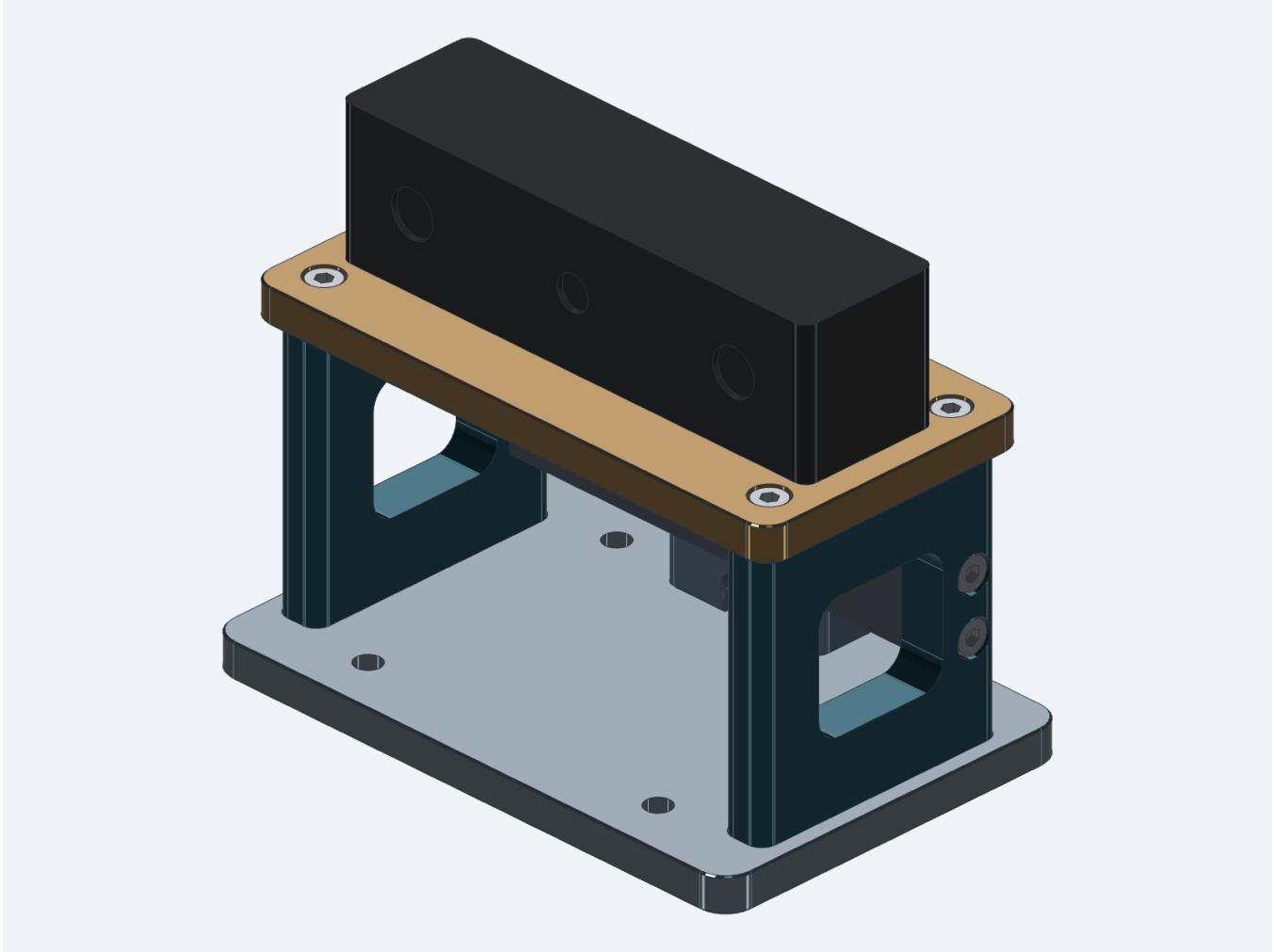
Compact RGB-D head

Six custom CNC parts | Revised structure, mounting and cable route | Design discussion sample



What changed

Locating seats at both ends of the side plates.

