



Meridian DSP5200

Compact DSP Floorstanding Loudspeaker Providing Precision, Punch...And Passion!

John Kotches

Introduction

Digital Signal Processing is a term that should be familiar to just about all of the technologically savvy readers of *Widescreen Review*. A DSP loudspeaker, on the other hand, is something that is somewhat less familiar to our readers.

Meridian introduced the first DSP loudspeaker (the DSP6000) quite a bit longer ago than many realize, when the Compact Disc had just become the dominant media for home audio reproduction in 1990. For those who aren't counting, that's about 15 years. In that time, the DSP loudspeaker family is one that has grown dramatically in size. According to Meridian founder Bob Stuart, for the first few years of DSP loudspeakers' existence, sales were relatively lean and it seemed as though Meridian couldn't give them away. Now they are a mainstay of the product lineup. There are a number of available models covering the entire gamut of sizes, from bookshelf, in the DSP3100, all the way to full-range floorstanding loudspeakers, in their flagship DSP8000, as well as an in-wall model, the DSP420. Meridian's broad range of DSP loudspeakers can fit the needs of nearly any required installation.

The DSP5200 loudspeakers under review were introduced at CEDIA in 2004 and due to tremendous demand, and our need for five identical loudspeakers, it took over a year for the samples to become available for *WSR*.

"I was completely satisfied from shortly after unpacking the DSP5200s, and I dread having to pack them into their boxes."

Cabinetry And Drivers

Rather than taking a conventional approach of using thick MDF for their cabinets, the DSP5200s utilize a sandwich of materials combined together with a phenolic resin compound to provide an incredibly rigid cabinet with solid damping. A side benefit of this is that the cabinet itself weighs somewhat less than a loudspeaker constructed of more conventional materials.

The cabinet gracefully curves inward and forward so that the base is substantially wider than the top. As an added benefit, the non-parallel sides minimize standing waves within the cabinet, which improves linearity of frequency response.

A variety of finishes are available on the DSP5200, with gloss piano black or silver paint finishes as well as traditional wood veneers of satin finishes in Santos rosewood, natural maple, stained cherry, and black ash. The *WSR* review samples were all finished in piano black, which is very well done with a beautiful sheen; the one flaw is that it tends to attract every particle of dust in the room with ease!

The DSP5200 is a 2.5-way loudspeaker with dual 6.25-inch mid/bass drivers and a single 1-inch aluminum dome tweeter. The cabinet is of bass reflex (ported design) with dual rectangular ports at the rear base of the enclosure. Because of the inward tapering of the cabinet, there's an unusual optical illusion that the upper mid/bass driver looks larger than the lower driver. It definitely provides an interesting silhouette and an eye-catching aesthetic view. There's no question that the industrial design is elegant, and one can easily tell it is from the same lineage as the larger DSP7000 and DSP8000.

The back panel of the DSP5200 contains the required connections for the loudspeaker. Rather than the usual binding posts, you're given an array of inputs and even outputs on the loudspeaker. I will cover the



SPECIFICATIONS

DSP5200 Specifications

Frequency Response: \pm 3dB 35Hz - > 20kHz
 Maximum SPL: > 108dB at 1m (music material)
 Amplifier Power: 75 Watts / Driver
 Crossover Frequency: 2.6 kHz, 400Hz (lower woofer only)
 Enclosure Type: Ported
 High-Frequency Driver: 1 x 1" aluminum dome tweeter
 Midrange/Woofer: 2 x 6.25" polypropylene
 DSP: FreeScale 56367
 D/A Converter: Analog Devices AD-1852
 Available Finishes: Piano Black, High Gloss Silver, Santos Rosewood, Natural satin maple, satin stained cherry, black ash

Dimensions (WHD In Inches): 11.8 (base) / 7 (top) x 35.5 x 14 (base) / 8.5 (top)
 Weight (in Pounds): 77
 Price: \$11,000 / pair (DSP5200) \$6,000/each (DSP5200HC or DSP5200VC)

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functionality of these in a later section of this review. There are two digital inputs and a single digital output via S/PDIF connectors. Meridian Comms is available via both 500/800 series DIN connectors and G Series via BNC connectors. In addition, the software on the DSP5200 can be updated via an RS-232 input with a DB-9 connector.

The DSP5200 is available in pairs or singly as the DSP5200VC for floorstanding units. The DSP5200HC is the matching horizontal center channel to this loudspeaker. In this configuration the tweeter is centered between the two woofers.



