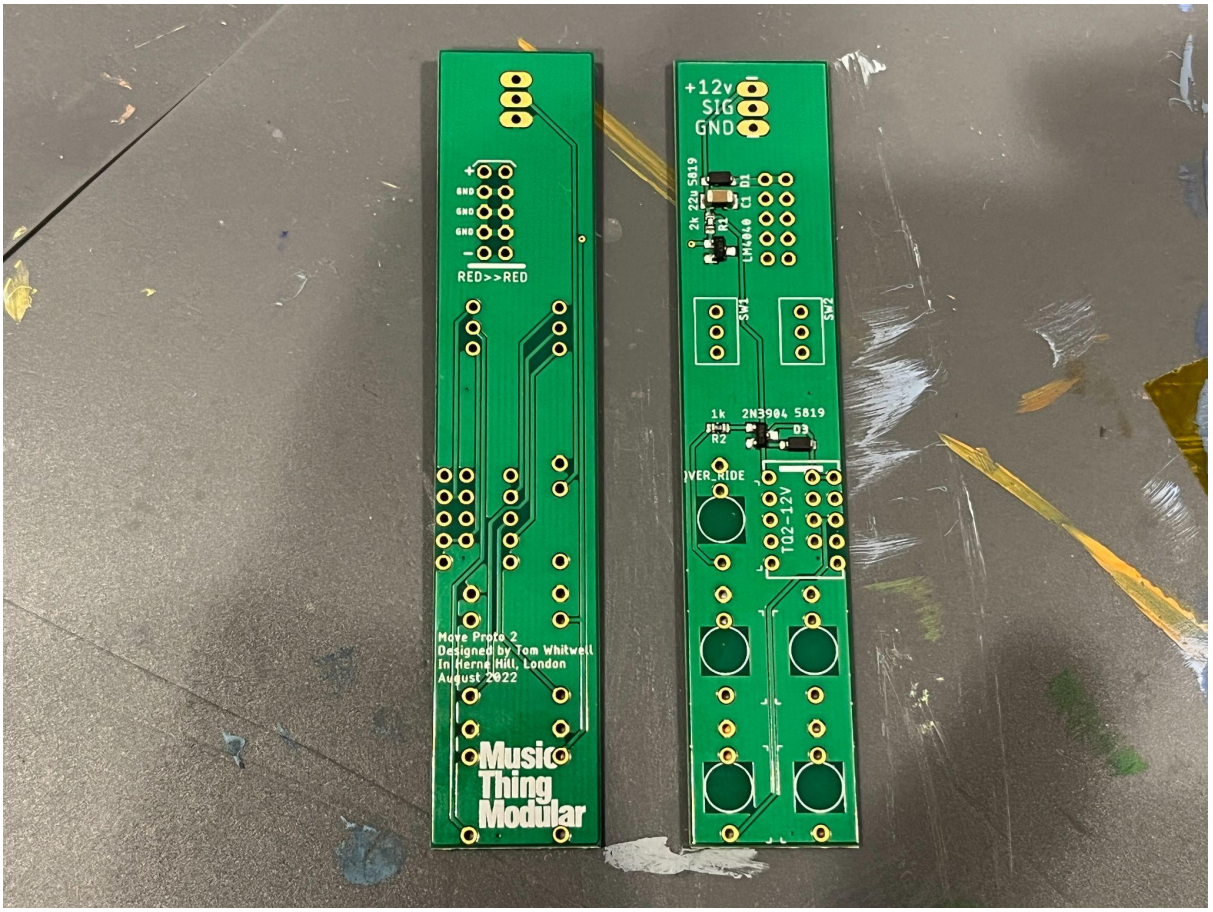
Music Thing Modular: Move

Build Documentation: September 2022

Introduction:

This is a simple module and a simple build - the few active components are SMD components already mounted on the board.

There are a few slightly fiddly mechanical manoeuvers but otherwise it's all fairly straightforward.

