Toniebox Teardown

Teardown of the Toniebox—an audio player for children above the age of three, first released in spring 2016.

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INTRODUCTION

The Toniebox is a popular audio player for children over the age of three, with easy-to-understand touch controls and small figurines (Tonies) with integrated NFC that work sort of like cassettes or CDs (remember those?). Why stop at an unboxing when we've got a perfectly good teardown table?

Toniebox, prepare to meet your unmaker.

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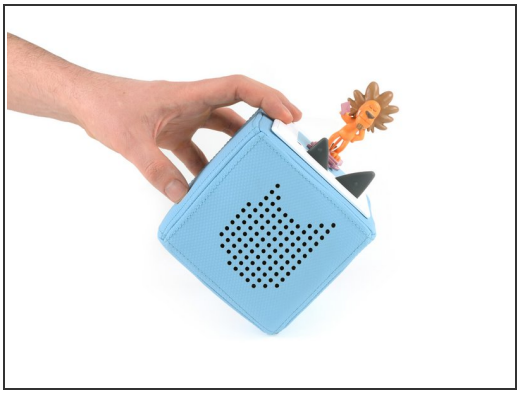
TOOLS:

- Tweezers (1)
- Precision Utility Knife (1)
- Phillips #1 Screwdriver (1)

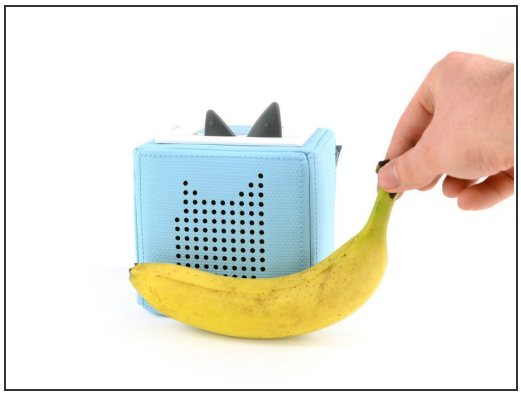
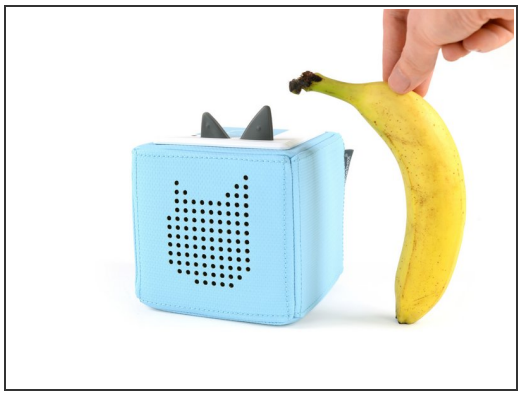
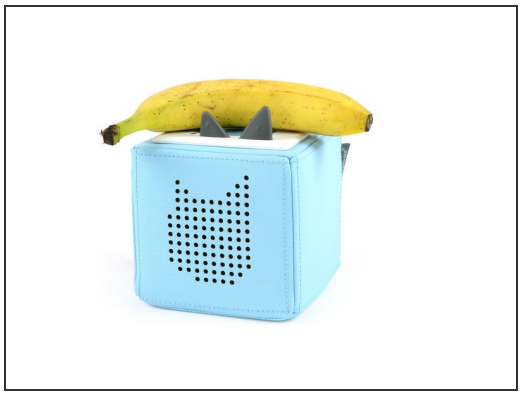
Step 1 — Toniebox Teardown


- The Toniebox is designed as an audiobook player for kids (age three and up), and packs the following features:
  - Motion control, via slapping the side or tilting the box
  - Small figurines (Tonies) with built in NFC chip
  - Soft shockproof shell
  - Internal storage for up to 400 hours of audio data
  - 7 hours battery capacity
  - Magnets in the top of the Toniebox, and in the sockets of the Tonies, to keep them stuck together while you tilt and turn the box

There was no NFC chip in our Kinder-Egg today—so sad.

