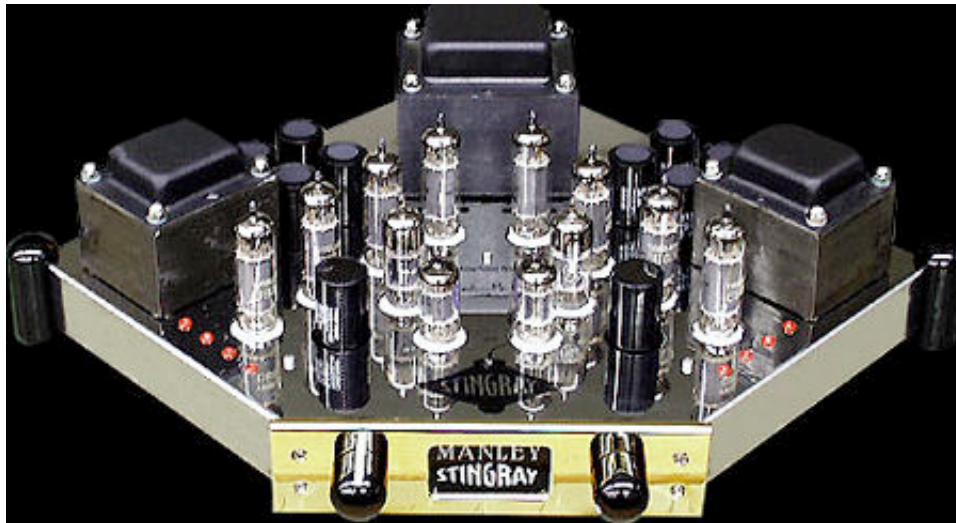
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Manley Laboratories Stingray integrated amplifier

Chip Stern, December, 1999

There's an aesthetic dimension to the Manley Laboratories Stingray that transcends high-end audio and borders on modern sculpture—not unlike the E.A.R. V20, which I auditioned in the October issue. Still, the Stingray is by no means an exercise in gimmickry. Form has clearly followed function at every step in the design process, the ultimate goal of which was to fashion a vacuum-tube integrated amplifier with real-world power that defined the outer limits of high-end performance in a functional, affordable, bare-bones package...with a touch of style.



Still, while the Stingray's aural charms ultimately proved quite engaging, I was initially captivated by its radical styling. To see the Stingray aglow in a darkened listening room is an oddly evocative experience—as if the Muppets, hired by Bayreuth to stage a Wagner opera, had decided to use a chorus of vacuum tubes in place of the usual sopranos, altos, tenors, and basses. And if the E.A.R. V20 reflected its maker's fascination with high-performance European sports cars, the Stingray is like a visitor from some distant galaxy as seen through the retro-futuristic strip-mall prism of 1950s SoCal pop culture. Like, radical, man.

In fact, when EveAnna Manley sketched her hexagonal work in progress—on a bar napkin during a pause for the cause at HI-FI '98 in Los Angeles—for erstwhile *Stereophile* Pooh-Bah [J. Gordon Holt](#), that venerable sage remarked dryly, between sips of his even drier martini, "It looks like a stingray."

Of such moments are legends born. In honor of JGH, this souped-up, highly evolved descendant of the venerable Manley 50W monoblocks was dubbed the Stingray. The fish is illuminated on the 24K-gold front panel in a manner befitting the

trailer for a William Castle/Vincent Price mondo sci-fi epic. ("No audiophiles will be seated during the final 15 minutes of this demo! Please don't reveal the surprise ending to your friends!")

It takes a village to nurture an amp

My wife, quite taken by the unconventional appearance of this curious new denizen of our audio menagerie, was pleased to learn that its overall design was the vision of a female audiophile. "It looks like a little village," she concluded. But while the essential vision was indeed that of Manley Labs' guiding light, it took a village of dedicated audiophiles, or at least Manley Labs' dedicated team, to raise such a child.

It's tempting to characterize the Stingray as an extension of EveAnna Manley's own personality: bright, brassy, forward, good-natured, in your face—in a word, dude, *rock'n'roll*.

"Well, I can't admit to consciously trying to inflict my personality on the sound of this gear, but I will admit to listening to a lot of rock'n'roll music," Manley laughs. "Music has such a powerful associative property for me—it's emotional. True enough, I played saxes and clarinets and a little trumpet in high school and college bands and orchestras, and even got a degree in Music, so yeah, I know my music theory and I do know what real instruments sound like.

"Now, because we build all of this pro recording equipment, I find myself in a lot of recording studios and mastering rooms, and, this being the music industry, most of it is pop or rock'n'roll music, so that becomes my reference. But you know what? A lot of the evaluative listening process is a relative thing, whether you're involved with acoustic purist music or multitrack recordings—once you know anything rather well, relative listening comes into play. Can you hear the detail of the beads on the shaker, the tone of the guitar, the decay of that hall, the solidity of the bass attack?

"Hey, Robert Plant's voice was once an acoustic instrument, just the same as that trombone was. They were both floating through the air until some microphone picked up the sound to convert that air movement into some little volts to be made into some bigger volts to get moved through a bunch of gear onto a storage medium, which we can later buy and do the reverse to."

While the Manley Stingray has only one power transformer, it is essentially a fixed-bias, dual-monoblock configuration on a single stainless-steel chassis. It has sets of separate left and right line inputs (gold-plated brass with Teflon dielectric) positioned to either side of the chassis and adjacent to their own output transformers, a four-position silver-contact input selector switch, and screw-down-style binding posts.

