Dutch & Dutch 8c Loudspeaker Review

★★★★★

By mitchco for Computer Audiophile

September 4

The D&D 8c's are the first loudspeakers to come into my room where I could achieve studio control room frequency response accuracy of 21 Hz to 20 kHz ±3 dB at the listening position without any external DSP.

Also, the first loudspeaker where my preferred high frequency response (i.e. neutral) was just about perfect right out of the box. Other speakers I have tested required a -5 dB shelf from about 3 kHz to 20 kHz to sound neutral.

Plus, the first full range bookshelf speaker that do not require subs, if set up correctly.

The D&D 8c's can reproduce studio control room frequency response accuracy in one's room using the onboard DSP software. The 8c's are perfectly time coherent, meaning the direct sound from all drivers are arriving at ones ears at the same time. Combined with a midrange cardioid dispersion pattern, and sub drivers big enough to not require external subs, to me, represent the state of the art in loudspeaker engineering design today.

Let's Talk Tech

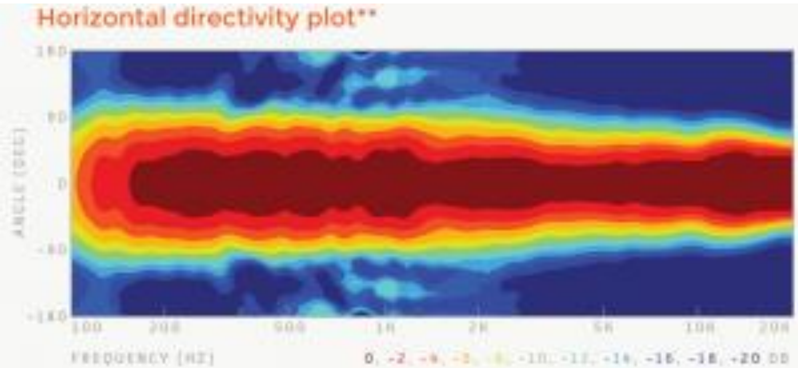
While the 8c is similar in concept to the Kii THREE I reviewed, the 8c's overall design and engineering are different and unlike any other loudspeaker on the market today. The 8c is a largish, heavy bookshelf loudspeaker that weigh in at 53 lbs. The shape is more rectangular in depth than square. Worthwhile to have a 2nd person on hand when lifting these onto stands. Make sure your stands are rated for the weight. My sand filled, Monolith stands are rated for 75 lbs.

The front baffle is a beautifully engineered CNC precision design. The dispersion pattern is just about perfect on and off axis. I reached out to Martijn Mensink, the designer of the 8c, to understand his thinking that went into the waveguide design:

“*The waveguide is designed specifically for this tweeter. We started out with an OS (Author note: OS = Oblate Spheroid) profile. It performed reasonably well, but there were some clear diffraction issues which resulted in comb-filtering, especially on-axis. An OSWG causes very little diffraction, but it assumes a perfectly flat wavefront (which of course has to be diffracted/curved from flat to spherical), which in practice is near impossible to achieve. The OSWG is a good starting point, but it needed quite some work to adapt to our tweeter.*

Our waveguide assumes an already somewhat curved wavefront due to the dome shape of the source, so that a minimum of diffraction is required. The profile is the result of theory and simulation, but ultimately also a lot of iteration - we built many many prototypes! Thank you CNC-router and 3D-printer. The eventual design has a small radius at the throat, then a very short Oblate Spheroid part (pretty much conical), then a very large mouth radius and finally a large baffle edge radius. The waveguide is optimized for constant directivity and response smoothness. For both it is a strict requirement to deal with diffraction effectively, because diffraction causes comb-filtering effects that change with angle.”

For years, I have been researching constant directivity waveguides and listening to several designs in my sound reproduction system. The 8c’s are next level loudspeaker engineering design and execution. The Polar Map is virtually perfect from 100 Hz to 20 kHz:



From 100 Hz on up, the on and off axis frequency response is incredibly accurate, best I have seen to date. The midrange driver is an 8” aluminum cone crossed over at 1250 Hz using a 4th order Linkwitz-Riley linear phase crossover to a 1” aluminum/magnesium alloy dome tweeter. Specs here.

Each side of the cabinet has a cutout to the inside chamber of the midrange cabinet, which is used to passively control the midrange polar response to be a cardioid pattern. This also controls Speaker Boundary Interference Response (SBIR). The idea is that the passive cardioid midrange (i.e. 100 Hz and up to the tweeter XO) outputs very little side and rear sound pressure so there is little to no speaker boundary interference.

Once you measure the physical distance from the rear of the subs to the front wall in centimeters, in the 8c's Active Room Matching user interface, you select the same values from a drop down list of values in centimeters for both front and side walls.

