

Dirty Secrets

By Steve Traudt: APSA; PPSA

Digital SLR cameras are amazing but they have one Achilles heel that causes much fear and uncertainty among photographers: **dust on the sensor!**

The sensor is the light sensitive device that replaced film. Like film, the sensor is located in the mirror box area. Each time you take a picture, the mirror raises allowing light to strike the sensor. In the process however, the sensor is exposed repeatedly to whatever contaminants are present in the mirror box. Since dust is everywhere, the sensor is constantly exposed to random dust.

Before continuing, I should clarify the sensor is actually covered by a glass or plastic filter. Dust lands on this filter and any cleaning operations are also performed on this filter, not on the sensor itself.

Your first goal should be a preventative approach. Your camera spends much of its life in a veritable dust magnet: your camera bag! So a good practice is to regularly vacuum out your bag. Try to change lenses in relatively calm and clean environments (often not possible in real-world photography). Keep the camera body pointed downwards when changing lenses to keep dust from “falling” into the opening. The rear of the lens should be kept clean. Your hands should also be reasonably clean.



Sooner or later (probably sooner), despite your best efforts, dust will land on the sensor. You'll know it by the fuzzy, out-of-focus spots on the image. They are especially noticeable in areas like the sky. They appear fuzzy since the filter is slightly above the sensor. As you stop the lens down

though, the spots become more obvious. For a really scary photo, take a pinhole shot. The tiny aperture of a pinhole will reveal EVERY speck of dust.

Dust on the computer image is “flipped 180 degrees, top to bottom” from the sensor. In other words, a spot of dust in the upper left part of the sensor (as you look into the mirror box) will appear in the lower left part of the photo on the monitor.

To check for dust, photograph a clean white paper, or smooth sky area or even your computer screen. Use a small f-stop such as f-16 (to exaggerate the dust) and manual focus. Throw the image out of focus. Your exposure may be very slow but that is fine. You should even wave the lens around a bit during the exposure.



Your goal is to simply put light on the sensor. Then open the image in Photoshop or other browser or editing program. You may need to use Levels or Auto Color to better see the dust.

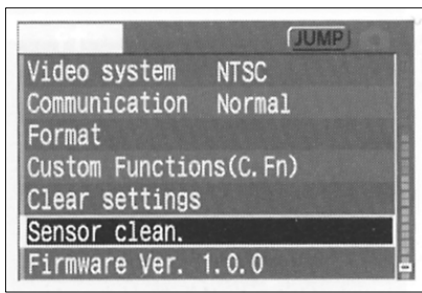
Delkin has introduced the “Sensor Scope” which lets you look directly at the sensor at 5x magnification. Although somewhat expensive, it greatly speeds up the process, bypassing the need to take a picture and then examine it in Photoshop. Along the same line, Visible Dust now offers their 7x BriteView Sensor Loupe.

Upon finding dust, you have three options. You can do nothing; in fact, many photographers subscribe to this approach! But the dust keeps building up and you spend lots of time in Photoshop removing the dust bunnies! It seems to me doing nothing is not really an option. Secondly, you can send the camera to a repair facility. This sounds reasonable until you realize how much it will cost and how long the camera will be gone. If you are an active shooter, you'd need to send it off several times a year. Even then, you are not guaranteed a clean camera as the return trip in the UPS truck can jostle loose more dust. Therefore, I think the only viable option is cleaning the sensor yourself!

There are many methods and philosophies to sensor dust cleaning. I will discuss those I work with and have

had good success with. This is an evolving science so be willing to adapt as new information comes out. Regardless of which method you choose, carefully read all instructions before proceeding.

To get to the dust, you need to raise the mirror. Resist the temptation to set the shutter to “B” and raise the mirror. This method is dangerous since your finger can easily slip off the shutter release allowing the mirror to drop. If you have a tool in the mirror box when the mirror comes down, damage



could ensue. The safest method is to use your camera’s “sensor cleaning mode”. This raises the mirror without the need to keep your finger in

place. Your battery needs to be sufficiently charged when performing this task.

