CONTACT INFORMATION

JAKE@AHCAUDIO.COM
AHCAUDIO.COM
INSTAGRAM.COM/AHCAUDIO

ΛHC ΛUDIO

INSTRUCTION MANUAL FOR CYBERNETICALLY ENHANCED ATARI PUNK CONSOLE

This is the assembly manual for the Cybernetically Enhanced Atari Punk kit.

This is not a kit for an absolute beginner. This kit assumes that you know how to solder and strip wires.

Some notes before you start - if you're experienced, you can skip right to building. If you're really experienced, you can simply skip to the schematic, which is the last page of the guide.

Take your time - this isn't a race.

When you get frustrated - stop, and take a break.

Keep it clean - your workspace, and your components. Nothing is worse than having to search around for a component.

Some of the components can be put in backwards - when the manual says a component is polarized or needs to be oriented in a certain way- physically, it will fit two (or more) ways, but electrically, it will only work in one direction - usually with dramatic effect if you put it in the wrong way. This is 70% of the problems I see with people putting together kits.

In the immortal words of Steve Melkethesian - "Solder Ain't Glue". Your solder joints should be shiny, and shaped like a Hershey's kiss. Not like blobs. Blobs that create connections where there are supposed to be none and are about 30% of the problems I see with people putting together kits.

TABLE OF CONTENTS

TOOLS AND EQUIPMENT YOU MUST HAVE:
Soldering iron
Solder
Side Cutter
Needlenose pliers

OTHER TOOLS AND WHY

MULTIMETER
First choice of a tool to work on eletronics is a multimeter. Really, as a beginner, just about any multimeter will do. Don't sweat it - a ten buck one from Harbor Freight will do most of what you need.   You can use it to identify components, you can test continuity, etc. etc.

TRANSITOR TESTER
Second choice is the $40 transistor tester available on Amazon. This will test components more easily than the multimeter, and has other useful features.

SOME DEFINITIONS

The silkscreen is the writing on the board - usually in white.

k stands for kilo - 1000x the value. When you write 2k2 - you mean 2.2k or 2200
u is micro - 10e-6 the value (I'm too lazy to typset a greek letter)
n is nano - 10e-9 the value

Resistance is measured in Ohms - these are assumed for all of the values for resistors.

Capacitance is measured in Farads - these are assumed for all the values for capacitors.


The tolerance band indicates how precise the component is - so a resistor with a tolerance of 10% means that a 100 ohm resistor can be anywhere from 90 to 110 ohms. When I indicate tolerance in parenthesis - this means that the resistor color band might be one of several colors.

Step one: Find the board and familiarize yourself with it. It has a front and a back. All of the components for this kit go on the front. Each component has a letter and a number that tells you where to place the component on the board. R is resistors, C is capacitors, D is diode, Q is transistors, and U is ICs.
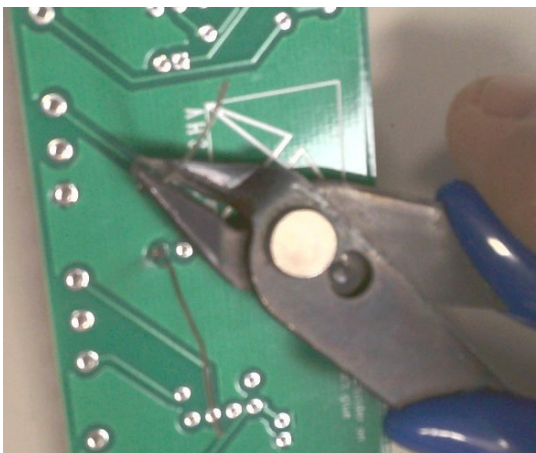
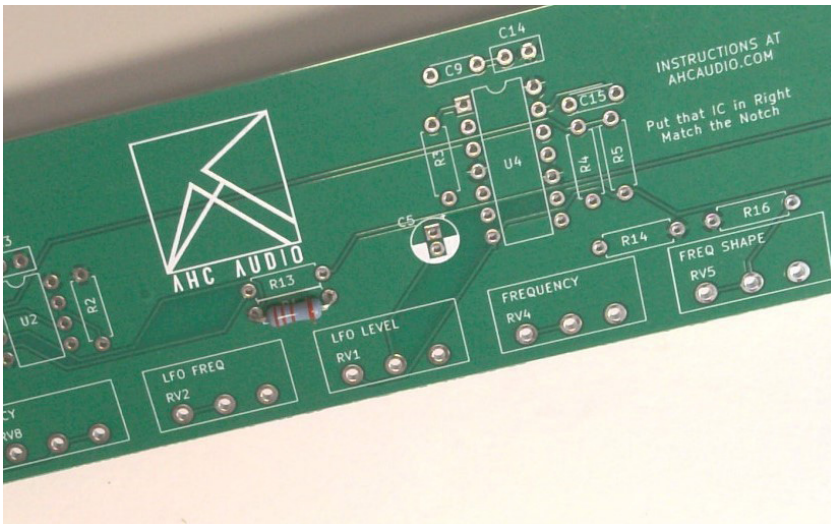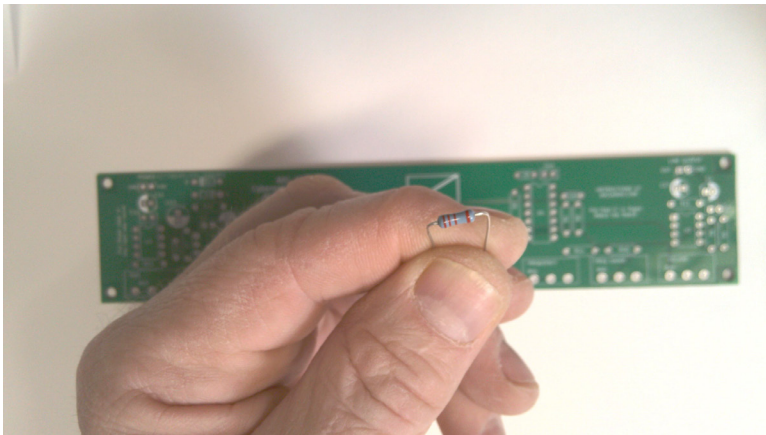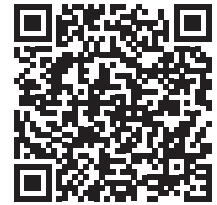This is the front.
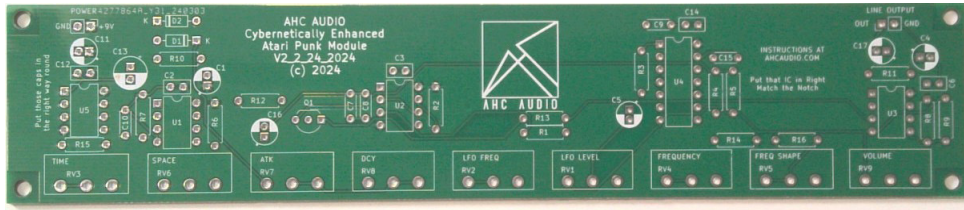
This is the back.
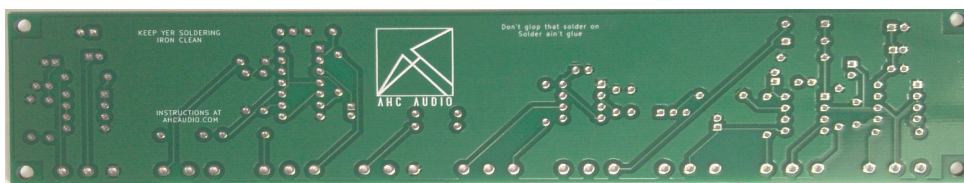
Step two: Find your component cards. There's two of them. They're 8.5x11 sheets of paper with components taped to them. We will start by putting in the resistors.

Step three: Find R1 - there's one of them, and it is a 2k2 resistor - which means its a 2200 ohm resistor. Resistors are color coded to tell you their resistance. If you scan the QR code to the right, it will take you to a website which helps you calculate the resistance from the code. I use a variety of resistors, so they might have 4,5 or 6 bands - in general though, a 2k2 resistor will have Red, Red,Black,Brown,(Brown, Red, or Gold), or Red,Red,Red, (Brown, Red, or Gold) bands. The last band is a tolerance band, so it doesn't affect the base value. I buy whatever resistors are the cheapest, to keep the kit price low, so they may have different markings. However, all of the markings will follow the rules for resistor markings.


