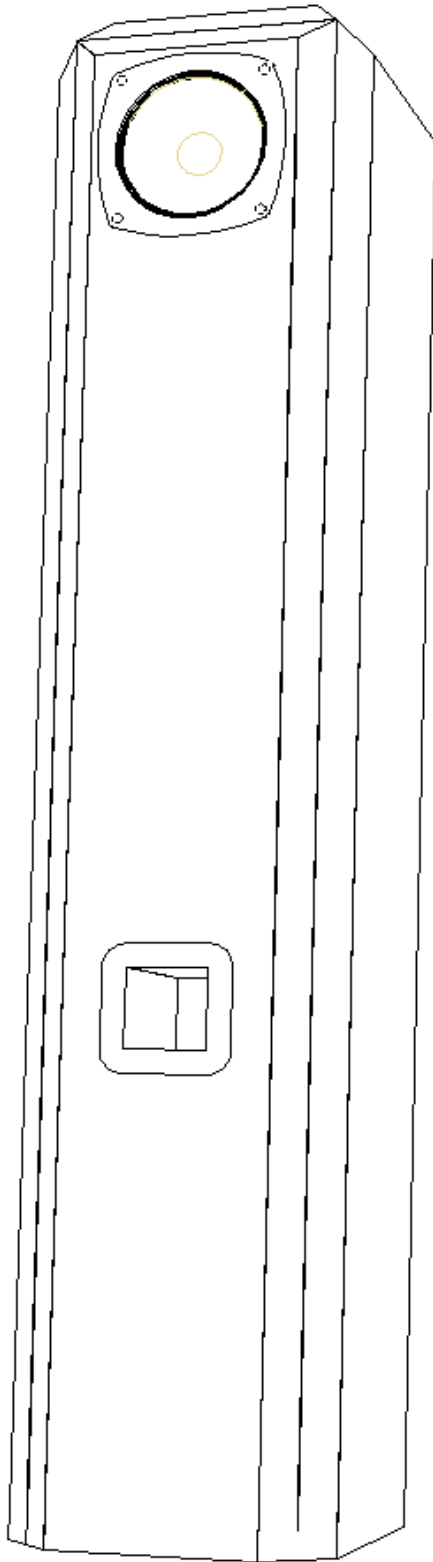


FX120 Column



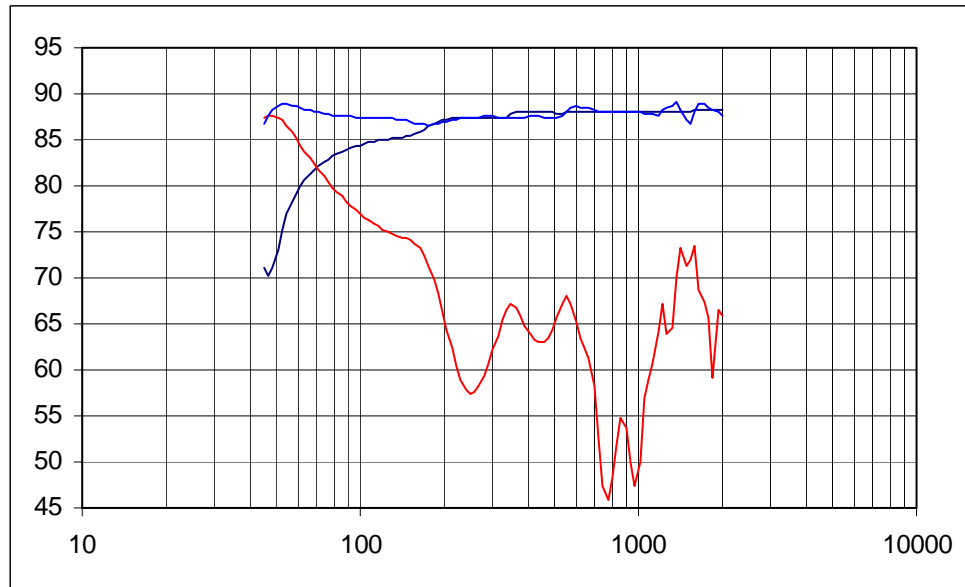
By Jacques Candé
Date: 2005-10-15

Design Goals

The objective of this project is to design a column associated to the FOSTEX FX 120 driver with the following performances:

