

Some Guidelines for Recording Sound

SAMPLING is the process by which you make digital recordings of real-world sounds. Voltage information is read at the input connector and then converted to a number that the computer can store (Analog to Digital Conversion). The computer then can send this digital information to the output connector, when needed, to reproduce the recorded sound (Digital to Analog Conversion).

SAMPLING RATE refers to the numbers of times per second the computer reads information at the input connector or sends digital information to the output connector. The higher the sample rate, the closer a digital recording will sound to the original. The most common sample rates are 44.1 kHz (CD quality), 22.05 kHz and 11.025 kHz.

SAMPLE RESOLUTION refers to the number of bits that the computer uses to store the digital audio information. The higher the sample resolution, the more precise a digital sample can be - allowing for more shading. The most common sample resolutions are 16 bit, allowing for 65,536 different numeric values to be used for storing information; and 8 bit which allows 256 different values. In some cases, a 4 bit resolution is used when compressing sound files.

When sampling, keep in mind that the highest frequency that you can reproduce is half the value of the sample rate. For example, with an 11.025 kHz sample rate, the highest frequency that can be reproduced is 5.5125 kHz (5512.5 HZ).

Today's CD players use a 44.1 kHz sampling rate and 16 bit sample resolution. What's the highest frequency that can be reproduced?

TABLE 1
File Size Requirements for Sound Data (Per Minute)

Sample Rate	16 Bit Stereo	8 Bit Stereo 16 Bit Mono	8 Bit Mono
44.1 kHz	10.5 MB	5.3 MB	2.6 MB
22.05 kHz	5.3 MB	2.6 MB	1.3 MB
11.025 kHz	2.6 MB	1.3 MB	661K

Sound files can become very large. Table 1 shows the approximate amount of hard drive space needed for a minute of recording. To best utilize and conserve your memory resources, always keep in mind what kind of sound you are recording and the sample rate that you are using. Try to record with a sample rate that will satisfy two goals: 1) best possible sound reproduction; 2) smallest amount of memory needed. Most sound recording/editing programs will allow you to change the sample rate according to your needs.

TABLE 2
Suggested Sample Rates for Various Recording Situations

Type of Sounds	Quality	Sample Rate
Speech, low pitched sounds	AM Radio/Phone	8 to 11.025 kHz
General purpose, high pitched sounds	FM Radio	22.05 kHz
CD quality	Hi-Fidelity Audio	44.1 kHz
<i>Use 8 bit resolution for sound effects and some general purpose.</i>		
<i>Use 16 bit resolution for hi-grade sound and/or music.</i>		
<i>The choice of stereo or mono depends on your needs. When playing back on a typical multimedia computer, mono should suffice.</i>		

Table 2 shows some guidelines to follow when recording sounds. This chart gives you a good idea of how to approach your recording. In the end, let your ears be the final judge of whether your recording is acceptable or whether you should record it again at a different sample rate.