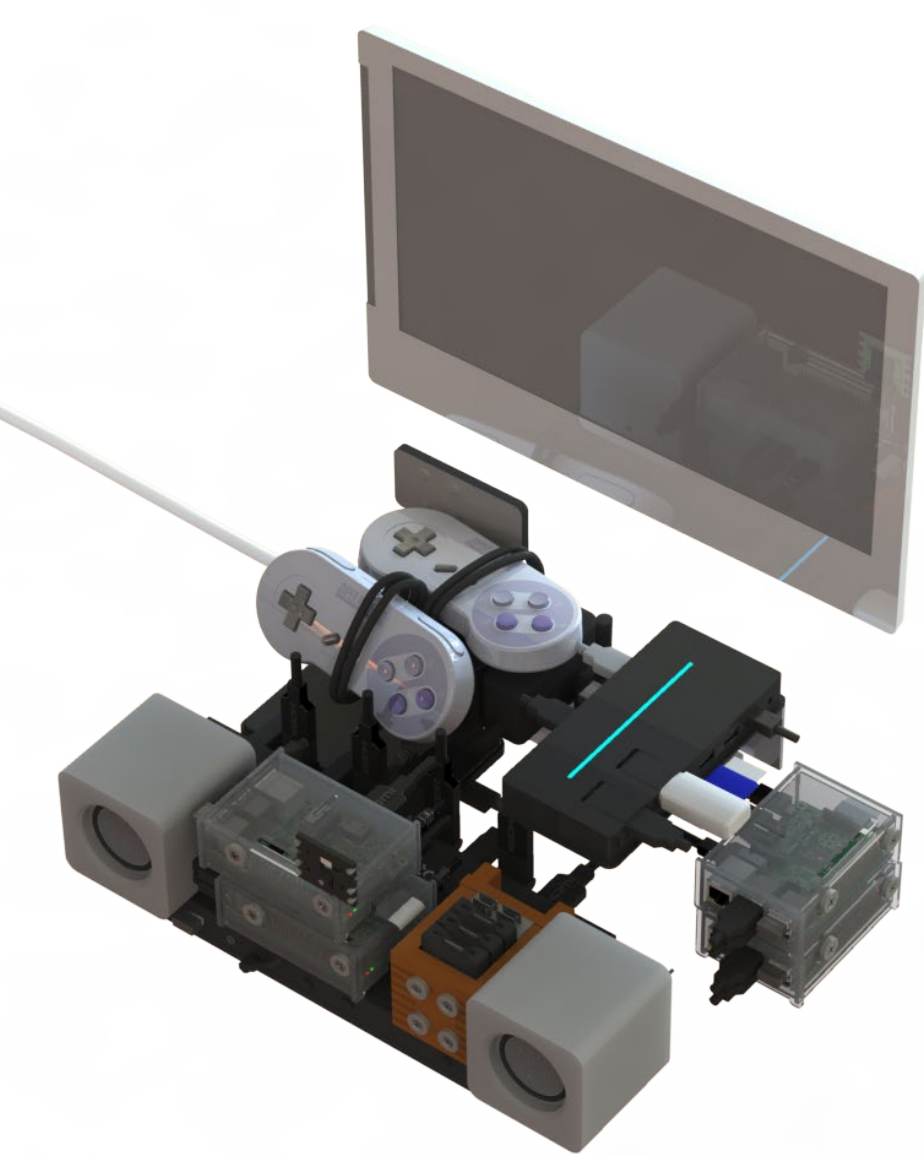


beast pi



[beastpi.com](http://beastpi.com)



configuration A - 4 pi's (keyboard hidden)



configuration B - 4 pi's and 1 Intel NUC

beast pi is a compact multi pi monster.

For pi enthusiasts, components being scattered everywhere is common and not visually appealing. beast pi was designed specifically for the purpose of housing as much computing power as possible, while also housing “extras” that are commonly desired.

beast pi has a full size keyboard and 13” LCD screen which really makes a difference when doing your work, or playing some games.

beast pi will hold up to 4 pi's, a 10 port USB HUB, two speakers and a four port hand held remote controlled HDMI KVM switch.

Removing 2 pi's will provide enough space for an Intel NUC PC.

pi's are held in place by N52 magnets, making it very easy to reposition, and remove your pi's.

beast pi was designed to give other pi users inspiration to build their own beast pi's. Take everything gathered in this document, learn from it and build your own.

Share this document with everyone. Computing science students, Linux persons, and general computer geeks will find it interesting.

introduction - beast pi

# Things to consider when building your own beast pi.

- The power bar you use, the space between plugs and the shape of the adapters.  
I cannot stress the importance of this enough. Component purchases were based on these 3 variables. Space is limited. Unless you want to lose a precious outlet, don't purchase anything that has a wide adapter. Ask a sales person to open the package if you are unsure.
- Long 3ft USB and HDMI cables are evil. Buy short ones.  
Okay, maybe they aren't evil, but if you plan on using a KVM switch with 4 pi's, you won't like them. Fitting 4 USB cables, 4 HDMI cables and 4 power supply cables will be a challenge. Short cables make everything much easier to fit and manage.
- 90 degree, right angle, gender changing, size converting, connectors exist. Use them.  
Most people have never heard of right angle connectors. They are the most useful components you can use for cable management. There are also pivot adapters that aren't fixed to 90 degrees. You will find these adapters very useful.
- Do you want sound?  
If you want to hear sound from every pi using the KVM switch, be sure to take into account the size of the speakers, how you are going to mount them and how they are powered. The KVM switch shown, takes the audio from the HDMI signal, and runs it to a 3.5mm standard headphone jack.

beast pi is sponsored by:

**GIZMOJUNKIES**

GizmoJunkies has graciously donated the most important parts for the creation of the beast pi.

They sent me:  
two raspberry pi B+  
two wifi adapters  
two power supplies  
two cases  
two Super Nintendo controllers

Good power supplies are really important. I got a few from ebay and they failed after plugging things into USB ports. The power supplies from GizmoJunkies have worked perfectly even with the pi's at full load.



GizmoJunkies has some really nice starter bundles too.

Go check out their site [here](#).



introduction - beast pi

# Why didn't you use a Mac mini?

Linux hardcore users are going to ask this, so I thought I would address it up front. The simplest reason is the Mac mini isn't.... mini at all. It seems that after 2009 the Mac mini grew substantially. It may be shorter in height, but it is over 3 inches wider in both length and width than an Intel NUC. Instead maybe they should have named it the Mac mini wide.

There was no way this was going to fit without the enclosure growing far beyond what I would feel comfortable with. With space being at a premium I went with an Intel NUC. Besides with a NUC you can install a wide variety of Linux distro's anyways. I used the shorter of the NUC's meaning a PCI mini SSD was used for the HD.



GEHIC ON-LAP 1302 13.3" TFT LCD  
(16:9) 1366x768

120V AC SUPPLY

GizmoJunkies POWER SUPPLY 5.3V-2.0A  
GizmoJunkies POWER SUPPLY 5.3V-2.0A  
BYTECC KVM POWER SUPPLY 5.0V-2.0A  
ALURATEK HUB POWER SUPPLY 5.0V-2.5A  
GizmoJunkies POWER SUPPLY 5.3V-2.0A  
GizmoJunkies POWER SUPPLY 5.3V-2.0A

GizmoJunkies RASPBERRY PI B+

GizmoJunkies RASPBERRY PI B+

GizmoJunkies RASPBERRY PI B+

GizmoJunkies RASPBERRY PI B+

RASPBERRY PI B+ CAMERA MODULE

4x1 USB HDMI KVM Switch

BYTECC KVM-4UHM 4X1 SWITCH

ALURATEK AUH1210F 10 PORT USB HUB

DEVICES BEING CHARGED BY USB HUB

GizmoJunkies USB SUPER NINTENDO CONTROLLER

GizmoJunkies USB SUPER NINTENDO CONTROLLER

ARCTIC S111 SPEAKERS 5.0V 2.0W

LOGITECH K400 WIRELESS TOUCH

BYTECC KVM-4UHM 4X1 REMOTE

- 5V / USB POWER
- USB CONNECTION
- HDMI CONNECTION
- AUDIO CONNECTION
- INFRARED SIGNAL

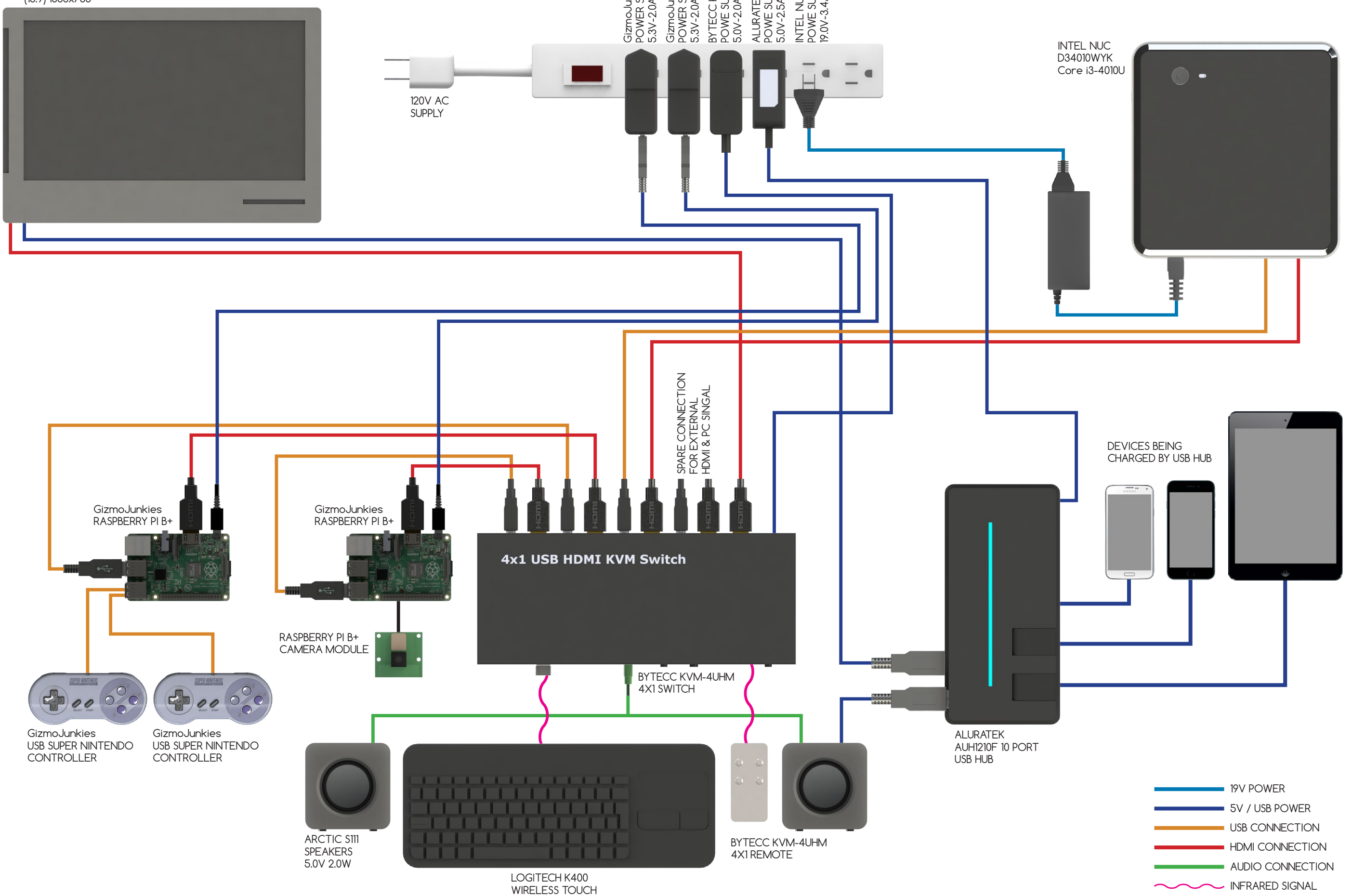
configuration a - beast pi

GEHIC ON-LAP 1302 13.3" TFT LCD  
(16:9) 1366x768

120V AC SUPPLY

GizmoJunkies POWER SUPPLY 5.3V-2.0A  
GizmoJunkies POWER SUPPLY 5.3V-2.0A  
BYTECC KVM POWER SUPPLY 5.0V-2.0A  
ALURATEK HUB POWER SUPPLY 5.0V-2.5A  
INTEL NUC POWER SUPPLY 19.0V-3.4A

INTEL NUC D34010WYK Core i3-4010U



DEVICES BEING CHARGED BY USB HUB

4x1 USB HDMI KVM Switch

SPARE CONNECTION FOR EXTERNAL HDMI & PC SIGNAL

BYTECC KVM-4UHM 4X1 SWITCH

ALURATEK AUH1210F 10 PORT USB HUB

GizmoJunkies USB SUPER NINTENDO CONTROLLER  
GizmoJunkies USB SUPER NINTENDO CONTROLLER

