adafruit learning system

Car Qi Charger

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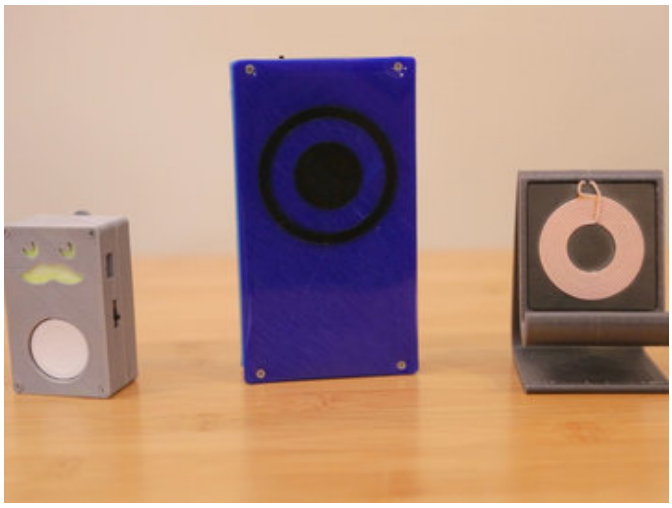
Guide Contents

Overview

Universal QI Charger

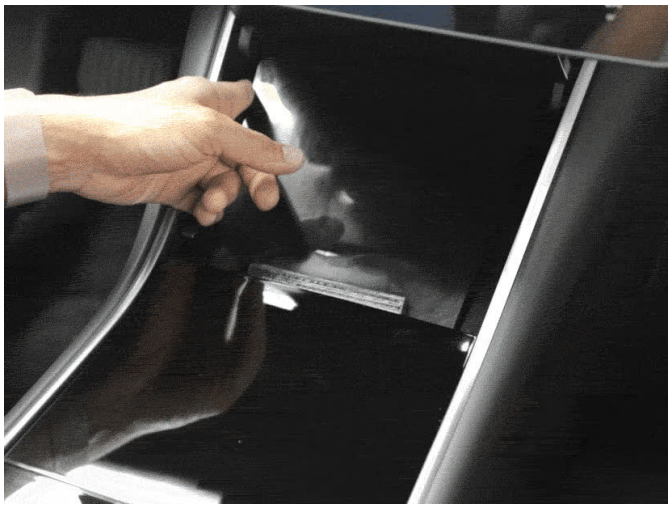
This universal qi charger supports all types of smart devices so it's really easy to add wireless charging to your projects.

We've used this exact setup for previous DIY projects, like our charging stand (https://adafru.it/ALJ) as well as a portable version (https://adafru.it/ALK), so definitely check those out for more project ideas!



We designed our charging pad to precisely match the Tesla Model 3 original mat.

On the back it says the mat is made out of TPU material, which is the same material we'll use for 3D printing!



Behind our 3d printed mat is a wireless charging transmitter.

So now we can easily charge our devices without having to plug them into the console!

An extra USB port is also available to charge other devices which is nice since you won't have to take up another USB port.

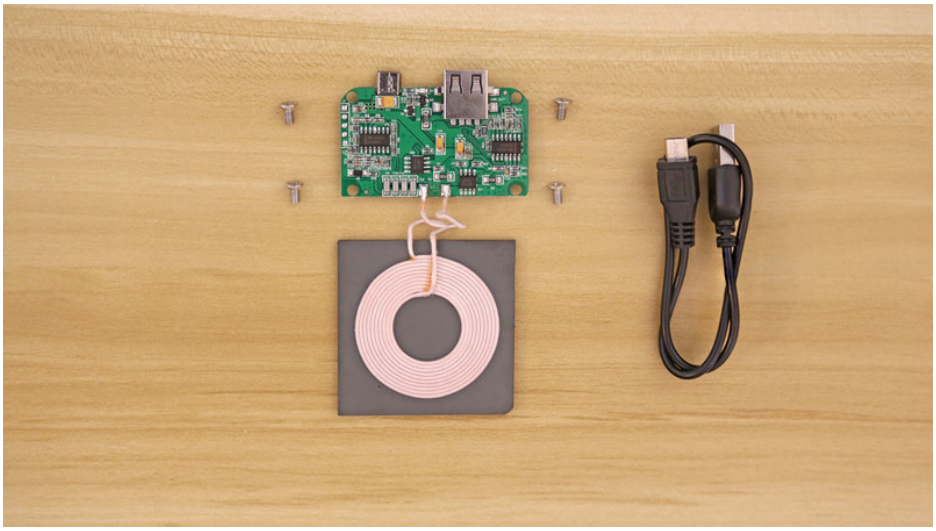
If your device doesn't have wireless charging, you can actually add one of these Charging Receivers (https://adafru.it/ALL). They're super thin and really easy to install, basically just plug them in and stick it to the back.

