



HONEY BADGER
AUDIO

1176 Revision D

Build Guide

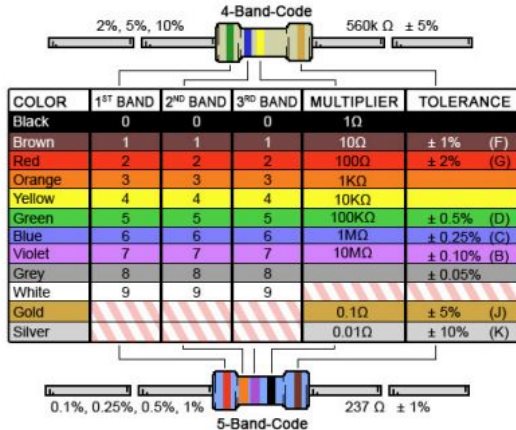
For educational purposes only

www.honeybadgeraudio.com

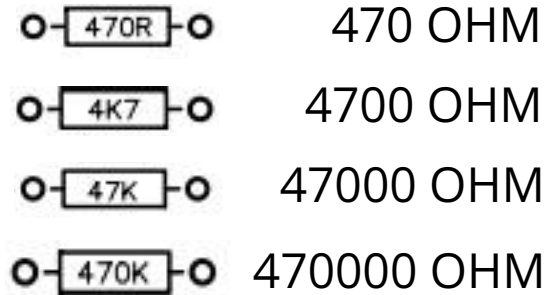
Resistors

The 1176 Bill of Materials specifies 1% metal film resistors.

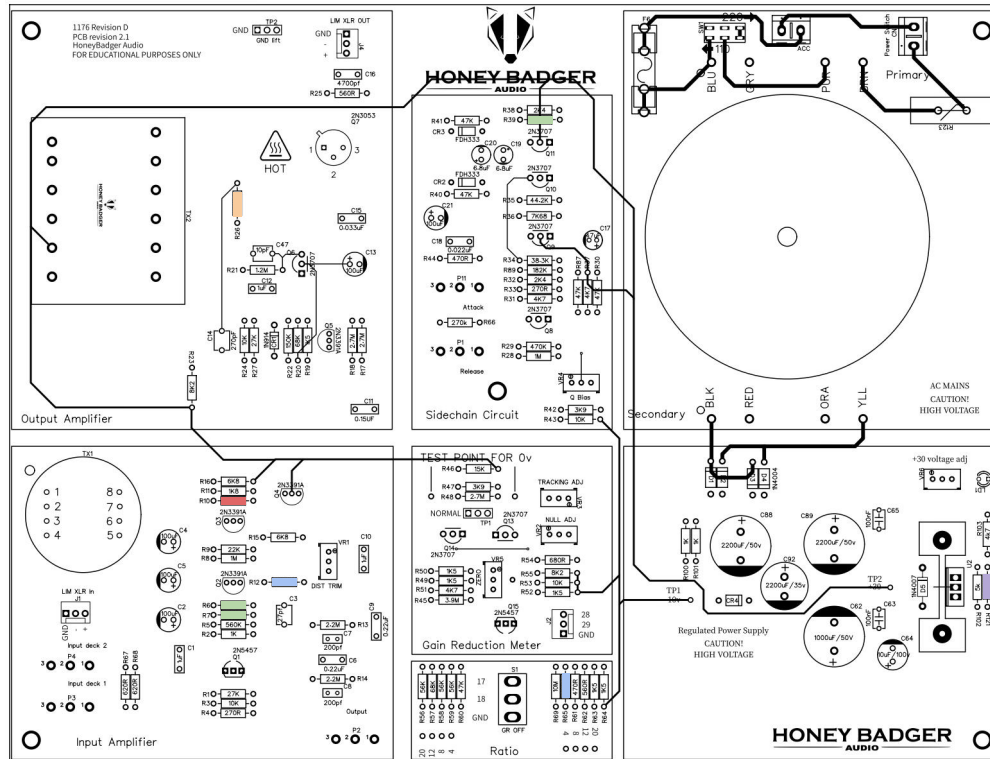
They are coded using 5 colored bands, and their values can be derived from the chart below. If unsure about value, verify with an Ohm meter.



The first step in building the PCB should be to mount all the resistors, which are symbolized on the PCB using the following format:



Resistors



39Ω: R26

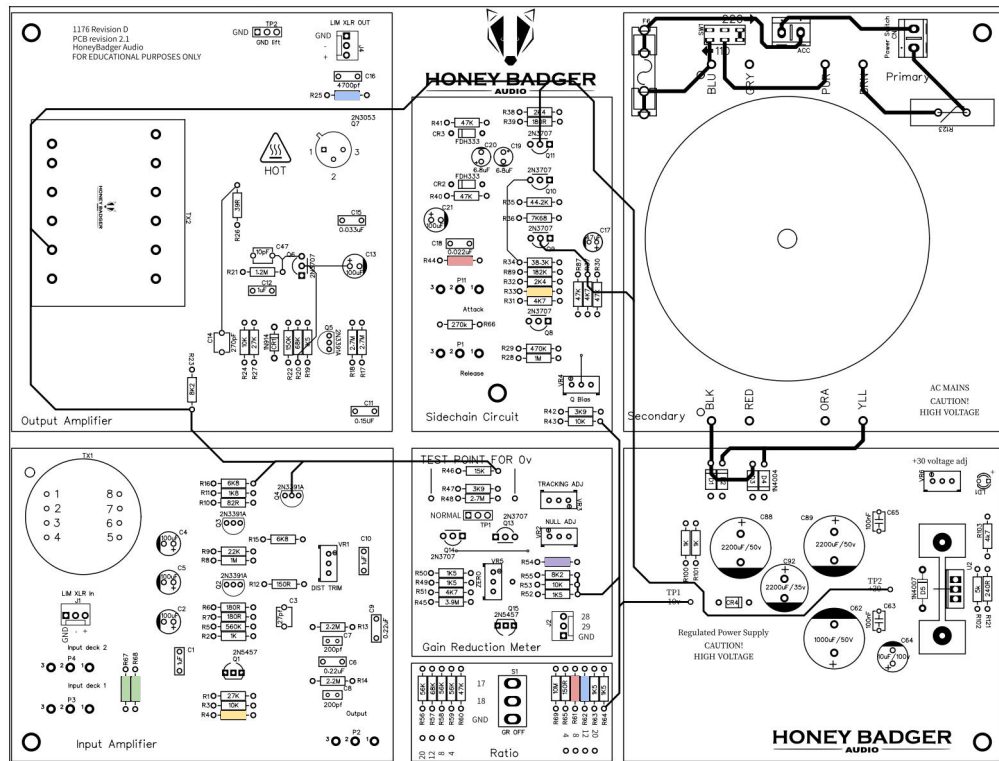
82Ω: R10

150Ω: R12, 65

180Ω: R6, 7, 39

240Ω: R121

Resistors



270Ω: R4, 33

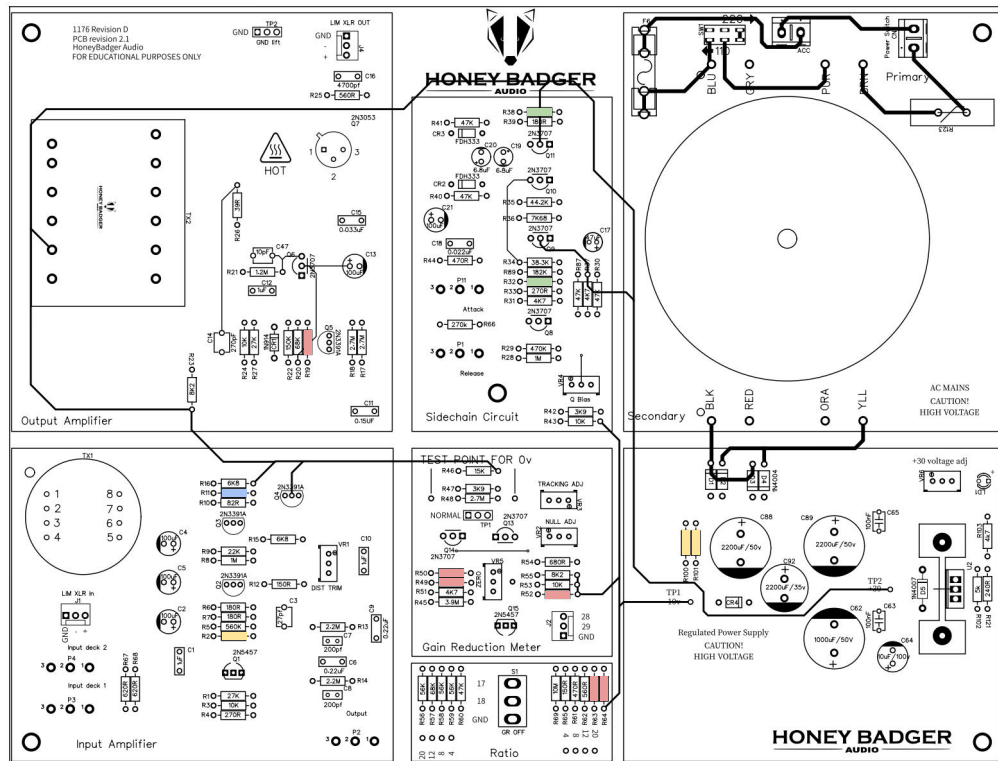
470Ω: R44, 61

560Ω: R25, 62

620Ω: R67, 68

680Ω: R54

Resistors



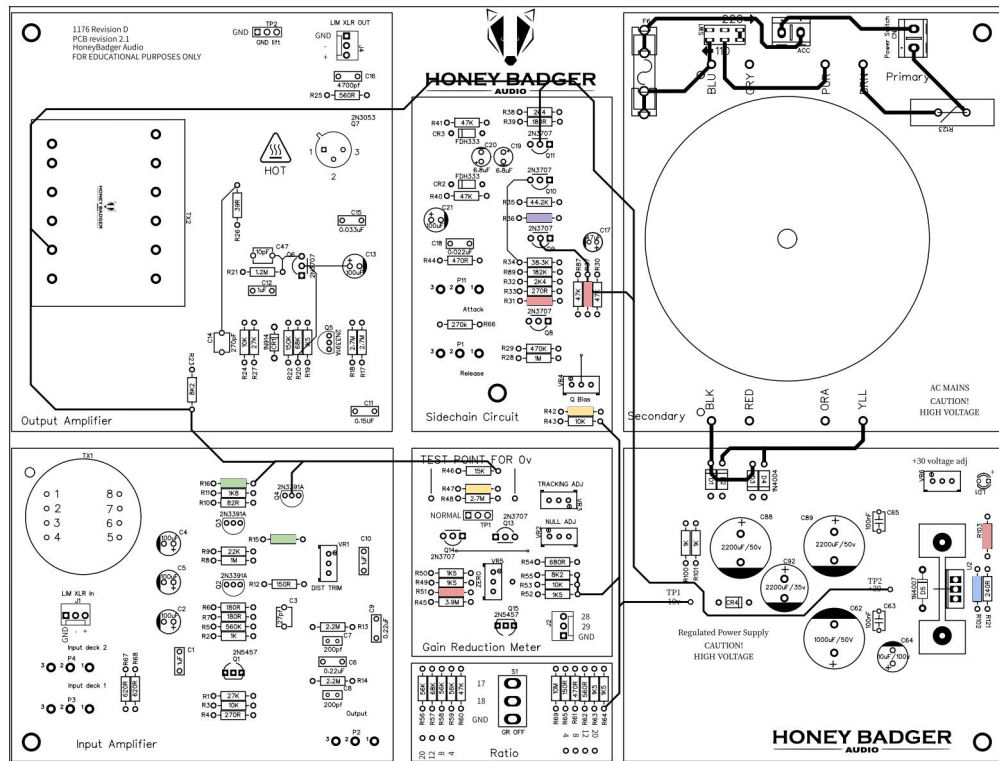
1k Ω : R2, 100, 101

1k5 Ω : R19, 49, 50, 52, 63, 64

1k8 Ω : R11

2k4 Ω : R32, 38

Resistors



3k9k Ω : R42, 47

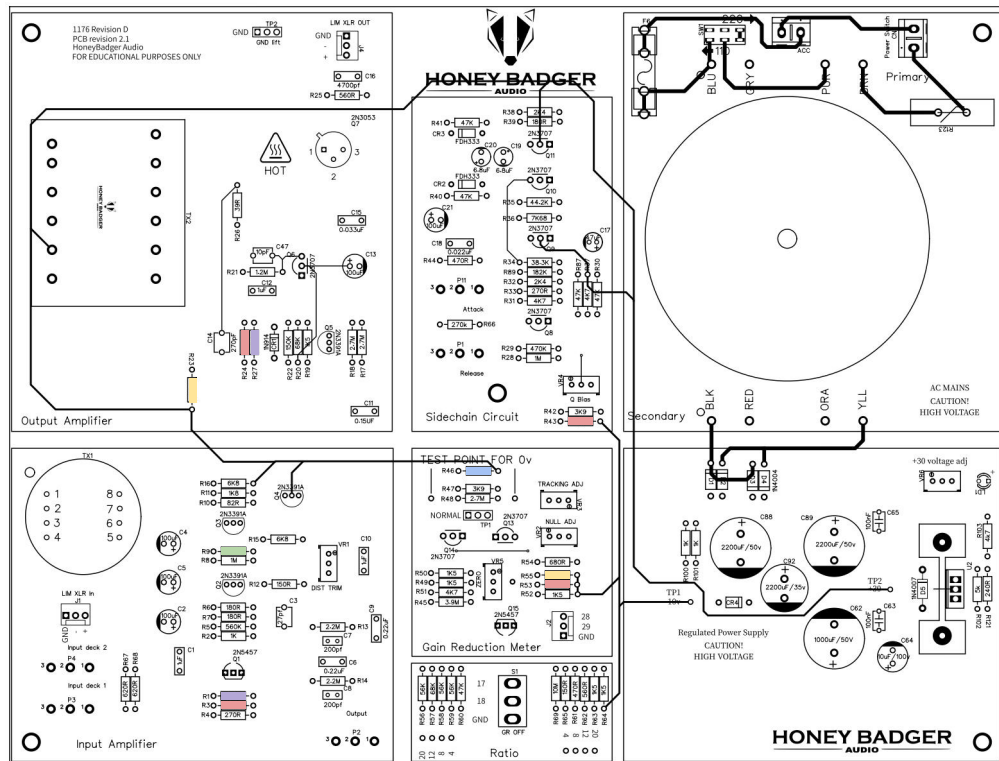
4k7 Ω : R31, 37, 51, 103

5k Ω : R102

6k8 Ω : R15, 16

7k68 Ω : R36

Resistors



8k2Ω: R23, 55

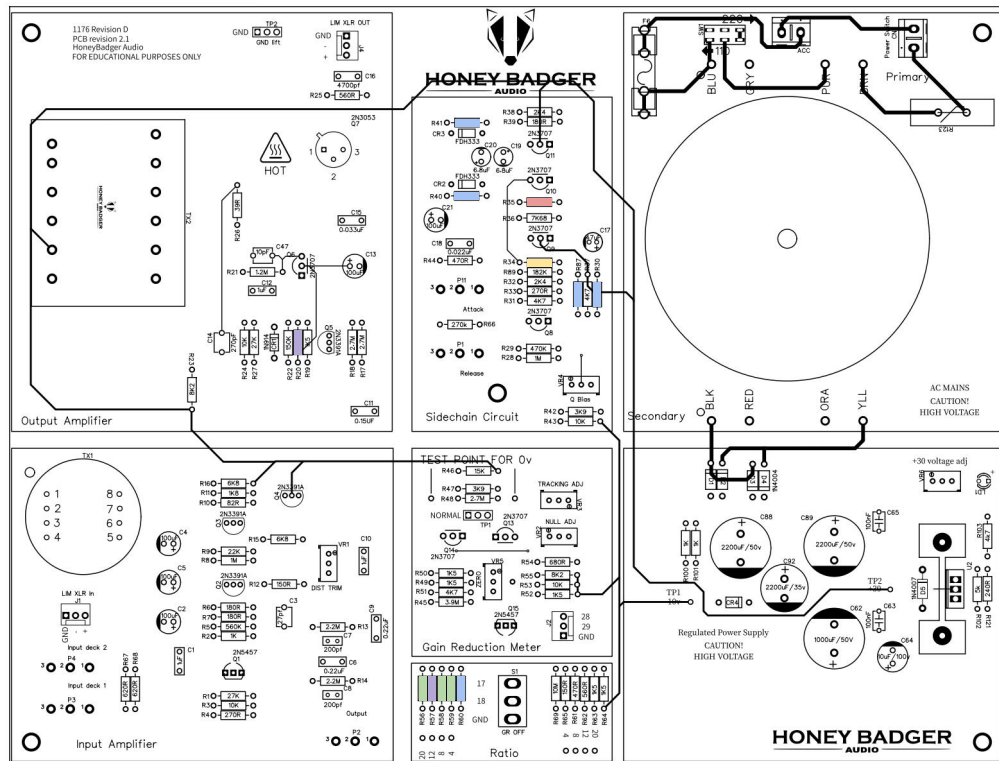
10kΩ: R3, 24, 43, 53

15kΩ: R46

22kΩ: R9

27kΩ: R1, 27

Resistors



38k3Ω: R34

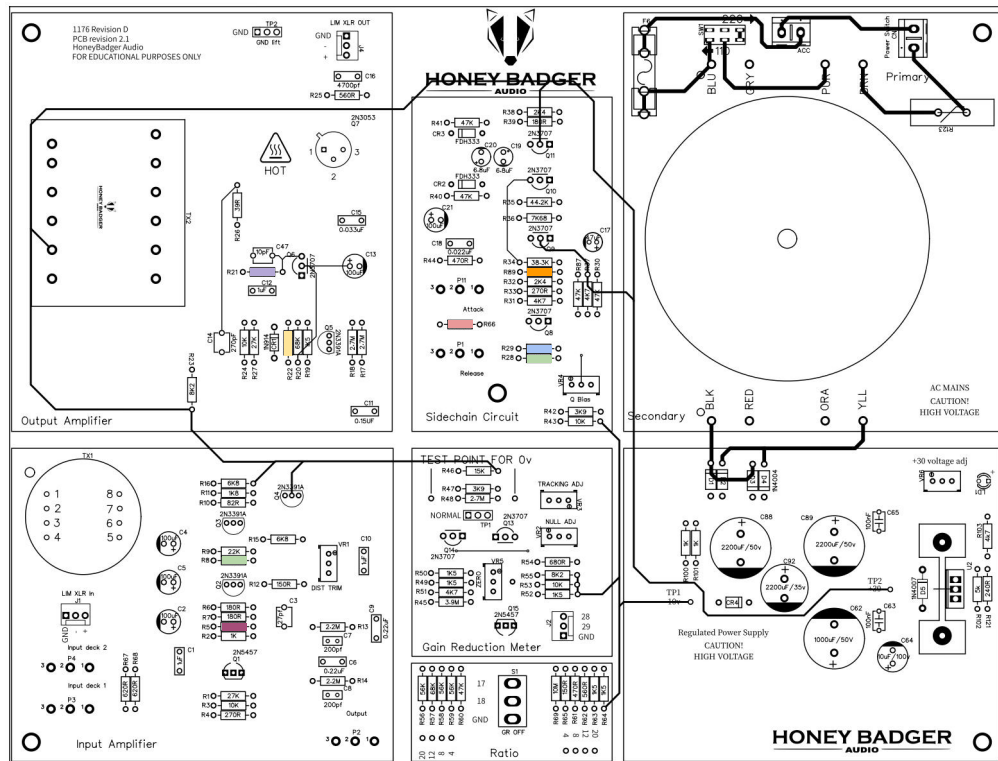
44k2Ω: R35

47kΩ: R30, 40, 41, 60, 87

56kΩ: R56, 58, 59

68kΩ: R20, 57

Resistors



150kΩ: R22

182kΩ: R89

270kΩ: R66

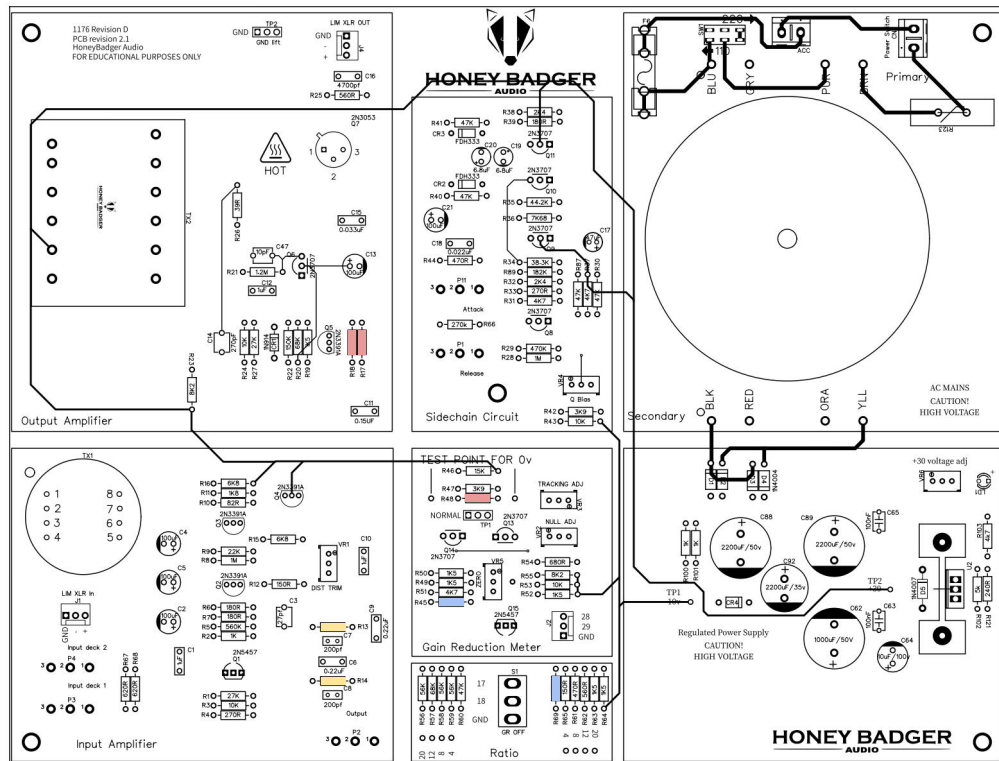
470kΩ: R29

560kΩ: R5

1MΩ: R8, 28

1.2MΩ: R21

Resistors



2.2MΩ: R13, 14

2.7MΩ: R17, 18, 48

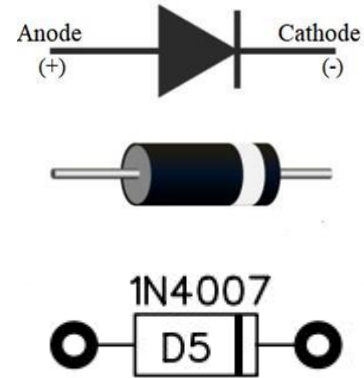
3.9MΩ: R45

10MΩ: R69

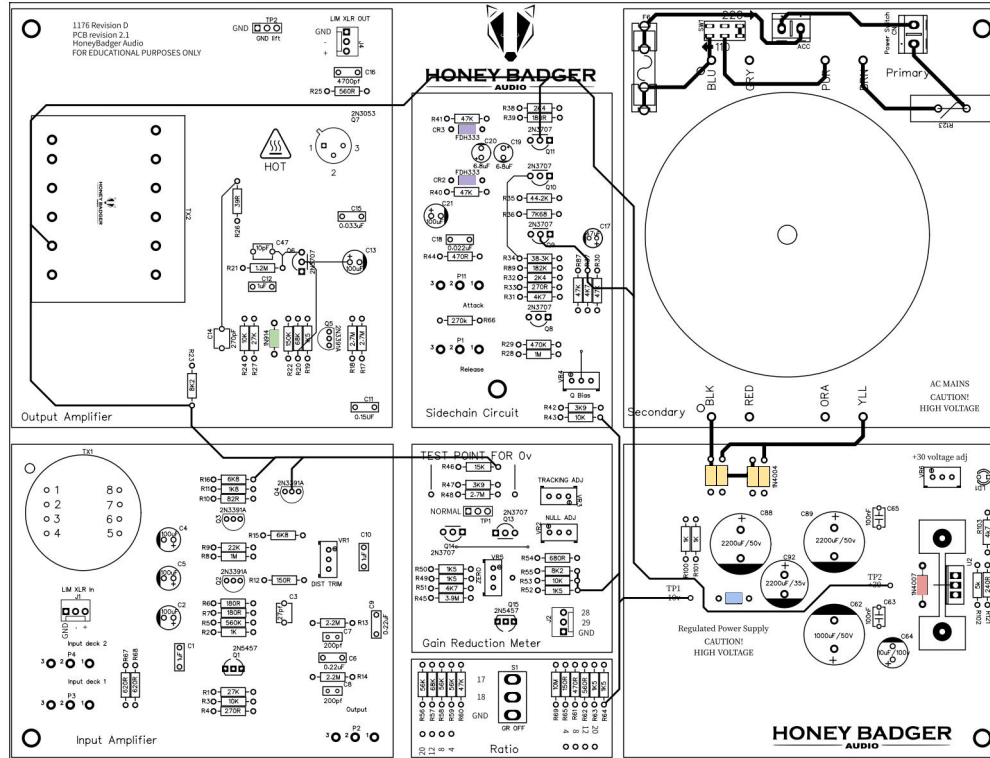
Diodes

After the resistors are soldered, the next component to place are the diodes. Take caution to place them in the correct orientation as they are polarity sensitive.

