

1U Buffered Multiple – Build Guide



In this build guide I'm going to assume that you have some basic proficiency in building PCB/panel kits. If this is the very first module you're building, I can highly recommend

<https://learn.adafruit.com/adafruit-guide-excellent-soldering>

The build of this module is not complex. It only has a handful of common components and can be built using the most basic equipment.

- Soldering Iron – I use and can highly recommend the Hakko FX-888D
- Side cutters
- Needle nose pliers (I personally use an 8mm/10mm pipe wrench for pots and Thonkiconn nuts)
- Helping hand (sometimes called third hand) to hold your PCB's – not required, but nice to have.
- A Multimeter to verify component values and check for shorts.



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Bill of materials

Name	Designator	Type	Quantity
10uF	C1,C2	Electrolytic, low profile. Regular height will need to be mounted on the back.	2
100nF	C3,C4	MLCC/Ceramic 5mm lead spacing	2
2.54-1*4P	H1,H4	4 pin header female	2
2.54-1*4P	H2,H3	4 pin header male	2
Thonkiconn	IN,O1,O2,O3	footprint fits various similar parts	4
LED 3MM Bipolar R/G	L1	2 leg bicolor led	1
100K	R1	1/4W 1%	1
1K*	R2	1/4W 1%	1
100R	R3,R4,R5	1/4W 1%	3
TL074CN	U1	TL074 or equivalent available to you	1
10 pin header	U2	boxed header, angled header, or 2x5 pin unboxed	1
14 pin IC socket		I like the machined ones but any type will do	1

Sources I use:

<https://www.thonk.co.uk/>

Potentiometers, knobs, Thonkiconn, rare parts

<https://www.taydaelectronics.com/>

Resistors, generic components, IC sockets

<https://www.tme.eu/nl/en/>

Wima film caps, trim pots, IC's (cheaper than Mouser)

<https://eu.mouser.com/>

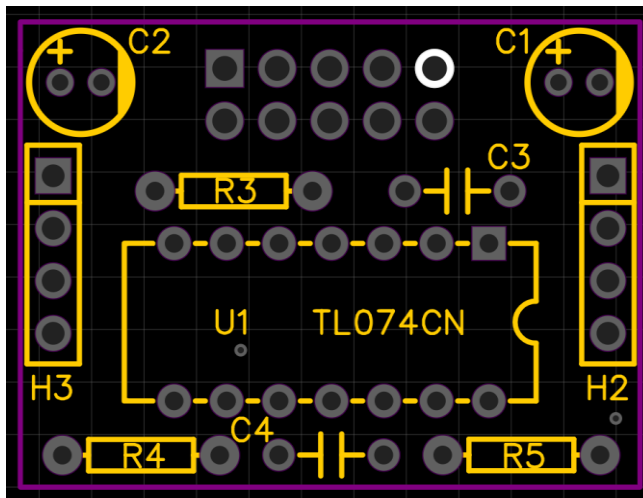
Has almost everything except the Thonk items.

<https://electricdruid.net/>

Rare IC's, vactrols, Electric Druid PIC's



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Main PCB

First install and solder all the flat resistors on the board.

- 100R R3, R4, R5

Install the IC socket → Watch the orientation!

Use the front panel to hold the socket in place while flipping the PCB. Solder in place.

Install the ceramic caps. You can solder these from the top.

- 100nF C3, C4

Install the electrolytic caps → Watch the orientation!

