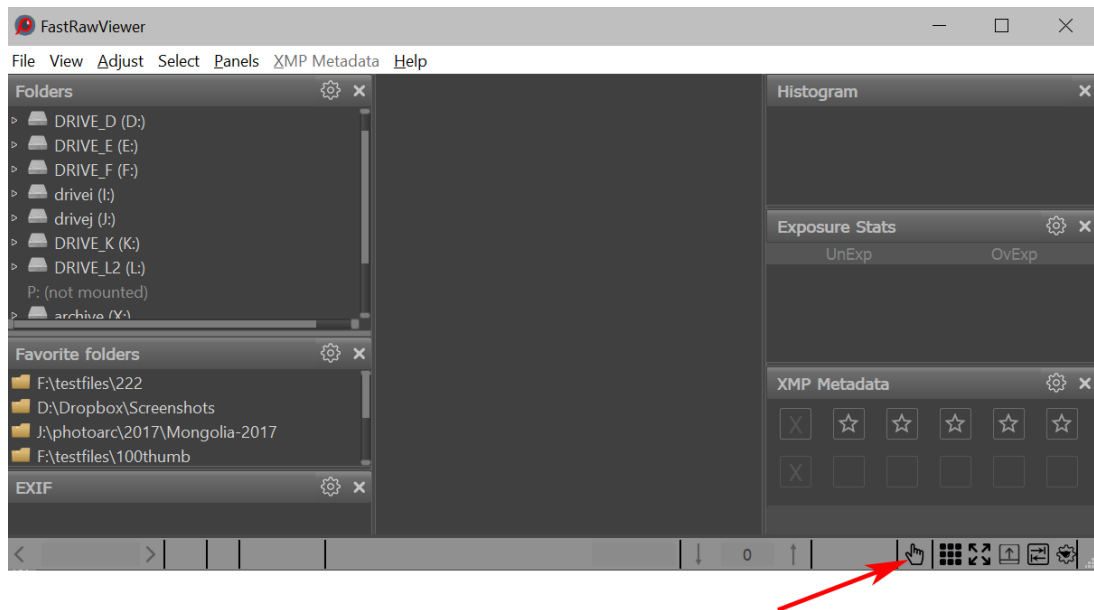
This button works identically to the way that one changes the touch screen mode through the settings.

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Working with a Single Image

In single image display mode, **FastRawViewer** displays the image in the main window, while the auxiliary data *(EXIF, histogram, exposure statistics, XMP data)* are displayed in additional panels:
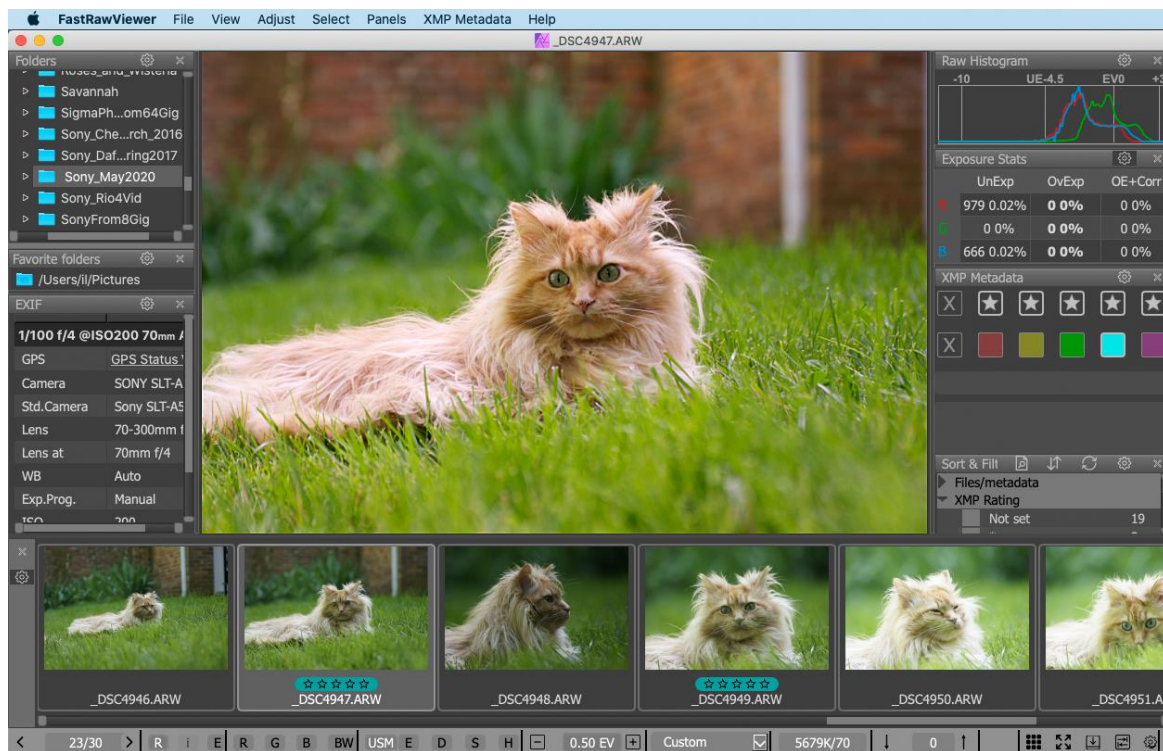
Right-click context menu

Right-click within main window area will show context menu similar to that in the grid mode/Filmstrip panel:
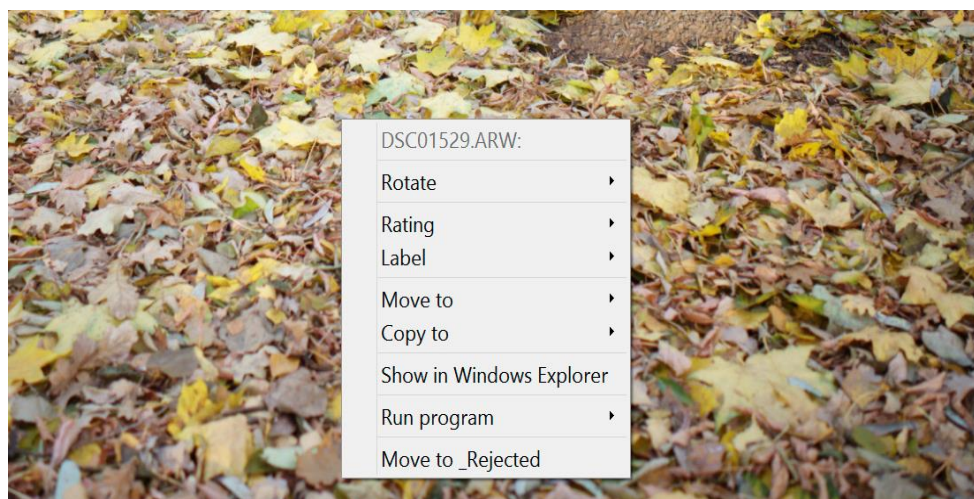
This menu is always for current *(single)* file even if current file is within *selected* group.

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Embedded and External JPEG

For every file, there can be up to three "representations":

- RAW file.

- Embedded JPEG preview *(Internal JPEG).*

- External JPEG file with the same name *(if the setting **Preferences – File Handling – File formats – Handle RAW+JPEG together is on**).*

The existence of representation is displayed in the status *(lower)* bar of the program, between the file dimensions in pixels and the EXIF data:

- **R I** – denotes the existence of RAW and Internal JPEG.

- **R I E** – RAW, Internal JPEG, External JPEG (or External HEIC for RAW+HEIC mode).

- **J** – only JPEG *(or PNG, or TIFF)*, without a RAW file.
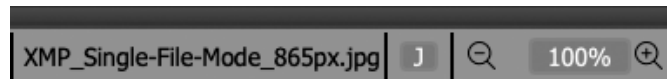
A capital letter indicates that the representation is available for viewing. Lowercase means that it exists, but is unavailable for viewing for one of the following reasons:

- **i** – the internal JPEG is not shown. This is a default setting for when there is an internal JPEG file and the RAW+JPEG mode is on *(can be changed in settings: **Preferences – File Handling – File formats – Do not show internal JPEG if external JPEG is present**).*

- **r** – RAW representation is not shown. This happens for unsupported RAW formats *(Sigma Foveon)* or for too large RAW files *(limits can be changed in **Preferences – Performance – RAW file size limit**).*

- File representation is damaged *(errors while decoding of file data).*

To switch between representations, use **Menu – View – Switch RAW/intJPEG/extJPEG** or press the **J** key on the keyboard. The representation that is currently displayed is denoted with letter indicator going white.

Tuning the behavior of the program in regards to the display of embedded/external JPEG files is done through **Preferences – File Handling – File formats**:

- **Handle RAW+JPEG together** – turns on the pairing of the RAW file and JPEG of the same name. If you turn off this setting, the pairing won't happen – the files will be shown separately and treated as separate.

- **Do not show internal JPEG if external JPEG is present** – disables decoding and displaying of an embedded JPEG when there is an external one.

- **Non-RAW files Decode priorities –** if set to "None" for a certain type of JPEG *(Embedded – those that are contained in RAW files, External – those paired with RAW files, commonly a result of setting a camera to shoot RAW+JPEG)*, decoding and display of JPEGs of such types are disabled. Other options **(On prefetch, On demand, On file open)** – set the event that triggers the decoding of JPEG files. Those options are explained below, in **Performance Settings** chapter – **JPEG/TIFF/PNG/HEIC Handling** section.

- **Default image to Display** *(same as Previous/RAW/internal JPEG/external JPEG)* – controls what representation will be used for display when opening the next file.

Zooming and Panning

To change the zoom level of the displayed image, you can use the following commands available through **Menu - View** and also through the keyboard shortcuts:

- **Menu – View – Zoom In** or **Ctrl-+** – magnifies the image on the display.

- **Menu – View – Zoom Out** or **Ctrl—** (**Ctrl-Minus**) – zooms out.

- **Menu – View – Fit to Window** or **Ctrl-0** – changes the zoom factor in such a manner that the image fits into the current size of the window *(and when changing the size of the window, the magnification factor will follow)*.

- **Menu – View – Fit to Window width** or **Ctrl-Alt-0** – the image will take up the width of the window.

- **Menu – View – Actual Pixels (100%)** or **Ctrl-1** – set the image scale to "100%" *(each image pixel is displayed as one monitor pixel)*.

- **Menu – View – Toggle Zoom** or **Z** – toggles zoom level between the setting in Preferences and the current zoom level. In more detail,

  o If the current Zoom level is less than the value of the "**Toggle Zoom" Zoom to** setting *(this value is 100% by default)*, then the current zoom/magnification value will be stored and the image will be magnified/zoomed up to this value *(again, to 100% for the defaults)*.

  o If the current magnification/zoom value is greater or equal than the value of the "**Toggle Zoom" Zoom to** setting, then

  - If there is a stored zoom value from a previous use of **Toggle Zoom,** the zoom level returns to that stored value.

  - If there is no stored value yet, it switches to the **Fit to Screen** mode.

If the image does not completely fit into the window:

- **Pressing and holding the left mouse button** turns on the Drag mode: the image moves with the mouse cursor.

- **Pressing and holding the right mouse button** turns on the fast panning mode: the program window becomes 'Navigation Pane', moving the mouse, for instance, to the top-right corner of the window will show you the top-right region of the image.

Furthermore, the fast combined "***Zoom + Panning***" modes are available as well:

- **Left mouse button + Shift –** turns on temporary zoom and Drag mode.

- **Right mouse button + Shift –** turns on temporary zoom and panning mode.

The zoom factor for these modes is set in the **Preferences – Interface – Zoom** section:

- **"Zoom and Drag" Zoom to**

- **"Zoom and Pan" Zoom to**

- **"Toggle Zoom" Zoom to**

- If you want to limit the range of the zoom available through the keyboard, please use the following setting: **Interface – Zoom – Zoom In/Zoom Out range**.

Changing Image Orientation

When you open the image, its orientation is calculated from the XMP file (if it exists), or from the EXIF data and the image is rotated accordingly.

- **Menu – Adjust – Rotate 90^0 CCW** *(or Ctrl-7)* – turns the image 90 degrees counter-clockwise.

- **Menu – Adjust – Rotate 90^0 CW** (or **Ctrl-9**) – turns the image 90 degrees clockwise.

- **Menu – Adjust – Rotate 180^0** (or **Ctrl-8**) – turns the image 180 degrees.

- **Menu – Adjust – Flip Horizontally –** flips image horizontally *(changes left and right sides).*

- **Menu – Adjust – Flip Vertically –** vertical flip, change top with bottom.

The orientation changes are recorded in an XMP file.

De-Bayering (demosaicking): CPU and GPU modes

Most of the current color digital cameras have "Bayer" sensors, that is, each pixel having peak sensitivity to one color component, red, green, or blue. These pixels are arranged in 2x2 square groups, each group having one "red", 2 "green", and one "blue" pixel.

De-Bayering *(demosaicking)* is a common name for interpolation schemes used to calculate 2 missing color values for each pixel *(for example, for a "red" pixel green and blue values are calculated) to form a full-color image. Such interpolation is always a trade-off between the image quality (sharp, artifact-free image)* and speed: faster demosaicking methods are not as good in terms of image quality as slower ones.

Because **FastRawViewer** is aiming at fast browsing through the RAW files, we use fast demosaicking methods, and the resulting image quality is not as good as the ones commonly found in commercial, free of time constraints, and also applying default sharpening behind the scenes, RAW converters:

- Maximum speed demosaicking on a CPU

- Fast enough but visibly higher quality demosaicking on a GPU

On the figure below, we compare two demosaicking methods implemented in **FastRawViewer** at about 100%, GPU to the left, CPU to the right:
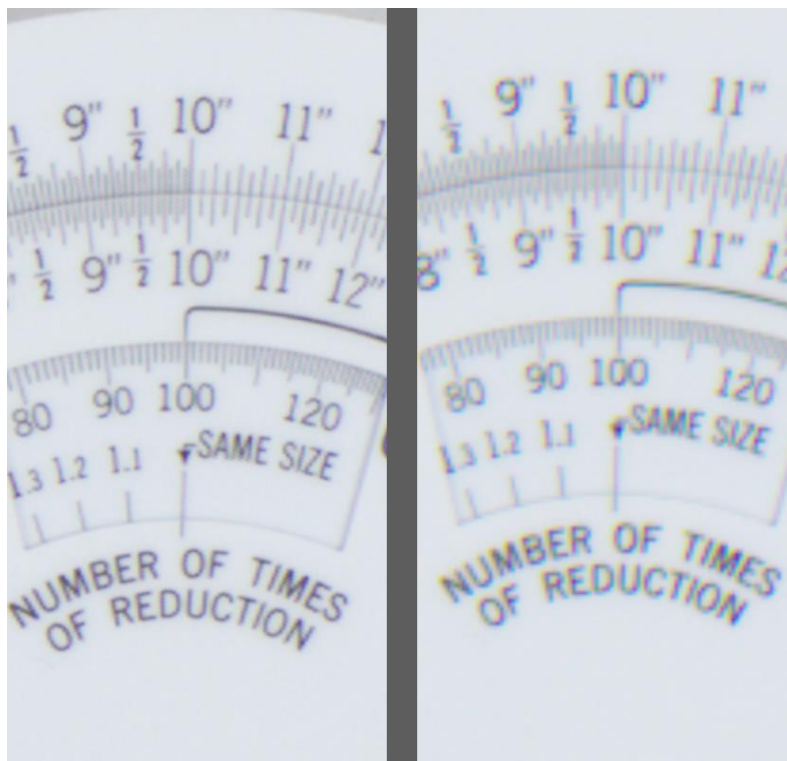
Demosaicking on GPU works sufficiently fast if:

- The GPU itself is a fast one *(7 years old "top speed", current mid-range)*. Demosaicking on slower GPUs will work slower than CPU-based demosaicking, but still with acceptable speed, even if it is an integrated GPU like Intel HD 4000.

- The video mode *(Graphics Engine)* is set to OpenGL or DirectX 11.

Demosaicking on GPU is switched on automatically on the first launch of **FastRawViewer** if all of the below is true:

- Fast GPU *(Intel Iris, Nvidia GTX, AMD/ATI R7/R9/RX/Vega)*

- CPU supports the command to convert data to 16-bit floating *(Intel Ivy Bridge and newer)*

- Video mode is set to OpenGL or DirectX 11 *(those will be set automatically on the first launch if the fast GPU is detected)*

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In all other cases opening a RAW file for the first time with GPU-based demosaicking selected can be slower than with CPU-based demosaicking, but if you still want a higher quality demosaicking, switch to GPU-based one manually.

Changes in RAW rendering parameters *(white balance, lightness/exposure adjustments, contrast – see below)* are always nearly instant in GPU mode; if you are a heavy user of such adjustments, it may make sense to switch to GPU even if the video card is very slow.

Sharpening for Display

While being processed in a RAW converter, RAW images generally have had some sort of sharpening algorithm applied to them *(this is true for both out-of-camera JPEGS and offline RAW conversion).*

In **FastRawViewer**, the sharpening is applied only for display. You can switch between two levels of sharpening and also set sharpening to "off." The settings are available through **Menu – View – Screen** sharpening *(the default shortcut is S)* and also through the **USM** button located on the bottom bar of **FastRawViewer**.

The following image has sharpening applied to the right side, while the left side doesn't:
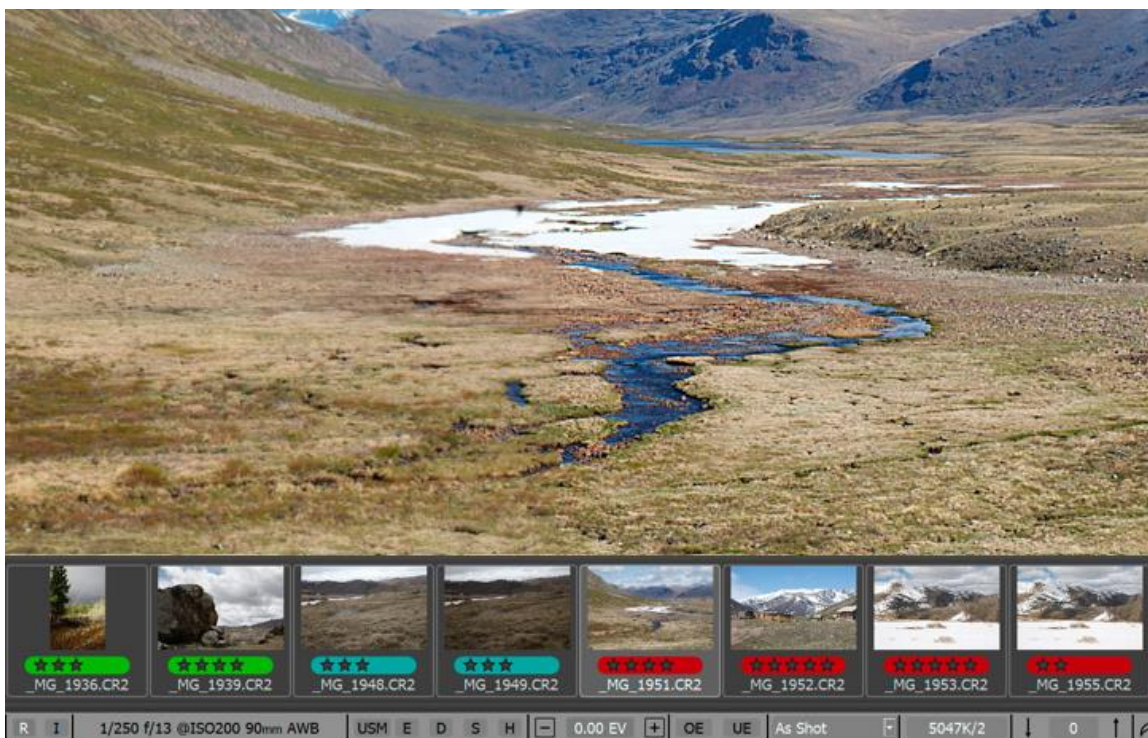
To fine-tune the amount and mode of sharpening, you can use **Preferences – Image Display – Sharpening.** We will cover this in more detail in the "*Program Settings*" section below.

This is also the place where you can switch off the sharpening for JPEG representation, turning on the **Sharpen RAW files only** setting**.**

Viewing File Channels, Viewing in Black and White Mode

FastRawViewer allows per-channel view of the RAW file and also conversion to black and white:

- **Menu – View – R channel** (**Ctrl-3**) Red channel is displayed.
- **Menu – View – G channel** (**Ctrl-4**) Green channel is displayed.
- **Menu – View – B channel** (**Ctrl-5**) Blue channel is displayed.

These modes work with internal RGB image *(after demosaicking, exposure adjustment, white balance setting)*.

In these modes, the RAW and RGB histograms are shown only for the displayed channel. If the RAW file is not RGB, then the histogram will be for the 1st, 2nd, and 3rd channels respectively.

- **Menu – View – RGB full color** *(Ctrl-2)* – back to RGB display mode.
- **Menu – View – BW-conversion full color** (**Ctrl-6**) – will show the black and white variant" of the image *(conversion from RGB is performed using the lightness channel formula, same as the one used while coding JPEG)*.

Boosting the Shadows

The **Boost Shadows** mode is intended to assess the quality of the shadows in the RAW: it **opens up the shadows** at the expense of compounding the highlights:
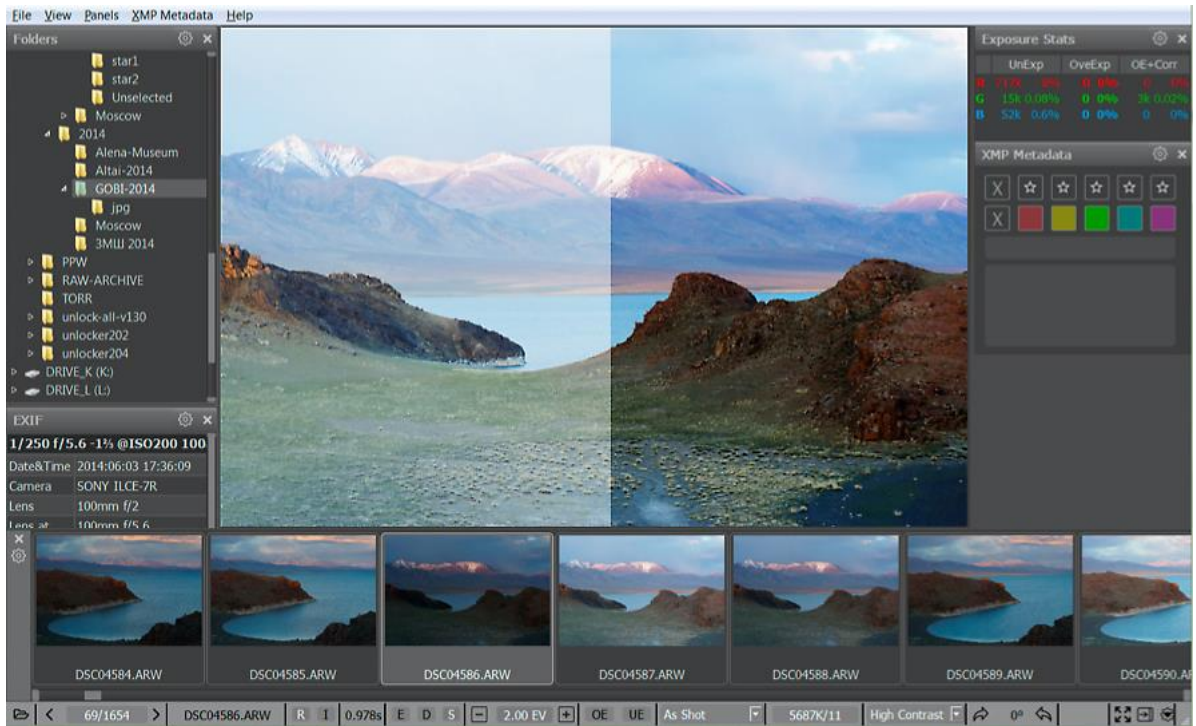
For the image above: on the left part, the shadow boost mode is on, on the right, it is off. When the mode is on the indicating **S** in the **SHL** group on the bottom bar turns bright white.

You can turn the boost on/off through **Menu - View – Boost Shadows** *(or by pressing **Shift-S** on the keyboard)*.

Setting the amount of boost: **Preferences – Image Display – Boost Shadows Amount** controls the additional gamma adjustment; the range is 0.2 to 2.0.

Inspection of Highlights

Highlight Inspection mode *(Menu – View – Highlights inspection or Shift-H)* does the "opposite" of the **Shadow Boost** mode:

- The brightness of the shadows and midtones is decreased, and as a result the image looks darker.

- The contrast in the highlights is increased.

- Additionally, you can "cancel" the white balance, by setting it to "**UniWB**" in **the Highlights inspection** settings.

As a result, you can evaluate the details in the highlights *(left – Highlight inspection mode on, right – default view mode; as we can see, the highlights contain plenty of details)*:
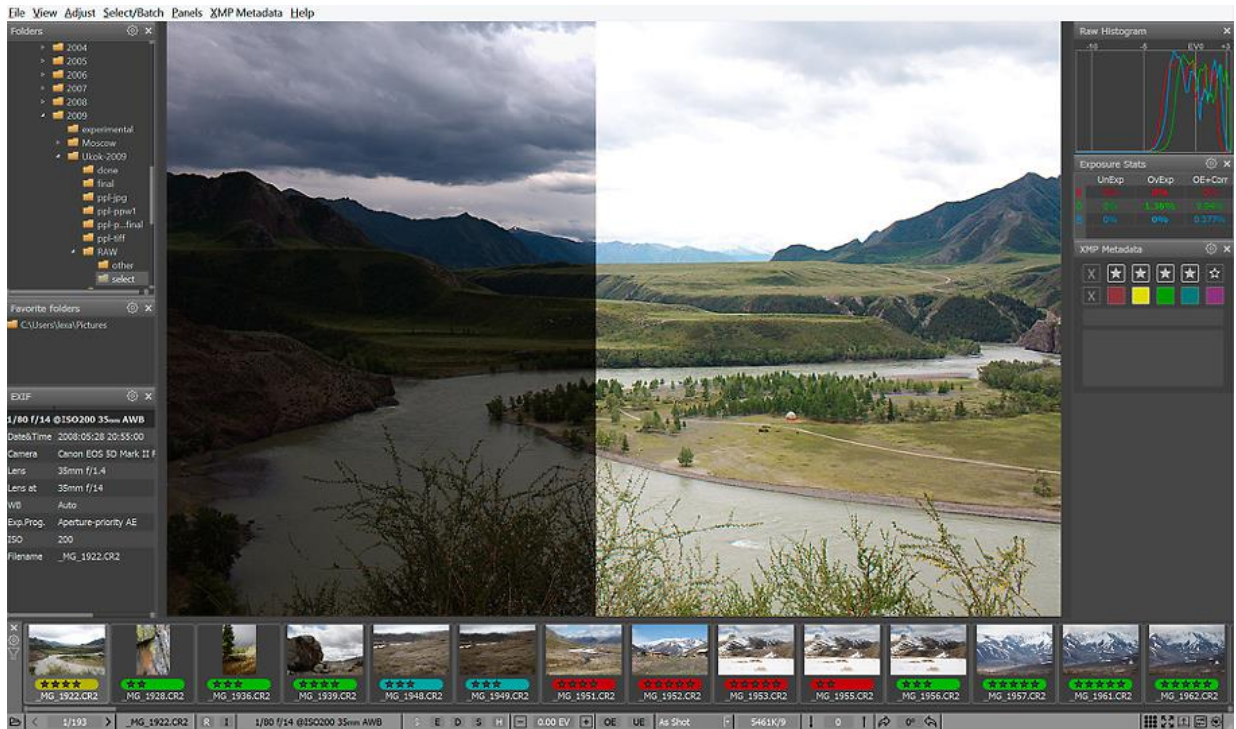
This mode is indicated by a white H letter in the SHL line at the bottom of the screen

Linear display mode

With the default settings, **FastRawViewer** displays RAW files with the following eye-candies applied:

- An S-shaped tone curve is applied to the image, increasing the contrast in the midtone (see below the section on "Adjusting the Image Contrast")
- Adobe 'hidden' exposure correction is applied (see below the section of the same name), raising the midtone.

With these (default) settings, the RAW display is correlated to the embedded JPEG in both contrast and overall brightness.

Both of these transformations can be turned off through the Preferences; or you can use Menu – View – Linear mode display (Shift-L). In both cases this will result in a "flat, non-contrasty" image.

With the default settings, linear display mode turns on only the linear curve "Gamma 2.2"; the **Preferences – Image Display – Ignore exposure correction/baseline exposure in linear mode** setting further turns off all exposure corrections (both explicitly applied and hidden).

As mentioned earlier, the result will be a "flat, non-contrasty" image, which corresponds to what the camera captured much more accurately:
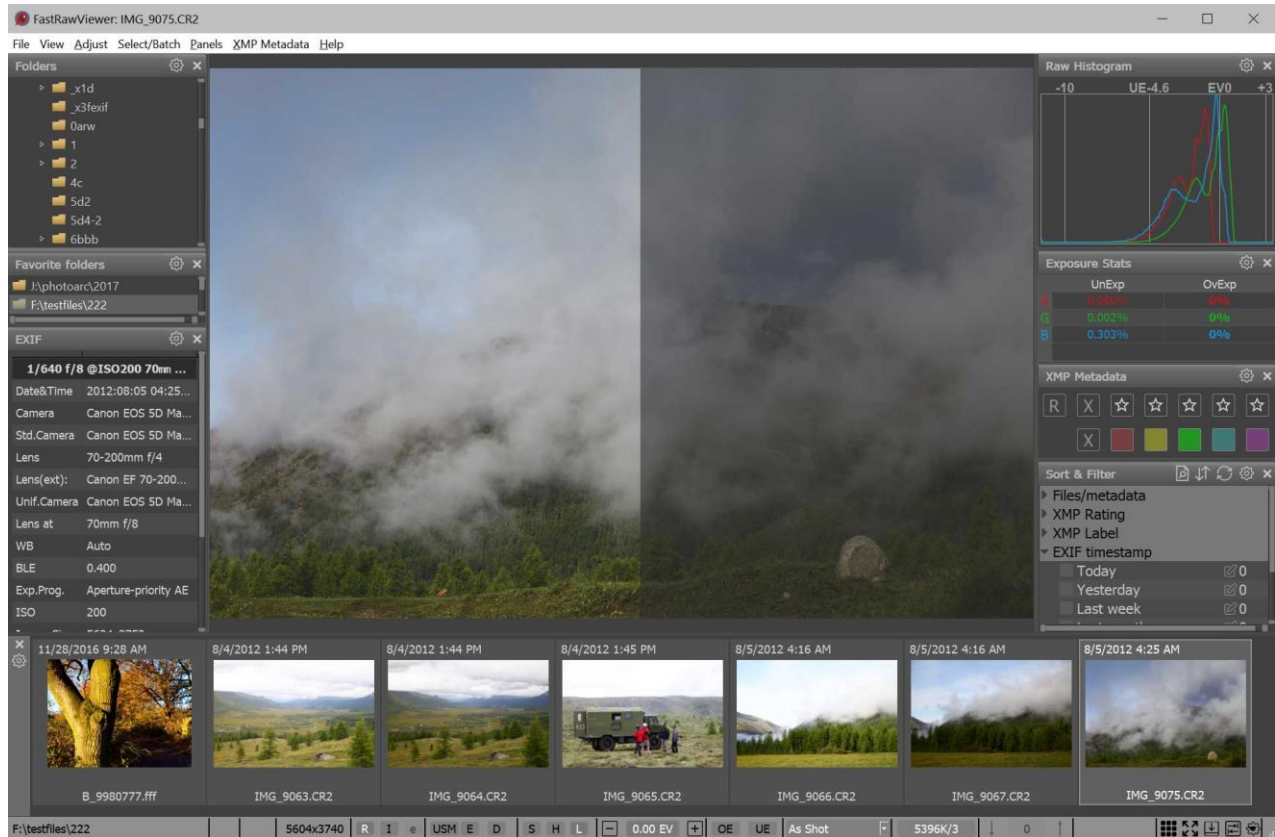
(in the illustration, the linear mode is in the right part of the screen, and the regular mode is on the left).

This mode is indicated by the white L button in the S-H-L line (Shadow boost, Highlight Inspection, Linear mode) in the program's bottom bar.

Adjusting the Image Contrast

FastRawViewer allows one to apply "standard" tone curves *(sRGB, Gamma 1.8 u 2.2, L*),* but also offers the Variable Contrast mode for tone curves. To switch between those two types, you can use **Preferences – Image Display – Contrast Curve Type**.

In Variable Contrast mode, the image contrast can be adjusted in "grades":

- -5 to +5 for "normal contrast".
- U+0 to U+5 for "ultra contrast" *(useful, for example, for underwater photography)*.

Normal contrast curves correspond to the contrast setting in Adobe RAW converters, process version 2012, from -100 to +100 *(with a step of 20)*; that is, +2 corresponds to 40 on the Adobe scale, while -3 corresponds to -60.

Ultra contrast corresponds approximately[2] to Adobe Contrast +100 with the Blacks slider from 0 to -100.

To increase contrast, you can use **Menu – Adjust – Increase Contrast** *(or press K on the keyboard)*, to decrease contrast **Menu – Adjust – Decrease Contrast** *(or Shift-K).*

By default, the contrast settings are recorded to an XMP file only in **FastRawViewer** format. To record it in the format that is acknowledged by Adobe converters, turn on **Preferences – XMP – Exposure, Contrast, WB – Write Adobe-compatible Contrast/Blacks into XMP file**.

Using Monitor Profile for Display

FastRawViewer supports **Color Management** when showing RAW and JPEG files, however this mode is turned off in the **Windows** version by default for the following reasons:

- The majority of modern monitors are sRGB *(or close to it)* and using sRGB as a workspace when displaying RAW gives very acceptable results.

- Furthermore, in many cases supplied monitor profiles are inadequate, and they have a negative impact on the image appearance.

- Moreover, a noticeable number of users have optimized their video settings for computer games, manually turning on the anisotropic filtering of textures. This mode is incompatible with the Color Management function of **FastRawViewer.**

Color Management can be turned on through **Preferences – Color Management – Enable Color management**. Further color management settings are described in the "*Settings – Color Management*" section below. If the system profile of the monitor is set up properly, then further tuning of settings will, most likely, not be needed.

Support for Cameras Modified to Black and White

FastRawViewer supports black and white cameras that are made from color cameras by removing the color filter array *(CFA)* from the sensor.

This mode is turned on through Preferences – Image Display – Use Monochrome mode for Bayer images, available choices are:

- **None** – Off

- **Always** – All Bayer RAW files will be processed as monochrome

- **Detect** – monochrome images are detected automatically, and if such an image is detected it will be processed as a monochrome *(this mode is slower, because first such an image will be processed as a color image).*

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[2] Adobe programs clip the shadows below the setting for "blacks," in FastRawViewer we use a curve with a very gentle slope.

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In this mode:

- Demosaicking *(de-Bayering)* is skipped.

- Per-channel viewing is turned off.

- White balance preferences are turned off.

- RAW histogram and exposure statistics are for one channel.

The image is black and white:

This mode is not applicable to JPEG images; they stay colored.

Working with Exposure

FastRawViewer offers several tools to analyze the exposure on a photograph, recommend exposure adjustments during a shooting session, and select exposure adjustment during RAW conversion:

- RAW-histogram.

- Over/Underexposure statistics.

- Showing the areas of over- and underexposure on the image.

- Automatic setting of positive *(lightening)* exposure adjustment.

- Manual Exposure adjustment setting.

Histogram

The **RAW-data histogram** is created based on the unmodified *(disregarding any exposure adjustments metadata)* RAW data from the file:

Horizontal Scale:

- EV0 – the level that corresponds to the middle gray. If exposure adjustment has not been applied, it's set to 3 photographic stops below the saturation level of a camera.

- -5 – the level that corresponding to the level of the underexposure indication *(see below)*

- +3 *(when exposure adjustment is turned on it can be +2 or +1)* – extreme highlights.

- The leftmost mark of the scale is the level that corresponds to the value of "1" in the RAW data.

The histogram step on the horizontal axis is 0.1EV, so there will **always** be a "comb" in the shadows, as there are less possible levels than 10 levels per stop.

When applying exposure adjustment *(see below)* the histogram itself does not change – instead the horizontal axis shifts. During a positive exposure adjustment, the EV0 level shifts in the direction of the shadows *(because the shadow sections shifts to brighter ones – closer to middle gray)*, correspondingly the other vertical marks move as well *(and if needed, the numbers for the marks change as well)*. During a negative exposure adjustment, the axis shift is in the opposite direction.

With this, the underexposure level indicator stays in place because the quality of the shadows doesn't change with the change of exposure compensation.

Exposure Statistics

For RAW data, the exposure statistics are calculated for each channel. These statistics are displayed in the Exposure stats panel, which by default is located in the right side of the program window.

If no positive exposure compensation was applied *(that includes automatic exposure correction, please see below "Hidden Adobe exposure compensation")*, the table consists of three columns: name of the Raw "color" channel, percentage of underexposed pixels, and percentage of overexposed pixels:

For the shot above, the statistics table shows that:

1. **Underexposure *(UnExp)*** is 2.45% in the Red channel, 0.29% in the Green channel, and 1.78% in the blue channel – those pixels are in the underexposure zone, that is **8EV** (with standard settings) **below** the saturation point for the camera.

2. **Overexposure** *(OvExp)*: no overexposure.

8EV is a standard value for the photographically usable dynamic range. You can change it to match your particular camera through **Preferences – Image Display – Exposure – Underexposure detection limit.**

The underexposure indication limit (meaning the dynamic range of the camera) can be set even more flexibly, depending on the ISO settings. For this, one needs to turn on the **Preferences – Image Display – Exposure - ISO-based underexposure limit** setting and set three parameters for the camera: underexposure level *(dynamic range)* for ISO 200, ISO 1600, and "for high ISO."

Calculating the Underexposure Limit *(dynamic range)* will happen in the following manner

- For ISO values of 1600 and lower, down to ISO 6, the linear change is such that the line passes through the value for ISO 200. In other words, the line passes through two user-defined points: ISO 1600 and ISO 200.

- For ISO settings 1601 and above, the dynamic range decreases by one stop for each stop of ISO setting increase, but the limit is always greater or equal to the value that is entered for high ISO.

If positive exposure compensation was applied to the image the table may contain an additional column **OE+Corr**, indicating the number of pixels, which will be above the maximum value after the exposure compensation is applied.

After the positive exposure compensation was applied as in the shot above, 10% of "green" pixels are above the maximum, most probably because the value of the exposure compensation is a little bit overboard.

For a fast review of a significant number of files, it may be convenient to keep the **OE+Corr** column always on. This way, you won't be distracted by the changes in the size of the panel. This can be done by going into the **Exposure Stats** panel's settings *(gear icon)* and checking **Always display OE+Corr column.**

In the same settings menu, you can also enable the count of the number of over- and underexposed pixels by checking **Show pixel counts**:

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Spotlighting the Areas of Over- and Underexposure

The over/underexposure areas can be identified using a colored overlay.

Spotlighting the overexposure zones can be turned on and off through **Menu–View–Overexposure Display** *(or by pressing the **O** key on the keyboard):*
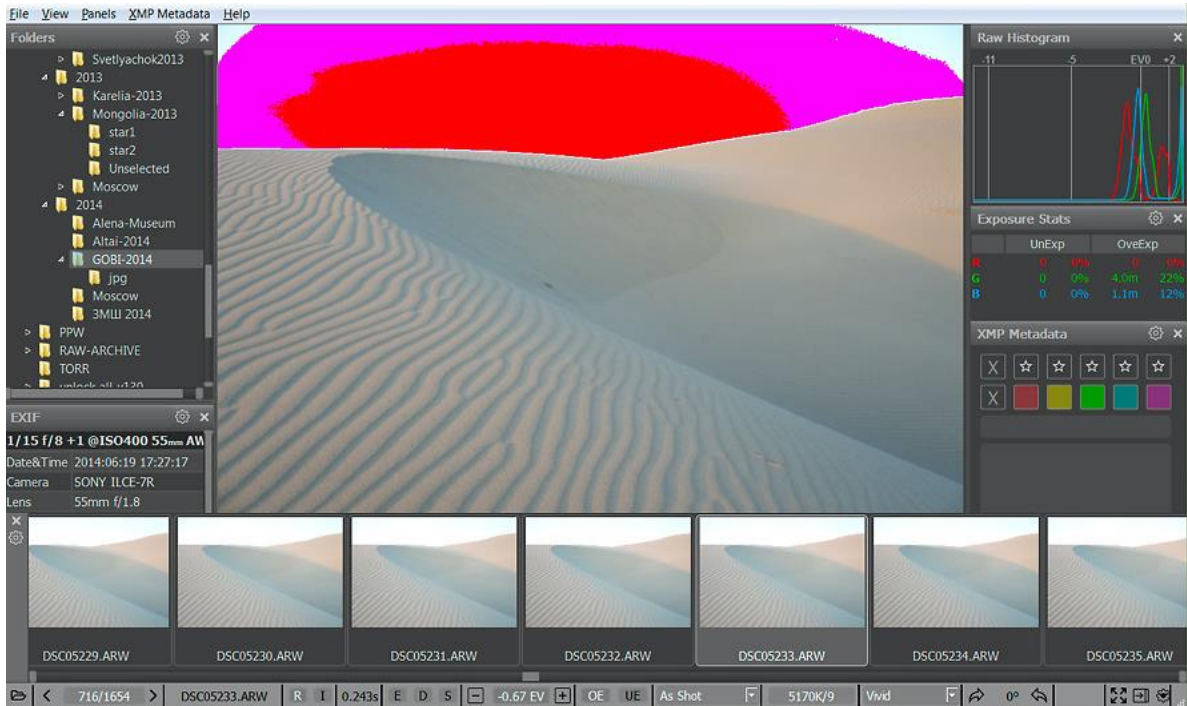
If some pixels of a channel hit the overexposure limit the values for such pixels are clipped. **FastRawViewer** is using the following color scheme to spotlight the areas of overexposure:

- **Magenta** – areas where the green channel is clipped.
- **Cyan** – areas where only the red channel is clipped.
- **Yellow** – areas where only the blue channel is clipped.
- **Blue** – areas where both green and red channels are clipped.
- **Green** – areas where both blue and red channels are clipped.
- **Red** – areas where both blue and green channels are clipped.
- **Black** – areas where all 3 channels are clipped.

For this image, we see the blown-out green channel on almost the entire sky over the sand dune; while on the central portion of the sky the blue and green are both blown out. More likely than not, recovering the sky's tone normally via Highlight recover won't be possible.

With standard settings, the positive exposure adjustment has the effect on the overexposure area display: the areas shown are the ones that would be overexposed, if we had taken the shot with this exposure compensation on the camera. This behavior can be changed by turning off the setting **Preferences – Image Display – Exposure – Exposure adjustments affects OverExposure display**, in

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this case only those areas that are overexposed *(clipped)* in the RAW file itself will be shown as the overexposed areas *(obviously, the exposure adjustment in FastRawViewer has no effect on the content of RAW files).*

Viewing the underexposure zone can be turned on and off through **Menu–View–Underexposure Display** *(or by pressing the U key on the keyboard):*
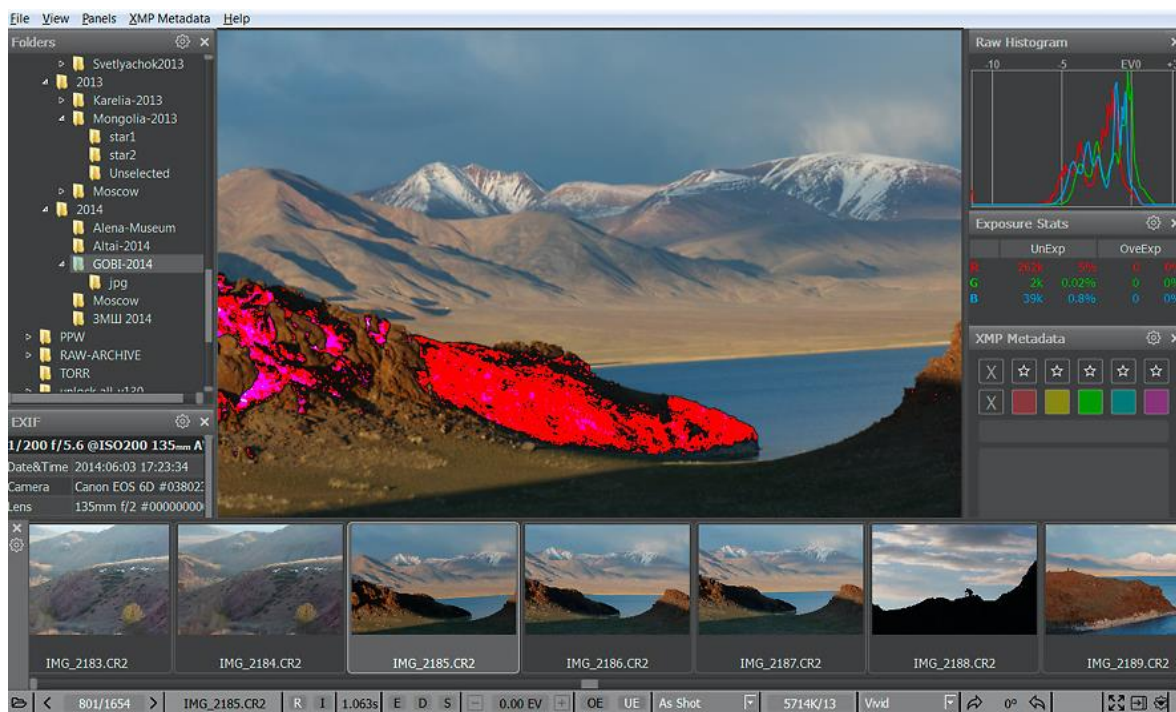
Like in the previous, the underexposed pixels are spotlighted with saturated colors:

- **Blue** – where the blue channel is underexposed.
- **Red** – where the red channel is underexposed.
- **Green** – where the green channel is underexposed.
- **Magenta** – where both red and blue channels are underexposed.
- **Cyan** – where both green and blue channels are underexposed.
- **Yellow** – where both green and red channels are underexposed.
- **White** – where all three channels are underexposed.

