

QUICK-START FOR
UNIVERSAL VLS 4.6

LASER!

FRESH 21 SEPTEMBER 2017

The laser is quite safe to use,
but it is powerful; using
it requires your full caution,
attention and respect.

Some rules of the road:

Rules of the road

If you're not sure...

DON'T!

Get the help you need,
even if it means waiting.

Rules of the road

Don't bypass or disable any
of the safety features.

(I'm not sure how or why
you would, but art students
do strange things.)

Rules of the road

Work in pairs. It always helps
to have a second set of eyes
in case you miss a detail.

Rules of the road

Never leave the laser
unattended while cutting.

If your material catches fire,
the laser will shut down, but
that doesn't put the fire out...

Rules of the road

Know where there fire
extinguisher is located.

(As you enter the room, it's
right next to the door.)

Rules of the road

Bring extra material for testing.

Especially if you are new to the laser, or are trying a material you've never used before, it may take some trial and error to get the settings right.

Rules of the road

Only use safe materials.

Not sure if the material you
want to use will generate
poisonous gasses? Ask your
faculty BEFORE cutting.

GOOD

Material	Raster Engraving	Vector Engraving	Vector Cut
Corrugated Cardboard	OK	OK	OK
Uncoated Paper	OK	OK	OK
Chipboard/Matboard/Museum board	OK	OK	OK
Resale Acrylic	OK	OK	OK
Interior Plywood	OK	OK	OK
Balsa Wood / Basswood	OK	OK	OK
Hardwoods (Domestic Only)	OK	OK	OK
Arries Board (Resale MDF)	OK	OK	OK
Masonite	OK	OK	OK
Resale Cork	OK	OK	OK
Resale Vegetable tanned leather	OK	OK	OK
Resale Muslin	OK	OK	OK
Unmounted Linoleum	OK	OK	OK

BAD

Material	Banned Reason
PETG, PET	Along with other emissions, is known to emit Benzene which is known to cause cancer.
Polystyrene	Known to emit styrene fumes.
ABS	Emits cyanide gas and tends to melt.
PVC	Emits chlorine gas during a cut.
Bending Plywood	Bends into the path of the laser carriage during operation.
Tropical Hardwoods	A lot of tropical hardwoods have toxins in the wood.
Corian	Creates a fine grit inside the laser bed and will grind down equipment
Casting Wax	Melts a lot.
Nylon	Emits toxic fumes.
Vinyl	Emits chlorine gas during a cut
Delrin	Along with other emissions, is known to emit Benzene which is known to cause cancer.
Foamcore	Foamcore is an expanded polystyrene and is known to emit styrene fumes when cut.

The rule of thumb: if you can
burn it with a cigarette lighter,
you can cut it with the laser.

Rules of the road

Clean up after yourself.

If you brought it in with you, take it back out. Store materials and projects in your locker, in your studio, or someplace designated by your faculty. Keep the lab clean and uncluttered.

the laser station

ENGRAVED
WITH A LASER, CAN PRODUCE
TOXIC AND CORROSIVE FUMES. Only use
materials that are approved by faculty.

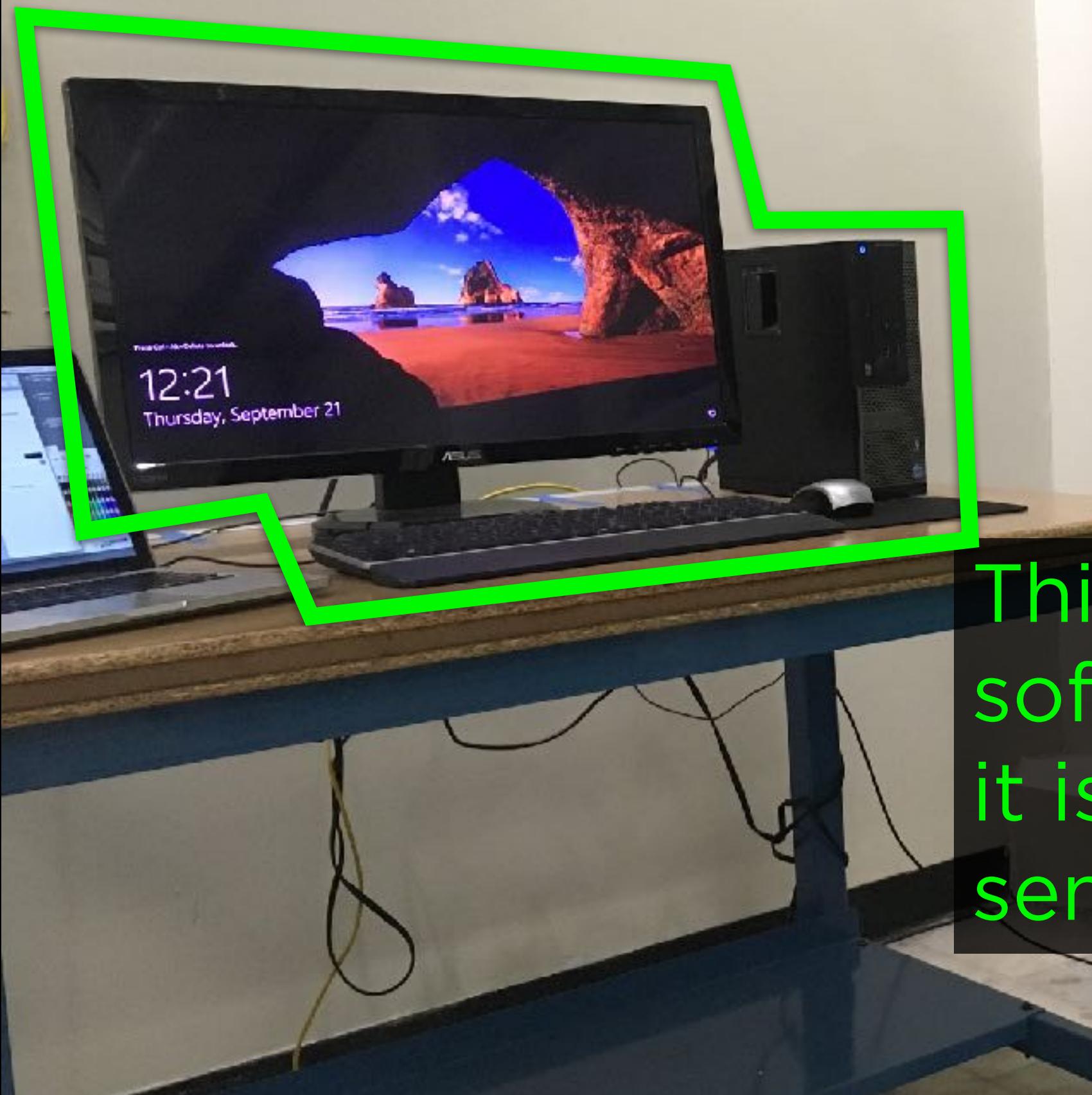


This is the laser.

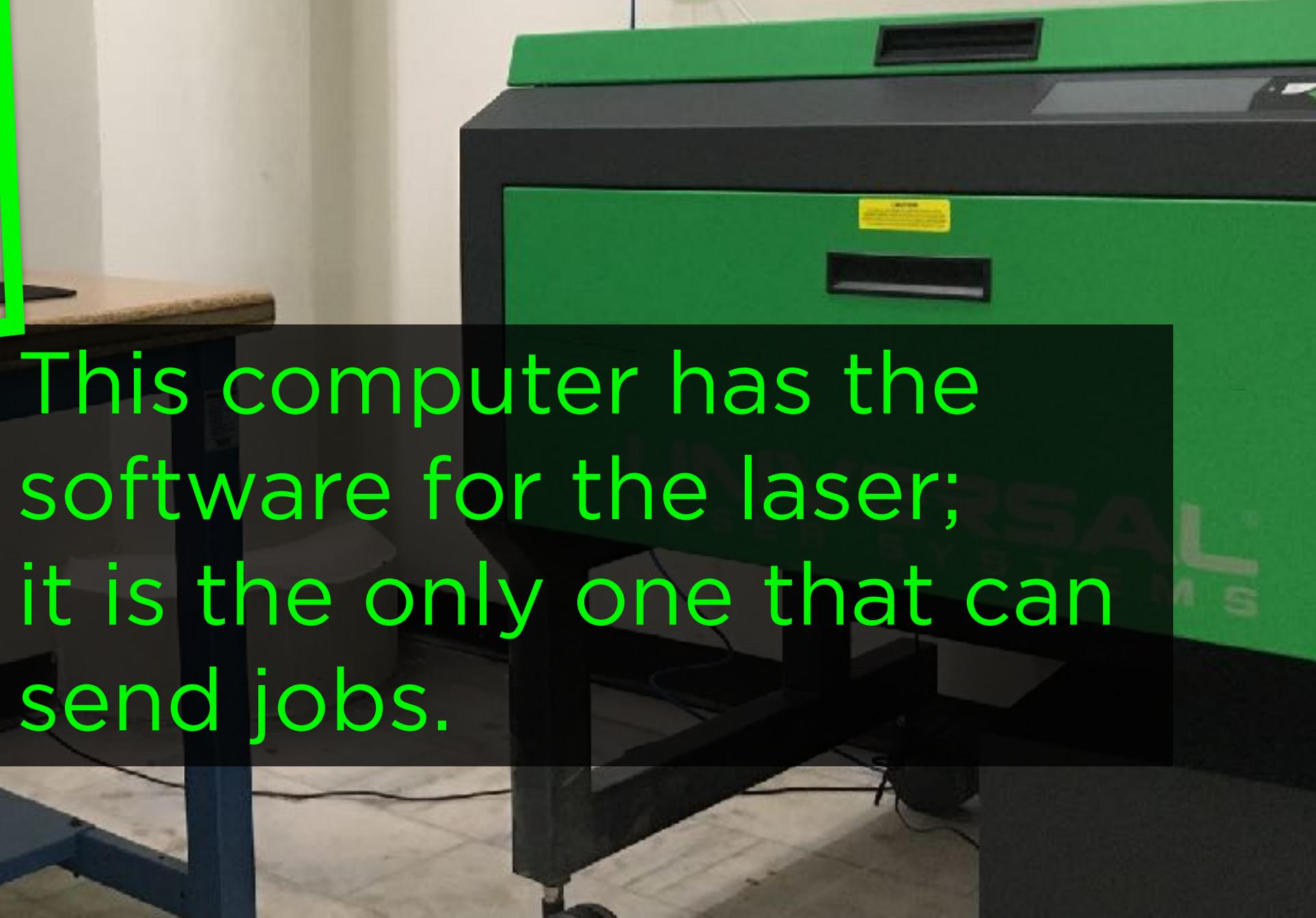
ENGRAVED
WITH A LASER, CAN PRODUCE
TOXIC AND CORROSIVE FUMES. Only use
materials that are approved by faculty.



This device extracts the fumes from the laser while it is running.



This computer has the software for the laser; it is the only one that can send jobs.



workflow

Power on the fume extractor.

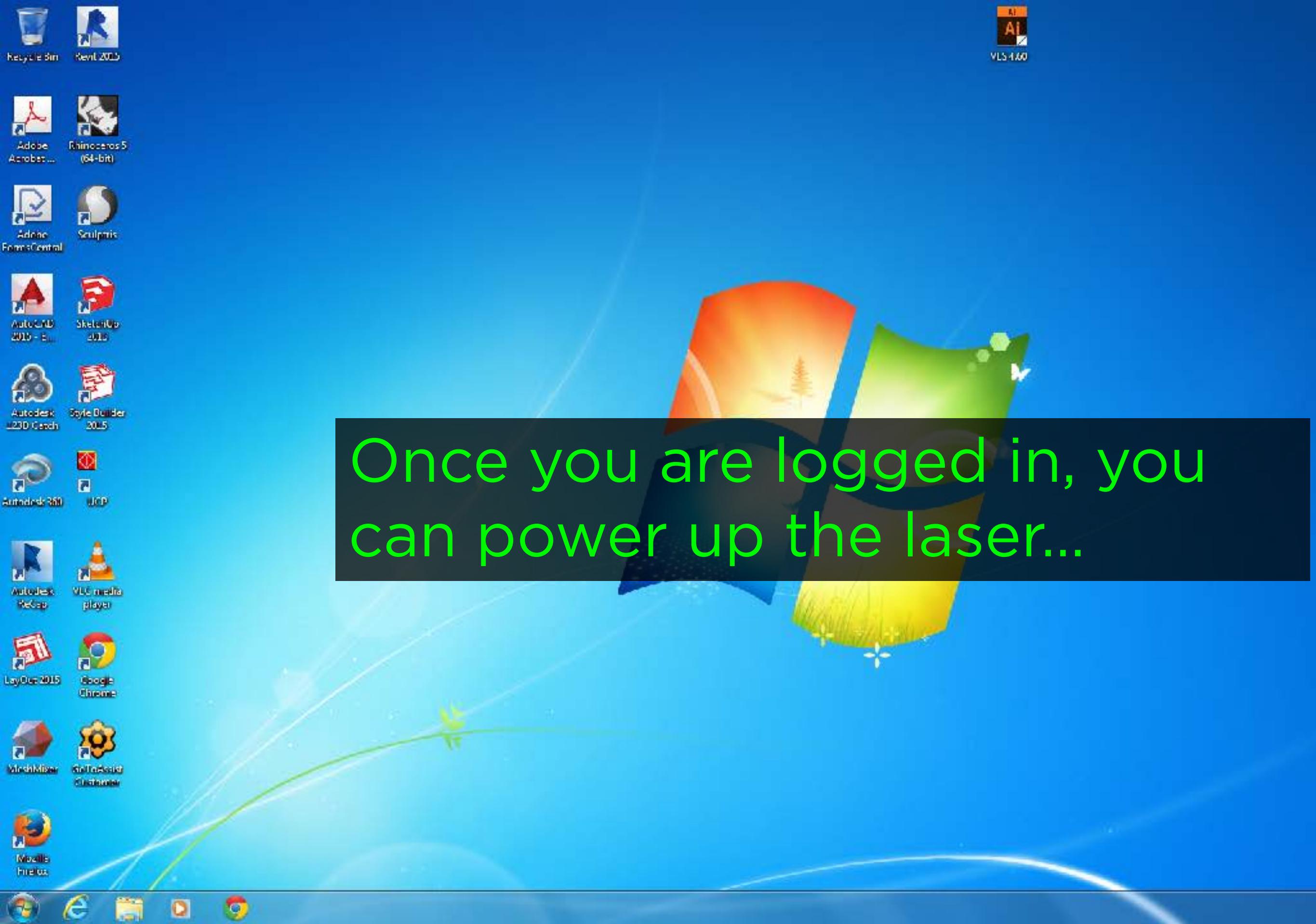


Press CTRL + ALT + DELETE to log on

Log into the laser workstation.



Windows 7 Enterprise



Recycle Bin Revit 2015

Ai VLS 4X0

Adobe Acrobat... Rhinoceros 5 (64-bit)

Adobe FormsCentral Sculptris

AutoCAD 2015 - e... SketchUp 2015

Autodesk 3D Catch Style Builder 2015

Autodesk 3ds Max JCP

Autodesk ReCap VLC media player

LayOut 2015 Google Chrome

MeshMixer AutoAssist Cluster

Mozilla Firefox

Windows Internet Explorer

12:22 PM
9/5/2015

Power on the laser.



For general use, it's easiest to print from **Adobe Illustrator**. We've created an Illustrator **template file** that's set up with stuff that's handy for the laser. Get the template from your instructor, or download a copy from the lab's wordpress blog (more on that later.)

When you open the template,
the document will look
something like this.

- Use RGB red swatch for vector cutting
Set STROKE to 0.01pt
Set FILL to NONE

- Use RGB blue swatch for vector engraving
Set STROKE to 0.01pt
Set FILL to NONE

- Use BLACK swatch for raster engraving
Set FILL to BLACK

It is sized to 18" x 24"
(the size of the cutting table.)

Use RGB red swatch for vector cutting
Set STROKE to 0.01pt
Set FILL to NONE

Use RGB blue swatch for vector engraving
Set STROKE to 0.01pt
Set FILL to NONE

Use BLACK swatch for raster engraving
Set FILL to BLACK

You'll also see some tips.
They are in a non-printing layer.

