

Fusion 360 Electronics Tutorial

Introduction

Fusion 360 is a collaborative cloud-enabled 3D CAD, CAM, CAE, and PCB software developed and sold by Autodesk. Fusion 360 electronics is part of the Fusion 360 platform with the capabilities of creating electronics schematic, layout PCB, and easy-to-use component editor.

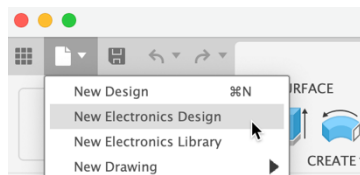
<https://www.autodesk.com/products/fusion-360/electronics-engineer>

Fusion 360 electronics work fundamentally in two workspaces: Schematic capture and PCB design. First, the circuit connectivity is designed using the standard component symbols with which we are all familiar. The components are positioned on the printed circuit board in the second stage, and traces between connected components are laid out. Fusion 360 makes this easier by preserving the connections between components and applying various electrical and design rule checks to ensure the board will function as expected. Fusion 360 electronics users can work on their circuit board in a functional 3D model workspace. The additional dimension allows the user to provide enclosure dimension to the electronic engineer quickly. The equipped 3D model of the circuit board can be inserted into the enclosure, and component placement can be fine tune in the design workspace.

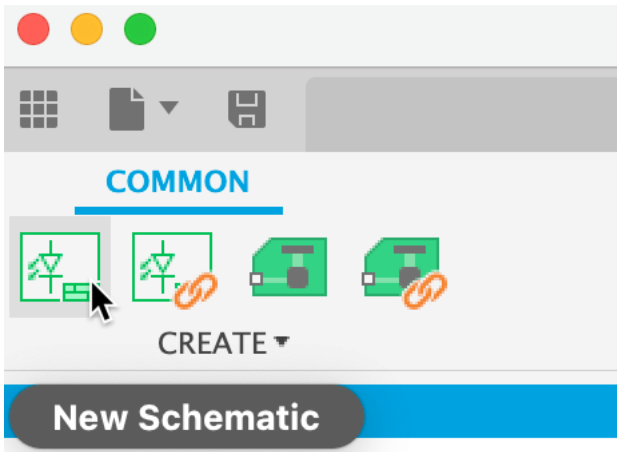
In this tutorial, we will design an alternating LED flasher. Based on the ubiquitous **LM555 timer**, this circuit uses a few passive components to provide you with immediate feedback on its operation. The component and values that will be needed for this tutorial are the followings based on a +5V source.

Getting Started

From the initial Fusion 360 design workspace, select the option New Electronic Design from the File pull-down menu.

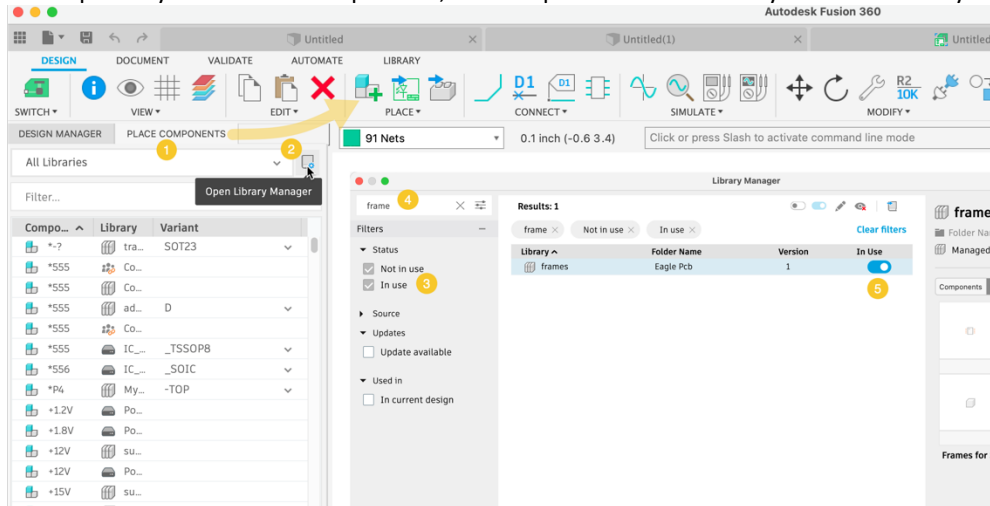


The electronic document allows you to repurpose an existing schematic or create a new one. The primary function of the electronic document is to keep your electronic schematic and circuit board synchronized. Modifications to your schematic will immediately be reflected on the PCB. The linked schematic will automatically adopt commands such as naming or changing component values performed on the PCB. For our tutorial, we will use the option to create a brand-new schematic.

