



## Pass Labs XA60.5 monoblock power amplifier

By John Atkinson • Posted: Dec 30, 2013



A highlight of my reviewing life in the 1990s was the time I spent driving my then-reference [B&W John Bowers Silver Signature](#) loudspeakers with the [Pass Labs Aleph 3](#) amplifier. As I wrote in an [April 1997 Follow-Up](#), this little single-ended MOSFET amplifier offered "wide, deep, detailed soundstages; a delicious presentation of recorded detail without the sound getting in-your-face; a purity of tone that became addictive; and an ability to go sufficiently loud (in *my* room with *myspeakers*) that belied the 30Wpc specification. And when the Aleph 3 did clip, it did so relatively gracefully."

Class A in *Stereophile's* "Recommended Components" listing was my verdict for the Aleph 3, but for reasons I can't pin down, I didn't audition another Pass Labs component until the end of 2012, when I was bowled over by the sound of their XP-30 line preamplifier. As I described in my [April 2013 review](#), the XP-30 paradoxically sounded superior to no preamplifier at all. Impressed, I asked for a pair of review samples of Pass Labs' XA60.5 monoblocks (\$11,000/pair).

## Supersymmetry

Whereas the Pass Labs preamplifiers are designed by Wayne Colburn, the power amplifiers are the work of company founder and high-end audio veteran Nelson Pass, who even lays out his own circuit boards. The X-model amplifiers, beginning with the X1000 in 1998, were the first implementation of Nelson Pass's patented Supersymmetry topology (see "[Nelson Pass on the Patents of Pass](#)"). The XA series, which debuted in 2002, combined Supersymmetry with the single-ended class-A operation of the Aleph series. The XA.5 models offer detail improvements over the XAs.

Supersymmetry was described in US Patent 537689, *Amplifier with gain stages coupled for differential error correction*, granted in 1994: "An object of the invention is to provide a high fidelity amplifier that accepts both balanced and unbalanced input signals, amplifies the input signal with as little added distortion and noise as possible, rejects common mode noise components of the input signal, and produces a balanced differential output signal. . . . [T]he above object is met by an amplifier circuit having two identical inverting amplifier stages that are coupled together in such a way that the amplified signal output from one stage is fed negatively to the other stage so as to be reinforced differentially at the output of this other stage, while distortion and noise contributions by an amplifier stage to its output are fed positively to the other stage so as to be recreated in common mode at the output of this other stage. Thus, the input signal is amplified and provided on balanced differential outputs with the common mode component unamplified, while any amplification errors contributed by the amplifier stage appear in common on both outputs and are thus differentially cancelled."

This simple topology is common throughout the Pass line, the major differences being in the power supplies and biasing. Nelson Pass described the circuit used in his XA-series amplifiers in an article available [here](#): "We approached the development of the XA series with an eye to creating a warm/sweet X amplifier, or conversely, a powerfully dynamic Aleph. The successful result is a circuit which is described as balanced, single-ended class-A, consisting of two balanced Aleph amplifiers sharing a single differential input pair of transistors."

"The amplifier has only the two stages, an input stage of a balanced pair of input MOSFETs, and the output stage, a balanced pair of single-ended class-A power MOSFETs. . . . Feedback is used only to set the gain and correct for dissimilarities between the two matched output stages. There are no adjustments. There are no frequency-compensation capacitors. The amplifiers are unconditionally stable and reliable into any load. . . . The XA amplifiers operate at approximately 33% efficiency, that is to say they idle at three times their rated output."

Pass elaborated on this description in a conversation with *Stereophile's* Brian Damkroger while Brian was preparing his [May 2009 review](#) of the XA30.5 stereo amplifier: "In the XA.5 amps the bias is set quite high, so that the output stage operates in class-A up to the rated output and emulates a single-ended amplifier at low levels." The circuit topology is "a push-pull output stage in parallel with a constant current source. The *n* channel, which handles the push, or plus, side of the push-pull, is biased at a higher level than the *p*, or negative channel. At very low power levels, the *p* channel doesn't see the current source and the output is effectively that of the *n* channel functioning in single-ended mode. At higher levels, both *n* and *p* devices contribute to the output

as a push-pull pair, operating in class-A mode up to the amp's rated output and class-AB beyond that point."

Pass Labs' XA amplifiers therefore offer the promise of allowing their owner to have his single-ended, class-A cake, and eat it at high powers, too.

### **The XA60.5 . . .**

. . . is the next-to-bottom model in Pass's XA line. A monoblock housed in the same case as the XA30.5 stereo amplifier, its sculpted, gray-anodized aluminum fascia cleverly incorporates handles, and is dominated by a large, blue-illuminated meter that indicates the output stage's current draw. As there is a substantial bias current, the meter's needle points resolutely upward, with no motion until the output current exceeds the bias and the amplifier starts to operate in class-AB mode.

