



WRIST THROWER LIGHT & SOUND KIT

USER GUIDE

v1.1

ECTØLABS

INTRODUCTION

Thank you for purchasing the EctoLabs Wrist Thrower Light & Sound Kit! This is a completely self-contained electronics system designed especially for prop replicas of the Wrist Thrower (aka Compact Thrower, Wrist Blaster, One-Shot Blaster) from Frozen Empire.

If you are yet to build your own replica, we have released our own set of 3D print files which include all the main parts of the prop designed with this kit in mind. You can download the files for free from our GitHub page at:

<https://github.com/EctoLabs/wrist-thrower>

We have also provided a build thread on GBFans that details the making of our very own deluxe Wrist Thrower replica. This features photos of each step as well as an extensive shopping list for all the additional parts we used, including screen-accurate found items. Visit the thread on the GBFans forum here:

<https://www.gbfans.com/forum/viewtopic.php?t=51824>

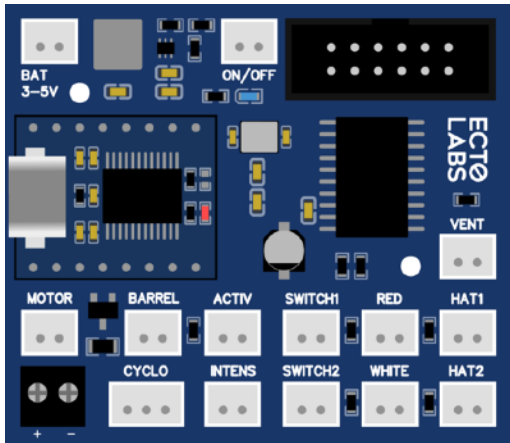
WARNING

Do not connect a battery to your kit before reading the Battery Information section of this guide.

It is essential that your battery is of correct specification and has the correct wiring arrangement. Failure to check this may result in a damage to your battery and the included electronic components.

INCLUDED IN YOUR KIT

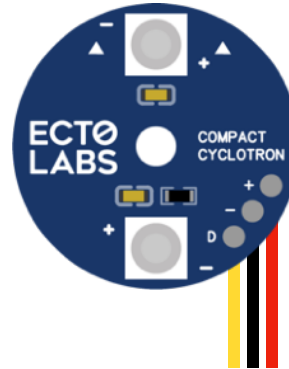
Below are all the components included in your Wrist Thrower kit. Before beginning installation, we recommend checking all of the bags to make sure you have everything you need. Be sure to handle all parts carefully at all times to avoid breaking any wires.



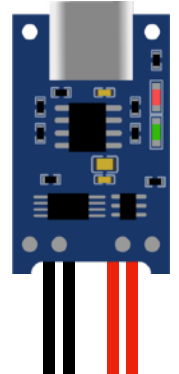
1x Thrower Main Board



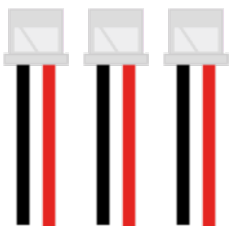
1x 28-Segment Bargraph



1x Cyclotron Light Board



1x USB-C Battery Charger



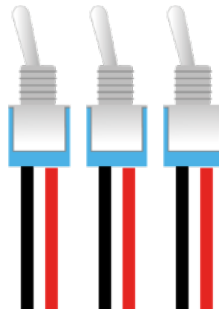
3x 5mm Warm White LEDs



1x 3mm Red LED



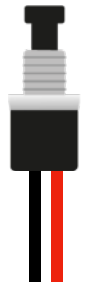
1x 3mm White LED



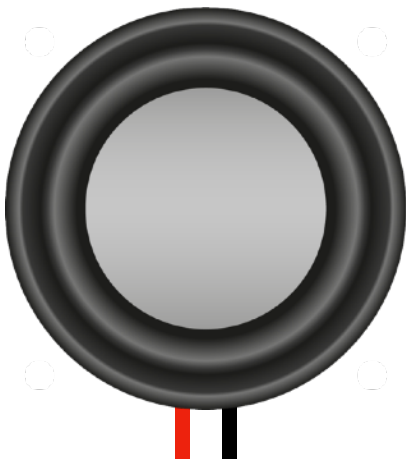
3x Metal Toggle Switches



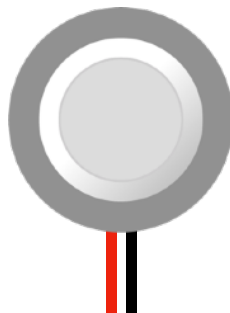
1x Slide Switch



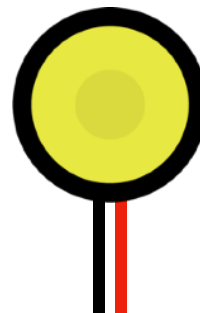
1x Black Push Button



1x 3W (4 Ohm) Speaker



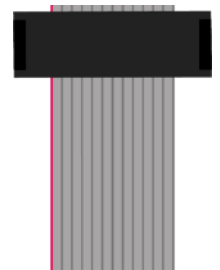
1x High Power Barrel Light



1x Yellow Push Button



2x Cable Connectors



1x 28-Pin Ribbon Cable

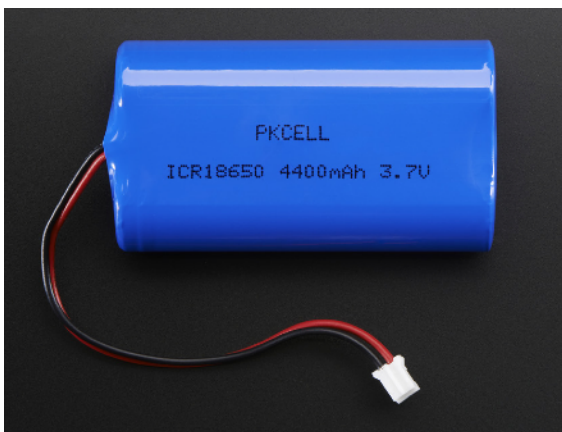
BATTERY INFORMATION

Your kit contains everything you need to add amazing light and sound to your prop build. However, you will need to purchase a suitable battery in order to power the system. Thankfully, these are readily available from many online retailers. We have provided some links in the 'Battery Buying Guide' section below.

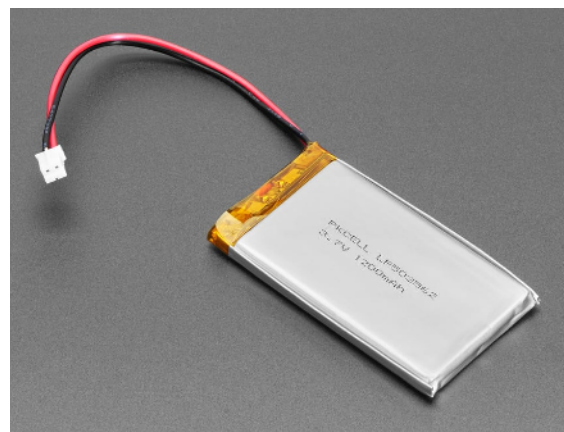
You will need one **Lithium Ion** (Lilon) or **Lithium Polymer** (LiPoly) battery with a voltage of **3.7V**. It must also have **built-in protection** to prevent over-charging. You should be able to find this info in the battery's specification information or datasheet.

