TGSTL: Tildagon sound to light Hexpansion for EMF Camp tildagon badge

What is it

TGSTL uses a third-party sound detector board to produce cool sound to light effects on the EMF camp Tildagon badge LEDs. It uses a 3D printed LED enhancer to provide a much larger reflective surface for the badge LEDs.

There is a video of it in action at:

https://youtu.be/Oy822CMz1iM

What do I need to make it work

Protohex Hexpansion PCB by Jake Walker
https://www.tindie.com/products/jakew/protoboard-hexpansion/

Sparkfun sound detector with header
https://thepihut.com/products/sparkfun-sound-detector-with-headers

RV097NS style 10k ohm potentiometer
https://www.amazon.co.uk/dp/B07SVLZNYP

Software at https://github.com/tonygoacher/tildagon_soundtolight

2 x M2 x 8mm screws.

2 x M2 washers.

There are a few 3D printed parts too:

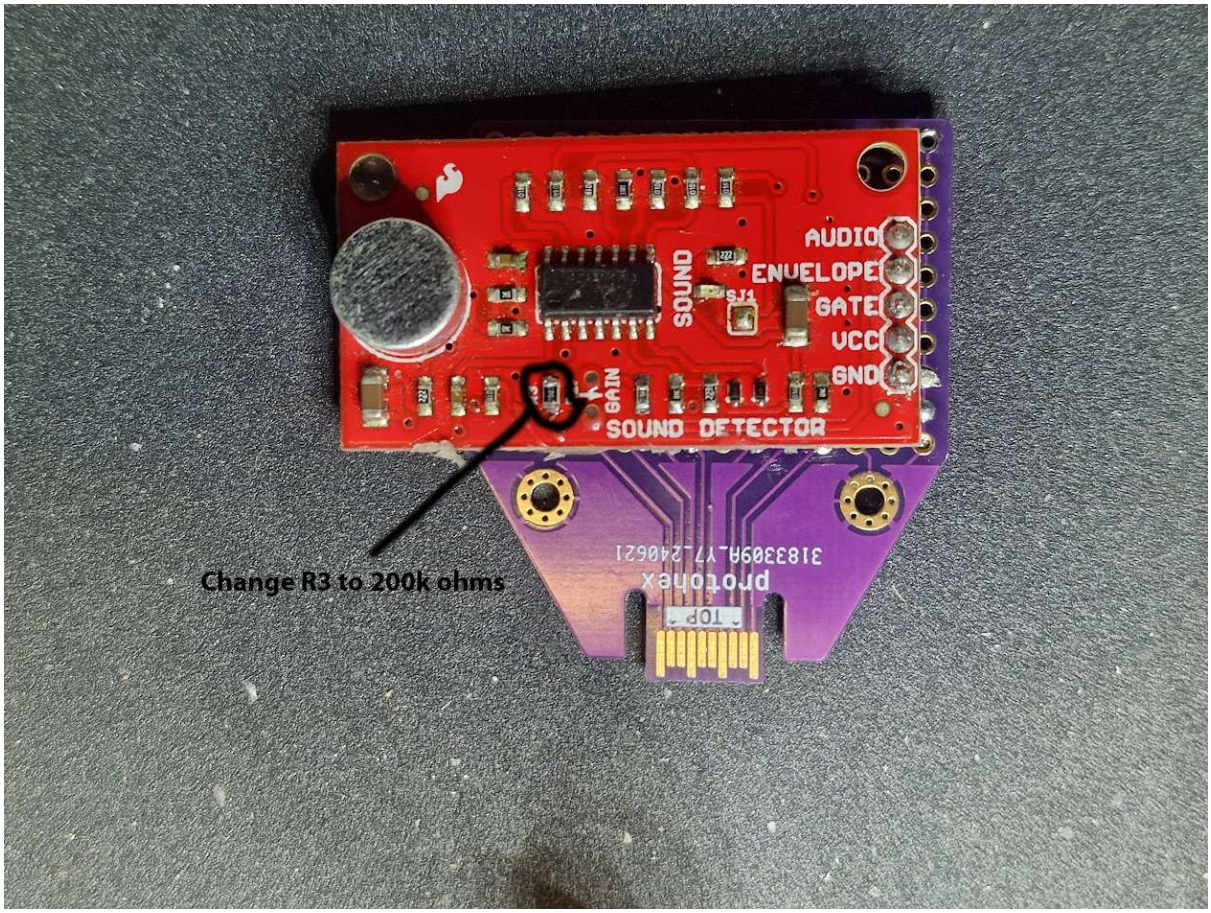
Potentiometer mount

LED enhancer (make sure this is printed in white material!)

