

**001 - IR TURRET**



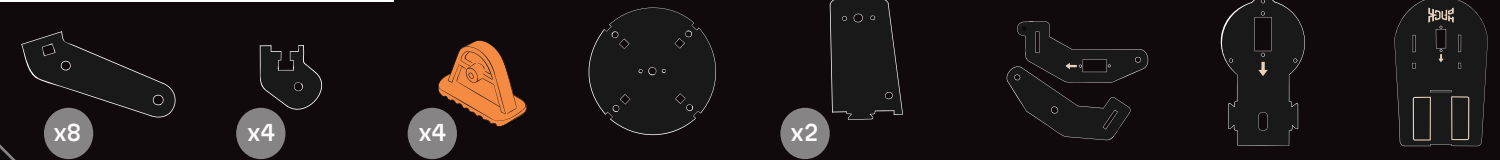
# BUILD ALONG WITH MARK ROBER



[CRUNCHLABS.COM/TURRT](https://crunchlabs.com/turrt)

## PARTS

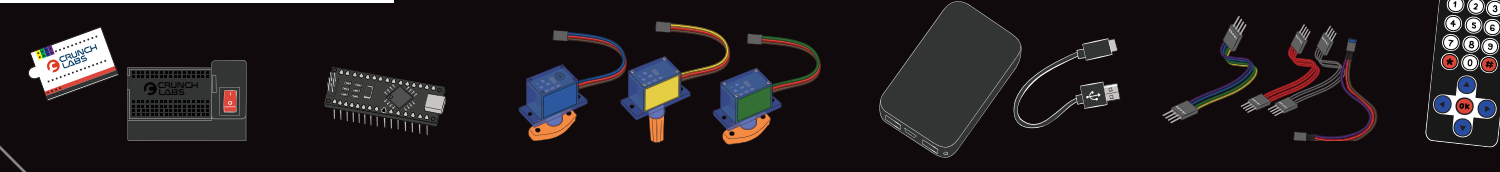
### BASE PIECES



### LAUNCHER & ROCKETS



### ELECTRONICS

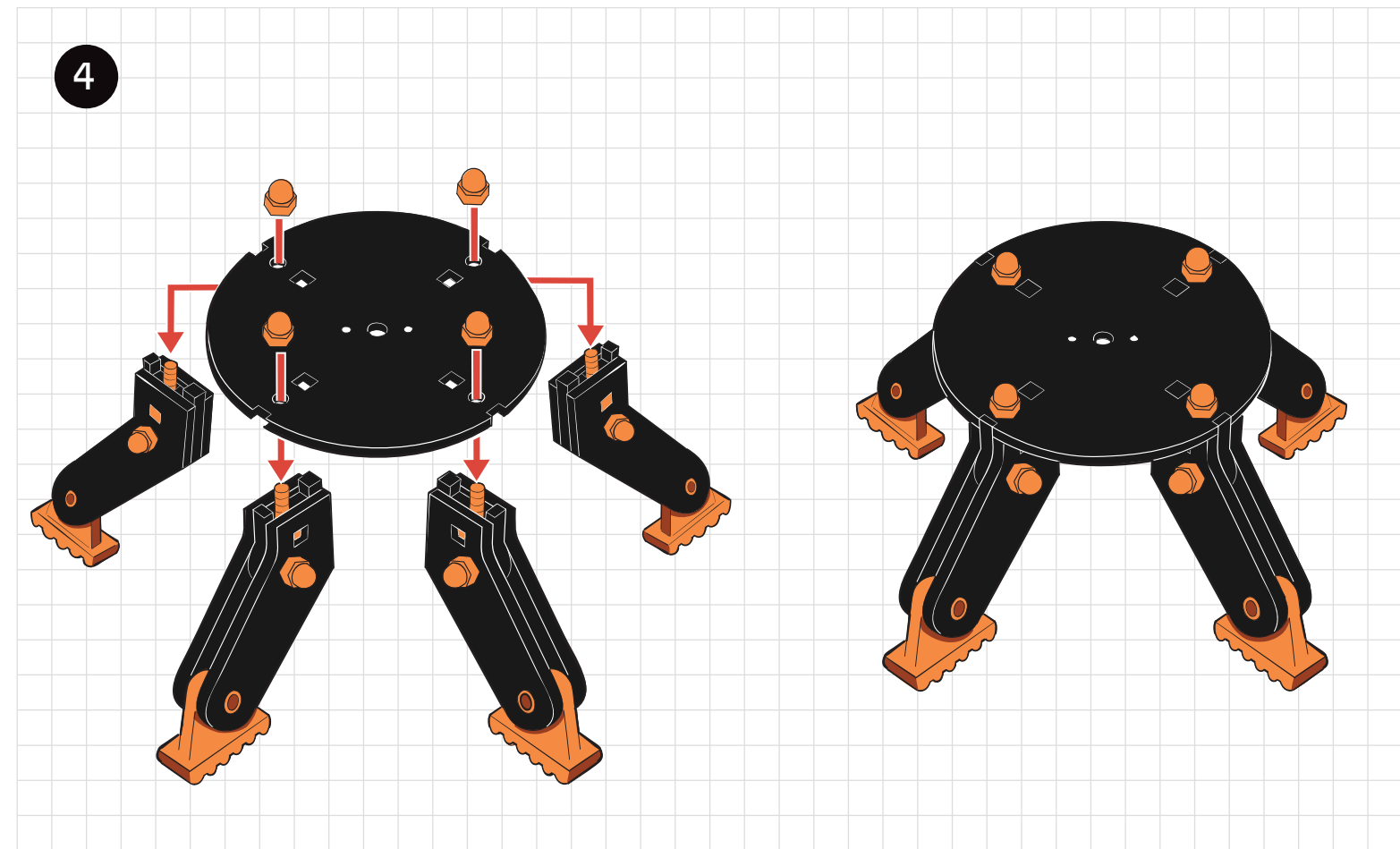
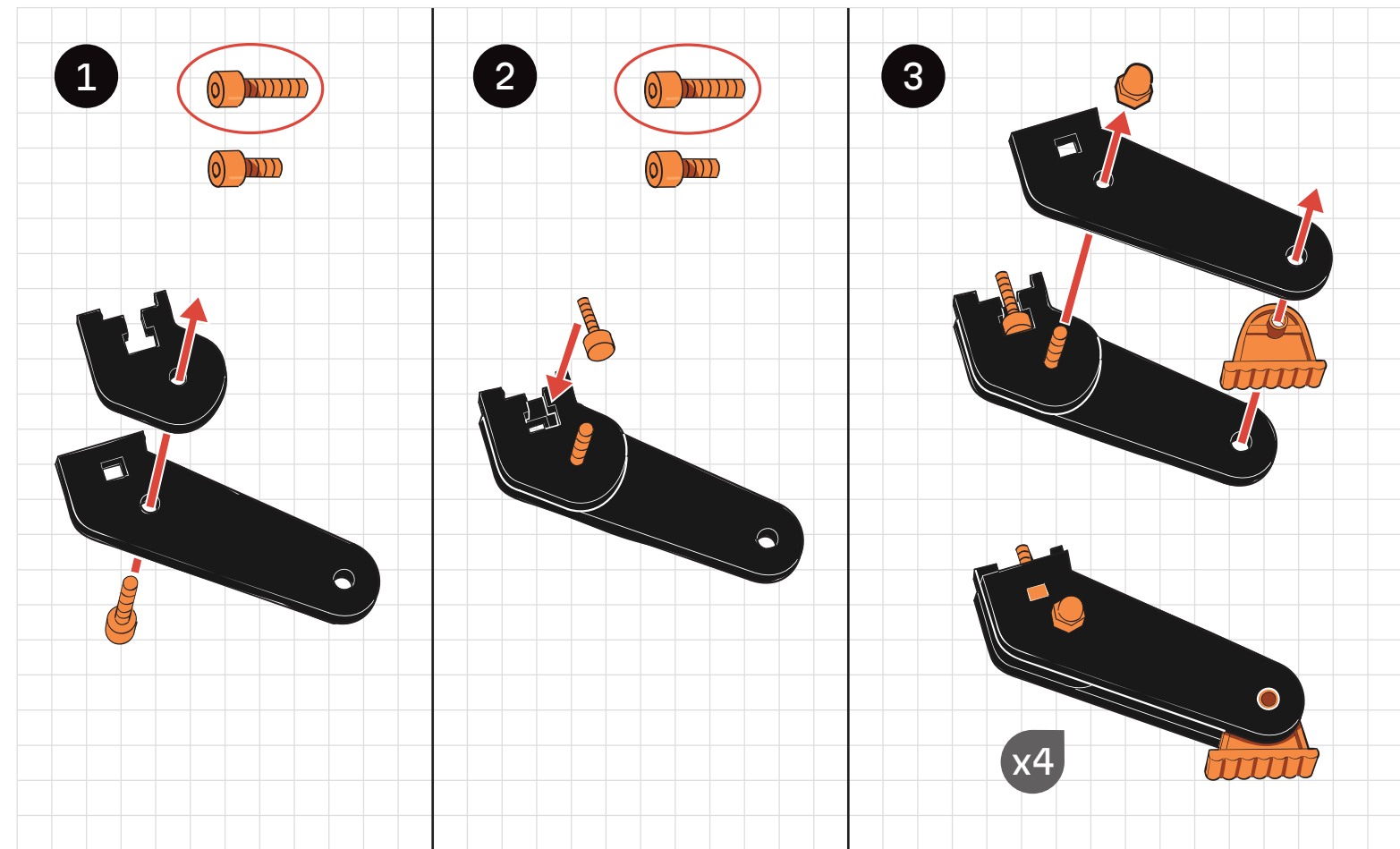


### TOOLS & ACCESSORIES

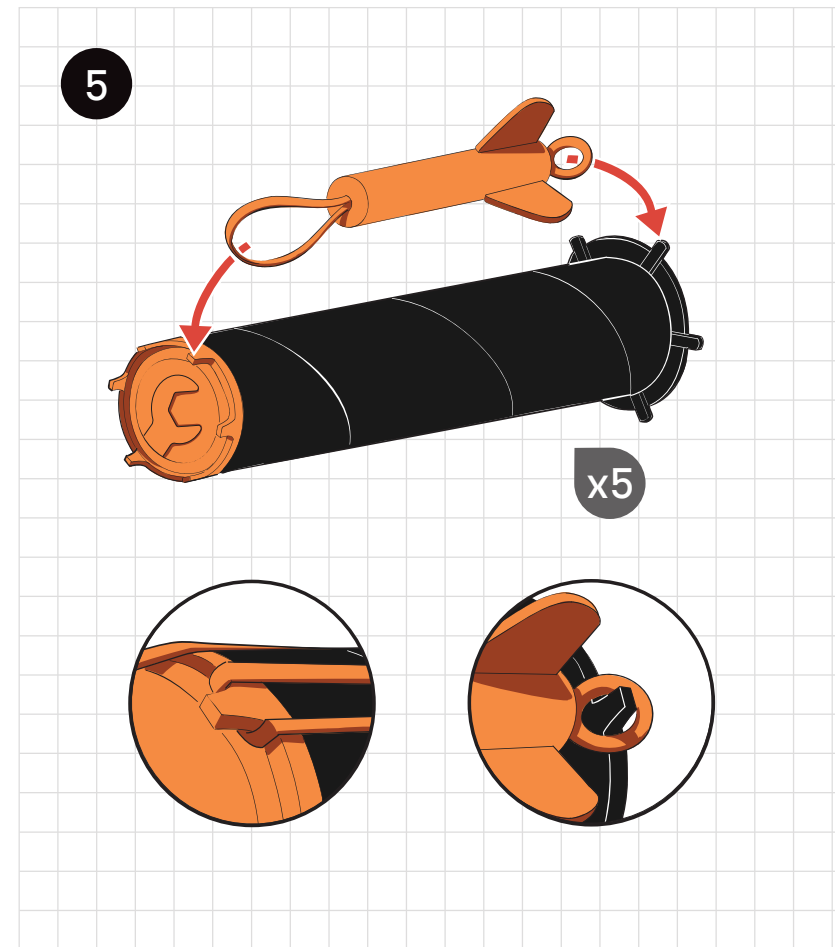


For missing and replacement parts, visit “My Account” at [crunchlabs.com](https://crunchlabs.com) and we’ll ship them to you for free.