These are available in a large number of different sizes and capacities. The capacity is indicated by a number such as 1000mAh, 2000mAh, 3000mAh, etc. The greater this number, the longer the battery will last before you will need to recharge it. The physical size of the battery will also increase as the capacity gets larger, so it is important to choose one that will sit comfortably inside the body of the thrower (please check the dimensions of the battery before purchasing to make sure it will fit).

We recommend a battery of at least **2000mAh** in order to keep your kit running for a good amount of time. It should also have a **2-pin JST-PH** connector (at the end of the red and black wires) in order for it to plug directly into your kit.



A typical Lithium Ion battery. These usually consist of 1-2 cylindrical cells with pink and blue wrapping.



A typical Lithium Polymer battery. These tend to be flatter with silver wrapping.



It is important to only use a battery rated at 3.7V - higher voltages will damage your kit.

CHECK YOUR BATTERY'S WIRING

The final thing to check is the 'polarity' of your battery's red and black wires. Put simply, this refers to which way round the wires are inserted into the white connector. Annoyingly, there doesn't seem to be an industry standard for this so you will find some batteries have the red wire on the left and black wire on the right, and others with the black wire on the left and red wire on the right.

However, it is essential that these are correct before plugging the battery into your kit, otherwise you may cause damage to the circuit and your battery.



ATTENTION - PLEASE READ

These instructions are for version 1.1 (or above) of the main board only.
The version number will be printed on the back of the board next to the text 'WRIST THROWER'.

If you are using the original kit (labelled 'COMPACT THROWER' on the back of the main board), then please refer to v1.0 of the user guide as the polarity of the wires are reversed with this kit.

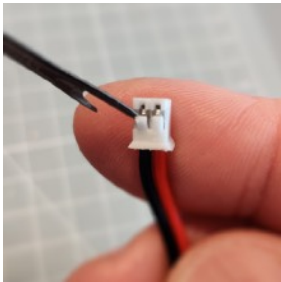
With the **silver contacts facing you**, look at the white connector and make sure that the red and black wires are arranged as seen in the first image below indicated by the green tick:



If your wires match the bottom image (indicated by the red cross), don't worry - it is relatively simple task to switch them. Please read the next section on how to do this.

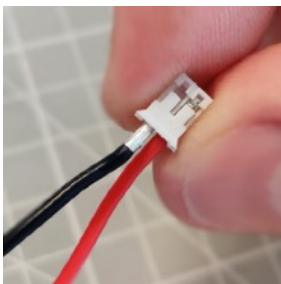
SWITCHING THE BATTERY WIRES

If your battery wires have the incorrect polarity, you can switch them around using just a needle, toothpick, stitch unpicker, or any other small pointed tool:



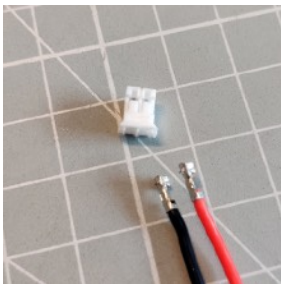
STEP 1

With the visible silver contacts on the connector facing you, carefully slide the point of the tool underneath the one of the small tabs and very slightly bend it upwards. This only needs to be raised by a small amount, otherwise you will risk snapping the tab.



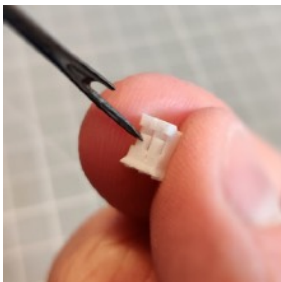
STEP 2

While the tab is raised, gently pull the wire so that the silver contact is released and can be removed from the connector. You should be able to remove the wire easily, so if it does not release, use the tool to raise the tab a bit more and try again. Do not use excessive force or you may break the wire or the contact.



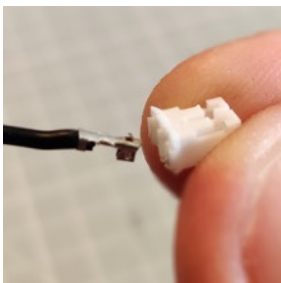
STEP 3

Repeat the same process for the second wire until the two wires and the connector are fully separated.



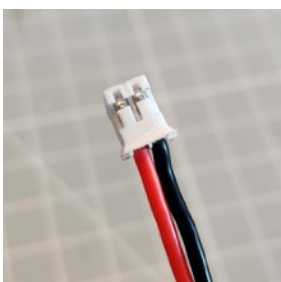
STEP 4

Hold the connector and use the point of the tool to gently push the two tabs back down until they are flat. Again, do this very gently to avoid snapping the tabs.



STEP 5

You are now ready to reinsert the wires. You will see that the silver contacts have a tiny tab - make sure this is facing upwards. Slide the **BLACK** wire back into the **right hand** connector slot until the tab on the contact hooks over the plastic tab on the connector. You may hear a little click once it is fully seated. Repeat for the **RED** wire.



STEP 6 - DONE!

That's it! You should now have a battery connector with the correct polarity (**RED** on the left, **BLACK** on the right) ready to connect to the included battery charger.

BATTERY BUYING GUIDE

Compatible Lithium Ion and Lithium Polymer batteries can be purchased from a number of electronics / maker stores online. Below are a list of recommended batteries you can use with your kit. We have provided purchase links for the UK and USA, but you should be able to find similar products worldwide.

Lithium Ion Batteries (recommended)

These are larger in size and slightly trickier to fit inside the thrower, but the higher capacities will last longer between charges and tend to cope better with the power requirements of the kit - especially when the sound effect volume is set to a higher level:

PIMORONI (UK):

[6700mAh](#)

[4400mAh](#)

[3350mAh](#)

[2200mAh](#)

ADAFRUIT (US):

[4400mAh](#)

[2200mAh](#)

Lithium Polymer Batteries

These will be easier to fit inside your thrower due to their flat shape, but be aware that they may need charging more frequently, especially when using your kit at higher sound volumes which may drain the battery very quickly. We would recommend opting for the highest capacity possible:

PIMORONI (UK):

[2000mAh](#)

THE PIHUT (UK):

[2000mAh](#)

AMAZON (UK):

[3700mAh](#)

[2000mAh](#)

ADAFRUIT (US):

[2500mAh](#)

[2000mAh](#)

