GigaPX Tools 2.5

Solutions for gigapixel images

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Introduction

GigaPX Tools is a program which consist in a set of useful functions to manage gigapixel images. It supports, both for input and output, three of the most used file formats : **RAW**, **TIFF/bigTIFF** and **KRO**.

The tools provided by the software are : "**Format conversion**", "**Split**", "**Merge**", "**Crop**" and "**Resize**". **Format conversion** is useful to change the image file format to a different one. **Split** is used to divide the giant image into small tiles. This could be necessary when the image needs to be retouched in some areas and it's not possible to edit the whole image due to the size of the picture. **Merge** is used to recombine the tiles into a single image, but it could be used to paste different images into one picture too. **Crop** permits to cut out the borders or to extract a small part of the image, while **Resize** is useful to get a reduced version of the whole image.

The program doesn't need much memory, thus it can be used successfully with a 32-bit operating system and 2-4 GB of ram. Using a test image of 76.8 gigapixel it ran smoothly and all procedures were completed with success.

Choose the right version

GigaPX Tools is offered in three different editions : **Free**, **Lite** and **Pro**. The **Free** version is free both for personal and commercial use. See the table below for the differences between the versions:

	FREE	LITE	PRO
Maximum image side dimension (width or height)	150,000 pixels	300,000 pixels	100,000,000 pixels
Maximum image size	2.0 gigapixel	6.0 gigapixel	No limits
Maximum tile side dimension (width or height)	30,000 pixels	30,000 pixels	1,000,000 pixels

Please refer to www.gigapxtools.com for additional information regarding the price of the licenses.

Format conversion
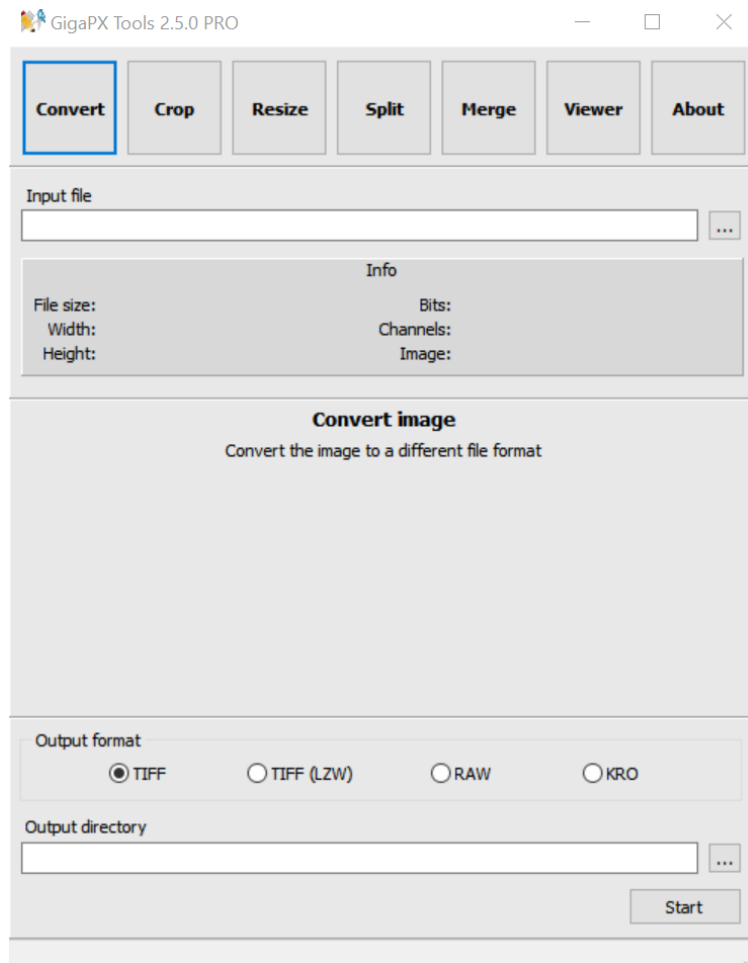
As stated in the introduction, the program is capable of managing **RAW**, **TIFF/bigTIFF** and **KRO** files both **8-bit** or **16-bit**.