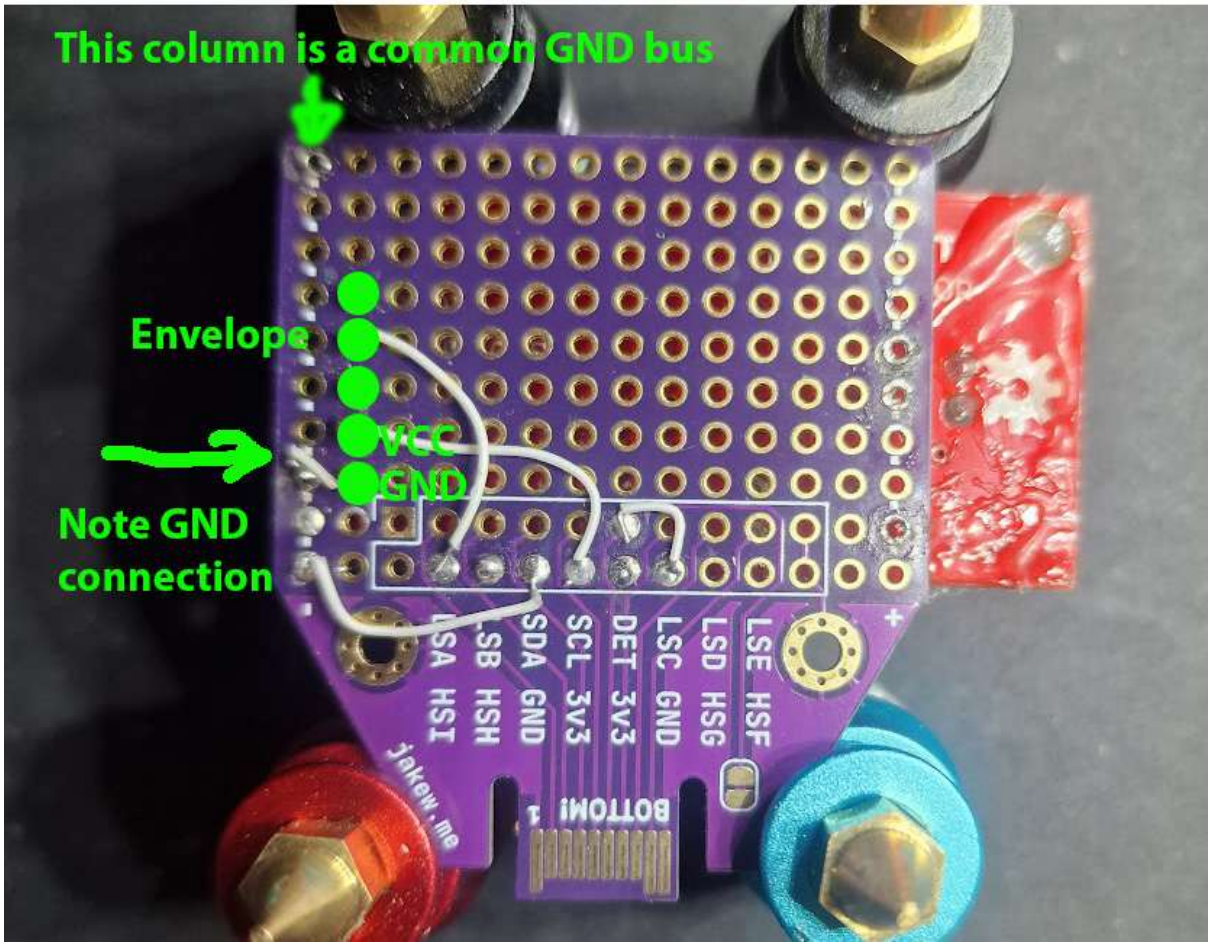
Potentiometer knob

How to make it

1. Change the Sound Detector resistor R3 for a value of 200k ohms.
2. Solder the sound detector board to the TOP of the Protohex board in the position shown. The picture on the next page shows the sound detector PCB pins highlighted in green on the bottom of the protohex board.



