Walkie One 5.2 R8

Service detail and shop handoff

This revision applies the useful engineering and delivery detail of the supplied v12.3 shop package to Concept 5.2. It preserves 5.2's rounded bumper, champagne center, circular play key, terracotta PTT and sage volume controls. Actual revised geometry is supplied in STEP, native Fusion, STL and millimetre 3MF.

Start with the 27.2 mm baseline. A complete 26.2 mm candidate is also included, with its relocated microphone and thin seal requirements. Both retain the 88 x 136 mm nominal body footprint; side controls make the represented maximum width 89.164 mm.

New details are the coarser W grille, integral USB-C reaction support, six-tab cable guide and battery-tray service notch. Cleaned reference exports retain all 306 PCB solids and omit loose source surfaces. Both native Fusion archives were reopened with 407 solid bodies and the expected envelope.

These are checked prototype files. Printer compensation, complete wiring, real switch contact/force, acoustics, RF, thermal behavior and battery tolerances require a first article. The original v12.3 files and R7 delivery are unchanged.

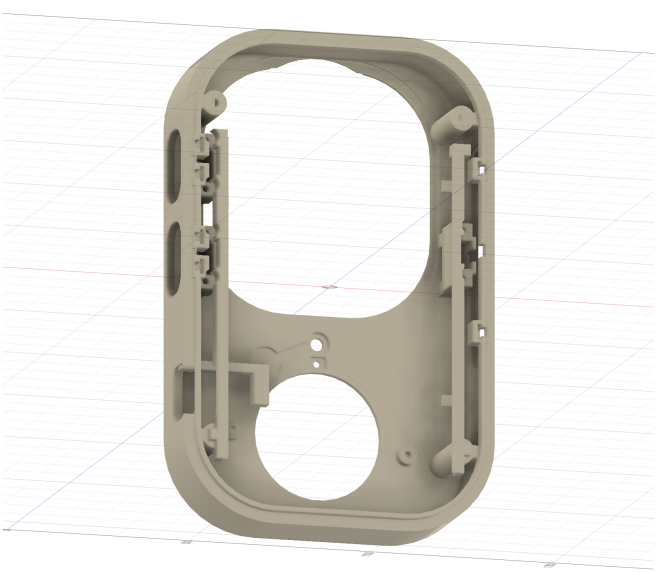
How the reference was applied

The v12.3 ZIP was treated as a design benchmark and evidence. Its logs describe its own configuration; they are not manufacturing authorization. R8 results come from fresh checks of the 5.2 files.

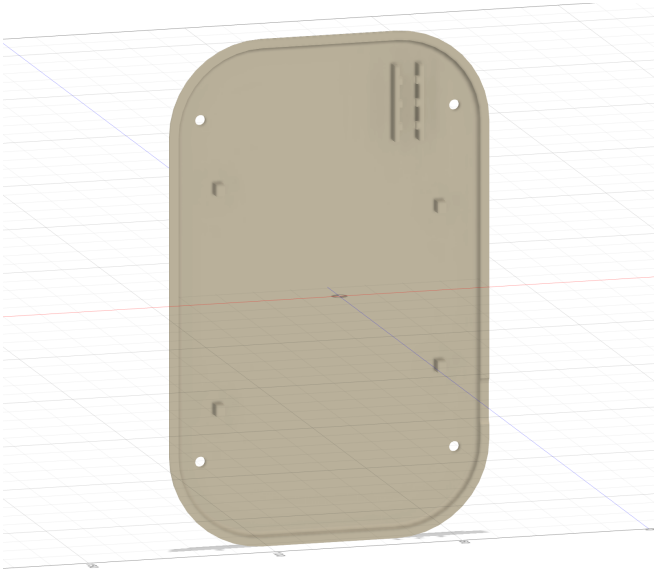
Reference detail	5.2 R8 treatment	Reason or limit
Coarse three-size W grille	319 holes, 1.6/2.0/2.2 mm; 3.2 mm pitch; 1.0 mm minimum web	Keeps the larger 5.2 grille and original sampled W artwork.
USB-C reaction bridge	New integral side-wall tie and metal-shell stop	Rebuilt around 5.2's actual PCB and receptacle.
Cable channel and six tabs	New 5.3 mm clear rear channel with six tabs	Local end-fed guide; full harness remains unmodeled.
Battery removal relief	12 mm service notch in upper tray wall	Preserves the floor and broad remaining retention lands.
Switch and acoustic retention	R7 keepers, stops, seats and seals retained	Retains adjustable interfaces specific to 5.2.
Coupons and 3MF	Four new shop coupons; 33 fabrication STL/3MF pairs per configuration	Process and material categories remain explicit.
Native Fusion and visual audit	Two reopened F3Ds; six exterior views and internal views for each	Direct editable BRep assemblies, not reconstructed Fusion timelines.
24 mm no-stack arrangement	Not transplanted	v12.3 has a different 78 x 150 mm layout. R8 preserves 5.2's package.