Ideally suited to accept spades or bare wire, these old-fashioned-looking posts are positioned close enough to the back of the output transformers that using a pair of pliers is a tight squeeze. Nor was I able to piggyback a second set of speaker cables with WBT expanding bananas for a biwire setup, as I had with the more versatile vertical binding posts of the Mesa Audio Tigris and the E.A.R. V20. My handy-dandy Dynaclear Postman (with its 1/2" and 7/16" slots) didn't work here, making it a bit clumsy to change cables. If I'd had an adjustable wrench or a 3/8" nut driver, I'd have been cool.

The Stingray's hexagonal shape—essentially a square with the front and back corners cut off—evolved from Manley's desire to keep signal paths and connections as short and direct as possible so as to employ a passive preamp instead of a gain-stage device. Which is why a pair of bullet-shaped aluminum pillars serve to conceal and gussy up the left and right corners, and double as the conical feet on which the amplifier rests.

And so, in detail after detail of the Stingray, form follows function. Thus the decision to employ, for exceptional transparency, a passive preamp and high-quality passive

Noble volume and balance controls.

"The main functions of preamps these days are switching and volume," Manley explains. "When you have to drive only a few inches of wire, as in the Stingray, and all your sources are a couple of volts output, as they mostly all are these days, a passive preamp works great. Some guys, thinking less is more, get in trouble with passive preamps trying to use a 50k ohm potentiometer to drive 12' of whatever capacitance in the cable. Whoops? Where did the balls and high frequencies go? Gotta get down to some low impedance to drive cable properly without loss.

"Another way that the form followed function was having the power switch next to the IEC connector. If I had run the power switch up at the front panel, then the mains would have had to flow right under the input circuitry. By keeping the power switch at the back, where it's easily accessible, wiring—and thus labor—are greatly simplified, and all the AC is kept furthest away from the sensitive input stages."

The most remarkable thing about the Stingray is the amount of gain and dynamic range Manley and her design team managed to elicit from four little EL84 output tubes per channel—not exactly a tube that springs to mind when envisioning a 50W amp of low global feedback (only 4dB) operating in ultralinear mode. All sparkly, quick, and open, the EL84 has never been synonymous with prodigious bass, but the Manley team reasoned that perhaps this was not the tube's fault. Because Manley Labs winds its own transformers, "Hutch" Hutchison was able to define a new series of parameters, Michael Hunter could wind some prototypes, and, in short order, Paul Fargo would have one hooked up to an amplifier on the test bench for measurements and A/B listening tests with the old designs.

As Manley describes it, " 'Sorry, boys,' I'd tell them. 'Your numbers are way better with the new designs, but we're still not there sonically. Try again.' So what actually ended up happening was a balance of numbers and ears. The bass sound I was looking for came from the right amount of inductance combined with a slight introduction of saturation. 'Oh, the horror!' you say. Nope, numbers ain't everything...as you may have heard. The other place we found we were losing a little bass was in the old input stage we'd been using for the past 15 years. So Paul Fargo developed a new input design that really did the trick. And it suited us well, with the Stingray's passive volume and balance control, to score a little extra gain there anyway. And Mr. 12AT7 takes care of that job."

Bright lights, fast city

In high-end audio, the name of the game is system synergy. As taken as I was with the Stingray's sound, I set out to audition it in a variety of applications, with different combinations of tweaks and gear. I tried both short-wall, nearfield settings (with a variety of stand-mounted speakers)—in which, I anticipated, some *Stereophile* readers might use the amp—and full-range floorstanders in my customary long-wall space. (See "Associated Equipment.") I also did a fair amount of comparative listening with a pair of similarly priced integrated amps that were visiting for the summer: the 6V6/EL84-equipped Mesa Tigris and the EL34-configured Conrad-Johnson CAV-50.

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During this time I also experimented with speaker cables with each integrated-amp/speaker combo, alternating between the more passive, linear, midrange-oriented JPS Superconductor Singles and the remarkably rich, triodelike contours of the new, more subjectively voiced Monster Cable Sigma Retros. And, most significantly, I got to upgrade the performance of all my analog and digital components with the new Synergistic Research Designer's Reference² Master Couplers. These are, for my critical listening purposes and sheer aural exhilaration, an absolute reference point of sonic integrity. The manner in which they optimize system performance/synergy and reveal all sorts of anomalies and sonic warts at every level is incredibly revealing, and the degree of bass extension, midrange resolution, and top-end air they let shine through is a revelation. They make good components sound great, and great components sound positively surreal. All of a sudden, I was in no hurry to "upgrade" any of my core components. Damn, high-end audio is fun!

Cassandra Wilson's beautifully recorded *Traveling Miles* (Blue Note 8 54123 2) proved ideal in illustrating the Stingray's essential musical character, harmonic correctness, and ease of resolution with acoustic and electric sources, fast transients, and the human voice. My initial impressions of the Stingray were of its incredible speed and tonal brilliance. On "Time After Time," the localization, separation, and detail of specific images, such as the acoustic and electric strings in the left and right channels and the enormous acoustic bass, were clear and lucid; each instrument was distinctly delineated in its own acoustic space, yet elegantly blended with the rest.

Wilson's voice was beautifully centered and richly detailed, from the chesty mezzo character of her tone to the breathy aura of her phrasing and articulation. Nor—unlike many of the amplifiers I've auditioned of late—was there anything laid-back or rolled-off about the highs. The upper harmonics of Regina Carter's fiddle had wonderful sparkle and life on "Seven Steps to Heaven." Tiny percussive details were clearly rendered, the piano and vibraphone were never muddled in midrange murk, the soundstaging was deep and open and holographic, and there was plenty of attack and forward thrust to the bass—super rhythm and pacing, if not the last word in heft.

Likewise on the hypnotic gamelan airs of "Metalanguage," from *Alternesia* (M•A Recordings/Series Momentum M3), by my worthy colleague and fellow percussionist, Jon Iverson. This is a fantastic full-range recording with exceptional air, soundstage depth, and low-end slam, thanks to Jon's use of a venerable 2", 16-track MCI. The Stingray collated the swelter of metallic, wooden, and skin voices like a spinster librarian, seemingly sorting out and cross-referencing all the tonal focal points by height and age, in alphabetical order.

