

# the absolute sound

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## THE CUTTING EDGE



## Steinway Lyngdorf S-Series System

Perfection Itself

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**T**he Steinway Lyngdorf S-Series System is a revolutionary audio product. It sets a new standard for what is possible in a compact and rationally priced system. But the true revolution is that the S-Series System redefines not just what a stereo system can do but what it ought to do. In effect, the S-Series System produces in an ordinary room without acoustic treatment the kind of sound that was formerly only available in RFZ (reflection-free zone) systems in purpose-built rooms.

Revolutions have precursors. The corner-woofer system used in the S-Series System is similar in concept to previous corner-woofer setups from TacT and Lyngdorf (which were, to begin with, a single company). And decades ago Jorma Salmi of Gradient started designing a series of speakers that minimized early reflections and emphasized direct arrival, in at least one of which (the Revolution) the speakers could be placed against the backwall, as the mid/treble units are in the Steinway Lyngdorf S-System. Even before that, Roy Allison was designing speakers to be placed against room boundaries—walls or corners—as did AR with the famous LST.

But the S-Series System is the first to put it all together—corner woofers, wall-mounted speakers, DSP room and speaker correction, integral digital amplification—in a single, unified, and easily-set-up-and-operated system. All you need are source components. The S-Series System does the rest and in a most extraordinary way.

### Sound in Rooms in General

To understand why the S-System is indeed revolutionary in its sonic nature, think first about live experience. (I am writing this in the middle of one of my orchestral rehearsal-and-concert weeks, so I am coming off the direct experience most immediately, and it is much on my mind and in my ears.)

One of the most striking aspects of live, acoustically generated sound, and one of the hardest aspects to reproduce, is the extraordinary clarity. Audio people tend to think of clarity as attached to higher frequencies. But the truth is that live sound is clear all the way down. Violins and triangles and cymbal crashes can be reproduced clearly enough. But cello and bass sections

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and trombones have a sense of definition and clarity in real life that almost always escapes reproduced sound.

Everyone has noticed this for a long time and wondered why this clarity and definition is lost and how to get it back. Odd ideas have arisen. First there was the really peculiar one that it had something to do with amplifiers, when in fact good amplifiers are all but perfect in the relevant frequency ranges. Then there was the approach that one could get the definition back by making the sound lean. The problem there is that real music is not lean. It is, rather, full and warm. What it has is not leanness but definition, and the former can only be a counterfeit for the latter.

People who studied this problem systematically rather than just speculating about it arrived long ago at the conclusion that the problem arose from the interaction of speaker and room. Anechoically, the speaker and its driving electronics were doing the job [see the Gradient experiments described at <http://www.regonaudio.com/Audio%20in%20Modern%20Times.pdf>].

But in the room, clarity and definition below about 500Hz were lost. Ever wonder why magazines that show measurements stop their “waterfall” plots around 300 or 500Hz and show only what is above that? And why these plots are quasi-anechoic? The reason is that the in-room waterfall plot below 500Hz is usually a complete disaster to the point that there is almost no point in looking at it.

Above 500Hz, the performance is significantly better. The in-room match between the two channels of a directional speaker can be almost perfect: Put one speaker out of phase with the other and play the two together and the signal can almost cancel at the listening position. This is real room-independence. But most speakers do not even manage that and further down most do not manage much of anything. Everything is awash in room sound and, in particular, in early reflections.

The word “early” is crucial here. In one theory, stereo ought to have no reflections at all. But in practice, this does not work out, at least not the way stereo recordings are actually made. Odd effects arise in anechoic stereo. For one thing, a close-miked vocal—and they are everywhere in recordings both classical and popular—tends to appear right at the end of one’s nose or even inside one’s head on playback. (It is interesting to note that vocal recordings made at a natural distance, such as the Simax recording of Grieg songs [Simax PS1011], sound completely different and much more like live vocal solos. But there are few of them.) For better or worse, stereo recordings are actually made with the anticipation that there will be some room sound at least of a diffuse sort to fill things out and generate a sense of sound-space.

On the other hand, if some overall room sound is needed to make ordinary stereo recordings sound plausible, the role of early reflections is more debatable. Sidewall reflections can add a sense of space and can do so without affecting timbre. But early backwall reflections tend to add confusion, partly because they come from essentially the same direction as the direct arrival.

