

[illegible]

INTRODUCTION

We're taking apart Starbucks' brew-it-yourself Barista Espresso Maker to take the mystery out of these relatively simple espresso machines.

This espresso machine uses pump pressure to brew concentrated coffee, and steam pressure to make frothy milk. A steam wand found on nearly every espresso machine allows the operator to froth and steam milk to make drinks ranging from the simple cappuccino to the addictive macchiato. Let's dig inside Starbuck's most popular model to see exactly how it makes these wonderful caffeinated beverages we love so much.



TOOLS:

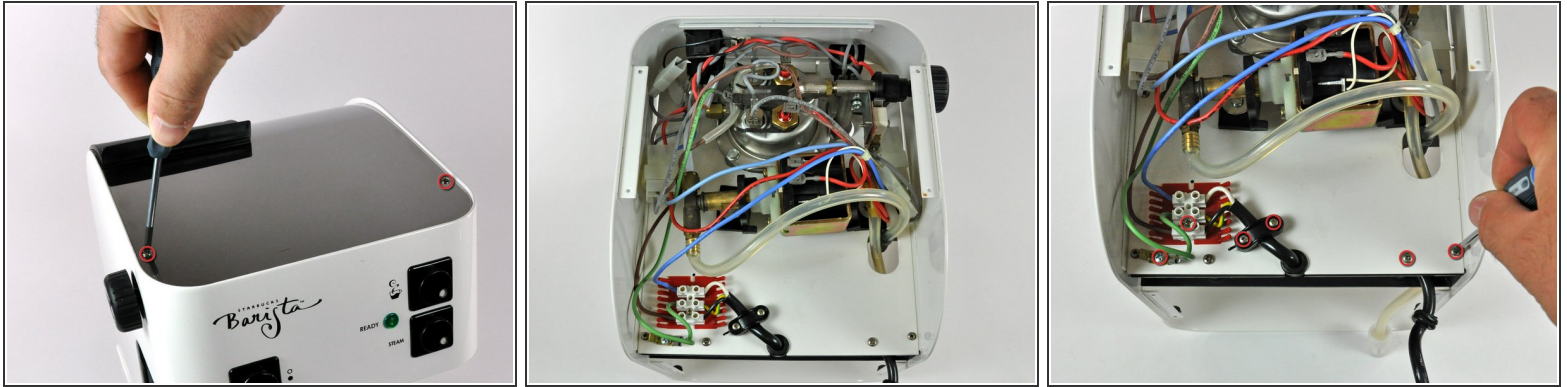
- [2 mm Hex Screwdriver](#) (1)
 - [8mm Nut Driver](#) (1)
 - [Flathead Screwdriver](#) (1)
 - [Phillips #1 Screwdriver](#) (1)
 - [Spudger](#) (1)
 - [Smart Wrench](#) (1)
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Step 1 — Starbucks Barista Teardown



