

Hsu Research ULS-15 Subwoofer and HB-1/HC-1 MK2 Speakers

Secrets Review of Speakers and Subwoofer

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Introduction

Hsu Research is an A/V company selling only online, and which continually produces superb products at affordable prices. Until recently, Hsu sold nothing but subwoofers. I bought one of the original Hsu Research VTF-2 subs, which had incredible performance for a \$500 price tag. I've since upgraded to the VTF3-HO with Turbocharger. Like the rest of the Hsu's line, those subs had a ported design.

Now comes Hsu's first sealed-box subwoofer, the Hsu Research ULS-15. It's one of the first subs to hit the market with wireless connections (RF), and it has four separate channels, so you can have several discrete wireless subwoofer channels if you like (e.g., front left, right, and LFE). Along with the ULS-15, Hsu also sent their newly redesigned HB-1 Mk 2 bookshelf speakers and HC-1 center channel speaker, for a complete 5.1 system. I had heard good things about the HB-1's, but never had a chance to audition them in person. Plus, I was very curious to see how Hsu's experience with subs would translate into full range speakers.

SPECIFICATIONS

ULS-15

Design: Sealed Enclosure
Driver: 15"

Amplifier Power: 1000 Watts RMS
Short Term
Crossover: 30 Hz - 90 Hz, 24
dB/Octave
Phase: 0/180

Inputs: Balanced XLR (2), RCA (2),
Wireless (2), Speaker Level (2)

Dimensions: 18" H x 18" W x
19.25" D
Weight: 80 Pounds

MSRP USA (\$1,299-satin black;
\$2,199 DualDrive; \$3,999
QuadDrive)

HB-1 Bookshelf speaker

Design: Ported Enclosure
Drivers: One Horn Tweeter, One
6.5" Woofer
MFR: 60 Hz - 20 kHz \pm 2 dB

Sensitivity: 92 dB / 1m / 2.83V in
half space
Recommended Power: 10-250W
RMS Per Channel
Nominal Impedance: 6 Ohms

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Dimensions 15" H x 8" W x 8" D

Weight 14.5 Pounds/Each
MSRP: \$149 USA

HC-1 Center Channel Speaker

Design: Ported Enclosure
Drivers: One Horn Tweeter, Two
6.5" Woofers
MFR: 60 Hz -20 kHz \pm 2 dB

Sensitivity: 92 dB / 1m / 2.83V in
half space
Recommended Power: 10-250W
RMS Per Channel
Nominal Impedance: 12 Ohms

Dimensions: 8" H x 23" W x 10" D

Weight 22 lbs

MSRP \$239 USA

The ULS-15

The ULS-15 is a departure from prior Hsu models. First, as the model number indicates, it has a front-firing, 15" driver, the first time Hsu has used anything larger than a 12" speaker. It uses a patented motor (the voice coil and surrounding magnet constitute a "motor") that Hsu claims is linear over a much wider range than typical motors, which becomes especially important in large drivers.



However, the most obvious difference between the ULS-15 and other Hsu subs is that the ULS-15 is a sealed design. In other words, there are no ports. Enthusiasts debate the relative merits of sealed vs. ported designs with gusto. To oversimplify, there are only so many ways to produce loud, deep bass. The size of the driver, driver excursion (movement of the cone), amplifier power, and size of the enclosure pretty much tell the story. One cost-effective way to increase low frequency output is to design the enclosure with ports so that the cabinet resonates at certain frequencies. The size and placement of the port ducts and enclosure dictate the resonant frequencies. It's a way to increase output and extension without having to build a bigger cabinet or use a larger driver.

Of course, there is no such thing as a free lunch, and there are downsides to ported designs. The most commonly observed one is that a ported speaker has poorer transient response than a sealed design, particularly at low frequencies. The technical term is "group delay," which means that the low bass response starts later and ends later than the rest of the sound. I recently read a technical article that claimed studio monitors exhibiting group delay were a bigger problem than speakers with uneven frequency response. And in fact, most recording and mixing studios use sealed monitors.

But whether group delay is a significant issue for the typical home theater user is less clear. On the one hand, it can be argued that when a depth charge explodes in *U-571*, the consumer is more interested in loud, room shaking bass than whether the signal is perfectly aligned in the time domain. On the other hand, when listening to *Hey Nineteen* from Steely Dan, my musician brain wants to hear the tight, locked-in kick drum and bass guitar in perfect sync with the rest of the song.