- Use RGB red swatch for vector cutting
Set STROKE to 0.01pt
Set FILL to NONE

- Use RGB blue swatch for vector engraving
Set STROKE to 0.01pt
Set FILL to NONE

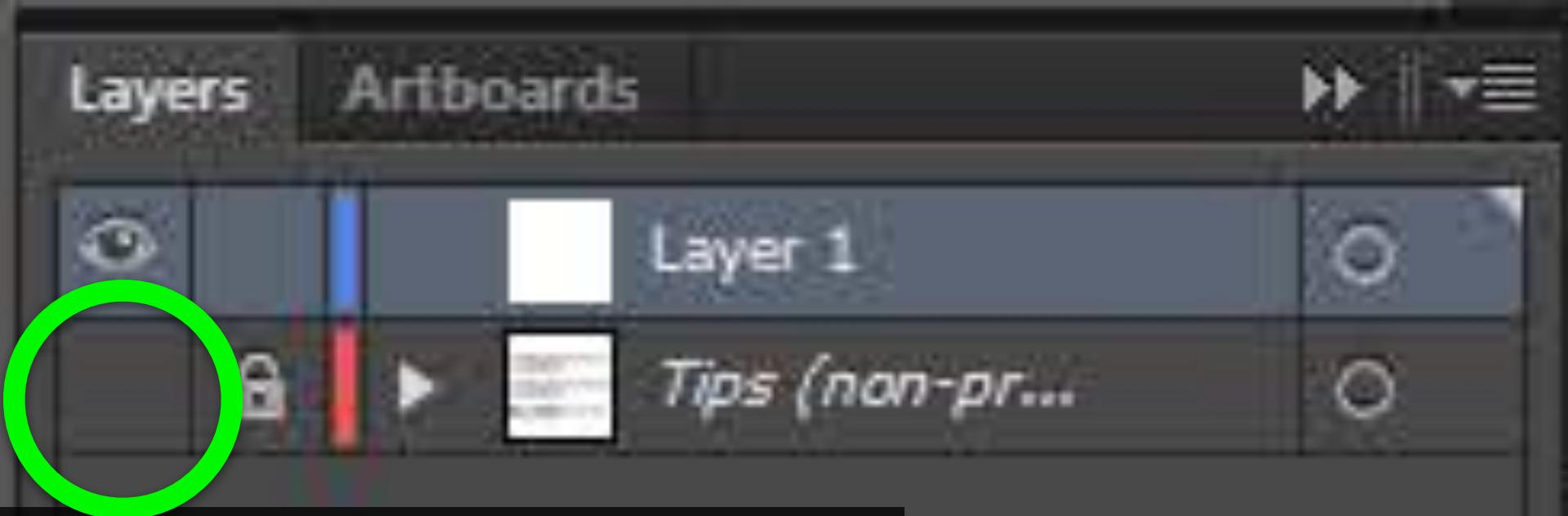
- Use BLACK swatch for raster engraving
Set FILL to BLACK

The tips let you know which specific colors tell the laser to perform specific functions.

- Use RGB red swatch for vector cutting
Set STROKE to 0.01pt
Set FILL to NONE

- Use RGB blue swatch for vector engraving
Set STROKE to 0.01pt
Set FILL to NONE

- Use BLACK swatch for raster engraving
Set FILL to BLACK



You can hide the tips by toggling off the 'view' icon (the eyeball) next to the 'Tips' layer in the layers palette.

The laser can do
three basic things:

- + vector cut
- + vector engrave
- + raster engrave

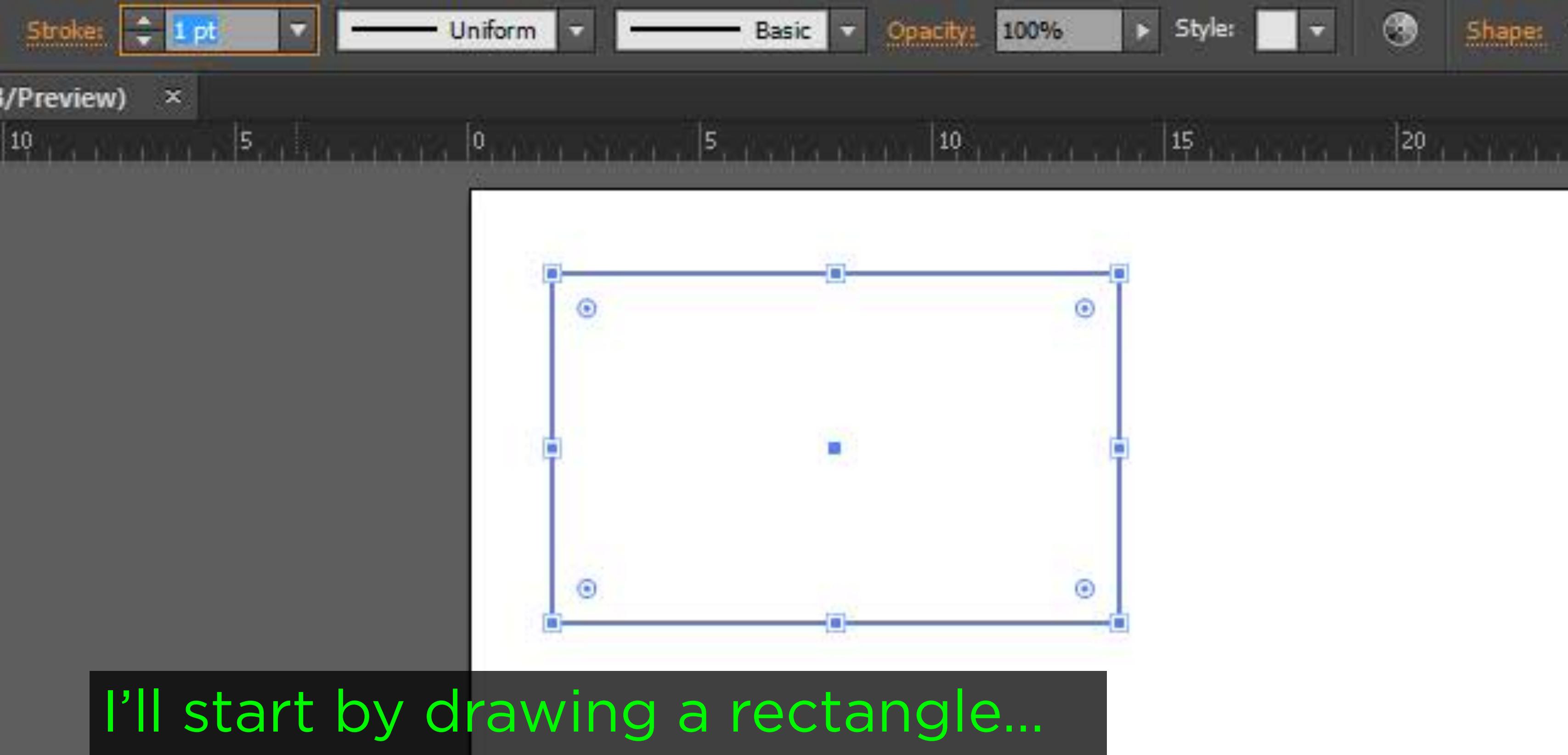
If you want to **cut** clean
through a material, you use
vector art to specify a path
that the laser will follow.

Vector art is typically created
in programs like Adobe
Illustrator.

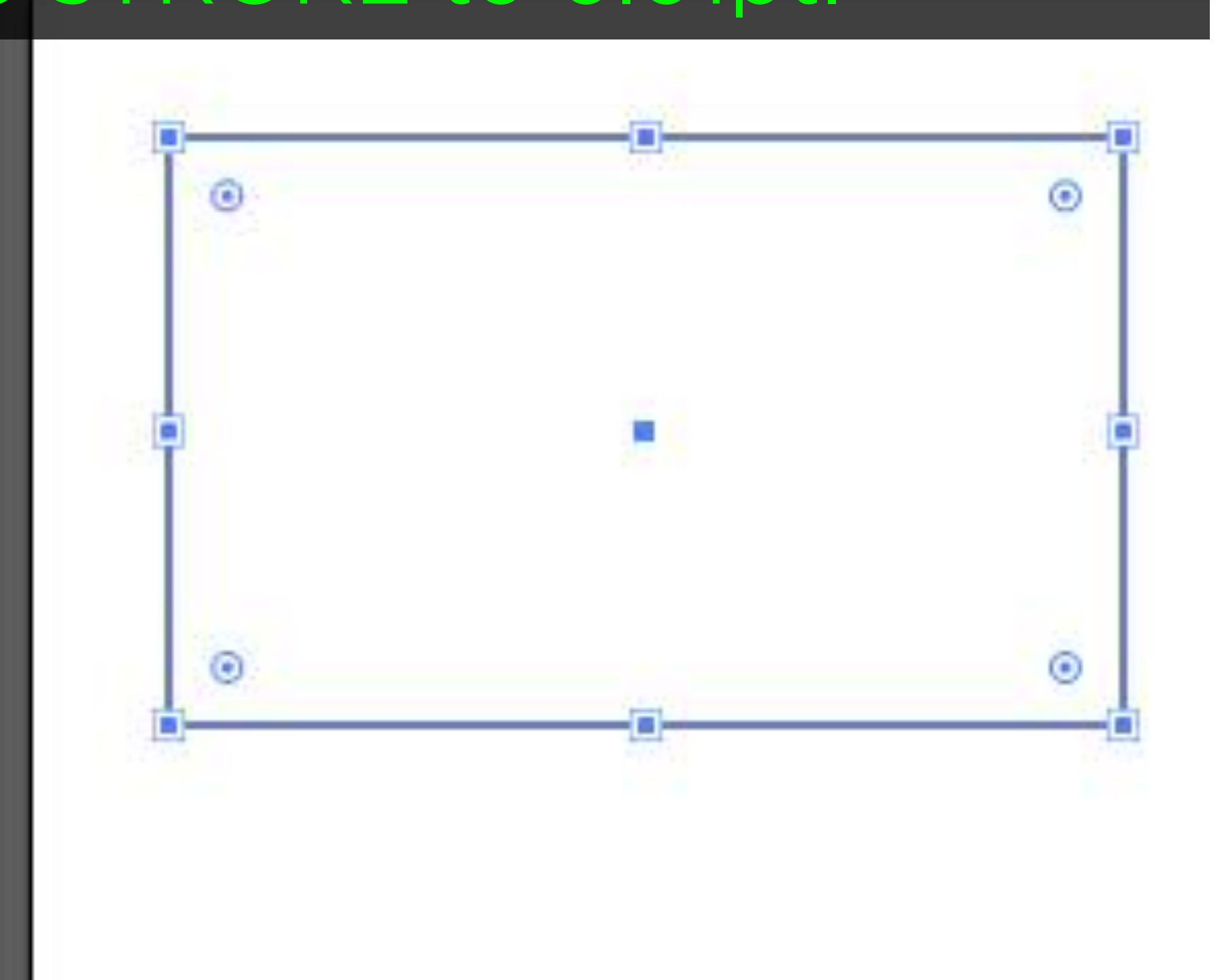
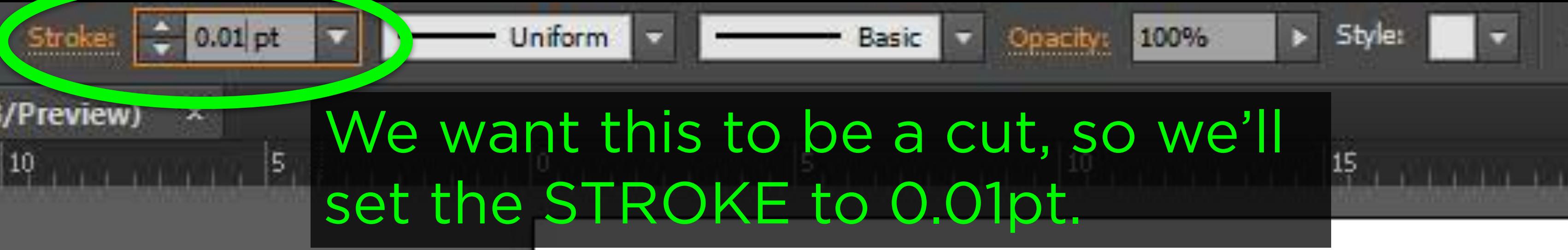
If you want a clean hairline that is engraved on the material, but not cutting all the way through, you will vector engrave. Again, you are specifying a path that the laser will follow using vector art.

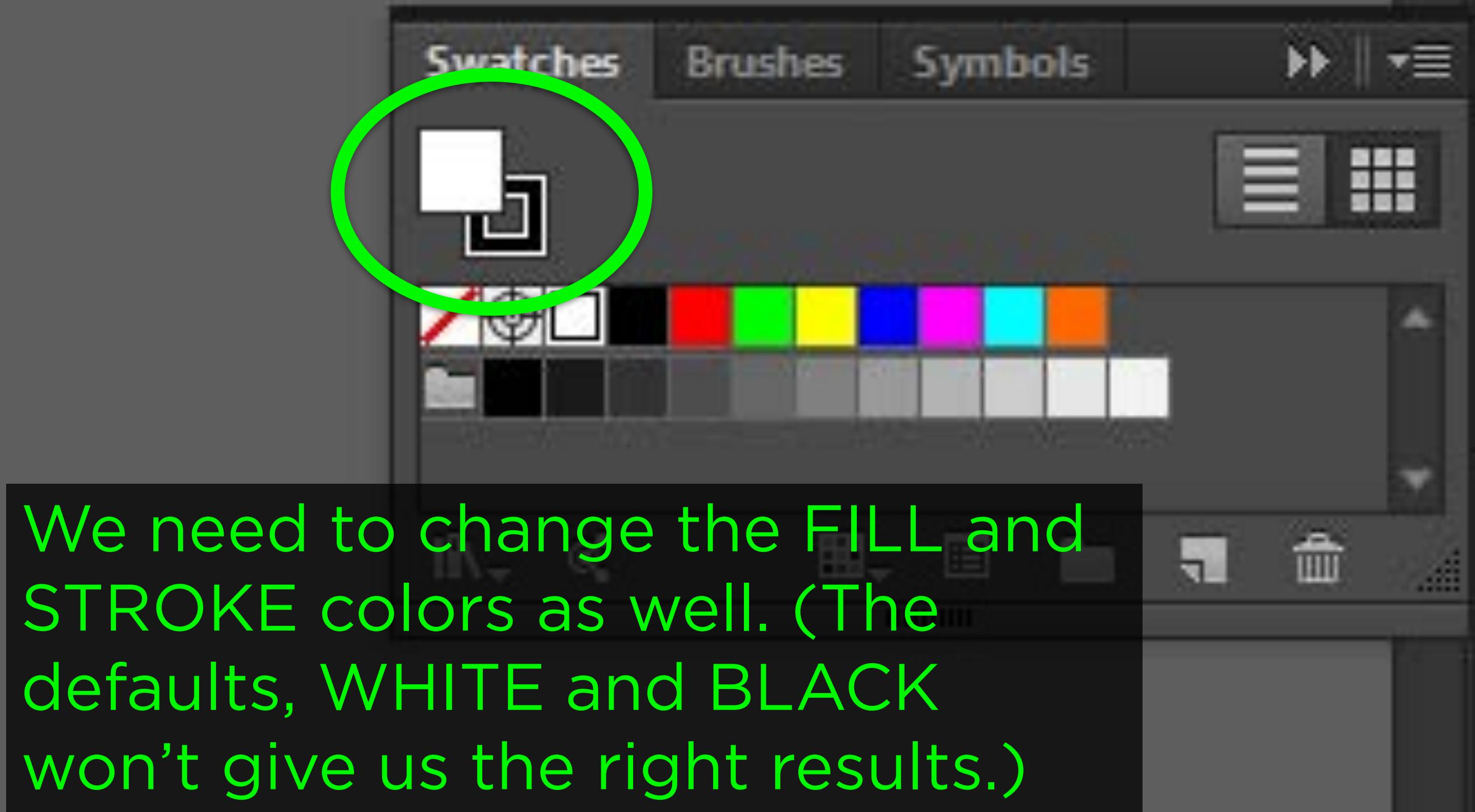
If you want to mark a material with anything other than a hairline without cutting through, you will raster engrave. Any vector art that has a fill, a stroke greater than 0.01pt, or raster art (anything with pixels) will raster engrave.)

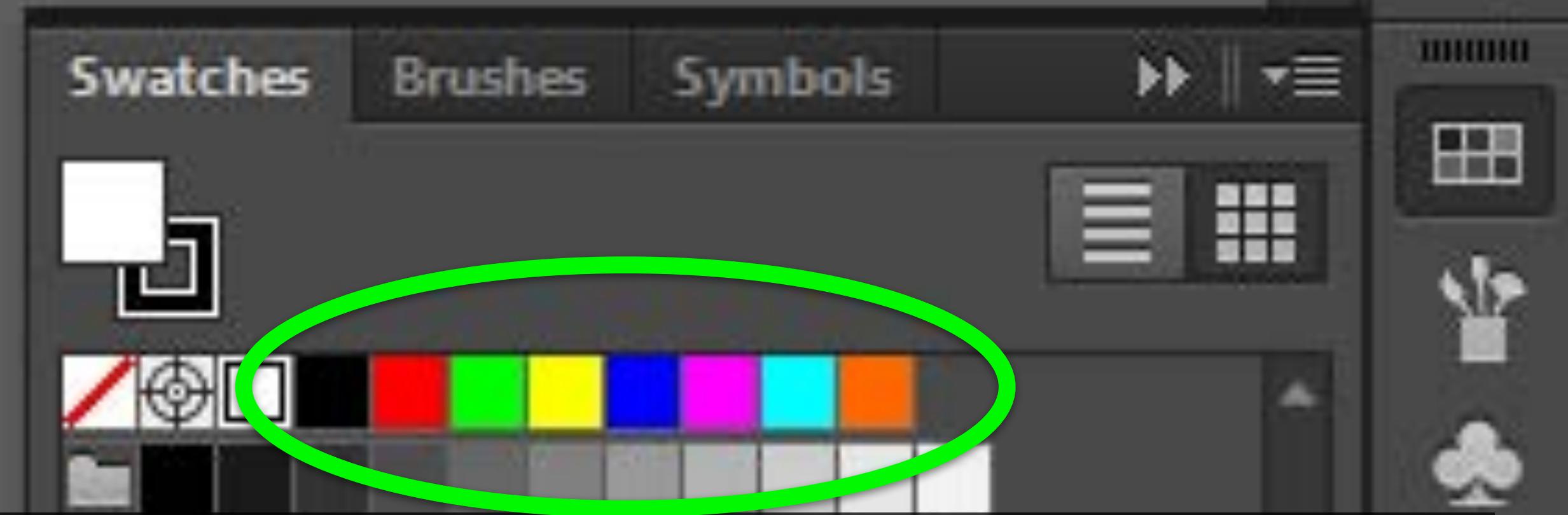
Let's see all three in action...



I'll start by drawing a rectangle...







