

Bartop Arcade based on Raspberry Pi

I based my plans sort of on this one but I've modified the width and don't cut all the same pieces he did. I have made some changes to the PDFs which are available directly from me. I use $\frac{1}{2}$ MDF for my build and $\frac{3}{4} \times \frac{3}{4}$ scrap pine or hardwood if I have it for the inside pieces
<http://www.instructables.com/id/2-Player-Bartop-Arcade-Machine-Powered-by-Pi/?ALLSTEPS>

Width of all pieces (refsheet.pdf) that I build is 55cm instead of the 50cm reference. With my first prototype I found it too tight for wiring and the joysticks. I print all the PDFs on 11x17 paper and tape together the full size plans included for the control panel and side pieces (side A and B)

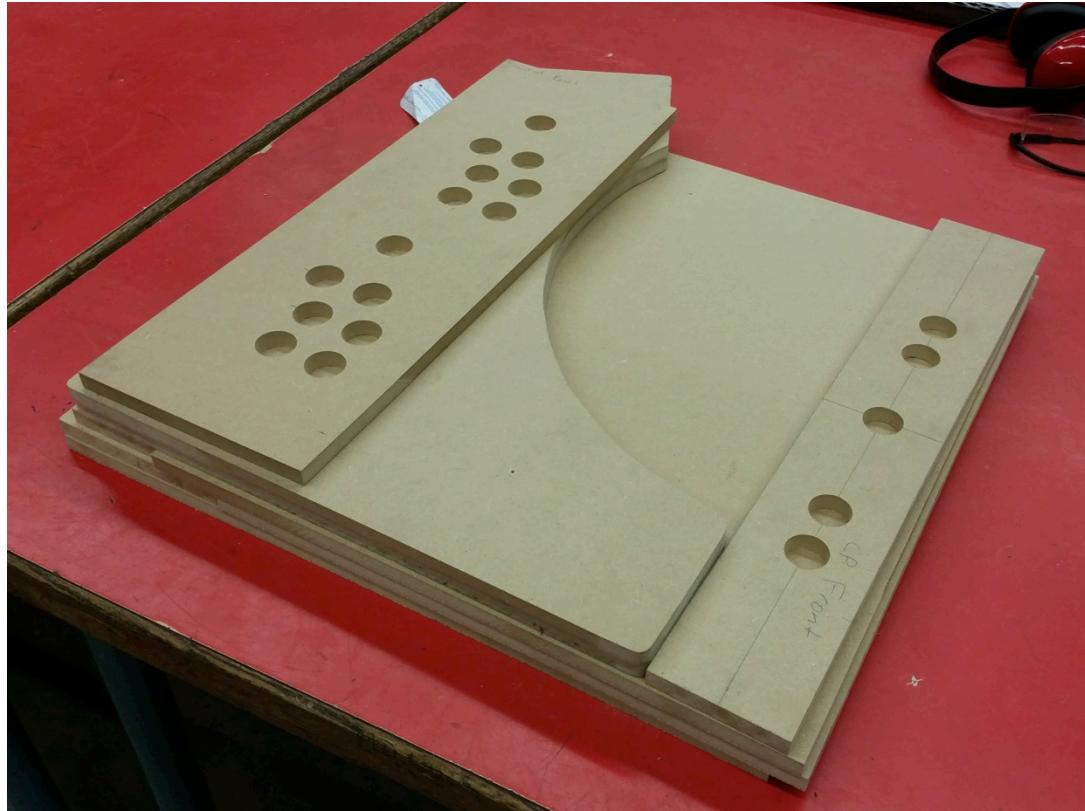
I split the back into 3 pieces. Bottom about 3 inches high, top about 3 inches high to allow room for a carry handle and vent holes (pics on instagram). The big piece that is left I put on a hinge and camlock system for easy access to wires, etc.

The control panel is held on with T nuts. I'm sure there is a better way to do this but I like the look of the flat head bolts throughout the project.

<http://www.homedepot.com/p/Everbilt-10-24-tpi-Coarse-Zinc-Plated-Steel-Tee-Nut-4-per-Pack-802281/204274192>

With my latest build I also attached the screen pieces to the cab with T-Nuts instead of permanently mounting to the cabinet. This allows easy fixing if needed.





