

# CleanAMP



## Assembly Guide

*Solid State Amplifier*

*2 x 35Watts RMS @ 4ohms*

*2 x 32Watts RMS @ 8 Ohms*

**Required Power:**

**48V DC @ 2.1 Amps**

*CleanAMP is a Hi-Fi stereo power amplifier based around the TDA2050.*

# ubld.it

Support: <http://ubld.it/cleanamp>

# Tool Checklist

|2|

## 1. Soldering Iron



*We recommend the Hakko FX888 or similar iron with a chisel tip.*

## 2. Wire Cutters



*Small cutters for clipping excess wire leads after soldering.*

## 3. Solder



*Electronic solder is used for soldering parts to the PCB.*

## 4. Multimeter





*Multimeter for verifying component values and adjusting the circuit.*

# CAUTION








## EYE PROTECTION REQUIRED BEYOND THIS POINT









*BOM is short for Bill of Materials. Check each line item as you verify the required quantity of components.*

<input checked="" type="checkbox"/>	Line	Designator	Description		Required	Kit Qty
<input type="checkbox"/>	1	C1, C2	4.7uF 50V Electrolytic Capacitor		2	2
<input type="checkbox"/>	2	C10, C11	1uF 50V Electrolytic Capacitor		2	2
<input type="checkbox"/>	3	C3, C12	22uF 50V Electrolytic Capacitor		2	2
<input type="checkbox"/>	4	C4, C5	100pF 50V Disk Capacitor		2	2
<input type="checkbox"/>	5	C6, C7, C14	1000uF 50V Electrolytic Capacitor		3	3
<input type="checkbox"/>	6	C8, C13	100uF 50V Electrolytic Capacitor		2	2

## STEP 1: Check the BOM (continued)

<input checked="" type="checkbox"/>	Line	Designator	Description		Required	Kit Qty
<input type="checkbox"/>	7	C9, C15, C17, C18	.1uF 50V Disk Capacitor		4	4
<input type="checkbox"/>	8	D1	1N4004 Diode		1	1
<input type="checkbox"/>	9	J1	1/8" (3.5mm) Stereo Jack		1	1
<input type="checkbox"/>	10	J3, J3, J4	2 Pole 5mm Terminal Block		3	3
<input type="checkbox"/>	11	K1	Relay		1	1
<input type="checkbox"/>	12	Q1, Q2	BC546B NPN Transistor		2	2
<input type="checkbox"/>	13	R1, R2, R3, R12, R16	1K Ohm ¼ Watt Resistor		5	5

## STEP 1: Check the BOM (continued)

<input checked="" type="checkbox"/>	Line	Designator	Description		Required	Kit Qty
<input type="checkbox"/>	14	R10, R11	680 Ohm 1 Watt Resistor		2	2
<input type="checkbox"/>	15	R13	51K Ohm ¼ Watt Resistor		1	1
<input type="checkbox"/>	16	R4, R5, R6, R7, R14, R15	47K Ohm ¼ Watt Resistor		6	6
<input type="checkbox"/>	17	R8, R9	1 Ohm ½ Watt Resistor		2	2
<input type="checkbox"/>	18	U1, U2	TDA2050HV Hi-Fi Power Amplifier		2	2
<input type="checkbox"/>	19	N/A	5D-9 In-Rush Limiter (Optional: See final Assembly notes)		N/A	1

## STEP 2: Inserting the first component

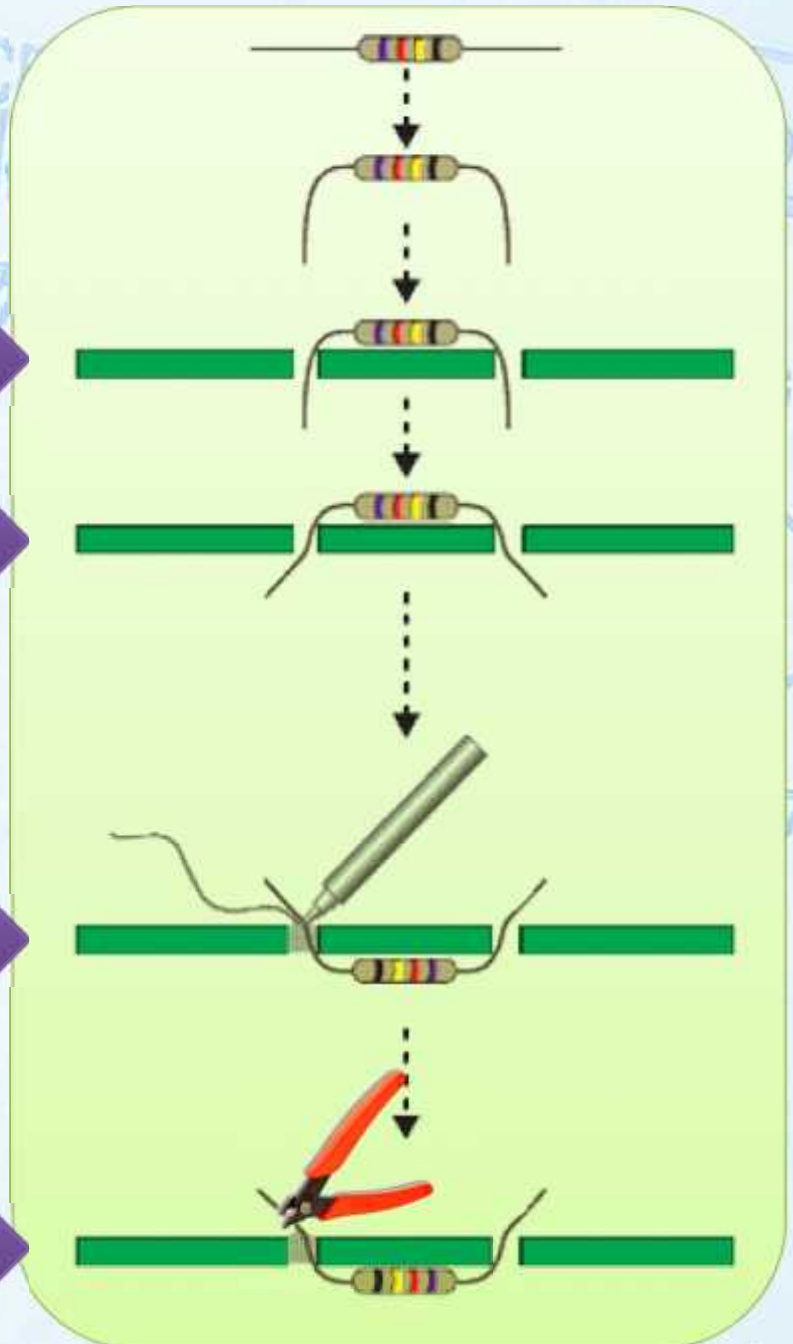
*Before we locate the first component let's take a minute to review the proper way to insert and solder the components to your circuit board.*

*Insert the components into the circuit board.*

*Bend the component leads to hold the component in place while soldering.*

*Flip the board and solder the component leads.*

*Trim the component leads at the top of the solder joint.*



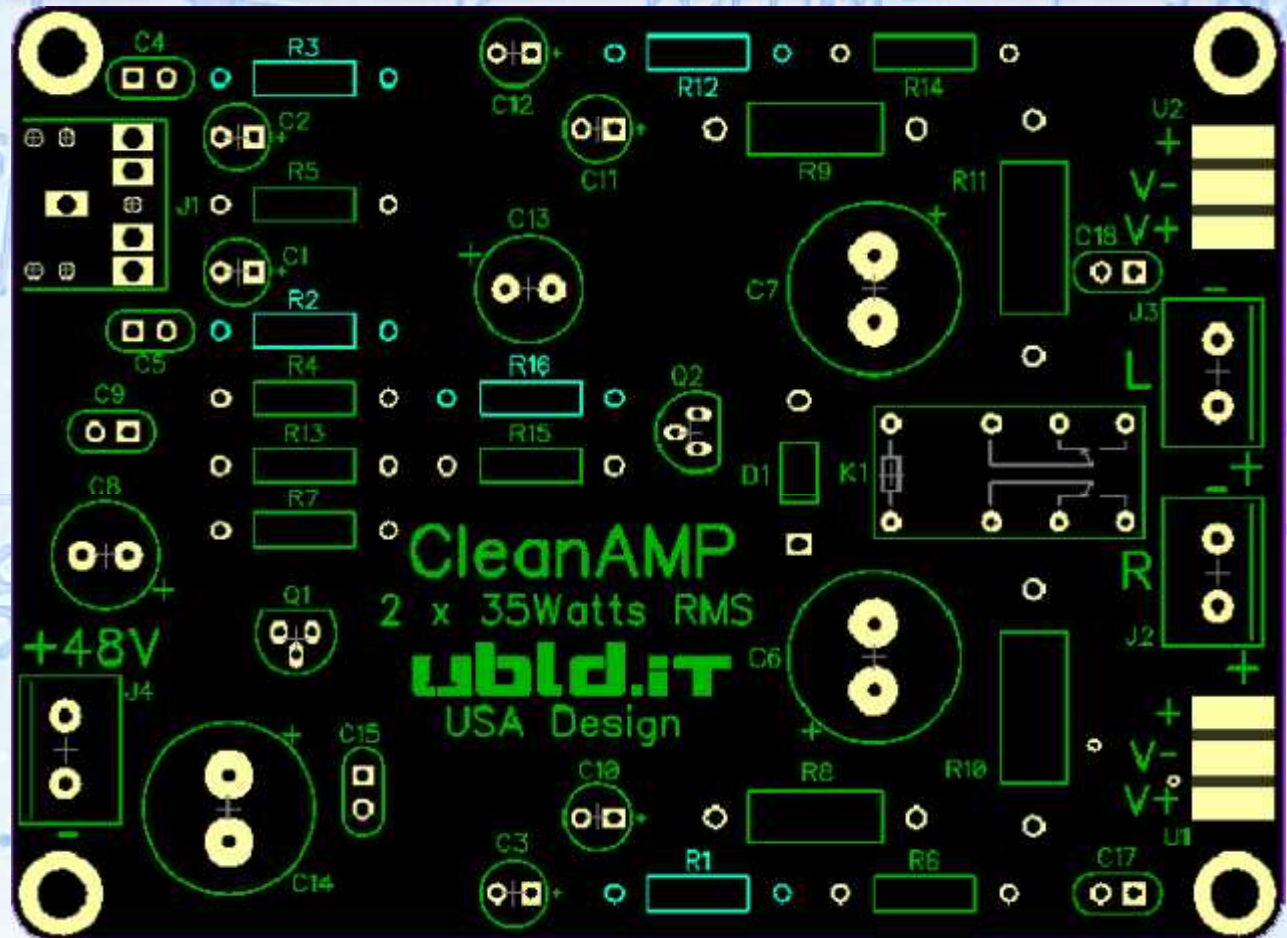


## STEP 2b: Inserting the first component

The first components to locate are three 1K Ohm  $\frac{1}{4}$  Watt Resistors (line #13).



