

Building instructions box

Preface

This project and the controls are fine, but I have a suitable box and in the past someone can build it like this or you take an old chest of drawers and a place to live with the components. It's up to each one of you to decide how you want it. However, you are welcome to copy it as described.

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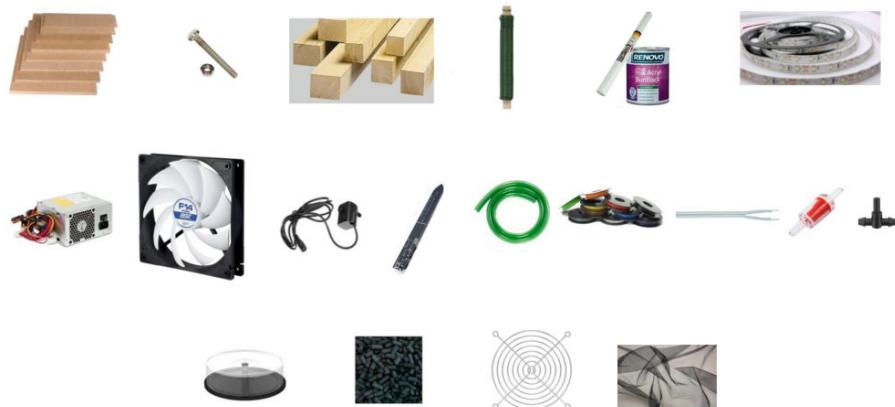
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Shopping list

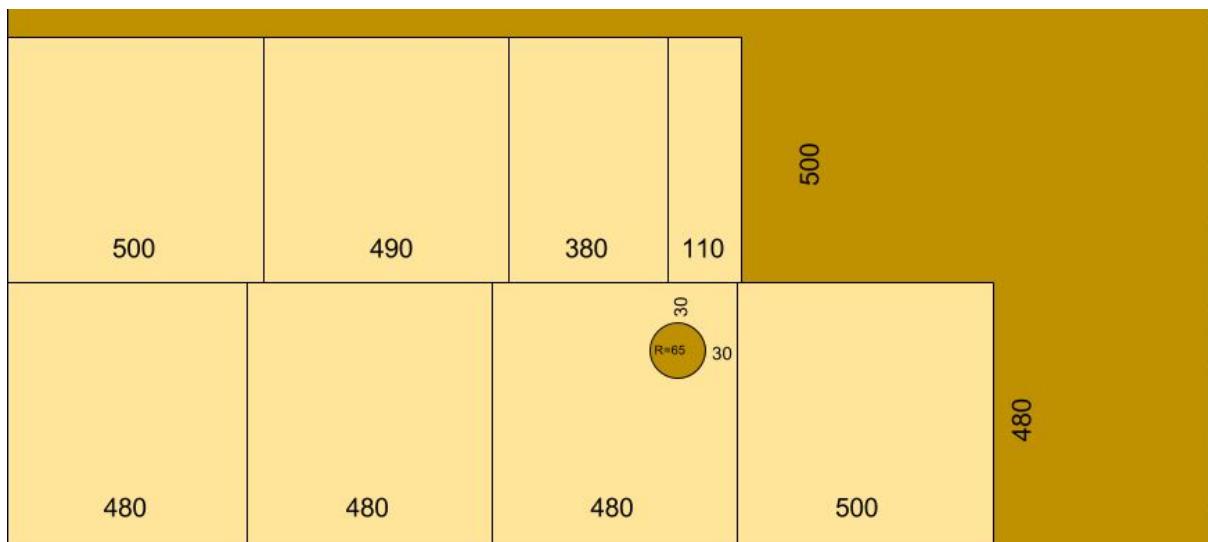
1x MDF board (front) 500 x 500 x 10 mm @DIY market
1x MDF board (rear) 500 x 480 x 10 mm @DIY market
1x MDF board (floor) 490 x 500 x 10 mm @DIY market
1x MDF board (large lid) 380 x 500 x 10 mm @DIY market
1x MDF board (small lid) 110 x 500 x 10 mm @DIY market
3x MDF board (left+right+dividing wall) 480 x 480 x 10 mm @DIY market 16€
2x M4 x 20 screws (or threaded rod for self sawing) with nuts @DIY market 5€
8 meter wood spruce 20-25 x ca. 20-40 @DIY market 8€
1,8 meter squared lumber 12 x 12 @DIY market 3€
Garden wire @DIY market 1€
2x 120x120mm mosquito nets or slightly thin air permeable @DIY market 2€
500ml acrylic varnish white matt with primer + Rollerset @DIY markett 20€
1 meter aquarium hose 4mm inner diameter @DIY market 1€
3cm PVC hose inner diameter 8cm @DIY market
3cm PVC hose inner diameter 6cm @DIY market
1,5 meter power cable 1,5mm² 2 wires @DIY market 1€
1x Submersible pump DC 12V @eBay 2.50€
1x LED Strip SMD 2835 (or 4014)600 LED's cold white @eBay 6€
2x LED Strip SMD 2835 (or 4014)600 LED's warm white @eBay 12€
3x Rocker switch 6A @eBay 2€
500g activated charcoal pellets 3-4mm @eBay 8€
2 x Fan Arctic F14 PWM (important PWM, also gives some without) @Amazon 18€
1x blank CD spindle 10pcs @eBay 6€
2x fan grille 120mm @eBay 3€
PC power supply @eBay 20€
25 meter copper wire 0.25mm² @eBay 5€
1x T-piece hose connector @ebay 1€
1x Aquarium Check Valve @eBay 1€
1x DHT22 Sensor @eBay 2.5€
1x CJMCU Plant Watering Alarm @eBay 7€

If you already have parts there like an old power supply then just use that, I have for example here a power supply lying around which I had fished out on the street from a pile of bulky garbage.

Likewise, for example, an old stranded cable from an old electrical device (power supply light).



The MDF boards I let me cut from a large 10x1220x2440mm board directly to measure, just ask in the DIY store, with me the right are cheap for a total of 16€. If you don't have a jigsaw or if you can't get the hole in the partition, ask if they can do it. Or take a thin saw blade with you. Here the sketch of how to get the parts from the big plate:



The other part I buy on the internet, my main source of supply is eBay.de. I buy electronic parts mostly from the Far East, because you have to save real coal but you have to be able to wait for it. On eBay I always sort by new, cheapest first and if I need it fast then location Germany.

Note that if you have an electrotechnical shop nearby you can get diodes, resistors and mosfets cheaper there than from the internet. Alternatively, you can use another Mosfet. PC power supply you may still have to lie around or look at eBay classifieds. The same goes for the empty CD spindle, 6€ is really hard but you often have it at home.

Then we need a water tank, I use the Ikea 365+ reservoir with 2,3 litres. You can also take a 3 litre PET bottle or what you have there, it must not be wider than 10cm, max. 45cm high, closed & tight. Preferably made of plastic so that you can drill a hole for the hose later on.

