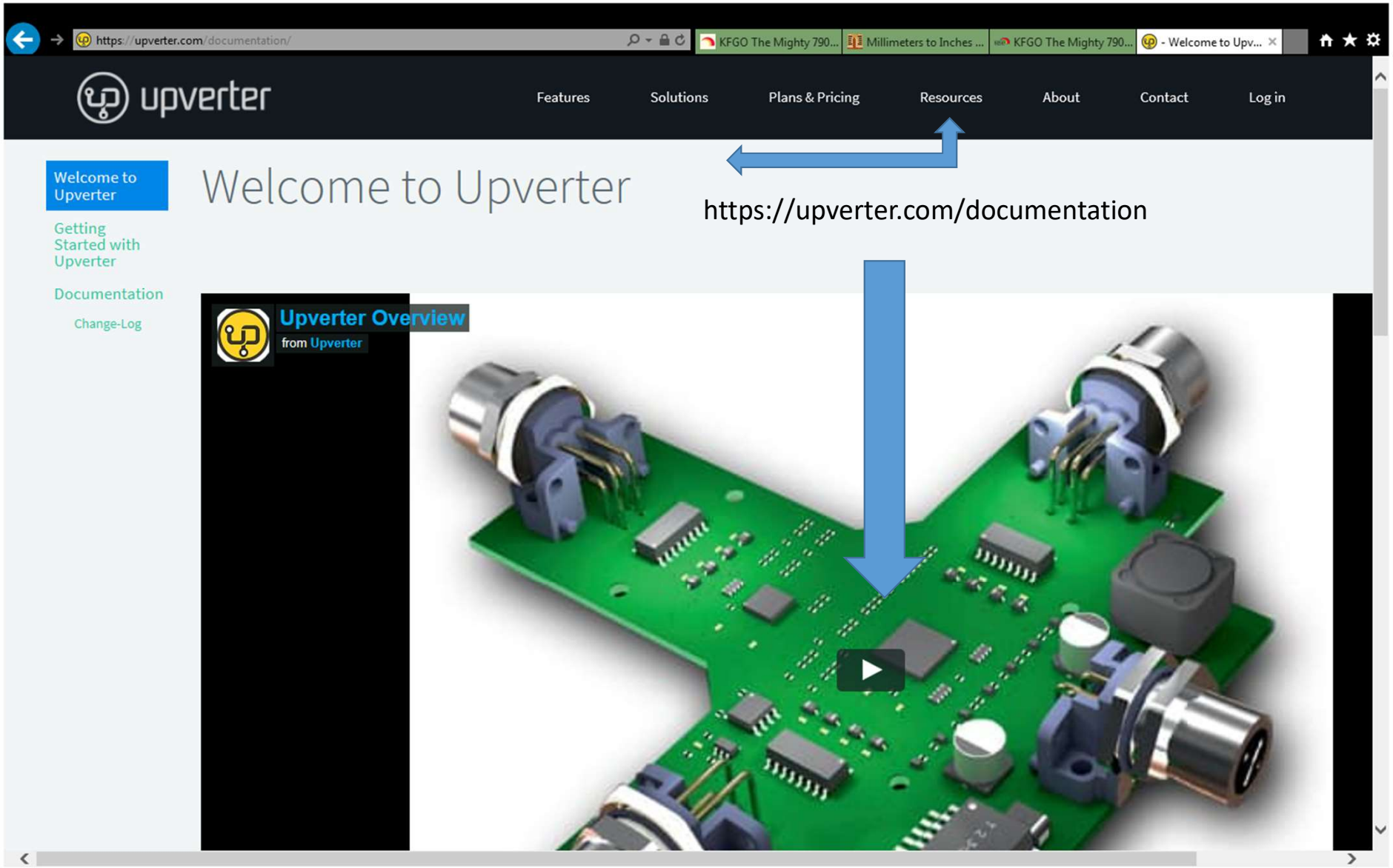
https://upverter.com/documentation/
KFGO The Mighty 790...
Millimeters to Inches ...
KFGO The Mighty 790...
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Getting Started with Upverter
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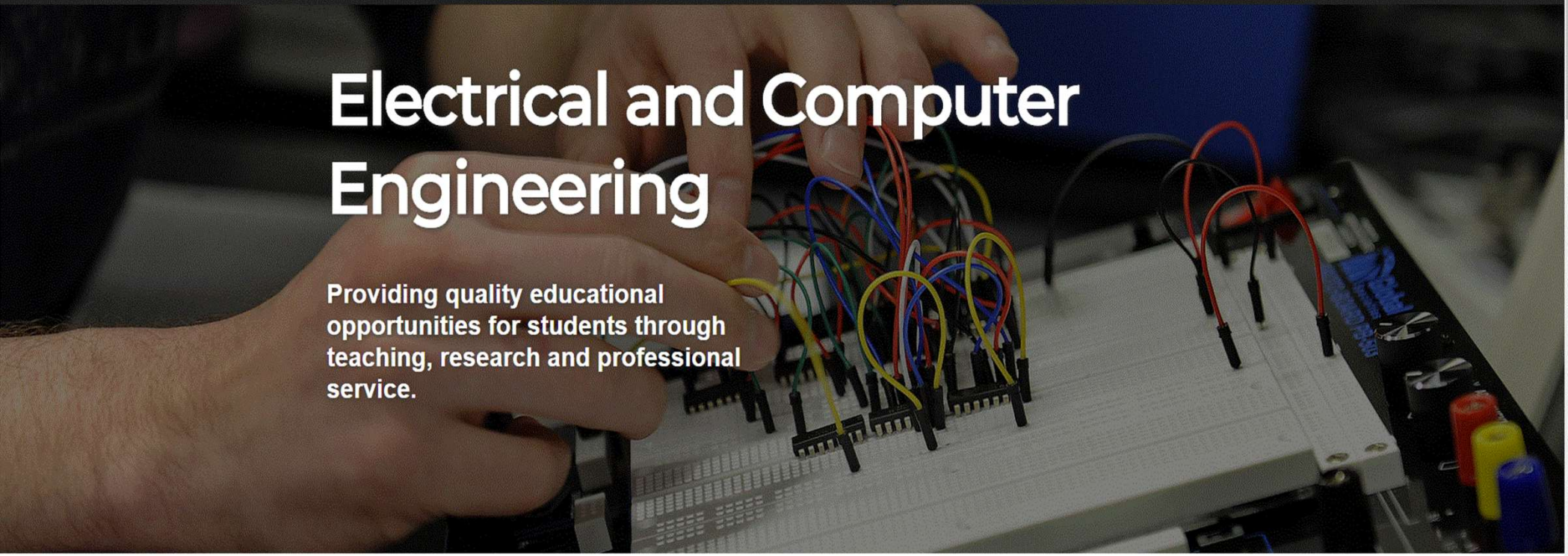
from Upverter



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

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

TRANSISTOR	B-1-128	2N1729	NTE100	Trans PNP, Ge, RF/IF Amp, Osc, Mxr, 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	SNGL 7B NV SPI Rheo 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.)

☐ ECE STOCK	☐ DigiKey	☐ Marlin P. Jones
☐ Allied	☐ Electronix Express	☐ Mouser
☐ Amazon.com	☐ JameCo Electronics	☐ Newark

Other Vendor Name: _____

Web Address (if applicable): _____

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

QTY	**ECE Stock Location	ECE Stock or Part #	Description	Price/Unit	Total

ECE Office Use Only

https://upverter.com/

Extension Cords products - Gra... | Realization. Not CAD. - Upv...

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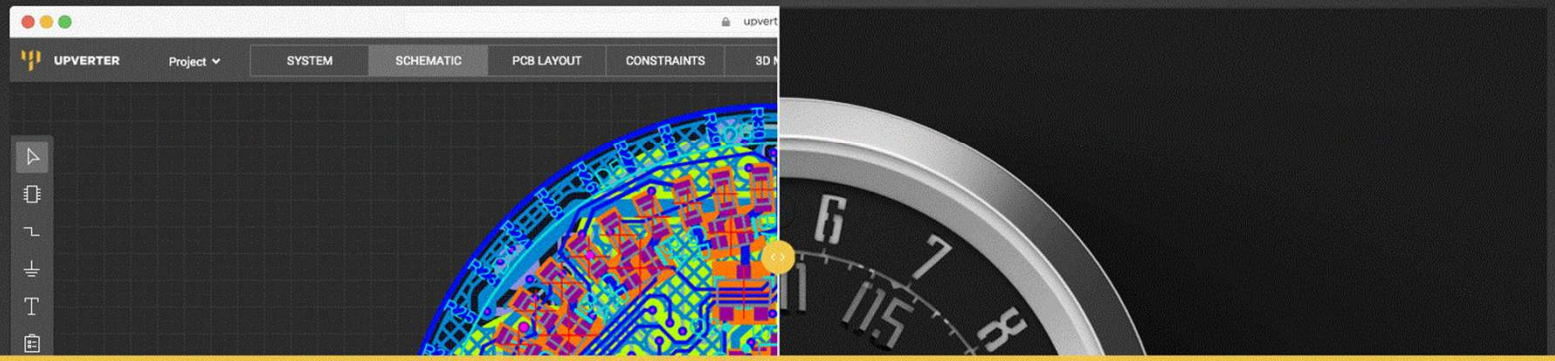
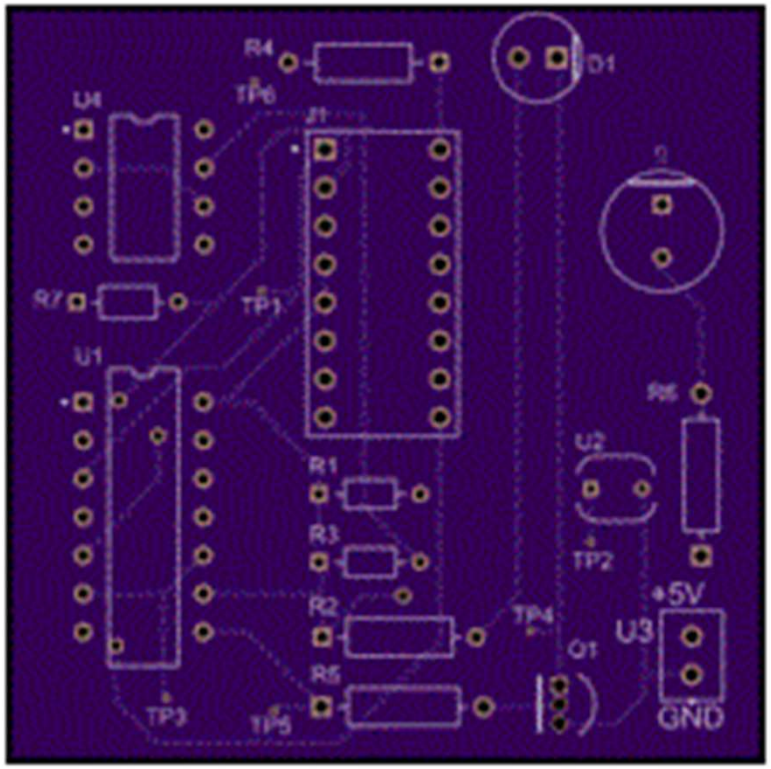
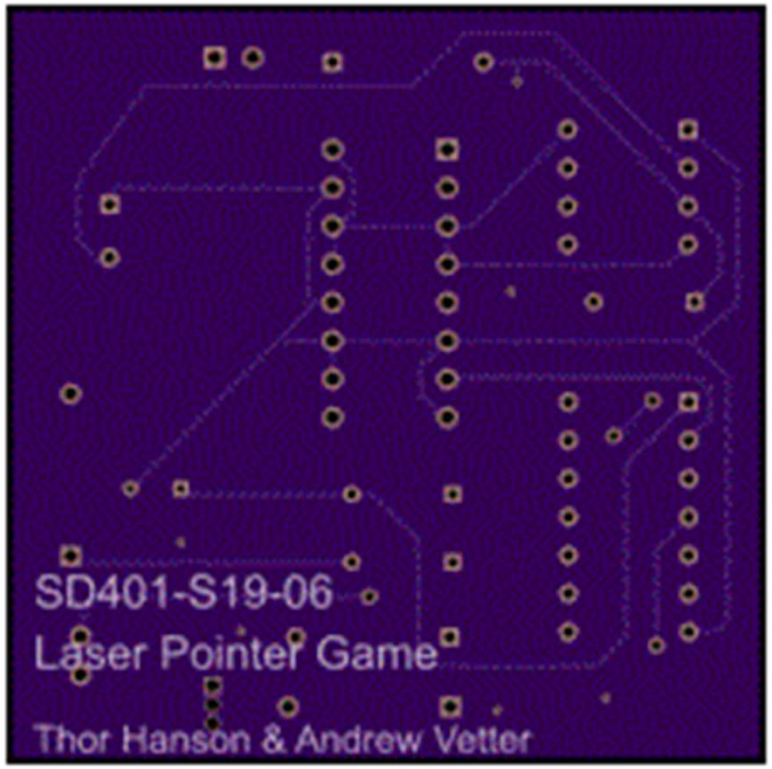


Start Designing Your Electronics Online with Speed and Ease

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

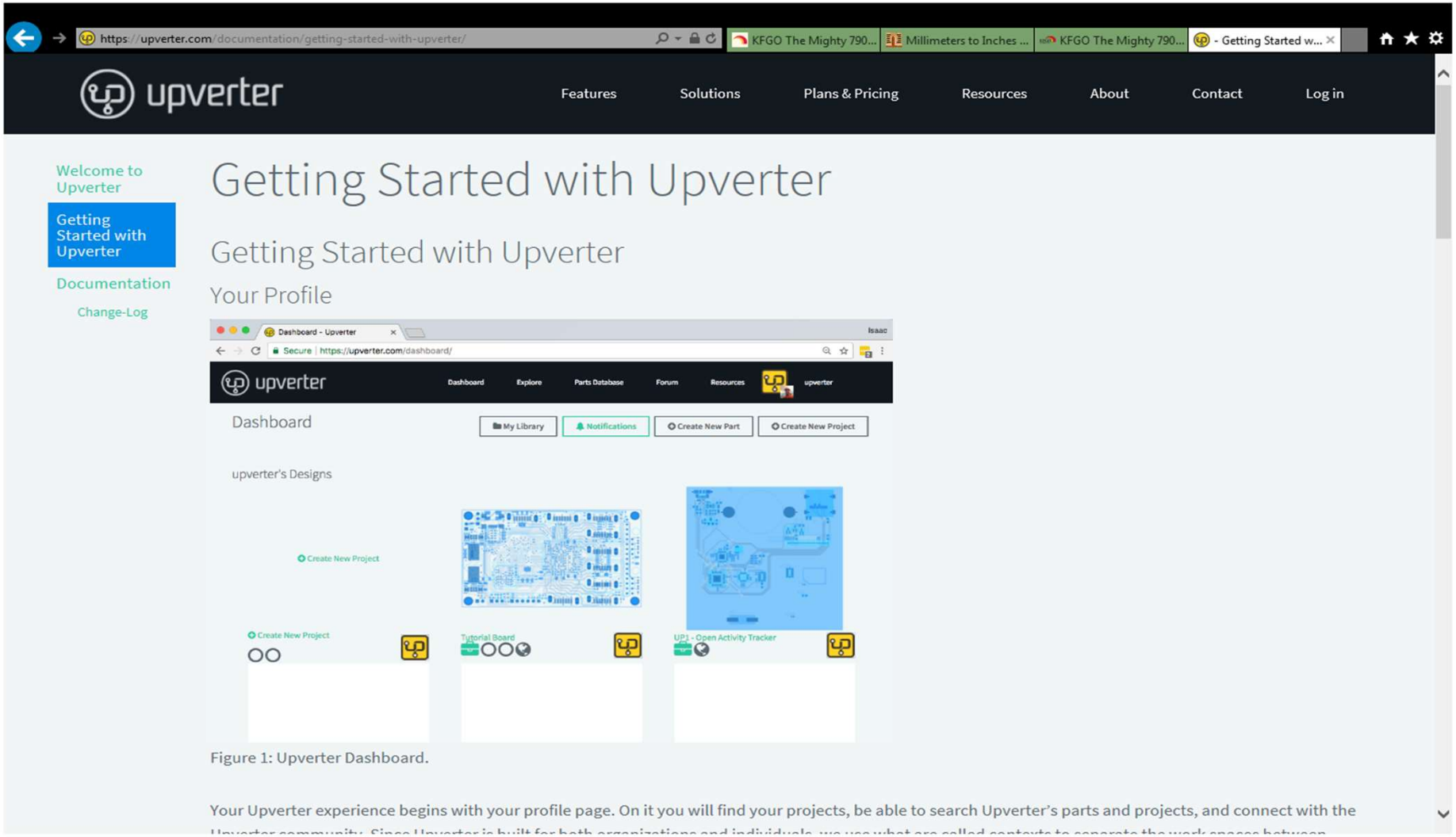
Some problems- it is web based- Upverter does not like Internet Explorer, works ok with Mozilla, but seems to work best with **Google Chrome**

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.



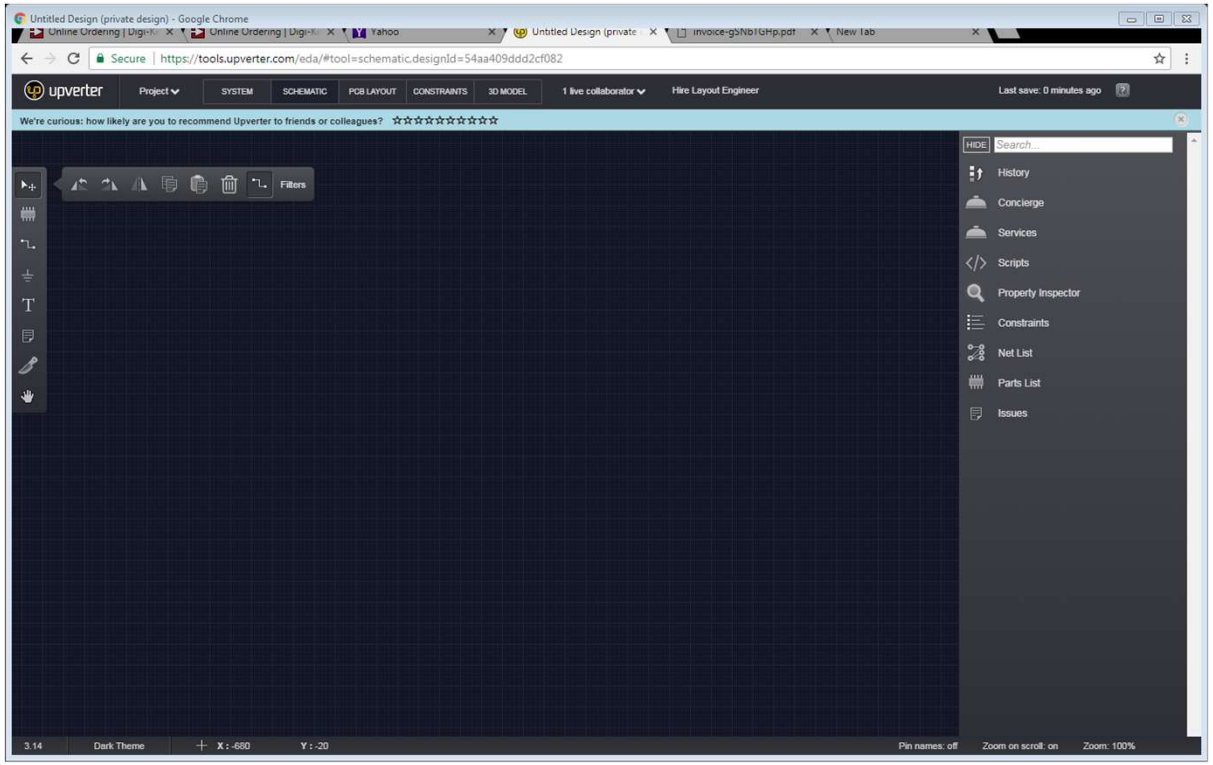
After going to Upverter.com and creating an account

