

MSP BASICS

Reading & Tutorials

Cycling '74, "Topics: How MSP Works," MSP Tutorials 1-3, and MSP Synthesis Tutorials 1-5.

Available online at: <https://docs.cycling74.com/max7/tutorials/00_mspindex>.

Terms & Concepts

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| <p>MSP Programming Digital signal processing (DSP) Signal network - Signal flow diagram Instrument definition Tilde character (~) Striped patch chords</p> <p>Audio Hardware/Drivers Built-in audio hardware Mac OS: Core Audio Options > Audio Status</p> <p>Digital Audio Concepts Real-time audio Data rates - Audio rate - Control rate Sampling rate (sr) - 44.1k, 48k, 96k Signal range - Bipolar signal (-1.0 to 1.0) - Unipolar signal (0.0 to 1.0)</p> <p>Digital-to-analog conversion <i>dac~</i> - Audio output - Mono/stereo - Start/stop messages - Startwindow message <i>ezdac~</i> - a graphical <i>dac~</i></p> <p>Digital oscillator <i>cycle~</i> - Wavetable (<i>Length = 512/13</i>) - Cosine waveform - Looping oscillator - Interpolating oscillator</p> <p>Sample playback with <i>playlist~</i>, <i>cycle~</i> & <i>buffer</i></p> | <p>Amplification <i>*~</i> - Multiply two signals</p> <p>Mixing <i>+~</i> - Add two signals <i>Striped patch chords that are connected to the same signal inlet are automatically mixed</i></p> <p>Clipping Total signal exceeds 1.0 <i>The output signal must be scaled with *~ to avoid clipping</i></p> <p>Signal generators <i>cycle~</i> - bipolar cosine <i>phasor~</i> - unipolar sawtooth <i>tri~</i> - anti-aliased triangle <i>noise~</i> - white noise <i>pink~</i> - pink noise</p> <p>Amplitude units - Absolute (0.0-1.0) - Relative (dB)</p> <p>Amplitude envelope ADSR <i>line~</i> - linear ramp generator <i>function</i> - MSP's graphical breakpoint editor for amplitude envelopes</p> <p>Beats - Beat theorem & equation - Roughness - Critical bandwidth - Binaural beats</p> <p>Real-time signal analysis Faber Acoustical, SignalScope Waveform (scope~) Spectrum (spectroscope~)</p> | <p>Routing signals - <i>send (s)</i> - <i>receive (r)</i> - <i>gate~</i> - <i>selector~</i> - <i>mute~</i></p> <p>Classic Waveshapes Sine No harmonics Sawtooth All harm. partials, $A = 1/n$ Square Odd harm. partials, $A = 1/n$ Triangle Odd harm. partials, $A = 1/n^2$</p> <hr/> <p>SYNTHESIS FUNDAMENTALS</p> <hr/> <p>Additive synthesis Spectral types: - Harmonic - Nearly harmonic - Inharmonic - Closely spaced</p> <p>Amplitude modulation (AM) - Carrier - Modulator - Tremolo - Sidebands - Ring modulation - DC offset</p> <p>Frequency modulation (FM) - Vibrato - Harmonicity ratio (F_m/F_c) - Modulation index (A_m/A_c)</p> |
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Reference

Cycling '74. 2015. *Max 7 Documentation*. Available online at: <<https://docs.cycling74.com/max7/>>.