Lower frame with a removable camera plate.

Recessed screw heads and slotted camera mounts.

A full-height cable opening in a POM guide.

Measured concept size

Frame: 100 x 66 x 58 mm

With placeholder camera: 83 mm high

Six custom parts: approx. 0.280 kg

Camera and screws excluded from mass.

Comparison with first sample

16.2% lower overall height.

26.1% smaller frame bounding volume.

Assessment: a more developed concept sample. Actual shell fit and engineering performance are unverified.

Quality assessment and evidence

Checks judge the delivered geometry; a passing geometric check is not a production approval.

Custom solids and STEP round-trip	PASS | Six closed, valid, positive-volume solids.
General CNC geometry review	OK | All six final STEP parts; no error findings.
CNC warnings retained	12 drill-depth warnings: 4 per side plate, 4 in brace.
Assembly interference	PASS | No unintended overlaps; 16 thread fits declared.
Locating and mating contact	PASS | Eight intended part contacts measured at zero gap.
Base and top screw alignment	PASS | Analytic cylinder axes match at eight locations.
Nominal cable clearance	PASS | 6 mm cable has 0.5 mm clearance to guide and base.
Fastener and driver geometry	PASS | 16 engagement lengths, 14 straight driver probes.
Regression checks	PASS | Old cable clash and deliberate alignment faults detected.
Material and manufacturing assumption	Five 6061-T6 aluminum parts, one POM guide; CNC milling.

Warnings: the 2.5 mm blind pilot bores are 12 mm deep (4.8 diameters versus the general recommendation of 4). Proposed full thread depth is 7.5 mm, leaving 4.5 mm cylindrical runout plus a 0.75 mm drill tip. Retained deliberately; the shop must confirm its drilling and tapping method.

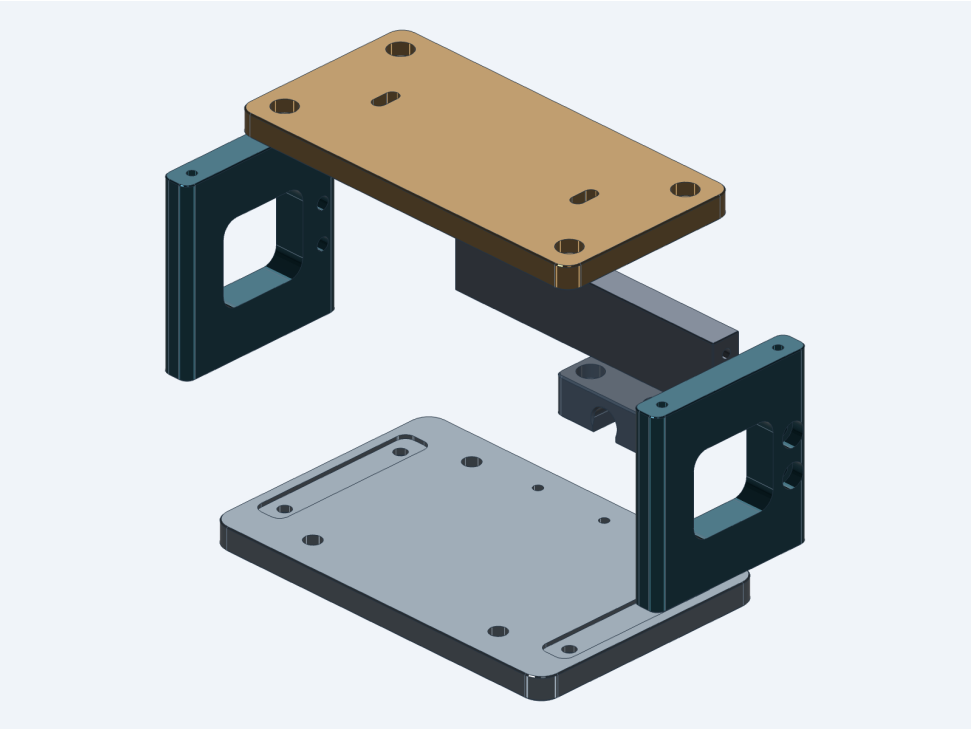
Check basis: 3-axis milling with re-fixturing; end mills 3, 6 and 10 mm, standard drills. General text-to-cad rules, not a named shop. The slitting-saw feasibility rule was not evaluated (no limit supplied by the rules); it is not claimed as a pass.