R1
QTY:1
2k2
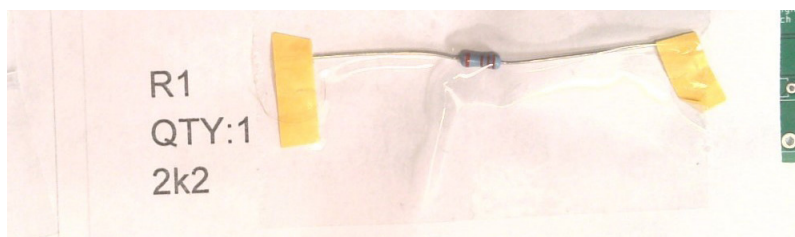
Step four: Bend R1 and place it on the board, in the spot marked R1. Solder it in place, and clip the ends. For all other components, follow these steps - Bend, place, solder, and trim the ends. All of the components will go in through the front side, and all of the components will be soldered on the back of the board. For a soldering tutorial, you can click on the QR code to the right.

Step five: Bend, place, solder, and trim the ends for R2,R10,R12. These are 100k resistors with color bands Brown, Black, Yellow, (tolerance).

Step six: Bend, place, solder, and trim the ends for R3,R13. These are 1k resistors with color bands Brown, Black, Red, (tolerance).
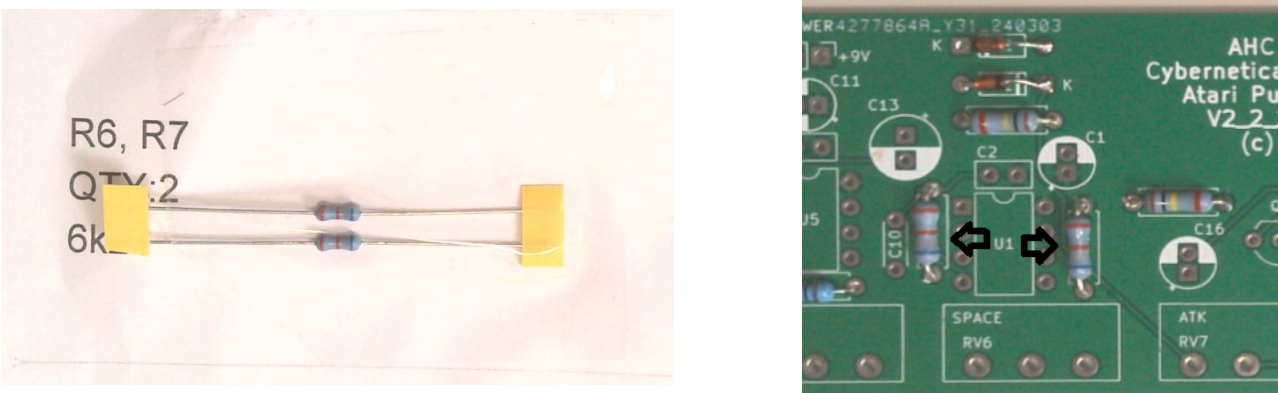
Step seven: Bend, place, solder, and trim the ends for R4,R11. These are
10k resistors with color bands Brown, Black, Black,Red, (tolerance).
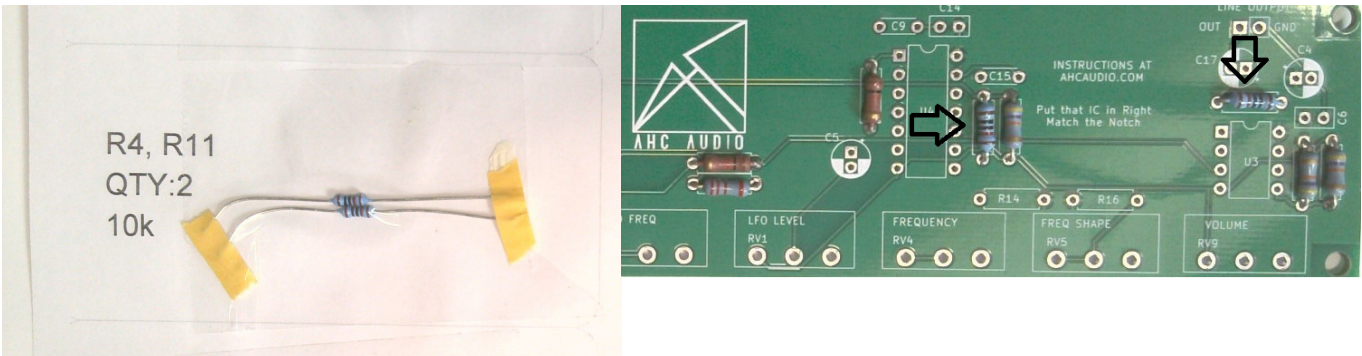
Step eight: Bend, place, solder, and trim the ends for R5,R8,R9. These
are 47k resistors with color bands Yellow,Purple,Orange (tolerance).
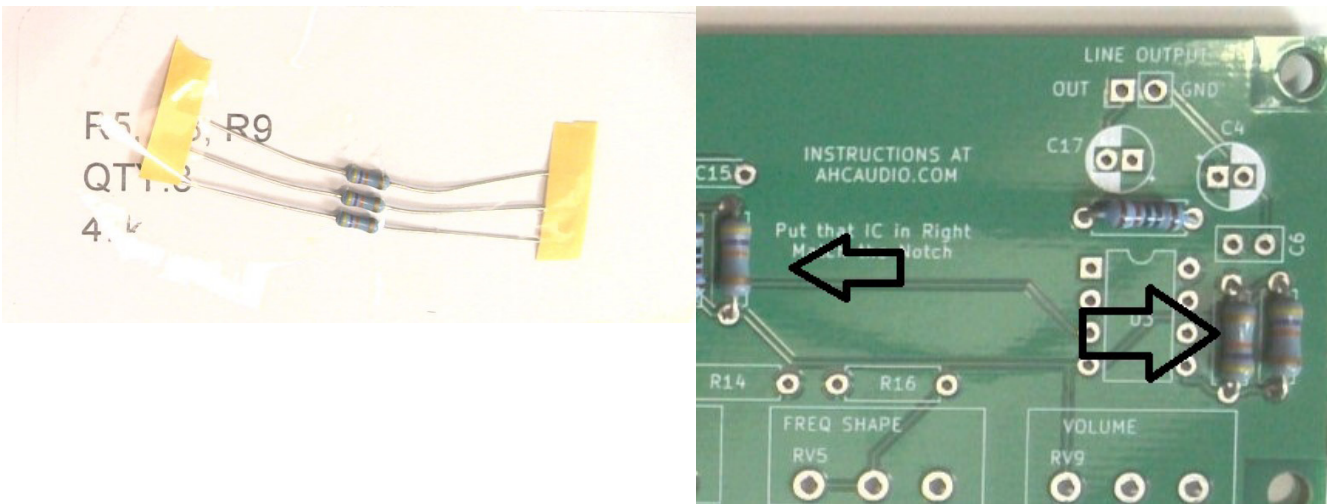
Step nine: Bend, place, solder, and trim the ends for R6,R7. These are
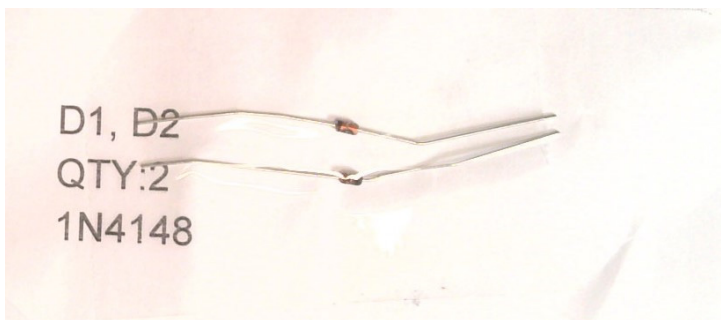6k2 resistors with color bands Blue,Grey, Red,(tolerance).

Step ten: Bend, place, solder, and trim the ends for R14,R15,R16 These are 220 ohm resistors with color bands Red, Red,Black,Brown, (tolerance).
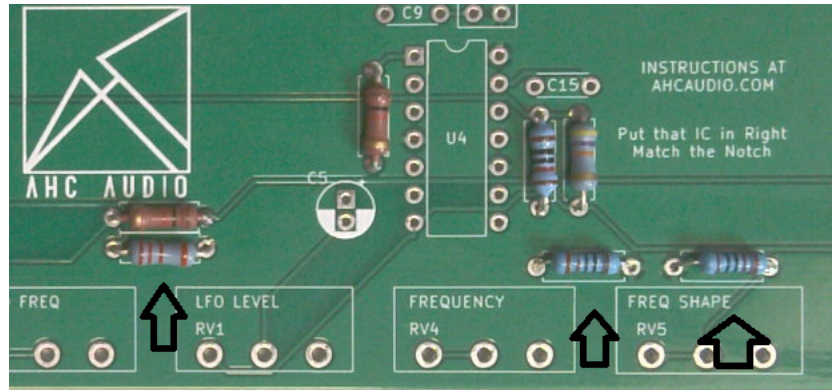

Step eleven: STOP
THIS COMPONENT CAN PHYSICALLY BE PLACED IN TWO WAYS,BUT ONLY WORKS ONE WAY ELECTRICALLY
FOLLOW THESE INSTRUCTIONS TO THE LETTER.

