



BarCade: Introduction

This help document, with acknowledgement to Chris Coward's MiniMame document, was created to detail the construction of my tabletop arcade controller, affectionately referred to as the BarCade. My cabinet was inspired by a number of other excellent projects that are listed at the end of this document. It was built with parts already on hand, where possible. Although some items had to be purchased, I did a good job of sticking to this rule.

In addition to the parts listed on the next page, you will also need a functional PC and 15" monitor. You can generally find someone willing to give you the monitor for free and the low-end PC required by this setup won't be any harder to find. Once I built this cabinet and let people know what was driving it, everyone seemed to have at least one 'beater' machine gathering dust in their basement.

I would recommend reading this document through several times, as well as browsing the additional photos on my website, www.ArcadeCab.com. Then refer to this often as you build your own cabinet.

If you have any questions as you go, feel free to contact me at info@arcadecab.com.

Good luck and enjoy the project.

Mike Trello,
August 29th, 2004

List of Materials

Below is a list of materials you will need and the major tools required. Certain items, such as a table saw, are handy but not mandatory. You may find you need items in addition to those listed. (Note- I used $\frac{3}{4}$ " wood but you could substitute $\frac{1}{2}$ " for everything but the supports. For those you could use 1x2s. This would make the cabinet much lighter while sacrificing only a little strength.)

Materials

- ☐ 96" x 48" sheet of $\frac{3}{4}$ " Cabinet-grade Plywood or MDF
- ☐ Wilsonart Laminate- 48" x 48" (http://www.cabinetparts.com/cgi-local/shop_2003.pl/page=Black_1595.html/SID=1093744603.98501)
- ☐ Wood glue
- ☐ Black, enamel spray paint (the cheapest)
- ☐ Vinyl (adhesive-backed)
- ☐ CPU Fan
- ☐ 2 Fan covers
- ☐ 1-1/2" and 1-1/4" Drywall screws
- ☐ 2 Tee-nuts (<http://www.rockler.com/findit.cfm?page=1592%20&sid=AF270>)
- ☐ 2 matching thumbscrews (for Tee-nuts)
- ☐ 30" Piano hinge (<http://www.rockler.com/ecom7/findprod.cfm?sku=20&sid=AF800>)
- ☐ Assorted foam brushes
- ☐ Black Paint
- ☐ Wood putty
- ☐ 10' Metal strapping
- ☐ 15"x15" 0.08 Acrylic sheet (Lexan)
- ☐ 1-1/8" Utility Cam Lock (<http://www.eastloc.com/camlock1.htm>)
- ☐ Laminate adhesive

Tools

<input type="checkbox"/> Circular Saw	<input type="checkbox"/> Drill	<input type="checkbox"/> Table Saw
<input type="checkbox"/> Jigsaw	<input type="checkbox"/> Orbital Sander	<input type="checkbox"/> Extension cord
<input type="checkbox"/> Router	<input type="checkbox"/> Slot cutting bit	<input type="checkbox"/> Flush trim bit
<input type="checkbox"/> Laminate trim bit	<input type="checkbox"/> Saw Horses	<input type="checkbox"/> 3" Laminate Roller
<input type="checkbox"/> 1-1/8" spade bit	<input type="checkbox"/> 7/8" drill bit	<input type="checkbox"/> Assorted clamps
<input type="checkbox"/>	<input type="checkbox"/> Laminate knife	<input type="checkbox"/>

Arcade Accessories

You will also need six Happ Horizontal Pushbuttons, 60" of $\frac{3}{4}$ " wide T-molding, and a joystick of your choosing.

Additional Notes regarding materials

Two last items before we begin:

- 1) The BarCade was constructed from materials on hand therefore you may find some of the cutting descriptions less than optimal. Hopefully the photos will help you fill in the blanks where the text seems to make no sense.
- 2) Certain sections of the plans may not go into enough detail for the novice. This was due to time limitations and the fact there are many other sites than handle those details better than I. Where possible, links are recommended. If you get stuck, feel free to email me.

Starting the Cabinet

Monitor

[] Your monitor needs disassembled first. Take the back chassis off the monitor by removing the (likely) four screws. Be careful with the innards. Next, tape off the monitor glass with masking or painter's tape. Take the black enamel spray paint and paint the remaining plastic cover with several coats. Be sure to paint all the way to the edge of the glass. Set the monitor somewhere dust free and let it thoroughly dry overnight.

The sides

[] Refer to the measurements below and draw the side onto a piece of MDF (see Figure 2). Carefully cut it out with a jigsaw and circular saw. Use a little sandpaper to smooth out any rough spots.

Note- It should be apparent that I did not use MDF for the BarCade. I used cabinet grade birch plywood that I had on hand. You can use whatever material you choose. However, for the sake of consistency, I will assume $\frac{3}{4}$ " MDF is being used.