Think of it this way: If your speakers are three feet from the back wall, then you are hearing your speakers accompanied by, in effect, a virtual second set of speakers set behind the first by six feet, six feet being the round trip from the real speaker to the backwall and then to the speaker again. In the real top end, a box speaker can put out rather little rear-firing energy, but further down in frequency there is a lot of “back wave” and in the bass, the speaker becomes omnidirectional—sound every which way.

Would you really want a second pair of speakers back six feet playing the same music? I would take it for more or less obvious that you would not!

The S-Series System gets rid of this source of confusion, gets rid of the back wall delayed reflection altogether by putting the speakers against the wall to begin with. One gets much of the definition of purpose-built RFZ rooms, with their specially angled and damped room boundaries, and one gets this without any special room construction or even acoustic treatment. The S-Series System is in fact intended to work in perfectly ordinary rooms. Heroic room treatment is neither asked for nor even desirable here.

## How the S-Series System Works

In attempting to get rid of reflections off the backwall, it is clearly natural to put the speakers against the wall. This will make the reflected sound and the direct radiation almost coincident in time and make the ear/brain treat the two as one acoustic event. But this natural idea is difficult to execute in practice because the proximity to boundaries introduces colorations unless the speakers are very thin, or in the wall itself. There is a complicated interaction that is frequency dependent between the wall reflection from behind and the direct sound and this causes irregularities in frequency response.

Enter digital signal processing. DSP can deal with the induced response irregularities. One can take the boundary-loaded system and simply make it flat. This will, of course, work best if the speakers involved are designed for it. The interaction between a wall and a speaker placed against that wall will be especially troublesome if the speaker is deep and hence has a front that comes out from the wall a long way. But if the part of the speaker producing the mids and highs is thin, this problem is diminished. DSP correction becomes relatively simple to do and the results are consistent with respect to listening-axis variation. In the S-Series System, the mid/treble satellite units are just three inches thick.

The bass in the S-Series System is handled by a pair of box woofers, one in each corner adjacent to the wall where the satellite units are mounted. DSP makes possible exact time alignment between the woofer and the satellite mid/high unit. (Crossover is at 300Hz). The user provides the DSP processor with the measured distances to the speaker units, and the DSP does the rest. Everything is in phase when it arrives at the listening position! Note that the woofers and satellite units do not need to be particularly close together. The woofers can be and should be placed in the corners, while the satellites are to be placed some distance in towards the center of the wall, not in the corners themselves. DSP lines up everything in time so integration is no problem.

The satellites have wide horizontal dispersion and, indeed, have a special (patent-pending) “tweeter dipole” arrangement that spreads the tweeter backwave out to the sides, in effect along the wall. This gives wider radiation of the highs into the room without creating any substantial discrete early reflections from the backwall. And the whole arrangement makes the speaker have the kind of interaction with the wall that can be DSP-corrected very effectively. Nearly absolute neutrality is in evidence here, with the best setup (which in my room involved angling in the speakers slightly from the flat-against-the-wall position).

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Put all this together, and the sound arrives at the listening position with, in effect, no backwall early reflection at all and with everything lined up in time as well as correct in frequency response. I and other people have discussed previously the glorious bass of corner woofers with DSP correction. (Among other advantages, the corner position makes for a lot of room gain so that the relatively small woofers here can plumb the depths and do so without strain and with minimal distortion.) In the S-Series system, the benefits of boundary loading and minimized reflection apply not just to the bass, but also to the higher frequencies. All the way up, in fact.

## Does It Work?

Audio is full of theories of how things could work or ought to work. But far from all of them work out in practice. The theory of the S-Series System is one of the ones that does work. The sound from this system is all but unique (“all but” because of the RFZ room experience—not a practical alternative for the home). The Gradient 1.3 and Revolution come close but lack the bass power and extension. The resulting unique sound may come at first as a bit of a surprise. But there are aspects of it that get one closer to live experience than any other system that does not similarly suppress the backwall. Listened to with an open mind and ears, it is a revelation.

Some specifics are in order. First, the system with its RoomPerfect room correction is, as noted, very smooth and flat in perceived response. The RoomPerfect system is built in—no computer connection required for setup or use—and it is easy to install, with a self-guiding menu in the system itself. What to do next appears on the screen that ordinarily shows volume level and input and voicing settings. One just punches buttons on the remote and moves the supplied microphone to suitable positions and it all works, fast and easily.