Also make sure you have tools:

- Glue e. g. Pattex All in One Adhesives & Seals or other 2 in 1 Adhesive
- Drill bit diameter 4 mm
- cordless screwdriver
- Cling film for sealing
- Reciprocating saw/saw for hole in the partition wall (diameter 124 mm)
- possibly screw clamps or something to weigh down for gluing
- Soldering iron with soldering tin for the board later
- Pincer to cut the wire or good pair of scissors

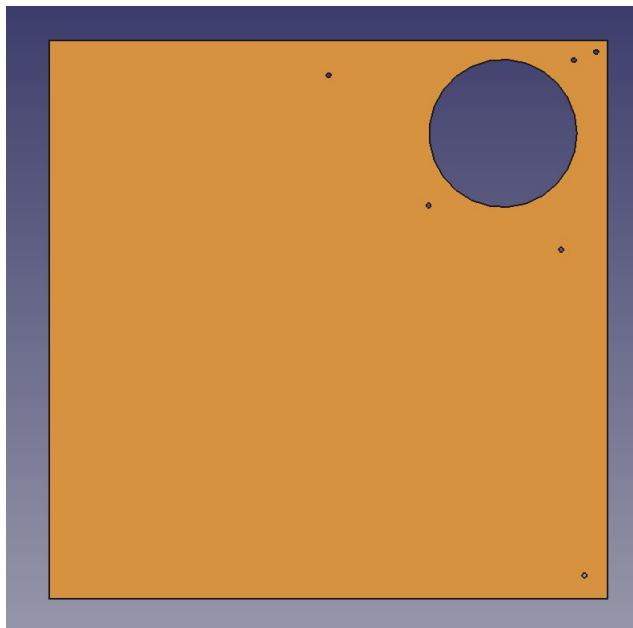
Preparing MDF boards

Take the partition wall (480x480mm) and drill all holes with a 4mm diameter drill bit. The big hole for the activated carbon filter (diameter 130mm) has to be cut out with a jigsaw if you haven't already had the hole cut in the hardware store. A compass is good for drawing or you can use the lid of the CD spindle and put it on it to draw. Make sure that there is a little distance to the top and to the right so that the plate does not tear out and you have enough space for the holes outside. If the hole gets a little bigger no problem, later on between the CD spindle and the hole there is the plastic wrap as seal + damper.

For the two holes around the AKF, hold your fan and draw the four holes with a drill or pencil. The other positions for holes don't matter, follow the sketch.

The hole at the top right should be wide enough to fit your stranded wire through, just move it a little bit to the left and right with the drill until it fits.

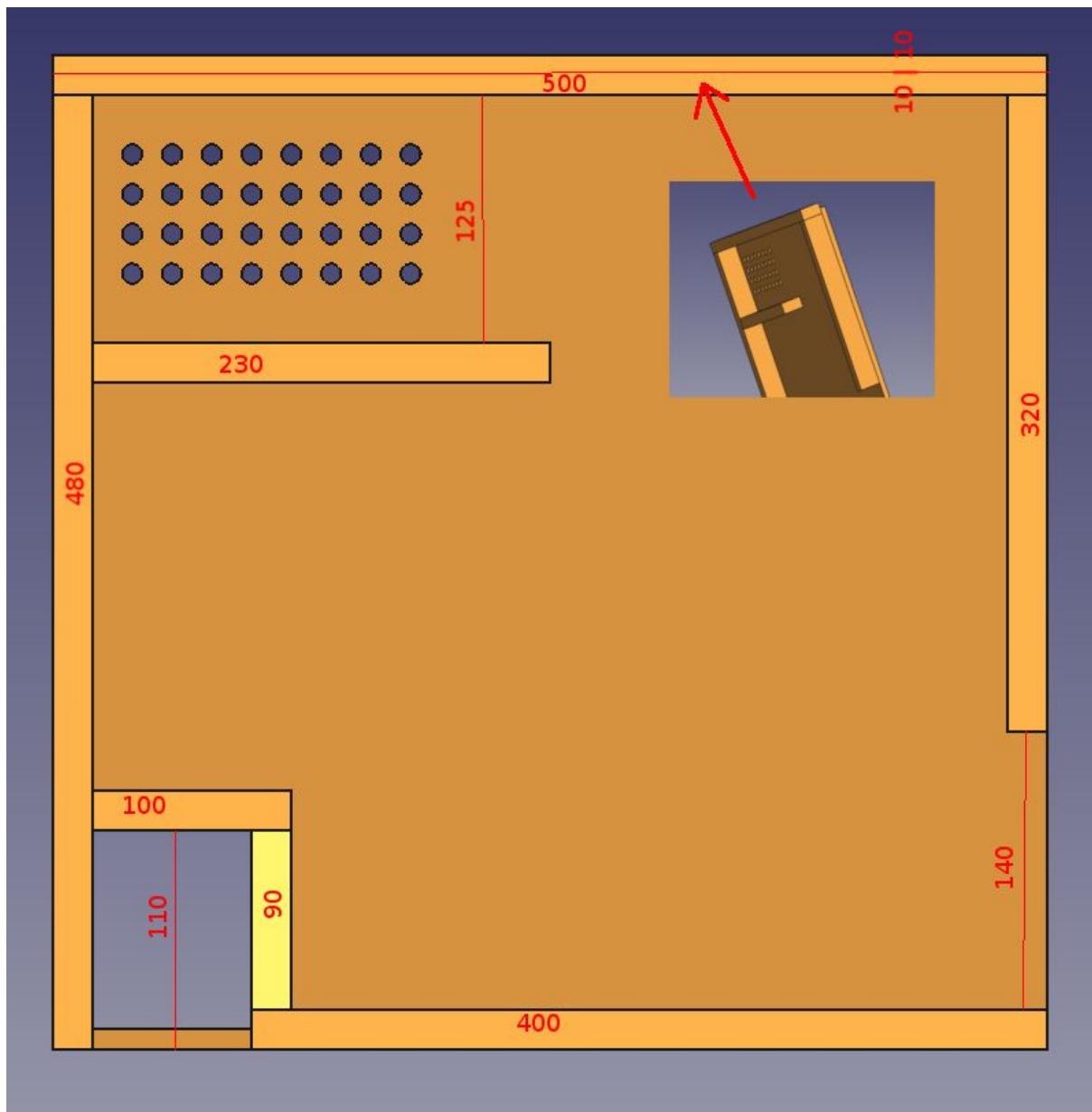
The hole in the middle top is later for the hose with an inner diameter of 4mm, let the drill circle until the hole is wide enough so that the hose fits through it.



For the floor we saw the feet together, take the squared lumber and cut pieces on the sketch.

Now we glue the parts on the floor (490x500mm) after the sketch, the 500mm foot should stick 10mm out of the ground, so watch out for it! In the sketch you can see what I mean.

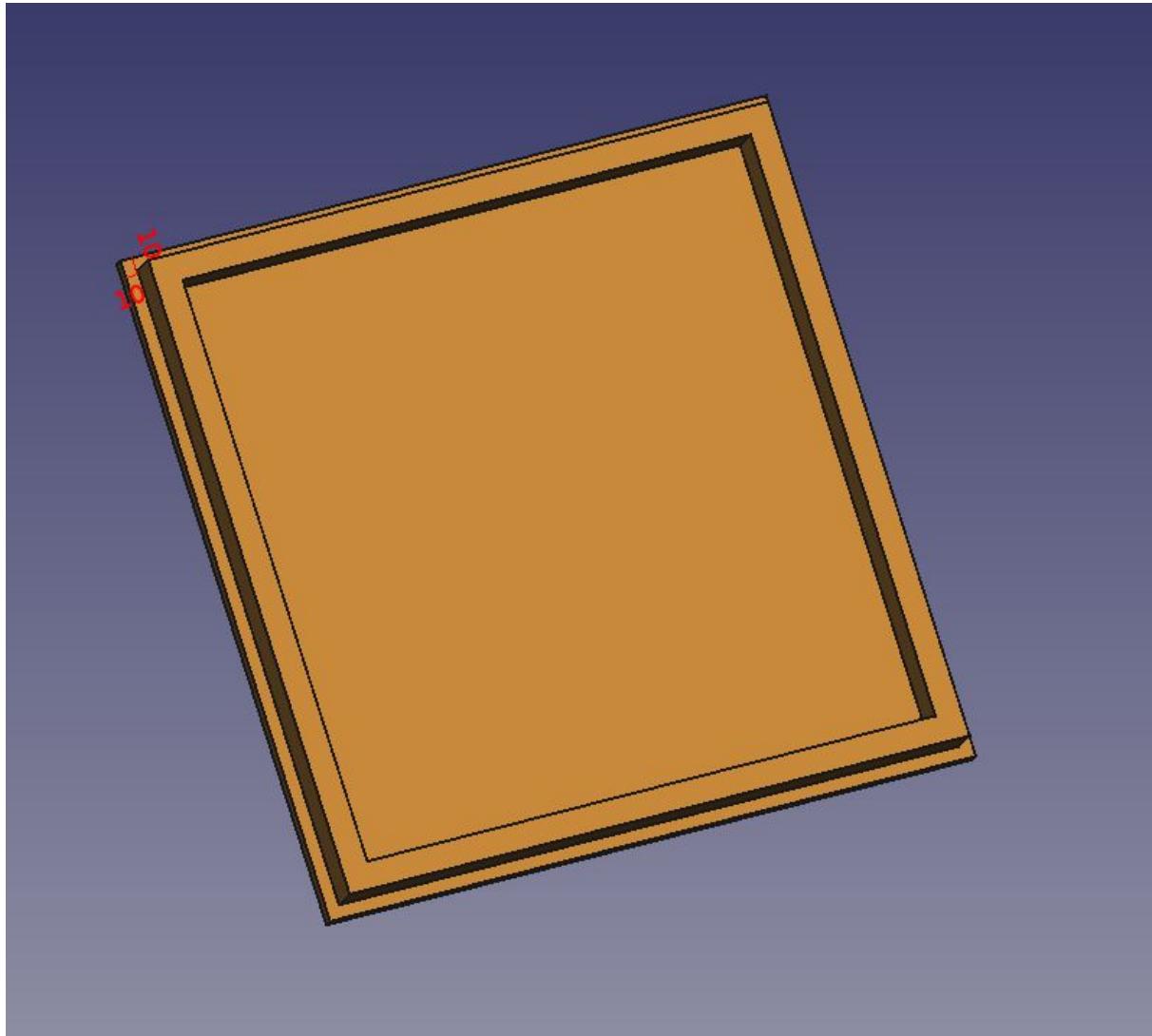
It's best to use a pencil, sketch everything on the plate and then take the measurements, depending on how thick your squared lumber really is.