RAW and TIFF must have **3 channels** (RGB), while KRO must have **4 channels** (RGB + Alpha).

The byte order of the 16-bit RAW files must be "**PC-IBM**".

The conversion tool can open any image in one of the supported formats and save it in any other supported format. The saved images always have the same color depth as the input files.

Before proceeding with the conversion, you've got to select the input file (the image to be converted). Click the ... button on the right side of "**Input file**" and select the image. It is also possible to drag the selected file into the "**Input file**" area.
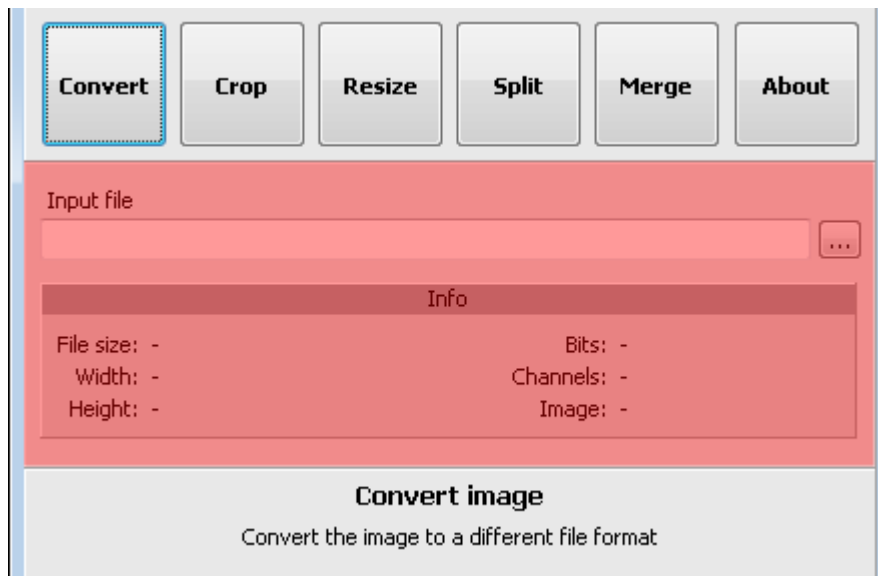
*The **input file** area marked in red*

When a RAW file is selected, a new small window could appear asking the width, the height and the number of bits of the image. Click the 8-bit or 16-bit button, then, while the width or the height value is typed in the proper input box, the program automatically calculates the value of the other dimension.

If the file name ends with the values of the width and the height, then the program retrieves the image dimensions and the number of bits automatically.
Ex : test_10000x5000.raw.
The presence of the underscore ("_") before the first number is mandatory.

Before saving the picture it is possible to select a different folder for the output file. This could be useful to save time in moving the image after conversion, but it's very helpful to increase the conversion speed if the computer has at least two physical disks (one disk with two or more partitions counts as one disk). Saving the image to a different disk dramatically reduces the disk heads movements, increasing the read/write operations speed.
Click the ⬚ button on the right side of "Output directory" and choose the disk and folder you want. It is also possible to drag the output directory in the "**Output directory**" area.

If this field is left empty the program saves the image in the same directory as the source file.
To clear a previous selection double click the "**Output directory**" input box.

*The **output directory** area marked in red*

To convert the image into one of the three formats, click the appropriate radio button : "**TIFF**", "**TIFF (LZW)**", "**RAW**", "**KRO**".

> "TIFF" means uncompressed, while "TIFF (LZW)" means compressed using the lossless LZW algorithm. If the possible compression ratio is low, the size of the compressed file could result bigger than the uncompressed version.

> The "bigTIFF" format is automatically used, while saving, if the predicted file size is 4 GB or more. To avoid confusion, in this case the program adds ".big" to the end of the file name and before the .tif extension (.big.tif).

Depending on the image dimensions the conversion process could take from some minutes to some hours. Click "**Start**" to begin the conversion.

