

Csound Value Converters

Frequency < > Pitch

Value converters are provided to convert from pitch to **cps** (Hz) frequency (and vice-versa). Pitch can be notated in two ways:

- (a) **pch**: octave point pitch class: **octave_number.pitch_class**
pitch class **C** = 00 and pitch class **B** = 11
- (b) **oct**: octave point decimal: **octave_number.decimal_part**

The two forms consist of a whole number, representing octave registration, followed by a specially interpreted fractional part. For **pch**, the fraction is read as two decimal digits representing the **12 equal-tempered pitch classes** from .00 for C to .11 for B. For **oct**, the fraction is interpreted as a **true decimal fractional part** of an octave. The two fractional forms are thus related by the factor 100/12. In both forms, the fraction is preceded by a whole number octave index such that 8.00 represents Middle C, 9.00 the C above, etc. Thus A440 can be represented alternatively by 440 (cps), 8.09 (pch), 8.75 (oct), or 7.21 (pch), etc. Microtonal divisions of the pch semitone can be encoded by using more than two decimal places.

Value converters convert between these three notations:

octpch(pch)	octave point pitch-class (pch) to octave point decimal (oct)
pchoct(oct)	oct to pch
cpspch(pch)	pch to cycles-per-second frequency (cps)
octcps(cps)	cps to oct
cpsoct(oct)	oct to pch

Example

aout **oscil** p4, **cpspch**(p5), 1 ; **p5** notated in **pch**

Amplitude (dB) < > Amplitudes (linear)

A similar converter is provided for transforming dB amplitude values to linear gain/amplitude. They basically implement the decibel amplitude scale formulas:

$$Amp_{dB}(G) = 20 \log_{10} G$$

$$G(Amp_{dB}) = 10^{\frac{Amp_{dB}}{20}}$$

ampdb(x)	the amplitude of decibel scale value x .
dbamp(x)	the decibel scale value of amplitude x .

Examples

imax = 32767

a1 oscil imax, p5, 1

out a1*ampdb(p4) ; p4 is dB amplitude in relation to full scale (0dB).
; -6dB is ½ scale amp, -12 is ¼ scale amp etc.

a1 oscil ampdb(p4), p5, 1 ; p4 is a direct dB amplitude value (positive)
; 60 is 1000, 90 is 32000.

Variable type conversions

Two operators can be used to convert between certain variable types:

i(kval) converts a k-type variable into i-type, obtaining its value either at initialisation or re-initialisation time.

a(kval) converts a k-type variable into a-type, interpolating its value linearly between control-periods.

Examples

iamp = **i(ksig)**

asig = **a(kctl)**