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¹ Electronic House magazine award for the 42" Olevia (LT42HV). ² IT Week magazine award for the 27" Olevia (LT27HV). ³ About.com award for the 32" Olevia (LT32HV). ⁴ 2005 Electronic House Expo Multi-Room Audio/Video award for the 42" Olevia (LT42HV).

The DSP Difference

Meridian's DSP loudspeaker is a radical departure from a traditional passive loudspeaker and a modern technological take on the active loudspeaker. In a passive loudspeaker we have passive parts, including inductors and capacitors, which are used to build the crossover between the various drivers in a loudspeaker. This keeps the drivers from being presented with signals outside their optimal operating range. The problem with this approach is that it is electrically inefficient. You end up losing a substantial bit of your amplifier's power driving through these passive components to get to the drivers behind the crossover.

Enter the active crossover/loudspeaker, which replaces the passive components with an electronic crossover separating the full-range signal into discrete signals for each driver in the loudspeaker. In an active loudspeaker, the discrete signal is sent to an amplifier, which is usually dedicated to a driver. Here there is no electrical loss through the electronic crossover, which nets you effectively greater power from your amplifier section. How much more? Typical passive crossover losses are between three and four decibels, which means you have now doubled or tripled the amplifier power. You get the equivalent of a 200- to 300-watt amplifier with a 100-watt amplifier in an active loudspeaker.

In 1990, Meridian brought loudspeakers into the digital era with their DSP6000. Instead of taking a line-level input from a preamplifier, a digital output is fed into the loudspeaker. This was originally from a CD player; however, for our readers it would be a preamplifier/processor with a digital output via S/PDIF. Now the signal travels in its most robust form (digitally) from source through processing to loudspeaker. Instead of electronic circuits, a DSP (the Motorola 56367) handles the crossover duties. In the digital domain, you have better control over the crossover than you could otherwise have in the analog domain. Do you want asymmetric crossovers with very steep slopes? No problem. Phase perfect? Of course, you can build this if you want. This is a given when performing crossovers in the digital domain. But that isn't enough, and the current generation of DSP loudspeakers (all of the family) share substantial additions beyond the rudimentary splitting of signals out to the various drivers in the loudspeaker.

So, just how is the crossover implemented in the DSP5200? Very well, would be a cheeky response and not very helpful. The answer is that the crossover doesn't exist in the traditional sense. Instead, the input signal is processed with a Finite Impulse Response filter that approximates the performance of

an 8th order Linkwitz-Reilly crossover. This produces 48 dB/octave complementary high- and low-pass slopes at 2.6 kHz. There are very slight nonlinearities as compared to the traditional LR crossover for the high-pass side, but these filter artifacts are so far below practical limits (more than -130 dB below a full-scale signal) that they are inaudible to our ears. I imagine exceptionally good test equipment can pick up the artifacts. By using steep crossovers you can utilize the drivers much closer to their limits while avoiding resonant frequencies and breakup modes without additional filters that might otherwise be necessary with additional EQ or other filters.

I mentioned earlier that this was a 2.5-way loudspeaker, but I haven't mentioned the how or why of this, so I guess now would be the appropriate time. The how is quite simple, using an effective technique that has been tested throughout the ages in loudspeaker design—believe it or not, it's an analog filter. Even Meridian, with their digital prowess, uses analog filters from time to time. In this case, this is the appropriate tool for the job, so on the lower woofer a first order (6 dB/octave) low-pass filter at 400 Hz is applied just prior to the amplifier stage. That covers how, but why would this technique be used? Comb filtering is the answer. Because the distance of the lower woofer could create comb-filtering effects with the tweeter, this gentle low-pass filter is utilized to bring the driver's output below a level that it will have any detrimental interaction with the tweeter, due to their distance in the very narrow crossover region. By the time the lower woofer has hit the crossover frequency, its output has lowered by roughly 15 dB (or a factor of 30), which means that it is an insignificant contributor to the output at the crossover frequency. The concept of a 2.5-way loudspeaker is not unique to Meridian, however, their particular implementation with the DSP main crossover, plus the analog filter prior to the amp definitely are. Meridian uses similar techniques in their larger DSP loudspeakers (DSP5500, 6000, 7000, 8000) to control the multiple woofers and prevent comb-filtering across as many as six woofers per cabinet in their flagship DSP8000 loudspeakers.