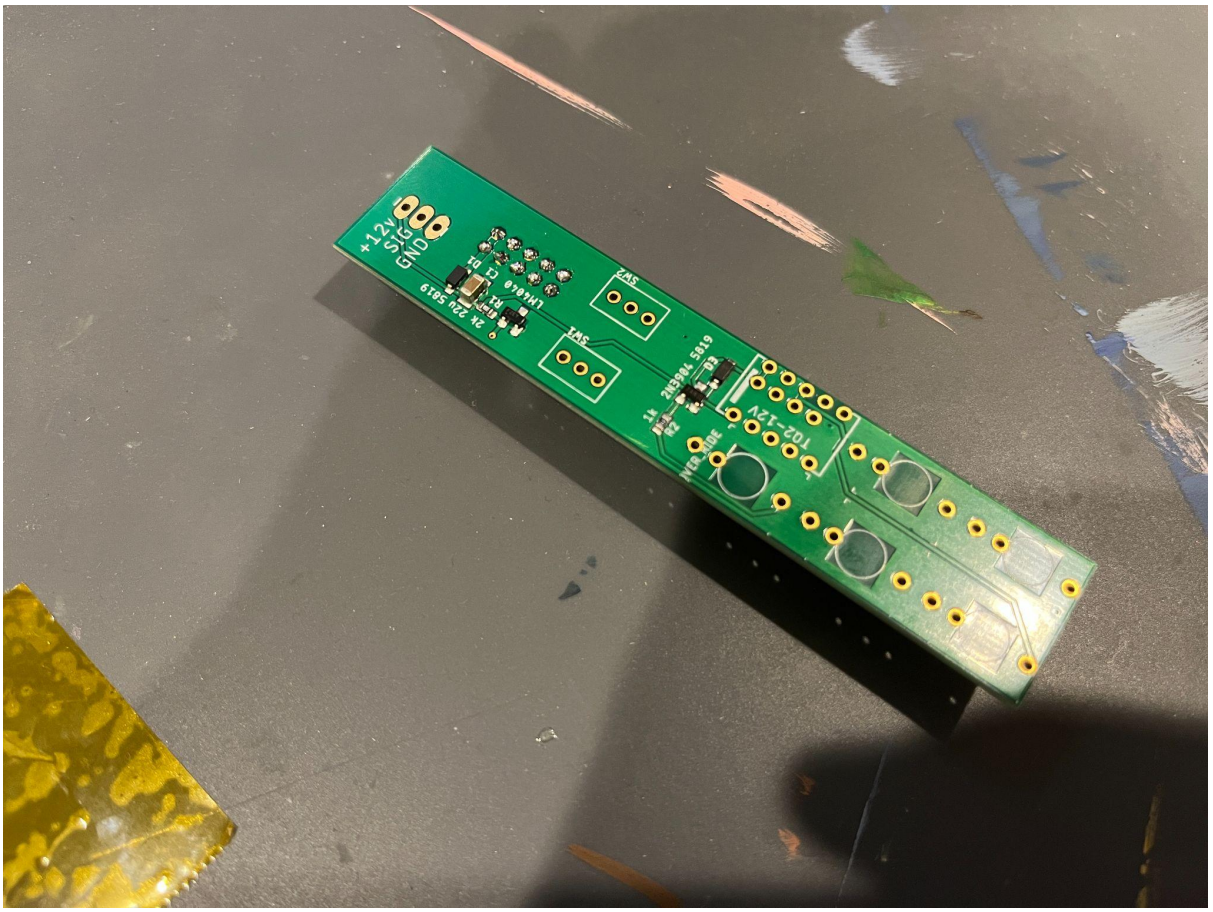


1. Identify the front and back

BACK: The side of the board with the large Music Thing Modular logo is the back. It faces away from the front panel. The power cable is connected to the back of the board by the power header.

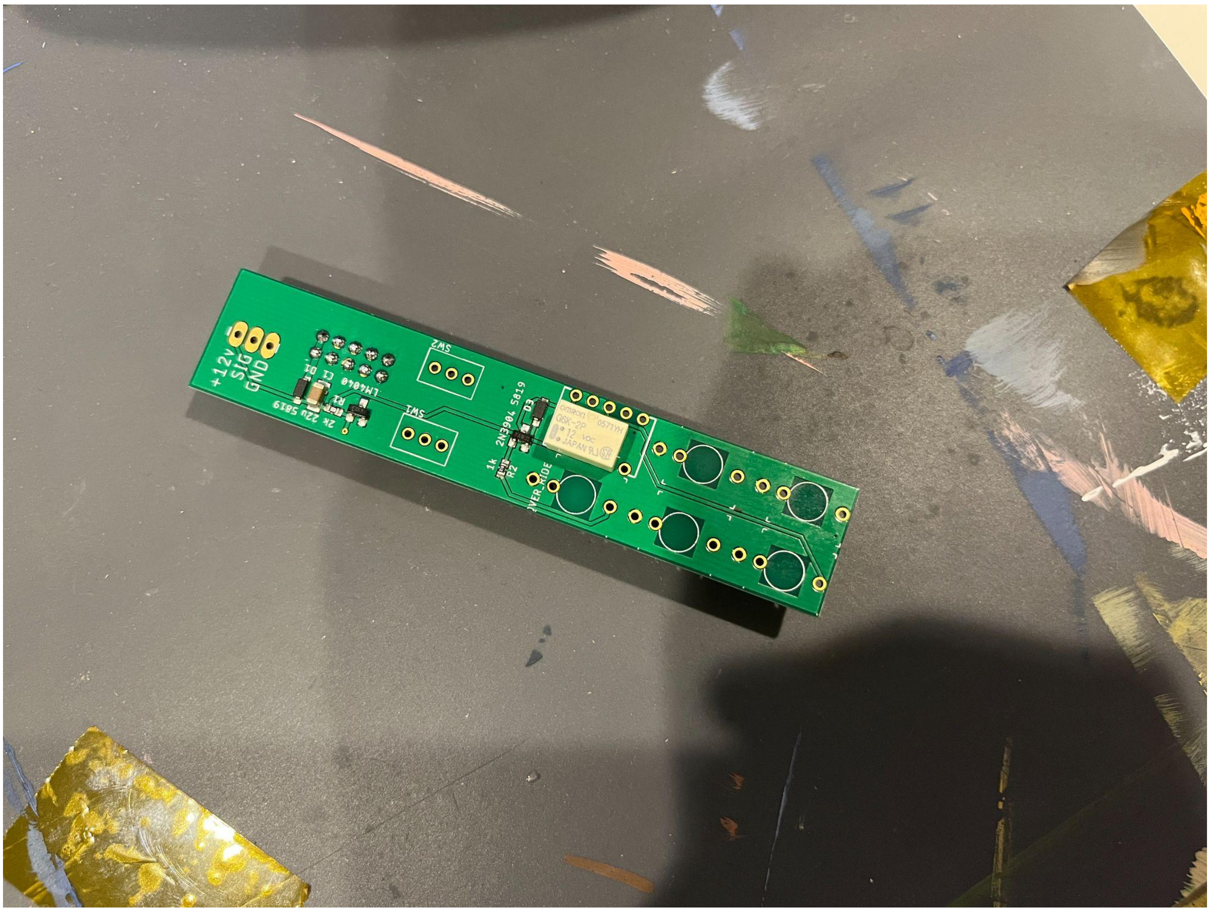
FRONT: The side of board with small components already installed, rectangular markings for switches and the relay is the front. It faces towards the front panel. The majority of components are attached to the front of the board, with pins going through the board, and solder joints on the back.

