



Kinetic Light-Up Speaker

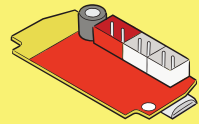


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In this crate

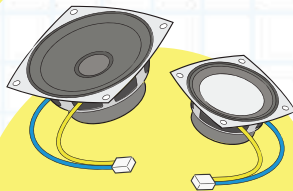
You'll build a speaker with
real electronic components.



wireless board

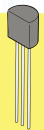
This receives a signal from a phone or other device.

uses
Bluetooth®
wireless
technology



speaker drivers

These vibrate to make sound!



transistor

This helps power the lights.



USB cable

This is how your speaker will get power.



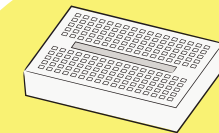
capacitor

This stores electricity.



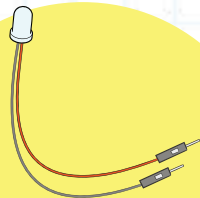
resistor

This slows electricity.



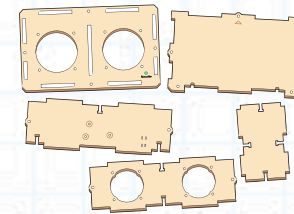
breadboard

This connects different electronics together.

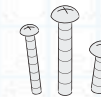


LEDs

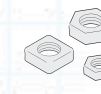
The lights flash in time with the beat.



wood set



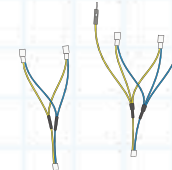
screws



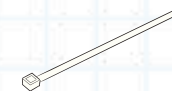
nuts



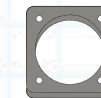
washers



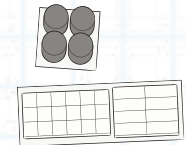
wires



zip ties



gaskets



sticky foam



light bar



O-ring



tubes



caps



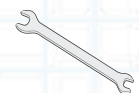
foam balls



breadboard guide



screwdriver



wrench



scissors



USB power source



device with
Bluetooth technology

We've also provided **everything else**
you need to build your speaker.

Tip! Sort your hardware by size before you start.

From home

Build the base

You'll need:

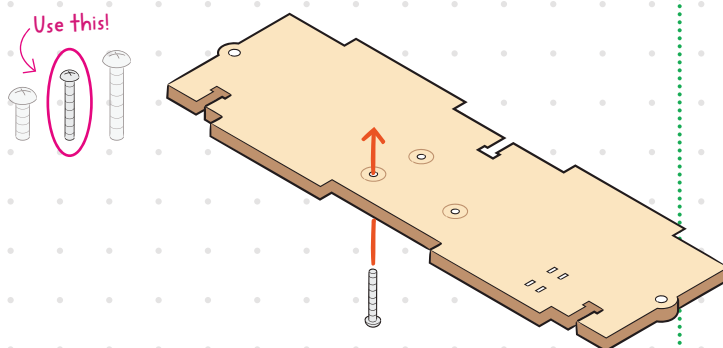
- ☐ bottom panel
- ☐ wireless board
- ☐ medium screws
- ☐ small hex nuts
- ☐ USB cable
- ☐ zip ties
- ☐ screwdriver
- ☐ wrench

From home:

- ☐ scissors

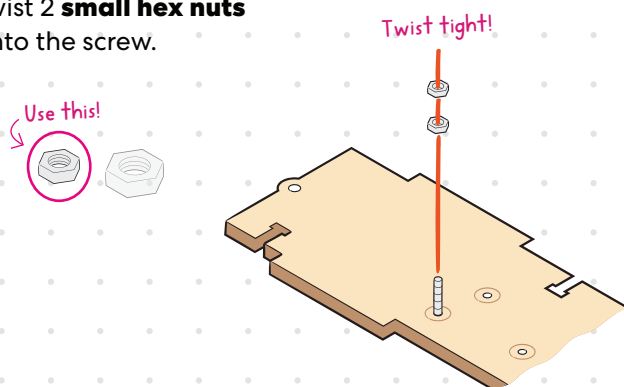
Step 1

Grab the **bottom panel** and hold it with the etched side up. Poke a **medium screw** up through a circled hole.



