

## Sadowsky SA200, SA410 & SA210

By [Jonathan Herrera](#) | June 2006

**New all-tube bass heads are rare, and a new rig bearing the brand of a celebrated bass builder is almost unheard of. The Sadowsky SA200 amp and SA210 and SA410 cabinets come from a transatlantic collaboration between Americans Roger Sadowsky and Jim Bergantino and Dutch amp builder Dolf Koch. Sadowsky enlisted Koch to design a tube amp unencumbered by price, size, or weight concerns. Bergantino handled the cabinet engineering, aiming for sensitive design that would extract maximum output and punch from moderately powered amps. Sadowsky shepherded the project, providing conceptual guidance toward his goal of undeniably great tone that required little EQ adjustment.**

Audio use of the vacuum tube would have long ago faded into technological obscurity behind the cheaper, more reliable transistor if weren't for guitarists, bass players, and hi-fi nuts. Tubes uniquely accomplish amplification's main purpose: using a small amount of energy (a bass's output signal) to modulate larger energy source (power from the wall outlet). As opposed to transistors, tubes respond differently to transients (the initial attack of an audio signal), emphasize distinctive parts of the harmonic spectrum, and glide into clipping more smoothly. The audible results of these qualities give tubes their unique tone and feel. The SA200 is an excellent example of the breed, combining classic tube circuitry with modern amenities and construction techniques.

Operating the SA200 is straightforward. Because tube sound varies greatly with respect to gain, the three volume-controlling knobs—gain, volume, and master—have a significant impact on tone. The gain knob governs the first preamp stage, just after the "in" input. Volume comes at the end of the preamp, controlling the gain of the signal as it hits the power amp section. In essence, the gain and volume controls sandwich the preamp's EQ circuitry, and their ratio is an important tone determinant. For example, setting gain high than volume introduces a bit of saturation, while an opposite ratio preserves signal clarity. The fat switch introduces second-order harmonic information, further thickening the tone and accentuating the gain:volume ratio. Master controls the output tube volume, specifically the gain into the output stages' phase-inverter section. (Class AB amps like the SA200 have a component that splits the audio signal's phase, sending each side to opposite banks of output devices for improved efficiency.) As with the SA200's other gain governing knobs, high settings color the tone appreciably.

The SA200's simple EQ section augments a conventional passive tone stack with active cut and boost at the extreme ends of the frequency spectrum. As with most passive tone stacks, it's an interactive circuit, meaning settings of one knob affect the efficacy of others. As a result, dialing in a desired tone is a balancing act among the controls. It's no big deal, but don't expect the laser-sharp accuracy of a graphic or parametric EQ circuit.

Another cool aspect of tube amps is the influence that different tube types and brands have on sound. To further tweak tone beyond EQ, one could swap out the stock 12AX7 tubes for a different brand, or even experiment with lower-gain noval (nine-pin) dual triode tubes like 5751s. The SA200's output section also allows for a variety of octal (eight-pin) output tubes, including EL34s (included), 6L6s, and 6550s. As expected, swapping in different power tubes changes the output rating and necessitates a bias adjustment.

The Sadowsky has a solid assortment of rear-panel routing and operational features. Because output transformers are sensitive to speaker load, tube amps like the SA200 usually have an impedance selector switch. It's cool that the head is endorsed to run at a 2: load, which is a little unusual for all-tube heads. Other goodies include an effects loop, a foot switch jack for muting, a line-level tune output jack, and a full-featured direct output. While tube purists tout the benefits of an all-tube transformer-balanced DI, the SA200's solid-state op-amp-based balanced output seemed to accurately project the tubey warmth of my test bass's signals.

Solidly constructed from heavy-gauge steel, the SA200 felt professional and rugged. The front-panel lettering was legible and the knobs' bright white indicating lines helped for quick position checks. Each knob turned smoothly, and all the switches and jacks were a high quality. The SA200's interior construction was also solid. The two 12AX7 preamp tubes and 6N1P phase-inverter tube were firmly attached and shielded, and the sextet of EL34 output tubes were all firmly harnessed. Sadowsky recommends leaving bias adjustments to a trained technician, but the fixed-bias SA200 does have bias measuring points and an adjustment pot for the technically inclined.

