

Creating an 8-bit copy of 16-bit images in MetaMorph

ABSTRACT

With modern computer monitors you can have 16 million (2 to the 24th power) colors displayed on-screen at any one time. However, these colors are composed by having independent red, green, and blue channels. Each color channel is an 8-bit value ranging from 0 to 255. A gray scale image window is defined as using equal intensity for each color channel; this limits you to having a maximum of 256 gray shades being displayed on the monitor.

OVERVIEW

So the question is “How do you get a 16-bit image, which can have a gray scale range of 0 to 65535, to be displayed within the 8-bit (0 to 255) limit of the monitor?” The answer is scaling. The function in MetaMorph is called Scale Image and is found in the Display Menu.

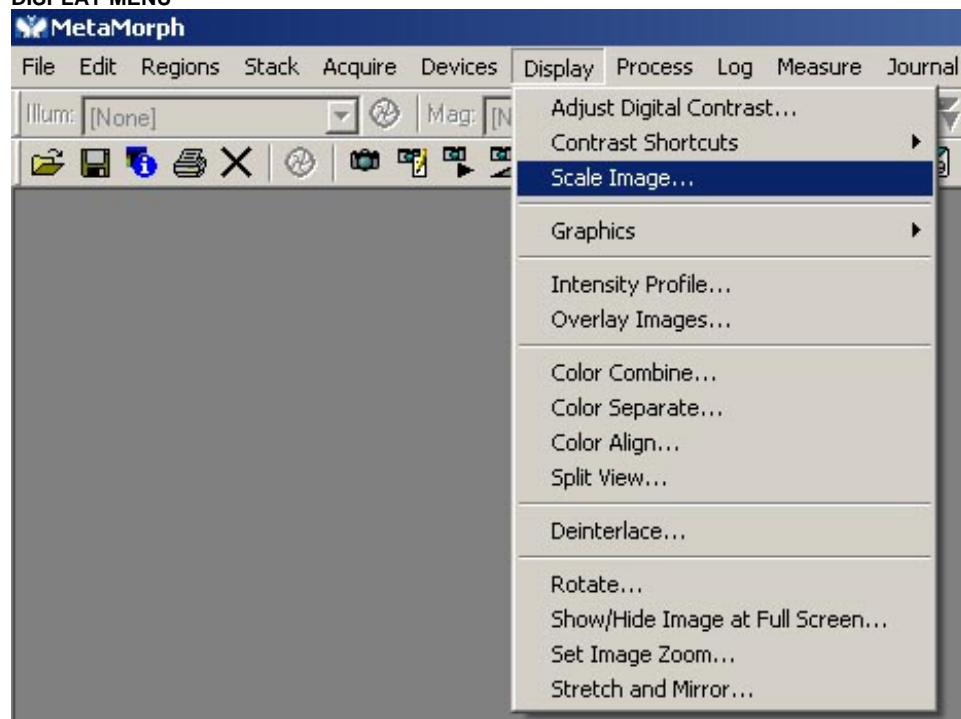
ARTICLE #
T20049

PRODUCTS
MetaMorph®

CREATED
7-Nov-2005

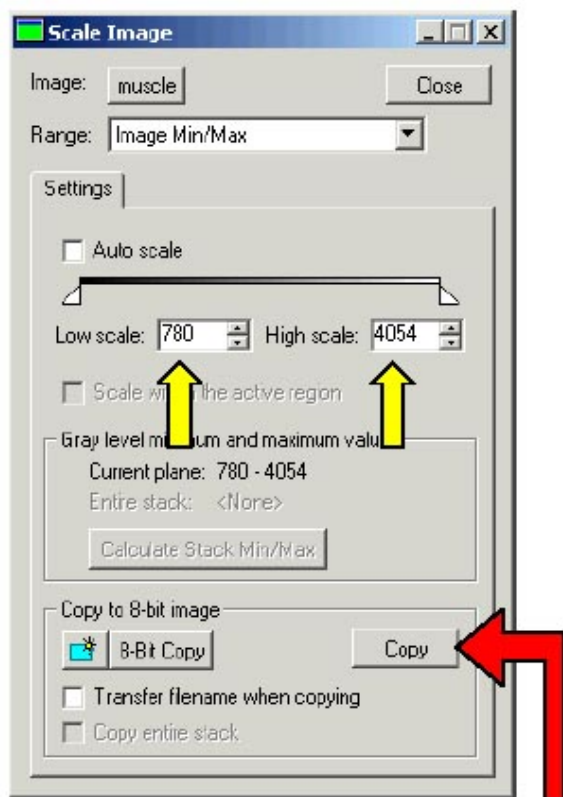
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FIGURE 1
DISPLAY MENU