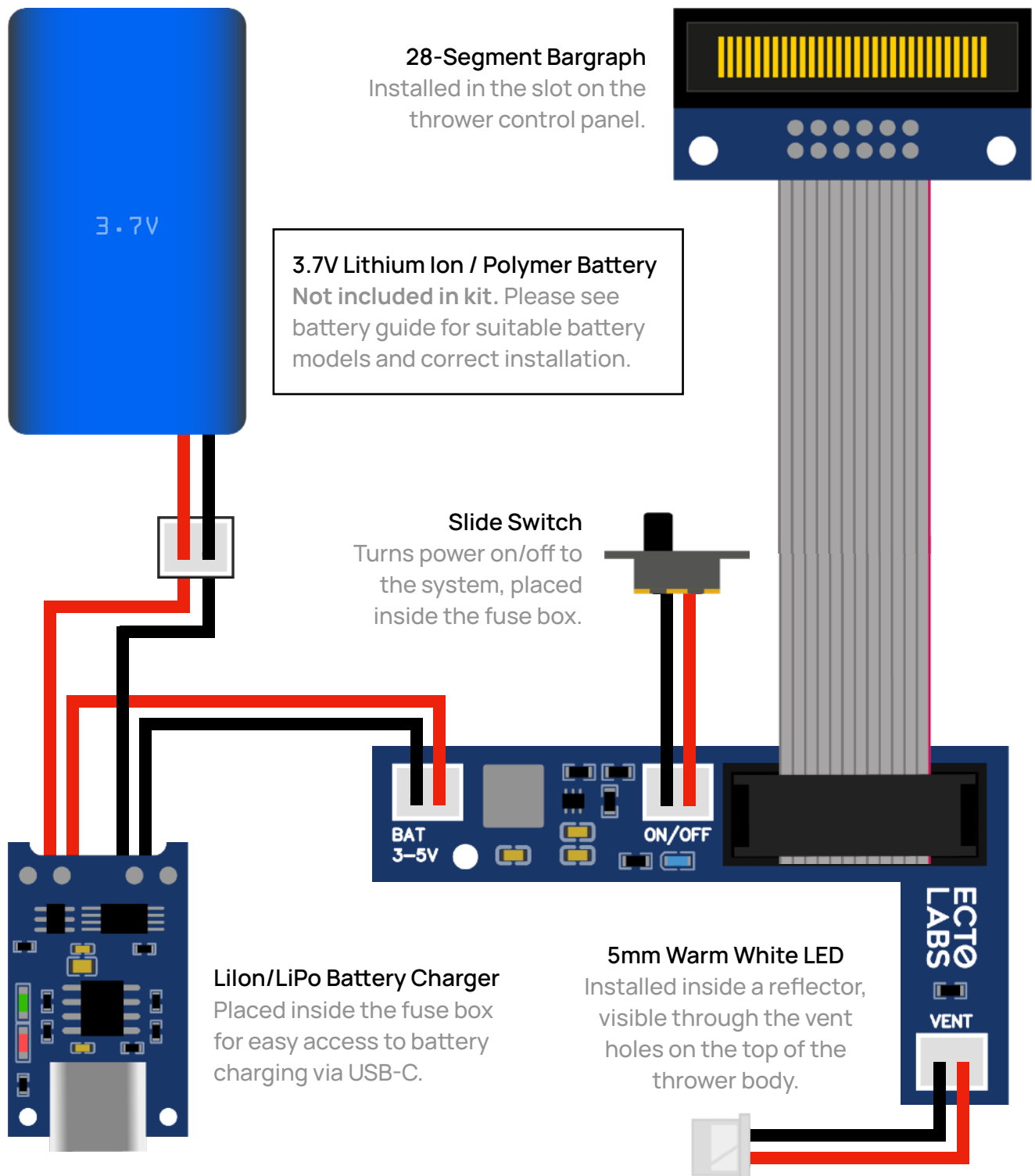
AMAZON (US):

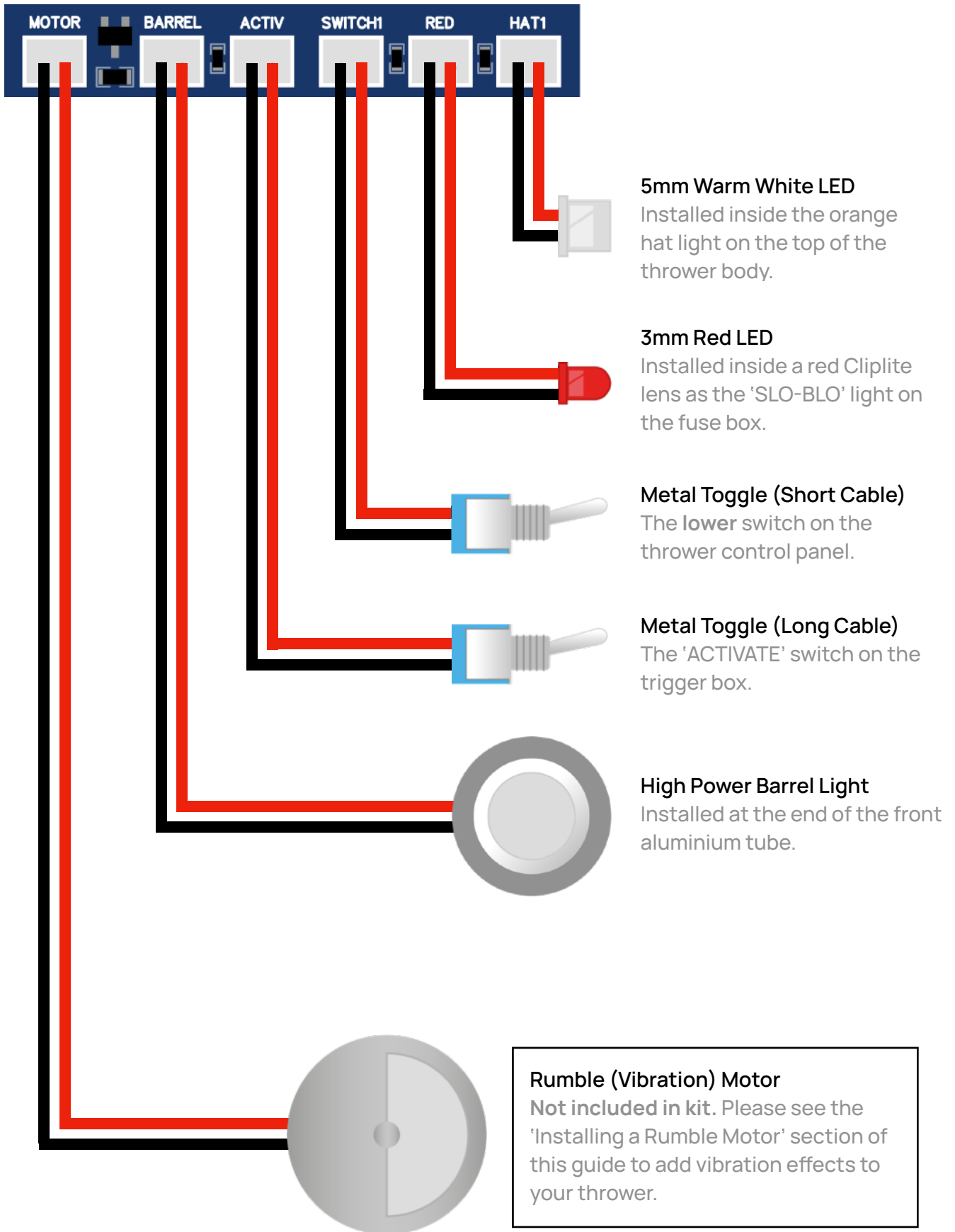
[3700mAh](#)

