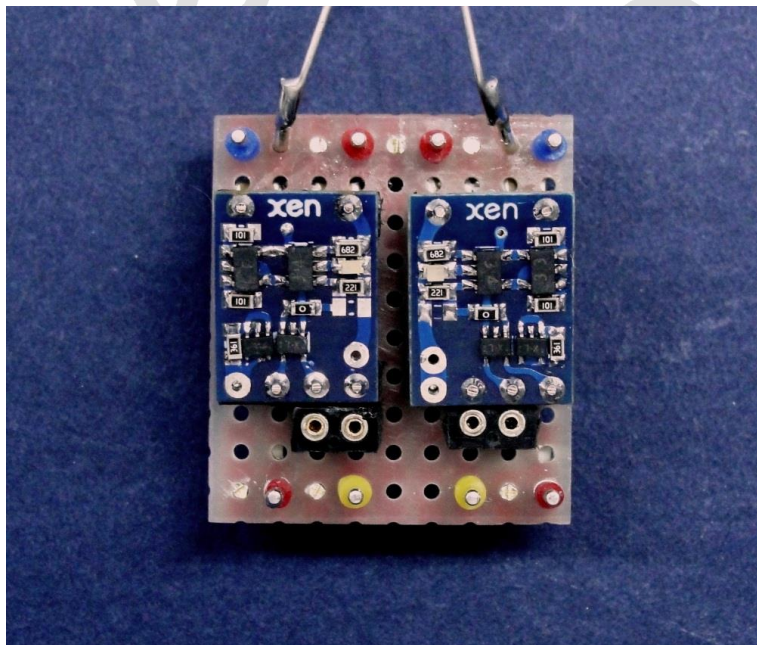


Folded Cascode Discrete Opamp J-797 OPA

XEN Audio

May 2019



The third topology that was built was the J797-OPA. As already described previously, this topology follows that of the simplified topology of the AD797, but with JFET inputs. Voltage gain is achieved with a folded cascode LTP stage, followed by an output buffer.