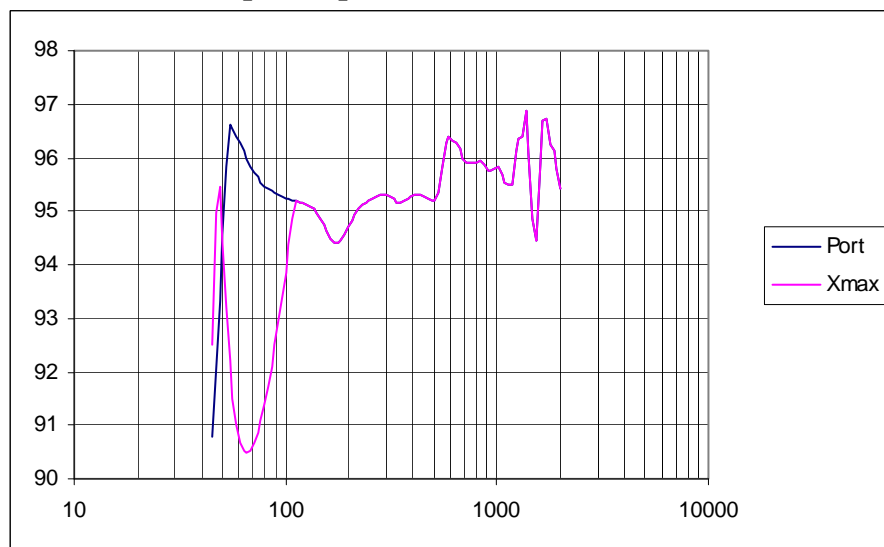
Frequency response down to 45 Hz, see result of the mathematical simulation:

- **Response at moderate power:**



Black is the direct radiation from the driver, red is the radiation from the port, blue both combined.

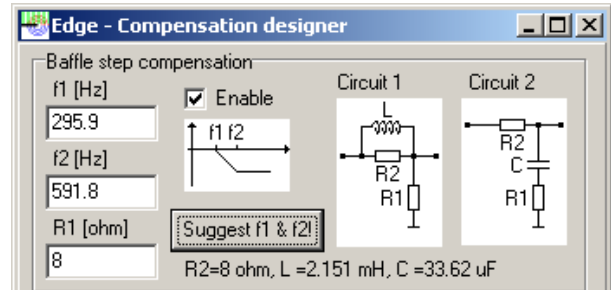
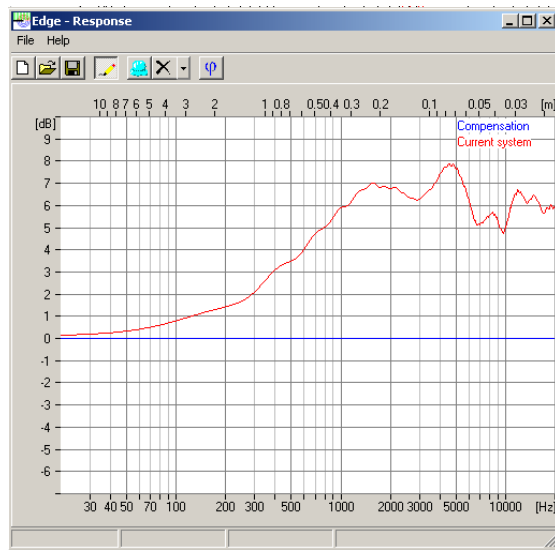
- **Maximum output response at 1 meter distance**



