Digital Sensor Cleaning

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Purposes of Presentation

Educate POV members about cleaning digital sensors including:

- Diagnostics
- Testing
- Commercial cleaning methods
- A homegrown solution
- Prevention

Learning Objectives

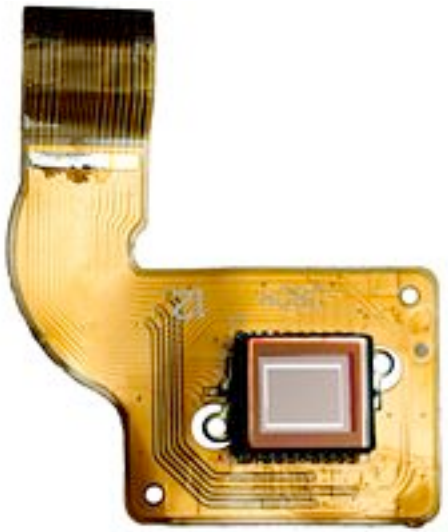
By the end of this presentation you will have a greater understanding of:

- What a digital photographic sensor is
- How to test for dirt on the sensor
- Popular cleaning methods
- Where to find additional information

What Is A Digital Sensor?

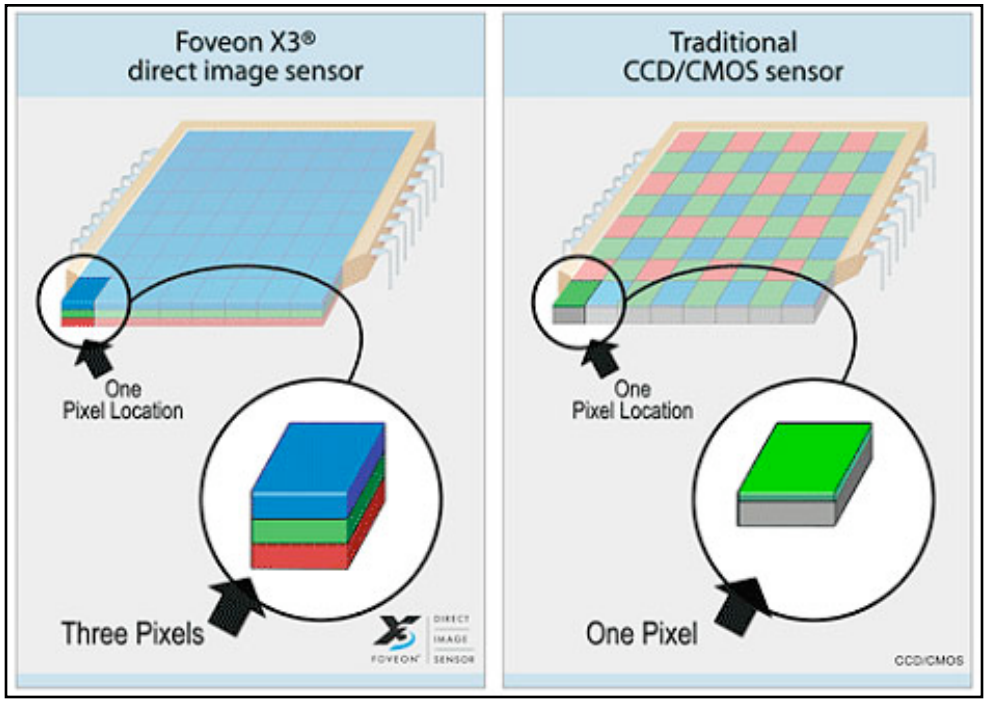
A **digital sensor** reads the intensity of light as filtered through different colored filters

A sensor contains grids of electrically charged pixels that capture an image that is projected by a lens



