

Setting Up Multiple Subs

Now that I have explained why one wants to use multiple subs and what kinds of “rules” one should use in placing them in the room, it is necessary to describe how to set them up.

First, it should be understood that the more “degrees of freedom” that one has at the setup phase the better the result that can be achieved. By far the most ideal situation here is to use a Behringer DCX2496 as the control unit for at least three subs (not necessarily identical). The multi-channel outputs can drive up to four subs and the degree of control in this unit is more than adequate. That said, I don’t actually have a DCX2496 in my system as it stands. I use the controls on the plate amps in the subs. (I no longer use plate amps in the subs that I sell because they have not proven to be reliable enough, lack sufficient controls, tend to be more expensive per watt than rack amps and I don’t want all that heat in my sealed sub boxes. Hence, my subs now come without no amps installed.) With no amps in the subs, a DCX2496 and a couple of rack amps is ideal.

The signal source for the subs is either the sub output from a receiver or a sum of the left and right channels. If the sub out on the receiver is used make sure that it is in the “plus” mode where all LF signals are sent to this single output as well as to the mains. If using left and right signals, then you should understand that there will not be any LF content in the subs from the center channel or surrounds should this be present. The DCX will not sum three channels in, which is a serious limitation in some cases.

I am often asked about amps for the subs. Basically it doesn’t matter much at all. Subs are not going to be very sensitive to amp quality because the bandwidth over which they are used is so small. Just get any amp with about 200 watts per channel. You can even live with 100 watts per channel if you have three or four subs. The point here is don’t spend a lot of money on sub amps because it is not necessary.

The other point that I want to make is that the use of filters and EQ in a multiple sub situation is going to be highly non-intuitive. This is because the summation of all the subs with the mains is hyper phase dependent and with gain changes there are also phase changes. It is not at all uncommon to find that lowering the level of some sub in a certain band will actually raise the level of that band and visa-versa. Basically the complex summation of the mains and all the subs is not something that can be readily predicted except by a massive calculation in a computer. It would be impossible for a human to do such a calculation in their head, for example. Now it is true that an EQ change that changes all the subs at the same time (“Global EQ”) will work as expected for that range of frequencies for which there is no overlap with the mains.

There are possibly an infinite number of ways to proceed, but I have found the following to work well.

- 1) Pick the sub closest to the mains, this must be a HF sub, i.e. it must overlap the mains. Overlap with the mains is unusual in my approach. Most people would suggest a crossover, but for a

number of reasons, this doesn't work very well (crossover all the subs at the same point? How will this all add up at various places around the room? Basically it doesn't work.) I suggest that the mains and the subs overlap, in other words they are all playing at the same time at some frequency. Note that it is quite possible that one or more of the subs will be at a much lower level than the others, so the overlap concept is mostly between the mains and the first sub. The mains should be left alone, i.e. no EQ used at all. I have to reiterate this last point – at no time should one ever EQ the mains based on room data. The mains should be designed for the best possible direct field with as flat a power response as possible (with a high DI of course). Thus EQ of the mains could only make them worse.

Based on a spatial average of the listening area (do not use a single point – please) adjust the available parameters of the first sub to achieve the best possible transition from this sub to the mains. Depending on the number of available degrees-of-freedom this could be an arduous task. (That's why I developed a computer program to do it!) But heck, DIY's and audiophile's will do anything for the best possible sound. Right!?

- 2) Add in the second sub, preferably the one that is farthest from the listener. The procedure is much the same as in step one except that now we are more concerned with the lower frequencies and there should be very little energy from this sub in the range where the mains are operating. In fact, if you find that with the addition of each new sub the level of the latest addition is not lower in general than the previous one then something is probably wrong.
- 3) Finally add in the last sub. If your subs have different frequency range capabilities then this sub should be the one with the lowest frequency capability. Adjust as before.
- 4) Some improvements may be possible with all the subs and mains playing by "tweaking" individual channels or using Global EQ (EQ on all channels) to get to the smoothest possible response, with, IMO, about a 3-6 dB rise from the 100-200 Hz level to 20 Hz. Basically something like a 3 dB/Decade rise below 100 Hz. This sounds, to me, to be about neutral, but, of course, it is highly dependent on the source material since a lot of recordings have boosted bass.

While adjustment for taste is acceptable, I suggest NOT doing this for several weeks and never doing it based on individual recordings. Only after you have a feeling for how the settings work over a wide range of recordings and listening sessions should you move beyond the pure measurement based settings.

Good Luck!

Note: this article was written by Dr. Earl Geddes, and was originally published at www.geddes-audio.com. Reprinted with author's permission.