

Hsu Research ULS-15 Subwoofer & HB-1 Mk 2 Speaker

Gene Pitts



UNDER THE “NORMAL operating conditions” prevailing in my 13x33-foot listening room, I don’t make a permanent change in my reference loudspeaker system very often, however frequently I might drag some intriguing speaker in for a listening trial. First of all, I am too much of a cheapskate, and the really good systems ordinarily cost out to dollar totals that are in the same

league as car prices. Too rich for my blood or rather my bank account. While I can usually hear the difference achieved by a system with a five-digit price over one with only four numbers to the left of the decimal, if there is one, I’d rather put those dollars into the music, i.e. the LPs, the tapes, the CDs, and now the downloads and computer memory banks for tune storage. I have

frequently quipped that the music is more important than the gear and that I can always tell the difference between Bruce Springsteen and Barbra Streisand. However, I am not too arrogant to admit that sometimes two different speaker designs will sound enough alike for me to confuse them if I am not listening closely. This is particularly true if they have been level matched at perhaps 3 kHz and here I do not mean equalized over a broad band. The other main reason I don't change speaker systems often is that the good ones are big and heavy and I am too lazy and weak to deal with such difficulties if I can think of some sneaky way to get a better result. And that's what I am discussing here, getting good sound inexpensively without much effort.

My first pair of speakers were AR2-ax's from Acoustic Research, and I bought them not long after I graduated college. I bought them one at a time, because audio systems hadn't yet made a total transition to the stereo pair. Thus, one of those ARs had a nice oiled-walnut veneer finish while the other was plain plywood with a white birch (?) surface which eventually got stained and waxed heavily. As I recall, those speakers cost less than \$130.00 each and were generally considered to give their big brother, the AR3, a good run. The AR3 could play louder and do more "justice" to lower notes, i.e. open E strings at 41 Hz from a rock 'n' roll bass. Eventually I replaced the ARs with ADC 303Ax speakers, having come under the tutelage of George Tillett, who was editor of Audio Magazine just before me and who went on to do engineering at ADC. His non-stereo home reference system used a single Quad electrostatic that sat about five feet away from his listening chair and was aimed directly at his feet which were usually propped up on an ottoman during listening sessions. I never cared much for the sound from that Quad, as it was beamy in dispersion and could not play very loudly without arcing in a disconcerting manner. It didn't do bass well either, but the mids and highs possessed a wonderful air and characteristic sweetness rarely matched since. And how long ago was that Quad came into use? Sixty plus years?

Anyway, I have come to believe that the most cost-effective way for cheapskates like me to do a home system is to use a subwoofer with a pair of satellites, though it's better with two subs if you can afford the cost and the space. There usually is stereo signal down in the 20 to 80 Hz range, but few civilians knew that until CDs came along. The uninitiated also think that subwoofers merely add on some few nearly irrelevant bass notes, ones that an ordinary floor-standing speaker can handle at least passably. Even if they are using cheap and smallish monitors, they seem to think, "why bother?" or "not worth the expense." The short and quick response to this churlish attitude is that one gains another 20 Hz or more on the low end, the equivalent of the difference in musical note output between the AR2Ax and the AR3. Or between a string bass and no bass. There is a lot of left-hand piano down there too, not to mention some important organ notes.

But there is MUCH more to the question. Adding a sub helps in quite a few ways, ones not widely known or expected. First, there is the big increase in overall loudness, where the whole system simply plays MUCH louder, without distortion, and you find yourself playing it more loudly without realizing it. Then there is the much improved accuracy of instrumental timbre, and



this includes both men's and women's voices. One would think that two satellites would have precisely the same timbre whether connected up with a sub or not. Not true. At first I didn't believe what I was hearing because the primary tones in these voices are well above the crossover frequency out of the sub. What happens is that the low bass notes no longer interact with the higher notes to produce what is essentially IM distortion.