All pieces cut out according to blueprints – (2nd arcade build)



Cabinet assembly – glue and brad nails



Control Panel drilled with 1 1/8" Forstner



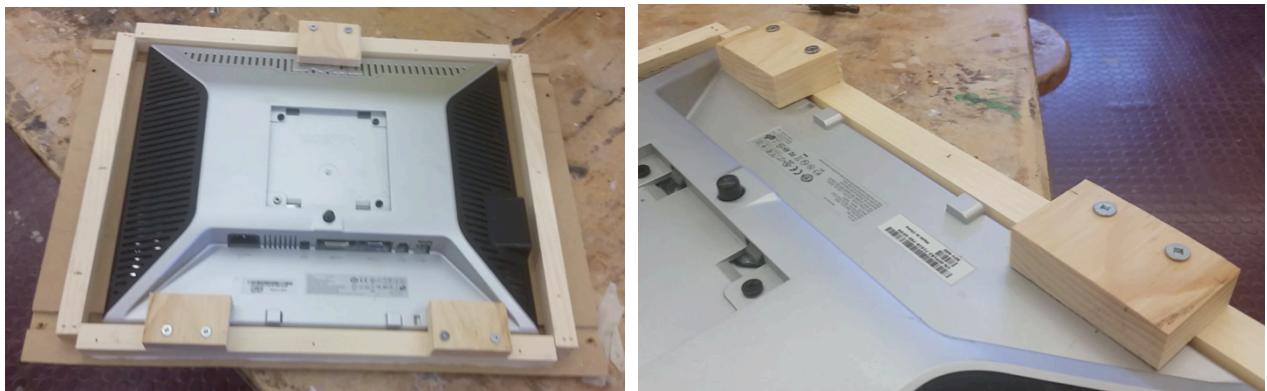
Back piece cut into 3. Top handle, door, bottom for power holes and hinge
Test fitting arcade buttons and Joysticks



All bolts used throughout this project are #10 NC. For the control panel I used flat head #10 and countersunk the board for a flush top. Different joysticks have different mounting options but this method worked easy for me. 4 Washers and nyloc nuts underneath holding each joystick them in place.