Step 2

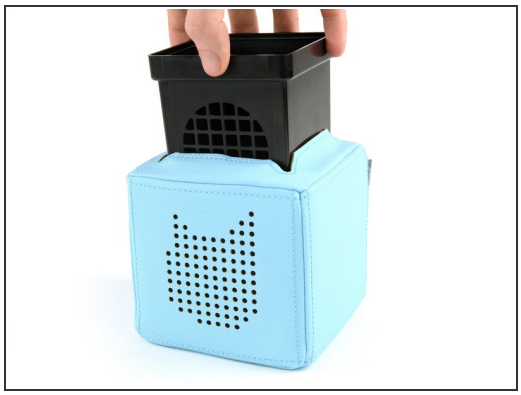




- Because we're doing this teardown in Germany, we'll forgo the usual metric and imperial measuring shenanigans and simply give you a banana for scale.
- Each side of this cube measures 3/4 of a banana. (4.7 inches or 12 cm according to the manufacturer, who evidently did not have a banana handy.)
- Placing the banana onto the NFC sensor also doesn't play anything.

Step 3

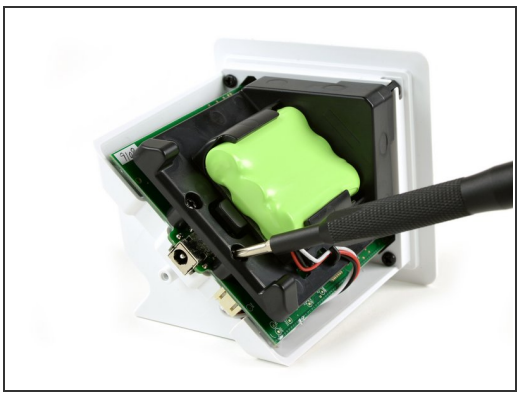
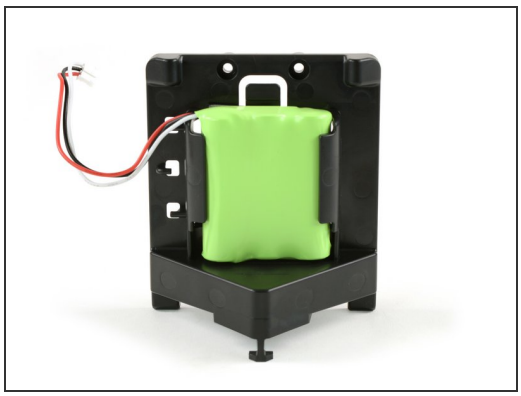
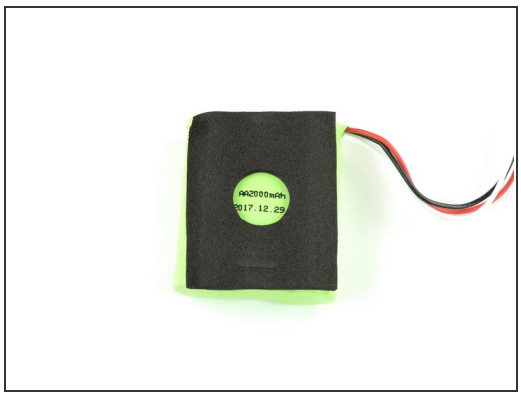

- The cover on the bottom is as stubborn as a pickle jar. But hey, we have seen far worse opening procedures! Besides, the rest looks pretty easy.
- A single Phillips screw holds the innards in the foam housing. Just the way we like it.

Step 4

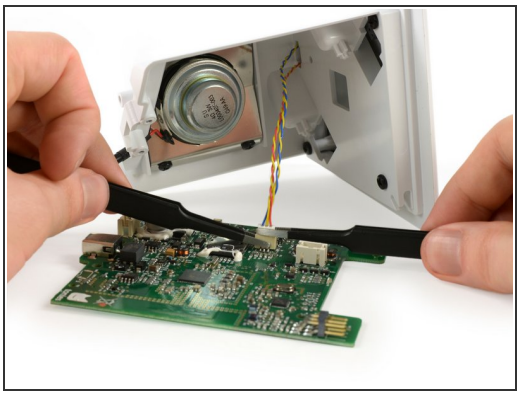

- Now for the "unboxing".
- The main components lift right out the top of the box. Easy peasy.
- Surrounding it is this black cage, which is also easy to take out and seems to serve mainly for crush protection.
- The squeezable foam bumper comes out last. According to the manufacturer, it's made from sustainable fabrics.

