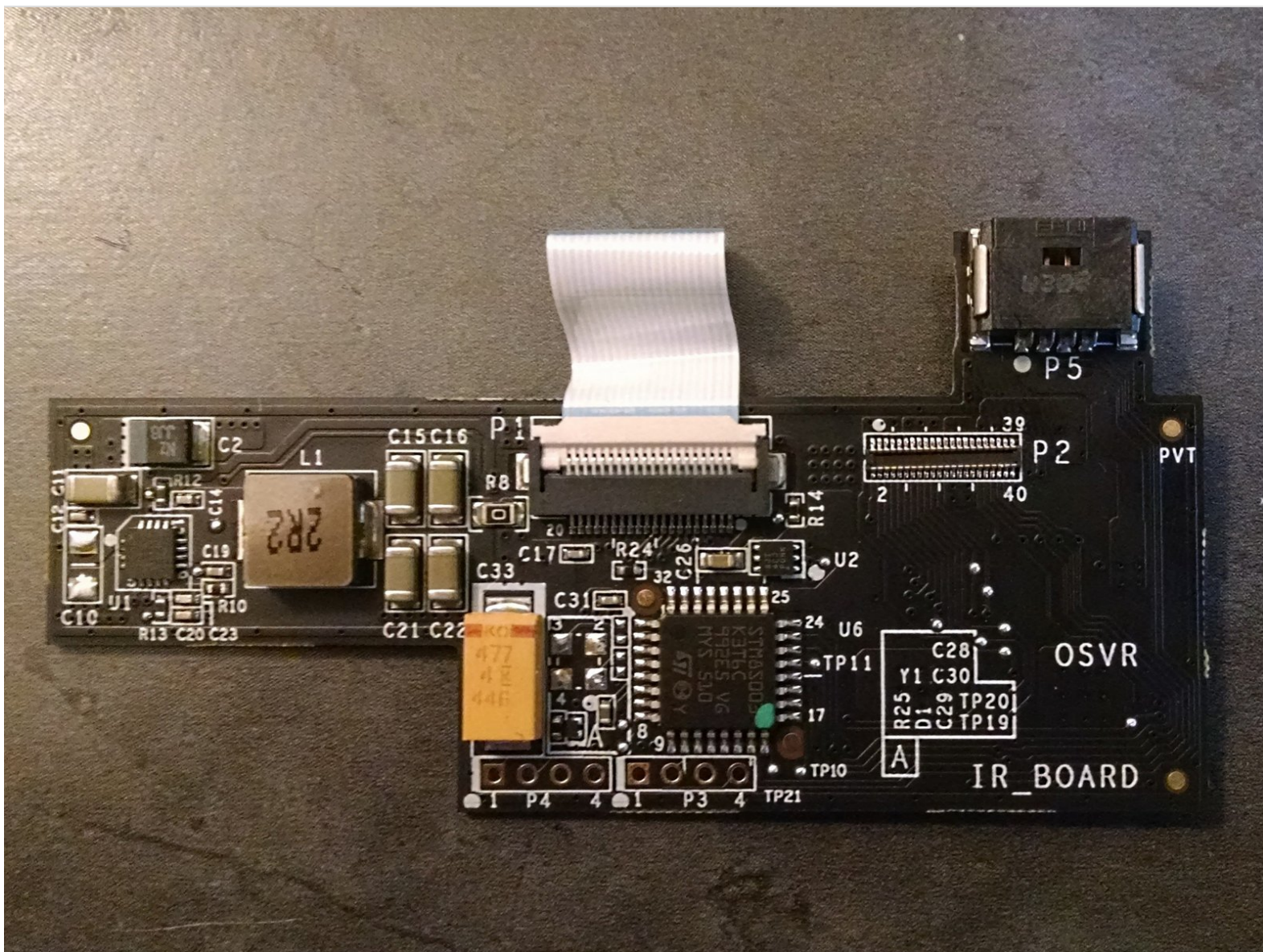# iFIXIT

OSVR HDK 1.2 1.3 1.4 2 Positional Tracking IR Board Access for Programming or Replacement

Remove/replace the positional tracking IR board in an OSVR HDK 1.2/1.3/1.4 (also applies to HDK 2).

