

# Basics of Audio Systems

# Audio

- The Electronic representation of Sound

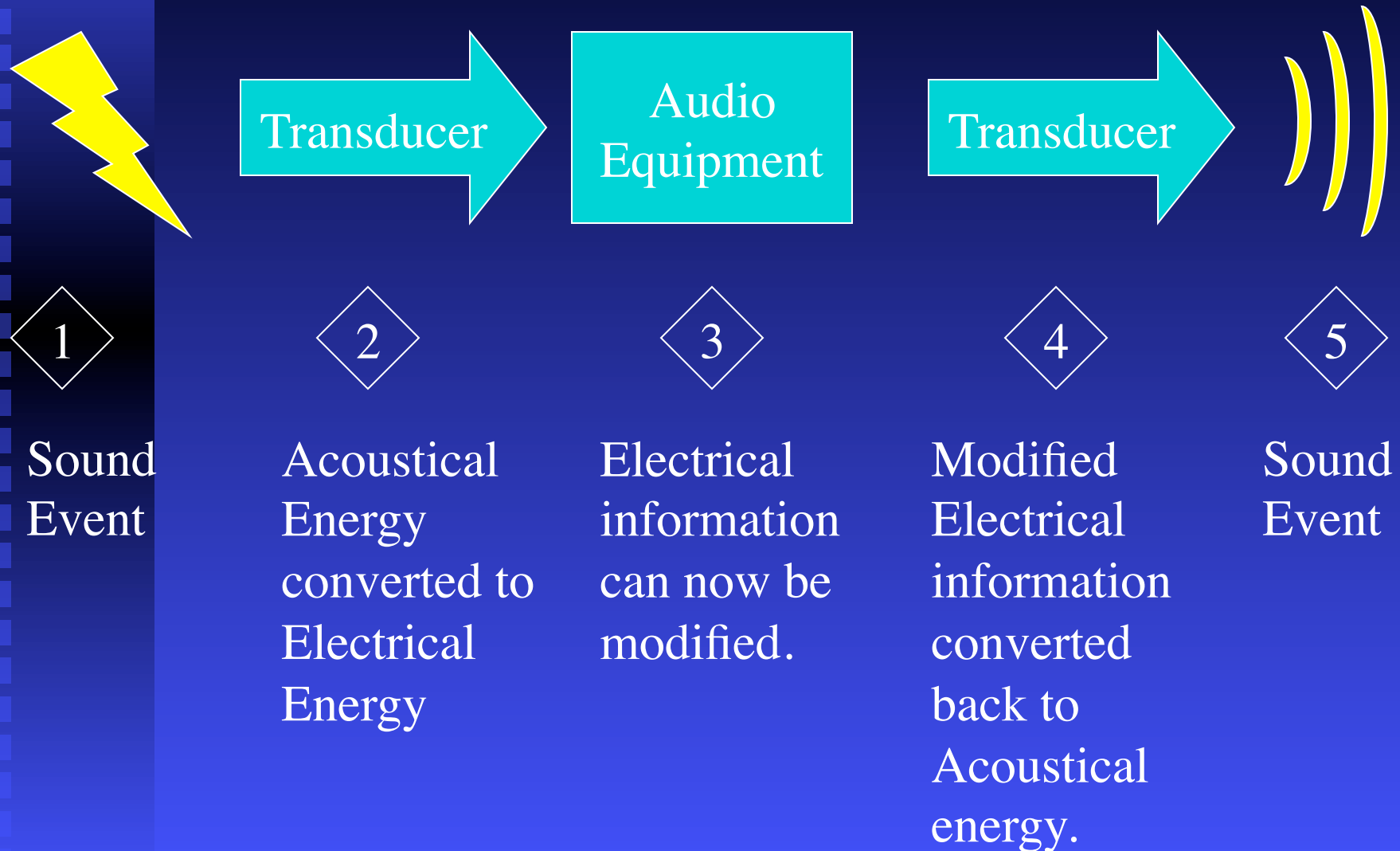
# Basic Signal Path

- Outputs always connect to:
- Inputs

# Signal Flow Charts

- Critical to design of systems
- Drawn by designer
- Used by crew to build system

# High level View

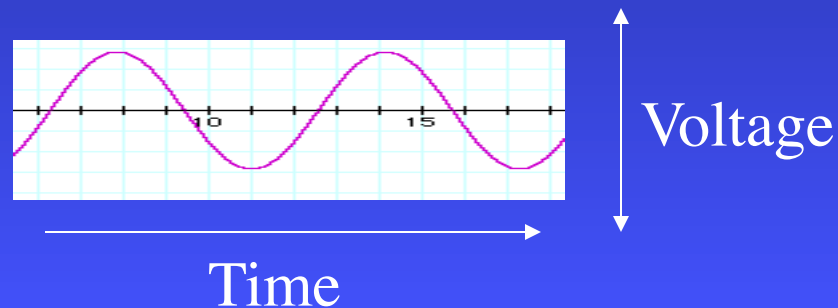


# Transduction

- The conversion of one form of energy into another
- In our case, acoustical to electrical
- Or, electrical to acoustical

