

Electrical and Computer Engineering

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Electrical and Computer Engineering

Providing quality educational opportunities for students through teaching, research and professional service.

Welcome

The Electrical and Computer Engineering Department offers high quality

Degrees Offered

We offer B.S., M.S. and Ph. D. degrees in **Electrical Engineering** and

Electrical and Computer Engineering

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ECE Equipment Inventory

List of  [ECE equipment](#) as of 3/1/2019.

ECE Parts List

List of  [parts available](#) in the ECE department.

NDSU

Electrical and Computer Engineering

Phone: **(701) 231-7019**

Campus Address: **EE 101**

USPS Mailing Address: **NDSU Dept 2480, PO Box 6050, Fargo, ND 58108-6050**

Physical Address: **1411 Centennial Blvd, Fargo, ND 58102**

Page Manager: **Electrical and Computer Engineering**

Friday, March 01, 2019 4:27:41 PM

[Privacy Statement](#)

Inventory.xlsx					
16 / 65					
TRANSISTOR	B-1-128	2N1729	NTE100	Trans PNP, Ge, RF/IF Amp, Osc, Mixer, AM	NTE
SCR	B-1-129	2N1849	NTE5507	SCR-400 VRM, 16 A	NTE
TRANSISTOR	B-1-130	2N2160	NTE6400A	Trans Unijunction, Si	NTE
TRANSISTOR	B-1-131	2N217	NTE102A	Trans PNP, Ge, AF Preamp, Dr, PO	NTE
TRANSISTOR	B-1-132	2N222A	NTE102A	[PNP] Medium Power Amplifier Germanium	NTE
TRANSISTOR	B-1-133	2N2374			
TRANSISTOR	B-1-134	2N243			
TRANSISTOR	B-1-135	2N2564			
TRANSISTOR	B-1-136	2N2635			
TRANSISTOR	B-1-137	2N2644			
TRANSISTOR	B-1-138	2N2646		Unijunction Transistor	Newark
TRANSISTOR	B-1-139	2N2806			
TRANSISTOR	B-1-140	2N2857			
TRANSISTOR	B-1-141	2N2862			
TRANSISTOR	B-1-142	2N29			
TRANSISTOR	B-1-143	2N2907		[PNP]	
TRANSISTOR	B-1-144	2N2905			
TRANSISTOR	B-1-145	2N5089			
TRANSISTOR	B-1-146	2N2944			
TRANSISTOR	B-1-147	2N3055		TRANSISTOR NPN 60V 15A TO-3	Mouser
TRANSISTOR	B-1-148	2N321			
TRANSISTOR	B-1-149	2N327A			
TRANSISTOR	B-1-150	2N3299			
TRANSISTOR	B-1-151	2N3371			
TRANSISTOR	B-1-152	2N3563			
TRANSISTOR	B-1-153	2N3643			
TRANSISTOR	B-1-154	2N3703			
TRANSISTOR	B-1-155	2N3706			
TRANSISTOR	B-1-156	2N3710			
TRANSISTOR	B-1-157	2N3711			
TRANSISTOR	B-1-158	2N3712			
TRANSISTOR	B-1-159	2N3713			
7400 SERIES	B-1-160	SN74LS595N		IC 8BIT SHFT REG OUT LTCH 16DIP	
	B-1-161	MCP4162-103	4162103	SINGL 78 NV SPI Rho MICRO DIGITAL POTENTIOMETER ics	
TRANSISTOR	B-1-162	2N3789			
TRANSISTOR	B-1-164	2N3820			
TRANSISTOR	B-1-165	2N3826			
TRANSISTOR	B-1-166	2N963			
TRANSISTOR	B-1-167	2N964			
TRANSISTOR	B-1-168	2N967			
TRANSISTOR	B-1-168A	FGPN60LS		IGBT- Insulated Gate Bipolar Transistor 600V	Newark
TRANSISTOR	B-1-169	2N3827			
TRANSISTOR	B-1-170	2N3839			
TRANSISTOR	B-1-171	2N3904	2N2222AP	Trans NPN SS GP 200mA TO-92 Package	Digi-Key
TRANSISTOR	B-1-172	2N3906	2N222	TRAN PNP SS GP 200mA TO-92	Digi-Key
TRANSISTOR	B-1-173	2N3913			
TRANSISTOR	B-1-174	2N404			
TRANSISTOR	B-1-175	2N4060			
TRANSISTOR	B-1-176	2N408	SK3004	T-PNP, Ge, AF Preamp, Dr, PO	
TRANSISTOR	B-1-177	2N4120			
TRANSISTOR	B-1-178	2N428			
TRANSISTOR	B-1-179	2N4126			
TRANSISTOR	B-1-180	2N5060			
OP-AMP	B-2-001	OPA4251PA		IC Quad Micro Power Op Amp, 15 V	Mouser
OP-AMP	B-2-002	LM833N		Dual Audio Op Amp, 15 MHz BW	Digi-Key
MULTIPLEXER	B-2-003	MAX396EPI		CMOS Analog Multiplex, Low-V, Dual 8 Ch	
SENSOR	B-2-004	QT60040-IS		SENSOR IC MATRX TOUCH 4CH 14SOIC	Digi-Key
OP-AMP	B-2-005	CLC428		Op Amp, Dual Wideband/ Low-Noise/ Voltage Feedback	
SENSOR	B-2-006	TQ1		Sensor Touch Charge Transfer	

Component Request Form
North Dakota State University
Electrical & Computer Engineering Department

Name: _____ ECE Course #: _____

E-mail: _____ Or Group #: _____

Date: _____ Or Funding Info (if known): _____

Authorizing Signature: _____

CHECK ONE
(Use ONE order form for each distributor.)

<input type="checkbox"/> ECE STOCK	<input type="checkbox"/> DigiKey	<input type="checkbox"/> Marlin P. Jones
<input type="checkbox"/> Allied	<input type="checkbox"/> Electronix Express	<input type="checkbox"/> Mouser
<input type="checkbox"/> Amazon.com	<input type="checkbox"/> JameCo Electronics	<input type="checkbox"/> Newark

Other Vendor Name: _____

Web Address (if applicable): _____

[illegible]

****Note:** the ECE Stock Location can be found at http://www.ndsu.edu/ece/parts_inventory.pdf.

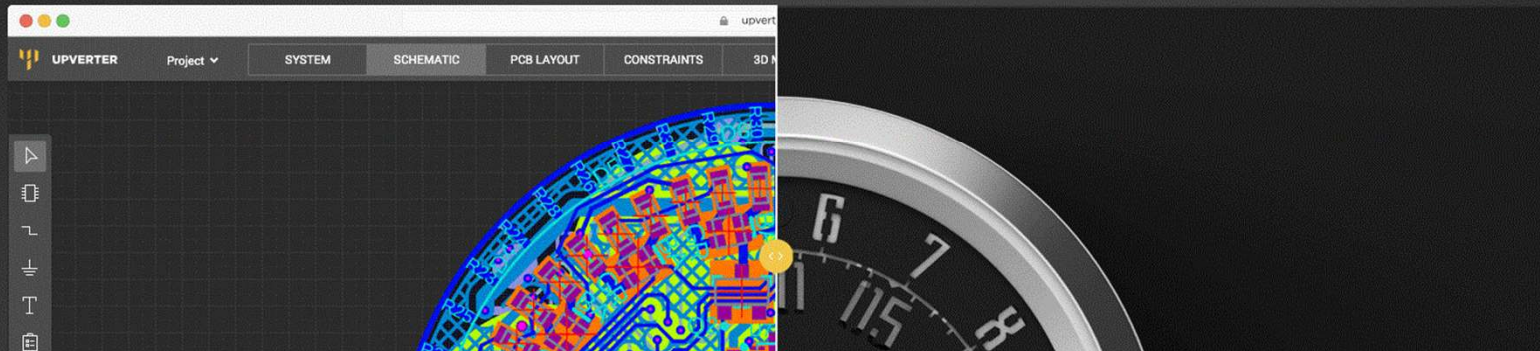
[illegible]

ECE Office Use Only

Electronics Design for Anyone and Everyone

Meet Upverter, the Free, easy-to-use electronic design tool that helps you bring your unique hardware ideas to life, no matter your engineering knowledge.

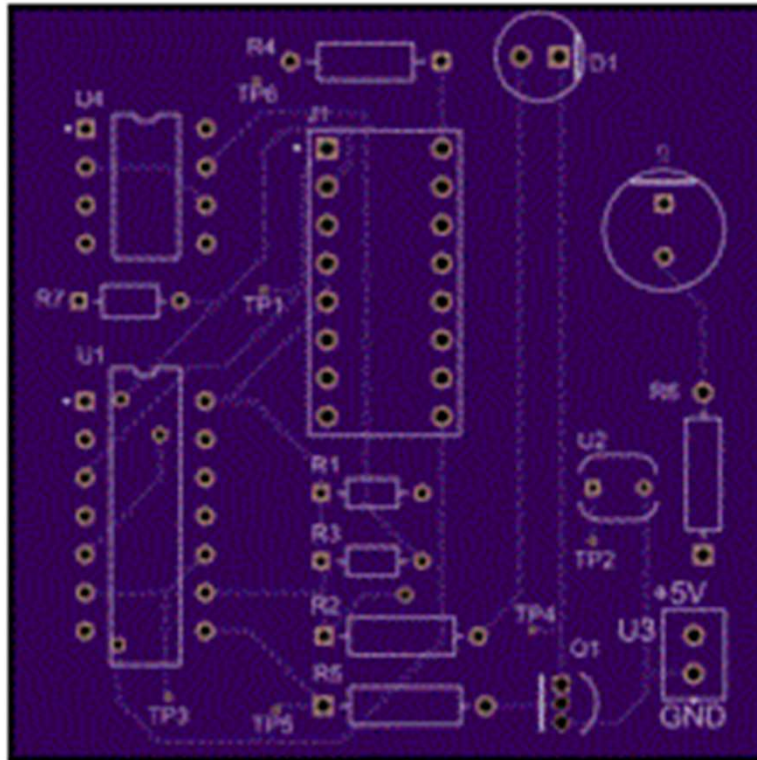
Sign Up For Free



Start Designing Your Electronics Online with Speed and Ease

Start from scratch, upload an existing design, or choose from thousands of community designs to customize any way you want.

UPVERTER .ppt



By using Upverter you will create gerbers , gerber files are used to create pcb's. This is a typical pcb.

Why use Upverter?

In the near future you may or may not be using Upverter.

There are many PCB generating programs available. It all depends on the application.

For Schematic Design and PCB Design, you may choose Multi-Sim (very good program and is heavily used by Engineers, It is also expensive and has a large learning curve.

Digi-key has pcbartist, there is ki-cad, design-spark and many more.

Upverter.com was chosen as it is web-based, its free, and has an easier learning curve than others, plus it has a collaboration option that works quite well when you team-up on a project.

UPVERTER

Power Point to aid in the creation of a PCB

Slides 1-12 Upverter Information

 Slides 13-24 Create the Schematic

Slides 25-41 Create the PCB 

Slides 42-50 Create the Gerber's

Slides 51-53 On line Gerber-Viewer

Slides 57-60 Order Procedures from Osh Park

Slides 61-67 For a more advanced PCB using Arduino Atmega328P

Upverter is web based

go to upverter.com, and Sign up. Username is email, password and then maybe collaborate after you pick a partner

- Create your own account, password protected

Collaboration is possible. This makes it easy to work on a project together

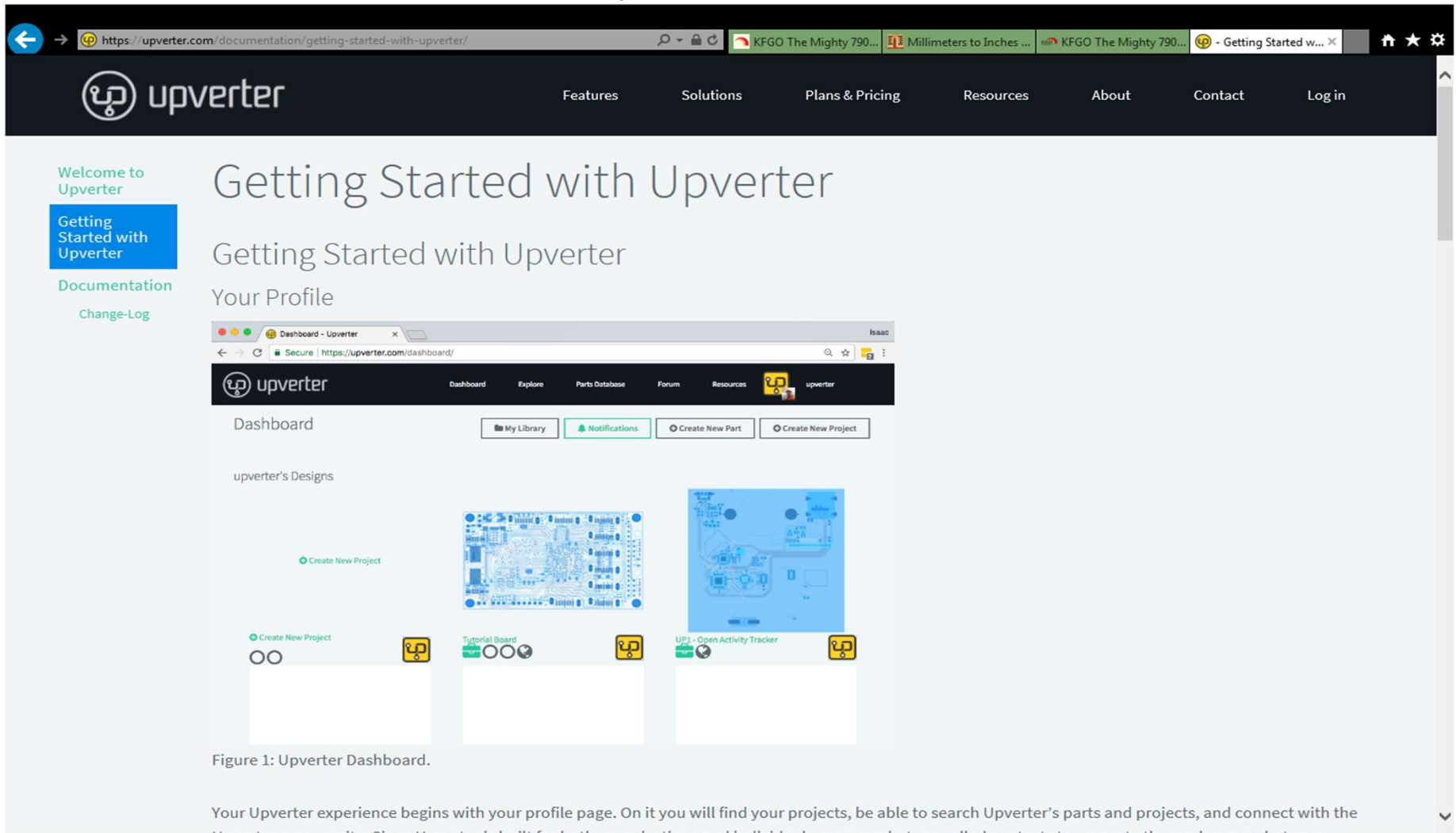
Some problems- it is web based- Upverter does not like Internet Explorer, works ok with Mozilla, but seems to work best with **Google Chrome**

Also you can collaborate with different log-ins but you cannot be logged in to two different computers at the same time with the same log-in ID and password.(It doesn't like collaborating with itself).

<https://www.youtube.com/watch?v=QZbE-gGRtD4>

This was very a useful website for getting started There is a Part 1 for making the schematic and Part 2 for making the PCB If you take the twenty minutes and work through it, you will find it rewarding

After an account has been created, this is what you will see.



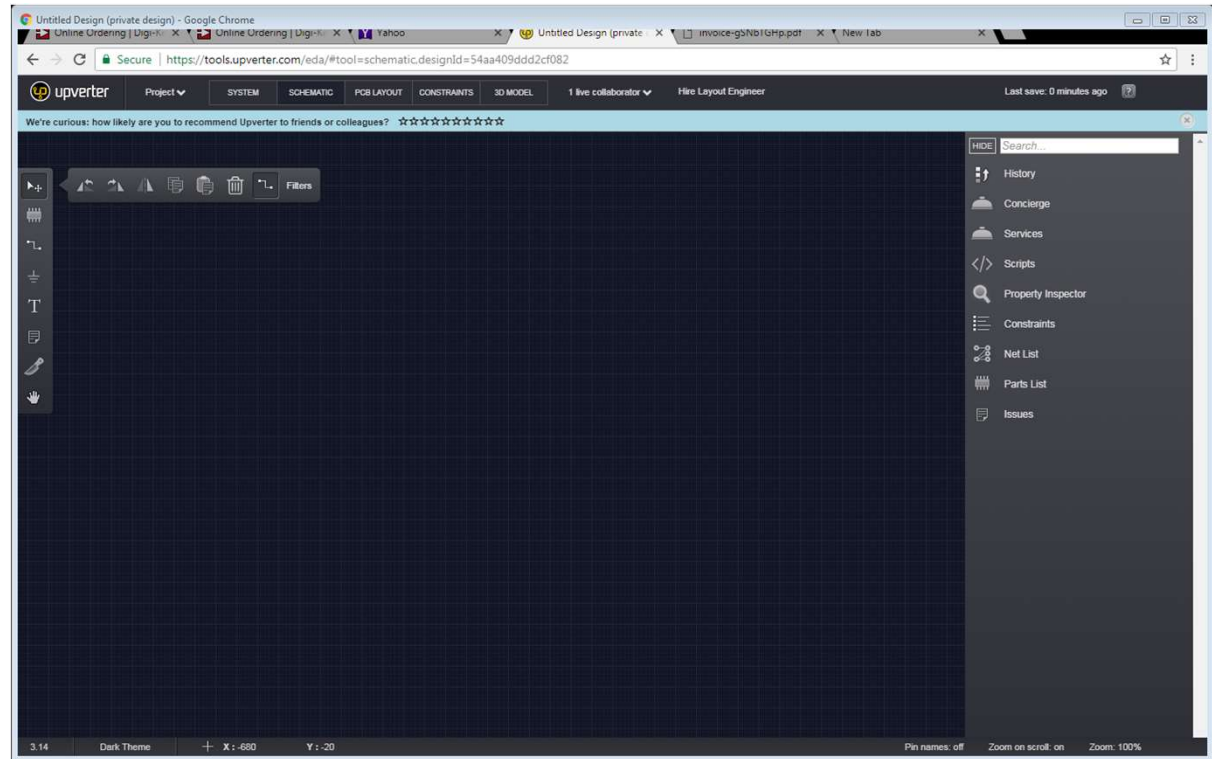
After going to Upverter.com and creating an account

Create a New Project

- Create a New project

>Project

> New



NDSU Employment Op x Yahoo - login x Yahoo x yahoo.com - Polarity Yo x New Tab Search x Microsoft PowerPoint x Microsoft PowerPoint x 555 timer (private des: x Upverter User Manual x

docs.google.com/document/d/1rw9T5aFdXkz1TaKuxiM3JfbQH5I-BDWSpvFbdEyPINc/edit

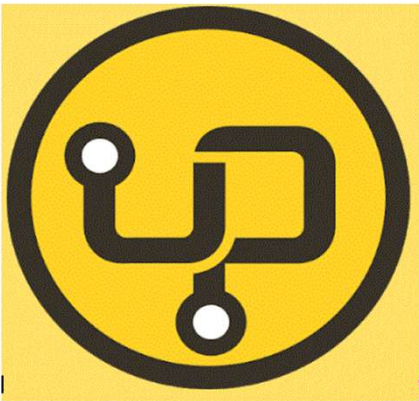
Upverter User Manual Rev A

File Edit View Insert Format Tools Add-ons Help

100% Normal text Arial 11 B I U A

Outline

- Mission
- Manifesto
- Welcome to Upverter
- Getting Started with Upverter
- Your Dashboard
 - Project Editor
 - How to Fork/Copy an Existin...
 - How to Delete a Project
- System Designer
 - Select & Move
 - Rotate Left
 - Rotate Right
 - Flip
 - Delete
 - Auto net routing
- Block
 - System Designer Block Types
- General
- Sensors/Input



upverter

User Manual

Revision A

Format page: left margin

Juan Cruz Becerra
Aug 26, 2018
Format: indent first line

Юра Александров
Jan 31, 2019
Format page: right margin

Tim Gillespie
Jun 24, 2019
Add: " "

Jason Hastings
Jul 25, 2019
Format list: add to list
Format: indent first line, indent left

jamie schnaitt...
12:59 PM Sep 1
Resolve
I feel like a Wiki would be a better way to do this
Reply...

Srini Vasam
Jun 7, 2018
Delete paragraph
Add paragraph

User Manual is very handy and easy to get at, open from Lower Left corner of page

Adding Parts to the schematic. Verified vs. Generic

Untitled Design (private design) - Google Chrome

Online Ordering | Digi-Key | Online Ordering | Digi-Key | Yahoo | Untitled Design (private | invoice-gSNbTGHP.pdf | New Tab

Secure | <https://tools.upverter.com/eda/#tool=schematic.designId=54aa409ddd2cf082>

Add Component

components

modules

generics

in-design

jeffrey.erickson's library

































- has footprint
- has price
- has symbol
- verified attributes
- verified geometry
- verified pad assignment
- verified pin names
- part number

Load More

1371853 result(s) found.