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INTRODUCTION

This guide shows how to access and if necessary remove the IR board. This is most often done primarily to solder on a header to reprogram the IR driver microcontroller to improve the IR positional tracking performance. It forms a part of the <u>overall instructions to reprogram the IR driver microcontroller</u>.

This guide is included as a "prerequisite" to the <u>Technique: How to add a IR board programming connector to OSVR HDK 1.2 1.3 1.4 2</u> guide, so if that's what you want to do, that's the only guide you need to follow, it includes all the steps here.
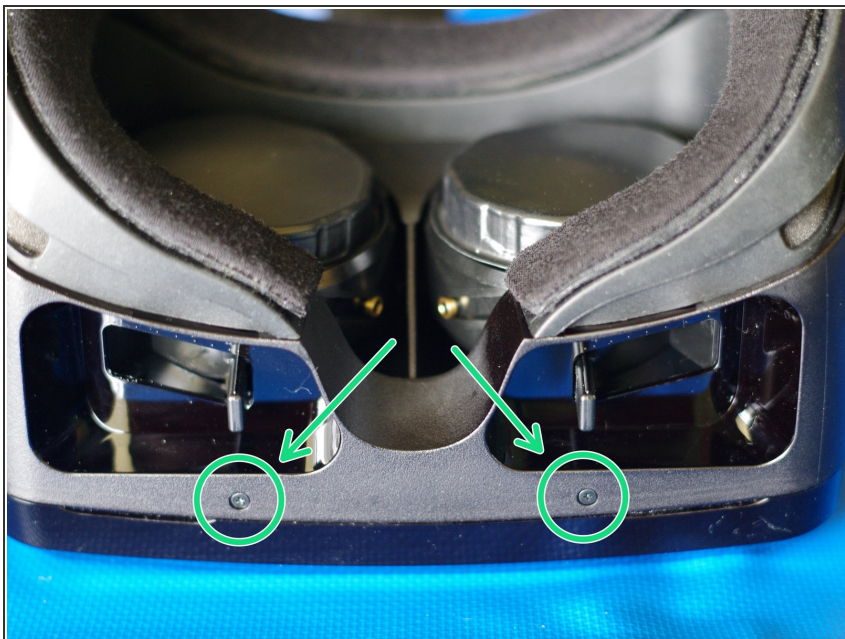
Portions of this guide are based on <u>other community-contributed iFixit guides for the HDK</u> - thank you to those contributors for their work, especially their great photography! Their disclaimer applies to this as well, of course: they are not responsible if you break anything following this guide.

🔧 TOOLS:

- Phillips #00 Screwdriver (1)
- iFixit Opening Picks set of 6 (1)
Optional - this or a spudger can help with the ribbon cable disconnection.
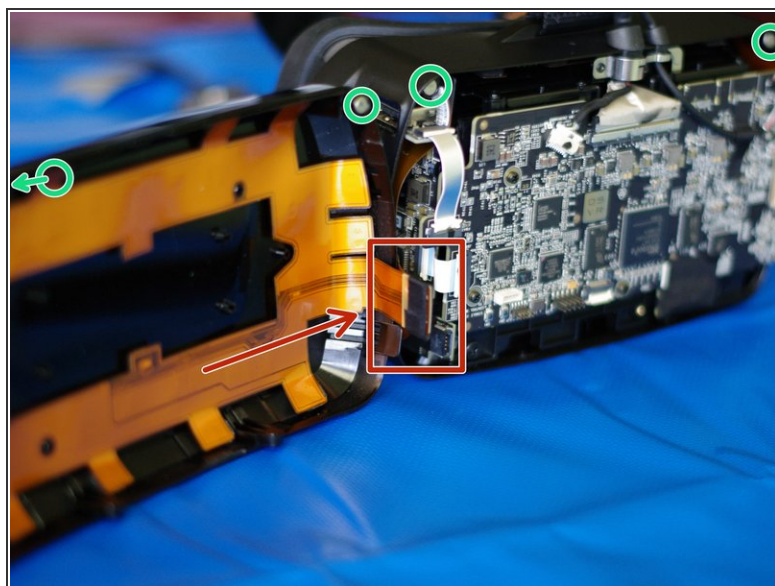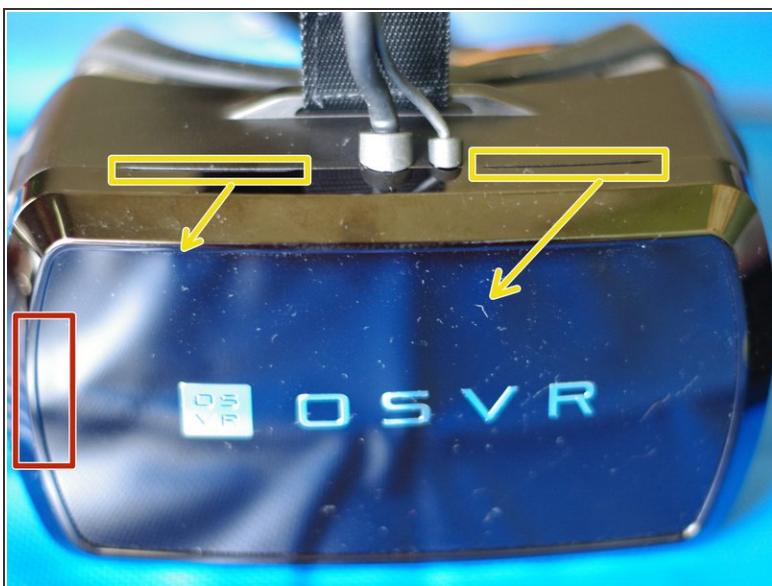
Step 1 — Removing faceplate screws

- Lay HDK headset face down on a soft surface. Remove the two Phillips #00 screws from the bottom.

⚠ If the screws do not easily unscrew, you may need to try a different screwdriver. They are quite small and precise, and in the 1.3 and later at least, seem to be a Phillips #00 (possibly just a #0 in 1.2), but if your screwdriver set is not exact, they are easy to strip. **If the screws don't turn, try another screwdriver.**
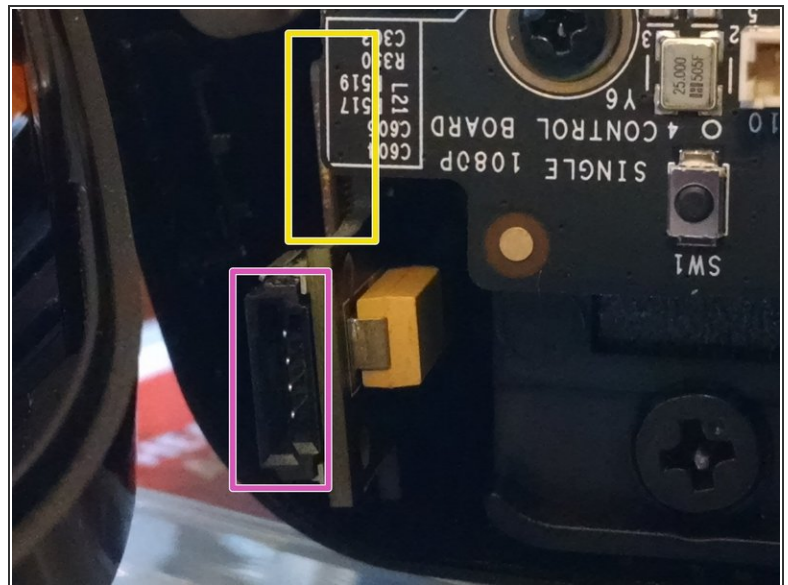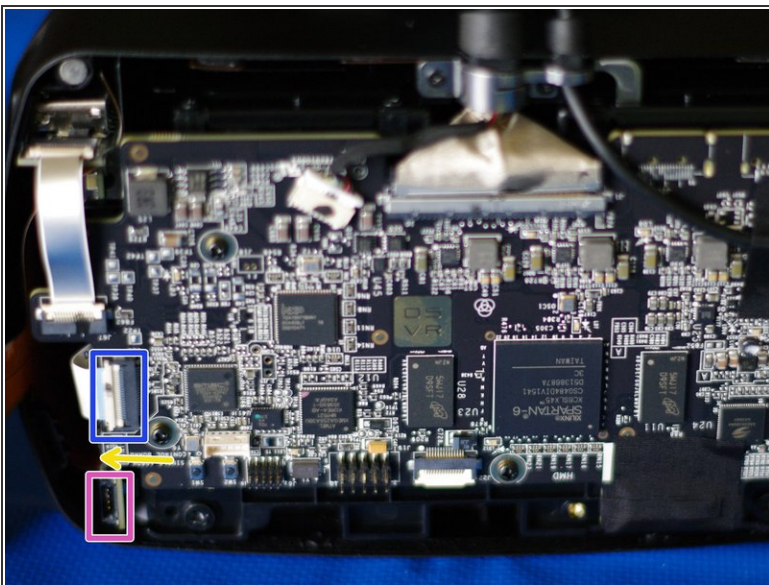
Step 2 — Opening faceplate