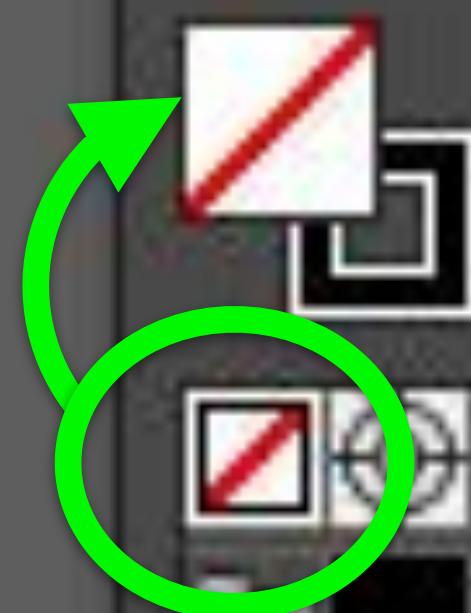
Notice these 8 swatches. These aren't the default illustrator swatches. Rather, we've created these in the template file because they are specific RGB values that the laser software knows. For the purposes of this tutorial, the specific swatches you care about are RED, BLUE, and BLACK.



Swatches

Brushes

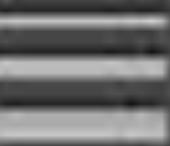
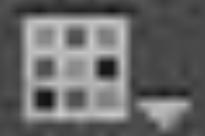
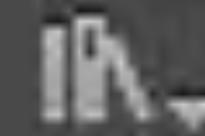
Symbols



For cutting, set the FILL to NONE.

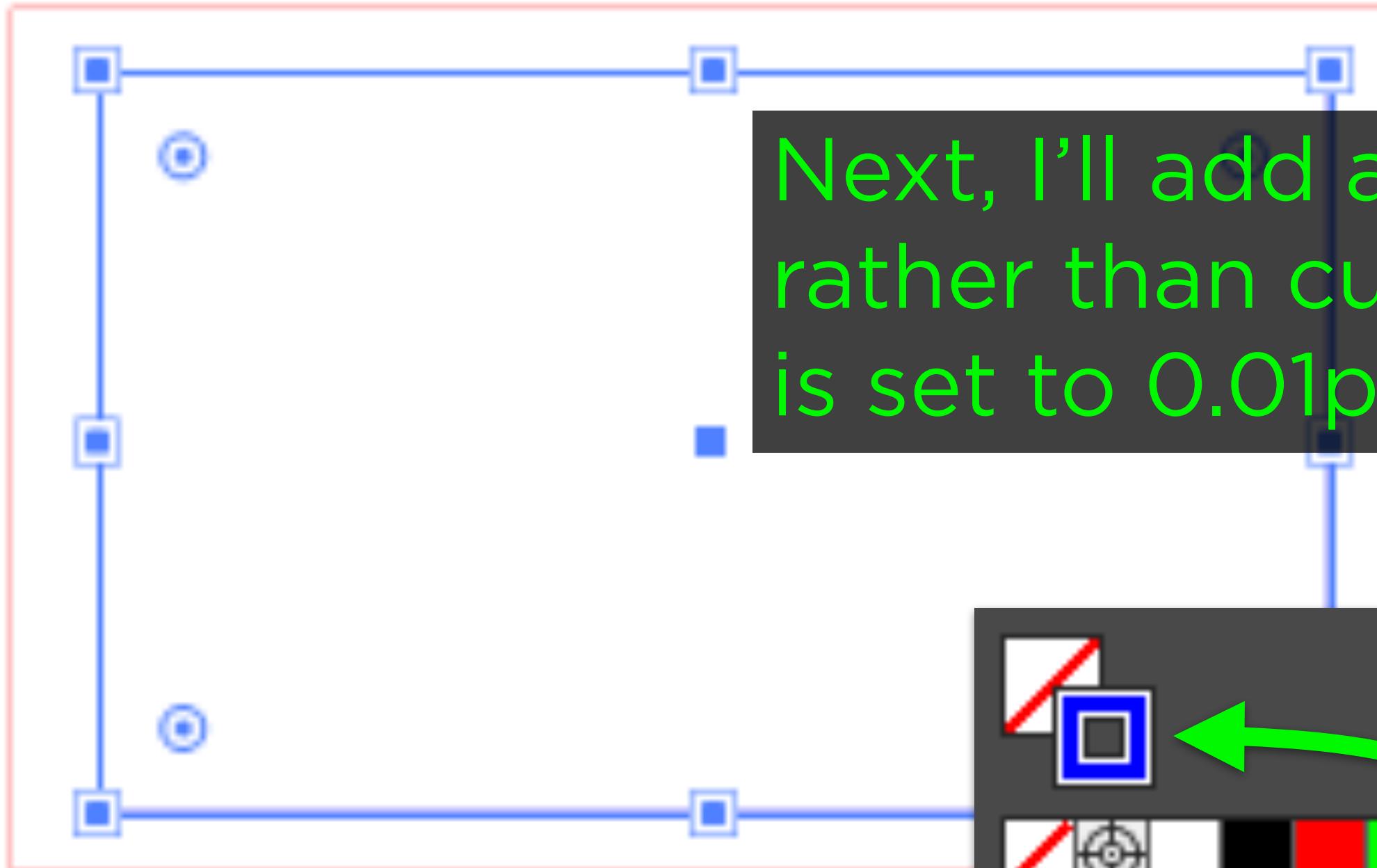


[None]





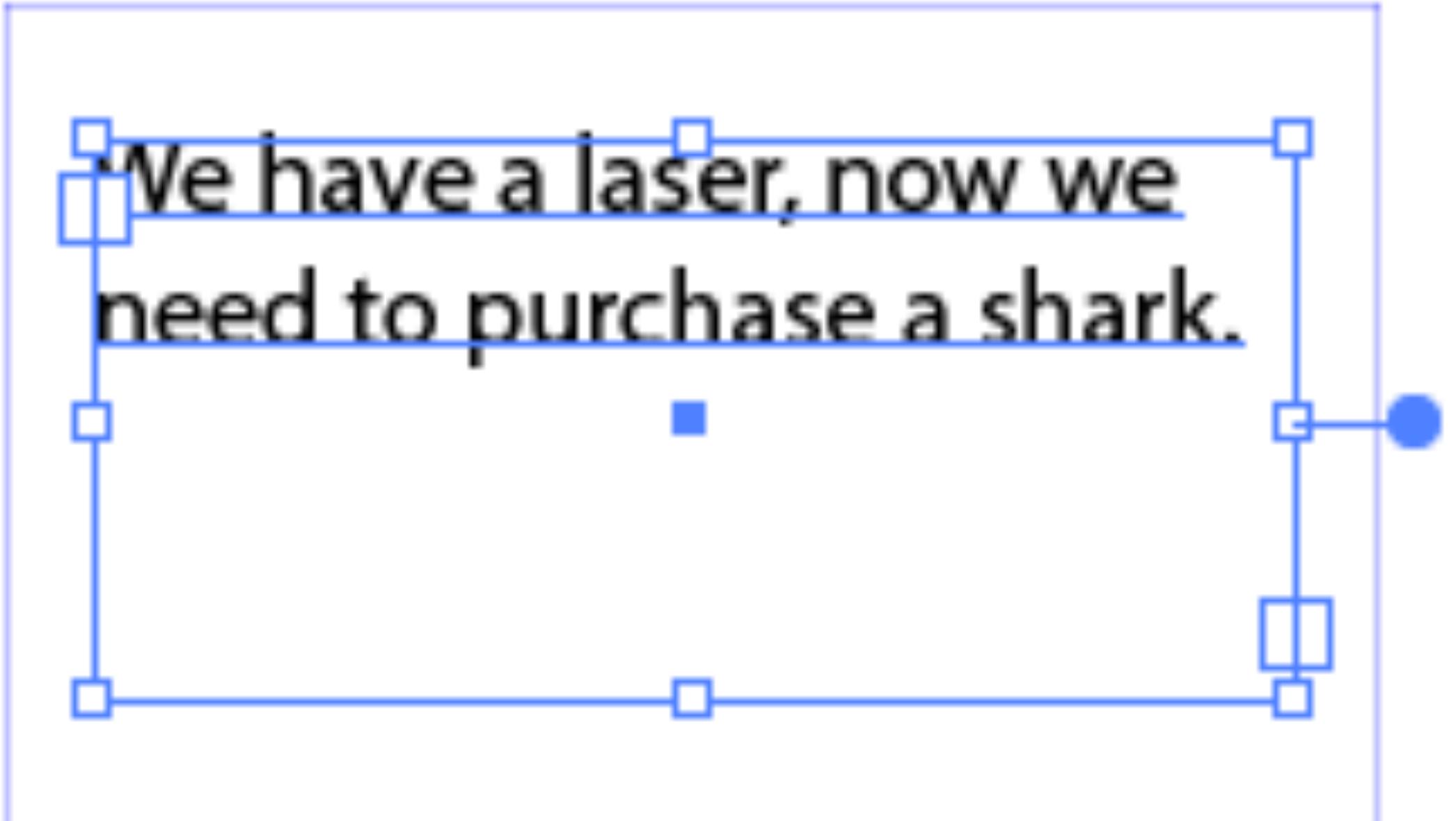
And set the STROKE to RGB RED.



Next, I'll add a path to engrave, rather than cut. The stroke width is set to 0.01pt...



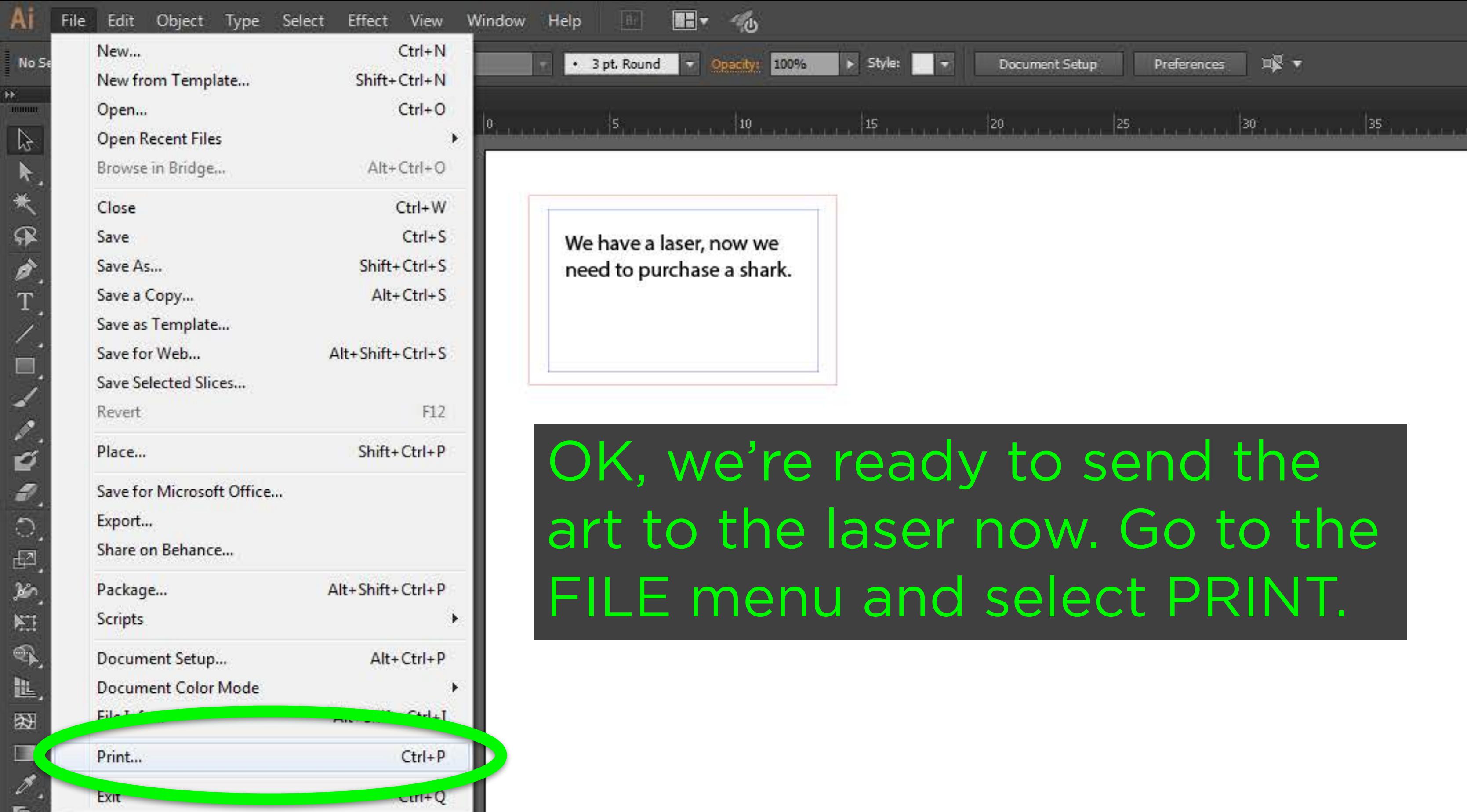
... and set the **STROKE** to RGB BLUE.

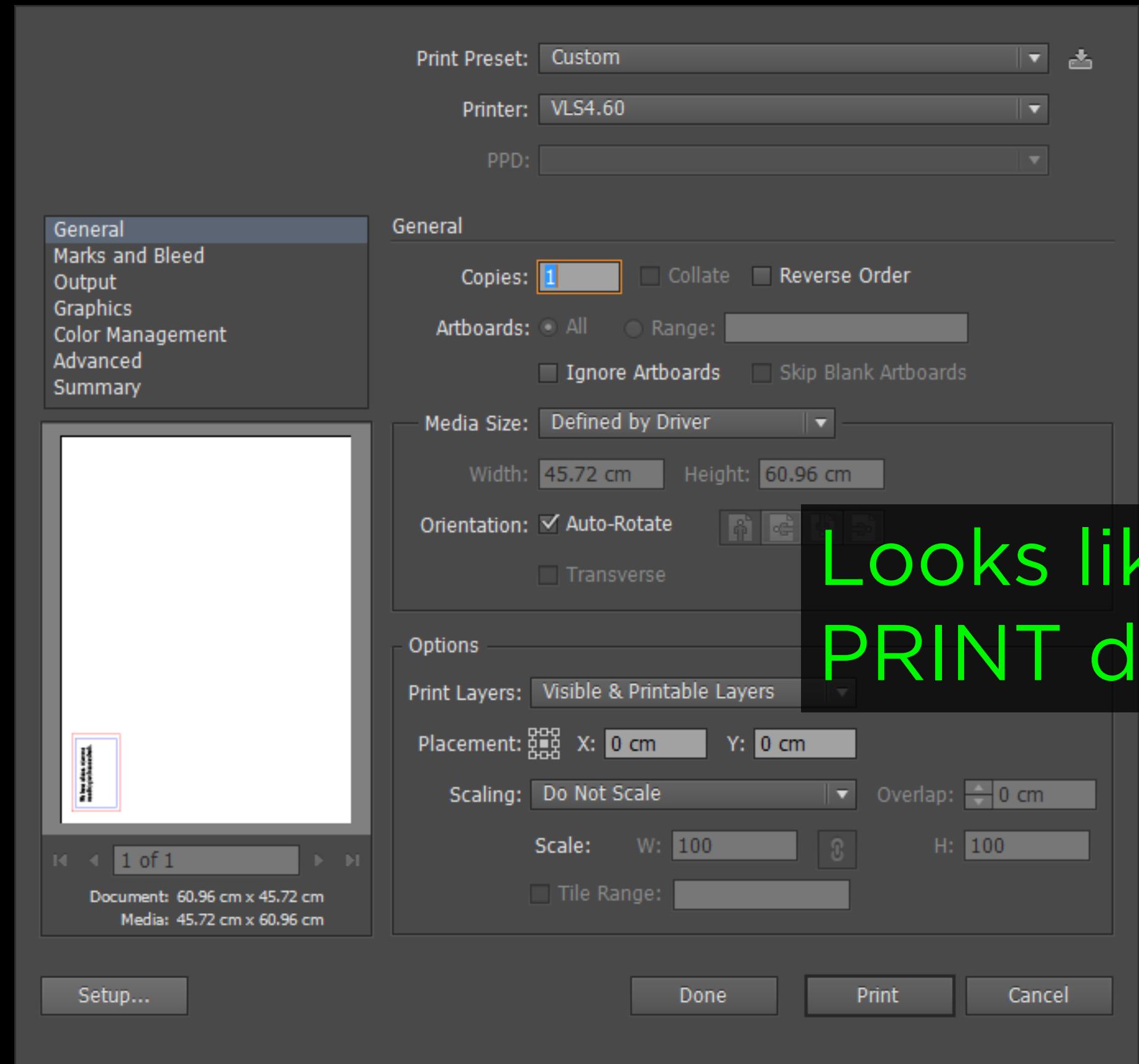


We have a laser, now we
need to purchase a shark.

Finally, I'll add some text. It
has a BLACK fill and no stroke.

Remember, anything with a FILL, no matter what color, will automatically turn into a raster engraving. Same goes for anything with a stroke greater than 0.01pt.





Looks like a normal
PRINT dialog.

