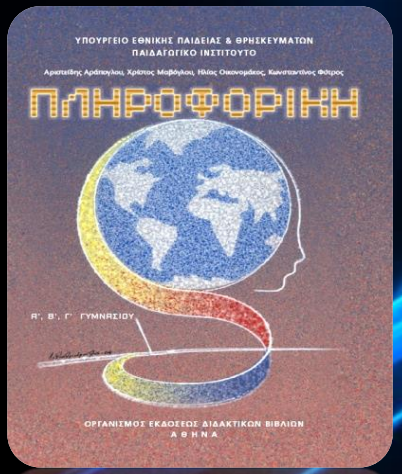
http://www.zioulas.gr

VCZ

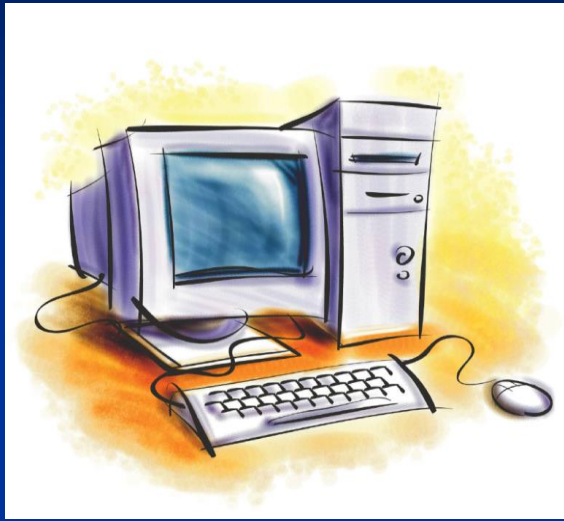
MULTIMEDIA

CHAPTER 3.2



EVANGELOS C. ZIOULAS (IT TEACHER)

KEY WORDS



ANIMATION

REFRESH RATE (FPS)

