# grain surgery 2 for Photoshop

## intelligent noise manipulation

# QUICKSTART GUIDE

for Windows and Macintosh

**VISUAL INFINITY**

# Contents

# Installing Grain Surgery

**GRAIN SURGERY 2** is designed to plug in to Adobe Photoshop 5.5 or higher.  It will not work on earlier versions.

IMPORTANT NOTE:  In order to work correctly, **GRAIN SURGERY 2** must be installed in the **Plug-ins** directory or a subdirectory of it, under a Photoshop directory on your hard drive.

If you are using a version of Photoshop in a language other than English, the folder name may not be "Plug-ins" but may have been translated to your language.  Navigate to the appropriate plug-ins folder during the installation.

## Installation for Windows

SYSTEM REQUIREMENTS:  **GRAIN SURGERY 2** requires a machine running Windows 98, NT or 2000, with at least 128 MB of RAM.

1.      IMPORTANT: Quit any currently running copy of Photoshop before launching the installer.

2.      To launch the installer double click the **Grain Surgery Installer** icon.

3.      Click **Next** at the **Splash** screen and **Next** again after you've read the **Welcome** screen.

4.	Please read the End User License Agreement and click **Yes** or **No**.  If you click **No**, the installer will prompt you to quit or continue.

5.	The **Choose Plug-ins Directory** screen appears next.  Click the **Browse** button and navigate to the **Plug-Ins** folder inside your Photoshop application folder.  Double click to place it in the Path.  Click **OK**, which returns you to the **Choose Plug-ins Directory** screen.  Then click **Next**.

6.	Click **Next** in the **Ready to Install** screen, after verifying its information.  The installation will now proceed.

8.	The **Finished Installation** screen appears.  Click **Close**.

	You have completed the installation process.  The next time you launch Photoshop, the **GRAIN SURGERY 2** filters will be available in the **Filter** menu.  The **Auto Match Grain** plug-in will be available under **Automate** in the **File** menu.

## Installation for Macintosh

	SYSTEM REQUIREMENTS: **GRAIN SURGERY 2** requires a machine running OS 9.1 or above, with at least 128 MB of RAM.

1.	To launch the installer, double click the correct installer icon for your operating system and version of Photoshop:

- If you're running Photoshop 7 under OS X, choose the **Grain Surgery Carbon Installer.**
- If you're running Photoshop 5.5 or 6 in the classic environment under OS X, choose the **Grain Surgery Classic Installer.**

5

• If you're running Photoshop 5.5 or higher  under OS 9, choose the **Grain Surgery Classic Installer.**

2.　　　Click **Continue** under  the **Splash** screen.

3.　　　Please read the License Agreement and click either **Decline** or **Accept**.  If you decline, the installer will simply quit.

4.　　　The **Grain Surgery Installer** dialog appears.  In the **Install Location** section at the bottom of the dialog, choose  the **Select Folder** menu item and navigate to the **Plug-Ins** folder inside your Photoshop application folder.  Double click it.

5.　　　Click the **Select** button.  This takes you back to the **Grain Surgery Installer** dialog.

6.　　　Verify that the text under **Install Location** now reads:  "The folder "Grain Surgery"  will be created in the folder "Plug-Ins" on the disk ("Your disk name").  If so, click **Install**.  Otherwise,  repeat step 4.

7.　　　The installation will now proceed.  If the installer detects a previous version of GRAIN SURGERY in your **Plug-ins** folder, it will overwrite it.

8.　　　Click **Quit** to quit the installer.

You have now completed the installation process.  The next time you launch Photoshop, the GRAIN SURGERY 2 filters will be available under the **Filter** menu. The **Auto Match Grain** plug-in will be available under **Automation** in the **File** menu.

# Launching the Filters

The four **GRAIN SURGERY 2** filters have many different parameters which allow complete creative and technical control, but in their default state they are almost fully automatic.

## Launching the Filters

Open your image, choose **GRAIN SURGERY 2** in the **Filter** menu, then select the filter you want to use.  The dialog appears, and the image appears at 100% magnification and centered in the preview window. Use the hand pointer to drag the image around in the window.