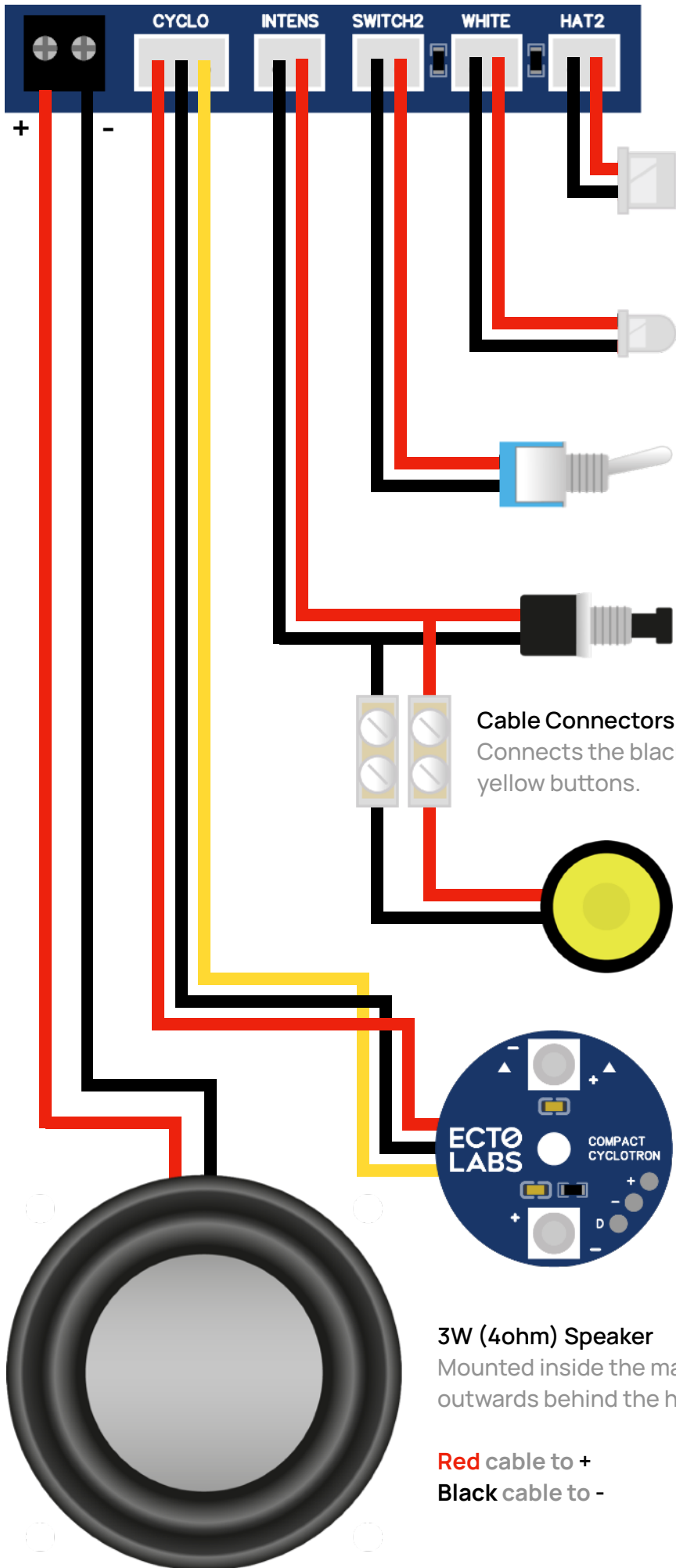
[2000mAh](#)

CONNECTING YOUR KIT

The following diagrams show how to connect up all the components contained in your kit. Pay close attention to the labels on the main board to make sure you have attached each component to the correct connector before powering on the system. Failure to do so may damage the component or the board itself.







5mm Warm White LED
 Installed inside the milky white hat light on the front of the thrower body.

3mm White LED
 Installed inside a clear Cliplite lens on the top of the body.

Metal Toggle (Short Cable)
 The **upper** switch on the thrower control panel.

Black Push Button
 The 'INTENSIFY' button on the trigger box.

Cable Connectors x2
 Connects the black and yellow buttons.

Yellow Push Button
 Installed at the end of the Wrist Thrower's handle. Shares function with the black push button.

Cyclotron Lights
 Mounted inside the triangular mini cyclotron.

3W (4ohm) Speaker
 Mounted inside the main body of the thrower, facing outwards behind the heatsink.

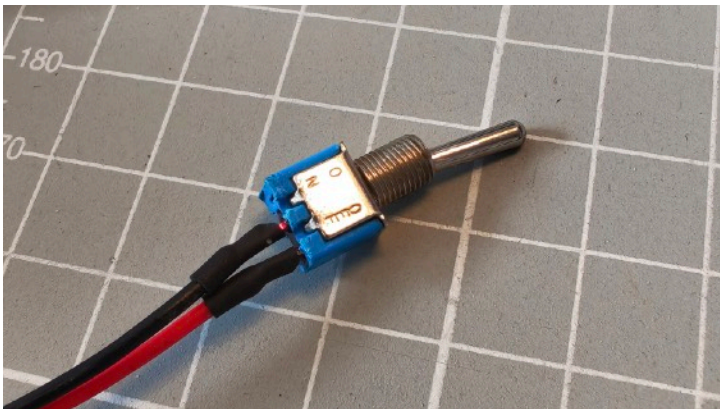
Red cable to +
Black cable to -

INSTALLING YOUR KIT

As every prop is built slightly differently, the way in which the kit is installed can vary. However, here are a few suggestions which you may wish to follow or adapt as you see fit:

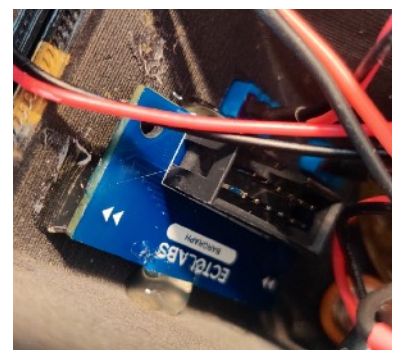
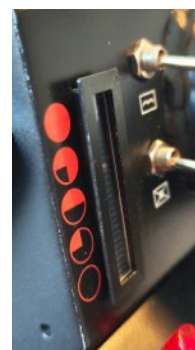
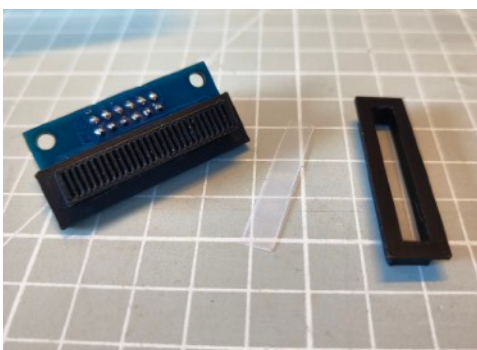
TOGGLE SWITCHES

Each switch has 'ON' and 'OFF' engraved into the metal part. When installing the switches, make sure they are in the **OFF** position and position them so that the toggle is pointing downwards. These switches come with two nuts and a washer, although you may find you only need one nut to secure the switch from the outside. For the two switches on the throwers's control panel, the switch connected to 'SWITCH1' on the main board should be at the **bottom** and 'SWITCH2' should be at the **top**.