And on "Asking For It," from Hole's *Live Through This* (DGC DGCD-24631), the Stingray handled all the ambient effects and acoustic cues with classical ease and aplomb, then easily shifted into overdrive to track Courtney Love's gargling-with-grenades voice and the band's crunchy garage-band roar with the kind of snap, crackle, pop, and elemental swell that more polite audio designs never approach.

In my secret identity of Clip Stern, high-end audio's Vlad the Impaler, I'm always driving amps to destruction. So it was with the Stingray and its mechanically detented volume control (not to be confused with much more expensive graduated switched resistors, to which it bears a superficial resemblance). Depending on the source, I found that, as I increased the volume, the Stingray got a little louder, then a little more loud, then a bit louder still—until suddenly there was an abrupt jump to A LOT LOUDER as the amplifier delivered its singing telegram: "Hey, *schmuck*, you have reached the outer edges of this system's performance limits. *Back off!*" I found myself wishing I could dial up a setting somewhere between 7 and 8.

But you know what? The electrical contact of the Stingray's volume control is actually continuous, like a normal pot; it is ball bearings that give it the feel of those little mechanical clicks. By backing up so the ball bearing didn't quite rock over to the next click, I *did* find an in-between step that seemed to represent the optimum median gain before shifting over into Glare Central.

Comparisons

No integrated amplifier in this price range is going to have everything, and in one-on-one auditions with the Mesa Audio Tigris and the Conrad-Johnson CAV-50 the Stingray more than held its own—and was, in some ways, the most musically satisfying. Still, each amp had its own areas of emphasis and strength. A matter of personal taste. The best way I can characterize the differences is that the Stingray sounds as if it was voiced from the top down, the Tigris from the bottom up, and the CAV-50 from the midrange out.

I found the CAV-50 to be euphonic and fairly bloomy: rolled-off on the top, laid-back on the bottom. I was pleased to discover how sensual and harmonically correct it rendered vocals, and had a lot of fun blowing doors off hinges with large-gestured symphonic recordings, without the sound getting grainy or glaring—a very lush, romantic presentation. However, it didn't quite deliver the elemental bite and bark I want from rock or the rhythm and pacing I prefer with acoustic jazz, tending to favor the warm afterglow of upright bass rather than tracking the leading edge of attack transients. Of course, the CAV-50 uses an integral power cord, so I wasn't able to confer on it the sonic benefits of a state-of-the-art power cord like the Designer's Reference² Master Coupler. Hardly seems fair, does it? Still, employing the JPS Superconductor Single speaker cables—a fairly linear design with a detailed, articulate midrange and a bit of extra juice in the presence region—really helped localize the bass and gave the CAV-50 more air and presence on top. System synergy is everything.

The Mesa Tigris is, in some ways, the most versatile of these three amps, what with its dedicated headphone amplifier and the multiple pentode/triode/negative-feedback combinations of its Tandem State Imaging. It has terrific slam and bass resolution, a sweet, smooth top end, a warm, musical midrange, and fine soundstaging. I love listening to rock and driving acoustic jazz on it. But as I intimated in writing of its multiple personalities in my original review, it's less powerful, and more colored or subjective in its presentation—which means it doesn't have the upper-midrange articulation and see-through clarity that make the Stingray more satisfying for a greater variety of acoustic sources and rock. For the Tigris to match the gain, headroom, and soundstaging depth of the 50W, ultralinear Stingray would necessitate adding progressive increments of negative feedback, which would make it much more linear and significantly increase the dynamic range, but with a commensurate loss of transparency.

The Stingray had little in the way of upper-bass bloom or plumpness. Its bass was still much faster and more forward than the CAV-50's, if not quite as fat and immediate as the Tigris's. Still, the speed and accuracy with which it portrayed bass were quite musical, the midrange was exceptionally clear, open, and articulate, the presence region had real bite, and the high end was detailed and brassy. I would not recommend using the Stingray with exceptionally bright or analytical speakers, as the sonic aftermath could be likened to the penumbra's effect on the eyes during a solar eclipse.

Conclusions

The Manley Laboratories Stingray is a carefully thought-out, lovingly designed integrated amp with a big, open soundstage, a shimmering, crystalline top end, a clear, richly detailed midrange, and a lean, focused, articulate bass response with such superb speed and pacing that it more than compensates for its lack of extreme low-end heft.

Which is not to say that the Stingray doesn't have beaucoup bass. With small,

warm, efficient bookshelf speakers, the Stingray's sound was rich, vibrant, and alive, with plenty of pep, detail, character, and punch. It was shocking how rich and musical the Stingray sounded with the humble little PSB Alpha minimonitors and the warm, sweet Soliloquy 5s.

Which is not to say that it lacked the guts to drive big full-range speakers...provided they have the requisite sensitivity. At HI-FI '99 in Chicago, I heard the Stingray drive the big Tannoy Churchills to purr-fection, while with my full-range Celestion A3s—in tandem with the warm, airy, triodelike midrange character and plump, autumnal upper-bass emphasis of the Monster Cable Sigma Retros—I was able to get as vivid, balanced, and involving a sound in my listening room as I've ever experienced.

All in all, the Stingray is cool, sexy, and musical. But mostly, it's fun.

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Sidebar 1: Specifications

Description: Vacuum-tube integrated amplifier with ultralinear, push-pull output stage. Tube complement, per channel: four EL84s, one 6414, one 12AT7. Line inputs: CD, Video, Tuner, Aux (Record Out, Subwoofer Out available on request). Power output: 50Wpc, optimized for 5 ohm nominal load (15dBW); 25W triode configuration available on request. Damping factor: 10 (equivalent to a source impedance of 0.5 ohms with a 5 ohm load). Bandwidth: 15Hz-40kHz (no limits given). THD at 5W: 0.25%. S/N ratio: 87dB (A-weighted).