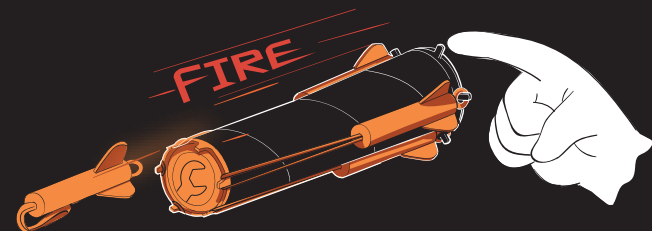




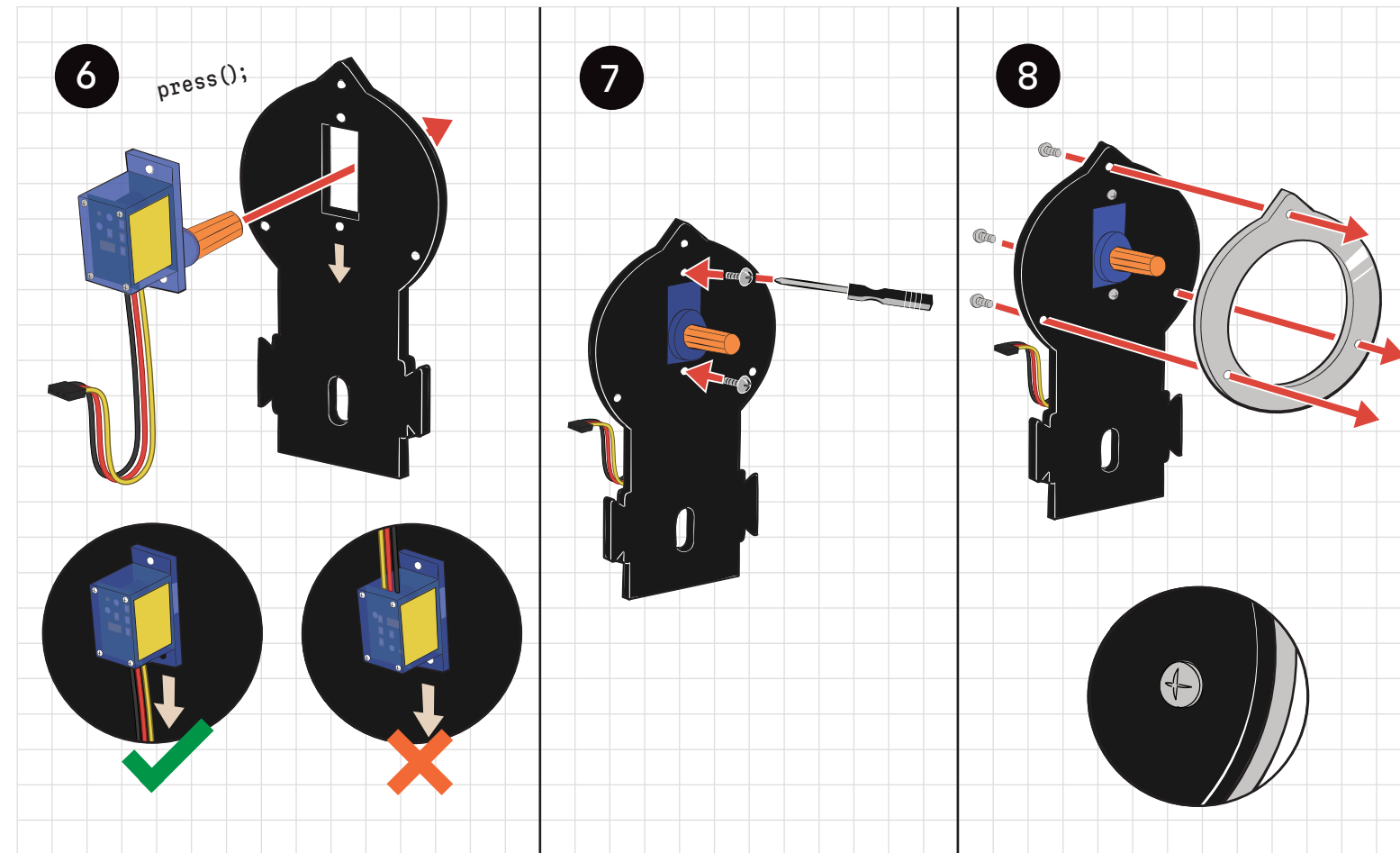




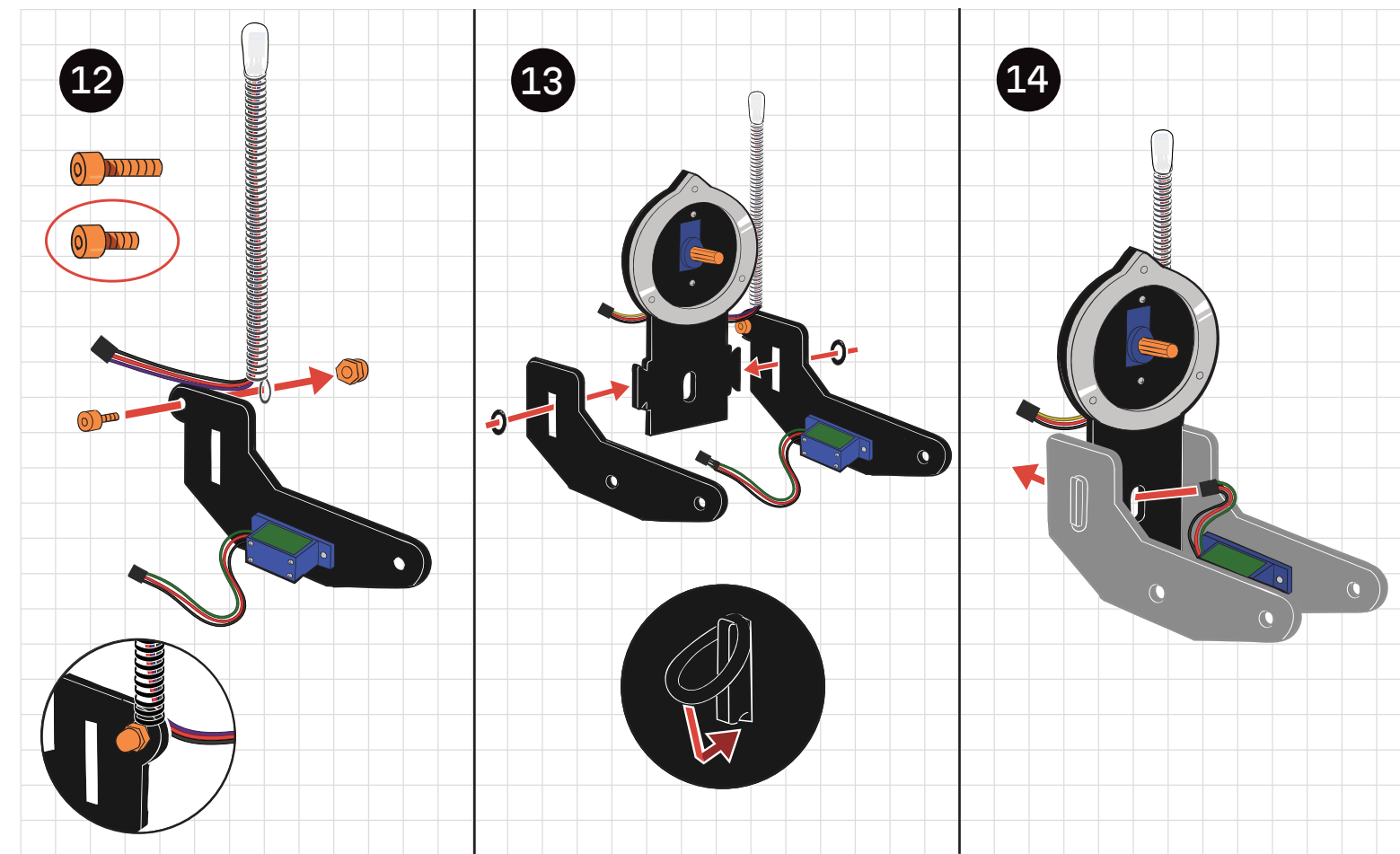
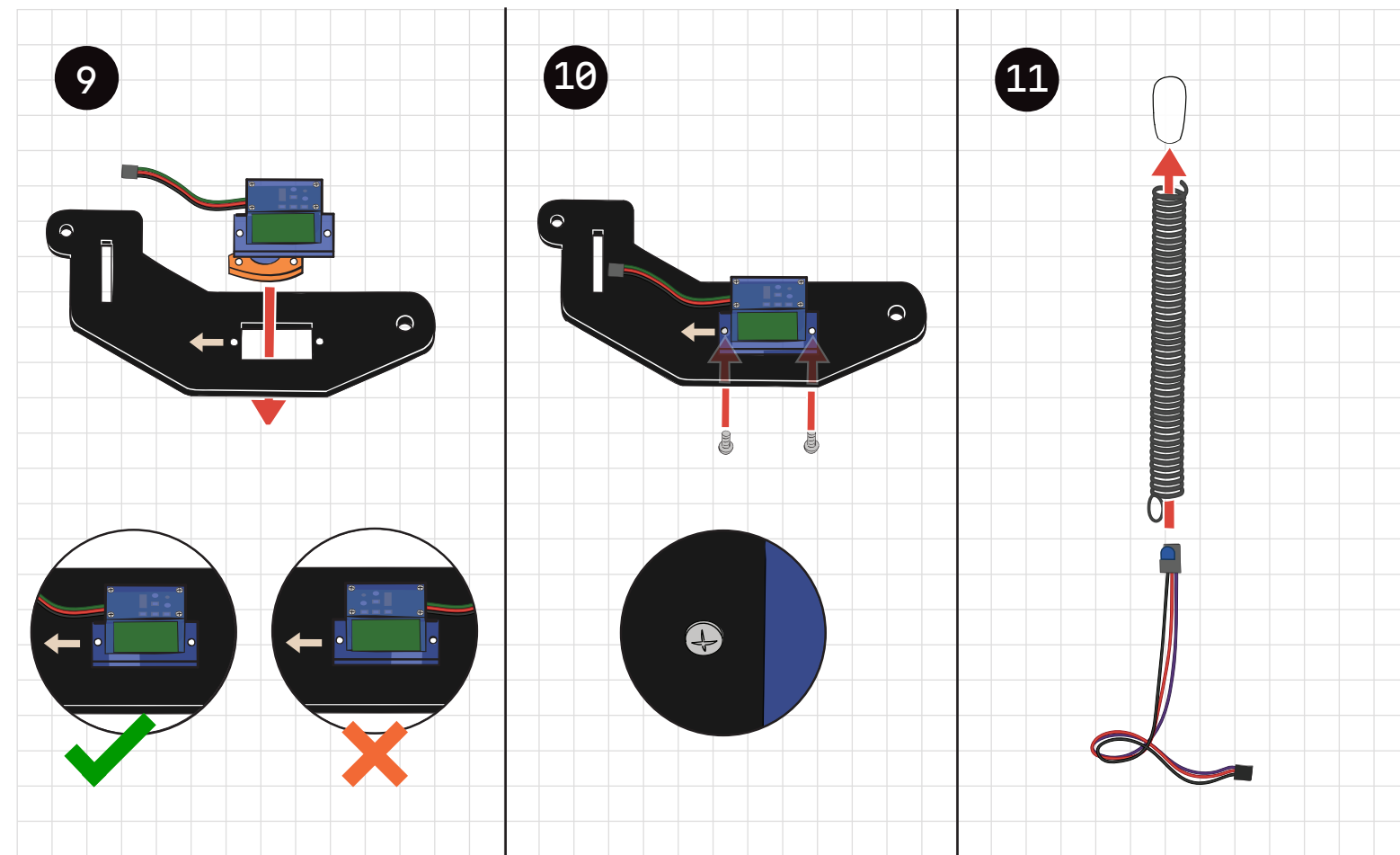
## TEST



