

“ ... POTENT ... VISCERAL
... EFFORTLESS ... ”

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Seismic™ 12

by Christopher Zell, Ph.D



Paradigm Electronics Inc. has established a well-deserved reputation in the subwoofer market, particularly with their impressive and affordable Reference Servo-15. I have spent considerable time integrating and listening to numerous Servo-15s in a variety of systems and rooms over the last few years, and can verify that the Paradigm woofers are a real player in the field. However, Paradigm did not offer an option for those space or décor-challenged customers who desired a diminutive but powerful bona fide subwoofer. After four years of intensive research and development, Paradigm has answered this demand with their recently released entries into the ultra-small powered subwoofer arena, the Reference Seismic 10 and Reference Seismic 12. It was with a considerable amount of anticipation and high expectations that I received Paradigm’s larger model, the Reference Seismic 12 subwoofer a few months ago.

DESCRIPTION

Subwoofers are often the hardest things to justify to the significant other of a home theater buff. The large, usually ugly boxes

generally are not well received in the typical home theater room that often serves a dual purpose as a family or living area. With the advent of minimally-sized yet potent subwoofers, such as the Paradigm Seismic Series, this has become an easier sell in many cases, improving placement flexibility and therefore often ultimate performance. Despite having considerable experience with mini-sized subs, I am always amazed at how small and downright cute they can be. Maybe cute is not the right word after you strain to lift this dense, 67-pound unit, but the 14-3/4 inches high by 14-1/2 inches wide by 14-1/2 inches deep Seismic 12 is no exception, its size disguising the power and impact it can produce. Paradigm designed and manufactured the downward-firing, 12-inch driver, featuring a low-mass, high-stiffness cone, with greater than two inches of peak-to-peak excursion. The rugged, mineral-filled co-polymer polypropylene driver includes a number of innovations, including dual spiders, one

linear and the other progressive, resonance controlled ribs to minimize unwanted distortions and a computer optimized magnet structure. The powerful Ultra-Class-D internal amplifier is rated at 1200 watts RMS from 20 to 150 Hertz, and 4500 watts peak. Bass response is extended to a reported 17 Hertz with the aid of dual 10-inch high-velocity passive radiators located on opposing cabinet sides.

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Cosmetically, the Seismic series subwoofers are more than just a standard black cube. A blue, lighted Paradigm logo on the black front cabinet face provides a touch of class. The rounded top edges make for a gentler profile, blending nicely into the gloss black, inlaid top surface. The gently sloped outrigger feet, similar to those on the Studio 100, raise the downward-facing active driver slightly above the floor. Of course, the two passive radiators visible on each side face let you know that this is a subwoofer and not a piece of furniture, but the overall look is attractive.

The rear of the cabinet contains all inputs and control facilities. An IEC power cord jack and amplifier power controls are located to the left. The Seismic 12 can be switched on and off manually, automatically turned on and off based on the presence of an input signal, or controlled by an external trigger. The upper middle section of the back panel contains two low-level, mono-only inputs, one RCA jack for standard single-ended inputs, and an XLR jack for balanced signals. Four continuously variable dials located on the right of the back panel control subwoofer level, cut-off frequency (35 to 150 Hertz), phase alignment (0 to 180 degrees), and bass contour boost (0 to +6dB at 60 Hertz). A very nice touch is the handy frequency response illustrations and accom-

panying text next to each dial, depicting and explaining the purpose of the particular control. This is very useful for those who may be a bit confused about exactly what each control does, and also allows easier dial identification when the sub is in its final, possibly inconvenient position. There are a couple of omissions concerning the functionality of the Seismic 12, including the absence of a switch defeating the low pass filter. If the bass management system of your processor or receiver is utilized, then ideally you do not want a low-pass filter at all in the subwoofer itself. As is unfortunately the case with many current subwoofers, the best you can do is to set the crossover frequency as high as possible. Even with the Seismic 12's cut-off set to the maximum 150 Hertz, there still will be some interaction with the processor crossover, which is typically set at 80 Hertz per THX recommendations. Additionally, the Seismic 12 does not contain a high-pass filter for your main loudspeakers. If this is necessary, Paradigm recommends one of their X-series crossover controllers for integrating this subwoofer with your main loudspeakers. The X-series controllers also work well for summing the bass from a stereo preamplifier output into a mono subwoofer signal. This is not normally needed for home theater usage, since your processor or receiver's bass management system normally provides preamp level, high-pass loudspeaker outputs, and also an appropriate mono subwoofer output signal.