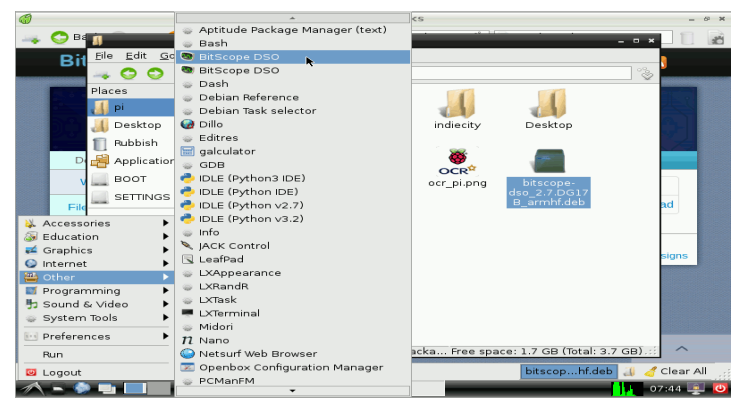
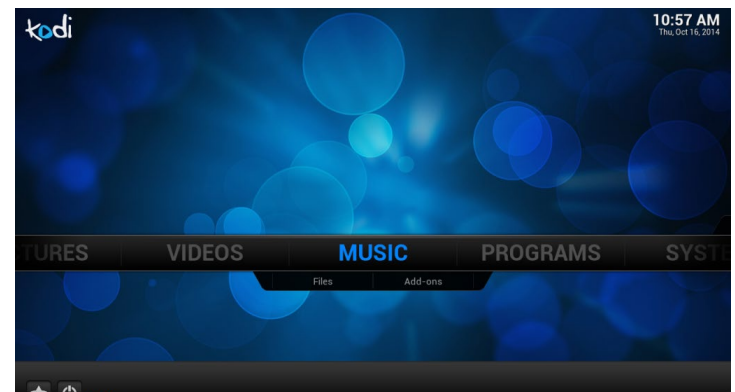
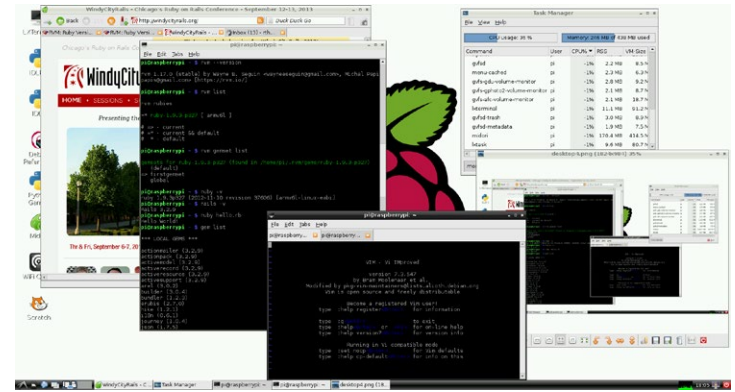
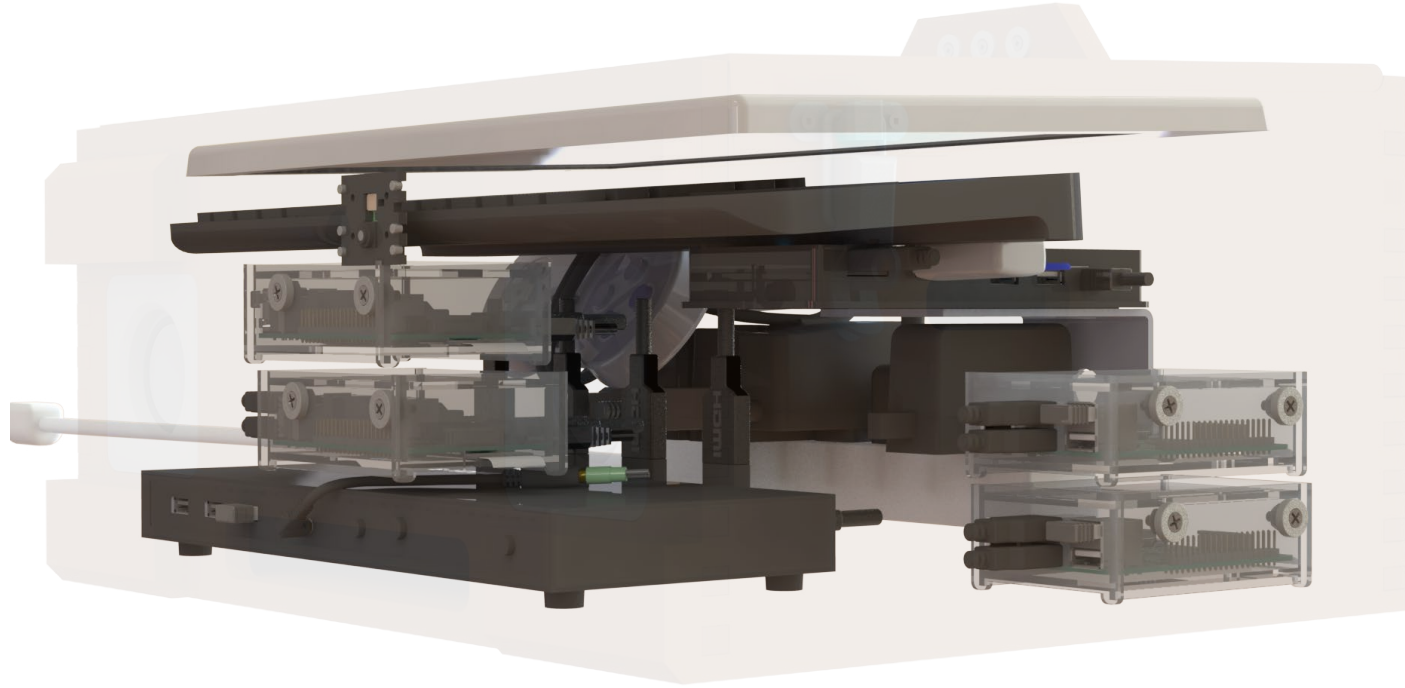
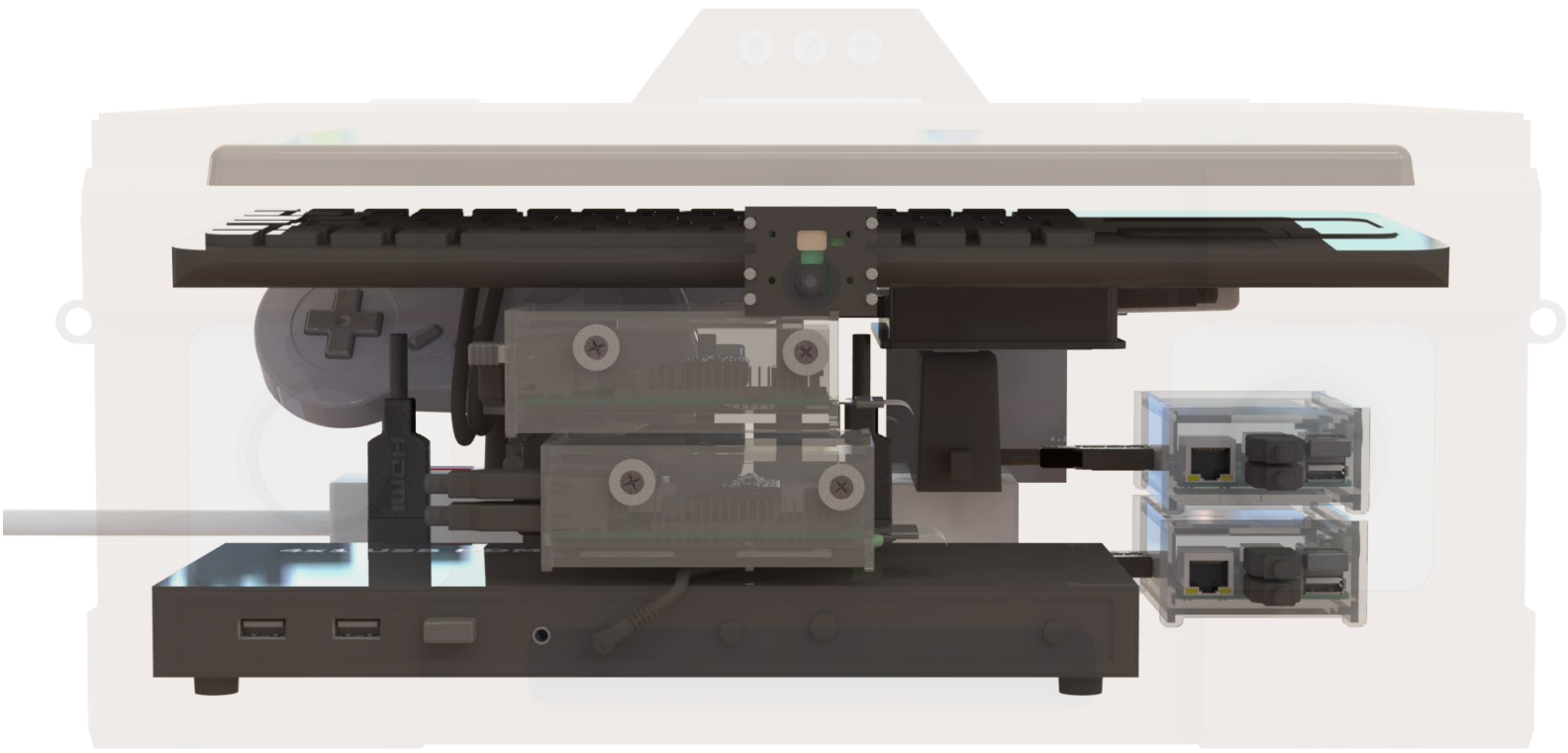
ARCTIC S111 SPEAKERS 5.0V 2.0W

LOGITECH K400 WIRELESS TOUCH

BYTECC KVM-4UHM 4X1 REMOTE

- 19V POWER
- 5V / USB POWER
- USB CONNECTION
- HDMI CONNECTION
- AUDIO CONNECTION
- ~ INFRARED SIGNAL

# configuration b - beast pi



pi 1 - Main workplace.  
The pi that has a camera module attached. The pi that you do most of your work with.

pi 2 - games.  
Set up with RetroPie or PiPlay for instant retro gaming. 2 USB SNES controllers attached.

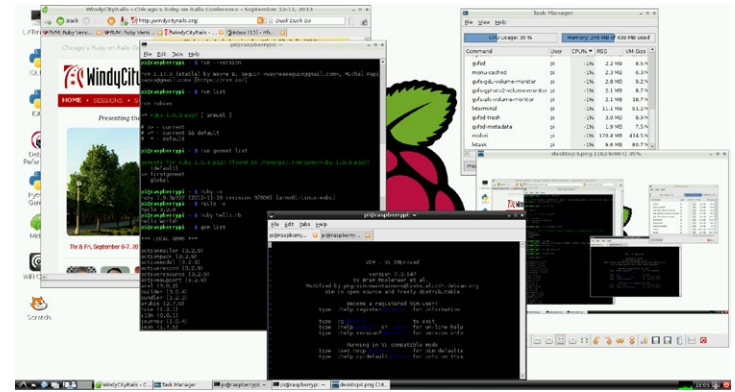
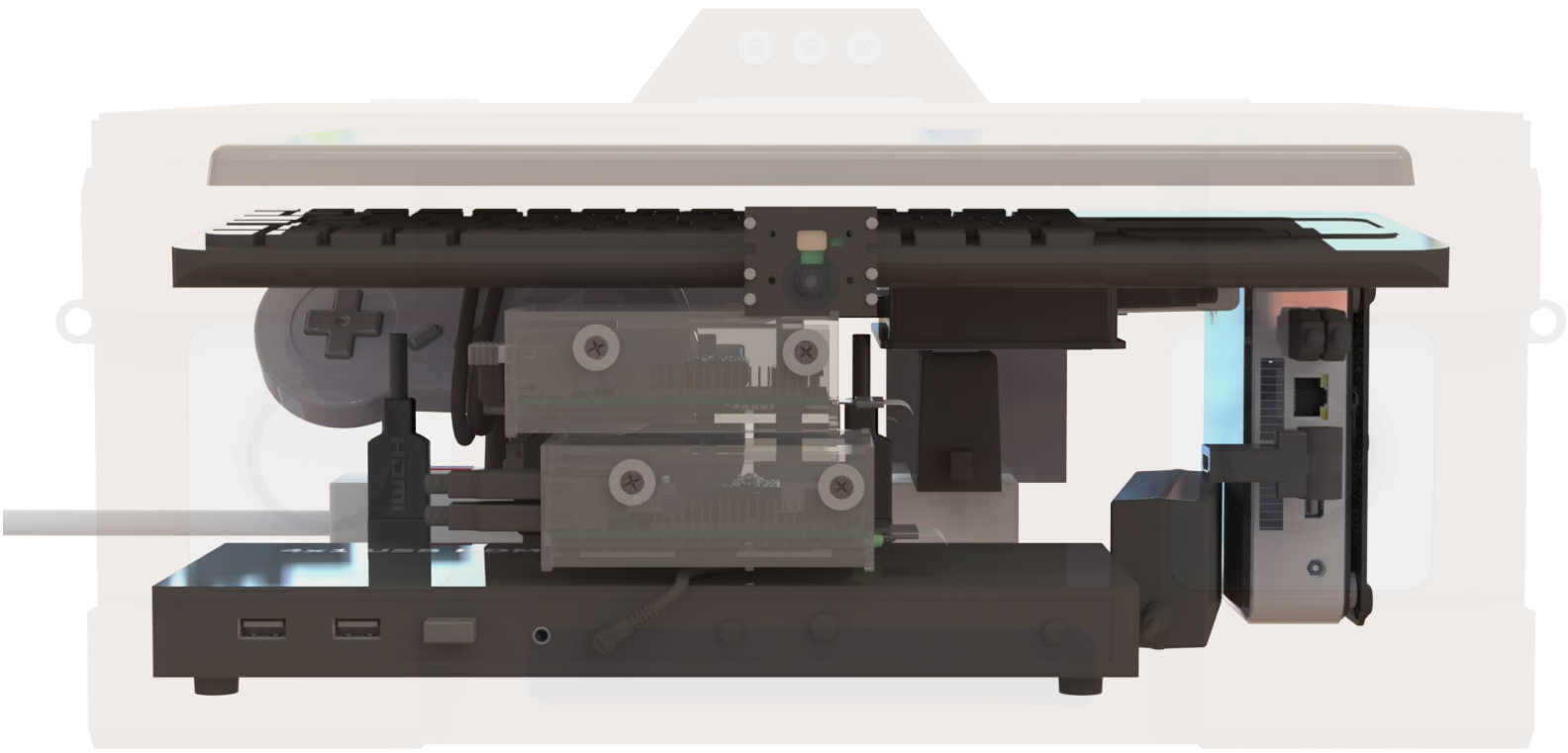
pi 3 - openelec.  
Run xbmc / kodi for all your movies, music and other etc media playback.

pi 4 - Spare pi.  
Testing of new os images, programs etc. Or a server. Sometimes you just need a ready spare.

### Configuration A

The most extreme pi setup for the most extreme of pi enthusiasts. You can easily switch between tinkering, different distro's, playing games and movies with one remote for the KVM switch.