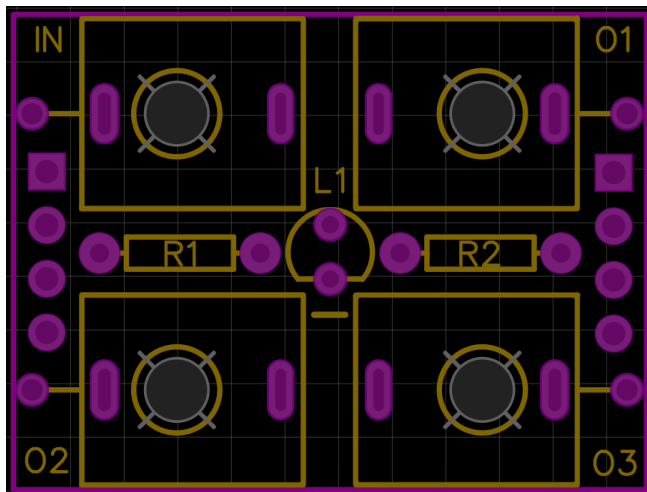
- 10uF C1, C2

Bend the legs a little outwards to hold them in place while flipping the PCB to solder it from the other side.

Install the IDC 10 pin header on the bottom side of the PCB. → Make 100% sure you do this right. It's very hard to unsolder these without destroying the board.



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Interface PCB

First install and solder all the flat resistors on the board.

- 100K R1
- 1K R2

Install the LED, mind the orientation. The flat side on the LED should match the flat side on the silkscreen should → but don't solder yet!

Install the 4 Thonkiconn jacks → but don't solder yet!

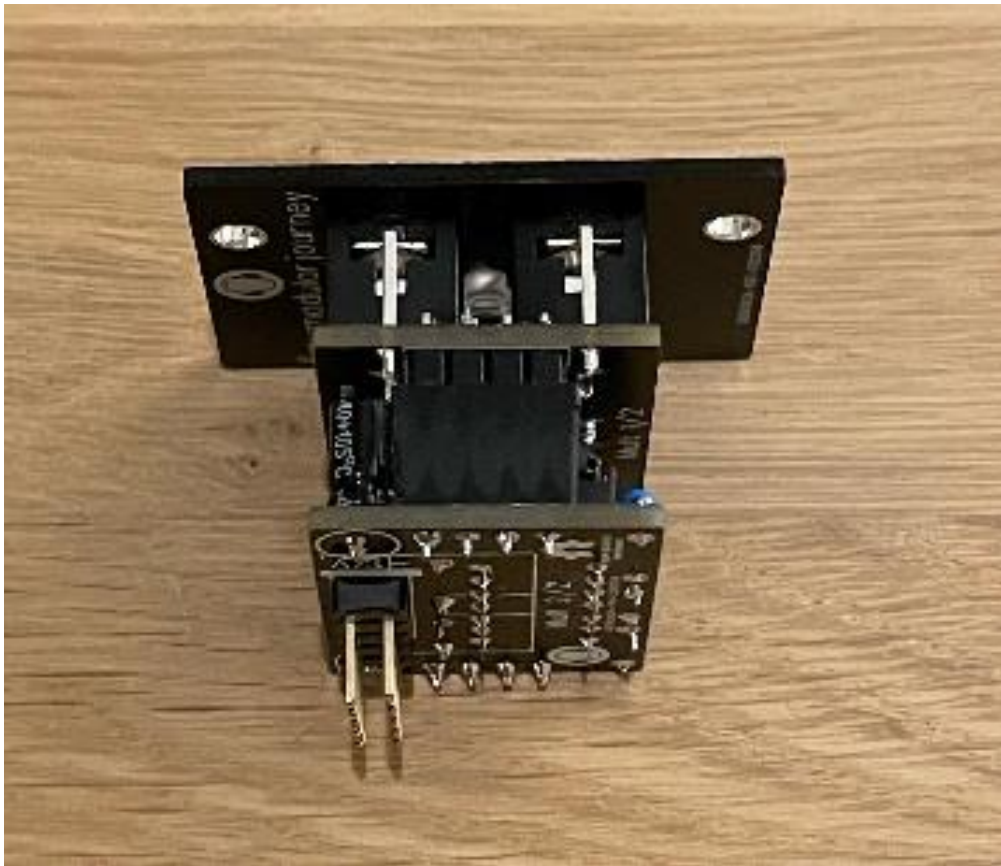
Now take the front panel and tighten the nuts on the Thonkiconn to secure the front panel in place. Make sure they don't rotate under the force. Everything should align up nicely without tension.