Request Symbol and Footprint

Create New Part Manually

			Value	Description	Package	Type
	Generic Resistor	 	5K	Generic Resistor		resistor
						
	Generic Capacitor	 	10uF	Generic Capacitor (Non-Polarized)		capacitor
						
	Generic Battery	 		Generic Battery		battery
						
	Generic Voltage Source	 		Generic Voltage Source		integrated circuit
						
	Generic LED	 		Generic LED		diode
						
	Generic Polarized Capacitor	 	10uF	Generic Capacitor (Polarized)		capacitor
						
	Generic Diode	 		Generic Diode		diode
						
	Generic General Switch	 		Generic General Switch		integrated circuit
						

555 timer (private design) - Google Chrome

Secure | <https://tools.upverter.com/eda/#tool=schematic,designId=39427c86f5328698>

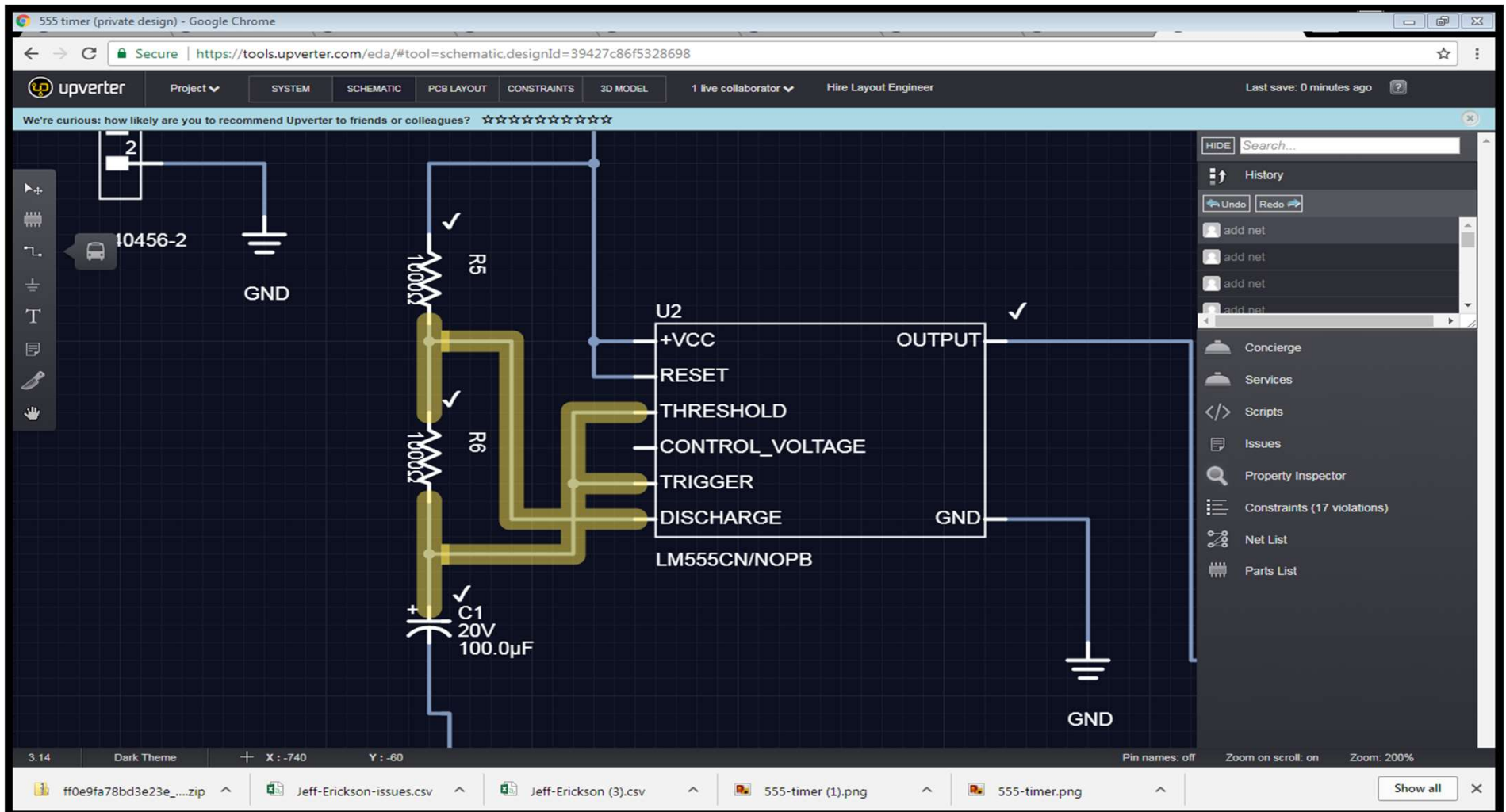
upverter Project SYSTEM SCHEMATIC PCB LAYOUT CONSTRAINTS 3D MODEL 1 live collaborator Hire Layout Engineer Last save: 0 minutes ago

We're curious: how likely are you to recommend Upverter to friends or colleagues? ☆☆☆☆☆☆☆

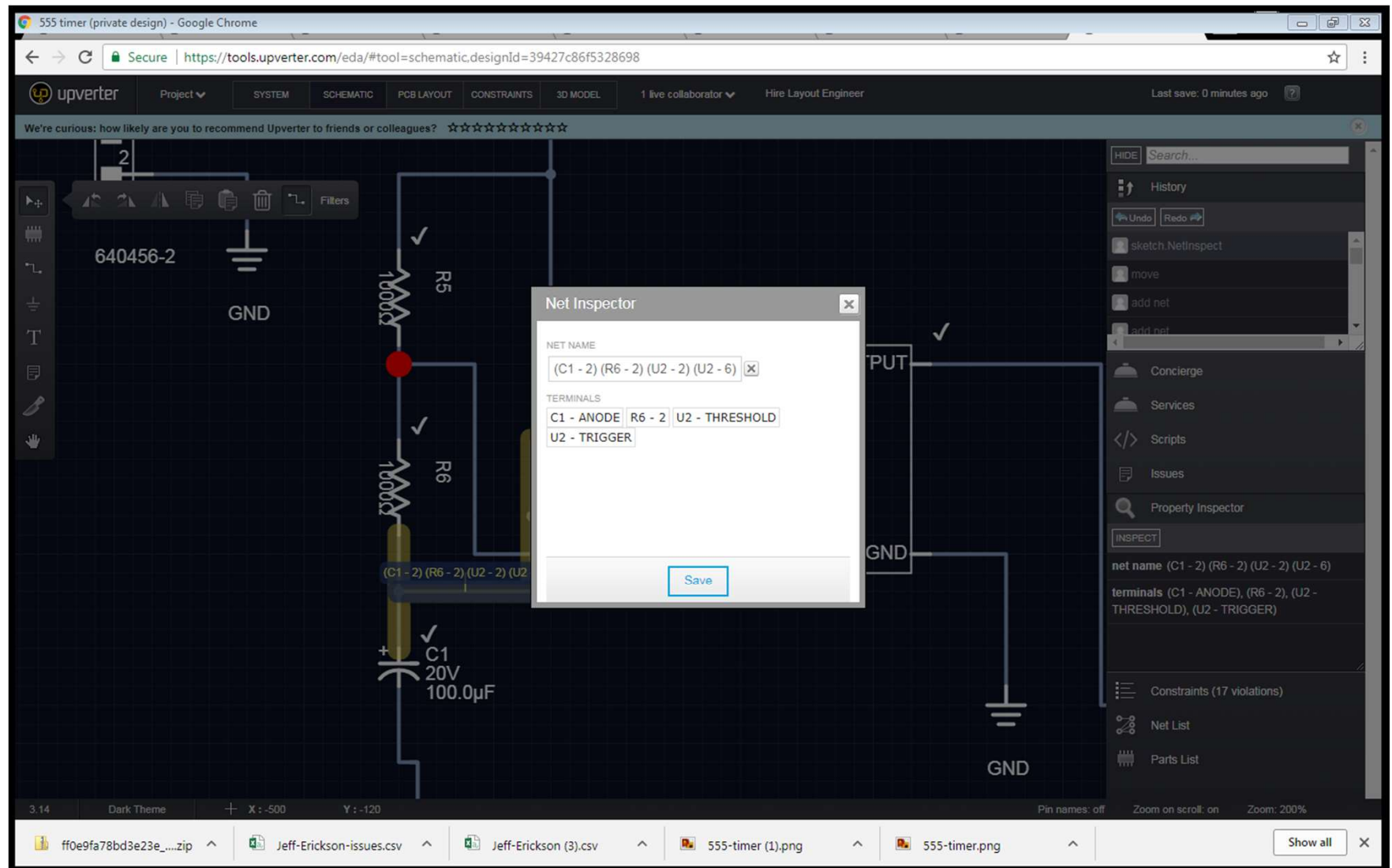
3.14 Dark Theme X: -890 Y: -40 Pin names: off Zoom on scroll: on Zoom: 100%

ff0e9fa78bd3e23e_...zip Jeff-Erickson-issues.csv Jeff-Erickson (3).csv 555-timer (1).png 555-timer.png Show all

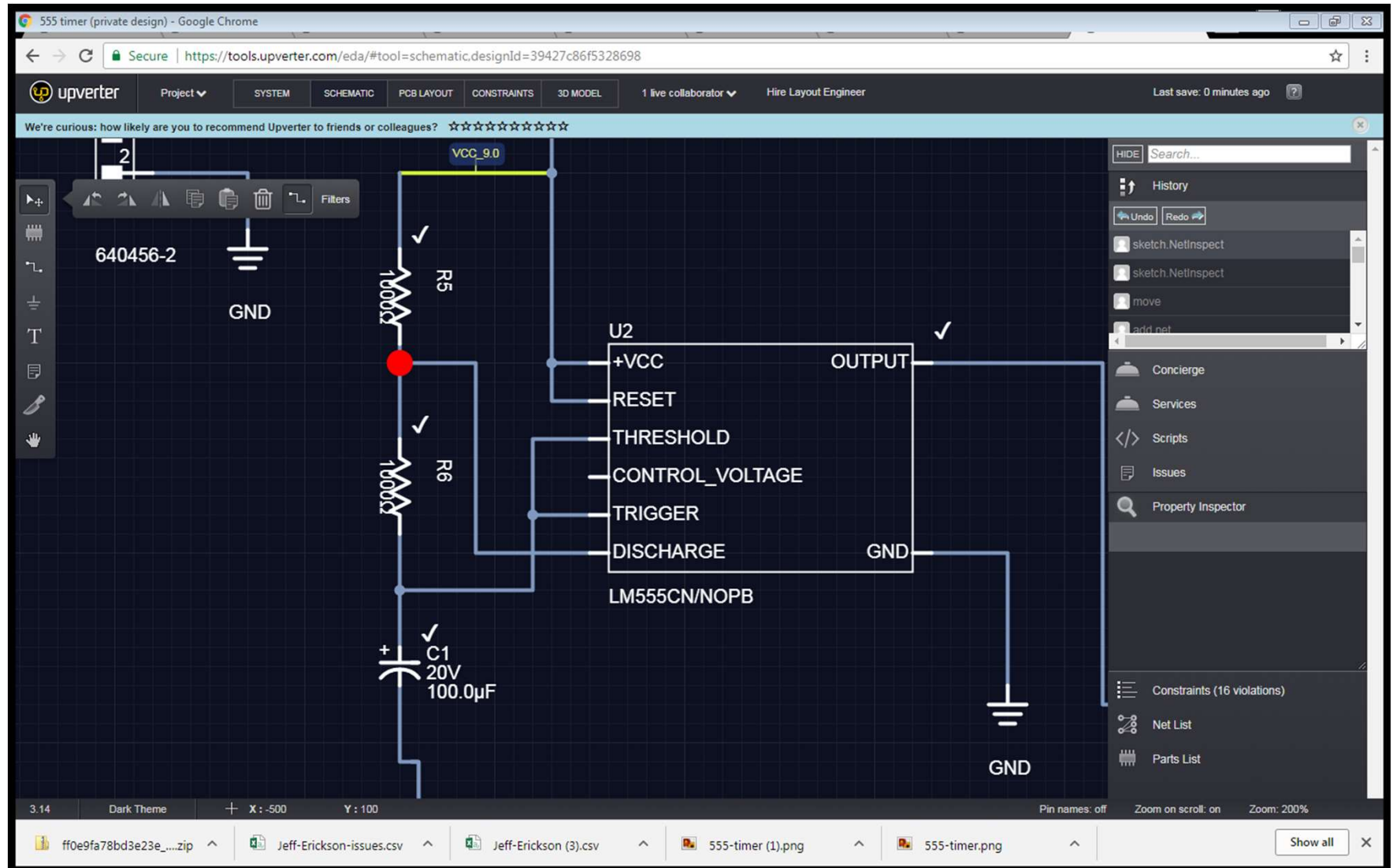
When creating schematic, do you have any issues like this? (Highlighted in Gold?)



Nets have to be named. Double click on the gold, this box shows up, and name your NET



Gold outline is now gone and circuit is finished- time to convert the Schematic into a CAM File



I started with a Microcontroller- using the Arduino ATmega328-PU IC, which is a 28 Pin DIP Package IC

Untitled Design (private design) - Google Chrome
Online Ordering | Digi-Key | Online Ordering | Digi-Key | Yahoo | Untitled Design (private | invoice-g5Nb1GHP.pdf | New Tab

Secure | <https://tools.upverter.com/eda/#tool=schematic.designId=54aa409ddd2cf082>

Add Component

components ATMEGA328 Search

















modules
generics
in-design
jeffrey.erickson's library

- has footprint
- has price
- has symbol
- part number
- verified attributes
- verified geometry
- verified pad assignment
- verified pin names

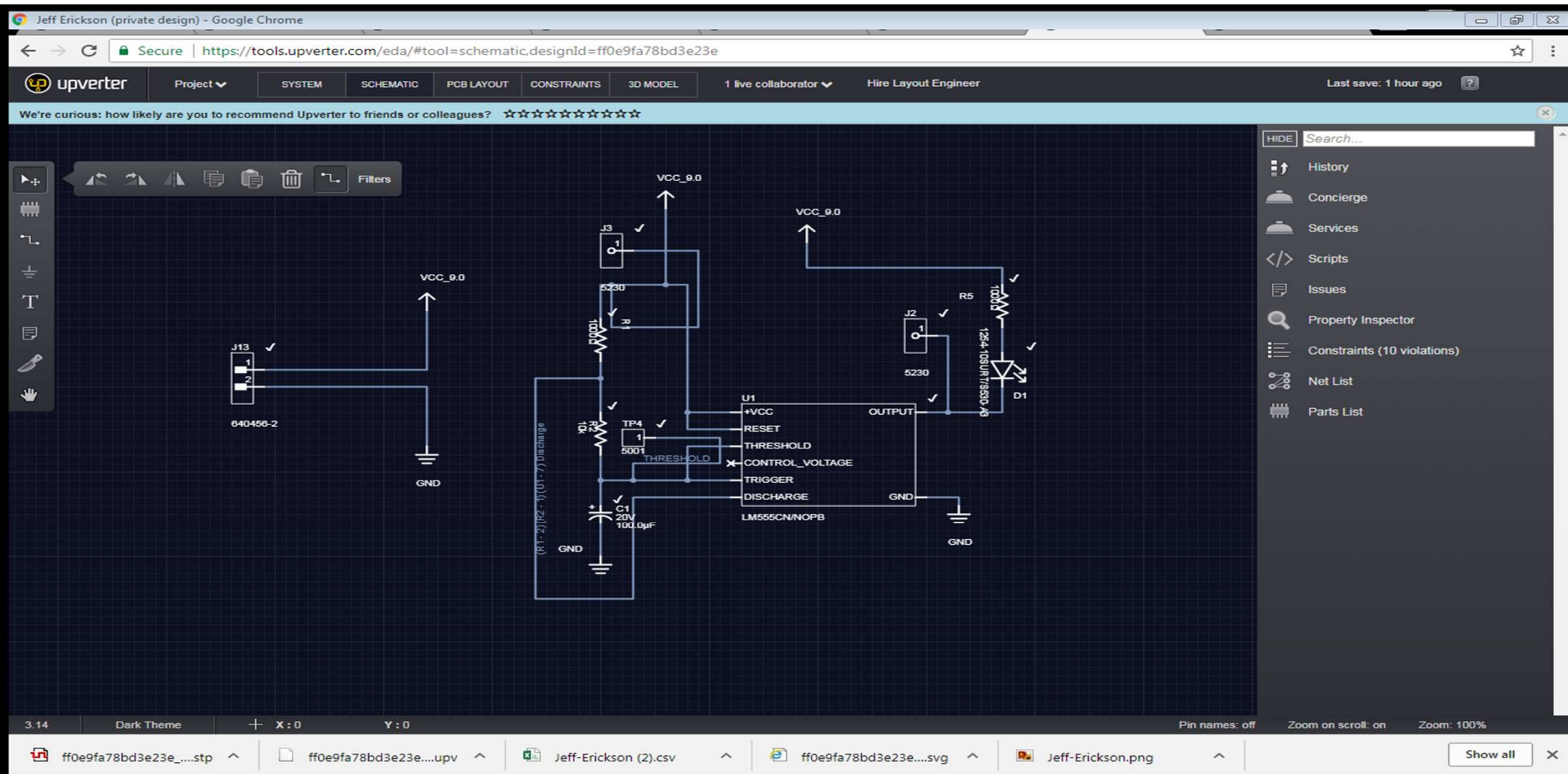
Load More

41 result(s) found.

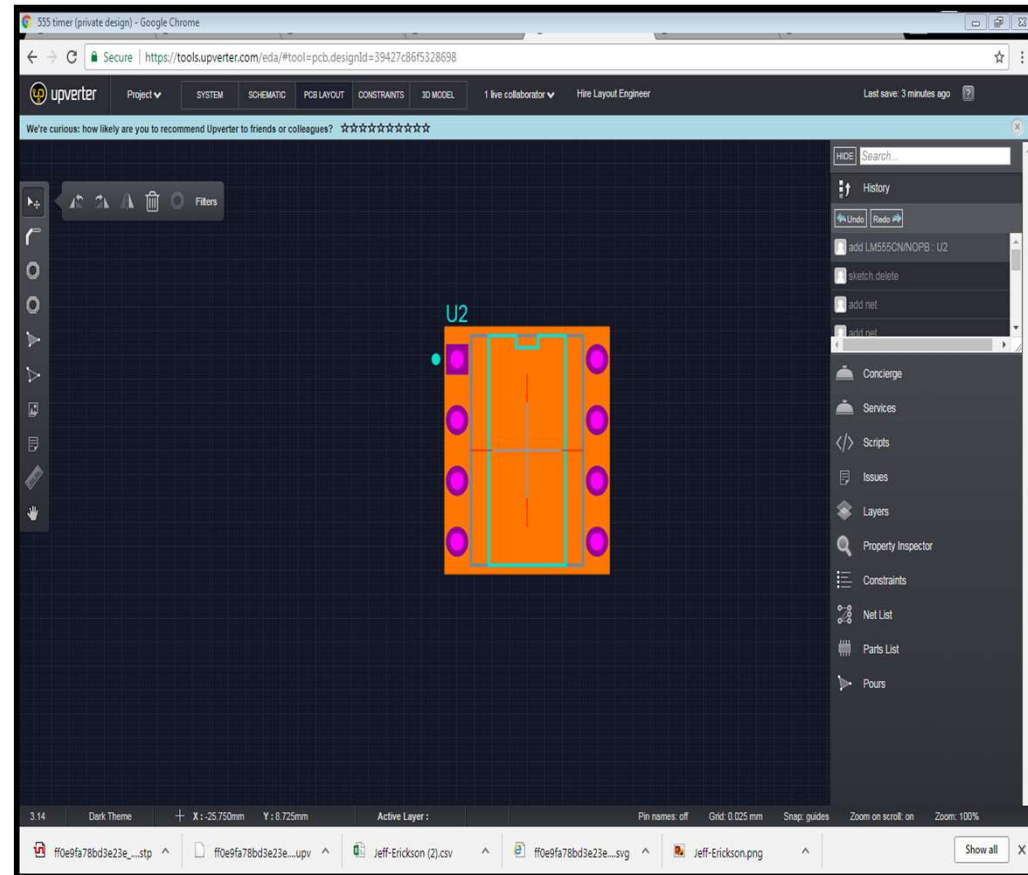
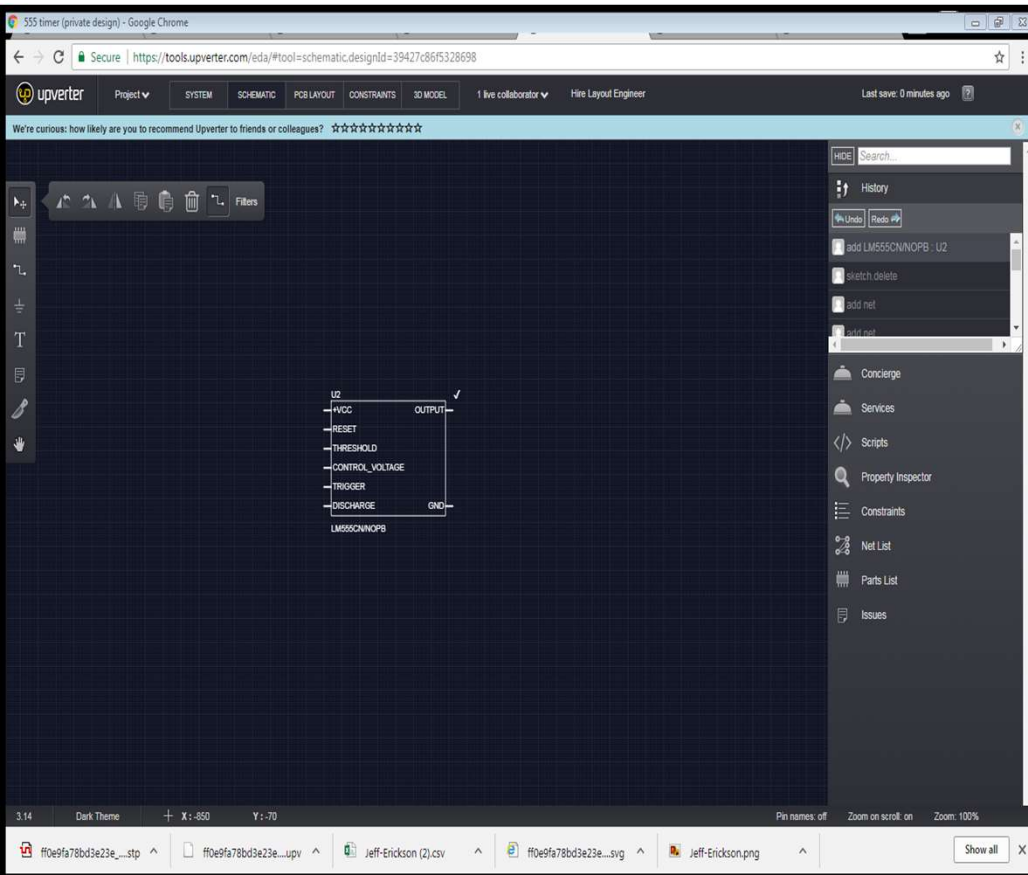
[Request Symbol and Footprint](#) [Create New Part Manually](#)