The v12.3 eight-piece, all-printed construction is not substituted for 5.2's multi-material construction. The 41 installed fabricated/material pieces include cast polyurethane, metal, optical PMMA and cut sheets as well as printed nylon. Combining them into two rigid shells would change appearance, compliance and assembly.

USB-C support and service access



Front tub: USB support near the side opening.



Rear cover: cable channel with six tabs.

USB-C. The supplied receptacle metal shell has its rear at X22.4773 mm. The stop face is X22.2773, giving 0.20 mm nominal clearance. A 4.2 mm thick pad connects through a 2.4 mm wide tie to the right side wall. Its bottom at Z-5.15 clears nearby PCB components by nominal 0.30 mm. The tie passes above the trial plug's plastic housing.

Fresh checks show no support-to-hardware overlap at rest. A translated shell remains clear through 0.20 mm and contacts the stop at a 0.21 mm probe. This is a geometric contact check, not permissible connector deflection or measured strength. Check stiffness, insertion force, repeated use and solder loading physically.

Cable guide. The channel runs Y38 to Y58, between X18.2 and X23.5: 5.3 mm clear width and 2.8 mm clear height below the tabs. Rails/tabs are 1.2 mm thick; tab overhang is 0.8 mm. A declared 4.8 x 1.6 mm bundle envelope clears represented parts. Feed from an open end before closure; the 3.7 mm mouth is narrower than that bundle. Do not force the tabs open or assume every harness fits.

Battery access. The 12 mm notch removes 50.4 mm3 from the upper tray wall. Its floor is Z1.7; tray geometry below Z1.699 is unchanged. Release the PET straps before removal, keep tools off the pouch and preserve broad insulation. This does not create a swelling allowance.

Grille and process coupons

Measured item	R7	R8
Hole count	473	319
Hole diameters	1.4-1.8 mm	1.6 / 2.0 / 2.2 mm
Nearest-neighbor pitch	2.6 mm	3.2 mm
Minimum geometric web	0.8 mm	1.0 mm
Total projected throat area	983.56 mm2	858.91 mm2
Opening area over the same speaker outlet	342.48 mm2	354.90 mm2
Grille fabrication mesh facets	243,494	165,236

Hole count falls 32.6%, minimum web increases 25%, and grille mesh facets fall 32.1%. Total opening area falls 12.7%, but area directly over the unchanged 36.4 mm speaker outlet rises 3.6%. Lower sealing geometry is unchanged; the slim panel retains its hidden battery-protection relief. These measures do not predict sound level or frequency response.

The original W sample classes are resampled onto the coarse lattice. Openings touching the active speaker region use at least 2.0 mm diameter. The W is subtler there because acoustic opening area is protected. Approve the appearance using the actual preview and a painted coupon.

Coupon order. C01 checks the three bore sizes, the 1.0 mm web pair and 3.4 mm status bore. C03 supplies a 3.0 mm trial pin. C02 reproduces the actual cable channel and six tabs. C04 is the full-size baseline grille for warp, cleaning, finish and mesh-seat trials. Seven selectable stops and the actual PTT host/flange coupons remain under review/control_coupons.

Use the same machine, material, orientation, extrusion width, layer height, compensation and finish for coupons and parts. Inspect first-layer hole closure, strings, thin tabs, supports and sliding contacts. Record compensation and regenerate consistently instead of enlarging arbitrary holes. No universal shrink factor is embedded.

Controls, optics and critical dimensions

These interfaces retain R7 geometry. R8 repeats their movement checks because the surrounding assembly has changed.