So definitely check out all of the Qi Charging products (https://adafru.it/ALL) from us!

Prerequisite Guides

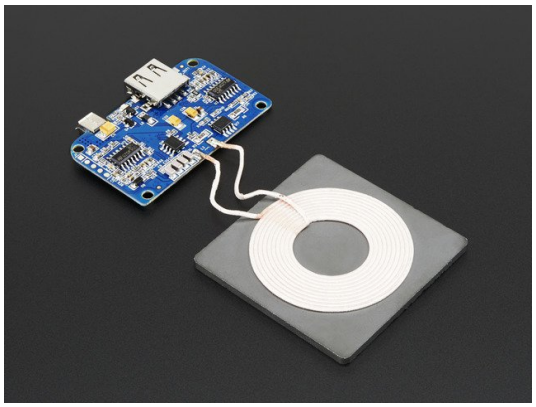
I suggest walking through the following guides to get a better understanding of the electronics.

- 3D Printed Qi Wireless Charging Stand (https://adafru.it/ALM)
- Portable Qi Charger (https://adafru.it/ALN)



4 x M3 x 5mm Screws

M3 x 5mm Screws



Universal Qi Wireless Charging Transmitter

$26.95

IN STOCK

ADD TO CART

Cheetah 3D Printer Filament - 3mm Diameter 1kg - Midnight

$59.95

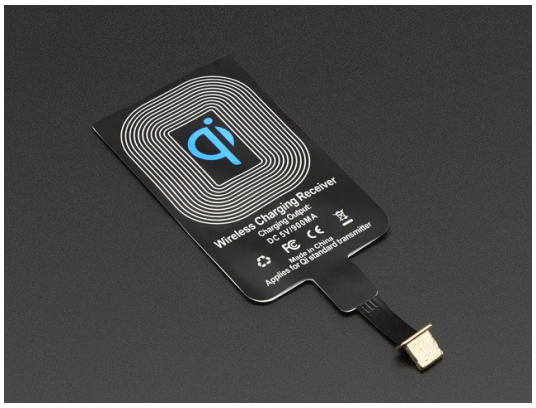
IN STOCK

ADD TO CART

Ultimaker 3 - 3D Printer

$3,750.00
IN STOCK

ADD TO CART

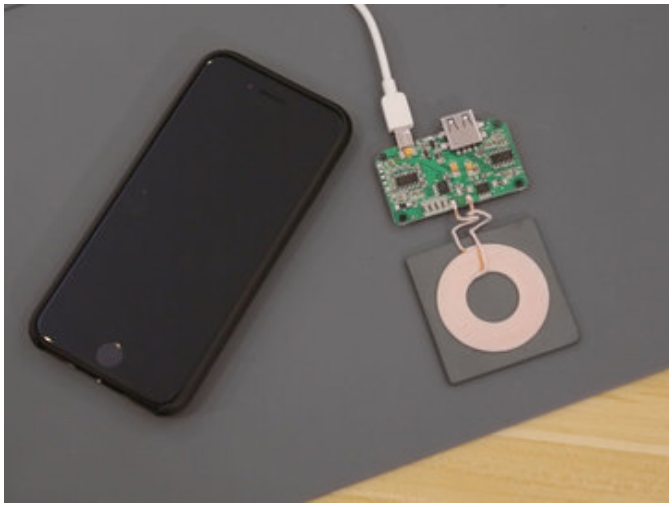


Qi Wireless Charging Module - 20mm - Lightning Connector

$24.95
IN STOCK

ADD TO CART

Circuit Diagram



The only extra components required are a Micro USB that is long enough to reach the cars USB port to Qi USB port. For Tesla Model 3 we used a USB cable 10 Centimeters long.