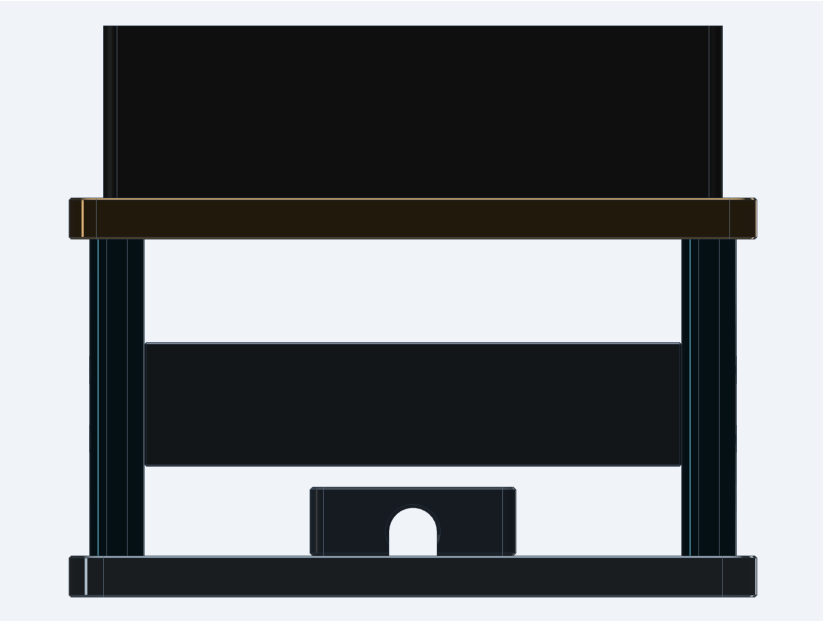
Not verified: actual shell/camera/neck fit, connector passage, full service-removal paths, cable bend radius, loads, stiffness, fatigue, vibration, thermal performance, optical field, thread strength, torque, fixtures, holders, tolerances and finish. No native SolidWorks feature tree or assembly mates are supplied.

Rule basis: Protolabs Network CNC guide. M3 head/socket envelope: Accu data. Source links in QUALITY_REVIEW.

Assembly and machining intent

Exploded custom parts at left; actual assembled rear view at right. Camera and screws are reference geometry.





Suggested assembly order

1. Fit the guide to the base. Seat both sides in the base pockets; insert four M3 x 8 screws from below.
2. Fit the rear brace between the sides with four M3 x 12 screws from outside.
3. Mount the camera to its plate from below; M3 x 6 reference only, subject to the camera vendor.
4. Lower the plate onto the side locating seats and fit four M3 x 8 screws from above.
5. Route the cable before closing the shell. Guide uses two M3 x 12 screws; no clamping or strain-relief claim.

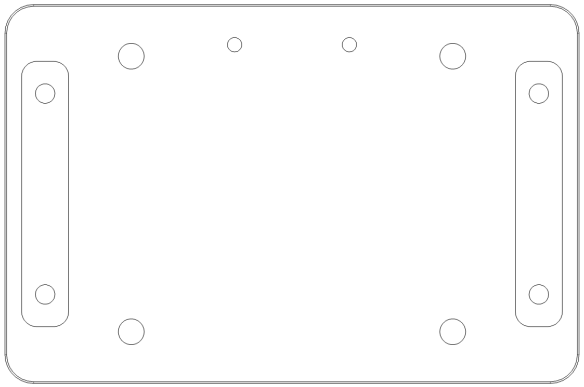
Shallow seats provide nominal 0.1 mm clearance per side. Final positional tolerances must be engineered.

