

PLL-SSTC-Driver Rev 1.2

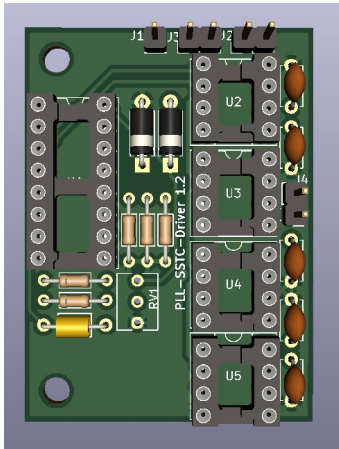
cd4046 dual ucc pair gdt driver

by

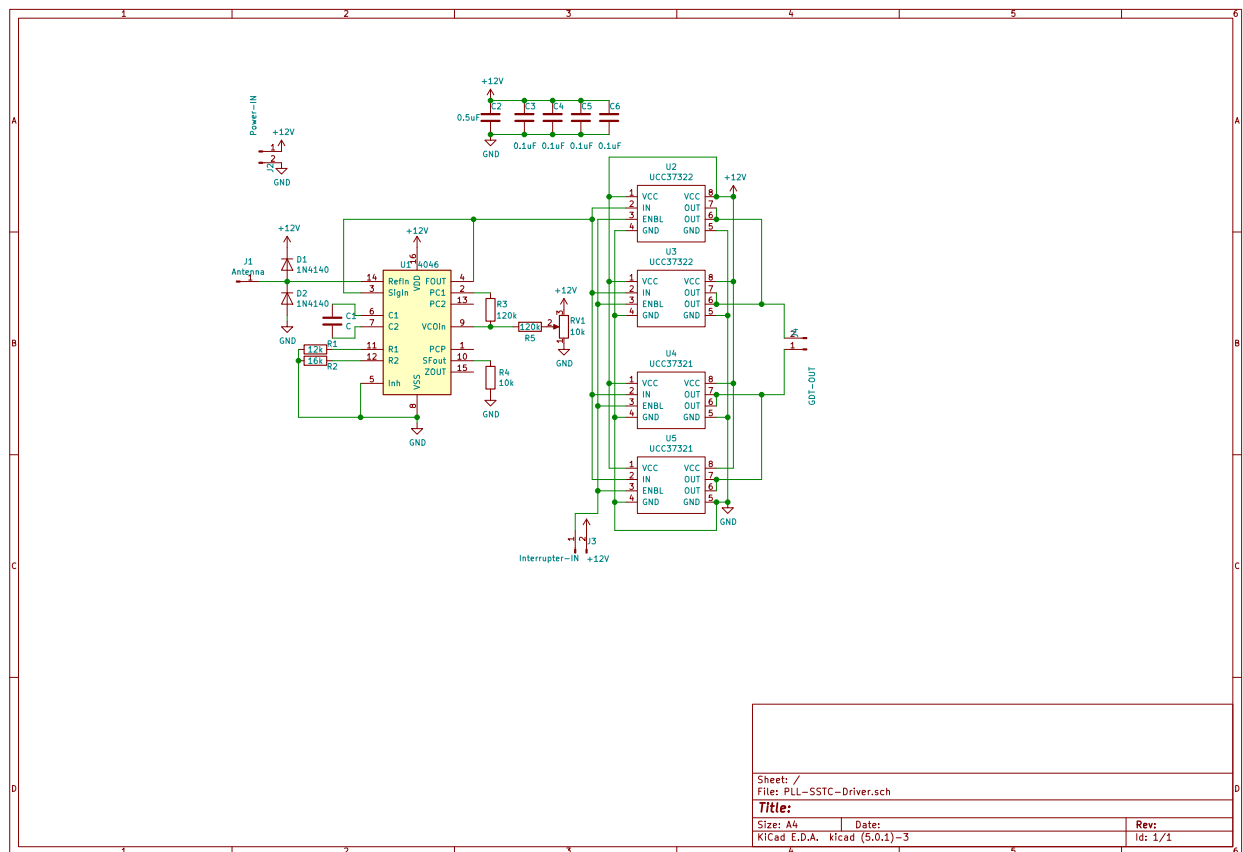
Fumeaux

PCB:

The PCB is 34.8x47.6mm. The mounting holes aren't referenced to anything. They are 40mm apart and fit M3 bolts. From the center of the holes to both close edges it 3.8mm. There is even enough room for most standoffs (top and bottom).



