



Apple 5W USB Power Adapter (Folding Pins - UK plug) Teardown

A look inside the new folding plug from Apple, including the mechanism and electronic components used.

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INTRODUCTION

UK style plugs are notoriously treacherous to bare feet—when dropped they almost always land points-up, making them the LEGO of the power distribution world. Not only that, but they're big, and inconvenient to throw in your bag to charge your devices on the go. Apple finally put its engineering might to the task, and developed the all-new, highly superior *folding* plug. The more compact, more foot-friendly variant.

But how does it work? What's behind that shiny white plastic? Read on to find out.

TOOLS:

- [T9 Torx Screwdriver](#) (1)
- [Coping Saw](#) (1)
- [iFixit Tech Knife](#) (1)
- [Flush Wire Cutters](#) (1)
- [File Set](#) (1)

Step 1 — Apple 5W USB Power Adapter (Folding Pins - UK plug) Teardown



Specifications

- Input: AC 100–240 volts (V), 50/60 hertz (Hz)
- Output: DC 5V, 1 A

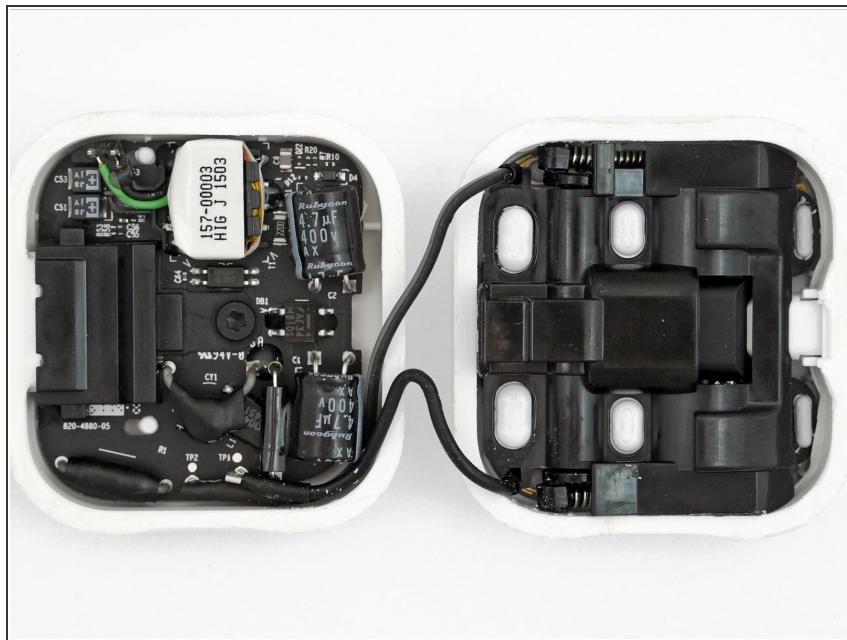
Note: Because the Apple USB Power Adapter complies with mobile phone charger interoperability standards in certain regions, you may be able to charge third-party mobile phones using the adapter. Check with the manufacturer about compatibility with any third-party phone before charging.

- Released with the Apple Watch in the UK / HK, the new folding plug has pins that fold completely flush for travel.
- Matches the older style plug with a 5W / 1A specification.
- AC 100 - 240V input.



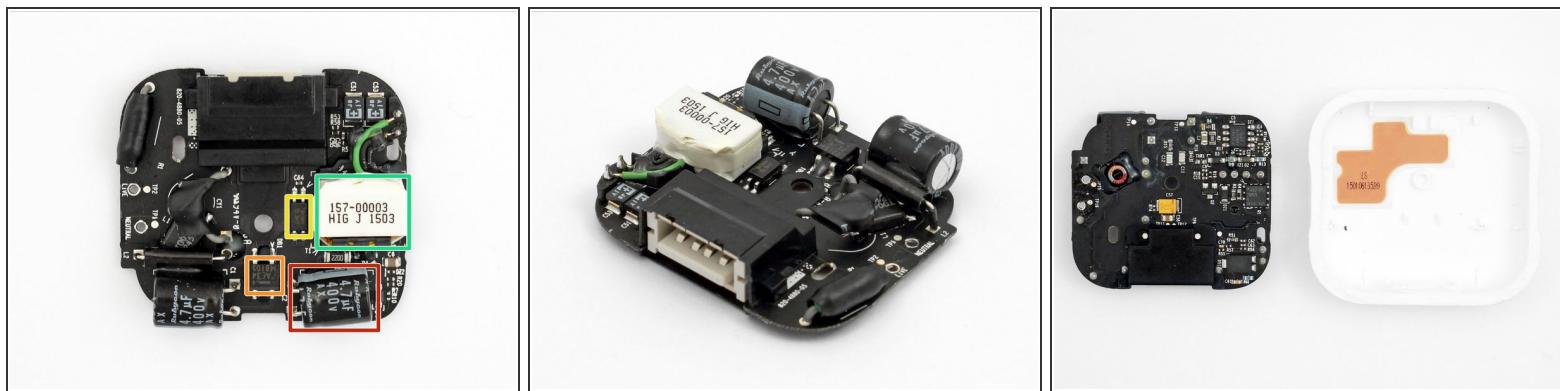
This product uses and can store high voltage electricity - it is dangerous and could potentially kill you.

