THE DIGITAL IMAGING WORKFLOW

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This booklet describes the sequence of steps required to make high quality digital images. The sequence is valid wherever you are working.

Some settings, however, are tailored to my teaching environment in the Digital Imaging Lab of the Photography Department, Columbia College Chicago.

Peter Thompson

With ongoing hat-tips to Tom Shirley, Tammy Mercure and Thomas Wolf for their valued inputs into this document

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Home
- **Calibrate your home monitor** *(on home computer, only)*
- **Set your Photoshop Color Settings Presets** *(on home computer, only)*

Digital Lab or home
- **Assess image** *(home or Digital Lab)*
- **Scan image appropriate to output** *(Digital Lab for best quality)*
- **Make project folders** *(home or Digital Lab)*
- **(Crop/correct perspective, if needed)** *(home or Digital Lab)*
- **(For grayscale output: convert to grayscale)** *(home or Digital Lab)*
- **Overall: set black/white points, adjust contrast and tonal range, remove color casts, selectively sharpen using adjustment layers** *(home or Digital Lab)*
- **Specific areas: adjust color and tone, selectively sharpen using layers and adjustment layers** *(home or Digital Lab)*
- **(Convert to output color space, if needed [duo-tri-quadtones])** *(home or Digital Lab)*
- **Make test prints, apply final printing adjustment layers, make final prints** *(Digital Lab for best quality)*
- **Save layered file, save a copy, (for e-publishing: flatten & convert to appropriate file format)** *(home or Digital Lab)*
- **Backup files and optimize harddrive** *(home)*
- **Archive** *(multi-site)*

There are all kinds of monitors and they range from fabulous to garage-sale candidates. It is therefore unlikely that setting up your home monitor will actually allow you to judge accurately what your color will look like when you output it in the Digital Lab. The following set-up procedures, therefore, will not give you a box seat but will get you into the color ballpark. You will not need to touch the monitor calibration on any computer in the Digital Lab. In fact, changing any monitor calibration in the Digital Lab will sabotage your ability to judge the color within your own files.

For technical theory and explanations of this process: Blatner and Fraser, REALWORLD PHOTOSHOP, pps. 145-160.

If you use OS 9.x
• Turn on your CRT monitor and wait at least 1 hour for it to warm up and "settle" its colors (for LCD monitor you do not have to wait).
• To launch the ColorSynch Default Calibrator, open the Control Panel pullout tab.
• On the Control Panel pullout tab go to the Monitor ikon and press the flyout arrow
• On the flyout menu choose "Open Monitors Control Panel" then press "Color"
• In the "Color" dialog box choose "Calibrate"
• In the Calibrate dialog box click "Expert", then click on the arrow at the bottom right and follow the Setup Assistant. Two suggestions as you go through this process: sit approximately 3

home

feet from the monitor, and squint slightly. This will aid you in assessing the color choices.
• Give your resulting monitor profile a name followed by the date.
Photoshop will then automatically open this Display Profile until you change it.

If you use OS 10.x
• Turn on your CRT monitor and wait at least 1 hour for it to warm up and "settle" its colors (for LCD monitor you do not have to wait)
• To launch the ColorSynch Default Calibrator, open the Displays System Preference (APPLE/SYSTEM PREFERENCES)
• Click "Displays", then press the "Color" tab
• Select "Apple RGB 1998" as your Display Profile, then press "Calibrate"
• On the "Calibrate" introduction page, check the "Expert Mode" box, and then click the right arrow and follow the Setup assistant. Two suggestions as you go through this process: sit at least 3 feet from the monitor, and squint slightly. These suggestions will aid you in assessing the color calibration choices
• Give your resulting monitor profile a name followed by the date.

Photoshop will then automatically open this Display Profile until you change it.

The PDF document entitled "color_settings.pdf" contains step-by-step instructions for setting the color settings presets in your own Photoshop application at home so that it correctly interfaces with the presets in the Lab. This PDF document is located in the TUTORIALS partition on the Lab server.

You will not need to touch the color settings presets on any computer in the Digital Lab. In fact, changing any preset in the Digital Lab will sabotage your ability to judge the color within your own files.

For tech theory and explanations of the entire process: Blatner and Fraser, REALWORLD PHOTOSHOP, pps. 145-160. The Blatner and Fraser recommendations differ somewhat from the ones contained in my PDF document. The reason for the difference is that the PDF document represents the best combination of factors to balance your working at home and working in the Digital Lab.

