Build an arcade cabinet for 200euro ($250)

by **ExperiMendel** on June 3, 2012

Table of Contents

Intro: Build an arcade cabinet for 200euro ($250)

Build an arcade cabinet for around €200 ($250)

It all started with some SNES gamepads and a SNES emulator, but it all got slightly out of hand.

After we had done some SNES gaming with some cheap knockoff SNES gamepads we converted to usb, we wanted more. We came up with the idea to make a MAME arcade machine, and settled pretty quickly on the fact that a full size arcade cabinet was the only way that would fulfill our dreams. But, there's two of us (me and my friend) surely we can't share one machine, right? Of course not! We're building two of them!

That wasn't all. Why build a huge machine with only a single function? So we tried to come up with more. The major other feature of our arcade machine is a fridge! There's loads of space below the controls and the screen that we weren't going to fill with electronics like in the old days. So we've put a fridge in there. This of course did mean that there would need to be a door in the botom, and that also added a problem of sturdiness because the door can't help support the other three sides. But afterwards the machine ended up really sturdy, especially because the fridge holds it together a little bit as well by it's weight.

Before building the machine, we did a lot of planning and designing, stuff that, if you are genuinely interested in building a MAME, you might be doing at the moment. We know how hard it can be to find all of the perfect information in one place, so we will try to do our best to give you all possible information we've found in our building process.

DEMONSTRATION VIDEO

If you're not familiar with these terms I'll explain them here:
Bezel - the bezel is the plastic in front of the screen and the black around the screen
Marquee - the marquee is the image above the screen, this has a 'marquee light' behind it so it is backlit
Cabinet - the cabinet is another name for the whole machine, but especially the case

Image Notes
1. It's playing the 'Mario Bros.' game here.

Image Notes
1. The fridge, with some electronics in it...
2. A 3D printer. Another project I still have to finish

Step 1: Precise Planning and Detailed Design

First, you need to know what you want. What should it look like? What size should it be? What materials am I going to use?

Cabinet Design
For us, we already decided on the size of a full size arcade cabinet, about 180cm high and about 60cm wide. However, if we wanted to fit our fridge inside, it needed to be at least 60cm wide on the inside. (fridge measurements are: 60cm x 60cm x 85cm)
Our first design was inspired by someone else's MAME machine, called 'project mame' . But the fridge wouldn't fit inside and we didn't really love the design yet.

We scrapped that design, and set off to make our own. Which was mainly inspired by the Neo Geo MVS . It's big, red and doesn't look too complicated to build. We designed our cabinet in Google SketchUp (a free cross platform 3D design program), and we were very sure to design every single little bit to make sure that we wouldn't run into trouble halfway through the build. You can find the design files below. Feel free to use them or change them in any way you want as long as you don't sell them and mention us as a source if you (re)upload any of them (GNU public license).

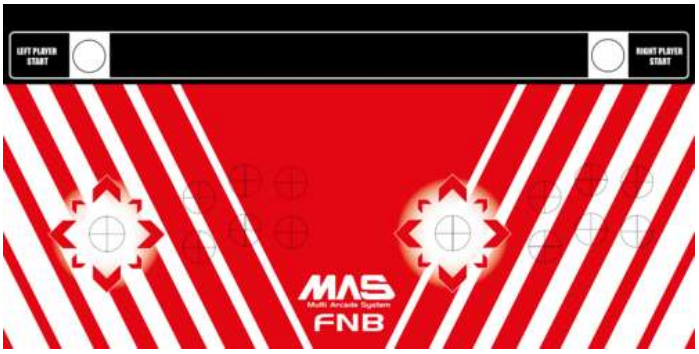
Artwork Design
We weren't out to replicate a Neo Geo MVS, although it was a big inspiration. The control panel artwork is similar to the one on the Neo Geo but a but simpler. The marquee design was totally designed from scratch, because we wanted to keep the design general (not specific to a single game) and we didn't want 'MAME' written all over it either.
We designed the artwork in Adobe Illustrator, the design files and the .png pictures will be uploaded as well. I've also tiled the artwork files so you can print them on A4 paper.

Again feel free to use them or change them in any way you want as long as you don't sell them and mention us as a source if you (re)upload any of them (GNU public license).

What you want to pay attention to:
While designing you want to pay attention to these points:
-Will it fit where i want to put it?

-Will it still fit through my door / in my car to transport it?
-Can i fit it on a round number of MDF (or other material) sheets? (you don't want to buy a whole sheet for a few centimeters)
-Is it easy to saw out of the material i'm using?
-Did you think about the thickness of the material?
-How will I access my electronics on the inside? (we went for two big holes, both for access and cooling of the electronics and the fridge)

These are just some key things you might want to think of. It's just to save you that stupid feeling when you, for example, find out it doesn't fit through the door.



File Downloads

cabinet design.zip (1 MB)
[NOTE: When saving, if you see .tmp as the file ext, rename it to 'cabinet design.zip']

artwork.zip (5 MB)
[NOTE: When saving, if you see .tmp as the file ext, rename it to 'artwork.zip']

Step 2: Supplies!

