

Concept 27 / R2

Chalk and powder · Orange press-to-talk · 9 September 2026



Functional prototype handoff

Elian's SR2 component-retention functions have been adapted to the approved Concept 27 no-stack body. The chalk finish, soft grey rim, pewter controls, centered microphone and orange ribbed talk button remain.

Includes corrected CAD, a placed electronics assembly, individual parts and stock definitions, assembly instructions and measured checks. Images are rendered from the actual CAD meshes.

Prototype review release. Physical materials, switch forces / overtravel, harness and optical / acoustic / RF performance remain to be qualified.

Dimensions and retained design

Millimetres. STEP is authoritative. These views are not full-tolerance manufacturing drawings.

Rigid body W x H x D	Overall with rim / controls
78 x 150 x 24 mm	83.35 x 152.70 x 24.739 mm



X right, Y up, front Z=0, rear Z=-24. The original 121 grille holes retain their centers and diameters: 32 x 1.4 mm, 48 x 1.8 mm and 41 x 2.2 mm.

The 5.2 SR2 exterior and stacked architecture are not used. The actual PCB and pouch remain separated in plan by 1.32 mm. Preserve the battery protection-module clearance and all soft-contact zones.

The external status lens, soft rim, orange grip and pewter caps retain their R1 BReps. The three side drive pads change only internally to meet the real switch plungers.

Front component retention

Actual front shell interior. Removable keepers and soft pieces are separate parts in the BOM.



Function	R2 implementation
Speaker	Mounting-ear screw keepers + preload pads and front gasket; avoids a rigid bridge over the pouch.
Microphone	Centered actual acoustic port, corner seats, rear keeper, annular seal and porous membrane.
LED	Horizontal uncut LED/legs, cradle and keeper with saddle pads; internal optical turn to unchanged lens.
Controls / PCB	Actual side plungers aligned to hidden drives; front clamp completed with flush screws. Four bare-board support zones.

Install front keepers and clamp before PCB / battery placement. Source R1's main clamp pilots were accessible with the PCB removed; the separate blind cavity needed completion.

Rear support and service access

Actual rear shell interior. The complete reference STEP shows the placed hardware.



Function	R2 implementation
Battery	Broad rear pads and compliant XY liners, with a finger-removal region and protection-module clearance.
PCB	Four paired rear foam pads, supported by integral posts, opposite the bare-FR4 front seats.
Antenna	Nonmetal perimeter frame, PET seat and four nylon M2 screws. Two upper driver reliefs; fit upper liners after screws.
USB / closure	Reaction bridge clears actual connector pins. Recessed M2.5x12 closure screws fit beneath the removable rim.

The rigid cover insertion is checked at 0.5 mm intervals over the last 12 mm. Fit the flexible rim after closure. Real foam compression and wire routing are separate physical checks.

Materials and fasteners

Separate fabrication operations. Material names are prototype targets, not approved purchasing specifications.

Part class	Count	Manufacturing intent
Polymer geometry	16	Rigid/clear prototype parts plus TPU rim and orange grip; 16 geometry-only 3MFs.
Pewter faces	3	Brushed / anodized 6061 targets; printed substitutes only for fit.
Compliant stock	29	Die-cut foam / silicone; use free-state CAD where supplied.
Sheet pieces	2	PET antenna seat and rated porous acoustic membrane.
Adhesive references	6	Select compatible stock; installed thickness is an allowance.

Qty	Nominal fastener family	Use / material
4	M2.5-0.45 x 12 mm · ISO4762	steel
2	M2-0.4 x 8 mm · ISO7046	steel
6	M2-0.4 x 5 mm · ISO7046	steel
2	M2-0.4 x 4 mm · ISO7046	steel
4	M2-0.4 x 3 mm · ISO1580	nylon

18 modeled screws contain minor-diameter cores; helical threads are omitted. Separate full-major-diameter envelopes pass the clearance check. Verify actual driver, pilot preparation, engagement and torque. Use `Fastener_Schedule.csv` for every coordinate and head reference.

`Parts_Schedule_BOM.csv` contains all 56 named parts. `Soft_Stock_Schedule.csv` separates free and compressed installed definitions. No foam stiffness, adhesive durability or clamp force is established by these volumes.

Build and service sequence

Follow the order below; inspect physical fit at each stage.

1. Verify parts and processes

Use the per-part BOM and STEP in millimetres. Select material samples, cut soft stock from its free-state definition where supplied, and inspect pilots / slots. Do not print the complete assembly as one body.

