TrashCompactor24

FX Type: **COMPRESSOR**
Build Level: Intermediate
Based On: madbean original

Last Updated: August 19, 2024 4:54 PM
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The *2024 version* of the **Trash Compactor** has no circuit changes. The PCB layout has been converted to the Standard Series template.

Overview

The **TrashCompactor** is designed as a "studio" quality, VCA-based compressor with a high dynamic range. Okay. "Lotta of fancy terms, there fancy pants," you are saying. And, yes - it's the same marketing drivel all pedal manufacturers say about their compressors. But, unlike them, I am a wizard. I am a wizard in the sense that I copied THAT's compressor application note for the 4305, put a sensible audio wrapper around it and it works like a charm. That's the magic: taking other people's ideas and ~~monetizing~~ expanding upon them.

Although the TrashCompactor could have been designed as a single supply circuit, I decided to keep the bipolar supply suggested in the design note. Not many guitar compressors utilize this approach so it's worth a few extra steps for the increased dynamic range a dual supply offers. In addition, I included a JFET input buffer, volume output control and dry signal mix. That last thing turns out to be a great addition. Dialing in a little uncompressed signal in parallel with the compressor adds in some high end and sparkle to the output. Altogether, this is a great sounding compressor that offers an alternative to the optical/transistor based ones that comprise many guitar pedals.

The only downside is the THAT4305 is a QSOP16 IC. That means tiny and very difficult to hand solder (unless you are experienced and prepared to rework potential soldering errors). For that reason, I am offering the TrashCompactor with the option of a pre-soldered breakout board that already contains the 4305. Ordering the project with this option means you only need to solder in pin headers and then solder the breakout board to the main PCB. That makes this project accessible to pretty much all levels of DIY builders.
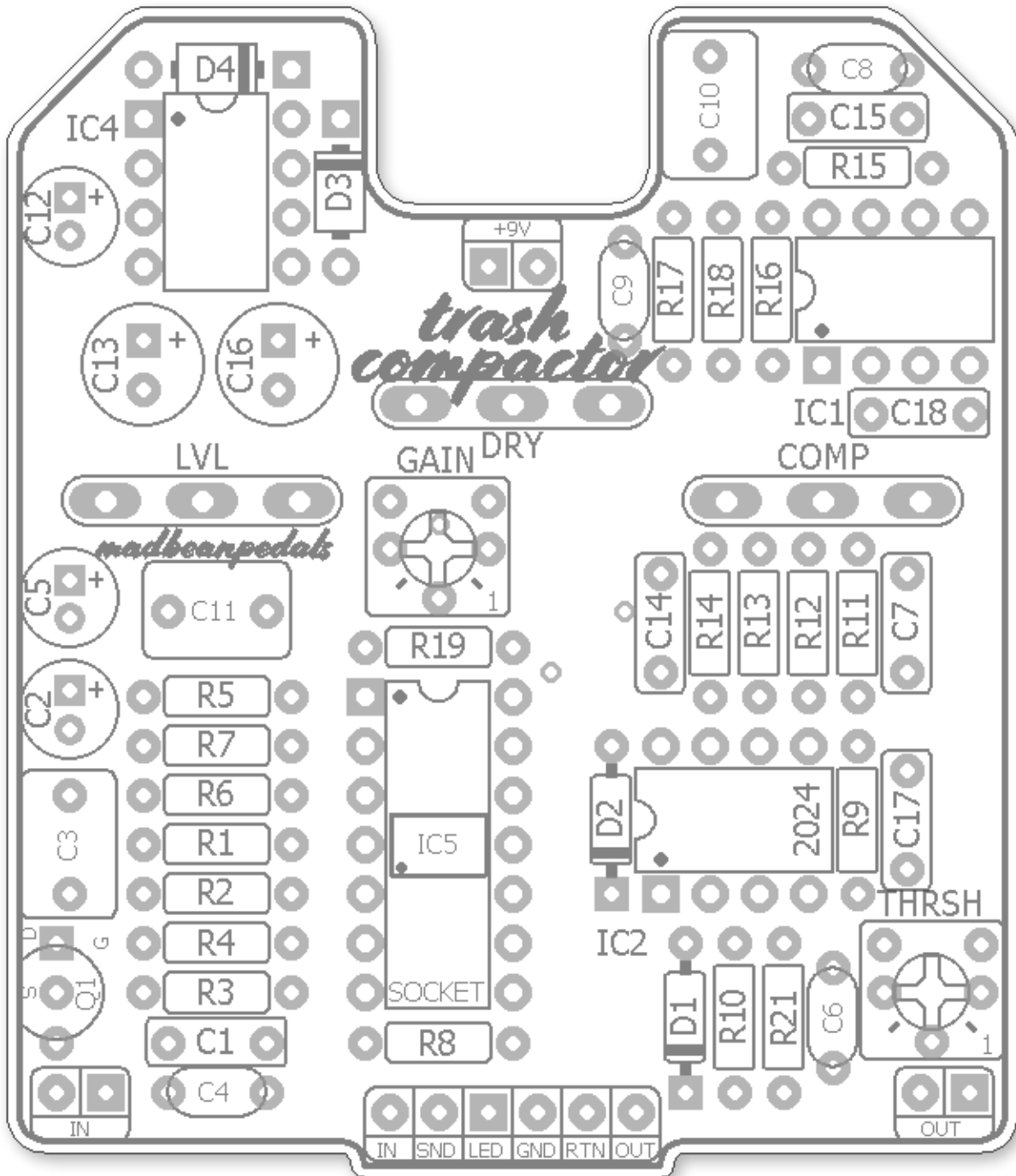
Controls