Careful planning is your key to succes. Make sure that you know exactly what you need beforehand.

We're just two students, we don't have all the money in the world, so we wanted maximum fun for minimum cost, we tried to save everywhere we could.

Even though we built two machines, I'm going to make this guide as though you were to build one, which is probably your situation.

Here's what you need to build a cabinet just like ours:

Materials

Hardware:
2x a sheet of MDF (1,2cm x 244cm x 122cm) - €34
1x a 200 pack of screws (3,0mm x 25mm) - €4,70
1x a plate of acrylics (0,2cm x 160cm x 66cm) - €11,50
3x pinewood bar (1,8cm x 1,8cm x 270cm) - €11,40
1x a pair of kitchen door hinges - €5,80
Total hardware: €64,40

Paints:
1x 750ml MDF Primer - €15
1x 750ml satin lacquer - €18
Total paints: €33

Arcade controls
2x Classic arcade joystick - €24
14x Arcade buttons (in several colours) - €31,50
1x 1 player start button - €2,75
1x 2 player start button - €2,75
3x cheap gamepads - €9
20x joystick microswitch connectors - €2,80
30x button microswitch connectors - €5,40
Total controls: €77,20

Miscellaneous:
1x 150g MDF filler - €4
1x fluorescent tube light + armature for the marquee lighting - €20
1x extension cord (for the computer, screen and speakers) - €8
Total misc: €32

Total: €206,60

This excludes the computer, screen and speakers, since these were things we already had, and they will be easy to find if you don't have any. You don't need a very good computer since it's mainly going to run very old arcade games. The screens we used are 19" 4:3 Acer LCD screens. It also excludes tools, glue and some other stuff that we had laying around, but chances are, you have this as well.

The supplies listed above were all bought at a local hardware store, with exception to the ones with a link provided.

Quick tip: Ask at the hardware store if they can saw one of the sheets of MDF at the inside width of your machine (in our case 600mm), this will save you a lot of work, and you probably don't have a saw that big anyways.

Step 3: Getting started...

So you've got your design and you have your materials. Great! Lets get started.

We started by sawing out the sides. these are the largest pieces of your machine and it also gives the biggest satisfaction right away so you'll get motivated to work on it.

Draw the shape of the sides of your machine on the MDF. Measure very carefully, you can only saw it once, ant you don't want to get it wrong.

Quick tip: We've found that it's very important to only use one tape measure. We have two, but they differ a few centimeters over bigger lengths

Once you've transferred your plans onto the wood, you can start sawing. We used an electric jig saw. Alternatively, if you have access to a very big CNC router or laser cutter, you could use that, since that wil never get the measurements wrong, it would be perfect.
Because we were building two machines, we just put two sheets on top of each other and sawed through both the sheets, so both sides of one machine would be pretty much the same. If you do this, make sure you clamp the sheets of MDF to a table very tightly, because you wouldn't want them to move. Also make sure that the edges line up, not every piece of MDF is the same size.

After you've sawed the sides, you want to round the corners. If you sawed them two sheets on top of each other, it is best to keep them clamped together for this. It might take some time to round some corners, but it is well worth it afterwards.

Then, you saw the big back side out of one of the 600mm wide pieces they've pre-cut for you at the hardware store, and you saw the access holes in them.

Image Notes
1. For some corners you want to drill a hole and re-insert the saw in the right direction.

Step 4: Cabinet Contsruction

This is where the real fun starts, your cabinet will start to take shape in no time.

I constructed the square frame for the bottom out of the 18mm x 18mm pinewood, and screwed and glued it to the bottom of rear plank. I also put pinewood bars on the sides of the rear plank, which would become the corners. You'll screw the sides to the rear with screws and glue through the pinewood bars and the pinewood frame. Be sure to pre drill all your holes and also put your (cordless) drill on screwprotect if you can, because the pinewood splits very easily.

Attach the first side

Now it's time to put on the sides. Place one of your sides onto the floor, next to the rear with the frame and the pine on it. Place your side onto something like a few wooden blocks, so you can clamp your glue clamps to it without lifting the whole side off the floor. Apply the glue to the pinewood and the MDF of the rear side, and flip it onto the side. Then quickly clamp it down tightly and screw in the screws.

Attach the second side

After you've done the first side, remove the clamps and put it back on it's rear side. Now get the other side and put it next to the rear as well. Now do the same. Watch out though, since you've got one side attached to only the corner and the frame in the bottom, you will have to support it. You can do this by supporting it with some of the 600mm planks you're going to use later.

Put in the diagonal rear/top side

You now have both sides attached. But the construction is still not very sturdy. If you attache the rear/top diagonal plank, it will become a lot more stable. Do this while it's still on it's side on the floor. Attach the pinewood bars to the rear/top plank first, again with glue and screws. Then apply the glue and slide it in between the sides until it's exactly in position, then put the screws in.