FRAME

PAL & NTSC SYSTEM

SOUND CARD

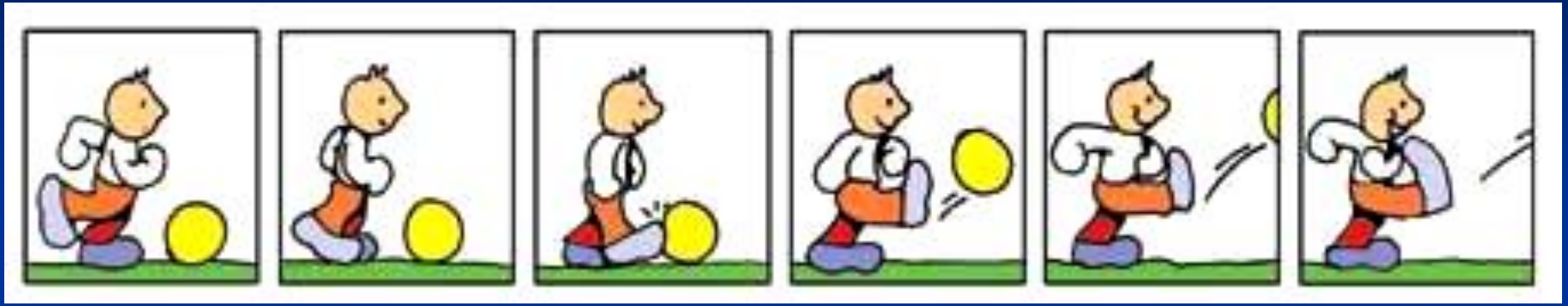
SAMPLING

COMPRESSION

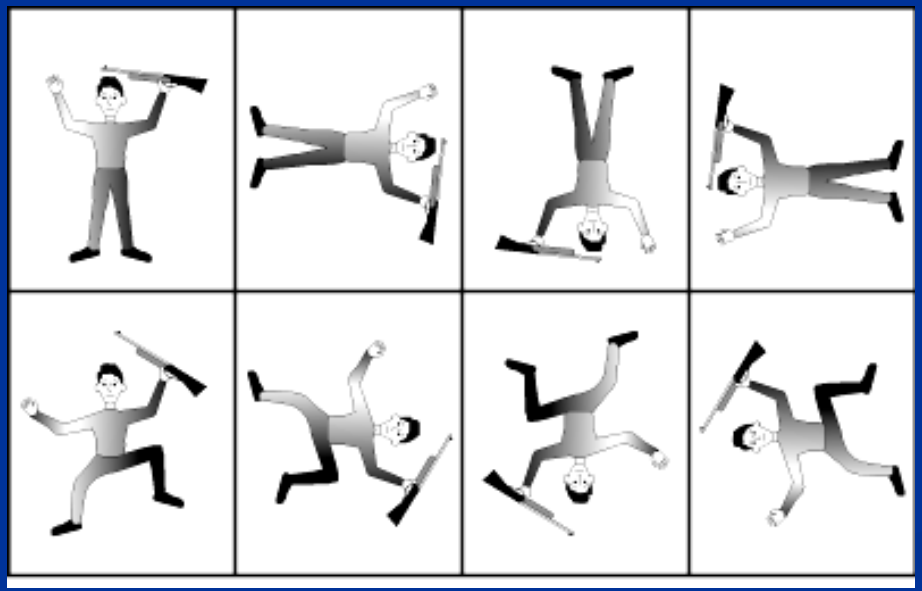
ANIMATION

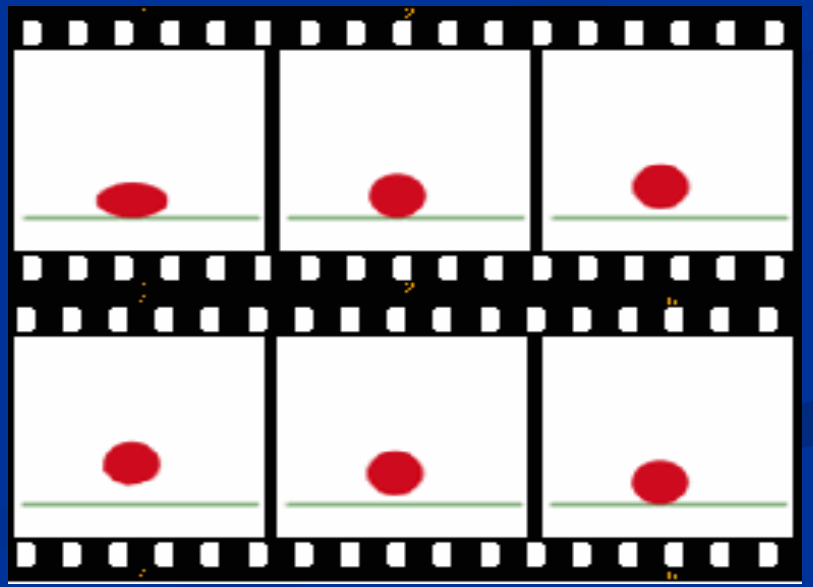
- The motion is caused by a **succession of images** (video) or individual designs (animation).
- The switch between two successive images takes place in a few milliseconds.
- This gives the user the **illusion** of a real video clip.
- In order to process a video file, we need to make a separate image (**frame**) for each individually.

ANIMATION (Succession of Designs)

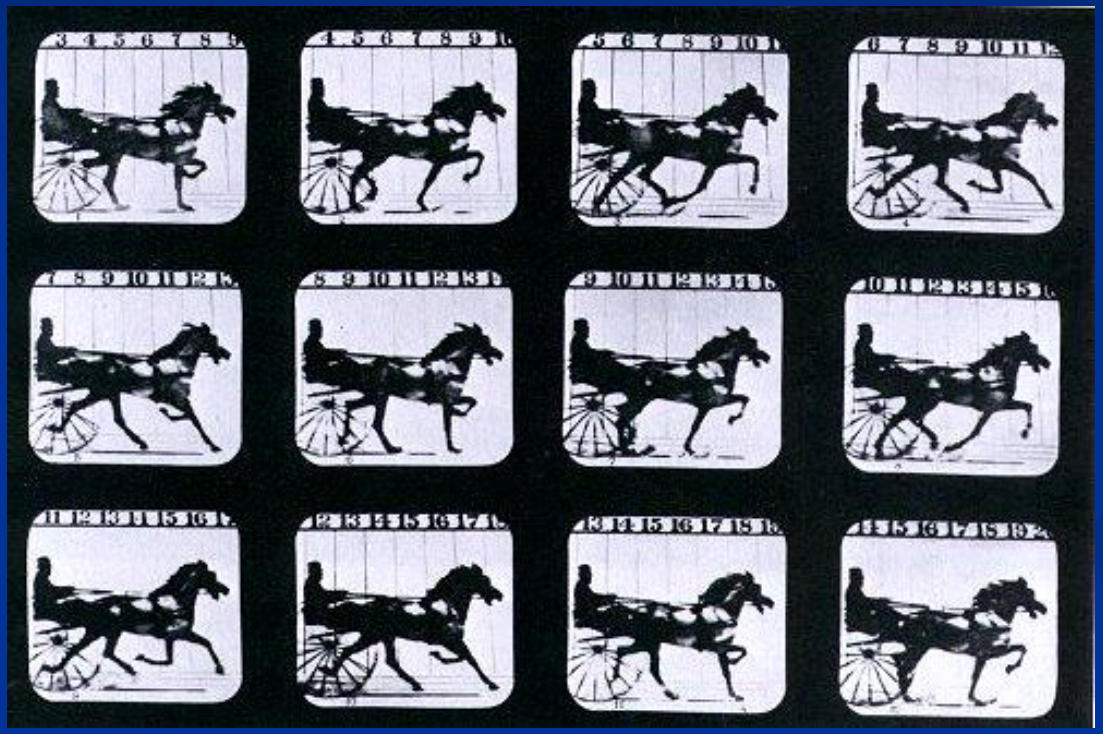


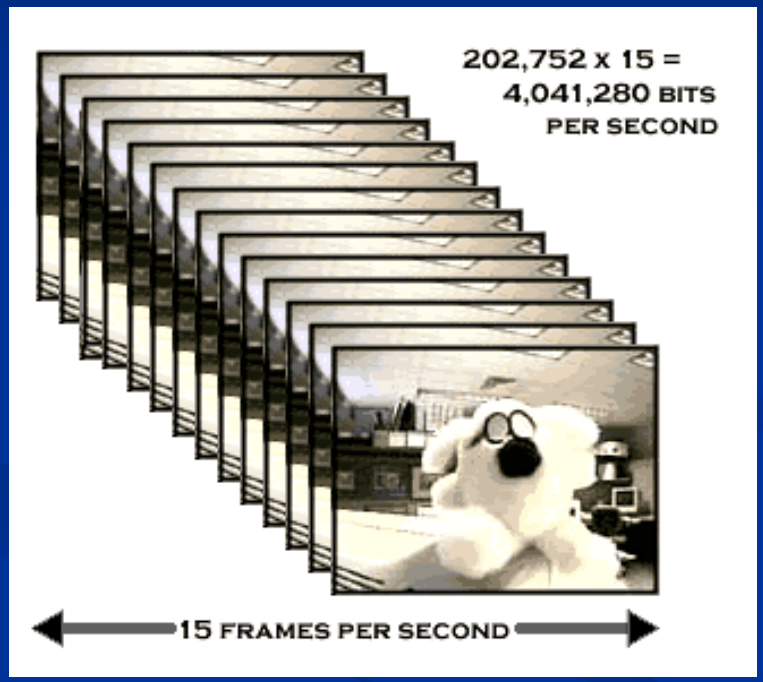
Succession of images that creates an animation file





VIDEO (Succession of Photos)