Step 2

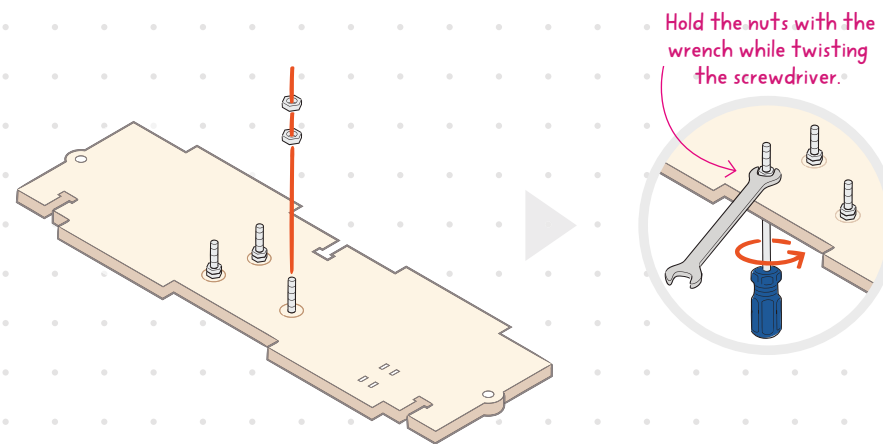
Twist 2 **small hex nuts** onto the screw.



Step 3

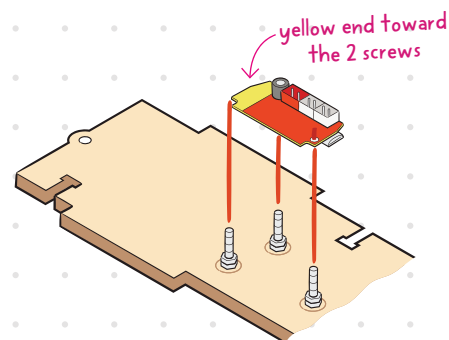
Repeat **Steps 1-2** for the other holes.

Tighten all 3 screws with the **screwdriver** and **wrench**.



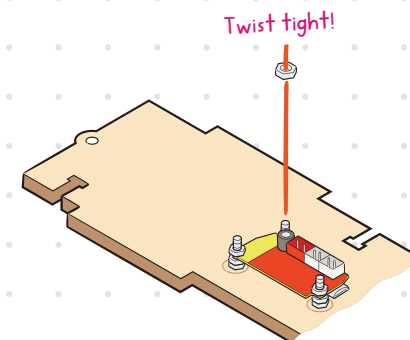
Step 4

Set the **wireless board** on top of the nuts.