BARGRAPH

The bargraph module is made up of three separate parts - the LED board (with permanently attached 3D printed segment cover), a bezel and a diffusing lens. Gently lift the bezel off the cover - the diffuser will be loose inside the bezel, so be careful not to lose it as its may fall out. Install the LED board inside the thrower so that the protruding part of the cover sits inside the bargraph slot in the thrower body. If the diffuser has fallen out, replace this inside the bezel with the glossy side facing outwards. Insert the bezel into the slot until it sits flush and is firmly seated. As the bezel is 3D printed, there may be a slight texture on the surface so you may wish to smooth out and paint this piece. The LED board has two mounting holes, but you may find it easier to secure it in place by using some hot glue as shown below.



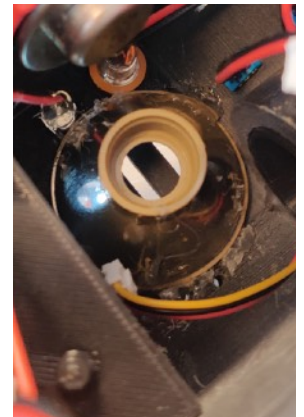
BARREL LIGHT

This has been designed to fit inside an aluminium tube with an inner diameter of 22mm. Simply slide the light inside the tube from the front end until it sits flush, with the wires threaded through the tube to the inside of the thrower. It should be a tight fit, but you may need to lightly sand the outer edge of the light if you are having trouble inserting it.



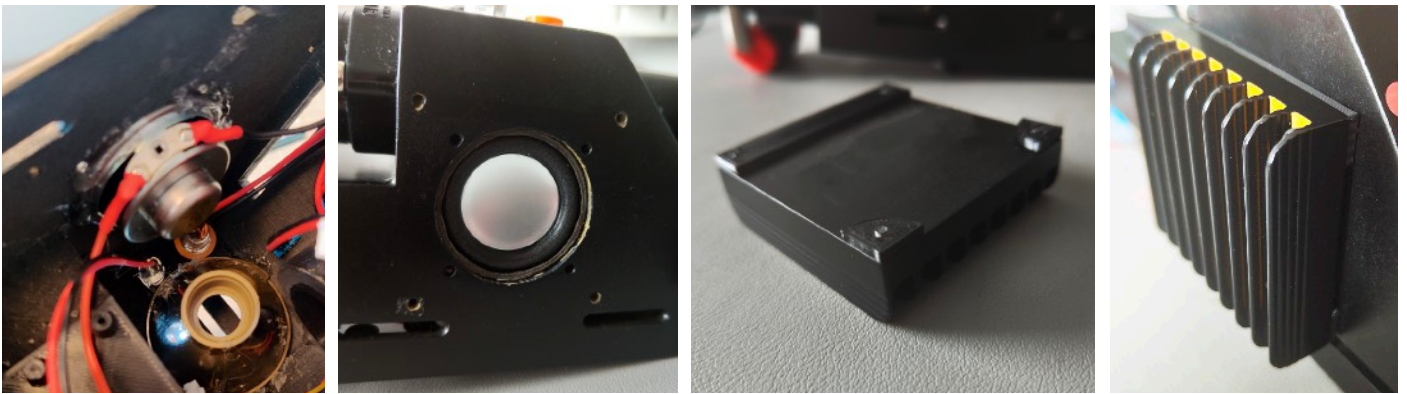
LEDs

We recommend using hot glue to secure the LEDs inside the various lenses. This includes the Cliplite lenses for the small 3mm red and white LEDs and the hat light lenses for the larger 5mm flat top LEDs. For the vent light, we recommend using a reflector from a military spec flashlight - these often have a removable threaded section which you can glue the LED to inside.



SPEAKER

Due to the compact and closed nature of the Wrist Thrower prop, finding a perfect place to position the speaker is a little tricky. We found the best compromise was to create a large hole in the side of the thrower, underneath the heatsink, and mount the speaker directly behind this hole. This does, however, present the issue of quiet and muffled sound when the heatsink is replaced, so it is essential to provide an area where the sound can escape. This can be achieved by either drilling holes through the flat areas of the heatsink to create a speaker grill (similar to the Hasbro Neutrons Wands), or place spacers behind the heatsink to create gaps of about 3mm so the sound effects can be heard more clearly. We opted for the spacer option as this does not ruin the look of the heatsink with its yellow painted sections. We have provided some spacers on our [GitHub](#) page which can be 3D printed and painted to work with the GBFans aluminium heatsink.



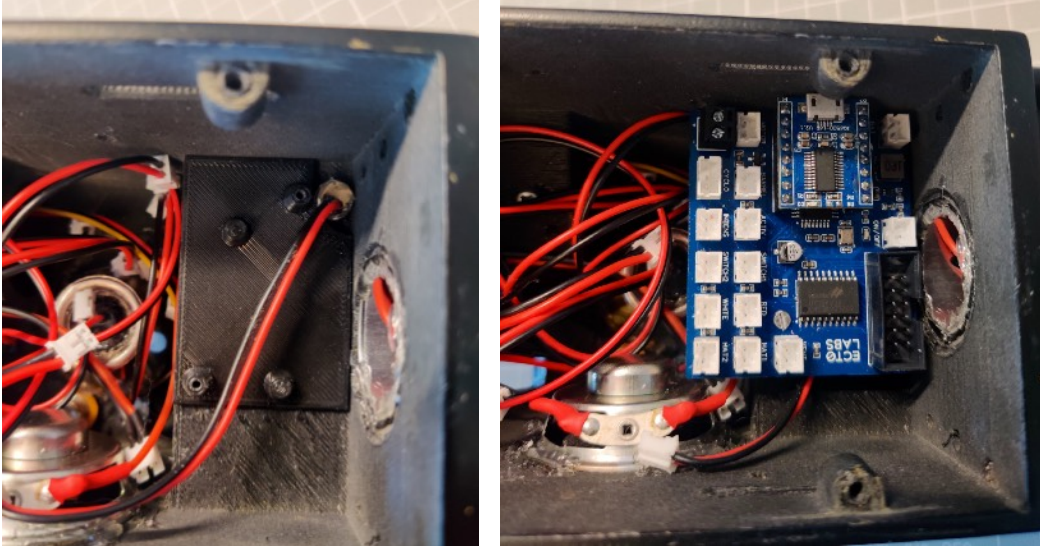
CYCLOTRON

If using our [GitHub](#) files, the body of the mini-cyclotron includes a pillar which you can use to mount the cyclotron LED board using a single M3 bolt. If using another design, you will need to position the board so that it is recessed by about 10mm - this will give you the correct diffusion effect once the face of the cyclotron (with circular window and red lens) is attached. Make sure the board is mounted so that two LEDs sit vertically as shown below. The wires can then be thread through the tube and into the body of the thrower.