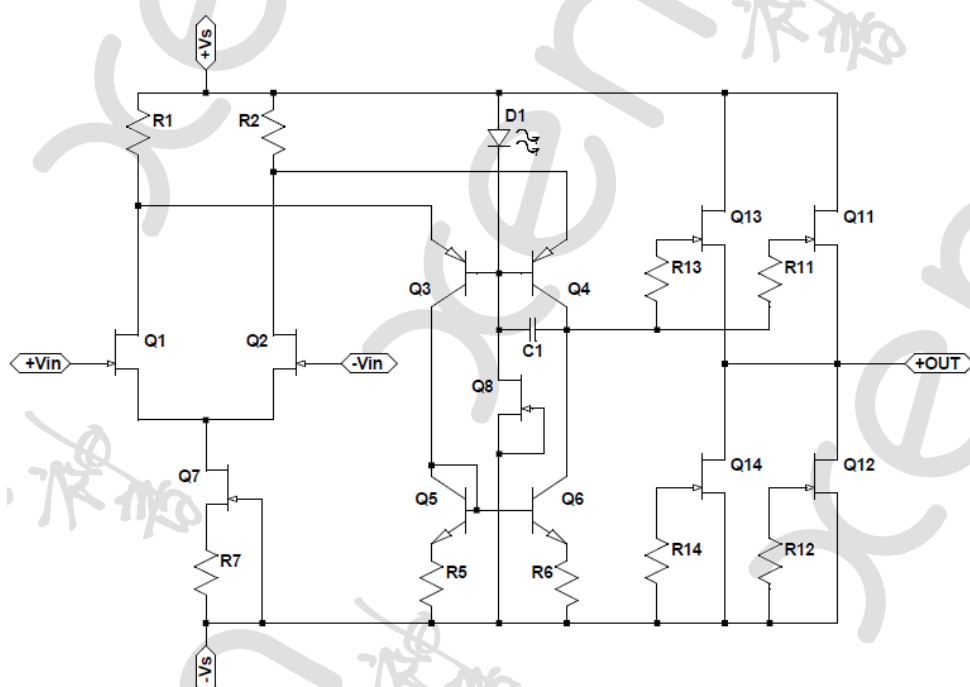


Fig. 1 JCOPA Schematics

As in the previous two versions, for best possible thermal tracking of the circuit, dual N-JFETs were used in both the input and the output stages. Two pairs of JFETs were used for the output, biased at 4mA each, in order to limit the thermal dissipation for each device. Low-noise dual BJTs with matched hfe were also used for the cascode and the current mirror.

Mechanical Layout

The PCB layout is very similar to the JCOPA. As such, it can easily be configured as a single opamp with SOIC8 pin connections, or as dual opamps in DIP8.

Measured Performances

Again, the measured performance of the prototype agrees with simulations.

Gain of 10 bandwidth is at about 300kHz with C1 at 330p. 10kHz square waves are slightly rounded, suggesting further room for reducing C1 at gain >1. Bandwidth at unity gain is 1MHz at 1Vrms, which is slew rate limited.

The table below compares all 3 opamp's against each other under different loading conditions.

O/P Voltage	2	Vrms							
Output bias	5	mA	Output bias	8	mA	Output bias	8	mA	
NFB Network	18k / 2k	ohm	NFB Network	100k / 10k	ohm	NFB Network	100k / 10k	ohm	
XEN SOPA			JC1 OPA			J-797 OPA			
H2	H3	THD	H2	H3	THD	H2	H3	THD	
dB	dB	%	dB	dB	%	dB	dB	%	
-101	-122	0.0009	-108	-123	0.0004	-105	-111	0.0006	
-102	-113	0.0008	-90	-116	0.0032	-102	-107	0.0009	
-92	-95	0.0031	-83	-105	0.0071	-94	-103	0.0021	
-96	-115	0.0016	-111	-120	0.0003	-103	-110	0.0008	
-93	-100	0.0025	-87	-107	0.0045	-88	-101	0.0041	
-77	-81	0.0167	-80	-95	0.0102	-80	-94	0.0102	