When placing the diodes, be sure to align the stripe with the correct orientation on the PCB as follows:



Diodes



1N4004: D1-4

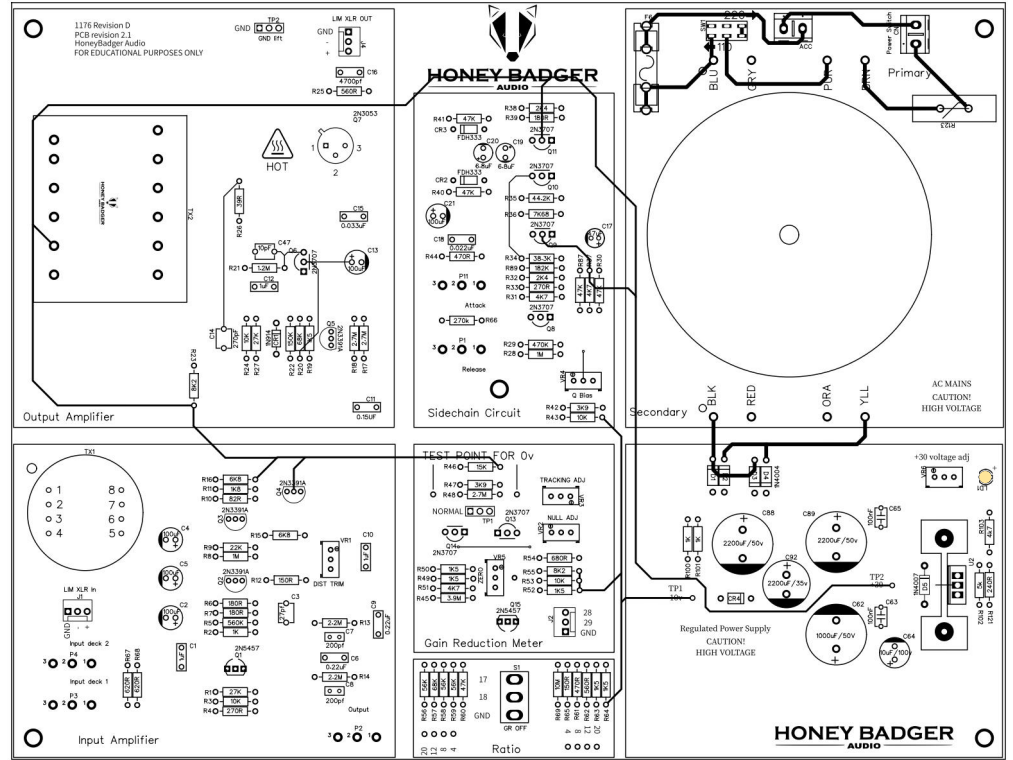
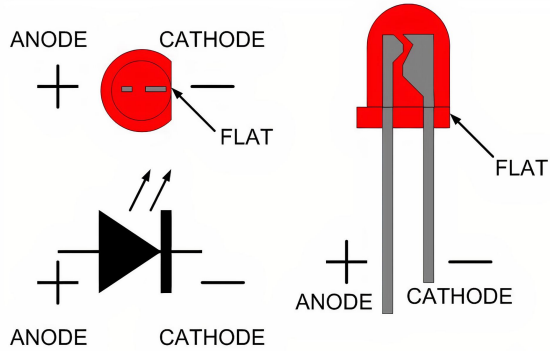
1N4007: D5

1N4740: CR4

1N914: CR1

FDH333: CR2, 3

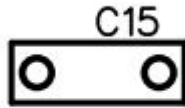
LED



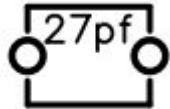
Yellow LED: LD1

Film Capacitors

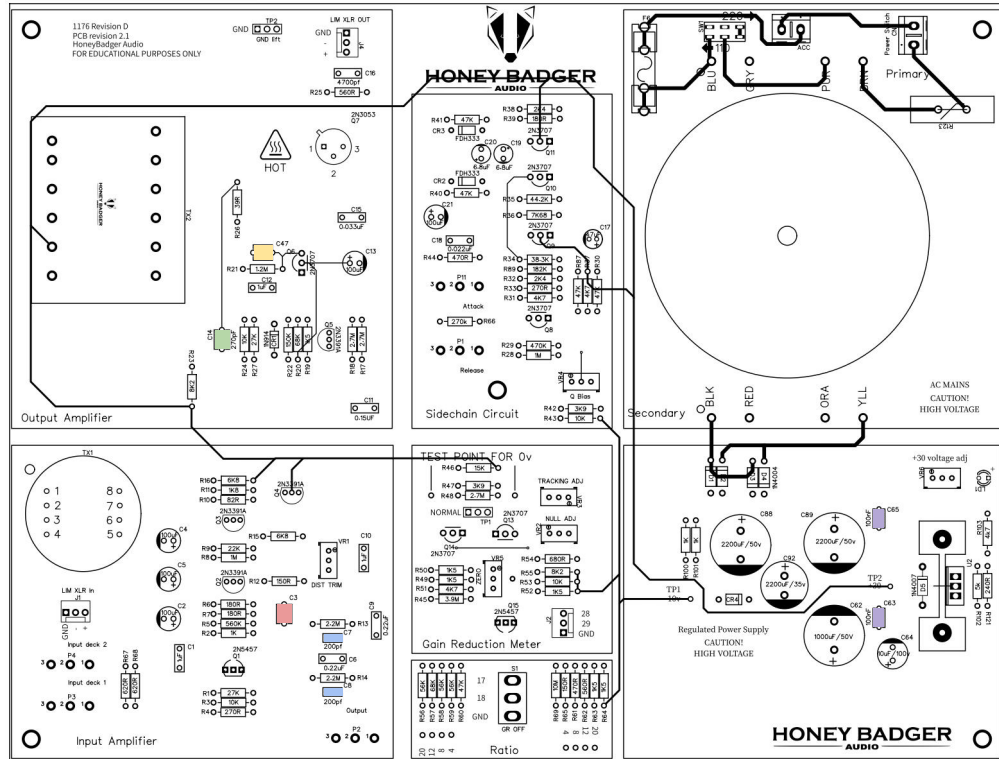
The next step in assembly is to solder the film capacitors, which are not sensitive to polarity, and are symbolized on the PCB as follows:



0.033uF



Ceramic Film Capacitors



10pf: C47

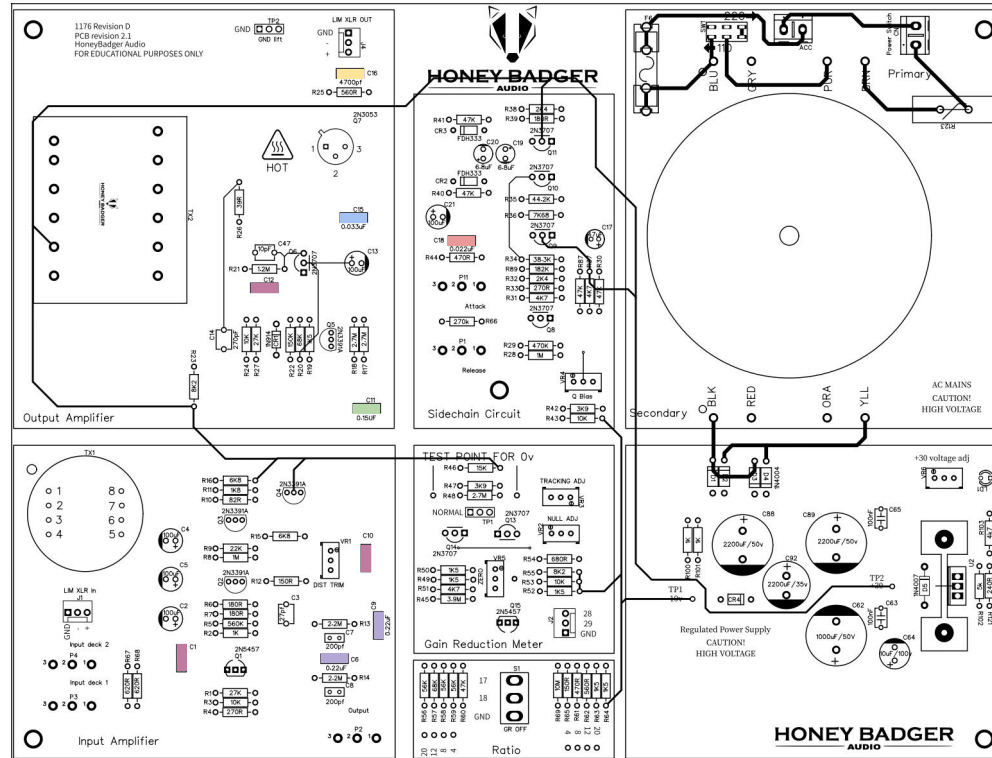
27pf: C3

200pf: C7, 8

270pf: C14

100nf: C63, 65

Poly Film Capacitors



4700pf: C16

0.022uF: C18

0.033uF: C15

0.15uF: 11

0.22uF: C6, 9

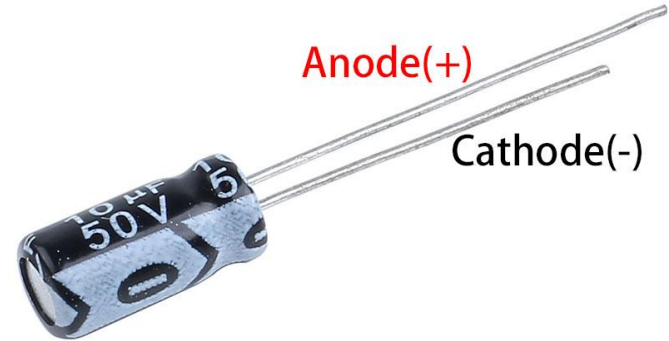
1uF: C1, 10, 12

Electrolytic Capacitors

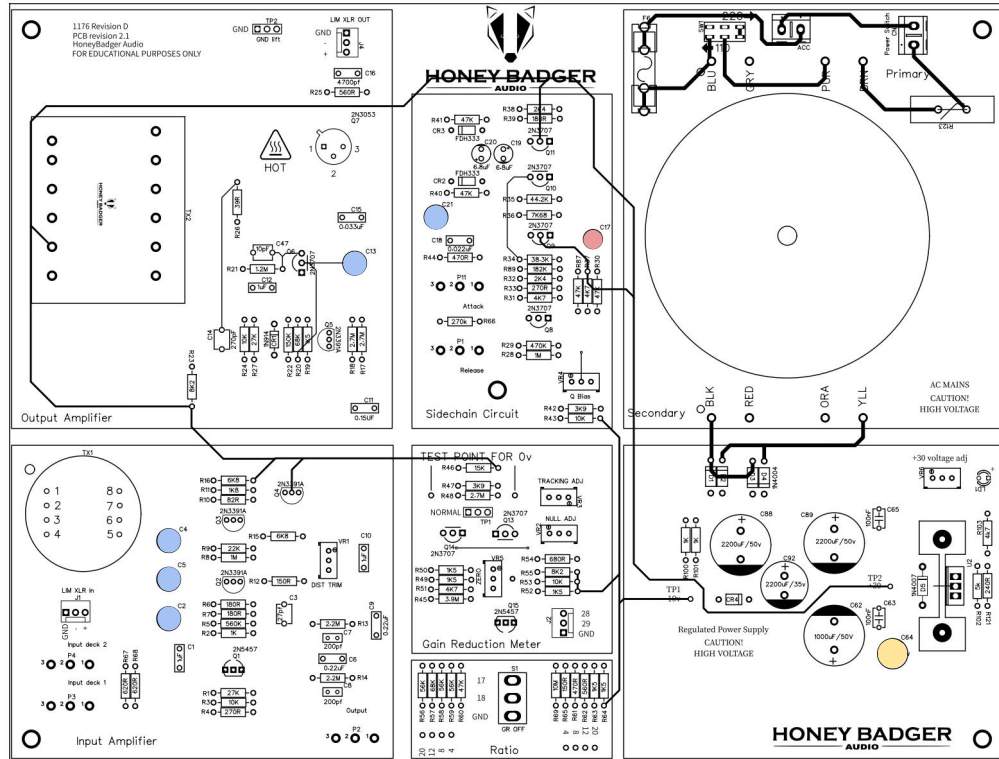
After the film capacitors are soldered to the board, the electrolytic capacitors are next. Careful attention needs to be given to the proper orientation of the capacitor on the PCB as they are polarity sensitive. Electrolytic capacitors are symbolized on the PCB as follows (Note the polarity (+) sign):