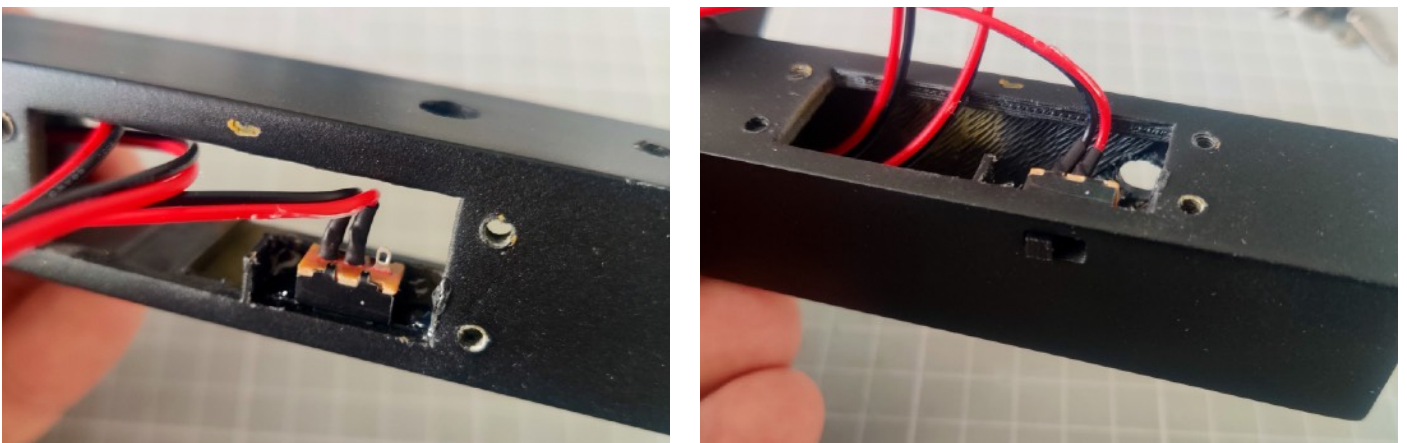
MAIN BOARD

We recommend placing the main board on the 'shelf' inside the thrower in the orientation shown in the photos below. You will find a mounting plate included in our [GitHub](#) files which can be permanently glued inside the thrower - the main board can then be attached to this using 2x M2 bolts through the mounting holes. This means you can easily remove the board if maintenance is required at a later date.



SLIDE SWITCH

This switch is intended to be hidden while being easy to get to for operation. Therefore, you should place this inside the fuse box. If you are using our [GitHub](#) 3D files, you will find a slot in the bottom of the fuse box for the switch to sit inside. Simply glue the switch into the boxed off area inside, with the arm of the switch sitting inside the rectangular hole. You will then be able to turn your thrower on and off easily by simply reaching under the fuse box. If you are using your own fuse box design, then place the switch inside where you can get to it easily after removing the cover plate.



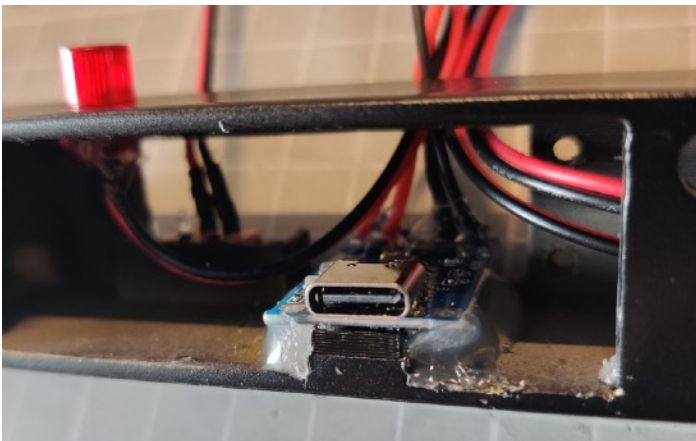
YELLOW PUSH BUTTON

The yellow button should be mounted to the silver dial at the end of the red handle. A nut is included with the button, but you may not need this and prefer to secure the button using hot glue or epoxy. We have attached long wires to this button so that they can be connected to the black 'INTENSIFY' button inside the trigger box. You will need to thread these wires through a hole in the red handle and through the length of the silicone hose. Connect the red and black wires to the corresponding bare wires from the black button using the two cable connectors provided in the kit.



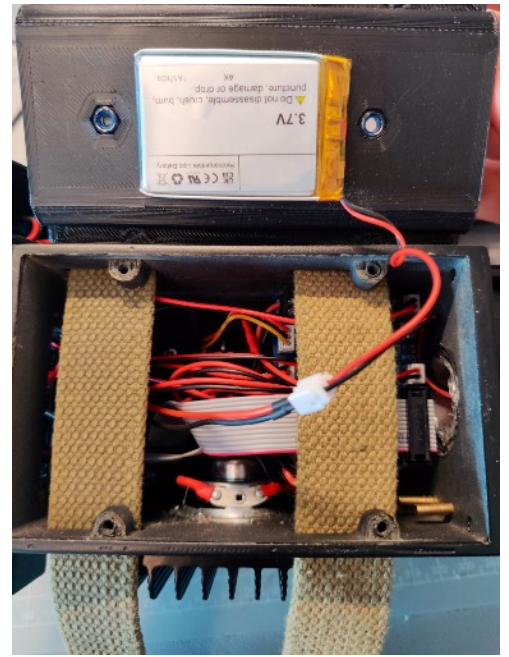
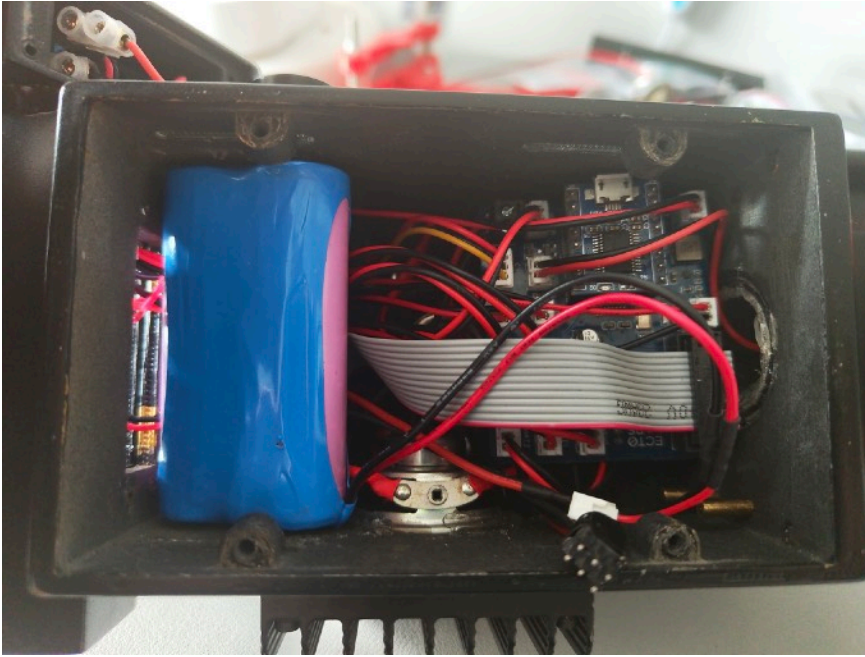
BATTERY CHARGER

Place the charger board inside the fuse box so that you are able to charge the battery without having to open up the thrower. If you are using the fuse box from our GitHub files, hot glue the charger so that it sits on the raised part as shown below, making sure the USB socket is flush with the edge of the box. You can simply remove the box's cover plate and connect a USB-C cable to begin charging. For more information, please see the 'Charging Your Battery' section in this guide.