Exposure adjustments **do not affect** the display of underexposure areas *(or underexposure statistics).*

For this shot, part of the foreground is underexposed; also, one can see areas with the red channel underexposed *(red),* and, also areas where both red and blue channels are underexposed *(magenta).*

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Unlike for overexposure, which is determined fairly unambiguously in digital cameras *(by the "blowout" of one or more channels, the channel histogram pressed to the right edge and having a characteristic spike)*, the limit of the unacceptable underexposure area cannot be exactly determined, because it depends on:

- Planned print size.
- Planned shadow boost in the current shot.

In **FastRawViewer,** the limit that controls the underexposure warning is set by the user themselves in the preferences (**Preferences – Image Display – Exposure – Underexposure detection limit**). The default value *(8EV)* is fairly conservative, and works pretty well for low ISO settings, 100-800 ISO. In the case of using high ISO, or strict demands to the image quality, this parameter may to be set lower *(to 6-7EV, and sometimes even lower)*, according to the technical requirements for the resulting image.

Exposure correction

Adobe 'hidden' exposure correction

By default, an exposure correction equal to the one that is automatically applied by Adobe converters is also applied when a RAW file is opened in **FastRawViewer** *(for more details, please see https://photographylife.com/adobes-silent-exposure-compensation)*.

As a result, the overall brightness of the rendition on the screen is a close match to a JPEG preview; and, given the contrast curve in **Preferences** is set to 'Variable Contrast' and contrast is set to default, it also matches the rendition in Adobe converters with all the sliders there being set to '0'.

The application of this standard exposure offset can be switched off via **Preferences – Image Display – Exposure – Apply Adobe hidden exposure correction.**

To «roll out» hidden correction in Adobe tools *(Camera Raw, Lightroom)* use **Preferences – XMP – Exposure, Contrast, WB – Force Adobe software to match FastRawViewer brightness (exposure)**. This setting is enabled only if **Apply Adobe hidden exposure correction** setting is turned off.

Automatic exposure correction

If **Shift-A** is pressed, or **Menu – Adjust – Auto Exposure Correction** is enabled, **FastRawViewer** calculates and applies automatic exposure correction in such a way, that 1% of the total number of pixels in the image are pushed to saturation *(receive the value of 255 on the 8-bit scale)*.

The following settings for the automatic exposure correction are user-adjustable:

- Mode:
    a. Fixed shift by the given number of stops *(EV),* the value is controlled through **Preferences – Image Display – Exposure – Auto Exposure – Fixed Exposure shift.**
    b. Automatic calculation of the exposure compensation to shift the histogram 'to the right', controlled through **Preferences – Image Display – Exposure – Auto Exposure – ETTR-style autoexposure** *(shift histogram to the right).*

- Fine-tuning of the automatic exposure compensation:
    a. **Saturate up to NN% pixels** – controls the percent of the pixels that will reach the saturation as the result of the automatic exposure correction.
    b. Exposure shift limits:
        i. **Unlimited** – no limit, goes all the way to the setting for **Saturate up to NN% pixels**
        ii. **Hard limit** – no more than the number of stops set in this field.
        iii. **Virtual ISO** – the limit depends on the ISO setting that was used to take the shot:
            - If the shot was taken at ISO in-camera setting higher that this limit, the maximum exposure correction is 0.
            - For the shots taken at lower than this limit ISO setting in camera, the maximum value for the exposure correction is equal to the difference *(in stops, EV)* between the ISO setting in the camera and the limit set *(for example, if the limit is set to ISO 6400, and the shot was taken at ISO 1600, the maximum amount of exposure correction is 2EV).*

To switch off the exposure correction, making it 0 *(or, if Apply Adobe hidden exposure correction **is ON, making it equal to that value of hidden correction),* press the 'A' key** on the keyboard. **Second press of 'A'** will restore the previous correction.

Manual Exposure Correction

- Increase exposure adjustment: **Menu – Adjust – Adjust exposure correction – Increase Exposure** (**Alt-*Plus/*Alt-Ctrl-*Plus keys***) or the **+** button in the lower bar of the window. Shift-Click on bottom bar button will use larger step.

- Decrease exposure adjustment: **Menu – Adjust – Adjust exposure correction – Decrease Exposure** (**Alt-*Minus/* Alt-Ctrl-*Minus keys***) or **-** button in the lower bar of the window. Shift-Click on bottom bar button will use larger step.

The amount of exposure adjustment change per click / key press can be set through **Preferences – Image Display – Exposure – Manual Exposure step size** for small/big steps separately.

Recording of the exposure correction to XMP files: Interaction with Adobe Programs

Exposure adjustment is recorded in XMP file in the **FastRawViewer** format *(if reading/recording XMP is on)*.

Moreover, exposure adjustment in a format that is compatible with Adobe *(Bridge, Camera Raw, Lightroom)* is recorded in XMP as well. This recording can be turned off through **Preferences – XMP – Exposure, Contrast, WB – Adobe Compatible Exposure and White Balance**.

Exposure Adjustment when Browsing to the Next File

The value of the exposure correction can be read from an XMP file. If, upon opening a file, exposure correction is available in the XMP sidecar, this exposure correction will be applied. Both Adobe and **FastRawViewer**'s tags for exposure correction can be used. The priority is determined by XMP – Preferred tags for exposure/WB setting.

If XMP file does not exist, or the exposure correction records are absent in it, exposure correction will not be applied *(however, if **Apply Adobe hidden exposure correction** is **ON**, it will still be applied)*.

This behavior can be altered through the setting **Preferences – Image Display – Exposure – Exposure correction on file open**:

- **No correction** *(default)* – exposure correction is not applied.
- **Autoexposure** – Automatic exposure correction will be applied, according to the respective settings for this type of correction.
- **Keep from prev. file** – same value of the exposure correction, as it was set for the previous file is applied. If the file is the first one opened during this session, no exposure correction is applied.

Forcing Adobe tools to render tones accurately

Some photographers prefer to start processing RAW from neutral settings as was suggested about 10 years ago by Dan Margulis. There is also the question of the default silent clipping of highlights in raw converters, which sometimes is confusing and you may want to disable it.

For example, with Adobe CameraRaw and Adobe Lightroom we have:

- Hidden lightness adjustment (correction for baseline exposure) which makes the lightness of the rendered midtone accord with the lightness of the midtone in the out-of-camera JPEG. This is described in **Adobe hidden exposure correction** section (above);
- An S-curve, adjustments to blacks, overall brightness, and contrast, as well as some other basic tone-mapping parameters are applied, to enhance the rendering and make it more pleasing right out of the box. If the scene has high dynamic range, strong saturated colors, or if some serious image editing is planned, then that enhanced view may be not the best starting point.

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Our experiments show that we can achieve pretty good linearity using just a few simple overrides over the default settings if we start with Adobe process 2010 aka Process Version 2 (and convert to more recent PV later, if needed). Essentially, all that is needed in PV2 is to select the linear tone curve and set all the basic adjustments, starting with Exposure, to zero.

If you want to switch to highly linear mode, you need to adjust Preferences:

- Set **Image Display - Exposure - Apply Adobe hidden exposure correction** setting to **not checked.**

- **Image display - Contrast curve type**: set to any fixed contrast one: sRGB, gamma 1.8, 2.2, L* (gamma 2.2 is recommended for proper lightness match)

- **XMP - Exposure, Contrast, WB - Adobe process version**: set to **Version 2 (2010)**

- **XMP - Exposure, Contrast, WB - Force Adobe software to match FastRawViewer brightness**: set to checked.
  This will result in silent "exposure boost" / baseline exposure being rolled back in Adobe CameraRaw/Lightroom, preventing false clipping indications and allowing one to regain the highlights that were not truly clipped.

- **XMP - Exposure, Contrast,WB - Write linear curve to XMP**: set to checked.
  If this setting is enabled, Adobe-compatible exposure and white balance tags will be written with the following additions and amendments:
  - o   the curve will be set to Linear (both name and values)
  - o   tag crs:Shadows will be set to 0
  - o   tag crs:Contrast will be set to 0
  - o   tag crs:Brightness will be set to 0
  - o   tag crs:ProcessVersion=5.7 will be forced
  - o   tags crs:ToneCurvePV2012, crs:ToneCurvePV2012Red, crs:ToneCurvePV2012Green, crs:ToneCurvePV2012Blue will be deleted

Enabling these settings will not automatically rewrite existing XMP files or create new XMP files if they are absent. To set new XMP parameters for the linear mode or to roll back Adobe's "exposure boost", you need to do the following after enabling appropriate settings:

- either check "Force XMP files creation" (**Preferences -> XMP - Force XMP files creation for RAW files**) and open the files where you want the new settings in **FastRawViewer**.

- or open the files where you want the new settings in **FastRawViewer** and at the Bottom Bar change the White Balance or Exposure; clicking twice on "Exposure correction on/off" to switch it off and then back on should do the trick.

White Balance

FastRawViewer offers several methods of setting white balance:

- Choose one of the standard presets *(As Shot/Auto/Daylight/Tungsten)* and presets fetched from RAW *file (most modern cameras save several standard presets in RAW metadata)*.

- Set it by clicking on the known neutral gray area of the image.

- Set it by choosing the color temperature/tint value.

Indication of the White Balance

The white balance is displayed:

3. As the name of one of the presets *(or Custom)* in the drop-down list of white balance presets *(see the next picture)*.

4. As the values shown on the button for manual editing of white balance *(to the right of the drop-down list of available white balance presets)*.

The available white balance indication modes are chosen through **Preferences – Image Display – White Balance – White balance display mode**:

- **Color Temperature/Tint** – a mode commonly used in RAW converters.

- **Mired/Tint** – instead of correlated color temperatures, the value indicated is in Mired.

- **WB Coefficients** – the per-channel coefficients *(factors)* of white balance are shown.

- **Channel EV Correction** – the per-channel correction factors in EV *(stops)* of white balance are shown.

The calculation of color temperature/tint is not possible for all the cameras. It is also not possible for extreme white balance coefficients. Here are the limitations:

1. **FastRawViewer** must have the color data for the camera *(for the vast majority of modern cameras, it does)*.

5. The camera has to be RGB and tricolor. CMYG, RGBE, and other non-RGB cameras are not supported.

6. A range of color temperatures from 1667 to 25000K is supported. If you set the manual balance *(see below)* from a deep blue or a dark red area, then calculating the temperature may be impossible.

For those cases where the calculation of color temperature is impossible, the indication of CCT/Tint or Mired/Tint values is changed to "---/--".

White Balance Presets

For the majority of modern cameras, **FastRawViewer** contains a large amount of standard presets *(settings)* of white balance.

Choosing a preset can be done via the drop-down list menu in the lower bar of the program window:
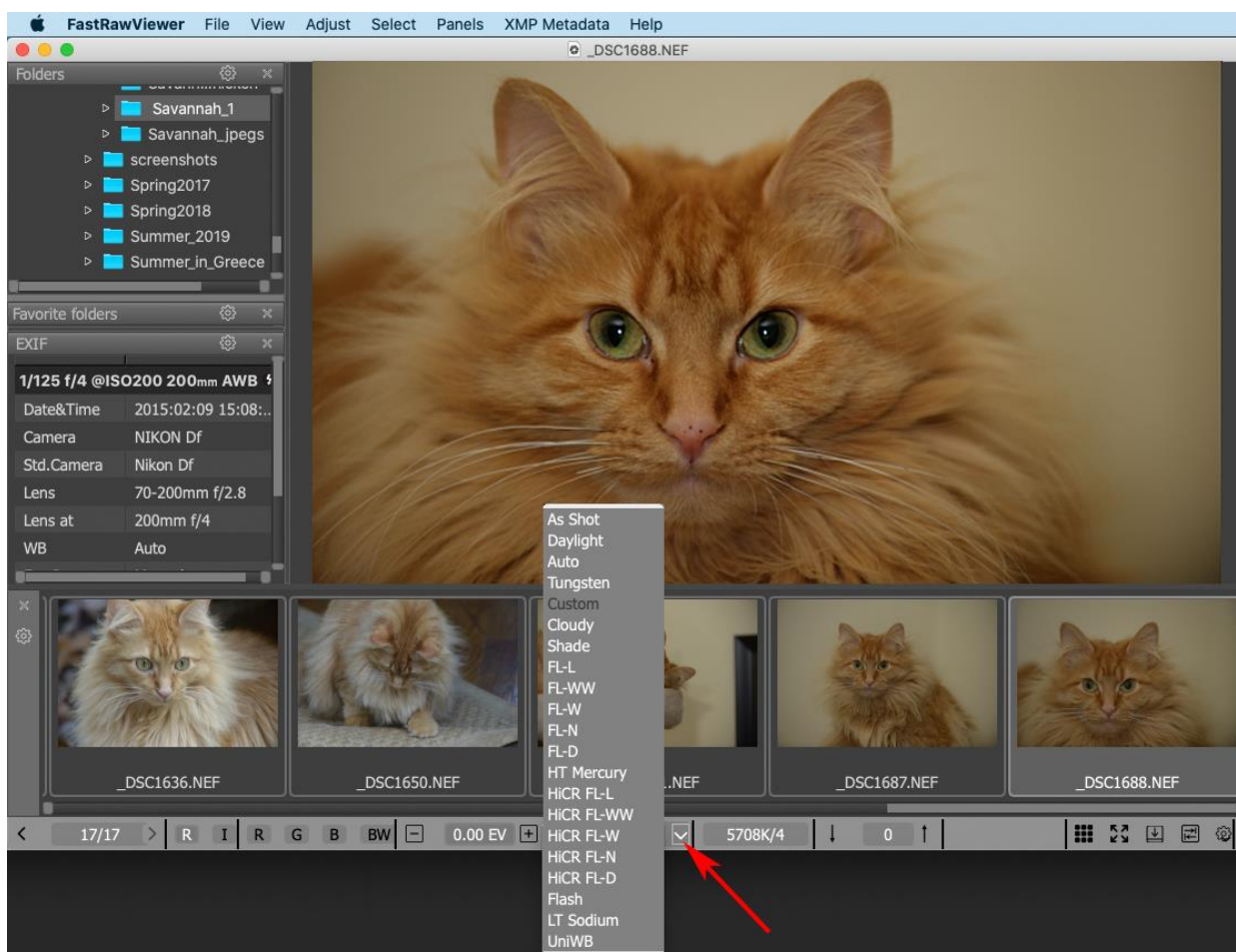
Virtually everything is in this menu:

- As Shot *(excluding a small amount of old cameras, which don't record white balance in RAW).*

- Daylight.

- Auto.

- UniWB *(sets all coefficients of white balance to 1.0).*

The other modes in this drop-down correspond to those individual camera presets, and those vary depending on camera manufacturer and camera model.

Standard white balance modes *(As Shot, Daylight, Auto, Custom)* can be cycled through using **Menu– Adjust–Toggle White Balance** *(or by pressing **W** key on the keyboard)*.

If the RAW file contains a list of standard white balances in its EXIF data, this list will be shown in the drop-down menu *(between Auto and UniWB).* If there is no list of white balances in the file, then the generic table for the camera model that took the shot will be used instead.

If two neighboring files are taken with one camera, and a mode to preserve white balance when moving between files is active (**Preferences – Image Display – White Balance – White balance for next file (same camera**), *see detailed description below)*, but the two above-listed files contain different balance preset lists *(for example, one file is in the camera's original RAW format, while the other is converted to DNG)*, then:

- If possible, the setting *(preset)* with the same name is preserved.

- If no such preset exists, then the "***White balance for the next file (another camera)***" is used, meaning that the program assumes that if the lists of white balances are very different between two files, then the camera must have been changed.

Controlling which White Balance will be Used when Opening a File

When opening the next file the White Balance is set in accordance to the settings in **Preferences– Image Display – White Balance:**

- **White Balance for next file (same camera)** – sets the white balance mode when opening a file coming from the same camera model as the current file is. Choices here are: Same as previous, As Shot, Daylight, Auto, Tungsten, and Camera Auto/As Shot. Last one is for the cases when As Shot WB was set manually and means 'use Auto WB recorded by the camera, fallback to As Shot if no camera recorded Auto WB is found. This is very useful with UniWB, or forgetting to switch WB to a setting appropriate for the lighting conditions.

- **White Balance for next file (another camera)** – sets the white balance mode when opening a file coming from a different camera model. The choice of "***Same as previous***" normally does not fit here – all other choices are the same as for the previous.

- **Keep Custom WB for next file (same camera)** – instructs **FastRawViewer** if the current white balance coefficients should be applied to the next file coming from the same camera model.

Setting White Balance by "Click-Gray" Method

To set the white balance using an arbitrary area of the image as a reference, use **Alt-left mouse click**.

The size of the area which is evaluated to calculate the white balance can be set through **Preferences – Image Display – White Balance – WB Sampler size**

Coefficients will be calculated for the chosen area so as to make whatever is "clicked" gray. The image will change its look *(automatically calculated exposure adjustment may change as well)*.

If the correct color temperature can be calculated with the given coefficients, then it will be displayed on the button for the manual white balance adjustment.

Manually Setting the Color Temperature

When pressing the button with the values of color temperature/shades *(to the right of the drop-down list with white balance presets)* the manual white balance adjustment dialogue appears:
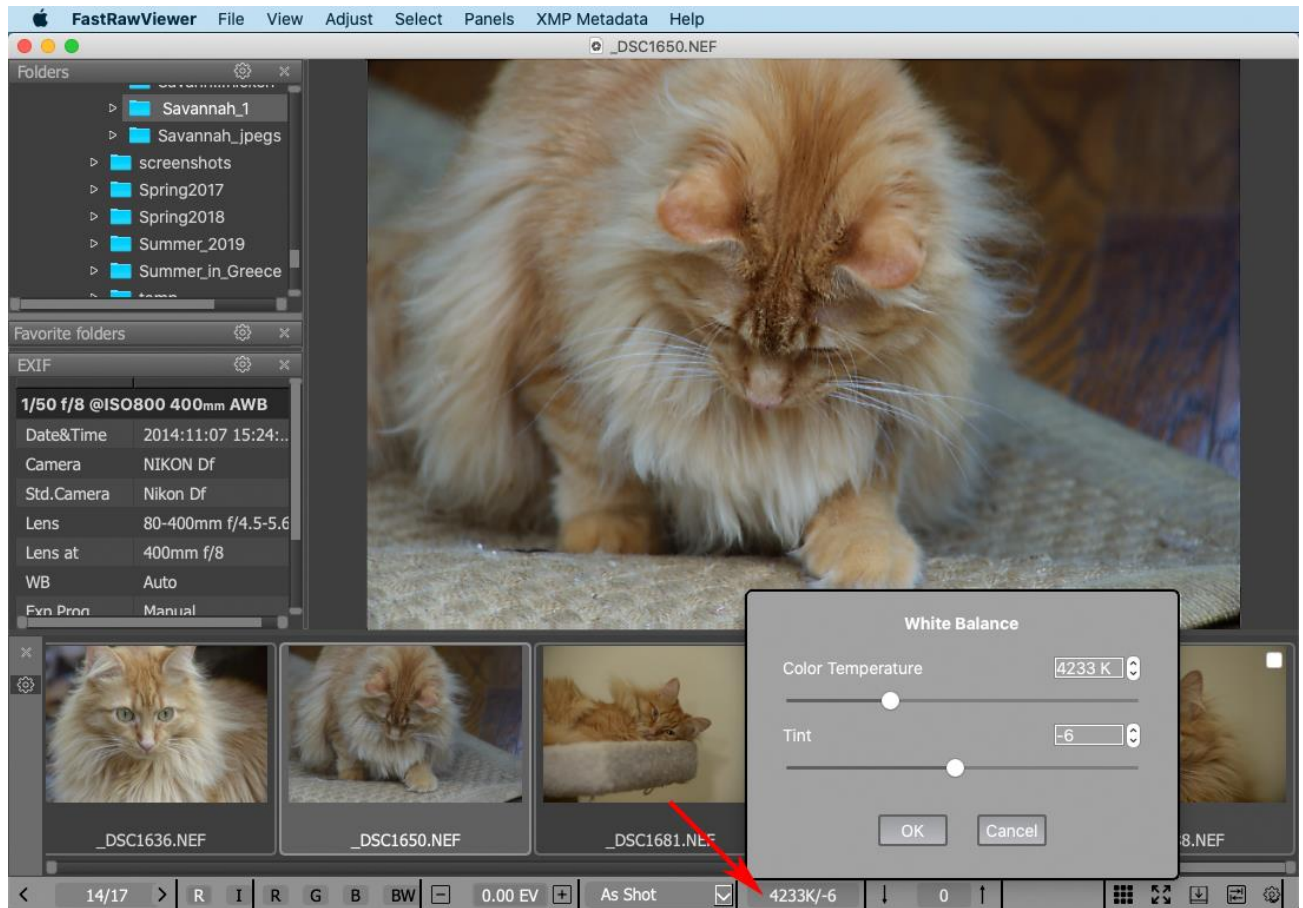
The changes made in this dialogue are applied to the image on the screen on the screen with a slight delay *(up to 200ms)*. If the changes you've made satisfy you, hit **OK**. If not, continue adjusting, or hit **Cancel** to disregard any changes.

Undo editing

Menu – Adjust – Reset image rendering to defaults *(Ctrl-Shift-R, Ctrl-Command-R)* applies default image editing settings that are enabled in **Preferences – Image Display – Reset rendering to default parameters**. Initial defaults are:

- White balance is set to «As Shot»

- Exposure correction is set to «No correction»

- Contrast is set to «0».

These changes are recorded to XMP if XMP support is turned on *(default)*.

Outlining In-Focus and Highly Detailed Areas

FastRawViewer can help identifying if the sharp areas are indeed where you wanted them to be on the image. This is accomplished through outlining the following:

- Bold high contrast edges.

- Areas containing small *("pixel-level")* sharp details.

- Additionally, you can turn on the simultaneous display of both types of outlines *(not possible for some video cards)*.

You can cycle through these modes using **Menu–View–Toggle Focus Peaking** *(or by pressing the P key on the keyboard)*, like following: **Everything off – High contrast edges – Fine details – Both filters – everything off**.

Unnecessary/unused modes can be turned off through **Preferences – GPU Processing – Focus Peaking mode**.

The **High Contrast Filter** shows contrasting, but not necessarily very sharp areas of the image:
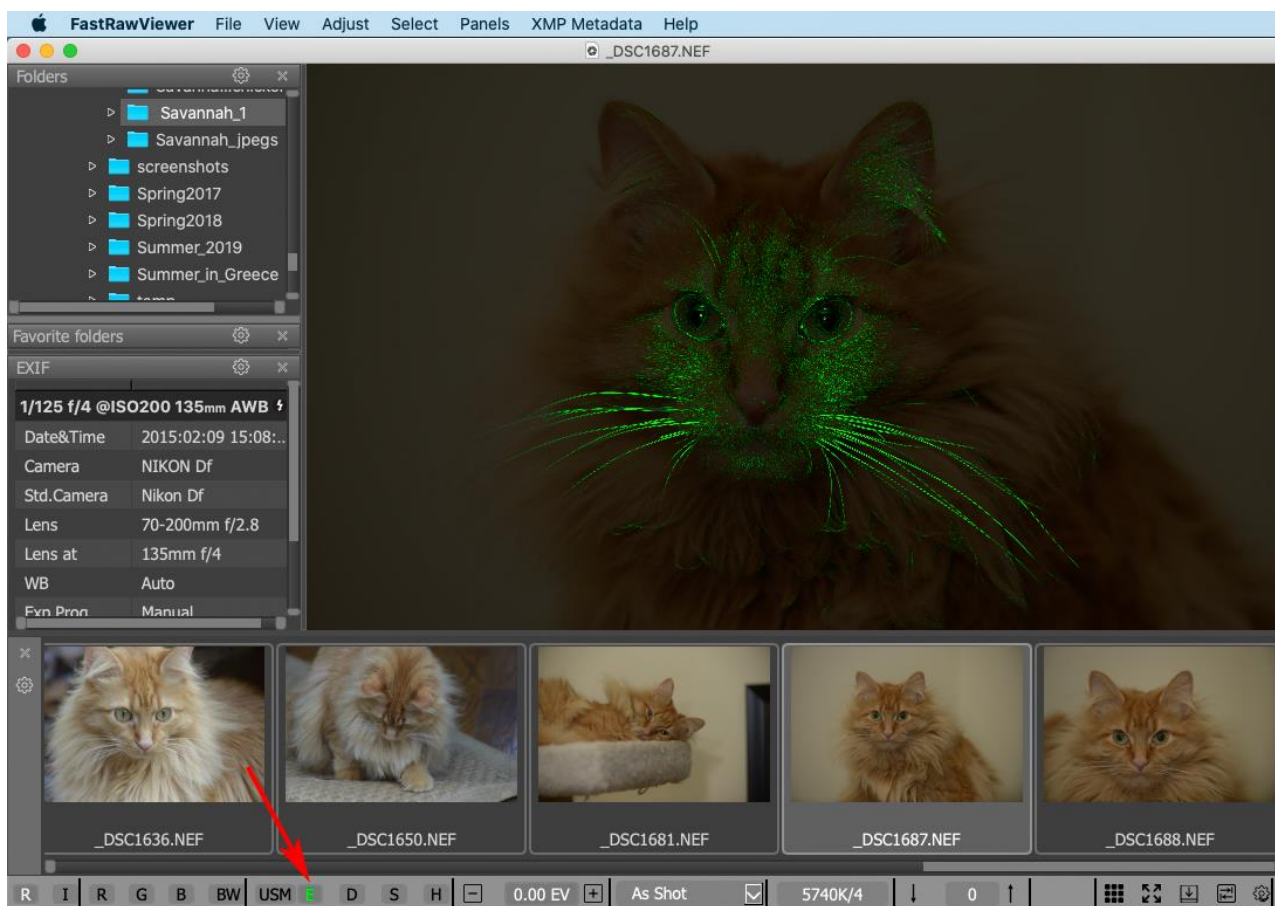
When this filter is on the letter **E** in the **USM-ED** group on the bottom bar takes the same color that is used for the outline *(green by default).*

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The **Fine Detail Filter** outlines small, acute, but not necessarily contrasting details:
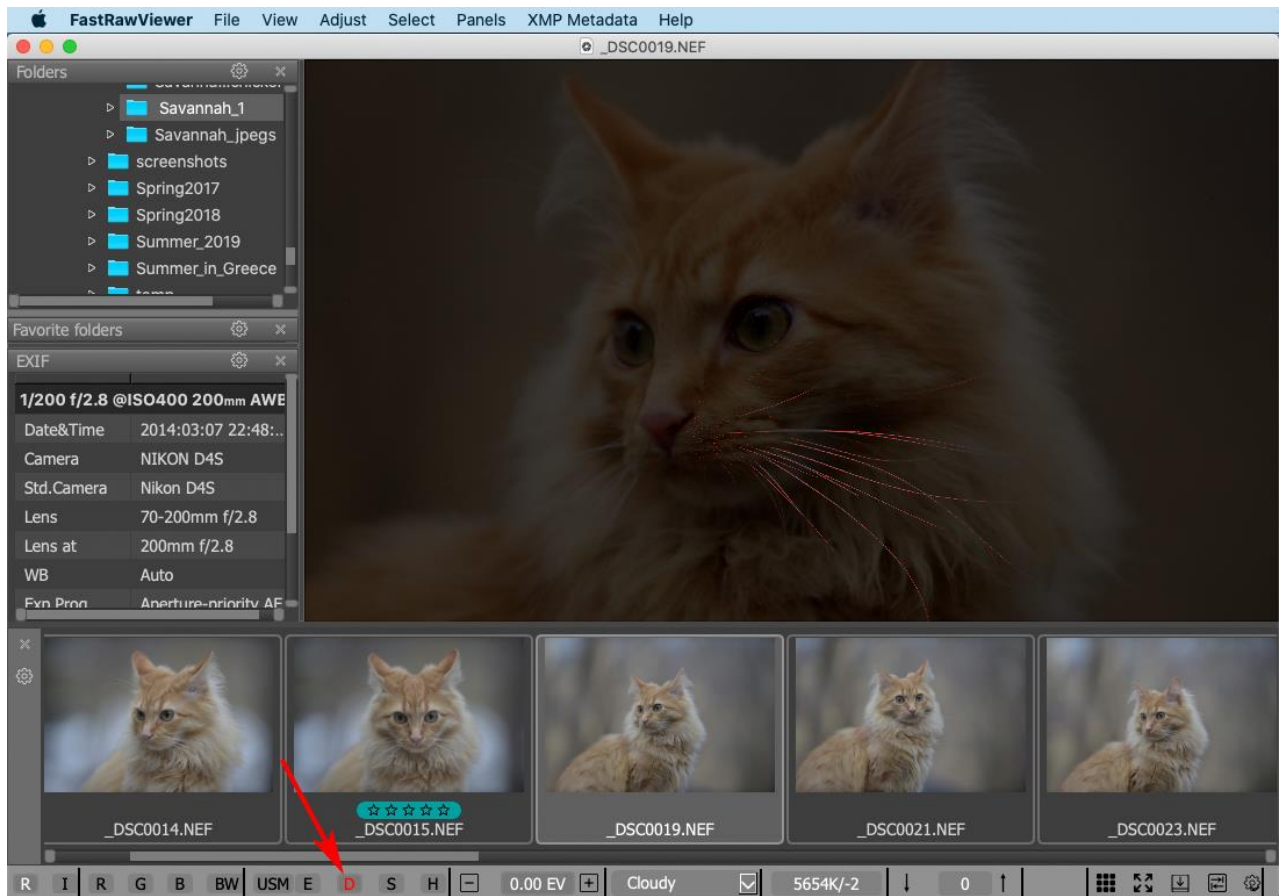
When this filter is on the letter **D** in the **USM-ED** group on the bottom bar takes the same color that is used for the outline *(red by default)*.

The colors that are used outlines for both filters, as well as the opacity of the filter overlay are controlled through the settings in the **Preferences – GPU Processing – Focus Peaking mode** section**.**

For GPU-based demosaicking the overlays indicating the areas of sharpness and sharp details have lower brightness, as this demosaicking creates less artifacts and the algorithm has less data to cling to.

Overlay Grid

One can overlay a grid over an image, available grids are:

- Standard grids: Golden rule, 3x3, 4x4, 5x5

- Two custom grids *(regular grid up to 25x25)*

To switch the grid on, use **Menu – View – Grid Overlay** – and select the one or more grids. If several grids are selected, they can be cycled through **Menu – View – Grid Overlay – Next Overlay Grid** *(the default hotkey is Alt + G)*.

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The selected grid is displayed as dashed lines, with black and white dashes interleaved, over the image.
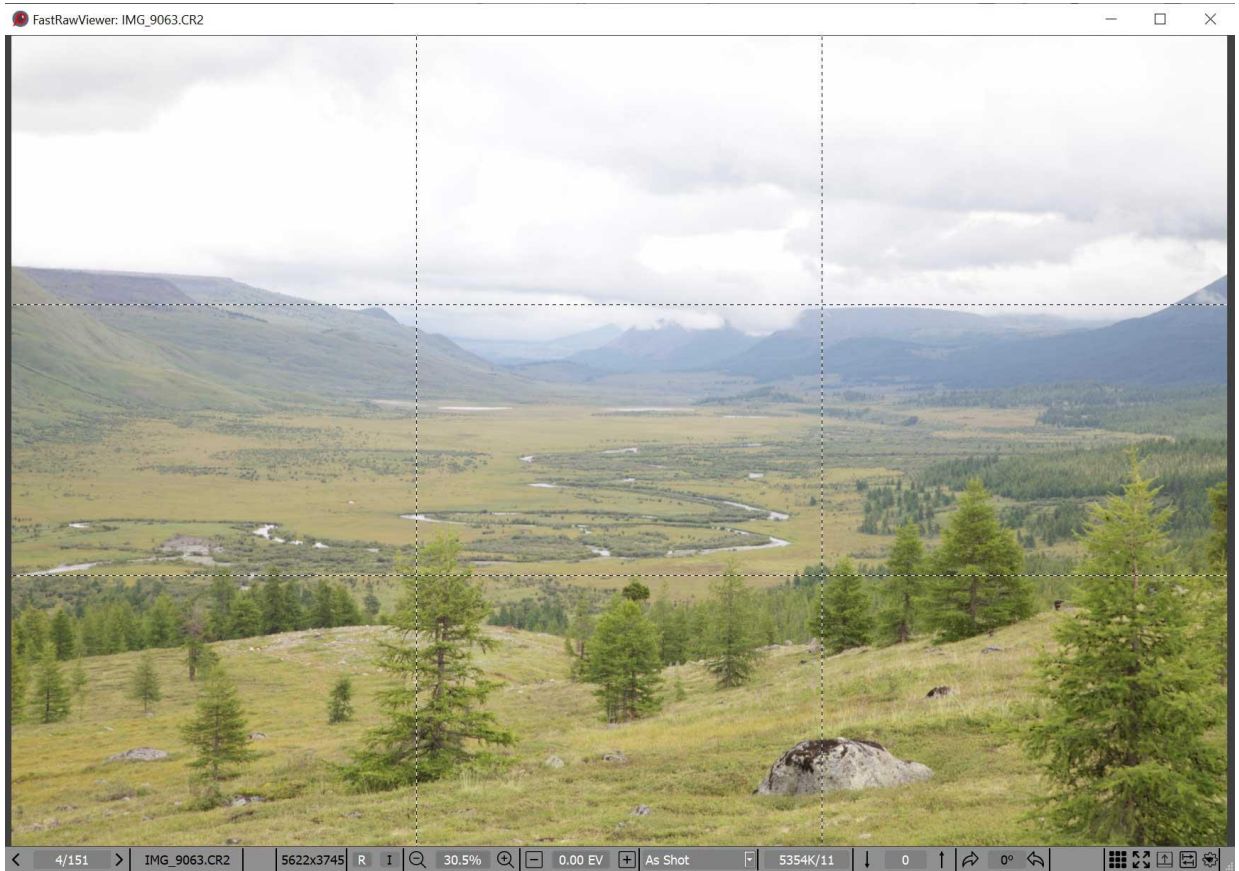
The grid settings are available in **Preferences – Image Display – Sharpening/Other**.

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Multi-window Mode

How It Works

Switching to multi-window mode can be done through **Menu – Multi-window – Window layout**.

Switching to multi-window mode and back can also be done via the buttons *("2o-window mode" or "4-window mode")* in the right part of the application's bottom bar. When 2/4-window mode is active, the lines on the button become white. In **Grid View** mode, these buttons are inactive. How these buttons are displayed can be tuned through **Menu – File – Customize – Customize status bar** *(the corresponding element in the list is called Multi-window mode controls)*.

A switch to multi-window mode will cause two or four subviews to open on the screen *(the screenshot below shows four subviews)*:
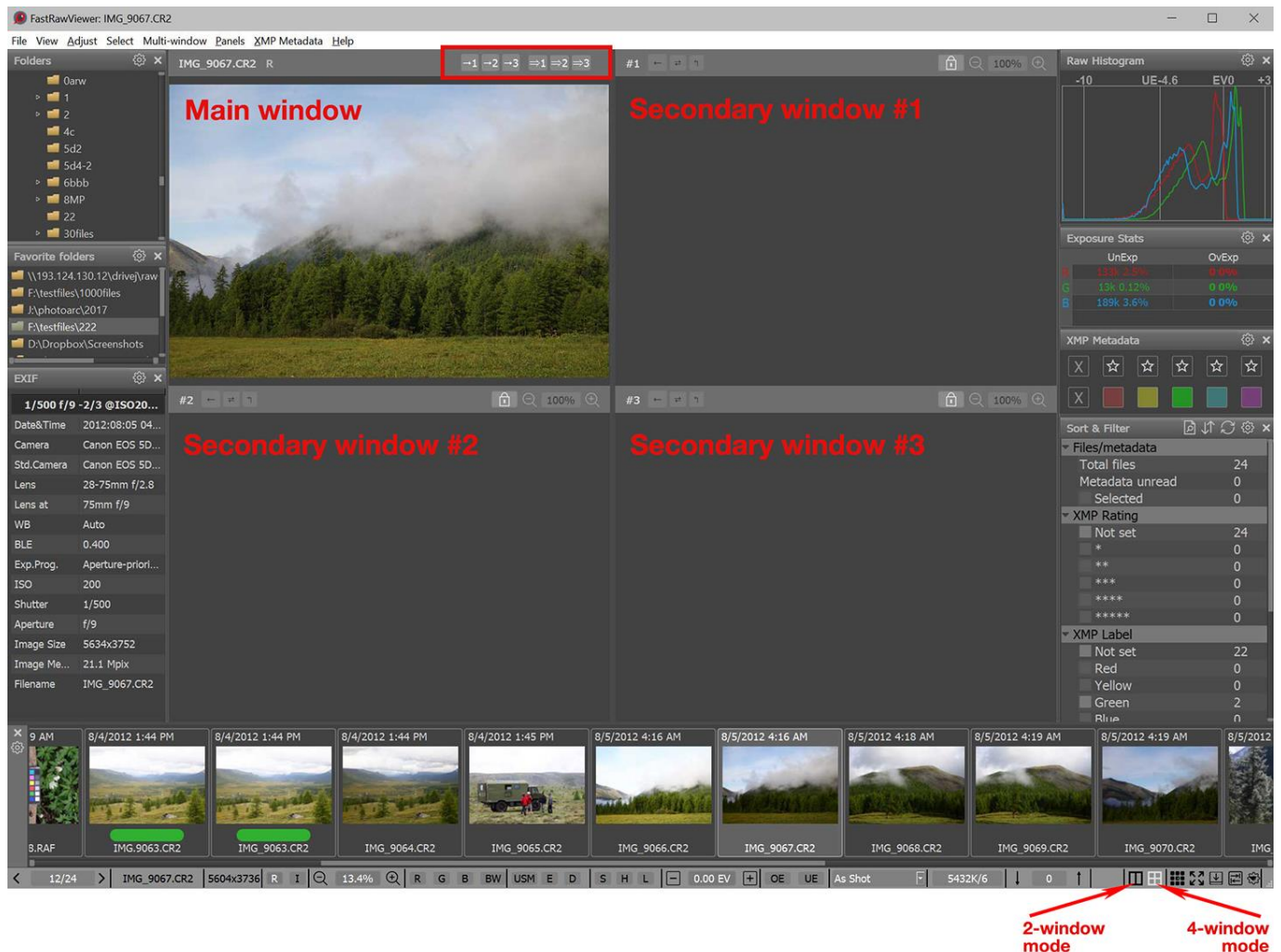
- The top-left *(or just left for two-subview mode)* **is the main window,** analogous in function to the window in Single Image View.
  In particular,

- o All hotkeys affect this window *(exception: zoom, pan, and display modes, see below)*.
- o Histogram, EXIF, exposure statistics, etc., are displayed only for the main window
- o Changing the rendering parameters *(lightness, contrast, white balance)* for a RAW image is only possible for the main window.

- The other windows are secondary *(additional/ancillary)*, they display copies of some images that cannot be edited, that is the rendering parameters for the views in secondary windows can't be changed in those windows.

- The order of the windows *(main is at the top left)* is the default. The main window and the secondary subview #2 can be placed at the right column via **Preferences – Multi-window mode - *Main/secondary window order*** *(please see the* "Multi-window Mode Settings" section*)*.
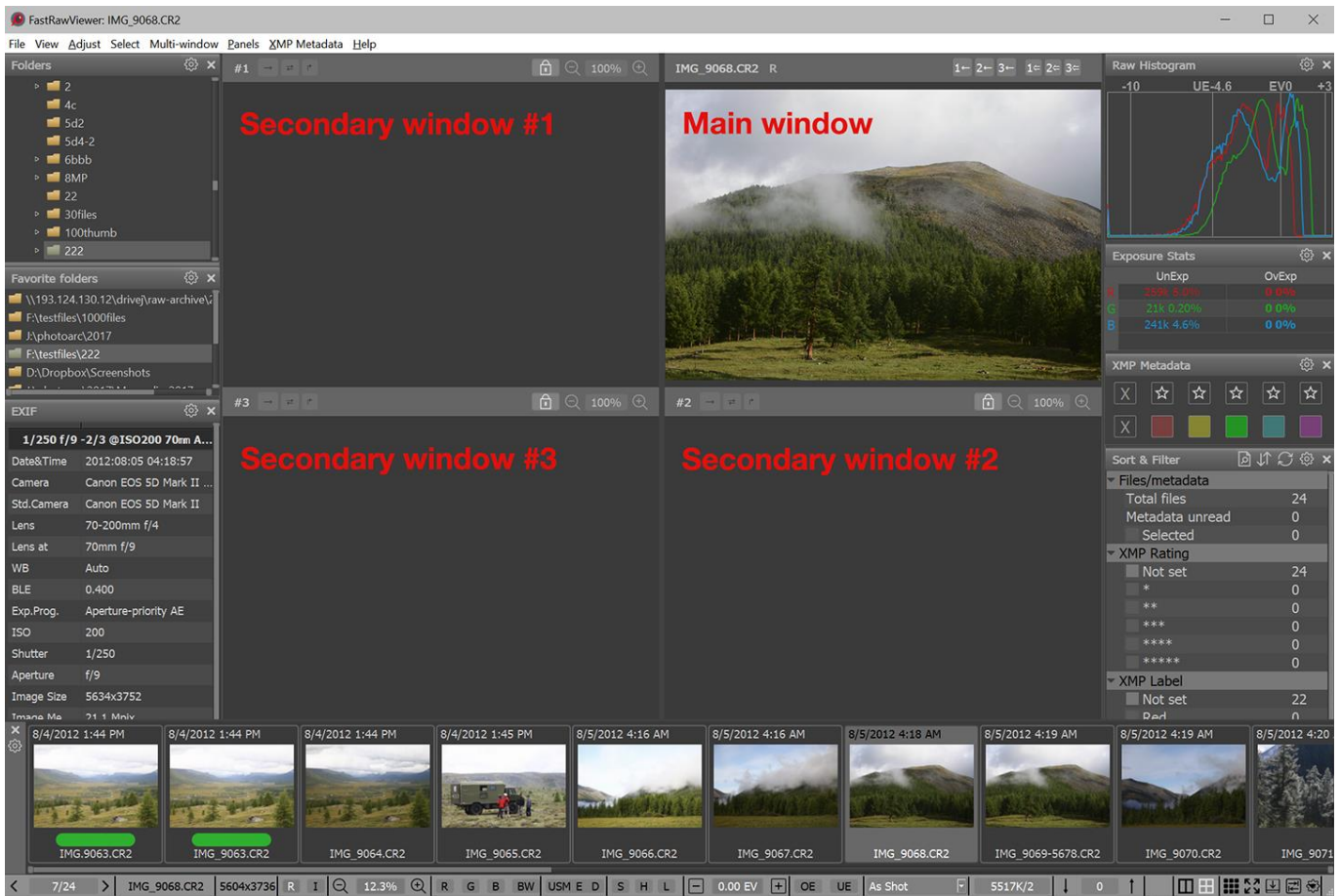
To populate windows, you can use the following options:

- Drag-n-drop a file from the Filmstrip to the desired window

- Drag-n-drop a file from one window to another one *(attention: drag-n-drop from a window works if the file zoom is "fit to window" or smaller. If the scale is larger, then the image will move around the original window)*.

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- The file's context menu, both in the window or in Filmstrip *(in the menu, it's Open in Window…)*. This menu element appears if the application is switched to Multi-window mode.

If a group of files is selected in the Filmstrip, then drag-n-dropping / the context menu will work for the whole group; a window, however, can only open one file at a time. To drag-n-drop / use the context menu for one file out of a selected group without destroying the selection, press and hold the Alt key *(Option key, if using macOS)* while executing the operation.

Important: both the context menu and drag-n-drop from the Filmstrip work normally when using **Advanced Selection mode** *(more about that in the above section «Operations with Multiple Files»)*, this is set by default.

If FastRawViewer is switched to Standard Selection Mode, then when clicking on an element of the Filmstrip, that file will be activated and displayed in the main window. This behavior is an essential part of Standard Selection Mode and the way it selects groups, and it cannot be changed.