Above are diodes one and two. They have a band on one end of the component lead. Below, you can see a close-up of the black band, and how the bands are placed on the circuit board. Note carefully, the black band on the diode matches the white band on the circuit board. This is very important.
Bend, Place, Solder, and cut D1 and D2.
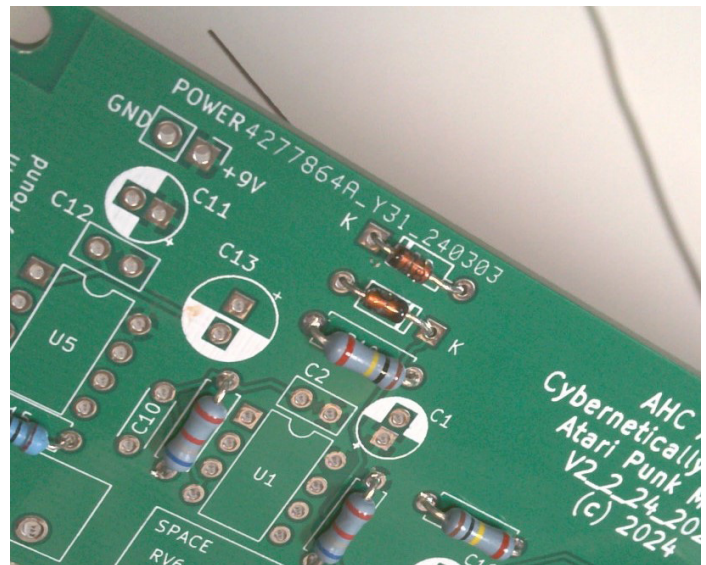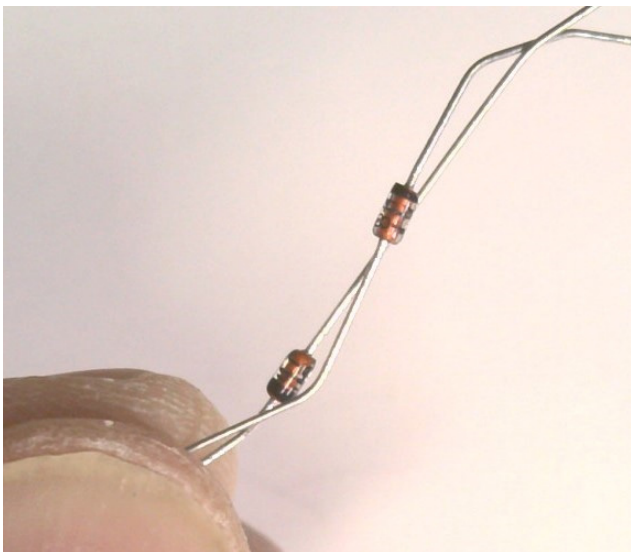
Step twelve: We're going to place a new kind of component - capacitors. We will place C2,C3,C6,C12, solder, and clip. These are .1uF capacitors - they are marked with a very tiny 104. This is one of those times that a component tester is good to have - you need a magnifying glass to read the print.

C2, C3, C6, C12
QTY:4
.1uF
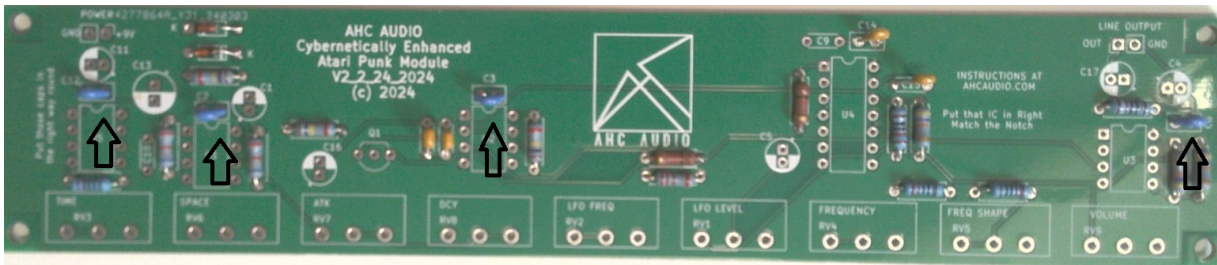
Step thirteen: Place C7,C8,C14,C15, solder, and clip. These are 100n capacitors (which are actually the same as the .1uF, but they're used for different functions, so I named them differently to separate them). Also marked 104.


C7, C8, C14, C15
QTY:4
100n
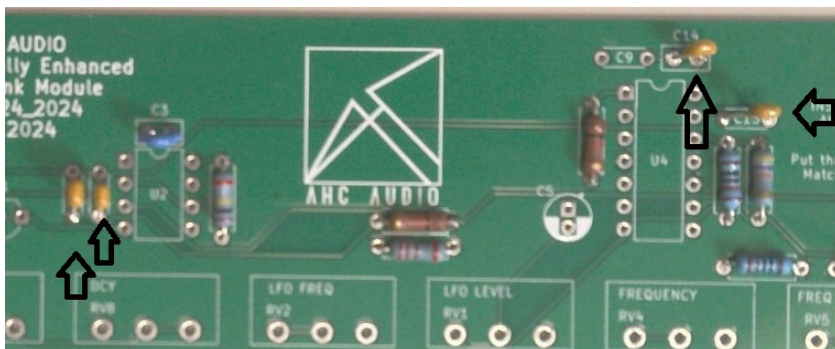
Step fourteen: Place C9,C10 solder and clip. These are 10n capacitors, and marked 103 - but again, teeny tiny lettering.
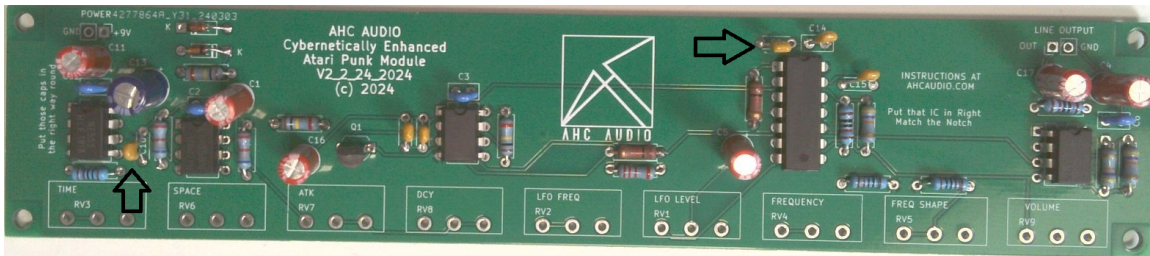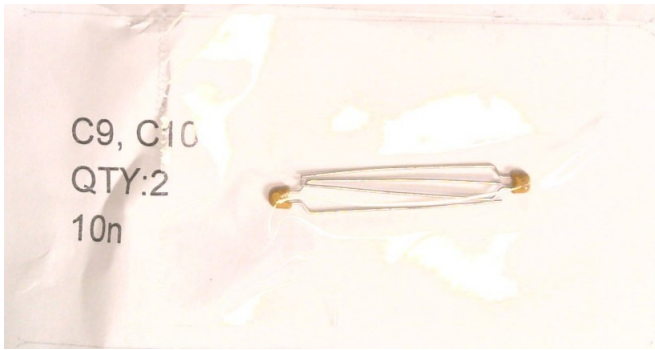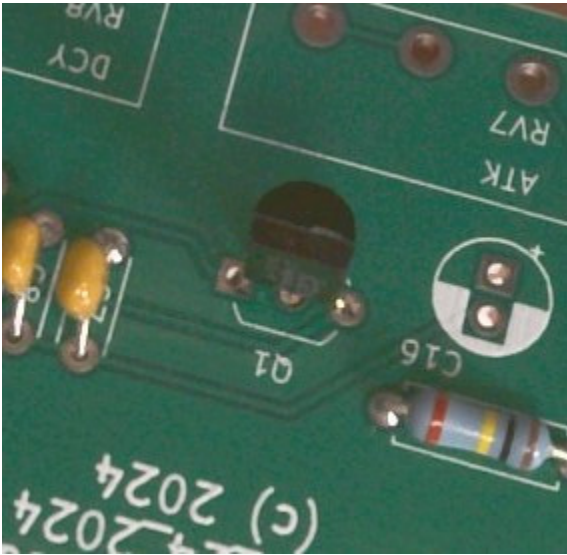

Step fifteen: STOP
This is a component which you can place improperly. Pay close attention.