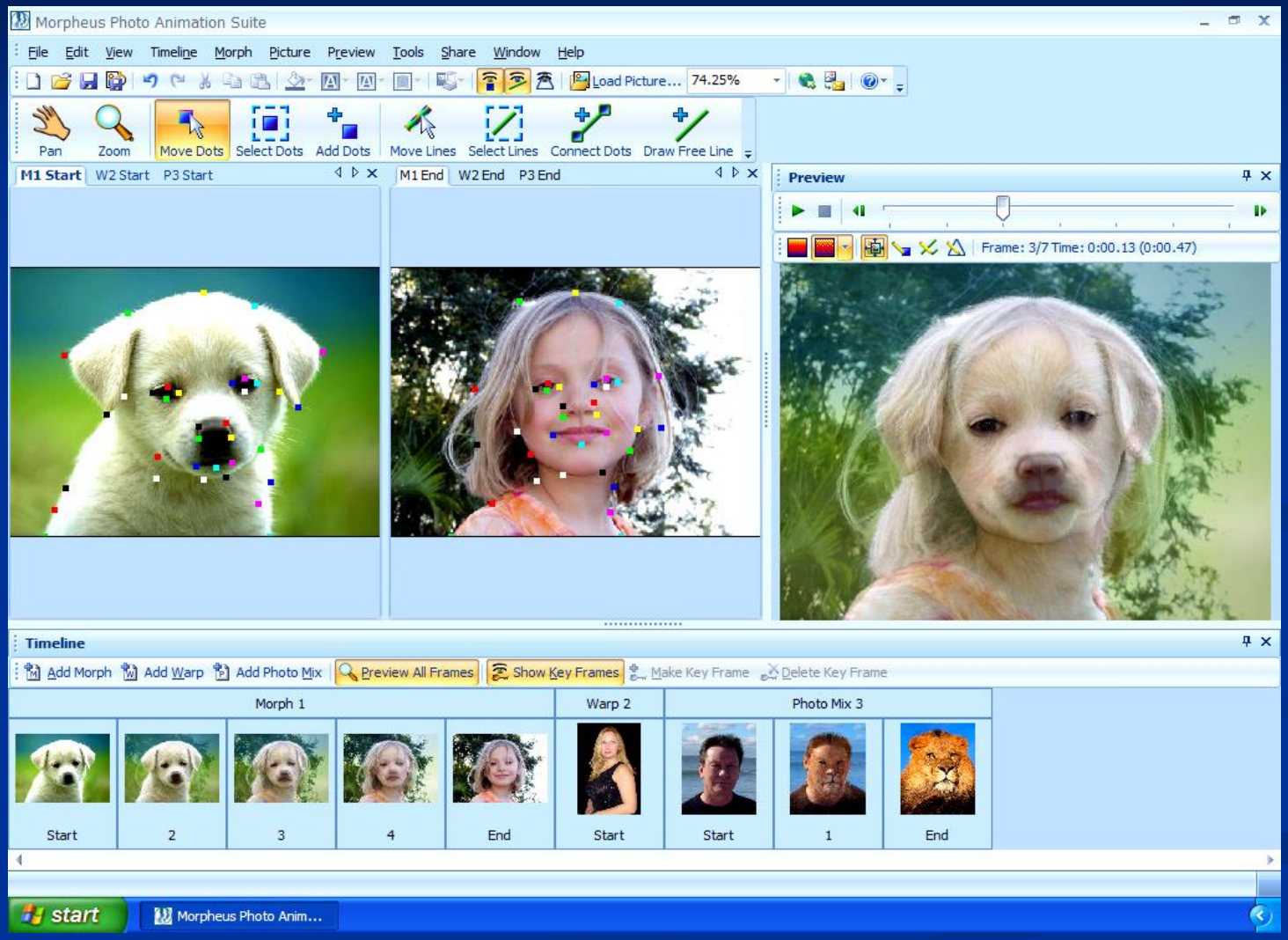


To create a sense of movement, a video file needs to have at least 15 fps (frames/sec)

- The refresh rate of a video is measured in **FPS** (frames per second).
- The European system **PAL/SECAM** works with **25 fps** while the American **NTSC** works with **30 fps**.
- Video processing software includes:
  - *Power Director*
  - *Pinnacle Studio*
  - *Corel Video Studio*
  - *Adobe Premiere Elements*
  - *Nero*

