EPILOG Helix Laser Cutter Guide

Systems Cyber

December 22nd, 2020

Introduction

The Systems Cyber Research Group owns a laser machine capable of cutting and engraving acrylic, wood, plastic, glass, and other materials [1]. It is located in the CSU Powerhouse Energy Campus garage bay and has the following specifications:

Make: Epilog
Model: Helix Mini 24
Model Number: 8000 Laser System
Serial Number: 8040 2024 8032 418R
CSU Asset Number: 331 289
Date of Manufacture: May 2020
Acquisition Date: May 2020
Engraving Area: 24" x 18" (610 x 457 mm)
Laser Wattage: 30, 40, 50, 60, or 80 watts

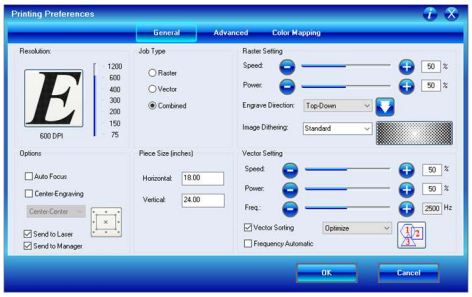
This is a quick guide to using the Helix in a manner that is safe for both the operator and the machine. More information, including in-depth training from Epilog [5], can be accessed via the links provided in references section.

Part 1. Connect PC to Helix and Power ON

a) With the Helix turned off, connect USB from PC to the Helix.
b) Power on the Helix using the switch located on the lower left of the device. Wait a few moments for it to boot-up.
c) For Windows devices open **Control Panel > View Devices and Printers.**
d) If this is your first time connecting your PC to the Helix, the new device should be available under the **Unspecified** section of Devices and Printers.

Part 2. Installing the Epilog Driver

The laser cutter requires a special driver in addition to the printer drivers already installed on Windows. Skip this part if you have already installed and updated the Epilog Driver.



The Epilog Driver Window

a) Download the driver executable file for the 'Mini18/24 Helix' from the Epilog Laser Firmware and Driver Downloads page [2].
b) Run the executable file, copy the path to clipboard for later use, and select 'Unzip'.

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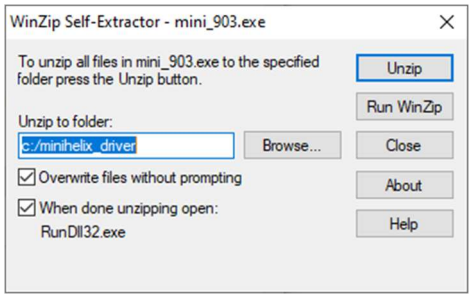


Executable Window

c) Open Windows **Control Panel > View Devices and Printers.**
d) In the **Unspecified** section of Devices and Printers, right click on the laser's icon, then click **Properties.**
e) Select the **Hardware** tab.
f) Select the device **EpilogEngraver**. Then click **Properties**.
g) Click **Change Settings.**
h) Click the **Driver** tab.
i) Click **Update Driver….**
j) Click **Browse my computer for driver software.**
k) Click the **Browse** key to direct your computer to the driver path **OR** paste the driver path copied from step b (C:/minihelix_driver).
l) Once the proper path has been entered click **Next.**
m) Wait while until the progress window disappears, then you may be asked if you want to install this driver. Click **Always trust software from "Epilog Corporation"** then **Install**.
n) Your Epilog Laser Print Dashboard has been successfully installed on the USB port. Click **Close**.
o) Exit out of previous windows until you see your driver in the Devices and Printers page. Exit this window and you are ready to print!

Part 3. Select a Graphics Editor and Create a Design

There are many graphics editors available that are able to produce graphics and patterns that can be cut or printed to the Epilog. Some of the most common are provided in table X. This guide will use *Inkscape* to demonstrate how create designs that use the Helix's etching (**raster**) cutting (**vector**) capabilities. It which is available for free online [4].

	Open Source
CorelDRAW	
Photoshop	
Gimp	x
Adobe Illustrator	
Inkscape	x
EngraveLab*	

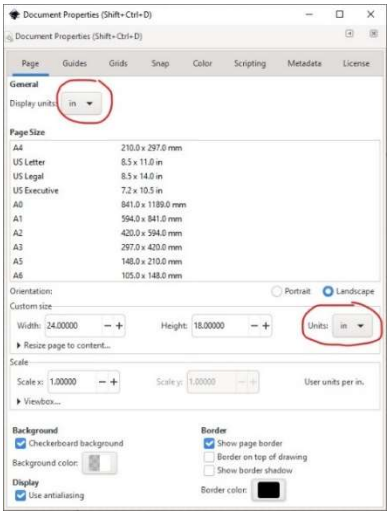
**CD-ROM came with Helix and is availble in the lab*