It appears that most buyers of three-piece systems focus almost solely on the satellites, items like the justly famous BBC monitors, and don't think much about the subwoofer, about what it does and how well, let alone how well it integrates with the satellite. This last is a tricky proposition because there are many, many aspects of performance to match up. It seems like a parlor trick when the satellites are connected up in the three-piece mode and all of a sudden are producing much less distortion than they did when played as a stereo pair. This has to do with NOT hitting them with a low blow, i.e. bass notes lower than they really can handle whatever their specification says. It has been my universal experience that the satellites sound cleaner,

NOTES

Hsu Research, 985 No. Shephard St., Anaheim, CA 92806; www.hsuresearch.com; 800/554-0150; sales@hsuresearch.com.

ULS-15 Subwoofer

Bass Extension: 15 Hz, ± 0.5 dB.

Woofer Diameter: 15 inches.

Amplifier Power: 1000 watts short term.

Crossover Frequency Range: 30 – 90 Hz, by-passable.

Crossover Slope: 24 dB per octave.

Crossover Type: Linkwitz-Riley, low pass only.

Phase: 0° or 180°.

ULF Trim: 16 – 50 Hz.

Dimensions: 18 inch cube; feet add 1 inch; grille and heat sink add 1.5 inches.

Shipping Weight: 84 lbs.

Price: Rosenut real wood veneer, \$1199.00; satin black, \$1099.00.

showing much less distortion, when used with a sub and a decent crossover.

But let me describe why I really did need to fix or upgrade my system. One day, it appeared that the satellites were not playing well, that one of them was at a lower level than the other and both were distorting. I had put them into my system, which has used a sub for more than three decades, only about two years previously, replacing another pair of satellites from the same maker on which the foam surrounds on the woofers (midranges, actually, in the three-piece system) had failed on both sides. Doing the standard logic, I switched cables from the output of the sub, but no

MIT as an engineer, and caused something of a stir around the Boston Audio Society with his first sub which used what was essentially a large mailing tube for the speaker cabinet. It was extraordinarily cost-effective and truly innovative! To my judgment, his subs are still as cost-effective and innovative. I will say that his ULS-15 is rather more stylish than a mailing tube; the reason I can write this with great assurance is that my wife gave it a top-of-scale Décor Score by not even noticing it had been introduced into the listening room!

All pro speaker reviewers have a set of “favorite” or “chosen recordings,” usually CDs these days for better portability to shows, and of course I have mine. A

This sort of three-piece system, using a subwoofer and two bookshelf-size monitors, is about as easy on your wallet as possible, yet can achieve GREAT sound!

change. Eventually, I realized that the sub was not playing and that its built-in amp and crossover were gone despite what the pilot LED showed. Apparently, someone had stepped on the IEC-style power cord so that it was intermittently in contact with the sub’s plug; the sudden in-rush of power apparently fried the circuitry. It wound up cheaper buying a new subwoofer, indeed to move up to the Hsu ULS-15, than to try to repair the sub previously in my system, if indeed it could have been repaired. (The maker doubted that was possible, and even if it was, the cost incurred to hire an appropriately good repairman for long enough, not to mention the cost of parts, overwhelmed the difference in the MSRPs of the two subs.)

I have known Poh Ser Hsu, the guy behind the Hsu subwoofers, for a couple of decades and knew of him earlier for perhaps another 10 years. He came out of

reviewer needs to be able to play and replay short track sections of one to three minutes such that the speaker system undergoes a tough test and that the listener can stand hearing this same piece of music perhaps three dozen times on each day of the show. With a subwoofer, one wants the music (no, not test tones) to go down to the bottom. The lowest musical note I know of is the 16 Hz pedal on the Saint Saens: *Organ Symphony*. It isn’t that low on every recording of the Saint Saens, but you can find it on the Boston Audio Society’s Test CD-1. Micha Schattner supplied the excerpt from the second movement (Poco Adagio). It was performed by the Boston Civic Symphony and conducted by Max Hobart in Boston’s Jordan Hall 1983. You can obtain a copy by joining the BAS. In addition to the piece of organ music, the CD has a test tone, a slow downward sweep from 80 to 10 Hz. One point of such testing is to find out whether the speaker under test does get down that low or simply cuts out at some intermediate point. The other point is to reduce your dry-cleaning bills.