- Turn the headset upright.

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- Behind the red box is a connector between a ribbon cable attached to the faceplate and a ribbon cable wrapped inside the body of the HMD. It's taped together in addition to the force of the connection, but is still somewhat fragile, so **when opening, this left side should be treated as the "hinge".**

- There are now only two pairs of magnets at the top in the corners holding the faceplate to the body of the HMD. (In the inside image, one of the faceplate magnets is not pictured.)

- There are two grooves on top, marked, to use in faceplate removal. Keeping in mind the minimal force holding the faceplate on, and the location of the faceplate connector, gently pull/fold the faceplate out and to the left. **Do not use any tools for this step!**

- (i) Images show an OSVR HDK 1.4, HDK 1.2 and 1.3 internally look extremely similar. The main circuit board on the HDK 2 differs, but the basic opening procedure and tracking cables should be the same. The faceplate connector cable for the HDK 2 is different, less fragile, and does allow for easy disconnection/reconnection if desired.

- ⚠ **Avoid placing strain on the (1.x) connector highlighted in red: do not let the faceplate dangle from it or pull on it.** If it disconnects internally, you will notice the IR tracking LEDs not lighting up. As long as the connector has not torn off, you can align and squeeze it gently to re-seat the connection and fix it; you'll feel it click.
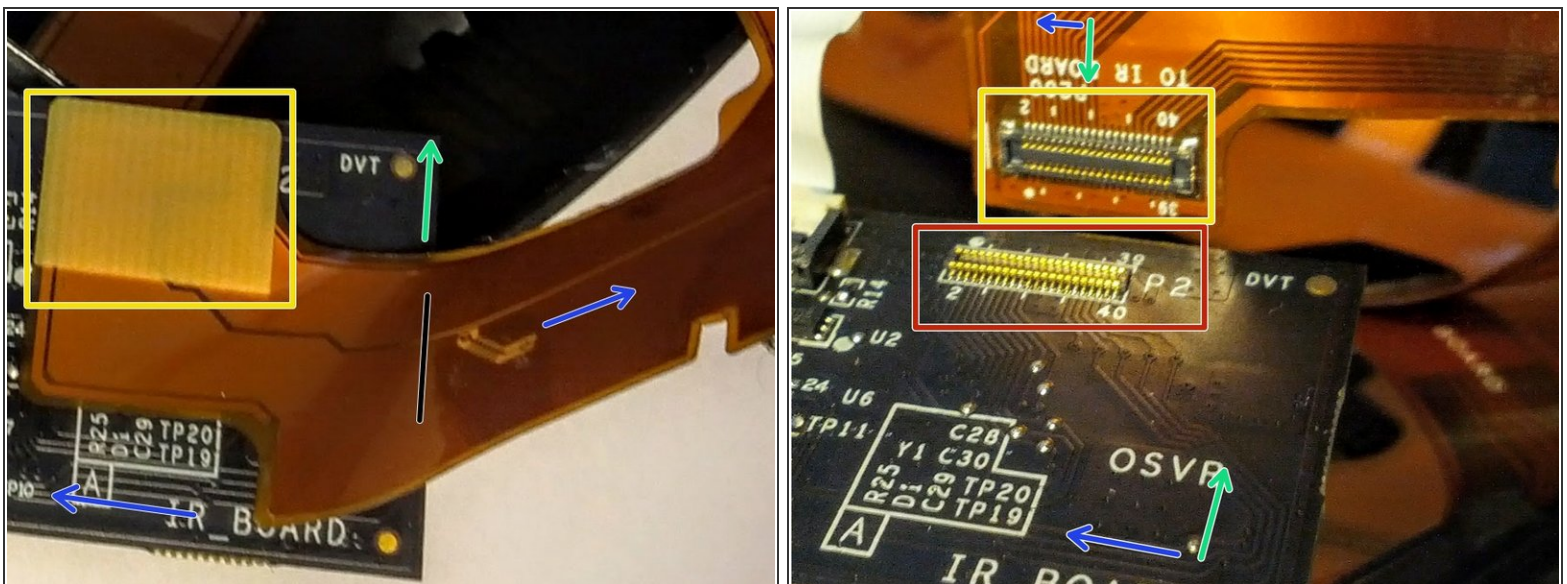
Step 3 — Disconnect IR board cables (general)

