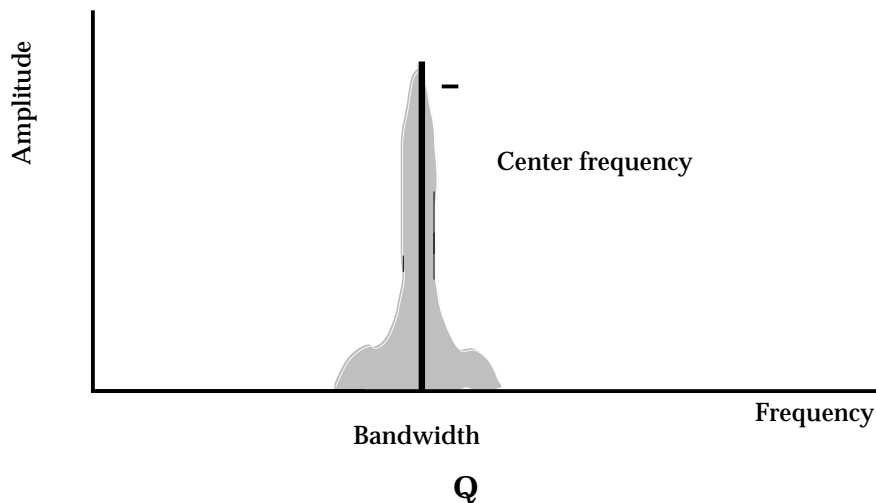


# Q

**Q:** In reference to a *resonant* mechanical or electrical circuit or a *capacitor*, Q stands for “quality factor.” (1) In the case of a resonant system, Q is a measure of the sharpness of the *resonant peak* in the *frequency response* of the system and is inversely proportional to the *damping* in the system:

$$Q = \frac{\text{center frequency in Hz}}{\text{bandwidth}}$$

Equalizers that contain resonant circuits are rated by their Q-value: the higher the Q, the higher and more well-defined the peak in the response. In filters, the ratio of a *bandpass* or *band-reject* filter’s center frequency to its bandwidth defines Q. Thus, assuming a constant center frequency, Q is inversely proportional to bandwidth, i.e., a higher Q indicates a narrower bandwidth. Also called *Q-factor*. See also *resonance*. (2) In I systems, Q is a measure of the *directivity* of the sound output: a Q=1 means that the system radiates energy equally in all directions, or into 360° of solid angle. A Q=2 means that the speaker radiates into a hemisphere; higher values of Q mean that the speaker radiates into increasingly smaller angles, or in other words, has greater directivity. (3) Also a measure of *inductor* or *capacitor* efficiency.



**Q-factor:** See Q.

**Q-Lock:** A brand of electronic synchronizer used for interlocking various audio and videotape recorders. The name is used generically for any such synchronizer. See *BTX*.

**quadraphonic:** An sound system which attempts to model a live acoustic using four audio channels to give the effect of sound arriving from different parts of the listening environment. See also *stereophonic*, *LCRS*, *surround-sound*.

**quadrature:** Two signals which are 90° out-of-phase with each other are said to be in quadrature. Also, a signal or function such as *impedance* will have a phase angle that varies with frequency or with time. The phase angle can be resolved into two components, real and imaginary, which have a 90° phase difference, where the imaginary part is called the quadrature part.

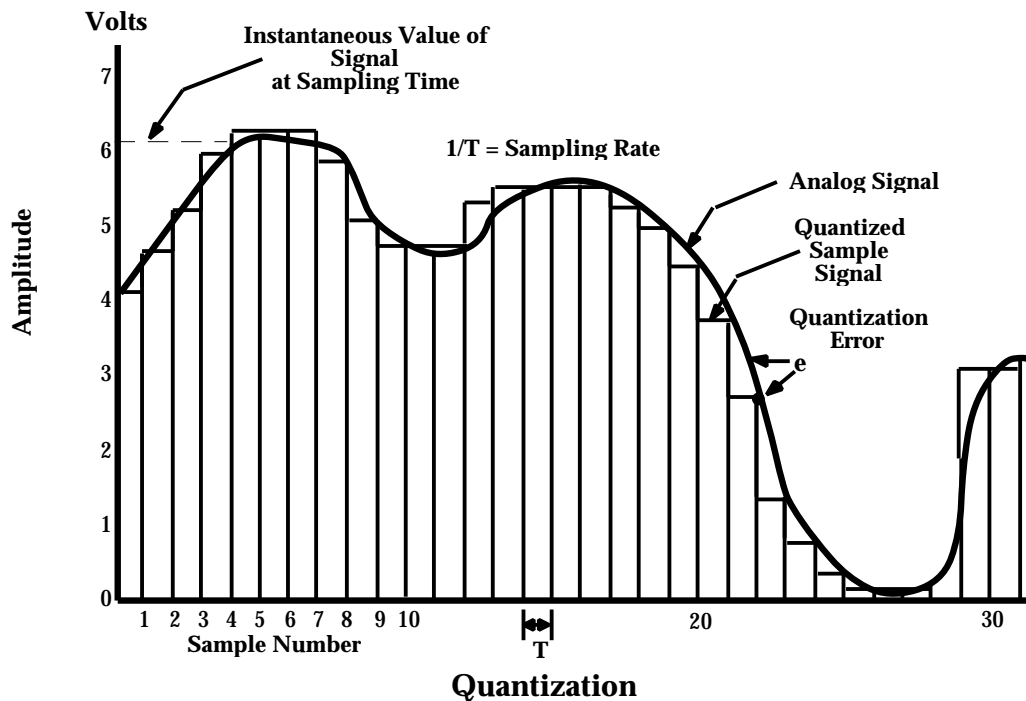
# Q

**quad track:** A track negative, and any release prints made from the track negative, that contains all three digital sound formats: *Dolby Digital*, *DTS*, and *SDDS*, plus a standard *SVA* analog track.