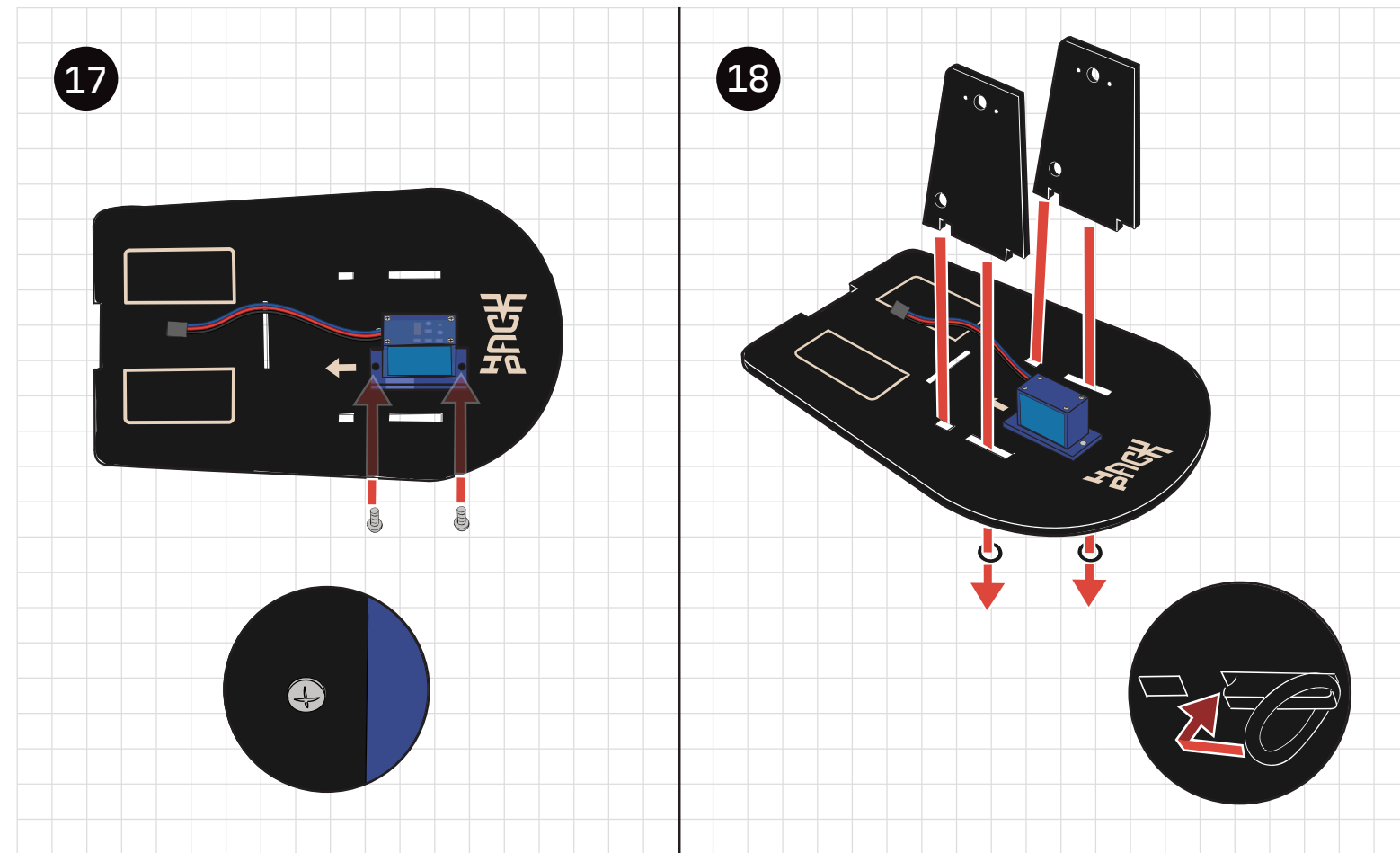
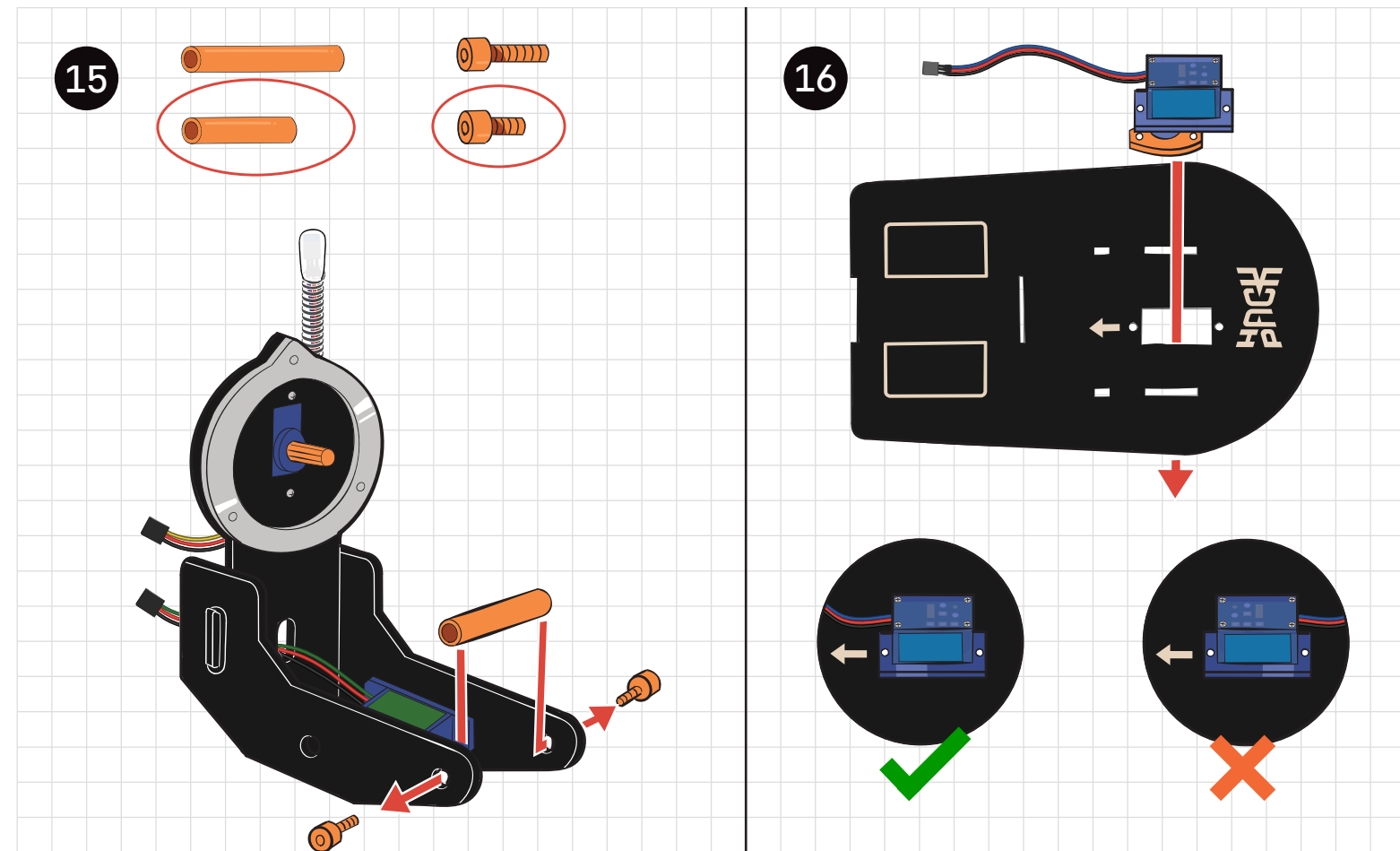
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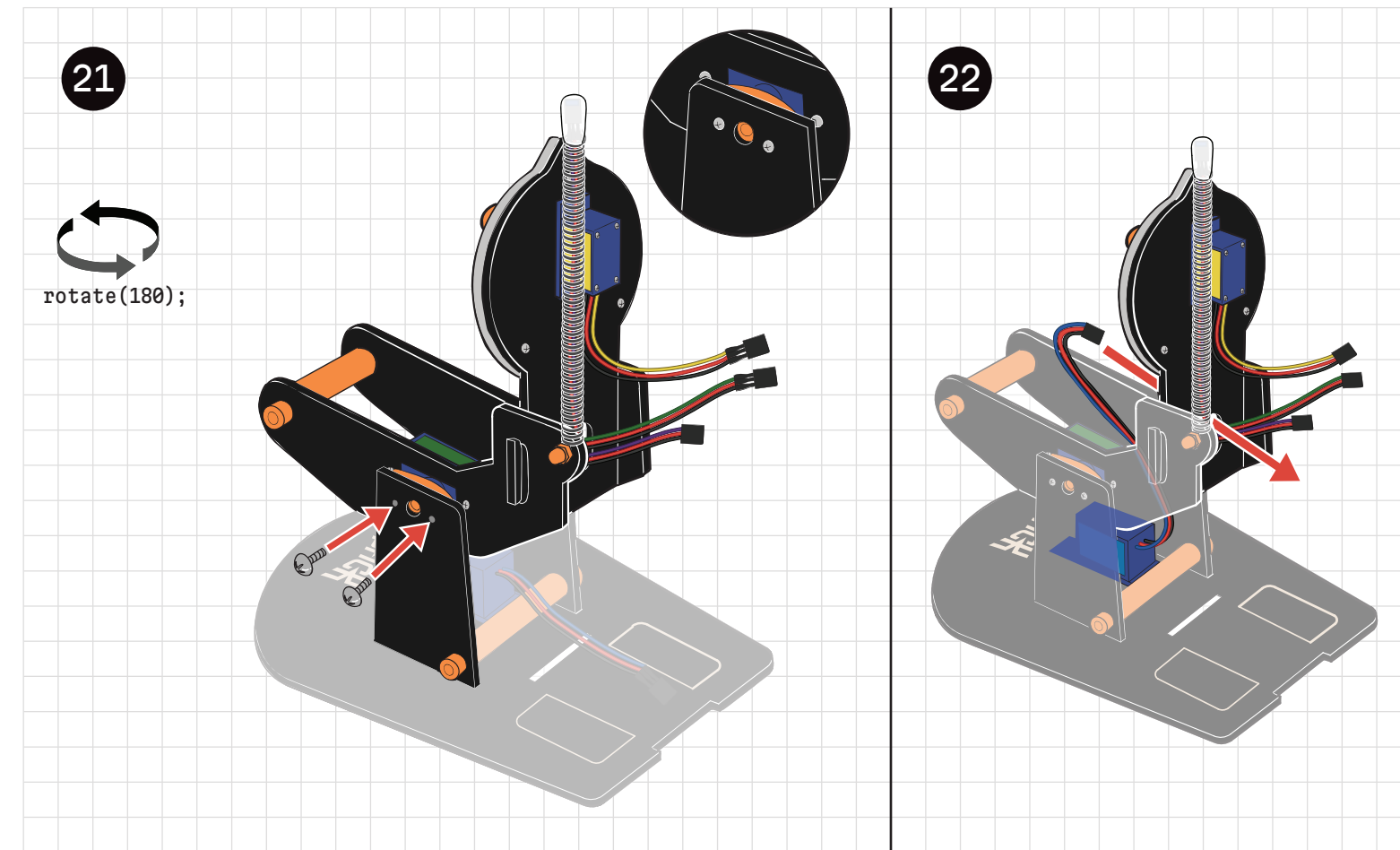
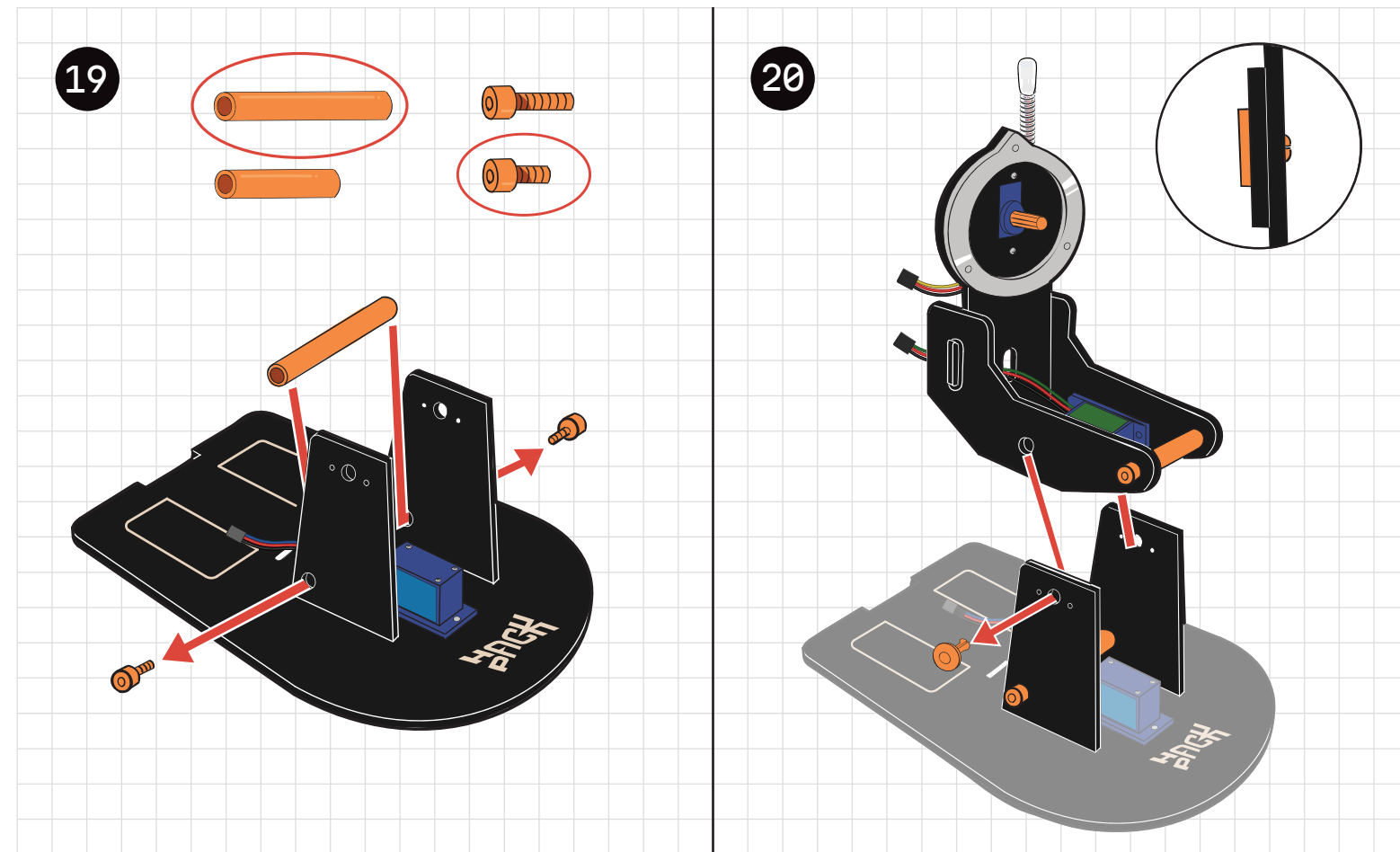