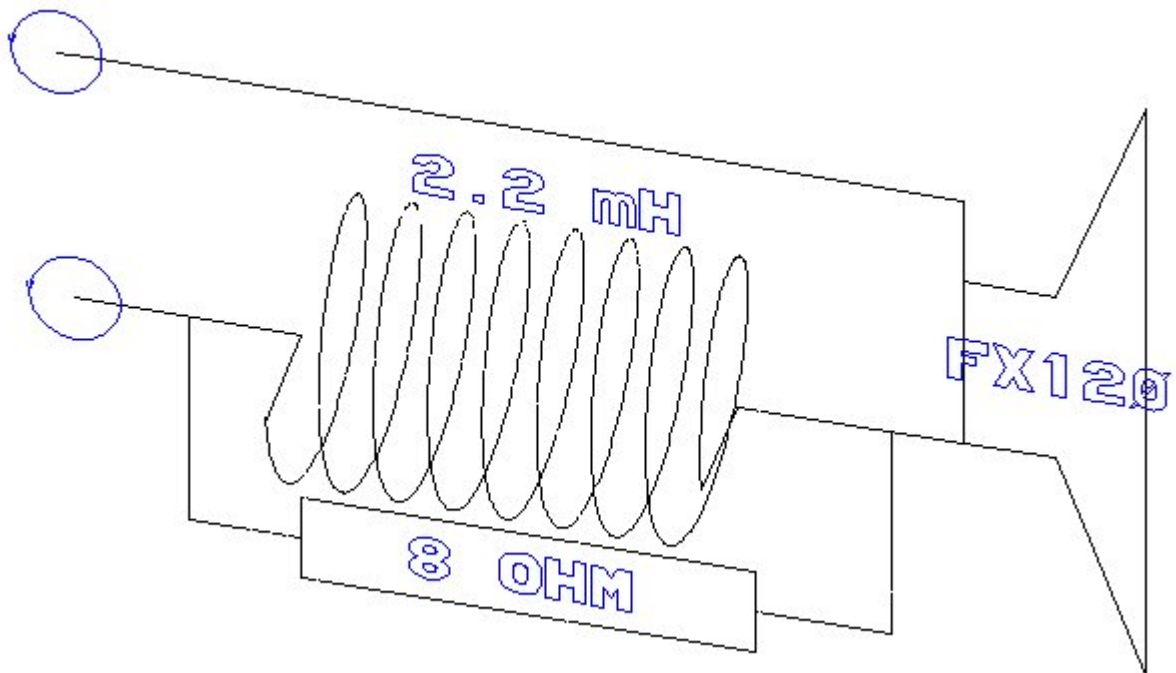
The response amplitude is limited by either:

- 6 watts power amplifier, SE EL84
- non linear behaviour of the port
- maximum displacement excursion of the membrane.

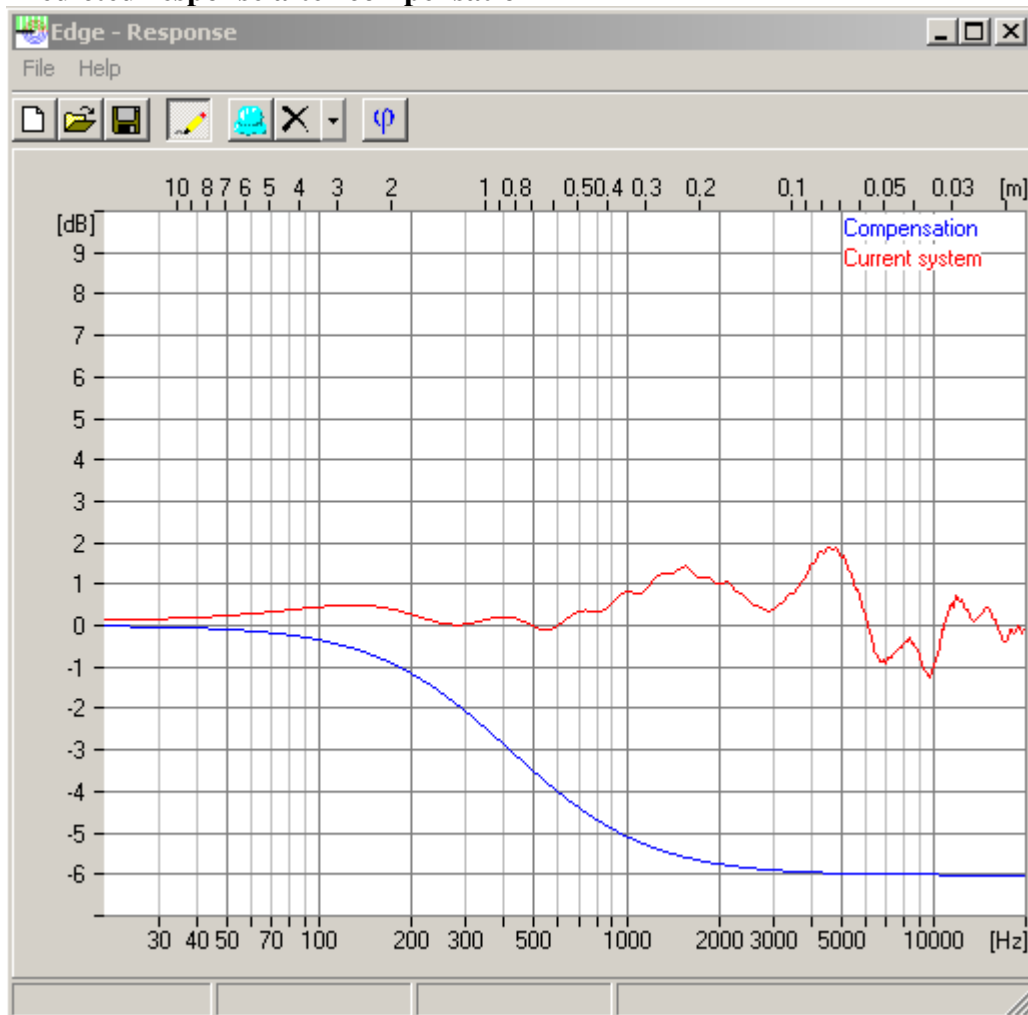
The Baffle Step diffraction effect is anticipated see simulations
Response predicted by Edge Effect Designer programme and suggested
compensation:



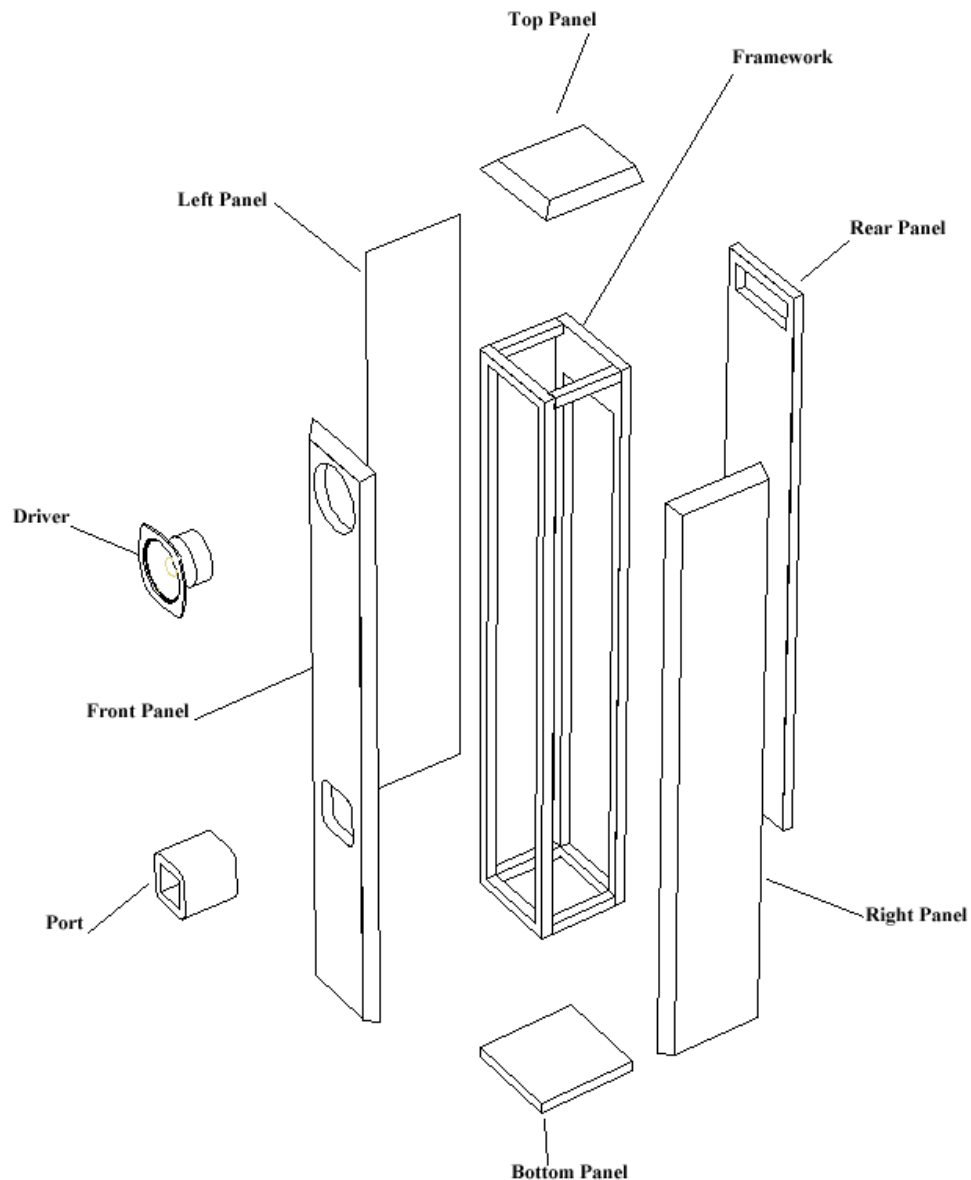
A filter made of a 8 ohm resistor and a 2.2 mH solenoid will be put in series with the driver.



