DIY - Euro Rack

I been struggling of later to get projects finished, basically I hadn't really given the mechanical side of things much thought. So I've tried to document my attempt at Case and PSU construction. I guess this is for the benefit of people like me with no real experience of this type of thing. Ha-ha last time I did any wood working I was still in school, which is 17 years ago now. Everything I've learnt has been from you-tube.

As part of the case design I'm planning on building a Thomas Henry PSU from his Nuts and volts article.

http://www.nutsvolts.com/media-files/11/January%201998%20Thomas%20Henry%20-%20Power%20Supplies%20for%20Electronic%20Music.pdf
I feel up to the task after reading about mains wiring and PSU construction from other books and resources.

This thread http://electro-music.com/forum/topic-51694.html has also been a great resource in understanding the design process of PSU's and how it relates to the components you choose to impelenment.
I'm planning on doing a write up of the TH PSU article and posting a follow up to this one.

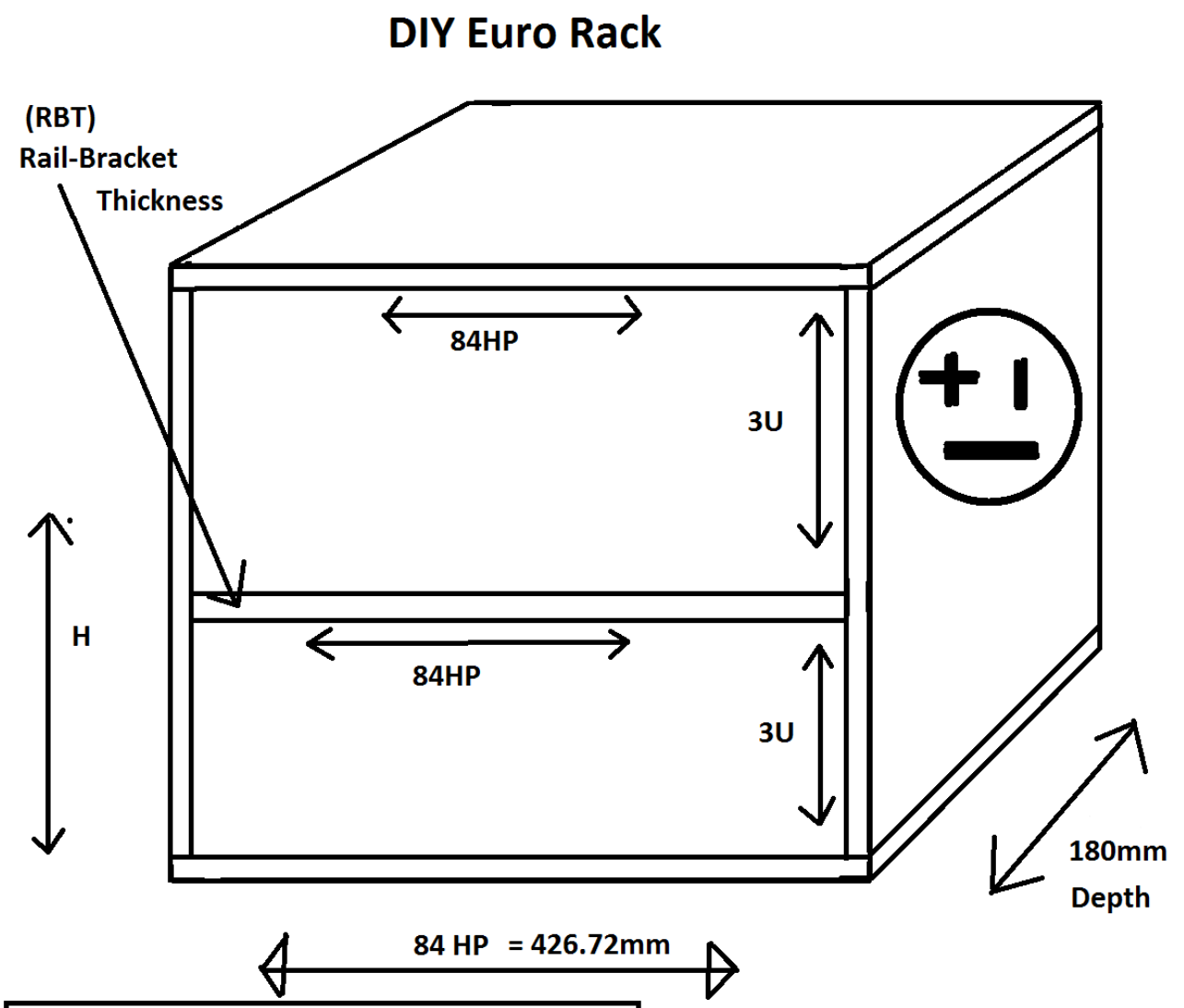
Cabinet Design

Once I had read through this great EM thread http://electro-music.com/forum/topic-18281.html a couple dozen times, I decided on making a DIY enclosure based on the Euro rack standard.

This page was a great resource when figuring the whole thing out.
http://www.doepfer.de/a100_man/a100m_e.htm

The inspiration for this case came from these A100 Portable Suitcase designs. Seeing them proved to be very helpful.
http://www.doepfer.de/a100p_e.htm
For me a portable case design seemed the best way to go. I can just keep adding case's as and when I need them.

A basic drawing I used to help me finalize my measurements.