Quick tip: The top/rear side is at 45ËÂÂš angle, which means you'll have to saw this piece at an angle. We gave it a 45ËÂÂš angle with the rear side, since this wasn't a very important angle and a 22,5ËÂÂš angle with the top piece, which has a 22,5ËÂÂš angle as well.

If you have put in the rear/top side in place. Your arcade cab should now be able to stand upright.

And now?

You should now be able to put the rest of the pieces in pretty easily. Start with the front side of the control panel and, if you're not using a door, the front side where the door would be as well. Then put in the pieces below the marquee, make sure to make a notch in the piece where the marquee fits in (see next step) and where the bezel wil fit in.

The Doors

You can also put the door in now. Be sure so experiment with your hinges a bit until you know exactly where to put them. Doors are pretty easy to make, just attach the hinges to the cabinet and to the door, and you're done.

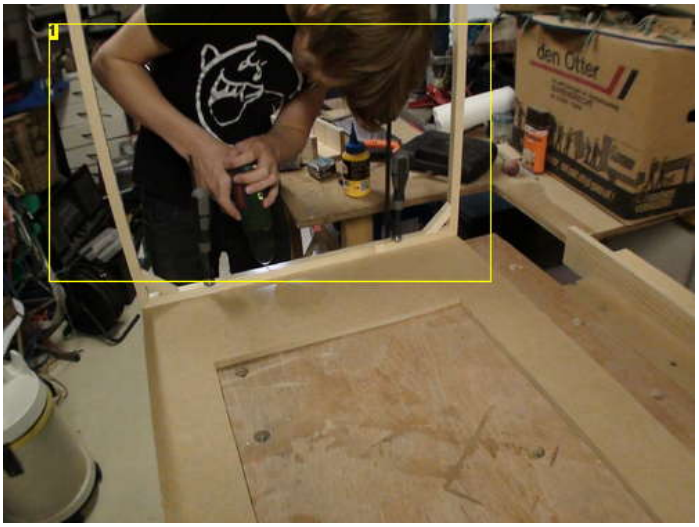


Image Notes
1. the pinewood frame

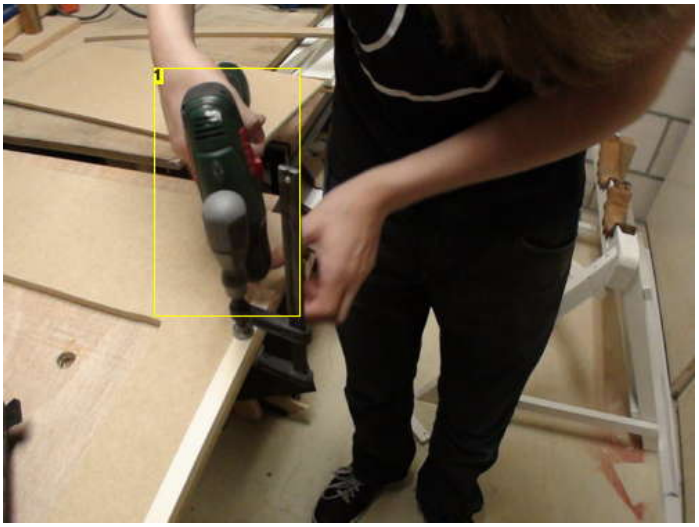


Image Notes
1. clamp it tight for the best glueing

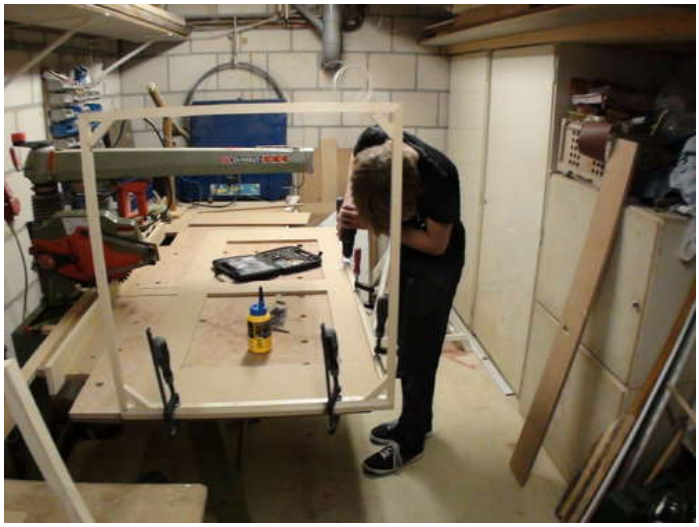
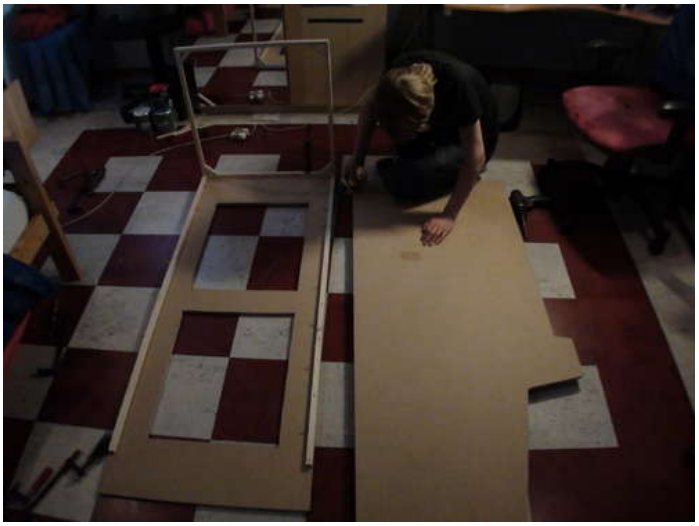


