

Audio Research Reference 600 Mk II Tubed Monoblock Power Amplifiers

Companies that regularly push the performance envelope often find themselves in a pickle. Lower-priced products sometimes sound better than the reference models because they incorporate lessons that designers have learned after extended experience with those reference units.

That's exactly what happened when Audio Research decided to build a half-sized version of their mighty Reference 600 power amplifier. Its little brother, the Reference 300, had some sonic advantages over its big brother. (Several of these advantages also found their way into ARC's superb VT-200 Mk II and VT-100 Mk II stereo amplifiers.) Now we have the second generation of William Z. Johnson's statement in amplifier design, the Reference 600 Mk II, which takes the lessons learned from both the original Reference 600 and the Reference 300 and adds a few new tricks in yet another attempt to redefine the state-of-the-art in audio amplification.

The Reference 600 Mk II is a serious amplifier in every possible sense of that word. These monoblocks are *very* expensive (\$34,990 per pair) and massive, produce an enormous amount of heat, and require a high level of owner commitment (tube biasing and tube replacement is no small, or inexpensive, challenge in an amplifier with 34 tubes per chassis). But High End audio in its purest expression has never been about sacrificing sound quality to convenience or cost. The Mk II is first about music; other considerations are secondary.

The front panel of the Mk II is dominated by a pair of meters that can be switched by the user among output power, bias level, or incoming AC-line voltage readings. A row of 16 front-panel holes provides access to the bias adjustment for each of the 16 output tubes. Other front-panel controls adjust meter brightness, put the unit in standby mode (the standby knob doubles as a mute switch), adjust the speed of the four cooling fans, and determine which output tube's bias reading is indicated on the front-panel meter.

Three pairs of beautifully made, custom binding posts allow access to three transformer taps, for connecting a wide range of loudspeaker impedances. A fifth binding post connects to the output transformer's center tap. Input is via a balanced XLR connector; no unbalanced input is provided.

The Mk II is an all-tubed design, both in the audio circuitry and in the power supply. The series-pass elements in the regulators are Sovtek 6550s – the same tube used in the amplifier's output stage. It may seem odd to use tubes rather than transistors in the power supply because it's easy to think of the power supply as existing outside the audio signal path. (Indeed, schematic diagrams show the audio signal path from left to right, with the power supply drawn outside the signal path, or even on a separate sheet of paper.)



Moreover, we tend to think of a power amplifier as a device that makes an input signal bigger. But a more accurate visualization is of a device that pulls 120V 60Hz alternating current from your wall outlet through the amplifier's power transformer, converts the AC into direct current, stores that direct current in large capacitors, and then allows the tiny audio signal at the amplifier input to modulate the flow of that stored energy. The electrons stored in the capacitors are driven through the loudspeakers by the output tubes. The electrical current that flows through your loudspeakers' voice coils – and makes music – flows first through the power supply. Looked at this way, the amplifier sub-system that converts AC into DC (the power supply) is actually *in* the audio signal path. That's why so much expense and chassis space was devoted to the Mk II's tubed power supply.

It's worth noting that ARC abandoned tubed power-supply regulation for nearly ten years, from

ASSOCIATED EQUIPMENT

Sources: Spectral SDR-3000/SDR-2000 Pro; Linn Sondek CD12; Mark Levinson No.31.5/No.360S; Krell KPS-25s; Wadia 850; Parasound CDP-2000; Arcam Alpha 9; Rega Planet digital front ends; Basis 2500 turntable; Graham 2.0 pick-up arm; Transfiguration Spirit cartridge LP playback. Line-stage preamplifier: Audio Research Reference One, preamp section of Krell KPS-25s. Phono preamp: Conrad-Johnson EF-1. Loudspeakers: Genesis 200; Avalon Eidolon; Vandersteen Model 5; Totem Arro; Revel Gem; Revel Studio; Aerial 7B; Evett & Shaw Pesaro. Interconnects: Cardas Neutral Reference; AudioTruth Diamond; Straightwire Crescendo MIT MI-350. Cables: AudioQuest Dragon 2 and Dragon + bi-wire; Cardas Neutral Reference, MIT MH-850. Accessories: Monster Cable HTS-2000 AC power conditioner; MIT Z-Stabilizer II; MIT Z-Center; MIT Z-Isolator HC; MIT Z-Cord II; Kimber PowerKord 330; Kimber WATaGate AC outlets; Billy Bags 5500 equipment rack; ASC Tower Stouts; Tower Slims; and 16" Full-Round Tube Traps.

