Diamond Calculator 3.0 tutorial
How to Create High dynamic range (HDR) panorama
by third-party software

You can create high dynamic range panorama for DiamCalc using any editor, which supports 32-bit per channel color mode.

For example, you can use:

- Adobe Photoshop CS3 Extended (http://www.adobe.com/downloads/)
- Adobe Photoshop CS (http://www.adobe.com/downloads/)
- Artizen HDR (http://www.supportingcomputers.net/)

1.1 The idea of mapping an image onto the sphere

The panorama image used for DiamCalc 3.0 needs to be in what's known as «equidistant cylindrical projection», more commonly called a «cylindrical map». The image is wrapped onto the sphere.
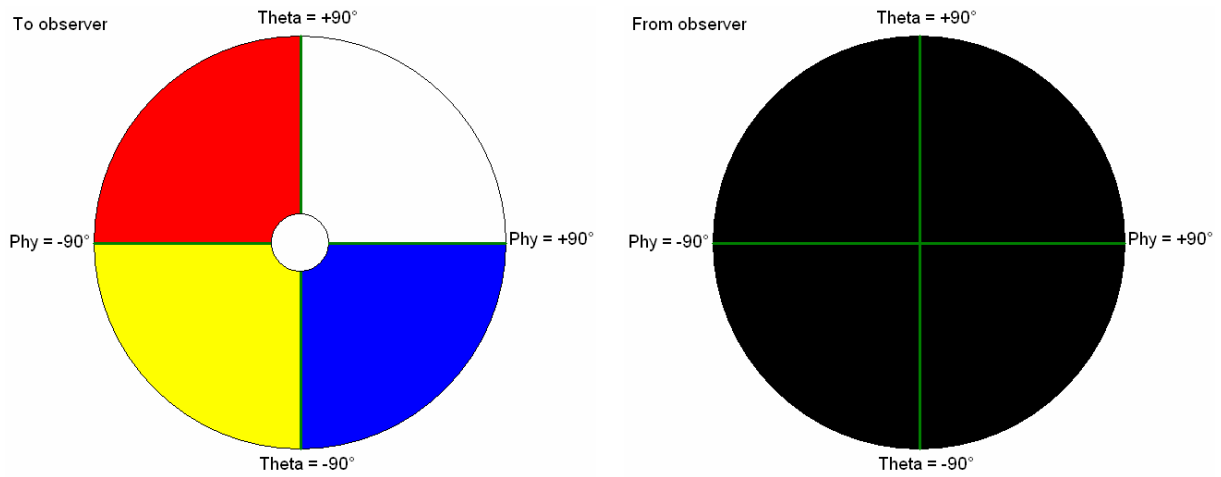We load the image like this:
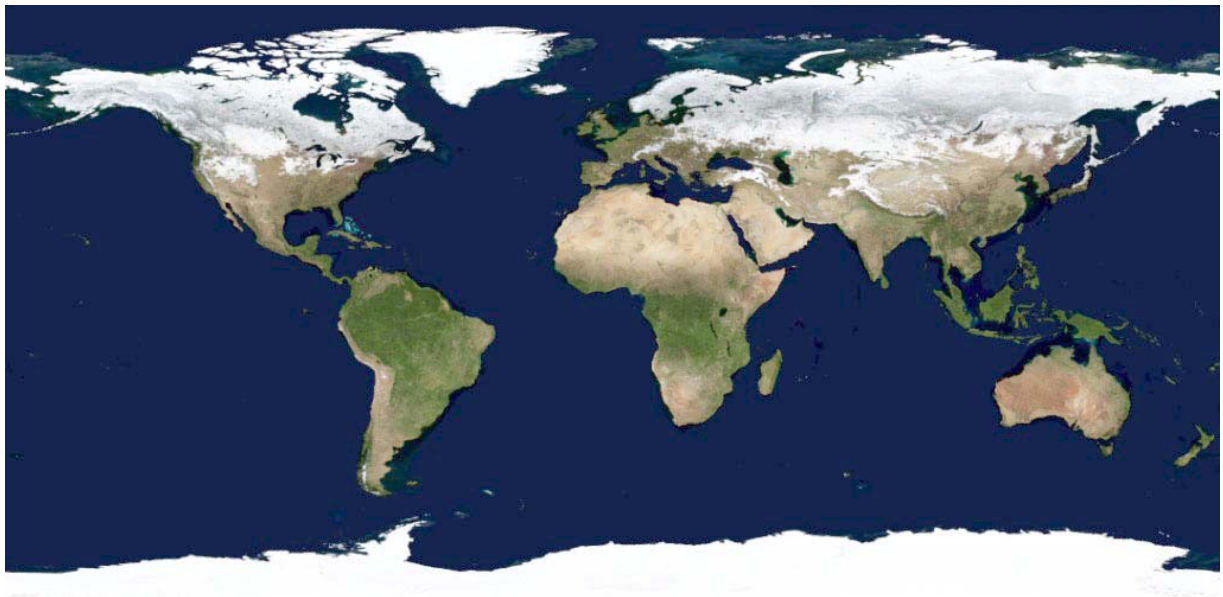
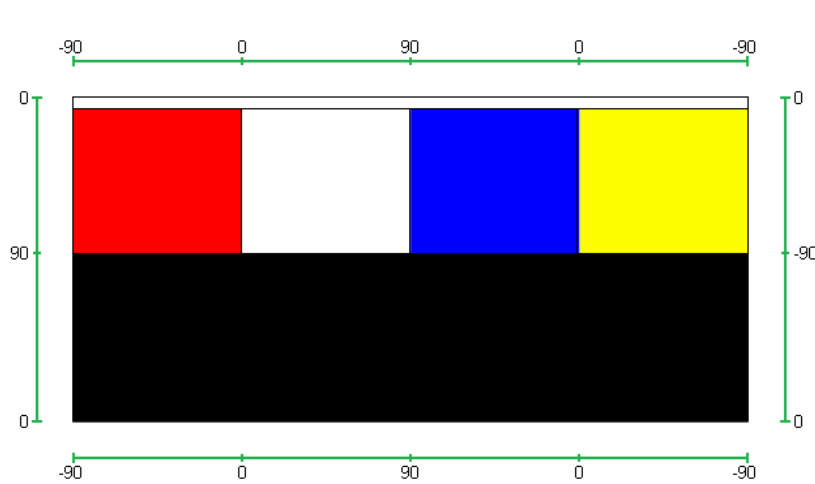And we get the environment of the diamond (diamond is somewhere inside this sphere):