- **LVL:** Active volume control/boost.
- **COMP:** Compression amount. From minimal to rather extreme.
- **DRY:** Clean (uncompressed) signal amount. This blends in parallel with the compressed signal.
- **THRESH/GAIN:** These trimmers set the threshold detection and gain recovery amount of the 4305. See notes.

12v

TC1044SCPA

5817

47uF +

100uF +

100uF +

+ | −

trash compactor

① ② ③

10kB

1uF

330pF

100n

20k

150pF

100k

1k

10k

NE5532

100n

50kA

③ ② ①

madbeanpedals

10uF +

1uF

47uF +

1uF

33k

6k2

20k

1k

1M

10k

1M

47n

2n5457

S | T

100pF

10k 1

10k

THAT4305

5k1

10kB

③ ② ①

100n

5k1

620k

10k

1k4

100n

914

LM1458

2024

10k

100n

914

240k

10k

22pF

10k 1

S | T

IN | SND | LED | GND | RTN | OUT
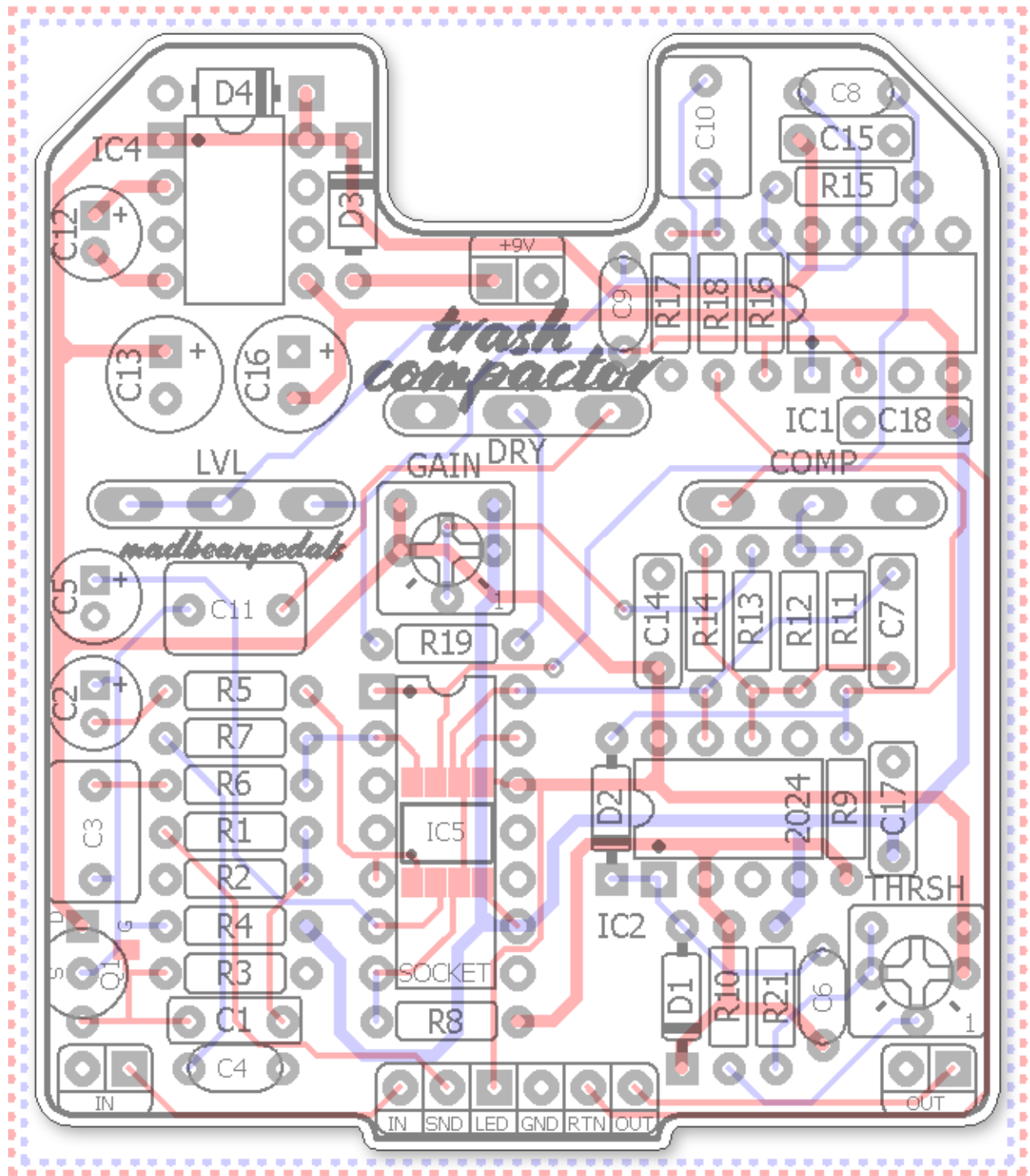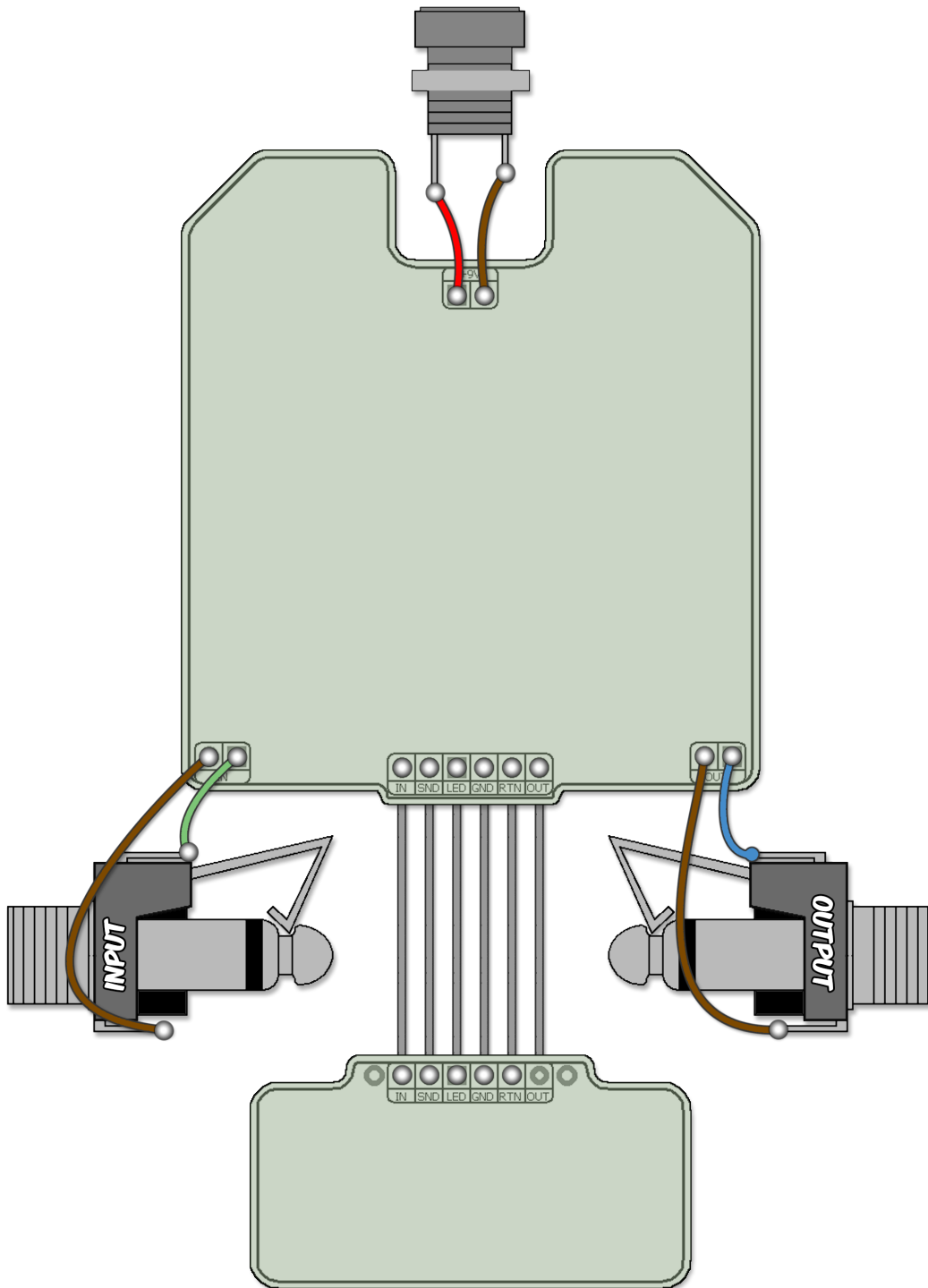
Wiring