Find and place Q1 - it's a transistor. Note, it has a flat side and a curved side. You need to match the curve of the component to the silkscreen on the board
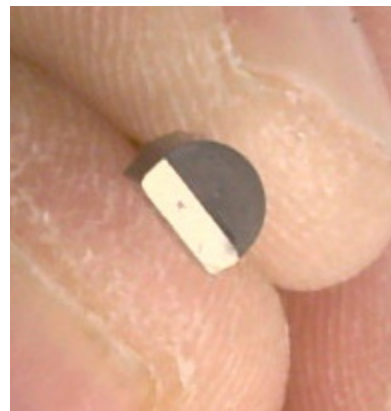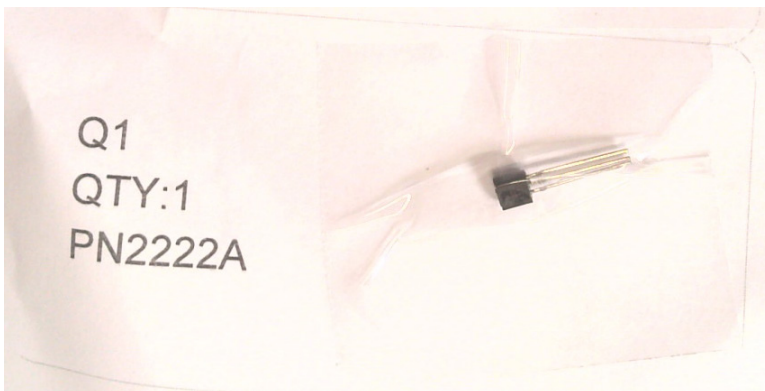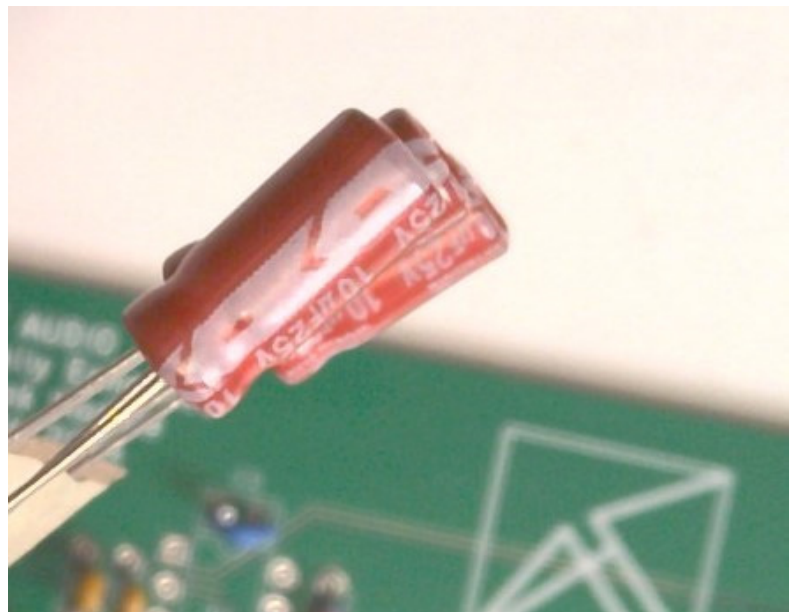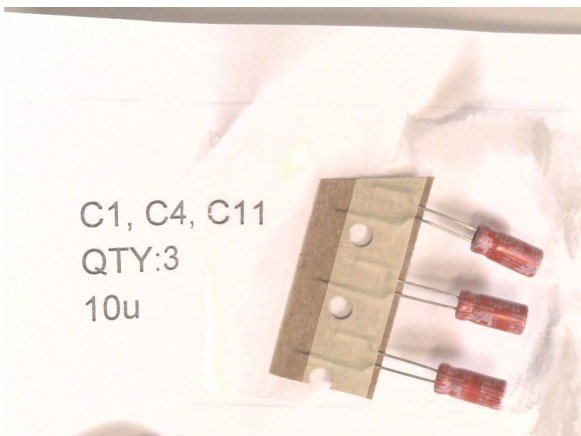
This is how the transistor should be placed. Place, solder, and clip.

Step sixteen:STOP
We're going to place electrolytic capacitors. These are polarized, and if we put them in backward, it's a surprising and unpleasant event. They have negative and positive side. The negative side is marked with minus signs on white stripes.