What are the possibilities contained within your image?

How does your image determine what do you wish to do with it? What will be its scale? Will it be printed on a laser printer, or on a printing press, or wil it be e-published on the Web, or placed as a mural on a wall? Will it be re-purposed for some as-yet unspecified but likely future use?

Your answers to these types of questions will influence each of the following steps.

digital lab or home

The PDF document entitled "imacon_settings.pdf" contains step-by-step instructions for scanning using the Inacon scanner. This PDF document is located in the TUTORIALS partition on the Lab server.

For e-publising and for scanning previously published work: home flatbeds are OK.

For negative and transparency scanning and for scanning final analog prints, use the Imacon.

The Imacon is the best software for setting your initial black and white points.

Do all your scanning for fine art prints in the Digital Lab because, unless you own an Imacon scanner, 1) the quality of your scan will be higher in the Lab, and 2) when you scan at home you will sometimes inherit color shifts when you bring the image file back into the Lab.

Transparencies
For best color quality: shoot and scan transparencies so that the base color inherent in negatives is not an issue that you must color correct. That is to say, base + fog is different for each roll of negative film. This is not an issue for transparencies because their whites are perfectly clear gelatin.

Reflective images printed in ink
The PDF document entitled "Remove_Moire_patterns.pdf" contains step-by-step instructions for removing moiré patterns after scanning published images. This PDF document is located in the TUTORIALS partition on the Lab server.

Color casts
As long as you do not change your actual resolution, the color of your image should not change due to enlargement.

Moiré patterns
When scanning images previously printed with inks, moiré patterns will invariably show up. Do not use the scanner to get rid of them (other than to make sure that the image sits squarely on the scanner's platten which can sometimes lessen the moiré patterns). The PDF document entitled "Remove_Moire_patterns.pdf" contains step-by-step instructions for removing moiré patterns after scanning published images. This PDF document is located in the TUTORIALS partition on the Lab server.

Check scan with Histogram
Some scanners allow you to judge the contrast of your image before the scan. If so, move the shadow and highlight sliders of the histogram to match the shadow and hightlight extremes of your image (see the PDF document entitled "imacon_settings.pdf" for step-by-step instructions of using the histogram with the Imacon scanner. This PDF document is located in the TUTORIALS partition on the Lab server.

If you so not pro-actively organize your image files, you will likely inherit chaos. Therefore, I recommend that you create a master folder for every project. Label it with your project's name. Place within it three nested folders. I label mine as follows: "Scan(s), "InProgress", and "Final".

Save your raw scan(s) for the project in the folder labeled "Scan(s)."

Then make a copy of the raw scan and place it inside the InProgress" folder. It is inside this folder that the majority of your work will take place.

The final layered or flattened image(s) will sit inside the "Final" folder.

Crop
Unless you actively decide to the contrary, it is good practice to get rid of areas outside the image. A black border surrounding an image, for instance, will throw off your Histogram and the setting of your black point (unless you are careful to recognize those pixels for what they are, and compensate for them when you set the black point (see the following section in the Digital Workflow for setting the black point).

Correct perspective
Correcting perspective is often needed if you take a picture of a building, for instance, with a 35mm camera (as you look up, the sides of the building will lean in). The PDF document entitled "Correct_Perspectives.pdf" contains step-by-step instructions on how to "straighten" the perspective of a building. This PDF document is located in the TUTORIALS partition on the Lab server.

To see a narrated Quicktime movie demonstrating this process, see the "Digital Take-Home Professor" tutorial on perspective correction (with a PDF text file and a practice Photoshop file). Access it via the TUTORIAL partition on the Lab server. The tutorial can be burned to a CD and taken home.

Conversion modes in Photoshop
1. IMAGE/GRAYSCALE
2. IMAGE/ ADJUST/ DESATURATE, then IMAGE/ GRASCALE
3. IMAGE/ LAB COLOR, then IMAGE/GRAYSCALE
4. Add Channel Mixer adjustment layer, then IMAGE/GRAYSCALE
5. IMAGE/CALCULATIONS, then make New Document.
   Convert this new Multichannel document to grayscale with
   IMAGE/GRAYSCALE

Conversion workflow
1. With color image that will only be output to grayscale :
• Open RGB file
• SAVE AS/ A COPY
• Rename to safeguard original and obtain new working file
• Apply Channel Mixer Adjustment Layer to new working file
• Retouch/restore/composite in this grayscale working
  environment (remember: this is an RGB file that only looks gray
  scale)
• IMAGE/GRAYSCALE
• SAVE
• Make test print on Epson Piezography printer
• Add Adjustment Layers as needed to correct image after proofing.
• Add Adjustment Layers as needed.