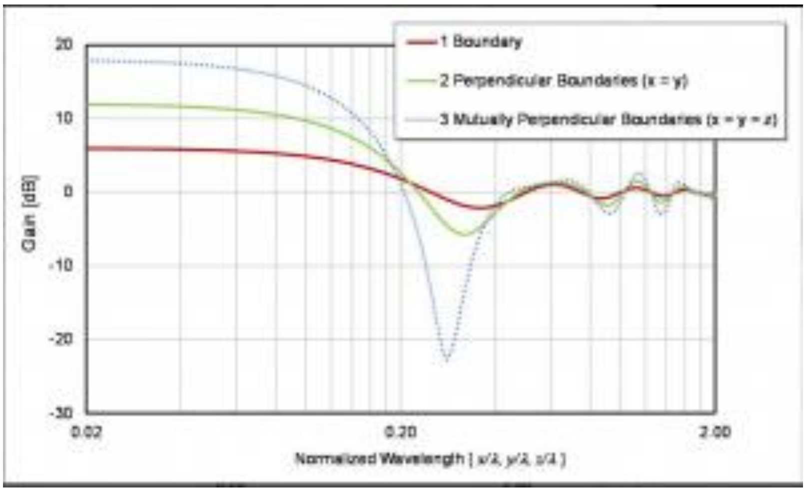
While using REW, I selected a range of values around the measured distance to see which yielded the flattest response. Each value selected made quite a measurable difference, so it is worthwhile to check a small range around the measured physical distance. For example, if the subs are 40 cm away from the front wall, also try 30 cm and 50 cm in the Active Room Matching panel and re-measure each time with REW.

It does not take long to find the right value and usually it is bang on to the closest value that was physically measured.

Impressive!

On the back of the loudspeaker are two 8” aluminum cone subwoofers operating from 100 Hz on down in a sealed cab. Yes, that’s right, the dual subwoofers are built in. With their large linear max excursion design, these bad boys have an amazing amount of low frequency impact. That impact is further realized by being close to the front wall boundary, leveraging what is called the Allison effect, named after the late Roy Allison.

By placing the loudspeaker close to the front wall (e.g. 40 cm to back of cabinet) one can gain roughly +6 dB in response below 100 Hz:



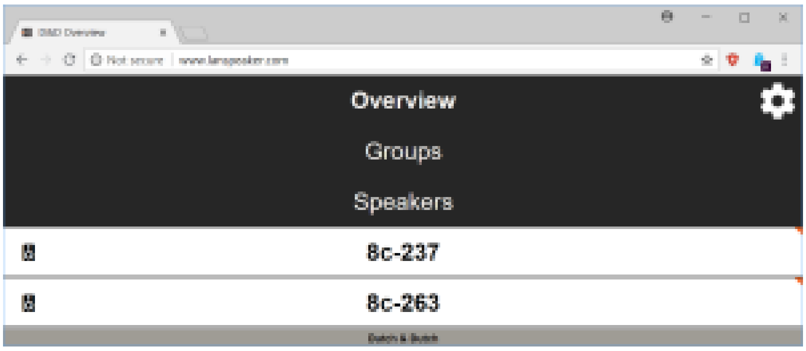
Even more low frequency room gain can be had using perpendicular boundaries, but at the expense of increased speaker boundary interference response (SBIR) above 100 Hz. In the linked article, scroll down to bookshelf loudspeaker to see a great example of SBIR.

A 6 dB increase below 100Hz is significant and relatively speaking is a 4 times increase in power (watts) and on the way to being almost twice as loud, as perceived by our ears (a 10 dB increase in SPL is perceived as being twice as loud to our ears).

As Martijn Mensink, designer of the 8c's explains, "Basically, the first comb-filtering dip caused by the front-wall reflection is shifted to a frequency above the working range of the subwoofers. For instance, when the distance is 40 cm, the first boundary dip will be at 215 Hz. The woofers only go up to 100 Hz. The wall increases the output by a maximum of 6 decibels and you get a very nice coherent first wave-front, with no smearing in the time-domain. Above 100 Hz the cardioid midrange takes over. Whereas the subwoofers are using the boundary sort of like a springboard, in the midrange it's as if the wall isn't actually there, because very little sound is radiated towards it by the cardioid. That's why you can place the 8c's so close to the front wall! "

Again, next level loudspeaker engineering to seamlessly integrate the room into the loudspeaker design that addresses common room acoustic issues that we all have in our listening rooms. Not only mitigating SBIR, but leveraging the Allison effect to maximize low frequency output/impact at the same time. Nicely done!

All parameters for controlling the 8c's in one's acoustic environment are available through a web browser user interface that communicates with the loudspeakers onboard computer in real time:



Each speaker (i.e. on board computer) is connected to the internet via a hardwired Ethernet connection. Each speaker's serial number is identified in the user interface. This is where we will be making all of our configuration and calibration adjustments in the next section.

The 8c's use Analog Devices [ADAU1452 DSP chip] in which D&D developed their own DSP board and audio boards, along with all of the software developed for the 8c.

Having the loudspeakers connected to the internet makes it easy to apply software "loudspeaker" updates, as new features are added to the on-board computer's memory. This future proofs the loudspeaker, as the driver technology and physical design are as it good as it gets. This approach also allows D&D tech support to interface with the loudspeakers if ever required.

The 8c has balanced analog and digital (AES3) inputs along with a range of input sensitivities to handle both consumer and pro level output devices. I didn't spend too much time on the hardware side, as to my ears, sounds transparent. Mostly, I am interested in how the loudspeaker sounds to my ears and how accurate it is from an objective measurement perspective. Let's get started.

Setup, Configuration, and Calibration

I pushed my large JBL speakers to the sides and set up the 8c's on my 24" sand filled, Monolith stands and placed the 8c's ~30cm from the front wall, as measured to the back center of the subwoofers. Vibrapods are used to isolate the speakers from the stands and the stands from the floor. I did not move the subs out of the way, but they were not hooked up for this evaluation.