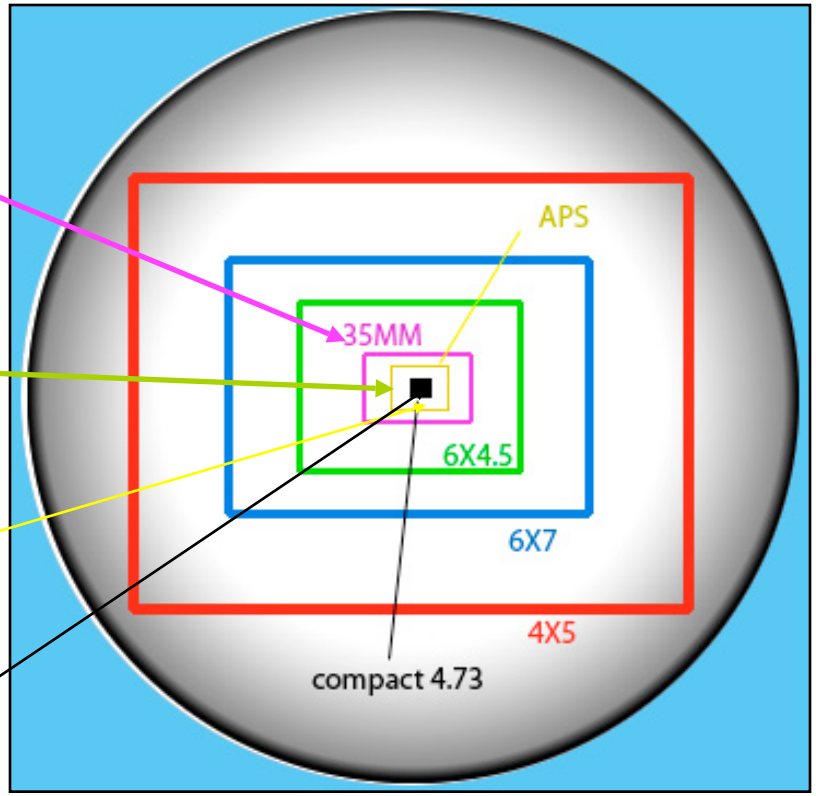
Sensor Types

- CCD and CMOS sensors dominate
- Foveon sensors found in Sigma cameras-- supposed to produce richer color, but suffer from noise issues
- CCD>Charge-Coupled Device
- CMOS> Complementary metal–oxide–semiconductor



Sensor Size Comparison

- Full-frame DSLRs
  - 36x24mm
- APS-C DSLRs
  - 25x15mm
- 4/3rds (Olympus, Leica, Panasonic) smaller
  - 18x13.5mm
- Point and shoots
  - 7x5mm

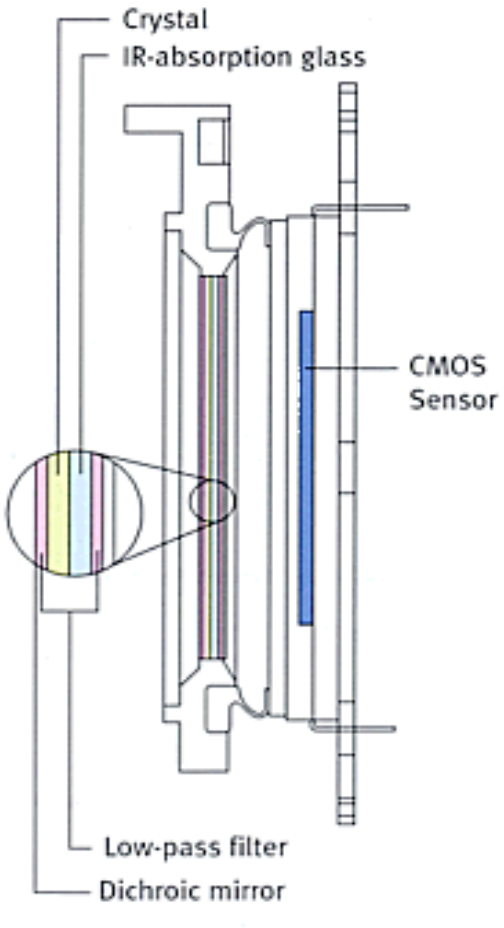


Smaller is noisier

Sensor Construction In Camera

The sensor is protected by layers of glass

- Infra-red absorption filter
- Low-pass filter
- Protective crystal



Does Your Sensor Need Cleaning?

- Dark smudges appear on image
- Smudges remain after lens cleaning
- Most prominent with pictures of a blue sky

Testing For A Dirty Sensor (1)

Outdoor approach

1. Take a photo of a clear blue sky using a 35-70mm lens
2. Set the aperture at f22; no sharpening.
3. ISO @ 200.
4. Use manual focus
5. AV or M mode is OK.

Testing For A Dirty Sensor (2)

Indoor approach

1. Create a white screen in Photoshop
2. Setup your camera with a 50-70mm lens on a tripod until the white screen fills your viewfinder (about one foot away)
3. Manual focus on screen; disable image stabilization & sharpening
4. Set aperture to f22, ISO 200; AV or M mode OK.
5. Bracket three shots.
6. Review image on screen; black smudges will appear. The tiny ones can be ignored.

“Before” White Screen Test

Cleaning Your Sensor

Strategy: start gentle

- Rehearse the process
- Get your tools & supplies in order like a surgeon
- Make sure lighting is optimal
- Low-dust work area preferred; wash your hands or wear white lint-free gloves
- Feel free to take it to repair shop

Sensor Cleaning Methods

Less aggressive

More aggressive

- In-camera dust buster
- Blower
- Brush
- Wet swabs
- “Lollipop” pickers
- Wet-vacuums w/scopes
- Post-it adhesive tape
- Never use Q-tips

In-Camera Dust Buster

- Activate from menu
- Can also trigger after each startup as default
- Uses vibrations + slick glass
- Olympus very effective; others so-so

Blowing Air

- Rocker blower or Hurricane blower
- Aim camera down
- Cheap and low-tech
- Fairly effective
- Never use mouth

Brush

- Ultra soft; can use fine artists brush
- Fairly cheap
- Can recycle dirt
- Requires charging with vacuum cleaner

Wet Swabs

- Combines methanol (“Eclipse”) with lint-free soft swab on paddle
- Dries fast
- Very effective
- Expensive
- Ventilation & patience necessary

