App description

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0. What powers PrintHaus

0.1 Use cases

PrintHaus creates individually designed buildings for model making and 3D printing, as prepared print parts or an assembled 3D scene.

For model railway enthusiasts, stations, workshops and rows of houses can be created to suit a layout: for example, H0 at 1:87, TT at 1:120, N at 1:160 or Z at 1:220. Larger gauges are also available.

In complete buildings for tabletop games and dioramas, the roof and each floor are individually removable. Every floor is accessible from above and can be used for play. Suitable scales include 1:56 for 28-mm miniatures, 1:100 for 15 mm and 1:285 for 6 mm.

Architectural models allow proportions, facades and room layouts to be explored: for example, at 1:50, 1:100 or 1:200.

For apartment planning, an existing apartment or a potential new home can be printed as a physical model. The room layout becomes tangible and provides a basis for discussing furnishing ideas.

For play worlds and dollhouses, buildings can match existing figures and vehicles. Presets range from 1:22.5 for Playmobil and 1:64 for Hot Wheels to dollhouse scales of 1:24, 1:48 and 1:144.

0.2 How the app works

PrintHaus first creates solid wall bodies from the floor plan outlines. These are extruded to the height of each floor and combined with base plates, floor slabs and the roof to form the building. Under sloping roofs, the walls are cut at the underside of the roof so that the gables follow its shape.

For windows, doors and passages, the app generates cutting bodies that remove material from the walls. Frames, glazing bars and door leaves are created as separate geometry. Plinths, cornices, timber framing and opening details are also built in three dimensions. Their profiles project from the wall or cut into it.

At the joints, PrintHaus calculates matching connection profiles, including dovetail connectors, tenons, grooves and tongues. The corresponding mating profiles are created in the wall, slab or roof. Joint clearance is taken into account for the print scale so that the parts can fit together.

The surfaces that receive a texture and the joint surfaces that remain smooth are defined on the building itself. For print export, PrintHaus calculates a physical relief from this: mortar joints, roof tiles and wood grain change the surface geometry. This relief is also included in the STL print data.

With the same software version, the building geometry is reproducible from the same project data and settings. PrintHaus works deterministically: the construction follows fixed rules, not chance.

0.3 Controls and preview

The main navigation covers Floors, Floor plan, Roof, Fit-out & Add-ons, Openings, Extras and Export. Earlier steps remain accessible at any time.

The square icons show shapes and tools directly. A coloured outline marks the selection. A tooltip explains the symbol when needed.

The preview shows the house from every side through rotation. The view cube provides direct access to fixed viewing directions.

Under Visibility in the 3D view, the roof and individual floors can be hidden to reveal the rooms underneath. A section through the building can be moved to expose the interior. X-Ray also shows concealed components.

The fast preview accompanies editing. Choosing the detailed view also calculates the CAD geometry with profiles and surface relief. Viewing angles can be saved as snapshots.

Dimensions can be entered directly or changed with the slider. Undo and Redo allow alternatives to be compared. Help explains the current step.

During editing, the current design can be saved as model.json, including building data and selected colours. The project can be reopened through Settings → Load project. Saving the design does not use a print download.

Archie, your master builder, supports you directly in the app with questions and changes. His chat is available below the workspace. In supported browsers, commands can be dictated locally.

A house design with Archie can start from a text description. Model space and scale define the design envelope, with roof overhangs and added components taken into account.

Archie plans dimensions, floors, heights, roofs, windows and doors, as well as shutters, terraces and dormers, based on your requirements. New groups of windows and dormers can be centred or evenly spaced on the selected wall or roof area. The dialogue clarifies outstanding dimensions and design questions.

Archie can edit existing windows using their geometry, for example matching widths and window heads or calculating spacing. Glazing crosses can be added to fixed exterior windows of the main building, including those on the ground floor or in the current selection.

Requests can be refined in the dialogue, for example to specify particular windows or storeys. The assistant asks for clarification when a request cannot be assigned clearly.