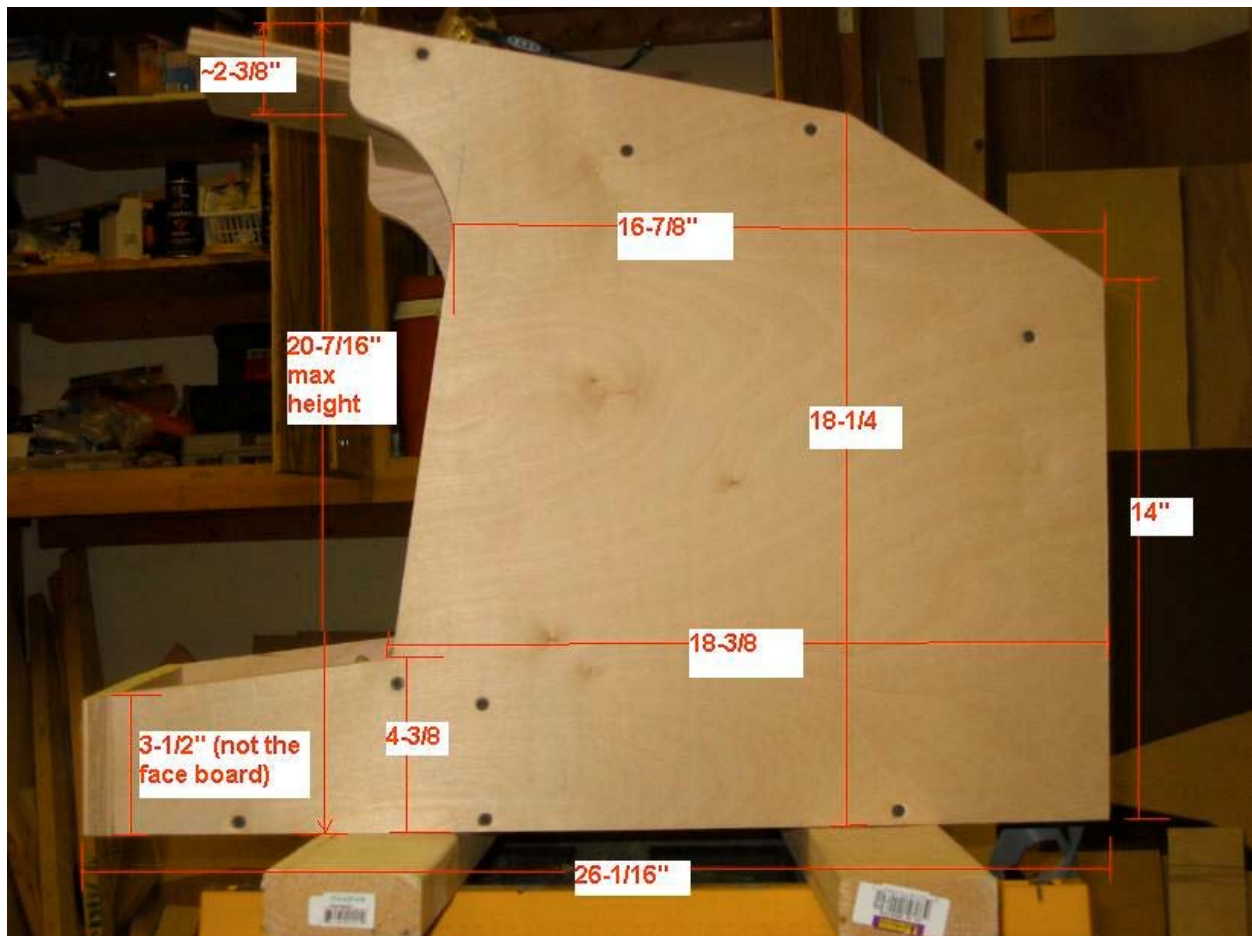


Figure 1: Side S1



Figure 2: Side S1, with outline drawn on wood

[] Take the completed side S1 and lay it on the starting board, ensuring the bottom and back edges are flush. Trace the outline onto the starting board. Remove the completed side [S1] and set it aside. Now, with a jigsaw, rough cut the side out. Try to stay within 1/2" of the line.

[] Now pick up S2 and put S1 down on the sawhorses. Place the unfinished S2 atop S1, again being careful to make the back and base sides flush. Clamp the two boards together. Take your router with a flush cutting bit installed and, moving left to right, route S2 so that it perfectly mirrors S1.

Note- If you've never used a flush trim router bit, you need to make sure you set the height correctly. With the power off to the router, set the router on the board you are going to work with. Loosen the collar and lower the bit until the bottom of the cutting edge reaches the bottom of the top board. The "wheel" will then be totally against the bottom board.

[] Next, you will need to switch bits in the router and put the slot cutter in. The back, top, and front down to the base of the monitor need to be slotted. Make sure that the slot is in the exact center of the wood before you start. It is suggested that you test cut a scrap piece to ensure the bit is positioned properly. Cut left to right.

The Base

[] From the remaining piece of MDF, cut a strip 14-5/8" wide the entire 48" length. That strip will be labeled A1. From this board, cut a board 26-1/16" long. This will be the base [B1].

[] With a helper, stand the two sides up, on either side of the base. Make sure the front of the base is flush with the front edges of the sides. Pre-drill, countersink and screw the two sides to the base. Use 3-4 screws per side. It should look like Figure 3.



Figure 3

[] You need a strip that is 3-1/2" tall and 16-1/8" wide for the front face. Pre-drill, countersink and screw the board to the front of the cabinet as shown in Figure 4.

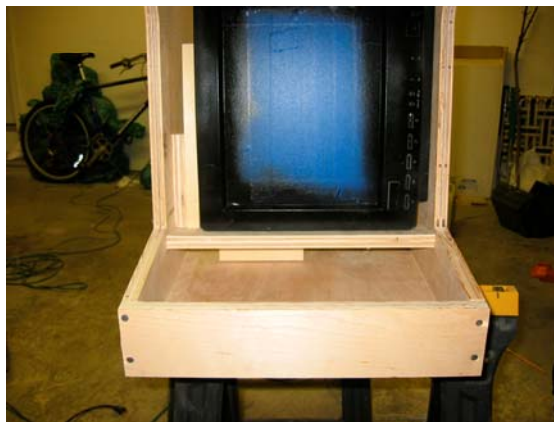


Figure 4- Front strip installed

The Monitor

[] From the long board A1, cut a 4" strip for the monitor support. This will be placed under the monitor to support it. It also will force the monitor to sit at the optimal angle. I placed the front of the strip 6-1/2" from the front of the cabinet, and 2-3/4" up from the base. I then put a screw in each side. Then I carefully rested the monitor atop the support and determined what angle the support should be. The optimal angle causes the monitor face to follow the side board's (S1 & S2) angle. In other words, the monitor face should be the same distance from the front of the cabinet at every point. Once you determine the angle, install another screw on each side.



Figure 5- Monitor support

[] Next, you will be need to support the monitor at the back. The monitor was turned on its right side, so the old base is now along the right wall of the cabinet. Sit the monitor in place. Measure the distance from the cabinet base to the underside of the chassis' circuit board. Cut a square of plywood from some scrap, and place it on the side wall, supporting the back edge of the monitor's chassis. See Figure 6 for what I am describing.

