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02/25/16

GCC LaserPro Laser-cutter

Overview

- Reads Adobe Illustrator files
- Can cut:
  - along a vector path (for lines, contours, etc)
  - in a raster pattern (for filled areas)

- Can cut a variety of materials
  - Examples: mat board, foam board, balsa wood, plexiglass, some metals

    - **WARNING #1**: No shiny metals!
      - Laser beam will bounce off it – very dangerous
    - **WARNING #2**: Be very careful of plastics
      - Fumes can be poisonous
    - **WARNING #3:** If material too thick, can't cut
      - ...without burning/flames/fire
      - (Try cutting several times with lower heat)

- Material must be flat
    - not warped
  - because height of beam above material is important

- Laser beam cuts by heat
  - It burns its way through the material
  - So...
    - Ventilation is crucial!
  - If material burns too much,
    - need to hit red **Emergency** Stop button to stop machine immediately
  - Beam can leave a burn mark on material
    - especially for thicker materials

- Maximum size of material is 18”x24”

Produce your Illustrator file

- Artwork must fit within 18”x24” dimensions
  - Can gang several artworks/drawings together

- For vector cutting
  - Stroke Width = 0.025 pt
  - Fill = NONE

  - Color:
    - Color inside Illustrator does NOT have to correspond to pen color of Laser cutter

- Easier to understand if it does,...
  - but it not necessarily have to be the same

- More about pen colors below

- Any other settings => other operations
  - For example: raster cut, score-but-don't-cut, etc

- You may position your artwork on an Illustrator artboard
  - E.G., in upper left corner
- Alternatively you can position artwork inside GCC menus
  - See details below

Keys

- Get keys from 4th floor Resource Room or 5th floor Imaging Center
  - You must be on the list of approved students
  - You will be put on the list
    - when you have received instruction
    - and your instructor is confident you know what you are doing

  - One key is for door of room
  - One key is for the GCC machine

  - Call Security downstairs
    - to turn on the roof fan
    - Security = extension 5656

Power on all machines

- Unlock door to small laser-cutter room

- Power strip on floor, turn on

- GCC LaserPro:
- Insert machine key into GCC machine
  - top, right side
  - NOTE**:**
    - Laser beam will not operate unless key is inserted
    - The head will move, but the beam will not go on
      - This is a safety feature

- Power on GCC LaserPro
  - Button is on right side, top, rear of machine

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- Power on Macintosh

- Turn on ventilation fan by door
  - Turn knob to Hand/1

- Turn on Compressor
  - red machine, on floor near GCC
  - (NOTE: As of date of this writing, this red machine is not working)

Cutting Bed & Cutter Head

- Lift glass lid
  - Keep it open for now
    - until you are ready to cut
  - SAFETY FEATURE:
    Laser beam will not operate while lid is open

- Cutting bed:
- Manually move laser head out of way if necessary
  - so you can get to the cutting bed

- For many thin materials, helpful to raise the bed
  - by first putting a flat wooden board on it
- Next...

- On small GCC panel, right side, top...
- Use down/up arrow buttons
  - to lower or raise bed of cutter

- Place material you want to cut on the bed
  - (or on the wooden board if you placed one on top of the bed)

- Positioning the Cutter Head
- Manually move laser head over your material
  - where you will want to cut
  - (More about positioning below)

- Adjust Height of Head to Focus Beam
- The head must be at the correct height
  - in order for the laser beam to focus on your material

- Problem: The “Auto Focus” button on the GCC panel doesn't work
  - (grrrr!)
- So instead,..

- Use the small metal measuring tool
  - ...to measure distance from beam head to material

  - This tool is a thin black cylinder/rod about 4 inches long, with a blue cap at top
  - It should be on the desk surface with the Macintosh

  - Place the cylinder/rod through the hole on the left side of the head
  - Use the Up/Down arrows on the GCC panel to adjust height of bed...
    - until your material just touches the bottom of the rod

  - This is not very precise,
    - but it is approximately the right height
      - to give you correct focusing
    - A slight difference in height can produce a hotter or colder cut

- Another problem:
  - Sometimes the machine will send an error message
    - about “the bed has reached its maximum height”
  - And will not allow you to do anything
  - This is because the little 1” rod on the right side of the laser beam
    - sometimes gets stuck
    - Reach in and use your fingers to wiggle that little 1” rod
    - This should allow the machine to resume

Inside Illustrator

- Open your Illustrator or EPS file
- Define colors of your line work
  - Color of line helps you remember how the cut will be made
    - (This will be defined later more precisely inside GCC menus)
  - Usually...
    - Black = cut all the way through
    - Red = score-but-don't-cut
    - etc.

  - **Colors**: GCC does not recognize 0 (zero) as a valid number
    - Use 1 instead
    - For example:
      - Black = 1,1,1 (not 0,0,0)
      - Red = 255,1,1 (not 255,0,0)

  - **Text**:

- By default, text will be treated as a raster cut
- To cut it as vector,
  - >Type >Convert to Outlines

- Select all the artwork you want to cut
- **TIP**: Do not group the artwork
  - (I believe groups don't work – not sure)
- With artwork selected, in the tiny "GCC Panel" window of Illustrator,
  - click tiny Export icon (lower right)
  - This opens the GCC menu window inside Illustrator

Prepare the Cutting Settings

- Inside Illustrator's GCC menu window...