Radial electrolytic capacitors have a line indicating the negative lead side. The positive lead is usually the longer leg when working with a new capacitor. They are symbolized and should be placed on the PCB as follows:



Electrolytic Capacitors

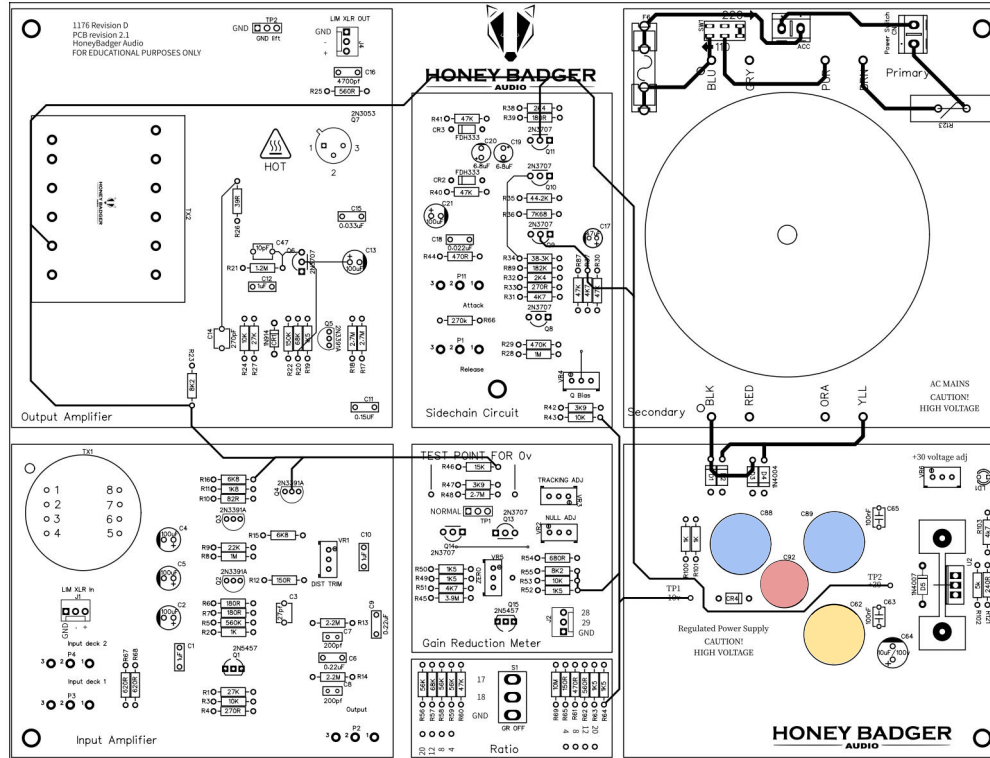


10uF/100v: C64

47uF/35v: C17

100uF/35v: C2, 4, 5, 13, 21

Electrolytic Capacitors



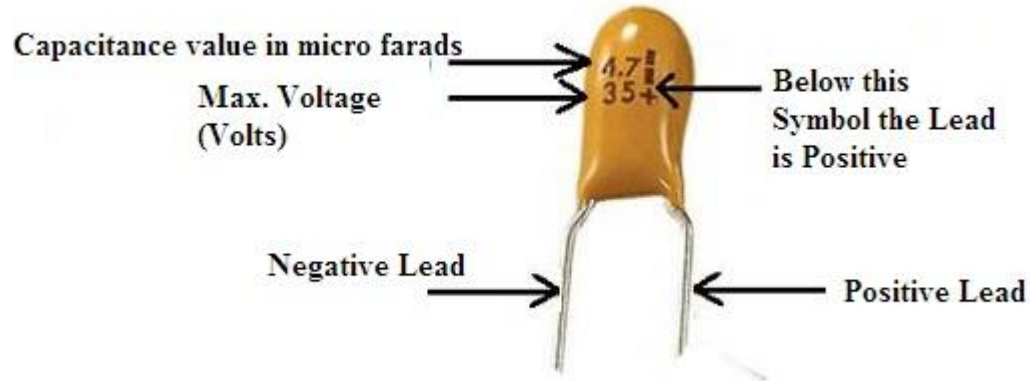
1000uF/50v: C62

2200uF/35v: C92

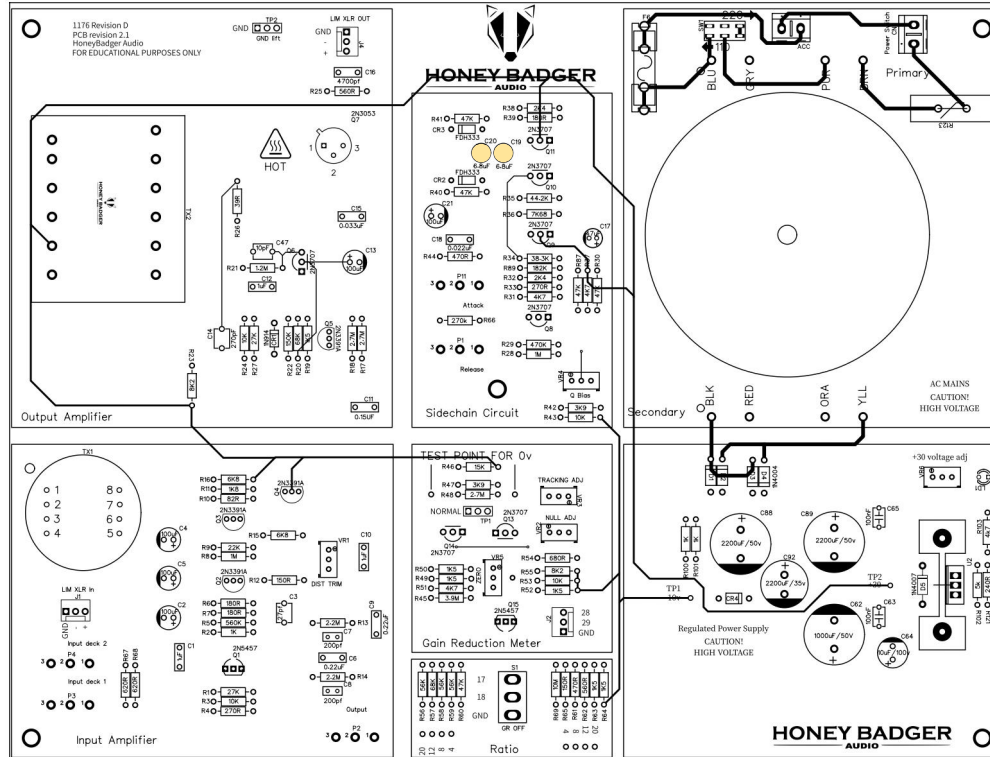
2200uF/50v: C88, 89

Tantalum Capacitors

Tantalum capacitors have a line and “+” sign indicating the Positive lead side and should be placed as follows:



Tantalum Capacitors

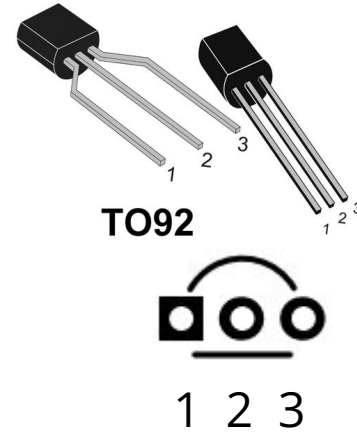


6.8uF/35v: C19, 20

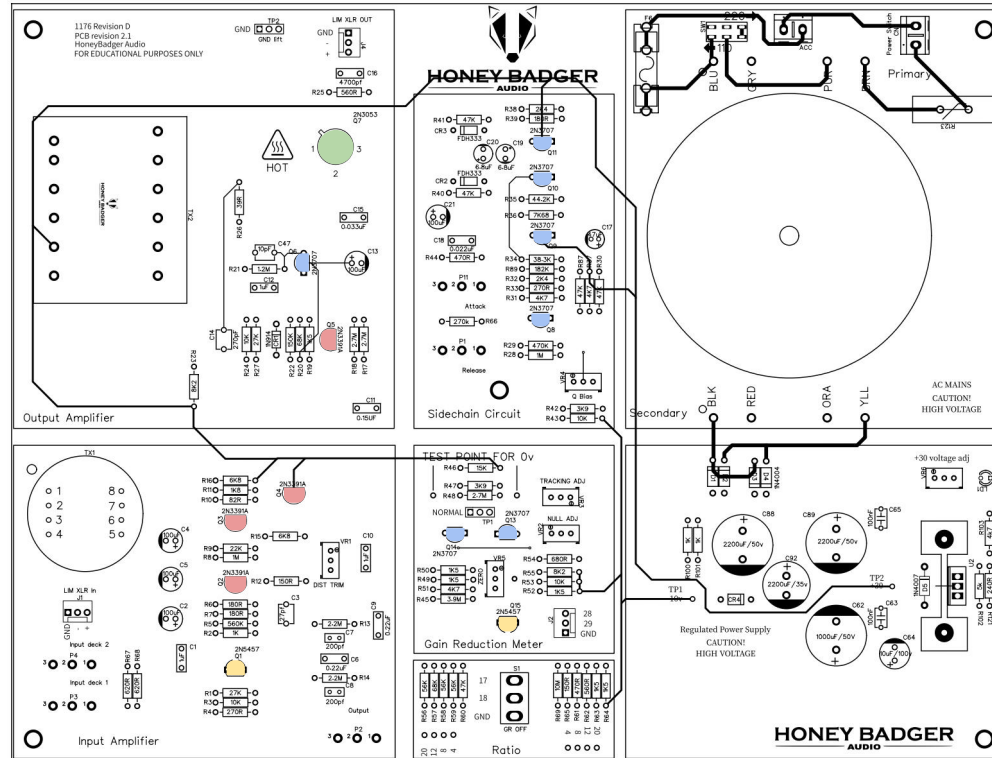
Transistors

Transistors are symbolized on the PCB as pictured, its D-shaped body should be lined up with the D-shaped silkscreen on the PCB.

Note that some transistors are are flipped, so pay extra attention when lining them up properly.



Transistors



2N5457: Q1, 15

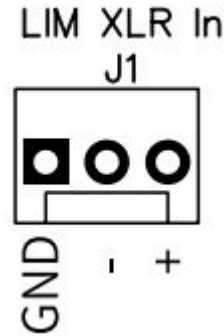
2N3391: Q2-5

2N3707: 6, 8-10, 11, 13, 14

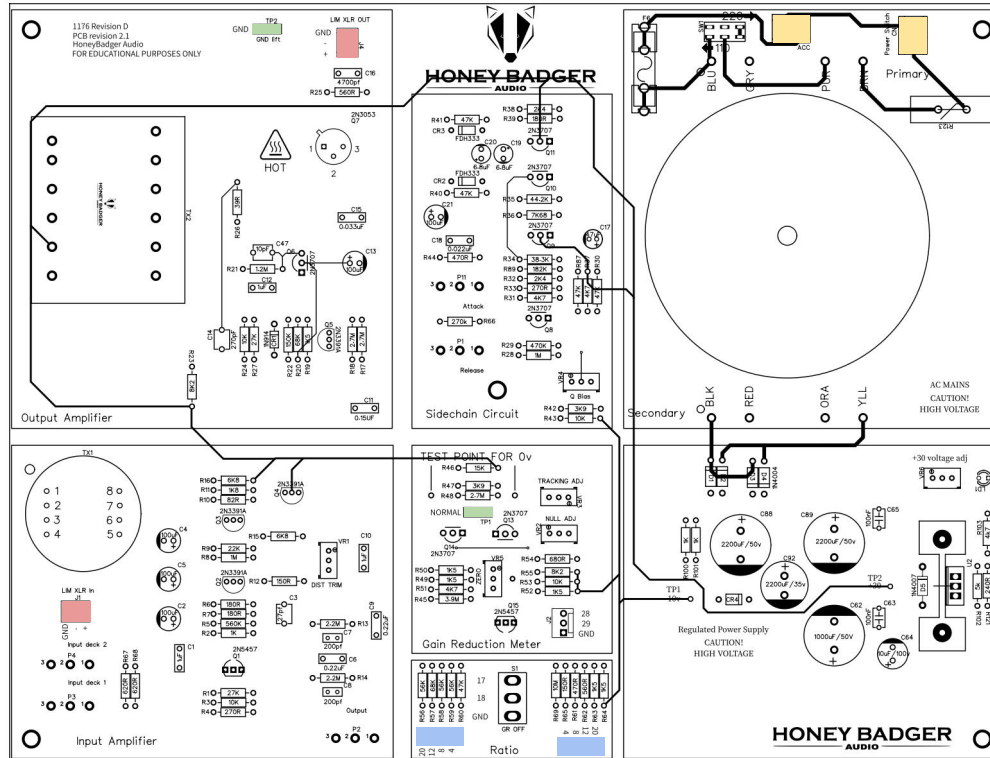
2N3053: Q7

Connectors and Headers

Connectors are important to ensuring your compressor receives signal on the correct pads. IT IS IMPORTANT TO KNOW WHAT WIRES ARE CONNECTED TO WHAT PINS. The PCB is marked to ensure no matter which way your connector is facing, you can wire it properly.



