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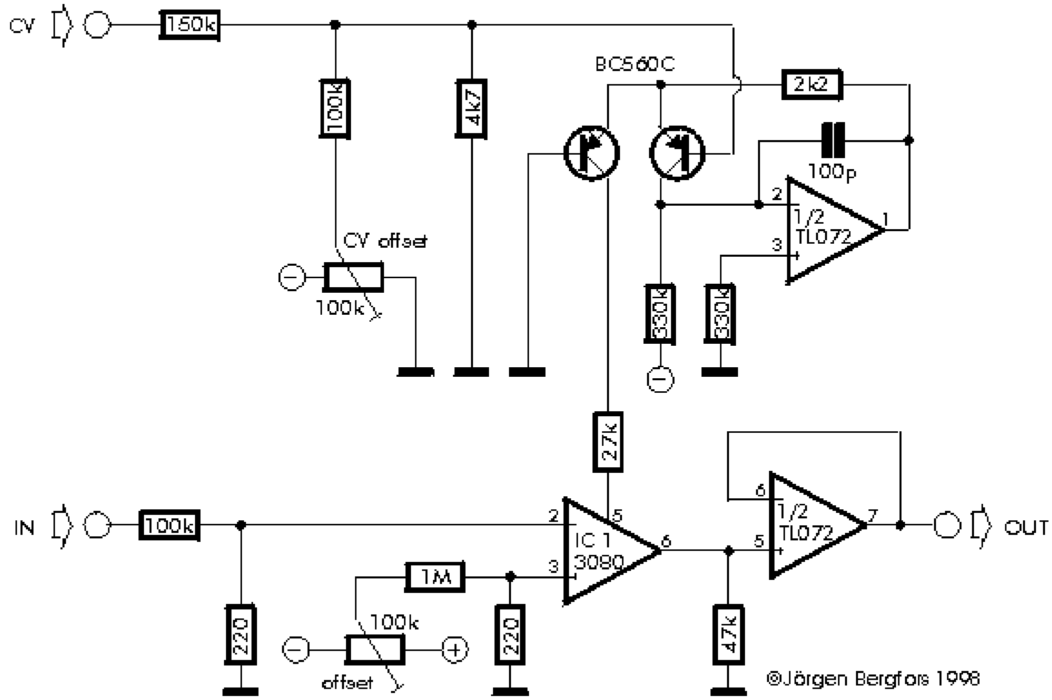
CA3080 VCA 1



The trusty old CA3080 is used here in a logarithmic VCA. The circuit is similar to the one in Elektor Formant, except that the FET buffer is replaced by a FET input op-amp. The load resistor is connected to ground and the op-amp is a voltage follower. This chip is frowned upon by some people. It has a reputation for being very noisy. In reality it is only slightly noisier than the alternatives. The noise is only present at full gain, which makes it a problem only if the VCA is fed with very weak signals.

What can be more of a problem is that the signal bleedthrough at higher frequencies is rather high. But even at low frequencies the signal attenuation is not as good as with the LM13600 or the SSM2024. The CA3080 has very low CV bleedthrough if it is carefully trimmed.

Noise & signal attenuation

Red = signal bleedthtrough at 0V CV. Blue = 10V CV, no signal. Green = 0V CV, no signal.