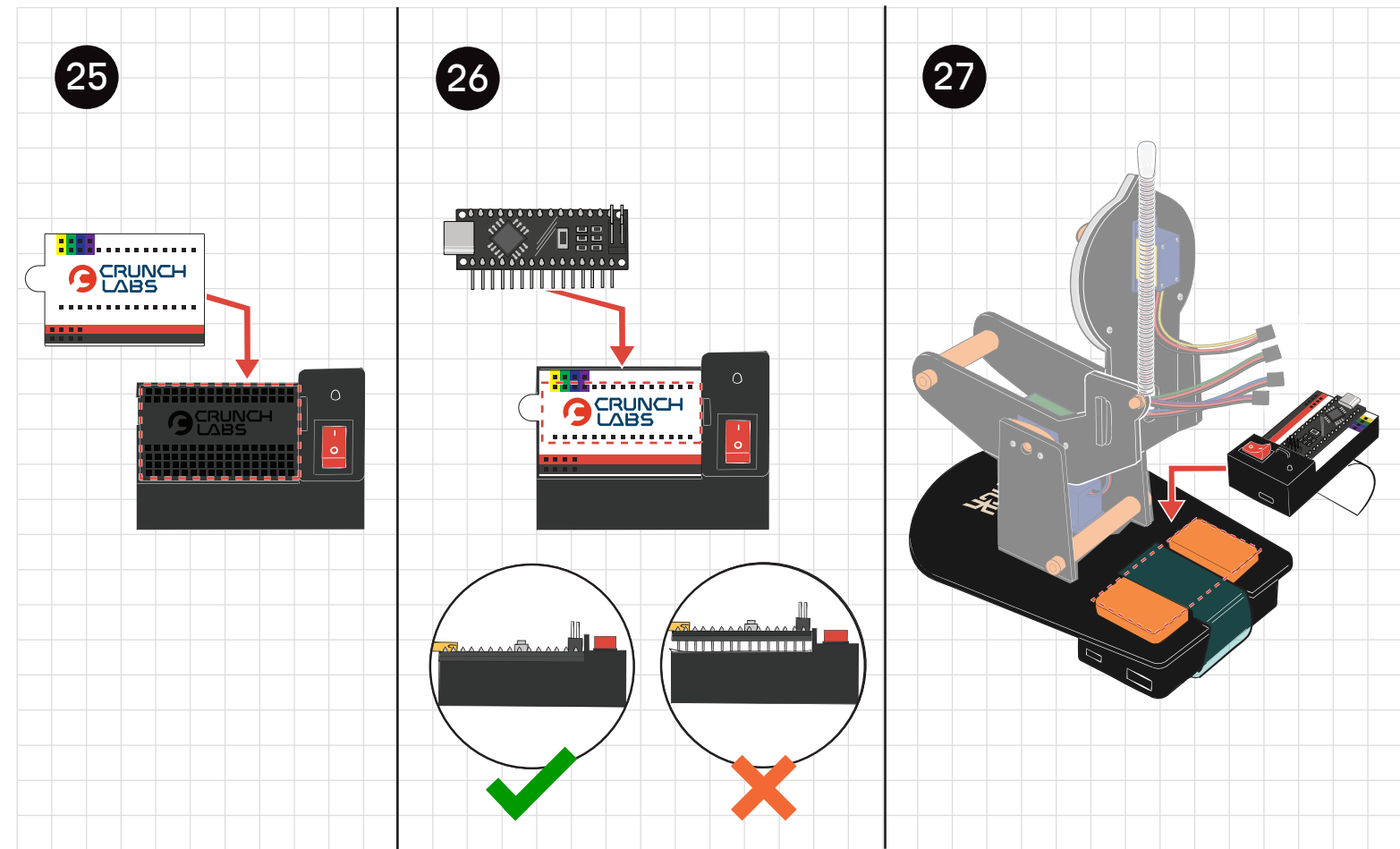
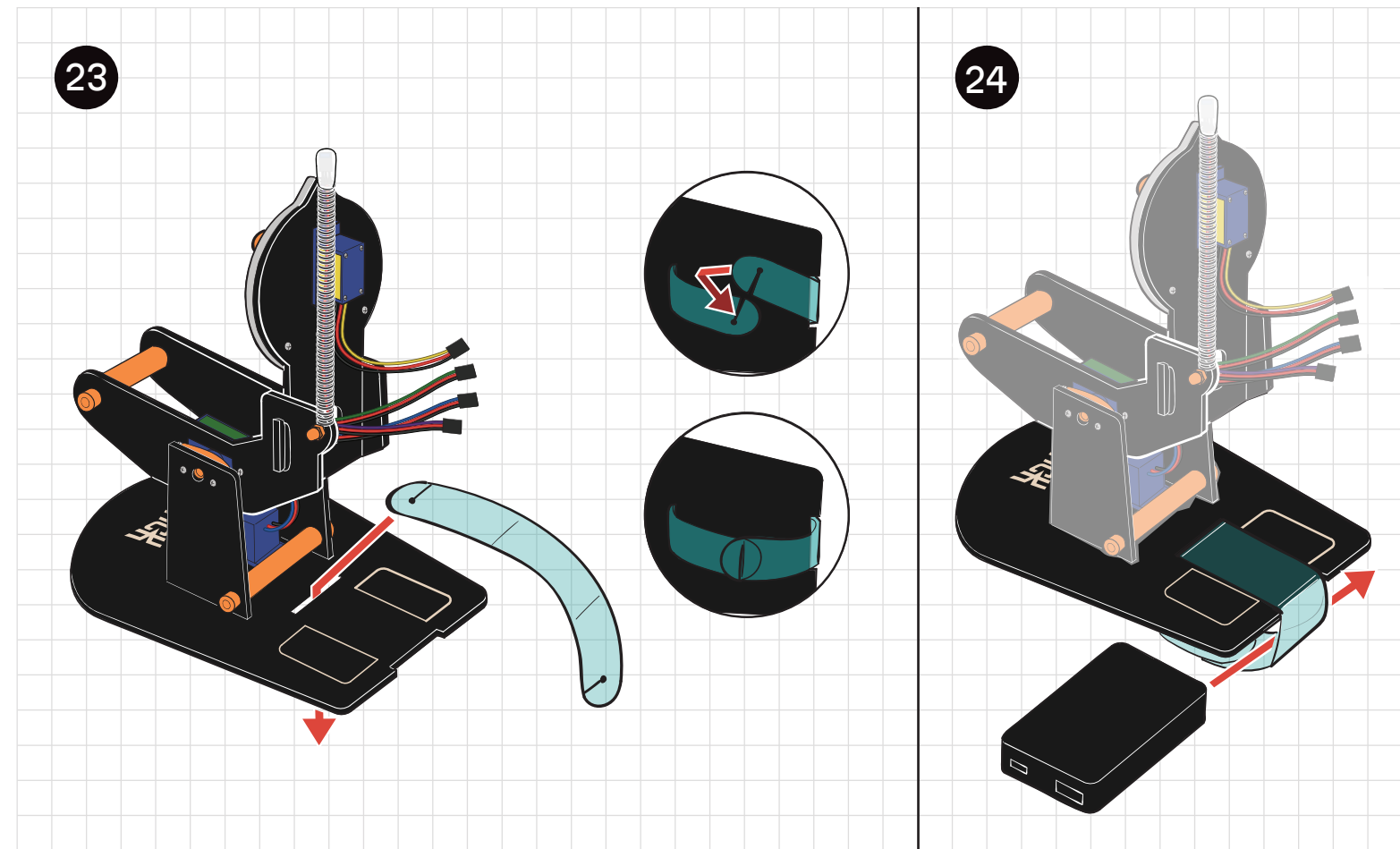