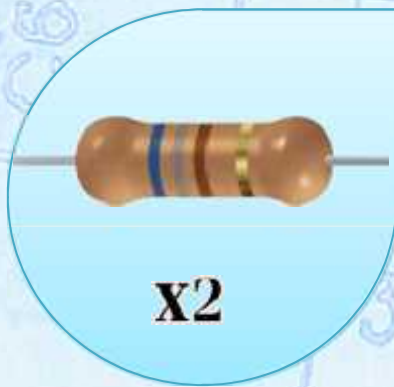
Solder 1K Ohm  $\frac{1}{4}$  Watt Resistor into R1, R2, R3, R12 and R16.



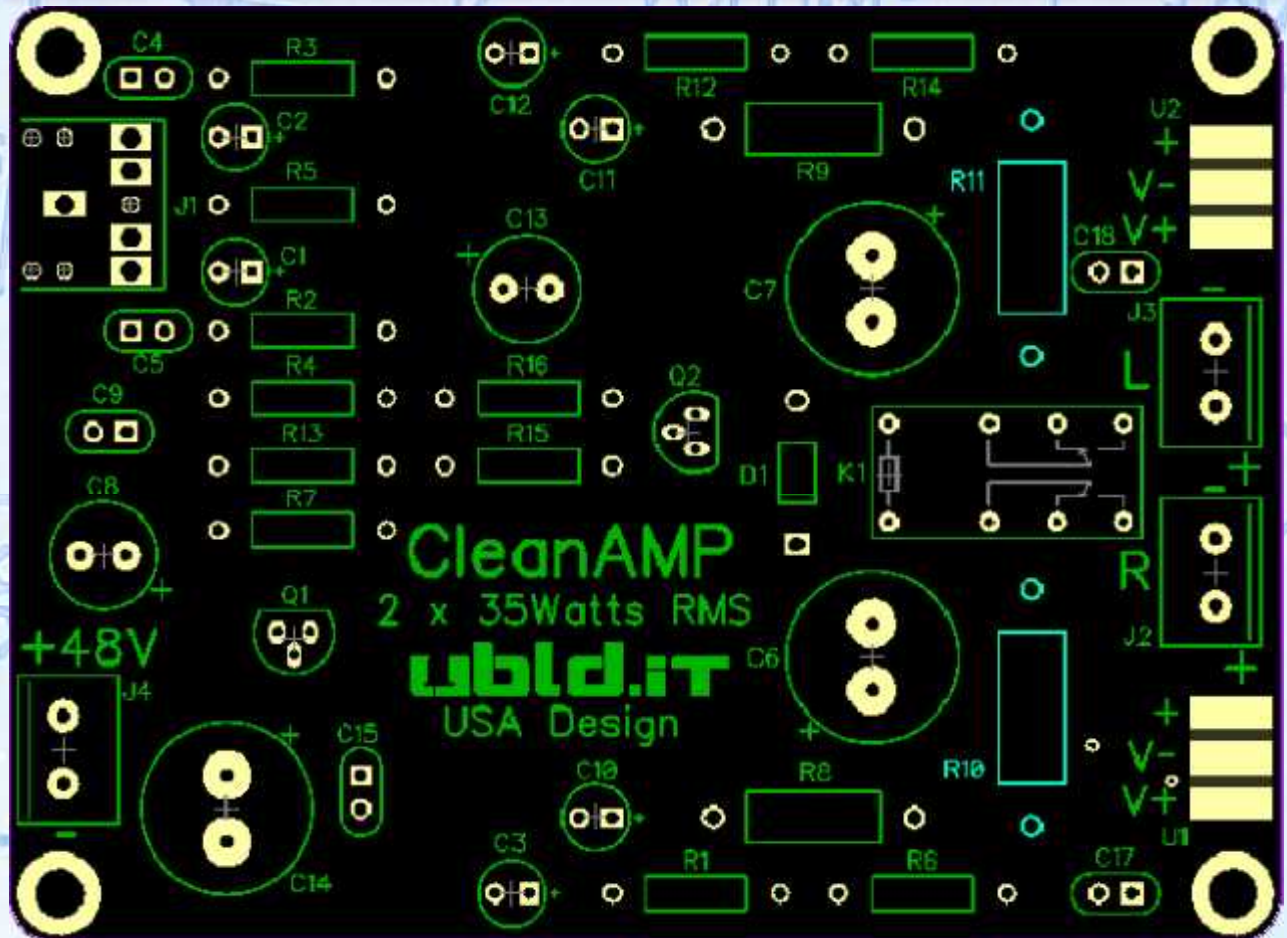
*Axial Lead Resistors such as the ones used in this kit are color coded. Compare the resistor you are installing to the images shown in each step. Also double check the values with a multimeter on the ohm setting.*

### STEP 3: Insert the 680 Ohm Resistors

Locate two 680 Ohm 1 Watt Resistors  
(line #14).



Solder the 680 Ohm 1 Watt Resistors into R10, and R11.

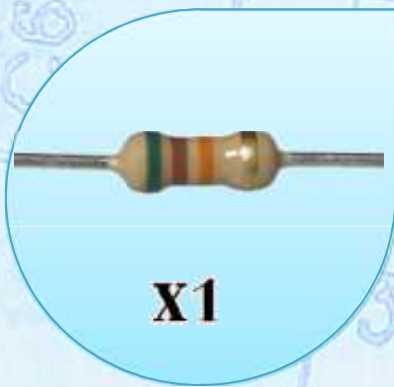


*Take pride in your work. This is a show piece so make sure you take your time to bend all the components leads to 90 degree angles using needle nose pliers.*

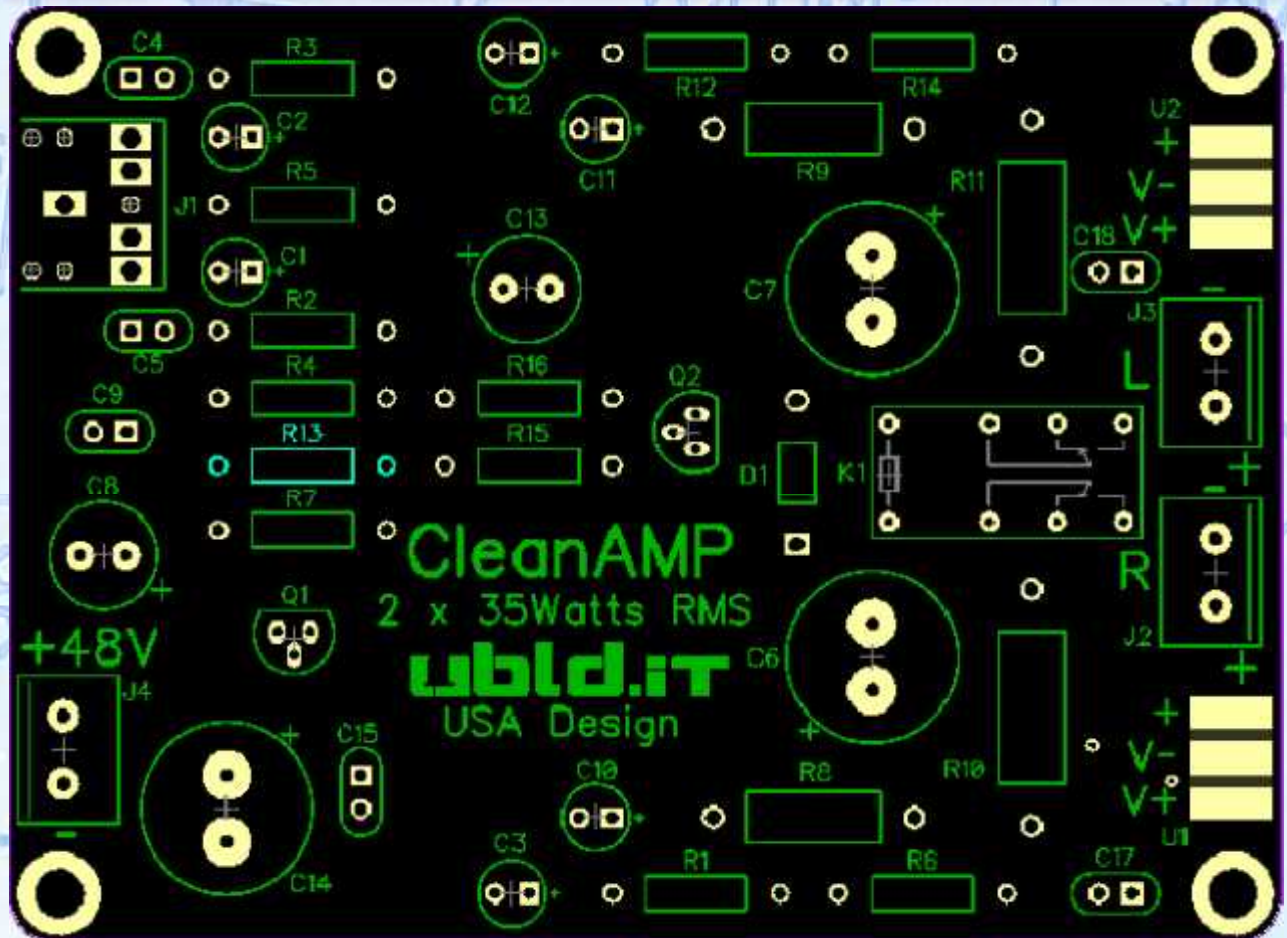


## STEP 1: Insert the 51K Ohm Resistor

Locate a 51K Ohm  $\frac{1}{4}$  Watt Resistors  
(line #15).



Solder the 51K Ohm  $\frac{1}{4}$  Watt Resistor into R13.