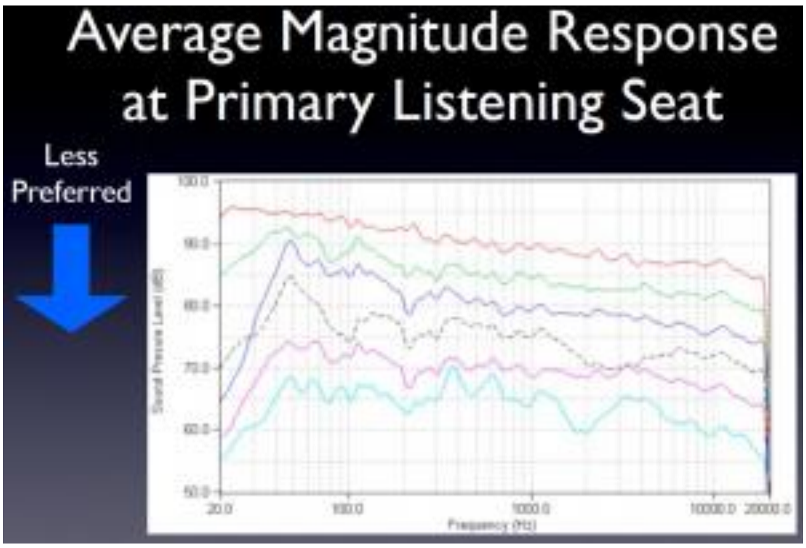
JRiver MC 24 is the software music player, connected to my Lynx Hilo via USB and then using the AES3 digital output of the Hilo to the AES digital input on the 8c on the left and then using an AES cable to link the left speaker to the right speaker. There is an included AES terminator with the 8c. For critical listening, I case the guitar, put a comforter over the drum kit and move the coffee table out of the way. During the evaluation, I also used the balanced analog outputs of the Hilo to the balanced analog inputs of the 8c's and did not perceive any difference in sound quality as compared to the digital inputs.

As a former recording/mixing engineer, I use industry guidelines from the ITU and EBU to set up my speakers in an equilateral triangle, speakers toed in, on axis, pointing directly at my ears. I also calibrate my listening level, so when I am performing critical listening, I monitor at ~83 dB SPL, C weighting, slow integration, using a calibrated sound level meter. Bob Katz's article that I linked, provides an excellent overview of the process and why. Most recording/mixing/mastering engineers use the same equilateral triangle setup and monitor level calibration for producing the art. I use the same approach for reproducing the art. For levels below 83 dB SPL, JRiver's dynamic loudness control is engaged. Remember folks, our ears frequency response changes with signal level.

The calibration process also includes using REW, as I measure the frequency response at the same reference SPL and adjust the speaker's frequency response to my preferred target frequency response at the listening position, using whatever comes with the loudspeaker. While I can easily and expertly apply Acourate or Audiolense DSP, the point of the review is to use only what comes with the loudspeaker.

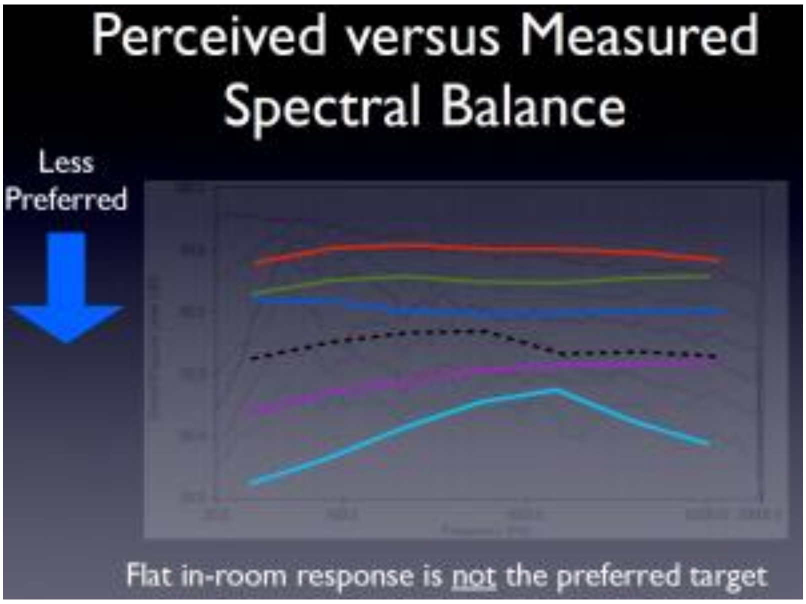
There is good scientific research on subjective listening tests correlating to objective measurements from Sean Olive and Floyd Toole on The Subjective and Objective Evaluation of Room Correction Products and The Measurement and Calibration of Sound Reproducing Systems respectively.

From Sean's slide deck is a preferred subjective ranking of average magnitude responses, objectively measured at the primary listening position:



The top preference (red trace) is a flat, but tilted measured response. If 0 dB is 20 Hz, then it would be a straight line to -10 dB at 20 kHz. The “trained listeners” curve in Figure 14 in the Toole reference is similar.

Note that this tilted measured response is perceived by our ear/brain, as subjectively flat or a neutral response according to Sean’s research:



See how an objectively measured response of 20 Hz and straight line to -10 dB at 20 kHz is subjectively perceived as a neutral or flat response to our ears/brain (red trace overlaid in the above chart). Most participants in the study preferred a frequency response from 20 Hz with a straight line to -10 dB at 20 kHz. A measured “flat” in-room frequency response is not the preferred target, as it sounds too thin or lacking bass.