Connectors and headers



Screw 2x5.08: CN1, 2

3x2.54: J1, 4

4x2.54: SEE RATIO WIRING

Header: TP1, 2

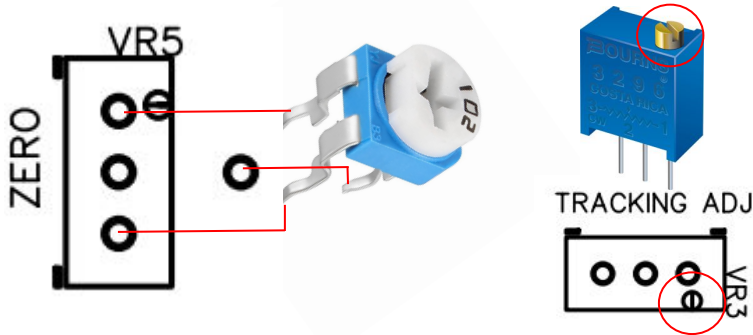
Trimmers and Potentiometers

On the 1176 build, there are two types of trimmers: multi-turn and single-turn. Notice on some locations there is an additional pad placed slightly ahead of the center pad. These locations are for the single-turn type. Notice the location of the trimmer cap. It is important to place the trimmer in the correct direction so you can calibrate by following the guide.

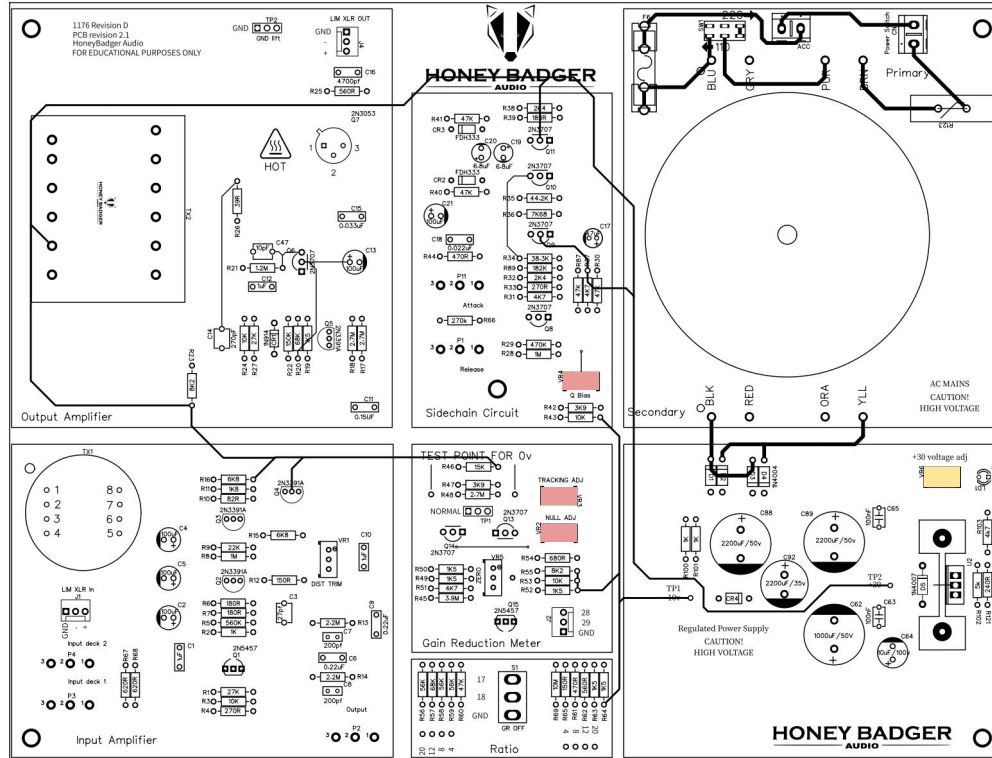
Each trimmer has a 3-digit number on the top or side. Following this guide will help you verify the value you require.

Standard Resistance Table

Resistance (Ohms)	Resistance Code
10	100
20	200
50	500
100	101
200	201
500	501
1,000	102
2,000	202
5,000	502
10,000	103
20,000	203
25,000	253
50,000	503
100,000	104
200,000	204
250,000	254
500,000	504
1,000,000	105
2,000,000	205



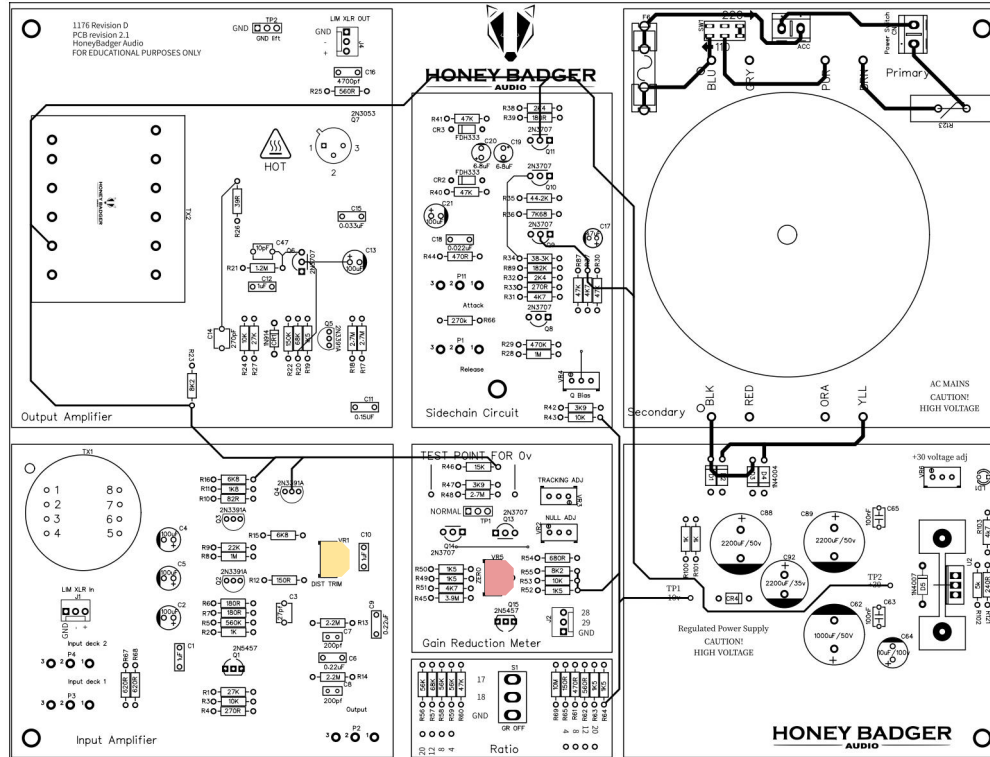
Multi-turn Trimmers



1kΩ: VR6

2kΩ: VR2, 3, 4

Single-turn Trimmers

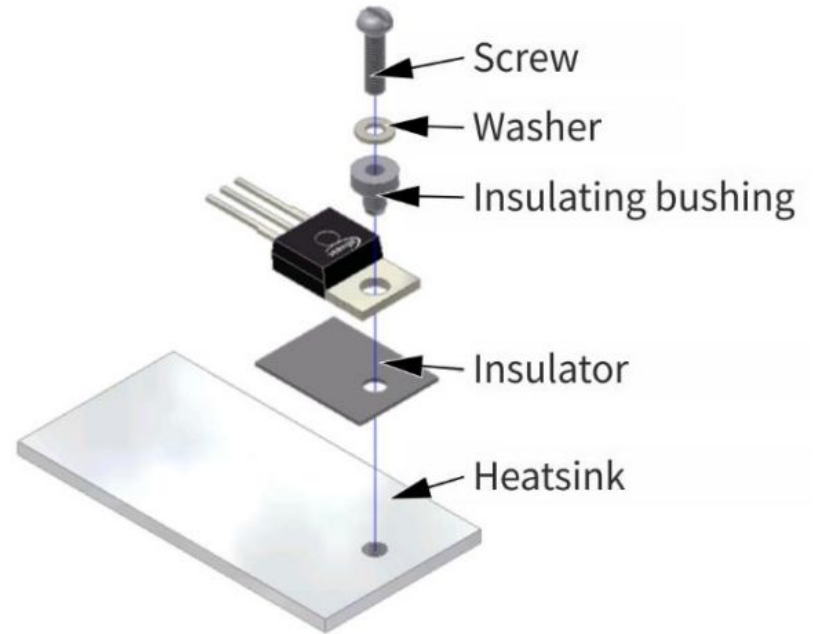


100Ω: VR1

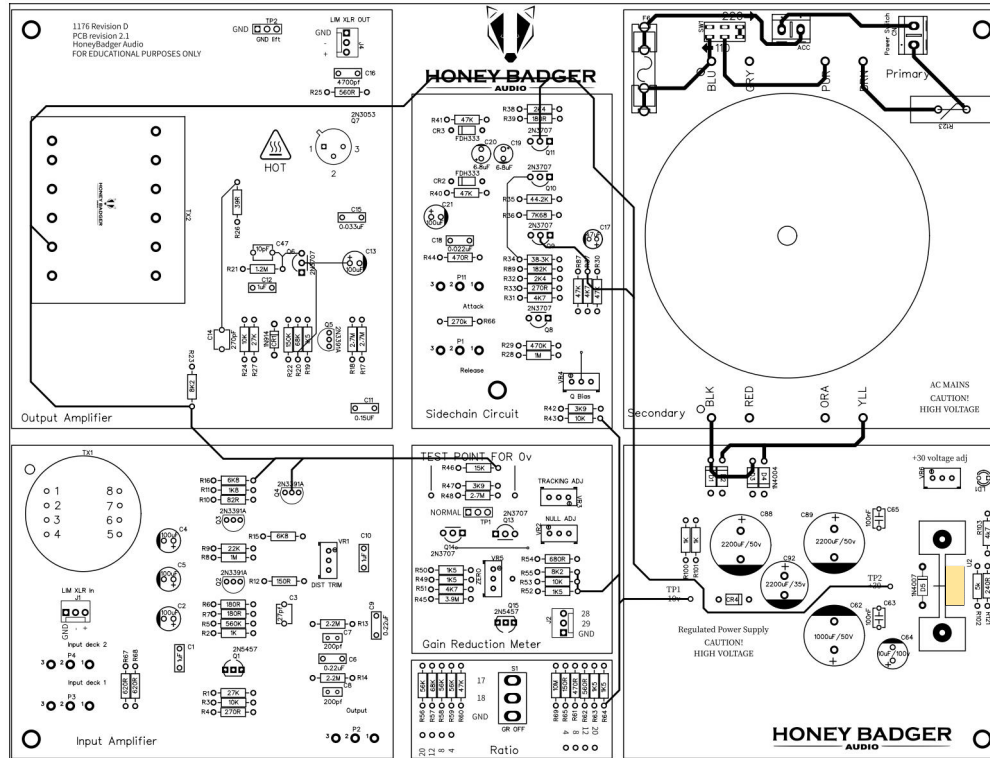
2kΩ: VR5

Regulator + Heat sink

The 1176 has one voltage regulator that manages the +30 volts required to drive the amplifiers. The regulator uses heat sink to dissipate heat. It is important to use a TO-220 isolation kit to avoid any short circuits. Follow the guide for properly mounting the kit.