Unless otherwise noted, all Standard Series projects have the same wiring for both the **SSBP** and **SSABP** bypass boards. A 6-pin, 2" ribbon cable is recommended for soldering the connections between the two PCBs.

B.O.M.

Resistors		Caps		Diodes	
R1	1k	C1	47n	D1	1n914
R2	1M	C2	47uF	D2	1n914
R3	1M	C3	1uF	D3	1n5817
R4	10k	C4	100pF	D4	12v Zener
R5	33k	C5	10uF	**Transistors**	
R6	20k	C6	22pF	Q1	2n5457
R7	6k2	C7	100n	**ICs**	
R8	5k1	C8	330pF	IC1	NE5532
R9	10k	C9	150pF	IC2	LM1458
R10	240k	C10	1uF	IC4	TC1044SCPA
R11	1k4	C11	1uF	IC5	THAT4305
R12	10k	C12	47uF	**Trimmers**	
R13	620k	C13	100uF	GAIN	10k
R14	5k1	C14	100n	THRSH	10k
R15	20k	C15	100n	**Pots**	
R16	10k	C16	100uF	DRY	10kB
R17	100k	C17	100n	COMP	10kB
R18	1k	C18	100n	LVL	50kA
R19	10k				
R21	10k				

THAT4305:
https://www.mouser.com/ProductDetail/887-4305Q16-U

Shopping List

| Value	QTY	Type	Rating
1k	2	Metal / Carbon Film	1/8W
1k4	1	Metal / Carbon Film	1/8W
5k1	2	Metal / Carbon Film	1/8W
6k2	1	Metal / Carbon Film	1/8W
10k	6	Metal / Carbon Film	1/8W
20k	2	Metal / Carbon Film	1/8W
33k	1	Metal / Carbon Film	1/8W
100k	1	Metal / Carbon Film	1/8W
240k	1	Metal / Carbon Film	1/8W
620k	1	Metal / Carbon Film	1/8W
1M	2	Metal / Carbon Film	1/8W
22pF	1	Ceramic / MLCC	25v min.
100pF	1	Ceramic / MLCC	25v min.
150pF	1	Ceramic / MLCC	25v min.
330pF	1	Ceramic / MLCC	25v min.
47n	1	Film	25v min.
100n	5	Film	25v min.
1uF	3	Film	25v min.
10uF	1	Electrolytic	25v min.
47uF	2	Electrolytic	25v min.
100uF	2	Electrolytic	25v min.
1n914	2		
1n5817	1		
Zener	1	12v	1W
2n5457	1	or, MMBFJ201	
NE5532	1		
LM1458	1		
TC1044SCPA	1		
THAT4305	1		
10k	2	Bourns 3362p or 6mm	
10kB	2	PCB Right Angle	16mm
50kA	1	PCB Right Angle	16mm

Additional Hardware

(1) 1590B enclosure
(2) Lumberg 1/4" Compact mono jacks
(1) Slim 2.1mm DC jack
(1) Standard 3PDT footswitch
(1) 5mm LED

Build Notes

- Unless you are pretty experienced with SMT soldering I recommend getting the pre-soldered breakout board. But, if you want to push yourself a bit you can certainly try soldering the 4305 yourself. You'll need to do it directly to the Trash Compactor PCB since the breakout board is only included with a pre-soldered chip. Just make sure you have some flux and small core solder. And, some solder wick would be a good idea!