3. Wire up the board as shown. Note the small GND wire connecting the bottom pin of the sound board to the GND bus

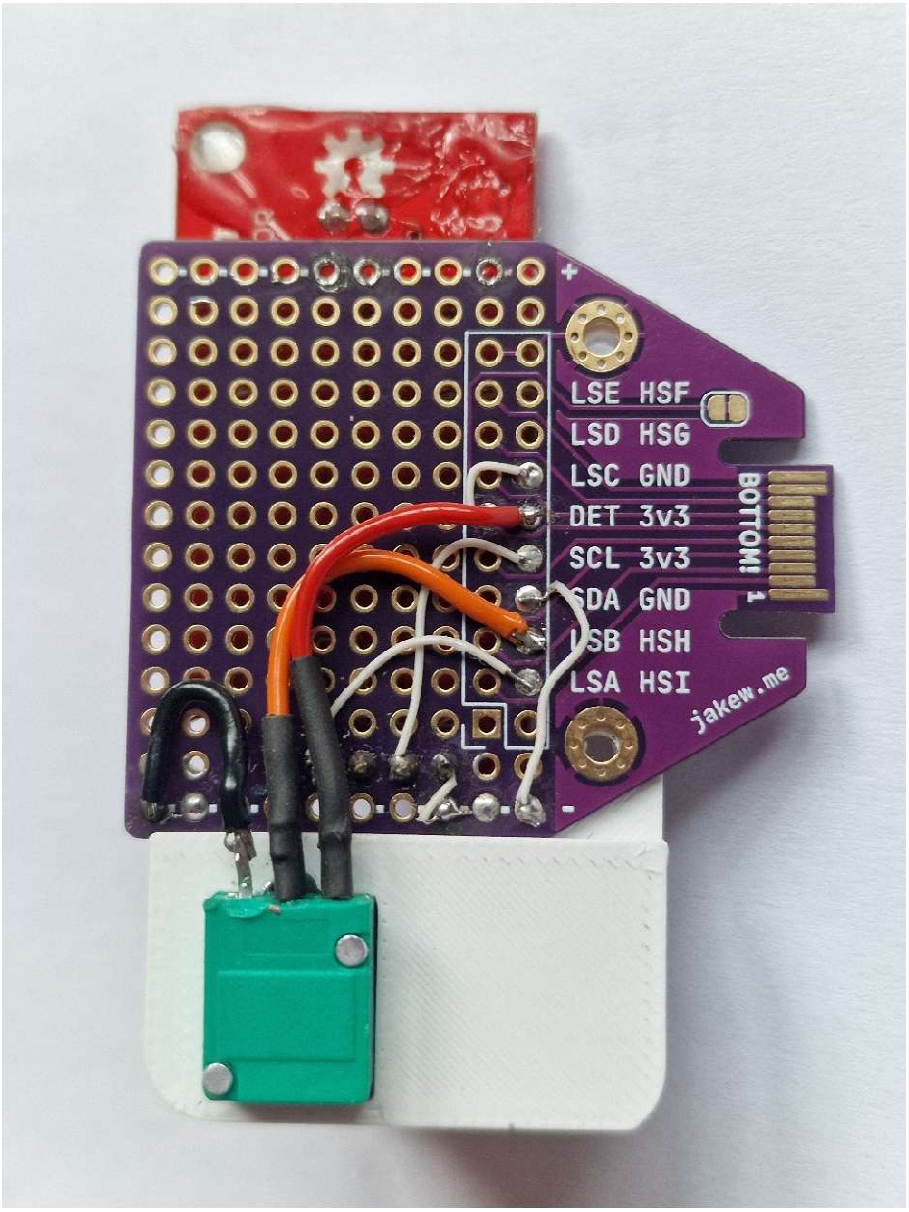


Ensure the sound detector board is connected in the position shown by the green circles.
Ensure that the left side column of holes is clear. These holes are connected together on the PCB (indicated by the small white lines on the PCB) and are used as a common GND bus.

The Hexpansion protoboard connections:

DET	GND
3V3	Sparkfun VCC
3V3	Potentiometer A
GND	Potentiometer B
GND	Sparkfun GND
HSH	Potentiometer Wiper (centre pin)
HSI	Sparkfun Envelope

Now fit the potentiometer to the mount and wire as shown.