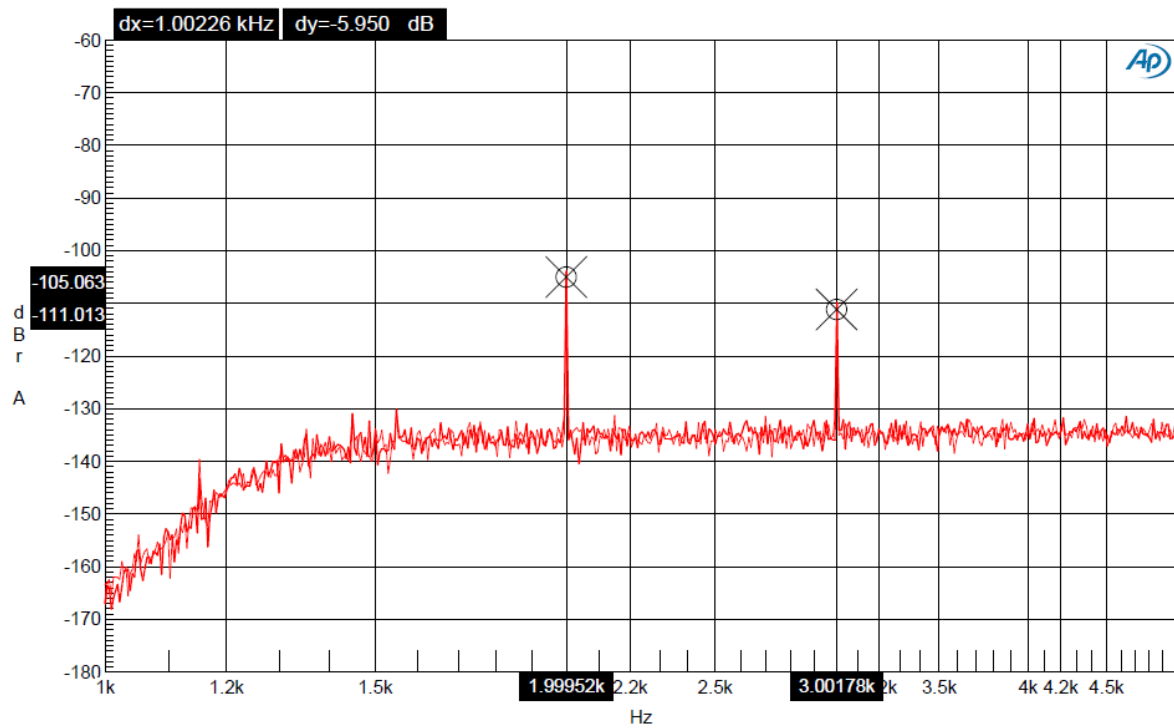


Fig. 2 Distortion Spectrum at 1kHz, 2Vrms out (notched)

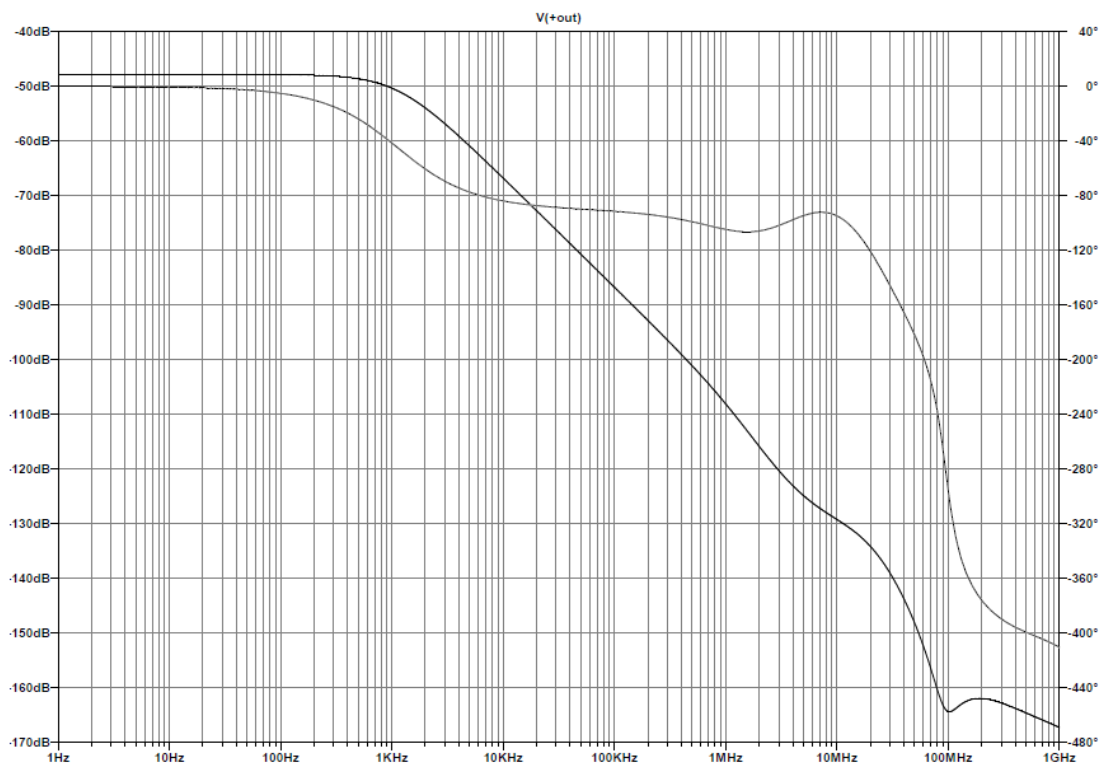


Fig. 3 Simulated Open Loop Characteristics (input level at -120dB)