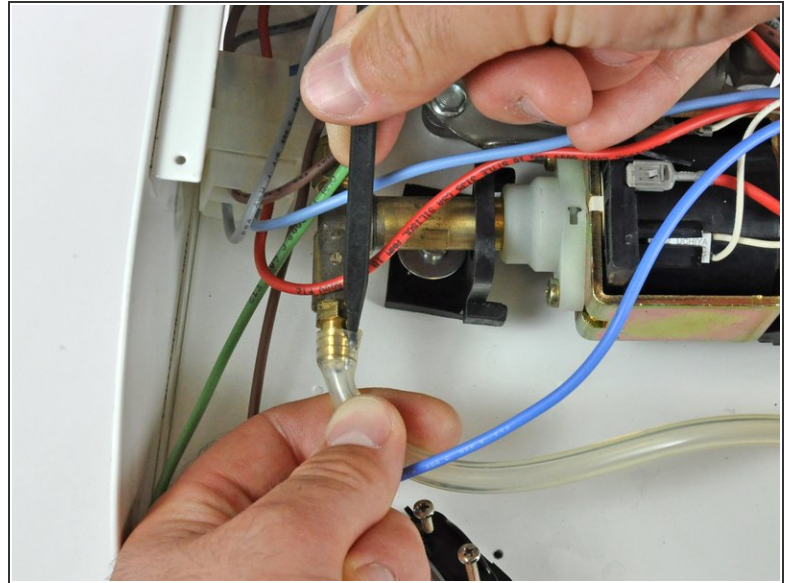
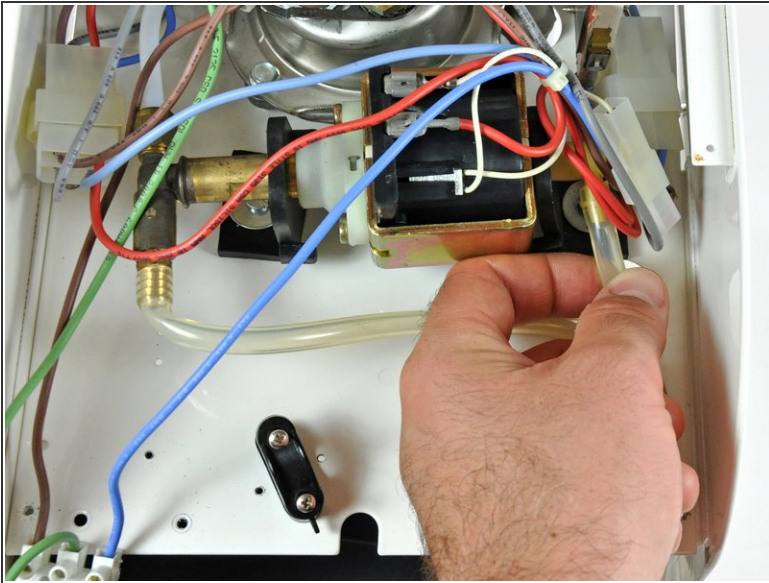
- The Starbucks Barista Espresso Maker is marketed for home use and is generally regarded as a good beginner's espresso machine.
- The Barista will allow you to:
 - Brew espresso.
 - Steam milk.
 - ~~Lose your masculinity.~~
- We started the teardown by removing the accessory drawer, drip tray, and water tank. All three parts simply slide out of the frame.

Step 2



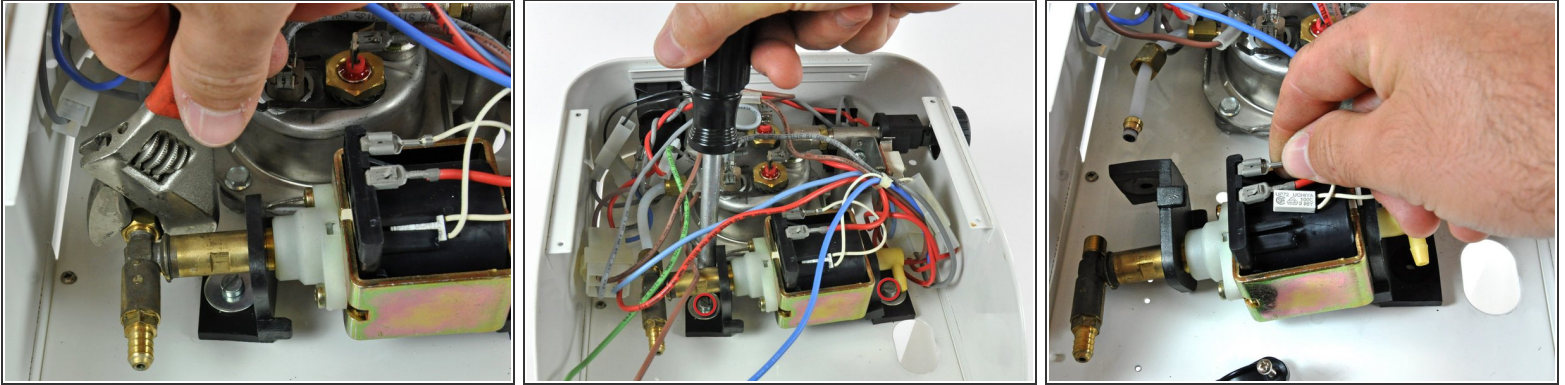
- Remove the six Phillips screws securing the chrome rear panel to the Barista.
- Once the chrome panel is gone, you get a pretty comprehensive look at what makes the Barista boil. Major components include:
 - A reciprocating pump.
 - A pressure release valve
 - A boiler (with an internal heating coil).
 - A steam valve which, as you guessed it, allows steam into the steam wand for making frothy milk.
 - A bird's nest of wiring supplying power to everything.
- Remove all the Phillips screws holding the AC power cord and distribution block to the frame.

