

SECRETS of Home Theater and High Fidelity



Product Review

Manley Labs Mahi Tube Monoblock Power Amplifier

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Introduction

Mahi, Shrimp, Steelhead . . . EveAnna Manley has been naming her latest array of products after fish. If you want to know why, see her [video interview](#). Frankly, it is a lot easier to remember names like these than model numbers.

The Mahi is Manley's newest power amplifier, a monoblock rated at 40 watts output. But there is much more to it than simple specs. You can switch in the amount of negative feedback you want, and also switch between Triode Mode or what is called "Ultra Linear Mode" (UL). The EL84 (also called 6BQ5) output tube is a power pentode, but it is wired here either as a triode, or in UL mode. The suppressor grid is always connected to the cathode, and the connection is inside the tube, permanently. This, in fact, confuses the pentode designation. The signal and bias go to the control grid, and the screen grid is connected either to the anode for Triode Mode, or to a dedicated tap on the output transformer for UL Mode.



Click the photo above to see a larger version.

Specifications:

Output Power: 40 Watts

Vacuum Tubes:
4 x EL84 Output
1 x 12AT7WA Input
1 x 6414 Driver

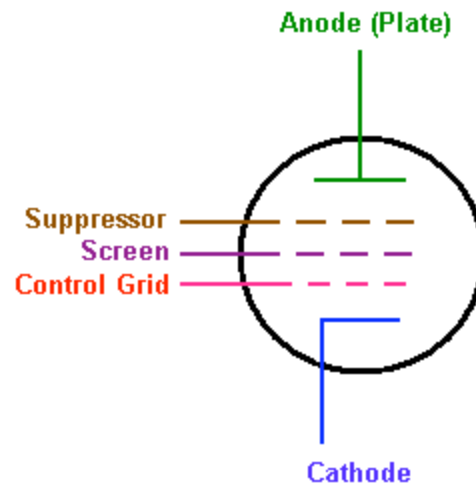
Freq. Response +0.5 dB: 10 Hz - 90 KHz

Input Sensitivity: 460 mV Nominal

Input Impedance: 100 kOhm
 Load Impedance: 5 Ohms
 S/N Ratio @50W: -80 dB
 Dynamic Range: 86dB
 Power Consumption: 100 Watts (Idle),
 168 Watts (Full Power)
 Dimensions: 5" H x 12" W x 10" D
 Weight: 17 Pounds Each
 MSRP: \$2,500/Pair

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The idea behind having switchable Triode or UL modes is that the two modes have a different sound, with triode being sweeter, and UL being a little snappier.

The Design

The Mahi is a monoblock, meaning that it is just one channel. It uses a 12AT7 triode as the input, 6414 as the driver (interfaces between the input stage and output stage), and four EL84 pentodes in push-pull as the output stage.

You can select the amount of negative feedback that you want, using a toggle switch on the top of the chassis. There are three choices, max, std, and min. A second toggle allows you to switch between triode and UL modes.

For tubes, a bias DC voltage is maintained on the grid, which controls how much current flows between the cathode filament (-) and anode plate (+) during idle. When music signals come through, that idle current is instantly diverted to the speaker terminals. That idle current makes up the portion of power that is biased into "Class A". Beyond the idle current, the amplifier has to bring in more current as needed, and this is the portion of the power biased into "Class B" operation. (This is my own simplified explanation.) The Mahis are biased as Class AB1.

Because tubes get hot, they age, and as they age, the amount of electrons coming off the cathode can drift. So, the Mahi, like many tube amplifiers, has a simple way for consumers to adjust the bias voltage. On the top of the chassis, next to each tube, are two small holes labeled "BIAS 1, 2, 3, or 4". At the front of the chassis is a single hole labeled "GROUND". Using a voltmeter capable of reading in DC millivolts, you place the ground lead in the ground hole, and the hot lead into the red hole for one of the tubes. There should be no signal coming into the amplifier for these adjustments. The reading should be around 250 millivolts. In my own tests, each tube gave a reading of between 230 mV and 235 mV. The red holes are connected via a white line to other holes where you insert a jeweler's screwdriver and adjust the bias voltage so that it reads close to 250 mV.



The rear end of the Mahi is pretty simple. There is an On/Off power toggle and grounded AC socket for use with the included detachable power cord. The connectors are also nearby, with an RCA input jack and five-way speaker binding posts. The power toggle is on the rear instead of the front for a good reason, namely, that it keeps the AC in the back corner near the power transformer and power supply capacitors, and away from the input circuits.