Image Notes
1. pre drill holes



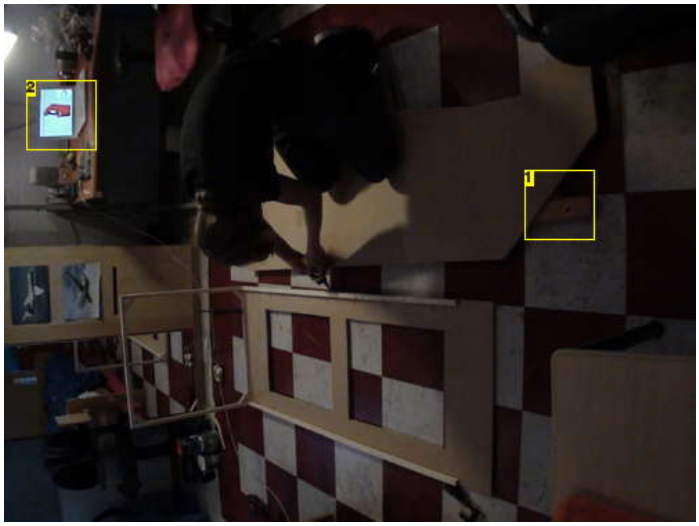


Image Notes
1. put the side onto something so you can lay it flat, while still having space for the clamps. We used the side of an Ikea Bookcase :)
2. Laptop with the design ready!

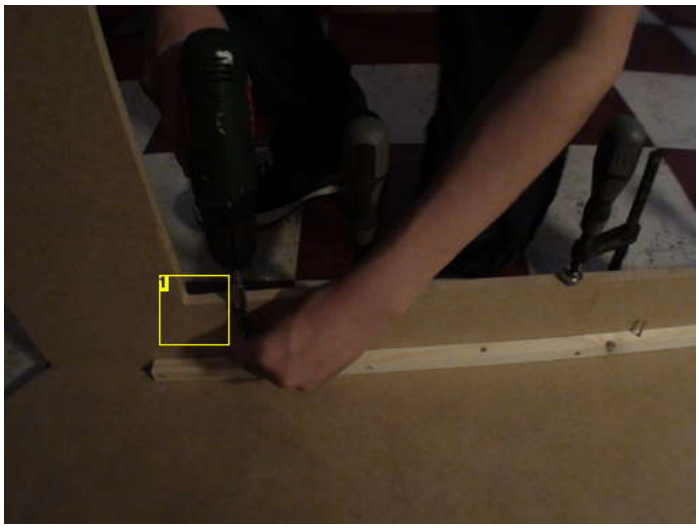


Image Notes
1. put the rear onto the side and clamp, glue and screw them together

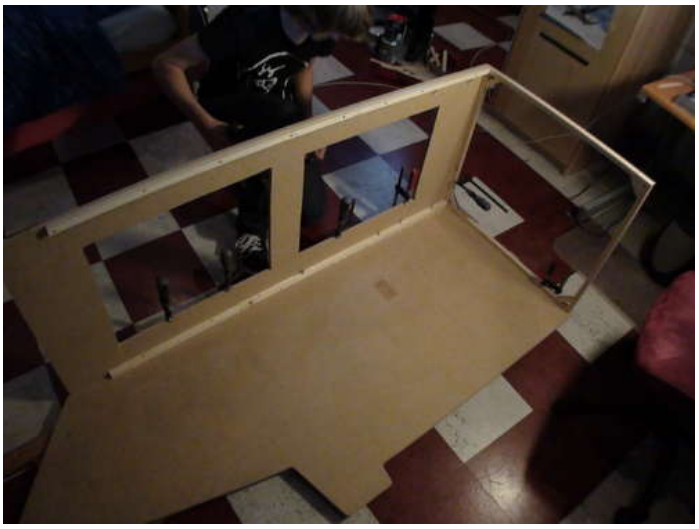


Image Notes
1. Make sure you have pre drilled those holes beforehand.