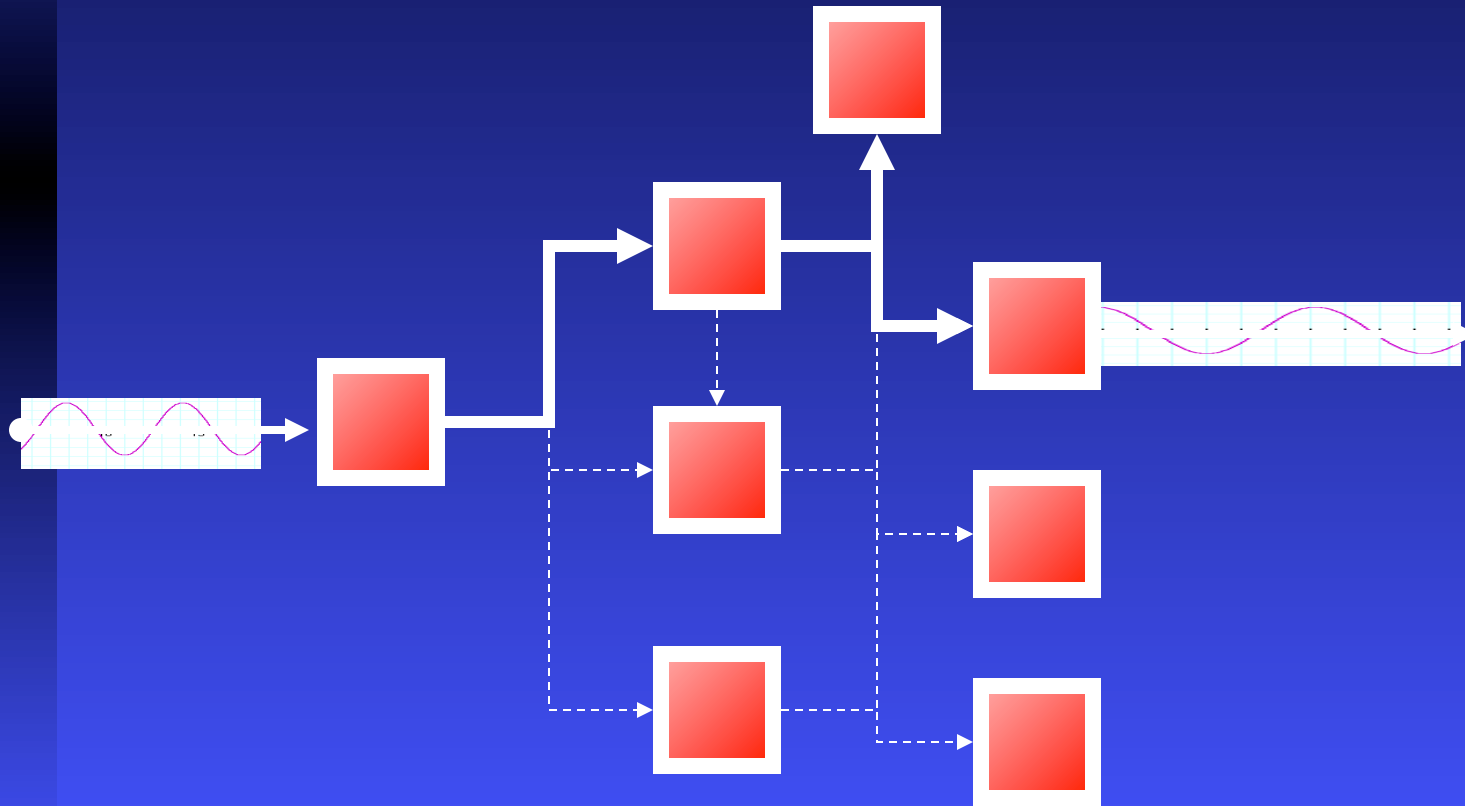
# Signal

- Audio information
- Can be either analog or digital
- Analog is a voltage
- Must travel along circuitry at close to speed of light or be stored.
- Otherwise, information is lost.



