

1. Summary

NEC (Northeast Electronics Corp, USA) Impulse Counter & Noise Measuring Set, Model 58B, S.N. 147. HRSA May 2024.

Operating manual on-line at <https://archive.org/details/nec-model-58-b-impulse-counter-instruction-manual> and includes schematics, however page 4-2 (part of description) is missing.

Original condition very good. Rear 5-pin DIN for 58BXPJ power. Includes pcb extender board for 2x22 edge connector - for four pcb assemblies in cage. Shielded compartments for Input circuit and Impedance (Line input jacks) with T-2 (NES3345D); PC-1 (Input Amplifier); includes C2 ecap.

[NES-3345D is 600 600 balanced/unbalanced with input CT](#), and output options; has 20-150kHz bandwidth flat - up to 100dBm (+dBm, 10mW).

309 input jack is for 3/16" jack.

Input signal transferred to input amp pcb with 709 opamp gain of 20dB for 0-40dBm, and loss of -10dB for 50-90dBm. Then signal sent through one of three filters or direct to External Network connector (front panel Ext Conn Link J10-11, 4mm banana), with return signal then through attenuator (0-90dBm selector) to Buffer Amp input. Buffer amp output passes to another attenuator and amp to monitor output socket. Other paths take signal through detectors etc for impulse measurement.

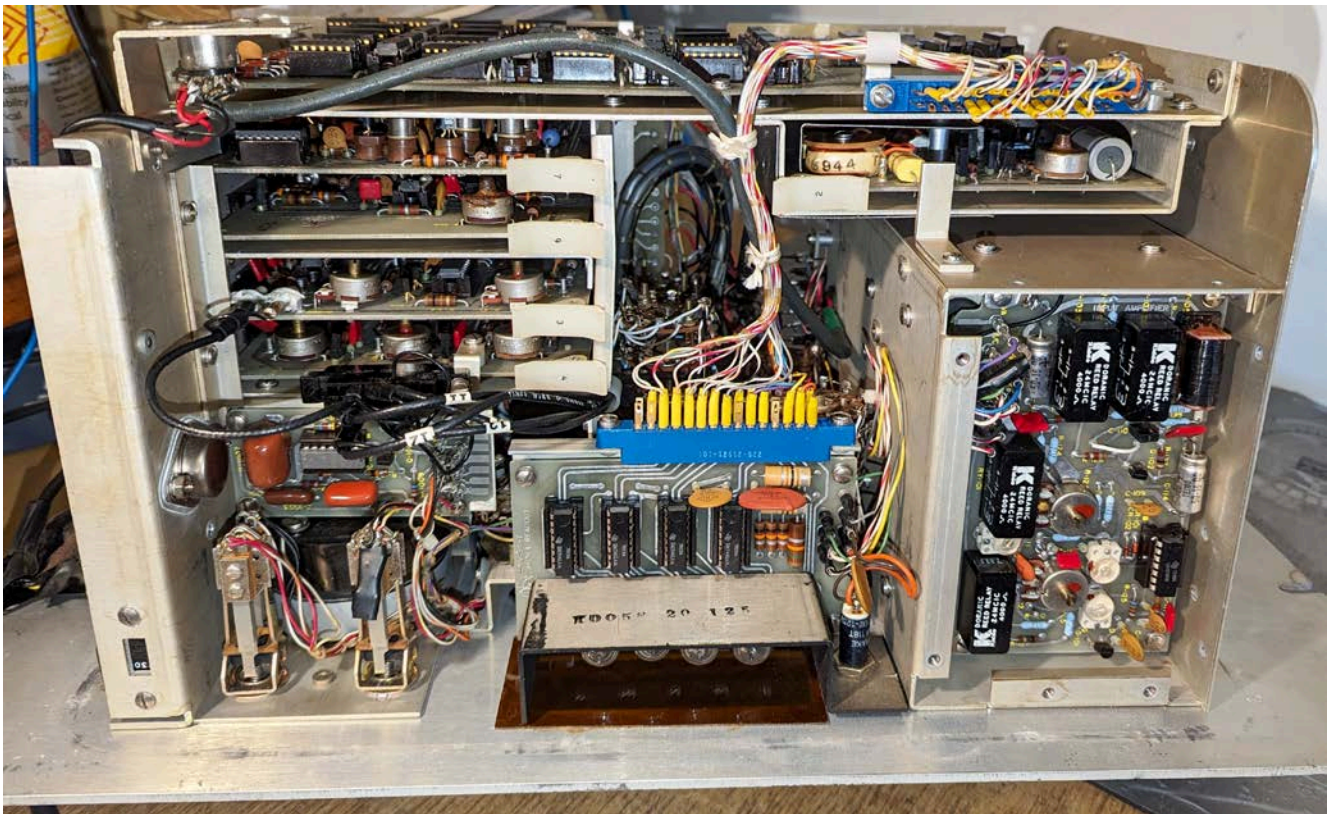
Possible applications:

<https://groupdiy.com/threads/design-a-general-purpose-600-ohm-balanced-attenuator.2229/page-3>

Front panel:



Rear hood removed showing shelved pcb assemblies. RHS input related circuitry and input amp/attenuation pcb assembly are totally enclosed in compartments. An extender pcb provided in unit to allow adjustment of pcb assemblies in shelves.



1.1 Testing:

C607 50uF 250V: 63uF, <30uA 240V but jumpy
 C608 50uF 250V: 58uF, <30uA 240V but jumpy
 C605 250uF 50V: 270uF, <30uA 50V
 C604 250uF 50V: 285uF, <30uA 49V
 C603 250uF 50V: 275uF, <20uA 49V
 C602 250uF 50V: 270uF, <15uA 49V
 C606 100uF 16V: 127uF, <10uA 15V
 C609 200uF 15V: 400uF, <15uA 15V replaced after fault cleared
 C610 200uF 15V: 407uF, <20uA 15V replaced after fault cleared
 C611 200uF 15V: 255uF, <10uA 15V replaced after fault cleared
 C1 4,000uF 15V: uF, <20 uA 15V replaced and moved to PC-6. CB-1 pcb (for C1 mounting) removed and wires connected through.

4x 6V3ac patched over to test E-95480-4 power supply pcb assembly:

Q605 TIP29 open circuit. Replaced with TIP48 1A TO220. Fault appears to have degraded the 200uF 15V e-caps from reverse bias, so a protection diode was added across C611, C610.

+12, -12 and +5V regulation levels were reset.

Overvoltage protection of 5V rail uses 5V1 zener. For a nominal 0.7V trigger voltage of SCR, the 5V rail likely exceeds $5+1.4=6.4V$. A 2V7 zener across the 5V1 caused the protection to trip.

Mains wiring separated from secondary side. New IEC socket added - filter removed. Mains C&K switch contacts needed spray clean. Mains connection megger tested 400M 1kVdc. Mains magnetising current about 40mA 240Vac with PC-2 removed.

P/S +/-12V powers PC-1 and 1A Input amp; PC-2 WTG-Buffer ; PC-3 Level detector; PC-4 Channel amps; PC-7 DC-to-LOG; PC-9 AC-DC.

P/S +5V powers PC-3 Level detector; PC-5 Logic; PC-7 DC-to-LOG.

P/S 190V powers PC-7 DC-to-LOG; PC-8 Readout (via 2 paths).

Removed PC-2;5;7(top shelf);PC-9(2nd top shelf);PC-3;PC-4 (BCD level) .
PC1-A, PC-8 and PC-10 too difficult to disconnect.

PC-2 powered up ok. +/-5mA on buffer.

PC-3 powered up ok - ~10mA for +/-12V, and 140mA for +5V.

PC-4, PC-9 powered up ok with +/-12V and opamps appear ok etc, about 20mA/rail/pcb. E-caps not tested.