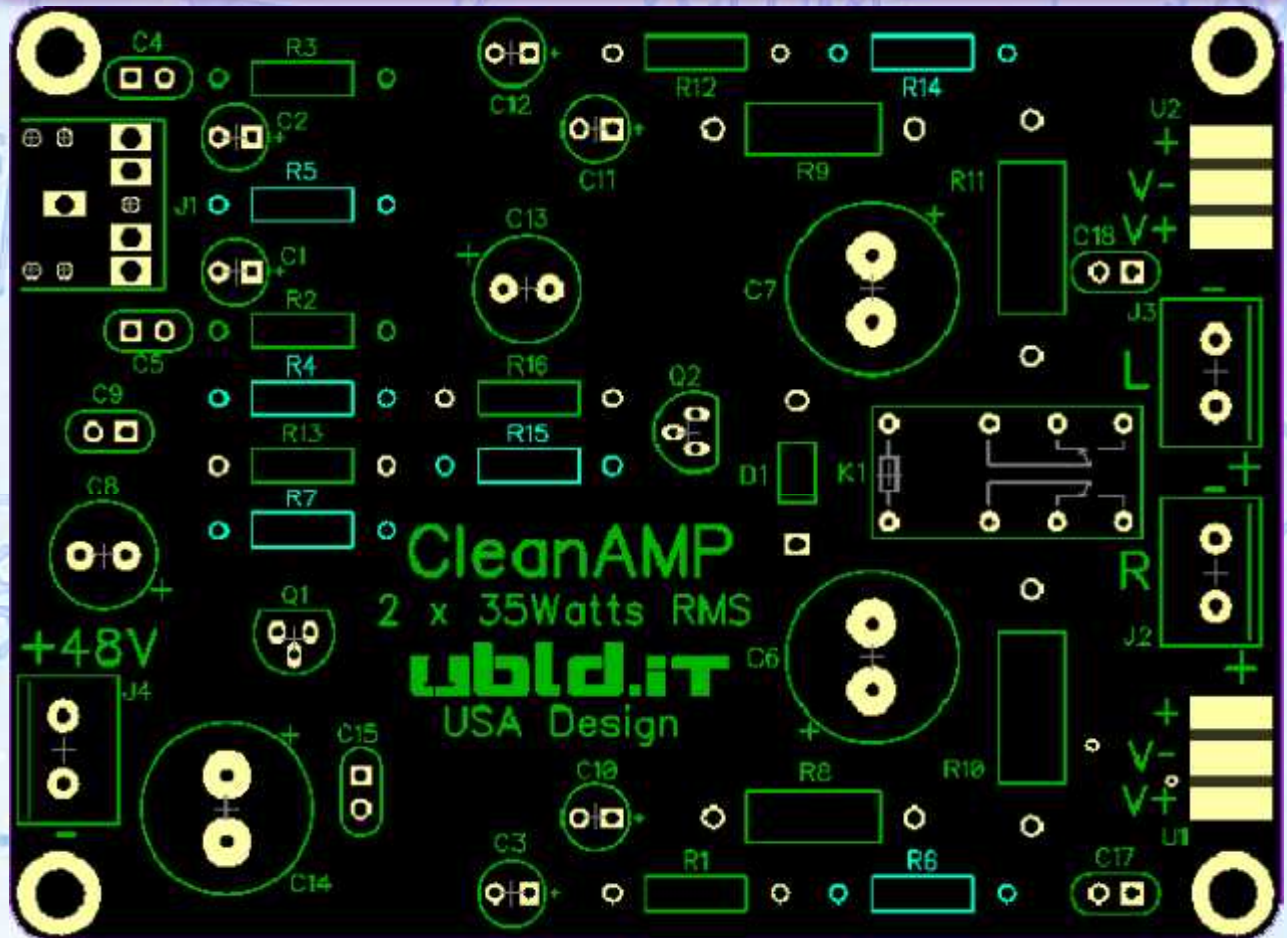
*It's not necessary for resistors, but inserting them all in the same direction will make your board look that much better. Use the last band (tolerance band) as a reference for the orientation.*

## STEP 5: Insert the 17K Ohm Resistors

Locate eight 47k Ohm  $\frac{1}{4}$  Watt Resistors (line #16).



Solder the 47k Ohm  $\frac{1}{4}$  Watt Resistors into R4, R5, R6, R7, R14 and R15.



*For better looking solder joints use Kester #2331-ZX water soluble flux pen on every pad before applying solder. Flux removes oxidation and allows heat to transfer from your iron to the pad.*

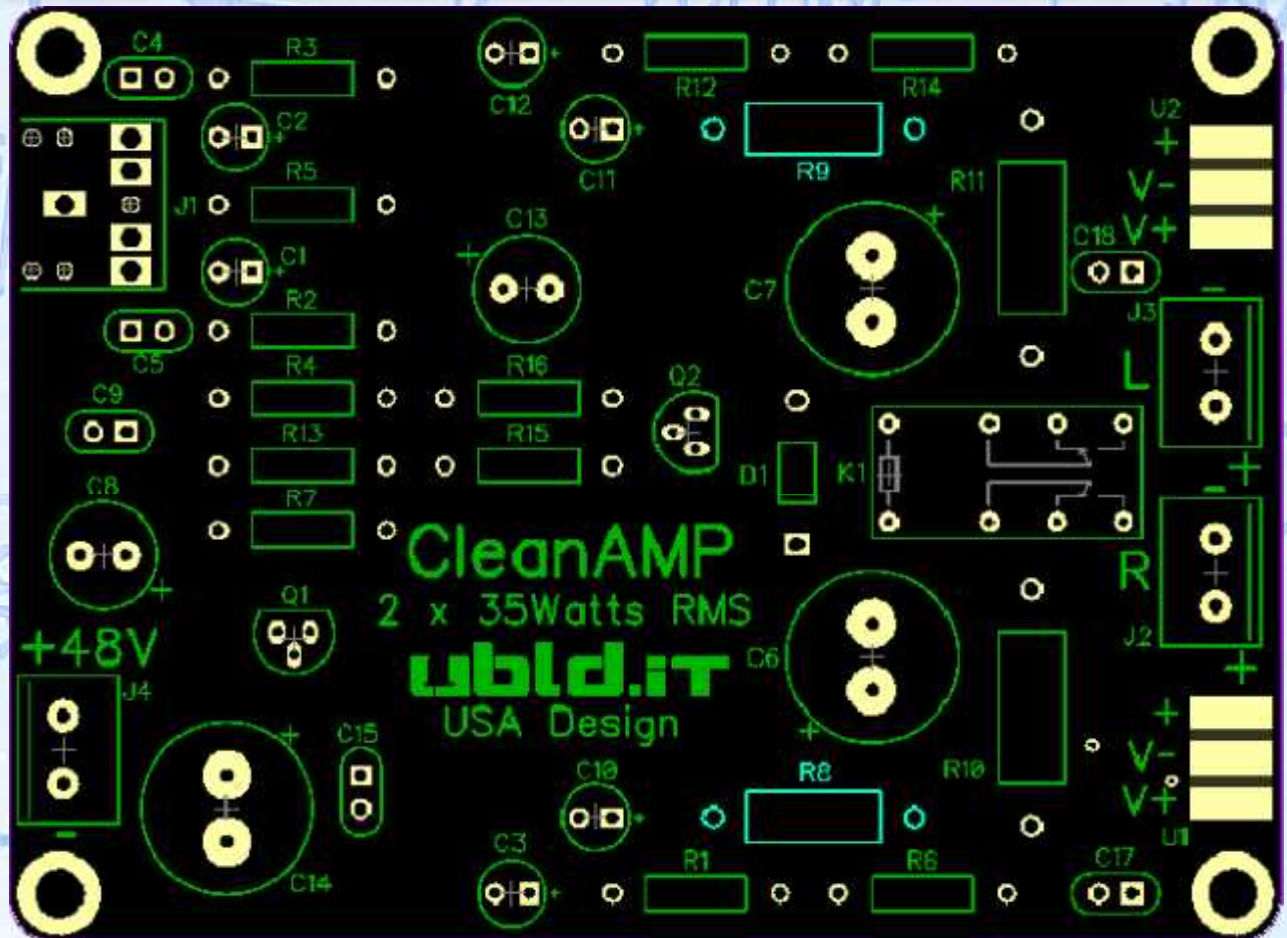


## STEP 6: Insert the 1 Ohm Resistors

Locate two 1 Ohm ½ Watt Resistors (line #17).



Solder the 1 Ohm ½ Watt Resistors into R8, and R9.



*A resistor limits the flow of electrons. The flow of electrons is called the current (Amps). Therefore, a resistor is known as a current limiting device.*

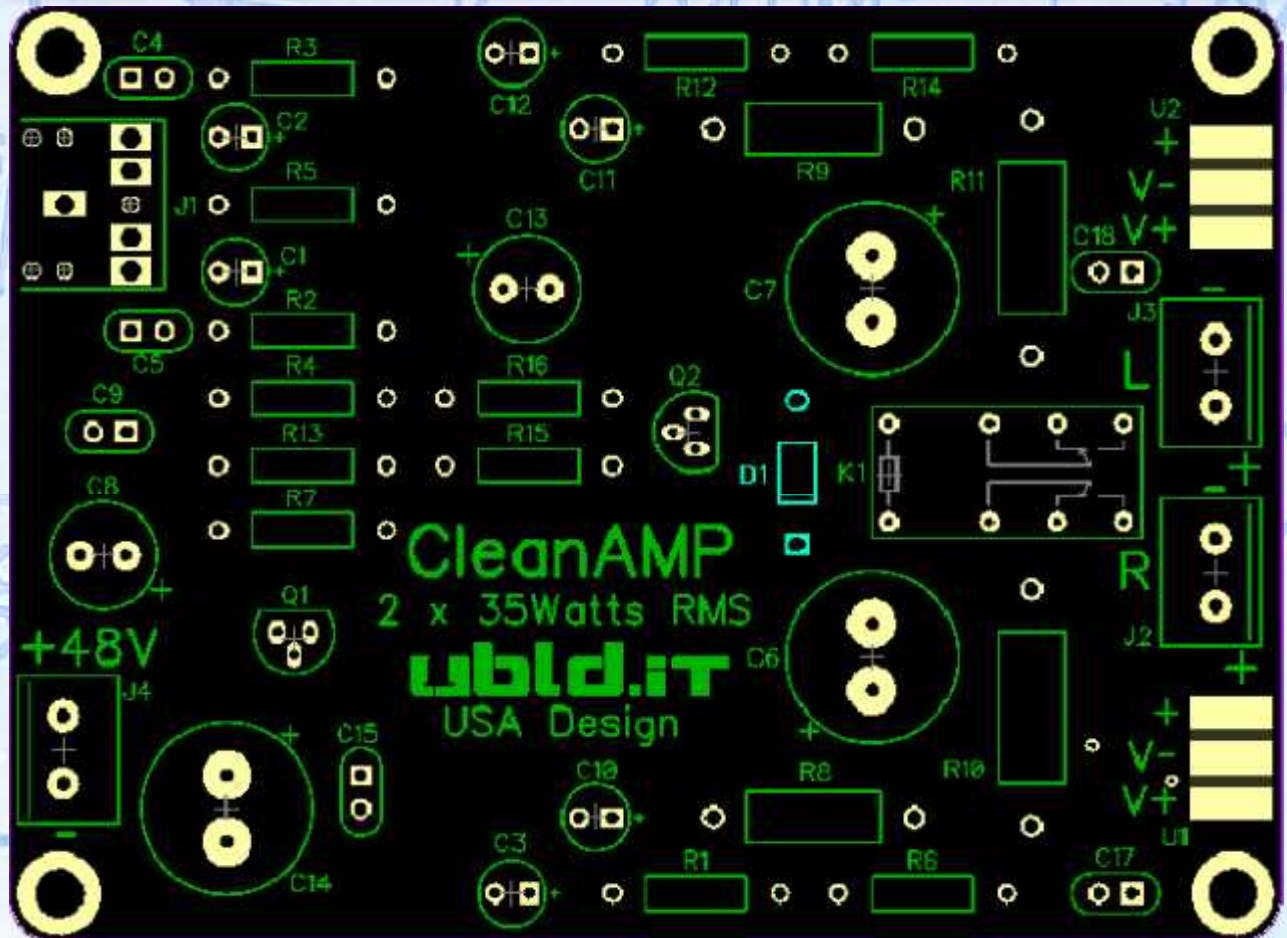


## STEP 7: Insert the 1N4004 Diode

Locate one 1N4004 Diode (line #8).