“The Science of Preferred Frequency Response for Headphones and Loudspeakers” goes into more detail and provides links to further studies, which show the same preferences, for both loudspeakers and headphones, after repeated listening trials. As Dr. Floyd Toole says, preferred is synonymous with accurate.

I have been using computer based software DSP since 2011 to custom design digital FIR correction filters in both the frequency and time domain for loudspeakers in rooms. In my own listening tests, I prefer the tilted response from 20 Hz to -10 dB @ 20 kHz. To my ears, sounds subjectively balanced or neutral from top to bottom.

Whatever your preference is, this is a good place to start, as the subjective listening tests that Sean and team have performed, multiple times, with multiple participants, does correlate to a preferred in-room measured response, assuming good loudspeaker design with smooth directivity.

After taking a few measurements with REW, I started playing with the Active Room Matching (ARM) settings. First, I set the ARM for each speaker independently. The left speaker measured 28cm from the front wall and the right speaker measured 38cm from the front wall due to the picture window. The following ARM settings are what I ended up with for the left and right speakers respectively:

Active Room Matching		Active Room Matching	
Treble	0 dB	Treble	-0.5 dB
Bass	2.5 dB	Bass	0 dB
Sub	0 dB	Sub	-1 dB
Parametric EQ		Parametric EQ	
Front wall	20 cm	Front wall	30 cm
Side wall	60 cm	Side wall	90 cm

Notice the treble adjustments, no adjustment on the left and -0.5 dB on the right. As mentioned at the beginning of the article, the 8c's out of the box hit my preferred high frequency target frequency response with virtually no adjustment.

<Soapbox>

I find most speakers unlistenable in the top end. They do not exhibit a downward tilt in high frequency response which results in sounding too bright, no matter what room they are in. Looking at my last three speaker reviews, each one needed approximately -5 dB high frequency shelf starting between 3 kHz to 5 kHz depending on speaker, on up to 20 kHz. That's a considerable reduction in high frequency output to sound neutral to my ears and based on Toole's and Olive's subjective listening research.

For loudspeakers that don't have any way to control the high frequency output, one needs to resort to outboard tone controls or DSP to tame the top end. Why so much high frequency output? I find if confounding as to the reason why this is. Is it marketing worrying that if the speaker does not have enough high frequency sizzle that it won't stand out from the rest – sound boring, or even sound… neutral ☺ Or is the standard "if it measures flat on-axis in the anechoic chamber" approach flawed?

As alluded by Kevin Voecks in the link above, the modern approach, again from Toole and Olive, is the spin-o-rama which uses 72 anechoic measurements and computer processing algorithms to determine a neutral sounding speaker based on this anechoic data. Certainly described in Toole's book and even this presentation from 2002. How to make neutral sounding loudspeakers has been known for some time…

Today, loudspeaker manufactures can choose to make more neutral sounding loudspeakers by using what Floyd Toole and others have contributed to an open industry standard called, Standard Method of Measurement for In-Home Loudspeakers ANSI/CTA-2034-A." This is just a preview, as the standard costs a hundred dollars or so to purchase.

If you spend time doing the research, one can conclude that this measurement approach can predict with a high degree of accuracy what a good sounding loudspeaker will "sound like" in an in-home environment correlated to objective anechoic measurements. I sincerely hope more loudspeaker manufacturers leverage this "standard" measurement approach to produce more neutral sounding speakers that don't require significant high frequency output reduction to sound neutral…

</**Soapbox**>

Kudos to D&D for engineering the first loudspeaker I have measured that requires no or minimal high frequency adjustment to sound neutral in my room.

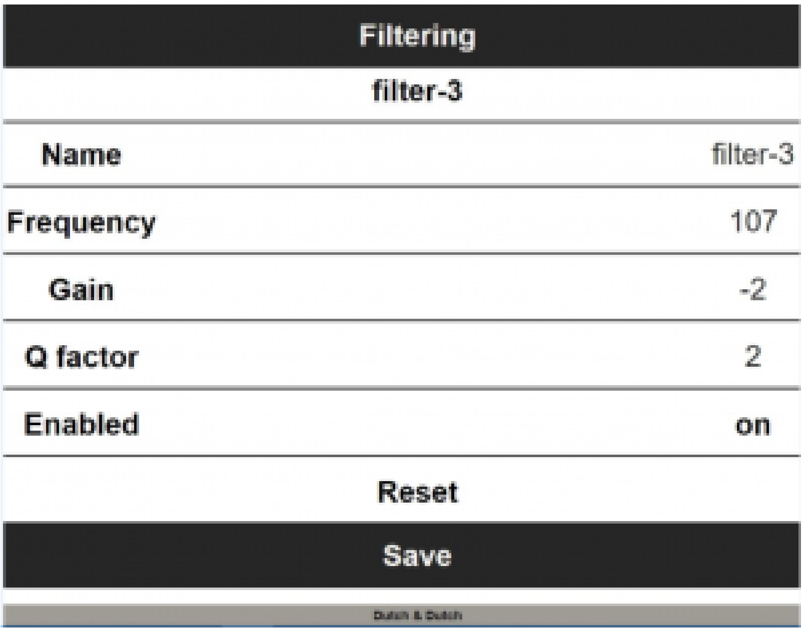
Next I dialed in some Parametric EQ below 500 Hz. Given the 8c's mid and high frequency response is lining up with my preference, no eq is required. What we are doing here is bringing down the room modes or standing wave peaks a bit to provide a smoother response. It is room ratio dependent and will be different for each room.