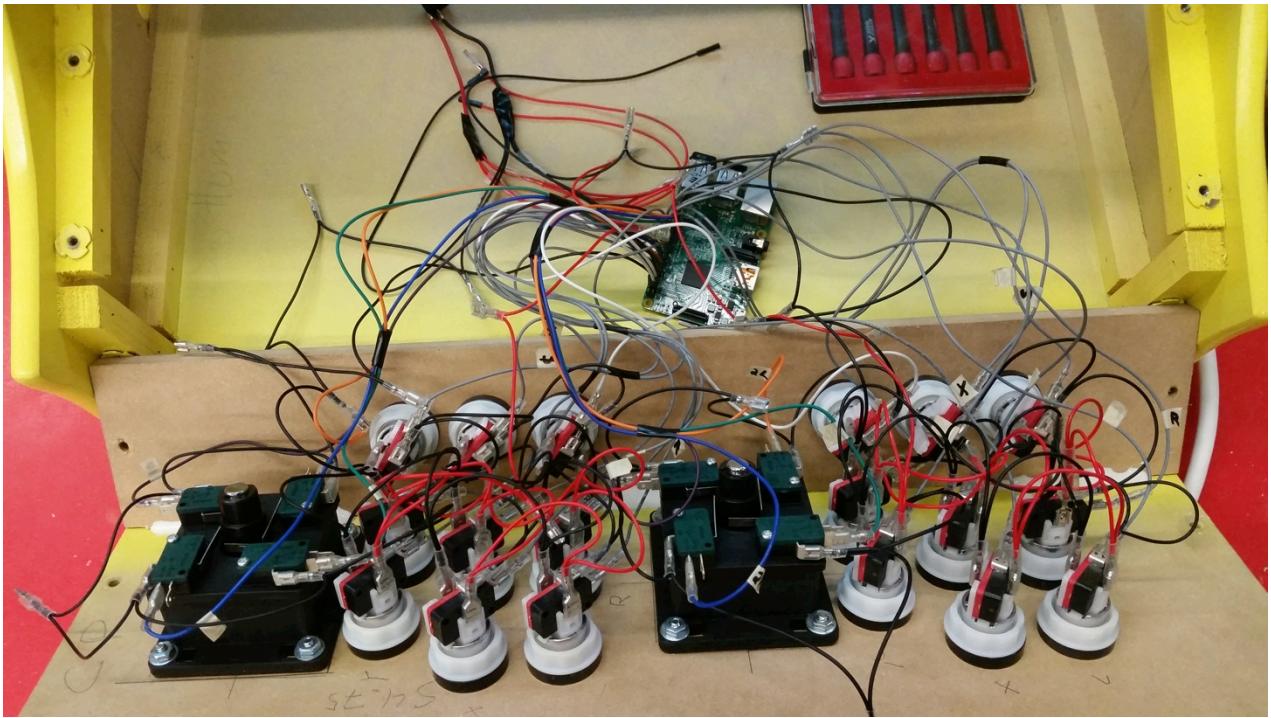


Screen surround built. Made from 4 pieces to custom fit the screen I use. Before glue and assembly each piece was cut with a Dado blade (or router) so that only the screen was visible and the rest of the monitor was not. Drop cutting one single piece and then using a router would also work but I prefer this method. Some $\frac{3}{4} \times \frac{3}{4}$ pine was used to hold the outermost part of the monitor