Print

Print Preset:

Printer:

- VLS4.60
- VLS4.60
- Send To OneNote 2013
- Microsoft XPS Document Writer
- Fax
- Adobe PDF
- \\\PRT-001.cloud.ccas.gwu.edu\Acad 355 Dell C3765dnf Color Laser
- \\\prt-001.cloud.ccas.gwu.edu\SMPA 524 Dell C1765nf
- \\\prt-001.cloud.ccas.gwu.edu\Acad 355 Dell C3765dnf Color Laser

General

Marks and Bleed
Output
Graphics
Color Management

Advanced
Summary

Copies:

Artboards:

Media Size:

Defined by Driver

Width:

45.72 cm

Height:

60.96 cm

Orientation:

Auto-Rotate



Transverse

Options

Print Layers:

Placement:

X: 0 cm

Y: 0 cm

Scaling:

Do Not Scale

Overlap:

0 cm

Scale:

W: 100

H: 100

Tile Range:

1 of 1

Document: 60.96 cm x 45.72 cm

Media: 45.72 cm x 60.96 cm

Make sure 'Printer'
is set to **VLS4.60**

Use RGB red swatch
Set STROKE to 0.0
Set FILL to NONE

Use RGB blue swatch
Set STROKE to 0.0

Transverse

Options

Print Layers: **Visible & Printable Layers**Placement:  X: 0 cm Y: 0 cmScaling: **Do Not Scale**

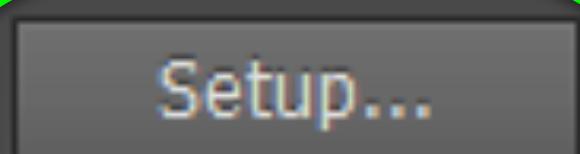
Scale: W: 100

 Tile Range:

1 of 1

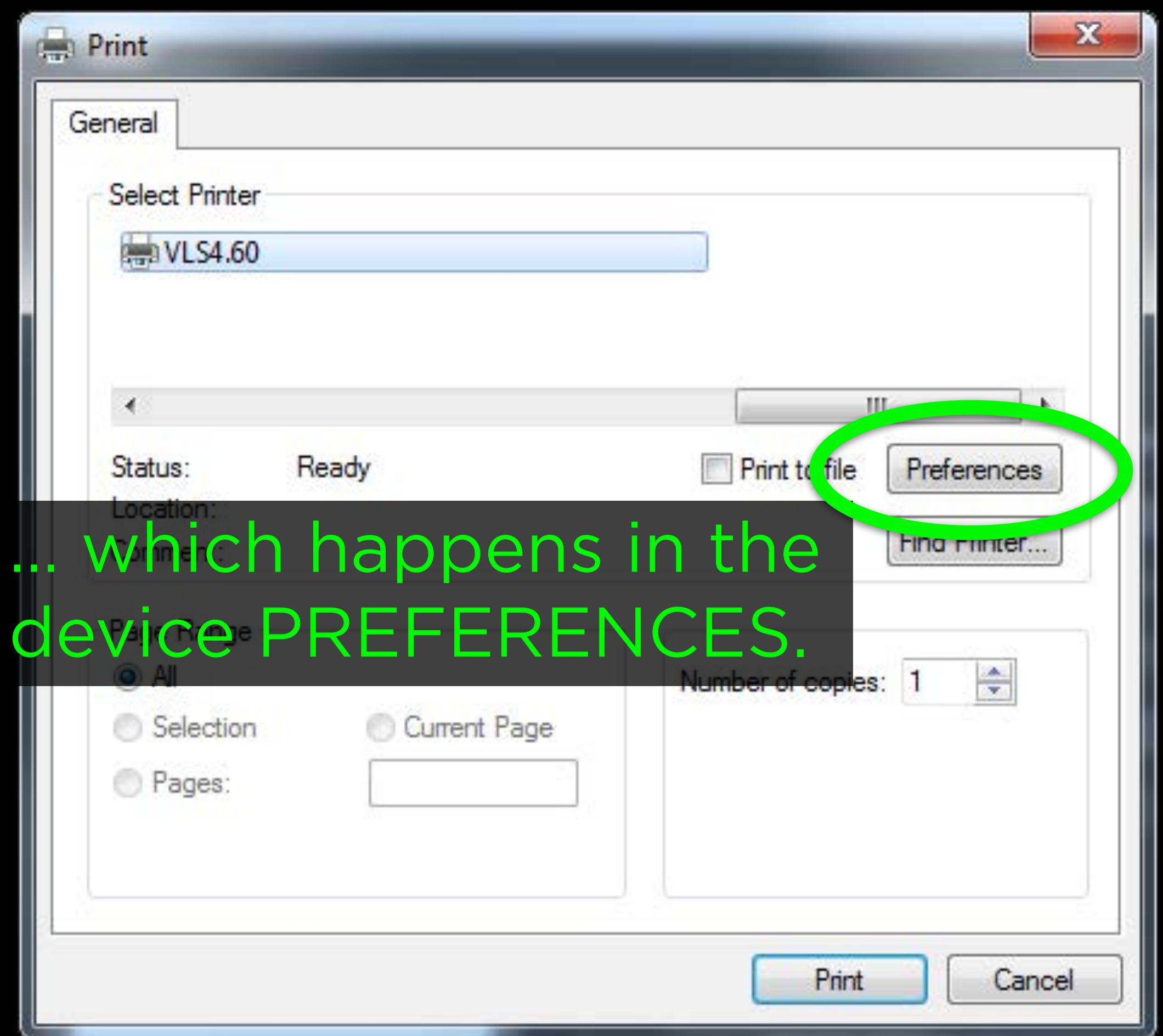
Document: 60.96 cm x 45.72 cm

Media: 45.72 cm x 60.96 cm

 Setup...But we need to change
the SETUP...

Done

Print



Laser Settings for VLS4.60

Selected:

Find**Next**

- Materials Database
 - + Ceramic
 - + Fabric
 - + Foam
 - + Glass
 - + Metal
 - + Natural
 - + Plastic
 - + Rubber

Click to select material, double-click to edit, right-click for other commands.

Notes:

Print Special Effects

3D

Setup

Print
Direction

Vector Performance

Standard

Material Thickness

Units

- Metric
- Inches

 Merge Pages

Fixture Type

NONE

Intensity Adjustment

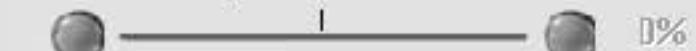
Raster



Vector Engraving



Vector Cutting



This SETTINGS window
is where you specify
the material you are
using, and its thickness.

Apply

Load

OK

Defaults

Save

Cancel

Laser Settings for VLS4.60

Selected:

Find**Next**

- Materials Database
 - + Ceramic
 - + Fabric
 - + Foam
 - + Glass
 - + Metal
 - + Natural
 - + Plastic
 - + Rubber

Click to select material, double-click to edit, right-click for other commands.

Notes:

Print Special Effects

3D

Setup

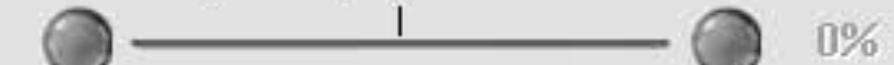
Print Direction



Vector Performance

Standard

Intensity Adjustment

Raster**Vector Engraving****Vector Cutting**

Here are the materials
you can work with.

What about glass and metal?
Our laser isn't powerful enough
to cut metal,* but can mark
metal using a special compound
applied to the surface. It can't
cut glass either, but can engrave
it by creating micro-fractures.

*There are caveats to both of these, but beyond the scope of this tutorial.

What about other materials
that aren't in the database?

Custom settings can be
created for other materials, but
that's beyond the scope of this
tutorial.

Not sure?

Ask your instructor!

A close-up photograph showing a person's hands holding a white sheet of paper. The hands are positioned so that the paper is partially visible, showing its edges. The background is a solid brown color.

I'm going to demo
using mat board.

Laser Settings for VLS4.60

Selected: Standard Material Mat Board 350250

Find**Next**

- Natural
 - Cork Board
 - Leather
 - Mat Board
 - Mother of Pearl
- + Paper
- + Stone
- + Vellum
- + Wood
- + Plastic

It turns out mat board
is in the database.

Click to select material, double-click to edit, right-click for other commands.

Notes:**Print Special Effects**

Normal

Print Direction**Vector Performance**

Standard

Intensity Adjustment**Raster****Vector Engraving****Vector Cutting**

Click to select material, double-click to edit, right-click for other commands.

Notes:

Print Special Effects

Normal

Material Thickness

0.063 "

This thickness is left over from a previous job. Is it correct? Important, because the laser needs to know what depth to focus on.

Merge Pages

Units

- Metric
- inches

Vector Perform

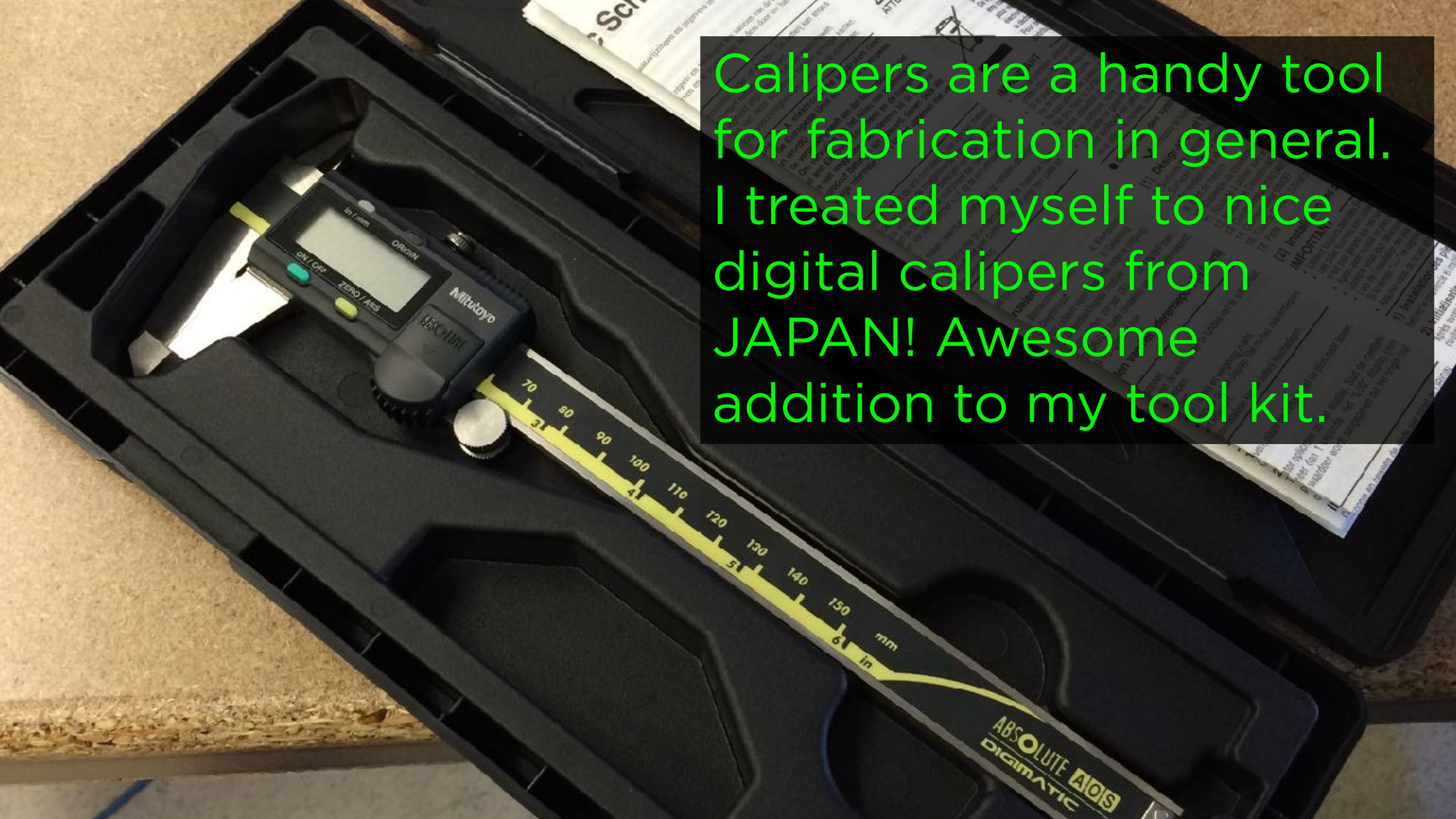


Standard

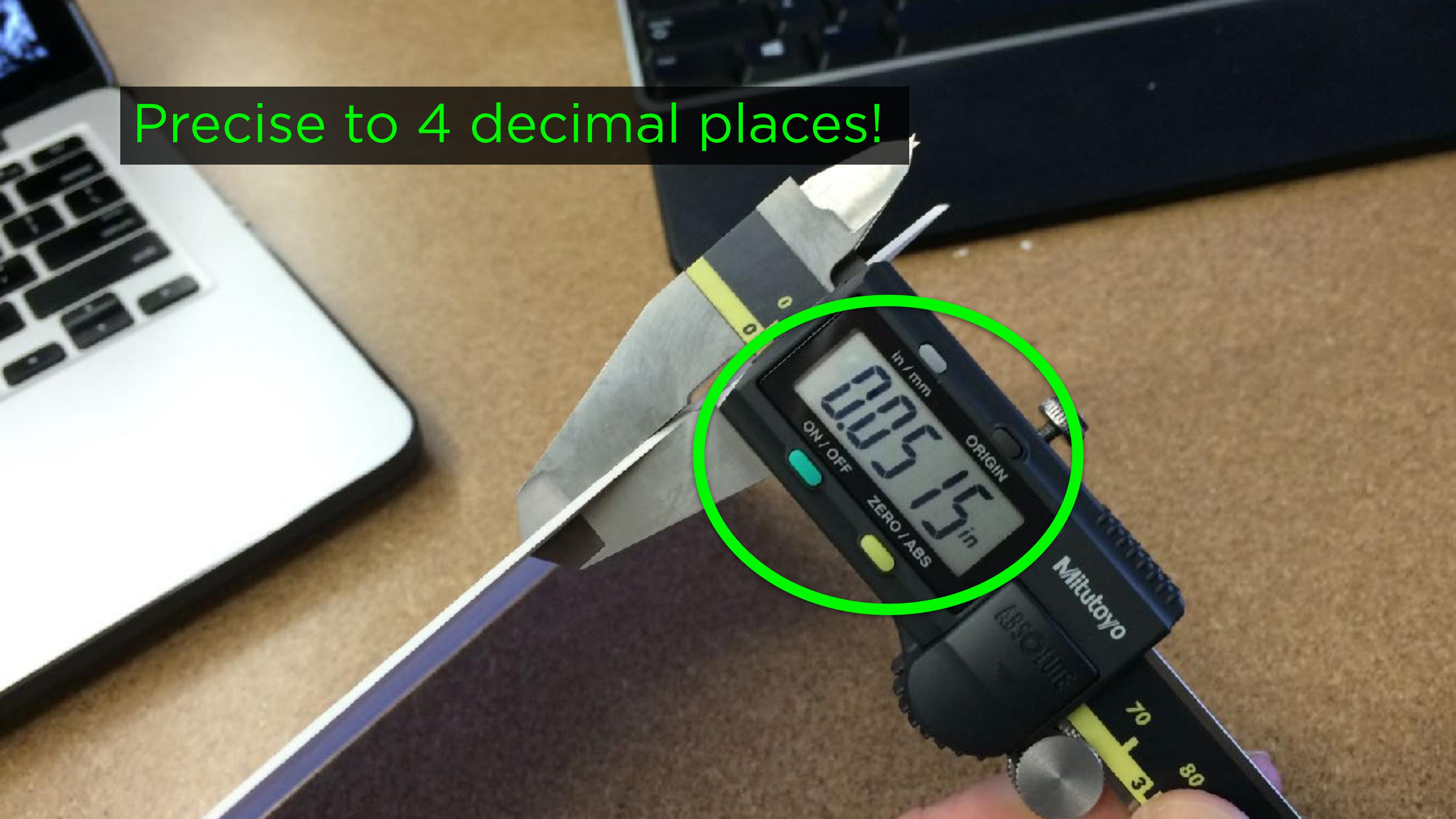
Fixture Type

NONE

Calipers are a handy tool
for fabrication in general.
I treated myself to nice
digital calipers from
JAPAN! Awesome
addition to my tool kit.



Precise to 4 decimal places!



Notes:**Print Special Effects****Normal****Material Thickness**

0.051 "

 Merge Pages (Manual)**Print
Direction**

Punched it. The software rounds to 3 decimal places.

Units Metric inches**Fixture Type**

NONE

Vector Perf

Stand

click for other commands.

Vector Performance



Standard



Fixture Type

NONE

OK!