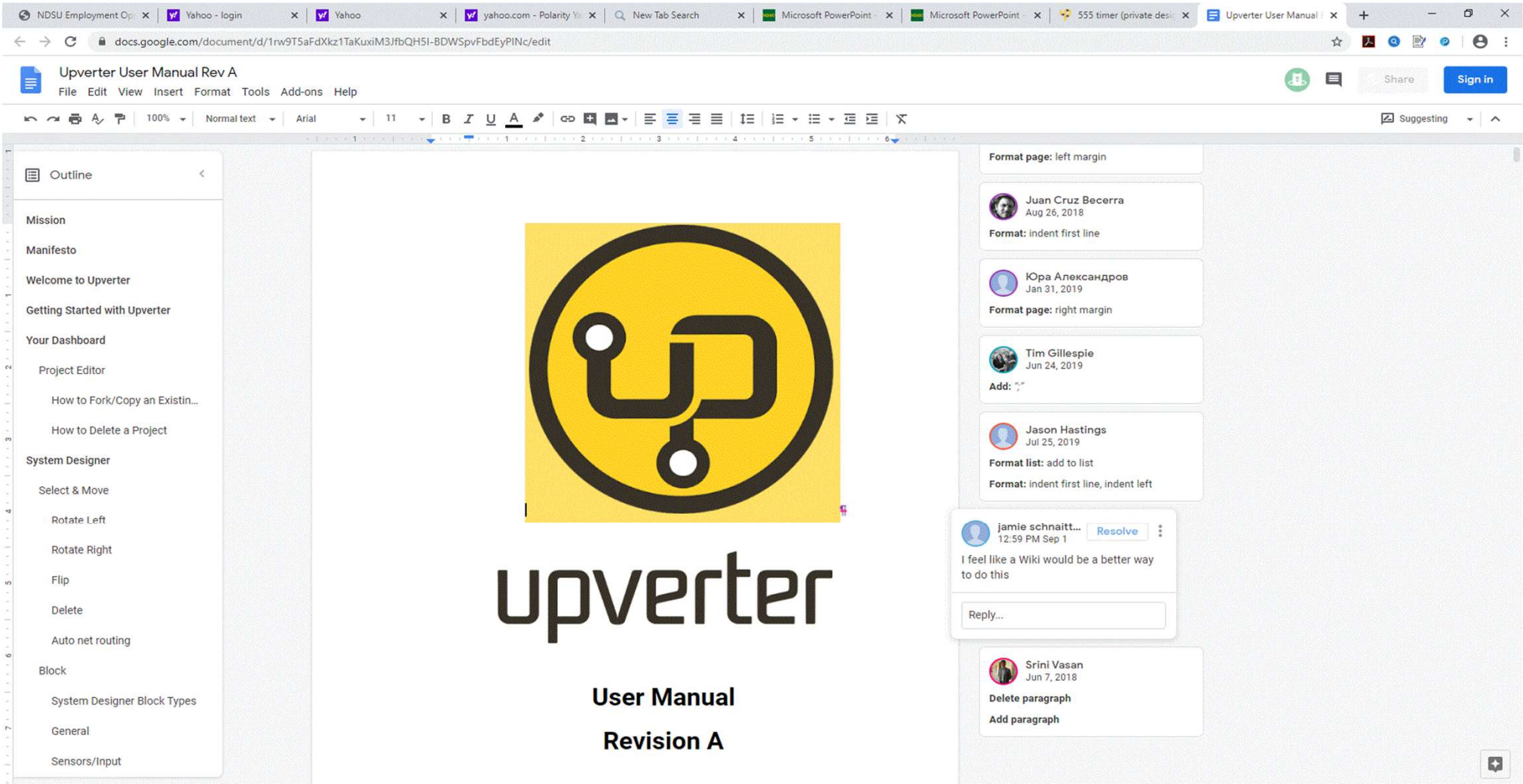
Create a New Project

- Create a New project

>Project

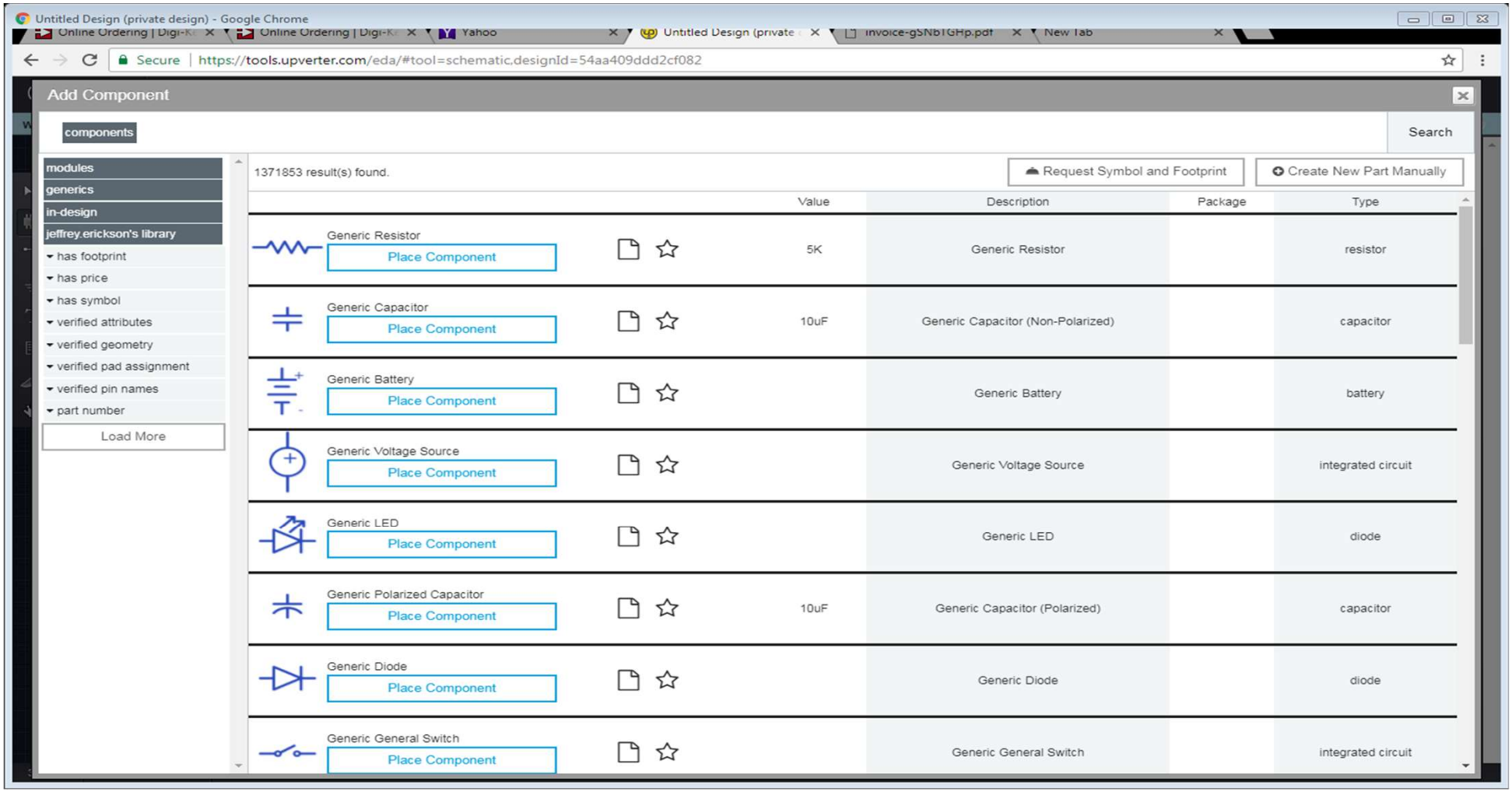
> New

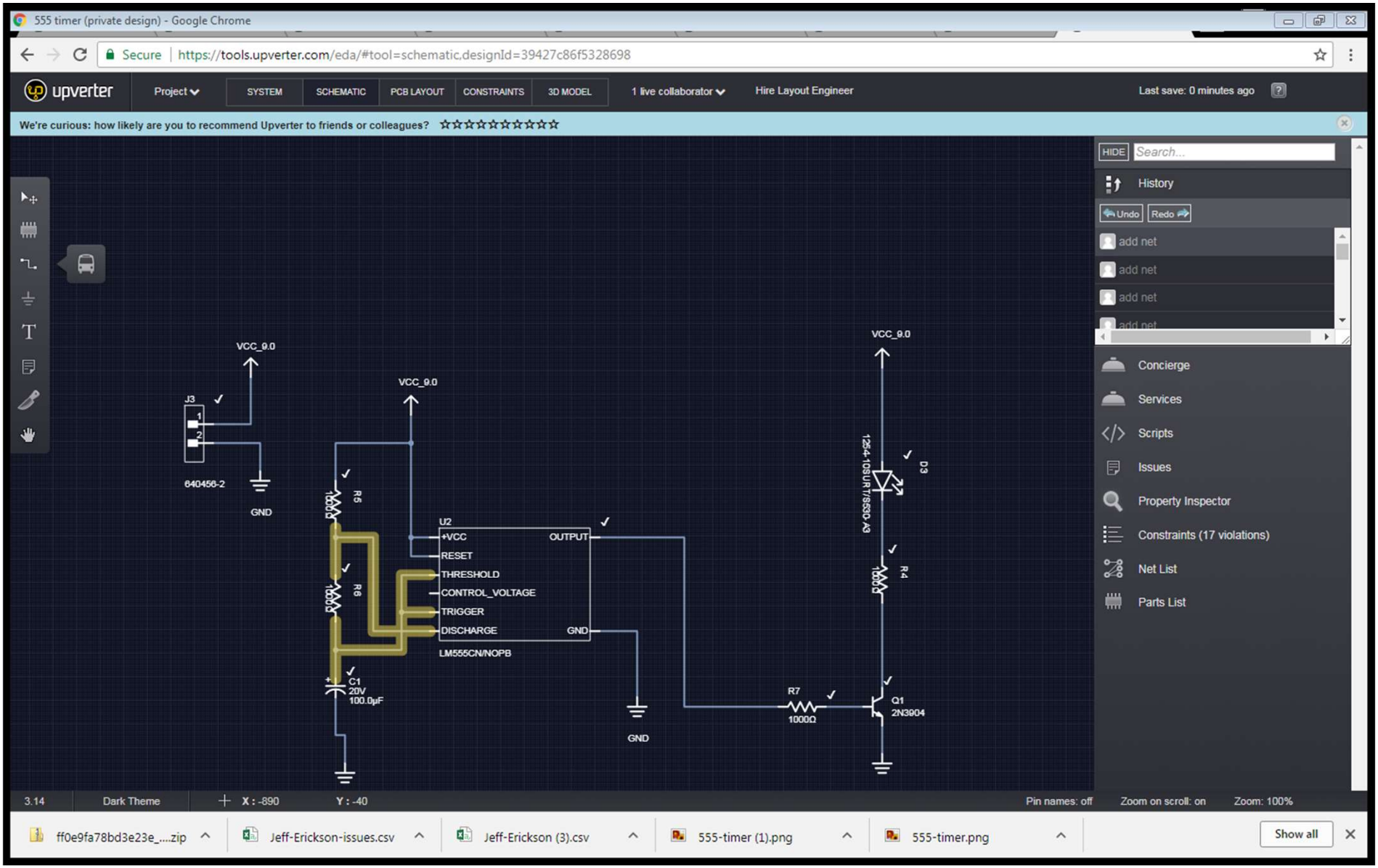




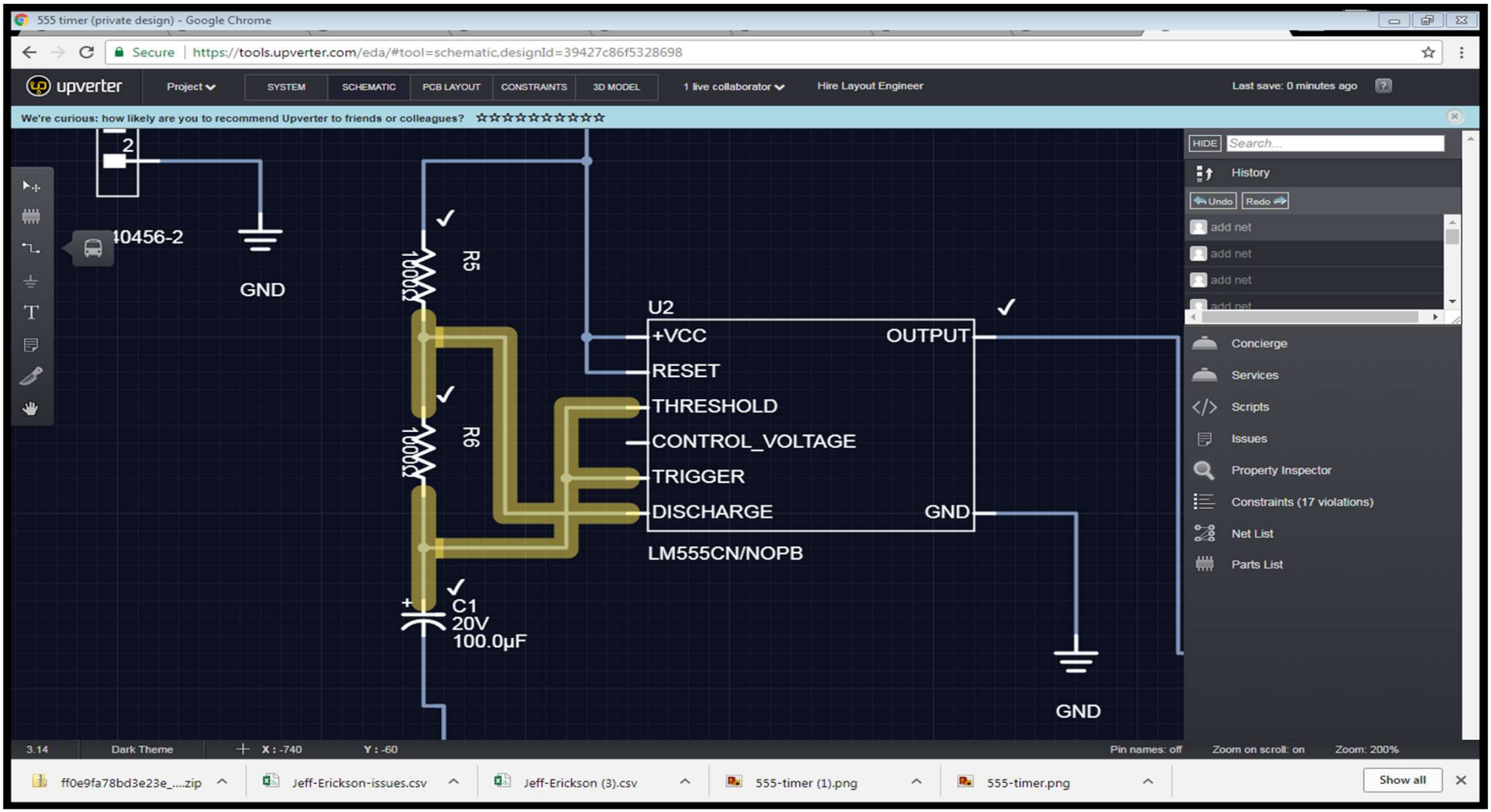
User Manual is very handy and easy to get at, open from Lower Left corner of page

Adding Parts to the schematic. Verified vs. Generic

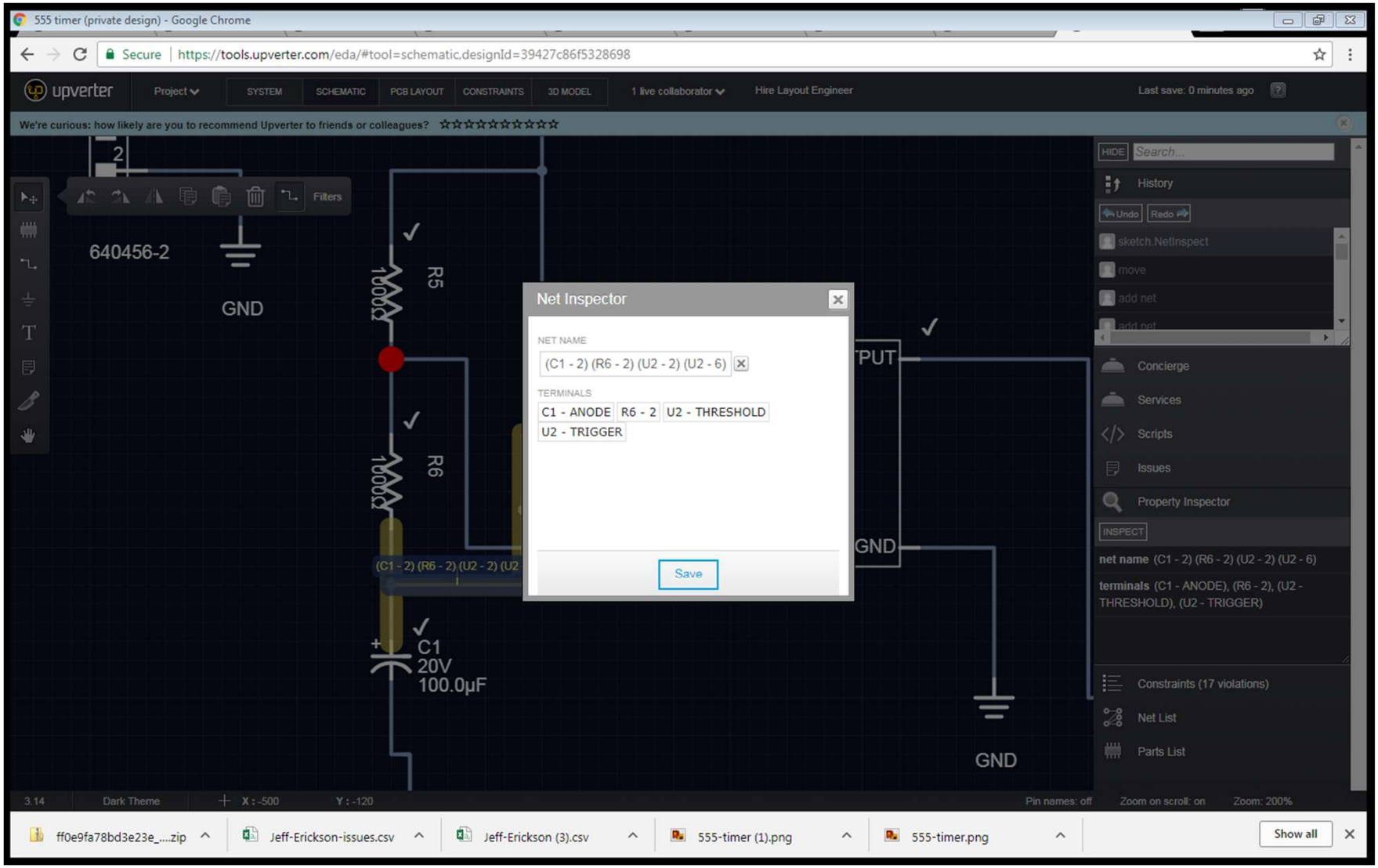



555 timer (private design) - Google Chrome
Secure | https://tools.upverter.com/eda/#tool=schematic,designId=39427c86f5328698
upverter
Project
SYSTEM
SCHEMATIC
PCB LAYOUT
CONSTRAINTS
3D MODEL
1 live collaborator
Hire Layout Engineer
Last save: 0 minutes ago
We're curious: how likely are you to recommend Upverter to friends or colleagues? ☆☆☆☆☆☆☆☆☆☆
HIDE
Search...
History
Undo
Redo
add net
add net
add net
add net
Concierge
Services
Scripts
Issues
Property Inspector
Constraints (17 violations)
Net List
Parts List
VCC_9.0
VCC_9.0
VCC_9.0
J3
1
2
640456-2
GND
R5
R6
U2
+VCC
RESET
THRESHOLD
CONTROL_VOLTAGE
TRIGGER
DISCHARGE
OUTPUT
GND
LM555CN/NOPB
C1
20V
100.0µF
GND
1254-1058-RT/6630-A3
D3
R4
R7
1000Ω
Q1
2N3904
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

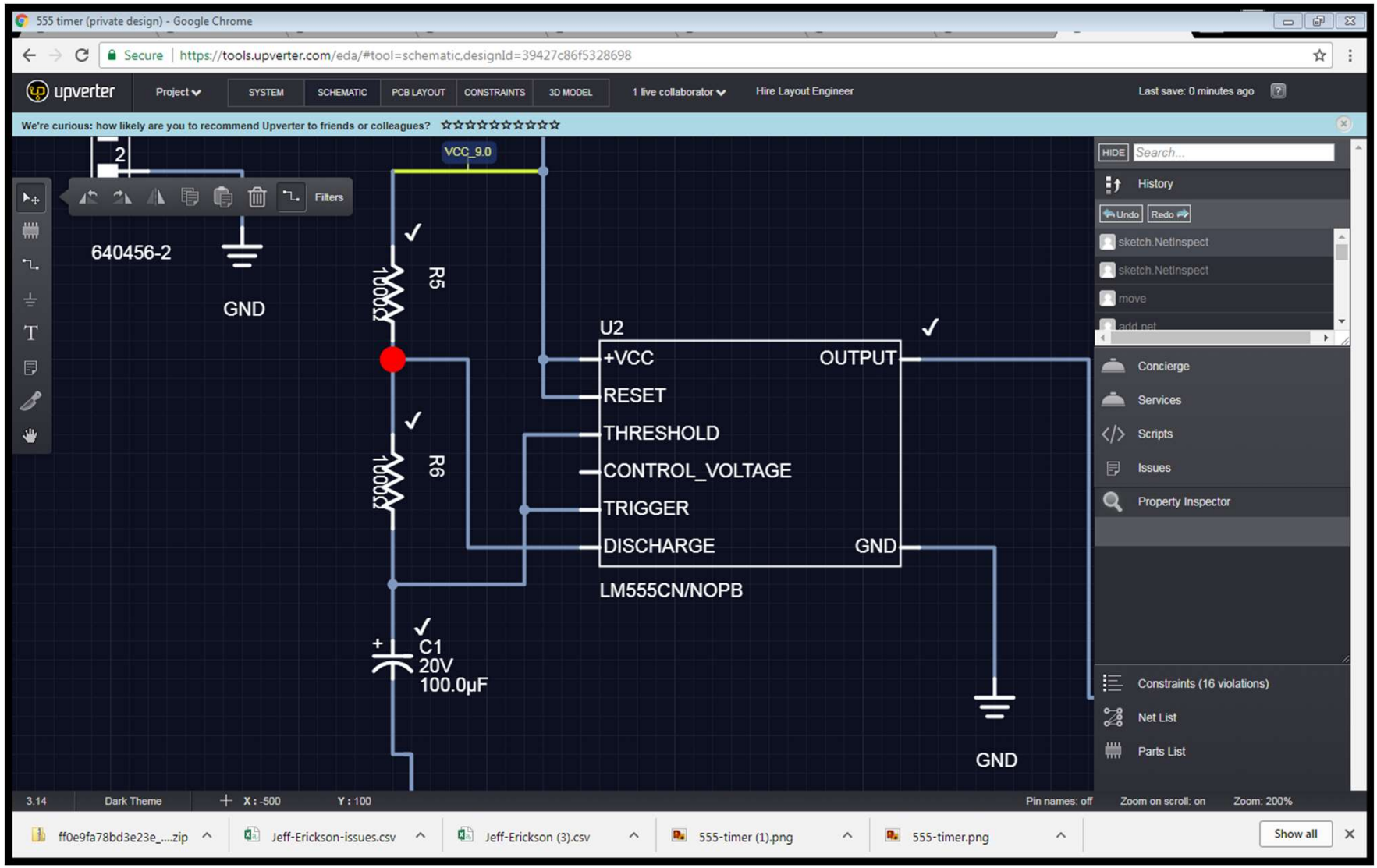
When creating schematic, do you have any issues like this? (Highlighted in Gold?)



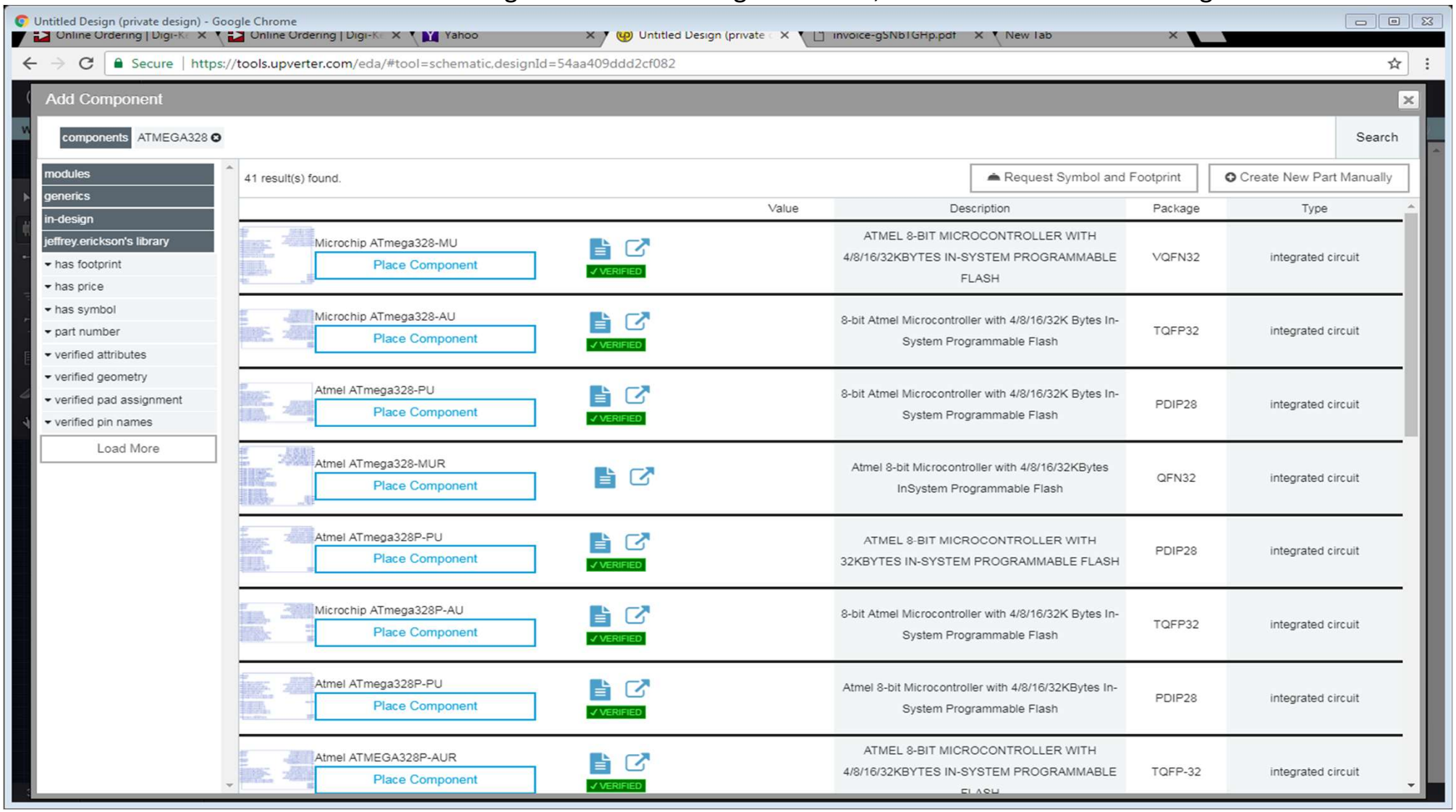
Nets have to be named. Double click on the gold, this box shows up, and name your NET



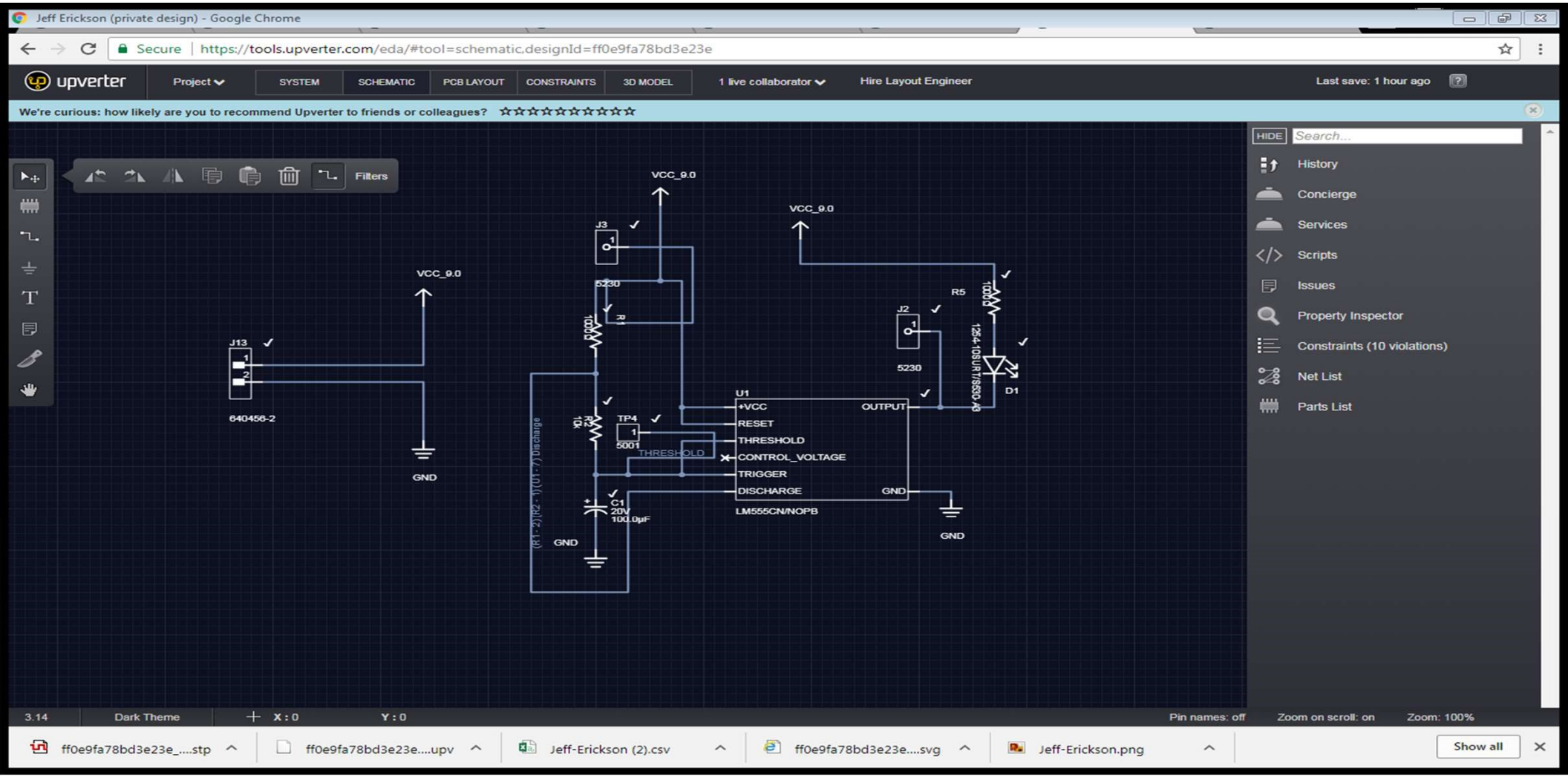
Gold outline is now gone and circuit is finished- time to convert the Schematic into a CAM File



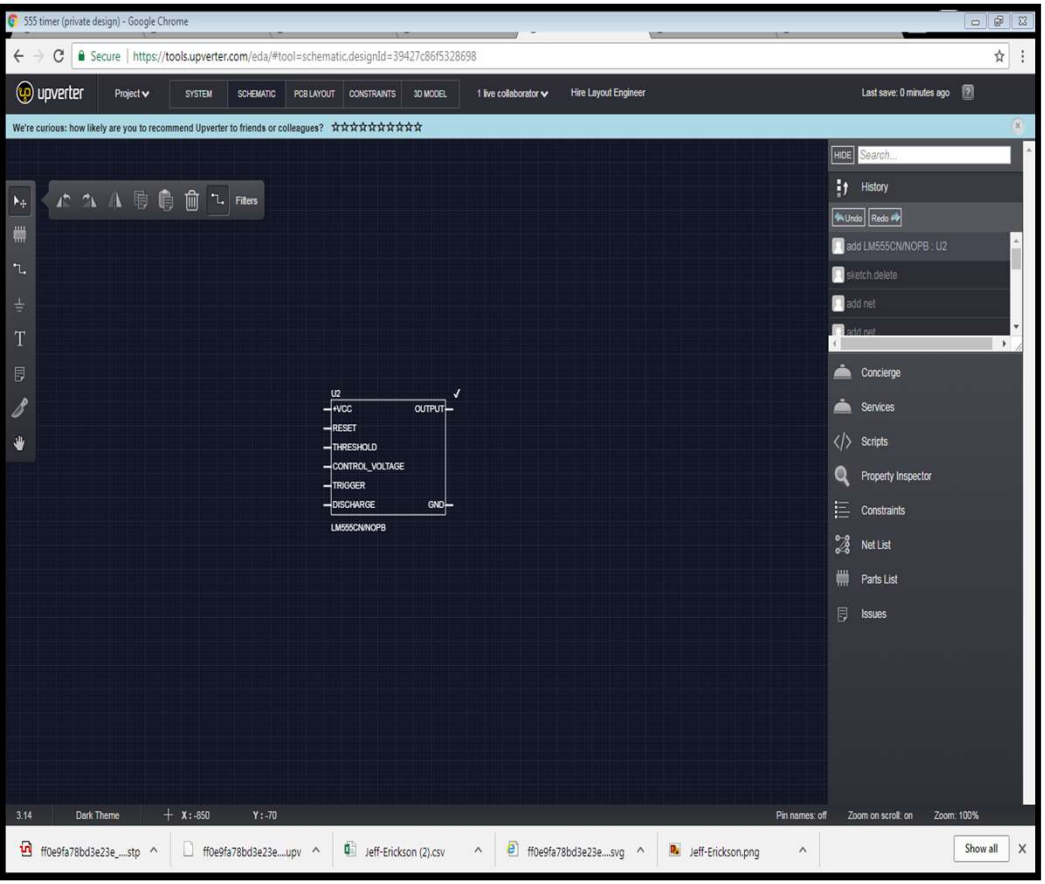
I started with a Microcontroller- using the Arduino ATmega328-PU IC, which is a 28 Pin DIP Package IC