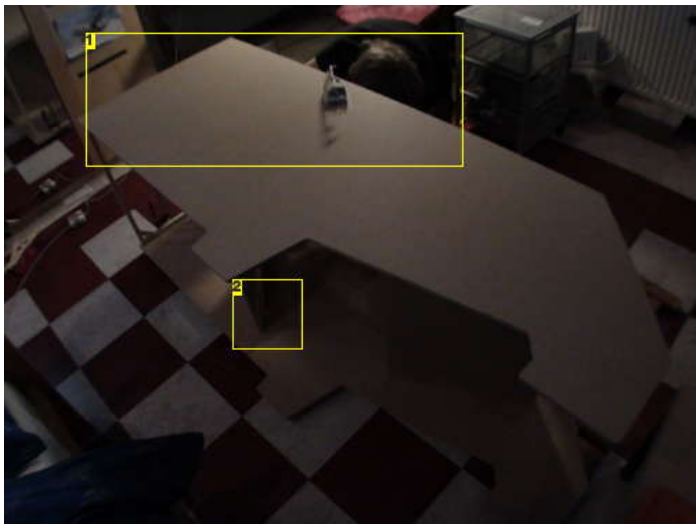


Image Notes
1. other side on top
2. support the side with one of the 600mm pieces you haven't used yet, so it won't collapse.

Image Notes
1. Ikea bookcase side.

Image Notes
1. standing upright for the first time, it really starts to look like an arcade cabinet already :D

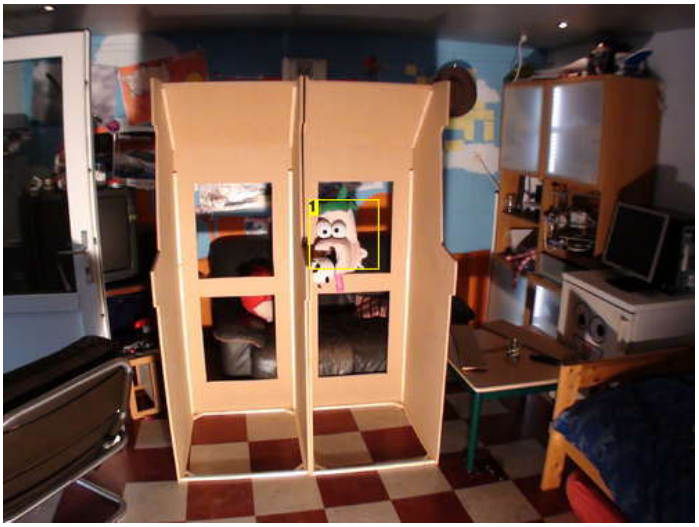


Image Notes
1. Ferb eating a panda, don't know how that got there

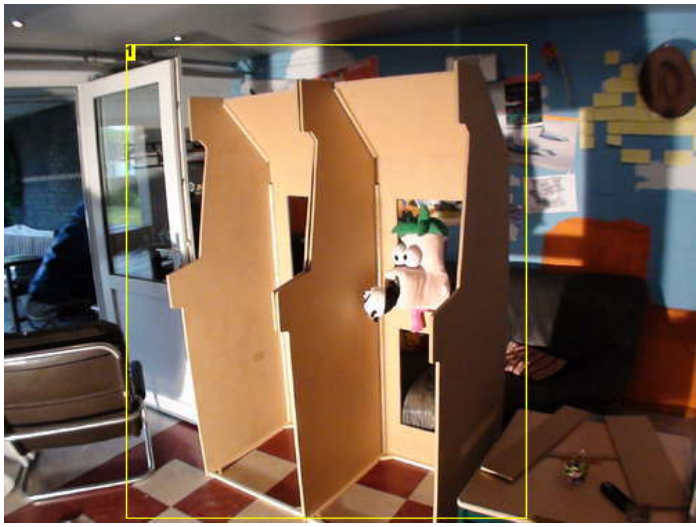


Image Notes
1. both of the cabinets next to each other, this was all done in a single day

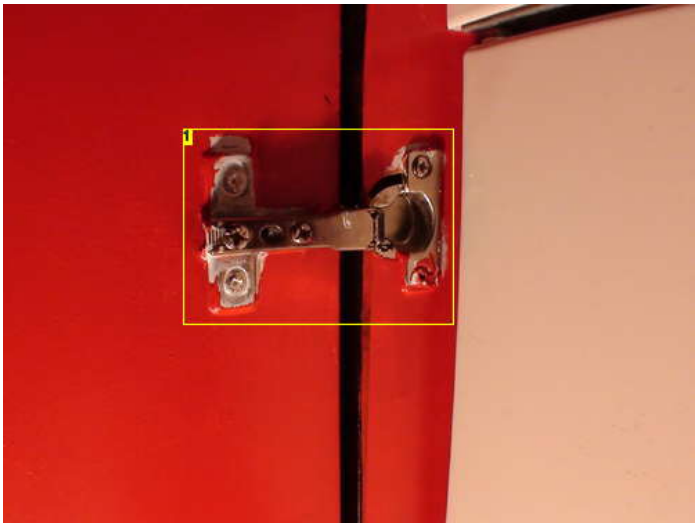


Image Notes
1. I found the best way to mount the hinges was like this. Be sure to make your door open in the right direction!

Step 5: Marquee Madness

If you have put in the pieces below the marquee, you are now ready to make the marquee. The Marquee is made out of two layers of plexiglass with the printed artwork sandwiched in between.