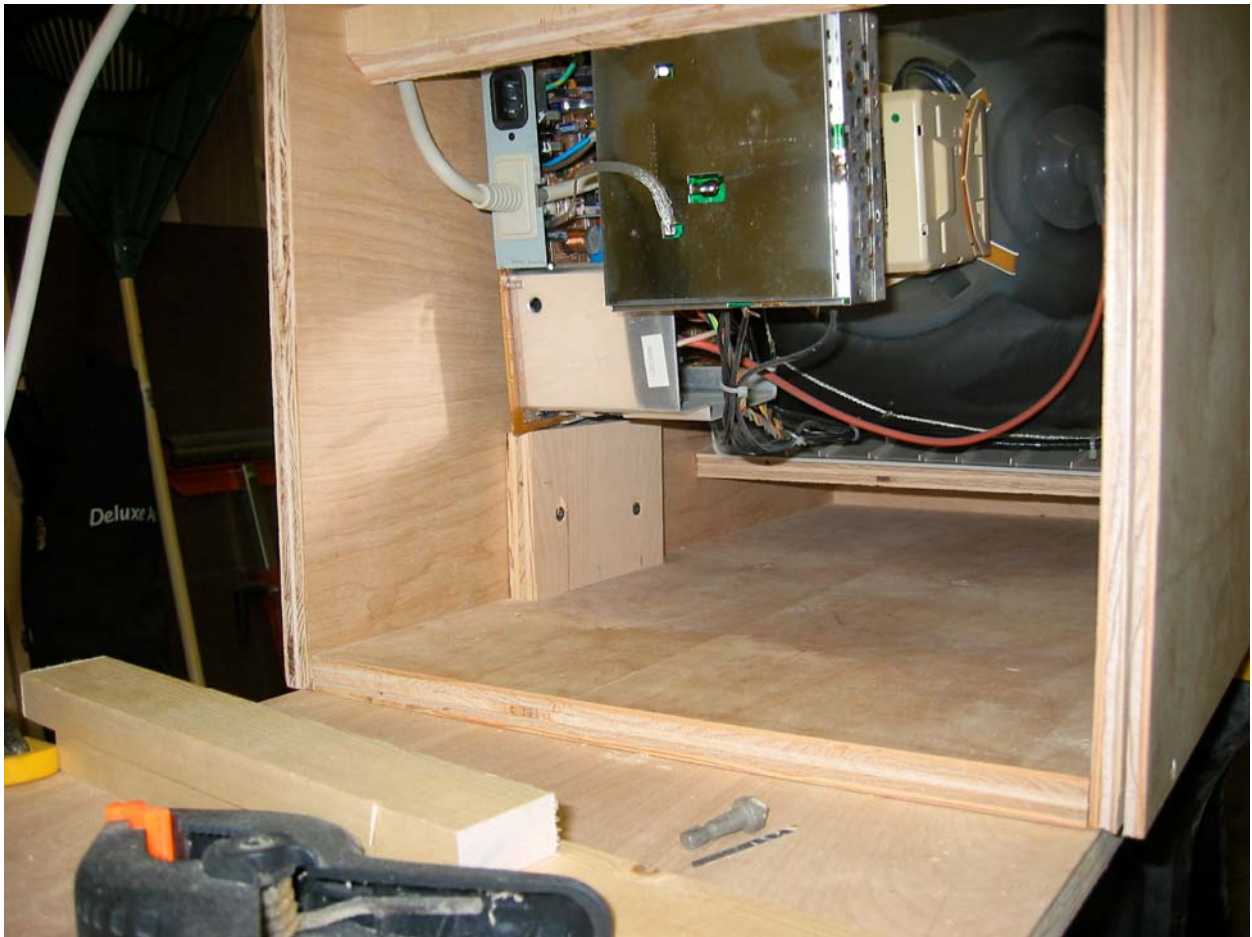


Figure 6 - Monitor support in place

[] Next, a strip [S1] will be cut to help square the back of the cabinet up. Cut a 1" wide strip 14-5/8" wide from scrap MDF. Place it near the upper back (see Figure 7) and screw it into place.

Note- If you use MDF, it is critical you pre-drill each hole. MDF has a nasty habit of splitting, especially when a screw is sunk into an edge. Countersink all exterior-facing screws so the heads are below the surface. This will eliminate any bumps under the laminate.

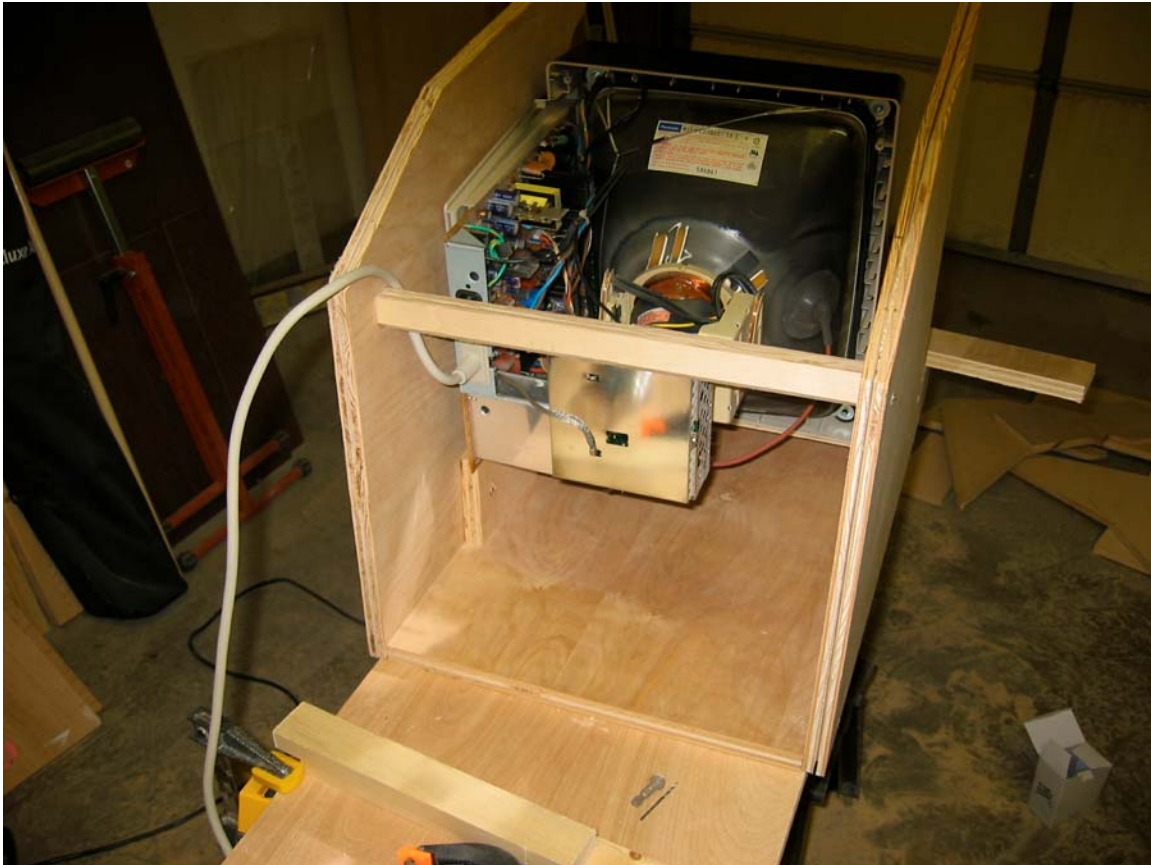


Figure 7- With strip S1 in place

[] Now you will need to keep the monitor from sliding backwards. I cut another block and used two L-brackets to secure it in place immediately behind the monitor shelf (see Figure 8). Make sure the monitor is placed where it will finally rest. The block will keep it securely in place.