One of the more interesting aspects to me is that each loudspeaker can be set for boundary gain compensation—the on-board memory can store correction curves based on close proximity to side wall(s), a back wall or even corner placement. Ideally, of course, you'd want the loudspeaker to be freestanding, but being able to compensate for the low-frequency effects of a boundary allow for much more flexible placement in the real world. As incredible as WSR's Reference Holosonic™ Spherical Surround™ Home Theatre Laboratory is, very few can achieve a space like it, even when it is designed from scratch for the task.

Another function available is an axis control, which sets the height of the listener with respect to the tweeter, with 0 placing the listener on axis with the tweeter. Setting the axis value below 0 indicates listeners are seated below the tweeter and above 0 indicates seating above the tweeter. An additional treble tilt is provided for the Center channel in a DSP loudspeaker system to compensate for placement above a television.

More "mundane" features such as treble and bass controls are available when the DSP loudspeaker isn't used with a Meridian processor. In addition, sources can be configured to give a semi-customized display on the integrated LED unit. Volume control is also available on the LED unit. Fortunately, the display can be blanked for those of us with a darkened theater environment.

Beyond The Basics

All of this is quite nice, but there's even more going on under the "hood" of the DSP loudspeaker. In addition to crossovers, each

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- Gary Reber, WSR Issue 108

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"One thing is certain with all these observations: the Sunny cable is easily the finest cable to have graced my system ... The Sunny Supreme has taken my system to that magical place that is rare indeed."

- Clement Perry, March 2006





Hooking Up The Meridian Digital Theatre™

Usually when purchasing a Meridian Digital Theatre (MDT from now on), the dealer you purchase from is also going to provide installation assistance. When a reviewer gets review products, especially a full MDT, one of Meridian's technical staff usually shows up to help with the installation and setup. This time, I had to brave the install on my own. Falling back on hackneyed cliché, I'll say that connection of an MDT is not rocket science, but it is more complex than hooking up a standard pre-amp/processor with a power amplifier and loudspeakers.

Luckily for me, I received the DSP5200s on a Friday late in the afternoon, and I had all weekend to get the MDT running. I had zero experience in doing so, and it took me about three hours from uncrating the loudspeakers until I had the MDT producing music. This was for a "by the book" installation with the center channel as the master loudspeaker. To get the installation configured as I wanted to, I did have to pick up the phone and call for a bit of help on the following Monday, and about 20 minutes later I had my front left loudspeaker running as the master loudspeaker. For those who are interested in the nuts and bolts of connecting up DSP loudspeakers with Meridian Comms via digital outputs, please look at the online version of this article.

Loudspeakers also need to be configured for their individual role in the MDT (master/slave and Front L/C/R, Side/Back L/R). This is accomplished in a matter of moments with the Meridian System Remote. In addition, the loudspeakers are configured to be near boundaries, and sources have limited renaming capacity from an available table of names. It would be nice to have the text string for renamed inputs passed from the Meridian controller to the source, but this is not done. Also, it would be nice to have the volume display kept in sync with the processor so that volume display is always the same at the processor and speakers, instead of just 0 to 99 levels on the loudspeakers. This is not the end of the world, it's me being nitpicky.

When calibrating loudspeaker levels on

the MDT, you cannot adjust levels above 0 dB. In the end, you are setting the level of 0 dB FS (full scale) in a digital system, above which you will get distortion. Therefore, all adjustments must be an attenuation from 0 dB. This is not a big deal, as you simply employ the strategy of setting your loudspeaker with the lowest level at 0.0dB, and then match all other loudspeakers to this loudspeaker. It's not something that is covered in the manual, but it only took me a few moments to figure out.

Exploring The Sound

AIX (and Mark Waldrep) produces some of the most natural-sounding discs around for DVD-Audio, and the only negative comment I can make is that there aren't enough of them available. I pulled out Paul Williams' *I'm Going Back There Someday* and listened to the duet with Willie Nelson, "The Rainbow Connection." With each artist to either side of center and each instrument in the mix clearly delineated, the DSP5200s got every nuance of the recording down pat. From the slight hesitance in Nelson's guitar solo to the (thank goodness) lack of any processing on the vocals, you hear these musicians in their natural state. Because the DSP5200s don't sugar coat anything, the vocal imperfections and camaraderie between Nelson and Williams came across loud and clear.