- If you are following this guide to reprogram the IR board, and are able to use the "P5" programming connector - no more disassembly is required. The pink box indicates the location of P5 in an assembled HDK 1.x with the connector (1.4 units shipped with a P5-containing IR board).

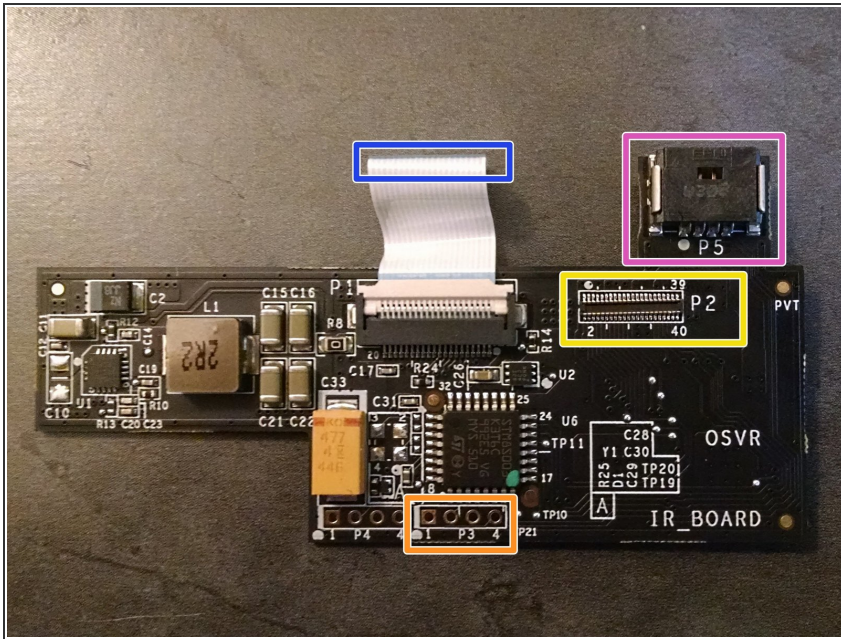This document was generated on 2019-09-22 08:55:36 AM (MST).

- Disconnect the board-to-board ribbon cable (connecting the IR board to the main circuit board) by lifting/tilting the white locking piece then gently sliding out the ribbon cable.

- Flat on the surface of the IR board, about where the yellow arrow points, the orange ribbon cables (which carry the IR LEDs and additional positional tracking circuitry) connect to the IR board with the same sort of flat connector that is used between the faceplate ribbon cable and the main body.