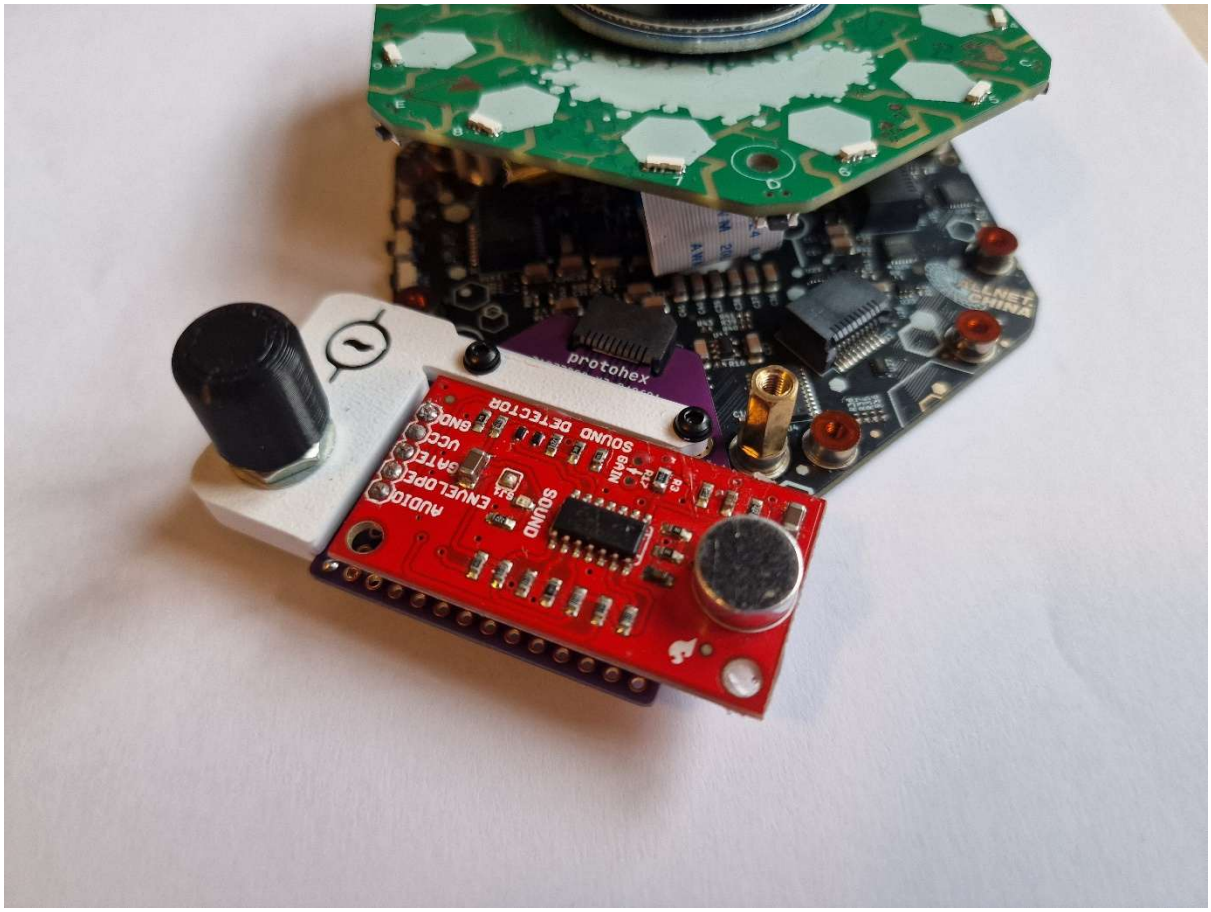
Fitting

Unscrew the 3 M3 screws holding the badge top PCB in place.

Plug the Hexpansion into port 4

Fit the M2 screws.

Place the LED enhancer onto the badge top PCB and re-fit the M3 screws.



Deploying the software

You will need to ensure git and mpremote are installed on your computer. There is a great tutorial here:
https://tildagon.badge.emfcamp.org/using-the-badge/connect-to-wifi/#option-4-use-mpremote-to-edit-the-settings-file

Download the TGSTL software from the github repo:
https://github.com/tonygoacher/tildagon_soundtolight
Using a command line interface, navigate to the software folder.

Connect the tildagon badge USB in port to your computer

If you have a bash shell, simply run ‘deploy.sh’.

Without a bash shell, run the following commands
mpremote mkdir apps

mpremote mkdir apps tgstl

mpremote fs cp app.py :/apps/tgstl/

mpremote fs cp metadata.json :/apps/tgstl/

mpremote fs cp tildagon.toml :/apps/tgstl/

mpremote fs cp logo.jpg :/apps/tgstl/

When finished. Press the ‘reboop’ button.

Using TGSTL

Power on the tildagon badge using the ‘bat’ button.

The blue led on Hexpansion port 4 should illuminate to indicate the Hexpansion has been detected.

TGSTL should appear on the system menu, scroll through menu using the ‘A’ and ‘D’ buttons. Activate the app with the ‘C’ button.

Press and hold the ‘A’ button to change effects. As the python script runs in a tight loop, it may take up to 1 second for the first press to be detected. Subsequent button press should run at normal speed.

The current effect is displayed in the text box on the LCD display.

Use the potentiometer to adjust the sensitivity. Setting sensitivity to minimum automatically causes the default ‘Rainbow’, none sound activated, effect to run.

Press and hold the ‘F’ key to quit the app.

NOTE: The script runs in a 20ms loop and does not return control to the tildagon OS as frequently as a normal app. This will probably break other apps running at the same time. This is because the default 50ms update time of a normal app is too slow to detect the sound envelopes used to create the effects.

Have Fun!!
Tony

Instagram: tonygoacher
Youtube: https://www.youtube.com/TonyGoacher

If you want some help desoldering the resistor (you send me the board, I’ll do it for you if you!) , printing the parts or in general with this project. Just email me at:

tony.goacher@hotmail.co.uk