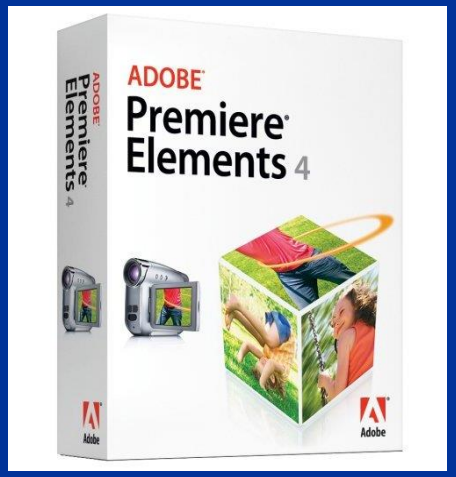
VIDEO PROCESSING SOFTWARE

ANIMATION PROCESSING SOFTWARE



Link to fantamorph.com

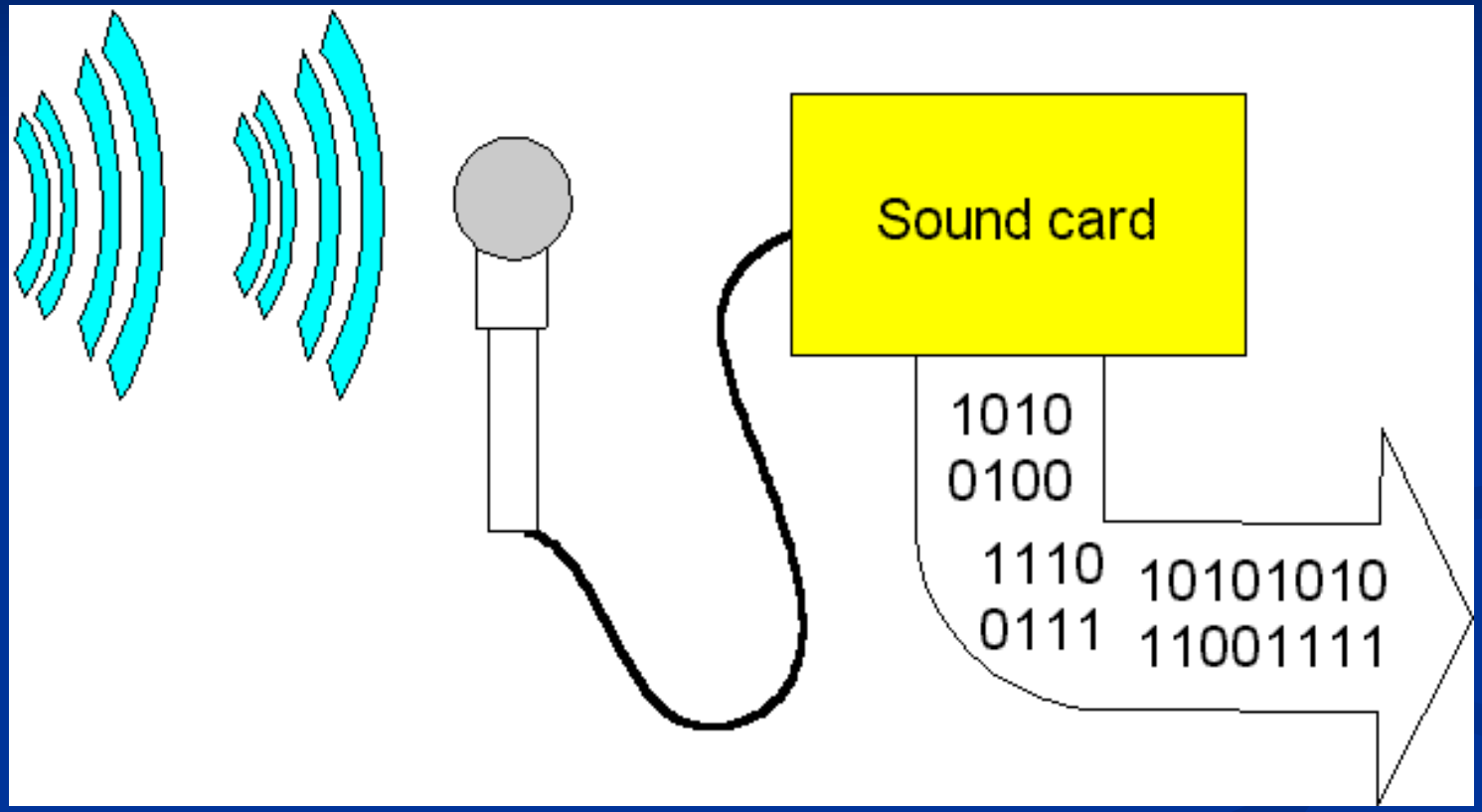
VIDEO PROCESSING SOFTWARE



SOUND

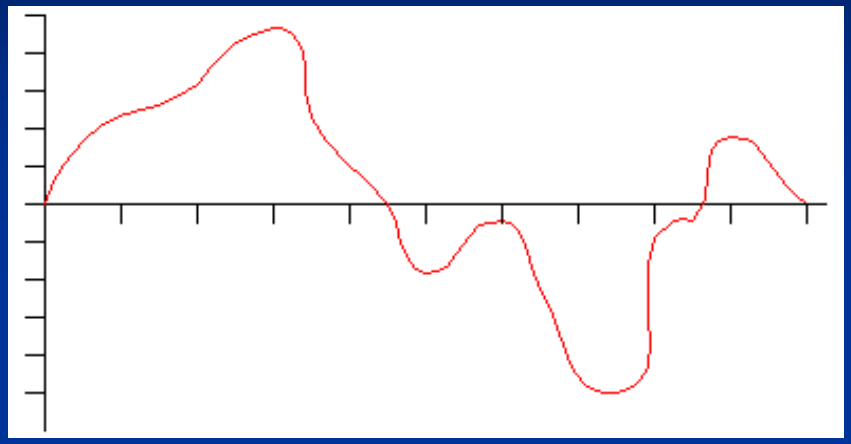
- In a computer we often insert analog sound (mainly from a microphone or musical instruments).
- The **sound card** is responsible for converting (digitalize) the sound input from analog to digital form (bits).
- This converting process requires the measurement of signal volume in regular time intervals.
- This procedure of converting analog to digital sound is best known as **sampling** (since an individual interval of analog signal is converted in digital **samples**).

SOUND CARD (DIGITALIZATION)

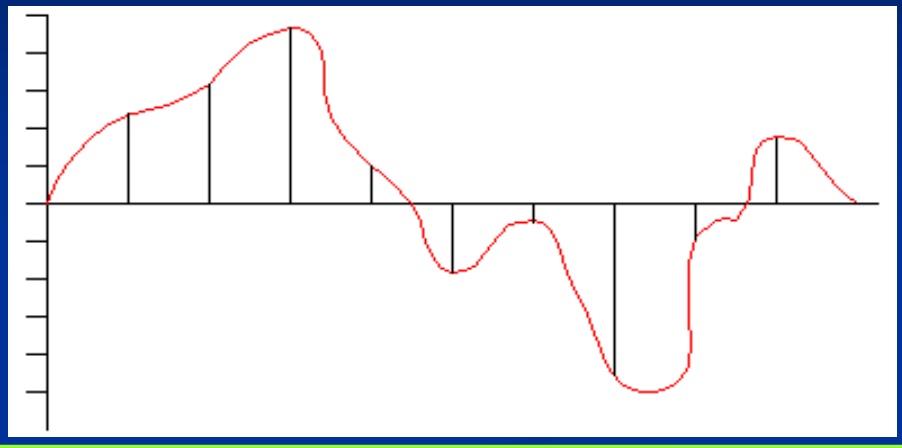


For **sound reproduction** the reverse process is used, so the sound card converts bits sequence into analog form and forwards it to an audio output device such as speakers or headphones.