Because of my listening biases for these long-term sessions, I favor a 1982 recording of an acoustic double-bass, a Kontrabass, from Gary Karr whose instrument is a 1611 Amati which formerly belonged to Serge Koussevitzky. Karr is accompanied by Harmon Lewis playing the pipe organ in the Vega Hall of Takarazuka-shi, a spa hamlet about 20 miles from Osaka, Japan. Originally on King Records, the title is *Adagio d’Albinoni* and it runs nearly nine minutes, though a reviewer needs only about the first 2-3 minutes. There is also a wonderful *Ave Maria* from Bach-Gounod. The Vega Hall sounds like it’s a church but that might be an illusion because of the nature of the music. It is a mildly wet recording, which is to say one can hear the room, hear the bass bounce off the back wall when Karr and Lewis stop. Karr’s bass stands in front of the Lewis organ by a good distance, and it has been astonishing over the years to hear how very differently the timbre and placement of this fine instrument are handled. In one case, a celebrated top-of-the-line French speaker “added” ripples to the organ’s bass pedal line which was absolutely the same loudness on every other speaker I ever played this cut on. (No, not all of them went down to the bottom note.)

N O T E S

HB-1 Mk 2 Bookshelf Speaker

Frequency Response: 60 – 20 kHz, ± 2 dB.

Enclosure Type: Vented.

Woofers: 6½-in. treated paper cone with treated cloth surround, flat poly-cotton spider and high temperature aluminum voice coil.

Tweeter: Very high efficiency, controlled-directivity horn with neodymium magnet and ferro-fluid voice coil.

Recommended Amplifier Power: 10 – 250 Watts.

Sensitivity: 92 dB at 1 meter for 2.83 V rms in half space.

Nominal Impedance: 6 ohms.

Minimum Impedance: 4 ohms.

Dimensions: 15 in. H x 8 in. W x 8 in. D.

Net Weight: 12.2 lbs.

Price: Rosenut real wood veneer, \$179.00; satin black, \$149.00.

The main point for a reviewer using this music are the several runs Karr makes. They go down through the crossover from midrange to bass, and I have found through years of checking that there are very few other recordings that do this. The point is that if there is the slightest difficulty with level matching of the two drivers, it will be clearly shown. Similarly, the timbre of the two speakers must be well matched or “voiced” by the designer so that an organ’s pedal notes sound like those from the keyboard. To my ears, a poor match is equivalent to a bass singer such as Trace Adkins sounding like Lady Gaga when the notes rise in pitch.

The lowest notes in standard instruments are those very few below 40 Hz. A full 108-note pipe organ is supposed to do down to 6 Hz, an 880-note piano has an A at 27.5 Hz; Mr. Karr’s Amati has as its lowest note C at 32.7 Hz. The sung bass vocal range starts at E or 82.4 Hz and rises to the coloratura soprano’s F of 1396.9 Hz. While no vocal notes should come from a subwoofer or the bass section of a full-range speaker, I am consistently amazed at how much first-rate reproduction of the human voice will tell you about a speaker system’s low bass performance. It is as if the “errors” in the bass sneak up into the throats of singers and do damage.

But let me give Karr his due as a musician; because he plays so nicely, I have no difficulty playing this CD five to eight times per day over the course of an audio show. I even play it at home, for my own pleasure. He plays as if he’s a Viennese gypsy, simply full of brio and schmaltz and romance and emotion. Some of his vibrato may be overdone, too wide, but not by much and it does go with the territory. I have sometimes quipped about Karr having extra long arms because of the way he’s able to play the runs. The Hsu ULS-15 sub’s performance if, so far, the very best I have experienced on this disc.