Unlike Hsu's VTF series (Variable Tuning Frequency) which allows the user to configure the sub for either maximum extension into lower frequencies, or maximum output by plugging the ports and selecting a switch on the sub, the ULS-15 is a sealed design, designed for maximum extension. Hsu's published specs list the ULS-15 as being down only 1dB at 15 Hz.

The ULS-15 is driven by an onboard BASH amplifier capable of 1000 watts RMS (short term). The back panel is similar to that of the VT3-HO, with line and speaker level inputs. However, the ULS-15 also sports two balanced XLR inputs. There is a defeatable low pass filter (30 Hz - 90 Hz, at 24 dB/octave) for use with the speaker level inputs, variable phase control from 0-180 degrees, and a ULF trim dial (adjustable from 16 Hz - 60 Hz) designed to compensate for standing waves caused by room boundaries.



The ULS-15 also offers a wireless (RF) connection to the receiver or pre-pro, using a separate transmitter powered by a wall wart. The transmitter connects to the subwoofer-out RCA jack on the receiver. The transmitter actually has two mono RCA inputs, and Hsu recommends using a Y-cable splitter (not provided) so that the signal is sent through both inputs. The transmitter has a four-way DIP switch, which provides four different channels to minimize interference with other wireless signals, and also to allow you to use more than one discrete channel subwoofer, such as front left/right.



The default channel 1 worked fine without interruption from my home's Wifi network, but occasionally picked up interference from my son's Wii when he connected it to my main listening system. Flipping the DIP switch resolved the issue. The transmitter has a small antenna that can be adjusted both vertically and horizontally to maximize reception. I placed the transmitter on a shelf inside my equipment rack, but there were no reception issues. Note that you have to match the dip switch setting on the transmitter to the setting on the receiver.

The subwoofer has a matching receiver antenna that plugs into the back of the unit, along with a switch to set the sub to wireless (rather than wired) operation. Wireless subs seem to be the next big thing. Several

manufacturers were showing them at CEDIA, and after spending a little time with the ULS-15, I can see why. Subwoofers are very sensitive to room placement, and moving them even a foot or two in one direction can seriously alter the output at various frequencies. So while sub placement is still tethered to finding conveniently located AC power, you can now put the sub anywhere without wondering how you are going to run cable from the sub to the receiver. Wireless connections also eliminate one more possible source of ground loop hum.

Hsu markets the ULS-15 in single, dual, or quad configurations. The DualDrive consists of two ULS-15's at a discounted price of \$2,199 (satin black), and claims up to 6 dB more output than a single ULS-15.

Subwoofer aficionados know that multiple subwoofers are generally the best way to increase output, in addition to combating room modes with careful placement. The QuadDrive system has four ULS-15's. Hsu states that a QuadDrive can provide up to 16 times the output of a single ULS-15 (a whopping 12 dB). The QuadDrive system sells for \$3,999 (satin black finish). Considering that a single ULS-15 costs \$1,299, that's a volume discount of almost \$1,200.

HB-1 MK2 Bookshelf and HC-1 MK2 Center Channel Speaker

The HB-1 MK2 is Hsu's second generation bookshelf speaker. It's a ported, two-way design, consisting of a 6.5" woofer and a horn tweeter. The MK2 improvements include a Neodymium magnet for the tweeter. Hsu claims that the MK2 has a flatter frequency response and an improved horn over the original design. As with most horn designs, the HB-1 is very efficient, rated at 92 dB sensitivity. Although rated down to 60 Hz (-2 dB), I chose to cross over the HB-1's at 80 Hz and send the LF to the subwoofer. The HB-1 MK2 ranges from \$149 in satin black, \$179 in wood veneer, and \$199 in piano black.

The matching center channel HC-1 MK2 uses the same horn tweeter, flanked by two 6.5" woofers in a horizontal W-T-W configuration. The HC-1 MK2 has two small ports on the rear panel, and comes with a very handy mounting system that allows the speaker to be angled either up or down towards the viewer. The HC-1 MK2 lists for \$239 in satin black, \$279 in wood veneer, and \$299 in piano black.

My prior experience with Hsu speakers was that they emphasized function over form, and as a result didn't pay much attention to aesthetic appearance. However, both the HB-1 and HC-1 come in a variety of real wood finishes, as well as piano black. The review samples were finished in rosenut, and they looked great. The speakers have a single set of binding posts, and also magnetic removable grilles.