Apply

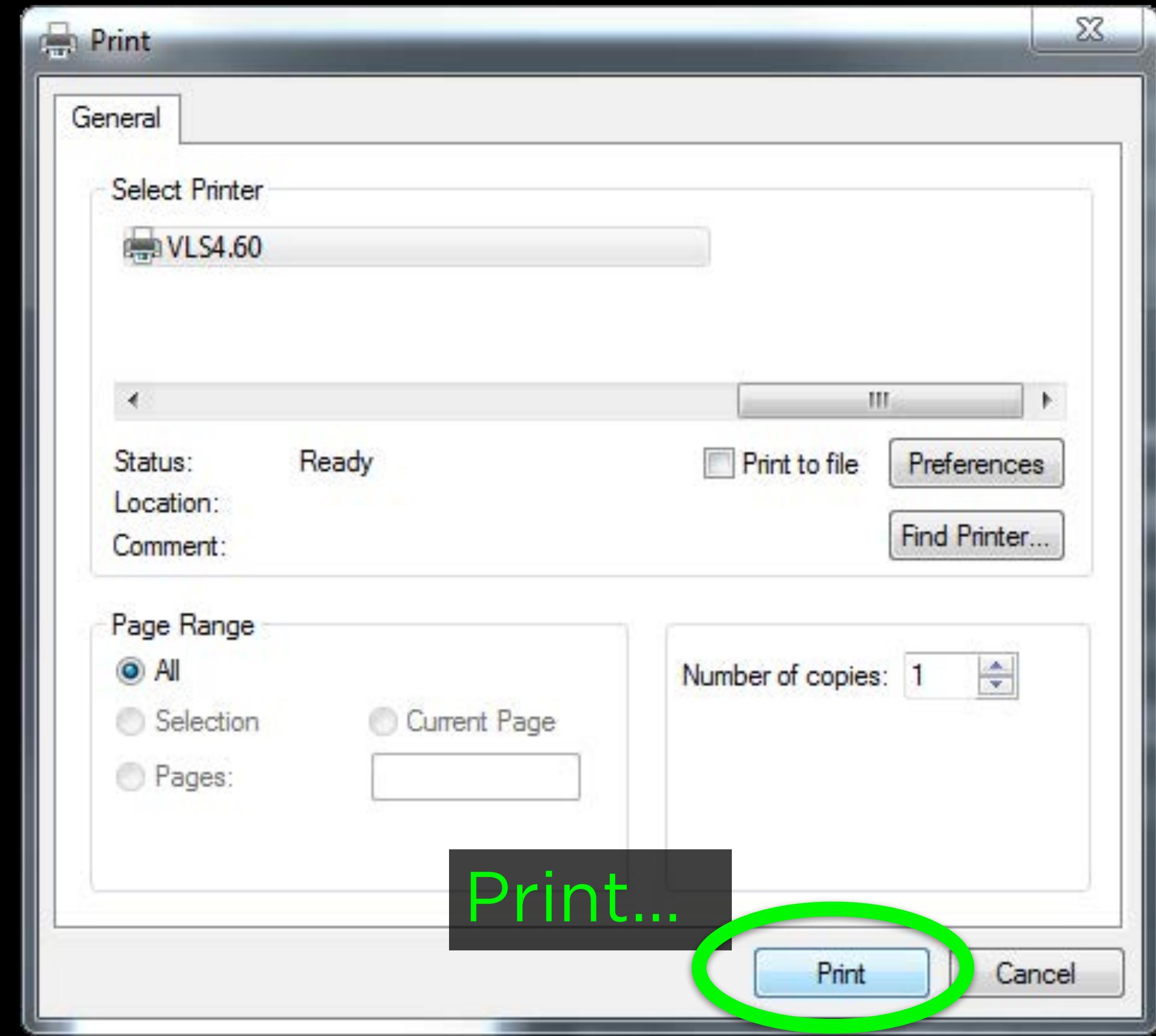
Load

OK

Defaults

Save

Cancel



Width: 45.72 cm

Height: 60.96 cm

Orientation: Auto-Rotate



Transverse

Options

Print Layers: Visible & Printable Layers

Placement: X: 0 cm Y: 0 cm

Scaling: Do Not Scale

Overlap: 0 cm

Scale: W: 100

H: 100

Tile Range:

Really... PRINT!

Done

Print

Cancel

Setup...



1 of 1

Document: 60.96 cm x 45.72 cm

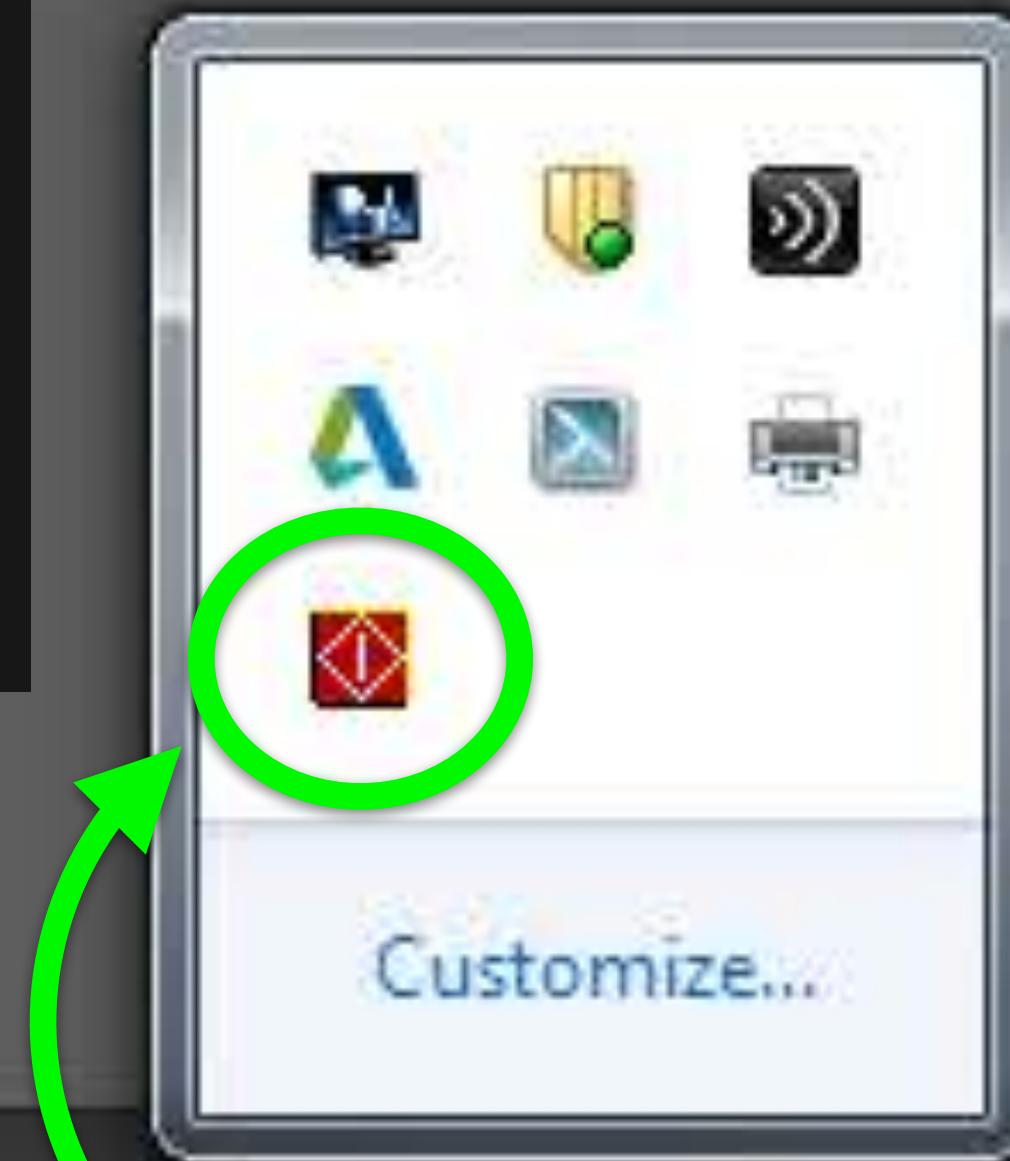
Media: 45.72 cm x 60.96 cm

We have a laser, now we
need to purchase a shark.

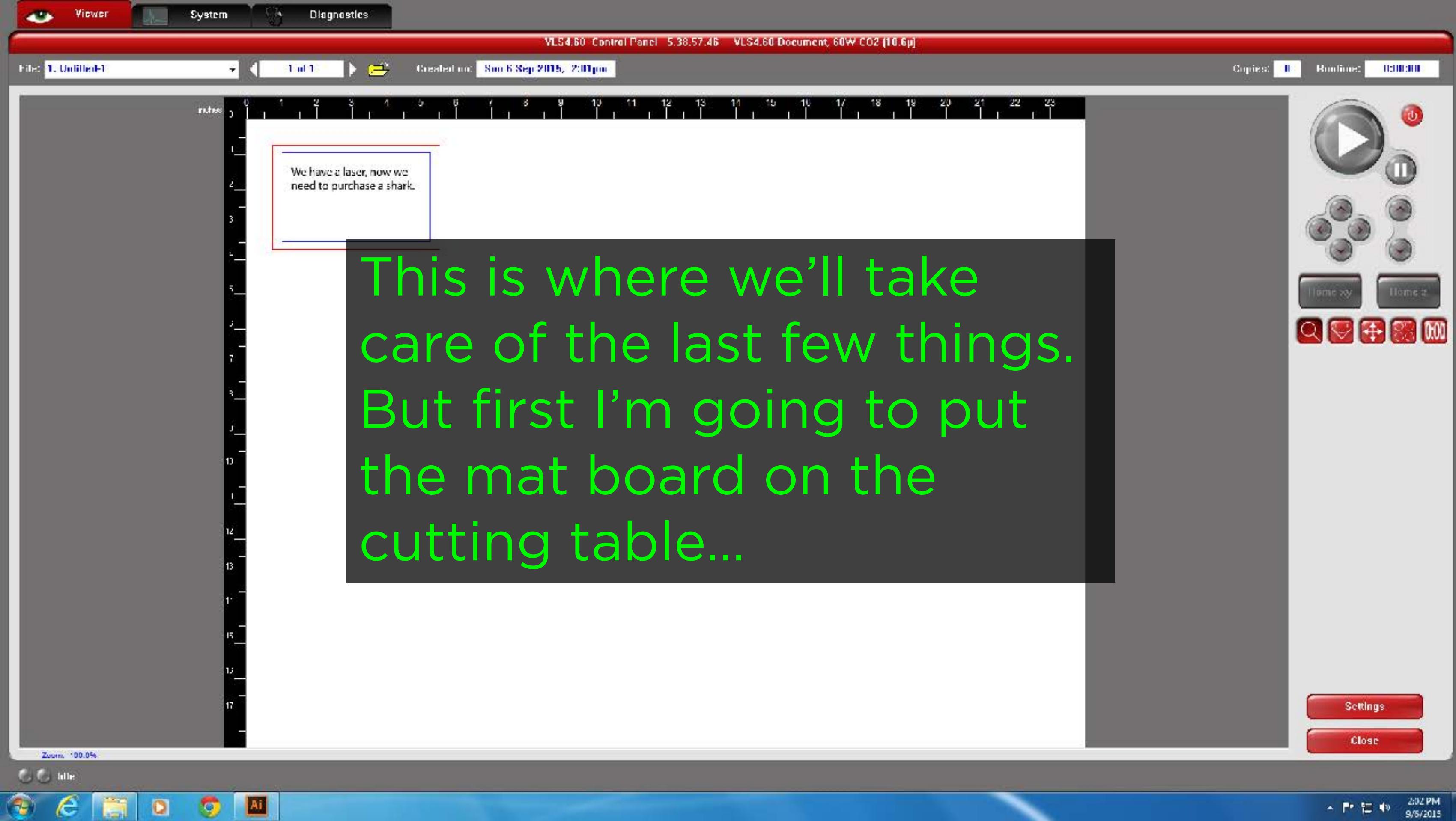
OK...
ummm...
nothing happened.

DON'T PANIC!

Because we need to go
the laser's control
panel. It's found in the
dock at the bottom of
the screen.



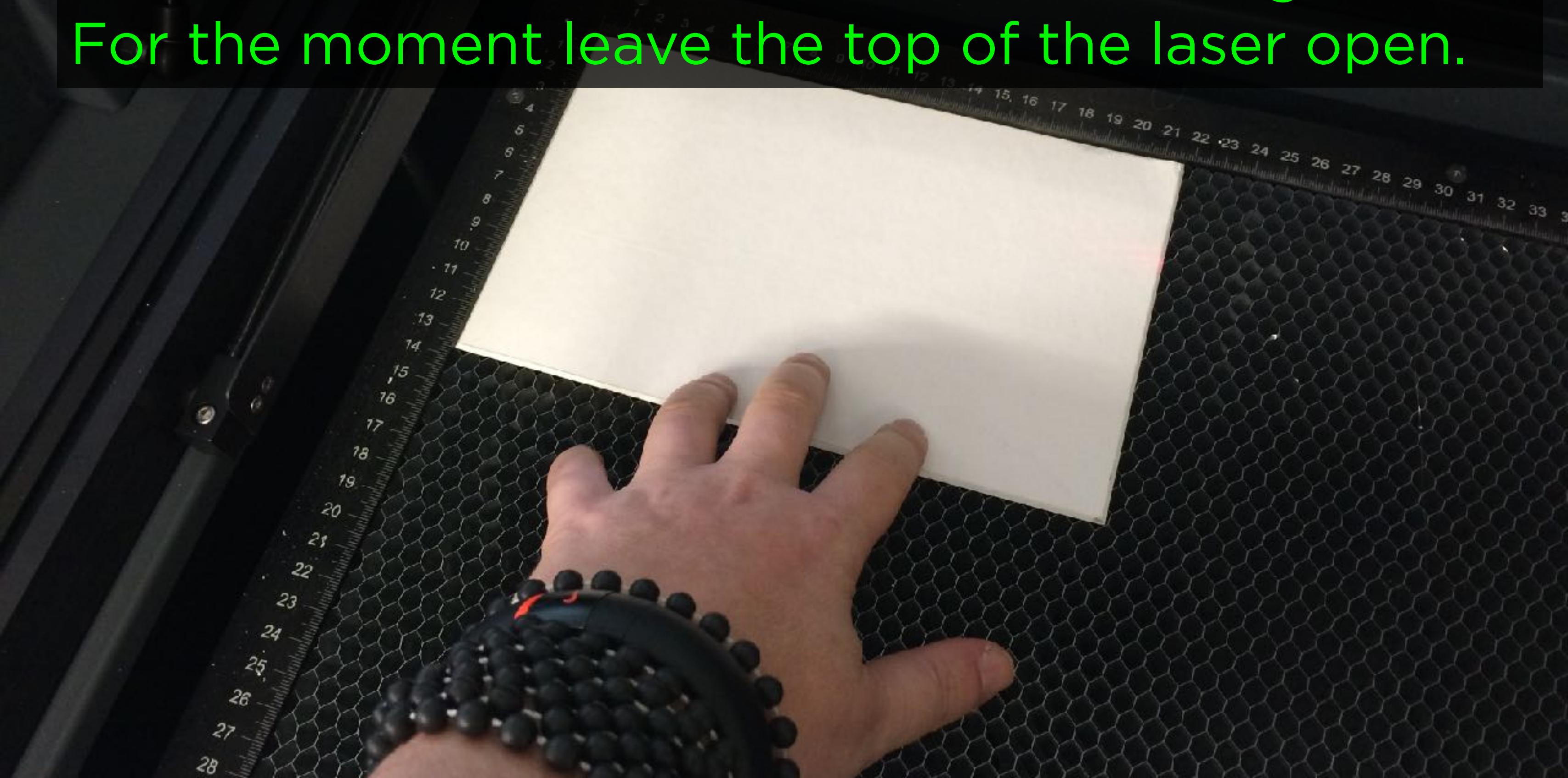
2:02 PM
9/6/2015





Gently lift the top of the laser.

Place the material to be cut on the cutting table.
For the moment leave the top of the laser open.



15 16 17 18 19 20 21 22 23

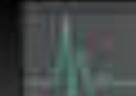
Back in the control panel, click on the FOCUS VIEW button.



X: 24.000"
Y: 0.000"
Z: 0.043"
R: 9.600"