C1, C4, C11
QTY:3
10u

See how the white stripe is matched to the white half of the silkscreen - all of the electrolytic capacitors need to be matched in this way. Place C1,C4,C11 - 10u - the right way round - and solder, and trim.
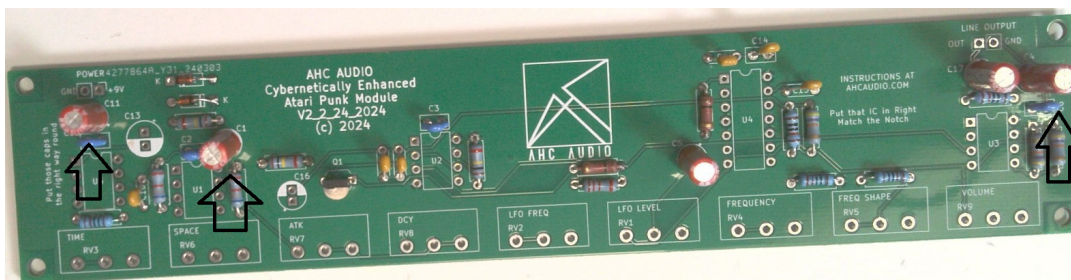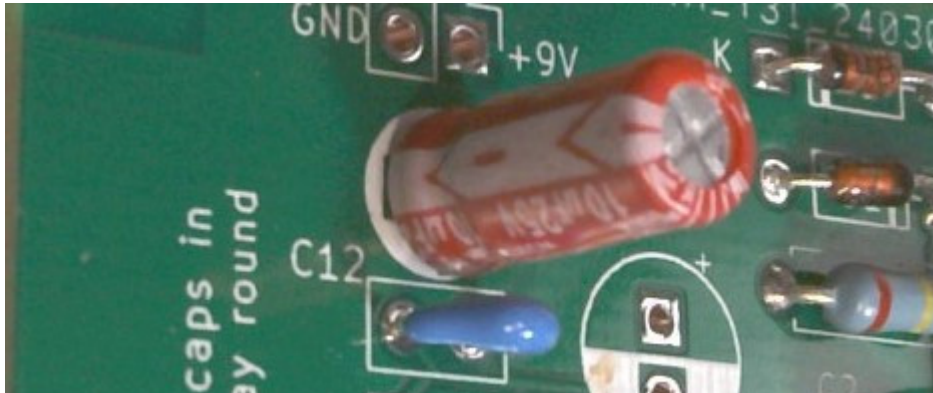
Step seventeen: Warning - this is another polarized component. Place capacitors C5,C17 - 100u - the right way round - solder and clip. Negative stripe goes to white half of silkscreen.
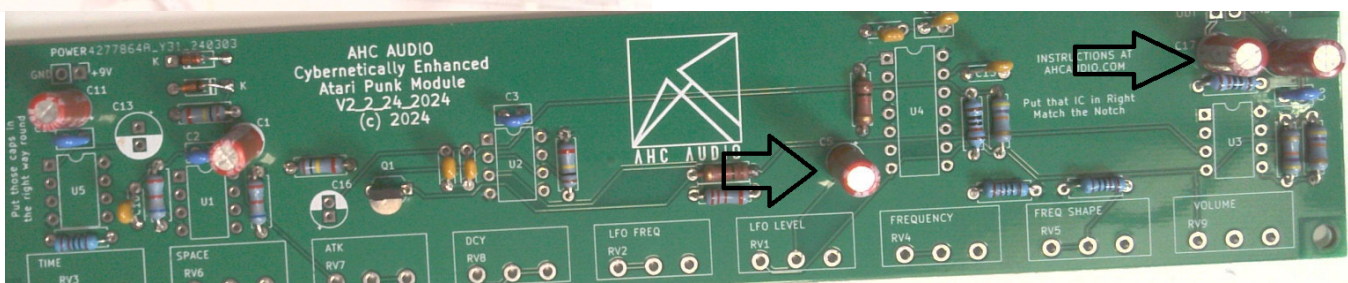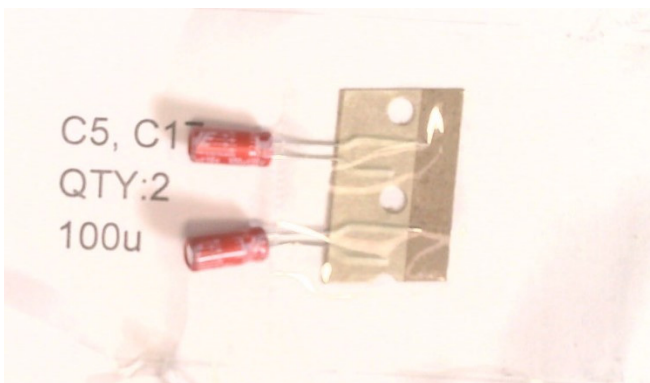
Step eighteen: Warning - this is another polarized component. Place C13, which is a 220u capacitor - make sure its the right way around. Negative stripe goes to the white silkscreen half.
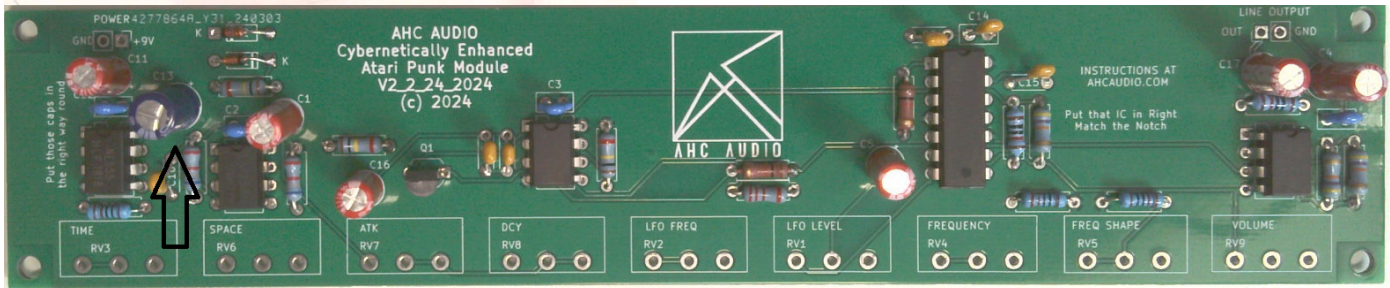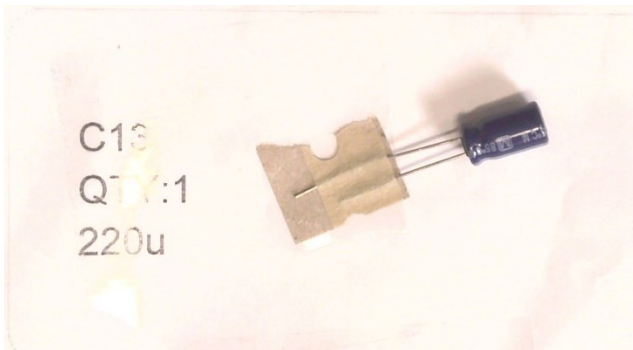
Step nineteen: Warning - this is another polarized component. Place C16, which is a 2.2u capacitor - make sure its the right way around. Negative stripe goes to the white silkscreen half.
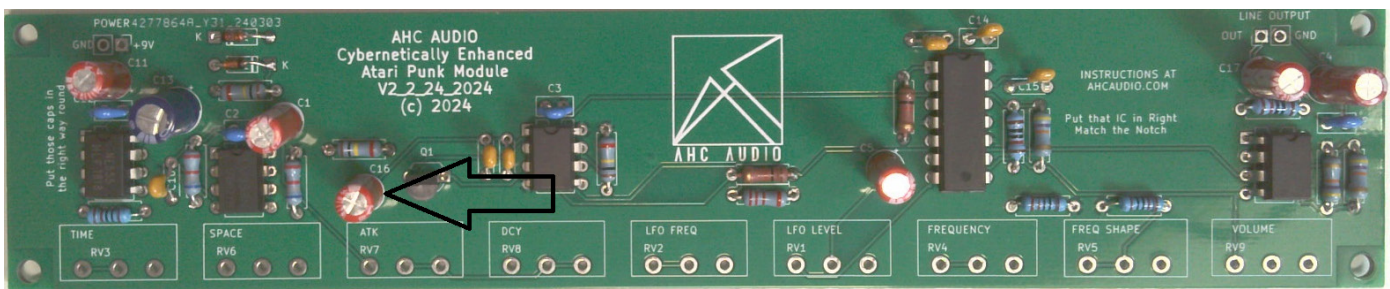
Step nineteen: STOP

We're going to put in the ICs - they look like little bugs.
The have a notch on one end. In the photo below, the notch is facing down. This is really important. The silkscreen
will show a notch, you need to match the notch up.
There's really no fixing it if you put one in backwards.