If you don’t care for organ pedal notes on classical music, there is an SACD version of Bob Dylan’s “Stuck Inside of Mobile with the Memphis Blues Again” from the *Blonde on Blonde* album with a truly wonderful bass line. On my new Hsu ULS-15, the bass is clean, clear, musical, distinct, and purely fine. This sub sets a new level of performance on this. While I commonly listen to guitar lines, not bass lines, this track has changed my focus, maybe permanently. These electric bass notes hang in the air like weather balloons, big, plump, and impossible to overlook.

But I ought quit this orating and start describing these two speakers’ design and sound, as well as my set-up procedures. The ULS-15 subwoofer first. It’s heavy, so be prepared, and follow the instructions on the outside of the box. Best to unbox very close to its final location. As Poh Ser mentions, in the manual, right at the top of the first note, “subwoofer placement is critical in order to achieve optimal sound quality.” While a sub may radiate sound omnidirectionally, it is not perceived in that way. Even VERY low pedal organ notes, sufficiently loud, are “in that direction” for me, and they come in stereo these days. Poh Ser suggests and I generally agree that one ought to avoid the center of the room and try near-field placement or corner placement. Hsu says putting his sub into an entertainment center is okay if you obey some caveats, e.g. “fire the woofer straight into the room,” etc. I put the sub below and beside his HB-1 bookshelf system, on listener left. The sub



includes a Linkwitz-Riley low-pass crossover with a 24-dB-per-octave slope and also has a mono amp which will produce 1000-watt peaks. There are adjustments on the back panel for crossover frequency range of 30 to 90 Hz, phase (0° or 180°), overall volume, and for trim of the ultra-low frequencies or bottom end in order to deal with room gain. If you are using a receiver or other piece of electronics with a Dolby Digital “subwoofer or LFE output,” the ULS-15 will accept low level signals. And there are five-way binding posts which accept high-level inputs from an amplifier. There is also a set of XLR or balanced inputs; to be recommended! The power switch has three positions: Off, On and Auto in which the unit senses the presence of bass signal and turns the subwoofer on. Perhaps the most innovative aspect of this sub is its wireless connection. One connects the low-level pre-outs to the two inputs of the wireless transmitter, and then matches up the control channel indicators on the transmitter and receiver on the back of the sub. This cuts down on wiring and can help in home theater systems.

Now, being a Certified Knuckle-Headed Editor (CKHE), I decided to ignore the Hsu’s built-in crossover, exemplary in its design, and use my personal external electronic crossover, an XM44 from Marchand which uses small cards with edge connectors (as with computer memory) to change the center frequency of the crossover. It’s set at 80 Hz. I have no inclination to change crossover frequency or to change to another method of doing the crossover.

Even though I had previously been using a rather fine pair of bookshelf monitors, my respect for Poh Ser is such that I agreed pretty quickly when he asked that I try out his HB-1 Mk 2 speakers with his sub. He knows what he’s doing and I can always learn something. These HB-1s are two-way speakers which use a controlled-directivity horn for the top and fairly standard paper cone woofer. They are good enough, versatile enough and inexpensive enough that they can do a creditable job in every application from stereo pair through center channel on out to five in a 5.1 system or seven in a 7.1 system. Poh Ser had some pretty specific instructions and requests on positioning and aiming his speakers, the sort of thing that gets to Ye Grumpy Editor. After three decades of dealing with my listening room with various speakers, this CKHE tends to ignore or resist such things, but it turned out that Hsu was right and was right without even being in my room. The



height of the tweeter off the floor was about the same as my previous speaker, and the distance to the back and side walls were “within reason.” But Poh Ser suggested, much to my surprise, that I use about a square foot of acoustic foam on the left side. I didn’t think it was going to change anything, for better or worse, but the left-right imaging got markedly better, with considerably improved definition or space between instruments. In addition, there was an improved stage behind the speaker line, a three-dimensional space I can hear into. It’s there and better on more recordings, and not just the well-recorded ones in my collection.