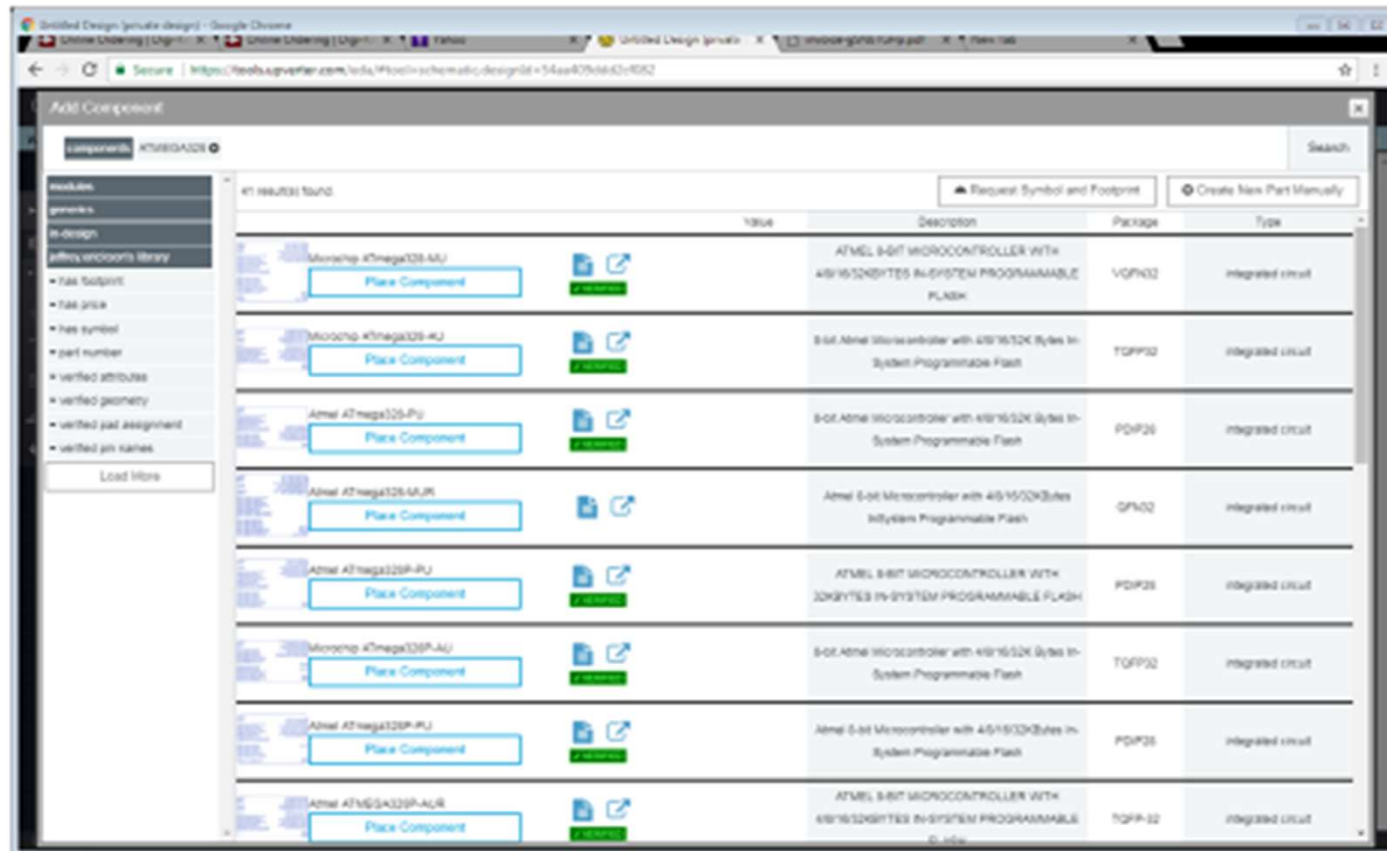
Value	Description	Package	Type
 Microchip ATmega328-MU Place Component 	ATMEL 8-BIT MICROCONTROLLER WITH 4/8/16/32KBYTES IN-SYSTEM PROGRAMMABLE FLASH	VQFN32	integrated circuit
 Microchip ATmega328-AU Place Component 	8-bit Atmel Microcontroller with 4/8/16/32K Bytes In-System Programmable Flash	TQFP32	integrated circuit
 Atmel ATmega328-PU Place Component 	8-bit Atmel Microcontroller with 4/8/16/32K Bytes In-System Programmable Flash	PDIP28	integrated circuit
 Atmel ATmega328-MUR Place Component 	Atmel 8-bit Microcontroller with 4/8/16/32KBytes InSystem Programmable Flash	QFN32	integrated circuit
 Atmel ATmega328P-PU Place Component 	ATMEL 8-BIT MICROCONTROLLER WITH 32KBYTES IN-SYSTEM PROGRAMMABLE FLASH	PDIP28	integrated circuit
 Microchip ATmega328P-AU Place Component 	8-bit Atmel Microcontroller with 4/8/16/32K Bytes In-System Programmable Flash	TQFP32	integrated circuit
 Atmel ATmega328P-PU Place Component 	Atmel 8-bit Microcontroller with 4/8/16/32KBytes In-System Programmable Flash	PDIP28	integrated circuit
 Atmel ATMEGA328P-AUR Place Component 	ATMEL 8-BIT MICROCONTROLLER WITH 4/8/16/32KBYTES IN-SYSTEM PROGRAMMABLE FLASH	TQFP-32	integrated circuit

As you can tell, this schematic is different. This is a schematic of a 555 timer that blinks an LED, after schematic is finished, the next step is to create the PCB. Press "Q" to jump back and forth from Schematic to PCB



In Creating a Schematic you need to use Verified parts, If on the schematic there is no checkmark, the parts will not transfer over to the Bill of Materials list of the PCB Editor when installing a part, press “Q” and it will tab between schematic and PCB





Remember only the Verified parts will work in creating a PCB

Reminder of all the tutorials available on line and on YouTube

The screenshot shows a Google Chrome browser window with a search for 'upverter tutorials'. The results page lists several video tutorials and articles. The first result is a YouTube playlist titled 'Upverter Tutorials - YouTube' with a link to a playlist of 5 videos. Below this are three video results from YouTube, each with a thumbnail showing a video player interface. The first video is 'Part 1/2: Building a Bluetooth Module in Upverter - YouTube' by Upverter, uploaded on Mar 16, 2015, with a duration of 1:10:05. The second video is 'Creating a new Part in Upverter - YouTube' by Upverter Support, uploaded on Mar 16, 2015, with a duration of 15:22. The third video is '2/2: Building a Bluetooth Module in Upverter - YouTube' by Upverter, uploaded on Mar 16, 2015, with a duration of 1:28:01. Below these are two text-based results: 'Create a PCB from Scratch with Upverter - Hackster.io' and 'How to create a footprint in Upverter on Vimeo'. At the bottom, there is a section for 'Searches related to upverter tutorials' with suggestions like 'upverter download' and 'hardware design tools'.

upverter tutorials - Google Search - Google Chrome

Secure | <https://www.google.com/search?q=upverter+tutorials&oq=upverter+tutorials&aqs=chrome..69i57j0j8&sourceid=chrome&ie=UTF-8>

Upverter Tutorials - YouTube
<https://www.youtube.com/playlist?list=PLFc8RFFAdjug0y5S975BiEGrknMu1sgL>
Mar 16, 2015 - Check out some of our **Tutorials**! If you still have any questions, feel free to make a post on our forum! <http://forum.upverter.com>.

Part 1/2: Building a Bluetooth Module in Upverter - YouTube
<https://www.youtube.com/watch?v=QZbE-gGRtD4>
Mar 16, 2015 - Uploaded by Upverter
Build your very first bluetooth module! Click on the a timestamp to jump directly to any topic. Create a new project ...

Creating a new Part in Upverter - YouTube
<https://www.youtube.com/watch?v=rTCFLhVY-MI>
Mar 16, 2015 - Uploaded by Upverter
Here's how to create a new part in Upverter. Try Upverter for free at <http://www.upverter.com/community> ...

2/2: Building a Bluetooth Module in Upverter - YouTube
https://www.youtube.com/watch?v=E44qD_H6Ftw
Mar 16, 2015 - Uploaded by Upverter
We've covered basic UI and schematic design in the first part (<http://youtu.be/QZbE-gGRtD4>) and are now ...

Create a PCB from Scratch with Upverter - Hackster.io
<https://www.hackster.io/Hulkco/create-a-pcb-from-scratch-with-upverter-63a944>
May 16, 2017 - This **tutorial** is intended as an example to carry out the Hackster live Meetup of May 2017, that is the creation of a PCB with **Upverter**. Find this and other hardware projects on Hackster.io.

How to create a footprint in Upverter on Vimeo
<https://vimeo.com/Upverter/Videos>
Uploaded by Upverter
How to create a footprint in Upverter. 3 years ago. UpverterPRO. Follow. 0 - 1. 0. Download Share. Leave the ...

Searches related to upverter tutorials

upverter **download**

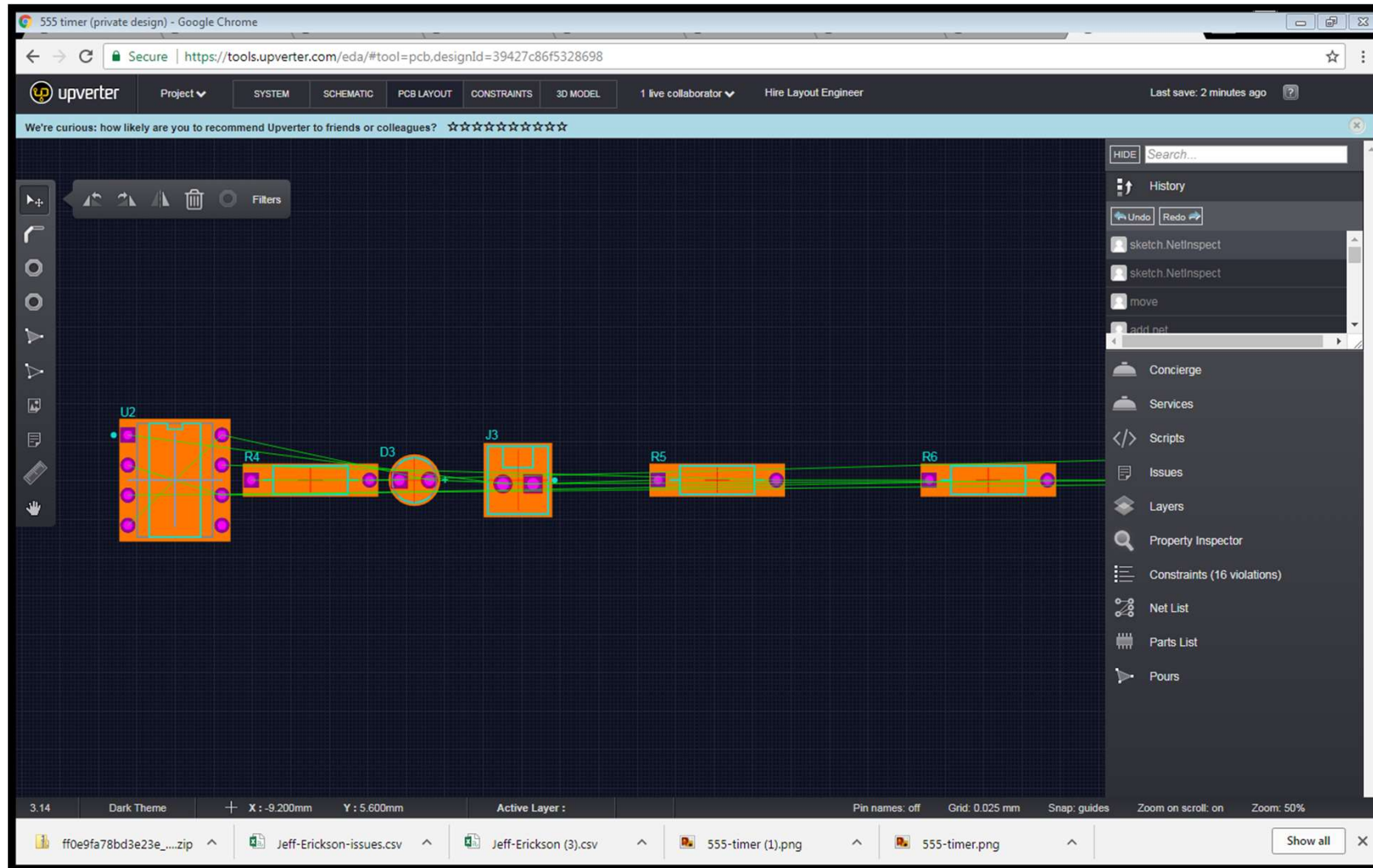
hardware design tools

https://www.youtube.com/watch?v=E44qD_H6Ftw

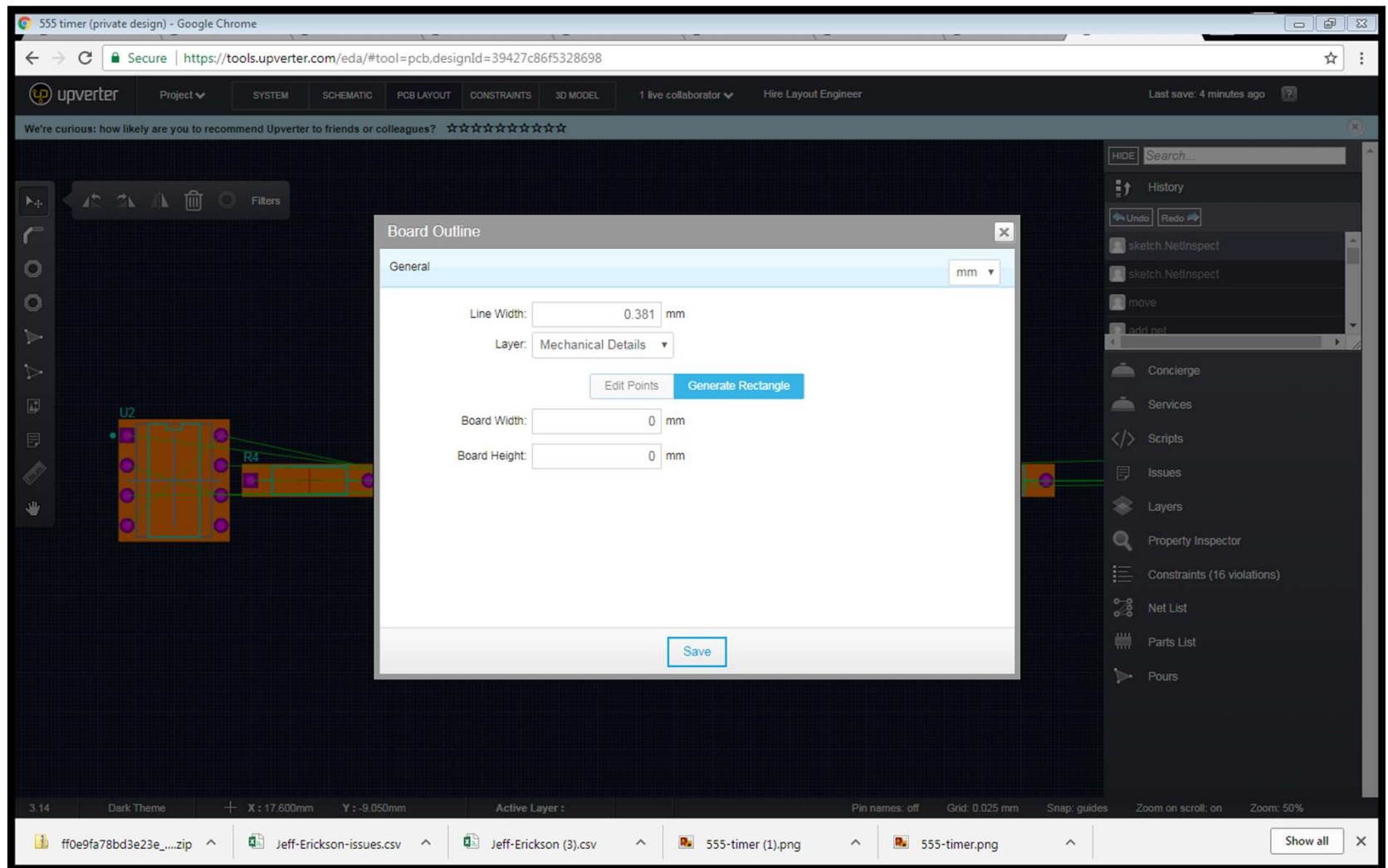
Go to this tutorial to see how to change your schematic into a pcb.

The screenshot shows a YouTube video player in a Google Chrome browser. The video title is "2/2: Building a Bluetooth Module in Upverter" by the channel "Upverter". The video has 1,408 views and was published on March 16, 2015. The video player shows a yellow background with the text "Upverter Tutorials" and "Part 2 PCB Layout". The video progress bar indicates 0:04 / 1:28:00. Below the video player, there is a description: "We've covered basic UI and schematic design in the first part (<http://youtu.be/QZbE-gGrtd4>) and are now tackling the layout side of the project." To the right of the video player, there is a "SUBSCRIBE 158" button. On the right side of the page, there is a "Up next" section with several video recommendations, including "BLE Module PCB Made With Silver Paste / Laser Printer", "Part 1/2: Building a Bluetooth Module in Upverter", "Upverter // Making PCB Design Easy, Powerful and", "How Data is Transmitted by RF circuits (Wifi, bluetooth, phone,)", "Board Building: Zak Homuth, Upverter", "Upverter Custom Board Outline (PCB)", and "Connecting Parts Together". The bottom of the page shows a file explorer with several files, including "ff0e9fa78bd3e23e....stp", "ff0e9fa78bd3e23e....upv", "Jeff-Erickson (2).csv", "ff0e9fa78bd3e23e....svg", and "Jeff-Erickson.png".

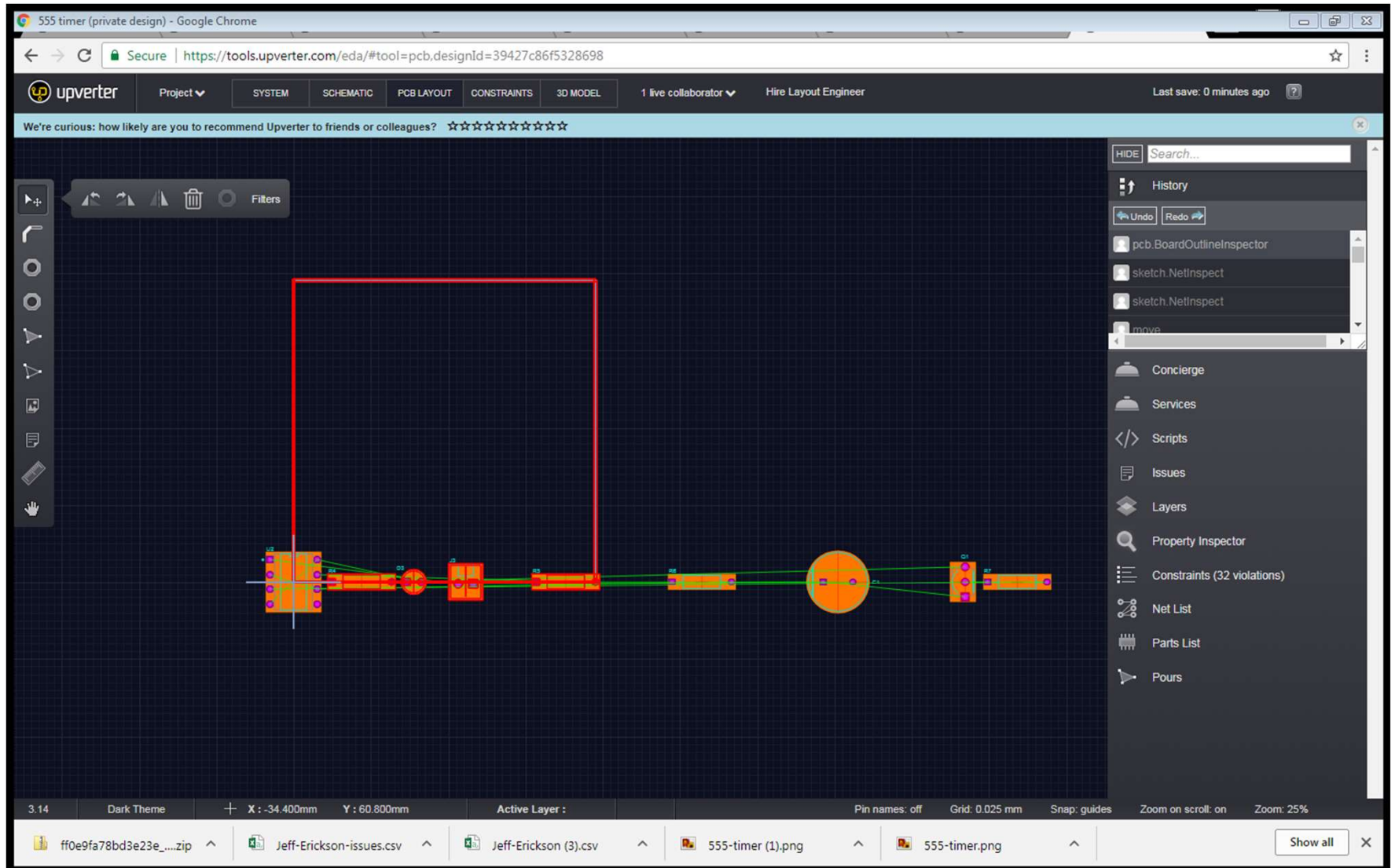
Click PCB Layout.
This should show up.
The VERIFIED Parts
and the NETS (These
are connections made
in the schematic and
altogether is called
the Rats nest.