Step 2



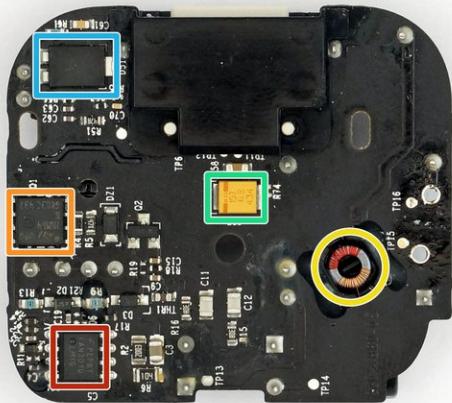
- Becoming more common on mains chargers, most of the design is fastened together during the moulding process. There is only a single screw (Torx T9 M2.5 x 2.75mm) in the entire product.
- You could possibly pry this open, but you would likely make a big mess. Instead this has been cut in two using a fine bladed coping saw.
- This was cut 1mm behind the USB port entrance.
- Inside we can see the design has been split into two halves.
- All of the electronics are on a single PCB on the left.
- All of the mechanism and high voltage contacts are on the right hidden under plastic hood.

Step 3



- A break down of the top side of the PCB:
 - Rubycon 4.7μF 400V electrolytic capacitor [400AX4.7M8X9](#)
 - Fairchild bridge rectifier [MB10S](#)
 - Everlight optoisolator [EL3H7-G](#)
 - Transformer markings 157-00003 / HIG J 1503
- *(i)* There's copper shielding to meet EMC requirements on the rear of the housing.

Step 4



- On the reverse side:
 - Fairchild PWM Controller [FAN301](#)
 - Fairchild N-Channel MOSFET [STD7NM64N](#)
 - Recessed inductor markings T00405 SP451
 - KEMET Tantalum Polymer Capacitor [T520M157M006ATE035](#)
 - Diode [SBR8U60P5](#)
- There's a blob of resin over R9 - a mistake?

(i) FAN301 currently has an [injunction](#) against it due to patent infringement. Perhaps this doesn't affect European sales?

Step 5



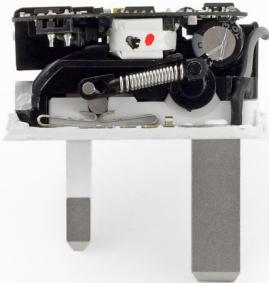
- Most of the mechanism is covered with a hood, fixed at points using thermoplastic staking during production.
 - The only way to remove the cover is to cut the tops off these.

Step 6



- Finally we can see how the mechanism works!
- The yellow tape is [Polyimide high temperature film](#).
- The cover is needed for the mechanism to work properly - the central black plastic piece will lift otherwise.

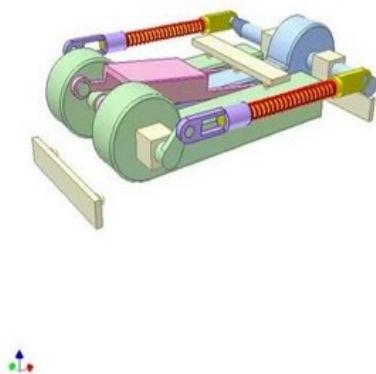
Step 7



- With the side of the bottom section filed away, you can see the stackup of the PCB, mechanism and contacts exposed.
- The Apple folding charger repairability Score: 1 out of 10 (10 is easiest to repair)
 - Almost everything is moulded together during manufacture, making it impossible to take apart without damage.

 Trying to reassemble this and use it would not be safe!

Step 8



- A short render of the mechanism showing how it works, contributed by [Thang010146 on YouTube](#)

To reassemble your device, follow these instructions in reverse order.