### Color Me Tube

The SA200 is a fantastic-sounding amp. You'll likely reach the same conclusion, especially if you favor buttery and plush dynamic response and colorful mids. While the SA200 is blessed with ample volume and headroom, there's no mistaking it for a powerful solid state amp, many of which have an unpleasantly audible headroom threshold but more predictable, linear tone as volume is increased. As I mentioned, gain settings and volume profoundly influence the personality of tube amps like the SA200. At big-gig stage volume:

the SA200 emitted a palpable sense of massive air movement, with blooming lows, barky mids, and smooth treble. It had a satisfying full-bodied tone, rich in even-order harmonics that made each note sound particularly burnished and colorful. Its dynamic response, while not offensively sludgy, was on the musically slow end of the spectrum: Note envelopes tended to have a pleasingly rounded attack rather than edgy immediacy. Backing off the volume for small club gigs and rehearsals seemed to accentuate the SA200's throaty mids and pillowy lows, speeding up transient response while reducing overtone coloration. While the SA200's EQ section is musical and straightforward, I favored a flat setting due to the amp's inherently gratifying tone.

When it comes to gear, bassists and guitarists differ most significantly in one area: Many bassists desire "transparent" representation of their bass's tone from their amp, while guitarists usually consider their amp an integral part of their instrument, exploiting its idiosyncrasies to help realize their ideal tone. While obviously a bass amp, and an exceptionally sweet-sounding one at that, the SA200 definitely comes from the latter philosophy. It unmistakably colors tone, and frankly, I think it's a sound that has undeservedly lost favor among some bassists. Many of the best bass lines were recorded on tube gear that imparted significant coloration, and we justifiably lionize these players and their tone. Why, then, the obsession with fidelity? The SA200, with its gorgeously tubey sound, reminds us that unabashedly "altered" tone has an important place at the table.

## SA410 & SA210

Due to the SA200's modest 200-watt output, Jim Bergantino designed the SA410 and SA210 for high sensitivity in order to wring maximum volume out of the Sadowsky or any other moderately powered head. (Sensitivity is the measure of a speaker's loudness given a standard input-signal level and measurement distance. Speakers with high sensitivity require less power than insensitive speakers with an identical impedance in order to achieve an equal volume.) To meet this goal, Bergantino engineered entirely new cabinets that utilize shorter-throw woofers than in his own Bergantino brand cabs, different tuning, and custom crossovers. The SA210 may look like the Bergantino HT210S we reviewed in August '05, but it's an entirely new cab, sharing only the HT's box.

Bergantino knows his stuff, and the SA cabs prove it. Each is constructed from thoroughly braced Baltic birch plywood. Their carpeted grilles, and plastic hardware are top-notch, exuding high-end hardiness. Both cabs are relatively shallow for their configurations, particularly the SA210. As a result, they're pretty easy to schlep and stuff into a small car, although neither is light.

With the SA200 and numerous other heads, the SA210 was appreciably louder than one might expect from a 2x10. This is undoubtedly due in part to the high sensitivity rating, but the cabinet does seem voiced for strong midrange, which helps augment perceived volume. It was punchy with a woody bark in the mids, and the low-register was a bit soft and bloomy. Treble-range detail and articulation were excellent, with snappy leading-edge transients and pleasant refinement. Considering its size, it's remarkably loud, and it proved to be ample for several loud gigs at big clubs. It seemed to evoke qualities I remember in the HT210S—potent midrange and big, round sound—but it was louder and a little looser in the lows.

The SA410 is a solid 4x10 that offers the high volume, punch, and power handling I expect of the venerable configuration. Like the SA210, the 410 had a strong midrange, with good upper-mid detail and resilience to aggressive playing. It handled B-string slaps without breaking up and had solid low-end extension and detail. The high-frequency snap was adequate, although not quite as lacy and smooth as Bergantino-branded cabs, as the SA410 utilizes a standard P.Audio compression horn, unlike the other cabs' more magically sounding tweeters.

