

CanonHDRCapture - User Guide

Franz Daubner

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1 Introduction

To increase the dynamic range of traditional digital cameras, several images taken with different exposure values of the same scenery can be captured and later combined by software to span a greater dynamic range.

This software allows to capture several such hdr-sequences (a hdr-sequence being a set of images later forming a single hdr image) automatically at specified time intervals. For example the application can be configured to capture hdr-sequences from 12. june 2007 12:00 until 13. june 2007 13:00 at a 15 minute time interval. Additionally, the application can be set to take a predefined number of images per hdr-sequence, or to determine automatically the number of required images by analyzing each captured image for under or overexposure and dynamically deciding whether another image needs to be captured. Captured images are always directly transferred to the pc, so the maximum number of hdr-sequences which can be taken in this way is only limited by the amount of free disk space on the pc and by the battery of the camera (if no external power source is used for that purpose).

1.1 Quickstart

1. Connect the camera via usb to the computer, select "M" (manual mode) on the mode dial and turn the camera on.
2. Press the connect button (Fig. 3). A popup window labelled "Detected Camera" with your camera's type in the dropdown - box should show, press ok (Fig. 4). The status display should show the message "camera connected".
3. Press the Add button under the Timers list. A new timer entry should appear in the list, select it.
4. Press the Preview button. The camera will take a test image and you will see the result in a separate window. Click on the image to make it disappear again.
5. Adjust the Camera Parameters and check the result with the Preview button until you get a decent exposure.
6. Press the "Reset Camera Values" button in the HDRSequence window.
7. Press the "Fire Single Sequence" button, the application should now capture a hdr-sequence of 5 images.

1.2 System Requirements

The application should run on any pc with a windows operating system supported by the .net 2.0 environment (that would be win2000, winxp and vista). It has been field-tested on a small notebook with an 800mhz processor and 256mb ram running windows xp. Hard disk requirements by the application itself are negligible (>6mb), but you'll need lots of free disk space for the captured raw images. Of course a compatible Canon camera (see 1.3) is required, and a free usb port on the pc.

1.3 Camera Compatibility

Currently supported camera models:

- EOS-1Ds Mark II
- EOS-1Ds
- EOS-1D Mark II N
- EOS-1D Mark II
- EOS 5D
- EOS 20Da
- EOS 20D
- EOS 350D (EOS Digital Rebel XT)

2 Main Window

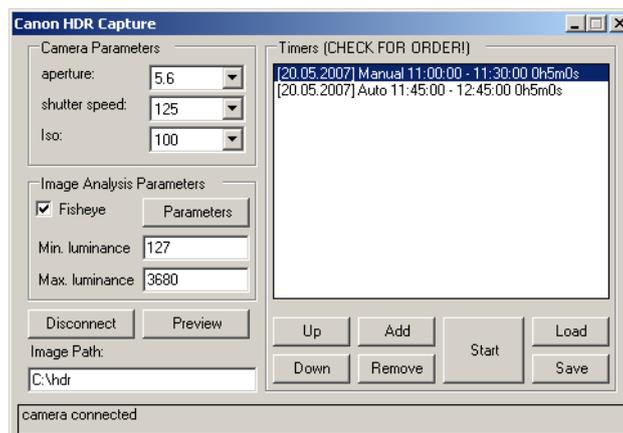


Figure 1: Main Window with camera already connected

2.1 General

Camera Parameters: This panel shows the currently selected exposure values on the camera. Depending on the shooting mode selected, some values might be greyed out or empty. When manual mode (labelled M on the mode dial) is selected, all three boxes should show valid parameters. By selecting a different value from one of the dropdown-boxes you can change the corresponding value in the camera.

Image Analysis Parameters: These settings change the behaviour of the image analysis algorithm determining under or overexposure in auto mode. The application will remember these settings.

Fisheye: Check this box if a circular fisheye is attached to the camera. If a circular fisheye is attached to the camera, some parts of the captured image will always be black. Therefore the image analysis used in automatic mode needs to exclude the black parts of the image or the result will always show an underexposure.