During the operation a progress bar is shown and it's possible to pause or abort the operation.
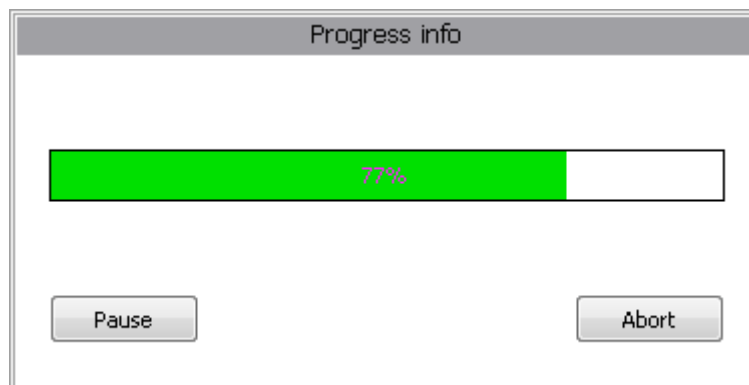
The progress bar

Crop image

This tool is useful to cut out black areas around the image borders or to extract a portion of the picture. The program will create a copy of the image starting to copy pixels from the topmost left point indicated in the input boxes and using the width and height values inserted.

Choose the input file, the output file format and the destination directory as described in the "Format conversion" chapter. Insert the coordinates, in pixel, of the topmost left point, then insert the desired width and height for the resulting image.

> The first point of an image is located on the top-left corner and its coordinates are (0,0)

The program is designed to protect the input file from being overwritten by the output file.

Image resize

Sometimes it could be useful to have a smaller version of the gigapixel image, for example to have a quick preview of the just rendered image, to publish it on a web page, to print a copy or set it as desktop background. Using this tool it's possible to create an image of any dimension (smaller than the original) easily.

Select the input file, the output file format and the destination directory as described in the "Format conversion" chapter, then insert the desired width of the resized image. The height will be calculated automatically to match the original aspect ratio.

> In some cases the dimensions of the resized picture could be slight different than the user selection due to divisions approximation during the scale process.

Split image
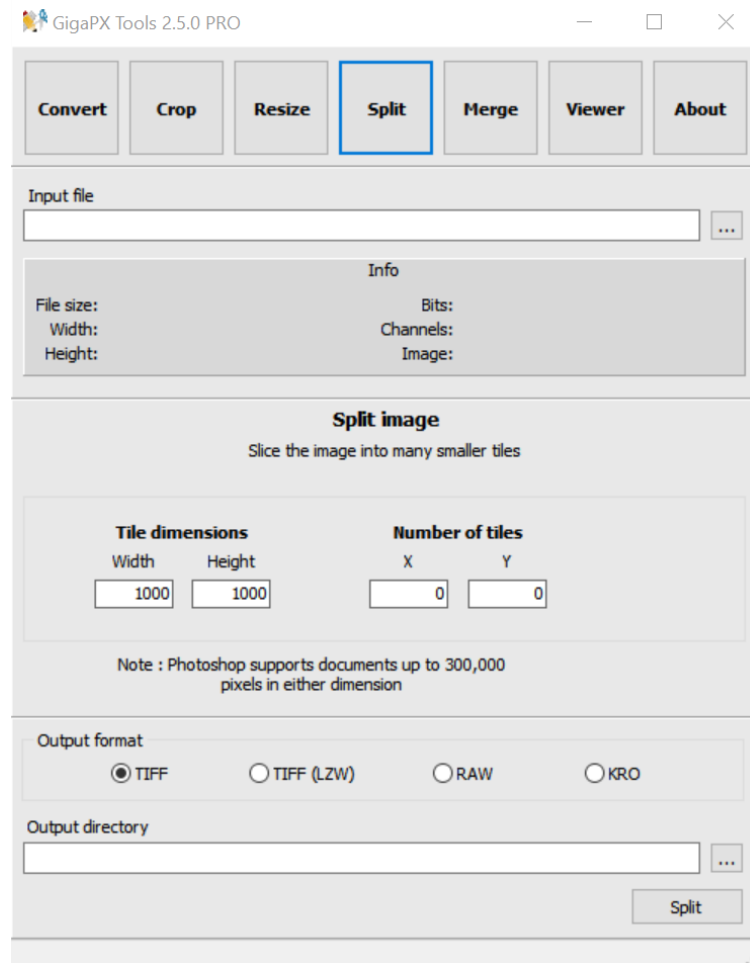
Stitching many photos into a gigapixel image is not a problem using recent software. These programs are powerful and precise, and often there is the possibility of removing ghosts artifacts automatically. However, it could happen that small areas of the big image needs to be retouched by hand using a photo editing software like Photoshop or Gimp. In most cases it's not possible to load the whole image in the editor due to the huge file size.