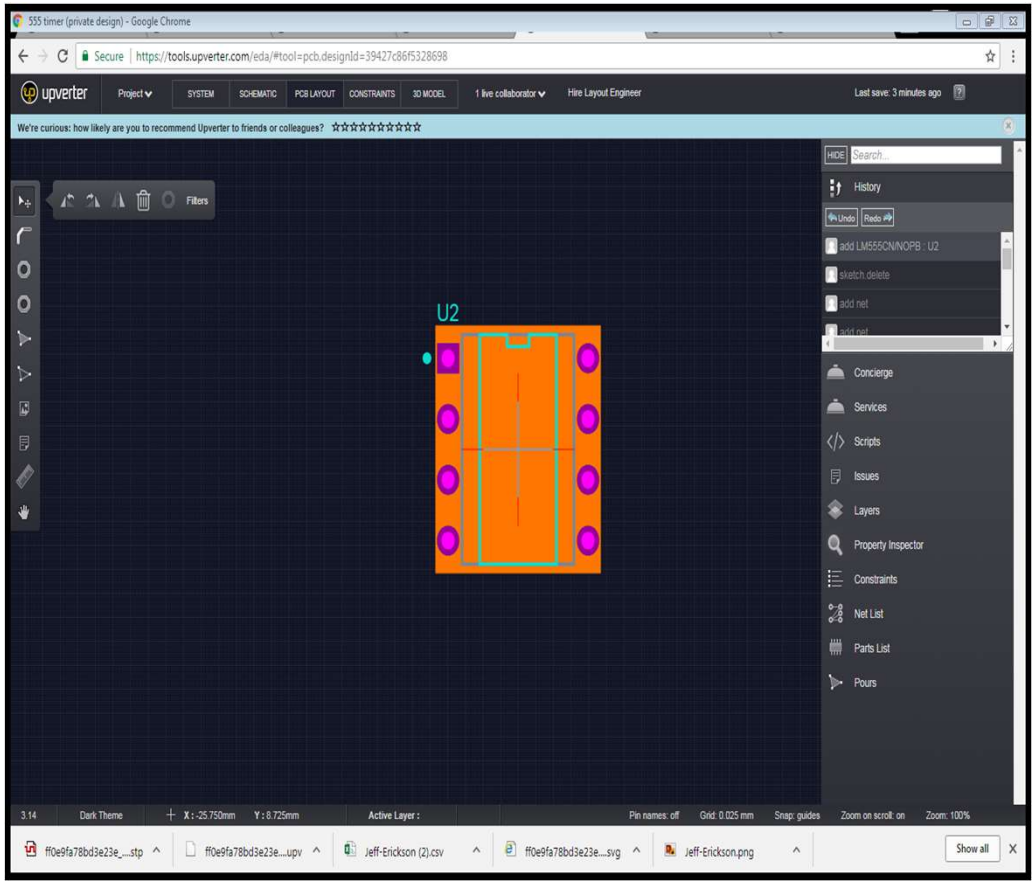


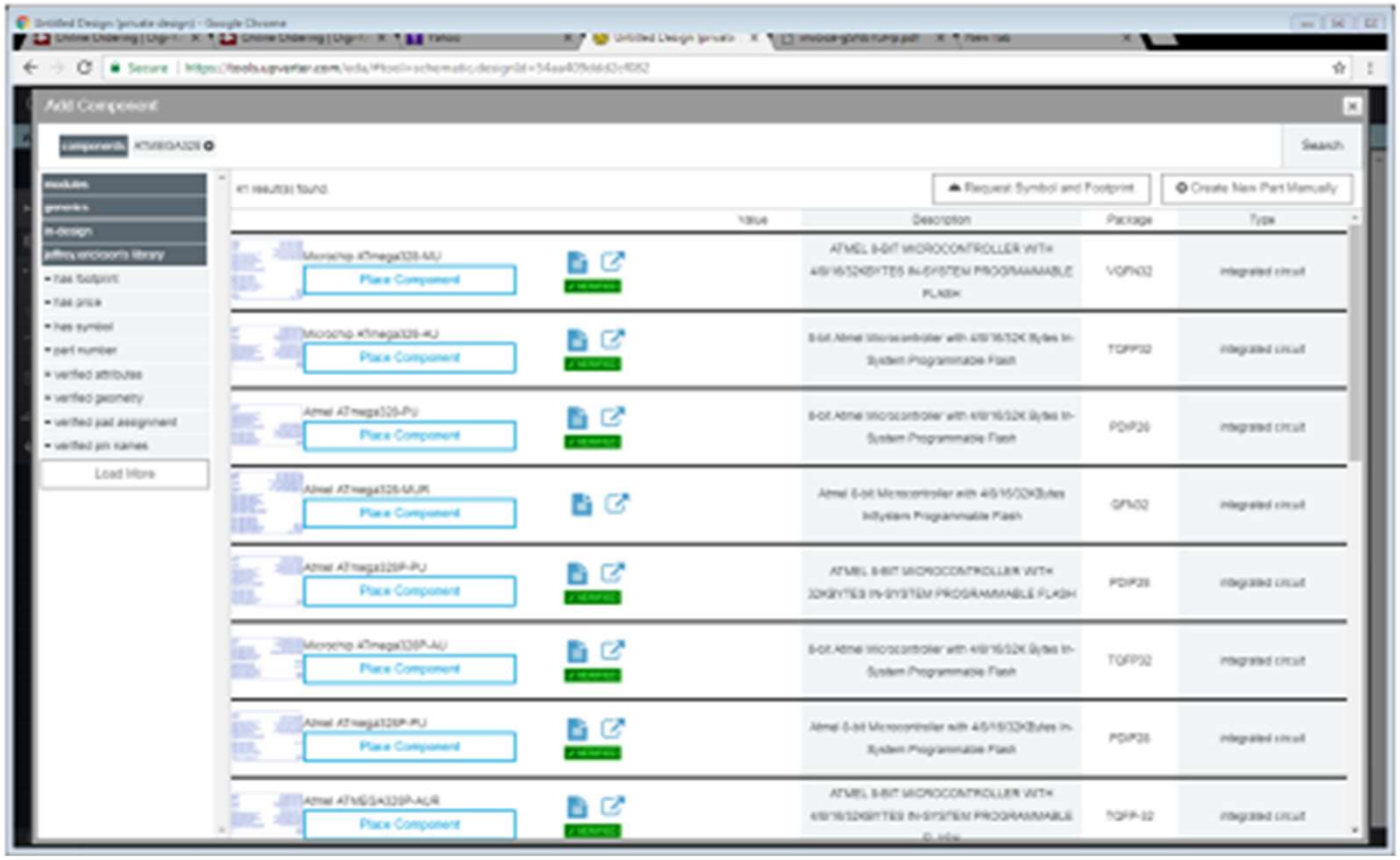
As you can tell, this schematic is different. This is a schematic of a 555 timer that blinks an LED, after schematic is finished, the next step is to create the PCB. Press “Q” to jump back and forth from Schematic to PCB



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

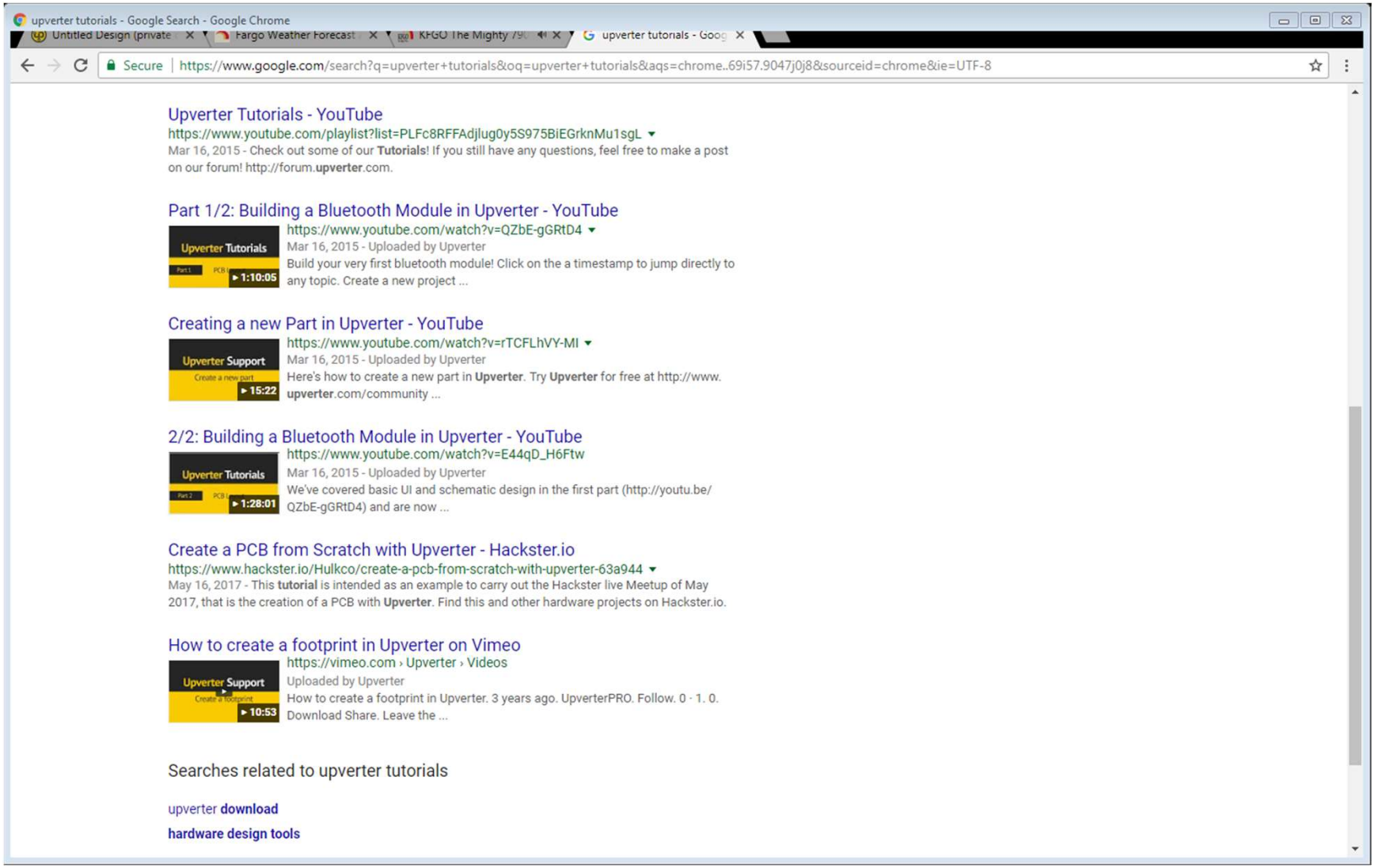






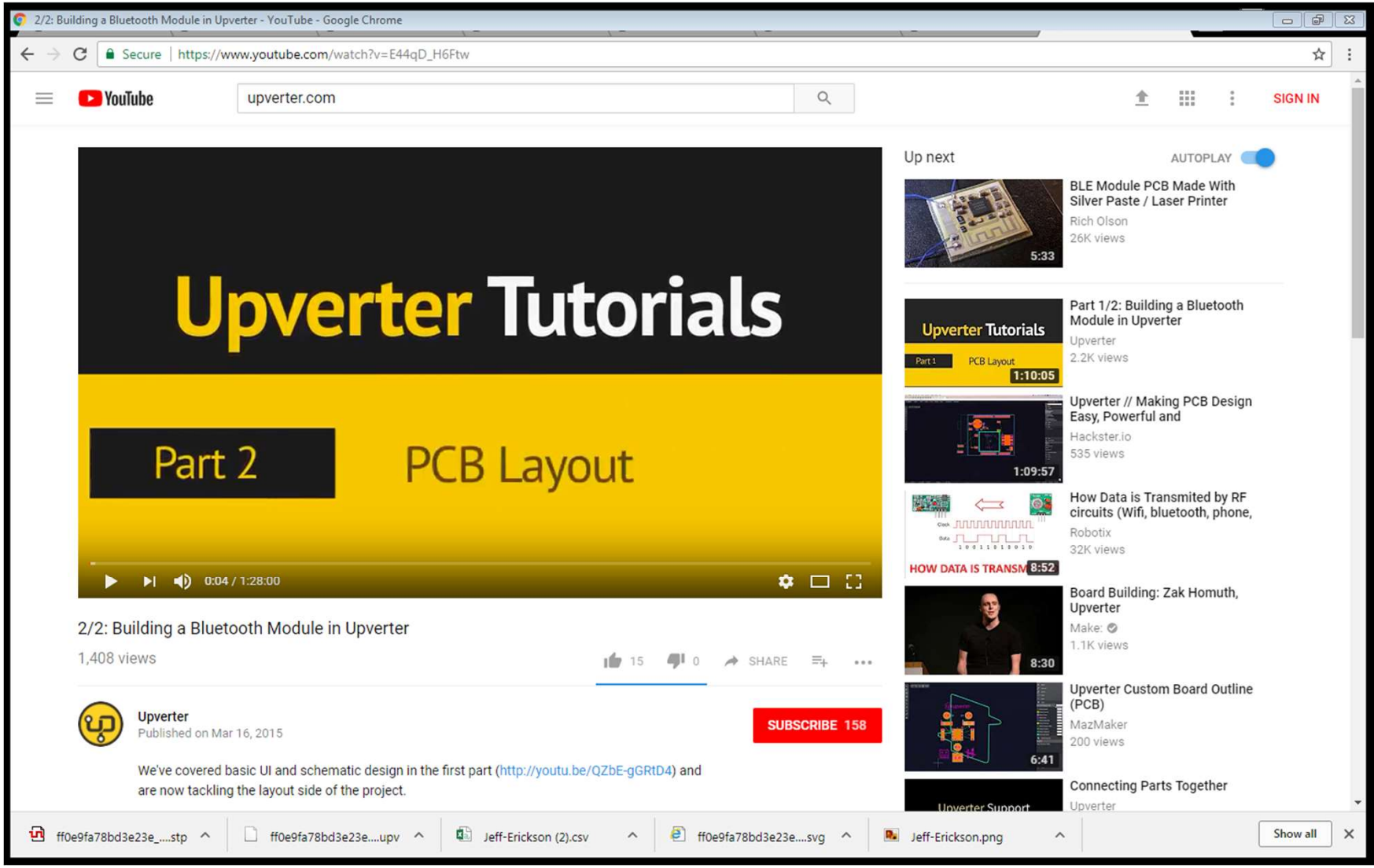
Remember only the Verified parts will work in creating a PCB

Reminder of all the tutorials available on line and on YouTube

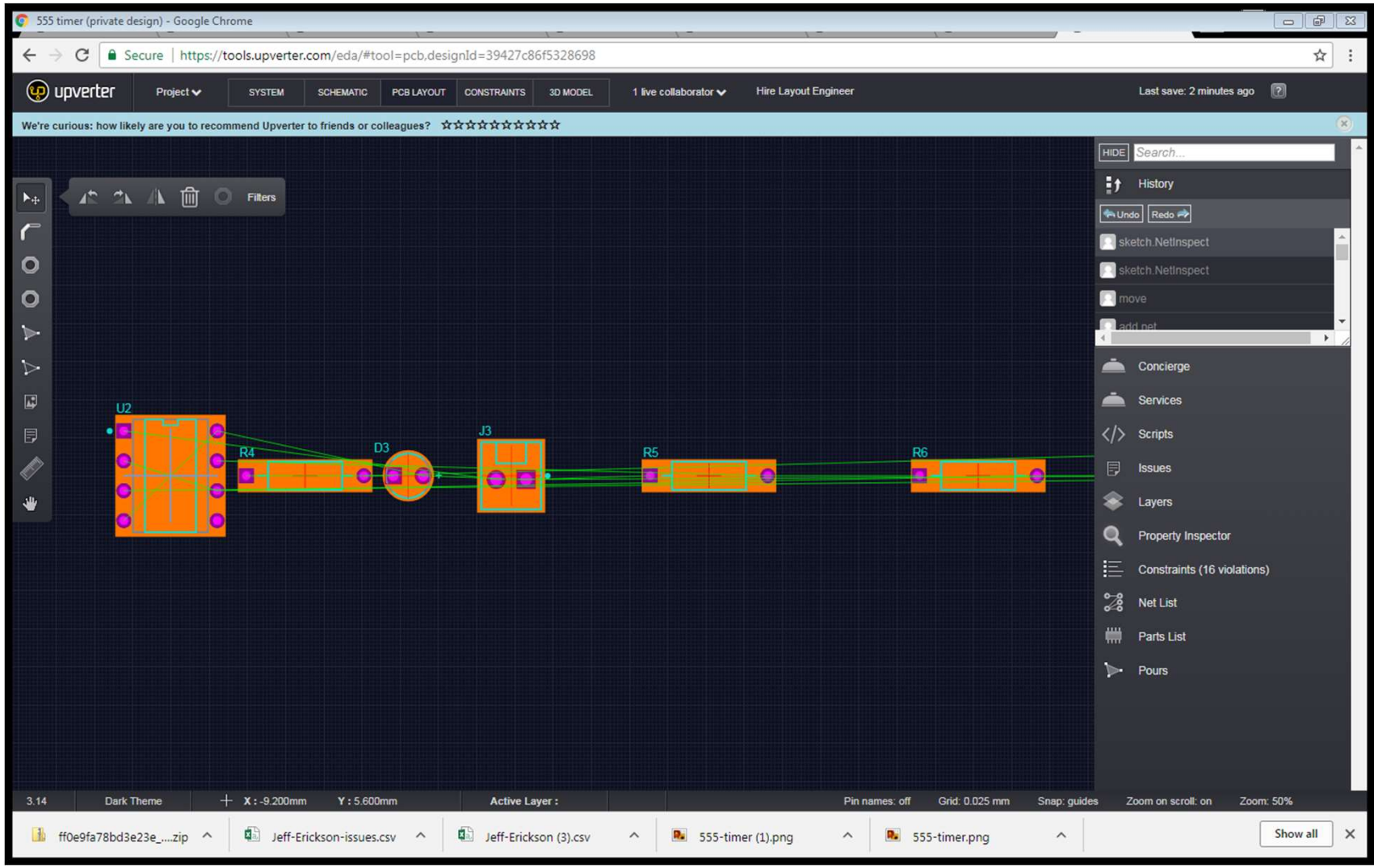


https://www.youtube.com/watch?v=E44qD_H6Ftw

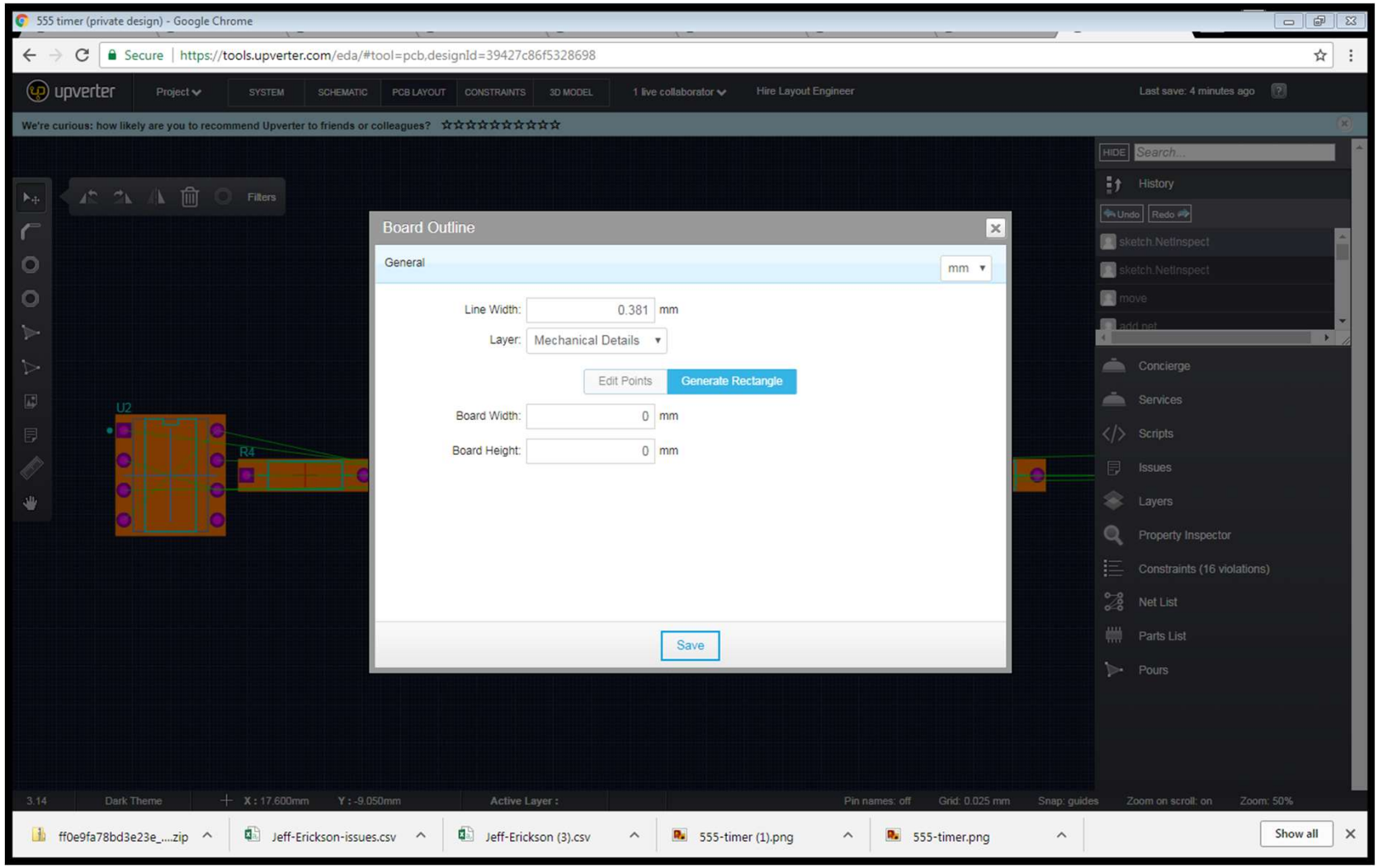
Go to this tutorial to see how to change your schematic into a pcb.



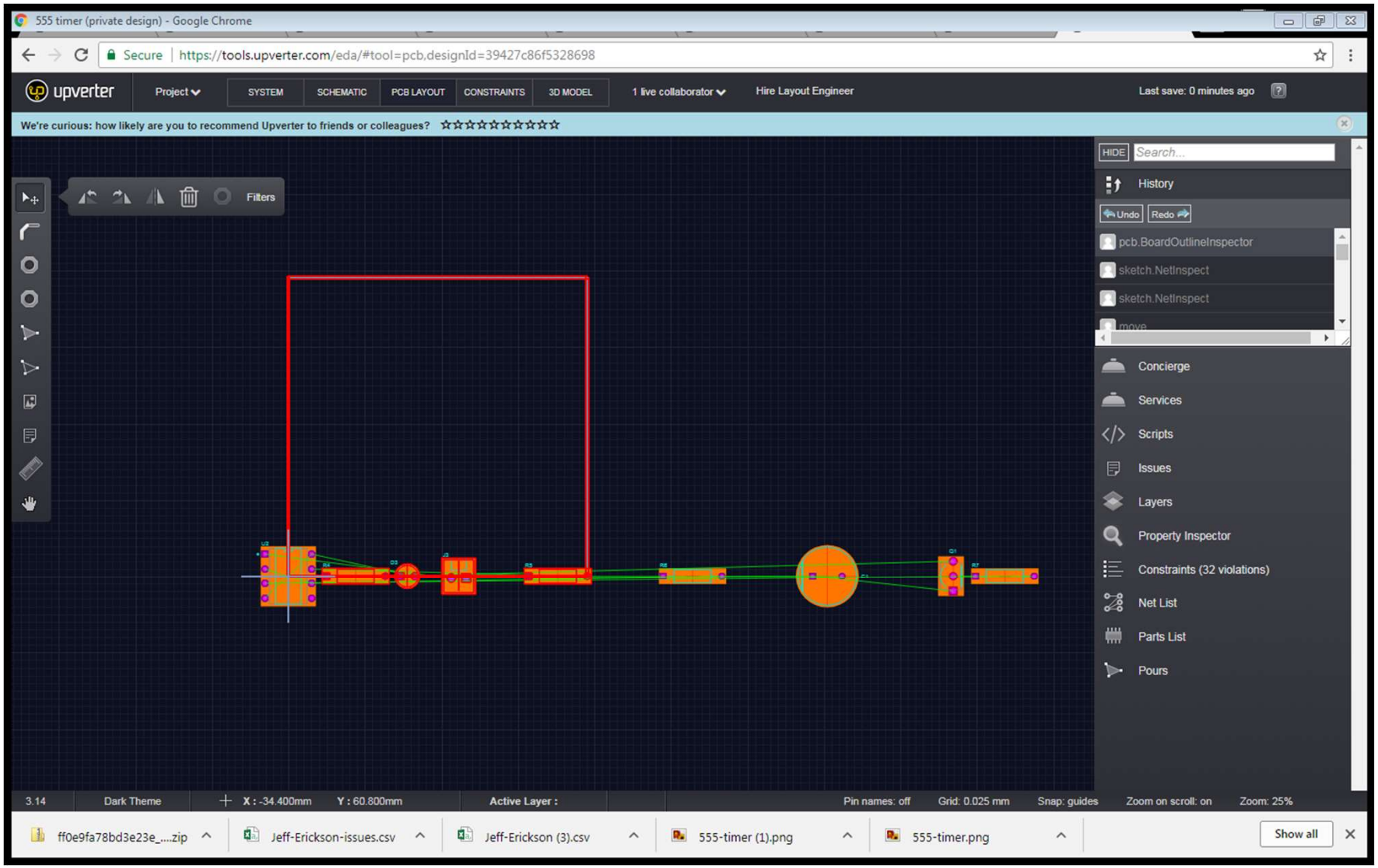
Click PCB Layout.
This should show up.
The VERIFIED Parts and the NETS (These are connections made in the schematic and altogether is called the Rats nest.



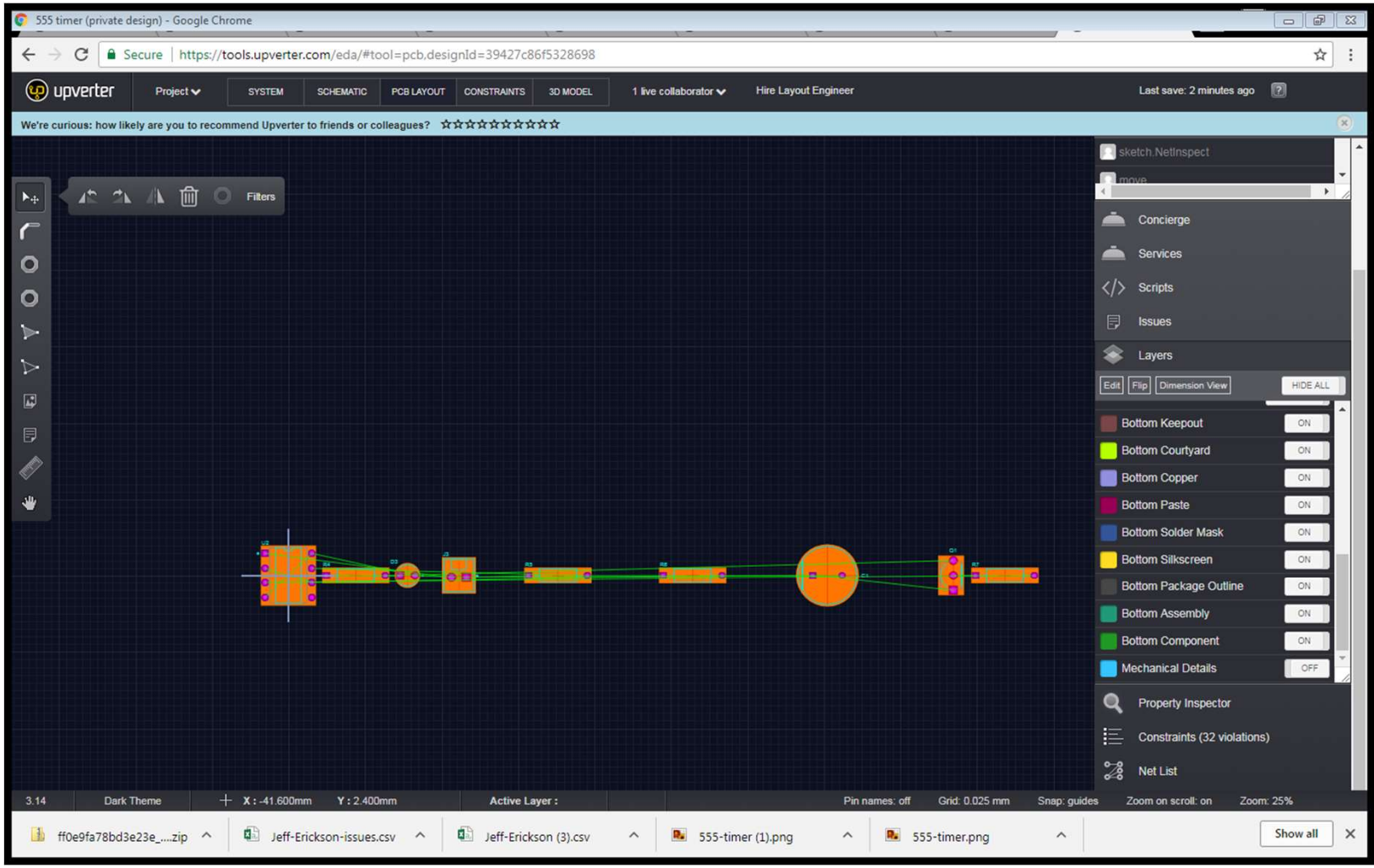
First step in creating a PCB Is the dimension of the PCB, Double click anywhere on the canvas and this shows up.



