

# Atari Rasta Juice / ARJ

<http://g2f.atari8.info>

## 1. INTRODUCTION

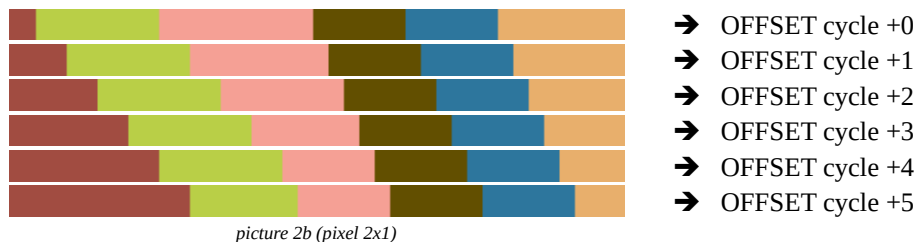
- G2F is the abbreviation of GRAPH2FONT, the program works in WINDOWS environment, it allows to edit, create graphics for ATARI XE/XL
- GRAPHICS 15 BASIC is 160 pixels per line (pixel aspect ratio 2x1), 4 color registers available
- BASIC's GRAPHICS 10 is 80 pixels per line (4x1 pixel aspect ratio), 9 available color registers
- GED+ is the G2F program mode, character mode, uses the raster program, up to 4 changes can be made per line, 'bad lines' must be switched off for correct representation of the image, which means that the fifth color is lost (character inversion)
- DLI is the G2F program mode, character mode, up to 4 changes can be made per line, the fifth color can be set (character inversion)
- GED-- is the G2F program mode, bitmap mode, uses the raster program, up to 3 changes can be made per line
- PGR is the G2F program mode, bitmap mode, uses the raster program, additional changes can only be made by editing the raster program, which means that this editing process is very complicated
- MCH is one of the file formats accepted by the G2F program

## 2. METHOD OF OPERATION OF THE PROGRAM

In the '/doc' directory with the program you will find the file 'rastajuce\_scheme.g2f', it shows a scheme of color changes in line for the GED-- mode of the G2F program (CPU 6502 Classic).



Each such consecutive colored field I will call a raster field, in the above graphic (*picture 2a*) you can see six such fields in one line of the image. The raster fields can be shifted to the right, there are six such variants of changing the position and width of the raster fields (OFFSET). The width of the raster fields can vary from 7 to 47 pixels depending on the selected variant (GRAPHICS mode 15, pixel 2x1).



The program's task is to determine the most frequent colors in each successive raster field and to present all pixels of such field by means of available color registers. Only one color register change per raster field is possible.

The program uses only one color change scheme (OFFSET), if you were to change this scheme every line then the quality gain of matching increases on average by 2%, but the degree of complication of the program increases disproportionately to the benefits, in addition, we lose the ability to export the result of the operation of converting graphics to modes GED+, GED-- of the G2F program, and only these modes give the possibility of further convenient editing.

## 3. DESCRIPTION OF THE PROGRAM

- allows to load only PNG (8bits Per Pixel) files with horizontal resolution of 320 pixels only, vertical resolution no more than 1600 lines
- works best with images with less than 32 colors, the more color changes in a line the worse the conversion effect
- converts to two ATARI XE/XL graphics modes, GRAPHICS 15 or GRAPHICS 10
- PMG (Player/Missile Graphics) is not used, you can add it in G2F
- the conversion result is saved to the file OUTPUT.MCH, this gives you the additional possibility of editing in G2F
- conversion result is additionally saved to files OUTPUT.MIC, OUTPUT.RCL which enables immediate generation of executable file for XE/XL in GRAPHICS 15 or GRAPHICS 10 modes, file 'make.bat' in directory '\a8' or '\a16'
- the difference between the original and the resulting image is stored in the OUTPUT\_DIFF.BMP file

- select one of the four G2F program modes: GED+, DLI, GED--, PGR
- CPU 6502 Classic (PAL 1.77 MHz) or CPU 65816 Rapidus (PAL 20 MHz) can be selected, of which only the CPU 6502 is supported by the G2F program
- possibility to select a part of the image for conversion by moving the vertical scrollbar

#### **4. PROGRAM OPERATION**

Main Program Menu:

**a) File**

At the beginning we have only this one option active. After selecting it, we get the possibility of loading a PNG file that meets the requirements listed in the 'PROGRAM DESCRIPTION' section.

**b) Mode**

- **Pixel 2x1**
- Pixel 4x1
- GED+
- DLI
- **GED--**
- PGR

**c) Palette**

- Altirra
- Atari800WinPlus
- **G2F**
- Jakub
- Laoo
- OlivierP
- Real
- Rocky
- Xformer
- Color distance
  - **YUV**
  - CIE76
  - Euclid

**d) CPU**

- **6502 Classic**
- 65816 Rapidus

**e) Background**

- **Solid color**

**f) Raster**

- Restart at next line
- Predication

**g) Offset**

- **+0 cycle**
- +1 cycle
- +2 cycle
- +3 cycle
- +4 cycle
- +5 cycle

#### **4c) PALETTE**

The color palette is used to remap the PNG source image (INPUT). At most, the program will convert such an image to 128 colors of the selected ATARI XE/XL palette and it will undergo further conversion.

In addition, you can choose how to evaluate the COLOR DISTANCE: YUV, CIE76, Euclid.

The COLOR DISTANCE parameter determines the most accurate match of the PNG image color to one of the 128 colors of the selected ATARI XE/XL palette. YUV, CIE76 are usually the best choices, with CIE76 being the most computationally intensive.

#### **4e) BACKGROUND**

The SOLID COLOR parameter decides about uniform background color. By default it is enabled, i.e. the background color register (\$D01A) is not taken into account during conversion, the screen edges on the right/left side are of solid color.

Disabling this option will make the background color change, this can increase the pixel color matching by ~1%. For this variant, it is then useful to have bullets on the right/left side of the screen to mask the background color changes (the OUTPUT.ASM file sets up bullets to mask the screen edges).

#### 4f) RASTER

The RESTART AT NEXT LINE parameter is disabled by default. It is only applicable for MODE = PIXEL 2x1 (GRAPHICS 15). Enabling this parameter will compute three new values of the color registers \$D016, \$D017, \$D018 for each successive line of the image (only three changes per line are available). Most often, this increases the degree of pixel color matching by ~2-3%.

Enabling this option is most profitable for the DLI and PGR modes of the G2F program, for the other modes GED+, GED-- it will take 3-y changes per line making additional editing in the G2F program much more difficult or impossible.

The PREDICATION parameter is off by default, it allows to noticeably improve the degree of pixel color matching. It is not applicable to the DLI mode of the G2F program.

#### 4g) OFFSET

Additional change to add 0.5 CPU cycles (graphic 2b), each additional CPU cycle is an offset of the color change in the line, thus changing the quality of the pixel color match. It does not apply to the DLI mode of the G2F program, nor to the 65816 CPU.

### 5. ADVANTAGES AND DISADVANTAGES

The main use of the program is to create colored graphics without PMG (Player/Missile Graphics), you can see it below on the attached example. A picture made by Powrooz/Agenda that uses PMG can be presented very accurately without PMG, which means you can further colorize such graphics or use free PMG for other purposes: scroll, effect on PMG, PMG multiplexer etc.



The disadvantage of course is the higher CPU usage which is involved to change the color registers in line, to reduce the CPU usage we need to reduce the number of image lines displayed.

Many graphic designers often bypassed the G2F program modes with the raster program (GED+, GED--) because of the assembler knowledge required. With ARJ, the raster program will no longer be so difficult to tame :)