As long as the feet are dry, we take the squared lumber for the front and cut off individual strips so that we can later get around like on the sketch.

And stick it on the front (500x500mm) with a distance of 10mm to the outside.

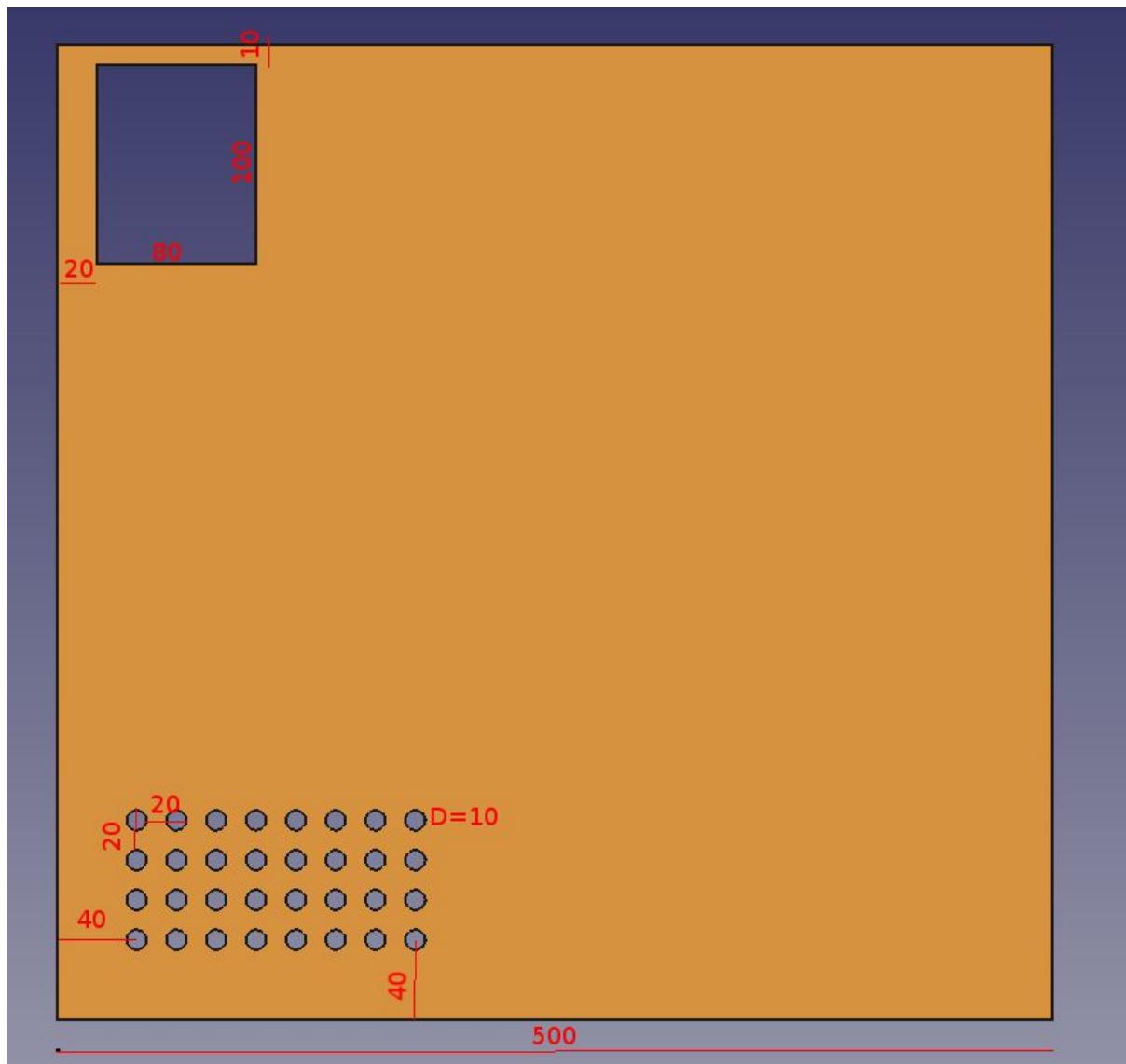
Please work very precisely and keep the distance of 10mm, otherwise the lid won't fit later and has to be reground. So take a pencil and draw the 10mm on the outside so that you can check again if you keep the distance.



When the feet are dry on the ground, the air holes go straight to drills with a diameter of 10mm and saw the 80x100mm hole. The cut-out can also be cut out completely as you have made your feet on the ground.

When drilling on the lower side, i. e. where the drill comes out, put some tape on it so that it doesn't fray.

Make sure you have the ground the right way around. Here is the sketch:



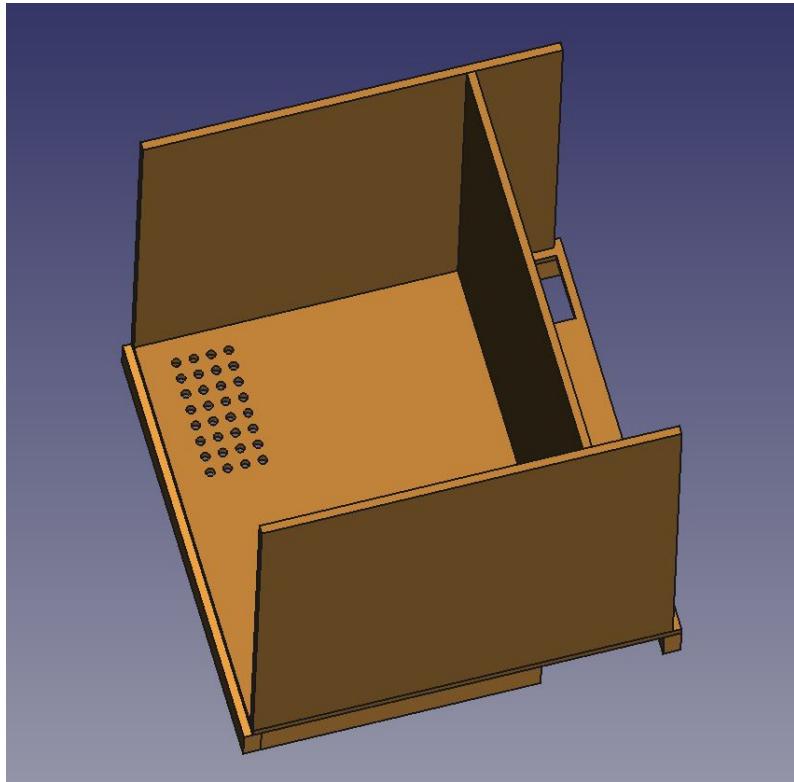
Assembly

The partition should have a distance of 110mm to the rear end of the box, draw the distance with a pencil so that you know where to stick.