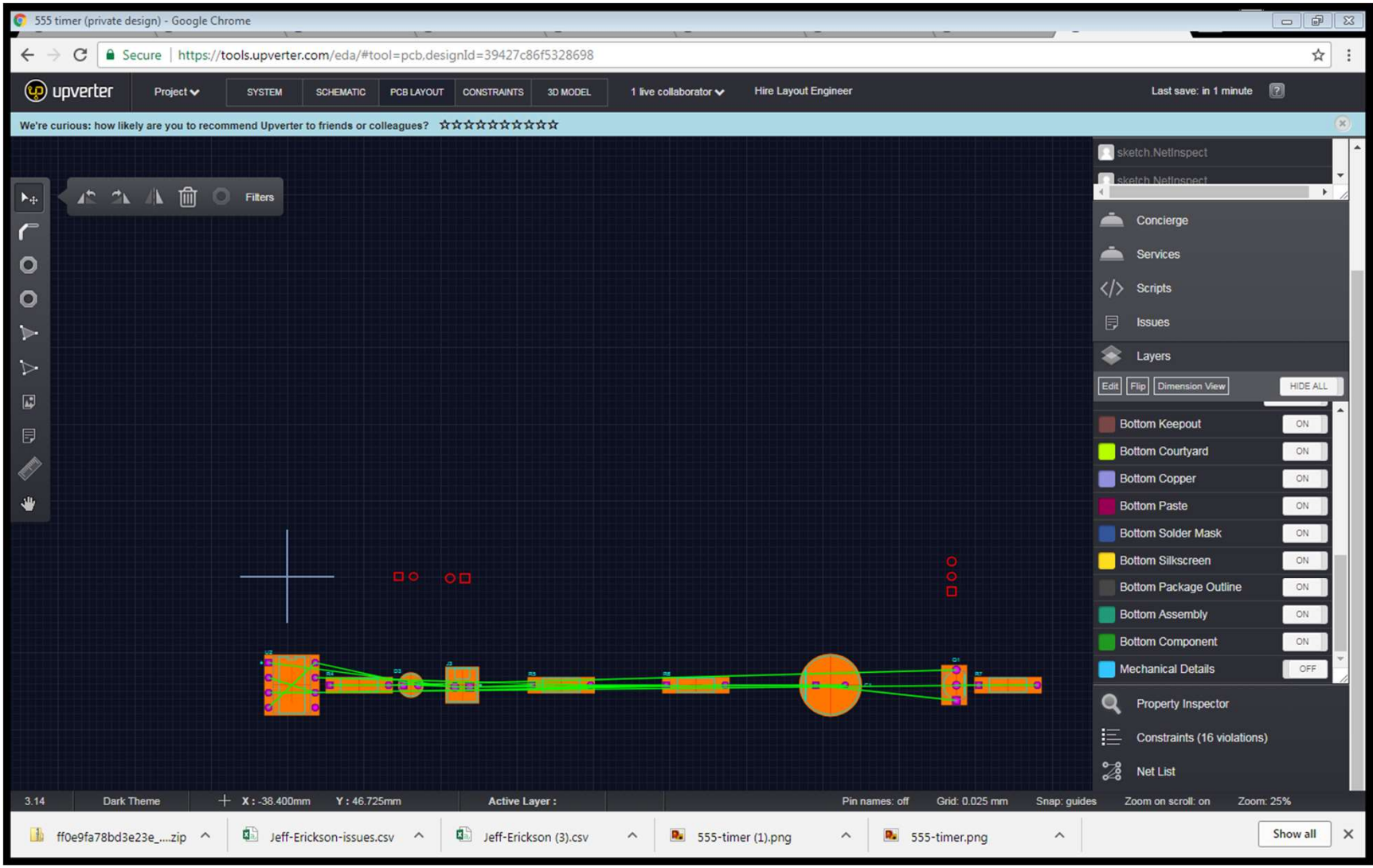
After filling in dimensions, in this case changing mm to mils, and typing in 2000mils x 2000mils, we create a pcb of 2” x2”



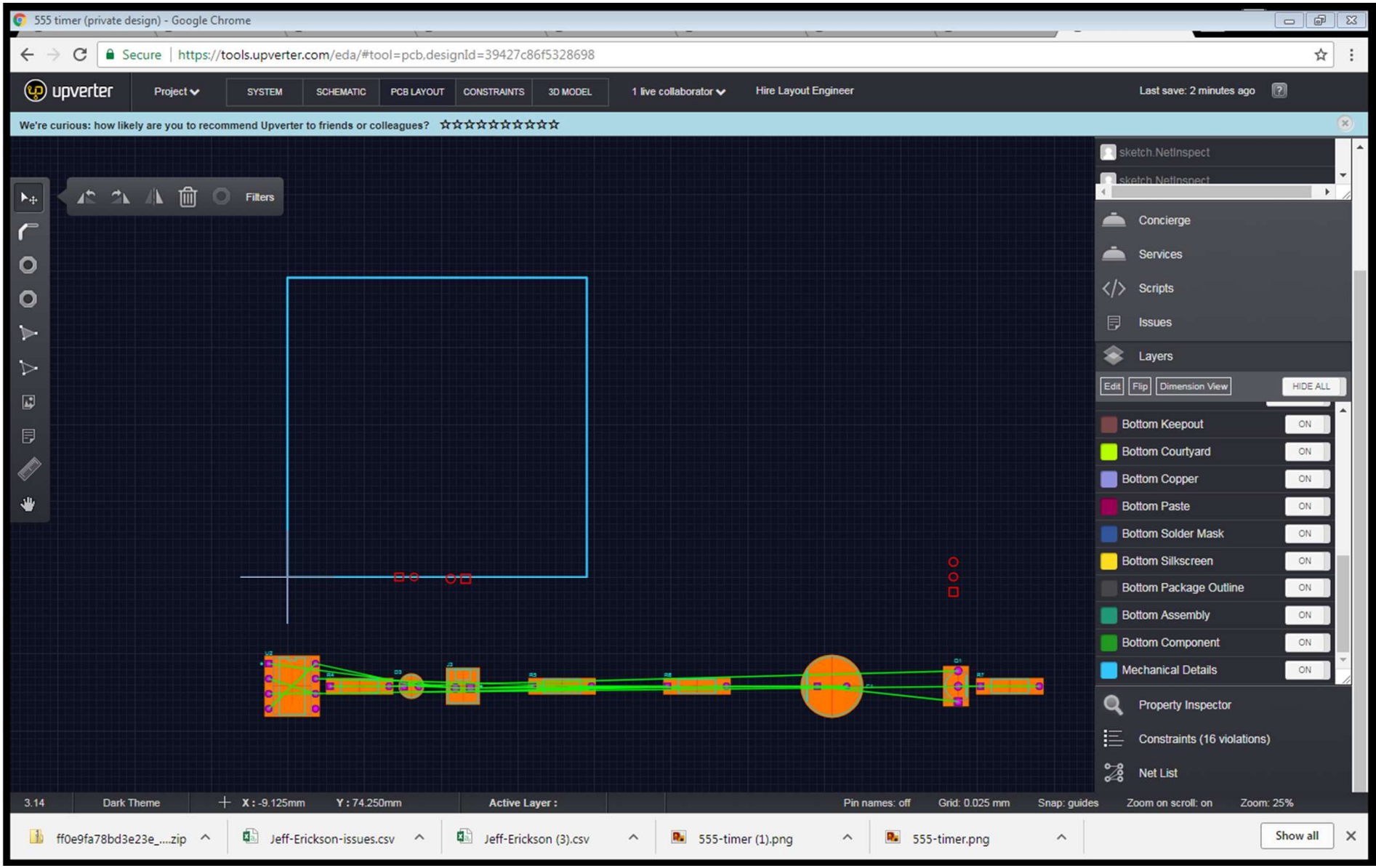
Go to the Layers tab on the right hand side, scroll down to Mechanical Layer and shut OFF, the square goes away, highlight all the visual components and move down slightly so the ORIGIN cross sits slight above all the visualized components



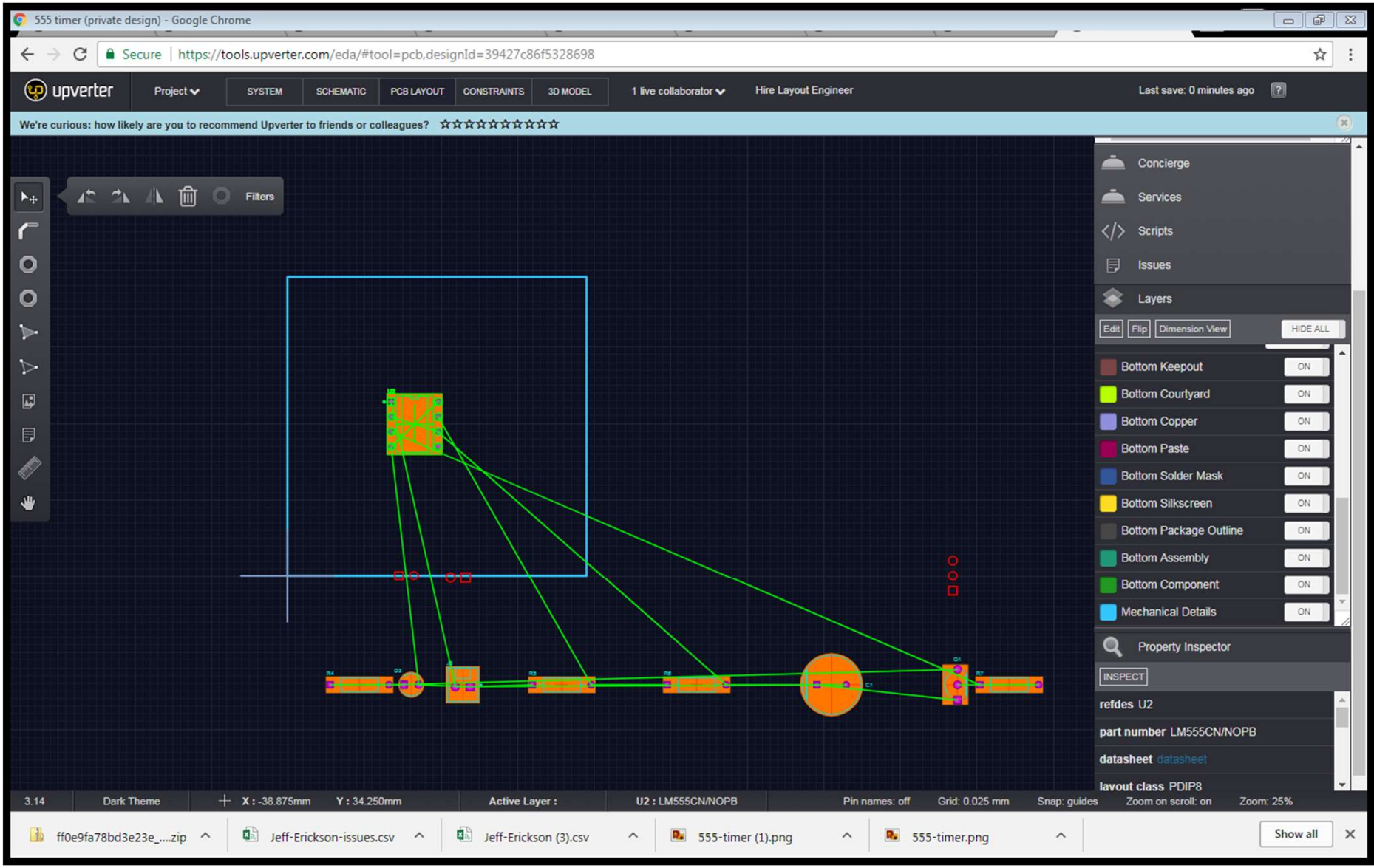
After moving all components out of the way, and turning the Mechanical Layer back on……

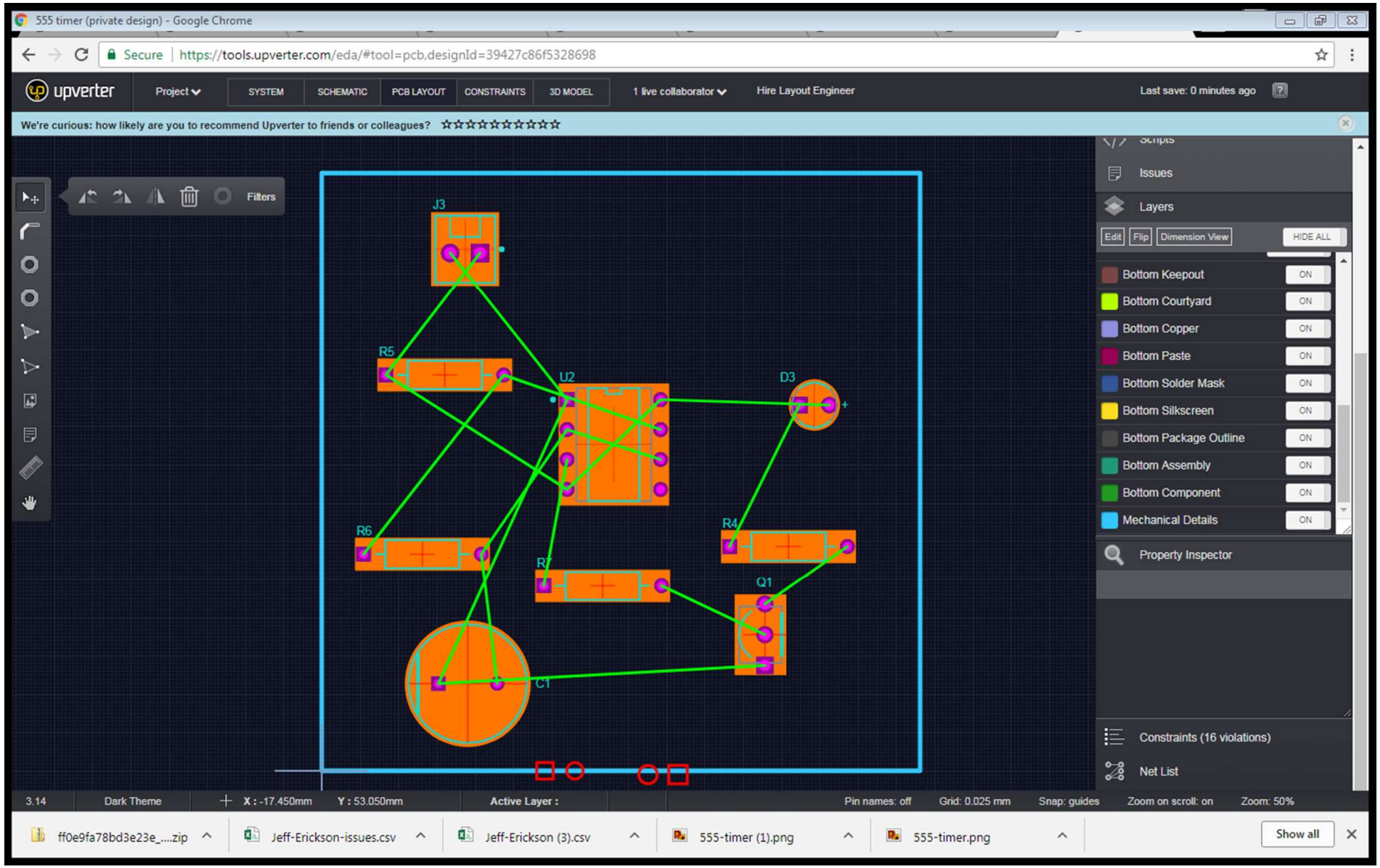


If this is what is shown the first step in PCB Fab is complete. Now highlight your parts and insert them in the box.

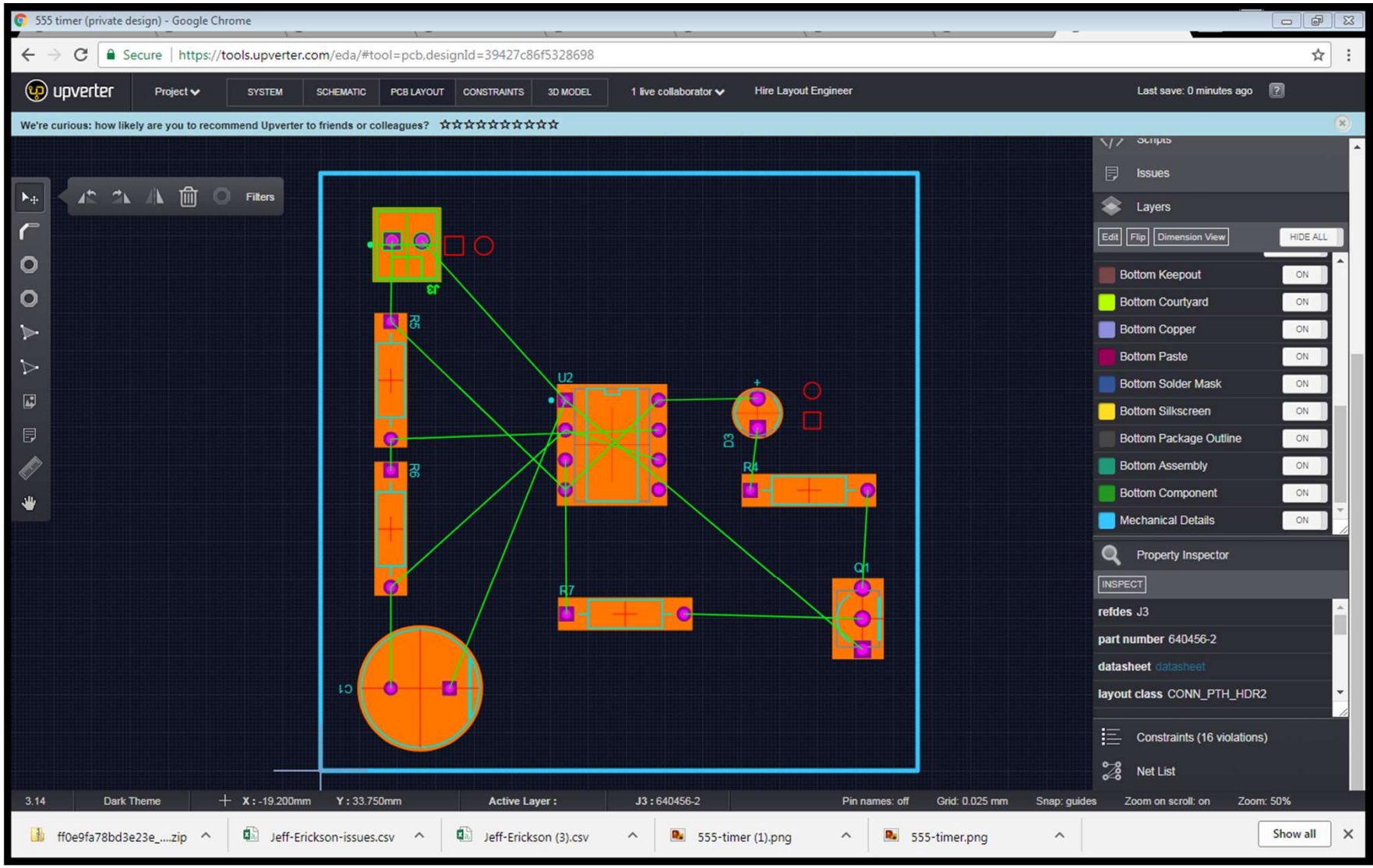


Always start with your main componen ts and add the rest in accordanc e with your schematic.

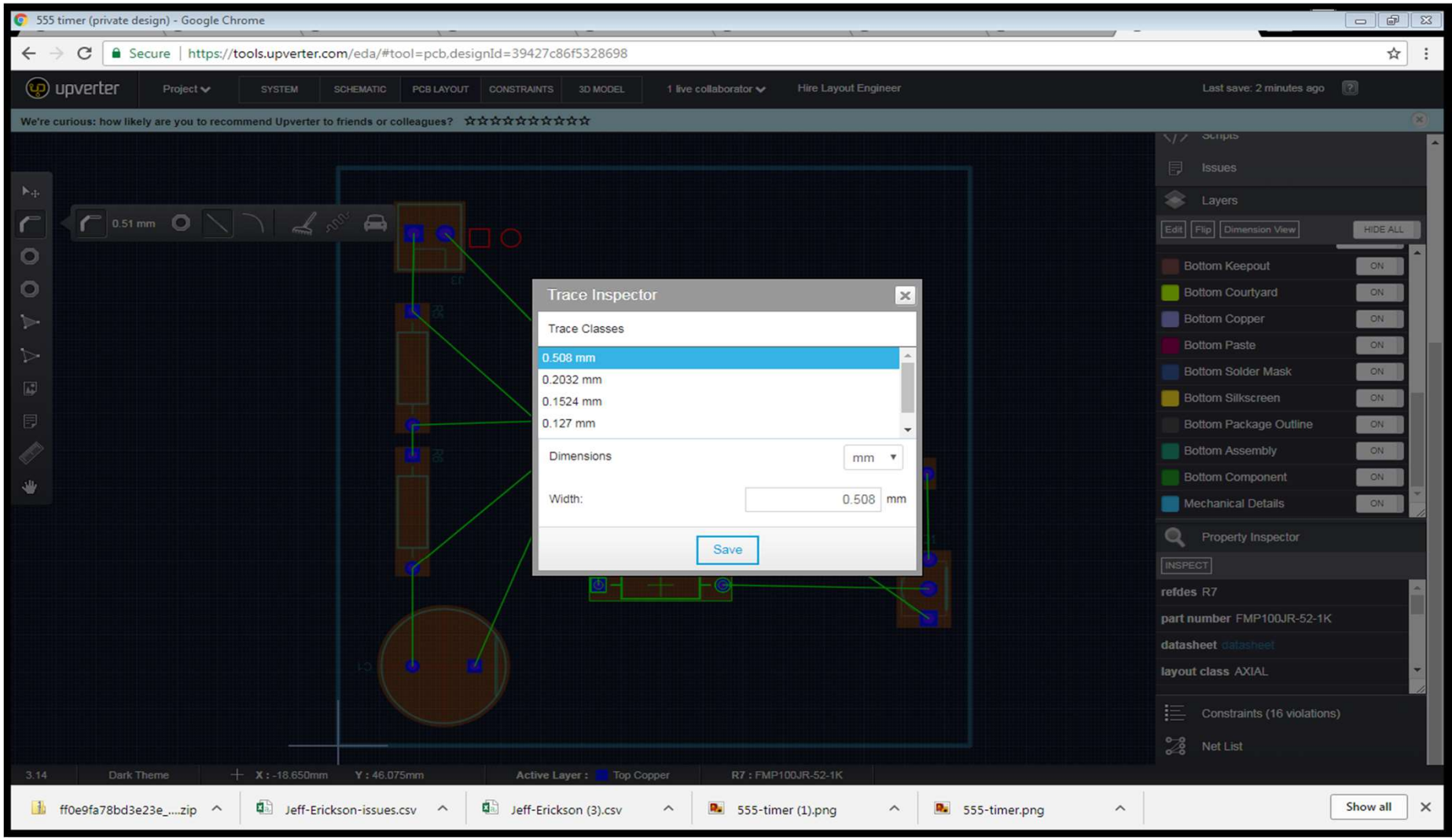



555 timer (private design) - Google Chrome
Secure
https://tools.upverter.com/eda/#tool=pcb,designId=39427c86f5328698
upverter
Project
SYSTEM
SCHEMATIC
PCB LAYOUT
CONSTRAINTS
3D MODEL
1 live collaborator
Hire Layout Engineer
Last save: 0 minutes ago
We're curious: how likely are you to recommend Upverter to friends or colleagues?
Filters
J3
R5
U2
D3
R6
R4
R7
Q1
C1
Issues
Layers
Edit
Flip
Dimension View
HIDE ALL
Bottom Keepout
Bottom Courtyard
Bottom Copper
Bottom Paste
Bottom Solder Mask
Bottom Silkscreen
Bottom Package Outline
Bottom Assembly
Bottom Component
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

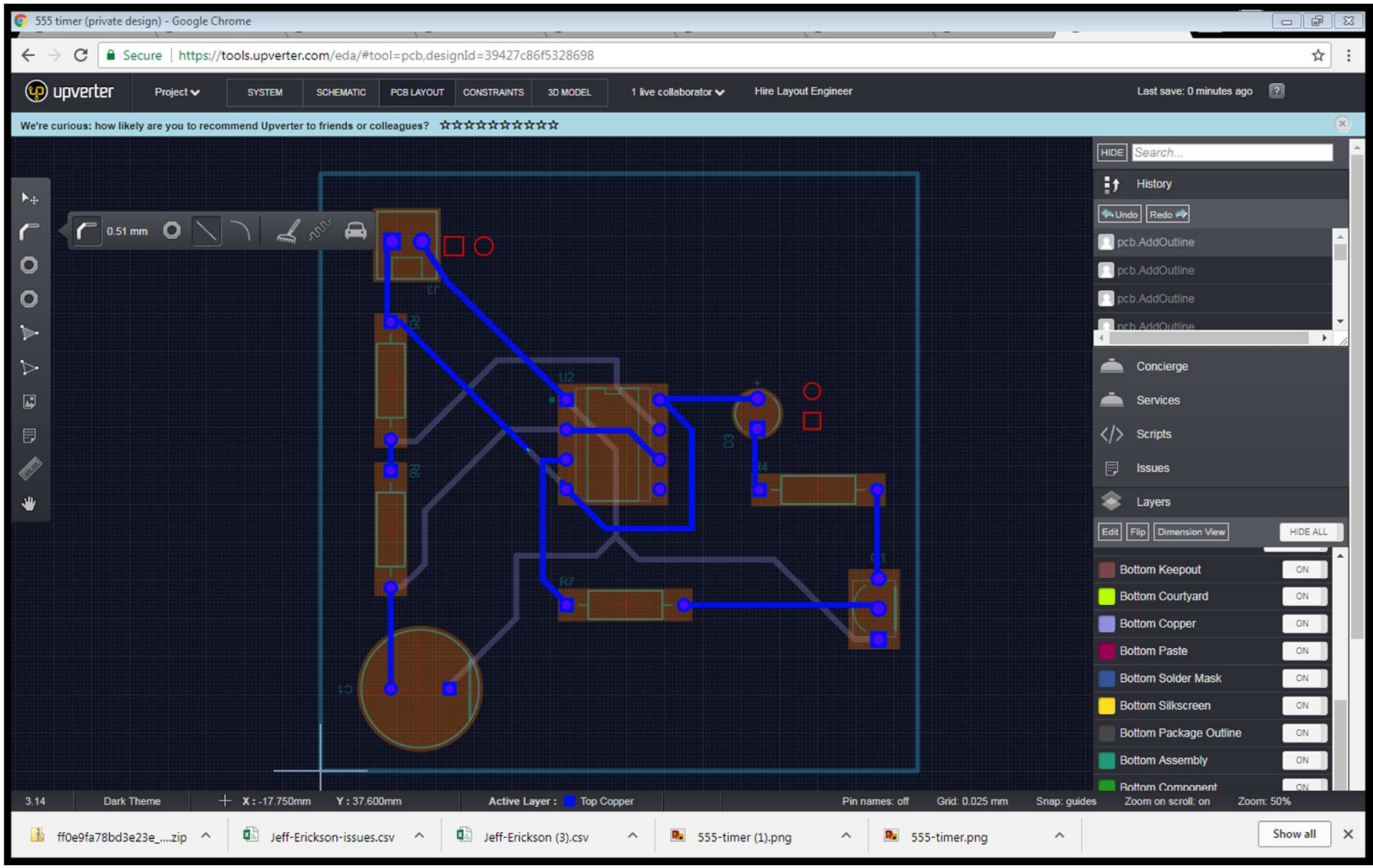
Move components around in straight lines, this also organizes the pcb, so it resembles the layout of the schematic.