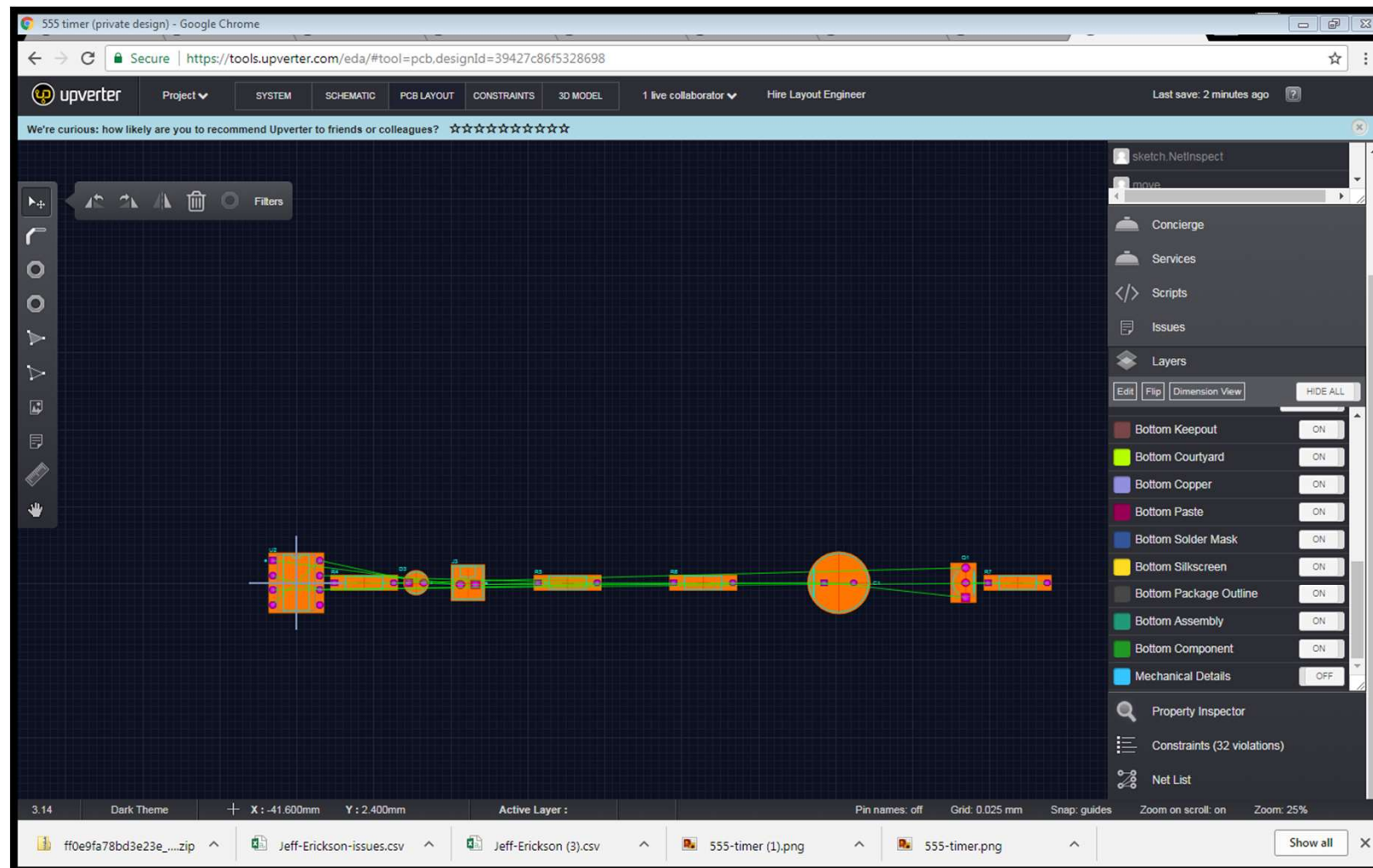
First step in creating a PCB is the dimension of the PCB, Double click anywhere on the canvas and this shows up.



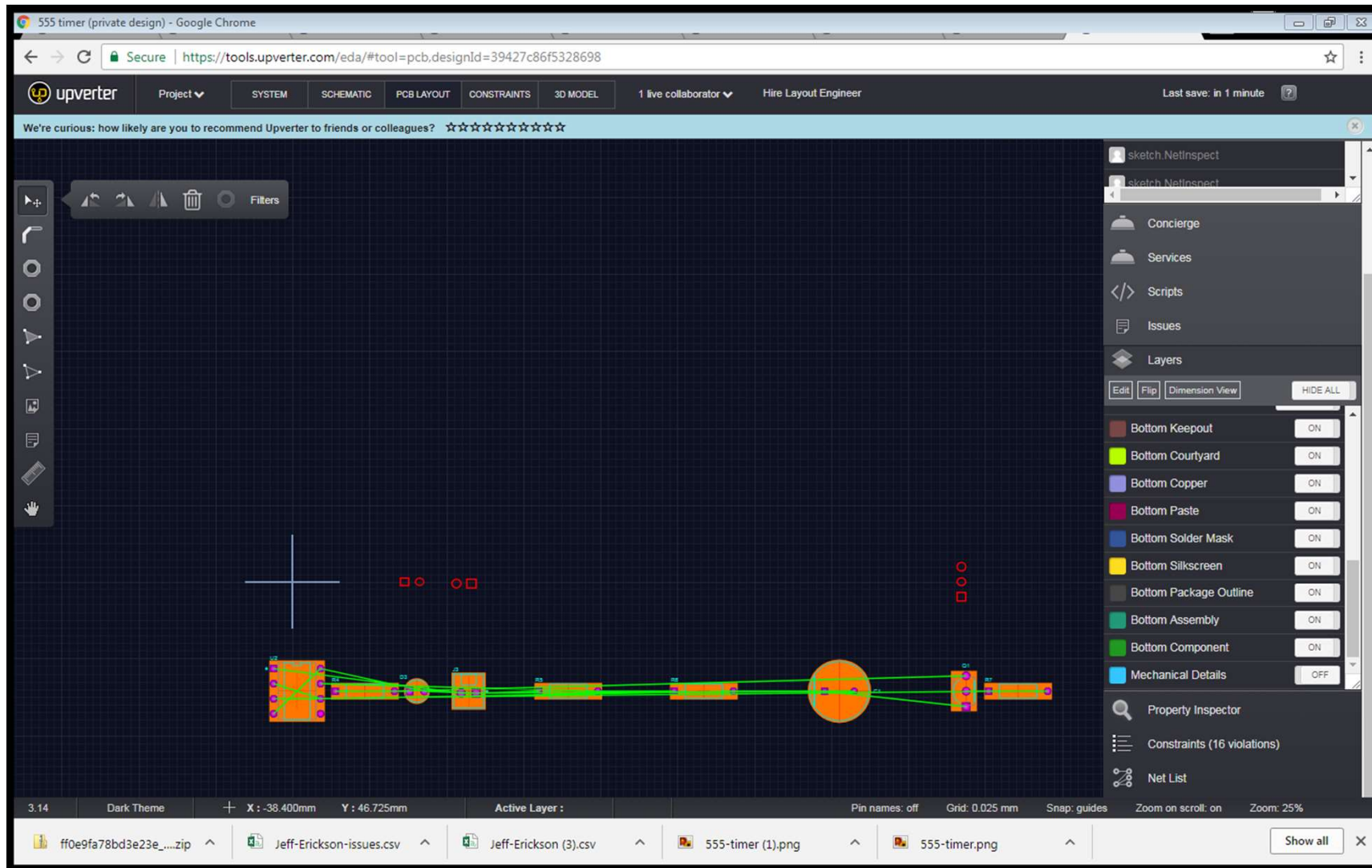
After filling in dimensions, in this case changing mm to mils, and typing in 2000mils x 2000mils, we create a pcb of 2" x 2"



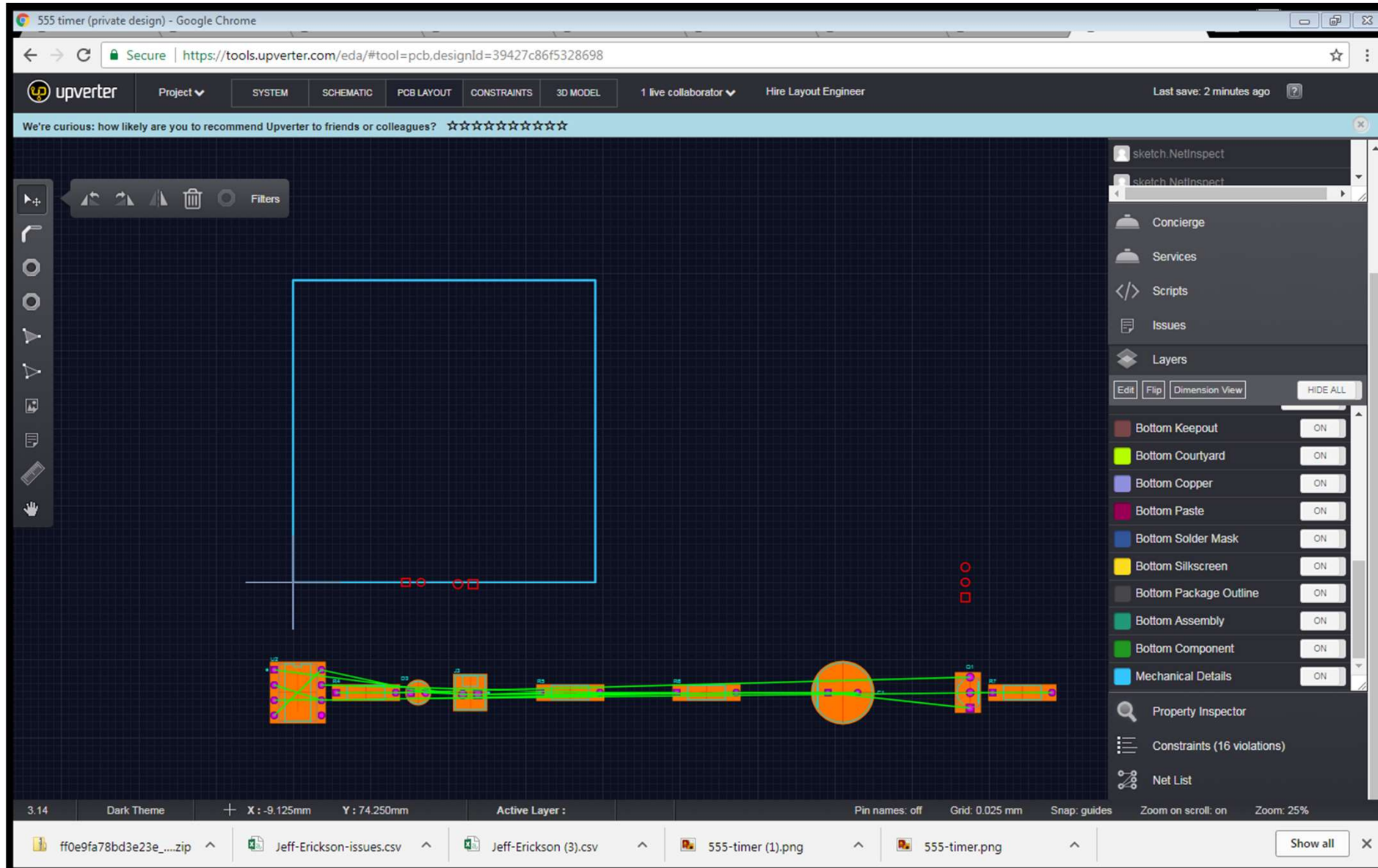
Go to the Layers tab on the right hand side, scroll down to Mechanical Layer and shut OFF, the square goes away, highlight all the visual components and move down slightly so the ORIGIN cross sits slight above all the visualized components



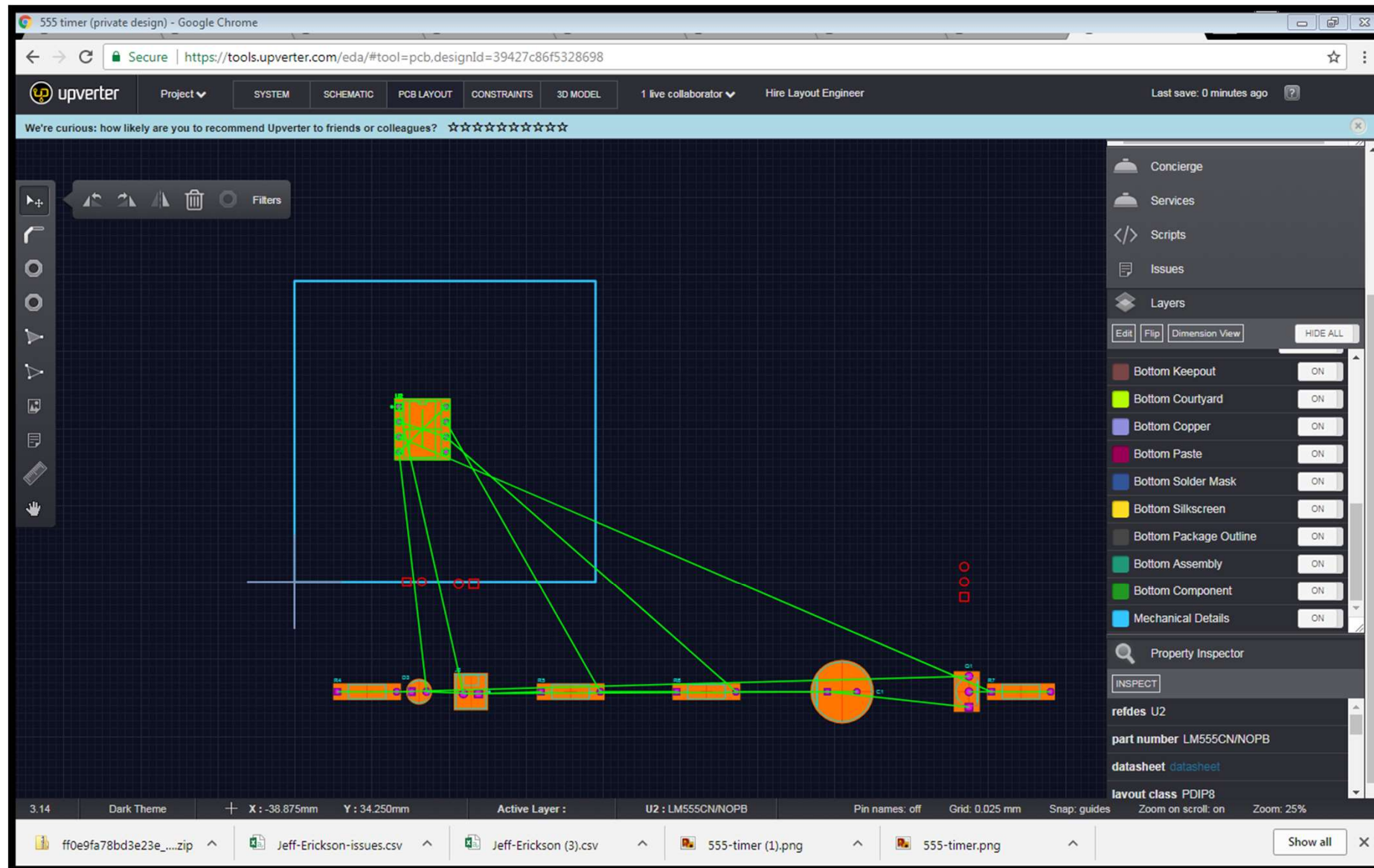
After moving all components out of the way, and turning the Mechanical Layer back on.....



If this is what is shown the first step in PCB Fab is complete. Now highlight your parts and insert them in the box.



Always start with your main components and add the rest in accordance with your schematic.



555 timer (private design) - Google Chrome

Secure | <https://tools.upverter.com/eda/#tool=pcb,designId=39427c86f5328698>

upverter Project SYSTEM SCHEMATIC PCB LAYOUT CONSTRAINTS 3D MODEL 1 live collaborator Hire Layout Engineer Last save: 0 minutes ago

We're curious: how likely are you to recommend Upverter to friends or colleagues? ☆☆☆☆☆☆☆☆

Scripts Issues Layers Edit Flip Dimension View HIDE ALL

- Bottom Keepout ON
- Bottom Courtyard ON
- Bottom Copper ON
- Bottom Paste ON
- Bottom Solder Mask ON
- Bottom Silkscreen ON
- Bottom Package Outline ON
- Bottom Assembly ON
- Bottom Component ON
- Mechanical Details ON

Property Inspector

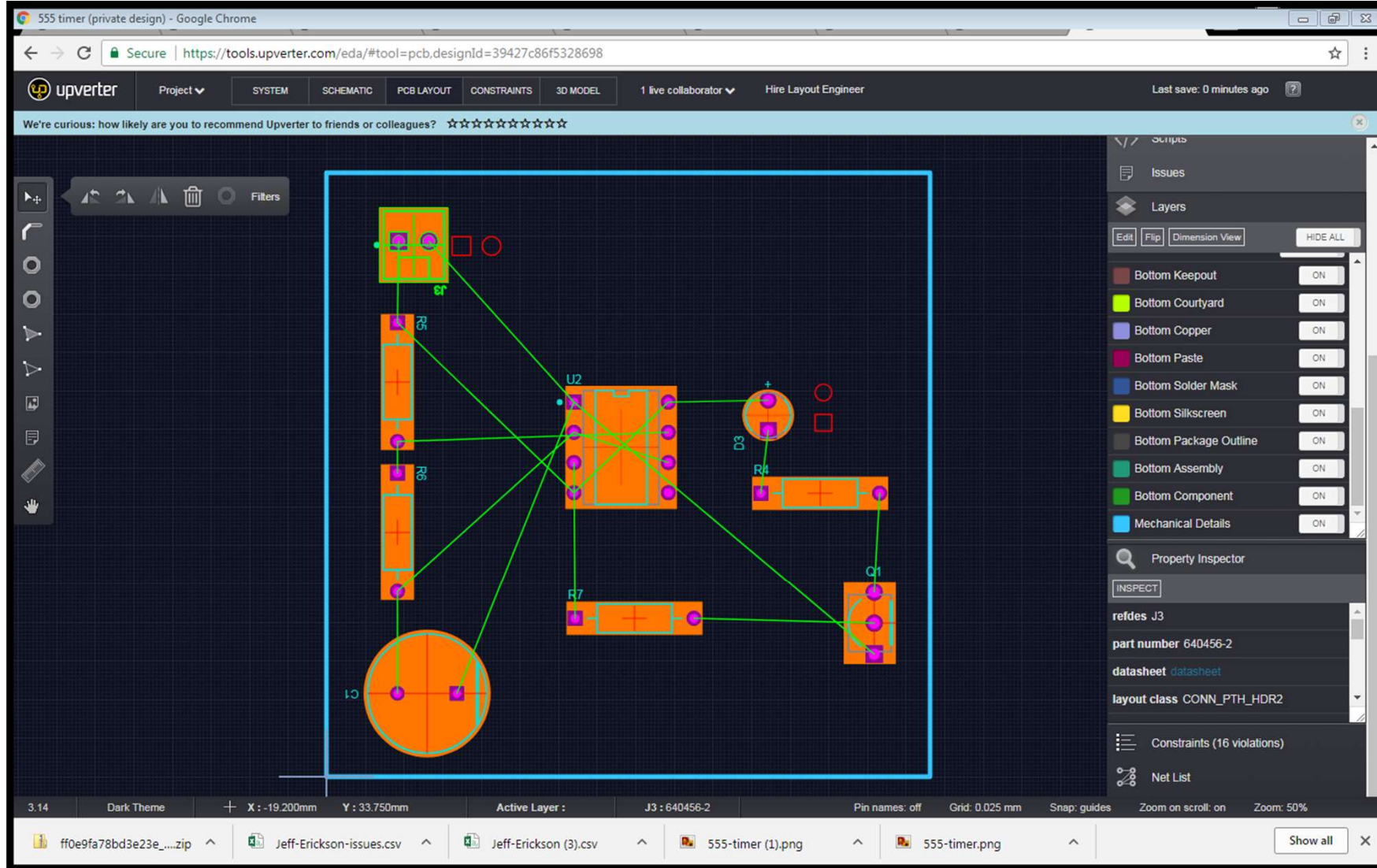
Constraints (16 violations)

Net List

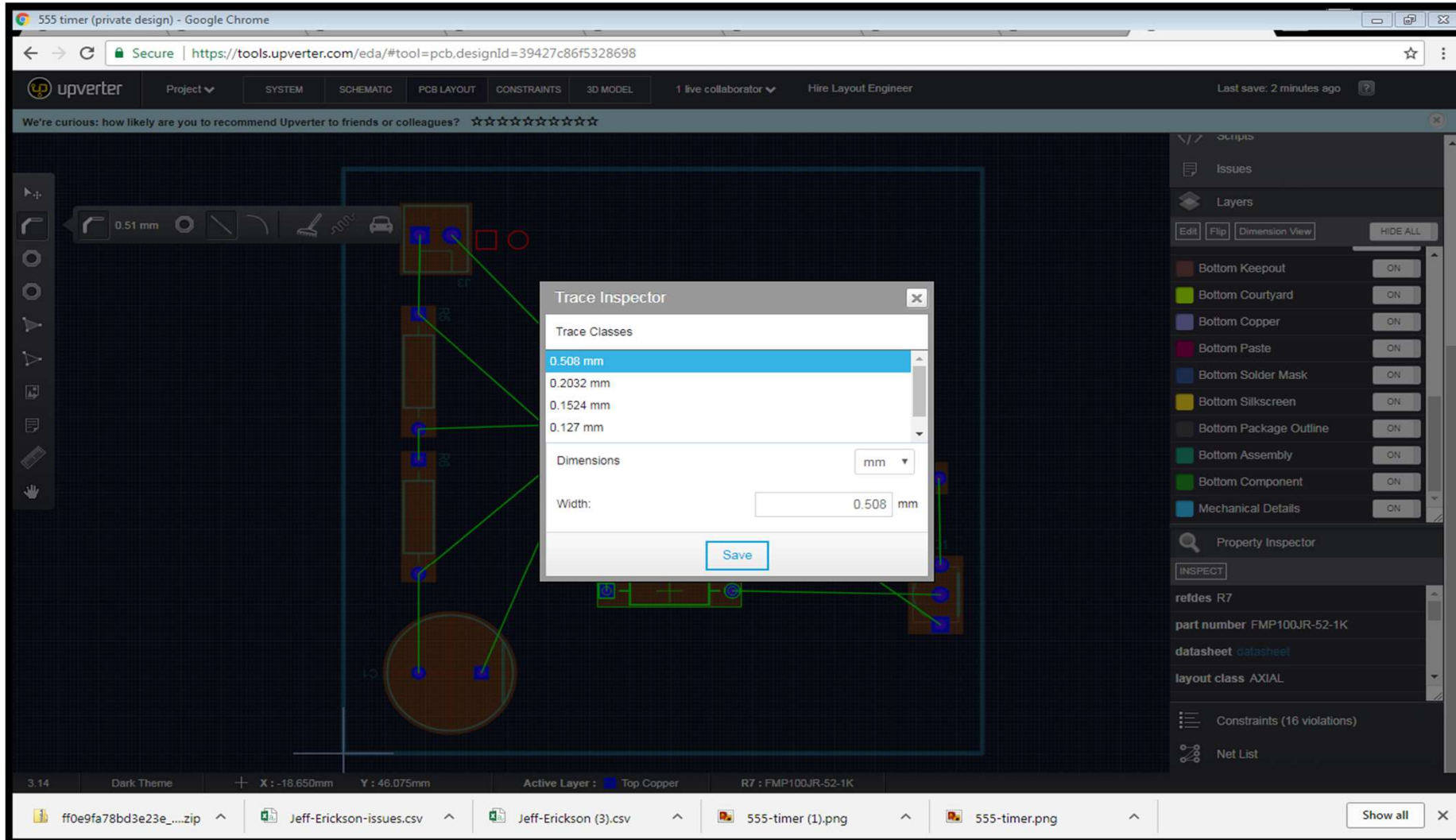
3.14 Dark Theme X: -17.450mm Y: 53.050mm Active Layer: Pin names: off Grid: 0.025 mm Snap: guides Zoom on scroll: on Zoom: 50%

ff0e9fa78bd3e23e_...zip Jeff-Erickson-issues.csv Jeff-Erickson (3).csv 555-timer (1).png 555-timer.png Show all