Using REW, I measured each speaker independently and here we are seeing the left and right onboard PEQ's I ended up with, as I fine-tuned the response using multiple REW sweeps:

Filtering
filter-1 (37 Hz)
filter-2 (106 Hz)
filter-3 (242 Hz)
filter-4 (499 Hz)
filter-5 (400 Hz)
filter-6 (199 Hz)

Filtering
filter-1 (488 Hz)
filter-2 (57 Hz)
filter-3 (107 Hz)
filter-4 (70 Hz)

Clicking on a filter will provide a details view of the parameters that can be varied in each PEQ:



This is filter-3 in the list for the right 8c above. One can adjust the frequency, gain and Q factor. The Q factor refers to the width of the parametric filter. The higher the Q the narrower the width of the filter.

With the ability to toggle the filter off and on in real-time, one can assess the impact by ear and/or measurement microphone whether playing music or test tones.

With the measurement microphone at the listening position, I made small adjustments by bringing down the peaks and leaving the dips alone. The psychoacoustic science says our ears are more sensitive to peaks than dips in frequency response. And that our ears hear the envelope of the frequency response, like 1/6 octave visual display smoothing is reasonably close to what our ears/brain perceive.

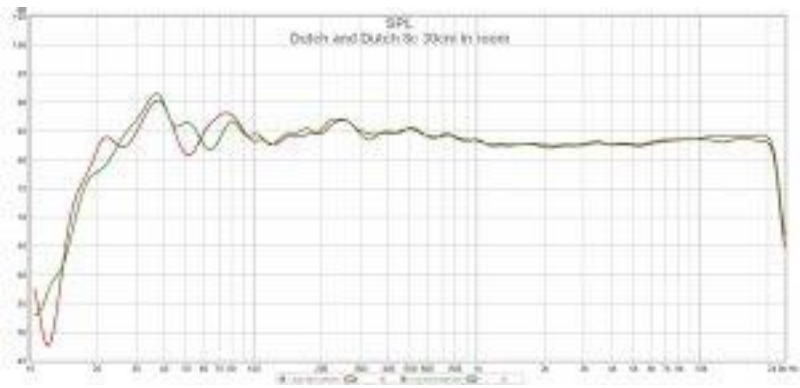
I am not showing the detail for every PEQ, as it is room dependent. All of them were small adjustments to smooth out the response below 500 Hz.

With setup, configuration, and calibration complete, let’s look at the measurement results.

Objective Measurements

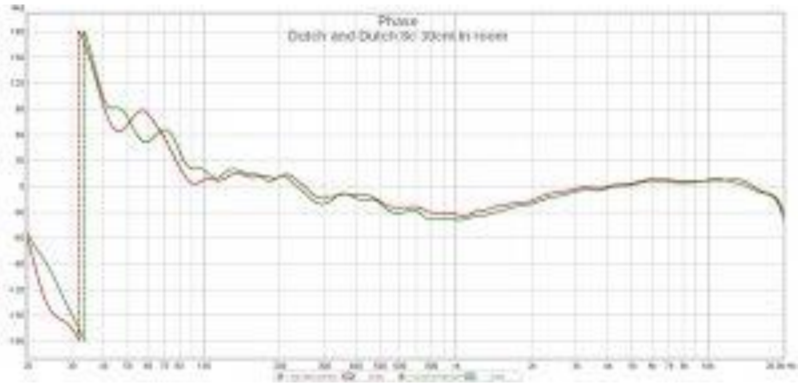
For this article, I thought I would take a couple of near field measurements first to show how good the frequency and phase response is for the 8c's. This is with my calibrated measurement microphone pointing in between the tweeter and mid-range driver, 30cm away:

The default impulse response measurement window is 500 milliseconds long, so a half second of room reflections are definitely in the result. Even still, look how smooth the frequency response is:



The room's standing waves are encroaching at low frequencies, but there is virtually no speaker boundary interference. The back of the 8c's are (L) 28 cm and (R) 38 cm away from the front wall. Optimizing this distance in the Active Room Matching user interface, for both left and right speakers, virtually eliminates any SBIR. These measures are with no PEQ's applied.

How good is it? Check out the phase response over frequency:



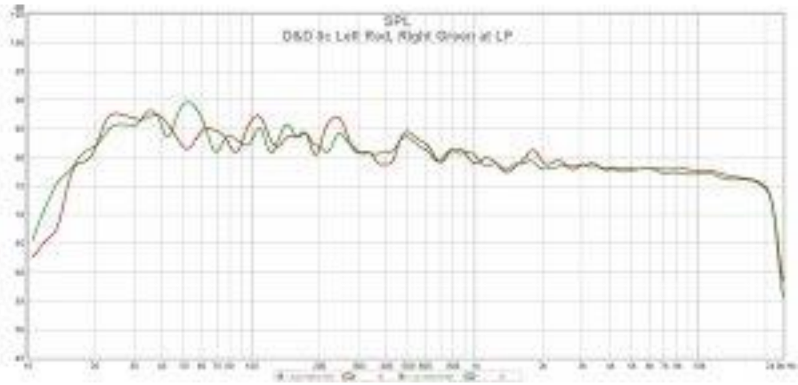
Virtually textbook. If you look back at the picture of the 8c in the room, you can see all sorts of boundaries, floor, side of subwoofer, angled partition to the left of the speaker, aside from the subs being back 28 cm from the front wall. The 8c's loudspeaker design with built in DSP technology is so good we virtually get a flat phase response coming off the speaker and front wall. Put another way, the sound from the rear subwoofers bouncing off the front wall are in phase with the rest of the speaker. Something to ponder… If we looked at the step response, we would see the direct sound arriving at the microphone, all at the same time. Also known as a time aligned or time coherent system.