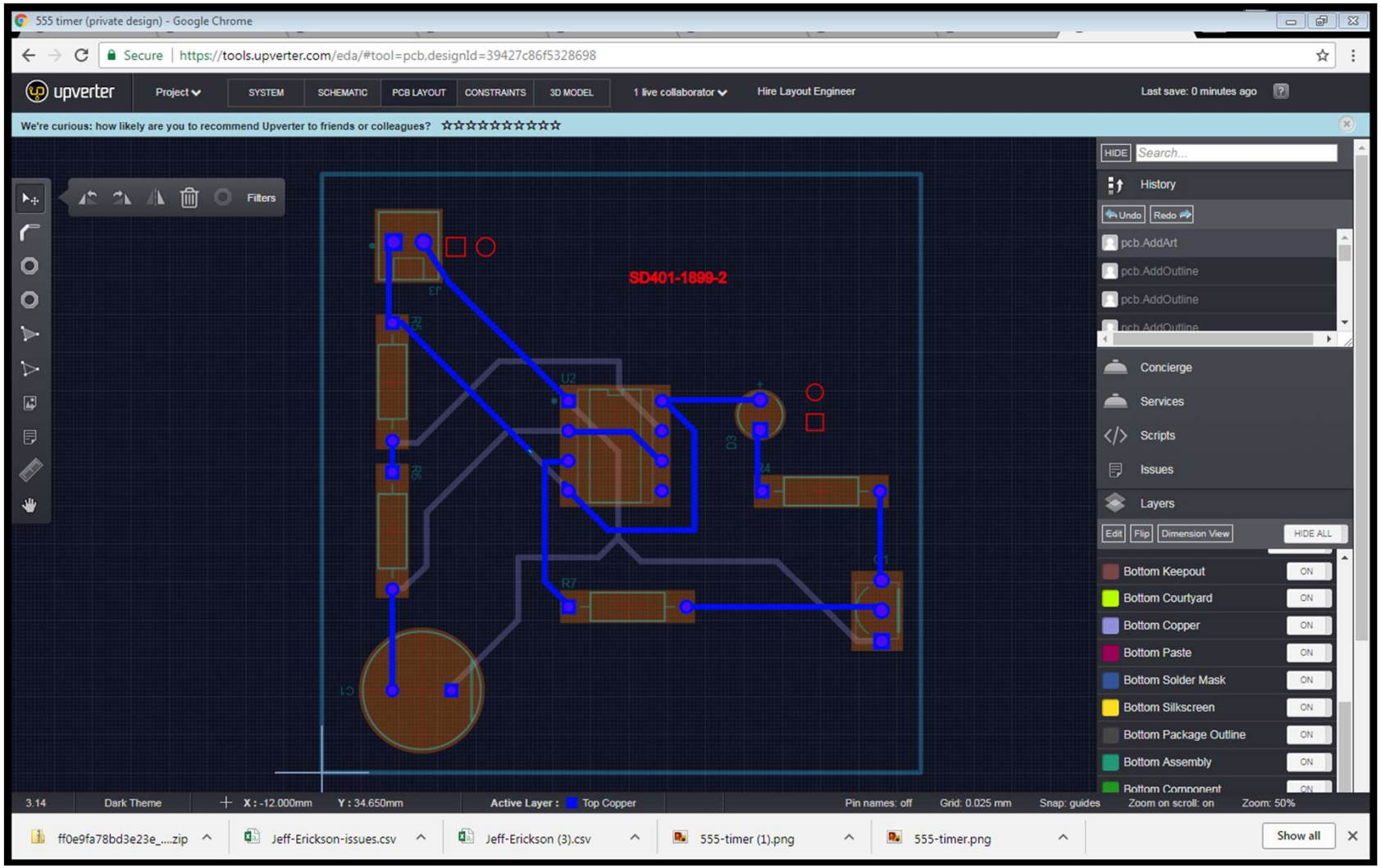
Next step is to determine the width of the trace you want to use and start adding traces, power and ground need wider traces than signal and control traces Try 20mil



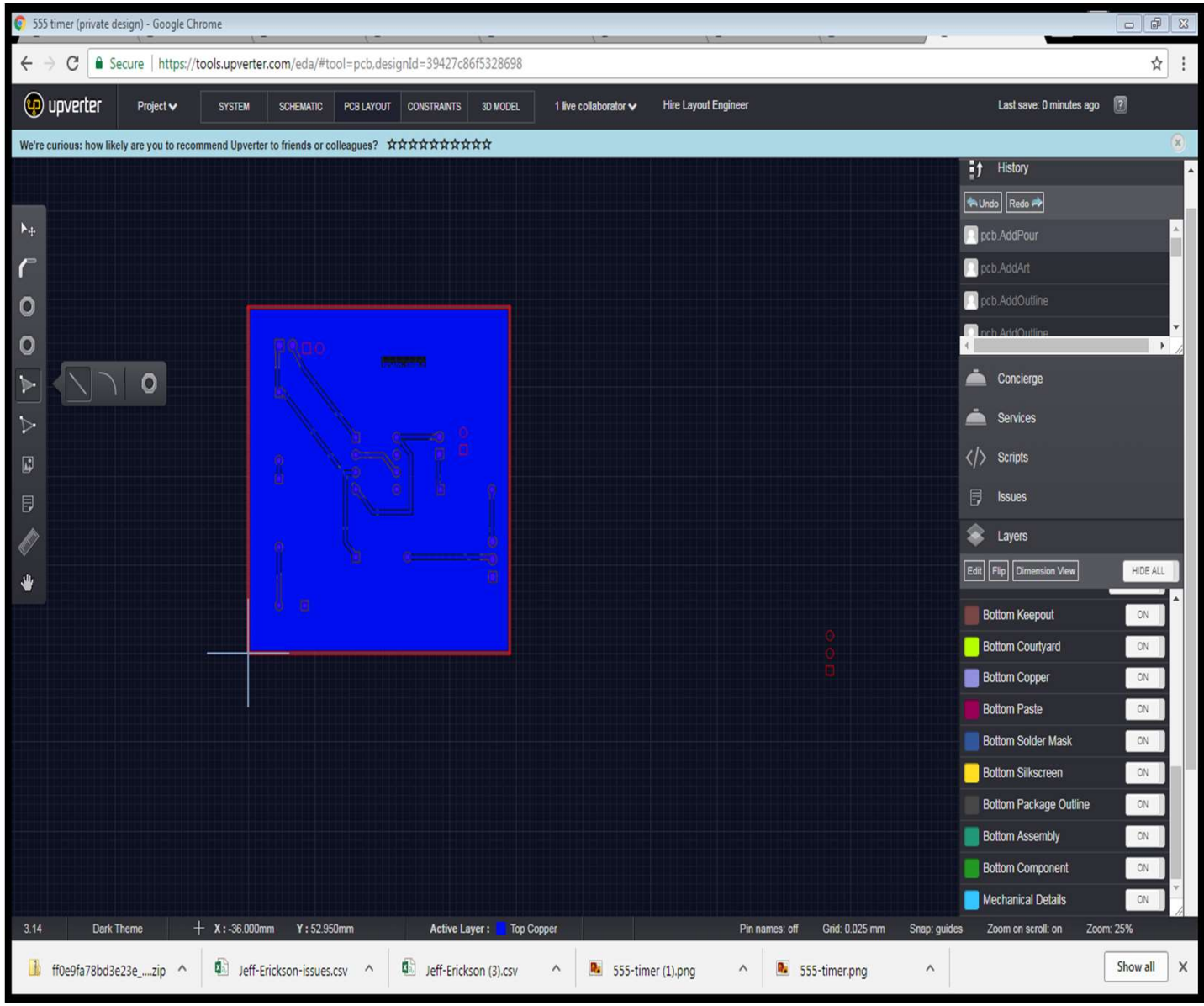
After adding all the traces (remember 1 and 2) changes from top to bottom layers.
Add some text.



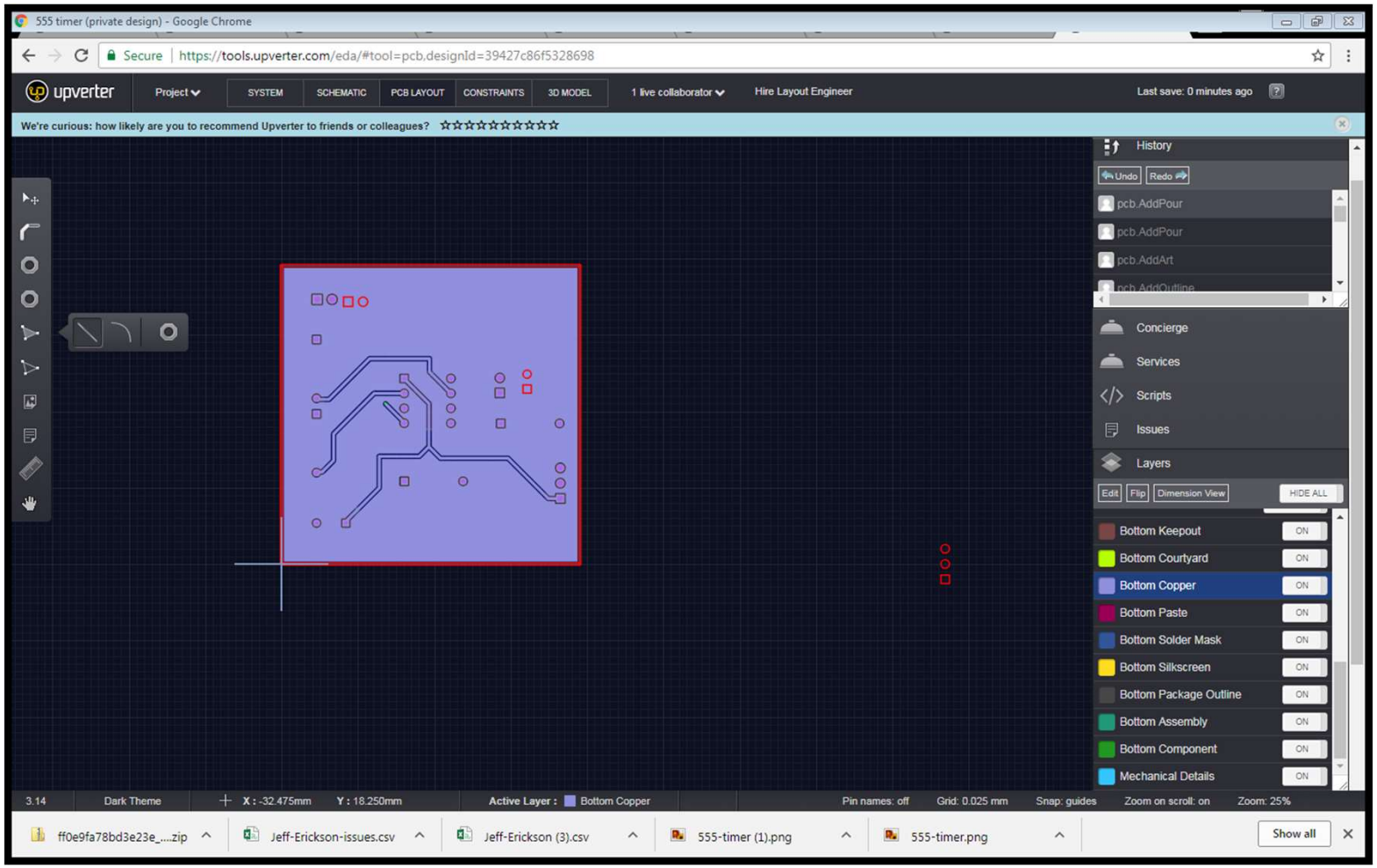
Add whatever is required for text



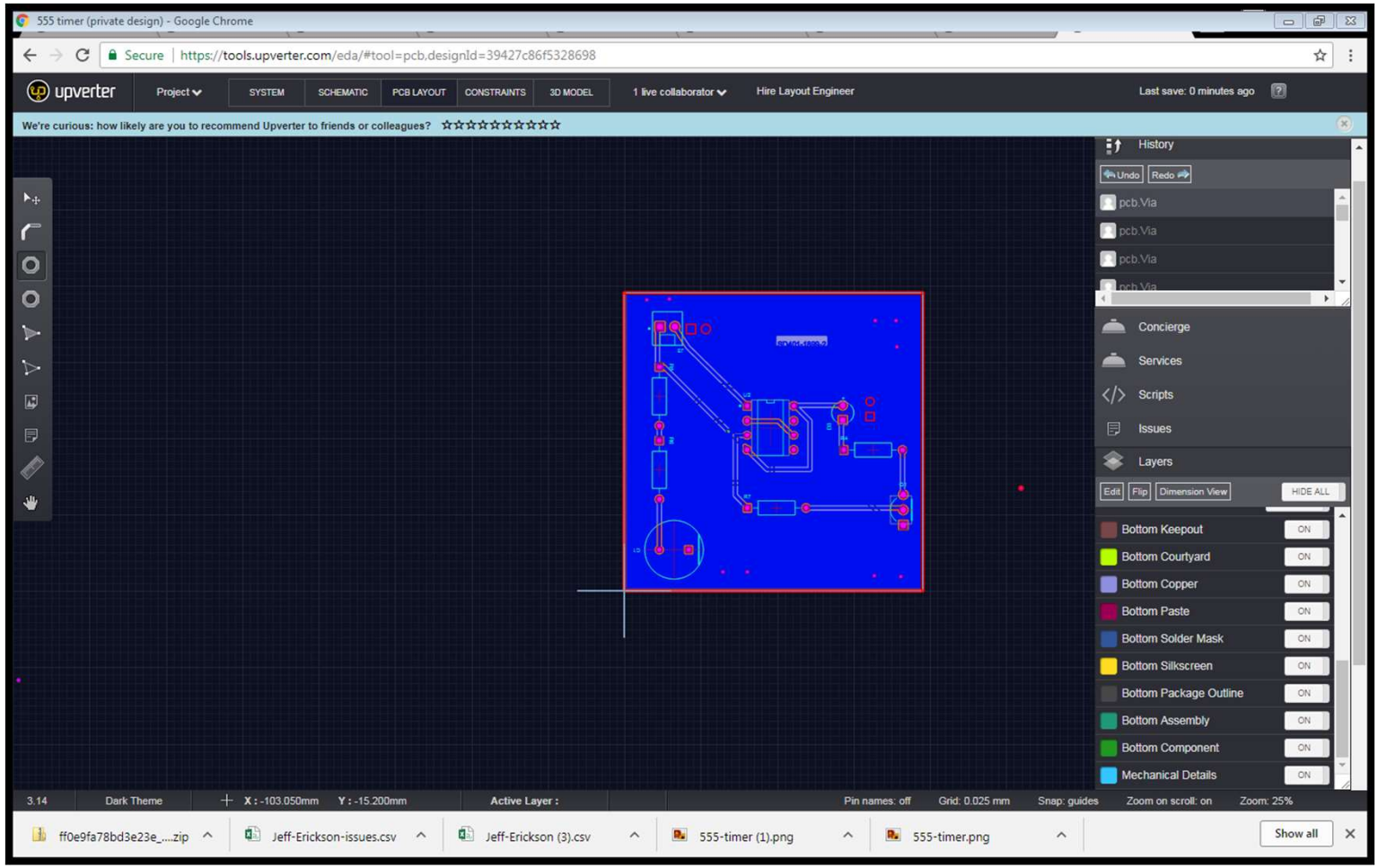
Using the Pour tool start at the ORIGIN and highlight the outside edge start bottom left/ go up/ to the right/ down/ then start to the left and stop- hit escape. No need to go all the way around 360 degrees. This should show up.



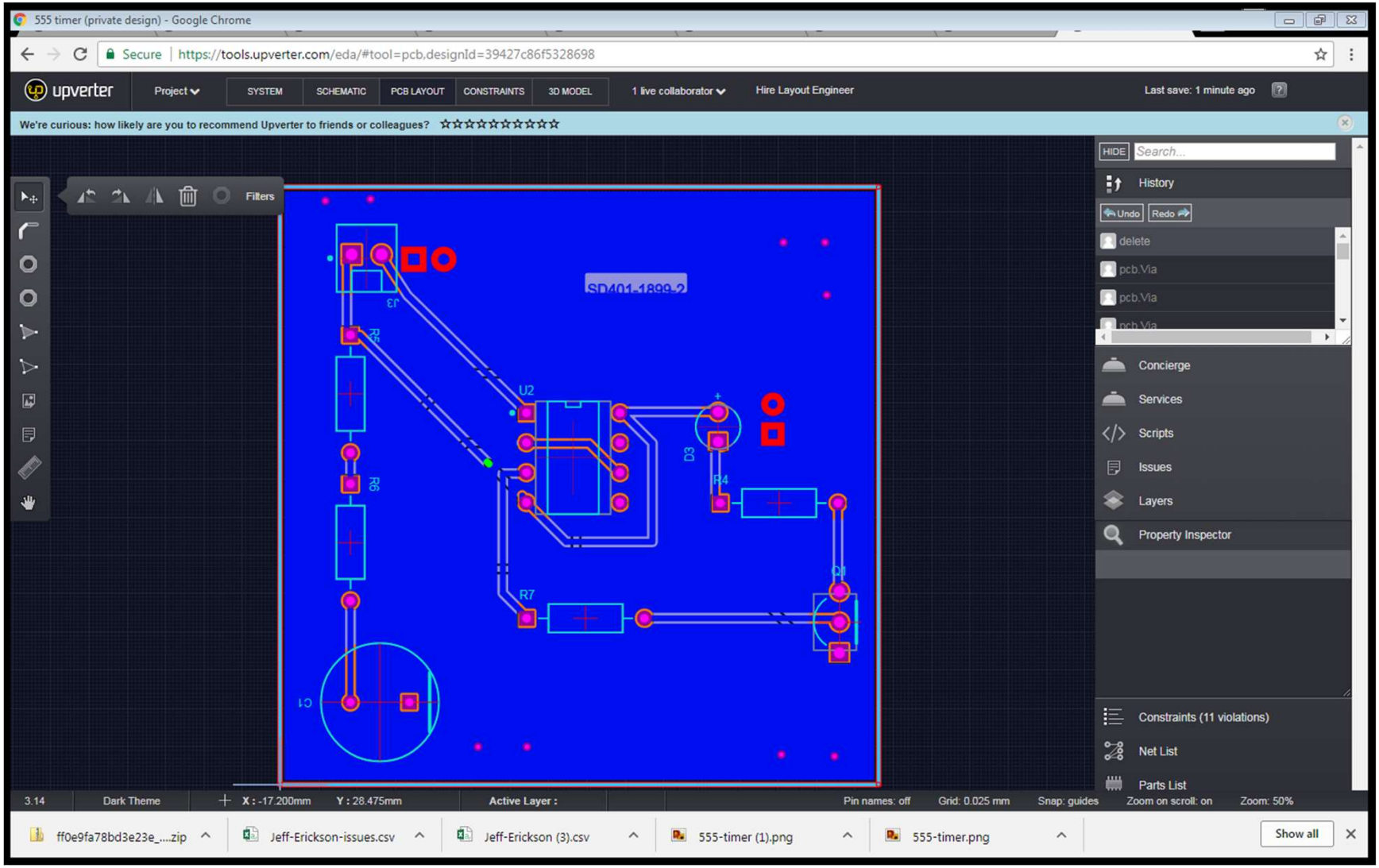
Press 2 -this will be the bottom layer and then using the pour tool start at ORIGIN , highlight the box and hit escape. This will show up.



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



PC Board is now done



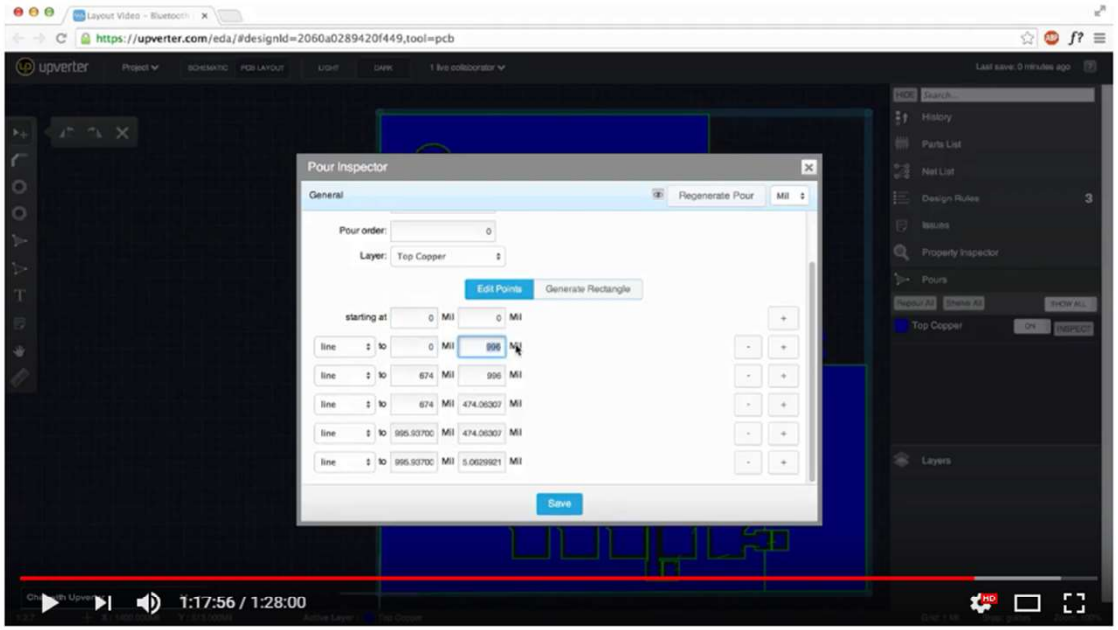
2/2: Building a Bluetooth Module in Upverter - YouTube - Google Chrome

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

YouTube

upverter part2

SIGN IN



2/2: Building a Bluetooth Module in Upverter

1,408 views

15 0 SHARE

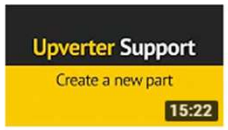
Upverter
Published on Mar 16, 2015

SUBSCRIBE 158

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.

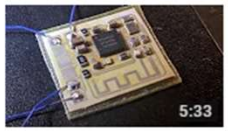
SHOW MORE

Up next AUTOPLAY



Creating a new Part in Upverter
Upverter
1K views

Part 1/2: Building a Bluetooth Module in Upverter
Upverter
2.2K views



BLE Module PCB Made With Silver Paste / Laser Printer
Rich Olson
26K views

Connecting Parts Together
Upverter
90 views

Editing your Schematic in Upverter
Upverter
432 views

Upverter Overview
Upverter
3.2K views

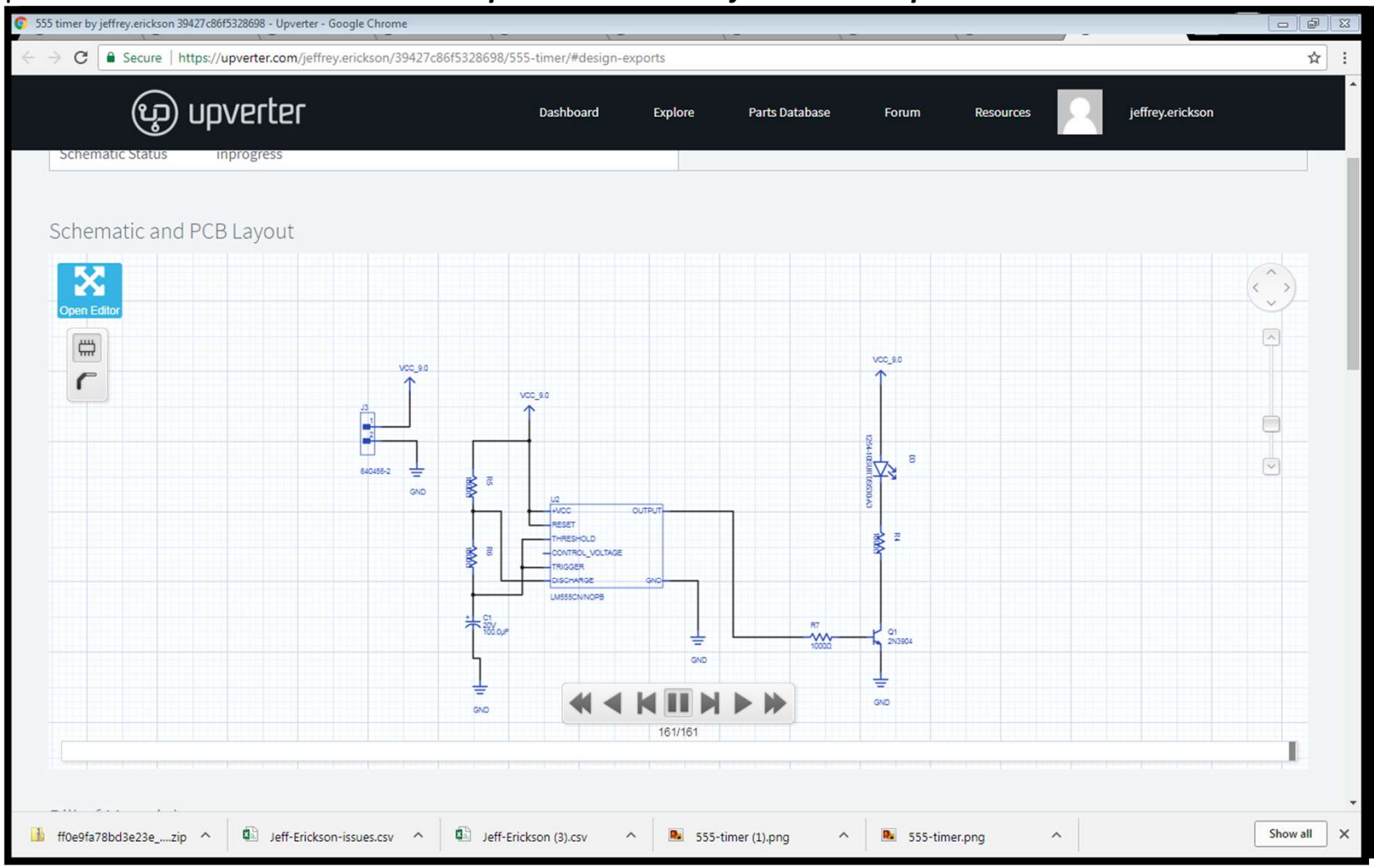
Upverter // Making PCB Design Easy, Powerful and
Hackster.io
535 views

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…….***

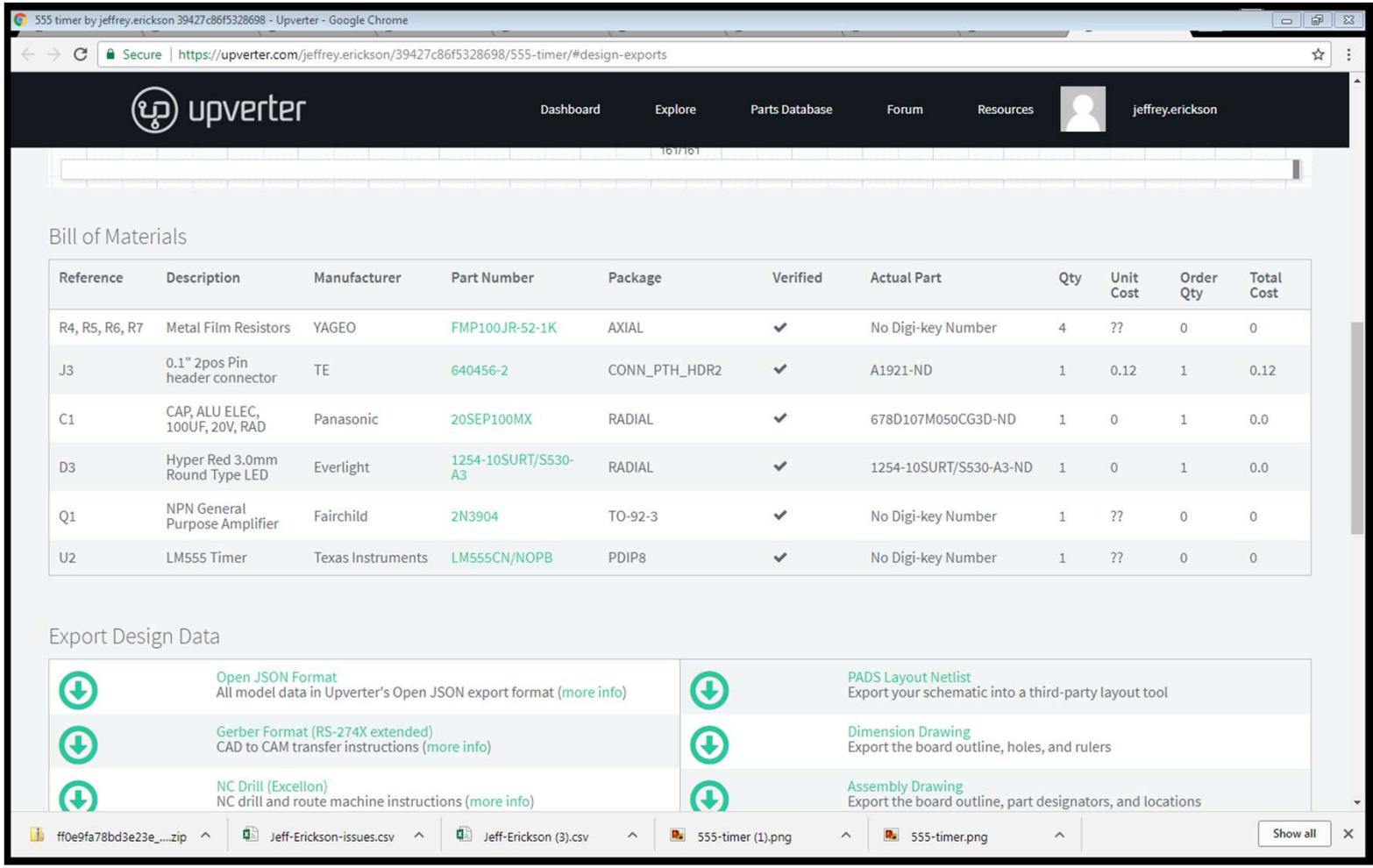
Your schematic…..
Scrolling further……



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

Bill of materials….