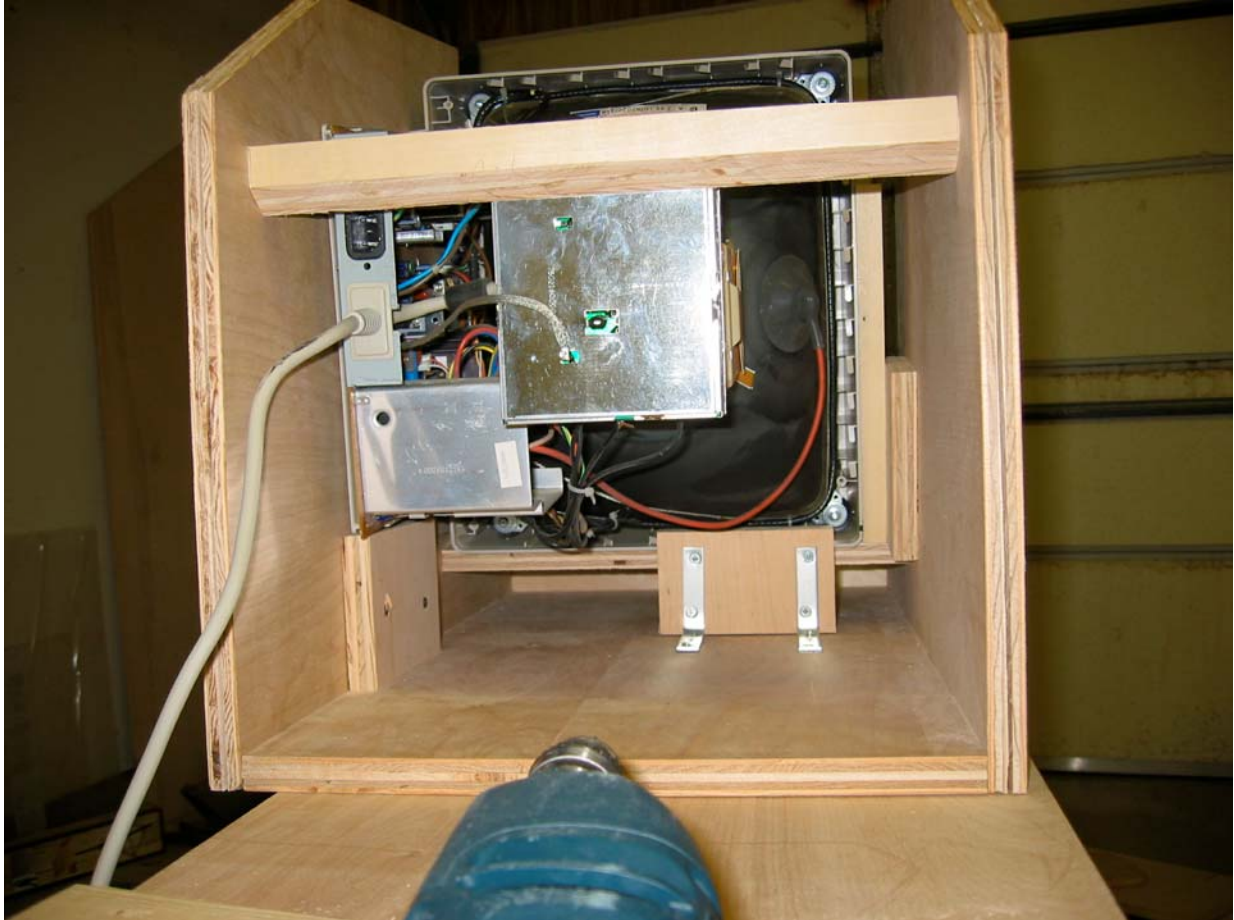


Figure 8

[] Next, cut a strip of MDF 1-1/2" wide x 14-5/8" long [S2]. This will be screwed in place immediately behind the monitor's shroud. See Figure 9 below. This will assist in ensuring the monitor stays in place.

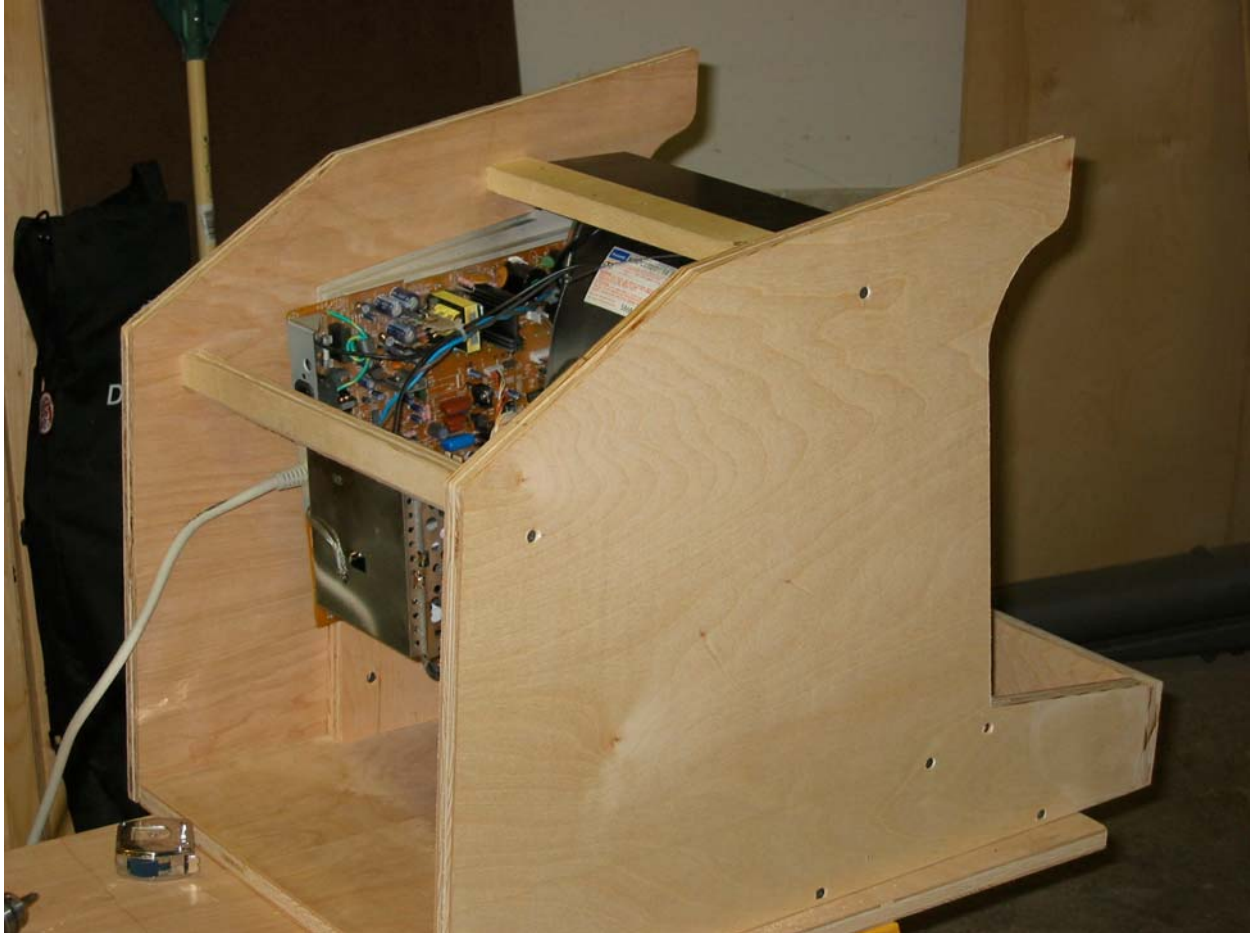


Figure 9 – S2 installed

[] From the MDF sheet, cut a 12-3/4" length. This will be the top. Bevel the backside approximately twenty degrees. This board is screwed in place, as in Figure 10. Two screws per side should be adequate.