The rear panel of the black-painted aluminum case has the same two pairs of binding posts as the stereo amplifier, but wired in parallel to facilitate speaker biwiring. A third pair of binding posts is used for 12V trigger operation, while there is a single XLR input jack, and an RCA jack wired in parallel with pins 1 and 2 of the XLR, for single-ended input signals. The sides of the chassis comprise the massive heatsinks required for class-A output-stage operation, these in the form of angled "wings" rather than the usual vertical fins.



The XA60.5's interior is dominated by a large Plitron toroidal power transformer mounted behind the front panel. This is flanked by two circuit boards running the full depth of the amplifier, each carrying 10 pairs of complementary power MOSFETs—way more than you'd have thought necessary for an amplifier rated at 60W. If you consider that class-A operation up to 60W into 8 ohms requires a constant DC bias current of just under 2A (according to a quick, back-of-the-envelope calculation), dividing this current among so many devices results in very little thermal stress on each. Nelson Pass says that the actual chip temperatures are about 70°C (158°F) below their rated maximum. But with that much bias current, a class-A amplifier will run hot, "about 25°C [77°F] above ambient," according to Pass.

Three circuit boards occupy the real estate at the rear of the chassis. On the big, bottommost board are 24 large, electrolytic power-supply capacitors and a couple of devices, presumably voltage regulators, mounted on tall heatsinks. The small, topmost board carries the XA60.5's input stage, and is supported by a slightly larger motherboard that appears to contain the output bias-setting circuitry and other housekeeping components. The connections from the power supply to the output stages and from those to the output terminals are implemented with large-gauge wire rather than the copper bus bars seen in some other high-end power amplifiers. But with the XA60.5's relatively modest power output, this will not be an issue.

The XA60.5's exterior design was the work of Pass Labs president Desmond Harrington, who told me he moved from Krell to create "temples for Nelson's designs."

### **Sound quality**

I used the XA60.5s for my review and for recreational listening over a period of three months. There was an unavoidable gap in the summer, however, when my listening room, which lacks air-conditioning, was not a comfortable environment for amplifiers that run as hot as the XA60.5s. I was fortunate enough to be able to use two superbly transparent loudspeakers with the Pass Labs: Wilson Audio Specialties' Alexias ([reviewed in December 2013](#)), and Vivid Audio's Giya G3s (to be reviewed in the spring). My auditioning comments are based on my experiences with both pairs of speakers.

I began playing guitar in my teens, but switched to bass guitar when asked to join a band that already had two guitarists. I've played bass ever since, and had similar experiences with other kinds of music and ensembles I've joined over the years. With an early-music ensemble, I envisaged myself playing krummhorns and treble viols; instead I found myself playing the viola da gamba and the rackets or *Wurstfagott* (sausage bassoon), a double-reed ancestor of the bassoon. Playing the recorder with a baroque ensemble, I almost always played the big bass instruments. When I asked my then-recorder teacher, Nancy Winkelmann, if I could play the high-pitched treble and descant recorders, she replied that anyone could play melodies, but it was the rare musician who fully grasped the importance of the bass lines to/in ensemble playing. (I *think* it was a compliment.)

I dip into this bit of autobiography to explain why my sonic judgments begin with an evaluation of a component's performance in the bass. If the low frequencies don't reach a certain standard, then the shortfall can't be compensated for by good or even great sound at higher frequencies. Perhaps paradoxically, this is why I so often have preferred small speakers. While their low-frequency extension is nonexistent, their reproduction of the upper bass can have a clarity and a purity—an ability to play tunes, if you will—that is too often denied larger, ported designs.

So let me get the single shortfall in the XA60.5's sound out of the way: While its low frequencies were extended and weighty, the Pass Labs amplifier's bass was also somewhat softened compared with that of the Classé CT-M600 monoblocks that have been my reference since I reviewed them in [March 2011](#).

Back in 2005, Erick Lichte asked me to add a bass-guitar part to a studio recording the Minnesotan male-voice choir Cantus had made of the evergreen carol "Deck the Halls," which was to be included on a [CD of Christmas music](#). I had used the graphic EQ and compression offered by a Phil Jones Bass Briefcase to modify the sound of my Fender Precision, but had then, in the final mix, added a slight boost between 50 and 100Hz to fatten the sound a bit more. The

result was just what Erick needed to release *Comfort and Joy: Volume Two* (Cantus CTS-1205), and with the Classé monoblocks, the balance between the Fender's weight and definition sounded just as I had intended. But listening to just the drums and bass on this track with the XA60.5s, it sounded as if I'd overdone the midbass equalization by perhaps half a dB.