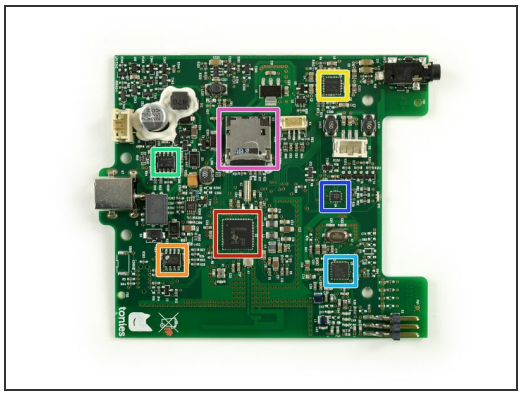
Step 5

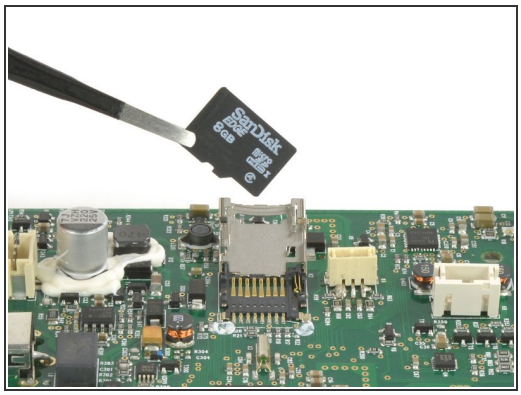




- The battery pack and motherboard are secured with just two standard Phillips screws.
- As printed on the back, the battery pack consists of three NiMH batteries with a capacity of 2,000 mAh.
- The manufacturer states this is a nickel-metal hydride (NiMH) battery pack—chosen because it's a safer technology than lithium-ion, and has almost no memory effect.

Step 6

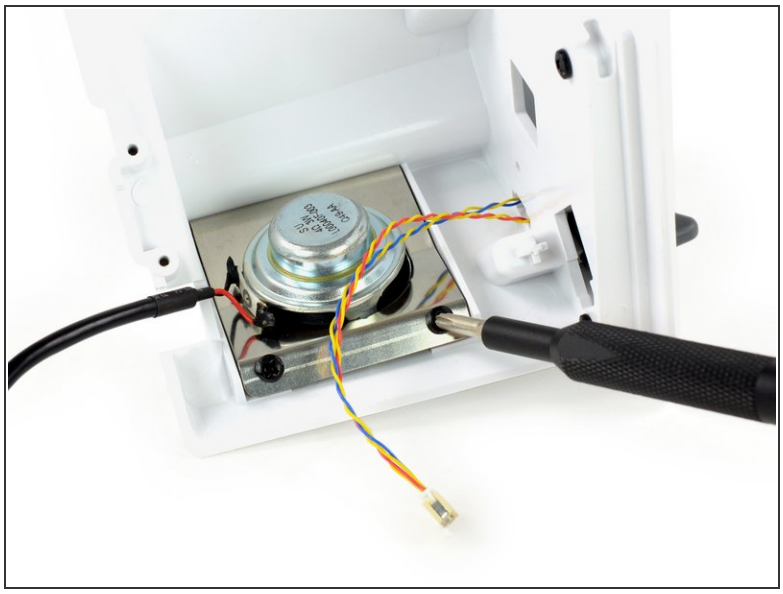






- We'll have a look at that motherboard just as soon as these stubborn little cables are unplugged. Let's see what all the noise is about! Onboard we find:
  - Texas Instruments C3200R1M2 microcontroller serving as CPU and WLAN Receiver
  - ISSI IS25LQ032 flash memory
  - A Texas Instruments DAC3100 TI 7BI ANVS G4 Audio Controller
  - Battery loading IC
  - A TRF7962A RFID Reader to read the NFC chips from the Tonies
  - NXP MMA8451 accelerometer for fast forward and rewind functions.
  - And a Sandisk Edge 8 GB MicroSD card formatted as Fat32

Step 7

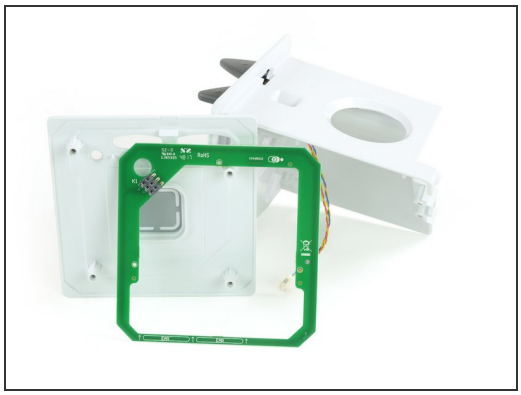


- And now for the Toniebox's vocal ~~chords~~ cords!
- Speaker specs: 4 Ω and 3 W. 'Nuff said. We weren't exactly expecting high fidelity audiophile hardware, after all.