PC-5 powered up ok on +5V drawing 770mA. 40x IC's total. Assuming 24x 4mA/IC, then 96mA supply - assuming 12mA/IC then 290mA. 16x 7490 draw $16 \times 29 = 460$ mA. 16x 8k2 and 5x 10k pull-ups, so up to abt. $512 // 2k = 410R$ loading of 4.5V = 11mA. So nominal up to 760mA.

PC-7 powered up ok with +/-12V and +5V and opamps appear ok. 105mA for 5V.

Chassis powered up with PC1-A, PC-8 and PC-10 connected. Rear protector plastic cover needs to be on to secure backplane for insertion of pcbs.

Unit powers up fine with all boards in, except one NL-950 nixie not working - swapped driver but the same - unsure if nixie uses soldered leads. All wafer switch contacts spray cleaned.

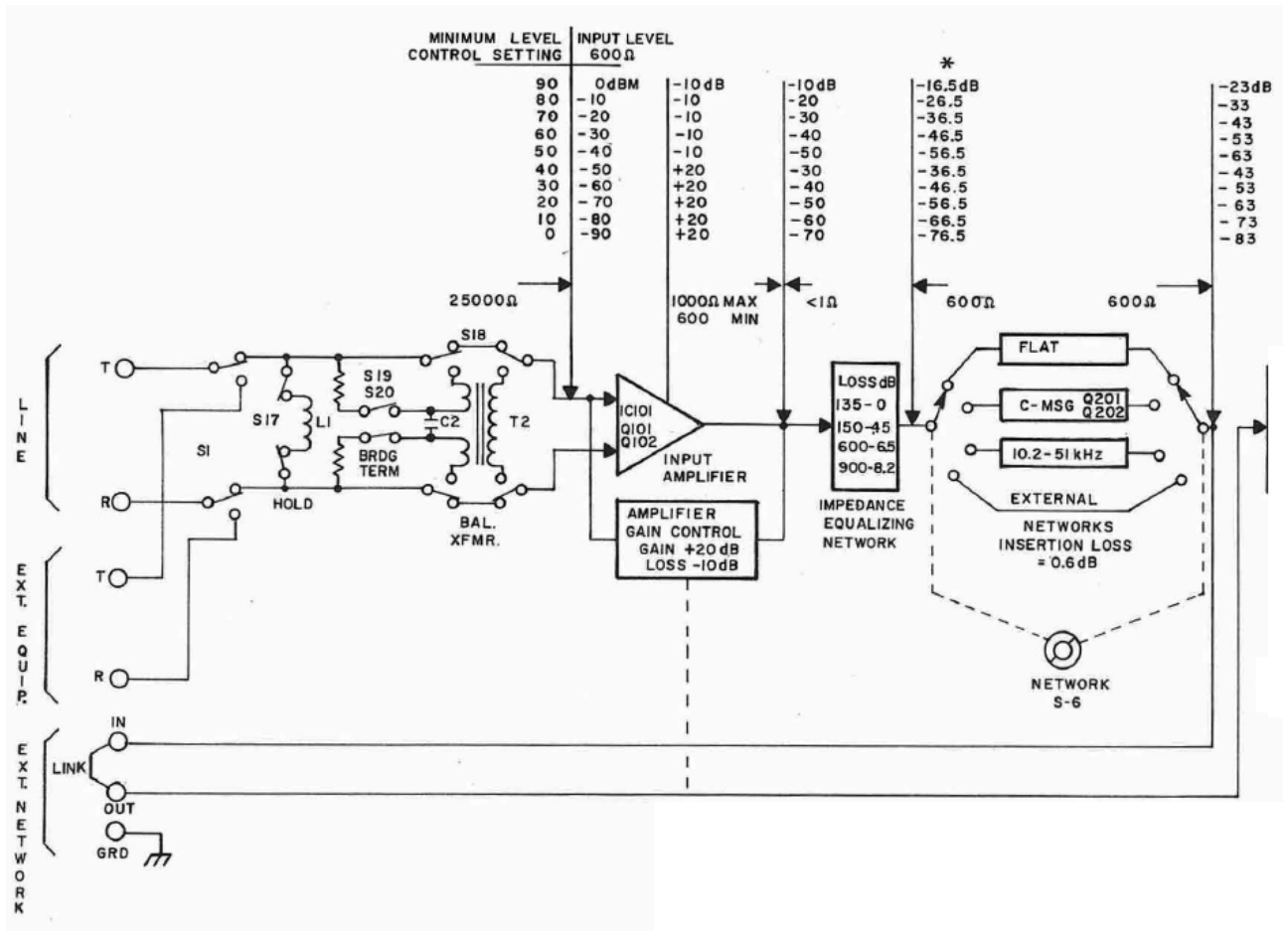
The selector switch appears to have been incorrectly installed, as locating pin is not in locating hole on chassis, and whole assembly was swivelling. Can't fix without total disassembly, so locking nut tightened and put back in action - just don't over-stress rotation at limits of 0 and 90.