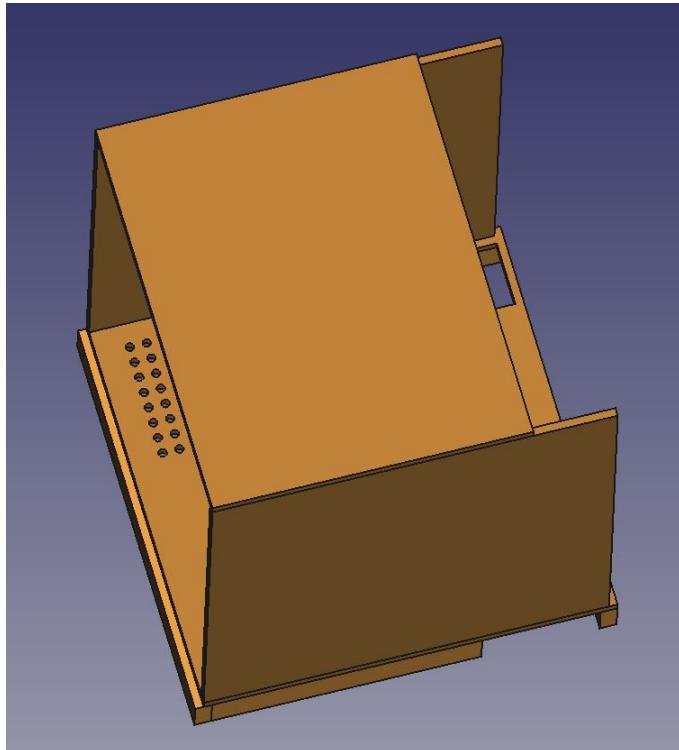
It's best to have two of you now, because as long as the top lid is not on it, the walls like to tilt. If not, place the floor to the side of the wall so that you can lean one side against the wall.

If your front is already hardened up, you glue it all together, I recommend Pattex All in One again, costs as much as good glue but has more advantages.

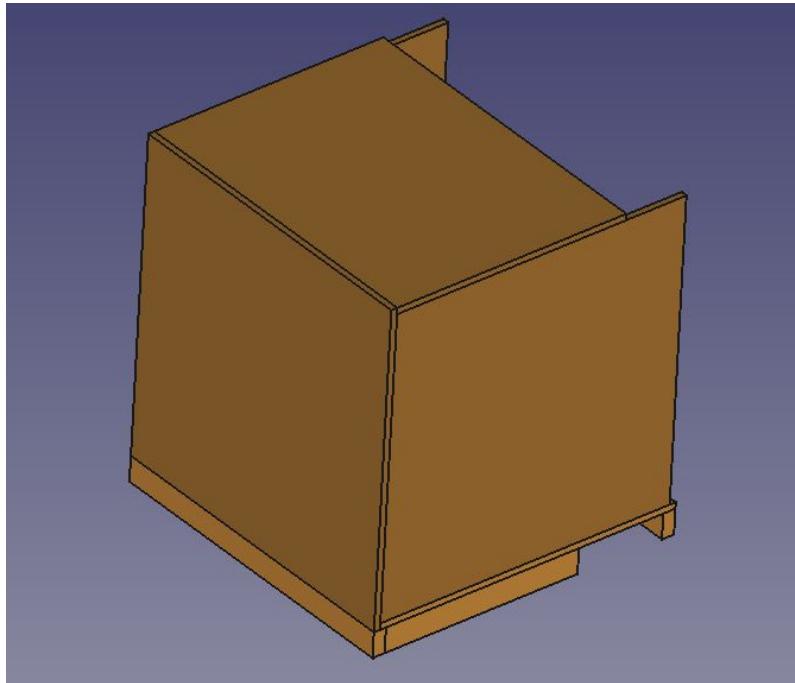
First, glue the side walls and the partition wall to the floor and align them flush as shown in the following picture.



Immediately afterwards, glue the large lid on top of it and weigh it down.



Now slide the front panel in before the glue dries, so you can align everything perfectly.



Then carefully remove the front panel again, otherwise it can happen that the adhesive sticks tightly to the overhanging adhesive.

Painting

Wait until the glue has dried and the box is solid.

Depending on whether you have foil or heating varnish you will now cover the growroom and the lid with it. With the lid, the interior can be painted/foiled, with the Growroom everything is painted/foiled down to the ceiling where the light comes in.

IMPORTANT: Do not paint the ceiling in the top of the box or your light will not stay on later.

If you are painting, then push the front after painting purely as long as the paint has not dried yet so that the strips can move the excess paint away from the front. Take off the front immediately afterwards, otherwise it would dry with the paint.

Building activated carbon filters

Put the front on the front and look through the hole for the AKF to see if the holes in the bottom are possibly covered by the ledge on the front, if yes, take a little bit off the ledge so that the holes are free.

For the filter use the 10 CD spindle, fly screen, activated carbon and fan screen.

I would put the activehole pellets into a pot in front of it, put the lid on it and shake it well so that the fragments get bigger. Otherwise it can be that in the flowering time nevertheless an odour is noticeable.

Use a soldering iron or something sharp to cut a hole in the cover and bottom of the spindle to place your fan grids. Then take the fly screen and cut out two parts of the flyscreen, which you can put on it later so that the activated carbon doesn't slip through.



If you cut off the bars outside of a ventilator grille with a pair of pliers so that the grille fits into the cover, then place the fly screen on the ventilator grille and fill the cover with the activated carbon and then put the second fly screen on top of it.



The other grid is glued with the 2 in 1 adhesive or something else to the bottom of the spindle, look at the picture where you have to put your glue dots, they must not stick out to the back, because later on the fan will get on the back and the fan blades would otherwise grind there. Attach the adhesive dots as far down as possible.



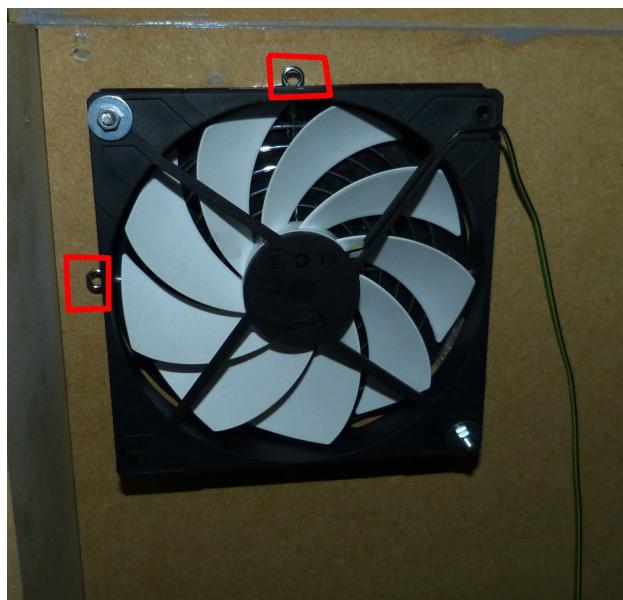
When the grille is dry you can close the lid with the bottom and your activated carbon filter is done.

Mounting the filter

Now we mount the AKF on the partition wall. First of all, your cling film wraps around the AKF and then pushes it from behind towards the growroom. It is best if the AKF does not touch the wall directly but the foil in between.