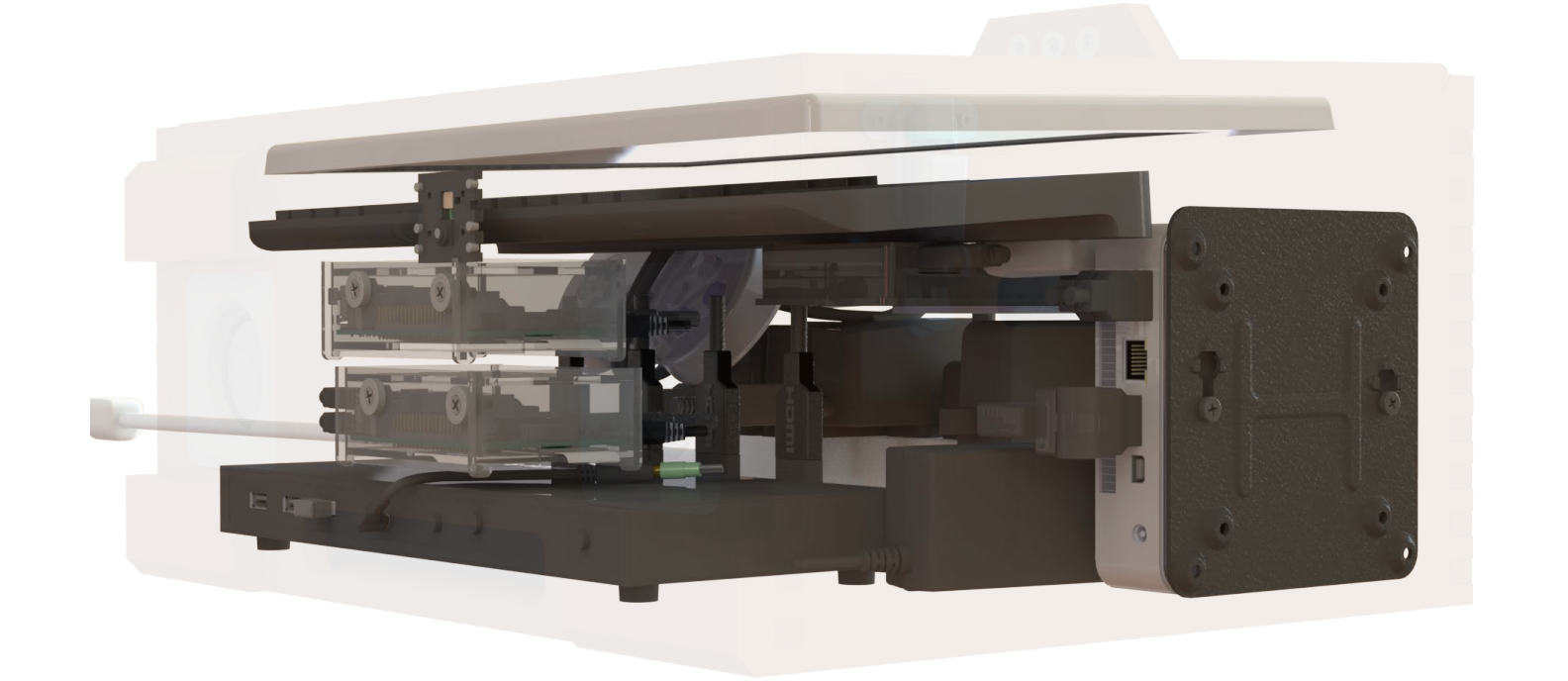




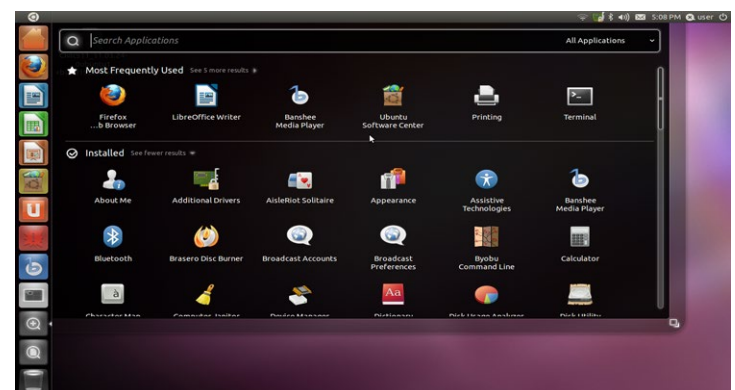
pi 1 - Main workplace.  
The pi that has a camera module attached. The pi that you do most of your work with.



pi 2 - games.  
Set up with RetroPie or PiPlay for instant retro gaming. 2 USB SNES controllers attached.



Intel NUC - x86.  
Windows or Linux running and ready for your full PC needs.



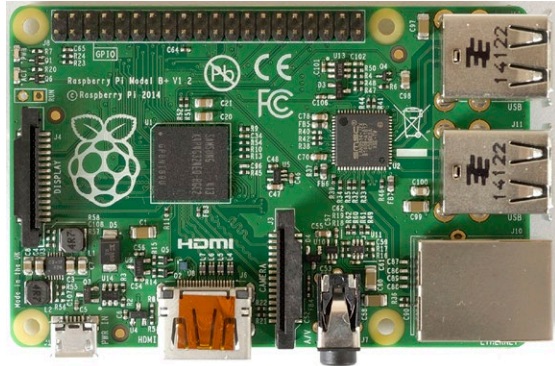
Extra - External source.  
Any device with an HDMI output could be attached to the KVM switch.

Configuration B  
A setup for the enthusiast that needs a full x86 PC ready to go. This also leaves one available space for another device to connect to the KVM switch.

configuration b - beast pi

# BILL OF MATERIALS

**GIZMOJUNKIES**



**Raspberry Pi B+**

| Configuration | QTY. |
|---------------|------|
| A             | 4    |
| B             | 2    |

[Purchase Link](#)

**GIZMOJUNKIES**

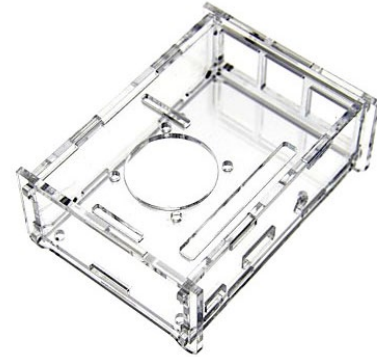


**Power Supply 5.3V/2A**

| Configuration | QTY. |
|---------------|------|
| A             | 4    |
| B             | 2    |

[Purchase Link](#)

**GIZMOJUNKIES**

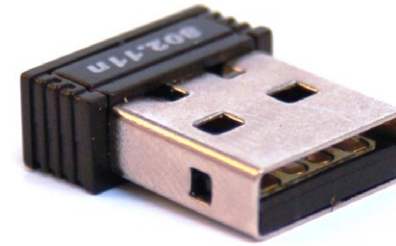


**Acrylic Case**

| Configuration | QTY. |
|---------------|------|
| A             | 4    |
| B             | 2    |

[Purchase Link](#)

**GIZMOJUNKIES**



**Micro USB Wifi Adapter**

| Configuration | QTY. |
|---------------|------|
| A             | 4    |
| B             | 3    |

[Purchase Link](#)

**GIZMOJUNKIES**



**USB SNES Controller**

| Configuration | QTY. |
|---------------|------|
| A             | 2    |
| B             | 2    |

[Purchase Link](#)

**GIZMOJUNKIES**



**Micro SD w/Noobs**

| Configuration | QTY. |
|---------------|------|
| A             | 1    |
| B             | 1    |

[Purchase Link](#)

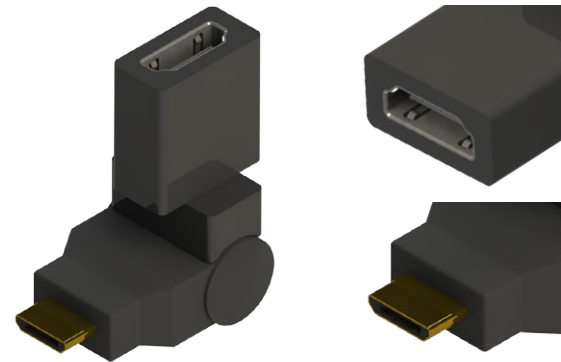
**GIZMOJUNKIES**



**Micro SD w/Kodi Blazed**

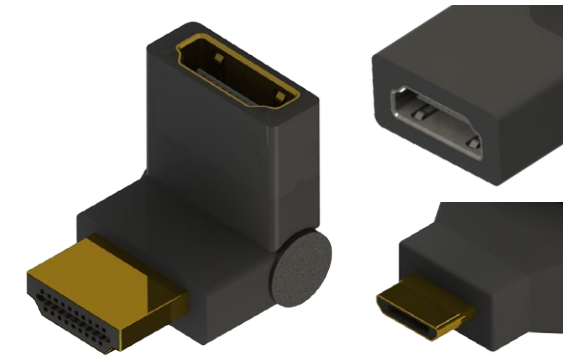
| Configuration | QTY. |
|---------------|------|
| A             | 0    |
| B             | 1    |

[Purchase Link](#)



**HDMI A F - C M Pivot / Rotate**

| Configuration | QTY. |
|---------------|------|
| A             | 0    |
| B             | 1    |



**HDMI A F - A M Pivot / Rotate**

| Configuration | QTY. |
|---------------|------|
| A             | 0    |
| B             | 1    |



**USB SD Card reader**

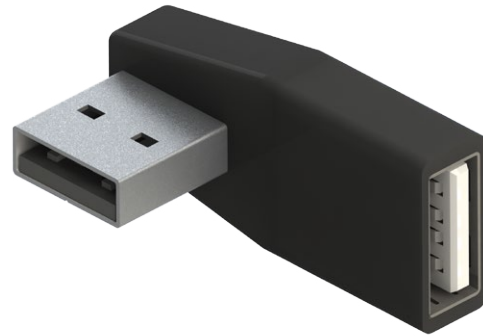
| Configuration | QTY. |
|---------------|------|
| A             | 0    |
| B             | 1    |

# BILL OF MATERIALS



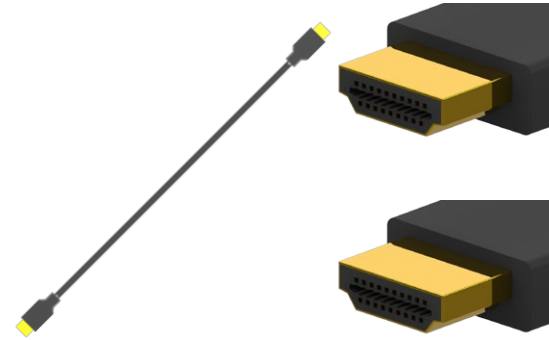
ONWARD 4532-R 1x.5in ADHESIVE PADS

| Configuration | QTY. |
|---------------|------|
| A             | 1    |
| B             | 1    |



USB A M - A F 90deg Left

| Configuration | QTY. |
|---------------|------|
| A             | 2    |
| B             | 4    |



HDMI Cable A M - A M 18"

| Configuration | QTY. |
|---------------|------|
| A             | 4    |
| B             | 3    |



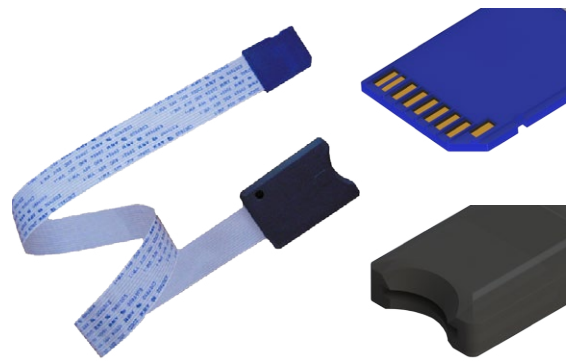
USB Cable A M - B M 18"

| Configuration | QTY. |
|---------------|------|
| A             | 4    |
| B             | 3    |



3.5mm Extension Cable 4"

| Configuration | QTY. |
|---------------|------|
| A             | 1    |
| B             | 1    |



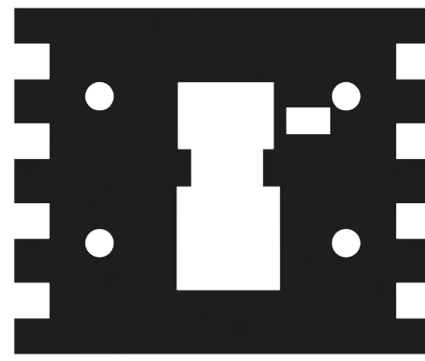
SD to SD slot reader cable

| Configuration | QTY. |
|---------------|------|
| A             | 0    |
| B             | 1    |



Micro SD to SD slot reader cable

| Configuration | QTY. |
|---------------|------|
| A             | 4    |
| B             | 2    |



Camera module acrylic mount

| Configuration | QTY. |
|---------------|------|
| A             | 1    |
| B             | 1    |



Pi Camera Module

| Configuration | QTY. |
|---------------|------|
| A             | 1    |
| B             | 1    |



WOODS PS-650 POWER BAR

| Configuration | QTY. |
|---------------|------|
| A             | 1    |
| B             | 1    |

# BILL OF MATERIALS

**BYTECC KVM-4UHM 4X1 SWITCH**  
QTY. 1



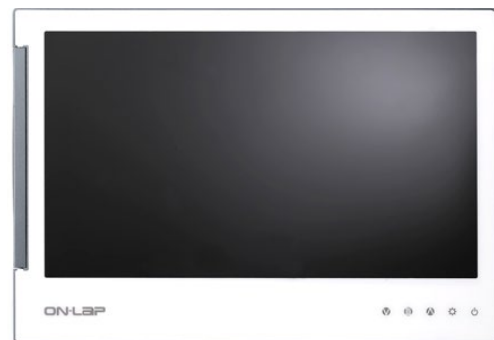
The ability to switch between 4 computers using a remote control. This is what makes the beast pi the most convenient Raspberry Pi workstation.

**ALURATEK AUH1210F 10 PORT USB HUB**  
QTY. 1



No serious Raspberry Pi user is without their USB HUB. Peripherals need juice and Pi's need USB ports. Providing 5V / 2A you can charge your other goodies too.

**GeChic On-Lap Monitor 1302 (16:9) 1366x768**  
QTY. 1



A simple display for your Pi's and NUC. It's incredibly thin and connects with a standard HDMI port. It's also powered by USB, so it won't use another spot on the power bar.

**LOGITECH K400 WIRELESS TOUCH**  
QTY. 1



A full size wireless keyboard with a built in track pad. It only needs 2 AA batteries and also has a power switch on the back.

# BILL OF MATERIALS

Intel NUC (Configuration B Only) model D34010WYK shown.  
QTY. 1



An incredibly small but powerful x86 computer. At 4.6 x 4.4 x 1.6" uses very little space. It has all the connectivity you need. For wireless internet a USB wifi will be req.

ARCTIC S111 5V 2W SPEAKERS  
QTY. 1



Small simple speakers that don't cost alot, but can play pretty loud. They are powered by USB, so they won't use another spot on the power bar.

STARTECH S2510BPU337 2.5IN HD ENCLOSURE  
QTY. AS REQUIRED



This enclosure is very thin. It is 0.4" (10mm) tall and powered by one USB 3 cable. You could stack a few inside beast pi easily.

ZIP TIES  
QTY. TONS



Cable management takes time and practice. It is common to zip, cut and re-zip many times. Buy alot.