SET-UP

An obvious consideration when you own a set of full-range main left and right loudspeakers in a home theater is whether or not a subwoofer is really necessary. In my mind, the answer is yes for several reasons. First, when optimizing the location of your left and right mains, qualities such as imaging, clarity and balance across the midrange and treble are paramount. A location that maximizes these properties is almost never the optimal location with respect to low bass response (less than 80 to 100 Hertz) and balance across seating locations. A separate subwoofer can be placed where it produces the flattest frequency response across the widest range of listening positions. What better way to achieve this than to have

a small subwoofer, such as the Paradigm Seismic 12, that can be located in a multitude of relatively inconspicuous positions, yet still deliver low-end power and flat frequency response. Second, there are advantages to relieving the main loudspeakers and amplifiers of the lowest bass, alleviating the need for additional power and minimizing low-frequency driver excursion. Additionally, unless the main loudspeakers have a true subwoofer that is crossed over under 100 Hertz or so, removing large low-end bass driver excursions allows it to act more in its linear range and minimizes some Doppler distortion that may otherwise occur. I do not believe that this means full-range mains are undesirable for a high-end home theater. Having the option of turning the subwoofer off and running the mains as "large" for two-channel music is appealing for reasons of maximum integration and purity. Also, although the mains will most likely be cut off at 60 to 80 Hertz by the home theater processor's bass management system, this does not mean that all frequencies below that are eliminated. On the contrary, it is important to remember that crossovers are generally not infinitely steep, and that a significant amount of signal energy is still present in the mains more than an octave below the cutoff frequency, albeit at reduced levels.

It is far easier to get a full and synergistic meld of a subwoofer and main loudspeakers when the bass response is devoid of large frequency peaks and nulls. Nulls, which are normally caused by cancellations, can make the bass sound non-integrated, non-continuous and sometimes anemic. Conversely, if there are large resonant peaks, they stick out like a sore thumb, giving you the illusion of one-note bass. Balancing the peak level with the rest of the system will come at the expense of reduced output for the majority of the bass range, thereby losing all of the power and visceral impact that you were craving before you got the sub. Despite the temptation that most of us must battle when we first get a sub, to rattle our windows and crack the foundation, what you ultimately want is integrated bass that does not sound like a separate source, but instead adds power and impact, yet remains musical.

As a prerequisite, you'll want to adjust the subwoofer distance/delay setting in your preamp set-up before adjusting the Seismic 12's controls. The output near the crossover frequency will be strongly affected by this delay setting, since both the subwoofer and the main loudspeakers contribute equally at that point. In my reference home theater system, I first placed the Seismic 12 in a proven subwoofer location, between the speakers, and behind the center channel. While listening to 20 to 100 Hertz bass sweep signals, I moved the subwoofer around slightly until the response seemed the flattest. After my initial adjustments, I used my trusty Radio Shack SPL meter, calibrated to adjust for its inherent low frequency roll-off, to have a quick look at frequency extension and consistency. There was a noticeable but acceptable peak around 45 Hertz that is likely caused by a room-length resonance. In my environment, the Seismic 12 was solid until near 20 Hertz, with some useable output below that point.

"... the Seismic 12 was indistinguishable as a separate source ... dominant low-end percussion and bass guitar moved back and forth between subwoofer and main loudspeaker woofers without changing character and quality."

As a final set-up note, I was impressed with the wealth of useful information contained in the short but concise owner's manual, which walks you step-by-step through the set-up and calibration of your subwoofer. Paradigm's manual provides some useful tips on placing and setting the Seismic subwoofer controls, as well as information regarding the use of two subwoofers in a single room.

USAGE

A prime use of my home theater these days is concert videos. In spite of its horrible video quality, my current favorite is Peter Gabriel's *Secret World Live* (Geffen), from the tour supporting his mid-1990s album, *Us*. What better way to check out a sub-

woofer than to let it recreate the fantastic rhythm section of drummer Manu Katche, along with Tony Levin, certainly one of the top rock bassists in the world today. Much of Gabriel's music is built upon hypnotic world beat rhythms, which I find virtually impossible to sit still through when properly reproduced. "Steam" is a prime example. The Paradigm subwoofer allows the song to writhe with the visceral impact of the bass and kick drum. The climax of songs such as "Almost the River" and the tightly choreographed "Shaking the Tree" throbbed impressively through the Seismic 12. Certainly the Seismic 12 started to run out of steam before my reference speakers, but that was only when I was approaching scary levels in my reasonably large (21 feet long by 15 feet wide by nine feet high) main listening room. This is impressive, given the size of the Seismic 12, and the unrestrained dynamics of my loudspeakers.

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One of the main reasons most consumers desire a subwoofer is to enhance the movie experience. Everyone wants the Tyrannosaurus to rattle the rafters, the depth charge explosions to rumble the couch, etc. Rest assured that a competently designed small subwoofer such as the Paradigm Reference Seismic 12 can deliver gut-wrenching bass to very high levels. Without using a lot of text to describe each rump-shaking sequence, the numerous folks who experienced movies in my room were consistently wowed by the entire experience. I received many enthusiastic remarks during thunderous scenes, such as the multiple close-up horse racing sequences in *Seabiscuit* (DreamWorks Pictures). Similarly, the Seismic 12 very effectively energized the room during the scene from *Harry Potter and the Sorcerer's Stone* (Warner Bros. Home Video) in which a troll demolishes the girls' bathroom in an attempt to make a pancake out of Hermione Granger (Emma Watson).