Scrolling further…..



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

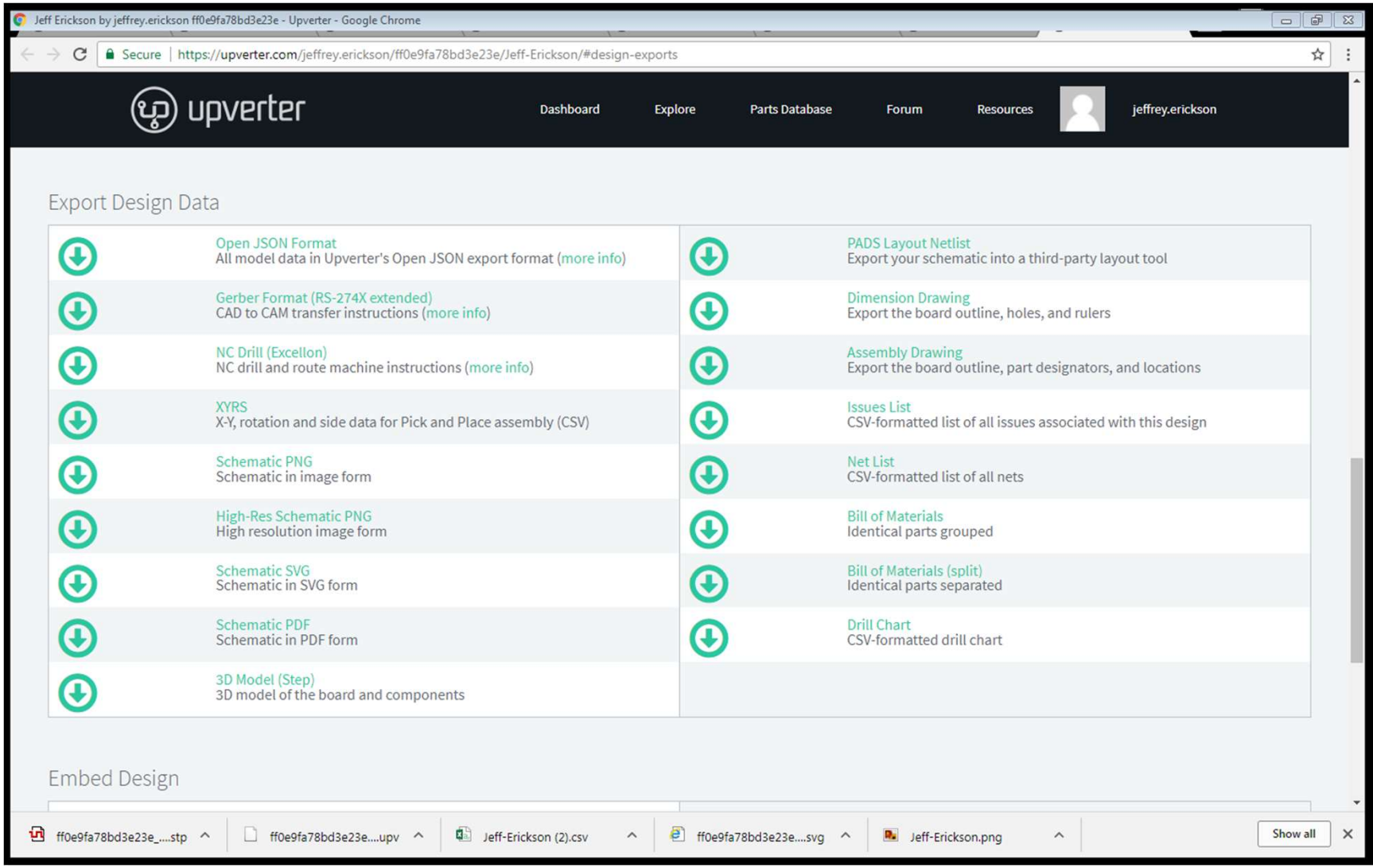
Scrolling down you will see this they are to export all files, such as Schematic in PDF format, or Bill of Materials

Export files…

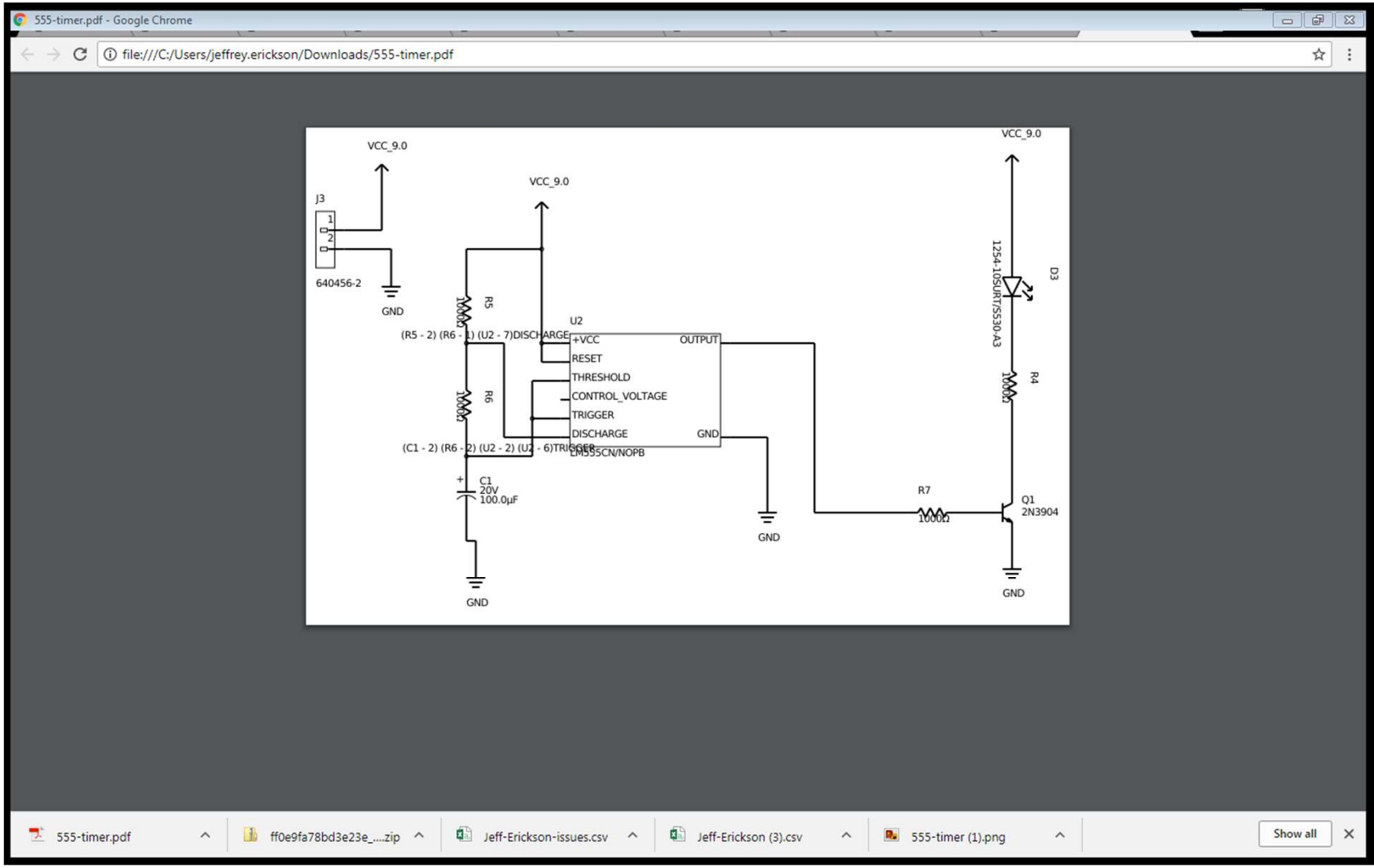
Gerber files are also saved along with NC Drill files, which are then zipped and sent to…..

A Gerberviewer.com

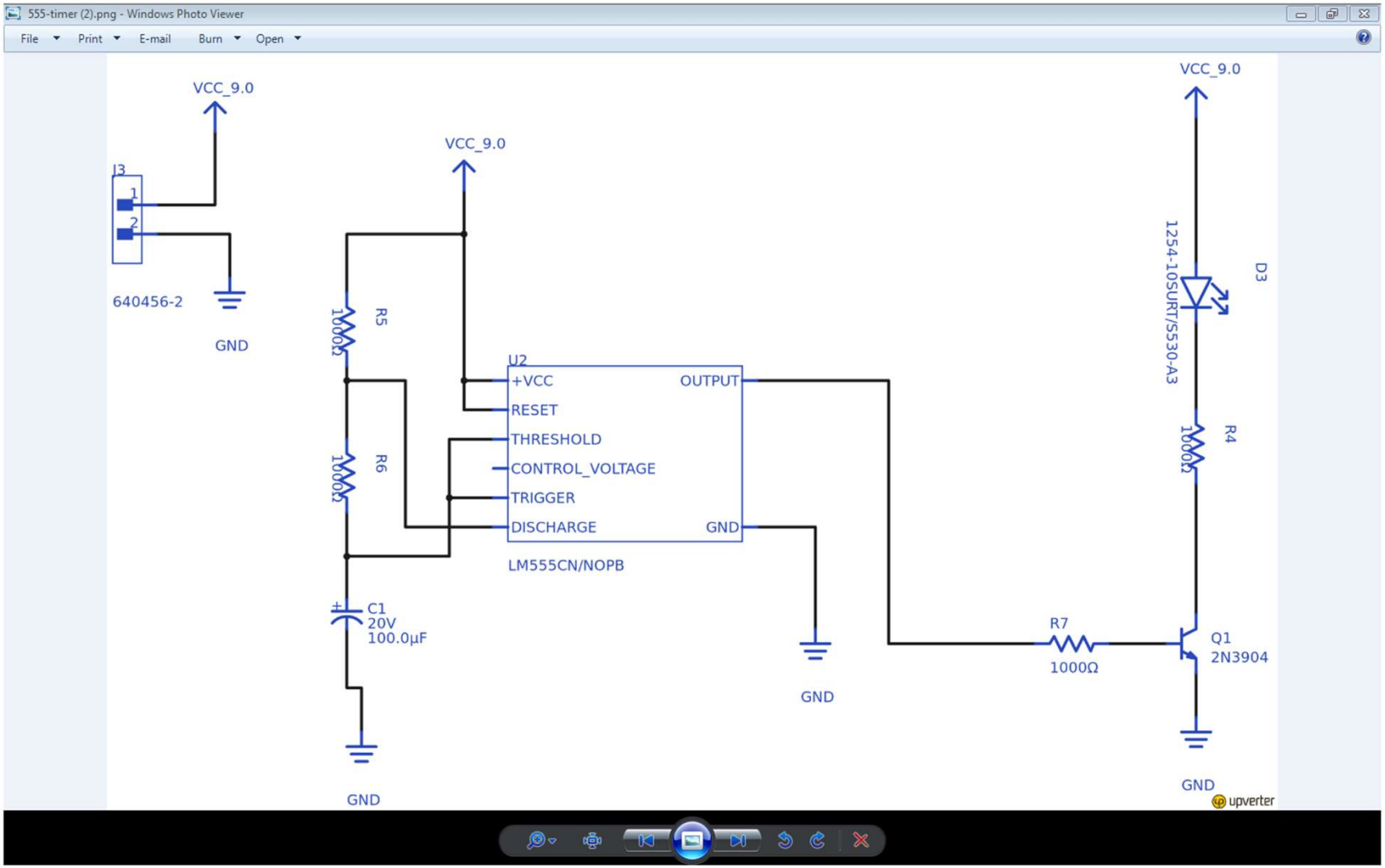
For checking



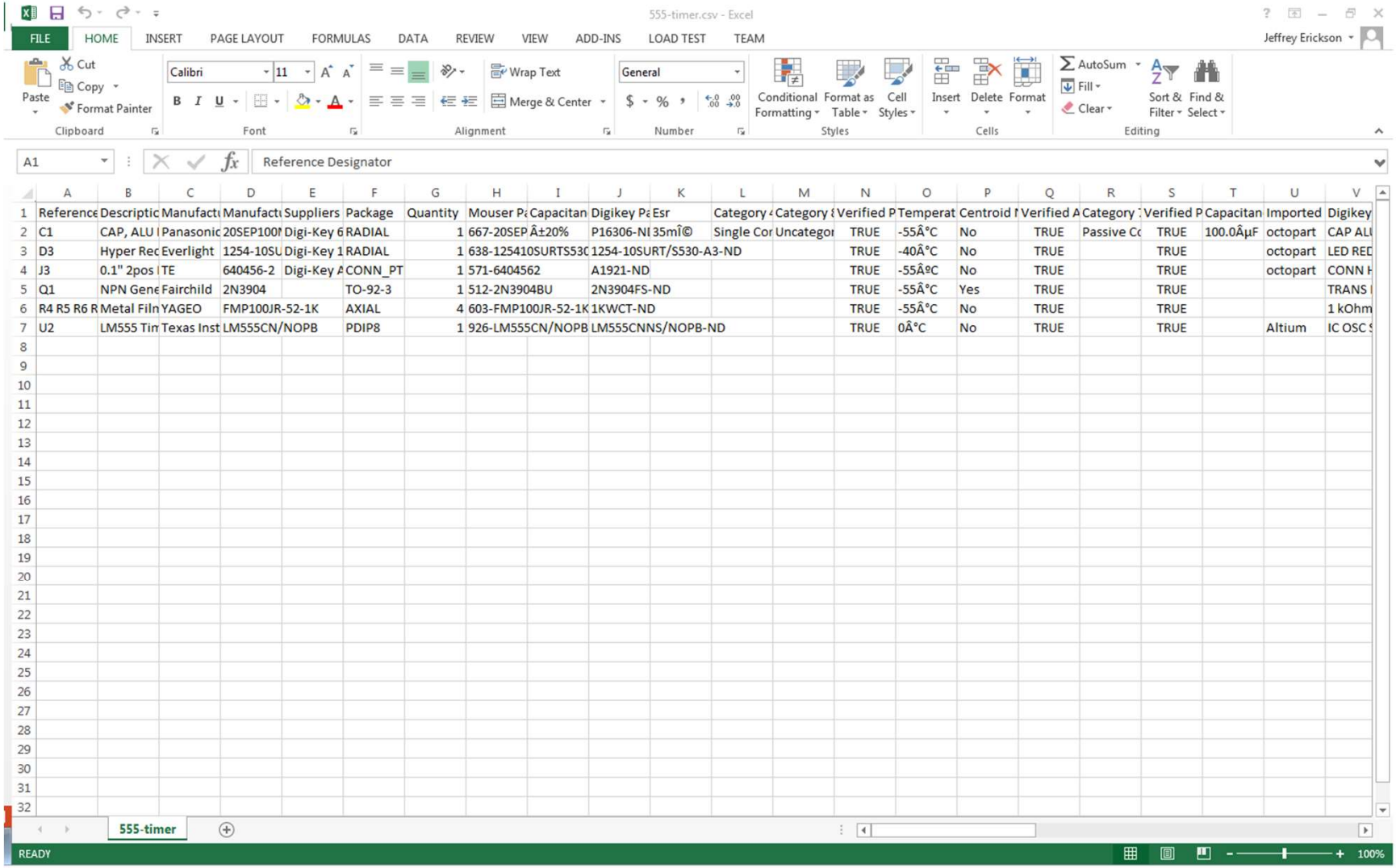
You may download your schematic as a pdf



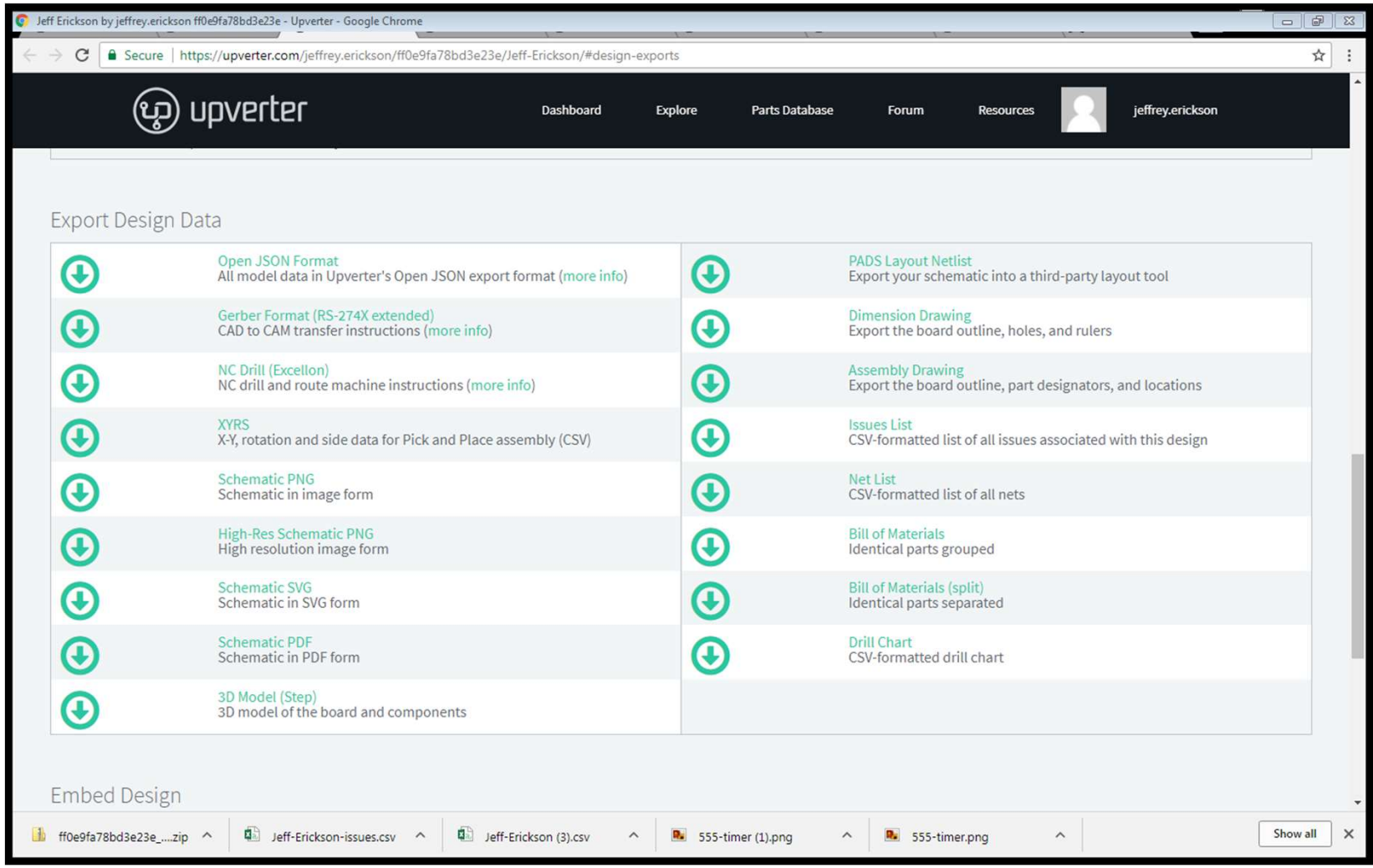
Or as a .png file……. Which is a Higher resolution Schematic image.



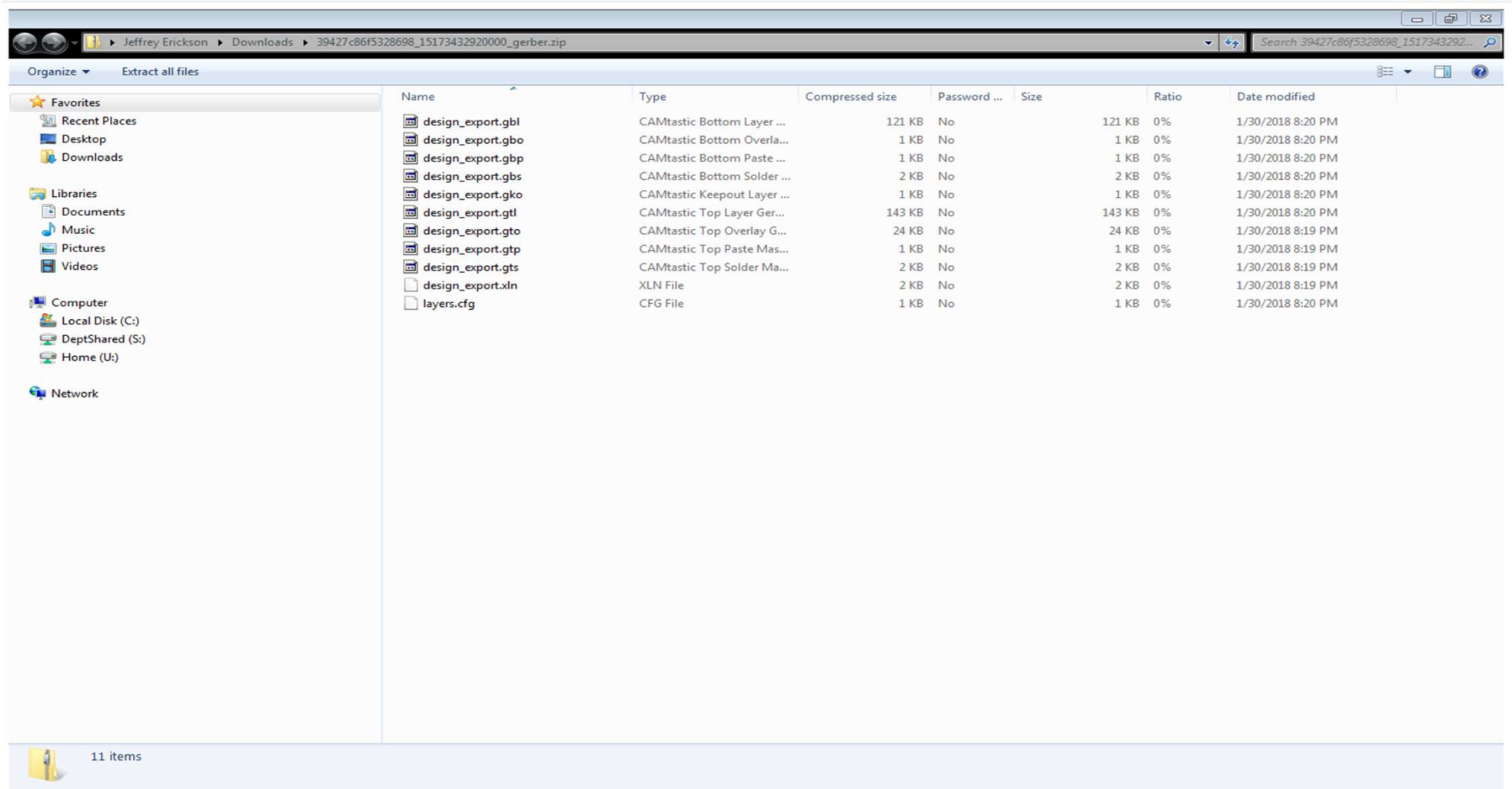
Download the projects bill of materials as an Excel spreadsheet… convert to pdf… etc.



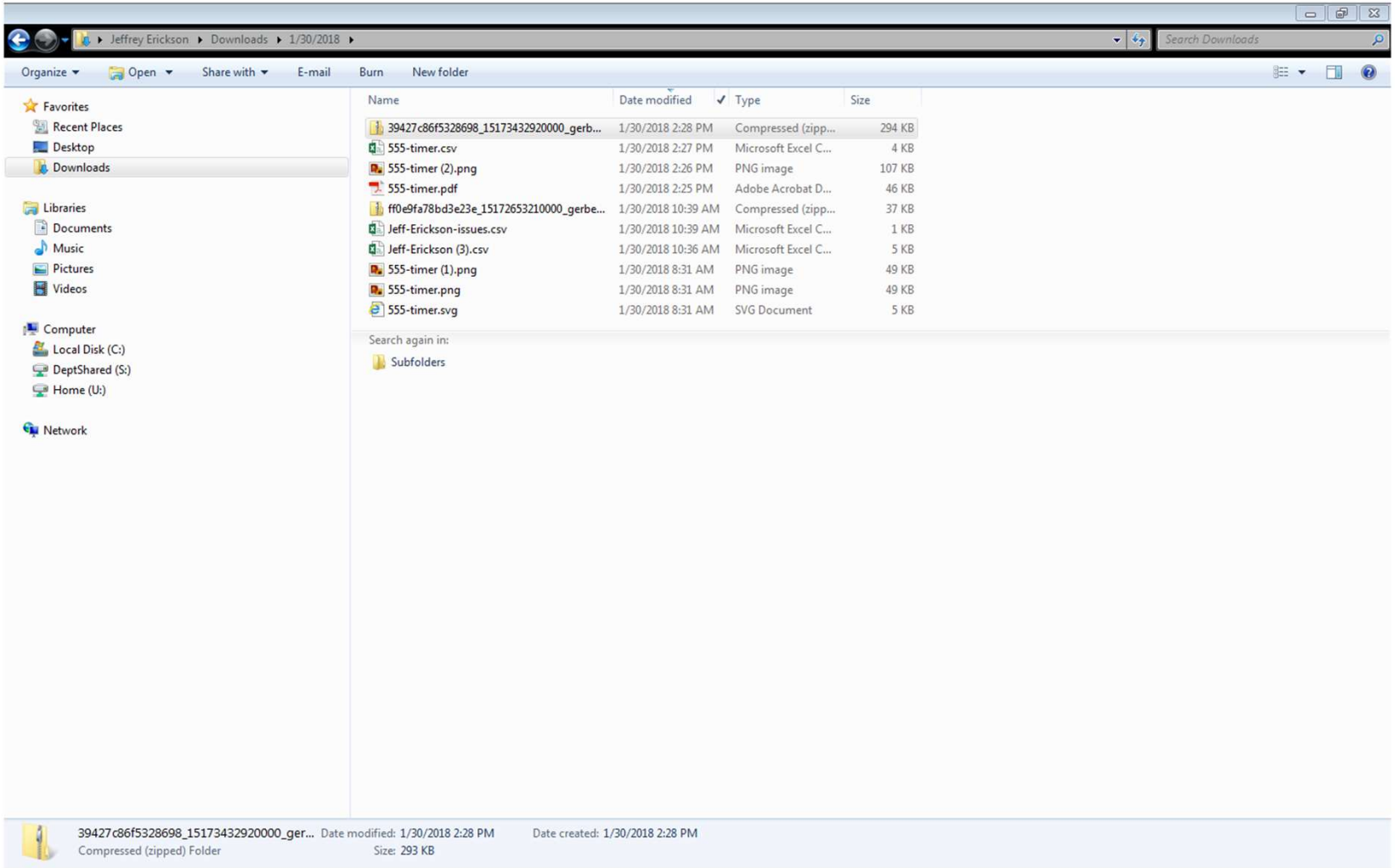
To generate Gerber files – use the Gerber Format (RS-274X extended) *read directions if required*

