Modular MK3S Electronics Enclosure for SKR+Pi

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VIEW IN BROWSER

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Summary

Electronics case for SKR-like mainboard and Raspberry Pi with modularized panels for easy modification

3D Printers > Prusa Parts & Upgrades

Tags: case enclosure mk3s electronics raspberrypi skr klipper

Have you ever wanted to make one small change to your electronics enclose and thought “Crap! Now I have to reprint the whole thing!”

Fear not! For a solution is here: A Modular Enclosure!

Most sections of walls are individual modular panels that can easily be removed or modified.
Want more space and don't like the integrated cable channels? No problem! They're also modular, so you can leave them out to regain some more internal volume.

Background

This is a remix of a previous remix that I made to KalleKnall's Einsy/Pi Enclosure which scaled up the enclosure to hold SKR-style mainboards. The original remix can be found here if interested.

I would often want to add new components or move around electronics within the printer's electronics enclosure. But since it was a single monolithic part, in order to add cutouts for cables, or mounting holes to attach PCBs, I would have to reprint the entire box; which takes a long time and wastes a lot of material.

To combat this issue, I replaced many of the walls with “rail cutouts” where a smaller piece would slide in.
Thus if I wanted to add a new cutout I would only need to redesign, print and replace that single section. Which made it faster to iterate, wastes less material and means that I can replace just the one wall instead of needing to dismantle and remove everything from the entire enclosure.
It also allows for more complex assemblies using heat set inserts which would not work as a single monolithic part due to being unable to position a soldering iron in such a way to actually insert them

This slightly weakens the overall structure of the enclosure due to lacking solid single-piece walls. But the box is not typically subject to large amounts of stress, and when combined with the rigidity that the mounting brace and front cover provide, it is still plenty strong.

Bill of Materials

Base enclosure:

- Parts from original
  - Printed parts
    - 2x small cable mount 6mm (2 halves = 1 unit for x-motor)
    - 2x small cable mount 7mm (2 halves = 1 unit for heatbed wires)
    - 2x large cable mount (2 halves = 1 unit for extruder wires)
  - Screws/Fasteners
    - Screws and nuts for cable mounts
    - Screws and nuts for rear brace
    - Screws and nuts for raspberry pi
- Front cover
  - 8x M3 x 8mm (or longer) **countersunk** screws
    - For countersunk screws, length includes head
    - So 8mm countersunk screw has ~6mm threaded shaft

    - 8x M3 x D4.6mm x L5mm heat set inserts (other lengths should work too)
- Mainboard mount
    - 4x M3 x 8mm screws
    - 4x M3 x D4.6 x L3mm heat set inserts
- Mix and match provided and/or custom wall plates

Optional assemblies:

- Cable channels
    - 15x M2.5 x 8mm **countersunk** screws
        - For countersunk screws, length includes head
        - So 8mm countersunk screw has ~6mm threaded shaft
    - 15x M2.5 x D4mm x L3mm heat set inserts
- Raspberry Pi cooling [built in to front cover]
    - 4x M3 screws
        - Length may vary depending on fan
        - Roughly 13mm for most common 10mm fan height
        - Recommend button-head for lower-profile
    - 4x M3 x D4.6mm x L3mm heat set inserts
    - 1x 40x40mm fan
- Stepper driver cooling [provided wall plate]
    - 4x M3 screws
        - Length may vary depending on fan
        - Roughly 13mm for most common 10mm fan height
        - Recommend button-head for lower-profile
    - 4x M3 x D4.6mm x L3mm heat set inserts
    - 1x 30x30mm fan
- Buck converter assembly [provided wall plate]
    - 3x M3 x 8mm screws
    - 3x M3 x D4.6mm x L3mm heat set inserts
    - 1x 5V buck converter
        - There are probably plenty of them in this form factor as it's likely a clone of some design
- USB-breakout/passthrough [provided wall plate]
    - 4x M3 x 5mm screws
    - 4x M3 x D4.6mm x L3mm heat set inserts
    - 2x M2.5 x 5mm screws
    - 2x M2.5 x D4mm x L3mm heat set inserts
    - 2x USB-C breakout board
        - Or clone, as long as it's the same size/form-factor
- PCB-mount [provided wall plate]
    - 4x M2.5 x 8mm screws
    - 4x M2.5 x D4mm x L3mm heat set inserts
        - Length may vary depending on board