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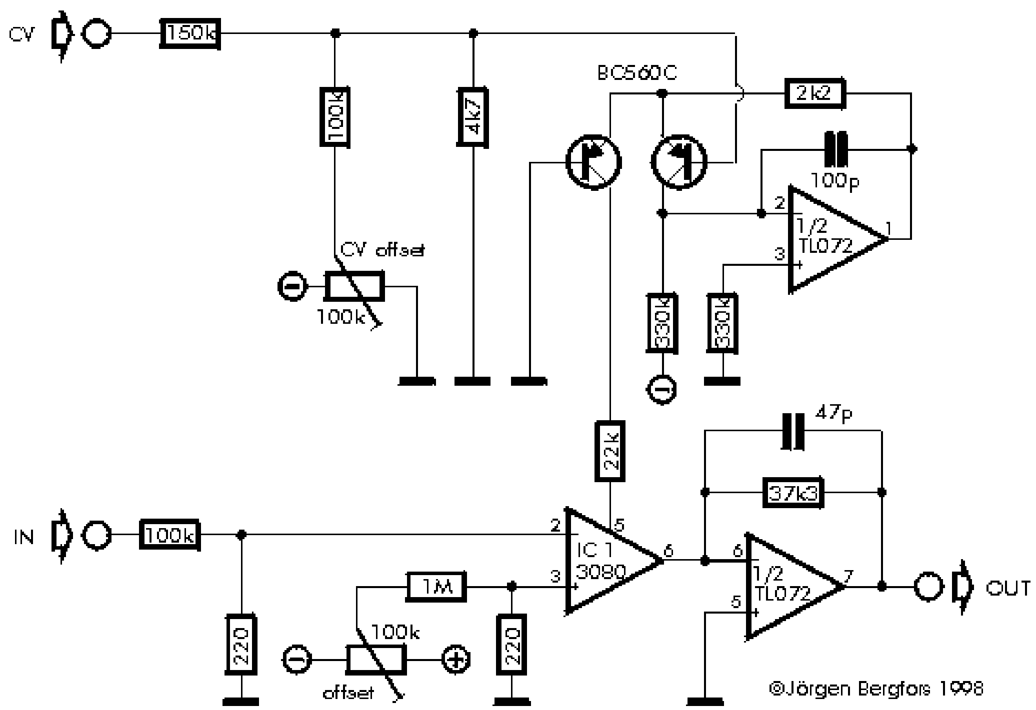
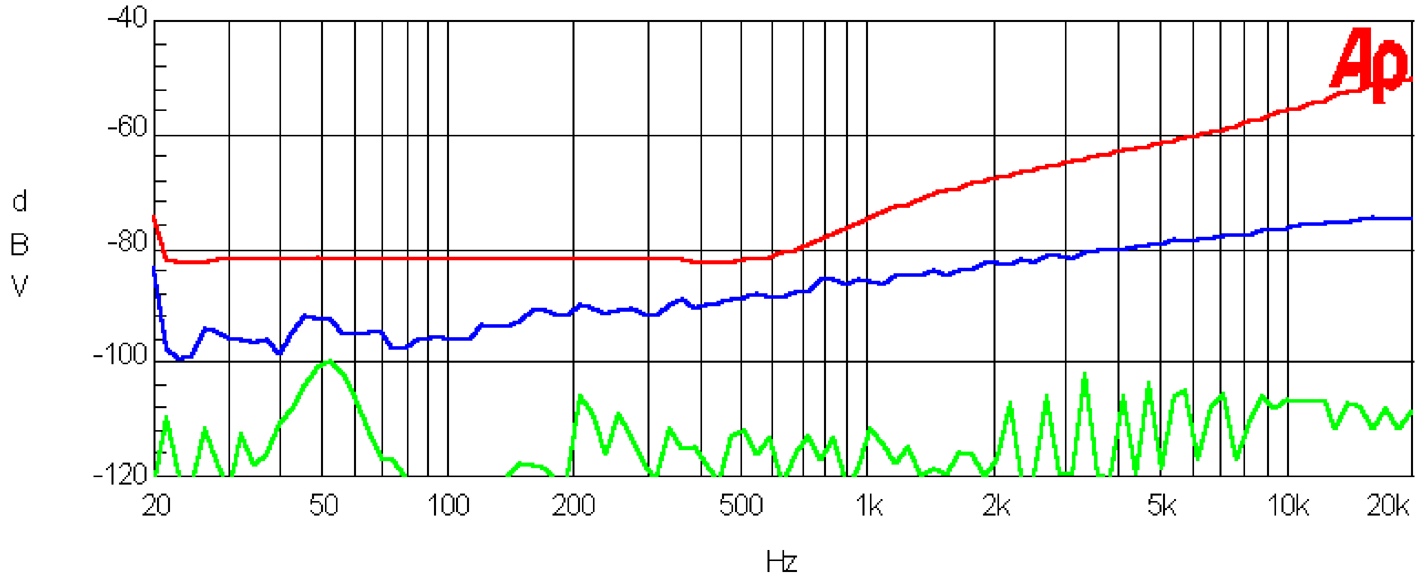
CA3080 VCA 2