Dimensions: 19" W by 6.5" H by 15" D. Shipping weight: 30 lbs.

Serial number of unit reviewed: MST 111.

Price: \$2250. Approximate number of dealers: 35. Warranty: 5 years, limited; tubes, 6 months.

Manufacturer: Manley Laboratories, 13880 Magnolia Avenue, Chino, CA 91710.

Tel: (909) 627-4256. Fax: (909) 628-2482. Web: www.manleylabs.com.

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Sidebar 2: Associated Equipment

Analog sources: Rega Planar 3, Dual CS 5000 turntables; Grado Reference Master, Ortofon X5-MC cartridges; Audio Refinement AM/FM tuner.

Digital sources: California Audio Labs CL-20 DVD player, Delta CD transport; Audio Refinement CD player, California Audio Labs Alpha 24/96 tube DAC.

Preamplification: E.A.R. 834P tube phono preamp.

Loudspeakers: Celestion A3, [Joseph RM22si](#), [Soliloquy 5](#), [PSB Alpha](#), Cabasse Aria (by Zalytron Industries, designed by Joe D'Appolito).

Cables: Interconnects: Synergistic Research Designer's Reference² Master Coupler, Resolution Reference Mk.II; Straight Wire Serenade. Speaker Cables: JPS Labs Superconductor Single, Monster Cable Sigma Retro.

Accessories: JPS Labs Power AC Outlet Centers. Argent RoomLenses, EchoBusters room treatments; PolyCrystal brass speaker spikes, cones, stands; Signal Guard II Resonance Attenuation Platform; Shakti Stones.—**Chip Stern**

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Sidebar 3: Measurements

Unless otherwise noted, all measurements were made at level settings that resulted in a 1W output with an input of 100mV. This was approximately 1:30 on the Manley Stingray's volume control, at which position the voltage gain into 8 ohms was 29dB. The Stingray's gain at the maximum setting of the volume control was 39.5B.

After one hour of operation at 1/3 power the Stingray was running no hotter than is typical of tube amplifiers. The Manley's input impedance measured a comfortably high 47.2k ohms. The output impedance, however, was also high, ranging from a maximum of 3.87 ohms at 20Hz to a minimum of 2.83 ohms at 20kHz—values guaranteed to affect the amplifier's frequency response through real loudspeakers. DC offset at the main outputs measured a negligible 0.3mV in the left channel, 0.1mV in the right. The Signal/Noise Ratio (referenced to 1W into 8 ohms, left channel, all values rounded to the nearest dB) measured a good 73dB from 22Hz to 22kHz, 69dB from 10Hz to 500kHz, both unweighted, and 78dB A-weighted. The A-weighted value dipped intermittently to 70dB, this most likely due to a slightly noisy tube.

The Stingray is noninverting, a positive-going input resulting in a positive-going output. Its volume-control tracking is fair, with a left/right output deviation of up to 1dB, depending on the setting. The volume control's detents are fairly coarse, particularly from 12:00 down. While the maximum change measured in the plus direction was 1.7dB, two steps in the minus direction resulted in changes of approximately 5dB each. It is possible, however, to position the control between

detents.

Fig.1 shows the Stingray's frequency response. (Note the 1dB/division scale.) The response into a resistive load shows a slight downtilt at low frequencies. The uneven response into our simulated loudspeaker load, however, is the result of the amplifier's high output impedance. Similar deviations will always be present in actual use, though varying slightly depending on the impedance of the speaker used. These changes should be clearly audible, and will make the amplifier's sound highly speaker-dependent—a characteristic of most tube amps.

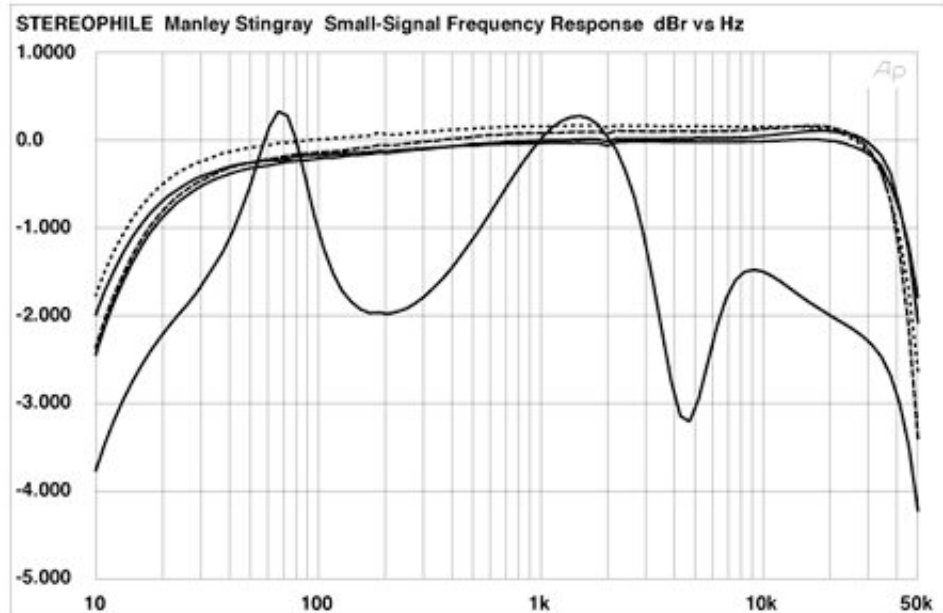


Fig.1 Manley Stingray, frequency response at (from top to bottom at 1kHz): 2.828V into 8 ohms, 4 ohms, and simulated loudspeaker load, (1dB/vertical div., right channel dashed).