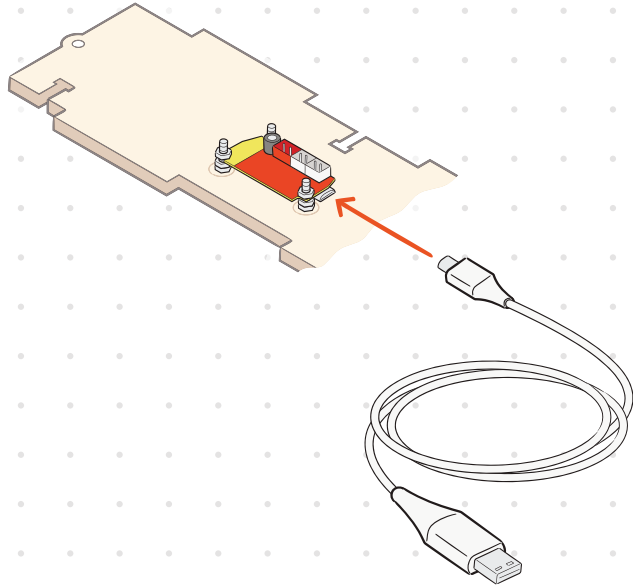


Step 5

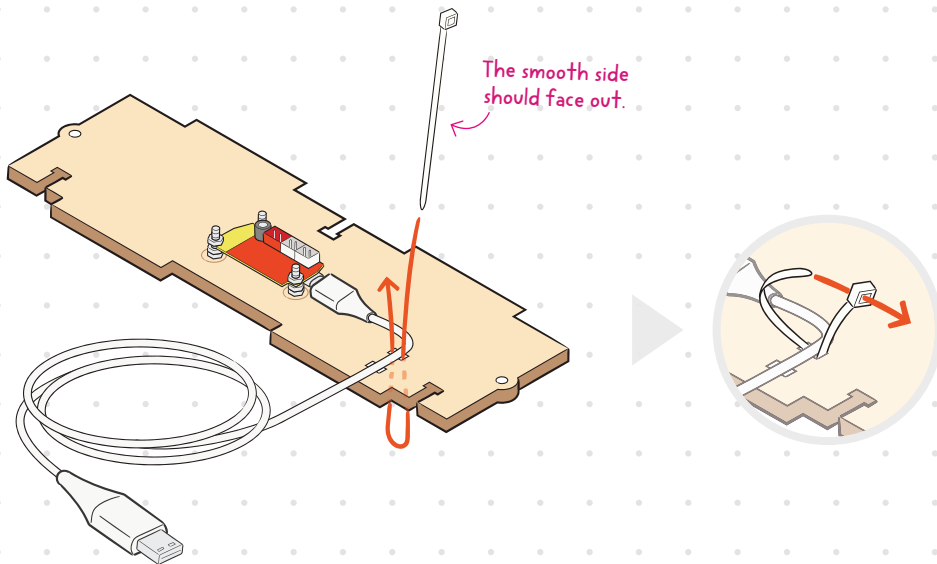
Twist another small hex nut onto each screw to hold the board in place.



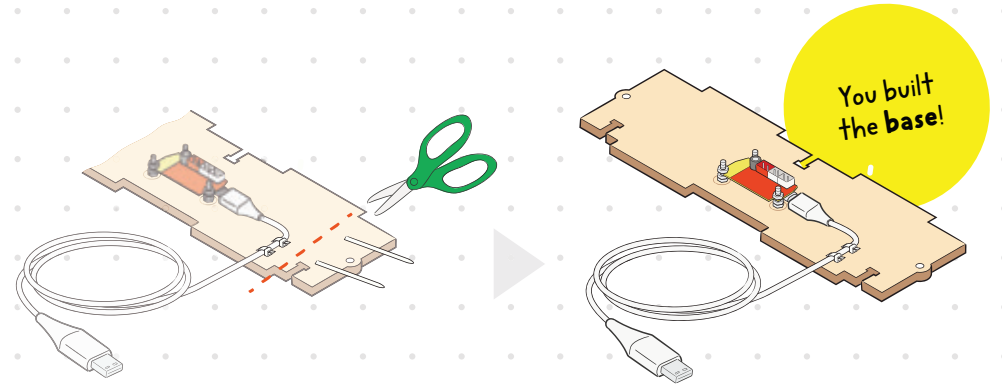
- **Step 6**
Plug the **USB cable** into the wireless board.



- **Step 7**
Line up the cable with the small rectangle holes. Poke a **zip tie** down through a hole and up through the other side. Pull it tight.

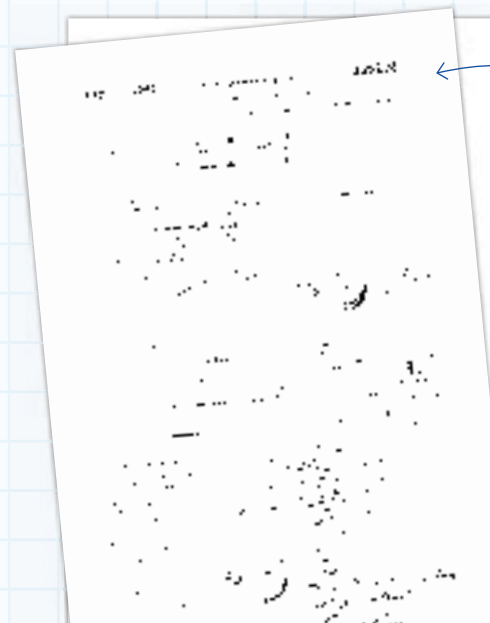


- **Step 8**
Repeat **Step 7** to add another zip tie. Then trim both tails with **scissors**.



Wireless board

The **wireless board** receives signals from a phone (or other device) so your speaker can play music. The radio waves that carry the signals can change frequencies hundreds of times *per second*. This **frequency hopping** ensures that your signal doesn't "bump into" any other signals in the air (like WiFi or phone calls).



Did you know?
The original frequency-hopping tech was invented back in 1941 by a surprising duo — movie star Hedy Lamarr and musician George Antheil.



photo: Hedy Lamarr in *The Heavenly Body* (public domain);
patent source: United States Patent and Trademark Office,
www.uspto.gov.

