

# Performance Tuning Guide for Adobe Photoshop 3.0 for Silicon Graphics

This document describes the steps you can take to optimize the performance of Adobe Photoshop 3.0 for Silicon Graphics.

## What Kind of System Makes Photoshop Perform the Best?

In general, Photoshop 3.0 performs best on systems with:

- the fastest possible integer performance (only a few operations use floating point)
- lots of real memory
- very fast disks and disk subsystems
- very fast system bus
- large data cache (at least 512KB)

Specialized graphics hardware that might speed up display time with 3-D packages usually does not help Photoshop because Photoshop spends most of its time performing imaging calculations or managing its scratch disk rather than sending final bits to the display.

The more RAM, the better. If you do not have enough RAM, Photoshop is forced to overflow its image data to its scratch disk, which is much slower than when all image data fits in RAM.

To calculate how much RAM you would need for Photoshop to perform most of its operations totally in RAM (rather than having to overflow to its scratch disk), here is a quick formula: add up the uncompressed sizes of the images that you would load into Photoshop at a given time, multiply by 4 and then add 48MB. For example, if you typically edit 50MB of image data at a time, then to greatly decrease the chances of having to use the scratch disk, you would need 4 times 50MB plus 48MB, which equals 248MB of RAM.

## How Much Memory Should I Allocate to Photoshop?

You can specify the size of the memory block Photoshop should allocate at start-up by choosing File>Preferences>Memory and Scratch Files and setting the amount of physical memory for Photoshop. With a few exceptions (e.g., certain plug-ins), Photoshop will restrict its memory usage to the size of this allocated memory block. For its other space needs, Photoshop overflows to a scratch disk on the UNIX file system.

The optimal size for Photoshop's memory block is a delicate balance. On the one hand, you want to allocate as much memory as possible to Photoshop so that its scratch disk is used as little as possible. On the other hand, if you allocate too much memory to Photoshop, UNIX and the various components of the X Window System do not have enough room for their operations, and pieces of Photoshop itself and its memory blocks will be swapped in and out by the UNIX virtual memory system. If significant swapping occurs while Photoshop is working, your Photoshop performance will degrade severely.

There is no hard-and-fast rule for the best value for Photoshop memory. Optimal performance depends on many things, including your hardware setup, your systems software setup, what other applications are running at the same time as Photoshop, and what Photoshop operations you tend to use the most. **But a good place to start is to set Photoshop memory to your total RAM minus 48MB, or 6MB, whichever is larger.** For example, if you have 256MB of RAM, then set Photoshop's memory block size to 208MB by clicking the Fixed option and typing 208 in the text box.

It is unlikely that you will want to increase Photoshop memory beyond this point. Instead, you might find that you experience less swapping (and therefore faster Photoshop operations) if you decrease Photoshop's memory allocation slightly, perhaps by another 20-30MB. For example, on a 256MB machine, perhaps allocate 188MB rather than 208MB.

If you are running other desktop applications or background processes at the same time as Photoshop, you may need to decrease Photoshop's memory allocation even further to achieve optimal performance.

## How Can I Optimize My Scratch Disk Performance?

When Photoshop is operating on images that are too large to fit entirely within its allocated memory block, it creates one or two overflow areas within the UNIX file system called *scratch disks* (primary and secondary). In some situations, scratch disk performance is more important than all other Photoshop performance factors.

You control where Photoshop puts its scratch disk by choosing Preferences>Memory and Scratch Disks from the File Menu and selecting a location. (If you accept Photoshop default scratch disk locations, then your primary scratch disk will be located within your Photoshop working directory, called <workingdir> within the Installation Guide).

Here are specific guidelines:

- The most important rule is that the scratch disks should be on locally mounted disks, not NFS mounted disks. The speed of local SCSI disks can be many times faster than the speed of remote disks, which are accessed over an Ethernet line.
- Purchase the fastest possible disk or disk storage subsystem you can find and set your primary scratch disk preference to a directory on that disk. You may need to look to third-party disk drive providers for the best price and performance options.
- Deselect the Pre-allocate scratch file space option in the Memory and Scratch Disks preferences dialog. When this option is selected (the default), Photoshop is considerably slower when it first allocates disk space from the UNIX file system because it has to physically write data to each new disk block to ensure that no other process will take away the disk block before Photoshop has a chance to use it. (Photoshop can crash if an allocated disk block is taken from it.) If no other application will be writing to Photoshop's scratch disk partitions at the same time you are running Photoshop, then pre-allocation is unnecessary. (Note: one way to ensure that no other applications will write to the same partitions that Photoshop uses for its scratch disks is to dedicate an entire disk, or at least a disk partition, to the Photoshop scratch disk.)

- Put UNIX swap space and the Photoshop scratch disk on separate physical disks so that UNIX swapping and reads/writes to the Photoshop scratch disk can happen in parallel. (This should be advantageous only if you observe that UNIX is swapping at the same time that Photoshop is writing to its scratch disk.)

## **UNIX Swap Space Issues**

Photoshop reliability and performance can suffer if you do not have a large enough UNIX swap area. Also, the faster UNIX can perform its swapping, the faster all applications will run, including Photoshop.

The speed with which the UNIX operating system can perform its virtual memory operations can depend on how you set up your system. Here are guidelines:

- Purchase the fastest possible disk you can find and put your swap partition on that disk. You may need to consider third-party disk drive providers for the best price and performance options.
- Swap partitions theoretically should perform faster than swap files.

It is difficult to make specific recommendations on how much swap space you will need; however, if you set your Photoshop Memory and Scratch Disk preference to allocate a large block of memory, then Photoshop will need sufficient swap space to back up that memory allocation. Our best recommendation: have swap space that is at least twice as large as the total RAM on your system.

## Summary

The following chart summarizes the performance tuning guidelines described in this document:

Performance Area	Recommendation
Optimal computer	<ul style="list-style-type: none"><li>• the fastest possible integer performance</li><li>• lots of real memory</li><li>• very fast disks and disk subsystems</li><li>• very fast system bus</li><li>• large data cache (at least 512KB)</li></ul>
Memory allocation	<ul style="list-style-type: none"><li>• <b>start with total RAM minus 48MB, or 6MB, whichever is larger</b></li><li>• allocate <i>less</i> memory to Photoshop if you experience swapping during imaging operations</li></ul>
Scratch disk	<ul style="list-style-type: none"><li>• use a local disk, rather than an NFS-mounted volume</li><li>• use the fastest possible disk</li><li>• <b>deselect the Pre-allocate scratch file space option</b> in the Memory and Scratch Disks preferences dialog, if you can do so reliably</li><li>• put your primary scratch disk on a different disk than UNIX swap</li></ul>
UNIX Swap Space	<ul style="list-style-type: none"><li>• use the fastest possible disk</li><li>• use swap partitions rather than swap files</li></ul>