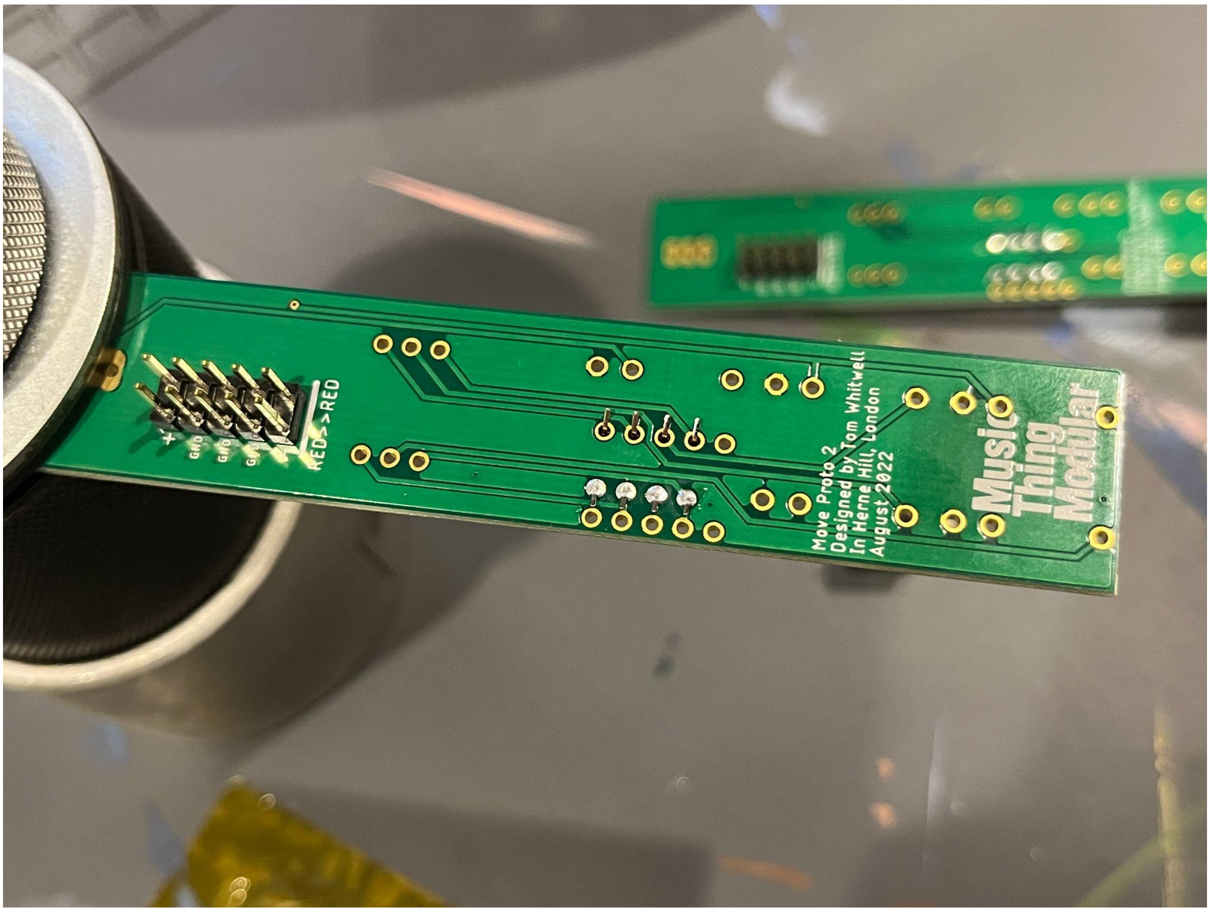

RED<->RED
Music Thing Modular
Wave Proto 2
Designed by Tom Whitwell
In Kerne Hill, London
August 2022


+12v
SIG
GND
SW2
SW1
TO2-12V

2. Attach the power header

The 10-pin power header points out of the back of the module. The black plastic clip is also on the back of the module, and the pins are soldered on the front side of the PCB, as shown in the pictures.
I usually balance the board on one or two sockets, then solder ONE pin of the power header. Then I check that it's flat - it's easy to adjust when only one pin is oldered. Once I'm happy, I solder the other 9 pins into place.
The pins are quite large, so absorb a bit of heat while you're melting the solder - take it slow.


+12v
SIG
GND
LM4040
2N3904


RED<->RED
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Music
Thing
Modular