The Sound

I started this review with two questions. First, how would the Hsu magic translate from a ported to sealed box subwoofer? And second, what would a horn-loaded bookshelf speaker designed by a renowned sub guru sound like? There is always a risk with subjective listening tests, because if you are pre-conditioned to hear certain things, it can become a self-fulfilling prophecy. However, I have started a review expecting to "hear" a certain sound, and been surprised many times.

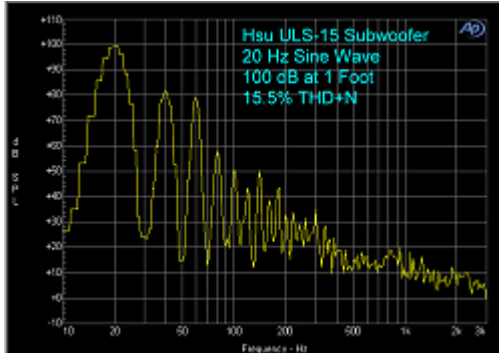
So with that disclaimer, the ULS-15 performed as I expected it would, meaning that, like all Hsu subs, it had clean, substantial output across the subwoofer's frequency range. I also noticed, as with other sealed designs, a subtle difference in the sound. For example, the film *Batman Returns* (Dolby TrueHD) has plenty of low-end action coming from explosions, gunfire and the buffed-out Batmobile. With the ULS-15, transients were more pronounced, with a quicker attack and release than normally found in ported subs. To the listener, it can seem as if there is less output (even though I calibrate levels with all tested subs to match with the main speakers). I think what is happening is that, with a ported sub, the port-induced group delay means that the LF from the sub reaches the listener later than the high-passed upper harmonics coming from the main speakers, and likewise extends after the sound from the upper harmonics has dropped off. This creates a "fatter" sound, which the ear sometimes interprets as louder.

With music, the Hsu's excellent transient response meant taut, focused bass. As mentioned above, Steely Dan's *Hey Nineteen* from *Gaucho* (SACD), has a pulsing, dotted rhythm, anchored by Walter Becker's bassline locked in time with Rick Marotta's kick drum. The ULS-15 reproduced the punch-like sound of the kick drum, like you'd hear in a live performance.

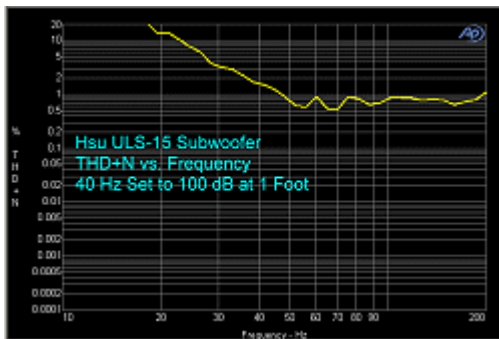
While the ULS-15 subwoofer sounded as expected, the HB-1 MK2 bookshelf speakers wildly exceeded my expectations. The Hsu's had amazing detail and precise imaging, at a performance level of speakers costing several times the HB-1's \$150 price per speaker. The HB-1's distinguished the picked guitar and electric piano tinkling on *Hey Nineteen*, even though they occupied the same frequency space in the mix. There was no hint of the nasal, honking tone that sometimes plagues horn speakers. The soundstage was fine, although not nearly as dramatic as the overachieving detail and imaging produced by the HB-1's. I did notice some lobing effects from the HC-1 when sitting off-center, likely due to the W-T-W configuration, but otherwise vocals were reproduced with no apparent timbral mismatch between it and the HB-1's.

On the Bench (JEJ)

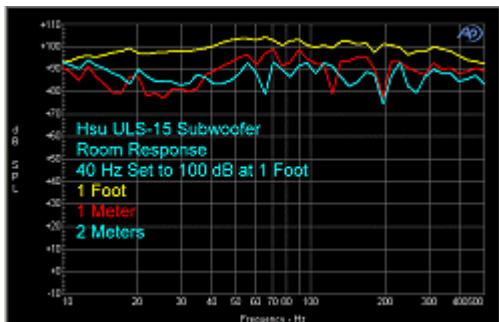
At 20 Hz and 100 dB, the ULS-15 produced 15.5% THD+N



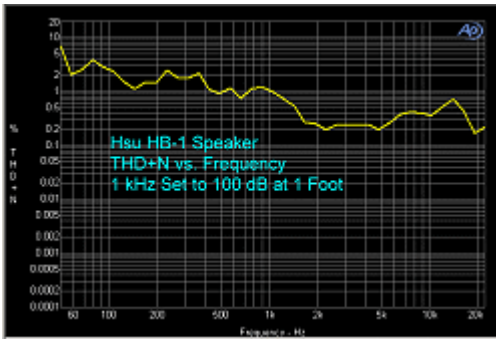
THD+N vs. Frequency indicates that the ULS-15 stays at 10% THD+N or less from about 14 Hz to 200 Hz.