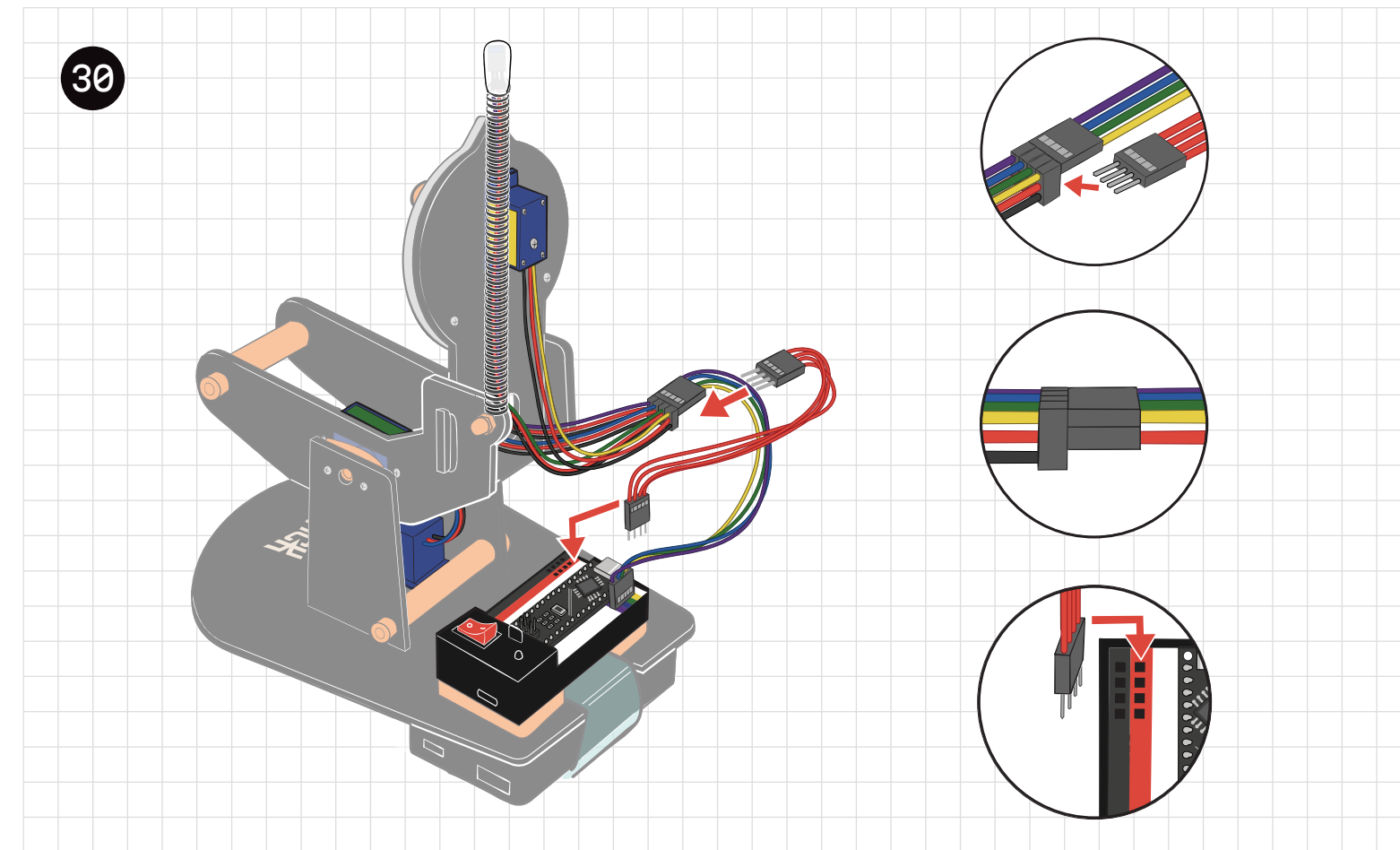
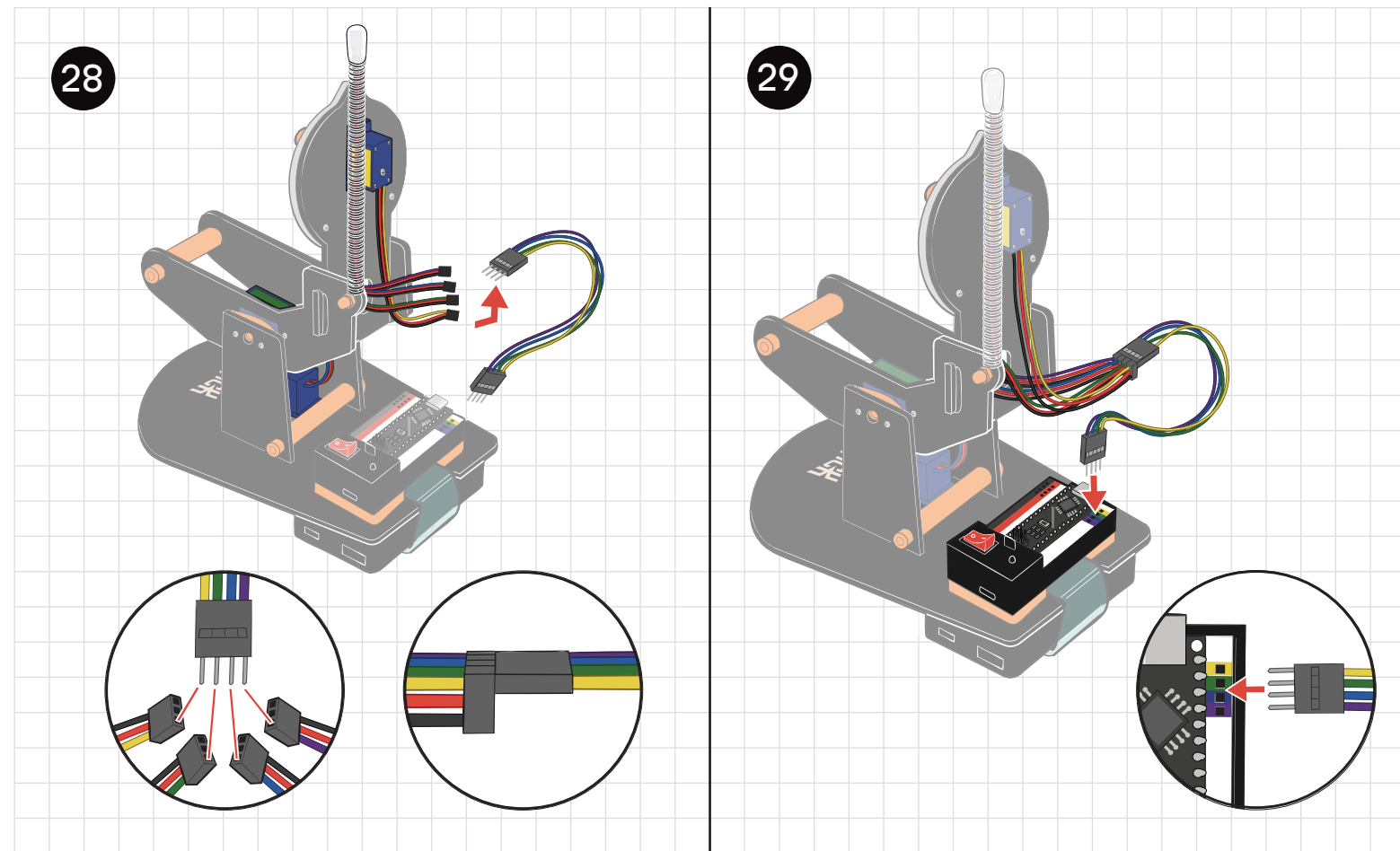




