

Simplified assembly

Version 28.6 / September 19 native Fusion snapshot



A simpler enclosure direction, preserved as supplied and packaged for the next prototype review. The owner has accepted this direction for the upcoming website section.

Status: documented prototype, with physical fit and qualification still open. This release adds traceable exports and handoff documents; it does not repair the native geometry. Golden remains 28.1 / R3.4.

In this package: original Fusion and STL files, 13 native-position STEP/STL bodies, reference assemblies, actual-CAD views, parts/material schedule, fit register and physical test record.

Source, dimensions and authority

Item	Verified description
Public version	28.6 identifies this dated supplied snapshot; original 28_1_R3_6 filename is retained.
Bare shell	80 x 150 x 24 mm; prior 28.5 shell was 78 x 150 x 24 mm.
Rim envelope	84.2 x 154.2 x 28 mm; projecting speaker frame reaches about 28.95 mm total assembly depth.
Main PCB	Flat 60 x 80 x 1.33 mm laminate; does not use the 28.5 compound tilt.
Battery envelope	62 x 38.5 x 8.5 mm; not permission to compress a battery.
Print-body inventory	13 solid bodies across 11 originally supplied STL files.
Native source	Fusion 2705.1.15; millimetres; 209 timeline entries.

Geometry authority. Original F3D is the editable source. The individual STEP/STL files were exported from native assembly-position bodies. The full reference STEP is for inspection and is not a slicing file. Its 367 visible solids exclude the 48 hidden hardware/wiring solids retained in the original F3D.

Coordinate reconciliation. Original Plus, Minus, Talk and both optical pieces sit about +5 mm in Y relative to native Fusion. The new derivatives correct placement only; no source shape was changed. Original files remain available unchanged.

File integrity. SHA256SUMS.txt identifies each packaged file. The 13-body manifest maps each derivative to its original occurrence and body. Import in millimetres at 100% and check shell dimensions.

Parts and proposed materials

ID	Body (CAD qty 1)	XYZ bounds, mm	Material intent
01	Play button	29.00 x 29.20 x 4.65	Rigid prototype
02	Volume plus	5.65 x 22.80 x 11.00	Rigid prototype
03	Volume minus	5.65 x 22.80 x 11.00	Rigid prototype
04	Talk grip	5.80 x 58.00 x 12.00	Flexible / TBD
05	Optical body A	3.90 x 4.20 x 5.55	Clear / TBD
06	Optical body B	5.40 x 5.40 x 3.92	Clear / TBD
07	Rear shell	80.00 x 150.00 x 14.00	Rigid prototype
08	Front shell Body1	80.00 x 150.00 x 14.00	Rigid prototype
09	Front frame Body2	48.00 x 50.00 x 1.00	Rigid prototype
10	Play-switch base	42.00 x 24.00 x 4.00	Rigid prototype
11	LED housing	19.00 x 14.00 x 10.60	Rigid prototype
12	Speaker frame	48.00 x 50.00 x 2.00	Rigid prototype
13	Rim	84.20 x 154.20 x 28.00	Flexible / TBD

Bounding-box extents are not tolerance drawings. Process, shrink allowance, orientation, layer settings and final finish remain supplier/engineering decisions. CAD quantity is not a released order quantity.

Front shell Body1/Body2: overlapping geometry must be classified as integral or separate before ordering. **Optics:** two separate solids are retained; opaque prints check fit only. Flexible rim and talk grip require specified hardness and fit allowance.

How the assembly is arranged



Actual native geometry, separated for identification. Exploded distances are illustrative and do not prove an assembly path, fastening sequence or tool access. No hidden wiring/hardware or non-solid PCB sheets are shown.

Major stack: front shell and frame, play cap and switch base, speaker/film, LED/optics, nominal switches, flat main PCB, battery envelope, rear shell and rim. Retention and installed stock must be reconciled with the real parts.

Review the rear and interior images alongside the individual STEP bodies. Source names, bounding dimensions and materials are provided in Parts_and_Materials.csv.

Interior and connected fit



Rear shell and rim removed for inspection. Reference colours are illustrative. The visible main PCB group is derived from native solid bodies; source non-solid reference sheets are omitted from the viewer.

Connected fit is open. The source retains 15 hidden hardware solids and 33 hidden wire solids. Including these adds 29 printed/reference intersections. These historical references must be updated or explicitly retired; their count is not a BOM.

Do not inherit the 28.5 harness, screw schedule or clearance results. Obtain the current schematic, connector pinout and received component drawings before electrical assembly. CAD colour is not wire polarity.

Measured fit issues

Interface	Volume mm3	Required review
Rear shell / battery	40.761	Reconcile supports and retention against the real protected battery envelope. No pouch compression.
Rear shell / PCB	36.336	Resolve board/support contact; board must seat without bowing.
Front shell / PCB	1.290	Review local clearance and connected board fit.
Play cap / front shell	11.536	Review opening, retention and full travel with the actual switch.
Play base / nominal switch	10.800	Confirm switch dimensions and seat geometry.
Front shell Body1 / Body2	16.997	Decide integral union or separate frame; do not order both as independent production pieces yet.
Front shell / acoustic film	99.463	Set film trim, thickness and installed position.