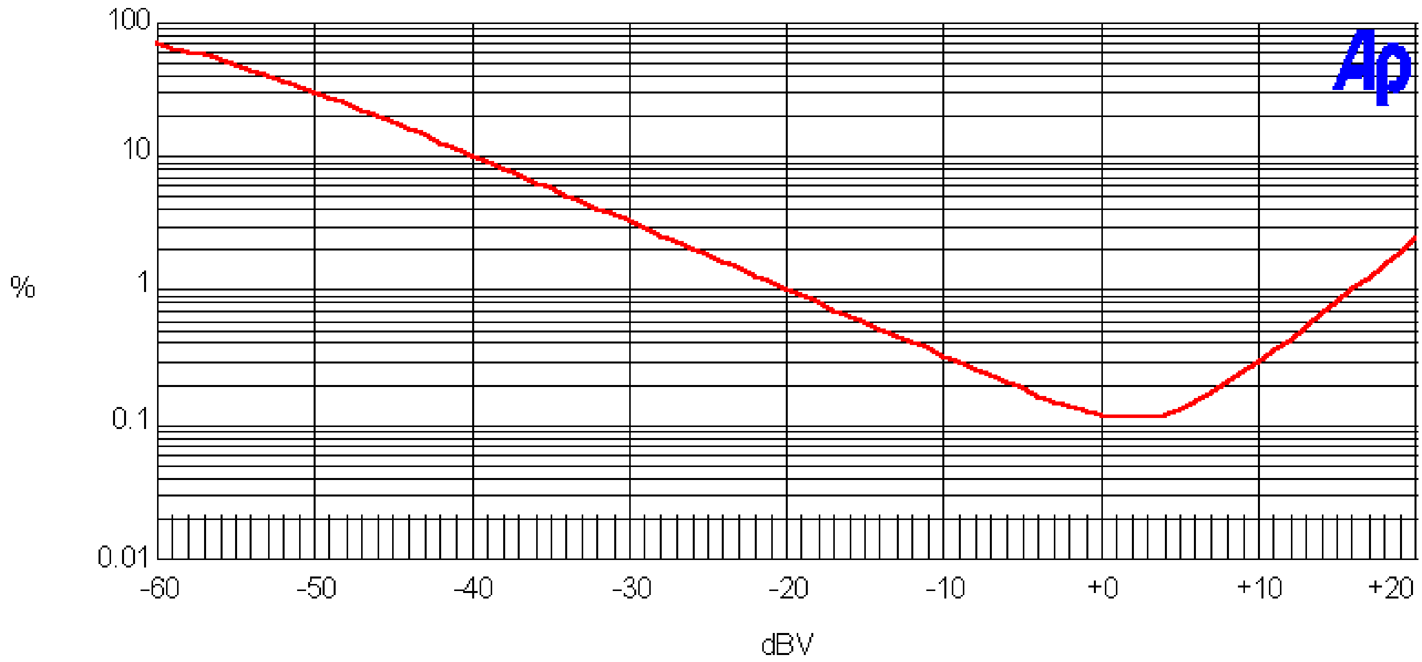
This is the same circuit as the CA3080 VCA 1, except for the output stage. The chip is also driven a little harder. The load resistor is connected in the feedback loop of an operational amplifier. Here a 15 year old RCA chip is used. The performance of this circuit is slightly better than the CA3080 VCA 1. This probably has more to do with the increased I_{abc} than with the different output configuration. This circuit actually isn't much noisier than the SSM2024, but the signal bleedthrough is around 10 dB higher.