I inserted the Paradigm Seismic 12 into a two-channel system in a friend's relatively small listening room (approximately 11 by 14 feet), with the main loudspeakers located along the long wall. He is an accomplished audiophile and loudspeaker designer, and I welcomed the opportunity to evaluate the Paradigm subwoofer in his listening environment. His custom two-way monitors are able to pressurize this small space very impressively without the aid of a subwoofer, but we wondered if the Seismic 12 could improve things further. Our early attempts, using a variety of subwoofer positions and calibration settings, resulted in a trade-off between ease of presentation and power vs. integration, along with a slightly distracting feeling of separateness as the bass moved in and out of the subwoofer's frequency range. After a long afternoon of experimentation, the best results were achieved with the sub in a near-field location next to the couch and a crossover frequency of 60 Hertz. This was the first time I consistently preferred listening to music with the subwoofer in the system. This optimization reduced peaks, allowing us to raise the subwoofer level a smidgen and add power without peaky, bloated notes ruining things. As I mentioned earlier, many times subwoofer levels are turned down in order to reduce a few nasty peaks, causing the majority of the bass range to be a bit low in level and therefore not in frequency balance. Although a number of CD sources with significant low-frequency content were utilized that afternoon, the majority of my impressions were formed while listening to Creed's 1997 release *My Own Prison* (Wind-Up Records), stemming from singer/songwriter Scott Stapp's tumultuous upbringing, reflecting his conflict with family and faith. Tracks such as "Illusion" and "One" sounded effortless, benefiting from the added low-end extension and impact imparted by the Seismic 12.

The moral of this story is, regardless of how much I enjoy subwoofers and advocate their usage in home theater or music systems, they are a pain in the neck to integrate properly. Many music enthusiasts are not subwoofer fans, mostly because of the difficulty in finding that magical combination of subwoofer settings and positioning that are so elusive when augmenting the lower frequencies.

“... proficient and potent without a heavy cost premium ... I highly recommend the Seismic 12.”

A natural mate for the Paradigm Reference Seismic 12 is their Reference Studio 100 main loudspeakers. I inserted the Studio 100-based home theater loudspeakers into my reference listening system along with the Seismic 12, using a cut-off frequency of 80 Hertz, concentrating on its performance and integration with music, particularly multi-channel SACD and DVD-Audio discs. Whether it was because of a synergy that exists between these members of the Paradigm Reference family, or just dumb luck, the subwoofer and the loudspeaker system formed a most pleasing match. The dynamic capabilities, as well as the overall bass extension of the system, were considerably enhanced by the addition of the subwoofer. While listening to Blue Man Group's DVD-Audio release *Audio* (Virgin Records), the Seismic 12 was indistinguishable as a separate source. For the majority of “Mandelgroove,” the subwoofer actually had little to do, but at the song's climax, the dominant low-end percussion and bass guitar moved back and forth between the subwoofer and main loudspeaker woofers without changing character and quality. I often hear people say small subwoofers may be able to recreate booms and explosions in movies, but they are unable to sound musical. To my ears, this was definitely not the case with the Paradigm Reference theater system and Seismic 12 combination.

DOWNSIDE

Although the Paradigm Reference Seismic 12 is a success overall, there are a few points to bear in mind when considering the purchase of this subwoofer. First, there is no way to fully bypass the Seismic 12's low-pass filter, which means there will be some interaction with your processor's bass management system. This is a recurring problem with most subwoofers on the market, a situation that I wish more manufacturers would consider. Also, the user should determine if the small size and resulting flexibility and cosmetic advantages are necessary. Although the Paradigm Seismic 12 is very competitively priced when compared to other smaller-sized subwoofers, you still pay a bit of a premium

when compared to many larger, equal or more potent subwoofers, a case in point being Paradigm's own excellent Reference Servo-15. Lastly, some competitive products have the ability to assist in electrically optimizing a subwoofer into the listening environment, such as measurement capabilities and parametric equalization. This is however normally reflected in a larger price tag than the Seismic 12's.

CONCLUSION

The small-profile subwoofer market is becoming a bit more crowded as time passes, but the Paradigm Seismic 12 is a worthy contender in this arena, occupying a valid position in performance and price. I was very impressed at its performance with movies, and also the more difficult task of music reproduction, even when paired with high-end dynamic main loudspeakers. Due to its compact size, one of the most appealing attributes of the Seismic 12 is its ability to be placed in inconspicuous places when the need or desire arises. For those who covet or require the advantages of a small-profile, proficient and potent subwoofer without a heavy cost premium, I highly recommend the Paradigm Reference Seismic 12.