Instead of the usual flat round feet, the Mahi has four corner posts that are pointed at the bottom for maximum isolation from the table on which they sit. The front panel, with the Manley logo, is illuminated for the retro-look that tubophiles love.

The overall appearance of the Mahi is one of elegance. They are beautiful.



The Sound

I tested a pair of Mahis with a Classé CDP-10 CD Player, Balanced Audio Technology VK-5i Preamplifier, and Magneplanar MG1.6/QR Speakers. Cables were Nordost, BetterCables, and Analysis Plus.

Like other tube products, the Mahi needs about an hour to sound its best. The hot temperature is an important part of the way tubes work, and while the filament is the only structure that is heated by current (in order to allow electrons to flow), the rest of the tube gets hot too, and it takes a while for everything to stabilize, including the glass envelope.

The Mahi has a little more hum than my BAT VK-75SE, but a little hum and hiss are common with tube amplifiers. You can see this in the bench test graphs below.

Notwithstanding a little more background noise, the Mahi sounded very much like my VK-75SE, at least at low-medium volume. It was very clear, and quite smooth. I fooled around with the negative feedback switches and triode/UL switches a lot at first, and I could easily hear the differences. With minimum feedback, the sound had a much more full bodied midrange, while maximum feedback seemed to make the sound more even across the frequency range. Going from triode to UL, the leading edges of the sound had more snap to them. My final choice was maximum feedback and UL mode.

The Maggies are not easy speakers to drive (4 Ohms impedance, 86 dB/2.83v/m sensitivity), but that is why I use them in product tests. I found that the Mahis sounded very good at modest volume, but tended to be mushy at higher volume. This really is not surprising since the Mahi is a relatively low powered amplifier. So, I just listened at moderate volume and enjoyed the heck out of the Mahis. By the way, with a pair of these, you have Mahi Mahi, which is the proper name for the fish.

Whether it was single piano, such as Chopin: The Romantic Pianist, or Violin Concertos, such as Sarah Chang playing Dvorak, the Mahis gave me afternoons and evenings of great pleasure. The instruments were clearly delineated, and I had no problems visualizing a large soundstage.



Because of the low power output, better performance will be achieved by using more efficient speakers with the Mahi. I would suggest something on the order of 90 dB/w/m, or higher. Besides the Maggies, we used the Mahis with our Krix Esoterix speakers (8 Ohms, 88 dB/w/m), which were a better match.