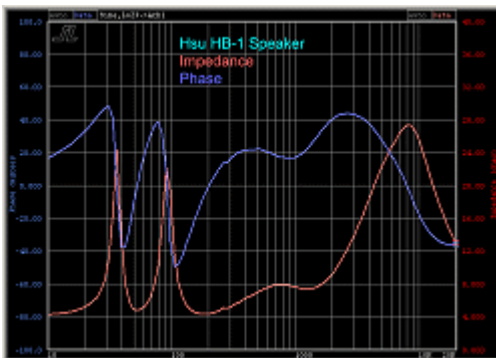
Frequency response is pretty flat from 20 Hz to 200 Hz.



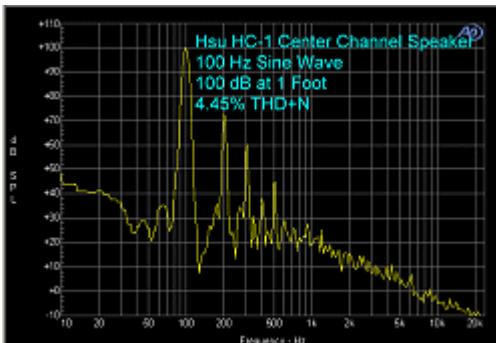
For the HB-1, THD+N vs. Frequency, distortion stays at about 2% or less from 60 Hz to 20 kHz,



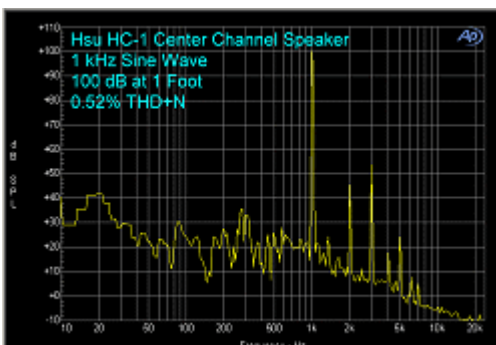
The HB-1's impedance appears to be nominally 8 ohms, with a large peak at 8 kHz. Electrical phase stays within about $\pm 40^\circ$.



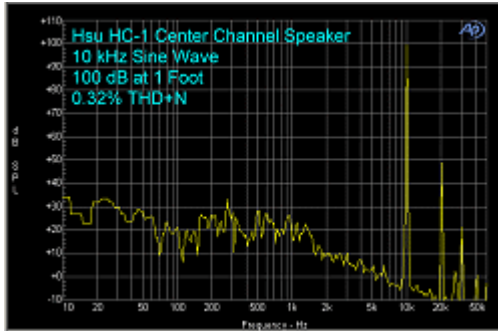
For the HC-1, 100 Hz at 100 dB and 1 foot produced 4.45% THD+N.



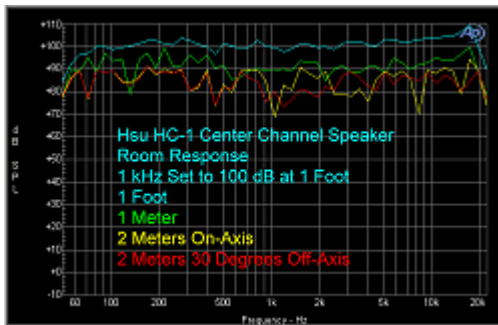
At 1 kHz, 0.52% THD+N. This is excellent performance.



And at 10 kHz, less than 0.3% THD+N.



Room response was reasonably flat from 80 Hz to 20 kHz. Off-axis, there did not appear to be only slight high frequency fall-off.



Conclusions

The ULS-15 is the latest in a long line of excellent subwoofers from Hsu Research. It produces low frequency output, with superb transient response. I'd particularly recommend it for anyone using a sub in a critical music listening environment, and would not hesitate to put one into my home recording rig. If I were purchasing the ULS-15 for my own home theater system, I would get the DualDrive. For \$2,199, you get two ULS-15's, which dramatically increases total output, and provides better control of room modes.

Now, about those main speakers. Every once in a while, I come across a product that performs at a level so far above its price point it is shocking. The HB-1 and HC-1 MK 2 speakers fall into that category. Simply put, I was amazed that a \$150 bookshelf speaker and \$239 center channel speaker could sound that good. Highly recommended!