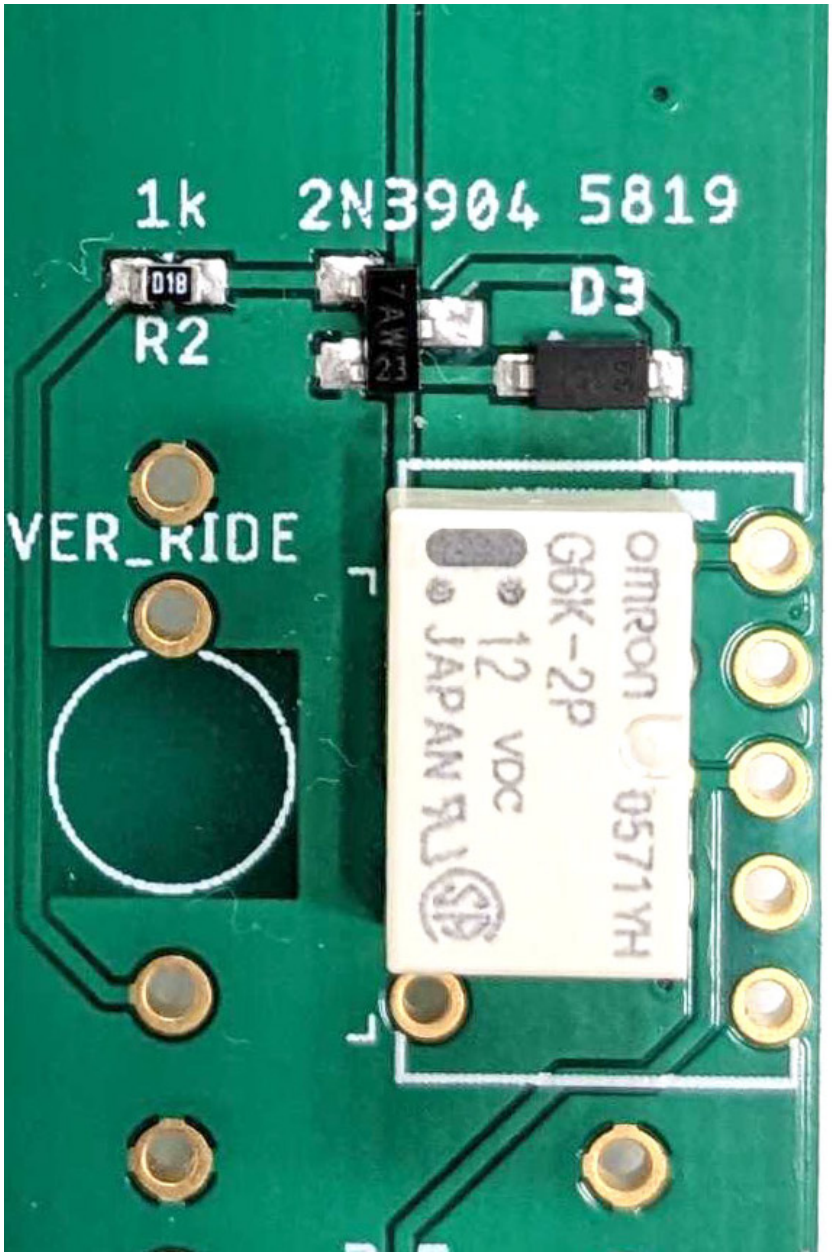
3. Attach the Relay

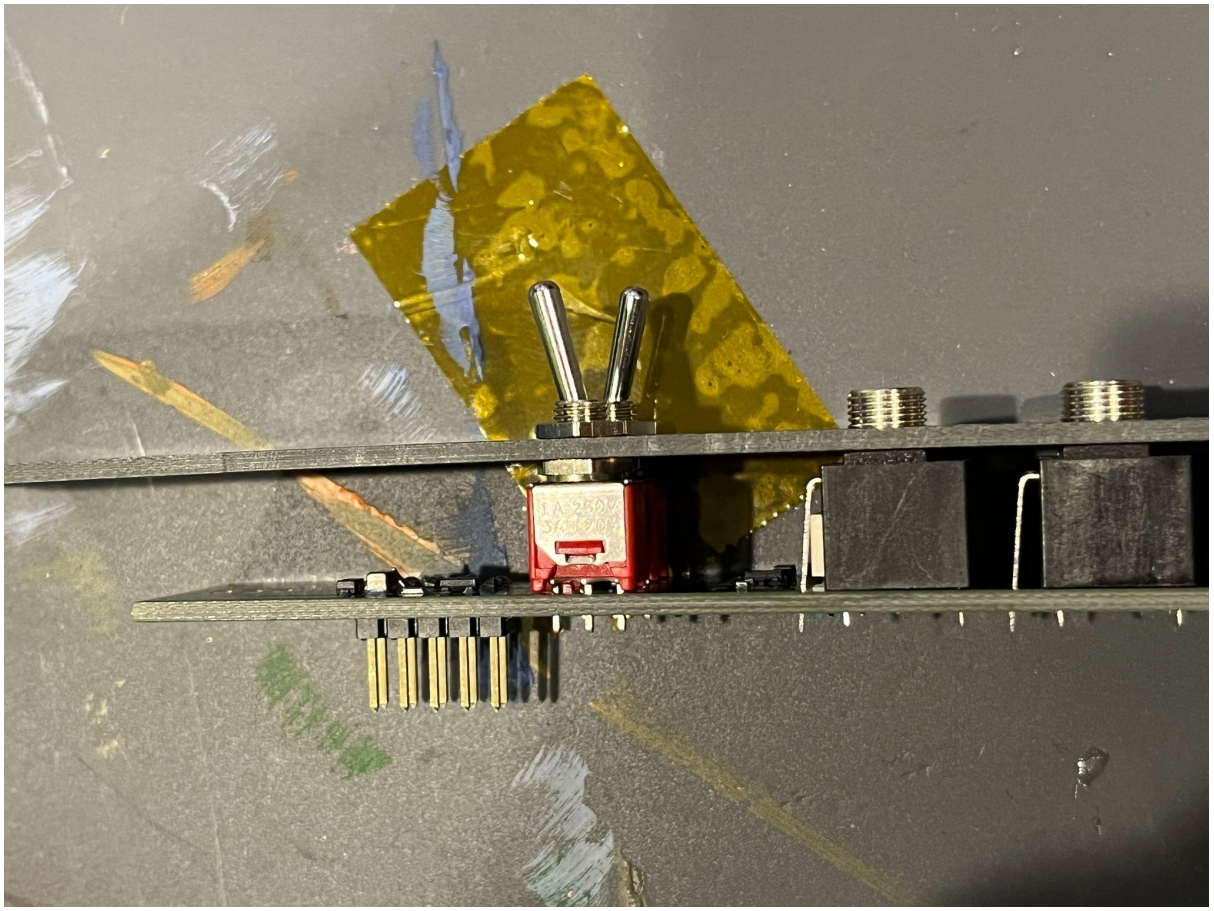
The relay is a small chip-like component. The PCB has layouts for two different sizes of relay. The photos above show the smaller 8-pin Omron G6K-2P DC12, but you can also use the slightly larger Panasonic TQ2 - 12v, which uses all 10 wider-spaced holes.

