

Bittle X Platform v3.2 - Interface Specification

Version 3.2, 2026-10-18. The platform is the stock Petoï Bittle X back cover with 4 teardrop pegs on its top. An add-on has a plate with 4 keyholes. Put it on the pegs, slide it 7 mm forward, and it clicks. To remove it, slide it 7 mm rearward and lift it. It comes off closed: the head is not in the way. The keyholes have the shape of the pegs, so the add-on goes on in one direction only. No tools, glue or tape are necessary. interface.json has all the numbers in machine-readable form.

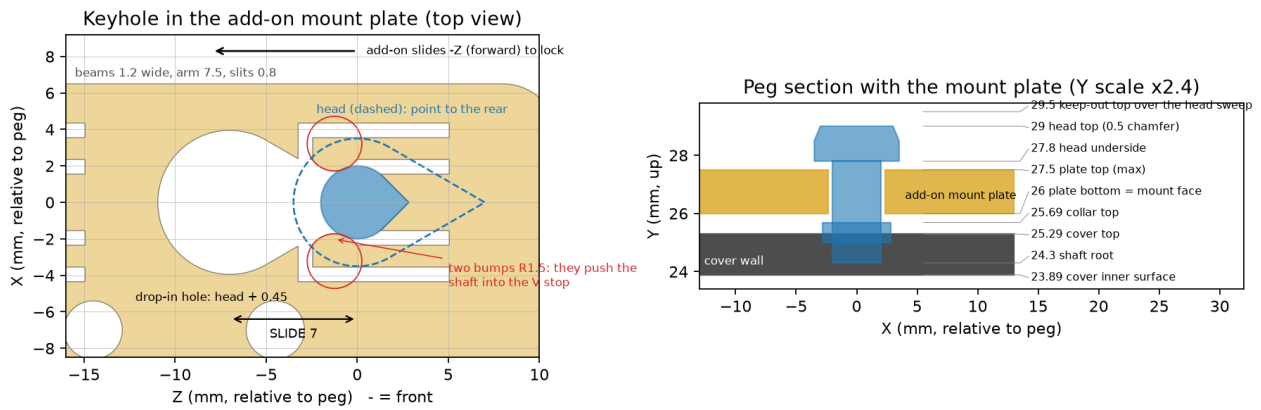
Version 3.0 is not compatible with earlier versions: the pegs have a new shape and place, and the slide goes the other way. Version 3.1 adds a notch in the front edge of the cover, left side, for the Grove plug on the BiBoard (the head camera cable). Version 3.2 turns the cover model 180 deg to match the robot: the Pi slot (the BiBoard header) is at the front left, and the notch is on the front left, as on the robot. Reprint the cover: the pegs and the keyholes are the same as in 3.0. Keep add-on parts out of the plug space (GROVE_PLUG, in keepout.stl).



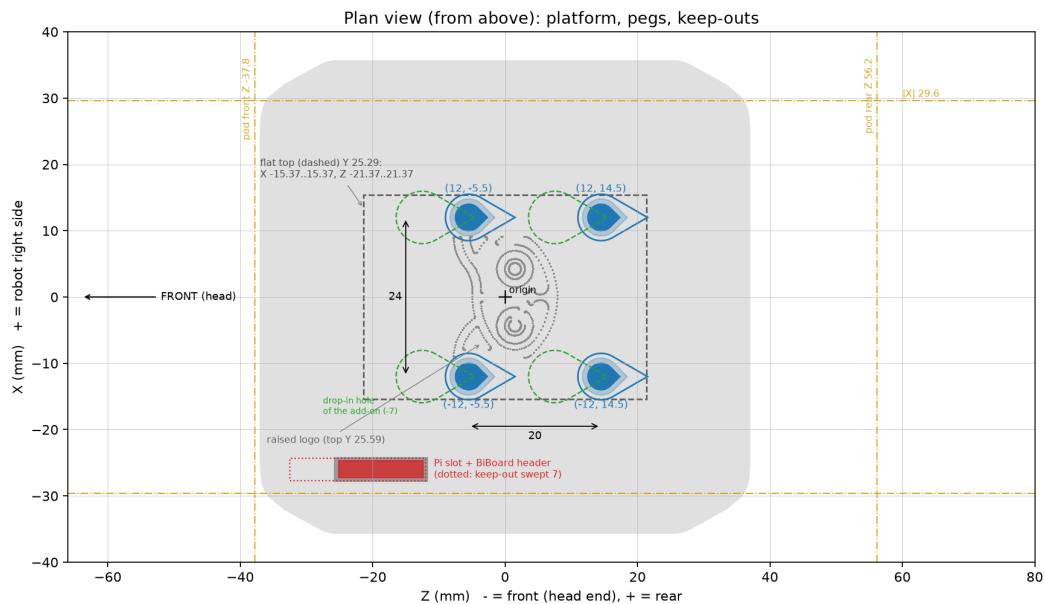
The platform (white) on the robot, with the starter plate on the pegs.