## Initial Settings

When the filter is launched, the preview image is automatically processed using the initial settings.  If this is the first invocation of  this **GRAIN SURGERY 2** filter since Photoshop was launched, the filter uses its default settings.  Otherwise, it uses the settings cached in memory from the last application of  it on any image.  Click **Reset All**  to call up the default settings.

The exception is that when the **REMOVE GRAIN** or **SAMPLE GRAIN** filters are called, the image is always resampled automatically regardless of previously sampled positions. This ensures that every newly opened image is accurately sampled.  See the section on *Quitting the Filters*  for more details.

## Paned Interface

Each tool has a paned interface.  The panes are controlled by the buttons at the top left of the dialog.  Stepping through the panes from left to right gives you access to the features of each tool in the order in which your workflow would normally proceed.

## Supported Image Modes

All **GRAIN SURGERY 2** filters support  RGB and Grayscale modes. In addition, **REMOVE GRAIN** supports CMYK and Lab modes.

Attempting to launch a  **GRAIN SURGERY 2** filter on an image in an unsupported mode will cause the tool's name to be grayed out in the **Filter** menu.  To use the tool, first convert the image to RGB in Photoshop (**Image** > **Mode**), apply the tool to the image, and then convert it back to the original mode.

## Image Size

There is no upper bound to the size of image which can be processed using **GRAIN SURGERY 2**.  However **REMOVE GRAIN** can't process an image smaller than 64 x 64 pixels.

## Supported Photoshop Features

All **GRAIN SURGERY 2** filters support several Photoshop features that will enhance your workflow and your results.  All the tools work on any selection.  They work on any layer or adjustment layer.  They can be called on any individual channel.  They support Actions.  In addition, our new **AUTO MATCH GRAIN** tool takes advantage of Photoshop's automation capabilities to allow batch processing of images.

# Previewing results

Noise manipulation is subtle and subjective work.  Optimum results are achieved by applying small increments to several settings, and checking after every change whether one is getting closer to the desired effect.  To facilitate the work, we have provided several custom preview features unique to **GRAIN SURGERY 2**.

## Common Preview Features

Features A to E  are common to all four tools in the suite.
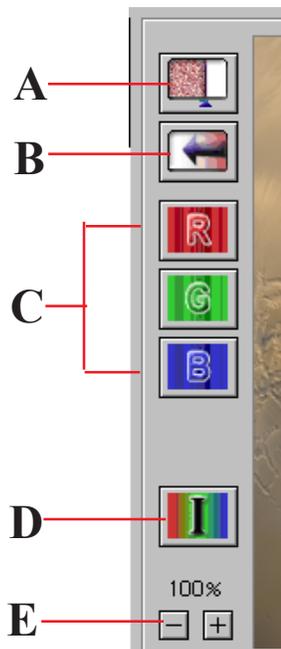
*Left:   The common GRAIN SURGERY 2 preview features:*

*A.  Split Preview*
*B.  View Original*
*C.  Channel selectors*
*D.  Invert Image*
*E.  Magnification icons*

*Right:  Additional MATCH  GRAIN preview features:*

*F.  Split Image*
*G.  View Source*

9

A.      Click the **Split Preview** icon to split the preview window between the original image on the left and the current settings on the right.  Then shift-click to hide or show the split bar.  Click again to return to normal preview mode.  To move the split bar horizontally, drag the triangle at the base of it.

B.      Hold down the **View Original** icon to display the unmodified image to which GRAIN SURGERY 2 was applied.

C.      To examine each channel separately, click the corresponding **Color Channel**  icon.  On a grayscale image, these icons are disabled. REMOVE GRAIN can also process images in CMYK and Lab modes.  The **Color Channel** icons will change to reflect the channels in each mode.

D.      To **invert** the image or currently selected channel, click the "I".

E.      To zoom in or out on the image in the preview window,  use the **Magnification** icons labelled "**+**" and "-".

## Match Grain Preview Features

MATCH GRAIN offers two additional preview features which let you compare the grain in the source and in the target image.

F.      Click the **Split Image** icon to split the preview window between the source image on the left and the target image on the right.  Then shift-click the icon to show or hide the split bar.  To move the split bar, drag the triangle at the base of it.

G.      Hold down the **View Source** icon to display the source image from which the grain was extracted.

10

# Using Snapshots

To help you choose settings and evaluate the effects of subtle adjustments, every **GRAIN SURGERY 2** filter now offers the ability to select, view, keep in memory and compare four complete groups of settings, called **snapshots**.