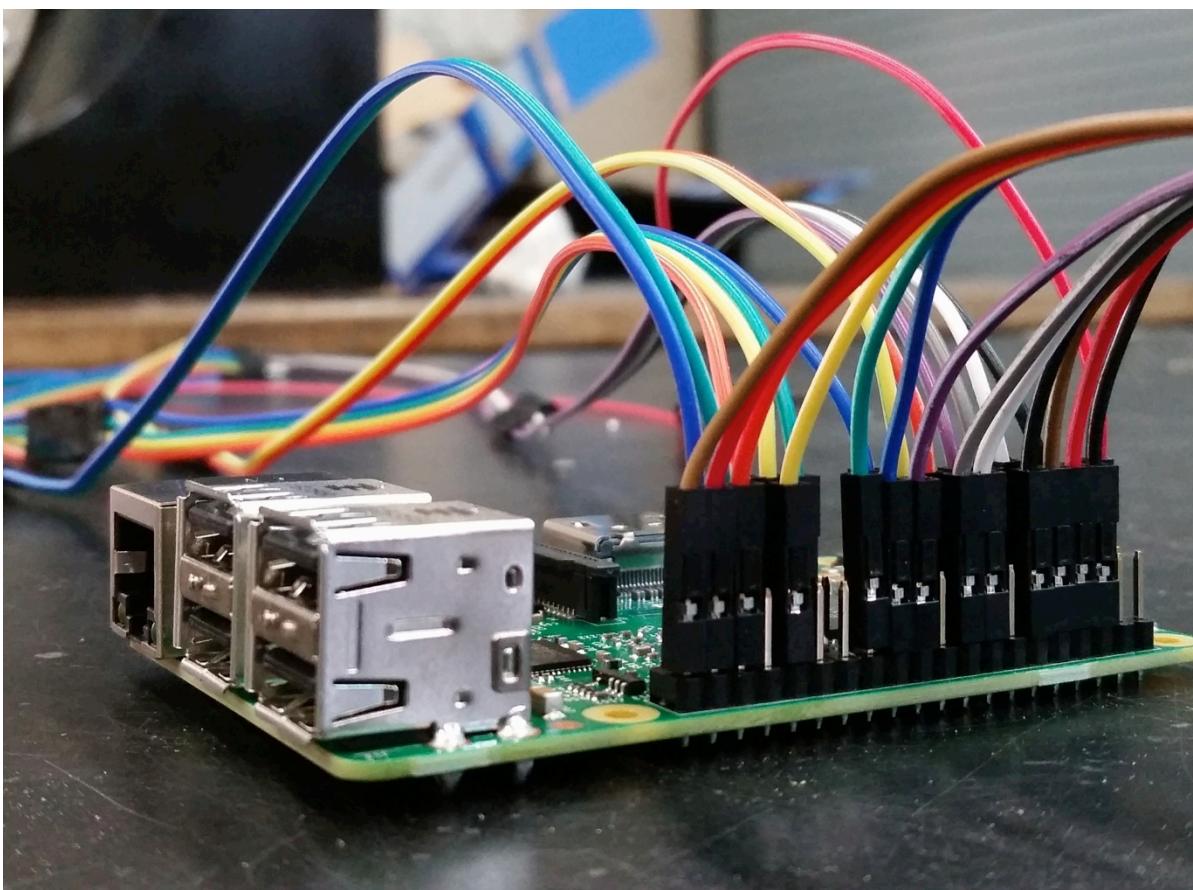


Using scraps from the offcut bin I made 3 'clamps' to hold the monitor to the screen piece. Custom make each piece to fit your style of monitor. I used the Bandsaw and disc sander prior to drilling them I used #10 screws. This is the only part of the project where I use screws. I prefer using bolts as they do not strip anything like wood screws would after constant in and out.





Buttons installed and microswitches wired to the GPIO headers of the Pi (prior to cable management and tidy up!). LED lights also wired/daisy chained and powered by the Pi.
**See wiring diagram on a later page



Color coded wire and Dupont connectors used for this build (2nd arcade)



Plexiglass, Screen piece and monitor fit. They bolt onto the cabinet using #10 NC bolts and T-nuts.

- Vinyl Cut decals applied to control panel



Everything Bolted together



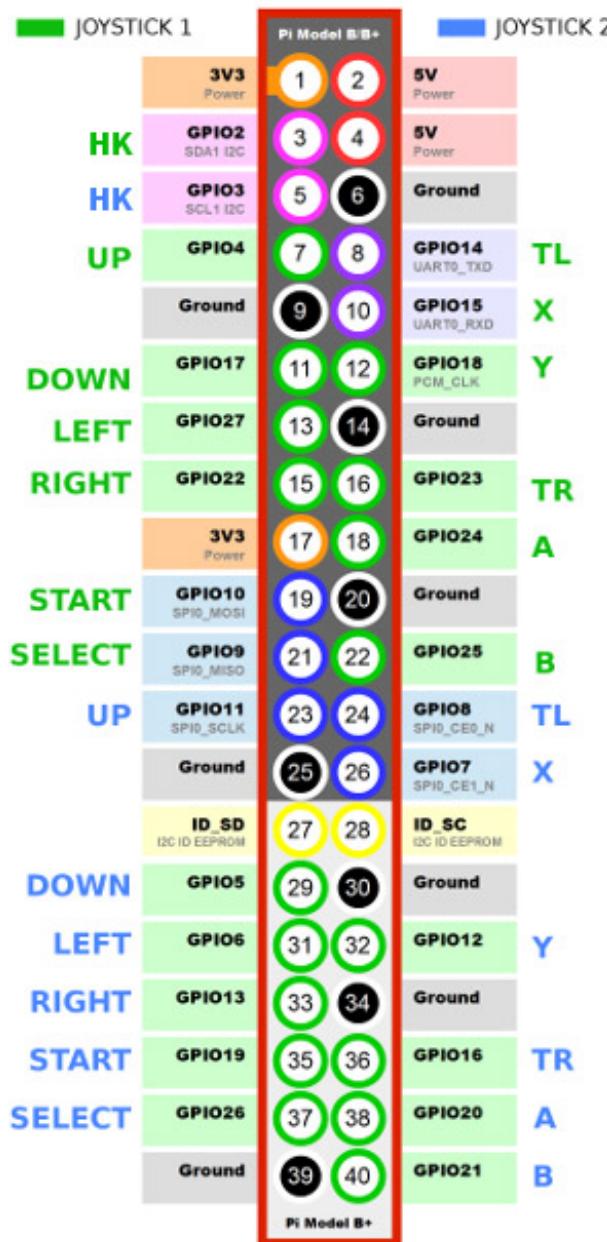
Finished 3rd arcade cabinet. LED buttons, side reset button, and audio controls. Because of the way I built this one I can completely dismantle the cabinet in minutes. The screen/mounting system, and control panel all come off with ten #10 NC bolts to expose the inner parts. If I only need to fix a wire or microswitch I take off the control panel, fix it, and then bolt it back on again. The T-nuts ensure I don't strip anything. My first prototype used wood screws directly into the plywood to hold everything together. That was a mess and stripped everything very quickly!