Signal to External N/W socket is clean and wideband to 0.9Vrms out for 20dB gain (40 control) with 900R and BAL XFMR in, or out, and EXT filter. Likely the same for -10dB attn (50 control) but can't test to get output signal level to 0.9Vrms. Just noticeable clip/clamping starting on one peak of sinewave at 1.0Vrms.

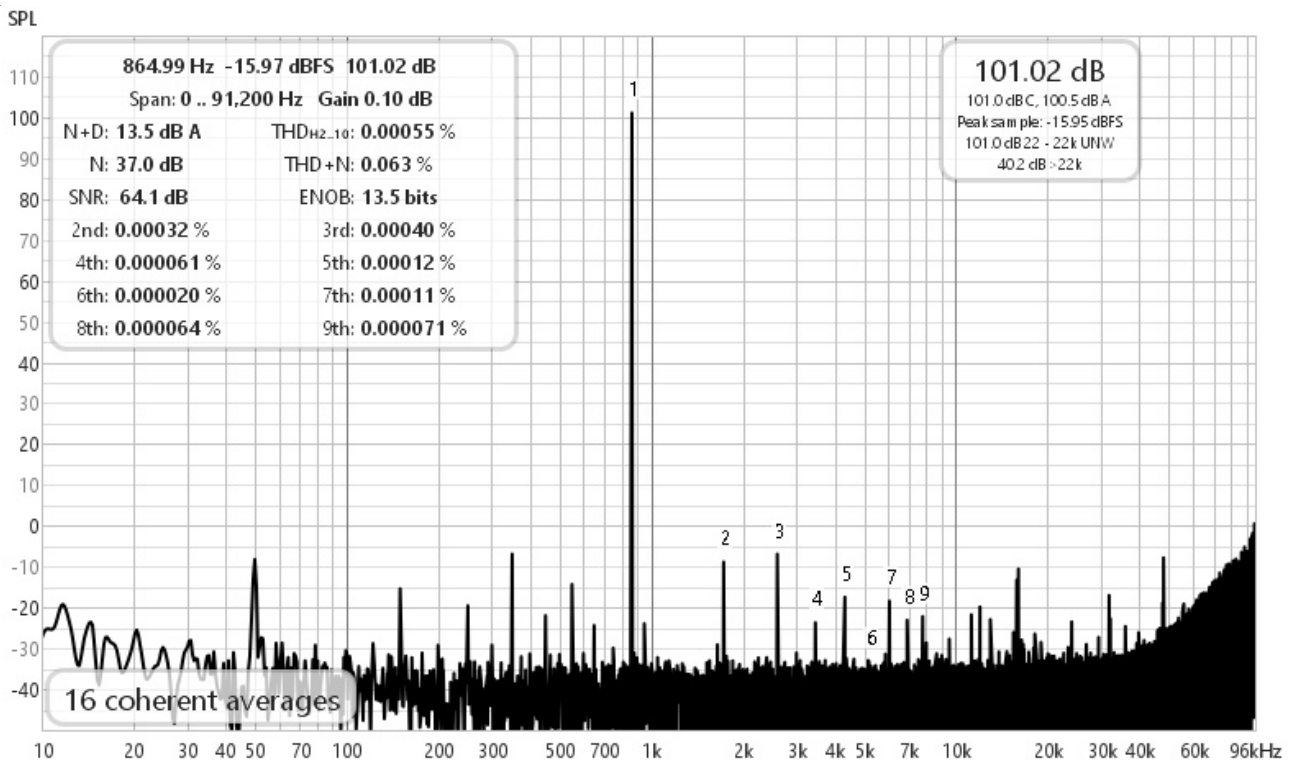
Linking EXT NETWORK through causes attenuation at EXT terminals. Signal at Monitor is modified by Lin Level attenuation/gain setting, and starts soft clipping at 1.6Vrms (for whatever atten level). Distortion and noise is significantly more for Monitor output signal (somewhat better for Blanking Range set to x1000, and slightly less 440Hz when Selector is not on Circuit Noise setting, and Increment Add set to highest level).

