Thermomix TM5 Teardown

Teardown of the multifunctional kitchen machine, the Vorwerk Thermomix TM5.

Written By: Tobias Isakeit

INTRODUCTION

Vorwerk served up its pioneer and flagship multifunctional kitchen machine with 2014's Thermomix TM5. The purchase price of over $1,100 isn't too digestible for everyone's wallet; however, the device is supposed to conjure up some delicious dishes. Loved by some, despised by others, the Thermomix should not be left out when discussing cooking gadgets.

We wondered what the machine's ingredients were—so we competently dismantled and deboned it in order to find out.

To make sure that you always get the freshest teardowns served hot, you can drop by our Facebook page, have a look at our Instagram account and follow us on Twitter.

🔧 TOOLS:

- Jimmy (1)
- Mako Driver Kit - 64 Precision Bits (1)
- Spudger (1)
- iFixit Opening Tools (1)
- iFixit Precision Bit Driver (1)

This document was generated on 2019-10-11 03:06:00 PM (MST).

Step 1 — Thermomix TM5 Teardown

- This machine is capable of stirring, mixing, kneading, crushing, weighing, heating, cooking, and steaming.

- However, what we're interested in is its inner life, which is why we make our own soup:

  - As a basis for our teardown we take...

  - ... a Thermomix TM5 and separate the mixing bowl (including the cover) from the device.

  - Then we detach the recipe chip from the base unit.

Step 2
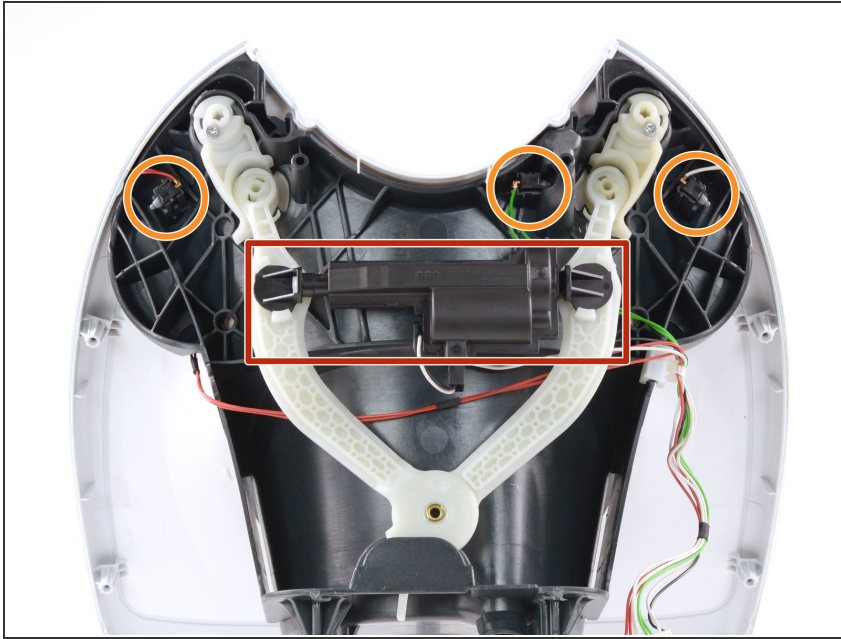

- Next we peel off the cover on the back with our ~~kitchen knife~~ Jimmy.

- Two screws later we're already holding the Thermomix handle in our hands.

Step 3

- We treat ourselves to a little appetizer, take the opening tool out of the kitchen drawer, and remove the program selector and motor shaft ring.

- The flexible shaft from the Mako Precision Bit Set helps us to loosen the Torx screws on the back and underside.

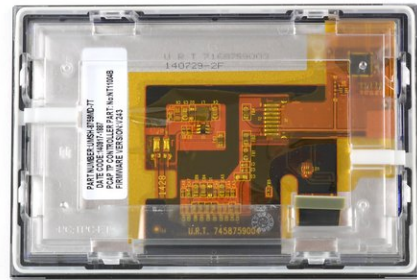This document was generated on 2019-10-11 03:06:00 PM (MST).

Step 4

- After carefully loosening three cable connections inside, we can remove the front—revealing an interesting mechanism behind it.
  - The handholds on the front are locked by the motor via a mechanical hinge construction.
  - Several sensors register whether the cover is on the mixing bowl and whether the arms are completely closed.

Step 5

- Each time the mixing bowl cover is locked, a whole choreography of mechanics is triggered:
  - The first sensor (component of the 5-pin plug near the crankshaft) determines whether the mixing bowl is inserted at all.
  - Then the motor mechanically turns both arms and locks the mixing bowl cover.
  - Three more sensors check whether the cover is fixed and the handles are completely closed.
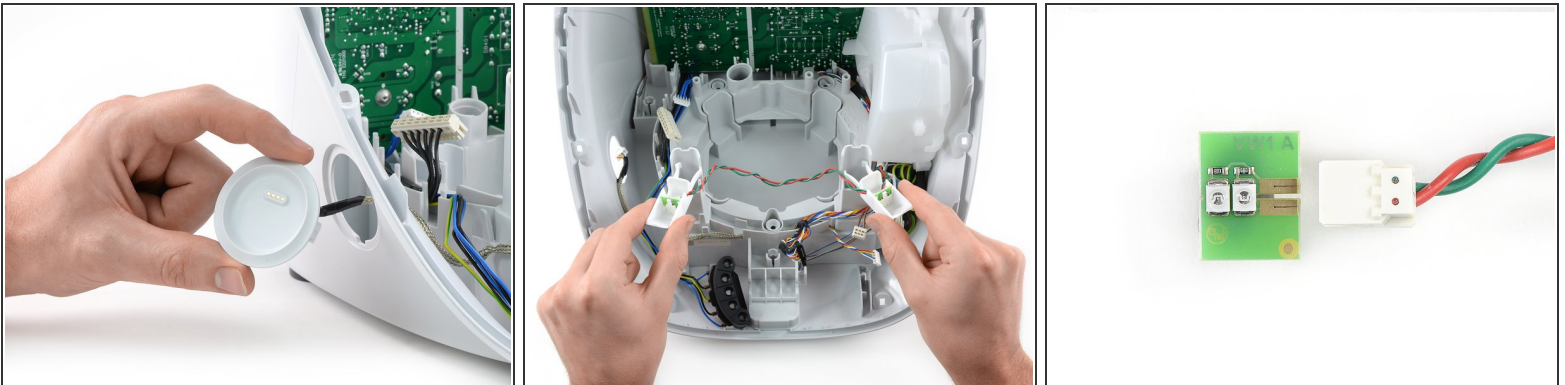
Step 6