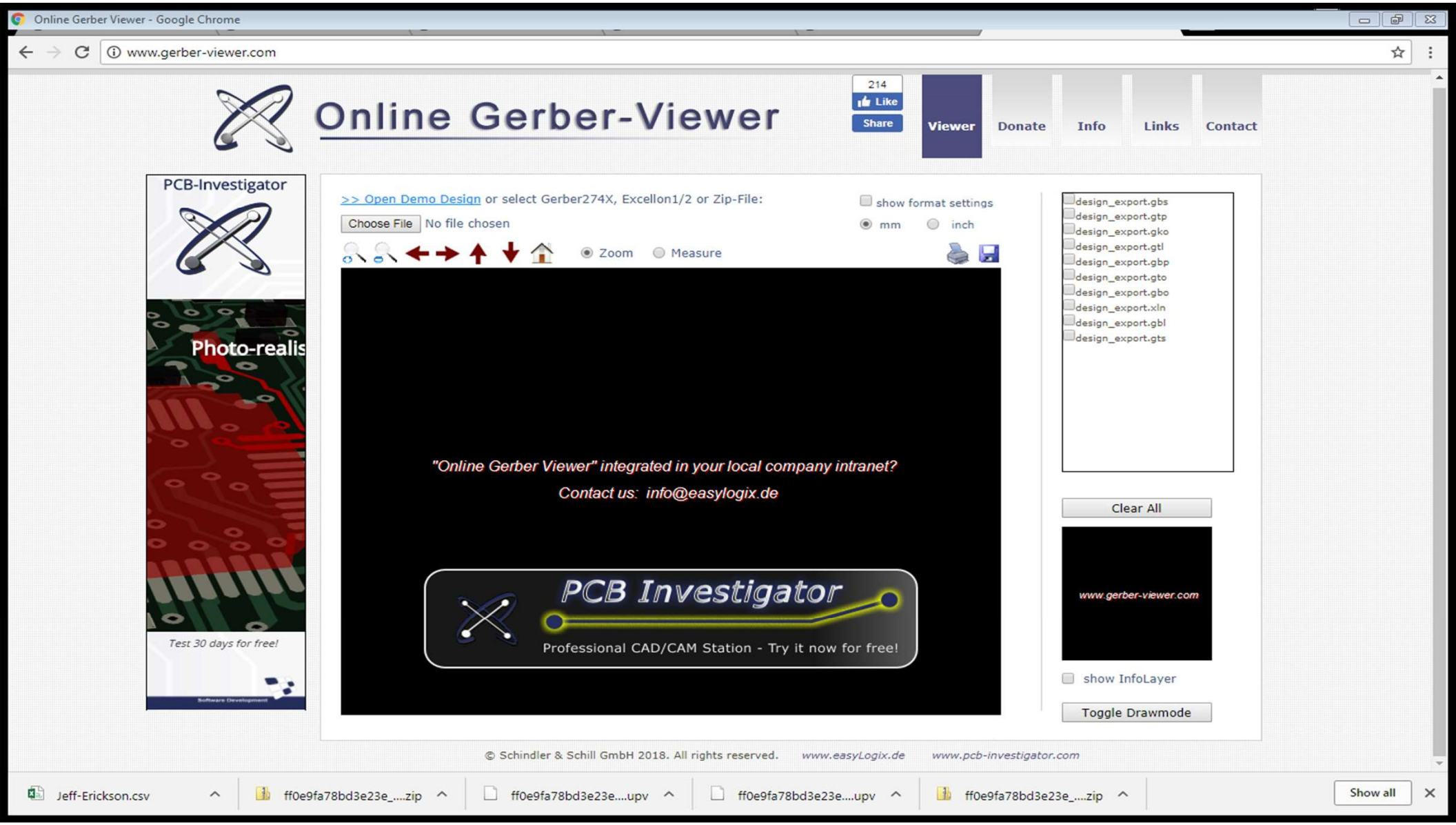


It will automatically download these files, which contain all gerbers as well as xln drill files



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
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Donate
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Links
Contact
PCB-Investigator
Photo-realis
Test 30 days for free!
>> 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
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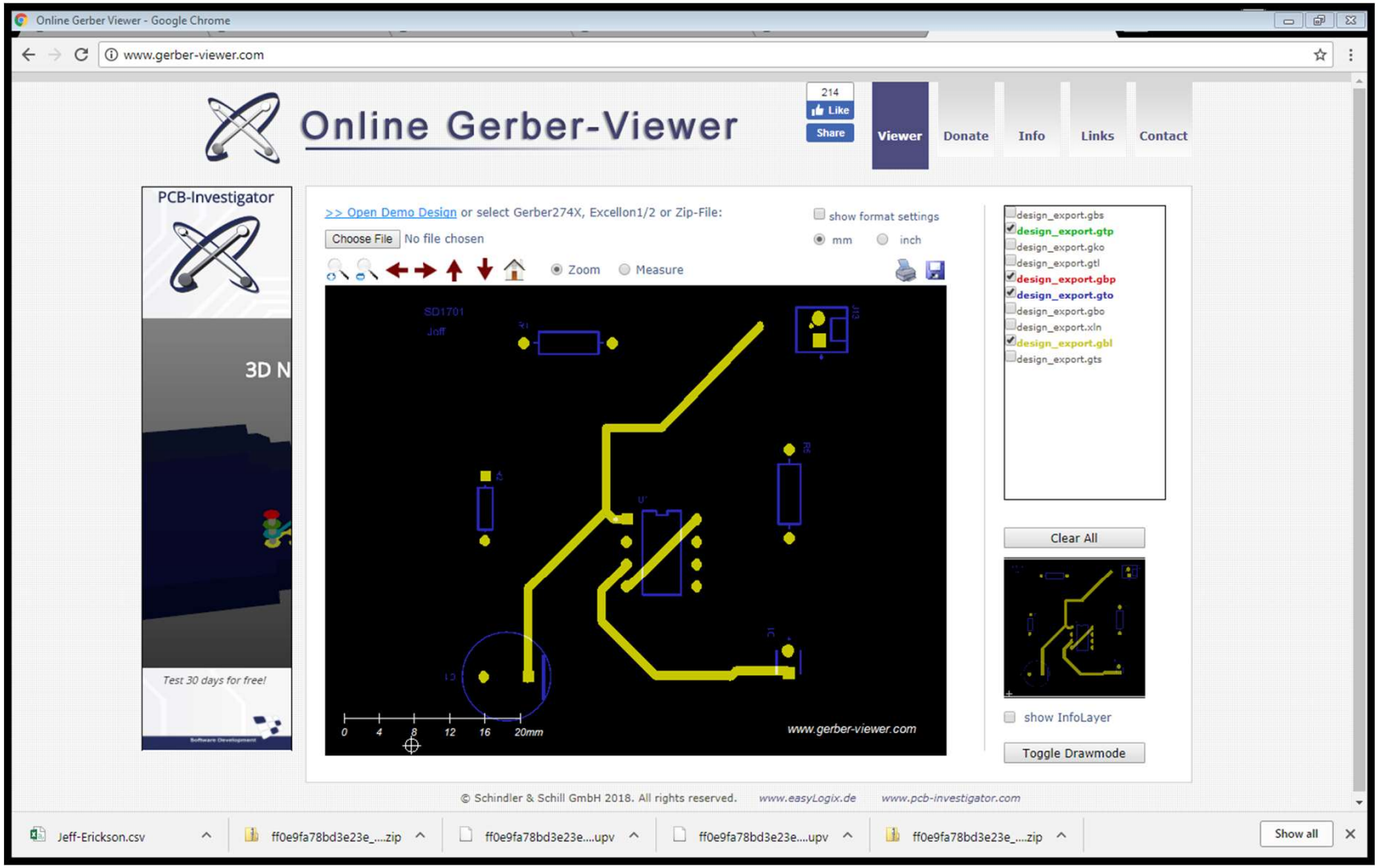
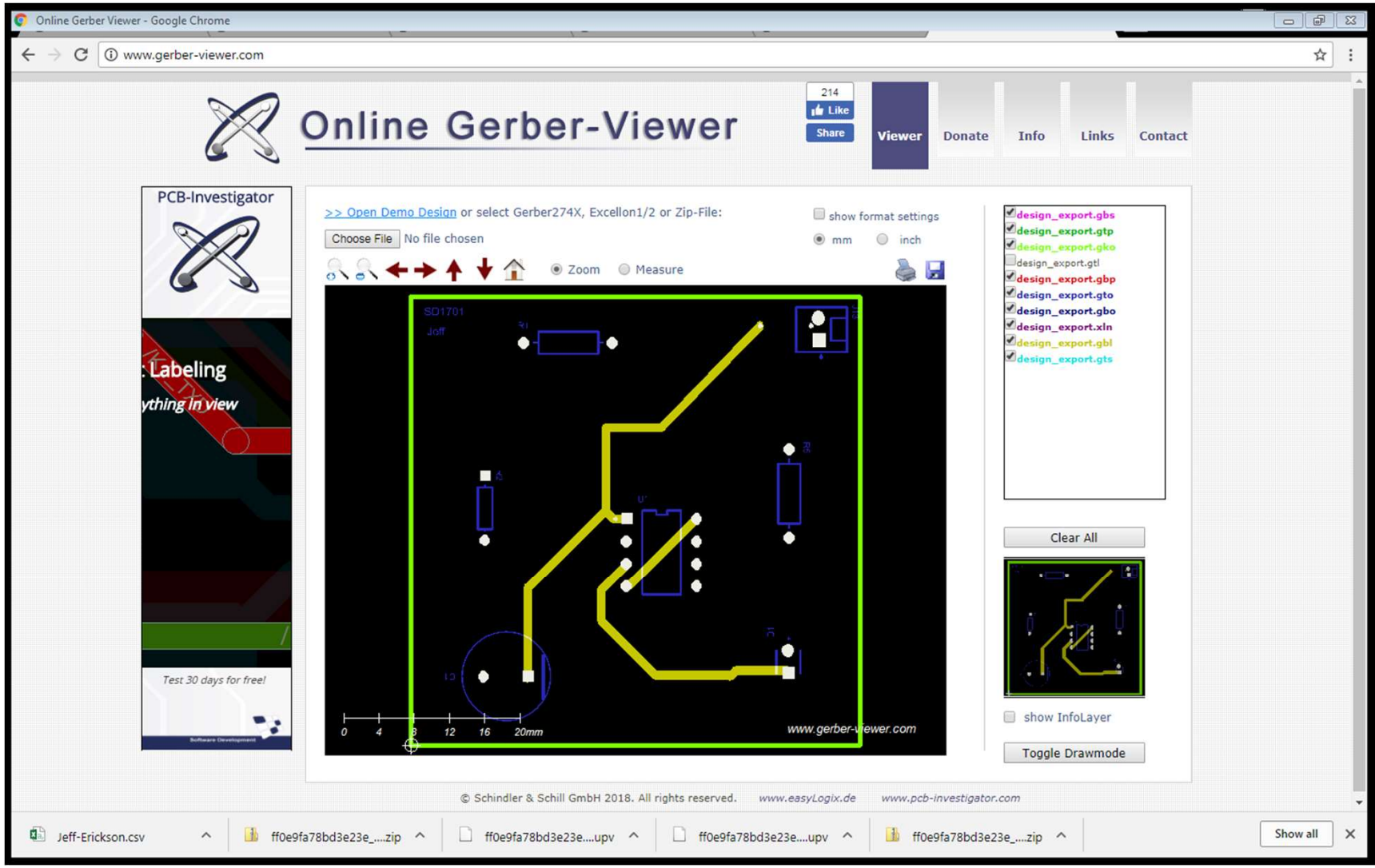
www.easyLogix.de
www.pcb-investigator.com
Jeff-Erickson.csv
ff0e9fa78bd3e23e_....zip
ff0e9fa78bd3e23e....upv
ff0e9fa78bd3e23e....upv
ff0e9fa78bd3e23e_....zip
Show all

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…..



JE1
JE2

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

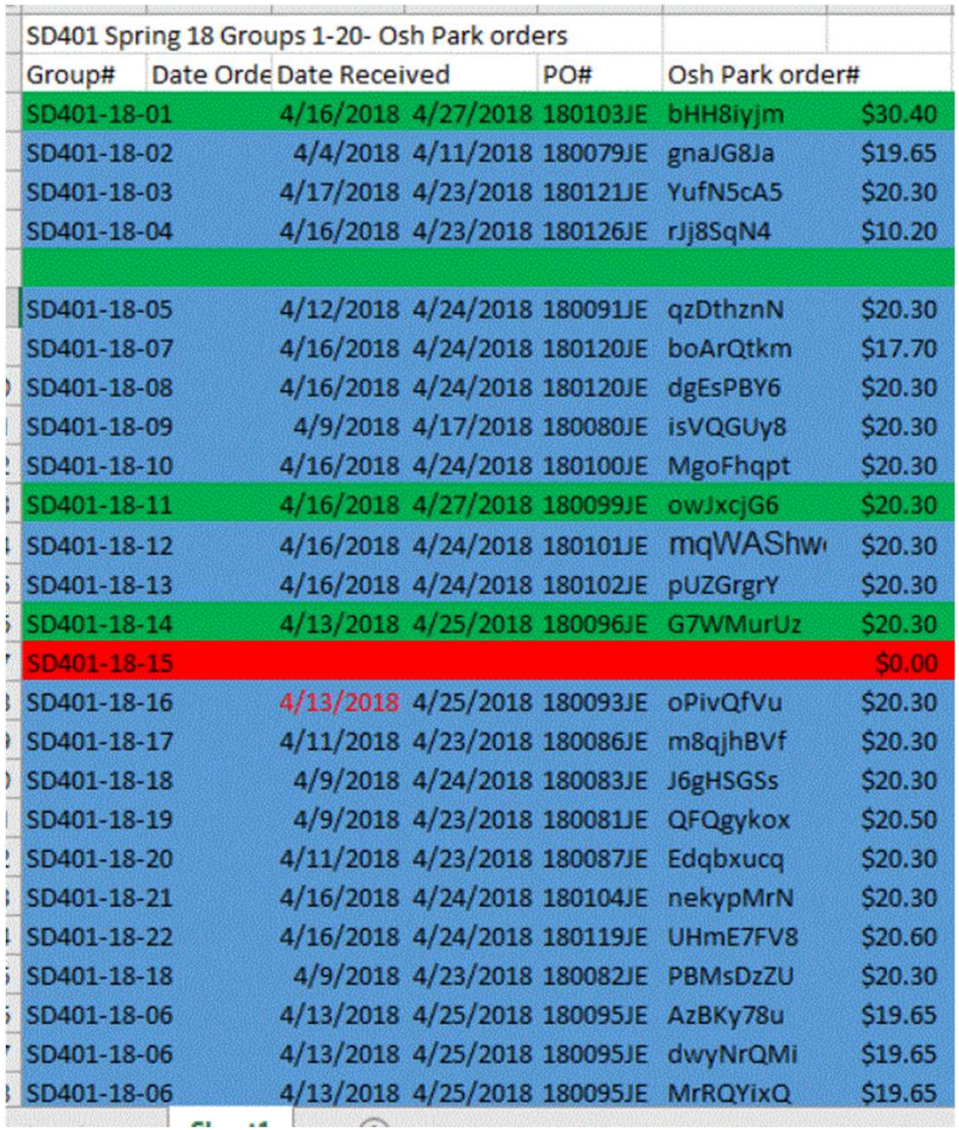
JE1 After looking at your files in the
Jeffrey Erickson, 1/30/2018

JE2 Jeffrey Erickson, 9/4/2019

ALL orders/and emails must have this format shown.

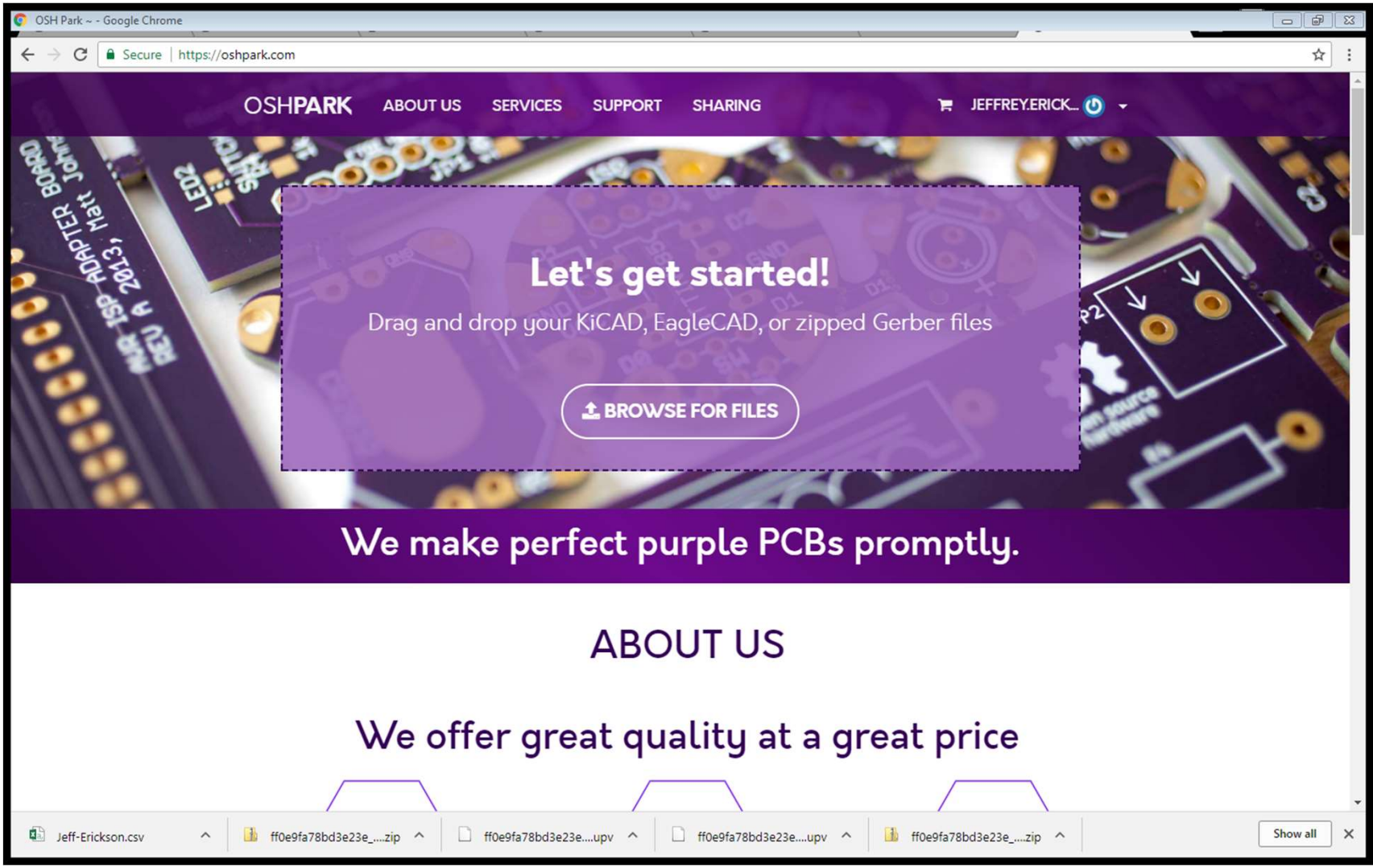
SD401-F19-XX for Senior Design ECE401, Fall of 2019 Semester, Group number XX.

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

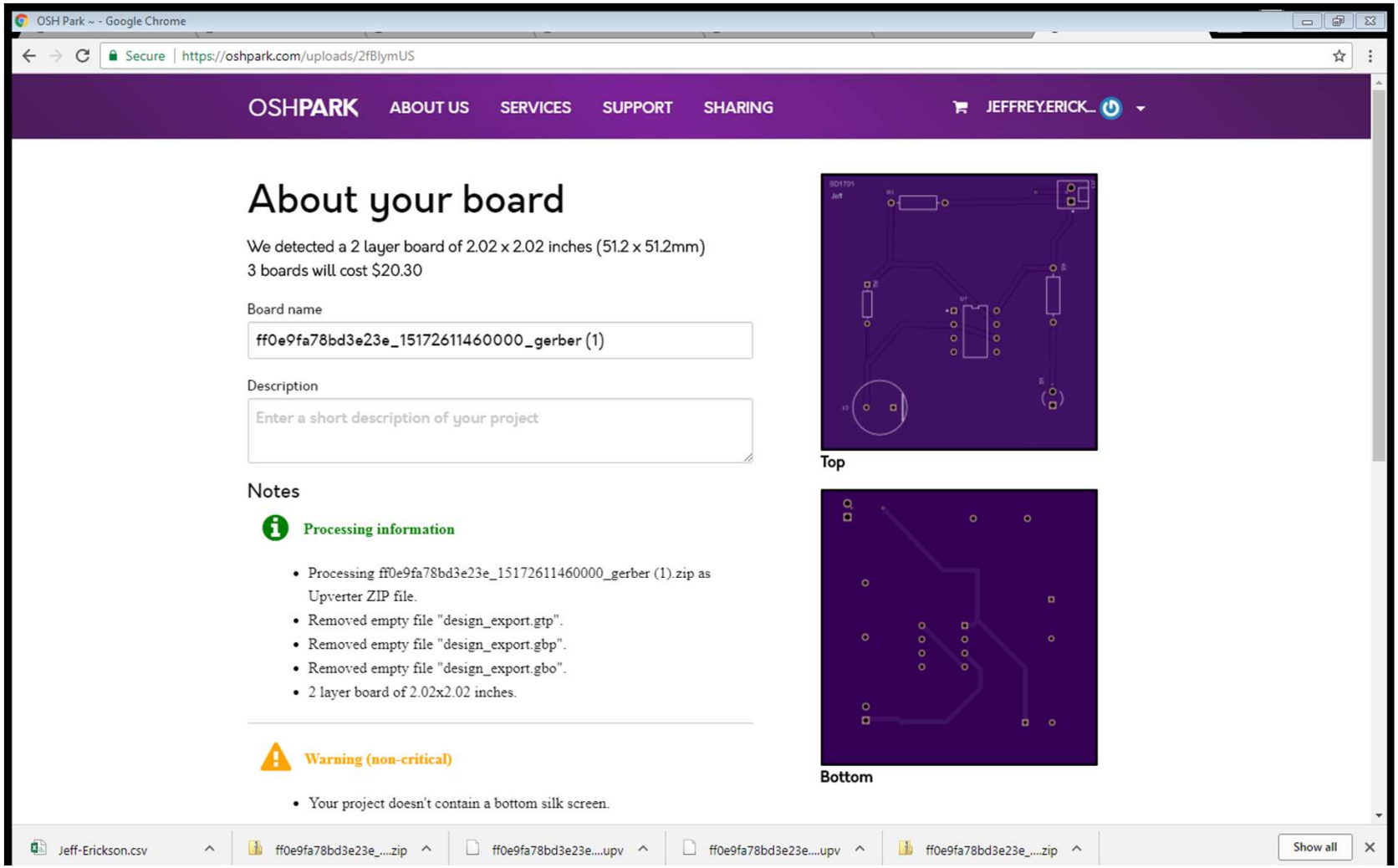


SD401 Spring 18 Groups 1-20- Osh Park orders					
Group#	Date Orde	Date Received	PO#	Osh Park order#	
SD401-18-01		4/16/2018	4/27/2018	180103JE	bHH8iyjm	$30.40
SD401-18-02		4/4/2018	4/11/2018	180079JE	gnaJG8Ja	$19.65
SD401-18-03		4/17/2018	4/23/2018	180121JE	YufN5cA5	$20.30
SD401-18-04		4/16/2018	4/23/2018	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	PBMsDzZU	$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!

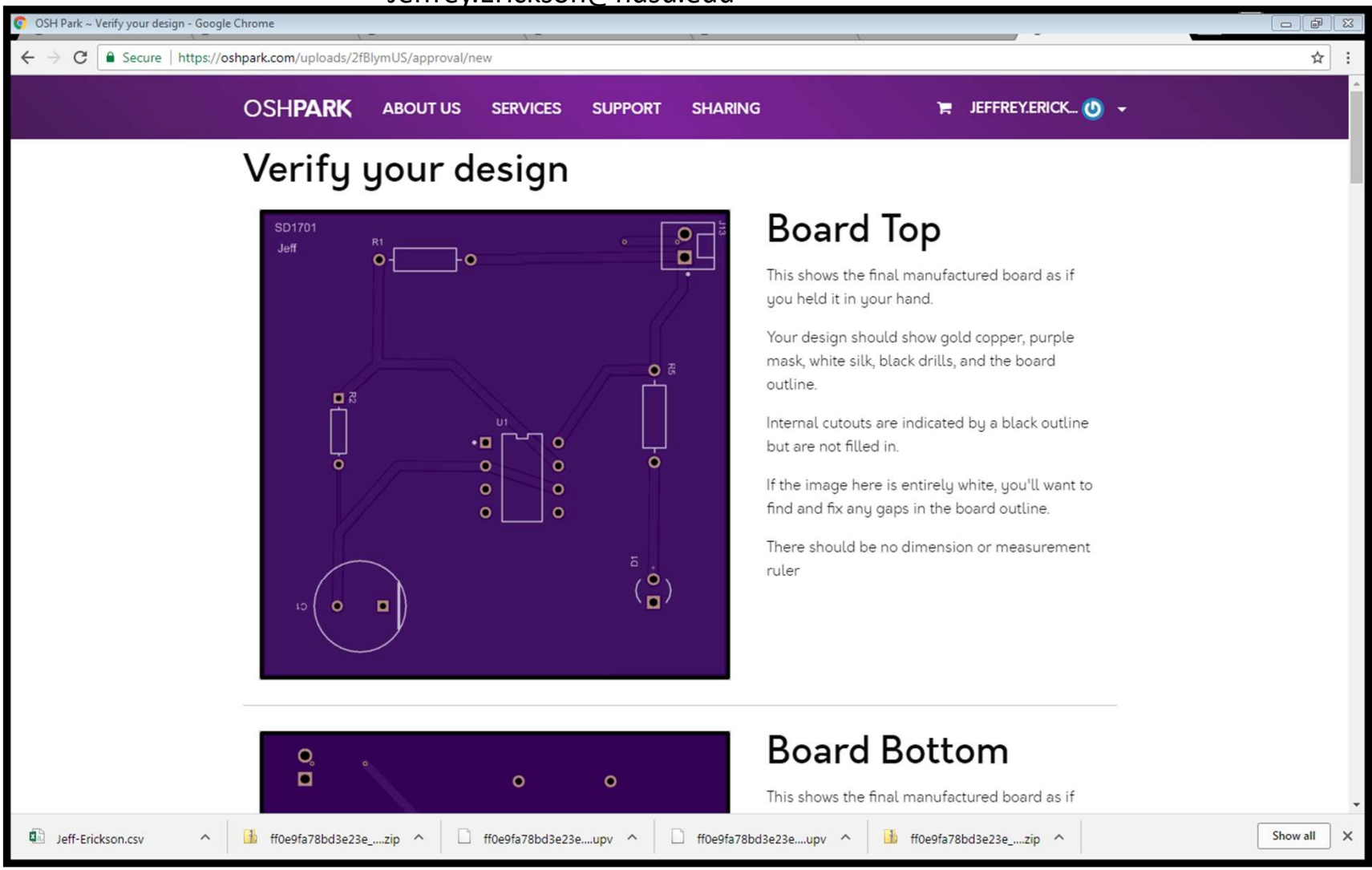


You will see this , it gives information about your board. IF this shows up and are agreeable with the price, scroll down and press Continue

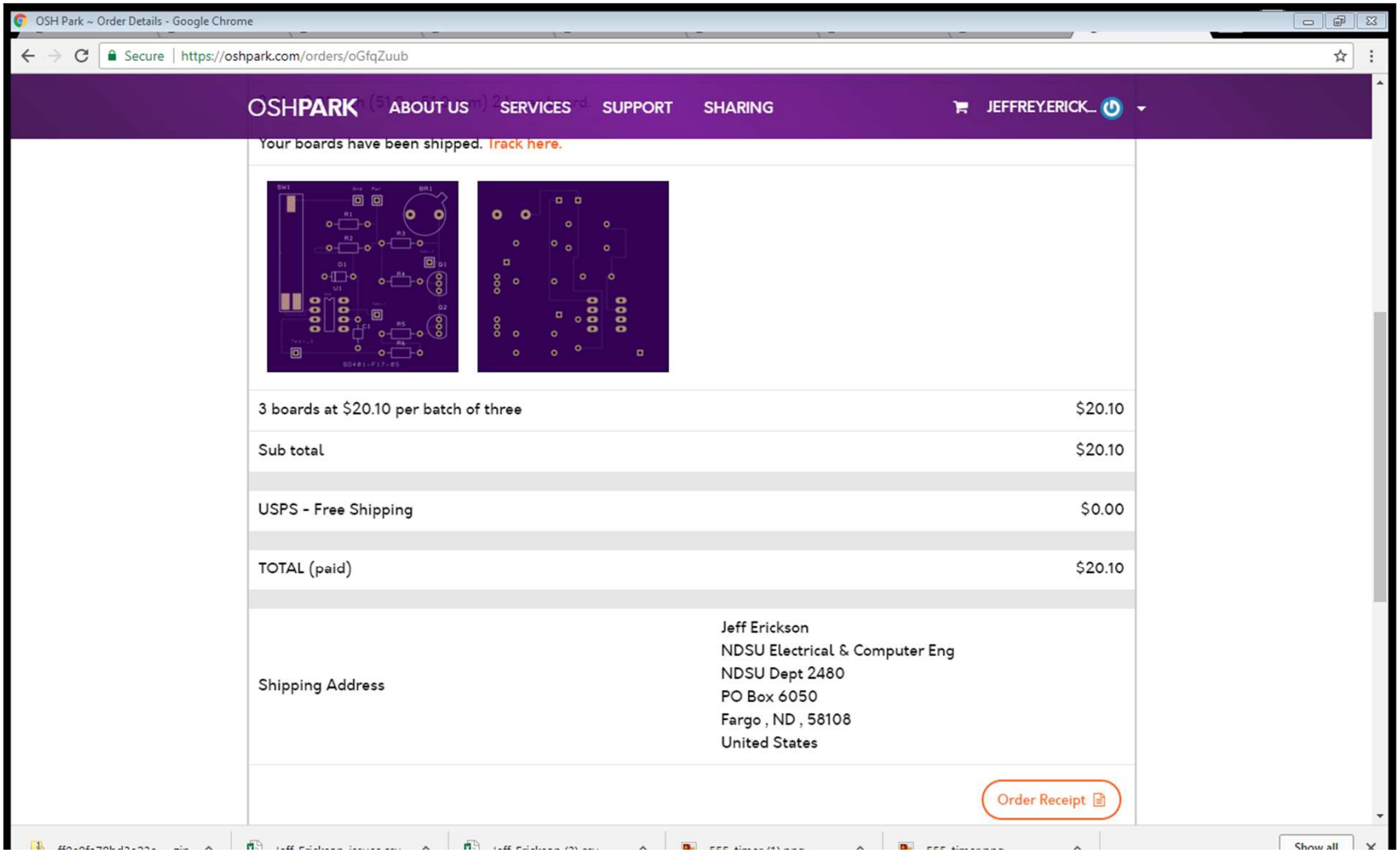


Now you can VERIFY all details of your board.