Fig.2 indicates the Manley's output with a 10kHz squarewave input. The risetime is fair, but there is a noticeable overshoot and some damped, ultrasonic ringing. The overshoot is also very evident in the 1kHz squarewave (not shown), though the ringing is not.

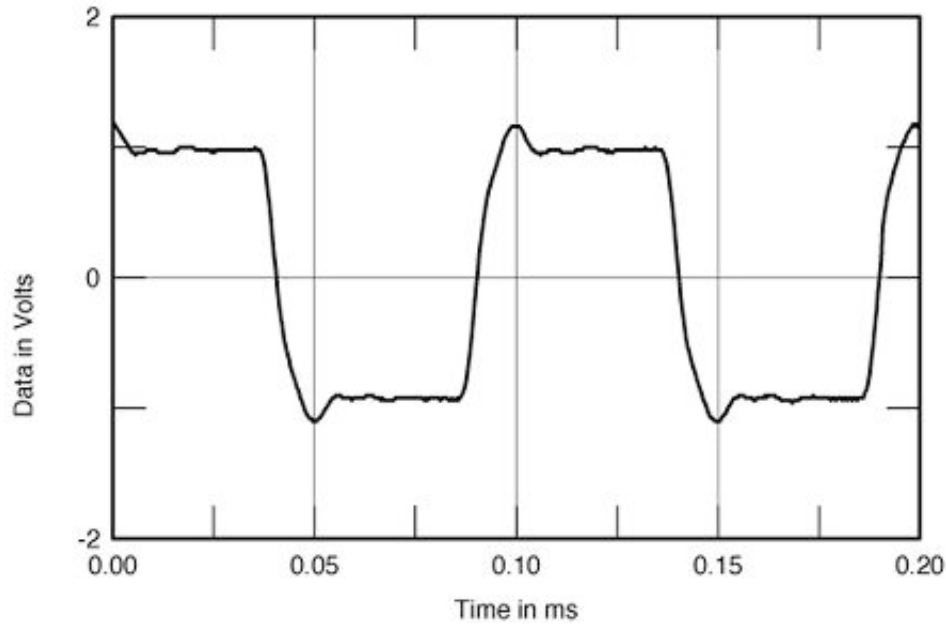


Fig.2 Manley Stingray, small-signal 10kHz squarewave into 8 ohms.

Fig.3 shows the Stingray's channel separation: a fair result at best, with the crosstalk in one direction noticeably worse than the other. However, in neither direction is the crosstalk likely to result in noticeable audio degradation.

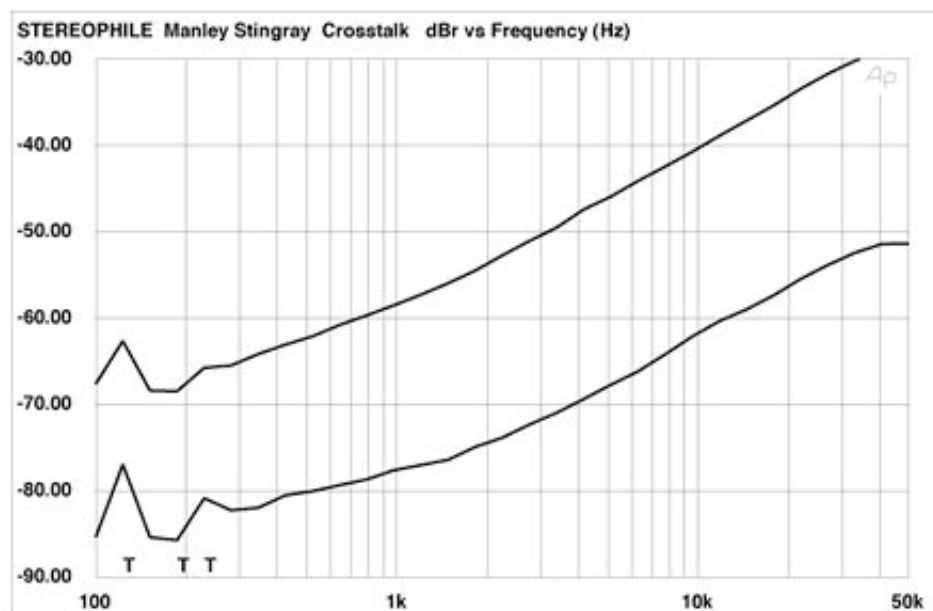


Fig.3 Manley Stingray, channel separation vs frequency, from top to bottom: L-R, R-L (10dB/vertical div., right channel dashed).

The THD+noise percentage vs frequency results shown in fig.4 are respectable for a tube amplifier, though the right channel's low-frequency distortion could be lower. (The bias for each tube was within 10mV of the recommended 250mV reading for these measurements.) It's clear, however, that the Stingray is not very happy with loads below 4 ohms. Fig.5 shows the waveform of the amplifier's THD+noise at 2W into a 4 ohm load. The second harmonic predominates.

