



**“...a superlative
musical investment,
an indisputable
high-end bargain...”**

In the world of high-performance audio, brands come and go — an audio firm should be considered well established only after it has survived its first decade. But given that so many hi-fi companies embody the personality of a single visionary, it's difficult for them to survive, let alone thrive, for longer than 25 or 30 years. One venerable brand — Audio Research Corporation (ARC), of Minneapolis, Minnesota — has defied the odds. Founded by William Z. Johnson in 1970, ARC is now thriving in its fifth decade, even after technical and corporate leadership passed from Johnson to his protégés. ARC is devoted to the musical accuracy and integrity offered by tube-based designs; their stated goal has always been to advance the state of the art of music reproduction, and they've never lost sight of that goal. Yet to flourish for the better part of half a century has required more than just adherence to an ideal; also needed are sound business practices, constant evolution and innovation, a commitment of service to its customers and dealer network — and a seemingly endless series of good-sounding, fairly priced components that stand the test of time.

Several achievements stand out in any survey of Audio Research Corporation's accomplishments, but perhaps it's the series of preamplifiers bearing ARC's "Reference" badge that loom largest. The Reference 5 line-stage preamplifier is the current torchbearer of this storied procession, and the subject of this review.

What's in the box?

The Reference 5 (\$12,000 USD) is fairly large (19"W x 7"H x 15.5"D), yet not nearly as big as the trunk-busting carton it's shipped in (25"W x 14"H x 25"D). Befitting the expense and integrity of such a precision electronic instrument, the Ref 5 comes double-boxed, yet ARC goes further by using six panels of Styrofoam to float the inner box within an envelope of protection. It would take a serious blow to this package to disturb the isolation of the cocooned chassis. The shipping weight of 42 pounds clues the recipient in to the fact that, at 30 pounds, this is one heavyweight of a preamp.

Though the review sample had a silver aluminum faceplate and matching handles, the Ref 5 can also be ordered in black on black. ARC has ditched the contrasting (black handles on silver) look of yesteryear, and I concur: the monochrome façade looks more contemporary. The remainder of the chassis is black-anodized aluminum, with a cover of transparent polycarbonate polymer, slotted for ventilation. While the top can still be ordered in traditional aluminum, go with the acrylic — it not only provides a bird's-eye view of the interior, but, per ARC, it sounds better, presumably due to its antiresonant quality. The front panel is dominated by the large, green display that debuted on the Ref 5's predecessor, the Reference 3. While there's a love-it-or-leave-it public attitude attributed to the display, it never bothered me — I selected the Display Off option. (Even so, a group of nine pixels in the center of the display remains on to indicate that the Ref 5 is fully operational; initiating any system change fully illuminates the display for ten seconds.) Volume and Input knobs flank the display, under which a black channel contains a row of six black buttons. Depressing those buttons will, in turn, toggle between On and Off, engage the Theater Bypass mode, select balanced or single-ended connections for each input, produce a mono summing of channels, invert the output signal's absolute phase, and mute all outputs.

While the designers of some tubed devices revel in a sense of antiquity and thus provide no convenience features, the Ref 5 belies its purist signal path. It's loaded with the features listed above, and is fully remote controlled. The remote duplicates all front-panel options and adds four more: direct input access, balance controls, display brightness (multiple intensities and off), and an "hour counter" to monitor tube life. There are six primary inputs — CD, Tuner, Phono, Video, Aux 1, Aux 2 — and a seventh, unity-gain Processor input for Theater Bypass. On the output side are one record out and two pairs of mains. All inputs and outputs are available both single-ended (RCA) and balanced (XLR), and are arranged in ten columns of matched pairs (as opposed to the mirror-imaged, left/right layout often seen in other designs).

The informative yet concise product manual is testament to ARC's +40-year history of successful interaction with its customers. Especially useful is the diagram that guides the

Audio Research Reference 5 Preamplifier

Continued...