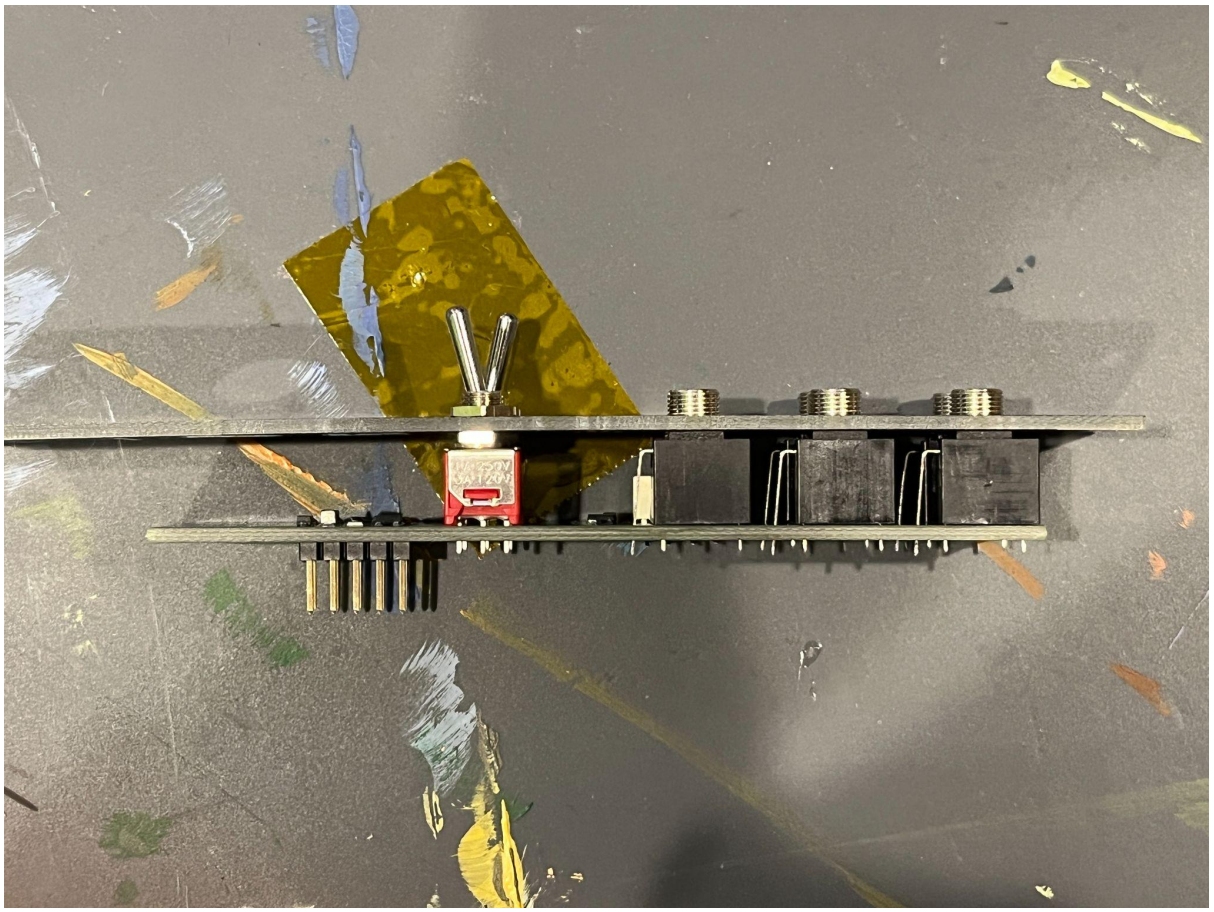
Both relays have a line clearly marked at one end. This line should match the line on the PCB - at the end next to the small Diode D3.

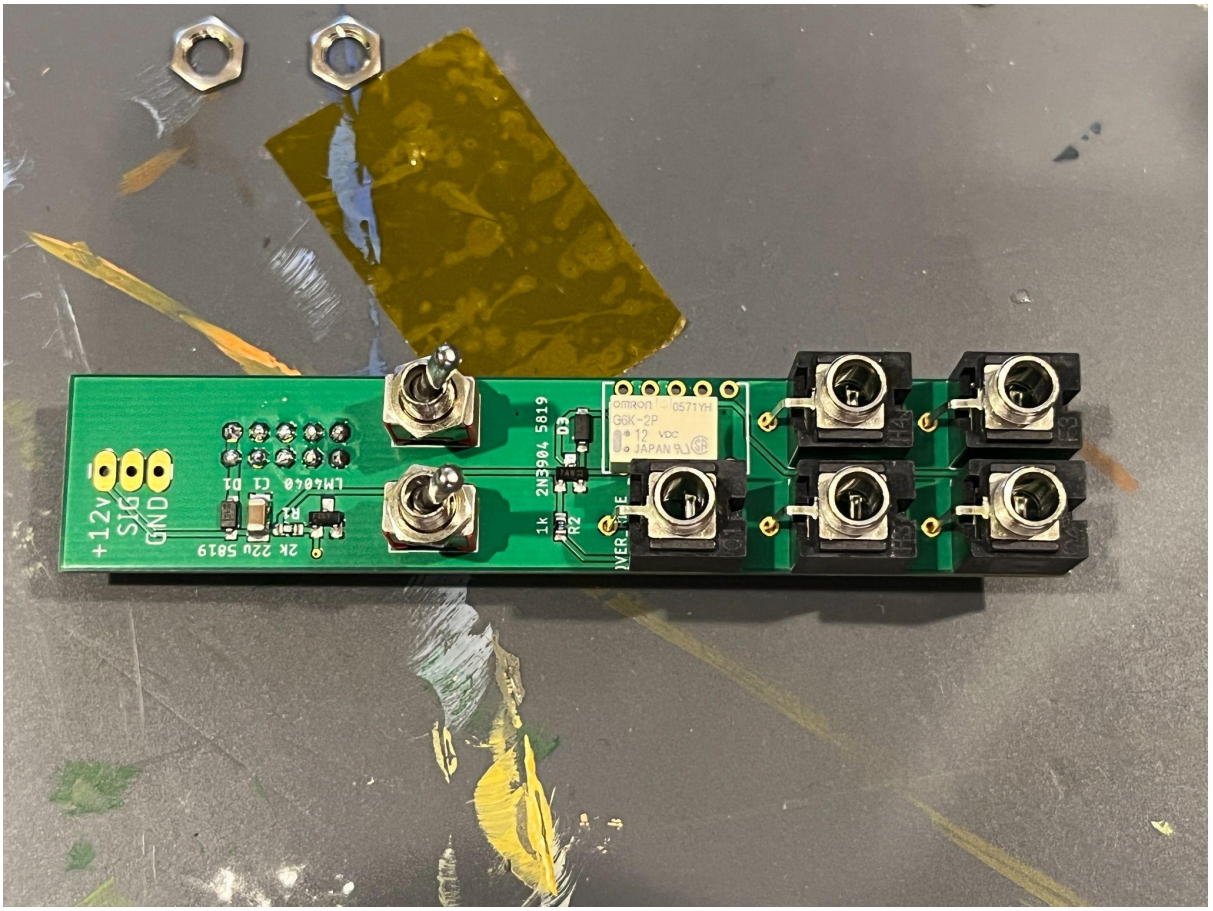
I normally bend the legs down to hold it in place while soldering.