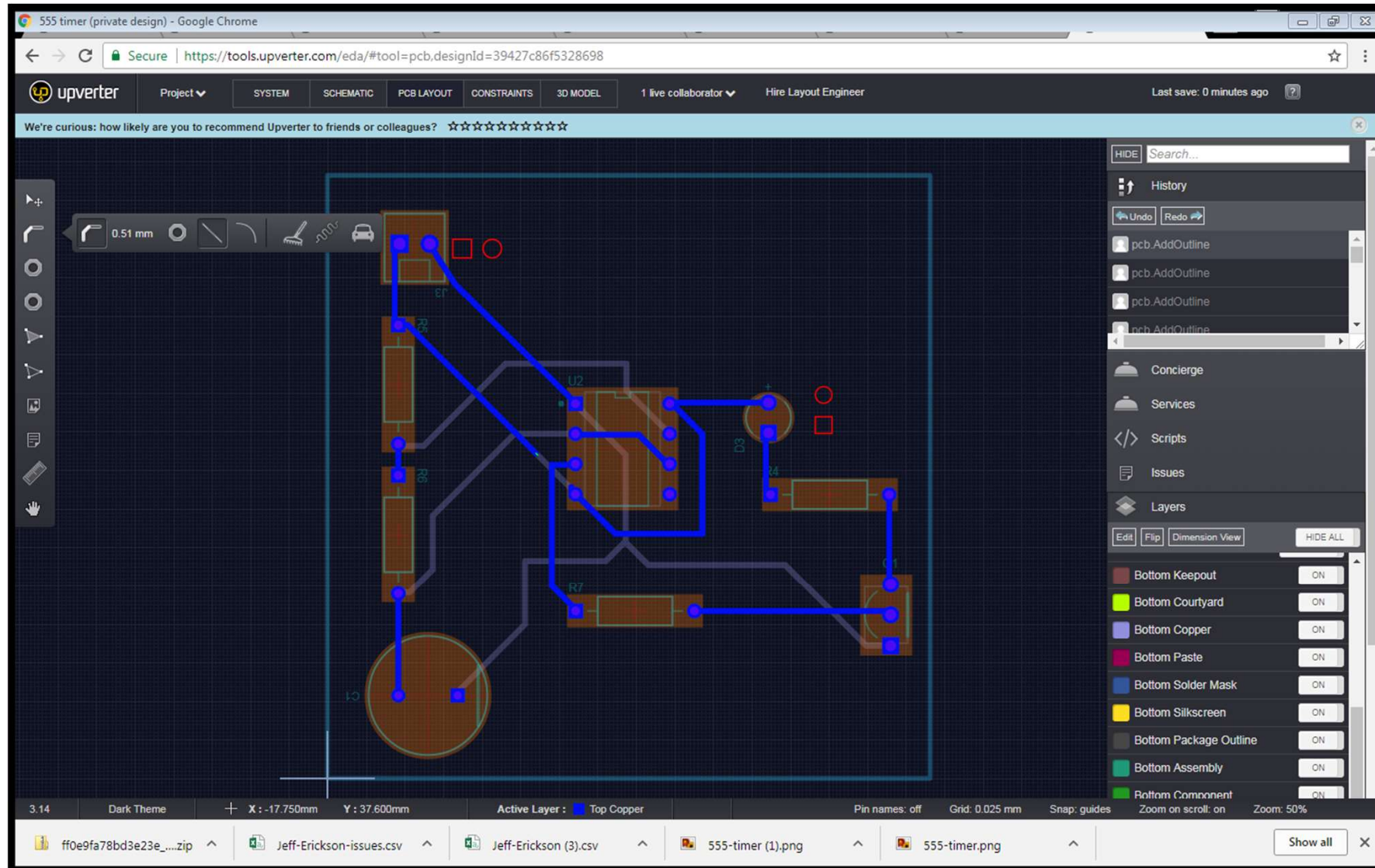
Move components around in straight lines, this also organizes the pcb, so it resembles the layout of the schematic.



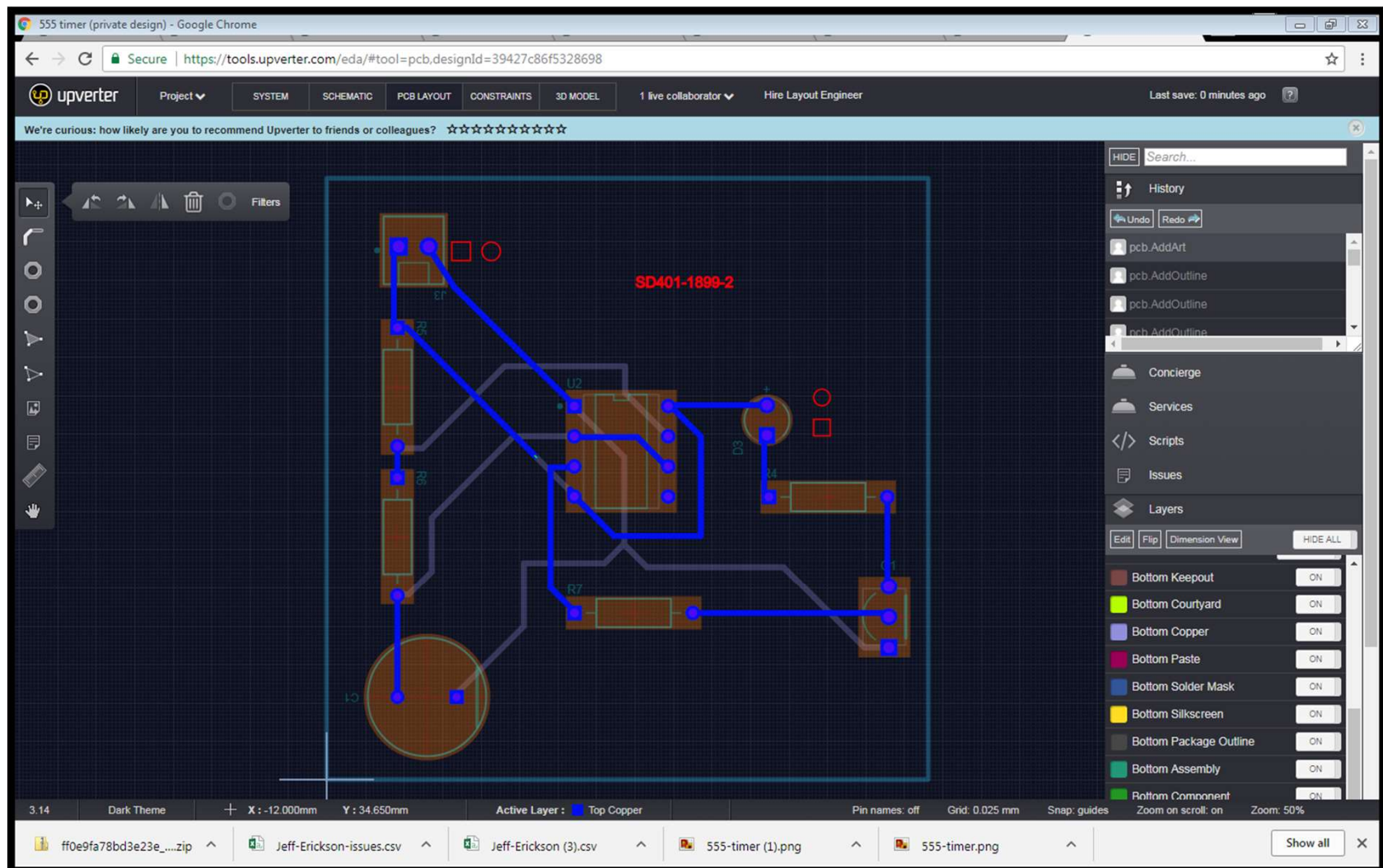
Next step is to determine the width of the trace you want to use and start adding traces, power and ground need wider traces than signal and control traces Try 20mil



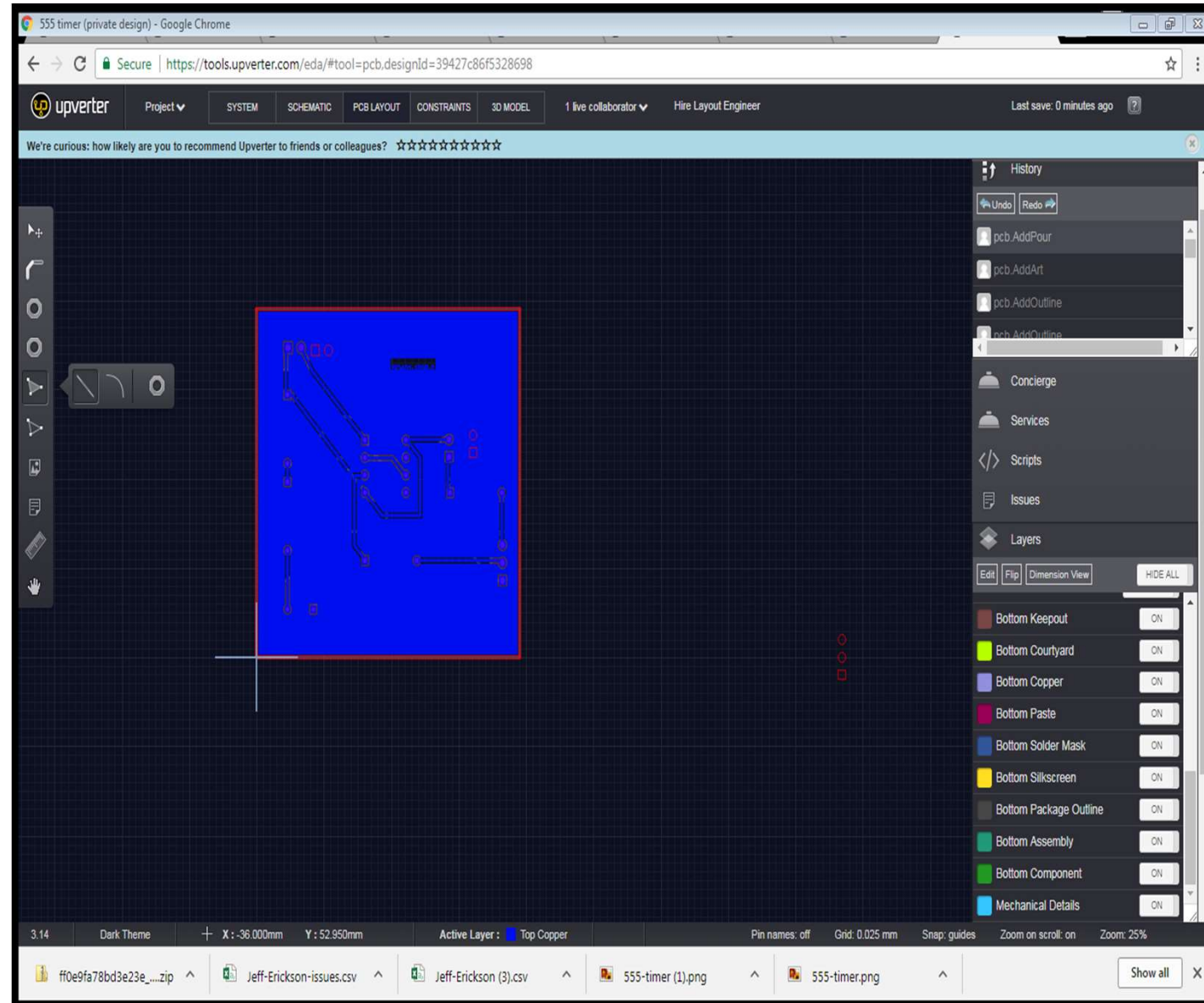
After adding all the traces (remember 1 and 2) changes from top to bottom layers. Add some text.



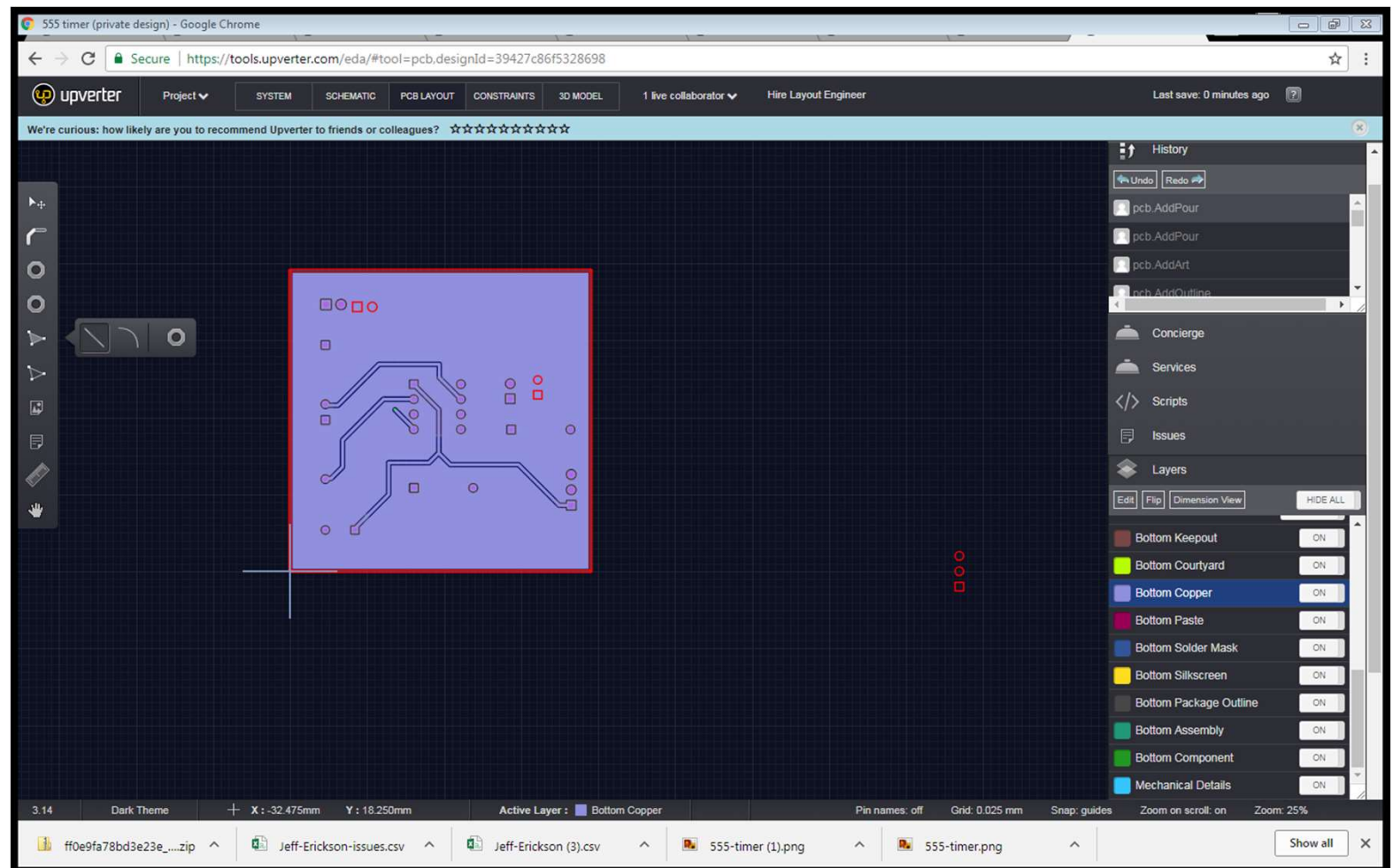
Add whatever is required for text



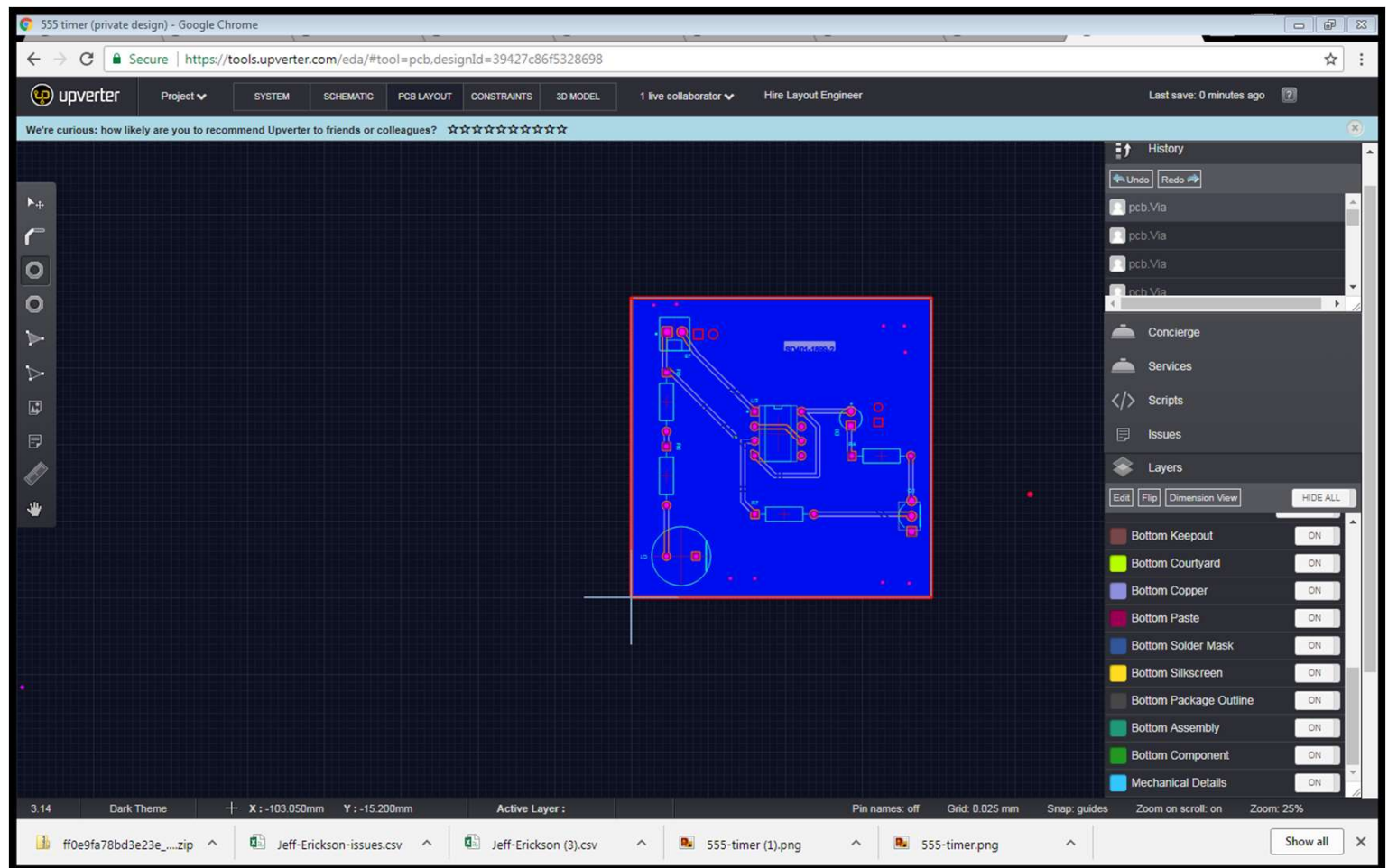
Using the Pour tool start at the ORIGIN and highlight the outside edge start bottom left/ go up/ to the right/ down/ then start to the left and stop- hit escape. No need to go all the way around 360 degrees. This should show up.