**quality factor:** See *Q*.

**quadruplex recorder:** A *VTR* recording configuration in which four heads are mounted around a wheel that turns in contact with 2" tape. This system has largely been replaced by *helical scan* formats.

**quantization:** (1) The representation of an analog signal by a vector of discrete values. The signal, after quantization, has a stepped shape rather than its original continuous curve, and the difference between this and the original signal is *quantization error*. See *granulation*, *PCM*, *quantization noise*. (2) A function found on sequencers and drum machines that causes notes whose start time does not correspond to the beginning of a beat to be rounded off to the nearest rhythmic value. See *percentage quantization*.



**quantization distortion:** See *granulation*.

**quantization error:** The difference between the actual *analog* value at the sample time and the nearest quantized (digitally encoded) value is called *quantization error*. At worst, the quantized value encoded will be no greater than one-half increment away from the actual analog value. *Quantization error* is related to the *S/N* ratio and the maximum number of quantization increments is related to *dynamic range*. See *bit depth*.

# Q

**quantization noise:** One of the types of error introduced into an analog audio signal by encoding it in digital form. The digital equivalent of tape hiss, quantization noise is caused by the small differences between the actual amplitudes of the points being sampled and the *bit depth* of the *A/D converter*. In the quantization of a sine wave whose frequency is a submultiple of the sampling frequency, the error will have a definite pattern which repeats at the frequency of the signal, having a frequency content consisting of multiples of this frequency, where it can be considered as *harmonic distortion* rather than *noise*. In music, however, the signal is constantly changing and no such regularity exists, resulting in *quantization error*, producing wide-band noise, called quantization noise. See *granulation*.

**quantization strength:** See *percentage quantization, quantization(2)*.

**quantize:** To produce an output in discrete steps. See *quantization(2)*.

**quantizing increments:** (1) The total number of stepped levels, from *noise floor* to *saturation*, that an *A/D* has available for assignment of the continuously varying analog input voltage with each sample taken. For example, if each sample has a *bit depth* of 10, there will be  $2^{10}$ , or 1,024, quantizing increments. (2) The voltage or decibel difference between any particular quantizing step and the next step higher or lower. In a system with  $2^{10}$ , or 1,024 discrete steps, if signal voltage from noise level to saturation varies from 0.0V to 1.0V, each quantizing increment will correspond to about 0.001V. See *dynamic range, sound pressure level*.

**quarter track:** Sometimes called a *four-track*, refers to most home-type, reel-to-reel tape recorders which use one-fourth the width of the tape for each recorded track, allowing stereo signals to be recorded in both directions, doubling the recording time. Professional stereo tape recorders use one-half the tape for each track, resulting in better fidelity and reduced noise level. See *magnetic tape*. See also *half track, two-track*.

**quarter-wavelength rule:** If a wall is a *node*, then the nearest other node at any frequency will be  $\frac{1}{2}$  (*wavelength*) away from the wall. Given this, the *antinode* is midway between those two points, or  $\frac{1}{4}$  (*wavelength*) away from the wall, for any given frequency. So, for example, if you want to filter out 60Hz, divide 18' (the wavelength of 60Hz) by 4 = 4'6" and hang a thin layer of frictional material (such as fiberglass or acoustic foam) at that distance from the wall(s) and floor and ceiling.

**quasi-balanced:** See *floating unbalanced output*.

**QUERTY:** The usual typewriter keyboard, the same design used on computer keyboards, named after the characters which comprise the left-most letters of the top row, just under the numerals. While this arrangement of letters on the keyboard was designed a century ago to slow down the typing rate of agile typists so that the mechanical keys did not collide and interlock, the format is so ubiquitous that it has made the transition to the electronic computer keyboard, despite attempts to rearrange the keys to allow entry by the fastest possible fingers.

# Q

**QuickTime:** A software multimedia environment developed by Apple Computer, running on the Mac or under Windows™. QuickTime enables the creation and playback of QuickTime movies featuring full-motion video, MIDI tracks and 16-bit ADPCM audio. However, QuickTime Movies (documents in QuickTime format) do not need to include pictures, and are a good way to distribute audio files. It is possible to import an AIFF, SND, or SoundEdit file into a QuickTime editing program, such as Adobe Premiere, and save the file as a QuickTime Movie, supported by a number of audio applications, including SoundEdit 16, Deck II, Peak, and Audioshop.

**quiescent noise:** (1) See *noise floor*. (2) The combined *intrinsic noise* produced by all sound reinforcement devices, plus all extrinsic noise present in the listening space, such as HVAC equipment, traffic noise, measured when the listening/recording space is empty. Sometimes used as a synonym for *noise floor*, confusing everyone.