The controls for these snapshots are located directly under the preview window.  The group on the left lets you switch between snapshots, and the group on the right lets you copy the settings from the current snapshot to any of the other three snapshots.

There is always an **active snapshot** in any **GRAIN SURGERY 2** tool. When launching a tool for the first time in the current  Photoshop session, Snapshot  A  is active by default.  If you switch to another snapshot and then exit the tool via the **OK** button,  that snapshot will be active the next time you launch the tool.
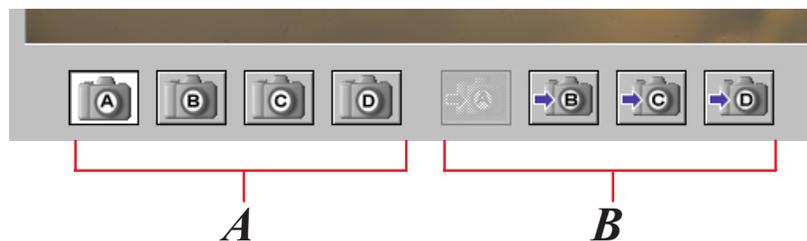


*The GRAIN SURGERY 2 Snapshot features:   A.  The Take Snapshot Group. Snapshot A is the active snapshot.     B.  The Copy Snapshot Group. In this example you may copy the settings in A to  any of B, C and/or  D.*

## Creating and comparing snapshots

1.     Choose a snapshot and click its icon to make it active. Its current settings appear in all of the tool's panes, and the preview image is processed accordingly.

2.     Cycle through the panes in the tool and adjust your settings as needed.

3.     Click any other snapshot to make it active. The settings for the previously active snapshot are retained in memory. They are now available in two ways:

        a) Clicking the previously active snapshot again will bring its settings back and display its results in the preview window.

        b) Shift+clicking the previously active snapshot will toggle between it and the currently active snapshot.

## Copying snapshots

        Use the **Copy Snapshot** icons to verify the results of adjustments to various settings. For example:

1.     Click **Snapshot** A and adjust the tool's settings.

2.     Click the **Copy Snapshot** button labelled B. B now becomes the active snapshot and all of A's settings are now also in B. The **Copy Snapshot** to B button is grayed out since you can't copy a snapshot to itself.

3.    Adjust any parameter in snapshot B.

4.    Shift+click on snapshot A to toggle its image with snapshot B, and observe the results of the change you made.

Note that if you have not visited a snapshot by clicking it since the start of the current Photoshop session, it will be grayed out when you press the shift key, which indicates that no saved settings are available in it.

## Resetting snapshots

The reset buttons are especially useful if you open a tool on a new image and you want to clear the settings retained from the last processed image.

1.    Click **Reset Snapshot** to reset the active snapshot to default values.

2.    Click **Reset All** to reset all four snapshots to default values.

# Managing Settings

To save current settings in all panes of the active snapshot, click the **Save** button in the **Saved Settings** group. A naming dialog appears. The suggested default name is the name of the image. Click **OK** to accept this name or enter a new name then click **OK**. These settings will now appear as a file in the **Saved Settings** window. They are saved to disk and will be available in future invocations of that tool, unless they are explicitly deleted using the **Delete** button.

Note that saved settings in **REMOVE GRAIN** or **SAMPLE GRAIN** include the current manual and automatic sample placements.  These settings will not be valid on a different  image.  For this reason it is advisable to choose a name that helps you identify the image to which they refer.

Settings are saved in a folder named **Saved Settings,** which resides in the **Grain Surgery 2** folder inside Photoshop's **Plug-Ins** folder.  This location can not be changed.  If  you move a saved settings file out of that folder the file will no longer be visible in the **Saved Settings** window.

To recall and use a group of saved settings, select it in the **Saved Settings** window and click **Load**.  The settings will be loaded into the current snapshot and will automatically be applied to the image in the preview window.

To rename a group of saved settings, use the **Rename** button. You can not rename a settings file by navigating directly to it in the Plug-Ins folder and renaming it there.

Similarly, to delete a saved settings file from disk, use the **Delete** button.



