

MUSIC & COMPUTERS CH. 2

TERMINOLOGY AND CONCEPTS

in order of appearance

<p>2.1 Digital Representation of Sound time series continuous function (analog) discrete function (digital) analog to digital converter (ADC) digital to analog converter (DAC) interpolation audio graphs - audiogram (<i>a</i> vs. <i>t</i>) - time-freq. rep. (<i>f</i> vs. <i>t</i>) brightness <-> high <i>f</i> content</p> <p>2.2 Analog vs. Digital sampling sample rate (<i>sr</i>) sample resolution staircasing quantization error</p> <p>2.3 Sampling Theory Nyquist sampling theorem aliasing/foldover undersampling band-limited waveform Nyquist frequency (<i>sr/2</i>) anti-aliasing filters - low-pass filter - pass band - roll off - frequency response</p>	<p>2.4 Binary Numbers binary number decimal number hexadecimal number bit most significant bit least significant bit <i>n</i>-bit system largest value in a <i>n</i>-bit system ($2^n - 1$) $2^8 = 256$ $2^{16} = 65,536$ $2^{24} = 16,777,216$</p> <p>2.5 Bit Width bit width/depth byte word kilobyte (K) megabyte (MB) gigabyte (GB) terabyte (TB)</p> <p>2.6 Digital Copying digital vs. analog copies generations degradation sonic detail loss of high frequency information Copyright Law performance rights organizations U.S. Constitution, Article I, Section 8 digital watermarking</p>	<p>2.7 Storage Concerns: The Size of Sound compact disc technology cd quality audio (44.1KHz, 16 bit, stereo)</p> <p>2.8 Compression eliminating redundancy perceptual encoding - mp3/mp4 - μ-law prediction algorithm adaptive compression technique Moving Pictures Expert Group</p> <p>MISC. high quality audio sampling resolutions: 16 bit, 24 bit DVD quality audio sampling rate: 48KHz</p>
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Text

Burk, Phil, Larry Polansky, Douglas Repetto, Mary Roberts and Dan Rockmore. *Music and Computers: A Theoretical and Historical Approach*. Emeryville, CA: Key College Publishing, 2005.

Quotable

“The *Nyquist sampling theorem*...states that to well represent a signal, the sampling rate...needs to be at least twice the highest frequency contained in the sound of the signal.”