THE PROCESS OF SAMPLING

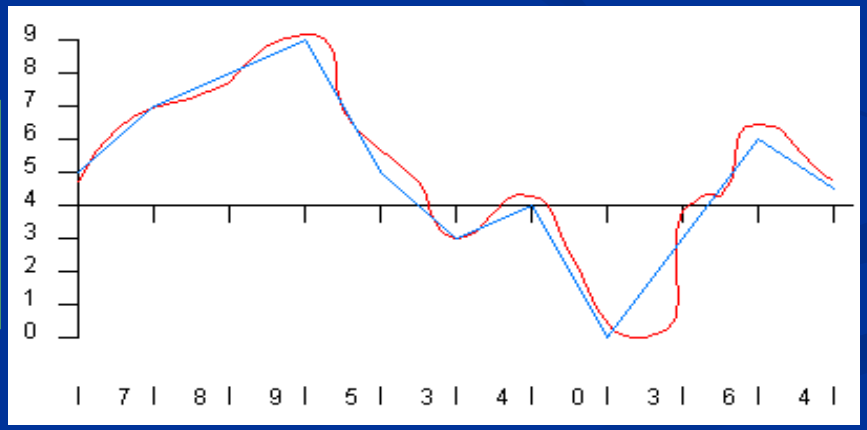


The graphical representation of analog sound wave

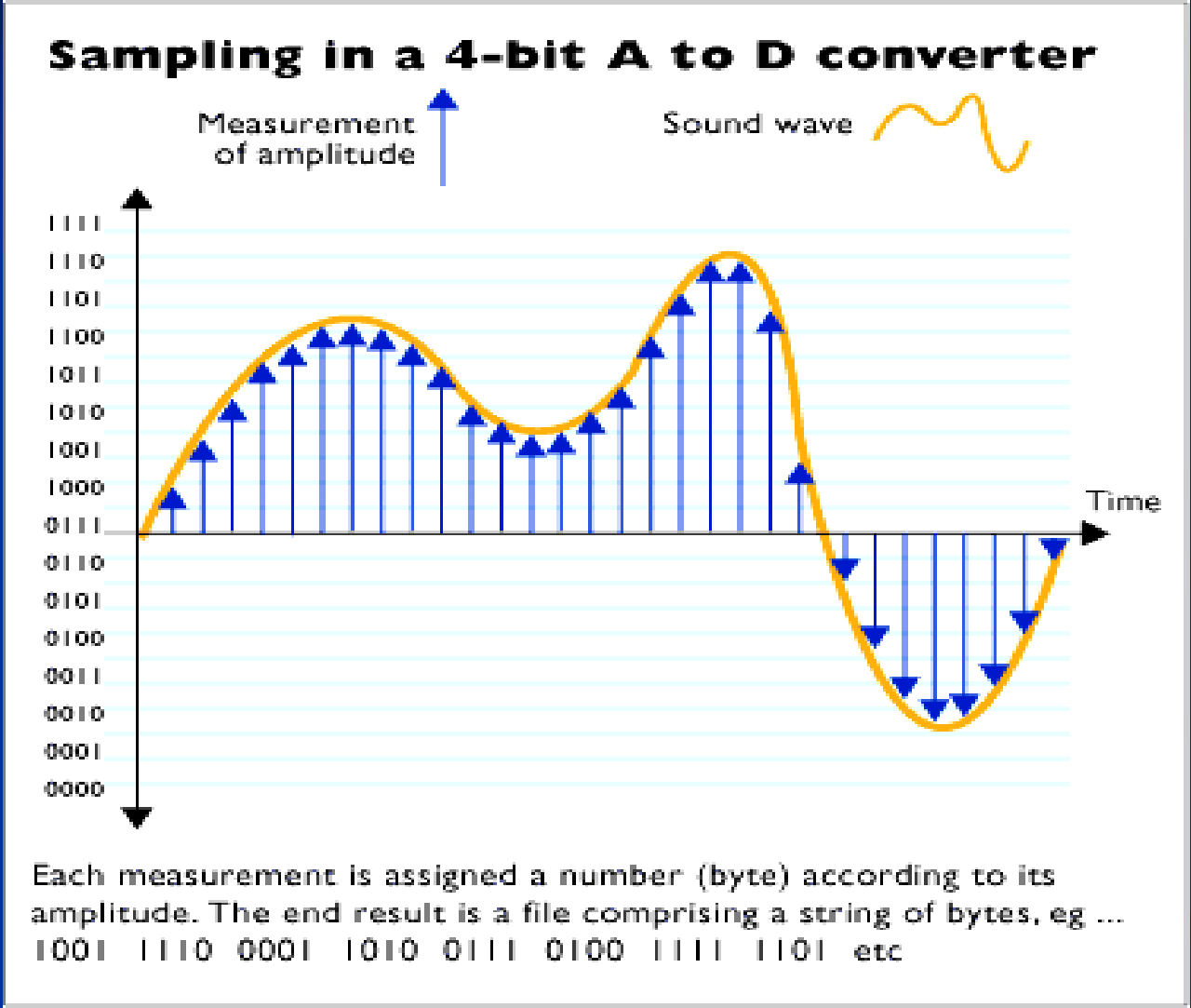


Specific sound intervals (samples) are selected periodically to be represented in digital form