Parameters button: This button allows you to configure the values used to determine the black areas of the image when a circular fisheye is used (see Fig. 2). This button will be deactivated when the fisheye option is not active.

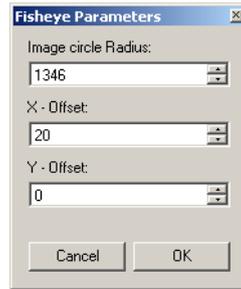


Figure 2: Configuration window for fisheye parameters.

Min. luminance: Specifies the luminance threshold used to determine underexposure in automatic mode. If a pixel's value in the image is below that threshold, the image is considered underexposed. This value should be set to the camera's black point, which can be determined with dcrw.

Max. luminance: Specifies the luminance threshold used to determine overexposure in automatic mode. If a pixel's value in the image is above that threshold, the image is considered overexposed.

Connect Button: Establishes a connection to the camera. When you press the connect button, a popup window with all detected cameras shows. Select the desired camera and press OK. If the drop down box is empty, check if the drivers for the camera are installed and if the camera is connected properly to an usb-port. The status display at the bottom of the main window shows if the connection was successful. (see Fig. 3 and 4)

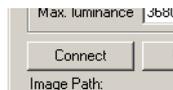


Figure 3: Connect Button

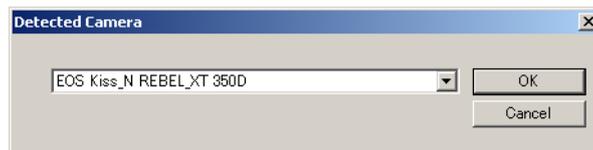


Figure 4: Camera Selection Popup

Preview Button: Fires the shutter of the camera and displays the resulting picture in a separate window. You can click into the window to make it disappear again.

Image Path: The path where the captured images will be saved. The application will remember this setting next time it is executed.

2.2 Timers:

Save: Saves all timers to an xml - file.

Load: Loads a set of timers from an xml - file. All previously defined timers will be discarded.

Start: Starts the currently selected timer. If the current timer executed successfully (or can't be executed because it has already expired), the next timer in the list will be processed until there are no timers left at the bottom of the list. As soon as a timer has started, a popup window appears, showing the status of the timer.

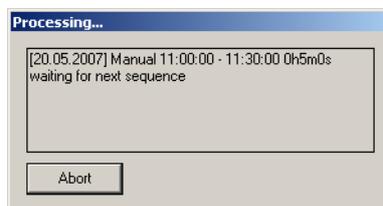


Figure 5: Timer popup - waiting for the start of the next sequence

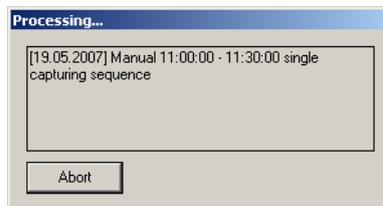


Figure 6: Timer popup - capturing a sequence

Add: Adds a new timer to the list. The start settings will be set to the current camera settings, start and end date will be set to the current date.

Remove: Deletes the currently selected timer from the list.

Up/Down: Changes the position of the currently selected timer in the list.

3 HDR - Sequence Window

Time Interval: Specifies the time interval in which the timer will be active. When the start time has already passed when the timer starts executing, a sequence will be fired immediately. The end time specifies when the timer will stop starting new sequences. It will not stop an already running sequence.

Repeat: These settings specify at which intervals hdr-sequences should be fired. A value of Hours: 0 Minutes: 5 Seconds: 0 would fire a sequence every 5 minutes beginning with the start of the time interval until the end of the time interval. The single event setting defines that only a single sequence will be fired when the time interval starts, while the continuous setting defines that sequences will be fired continuously until the time interval ends.

”Fire Single Sequence” Button: Immediately starts capturing of a hdr-sequence with the currently selected settings ignoring the timer values.

”Reset Camera Values”: Sets the Start Settings for the hdr-sequence to the current camera settings.

”Reset Interval Settings”: Resets the ”Time Interval” and ”Repeat” settings to their default values.