An amazing technical feat given the number of odd boundaries to my already disadvantaged room ratio room. What is even more impressive is this is with a few parameters punched into the ARM section, with no PEQ's, and already the performance is virtually textbook. Martijn and team at Dutch & Dutch have done an outstanding technical design job to effectively mitigate bad room effects (i.e. SBIR), yet at the same time leveraging good room effects (i.e. the Allison effect). This allows one to further enjoy the incredibly accurate sound quality these loudspeakers reproduce.

Moving the measurement microphone to the listening position:

Note I move the coffee table and couch out of the way. The issue with leaving a couch or chair near the measurement microphone's proximity is that you are correcting for both the direct sound and comb filter response. Similar comb filtering occurs with a coffee table or any object between the speakers and measurement mic. You will get a much better sounding result with nothing around the proximity of the microphone or between the microphone and speakers during calibration and then adding the furniture back after.

As mentioned in the calibration section, I kept sweeping REW's test tone and looking at the charted response. First I adjusted the Active Room Matching (ARM) parameters for smoothest response that matched my preferred target response. Then, I worked on the low frequency room modes or standing waves below 500 Hz using the on-board PEQ's. I arrived at the following frequency response measured at the listening position:



That’s an excellent “in-room” measured frequency response using no external eq or DSP. It is just about ±3 dB from 21 Hz to 20 kHz. Studio control room frequency response accuracy. Given my unfavorable room ratios, it really says a lot about the 8c’s engineering design. I would expect most rooms to be better than mine and could achieve as good or even better result.

How closely can I match the 8c’s to Olive’s research on preferred (neutral) frequency response?

Wow, that is quite close compared to my measured reference frequency response using custom designed DSP FIR filters and subs. The 8c’s effectively hit the target 100%. That’s a first for any loudspeaker I have measured in my room without resorting to external eq or custom DSP. Fantastic job D&D for your loudspeaker to not only adapt to my room, but hit my preferred neutral in-room target frequency response.

Let’s have a look at the dispersion characteristics of the 8c’s where I move the measurement microphone, 3 feet left of center from the LP, measure left and right speakers, then 3 feet right of center, and measure left and right again:

Impressive. Simply the HF level is a bit lower with very little high frequency response deviation over a six foot listening area. Virtually perfect off axis high frequency response from 1 kHz on up.

Inevitably the room comes into play down low, but the good news is that they are all dips and our ears don’t really hear those, as we are more attuned to the envelope. Putting a ruler on the graph along the slope of 20 Hz to -10 dB at 20 kHz, the envelope pattern holds, even across a 6 foot seating area. Confirmed in my listening tests, the 8c’s sounded incredibly smooth both at low and high frequencies, no matter where I shifted around on my six foot couch while music is playing.

I believe we are seeing the future of loudspeaker design with fully integrated features, like being able to appropriately adapt to any room. It is simply a matter of time before FIR filters with enough taps applied to correct more of the room becomes a reality. I suspect Acourate or Audiolense or the like will soon be incorporated, using OpenDRC into these “all in one” loudspeakers. We have already reached the pinnacle on PC’s using powerful DSP software programs that can reduce low frequency group delay or eliminate room modes and standing waves.

Well, the 8c’s are the most accurate loudspeakers that have come through my living room. There is no point in displaying the timing (i.e. step) response, as we already know the speaker is time coherent from the near field measurement shown earlier. The phase is virtually flat across the frequency band indicating that the 8c "system" is time aligned or linear phase.

Put another way, we need a linear phase "system" to reproduce an ideal loudspeakers minimum phase response, as speakers, like microphones, are minimum phase devices. The trouble occurs when adding speaker crossovers that distort the phase, along with room acoustic issues below Schroeder when the response is no longer minimum phase. So… just about virtually every loudspeaker in any room, except when using custom DSP solutions or a pair of D&D 8c's!

Subjective Listening Results

I spent over 100 hours listening to these speakers with a wide range of digital media content. The 8c's are the most accurate speakers I have reviewed to date. The 8c's sound great at any listening level from night time "don't wake the kids" to "stupid loud." While they can't match my dual 15" cabs per side with dual 12" subs, they do put out a prodigious amount of musical sounding bass that totally belies their bookshelf size. Both my wife and daughter thought my external subs were hooked up (they weren't).

One of my favorite alt bands, the Brian Jonestown Massacre has several tunes I enjoy, including this dreamy/spacy sounding tune, "Dropping Bombs on the Sun." Sounds staggeringly huge with solid low frequency response. Because the bass line has quite a few different, but long sustaining low notes, I find it a good tune to listen to how the bass sounds in the room. Nice and full sounding, without sounding boomy or "one note" resonance sounding. Just solid.

