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

1. Sound Event
2. Acoustical Energy converted to Electrical Energy
3. Electrical information can now be modified.
4. Modified Electrical information converted back to Acoustical energy.
5. Sound Event

Transducer → Audio Equipment → Transducer

- Acoustical Energy
- Electrical information
- Modified Electrical information
- Sound Event
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

INPUT

INPUT

INPUT

INPUT

Combining and Routing

OUTPUT

OUTPUT

OUTPUT

OUTPUT
Basic System Relationships

Mic → MIXER → Processor → Recorder → Amplifier → Speaker

Playback
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