Here is an example of creating your own HDR panorama.

1. The top hemisphere should look like this:
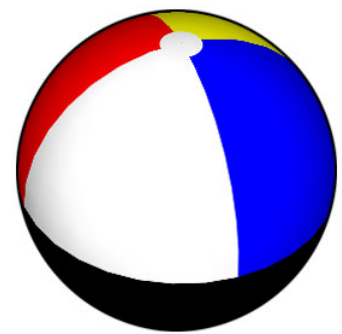
2. And the bottom hemisphere is black:

To observer

Theta = +90°

Phy = -90°

Phy = +90°

Theta = -90°

From observer

Theta = +90°

Phy = -90°

Phy = +90°

Theta = -90°

*(green lines show the axis)
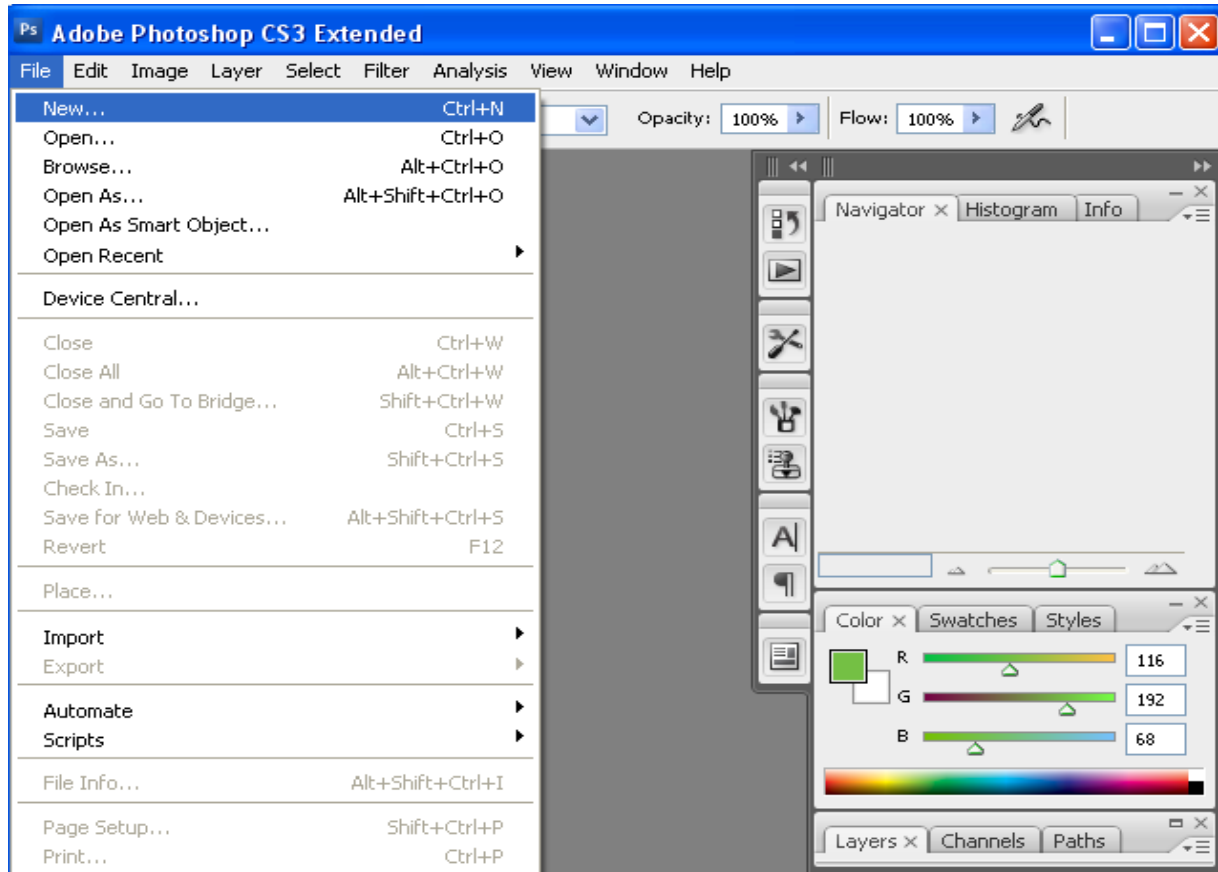
3. Then the panorama image will be:

4. When your image wrap the sphere, it looks like this:

1.2 Adobe Photoshop CS3 Extended

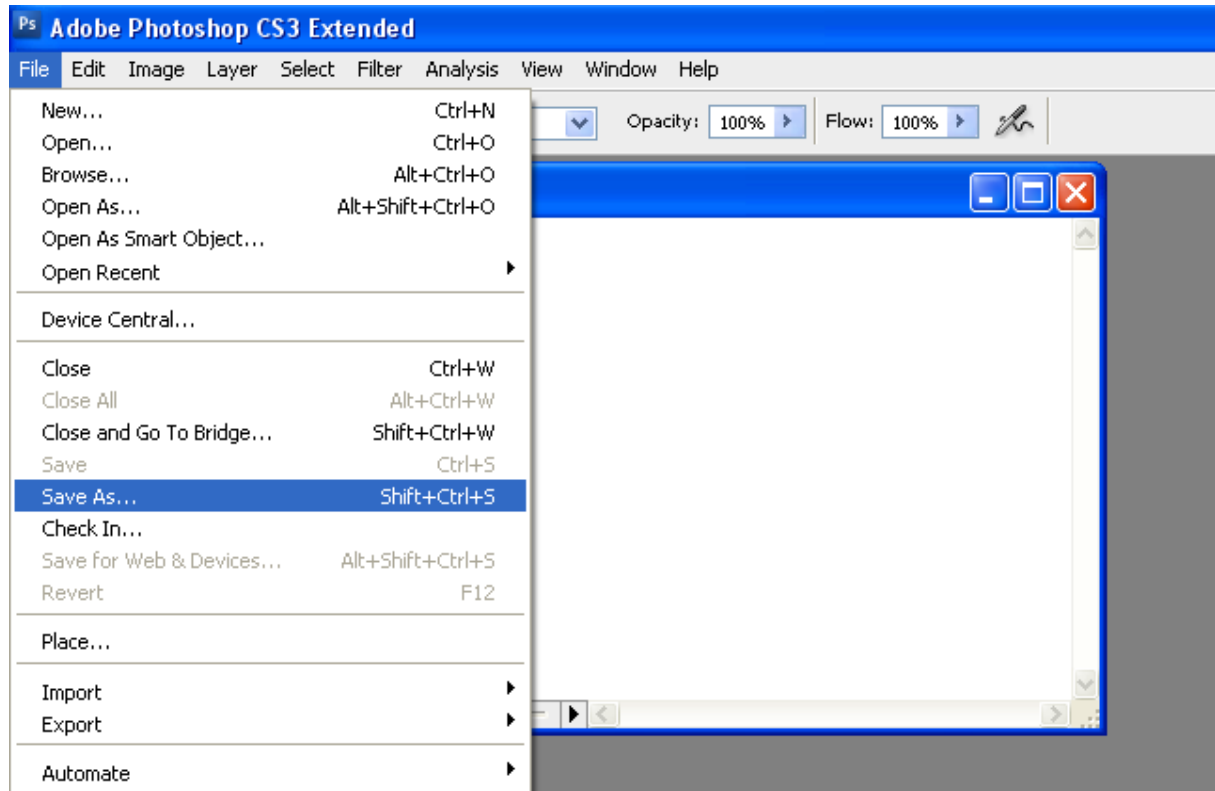Choose **File->New** from the menu panel

The dialog box with new image options will appear. Here you should change width and heights. Remember that height should be two times less than weight, but of them should be power of 2 (such as 1024x512, 512x256, etc.)
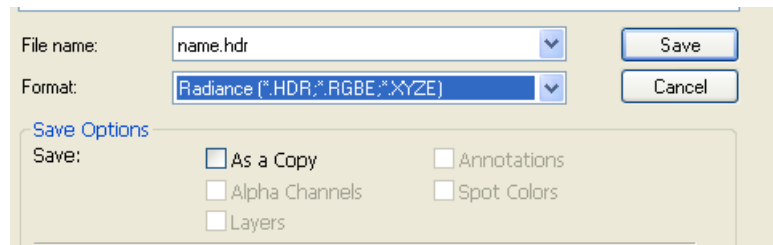Then, be sure that Color Mode is set to **RGB Color** and **32 bit**
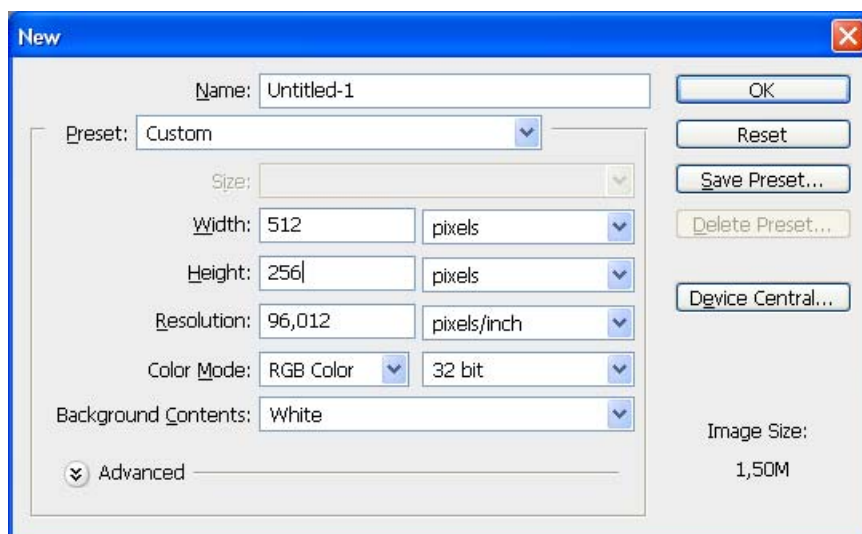
The blank image will appear and you can edit it.