Feature	Nominal value	Build control
Front play key	34 mm diameter; X0, Y-38	Finish bearing surfaces; mask the guide.
Front gap / stop travel	0.12 / 0.45 mm	Confirm actual first contact, force and full return.
Front seat / stop shims	0.28 / 0.30 mm	Measure the actual PET stack.
Keeper outer ligament	1.10 mm	Keeper thickness 1.2; screw axes X +/-11, Y-38.
Keeper screw	M2x5, head height at most 1.0 mm	3.8 mm nominal engagement; 0.3 mm bottom gap.
Side free gap / nominal stop	0.20 / 0.55 mm	Matched shoes; alternatives 0.40-0.70 mm.
Status tip / aperture	3.0 / 3.4 mm diameter	Optical guide needs separate qualification.
LED-to-guide gap	0.10 mm	Machine or gauge the seat; layer height is not fit accuracy.
Optical foam	1.0 mm free; 0.70 mm installed	Eccentric OD8 / ID5.4; minimum ligament 0.9 mm.

The front key clears through 0.45 mm; the 0.46 mm probe contacts its stop ring. Side keys and grips clear through 0.55 mm; 0.56 mm probes contact the shoes. These are nominal rigid movement checks. No shoe is a manufacturer-approved switch overtravel setting. Establish electrical contact and release with the actual switch lot, including end presses on the PTT.

For the optical ring, OD center is X14.4, Y-19 and ID center is X14, Y-19. The 0.4 mm eccentricity gives adjacent microphone clearance. Do not substitute a concentric washer. PMMA transport surfaces need optical finishing; clear resin is a separate experiment. Check all RGB states, leakage and viewing angles.

Fabrication work order

File group per configuration	Count	Use
Rigid nylon	23 STL + 23 3MF	Structural parts, holders, keepers and stop shoes.
Cast masters	8 STL + 8 3MF	Final-size bumper, collars and grips; develop molds separately.
Machined fit prototype	1 STL + 1 3MF	Aluminum play key; printing is for fit.
Optical reference	1 STL + 1 3MF	PMMA guide; printing needs optical trials.
Cut sheets	8 DXF + schedule	Foam, porous mesh, PSA and PET shims.
Hardware references	20 groups	Purchase and reconcile; never print as components.

Each 3MF contains one part, millimetre units and an illustrative colour. It matches the checked bed-oriented STL geometry. No printer settings, supports or approved colour specification are embedded. Installed-position meshes are for viewing; select the process folder for fabrication.

The inherited first functional-build route is SLS/MJF PA12 with finished bearing surfaces. FDM is a fit/process trial: inspect the USB tie, cable tabs and recessed features in the slicer. A 0.4 mm nozzle and 0.16-0.20 mm layers are starting trials, not acceptance criteria. Keep support scars off moving, optical and cosmetic surfaces.

Use the BOM and cut schedule together. Foam STEP thicknesses describe installed compression, not free stock. Preserve porous mesh permeability and bond only its perimeter. Do not block microphone or speaker lumens. The soft-part files are final-size masters, not compensated molds; TPU does not automatically reproduce cast-material behavior.

Four closure screws remain M2.5x10 DIN965Z/PZ1 with the small specified head, for example Accu SPK-M2.5-10-A2. Check fit in the 5.0 mm countersinks; larger-head ISO10642 is not interchangeable. Qualify tapping, torque, stripping and service reuse in the selected material. Straps, adhesives and some compliant pads remain listed but unmodeled consumables.

Assembly and service sequence

1 - Incoming parts and coupons. Reconcile the actual PCB, battery protection, speaker ears, switches, LED and microphone to their references. Measure coupons and choose compensation, finish and stops before the complete build.

2 - Finish and inspect. Clean openings. Inspect the guarded seam, USB tie root, cable tabs, keeper ligaments, pilots and battery notch. Mask bearing surfaces and gasket lands.

3 - Front cassette. Assemble the switch cassette outside the housing with measured seat shims, switch, keepers and low-head screws. Check first contact and return with the selected stop stack.

4 - Controls. Load the play and side keys through the intended internal access. Fit collars/grips, side switches, rear keepers and matched stop shoes. Secure the front cassette while rear screw access is clear. Repeat electrical and PTT end-press checks.

5 - Audio and optics. Install speaker cradle/gasket, porous mesh and grille. Fit the microphone support/seal, opaque optical carrier, eccentric foam and PMMA guide. Preserve controlled gaps and keep adhesive outside lumens and guides.

6 - PCB and USB. Fit the PCB on its intended edge supports with insulation on verified bare-board lands. Confirm USB alignment and clearance to the new stop at rest. Trial-fit the intended cable through the full recess.