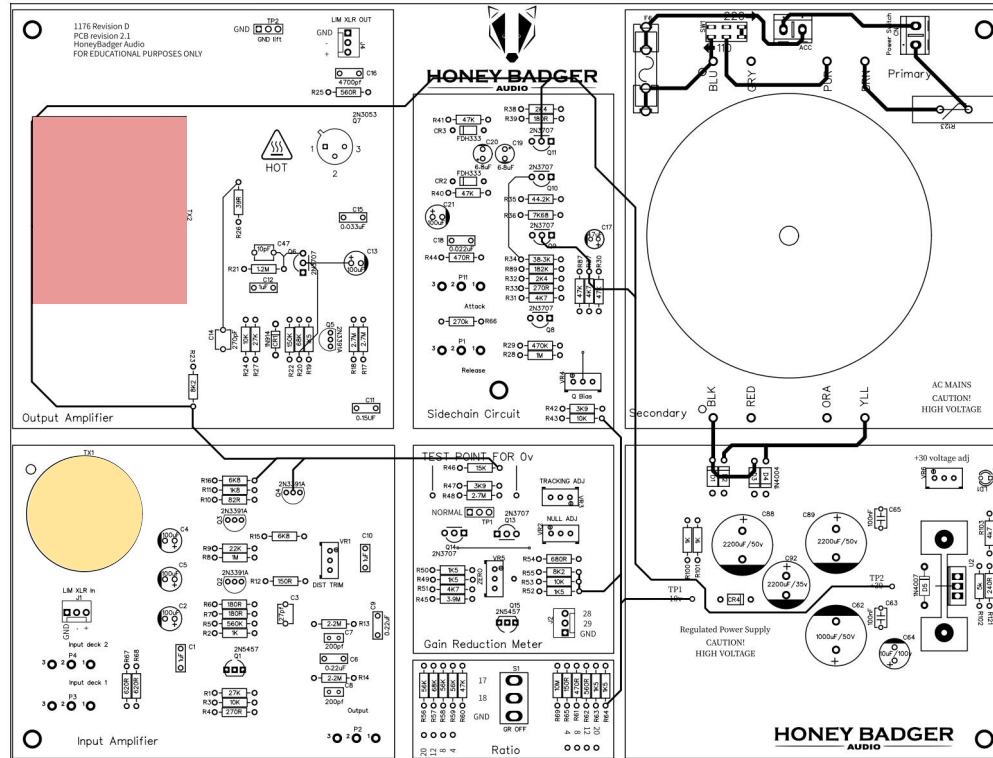


Regulator + Heat sink



LM317: U2

Audio Transformers



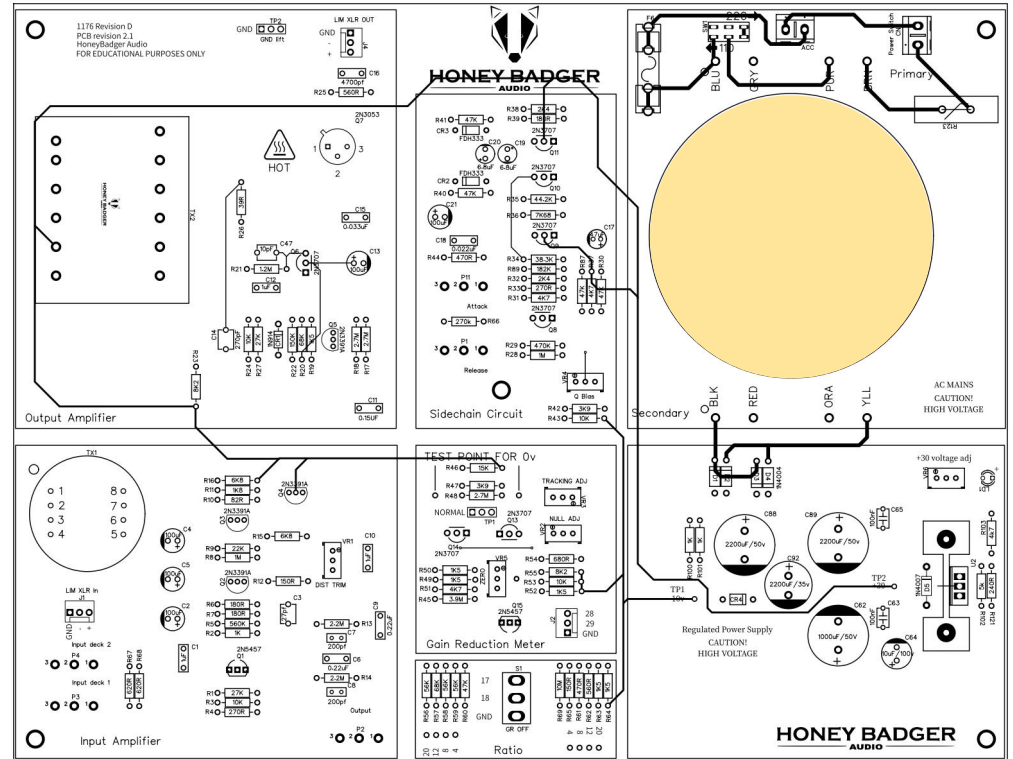
CM3303: TX1

CM96731: TX2

Power Transformer

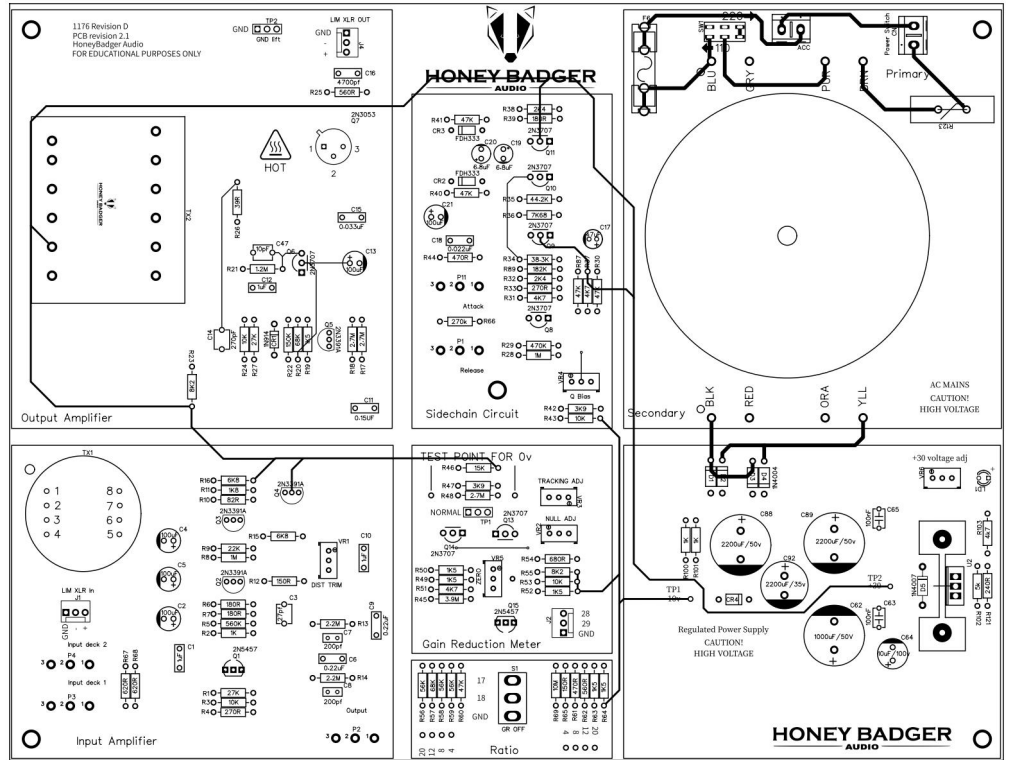
Connect the respective colors to their pads making sure to get all the wire strands in the hole.

AC voltage will be flowing through these wires, so it is important to make sure they are all soldered to their pads cleanly.



VTB48-520:TX3

Your PCB is now fully stuffed.
CONGRATULATIONS!



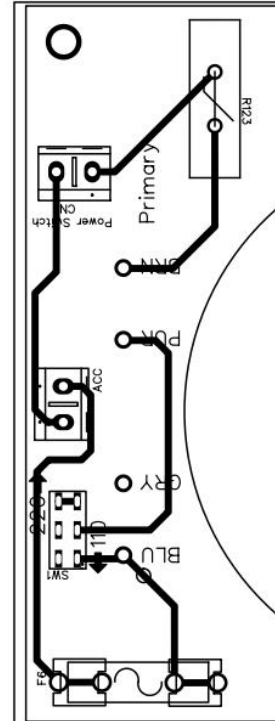
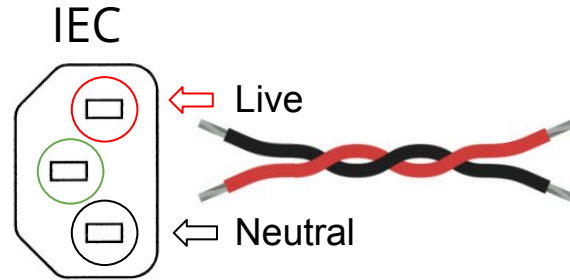
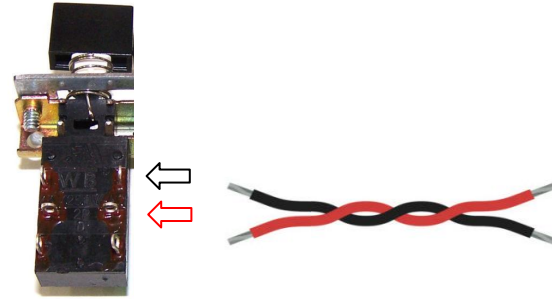
Wiring ACC Mains

When wiring the power transformer and the power switch, it is recommended to twist the wires to reduce any stray interference they may cause. Twisting them by hand will be sufficient enough, given the short length.



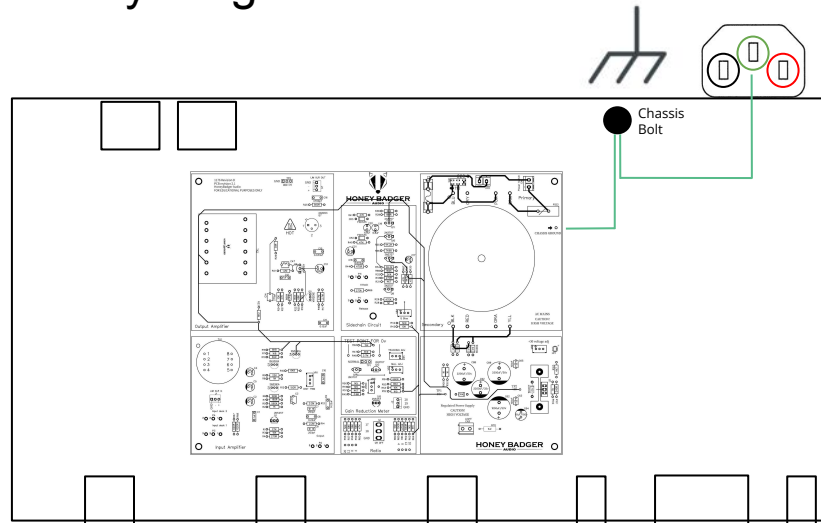
Wiring mains

Solder all wires to their respective tabs. Be sure to add heat shrink tubing to avoid any stray wires and to be sure you are safe.



Wiring Grounds

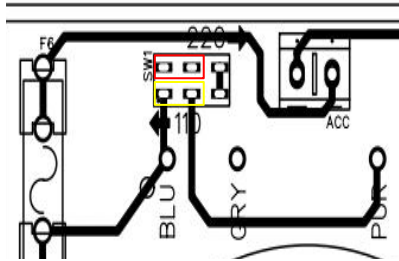
Ground wires are essential to the safety and operation of electrical equipment. Care should be taken to ensure the ground wires are as short and as neat as possible. The PCB has a chassis ground pad that you need to connect to the chassis ground. This grounding technique is called Star Ground. Follow this guide to connect your ground wires.