Before you put in the pieces to hold up the marquee, please make sure that the notch is wide enough to fit the 4mm of plexiglass easily. We didn't do this, and i can tell you, trying to make the notch larger with a file is a very boring and time consuming task.

Making the marquee is pretty simple. There are two things you need to do.
The first is print out and cut out the design.
The second is to cut the plexiglass to the right size.

Cutting plexiglass
First, draw out the measurements you want your plexiglass to be, pencil might be hard to see, so you might want to use a pen or a sharpie. Then, use a long ruler or something else straight and cut a groove into the plexiglass. You'll have to press down quite hard to get a good deep groove. If your groove is deep enough, you put it to the edge of a table and just break it off. This is quite similar to cutting glass. For that reason, watch out that you dont hurt or cut yourself either with the knife or on the sharp edges of the plexiglass.

When you're at it, cut the bezel/screen plexiglass plate and the control panel plate as well.

The very top part will be laid in loose, just on the pinewood bars. That's because you want to be able to open the top, to access the marquee light and the marquee. This top part also need a notch, think about this when you're cutting the plexiglass. The plexiglass will need to be slightly bigger than the opening because it has to go into the notches as well.

The bezel
At first, we wanted to make the bezel by spraypainting the edges of the plexiglass satin black. Although this probably would give a nicer finish than it has now, I went the cheap and easy way.
I mocked up where the screen would be inside the arcade machine, I took the measurements of the screen, and got a big piece of black posterboard and cut out where the screen would be. It might be a bit harder to get in place in the machine, but since you can access it from the rear, it isn't that much of a hassle. The only thing you

want to think about is cleaning off the screen and the posterboard before you put it in, because if you've got some dust in between, it will be easy to see.

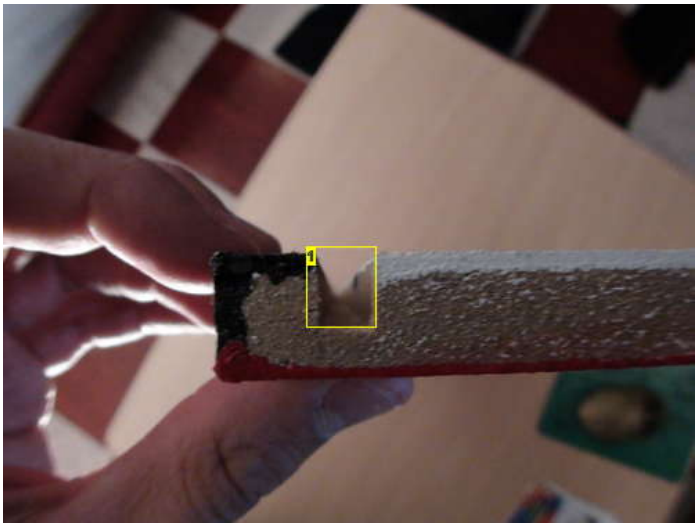


Image Notes
1. The notch for the marquee

Step 6: Fillers and Primers

Next up, the paint job.
But not yet. First, you want to fill all the holes, gaps and dents with filler. Also, now is the last time to sand those round corners perfectly. Use the filler like it says on the tube. We used MDF filler, which gave a pretty smooth result, but needed to dry for quite a long time. After the filler has dried, sand all the places where you've applied filler until it's completely smooth and, if necessary, use more filler. After that sand the whole cabinet lightly.

Ready for some primer and paint.
Putting on the MDF primer is easy, but takes time. Just paint it like you would with any paint, get a roller and a brush for the corners and make sure it's covered in a nice even layer of primer. Now make sure you let it dry for long enough. It might need another layer of primer, but most of the time, you'll be done in one layer.

I put on the black lacquer first, and then the red. Which worked fine for me, apart from some small parts of the black edges i had to redo with a little brush.

Image Notes
1. ready for primer and paint

Image Notes
1. primed and ready for some color

Step 7: Controls and Electronics

The control panel
The control panel is made out of a layer of wood, with the artwork printed out on top of that, with a plexiglass layer in front. This gives a nice and shiny look and the plexiglass is very durable and pretty scratch resistant.
Most of the arcade buttons you're going to find need to be fitted into 28mm holes. Just mark off all the holes in exactly the right spot, and then pre drill them through both the plexiglass and the wood clamped together. (leave the plastic protection layer on the plexiglass or you might scratch it) Now while the two layers are still clamped together, drill the 28mm holes with a wood spade drill. For the joysticks, i made 30mm holes, which works fine, but I would recommend to go a bit bigger if possible.

In the control panel is also a notch to fit the bezel in. There's a notch holding the bezel in place at the top as well. There's also some pinewood bars to stop the bezel from going into the machine if someone were to push down on it. The plexiglass on top of the control panel artwork is from the bottom to the part where the bezel is in. The control panel itsself lays loose on some wooden bars so you can remove the controls and the screen.

Hooking up the controls
This is where most arcade builders use an iPac control board . But we thought these were too expensive, if you have to include shipping and import tax as well. We've found another solution. It might not be as simple and elegant as the iPac board, but it's a lot cheaper.