7 - Battery. Fit the tray, broad isolation pad and battery. Leave the protection and leads clear, remove strain and apply both PET straps without preloading the pouch. The notch is access, not a cell clamp.

8 - Rear and wiring. Fit the antenna seat/bond film. Feed suitable leads through the rear guide. Leave a service loop and keep wires away from screws, seam, controls and USB stop. Confirm actual bend radii and antenna separation.

9 - Closure. Bring the rear straight on and stop if it resists. Fit four closure screws progressively. The digital closure check samples rigid parts only; inspect actual soft materials and wires for pinching.

10 - Functional check and service. Verify controls, USB seating, optics, audio and electronics before final finishing. Disconnect power and release retention before lifting components. Do not use the USB support, optical carrier or cable tabs as pry points.

Retention and physical acceptance

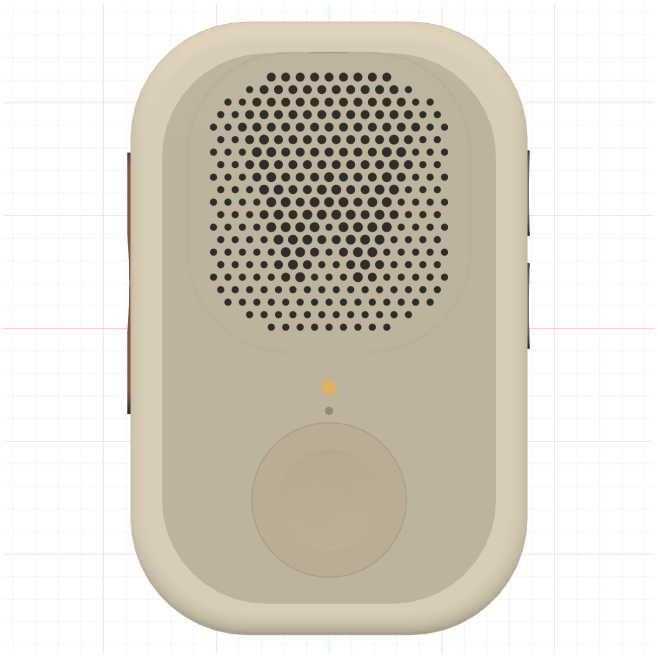
v12.3 reports six-direction location for its own components. R8 does not copy that claim onto a different design. This register identifies the remaining build confirmations.

Component	Restraint in 5.2	Required confirmation
PCB	Existing edge supports/pads; new USB shell support	Bare-board contact, flex, connector height and extraction loads.
Battery	Tray and PET straps; new access notch	Lead/protection fit, insulation, supplier allowance, no point loads.
Speaker	Cradle and compressed gasket	Retention, seal, ears and buzz.
Microphone	Cradle and acoustic gasket/PSA	Axis, compression and insulated support.
LED and guide	Carrier, eccentric foam and guide seat	Stand-off, capture, mixing and leakage.
LTE flex	Rear seat and bond film	Adhesion, coax strain relief and RF clearance.
Switches	Screw keepers, cassette and selectable stops	Contact, force, release, end press and cycling.
Wiring	New local six-tab guide	Full route, access, slack, chafing and rear service loop.

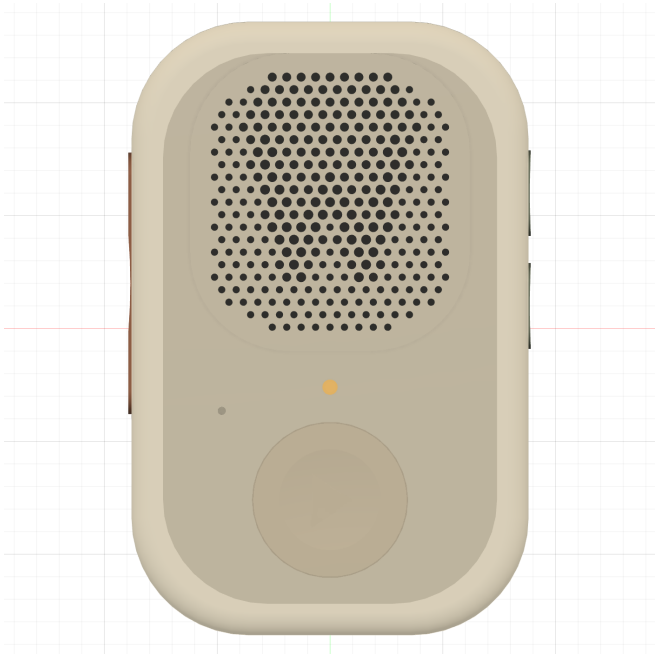
Digital checks establish nominal geometry, selected motion clearances and assembly-envelope tests. They do not establish shock survival, compliant retention force, fatigue, adhesive strength or a complete tolerance stack.

