

High Dynamic Range Imaging

by
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High Dynamic Range

- Abbreviations: HDRI or HDR
- Human Vision
- The Camera
- The Problem
- Solutions
- Demo

HDR

- From



HDR

- To



HDR

- To



HDR

- To



HDR

- As the human eye records objects around us, the brain interprets the brightness of various objects.
- The brain instructs the eye to automatically adjust the exposure by opening and closing the pupils.

HDR

- This is a reflex action that we are unaware of most of the time.
- As our eyes scan the scene around us, our eyes are adjusting exposure continuously.

HDR

- Outdoors on a sunny day, the dynamic range of a scene maybe 15-17 stops (or 15-17 EV's).
- Clouds in sunlight would be one extreme.
- At the same time the interior of a house, parking garage or office would be the other extreme.

HDR

- Negative film: 10 EV
- Slide film: 6EV
- Digital sensor: 6-9 EV
- Print: 6-7 EV
- Computer monitor: 9EV

HDR

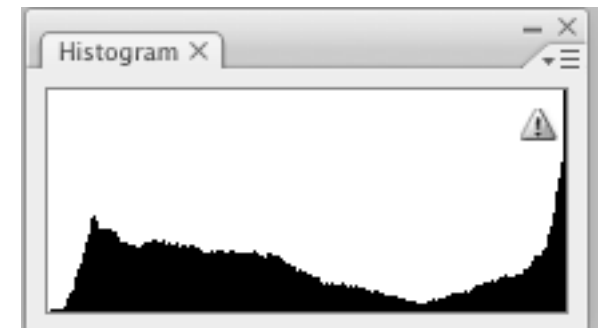
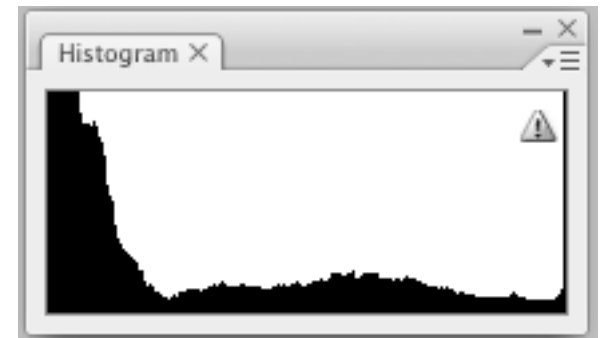
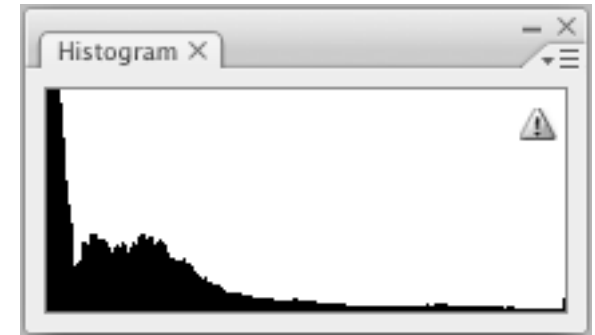
- How do we make camera capture dynamic range?
- Is RAW image is a good choice?
- When brightening shadows:
 - Muddy shadows
 - Noise

HDR

- The HDR solution is bracketed exposures that covers entire range.
- Take 2, 3, 5, 7, ... exposures.
 - For example: -2, -1, 0, +1, +2
 - Or: -4, -2, 0, +2, +4
 - ... or more.
- Tripod required... more on this.

HDR

- Highlight exposure
- Mid-tone exposure
- Shadow exposure



HDR

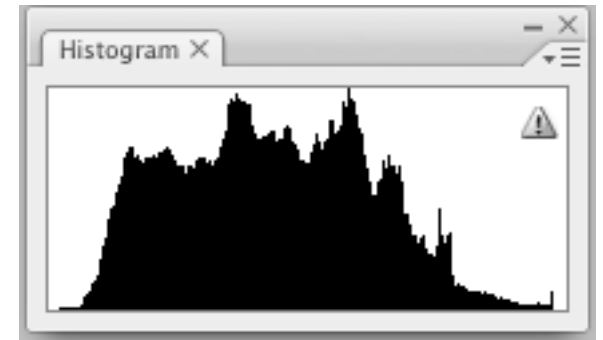
- Technique: Blend exposures with 2 images in Photoshop.
- Expose dark image on bottom layer.
- Expose highlight image on layer above.
- On highlight layer: layer mask to block dark areas so that bottom layer shows through.