SPECS

Output power: 500W continuous into 16 ohms, 20 Hz-20 kHz at less than 1% THD
Output impedance: Not specified
Input impedance: 200 k/ohms balanced

the early 1980s to the early 1990s. The first product in ARC's tubed power-supply renaissance was the VT150, an amplifier that in my view was a significant step forward in tube neutrality. (The VT series had far less "tube" sound than ARC's Classic series.) The \$15,000-per-pair VT150 was built after ARC decided that there wasn't a large enough market for Johnson's visionary amplifier, the design that would eventually be built as the Reference 600. Based on the VT-150's musical and commercial success, the Reference 600 finally made the jump from paper to physical reality. Since the VT150 (an amplifier I lived with for about two years), ARC has been on a roll, producing one great design after another. It is perhaps no coincidence that this particularly fruitful period was marked by a return to tubed regulation.

Each of the Mk II's sixteen (per channel) 6550 output tubes is driven by a Sovtek 6922. The input tubes are also 6922s. The driver and output tubes are mounted horizontally along the chassis sides, with four fans below to draw air over the tubes. The 6550s can deliver 500W into 8 ohms – a massive amount of power by any standard. The 6550 can be replaced with 6550B, 6550C, KT88, KT90, KT91, or KT100 tubes just by re-biasing the amplifier. The output transformers, designed from scratch for the Mk II, reportedly contributed to the high power-output rating.

The amplifier's physical construction deserves comment. The chassis is exceptionally strong and solid, as it should be to hold the weight of two huge transformers (one power and one output) and all the circuitry. When moving the amplifiers, I was never

concerned about chassis flexing. If placed on a carpeted floor, the amplifiers should be mounted on a solid platform. (If you let the feet sink into carpet, airflow beneath the chassis will be restricted.) Another downside of such high mass is that the amp takes a long time to reach thermal equilibrium and sound its best. I was surprised at how much more liquid and spacious it kept sounding, even after several hours of listening.

The technical differences between the Reference 600 and Mk II are evolutionary. Although the output stage remains the same, the rest of the signal path has been redesigned. The Mk II's input stage uses a new DC servo; a cathode-follower buffer has been added between the first and second gain stages; and a more powerful push-pull driver stage replaces the original circuit (half a 6922 dual-triode). The power-supply regulation has also been redesigned. A detachable power cord and hour-meter finish off the changes. The price has increased from \$29,990 per pair to \$34,990 per pair. Owners of the original can upgrade for \$7,495, plus shipping and tube replacement (if necessary).

I lived with a pair of Reference 600s for more than a year before sending them back to be updated to Mk II status. (The return was precipitated by a tube failure that took out a resistor and part of a circuitboard trace.)

I used the original Reference 600 to drive Genesis 200s, Avalon Eidolons, and Revel Gem loudspeakers. The updated Reference 600 Mk II powered the same Avalon Eidolons (still my favorite loudspeaker), the new Revel Ultima Studio loudspeaker (review in progress), and Vandersteen Model 5s.

Musically, the Mk II isn't a significant departure from the original Reference 600, an amplifier that was so outstanding that quantum performance leaps would be impossible. Instead, the Mk II builds on the original's many strengths.

First, the Mk II has a more natural sense of air and bloom than any amplifier I've heard. Individual images seemed to hang in space surrounded by an almost tangible halo, just as we hear in live music. I also heard air behind and around instrumental images, just as we do from live music.

This impression of instruments within an acoustic space is remarkable on music with limited dynamic range, but quite staggering on instruments and ensembles with wide dynamic swings. The bloom around instrumental outlines expands with the instrument's dynamics in a way I've never heard before in a power amplifier. It is as though the amplifier gets completely out of the way so that the instrument's dynamic range can be fully realized. Jonathan Valin calls this quality "action," and the Mk II has it in spades.