Solder the 1N4004 Diode into D1.



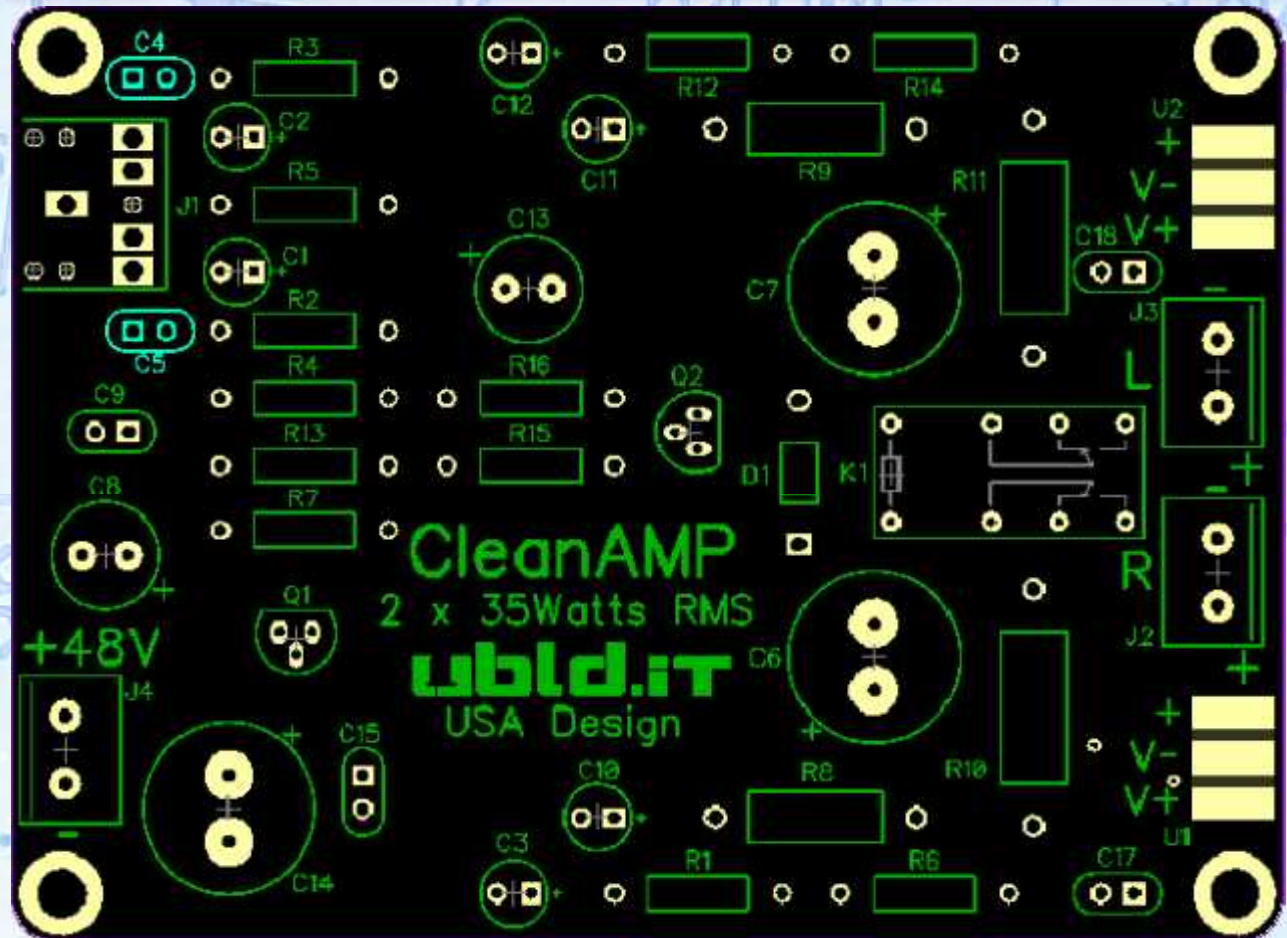
*Warning: Diodes are polarized. Match the stripe on the components with the stripe on the silkscreen.*

## STEP 8: Insert the 100pF Disk Capacitors

Locate two 100pF 50V  
Disk Capacitors  
(line #4).



Solder the 100pF 50V Disk Capacitors into C4 and C5.



*You don't have to be an expert in math to learn electronics but you do need to understand Ohms law and Watts law. ( $E = I \cdot R$  and  $P = I \cdot E$ ). Take the time to learn the difference between Voltage, Current, Power, and Resistance.*

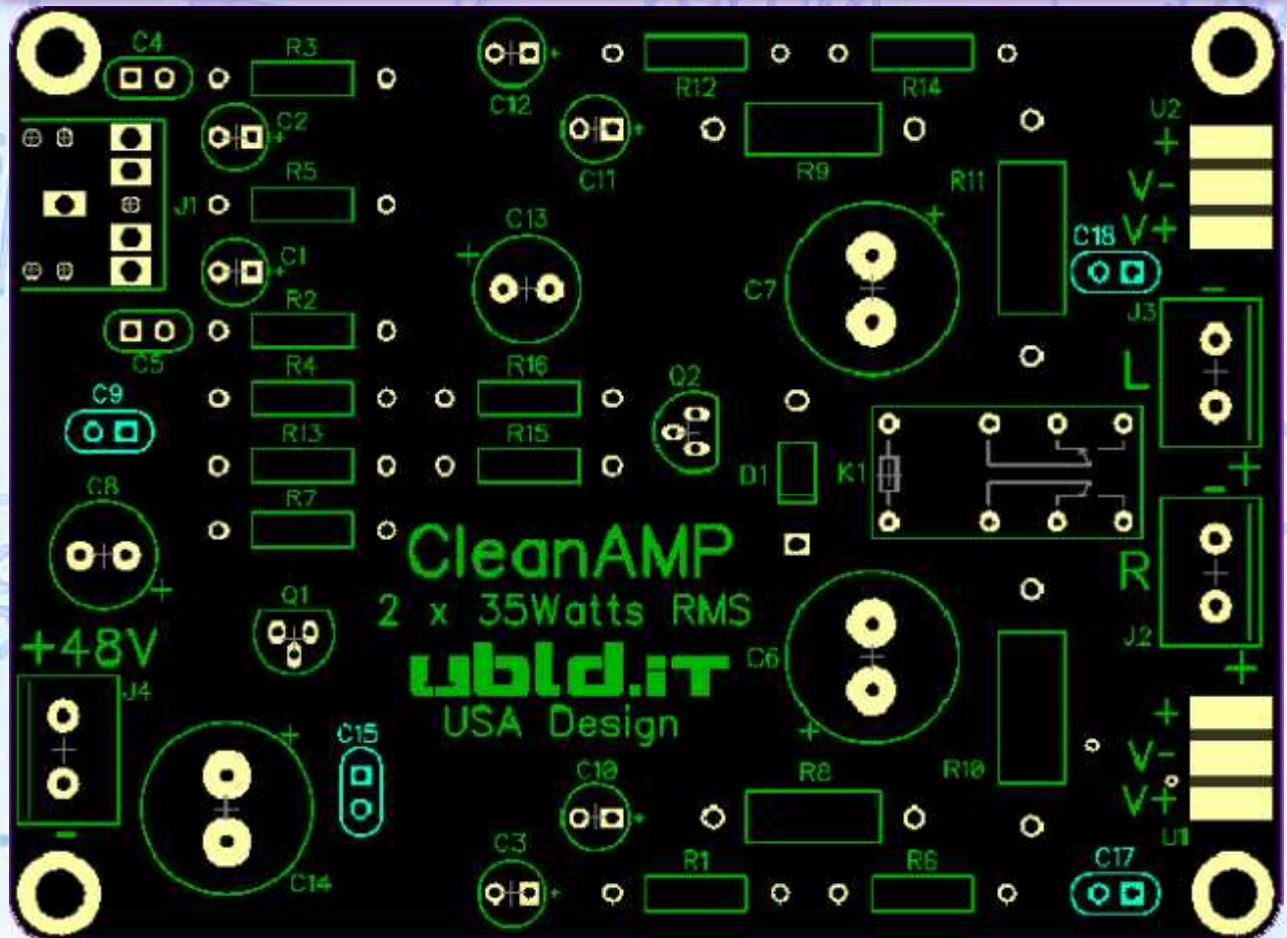


## STEP 9: Insert the .1uF Disk Capacitors

Locate four .1uF 50V  
Disk Capacitors  
(line #7).



Solder the .1uF 50V Disk Capacitors into C9, C15, C17 and C18.



