# The Vocoder

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# Outline

- More Sinusoidal Modeling...
- Vocoder History
- Vocoder for Information Compression
- Vocoder Music Examples
- My Pd Vocoder

# Sinusoidal Modeling

- Characterizes sound as a set of harmonics with envelope modulation

- Cuts out "dead space" between harmonics ==> Compression

- Are they any good applications for this?

- Can we do this without Fourier analysis or DSP?

# The Vocoder

- Invented by Homer Dudley at Bell labs in 1930s for speech compression and synthesis ==> before DSP!

- Before 1970s to 1980s, vocoders were generally made from analog parts
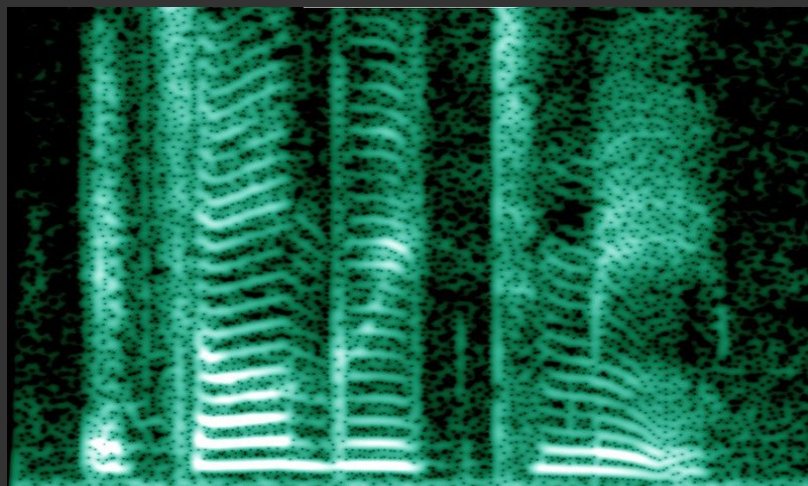
- How does it work?

# The Vocoder

- Human speech occupies 4 kHz BW, but doesn't need this much to express information contained

- Vocoder - voice encoder encodes speech as a set of time-varying modulation envelopes ==> less BW