Find the 14 legged bug - it will be labeld 556 - it might be NE556 or LM556. Place on the board at U4 making
sure that you match the notch. See the below picture. You might use a little bit of tape to hold it in place
while you solder. You might have to squeeze the legs in to get them to fit in the PCB. You place and solder, but
you don't need to clip the wires.
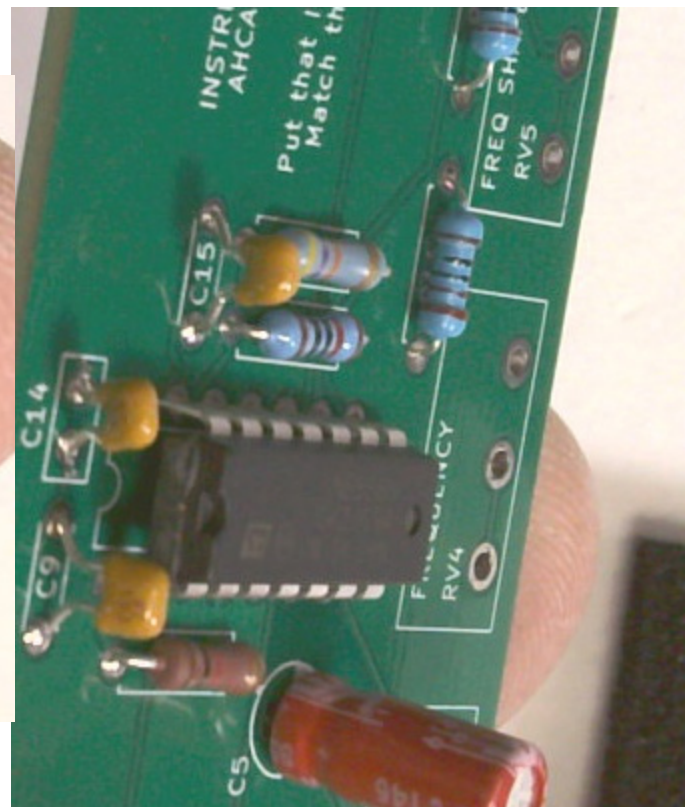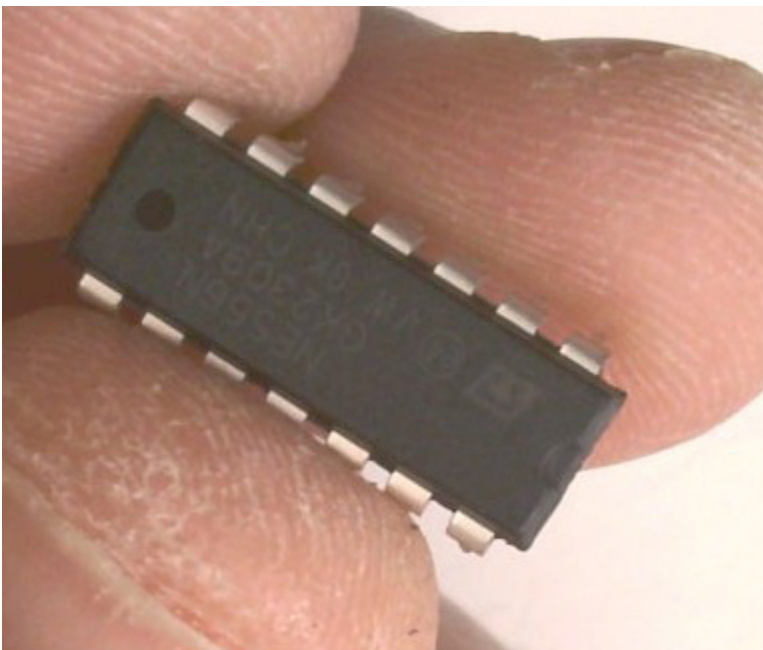
Step twenty: Caution - this is another component that can be put in backwards. Find the 555 timer - there will be two of them. These are placed at U2 and U5. Again, make sure to match the notch. Place, solder. No need to clip. You may have to push in the legs a bit to get them to fit.
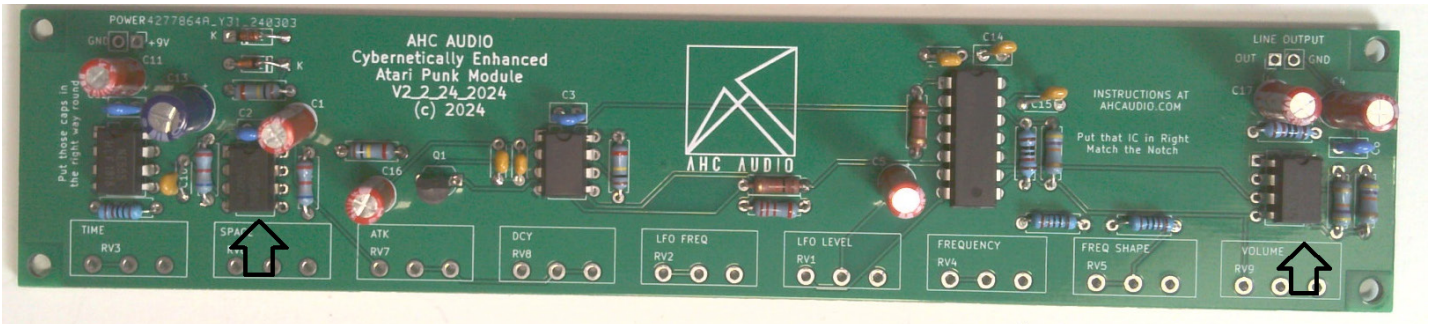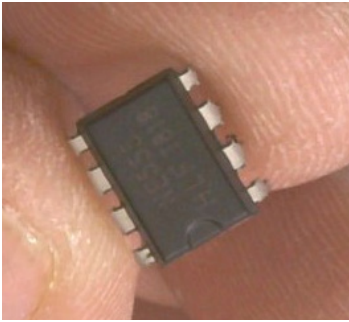
Step twenty one: Caution - this is another component that can be put in backwards. Find the 358 opamp - there will be two of them. These are placed at U1 and U3. Again, make sure to match the notch. Place, solder. No need to clip. You may have to push in the legs a bit to get them to fit.
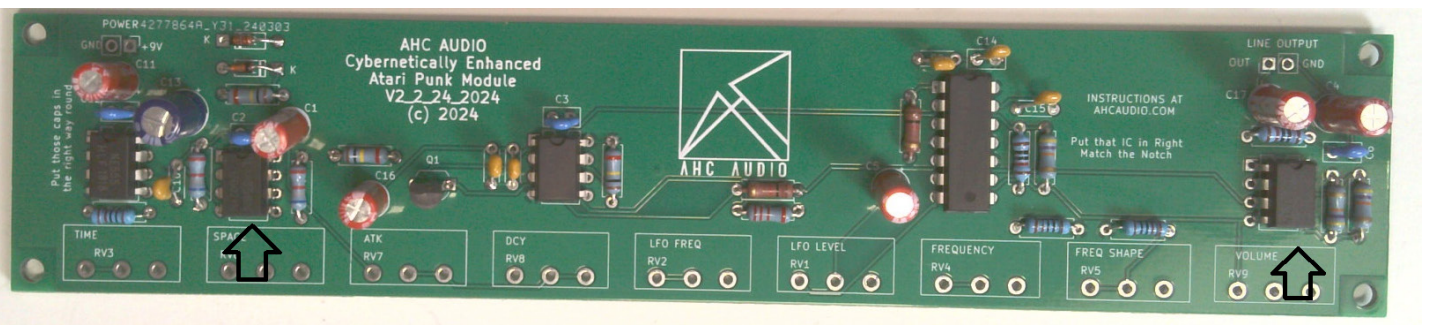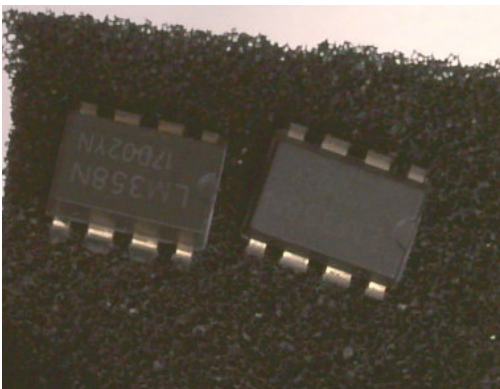
Step twenty two: It's time to install the potentiometers. You should have 9 - 2-10k,6-500k,1-100k. You will install the 10k in RV3 and RV6. You will install the 500k in RV7, RV8, RV2, RV1, RV4, and RV5. You will install the 100k in RV9. You should install all of the potentiometers flush, as shown in the below picture. These are somewhat tricky to install, but here's a tip. Place the potentiometer in the board. Solder one of the potentiometer pins as close to flush as you can get. Then, reheat that solder joint while pushing down on the top of the potentiometer to seat it on the board. You can also use tape to hold them in place.
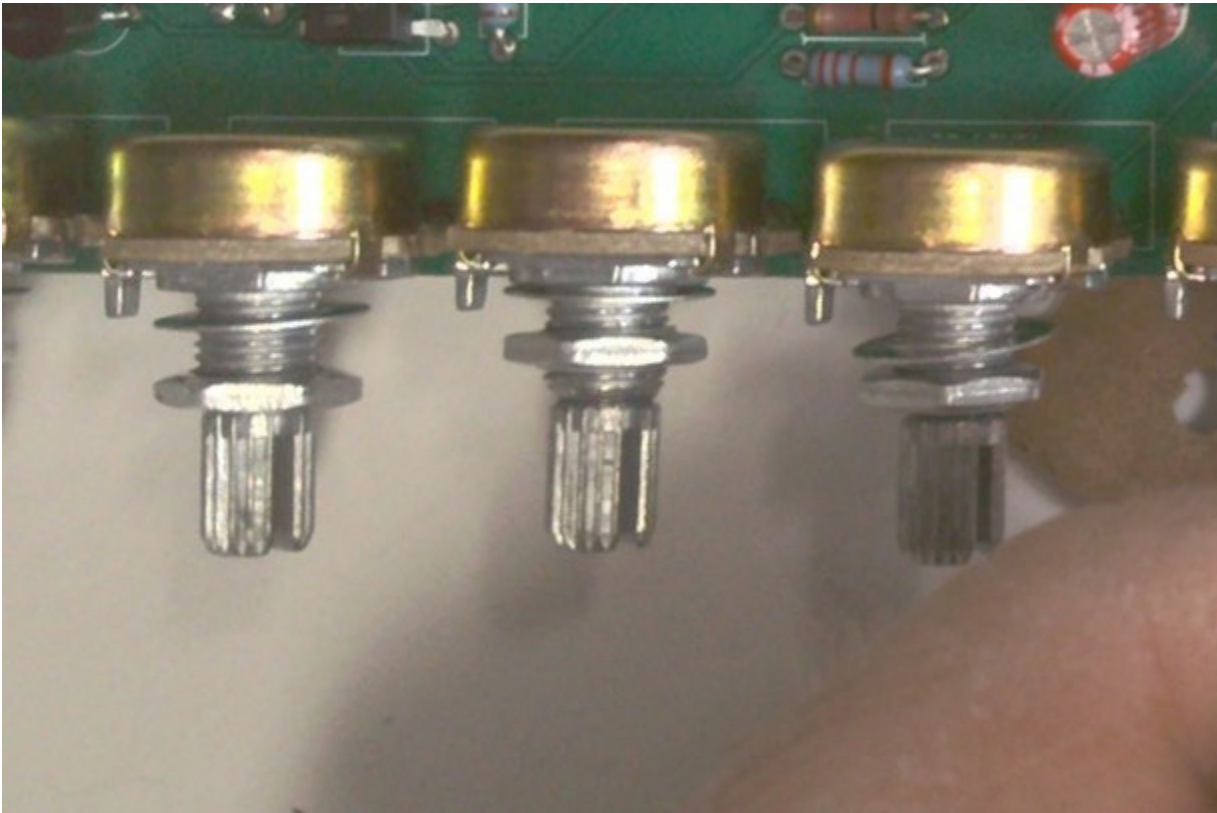