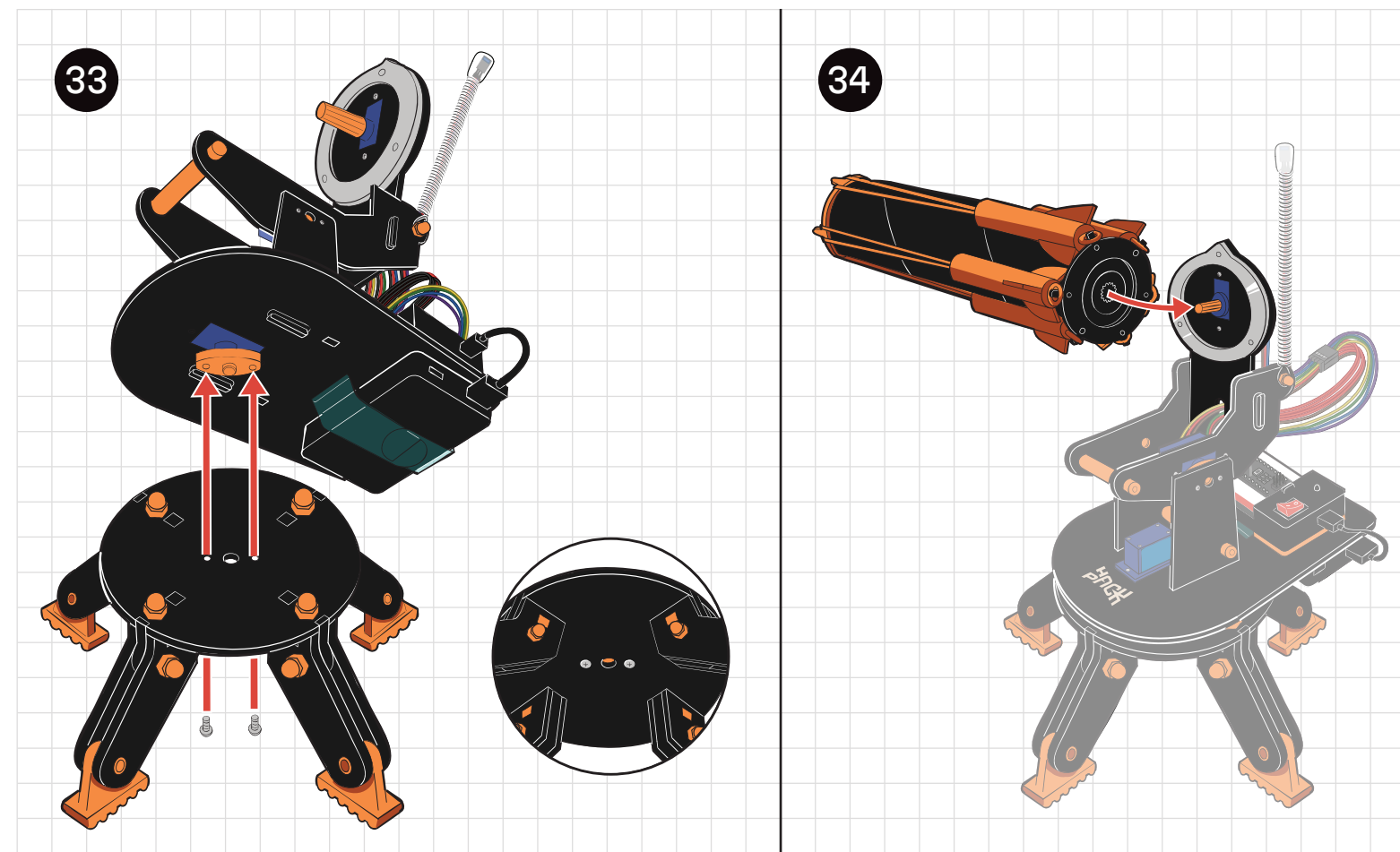
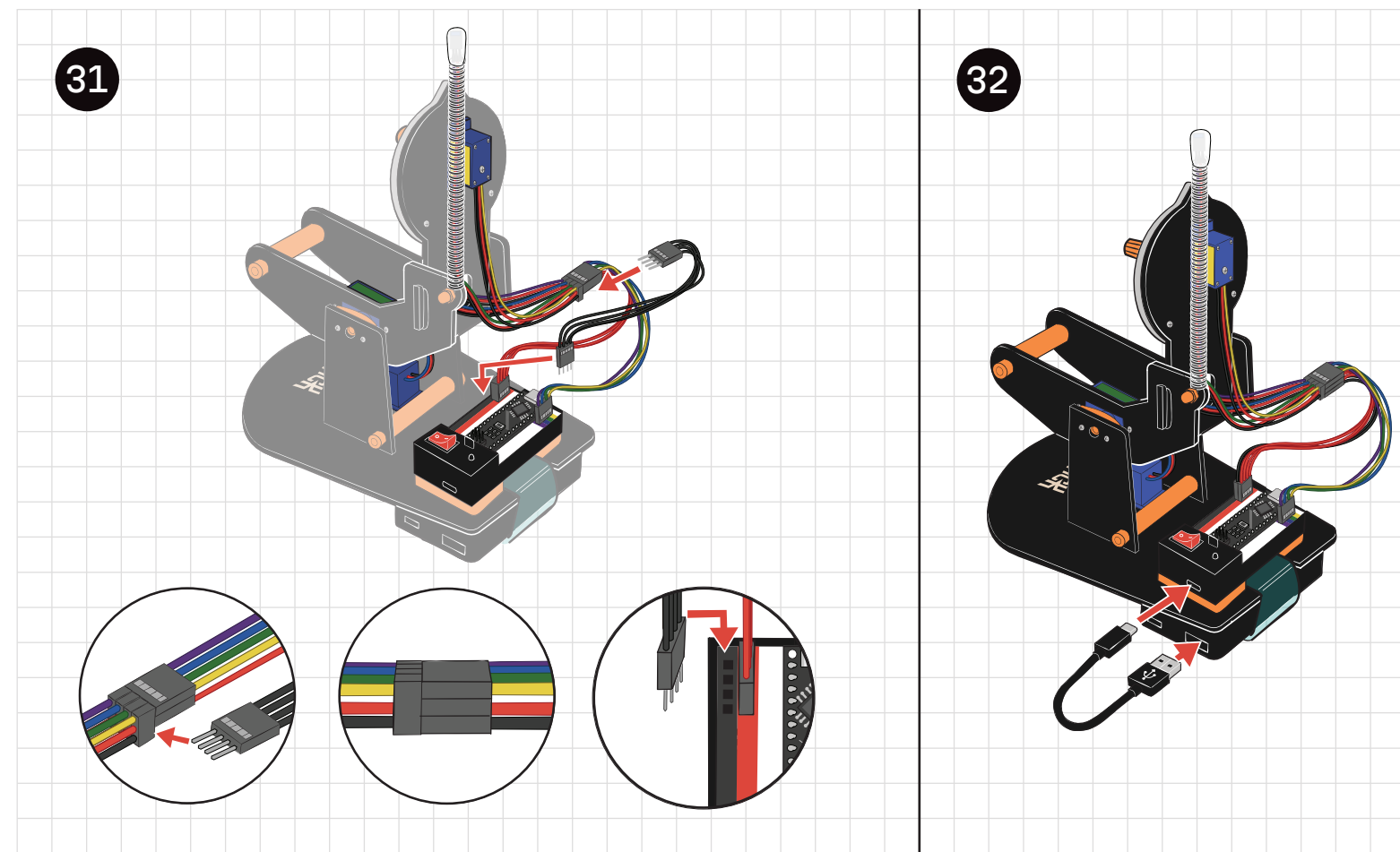






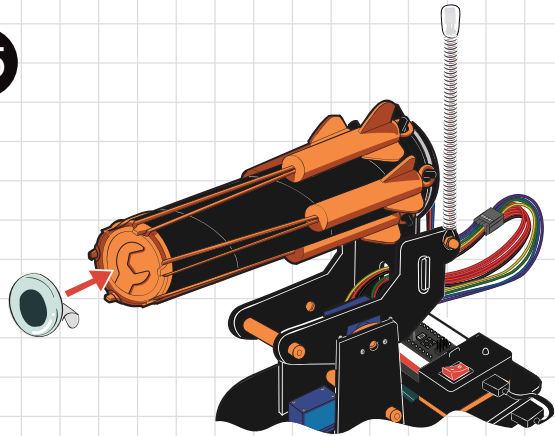




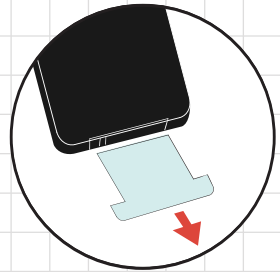
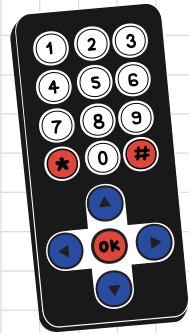




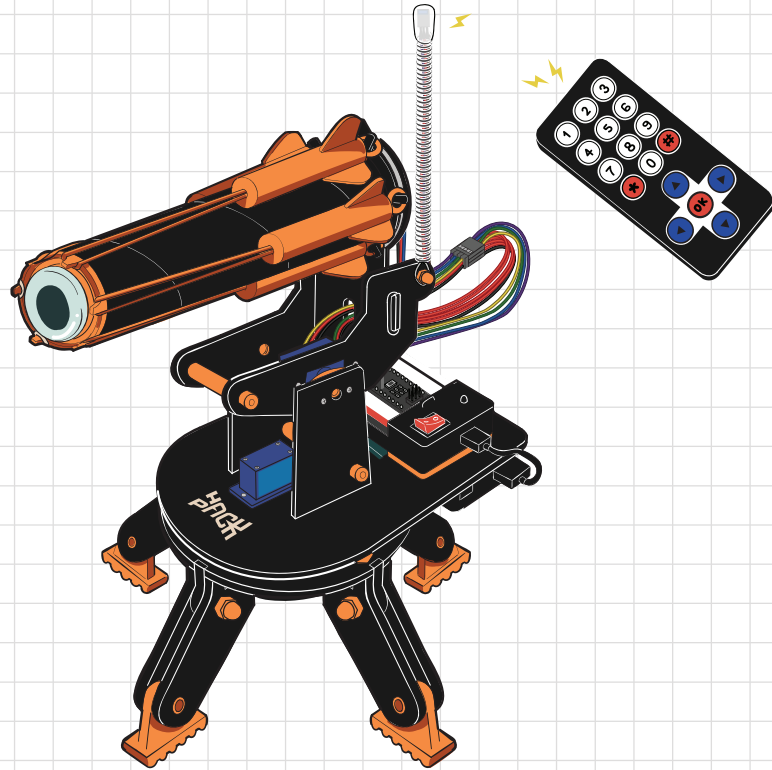
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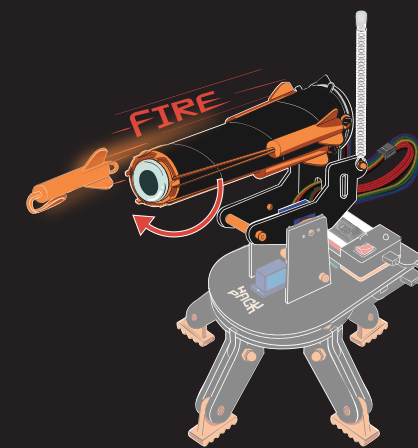
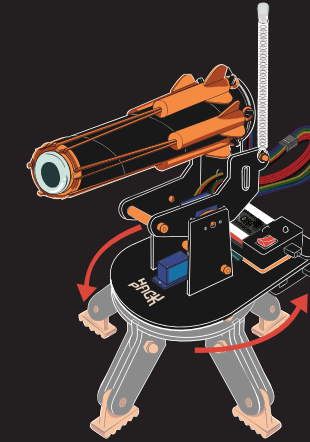
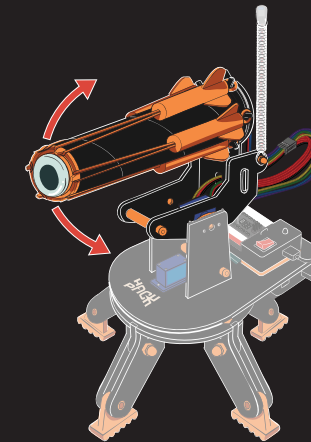
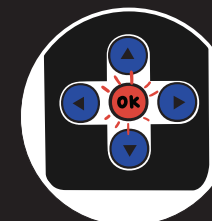
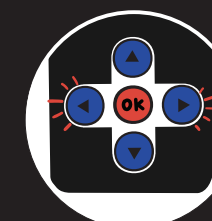
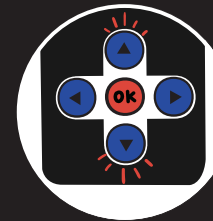
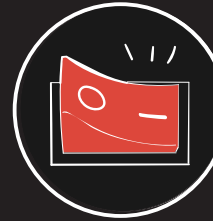
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BUILT!