Then the fan is added from behind, which should suck in the air and blow out air through the filter. Take care not to grind the rotor blades on the filter. If the loops of the grille point up to 90 degrees, they are on the fan housing and the rotor blade can run smoothly. At the side of the fan you can see arrows in which direction it is blowing, the fan should pull the air through the activated carbon filter and blow it into the supply chamber. It is best to let the fan look upwards.



The fan is mounted with the M4 threaded rods or screws in the 4 holes. My tip: try to make a foil around the thread so that it doesn't come into direct contact with the wood. So the box will be quieter later. I ignore the red holes, I closed them again because I use only 2 screws.



Prepare & install hardware

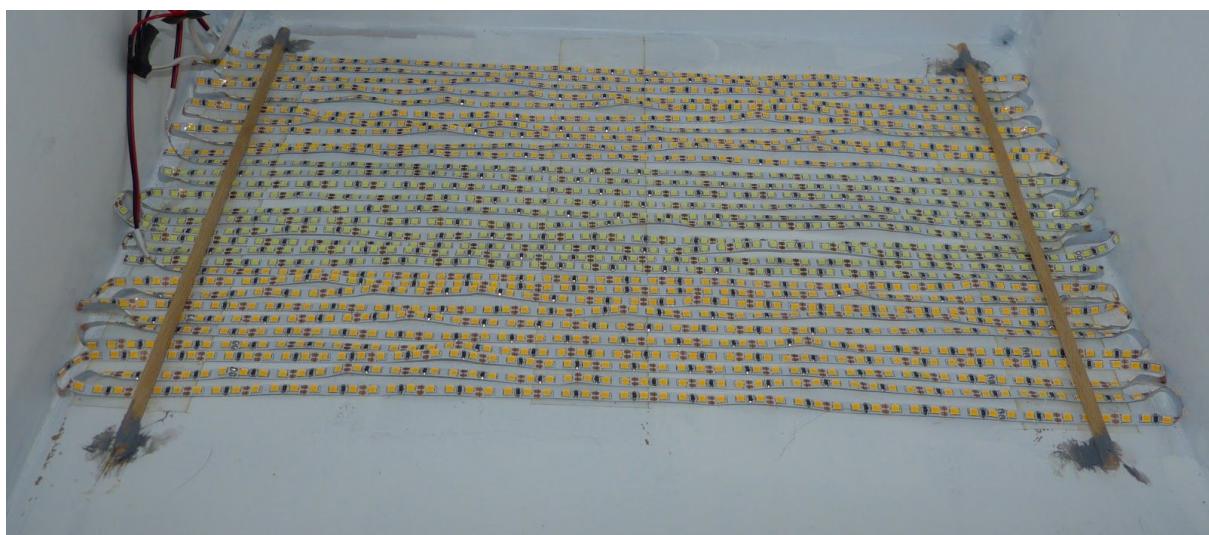
GENERALLY: always cut the wires off long enough, rather tweak a little bit afterwards. The cables should be 1.5 times as long as the box is high.

If there are plugs at the end of the LED stripes, twist them off and remove approx. 2 cm of insulation from the cables, this is soldered to the main cable after installation (the 1.5 m long 2-core power cable).

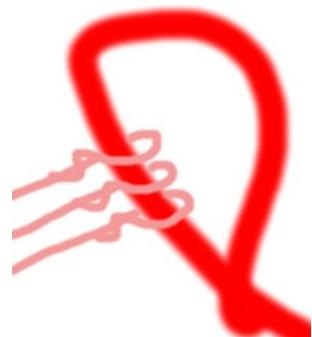
Then turn your box upside down and glue the strips as you can see on the picture. Start with warm white, then cold white in the middle and then warm white again. Make sure that you always start on the side where the hole for your main line is so that the cable is enough.



In the picture you can see that my blanket is painted white, please do NOT hold your LED stripes any more. If the stripes don't hold when you turn the box around again, get 2 thin wooden strips from the hardware store and glue them to the outside. Scratch off the varnish/foil and possibly also scratch the wood surface so that the adhesive has a better grip.

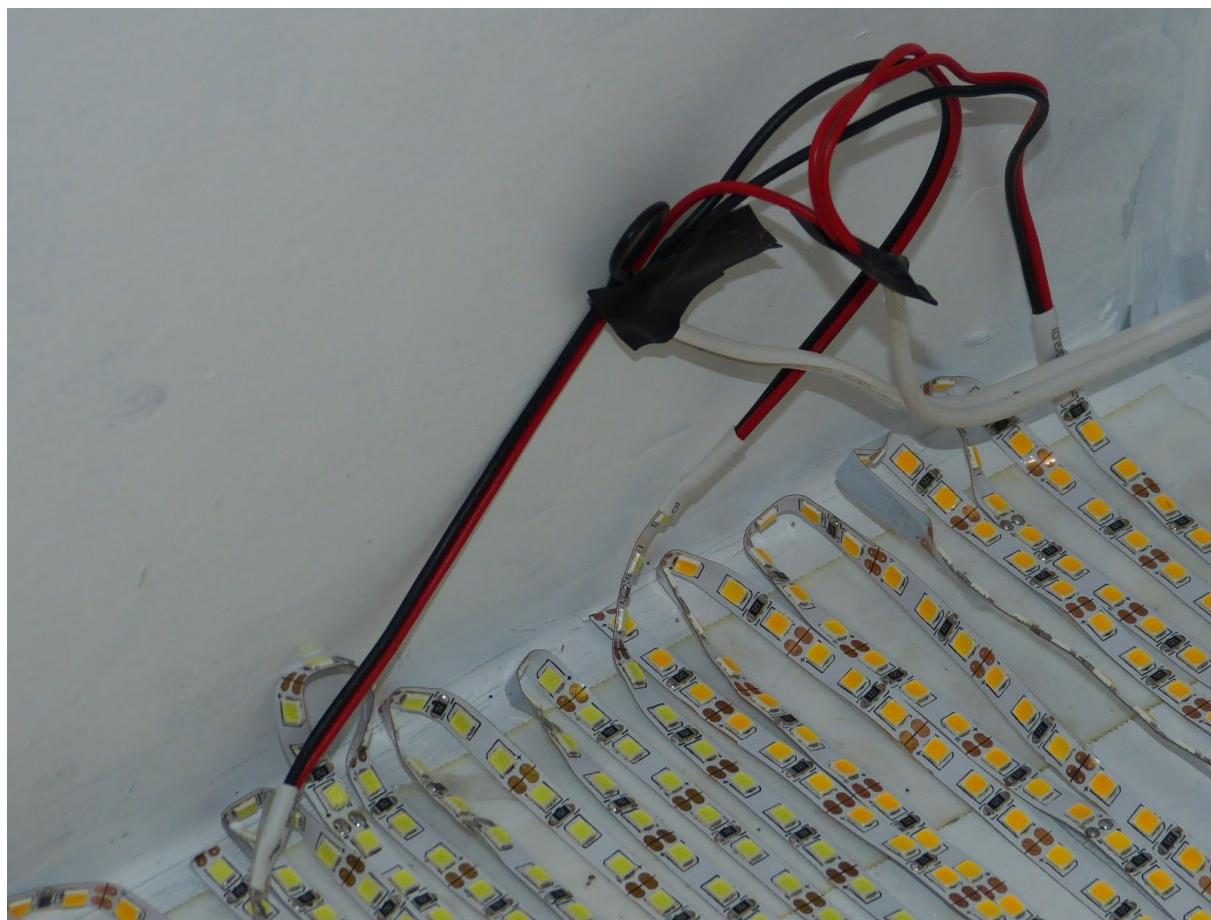


Then insulate 1-2 cm of the main line and insert it through the hole in the box. Now all red wires are knotted together with a cable from the main line. Afterwards, the rocker switches are attached to the red wires and these, in turn, are connected to the main line.