Figure 10- Top board in place

[] You will need a board that is 14-5/8" wide x 7-5/8" long that is beveled at both ends to smoothly match the top and back boards. (Geometry is not my strong suit so if anyone determines these exact angles, I'd appreciate a quick email.) This is the upper-back board [T1].

[] Cut another board approx. 14-3/8" x 12-1/4" long. This will be the rear door [T2].

[] Test fit the two boards, as in Figure 11. Do not secure either board yet. This will make installing the PC parts a **lot** easier.

[] To help ventilate the cabinet's interior, a fan will be installed.



Figure 11- T1 and T2 boards test fit

[] A fan will go in the top of the cabinet. Cut a 2-1/4" hole in the center of T1. Flip the board face down and spray paint the interior of the hole. After the paint has dried, attach the fan. Make sure the fan is installed so that air is forced **out** of the cabinet. Connect the fan to the inside of the board. Set this board to the side. See Figures 12 – 14.



Figure 12- The hole has been cut for the fan



Figure 13- The inside of back panel, after spray painting

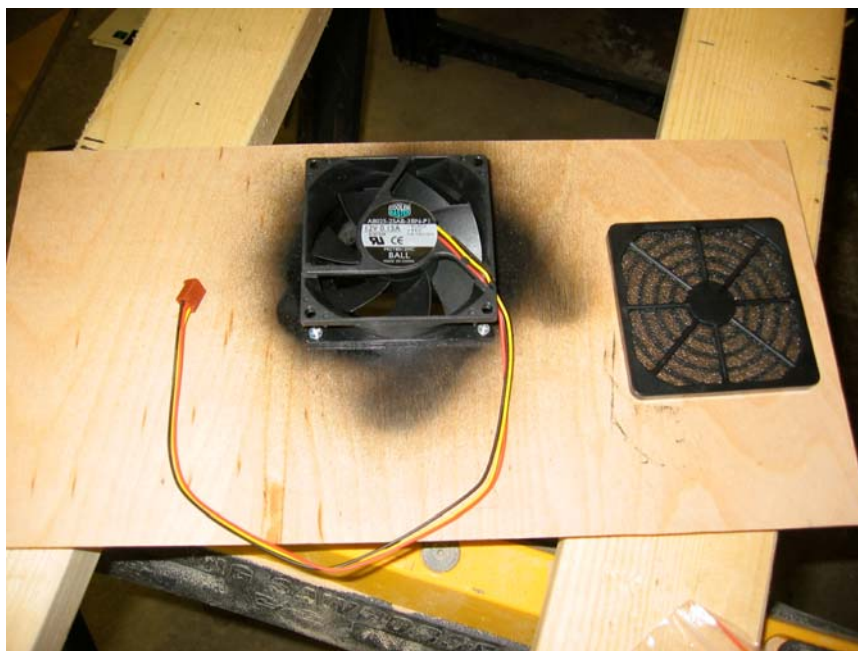


Figure 14- Fan installed

Prepping the speaker and controls

[] I added a single speaker and control to the cabinet. First I tore apart a cheap PC speaker that I had lying around. See Figure 15. Then I decided how to mount the controls.

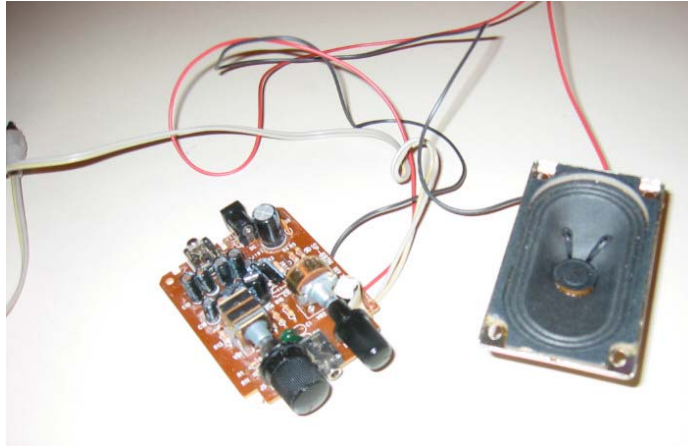


Figure 15 - Speaker and controls

[] If you want front controls, measure the controls and cut a corresponding hole in the face of your cabinet, as in Figure 16. Smooth out the hole and ensure the controls will fit nicely. Set aside the speaker parts for later.



Figure 16

Installing the PC

[] Now is the time to place the PC parts. As the BarCade cabinet is very small, you will likely need to remove the parts from the case. Do so **very** carefully. We will add in each component in the next steps. The exact placement of parts will be different for you and dictated by the specific design of the PC you use. Place equipment as best as you can.



Figure 17 - PC still in case

[] Place the motherboard under the left side of the monitor, while facing from the backside. Screw it into place with standoffs.



Figure 18 - Motherboard placed (note monitor has been removed)

[] Find a spot for the power supply (near the back) and secure, using metal strapping.

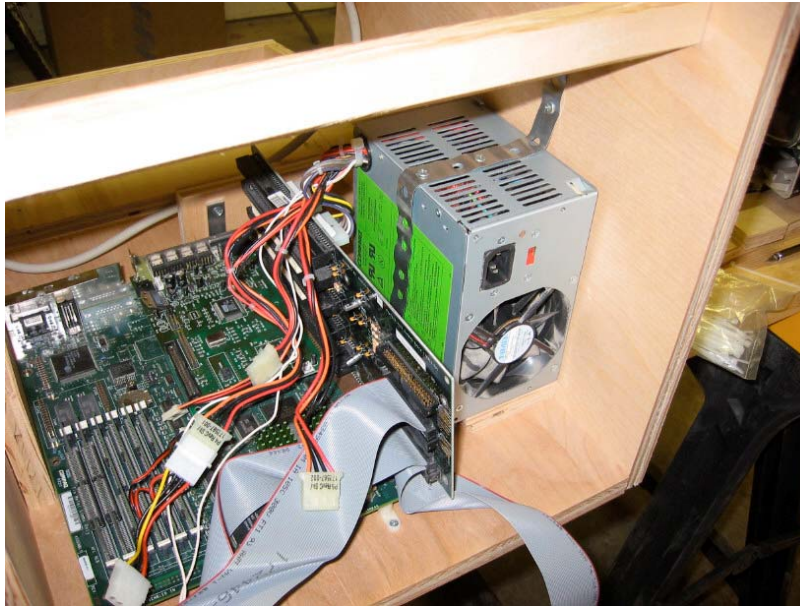


Figure 19 - Power supply in place

[] Find a spot for the hard drive and floppy, if needed. Secure with strapping. Make the connections to the MB.