If a file that is already opened in the main window is opened in a *(secondary)* window, then the image is copied from the main window to the secondary, and this is very fast. When opening other files, a full rendering cycle happens, with the following characteristics:

- The displayed "representation" *(RAW/JPEG…)* is selected in accordance with the settings in File Formats – Default image to display

- The rendering parameters are taken from the XMP *(if such exists)* or from the settings.

- The parameter Force create XMP is not applied

To copy an image from the main window to a secondary one, you can also use menu options/shortcuts or the buttons in the left part of the top panel of the main window *(the picture below is for the default order of the windows)*:

- **Menu – Multi-window – Copy image from Main window to Window N** *(or the buttons →1, →2, →3)* – copy an image from the main window to the secondary window #N

- **Menu – Multi-window – Copy image … then open next file** *(or the buttons =>1, =>2, =>3)* – copy the image from the main window to the secondary, and then open in the main window the next file in the folder.

As a result, the secondary subviews *(some or all)* will also display some files:
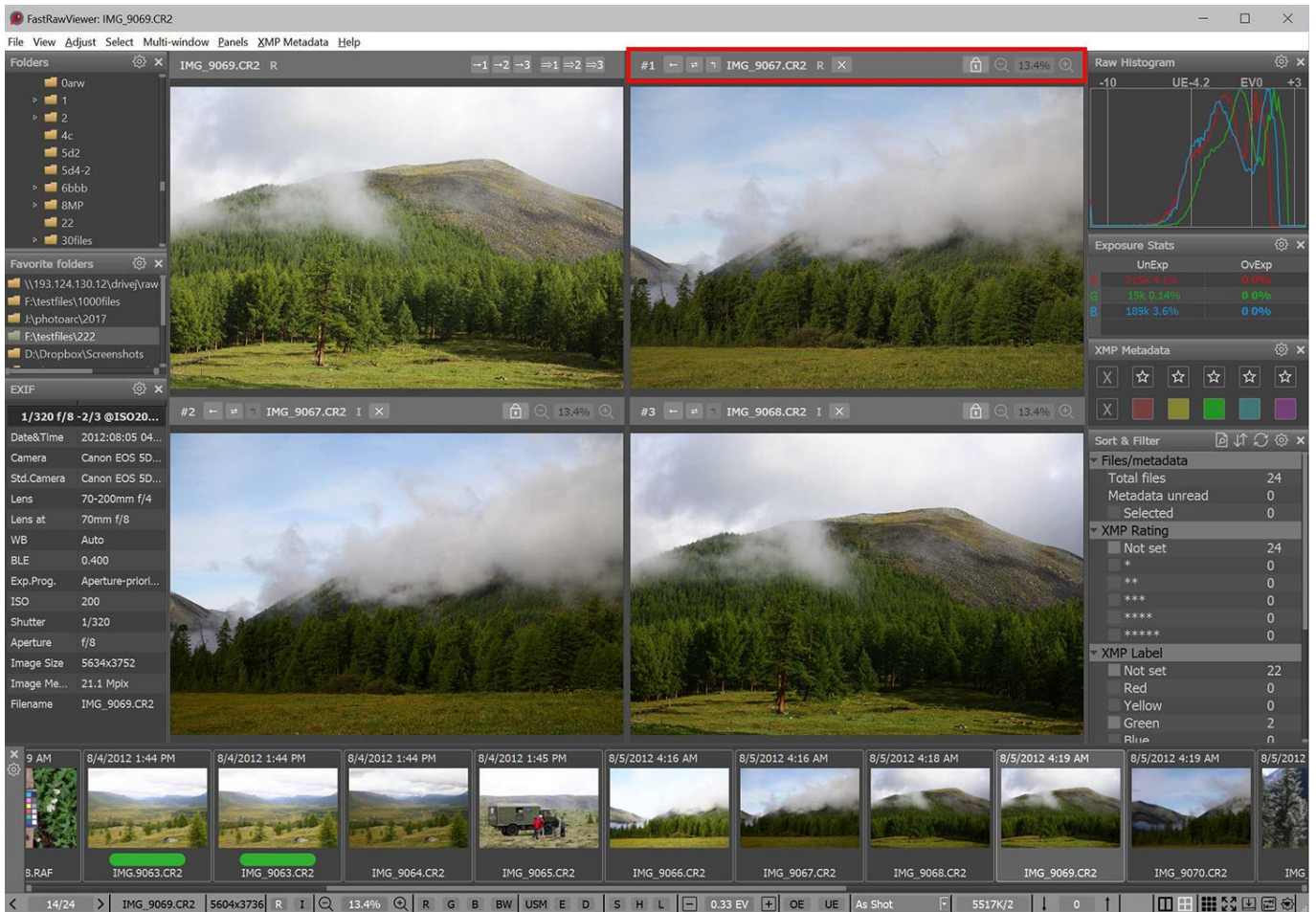
The top bar of the secondary subview contains, left-to-right:
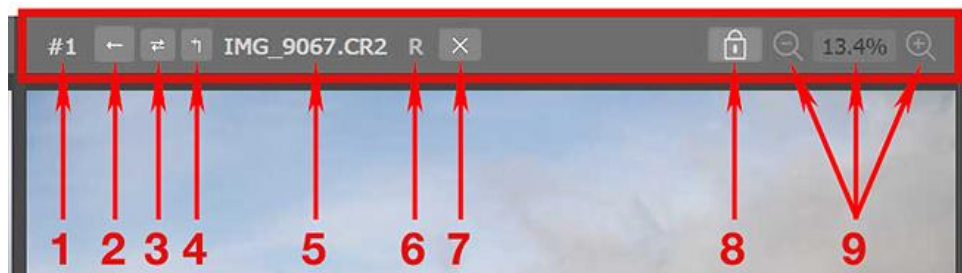
1. #n – subview number
2. ← – is a button for copying an image back, from the secondary window to the main window
3. ⇄ – is a button for swapping the images in the secondary and main windows.
4. ↰ – is a button for copying the rendering parameters of a RAW file from the secondary window to the main window.
5. The name of the file displayed in the secondary window

6. R/I/E/J – the type of the displayed representation *(Raw, Internal JPEG, External JPEG, Lone JPEG)*

7. ✕ – is a button for clearing the secondary window

8. Padlock – zoom/pan status; when the padlock is closed, zoom and pan are synchronized across the main window and all of the secondary windows. When it's open, each window can be zoomed/panned independently.

9. Button for zooming out, the current zoom level, and button for zooming in.

When the settings are changed such that the main window is positioned on the right side, all arrow icons are mirrored.

The contents of the secondary window can be returned to the main window using:

- **Menu – Multi-window – Copy image to Main window from…** *(or the button ←)* will copy from the secondary window to the main window.

- **Menu – Multi-window – Swap Main window with image in…** *(or the button ⇄)* on the secondary window swaps the content of the main and secondary windows.

When copying or swapping images, what's actually happening is a full-scale re-opening of a file in the main window; the displayed representation *(RAW, internal JPEG, external JPEG)* is determined through **Preferences** – **Multi-window mode** – **When opening a file from a secondary window use:**

- **Default image format to display**: the displayed image representation is determined by the setting **Preferences – File Formats – Default image**

- **Secondary window file format**: the image representation that was displayed in the secondary window will be opened in the main one.

If the Shift key is held down while pressing a button in a top bar of a window to perform a copy or swap, then RAW rendering parameters *(lightness, contrast, white balance)* will also be copied.

Furthermore, a file can be copied from a secondary window to the main window via:

- **Drag-n-drop** a file from a secondary window to the main window

- **The context menu** in the window *(Open in Window element)*

In this case, a full-scale re-opening and re-rendering happens, as if the file had been opened through **Menu – File – Open**.

Synchronous Zoom / Pan

With the default settings, the shortcuts for zooming in/out affect:

- The window that is closest to the mouse cursor
- And the windows that are tied to it *(via the closed padlock)*

Similarly, the "padlock connection" affects panning an image in a window *(with the mouse, or scrollbars)*, the connected windows will also pan the same distance.

There are three possible modes for zoom synchronization *(these are selectable, see below the **Preferences** section)*

- Same zoom value
- Same width
- Same size *(that is to say the length of the diagonal)*

For images that have the same size and orientation, all three options naturally give the same result; the three options therefore only have "meaning" when looking at images that have different sizes and/or orientation.

Synchronizing Special Display Modes

Special display modes are applied simultaneously to all images opened in the main and secondary windows.

Here, by "special display modes" we mean:

- Screen sharpening
- Focus Peaking
- Per-channel *(R-G-B)* black and white display
- Over/underexposure indication *(only for RAW)*

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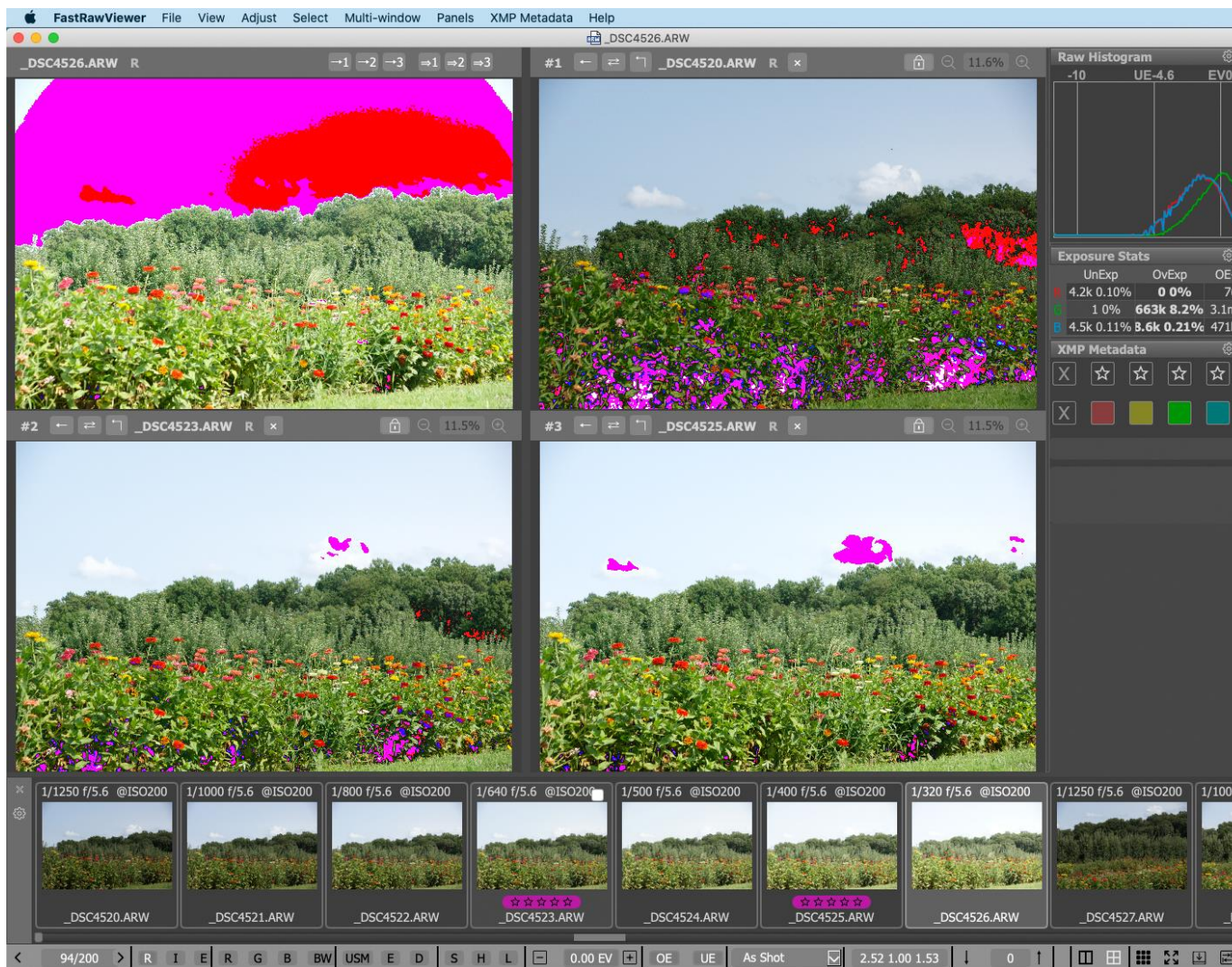
Scope of Hotkey and Menu Actions

- With the exception of zoom / pan and the special display modes listed above, all actions taken through the menu and / or via hotkeys are applied only to the main window.
- For the secondary windows, there are context menus that allow one to perform standard actions *(XMP ratings/labels, copy, move, pass to an external program)*, excluding rotating the image.
- Also, from the secondary windows one can perform **Drag-n-Drop** actions to both external programs and the folder tree in the Folders panel.

Copying RAW Rendering Parameters from a Secondary to the Main Window

If the main window and a secondary window contain an image taken by the same camera model, and both windows are displaying RAW images, then you can copy the RAW rendering parameters *(namely, exposure correction, white balance, contrast)* from the secondary window to the main window. The copied settings will be applied to the RAW image in the main window and recorded to the corresponding XMP file.

This way, the secondary window can be used as a repository for processing presets.

Copying the settings can be done via:

- **Menu – Multi-window – Copy processing from … to Main Window** or by pressing the ⬑ button on the window top bar.
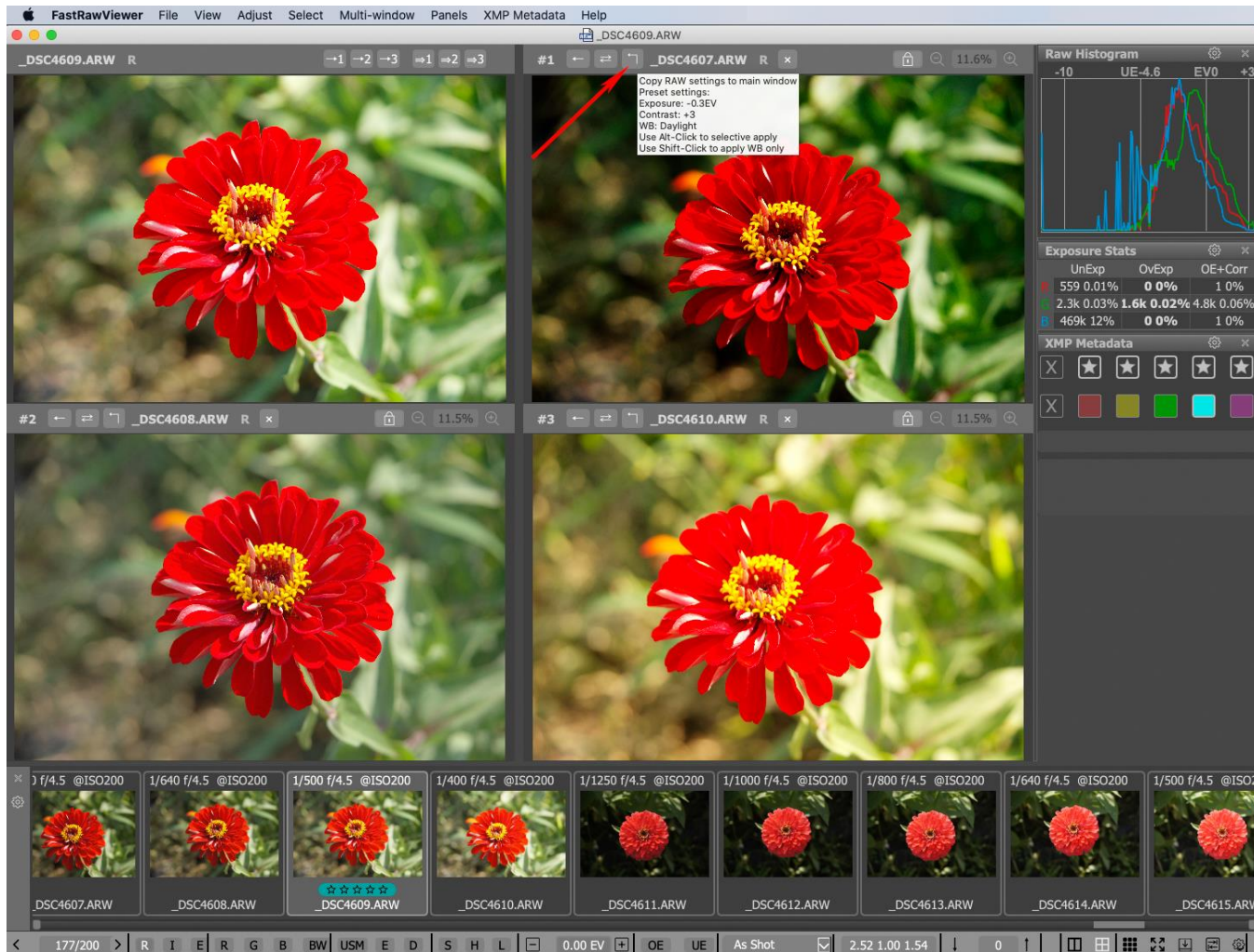
When this is done, all the above-listed rendering parameters are copied.

- Shift-Click on the ↰ button in the top bar of the secondary window to only copy the white balance.
- Alt-*Click (Option-Click for Mac)* – opens a dialog window in which you can select which rendering parameters to copy

The checkbox settings in this window are saved for the duration of the session, and each secondary window has an individual list of settings.
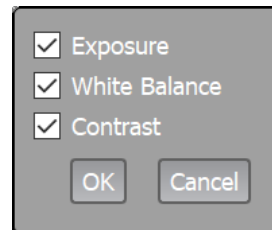
Why Do We Have the Main - Secondary Window Distinction?

If all of the windows were treated as equal, then a multitude of logical and interface problems would emerge, for example:

1. All actions that affect files *(exposure, white balance, contrast)* are immediately saved in an XMP sidecar file. As a result, the changes applied to one window would either have to be duplicated in all the windows where the file is opened *(but then why do you need several*

windows?), or the results of the last change would have to be saved, leading to confusion and unwanted overwriting of the rendering parameters.

2. The user would have to constantly keep track of the context for their actions; which window is currently active, and which will be affected by a hotkey? Which window will be affected when clicking Next File? If the same file is opened across several windows, will they all be flipped through?

By delineating one window as the main one, where all actions "with consequences" can happen, and which is affected by shortcuts *(with the exception of shortcuts that affect their specific secondary window)*, the problem of context is solved.

Other Points

1. The contents of the secondary windows are **only** stored in the video card memory *(GPU)*. This approach allows one to copy the contents between windows almost instantaneously, but these GPU-stored objects do not survive the computer entering sleep mode or hibernation.

2. If a file that was displayed in a secondary window disappears from the zone of visibility *(filtered out through **Sort&Filter** or moved to a different folder)*, the secondary window will be cleared and there will not be a move to the next file the way it happens for the main window.

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Performance Settings

Depending on the characteristics of your computer, the most important ones being

- Amount of RAM.

- Number of processors and cores per processors.

- Type and performance of the video card.

You may need to tune the performance settings of **FastRawViewer** to be more comfortable.

FastRawViewer is optimized for work with files on modern high-speed storage devices: SSD drives, disk arrays *(RAIDs),* fast flash cards *(UHS-I and similar in fast USB3 readers)*.

When using slower media, additional optimization of **FastRawViewer** may be necessary, because the default settings will not be optimal.

Settings for Different Types of Data Storage

Sequential and "Random" Browsing

While you are moving sequentially from one file to another *(using **Menu – File – Next File** or by selecting the **next file through the Filmstrip** or **Grid**)*, **FastRawViewer** is decoding the next file ahead, so as to make the transition to the next file faster.

When you are browsing through the files in a "random" manner, that is selecting files that are two files ahead or two files behind, the program can't predict what will be the next file to process.

Because of this, it is recommended that one browse the shoot in a sequential manner, which is only logical as in most cases, one wants to look through all of the shots that one made. As was already mentioned for sequential browsing, decoding looks ahead, working in the background, making the whole process smoother, without any delay for reading and decoding files.

The limits of parallel file reading

SSDs allow one to read several files at a time, without any speed losses; this feature is used by **FastRawViewer** when it prefetches files.

For other kinds of media, this parallel reading has to be limited (how to do this is described a bit lower), to the following values:

- Mechanical hard drives (HDDs) and hybrid HDD+SSDs : 1-3 parallel read threads
- External HDDs connected via USB cable: 1-2 parallel read threads
- Network-attached storage (NAS):
    - When using WiFi: 1-2 parallel read threads
    - When using 1 Gbit Ethernet: 2-3 parallel read threads

- When using 5-10 Gbit Ethernet with a fast NAS disk array – the number of parallel read threads can be unlimited, and the setting can be left to the default.
- Flash cards, external SSDs:
    - Fast cards (UHS-II), external SSDs, when using SATA/USB-C/USB 3.1-3.2 connections: the number of parallel read threads can be unlimited, but it's common that limiting it to 4-6 read threads will give better results.
    - Mid-speeds (UHS cards, USB3 connections): 2-3 parallel read threads
    - Slow cards or a slow reader: 1-2 parallel read threads.

The number of read threads running in parallel can be limited:

- As a global FastRawViewer setting
- For specific media types (removable media, network media)
- For a specific volume or catalog prefix

Global limits to the number of read threads running in parallel can be applied through the following settings:

- Preferences – Performance – Parallel prefetches: the initial value for the number of parallel read threads
- Preferences – Performance – Parallel prefetches – Auto-extend to: the maximum number of parallel read threads (when flipping through files in one direction)
- Preferences – Performance – Thumbnail cache – Thumbnail decoder thread count: the number of parallel read threads for building previews.

For global limits, we recommend turning off Auto-extend and setting the other two settings to the recommended values.

Specific limits to the number of read threads running in parallel for the respective media types can be applied through the following settings**:**

- **Preferences – Slow media – [group type] – Limit parallel file prefetch**: limits for the RAW data for the given group of volumes.
- **Preferences – Slow media – [group type] – Limit parallel thumbnail reading**: limits for building previews.
- **[group type]** – Removable Media, Network media

Individual limits for a specific volume (drive letter) or folder can be turned on in the section Volume/Drive specific settings:
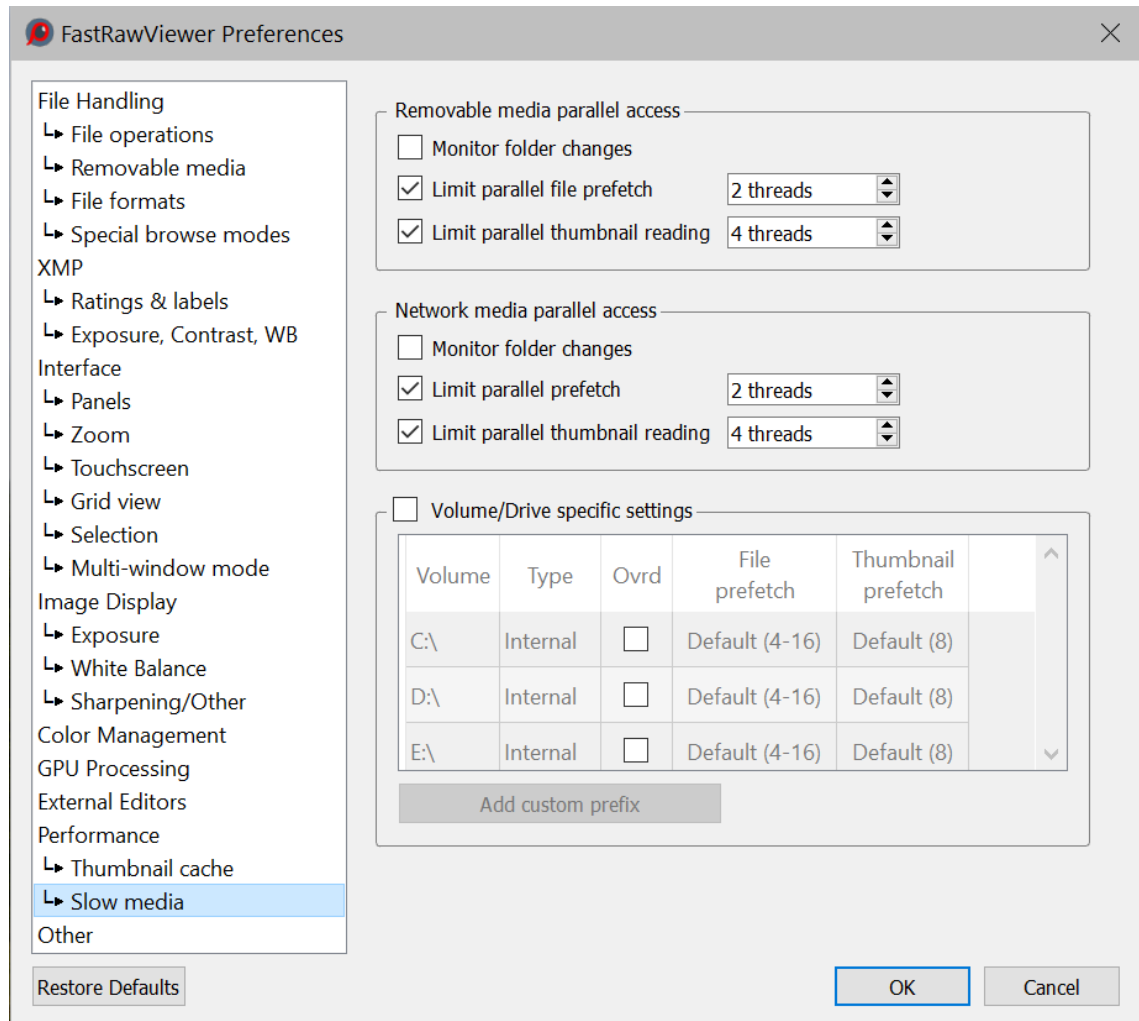
To turn on individual limits, one needs to:

- Check the checkbox for Volume/Drive specific settings
- Select the appropriate drive letter (for macOS, the volume) in the table
- Check the Ovrd checkbox for it

Set your limits in the input field that become active.

TIFF/PNG/JPEG/HEIC Handling

The event that triggers the decoding of JPEG files is defined in **Preferences - File formats – Non-RAW files decode priority**, separately for each type of RGB files:
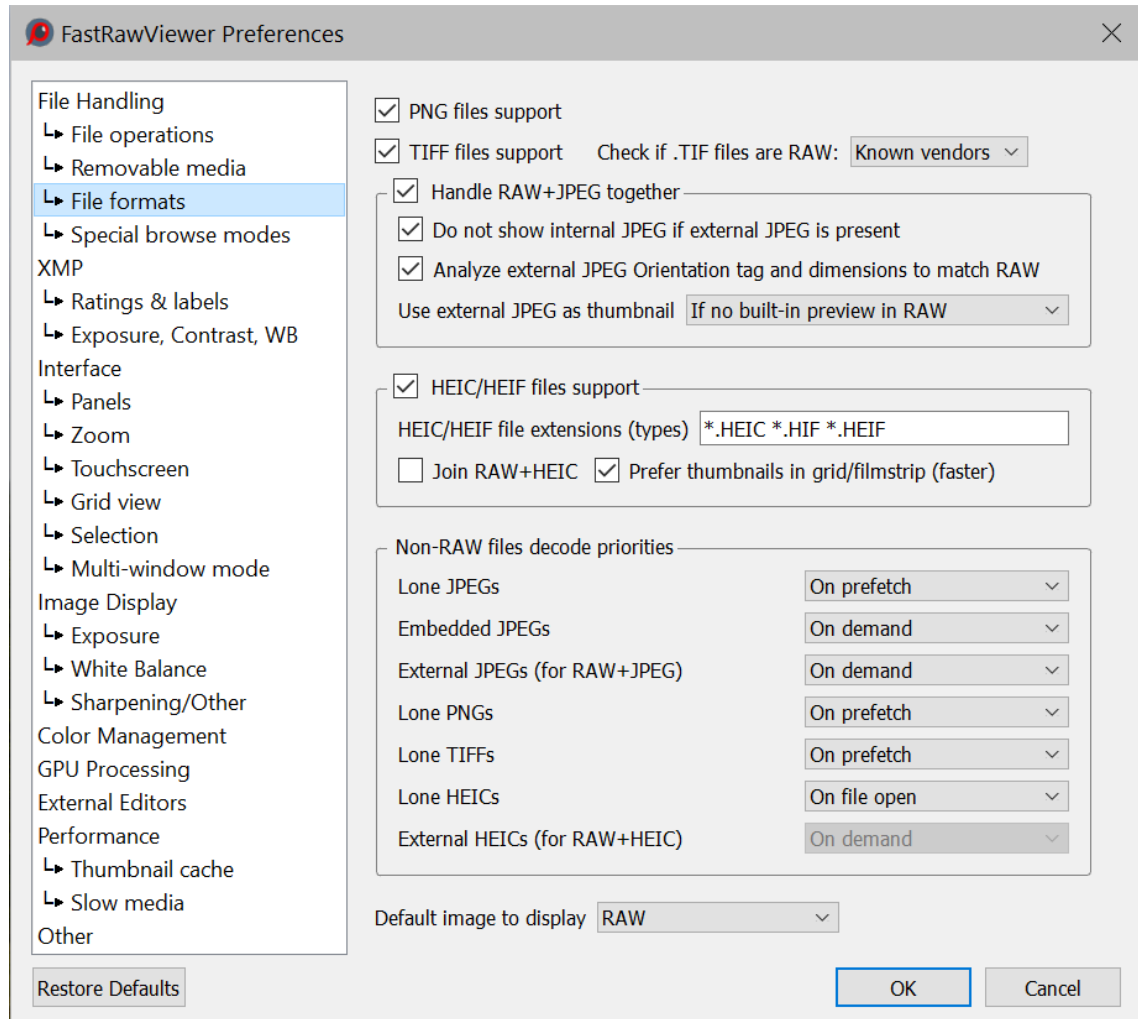
- **None** – do not decode at all, so this "representation" will be inaccessible;
- **On demand** – the decoding will happen during switching from RAW to JPEG;
- **On file open** – the decoding will happen at the moment of file load;
- **On prefetch** – the decoding will happen during the file prefetch.

Depending on how often you look at embedded JPEGs or external JPEGs paired with RAW, you can select one of the following settings:

- Always or often – "***On prefetch***"
- Rarely or almost never – "***On demand***".

For files not accompanied by RAW *(Lone JPEGs, Lone PNGs, Lone TIFFs, Lone HEICs)* only two options are available, naturally: **On file open** *(as it was before)* and **On prefetch**; other options don't make sense.

The "On prefetch" mode uses a lot of memory, for example: 20 Mpix JPEG takes up 3-4 MB before unpacking, and 80 MB unpacked *(as RGBA)*; that means caching 20 such JPEGs will take up 1.6 GB instead of 60 to 80 MB.

Customizing Display Modes

FastRawViewer uses the advanced features of modern video cards to display images and can use a GPU for all the stages throughout the cycle of RAW data display. Depending on the particular set of features and performance of your video card, you may wish to tune the settings controlling the display:

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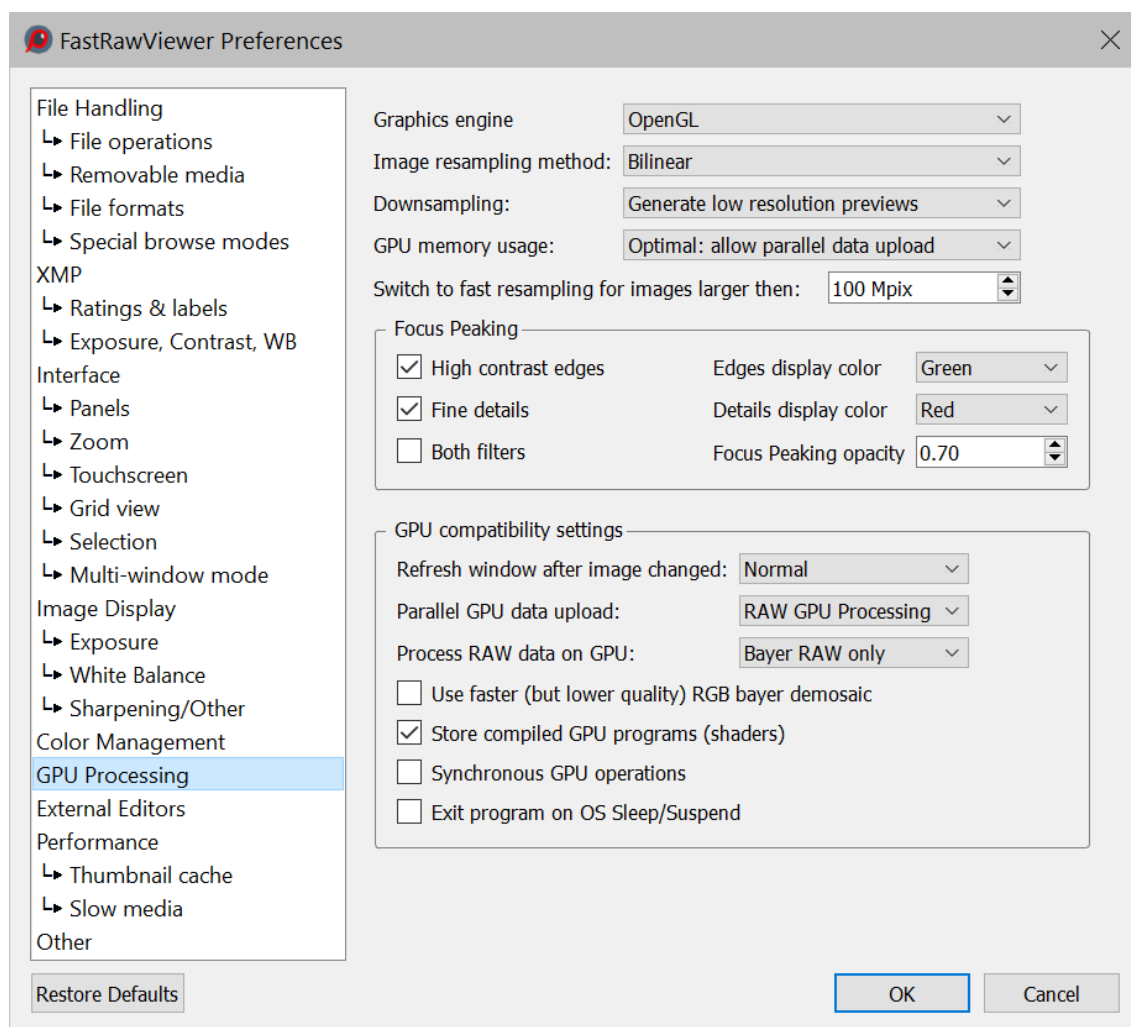
Graphics Engine: video mode (Windows only)

Two video modes are supported: DirectX 11 and OpenGL. OpenGL mode is most of the cases *(but not always)* the fastest one.

Unfortunately, due to the multitude of GPU, driver version, OS combinations, it is impossible to provide some sort of universal recommendations. If performance is slow, or display problems are exists (incomplete redraw, black screen) try switching between DirectX 11 and OpenGL.

GPU Memory Usage: video RAM

- Minimal/Minimal+ modes – those use as little video memory as possible, but they are guaranteed to be the slowest. Use if the GPU has 512MB or less of video RAM (<2GB for multi-window mode)
- Optimal mode – provides a balance between performance and video RAM usage.
- Maximal mode – the fastest one, this mode is recommended if more than 2 GB of video RAM is available (4GB for Multi-window mode).

Process RAW data on GPU: controls processing of the RAW data on the GPU

- None – all processing is performed on the central processor *(CPU)*, video card is loaded with fully prepared RGB images.
- Bayer RAW only – only Bayer RAW data will be processed on the GPU *(and a higher quality demosaicking will be used, see **De-Bayering (demosaicking): CPU and GPU modes**)*.
- All RAW files – all RAW data will be processed on the GPU.

When RAW data is processed on a GPU:

1. Adjustment to white balance, lightness/exposure, contrast have nearly instant effect
7. Better demosaicking
8. However, the first time the file is displayed *(on file open)* it can be slower, as more data is loaded into the GPU.

Note: Consequently, the optimal set of parameters depends on the hardware and software *(drivers)*; but it also depends on your preferred workflow: if you are using inspection tools heavily and/or adjusting rendering parameters often enough, especially if going through iterations, processing on GPU will save you time even if the video adapter is a slow one and the delay associated displaying the file for the first time is longer.

Image Resampling method – sets the method to be used for calculating zoom-in (going above 100% view):

- **No resampling** – for large zoom factors, the image will look as if it is constituted of small square tiles.

- **Bilinear resampling** – fast, mid-quality method.

- **Bicubic resampling** – high-quality method, a relatively fast vast video card is recommended.

Preferences – GPU Processing – Downsampling options – sets the method for zoom-out calculations:

- **None –** no additional processing is involved.

- **Generate low resolution previews** – most compatible method, but relatively slow.

- **Suppress downsampling artifacts –** we recommend turning this on when you are viewing a noisy image *(high ISO, underexposure, deep shadows bumped, etc.)*

- **Area resize –** allows for the best-quality smaller images, but requires a high-performance video card.

Default settings are optimized for low performance *(older)* video cards, but if you happen to have one of modern cards *(including those based on Intel HD4xxx and higher),* we recommend changing the settings in the following way:

1. Turn on Preferences – GPU Processing – Image resampling method – Bicubic.

9. Set **Preferences – GPU Processing – Image downsampling** to Area resize

In this case, the amount of the data transferred into the video card is minimized, and the image display is faster.

Other video adapters' compatibility parameters

In some cases *(older video cards, buggy drivers)* you may encounter equipment compatibility problems. In this case, you may need to use the compatibility options under the **Preferences – GPU Processing – GPU Compatibility settings** section:

- **Synchronous GPU Operations** turns on a slower but more stable mode operation for the misbehaving video cards.

- **Refresh window after image changed** – sets the mode for forced refresh of the screen

  o **None** – don't use forced window refresh, the fastest mode

  o **Normal** – window refresh using standard methods

  o **Slight window resize** – the screen refresh is implemented through the slight resize of the window. You may want to turn this mode on if the images on the screen are not redrawn properly.

Exit program on OS Sleep/suspend – some versions of Windows video card drivers perform an incorrect wake up and **FastRawViewer** crashes when the computer wakes up after Sleep/Suspend. In this case, you will need to use this mode and start **FastRawViewer** again each time the computer wakes up.

Troubleshooting

Windows: Changing the Active Graphics Engine

In some cases *(to the best of our knowledge, this will only happen due to an old graphics driver),* **FastRawViewer** cannot use the automatically selected graphics engine.

When this happens, one of the following warnings is displayed:

OpenGL mode, unsupported version of OpenGL
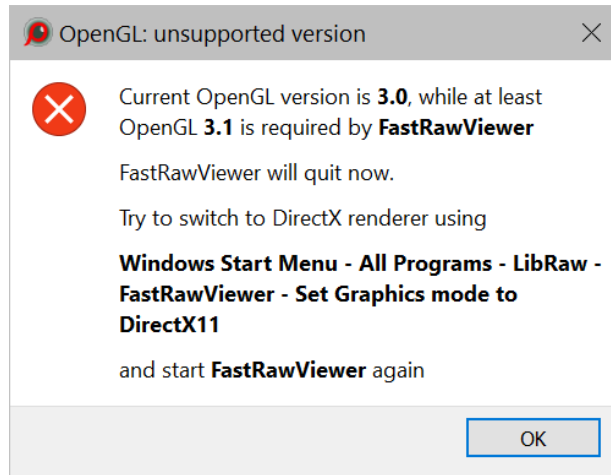
FastRawViewer informs the user that the version of OpenGL made available by the OS is not recent enough for the program to operate, and offers to manually switch to the graphics acceleration through DirectX 11 *(see below, the section "Manually Changing Graphics Modes").*

OpenGL mode, context is not initialized properly
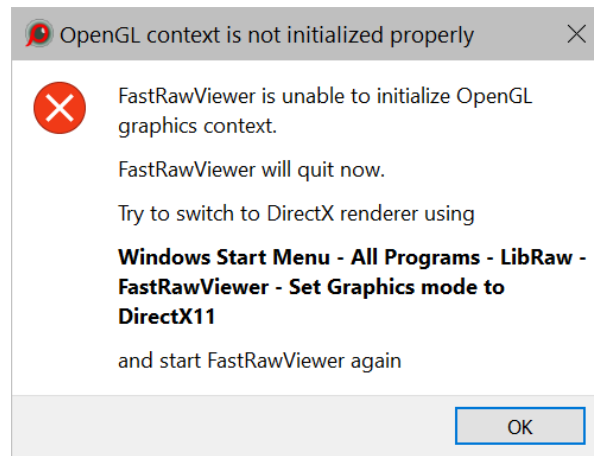
FastRawViewer informs the user that the version of OpenGL available in the system does not support the features necessary for the program to operate, and offers to manually switch to the graphics acceleration through DirectX 9 *(see below, the section "Manually Changing Graphics Modes").*

DirectX11, context is not initialized properly
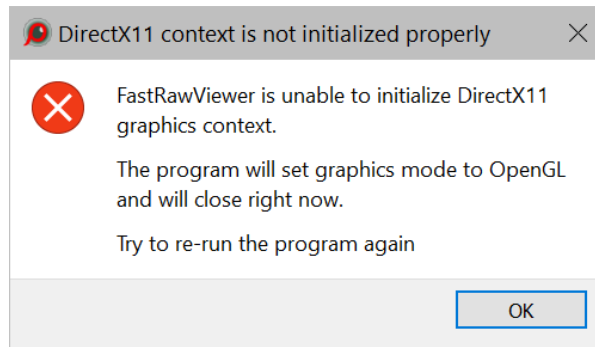
FastRawViewer informs the user that the version of DirectX 11 available in the system does not support the features necessary for the program to operate; and switches to DirectX9, which will be used upon the next program launch.

Manually Changing Graphics Modes

When installing **FastRawViewer** on a Windows platform**,** several additional items are installed into the Start menu, which allow one to change the graphics engine without launching **FastRawViewer** *(if the automatically selected graphics engine turns to be inadequate, then access to the settings is impossible, as the program itself cannot be launched).*

The following is accessible:

Windows XP – Windows 7, Windows 10 *(and Windows 8 with an installed Start8 or Classic Shell)*

Windows menu – All programs – LibRaw – FastRawViewer, Set **Graphics Mode** to:

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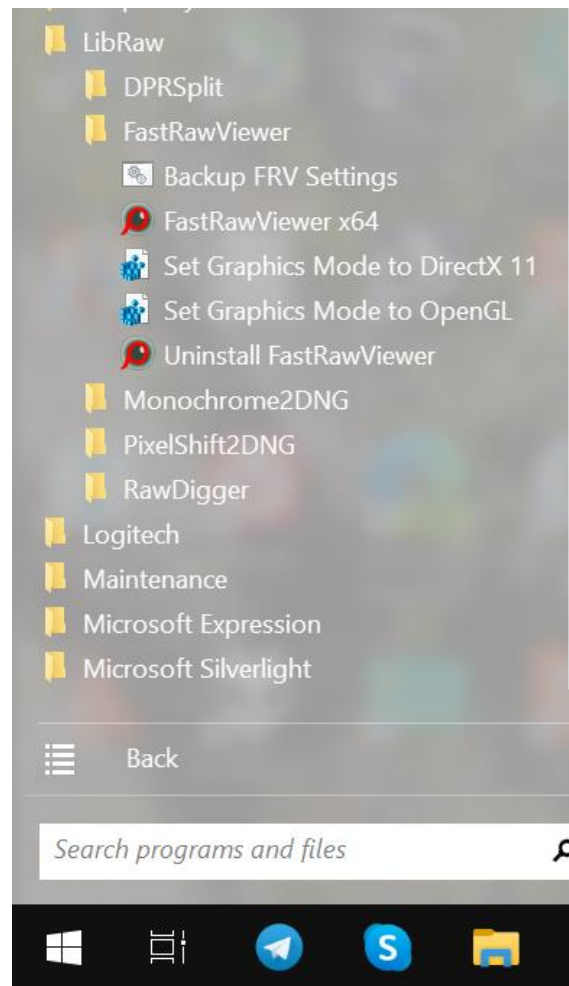
The Registry scripts shown above must be used in the case that **FastRawViewer** informs the user that the available version of OpenGL is inadequate and suggests switching to DirectX.

Scripts that switch video modes will disable **Process RAW data on GPU mode**, should you wish to continue using it, please switch it back manually via Preferences **– GPU Processing**

Black Screen in Image Display Window

When opening a file, a black screen is shown instead of the image.

This problem is due to some incompatibility between **FastRawViewer** and the installed graphics drivers.

Possible solutions:

1. Switch to the other version of the graphics engine *(if you're using OpenGL – change to DirectX and vice versa)*. A description of the engine switch is given in the previous section.

10. Update the driver of your video card to the newest version.

If neither of the above-listed helped you, turn on the debug log *(see below «Debug Information»)*, restart the program, open a RAW file, and send the debug log to tech support at http://www.fastrawviewer.com/contact/Technical-support or support@fastrawviewer.com

Other problems

If your problem is not listed above, then, to make troubleshooting faster, please turn on your Debug Log, *(see below)* and when contacting support please attach a copy of the debug information.

Debug Information (Debug log)

To turn on the output of debug information, turn **Other – Debug log messages** in the Preferences to 'All', **Save Debug log to file: Yes, remove on quit** and restart the application.