*Capacitors store an electrical charge much like your body builds and stores static. It's also good to know that since a capacitor takes time to charge and discharge it's said that it opposes changes in voltage.*

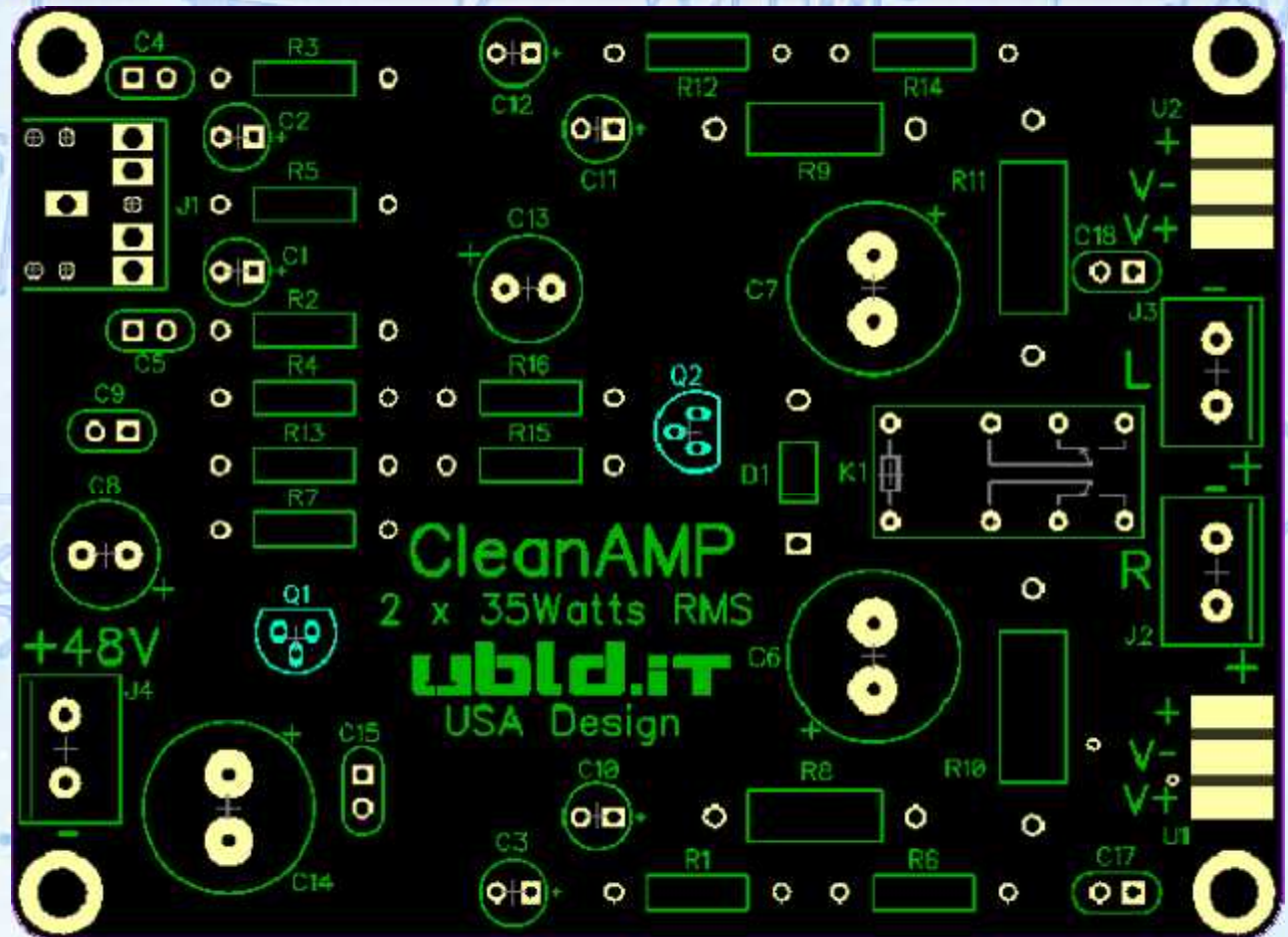


## STEP 11: Insert the BC546B NPN Transistors

Locate two BC546B NPN Transistors (line #12).



Solder the BC546B NPN Transistors into Q1 and Q2



*Transistors are used for signal amplification and switching. In the case of the CleanAMP it's used as a switch to enable the K1 relay.*

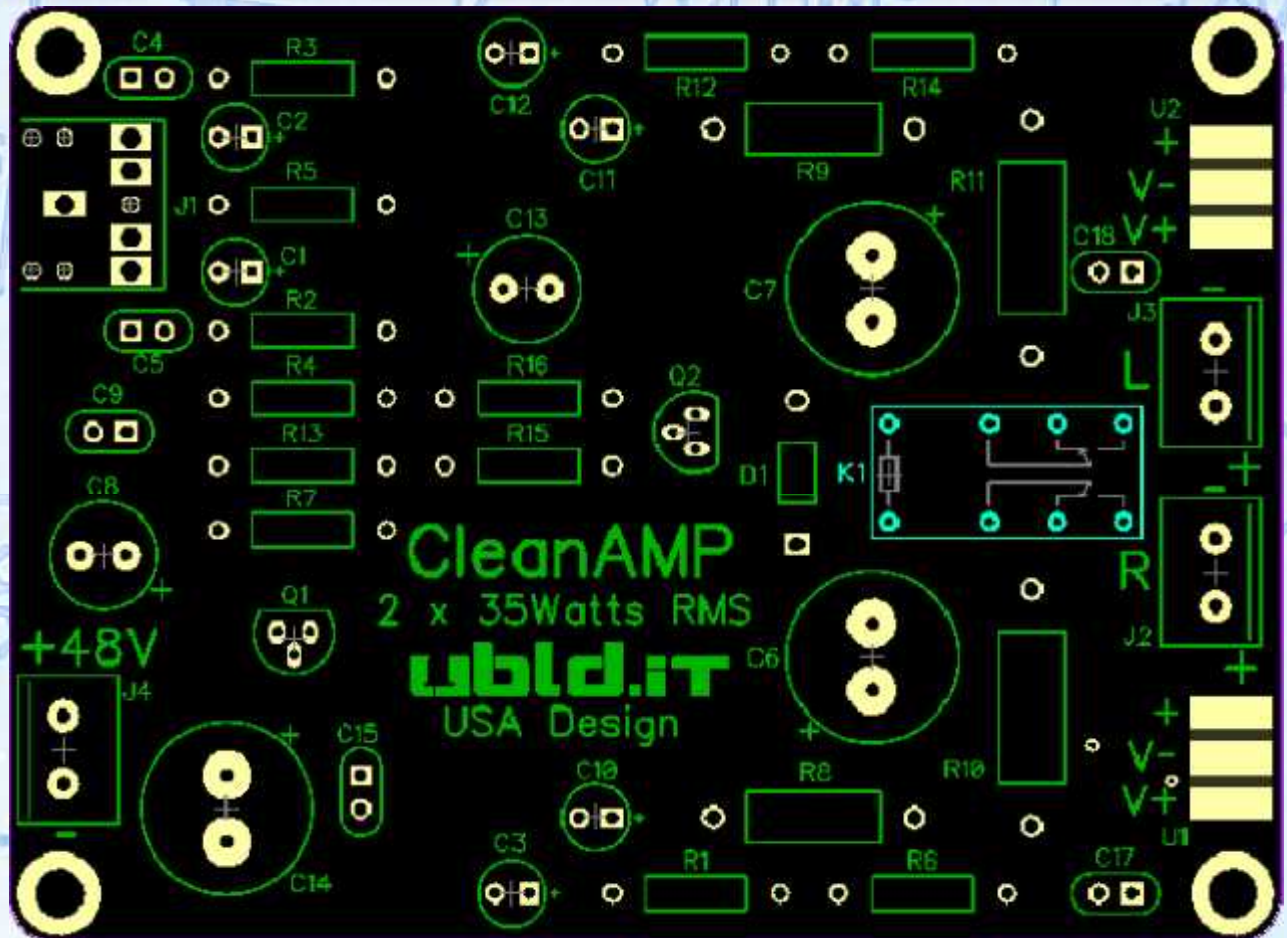
## STEP 12: Insert the Relay

Locate one Relay  
(line #11).



**X1**

Solder the Relay into K1



*The relay is used as an Anti-Thump relay.*

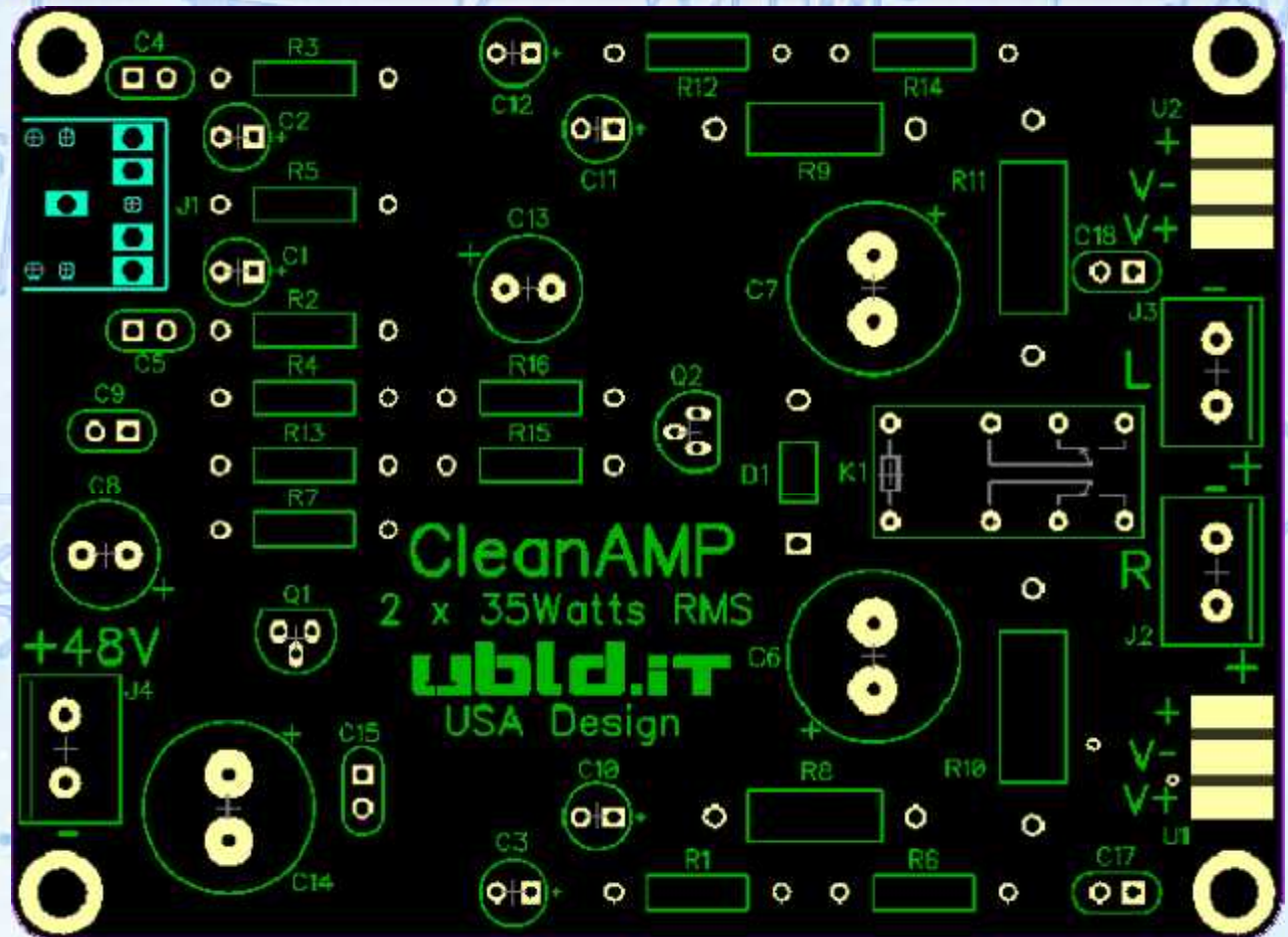


**STEP 14:** Insert the 1/8" (3.5mm) Stereo Jack

Locate one 1/8" (3.5mm) Stereo Jack (line #9).