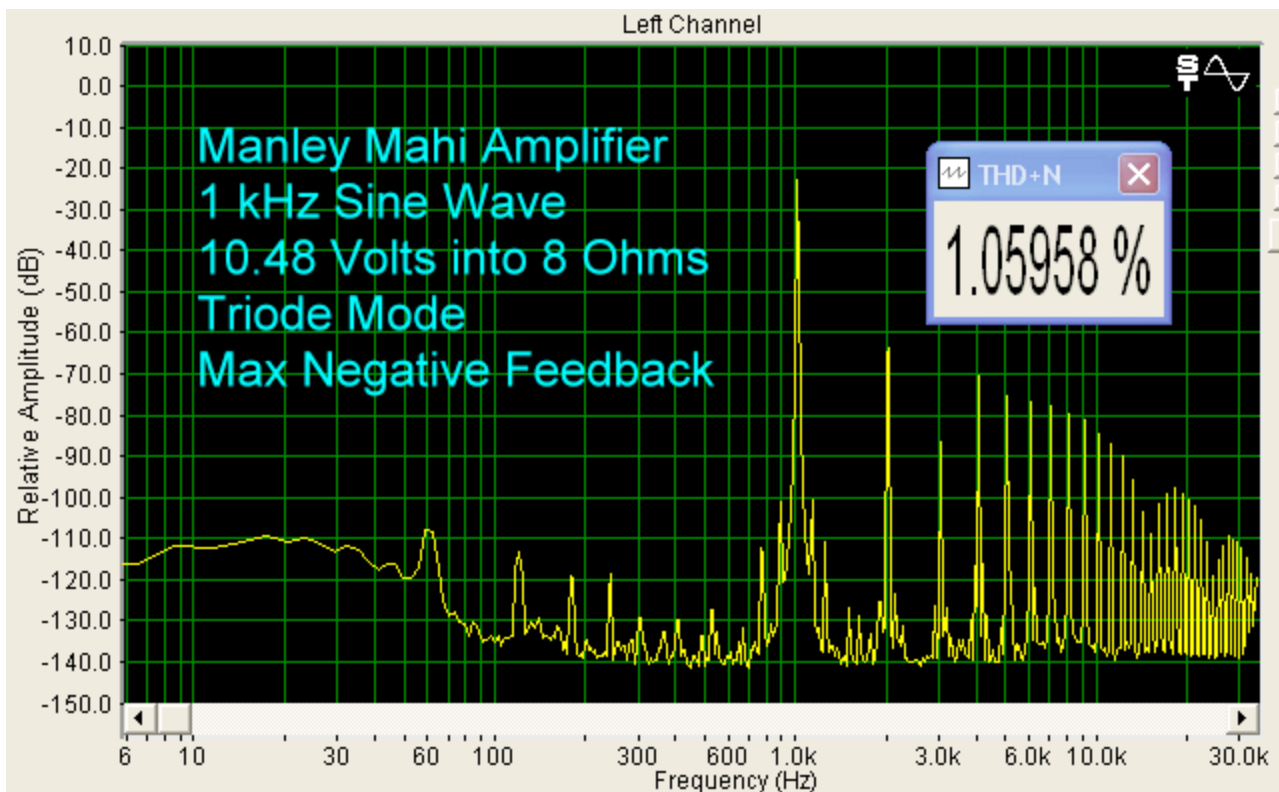
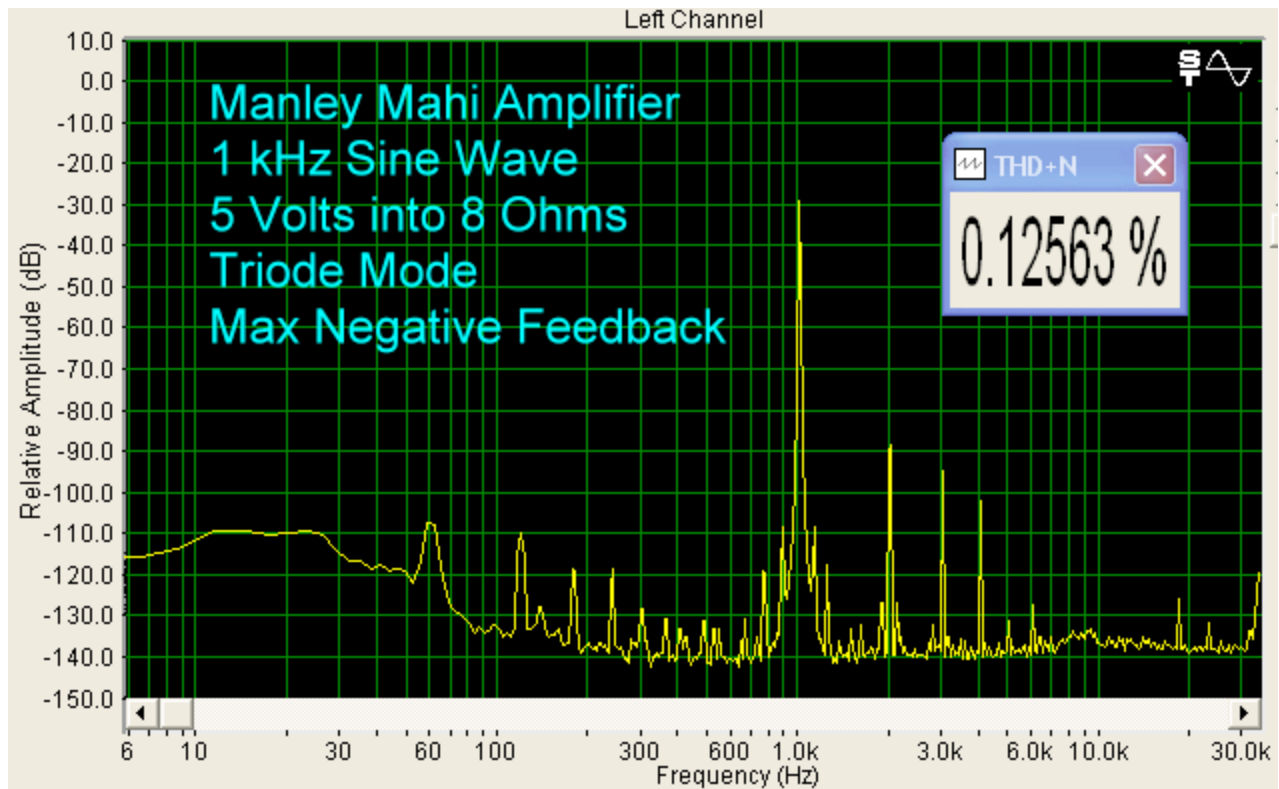
On the Bench

