

# Audio 1

Where does digital audio come from?

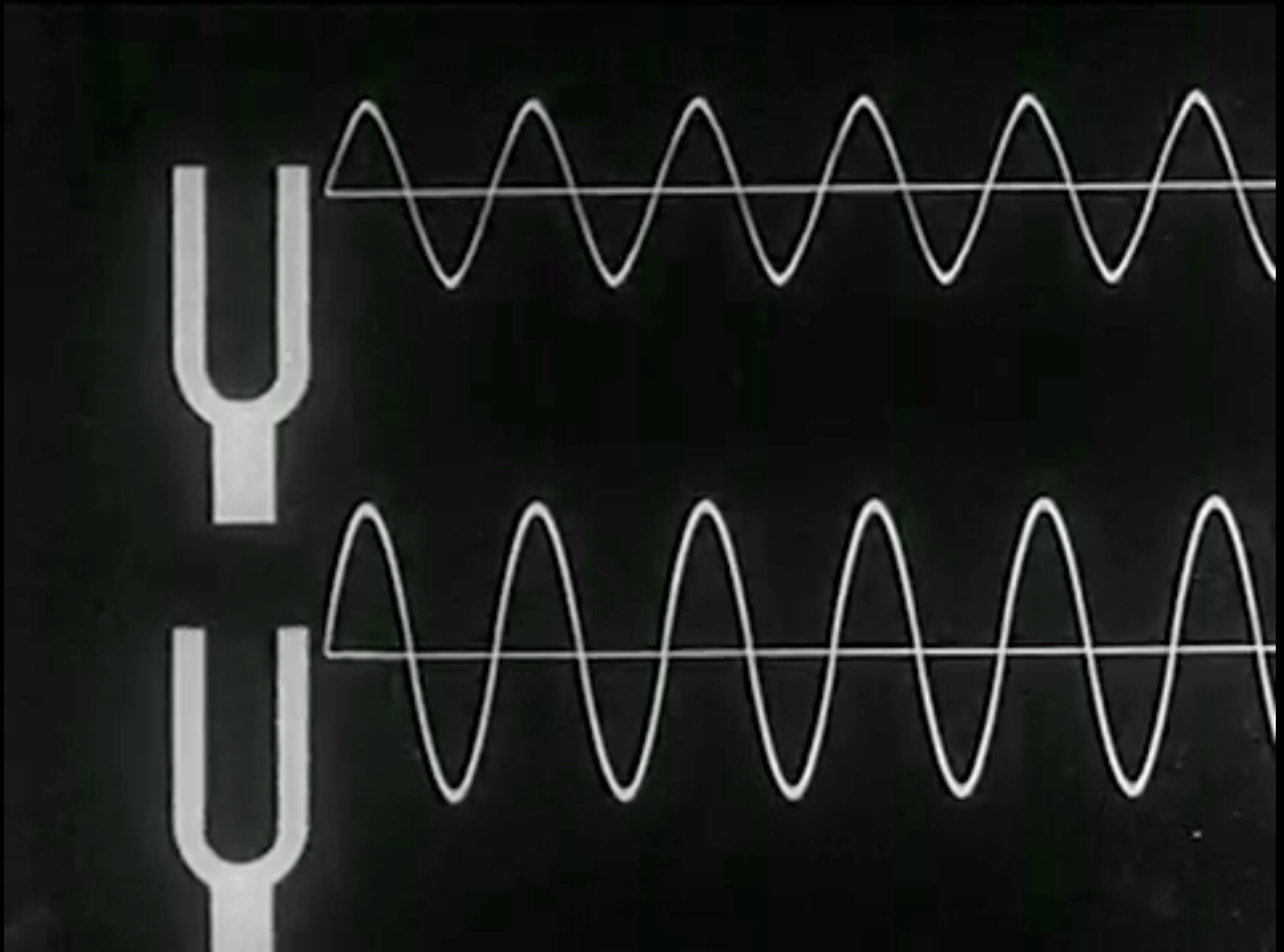


**1. What is sound?**

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2. How do you reproduce sound?