Solder the 1/8" (3.5mm) Stereo Jack into J1



*J1 is where you will plug in your audio source such as your cell phone, iPod or MP3 Player.*

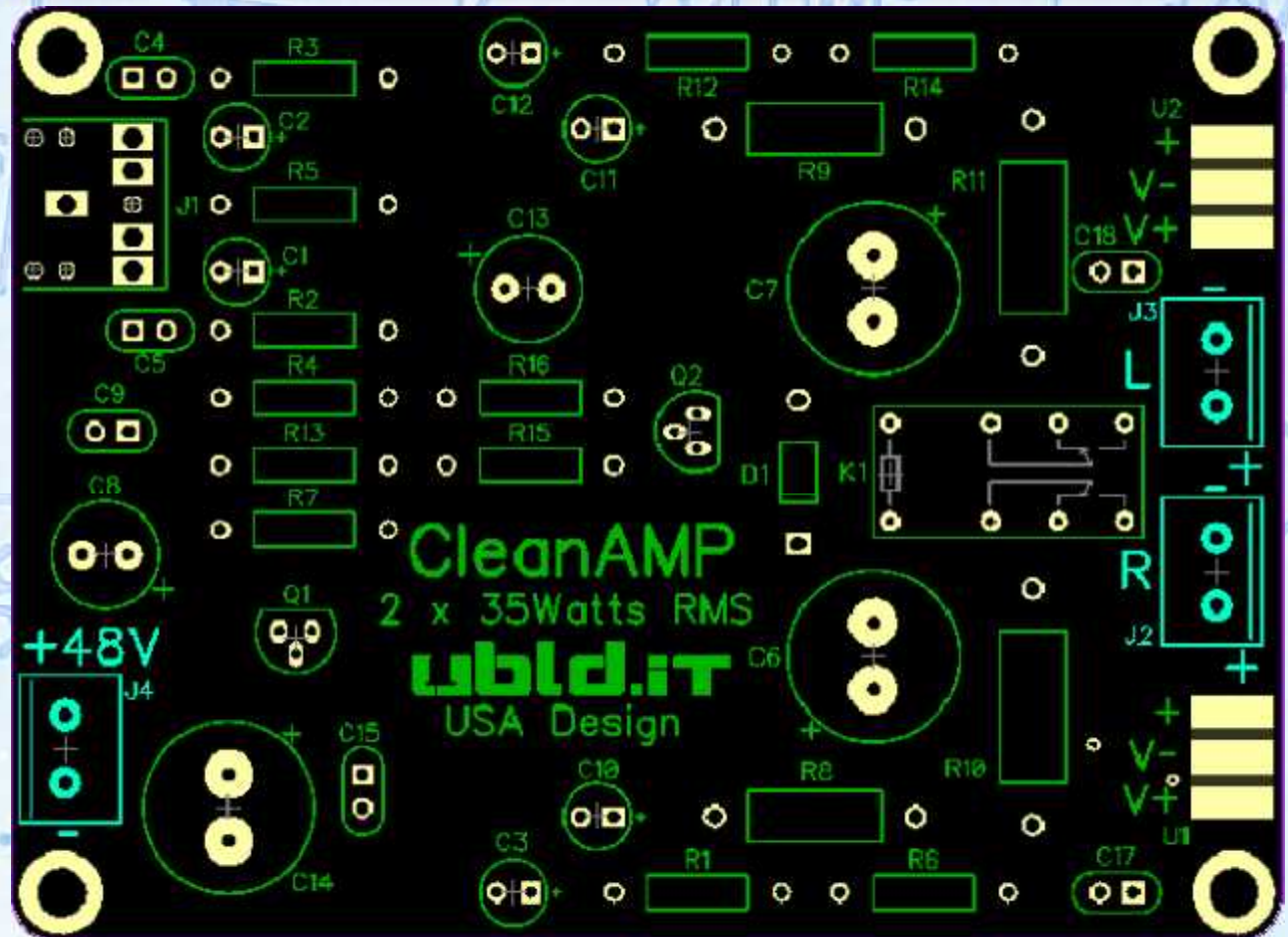


**STEP 15:** Insert the 2 Pole 5mm Terminal Blocks

Locate three 2 Pole 5mm Terminal Blocks (line #10).



Solder the 2 Pole 5mm Terminal Blocks into J2, J3, and J4



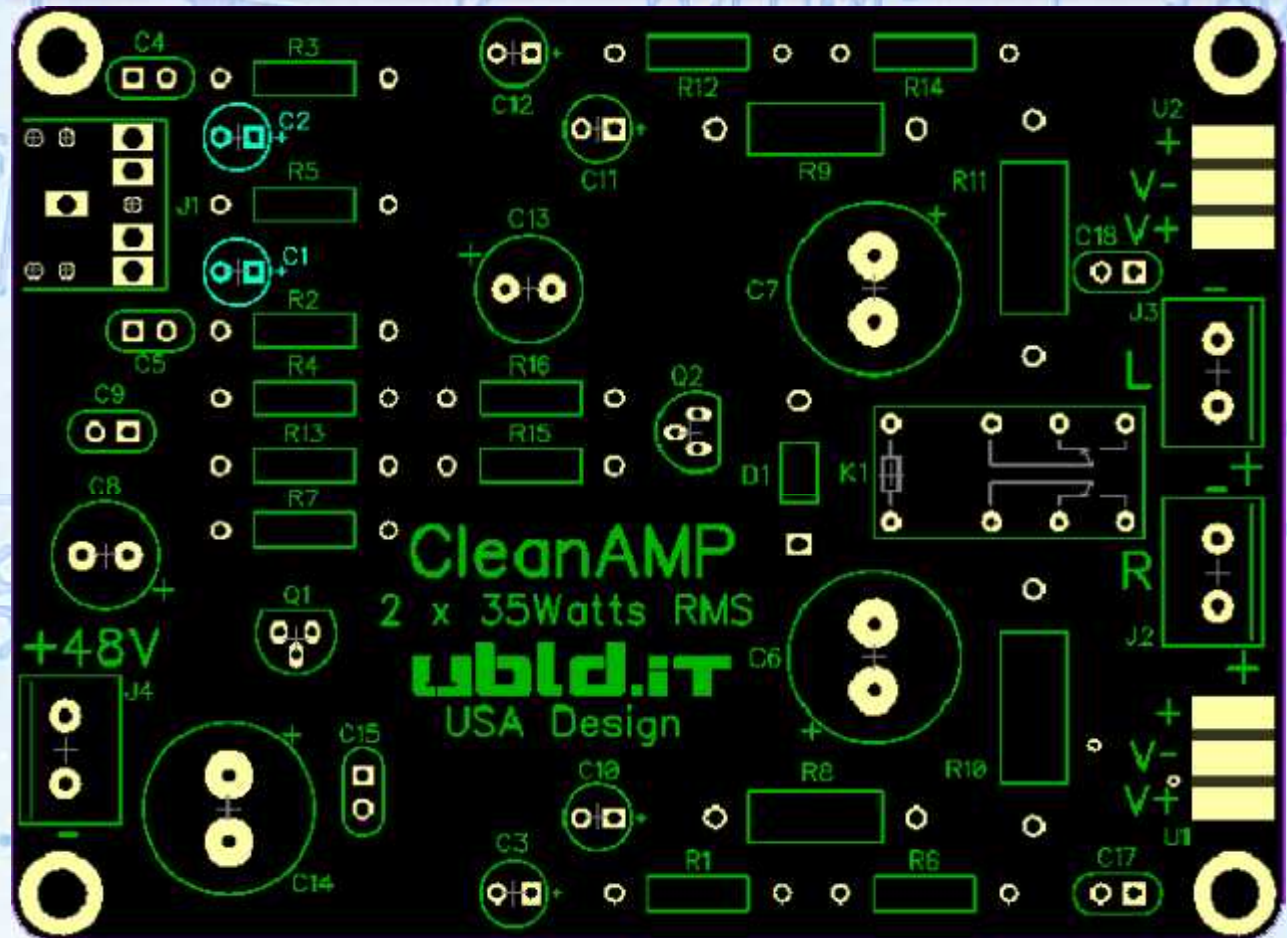
*Take the time to align the terminal blocks parallel with the edge of the circuit board. It's possible for them to be aligned a little slanted.*

## STEP 16: Insert the 4.7uF Capacitor

The first components to locate are two 4.7uF 50V Electrolytic Capacitors (line #1).



Solder 4.7uF 50V Electrolytic Capacitor into C1 and C2.