# BILL OF MATERIALS



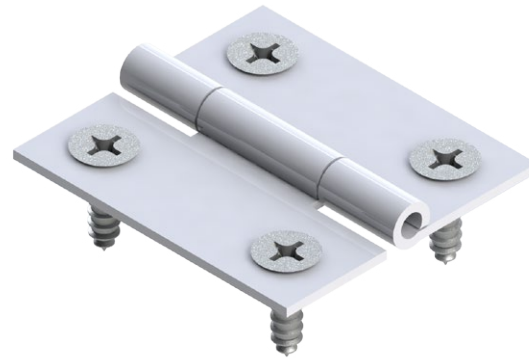
#4 x 1/4" Wood Screws

| Configuration | QTY. |
|---------------|------|
| A             | 4    |
| B             | 4    |



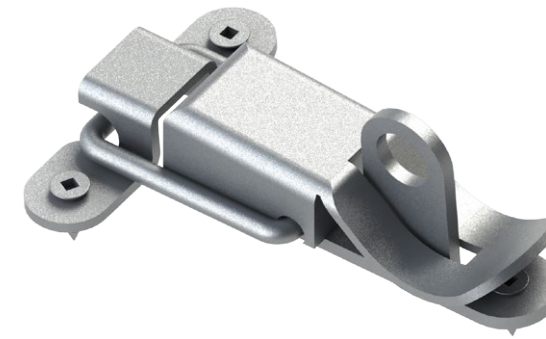
#4 x 3/8" Wood Screws

| Configuration | QTY. |
|---------------|------|
| A             | 20   |
| B             | 20   |



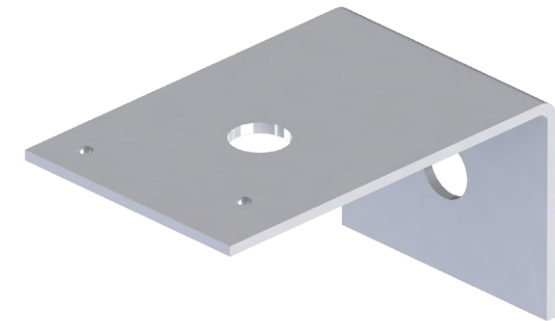
ONWARD 836X-V HINGE

| Configuration | QTY. |
|---------------|------|
| A             | 2    |
| B             | 2    |



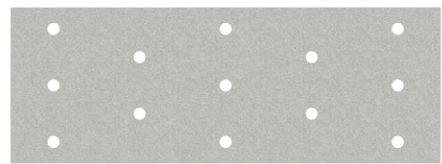
ONWARD 158X-V LOCKABLE CATCH

| Configuration | QTY. |
|---------------|------|
| A             | 2    |
| B             | 2    |



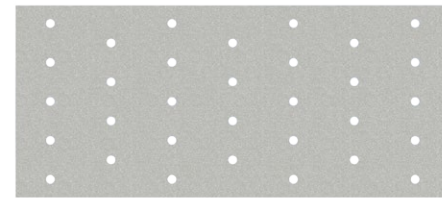
SIMPSON STRONG TIE A24 12-Ga. Angle

| Configuration | QTY. |
|---------------|------|
| A             | 1    |
| B             | 1    |



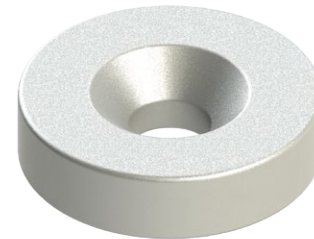
SIMPSON STRONG TIE TP15 Tie Plate

| Configuration | QTY. |
|---------------|------|
| A             | 4    |
| B             | 2    |



SIMPSON STRONG TIE TP37 Tie Plate

| Configuration | QTY. |
|---------------|------|
| A             | 1    |
| B             | 1    |



N52 MAGNET 1/2"OD x 5/16"ID x 1/8"T

| Configuration | QTY. |
|---------------|------|
| A             | 17   |
| B             | 19   |



N52 MAGNET 1/8"OD x 1/8"T

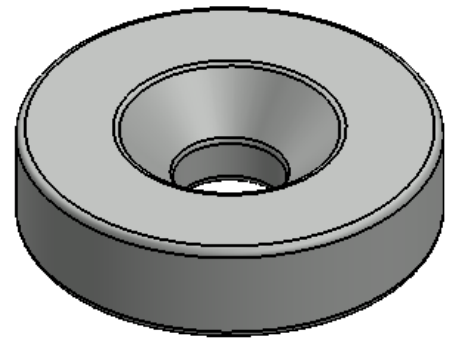
| Configuration | QTY. |
|---------------|------|
| A             | 6    |
| B             | 6    |



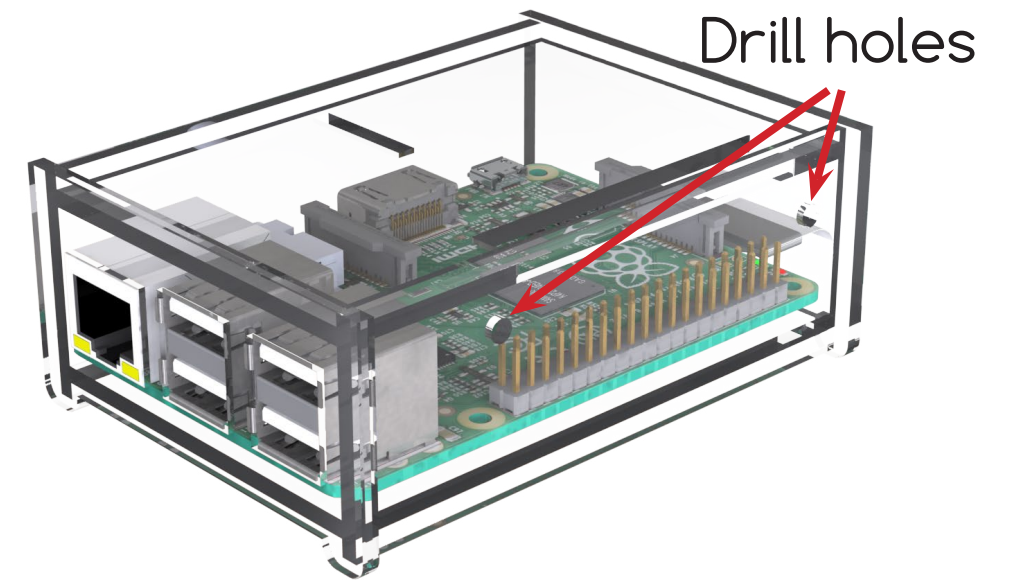
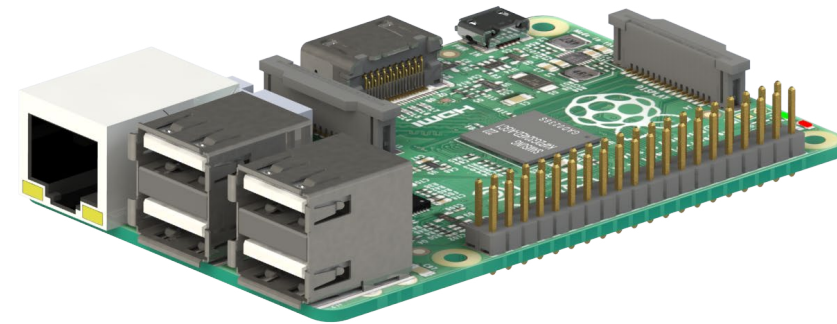
PROMAG 12382 Magnetic 1 x 2' adhesive sheet.

| Configuration | QTY. |
|---------------|------|
| A             | 1    |
| B             | 1    |

# Magnets for mounting and easily removing pi's

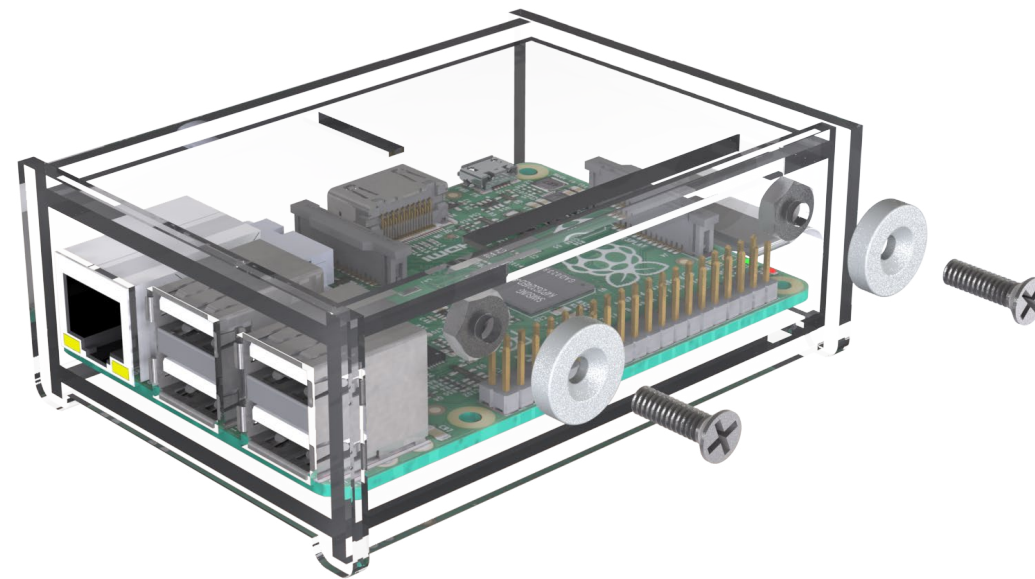


FASTENING MAGNET  
USE WITH 6-32 MACHINE SCREWS

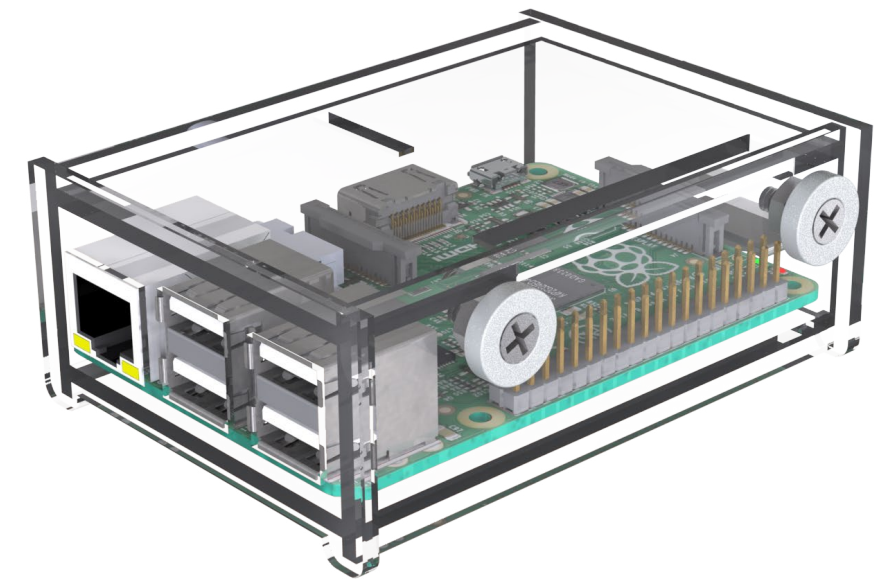


Step 1  
pi without acrylic case. Please purchase a case for your pi.

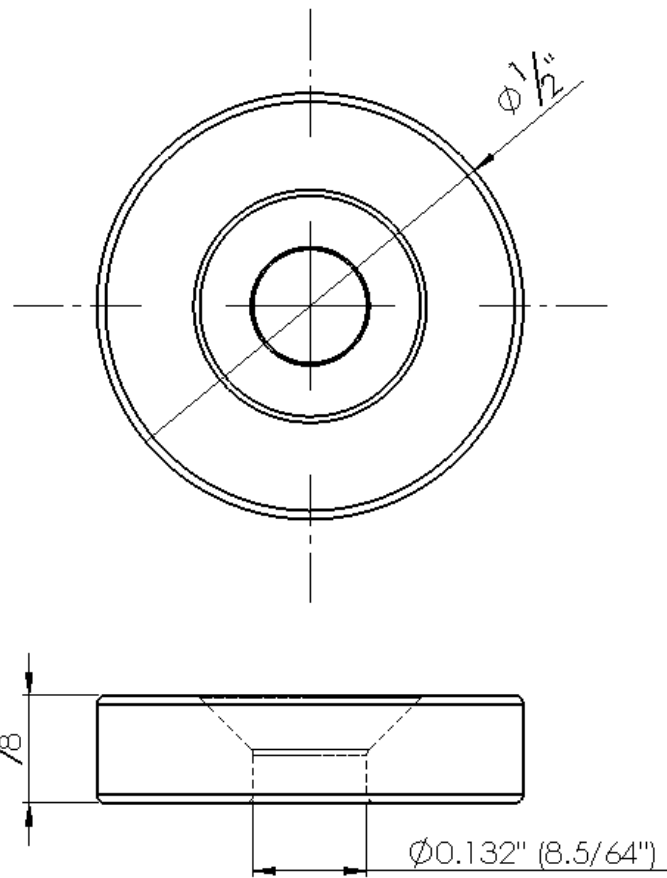
Step 2  
Acrylic case added. 9/64" holes drilled to accept 6-32 x 1/2" long machine screws.



Step 3  
Hold nuts while threading screws through magnets and case. Tighten.

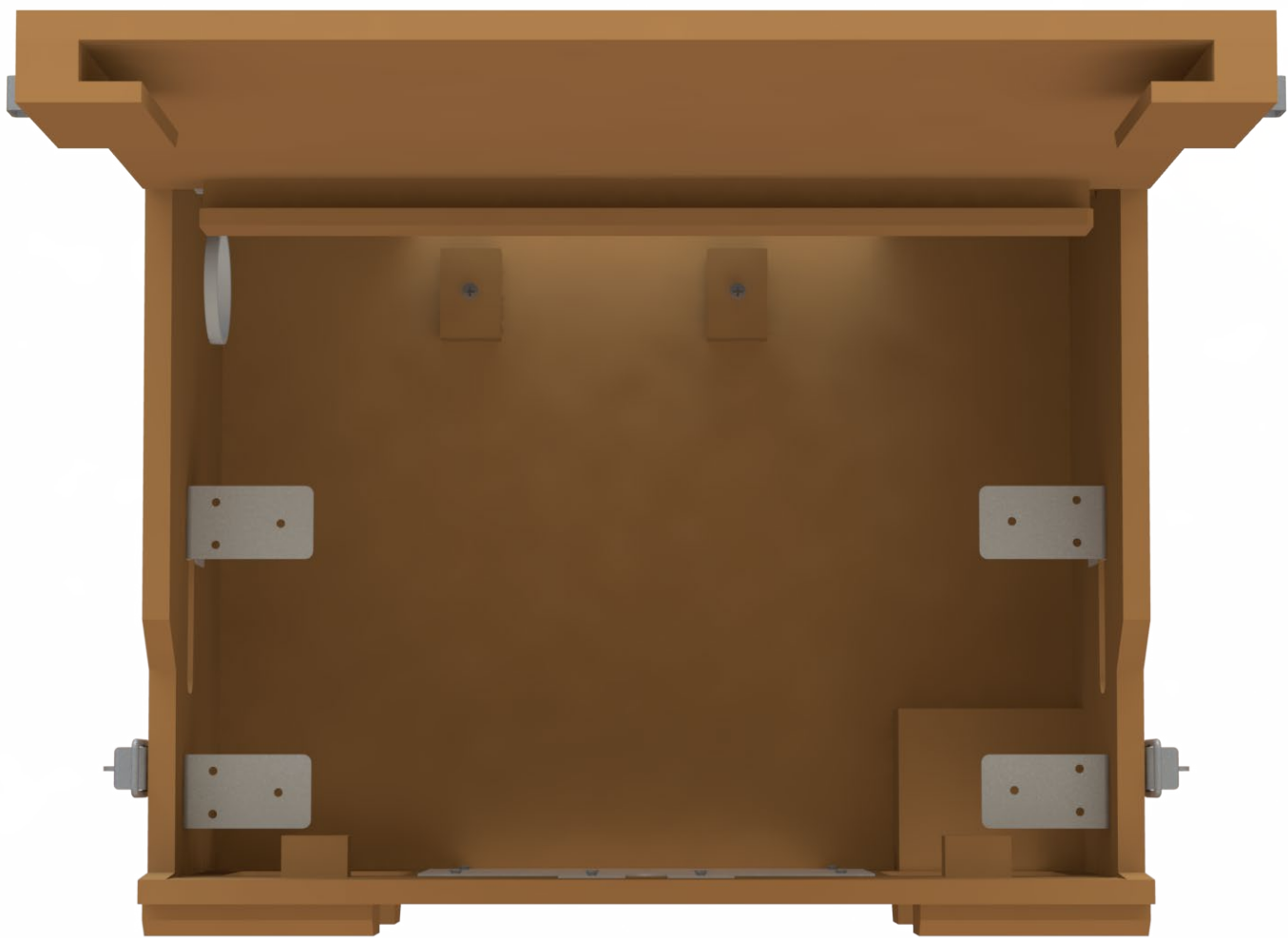


Step 4  
Case ready to stick on to metal surfaces inside beast pi enclosure. Easy and fast to position and remove.