Noise & signal attenuation

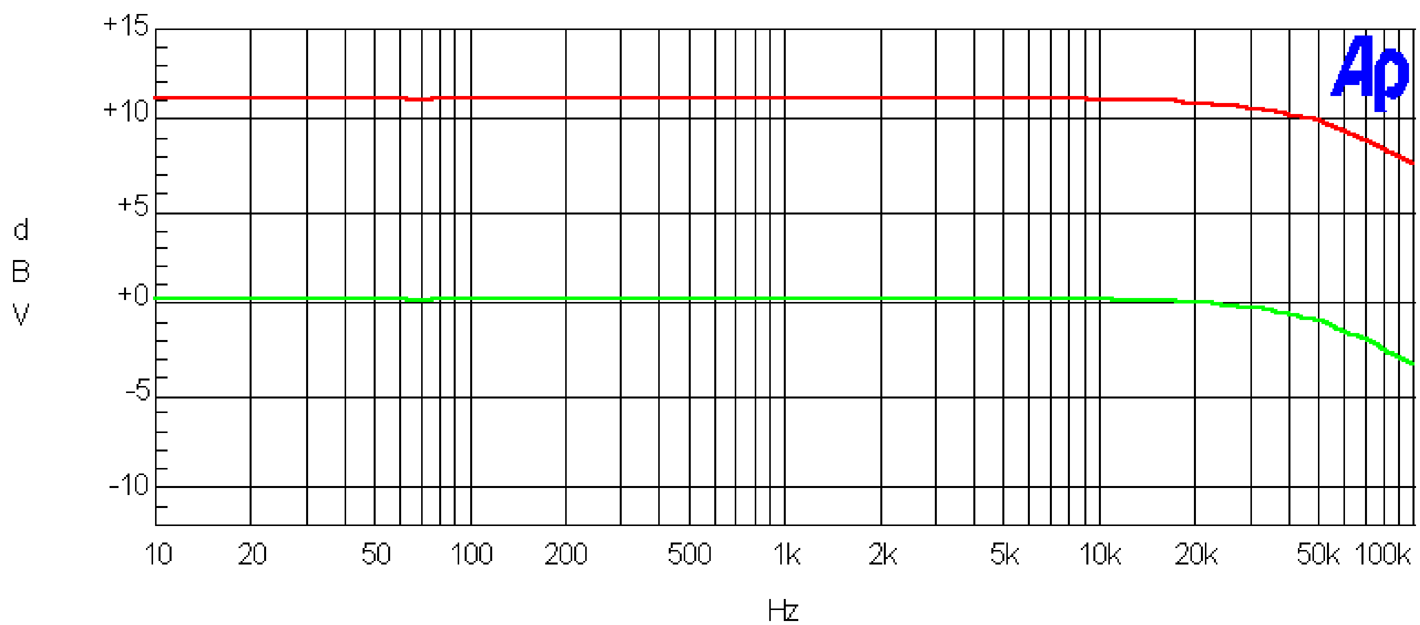
Red = signal bleedththrough at 0V CV. Blue = 10V CV, no signal. Green = 0V CV, no signal.



Distortion (THD+N) vs. input level



Frequency response



Test results

Dynamic range	**10 V CV, no signal**	**81 dBr A**
	0 V CV, no signal	**110 dBr A**
	0 V CV, 1kHz 10 V p-p in	**85 dBr A**
	0 V CV, 2 kHz 10 V p-pin	**77 dBr A**
	0 V CV, 10 kHz 10 V p-pin	**67 dBr A**
	Headroom (over 10V p-p)	**5 dB**
CV bleedthrough	**with careful trimming**	**2 mV**

Summary

This was expected to be a poor performer but turned out to be quite respectable. It is a little noisier but the difference is surprisingly small. This circuit seems to be less noisy than the other CA3080-based ones.