- At bottom left,
  - click Eye icon to see what artwork will be cut
    - as Vector or as Raster
    - Filled => raster
    - Lines only => vector/lines

- Top menus:
  - "Pen" tab:
    - Each pen can produce a different kind of cut
      - Each pen has color, speed, power, etc

    - Example:
    - Pen1 =
      - Black (rgb = 1,1,1)
      - Width = 0.025 => vector cut
        - *Must* be 0.025 or thinner to get vector cut

    - First...

Assign Illlustrator lines to "pens" for different cuts

- Different GCC "pens" => different kinds of cuts
  - For example, slower cut, hotter cut, etc.

- First you will tell GCC which of your Illustrator lines go to which "pens"
  - Inside GCC window...
    - Select a line or lines in your drawing
      - (You may need to zoom in to select)
    - With your line(s) selected,
      - choose a pen number (pen 1, pen2, etc)

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Define Settings for "pens" to get different cuts

- Settings of each pen determines how it will cut
  - Hotter cut laser beam will cut more
  - Less hot beam will score but not cut
  - Etc.

  - Color:
    - This is for convenience only
    - Illustrator colors do not have to be same as GCC colors
      - For example, a black Illustrator line could be assigned to the "red" pen
    - Usually easier to make the colors the same

  - Speed + Power + PPI = heat of laser
    - There are three parameters which control the heat of the laser beam

    - Speed = how fast the beam moves
      - 100 = 100% speed = very fast
        - and therefore not very hot
      - 10 = 10% speed = much slower

    - Power = power of beam
      - highter number = hotter cut
      - TIP: leave Power = 100; adjust only speed and PPI

    - PPI = Pulses Per Inch
      - higher number = more pulses = hotter cut
      - PPI = 1400 is a good number to start with

    - Examples:
      - Speed=5; Power=100; PPI=1400 => a very slow, hot cut
      - Speed=50; Power = 100; PPI=1400 => a quicker and therefore not so hot cut
      - Speed=5; Power=100; PPI=500 => slow, not very many pulses, not extremely hot

  - (See table at bottom of this document for suggested settings for different materials)

  - "Advance" tab:
    - "Home" => Placement according to your Illustrator layout
      - That is, head will start at far upper left of page/board
      - Most useful when you gang artwork onto one sheet

- "Center" =>you manually position the head over the material
  - Your artwork will be cut there
  - Most commonly used, especially for testing

Send your file to the GCC machine

- When your settings are finished,
  - Hit the tiny Export icon (bottom menu icons)
    - You should get two messages about your file being successfully exported
    - On the GCC machine's panel,
      - the name of your Illustrator file should appear

Do a non-Cutting Test

- Keep the lid of the machine open
  - This prevents the beam from activating

- Hit the small red Start/Stop button on GCC panel

- The cutter head moves over the material
  - at exactly the speed and in exactly the pattern as it will when it cuts,
    - but the beam does not go on, doesn't cut
- To interrupt the test...
  - Hit the small red Start/Stop button again

- If you need to change something in your Illustrator file...
  - On the GCC panel, hit Delete to delete the old file you just tested
  - In Illustrator make your changes
  - In the Illustrator GCC window, hit Export again
  - Re-test

Cut the Material

- When you are ready to cut...

- Close the lid
- Make sure the ventilation fan is on
  - (Switch is next to the doorway)

- Hit Start/Stop button again
  - The head moves, beam is on, beam cuts material

- **WARNING:**
  - If too much smoke or if flames,
  - Immediately hit the round red **Emergency** Panic button

        - on right side of machine
    - This immediately stops the machine
    - To reset this Emergency button,
        - turn it

- If material is not cut all the way through...
    - two approaches:

    - A)
    - Without touching your material or the head,
    - hit small red Start/Stop button again
        - to cut exact same pattern a second time

          or

    - B)
    - Change the settings in your Illustrator file, then...
        - ...export again & re-cut

Finish Up

- When you are finished...
- Open the lid
- Remove your material
- On the little GCC panel
    - Hit Delete
        - to delete your file from GCC's memory

Shutting Everything Down

- Turn off the big fan near the door
- Turn off the compressor on the floor
- Shut down the Macintosh
- Power off button on the GCC LaserPro

- Power off power strip on the floor
- Lock door and turn off lights
- Return keys to DDA

Some Suggested Settings for Cutting Speeds & Powers

- 3/16” FoamCore foamboard
    - To cut: Speed = 5; Power = 100; PPI = 1400
    - To score lightly: Speed = 60; Power = 100; PPI=1400

- 1/16” matboard
  - To cut: Speed = 1; Power = 100; PPI=1400
  - To score: Speed = 60; Power = 100; PPI=1400

- Epson Enhanced Matte paper
  - To cut: Speed = 10; Power = 100; PPI=1400
  - To score: Speed = 50; Power = 100; PPI=1400