3D Printing Mouse Design Guidelines

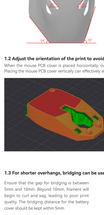
For the 3D Printed Mouse Design, you can see and understand the limitations of 3D printing, how they affect the design, and strategies to address them. By following these guidelines, your mouse design will be more suitable for printing, and will have better durability and usability over time.

1. Try to minimize the use of supports

Supports not only waste more material and extend print time, but they also increase the likelihood of imperfections. With proper planning, the use of supports can often be completely avoided.

1.1 Increase the angle of features relative to the horizontal plane to avoid supports

The aesthetic features of the mouse should maintain an angle of 30° or more relative to the horizontal plane. 45° is typically considered a safe angle.



1.2 Adjust the orientation of the print to avoid overhangs

When the mouse PCB cover is placed horizontally, overhangs appear inside, requiring support structures. Placing the mouse PCB cover vertically can effectively avoid the need for supports.

1.3 For shorter overhangs, bridging can be used as a connection method

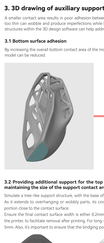
Ensure that the gap for bridging is between 5mm and 10mm. Beyond 10mm, filament will begin to curl and sag, leading to poor print quality. The bridging distance for the battery cover should be kept within 5mm.

2. Wall thickness control

A reasonable wall thickness can strike a balance between printing time and structural strength.

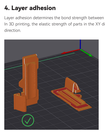
2.1 Strength support

A 2mm thick baseplate, combined with reinforcing ribs on the surface (seen below), can provide stable support for the mouse.



2.2 Save material while maintaining flexibility

A 1.2mm thick PCB cover can reduce print time and save material. Additionally, a thickness of 1.2mm can ensure that the mouse buttons maintain sufficient flexibility, making them easy to click.

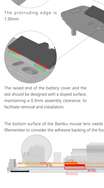


3. 3D drawing of auxiliary support structures

A smaller contact area results in poor adhesion between the first layer and the build plate. Features that are too thin can exhibit and produce imperfections while being printed. In such cases, drawing auxiliary support structures within the 3D design software can help address these issues.

3.1 Bottom surface adhesion

By increasing the overall bottom contact area of the model with the build plate, the wobbling at the top of the model can be reduced.



3.2 Providing additional support for the top increases the success rate for printing while maintaining the size of the support contact area

Simulate a tree-like support structure, with the base of the support designed to be thicker to ensure stability. As it extends to overhanging or wobbly parts, its cross-sectional area quickly decreases, especially in the portion close to the contact surface.

The thickness of the support base is either 0.2mm or 0.4mm, depending on the nozzle size selected for the printer, to facilitate removal after printing. For long-distance bridging, set segmented support points every 5mm. Also, it's important to ensure that the bridging positions remain completely horizontal.

4. Layer adhesion

Layer adhesion determines the bond strength between layers of a 3D printed object when subjected to force. In 3D printing, the elastic strength of parts in the XY direction is stronger than the printing strength in the Z direction.

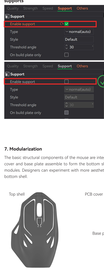
Snap fasteners need to deform when pressed, requiring strength in the direction of the pressure. Therefore, snap fasteners should be printed vertically.

5. Assembly design

The assembly of the mouse involves multiple design, printing, and assembly steps. It's essential to ensure that the components fit and function correctly. The design should be easy to assemble and disassemble, allowing for easy maintenance or replacement of parts.

5.1 Assembly clearance

Clearance for the battery cover snap fastener.



The bottom surface of the Bambu mouse lets needs to maintain a distance of 2.6mm from the desktop (Remember to consider the adhesive backing of the footpad.)

Screw installation

For Ø2*6 screws, ensure an installation clearance of 1.85mm and 2.40mm.

Application of cosmetic seams

When a model needs to be printed in multiple parts, cosmetic seams can serve as guides to connect the different sections, allowing them to fit together more snugly. At the same time, they can help mitigate issues of uneven assembly gaps that arise due to imperfections in the edge contours of 3D printed models.

6. Slicing recommendations

Slicing parameters will impact the quality, strength, and subsequent assembly performance of the print. Proper slicing settings ensure the mouse's durability and functionality while also optimizing print time and resource consumption.

6.1 To ensure structural flexibility for the battery cover, it's best to disable the brim

6.1 To reduce discomfort at the edge of the mouse where a hand makes contact, it's best to disable the brim for this piece as well

6.2 Given the extensive work done in the preliminary stages, you can confidently disable supports

7. Modularization

The basic structural components of the mouse are integrated into the PCB cover and the base plate. The PCB cover and base plate assemble to form the bottom shell. The bottom shell and the upper shell act as two modules. Designers can experiment with more aesthetic designs based on the fundamental structure of the bottom shell.

Note: We provide 3D files for parts which are designed to match with the hardware kit, so you can begin by using those to design your own parts.