The method shown using magnets may interfere with accessibility to the GPIO pins. Be creative and do it your own way!

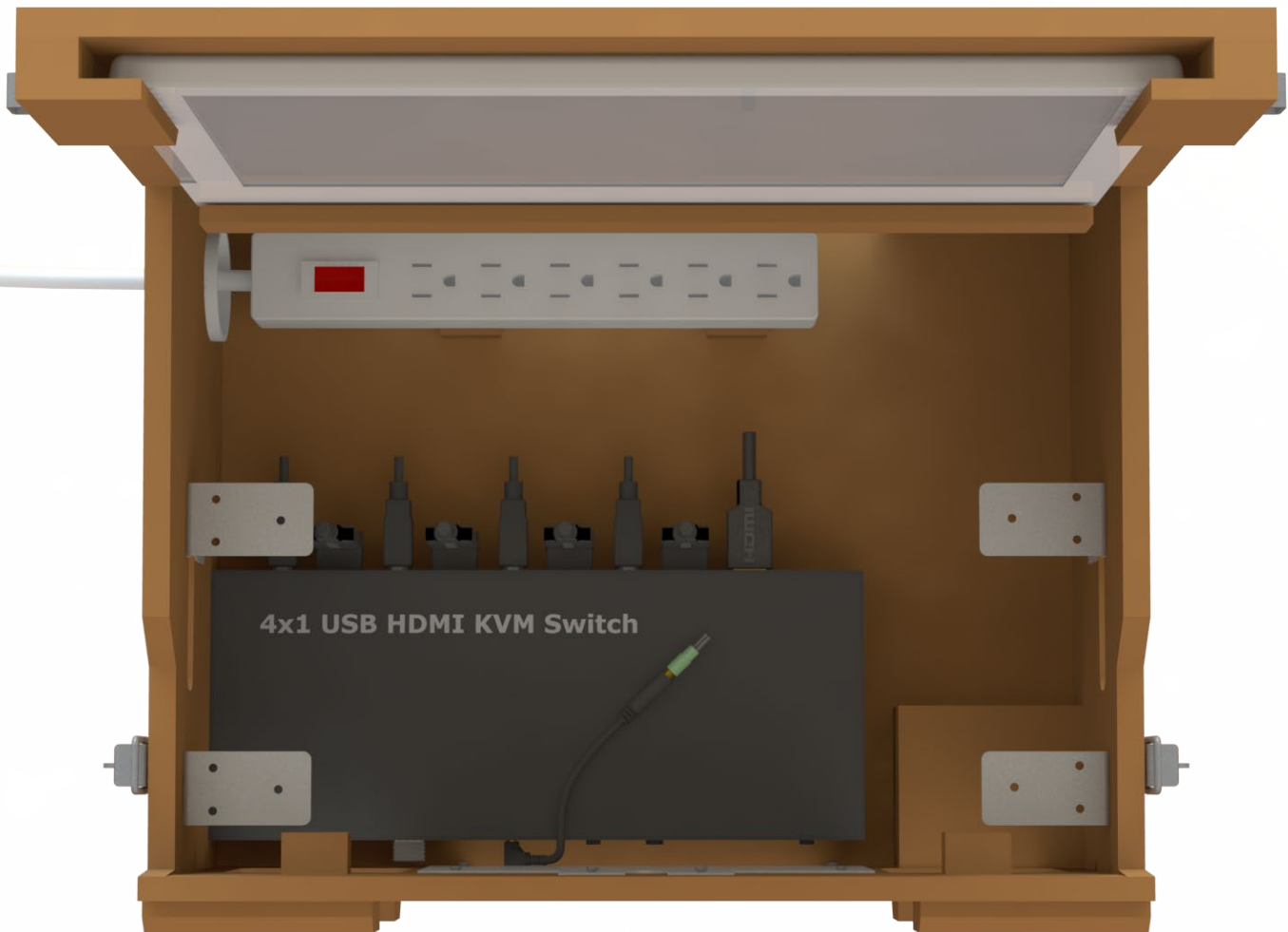
magnet mounts - beast pi



The positioning of the components were spaced to allow optimal fit. It was very difficult to find the perfect balance between form and function.

The easiest way is to add components that are on the floor, and work your way up.

The assembly shown is for configuration b.



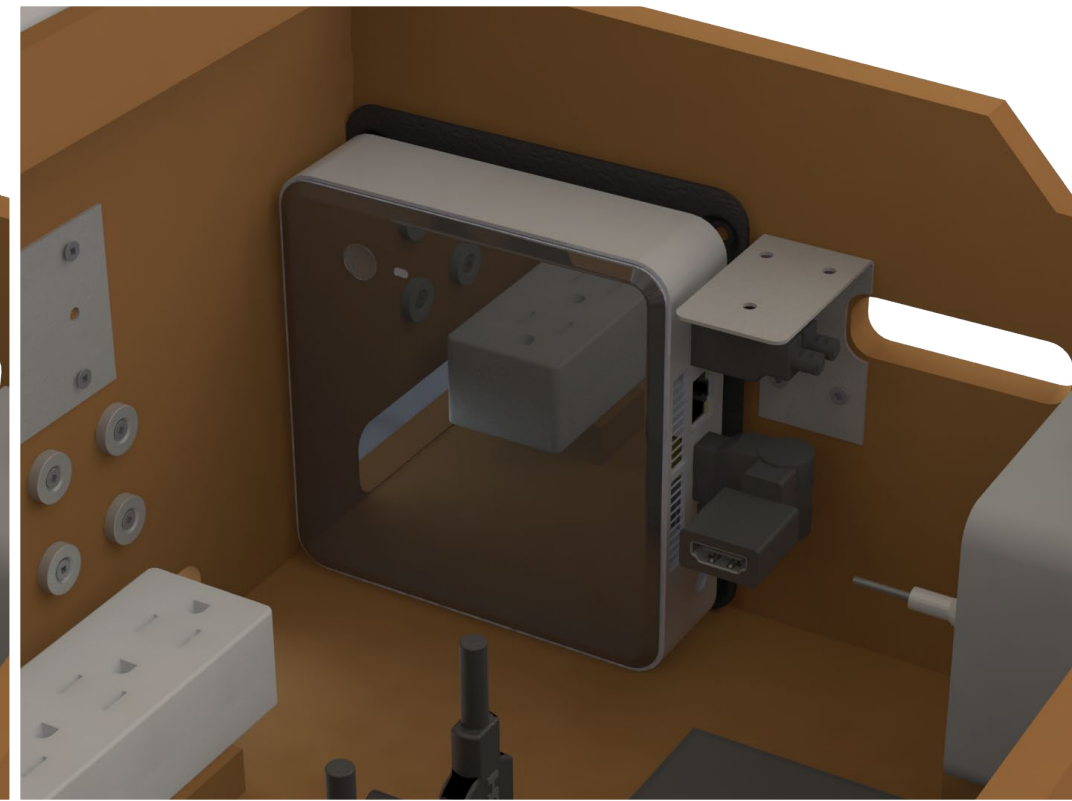
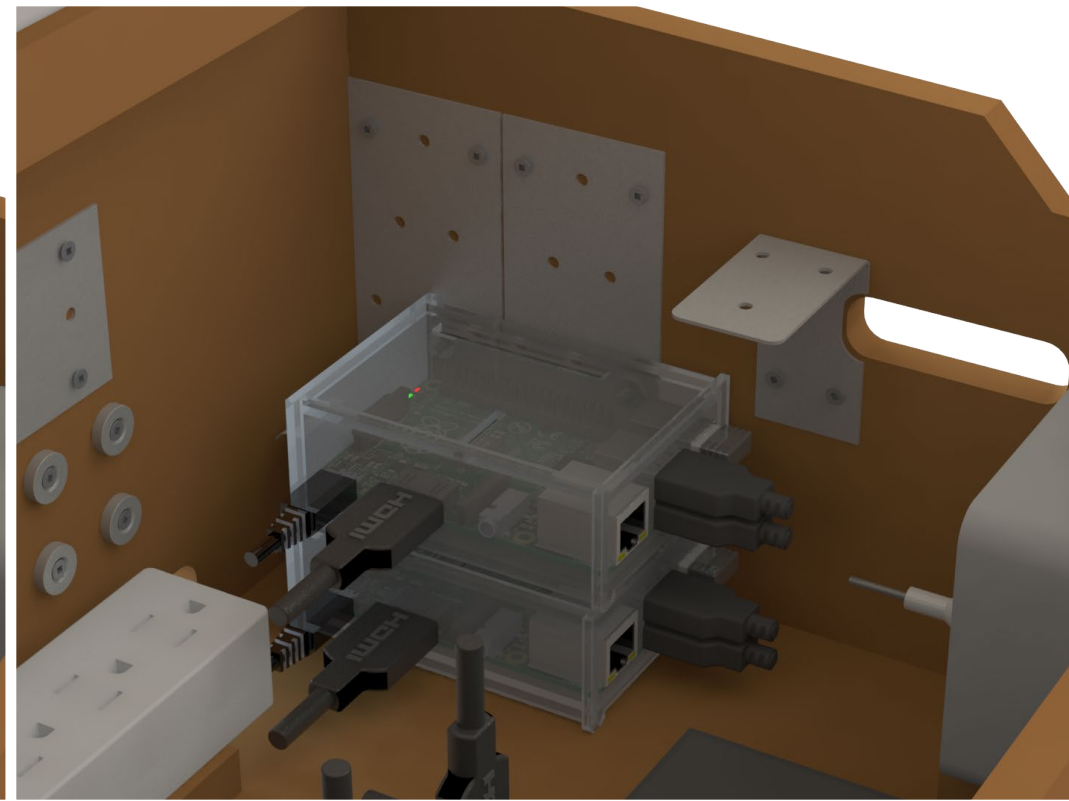
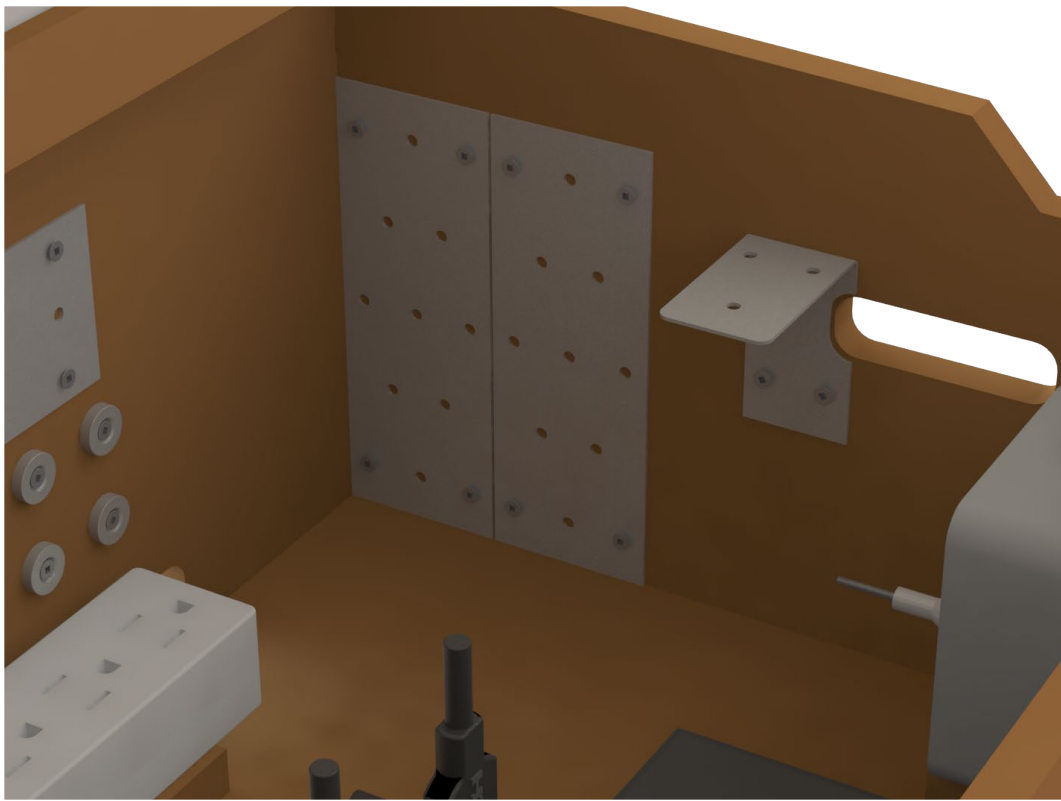
screen

power bar

KMV switch

assembly - beast pi

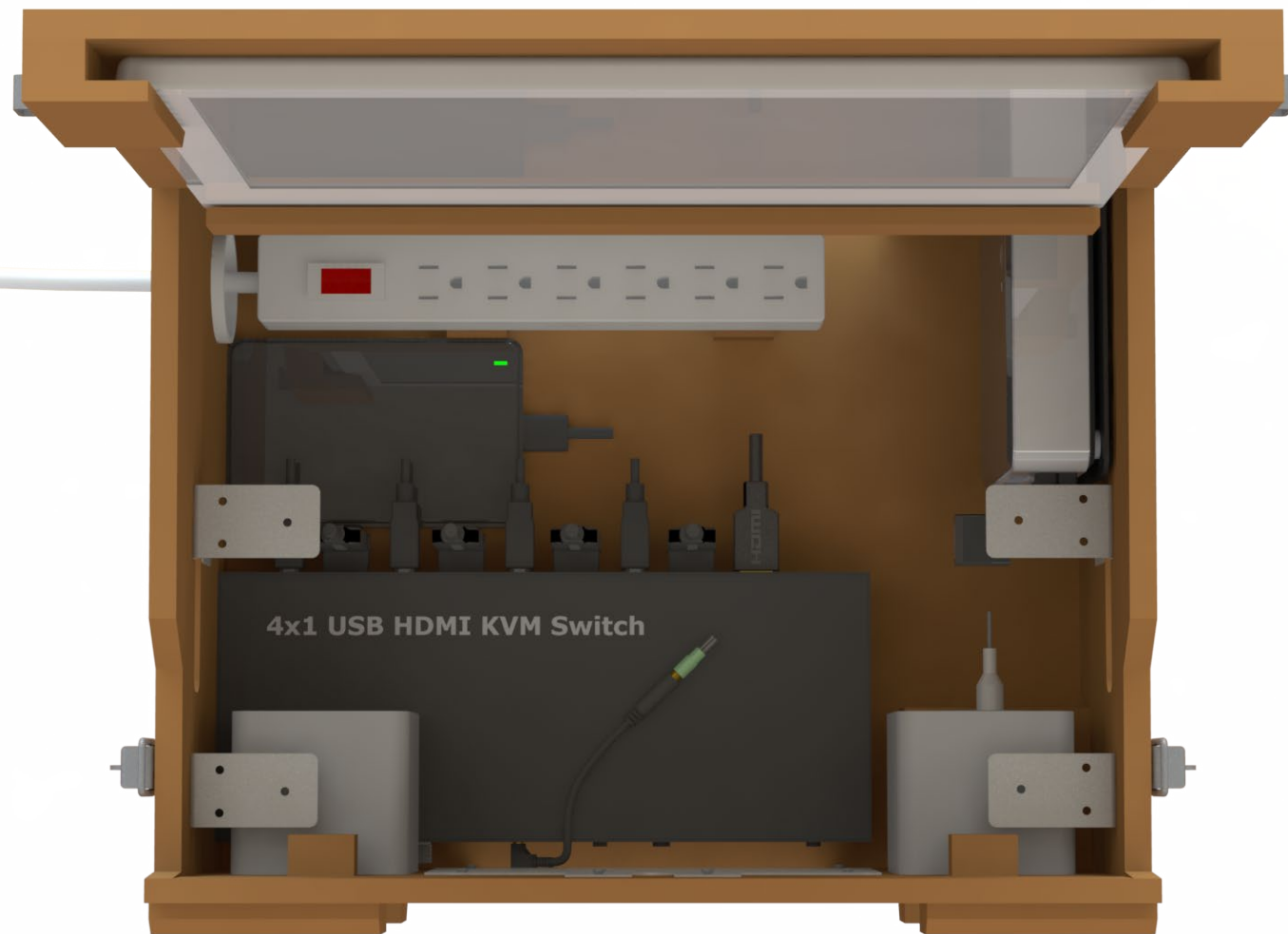




using tie plates to add 2 pi's  
configuration "a" only.