TEST

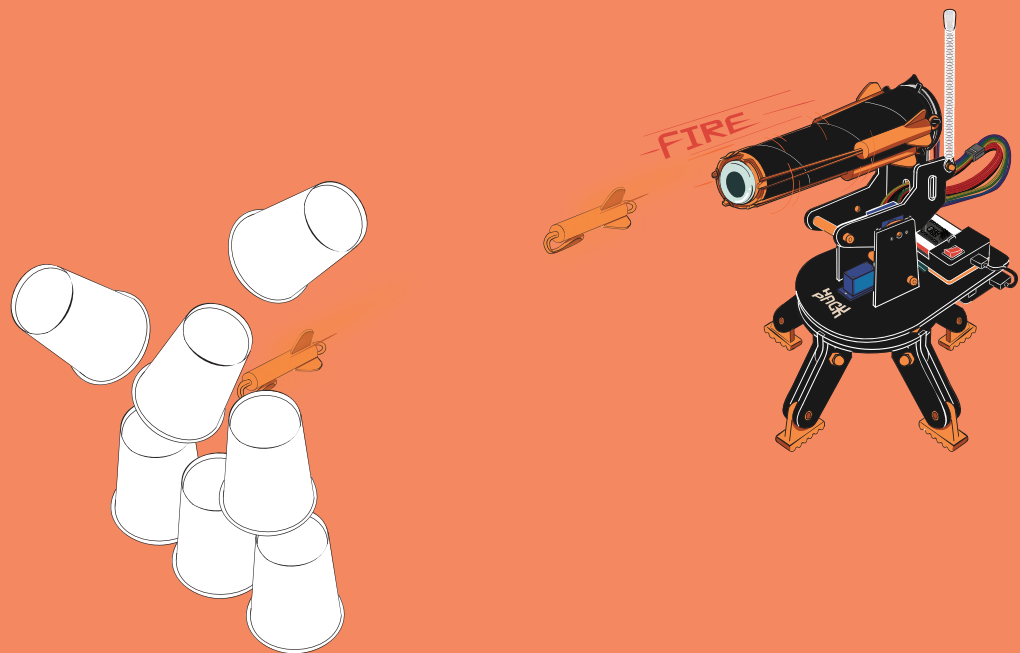


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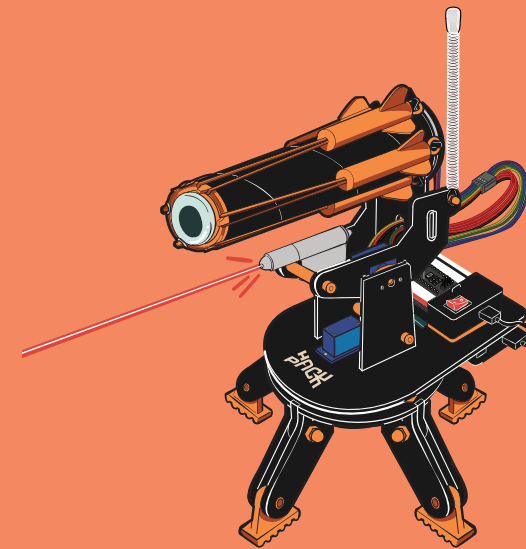
## ACCURACY TESTING

Try hitting targets around the room. If that's too easy, try hitting a moving target like a pendulum, or your little brother.



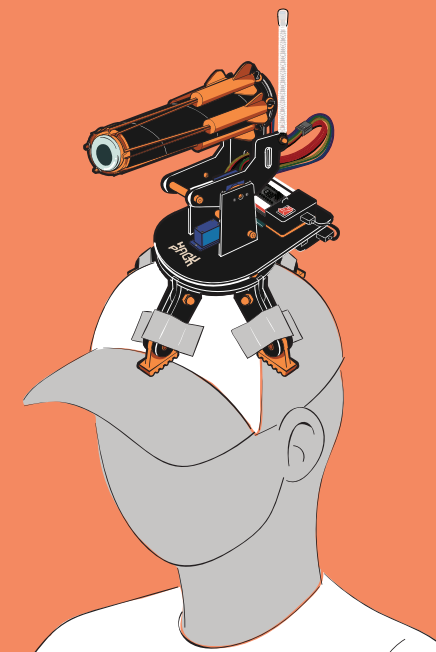
## CYBERPUNK ENHANCEMENT

Attach the turret to a hat, or a shoulder strap, using tape or magnets for maximum cybernetic enhancement.



## LASER FOCUS

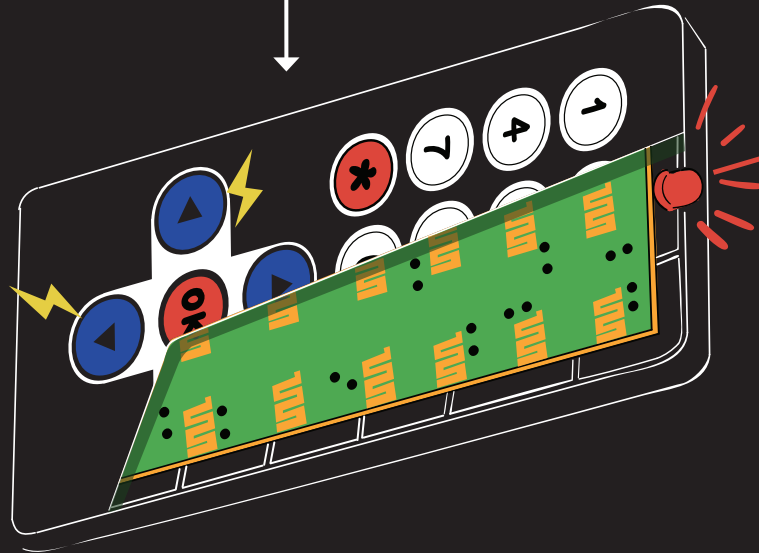
Create your own sight by adding a laser pointer.





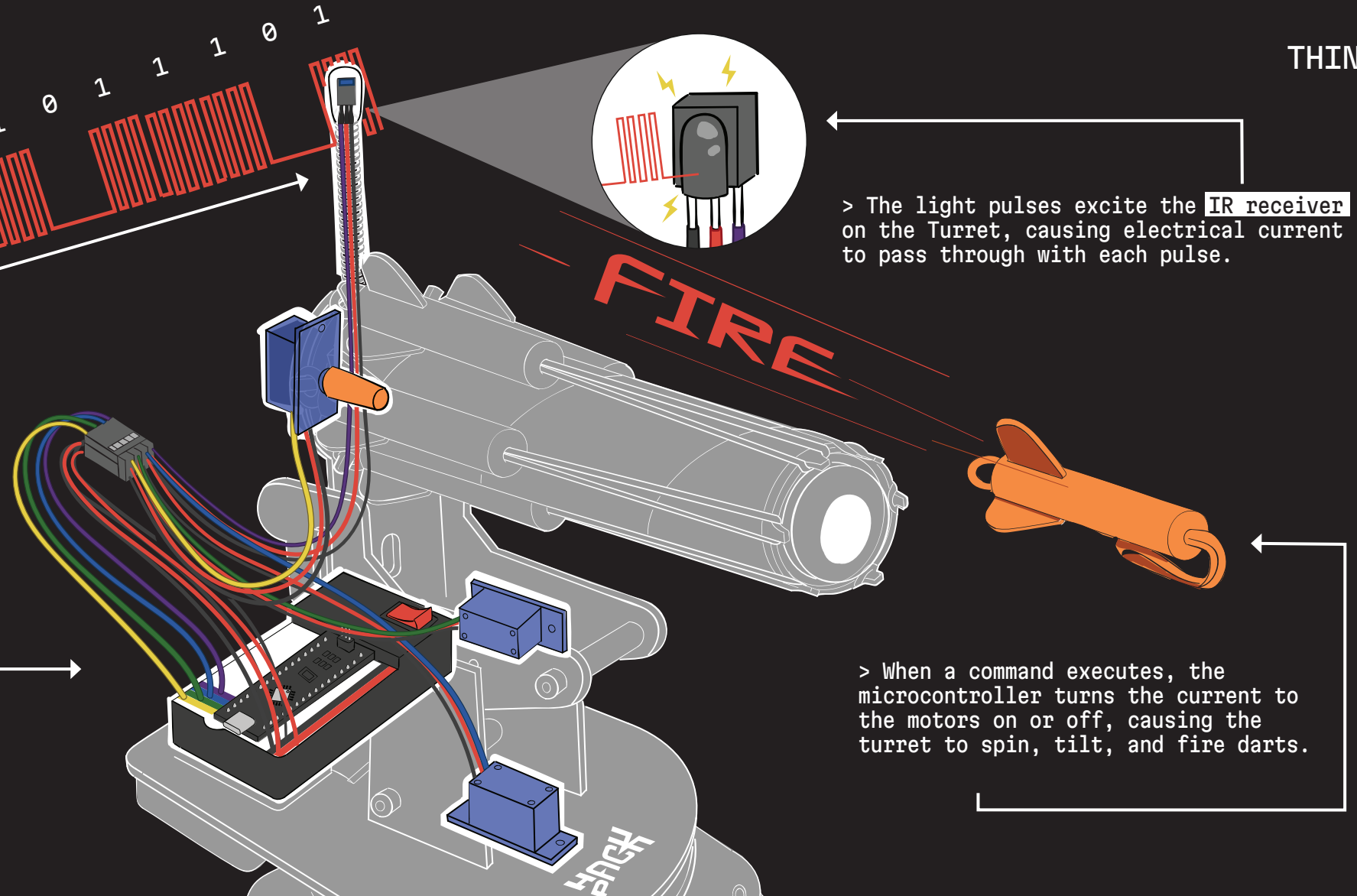
THINK

> When you press a button on the IR remote, the **IR LED** inside emits pulses of invisible infra-red light.



