Bag End Infrasub-18 Powered Subwoofer

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Many readers of STEREO REVIEW are probably unfamiliar with Bag End Loudspeaker Systems, as I was until recently. Bag End is a trademark of Modular Sound Systems of Barrington, Illinois, a manufacturer of speakers and related accessories mainly for professional sound applications. The company's first product intended specifically for home audio is a unique subwoofer called the Infrasub-18.

The Infrasub-18 is based on a invention of two well-known audio engineers, Ron Wickersham and Ed Long, who were responsible for several significant developments for the past several decades. The Infrasub-18 subwoofer features what the inventors call "ELF" technology, which stands for Extended Low Frequencies, a proprietary method of extending bass response down to ultra-low frequencies. Despite the mane, there is nothing elfin about the Infrasub-18, which is inarguably the bulkiest and heaviest subwoofer we have ever tested.

The ELF system uses an unconventional form of electronic equalization to achieve its rated response range of 8 Hz to 95 Hz plus or minus 3 dB. The roughly cubical enclosure houses a single 18-inch driver in a fully sealed chamber of 3 cubic feet. Unlike a conventional subwoofer, which operates above its mechanical resonance frequency, the Infrasub-18's driver operated entirely below its resonance frequency, which results in a response that rolls off at 12 dB per octave with decreasing frequency. The ELF equalizer, which is housed in the cabinet, contains a simple electronic circuit called a dual integrator whose frequency response rises linearly with decreasing frequency at a rate of 12 dB per octave. The result (in theory, and quite closely in practice) is a flat response over the subwoofer's operating range.

In addition to equalizing the Infrasub-18's response, the dual integrator effectively removes high frequencies and corrects the phase response to produce a short and constant signal time delay (relative to the signals produced by the main speakers), which is said to improve bass sound quality. According to Bag End, the response in the system's bottom octave (8 to 16 Hz), though not audible in the conventional sense, also contributed to the natural quality of the reproduced sound by further reducing the delay time throughout the bass region.

The Infrasub-18 is made of 3/4 inch medium-density fiberboard (MDF) and styled in the roughly cubical format used in so many subwoofers. Its huge driver, with a 4-ohm rated impedance, occupies one face of the cube, which has an easily removable wood-framed black cloth grille. The rear panel is largely devoted to an aluminum plate that contains various connectors and controls as well as full operating instructions, performance specifications, and three paragraphs explaining the ELF system! Unfortunately, it's not all that convenient to read this information while installing the subwoofer. The metal rear panel also serves as a heat sink for the built-in 400-watt amplifier.

The principal subwoofer operating control is a volume knob. Nearby is a polarity switch (0 or 180 degrees). The Infrasub-18 has a pair of high-level inputs for the left and right signals, which can be connected to the amplifier or receiver speaker outputs. These inputs are insulated spring clips that accept only bare wire ends (no lugs or banana plugs), which we found surprising in a product with a pro heritage.

Alternatively, the subwoofer can be driven by line-level signals via three pairs of RCA input jacks n the rear panel. Next to them are three corresponding RCA jacks that carry the high-pass filtered outputs back to the line-level inputs of the main system amplifier. The high-pass filter is normally set for a -6-dB response at 95 Hz, with a 12-dB-per-octave slope, but its cutoff frequency can be changed by removing a screw-fastened cover plate.

The Infrasub-18 has a novel method of overload protection. Called "concealment," it is said to allow operation at high levels with a minimum of audible side effects or risk of damage. Instead of limiting or reducing the overall signal level, the concealment circuit dynamically reduced the signal amplitude of the lowest (and most power-hungry) frequencies without affecting the levels of higher bass frequencies. The concealment threshold is not user-adjustable and is set to 3 dB below the amplifier's overload point.

When the concealment threshold is exceeded (at 200 watts!), a full 400 watts for power is still available for short-duration signals.

The amplifier itself is also protected by a thermal circuit that shuts it down if it gets too hot. It comes on again automatically when it cools. During our teste, the amplifier never shut down, although after a period of listening to music at reasonably high levels the metal back plate became quite warm.

We could not verify the 8-Hz response of the subwoofer (the lower limit of our Audio Precision test system is a mere 10 Hz), but we did confirm its remarkable deep-bass capabilities. Driven through the line-level inputs, its close-miked response was plus or minus 1.2 dB from 10 Hz to 70 Hz, falling off to about -4 dB at 95 Hz. measured at a distance of 1 meter with an 80-dB sound-pressure level (SPL), distortion above 60 Hz was very low (less than 0.3 percent); it rose to 9 percent at 30 Hz and 11 percent at 25 Hz. The distortion, of course, is a function of signal level and frequency.

During lab tests and listening tests, we were unable to detect the effect of the concealment system (or even if it had come into play), since there is no visual or audible indication of its operation. It's possible that the higher distortion readings at very low frequencies were related in some way to the protective systems, but we could not verify that hypothesis.

As with any speaker, the ultimate test is listening to how it reproduces music. We operated the Infrasub-18 with a pair of good two-way speakers whose response was excellent down to the subwoofer's 95 Hz upper limit.

Matching the Infrasub-18's output to that of the "satellites" was simple, involving little mote than setting its level to complement the main speakers. The ELF system is very powerful, and when we teamed the subwoofer with fairly efficient speakers (sensitivity in the vicinity of 90 dB SPL), the sub's volume had to be set close to its minimum level! We tried higher settings, which clearly overpowered the range above 100 Hz, although the sound was not seriously distorted.

In any event, the listening tests revealed the true bass content of some of our favorite CD's, particularly recordings containing the lower registers of large pipe organs. Even those whose depths we have frequently plumbed revealed unsuspected bass content. The Infrasub-18 should be ideal for reproducing the deep bass of movie soundtracks.

During a frequency sweep from a test CD, which normally produces some minor wall vibration with speakers having a good bass content, we were exposed to a cacophony of buzzes, rattles, and other sound as the powerful deep-bass output of the Infrasub-18 excited resonances in room boundaries and furnishings. Adding this subwoofer to most home systems will require "debugging" some of the furniture to tame such resonance effects.

The Infrasub-18 is clearly the most potent subwoofer designed for home use that we have seen (and heard, to the extent that one can "hear" its full output). It is not for everyone, given its size, weight, and so on, but at its price it is a clear bargain.