Wall textures and component colours can also be changed through chat, such as the roof, window frames or the facade of an individual floor. Archie uses the available colour palettes and complete hexadecimal colour codes.

Archie answers questions about app functions, components and architectural styles using product and architectural knowledge in German and English.

0.4 Colours

Under Visibility → Colours, a component colour dialog brings together colours for walls, slabs, the roof, fit-out and add-ons, and openings. The main building and extensions can be styled separately, with wall colours set per floor and slab colours individually.

The selection includes Historic, Standard and filament colours from Anycubic, Bambu Lab, Creality, ELEGOO, eSUN, HATCHBOX, OVERTURE, Polymaker, Prusament and SUNLU.

The manufacturer palettes include PLA colours with normal or matte finishes and can be filtered by Product line. Tooltips identify the filament, colour and finish; a custom hexadecimal colour code allows any colour to be specified. Applied component colours appear directly in the preview.

0.5 Settings

The Settings window at the top right brings together model and output preferences, the app language, “Account and license”, enabled features and allowances. An optional nickname sets how Archie addresses you. The Measurement units setting switches length entry and display between metric measurements and feet/inches. The actual building dimensions are preserved when switching.

The output type is “3D printing” or “Scene export”. Print target offers Bambu Studio, OrcaSlicer, PrusaSlicer, Neutral 3MF and STL export. With the STEP add-on enabled, STEP extends the selection as the sixth print target. The slicer targets use profiles matched to the selected printer.

For Scene export, Output quality offers five options: “Low Poly”, “Compact”, “Medium”, “Detailed” and “Uncompressed”. They determine geometry detail, textures and file compression. “Uncompressed” contains the same detail as “Detailed”, with lossless PNG textures and without Draco compression.

Construction offers “Shell and interior fit-out” for a complete house or “Building shell only” for the exterior form. The Doors setting offers “Fixed” for leaves joined to their frames. “Component model” (BM) and “Hybrid model” (HM) also offer “Movable” doors up to 1:99.

Ordinary windows and doors can be printed with or without panes using the shared glazing setting. The single-colour or multicolour preference is saved. Separate material bodies are supported in BM and in separate HM window objects. HM building bodies and MM use one colour per print body; a separate roof can retain its own colour.

These preferences are saved to the account and reused for the next project. They also apply to outputs through connected assistants.

0.6 MCP interface

The MCP interface connects PrintHaus to external chatbots. The PrintHaus plugin can be downloaded in the account settings and connected to a compatible chatbot. PrintHaus sign-in, connection consent and the corresponding account entitlement are required. Installing the plugin alone does not unlock API access.

The chatbot controls the app through this interface. It interprets descriptions and images of buildings and translates them into building parameters. PrintHaus calculates the geometry from these parameters according to its fixed rules. The quality of the reconstruction depends on the chosen chatbot and its model.

A connected chatbot hands the finished model and its complete preview over to the app's Export step. Print, STEP or scene downloads can then be started there. The most recently saved project is available to the chatbot for further changes.

1. Floors

PrintHaus supports up to ten floors. The height of each floor can be adjusted individually. The preview shows how the proportions of the house change.

A foundation raises the ground floor above the terrain. An existing plinth continues downwards with its profile, colour and texture.

2. Floor plan

Floor plans can use a rectangle, an L, T or U shape. Custom outlines can be drawn freely. Snap points and angle snapping help close the shape.

Individual edges can be split and moved to create recesses, projections or connection areas for a side wing.

Separate upper-storey outlines allow setbacks, projecting building parts and stepped storeys. Free footprints also support courtyards through inner contours; outlines can differ between storeys.

An extension can form a low side wing, a workshop or a second building section. It has its own footprint and height. PrintHaus calculates its connection to the main house.

The walls of the extension can also contain windows, doors and passages. They can be designed independently of the main house.

A narrow rectangular floor plan suits a terraced house. The adjoining walls on the left and right can be defined as Party walls. The street and courtyard facades remain freely configurable.

