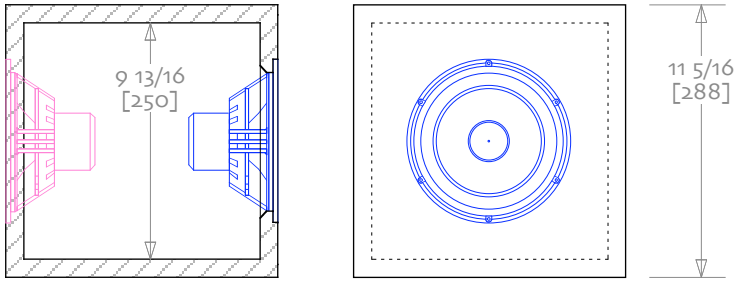
Sealed SDX7

Sheet 1 – The Cubes

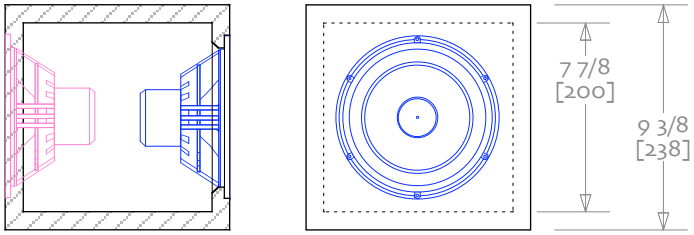
The SDX7 works well in a small sealed box. The driver's small size & its ability to go up relatively high means that the box aspect used can vary considerably. Here are illustrated some possible realizations. Since sealed box size is non-critical, anything between the extremes shown will work.

These examples are bassed on 4 sizes of box with Q = 1.0, Q = 0.7 (butterwork max flat amplitude) Q = 0.577 (Bessell max flat phase) and Q = 0.5 (critical Q). These have net volumes of 3, 7, 14, 21 litres respectively (1/8, 1/4, 1/2. 3/4 ft^3) and assume 1 lbs/ft^3 stuffing. Less stuffing will require a box a bit bigger to achieve the same Q values

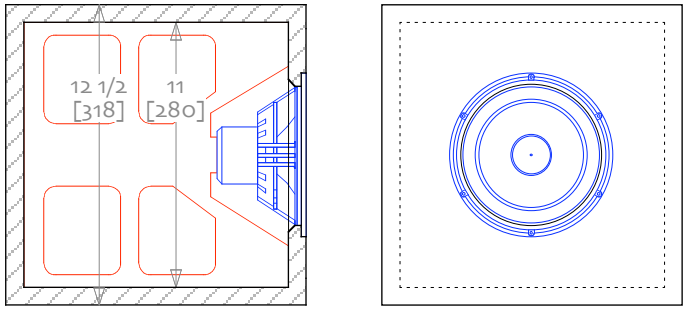
F10 are 53, 40, 35, 32 Hz. Since the motor is low distortion, and there is lots of excursion (red curve is excursion at 100W), these can readily be EQed to go really low.



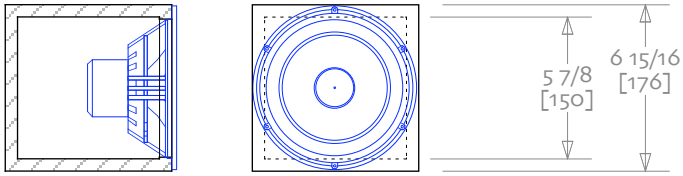
14 litres = 1/2 ft^3
1 x SDX7 Q = 0.577 or 2 x SDX7 Q = 0.7



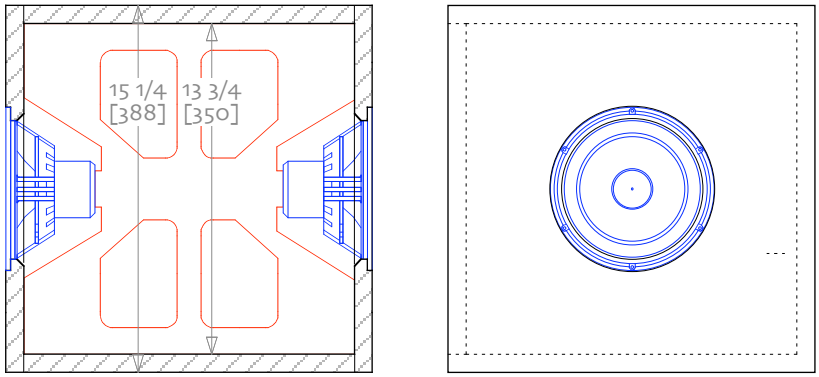
7 litres = 1/4 ft^3 |
x SDX7 Q = 0.7 or or 2 x SDX7 Q = 1.0