Threaded holes are shown as tap drills. Nominal screw shanks intentionally overlap them in reference assembly.

P01 | Base and neck interface

Concept coordinate drawing | Hidden edges suppressed | Views individually fitted; NTS | Not a release drawing

TOP / X-Y



FRONT / X-Z



RIGHT / Y-Z



Geometry and feature locations

Blank envelope 100 X x 66 Y x 6 Z; bottom datum Z 0. Outer plan corners R5; edge break 0.3.

2 locating seats: 8.2 X x 46.2 Y, R2.6, centred X +/-43, Y 0; depth 1 from top to Z 5.

4 holes dia 3.4 through at X +/-43, Y +/-17.5. Counterbore dia 6.4 x 3.3 deep FROM UNDERSIDE.

Assumed neck interface: 4 holes dia 4.5 through at X +/-28, Y +/-24. Client pattern unknown.

Guide threads: 2 x M3 x 0.5 through at X +/-10, Y +26. Modelled as dia 2.5 tap drills.

Material proposal: 6061-T6 aluminum, density assumed 2.70 g/cm3. CNC milling, 3 axes with re-fixturing.

Final STEP CNC check: OK, 0 warnings. Full measurements and rules in reports/base_plate_dfm.json.

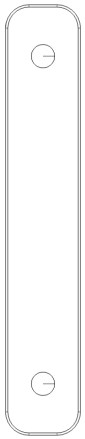
Origin: base bottom centre. Front -Y, up +Z. All locations reference assembly coordinates.

No production tolerances assigned. Confirm datums, fits, tap callouts, edge breaks and finish before release.

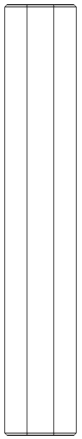
P02 | Left side plate

Concept coordinate drawing | Hidden edges suppressed | Views individually fitted; NTS | Not a release drawing

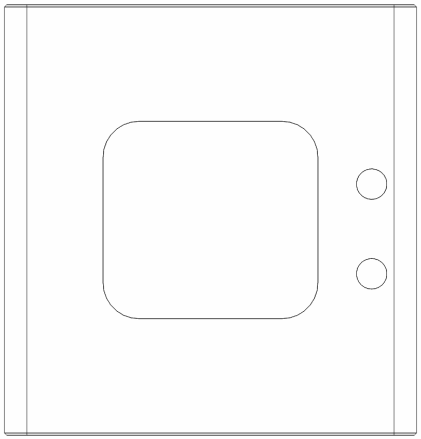
TOP / X-Y



FRONT / X-Z



RIGHT / Y-Z



Geometry and feature locations

Envelope 8 X x 46 Y x 48 Z; X -47 to -39, Y +/-23, Z 5 to 53. Outer XY corners R2.5.

Through window normal to X: 24 Y x 22 Z, R4 corners; centred Y 0, Z 29. Edge break 0.25 externally.

Top and bottom: 2 blind M3 x 0.5 per end at X -43, Y +/-17.5; full thread 7.5 from seating face.

Pilots dia 2.5 x 12 full-diameter depth plus 0.75 tip; bottom entry Z 5, top entry Z 53.

Brace holes dia 3.4 through X at Y 18, Z 23 and 33. Dia 6.4 counterbores x 3.3 FROM OUTER X- FACE.

Material proposal: 6061-T6 aluminum, density assumed 2.70 g/cm3. CNC milling, 3 axes with re-fixturing.

Final STEP CNC check: OK, 4 warnings. Full measurements and rules in reports/left_side_dfm.json.

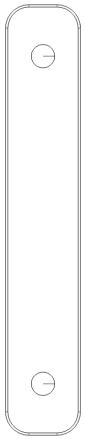
Origin: base bottom centre. Front -Y, up +Z. All locations reference assembly coordinates.

