

agdr Desktop Headphone Amplifier

V 1.4 changes

- Full part renumbering done on the PC board and BOM.
- BOM cleaned up and verified. Found a couple of parts that were left off.
- Pre-amp output RCAs added on the front of the board, next to the 3.5mm and ¼: output jacks. A new dual buffer/amplifier chip can optionally be used to power the pre-amp out jacks. The pre-amp outs can be used in several ways:
 - The RCA jacks can be fed directly using the jumper holes attached to the RCA pins and wire connect. In this case the buffer/amp chip would be left off the board. The jack can be wired into the rear RCA jack, or into the output of the input selector switch (front or rear inputs). With this method the pre-amp outs just pass the input signal along directly.
 - Same as above, but instead the buffer/amp chip can be populated and that chip fed from the inputs. If the chip is wired as a 1x voltage gain buffer the input signal is passed along but current buffered. If the gain resistor is added then the input signal will be multiplied by some voltage gain. All of this is before the volume control, of course.
 - Either the jack or the buffer/amp chip can be fed from PCB holes after the LME49990 gain chip, including any gain it is set for, or after the volume control.
- Output NJM4556AL balancing resistors changed from 3.32R to 0.5R. The new 0.5R resistors are the standard (longer) 6mm low current noise variety, which are now soldered in on end (tombstoned). The change further lowers the output offset voltage and brings the balancing currents up closer to 1% of total chip half current capability.
- The DC servo is removed entirely. In actual testing the OPA2188 chip turned out to be useless for 100uV level DC servo work due to its large input offset current, which times the servo resistors is equal to the offset being corrected. The OPA627 does work, but oscillates at 80kHz due to its open loop phase adding 60 degrees lag to the buffer chips existing 90 degrees. The new 0.5R output buffers further lower the output DC offset to about 1mV anyway, which is perfectly acceptable.
- The upper power rail selection is lowered from +/-17Vdc to +/-16Vdc. This insures that the input of the NJM4556A chips never exceed the data sheet limit of +/-15Vdc, since the output of the gain stage LME49990 only gets to within 2V of the rails. The change involved new values for R36 and R37.
- Changed R1 and R2, the CLC filter resistors, to larger 2512 2W units for reliability.
- The NJM2068 chips that looped around the output buffers are gone. The slew rate of the NJM4556A was too slow at 3V/uS vs. the faster slew of the NJM2068.
- Holes for a 6th 4.7uF coupling capacitor added back, now that the NJM2068 chips are gone, to allow the coupling filter corner frequency to be 1.12Hz again, vs. 1.8Hz for the O2 amplifier.

- And... all mention of the O2 amplifier and the O2's license is left off the PC board now, as per the long discussion in the forum. The net result is that this design is believed to be much to different than RocketScientist/ NwAvGuy's O2 headphone amplifier to be a "derivative" under the O2 license terms, but rather a new product entirely, as NwAvGuy's ODA was supposed to be.