Figure 20 – Hard drive and diskette drive in place

[] Once the PC is positioned, place the upper back board and screw into place (Figure 21).



Figure 21

Note- The next few steps do not have any accompanying pictures. I apologize.

[] Take the backboard T2 and determine where the 2-1/4" hole should be that would match up with the fan on the power supply. Cut it out and spray paint it as you did with T1 (pages 12 and 13).

[] With board T2, drill the cam lock hole with a 7/8" bit.

[] Cut a piece of plexiglass 14-1/2"h x 14-9/8"w. Mask off the viewable area and paint the backside of it with 4 or more coats.

[] Cut a strip from A1 14-5/8" wide. I used a 1/16" drill bit to create a (very) simple PacMan design to simulate a speaker grill. I spray painted it to get paint into the holes then I painted the strip and glued it into place.



Figure 22

[] Patch sides and front with wood putty. After it dries, sand well.

[] Flip the cab on its side. Prime and paint the underside as well as the 1/2" on the sides that will show when the back door is shut. Wait for it to dry overnight. See Figure 23.

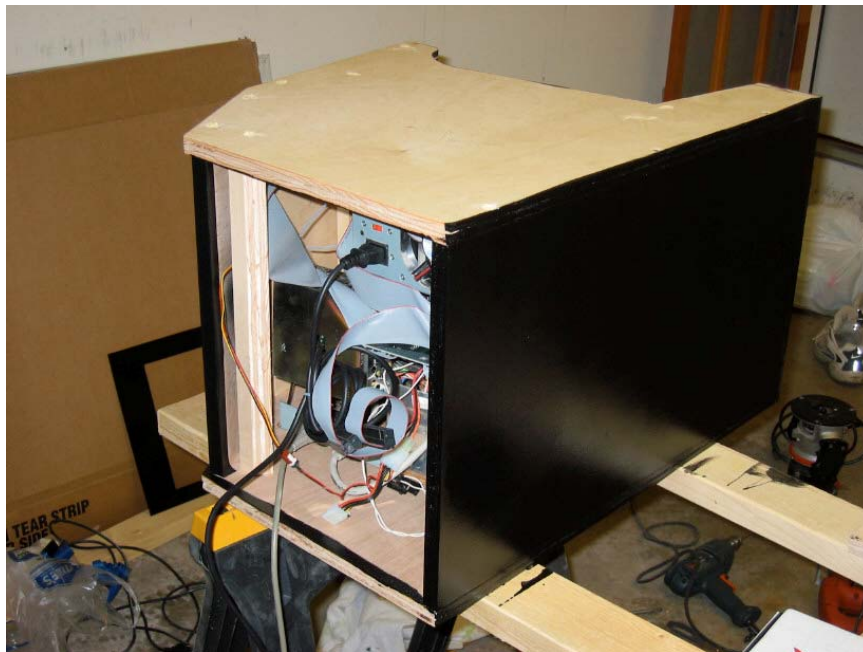


Figure 23

[] Either paint the top or apply adhesive-backed vinyl to it as I did.

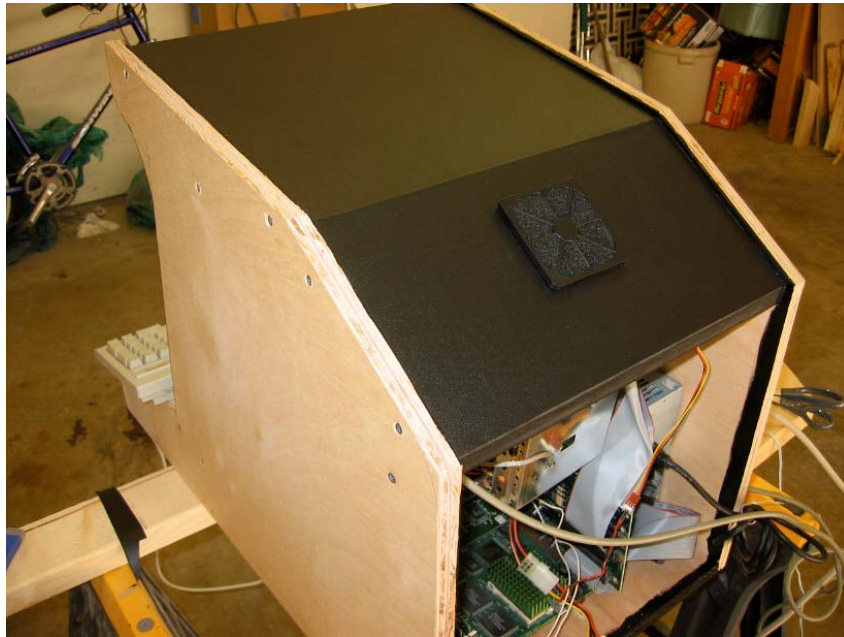


Figure 24 - Vinyl installed on the top

[] Next you will need to cut the control panel out. Decide on the shape you want and cut it out. Slot the board for T-molding.



Figure 25 - Blank Control Panel resting in place

[] Next, drill the layout you want. Use a 1-1/8" spade for the button holes. I also recessed the joystick by routing the backside 3/8". What the recessing does it give you an extra 3/8" height for the joystick.

[] Paint the backside (underside) as the overhang will show.



Figure 26 - Backside of CP after being painted

Laminating

[] Lay out the laminate sheet. You will need to cut a strip 28" (x 48") off. Take that piece and cut it into half. The resulting two pieces will be used for the two sides.

[] Now cut another piece 12" x 21" which will be for the control panel. Note- This is intentionally oversized.



Figure 27 – Laminate sheet prior to scoring

[] Glue the laminate pieces to both sides of the cab and the control panel per the instructions on the adhesive container.



Figure 28 - Both sides of the cab are covered

[] Trim the laminate with the laminate trim bit. Knock down the sharp edges with the file by going at a 45 degree angle away from the laminate.



Figure 29 - Everything has been flush cut

[] From the backside of the control panel, I used a 5/8" spade bit to drill through each button hole. I cleaned up the hole from the front side, with the laminate bit. Do this by placing the bit into the hole, then starting the router up. Go around the circle a couple of passes, then turn off the router and pull it up from the hole. This gives a nice clean finish.