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owner through initial setup and tube installation (the tubes are shipped uninstalled, but bubble-wrapped and secured within the chassis). As opening the hood is a requirement not only to install the tubes, but also to remove the pull-out protective sheet from beneath the main capacitors, a screwdriver is included. As to the power cord, I relied on the heavy-gauge, 20A example that ships with every Ref 5. (Note that the Ref 5’s maximum draw of 130W doesn’t necessitate 20A power; rather, ARC prefers the mechanical integrity, gripping power, and sound of the 20A IEC connector.)

Before I settled in with the Reference 5, three minor operational quirks identified themselves. First, and contrary to industry custom, the volume control is on the left, the input-select knob on the right. I now realize that such control positions follow the practice originally implemented by founder William Z. Johnson and unfailingly adhered to by ARC. Why, however, must the big display *reverse* that order, exhibiting the selected input on the left and an audacious volume reading on the right? It struck me as incongruous. Second, the knobs are not rotary dials; rather, they toggle, clockwise and counterclockwise, by about 20 degrees. While not a big deal, this detail proved less exceptional than my expectations. Finally, on a central row of the demure remote control is a left arrow button (Volume Down), a middle button (Mute), and a right arrow (Volume Up). As the device is narrow, my inadvertent depression of Mute when attempting to change the volume happened not infrequently.

Are any of these foibles a big deal? No, and they had no bearing on the Ref 5’s performance. But they merit brief mention.

The inside scoop

The Reference 5 is a line-level preamplifier with a pure class-A triode, fully balanced, zero-global-feedback circuit design. The low- and high-voltage power supplies employ ARC-designed transformers made in the US. There’s an R-core transformer for the sensitive audio circuits mounted on the left wall of the chassis, and a toroid mounted on the right side for everything else (such as the microprocessor controls, display, relay array, heater, and auxiliaries). These power supplies are tube-regulated (a 6H30 dual triode controls a 6550C pentode), with massive energy storage to ensure unflinching dynamics. From the input board, the signal is routed to the 103-step volume control, then directly to the tubes for gain. Such gain exploits four more 6H30P tubes (with the volume maxed out, there is 12dB of gain at the balanced outputs, 6dB single-ended).

ARC claims an extremely wide frequency response for the Ref 5: 0.2Hz-200kHz, +0dB/-3dB. In addition to exploiting proprietary and other high-quality parts, the finest aerospace-sourced material is used in the Ref 5’s circuit boards to take advantage of that material’s superior mechanical and dielectric properties. The boards are assembled in-house (from the raw parts up, without relying on preassembled boards) — just like the rest of the Ref 5, which is handmade by the craftspeople of ARC’s Minneapolis headquarters. Finally, damping material is strategically placed throughout the chassis and its subcomponents, and every tube wears a damping ring. A visual tour of the Ref 5’s interior revealed exacting execution, logical layout, and impressive parts. One detail I noted were circuit-board traces that relied extensively on 45-degree angles (often coupled in pairs) and rounded corners, rather than a proliferation of abrupt 90-degree angles.

The Ref 5 is obviously a highly engineered product, but to what end? ARC’s David Gordon told me that the design goal for the Ref 5 was to further eliminate the perceived limitations of tubed components, while retaining the organic flow, listener engagement, and musical purity of the best tube-based circuits. What about tube rush, and tubes’ higher noise floor? ARC claims a jet-black noise floor that challenges that of the best solid-state designs, and allows even the most micro of microphonic cues to resound. But don’t tubes roll off frequency extremes and overemphasize the midrange? The Ref 5 responds with that bandwidth of 0.2Hz-200kHz, +0dB/-3dB, at rated output. What about limited dynamics, sloppy bass, unnaturally euphonic mids? With its massive, multistage, tube-regulated power supplies presenting over 350 joules on demand, the Ref 5 should satisfy with extreme dynamics and accuracy.