21 litres = 3/4 ft^3 | 1 x SDX7 Q = 0.5



3.5 litres = 1/8 ft^3 | 1 x SDX7 Q = 1.0



42 litres = 1 1/2 ft^3
2 x SDX7 Q = 0.5 or 4 x SDX7 Q = 0.62

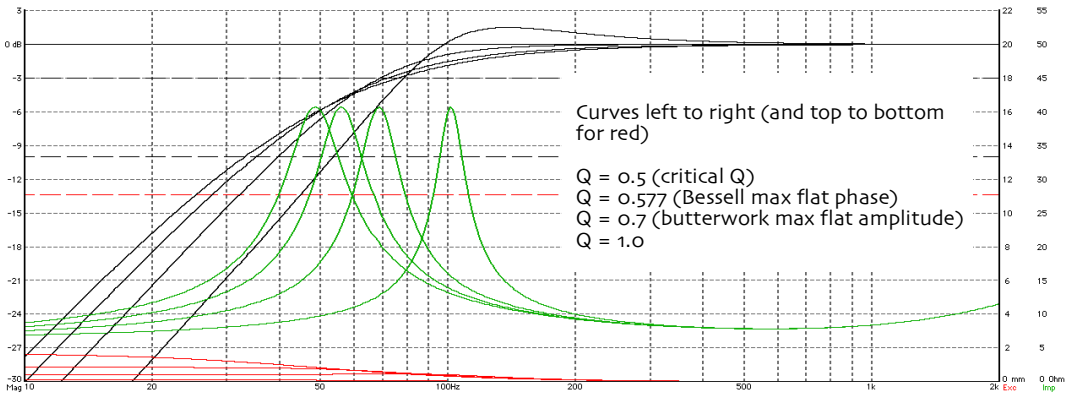
Notes:

0/ on this page all of the coxes are exact cubes

1/ examples use 3/4" (19mm) material (for the smaller ones, you could go as small as 1/2" (12mm) void free plywood.

1/ all boxes have been sized to accomodate a brace except the smallest one.

2/ double volume for 2 drivers, quadruple it for 4 drivers.



SDX7
reference sealed designs
sheet 0 – the cubes
10-february-08 drawn by dld

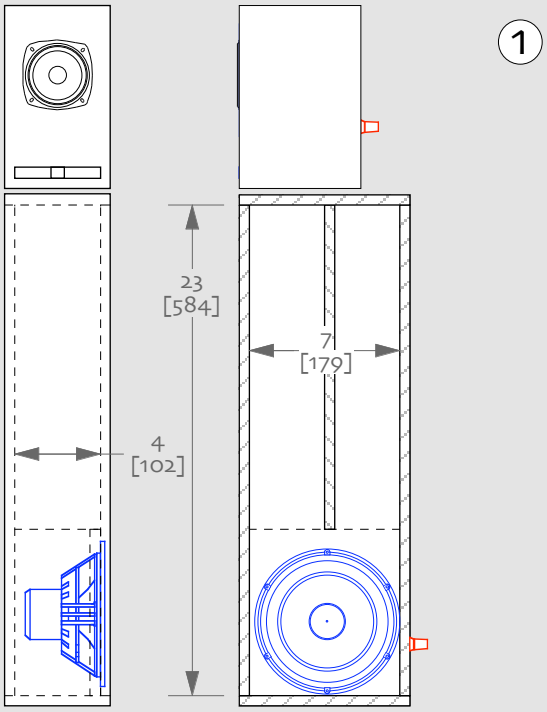
Sealed SDX7

Sheet 1 – Other Rectangular Boxes

Since the SDX7 is fairly extended it can be used as a woofer or even a midbass (we are still exploring its real-world limits on the top end). When used like this a cube is not the best shape to compliment the rest of the loudspeaker.

As we are considering sealed, almost any shape that enclosues the desired volume of air will usually be suitable. One needs only be conceened with reflections coming back thru the wall behind the driver and if the box ratio becomes such that one dimension is considerably larger than the others we may end up with some 1/2 wave transmission line effects (this last mitigated by the small enclosure volume used)

Any volume from 3.5 liters up to 21 liters (1/8-3/4 ft^3 / 215 - 1260 in^3) is useable. Keep in mind that stuffing the box can make the effective box volume up to 30% larger -- also that too much stuffing can have detrimental effects too.