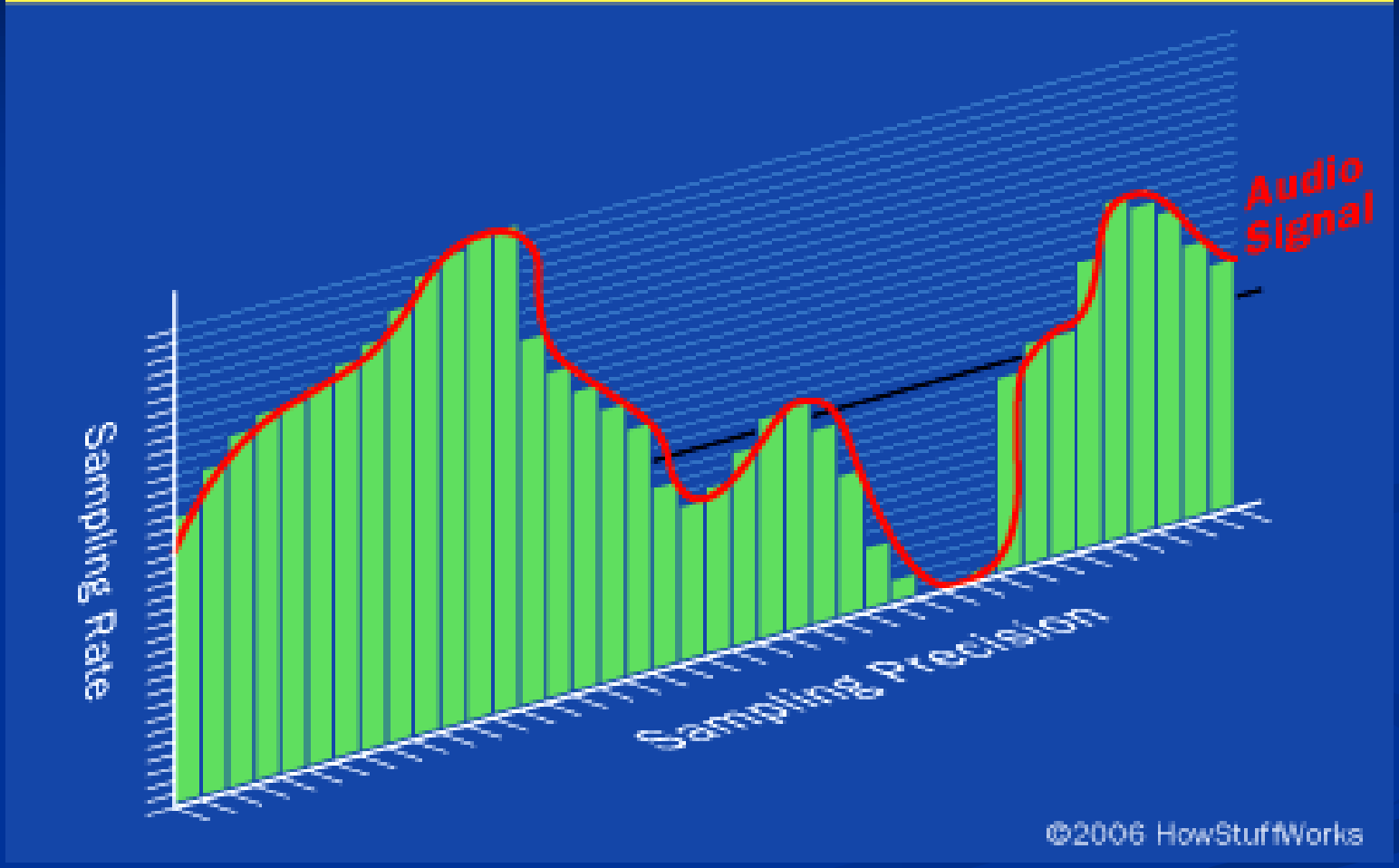
Comparison between analog (red) and digital (blue) waveform