# Signal Path

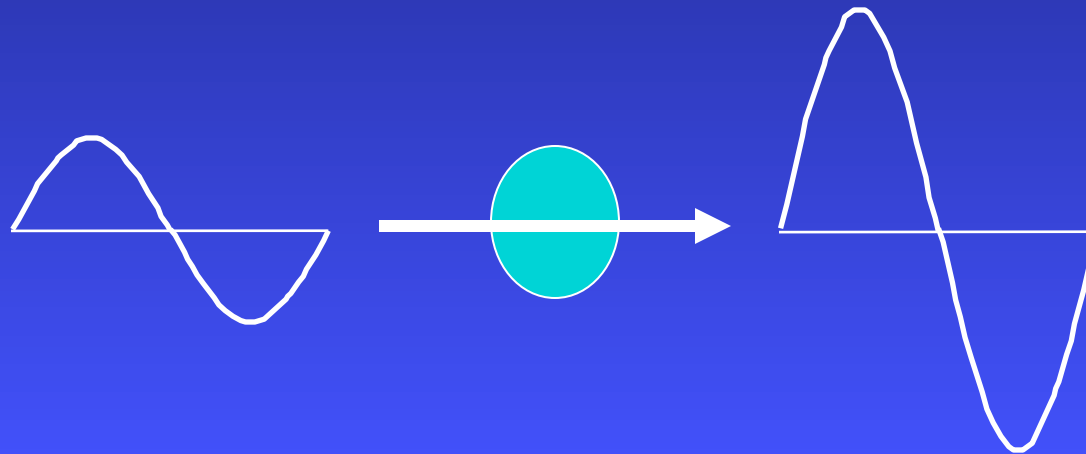
- The specific route that a signal travels through the possible circuits





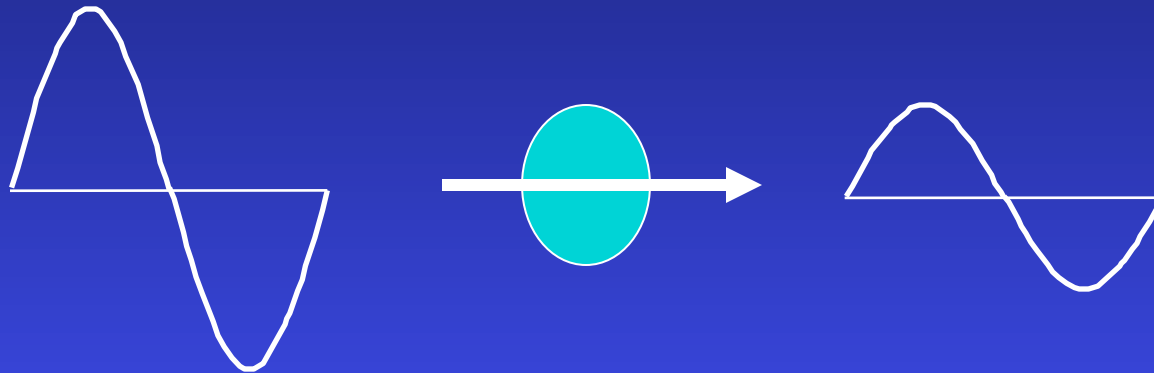
# Gain

- Amplification factor of a circuit
- Expressed in power or voltage
- Every circuit has a gain between input and output