When you finished editing, you should save it in HDR file format. Choose **File->Save as**... from the menu panel.
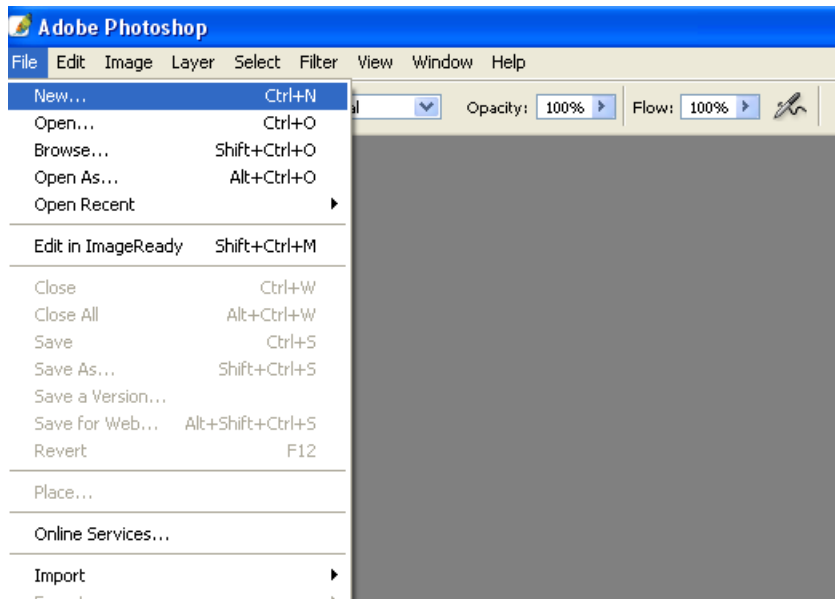

The dialog of all supported formats will appear. Make sure, that HDR file format was chosen. For being sure, type **.hdr** at the end of the filename.

1.3 Adobe Photoshop CS

Formally Adobe Photoshop CS can't create 32-bit per channel images, but you can create 16-bit HDR and work with it (most of the time it will work correctly, but for better result use Adobe Photoshop CS3 or other software, which can create 32-bit per channel images).

Choose **File->New** from the menu panel

The dialog box with new image options will appear. Here you should change width and heights. Remember that height should be two times less than weight, but of them should be power of 2 (such as 1024x512, 512x256, etc)

Then, be sure that Color Mode is set to RGB Color and 16 bit
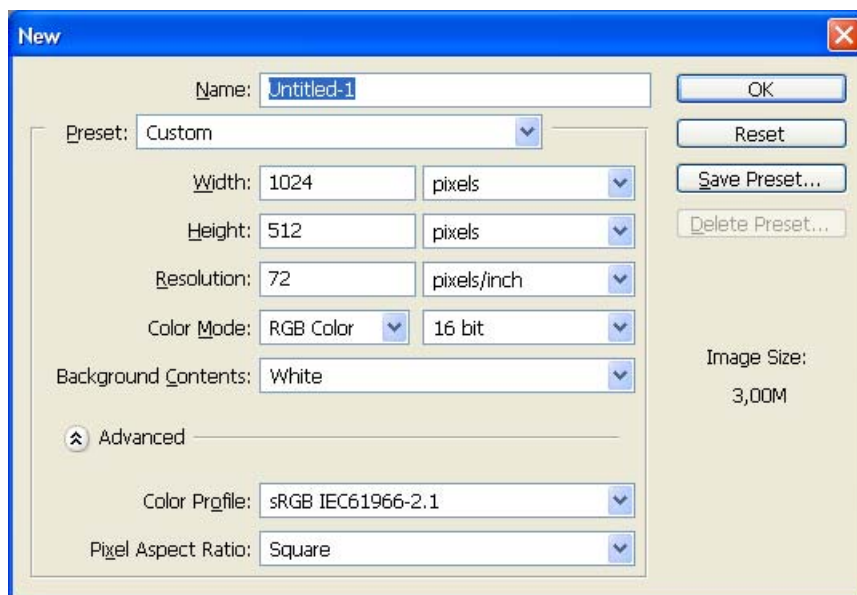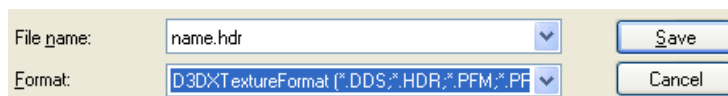