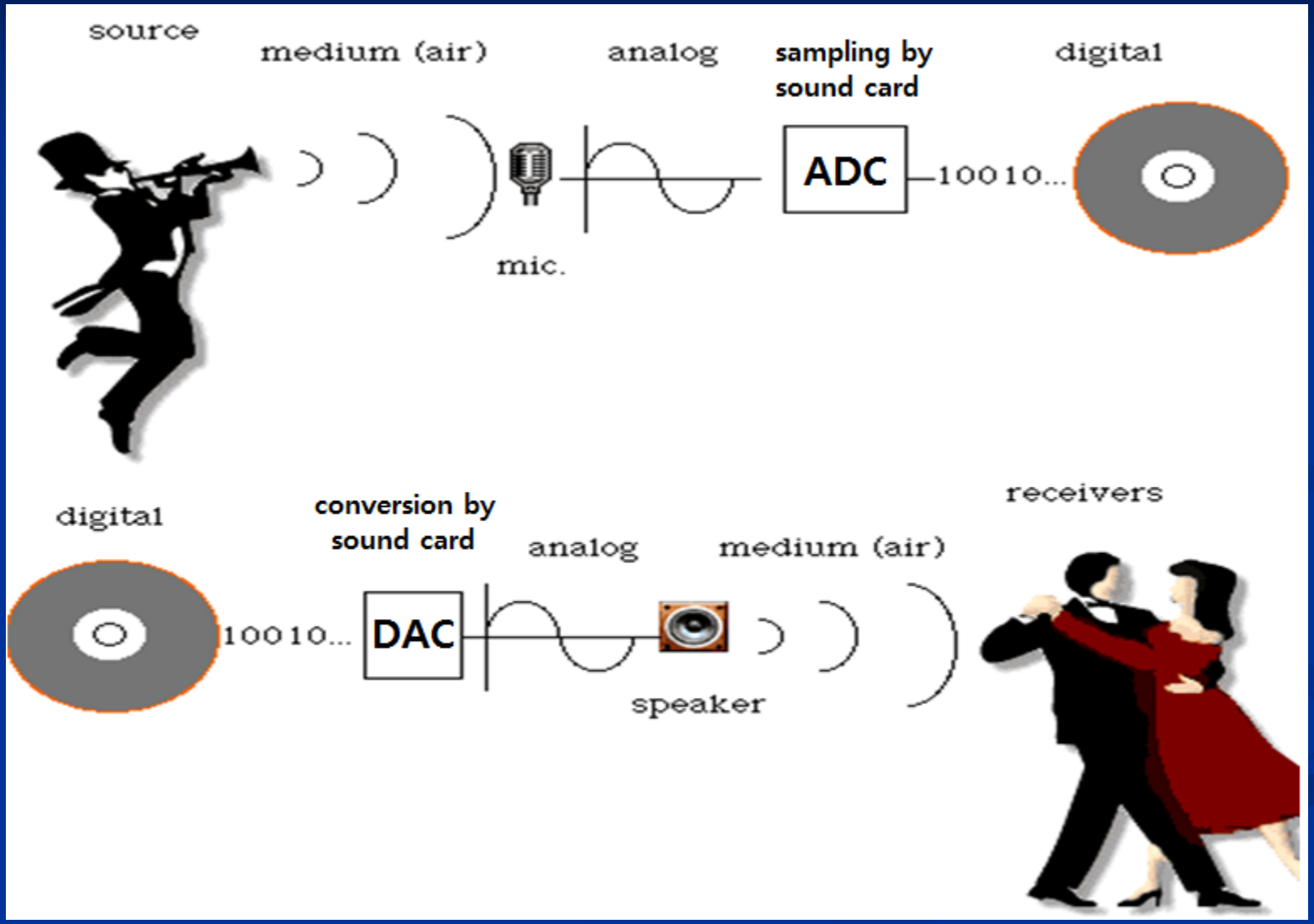
SAMPLING


Sampling in a 4-bit A to D converter
Measurement of amplitude
Sound wave
1111
1110
1101
1100
1011
1010
1001
1000
0111
0110
0101
0100
0011
0010
0001
0000
Time
Each measurement is assigned a number (byte) according to its amplitude. The end result is a file comprising a string of bytes, eg ...
1001 1110 0001 1010 0111 0100 1111 1101 etc

Digital Sampling

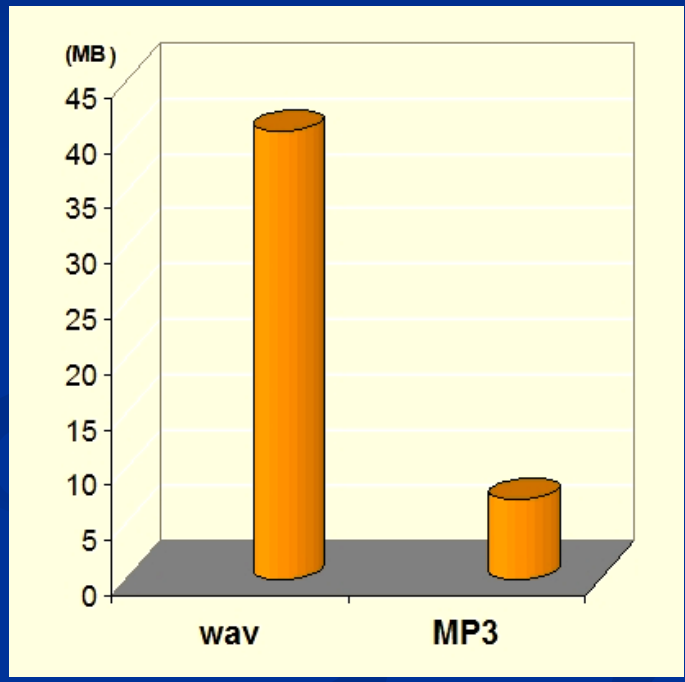


SOUND CONVERSION



SOUND COMPRESSION

- Through **sound compression**, a digital compressed audio file (e.g. **.mp3**) becomes smaller almost 10 times than the initial uncompressed sound file (e.g. **.wav**).
- The quality of compressed sound is poorer than the initial one, but this is not perceivable by users.