Predicted response after compensation



Exploded view of the loudspeaker

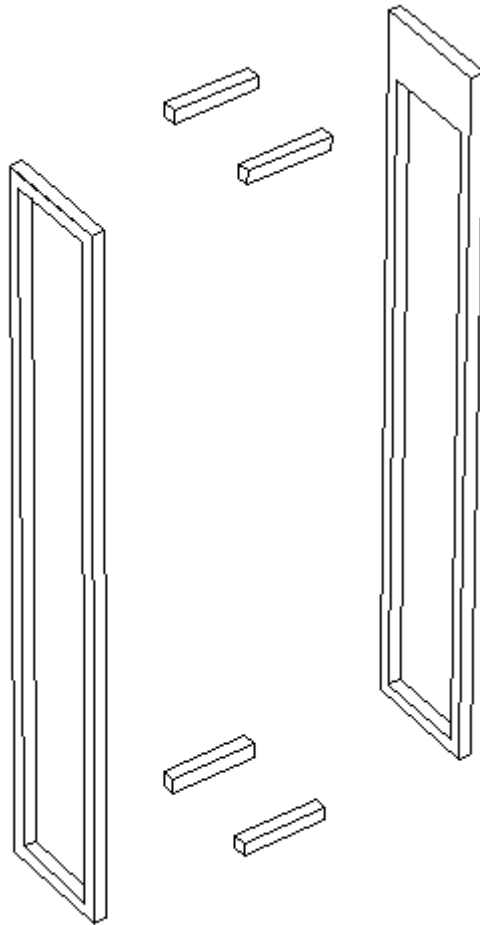


All the elements are made of 18 mm thick Birch Plywood with the exception of the port which is made of 15 mm thick Birch Plywood.

The rear panel features a square cutout to accommodate the two binding posts which pass through the back of the framework.

The rear panel is fastened to the framework with screws in order to allow visiting the box and modifying the damping material if required.

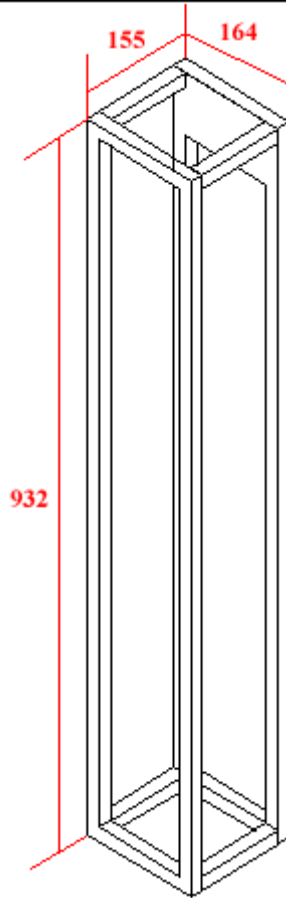
Exploded view of the Framework



The Framework is composed of 4 bars made from 18mm square battens. The front and a rear frames are made out of 18 mm thick Birch Plywood planks.

The detailed assembly logic to build up the box is not specified in this document.

Frame work dimensions



The front frame features a rectangular cut-out 128x896 in order to have constant 18mm thick members.

The rear panel features a rectangular cutout 128x832 in order to have a member wide enough to accommodate the two binding posts all the other three members being 18 mm thick.

The four battens are 18mm square times 119 mm long.

Rear panel dimensions

The rear panel is made of a 18mm thick Birch plywood plank 163 wide and 931 mm long., (1 mm less than theoretically required to allow easy mounting/dismounting).

Bottom panel dimensions

The Bottom panel is made of a 18mm thick Birch plywood plank 164 wide and 173 mm long.

Lateral panels dimensions

When assembled, the lateral panels dimensions are 173 wide times 950 long, made of a 18 mm thick Birch Plywood plank.

Two sides are chamfered at 45 degrees (one length and one width)

When assembling, use the chamfered edges as reference for alignment, slightly oversize the piece and trim the final dimensions by shaving the edges without chamfer.