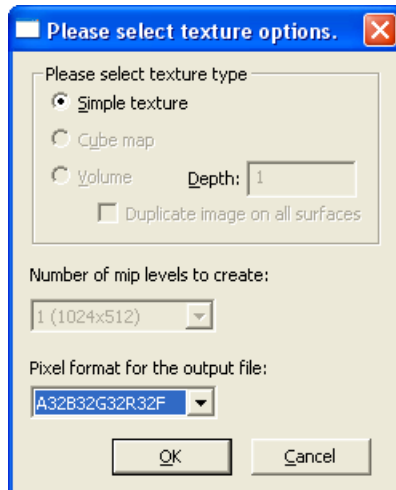
The blank image will appear and you can edit it

When you finished editing, you should save it in HDR file format. Choose **File->Save as...** from the menu panel
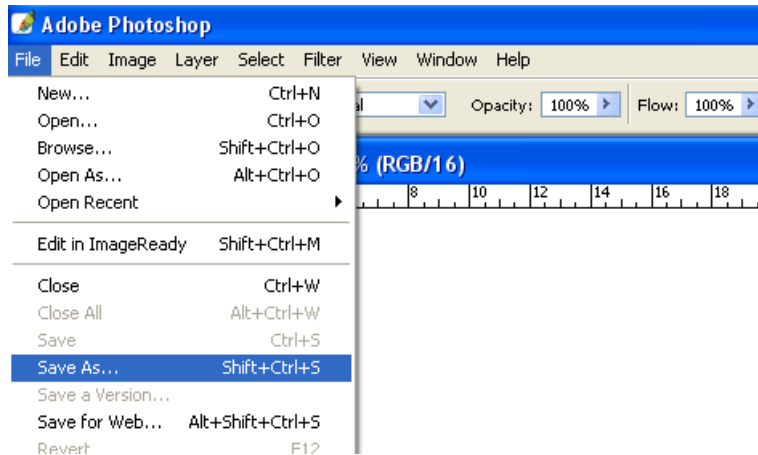

The dialog of all supported formats will appear. Make sure, that HDR file format was chosen. In Adobe Photoshop CS you should type .hdr at the end of the filename. If you forgot to do it .dds format will be set by default and it won't work with DiamCalc 3.0.

When you click **Save** button the dialog will appear. **Pixel format for the output file** should be **A32B32G32R32F**. Then press **OK**
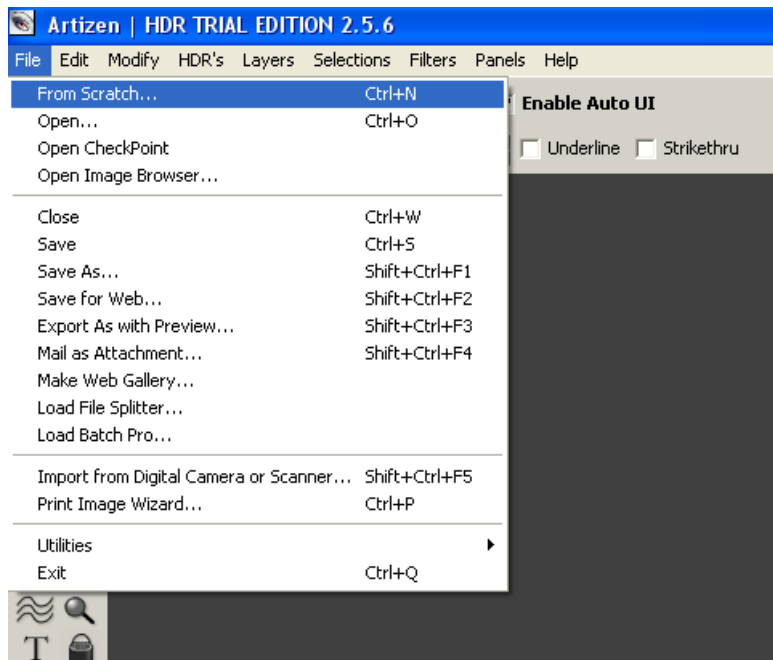