No production tolerances assigned. Confirm datums, fits, tap callouts, edge breaks and finish before release.

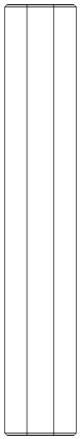
P03 | Right side plate

Concept coordinate drawing | Hidden edges suppressed | Views individually fitted; NTS | Not a release drawing

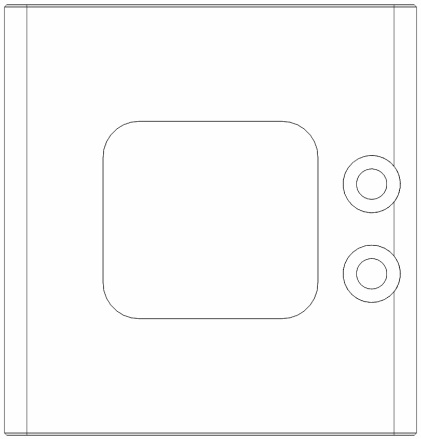
TOP / X-Y



FRONT / X-Z



RIGHT / Y-Z



Geometry and feature locations

Envelope 8 X x 46 Y x 48 Z; X +39 to +47, Y +/-23, Z 5 to 53. Outer XY corners R2.5.

Through window normal to X: 24 Y x 22 Z, R4 corners; centred Y 0, Z 29. Edge break 0.25 externally.

Top and bottom: 2 blind M3 x 0.5 per end at X +43, Y +/-17.5; full thread 7.5 from seating face.

Pilots dia 2.5 x 12 full-diameter depth plus 0.75 tip; bottom entry Z 5, top entry Z 53.

Brace holes dia 3.4 through X at Y 18, Z 23 and 33. Dia 6.4 counterbores x 3.3 FROM OUTER X+ FACE.

Material proposal: 6061-T6 aluminum, density assumed 2.70 g/cm3. CNC milling, 3 axes with re-fixturing.

Final STEP CNC check: OK, 4 warnings. Full measurements and rules in reports/right_side_dfm.json.

Origin: base bottom centre. Front -Y, up +Z. All locations reference assembly coordinates.

No production tolerances assigned. Confirm datums, fits, tap callouts, edge breaks and finish before release.

P04 | Adjustable camera plate

Concept coordinate drawing | Hidden edges suppressed | Views individually fitted; NTS | Not a release drawing

TOP / X-Y



FRONT / X-Z



RIGHT / Y-Z



Geometry and feature locations

Envelope 100 X x 50 Y x 6 Z; X +/-50, Y +/-25, Z 52 to 58. Outer plan corners R4; edge break 0.3.

2 underside seats: 8.2 X x 46.2 Y, R2.6, centred X +/-43, Y 0; depth 1 up to Z 53.

4 holes dia 3.4 through at X +/-43, Y +/-17.5. Counterbore dia 6.4 x 3.3 FROM TOP Z 58.

Assumed camera slots at X +/-30, Y 0: width 3.4, overall Y length 7.4, through; +/-2 Y adjustment.

Underside head recess per slot: width 6.4, overall Y length 10.4, depth 3.3. Confirm actual sensor interface.

Material proposal: 6061-T6 aluminum, density assumed 2.70 g/cm3. CNC milling, 3 axes with re-fixturing.

Final STEP CNC check: OK, 0 warnings. Full measurements and rules in reports/camera_plate_dfm.json.

Origin: base bottom centre. Front -Y, up +Z. All locations reference assembly coordinates.

No production tolerances assigned. Confirm datums, fits, tap callouts, edge breaks and finish before release.