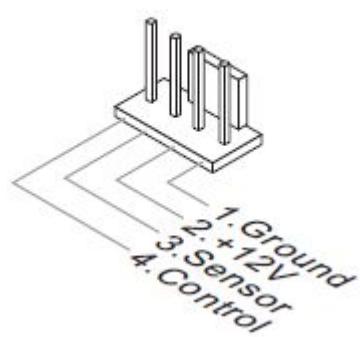
On the picture not to see the rocker switches, I have added them afterwards, so you can switch off some strips in the vegetation phase the warm white ones and in the blossom the cold white ones, so that you lower your temperature. So I knotted them together (picture).

Then solder it completely tightly and strip it with adhesive tape, finished.

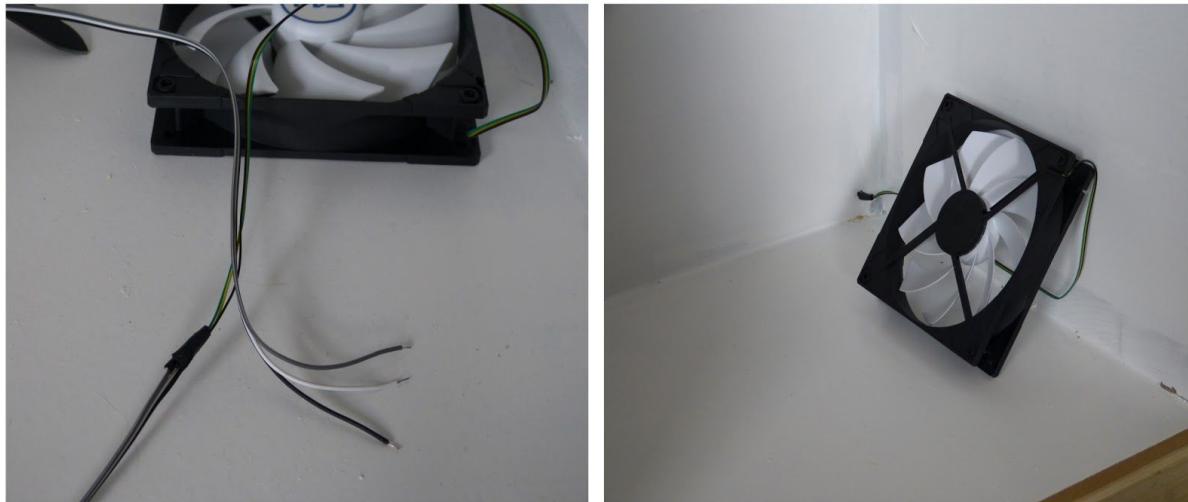


Now we prepare the fans, when assembling the exhaust air fan, simply cut off the plug, strip the three wires and solder the wires with a bit of solder so that they don't disperse. Generally with the fan you should have three cables, yellow = +12v, black = Ground and blue = Control for our controller. Just pinch the fourth green cable away, we don't need that (sensor).

CPUFAN1



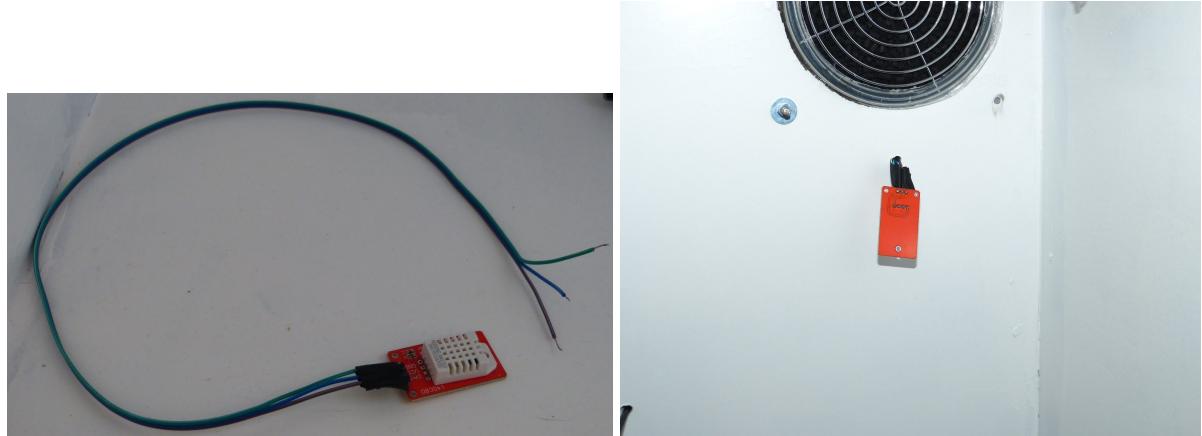
For the recirculation fan you have to extend the three cables, so solder another 3 cables to it and isolate them separately with tape.



We solder three cables to our DHT 22 sensor which measures the temperature and humidity. If you have ordered the DHT 22 sensor ready on a PCB, then VCC (+5 V) Ground and the data pin are on it. If not, it's like this one in the picture.

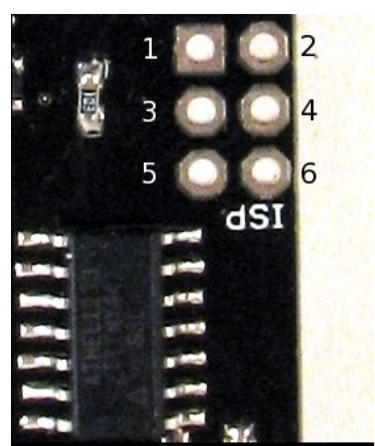


When the cables are connected, insulate all pins with tape and strip the other end of the cables and solder them with solder and run the cables through the partition.



We then solder 4 cables to the sensor to measure the moisture content of the soil. Insulates both sides and tins them with solder.

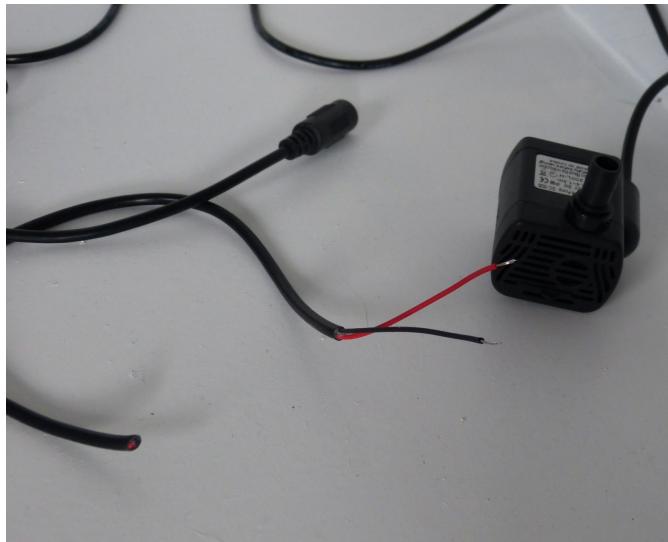
As you can see on the picture +5 next to the rectangular hole, two above it the ground and the two data cables come into the middle right and left. Make a note of where you have soldered which cable colour or label the cables. Solders the cables to the sensor and isolates the individual cables with adhesive tape. Afterwards, the sensor is used to tape-back to the top of the button.



