

No More Dirty Pictures

John Henshall takes a look at the most time wasting aspect of digital imaging – dirt on the sensor

Although digital image capture brings many advantages, I have to admit that there is one potential problem which can take up many frustrating hours of our time – time which cannot be charged for.

The problem is caused by dust and other tiny particles of debris entering the camera body when changing lenses.

The dust seems to be particularly attracted to the sensor and appears as dark spots on images.

These spots are particularly noticeable in skies and other areas of relatively smooth tone though – fortunately – this is where it is easier to detect and retouch using the Healing Brush or Rubber Stamp tools.

When the dust appears on faces, or in areas of complex detail, it is considerably more difficult to clone out.

Various ingenious solutions have been put forward to solve the problem.

These include vibrating the sensor to shake the dust off, a mini vacuum cleaner and a firmware solution from **FotoNation** which I reported on in March 2004. Unfortunately this has not yet been taken up by any of the DSLR manufacturers.

Cleaning the sensor yourself is the best way of saving hours of retouching but it does have its dangers.

In fact, when we say 'sensor cleaning' we really mean cleaning the anti-aliasing cover filter, which is mounted a small distance above the sensor, not the actual sensor itself. But maybe I'm being pedantic.

One method you definitely do not want to use is a can of compressed air to blast the inside of

the camera. This is a recipe for disaster.

At best this method moves the dust around inside the camera, forcing it into nooks and crannies from which it can emerge when the camera is switched on and the sensor acquires a charge.

At worst the propellant which drives the air out of the can will mix with the air and form a deposit on the sensor. This is much more difficult to remove than any specks of dust.

In fact, using air in any form – suck or blow – is a potential problem.

Some people favour a foot pump but what about the air

a wet 'swab and methanol' sensor cleaning method such as **Sensor Swab** with **Eclipse Optic Cleaner** from Photographic Solutions Inc (www.photosol.com).

This does the job well but must be used with care. It's important to have just the right amount of solvent on the swab – not too wet, not too dry. Just a couple of drops are all that is needed. And remember that, once applied, the solvent begins to evaporate extremely quickly.

You also have to use a little pressure, so I always have a niggling worry that I might pick up a piece of grit on the swab and scratch the cover filter. This is more likely if the solvent dries before you start the swabbing.

In practice, however, I have never had a problem with wet cleaning.

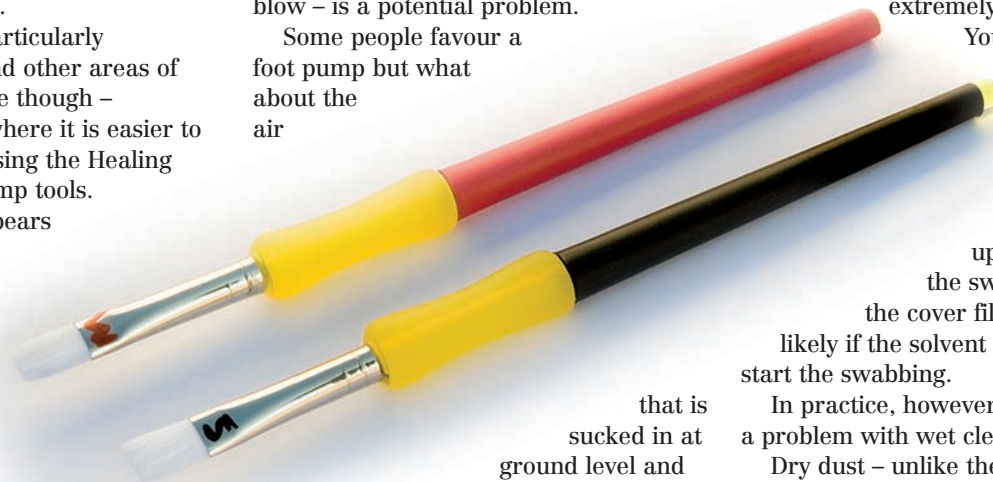
Dry dust – unlike the sticky kind which glues itself to the sensor – does not need such wet contact methods.

When I was a young lad my grandfather showed me how a piece of amber – the fossilised deep yellow resin used in jewellery and *Jurassic Park* – could attract and pick up little bits of paper after the amber had been rubbed on a woollen jumper.

I didn't know it then but that was my first encounter with the triboelectric effect – a phenomenon in which materials become electrically charged after they are brought into contact with a different material and then separated.

For years, the world of electron microscopy has used a system of dust removal which uses the triboelectric effect.

The technique uses a soft, clean nylon brush which is electrically charged by blowing



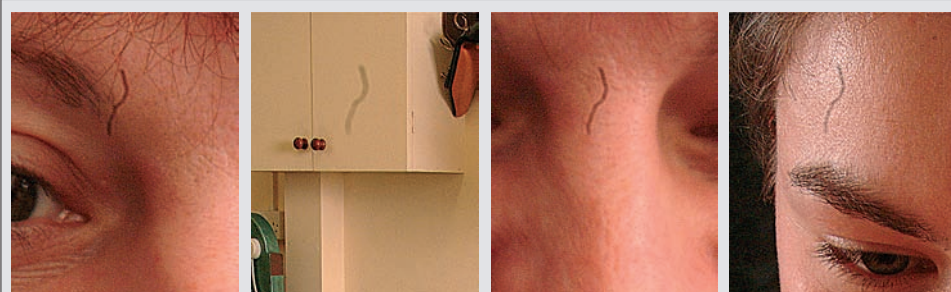
CleanSkies Sensor Cleaning Brushes

that is sucked in at ground level and then blown into the camera's lens chamber? How much new dust is in that air? A hand puffer is hardly any better – it, too, has to suck in the air from somewhere.