Common Graphics Software

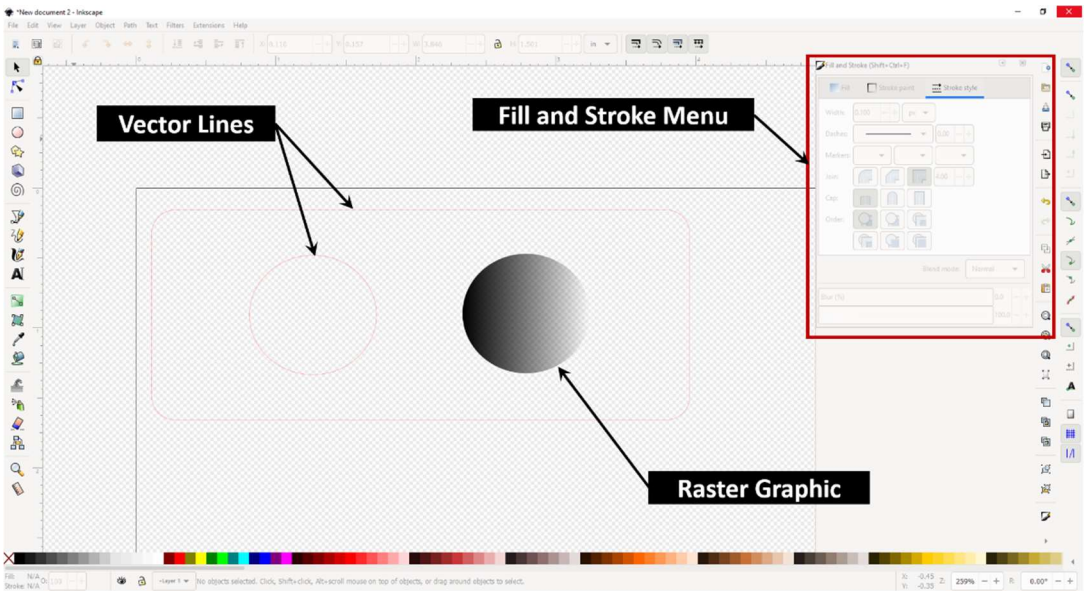
The primary difference between raster and vector graphics is that raster graphics are composed of pixels, while vector graphics are composed of paths or lines. When the Helix is given a vector, it will switch its power settings and follow the path of a line producing a cut in the material. When the Helix is given a raster, it will switch its power settings and etch in a pattern similar to that of a normal ink printer

from left to right. This will produce an etch assuming the power settings aren't set too high. The following instructions will show how to make a raster line and a vector line in Inkscape.

a) Download Inkscape.
b) Open Inkscape, start a new file and go to **File > Document Properties**.
c) Under the page tab set the general display units to **inches**.
d) Change the custom size to **24 x 18 in**.
e) Change the Scale x to **1**.
f) Adjust the **Background, Border, and Display Settings** as desired and close the window.



Inkscape Document Properties Window



Vector Lines, Raster Graphic, and Fill and Stroke Menu

g) Select the square tool and create a 1x2 inch rectangle. (If the rectangle is not visible, change the color by selecting the object and clicking any color at the bottom of the window.
h) Adjust the rounded edges with the edit nodes tool .

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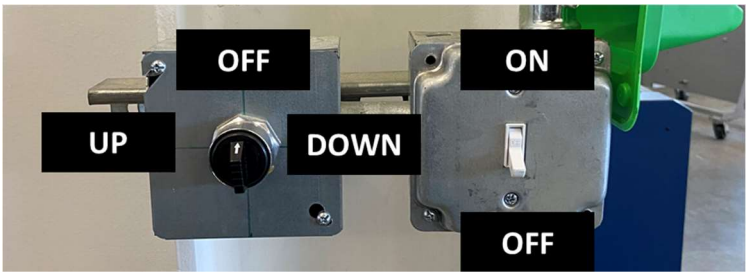
i) Using the circle tool , create two circles as shown.
j) To turn one circle and the rectangle into vectors, select both objects (hold Shift) and go to **Object > Fill and Stroke…**
k) Adjust the **Fill** settings to **No paint**
l) Adjust **Stroke paint** color to RGBA "**ff0000ff**". (any color is fine but red is very visible)
m) Adjust **Stroke style** width to **0.1 px**. (Any value 0.00 < x < 0.01 will be interpreted as a vector).
n) To turn one circle into a raster, select the other circle, and go to **Object > Fill and Stroke…**
o) Adjust the **Fill** settings as desired. Do not select No paint.
p) Adjust **Stroke paint** color as desired or none.
q) Adjust **Stroke style** width to **any value > 0.1px or to 0px.**
r) Save the graphic as a PDF. Accept any default settings.