- Intended to be used for any generic board that a user wants to make with PCB, perf-board, etc. using provided hole spacing
- On my printer, I made a small fan controller to support use of 4-wire PWM fans

Though not required, I would also recommend using split lock-washers where possible to reduce the likelihood of any screws coming loose due to vibrations from printing (Will require using slightly longer screws).
In fact most of the MK3S is constructed without any kind of anti-loosing countermeasures. But I would be more concerned about loose screws/ metal within the enclosure (due to potential for shorting and damaging components) than elsewhere on the printer.
The interior of the base has cutouts for optional lock washers where the cable channels attach since they cant be easily be used on the outside due to using countersunk screws.

Files:

I've included files for all the “base” blank plates can used as a base to make your own custom mounts/cutouts, and for “plain” solid walls.

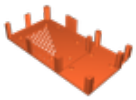
And I've also included some of the ones that I've made for myself such as an improved [cleaner looking] fan mount for the top cutout which can be used to add a small fan to help keep the stepper drivers a bit cooler.

This remix is based on

MK3S Electronics Enclosure for SKR+Pi
by Skybob22

Model files

Enclosure Base 6 files



skr-modular-enclosure.3mf

skr-modular-enclosure-cover.3mf

rear-brace.3mf

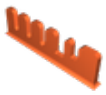
skr-modular-enclosure.step

skr-modular-enclosure-cover.step

rear-brace.step

Cable Channel Dividers

8 files



left-cable-channel.3mf

right-cable-channel-top.3mf

right-cable-channel-middle.3mf

right-cable-channel-bottom.3mf

left-cable-channel.step

right-cable-channel-top.step

right-cable-channel-middle.step

right-cable-channel-bottom.step

Premade Plates

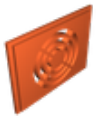
18 files

modular-plate-top-cable-top.3mf

Fits "Top" slot category

modular-plate-top-cable-bottom.3mf

Fits "Top" slot category

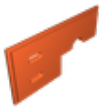


modular-plate-top-fan.3mf

Fits "Top" slot category

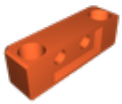
modular-plate-left-no-usb-cable-bottom.3mf

Fits "Left" slot category



modular-plate-left-usb-cable-bottom.3mf

Fits "Left" slot category



modular-plate-left-usb-panel-mount-insert.3mf

modular-plate-left-cable-top.3mf

Fits "Left" slot category. Used for both the USB and non-USB versions

modular-plate-inner-buck-converter.3mf

Fits "Bottom" slot category. Intended to be used for the single "Inner" wall

modular-plate-bottom-right-pcb-mount.3mf

Fits "Bottom Right" slot category. Intended for any user-created PCB

modular-plate-top-cable-top.step

modular-plate-top-cable-bottom.step

modular-plate-top-fan.step

modular-plate-left-no-usb-cable-bottom.step

modular-plate-left-usb-cable-bottom.step

modular-plate-left-usb-panel-mount-insert.step

modular-plate-left-horozontal-cable-top.step

modular-plate-inner-buck-converter.step

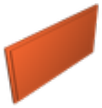
modular-plate-right-fan-controller.step

Blank Base Plates

12 files

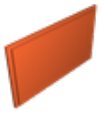
modular-plate-top.3mf

Fits "Top" slot category



modular-plate-left.3mf

Fits "Left" slot category



modular-plate-right.3mf

Fits "Right" slot category

modular-plate-pi.3mf

Fits "Pi" slot category

modular-plate-right-bottom.3mf

Fits "Bottom Right" slot category

modular-plate-bottom.3mf

Fits "Bottom" slot category

modular-plate-top.step

modular-plate-left.step

modular-plate-right.step

modular-plate-pi.step

modular-plate-right-bottom.step

modular-plate-bottom.step

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