

The Aphex Model 230's Phase Rotator

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ASYMMETRY PROBLEMS

Voice waveforms tend to have asymmetrical peak amplitudes. If you watch one on an oscilloscope you will be able to see the positive and negative peaks out of balance and changing - sometimes reversing - which half has higher amplitude. This is totally natural and not be a problem until audio processing is encountered, either on-air or mixing and mastering. Some voices can be so extremely asymmetrical it's impossible to get a good mix. The excessively high peaks knock down the level unnaturally. Voice density fluctuates. The Model 230's Phase Rotator can help make voice waveforms more symmetrical, avoiding the audio processor difficulties.

SYMMETRY & LOUDNESS

Gain reduction processors, especially limiters, use peak detection to control the level. Typically, "RMS" compressors still use peak detectors but with a longer attack time so they also respond to the peak factor. If two sound waves, one symmetrical, and one asymmetrical of the same volume level are fed into limiters with the same peak threshold, the symmetrical one will come out sounding louder. That's the bottom line.

BIGGER VOICEOVERS

When you turn on the Phase Rotator, it starts displacing the harmonics of your voice so they line up in a way that creates a more symmetrical waveform. The more symmetrical waveform's lower peak level causes less gain reduction than the natural voice would. This makes the voice sound louder, and less vulnerable to "compression holes" where the compressor seems to fight the voice talent's elocution. With the Phase Rotator, you typically notice a smoother, more consistent voice body after processing. The voice sounds natural but bigger. It rides higher in the mix and needs less tweaking.

TESTING & COMPARING

It's important not to judge the Phase Rotator by listening to yourself live in headphones. You will hear a tonality change when switching on the Phase Rotator. It may be unflattering. This the same effect you hear when flipping the mic polarity. Your self-conducted sound mixes with the reproduced sound in the cans. Depending on the relative phase, you'll get dips and peaks in the frequency response. The Phase Rotator actually has perfectly flat frequency response. The recorded track won't sound like the headphones.

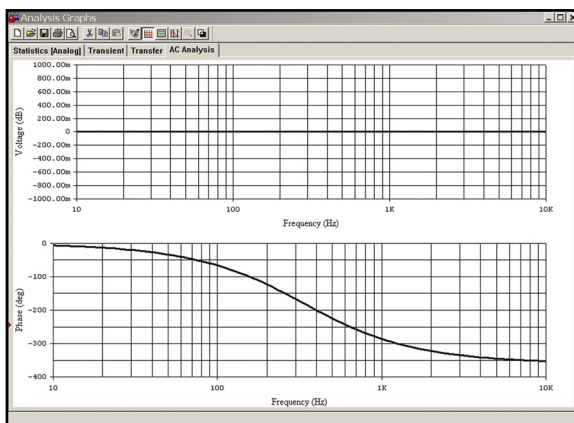
The best way to test the Phase Rotator is to record sentences with and without the Phase Rotator turned on. Use at least 6dB of compression with medium to fast release timing. Then, listen to them played back at exactly the same level mixed over a background bed.

Often you'll find the Phase Rotator holds up the voice's bass resonance and clarifies (opens up) the apparent highs. This is a psychoacoustic benefit of Phase Rotation. It unlocks harmonics from their fundamentals and lets them arrive at a different time so the ears can resolve them more distinctly. All frequencies are there, nothing is added or lost.

SUMMARY

The Model 230's Phase Rotator could well become your secret weapon in the announcer wars.

Phase Rotator Frequency & Phase Response Analysis



Effect Asymmetry Has On Limiter Output