RECALBOX

<http://www.recalbox.com/diyrecalbox>

<https://github.com/recalbox/recalbox-os/wiki/Home-%28EN%29>

RASPBERRY PI GPIO WIRING



There are 40 headers on the Raspberry Pi (pi2 and pi3)

Recalbox is almost fully automatically configured to detect a GPIO controller (make sure to enable GPIO controllers in the recalbox.conf file) if you plug each microswitch into the right place. There are usually some left over headers available. I used extra grounds and a 5V header to power the LEDs if needed. That saved me \$10 bucks from having to buy a separate power supply just for the LEDs

I use a 4:3 Dell 19" monitor (craigslist for about 30-40 bucks) with an HDMI to DVI cable from the Pi to the monitor. Because I use a DVI input I have to make changes to the 'config.txt' file after the install process is complete (shown below. put a hashtag in front of hdmi_drive=2 .)

```
# comment to get jack audio  
#hdmi_drive=2
```

I also edit the 'recalbox.conf' file to allow the GPIO header controller. This has to be done by root access via the terminal. I do it directly by plugging a keyboard into the Pi "On the frontend screen, press F4 to quit, then ALT+F2 to get a terminal and use the same credentials as above."

Once you have got past the password part ("root" as login and "recalboxroot" as password.) type 'nano recalbox.conf' to access the file. Scroll down and enable the gpio by changing the 0 to a 1 as show below

[https://github.com/recalbox/recalbox-os/wiki/Root-access-on-terminal-\(EN\)](https://github.com/recalbox/recalbox-os/wiki/Root-access-on-terminal-(EN))

```
# ----- D3 - GPIO Controllers ----- #  
## GPIO Controllers  
## enable controllers on GPIO with mk_arcade_joystick_rpi (0,1)  
controllers gpio.enabled=1  
## mk_gpio arguments, map=1 for one controller, map=1,2 for 2 (map=1,map=1,2)  
controllers gpio.args=map=1,2
```

I also do the network changes here if I haven't done that already in the recalbox front screen menu GUI

```
# ----- B - Network ----- #  
## Set system hostname  
system.hostname=NAMEYOURSYSTEM  
## Activate wifi (0,1)  
wifi.enabled=1  
## Wifi SSID (string)  
wifi.ssid=NETWORKNAME  
## Wifi KEY (string)  
wifi.key=NETWORKPASSWORD  
## Samba share  
system.samba.enabled=1  
### Virtual Gamepads  
system.virtual-gamepads.enabled=0  
### SSH  
system.ssh.enabled=1
```

This enables file sharing on your network (wireless or wired with ethernet). You can now start adding files via your network or typing in the IP address of the pi and using the

browser GUI. If you are on the same network you can do everything from a mobile device. It's cool being able to download a rom on my phone and wirelessly send it to the Pi.

If you order buttons with LEDs you can use a separate power source but I managed to use an extra ground and 5v header from my Pi to power the 18 buttons on mine. So far no problems or fire.

Each of the buttons is wired directly to the Pi using 'dupont connectors'. They are cheap but they do require a crimping tool. I have some premade cables I bought from Lee's electronics to save time crimping as much. <https://www.instagram.com/p/BBMPN0rOHEe/>
<https://www.instagram.com/p/BBMPTJiuHEj/>
<https://www.instagram.com/p/BBMPfwUuHEu/>
The ends of the wires use red quick connects. Make sure to get the right size based on your microswitch tabs.

I think that's about all the good stuff. I'm pretty happy with my monitor mounting design. It is lighter than leaving the stand in the case and leaves lots of room for the wires. I have seen people use VESA mounts before but I wanted to keep my build as light and cheap as possible and still allow easy access to everything.