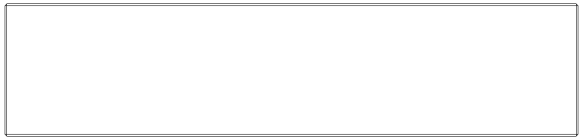
P05 | Rear brace

Concept coordinate drawing | Hidden edges suppressed | Views individually fitted; NTS | Not a release drawing

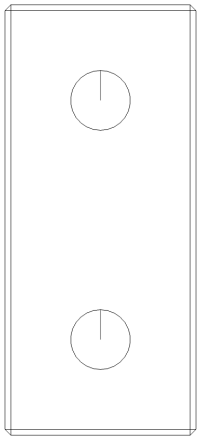
TOP / X-Y



FRONT / X-Z



RIGHT / Y-Z



Geometry and feature locations

Envelope 78 X x 8 Y x 18 Z; X +/-39, Y 14 to 22, Z 19 to 37. External chamfer 0.25.

Each X end: 2 blind M3 x 0.5 at Y 18, Z 23 and 33; full thread depth 7.5.

Pilot dia 2.5 x 12 full-diameter depth plus 0.75 drill tip, measured inward from X +/-39.

Seat the ends against the side inner faces. Reference screws M3 x 12; measured engagement 7.3.

Proposed end drilling and tapping require re-fixturing. Shop must confirm clamp and drill access.

Material proposal: 6061-T6 aluminum, density assumed 2.70 g/cm3. CNC milling, 3 axes with re-fixturing.

Final STEP CNC check: OK, 4 warnings. Full measurements and rules in reports/rear_brace_dfm.json.

Origin: base bottom centre. Front -Y, up +Z. All locations reference assembly coordinates.

No production tolerances assigned. Confirm datums, fits, tap callouts, edge breaks and finish before release.

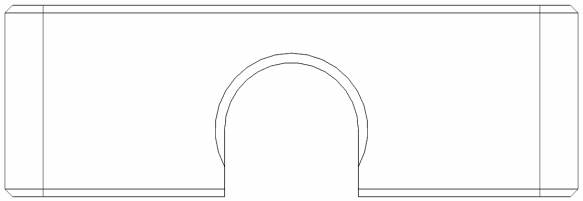
P06 | Cable guide

Concept coordinate drawing | Hidden edges suppressed | Views individually fitted; NTS | Not a release drawing

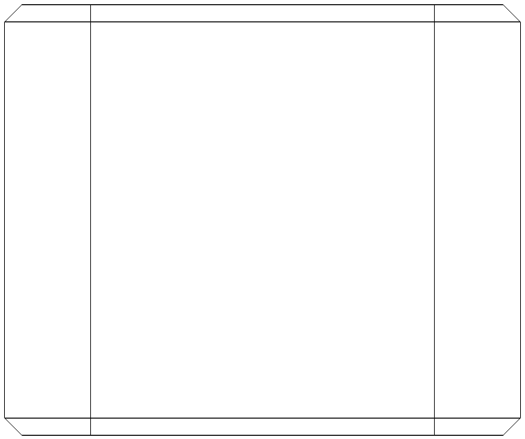
TOP / X-Y



FRONT / X-Z



RIGHT / Y-Z



Geometry and feature locations

CNC POM envelope 30 X x 12 Y x 10 Z; X +/-15, Y 20 to 32, Z 6 to 16. Plan corners R2; edge break 0.4.

Cable opening 7 wide x 7 high, open underneath: upper R3.5 centred X 0, Z 9.5, with straight lower legs.

Entry flares at Y 20 and 32: 0.5 deep, radius 4 reducing to 3.5. Drill from ends; mill opening from below.

2 holes dia 3.4 through Z at X +/-10, Y 26. Counterbore dia 6.4 x 3.3 FROM TOP Z 16.

Nominal cable dia 6, axis Y at X 0, Z 9.5; 0.5 minimum clearance. Connector passage remains unverified.

Material proposal: POM, density assumed 1.41 g/cm3. CNC milling, 3 axes with re-fixturing.

Final STEP CNC check: OK, 0 warnings. Full measurements and rules in reports/cable_guide_dfm.json.

Origin: base bottom centre. Front -Y, up +Z. All locations reference assembly coordinates.

No production tolerances assigned. Confirm datums, fits, tap callouts, edge breaks and finish before release.