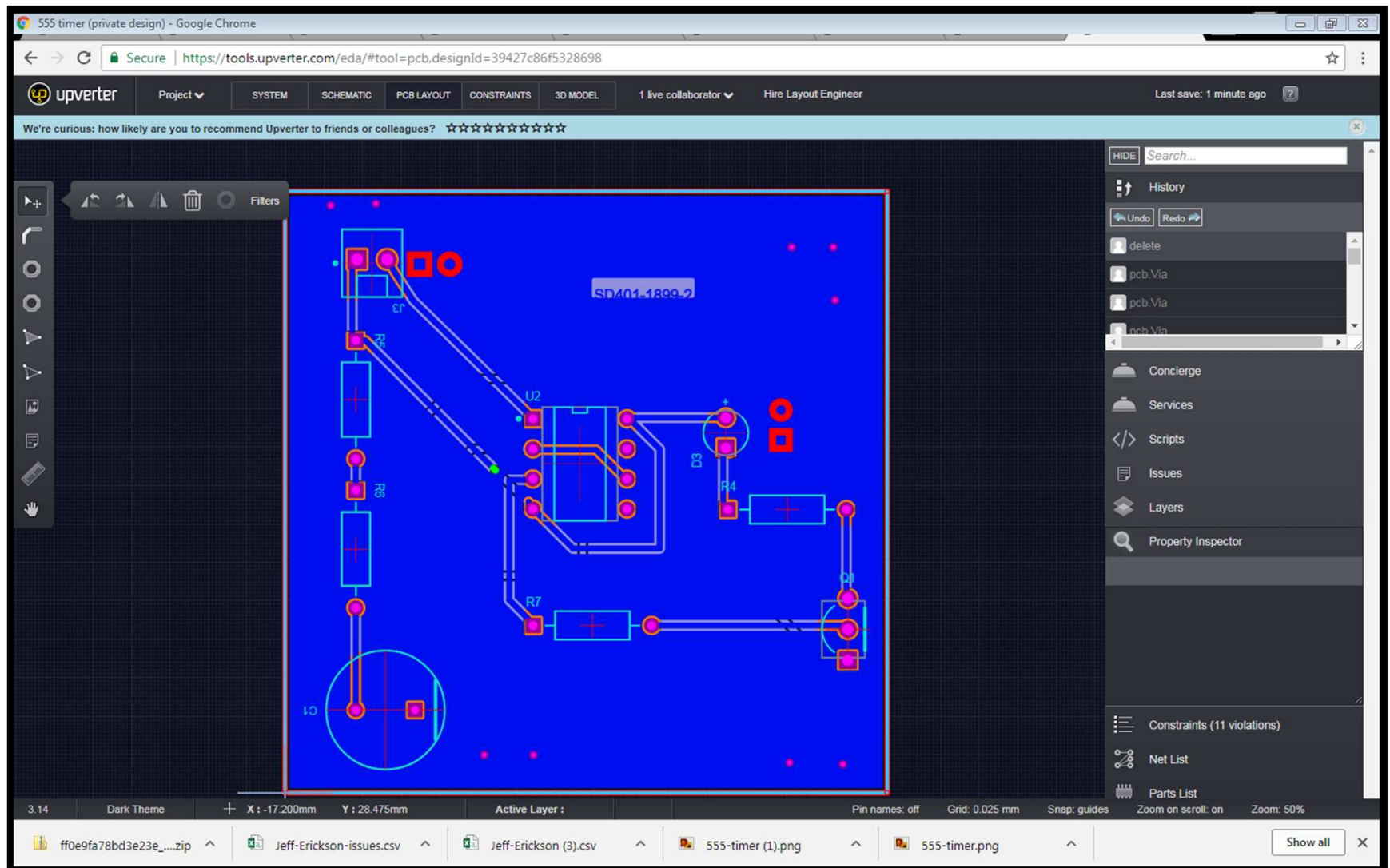
Press 2 -this will be the bottom layer and then using the pour tool start at ORIGIN , highlight the box and hit escape. This will show up.



Add VIAS to connect the top and bottom layers together if required



PC Board is now done



2/2: Building a Bluetooth Module in Upverter - YouTube - Google Chrome

Secure | https://www.youtube.com/watch?v=E44qD_H6Ftw

YouTube

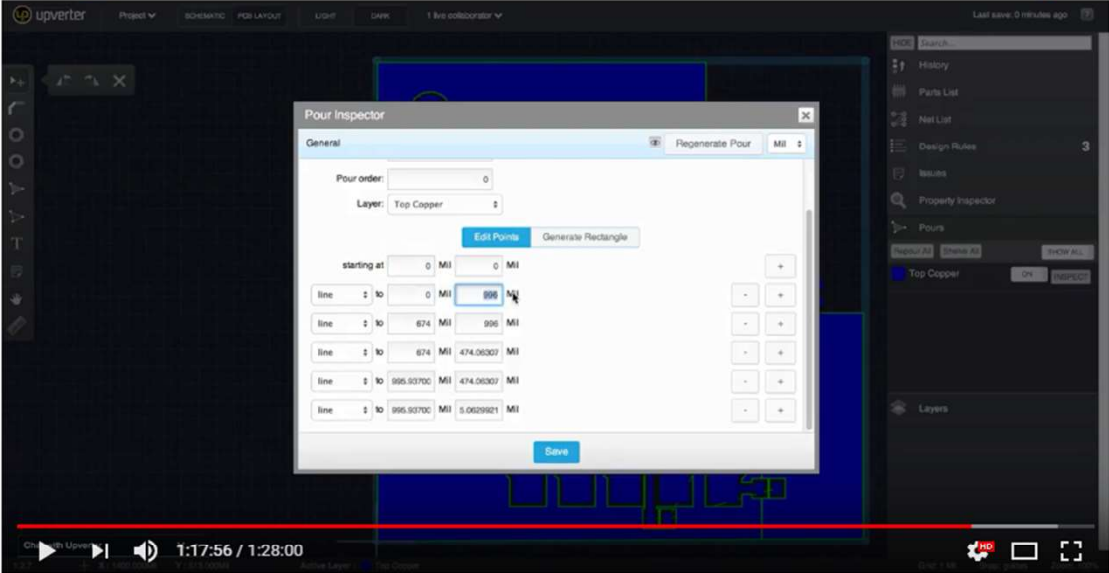
upverter part2

SEARCH

SIGN IN

Layout Video - Bluetooth

<https://upverter.com/eda/#designId=2060a0289420f449,tool=pcb>



2/2: Building a Bluetooth Module in Upverter

1,408 views

Upverter

Published on Mar 16, 2015

We've covered basic UI and schematic design in the first part (<http://youtu.be/QZbE-gGRtD4>) and are now tackling the layout side of the project.

SHOW MORE

Up next

AUTOPLAY

Upverter Support

Create a new part

15:22

Upverter Tutorials

Part 1/2: Building a Bluetooth Module in Upverter

2.2K views

1:10:05

Upverter Support

Connecting Parts Together

90 views

1:31

Upverter Support

Schematic Editor walkthrough

432 views

2:09

Upverter Tutorials

Overview

3.2K views

3:24

Upverter // Making PCB Design Easy, Powerful and

Hackster.io

535 views

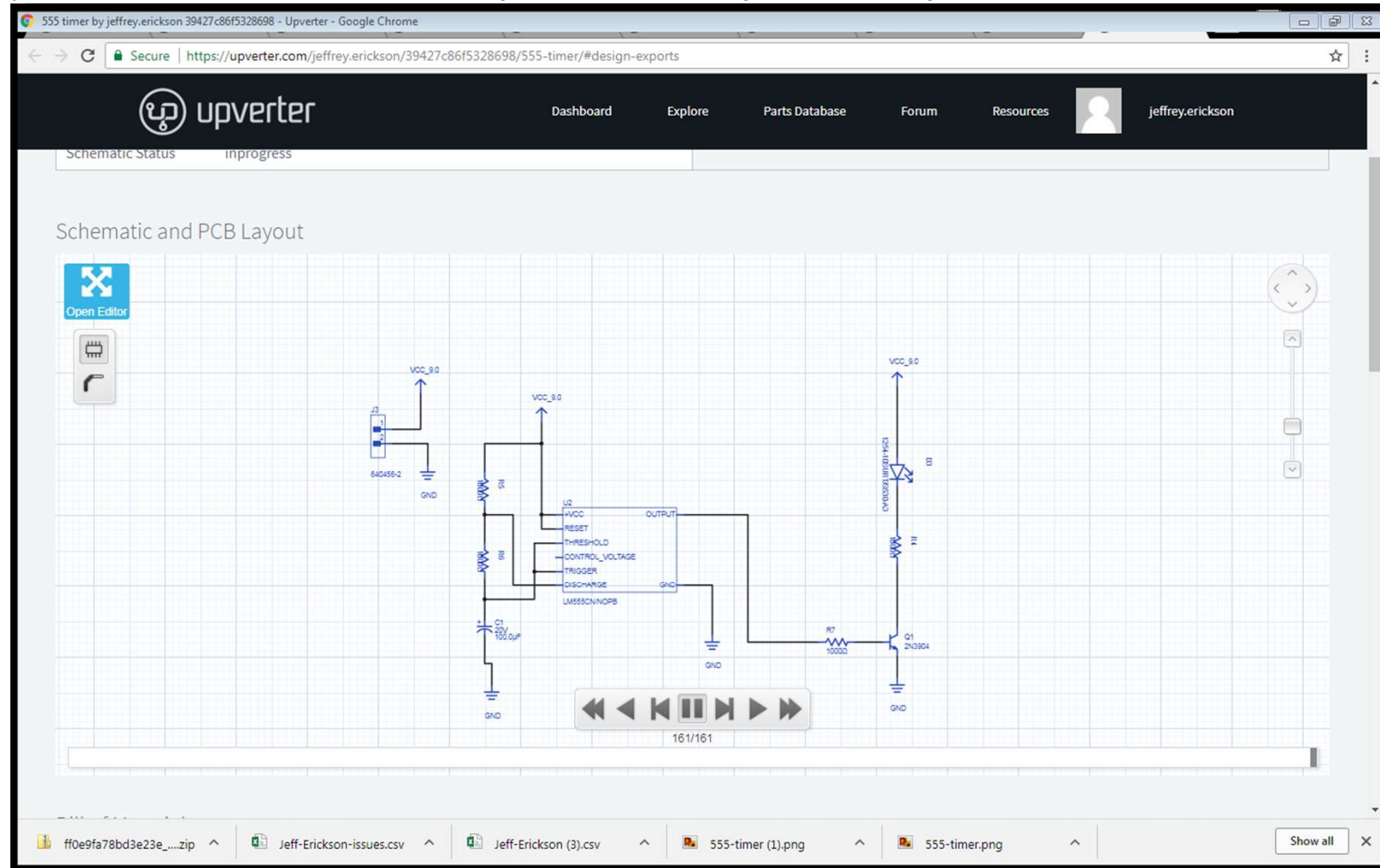
1:09:57

Once finished , you will need to create the Gerber files which are then exported to companies that make PCB's, such as Advanced Circuits, or in our case we will use OSH Park.com.

Upverter to Gerber files exported. **Go to dashboard and press ----- Project ----- Export Files**

Once seeing this image of your schematic, **scrolling down you will see.....**

Your schematic.....
Scrolling further.....



Bill of materials- IF you used verified components- Generics won't show up

Bill of materials....

Scrolling further.....

555 timer by jeffrey.erickson 39427c86f5328698 - Upverter - Google Chrome

Secure | <https://upverter.com/jeffrey.erickson/39427c86f5328698/555-timer/#design-exports>







upverter Dashboard Explore Parts Database Forum Resources jeffrey.erickson

16 / 161

Bill of Materials

Reference	Description	Manufacturer	Part Number	Package	Verified	Actual Part	Qty	Unit Cost	Order Qty	Total Cost
R4, R5, R6, R7	Metal Film Resistors	YAGEO	FMP100JR-52-1K	AXIAL	✓	No Digi-key Number	4	??	0	0
J3	0.1" 2pos Pin header connector	TE	640456-2	CONN_PTH_HDR2	✓	A1921-ND	1	0.12	1	0.12
C1	CAP, ALU ELEC, 100UF, 20V, RAD	Panasonic	20SEP100MX	RADIAL	✓	678D107M050CG3D-ND	1	0	1	0.0
D3	Hyper Red 3.0mm Round Type LED	Everlight	1254-10SURT/S530-A3	RADIAL	✓	1254-10SURT/S530-A3-ND	1	0	1	0.0
Q1	NPN General Purpose Amplifier	Fairchild	2N3904	TO-92-3	✓	No Digi-key Number	1	??	0	0
U2	LM555 Timer	Texas Instruments	LM555CN/NOPB	PDIP8	✓	No Digi-key Number	1	??	0	0

Export Design Data

 Open JSON Format All model data in Upverter's Open JSON export format (more info)	 PADS Layout Netlist Export your schematic into a third-party layout tool
 Gerber Format (RS-274X extended) CAD to CAM transfer instructions (more info)	 Dimension Drawing Export the board outline, holes, and rulers
 NC Drill (Excellon) NC drill and route machine instructions (more info)	 Assembly Drawing Export the board outline, part designators, and locations

ff0e9fa78bd3e23e_...zip ^ Jeff-Erickson-issues.csv ^ Jeff-Erickson (3).csv ^ 555-timer (1).png ^ 555-timer.png ^ Show all X

Scrolling down you will see this they are to export all files, such as Schematic in PDF format, or Bill of Materials

Export files...

Gerber files are also saved along with NC Drill files, which are then zipped and sent to.....

A Gerberviewer.com

For checking

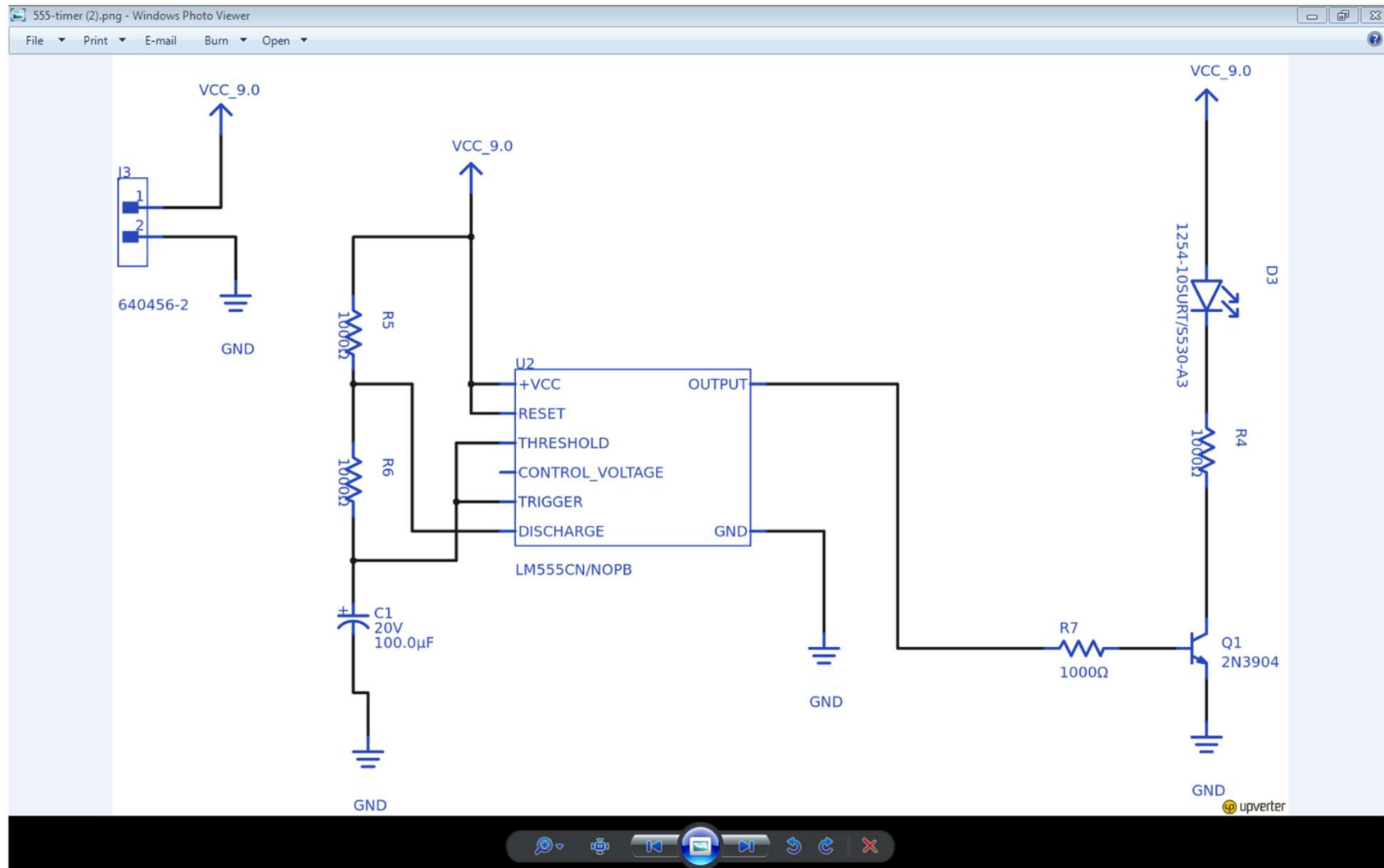
The screenshot shows the Upverter web interface for a user named Jeffrey Erickson. The page is titled "Export Design Data" and lists 14 export options in a two-column table. Each option includes a green download icon, a title, and a brief description. The options are:

Open JSON Format All model data in Upverter's Open JSON export format (more info)	PADS Layout Netlist Export your schematic into a third-party layout tool
Gerber Format (RS-274X extended) CAD to CAM transfer instructions (more info)	Dimension Drawing Export the board outline, holes, and rulers
NC Drill (Excellon) NC drill and route machine instructions (more info)	Assembly Drawing Export the board outline, part designators, and locations
XYRS X-Y, rotation and side data for Pick and Place assembly (CSV)	Issues List CSV-formatted list of all issues associated with this design
Schematic PNG Schematic in image form	Net List CSV-formatted list of all nets
High-Res Schematic PNG High resolution image form	Bill of Materials Identical parts grouped
Schematic SVG Schematic in SVG form	Bill of Materials (split) Identical parts separated
Schematic PDF Schematic in PDF form	Drill Chart CSV-formatted drill chart
3D Model (Step) 3D model of the board and components	

Below the table is an "Embed Design" section. At the bottom of the browser window, the taskbar shows several open files: "ff0e9fa78bd3e23e....stp", "ff0e9fa78bd3e23e....upv", "Jeff-Erickson (2).csv", "ff0e9fa78bd3e23e....svg", and "Jeff-Erickson.png". A "Show all" button is visible on the right side of the taskbar.

Or as a .png file.....

Which is a Higher resolution Schematic image.



Download the projects bill of materials as an Excel spreadsheet... convert to pdf... etc.


















To generate Gerber files – use the Gerber Format (RS-274X extended) *read directions if required*

Jeff Erickson by jeffrey.erickson ff0e9fa78bd3e23e - Upverter - Google Chrome






Secure | <https://upverter.com/jeffrey.erickson/ff0e9fa78bd3e23e/jeff-Erickson/#design-exports>

upverter Dashboard Explore Parts Database Forum Resources jeffrey.erickson

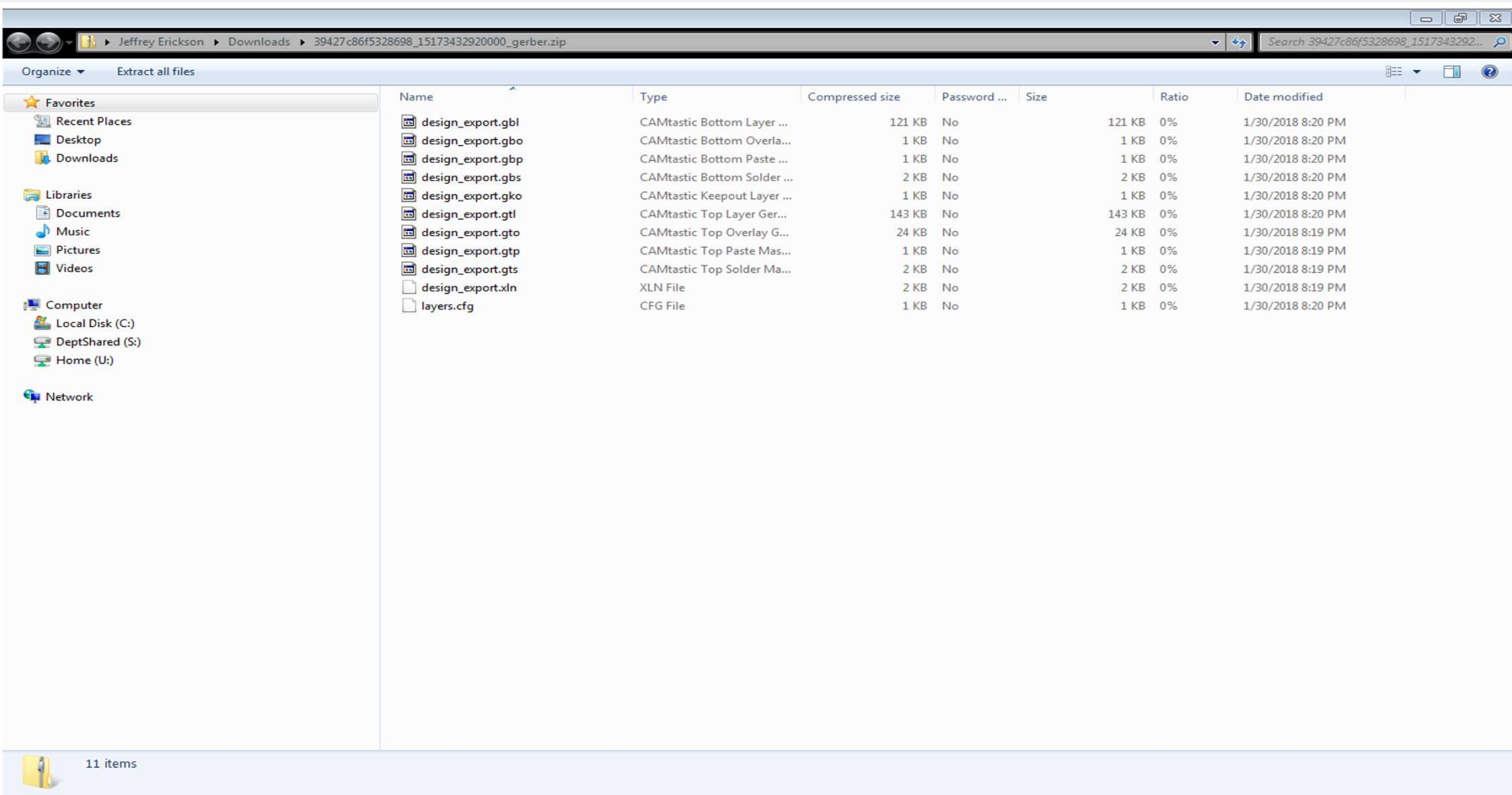
Export Design Data

 Open JSON Format All model data in Upverter's Open JSON export format (more info)	 PADS Layout Netlist Export your schematic into a third-party layout tool
 Gerber Format (RS-274X extended) CAD to CAM transfer instructions (more info)	 Dimension Drawing Export the board outline, holes, and rulers
 NC Drill (Excellon) NC drill and route machine instructions (more info)	 Assembly Drawing Export the board outline, part designators, and locations
 XYRS X-Y, rotation and side data for Pick and Place assembly (CSV)	 Issues List CSV-formatted list of all issues associated with this design
 Schematic PNG Schematic in image form	 Net List CSV-formatted list of all nets
 High-Res Schematic PNG High resolution image form	 Bill of Materials Identical parts grouped
 Schematic SVG Schematic in SVG form	 Bill of Materials (split) Identical parts separated
 Schematic PDF Schematic in PDF form	 Drill Chart CSV-formatted drill chart
 3D Model (Step) 3D model of the board and components	