*The Saved Settings group lets you load a group of settings into the active snapshot, and lets you save, rename or delete the settings currently in the active snapshot.*

14

# Quitting the Filters

If you exit any **GRAIN SURGERY 2** tool using the **OK** button, all settings in all snapshots will be retained in memory, except for the position of automatic samples.  The active snapshot and the settings for all snapshots will be restored the next time you invoke the tool.

If you quit the tool using the **Cancel** button, any changes you made to any settings in this invocation of the tool will not be saved.  When you next invoke the tool, the active snapshot and the settings in all snapshots will be the same as when you last exited with **OK**.

When you exit Photoshop, all settings in memory will be lost, unless they were explicitly saved to disk using the **Save** button.

## Saving Sample Positions

The sample positions in **REMOVE GRAIN** and **SAMPLE GRAIN** are reset and the image is resampled automatically on each invocation.  But if you set  the **Samples Position** menu to **Manual** and reposition the samples,  you can now switch to **Manual** and retrieve these positions at the next invocation of the tool.

The reason for automatic resampling on each invocation is that sample positions set on one image may give unacceptable results on a different one, due to variations in size, content  and noise characteristics. You can explicitly save manual sample positions to disk using the **Save** button.  It is helpful to give your saved settings a name which identifies the image from which they were extracted.

# Removing Noise

The REMOVE GRAIN dialog contains four panes: **Degrain**, **Fine Tune**, **Apply** and **Sample**. These are designed to allow you to cycle once through the panes to complete processing your image.

## Degrain

1.      Adjust the **Noise Reduction** slider until you reach the desired level of noise reduction. This is the master slider which controls the trade-off between noise reduction and image sharpness. The default of 100% may be too high on some images. You can boost noise reduction until you reach an acceptable level of noise reduction for your application, or you just begin to detect a loss of sharpness.

2.      If your grain is large and chunky, try increasing the number of **Degraining Passes**, otherwise leave it alone.

3.      Also try switching the **Degraining Mode** to see which one produces the best results for your image. The default **Multichannel** mode takes advantage of correlations between channels to improve some degraining results.

4.      If you're now happy with the results, click **OK**, otherwise move on to the **Fine Tuning** pane and see if you can achieve further improvements. If sharpness is an issue move on to the **Sharpen** pane.

## Fine Tuning

Here is what the sliders in this pane do:

**Chroma Suppression** suppresses some of the chroma from the noise to clean up the image.  If the noise in your image is very colorful, increasing this control can help subdue it.  Setting the amount too high may strip some chroma from the image itself.  Note that Chroma Suppression is disabled in the **Single Channel Degraining Mode**.

**Texture** controls the amount of low-level noise which passes through to the output.  This is especially useful to reduce objectionable artifacts, or to retain finely textured areas such as wood grain, brick or the like.  Lower values will result in a smoother, possibly artificial looking result.  Too high a value may leave the output unchanged from the input.

**Noise Size Bias** controls how the noise reduction process responds to variations in noise size within the same image.  At the default setting of 0, REMOVE GRAIN 2 treats all sizes equally.   A negative value leaves larger residual noise, and a positive value leaves smaller residual noise.

**Clean Solid Areas** controls the extent to which adjacent pixels with low variations in value will be smoothed out by the noise reduction process.  This is helpful if an image has large solid color regions such as an area of sky,  where the noise is particularly objectionable.  Too high a setting can cause nearly solid areas of the image to be smoothed out, which may result in an artificial appearance.

## Sharpen

To enhance subtle edge detail which may have been suppressed by the degraining process, use **REMOVE GRAIN**'s **Unsharp Mask** filter. This works similarly to Photoshop's **Unsharp Mask**.

## Sample

If you are not getting the results you anticipated in terms of retained sharpness or amount of grain removed, go to the **Sample** pane and inspect the noise samples which were automatically selected by **REMOVE GRAIN**.

If your image is challenging to sample, for example due to under- or overexposed areas or to a lack of featureless areas, you may choose to reposition the samples manually. Changing the number or the size of the samples may also be helpful. Consult the manual for full details.

Note that the samples must always be overlaid on the original image. For this reason, the **Split Preview** feature is disabled in the **Sample** pane. The **Return to Original** feature is functional and is used to toggle the samples on and off the source image display.