Wiring ACC Mains

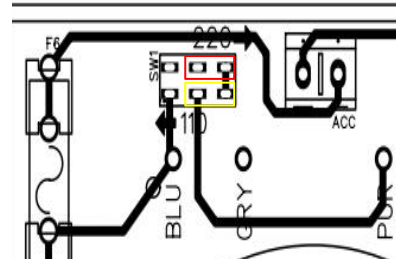
Your 1176 has a voltage selector pad. Use the trimming from a resistor to jump the connection. Depending on your country, connect the tabs as follows:

110v mains



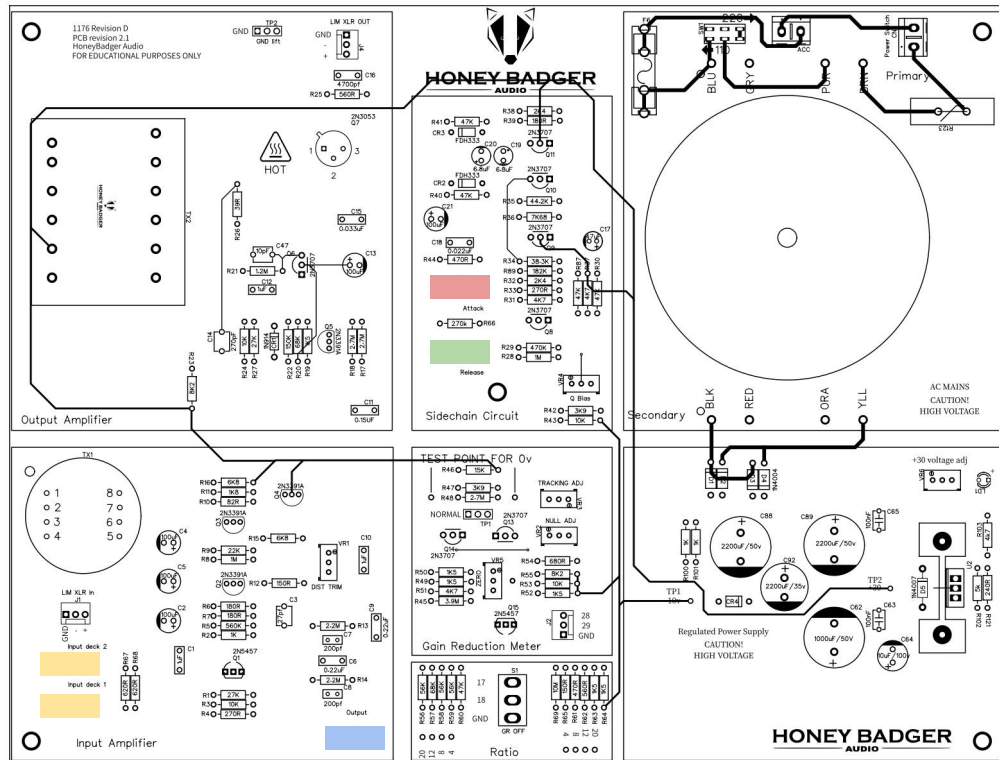
North America

220v mains



Europe

Potentiometers



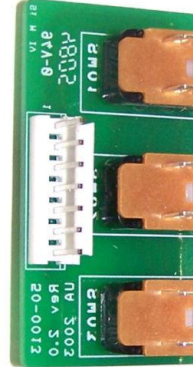
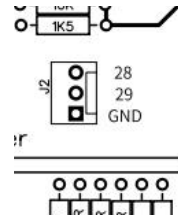
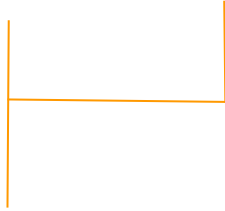
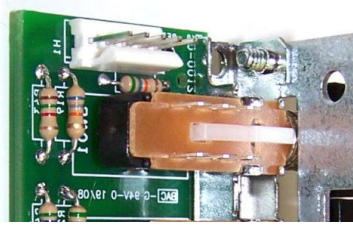
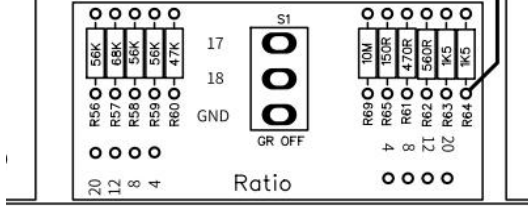
Dual 10kΩ: P3/4

25kΩ: P1

250kΩ: P2

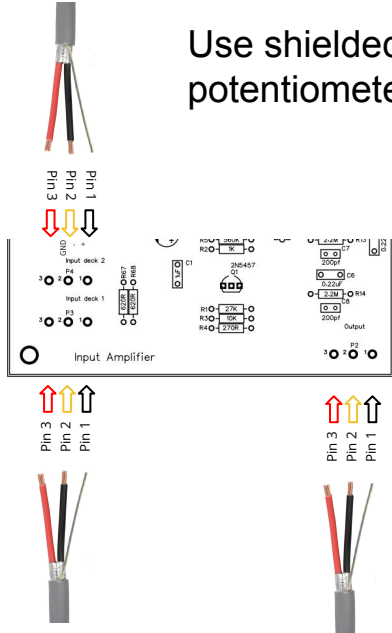
5MΩ: P1

Wiring Rail Switches

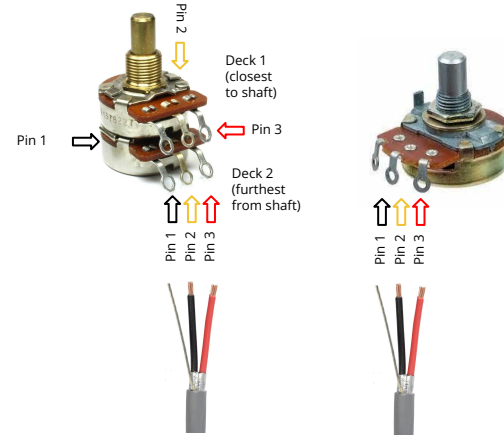


Wiring Potentiometers

Use shielded audio cable for all potentiometer wiring.

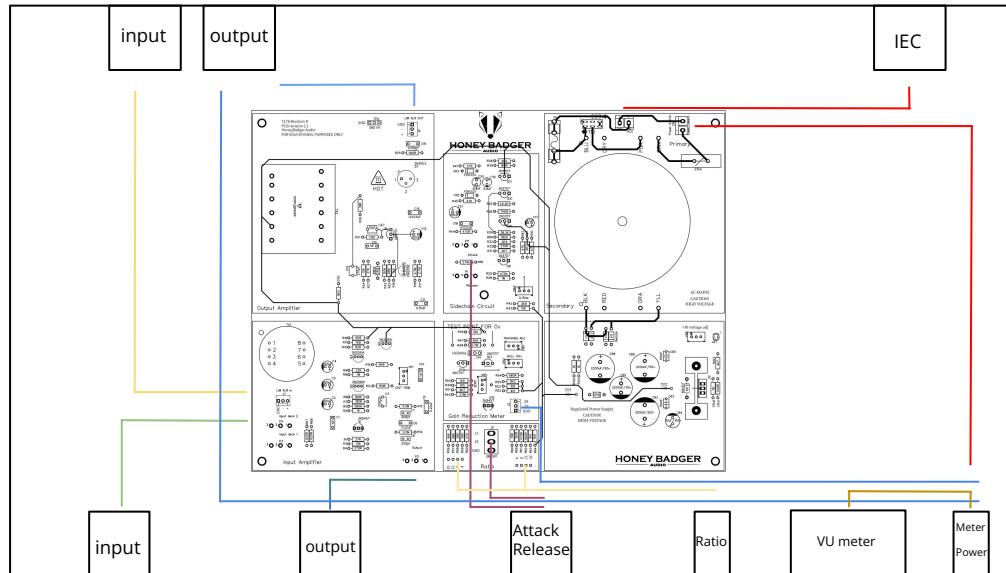


Identifying the pins on the potentiometers is important to wiring them correctly. If you are looking at the front, pin 1 will be the first on the left, followed by pin 2 in the center, and 3 on the right.



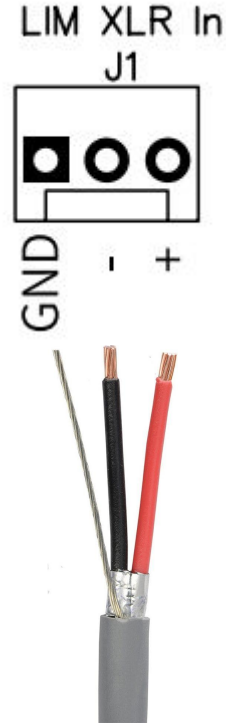
Wiring considerations

Wiring is an important part of the construction. Many manufacturers take care to run the audio lines away from Alternating current to ensure noise does not get into the audio path. Here are some considerations when running the lines:



Wiring Audio lines

Wiring audio lines is an important part of the construction. Take care to run the lines away from Alternating current to ensure noise does not get into the audio path.



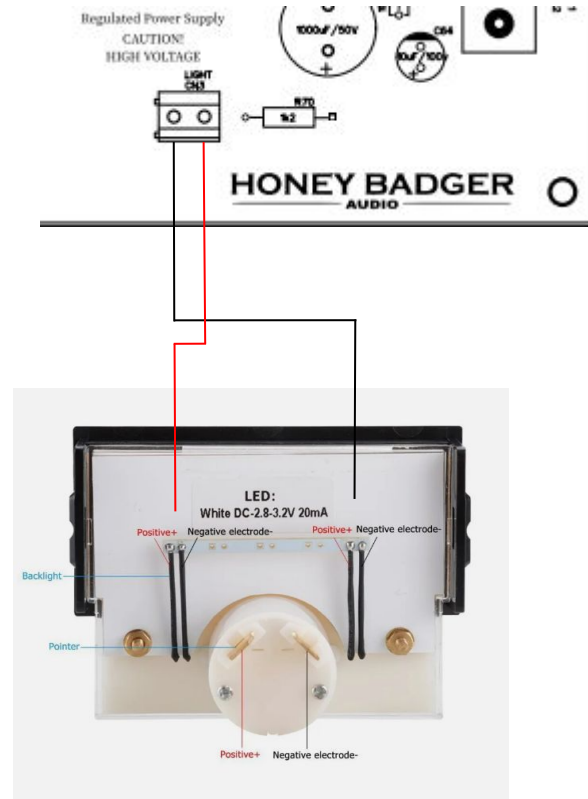
Installing VU meter



1. Mount the plastic trim through the front of the front panel.
2. Attach the VU from the rear of the front panel.
3. Slide the tab that will hold the set screw through the insert.
4. Screw the set screw to the tab and adjust to finger tightness.
5. Do the same for the other side.
6. Adjust with a small flat screwdriver, and **DO NOT** overtighten.

Wiring VU meter light

The VU meter comes with an LED backlight that needs to be wired in. The backlight is polarity sensitive so it is important to wire it as follows:



Calibrating Voltage Regulator

You will need the following tools:

- Multimeter, preferably with alligator clip on the black so you can be hands free
- Mini flat screwdriver

How to adjust:

- Begin by setting your multimeter to measure DC volts
- Put the black clamp lead on the main chassis ground terminal
- Put the red lead at TP2
- Turn the unit on
- Observe the voltage on the meter. If it is above or below 30vdc, adjust the trimmer VR6 (30v adjust) until +30v is met.

Calibrating Compressor (setup)

Setting up the compressor is done in 3 stages. The first is to set the Q bias adjustment. This sets the Q1 to be slightly into conductance and will be essential to the remainder of the adjustments. Set the controls as follows:

- Input and output to 12 o'clock position
- Attack full clockwise (fastest)
- Release full clockwise (fastest)
- Ratio 20:1
- Meter mode in Output +4 mode

Calibrating Compressor (Q BIAS)

Next is to send a fixed signal until a set amount of gain reduction occurs. To do this, you will need a signal generator set to output 0dBu (0.775vac). Adjust the setting as follows:

- With the input signal set, adjust the output until +1 is seen on the VU meter.
- Adjust VR4 (Q Bias) until a drop of 1 dB occurs and the meter reads 0dB.

The unit is now compressing audio and is ready for the next step.

DO NOT ADJUST THE Q BIAS AFTER THIS STEP.

Calibrating Compressor (Null Adjust)

The next adjustment is to balance the transistors Q13 and Q14. Begin by adjusting the controls as follows:

- Ratio at 20:1
- Disconnect the signal generator.
- Set the Meter mode to Gain Reduction.
- Remove the jumper at TP1.



Now you can begin the adjustment. The goal in this section is to measure 0v across resistor R48. To do this, we need to adjust two trimmers VR2 (Null adj) and VR5 (zero adj). Begin by adjusting the Zero adjust to 0dB on the VU meter.