Step twenty three: Caution - this component can be miswired. Find the battery snap. It has a red and black leads. You may need to strip the wires. Feed them through the power holes as shown below, with the black lead going to GND and the red lead going to the +9V. You will want to tin the wires - meaning you strip them, twist the bare strands, and then coat them in solder to prevent stray strands of wire from shorting out nearby terminals.
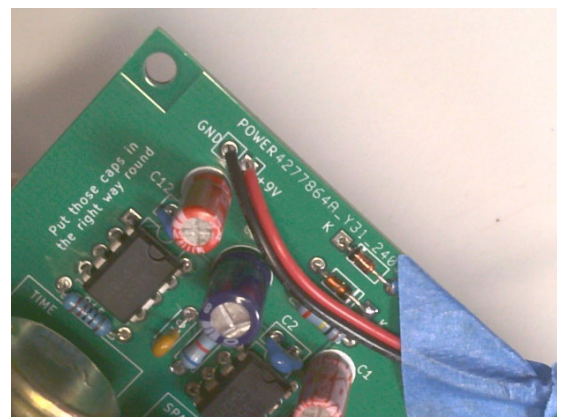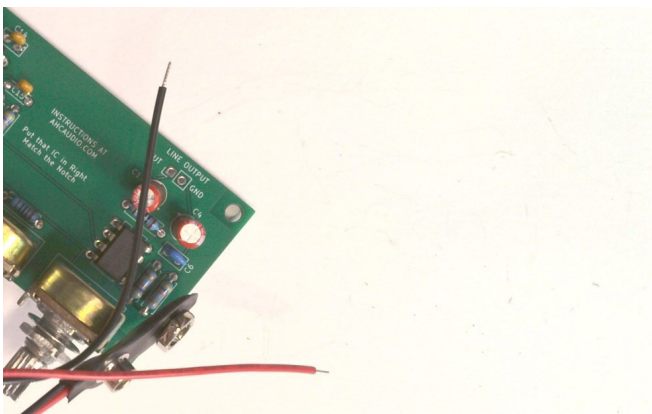
Step twenty four: Caution - this component can be miswired. Find output jack.

Blue wire goes here
Black wire goes here
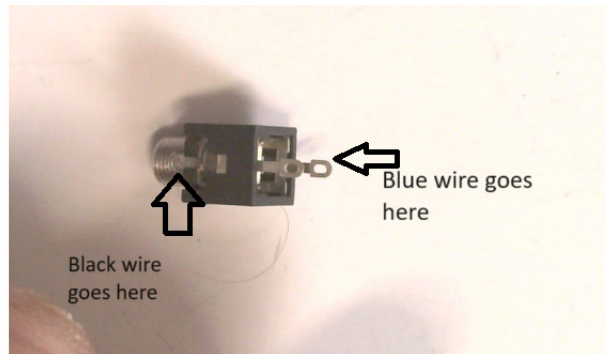
Strip one end of the blue wire and solder to the jack as shown. Note where the blue wire is connected to the jack.
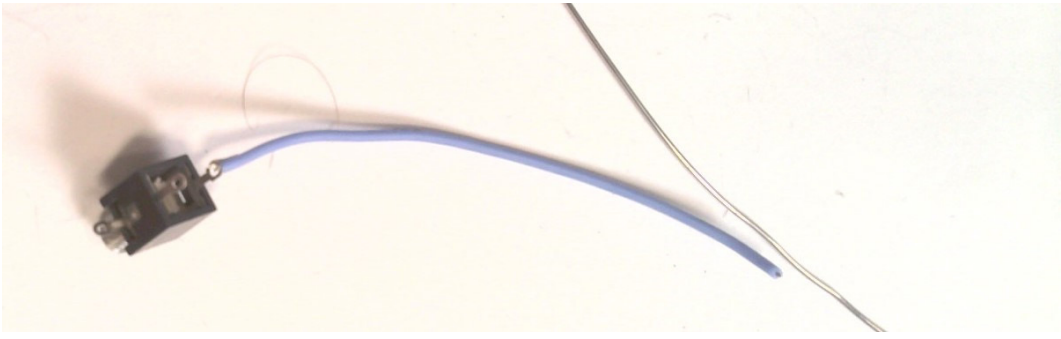
Strip one end of the black wire and solder to the jack as shown. Note where the black wire is connected to the jack. The terminal that sticks up perpendicular to the jack should have the black wire attached, and if that terminal is facing upwards, the lower parallel terminal on the back should be connected to the blue wire. You will want to tin the wires - meaning you strip them, twist the bare strands, and then coat them in solder to prevent stray strands of wire from shorting out nearby terminals.
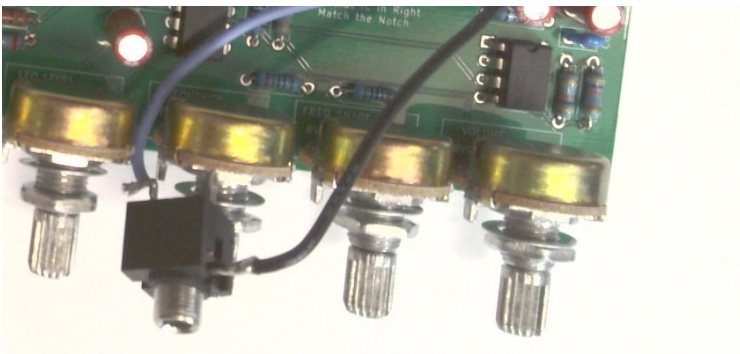
Solder the black wire to the GND on the LINE OUTPUT, and the blue wire to the OUT on the LINE OUTPUT. You'll have to strip the wires. You will want to tin the wires - meaning you strip them, twist the bare strands, and then coat them in solder to prevent stray strands of wire from shorting out nearby terminals.
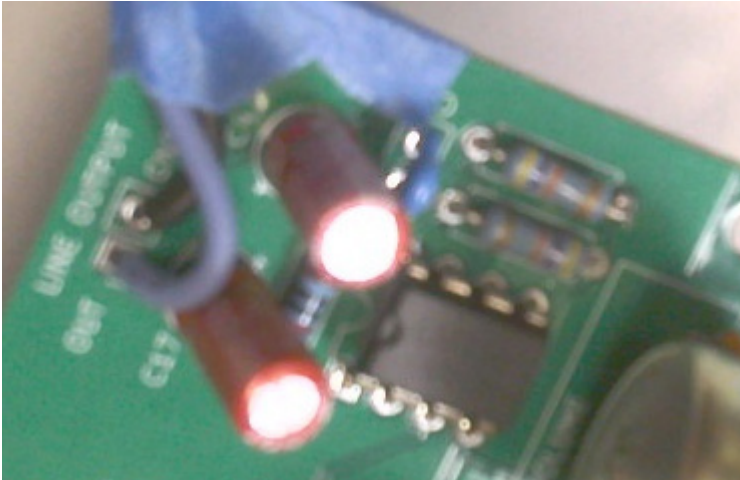
You're done!
Check it over one more time, turn down the volume, and then connect the battery.
IF YOU SMELL ANYTHING STRANGE, OR ANYTHING GETS HOT, IMMEDIATELY DISCONNECT THE BATTERY. YOU HAVE HOOKED UP SOMETHING BACKWARD. GO BACK THROUGH, AND MAKE SURE THAT THE DIODES, THE ELECTROLYTIC CAPACITORS, THE TRANSISTOR, AND THE ICS ARE ALL HOOKED UP THE RIGHT WAY ROUND.
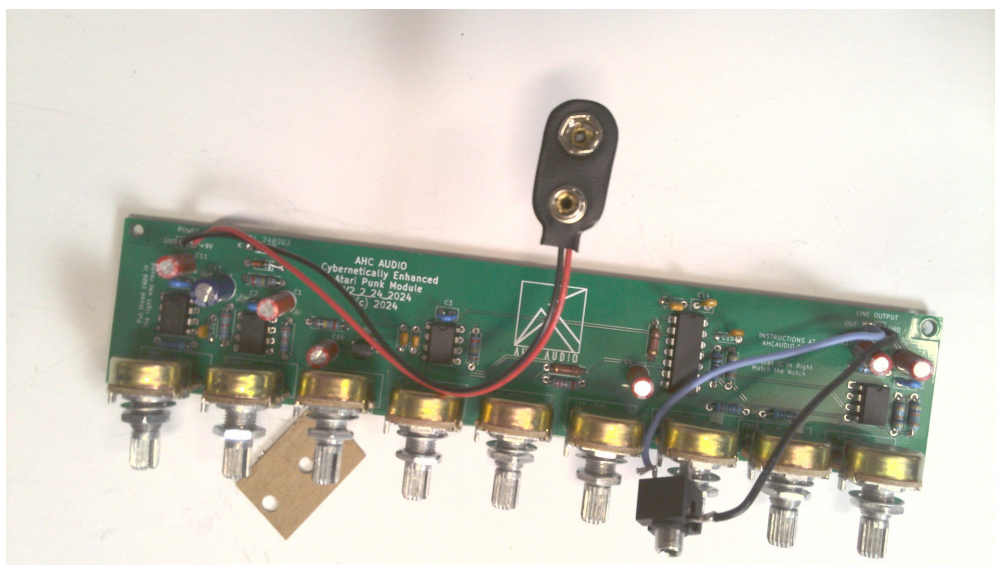
USING THE ATARI PUNK CONSOLE

Connect a 9V source. A battery is fine. Turn down the volume. If you're starting for the first time, turn all of the rest of the knobs to the center.