A fabulous recording that demonstrated this remarkable "action" is

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bassist Tony Overwater's *Up Close* [Turtle Records 198119], recorded live-to-two-track with purist techniques in an old wooden church in Amsterdam. (The recording was made with custom active microphones, Spectral Electronics, MIT cables, Nagra D recorder at 24-bit/96kHz, and monitored on Avalon Arcus loudspeakers.) On the tracks featuring tenor sax (duets with acoustic bass), the sound of the sax's expanding bell of air as it got louder was jaw-droppingly realistic – and an aspect of the music that the Mk II uniquely reveals, in my experience.

A related strength is the Mk II's ability to go loud with a sense of utter ease. This amplifier handled loud and complex orchestral passages with the same aplomb it displayed on chamber music. No matter what the loudspeaker load, playback volume, dynamics, or musical style, the Mk II sounded as though it were cruising. I heard no hardening of timbre, compression of peaks, strain, or changes in soundstage dimensions with changes in volume. This ease made the amp particularly satisfying with orchestral music; to hear a full orchestra (particularly on Keith Johnson's HDCD discs on the Reference Recordings label) reproduced with seemingly unlimited dynamics and unfettered effortlessness produced a genuine visceral thrill. The Mk II was also put to the test with the Sony SCD-1 SACD player at the front end. The SACD format's ability to reproduce transient speed and wide dynamic contrasts was highlighted by a similar quality in the ARC.

As impressive as the macrodynamics were, the Mk II didn't have quite the transient zip of, say, Spectral amplifiers. The Spectral system better defined the attack and decay of musical signals, particularly those with steep transient waveforms. Still, the ARCs had exceptional dynamic agility.

At the top of my list of sonic criteria are accurate tonal balance and correct rendering of timbre. A product can have a gigantic soundstage, transparency, and wide dynamics, yet disappoint musically if timbres sound synthetic. Part of what was so endearing about the Mk IIs was their unequalled realism in portraying instrumental and vocal textures. They didn't add the top-end sheen of most transistor amplifiers, nor did they exhibit *any* colorations I associate with tube amplifiers, such as an overly liquid sound at the expense of resolution. Instead, they simply sounded more like live music than any amplifier I've heard – a sound more immediate and direct, without being overly vivid.

The Reference 600 Mk II's bass was exceptionally tight and well defined – in a class by itself when it comes to tubed amplification. No, it didn't quite have the extreme bottom-end solidity and sock of good transistor amplifiers (the Krell KAV-250, for example), but the disparity was not as great as one would expect. Although I enjoy "center of the earth" solidity at the extreme bottom end, I would gladly trade the last word in punch for this amp's other magical qualities. I must reiterate that the bass was exceptional for tubes – more solid-state-like than other tubed amplifiers, but with greater roundness and body than transistor amps.

If you audition a pair for yourself, be sure they're adequately warmed up. Although they sound good cold, they don't sound spectacular until about an hour of use, and the real magic doesn't happen for at least two hours. During a listening session, the amplifier keeps getting more liquid, spacious, and musically involving.

You may also consider replacing the stock AC cords with Kimber PowerKord 330 and Kimber's audio-grade AC wall outlets; they make a worthwhile improvement.

Conclusion

The Audio Research Reference 600 Mk II is of reference quality in the true meaning of that over-used word. To my mind, it establishes a benchmark level of performance in amplifier design,

tubed or solid-state. It combines spectacular sonic performance, a musically seductive presentation, seemingly unlimited dynamic capabilities, and the ability to drive any loudspeaker load with ease. Moreover, I've auditioned the original Reference 600 and the Mk II with eight loudspeakers and found no sonic idiosyncrasies that suggest careful system matching is required. This amp is as close to neutral-sounding as any I've auditioned.

I must warn potential purchasers about two drawbacks: fan noise can become audible during quiet musical passages; and a pair of these monsters puts an enormous amount of heat into the room. Just as the Reference 600 is approaching its ultimate liquidity, my listening room starts to feel like a sauna. (During the hottest days of summer, I switched to ARC's VT-100 Mk II for all but the most serious listening.)

If you can live with the price, heat output, size, fan noise, and tube replacement, this amplifier will provide musical rewards that make all the drawbacks tolerable.



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Serial Number of review samples: 57288001, 57288002

Source: Manufacturer loan

Warranty: Three years

Price: \$34,990 per pair