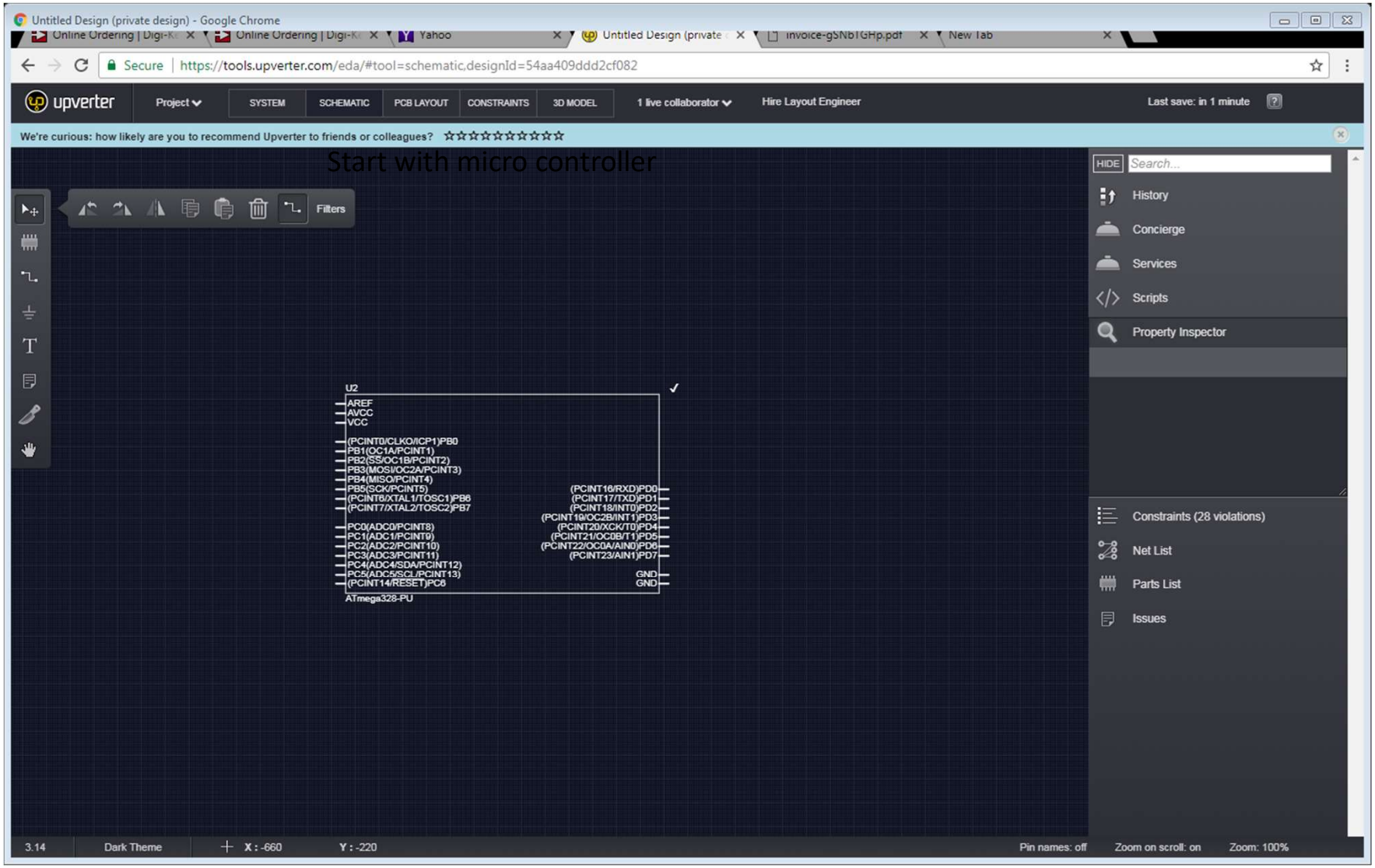
Do not purchase/ files are emailed to Purchase – Jeffrey.Erickson@ndsu.edu



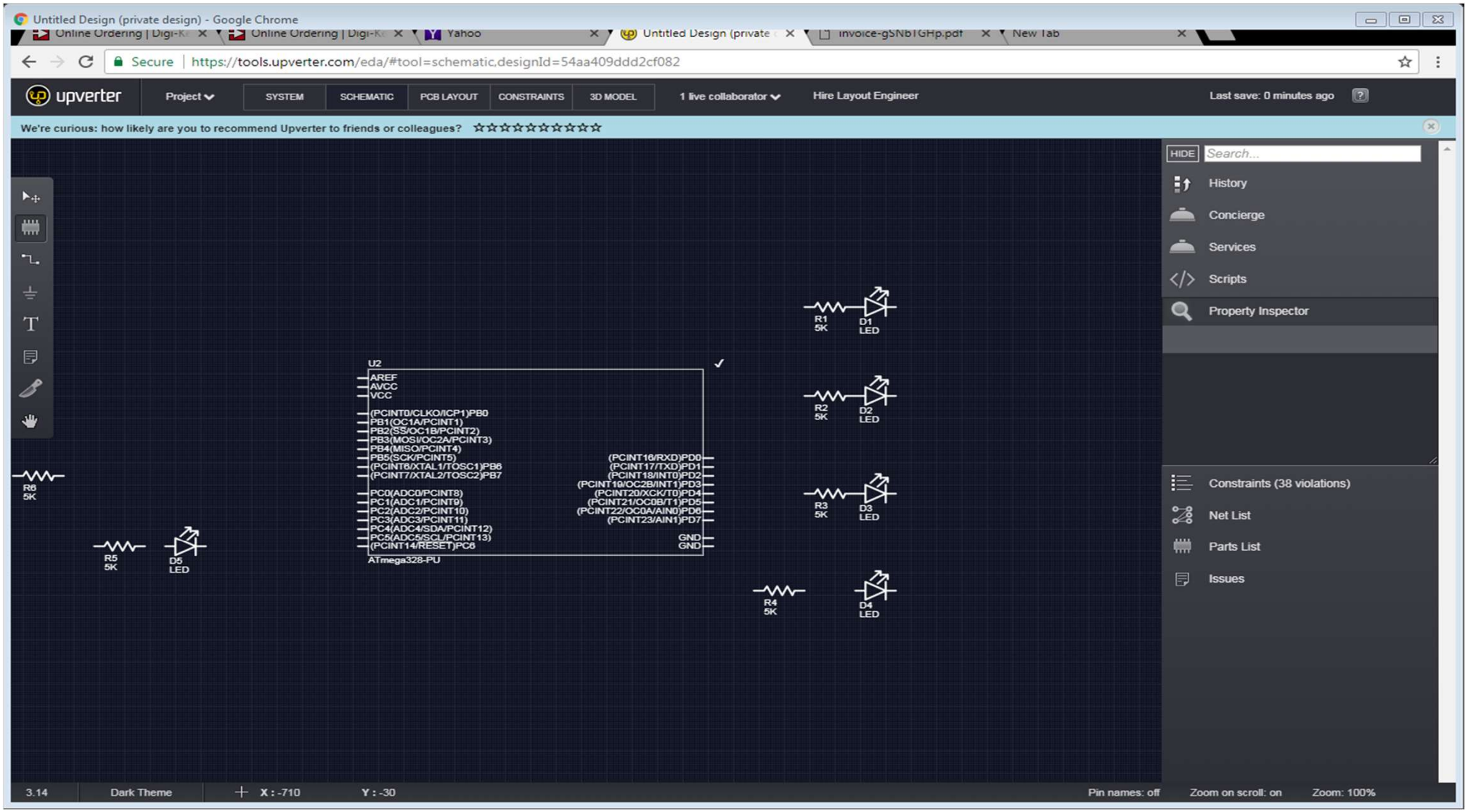
This is the final- but DO NOT ORDER unless it is for yourself- send the files to Jeffrey.Erickson@ndsu.edu



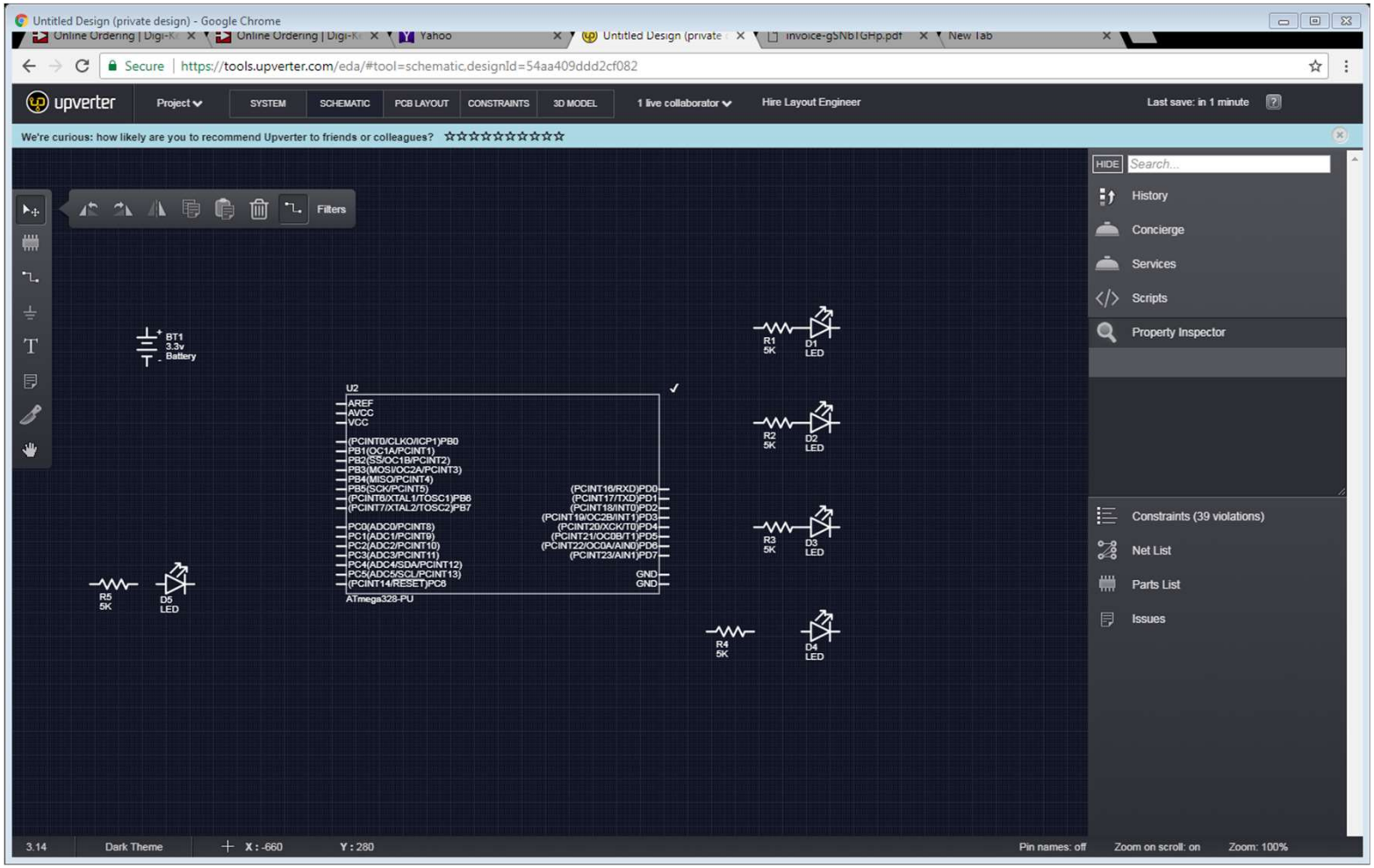
The check mark says it is a Verified part. This is required to transfer to the PCB Design



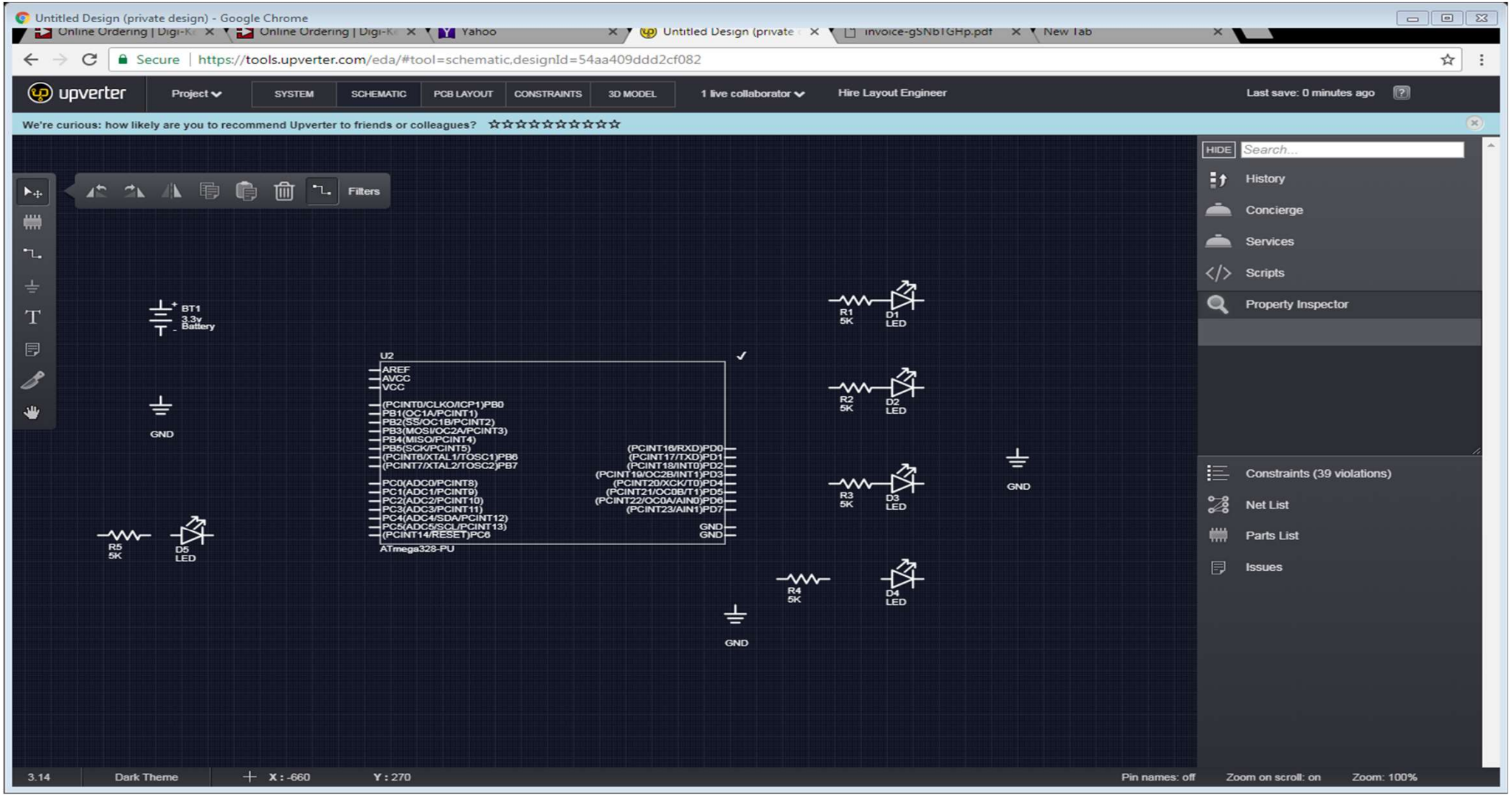
Add some components, such as LED’s and current limiting resistors



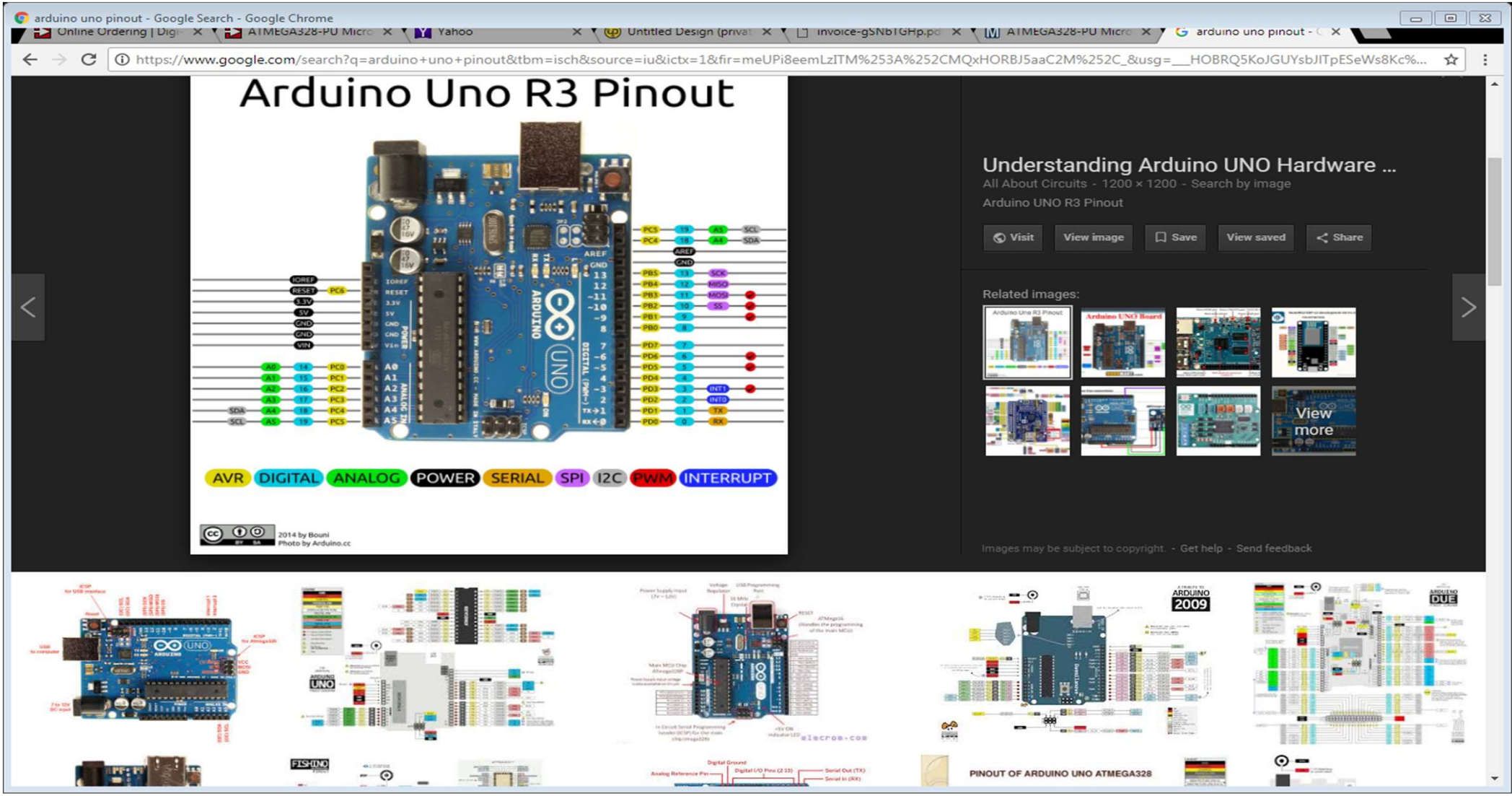
Insert a battery, in this case BT1, change the 3.3 Volt to 9V



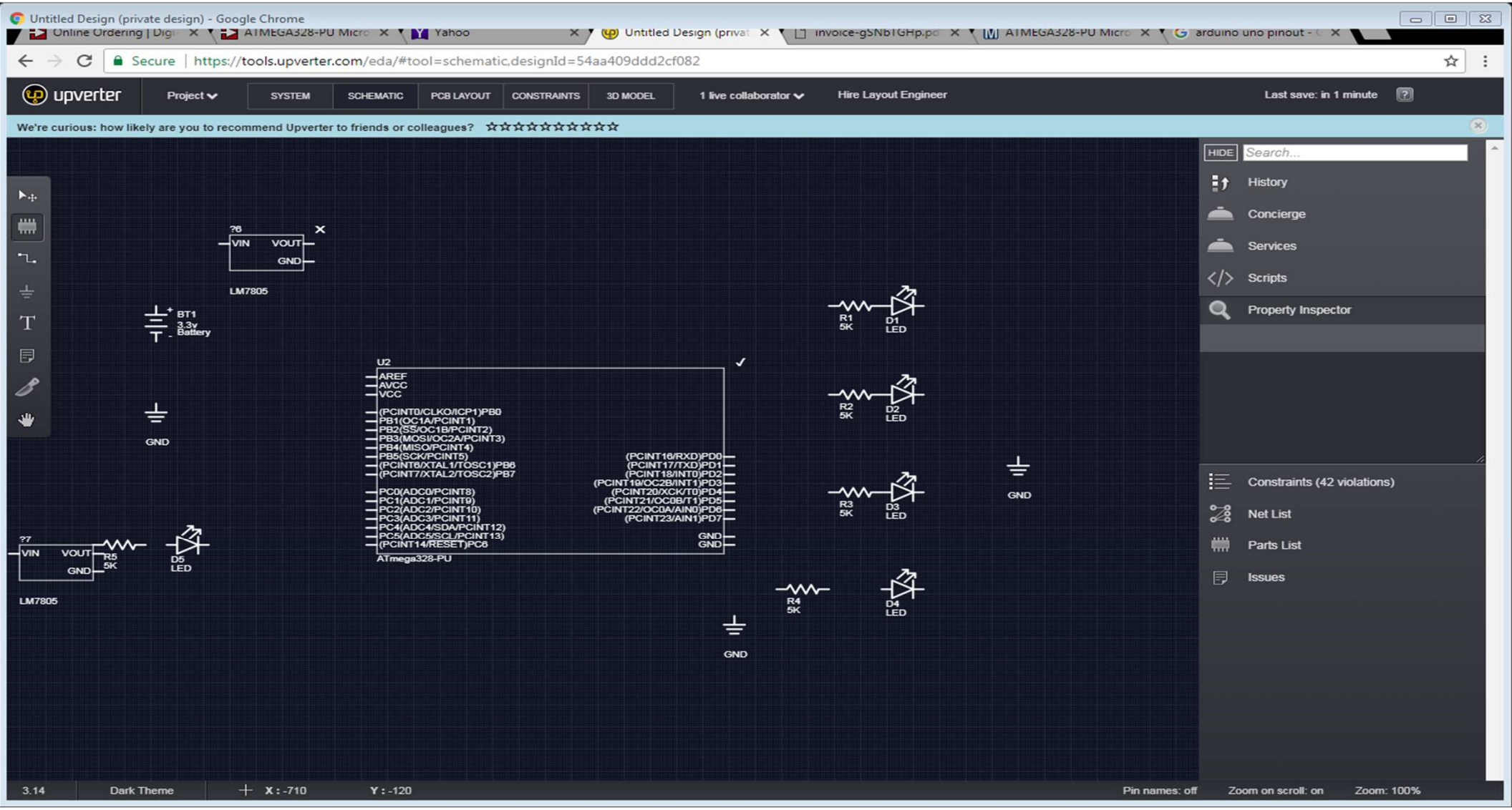
Add your grounds



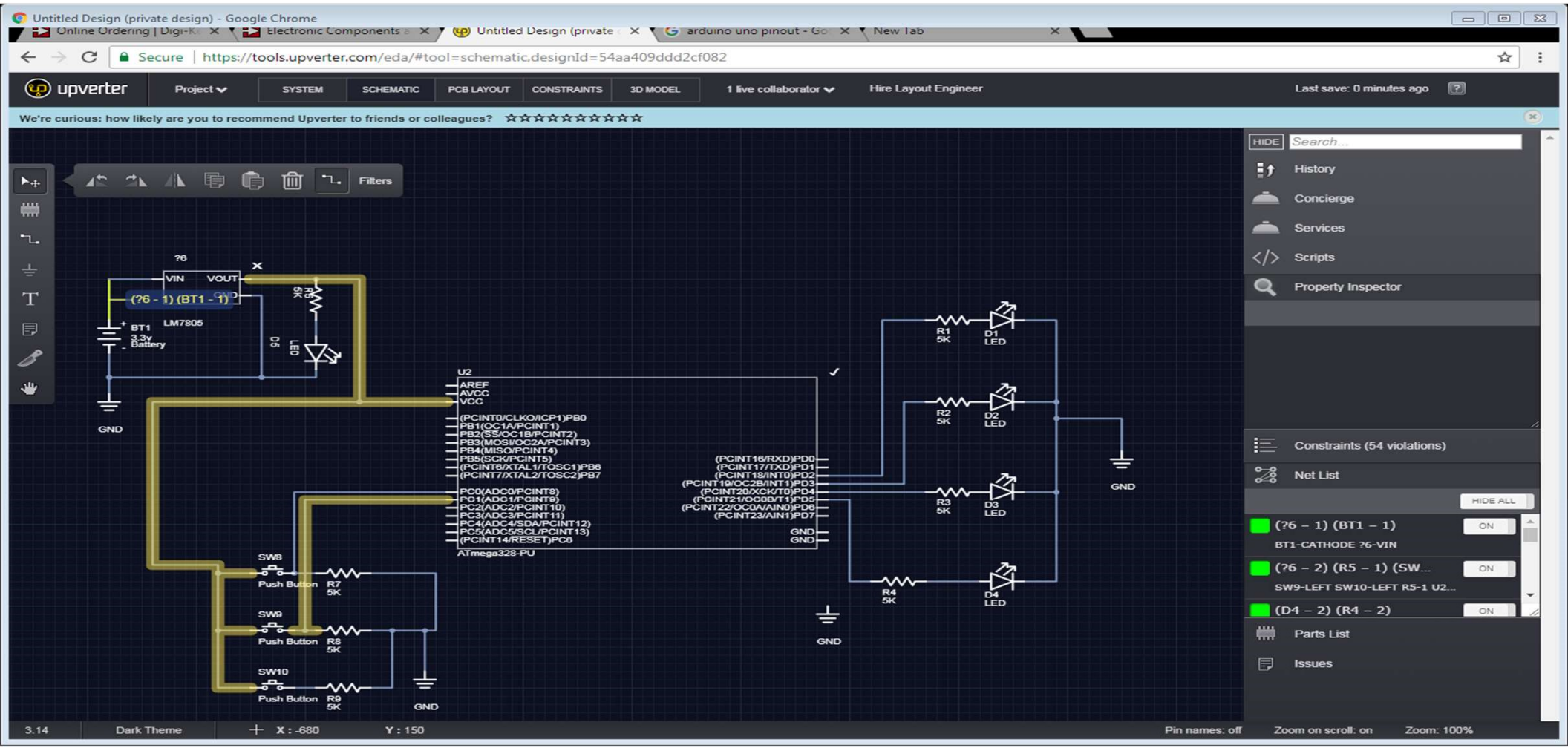
You will need Data sheets handy, indicating Pin Lay outs, for Vcc Gnds, Input and output pins



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