Top panel dimensions

When assembled the top panel dimensions are 164 wide times 173 long, made of a 18 mm thick Birch Plywood plank.

Three sides are chamfered at 45 degrees (one width and two lengths).

When assembling, use the chamfered edges as reference for alignment, slightly oversize the piece and trim the final dimensions by shaving the edge without chamfer.

Front Panel dimensions

When assembled the top panel dimensions are 164 wide times 950 long, made of a 18 mm thick Birch Plywood plank.

Three sides are chamfered at 45 degrees (one width and two lengths).

When assembling, use the chamfered edges as reference for alignment, slightly oversize the piece and trim the final dimensions by shaving the edges without chamfer.

The circular cut-out of the driver is centred at 82 mm from the side and the top edge, (with chamfer) of the piece.

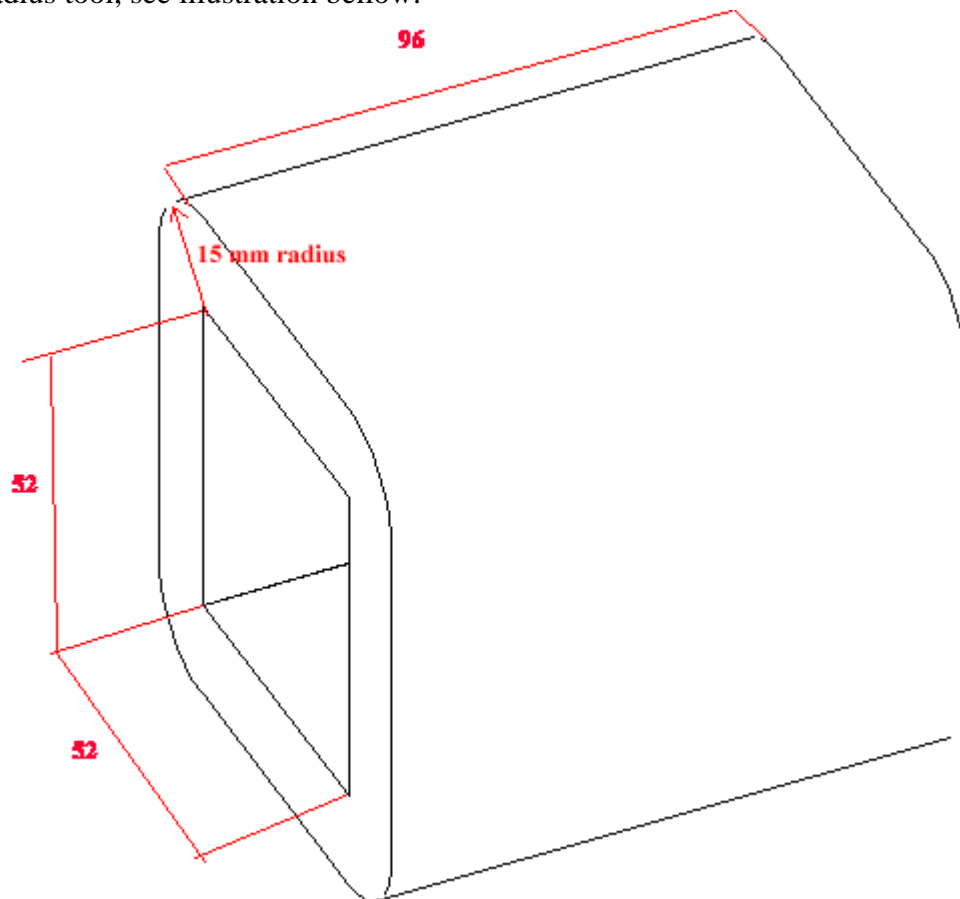
The port is centred 522 mm below the driver cut out centre.

Port dimensions

The port is made of a 15mm thick Birch Plywood plank 96 mm wide.

4 parts are cut with 45 degrees chamfers in order to build a duct 96 mm long with a square cross section of 52 times 52 mm.

After assembly the edges of the duct will be rounded with a router using a 15 mm radius tool, see illustration bellow.



Damping scheme

Stuff the box with about 120 grams of damping material uniformly distributed, (loose fibres).

Line up the inner sides of the box close to the driver with wool felt, build up a 164 times 164 times 155 mm square hood that you attach to the box with double side tape or small nails.