You are now ready to actually “clean” the sensor but I must first issue some warnings. **I know nothing about your qualifications and neither I nor PSA can be responsible in any way for damage—this material is provided for your information only. Anytime you expose or touch the sensor, there’s a chance of scratching the filter or causing other damage. Although most photographers successfully clean the sensor, a few have caused damage that requires replacing the sensor. For some, the danger outweighs the benefit. Keep in mind that most camera brands specifically bar you from doing your own cleaning and in fact, you could void your warranty. Use common sense and only use proper tools and materials.**

When cleaning the sensor, always start with the most conservative technique first and progressively use stronger methods only if needed.

The longer dust sits on the sensor, the more difficult it becomes to remove. Humidity in the air plus static charges conspire to “weld” the dust in place. The sooner you attack dust, the easier it is to dislodge it.

Step one in your bag of tricks should always be blowing air on the sensor. Don’t use “canned” air as it has a “propellant” which can leave a residue on the sensor. Rather, use a rubber squeeze bulb such as the Giotto Rocket blower. Raise the mirror and give 3 or

4 good squeezes, being careful the blower tip does not touch the sensor. Hold the camera pointing downward as you do this. Before and after any outing, I always blow my sensor with air. Since I started doing this, I have had far fewer problems since you are dislodging the dust before it becomes “welded”.

Eventually though, you’ll get dust that can not be blown away. At this point, you’ll need to physically touch the sensor to effect removal. There are a variety of methods but the two I use are a brush and a pen.

Sensor brushes are specially selected for their soft, high quality fibers that hold a static charge. You “charge” the brush by blowing air on the fibers and then lightly brushing the sensor (after first raising the mirror) to attract the dust. After each swipe, recharge the brush with more air. Don’t touch the fibers with your fingers. Brushes are easy to use and can be used indefinitely. They should be periodically washed. Brush prices vary widely so choose carefully. I use the D-SLR brush which runs about \$20 to \$25.

Note that some cameras have an excess of lubricants in the mirror box area. Your brush could inadvertently drag oil across the sensor; see below photo. It is recommended before the first use of a brush, you clean the mirror box area with some swabs and methanol to remove the excess oil.



Sensor brushes will work most of the time but if they don’t, I use the Sensor Klear pen, a great bargain at about \$10. This device has a graphite coated velvet tip that glides effortlessly across the sensor. I have had very good luck with the Sensor Klear pen. Seldom do I need to go beyond the Pen. The manufacturer rates the pen for up to 50 uses. Instructions are on the package.

If and when the brush or pen fails to remove the dust, the ultimate method is alcohol on a swab. The original

swabs were Sensor Swabs made by Photographic Solutions. When used with Eclipse cleaner, the results are excellent. Eclipse is a high purity methanol that evaporates without leaving a residue. Since a Sensor Swab runs \$3-4 each and you may need two or three per cleaning, photographers looked for less expensive choices. One such alternative is a PecPad tissue wrapped around a holder. PecPads are less than a dime each. One popular holder for the pad is the Sensor Wand, a specially shaped soft rubber spatula. When using this method, 2 drops of methanol are applied to the swab which is then gently wiped across the sensor. Alcohol is going to pretty much remove any contamination including oil. Be sure to read the directions fully before attempting this and practice on a glass filter or water glass first.



There is now a new Eclipse 2 formula that features a different mixture of alcohols specially made to clean the tin oxide sensors on certain new cameras. For a list of such cameras, see www.photosol.com

Be aware that it is probably not legal to take Eclipse or other cleaning alcohols onto an airplane which makes it difficult if you are going on a trip. There are at least two alternatives that I know of. First, Photographic Solutions recently announced the "SensorSwab Plus" which is a single swab, pre-moistened with Eclipse, in a foil pack. Another option is the UltraClean liquid sold by Dust Aid. This is a rapidly evaporating, non-alcoholic cleaner that is travel safe.

Many new dSLR cameras are appearing that have dust-busting technology built in. Although these are a definite improvement, you still need to be ready to deal with recalcitrant dust.

Your cleaning tools must be with you at all times. Most of my cleanings take place in a car or motel

room. Every digital SLR will get dust, so learn to deal with it.

A clean sensor is a Happy Sensor!

For more info, please visit these web sites:

www.synvis.com

www.cleaningdigitalcameras.com

<http://www.micro-tools.com>

<http://www.dust-aid.com/>

<http://photosol.com/>

<http://delkin.com/>

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