To bypass this problem **GigaPX Tools** offers the "**Split**" function. This tool divides the picture into small pieces, so it's possible to edit the tiles that need to be adjusted.
When all the required changes are done, it's possible to combine the tiles back to the gigapixel image using the "**Merge**" function.

Before proceeding, choose the input file and the output directory as described in the "Format conversion" chapter.

Now select the width and the height, in pixel, of the tiles. The program calculates the number of tiles along the X axis and the Y axis that will be generated. Chose the file format of the tiles (Tiff, Raw or Kro), then click "**Split**".

It could take a while, depending on the image size, but in the end the user will find X * Y tiles saved on the disk.

Don't change the file name of the tiles or the merge function will fail. For more info about the file name convention see the "Merge tiles" chapter.

Merge tiles
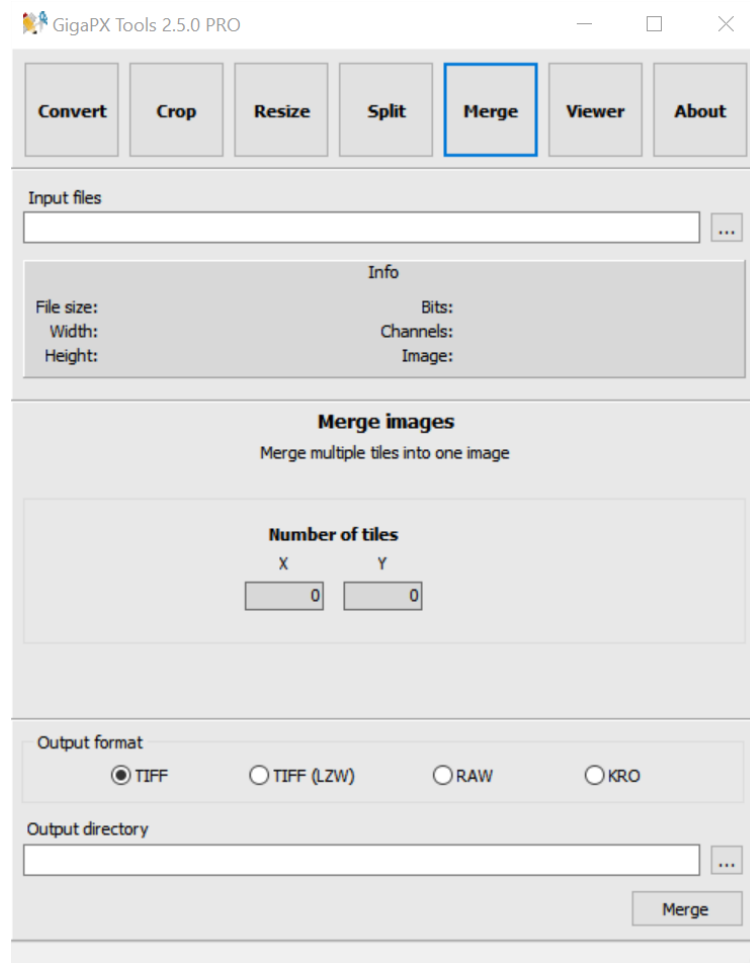
This function is normally used after the "**Split**" to recombine all the tiles generated into a single gigapixel image, but the same tool could be useful to merge two or more images not related with the splitting process.