Viewer



System



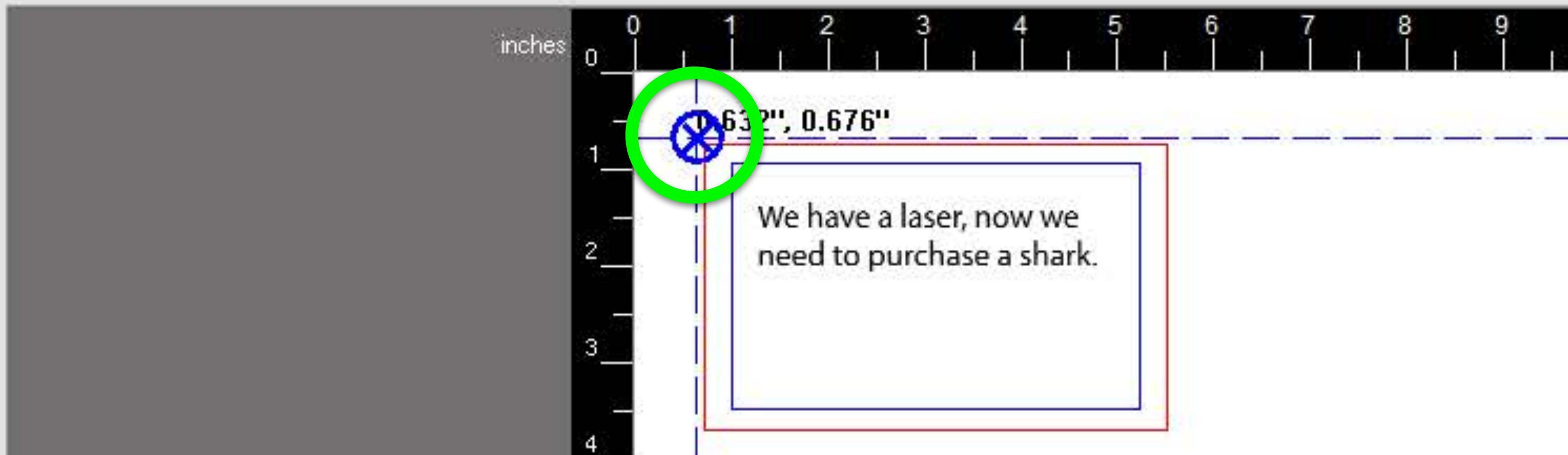
Diagnostics

VLS4.60

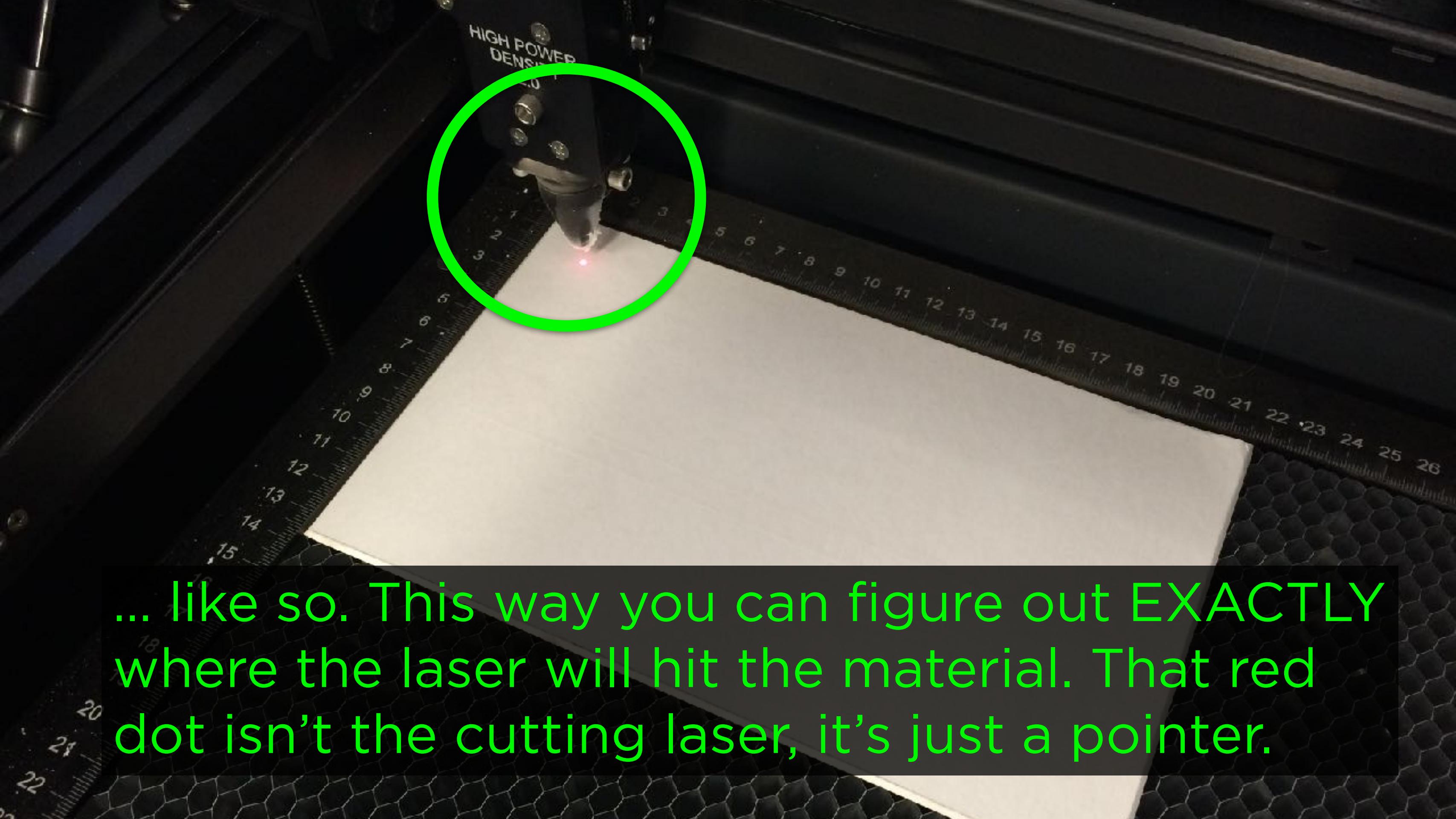
File: 1. Untitled-1

1 of 1

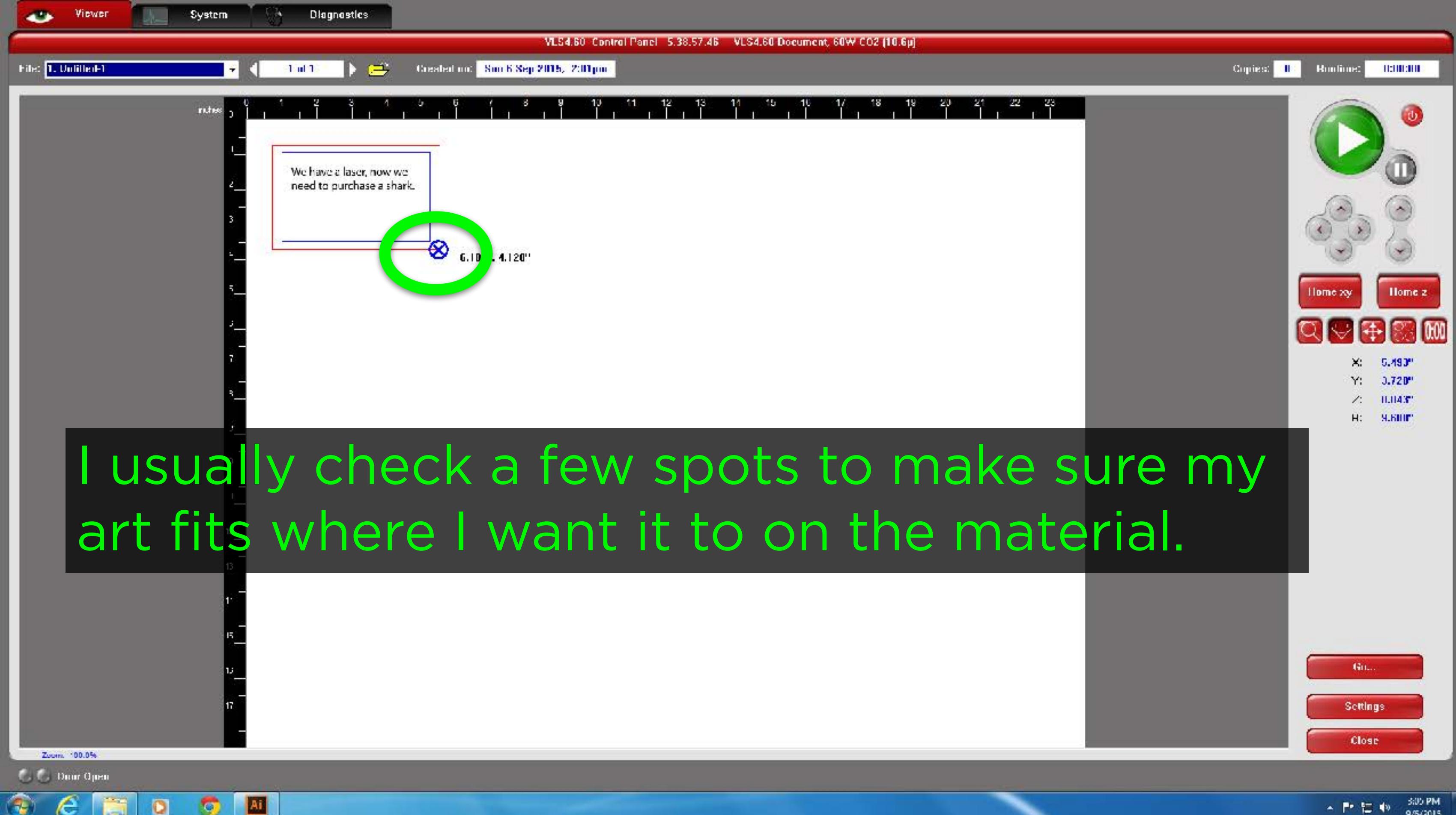
Created on: Sun 6 Sep 2015, 2:0



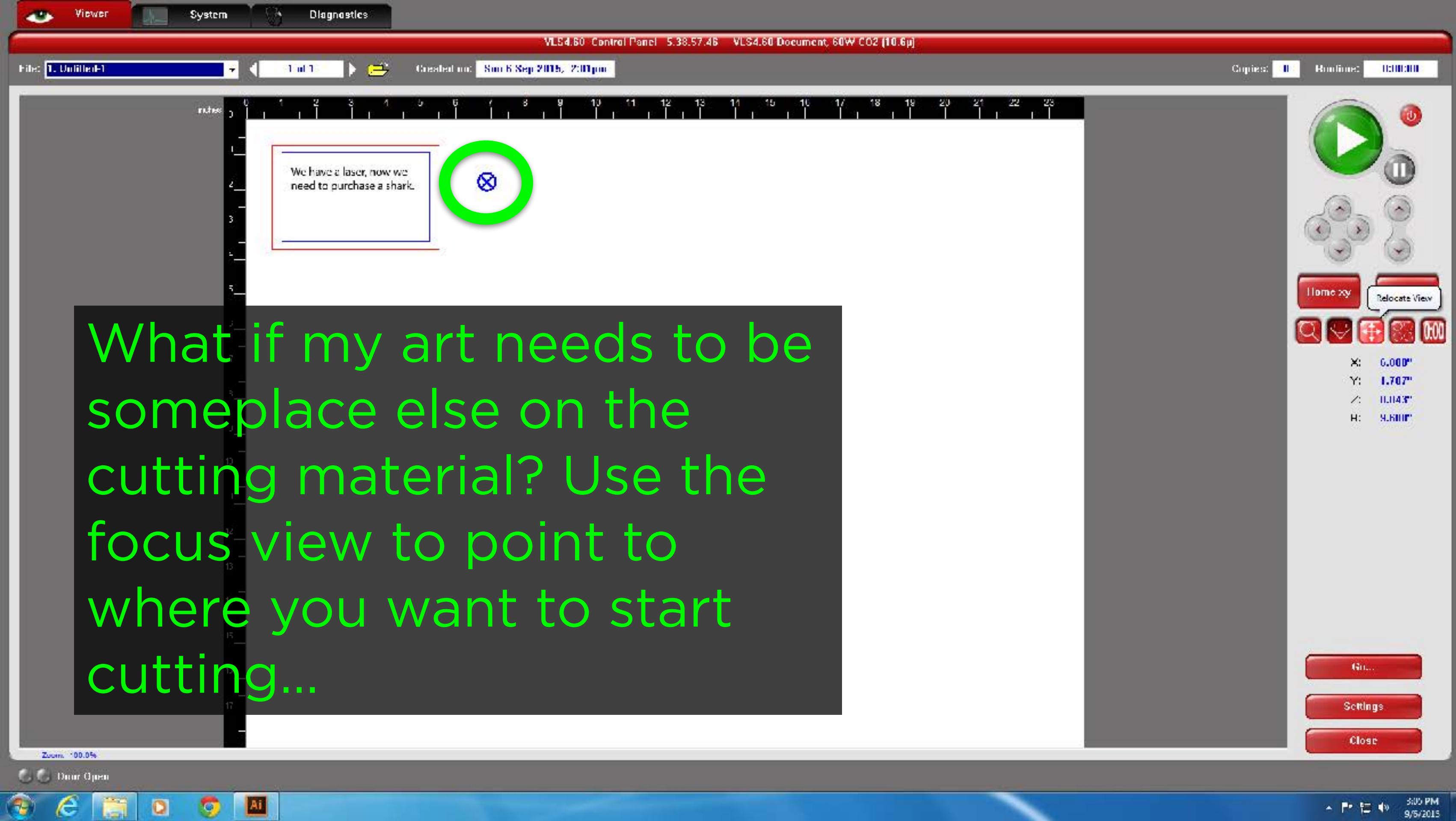
Clicking on the image area moves
the lens around the cutting table...



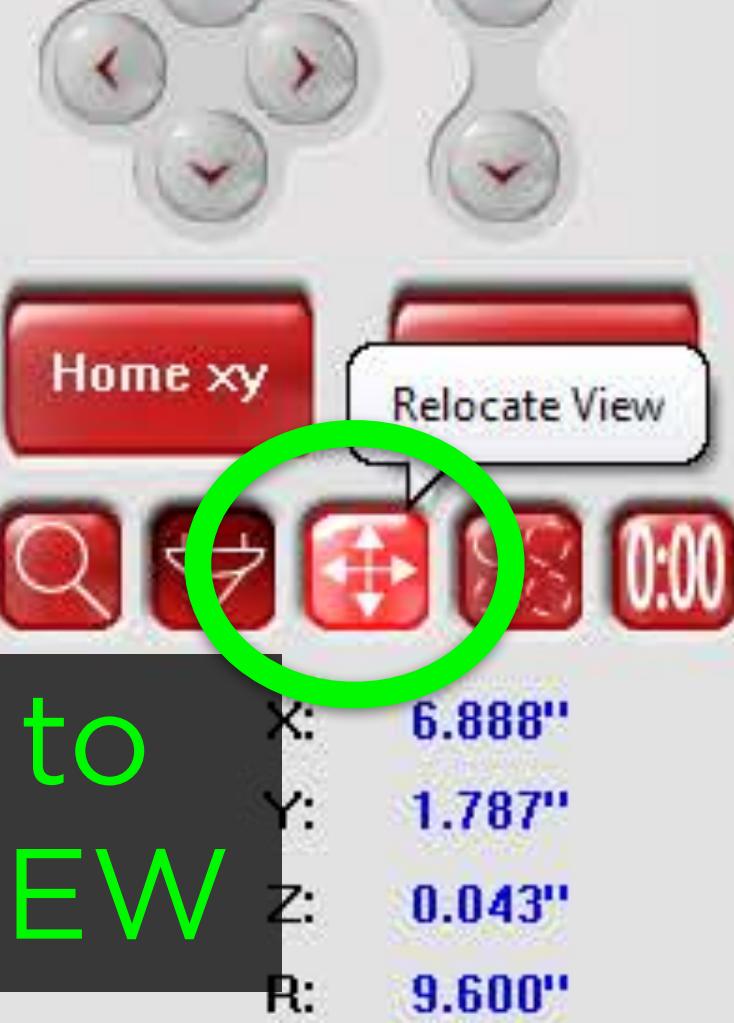
... like so. This way you can figure out **EXACTLY** where the laser will hit the material. That red dot isn't the cutting laser, it's just a pointer.



I usually check a few spots to make sure my art fits where I want it to on the material.



... then switch to
RELOCATE VIEW





Viewer



System



Diagnostics

VLS4.60 Control Panel 5.38.5

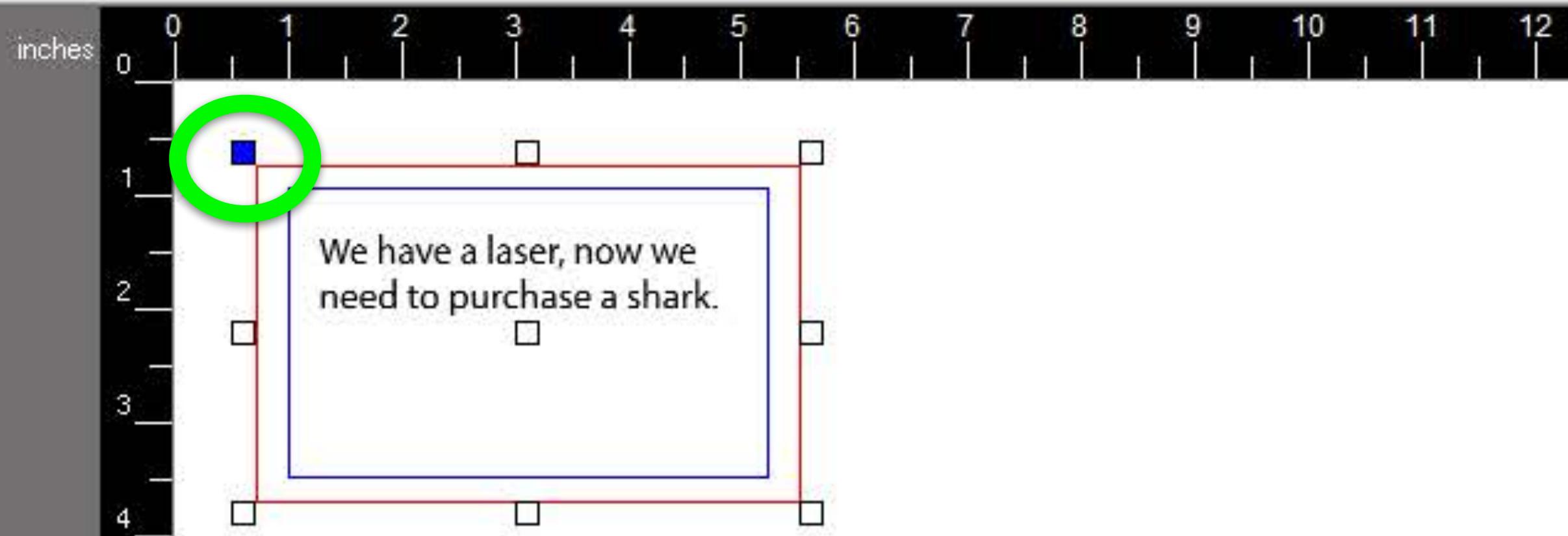
File: 1. Untitled-1

1 of 1



Created on:

Sun 6 Sep 2015, 2:01pm



We have a laser, now we
need to purchase a shark.