1. What is sound?
2. How do you reproduce sound?
3. Audacity demo



Sound Waves And Their Sources (1933), Encyclopædia Britannica

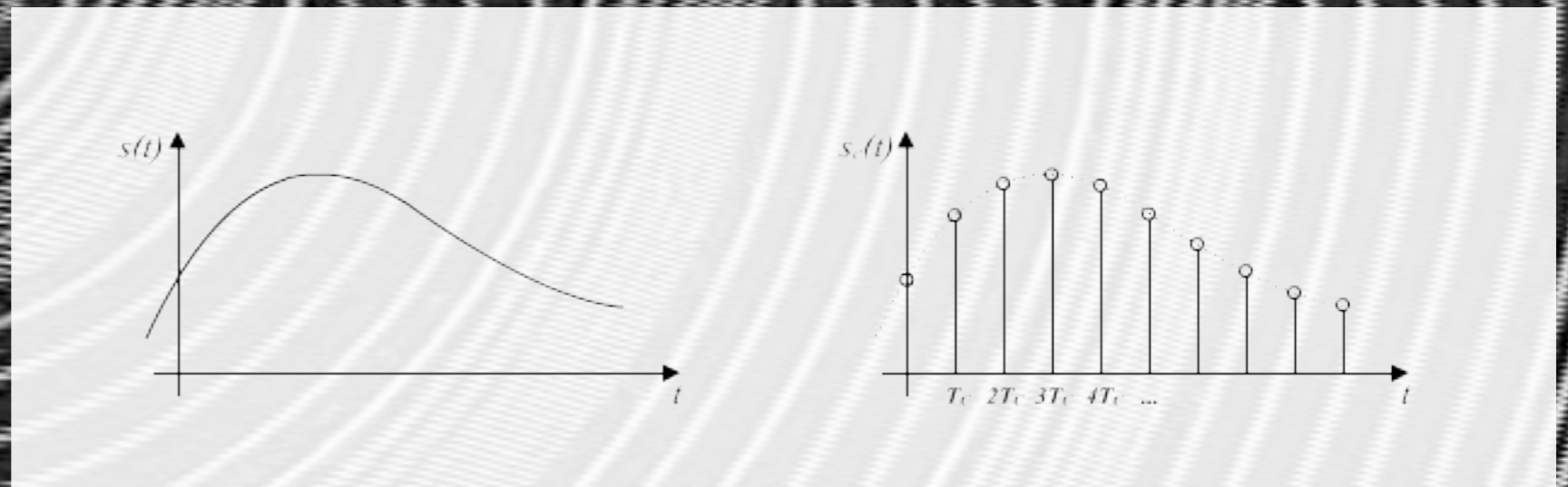
# Audio basics

- Audio is *recorded* sound
- Sound can be converted into audio with a microphone
- Audio can be converted back into sound with a speaker
- We are mainly concerned with **digital audio**