Record the first article's printed dimensions and finish buildup; bore/web quality; pilot and torque results; electrical contact and return across repeated presses; USB seating and cycling; channel loading; battery fit and supplier allowance; speaker output/buzz; microphone sealing; optical output; RF and thermal behavior. Record measurements and test conditions rather than labeling the entire device simply PASS.

The 26.2 mm candidate



27.2 mm baseline and centered microphone port.



26.2 mm candidate and relocated microphone port.

Both configurations receive the R8 grille, cable guide, USB support and service notch. Rear, PCB, battery and antenna remain fixed. In the slim version the front package moves 1 mm rearward; the microphone moves 24 mm left while retaining its height above the battery.

Slim interface	Nominal result	Limit
Depth	26.2 mm	No additional R8 thinning beyond the existing candidate.
Mic-to-pouch gap	0.30 mm	Tight CAD clearance, not a swelling allowance.
Grille-to-protection gap	0.50 mm	Hidden relief retained.
Broad front wall	2.0 mm	No blanket thinning.
Mic-board / acoustic roof	1.15 / 0.80 mm	Support these local features during finishing.
Thin mic seal	0.43 mm foam installed + 0.14 mm PSA	Candidate free foam 0.55 +/-0.025 mm; qualify stock and tolerances.

Use a complete configuration. Baseline grille, front tub and microphone gasket are not interchangeable with slim parts. If the thin seal or relocated harness cannot be qualified, use the complete 27.2 mm baseline.

CAD integrity and delivery evidence

Each configuration contains 41 fabricated/material solids and 20 hardware groups with 366 solids: 407 total. All 33 fabrication meshes are closed and consistently wound. Exact static tests report only 10 documented full screw shanks in undersized pilots and no unexplained overlaps. Heads, driver gauges and key movement are checked separately.

The PCB input contained 306 solids plus 2,092 free faces. Fusion initially represented the loose geometry as 1,360 additional surface bodies. R8 exports complete original solids, retaining their placements and dimensions. Unmodified source STEP remains under inputs. Mixed-shape volume including free faces is not used as physical component volume.

Both F3Ds were reopened and checked for 407 solids, per-component volume agreement and precise bounds of 89.16369 x 136 x 27.2 or 26.2 mm. Six exterior views and internal views are supplied for each. Fusion's ordinary display bounding boxes include a tolerance margin; reported dimensions use precise BRep bounds.

Fusion-exported STEP is checked against the original per-part STEP with 0.002 mm bound tolerance and volume tolerance of 0.03 mm3 or 0.002%, whichever is larger. Small kernel-translation volume differences are recorded in review/combined_exports.json. The source-generated STEP in build remains the dimensional master.

Native-editing limit. F3Ds contain named, directly editable solids and manufacturing descriptions. They do not recreate v12.3's fully parametric Fusion timeline. Driving parameters and construction are in config.json and source/build.py, controls.py, front.py, slim.py and shop_details.py. Rebuild there for repeatable dimensional changes, then regenerate checks and native archives.

Evidence. Each build/verification folder contains geometry_validation.json, independent_motion_and_access.json, service_details.json and 3mf_validation.json. Native reopen reports and Fusion-exported CASE STEP are in fusion. Coupons and control samples have their own manifests. SHA256SUMS identifies the delivered files.

Rebuild. Install source/requirements.txt in a compatible Python environment. Run source/build.py with --configuration main or slim, then validate.py, check_service_details.py and shop_exports.py for the same configuration. Run check_motion_and_access.py with the build directory. Run shop_coupons.py and control_coupons.py for coupons. assemble_fusion.py runs inside Autodesk Fusion and exports both configurations into new documents.

For benchmark provenance, see reference_v12_3/README_v12_3.md, CAD_AUDIT_SUMMARY_v12_3.md, USB_C_SUPPORT_NOTE_v12_3.md and SOURCE.json. Autodesk's BRep geometry documentation explains bodies, topology and surface geometry. Loose-face findings and R8 results above were measured from these local files.