If an error occurs, go to Menu – Help – Show Debug log in Explorer (macOS: Reveal Debug log in Finder). A window in Windows Explorer/macOS Finder will open, set to the debug log. Attach this log to your e-mail to tech support.

The debug log can be viewed through Menu – Help – Debug log

Program Settings

File Handling

This group of settings controls the file processing rules.
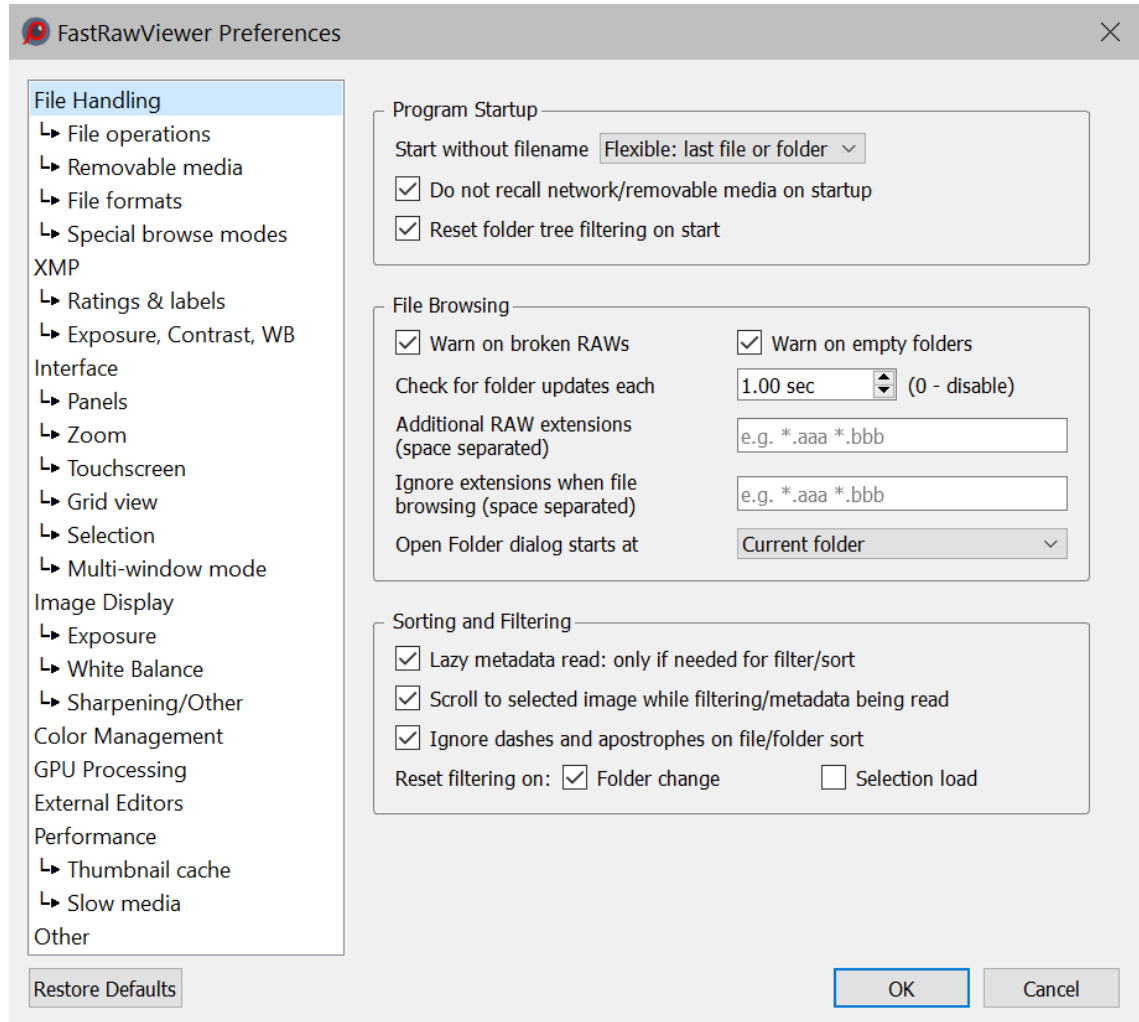
Program startup group

- **Start without filename** – to set the behavior if **FastRawViewer** was started without passing a filename to view:

  o **Empty Screen** – **FastRawViewer** starts up "without file".

  o **Last opened file** – opens the top *(last)* file from the Recent Files list.

  o **Last visited folder** – opens the folder from the list of Recent Folders.

  o **Specified folder** – allows you to set a "start folder".

  o **Flexible, last file or folder** – opens last file or last folder, what it was later.

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- **Do not recall network/removable media** – forbids the automatic display of files/folders from network volumes and removable media.

- **Reset folder tree filtering on start** – will clear folder filtering on program start.

File Browsing group

- **Warn on broken RAWs** – turns on the warning if a damaged RAW file is encountered.

- **Warn on empty Folders** – turns on notifications for situations when folders have no files the program can process.

- **Check for folder updates each** – sets the refresh rate for the list of files in the current folder *(if the folder changes, for instance other files are copied into it, then it won't be reread very often).*

- **Additional RAW extensions** – additional extensions for the RAW files **FastRawViewer** should process *(appended to the built-in extension list).*

- **Ignore extensions when file browsing** – this setting allows the user to supply a list of file extensions. Files having the extensions listed here:
  o will be ignored during file browsing;
  o will not be displayed in the "Open file" dialogue window.

- **Open folder dialog starts at** – sets the folder at which the "**Open Folder**" dialog starts:
  o **Current folder** – Current folder.
  o **One** level **up** – One level up.
  o **Specified folder** – the folder specified by the user, always the same *(until a different folder is specified here).*

Sorting and Filtering Group

This group controls behavior for the sorting and filtering of files in the current folder.

- **Lazy metadata read** – if, for the current sorting/filtering method, file metadata (EXIF or XMP) isn't necessary, then metadata won't be read *(ahead).*

- **Reset filtering on folder change** – if this setting is turned on, then file filtering will be turned off when changing the current folder.

- **Reset filtering on selection load** – will reset file filtering when **Menu – Select Load/Append selection from file** is used. Without this option only not filtered files will marked based on file list loaded, while filtered out will remain invisible and so unmarked.

- **Scroll to selected image while filtering/metadata being read** – if metadata is necessary for filtering/sorting, then the files in the current folder will be re-sorted/re-filtered as metadata reading progresses. When this setting is turned on, Grid/Filmstrip will auto-scroll to the currently selected file *(meaning scroll the Grid/Filmstrip at the same time as re-sorting/filtering – it will automatically return to the current file).*

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- **Ignore dashes and apostrophes on file/folder sort** – sorts files without accounting for punctuation marks in filenames.

File operations

This page contains the settings related to file operations: copying, moving, and renaming.
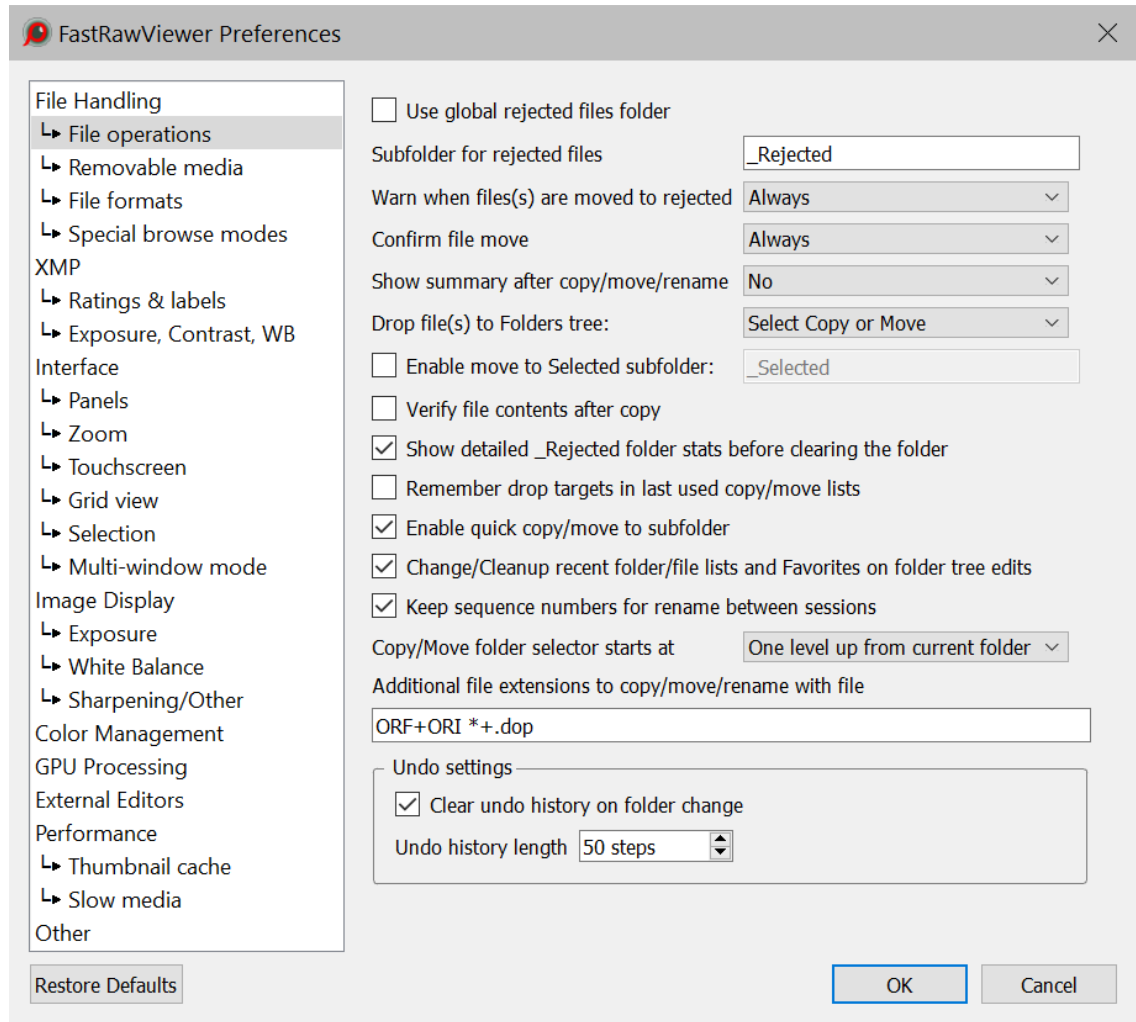
- **Use global rejected folder** – sets the folder for Rejected files as a global folder, or as a subfolder in the current folder *(checkbox is unchecked).*

- **Subfolder for rejected files** – the name of the subfolder to store the rejected files.

- **Warn when file(s) are moved to rejected** – customizes the warning settings for when files are moved to the _Rejected subfolder:
  - o **No** – never warn me.
  - o **Always** – always warn me.
  - o **Multiple files** – warn only moving several files to the _Rejected subfolder.

- **Confirm file move** – customizes the warning about moving a file(s) to the same destination as for the previous operation, with same options as for the setting directly above this.

- **Show summary after copy/move/rename** – whether or not to show a pop-up confirming a successful file operation, with options:
  - **No** – never show.
  - **If progress was not displayed** – yes, if a dialogue with the operation's progress was not displayed.
  - **Always** – always show.

- **Drop file(s) to folders tree** – allows one to select one of the following drop modes:
  - **Copy w/o prompt** – the file is copied; no user confirmation is requested.
  - **Select copy or move** – at each drop action, the user will be prompted to select what to do with the file *(copy, move, cancel the action)*.
  - **Move files** – the files will be moved, while the request for confirmation is controlled by the **Confirm file move** checkbox in the same **Copy/Move/Reject** pane.

- **Enable move to _Selected subfolder** – turns on support for the _Selected subfolder, you can set a custom name for it in the neighboring field.

- **Verify file contents after copy** – turns on the verification of files after copying or moving a file to another file system.

- **Show detailed _Rejected folder stats before clearing the folder** – enables extended statistics for files to be deleted: *(NN RAW files, MM RAW+JPEG…)*

- **Remember drop targets in last used copy/move lists** – turns on the recording of the names of folders that are used in drag and drop to the list of folders in copy file to/move file to.

- **Change/Cleanup recent folders/file lists and favorites on folder tree edits** – when renaming folders, whether to rename/remove elements in the Recent files/Recent folders/Favorite folders lists, etc.

- **Keep sequence numbers for rename between sessions** – this turns on saving file sequence numbers when renaming so that a new FastRawViewer session starts rename counter from the last number used in the previous session +1.

- **Allow move/reject for locked files** (Mac only) – allows for the moving/copying of locked files.

- **Copy/Move folder selector starts at** – controls the dialog to select a destination folder when preforming copy/move operations, with the following options:
  - **Last used** – the folder that was used last for Copy or Move operation *(for Copy and Move, separate "last used" lists are kept)*.
  - **One level up from last used** – a folder one level above *("parent")* the previous option.
  - **Current folder** – current folder
  - **One level up from current folder** – a folder one level above *("parent")* the previous option.

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- o **Specified folder** – the specified folder *(an additional text line input will pop up to enter the folder path with folder selection button).*

- **Additional file extensions to copy/move with file.** Allows one to list the additional file extensions of the files to be copied/moved along with the main (raw) file of the given extension.
  Syntax: RAWext+AUXext, several such pairs can be listed, separated by spaces. If AUXExt starts with a dot, then the extension will be added to the end of the FILENAME.RAWext (FILENAME.RAWext.AUXExt); if it starts with a letter, then RAWext will be replaced by AUXext, forming FILENAME.AUXExt. An asterisk (*) can be indicated in place of RAWext, in this case, this will be applied to all files.
  Default: ORF+ORI *+.dop
  means: copy FILENAME.ORI along with FILENAME.ORF, and copy FILENAME.EXT.dop along with FILENAME.EXT *(.dop is a DXO Photolab file containing metadata)*
  Attention: the rules that govern copying JPEG, XMP, .rpps are defined separately via the Handle RAW+JPEG together, Use XMP, Write RPPS files settings, accordingly.

- **Undo settings –** Customizing the Undo mode:
  - o **Clear undo history on folder change –** clears the undo history when the undo is changed.
  - o **Undo history length –** sets the number of undo levels.

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Removable Media

This group of settings sets the specifics of work with removable media and network volumes.
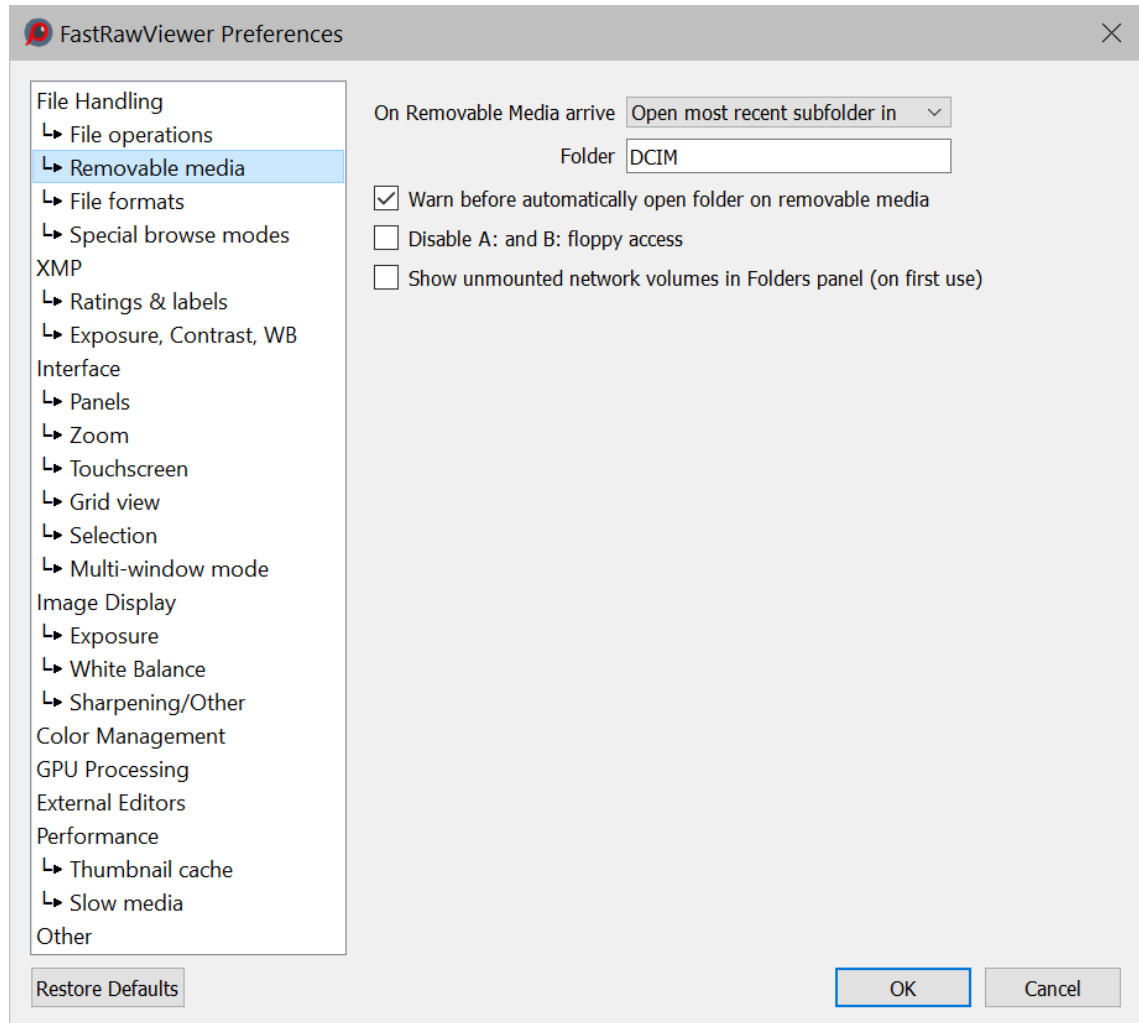
- **On removable media arrive –** what to do when removable media is detected:
    - **Open most recent subfolder in** – opens the most recent *(by date of modification)* subfolder in the selected folder *(/DCIM by default)*.
    - **Open folder** – opens the selected folder.
    - **Do nothing** – Do Nothing.
    - **Open in subfolder browse mode –** opens the indicated folder together with the nested folders *(with this, the depth of subfolder browsing is fixed: two levels)*.
- **Warn before automatically open folder on removable media –** display a warning before automatically opening a folder on removable media**.**
- **Disable A: and B: floppy access –** prevents any access to the A: and B: drives, as well as monitoring of changing media for those drives *(**Windows** only)*. This preference is intended

for the *(fairly common in our day)* case of a computer having a floppy drive controller, and one or two drives being "visible" to the system, though they're not actually present.

- **Show unmounted network volumes in Folders panel**
  – this setting will switch on the display of the contents of the current unmounted volume in this panel *(if this setting is Off, the network devices that do not have a drive letter assigned will not be displayed).*

File formats
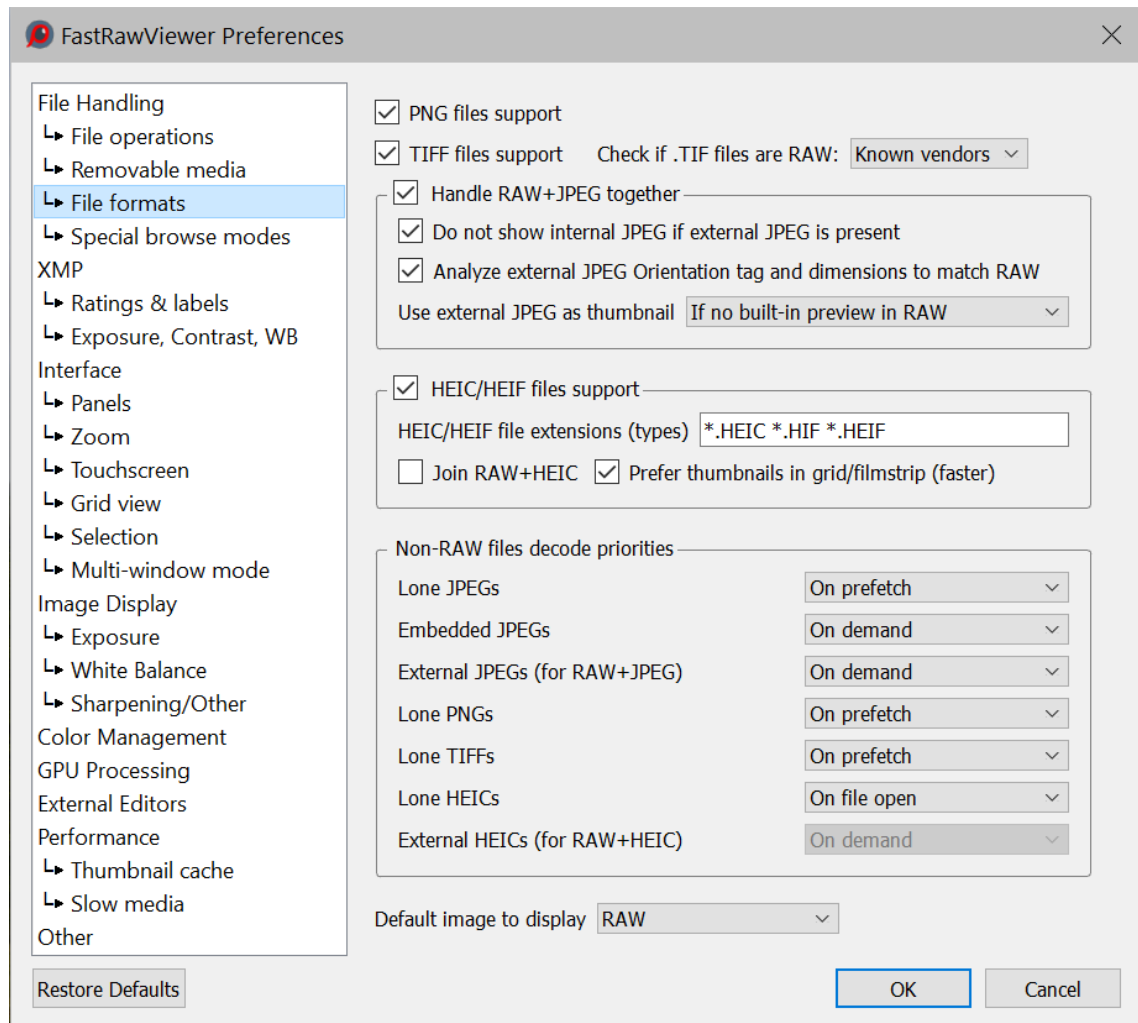
- **PNG file support, TIFF files support** – turns on support for the respective formats.

- **Check if .TIF files are RAW**:   The point of this is the following: some (old) cameras wrote RAW files with the .TIF extension. Accordingly, **FastRawViewer** checked each TIF file smaller than **MaxTIFFForRAWCheck** hidden parameter setting (see below) to see "is this a RAW file," which in some cases leads to false triggers. This setting organizes the above-described checking procedure in the following way:

  o **Do not check**: consider .TIF files to be just TIF files, without suspecting them of being RAW

  o **Known vendors**: check the file to determine camera manufacturer, only trust a "this is RAW" verdict if the "vendor / number of colors in the file" combination fits known cases.   This is the default, and it should work in 99% of cases

  o **All TIFF files**: check all TIFF files regardless of vendor tags.

- **Handle RAW+JPEG together** – turns on the pairing of RAW and JPEG of the same name: displaying them as different representations of the same image, and treating them as a single

unit for move operations, so that both are relocated to a different folder when a move operation is invoked.

- o **Do not show internal JPEG if external JPEG is present** – removes the embedded JPEG from the list of available representations if there is an external JPEG *(which, usually, has better resolution)*.

- o **Analyze external JPEG Orientation tag and image dimensions to match RAW** – **FastRawViewer** will rotate the external JPEG if necessary, to match the orientation of the RAW image.

- o **Use external JPEG as thumbnail**: use external (associated) JPEG for thumbnail generation (in most cases this is much slower than embedded JPEG decoding):

  - ▪ **Do not use**: if no embedded thumbnail present, 'No preview' will be displayed in Grid/Filmstrip
  - ▪ **If no built-in preview in RAW**: use only if no embedded preview present in RAW.
  - ▪ **Prefer external JPEG**: use associated JPEG (if any) even if embedded preview present in RAW.

- **HEIC/HEIF files support** – turns on support for HEIC/HEIF files.

  - o **HEIC/HEIF file extensions (types)** – the list of file extensions for files that are considered to be HEIC/HEIF

  - o **Join RAW+HEIC** – joins a RAW and a HEIC/HEIF (analogous to RAW+JPEG mode)

  - o Prefer thumbnails in grid/filmstrip – in cases when the size of the thumbnail embedded in the HEIC file is smaller than the thumbnail size set in **FastRawViewer**, this setting controls whether to "zoom up" the embedded thumbnail (this is quicker) or build a preview from the full-resolution data.

- **Non-RAW files decode priorities** – sets the decoding mode for each RGB file type (Lone JPEGs/TIFFs/PNGs, not paired with RAW; embedded JPEGs, contained in RAW files; external JPEGs, paired with RAW, as in RAW+JPEG:

  - o **None** – do not decode at all *(only for Embedded/External JPEGs)*

  - o **On demand** – the decoding will happen during switching from RAW to JPEG *(only for Embedded/External JPEGs also)*

  - o **On file open** – the decoding will happen during the file load

  - o **On prefetch** – the decoding happens in advance, decoded data is cached.

- **Default image to display** – which representation to display when switching to the next file:

  - o **Same as** previous – the same as for the current file.

  - o **RAW, internal JPEG, external JPEG** – explicit designation of the representation.

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Special browse modes

This group of settings controls special folder browse modes
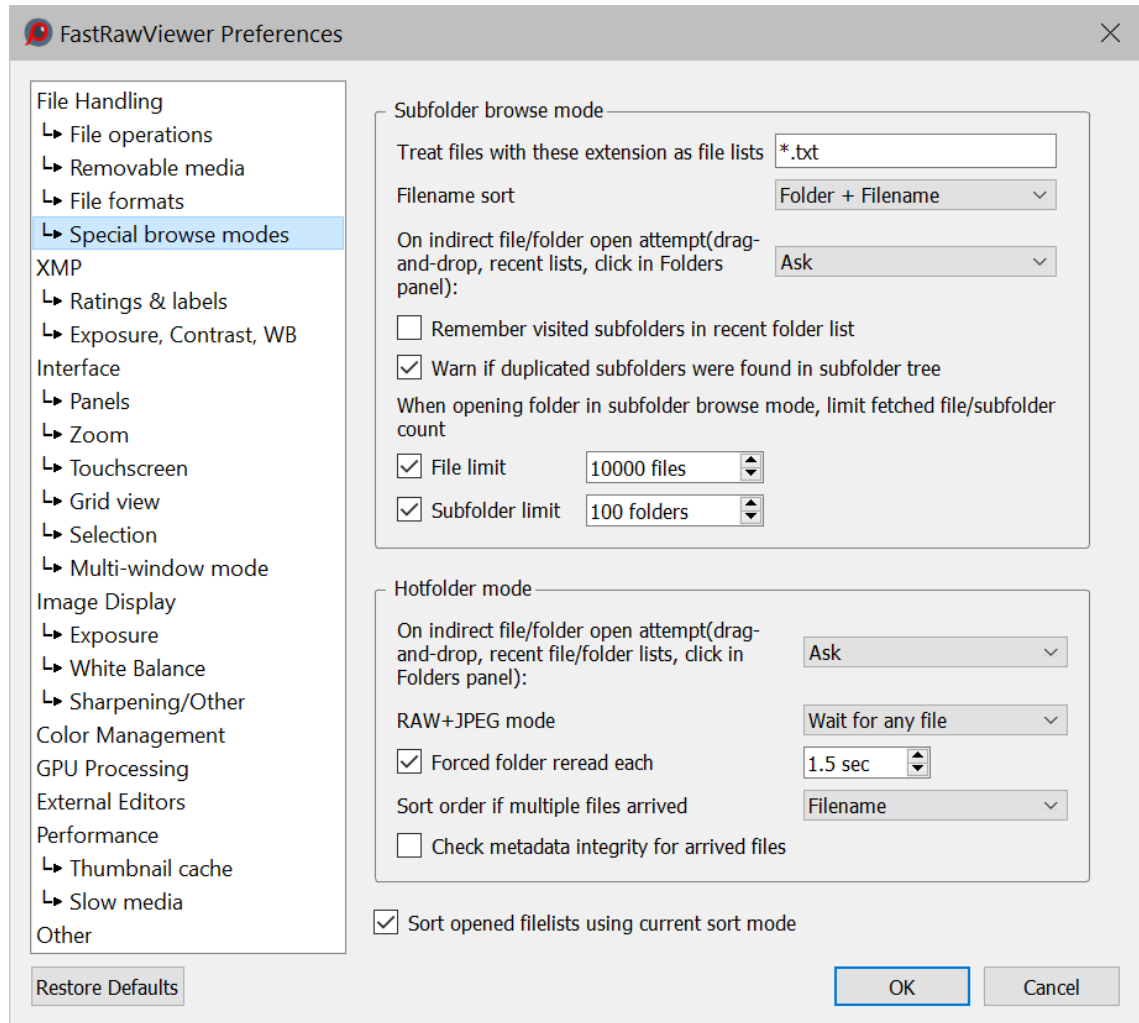
Subfolder browse mode group: settings for subfolder browse mode:

- **Treat files with these extensions as file lists** – sets the list of extensions that will be treated as files containing lists of files: this will open them as a list when Drag and dropping, and these extensions will be offered when reading or saving lists of files.

- Filename sort in subfolder browse mode:
  - **Folder + Filename** – consider the full name of the folder where the file is located when sorting
  - **Filename** – sort only by filename

- **On indirect file/folder open attempt**…. what to do with an *indirect* move out of subfolder browse mode:
  - **Ignore**: stay in subfolder browse mode.
  - **Ask**: ask

- o **Open w/o confirmation**: move to default mode without asking.

- **Remember visited subfolders in recent folder list:** the subfolders that were visited when viewing files in subfolder browse mode will be remembered in the list of Recent folders.

- **Warn if duplicated subfolders were found in subfolder tree:** if, when scanning the subfolder tree, duplicates are found *(cyclic symbolic links, symbolic links or folders with the same name but different letter cases)*, then a warning will be displayed. If this setting is turned off, duplicates will be ignored.

- Limits on the depths of subfolder scanning

  - o **File limit**: stop scanning if the indicated number of files is found

  - o **Subfolder limit**: stop scanning if the indicated number of subfolders is found.
    This limit is not a hard one: if, while scanning, 99 subfolders are found, and in the next folder there are a further 1000, then in all 1099 subfolders will be browsed, but the program will not go any deeper.

<u>Hotfolder mode</u> group: settings for folder monitoring mode:

- **On indirect file/folder open attempt….** – what to do if, while in Hotfolder mode, the current folder is changed, or there was an "indirect" file opening *(Drag and Drop):*
  - o **Ignore –** do not open the new file/folder, stay in Hotfolder mode.
  - o **Ask –** asks
  - o **Open w/o confirmation –** interrupt the Hotfolder mode, open the indicated file/folder.

- **RAW+JPEG mode:** this setting is available if
  - o **Wait for any file –** all files that appear in the folder will be opened.
  - o **Wait for RAW file –** only RAW files will be opened
  - o **Wait for pair –** only legitimate RAW+JPEG pairs will be opened

- **Forced folder reread each –** forces a reread of the folder with the indicated frequency *(if this is turned off, then only a notification from the operating system that "something in the folder has changed" will be used)*.

- **Sort order if multiple files arrived –** if several files appear in the folder, they will be sorted according to this setting and the last of them will be displayed.

- **Check metadata integrity for arrived files –** for new files that appear, the integrity of the metadata will be checked.

<u>Filelist mode settings</u> <u>(not marked as group)</u>

- **Sort opened filelists using current sort mode –** if checked (default), opened file lists will be sorted according to current sort mode. If not checked: file list order will be preserved.

XMP

This group of settings controls the processing of XMP files
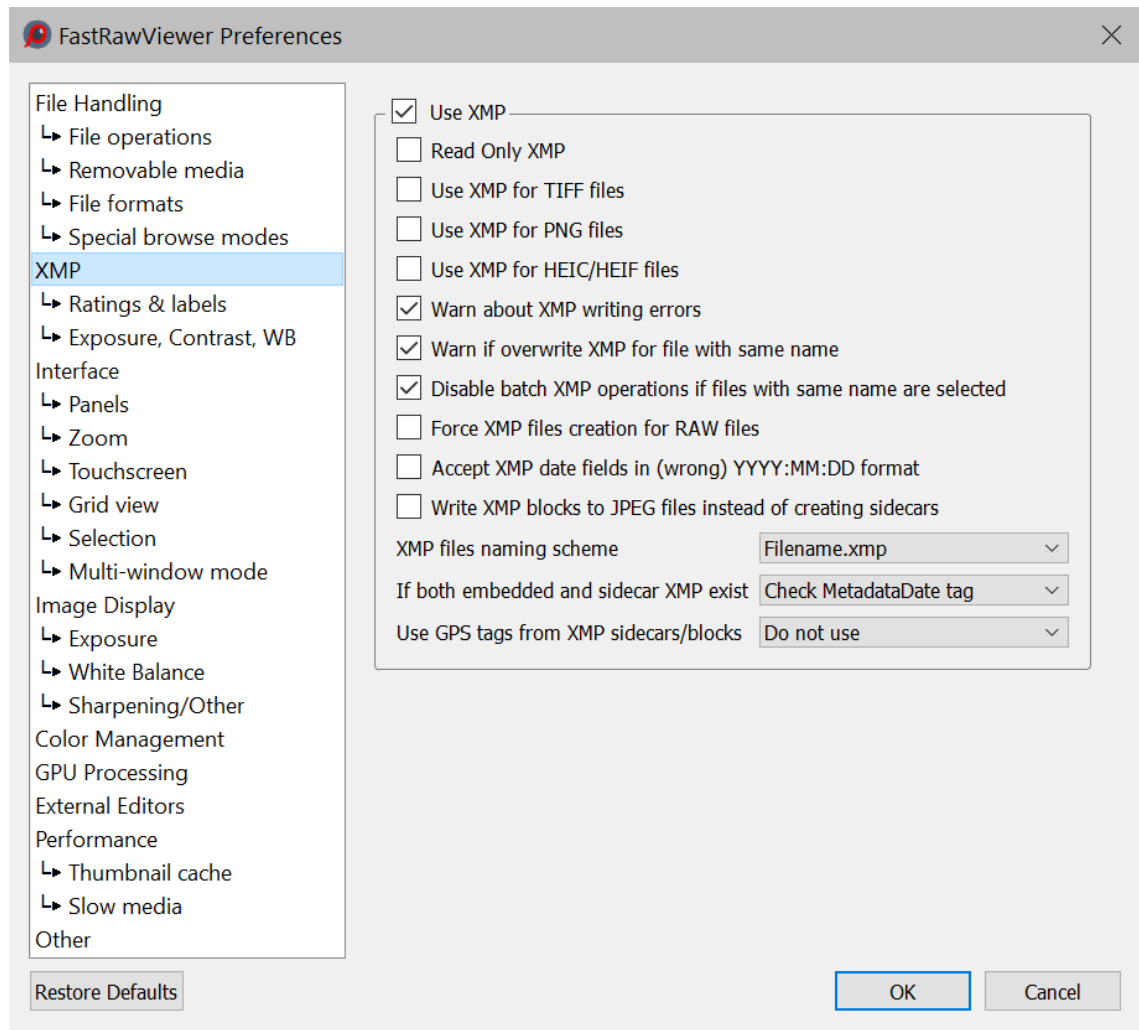
- **Use XMP** – turns on/off the use of XMP files.

- **Read Only XMP** – turns on the mode, where XMP files are read, but not changed.

- **Use XMP for TIFF/PNG/HEIC-HEIF files** – turns on XMP support for files of the indicated type.

- **Warn about XMP writing errors** – informs the user of any errors that occurred during the XMP file recording process.

- **Warn if overwrite XMP for file with same name** – If it is "on", **FastRawViewer** will ask user for confirmation before overwriting an XMP sidecar file containing settings for a file with the same name but different extension.

- **Disable batch XMP operations if files with same name are selected** – If it is "on" *(default)* and the selected files contain filenames that differ in extension only, the batch editing of XMP *(setting or changing orientation, labels, ratings)* will be grayed out / disabled in Menus and in context menu.

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- **Force XMP file creation for RAW files** – turns on the unconditional creation of XMP files, even if no adjustments were changed manually while viewing the RAW file *(those adjustments are orientation, white balance, exposure adjustment, labels and ratings).* Useful for automatic propagation of adjustments to the next file.

- **Accept XMP date fields in (wrong) YYYY:MM:DD format** – some applications may write incorrect XMP date tags with YYYY:MM:DD date format *(instead of ISO 8061 YYYY-MM-DD)*. This setting allows correct parsing of that tags. Disabled by default because most tools use correct format.

- **Write XMP blocks to JPEG files instead of creating sidecars** – when working with JPEG files, record XMP blocks directly to the JPEG files, instead of creating sidecar files.

  o **Fallback to XMP sidecar if XMP block write to JPEG fails** – if XMP block could not be recorded into JPEG file *(e.g. because of read-only file)*, **FastRawViewer** will create XMP sidecar file for this JPEG file.

  o **Restore original JPEG file date after writing XMP block –** if this setting is turned on, then after writing an XMP block, the original file modification data will be restored.

  o **RAW+JPEG mode: embed XMP block into JPEG** – in RAW+JPEG mode, writes not only XMP sidecars, but also XMP blocks into JPEG files.

- **XMP files naming scheme:**

  o **Filename.xmp, Filename.XMP –** sets the naming scheme to be without indicating the source extension of the RAW file, and selects the preferred extension case.

  o Filename.**ext.xmp, Filename.ext.XMP** – naming scheme with source extensions is set.

- **If both embedded and sidecar….** – sets the criterion for choosing between two XMP sets of data, embedded in the file or XMP sidecar: analyze the metadata, or always take the sidecar.

- **Use GPS tags from XMP…**:

  o Do not use: always take GPS data (only) from EXIF

  o **Prefer EXIF**, Prefer XMP: if GPS data is available both in EXIF and in the XMP, prefer the source that is indicated

Ratings & Labels

This section dedicated to XMP:Rating and XMP:Label tags creation
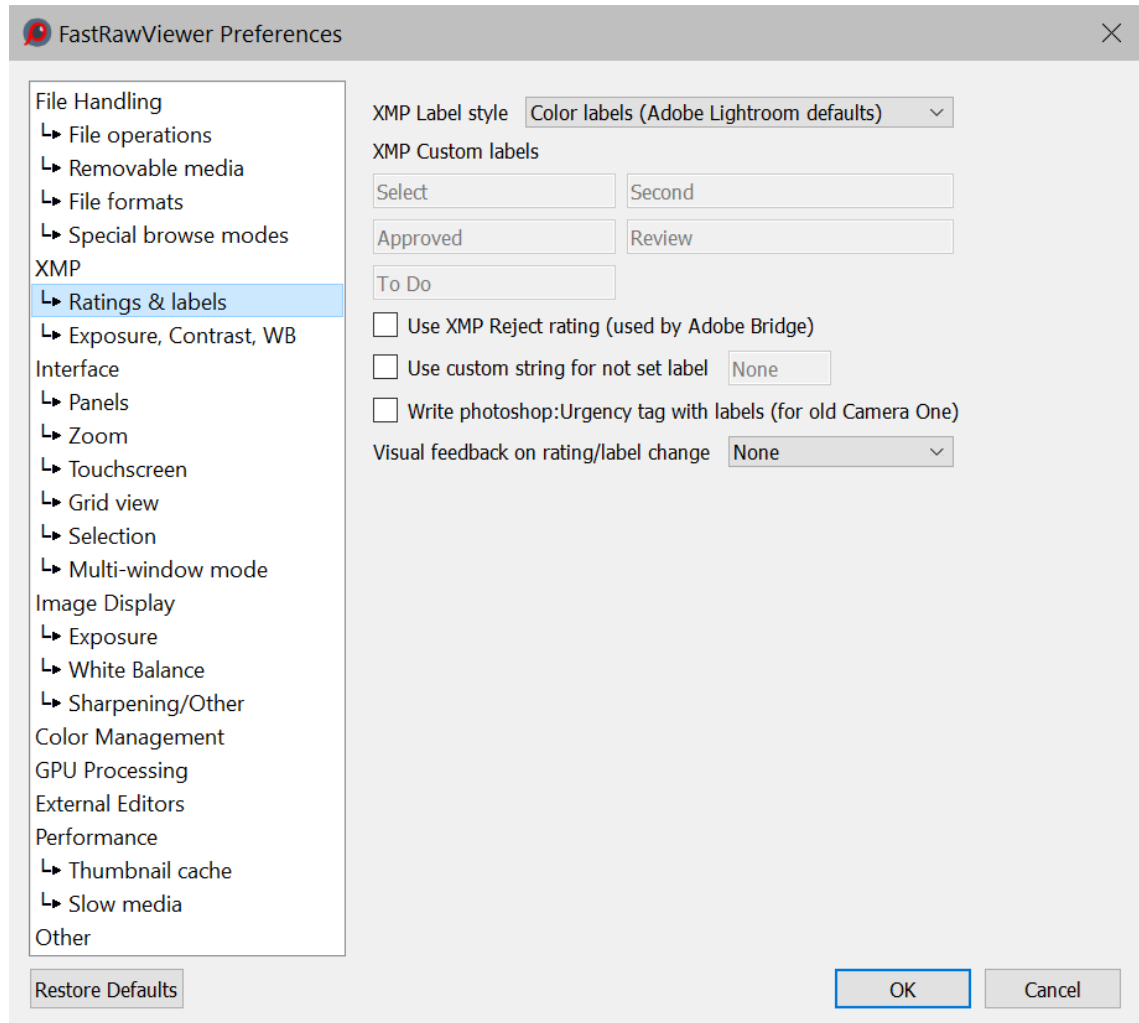
- **Use XMP Reject Rating** – turns on the possibility of setting the rating to -1. This rating is supported in Adobe Bridge. The setting is turned on automatically when selecting XMP Label Style: Adobe Bridge.

- **XMP Label Style** – sets the label format in XMP files:

  o **Adobe Bridge**: Select, Second, Approved, Review, To Do.

  o **Color labels/Adobe Lightroom**: Red, Yellow, Green, Blue, Purple.

  o **Review status/Adobe Lightroom**: To Delete, Color Correction Needed, Good to Use, Retouching Needed, To Print.

  o **Custom** – user labels *(any text you choose)*.

- **Use custom string for not set labels –** allows one to set text for a un-set mark *(if the text isn't set, then when setting a mark in "un-set" the xmp:Label tag is deleted from the XMP file).*

This is intended for use with the PhaseOne C1 program, which doesn't reread deleted tags from modified files, but does reread xmp:Label=None.

- **Write photoshop:Urgency tag with color labels (for PhaseOne C1)** – Turns on the recording of the XMP tag photoshop:Urgency, which is sometimes used by CaptureOne to recognize and set color labels. The setting is activated only if the **XMP labels style** is set in 'Color Labels' *(this is the default).* In other modes, the photoshop:Urgency tag is not modified: if it was in the XMP file, it stays unchanged.

