

img2shp

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This tutorial describes how to create MSX shape files using Gimp and img2shp tool.

1. Introduction

The Brazilian MSX program Graphos III includes a image format called shape, which is a kind of clip art collection for screen 2. There are four types of shapes described below.

- Type 1 – black and white image.
- Type 2 – color image.
- Type 3 – masked black and white image.
- Type 4 – masked color image.

The black and white images only use the screen 2 character pattern table whereas the color images use both character pattern and color tables. The mask resource allows us to select the image pixels that will be copied to the screen or not. This is very similar to the MSX 2 Basic instruction COPY followed by the logical operation TPSET.

The program *img2shp* converts one or many monochromatic GIF images to a single MSX shape file containing the image collection. This program only supports shapes type 1 and 3.

2. Preparing the image using the Gimp

The graphic editor “The Gimp” is free software and can be downloaded freely for both Windows and Linux. The Gimp will be very useful for *img2shp* image preparation.

Step 1: Selecting the image

Once shapes type 1 and 3 are black and white, the best option to work with is to select outline images. The PC B&W clip arts are a good choice for that. Anyway, you may create your own draws always based on the idea of outlines.

There are many clip arts on Google that fit our request. For such case, try to look for images using the following search string:

```
clip art outline <object_of_interest>
```

Figure 1 shows an example image.



Figure 1. Example image.

Step 2: selecting the area of interest

If the object of interest is a part of the image, use the Gimp rectangular selection tool to select the object. Copy the selected area (control + C) and then paste as a new image (shift + control + V). The original image will not be necessary. So, close it.

In our example, the whole image will be used. In that case, the selection and copy tools are not necessary.

Step 3: resizing the image

The MSX shape file is an image that ranges from 8x8 to any size minor or equal to the screen 2 dimensions (256 x 212 pixels). Thus, the image size must be multiple of 8 in any direction. But don't worry with that, because the script fits the image to a size multiple of 8 for you.

Resize the image selecting "Image" option on the top menu, then "Resize image". Choose the image size and the interpolation method. We strongly recommend the "Cubic" interpolation.

In our example, the image will be resized to:

Width: 64 pixels

Height: 100 pixels

Figure 2 shows the image resizing result.



Figure 2. Resized image.

Obs: the image resizing results on smoothing effect, dissolving the black line into shades of gray. In order to minimize this effect, make use of images with the size next to the final size. Compare figures 1 and 2 and notice how the image outline turns "weaker".

Step 4: converting image to B&W

The image on figure 1 seems to have only black and white colors. Nevertheless, it is a gray level image which may contains several shades of gray. In addition, the image resizing process generated more gray levels on the image. In order to convert our image to pure B&W colors, we will apply the Gimp "Threshold" tool on figure 2, classifying the image into black (color 0) and white colors (color 255).

For such work, select "Colors" on top menu, then "Threshold". The dialog shows a graphic that indicates the gray levels classified as black and other gray levels as white. The threshold value limits the two groups. The initial value is 127, which means that values from 0 to 127 are classified as black, while the values from 128 to 255 are classified as white.

Click and drag the black arrow on the dialog (blue circle on figure 3) to modify the threshold value. You may change more accurately this value by changing the threshold value in the box (red circle on figure 3) and pressing up and down keys.

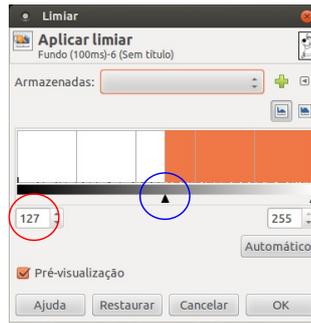


Figure 3. Color threshold.

The image must be visible together with the dialog, once the changes are updated in real time. In that case, we may change the threshold value and observe until the outline seems good. As lower the value is, the weaker is the outline. In the other hand, the higher the threshold value, the stronger is the outline. Nevertheless, high values may result on some artifacts.



a) low threshold: 50



b) nice threshold: 240



c) high threshold: 250

Figure 4. Threshold applied on figure 2.

Step 5: saving the image as GIF

The resulting image must be saved as GIF format. For that, select “File” on the top menu and then “Save as”. If you add the “.gif” extension to the file name, the software recognizes automatically the GIF format. Choose a place to save and then click on “Ok” button.

Cool hint:

Is it possible to convert from human faces or any photography to B&W. Let's see how to do it using Gimp.

First, load the image on Gimp. Then, choose the “Image” option on the top menu, “Mode” and “Indexed”. On the pop up dialog, select the option “Use black and white (1bit) palette” and then click on “Convert” button. Figure 5 shown an example of human face converted to B&W.



Figure 5. B&W image from a human face.

3. Converting the image(s) using *img2shp*

The program *img2shp* is a GNU-Octave / Matlab script designed for converting one or many GIF images to a single MSX shape file.

There are no parameters passed to the program. So, we must edit the script and change the data located at the section “configurações gerais” at the beginning of the code.

```
% Configurações gerais (general configurations)
base_name = 'image_name';
ext_name = '.gif';
tot_imgs = 5;
has_mask = false;
```

The *img2shp* is based on images where their names follows this rule:

name_base + index + .gif

For example, suppose that we have four images from the Scooby Doo cartoon. The files shall be named as follows:

- scooby1.gif
- scooby2.gif
- scooby3.gif
- scooby4.gif

In this example, the base name is “scooby” and the total images “tot_imgs” is 4. Change these values in the script. The option “has_mask” indicates if the image will have mask (shape type 3) or not (shape type 1).

```
% Configurações gerais
base_name = 'scooby';
ext_name = '.gif';
tot_imgs = 4;
has_mask = false;
```

After changing the configurations, save the script and run it using Octave or Matlab. Place the GIF images under the same subdirectory of the script.

The script now does the whole task alone. The output file is based on the “base_name” which will be “scooby.shp”.