Pickers and Pluckers

- Long tools with sticky ends
- Physically contacts glass
- Effective only if you keep your oily fingers off the tips
- Requires regular cleaning

Vacuums and Scopes

- Scopes=pricey loupes
- Uses mini-vacuum
- Expensive
- Effective only on loose dust

Post-It Adhesive Tape

- Yes, people use this
- Cheap
- May leave residue with repeated use
- Requires bravery

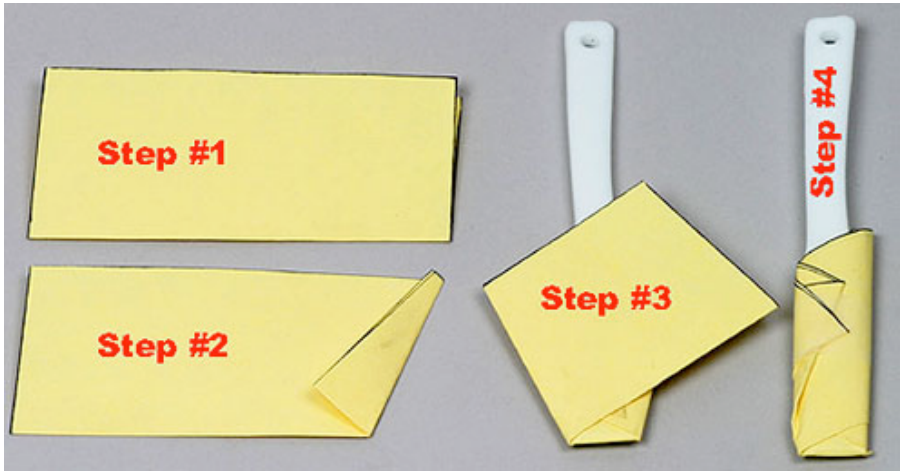
Home Made Wet Swab (1)

Ingredients

1. A small long cheap rubber-bladed spatula
   - Make sure handle is long enough to allow full control
2. Pack of Pec*Pads at photo store
3. Adhesive tape--two pieces each 2-in long
4. Small container of methanol
5. Eyedropper for methanol
6. White gloves (optional)

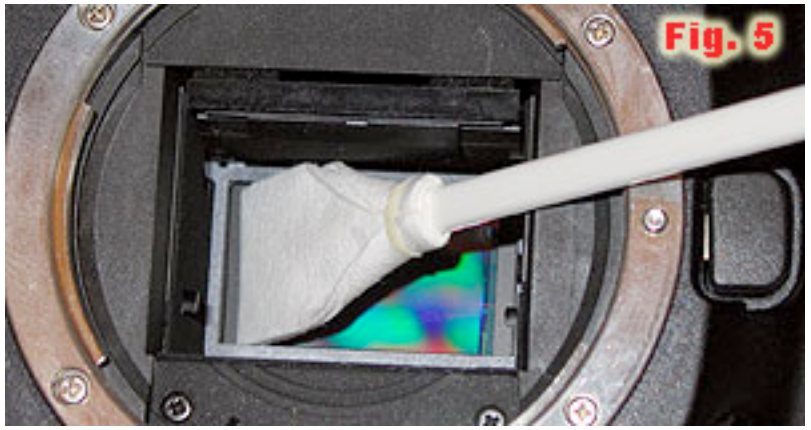
Home Made Wet Swab (2)

1. Cut spatula to fit your sensor opening
2. Fold Pec*Pads in half
3. Wrap Pec*Pads around spatula end to ensure squared off end
4. Tape Pec*Pads in place
5. Apply ONE drop of methanol to Pec*Pad end



Home Made Wet Swab (3)

1. Use camera menu function to expose sensor or set shutter to "B" and press
2. Wipe ONCE left-to-right with gentle steady pressure
3. Turn spatula over and wipe ONCE right-to-left
4. Keep sensor accessible until liquid dries
5. Discard Pec*Pad
6. Retest for dirt



Prevention

- Use the camera's dust buster
- Blow out camera internals regularly
- Change lenses in less windy areas
- Hold camera downwards when changing lenses
- Turn camera off when changing lenses
  - An electro-charged sensor sucks dust
- Blow dust off lenses prior to mounting

Online Sensor Cleaning Resources

1. **Cleaning Digital Cameras [make your own here]**
   - http://www.cleaningdigitalcameras.com/index.html
2. **Understanding DSLR Sensor Cleaning**
   - http://www.cleaningdigitalcameras.com/index.html
3. **Sensor Cleaning**
   - http://www.the-digital-picture.com/Photography-Tips/Sensor-Cleaning.aspx/
4. **Cleaning Camera Sensors [Microsoft]**
   - http://www.microsoft.com/prophoto/articles/sensorcleaning.aspx
5. **The Pixel Sweeper**
   - http://www.prime-junta.net/pont/How_to/a_Brush_Your_Sensor/a_Brush_Your_Sensor.html
6. **Shutterbug Commercial Products Cleaning Guide**
   - http://www.shutterbug.com/techniques/pro_techniques/1206cleaningdslr/