Add the large speaker drivers

You'll need:

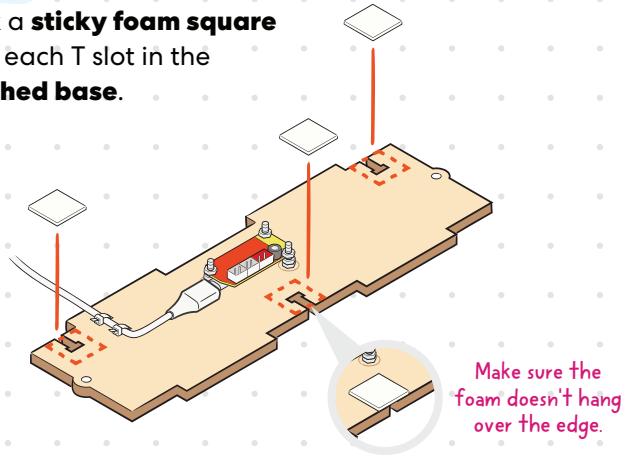
- ☐ finished base (from Part A)
- ☐ front panel
- ☐ sticky foam squares
- ☐ square nuts
- ☐ large hex nuts
- ☐ short screws
- ☐ long screw
- ☐ large speaker drivers
- ☐ wires
- ☐ sticky foam rectangles
- ☐ screwdriver
- ☐ wrench

From home:

- ☐ USB power source
- ☐ device with Bluetooth technology

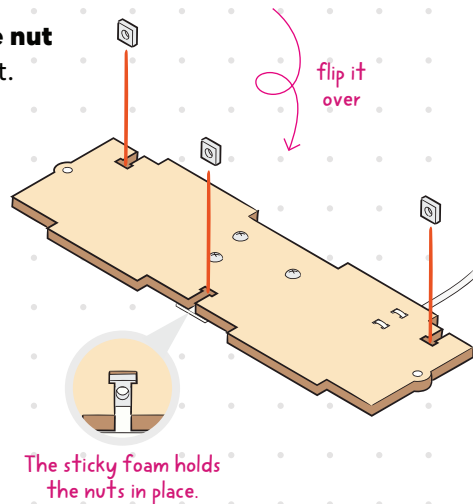
Step 1

Stick a **sticky foam square** over each T slot in the **finished base**.



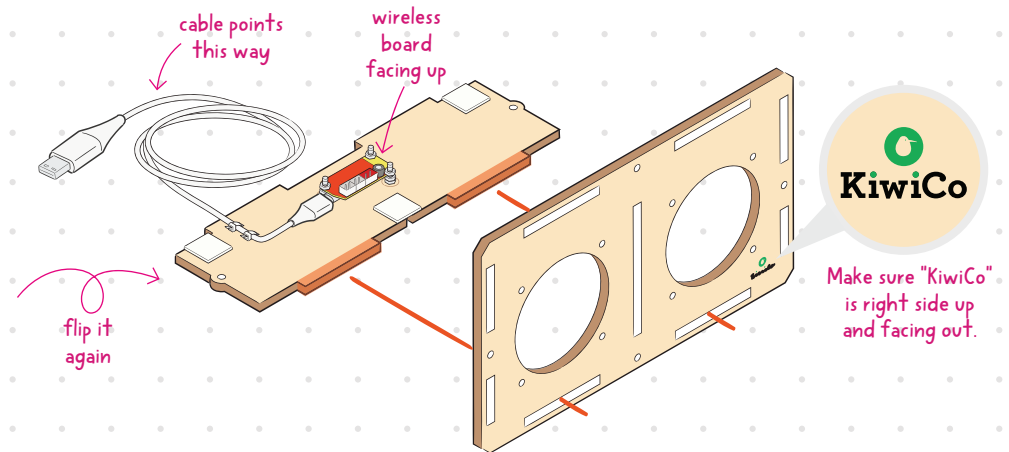
Step 2

Press a **square nut** into each T slot.



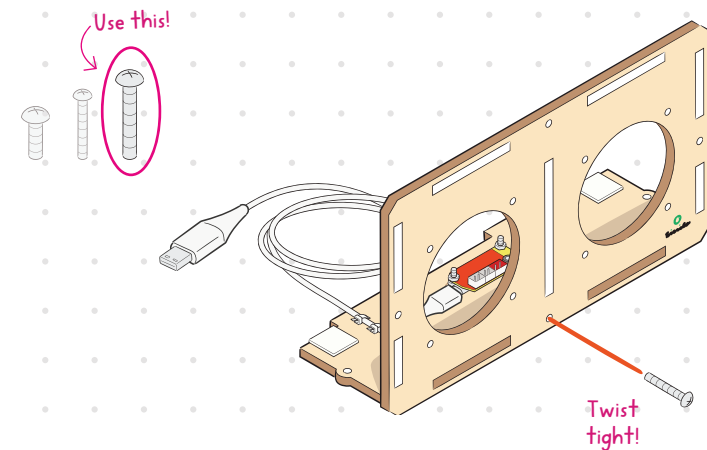
Step 3

Slide the bottom panel into the **front panel**.