Audio Research Reference 5 Preamplifier

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Associated Equipment

Speakers —
Vandersteen 5A

Analog source —
Spiral Groove SG-2 turntable, Centroid tonearm,
Lyra Kleos cartridge; Aesthetix Rhea Signature,
Parasound Halo JC 3 phono stages

Digital source —
Ayre Acoustics DX-5 universal A/V engine;
Apple MacBook Pro laptop running OS X Snow
Leopard and Amarra 2.1.1 music-player software

Preamplifier —
Ayre Acoustics KX-R

Power Amplifiers —
Ayre Acoustics MX-R monoblocks

Interconnects —
AudioQuest Wild Blue Yonder,
Cardas Clear, AudioQuest Diamond USB

Speaker cables —
AudioQuest WEL Signature

Power conditioners —
Ayre Acoustics I-5xe, Furman IT-Reference 20i

Equipment rack —
Harmonic Resolution Systems MXR rack
with M3X shelves

Intent is great, theory fantastic... but it's the sound that matters.

Beguile me

Audio Research cautions that the full measure of the Reference 5 cannot be taken until the completion of nearly 500 hours of break-in. Luckily for me, the review sample arrived with over 450 hours on its clock — I could sidestep any need to evaluate the nuances of component break-in. However, having gone through the break-in process with other amplifiers comprising parts of similarly high quality and whose circuit boards are made of the same material, I take seriously ARC's admonition in this regard — so please temper any high expectations of how you think the Ref 5 might sound fresh out of its box. Also, cognizant of the fact that tube life is approximately 5000 hours, I followed ARC's recommended protocol by powering up for playback, and switching the Ref 5 off whenever listening sessions had ended for the day. From a cold start, the Ref 5 came very nearly up to speed within 10-15 minutes.

I was thrilled to be able to dive right in and immediately apprise myself of the Ref 5's capabilities. I was not disappointed. From the word go, I was treated to quiet backgrounds, stimulating transients, and emotional engagement of the highest order.

Most important, the Ref 5 re-created the most realistic soundstage I've ever heard in my reference system. Not only were instruments solidly locked into place in three dimensions, they re-created a realistic sense of depth, substance, and height. A perfect example is the double bass of Charles Mingus on *Mingus, Mingus, Mingus, Mingus, Mingus* (LP, Impulse!/Analogue Productions AIPJ-54). With the Ref 5 as the fulcrum on which balanced my analog front-end and amp-speaker pairings, Mingus's bass displayed physicality and communicated the interaction between master and muse. This album, for which Impulse! gave Mingus the complete freedom to rerecord some of his better-known tunes from earlier, major-label albums, evidences the innovative and complex arrangements the artist intended. Especially true is the expressive rendition of "Mood Indigo," complete in its nod to the compositional genius of Duke Ellington. On stage are 11 instruments, each delineated with precision and body, yet the lines of play intertwined and overlaid one another without devolving into a morass of confusion. The Ref 5's clarity let me focus on an individual player, or pull back to take in the sweeping wholeness.

In the refined arena in which the Ref 5 plays, it is the ability of a component to convey fine detail while remaining relaxed and engrossing that I find to be the magic dust that separates the exceptional from the stolid. Microphonic detail with macrodynamic rhythm, pace, and timbral accuracy — the Ref 5 had it all. On its own, the sound of ARC's preamplifier was so complete and balanced across the board that I was able to take the full measure of its nuances only in comparisons.

A reference-level duel

During my months with the Reference 5, I had the luxury of comparing and contrasting the contender from Minnesota with my longtime champion from Colorado, the Ayre Acoustics KX-R solid-state line-level preamplifier. From my perspective, it is as if these two competitors are converging on perfection from alternative perspectives. ARC sits squarely in the tube camp, attempting to retain the glorious nature of tube-based design while eliminating any artifacts inherent to such an approach. By contrast, Ayre is unrepentantly solid-state, reveling in the strengths of the transistor while striving to capture the fluidity, musicality, and dimensionality attributed to tubed circuits. Each has its strengths, though at the end of the day, very little separates their sounds.