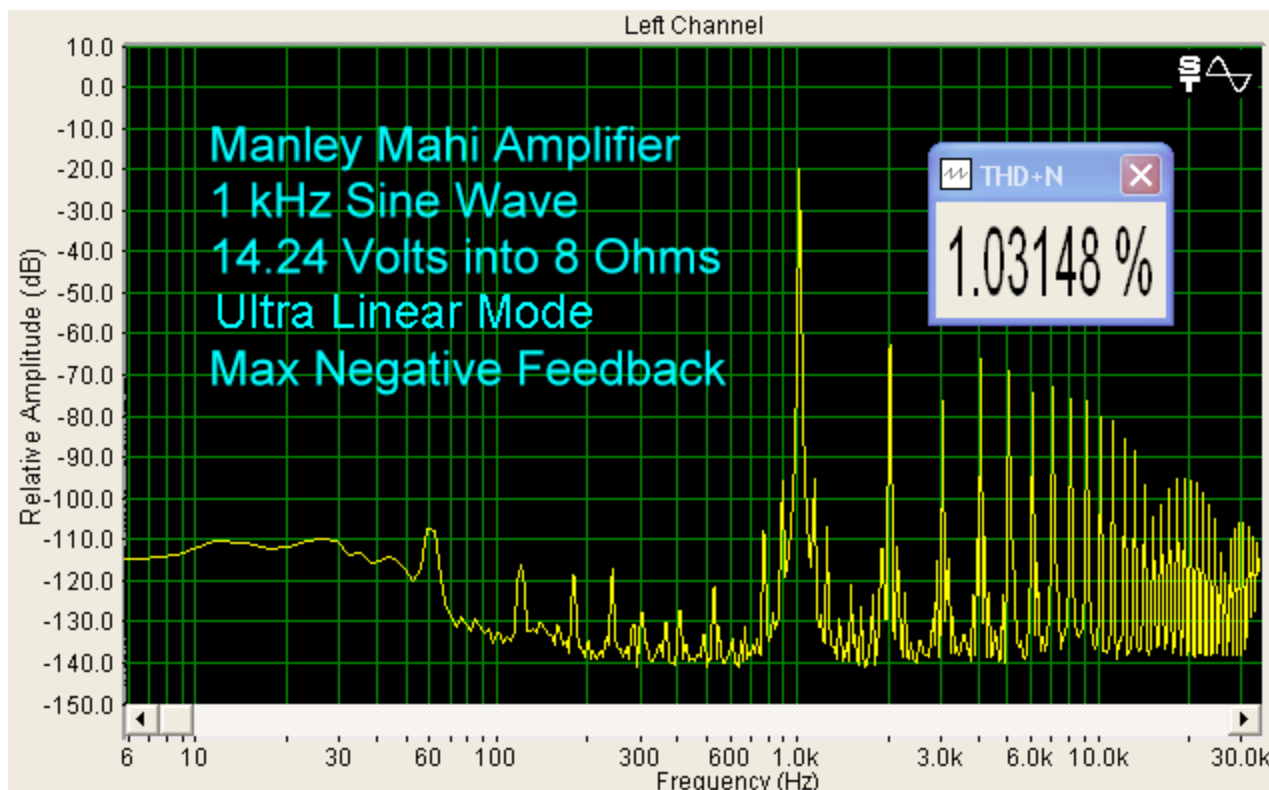
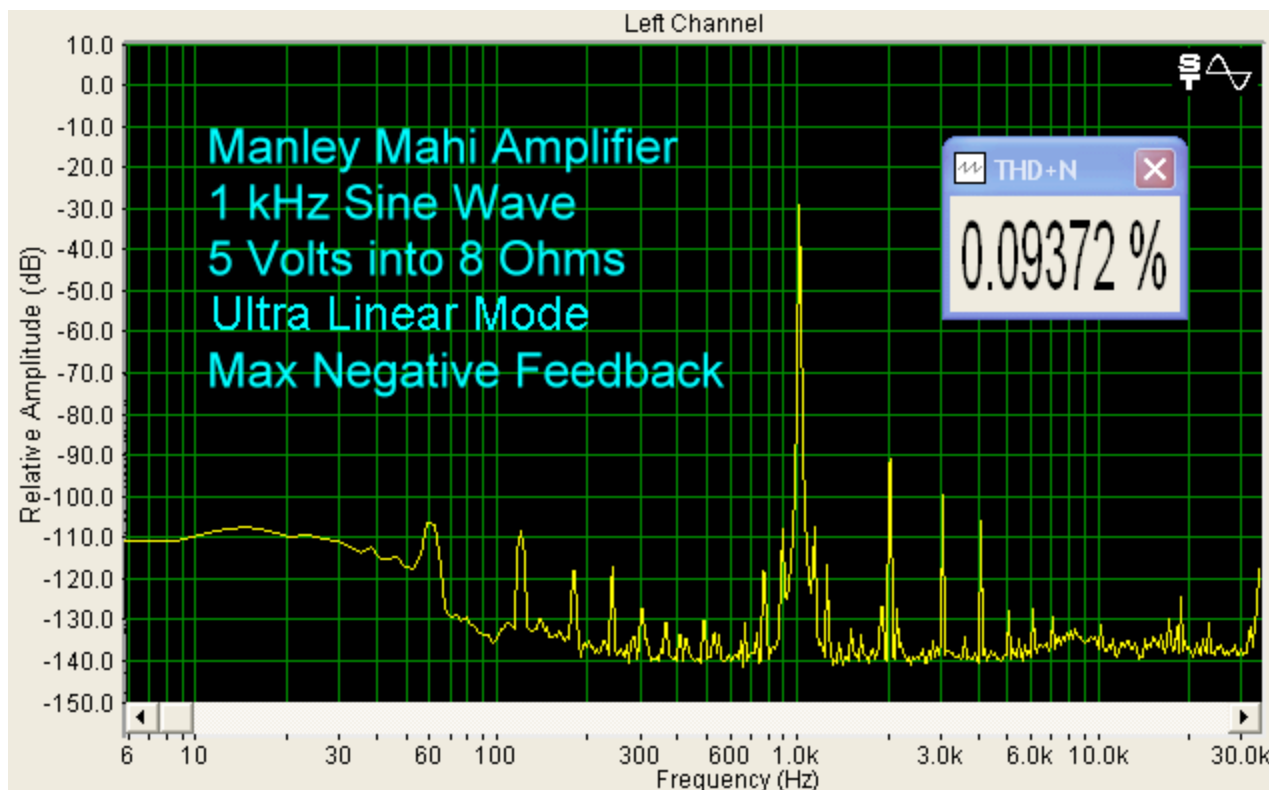
Output at clipping (1% THD + Noise) for a 1 kHz sine wave into 8 Ohms, using Triode Mode and maximum negative feedback, was 10.48 Volts, which represents 14 watts. In UL Mode (Ultra Linear Mode), we got 14.24 Volts at clipping, which is 26 watts. Note that this is 26 watts into an 8 Ohm load. The Mahi is specified into 5 Ohms, so 26 watts into 8 Ohms is equivalent to 40.5 watts into 5 Ohms, which is right on specification.