Scaling maps the image data to displayed values. You can set the point at which every intensity data value at this level or below will be displayed as black (Low Scale) and the point at which everything at another level or above will be displayed as white (High Scale). MetaMorph allows you to set these two points any place along the 16-bit range, which allows you to customize the display to match the image data. If your image data is on one end of the range i.e. 0 to 4095, which is what you would get from a 12-bit camera, you can set the scaling to match the image data. Other programs like PhotoShop automatically set the two points at the ends of the range (0 and 65535). With the above example, the image would appear black in PhotoShop as all the image data is on the lower end of the scale.

FIGURE 2
SCALE IMAGE DIALOG BOX



The easiest solution to getting around these display difficulties is to convert the 16-bit images to 8-bit. The down side of this is you are throwing away image data in the process. If the purpose is for display or publishing, then losing image data is not that critical.

PROCEDURES

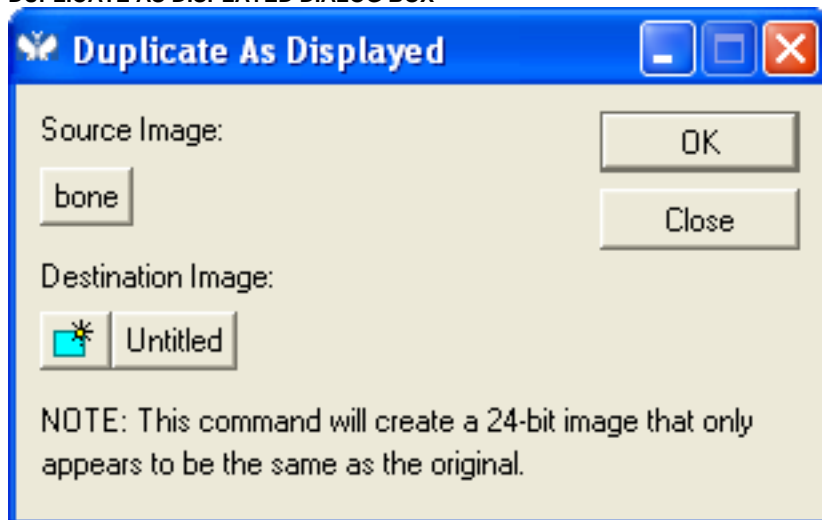
1. From the Display menu, choose Scale Image. The Scale Image dialog box opens.
2. Select the desired 16-bit image using the Image selector.
3. If you want to specify gray levels that are outside of the default range of the image's lowest and highest gray levels (Image Min/Max), select 8-Bits, 10-Bits, 12-Bits, 14-Bits, or 16-Bits from the Range list. This will change the range to include all of the gray values available in the specified image depth type.
4. To specify the high and low scale values manually, click and drag the Low and High Scale Sliders on the Scale Bar, or use the Low Scale and High Scale edit boxes. OR If you want to scale the image based on a percent of pixels to exclude, select Auto Scale. If desired, specify a percentage of pixels (not gray values) to be excluded from the lower and upper ends of the scaling ranges with the Low % and High % edit boxes.
5. After adjusting the scaling until the display is as desired, press the "copy" button to convert the 16-bit image to 8-bits. Make sure "Transfer filename when copying" is NOT checked.
6. From the File menu, choose Save As. Select the appropriate file name and directory to save the image. **WARNING:** If you use the same file name as the original image, you will overwrite the original image and that image data will be lost.

ADDITIONAL PROCEDURES

The following procedure will create a presentation image which can include the colored look up table (LUT), thresholding and regions of interest. This procedure is an additional method of converting 16-bit images into a format that can be easily opened in other programs.

1. Apply desired LUT, thresholding, and draw any desired regions on the image.
2. From the Edit menu choose Duplicate > As Displayed. The Duplicate as displayed dialog box opens.

FIGURE 3
DUPLICATE AS DISPLAYED DIALOG BOX



3. Select the source image with the Source Image selector.
4. Select the desired destination image using the Destination Image selector. You can Overwrite or Add To the existing image, or you can place the results in a New image window.
5. When you are ready, choose OK. The 24-bit image will be created.
6. When you have finished, choose Close.
7. From the File menu, choose Save As. Select the appropriate file name and directory to save the image. **WARNING:** If you use the same file name as the original image, you will overwrite the original image and that image data will be lost.

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