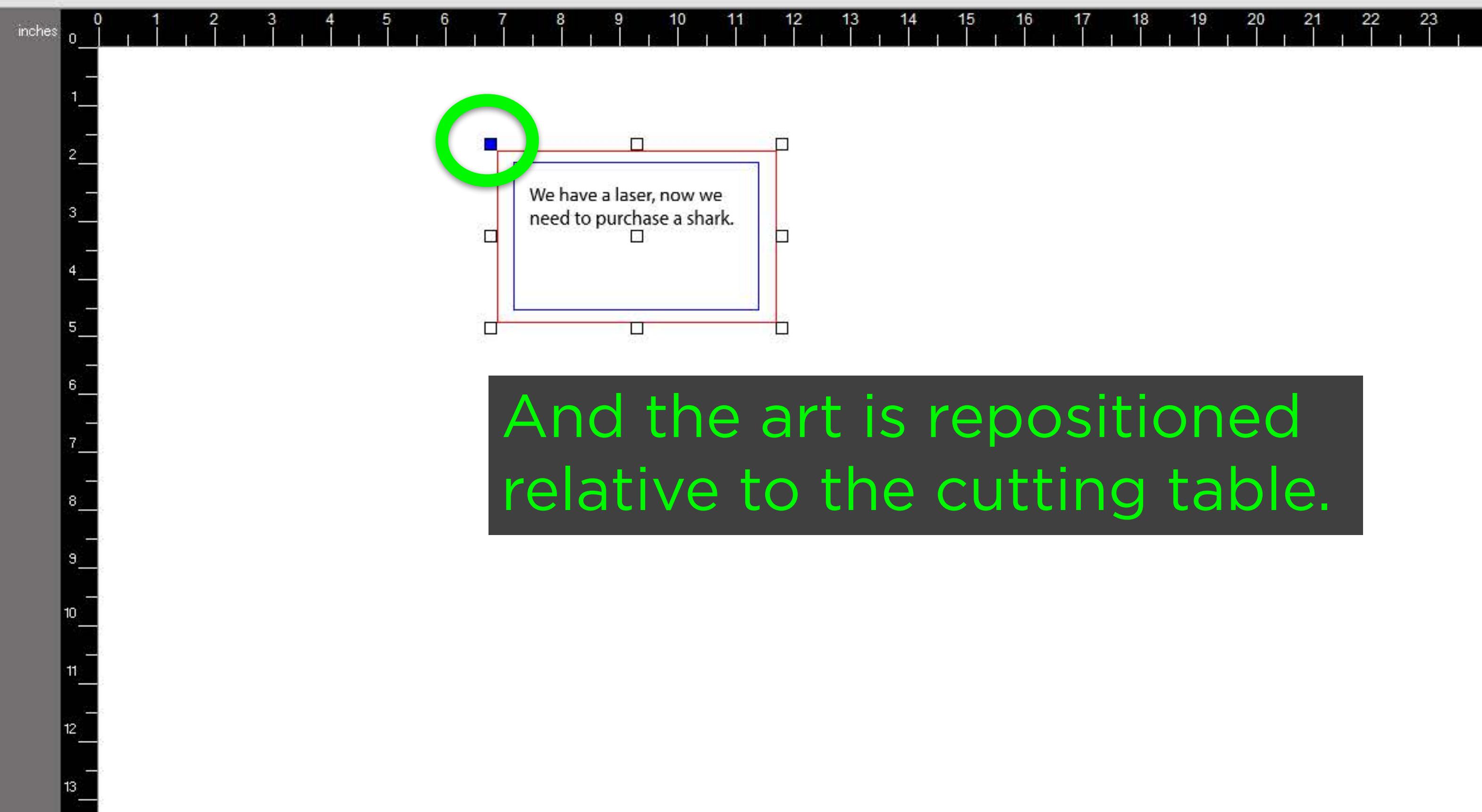
Click on a corner tab of the art to align
to the current location of the lens
(default is upper-left, usually fine.)

Then click on TO POINTER.



1 of 1

Created on: Sun 6 Sep 2015, 2:01pm



And the art is repositioned
relative to the cutting table.

15 16 17 18 19 20 21 22 23

How long will it take to run
the job? Click on that last
button to switch to this view...



Copies: 0

Runtime: 0:00:00

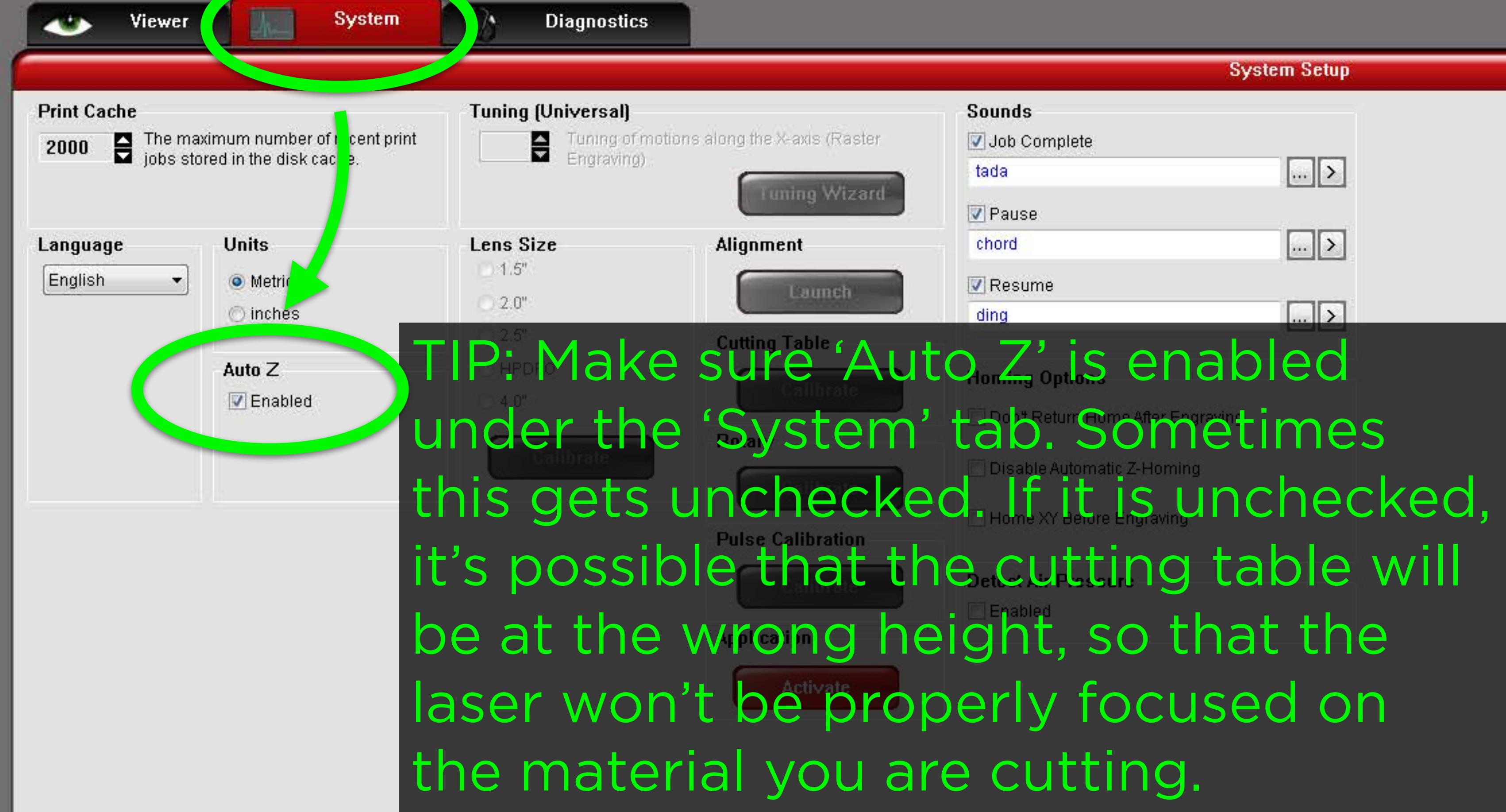
15 16 17 18 19 20 21 22 23

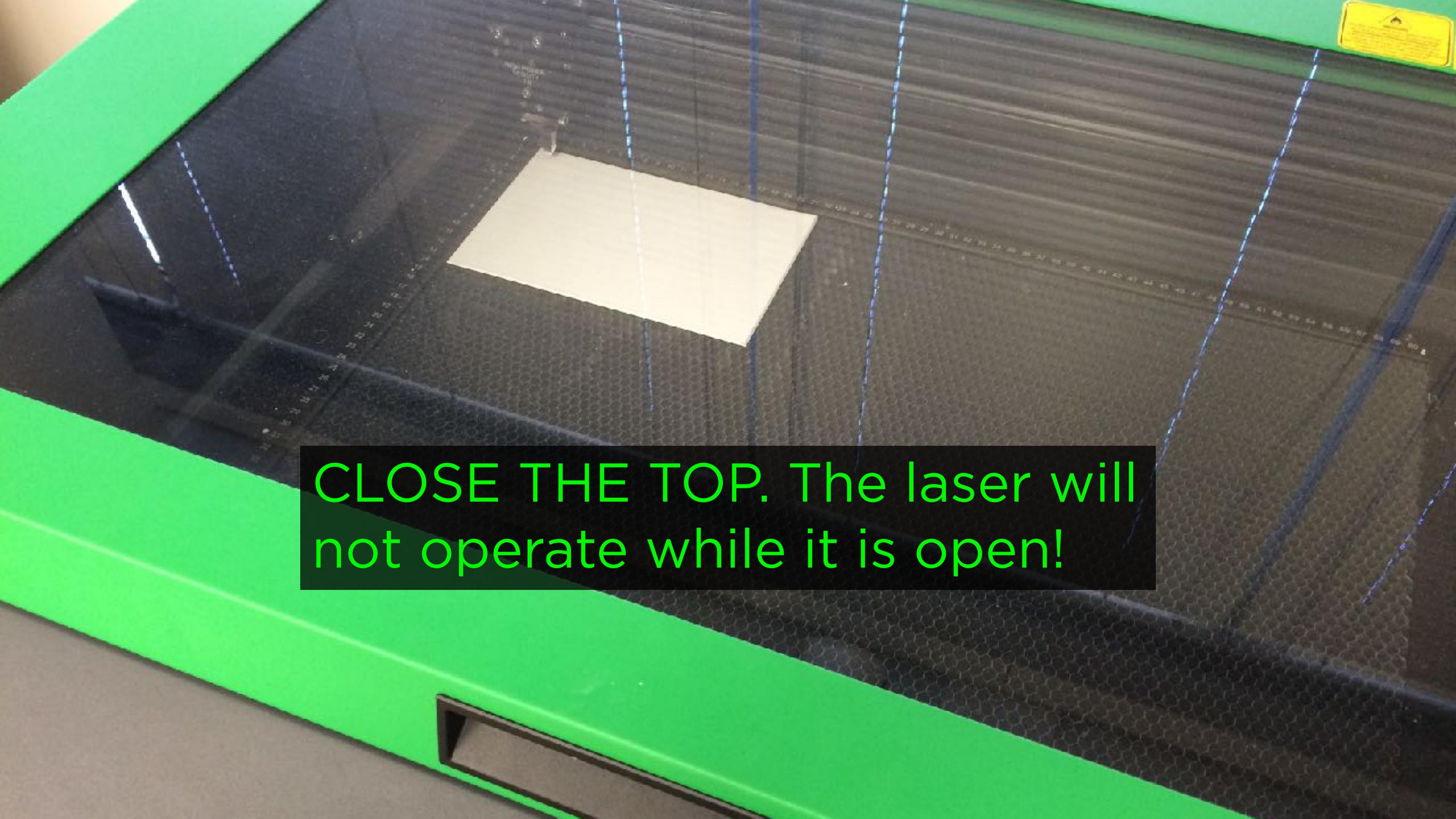
Then click START.



Estimated time is 1 minute
and 20 seconds... FAST!







CLOSE THE TOP. The laser will
not operate while it is open!

Copies: 0

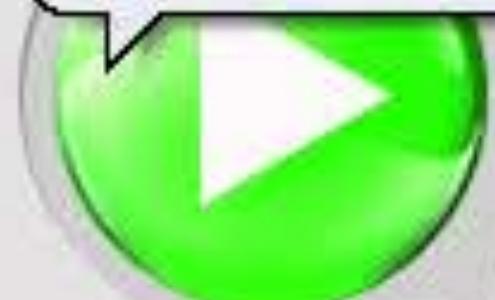
Run time:

0:00:00

20 21 22 23

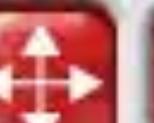
Now hit the ginormous
START BUTTON.

Start engraving this print job.



Home xy

Home z



0:00

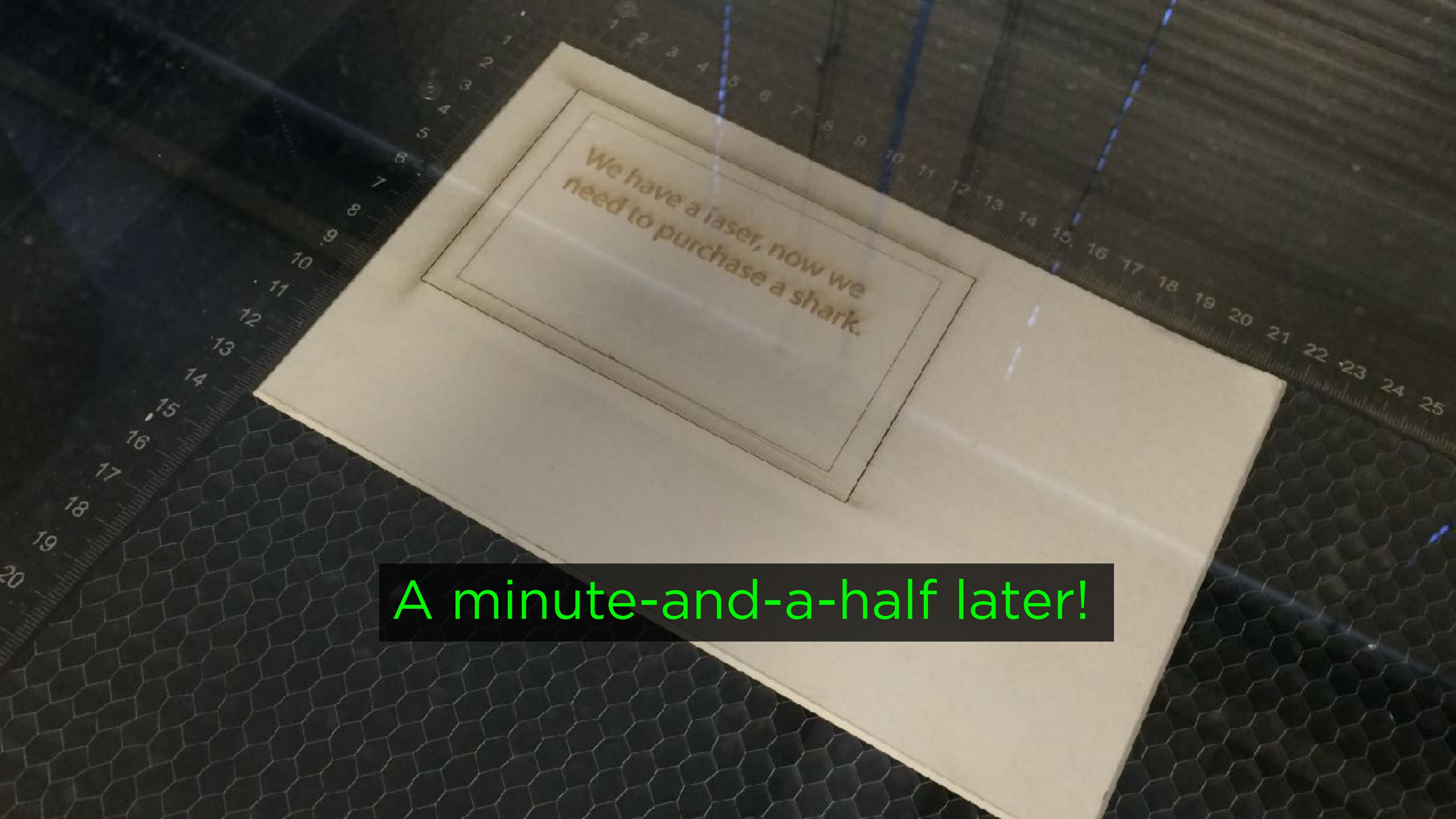
Once you start the job, do NOT leave the laser unattended. If the material you are cutting catches fire, stop the job; if YOU need to put out the fire. Know where the fire extinguisher is!

If there is a small flash fire on the laser, **DON'T PANIC!** It's contained in the cutting chamber, so it won't get out of control. **IF** you use the fire extinguisher, then...

1. Make sure fire is completely extinguished.
2. Call UPD's non-emergency number (202-994-6110) and let them know that there was a small fire that has been put out. The need to file a report indicating it wasn't arson!
3. Email your instructor and notify the tech on duty can make sure the extinguisher gets recharged.

TIP: if your job takes a long time, make sure the computer doesn't fall asleep. If the computer falls asleep the laser will shut down in the middle of the job. Move the mouse every few minutes.

Starting to cook!



We have a laser, now we
need to purchase a shark.

A minute-and-a-half later!

After the job is done, wait 30-60 seconds before opening the top. This gives the system time to vent any fumes and allows your material to cool.

A close-up photograph of a person's hand holding a white envelope. The envelope has a printed message in gold ink. A finger is pointing at the text.

We have a laser, now we
need to purchase a shark.

DONE!