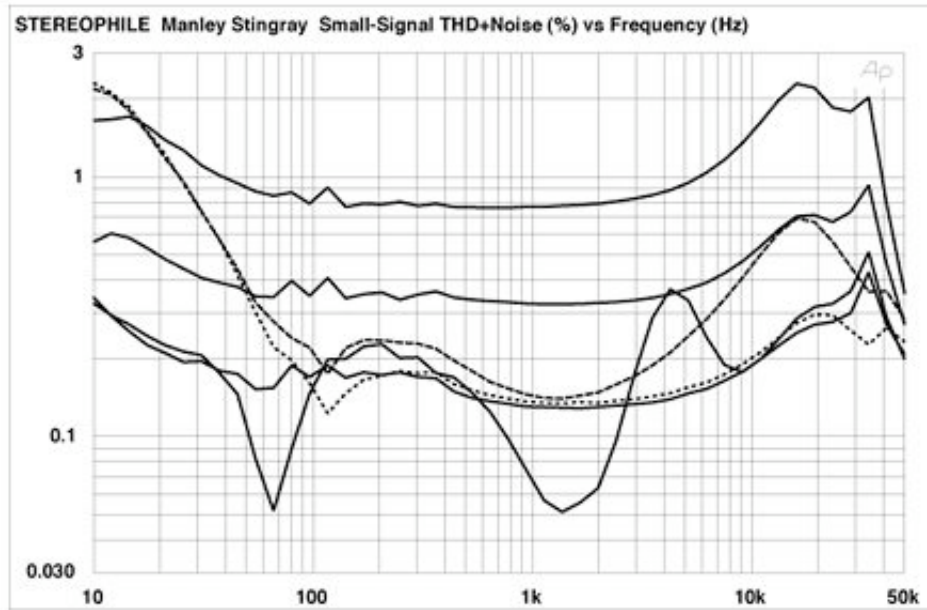


Fig.4 Manley Stingray, THD+noise (%) vs frequency at (from top to bottom at 2kHz): 4W into 2 ohms, 2W into 4 ohms, 1W into 8 ohms, and 2.83V into simulated loudspeaker load (right channel dashed).

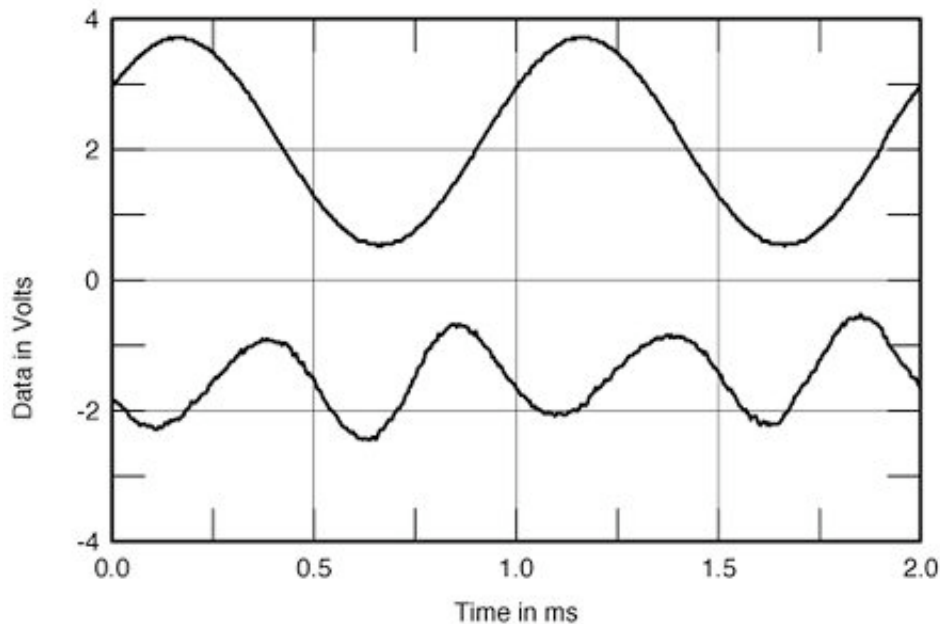


Fig.5 Manley Stingray, 1kHz waveform at 2W into 4 ohms (top), distortion and noise waveform with fundamental notched out (bottom, not to scale).

Fig.6 shows the Manley's spectral response with a 50Hz input at an output of 33.5W into an 8 ohm load. The second harmonic (100Hz) is just below -40dB (1%), the third at -44dB (just under 0.7%). For reference, fig.7 shows a similar spectrum taken with a 1kHz tone driven at 33.5W into 8 ohms. The second harmonic has dropped to a more respectable -59dB (just above 0.1%) with the third harmonic now highest in level, at -56dB (0.15%). Clearly the amplifier is less linear at low frequencies and high levels, but if you read EveAnna Manley's comments in the main text of this review, it seems that this was a deliberate design choice.

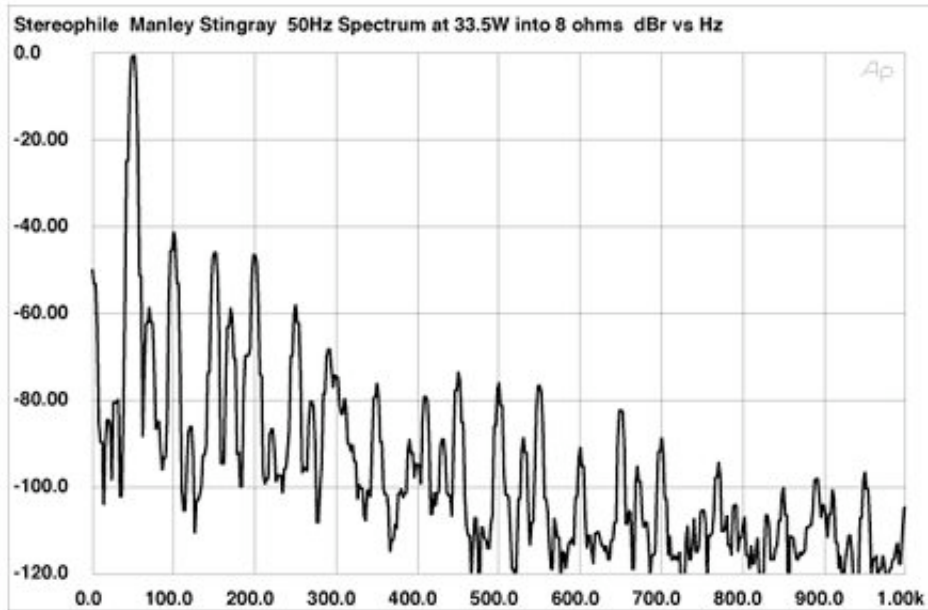


Fig.6 Manley Stingray, spectrum of 50Hz sinewave, DC-1kHz, at 33.5W into 8 ohms (linear frequency scale).