The last kit I bought was this one

<http://www.ebay.ca/itm/Arcade-DIY-Kit-2-HAPP-style-joysticks-20-LED-buttons-2-player-USB-encoder-/121998868527?>

I didn't end up using the USB encoder but I'm sure you could if you wanted. This seller shipped to me within 7 days which was the fastest I have ever had an order come in (usually 4 weeks)

Amp module I use is this one. It requires a 12v 2amp power supply. I bought some speakers from RP electronics but you could also pull apart some old computer speakers.

<http://www.ebay.com/itm/AC-DC-12V-TDA7297-2x15W-Digital-Audio-Amplifier-DIY-Kit-Dual-Channel-Module-/371499351808>

Don't forget proper 5v 3A power supply for the Pi otherwise it will be underpowered and show a rainbow square in the top corner of your screen.

Small fans run off a 12v power supply on the rear of cabinet. Try and get silent ones. Intake and 'exhaust'. And vent holes.

Surge/power bar: Monitor cable plugged into this. My audio amp used a 12v 2A power supply. The pi uses a 5v 3A power supply. Rp electronics or Lee's for good quality power supplies.

File formats: Each emulator supports different file types. Within the automatically created game folders on the share partition (access via wifi) will be a text doc with appropriate file types that will work. Drop the roms into the appropriate folders. Some folders also require a

bios file(s). See recalbox manuel for instructions

<https://github.com/recalbox/recalbox-os/wiki/Manual-%28EN%29>

Front of cab buttons: Select/coin, start/1player, and hotkey (used for button combinations and menus)

For game files/roms search the internet. You are on your own for this part.

Arcade info for Mame and Fba Libretro. They have specific rom sets they recommend. Not every game will work so trial and error.

[https://github.com/recalbox/recalbox-os/wiki/Easy-Arcade-on-Recalbox-\(EN\)](https://github.com/recalbox/recalbox-os/wiki/Easy-Arcade-on-Recalbox-(EN))

Info for gpio and where to plug in

[https://github.com/recalbox/recalbox-os/wiki/GPIO-controllers-\(EN\)](https://github.com/recalbox/recalbox-os/wiki/GPIO-controllers-(EN))

Where to buy stuff:

<https://www.t-molding.com/> - t molding and router bits

ebay

amazon

craigslist – I find my monitors there.

Rp Electronics

Lee's Electronics

My shopping list

-4:3 monitor with DVI or HDMI input (17" or 19") **\$30**

-raspberry pi 2 or 3 (The 3 performs better with 'newer' games) **\$50-65**

-high quality micro SD card – minimum 8gb. I recommend 16-32gb. **\$20**

-wifi adaptor for raspberry pi 2 **\$10**. Raspberry pi 3 has it built in.

-HDMI or HDMI to DVI cable **\$10**

-2 joysticks and 19 buttons - **\$80-100**

-surge protector/power bar **\$10**

-amplifier and speakers **\$20**. Or pull apart some old computer speakers for free!

-power supplies for amp **\$12-\$20**, raspberry pi **\$16**. Ensure you have the correct Amps and voltages.

-4x8 sheet of ½" MDF. I can build two cabinets out of 1 1/2 sheets. **\$40** per sheet

-#10 NC T-nuts, #10 NC machine screws in various lengths. I use ¾"-2" throughout the build.

#10 NC nuts. **\$5**

-24 Inch X1-1/2 Inch Nickel Cont Hinge **\$6** from Home Depot and screws to attach to cabinet

-5/8 In. Chrome Cam Lock **\$6**

-Spray paint. I usually get 2 cans for lots of layers. **\$10**

 -If doing a vinyl wrap expect to pay about **\$50** for a custom vinyl cabinet wrap

-Plexiglass for marquee and front screen protector. I used scraps and donated materials but it can be up to **\$50** to get custom cut plexiglass. I have used 1/8" up to ¼" in thickness. It really helps the colors pop and looks way cooler!

Average cost for a build for me is usually \$350.

Extras like t-molding, vinyl wrap, LED buttons, etc all cost extra!