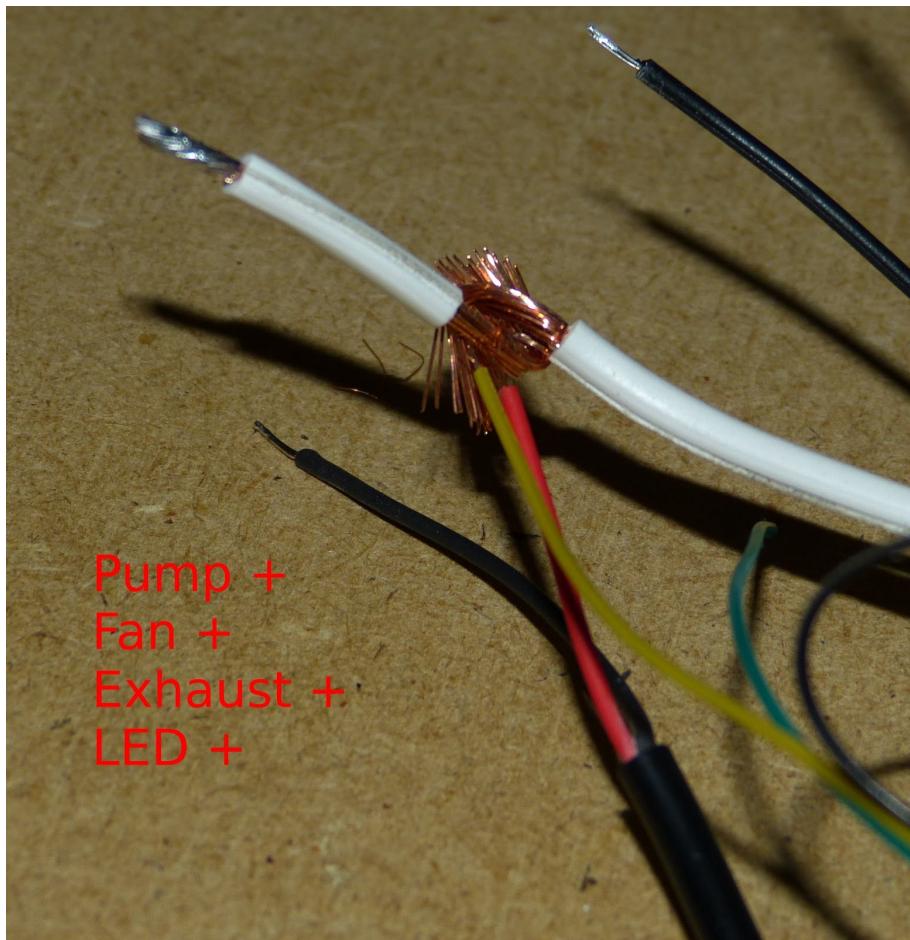
- pin 2 - +5V
- pin 3 - SCL
- pin 4 - SDA
- pin 6 - GND

Look for the chip you're looking at the right side.

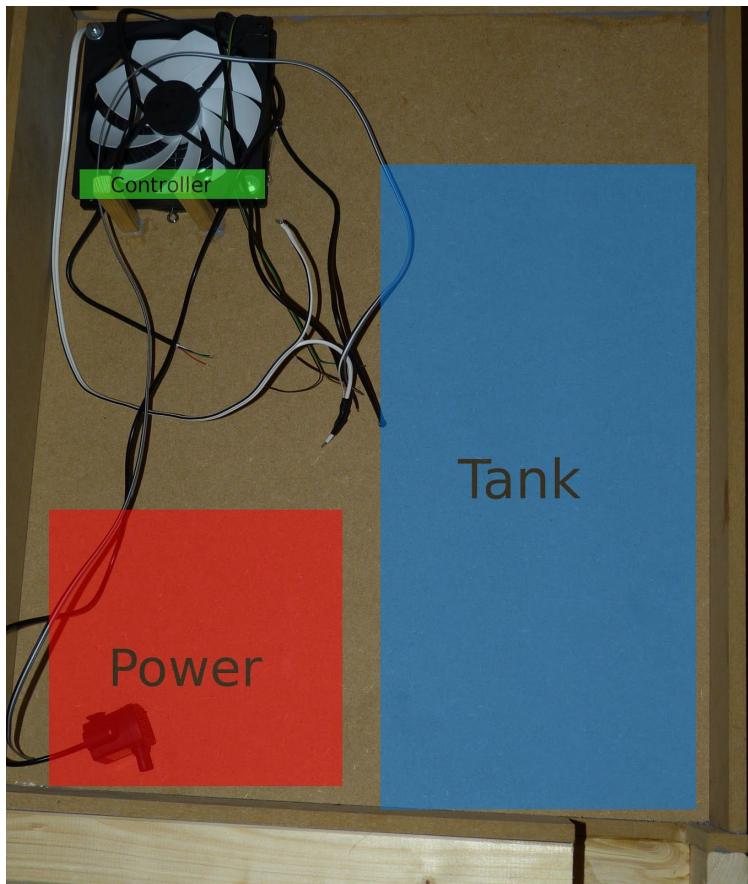
With the pump, simply cut off the plug, strip the insulation and tin the ends.



Now we solder all +12 volt inputs to one cable, just pinch off a small piece of your LED cable, hook the cables together, solder them and then insulate them with taper.



Later the arrangement of controller, power supply and water tank will be like this

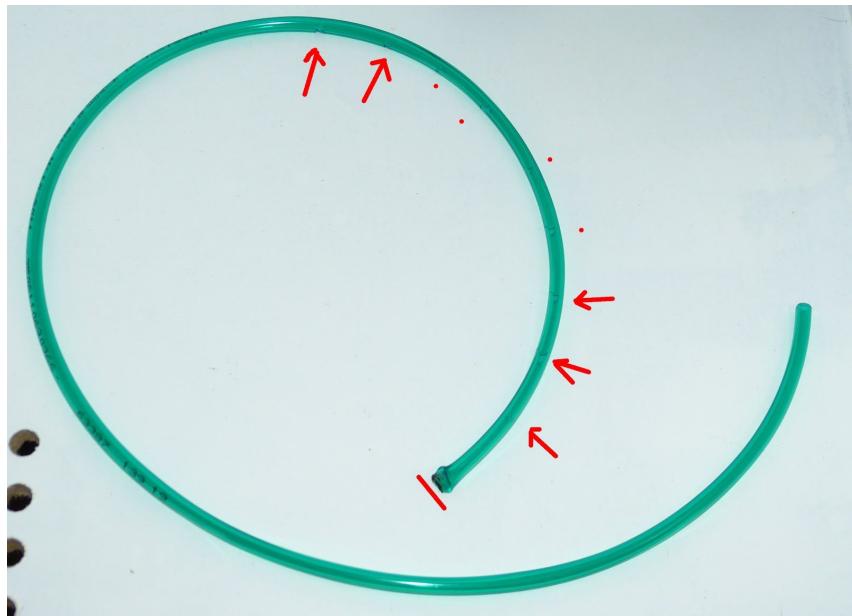


Finally, we need to cut off the hose so that it goes from the hole in the partition wall to the bottom of the Growbox.



Then take a lighter and hold it a little to the end of the hose and press it with a pair of pliers or your finger (be careful hot). So that at the end is closed (red line).

Then cut holes in small intervals with a pair of pliers or scissors at the end of the hose where the water can then flow out to the ground.