- **Visual feedback on rating label change** – give easily-seen visual feedback when ratings/labels are changed *(as in Adobe Lightroom).*

Exposure, Contrast, WB

This section defines processing settings transfer to Adobe software
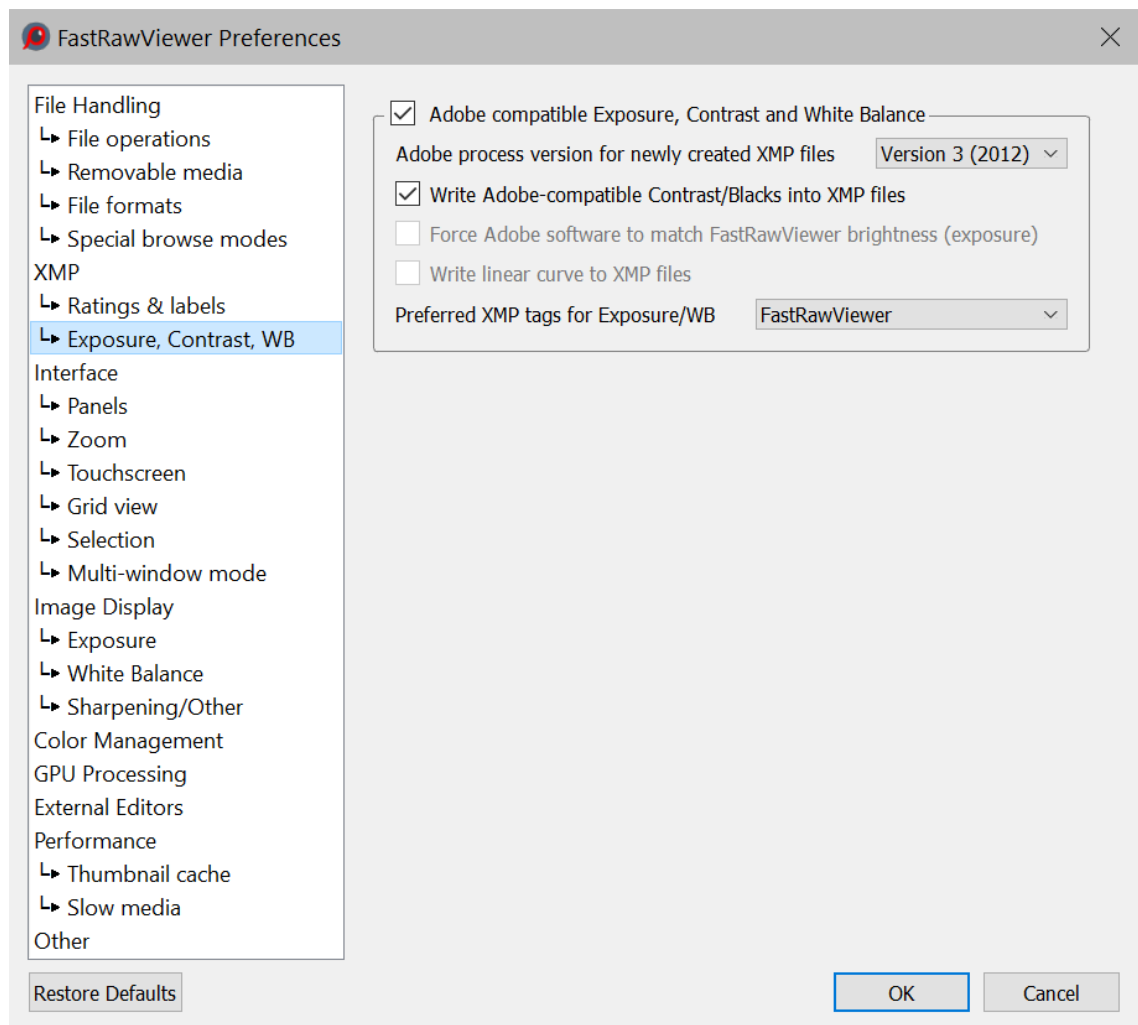
- **Adobe compatible Exposure and White Balance** – turns on reading and recording into XMP files exposure compensation and white balance in Adobe format:

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- **Adobe process version for newly created XMP files.** Default: Version 3 (2012), can be set to Version 1 (2003).... Version 5 (2019).

  Features:

  - If the tag **crs:ProcessVersion** is set already in XMP file, the version doesn't change and the exposure is written according to the version.

  - If the **crs:ProcessVersion** tag isn't present in XMP file, then it's added in accordance to the setting (this way, XMP files created in older versions of **FastRawViewer** and then not changed by ACR/LR will be "upgraded");

  - For Version 3 – Version 5 process, Exposure2012 *(equal to exposure correction in FastRawViewer plus Adobe Shift)* and the tags Contrast2012, Whites2012, Blacks2012 *(set to 0, if these tags are not present in the file)* are recorded.

  - For the Version 1/2 (2003/2010) processes the tags crs:Exposure, crs:Brightness, and crs:Contrast are recorded *(if the file already had the values for those tags, they are preserved, otherwise they are set to 0).*

- **Write adobe-compatible Contrast/Blacks into XMP files** – enables the recording of the contrast settings in the Adobe-compatible format.

- **Force Adobe software to match FastRawViewer brightness** – Available only if the **Image Display - Exposure - Apply Adobe hidden exposure correction** setting is not checked. This will result in silent "exposure boost" / baseline exposure rolled off in Adobe CameraRAW/Lightroom, preventing false clipping indication and allowing to re-gain the highlights that are not truly clipped.

- **Write linear curve to XMP** – this setting It is available if the following is already selected:
  XMP - Exposure,Contrast,WB - Adobe process version: Version 2 (2010);
  Image display - Contrast curve type: any fixed contrast one *(sRGB, gamma 1.8, 2.2, L*);*
  If this new setting is enabled, Adobe-compatible exposure and white balance tags will be written with following additions and amendments:

  - the curve will be set to Linear *(both name and values)*

  - tag crs:Shadows will be set to 0

  - tag crs:ProcessVersion=5.7 will be forced

  - tags crs:ToneCurvePV2012, crs:ToneCurvePV2012Red, crs:ToneCurvePV2012Green, crs:ToneCurvePV2012Blue will be deleted

- **Preferred tags for Exposure/WB** – controls the priority of **FastRawViewer**/Adobe exposure and white tags:

  - **FastRawViewer** – use tags recorded in **FastRawViewer** (libraw:), if they exist.

  - Adobe Camera Raw/Lr – use Adobe tags

  - **Flexible: last recorded** – choose between **FastRawViewer**/Adobe according to the date of the last change made to the file.

Interface

The group of settings for user interface adjustments.
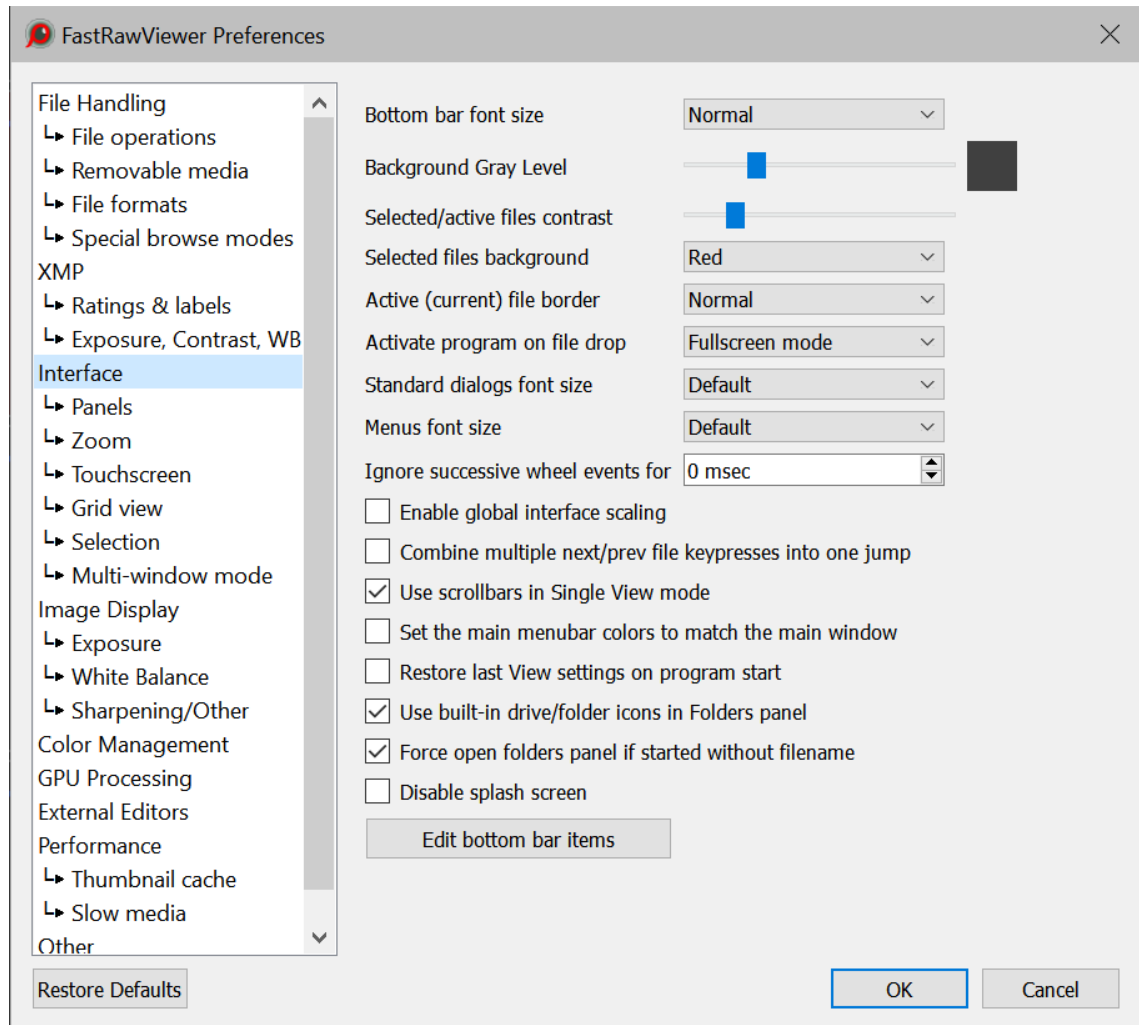
- **Bottom bar font size** – controls bottom bar font size (Small – Extra Large on Windows and Normal – Extra Large on macOS).

- **Background Gray level** allows you set the brightness of the main program window background.

- **Selected/active files contrast –** allows one to change the contrast *(against the FastRawViewer background)* of selected or active files when showing them in Grid mode or in the Filmstrip panel.

- **Selected files background –** allows one to set the background color for selected files.

- **Active (current) file border –** to set the color for the frame around the current file.

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- **Activate program on file drop –** controls program behavior for file Drag-n-Drop operations and if started in 'Single instance' mode:
  - o **None –** the program remains on the background (if it is already there)
  - o **Fullscreen –** the program brings itself to the foreground if it is in Fullscreen mode
  - o **Always –** the program brings itself to the foreground for both Fullscreen and "windowed" modes.

- **Standard dialogs font size** and **Menus font size –** allows to set non-default font size for system (standard) dialogs and for menus respectively.

- **Ignore successive wheel events for NN msec** – this setting is designed to tame the stream of events generated by mouse wheel, Apple Magic Mouse, or trackpad.

- **Enable global interface scaling** (and additional controls if checked): Controls global UI scaling, intended for HiDPI displays. If checked, additional drop-down will open with selectable choices:
  - o *Auto*: use automated scaling calculations
  - o *Manual*: use fixed UI items increase
  - o *Env. Variable*: use external settings via QT*SCALE* environment variables.

- **Combine multiple next/prev file keypresses into one jump:**
  With the default settings, FRV will store up to 5 clicks of the navigation buttons and executes them sequentially *(this can be turned off and back on using the DisableNextPrevQueue / EnableNextPrevQueue additional settings scripts).*

  If discussed setting is turned on:

  - o The size of the queue in which button clicks are stored is not limited.
  - o The queue is executed "in a single step" – the file to which the program needs to jump is calculated based on what is stored in the queue and the currently-open file; all intermediate files are skipped.

- **Use scrollbars in Single View mode**: turns on the Scrollbars in the single file view window.

- **Set the main menubar colors to match the main window** – *(Windows only)* colors of main menu bar will match main window color scheme
  <u>Note</u>: color of program top bar is controlled by Windows and could be edited only via Windows Colors Control Panel/PC Settings page.

- **Restore last View settings on program start** – when closing the program the following image display parameters are saved *(independent of the status of the settings)*:
  - Display mode (RGB, per-channel, BW Conversion)
  - Focus Peaking mode
  - Boost Shadows mode
  - Exposure correction on/off

  If **'Restore last View settings'** is turned on, then during the next start-up of the program, the above-listed parameters will be in effect.

- **Use built-in drive/folder icons in Folders panel** – show icons built-in into **FastRawViewer** in the Folders panel *(in several cases, using the system's icon can lead to problems).*

- **Force open Folders panel if started without filename –** if this setting is on, starting the program without a file to be opened, or with an invalid / non-existent filename will result in the display of Folders panel, even if this panel was switched off previously.

- **Disable splash screen** – switches off the display of logo at **FastRawViewer** start.

- **Edit bottom bar items** – launches the dialog that allows one edit the composition of the program's bottom bar.

Panels
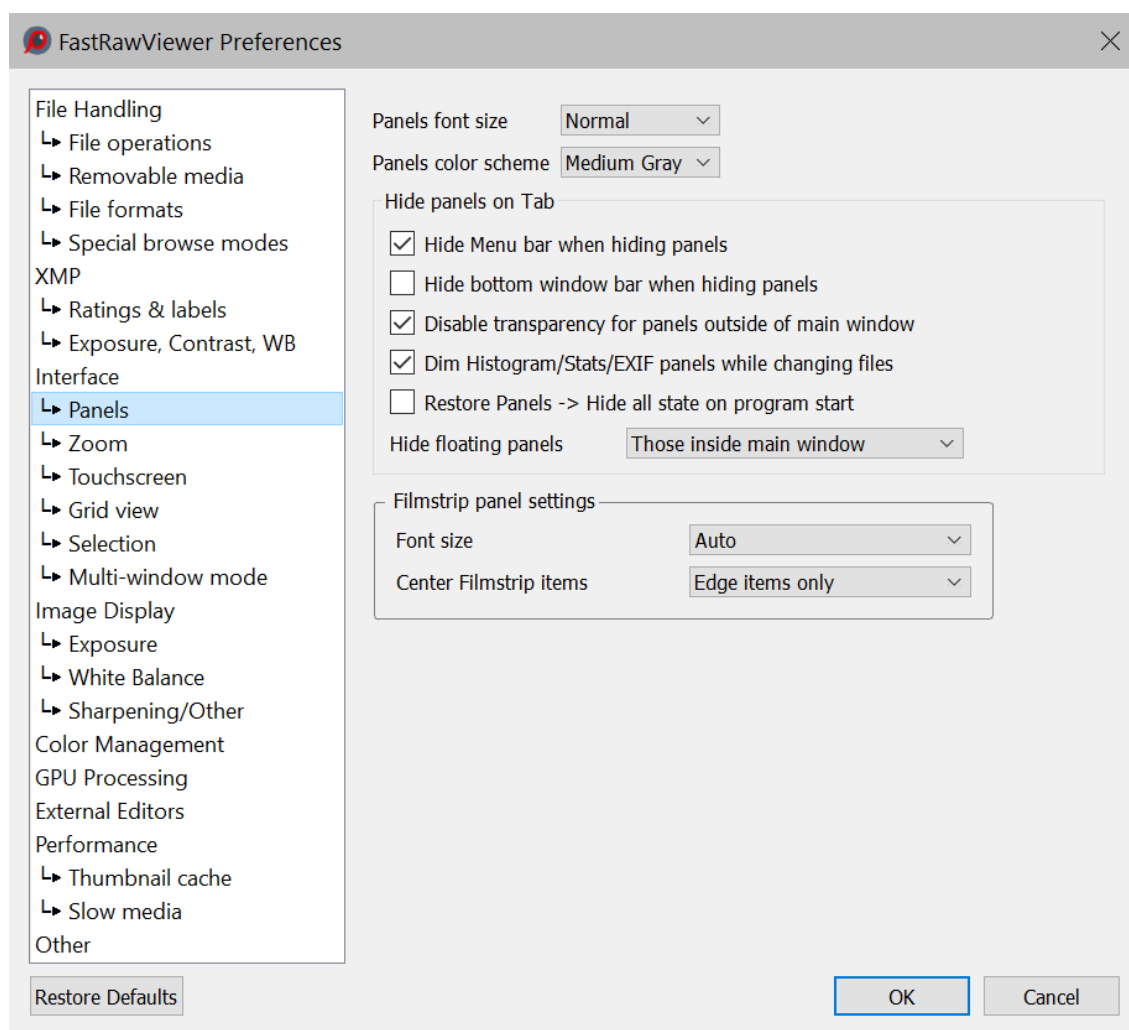
- **Panel's font size**: sets the font size in the informational panels.

- **Panels color scheme** – sets the brightness of the panel background.

- **Hide Menu bar when hiding information panels** – for the hide informational panels mode *(Tab),* controls if the menu bar should be hidden too.

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- **Hide bottom window bar when hiding information panels** – hide main program window status bar in 'hide information panels' *(Tab key)* mode.

- **Disable transparency for panels outside of main window** – allows disabling transparency for informational panels that are placed completely outside the main program window.

- **Dim Histogram/Stats/EXIF panels while changing files** – enables dimming of those panels for the time needed to switch to the next file. Dimming takes additional 6 to 15 milliseconds, if maximum performance is needed, you can turn this off.

- **Restore Panels -> Hide all state on program start** – allows the program to recall the "all panels are hidden" state when it's opened.

  Attention: the setting Interface -> *Force open Folders panel if started without filename* activates AFTER Restore Panels -> Hide All. If you want to always start without panels, you will need to either explicitly close them all, or turn off *Force open folders*.

- **Hide floating panels** – controls floating *(not "docked")* informational panels behavior on **Menu-Panels-Hide All panels** action:
  - **Hide all** – hide all panels
  - **Those inside main window** – hide only panels, that float within main program window
  - **Do not hide** – do not hide floating panels

- **Filmstrip panel font size**: selects font size for filmstrip panel:
  - **Auto** – the font size is set automatically, based on the setting for the Panel Font size and the preview size.
  - **Extra small…Extra Large** – the font size is set to the same as that of the Panels *(using the same setting)*.

- **Center Filmstrip items** – turns on Filmstrip automatic centering mode:
  - **No centering** – never center.
  - **Edge items only** – if the edge-most item is selected, it'll be moved to the center.
  - **Always center** – the active item will always be in the center.

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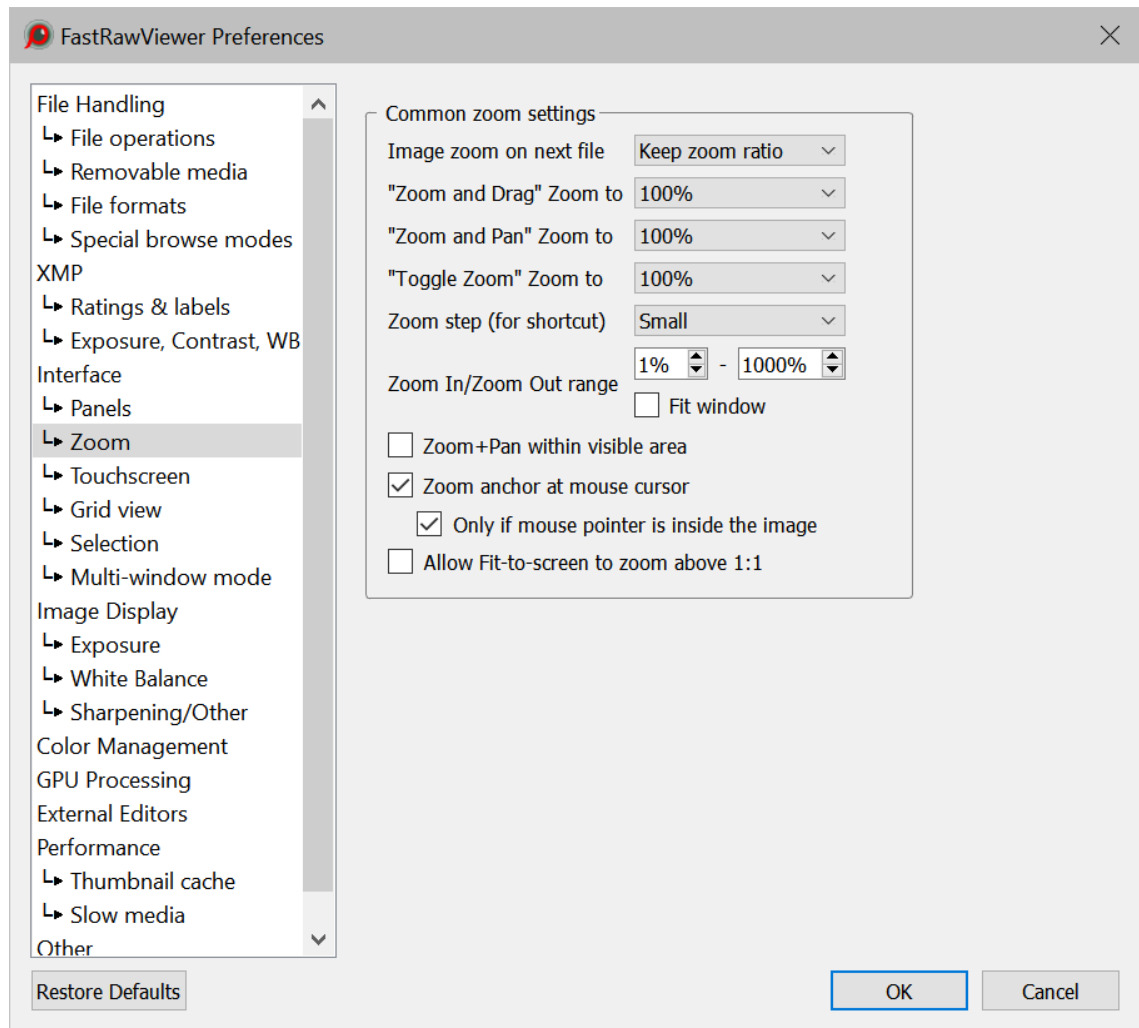
Zoom

- **Image zoom on next file** – sets the zoom factor to be used when displaying the next file:
  - **Keep zoom ratio** – will keep the zoom factor.
  - **Keep image width** – will keep the visible width of the image
  - **Fit to window** – the Fit to screen mode will be turned on.
  - **Fit to width** – the image takes up the entire width of the window.

- **"Zoom and Drag" Zoom to** – sets zoom factor to use in the Zoom and Drag mode *(Shift – left mouse click).*

- **"Zoom and Pan" Zoom to** – sets zoom factor to use in the Zoom and Pan mode *(Shift – right mouse click).*

- **"Toggle Zoom" Zoom to** – sets the magnification/zoom level used for the Toggle Zoom *(Z)* mode.

- **Zoom step (for shortcut)** – controls the zoom step for keyboard *(and mouse)* shortcuts:
  - o **Large** – fixed zoom step value of about 50%, to be used for keyboard control.
  - o **Medium** – zoom step is set to 20%.
  - o **Small** – zoom step is set to 5%.

    The last two settings are designed to be used while zooming with the Mouse Wheel or trackpad.

- **Zoom In/Zoom Out range** sets the range for zoom values for Zoom In/Out actions for any zoom mode, be it through menu, keyboard shortcuts, or mouse wheel.
  Fit to Window – sets the minimum zoom level such that the image fits in the window.

- **Zoom+Pan within visible area** – if this setting is on, then the panning will take place inside the area visible before the start of the panning. If it is off, then the panning will be over the entire image.

- **Allow Fit-to-screen to zoom above 1:1** – this allows one to zoom *(small)* images to more than 100% in the **Fit To Screen/Fit to Width** modes.

- **Zoom anchor at mouse cursor –** zooming will happen taking the position of the mouse cursor into account; the point underneath it will retain its position respective of the window during zooming.

  - o **Only if mouse cursor is inside the image**: the above setting will work only if mouse pointer is within visible image area.

- **Use Logical pixels for zoom calculation** *(available on Mac version and on Windows if Interface scaling is turned on):*
  - o If turned on *(default on Mac, "legacy" behavior)*, then the pixel in the screen is considered to be the "logical pixel" *(in the case of Retina, it's a block of 2x2 "physical" pixels)* and the calculation of the zoom size is done in these units.
  - o If turned off (default on Windows), the zoom value is calculated in "physical pixels", so for Retina screens the displayed zoom value will now be doubled, and at 100% zoom the image will be half the size compared to "legacy" behavior.

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Touchscreen

The settings in this group control working with the touchscreen (Windows version only)
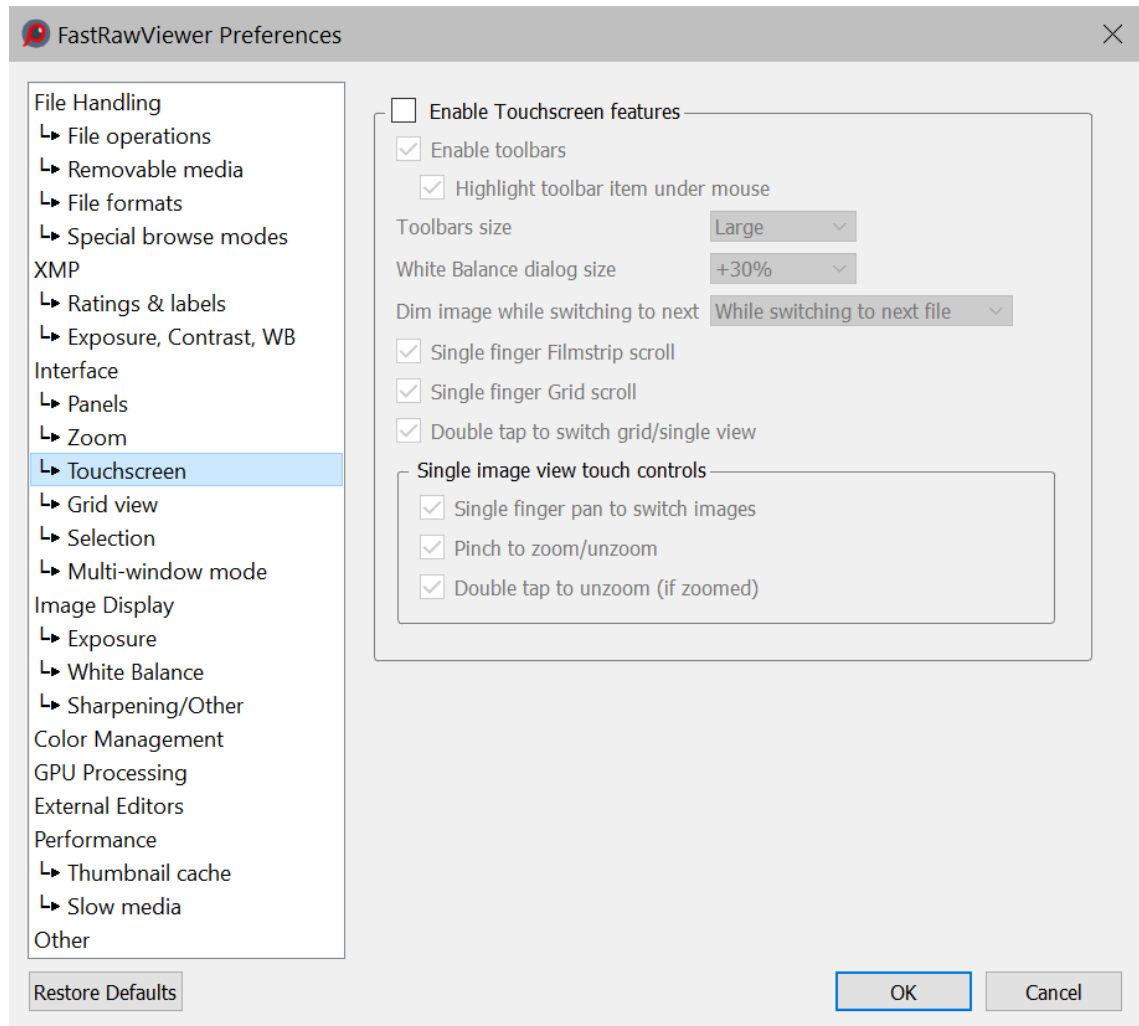
Touchscreen support is off by default, to turn it on one ought to use the setting **Enable Touchscreen features**. After it's turned on, the following settings become available:

- **Enable Toolbars** – turns on toolbars *(their visibility can be controlled through **Menu – Panels – Toolbars**)*.
  - **Highlight toolbar item under mouse** – default: "on". If it is set to "off", the toolbar button under the mouse is not highlighted.

    This setting is meant to be used with a "true" touchscreen: when a button is pressed with a finger, the last location where the pressure was detected is stored in the system as a cursor position, and the respective button remains highlighted even if the button itself doesn't change its status. This setting switches such highlighting off.

- **Toolbars size** – controls the size of the toolbar icons.

- **White Balance dialog size** – it allows to enlarge the dialog size when manually setting the white balance in touchscreen mode. Standard value: +30% *(over normal)*.

- **Dim image while switching to next** – gives visual feedback about the status of the image moving to another image:
  - o **Do not dim** – works as previous; no brightness decreases while switching between images
  - o **While switching to next file** – decreases the brightness by 40% while in the process of switching to another image. This is the default.
  - o **Next file or RAW/JPEG switch** – the same as previous, plus a 25% decrease in brightness when switching between RAW and JPEG.

Other checkboxes control touch features:

- **Single finger filmstrip scroll/grid scroll** – the scroll is performed with a single figure gesture.

- **Double tap to switch grid/single mode** – switches between Grid Mode and displaying a Single File with a double-tap.

- **Gesture** support in **Single File View**:
  - o **Single finger pan to switch** – allows one to switch images with one finger gesture from left to right. If the zoom is larger than Fit to Screen, instead of switching images the current image is scrolled.
  - o **Pinch to zoom/unzoom** – change the zoom level of the image with a pinch.
  - o **Double tap to unzoom** *(if zoomed)*: if the image zoom level is larger than Fit to Screen, a double-tap will bring it to Fit to Screen.

    If **Double tab to switch grid/single mode** is turned on, another double tap will return to Grid Mode.

Grid view

The settings in this group control the display of the image in Grid mode.
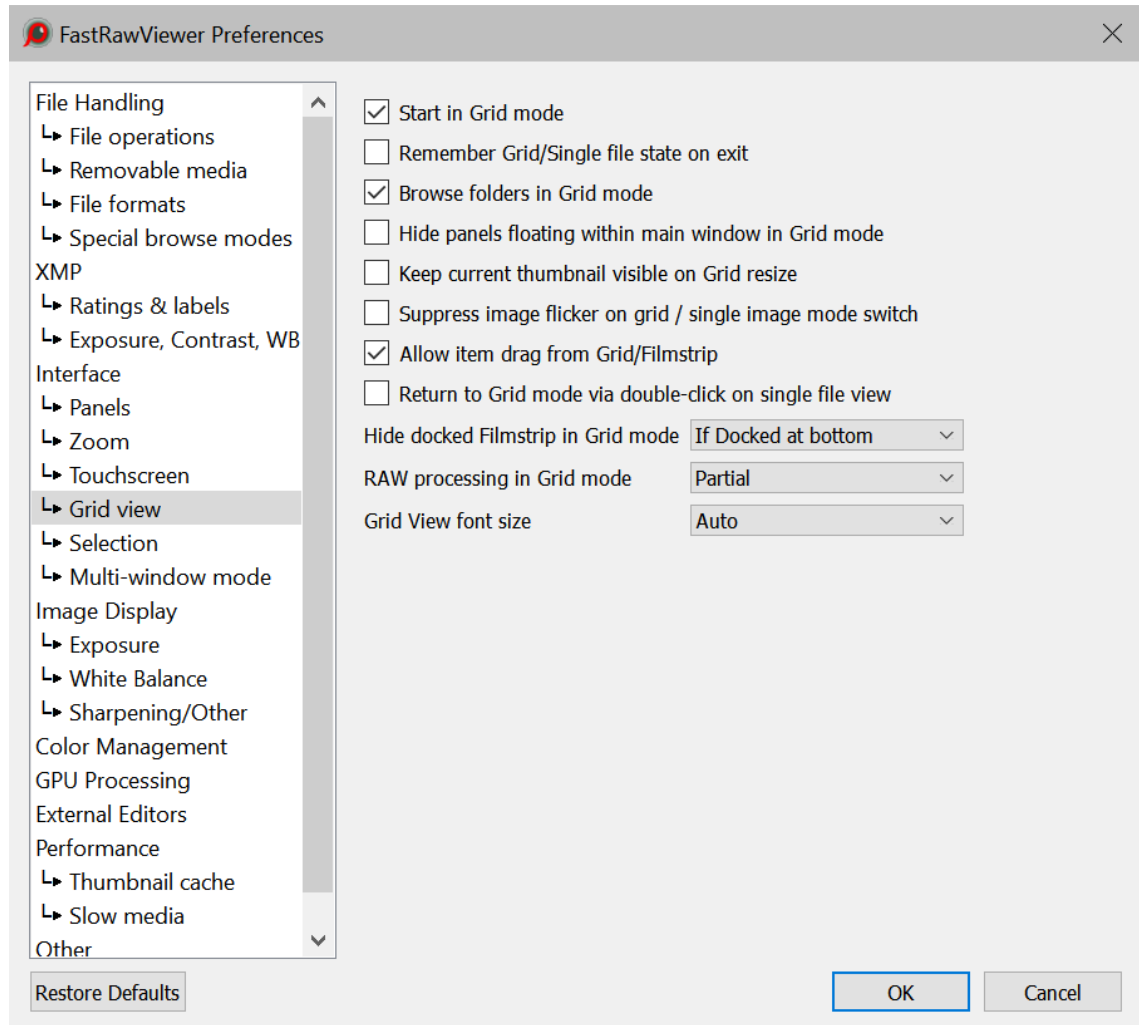
- **Start in Grid mode** – when launched without passing a filename, **FastRawViewer** will start in **Grid** mode.

- **Remember Grid/Single file state on exit** – turns on restoration of the previous mode for the next time **FastRawViewer** is launched.

- **Browse folders in Grid mode** – when moving from the current folder to another one, **FastRawViewer** will switch to Grid Mode.

- **Hide panels floating within main window in Grid mode** – if the setting is on, all floating panels in the Grid Mode that are currently positioned inside the program's main window will be hidden; they will reappear when switching to **Single File View Mode**.

- **Keep current thumbnail visible on Grid resize** – the current file will be held in the visible zone of the Grid View, no matter how the zone was resized.

- **Suppress image flicker on grid/single image mode switch**: In some cases, when switching from Grid to Single image mode, some flicker occurs: the previous image is displayed briefly *(so far, complaints came only from Windows users, and only when using the DirectX11 video mode)*.

  To turn off this effect, use this option *(it slows down Grid-Filmstrip switch for 10-15ms, so by default it is on only for Windows/DirectX11 mode)*.

- **Allow item drag from Grid/Filmstrip**: allows one to use drag-and-drop in the Grid/Filmstrip panels

- **Return to Grid mode via double-click on single file view**: If enabled, double click in the single image view window will cause switching (back) to grid view

- **Hide Filmstrip in Grid mode** – customizes the visibility of the Filmstrip panel in Grid Mode *(the Filmstrip panel can be brought back to display through **Menu – Panels – Filmstrip**):*

  o **No** – do not hide the Filmstrip panel

  o **If Docked at bottom** – if the Filmstrip panel is at the bottom of the program window, it will be hidden upon switching to Grid Mode. The setting has no effect for a Filmstrip that is anywhere else.

  o **If Docked anywhere** – the Filmstrip panel will be hidden if it is located in one of the main dock areas of the main window *(at the top, at the bottom, and on the left).* If the Filmstrip panel is dragged out of the main window, it will stay visible after switching to Grid Mode.

- **RAW processing in Grid mode** – customizes the RAW decoding when Grid Mode is enabled and RAW decoding is switched on through the Show Histogram/Stats/EXIF icon:

  o **Partial** – only partial decoding is preformed, enough for displaying the exposure statistics and histogram. In this mode, browsing files happens faster.

  o **Full** – full decoding is preformed, and switching to Single File view mode is nearly instantaneous.

- **Grid View Font size** – to set the size of the fonts for the Grid View and Filmstrip panels:

  o **Auto** – the font size is set automatically, based on the setting for the Panel Font size and the preview size.

  o **Extra small…Extra Large** – the font size is set to the same as that of the Panels *(using the same setting)*.

Selection
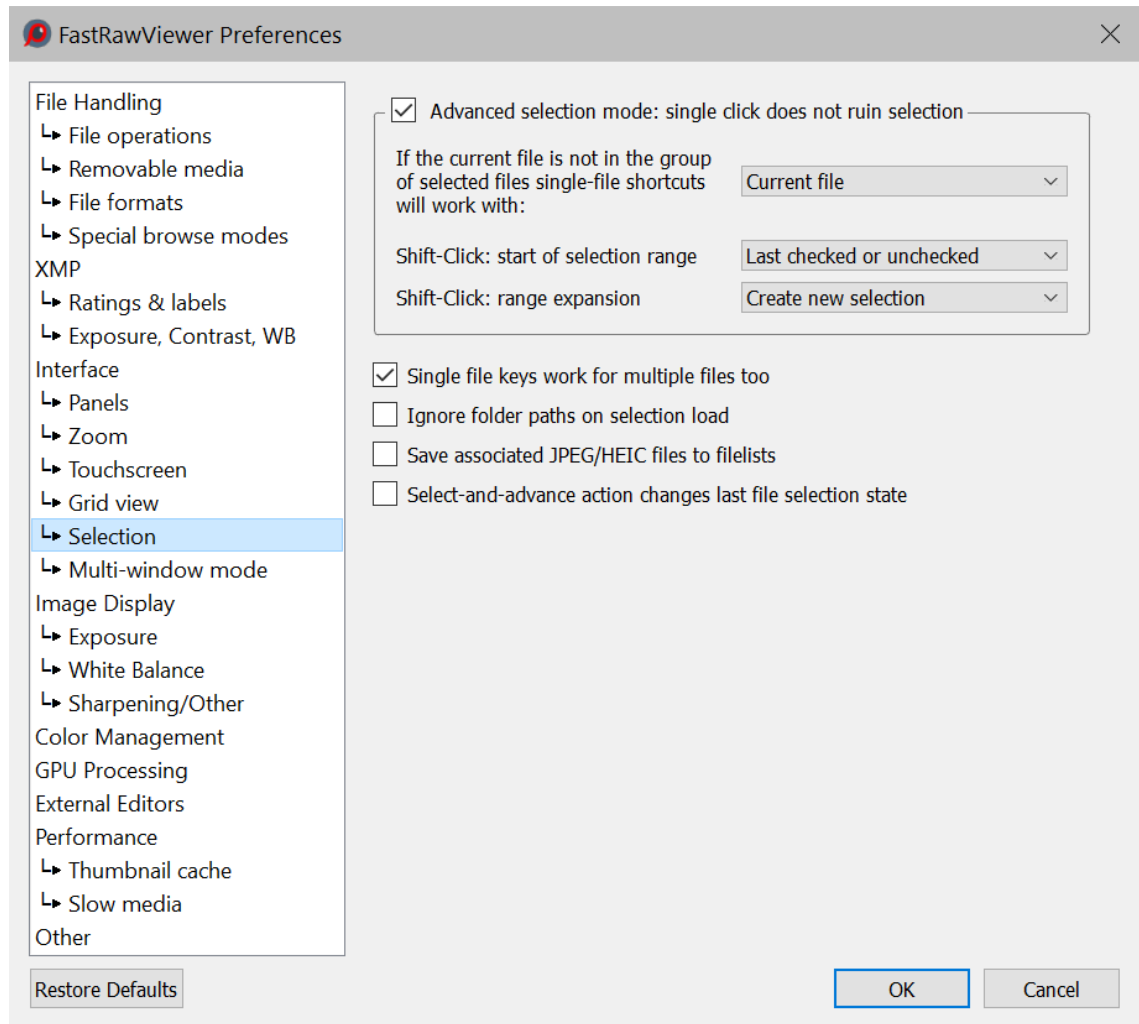
- **Advanced Selection mode: single click does not ruin selection** – enables the "advanced" mode of selecting files, for details see **Operations with Multiple Files**

    - **If the selected file is not in the group of selected files single file shortcuts will work with** – describes the program's behavior with regards to operations over several files, if the current file isn't in the group of selected files:
        - ○ **Current file** – works with the current file
        - ○ **Selected file** – works with the selected group
        - ○ **Both** – considers the current file to be a part of the group and works with all of it.

- **Shift-Click: start of selection range**, with possible values:
    - ○ **Last Checked or unchecked**: the selection range for Shift-Click will start from the last file for which the selection status was changed *(whether by the checkmark or Ctrl-Click)*.
    - ○ **Last checked**: the selection range will start from the last file for which the selection status was changed, but only if it was set to **selected.**

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o **Active (current) file**: the range starts with the current file *(if it was not Shift-Clicked)*

o **Active file/last selection changed**: the range starts with the current file, but if it was shift-clicked then with the last checked or unchecked.

In case it is impossible to determine where the range starts *(there is no current file, there is no file whose selection status has changed, etc.)* then the selection will start with the first file in the folder.

o **Shift-Click: range expansion**: sets the mode for range expansion:

o **Create new selection**: the old selection is cleared, a new one is created

o **Expand existing selection**: a new selection is added to the existing one.

This parameter can be temporarily inverted using Ctrl-Shift-Click: if "Create new selection" is in effect, Ctrl-Shift-Click causes the expansion of the existing selection, and vice versa.

- **Single file keys work for multiple files too** – turns on the mode in which work with groups of selected files is down with the same menu items/hotkeys that are used with single files *(see the section "Alternate mode: using same shortcuts/menus for single file and for the group" above)*

- **Ignore folder paths on selection load** – selection lists are simple list of files with full path, one file per line. With default settings, full path is checked against current visible files list, so selection lists are bound to specific folder. With **Ignore folder paths**… option on, only filename part is checked against current visible files list, so selection lists become folder-independent.

- **Save associated JPEG/HEIC files to filelist –** If enabled, filenames of paired RAW+JPEG/HEIG files are also saved with **Menu –Select – Save selection**.

- **Select and Advance action changes last file selection state** – when *Select-And-Move* action is applied *(to change the selection status of the current file and move to the next one)* it's not obvious what to do when the current file happens to be the last one. By default nothing happens, but this setting allows to flip the selection status of this file.

Multi-window mode
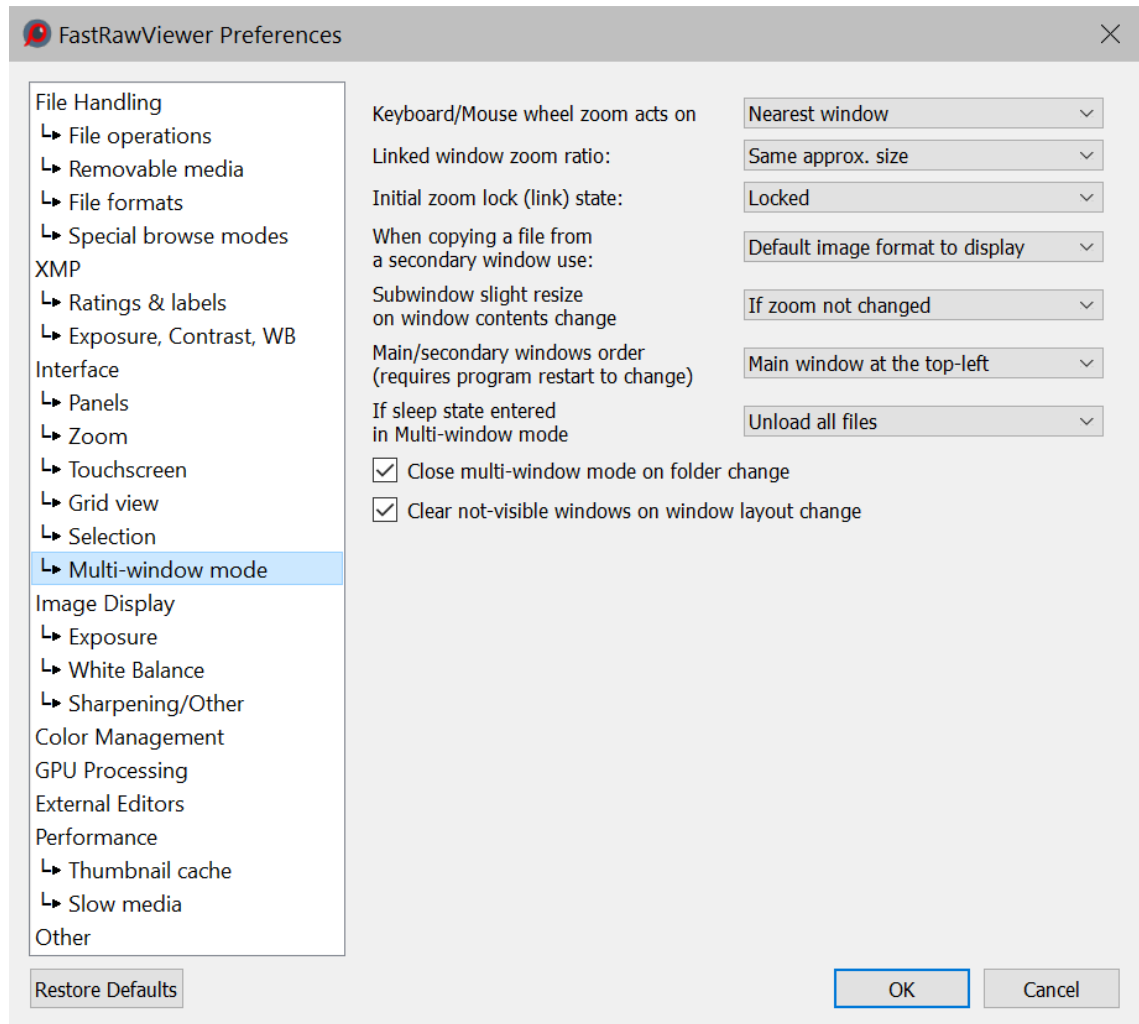
- **Keyboard/Mouse wheel zoom acts on** – which window is affected by the zoom hotkey:
    - **Main window** – the main window
    - **Nearest window** – the window closest to the mouse cursor

- **Linked window zoom ratio** – the method for calculating the zoom for images of different size:
    - **Same zoom** – the same zoom size *("in percent")*
    - **Same width** – same image width
    - **Same approx. size** – same image size *(length of the diagonal)*

- **Initial zoom lock (link) state** – the state of the zoom lock when opening secondary windows:
    - **Locked** – "closed padlock"
    - **Not locked** – open
    - **Keep previous** – the same as previous

- **When copying a file from a secondary window use** – determines what is displayed *(RAW/Int. JPEG/Ext JPEG)* when using functions "copy from secondary window" and "swap with secondary window":

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- **Default Format to display** – the displayed image type will be determined by the setting **Preferences – File Formats – Default image**
- **Secondary window file format** – the displayed image type will correspond to what is displayed in the secondary window.