What we did was; We bought some very cheap gamepads from Hong Kong with free shipping. This only set us back about €9 for three of those gamepads. We opened the gamepads up, and removed the pcb from inside, and soldered our connections directly to the board. You should be able to solder this yourself if you have some soldering experience, but be sure to take your time and take caution when soldering, because you are handling a very hot piece of iron and you're soldering a lot of wires to quite a small board.

The rest of the electronics
The rest of the electronics are all pretty simple. We have a computer, in my case an old HP with a 64 bit AMD athlon processor, 2GB ram and 500GB hard drive. A screen, an old 19" Acer screen. You really don't need a widescreen, but you could use one. You can also go for an old TV or an original arcade monitor for maximum

arcade effect.
For the sound, we wanted to go good quality, but cheap. I found some old, but really nice computer speakers laying around, and a subwoofer as well. Luckily the speakers fit precisely next to the computer in the cabinet, and the subwoofer is on top of the computer facing backwards, so the sound can go out the back.

As for the software, I am currently using windows 7 with MAMEUI , an easy way to get your MAME going and to play some roms. But if you use this, you will still need a mouse and keyboard ready at all times. I will be upgrading to Linux, where it will start up directly into XBMC , so I can play music, movies and launch the games from within there, but I haven't quite figured that out yet. (Update on that might follow?)

Quick tip: There's a function in the BIOS of most computers wich will turn them on when you switch power on after it's been of for some time. This will allow you to turn your computer on without accessing the power button, you only need to turn on the power strip or plug the computer in.

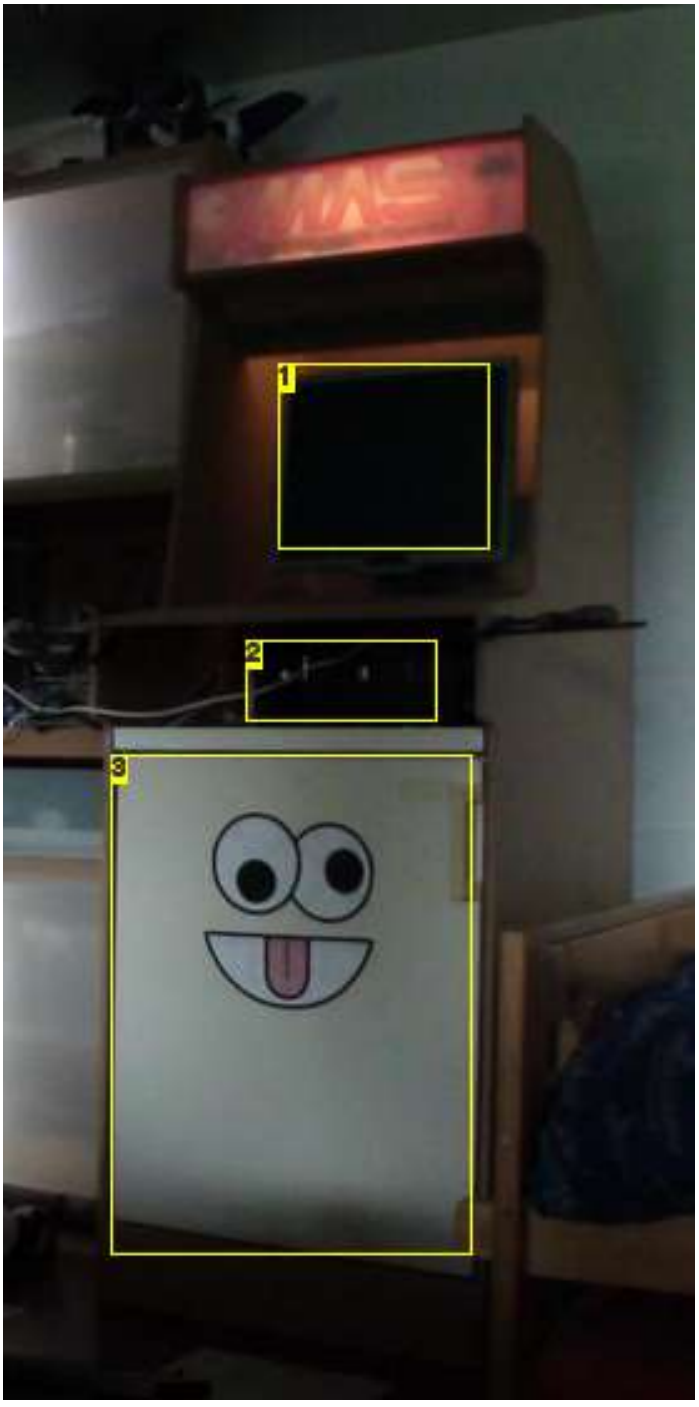


Image Notes
1. the screen on top of the computer
2. the computer, an old HP
3. Everything stands on top of the frifge. And yes, my fridge is very happy about it :D