Step 3



- Our first target was the pump.
 - ❗ The pump is responsible for drawing water up from the reservoir to keep the boiler supplied with water... to boil.
- First, remove the two clear plastic hoses from the barb fittings on either end of the pump.
 - ❗ When removing hoses from barb fittings, it is helpful to use a probe (the tip of a spudger in our case) to separate the hose from the metal fitting before pulling it off.
- One hose is responsible for drawing water up from the reservoir and the other returns excess water if the boiler is filled to capacity and reaches the preset pressure of the pressure release valve.

Step 4



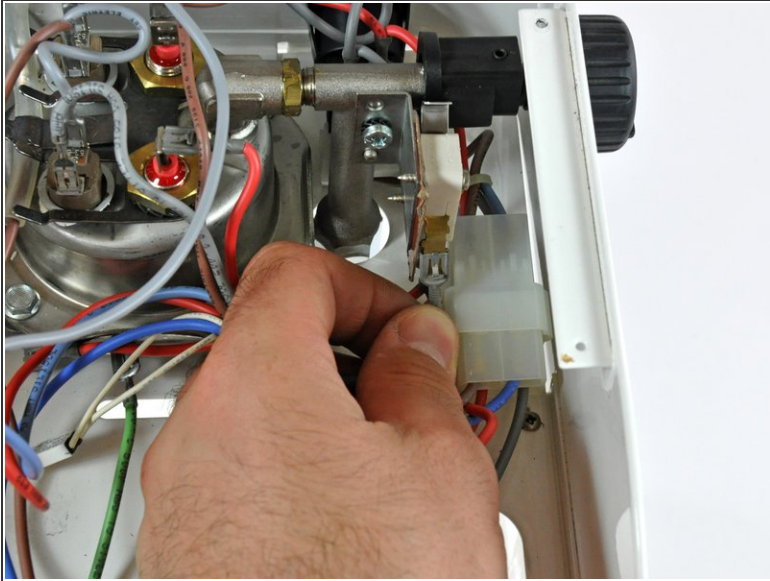
- Use a wrench to remove the boiler hose from the pressure release valve.
- Remove the two slotted screws securing the pump brackets to the frame of the Barista.
 - ① The simple angled rubber pump brackets are designed to absorb vibration from the reciprocating pump.
- Disconnect the two female AC power spade connectors from the pump and slip the thermal fuse out from its holder on the body of the pump.
 - ① The thermal fuse is a normally closed protective switch that opens the circuit once the pump has reached a critical temperature, thus shutting it down before the coil melts.

Step 5



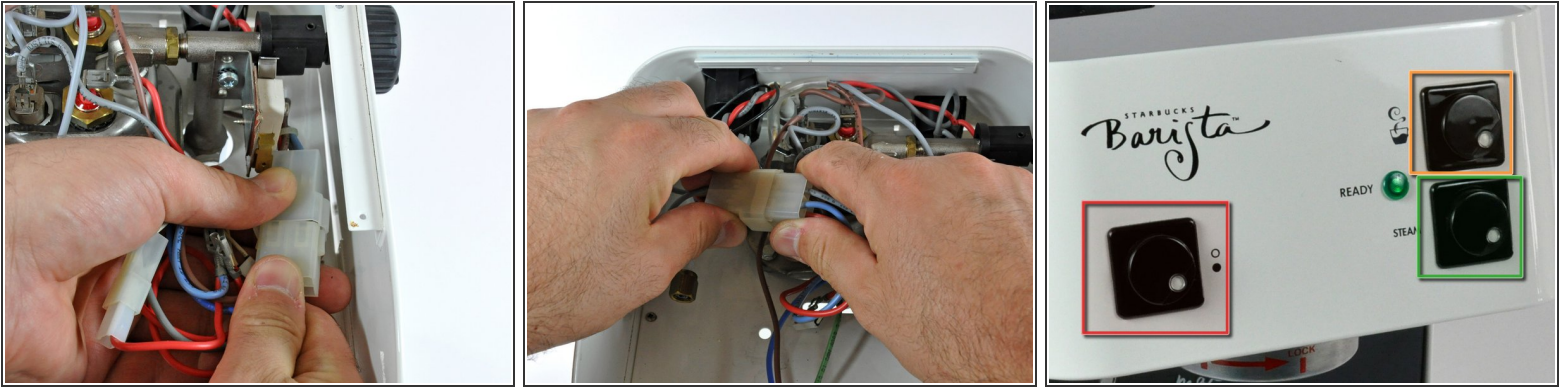
- Remove the two Phillips screws from the pump manifold and lift it off the end of the pump, minding the two locking tabs near its base.
- The pump used in the Barista utilizes the electromechanical properties of a [solenoid](#) to pump water up from the reservoir.
 - An iron core placed in the center of a cylindrical coil of wire is reciprocated back and forth through the coil when AC voltage is applied to it. Springs on either end of the core absorb its kinetic energy.
 - The core is attached to a plunger (outlined in green) that fits tightly into a cylinder on the pump manifold which creates the pumping action when the core moves back and forth.
 - The pressure difference between the inside of the cylinder and the water tank causes water to be drawn up from the reservoir into the pump, whenever the steam valve is opened, to assure the boiler is supplied with water.

