

A familiar build. A new face.

Edited directly in Autodesk Fusion from the completed final Concept 27 R2, with local casting-release tapers. The approved Chalk Ember direction adds a separate graphite grille, round light and brushed circular play button, with a smooth orange talk grip.



Kept from 27	Changed for 28
78 x 150 x 24 mm rigid body; existing internals	Mesh / bezel / scrim assembly; circular light and play face
Soft rim, microphone, volume controls and hardware positions	Smooth PTT surface; revised front seats and upper play carrier

Build status: supplier-review prototype. Fusion source, STEP/STL, cut outlines, nominal casting masters and verification are supplied. Physical first-article qualification remains open.

Dimensions and interfaces

Feature	Nominal dimensions / datum
Rigid body / overall	78 x 150 x 24 / 83.35 x 152.7 x 24.7393 mm
Coordinate system	X width; Y up; front face Z=0; rear Z=-24
Control centers	Speaker (0,42); mic (0,-14); play (0,-47); visible light (0,2)
Grille / pocket	Bezel 48 x 50 R11.5; pocket 48.4 x 50.4 R11.7, depth 0.30
Visible mesh / cut blank	Opening 44 x 46 R9.5; blank 45 x 47 R10
Acoustic path	35.0 mm shell opening within inherited gasket ID 38.0 mm
Round controls	Play cap dia.27.0; carrier dia.27.3; shell bore dia.27.9
Light	Optic dia.4.7; bore dia.4.9; lowered 3 mm; original collector retained
PTT	Original installed envelope and concealed engagement; R0.6 exposed edge

The front-shell interior below Z=-2.21 mm has zero difference in Fusion. The new 0.30 mm grille rebate preserves the final R2 mounting features; speaker pilots are restored at X +/-9.1, Y 18 and 66 mm.

Clearance values are nominal CAD values before resin shrink and finishing. Agree dimensional tolerances with RPS before tooling. The light collector retains the pre-existing nominal interference and needs a measured fit trial.

Grille stack and metal controls

Part	Installed Z / build instruction
Front skin rebate	Floor -0.30 mm. 1.90 mm skin remains outside opening. About 0.80 mm remains above lower speaker pilot ends.
Scrim film / scrim	0.05 mm perimeter film (-0.30 to -0.25); 0.10 mm black acoustic scrim (-0.25 to -0.15).
Mesh	0.36 mm envelope (-0.10 to +0.26). Nominal 0.18 mm wire / 1.0 mm pitch; about 67% projected open area before finish.
Mesh edge bond	0.09 mm allowance (+0.26 to +0.35), captured under bezel lip; qualify bond method.
Bezel / perimeter bond	304 bezel -0.10 to +0.55; 0.20 mm shell-to-bezel film (-0.30 to -0.10).
Play cap	304 stainless, dia.27.0 x 1.10 mm; fine circular brush; 0.04 mm laser-outline play mark. 0.10 mm carrier bond film.

Mesh procurement: the CAD uses 92 crossing rods to depict one purchased woven panel. This is an envelope approximation, not literal weave tooling. DXF defines the blank. Supplier confirms available weave, formed thickness, cut-edge capture, graphite finish and acoustic loss.

The larger rectangular grille is cosmetic around the unchanged speaker. It does not enlarge the speaker, move it, or claim improved audio. Prototype the entire mesh/scrim/bond stack and test response, rattle and adhesion.

Materials and colour targets

Component	Material / finish	Colour reference
Shells	Tough ABS-like cast urethane; fine matte	Pantone 9081 C* / E3E0D6
Rim	Elastomeric urethane; matte	Warm Gray 9 C* / 7D786E
PTT	Elastomeric urethane; smooth; Shore A 80-85 evaluation	173 C* / CC4118
Play / bezel	304 stainless; brushed play face / satin bezel	Natural metal sample
Volume faces	6061 aluminium; fine brush / clear protection	Natural silver sample
Speaker mesh	Stainless woven stock; graphite finish	Supplier coating sample
Optics / internals	PMMA circular lens; inherited coupler, PA12 supports, pads and OEM hardware	See complete BOM

*Inherited **proposed** Pantone references from Concept 27. Shell uses the Pastels & Neons Coated library; rim/PTT use Solid Coated. These are not verified exact matches in urethane. Approve physical chips and finished coupons before production. Natural metallic finishes are specified by material and sample, not a simulated Pantone swatch.