The facade editor uses plinths, storey bands and cornices to articulate the facade. Corner pilasters and stone quoins emphasise the building edges.

Timber framing is available for the whole house, individual floors or a gable. The beams follow the walls and take the openings into account.

Timber-framed upper floors can project beyond the floor below. This projection can continue over several floors, with the beams and connections following each offset.

3. Roof

Flat, hip, shed, gable, sawtooth and barrel roofs give the house different silhouettes. The No roof option is also available.

The ridge and eaves can be aligned with the floor plan. Pitch and overhang define the roof shape; its sides can also have different pitches.

Multiple building sections can have their own roofs.

On a mansard roof, the break height changes the roof space and the external shape. A cross-gable can further articulate the building.

A barrel roof forms a circular arc over a suitable rectangular building, such as a hall or workshop. Its rise can be adjusted from a semicircle to a flatter arc. Dormers and roof windows are not provided on barrel roofs.

A sawtooth roof creates the characteristic profile of a factory hall, with repeating roof and window surfaces.

Walkable flat roofs create roof terraces with access from inside. A parapet, solid railings, balusters or battlements form their edges.

4. Fit-out & Add-ons

Interior walls divide a floor into rooms. They can be full height or half height. Names and floor coverings distinguish the rooms.

Straight, winder and spiral stairs connect the floors. PrintHaus calculates the steps and stair run to suit the floor height.

In a stairwell spanning multiple floors, the stairs and slab openings are aligned across the storeys.

A balcony projects from the facade. Full, French and corner balconies are available with adjustable railings.

Terraces can run along a straight wall or around a corner. Depth and access are adjustable; steps can be placed at the house or along free outer edges. Level rectangular balconies and terraces can have railings with transparent or opaque infill. BM and HM print frames and infill separately; MM joins them.

Canopies, columns, supports and chimneys can be placed and designed to suit the existing components. In addition to wall chimneys, roof-mounted chimneys start at the roof connection without passing through the storeys below.

5. Openings

In the window editor, icons show the window shapes: rectangle, round arch, segmental arch, pointed arch, semicircle, circle or oval. Width, height and sill height define the opening's size and position.

Frames, glazing and glazing bars give the window its character. Under a sloping roof, the upper outline can follow the roofline.

Windows can be placed individually, in rows or in mirrored arrangements. Corner glazing also provides windows that wrap around a building corner.

Stone surrounds, decorative lintels, keystones, sills, apron panels and canopies frame suitable openings. Available combinations depend on window shape and space.

With a foundation enabled, basement windows can be inserted into its outer walls below the floor slab and edited in the foundation area. In MM, these windows and their panes are fixed to the body.

Louvred, boarded and panelled shutters are available for shading, with their own colour selection. They can be exported open or closed.

For more modern houses, roller shutters are also available, each with an individually adjustable closing position.

The door editor offers entrance doors in rectangular, round-arch, segmental-arch and Gothic pointed-arch forms, each as a single-leaf or double-leaf door. They can be plain, glazed or panelled, with side panels and a transom window.

Garage doors have adjustable size and position, with plain surfaces, boards, panels or a vision strip available for their design.

An open passage connects rooms or leads through the building. Arcades and arch shapes add their own character.

Portals can become a focal point with columns, brackets and profiled hoods.

An entrance landing connects the front door to the terrain. Rectangular versions can have steps on several sides. On a semicircular landing, the steps follow the curve.

Smooth surfaces, paving or granite give the entrance a different material appearance.

Railings, masonry stringers or balusters protect the open sides of the landing and follow the stair run.

Dormers bring light into the roof space and articulate the roof surface. Shed, gable, hip and barrel roof dormers have adjustable size and position. Some shapes follow the main roof pitch, while others have their own.

On shed, gable and hip dormers, the main roof covering can continue over the dormer. Alternatively, the dormer surface can remain smooth.

Roof windows sit directly in the sloping surface. Their size and divisions are adjustable, and several openings can be arranged side by side.