Step 6



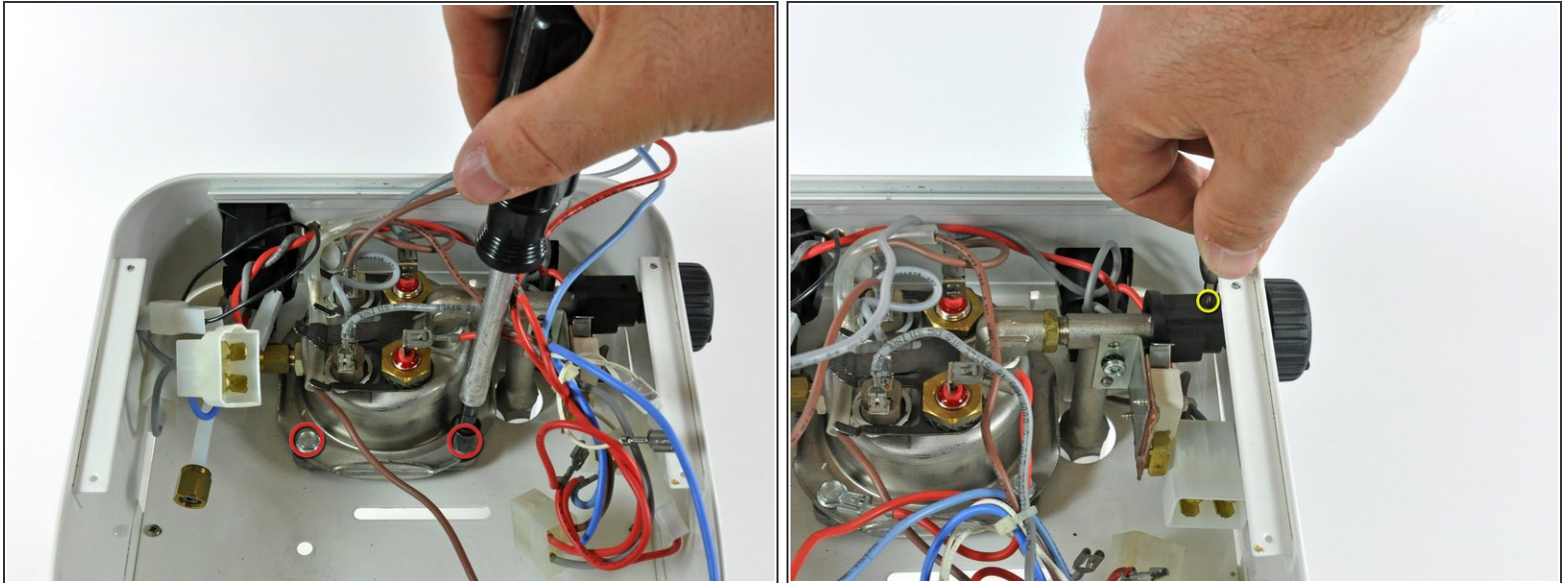
- Disconnect the spade connectors from the digital switch near the steam valve knob.
- ① When you open the steam valve knob (to steam your milk), a [cam](#) attached to its shaft presses the digital switch, closing the circuit. This either starts the pump, gives power to the heater, or both, to produce steam (we don't have a circuit schematic).

Step 7



- Disconnect the two large connector blocks.
- Several power leads connect to the three switches on the front face of the Barista for different operating modes. They include:
 - Device Power (On/Off)
 - Brew
 - Steam

Step 8



- Use an 8 mm bit driver to remove the four hex bolts from around the perimeter of the boiler (only two are shown).
- Remove the 2 mm hex set screw from the steam valve knob and pull it away from the piping to remove it from the Barista.
- At this point, the boiler is free from the Barista and can be removed.