Step 4

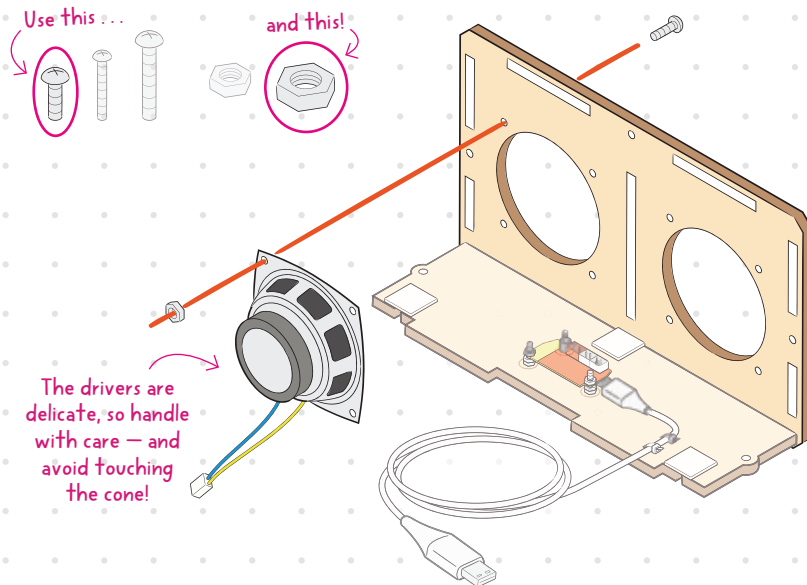
Secure the front panel with a **long screw**.



Step 5

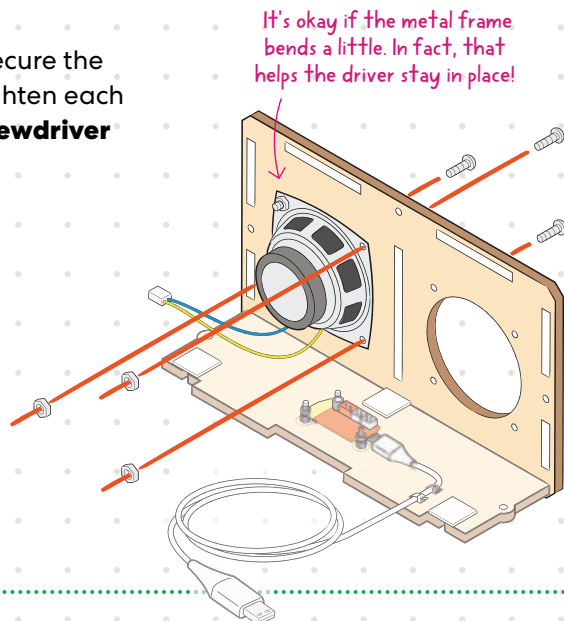
Line up a **large speaker driver** with a big hole. The white wire end should hang down.

Poke a **short screw** into a corner hole and twist on a **large hex nut** (by hand only).



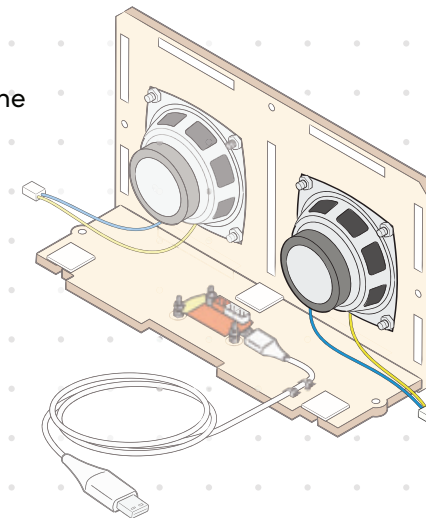
Step 6

Repeat **Step 5** to secure the other 3 corners. Tighten each corner with the **screwdriver** and the **wrench**.



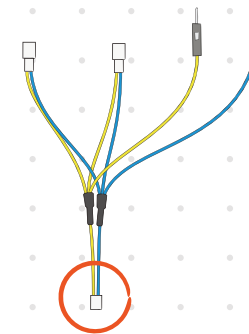
Step 7

Repeat **Steps 5–6** to add the other large speaker driver.