Calibrating Compressor Continued (Null Adjust)

Next, set your multimeter to measure DC volts. Place the leads on either end of R48 (it will help to have alligator clips so that your hands are free to make the adjustments). Now make the following adjustments:

- Turn the Null Adjust trimmer until 0 volts is met.
- Adjust the Zero Adjust until 0dB is on the meter.
- Readjust the Null Adjust trimmer to 0 volts.

Repeat this cycle until both criteria are met. Once you have 0 volts across R48 and 0dB on the VU meter, you can replace the jumper at TP1. You will need to adjust the Zero Adjust once the jumper is placed back in the Normal position.

Calibrating Compressor (Meter Adjust)

Your compressor is now compressing audio as it should. The next step is to accurately show how much gain reduction is occurring. To do this, you will need to set the controls as follows:

- Input and output at 12 o'clock
- Attack and release full clockwise (fastest)
- Ratio at 20:1
- Meter mode set to Output +4dB

Connect a signal generator and set it to 0dBu (0.775vac).

Calibrating Compressor continued: External controls (Meter Adjust)

Now that you have everything set up, you can begin setting the controls as follows:

1. Adjust the output control to read 0dB on the meter.
2. Turn the attack control full counter clockwise (GR off position).
3. Observe a drop in signal. If no drop occurs, increase the input and decrease the output making sure the output level on the meter reads 0dB.
4. Turn the Attack control to turn on gain reduction.
5. Observe the drop. If it is less than -10dB on the meter, repeat step 3.

The goal here is to see 0dB on the meter when gain reduction is OFF and -10dB when the gain reduction is ON. It may take some time, but once these requirements are met, **DO NOT TOUCH** the **Input and Output** controls. Otherwise, you will need to start over.

Calibrating Compressor continued: Internal controls (Meter Adjust)

Once you have met the requirements and you see a drop of 10dB when the gain reduction is ON, you can begin with the adjustments internally:

1. Set the Meter mode to GR.
2. Set the attack to full clockwise (GR OFF).
3. Adjust the Zero adjustment if the meter does not read 0dB.
4. Turn the gain reduction ON.
5. Observe the drop in signal. If the meter does not show -10dB, adjust VR3 (Tracking Adjust) until it reads -10dB on the VU meter.
6. Turn gain reduction OFF.
7. Adjust the Zero adjust trimmer to read 0dB.
8. Observe the drop. If the drop is anything other than -10dB on the meter, repeat step 5.

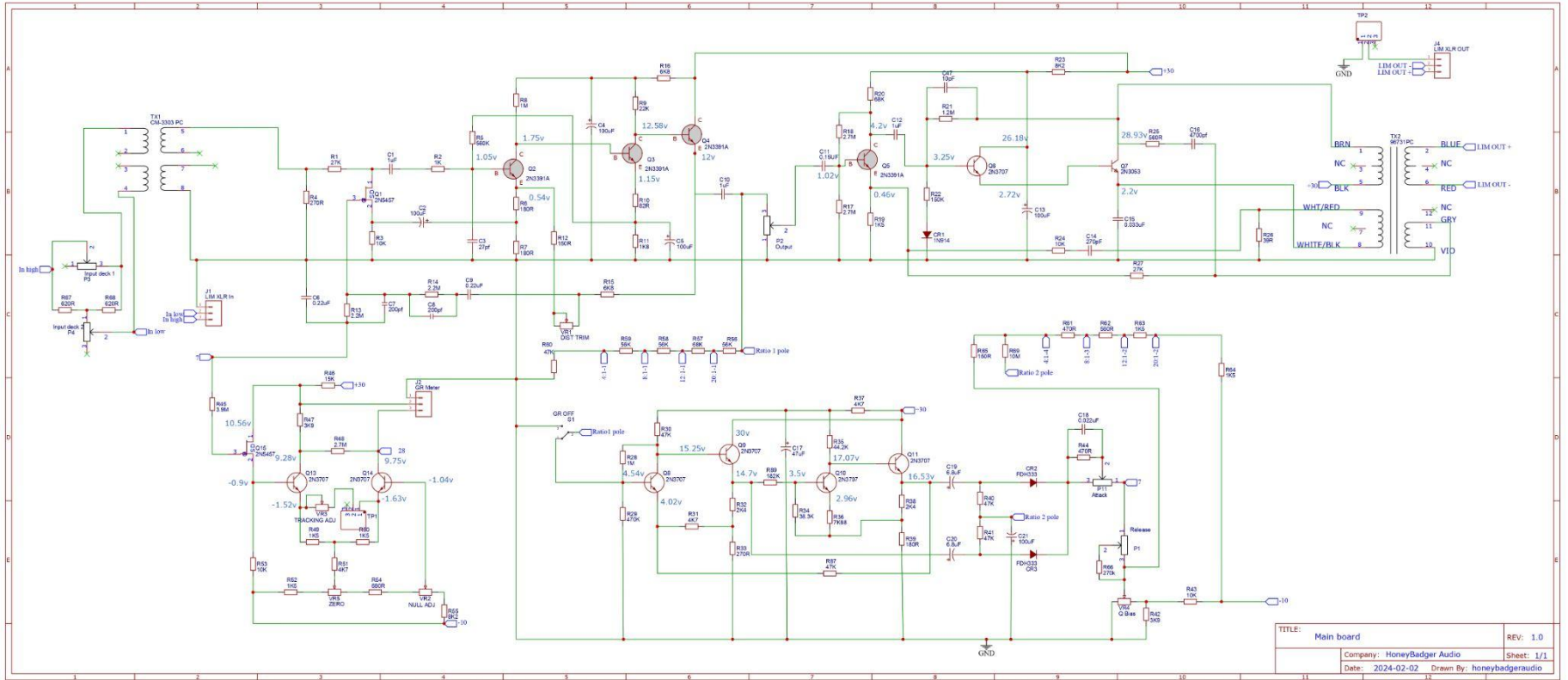
Calibrating Compressor continued: Internal controls (Meter Adjust)

The goal in this step is to read 0dB when gain reduction is OFF and -10dB when gain reduction is ON. Once you have met these requirements your unit is fully calibrated and ready to pass audio.

Your unit is fully calibrated.

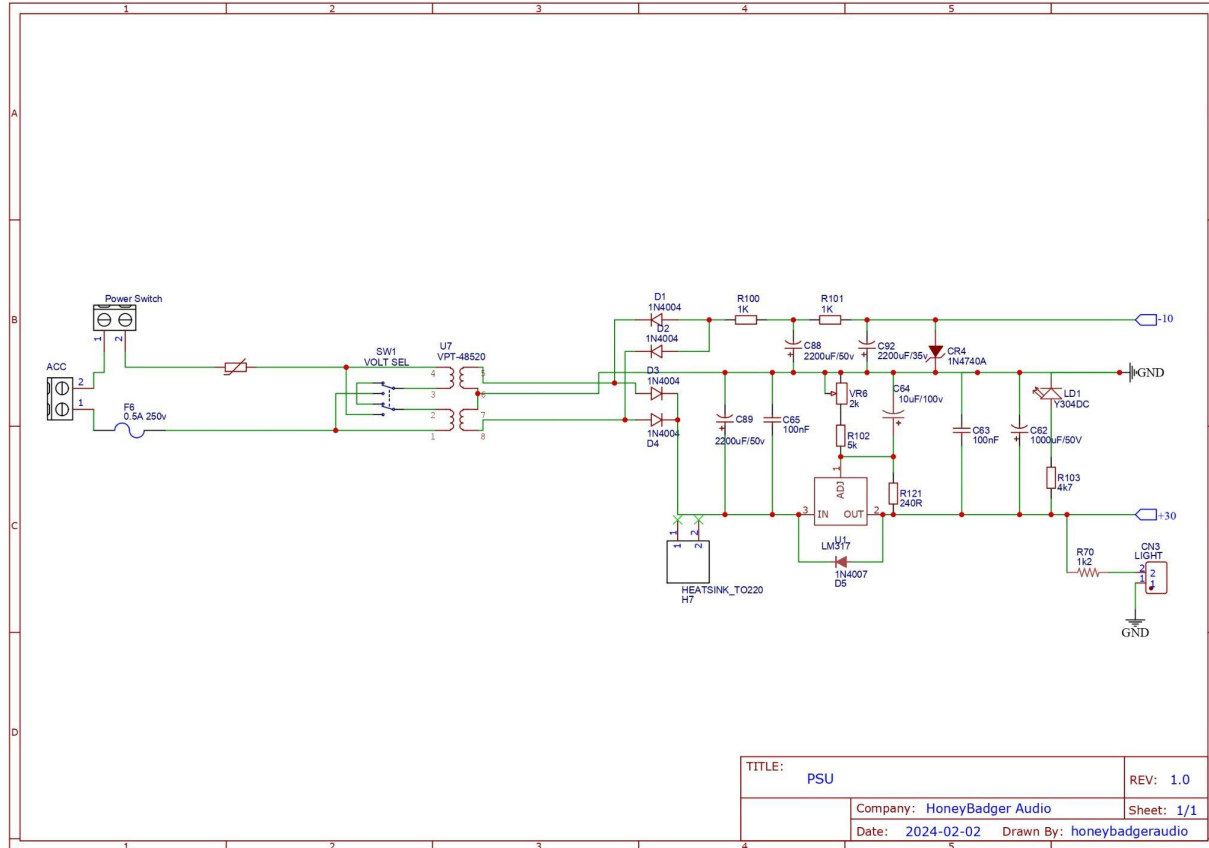
CONGRATULATIONS!

Schematic Amplifier



TITLE:	Main board	REV:	1.0
	Company: HoneyBadger Audio	Sheet:	1/1
	Date: 2024-02-02	Drawn By:	honeybadgeraudio

Schematic Power Supply



Bill Of Material

Resistors			Film Capacitors			Electrolytic		
value	position	qty	value	position	qty	value	position	qty
39R	R26	1	10pf	C47	1	10uF/100v	C64	1
82R	R10,	1	27pf	C3	1	47uF/35v	C17	1
150R	R12, 65	1	200pf	C7, 8	2	100uF/35v	C2, 4, 5, 13, 21	5
180R	R6.7.39	3	270pf	C14	1	1000uF/50v	C62	1
240R	R121	1	4700pf	C16+	1	2200uF/35v	C92	
270R	R4.33	2	100nf	C65, 63	2	2200uF/50v	C88, 89	
470R	R44, 61	2	0.022uF	C18	1			
560R	R62, 25	2	0.033uF	C15	1	Tantalum		
620R	R67.68	2	0.15uF	C11	1	6.8uF/35v	C19, 20	2
680R	R54	1	0.22uF	C9, 6,	2			
1k	R2.100.101	3	1uF	C1, 10, 12	3			
1k5	R19, 49, 50, 52, 63, 64	6				Thermistor		
1k8	R11,	1	Trimmer			20R	R123	1
2k4	R32, 38,	2	value			Fuse		
3k9	R42, 47	2	100R	VR1	1	0.25A	F6	1
4k7	R31, 37, 51, 103	4	1k	VR6	1			
5k	R102	1	2k	VR2, 3, 4	3	Transistors		
6k8	R15, 16,	2	2k single turn	VR5	1	2N5457	Q1, 15	2
7k68	R36	1				2N3391	Q2, 3, 4, 5	4
8k2	R55, 23	2	Potentiometer				Q6, 8, 9, 10,	
10k	R3, 24, 53, 43,	4	Dual 10k	P3/4	1	2N3707	11, 13, 14	7
15k	R46	1	25k	P11	1	2N3053	Q7	1
22k	R9	1	250k	P2	1	U2	LM317	1
27k	R1, 27	2	5M	P1	1			
38k3	R34	1				TX		
44k2	R35	1	Diodes			CM3303	TX1	1
47k	R40, 30, 87, 41, 60	5	FDH333	CR3, 2	2	CM96731	TX2	1
56k	R58, 59, 56	3	1N914	CR1	1			
68k	R57, 20	2	1n4007	D5	1	Connectors		
150k	R22	1	1N4004	D1-4	4	2x 5.08	CN1, 2	2
270k	R66	1	1N4740	CR4	1	3x 2.54	J1, 4	2
470k	R29	1				4x 2.54	SEE RATIO	2
1M	R8, 28	2	LED			3 pin header	TP1, 2	2
1.2M	R21	1	YLL LED	LD1	1			
2.2M	R13.13	2						
2.7M	R17, 18, 48	3						
3.9M	R45	1						
10M	R69	1						



HONEY BADGER
— AUDIO —

1176 Revision D

Educational Build Guide

www.honeybadgeraudio.com