Start Settings: The exposure values for the first image captured in the hdr-sequence. Based on these values the exposure will be varied for the following captured images.

Step Size: The exposure-difference between two consecutive images of the hdr-sequence. If the camera is set to 1/2 stop increments, 4 steps mean a difference of 2 stops, if the camera is set to 1/3 stop increments, 4 steps mean a difference of 1,33 stops.

manual / automatic: Selects the capturing mode of the sequence. Depending on the selected mode, a different mode - settings panel is displayed in the lower right corner of the window (see Fig. 8 and 9).

When manual mode is selected, a fixed number of pictures is captured, regardless of over or underexposure. The application tries to capture an equal amount of images darker and brighter than the start exposure. First, shutterspeed is changed accordingly, if the shutter-speed is already at it’s maximum (or minimum) the aperture is changed. Iso always stays at it’s initial value. The number of captured images can be configured in the ”manual settings” panel.

In automatic mode, every captured image is analysed for over- and underexposure. Depending on the result additional images with different exposure settings are captured. When varyinyg exposure the application tries to minimize the amount of necessary ”aperture changes”. When the fastest shutterspeed is already reached and the image is still overexposed, the application switches directly to the configured min. aperture and balances the rest with shutterspeed. To avoid any aperture changes at all set the min aperture and max aperture to the value defined in the start settings.

Sequence Name: The string used as prefix for the filenames of saved images. The name of saved images has the following form:

`<SequenceName>_<date>_<time>_<sequencenumber>.CR2`

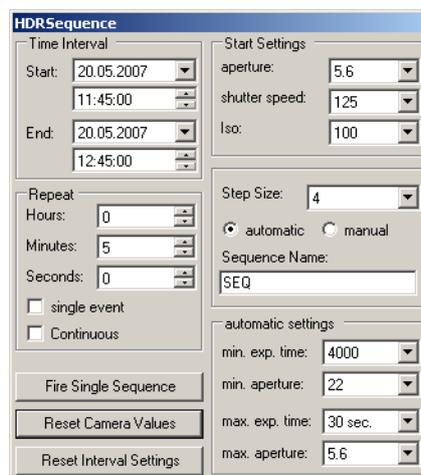


Figure 7: HDRSequence Window with an automatic sequence

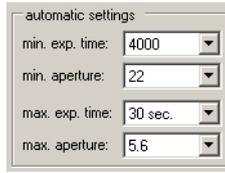


Figure 8: auto settings panel

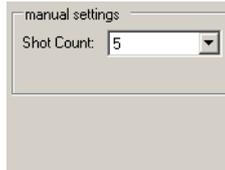


Figure 9: manual settings panel

Where `<date>` and `<time>` refer to the time when capturing of the sequence started, and `<sequencenumber>` is the number of the image within a sequence. When capturing an automatic sequence, the files are numbered +01, +02 and -01, -02 indicating images with darker or brighter exposures than the initial capture. In a manual sequence, images are just numbered consecutively starting with the darkest exposure and ending with the brightest.

4 Troubleshooting

Problem: The Camera selection popup is empty when i press the Connect button

Solution: Check if the pc recognizes the camera (the camera has to be listed under the connected usb devices) If the camera isn't listed

- Check the usb connection and make sure the camera is turned on.
- Ensure that the latest drivers for your camera are installed on the pc.
- Reboot the pc if necessary

Problem: I'm using a Canon 5D, the program stops capturing any images after several images have been captured

Solution: There's a bug in the firmware version 1.0.x of the 5D, which causes the camera to hang after 138 images have been captured. Make sure that you have the latest firmware version installed on your camera (1.1.0 or greater)

Problem: I need to reset the application to it's default values

Solution: Just delete the user-specific configfiles. They are located in the directory `C:\DocumentsandSettings\\LocalSettings\ApplicationData\CanonHDRCaptureGui` where `<UserName>` specifies the username of the currently logged in user. Delete all files within that directory (or the directory itself) to remove all personalized settings for that user.

Problem: The program crashed, i restarted the application but now it doesn't work

Solution: Try rebooting the pc. Seriously.