Orientation for the relay is vital









4. Attach the switches and sockets

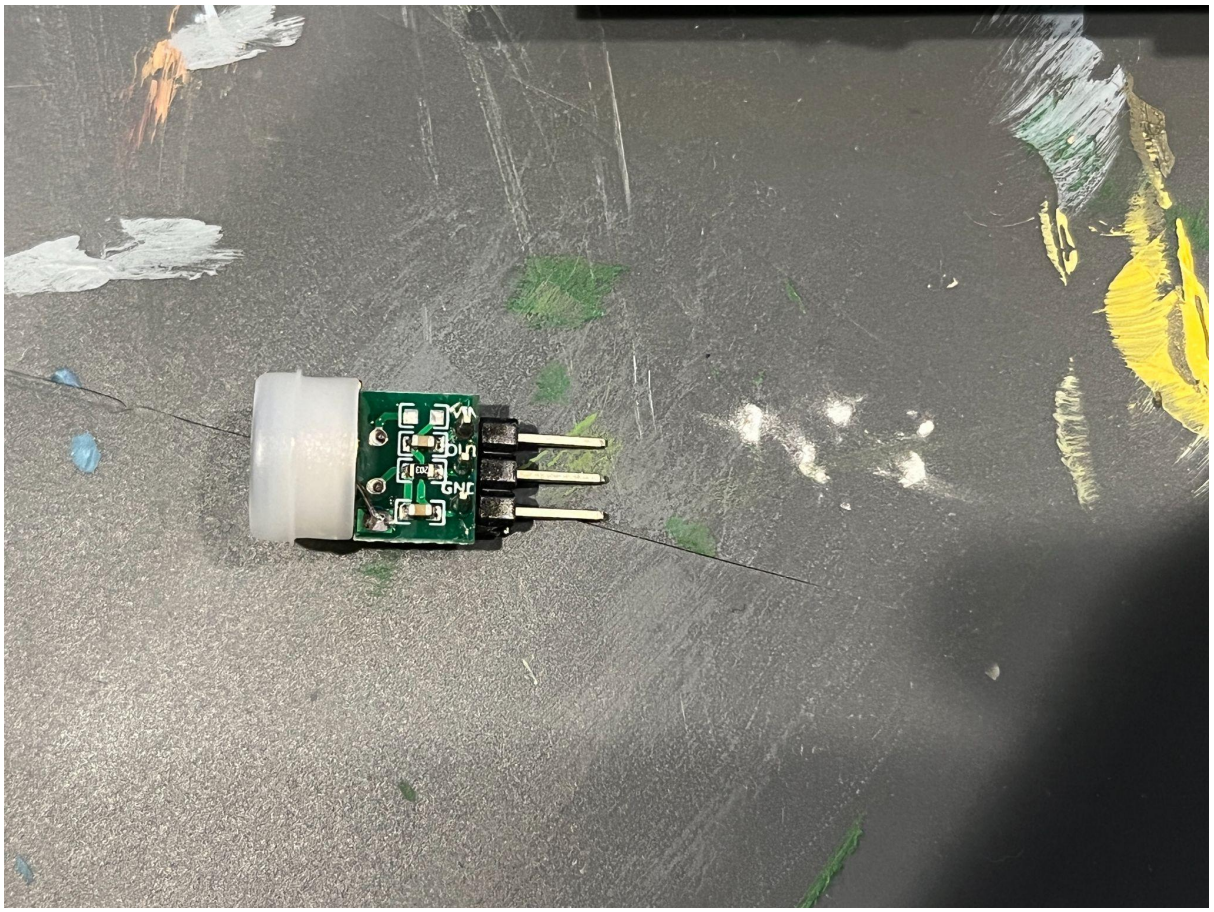
Prepare the switches: They should have one nut screwed fully on, and any other nuts or washers removed. This nut goes behind the panel to ensure everything lines up.

Before soldering, place both switches and all 5 sockets into place, behind the front panel. Finger-tighten nuts on the switches and maybe one or two sockets so that the front panel is held in place, check everything is straight before soldering.

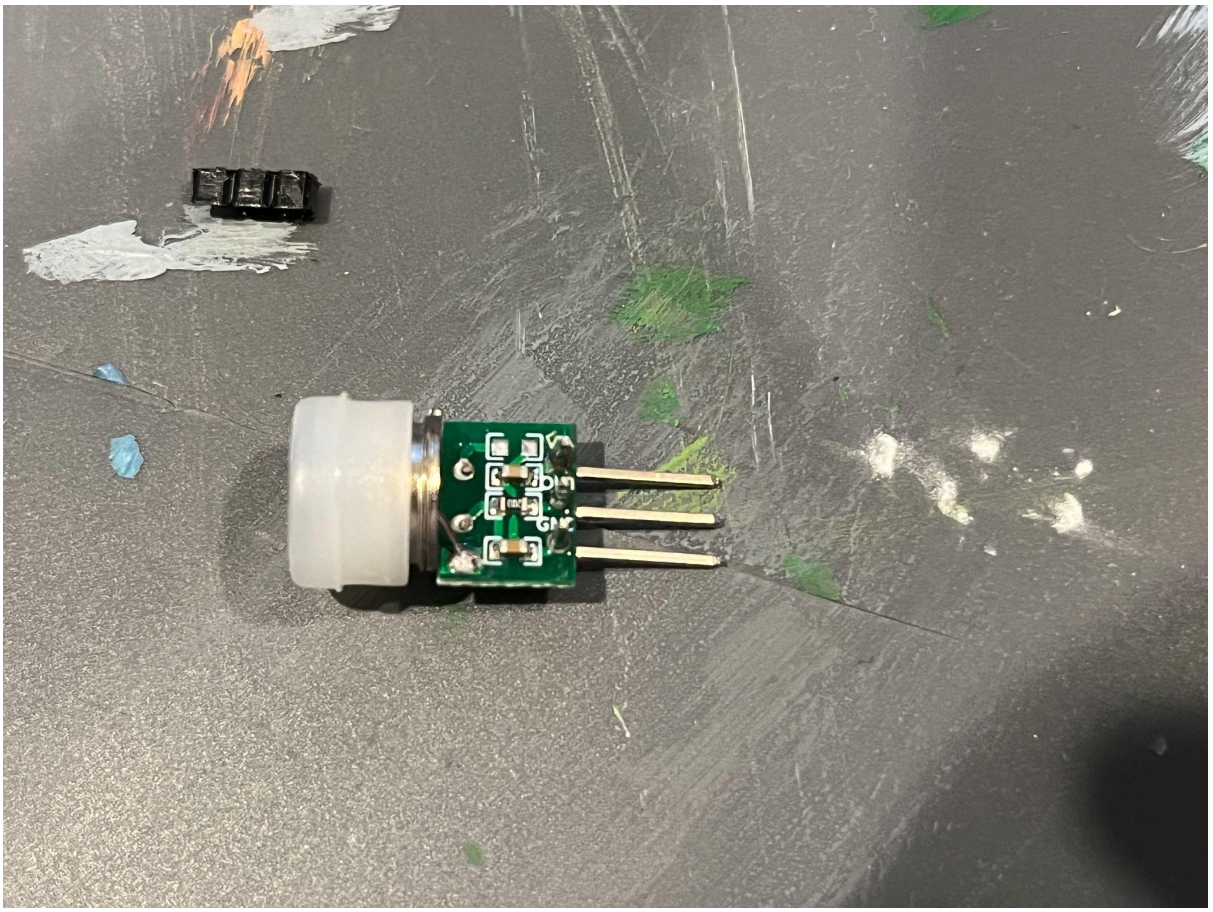
Then solder all 15 points on the sockets and 6 points on the switches. Check your work - if you miss a solder point here you might get a weird intermittent fault later.

