Air Tight ATM-300R Power Amplifier

The Power of the First Watt

Dick Olsher

In the past 50 years, I can't think of another power triode that has garnered a greater reverent following than the Western Electric (WE) 300B, to the point of being regarded in some audiophile circles as a virtual audio goddess. Its initial use, starting in the late 1930s, was limited to cinema amplifiers such as the single-ended WE 91A/B. The WE 300B never crossed over to mainstream hi-fi applications in the 50s and 60s due to the advent of higher-power-rated beam tetrode and pentode tubes and the proliferation of low-sensitivity loudspeakers. Then came the WE 300B renaissance. It was rediscovered in 1970s Japan, where its use was explored, mainly by hobbyists, in a variety of single-ended triode (SET) circuits in the context of horns and other high-sensitivity loudspeakers. Its fame as a linear and ultra-musical performer seemed to grow exponentially in the intervening years, as the SET wave slowly made its way from East to West.

Air Tight has been committed to 300B-based SET amplification for the past 20 years. The iconic ATM-300 was released in 1999 and first made it into our Editors' Choice feature in 2007. After a long pause, two more iterations of this design were released in the past five years. The ATM-300 Anniversary Edition was launched in 2016 to commemorate the company's thirtieth anniversary. And finally, with the arrival of the ATM-300R in 2018, Air Tight heralded the ultimate reference version of this design. While externally the cosmetics are unchanged, there is much to celebrate under the hood. It is Air Tight's expectation that each customer will opt for his favorite 300B tube, and it ships reference units without power tubes. However, the U.S. distributor includes Electro Harmonix 300Bs as stock. Actually, it's not a bad tube at all, and to be fair, let me fast-forward and reveal that it is capable of eliciting upwards of 80% of this amp's sonic potential. But for those of us, yours truly included, who are addicted to the siren call of 300B sound, there are, of course, superior alternatives to consider.

Air Tight analyzed the WE 91 circuit and identified several of its essential design aspects, which are echoed by the ATM-300R. First, the operating point of the 300B, while still within a safe zone, was nudged higher as far as plate voltage and current. Second, negative feedback (NFB) was applied to the input stage from the plate of the 300B, which accounts for the decent damping factor. Atasushi Muira, Air Tight's founder, was aiming for an overall sonic presentation that he described as "tight and clear." This may well be an unusual description for a 300B amp; after all, I've auditioned many 300B designs over the years that sounded poorly defined in the bass and soft, meaning overly liquid, through the treble range.

Prior to the arrival of the Air Tight, my go-to SET amp of late had been a variation of Eric Barbour's Svetlana SV811-10 amp, a design originally published in *Vacuum Tube Valley* magazine in 1996 and improved upon in 1997. My version uses solid-state rectification and the graphite-plate SV572-10 operating at zero bias in Class A2. It's a great-sounding SET, and I was wondering just how much better the ATM-300R could possibly be. My expectation was for an incremental improvement in sound quality, but the audio gods had a major surprise in store.

My first impression of the ATM-300R turned into an extraordinary event. I happened to be streaming Norah

Specs & Pricing

Power output: 9Wpc (<10% THD)
Frequency response: 30Hz–40kHz, –1dB/1W
Total harmonic distortion: <1% (1kHz/1W/8 ohm)
Input sensitivity: 290mV
Damping factor: 7 (1kHz/1W/8 ohm)
Dimensions: 430 x 245 x 275mm
Weight: 54 lbs. (24.5 kg)
Price: $16,995 with Electro-Harmonix 300B tubes

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Associated Equipment
Loudspeakers: Basszilla Platinum Edition MkII DIY, Fleetwood DeVille
Preamplifier: PrimaLuna EVO 400
Phono front end: Kuzma Reference turntable; Kuzma Stogi Reference 313 VTA tonearm; Clearaudio daVinci V2 MC Phono Cartridge; Jeff Rowland Design Group Coherence phono stage
Digital front end: MacBook Pro running Audirvana 3.5 software, Alldaq ADQ-USB 3.0 isolator, Schiit Audio Yggdrasil and Soekris dac1421 DACs
Cable & interconnects: Museatex Crypton and Tara Labs RSC & Acrotec 6N and Kimber KS 1016 Select
Accessories: Sound Application power line conditioners

Jones' *Come Away With Me* off Qobuz in 24/192, an album that I've enjoyed in many system contexts with a host of power amps, but I just didn't expect the totality of what I heard at that moment. I sank deeper into my Stressless recliner, closed my eyes, took a deep breath, and attempted to process the experience. For starters, any lingering cloud cover was completely blown off the soundstage. Spatial clarity and transparency were taken to the limit. The inner recesses of the soundstage became readily accessible, so much so that it almost felt possible to walk into the soundstage and circle around individual image outlines. All this in combination with velvety harmonic textures and superb tonal fidelity made it crystal clear that this was no ordinary SET amp.

The Air Tight ATM-300R wowed me with countless hours of listening pleasure. It consistently brought to life the full sonic promise of the 300B.