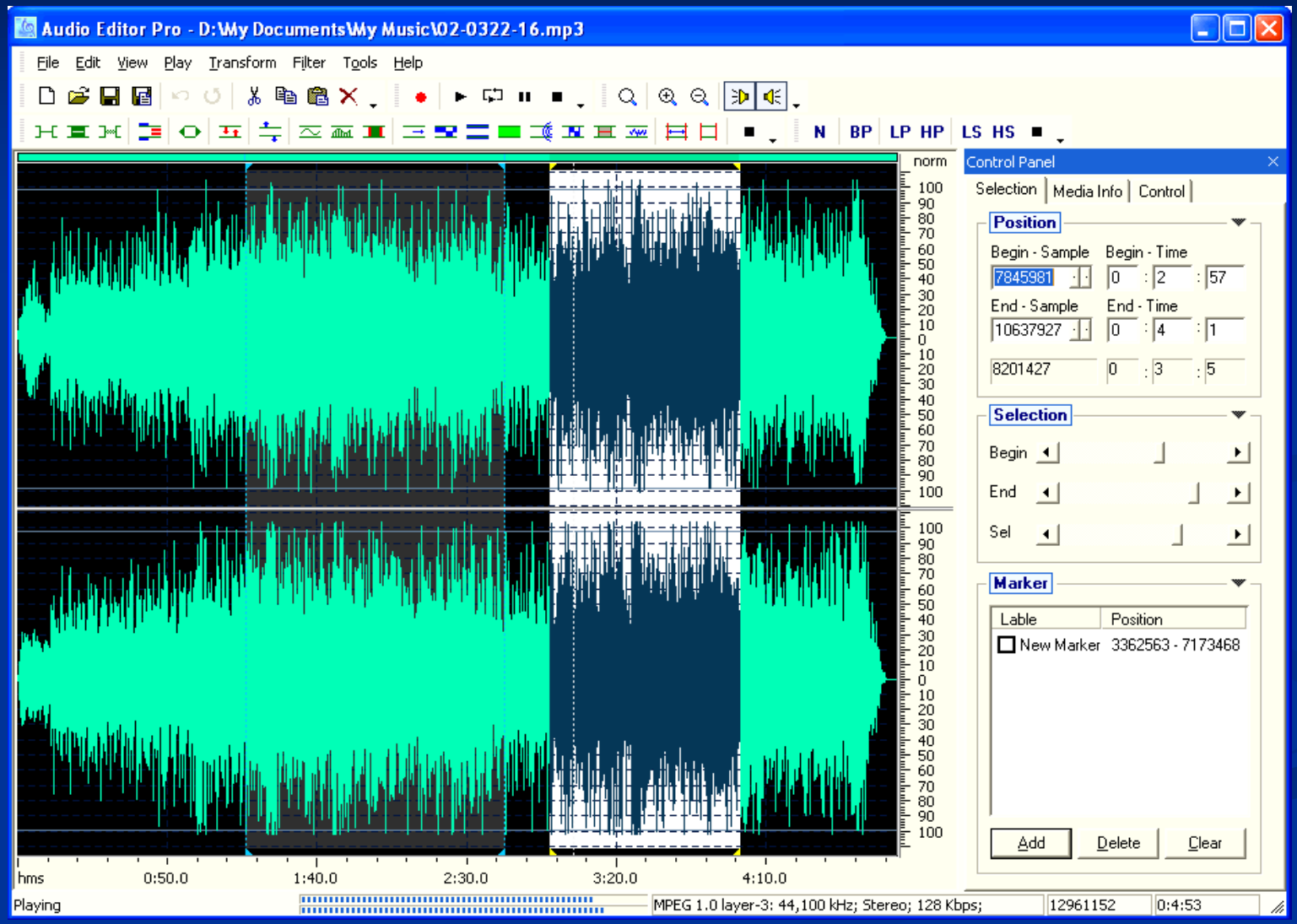


SOUND EDITING

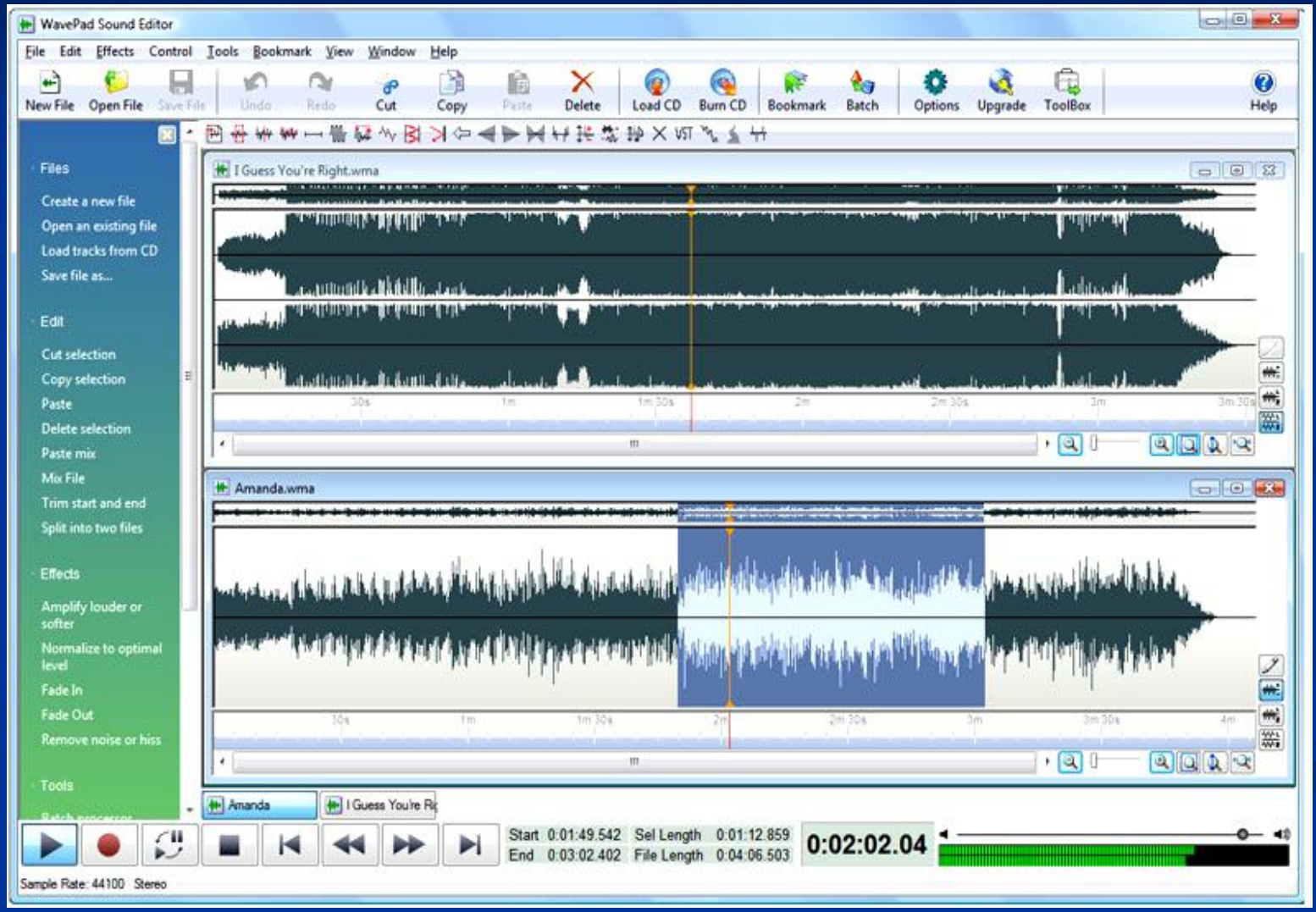
- By using specific types of software users can:
  - mix sound with other audio sources,
  - add special effects,
  - cat/copy & paste whole parts of a sound file

- Here are names of well-known sound editing software:
  - Sound Forge (Sony)
  - Audacity
  - WavePad Sound Editor
  - Soundtrack Pro (Apple)
  - Sound Studio

SOUND EDITING



SOUND EDITING



SOUND EDITING SOFTWARE