# Adding Noise

**ADD GRAIN**'s four panes are designed to guide you through the process of generating and applying exactly the grain you want to your image.

You can create your grain from scratch using the **Create** pane, or use one of our **Presets** emulating popular film stocks. You can then choose exactly how that grain is applied to your image, and you can modify the balance between the grain applied to highlights and shadows.

## Create

1.    Adjust the **Intensity** slider to control the amount of variation between pixels in the generated grain. This determines the visibility of the grain. You can also make this adjustment on individual channels.

2.    Select the **Grain Size** you want. You can also vary the size for each channel of a multichannel image.

3.    The **Aspect Ratio** slider controls the width of the generated grain over a constant height of 1. This results in non-square grain.

## Presets

If you want to reproduce the grain of a particular photographic stock, see if your film stock or an equivalent type is listed among **ADD GRAIN**'s **Presets.**

Selecting a preset applies its settings to the image.  If you like the result, click **OK** and you are done. Otherwise you can now adjust the grain using any of the sliders in ADD GRAIN.

## Apply

The sliders in this pane let you determine how the generated grain will look when applied to your image.

1.      You can adjust the color of the grain in several ways:

   a) Choose **Monochromatic** grain for a grayscale image, or for aesthetic effect on a color image.
   b)  Adjust the **Saturation** slider to control the overall amount of color in the grain.
   c)  Set the **Tint Color** to control the color balance of the grain.
   d)  Increase the **Tint Amount** to change the depth of the color shift.

2.      **Image Blur** lets you soften the image slightly, and can be useful to give a computer generated image a more photorealistic look.

3.      The **Blending Modes** control how the generated grain is combined with your image.  Try them all and select the effect you prefer. Usually the default  **Film** mode works well.

## Balance

This series of sliders lets you selectively apply grain to each tonal area of the image, on a per channel basis.  This emulates two important properties of film:  the grain is not distributed evenly in all three color channels, and grain density varies with exposure.

# Sampling Noise

The **SAMPLE GRAIN** tool lets you sample the grain in an image and then save not only the settings that produced the sample, but also the actual grain sample itself. You can now create, save and manage your own library of grain samples.

1.      Use the **Save** button in the **Saved Settings** group to save the settings that produced the current sample. This function places your settings in the **Saved Settings** window so that they can later be loaded for use. Note that settings saved for one image will likely be inappropriate on another image. Saved settings are useful to come back to a particular image in a future session, and for batch processing similar images.

2.      Click the **Add to Library** button in the sample pane if you wish to save the actual grain sample for future use on any image. A naming dialog appears. This sample will now appear as a thumbnail in the **Library** pane.

3.      Click **Take Sample**. The noise is sampled but the image is unmodified. The dialog disappears. The noise sample is not permanently saved to the library unless you explicitly saved it to disk using **Add to Library**. However, **GRAIN SURGERY 2** will automatically save it as **Last Sample** and place it as the first item in the sample library. The last sample will be overwritten every time you press the **Take Sample** button in **SAMPLE GRAIN**.

## Sample

This pane gives you full control over the sampling process.  Automatic sampling generally produces good results, but you can manually change the number, size and position of the samples.

A full explanation of these advanced features is included in the manual.

## Library

Your library of grain samples is permanent and entirely customizable.  It is filed alphabetically and kept in a "Sampled Grain" folder in the **Grain Surgery 2** application folder.

1.	To add a sample to your library, click the **Add to Library**  button. You will be prompted for the name of your sample, which by default is the name of the image itself.

2.	You can **Rename** or **Delete** a sample using the appropriate buttons.

# Matching Noise Between Images

**GRAIN SURGERY 2**'s unique grain matching features let you auto-matically and precisely match the grain between two images.  This is made possible by our grain sampling technology, which extracts from the source image an exact mathematical description of the noise.

In many cases, this will be all that is needed. You can also modify the results using features similar to those found in **ADD GRAIN**, and you can compensate for the existing noise in the target image.

## Preview Features

**MATCH GRAIN** offers two unique preview features which let you compare the grain in the source and in the target image. These are located at the top of the column of preview buttons.

1.      Click the **Split Image** icon to split the preview window between the source image on the left and the target image on the right.  To move the split bar, drag the triangle at the base of it.

