Tube Speaker TWO

A Concept Description and
Basic Construction Plan

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Warning:
There is no guerantee that your copy of the tube speakers work. It is your responsibility to obeye safety measures while machining parts and operating the devices. This includes all safety measures for your health and that of others.

Part list (for one speaker):

Housing:

2 x end cap DN160 **(hA)**
1 x pipe turn DN160 90° (or 87°) **(hB)**
1 x pipe joint DN160 **(hC)**
1 x pipe 500mm DN160 **(hD)**

1 x base plate 400x200mm (stand) **(hE)**
1 x mounting plate for loudspeakers **(hF)**

3 x distance rolls ~4cm to provide clearing
between bottom cap and base plate
+ screw/washer/nut **(hG)**

1 x 3...4 litres soft stuffing material (e.g. filter material for cooker hoods) **(hH)**
1 x foam material ~ 600 x 300mm, 30mm thickness **(hJ)**

Loudspeaker and electrics:

1 x mid bass speaker ~ 130mm (Here: Visaton NAC 130, retired) **(eA)**
1 x dome speaker (Here: Visaton DSM25FFL) **(eB)**

2 x ~1.1m loudspeaker cable 2.5mm **(eC)**

1 x foil capacitor, 2.2 uF **(eD)**
1 x coil 0.3 mH **(eE)**

Not all labels are used in the text!

Groupings of parts are denominated groupX .

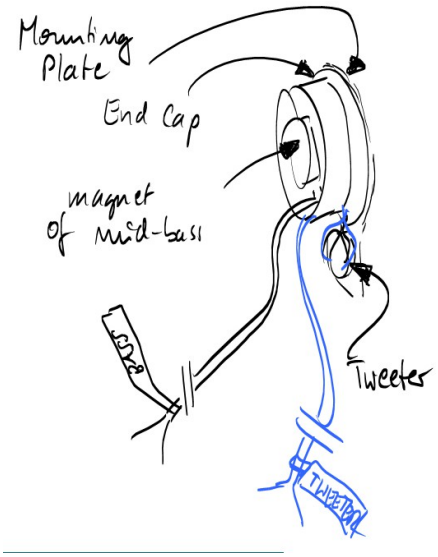
Loudspeaker Assembly (groupA)

The most complex part to be designed and crafted: Using the data sheets/drawings of the used loudspeakers helps to create a mounting plate which connects both loudspeakers to the elbow (hB). Here 7mm multiplex (birch wood) was used because of its strength. M4 screws hold the mid bass driver (eA) and the base plate. Threads were created in the end cap (hA) to hold the screws.

The mounting plate holds the tweeter (eB) too. A small "cable channel" allows for the loudspeaker cable from the tweeter to the inside of the loudspeaker cabinet. The distance between mid-bass and tweeter has to be minimized.

Warning: Some speakers have fragile solder terminals. It is recommended to mount the speakers very carefully onto the mounting plate and rework the openings if the loudspeakers solder terminals do not fit easily!

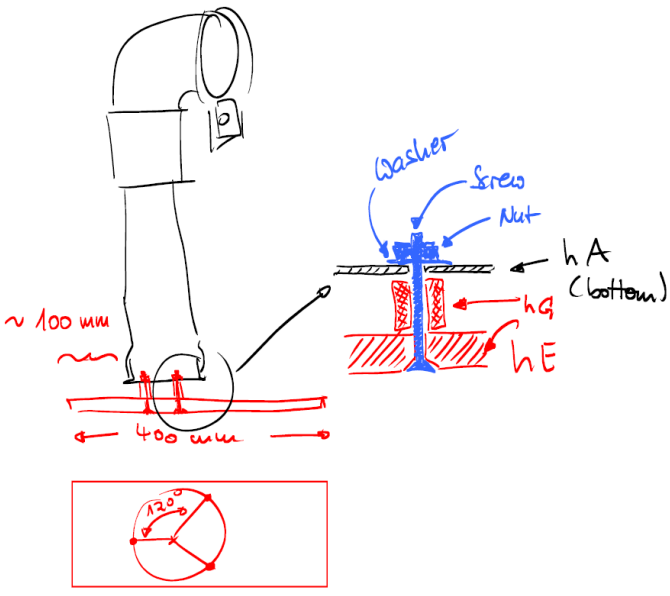
After mounting the loudspeaker chassis to the mounting plate and the end cap the loudspeaker cables can be soldered to the solder terminals of the chassis. Mark the mid-bass and tweeter cables at the free end of the cable for later work.



