

# Enhancing your Production with Audio

# Audio Basics

- Acoustics – the branch of physics dealing with sound
- Power of sound (Watts)
- Loudness (Decibels – dB)
- Loudness =  $k \times \log(\text{Power})$
- Frequency of human hearing -> 20 Hz – 20KHz
- Typical human voice -> 500 Hz – 4 KHz

# MIDI

- Musical Instrument Digital Interface
- Not actual sound – shorthand representation of music in numeric form
- Device Dependent
- Not good to record human voice
- Completely editable
- Small file size (compared to Digital Audio)

# General MIDI

- A number helps identify the musical instrument
- There are numbers from 0 – 127 (or 1 – 128)

# Digital Audio

- Recording Samples of actual sounds (Digitized Sound)
- Device independent
- Size of files depends on
  - Sampling Rate
  - Duration of Recordings
  - Bit resolution

# Sampling

- Sample of sound taken and stored as digital information, every  $n$ th fraction of a second
- Quality depends on how often samples are taken and how many numbers represent value of each sample

# Quantization and Clipping

- Quantization
  - Rounding each sample to nearest integer
  - Disadvantage :- background hissing
- Clipping
  - Clipping top and bottom waves if amplitude too great for available intervals
  - Disadvantage :- distortion of the sound

# Size of Digital Audio Recording

$$\text{Size} = \text{sr} * \text{t} * (\text{res}/8) * \text{n}$$

- sr - sampling rate
- t - duration of recording (in s)
- res - (bit resolution / 8)
- n – stereo (=2) or mono (=1)

# MPEG Audio

- Uses human perception of sound frequency (frequency masking) to control sound output

# MPEG

- MPEG2
  - transparent sound recording for theaters
- MPEG4
  - Speech compression, MIDI, text-to-speech, etc. all integrated to one standard
- MPEG7
  - Standardizing Metadata for audiovisual multimedia sequences
- MPEG21
  - Standardization from consumer's perspective particularly interoperability