Note that the source image is always displayed at the magnifica-tion  in effect when its sample was taken in the **SAMPLE GRAIN** tool.  It is displayed in the top left corner of the preview window and can neither be panned nor zoomed.  It is supplied only as a visual guide to the character-istics of the grain being applied to the target.  The target image on the right side of the split can be panned and zoomed in the usual manner.

2.      Hold down the **View Source** icon to display the source image from which the grain was extracted.

## Sample

1.     Apply **MATCH GRAIN** to the target image to which you want to add the noise.  The dialog appears and the noise from the source image, which appears as a thumbnail in the **Current Noise Source**, is automatically applied to the target image.  The result is displayed in the preview window.

2.     If you want to use a different image as the **Current Noise Source**, you have several options:

a)  The **Last Sample** thumbnail, always located as the first item at the top of the **Library** window, contains the image to which **SAMPLE GRAIN** was last applied.  Clicking it selects it,  places it in the **Current Noise Source** thumbnail and applies it to the target image in the preview window.  If you like the results, you can use the **Rename** button to save the sample permanently in your Library.  Otherwise it will be overwritten next time **SAMPLE GRAIN** is applied.

b)  Click any sample in your Library select it as the **Current Noise Source** and apply it to the target image.

c)  If the image you wish to use as the source is not in your library, click **Cancel** to close the **MATCH GRAIN** dialog.  Open the image you want to use as a source of grain and apply **SAMPLE GRAIN**  to it so that it becomes the **Last Sample**.

d)  You can also apply **AUTO MATCH GRAIN** to automatically match the grain between two images, whether open or not.

24

## Modify

If the automatic grain matching doesn't give you exactly the results you want, you have several options to modify the grain applied to the target image. You can say for instance "Make the grain in Image B the same as image A, only a little redder".

1. If there is already significant noise in the target image, adding the grain from the source could cause a noise mismatch or noise build-up problem. If this is the case, adjust the **Compensate for Existing Noise** slider. **MATCH GRAIN** will now automatically sample the target image as well as the source image, will compute the difference between the two grain patterns, and will apply only the amount of grain needed so that you still get a match. This should fix the problem.

2. You can modify the grain applied to the target image using the **Intensity**, **Grain Size** and **Aspect Ratio** controls. Each control has the same meaning as its counterpart in **ADD GRAIN**, but here each slider's value is relative to the matched noise: each default value leaves that property of the matched noise unchanged.

## Apply

Use the controls in this pane to modify the grain on the target image once you have applied it from a source image. See **ADD GRAIN** for a description of the sliders.

## Balance

Use these controls to modify the tonal balance of the grain on the target image once you have applied it from the source image. See **ADD GRAIN** for a description of the sliders.

# Auto Match Grain

New in **GRAIN SURGERY 2**, the **AUTO MATCH GRAIN** automation plug-in lets you streamline grain matching operations on a pair of source and destination images.  This will be particularly useful when using an action to batch process a series of similar images.

1.      Launch **AUTO MATCH GRAIN** from Photoshop's **Automate** sub-menu under the **File** menu.

2.      In the **Source** window, select the source image from which you want to extract the grain.  If your image is in Photoshop format (.psd), its layers will be listed individually and each layer will be available as grain source.  If the image you wish to use as a source is not open, click the **Choose** button.  Navigate to your image and click the **Open** button.  Your image will now appear in the **Source** window, already selected.

3.      In the **Destination** window, select the target image to which you want to apply the grain.  If your image is in Photoshop format (.psd), its layers will be listed individually and each layer will be available as a target image.  If the image you wish to use as a target is not open, click the **Choose** button.  Navigate to your image and click the **Open** button.  Your image will now appear in the **Destination** window, already selected.

4.      If you think you might want to modify the grain added to the target image, click the "Leave the Match Grain dialog open" checkbox.

5.      Click **OK** to close the **AUTO MATCH GRAIN** dialog and launch its operations.

Your source image or layer will be opened if necessary, its grain will be sampled, your destination image or layer will be opened as necessary.  The MATCH GRAIN dialog will appear, and will show the processed image in the preview region.  You can verify that the source you have selected appears as a thumbnail in the **Current Noise Model.**  It will also appear in the library as **Last Sample**.

6.      Click **OK** if you are satisfied with the results, or make any further modifications you wish to the target image.