*Electrolytic Capacitors have a specific orientation. They are said to be polarized. The stripe indicates the negative side. The + symbol on the silkscreen should be aligned with the positive side of the capacitor.*

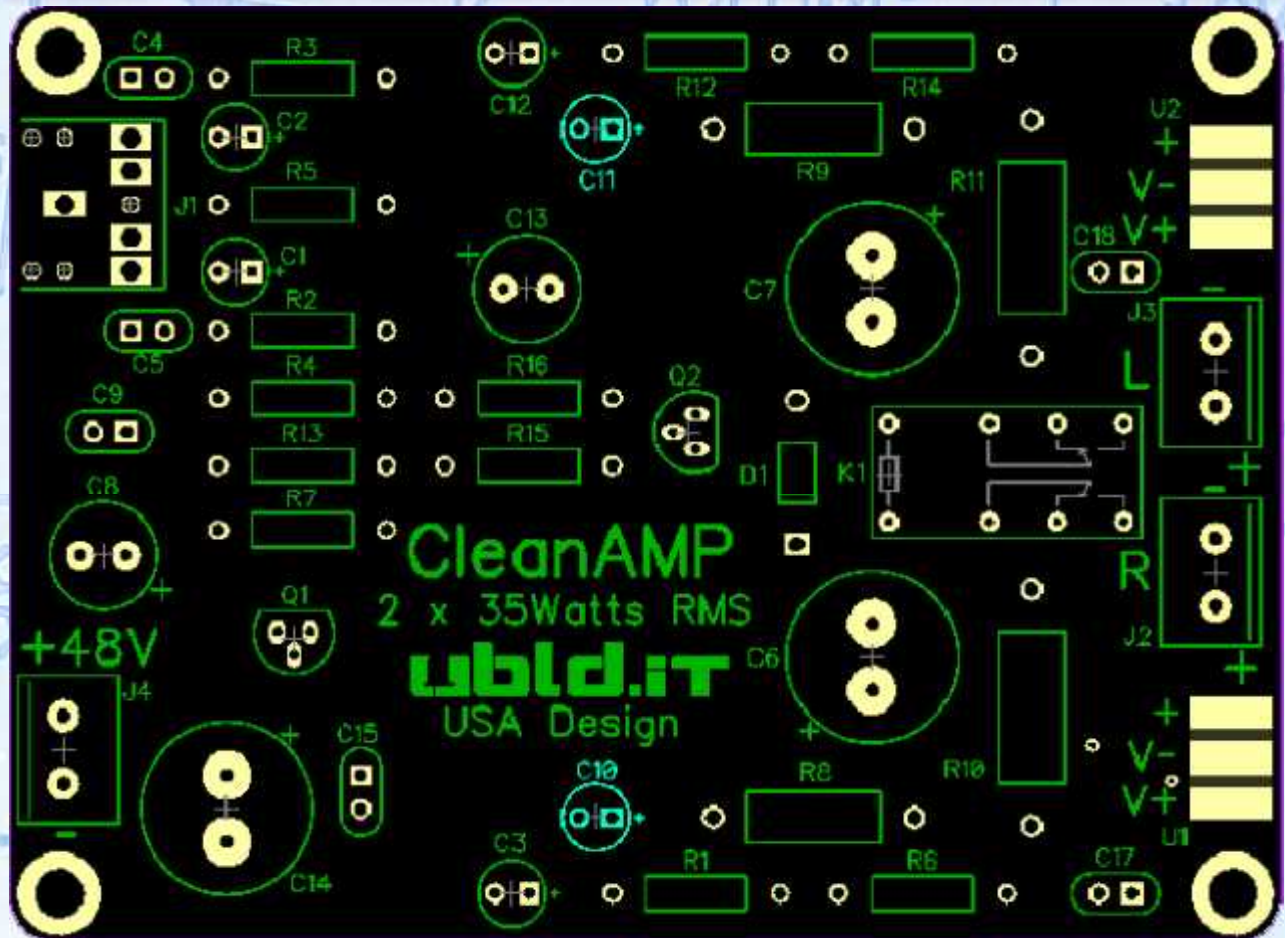


## STEP 17: Insert the 1uF Capacitors

Locate two 1uF 50V Electrolytic Capacitors (line #2).



Solder the 1uF 50V Electrolytic Capacitors into C10 and C11.



*Capacitors look like an open circuit to Direct Current(DC).*

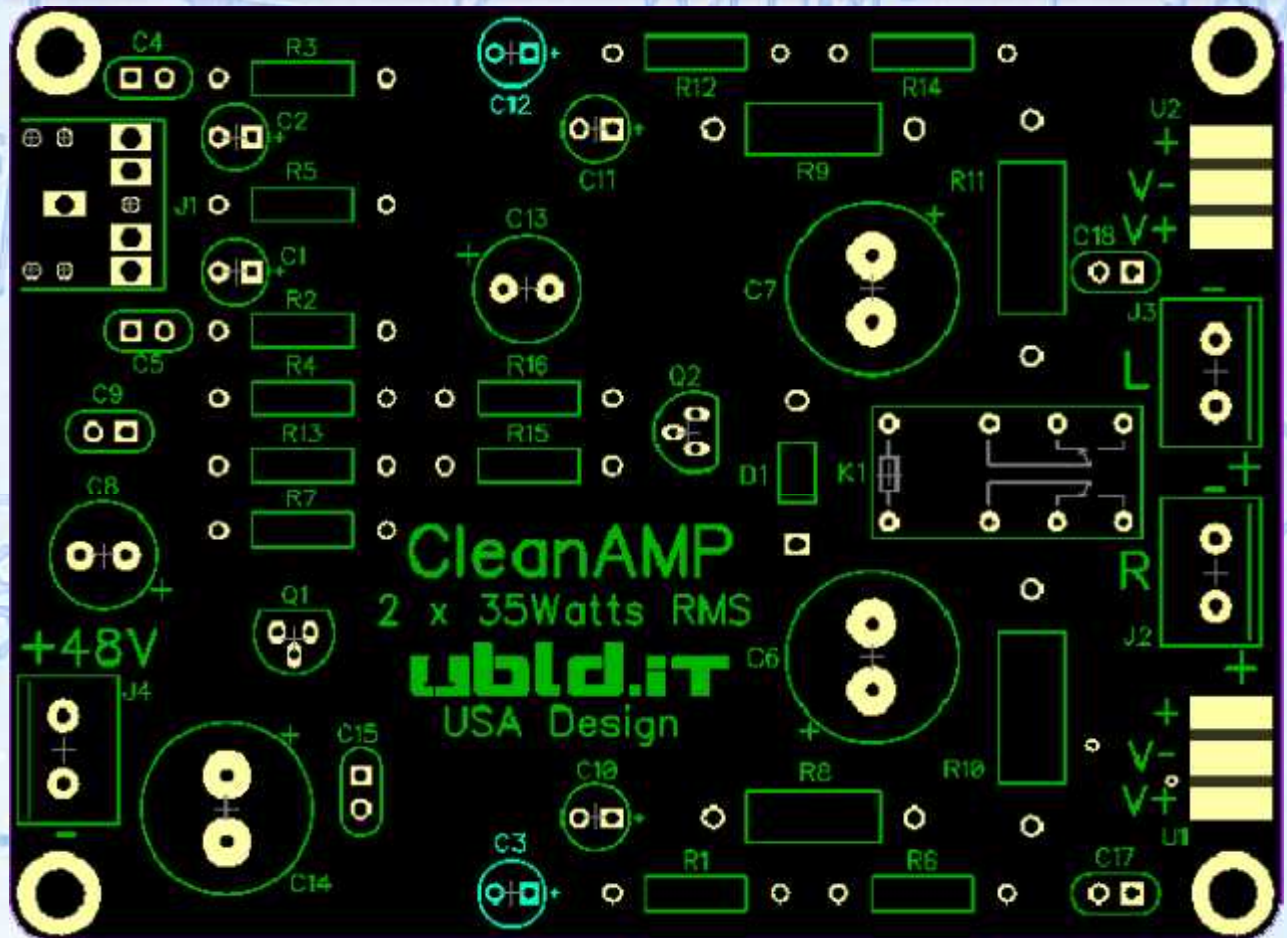


## STEP 18: Insert the 22uF Capacitors

Locate two 22uF 50V Electrolytic Capacitors (line #3).



Solder the 22uF 50V Electrolytic Capacitors into C3 and C12.



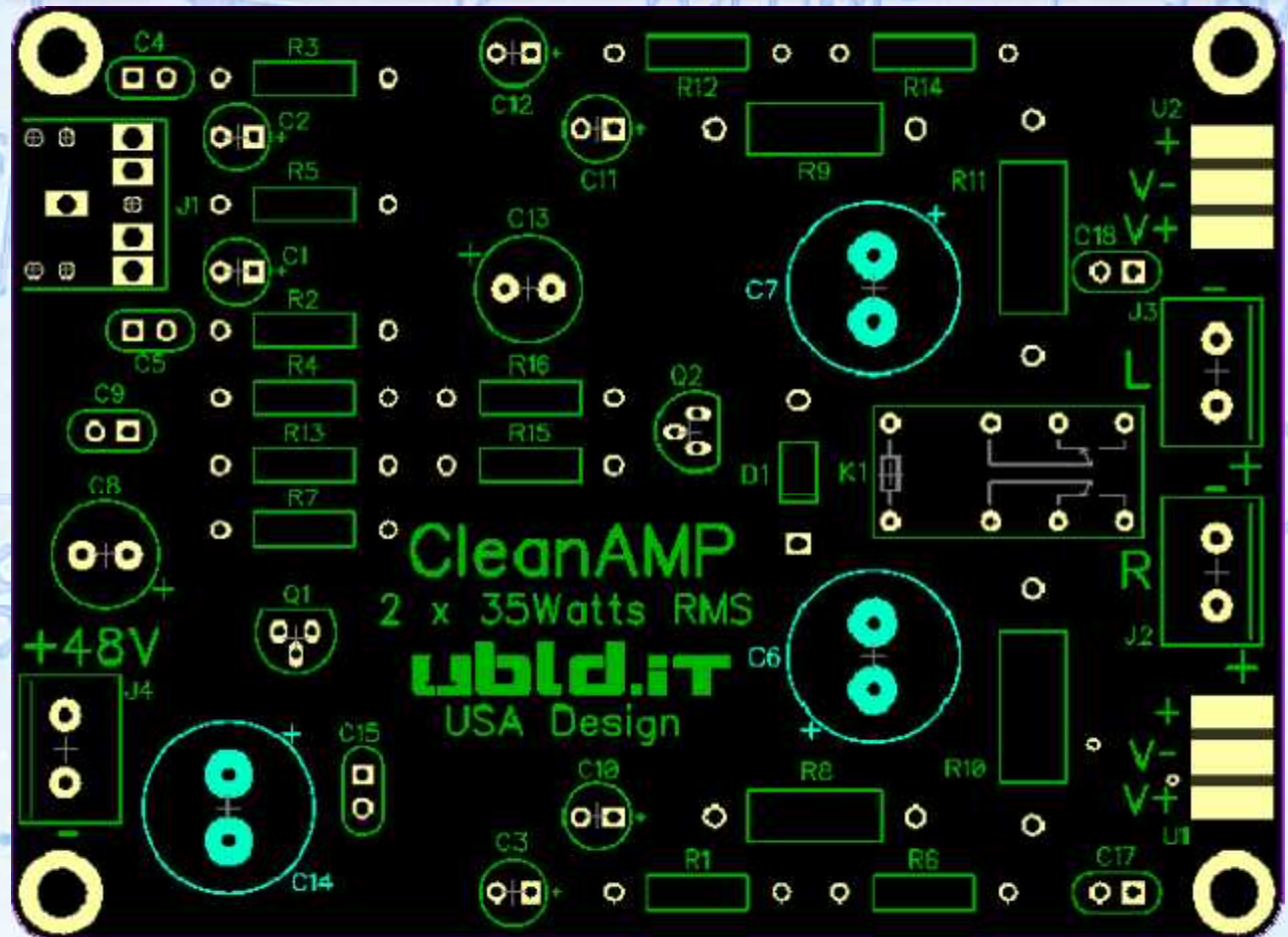
*Warning: Inserting any of the polarized capacitors backwards will cause them to explode violently. Double check the polarity for all electrolytic capacitors.*

## STEP 19: Insert the 1000uF Capacitors

Locate three 1000uF 50V Electrolytic Capacitors (line #5).