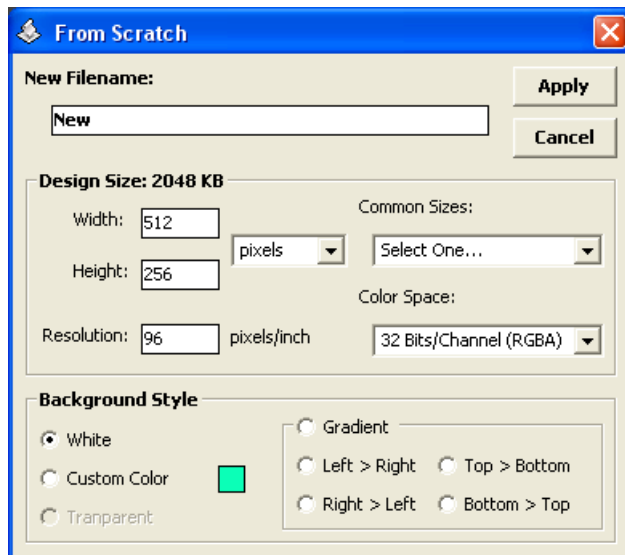In the next dialog choose **Yes, scale between maximum values**
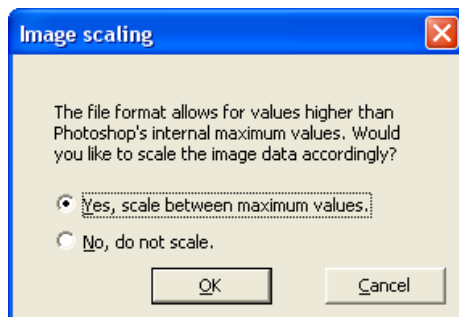
1.4 Artizen HDR

Choose **File->From Scratch..**

In the following dialog set **Width**, **Height** and **Color Space**. Remember that height should be two times less than weight, but of them should be power of 2 (such as 1024x512, 512x256, etc.). Color space should be **32 Bits**/**Channel** (RGBA)
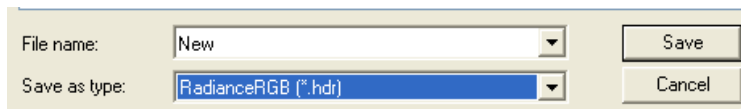

The blank image will appear and you can edit it

When you finished editing, you should save it in HDR file format. Choose **File->Save as...** from the menu panel
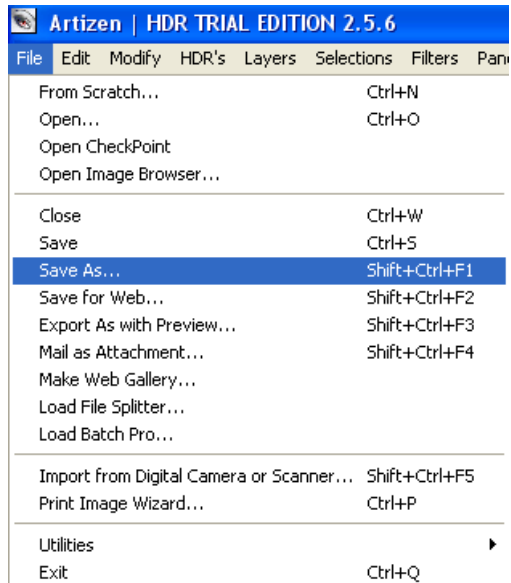
The dialog of all supported formats will appear. Make sure, that HDR file format was chosen. Press **Save** button.

Then you should set **Gamma Correction** to 2.2 and click **Apply** button