Using lower amounts of negative feedback increased the amount of distortion. For example, leaving everything else the same for the UL clipping test, changing the negative feedback from Maximum to Standard, the THD went from 1% to 14%, and at the Minimum negative feedback setting, it went to 23%. The output voltage at clipping between max feedback and min feedback was about the same, and since I preferred the sound at max feedback, the best performance for me was in UL Mode and maximum negative feedback.

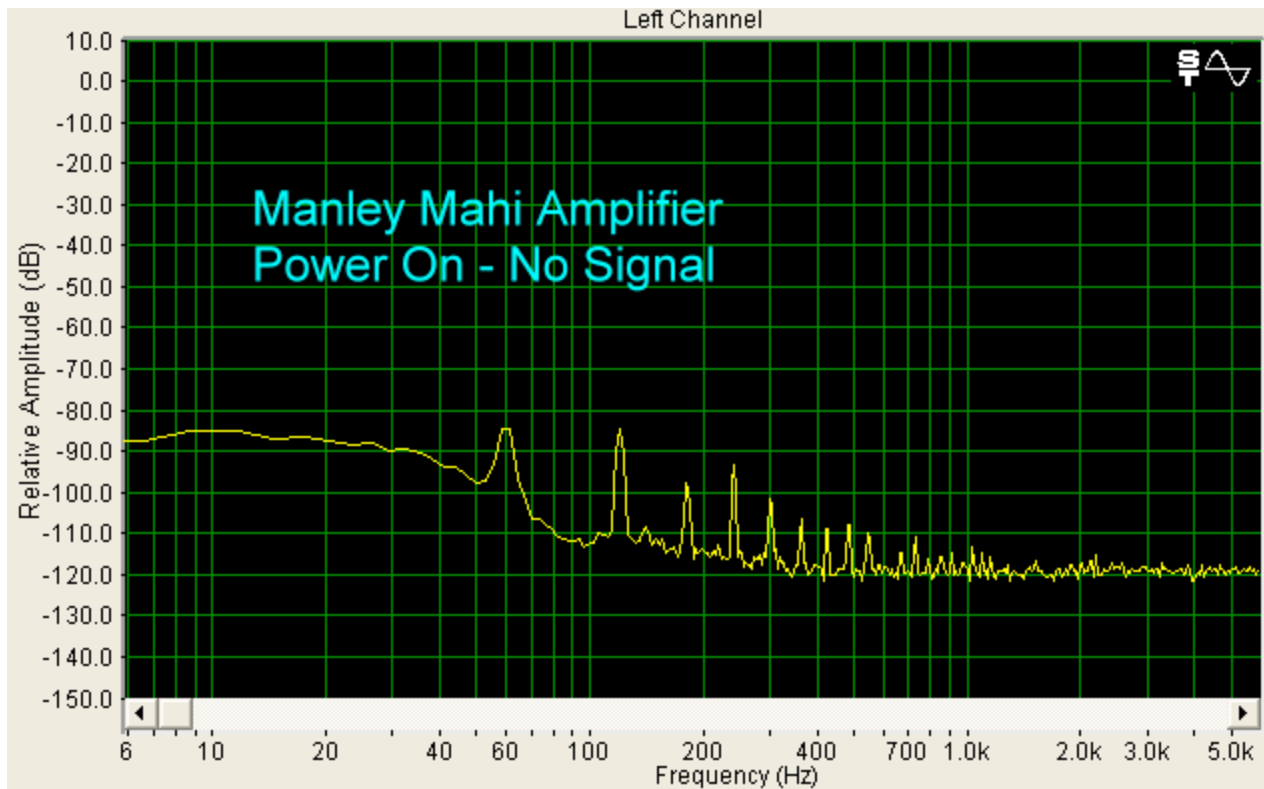
Distortion tended to be more of the even-ordered variety, and at 5 Volts into 8 Ohms, which is a typical listening level, there was about 0.1% THD. Tube products typically have more distortion than solid state, often because less negative feedback is employed.

That is just part of what you have to accept if you like tubes.