2. Prepare front controls

Bond the pewter faces to rigid carriers and orange grip to the PTT carrier. Preserve actuation clearances. Seat the lens and trial the original press fit.

3. Populate front subassembly

Fit front switch and clamp before the PCB. Fit side switches in the retained cages. Install speaker gasket, ear keepers, microphone seal / seats / keeper, and horizontal LED / light coupler. Keep screws accessible before the board and battery cover them.

4. Prepare rear subassembly

Attach PET seat film and antenna, then its nonmetal service frame with four nylon M2x3 screws. Use the upper screw access reliefs before installing the upper battery liners. Fit rear pads and remaining liners.

5. Place PCB and battery

Seat the board only on the paired bare-FR4 support zones. Install the pouch in the separate upper tray; left split pads must clear its protection module. Route actual leads in the channel under capture tabs, clear of seams and moving controls.

6. Close and test

Bring the rear subassembly straight toward the front. Installed soft-pad shapes are geometric targets; compress real stock gradually and verify loads. Fit four M2.5x12 screws and qualify torque. Fit the flexible rim last. Check actual USB cable and every control.

7. Service

Remove rim before closure screws. Lift rear cover carefully for coax / leads. Remove PCB and battery for front keeper / clamp access. Remove upper battery liners before the upper antenna-frame screws. Replace damaged stock or adhesive.

Measured checks and open work

These are nominal CAD / export checks, not a physical qualification certificate.

Check	Result / scope
Exported geometry	56 valid part STEP solids and 56 watertight, consistently wound STLs. CASE 74 solids; placed reference 430.
Installed fit	No unintended part-to-part overlaps above 0.00001 mm3. Original lens press fit remains 0.592018 mm3.
Control motion	All four actual actuators reached; sampled key sweeps clear. Rest gaps about 0.15 mm; front sweep 0.70 mm, side 0.65 mm.
Retention	All ten OEM groups encounter modeled support in each of six translation directions within the tested 1.2 mm range. This is not a force or allowable-play test.
Insertion / access	Cover and USB housing gauges clear; axial driver approach clear in documented assembly stages. Straight cable channel below capture tabs is retained.
Appearance	121 grille cylinders match R1; original cosmetic-part bounds and volumes retained. Actual CAD renders and flat front normals used.

Fit samples

Qualify TPU rim strain, orange grip studs, lens press-fit, metal carrier bonds and process tolerances on coupons.

Control bench trial

Measure rest clearance, actuation, return and hard-stop tolerances with actual switches. Datasheet pretravel is not a permitted maximum overtravel.

Soft-stock selection

Select foam/silicone grades, free thickness, compression force and attachment. Check PCB edge contact and broad battery load without pouch point pressure.

Functional assembly

Route actual harness/coax and verify USB cable model. Qualify microphone seal/membrane, horizontal LED light transfer and antenna performance.

Prototype validation

Inspect insertion and service sequence on real parts; test repeated operation, thermal behaviour and durability before production release.

File authority and source trail

Use the current R2 package for engineering; earlier R1 downloads remain available as archives.

Location	Purpose
cad / CASE.step	Manufactured parts and nominal screws, assembled in millimetres.
cad / REFERENCE_ASSEMBLY.step	CASE plus 10 exact supplied OEM groups; hardware remains separate, not fused.
cad/parts · meshes · three_mf	Individual installed parts and process-specific geometry containers.
cad/free_state_pads	Uncompressed soft-stock references where explicitly modeled.
source	Editable Adam-derived BRep builder, local measured parameters and unchanged original Adam checkpoint.
inputs	Checksum-locked R1 STEP, original hardware and unchanged Elian SR2 ZIP.
documents · validation	Assembly, BOMs, mapping, open items, source integrity and nominal audit evidence.
renders · preview	Nine actual CAD views and a lightweight finish viewer; illustrative explosion, electronics omitted.

Source fidelity

The original Elian ZIP has 156 entries and passes CRC. STEP/STL inventory entries match; four Fusion presentation records have stale listed sizes/hashes. Actual bytes are preserved. This discrepancy is not evidence of a mechanical defect.

The final model uses a real Adam MCP builder checkpoint followed by measured local engineering corrections. Local parameters, final fit edits and audits are identified explicitly. No native Fusion timeline, electrical circuit validation or production-ready tooling is claimed.

Rebuild with Python 3.12, build123d 0.11 and bd-warehouse 0.3.0. Run source/build_Concept_27_R2.py, then source/audit_Concept_27_R2.py by stage. Source imports are checksum-locked. SHA256SUMS.txt and File_Manifest.csv identify the delivered bytes.