BATTERY

Most dual-cell Lithium Ion batteries should be able to fit inside the main body of the thrower as shown below. Use a few drops of hot glue to secure it in place, bearing in mind you may need to remove the battery in the future, so don't use too much glue here! If you are using a flat Lithium Polymer battery, you can attach this to removable base using some strong double-sided mounting tape. Just remember to make sure that your battery placement will not impede the ability for the wrist straps to be fed through the slots in the sides of the thrower.



ADDING A RUMBLE MOTOR

Although this kit does not include a rumble motor, the main board does feature a connector for one to be added and vibration feedback has been programmed to fire in sync with the light and sound effects.

You will need one rumble motor (these are often designed for use in video game controllers) which can be purchased from online sources such as Amazon and Ebay. GBFans also offer a suitable motor in their store (we recommend going with the **LARGE** offset weight in order to feel the maximum vibration effects):

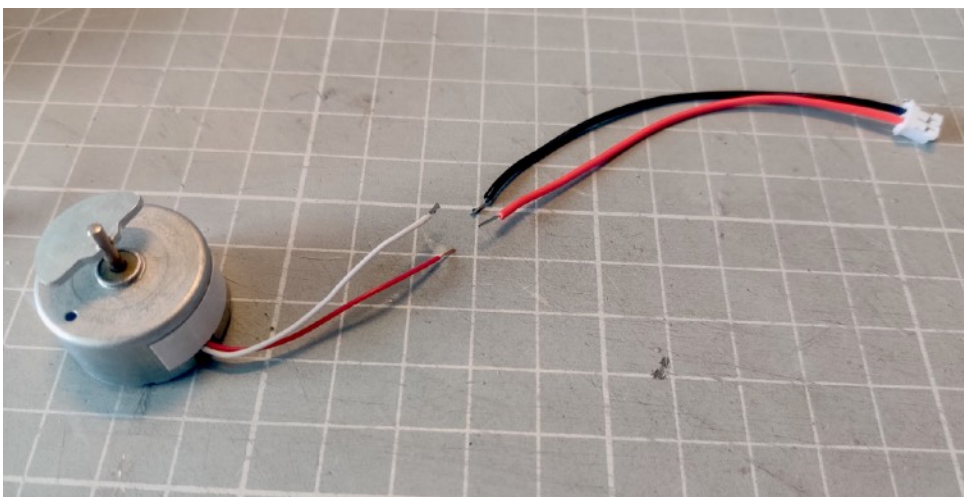


<https://www.gbfans.com/shop/pack-parts/vibration-rumble-motor/>

If your motor does not already have a connector attached to it, or if the wire is too short to reach the board, you may need a 2-pin JST-PH cable to extend it. You can then solder the wires together or connect them using a screw terminal block.

Removing the foam padding, this motor should be a good fit inside the tube connected to the mini cyclotron. If you are using our files from [GitHub](#), you will find a small cut out in the tube to enable the wires from both the motor and the cyclotron LED board to be routed into the thrower. Connect the motor to the **MOTOR** connector on the board.

Once installed, you will need to enable the vibration effects in the system settings. Full details can be found in 'Changing System Settings' section of this guide.



OPERATING YOUR WRIST THROWER

POWERING ON

Use the slide switch to provide power from the battery. The red **SLO-BLO light** will illuminate. Once this light begins quick flashing every second, you are ready to activate the thrower.

ACTIVATING

Flick the **ACTIVATE switch** upwards to light 'em up! You will hear the power up sound as the **SLO-BLO light** and **orange hat light** will turn on solidly. The **white indicator** will begin blinking, the **bargraph** will illuminate and the **mini-cyclotron lights** will start pulsing.

SWITCHING

Before you can fire the thrower, the **bottom toggle switch** on the control panel must be flicked upwards. This will play a sound effect and turn on the internal **vent light**. Flicking the **top switch** will also turn on the **white hat light**. Depending on your system settings, the **bargraph** will also react to the current position of the two switches.

FIRING

You can begin firing by pressing the **yellow button** at the end of the handle with your thumb. Alternatively, you can press the black **INTENSIFY button** - as the two buttons are connected together, their function is identical. The firing sound and lighting effects differ depending on the settings you have chosen. Please see the System Settings section below for details of each of the available options.

DEACTIVATING

Flick the **ACTIVATE switch** downwards to shutdown the thrower. You will hear the power down sound effect, all lights will turn off and the **SLO-BLO light** will return to a quick flash state.

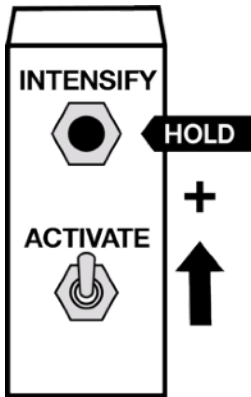
POWERING OFF

Remember to turn off battery power using the slide switch. The **SLO-BLO light** will turn off completely to confirm that power has been disconnected.

CHANGING SYSTEM SETTINGS

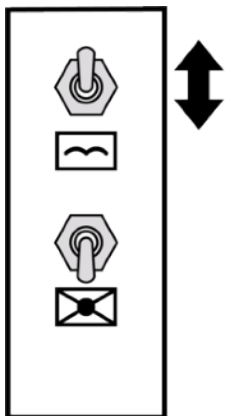
Your kit features a built-in voice guided settings menu enabling you to customise the operation of your thrower. Using a combination of different settings, you can set it up exactly as you want it! Settings are saved to the board's memory so it will remember your preferences even after you have powered off the system. To use the settings mode, make sure the speaker is correctly connected so that you are able to hear audio prompts.

TO ENTER SETTINGS MODE:

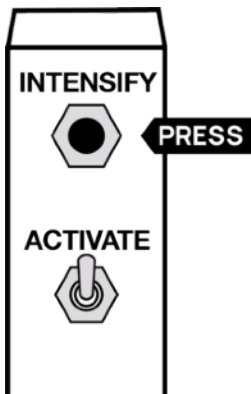


1. Power on your thrower by sliding the **hidden switch** to the ON position. Make sure the **ACTIVATE switch** is OFF - this puts the thrower into an idle state with the red SLO-BLO light fast blinking every 1 second.
2. Hold down the black **INTENSIFY button** (or **yellow trigger button**) and simultaneously flick the **ACTIVATE switch** to the ON position. The SLO-BLO light will now blink steadily and you will hear a voice say "System Settings", confirming that you have successfully entered settings mode.

TO ADJUST SETTINGS:



1. Flick the **upper switch** on the thrower's control panel up and down to cycle through the available settings. A voice will announce the setting that is currently active.
2. Once you hear the setting you wish to change, press the **INTENSIFY button** (or **yellow trigger button**) repeatedly to cycle through the options. Simply stop pressing the button as soon as you hear the option you require.
3. If you want to change another setting, flick the **upper switch** up and down as before, repeating the process above.