But this relatively minor departure from perfection didn't prevent me from appreciating what the Pass Labs did elsewhere in the audioband. I recently bought and downloaded Benjamin Zander's performance of Mahler's Symphony 2, "Resurrection," with the Philharmonia Orchestra (24-bit/192kHz ALAC files, Linn CKD 452). This was recorded by the team responsible for some of Telarc's great-sounding orchestral recordings, including Elaine Martone as co-producer and Robert Friedrich of Five/Four Productions. The "Resurrection" is an enormous, episodic work with huge orchestral climaxes contrasted against chamber-scaled sections in which a single solo instrument, a violin or a woodwind, takes the lead. Despite their modest power rating, the XA60.5s had no problem coping with the work's huge dynamic range. In one Maxellian moment almost 10 minutes into the third movement, *In ruhig fließender Bewegung*, the immense scare chord blew the wind past my ears even with the less-sensitive Vivid speakers. However, the rumbling bass drum in this movement needed a little more control than the Passes could bring to bear.



The XA60.5s defined a wide, deep soundstage with this recording. In the second movement, *Andante moderato*, the strings' pizzicato rendering of the triple-time tune illuminated the acoustic of the Watford Colosseum, a hall I knew well back when it was known as Watford

Town Hall. The same was true for the declamatory timpani at the start of the third movement, and the offstage brass choir at the start of the massive final movement was in the next borough. But the violin sections could be clearly heard to be drier than the woodwind and brass, the soundstage on this recording having a somewhat wide-angle perspective.

The fourth movement, *Urlicht*, has a lyric taken from *Des Knaben Wunderhorn*. Mezzo-soprano Sarah Connolly's opening line, "O Röschen rot!" (O little red rose!), raised goose bumps, so creamy and natural did her voice sound through the XA60.5s. As the solo violin and flute took turns weaving around her line, the image of the singer hung there between the speakers. To employ a still-meaningful cliché, her image was palpably real and fully fleshed out, rather than the two-dimensional stage flat so often produced by lesser amplifiers.

The XA60.5s didn't work their magic only with female voices. The unaccompanied choir that quietly enters two-thirds of the way through the "Resurrection"'s final movement were present in my listening room. The late Lowell George, in "20 Million Things to Do," from Little Feat's *Hotcakes & Outtakes: 30 Years of Little Feat* (ALAC files ripped from CD, Warner Archives/Rhino R2 79912), was resurrected in my room. The amplifier's high frequencies were neither exaggerated nor rolled off. When George knocks over the music stand in this track, it was as startling as it would have been in real life, yet without any spotlighting of the treble.

As I write these words, I'm listening to a live CD Stephen Mejias gave me, Hildur Gudnadóttir's *Leyfdu Ljósinu* (Touch TO:90), which I'd mentioned in my review of Pass Labs' XP-30 preamplifier. For the title track, Gudnadóttir constructs soundscapes comprising a looped motif based on a major-second interval that at first is underpinned by long, bowed notes on her cello, then by sung notes that first echo, then clash with the harmonies established by the cello. As each looped clone of the singer entered, it occupied its own place in the stage, unambiguously hanging there as the track develops. The voice is closely miked, but there was no sense of it being thrust forward at me, as it was with the Lamm M1.2 Reference monoblocks I reviewed in April 2012. When the cello reenters halfway through the track, growling octave-doubled harmonies as the voices recede into echoing, time-stretched space, it's a goose-bump moment. The Pass Labs amplifiers neither spotlit nor sweetened the sound of this inventive recording, instead quietly stepping out of the music's way—as, indeed, they should.

## Summing Up

I don't have much to say about the Pass Labs XA60.5 other than this: It is the best-sounding amplifier I have ever used. It's not perfect—I'd like my speakers' low frequencies controlled by a slightly tighter fist—but the XA60.5's magic midrange and sweet, detailed highs more than compensate, and are wholly addictive. And when you consider that, at \$11,000/pair, the XA60.5 is relatively affordable, it's Class A all the way!

**Description:** Solid-state monoblock power amplifier. Inputs: 1 single-ended (RCA), 1 balanced (XLR). Outputs: 2 pairs binding posts. Rated power output (1kHz at 1% THD+N): 60W into 8 ohms (17.8dBW), 120W into 4 ohms (17.8dBW). Voltage gain: 26dB. Frequency range: 1.5Hz–100kHz. Output noise: 200µV. Input common-mode rejection ratio: 60dB. Input impedance: 30k ohms (balanced), 20k ohms (unbalanced). Input sensitivity: 1.1V for full output. Damping factor: 150, equivalent to output impedance of 0.05 ohm. Operating temperature: 127°F (53°C). Power consumption at idle: 200W.

**Dimensions:** 19" (483mm) W by 7" (178mm) H by 19.2" (488mm) D. Weight: 62 lbs (28kg) net, 75 lbs (34kg) shipping.

**Serial numbers of units reviewed:** 26384, 26385.

**Price:** \$11,000/pair. Approximate number of dealers: 10–15.

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