Figure 30 - Button holes are pre-drilled

[] Place T-molding into the slot on the control panel. Place a slightly damp cloth over the T-molding as you work it into the groove with a rubber mallet and your fingers. The cloth will help protect the molding from scuffs.

[] Attach the speaker controls to the inside of the cabinet.



Figure 31

[] Take the keyboard hack (or I-pac) and install it. I used feet made for mounting circuit boards to attach it to the interior.

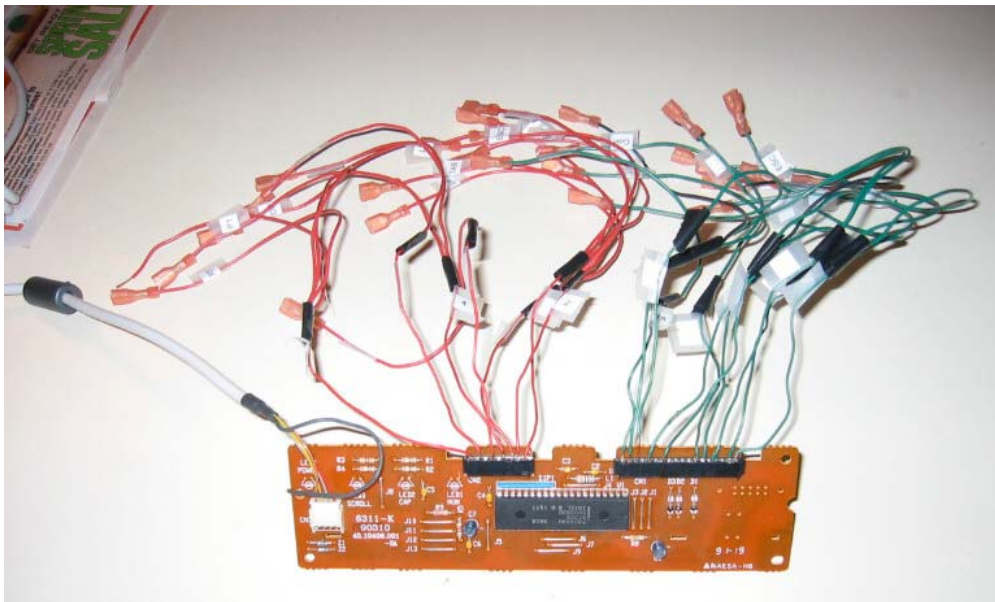


Figure 32 - Keyboard hack

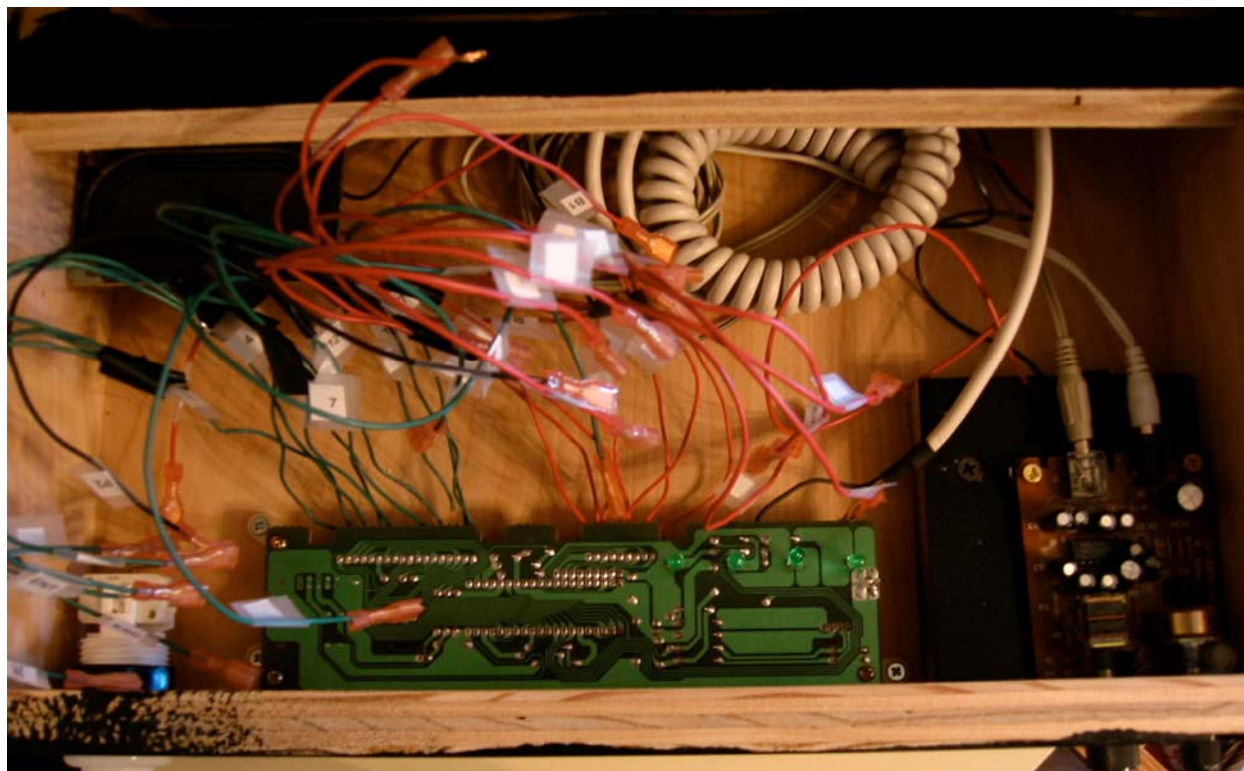


Figure 33 - Keyboard hack installed

Note regarding the keyboard hack: The creation of a keyboard hack is way beyond the scope of this document. Visit <http://www.arcadecontrols.org> for more information on this and other topics.

[] Cut the piano hinge in half, giving you two 15" pieces. Spray paint one face of each hinge with a couple coats of spray paint, as well as the screw heads used to attach it. Spray paint two L brackets at this time, too. Attach the CP with hinges.