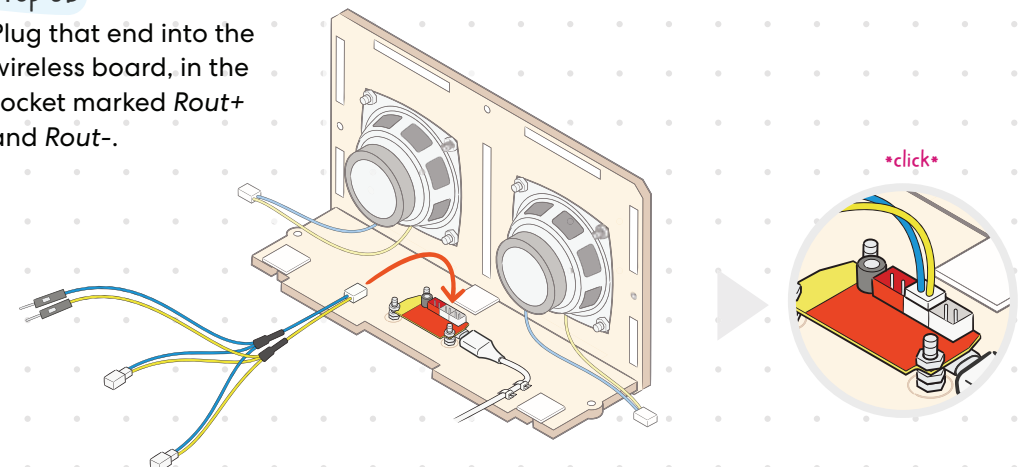
Step 8a

Grab the **wire** with 5 ends. Find the white end with 2 tiny holes.



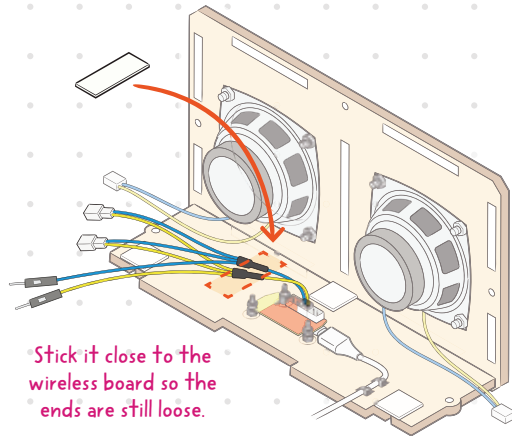
Step 8b

Plug that end into the wireless board, in the socket marked **Rout+** and **Rout-**.



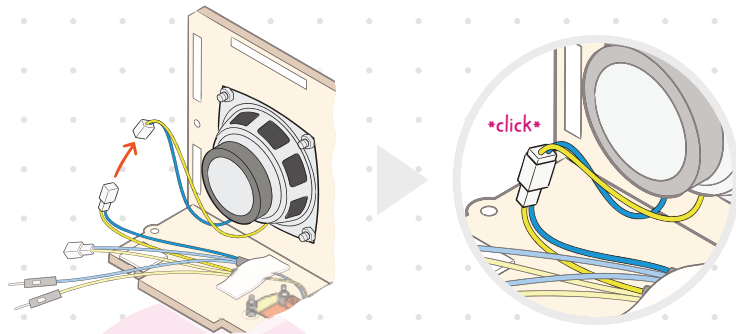
Step 9

Stick down the wire with a **sticky foam rectangle**.



Step 10

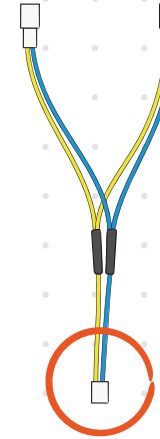
Plug 1 of the other white ends into the left speaker driver.



Why does the **right channel** connect with the **left driver**?
It's because that driver will be on the right when you look at the speaker from the front.