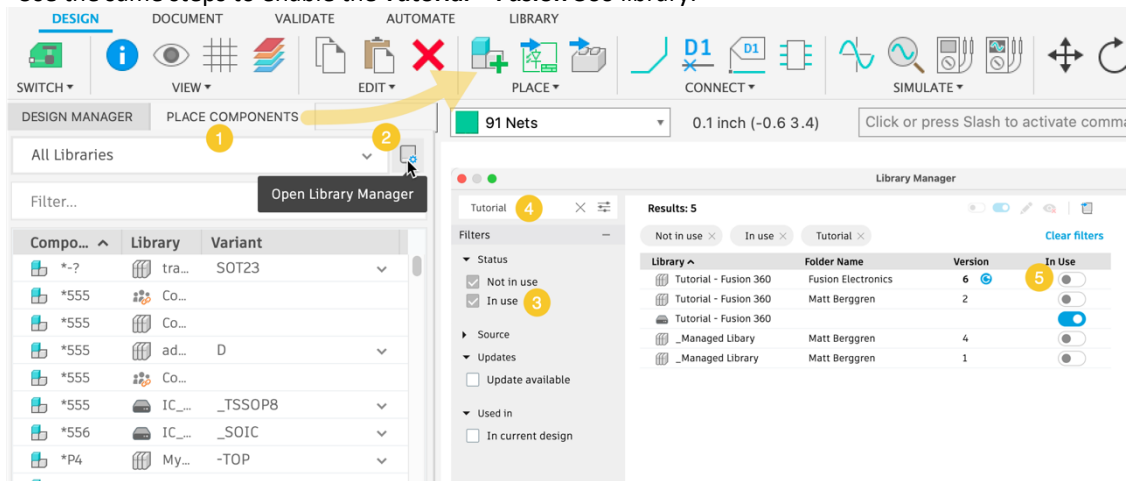


Activate Libraries in Schematic Editor

The schematic editor interface is very similar to the initial design workspace. We intentionally do this to keep a familiarity between the electronic and mechanical design capabilities of Fusion 360. From the Place Component panel, invoke the library manager. You can activate libraries that will be used for your design from the library manager. For our example, we need to ensure the Frames and Tutorial library is enabled. Fusion 360 does have a vast repository of available components, and our partners continuously contribute many more.

