

Recording Basics: Digital Recording

The Binary System:

- Sound can be represented digitally through the binary number system (0,1).
- It is precise and reliable.
- It is easily manipulated using math.

Converting Sound to Digital:

- An ADC translates a continuous analog signal into representative sampled binary words.
- The accuracy with which it does this is determined by its sample rate and its bit depth.

Sample Rate: (relates to frequency)

- 44.1kHz, 48kHz, 88.2kHz, 96kHz...
- Literally how many samples/snapshots (of the voltage) are taken per second.
- Nyquist Theorem- no information is lost if a signal is sampled at least twice as fast as its highest frequency component (recording up to 20kHz requires 40k samples)
- Aliasing (distortion) occurs if there is signal higher than half the sample rate (i.e. 25kHz)

Bit Depth: (relates to dynamic range)

- 8bit, 16bit, 24 bit (49.8dB, 97.8dB, 145.8dB of dynamic range respectively)
- Bit depth refers to the word length of each sample (8,16, or 24 characters).
- 16bit can record 65,536 different values (2^{16}), 24 bit records over 16 million values

Digital Standards:

- CD standard- 44.1kHz, 16bit (705,600 digits per second)
- Film standard- 48kHz, 16bit (768,000 digits per second)
- DVD-A 96kHz, 24 bit (2,304,000 digits per second)