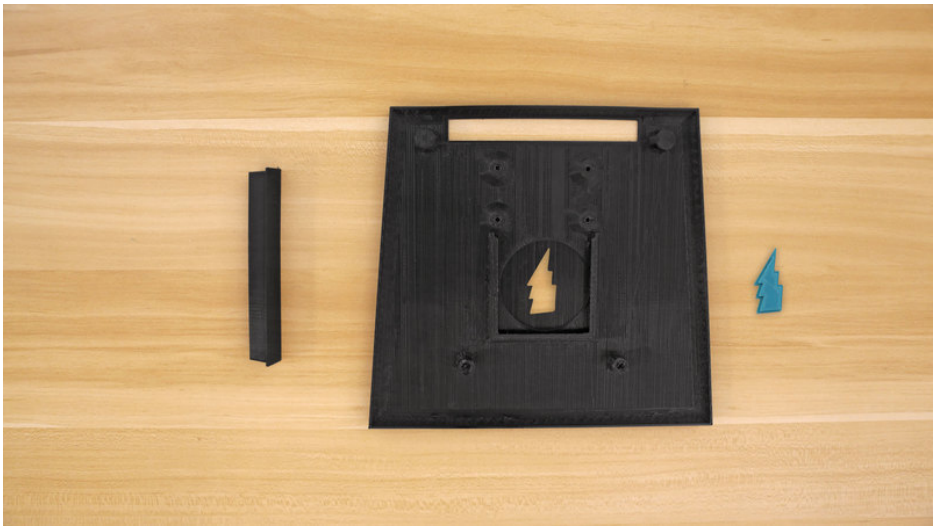
Testing USB port power

We recommend testing each USB port in your car to make sure you are using the maximum amount of amps available to that port. We used a Charger Doctor to check each port to ensure we are providing our devices with as much power as they can.

Surprisingly the two ports in the back supply different amps on each side (1.4 amps on left and 1.2amps on the right). The two ports in the front supply 1.3 amps on the left and 1.36 amps on the right.

The Qi charge is enable to provide 1.18 amps if plug into the passenger side (right) USB port.

3D Printing



The 3D printed parts are fairly easy to make with most common home desktop 3D printers that are on the market.

And if you don't have access a 3D printer, you can order our parts by visiting our Thingiverse (https://adafru.it/BkP) page and have someone local 3D print the parts and ship them to you.

To 3D print the mat we used the Ultimaker 2+ 3D printer and the CURA slicing software.

The built in material profiles for TPU filament works really well!

You can also use a bigger nozzle which will reduced the print time to print much faster.

The TPU filament we're using is Ninjaflex Cheetah (https://adafru.it/BkQ) which has a shore hardness of 95A so it's very flexible, heat resistant and super durable like you seriously can not break this stuff!