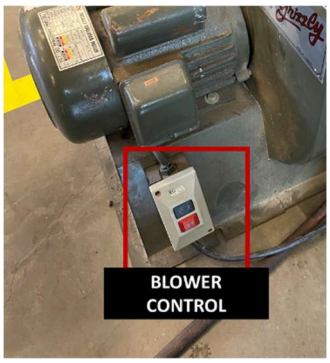
Part 4. Prepare Laser Cutter

a) Open the laser hood and ensure the bed is free of debris.
b) Lower air duct using switches located near the left of the Helix and fasten it to the blower output.



Air Duct Control Switches

c) Turn on the facility air duct and the blower.



Blower ON/OFF Switch

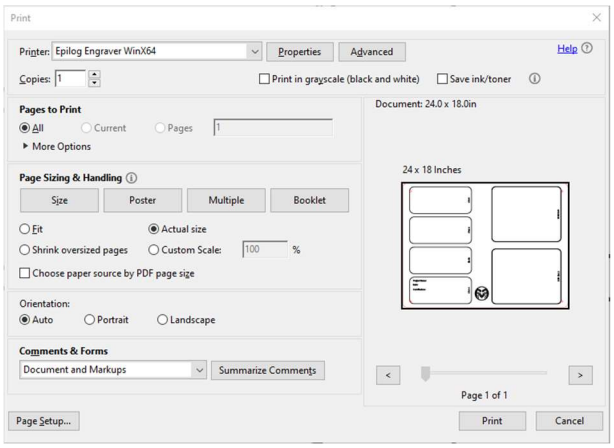
d) Connect to PC to Helix via USB.
e) Turn on the laser cutter.

Step 5. Send Design to Printer and Cut

a) Open your design in Adobe **Acrobat Reader*** (highly recommended)
b) Open the Epilog Driver Window, **File > Print > Properties**
c) To select the appropriate settings for your print, consider the following:

I. Is the graphic made of only vectors? Select **Vector** job type.
II. Is the graphic made of only raster illustrations? Select **Raster** job type.
III. A combination of both? Select **Combined** job type.

d) Select **Auto-Focus** on.
e) (Optional) Set **Piece Size** to 24 x 18 in to use the entire bed.
f) Adjust **Vector Settings** (Speed, Power, Frequency) depending on the material**.
g) Click **OK**.
h) In the Adobe Print Settings change Orientation to **Auto.**



Adobe Acrobat Print Settings

i) Select **Actual size**.
j) Deselect **"Choose paper source by PDF page size."** Dimensions should match those of the PDF file.
k) Click **Print** to send the job to the printer.
l) Find the sent the job and press **Start** button.

Important Buttons on the Helix

m) Inspect the job as it starts. Stop, adjust, and reset as needed.
n) Allow the smoke from the cut to be evacuated well after the job has been completed.

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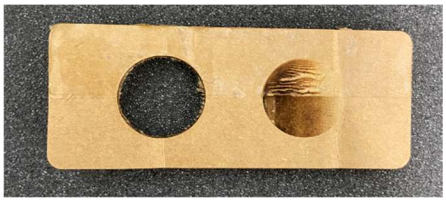

Example Design Applied to Scrap Piece of Cardboard

**Adobe Acrobat Reader seems to be the only program that generates the right output to the Helix when given a PDF*
***Material settings can be found through [5] or through trial and error. In the future a table can be made for use by the Systems Cyber group.*

Step 6: Shutdown and Cleanup

a) When all smoke has been cleared and all jobs have been completed, turn off the air duct and the blower.
b) Disconnect air duct and raise it.
c) Turn off the Helix.
d) Clear the table of debris.
e) Clear debris from under the table. Accessible by lowering front panel.

References

[1] Mini Helix Promotional Webpage, epiloglaser.com/laser-machines/mini-helix-engraver-cutter/
[2] Epilog Driver Webpage, epiloglaser.com/tech-support/epilog-drivers.html
[3] Mini Helix Driver installation Guide, epiloglaser.com/assets/downloads/driver-instructions/mini-helix-driver-install.pdf
[4] Inkscape Website, inkscape.org
[5] Epilog In-Depth Training (must request access), www.training.epiloglaser.com/login.php

Recommended Vector SPF Settings for Materials:

Coming Soon!

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