The result is an extraordinary neutrality over the bass and midrange in particular, this being the part of the frequency range where more ordinary speakers are most often messed up by room problems. Part of this has, I think, to do with the fact that the wall-mounting eliminates the baffle step, the transition from omni to primarily forward-radiating that in narrow-front speakers usually happens in the midrange. Wide-front speakers have a great advantage here because the baffle-step frequency is pushed down to the point where it causes minimal coloration. And of course the wall is the largest baffle of them all.

Moreover, the system has a truly extraordinary dynamic range for a compact system and this dynamic range applies over the whole frequency spectrum. The tweeter in particular, a version of the Heil air-motion transformer (AMI), has extraordinarily low distortion up into SPLs that would have domes crying for mercy—or frying. The Heil has always been a great tweeter for low distortion—but in earlier versions that I have encountered from other manufacturers, it was not really flat, tending to take off in the top and be somewhat irregular lower down. With DSP in place, these problems are obviated. (The upper frequencies are DSP'd to flat in the A1 amplifier, but then RoomPerfect DSP is applied on top over the entire frequency range from 20Hz–20kHz.)

The top here is smooth and extended, very, very clean and unstressed by anything. And on-axis it is extremely flat and very smooth in overall (room) response. As befits a system with the

Steinway logo on the front, pianos are reproduced superbly well, with not a hint of the subtle but definite “shatter” that many tweeters add to the top notes of the piano when they are struck hard. Freddy Kempf's Kreisler/Rachmaninoff “Liebeslied” on Bis, one of the most remarkable piano recordings around, sounded stunningly realistic and gave one the impression not just of hearing a generic piano but of the specific piano involved. The sense of instrumental identity was all but unprecedented.

The corner-woofer bass is suitably full and powerful when power is called for and it is very clean. And the integration with the mids is complete—the time alignment of the woofer and satellite relative to the listening position really works! In fact, the whole system works for coherence and neutrality far better than most speakers, and indeed works nearly perfectly. The transition from woofer to mid is seamless, and the transition from mid to tweeter is all but uncanny in its coherence (crossover at 2kHz). According to Peter Lyngdorf, this coherence was accomplished by making the mechanical/passive crossover design as nearly perfect in time and energy response as possible and then correcting the frequency response by DSP.

This is something not really do-able via passive analog crossover design alone, and it works a treat. Eyes shut, you would swear that the mid and tweeter were a single driver.

While the S-Series system is superb in these categories, it is the consequences of the absence of early back-wall reflections already discussed that makes the S-Series System not just superb but unique. One of these consequences is a much increased resolution in lower frequencies and mid frequencies, the solution of the problem of clarity in the lower frequencies I talked about above. With cello sections and doublebasses, tremolo now sounds like a tremolo, not an undifferentiated rumble. Bassoons actually have trills that sound like trills. Tympani parts have an unprecedented definition and realism. And further up, the resolution continues. Trills on clarinet and oboe have the definition and punchiness they have in reality (try the Scherzo of the Dvorak *New World* Symphony on Delos). But none of this is purchased at the price of making

## SPECS & PRICING

**Drivers:** S 15 satellite mid/treble speakers with one 5.25" mid driver and one AMT tweeter per channel; S210 corner woofers with two 10" drivers per speaker

**DSP:** SP-1 stereo processor, functions as preamp as well; multiple digital and analog inputs; remote control of volume, voicing choices, and inputs; plus built-in RoomPerfect setup with self-explanatory instructions on display screen

**Amplification:** A-1 digital amplifiers, links to SP-1 and Speak-on connectors supplied  
**Price:** \$30,720 (complete system)

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the sound too lean or exaggerating any particular frequency range. One can hear into the music in the mid and lower frequencies in a way that escapes most speakers entirely. And the result naturally sounds more like live music.

One also hears into the recorded space better. People are perhaps used to interpreting their own listening room and its reflections as part of the recorded space (how else could a system give every recording a “soundstage?”). This sort of thing is of course an artifact of the playback and not a recreation of the original venue as such. With the S-Series system, one hears not this room-generated soundstage but the real recorded space, the original venue to the extent that it has been recorded on the recording.