Madonna's Ray of Light, arguably one of her best, and while I am not a huge Madonna fan, I am blown away by this William Orbit produced adventurous album which has some incredible music and mixes. Solid low end response with Madonna's voice perfectly recorded and not overly sibilant, as compared to some of her other recordings (e.g. Fever). Drowned World, the Substitute of Love is quite the mix. Not once did the 8c's sound strained, as I kept turning up the volume to old school concert level of 95 dB SPL at the listening position. These speakers sound way bigger than they look. What you don't see is the double 8" subs leveraging the front wall for some huge and impactful bass.

At the beginning of Juno Reactor's, Immaculate Crucifixion is a low frequency drum sound that comes across as if the entire front wall is flexing in the living room when turned way up. It is one of those mixes that makes you feel you are at a club with the strobe lights flashing and the dance floor pulsing to the beat.

Moving up the dynamic range scale, ever since I first heard Peter Gabriel's Security CD played over large format control room monitors at a recording studio, I was floored at how good it sounded, especially the drums. Shock the Monkey (DR16) has really good drum slam. Not only dynamic sounding, but the stereo mix sounds crystal clear and well defined across the 8c's. It is as if the entire front wall of my room is the size of the stereo image.

The polar response of these speakers and the mix of direct and indirect sound was just about perfect in my room. I normally listen to higher directivity speakers, as I like more direct sound and less of my (crappy) room sound. But I am really digging the 8c's, which are a fraction of the size of my JBL Cinema loudspeakers.

As a former recording/mixing engineer, creating the stereo illusion with mono mic'd in the studio multi-track approach is not an easy task. If you would like to see a visual representation of mixing, I would highly recommend David Gibson's YouTube of The Art of Mixing. Prepare to have your mind blown.

Why do I keep bringing up polar response and directivity index? While speakers can have the same on axis frequency response they will sound different based on their polar response or directivity index. Some folks really like the diffuse sound of omnidirectional loudspeakers or open baffle loudspeakers. Others like a more focused direct sound and less room acoustics.

The latter is my preference. However, the 8c's have a nice balance of direct versus reflected sound. I really enjoy the size of the image that come off these loudspeakers, certainly reminds me of the size of the sound of my large JBL's, but at a fraction of the size. Really an amazing feat.

Flim and the BB's Tricycle DR19. Turning it way up is a great rush, as the band really punches it. I get a kick of how loud the band comes in at the top, right after the piano intro. The 8c's sound incredibly dynamic and tight. As I mentioned before, the top never became shrill or harsh as I pumped up the volume. The horns timbre never altered, even up past 95 dB SPL, which is twice as loud as my critical listening level.

The clarity of these loudspeakers are outstanding. This is because of the phase coherent wave front being sent to my ears with no speaker boundary issues. If you have the measuring tools, try using REW to measure your loudspeaker 30cm from the center of the speaker and look at the frequency and phase response. Compare to the 8c measured results above…

One of my most favorite tracks is SRV's Tin Pan Alley with DR18. When turned way up the dynamics feel like being at the concert hall, as I found the 8c's to have a wonderfully enveloping sound when my front wall becomes a window into the performance. The tonal balance on these speakers is spot on.

My teenage daughter likes Rihanna's Shut Up and Drive. Quite the dance mix with bright vocals and a ton of low bass. Even cranked up twice as loud as my critical listening level with peaks beyond 95 dB SPL, the vocals still sounded smooth and the subs are really pressurizing the room:

The 8c's are so close to the front wall, I could only get one of the subs on video, but I think you get the idea. LOL. After listening to that in my 16' x 31' x 8' living room, it is pretty convincing that these speakers don't require subs unless you are complete bass head.

Moving on to listening to some high frequency content, Marilyn Mazur's, Bell Painting (DR25 on CD!). The attack, clarity, and decay of the percussion instruments sounded realistic to my ears. I have a number of percussion instruments at home, including a few bells and it is really surprising to hear the reproduction sounding virtually identical to the real thing. The “stick on bell or cymbal” transient response is realistic sounding, as I play sticks on the ride cymbal and bell on my drum kit in the living room and compare as the loudspeaker is playing. The purity of the tone quality (i.e. timbre) is unlike anything I have heard. I don’t know how quite to describe it, other than it is accurately realistic to my ears.

The bells are accurately reproduced anywhere I move on the couch while the bells are playing. There is no polar response “drop outs” where the high frequency abruptly disappears and then one moves their head a few inches and it reappears. The CNC waveguide design matching to the magnesium alloy 1” dome tweeter has really paid off. There is no beaming or any anomalies across the high frequency range, as I listen to the bell transients and decays. Smooth as silk on and off axis. Best I have heard.

While I am not much of a classical music fan, one piece I do love, aside from all the music on 2001: A Space Odyssey, is the Blue Danube played at the end credits. I just play the movie end credits to listen. Sounds completely enveloping to my ears, as if I am transported to the hall while I keep turning the volume up. The concert hall seems to have infinite depth. The music just floats perfectly in the halls reverb. So well recorded to get the right mix of direct and reverberant sound. Outstanding imaging, as the front wall of my living room becomes the concert hall. What more could I ask for.

Conclusion

What ingenious loudspeaker design and engineering:

- Studio control room frequency response accuracy from 21 Hz to 20 kHz ±3dB at the listening position.
- Perfectly smooth response on and off axis. I.e. perfectly controlled directivity from 100 Hz to 20 kHz.
- High frequency output is perfect right out of the box. No large HF attenuation required to sound neutral.
- Midrange cardioid polar pattern to avoid speaker boundary issues, yet at the same time leveraging the Allison effect for more bass output/impact off the front wall from the dual subs on the back of the cabinet.
- Perfectly phase coherent loudspeaker design, as the direct sound and the reflected bass off the front wall is arriving at one's ears at the same time. No time smearing.
- Sophisticated room calibration controls with Active Room Matching and access to 24 PEQ’s per speaker.
- Low latency mode for TV or movie watching to avoid any lip-synching issues.