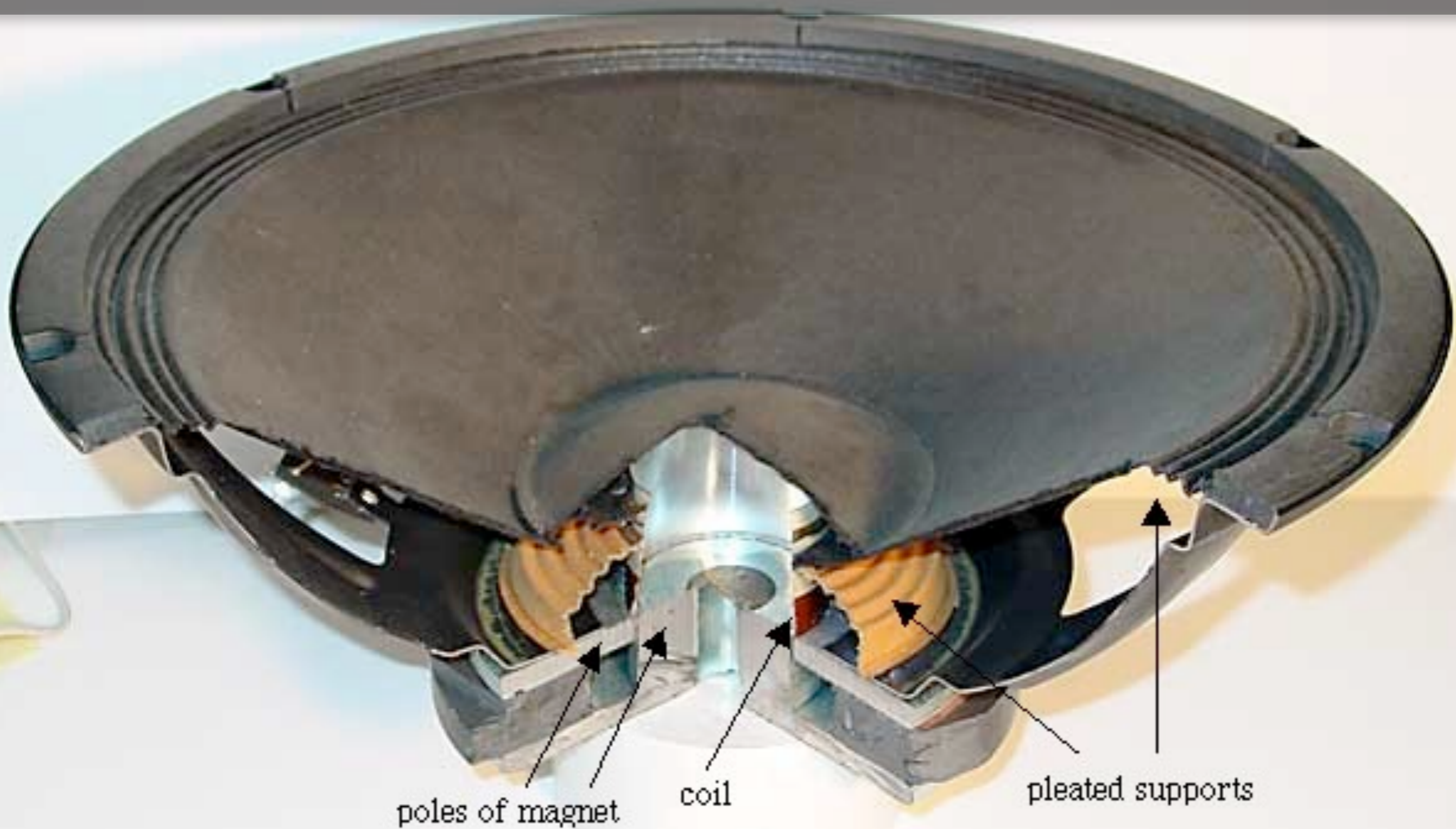
# Digital audio

- Audio waveforms are created with samples
- Each **audio sample** stores a snapshot of a sound signal's amplitude

# Audio samples



# Speaker



# The output process

- **Applications** on your computer create audio signals
- Your computer's sound card converts those signals from digital into analog
- A speaker physically turns analog signals into audible **sound**

# MIDI sound

- Musical Instrument Digital Interface
- MIDI : recordings :: Illustrator : Photoshop
- Each sound event includes pitch, intensity, timing, etc.
- Apple's Logic or GarageBand work with MIDI

# Waveform sound

- Editing & mixing audio samples
- We'll be using Audacity, free software for Mac or Windows (or Linux!)
- Other professional (not free!) audio software includes Pro Tools, Digital Performer

# Digital audio quality

- *Sample rate* describes the frequency of when samples are taken
- *Bit depth* determines how many bits of data are stored per sample
- Typical audio samples are stored in **32 bits** taken **44,100 times per second**

# Audio compression

- Most uncompressed audio is in WAV or AIFF or FLAC format these files can get really big
- MP3 compression lets you save disk space and network bandwidth
- The trade-off is you lose quality, like with JPEG compression for images

*Audacity demo*