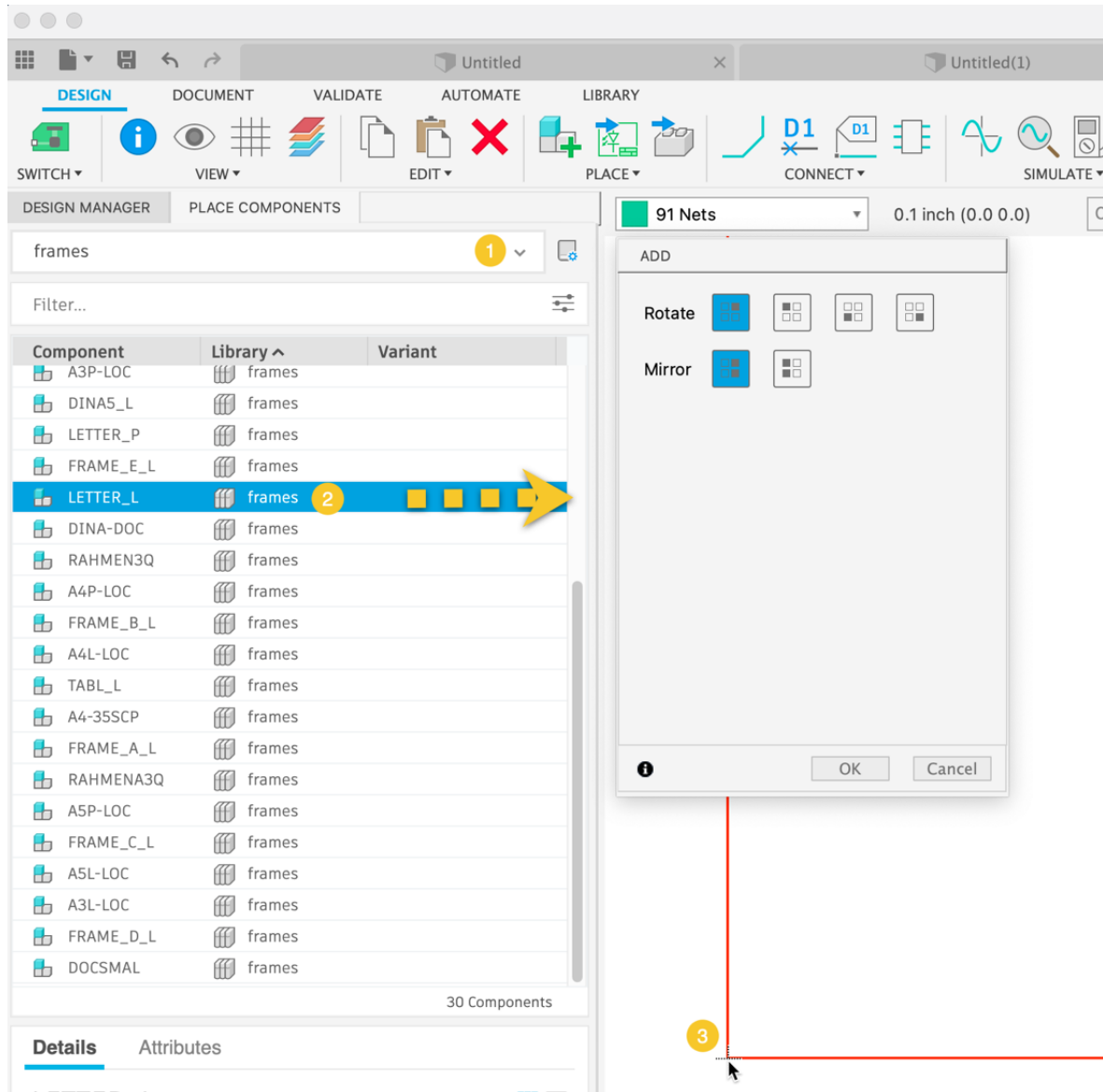


Use the same steps to enable the **Tutorial – Fusion 360** library.



Populate Schematic

From the Frame's library, select the Letter_L component and drag it into the schematic workspace. Place the Frame at the origin of the page.



For the passive components, we want to use the variant with the 1206 size for capacitors and resistors.

DESIGN MANAGER PLACE COMPONENTS

Tutorial - Fusion 360

Filter...

| Component | Library ^ | Variant |
|-------------|--------------------|--------------------|
| GND | Tutorial - Fusi... | |
| VSS | Tutorial - Fusi... | |
| VCC-BAR | Tutorial - Fusi... | |
| VSS-BAR | Tutorial - Fusi... | |
| GND-CIRCLE | Tutorial - Fusi... | |
| GND-BAR | Tutorial - Fusi... | |
| VDD-CIRCLE | Tutorial - Fusi... | |
| +V | Tutorial - Fusi... | |
| VCC-CIRCLE | Tutorial - Fusi... | |
| VSS-CIRCLE | Tutorial - Fusi... | |
| C | Tutorial - Fusi... | RADIAL-55.5MM-DI ^ |
| VLP-300-R/F | Tutorial - Fusi... | >VALUE |
| LED_CHIP | Tutorial - Fusi... | CHIP-0603(16... |
| LM555N | Tutorial - Fusi... | >NAME |
| JSTPH2 | Tutorial - Fusi... | >VALUE |
| R-US | Tutorial - Fusi... | CHIP-0805(20... |