There is no need to remove the front panel before attaching the PIR sensor.


+12v
SIG
GND
2k 22u 5819
LM4040 C1 D1
R1
1k
2N3904 5819
D3
R2
OMRON
G6K-2P
12 VDC
0571YH




MM
0.8
0.6
0.5
0.4
0.32
0.25
30
28
26
24
22
20



Thonk full kits come with the PIR already prepared. If you have a full kit then you can skip to step 6.

5. Prepare the PIR sensor

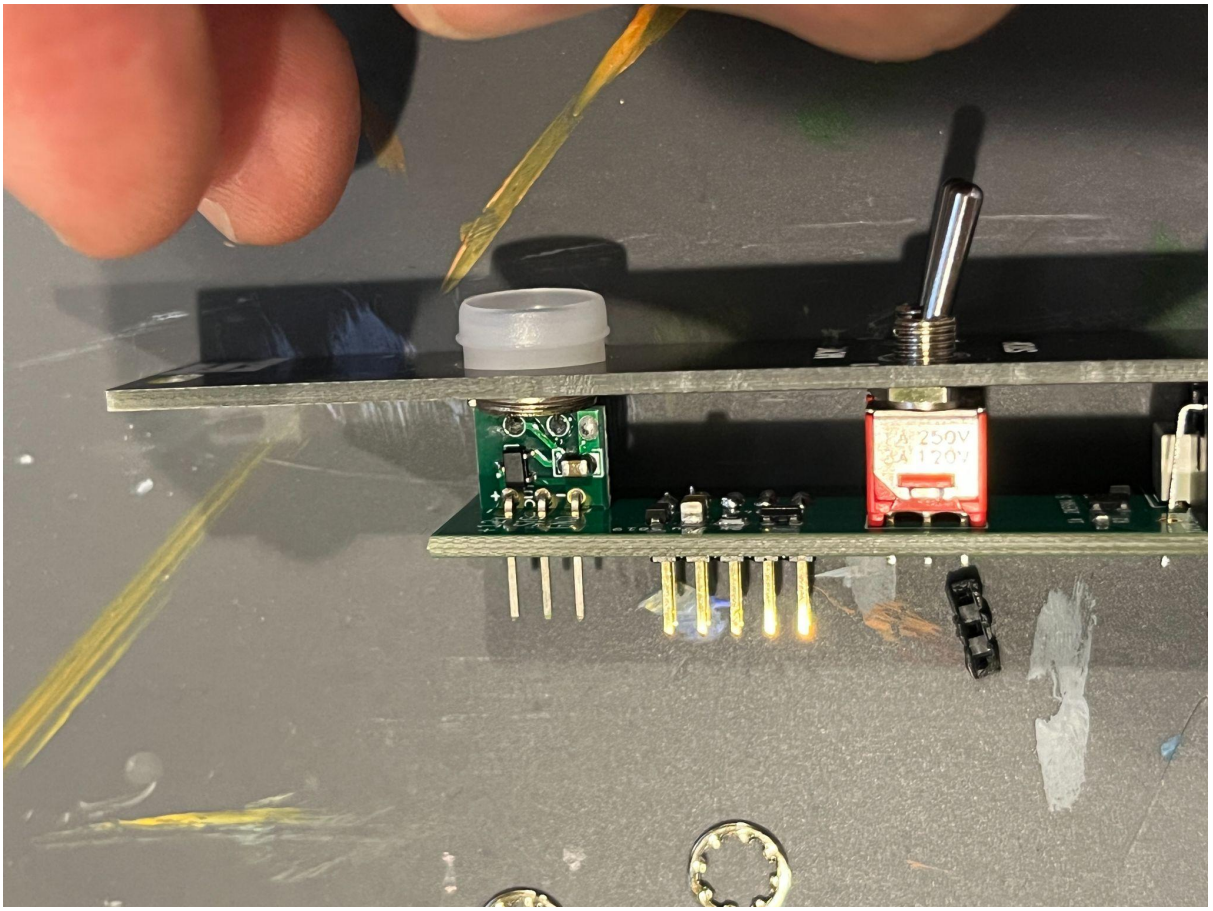
The PIR sensor is a factory-made module built around the AM312 digital PIR chip.

As it comes from the factory it's slightly too tall, so you need to remove the black plastic part from the legs.