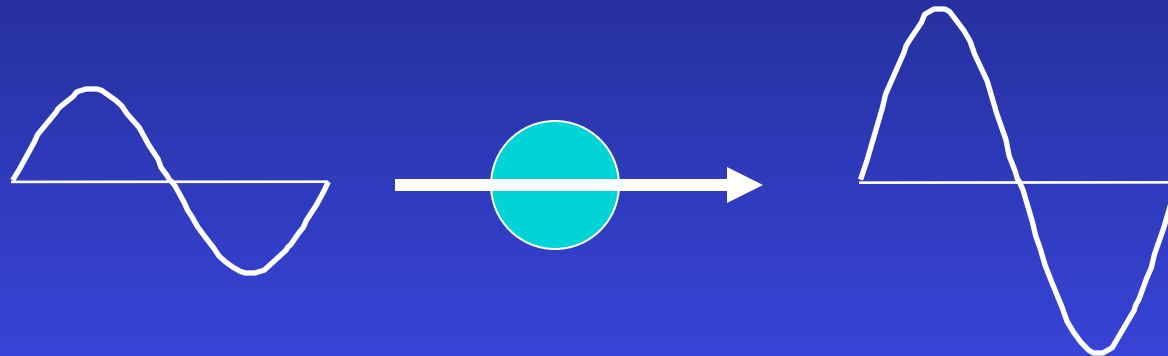
# Negative Gain

- If the Output power  $<$  Input Power



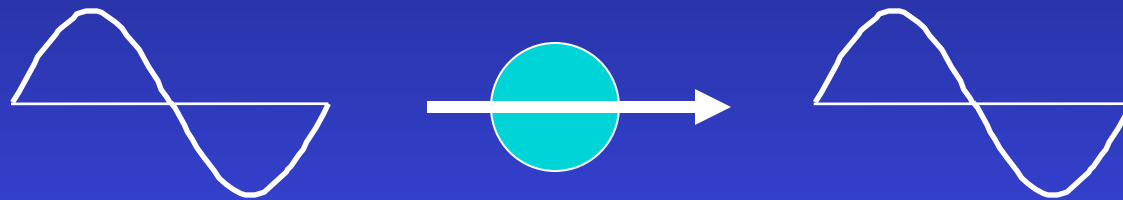
# Positive Gain

- If the Output power  $>$  input power



# Unity Gain

- If the power of the input = power of output



# Gain Stage

- Every circuit in the signal path that has a control to modify the gain of that circuit.

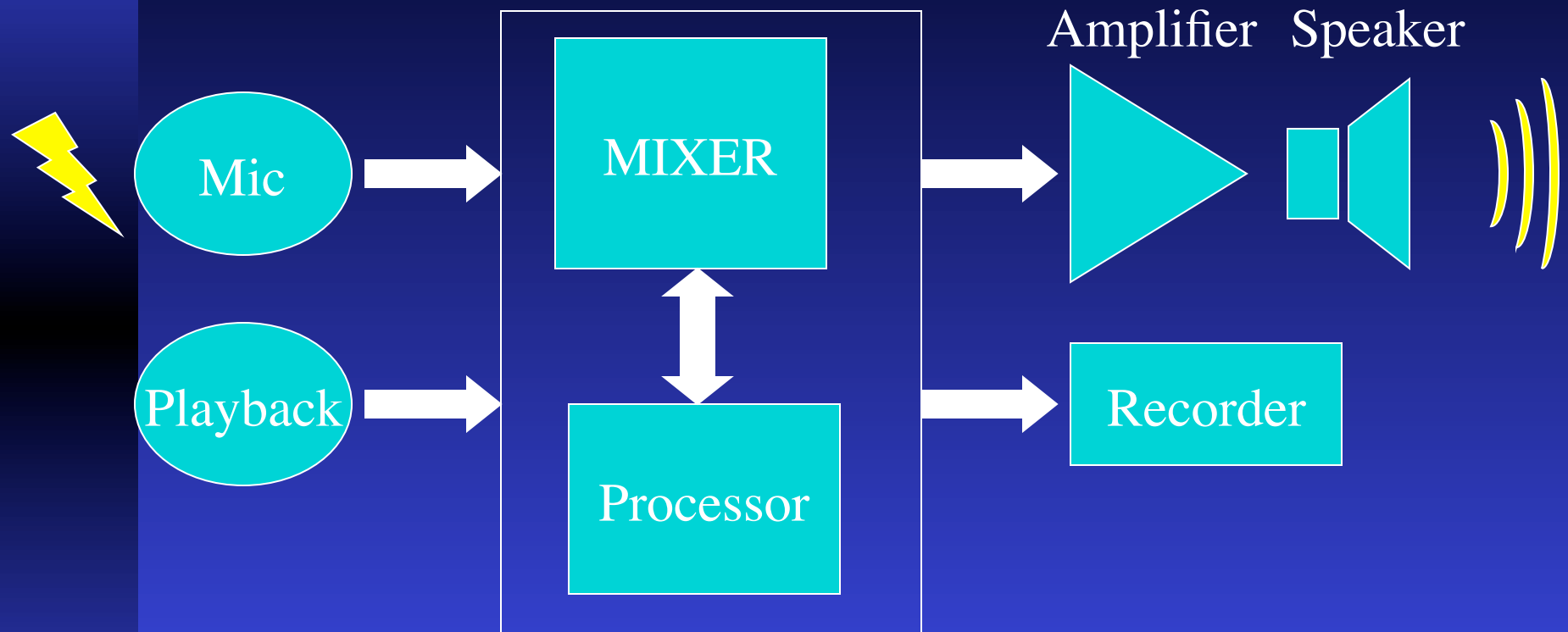
# Three levels of audio

- Mic level
- Line Level
- Power Level

# The Signal Paths in any System



# Basic System Relationships





# Types of Inputs

- Microphone
- Playback
- Synthesis

# Types of Outputs

- Outputs to speaker systems
- Outputs to recorders
- Outputs to broadcast
- Outputs to Analysis or Monitoring

# Microphone

- Converts sound to electricity

# Playback

- Plays back recorded audio data

# Mixer

- Mixes multiple sources into one or more outputs

# Processing

- Changes the audio in some way

# Amplifier

- Boosts line level signal to power level to drive speakers

# Speaker

- Converts electricity to sound