4. Once you have made all of your adjustments, save your changes by flicking the **ACTIVATE switch** to the OFF position. The voice will confirm this by saying "Configuration Saved" and your settings will be saved to the board's memory. You are now ready to use your thrower with your brand new configuration!

AVAILABLE SETTINGS & OPTIONS:

FIRING MODE

- **Quick Blast**

The default firing mode for the Wrist Thrower as seen in 'Frozen Empire'. A short shotgun-style blast will sound each time you press the **black** or **yellow button** with sound effect taken directly from the movie.

- **Proton Stream**

Activates a long Proton Pack style stream effect. Press and hold the **black** or **yellow button** to start the stream and release the button to stop it. If the button is held for more than 10 seconds, the stream will automatically cut out.

BARGRAPH DISPLAY

- **Stream Meter**

The bargraph will fill and empty depending on the status of the switches on the control panel. If you only have the **lower switch** in the ON position, the bargraph will illuminate to half way. If you also have the **upper switch** in the ON position, the bargraph will be fully lit. An animation will be displayed during firing.

- **Scrolling**

The bargraph will scroll up and down when the thrower is activated. It will then quickly flick up and down at a level depending on the position of the control panel switches. An animation will be displayed during firing.

- **Static**

The bargraph will scroll to the top as soon as the thrower is activated and remain fully lit during all operations. This is the most accurate mode to the original movie prop.

BARREL LIGHT

- **Strobe**

The light will strobe randomly during firing in sync with the sound effect, and fade out when firing ends.

- **Static**

The light will remain on solidly during firing and fade out when firing ends. Note: If you also have the sound effect volume set to 'Sound Off', this light will simply illuminate when the **black** or **yellow button** is pressed and turn off when the button is released (mimicking the way the original movie prop works).

VIBRATION

- **Enabled**

Vibration effects will be activated when flicking switches and during firing. This requires the installation of an optional rumble motor (please see the '**Installing a Rumble Motor**' section in this guide for more information).

- **Disabled**

Rumble motor will be disabled and no vibration effects will be activated

SOUND EFFECT VOLUME

- **High**

Sound effects will be played at 80% volume. This is the best settings for most batteries.

- **Medium**

Sound effects will be played at 60% volume.

- **Low**

Sound effects will be played at 40% volume.

- **Sound Off**

Sound effects will NOT be played.

- **Maximum**

Sound effects will be sounded at 100% volume. May not be compatible with some batteries. If you have are experiencing sound issues, or if your thrower is restarting when a sound effect is triggered, reduce the volume setting to 'High' or lower.

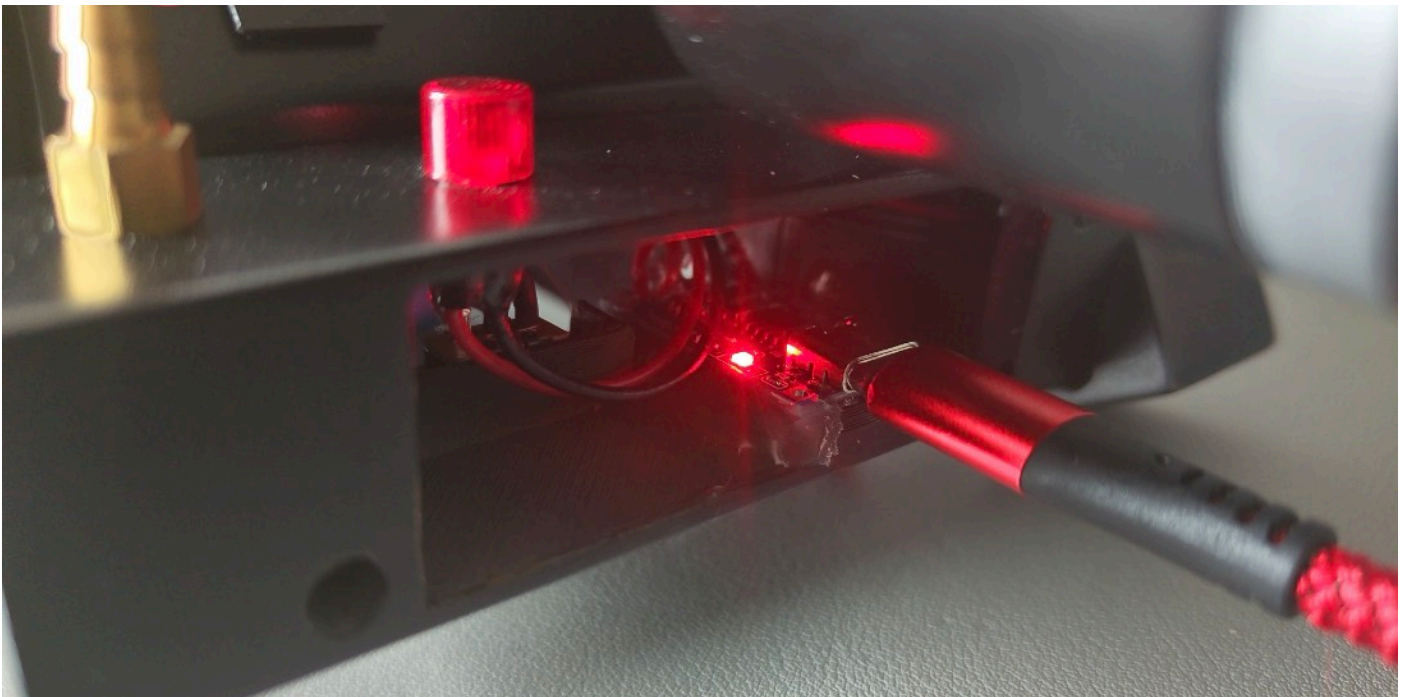


Please note that the MAXIMUM volume setting uses a considerable amount of power and should only be selected if you have a high quality battery capable of a peak current output of at least 2 Amps (such as the higher capacity 5200mAh Lithium Ion pack).

CHARGING YOUR BATTERY

Using the included battery charger board means you will not have to open up your thrower every time you require more juice! Install the board in the fuse box as detailed earlier and you only need to remove the fuse box's cover plate to gain access to the USB-C charging socket.

1. To begin charging the battery, first make sure that the system is fully powered OFF.
2. Connect a USB-C cable to the socket on the board using a suitable mains charger (such as those supplied with cellphones).
3. A **RED** light will illuminate when charging begins. Please note that some 'quick-charging' cables may not work with the charger board. If you have connected a cable and the red light does not illuminate, try a different cable .
4. The amount of time it takes to charge your battery will be dependant on it's capacity. The higher the capacity, the longer it will take to reach 100%.
5. Once your battery is fully charged, the RED light will go out and a **BLUE** light will illuminate. You can now disconnect the cable.



IMPORTANT SAFETY INFORMATION

Lithium batteries should always be used with caution. Do not leave your thrower unattended during charging. Do not damage, drop or apply pressure to your battery. We recommend inspecting your battery from time to time. If it appears swollen or otherwise damaged or punctured, disconnect the battery immediately, dispose of it carefully and seek a replacement.