The HB-1 Mk2 speakers mate up with the ULS-15 better than my previous pair of bookshelf monitors did with the busted sub or with the new ULS-15, to my consternation, and so I am out of pocket for them, too. I tend to raise an eye-brow when a horn is used in a home application, but boy, oh boy, it’s done right on the HB-1. The horn in the HB-1 is pretty shallow, and I have the notion that in part Hsu uses it to control dispersion of the high frequencies it reproduces. That is, he wants you to hear the direct sound, the stuff that is really the source, and not some “intermediate sound” that’s had its sonic character changed by being bounced off a side wall. Every different wall construction will change that in its own sweet way, concrete vs. plasterboard vs. a shelf of LPs, etc. In addition, horns are usually more efficient than cones for the same frequency range, but I am not so certain of that being a big deal because of this unit’s shallow design. Whatever, the HB-1 plays loud, as loudly as I want it. Very much more and I would be uncomfortably close to “bleeding ear” range. It felt like the sub was just loafing at these levels.

But the HB-1 plays softly, too, without losing detail or changing timbre. Some speakers need to be driven pretty hard to get their motors moving properly, exhibiting too much non-linearity when first starting up. They are just not accurate at low levels, and only when driven to their mid-levels and above are they “good sounding.” These little guys aren’t like that. They will play the part of “background speakers,” such that the lowest levels are submerged in the whirr of the refrigerator two rooms away, but they are accurate and musical even when driven at “idle.” I didn’t like listening to them in such a manner, as it constituted some sort of insult to the music.

One of my all-time favorite cuts for testing the midrange of speakers like the HB-1 is “Who Knows Where the Times Goes” by Sandy Denny. It has a truly

wonderful note that she holds for several seconds, so that it’s easily possible to do a quick A/B switch between pairs of speakers being tested, frequently with “unhappy” results for one or the other. I also use the Jeklin recording by Hans Ludwig Hirsch of Benedetto Marcello harpsichord works and the Mercury SACD version of Janos Starker’s rendering of Bach cello suites. Incidentally, I do not think my aural memory is so good that I can accurately remember the sonic signature of loudspeaker system more than a few seconds, and in fact, it is MUCH easier to tell two speakers apart if one can switch between them with little or no delay. And this is where such tracks as Denny’s help distinguish the chaff from the champs. If you have not tried a quick A/B yourself, you should, and you will thank me when you have. This is where the store’s salesman can frequently get to you.

I mentioned above that Poh Ser suggested I try a square of sonic foam beside the left HB-1, and I am very glad I did that. Most of the wall is an old, wood dental cabinet with drawers irregular in size and whether they are open or shut. A small part of that wall has bookcase filled with CDs, and the foam sits on some of these, and is close to the HB-1. I have been playing with speakers for hobby and job for decades, and I am a fan of foam as it usually does good things. I hadn’t expected to get my center image moved a little to the left and items in it reduced in size. It took about a week before those changes sounded correct, but at this point, I would not go back.

This trio of speakers from Hsu is nothing if not hugely cost effective. For less than \$1600 MSRP, you get a world-class system. You also get low-frequency performance that I think is rarely if ever matched, but never bettered, and then at a substantially higher system cost. You get accurate and musical sound over a wonderfully wide dynamic range, perhaps not that of a symphony orchestra up-close, but approaching that range. You get musical timbre and accuracy from the mid through the top frequencies that gives most every other system a run for the “best of” award. The only thing you don’t get with the HB-1 Mk2s and the ULS-15 are a big dent in your wallet from the ego thrill of outspending your audio buddies.

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 \$24.00 for 12 issues or \$36.00 for 18 issues within the U.S.,
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Reprinted from
The Audiophile Voice
Vol. 15, No. 3