OR

2. With color image that might be output either to grayscale
   or to color:
• Open RGB file
• SAVE AS/ A COPY
• Rename to safeguard original and obtain new working file
• Retouch/restore/composite in this RGB working environment
• SAVE to keep layers intact in RGB
• IMAGE/DUPLICATE

Now, with both files open: compare grayscale mode changes (see
Conversion modes on previous page) on the duplicate file

• Make final conversion to grayscale on the duplicate file with
  IMAGE/GRAYSCALE
• SAVE AS/ A COPY v. 2 labeled "Flat"
• Flatten
• SAVE
• Make test print on Epson Piezography printer to correct image
  after proofing.

To see a narrated Quicktime movie demonstrating the
conversion process, see the "Digital Take-Home Professor"
tutorial on conversion (with a PDF text file and a practice
Photoshop file). Access it via the TUTORIAL partition on the Lab
server. The tutorial can be burned to a CD and taken home.

OVERALL: SET BLACK/WHITE POINTS, ADJUST CONTRAST AND TONAL RANGE, REMOVE COLOR CASTS & SELECTIVELY SHARPEN USING ADJUSTMENT LAYERS

The PDF document entitled "Remove_ColorCasts.pdf" contains step-by-step instructions for color cast removal. This PDF document is located in the TUTORIALS partition on the Lab server. For technical theory and explanations of the entire process: Blatner and Fraser, REALWORLD PHOTOSHOP, pps. 227-276. To see a narrated Quicktime movie demonstrating color cast removal, see my tutorial (with a PDF text file and a practice Photoshop file). Access it via the TUTORIAL partition on the Lab server. The tutorial can also be burned to a CD and taken home.

Additional note on setting your black and white points *if* you are outputting to paper. In such as case, the crucial question is, "How much ink can my paper hold?" For rag and uncoated papers (that is, low gloss with high ink absorption--such as Somerset, Epson Fine Art, Concord Rag), set your blackpoint at 5% and your white point at 95% as starting points that will subsequently be proven correct, or not, by printing. Glossy and luster papers (that is, high gloss with low ink absorption) can actually hold a 0% black point and a 100% white point. As early as possible, therefore, decide on your paper type. Setting your black and white points at 0% and 100% will give you maximum flexibility.

For technical theory and explanations of the sharpening process: Blatner and Fraser, REALWORLD PHOTOSHOP, pps. 387-414.
My PDF document entitled "sharpening.pdf" contains step-by-step instructions for sharpening. This document is located in the TUTORIALS partition on the Lab server.

SPECIFIC AREAS: ADJUST COLOR AND TONE, & SELECTIVELY SHARPEN USING LAYERS AND ADJUSTMENT LAYERS

For a range of darkroom, retouching, color and tonal correcting techniques specific to what you might encounter at this intensive stage in the digital workflow, download any of the following PDF files. These documents are located in the TUTORIALS partition on the Lab server.

Burn_50grayfil_blk_softlite.pdf
Clean_OldDamaged_Photos.pdf
Colorize_GrayscaleImage.pdf
Create_ArtificialShadows.pdf
Dodge_50grayfil_whte_sftlit.pdf
Handcolor_GrayscaleImage.pdf
LuminosityMasking.pdf
Make_Vignette.pdf
New_Photo_Seem_Old.pdf
Remove_LargeBlemishes.pdf
Remove_BackgroundDetail.pdf
Remove_Backgrounds.pdf
Remove_DustScratches.pdf
Remove_Dust_Scratches.pdf
Selective_Coloring.pdf
SelectiveColor_AdjustLayer
Smooth_Grain.pdf
Smooth_SpottedAreas.pdf

For technical theory and explanations of the entire process: Blatner and Fraser, REALWORLD PHOTOSHOP, pps. 277-386.

The PDF document entitled "ConvertingtoGrayscale.pdf" contains step-by-step instructions for grayscale conversion. This PDF document is located in the TUTORIALS partition on the Lab server.