→

Details Attributes

C_RADIAL-55.5MM-DIA

GS1
>VALUE
>SPICEMODEL
>SPICEEXTRA

COMPONENT

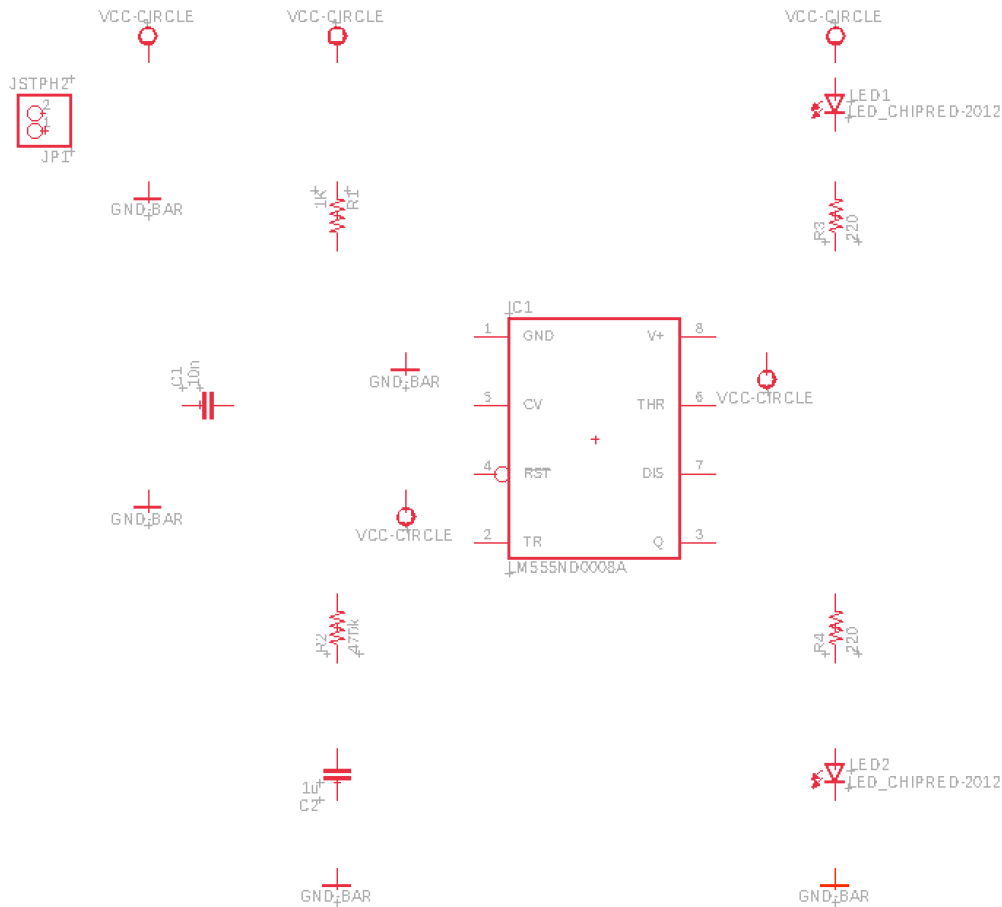
3D MODEL

CHIP-1206(32...

CHIP-1210(32...

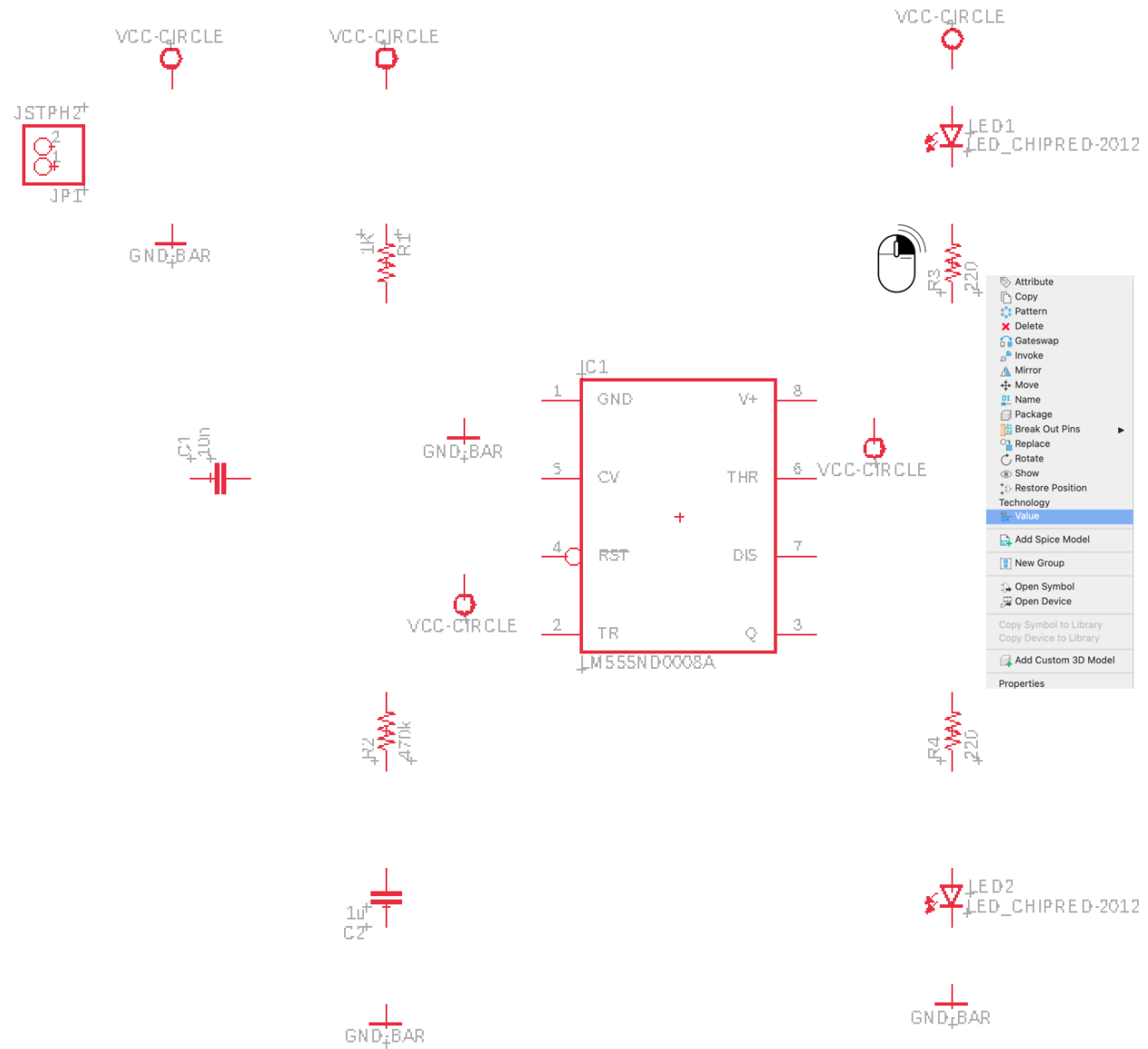
CHIP-1812(45...