A superior sense of overall luxury reigns with the Ayre, as its fly-by-wire operational refinement transcended that of a precision electrical instrument. Further, the machined-from-billet chassis presents a sleekly modern shape that screams *21st century*. Nevertheless, traditionalists may well prefer the time-honored yet updated appearance of the Ref 5. In any event, both contenders score points galore for full functionality, remote operation, and compatibility with complex system demands, including theater-bypass modes. I prefer the "always on" temperament of the solid-state KX-R to the on/

Audio Research Reference 5 Preamplifier

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Price: \$12,000 USD.

Warranty: Three years parts and labor.

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off realities of a tubed preamplifier, especially as my wife and children make daily use of my main rig.

My scorecard breaks down volume control, dynamic range, musical engagement, and soundstaging, even though these categories are interrelated. Starting with the volume control, and without denigrating the Ref 5, the performance Ayre attributes to the KX-R's Variable Gain Transconductance (VGT) volume control circuit is unequaled in my experience. The KX-R's signal/noise ratio is unwavering regardless of output, and it displays an utter lack of coloration anywhere on the dial. Ayre's achievement in this regard is extraordinarily liberating. I listen at vastly different volumes, depending on the time of day or night, my mood, and the music (my wife and children have their own level preferences). By contrast, the Ref 5 had more of a sweet spot, coming into its own about midway through its 103 settings (most of my daytime critical listening sessions took place in the "55" to "65" range). The slight tapering of performance at lower volumes was by no means a black mark against the ARC, but there was discernible S/N level compression — as there has been with every preamp I've had in my system, the KX-R excepted. However, and most important, I never heard any variable colorations triggered by an adjustment of the Ref 5's volume setting.

With regard to the preamps' ability to present both macrodynamics and microdynamics over an ultrawide bandwidth, I had only nits to pick. The full-range nature of my Vandersteen 5A speakers enabled me to verify the claims of extreme bandwidth of both manufacturers. Additionally, both models proved dead quiet at the listening seat: With no signal being passed, I had to be about 1' away from a speaker before I could tell that the Ref 5 was on; that distance dropped to about 1" with the KX-R.

At its optimal volume settings, the Ref 5 blossomed with a superior sense of envelopment, yet it couldn't quite match the Ayre's attainment of a higher median achievement, irrespective of volume. As to the simultaneous delivery of macro- and micro-informational cues, I'd call it a toss-up that favored the Ref 5 within its strike zone, but gave the advantage to the Ayre at low to middle volume levels. Each device provided an open window on the performances, remaining composed while enabling the emotional centers of the brain to engage with and continue to be immersed in the music.

The Ref 5's trump card, however, was its sublime superiority of soundstage re-creation. While both components threw a solid, stable soundfield, the depth of focus projected by the Ref 5 could be startling. Fully dimensional images, as opposed to the KX-R's more elliptical presentation, painted a more realistic and immersive picture. Acoustic pianos, in particular, were rendered with subtlety and finesse. One of the best jazz recordings of 2010 was *And If*, from the Anat Fort Trio (CD, ECM 2109), which not only captures Fort's piano artistry, but also the chemistry she achieves with her longtime collaborators, bassist Gary Wang and drummer Roland Schneider. In the second track, "Clouds Moving," ECM's naturally minimalist production ethos releases the performance, which took to the air through the Ref 5. From keys to hammers to strings and soundboard, Fort's piano was better grounded in physical reality via the ARC than via the Ayre as, with independent deftness, she deployed her left and right hands to highlight particular projections of the sound and character of her instrument.

Conclusions

The ARC Reference 5 is a beguiling performer that created the deepest, most organic, most compelling soundstage of any preamp I've had in my system. Never less than musically engaging, the Ref 5 was so quiet, capable, and easy to enjoy that I could forget about the glowing tubes inside (but for the need to toggle it on and off). It may not have supplanted my solid-state preamp as my household reference, but the ARC was better at imaging, slightly more engrossing at optimal volumes, and so good overall that I never felt an overwhelming urge to return my Ayre KX-R to the system. The Reference 5 is a superlative musical investment, an indisputable high-end bargain, and a fortification for another 40 years of audio excellence from Audio Research.

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