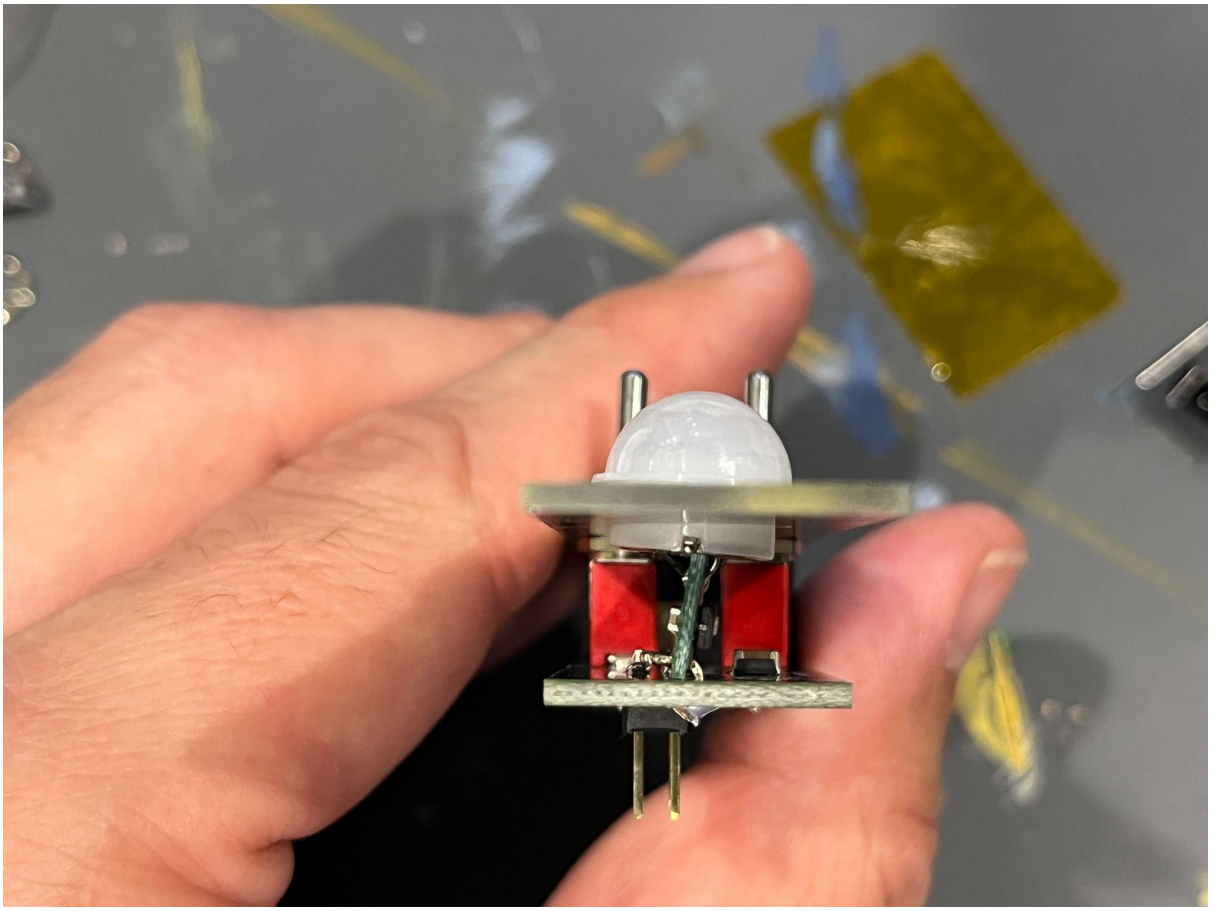
First, remove the fresnel lens - this just slips off.

Then remove the black plastic frame on the pins - this is slightly fiddly - use pliers, or cut through the pins with a scalpel.

Be careful and work slowly.


3A 250V
3A 120V


3A 250V
3A 120V



6 Attach the PIR sensor

Check that you can see the markings on the module pins. Markings might be different, but **orientation is critical**. If you can't identify the pins, get in touch with support@thonk.co.uk to get advice.

+12 or V+ or VDD	= +12v
GND or -	= GND
OUT or the middle pin	= SIG

Pass the module through the front panel. Ensure the pins are in the correct holes marked on the PCB - with GND at the bottom, towards the switches.

Solder one pin on the back of the module, then check the pin is aligned correctly. It might not be perfectly straight, but that's not a problem, so long as it looks OK to you.

Then solder the other three pins.

After you've tested the module is functioning as expected, you may want to glue the dome to the plastic ring below it, this shold remove the chance of it falling off if the case is moved around a lot.

Using the module

The principle of the module is simple.

The PIR module detects movement - and adds a 1-2 second delay after movement stops.

The relay acts as a mechanical switch connecting each input with its output. It's a completely passive connection - just a wire - so can actually be connected in either direction. It should be a perfect connection with no signal degradation.

You'll hear a click from the module every time the relay flips. If you find this annoying while you're not using the module, connect a cable from 'Move' to one of the inputs, and it will stop clicking.

With both switches in 'MOVE' position, there is only a connection between input and output when the module detects movement (or during the 1-2 second delay after movement).

With switches in 'STOP' the situation is reversed. Signal only passes when the module detects no movement.

Switch position	Are you moving?	Is there a connection?
Move	Yes	Yes
Move	No	No
Stop	Yes	No
Stop	No	Yes

The FLIP input overrides the PIR sensor. Add a square wave, LFO or any other signal, and the relay will flip each time it passes above the threshold, which is around or just below one volt.

The relay is pretty fast, and can flip at low audio rates — this is very audible from the module itself.

Switch position	Flip input	Is there a connection?
Move	High	Yes
Move	Low	No
Stop	High	No
Stop	Low	Yes

When nothing is patched to an input, the channel is connected to a +5v signal. This means you can trigger a sequencer or envelope anything else with the module.

It also means you can create a very crude and physically noisy oscillator if you connect a channel output (in Stop position) to the flip input. When the signal is high, it cuts off the relay, which pulls the signal low, which opens the relay… The relay flips as fast as possible, which seems to be about 1-2 khz.

Switch position	Are you moving?	Voltage output
Move	Yes	+5v
Move	No	0v
Stop	Yes	0v
Stop	No	+5v