Continue adding the components to the schematic but use the Tutorial Library this time. You can right-click to rotate the component with the component attached to the mouse cursor. You should end up with a schematic that looks like this:

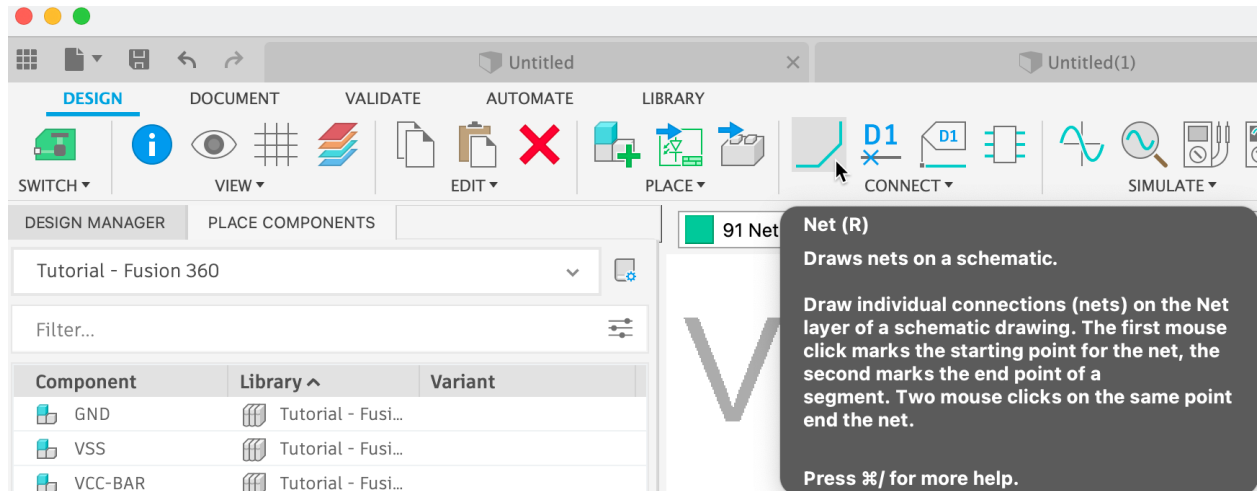


- 4 Resistors
- 2 Capacitors
- 2 LED
- 1 JST connector
- 1 LM555N Timer
- 5 VCC
- 4 GND

With the components placed, use the Value Command, available on the context menu of each part, to assign a value.

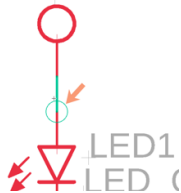


Define Connections

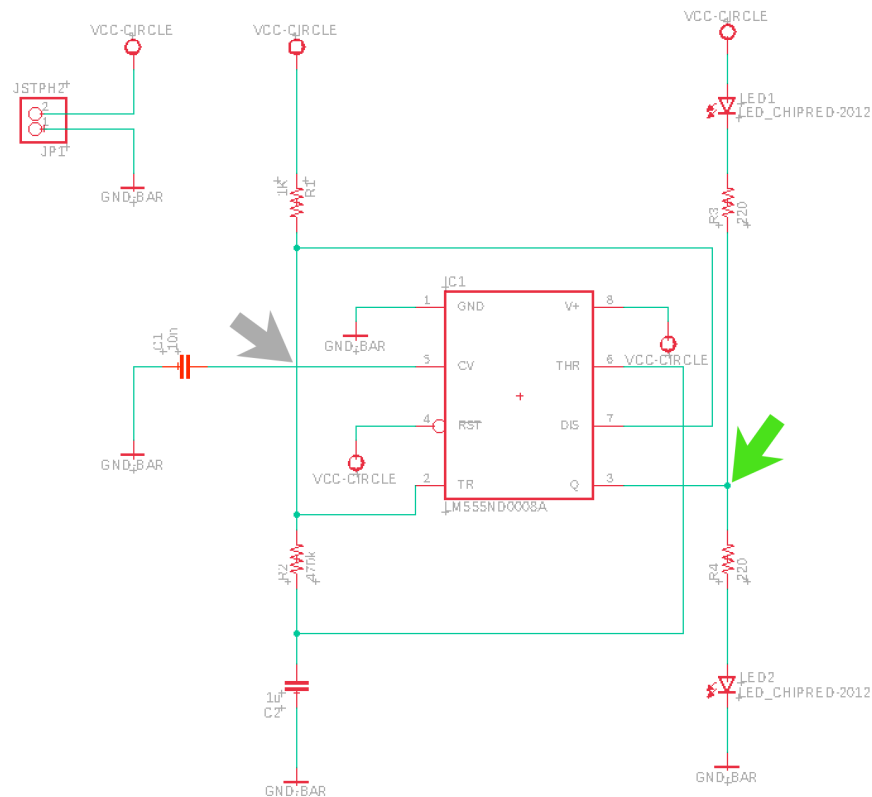


Using the NET command, let's define the connections on the schematic. The connecting point between the NET and the part Pin will be shown as a bubble:

VCC-CIRCLE



Complete the rest of the connections:

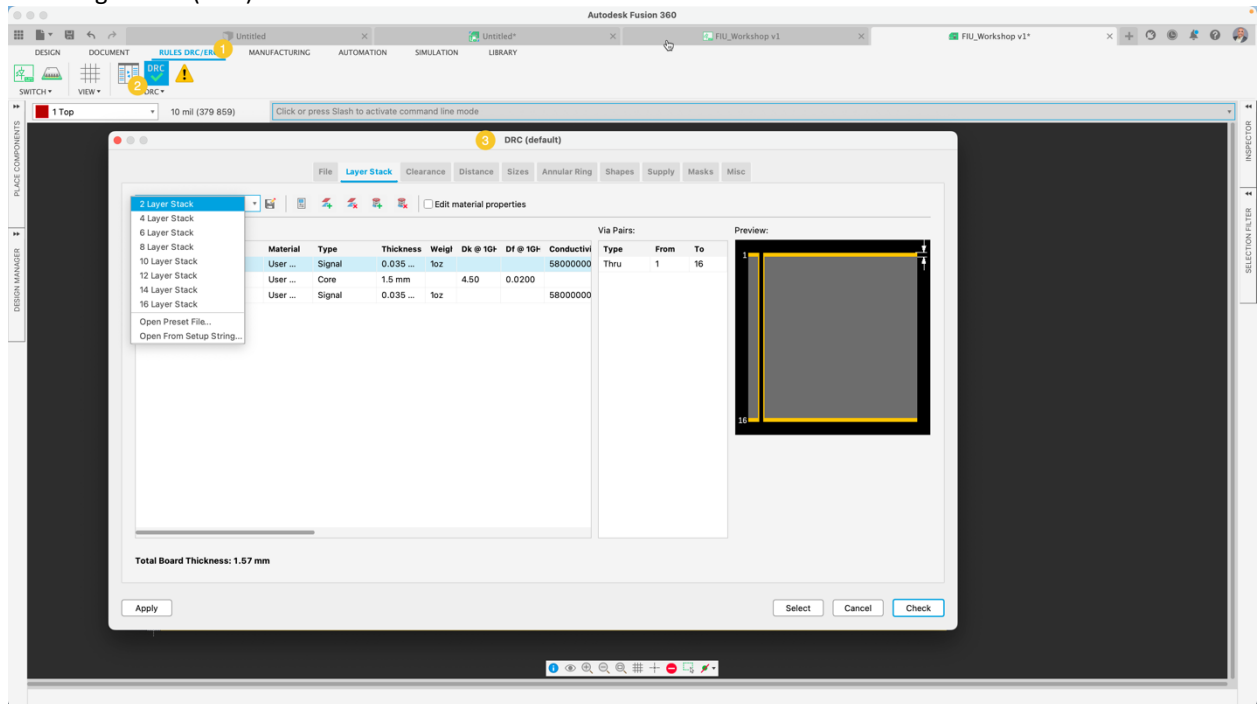


Switch to PCB document

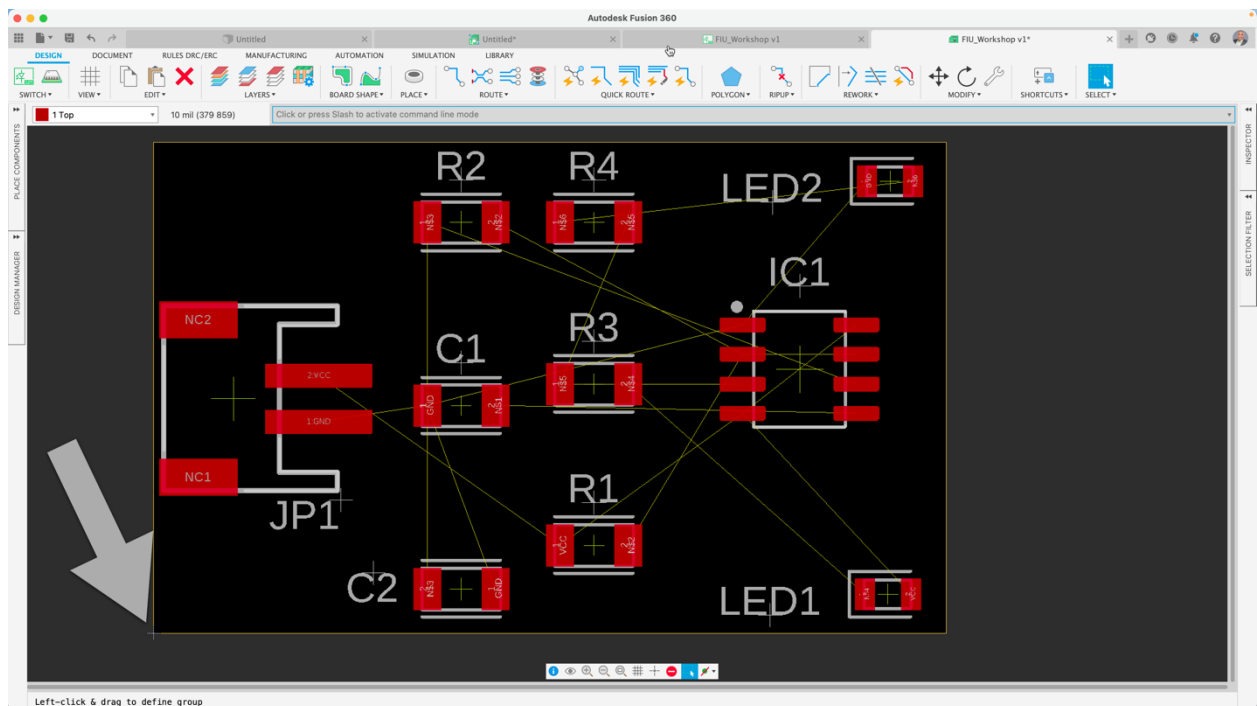
If there is a linked PCB document, will switch to the PCB