Impulse counter works, counting up when signal high enough and timer is on, but rolling over to 0000 when count passes 0999 (so perhaps a fault - perhaps swap nixies around). Count and Hold Display switches work. Second digit off, but all 1-9 numerals work. Blanking interval Vernier works, and Range works.

2. Measurements

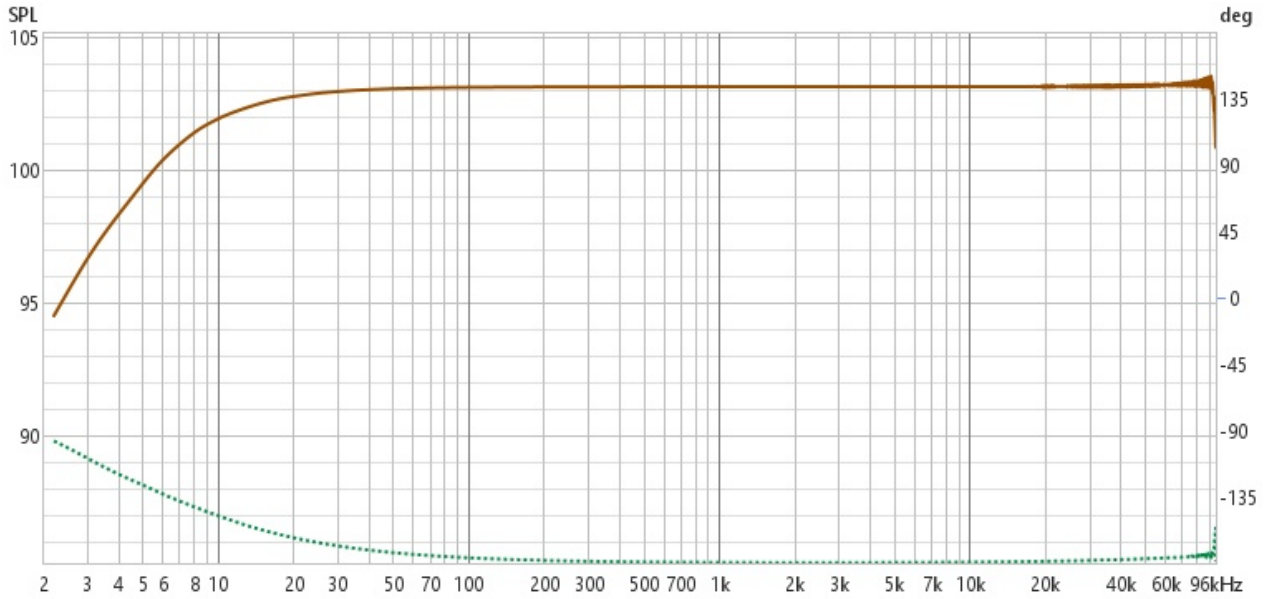


Noise floor and distortion from input to EXT NETWORK front panel socket was at same level of EMU 0404 USB soundcard with direct connections, with +20dB gain setting for output signal level up to 0.9Vrms.