Wood for Case Frame = 9mm (8/8") Thick Plywood

HP = Horizontal Pitch, 1HP = 5.08mm

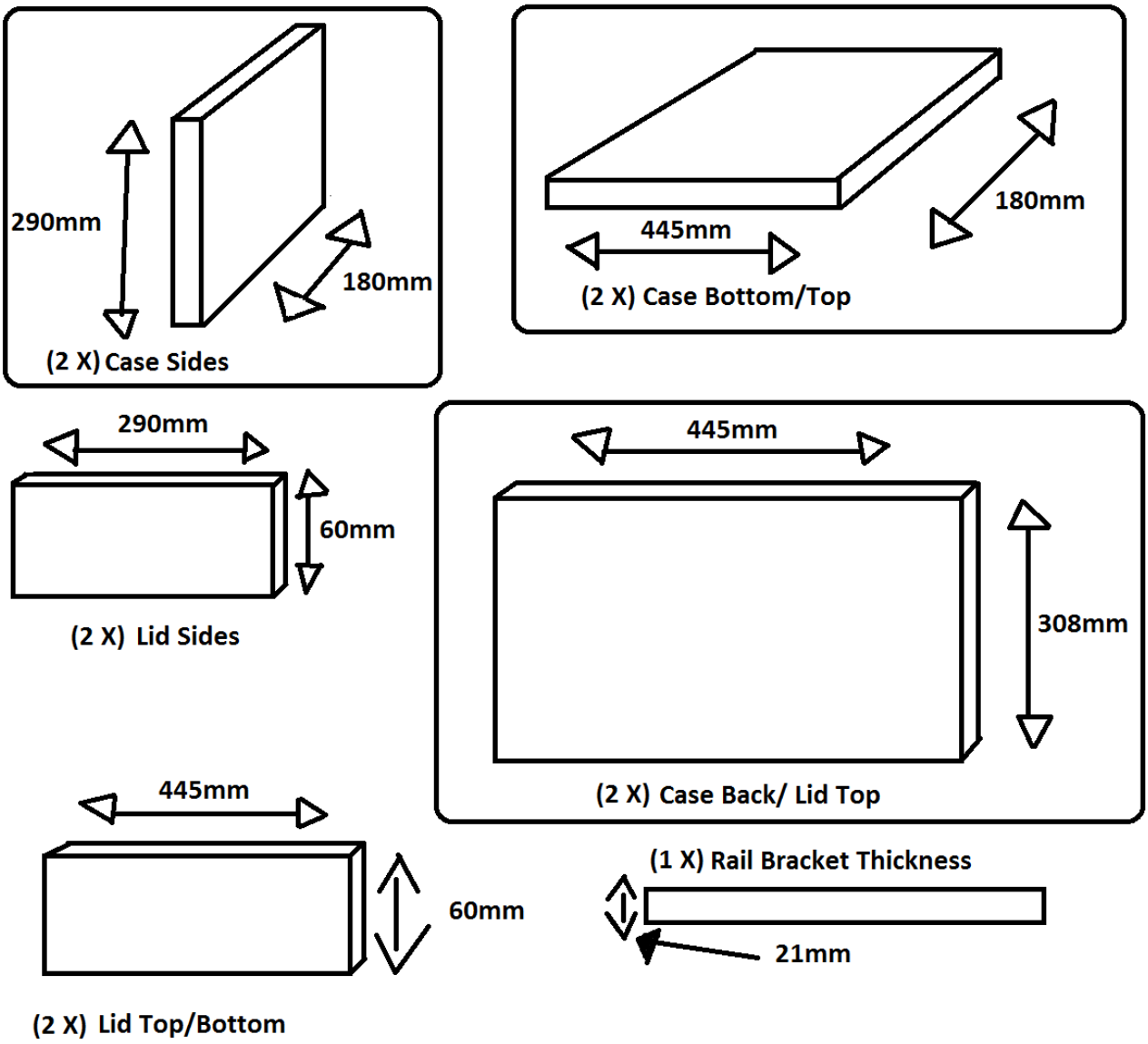
(84 HP = 427) 427 + 9 + 9 = 445mm

1U = 44.45mm 3U = 44.45 * 3 = 133.4mm

H = 3U + 3U + RBT

more info about Euro Rack At:
http://www.doepfer.de/home_e.htm

http://electro-music.com/forum/topic-18281.html



DIY - Euro Rack measurements

Measurements

Top/ Bottom W: 427mm + 18mm = 445mm
H: 180mm
info: The case Side pieces stand between the top and bottom pieces, Its 9mm plywood so add 18mm to the 84 HP value

Side's W: 134mm + 134mm + 21mm + 1mm = 290mm
H: 180mm
info: I choose a wood bracket that was 21mm thick. The middle rails will be attached to this. I also added a 1mm tolerance as-well

Back: W: 445mm
H: 290mm + 18mm = 308mm
info: this piece covers the whole of the back of the case

lid: Depth 60mm
info: The depth of the lid was chosen by the dimensions of the aluminium Extrusions and lid locators.

A more clear list

2X W – 445mm H – 180mm (Case Top/Bottom)
2X W – 290mm H – 180mm (Case Sides)
2X W – 445mm H – 308mm (Case-Back /Lid-Top)
2X W – 445mm H – 60mm (Lid Top/Bottom)
2X W – 290mm H – 60mm (Lid Sides)

I took these measurements to a local timber diy/trade store and got them to cut these pieces on a table saw using 9mm 8/8 thick ply wood. This only cost me £5 quid for the lot. Very happy with that. Making the box wasn't too hard. I took the same approach as shown in this vid.

http://www.youtube.com/watch?v=N7EYSDL9aYk&feature=relmfu

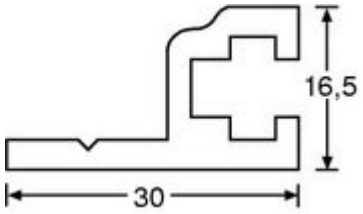
Drill pilot holes then fasten together with screws instead of glue and nails. I made the case and lid separately because I have only basic tools available to me. This is a bit tricky but turned out well enough. I built the case first then I started piecing the lid frame together piece by piece, making sure each section matched the case lip as close as I could get it. Once the frame was bolted together I then added the lid back. it ain't perfect but close enough and works well.
I would recommend if you have a jigsaw to add the depth of the lid (60mm) on to the case dimensions and build the case as a closed box. Then you can cut the lid section off. This way you will guarantee the case lid will be a exact match.
After a sanding and a clear vanish the boxes looked like this.