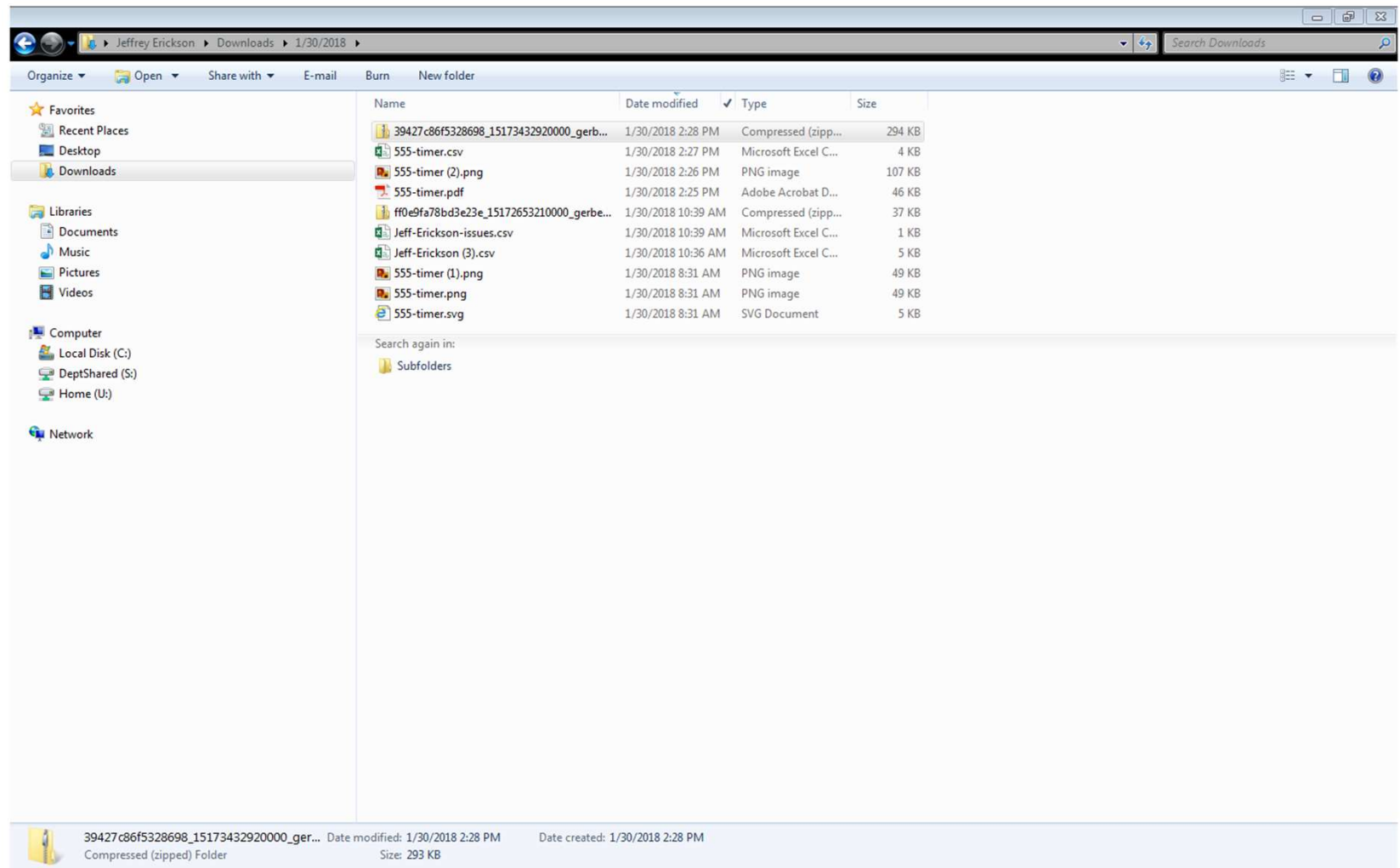
Embed Design

 ff0e9fa78bd3e23e_...zip ^  Jeff-Erickson-issues.csv ^  Jeff-Erickson (3).csv ^  555-timer (1).png ^  555-timer.png ^ [Show all](#) X

It will automatically download these files, which contain all gerbers as well as xln drill files



It also will compress the files automatically , which are needed to check them for accuracy.... Send the zipped files to gerberviewer.com.....



Online Gerber Viewer - Google Chrome

www.gerber-viewer.com

Online Gerber-Viewer

214
Like
Share

Viewer Donate Info Links Contact

PCB-Investigator




Photo-realistic

Test 30 days for free!


Software Development

>> [Open Demo Design](#) or select Gerber274X, Excellon1/2 or Zip-File:


Choose File No file chosen

☐ show format settings

☒ mm ☐ inch

 Zoom Measure

"Online Gerber Viewer" integrated in your local company intranet?
Contact us: info@easylogix.de




PCB Investigator

Professional CAD/CAM Station - Try it now for free!

- design_export.gbs
- design_export.gtp
- design_export.gko
- design_export.gtl
- design_export.gbp
- design_export.gto
- design_export.gbo
- design_export.xln
- design_export.gbl
- design_export.gts

Clear All



www.gerber-viewer.com

☐ show InfoLayer

Toggle Drawmode

© Schindler & Schill GmbH 2018. All rights reserved. www.easyLogix.de www.pcb-investigator.com

Jeff-Erickson.csv ^ ff0e9fa78bd3e23e....zip ^ ff0e9fa78bd3e23e....upv ^ ff0e9fa78bd3e23e....upv ^ ff0e9fa78bd3e23e....zip ^

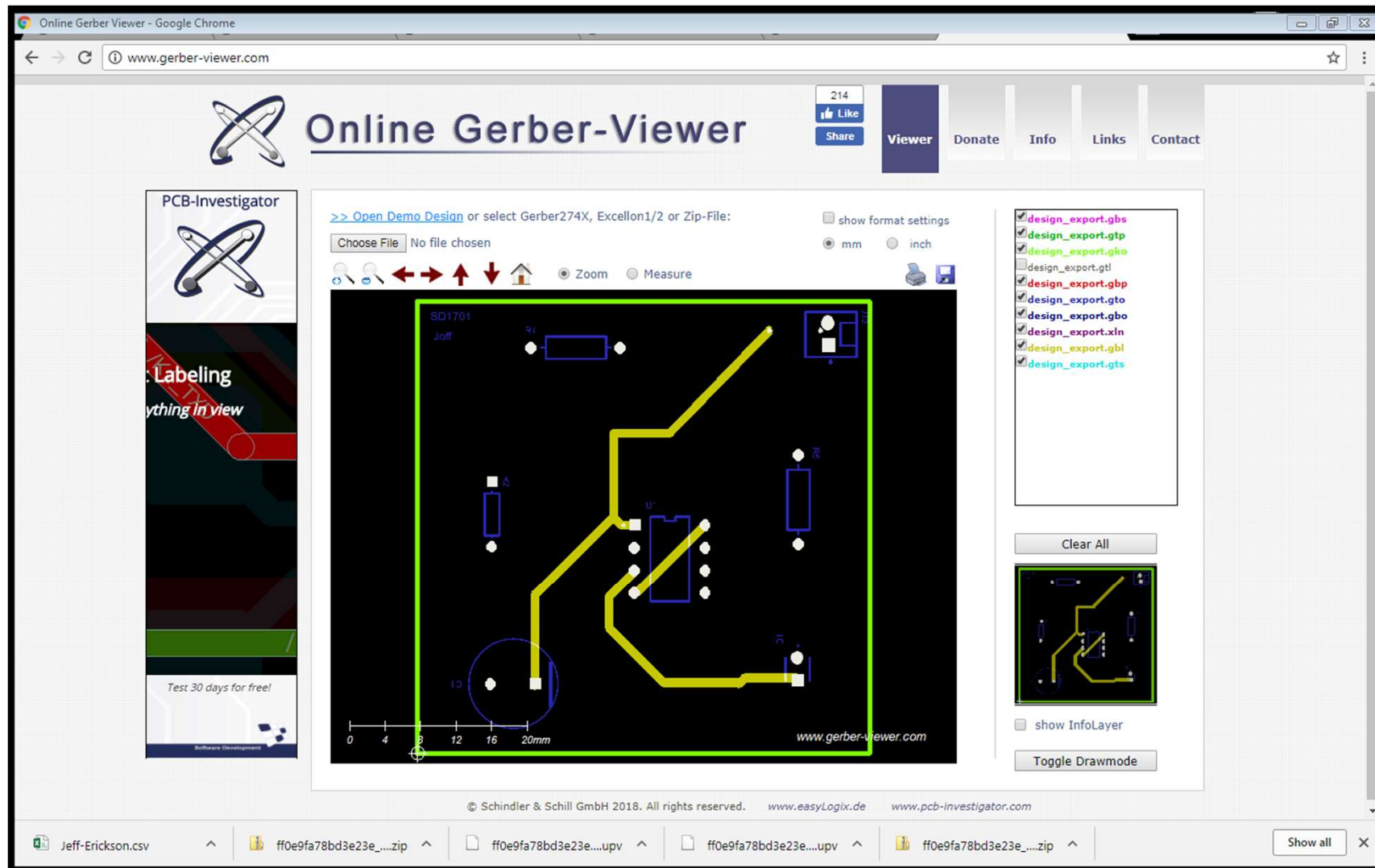
Show all X

This is one of the layers that was downloaded from Upverter files



Shows full PCB with Traces

If you like what you see, your PCB files are ready to order.... Go to.....



After looking at your files using the gerber-viewer.com website or similar, they need to be OK'd by Dr. Maassel or the TA or myself to make sure that all is ok for ordering.

These next slides show how to order with OshPark.com , It works well as you will see an instant picture of what your actually creating.

ALL emails/orders must have the SD401-F19-XX on it. Nothing will be approved with it.

Slide 55

JE1 After looking at your files in the
Jeffrey Erickson, 1/30/2018

JE2 Jeffrey Erickson, 9/4/2019

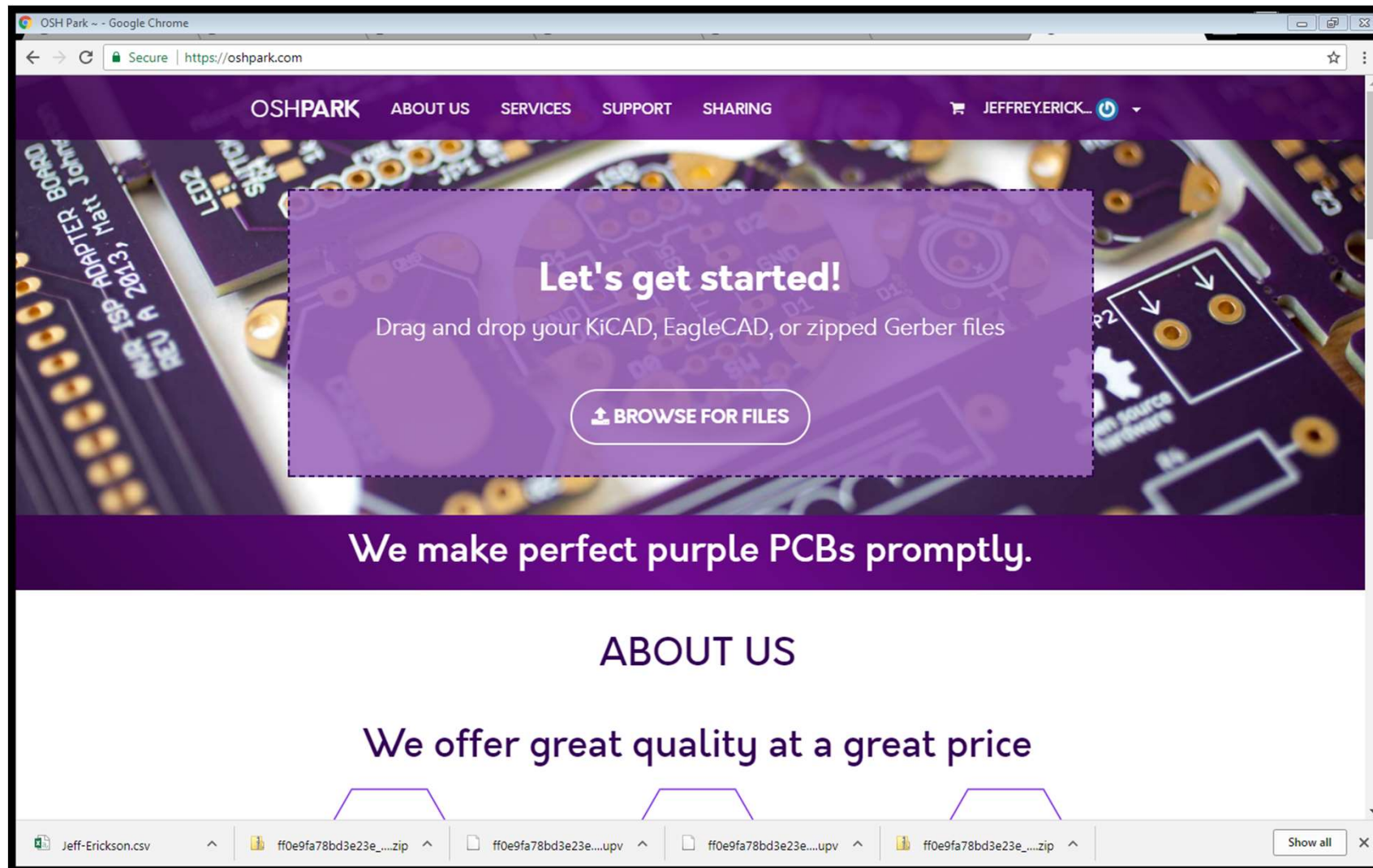
ALL orders/and emails must have this format shown.

***SD401-F19-XX for Senior Design ECE401, Fall of 2019
Semester, Group number XX.***

This to be included on Parts orders, PCB orders and emails.

SD401 Spring 18 Groups 1-20- Osh Park orders						
Group#	Date Order	Date Received	PO#	Osh Park order#		
SD401-18-01		4/16/2018 4/27/2018	180103JE	bHH8iyjm		\$30.40
SD401-18-02		4/4/2018 4/11/2018	180079JE	gnaJG8Ja		\$19.65
SD401-18-03		4/17/2018 4/23/2018	180121JE	YufN5cA5		\$20.30
SD401-18-04		4/16/2018 4/23/2018	180126JE	rJj8SqN4		\$10.20
SD401-18-05		4/12/2018 4/24/2018	180091JE	qzDthznN		\$20.30
SD401-18-07		4/16/2018 4/24/2018	180120JE	boArQtkm		\$17.70
SD401-18-08		4/16/2018 4/24/2018	180120JE	dgEsPBY6		\$20.30
SD401-18-09		4/9/2018 4/17/2018	180080JE	isVQGUy8		\$20.30
SD401-18-10		4/16/2018 4/24/2018	180100JE	MgoFhqpt		\$20.30
SD401-18-11		4/16/2018 4/27/2018	180099JE	owJxcjG6		\$20.30
SD401-18-12		4/16/2018 4/24/2018	180101JE	mqWAShw		\$20.30
SD401-18-13		4/16/2018 4/24/2018	180102JE	pUZGrgrY		\$20.30
SD401-18-14		4/13/2018 4/25/2018	180096JE	G7WMurUz		\$20.30
SD401-18-15						\$0.00
SD401-18-16		4/13/2018 4/25/2018	180093JE	oPivQfVu		\$20.30
SD401-18-17		4/11/2018 4/23/2018	180086JE	m8qjhBVf		\$20.30
SD401-18-18		4/9/2018 4/24/2018	180083JE	J6gHSGSs		\$20.30
SD401-18-19		4/9/2018 4/23/2018	180081JE	QFQgykox		\$20.50
SD401-18-20		4/11/2018 4/23/2018	180087JE	Edqbxucq		\$20.30
SD401-18-21		4/16/2018 4/24/2018	180104JE	nekypMrN		\$20.30
SD401-18-22		4/16/2018 4/24/2018	180119JE	UHmE7FV8		\$20.60
SD401-18-18		4/9/2018 4/23/2018	180082JE	PBMsdZU		\$20.30
SD401-18-06		4/13/2018 4/25/2018	180095JE	AzBKy78u		\$19.65
SD401-18-06		4/13/2018 4/25/2018	180095JE	dwyNrQMi		\$19.65
SD401-18-06		4/13/2018 4/25/2018	180095JE	MrRQYixQ		\$19.65

To Order: Go to oshpark.com create an account, Name and email address, DO NOT Pay for anything!



You will see this , it gives information about your board. IF this shows up and are agreeable with the price, scroll down and press Continue

OSH Park ~ - Google Chrome

Secure | <https://oshpark.com/uploads/2f8lymUS>

OSHPARK ABOUT US SERVICES SUPPORT SHARING

JEFFREY.ERICKSON

About your board

We detected a 2 layer board of 2.02 x 2.02 inches (51.2 x 51.2mm)
3 boards will cost \$20.30

Board name

ff0e9fa78bd3e23e_15172611460000_gerber (1)

Description

Enter a short description of your project

Notes

Processing information

- Processing ff0e9fa78bd3e23e_15172611460000_gerber (1).zip as Upverter ZIP file.
- Removed empty file "design_export.gtp".
- Removed empty file "design_export.gbp".
- Removed empty file "design_export.gbo".
- 2 layer board of 2.02x2.02 inches.

Warning (non-critical)

- Your project doesn't contain a bottom silk screen.

Top

Bottom

Jeff-Erickson.csv ff0e9fa78bd3e23e_...zip ff0e9fa78bd3e23e_...upv ff0e9fa78bd3e23e_...upv ff0e9fa78bd3e23e_...zip Show all

Now you can VERIFY all details of your board.

Do not purchase/ files are emailed to Purchase –
Jeffrey.Erickson@ndsu.edu

OSH Park – Verify your design - Google Chrome

Secure | <https://oshpark.com/uploads/2f8lymUS/approval/new>

OSHPARK ABOUT US SERVICES SUPPORT SHARING

JEFFREY.ERICKSON

Verify your design

Board Top

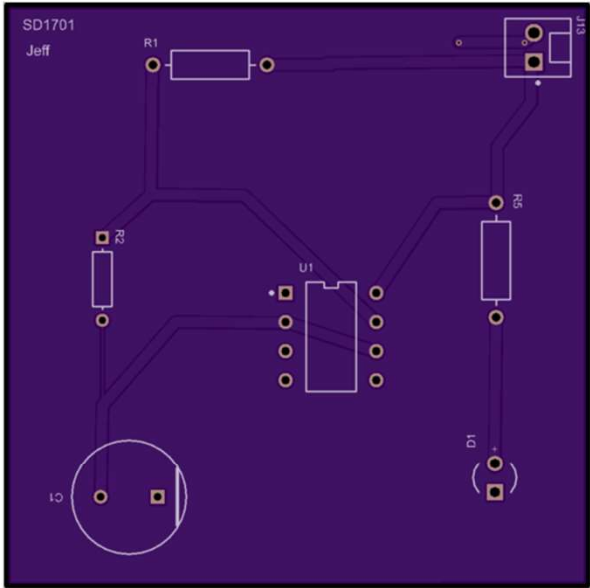
This shows the final manufactured board as if you held it in your hand.

Your design should show gold copper, purple mask, white silk, black drills, and the board outline.

Internal cutouts are indicated by a black outline but are not filled in.


If the image here is entirely white, you'll want to find and fix any gaps in the board outline.