Remember: always save your raw scan in your "Originals" folder before doing *any* color conversion on the file.

Conversion workflow
for a black & white or color image that will be output as a Duo-tone, Tritone or Quadtone:
• Open RGB file. For Grayscale file, convert it to RGB: IMAGE/ MODE/RGB
• SAVE AS/ A COPY. Rename to safeguard original and to obtain new working file
• Retouch/restore/composite in this RGB working environment
• IMAGE/GRAYSCALE
• SAVE
• IMAGE/MODE/DUOTONE (or Tritone or Quadtone)
• Load Presets/Gray-Black
Choose the preset you like (do NOT adjust the curves!)

To see a narrated Quicktime movie demonstrating this process, see my tutorial on creating a duotone (with a PDF text file and a practice Photoshop file). Access it via the TUTORIAL partition on the Lab server. The tutorial can also be burned to a CD and taken home.

MAKE TEST PRINTS, APPLY FINAL PRINTING ADJUSTMENT LAYERS, MAKE FINAL PRINTS

Printing workflow
• IMAGE/MODE/RGB (to access Proof Setup)
• VIEW/PROOF SETUP/CUSTOM PROFILE
Add profile for the paper you will use.
As an example, say you choose the Epson 2000P printer. Here are the paper and ink options you can choose:
      • EP2000EP_sEnh (for Somerset Photo Enhanced)
      • EP2000pEP_cRag (for Concorde Rag)
      • EPSONStylusPhoto200_ArchivalMattePaper
        (for Epson Archival Matte Paper)
      • eps2000_pqgp (for Epson Photo Quality Glossy)
    Intent: Perceptual
    Simulate: Paper White (check this box)

As soon you choose one of these profiles, the image on the monitor will change to simulate what your image will look like once it is printed with that paper and ink combination. The colors will most likely look alarmingly less saturated. So, after assessing the change to your image:

• Add Adjustment Layers (Levels and Curves) as needed to correct the image so it looks good on your monitor.
• Make test print on Epson 2000P printer
• Add Adjustment Layers as needed to correct image after proof.

SAVE LAYERED FILE, SAVE A COPY (FOR E-PUBLISHING: FLATTEN & CONVERT TO APPROPRIATE FILE FORMAT)

Layered file

Your layered file represents all your decisions and hard work. It must therefore be safeguarded and identified. I save mine with the word LAYERED as part of the file name for clarity and quick reference (do this via FILE/SAVE AS/SAVE A COPY. Note: make sure the "Layers" box is checked).

Flatten

Flatten if your file will be output to the Web.

Save a Copy

As a backup, save the file as a copy and add the word "COPY" to the file name for clarity and quick reference.

BACKUP YOUR FILES AND OPTIMIZE YOUR HARDDRIVE

Backup:

Use CD's, DVD's. Backup all files as needed. On the label identify the contents and the date.

Optimize:

For Mac OS9: once a week.

For Mac OS10: once a month.
Disk optimization is significantly less important with OS10 than it is with OS9 because the disk writing and caching scheme for the OX10 I/O is extremely efficient and never allows fragmentation to progress to the point of impairing the data or the harddrive. Disk optimization with OS10 is therefore not as much of an issue as with OS9.

Software for harddrive optimiztion:

Disk Warrior, Norton's Utilities, or Scandisk (for PC)

archive your files

For archiving your files, make two backup copies of everything, (including your System Preferences folder). Label the contents and place the date on the backup media.

Now save each copy in a separate place, one on-site and the other off-site (floods and fires *do* happen). In matters of archiving work only the terminally innocent are not paranoid.

There are several standard ways to archive work: zip disks, CDs, DVD's and portable harddrives.

Zips:
Unstable and expensive. Holds 100 Mb. Use as a transfer medium for daily work, only, not as a final archive medium. It is projected that zip disks will be less used within 2-3 years.

CD's:
Stable and cheap ($0.20). Holds 650 Mb. Use as a transfer medium for daily work, and also as an archive medium.

DVD's:
Stable and relatively cheap ($2.50). Holds 4.7 gigs (approximately 7 CD's). Use to archive your CD's.

Portable harddrives:
Stable and increasingly affordable. 40 gig portables are available for under $150, and falling. These can be used as a transfer medium for daily work, and also as an archive medium.