### OVERVIEW

#### Sadowsky SA200

List \$2,800

Street \$2,800

**Pros** Big, beautiful, tubey tone

**Cons** May be a little too plush-sounding for some

#### Sadowsky SA410

List \$999

Street \$999

**Pros** Punchy and loud with good low-end detail

**Cons** None

#### Sadowsky SA210

List \$749

**Street** \$749

**Pros** High volume from a little box; small for a 2x10

**Cons** None

**Contact** [www.sadowsky.com](http://www.sadowsky.com)

(718) 422-1123

## VACUUM TUBES 101

There are many types of vacuum tubes, but in audio amplification the most common types are the diode, tetrode, and pentode. Diode tubes have two elements, a negatively charged cathode and a positively charged anode (also called the "plate"). Power is applied to the cathode, causing it to heat up and emit electrons. The electrons, which are negatively charged, are attracted to the anode. Since the anode is not heated, it doesn't emit electrons. As a result, the electricity can flow in only one direction. When used this way, a diode tube converts ac (alternating current) into dc (direct current), a process known as rectification. Audio amps like the SA200 need high-voltage dc for the tubes' plates; the ac in audio amps is the audio signal itself and the power for the tubes' filaments (see below). The SA200 utilizes solid-state diodes that perform the same function, but some tube amps still utilize tube rectifiers.

Triodes add a couple of other components to the basic tube diode. Instead of directly heating the cathode, usually a separate heater or "filament" heats the cathode to emit electrons. The other added component is the "grid," which is placed between the cathode and anode. When a varying negative voltage is applied to the grid, it controls the electrons flowing between the cathode and anode, to which is applied a positively charged high DC voltage that originated in the power from the wall outlet. For best operation the grid is kept at an idling current—the tube's "bias"—which, in addition to diminishing low-volume distortion, ensures that all the cathode's electrons don't flow to the anode and burn it out when no signal is present. In a bass amp, the output from a bass's pickups varies the grid voltage. The changing grid voltage controls the flow of electrons from the cathode to the anode, causing a corresponding change in the anode itself. In the power tubes, the plates are connected to an output transformer, which converts the signal to one appropriate for speakers. This principle—a small amount of energy (grid voltage) controlling a much larger amount of energy (plate current)—is what amplification is all about. Some tubes, like the popular 12AX7, contain two triodes in one tube. Pentodes like the SA200's EL34s operate on the same basic principle as triodes, but they contain additional grids which help the tube's performance at the high currents necessary for power amplification.

## TECH SPECS

### SA210

**Power rating** 210 watts rms into 4Ω

**Input impedance** 1MΩ (w/6dB attenuation switch)

**Tone controls** bottom: ±12dB @ 40Hz; bass: +4dB, -10dB @ 80Hz; mid: +5dB, -10dB @ 800Hz; treble: +10dB, -6dB @ 3kHz; high: ±10dB @ 6kHz

**xlr DI output** Differential op-amp driven with pre/post and ground lift switches

**Power amp topology** Class AB

**Tube complement** Pre-amp: two 12AX7s, one N1P (phase splitter); power amp: six EL34s

**Output jacks** One Neutrik Speakon; two 1/4"

**Dimensions** 16<sup>15</sup>/<sub>16</sub>" x 6<sup>15</sup>/<sub>16</sub>" x 9<sup>7</sup>/<sub>8</sub>" (four rackspaces)

**Weight** 42 lbs

**Made in** Netherlands

**Warranty** One year

limited; three months on tubes

### SA210

**Type** 2x10 + tweeter, ported

**Frequency response** 48Hz–16kHz

**Power handling** 400 watts rms

**Impedance** 8Å¼  
**Sensitivity** 100dB SPL (1W/1M)  
**Speakers** Custom-designed Eminence  
**Dimensions** 22<sup>3</sup>/<sub>4</sub>" x 18" x 11<sup>1</sup>/<sub>2</sub>"  
**Weight** 50 lbs

**SA410**

**Type** 4x10 + tweeter, ported  
**Frequency response** 45Hz–16kHz  
**Power handling** 800 watts rms  
**Impedance** 4Å¼  
**Sensitivity** 103dB SPL (1W/1M)  
**Speakers** Custom-designed Eminence  
**Dimensions** 22<sup>3</sup>/<sub>4</sub>" x 25<sup>1</sup>/<sub>2</sub>" x 15<sup>1</sup>/<sub>2</sub>"  
**Weight** 86 lbs

**Made in** U.S.A.

**Warrant** Three years limited

**SECOND OPINION**

The Sadowsky rig gave me luscious, buttery girth on a bossa nova casual and warm and buoyant presence on a hard-rock studio session. In terms of character, this amp is in a class by itself. Plus, the 2x10 is compact, clear-sounding, and loud. —Brian Fox

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