- **Subwindow slight resize on window contents change** – some video cards/video drivers do not refresh the contents of the window even if the data for said window were changed. This setting turns on forced refresh:
  - **None** – do not refresh
  - **If zoom not changed** – refresh if the size of the zoom is unchanged
  - **Always** – forcible refresh whenever the window refreshes.

- **Main/secondary window order**: this allows one to switch position of the main window between upper left and upper right.
  The change takes effect upon application restart.

- **If sleep state entered in multi-window mode** – what to do when the computer enters sleep mode *(it is impossible in this case to save the contents of the secondary windows)*:
  - **Unload all files:** clear all of the windows but stay in multi-window mode
  - **Switch to single-window mode:** switch to single-window mode.

- **Close multi-window mode on folder change** – when moving to a different folder, multi-window mode will be turned off *(if the checkbox is unchecked, then the mode will stay but the secondary windows will all be cleared)*.

- **Clear non-visible windows in window layout change** – what to do when part of the *(secondary)* windows stop being viewable *(switching from 4 -> 2 windows or 4/2 -> 1 window)*. If the checkbox is checked, then the non-visible windows will be cleared.

Image Display

The settings in this group control the processing and the display of the images *(Exposure, White Balance and Screen sharpening are tuned in separate preferences pages)*.
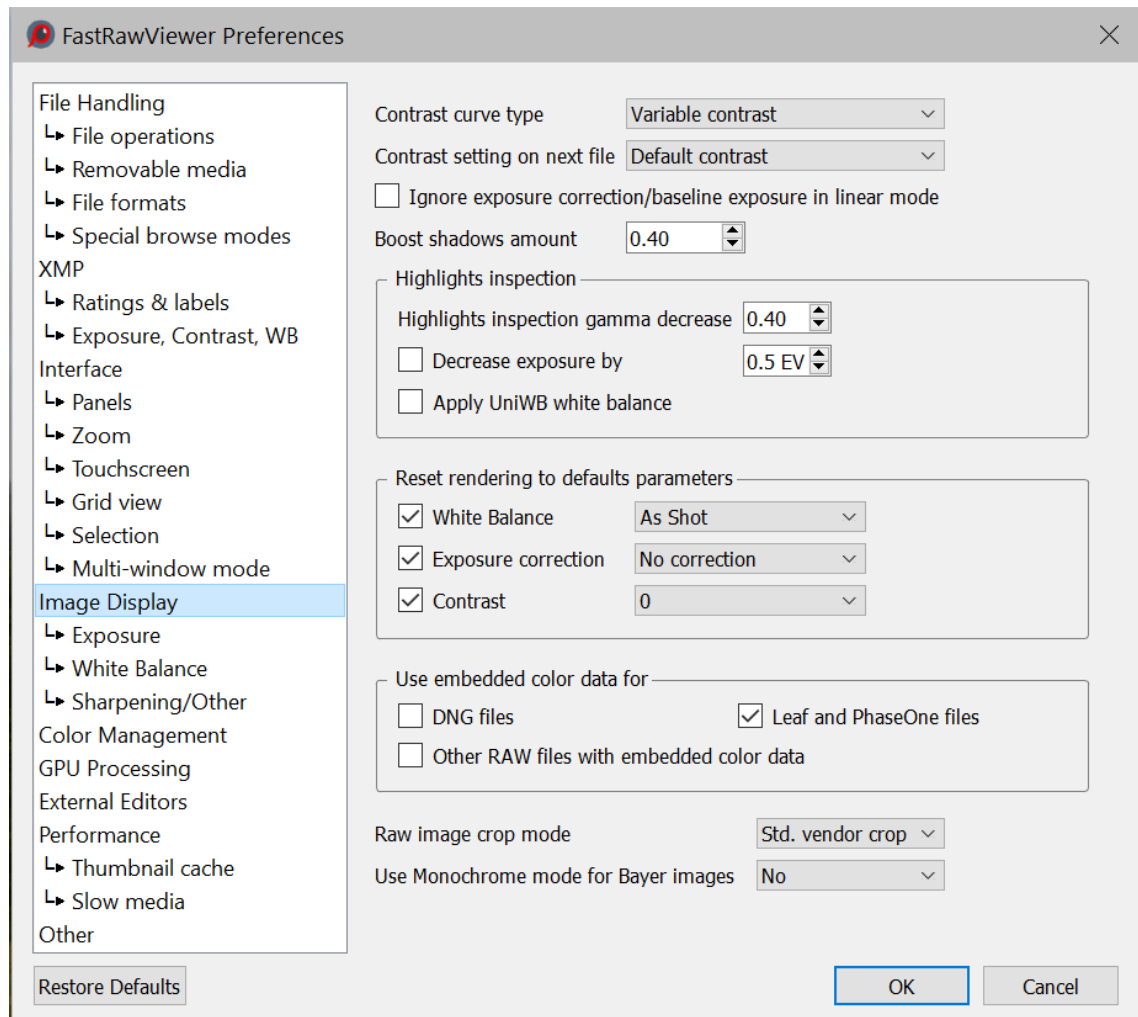
- **Contrast curve** – sets the tone curve to be used when displaying the image:
  - **Gamma 1.8, Gamma 2.2, sRGB, L*** - sets one of the standard tone curves, typically used in image editing.
  - **Variable contrast** – corresponds to the variable tone/contrast curve, see **Adjusting image contrast** section for details.

- **Contrast setting on next file**: Default contrast/keep from prev.file – which contrast setting to use when opening the next file.

- **Ignore exposure correction/baseline exposure in linear mode**: when turning on this setting, Menu – View – Linear mode display will turn off all forms of exposure correction, whether manual or automatic (hidden).

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- **Boost shadows amount** – controls the additional gamma adjustment while in Boost Shadows mode, the range is 0.2 to 2.0.

- **Highlights inspection** – this group of settings controls the Highlight Inspection mode:
  o **Gamma decrease** – the amount by which the Gamma for the image will be reduced.
  o **Decrease Exposure by** – additional image darkening.
  o **Apply UniWB white balance** – White Balance will be substituted with UniWB, thus avoiding any possible clipping caused by White Balance.

- **Reset rendering to default parameters** – sets the modes or values of white balance, exposure correction *(actually, lightening)*, and contrast that will be used for Menu – Adjust – Reset image rendering to defaults
  o **White balance:** As shot or one of 4 standard presets *(daylight, auto, tungsten, camera auto)*
  o **Exposure correction**: No correction or ETTR *(ETTR settings are selected on the Exposure tab)*.
  o **Contrast:** values from -5 to U+5.

- **Use embedded color data for** – controls the use of color data embedded into RAW files and allows using that data instead of data that comes with **FastRawViewer.**

- **Raw Image crop mode:**
  o Max. visible area (exactly what you think it is)
  o Std. vendor crop: uses the crop that is recommended by the camera manufacturer
  o User crop: even deeper crop, for example
    ▪ DNG: set through the DefaultUserCrop tag (this is how camera crop works in Leica cameras)
    ▪ Fujifilm: set an aspect ratio that differs from the standard. In this case, RAW is recorded for the whole sensor, the "recommended crop" is unchanged, but there is an additional tag with the Aspect Ratio.

- **Use Monochrome mode for Bayer images** – turns on the black-and-white mode for color cameras. This mode is intended for modified cameras, where the color filter array is removed.

  Available modes:
  o **None** – Off
  o **Always** – On for all files
  o **Detect** – monochrome images are detected automatically, and if such an image is detected it will be processed as a monochrome *(this mode is slower, because such an image will be processed twice, first as a color image; and after that, if it is detected that in fact it is a monochrome image, it will be re-processed)*.

Exposure
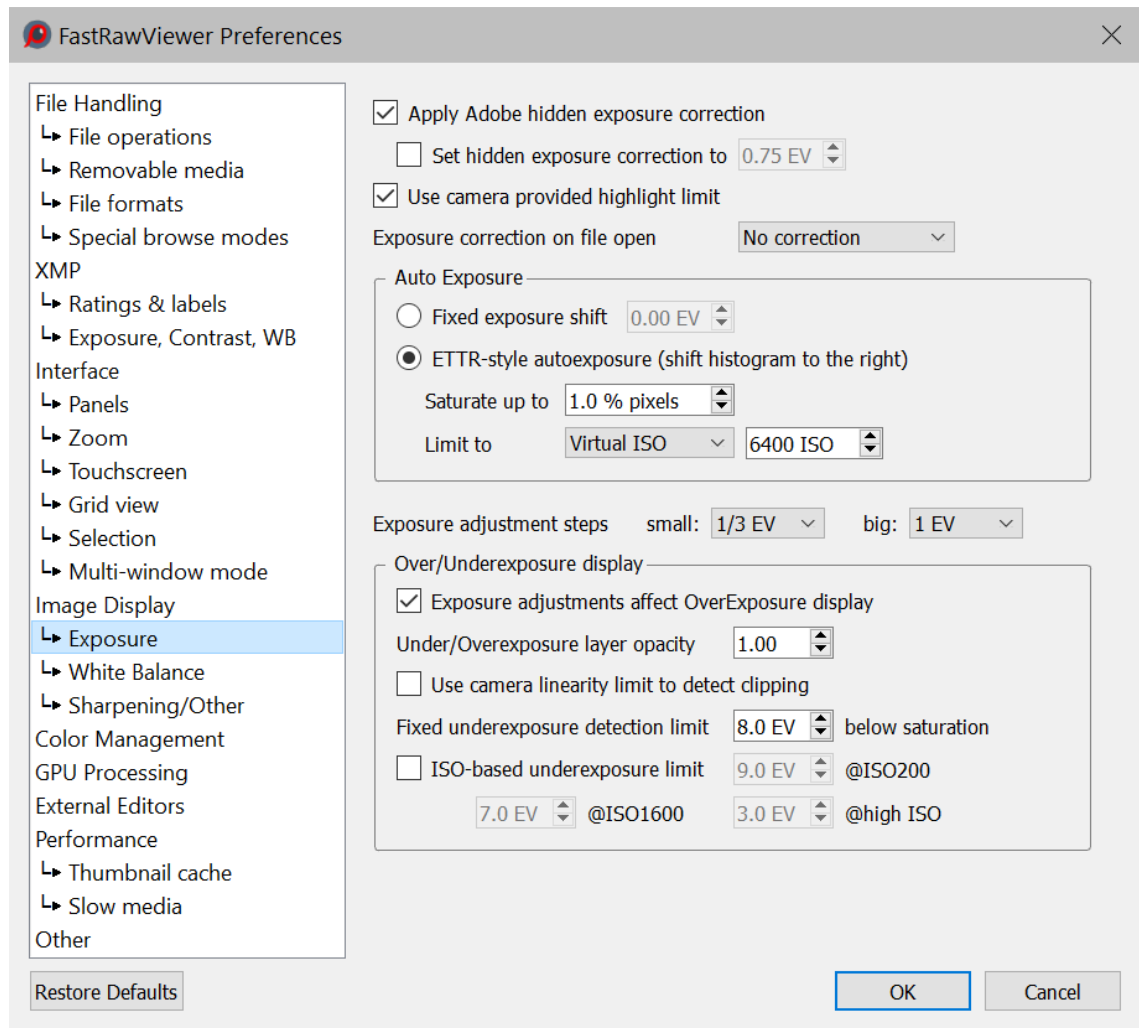
- **Apply Adobe hidden exposure correction** – switches ON the automatic exposure correction similar to the one used by Adobe RAW converters, such as Camera Raw and Lightroom. With this correction ON, same values in exposure correction will result in overall image brightness being similar between Adobe converters and **FastRawViewer**.

- **Set hidden exposure correction to** – allows setting a user-defined value for the hidden automatic exposure correction. Often this is not necessary, as **FastRawViewer** already comes with the corrections for all cameras supported in Adobe converters.

- **Exposure correction on file open**:
  - **No correction** – no additional exposure correction *(apart from the Adobe-style one, if it is ON)* is applied when a file is opened, unless the correction is found in the accompanying XMP sidecar file.
  - **Autoexposure** – automatic exposure correction is applied, according to the settings listed below.

- o **Keep from prev. file** – the new file will be opened with the same exposure correction that was set for the previous file *(it does not matter here how that exposure correction was set, manually or automatically).*

- **Auto Exposure** – controls the automatic exposure correction *(the one that is applied when 'automatic correction' action is performed).*
  - o **Fixed Exposure Shift** – the exposure is shifted by the fixed value.

  - o **ETTR-style autoexposure** *(shift histogram to the right)* – positive exposure correction that forces the saturation of the given percentage of pixels *(those saturated pixels are having value of 255 on the 8-bit scale)*; the percentage is controlled through **Saturate up to %NN of pixels** setting.

    The amount of the positive exposure correction shift is limited by the 'Limit to' setting:

    - ▪ **Unlimited** – no limit
    - ▪ **Hard limit** – the limit is set to the given amount.
    - ▪ **Virtual ISO** – limits the automatic exposure correction, taking into account the ISO setting in the camera. For example, if the current shot is taken at ISO 400 setting in the camera, while auto limit is set to ISO 6400 *(the default value)*, the positive exposure correction is limited to *(6400/400 =)* 16 times, or, in photographic units, to 4EV.

- **Manual exposure step size (small step/big step)** – sets the step sizes for manual exposure adjustment change.

- The Over/Underexposure display section controls the over- and underexposure indications
  - o **Exposure adjustments affect OverExposure display** – when turning on this setting the change in exposure adjustment *(both automatic and manual)* will affect the display of overexposed areas.

  - o **Under/Overexposure layer opacity** – controls the perceived contrast of the highlighting for over- and underexposed areas.

  - o **Use camera linearity limit to detect clipping –** displays overexposure for RAW for the RAW values that are larger than the camera's linearity limit as recorded in RAW file metadata *(not all the cameras record it; if the limit is unknown, then the maximum possible value will be used).*

  - o **Underexposure detection limit NN EV below sensor saturation** – sets the "usable dynamic range" of the camera with one value, the same for all ISO settings. Everything below this limit will be displayed as underexposed.

  - o **ISO**-based underexposure limit – the working range will be set by a kinked curve of the following type:
    - ▪ **For ISO 6-1600** – straight line going through the points @ISO 200 and @ISO 1600
    - ▪ **For ISO above 1600 –** the dynamic range decreases by one photographic stop for each stop of ISO increase, but no less than the value set for @high ISO.

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White Balance

This group contains all the white balance processing controls:
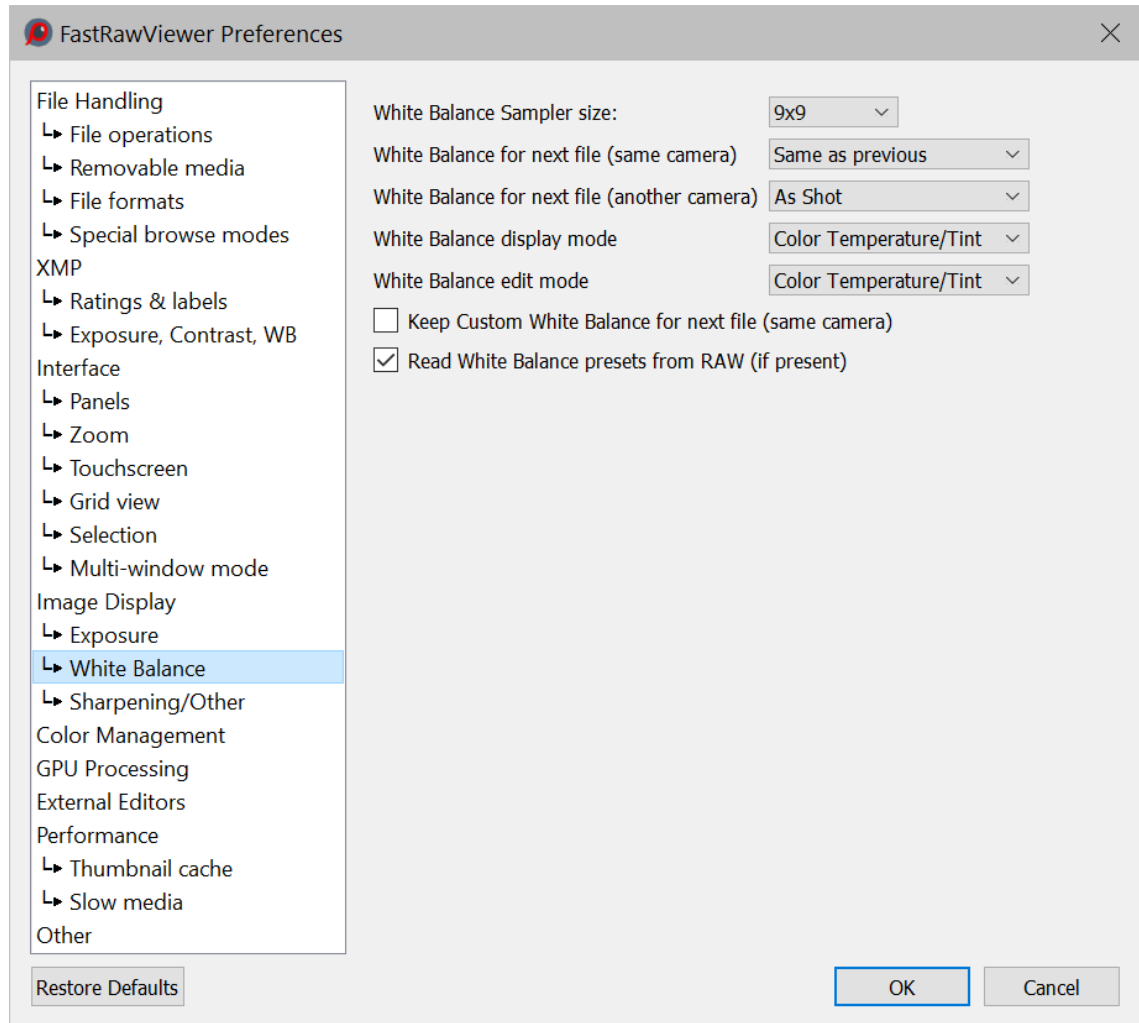
- **White Balance Sampler size** – for "click-on-gray" *(Alt-Click)* method, sets the size of the area used to evaluate the white balance

- **White Balance for next file (same camera)** – sets the white balance mode when opening a file coming from the same camera model as the current file. Choices here are:
  - **Same as previous** – keep the current white balance choice.

  - **Camera Auto/As Shot** – if the camera records the metered white balance *(which may differ from that which is used during the shoot)*, then that balance is used. Otherwise, it will be As Shot.

  - All others – the respective white balance mode will be in effect.

- **White Balance for next file (another camera)** – sets the white balance mode when opening a file coming from a different camera model.

- **White Balance display mode**:

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- o **Color Temperature/Tint** – a mode commonly used in many RAW converters, including those by Adobe

- o **Mired/Tint** – instead of correlated color temperatures, the value indicated is in Mired. Useful for selecting color filters to be used on the lens and on studio lights.

- o **WB Coefficients** – the per-channel multipliers for white balance are indicated.

- o **Channel EV Correction** – per-channel correction in EV *(stops)* for white balance are indicated.

- **White Balance edit mode:**
  - o **Color Temperature/Tint** – a mode commonly used in many RAW converters, including those by Adobe

  - o **Channel EV Correction** – per-channel correction in EV *(stops)* for white balance are indicated.

- **Keep Custom WB for next file (same camera)** – instructs **FastRawViewer** if the current white balance coefficients should be applied to the next file coming from the same camera model.

- **Read White Balance presets from RAW (if present)** – turns on reading white balance tables from RAW files.

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Sharpening/Other
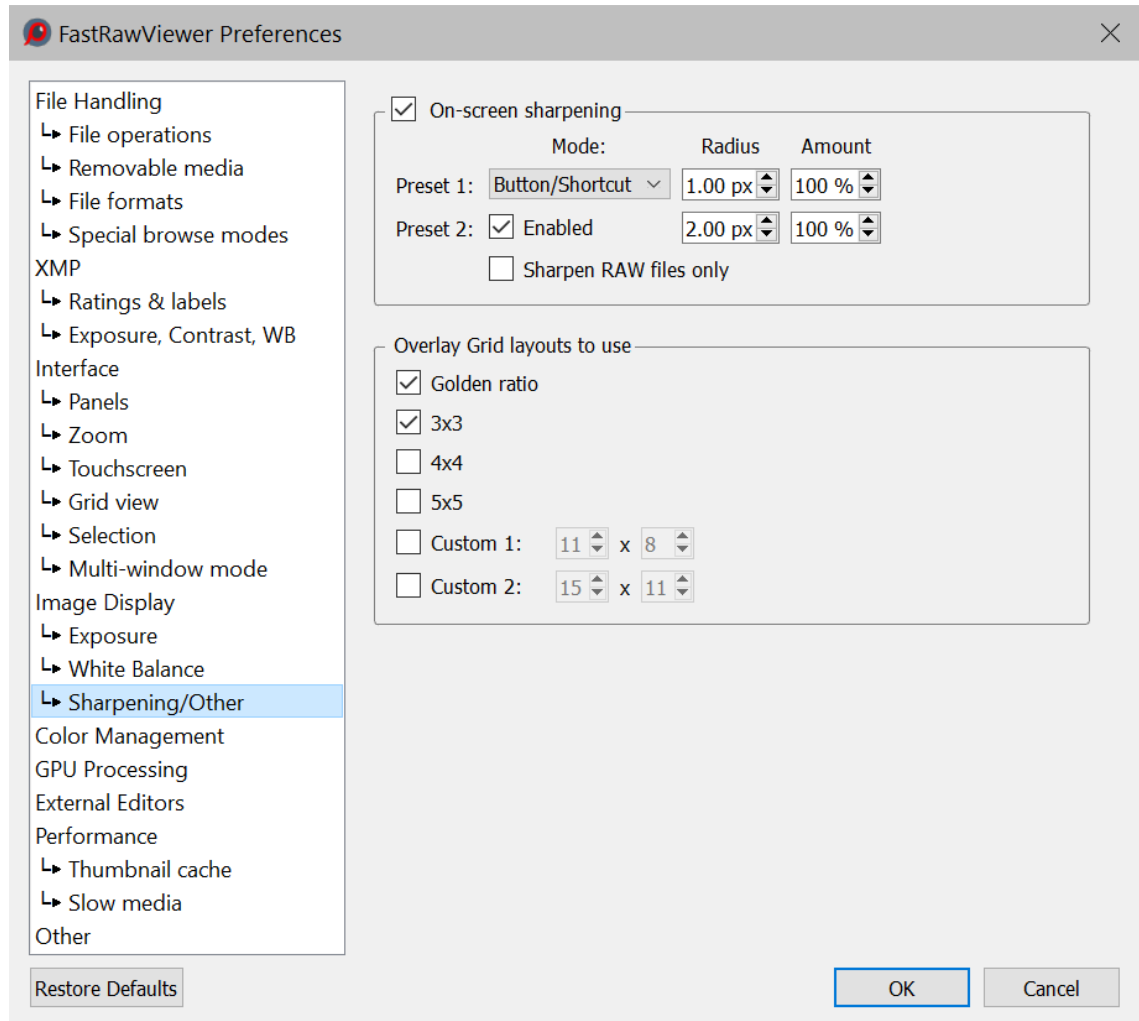
- **On-screen sharpening** – enables sharpening for display.
  - ○ **Preset 1/Mode:**
    - ▪ **Always on** – sharpening for display is always on
    - ▪ **Button/Shortcut** – turns on when the button is press.
  - ○ **Preset 2/Enabled** – allows one to use a second group of parameters for sharpening, thus cycling will be between *Off-Preset1-Preset2* or *Off-Preset1.*
  - ○ **Radius** – the radius the Unsharp Mask filter, which closely correlates to the Radius parameter in Adobe Photoshop USM settings.
  - ○ **Amount** – the strength of the sharpening, same as Amount Photoshop USM amount.
  - ○ **Sharpen RAW files only** – if this setting is on, the sharpening for display will affect RAW files only.
- **Overlay Grid layouts to use** – sets the grids that can be overlaid through **Menu – View – Overlay Grid**

When setting custom grids, the first parameter sets the amount of steps along the long side of the image.

Color Management

This group of settings controls the appearance of the color on-screen in respect to color management:
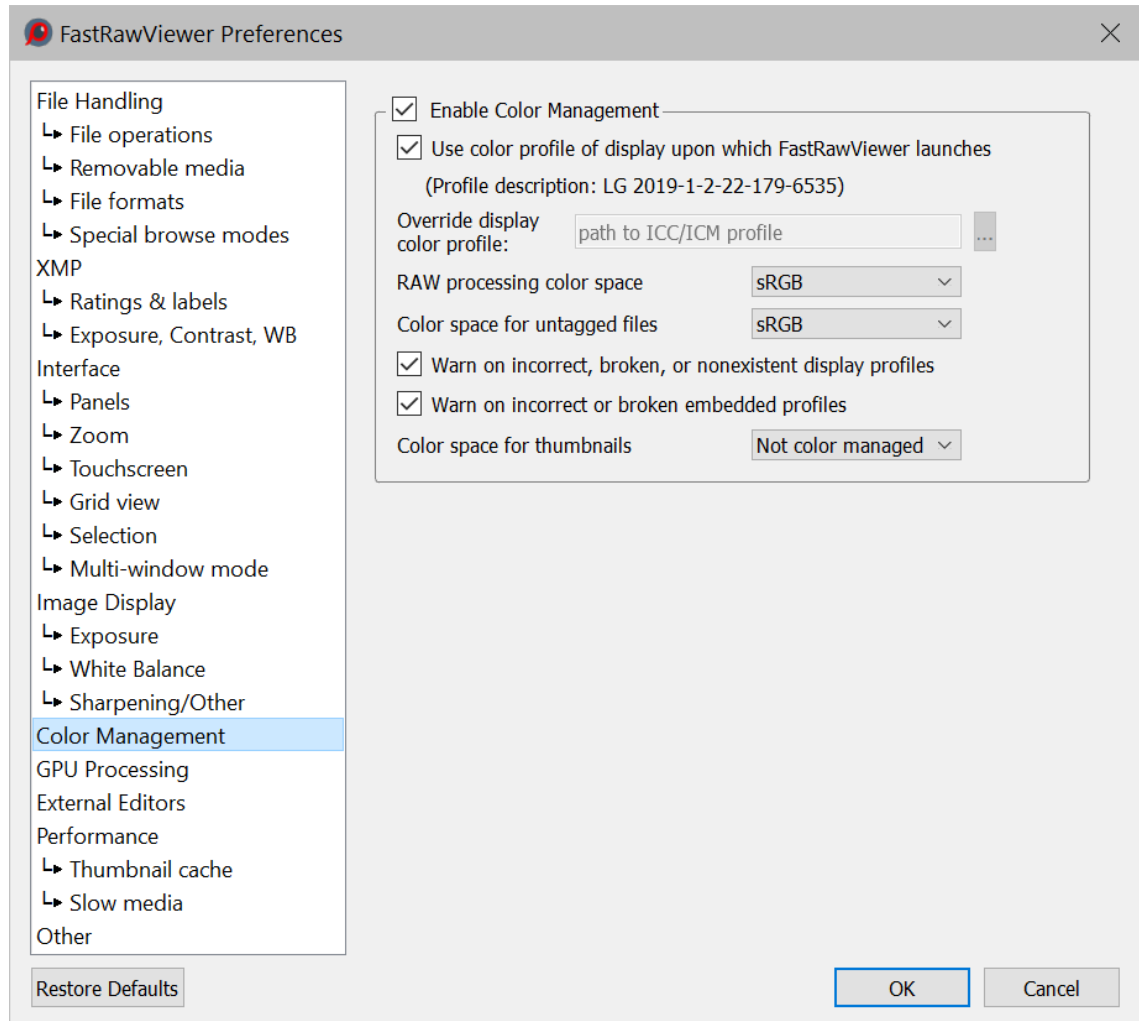
- **Enable Color Management** – turns on ICC-compatible color management.

- **Use system profile (for monitor where program starts)** – the ICC profile chosen in the system for that monitor where the program is being started will be used as the profile for the monitor.

- **Display Color profile** – allows one to specify a file with the ICC profile for the monitor.

- **RAW processing color space** – allows one to set a color space in which the last steps of the RAW data processing are done *(the first steps are performed in the camera's color space).* Lab TIFF files will be converted to the same color space when displayed in Single File View Mode.

- **Color space for untagged files** – allows one to set a color space for JPEG/TIFF/PNG files for which the color space is not specified *(not recorded in tags or ICCProfile sections)*.

- **Warn on incorrect, broken or nonexistent display profiles** – turns on a warning for when one tries to use an incorrect display profile.

- **Warn on incorrect or broken embedded profiles** – turns on a warning for incorrect profiles built into the JPEG data.

- **Color space for thumbnails**: sets the mode for color space for previews *(thumbnails)*.
  Lab TIFF files will be converted to the same color space when building previews. Previews for these files will be stored in the preview database *(if it is in use)* in RGB format. Because of this, when you change the color space for thumbnails, we recommend purging the preview database if it contains previews for Lab TIFF files.

GPU Processing

This group controls the video card modes and how the sharp areas of the image will be displayed.
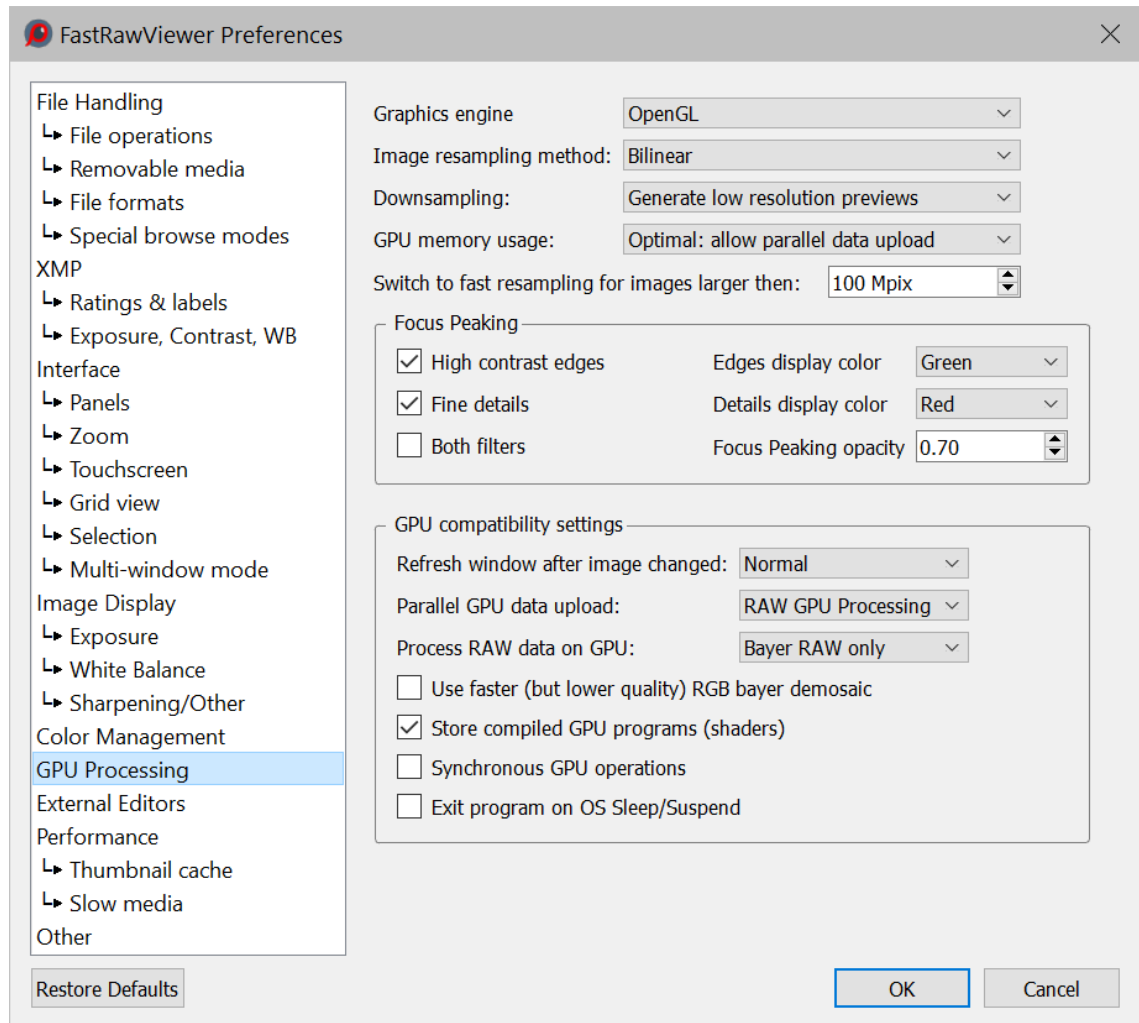
- **Graphics Engine** *(Windows only):* sets the method of using the graphics hardware acceleration: DirectX 11 or OpenGL. This option takes effect after application restart.

- **Image resampling method**:
  - **No resampling** – for large zoom factors, the image will look as if it is constituted of small square tiles. The fastest method.

  - **Bilinear resampling** – pretty fast, mid-quality method

  - **Bicubic resampling** – high-quality method, could be slow; a relatively fast vast video card is recommended.

- **Downsampling options**:
  - **None** – no additional processing, the downsized image may have a low quality look.

  - **Generate low resolution previews** – low-resolution previews are rendered in advance with the help of video card driver.

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Requires additional memory for the graphic textures, compatible with all video cards.

- o **Suppress downsampling artifacts** – suppresses the colored noise on the high ISO images. Not supported on all video cards.

- o **Area resize**: this is a high-quality but resource-intensive way of downsizing the image, we recommend that one only use this with a high-performance video card.

- **GPU Memory usage** – video RAM

  - o **Minimal** – all unused graphic resources are immediately freed up, and allocated again if necessary. This is the slowest mode.

  - o **Minimal+** – uses one set of graphic resources, when moving to a smaller image, video memory is not freed up.

  - o **Optimal** – two sets of graphics resources are used: the currently displayed image and the "next" one; when refreshing the window, the whole image is redrawn at once, and not piece by piece.

  - o **Maximal** – up to four sets of resources are used *(RAW, embedded JPEG, external JPEG, and the currently refreshed)*, the second switch between RAW and JPEG is instantaneous.

- **Switch to fast resampling for images larger then NN mpix**: if the displayed image is larger than what's indicated in this setting, then for this image a switch to Bilinear resampling/Generate low resolution previews happens.

- **Focus peaking mode**:

  - o **High contrast edges** – enables the outlines for contrasty details using color contouring. **Edges display color** sets the color for the contours.

  - o **Fine details** – enables the outlines for the areas with plenty of smaller sharp details using color contouring. **Details display color** sets the color for the contours.

  - o **Focus Peaking layer opacity** – controls the fading of the main image for the Focus Peaking contours to be visible better.

- **GPU compatibility settings**

  This group of settings is helps with the cases when certain compatibility problems are encountered *(for instance, the image is not completely refreshed)*:

  - o **Refresh window after image changed** – a choice of options to refresh the displayed image:

    - None – no forced refresh, the fastest mode, but may not work with all hardware
    - Normal – forced refresh of the window using "standard methods"
    - Slight resize – the application window changes its dimensions slightly, to force OS to redraw it

  - o **Parallel GPU data upload** – enables parallel data loading to GPU, available only for OpenGL video mode. This can improve performance, depending on the GPU and the drivers.

    - None – don't use parallel data upload to GPU

- RAW GPU Processing – use only when processing RAW on GPU

- Always – use for all files.

o **Process RAW data on GPU** – process RAW data on GPU instead of CPU *(for details, see Performance Settings)*:

- None – don't use GPU for RAW data processing

- Bayer RAW only – use GPU for processing Bayer files

- All RAW files – use GPU for processing of all RAW files.

o **Use faster (but lower quality RGB bayer demosaic)** – use lower quality demosaicking, same quality as of the one used when processing RAW data on CPU.

o **Store compile GPU programs (shaders)** – on those video cards on which this is supported, compiled GPU programs will be saved on the disk during the first startup. Program will start faster ever after.

o **Synchronous GPU operations** turns on the synchronous mode of video card work *(slower, but more reliable)*.

o **Exit program on OS Sleep/suspend** – forces the program to exit when the computer goes to sleep *(that is to address the issue with some older OS being unable to correctly restart OpenGL operations after the wake up)*.

External Editors
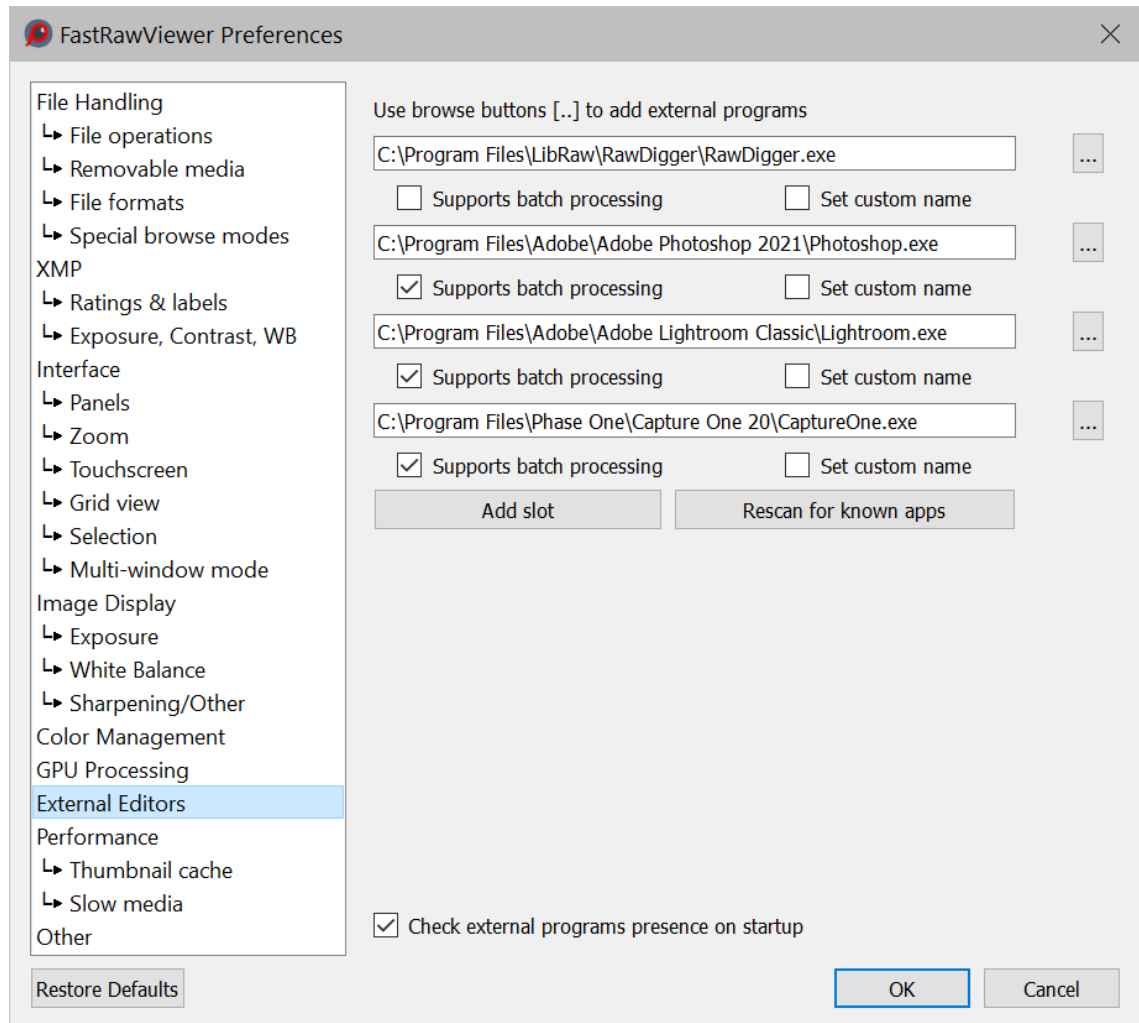
This window displays the paths to external programs. **FastRawViewer** can launch those, passing to them the name of the currently displayed file.

- **Supports batch processing**: if this checkbox is marked for the program, then this program will be included in both **Menu** and in the context menu for groups of files.

- Use **[…]** buttons to lookup executable file on your system.

- Additional arguments are added to the line with the path to the application, separated by | For example, if you want to call Adobe DNG Converter with additional switches '-d /path/to' (which means 'write the generated DNGs to the /path/to folder'), the line will look like the following:

  - Windows: C:\Program Files\Adobe\Adobe DNG Converter\Adobe DNG Converter.exe|-d|/path/to

  - Mac: /Applications/Adobe DNG Converter.app|-d|/path/to

- **Supports batch processing** – this program supports the import of several files into it at the same time. Said programs will be displayed in the menu Run Program for file groups.

- **Set custom name** – allows one to set an arbitrary name for a program *(said name will be used in the menu in place of the application file name of the external program).*

- **Add slot** button adds additional slot for external program *(up to 10).*

- **Rescan for known apps** button starts a search for RAW-aware applications known to **FastRawViewer**. After the search is finished, a dialogue similar to the following is displayed:
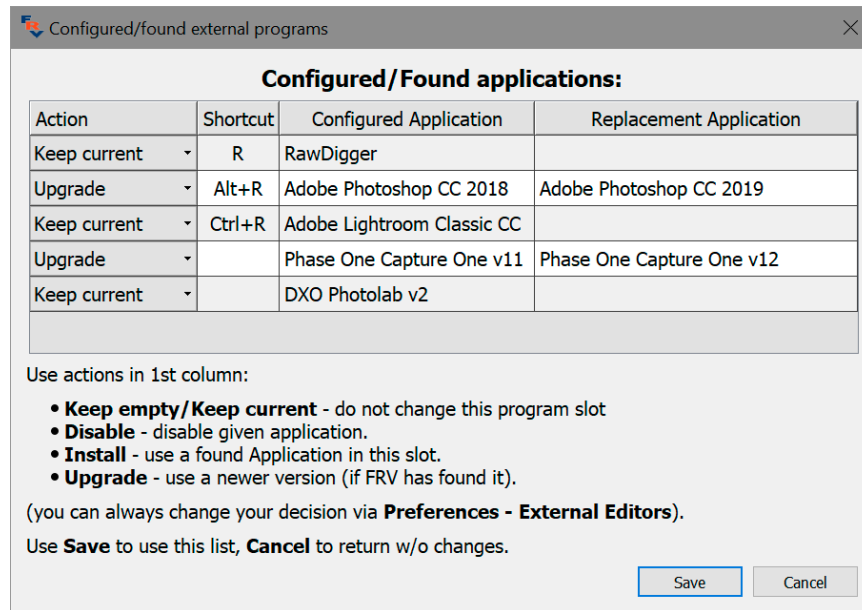
If, during the scan, some newer versions of applications are found, they will be displayed in Replacement Applications column, together with an option to renew *(Upgrade)* the settings for External Editors tab.

- **Check external programs presence on startup** enables check each program existence on **FastRawViewer** start.

  If during the startup it was determined that some application is absent, you will be presented with a dialogue similar to the following:
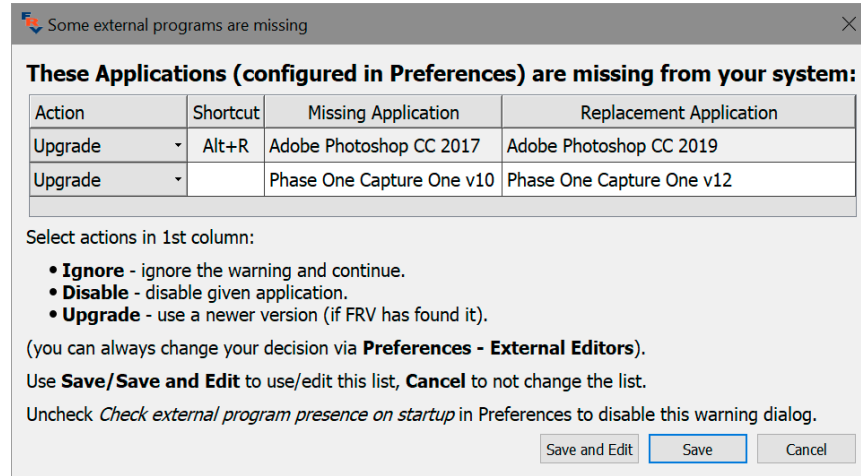
  If a "replacement" application was found, this replacement will be displayed in the Replacement Application column; thus allowing to renew the settings without resorting to manual editing.

It is possible to use macro tokens which will be expanded into system-specific paths.

Targeted to ease Affinity Photo 2 support under Windows, use:

%localappdata%\Microsoft\WindowsApps\AffinityPhoto2.exe

to run Affinity Photo2 as an External Editor.

Supported macros *(case insensitive)*:

- %localappdata% - local settings folder. Expands to
  - Windows: C:\Users\[Windows username]\AppData\Local
  - macOS: ~/Library/Preferences
- %userprofile%, %home% - expands to user's home folder.