There should be no dimension or measurement ruler



Board Bottom

This shows the final manufactured board as if



Jeff-Erickson.csv ff0e9fa78bd3e23e....zip ff0e9fa78bd3e23e....upv ff0e9fa78bd3e23e....upv ff0e9fa78bd3e23e....zip Show all



This is the final- but DO NOT ORDER unless it is for yourself- send the files to Jeffrey.Erickson@ndsu.edu

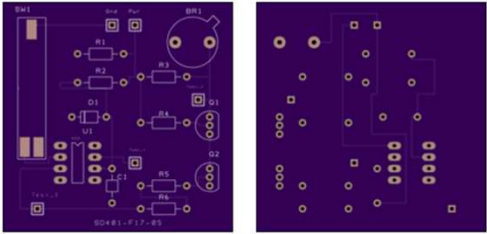
OSH Park ~ Order Details - Google Chrome

Secure | <https://oshpark.com/orders/oGfqZuub>

OSH PARK (5) ABOUT US SERVICES SUPPORT SHARING

JEFFREY.ERICKSON

Your boards have been shipped. [Track here.](#)



3 boards at \$20.10 per batch of three \$20.10

Sub total \$20.10

USPS - Free Shipping \$0.00

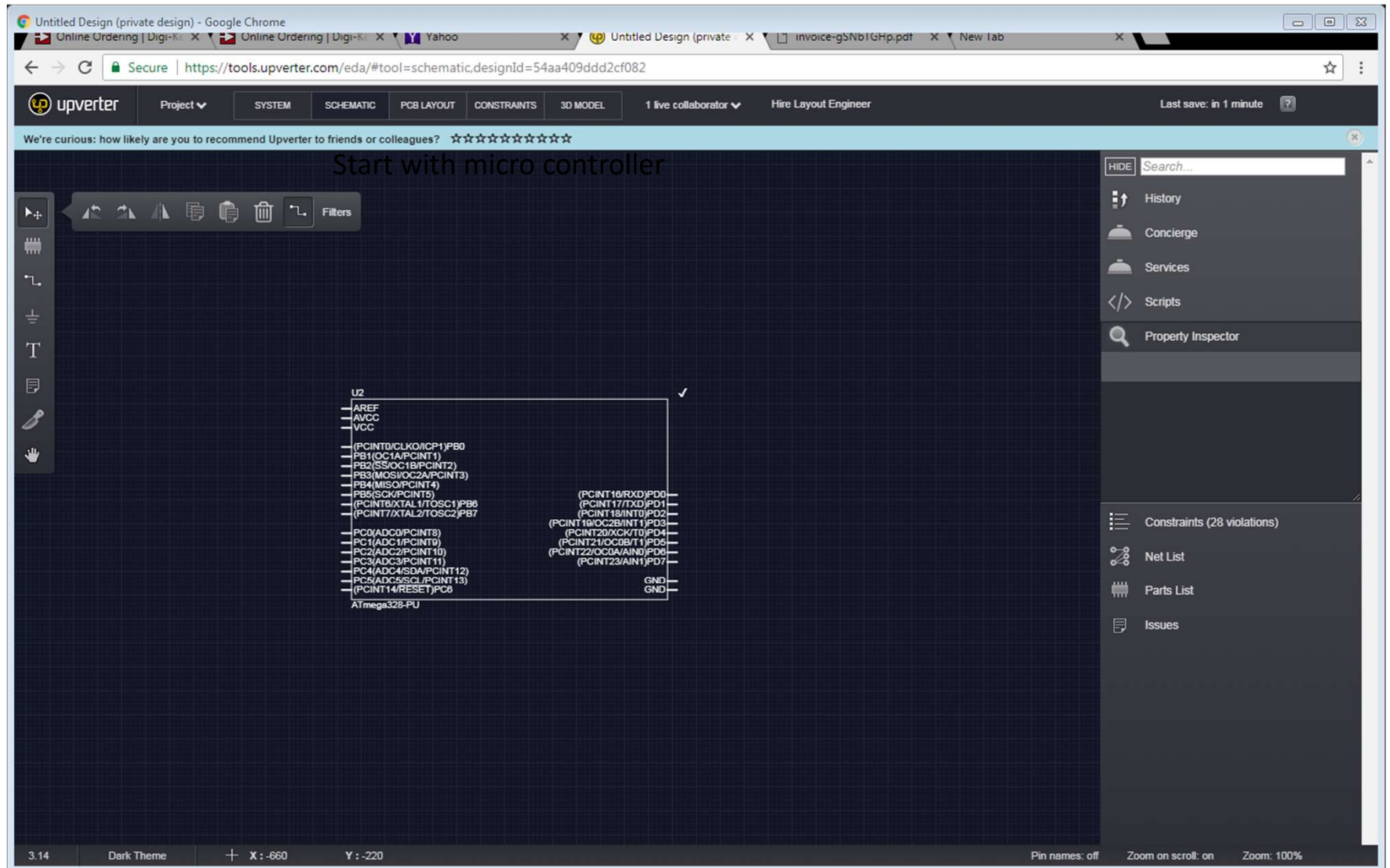
TOTAL (paid) \$20.10

Shipping Address

Jeff Erickson
NDSU Electrical & Computer Eng
NDSU Dept 2480
PO Box 6050
Fargo , ND , 58108
United States

[Order Receipt](#)

The check mark says it is a Verified part. This is required to transfer to the PCB Design



Add some components, such as LED's and current limiting resistors

Untitled Design (private design) - Google Chrome

Online Ordering | Digi-Key | Online Ordering | Digi-Key | Yahoo | Untitled Design (private | invoice-gSNb1GHp.pdf | New Tab

Secure | <https://tools.upverter.com/eda/#tool=schematic,designId=54aa409ddd2cf082>

upverter Project SYSTEM SCHEMATIC PCB LAYOUT CONSTRAINTS 3D MODEL 1 live collaborator Hire Layout Engineer Last save: 0 minutes ago

We're curious: how likely are you to recommend Upverter to friends or colleagues? ☆☆☆☆☆☆☆☆

U2

AREF
AVCC
VCC
(PCINT0/CLKO/ICP1)PB0
PB1(OC1A/PCINT1)
PB2(SS/OC1B/PCINT2)
PB3(MOSI/OC2A/PCINT3)
PB4(MISO/PCINT4)
PB5(SCK/PCINT5)
(PCINT8/XTAL1/TOSC1)PB6
(PCINT7/XTAL2/TOSC2)PB7
PC0(ADC0/PCINT8)
PC1(ADC1/PCINT9)
PC2(ADC2/PCINT10)
PC3(ADC3/PCINT11)
PC4(ADC4/SDA/PCINT12)
PC5(ADC5/SCL/PCINT13)
(PCINT14/RESET)PC6
ATmega328-PU
(PCINT16/RXD)PD0
(PCINT17/TXD)PD1
(PCINT18/INT0)PD2
(PCINT19/OC2B/INT1)PD3
(PCINT20/CK/INT0)PD4
(PCINT21/OC0B/T1)PD5
(PCINT22/OC0A/AIN0)PD6
(PCINT23/AIN1)PD7
GND
GND

R6 5K

R5 5K

D5 LED

R1 5K

D1 LED

R2 5K

D2 LED

R3 5K

D3 LED

R4 5K

D4 LED

History

Concierge

Services

Scripts

Property Inspector

Constraints (38 violations)

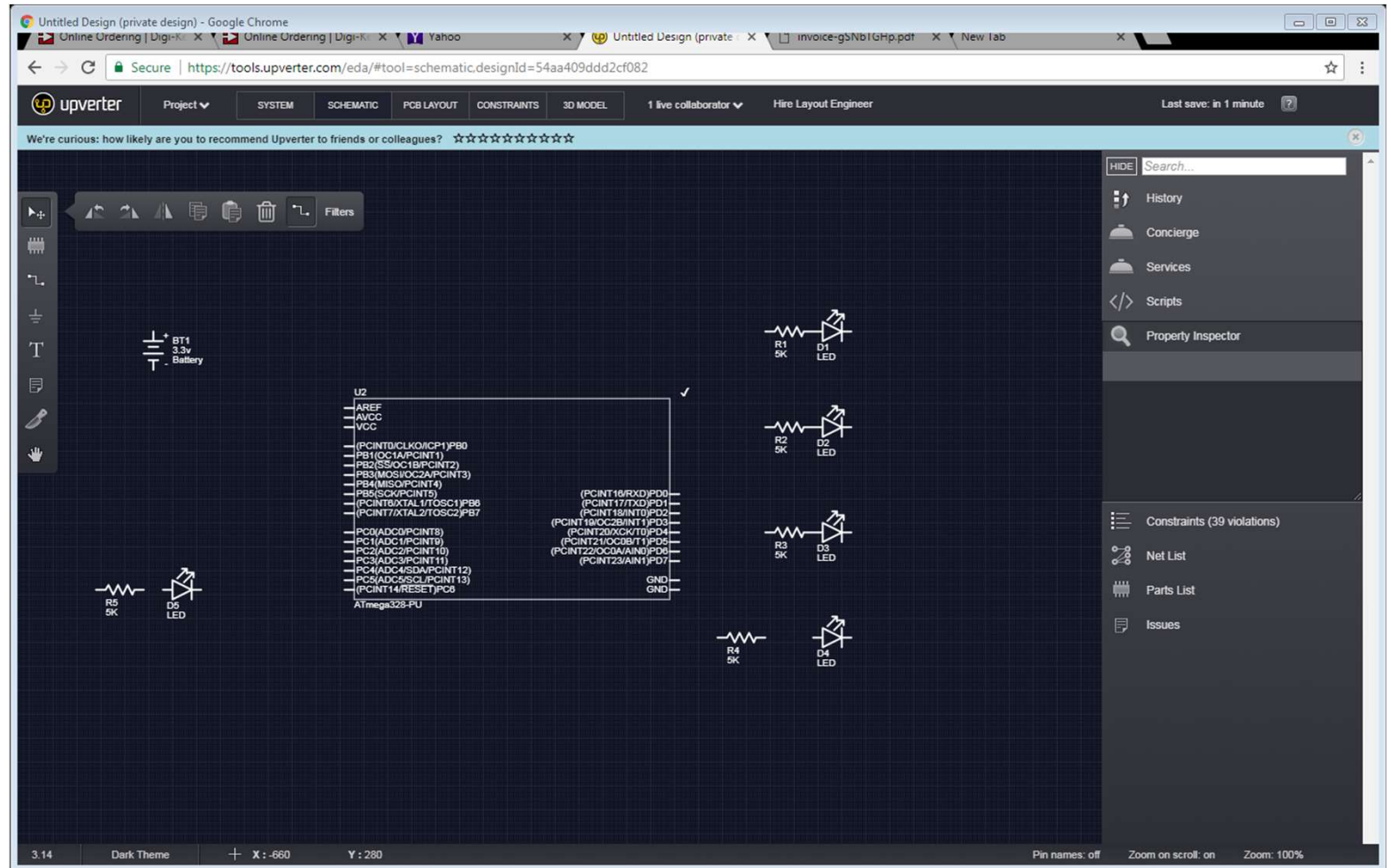
Net List

Parts List

Issues

3.14 Dark Theme + X: -710 Y: -30 Pin names: off Zoom on scroll: on Zoom: 100%

Insert a battery, in this case BT1, change the 3.3 Volt to 9V



Add your grounds

Untitled Design (private design) - Google Chrome

Online Ordering | Digi-Key Online Ordering | Digi-Key Yahoo

Untitled Design (private ... invoice-g5Nb1GHP.pdf New Tab

Secure | https://tools.upverter.com/eda/#tool=schematic,designId=54aa409ddd2cf082

upverter

Project SYSTEM SCHEMATIC PCB LAYOUT CONSTRAINTS 3D MODEL

1 live collaborator Hire Layout Engineer

Last save: 0 minutes ago

We're curious: how likely are you to recommend Upverter to friends or colleagues? ☆☆☆☆☆☆☆☆

Filters

BT1 3.3v Battery

GND

R5 5K

D5 LED

U2

AREF

AVCC

VCC

(PCINT0/CLKO/CP1)PB0

PB1(OC1A/PCINT1)

PB2(SS/OC1B/PCINT2)

PB3(MOSI/OC2A/PCINT3)

PB4(MISO/PCINT4)

PB5(SCK/PCINT5)

(PCINT6/XTAL1/TOSC1)PB6

(PCINT7/XTAL2/TOSC2)PB7

PC0(ADC0/PCINT8)

PC1(ADC1/PCINT9)

PC2(ADC2/PCINT10)

PC3(ADC3/PCINT11)

PC4(ADC4/SDA/PCINT12)

PC5(ADC5/SCL/PCINT13)

(PCINT14/RESET)PC6

ATmega328-PU

(PCINT16/RXD)PD0

(PCINT17/TXD)PD1

(PCINT18/INT0)PD2

(PCINT19/OC2B/INT1)PD3

(PCINT20/XCK/T0)PD4

(PCINT21/OC0B/T1)PD5

(PCINT22/OC0A/AIN0)PD6

(PCINT23/AIN1)PD7

GND

GND

R1 5K

D1 LED

R2 5K

D2 LED

R3 5K

D3 LED

R4 5K

D4 LED

GND

History

Concierge

Services

Scripts

Property Inspector

Constraints (39 violations)

Net List

Parts List

Issues

3.14 Dark Theme X : -660 Y : 270 Pin names: off Zoom on scroll: on Zoom: 100%

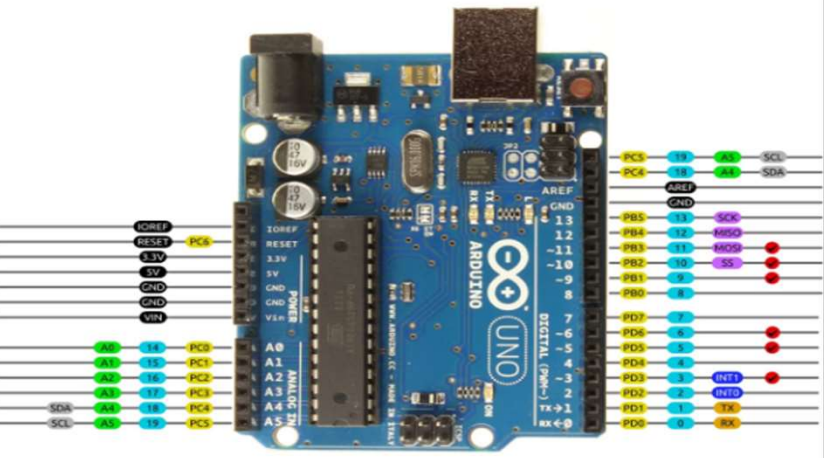
You will need Data sheets handy, indicating Pin Lay outs, for Vcc Gnds, Input and output pins

arduino uno pinout - Google Search - Google Chrome

Online Ordering | Dig... X ATMEGA328-PU Micro X Yahoo X Untitled Design (priva... X Invoice-gSNb1GHP.p... X ATMEGA328-PU Micro X arduino uno pinout - X

https://www.google.com/search?q=arduino+uno+pinout&tbm=isch&source=iu&ictx=1&fir=meUPi8eemLzITM%253A%252CMQxHORBJ5aaC2M%252C_&usg=__HOBQRQ5KoJGUySbJITpESeWs8Kc%...

Arduino Uno R3 Pinout



AVR DIGITAL ANALOG POWER SERIAL SPI I2C PWM INTERRUPT

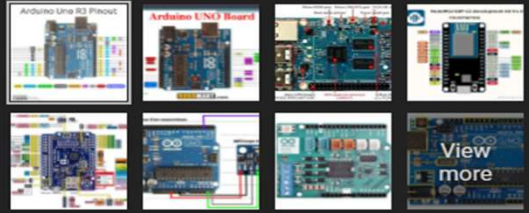
2014 by Bouni
Photo by Arduino.cc

Understanding Arduino UNO Hardware ...

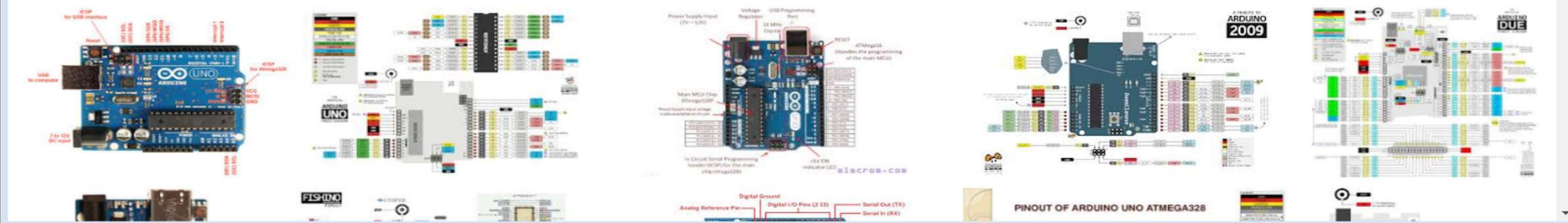
All About Circuits - 1200 x 1200 - Search by image
Arduino UNO R3 Pinout

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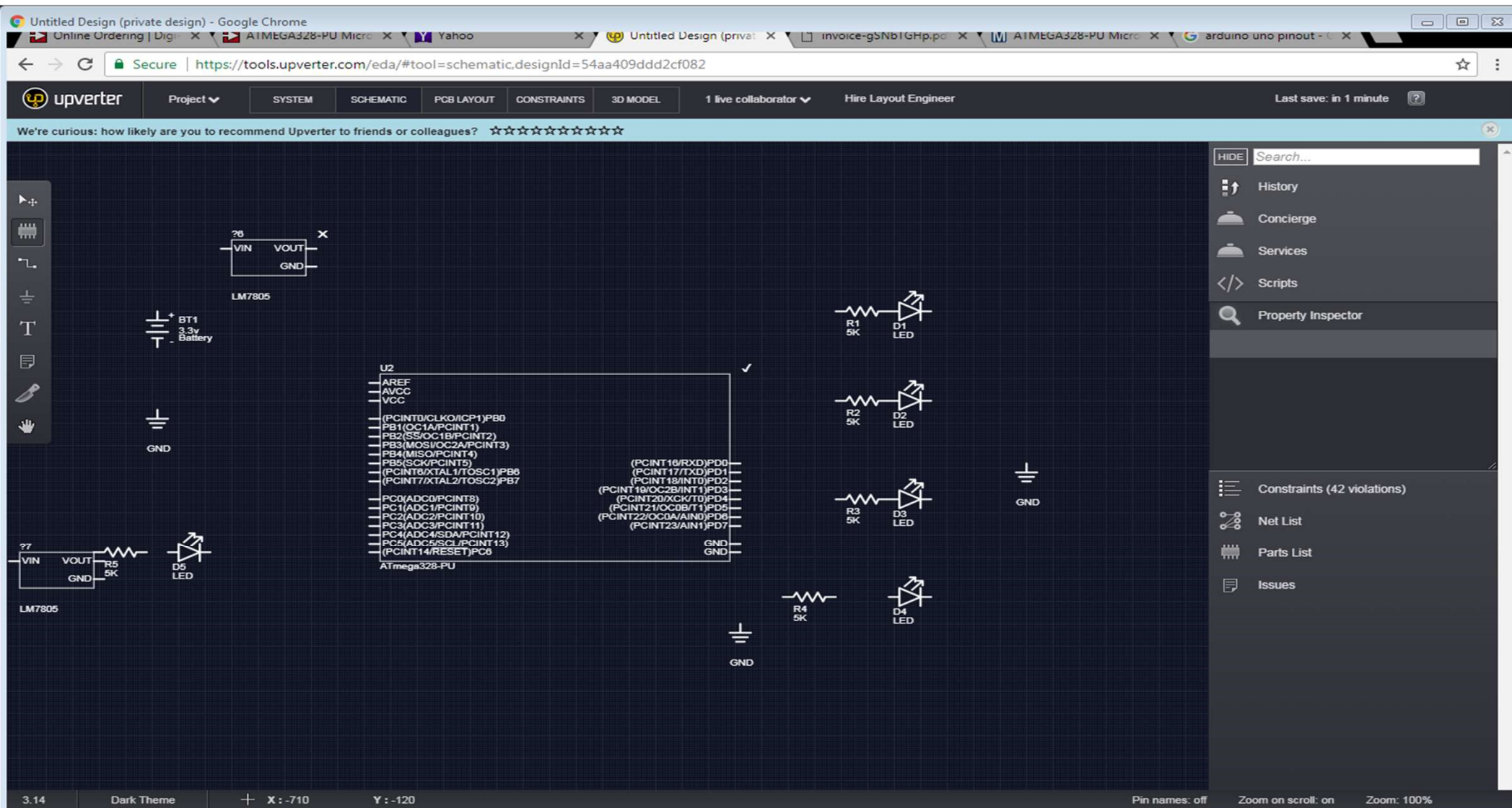
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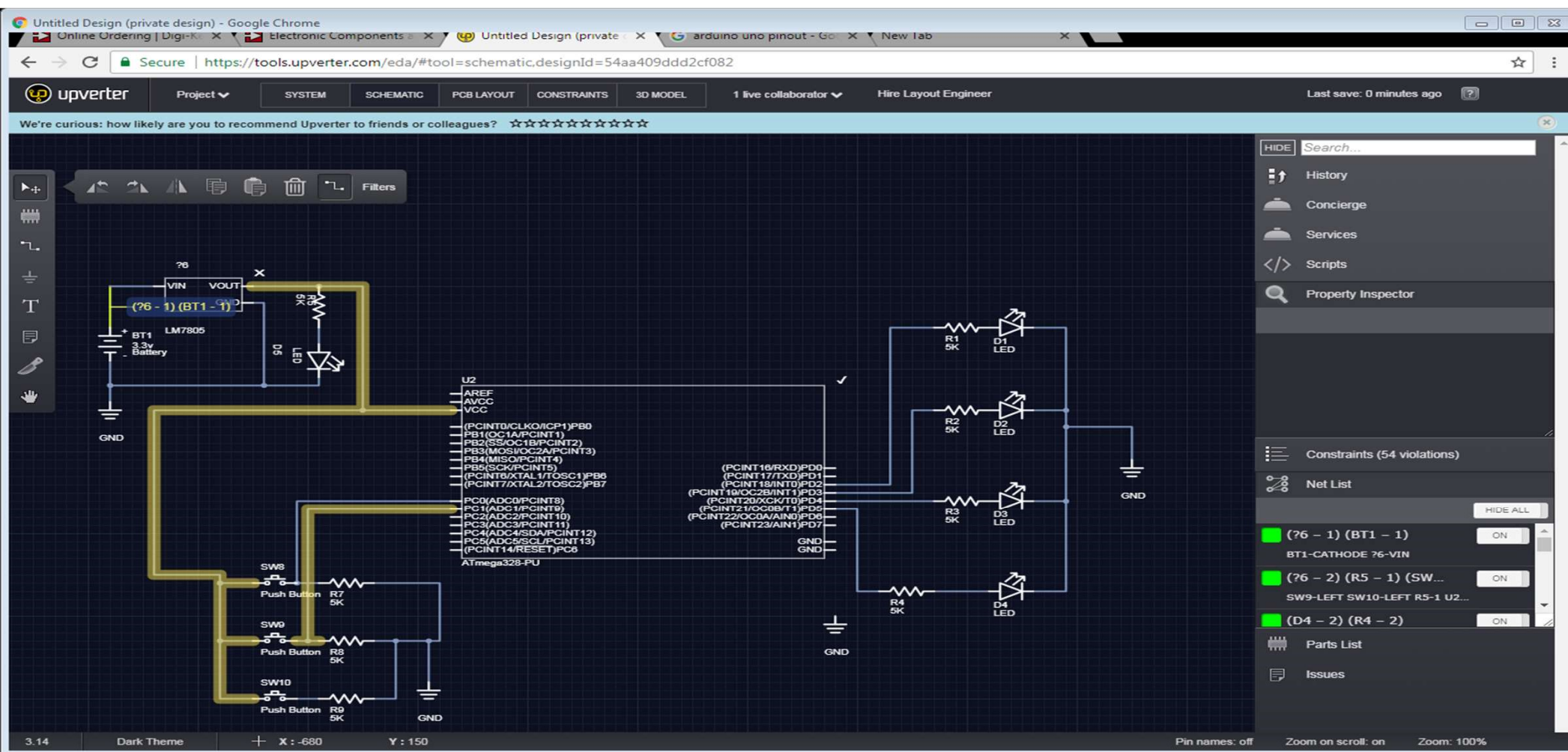
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Insert a Voltage Regulator such as an LM7805 5 Volt Regulator



The Connections between components, grounds, power ,etc. are called Nets If highlighted in Yellow there is an issue and must be corrected. Usually a naming issue.



Any questions please stop by, but remember to use the Tutorials and Users Manual on Upverter