Paths to SVG & GCODE
Instruction Manual
For Adobe Illustrator

Script version : v1.0
Document date : 20240116

Page
1/4

Introduction :

This script was created to ease the process of creating packaging mock-up with laser engraver from a diecut created with Adobe Illustrator. It works paired with the template Corius_SVG_GCODE_for_LASERGRBL.ait

The script addresses the issue of Illustrator natively exported SVG files not always compatible with LaserGRBL. The SVG generated with this script are only converting path stroke (no text, no fill, no stroke effect like dash, no color accuracy) with the only purpose to import them into LaserGRBL (they may work with other GRBL software though).
It also export directly into GCODE files supporting parameters from Illustrator file like laser power, feed speed and number of pass.

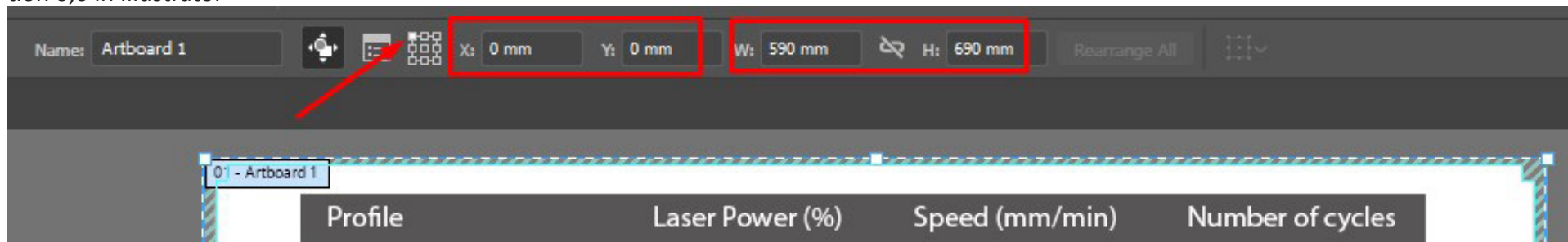The scipt was developped in Javasrcript, with Adobe ExtendScript Toolkit CC.

Usage principle :

The script will use the paths from the 3 main layers "CUT", "FOLD" and "TEST" to generate SVG files as well as GCODE files (.nc file extension) which can both be loaded into LaserGRBL software. The main GCODE parameters can be changed directly from the Illustrator template on the "GCODE_PARAMS" layer.

Template configuration :

The first thing to do is to configure the template accordingly to your laser engraver, and save it back into a template file (.ait) so you don't have to configure it each time you need to create a new diecut mock-up.

   The Artboard : make sure your artboard is set to the maximum engraving width/heigh of your engraver, and that the top left corner is at the x,y position 0,0 in Illustrator

Paths to SVG & GCODE
Instruction Manual
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Script version : v1.0
Document date : 20240116

Page
2/4

The margein : if your laser engraver is like mine, i.e a D.I.Y. kind with poor cable management you may need a security margein on the side to prevent some issue like cable pinched between the engraver frame and the motor, preventing the laser head to go fully back to the 0,0 position, resulting in a botched laser cut. In this case, prepare the "Margein" layer to make obvious the usable area. The script will simply ignore this layer, so don't use it to prepare your diecut. When your "Margein" layer is finished, lock it so you won't mess it up afterward.

The "GCODE_PARAMS" layer : I already prepared some material profiles in this layer. You will obviously need to adapt and/or create your own profiles here. The settings are all the GROUPS of textfields in this layer, except the group "TABLE". Here is how it works :
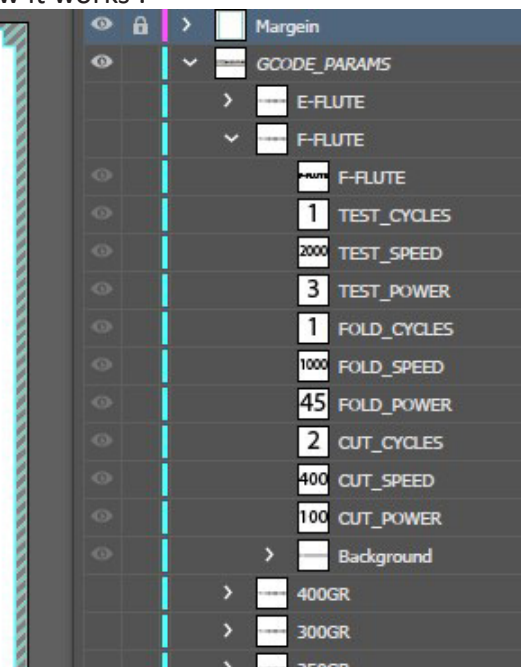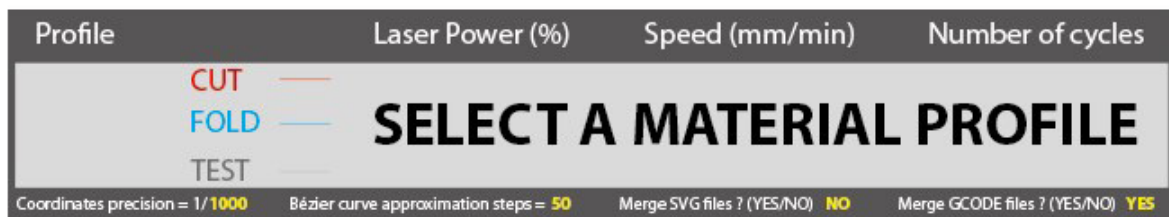
In this layer the group "TABLE" must remain named exactly as is, and all the items in it must remain with their own names. The other groups can all be re-named or deleted except at least one. They are the material profiles. Name the groups accordingly to the materials you will use. If we look at the group "F-FLUTE" for example, this name is the cardboard I often do mock-up with. This group contains a text "F-FLUTE" (this textfield can be named or not it doesn't matter, this is just the text to display in the artboard), and 3 sets of 3 named textfield. The text they contain are the laser power, the feed speed, and the number of cycles to do for each one of the 3 "engraving" possibilities : CUT, FOLD, TEST*. All these textfield must keep their own names (the script will search these names to extract the values they contain to set the GCODE properly).
If you need to create a new material profile, simply duplicate an existing group, like "F-FLUTE" for example, rename it properly, change the displayed text and set its 3 sets of 3 parameters.