Merge after split:
click the ⬛ button on the right side of "**Input file**" and select all the images of the set.
It is also possible to drag all the files into the "**Input file**" area. Note that you've got to drag all the files together and it's not possible to drag one file at time.

> To select two or more files: click the first file with the mouse, press and hold the SHIFT key, click the last file then release the SHIFT key.

After the selection of the input files, the program checks if one ore more tiles are missing analyzing the file names. If everything is right, the software shows the number of tiles along the X and the Y axis as confirmation. If an error message is displayed, check if you selected the right number of tiles.

Select the output format of the gigapixel image and the output directory as explained in the first chapter, then click "**Merge**" and the big file will be recreated.

Merge images without a previous split:

as mentioned above, it is possible to merge two or more images even if these files weren't created using the "**Split**" function. In this case it's important to follow two simple rules :

1. **Tile size**: all tiles must have the same dimensions (the shape can be square or rectangular). The tiles of the last column can be thinner, and the tiles of the last row can be lower.

2. **File name**: all tiles must have the same base name (let's say "Test"). After the base name, add the underscore "_" and the size in pixel (ie "1000x500"), then a new underscore "_" and the X/Y position of the tile (ie "X1Y1", which is the topmost left tile). Finally add the file extension (ie ".raw")
   Example: "Test_1000x500_X1Y1.raw", "Test_1000x500_X2Y1.raw", "Test_750x500_X3Y1.raw". The X3 is the last in the row and it's thinner. As last tile it's permitted to have a different width.

When the tiles follow these rules it's possible to merge the files as described in the previous paragraph.

Web viewer
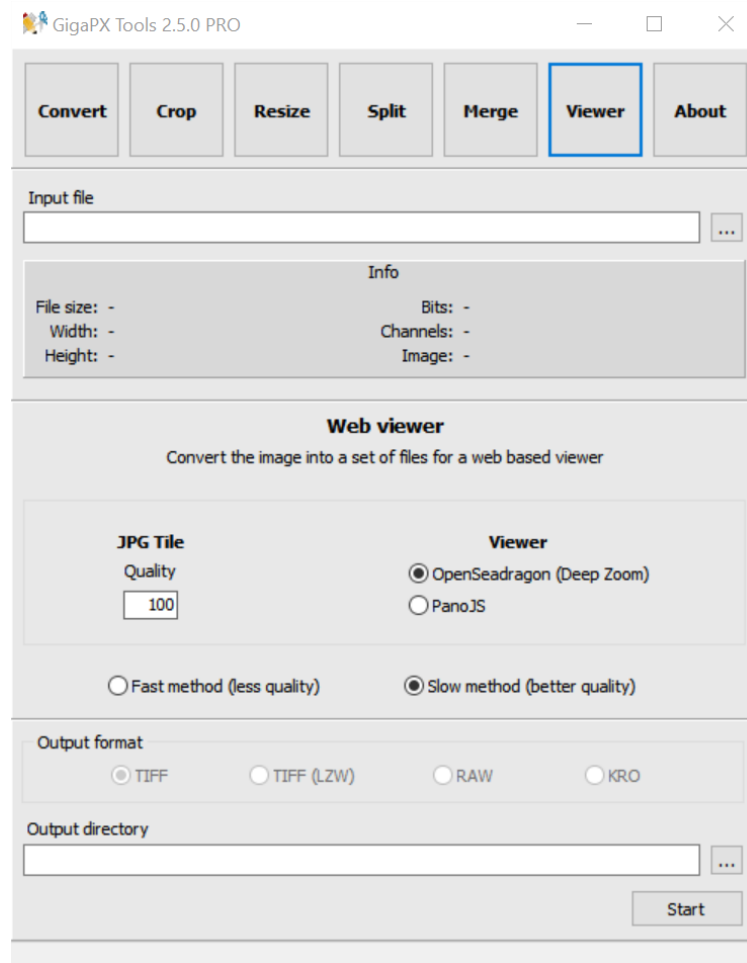
GigaPX Tools 2.5 introduces a new function : an image web-based viewer. The procedure converts the big image into a set of small tiles with different zoom levels. It's possible to select between two different viewers: OpenSeadragon and PanoJS.