Performance
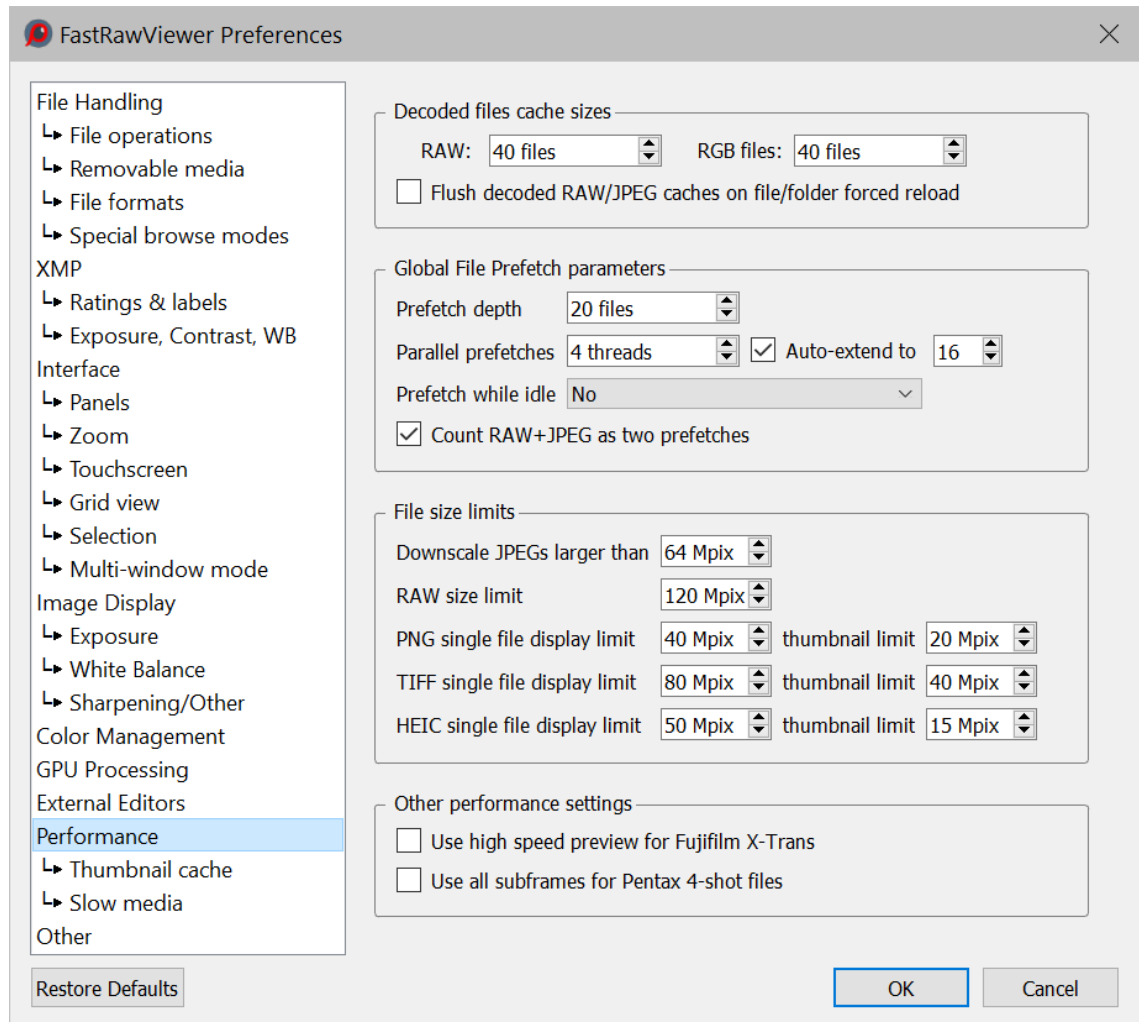
Decoded files cache size group:

- **RAW:, RGB files:** size of the cache for decoded files *(number of files)*
  Default values are set based on the amount of available memory..
  When setting the cache size, it's important to take into account the amount of memory that is occupied by data::
  - **2 megabytes per megapixel** for "regular Bayer files"
  - **8 megabytes per megapixel** for "full-color" (Linear DNG, Sony ARQ, Pentax 4-shot)
  - **16 megabytes per megapixel** for full-color in floating point (HDR composites and the like).
  - **4 megabytes per megapixel** for RGB files (JPEG, TIFF, HEIC, etc.).

- **Flush decoded RAW/JPEG cache on file/folder refresh** – if this setting is turned on:
  - when using **Menu – File – Reload – Reload current folder**, the decoded file cache will be reset.

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o when using **Menu – File – Reload – Reload current file** – the cache for the current file or file pair *(if RAW+JPEG)* will be refreshed

The size of the caches can be changed on the fly, without restarting FastRawViewer. When decreasing, memory will be freed up *(but it may not be returned to the operating system, if the memory is fragmented. In that case, FastRawViewer uses that memory later for its own needs)*

Global File Prefetch parameters Group

In this group, you can set FastRawViewer's general behavior when prefetching files.

- **Prefetch Depth**: the maximum depth of prefetch (in files/file pairs for RAW+JPEG).
  Prefetch Depth cannot be greater than half the size of the cache of the corresponding type *(if the cache sizes are different, then the depth of the Prefetch will be limited separately for each file type)*
  If you are browsing files in random order *(that is to say, the flipping direction cannot be determined)*, prefetching will be performed to half the Prefetch Depth in each direction. When flipping in one direction, the entire Prefetch Depth will be selected "in that direction".

- **Parallel Prefetches … Auto-Extend to….**
  When first opening a file in a folder, **N=Parallel Prefetches** will be launched *(see below for the limitations)*. If you are flipping through files in one direction AND Auto-Extend is turned on, then for each successive flip one more parallel prefetch will be launched, until the total number of Parallel Prefetches reaches the Auto-extend value (or the Prefetch Depth runs out).
  When changing the flipping direction, everything again starts from **N=Parallel Prefetches** and the number will increase up to Auto-Extend to…

- **Prefetch while idle**
  If FastRawViewer isn't busy reading other data *(Parallel Prefetch, or reading metadata/previews)*, and this setting is turned on *(not set to No)*, then every two seconds an attempt to read one file will be launched *(without considering the direction of flipping, around the current file)*.

- Setting values:

  o No – do not do Prefetch in the background *(default value)*

  o In Single View mode – only in Single File View mode

  o In Single View and Grid mode – also in Grid View Mode *(in Grid Mode, the current file will be prioritized)*.

Count RAW+JPEG as two prefetches: for RAW+JPEG pairs, their prefetches will be treated as two simultaneous prefetches (for example, with "Parallel Prefetches: 4", two RAW+JPEG pairs will be read simultaneously).

File size limits section

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o **Downscale JPEGs larger than NN Mpix** – JPEG files larger than the specified size will be down-sampled during the decoding process, so less memory will be required, while decoding and display will happen faster.

o **Do not decode RAW files larger than NN Mpix –** RAW data with a pixel count more than the specified will not be decoded; only an internal JPEG will be shown *(if it exists)*

o **TIFF/PNG/HEIC single file display limit –** TIFF/PNG/HEIC files above the set limit will be ignored in single view mode.

o **PNG/TIFF/HEIC thumbnail limit –** for files above the set limit, previews will not be created or displayed.

Other performance settings section

o **Use high speed preview for Fujifilm X-Trans –** this preference turns on faster *(but lower quality)* processing for files created by Fujifilm X-Trans sensors.

This mode is recommended if you are not satisfied with the display rate of these files in standard mode.

Automatically turns on during the first start-up, and when resetting to default the preferences if the system has one of the following processors:

- Intel Core2Duo and older.
- Intel i3-i7 1st generation with fewer than 4 cores.

o **Use all subframes for Pentax 4-shot files** – enables merging all sub-frames into one when working with Pentax frames shot in Pixel Shift mode.

Thumbnail cache
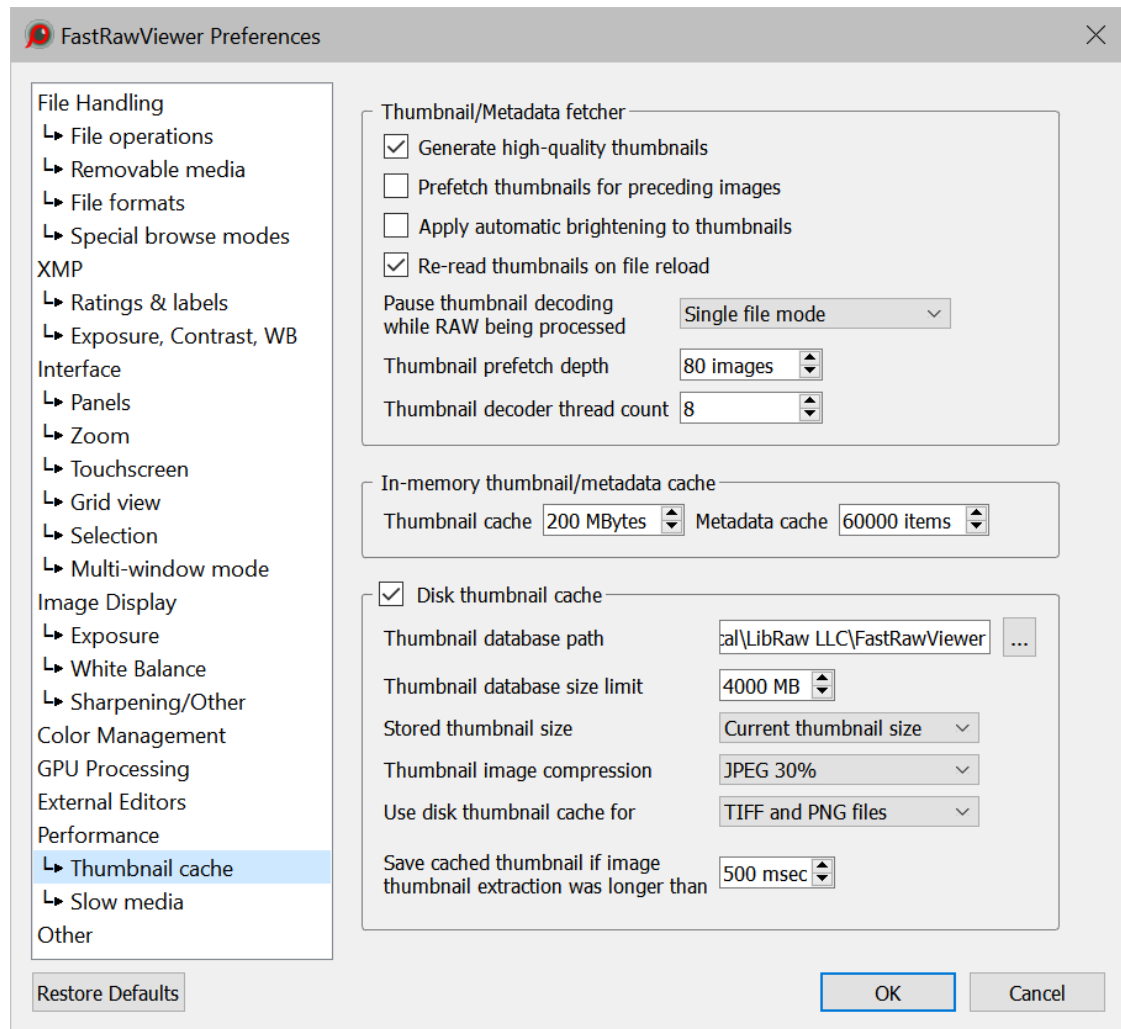
- **Thumbnail/Metadata fetcher** group
  - o **Generate high-quality previews –** sets the preview quality. High-quality previews *(the checkmark is set)* are built noticeably slower.

  - o **Prefetch thumbnails for preceding images**: to decode previews for the files "before" those visible on the screen.

  - o **Apply automatic brightening to thumbnails** – automatically increases the brightness of previews in Grid/Filmstrip modes if they're too dark.

  - o **Re-read thumbnails on file reload** - whether to rebuild file previews on the Menu - File - Reload - Reload files operation. If the checkbox is not checked, then only metadata (EXIF and XMP) will be re-read.

  - o **Pause thumbnail decoding while RAW being processed** – this control allows one to set priorities between the decoding of preview files and the decoding of RAW data *(these two processes compete for CPU resources and hard drive access)*:

- **No** – concurrency; Thumbnail decoding is not postponed while RAW decoding takes place.
- **Single file mode** – Thumbnail decoding is postponed in Single File View Mode until the RAW decoding is finished.
- **Single file and grid modes** – Thumbnail recording is postponed for any RAW decoding action.

- o **Thumbnail prefetch depth**: how many files *(relative to those viewed on the screen)* to read ahead and decode previews.

- o **Thumbnail decoder thread count**: how many parallel decode streams *(threads)* are enabled.

- **In-memory thumbnail/metadata cache** group

  - o **Thumbnail cache size**: maximum size of the cached previews in the memory *(each preview is stored in 4-byte per pixel format, so standard 200x133 preview is about 100kb, so 200Mbytes cache limit translates to ~2000 images)*.

  - o **Metadata cache size**: the maximum number of files for which metadata will be stored in the RAM

- **Disk thumbnail cache** group

  - o **Thumbnail database path** – the folder with which will contain the FRVThumbs.db file
    Default locations:
    - Mac: ~/Library/Application Support/libraw-llc/FastRawViewer
    - Windows: $HOME/AppData/Local/LibRaw LLC/FastRawiewer

  - o **Database size limit** – the maximum size of the database *(see below)*, by default: 4000MB.

  - o **Stored thumbnail size** – selects the size of previews that will be saved to the database:
    - Current thumbnail size: the larger of the two sizes used in Grid and Filmstrip
    - Maximum thumbnail size: the largest size available in **FastRawViewer,** 1600x1600 physical pixels for retina monitors, 800x800 for other monitors.

  - o **Thumbnail image compression**: compression type *(uncompressed, JPEG-90%, JPEG-30%)*.

  - o **Use disk thumbnail cache for**:
    - **TIFF/PNG files**: only thumbnails for TIFF and PNG files are checked for presence in disk cache/stored in that cache.
    - **All files** – thumbnail cache used for all files

  - o **Save cached thumbnail if image thumbnail extraction was longer than** – this is the main parameter that selects for which files previews will be stored in the database.

    Only those files, the building of previews for which will take greater than or equal to the amount of time set in this parameter will be stored in the database. Consequently, the only things that will go into the database are the previews that were built relatively slowly, and the database itself will grow slower. If you want to store previews for all files here, set the parameter to 0ms.

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Slow media

This page of settings controls parallel reading from slow media
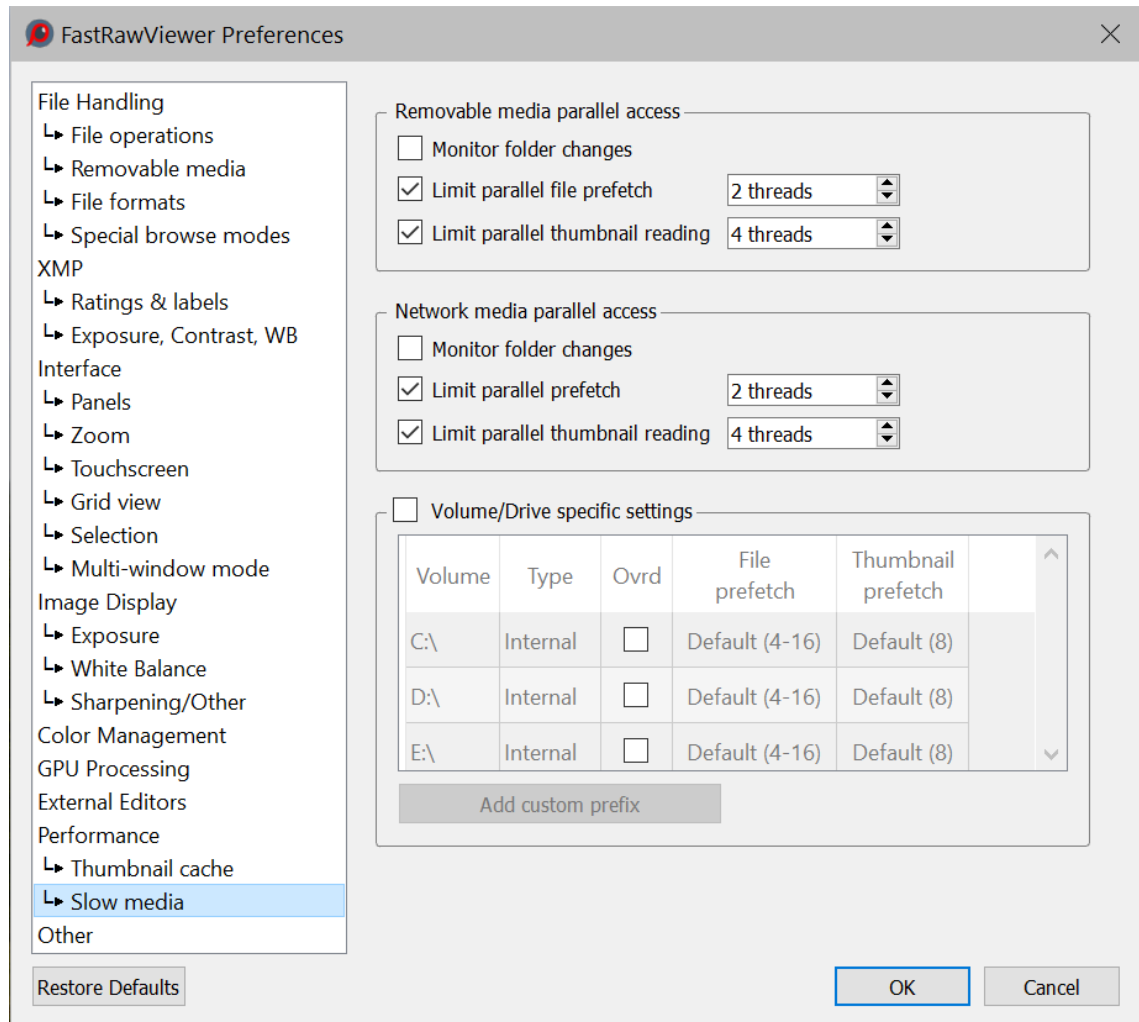
Removable media parallel access group, Network media parallel access group

(the settings in both groups are completely identical)

- **Monitor folder changes on removable media/network volumes** – monitor changes in removable media/network volume folders, updating the Folders and Filmstrip panels when new subfolders and files are added.

- **Limit parallel file prefetch**:
  Limit the amount of parallel file prefetch threads to the indicated number.
  This limiter is used after calculating the number of parallel prefetches from Parallel Prefetches/Auto-extend to (on the previous tab).

- **Limit parallel thumbnail reading**:
  Limits the amount of parallel thumbnail and metadata read threads.

<u>Attention</u>: if the setting **Preferences – Other – Use reduced Folders panel functions** is turned on, then determination of the media type *(network/removable/integrated)* is not performed and the settings above are not applied *(but limits can be set manually in the next section)*.

Volume/Drive specific settings Group

The following is listed in the table for this group:

- All the volumes mounted (Windows: drive letters)

- Manually added *(through the Add custom prefix button)* paths to folders.

For each path, one may

- Turn on one's personal parameters *(Ovrd checkmark)*

- File prefetch: the number of threads for parallel prefetch

- Thumbnail prefetch: number of threads for thumbnail and metadata prefetch.

When setting the parameters for a specific folder, the parameters for a path/prefix that contains the longest part of the path to the folder are applied while viewing subfolders.

Other

This section contains other settings that cannot be grouped with any other preceding group:
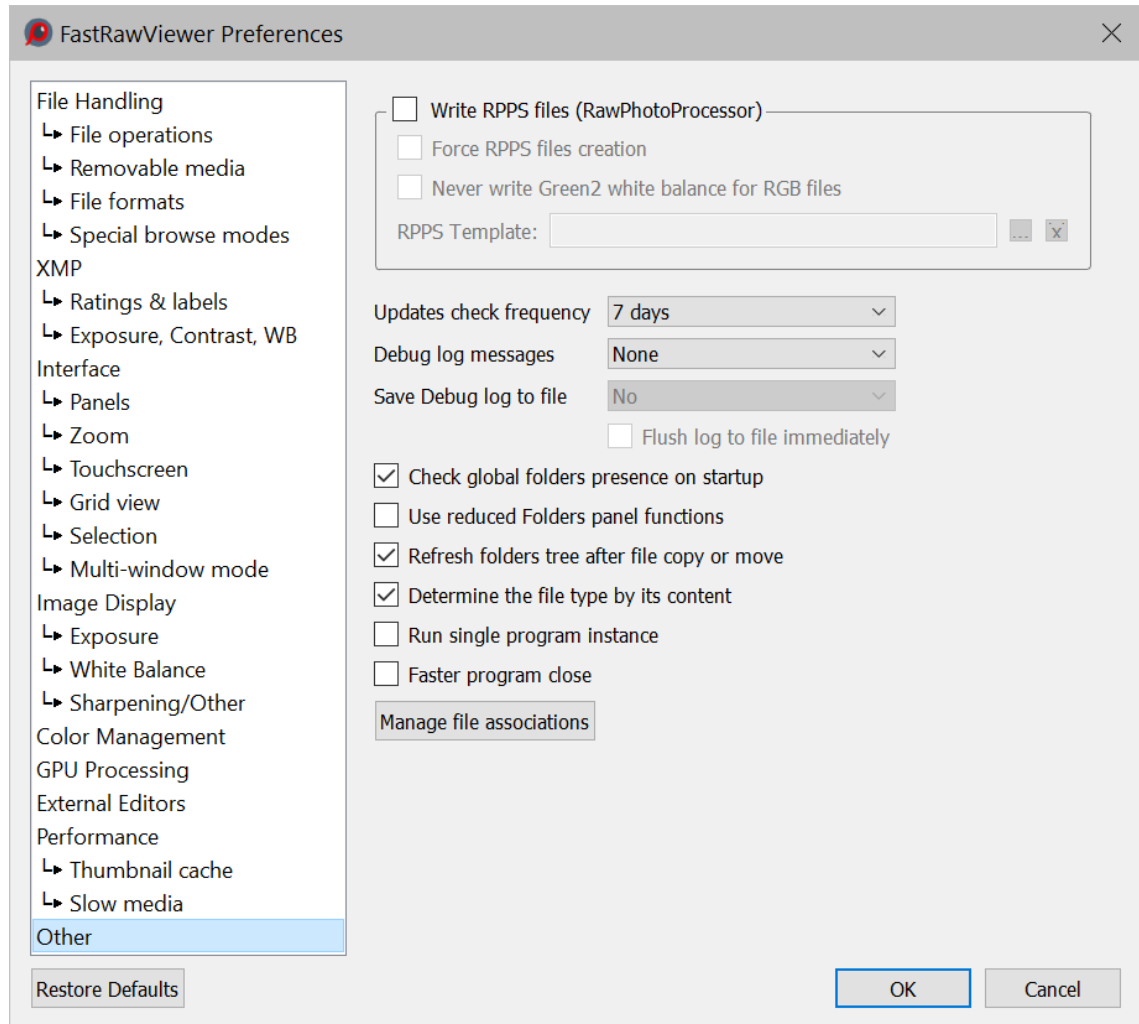
- **Write RPPS files** – saves an .rpps file *(for RawPhotoProcessor)* if manual changes of WB/exposure are applied to the image
    - o **Force RPPS files creation** – saves an .rpps file with automatic settings for WB/Exposure when a RAW file is opened.
    - o **Never write Green2 white balance for RGB files** – switches off the recording of the separate white balance coefficient for the second green channel.
    - o **RPPS Template** – the name of the file that will be used as a template while creating specific .rpps files *(used if .rpps file does not yet exist for the raw file).*
- **Updates check frequency** – this parameter schedules the checks for updates - at each program launch or once in every 1-3-7-15-30 days.
- **Debug log messages** – turns on the debug mode, the debug messages are available through **Menu – Help – Debug log**.

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- **Save Debug log to file** – Debug log recording to text file:

  Windows: *UserProfileFolder*/AppData/Local/LibRaw LLC/FastRawViewer/FRV_DebugLog.txt
  Mac: ~/Library/Application\ Support/libraw-llc/FastRawViewer/FRV_DebugLog.txt
  If the setting is set to some *on* state, Show Debug log in Explorer/Reveal in Finder appears as last item of **Help** menu.

  Possible values for the setting:

  - **No** – do not record log into file. If you'll change to **No** from some **Yes…** settings, existing log file will be removed.

  - **Yes, remove on quit** – log file is recorded, but removed on program successful close *(but will be kept if program crashes)*.

  - **Yes, keep forever –** log file recorded and not deleted, so it may grow indefinitely.

- **Flush log to file immediately:** *(this is accessible if writing the log to a file is turned on)*.
  This setting is intended to catch **FastRawViewer** crashes *(the last things written to the log will not be lost due to the crash)*. In all other cases it should not be turned on, as it decreases efficiency *(especially on slower disks)*.

- **Check global folders presence on startup** – checks for the presence of *(and, if necessary, for write permission)* the following *global* folders, if they're configured *(in the File Handling and Copy-Move-Reject Preference sections)*:

  - Start without filename - Specified folder

  - Open folder dialog starts at - Specified folder

  - Use global rejected folder - Subfolder for rejected files

  - Copy/Move folder selector starts at - Specified folder.

- **Determine the file type by its content**: If checked (default): Non-RAW files type (TIFF/PNG/JPEG/HEIC) to be determined based on file header content.
  (note: this works only for Non-RAW file types /extensions/).

- **Run single program instance** – *(Windows only)* turns on the "one instance" mode of the program. At an attempt of starting the second instance, the file is displayed in the already existing program window.

- **Use reduced Folders panel functions**: switches off some potentially incompatible with your applications / OS functions of the Folders panel, in particular:

  - Monitoring of Removable media change *(CD/DVD, USB devices).*

  - Monitoring changes in the folder tree structure.

  - Editing the folder tree.

- **Refresh folders tree after file copy/move**: if enabled, folders tree in Folders panel will refresh after file copy or move.

- **Faster program close** – *(Windows only)* turns on the fast program completion mode.

Manage File Associations – *(Windows-only)*: activates the system dialogue to edit file association with **FastRawViewer**.

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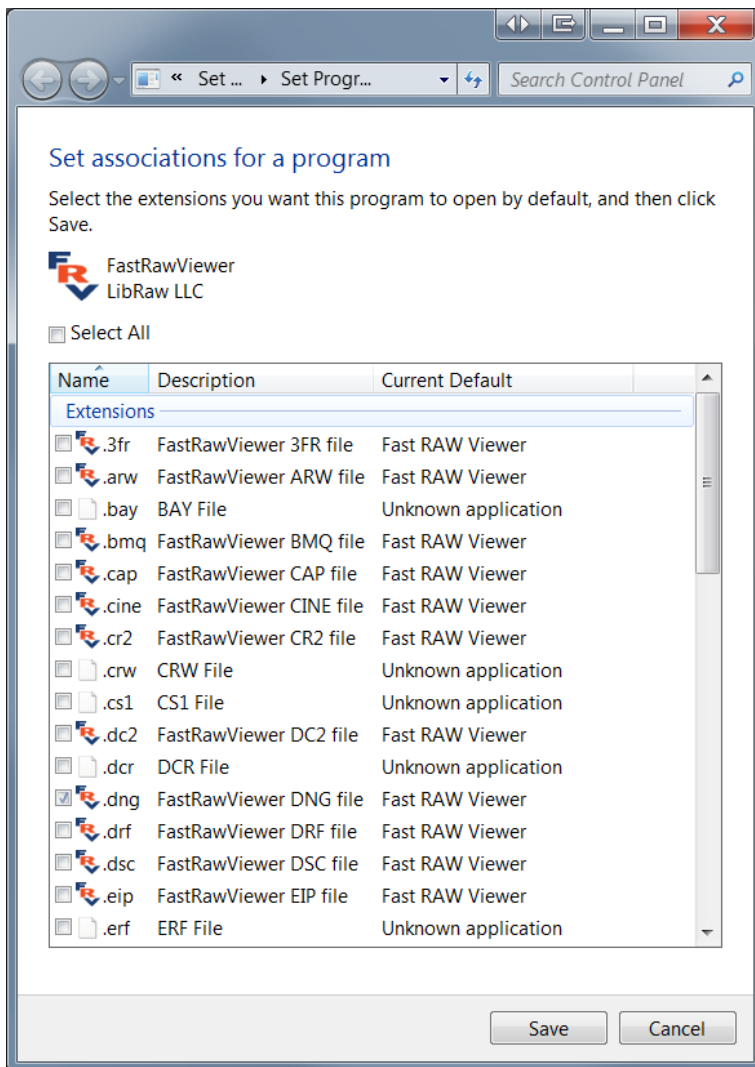
Additional Settings

A few of **FastRawViewer's** settings are accessible only by running scripts that are installed alongside the program. These "hidden" settings are needed extremely rarely, and should be applied, as a rule, only once.

These settings are only read at program start, so if you apply scripts with **FastRawViewer** running, immediately close the program and restart it. If the program is not closed immediately, and you move to editing and saving the settings, the changes made by the script may be lost and require repeating the procedure.

Using Additional Settings Scripts: Windows

Scripts installed with the program are copied into the folder
C:\Program Files\LibRaw\FastRawViewer\Scripts.

To open it, use **Menu – Help – Auxiliary settings** scripts:
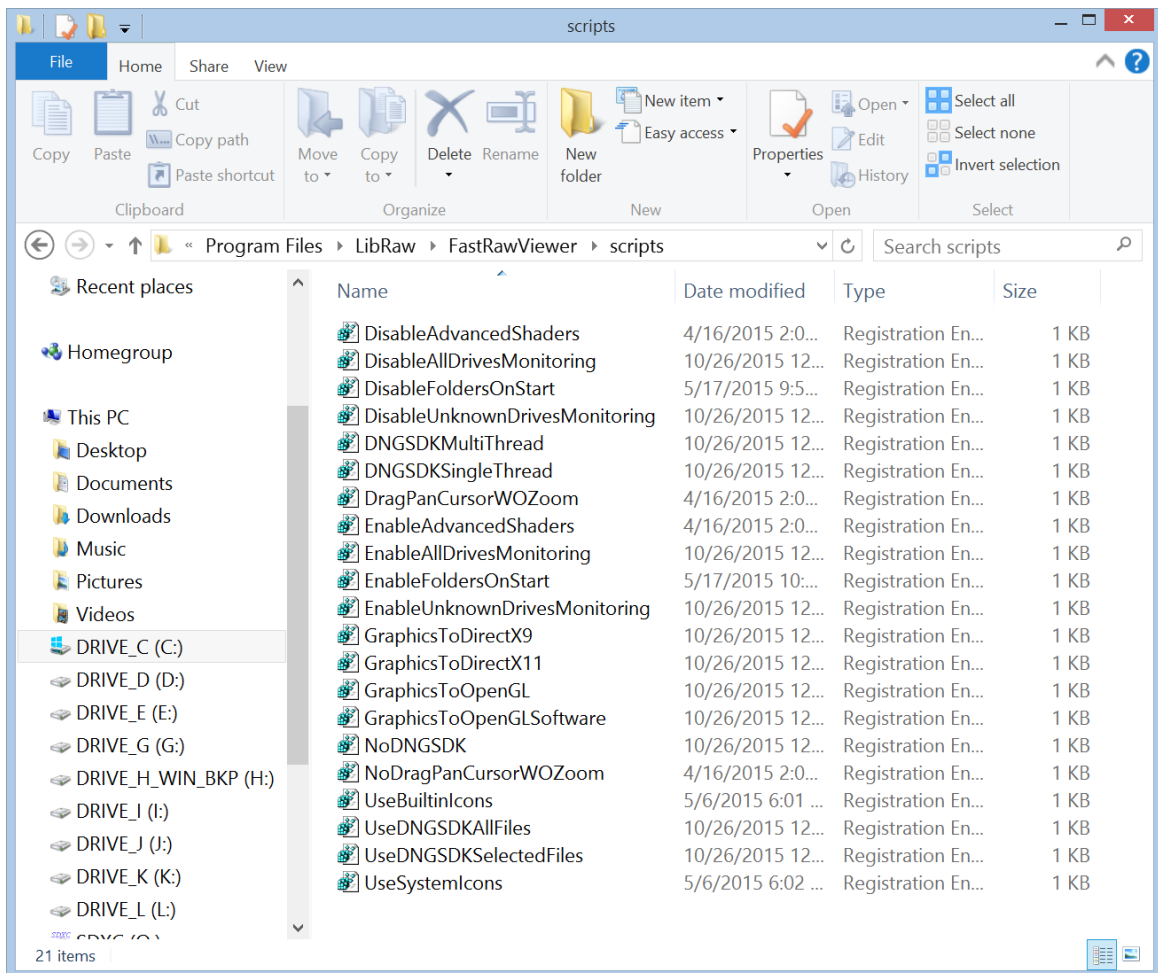
Select the necessary script and launch it (*double click or press Enter*).

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Registry Editor will run, which will first display a Windows UAC message:
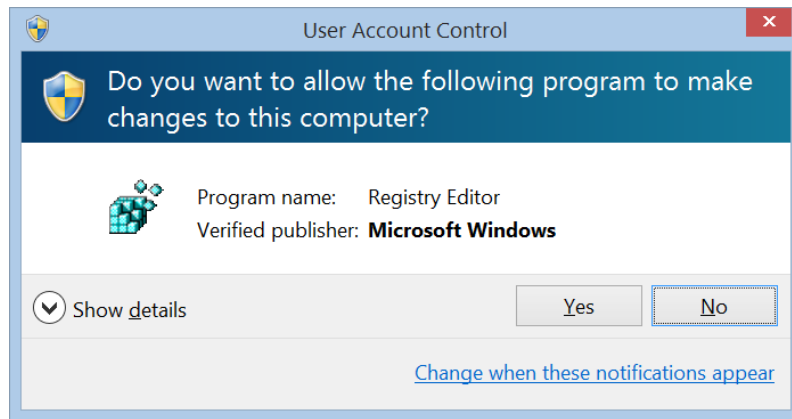
Press **Yes** to agree to the warning, after which Register Editor will warn you again:
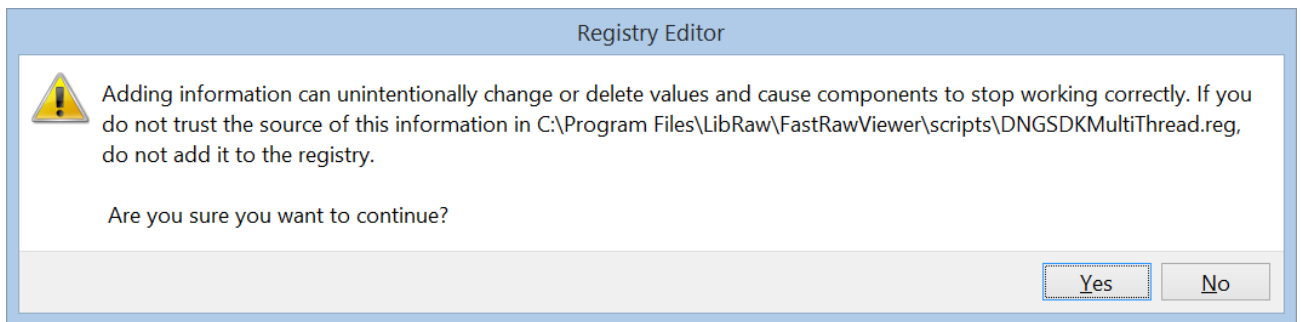
Once again confirm by pressing **Yes**, and Registry Editor will inform you of your success:
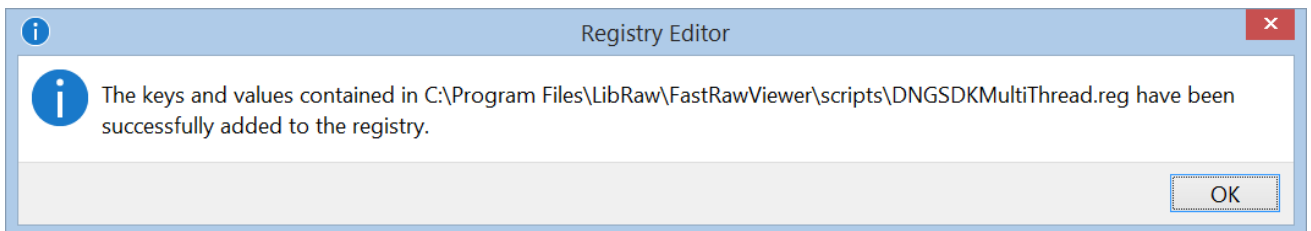
Using Additional Settings Scripts: macOS

The macOS version of **FastRawViewer contains the scripts in the application's resource folder.**

To use the scripts:

1. Use Menu – Help – Auxiliary settings scripts

11. The Scripts folder will open:
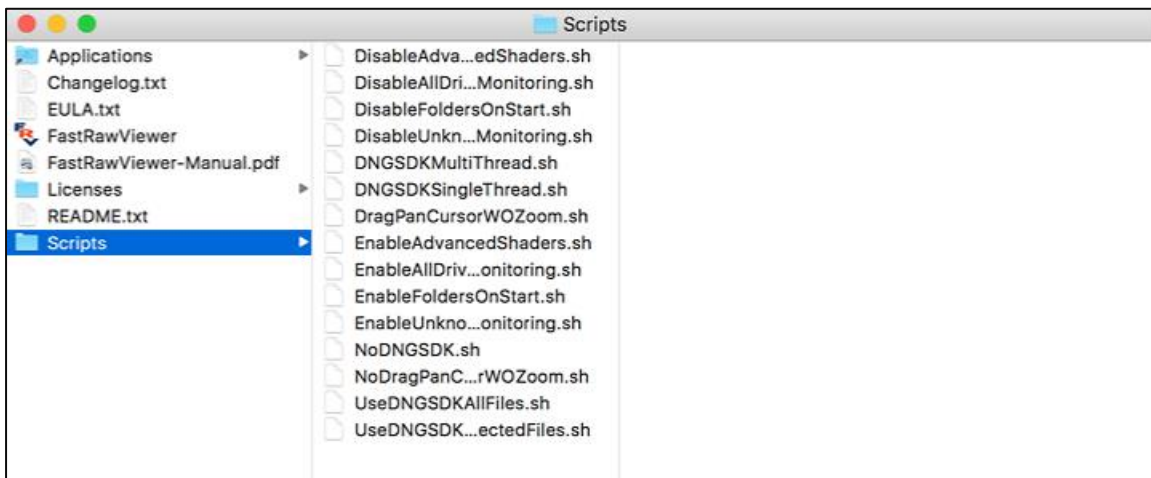
12. Open the Terminal program
    Applications – Utilities – Terminal.

13. Drag the needed script onto the **Terminal** window, and you will see the full path to the script you are about to execute.
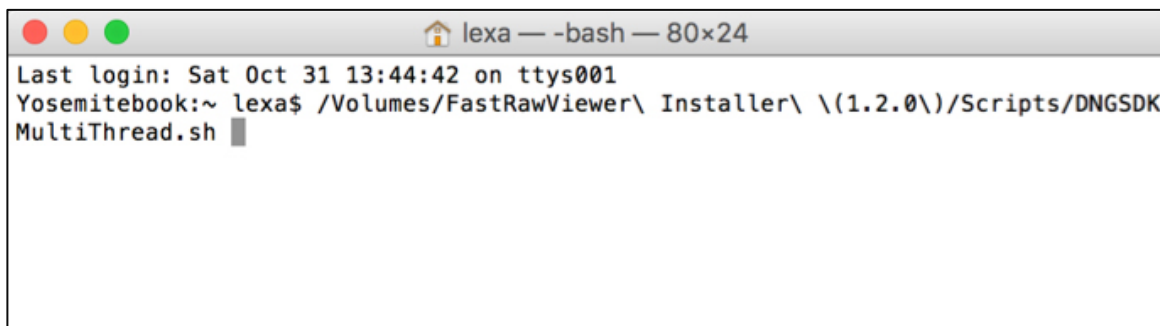
14. Switch to the **Terminal** window and press **Enter**. The script will be executed without any output to the Terminal window; if there's some sort of message, it means that there was an error.

List of Additional Settings

Script filename	Description
Advanced Troubleshooting	
Choosing/altering the program graphics acceleration method	
(Windows only) **GraphicsToOpenGL** **GraphicsToDirectX11**	Sets the graphics "engine" to OpenGL, or DirectX11
UseModernGraphics **UseCompatibilityGraphics** **UseLegacyGraphics**	Use modern OpenGL mode (3.1..4.x) or compatibility mode. Compatibility mode is enabled by default for macOS bigSur and Monterey because of broken graphics driver. Legacy mode is intended as last resort for windows.
Turning resource-intensive graphics operations on and off	
Use16BitFloatingPoint **No16BitFloatingPoint**	Use / don't use 16-bit floating point data while processing RAW data on GPU
UseOEUEOnGPU NoOEUEOnGPU	Use / don't use GPU to create over- and under-exposure maps
Controlling the Folders panel	
EnableFoldersOnStart **DisableFoldersOnStart**	**Enable** *(default value)* turns on the default behavior of the Folders panel: - When starting **FastRawViewer** passing the file name as an argument *(including through the Start without filename setting)* the last state of the Folders panel *(opened/closed, floating/docked)* is applied. - When starting without a filename as a parameter, the Folders panel always opens. **Disable**: **FastRawViewer** starts with a closed Folders panel. It can be opened through Menu – Panels – Folders. This setting is intended, first of all, as a test in extraordinary situations – in a few rare cases, the monitoring of the removable media status and/or the use of the folder/disk system icons leads to **FastRawViewer** not being able to work.
ExpandCurrentFolder **NoExpandCurrentFolder**	Enables auto-expansion of current folder in Folders panel
ReducedFoldersFunctions **StandardFoldersFunctions**	External scripts to set Preferences – Other – Use Reduced Folders panel functions.