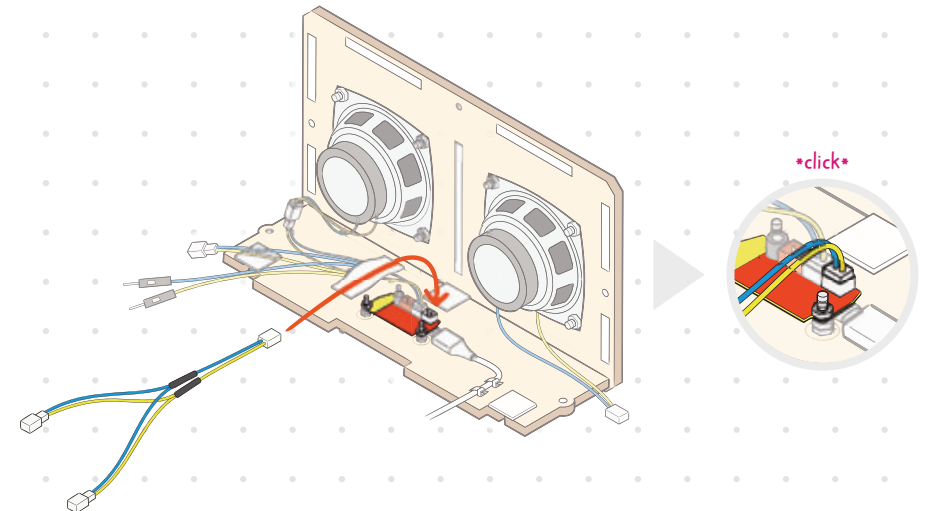
Step 11a

Grab the **wire** with 3 ends.
Find the end with 2 tiny holes.



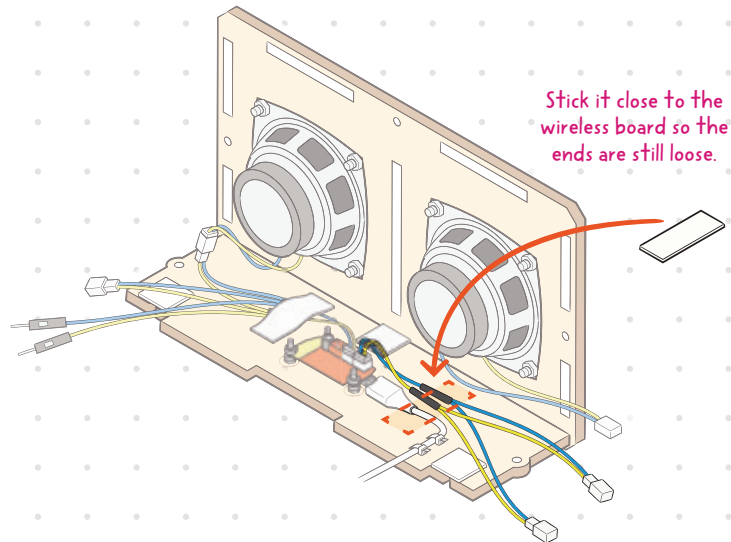
Step 11b

Plug that end into the wireless board, in the socket marked *Lout+* and *Lout-*.



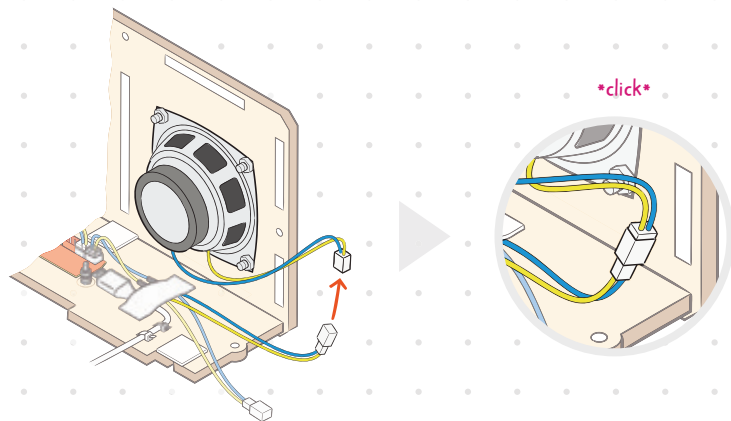
Step 12

Stick down the wire with a sticky foam rectangle.



Step 13

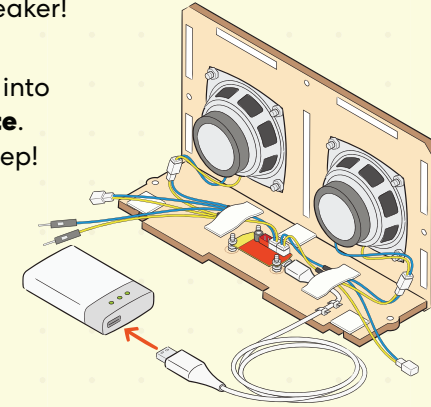
Plug 1 of the other white ends into the right speaker driver.