HDR

- Technique: Create a 32-bit image.
- Photoshop/Bridge: Merge to HDR.
- Photomatix.
- FDR Tools.
- Use tone mapping to create 8/16 bit image for output.

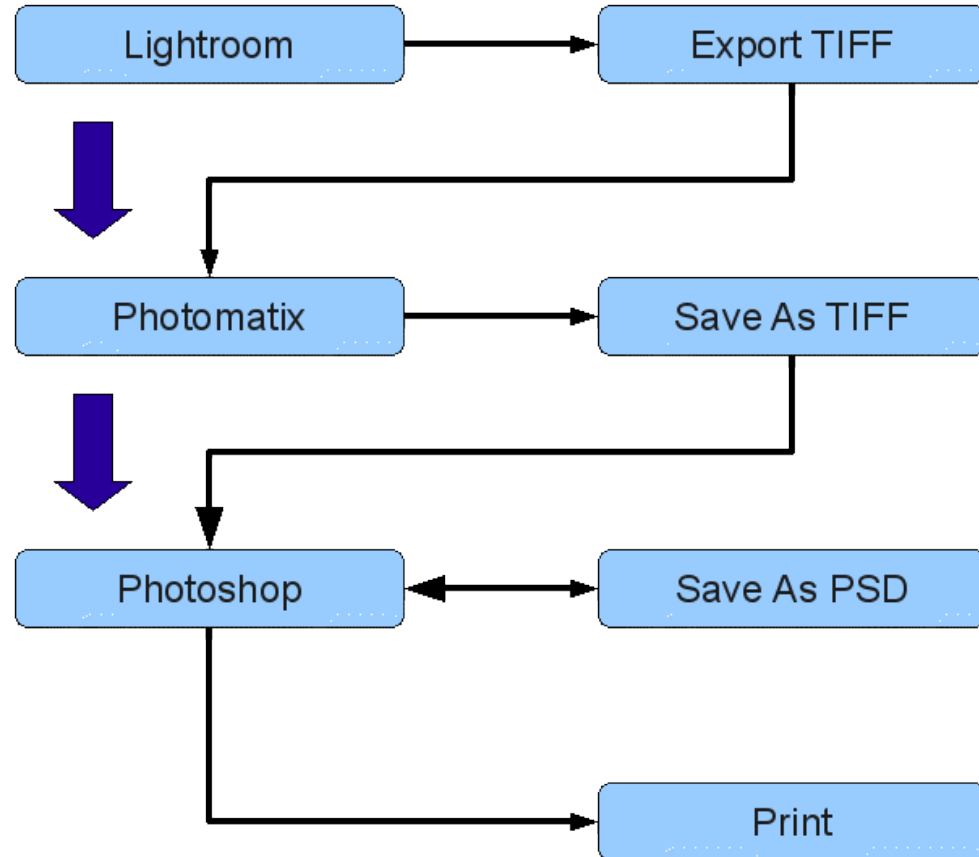
HDR

- Histogram after Tone Mapping



HDR

- Workflow:



HDR

- Software:
 - Photomatix: <http://hdrsoft.com>
 - FDR Tools: <http://fdrtools.com>
 - HDR Efex Pro: <http://niksoftware.com>

HDR

- Books:
 - High Dynamic Range Photography, Ferrell McCollough, Lark
 - Practical HDRI, Jack Howard, Rocky Nook
 - HDRI Handbook, Christian Bloch, Rock Nook

HDR

- Web Sites:
 - Digital Outback Photography
 - <http://www.outbackphoto.com>
 - Dan Burkholder
 - <http://www.danburkholder.com>
 - Stuck in Customs
 - <http://stuckincustoms.com>

HDR

- DEMO