Others advocate a small vacuum cleaner but any vacuum produced inside the lens chamber needs to be replaced by air sucked in from outside the camera. How clean is that air?

These methods may result in less dust but their true effectiveness is doubtful. After all, they are just moving dubious quality air about.

Sticky dust is a problem which needs



Just one tiny hair on a DSLR sensor can waste many hours of your time. Cleanliness is better than retouching.

compressed air through its bristles. The charged brush is then hovered over the dusty area and – hey presto! – the dust jumps onto the bristles of the electrically charged brush.

A Canadian company **VisibleDust** (www.visibledust.com) has now made this into the **Sensor Brush**, a commercial product for lifting the dust from our DSLR sensors.

The VisibleDust website is very informative but it does kind of scare us into believing that only its Sensor Brush is suitable. The problem is that Sensor Brushes are expensive, at around US\$100.

The fact is that any soft, flat, nylon brush will do – unless it contains glue size or other chemicals. An insulating handle would appear to be an advantage, so that the electrical charge does not leak away.

Such brushes are made by the million in China for makeup use. There is a wide variety of similar brushes made for use by artists. And they are all much cheaper than \$100.

The problem is that most of the artists brushes have glue size on them, to keep the bristles tidy for sale, and that size will mark the sensor if it isn't washed off.

Fortunately, it's easy to wash out with water but you need to do this repeatedly until the brush is absolutely clean.

How do you know when the brush is absolutely clean? The filter test.

Get out those lovely multi-coated filters which are no longer needed in digital photography – except the circular polarising filter.

Make sure the filter is absolutely clean – check this by reflecting a lamp in its surface – then use your brush to brush the surface of the filter back and forth hundreds of times.

Now examine the surface of the filter again by reflecting the lamp in it. If the filter is still clean, the brush is clean. If the filter shows signs of what look like very fine scratches, then it probably means the brush is contaminated with size, oil, or something.

If so, wash the brush thoroughly using a couple of drops of washing up liquid, rinse under running water with a final rinse in distilled water and allow it to dry overnight. The marks will wash off the filter, ready to repeat the test

tomorrow, when the brush has dried.

Repeat this test until the brush is clear of contaminants. If there is no smearing after hundreds of vigorous brushings, you can be sure that the brush will be fine for a few gentle wipes of the sensor.

I was lucky – the makeup brush I found in a department store had no size and passed the filter test first time. But the problem is that the store no longer stocks them.

So I turned to the Internet. No, not to Google but to www.eBay.co.uk, where I did a search for 'sensor cleaning brush,' just on the off chance.

I came up with a couple of suppliers

return your camera to the manufacturer and pay through the nose and endure the wait to have the sensor cleaned.

If like me you want to be able to clean the sensor anytime it needs it, read on.

First, ensure that you have a fully-charged battery in the camera. The last thing you want is to have the shutter close and mirror return while you are in the middle of a cleaning operation.

Stop the lens all the way down and take an out of focus reference shot of the sky or a plain wall. Don't worry about camera shake. Examine this shot at 100%. If there are only one or two small spots of dirt, go no further until the sensor really needs cleaning, otherwise you'll get obsessive about it.

Ensure that the room you work in is as dust-free as possible and make sure you are not wearing a fluffy sweater.

Mount the camera on a tripod adjacent to a table, angled so that you can steady your arms on the table and work inside the lens/mirror box with ease, keeping both hands free to control the brush.

Place a can of compressed air on the table. Do not shake it. Leave it for at least five minutes so that the propellant is fully settled.

Charge up the Mirror (red) brush by blowing air through it for 5–20 seconds.

Remove the camera lens.

Brush the lens/mirror box carefully.

Blow air through the Mirror brush to clean it before returning it to its storage bag. Never touch the brush's bristles.

It's now time to clean the sensor.

Select 'Sensor cleaning' in the camera menu. This will open the shutter and lock up the mirror until you switch the camera off. Read the manual first.

Charge up the Sensor (black) brush by blowing air through it for 5–20 seconds.

Use the brush to sweep the sensor lightly from right to left.

Clean and recharge the Sensor brush by blowing air through it for a further 5–20 seconds.

Sweep the sensor lightly from left to right. Switch the camera off, replace the lens. Blow air through the Sensor brush to clean it before returning it to its storage bag. Take a test shot.

Hopefully the triboelectric effect has worked and your sensor is now much cleaner – if not completely spotless.



The triboelectric effect is a phenomenon in which certain materials become electrically charged after they are brought into contact with a different material and are then separated. Amber can acquire an electric charge by rubbing on a material like wool. The word 'electricity' in fact comes from the Greek word for amber: ēlektron. In this picture I am using compressed air to induce a static electrical charge in a nylon brush.

and chose seller **bearislandtc** who sell a two **CleanSkies** Sensor Cleaning Brush Kit for Digital SLRs at a 'Buy It Now' price of only £7.29 plus £2.50 postage from North Carolina in the US.

There are two brushes in the set. One is colour coded black for cleaning the sensor, the other is red for cleaning the lens/mirror box area. The second brush is used in case there is any oil which you don't want to pick up and then later deposit on the sensor. Both brushes have yellow, non-conductive, soft grips.

The brushes arrived in just a few days and passed the filter test first time. I used them to clean the sensors in a Canon 1Ds Mark II prior to a recent trip to China and didn't have any dust for the whole trip. That alone saved countless retouching hours when preparing images for Alamy.com.

Things can go wrong when you start poking around inside your DSLR, so the following method is offered in good faith but with absolutely no guarantee. So if you are naturally ham-fisted or of nervous disposition, go no further –