Image Notes
1. The fluorescent tube lighting behind the marquee

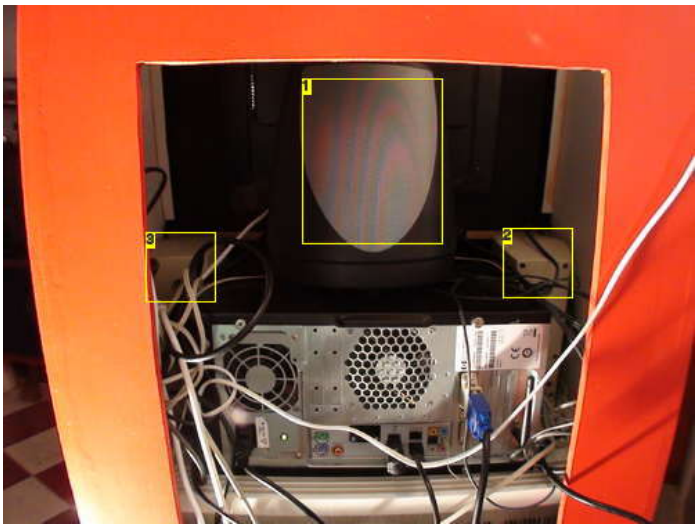
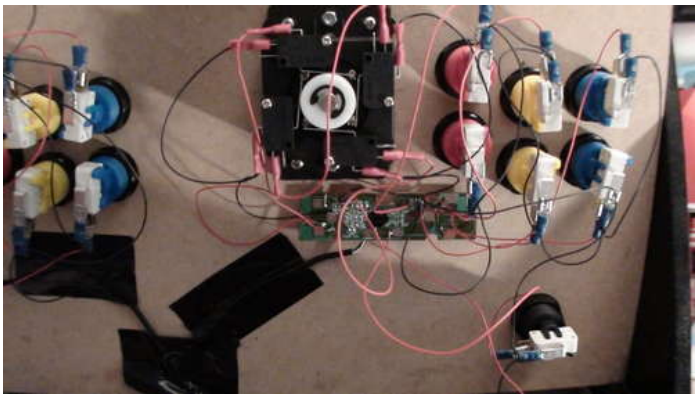
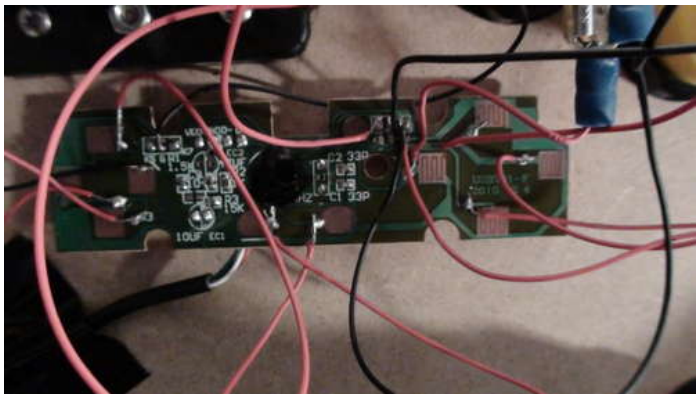
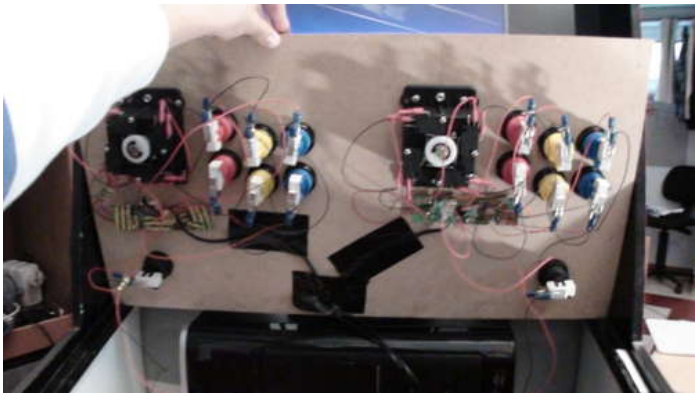


Image Notes
1. subwoofer
2. speakers
3. speakers

Image Notes
1. The power strip with a load of wires.







Step 8: Finished!

The arcade cabinet is now done

Now you can download some roms, and get addicted to the awesome games of the yesteryear!

If you have any questions, comments or if you liked it a lot, please leave a comment. If you build one yourself, definitely let me know and see. I hope you've enjoyed my instructable.

DEMONSTRATION VIDEO

Of course we didn't come up with everything ourselves, if you want to know more, you might want to check these links:
koenings.dk
mameworld
mameui
mamedev

ExperiMendel

Related Instructables

MAME Cabinet in 4 key steps by chrismake

Mame Ikea Cabinet (Photos) by jed21

Arcade Machine (Photos) by hacker3455

My MAME Cabinet (Photos) by gbarger

Arcade Cabinet with Ambient Light Effects by Cyberia2016

The Game Over Stand Up Arcade (Photos) by cowtasticfilms