The effect is, on many recordings, to create the sense of the images suspended in space with a definite angle but with a slightly indefinite front-to-back position. This is, of course, what one hears in concert reality for anything but extremely close-by sources. This is the sonic truth, in short. But if you are used to thinking that the reflection-generated soundstage is real, you may find this higher truth somewhat surprising. You’ll get used to it, however. Reality is the ultimate attraction. And good orchestral recordings sound here very much like real orchestras.

But it is not just big things that work well. The exquisite “Two Sleepy People” from *Time for Love*, the Julie London collection from Rhino/WEA, always sounds hypnotic in musical terms, something to play over and over. With the S-System it also sounded amazingly natural, amazingly close to the actual sound of a human voice (and what a voice).

One thing that was striking in addition to the naturalness of the midrange on this recording as well as all others was that while the S-Series System is flat and also highly resolving, the extremely low distortion of the tweeter actually makes the system forgiving of recording problems. On the recording just mentioned, London’s quiet, rather low-pitched voice makes no strain on tweeters, but Liberty was not noted for the smoothness of its violin sound. The wiry edge the violins they can have on other systems was made much less annoying and altogether less obvious by the perfect behavior of the tweeters in the S-Series System. In the setup I was using, with the satellites toed-in to face the listening position, the treble first arrival was essentially ruler flat. The reduced edginess was not roll-off of high frequencies but purity of them!

## Overall System Balance and Target Curves

The S-Series system’s DSP processing allows for some adjustments. But before describing those, let me describe the overall balance. RoomPerfect, the room-correction algorithm that the S-Series uses, is intended to produce not a flat steady-state response in the bass but rather a slightly rising—total up around 5 to 6dB, typically—corresponding to the normal room gain of speakers in rooms. All recordings are balanced with this gain in mind, and steady-state flat response in the bass sounds too lean on almost everything.

What RoomPerfect does is keep the overall usual effect of room gain but smooth it out. The system has no boom and no “holes” in the response.

Now audiophiles tend to be accustomed to the typical floorstander’s bass, which has a boom at some frequency between 50 and 100Hz, a big hole somewhere between 100 and 300Hz from floor cancellation, and a projected midrange above that,

often followed by a fairly extreme dip between 2 and 5kHz and a rising (on-axis) treble above that. If that is what one is used to, the S-Series will be a shock of revelation of truth. There is no boom; there is no hole above; the midrange is smooth and unprojected and so is the treble from, say, 1kHz on up. In my room with the satellites toed in, it is truly flat in direct arrival and correctly rolled off in power response (overall room response).

Almost everyone who has tried DSP room correction has had this experience of revelatory smoothness, especially the satisfaction of hearing the hole filled in—satisfaction for people who know what music sounds like anyway! But here it is especially convincing in being combined with the suppression of backwall reflections.

This is the overall shape of the balance of the system. But the detailed nature of the response is adjustable by a choice of “target curves.” These are “neutral”—the balance just described; “music,” which introduces a BBC-style dip in the 2-5kHz region; “soft” which shelves down the treble from 1kHz on up (smoothly down of course); and “open,” which reduces the lower frequencies and gives something closer to flat steady-state in-room response in the lows.

In my room, which is rather dead in the higher frequencies, I tended to use “neutral” or sometimes “music” on most recordings. Occasionally, on really bass heavy material, “open” was worth a try. “Soft” was really called for only on truly aggressive material, since, as already mentioned, the extremely low distortion of the tweeter made high-frequency energy rather more tolerable than is usually the case. (On most systems, I am a considerable fan of turning down the treble on a lot of recordings. Here this was needed rather less often on account of the ultra-pure top end.)

Perhaps this sort of thing makes some audiophiles nervous. They want to hear “what is there,” without regard for the fact that playback does not really have a true paradigm in detail that is anywhere near as precisely defined as the threshold of hearing frequency-response differences (about 0.1dB) and that sensible adjustment of balance to suit recordings is just that, sensible. But if you feel diffident about changing anything, just set the system at neutral and forget the target curves.

Personally, if I were seeking the ultimate system, I would add an outboard DSP device. Useful and well thought out though the target curves are, no system with only a few such choices can possibly accommodate all the vagaries of recordings. At the risk of seeming neurotic, I myself like to be able to get in there and do it myself, fix what went wrong in the mix in detail. But outside of that kind of obsession, the target curves of the S-Series processor will enable you to get almost all recordings to sound very close to as good as they can sound.