# Analog Vocoder
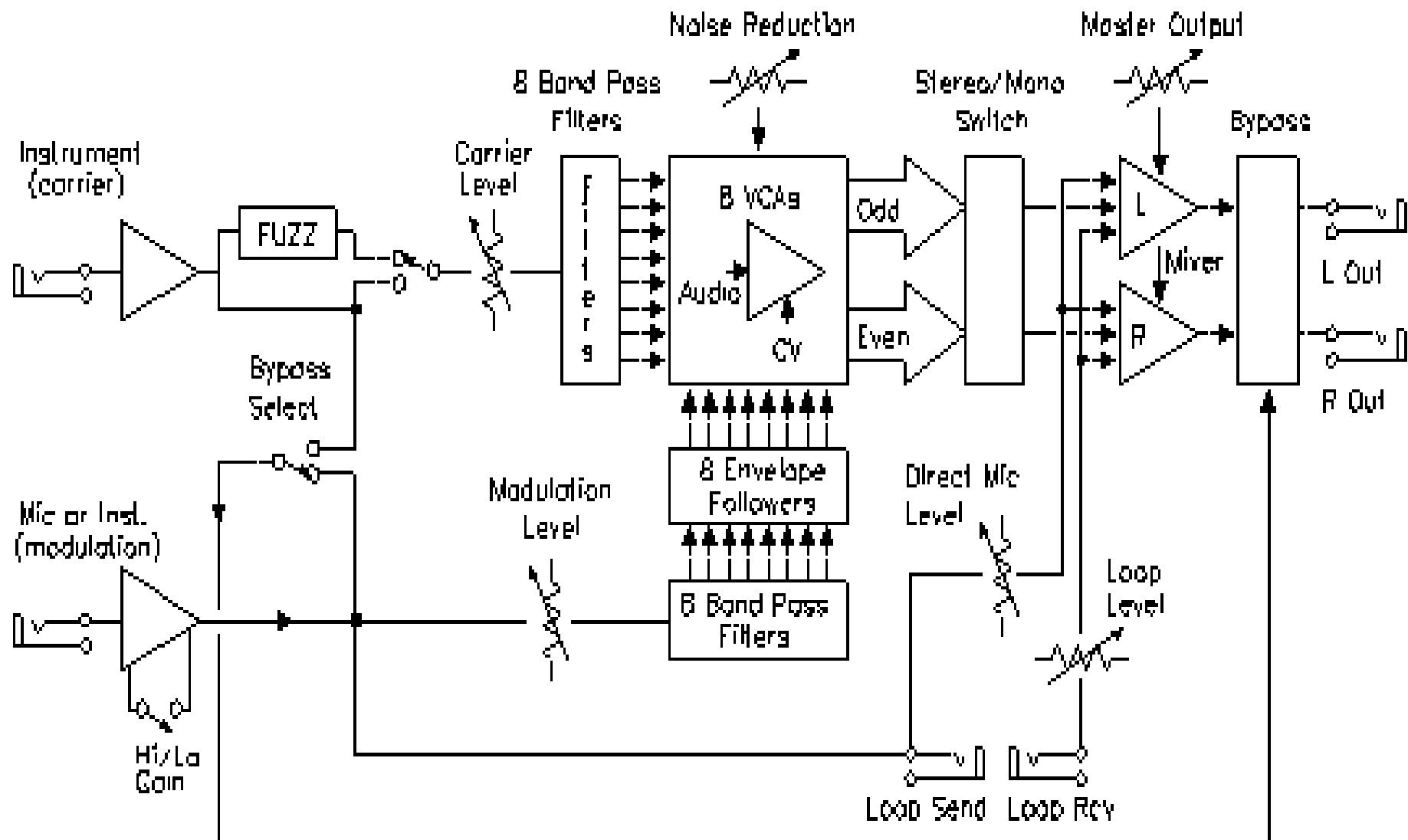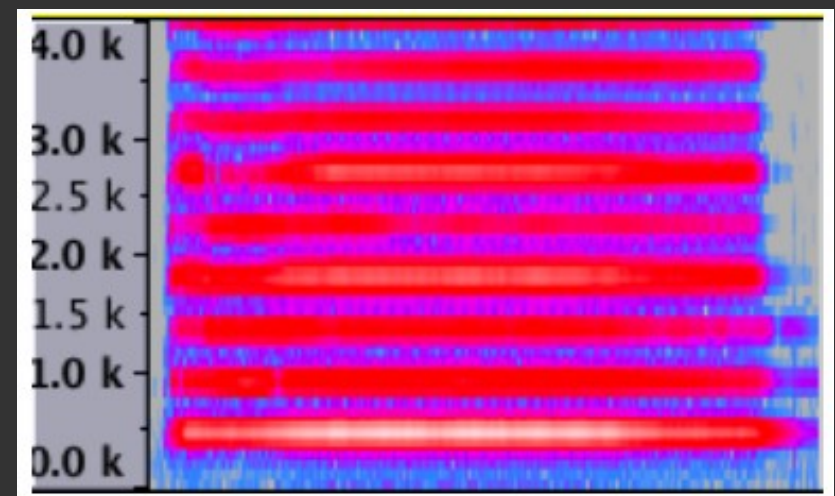
# Modern Uses

- Voice compression ==> CDMA cell phone standard includes variable bit-rate vocoder

- Cool Sounds =



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# Examples

- Wendy Carlos - A Clockwork Orange Theme
- Kraftwerk - Autobahn
- Yellow Magic Orchestra - Technopolis

  --More Modern Songs Not Heard--

- Air - Kelly Watch the Stars
- Freezepop - Manipulation

# My Pd Vocoder

# The End

Questions?