



# USB Mk-II

## The Universal Speaker Box

Like the original version, the USB Mk-II is an extremely versatile, magnetically shielded, two-way loudspeaker designed for stereo or multichannel music and video home entertainment systems. It performs equally well as an excellent full-range stereo pair, surround-sound pair, and high performance centre-channel speaker. Its excellent fidelity makes it as comfortable playing demanding music as it is playing your favourite movie soundtracks. The coaxially mounted drivers allow it to be oriented vertically or horizontally without compromising accurate time response. As a result, the speaker delivers full-range performance regardless of speaker or listener position since the listener is always exactly the same distance from each driver.



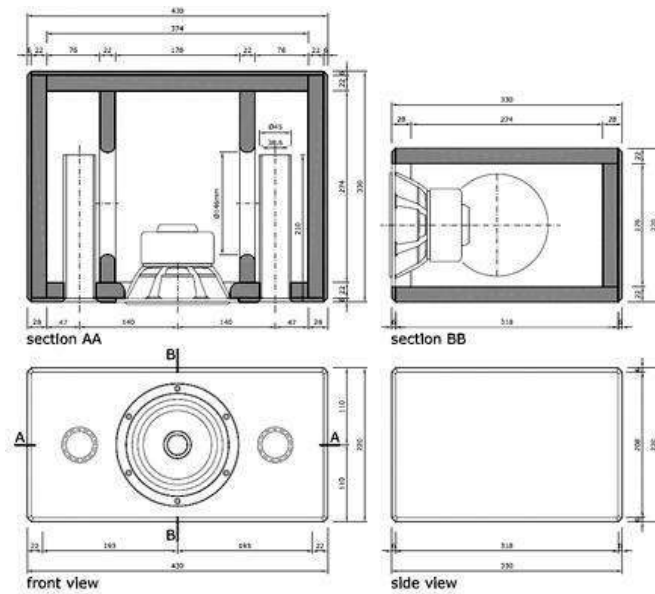
## The driver

The [Seas T18RE/XFCTV2-H1333](#) is a coaxial arrangement of a 6.5" woofer with an XP cone and a precoated fabric dome high frequency unit, with a low resonance frequency. The PP/TPX based cone matches ideally with the adaptive rubber surround. The result is an outstandingly smooth frequency response from the mid woofer. The coaxially arranged precoated fabric dome high frequency unit has a low resonance frequency, and integrates with the cone driver to a point source. The cone of the woofer acts as a horn loading for the tweeter, and the chassis of the dome unit represents the throat of this horn. The compensation magnet and the shielding cup is mounted on the woofer magnet system to eliminate magnetic stray fields, hence the unit can be used very close to CRT's in audio/video applications (according to Seas).



## The cabinet

All walls and the two internal partitions are made of 22mm MDF. The outside of the cabinet is furthermore covered with 6mm mdf bringing the total thickness to 28mm. The extra layer has two advantages: first of all the varying density works better in keeping the cabinet calm than a single layer of the same total thickness. Secondly it makes finishing the cabinet easier, all the butted joints are covered by this 6mm layer and the edges of the cabinet are routed with a 6mm/45 degree angle. So later on there will be no visible lines of hair-cracks in the paintwork. The symmetrically front placed reflex ports are made from 40mm diameter thick-walled PVC sewer pipe. A higher resolution drawing is available on request.