Another surprise was excellent bass range pitch definition and control, not usually strong suits of SET amplification. Backing Miles Davis (*Kind of Blue*), bassist Paul Chambers and drummer Jimmy Cobb came across with convincing tonal weight and rhythmic drive. Ditto for the Charlie Haden/Jim Hall duet album recorded at the 1990 Montreal International Jazz Festival. Haden's bass lines were beautifully sculpted and delineated; this no doubt being a function of a decent bass damping factor, on par with that of many push-pull tube amplifiers. You might get the idea that using NFB to obtain a reasonable damping factor is contentious, since so many designers either avoid it altogether or provide a means to switch it out. The ATM-300R shows that if NFB is applied correctly, you can have your cake and eat it, too.

The midrange is where tube magic happens and where the 300B kicks butt. Instrumental timbres were reproduced with exceptional transient and tonal fidelity to the real thing. But it wasn't just about accuracy and detail resolution. The music flowed with passion, dramatic flair, kinetic drive, and glorious harmonic textures that put other SET amps to shame. Stringed instruments from violin to double bass sang with a lyrical tone. Female vocals were tonally spot on and blossomed from soft to loud with realistic dynamic nuance.

The ATM-300R proved to be a virtual microscope when it came to resolving sonic differences between 300B tubes. I initially rolled in the Russian Gold Lion Genalex 300B and ended up liking it even less than the Electro Harmonix stock tube. It sounded texturally grainer and lacked the spatial incisiveness of the EH. Next, I turned to one of the most musical and reliable selections in in my collection, the Westrex WE 300B reissue. Its combination of sweet textures and pristine clarity resulted in stunningly lyrical voicing through the core of the midrange, being particularly complimentary to cello timbre. Only one thing remained on my wish list and that was a slightly more robust upper midrange. One of my tests for that is reproduction of the Hammond B organ solo on David Manley's *Lesley* album "Jazz Me" track. Normally, a Hammond B organ is coupled to a Leslie speaker. Instead, Manley ran the Hammond through a corner-loaded Klipschorn, which resulted in significantly more upper midrange and presence region energy. To get that tone just right I had to substitute the TJ Full Music mesh-plate 300B gold pin, a tube that I have enjoyed for many years. It's unabashedly livelier, more romantic, and more seductive sounding than the Westrex, but I felt that it dropped the last piece of the puzzle in place for me.

The Air Tight ATM-300R wowed me with countless hours of listening pleasure. It consistently brought to life the full sonic promise of the 300B, and fully justified its reference appellation. Its performance rests on four major sonic pillars working in synergy: velvety textures, remarkable timbre fidelity, superb soundstage transparency and image focus, and a satisfying bass foundation. It gives me great pleasure to crown the ATM-300R as the new king of low-power amplification. I've yet to audition a more musically convincing low-power amplifier at any price point. Simply put: an awesome display of the power of the first watt!

Technical Description

The original WE 91 tube was designed with an enormous amount of gain (about 92dB), which made sense when amplifying very low-level signals from cinema soundtracks. Unfortunately, extreme gain levels can cause noise and distortion. It is common today to scale back much of the gain of the original, which was derived from an input transformer and two cascaded WE 310A pentodes. Air Tight eliminated the input transformer, but to stay fairly faithful to the original design, the input pentode was replaced with a 12AU7 cascode stage. A cascode is a totem-pole arrangement with two triodes connected in series. Its claim to fame is that it simulates a pentode in terms of gain and characteristic curves. The cascode may not look like a pentode but it certainly behaves like one. The cascode is followed by a parallel-connected 12BH7A driver, which is capacitively coupled to the grid of the 300B.

The output tubes are cathode biased, meaning that the quiescent current is determined completely by the plate voltage and the cathode resistor value. No bias-current adjustments are possible. The current meter on the front panel is there merely to verify proper operation of each power tube. A nice touch is the addition of a soft-start circuit for the protection of the 300B filaments. The power supply is tube rectified using a 5U4GB. To allow the use of any 5U4GB, including modern versions which are likely less robust than vintage types, the rectifier tube is protected during startup from the in-rush current by solid-state diodes. A large custom-wound choke is used as part of the filter network to smooth out the 300B plate voltage supply. All of the filament power supplies are DC.

Each amplifier is hand assembled and soldered point-to-point under the direction of Mr. Yutaka "Jack" Miura, son of Air Tight's founder. Exceptionally high-quality trannies are used. The Tamura output transformers provide 4, 8, and 16 ohm secondary winding taps. However, only the 4- and 8-ohm taps are connected externally and are labeled as Low and High. My advice is to always try all of the available taps to determine which works best with your loudspeaker. With my Basszilla DIY loudspeaker there was a significant sonic difference between taps. The 4-ohm taps resulted in a livelier higher-order distortion spectrum, which was only tolerable on a few recordings. Needless to say, the 8-ohm taps were used for the duration of the evaluation.

An Alps potentiometer is wired in ahead of each channel's input stage. Including attenuators in what is a basic power amp seems to be a fairly common practice in Japanese designs. I'm normally not thrilled with having an extra passive part in the signal chain or with the resultant reduction in input impedance. But in this instance I used the attenuators to dial back the input sensitivity. At 0.29V for full output this amp is much too sensitive when used with an active preamp. In fact, with the attenuators wide open, a faint hum was audible about a foot in front of my 96dB-sensitive loudspeakers. Reducing gain by dialing back the attenuators took care of the hum issue. tas