Stop & Test

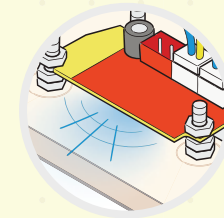
Pair and test your speaker!

1. Plug the USB cable into a **USB power source**.
The speaker will beep!



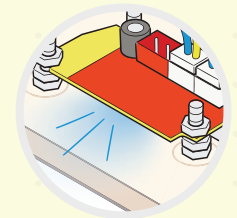
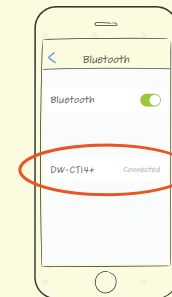
2. Check the wireless board. The blue light should be blinking. That means the speaker is ready to connect.

If the blue light is solid, your speaker is already connected to a device, and you can skip the next step.

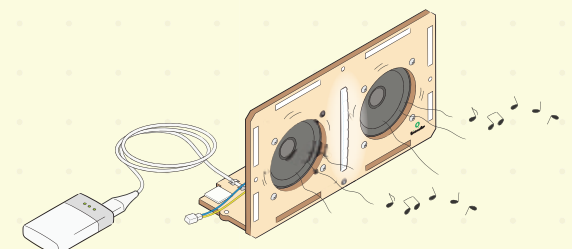


3. On your **device with Bluetooth technology**, go to the Bluetooth settings and enter pairing mode. Select **DW-CT14+** to connect.

When paired, the speaker will beep again, and the blue light will turn solid.

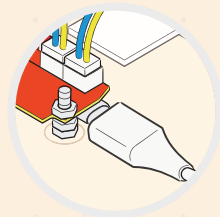


4. Play some music!

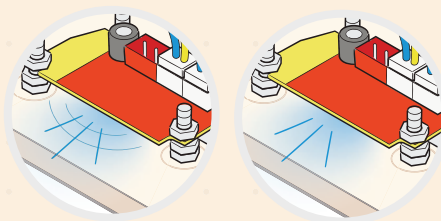


Troubleshooting

If the blue light isn't on, make sure the USB cable is firmly plugged into both the wireless board and a power source. The cable should draw electricity from any power source with a USB port.



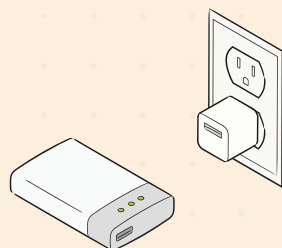
If you can't find the speaker on your device, make sure the speaker's light is blinking. If it's solid, the speaker is connected to a different device. Turn off the Bluetooth settings on that device for the speaker to enter pairing mode again.



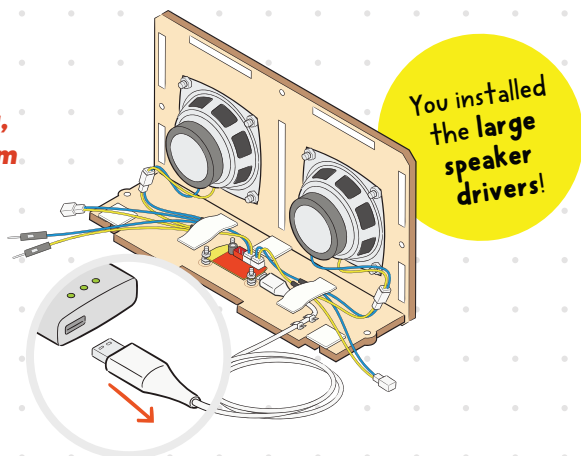
If your device can see DW-CT14+ but can't connect, restart your device.



If the speaker beeps over and over, try a different power source.



Stop! Before you keep building, unplug the USB cable from the power source.



Inside a speaker driver

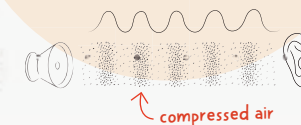
Sounds are waves in the air caused by vibrating objects — like your speaker drivers!

Voice coil

Electrical signals from the wireless board pass through the copper voice coil. Each signal creates a magnetic field in the coil so it either pushes away from the magnets or gets pulled toward them.

Diaphragm

The voice coil pushes and pulls the diaphragm, which pushes and pulls on the air next to it. This movement creates vibrations in the air called sound waves!



Surround and Spider

These flexible membranes let the voice coil and diaphragm slide back and forth smoothly.

Basket

The basket holds all the pieces together.

magnets

WARNING:

Don't take your speaker apart like this! It won't work anymore. (We sacrificed this one for a good cause.)