document, otherwise, will switch to electronics design to remind user to create a PCB document.

The Switch icon changes to support getting back to the schematic.

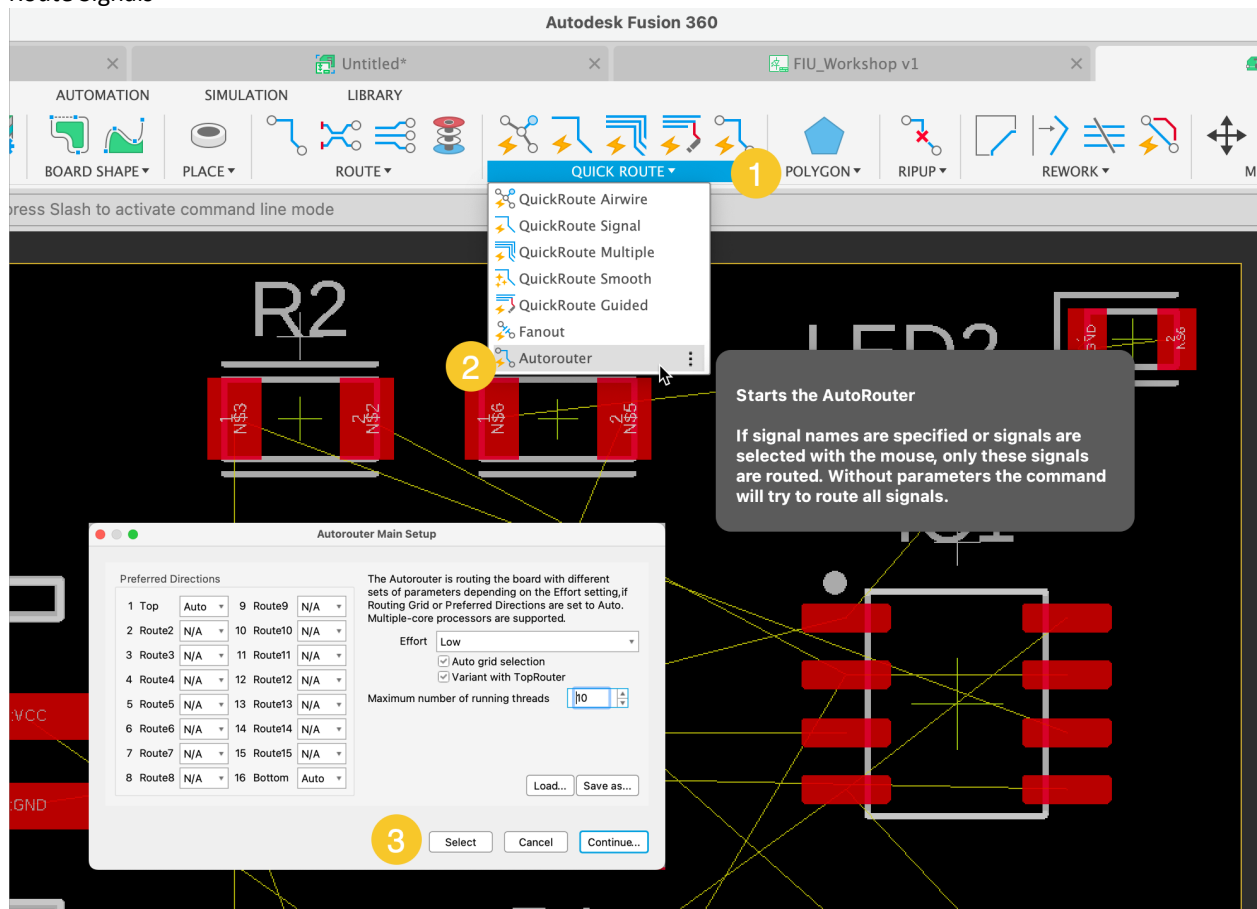
Set Design Rules (DRC)