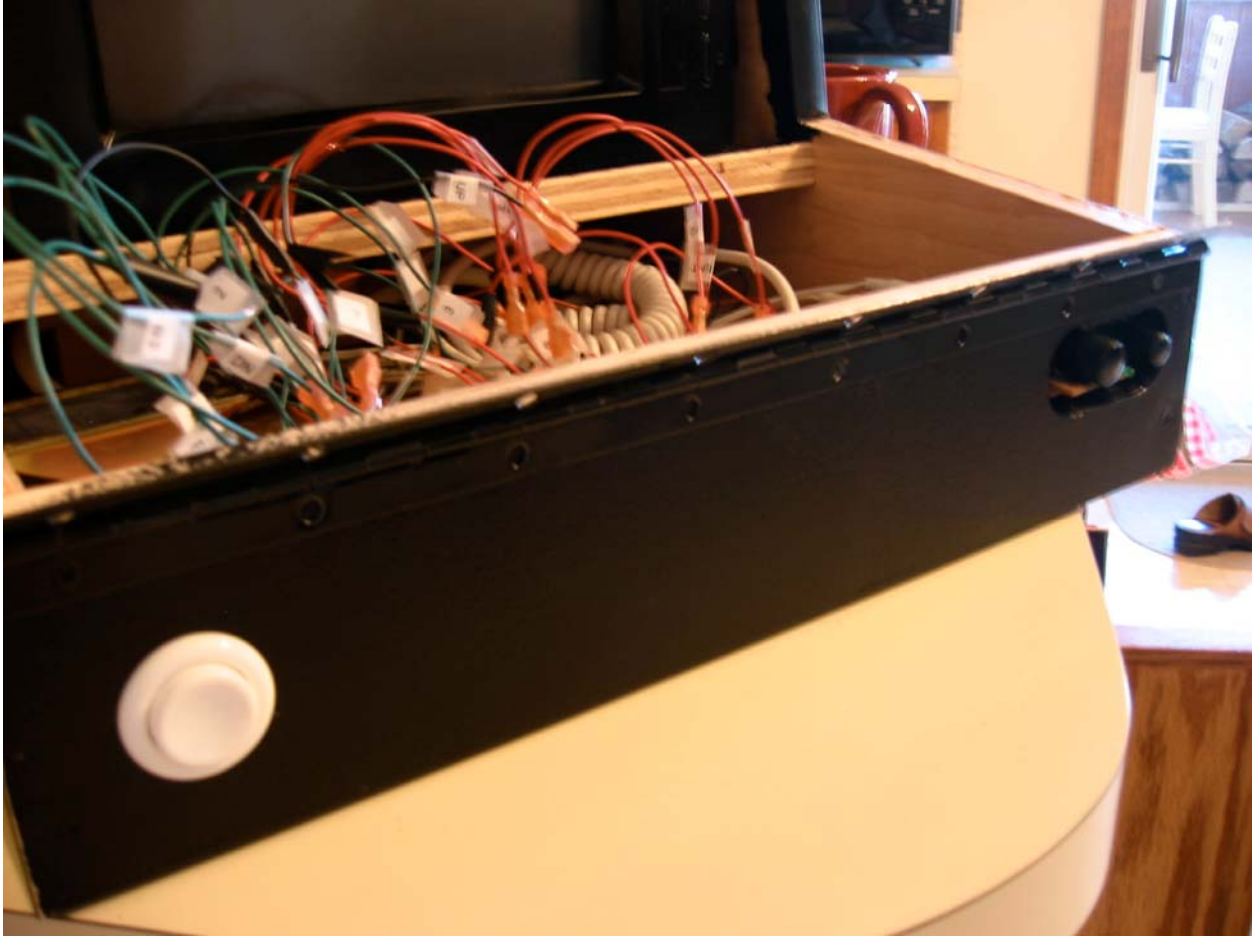


Figure 34 - Hinge attached to the cabinet front awaiting the CP

[] Attach L brackets and use thumbscrews. The thumbscrews are threaded into the tee-nuts, which are pounded in from the inside of the side wall. There was no good way to show this step, so you may be better served to see Oscar's write up which can be found on the References page.



Figure 35 - Thumbscrew installed



Figure 36 - Cabinet awaiting controls

Attach the Back [T2]

- [] Attach vinyl to (or paint) the rear door [T2].
- [] Attach the fan cover and the utility cam lock. Feed the power cord(s) out the back.
- [] Secure the door to the cabinet with the second piano hinge.

Finishing up

- [] Install the buttons and joystick. Wire each cherry switch to the appropriate connections on the keyboard hack (or I-pac).
- [] Clean up the cabinet by blowing out all dust and wiping the cabinet down.
- [] Place the plexi in place, close the CP, and lock it into place. Power the cabinet up and play!



Figure 37 - Buttons installed and the cabinet running!

Final Thoughts

I learned a lot from building this first table top arcade cabinet. When it was built, there were precious few examples of these cabinets on the web. There were several commercial products but few informative sites. I am grateful to those individuals (see References and Acknowledgments on the next page) for sharing their design pictures with the public. Although the plans in this document are not polished by any stretch of the imagination, I hope they will assist you in some way. If you built a cabinet, please share the design and construction with the world. I'd also love to see a finished picture.

You may also notice certain elements in these plans were not finalized. One example is the marquee. The difference between what looks reasonable on paper and how it turns out in the real world are often different. The height of the marquee area I was left with is just 1-1/2". With a little rework of the design, you could easily expand this area for your Bartop.

The angles of bevels, where included, may or may not be exactly correct. I am terrible at the math and apologize.

That's it. I hope this helped some.

If you have any questions, ideas or project pictures, feel free to contact me at info@arcadecab.com.

References and Acknowledgments

BarTops:

Oscar's Happy Hour Bartop MAME (<http://www.skum.org/bartop/construction.htm>): Oscar's site has a wealth of information on it. His designs are fantastic and he is one of the nicest people you will ever communicate with. He markets spinners (among other items) which I exclusively use. Check out his site.

Menace's Cabinet

(<http://www.arcadecontrols.org/yabbse/index.php?board=10;action=display;threadid=15617;start=msg122350#msg122350>) : Menace, from the BYOAC forums, constructed a very nice Bartop, which I took several design details from. This thread is a great resource.

Other Resources:

Build Your Own Arcade Controls (<http://www.arcadecontrols.com>) : The absolutely first site you should visit and reference! The forums are the very best of their kind anywhere. Any question you may have, they'll have the answer.

ArcadeCab (<http://www.ArcadeCab.com>) : My site has the .cfg files that you might wish to use as well as any future updates to this document.

ArcadeOS site (<http://www.mameworld.net/pc2jamma/frontend.html>) : The official resource for ArcadeOS. This is a great front-end for low-end PCs (such as the one used in this project).

Vantage site (<http://www.mameworld.net/pc2jamma/vantage.html>) : The official site for the emulator used.

Ultimarc (<http://www.ultimarc.com/>) : Andy sells the I-Pac, the keyboard emulator that I use in most all of my projects. If you don't wish to create your own keyboard hack, you may want to investigate Andy's offerings. They are incredibly easy to install and are bulletproof.

Mini-Mame (<http://minimame.com/>) : Chris Coward's site. His free help document is the finest example of cabinet plans I have ever seen. He obviously spent a tremendous amount of time creating them and generously chose to make them freely available. My plans can only aspire to be as good as his.