- For the new Standard Series version of the Trash Compactor, the breakout board now comes with both the 4305 chip and the pins pre-soldered. You will only need to solder the breakout to the Trash Compactor PCB.
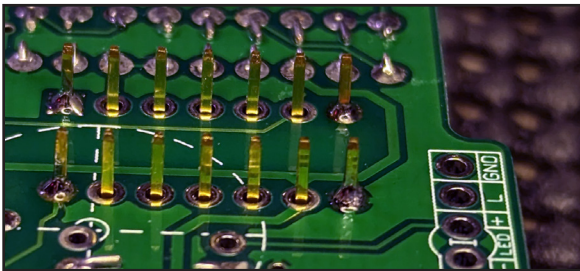
Load the board to the main PCB. Solder the first and last pin of each row. It helps if you use a little BluTac or some temporary fastener on the top side to keep things in place.
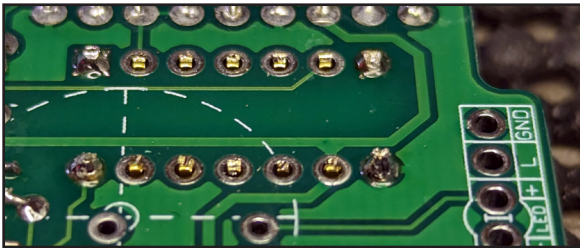
Gently trim the excess pins back to 1mm or so above the pads. Now solder in the remaining pins. You should reheat the first and last pins you did previously, as well.

Calibration

- Calibrating the compressor is straight-forward. The THRSH trimmer sets the sensitivity of the envelope detector which controls how much the signal is compressed through the 4305. The highest compression amount is full CCW, but you don't want to use this setting. You'll want a setting that provides a very high amount of compression when the COMP control is full up, but not so much that it completely crushes the audio. I landed on about 1/3 to 1/2 up which gave a perfect range from very subtle to very, very squishy.

- The highest COMP settings will cause a big reduction in audio level so the GAIN trimmer is used to set the makeup gain. What you want here is to set the GAIN trimmer so enough volume is added back at the highest COMP setting, but not so much that the total output gets too high when the COMP is turned down. It's really just a balancing act to find the middle ground. Again, about 1/3rd up seemed right to me.

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Build Notes

- The COMP control will reduce the output volume no matter how you have the trimmers set, so there is an active LVL boost at the end of the circuit to balance out different COMP and DRY settings.

- The DRY control is most useful once the COMP control is about 1/2 up. It adds back some uncompressed signal into the output which brightens it up a bit. At lower COMP settings, the DRY control should be left off.

     With minimal comp, it's also a decent signal booster.

- NOTE: I don't recommend using the Softie soft-touch bypass with this project. I used that initially but found it was fairly loud when switched. A regular 3PDT bypass worked out better. Some pop is normal. If you want something dead silent, use a relay bypass that mutes the output when switched. The CODA bypass does this.