Base Plate Assembly (groupB)

First saw a centered hole in the bottom end cap. In this case 45mm diameter were chosen as bass reflex vent. There is no tube but a "soft channel" made from the foam material (see parts list).

The center of the mounting holes in the base plate should be displaced to stay roughly above the center of gravity of the tube speaker. Just drill three holes (center points are on a circle, 120° angle between them) into the base plate (5 or 6mm should work). Use countersunk bolts to connect the base plate to one of the end caps (hA) to create a flat underside of the base plate. After drilling the three mentioned holes you have to drill a conical shape into the holes on the underside.



Now three holes have to drilled into the bottom end cap to match the holes in the base plate. Finally the parts can be assembled according to the drawing above.

Final Assembly Part One

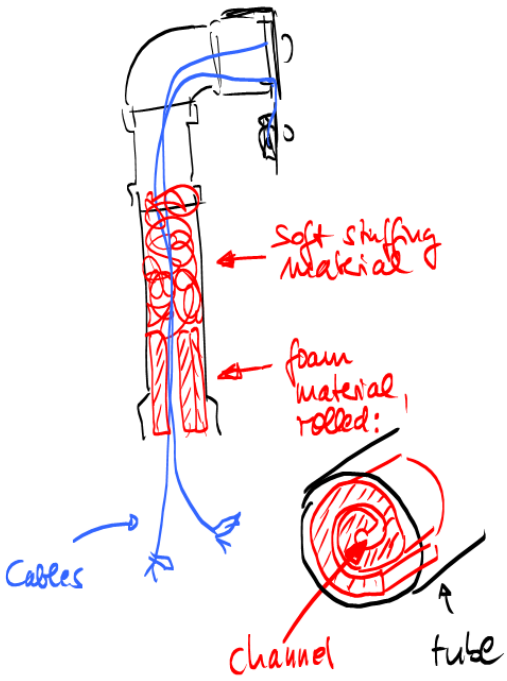
Information: Do not press the end caps fully into their counterparts. Keep a space of 5-6mm. This is necessary to reopen the cabinet. Thin wooden boards (5mm – 8mm – 12mm) can be used to successively widen the distance between end cap and counterpart.

Connect loudspeaker assembly (groupA) to the pipe turn (hB) and than to the pipe joint (hC) and then the resulting assembly to the 500mm-piece of pipe material (hC).

Stuff the soft material (hH) into the pipe, keep the cables in the center of the pipe to avoid contact between cables and tube. The resulting height should be roughly 300mm.

Roll the foam material, pull the cables through the channel in the the roll and put the roll into the hole (see sketch on the right side)

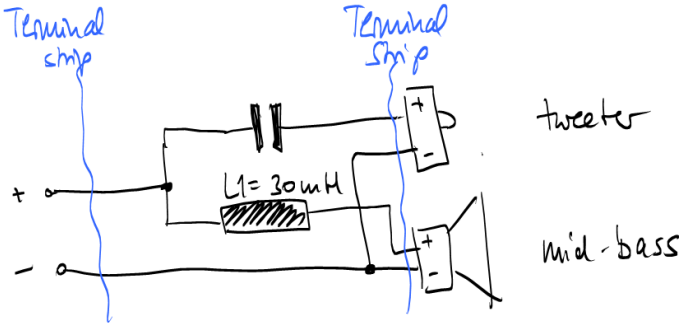
Finally press the bottom end cap with base plate (groupB) into the 500mm tube counterpart (hD) of groupA.



Final Assembly Part Two

The crossover is a very simple 6dB one: A inductivity (coil) supresses high frequencies for the mid bass driver, a capacity supresses low frequencies for the tweeter. Such a simple crossover gives fast response and minor phase shifts, but only low separation between mid-bass and tweeter.

The crossover is built onto a small wooden board. Two terminal strips (2 contacts to amp, 4 contacts to speaker chassis) and two full metal push pins are used for soldering the leads/parts.



Warning:
Do not overload your speakers. Read the data sheets for your speakers and allow for a safety margin. Most frequency ranges/max power data are given for 12dB networks. If you use a 6dB network you have to increase the separation frequency or limit the power.
In this case a 5W amplifier is used.