6. Extras

Textures such as brick, plaster, wood and slate are available for roofs, walls, doors and floors. Surfaces can be assigned separately, including by storey on facades. Existing plinths, chimneys, canopies and annexes have their own suitable assignments. Special forms such as sawtooth roofs follow their own surface rules.

Bomb Blast creates impact damage for damaged buildings and diorama ruins. The impact position, direction and dimensions are adjustable; a saved impact can also be disabled.

7. Export

Scale groups are available for TableTop, Model railway, Play worlds, Dollhouse and Architecture. Each group shows its predefined scales. A custom scale is also possible.

Up to 1:99, the applicable model types are available. From 1:100, PrintHaus uses the monolithic model. For offset floors, wall parts and their connections are divided so that the floors fit together later.

In full construction, the Component model, abbreviated BM, produces individual walls, slabs and roofs. The Hybrid model, abbreviated HM, combines each storey's lower slab with the walls above it into one unit. The Monolithic model, abbreviated MM, creates connected bodies for each floor. Building shell only omits internal slabs and interior fit-out; HM and MM join the exterior walls and base plate into a body spanning the storeys. PrintHaus converts the parts to the print scale, orients them and distributes them across build plates. Large BM parts can be subdivided with additional connectors to suit the build volume.

In multicolour BM, raised facade details remain separate material bodies inside the wall object. Timber beams, plinths, cornices and window details can therefore have their own colours within one printed wall. Separate HM window objects can also contain distinct frame, pane and roller-shutter materials. Supported assignments are retained in 3MF files and slicer projects. STL has no embedded colours.

For STL export, window frames, doors and other separate print parts are grouped into the appropriate STL files by component type and build plate.

The manufacturer list in Print export settings includes devices from Bambu Lab, Creality, Prusa and other suppliers. The available Nozzle and Layer height values depend on the selected printer and slicer profile. The build volume can also be defined manually.

The export overview shows the scaled model dimensions. PrintHaus checks the finished print parts against the selected build volume. BM print profiles refine layers near the upper surface in stages. Unsupported printer/slicer combinations are blocked; a manual build volume supports neutral formats and STEP when unlocked.

The Export tab uses the output type selected in Settings; switching between print parts and a digital scene is also possible here. For print export, Export only visible parts uses the preview state: the print parts are cut at the selected section position, and hidden components are omitted. The editable project file remains complete.

STL contains print geometry without embedded colours. Neutral 3MF preserves named parts, print orientation and supported colour assignments. It has no slicer profiles or filament assignments; printer and material are configured in the target program.

Projects for Bambu Studio, OrcaSlicer and PrusaSlicer include print plates and suitable profiles for further slicing. Bambu Studio and OrcaSlicer receive one project with named plates. Larger PrusaSlicer outputs are split into several projects when needed.

STEP provides a CAD file with the corresponding entitlement. The assembled GLB scene retains the project colours and can use full size in metres or a custom scene scale, independent of the print scale.

After calculation, a ZIP package is available. Print exports contain the selected files, a preview image and the editable project description. Scene exports also use a ZIP, containing PrintHaus.glb, a multi-view preview, model.json and scene.json. Sign-in and the appropriate export entitlement are required. Read the export notes before printing.

The interlocking connectors on walls and slabs are designed for assembly without superglue. BM roofs made from several sections are joined and glued along their preformed connection profiles.

Assembly progresses through the floors from the base plate to the roof.

8. The technology behind PrintHaus

PrintHaus constructs buildings from parametric components. Footprints, storey heights, roofs, openings, decoration and annexes are designed together. Changes affect dependent parts and connections.

Input validation considers geometric relationships such as wall height below a roof, opening clearances and the alignment of stairs and slab openings. Unsuitable combinations can trigger clarification, suggested changes or an error.

The fast browser view supports editing. Detailed previews and each output calculate the geometry they require. Print parts are scaled and arranged on plates; the digital scene retains the assembled building.

Fits are designed for the print scale. Assembly also depends on printer, material and slicer settings. Saved project data lets you reopen and modify a design and reuse it with other output settings.