Customizable, 3D-Printable Keyguard for Grid-based, Free-form, and Hybrid AAC Apps on Tablets

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VIEW IN BROWSER

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Summary

Keyguards help individuals, with limited motor control, point reliably at regions of an app running on a tablet.

Gadgets > Portable Devices

Tags: thingiverse assistivetech assistivetechnology assistivedevice keyguard

Go here for instructions on how to use this keyguard designer.

Keyguards help individuals with limited ability to point reliably at regions of an app running on a tablet. They do this by physically separating access to specific regions of the tablet screen with rails that rise up from the surface of the tablet. In this case, the apps are associated with Augmentative and Alternative Communication (AAC).

Some AAC apps organize their content into grids with menus and message bars, above or below the grid. Others are much more creative and

unpredictable in their layouts. Hybrid apps are largely grid-based but their keyguards can be enhanced by selectively exposing specific regions of the app.

The number of possible choices for tablet, tablet case, and AAC app, make it impossible to design a few keyguards that will meet everyone's needs. To complicate matters further, users have lots of flexibility for how they organize the content in their apps. All of this is to say that users must be given control over the keyguard design. I know of only one 3D modeling tool where that is possible - without requiring that each user become an expert in 3D modeling. That tool is OpenSCAD. OpenSCAD has a "Customizer" feature that allows users to provide input to an OpenSCAD design that can shape the design to meet their specific needs.

We have created an OpenSCAD designer that allows the user to identify their tablet, describe how the AAC app is laid out, describe their case, and choose a mounting method to mount the keyguard directly to the tablet or to the case. Once the keyguard is fully described, you can generate and save an STL file that you can print on your 3D printer.

If you have previously used the keyguard designer, you must read the description of the new version on this page.

Here are the changes introduced in the five most recent designer versions:

27 Nov 2024 (Version 67): //Version 67: Circular cuts in the openings_and_additions.txt file get their diameter from the "height" column, not the "width" column. Fixed a bug in the generation of the first layer of a laser-cut design that made circles too large. The user interface for grid design has changed to set the height and width of rectangular openings directly rather than indirectly via the widths of the horizontal and vertical rails - this resulted in changing the names of several options: rail slope > cell edge slope, preferred rail height > screen area thickness, and split_line > split_line_location. Fixed a bug that had slide-in tab thickness depending on the thickness of the rails. Changed the name of the Grid Layout section to Grid Info for consistency with other sections. Added grid width in millimeters (gwm), grid height in millimeters (ghm), and keyguard thickness (kt) to the variables available for use in the openings_and_additions.txt file. Fixed bug where edge compensation failed to take the cell edge slope into account when determining how much to reduce cell size. Replaced the "add rounded corners for strength" option with a "bar corner radius option" for simplicity. Fixed bug involving one slot for a snap-in tab responding to changes in uequal bottom of case opening.

8 Nov 2024 (Version 66): Changed the default value of case_width = 220 in Clip-on Strap Info to 275 so a generated horizontal clip would look realistic. Added support for directly choosing circular openings and moved

several of the grid layout options to grid special settings. Fixed bug that allowed the keyguard thickness of an acrylic keyguard to be other than 3.175 mm thick. Added support for rectangular and rounded rectangular shapes that are anchored in the center. Changed section name from "Type of Keyguard" to "Keyguard Basics" to reinforce that this is the section to start with. Removed some unused modules to clean up the code. Refactored the creation of a 2D image from a 3D design to avoid arbitrary lines in the SVG file that mess up the laser cut. Fixed bug in handling svg, ridge, ttext, and btext rotation and other options in the openings_and_additions.txt file. Added support for the iPad Mini 7 (A17 Pro).
Fixed bug where echoes of case additions leaked through to keyguards in keyguard frames. Fixed bug involving keyguard frames and keyguards where the preferred rail height is less than the keyguard thickness. Moved the generate instruction out of Special Actions and Settings and into Keyguard Basics. Added support for manual slide-in tab and clip-on strap mounts to keyguard frames. Added support for using the location of the screenshot to set the left and bottom uneven case opening values.

18 Aug 2024 (Version 65): Updated Accent 1400-30a data based on pixel count information from PRC. Added support for the Accent 1000-20. Fixed bug when there's an uneven case opening and the keyguard thickness exceeds the rail height. Fixed bug associated with ALS locations when tablet is oriented in portrait mode. Added support for engraving/embossing text from within the Customizer. Exposed the default left and bottom case opening values to make it easier to determine the unequal left/bottom of case value. Added support for a ridge that can be rotated at any angle, not just horizontal and vertical. Added support for customization of the slope (chamfer) around the edge of the keyguard. Added support for customization of the slope (chamfer) at the top edge of a cell (also affects the chamfer on bars). Added support for r/rr/c/hd cuts that don't go all the way through the keyguard by putting a number in the "other" column. Fixed bug that prevented using home button edge slope with keyguard frames.

Update 30 June 2024 (Version 64): Distinguished between two different Accent 1400-30 tablets that impacts their pixel count differences.

Update 8 June 2024 (Version 63): Cleaned up some artifacts that appear with manual ridge arcs when the ridge thickness is set to larger than 7 mm. Added minimal support for all 23 Samsung tablets introduced since 2020 (support doesn't include openings for cameras or buttons on the face of the tablet). Changed naming of Accent tablets to match what appears on the PRC website. Added an entry for Grid Pad 11. Fixed bugs when adding symmetric home button and camera openings. Corrected the data for the Accent 1400-30. Fixed bug that allowed laser-cut keyguards to have cells with non-90 degree top and bottom slopes. Fixed bug that allowed

the keyguard shelf to be thicker than the keyguard itself. Fixed bug that allowed cell inserts to be created via laser-cutting. Fixed bug that allowed the mini tabs for post mounting to be higher than the thickness of the keyguard.

Update 17 May2024 (Version 62): Fixed how "preferred rail height" is reported when generating Customizer Settings. Fixed bug with recurved edges of slide-in tabs with a length value less than 3 mm. Rested horizontal and vertical ridges on the bottom of the keyguard and adjust the total height to match. Added a ridge arc to support manual ridges around merged cells. Added cell_width (cw), cell_height (ch), and cell corner radius (ccr) to the variables that can be used in the openings_and_additions.txt file. Added height_of_ridge (hor) and thickness_of_ridge (tor) for use in the openings_and_additions.txt file. Fixed the double-entry of NovaChat 8.5 in the "type of tablet" pull-down list in the Customizer. Fixed the values for the Posts Info section when generating Customizer Settings. Added support for the iPad Pro 11-inch (M4), iPad Pro 13-inch (M4), iPad Air 11-inch (M2), and iPad Air 13-inch (M2). Fixed a bug where a groove appeared in the bar region even if the associated bar was of zero height. Fixed some bugs with the creation of posts. Fixed the camera location on the earlier iPad Pros.

Print Settings

Printer Brand:

Prusa

Printer:

i3 MK3

Rafts:

No

Resolution:

0.2 mm

Infill:

15%

Notes:

You generally don't need supports except when printing a keyguard with raised tabs. You may need to use a brim to print clips.

How I Designed This

Designed entirely in OpenSCAD. keyguard.scad can be edited with any text editor to extend its capabilities. Contact me if you are interested in this.

Category: Tablet

Model files

keyguard_v67.scad

this is the current version of the keyguard designer

keyguard_v66.scad

this is the previous version of the keyguard designer

Other files

openings_and_additions.txt

place in same folder with the keyguard.scad file

License