## Limitations

At this point, it would be traditional in my review format to add a sequence of objections, perhaps of a somewhat devastating nature. That is not going to happen here. There is nothing even remotely devastating to say about the S-Series System and the positive comments made so far stand without reservations of any substance. Properly set-up, the system does very much what it is supposed to do. And the results are spectacularly musical and accurate. What limitations there are are primarily in the nature of things, rather than in the design and execution of the system as such.

For example, the S System is a point-source system. And as point-source systems always do, it does its magic best if one is

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positioned at the correct height. It sounds quite well-balanced almost no matter where you are, but correct vertical positions brings things into ideal focus. Moreover, point-source imaging sounds rather different than line-source imaging. The sense of images floating vertically that line sources give is not given here. Not that the system particularly compresses things vertically. Actually it does this rather little compared to some point-source speakers (especially midrange-tweeter-midrange arrangements).

But it does not sound like a line source, and it lacks the sense of physical scale that line sources can produce. Whether this sense of scale is really there on the recording is a tricky question. And the S-Series point-source S15 satellites can be placed quite far apart without problems of centerfill or hearing the speakers as sources, on account of their uniformity of radiation pattern and this produces a convincing sense of large space, when such is on the recording. But the point-source S-Series System still stops a bit short of what is possible with line sources. If money is no object and large scale is your ambition, or perhaps your hubris, there is a line-source version of the S-Series, but it is of necessity much more expensive. Lots more drivers!

Second, there is the practical problem that one needs a suitable wall, with available corners for the woofers and a space to mount the satellites against the wall without clutter near them and a solid wall (i.e., not a window) behind them. This can take some looking for in many home. But most people can turn up something.

Incidentally, the S-Series System also has analog inputs, the input signal being digitized to a 100kHz sampling rate. This sounds fine, and one cannot have DSP without making analog signals digital. (It is worth it, whatever you might think *a priori*.)

### Summary

In the end, one has to ask, does the reflection-free setup of the S-Series System sound better? Closer to the actual sound of live music? Closer in musically important ways? To my ears, the answer is yes. I found that going back to almost any other speaker system seemed to be a return to hearing speaker sound that was more or less artificial in a way that I was not hearing with the S-Series System. The S-Series System sounds more like music, less like sound from speakers, no ifs, ands, or buts about it.

I have in fact been to get rid of this issue of sound off the walls

forever, ever since I got serious about audio. For this purpose, I have usually sat quite close to rather large, wide-front speakers. In this setup, close to wide speakers, one cannot move much, but at least one does not hear so much of the room around. The S-Series System gives this effect of suppressing the room around even more and in a more natural listening setup, over a larger listening area and with more stability. (The “nearfield” experience of sitting close up really requires a virtually “clamped head”; this is totally unnecessary with the S-Series System.)

Two things do especially strike me and did throughout. First, the S-Series System really does do what it sets out to do. Most speakers look rather haphazard in their design by comparison, a sort of “cast your bread upon the waters and hope that the listening room will help out just the right way” approach. The S-Series System takes the room out of the equation enough that it will sound very much the same and very truthful in almost any room. (I heard it in a quite live, not very diffusive room at a Steinway Lyngdorf showroom demo, and also in my own rather deader and highly diffusive audio room at home. The same neutrality was evident in both contexts.)

Second, while the system is hardly a budget item, it reaches a level of performance that is startling for the price. Not to put to fine a point on it, the S-Series System sounds to me more musically accurate and truthful to the material than many, in fact most, of the ultra-high priced systems I have encountered, and does this at a far lower price.

Successful revolutions tend to offer a challenge to older regimes. This one surely does. I hope it goes without saying that if you are thinking of spending anything like this amount of money or more on a total system, I think that you really need to listen carefully to the S-Series System first. DSP and its potential for design that makes optimal use of room acoustics have really come of age here.

Many current products have the character of being refinements of the status quo, significant refinements perhaps, but not really fundamental advances. To this picture, the Steinway Lyngdorf S-Series system is a conspicuous exception. It attacks head-on many of the fundamental problems that remain in audio playback in new and startlingly effective ways. And it offers a very compelling vision of the future.

Listen. You have never heard anything quite like it, and you may not be able to settle for anything else. **tas**