Script filename	Description
DriveStatusAsyncQueryOff **DriveStatusAsyncQueryOn**	Turns on/off asynchronous status checks of changeable media
DisplayNetworkSharesVolumeLabel **DisplayNetworkSharesShareNameShort** **DisplayNetworkSharesShareNameFull**	**(Windows only)** Controls network volumes name display: • …VolumeLabel – show volume label (same as Share name for most NAS, may differ on Windows servers). • …ShareNameShort – display share name *(last part)* • …ShareNameLong – display \\server\share
<td colspan="1" align="center">Advanced Tune</td>
<td colspan="1" align="center">Using Adobe DNG SDK</td>
UseDNGSDKAllFiles **UseDNGSDKSelectedFiles** **NoDNGSDK**	Use DNG SDK for • All DNG files • Linear DNG/Floating point DNG *(default)* • Do not use
DNGSDKSingleThread **DNGSDKMultiThread**	Use/do not use DNG SDK in multi-thread mode. Multi-thread mode gives greater efficiency, but may take up over the processor, getting in the way of other computer programs running at the same time.
DngUseColorMatrix **DngUseForwardMatrix**	Type of embedded color data used to display DNG files: ColorMatrix or ForwardMatrix.
EnableRawDecoding **DisableRawDecoding**	Enables *(default)*/disables RAW data decoding. If disabled, **FastRawViewer** will show embedded/external JPEGs only. If disabled, it can be turned on temporarily by -enableraw command-line switch.
DNGShowEnhancedImage **DNGShowStandardImage**	Hidden configuration parameter DNGPreferLargestImage, it is a bit field: • bit 0: if set, FRV will select largest DNG subimage *(default: select 1st subimage)* • bit 1: if set, FRV will extract Enhanced DNG image if present in DNG file Hidden configuration script **DNGShowEnhancedImage** will set both bits to 1, so Enhanced DNG will be preferred image to display. **DNGShowStandardImage** script will revert the change back.
<td colspan="1" align="center">TIFF format support</td>

Script filename	Description
AdditionalTIFFExts	The list of additional extensions *(apart from .tif and .tiff)* that will be interpreted as an indicator of TIFF files.
	Changing this setting:
	• Windows: Copy the file C:\Program Files\LibRaw\FastRawViewer\scripts\AdditionalTIFFext enstionSample.reg somewhere, edit it as you like: the list of extensions can be set as *.EXT1 *.EXT2, or .EXT1 .EXT2, or even just EXT1 EXT2, the space is the separator. After that, double-click on the file; RegistryEditor will launch and import your setting.
	• Mac: execute the following command in the Terminal: defaults write com.libraw-llc.FastRawViewer Prefs.AdditionalTIFFExts "*.fff *.yyy" Here *.fff and .*yyy are those extensions that you would like to be interpreted as TIFFs.
TIFFCMYKasGray	Switches on the display of CMYK-TIFF files, they will displayed in Grayscale
Controlling the HEIC decoder	
HeicDecoderDefaults	The HeicDecoderDefaults script sets the standard / automatic values for the following parameters:
	HEICDecoderPool1Threads – the number of threads that the file decoder runs for immediate display task (by default this is 0, automatic optimization; the number sets the amount)
	HEICDecoderPool2Threads – the number of threads that the file decoder runs for prefetch
	HEICDecoderPool2Size – the number of decoders used for prefetch
	HEICDecoderPool3Size – the number of single-thread decoders used for decoding the preview
	HEICDecoderStartThreshold – the size of the queue for the prefetch/preview decoder upon which additional decoders are started.
Controlling the Filmstrip/Thumbnails panels behavior	
EnableUnknown DrivesMonitoring	Turns on/off the monitoring of any changes in the current folder on:

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Script filename	Description
DisableUnknown DrivesMonitoring **EnableAllDrivesMonitoring** **DisableAllDrivesMonitoring**	• Media (disks), whose type cannot be recognized by **FastRawVewer** *(for example, RamDrive)* • Media, which are recognized by **FastRawViewer** *(CDROM, Floppy disks)*, but for which there are no separate settings in the Preferences *(it is there only for Removable Media and for network volumes).*
FilmstripCenterOn FolderUpdate **NoFilmstripCenterOn FolderUpdate**	Turns on *(default)*/off the centering of the highlighted Filmstrip element when changing the contents of the current folder.
RoundedThumbnails SquareThumbnails	Turns on/off the rounded corners for the Thumbnails in the Grid/Filmstrip.
RefreshFolderAfterProgramRun	Intended for more flexible processing of a situation where an external program creates files and you want those files to be either visible or invisible to **FastRawViewer**. Values: • 0 (set by the **RefreshFolderAfterProgramRunDefault** script) – before launching an external program, the refresh of the current folder (triggered by the signal "the content is changed" emitted by the operational system) is suspended for triple the time set in **Preferences - Performance - Check for folder updates each**.... This is default and legacy behavior. • 1 *(set by the **RefreshFolderAfterProgramRunSoft** script)* – there is no suspension of the current folder refresh; if the launched external program created a file, **FastRawViewer** will detect it without any extra delay *(without Forced folder refresh)*. If this file is being generated slowly, **FastRawViewer** will attempt to track the process, based on the changes in the file size and to delay opening this file while it is still growing, but this is hard to guarantee. • 2 *(set by the **RefreshFolderAfterProgramRunForced** script)* – using the time set in Check for folder updates each ... , **FastRawViewer** will force a re-read of the current folder. • 3 *(no prepared script)* – the combination of methods 1 and 2.
WheelScrollDefault	Sets the default mouse wheel scroll step for all scrolling lists *(folders, thumbnails in Filmstrip and Grid View, EXIF table).*

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Script filename	Description
	If one wants to increase/decrease the contrast – copy the script, and edit it *(change the default value to wheel step needed)* and run it.
FilmstripLegacyOpenDelay **FilmstripNoOpenDelay**	File selected by Filmstrip panel navigation may not be opened immediately. This delay allows arrow keys Filmstrip navigation without CPU/disk overload *(not every intermediate file will be opened)*. Starting from FastRawViewer 2.0.6: default is no delay. To set delay: copy the FilmstripLegacyOpenDelay script, edit it to set required value (in milliseconds) and apply.
FileArrivalDefaultDelay **NoFileArrivalDelay**	Designed to prevent **FastRawViewer** from attempting to display files that are not yet fully copied into the current folder. **FastRawViewer** • waits for the file size on the disk to stop changing (to determine that the size stopped changing the folder is re-read with the frequency set in Preferences - Performance - Re-read folder in...) • additionally, delays the display of this new file for the amount of time set in FileArrivalDelay *(default setting - 2 seconds)* • displays this file in Filmstrip/Grid panels Scripts that control the delay: • **FileArrivalDefaultDelay** - sets the default delay *(2000 milliseconds)*; if you want a different value for the default delay please edit the script • **NoFileArrivalDelay** - sets the delay to zero, thus disabling any extra delay and file size change analysis.
File Processing	
TryJPEGasRAW **NoJPEGasRAW**	Attempts to decode files with a JPEG extension the same as for RAW files. This setting is useful for cameras with modified Firmware *(the DiagRAW hack and old versions of the CHDK hack)* because these cameras save RAW files with JPG extensions.
UseGPSStatus **IgnoreGPSStatus**	Check GPS Status field *(default)* or ignore it and display GPS coordinates regardless of status.
ExposureRangeDefault	A script for setting the range of changes in "exposure". The script sets the default values as *(-5…+8)*, if you need to change it, copy the script somewhere, edit it, and run it.

Script filename	Description
OEDetectionDefault **OEDetectionHistogram** **OEDetectionManual**	OEDetectionMethod allows one to change the algorithm for detecting overexposure. Default - invokes the default method, which searches for the rightmost hump on the histogram. Histogram - the algorithm looks for a one-bin wide peak in the histogram highlights *(the bin width in FastRawViewer histogram is 1/20 EV).* Manual - a manual setting, the value is taken from the OEManualLimit parameter.
CoolscanNEFGamma	CoolscanNEFGamma sets the Gamma value for processing Nikon Coolscan NEF files. The value is multiplied by 100, that is for Gamma 2.2 use 220; for Gamma 1.0 use 100. The default value is 220. There are no scripts to edit this, please set this value into the registry manually.
CanonEnableMakernotesOrientation **CanonDisableMakernotesOrientation**	Enables (default)/Disables use of Canon:Makernotes orientation tag (this tag may be wrong if in-camera rotation tool was used)
EnableRotationWithoutXMPDisableRotationWithoutXMP	Turns on the option of rotating in Single View mode while recording this to XMP is disabled. The orientation isn't recorded anywhere.
EnableDetectDNGfromTiff **DisableDetectDNGfromTiff**	Turns on the detection of DNG files converted form RGB Tiff. When such files are detected - An sRGB tone curve is set - UniWB White Balance is set - Color data is taken from the DNG file
Performance	
SetProcessingMaxParallel	By default, **FastRawViewer** uses all of the available processing cores to process RAW data. Setting the Prefs.ProcessingMaxParallel parameter to a smaller value *(taking HyperThreading into account)* may increase the performance if there are many cores while the RAW files are relatively small.
UseAVX2 **NoAVX2**	Turns on/off the use of AVX2 instructions where for those computers where this instruction set is supported. By default, this is turned on.

Script filename	Description
Other settings	
DragPanCursorWOZoom **NoDragPanCursorWOZoom**	Turns on *(default)/*off the display of the Drag and Pan cursors in the case when the image fits completely in the Window and there is nowhere to Drag/Pan.
PrintSizeDefaults	Default settings for Print Size line in EXIF panel: PrintResolution – print resolution in ppi PrintSizeUnit – 0: inches, 1: centimeters, 2: millimeters
EnableNextPrevQueue **DisableNextPrevQueue**	**Enable** *(default mode)*: if a user issues a new command to move to the Next/Previous file while **FastRawViewer** was still executing the prior Next/Prev File command, this new command is queued and will be executed as soon as the prior one is completed. This allows for fluid browsing through files with just the Spacebar depressed, but can become uncomfortable if very large files are present, as reading and processing such files takes time. **Disable**: the new command to move to Next/Previous file will be ignored while the current command is in effect, and transition to the current file is not completed.
AlternateXMPWrite **NoAlternateXMPWrite**	Turns on alternate XMP write mechanics, use only if you experience problems with standard method.
UseBottomBarFontPixels **NoBottomBarFontPixels**	Turns on bottom bar font size setting via pixels *(DPI-independent)*, not points *(DPI depended)*. Use if you have multiple monitors with very different resolution and OS is unable to deliver resolution data to **FastRawViewer** application.
EnableLargeJumps **DisableLargeJumps**	When this is turned on, the Menu adds the items **Menu -> File -> Jump +2 files** *(+3 files, -2 files, -3 files)* and default hotkeys: **Ctrl-Alt-RightArrow** (move +2), **Ctrl-Shift-Alt-RightArrow** (+3) and similar for left arrow to move -2/-3. The size of the *jump* can be controlled through the Registry/Defaults **Large2JumpStep** and **Large3JumpStep** settings. The EnableLargeJumps script sets these settings to 2 and 3, respectively. If you need other values *(for example, your standard bracketing step is 3 and 5 shots)*, you will need to copy the script somewhere where it can be edited, change the values, and launch it *(or change the values manually through Registry Editor/defaults)*. The changed values take place after **FastRawViewer** has been relaunched.

Script filename	Description
	If the step for "large steps" is set to 0, then the corresponding menu points/hotkeys are deactivated.
ForceWindowSizeRestore **NoForceWindowSizeRestore**	Enables *(second)* forced main window size restore after main program window made visible.
ForceRestoreFloatingPanels **NoForceRestoreFloatingPanels**	If set: floating panels position/size will be forcibly restored on startup. Intended to use on system with multiple displays with different resolution/scaling

Support of non-standard cameras

FastRawViewer can be used for the display and analysis of images from "engineering" cameras, which are saved in the form of "sensor data dumps" without any other additional metadata.

A series of such cameras are already directly supported by the application *(FastRawViewer contains an internal table with the necessary data)*; to support other *(arbitrary)* sensors, one has to add a description of the structure of the sensor's data into the Windows Registry *(on Windows)* or macOS defaults.

To do this one must:

Windows: prepare a registry-script with content similar to the following:

```
[HKEY_CURRENT_USER\Software\LibRaw LLC\CustomCameras]

"Camera01"="24096096,4008,3006, 0, 0, 0, 0,0,148,0,0,Dalsa, FTF4052C 4:3,0"
```

And run it in Windows Explorer.

macOS: run a command in the Terminal, similar to the following one-liner:

```
defaults write com.libraw-llc.CustomCameras "Camera01" "24096096,4008,3006, 0, 0, 0, 0,0,148,0,0,Dalsa, FTF4052C 4:3"
```

In both cases:

Camera01 (or Camera02 … Camera64) – the "number line" in the table, up to 64 records of this type are supported.

The line "24096096,4008,3006, 0, 0, 0, 0,0,148,0,0,Dalsa, FTF4052C 4:3,0" defines the format of the camera's data and consists of 14 fields separated by commas *(a note for engineers: the format of this line is completely analogous to the line in the "sensor dump" table's description in dcraw.c with the one difference being that the CFA filter's format is set in base 10)*:

1. The exact size of the file in bytes *(in this example – 24096096)*. This is the only criterion by which **FastRawViewer** recognizes a data "format", files of a different size will be ignored.

2. The width of the sensor in pixels. Put the entire width, including the "black frame" in this field.

3. The height of the sensor in pixels, including the black frame.

4. The width of the black frame at the left edge of the sensor (in pixels)

5. The width *(height)* of the black frame at the top.

6. The width of the black frame at the right edge.

7. The width *(height)* of the black frame at the bottom.

8. Additional parameters for the file decoding subprogram *(see below)*.

9. The Bayer filter CFA format, with the byte field taking one of the following values:
   o 22 – BGGR
   o 97 – GRBG
   o 73 – GBRG
   o 148 – RGGB
   o 180 - GMYC

10. The amount of unused bit data (for example, if 14-bit data is recorded in a 16-bit format)

11. Additional metadata, bit mask.

   a. Bit 0 – find a .JPG file with the same name and read the EXIF data from it.
   b. Bit 1 – filter *(average neighbors)* for pixels with values of zero
   c. Bits 2-4 – the orientation of the image (0 = do not rotate, 3 = 180, 5 = 90CCW, 6 = 90CW)

12. Camera manufacturer

13. Camera model

14. The offset of the beginning of the sensor data from the beginning of the file (the value range is 0-65534, the special value 65535 means that "the rows are going in the opposite direction").

8, 10, 12, and 16-bit data formats are supported, the number of bits is calculated as *(the size of the file minus the offset from the beginning of the data*)/number of pixels.

Depending on the bitness of the data, the 8th *field ("additional parameters for the file decoding subprogram")* can accept the following values for 10-bit data:

- 1: "4 pixels in 5 bytes" packing is used
- 0: "6 pixels in 8 bytes" packing is used

For the cameras that are supported through this method, the data needed for proper color transforms is *(obviously)* missing in **FastRawViewer**. As a result:

1. the color displayed will be "raw", that is the saturation is low and hues are inaccurate;

2. only Auto WB is available in drop-down;

3. no calculation of CCT and Tint

Backing up the Settings

Windows: to back up the settings, please use the **BackupSettings.cmd** script, which is installed in the same **C:\Program Files\LibRaw\FastRawViewer\scripts** folder as the scripts described above.

As a result of running this script, an **FRV-backup** folder will be created in your **Documents** folder. This **FRV-backup** folder will contain three files containing a copy of your program's settings:

- **Preferences.reg** – for the settings which are controlled through the Preferences

- **Shortcuts.reg** – the settings for the keyboard shortcuts

- **LastUsedSettings.reg** – this contains the automatically saved settings such as a list of Recent Files/Recent Folders, window position, etc.

To restore settings from the backup copy:

1. Quit **FastRawViewer**

2. Double-click the file with the backup copy of the settings you want to restore – this will import them into the Windows Registry.

macOS: the settings are stored in ~**Library/Preferences/com.libraw-llc.FastRawViewer.plist**
All of the standard backup procedures for Macintosh *(TimeMachine, etc.)* will save and restore those settings without any trouble.

Informational Panel Settings

The settings icon (⚙) is located in the header of the informational panels, allowing one to perform actions or change preferences for the current panel. These setting can be changed at any moment while the program is running and are effective immediately.

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Folders Panel
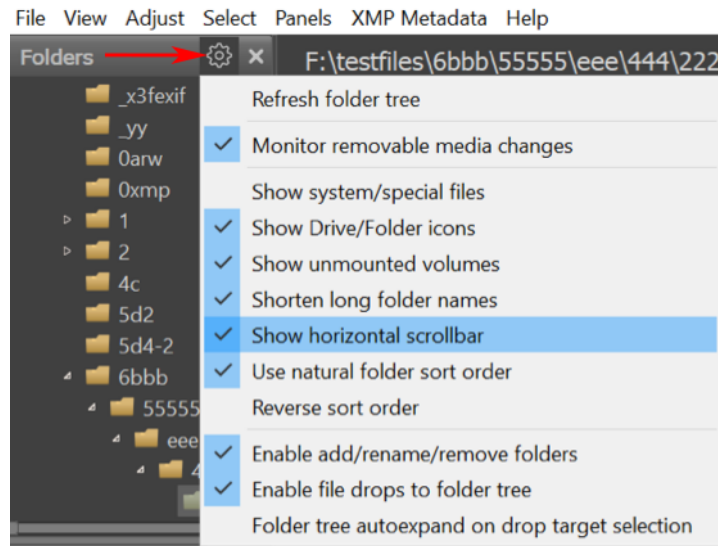
- **Refresh folder tree** – re-reads the folder tree. This action is intended to sync the displayed file structure with the current one on the disk; useful if the monitoring of the creation of new files/folders *(default setting for network collections and memory cards)* is turned off.

- **Show system/special files**: turns on the display of files/folders which are usually hidden:
  - Mac: bundles *(applications and disk images)*; folders, the names of which start with a dot; standard Unix folders like /usr, /bin etc.
  - Windows: C:\Windows folder.
  - All systems: Lightroom folders.

- **Show Drive/Folder icons** – allows drive and folder icon display.

- **Monitor removable media changes** – allows automatic discovery and monitoring of removable media.

- **Show unmoumted volumes (Windows only)** – allows drive letter display when the media is offline.

- **Shorten long folder names**: for folders with names longer than 8 characters, the displayed name for the folder will be automatically shortened to fit in the window.

  This is done by removing the middle of the folder name from the display. Any folder names shorter than 9 symbols aren't affected.

- **Show horizontal scrollbar**: if enabled (default), Folders panel contents could be scrolled using mouse/trackpad. If disabled, then horizontal scroll of panel contents is completely disabled.

- **Use natural folder sort order:** consider digits in file/folder names to be ordinal numbers and sorts those numbers in numeric value order.

- **Reverse sort order**: folders are displayed in reverse order (ZZ.AA). Windows: this doesn't affect disk letters, which remain in their natural order A:…Z:

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- **Enable add/rename/remove folders** – allows one to edit the folder tree.

- **Enable file drops to folder tree** – allows one to drag files into the folder tree.

- **Folder tree autoexpand on drop target selection** – enables the auto-expanding of subfolders when a file being dragged is dragged to it

Favorite Folders Panel
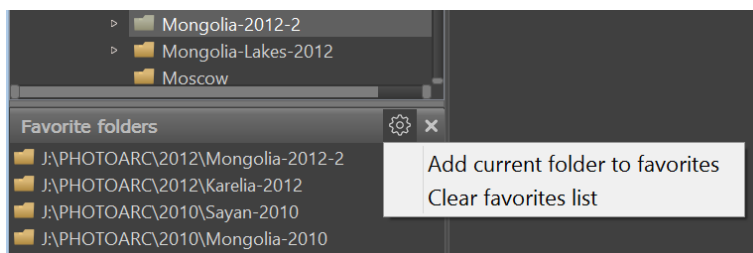
- **Add current folder to favorites** – adds the current folder to the list of favorites

- **Clear favorites list** – clears the list of favorite folders.

Filmstrip/Thumbnails Panel
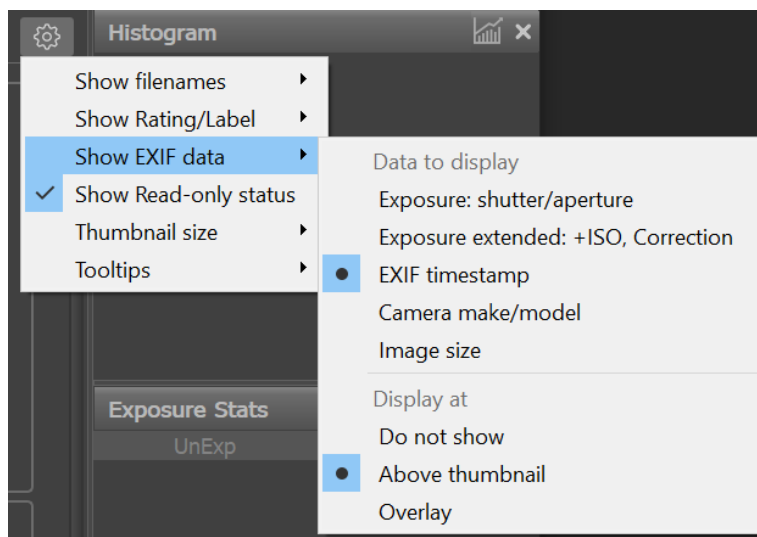
- **Show filenames** – sets a mode for file name display in the Filmstrip: don't show, show under the icon, or show over the icon.

- **Show Rating/Label** – sets a mode for XMP Rating/Label display in the Filmstrip: don't show, show under the icon, or show over the icon.

- **Show EXIF Data** – EXIF data display mode:
  - **What to display**: exposure *(abridged)*, exposure *(full)*, Timestamp, camera name, image size in pixels.
  - **Where to show:** Do not show, above thumbnail, overlay atop the thumbnail.

- **Show Read-only status** (Windows)/**Show Locked/Read-only status** (Mac) – read-only/locked files will be shows with a "padlock" symbol to the left of the checkbox mark.

- **Thumbnail size**: setting the size of the Thumbnail preview:
  - 11 sizes, starting with 75 and up to 600 pixels on the longer side.
  - **More space for vertical images** – allows on to set the icon aspect ratio 1:1 instead of 2:3
  - **Display Thumbnails** – allows one to turn off preview display, allowing only file names, and, if desired, XMP ratings/labels.

    This mode is efficient when using a Filmstrip in vertical orientation:
  - To adjust the font size in this mode, first set the thumbnail size and only after that switch the previews off.

- **Tooltips** – what to display in the floating hints: **Title**, **Description**.

- **Refresh thumbnails/ratings**: action for re-reading the file icons in the current folder.
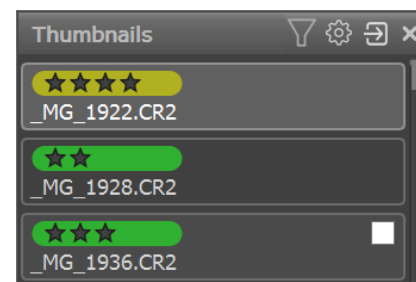
Grid View Panel

In the upper-right corner of the Grid View window there is a "gear" button that drops down the settings menu:
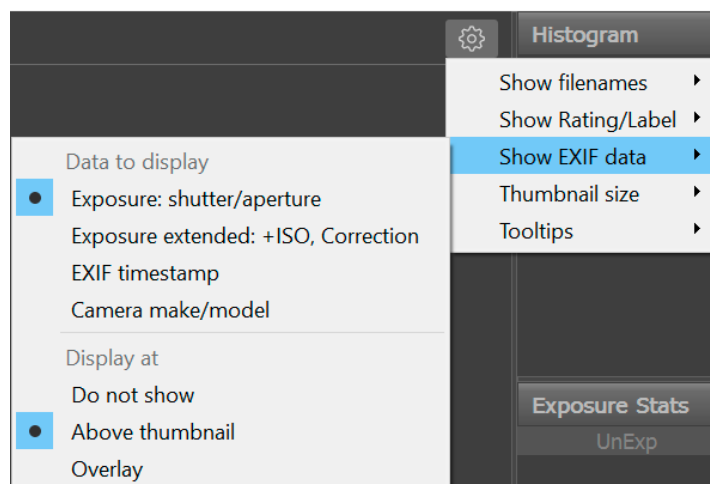
These settings are very much like those for the **Thumbnail** panel, with the following exceptions:

- The list of sizes is different: from 125 to 800 pixels on the longest side.
- There is no setting to switch off the display of Thumbnails.

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EXIF Panel
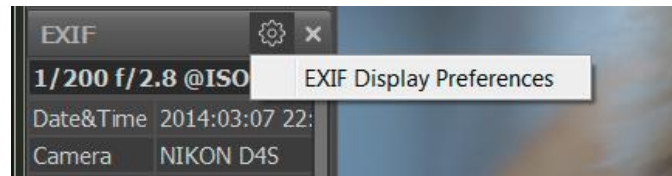
EXIF Display preferences runs a dialog for editing EXIF display:
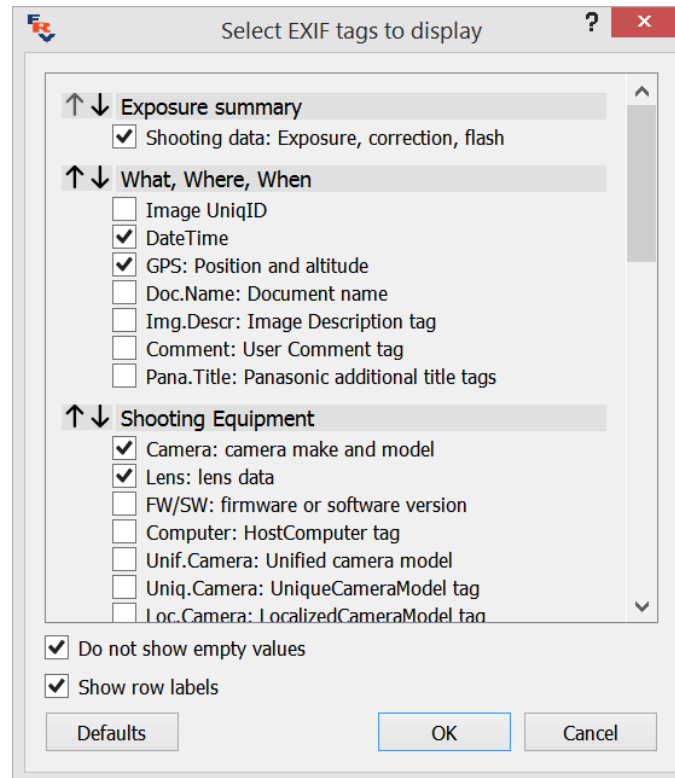
In this dialog:

- The **up/down arrows** allow one to move the groups of the displayed information.

- In each group, one can choose the elements that are necessary during display.

- **Do not show empty values** – forbids the output of empty lines *(for which the displayed RAW has no data)*.

- **Show row labels** – turns the left column of the EXIF-table *(field names)* on/off.

XMP Metadata Panel
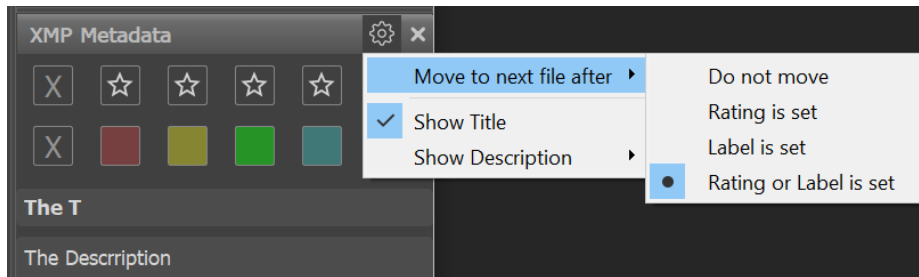
- **Move to next file after** – sets the automatic progression to the next file after setting a rating or mark:
  - **Do not move** – doesn't move.
  - **Rating is set** – moves when a rating is set.
  - **Label is set** – moves when a mark is set.
  - **Rating or label** – moves when setting either parameter.

- Show Title – shows the XMP title (name)

- Show Description – description view mode *(do not show; 1,2,3 lines)*

Exposure Statistics Panel
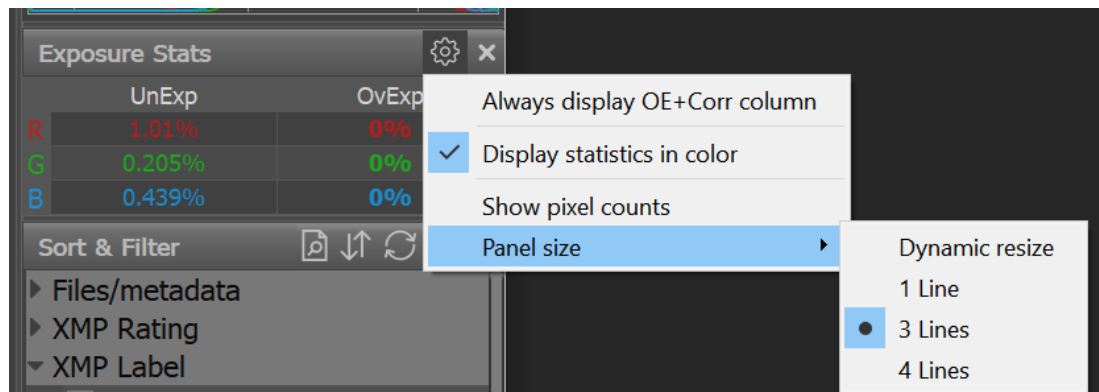
- **Always display OE+Corr column**: turns on the display of the third column of statistics *(OE+Corr)*, even if it has the same values as the OveExp column.

- **Display statistics in color**: turns on the output of table rows in the color corresponding to the color of the pixels.

- **Show pixel counts:** display pixel counts together with percentage**.**

- **Panel size:** dynamic resize will adjust size based on current image color channel count; other settings will result in fixed panel size.

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Sort & Filter Panel

The **Sort & Filter** panel contains the following icons, left to right:

- Filter files by filename
- File Sorting
- Re-reading the current folder
- Panel Settings.

The use of these items is described above in the "**Sort & Filter**" section.
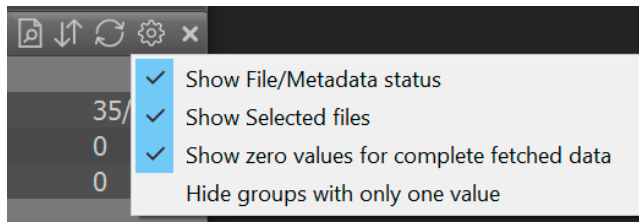
Sort & Filter	
Files/metadata	
Total files	35/677
Metadata unread	0
Selected	0
XMP Rating	
Not set	0/517
✔ *	22/32
✔ **	5/24
✔ ***	8/36
****	0/38
*****	0/30
XMP Label	
Not set	0/392
Red	0/36
✔ Yellow	35/72
Green	0/55
Blue	0/56
Purple	0/66
EXIF timestamp	
Today	0
01 Mar - 31 Mar 17	34/352
01 Apr - 11 Jul 08	0
01 Apr - 10 May 06	0
✔ 10 Jan - 04 Apr 17	35/539
Past	0/29
No timestamp	0

Panel Settings:

Show File/Metadata status ✔
Show Selected files ✔
Show zero values for complete fetched data ✔
Hide groups with only one value

- **Show Files/Metadata status** – turns on the display of this group in the statistics/selection table

- **Show Selected files** – turns on the display of the Selected line in the current group.

- **Show zero values for completely fetched data** – if this setting is off, then the table display the lines that do not don't correspond to any of the files in the current folder.
  Display is only turned off when the metadata for all of the files in the folder has been read.

- **Hide groups with only one value** – if the corresponding group *(XMP Rating, Label, EXIF Timestamp)* contains the same data; in other words, all of the files in the current folder fall into the same line in the group, the entire group will be hidden.

Customizing the Status Bar

Many control and information display elements characterizing the displayed image can be placed in the status bar. As a rule, all possible elements are not needed to the user *(and they won't all fit on a monitor of average resolution)*, so the display of these elements can be customized.

For customization choose **File – Customize bottom bar** in the menu**,** or choose Customize Bottom Bar in the menu that pops up when pressing the settings button in the lower right corner of the program window *(if you have not switched off the display of this icon)*.

This settings window pops up:
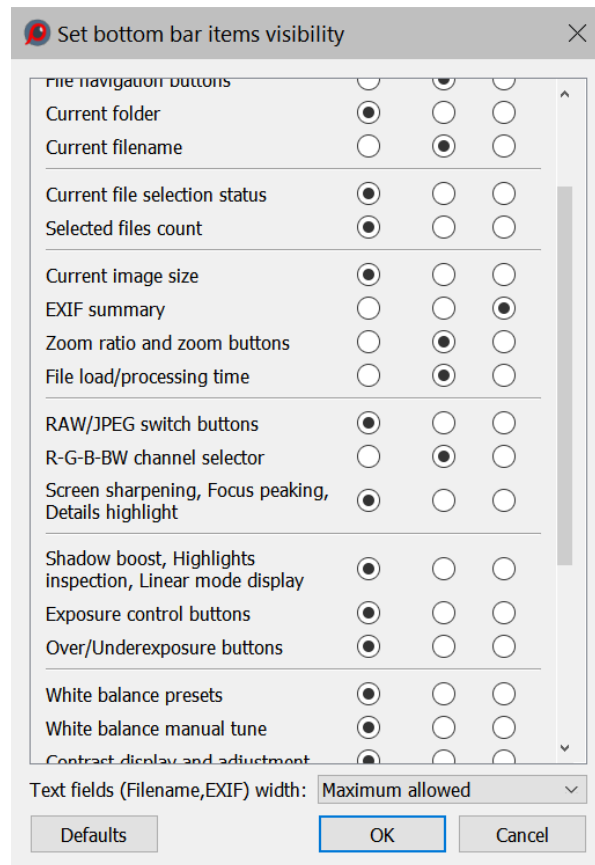
Each line on the table corresponds to one element of the program's status bar, and can be set to one of three positions:

- **Visibility always**: always shows the element. If the program window size is too small, then the elements will overlap.

- **If fits**: The element is shown only if the size of the window is such that the elements do not get in each other's way.

- **Hide**: The element is not shown.

The following elements can be customized:

- **File Navigation**:
    - **Open File Button**: Open file icon
    - **File navigation buttons**: Prev File/Next file button and current file number indication *(this button opens up the set file by number dialog)*.
    - **Current folder**: current folder being browsed.
    - **Current filename**: File name *(without the name of the folder)*.

- **Selection status**:
    - **Current file selection status:** *Sel* (in red) If current file is selected via Select, empty field otherwise.
    - **Selected files count:** number of selected files (if any), empty field otherwise.

- **File and Display information**:
    - **Current image size**: size of the image in pixels
    - **EXIF summary**: shooting data (exposure, flash, lens's focal length).
    - **Zoom ratio and zoom buttons**: current file zoom *(clicking causes Fit to Window)* Zoom In/Zoom Out buttons.
    - **File load/processing time**: time spent on reading-decoding-processing the file in **FastRawViewer**.

- **Controlling the current file display**:
    - **RAW/JPEG switch buttons**: Buttons for switching between RAW/JPEG
    - **R-G-B-BW channel selector**: Buttons for switching RGB channels and black and white representation.
    - **Screen sharpening, Focus peaking, Details highlight**: Buttons for turning on the corresponding modes

- **Exposure analysis, exposure compensation control**:
    - **Shadow boost, Highlights Inspection, Linear mode display**: Buttons for turning on the corresponding RAW display modes.
    - **Exposure control buttons**: current exposure compensation value *(clicking on this turns on/off exposure compensation)*.
    - **Over/Underexposure buttons**: Buttons for turning on/off the display of over/underexposed areas.

- **White balance and contrast control**:
    - **White balance presets**: choose preset WB.
    - **White balance manual tune**: current white balance indication; pressing on it summons a dialog for adjusting white balance manually.
    - **Contrast curve selector**: drop-down list of contrast curve choices.

- **Rotation control buttons**: control of the image rotation, current orientation display

- **Controlling XMP ratings and labels**:
  - **XMP Rating buttons**: indication and control of XMP ratings.
  - **XMP Label indicator**: indication of current XMP labels.
  - **XMP Label buttons**: indication and control of XMP labels.

- **Application interface controls**:
  - **Toggle touchscreen functions:** button to turn touchscreen mode on/off.
  - **Multi-window mode controls**: buttons to switch to 2/4-window mode and back.
  - **Full-screen, hide/show tabs/filmstrip, and customize:** application interface control buttons.

- **Text fields width**:
  This setting controls the width of the text field, such as file name, EXIF summary, etc.:
  - **Auto** – the width varies according to predetermined, built-in boundaries
  - **Minimum allowed** – always the minimum width;
  - **Maximum allowed** – always the maximum width.

Setting the Keyboard Shortcuts

FastRawViewer allows you to re-define all keyboard shortcuts, assigning an arbitrary amount of alternative keystroke and mouse button combinations to each of the actions possible in **FastRawViewer**.

To define or modify the sequences for the actions use the editor under **Menu – File – Keyboard Shortcuts** (**Ctrl-K**):
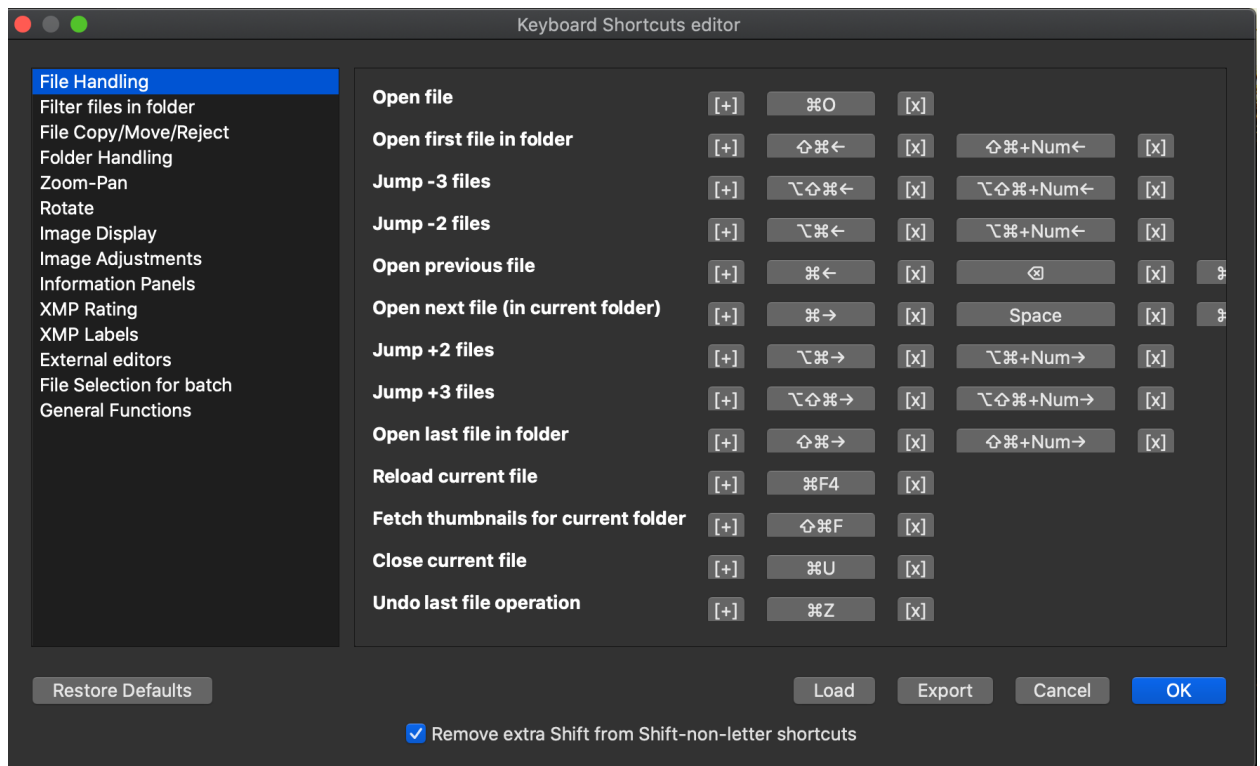
The left pane contains the list of groups of actions. The right pane displays the names of the actions in the highlighted group and current shortcuts for those actions.

Looking to the right of every action name:

- **[+]** – adds a new keyboard shortcut for the action
- **[keyboard combination]** – currently assigned shortcut
- **[x]** (to the right of every keyboard combination) – deletes this combination.

The **Remove extra Shift from Shift-non-letter shortcuts** option is Mac-specific: when saving shortcuts of the form Shift-number in newer versions of macOS, a "double shift" was accidentally recorded (Shift-1 => Shift-!). The extent of the problem is currently uncertain, this option will remove extra shift modifier. When it's turned on, Shift-1 (in the English configuration) will be recorded as ! *(without additional modifiers)*, and it works correctly.

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When pressing the buttons to add or edit the combination the following dialogue appears:

> Adding new shortcut for **Open file**
>
> To record shortcut:
>
> - Press key combination (key + Ctrl/Shift/Alt)
> - Or press mouse button (+optional keyboard modifiers: Ctrl, Shift or Alt)
> - Or use Mouse Wheel (+optional Shift modifier)
>
> **To cancel Key Capture press 'Shift' key three times**
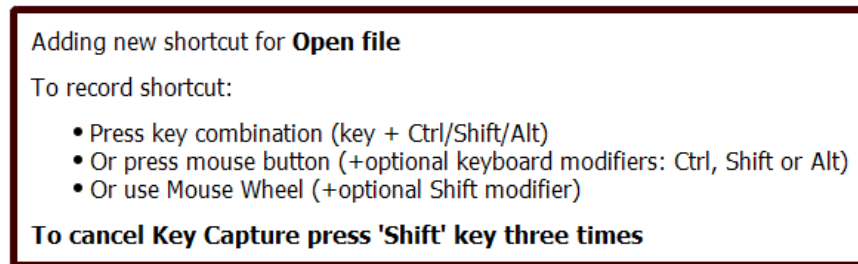
Hit the combination of keys *(and mouse buttons)*, which you want to assign to the action, and it will be memorized. To close the window without modifying the current status *(that is, to cancel the assignment)*, press the Shift key three times.

It is possible that the selected combination is already in use somewhere, and then the program will prompt with the following:

> ⚠ Key combination **Ctrl+O** already used in action **Open file**
>
> Remove old shortcut and assign **Ctrl+O** key to **Open folder**?
>
> Yes   No
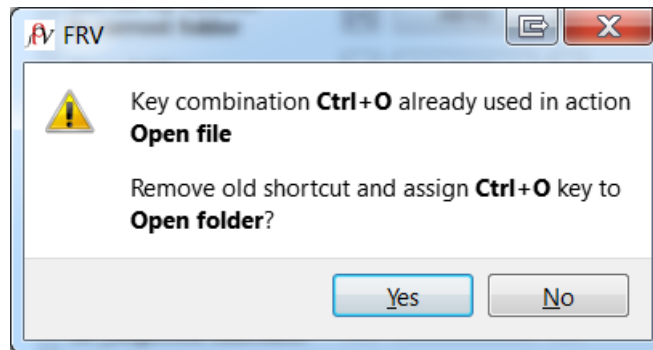
For some actions, only a specific mouse button can be assigned *(this applies to the actions, which are done with the mouse: setting the white balance for the "click-on-gray" method, etc.)*. In this case, the dialogue to assign the combination changes a bit:

> Adding new shortcut for **Quick Zoom and Pan**
>
> To record shortcut:
>
> - Press mouse button (+optional keyboard modifiers: Ctrl, Shift or Alt)
>
> Keyboard and Mouse Wheel shortcuts are not supported for this action
>
> **To cancel Key Capture press 'Shift' key three times**
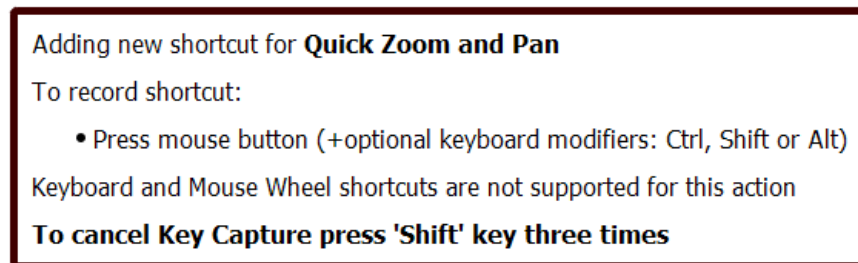
To transfer shortcut settings to another computer, use **Export** button on source and **Load** on destination.

Settings for Apple Magic Mouse/Trackpad

The standard settings for Apple Magic Mouse in macOS are designed for smooth scrolling *(Natural Scroll).* With these settings trackpad and Magic Mouse continue to send scrolling events for some time even after the user stopped moving his finger.

The settings are very suitable for panning; but cause erratic behavior if we want to associate some action to the trackpad or mouse. For example, if we associate "go to next/previous image" to the Magic Mouse with default natural scroll settings several files will be skipped.

To disable Natural Scroll, please visit **Accessibility - Mouse & Trackpad** and there select **Scrolling without inertia** and slow scrolling speed:

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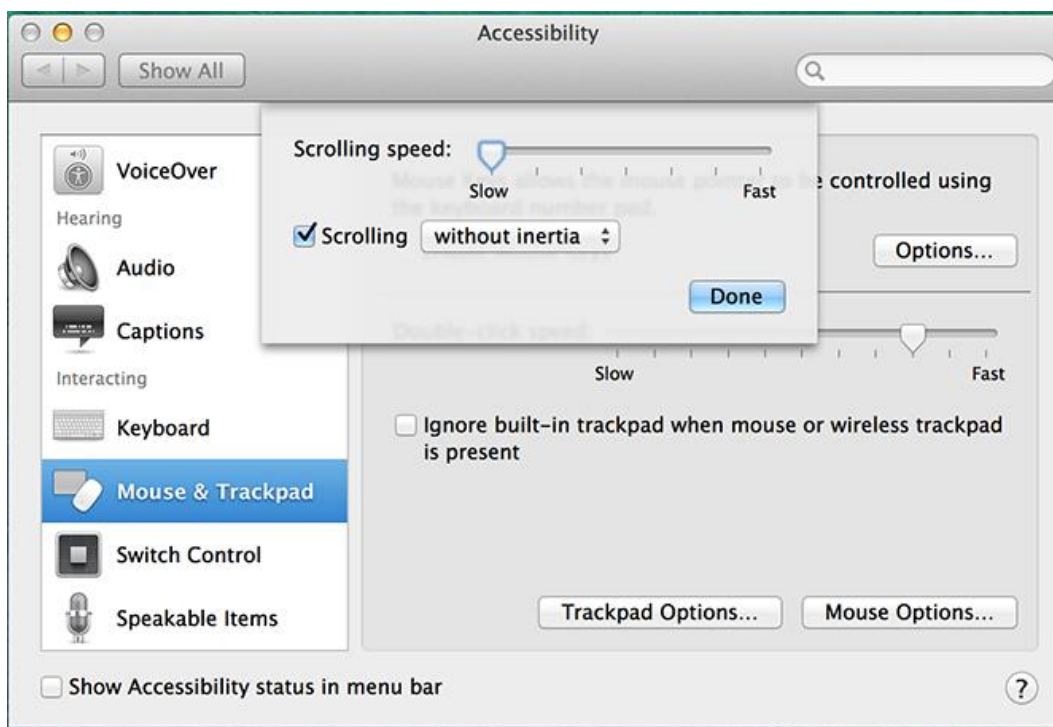
List of Supported Cameras (RAW formats)

Actual list of supported cameras is published on FastRawViewer's website:
https://www.fastrawviewer.com/cameras-supported

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FastRawViewer uses Qt 5.12 *(Qt 5.4 for legacy version)*, LibRaw library, RawSpeed library, LibXML2 and LibJPEG-turbo libraries, LibTIFF 4, LibPNG 1.6.36, Adobe XMP and DNG SDK, and Microsoft Visual Studio 2010 runtime library.

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LibRaw

LibRaw: raw images processing library

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Qt 5.12

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RawSpeed library

RawSpeed - RAW file decoder.

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LibJPEG-turbo

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Based on x86 SIMD extension for IJG JPEG library - version 1.02

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Adobe XMP SDK

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Adobe DNG SDK

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