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Digital Doctor
Fixing The BIG Scratch by Jack and Sue Drafahl

Digital imaging is quickly becoming an integral part of photo labs today. Most photo editors have at least an adequate level of expertise in adjusting brightness, color balance and gamma control, and have tried basic dust and small scratch removal.

THANKS TO NEW technological advancements, editing tasks are becoming even easier. For example, there are several scanner manufacturers that now incorporate the Digital ICE technology from Applied Science Fiction. As the film is being scanned, the scanner looks at both surfaces of the film for dust, scratches, fingerprints, fungus and other maladies that film can encounter. The Digital ICE technology then carefully removes those artifacts as it scans, which considerably reduces your editing time. We consider this technology one of the greatest advances in digital photography today, and any lab purchasing a scanner should have this at the top of its required features.

But what happens when you come across a scratch so BIG that even Digital ICE cannot repair the image? You know the one—it looks like the Grand Canyon running through the center of your most prized image. Scratches can occur from mishandling, but most major catastrophes are caused when metal parts in slide mounters or processing machines come in contact with the delicate emulsion.

This image comes from our salvage file, and is used for lectures, articles, and books to illustrate different problem-solving situations in digital imaging. In some of the illustrations we have enhanced the clone tool so that you can see it better. We have also added arrows to show the direction of the editing with the clone tool.

Often the overwhelming size of the scratch is enough to discourage the most enthusiastic image editor. Others give it a try, only to quickly become frustrated at how long it takes to repair. Even then, the results may look good from a distance, but upon closer examination, the editing becomes apparent.

The first step is to scan the image into your computer system. Since you only want to edit this scratch once, scan the image at as high a resolution as your editing system can handle. If you scan it too large, you will end up using the hard disk as scratch memory—no pun intended. You should have at least 5 times as much RAM as the scanned image file size.

If your scanner has Digital ICE, make one scan with it turned off and one with it turned one. The reason for two scans is

that the Digital ICE technology will try to repair the scratch, and may ultimately make the scratch harder to repair. If there are plenty of little scratches in addition to the big one, then ICE turned on will at least give you a head start on editing. Look at both scanned images and select the one you think will require the least editing.

The best method for attacking an editing job of this magnitude is to devise a game plan and stick to it. Speed and efficiency come in time with practice. Zoom in on the scratch area and follow it from beginning to end analyzing all the problems along the way. You will probably have to reach into your digital doctor's bag of tricks and apply a variety of editing techniques to complete the task.

Cloning Is Critical
The Clone tool will be your main device for this task and can be found in the main toolbox of most editing programs. This software device takes a small amount of pre-selected data and drops or pastes it in a newly selected point in your image. Most Clone tools have adjustments for size, shape, feathering and opacity.

Although this is the most popular editing tool, it is not for beginners, but you will become efficient with practice. Drag and drop data from one point to another. Try each feature, especially the sizing as it is a critical Clone tool function. A good digital editor will be constantly changing the size of the tool to match the work area. If the tool is too big or small, the tool shape will be evident in the final edit.

To best hide your editing, you must carefully monitor tonal changes along the scratch throughout the image. Drag and drop your data parallel to the tonal values along the scratch.


Use the clone tool to drag and drop data from areas next to the scratch. Data was copied from areas parallel to the tonal range in the straw hat.

Sometimes you will find that if you clone data from the area right next to the scratch, it might be darker or lighter than the damaged area. In that situation, you should move up or down the scratch a short distance to find data that better matches the damaged data. If you clone an area and your work is visible, most editing programs allow you to Undo your actions and try again. Adobe Photoshop 6 has a backwards function that allows you to back up dozens of editing steps.

Helpful Repair Hints
To reduce showing your repair efforts, you can change the opacity from 100% to 50% or 75%. This will reduce the cloning effect since it takes several clicks of the mouse to fill in a specific area. This is especially handy if you are editing a scratch in an area with smooth tonal gradation, such as skin tones or blue skies.

Take your time working your way up and down the scratch. Work on the easy areas at first, and save the more difficult areas for last. When you come across areas where a distinct line crosses the scratch, try to use a clone size slightly larger than the line. Be ready to back up and Undo as this will be one of the most difficult areas to repair.
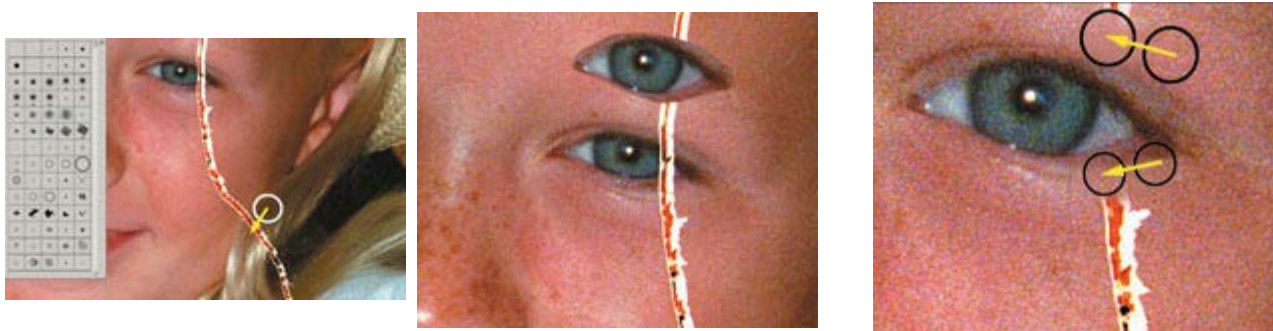
Parallel dragging and dropping of data with the   The select tool was used to select an area around   Additional drag and drop editing with the clone

clone tool will remove the scratch running through the hair.

the damaged eye and then feather the selection. The modified left eye was then pasted into the right eye.

tool completed the editing around the damaged eye.

Sometimes a scratch will cross an area that cannot not be repaired effectively using the Clone tool. A portrait where a scratch runs entirely through the eye is a good example. Look and see if the other eye is visible and approximately the same size as the damaged eye. If you are in luck, copy an area that includes the good eye and it surroundings to the clipboard. Then select the area surrounding the damaged eye where you want to paste the new data. Make sure you feather the selection. We can't tell you which feather setting to use as it will depend upon the size of your original scan and your selected area.

You may have to back up a couple of times to get this feather setting just right. Paste the new eye data, and then flip, rotate, and scale the data so it best matches the damaged eye. When the paste looks close, use the clone tool at a magnified setting to fine-tune any remaining problems. Save your repaired image as a new file so that you can compare it with the original damaged image.

Start collecting damaged images in a salvage directory to provide practice samples for your lab's digital technicians. You will find that even after mastering certain techniques, your skills continually improve over time. After half a year or more has passed since you edited an image, load in the original file and take another shot at it. We think you will be surprised at your improvement.

Scratch removal is one of the most impressive displays of digital editing, so make some before and after samples to show your customers. When they see what you can do with a very badly scratched image, they will surely tell other potential customers that you can fix most anything.

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