Solder the 1000uF 50V Electrolytic Capacitors into C6, C7 and C14.



*Warning: Inserting any of the polarized capacitors backwards will cause them to explode violently. Double check the polarity for all electrolytic capacitors.*

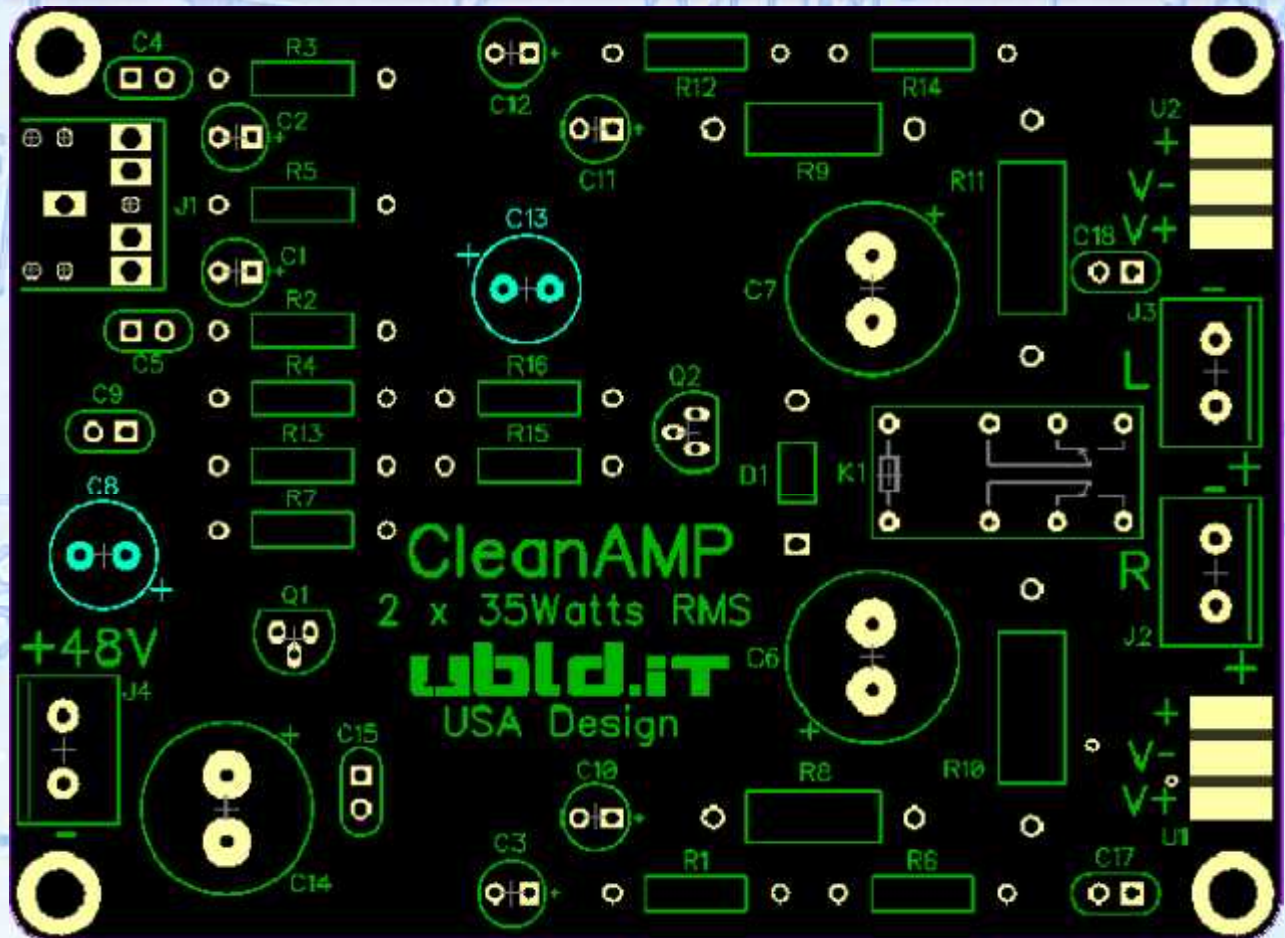


## STEP 20: Insert the 100uF Capacitors

Locate two 100uF 50V Electrolytic Capacitors (line #6).



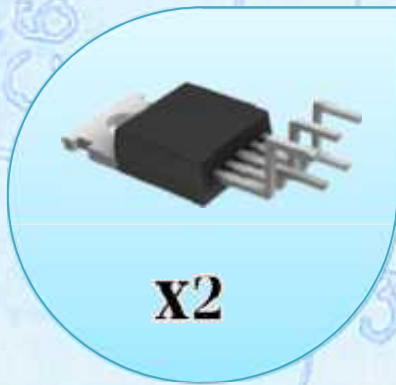
Solder the 100uF 50V Electrolytic Capacitors into C8 and C13.



*Warning: Inserting any of the polarized capacitors backwards will cause them to explode violently. Double check the polarity for all electrolytic capacitors.*

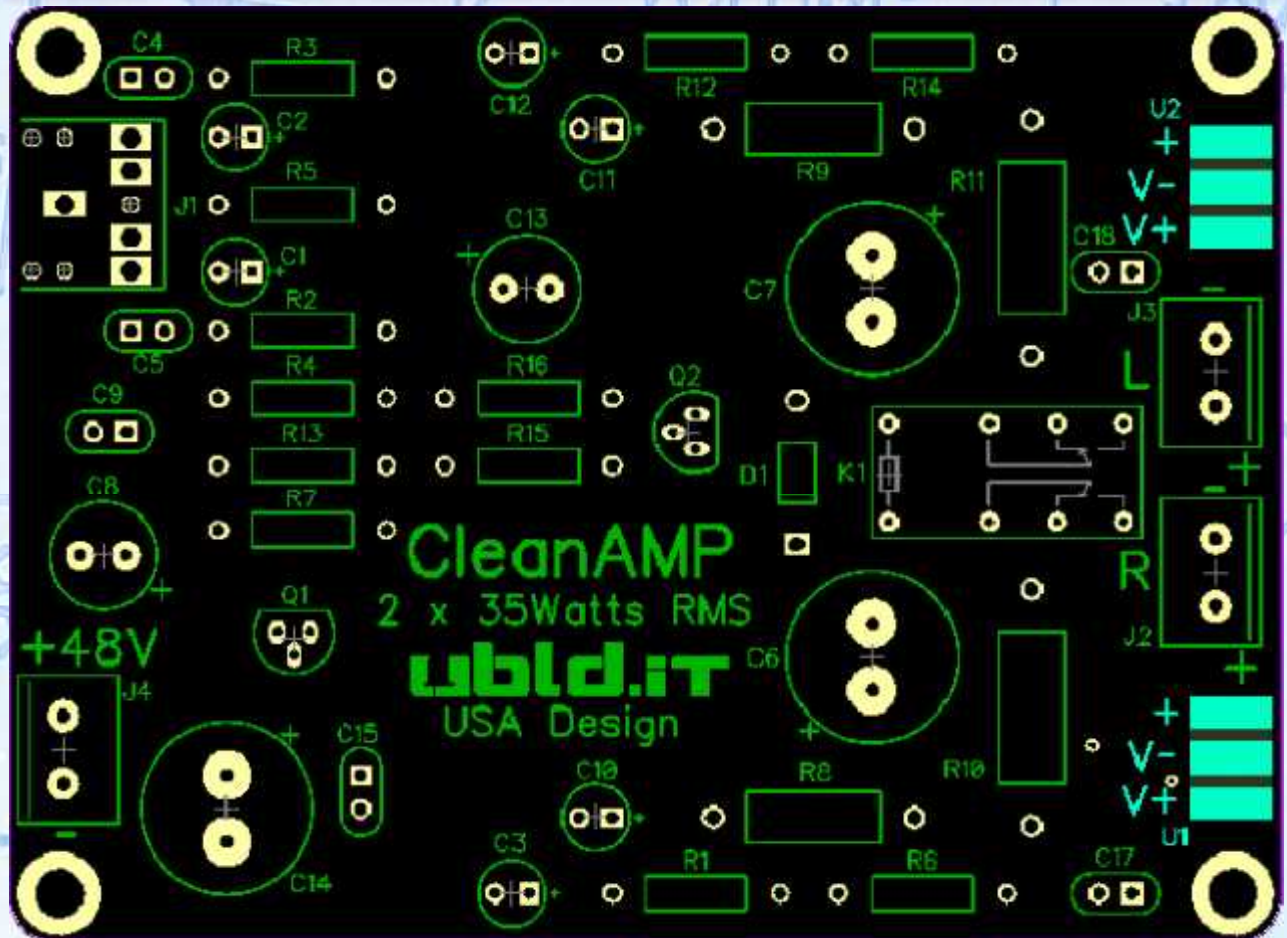
## STEP 21: Insert the TDA2050HV Hi-Fi Power Amplifier

Locate two TDA2050HV  
Hi-Fi Power Amplifiers  
(line #18).



Note: This component  
straddles both sides of  
the PCB. Solder both  
Sides Down.

Solder the TDA2050HV Hi-Fi Power Amplifiers into U1 and U2.



*The TDA2050HV MUST be mounted to a heatsink. Failure to do so will damage the part and cause a potential safety hazard. Approximately 50 Square Inches of surface area is required for the heatsink.*



Visit the Community Support Forums:  
<http://ubld.it/cleanamp>



**Required Powered:**  
**48V DC @ 2.1 Amps**



**Don't forget  
to mount the  
TDA2050  
Amplifiers to  
a Heatsink.**

**(See Step 21 Notes)**

Line 19: Some power supplies will turn themselves off due to in-rush. Placing the In-Rush limiter in line with the power supply will allow the supply to slowly turn on.

*Your final assembly should look like this. Double check all polarized components.*