https://adafru.it/ALO

https://adafru.it/ALO

https://adafru.it/C-G

https://adafru.it/C-G

https://adafru.it/ALR

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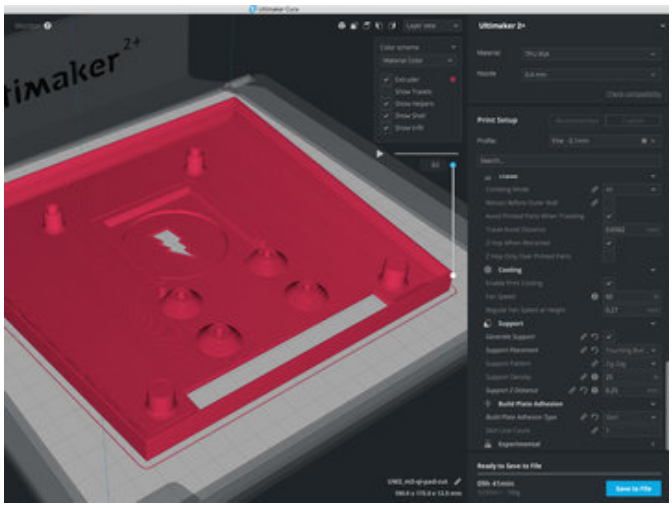
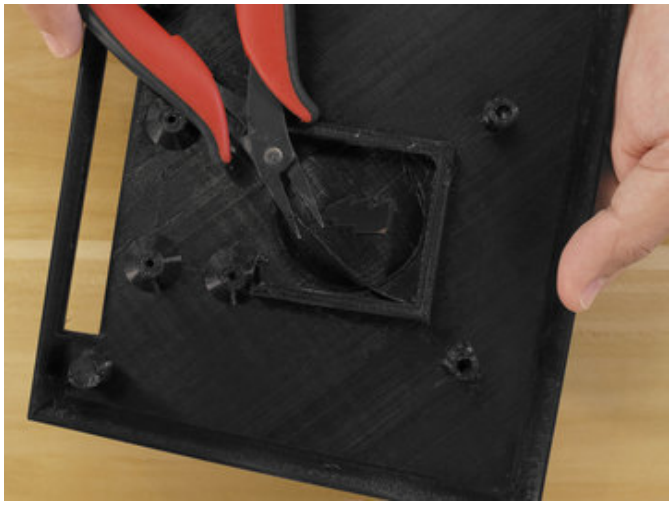


Slice Settings

Download the STL file and import it into your 3D printing slicing software. You'll need to adjust your settings accordingly if you're using material different than **NinjaFlex Cheetah**.

- 230C Extruder Temp
- 65C heated bed
- 1.0 Extrusion Multiplier
- .4mm Nozzle
- 0.38 Extrusion Width
- .2mm Layer Height
- 30% infill
- 30% Supports
- skirt
- 60mm/s | 120mm travel speed



Orientation

We recommend using a glass bed because of the non slip characteristics it gives to TPU materials. Oriented the mat flat so the "face" prints smooth.

Supports

Support material produces a scaffolding like structure that provides the overhang for the slot for the coil plate.

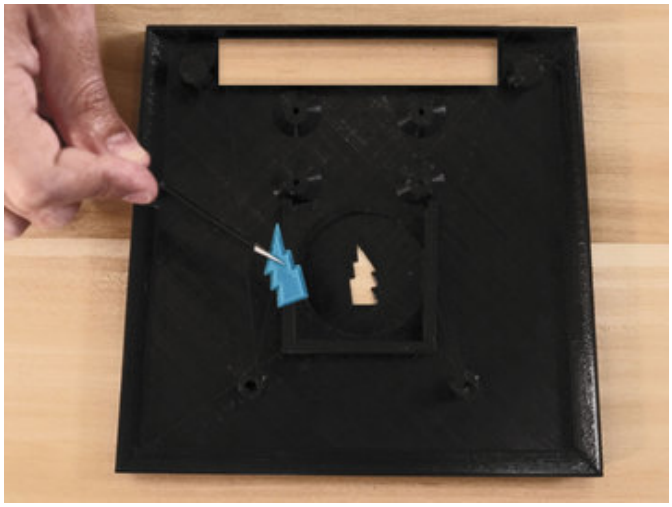
In cura, set the supports placement to: everywhere. Set the overhang to 60 degrees and the support pattern to zig zag.

Support density is 15% with a Z distance of .25mm

Infill

We set the infill to 20% with a Triangle pattern. We also dropped infill and wall speeds to 50mm/s.