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- Very low CV bleedthrough

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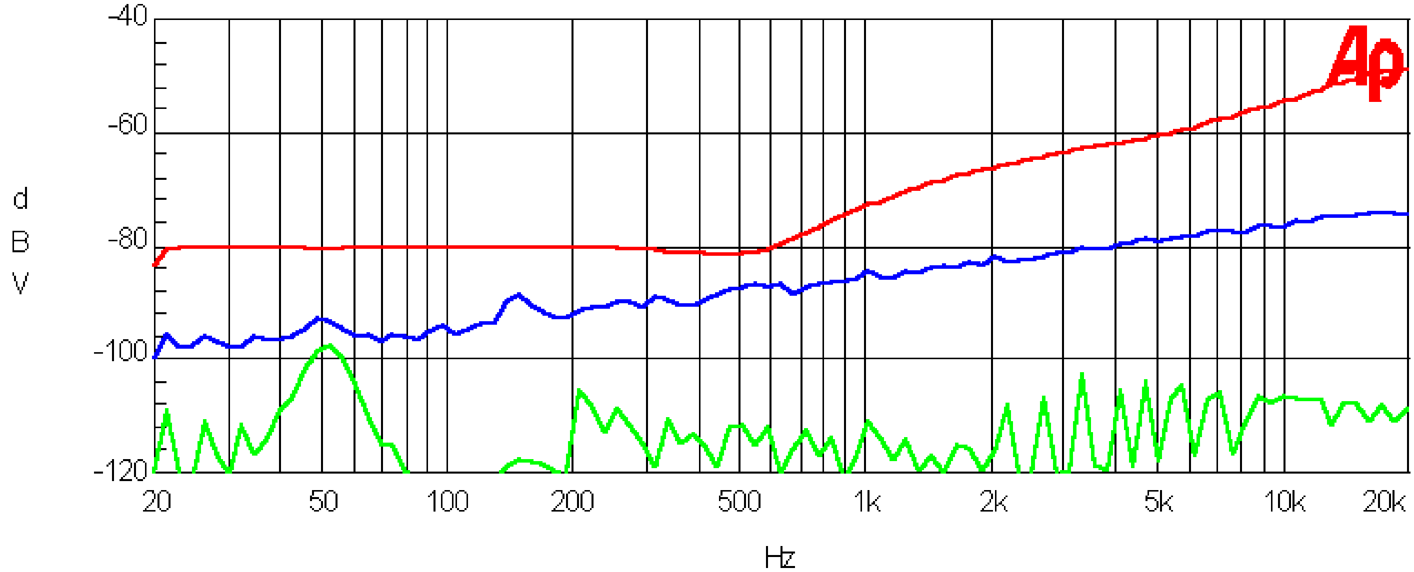
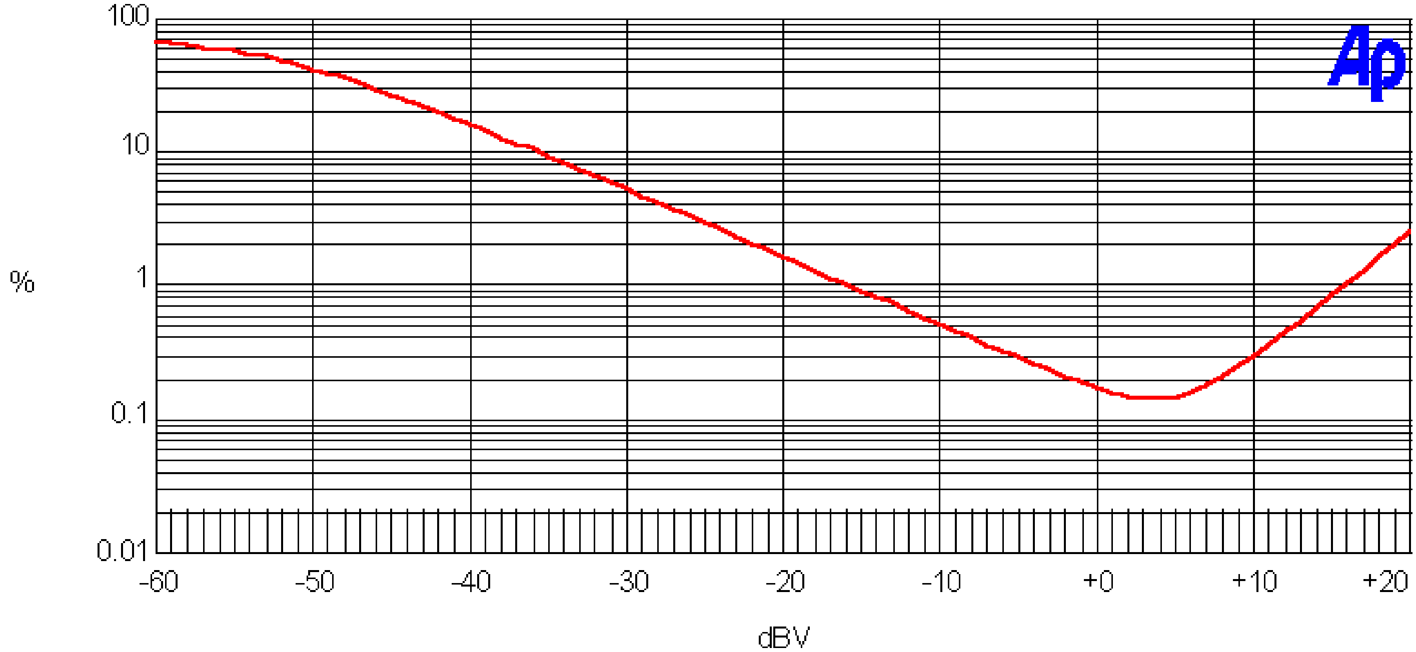
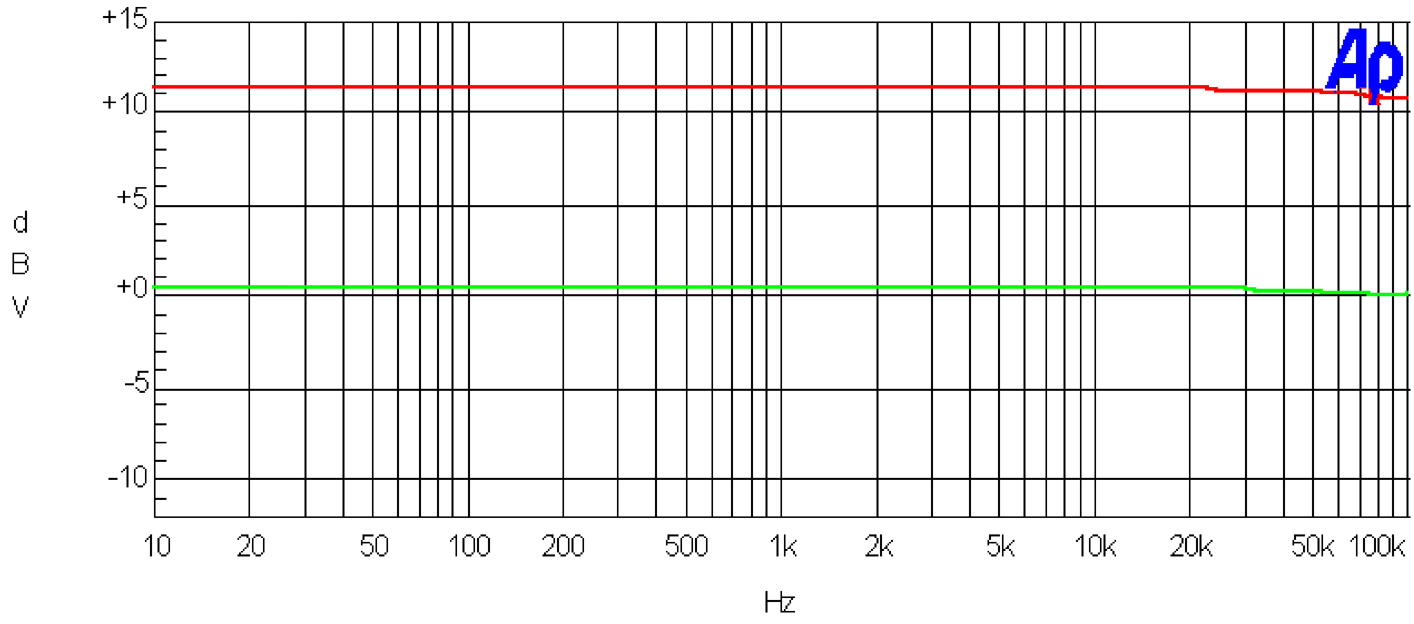
- High signal bleedthrough at higher frequencies



Distortion (THD+N) vs. input level



Frequency response



Test results

Dynamic range	**10 V CV, no signal**	**77 dBr A**
	0 V CV, no signal	**117 dBr A**
	0 V CV, 1kHz 10 V p-p in	**83 dBr A**
	0 V CV, 2 kHz 10 V p-pin	**76 dBr A**
	0 V CV, 10 kHz 10 V p-pin	**65 dBr A**
	Headroom (over 10V p-p)	**5 dB**
CV bleedthrough	**with careful trimming**	**6 mV**

Summary

This was expected to be a poor performer but turned out to be quite respectable. It is a little noisier but the difference is surprisingly small.

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- Very low CV bleedthrough

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- High signal bleedthrough at higher frequencies
- Yes, it is the noisiest of the lot