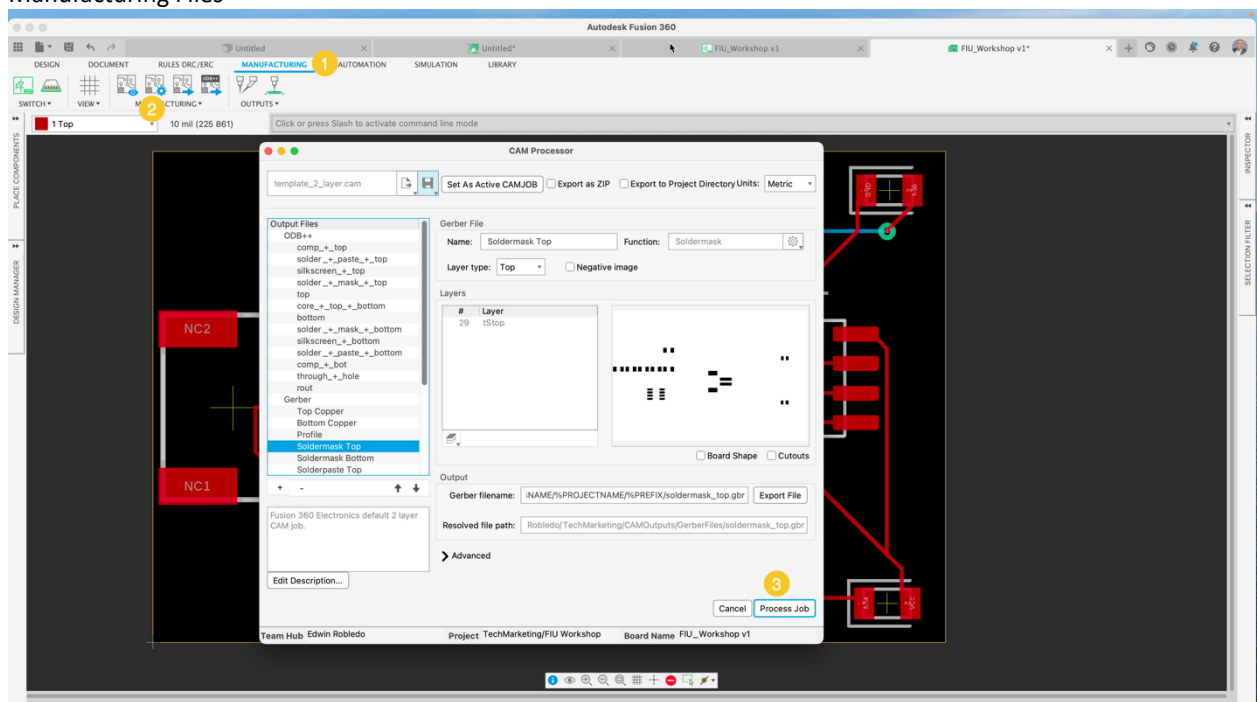
Modify the outline and drag components into the workspace.



Route Signals



Manufacturing Files



Resources for additional information about Fusion 360:

Blogs: <https://www.autodesk.com/products/fusion-360/blog#electronics-engineering>

Fusion 360 electronics Tutorial:

For Beginners: https://youtube.com/playlist?list=PLmA_xUT-8Uil80Xm8Gxz98YNum3I9Glnr

Blogs Page: <https://www.autodesk.com/products/fusion-360/blog#electrical-engineering>

Fusion 360 electronics: <https://www.autodesk.com/products/fusion-360/features#electronics>

Fusion 360 electronics landing Page: <https://www.autodesk.com/products/fusion-360/electronics-engineer>

Fusion 360 electronics YouTube Playlist: https://youtube.com/playlist?list=PLmA_xUT-8Uil80Xm8Gxz98YNum3I9Glnr

Fusion 360 electronics help files: <https://help.autodesk.com/view/fusion360/ENU/?guid=ECD-OVERVIEW>

Fusion 360 electronics forum: <https://forums.autodesk.com/t5/fusion-360-electronics/bd-p/6071>

Fusion 360 electronics self-paced learning: <https://help.autodesk.com/view/fusion360/ENU/courses/>

Free for Students: <https://autode.sk/3fR2jpR>