Values are exact-solid Boolean intersection volumes reported to three decimals. They are not penetration depths, cutting offsets or tolerance prescriptions. No geometry correction is included.

The battery/PCB seating and play interfaces should be resolved before a fully connected physical closure. Preserve battery wrapping and natural lead bends; never use closure force to compensate for overlap.

Rim, references and model health

Item	Finding / next step
Rim interfaces	Rear overlap 1549.969 mm3; front overlap 2684.020 mm3. Confirm intended flexible interference and compression.
Side-control residuals	Plus/rear and minus/rear about 0.0093 mm3 each; talk/rear 0.0733 mm3. Interpret as local tolerance/clearance issues, not the large raw-STL overlaps.
Optics	No printed/optical interference above 0.001 mm3 in native positions. Optical performance and finish are unqualified.
Timeline warnings	Sketch3 (77), Sketch9 (95), Sketch23 (181), Extrude23 (182), Sketch28 (184). Repair missing references and verify regeneration.
Reference content	1775 bodies: 415 solids and 1360 non-solid PCB reference sheets. Sheet-volume errors are not manufacturing-part failures.

Checks performed: 78 print/print pairs and print-body checks against 354 visible reference solids; a second pass included all 402 reference solids. Bounding boxes screened pairs. No Boolean errors were recorded.

Scope limits: static interference only. Not a full reference/reference check; excludes non-solid sheets. Motion, strength, tool access, printer tolerances and physical performance are unqualified.

First-article assembly plan

1 / Set the manufacturing intent

Resolve shell/frame integration and rim compression. Confirm rigid, flexible and optical processes before a final shop order.

2 / Inspect and dry-fit

Record the print process. Fit board and battery dummy without load; resolve the known seating contacts. Confirm permanent features before removing supports.

3 / Fit moving and acoustic parts

Check play seat and full travel, side controls, talk return, speaker/film, microphone/seal and the two optics.

4 / Reconcile hardware and connections

Verify actual fastener dimensions, engagement and access. Confirm component part numbers, pin maps, terminations, insulation and service slack.

5 / Close without force

Connect intended parts together. Shell must seat by hand; inspect battery, board, wires and USB before fastening. Evaluate rim using specified material.

6 / Record and review

Run the physical log and disposition every open fit item. Any geometry change needs a new dated export package.

Physical qualification record

All physical results are **NOT RUN**. The CSV provides fields for measured results, date and tester. These are proposed checks, not evidence of a completed qualification.

ID	Check	Record / acceptance
T01	Received process	Record printer, material, batch, orientation, layer settings and finishing.
T02	Dimensions and surfaces	Measure shell, pilots, controls and optics; record deviations against CAD.
T03	Battery and PCB seating	Confirm zero forced battery compression, no board bow and no pinched conductors.
T04	Connected closure	Install intended harnesses and factory leads; case seats by hand before fastening.
T05	Control travel	Check centre, edges, both talk ends and simultaneous controls for return and binding.
T06	USB access	Actual plug seats fully with shell and rim installed; record cable identity.
T07	Service endurance	Proposed 10 open/close cycles; record wear, cracks and retention.
T08	Control endurance	Proposed 1000 actuations per control; record binding and unintended activation.
T09	Function	Record electrical, charging, acoustic, indicator and RF results using the existing approved electrical procedure.
T10	Release review	Reconcile fit register and obtain engineering acceptance before production/Golden promotion.

Prior project targets of 10 service cycles and 1000 actuations per control are carried forward as proposed first-article tests. They do not establish production lifetime or certification.

Package map and next revision

Folder / record	Use
Original_Source/	Untouched supplied F3D and 11 STL files.
CAD/	Full-reference STEP, 13-body review STEP, individual STEP/STL and export validation.
Documents/	Start here, assembly/process plan, hardware/wiring notes, parts/materials, source inventory, fit register and physical test log.
Images/	Actual CAD exterior, rear, interior and exploded renders.
Evidence/	Native inventory, static Boolean results and diagnostic overlap image.
SHA256SUMS.txt	Verify file identity; archive package contains the complete set.

Export checks. All 13 individual STEP files import as valid single solids; all 13 STL meshes are watertight. Mesh bounds agree with native bounds within 0.03 mm. Fusion default-volume and independent STEP integrals can differ numerically; detailed values are recorded rather than treated as exact shape equivalence.

Next revision. Resolve the open fits and source warnings, document actual parts/materials/harnesses, regenerate the matched exports and complete first-article testing. Promotion to the Golden build remains a separate engineering decision.

Evidence sources: exact received 19-09-2026 archive; native Fusion inventory and temporary-copy Booleans; regenerated individual STEP/STL import checks. No original geometry was edited for this publication.