2 pi's added.  
configuration "a" only.

no tie plates. Intel NUC added.  
configuration "b".



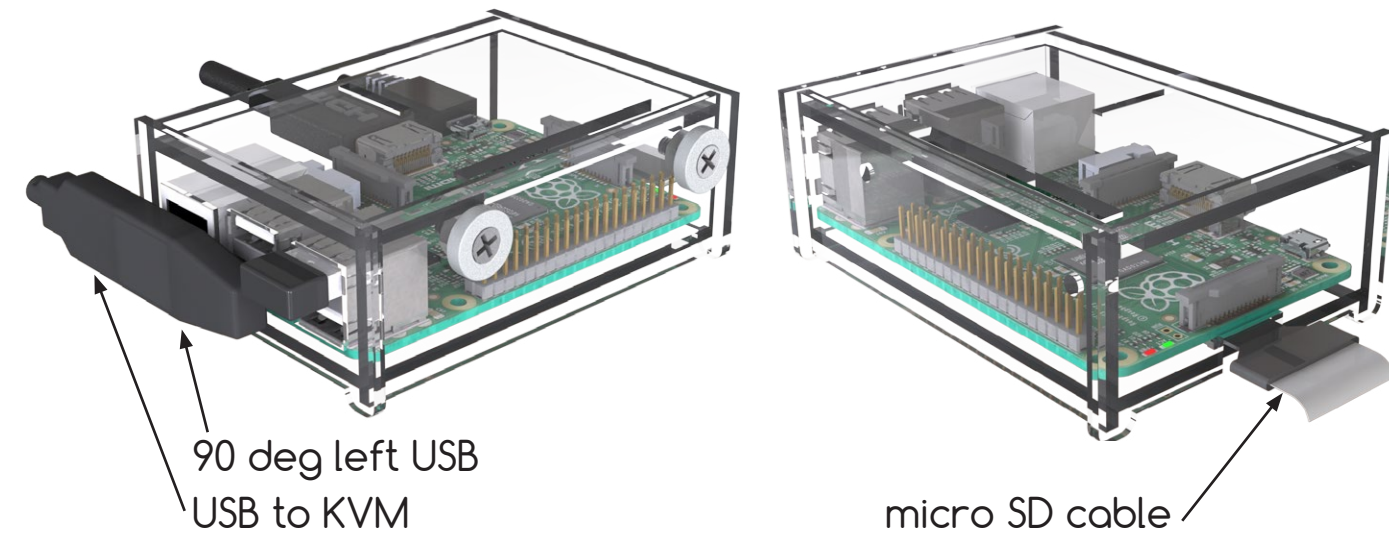
hard drive

speakers

Intel NUC

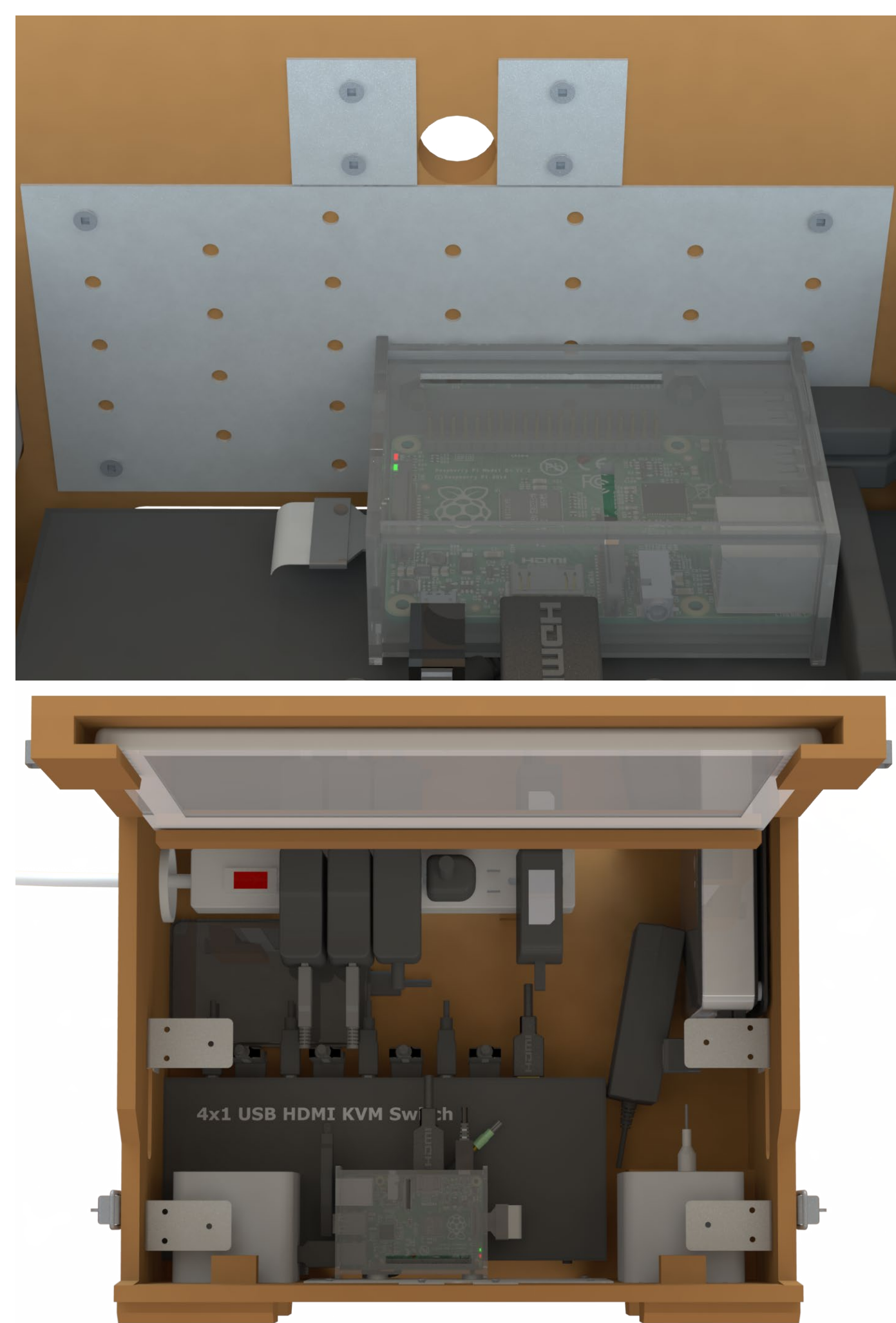
assembly - beast pi

I used 90 deg left USB adapters to eliminate the large cable bend radius for the USB cable that goes to the KVM switch.

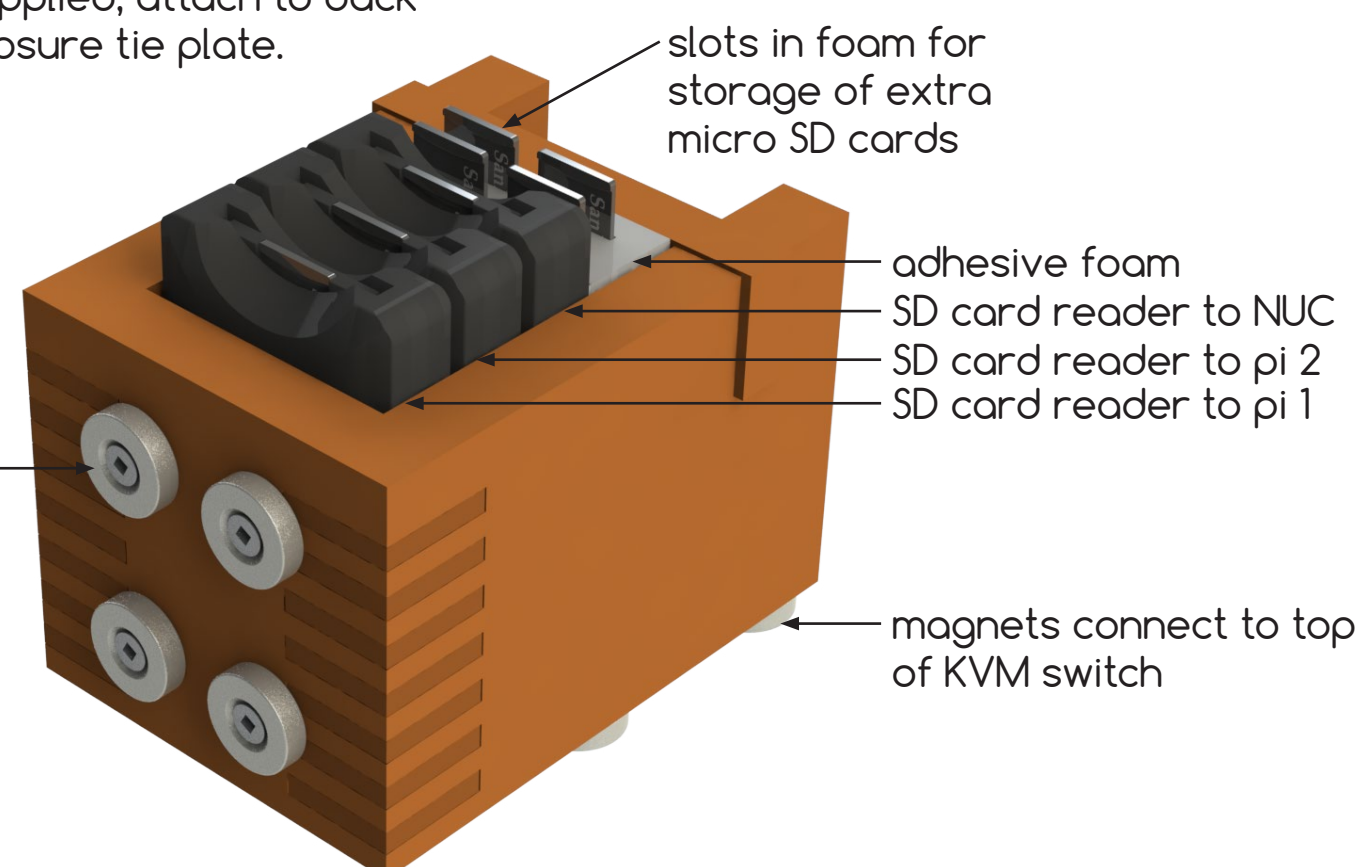
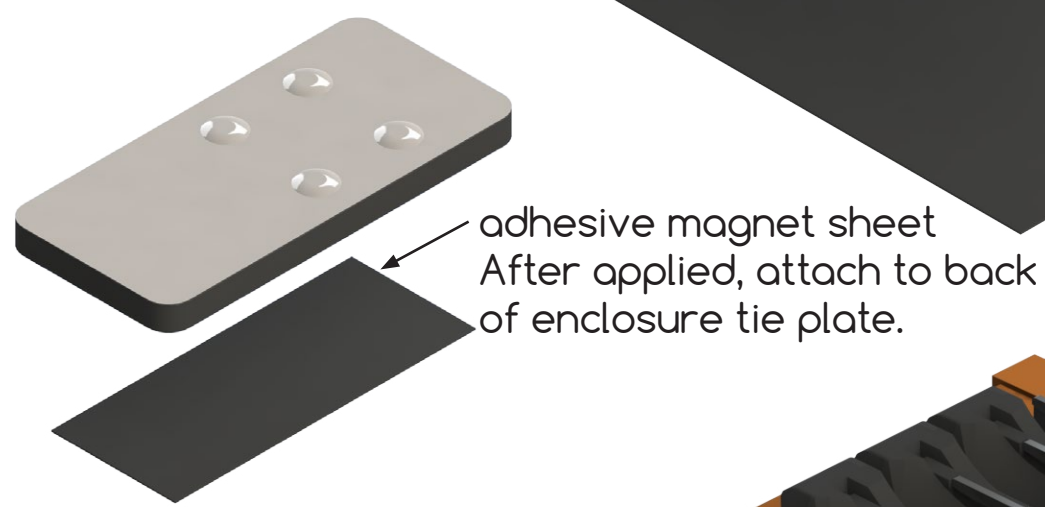
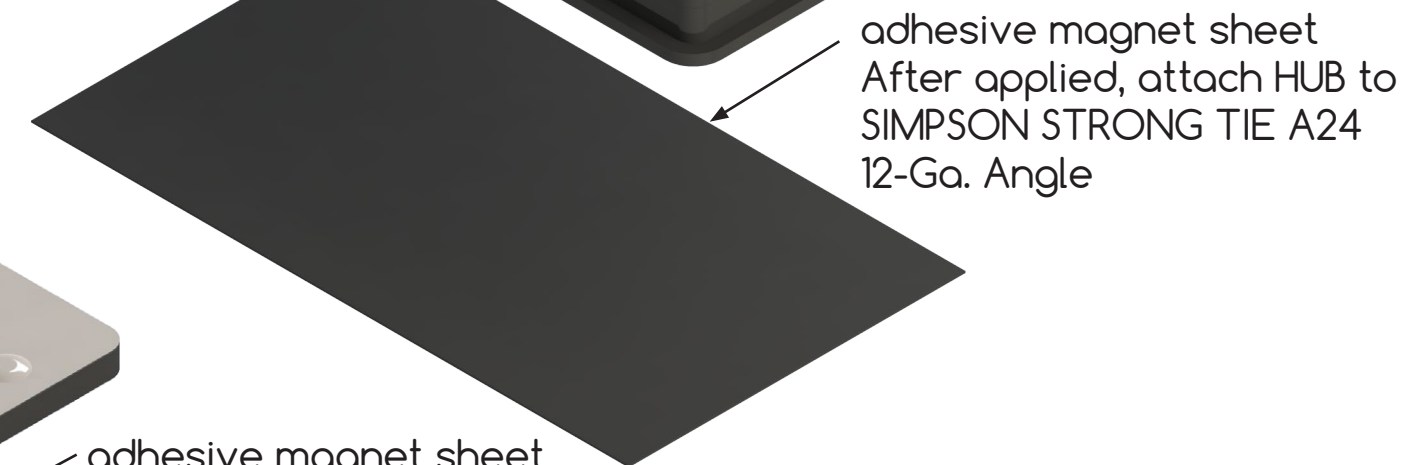
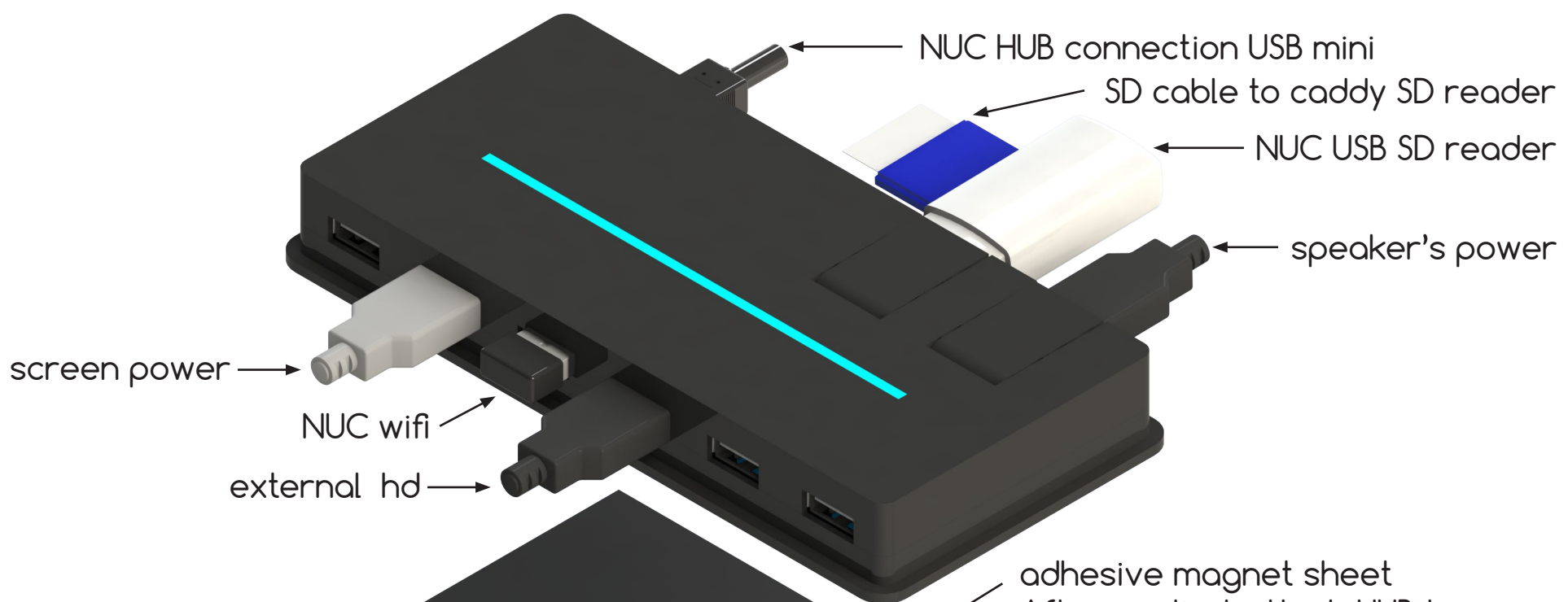