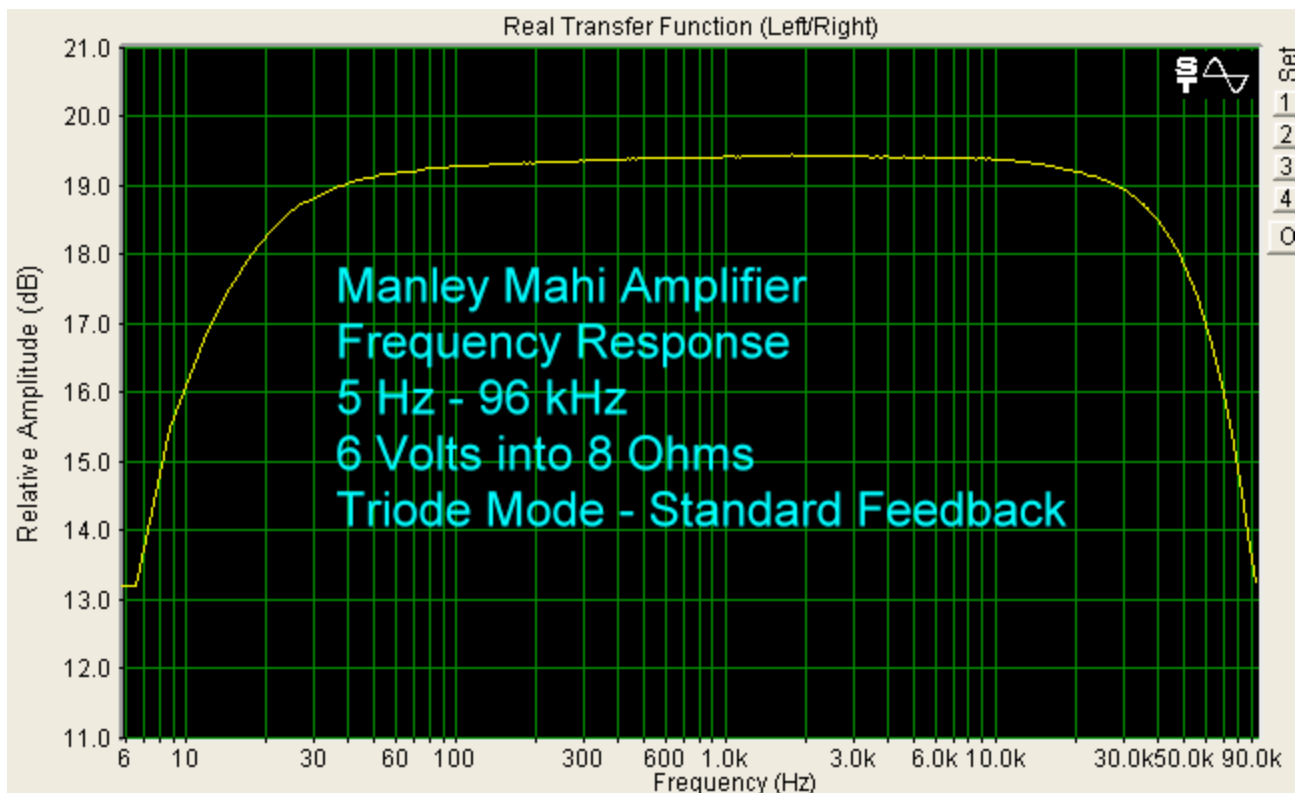


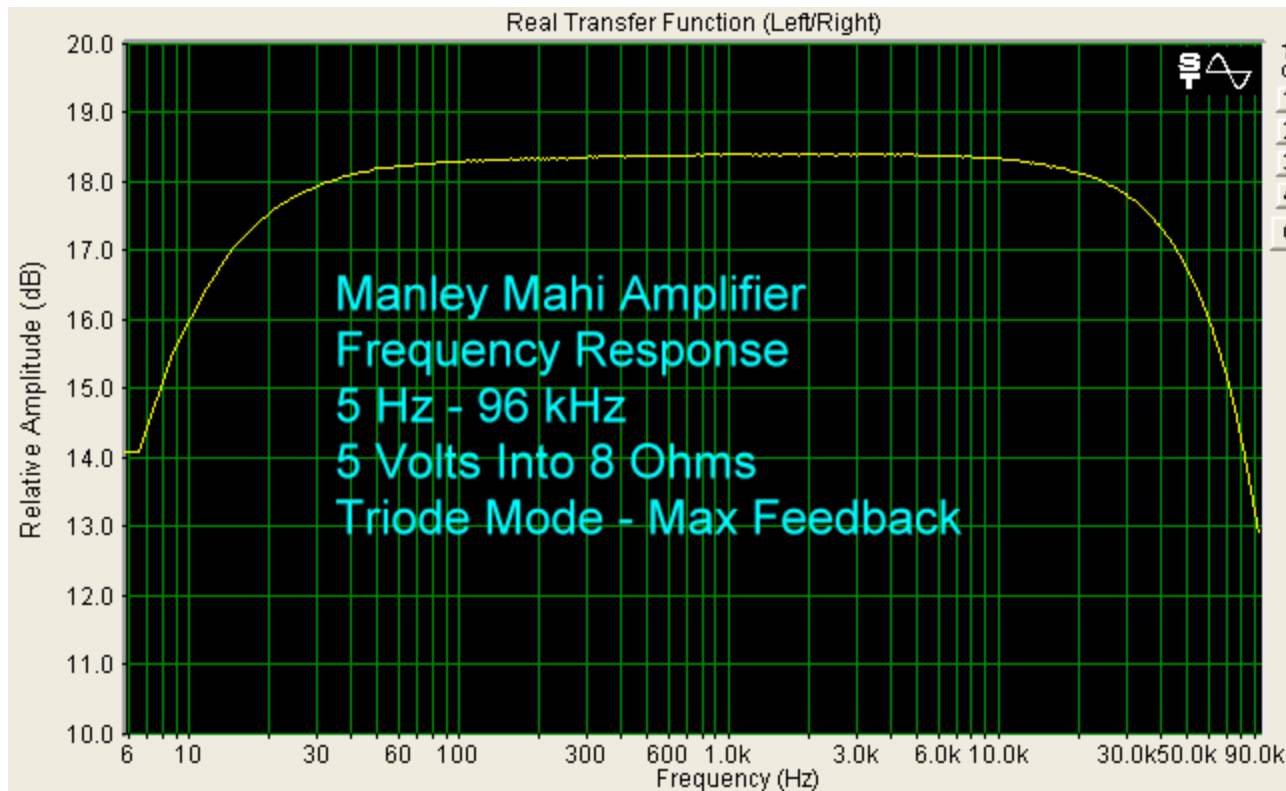


Below is a graph with the amplifier powered on, and input cables and output cables connected, but no input signal. It shows that the Mahi has a significant amount of AC ripple, and this is the hum that I was hearing. I have tested more expensive power amps that have hum too, and less expensive tube products that don't have this much. It is just another thing that is part of dealing with tubes.