- The next item on the menu is the control panel, which is used for most inputs.

- The 4.3" (640×480 pixels) LCD TFT touch panel is inserted by simple plastic clips that can easily be detached by hand.

- The board is served with two Torx screws on a ribbon cable connector. Here's what we find on it:
  - NXP MCIMX283DVM4B MPU 32-bit chip with ARM926EJ-S
  - NANYA NT5TU64M16HG DDR2 RAM with 128MB
  - MXIC MX30LF1G08AA-TI 128MB NAND flash memory

Step 7

- To get to the Thermomix fillet piece, we remove the selector knob encoder, the motor cover, and the 5-pin connector.

- And out comes the juicy 500 Watt reluctance motor. It stirs at 40-500 rpm and mixes up to 10,700 rpm in turbo mode.

- The accompaniment board features an NXP HEF4093B quad NAND gate with two inputs as Schmitt trigger for the engine control.
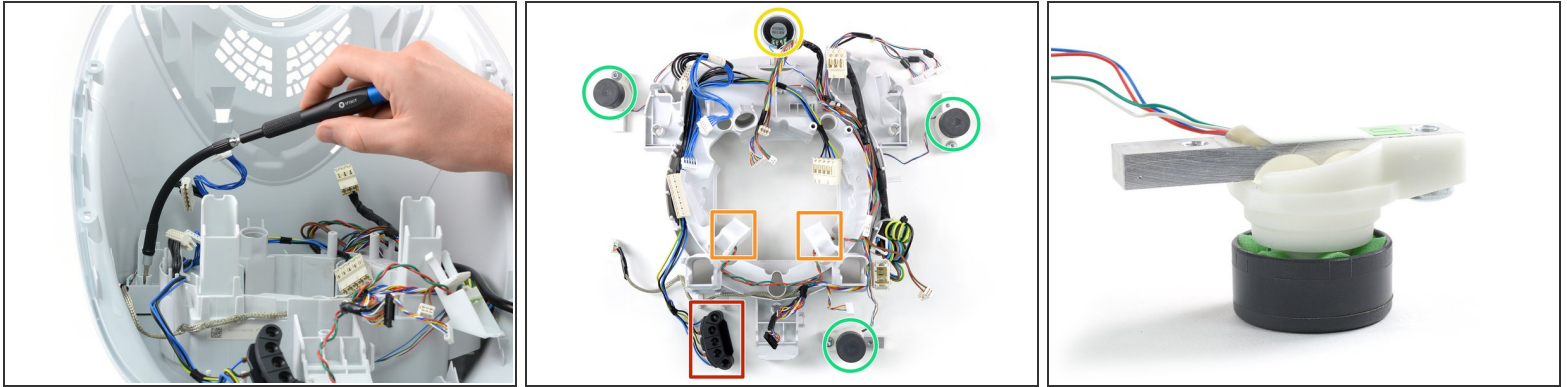
Step 8

- The Thermomix is fed with knowledge via the lateral interface with so-called recipe chips.

- The interface with the 4 pins strongly smells of a standard USB connection. This connection is also used to make the Thermomix WLAN-enabled via Cook-Key®.

- Four LEDs take over the lighting at the front. They sit in pairs on an exchangeable mini circuit board.

This document was generated on 2019-10-11 03:06:00 PM (MST).

Step 9

- On the way to the core of the Thermomix, we pass a suspicious, almost empty cable box. That surely has something to do with some kind of DIN standard.

- But we won't let ourselves get distracted by such deco fruits. We take out the brain, which seems to only be of interest on one side— the backside just features a conductor salad:

  - ATMEL ATxmega16D4 microcontroller

  - STMicroelectronics STM32F100 with an ARM® Cortex®-M3 core

  - MIP2K5 High-Performance IPD (Integrated Passive Device)

Step 10

- To get the remaining cable giblets out, we once again take advantage of the flexible shaft extension for our precision bit holder.

- We bravely grip everything and get it all out at once:

  - 5-pin connector for the mixing bowl

  - LED light elements

  - 5W speaker

  - 3 rubber feet with load cells for the balance function

    - ⓘ The specially shaped spring bodies change their geometry under load. The strain gauges attached to the metal register this change. The Thermomix then calculates the weight of the ingredients in the bowl.

Step 11 — Final thoughts

- The Thermomix is dismantled into its components. We have tasted the TM5, and here's our conclusion:

  - We found no ~~hair in the soup~~ proprietary screws; only Torx screws were used.

  - The components are all individually exchangeable, even up to the LED boards.

  - Housing, display, motherboard, and a few smaller parts are mostly attached via easily accessible clip connections.

  - Some of the cable connections are somewhat tight and therefore difficult to access. This increases the risk of damage to the cables and connectors.

This document was generated on 2019-10-11 03:06:00 PM (MST).