> The Turret's **electronics** are a microcontroller, 3 motors, a power supply, and an IR receiver antenna.

> The **microcontroller** reads the pulses of electricity, and figures out which command to execute based on the timing of the pulses.



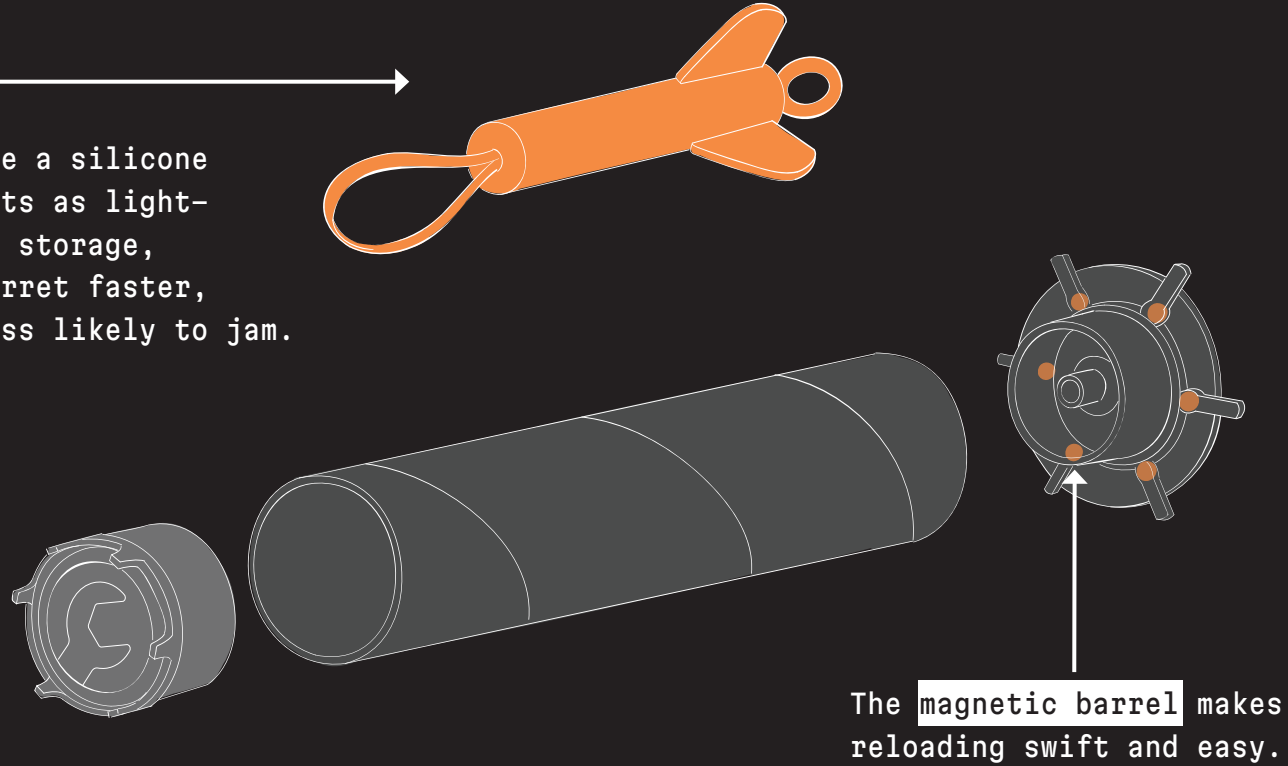
> The light pulses excite the **IR receiver** on the Turret, causing electrical current to pass through with each pulse.

> When a command executes, the microcontroller turns the current to the motors on or off, causing the turret to spin, tilt, and fire darts.



## THE ROCKET LAUNCHER

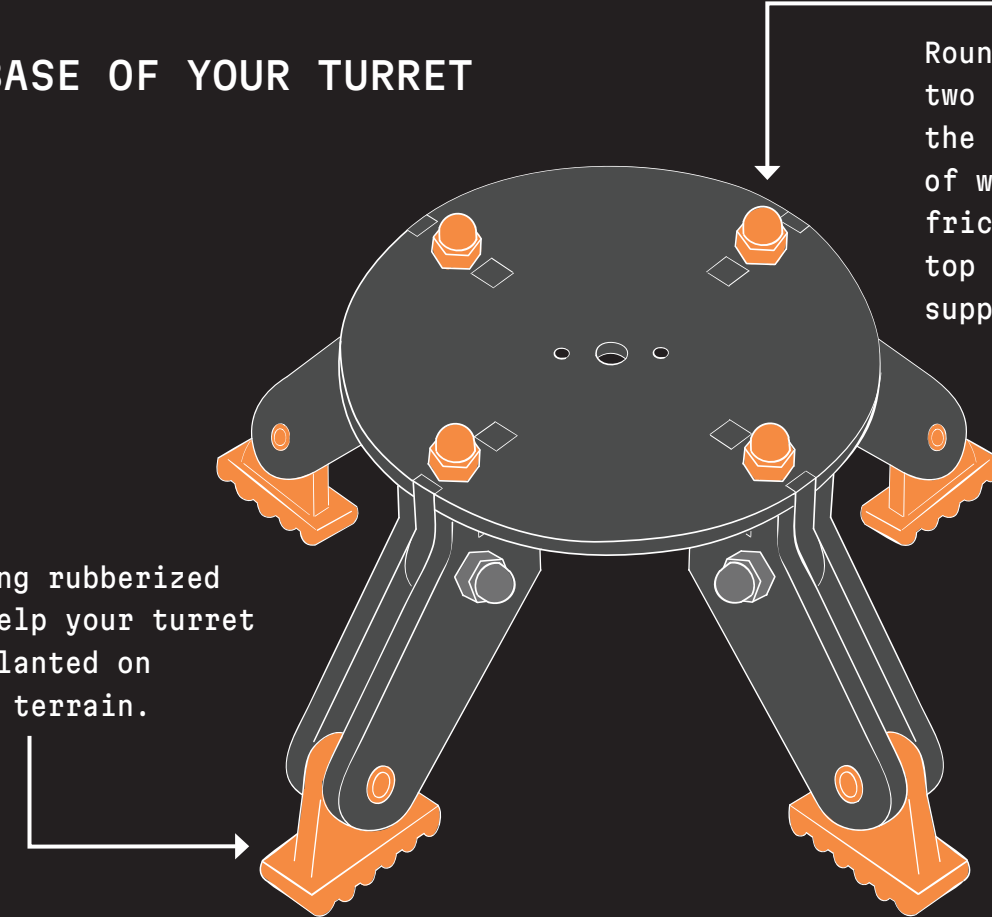
The darts have a silicone band which acts as light-weight energy storage, making the turret faster, safer, and less likely to jam.



## THE BASE OF YOUR TURRET

Pivoting rubberized feet help your turret stay planted on uneven terrain.

Round top acorn nuts have two functions: connecting the legs to the base piece of wood, and providing a low friction surface so that the top of the turret is well supported and free to rotate.

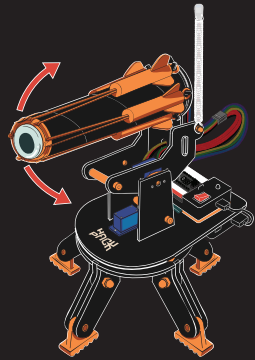
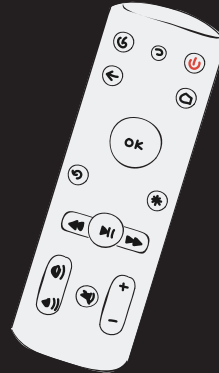






## SWAPPING SIGNALS

Hack another type of remote control (like one for a tv, space heater, or LED strip) so that your turret activates and fires at a specific location when the remote is used.



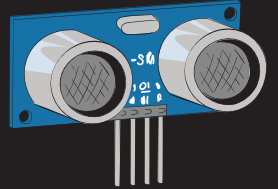
## ACCORDING TO PLAN

Add a pre-scripted routine to one of the buttons (ex: fire one round to your left, one to your right, and then three above your head).



## THREAT DETECTION

Connect an ultrasonic distance sensor to the turret to convert it to sentry mode. Program the turret to scan back and forth until the distance sensor detects something in range, then let the darts fly.



## CYBORG VISION

Connect an accelerometer or MPU to your head. Strap the turret to your shoulder and have it fire wherever you look. Bonus points: add an EMG muscle sensor so you can make the turret fire by winking!



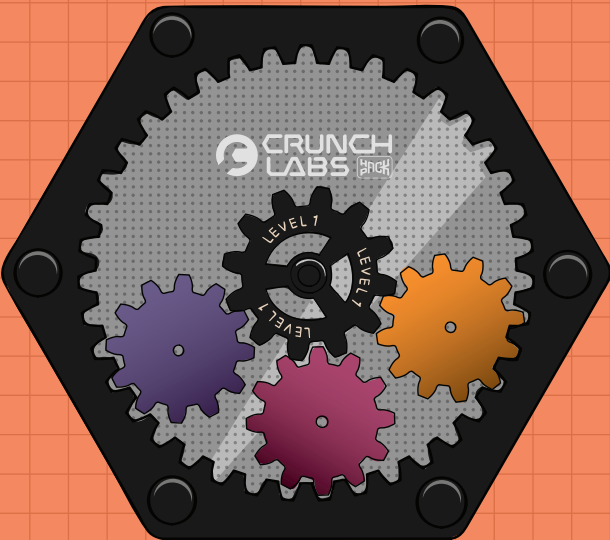
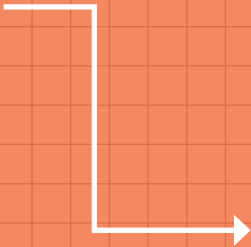
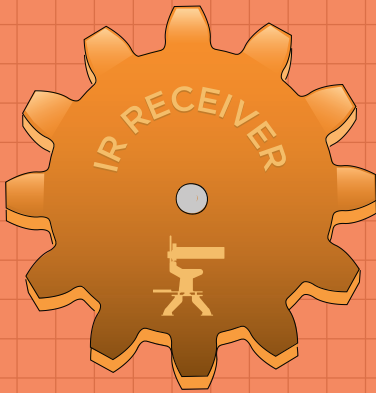
SHARE

SHOW OFF YOUR HACKS

Share your software mods and explore more ways to hack your IR Turret on [crunchlabs.com](https://crunchlabs.com)



ADD THE IR TURRET GEAR BADGE TO YOUR HACKPACK DIPLOMA.







**WARNING:** Do not aim at eyes or face. Do not discharge an object other than the projectile provided with this toy. This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.