Connect the 1/8" jack to an amplifier or interface of some kind. The output is line level, so it's appropriate for guitar amps and audio computer interfaces. The output can overload the front ends of some equipment, but you can adjust it using the volume control. Once you've hooked up the module, you can gently turn up the volume until you get some noise from however you're listening to it.

What do the knobs do?

TIME controls the tempo of the gate - in turn, controlling the tempo of output.
SPACE controls the length of each gate - in turn, controlling the length of each output.
ATTACK controls how fast each note raises in volume
DECAY controls how fast each note lowers in volume

LFO FREQUENCY controls the modulation of the main oscillator
LFO LEVEL controls the amount of modulation from the LFO
FREQUENCY controls the base frequency of the oscillator
FREQUENCY SHAPE controls the duty level of the oscillator - this results in strange changes to the base frequency

VOLUME controls the output level of the unit.

Essentially, this unit takes the Atari punk module and ads an envelope generator and voltage controlled amplifier. The envelope generator and the voltage controlled amplifier are very simple, to keep the cost of the unit down, and to make it easy to construct.

TROUBLESHOOTING

FIrst thing to check is to make sure the potentiometrs are centered. The Atari Punk will oscillate ultrasonically at certain settings. Ultrasonic oscillation is when the frequency of the oscillation is too high for human ears to hear.

Make sure the volume is up.

Make sure that you haven't put any components in backwards. 60% of the time, this is the problem. If you put something in backward, the whole unit wont work.

Make sure that you haven't shorted out any connections. A solder bridge is when solder slops over from one component connection to another. 30% of the time, this is the problem if you can't get the kit to work.
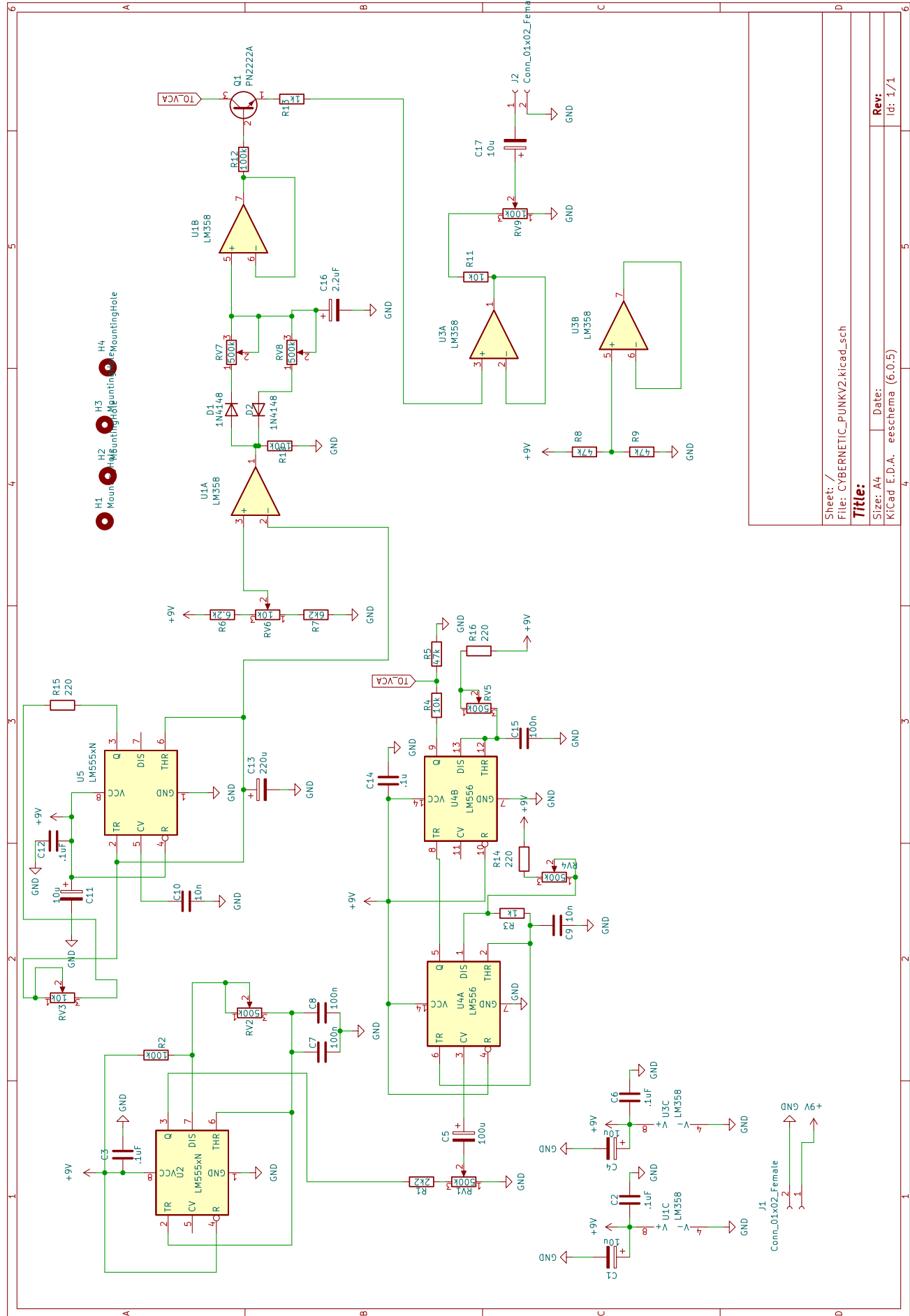
Check to make sure that you didn't put any components in the wrong place on the circuit board. 10% of the time, this is the problem if you can't get the kit to work.

CONTACT INFORMATION

JAKE@AHCAUDIO.COM
AHCAUDIO.COM
INSTAGRAM.COM/AHCAUDIO

Sheet: /
File: CYBERNETIC_PUNKV2.kicad_sch
Title:
Size: A4   Date:
KiCad E.D.A. eeschema (6.0.5)
Rev:
Id: 1/1

Q1 PN2222A
TO_VCA
R13 1K

J2 Conn_01x02_Female
GND
C17 10u
RV9 100K
GND

R11 10K
U3A LM358
U3B LM358
R8 47k
R9 47k
+9V
GND

U1B LM358
R12 100K
C16 2.2uF
GND
RV7 1500K
RV8 1500K
D1 1N4148
D2 1N4148
R10 100K
GND
U1A LM358

H1 MountingHole
H2 MountingHole
H3 MountingHole
H4 MountingHole

R6 6.2K
RV6 10K
R7 6K2
GND
+9V

R5 47k
R16 220
+9V
TO_VCA
R4 10k
RV5 500K
C15 100n
GND
U4B LM556
GND
+9V
R14 220
RV4 500K
R3 1K
C9 10n
GND

R15 220
U5 LM555xN
Q DIS THR
VCC GND
TR CV R
C13 220u
GND
C14 .1u
C12 .1uF
+9V
C11 10u
C10 10n
GND
RV3 10K
GND
GND

R2 100K
RV2 500K
C8 100n
C7 100n
GND
U4A LM556
Q DIS THR
VCC GND
TR CV R
C5 100u
R1 2K2
RV1 500K
GND
+9V

C3 .1uF
+9V
U2 LM555xN
Q DIS THR
VCC GND
TR CV R
GND

C6 .1uF
GND
+9V
C4 10u
U3C LM358
GND
J1 Conn_01x02_Female
+9V GND

C2 .1uF
GND
+9V
C1 10u
U1C LM358
GND