Paths to SVG & GCODE
For Adobe Illustrator

Instruction Manual

Script version : v1.0
Document date : 20240116

Page
3/4

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*: The meaning of CUT is obviously to cut through the material. FOLD is a partial engraving : we can't create a crease to properly fold the cardboard with a laser, we can only engrave it more or less. This setting needs proper adjustment : too much power and/or too slow feed and the cardboard will almost fall apart, not enough and the folding line won't even be visible and won't help to fold the cardboard. The "TEST" is added as a way to just check if the CUT/FOLD will be completely in a usable material area : when you reuse leftover material you often have various shape and size, it can be usefull to run a test cut at very low power (so it won't cut anything) just to check the laser head position and if it fits into the usable material area. This is in fact an upgrade of the LaserGRBL function available by clicking its "Frame" button which will only do a rectangular frame for this test.

The 3 colored lines beside the displayed texts "CUT" "FOLD" "TEST" are used to create the path color in the exported SVG files. Note : the template is in CMYK color mode, and SVG files are in RGB. The color conversion from the Illustrator file to the SVG with this script is very basic and far from accurate.

The bottom line of the TABLE contains 4 settings you can change :
        Coordinates precision : by default 1/1000th, so x,y coordinates in SVG and GCODE will be rounded to the 1/1000th. You might need to change this to 1/100th or 1/10th if your laser engraver can't take as precise inputs.
        Bézier curve approximation steps : to maximize compatibility the curves are converted into straight segments. If you have very long curves you might want to incrsease the steps count, otherwise 50 is already plenty.
        Merge SVG files : by default, NO. The script will export 1 SVG file per used main layer (CUT, FOLD, TEST). If changed to YES, the script will export 1 file combining CUT and FOLD layer, and 1 file if needed for TEST layer.
        Merge GCODE files : by default, YES. The script will export 1 GCODE file combining CUT and FOLD layer, and 1 file if needed for TEST layer. If changed to NO the script will export 1 GCODE file per used main layer (CUT, FOLD, TEST).

Save your template as a new template when you're done with all the settings.

Diecut creation :

you can use the layer "draft" to create any shape/size/guide to help you achieve the proper diecut, as this layer wil be disregarded by the script. Draw any cut through path on the "CUT" layer, any folding line on the "FOLD" layer, and if needed you can also draw the rough footprint of the whole diecut on the layer "TEST" just to check the area with the engraver before really starting the laser cutting job. These 3 layers are presetted with 3 different stroke colors, but the colors are meaningless anyway as the exported SVG will use whatever colors you defined for the 3 short lines in the table.

When the whole diecut is complete, in order to create the corresponding SVG and GCODE, you need to "select" the material preset to use by simply unhiding the corresponding group in the "GCODE_PARAMS" layer and hiding the others.

Paths to SVG & GCODE
For Adobe Illustrator

Instruction Manual

Script version : v1.0
Document date : 20240116

Page

4/4

Run the script :

The script file should be copy/pasted into the folder : C:\Program Files\Adobe\Adobe Illustrator 2022\Presets\en_US\Scripts
(Change the red text according to your Illustrator version and language), then you can run it by going into Illustrator menu : File > Scripts > Diecut_To_SVGand-GCode

The script will export SVG files and GCODE files in subfolders "SVG\" and "GCODE\" of your illustrator file.
The files names wil be : [the ai file name]_[material]_[CUT or FOLD or TEST or CUT+FOLD].
If your material profile is setted with "Number of cycles" > 1 then the GCODE will baked in as many run as this number for the corresponding CUT or FOLD or TEST layer whole paths (this last one shouldn't need to be >1 though).

Copyright and stuff :

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