Case Materials (basic version)

9mm Thick plywood
21mm thick timbre Bracket
rack rail's : 2 meters (407-730, £6.00)
rack rail nuts
Screws
Nuts and blots

One piece of hardware you will definitively need are rack rails. I went for these

http://www.esr.co.uk/electronics/hardware-aluminium2.htm



The Rack rails I'm using are pretty close to the Euro rails. The main differences are:

No lip on top of rail.

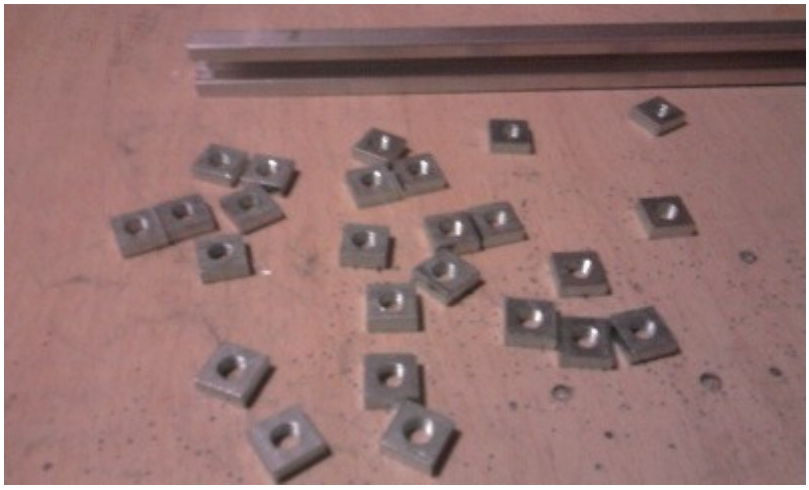
No mounting screws at the sides of the rails, so you have to use a timber bracket to fix the rail to the case.

Panel mounting nuts come individually and are M6 fixings. Euro style panel mounting nuts come in strips of HP lengths. Each nut has a 5.08mm spacing and are M3 size fixings.

Taking the M6 fixing into account, the spacing between two nuts is about 11mm. so the smallest panel size you can have is 4 HP = 20.32mm in a 84 HP rack that's 21 panel's

see this page for a detailed description of the format

http://www.doepfer.de/a100_man/a100m_e.htm



The main upshot about this substitute rail is that it retains pretty much the same look and feel as Euro rail but come's at a faction of the price.
For 2 meters it cost me £7:00 which gives you four 84 HP rails.

100 panel mounting nuts also cost £7:00 so four rail worth there as well.

Right that's it if you want to build a simple cheap enclosure, total cost under £20 not including screws and bolts.

If you are like me and want to make it into a all singing all dancing flight case, I recommend these videos. Lots of tips.
http://www.youtube.com/user/reliabledan

One thing to bare in mind they are two ways to build a flight case. The first is like how I've done it. You build your ply wood case and lid then bolt on the aluminium hardware.
The video's above show the other way using aluminium extrusions as the case glue. The measurements I've given here are the latter method.

Extras (pimped version)

Aluminium Extrusions: 4 meters (407-701, £4.86)
Metal Corners: X8 (407-100, £0.77)
Hybrid lid location: 4 Meters (407-712, £7.05)

Handle: X1 (407-022, £2.20)

Rubber Feet: X4 (407-804 £0.42)

corner braces X8 (407-146 £0.27)

I bought all of the hardware used in this build from ESR electronics. Here is a link to there flight case hardware section. just In case you want to see what bits and pieces are aviabile if you go down this road.

http://www.esr.co.uk/electronics/products/frame_cases.htm

Things I would change

on this case design the top/bottom rack rail attach to the top/bottom of the case frame, This can interfere with the flight case hardware and feet fixings if you are not careful

Add a buffer space of 40mm to each end of the case height and use timber rail brackets for all the rails. This will side step the above problem

lid depth was over estimated more like 50mm