  The manufacturer's homepage gives a bit more info, including the nominal load- and music-carrying capacities (3 W / 5 W) and that the speaker spans the audio spectrum from 20 Hz to 10 kHz.

Step 8

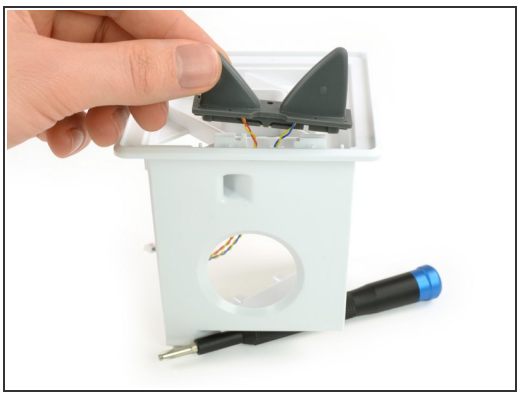
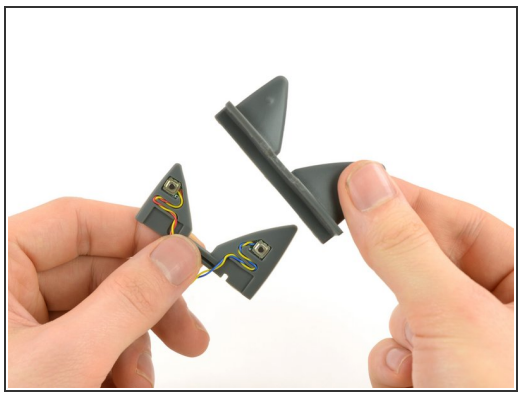
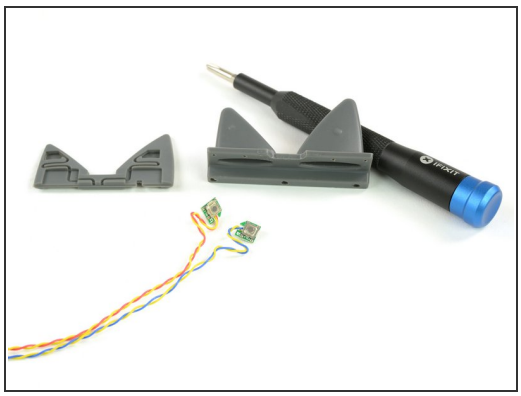




- Just four more Phillips screws, and we can remove the cap.
- Inside the cap we find a second PCB, this one responsible for the NFC connection.
- Except for another socket to connect with the motherboard and another crossed out trashcan (WEEE-Symbol), there's nothing to see here.

No microphone found on the top PCB nor the motherboard. This means the Toniebox is acoustically unaware of its surroundings.

Step 9

- Next we inspect the volume control buttons, located (rather appropriately) in the ears of the Toniebox.
- Removing the outer layer of the ears, we find two small buttons.
- Because the buttons connect to the motherboard via a JST plug, we don't need to cut a wire. Lucky us.

Step 10

- Bonus teardown: We perform minor surgery on the lion figurine and find, as expected, an NFC chip in his stomach.

Step 11 — Final Thoughts

- That's all, folks! We completely tore down our Toniebox, cut open the lion, and spread everything over the table. Here is our result:
  - All the screws are standard Phillips screws and no adhesive was used.
  - The box is easy to disassemble and reassemble, without damaging it or leaving any marks.
  - Battery pack and flash memory are also pretty common and easy to change.
  - The cap on the bottom is held in place by plastic clips, which could break if you open the box repeatedly.
  - Some of the plugs sit in their sockets pretty tight and might be hard to unplug without damaging the sockets.
  - The headphone jack is soldered to the motherboard.