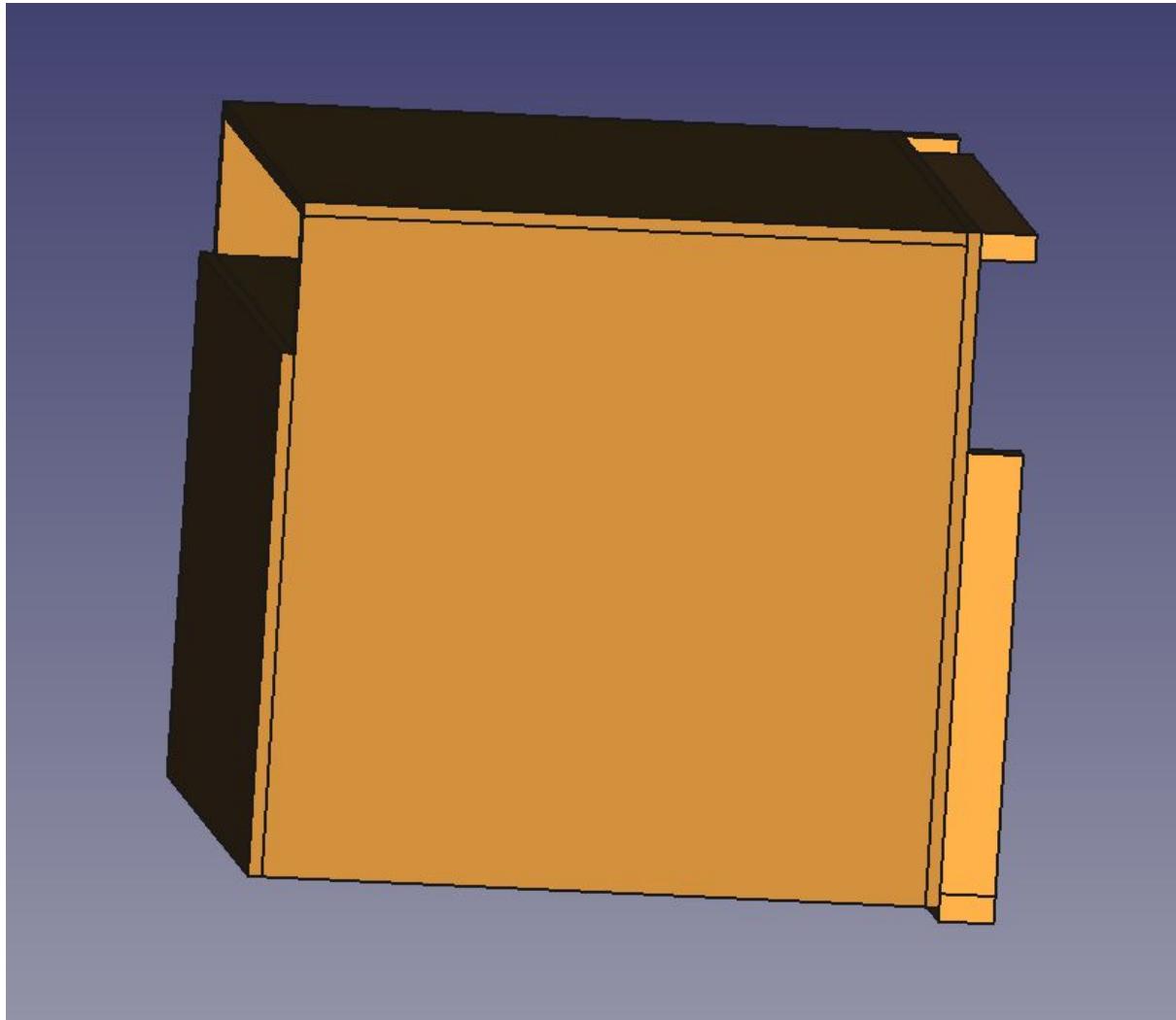


When the hose is finished, insert the open end through the partition. At the other end we mount the T-piece, the remaining hose leading to our tank and the throttle check valve. With the throttle check valve make sure that you can blow in the direction of the hose but not out of the hose.



Glueing the rear wall

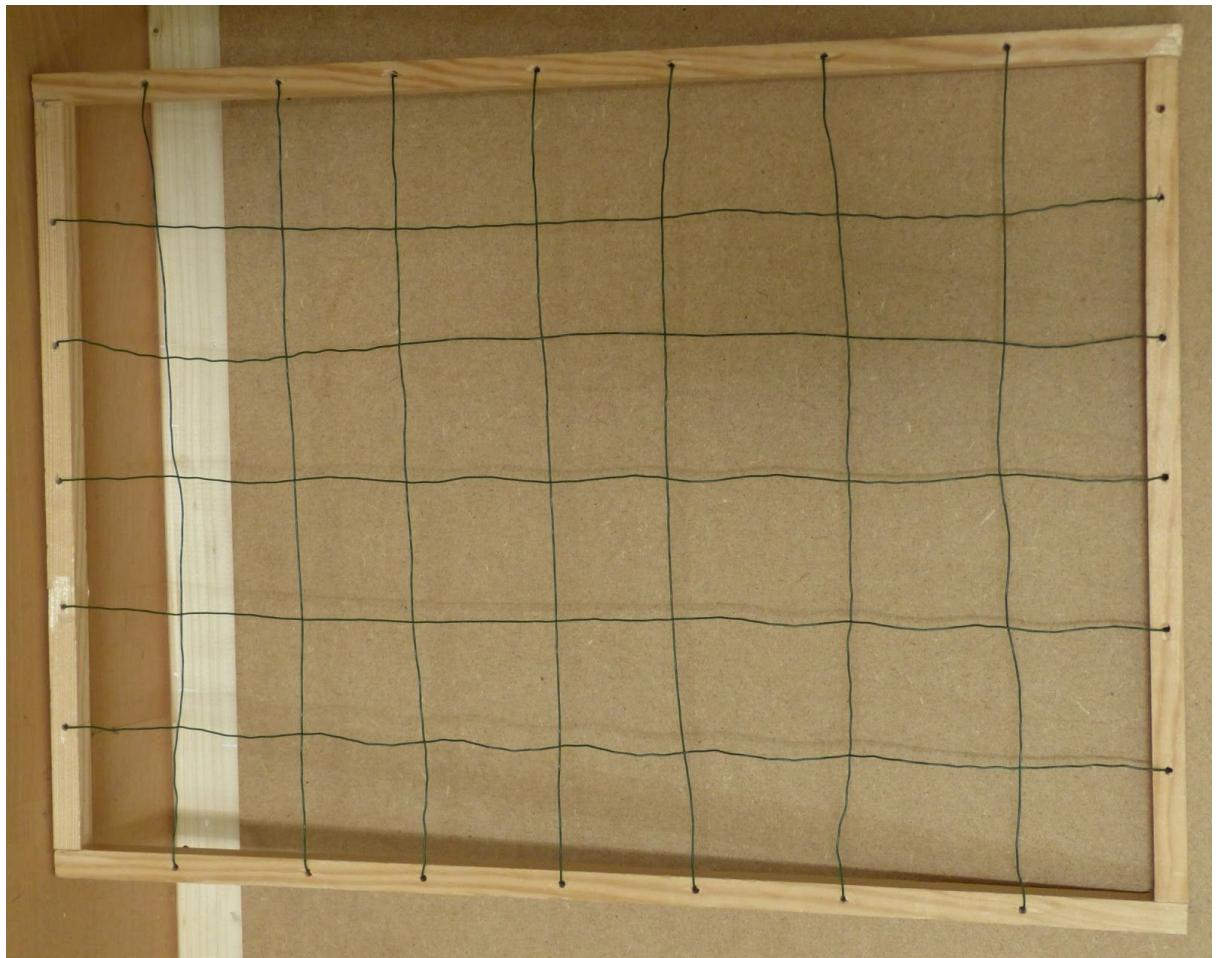
Now glue on the back wall and you're done! The best way to do this is to tilt the box forwards, then you can simply place the rear panel on top of it.



Building the lattice

Finally we have the square timber 12 x 12 and the garden wire which we use for the lattice. For this we saw off two squared lumber to the width of the box and then again two pieces for the depth, here it has to be noted that there is also a squared lumber on the lid and you don't build the lattice too deep so that the lid can still be mounted on it.

Stick together on the squared lumber so that you have a rectangle for the grid point when everything is dry, drill holes in the middle of the squared lumber so that you can thread through the wire later. The distance between the holes should be about 7 cm.



With the remaining squared lumber we saw three small pieces of about 2-3 cm in length. Afterwards we have to remove a little varnish in the box to glue the pieces to each left right and to the rear wall at a height of about 28 cm. The left and right piece can be a little further forward. Afterwards the pieces are glued on, they serve as a support for the lattice.



Tips for camouflage / decoration

You can paint the cabinet black and make it look like a subwoofer, or you can put a handle on the front of the cabinet to make it look like a small cabinet. Be creative!

Controller

In the other instructions you will find information on how to build and install the controller.