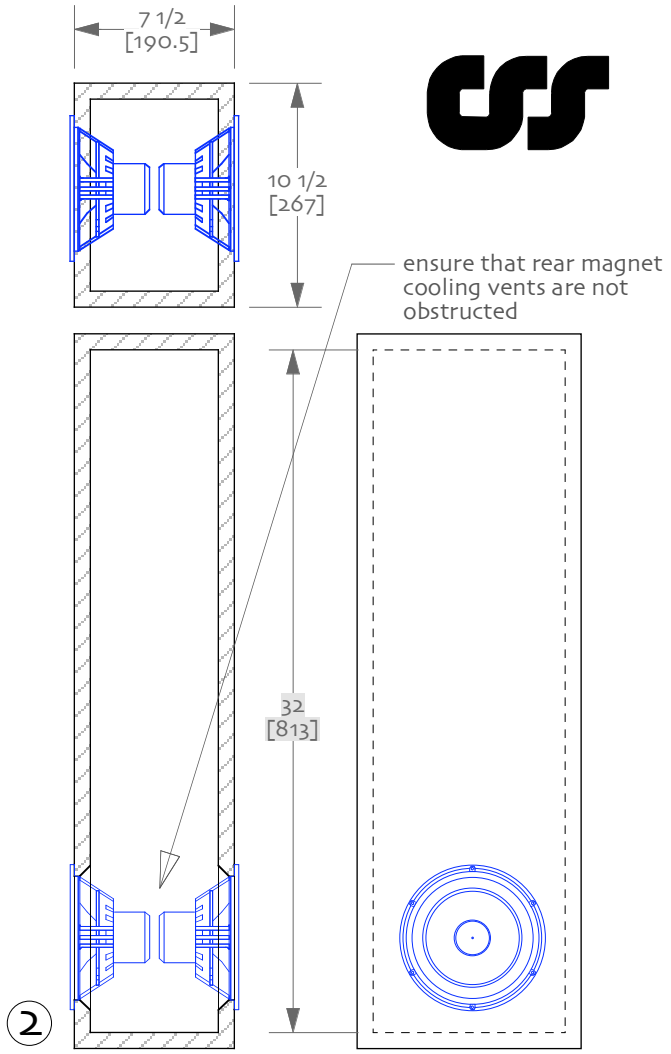
To figure out the internal size of a box choose the Q of the box you'd like or the volume of the box. Then choose any 2 dimensions, lets call them a & b.

Then take the volume required (in metric, the size in litres x 1000, in imperial use in^3). divide by a x b and that gives you the 3rd dimension. Since sealed is very tolerent of size, and you can tweak the apparent volume with damping, you don't even really need to consider the volume eaten up by bracing or the driver (which is ~ 0.5 liter = 30 in^2)

An actual practical example:

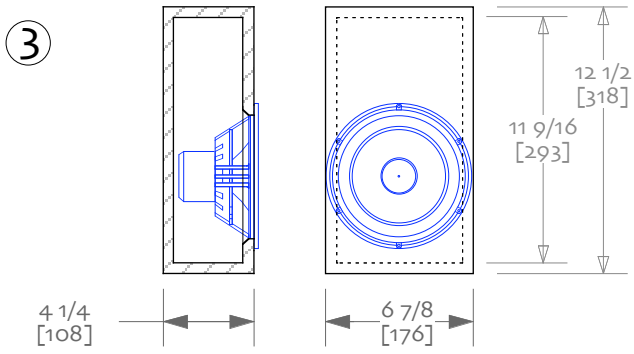
We have a small sattelite with a 3" driver, and want to add stereo bass. The woofer cabinet is intended to be the stand.

The satelittes are 5" wide so that is our 1st fixed dimension. With 1/2" (12mm) walls we have 4" internal. To fit the driver on the side we need 7" so a x b = 28 in^2. We want a Q between bessel & butterworth so we choose ~3/8 ft^3 = 648 in^3. 648 ÷ 28 = 23".