power supplies

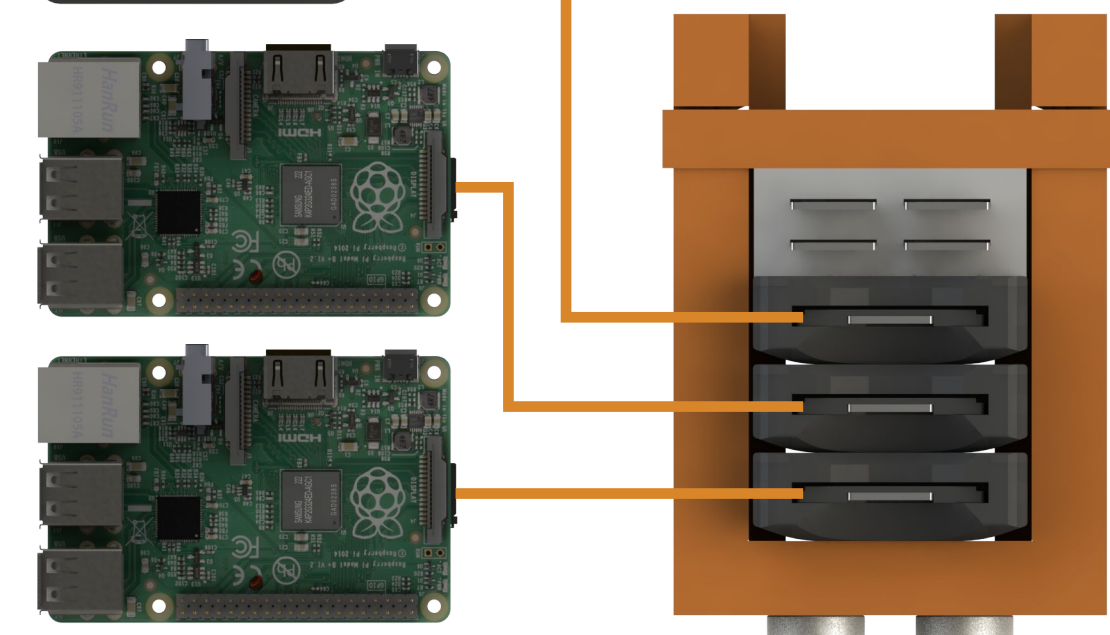
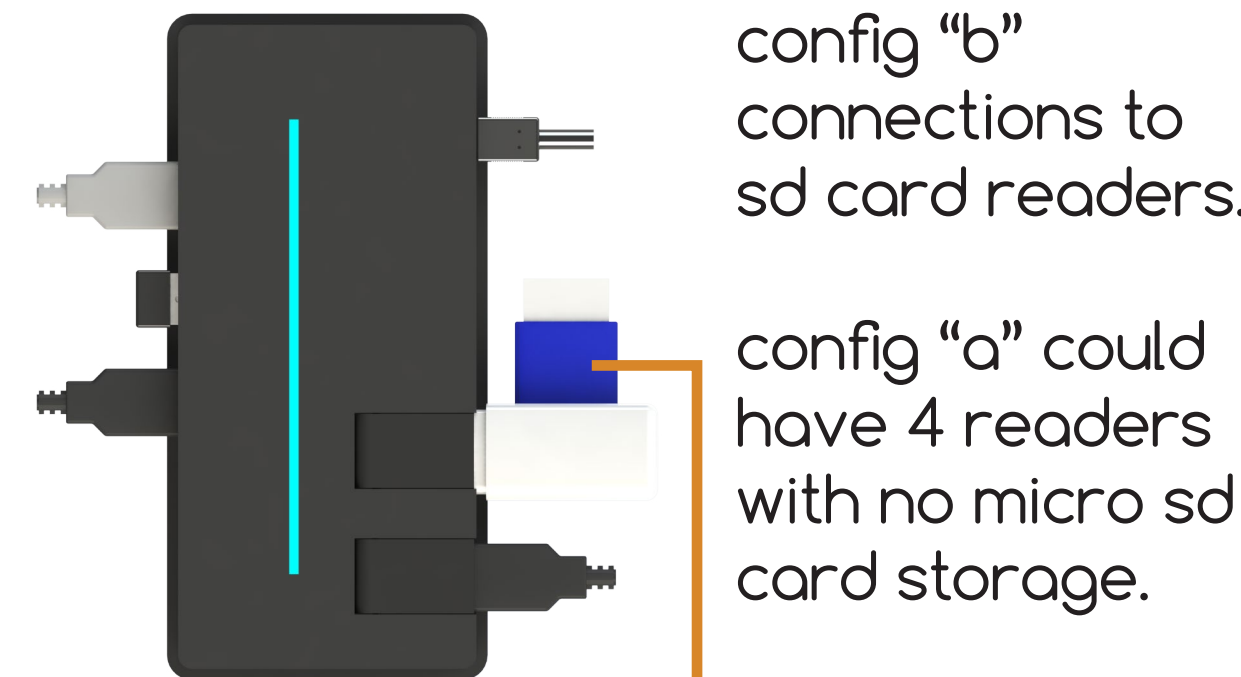
pi 2



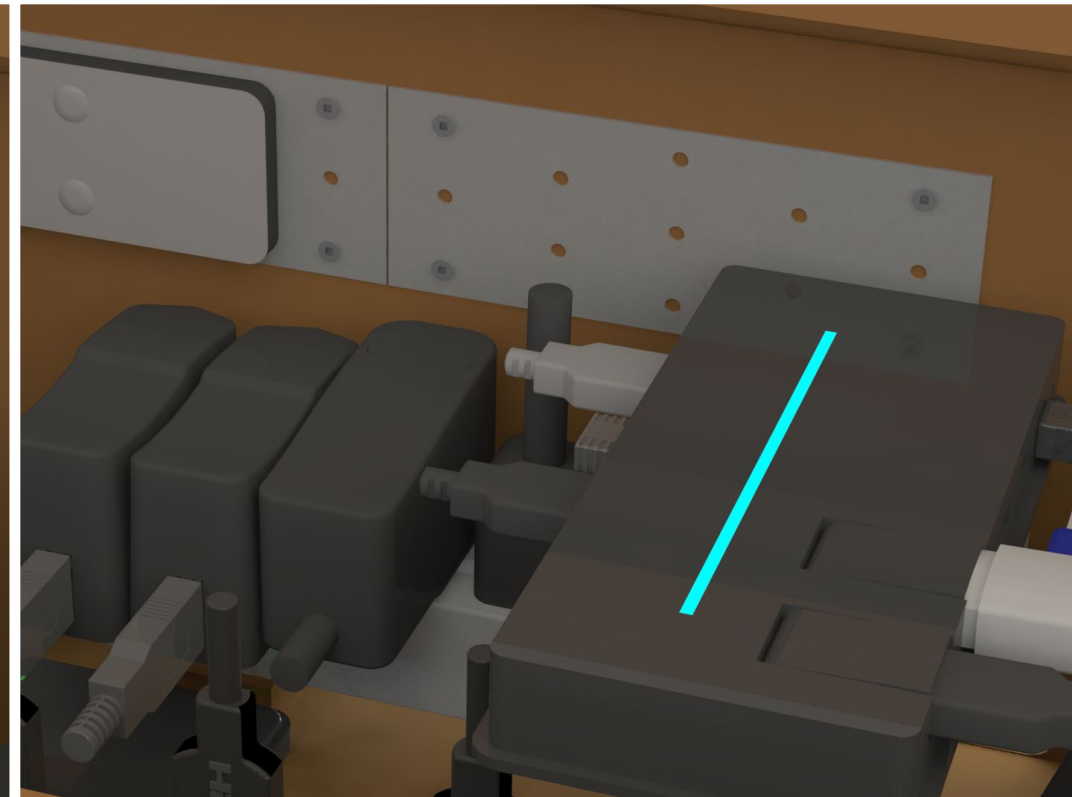
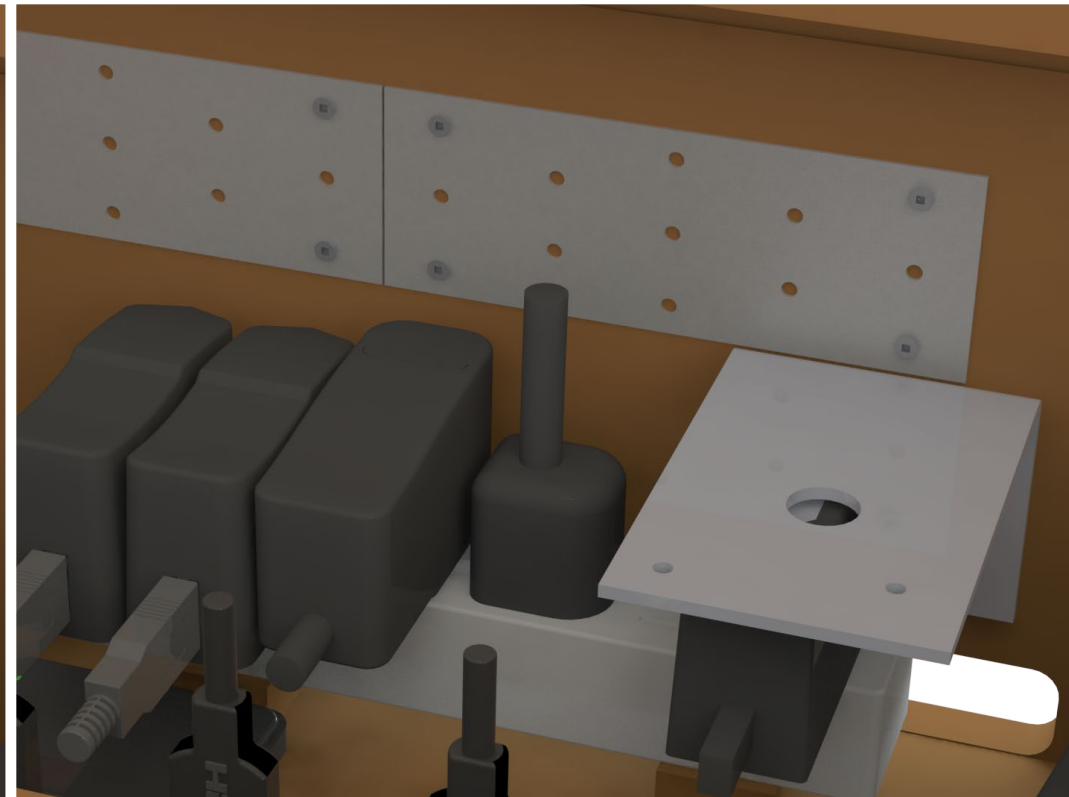
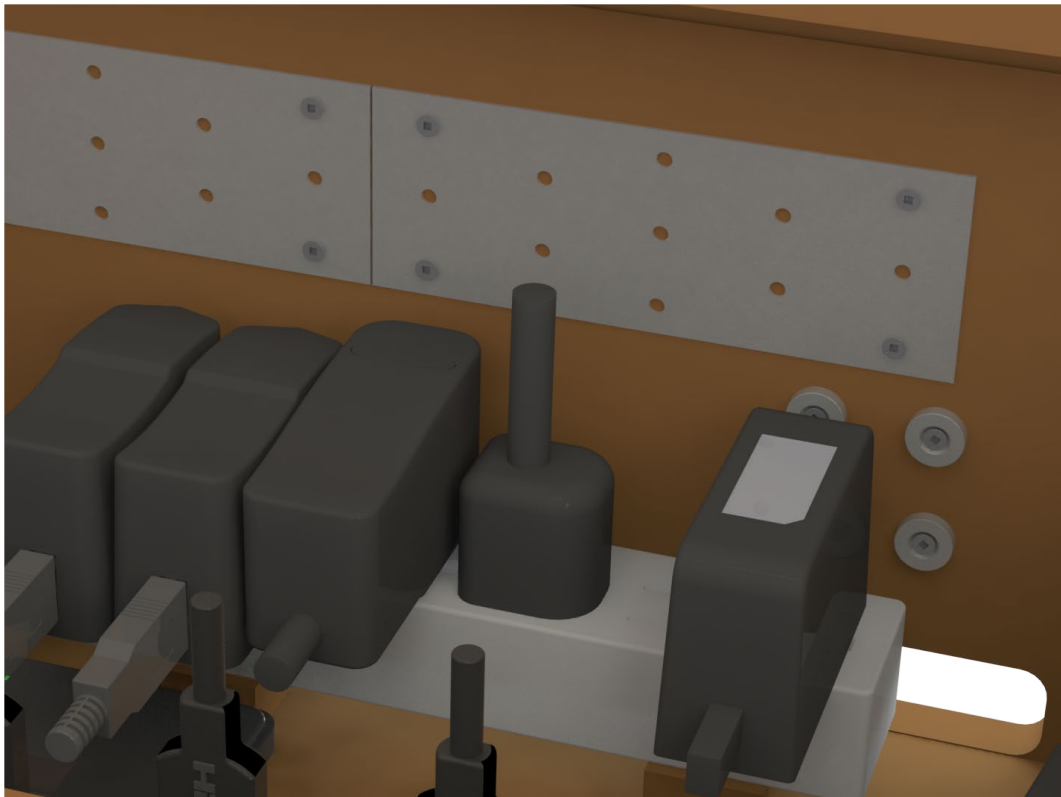
assembly - beast pi