- All in one “bookshelf” package. It is serious at 53 lbs.

If you have made it this far in the review, obviously, you can tell these are my new favorite accurate loudspeakers. I am really not sure what could be better than these, especially how well they integrated into my challenged room ratio room.

Folks will ask how the 8c’s compare to the Kii THREE’s. I did get to listen to both back to back. I even put a Three on one stand and an 8c on another stand and ran them in stereo. Other than low latency mode, both have a different delay and almost impossible to reconcile between them. But I did listen to them back to back.

Because of the cardioid response for SBIR control, both of these speaker designs are ahead of the curve. The 8c’s have larger midrange and sub drivers, a more refined high frequency directivity response when comparing the two polar maps, and the advantage of more onboard room integration controls (e.g. PEQ’s). The latter resulted in a smoother or more tightly controlled frequency response down low for the 8c’s. The 8c’s larger drivers sound more dynamic. The high frequency directivity response, aside needing HF attenuation on the THREE’s, sounded a bit smoother on the 8c’s. The 8c’s dual 8” subwoofers in my room are enough to not require external subs…

If I was to try and subjectively characterize the sound difference, both are very neutral performers, best I have heard. The THREE’s sound a bit drier than the 8c’s. I don’t know any other way to describe it. Objectively speaking, it may be a damping factor difference between the amplifiers. Both measure just about textbook response in the frequency and time domains. But with the 8c’s larger drivers, more onboard room calibration controls, and the best directivity polar map I have seen, edge out the Kii THREE’s to my ears. But that is just my preference.

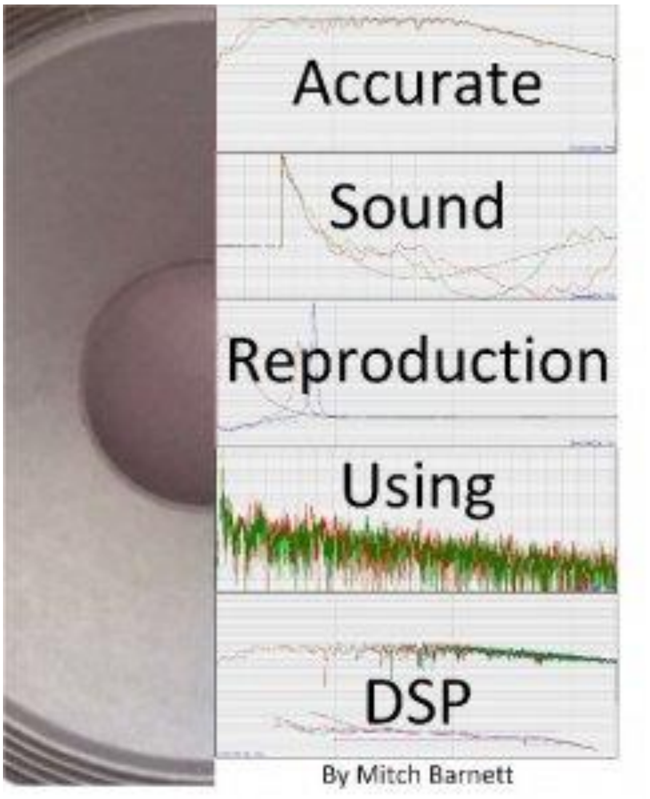
To me, a loudspeaker like the 8c is the future of loudspeaker design and engineering, arriving today. Take everything we know about the science of small room acoustics and psychoacoustics and equip the loudspeaker with tools so we as consumers can mitigate the fact that loudspeakers are listened to in rooms. It is just a matter of time that the loudspeaker will ship with a calibrated measurement microphone so the onboard computer can optimize loudspeaker room placement.

For now, Martijn’s suggestion is placing the subs 40 cm from the front wall. He recommends that as a good starting point, if you can get them that close to the front wall. This will fully enable the Allison effect while mitigating SBIR issues. Worked out really well for me and why I say the 8c’s are pretty damn good without external subs.

I can’t get over the polar response of these loudspeakers and the size of image they throw. It extends from floor to ceiling and beyond the width of the speakers. The stereo image or auditory scene or whatever you want to call it, totally belies the size of these speakers. It gives a new meaning to picture window ☺ Sorry to see these go…

Now what?

Enjoy the music!



I wrote this book to provide the audio enthusiast with an easy-to-follow step-by-step guide for designing a custom digital filter that corrects the frequency and timing response of your loudspeakers in your listening environment, so that the music arriving at your ears matches as closely as possible to the content on the recording. Accurate Sound Reproduction using DSP. Click on Look Inside to review the table of contents and read the first few chapters for free.


Mitch "Mitchco" Barnett.

I love music and audio. I grew up with music around me, as my mom was a piano player (swing) and my dad was an audiophile (jazz). My hobby is building speakers, amps, preamps, etc., and I still DIY today.

I mixed live sound for a variety of bands, which led to an opportunity to work full-time in a 24-track recording studio. Over 10 years, I recorded, mixed, and sometimes produced over 30 albums, plus numerous audio for video post productions, in several recording studios in Western Canada.