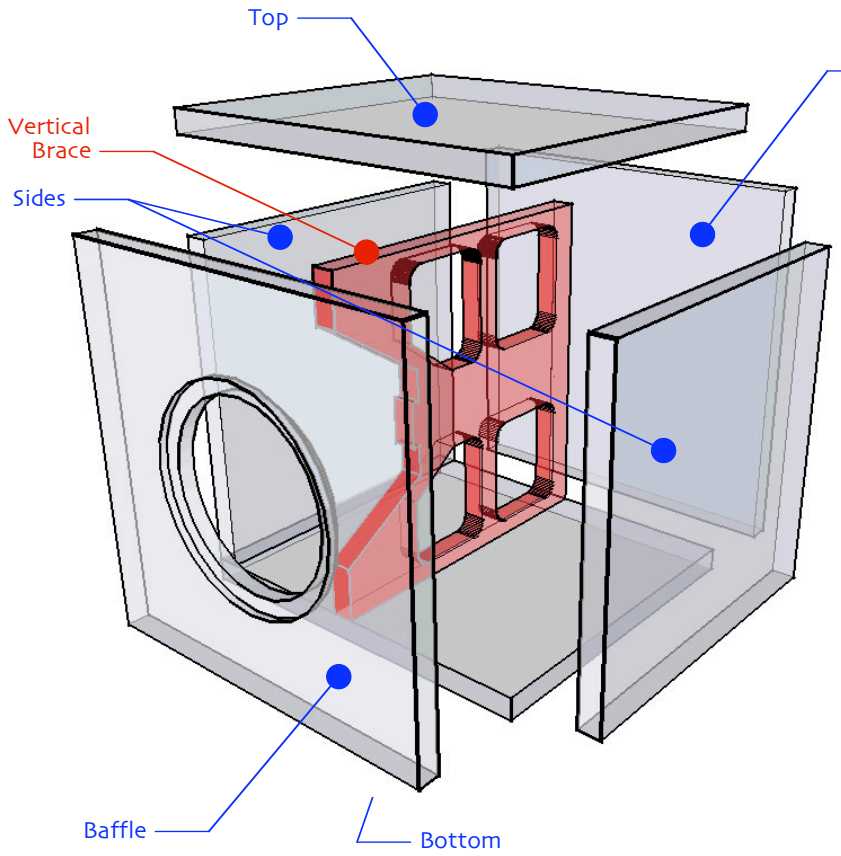
The Parts Express 1/4 ft^3 enclosures is a perfect fit for the CSS FR125SR. You could always just put 1 SDX7 in the 1/2 or 3/4 ft^3 PE cabinets or 2 in the 1 ft^3 box. Here is a push-push dual SDX7 enclosure with a bessel alignment (1 ft^3) and the same footprint. If you want a high crossover, the drivers can be mounted on the front/back.

Sat footprint is 7 1/2 x 10 1/2". Using 3/4" material that gives us 54 in^2 cross-section. 1 ft^3 = 1728 in^3 ÷ 54 = 32" high inside.

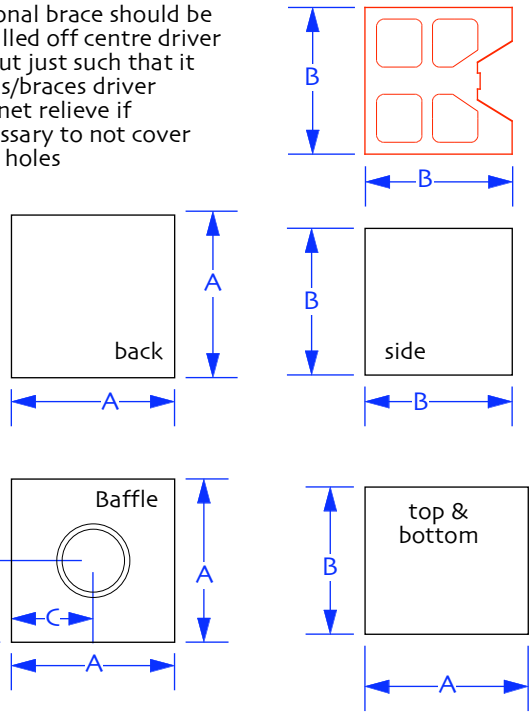


Now lets say we want to make a box as small as possible with as small a footprint as possible -- say for a computer woofer. So we choose 1/8 ft^3 = 216 in^3.

The footprint is limited by the size of the driver and with venting out the back of the magnet we need to maintain some airspace for cooling. So that limits us to 3 1/4 x 5 7/8" inside. that gives us 54 in^2 cross-section. 216 in^3 ÷ 19 = 11 1/2" high inside. Using 1/2" material we end up as shown.



optional brace should be installed off centre driver cutout just such that it kisses/braces driver magnet relieve if necessary to not cover vent holes



	1/8 ft^3		1/4 ft^3		1/2 ft^3		3/4 ft^3		1 1/2 ft^3	
	no amp	amp	no amp	amp	no amp	amp	no amp	amp	no amp	amp
A	6 15/16 176mm	N/A	9 3/8 238mm	N/A	11 5/16 288mm		12 1/2 318mm		15 1/4 388mm	
B	5 7/8 150mm	N/A	7 7/8 200mm	N/A	9 3/16 595mm		11 280mm		13 3/4 294mm	
C	3 15/32 88mm	N/A	4 11/16 119mm	N/A	5 21/32 144mm		6 1/4 159mm		7 5/8 194mm	

Notes:

0/ all panels 3/4" (19mm)
1/ dimensions for 2 variations on 3 different size enclsoures
2/ holes in holey braces are illustrative only -- you can use any pattern of holes that suits -- target is to remove 30-50% of the panel without reducing the panels compression strength
3/ circular driver cutouts are all in the centre of their respective panels

SDX7
reference sealed designs
sheet 2 – panel sizes
10-february-08 drawn by dld