The program takes care to copy all the needed files in the output directory and to configure the viewer. A power user has the chance to customize the basic page proposed or integrate the viewer in an existent web page.

With just few clicks you'll be ready to view, zoom and navigate in the picture using a web browser (Firefox, Chrome, Edge etc). When the conversion is completed, open the output directory and double click "OpenSeadragon.html" or "PanoJS.html" to open the browser and start to explore your gigapixel picture.

The image can be viewed from a local disk or uploaded to any website.

The tiles generated are always saved as JPG. It's it possible to select the quality of these files, where 100 is the maximum quality.

16 bit images are converted to 8 bit using a linear conversion. During the test the results were always good, but it could happens, with particular images, that the conversion fails with unexpected results.

Select the viewer: OpenSeadragon or PanoJS.

The tiles are resized by half at every zoom level. You can choose between a fast resizing but with lower quality procedure or a better quality but slower method.

To get more info about the viewers:

https://openseadragon.github.io/

https://dimin.net/software/panojs/

Appendix A : Opening RAW files

Most of the image file formats contain useful info as the width and height in pixels, the number of color channels and the number of bits per color. The RAW file format doesn't contains anyone of these info, so, when opening it with an image editor like Photoshop or Gimp, you must provide these info manually. Using wrong parameters will cause to show the image as corrupted.

To give an example of the corrected data, suppose the image's dimensions are 1792 x 1280 pixels, with 3 channels and 8 bits color depth. The right data to insert to open the image correctly are:

Appendix A : Opening RAW files
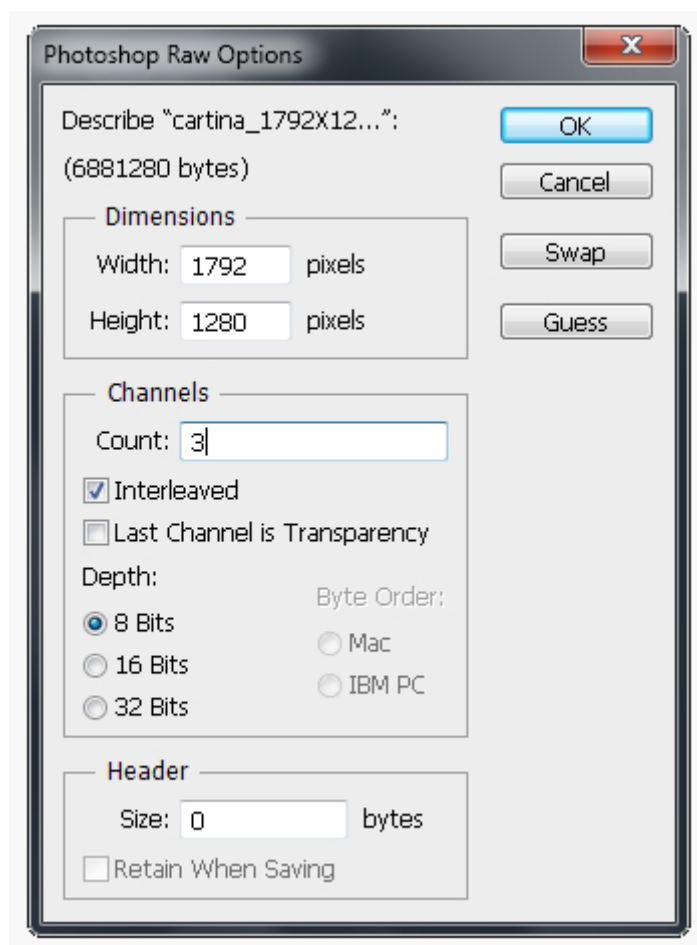
Contacts

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