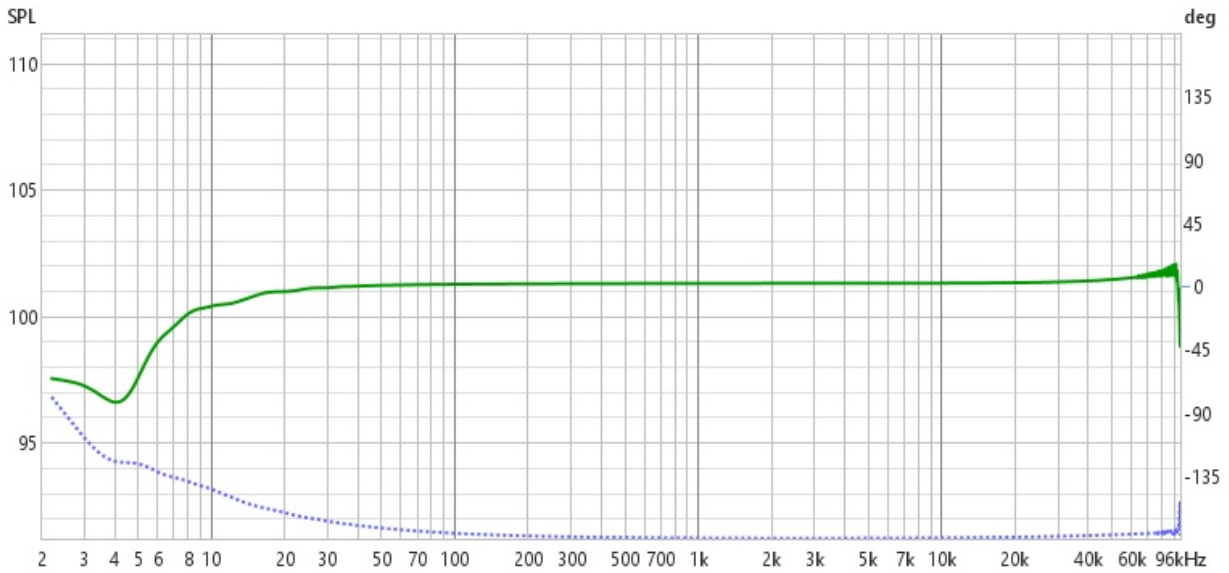


Frequency response was flat from 10Hz (-1dB) out to 96kHz limit of EMU0404USB (direct loopback calibration compensated) for direct connection (no filter inserted). Same typical response for all input impedance settings, and for +20dB or -10dB gain/attenuation settings. HOLD inductor (L1) in/out had no noticeable effect.