### Humble Homemade Hifi - USB Mk-II © 2011

\* 22mm + 6mm mdf  
 \* driver: Seas T18RE/XFCTV2 - H1333-08/06 (1x) Vbox=18 liter, fb=40Hz, f3=43Hz

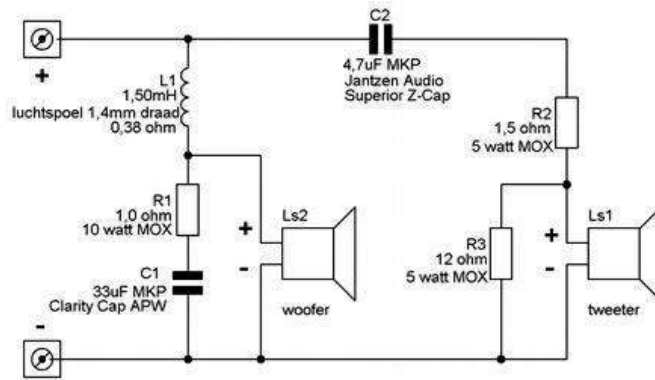
The damping material inside is reduced to an absolute minimum to maintain maximum output from the ports. A piece of Bonded Acetate Fibre damping material is rolled up and fills the centre of the enclosure, that's all! I used Monacor MDM-3 damping pad that consists of 2/3 sheep's wool and 1/3 polyester fibre. The internal volume is 18 litres and the bass-reflex port is tuned to 40Hz.



### The crossover network

The parallel filter network uses a combination of a first-order for the tweeters and a modified second-order on the woofer. The whole filter is nice and simple and compact to build. Both drivers are connected with the same polarity.



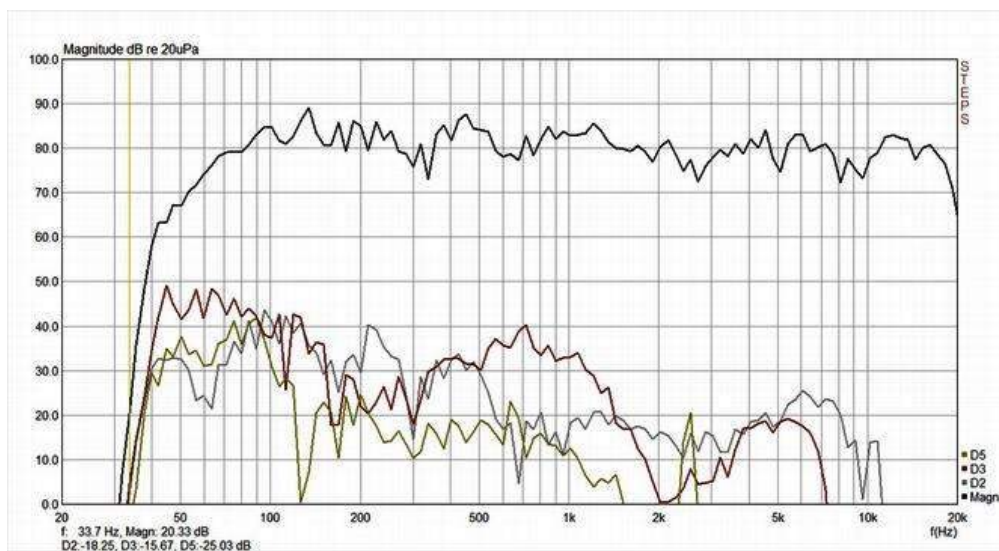


**Filter components:**

inductor: L1 = 1,50 mH air-core inductor 1,40 mm wire, R = 0,38 ohms

capacitors: C1 = 33uF standard quality MKP / C2 = 4,7uF Jantzen Audio Superior Z-Cap

resistors: R1 = 1,0 ohms, 10 watts MOX / R2 = 1,5 ohms, 10 watts MOX / R3 = 12 ohms, 10 watts MOX



**Sound**

The character of this speaker can best be described as neutral, smooth and coherent. Bass is warm and relatively deep considering the size of the cabinet, the mids are neutral and the top end is well detailed. The coaxial mounting of the drivers gives a very nice coherent spatiality; the character of the speaker is maintained at any listening angles. The XP-cone material reminds me of the signature of poly-cones without the sluggishness some polycone designs can have.



NOTE: This design is strictly for the home DIY enthusiast and not to be used professionally without my permission!

Tony Gee, The Netherlands, February 2011