  - The connector section of the ribbon cable is reinforced with a small board, which you can see just past the edge of the IR board itself. In a 1.4 or newer, as shown, it's right above the P5 connector (pink). If you come in from the front, you'll likely need a fingernail or pick/spudger. From behind the connector, a finger will probably be enough.

  - ⓘ When re-assembling, get the board in position and connect the other ribbon cable first. Then, this cable should naturally line up at the right spot. Be gentle and don't force it: these connectors are not made for hard or repeated reconnection, and they won't click together if not centered and aligned perfectly. It's a little fiddly but doable.

  - 📌 See the next step for more information, detailed photos, and disassembly tactics for this orange ribbon cable connector.

- Once those two cables have been removed, you should be able to shimmy the IR board out: be careful not to tug on any of the orange ribbon cables (they should be attached to the HMD case with adhesive on rubber bumpers at each LED location). It's OK to press the rubber bumpers back down onto the case if the adhesive has pulled away.

Step 4 — Details on the orange ribbon cable

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ⓘ This LED ribbon cable to IR board connection can be intimidating at first, because it feels "directly connected" to the board - but it's actually just a connector on the IR board face. The first two images are from a teardown of a modified 1.2 (you'll never see it like this in your own device) but they'll give a better idea of how it's connected.

⚠ These photos show the orange ribbon cable with the LEDs on it out of the HMD's housing. This was a development unit whose full tracking capabilities were sacrificed for the greater good. **DO NOT remove the orange ribbon cables from your own HMD** to try to get easier access - **precise positioning of the LEDs is required for tracking**.

● First photo: connector attached, with ribbon cable unfolded out of the way for a clear view. Viewing the "top" of the board, which faces out the side of the HMD when installed.

  ● When inside the HDK, the green arrow would be pointing out the front of the HMD.

  ● When the orange ribbon cable with the LEDs is correctly left intact, it would actually gently bend (near the marked black line) over the IR board so that both blue arrows would point toward the top of the HMD.

● Second image: connector immediately after disconnection, with both halves of the connector facing the camera. Again, ribbon cable unnaturally unfolded for ease of photography. As before, green arrows would point out the front, and blue arrows would point toward the top.

  ● Here, you can see both the ribbon-cable side of the connector ("receptacle"), in yellow, and the board-side connector, highlighted in red. For a clearer view of how they mate, see the JAE WP7 series connector datasheet (board uses a JAE-WP7B-P040VA1) which has 3d renderings.

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Step 5 — The IR board, removed

(i) This is a view of a HDK v1.4 and up IR board, looking at the side that faces the outside of the HMD. When re-installed, the left edge of the board as seen here goes toward the top of the HMD.

- Here you can get a better look at the features from the previous step which may help in reassembly.

  - This is the board-to-board ribbon cable. Removing the main board end is much easier to re-assemble than removing the IR board end, so just leave this cable attached to the IR board while it's out.

  - This is the board half of the connector to the orange ribbon cables - you can see it's flat against the board and rectangular in shape (and not necessarily perfectly square with the board), which might help you visualize reconnecting it.

  - This is the "P5" programming header suitable for use with official, full ST-Link v2 kits with cable bundle. Earlier boards do not have this connector or even this section of circuit board jutting out - that's nothing to worry about. The pinout is a duplicate of P3.

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- At the bottom-center, below the STM8 microcontroller, is a pair of unpopulated headers. The P3 header, highlighted in orange, is the programming header, and thus the one we're interested in. Pin 1 and 4 are numbered in the silkscreen, and pin 1 is also marked with a dot and has a square, rather than circular, pad.

- (i) The pinout for P3 (and P5, if present - pin 1 there is indicated by a circle) is: 1: 3.3v, 2: SWIM, 3: GND, 4: RESET

To reassemble your device, follow these instructions in reverse order. If you added a header on a cable, fold it in carefully, and be sure to not disturb the location of the rubber bumpers and LEDs on the IR ribbon cables. Give the connector to the faceplate ribbon cable a gentle squeeze to make sure it has stayed connected.