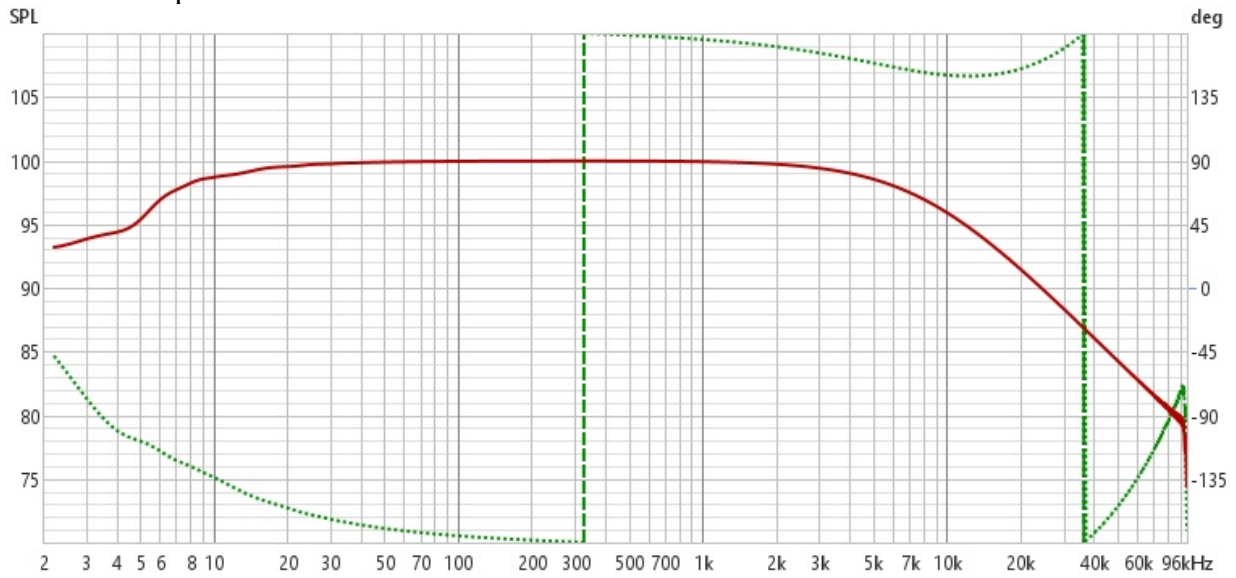
Balance Transformer out:



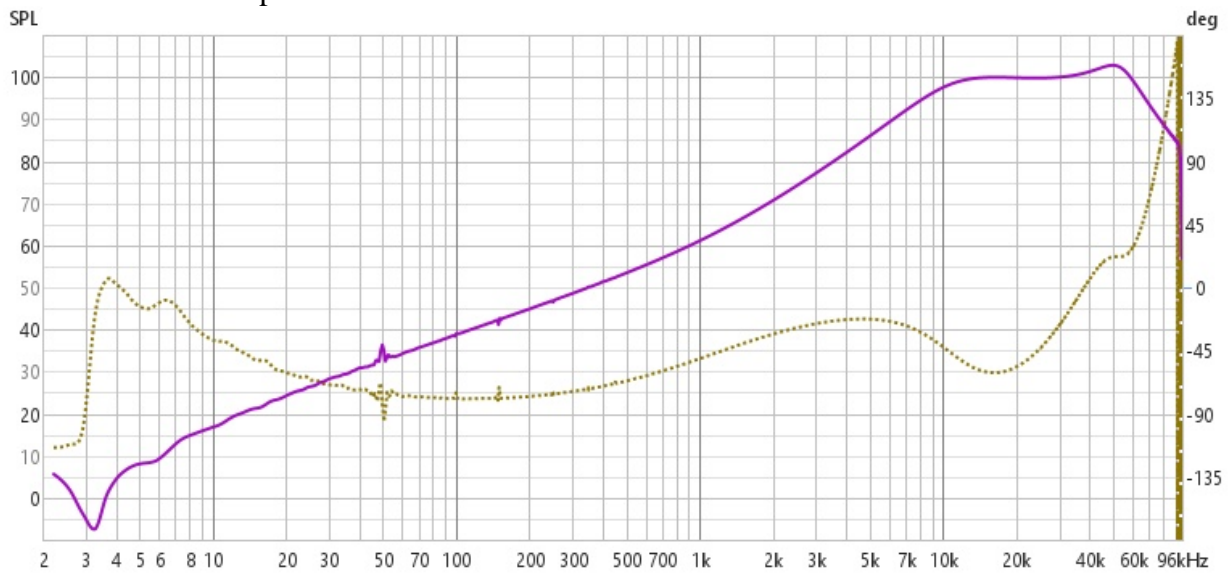
Balance transformer in:



FLAT filter response inserted a nominal ~8kHz first-order HPF.



10.2-51KHZ filter response showed flat bandwidth.



C-MSG filter showed flat bandwidth from ~800Hz to 2kHz.