     https://www.coda-effects.com/2016/04/relay-bypass-conception-and-relay.html

THAT4305 Datasheet: https://www.thatcorp.com/datashts/THAT_4305_Datasheet.pdf
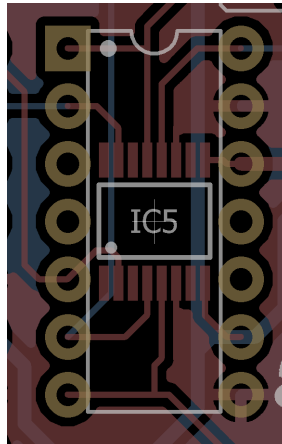
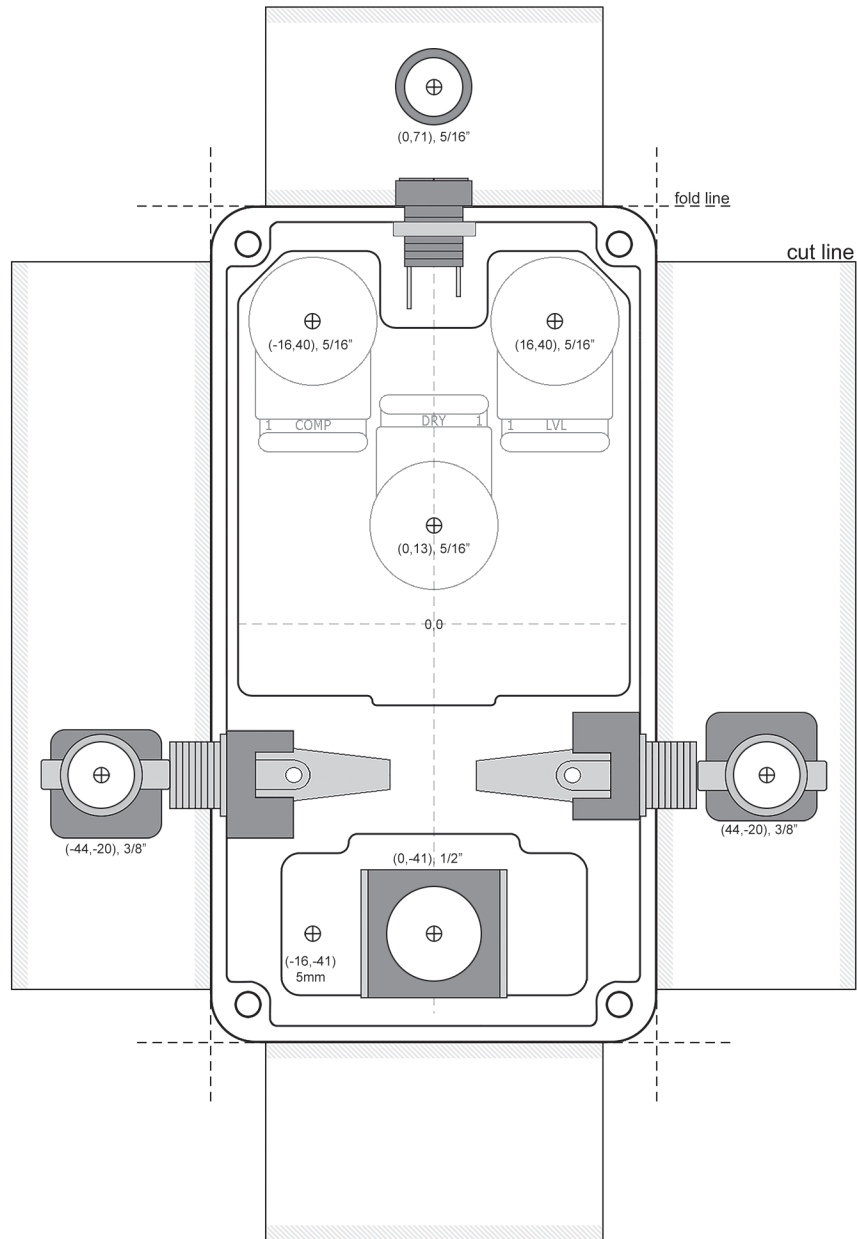Closeup of the pin arrangement on the breakout board.

Circuit Voltages

IC1	NE5532	IC5	THAT4305
1	431mV	1	0
2	0	2	-4mV
3	0	3	~0
4	-8.72	4	-2mV
5	0	5	-3.6mV
6	-2mV	6	-265mV
7	-49mV	7	-265mV
8	9.22	8	0
IC2	**LM1458**	9	0
1	-4mV	10	0
2	0	11	-30mV
3	0	12	9.22
4	-8.72	13	0
5	0	14	-49mV
6	0	**Q1**	**2n5457**
7	5mV	D	9.22
8	9.22	S	346mV
IC4	**TC1044SCPA**	G	0
1	9.22		
2	5.3		
3	0		
4	-3.68		
5	-8.72		
6	4.26		
7	6.17		
8	9.22		

9.5v One Spot
Current Draw: ~30mA
Knobs @ noon.
Voltages for the 4305 were taken from
the breakout board, not the IC directly.

