**Headphone Measurements:**

**Yamaha HP-50A - DIY Modified - dE**

- **Volts RMS required to reach 90dB SPL:** 0.440 Vrms
- **Impedance @ 1kHz:** 128 Ohms
- **Power Needed for 90dB SPL:** 1.52 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -5 dBr

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**Frequency Response**

Top - Compensated and Averaged

Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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