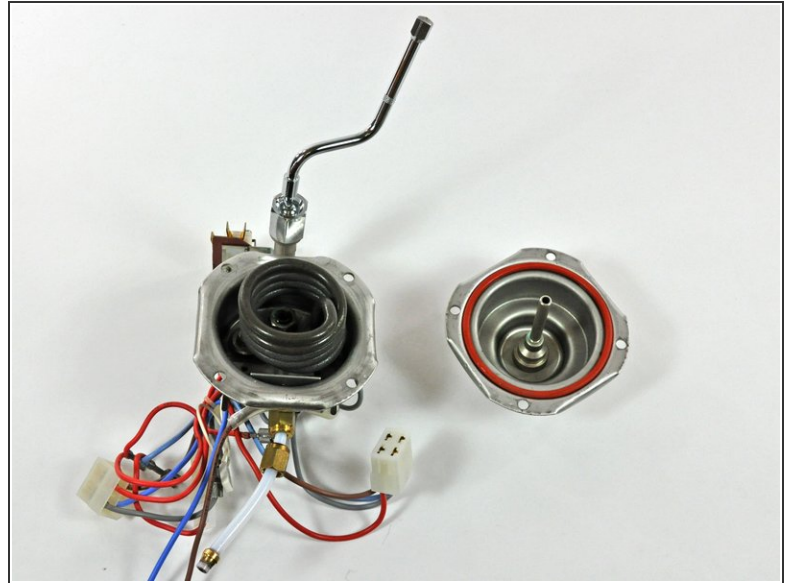
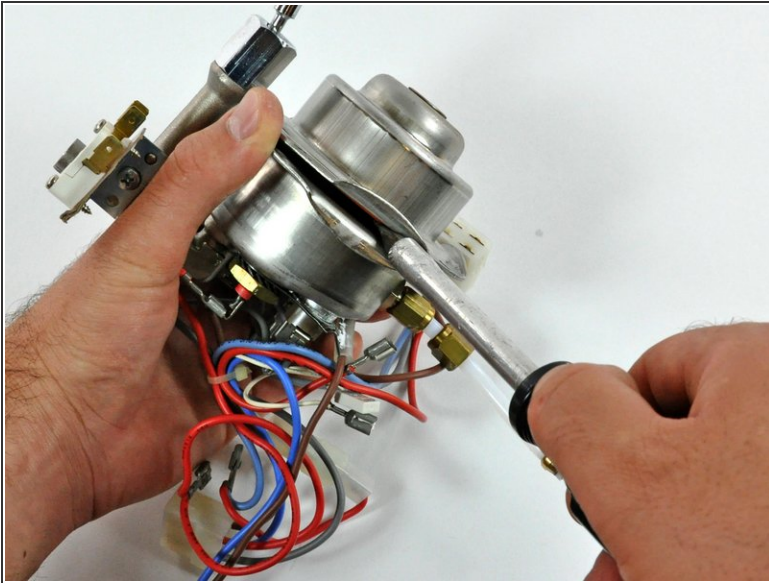
Step 9



i We will now focus on opening the heart of the Barista: the boiler.

- Remove the four hex bolts securing the brew head to the boiler assembly.
 - Lift the brew head off the boiler.
 - Remove the single Phillips screw securing the brew screen and gasket to the boiler housing.
 - The brew screen helps to evenly disperse water across the grounds in the basket.
 - Use a large standard screwdriver (we used a washer and a pair of pliers) to remove the one-way valve spring retainer from the bottom of the boiler.
- i** The one-way valve spring is tuned to only allow the valve to open when the pump is running. This prevents the brew head from dripping while warming up.

Step 10



- Use a flat blade screwdriver to separate the two halves of the boiler. Inside the boiler, you can see the main components:
 - Boiler housing (to contain water and steam).
 - Heater coil.
 - Dual thermal sensors, presumably one to maintain steam temperature and one for max temperature shut down.
- ⓘ The bottom portion of the boiler housing has a rigid hose reaching toward the top of the boiler to draw water from the top to keep the heater coil immersed in water.
- There are also two Klixon thermal sensors. The numbers stamped around their bases are:
 - 1NT01L-0036 L95-10 9910 M 10/250~T200
 - 1NT01L-0499 L127-15 9912 M 10/250~T200

Step 11



- And there you have it: the dissected Barista.
- ⓘ No actual baristas were harmed during the teardown of this device.
- Here's a [huge version](#) of the picture, just in case you'd like to use it as a desktop wallpaper!
- Be sure to keep an eye on our [Teardown](#) page for an inside look at the latest gadgets.

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