The SD caddy allows easy storage reading and replacement of micro SD cards. You don't have to physically touch your pi's to switch cards. The NUC can be used to flash new OS images, which can be quickly swapped to the pi readers.



assembly - beast pi



Attach against the back wall magnets the SIMPSON STRONG TIE A24 12-Ga. Angle

Place HUB on strong tie and remote on back wall tie plate.

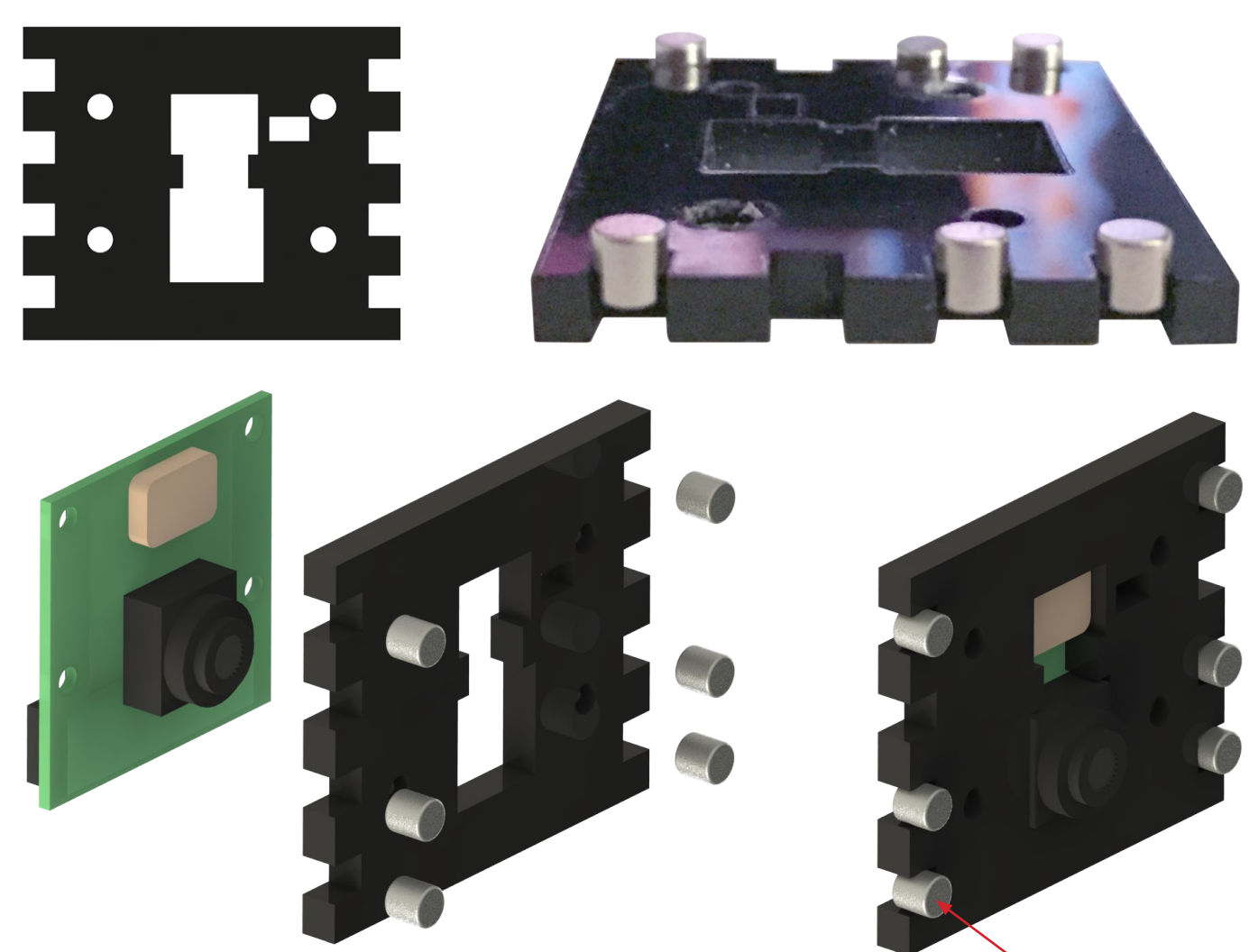


HUB

pi 1

SD caddy

assembly - beast pi



magnets connect to front of enclosure

6 small 1/8" diameter magnets were forced inside the slots on the side of the acrylic camera module mount. They were glued after being offset from the surface. The camera module was attached using double sided tape. Now the camera can be moved, rotated and detached easily from the front of the enclosure.

assembly - beast pi

Every once in awhile you have to take a break and play some games from the 90's.

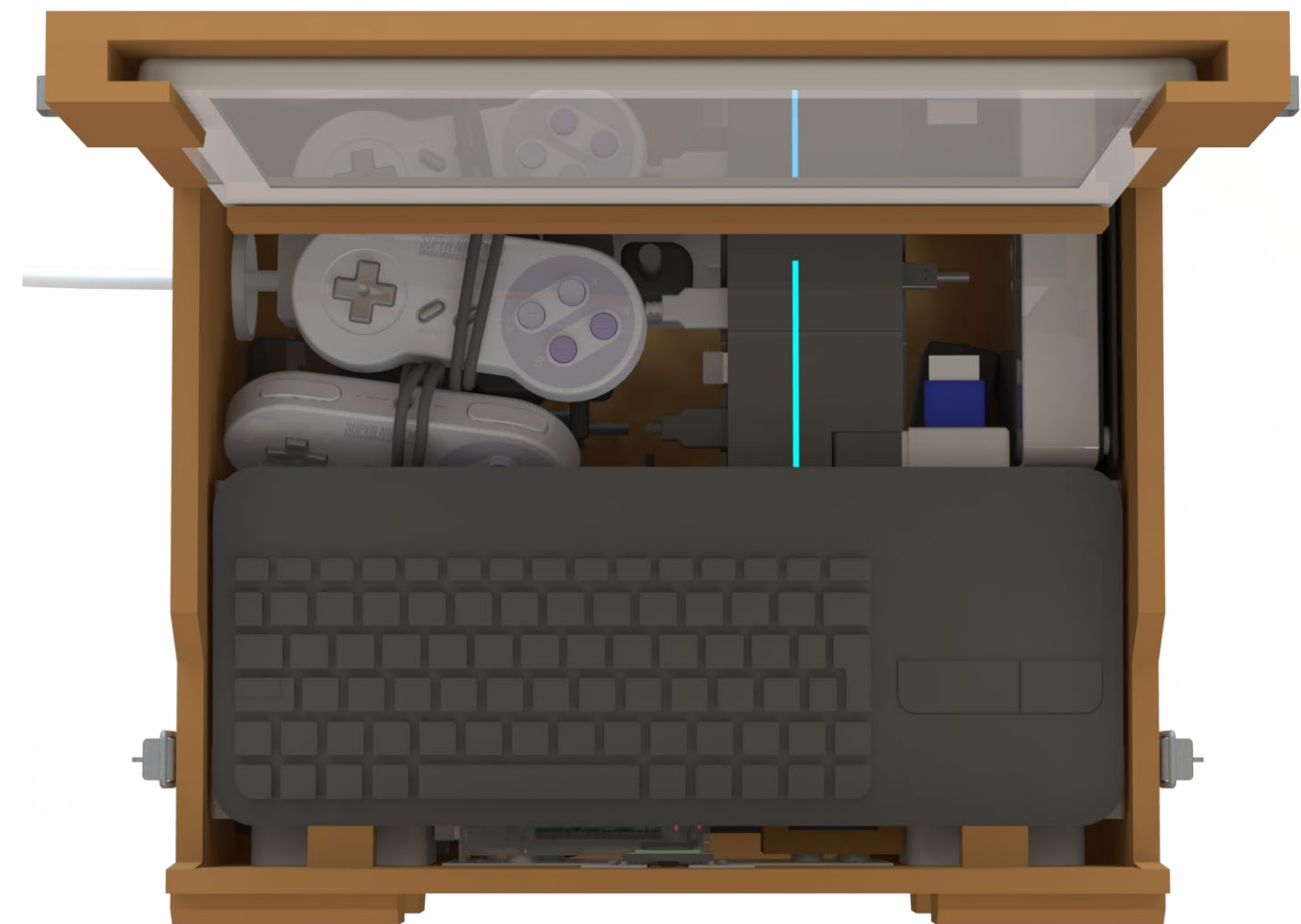
RetroPie, PiPlay and EmulationStation are very popular emulators that you can have on different micro SD cards, ready to swap and try.

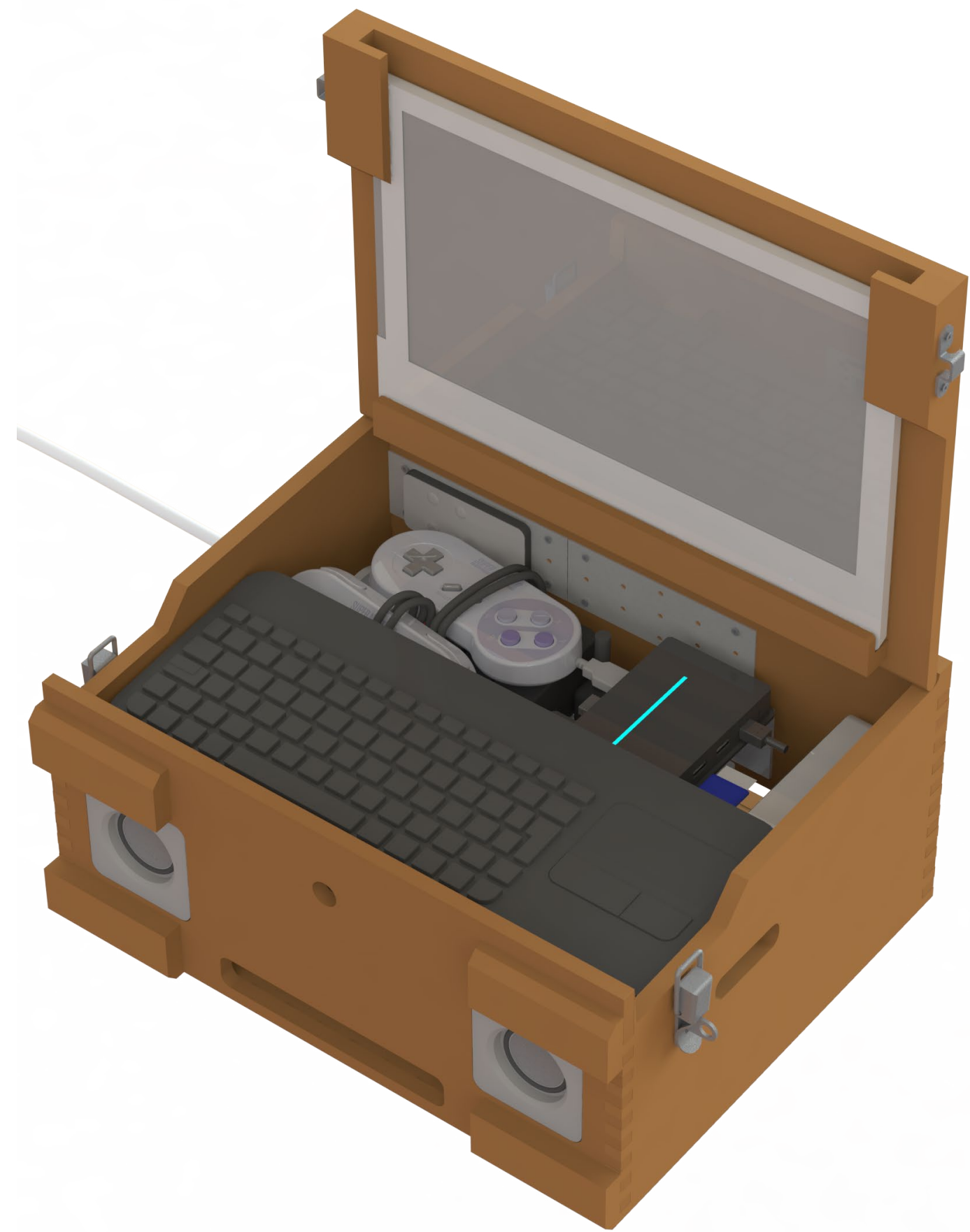
What is also cool, is that you can leave your game paused, and switch back to another computer using the KVM switch.

Super Nintendo USB Controllers

Keyboard

assembly - beast pi





assembly - beast pi