1590B Drill Template

Coordinates are denoted in (X,Y), drill size format starting from the center (0,0) location of the enclosure.
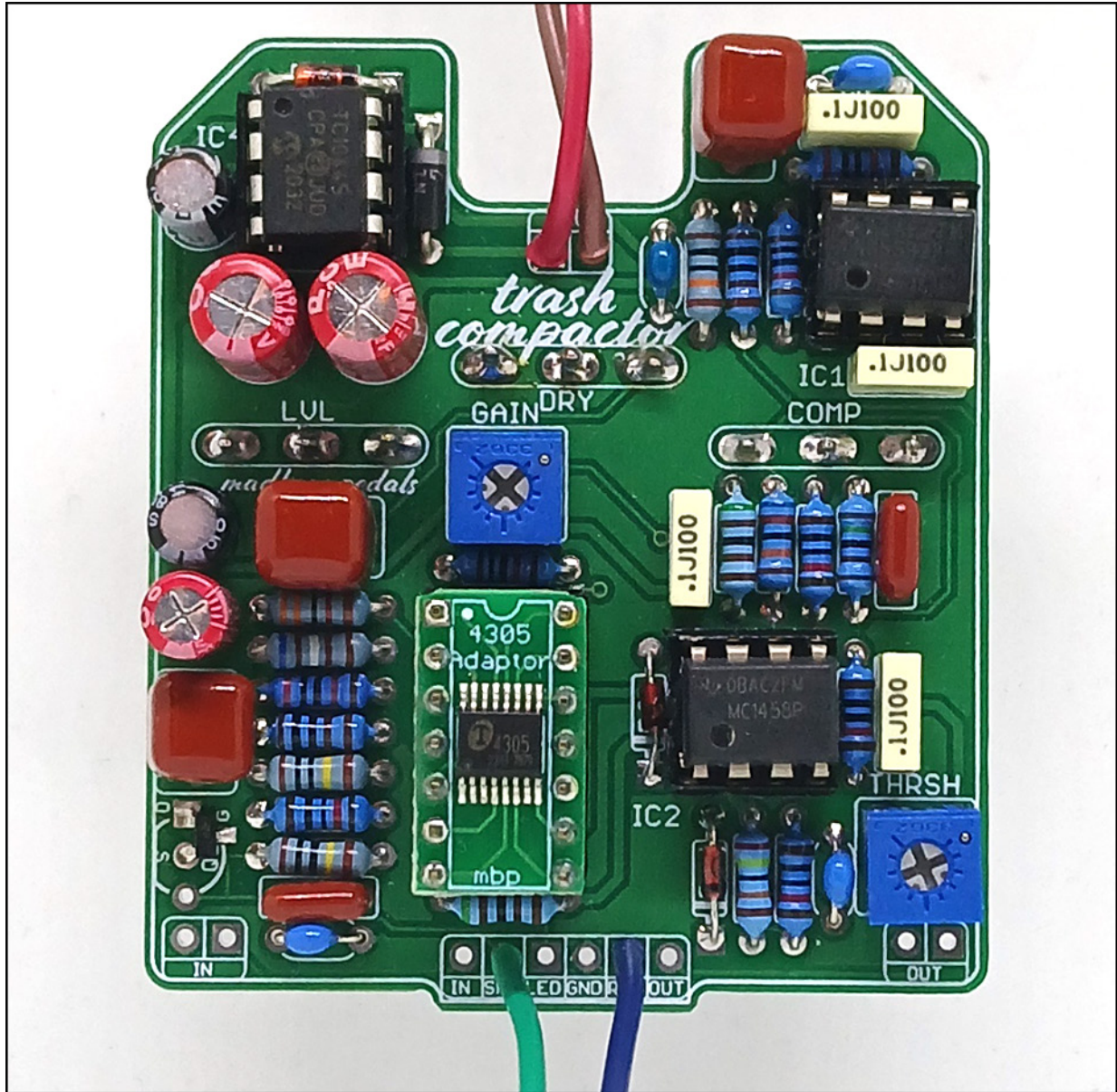
Link to Tayda Standard Series master drill template

(0,71), 5/16"

fold line

cut line

(-16,40), 5/16"

(16,40), 5/16"

1   COMP

DRY   1

1   LVL

(0,13), 5/16"

0,0

(-44,-20), 3/8"

(44,-20), 3/8"

(0,-41), 1/2"

(-16,-41)
5mm

Hardware

1590B enclosure
Lumberg 1/4" Compact mono jacks
Slim 2.1mm DC jack
Standard 3PDT footswitch
5mm LED
NOTE: Different 1/4" and DC jack styles may require different sized drill holes.

TRASH COMPACTOR

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