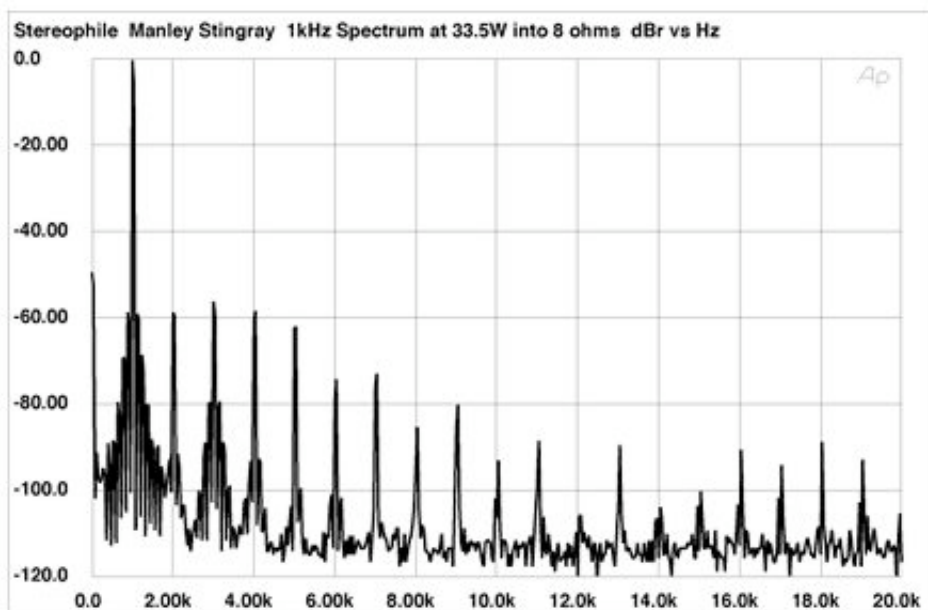


Fig.7 Manley Stingray, spectrum of 1kHz sinewave, DC-20kHz, at 33.5W into 8 ohms (linear frequency scale).

The spectrum shown in fig.8 reveals the intermodulation in the output with a combined 19+20kHz signal being delivered at 19.7W into 4 ohms (about as high as this amplifier will deliver into this load before visible clipping of the waveform). The difference artifact at 1kHz lies at -52.9dB (about 0.25%), the 18kHz component is -35.7dB (about 1.7%). This intermodulation is just marginally lower at most frequencies at the same power into 8 ohms (not shown), but higher at 1kHz (about 0.45%). The results of figs.6, 7, and 8 may appear uninspiring, but they are not out of the ordinary for tube amplifiers, which traditionally do relatively poorly on these spectral analyses.

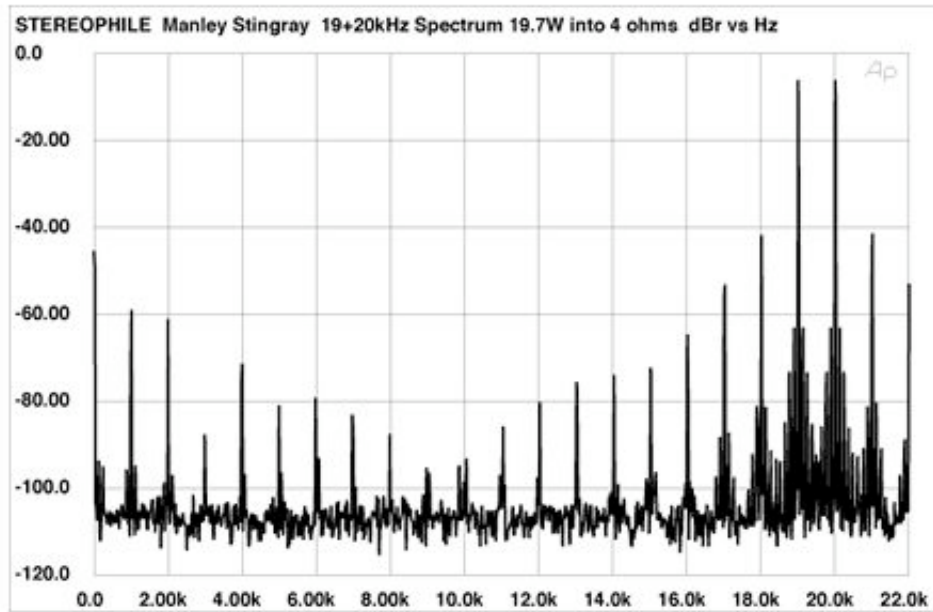


Fig.8 Manley Stingray, HF intermodulation spectrum, DC-22kHz, 19+20kHz at 19.7W into 4 ohms (linear frequency scale).

Fig.9 shows the way in which the Stingray's THD+noise at 1kHz varies with output power with one channel continuously driven into 8, 4, and 2 ohm loads. The discrete clipping measurements are shown, to the nearest watt, in Table 1. Note, too, that the clipping levels are given at 3% THD+noise rather than the 1% we usually specify. Note that the Stingray doesn't quite meet its specified power into either 8 or 4 ohms. However, an amplifier like this with a relatively undersized power supply will deliver more power with a music signal than with the continuous test tones used to derive fig.9 and Table 1. Accordingly, fig.10 shows the Manley's THD percentage plotted against power delivery for a low duty-cycle 1kHz toneburst (10 cycles on, 400 cycles off).