RPS must select resin grades, shrink allowance, cure and tooling. Do not substitute injection-molded PC-ABS for the specified casting route without a separate review. The metal grille and cap also require acoustic, RF, durability and adhesive evaluation.

Casting and assembly

1 / Make and inspect patterns

Four nominal casting masters: front shell, rear shell, rim and smooth PTT. No mold halves, gates, vents, shrink scaling or finish stock are modeled. RPS approves these choices.

2 / Preserve the internal build

Use the final R2 PCB pads, battery locators, split LTE frames, hidden rim pads, lead routes and countersunk fasteners. The UC1 one-degree approach is adapted to the revised bosses. Review the inherited thin walls and screw durability.

3 / Assemble the grille

Bond scrim to its perimeter land; bond cut mesh under bezel lip; fully contain cut wire edges. Bond the bezel to its pocket. Keep adhesive out of the acoustic opening.

4 / Assemble controls and optics

Fit lowered lens and original coupler; check output uniformity. Bond metal play cap to its round carrier; fit unchanged clamp and check return. Fit smooth PTT and inherited volume interfaces.

5 / Fit and test hardware

Use actual electronics and retained stock parts. Fit the hidden grip pads to the front shell only, then attach the rim after closure. Test switches, light, microphone, speaker, USB, RF and drop behavior.

Obsolete for 28: the 121-hole grille drill schedule and blank drilled front master from 27. The 28 front has a single acoustic opening with a separate purchased grille assembly.

RPS confirms silicone-tool urethane casting and rigid/rubber-like materials on its service page. This package requests supplier review; it does not represent RPS acceptance.
rapid-products.com/service/urethane-castings

Verification and first article

Check	Evidence / limit
Geometry preservation	436 unchanged assembly bodies retain native faces, volume, world bounds and placement versus final R2. The front interior below Z=-2.21 is preserved versus the casting-adapted baseline.
Export checks	91 individual STEP files (73 custom/material parts plus 18 fasteners), valid solids. Case: 182 solids. Full reference: 540 solids, including 356 OEM solids and 2 lead-route references.
Envelope / controls	Rigid body remains 78 x 150 x 24 mm. Four controls are sampled at 0.05 mm increments: front to 0.70 mm and sides to 0.65 mm. Actual force and permissible overtravel remain unqualified.
Interference	No new detected changed-part/OEM hardware overlap. The 0.592 mm3 lens-flange overlap is unchanged from 27 and remains an open fit qualification.
Independent check limit	OpenCascade coincident-shell subtraction was unstable on inherited trimmed toroidal surfaces. Native Fusion differences establish preservation; independent STEP checks cover validity and targeted interfaces.

Before a run: RPS and Elian must agree resin/tooling, thin-wall release, critical tolerances, adhesion, mesh stock, lens fit, screw torque and first-article acceptance. Jacob approves physical colour and finish samples. Test actual acoustics, optics, RF, harness, USB, control return and durability.

Open the native Fusion file to edit. Use the full STEP for fit review and individual files/DXFs with the BOM for fabrication planning. Read Open_Items.csv and First_Article_Inspection.csv before ordering. No sealing, drop or production-quality certification is claimed.

Final trace carried into 28

Functional area	Final design incorporated
PCB / battery	Four paired PCB supports on bare FR4; extended battery rails/liners and a central lead-service gate.
Speaker / optics	38 mm-ID split gasket stack; original speaker and collector retained. New front scrim, mesh and lowered round light need physical acoustic/optical trials.
Antenna / rim	Separate upper/lower LTE service frames, four soft edge stops, and four hidden front-shell rim grip pads.
Hardware / service	Countersunk closure and internal fasteners, actual side-switch plungers, full-length lead-route references and reviewed USB reaction support.

Fresh verification: read Trace_Reconciliation.md and the audit JSON files for geometry results on this exact 28 export. Prior PASS labels are not release approval. All source inputs are checksum listed.

USB mating hold: the supplied conservative plug gauge clears the case approach, but has approximately 2.484 mm3 overlap with the actual receiver reference at assumed full seating. Obtain the real mating plug and confirmed insertion datum; qualify on actual hardware. The PCB was not cut or altered to conceal this hold.

Physical qualification: resin shrink/release, threaded pilot durability, soft-pad compression forces, switch return/overtravel, mesh adhesion and rattle, optics, RF, lead routing, sealing and drop endurance remain open. This is a supplier-review prototype package.