1. Key numbers

Item	Value (mm)
Frame	X lateral (+X = robot right), Y up, Z along the body (-Z = head end). Origin: center line, middle of the cover.
Pegs (X, Z)	(12, -5.5), (12, 14.5), (-12, -5.5), (-12, 14.5): a centered 24 x 20 rectangle
Peg	teardrops with the point to the rear (+Z). Head: R3.5, point 60 deg, Y 27.8 to 29. Shaft: R2, point 90 deg
Add-on plate	bottom at Y 26, 1.5 thick at the keyholes
Keyhole	drop-in hole 7 mm in front of the peg = the head teardrop + 0.45; slot 4.7 wide back to a V stop at the peg; 0.4 lead-in chamfers top and bottom
Fit	put the add-on on 7 mm behind its place, then slide it 7 mm forward until it clicks. Remove: slide it rearward and lift
Click (detent)	two 1.2 wide spring beams, one on each side of each slot, freed by 0.8 U slits (fixed at the rear end only). Bumps R1.5 at 1.25 in front of the peg, 0.28 into the shaft path. They push the shaft point into the V stop, which centers it.
Click force	about 3.2 N to slide on and 3.2 N to slide off (all 8 beams, PLA estimate); beam strain 0.9 %
Keep clear	the peg heads as they slide; the BiBoard header in the cover slot (X -27.27...-24.73, Z -25.1...-12.4, top Y 29.1)
Size	the pod fits in Z -37.8...56.2, X <= 29.6; outside that, check the legs and the head



Left: keyhole and click beams in the add-on plate (top view, locked). Right: the peg and the plate (side section).



Plan view: pegs (blue), drop-in holes (green), BiBoard header (red), pod size (gold).

2. Design an add-on

- 1 Start from cad/starter_plate.step. It has the keyholes and the click beams.
- 2 Add your part on top of the plate, in the same print. You can also screw parts to the M3 holes.
- 3 Keep your part out of stl/installed/keepout.stl. This keeps it clear of the robot, the peg heads and the header.
- 4 Keep heavy parts low and near the pegs. Keep the center of mass of the add-on within 10 mm of Z 0, near X 0.
- 5 Keep the weight low and near the center line. The pegs carry the whole add-on.
- 6 For a plate of a different shape: subtract cad/keyhole_cutter.step, then add cad/detent_bumps.step. Both are in position.

3. Printing

One Cura profile prints every part: "Bittle X" (cura/Bittle_X.curaprofile in the repository; import it in Cura).
cura/install_profiles.py installs it, and a copy with the size compensation of each spool that the tolerance app measured.

Part	Orientation	Supports
cover_pegs_foot (recommended)	stand on the rear end, foot on the bed	none: the foot is the support. Snap it off after the print.

Part	Orientation	Supports
cover_pegs (no foot)	stand on the rear end	turn on tree supports from the bed and a 14-line brim
starter_plate and add-ons	plate bottom on the bed	none

Setting	Bittle X
Layer	0.20 (first layer 0.25)
Walls / infill	3 / 20 % gyroid
Outer wall / inner wall / infill speed	25 / 40 / 55 mm/s
Outer wall acceleration	500 mm/s ²
Supports / brim	off / 6 lines
Nozzle	220 C (PLA)

- 1 Material: PLA works. Use PETG for add-ons that you remove often or that get warm.
- 2 Standing on its end, the cover prints the pegs with layers along their length. This makes them strong. The shaft and collar points are down, so they need no supports.
- 3 The cover stands on a thin strip, and its center of mass is past that strip. The foot is a 3-layer plate with 7 fins under the leaning face. It increases the first layer from 53 to about 1000 mm². The fins touch the cover only at 21 small teeth, each one layer tall at 0.20 mm layers. Twist the foot off after the print.
- 4 In add-ons, keep overhangs at 45 deg or less. Use chamfers, not round edges, on the bottom side.
- 5 The fits use 0.35 (slot), 0.45 (drop-in hole) and 0.3 (under the heads) clearance. Calibrate your printer if the plate does not slide on.

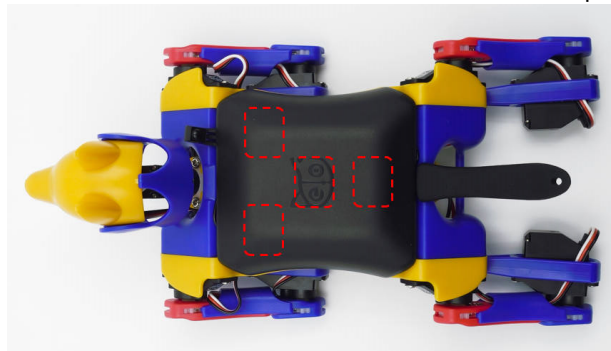
4. Files

File	Content
stl/print/	the parts to print, in print orientation
cad/starter_plate.step	the start point for an add-on
cad/pegs.step, keyhole_cutter.step, detent_bumps.step	the interface parts, in position (robot frame)
stl/installed/	all parts and keepout.stl in the robot frame
interface.json / interface.py	all numbers
build.py, docs.py	rebuild the parts and this document (build123d, manifold3d)

Open items: the BiBoard header height is an estimate from photos. The legs, the head and the robot balance are not modeled. The Peto cover is a mesh, so cover_pegs is STL only.

5. Bittle X V2 back touch sensor

- 1 On a Bittle X V2, the back touch sensor is a flexible circuit that is glued to the inside of the cover top. It has touch areas on the left, the right, the center and near the tail (docs.peto.com/extensible-modules/back-touch-sensor).
- 2 The peg roots stop inside the 1.4 mm wall, so the inside of the cover does not change, except at the Grove notch at the front-left edge. Move the circuit from the stock cover to cover_pegs in the same way as on the stock cover.
- 3 An add-on on the platform covers most of the touch areas. Disable the back touch mode (serial command Xb) when an add-on is on the robot.
- 4 For this reason, the platform has no parts under the cover top. A cover that prints flat without supports needs pegs held from inside the cover, where the circuit is. A later interface with sockets in a thicker top can avoid this.



Bittle X V2 touch areas (red boxes). Image: Peto, docs.peto.com/extensible-modules/back-touch-sensor.

6. License

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