Flip the whole thing over and place it on the table. → make sure the LED is in the hole in the front panel.

Solder all front panel components in place.



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Building the sandwich

There are multiple ways to do this, but this is my preferred method.

Start with the front panel still flat on the table.

Assemble the pin headers together.

Make sure that when you install the header assemblies, you build in some safety (poka yoke) measure to be able to never accidentally install the boards in the wrong orientation.

- One of the sides should have female header on the bottom
- One of the sides should have male header on the bottom

Now place the main board on top with the power header on your side. All text should be oriented the same. If not, one of the boards is placed wrong.

Solder one pin on both headers.

Flip the sandwich on its side, like in the picture. Make sure it's all aligned neatly and flat.

Solder all the pins on the headers on the visible side.

Rotate the board and do the same for that side.

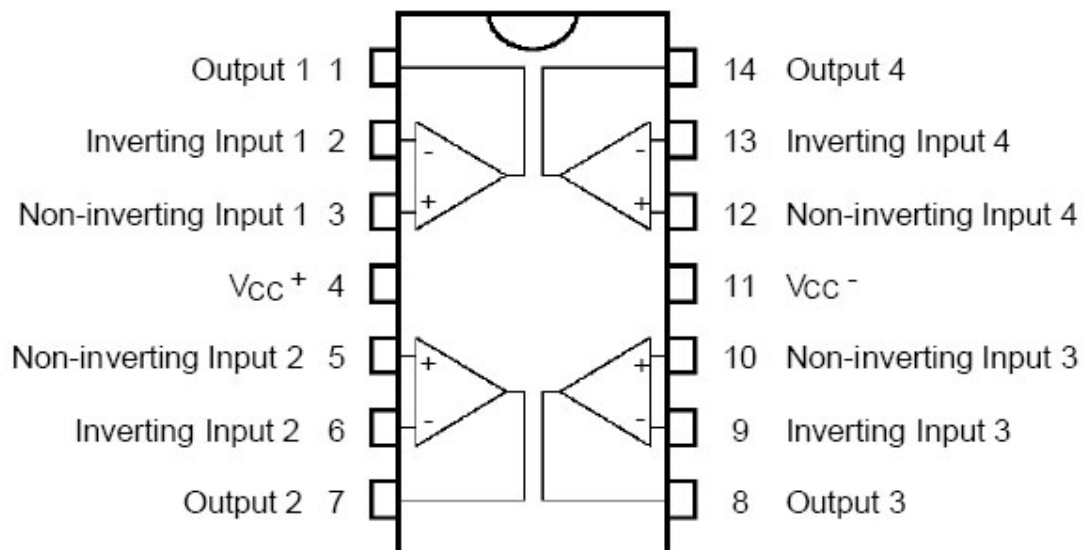


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Power-up & calibration

Before you power up the module, do a continuity test to check for shorts.

- Set your multimeter to resistance.
- Measure the resistance between +12V and ground, -12V and ground, and between the two power inputs. There can be some fluctuations due to the capacitors, but there should never be any shorts. → If you find a short, check your soldering.
- Remove the back PCB
- Connect your power cable → watch the orientation. The red stripe on the cable should match the stripe / -12V label on the pcb.
- Use your multimeter in the volts setting.
- Verify that the pin 4 receives +12V and pin 11 receives -12V.



- Remove the power
- Install the TL074 IC → watch the orientation. The notch should line up with the notch in the socket and silkscreen.
- Reassemble the pcb sandwich.

No calibration required. Your new module is ready to use.

I'm always happy to see if anyone would actually build my modules.

If you finish this and feel like it, tag me on Instagram:

@my_modular_journey or use the hashtag #mymodularjourney so I can see your build.