File: 19. Untitled-1

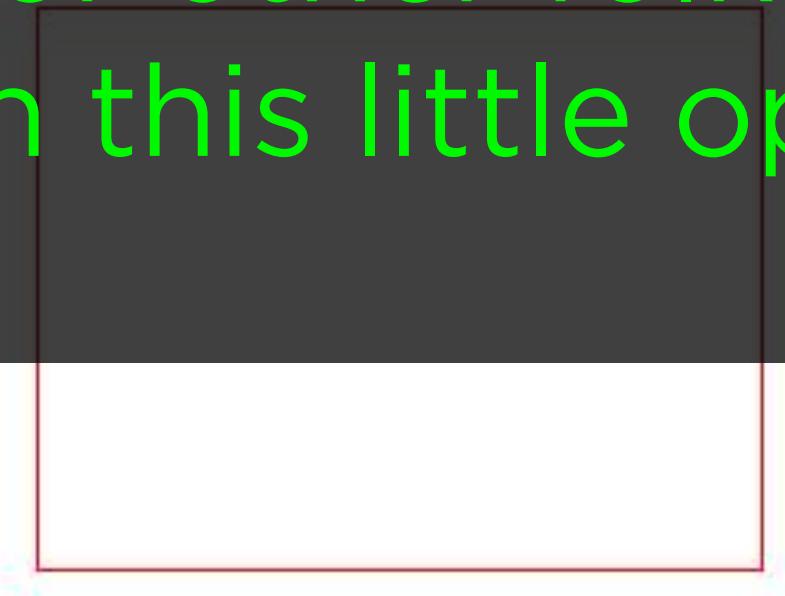
19 of 19



Created on: Fri 5 Feb 2016, 10:23am



Once you are finished cutting,
clear the job queue to save space
on the computer for other folks.
To do that, click on this little open
folder icon....



Select A Print Job

- 1. penpot-3
- 2. penpot-2
- 3. penpot-2
- 4. penpot-4
- 5. penpot-5
- 6. Untitled-1
- 7. cucalorus_plakas
- 8. cucalorus_plakas
- 9. cucalorus_plakas
- 10. cucalorus_plakas
- 11. cucalorus_plakas
- 12. Hologram
- 13. Hologram
- 14. Hologram
- 15. Hologram
- 16. Hologram
- 17. Untitled-1
- 18. moon
- 19. Untitled-1

You'll see a list of the recent jobs on the left. To clear everything out, click the 'Purge' button.

Select

Export...

Import...

Delete

Purge

Close

Filename:

Untitled-1

Created on:

Fri 5 Feb 2016, 10:23am

Runtime:

0:00:00

Fixture:

Standard Table

Material:

Cardboard

Thickness:

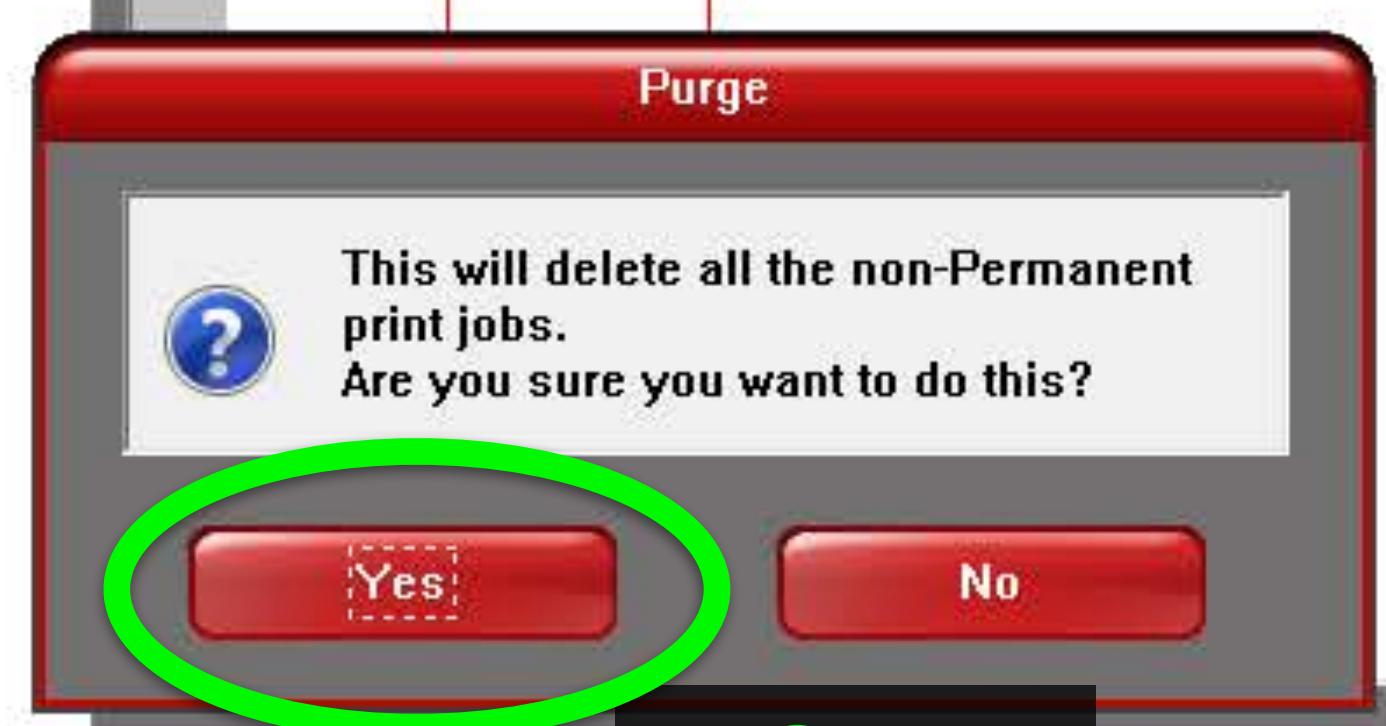
4mm

Permanent

Select A Print Job

- 1. penpot-3
- 2. penpot-2
- 3. penpot-2
- 4. penpot-4
- 5. penpot-5
- 6. Untitled-1
- 7. cucalorus_plakas
- 8. cucalorus_plakas
- 9. cucalorus_plakas
- 10. cucalorus_plakas
- 11. cucalorus_plakas
- 12. Hologram
- 13. Hologram
- 14. Hologram
- 15. Hologram
- 16. Hologram
- 17. Untitled-1
- 18. moon
- 19. Untitled-1

Permanent



DO IT!

Filename:
Untitled-1

Created on:
7 Feb 2016, 10:23am
Runtime:
0:00:00

Fixture:
Standard Table

Material:
Cardboard

Thickness:
4mm

Select

Export...

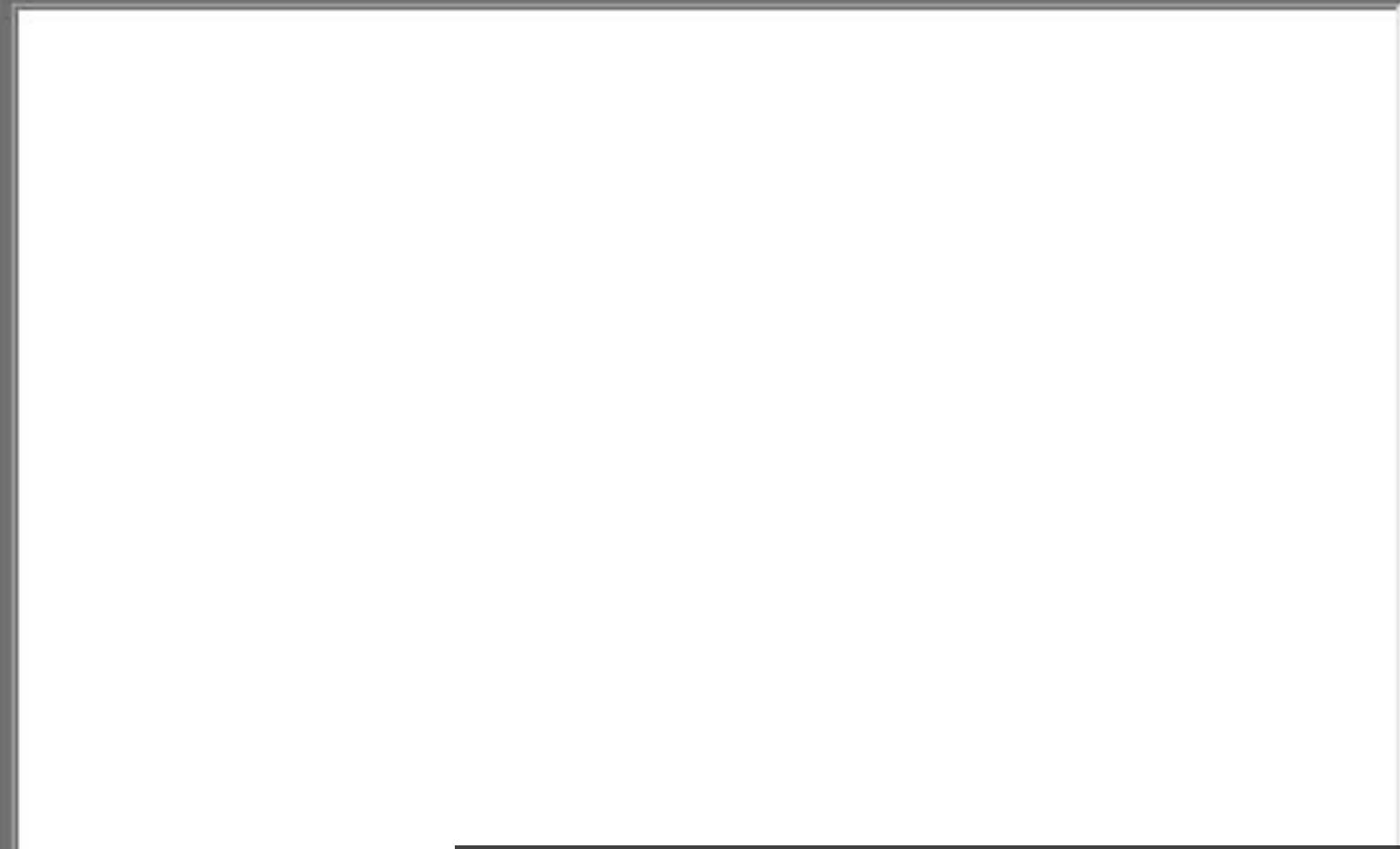
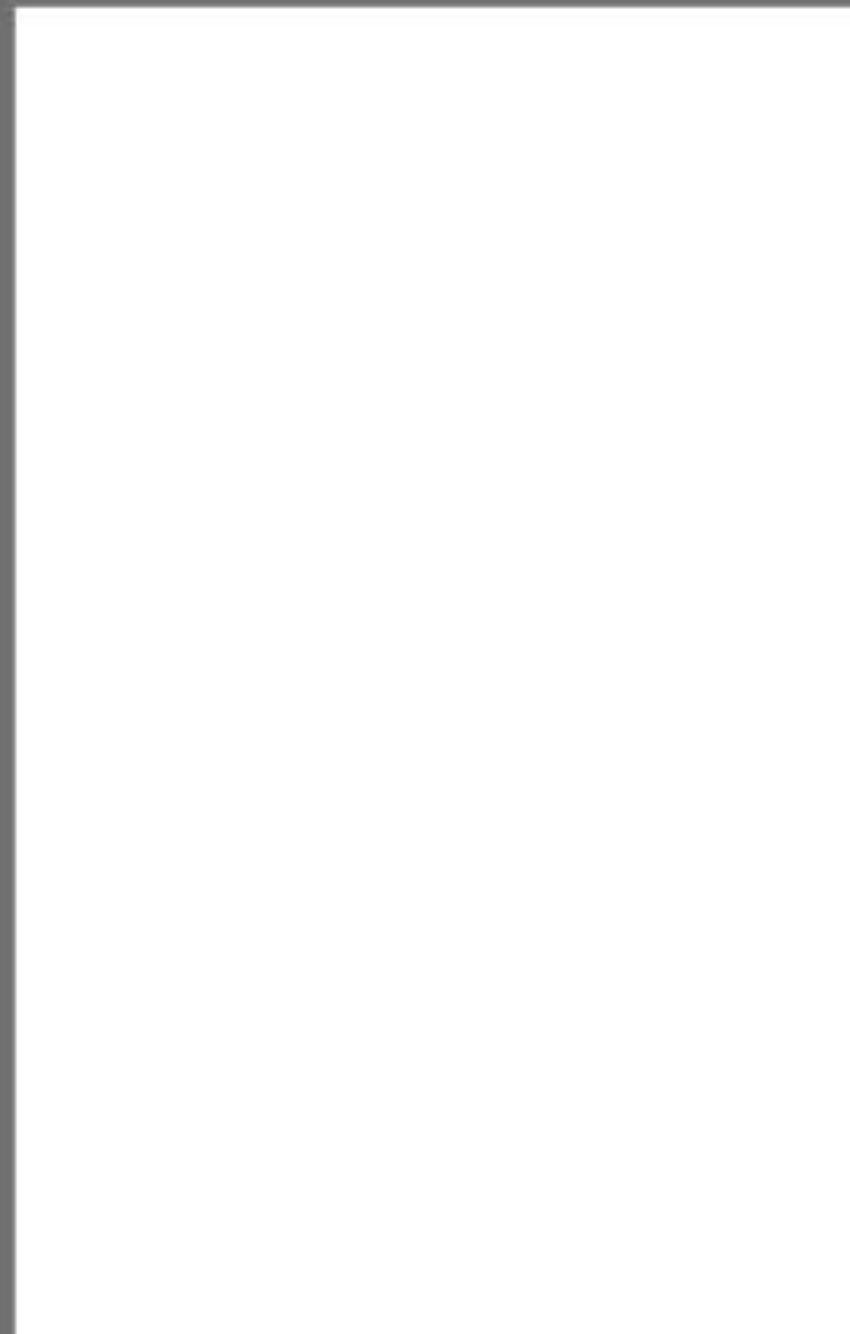
Import...

Delete

Purge

Close

Select A Print Job



Select

Export...

Import...

Delete

Purge

Close

Permanent

When everything is done, clear any debris from the cutting table, close the laser control panel, quit out of Illustrator, log out of the computer (which shuts off the laser) and power down the fume extractor.

When we started the lab a couple of years ago, we created a blog to capture all the tips and tricks we were learning as we went along. It includes all of the manuals and documentation that we could get our hands on:

<http://neanderthal.superluckyland.com>

Neanderthal Manual

Bootstrapping knowledge in the FABULOUS LABORATORY, one bone at a time.

Home



Subscribe to RSS

August 31, 2015

by James H

in Uncategorized

Comments (0)

Getting the lab reconfigured!



reconfigured for the Fall!

Goodies here.

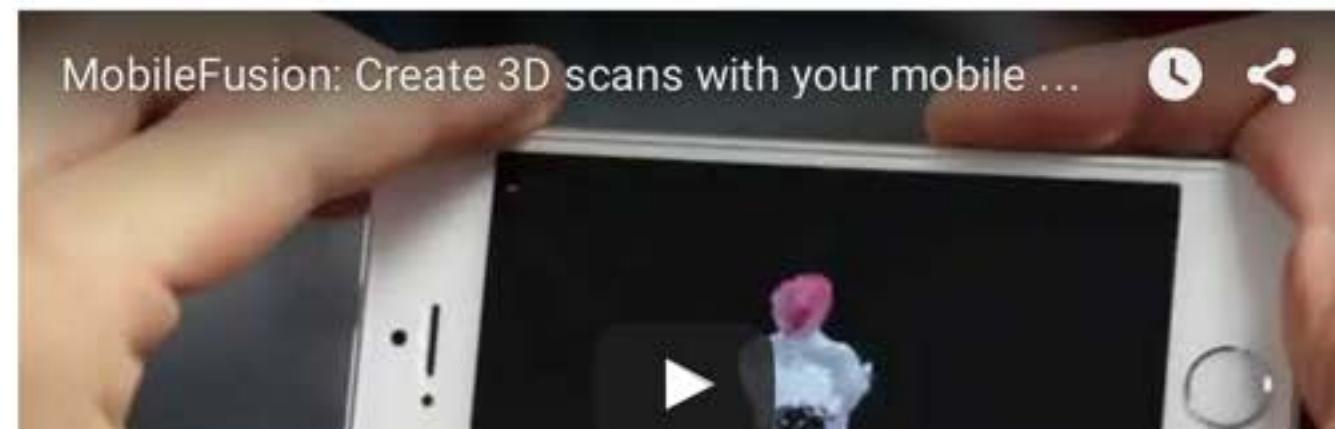
August 24, 2015

by James H

In Uncategorized

Comments (0)

New 3D scanning software for mobile...



More from this category

New 3D scanning software for mobile...

AUGUST 24, 2015

AUGUST 24, 2015

Do it right.

AUGUST 7, 2015

Designer drugs

AUGUST 4, 2015

Tutorial on pin design

JULY 25, 2015

More from this category

Getting the lab reconfigured!

AUGUST 31, 2015

AUGUST 24, 2015

Do it right.

AUGUST 7, 2015

Designer drugs

AUGUST 4, 2015

Tutorial on pin design

META

- [Log in](#)
- [Entries RSS](#)
- [Comments RSS](#)
- [WordPress.org](#)

CATEGORIES

- [Neanderthal FAQ](#)
- [File Conversions](#)
- [Resource](#)
- [Software](#)
 - [123D Catch](#)
 - [123D Make](#)
 - [AutoCad](#)
 - [Blender](#)
 - [MakerBot Desktop](#)
 - [Meshlab](#)
- [Hardware](#)
 - [Cubify Sense 3D](#)
 - [MakerBot Replicator 2X](#)
 - [NextEngine](#)
 - [Roland MDX-40](#)
 - [Universal VLS 4.6](#)
- [Uncategorized](#)

CONTRIBUTORS

- [Select Author...](#)

SEARCH

At the bottom of the homepage, you'll see categories for hardware and software in the lab, including the laser.

[Archive | Universal VLS 4.6](#)[RSS for this section](#)**August 14, 2015**

by James H

in [Universal VLS 4.6](#)

Comments (0)

Universal VLS 4.6 AWESOMENESS

We now have this in the lab:



There's a post in the laser category that has all of the documentation, including tip sheets for specific materials.

Generally useful documents

[The COMPLETE User Guide](#)[Laser Setup & Operations Presentation](#)[More from this category](#)