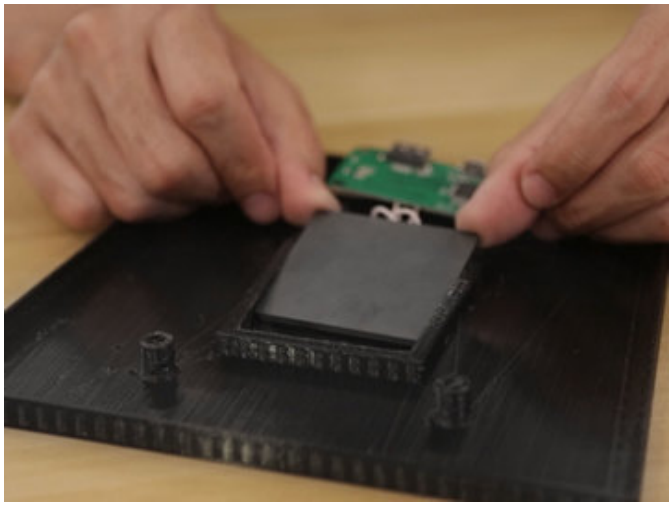
Assemble



Dual Color

If you decide to print the dual color version, we'll first need to insert the bolt onto the mat.

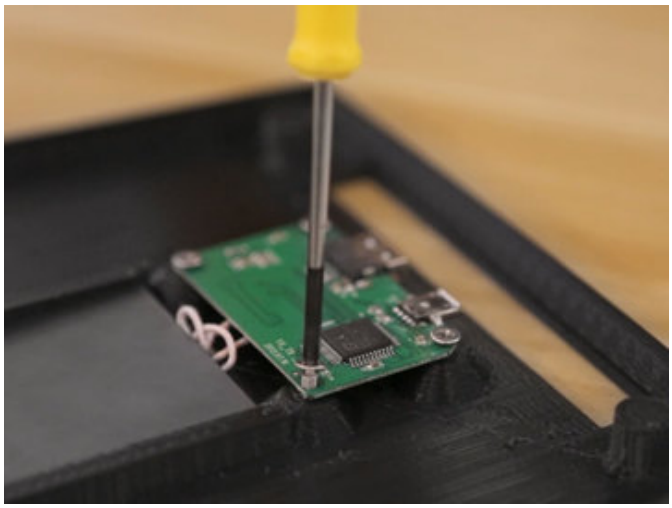
The small outline will press fit into the cutout from the the back of the mat and should hold in place with a tight tolerance.



Qi coil insert

To install the circuit we just need to slide the Qi charging base into the cavity. It's got a snug fit so we don't need any glue to hold it in place.

This is one of the reason we used a flexible material. The ability for flex parts is also required when install the mat in the cars console.



Mounting Qi board

We used **M3x6mm** long sized screws to attach the PCB to the built in standoffs on the mat so it's nice and secure!

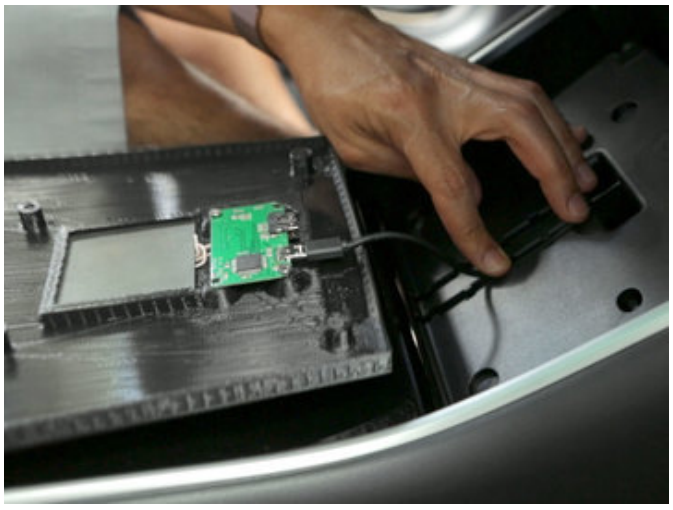
Insert bottom

The bottom bumper is a separate piece which is nice since we don't have to use any support material so it's optimized for 3D printing.

Replace mat

Installation is as easy as pulling out the stock mat and plugging in the qi charger to the built in USB ports.

An extra USB port is also available to charge other devices which is nice since you won't have to take up another USB port.



Place mat

Last step is to fit the cables into the channels. Move the mat close to the console at gauge the amount of slack needed for the cable.

Now we can align the pegs on the mat to the slot on the console and press fit the mat in place!

Charge

Wireless Charging makes it really convenient while driving so you don't have to worry about tangling up your cables.

It also fits the minimal aesthetics of the Model 3 so it looks nice and clean!