From the acoustic to the rock opera, the DSP5200s just keep on doing their job faithfully. Changing gears, we go over to Queen's *A Night At The Opera* and "Bohemian Rhapsody." This disc features mix elements such as 10-foot wide pianos and drum kits, choruses that pan from right to left incrementally, quadraphonic placement followed by anchored center lead vocals, to name a few. All of these and the DSP5200s got to them all with aplomb. This is an incredibly layered mix, and if you aren't paying complete attention, you're going to miss something somewhere.

After that energetic choice, I chose to calm down some and explore the DSP5200s in a stereo context for a few selections. Bob Mintzer's *Camouflage* is a disc I've used for about as long as it has been out for system evaluations, with "Long Ago And Far Away" (a tenor feature ballad) one of the best tracks on the disc. Here, the boundaries of the room are completely forgotten as the DSP5200s produce an image that seems to dramatically exceed the walls. In addition, the image height produced is something that caught me by complete surprise, as each track was lifted up into the room away from the plane of the loudspeakers. It is important to note that this

effect was not limited to stereo reproduction, that's just the section that I happened to note the effect. Further, this occurred with the tilt control set to zero.

To me, The Eagles' *Farewell Tour Concert* DVD isn't as good a performance as the original HFO—the band is 10 years older (so am I), and I think that the years are showing somewhat in the performance. "New Kid In Town" has great use of the entire surround mix, and the DSP5200's highlight each detail—the core band up front with supporting musicians in the surrounds. You can hear the effects of time on the voices—notes that were once easy to hit aren't as easy anymore. There's a little bit of strain as Glenn Frey enters the last verse "There's talk on the streets, it's there to remind me...." The timbre of Steuart Smith's Stratocaster® is appropriately smooth, and the unique timbre of the Fender® Rhodes Seventy-Three electric piano comes through crystal clear.

I'm not sure why, but whenever I sit down to type a review it seems as though I catch the same films in HD. So, I sat down to watch a segment of *The Day After Tomorrow* and was reminded why I enjoy

this film. I know, not great or engaging content but sometimes it's great to just check your brain at the door and enjoy the spectacle of a popcorn flick! I was captivated by the mellowness of the brass choir of the opening score along with the rich presentation of the string section. Shortly thereafter, as the Larsen B Ice Shelf breaks off, the high-frequency and midrange presentations are delivered with pristine clarity. I'm left wondering how much better this could be with a lossless soundtrack. During this scene, the interplay between score (rising tension) and sound effects along with dialogue are kept in perfect proportion. The DSP5200s made me much more keenly aware of the various soundtrack elements, from score, to sound effects, to dialogue, all mixed together to deliver a desired result. Later, as the Statue of Liberty is covered by waves (and mayhem ensues), the right to left imaging elements mirror the screen action as the waves pass from right to left on screen. This section has some very high level SPLs (about 102 dB on my meter), and at no time did the DSP5200s provide even the slightest hint of harshness or strain.

Conclusion

Many audiophiles cringe at the thought of all these bits being passed around and used to produce the sound, but the end result is nothing short of spectacular. Simply put, this is the "way of the future" and Meridian has been blazing the trail for some 15 years now with their DSP loudspeakers. I was completely satisfied from shortly after unpacking and setting the DSP5200s in their place, and I dread having to pack them back into their boxes to ship them back. What scares me (in a great way) is that there are currently four loudspeakers higher than this in the Meridian DSP loudspeaker lineup. Were I not a reviewer having to work with traditional processors and power amplifiers, I know that DSP loudspeakers would be the solution of choice. If you add up the cost of my current reference loudspeakers, amplification, and (yes) cabling, the price isn't that far off from the DSP5200s. ■



driver is individually equalized to provide a greater linearity than would normally be possible by traditional passive means. All of this is done with custom written software developed over many years by Meridian's staff of DSP engineers.

Because of the luxury of working digitally, drivers can be precisely time-aligned through the use of precision DSP routines obviating the need for complex cabinet construction just to get the driver voice coils time-aligned. Further, these are digital signals, and buffering is provided on input so that jitter is minimized within each loudspeaker.

All of this is well and good, but there are potential copy-protection issues that come about when faced with sending high-resolution digital data streams around, so the digital output is encrypted with the Meridian High Resolution algorithm. This is mandatory when transferring digital streams above 48 kHz and was always on, since I was using a Meridian 861 processor as my reference unit. Besides content protection, MHR has reported audible benefits—the randomization of data removes cyclical components from the raw PCM data which is said to provide audible improvements. Since I could not compare MHR on and off in quick succession, I cannot validate the statement.

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