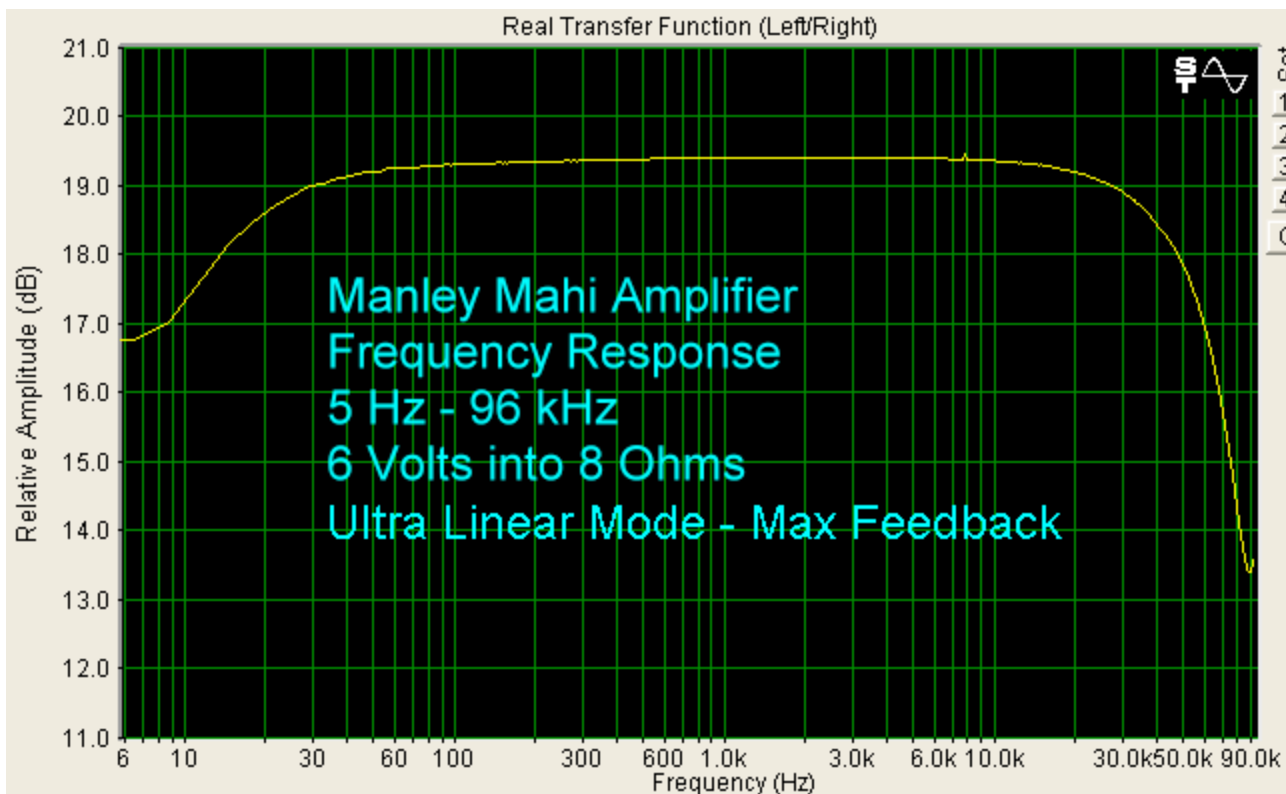


The measured frequency response is shown below. Notice that going from standard feedback to maximum feedback tends to flatten the frequency response a bit. This is a good demonstration of why negative feedback is used.





In Ultra Linear mode, the frequency response was about the same as in triode mode.



Conclusions

The Mahi is something I have come to expect from EveAnna Manley. It is very

handsome to look at, has a great sound, but you need efficient speakers. As long as you do that, you can look forward to some very pleasant music entertainment.

- John E. Johnson, Jr. -

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