Schematic:



If you want to know more about this design, refer to the original source:

<http://www.scopeboy.com/tesla/dwsstc/wk2.html>

Partslist:

1	C1 -	C : Capacitor_THT:C_Axial_L3.8mm_D2.6mm_P7.50mm_Horizontal
2	C2 -	0.5uF : Capacitor_THT:C_Disc_D4.7mm_W2.5mm_P5.00mm
3	C3 -	0.1uF : Capacitor_THT:C_Disc_D4.7mm_W2.5mm_P5.00mm
4	C4 -	0.1uF : Capacitor_THT:C_Disc_D4.7mm_W2.5mm_P5.00mm
5	C5 -	0.1uF : Capacitor_THT:C_Disc_D4.7mm_W2.5mm_P5.00mm
6	C6 -	0.1uF : Capacitor_THT:C_Disc_D4.7mm_W2.5mm_P5.00mm
7	D1 -	1N4140 : Diode_THT:D_A-405_P7.62mm_Horizontal
8	D2 -	1N4140 : Diode_THT:D_A-405_P7.62mm_Horizontal
9	J1 -	Antenna : Connector_PinHeader_2.54mm:PinHeader_1x01_P2.54mm_Vertical
10	J2 -	Power-IN : Connector_PinHeader_2.54mm:PinHeader_1x02_P2.54mm_Vertical
11	J3 -	Interrupter-IN : Connector_PinHeader_2.54mm:PinHeader_1x02_P2.54mm_Vertical
12	J4 -	GDT-OUT : Connector_PinHeader_2.54mm:PinHeader_1x02_P2.54mm_Vertical
13	R1 -	12k : Resistor_THT:R_Axial_DIN0204_L3.6mm_D1.6mm_P7.62mm_Horizontal
14	R2 -	16k : Resistor_THT:R_Axial_DIN0204_L3.6mm_D1.6mm_P7.62mm_Horizontal
15	R3 -	120k : Resistor_THT:R_Axial_DIN0204_L3.6mm_D1.6mm_P7.62mm_Horizontal
16	R4 -	10k : Resistor_THT:R_Axial_DIN0204_L3.6mm_D1.6mm_P7.62mm_Horizontal
17	R5 -	120k : Resistor_THT:R_Axial_DIN0204_L3.6mm_D1.6mm_P7.62mm_Horizontal
18	RV1 -	10k : Potentiometer_THT:Potentiometer_Vishay_T73XW_Horizontal
19	U1 -	4046 : Package_DIP:DIP-16_W7.62mm_Socket_LongPads
20	U2 -	UCC37322 : Package_DIP:DIP-8_W7.62mm_Socket_LongPads
21	U3 -	UCC37322 : Package_DIP:DIP-8_W7.62mm_Socket_LongPads
22	U4 -	UCC37321 : Package_DIP:DIP-8_W7.62mm_Socket_LongPads
23	U5 -	UCC37321 : Package_DIP:DIP-8_W7.62mm_Socket_LongPads

Pads



J1: Antenna

You should solder a feedback antenna to this pad.

J2: Powerinput

You probably want to use a smooth 12VDC, as voltage fluctuations will probably result in a bad waveform.

J3: The pad goes to the **enable pins** of the UCC's and can be used to interrupt them. If you don't want to interrupt it, apply 12V and don't leave it floating. You can use the other pin, which is connected to the 12V rail.

J4: This goes to your GDT. You can add a capacitor and/or resistor in series to your GDT, to tune the waveform. !Important! Don't power it on with nothing connected here, as this would put a lot of strain on your UCC's and they will go up in flames (not really but yeah).

Resistors

RV1: This poti adjusts the phase of the pll.

R1-2: These Resistor combined with the cap C1 are responsible for the starting frequency and how much the frequency can wander. Refer to the cd4046 datasheet for more information on how to calculate your values.

R3:

R4: You probably don't have to add this resistor for it to work, but if you want to use VCO (Control Voltage Monitor) you need it and another 10k connected to pin10 of the cd4046 and to your monitoring unit. Refer to the datasheet for more information.

R5:

Capacitor

C1: Capacitor

I didn't specify any value for this, as you most likely have a secondary already built. You can change to frequency with the value R1, R2 and P2.

C2-6: Decoupling capacitors

Chips

U1: Make sure that you CD4046 can run on 12V (some apparently don't).

U2-3: The UCC37322 is a mosfet driver chip. It has a Signal-In which is connected to the cd4046 and an Enable pin for external interrupting (J4).

U4-5: The UCC37321 is exactly the same as the 37322, but with an inverter on the Signal-In.

If you want to spend a little bit less on your Driver you can just use **one UCC37322 (U2 or U3) and one UCC37321 (U4 or U5)**. It should work just fine, but depending on the amount and gate capacitance of your mosfets, the UCC's might get pushed past their limit. That's why I added two of each. Just to be safe and to keep them cooler.

Diods

D1-2: These feather any voltage spikes from the antenna that could potentially fry your cd4046.