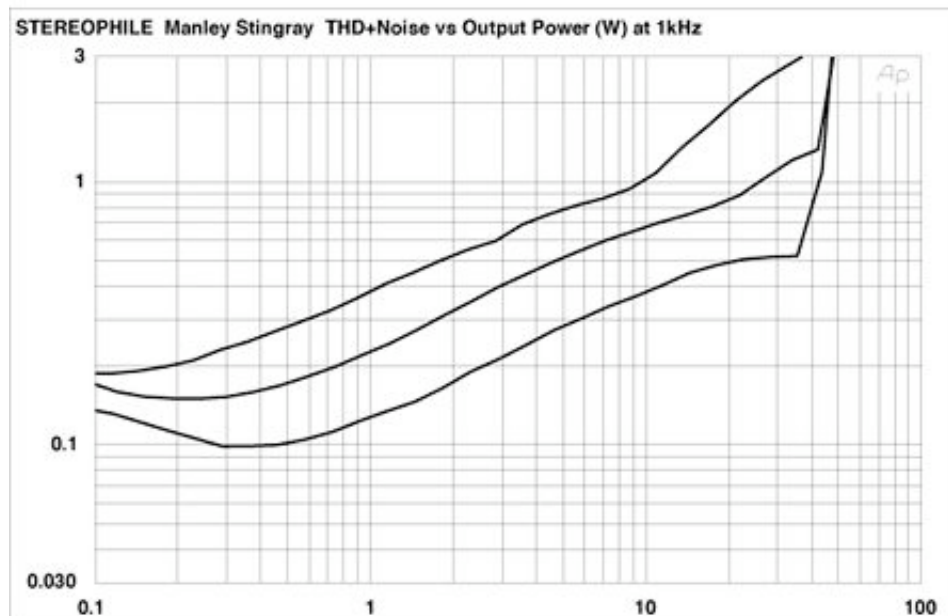


Fig.9 Manley Stingray, distortion (%) vs continuous output power into (from bottom to top) 8 ohms, 4 ohms, and 2 ohms.

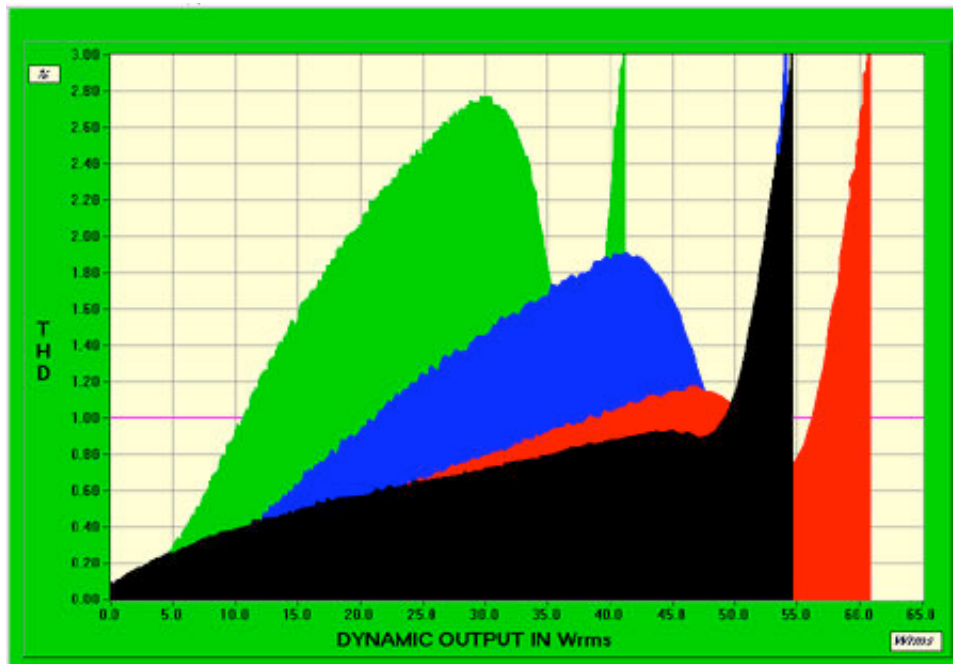


Fig.10 Manley Stingray, distortion (%) vs 1kHz burst output power into 8 ohms (black trace), 4 ohms (red), 2 ohms (blue), and 1 ohm (green).

Table 1 Manley Stingray: Discrete Clipping

	(3% THD+noise at 1kHz)		
	Both Channels Driven		One Channel Driven
Load	W (dBW)		W (dBW)
Load	(L)	(R)	(L)
8 ohms	45.9 (16.6)	46.6 (16.7)	46.6 (16.7)
(line V)	116V	116V	116V
4 ohms	45.5 (13.6)	46 (13.6)	47.5 (13.8)
(line V)	116V	116V	116V
2 ohms			38 (9.8)
(line V)			116V

Under these conditions, the Stingray delivers 54.6W into 8 ohms (black trace) and 60.8W into 4 ohms (red trace) for 3% THD+noise. The distortion rises in a relatively linear manner with output power. But into 2 ohms (blue) and 1 ohm (green), the power delivery drops and the distortion rises dramatically. Speakers with impedances that drop below 3-4 ohms or have high electrical phase angles should best be avoided. For a 1% THD figure (horizontal magenta line), the maximum current delivery was about the same into all loads, at around 3.5A, which is actually quite respectable considering the Stingray's physically small output transformers.

Except for those areas in which tube amplifiers often perform poorly on the test bench, the Manley Stingray turns in a respectable if unremarkable set of numbers. Just be aware that your choice of loudspeakers will be even more important with the Stingray than with other amplifiers—not because the loudspeaker may be difficult to drive per se (although I repeat that I'd avoid very low-impedance speakers with the Manley), but because the Stingray's high output impedance will interact with the loudspeaker's impedance to create audible deviations in frequency response.—**Thomas J. Norton**

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