2015 Midwest Clinic

Sound Reinforcement 101: Acoustical Performances

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Sound Reinforcement:

OBJECTIVE or *SUBJECTIVE*

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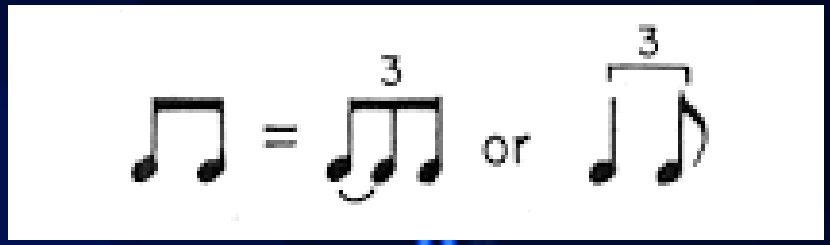
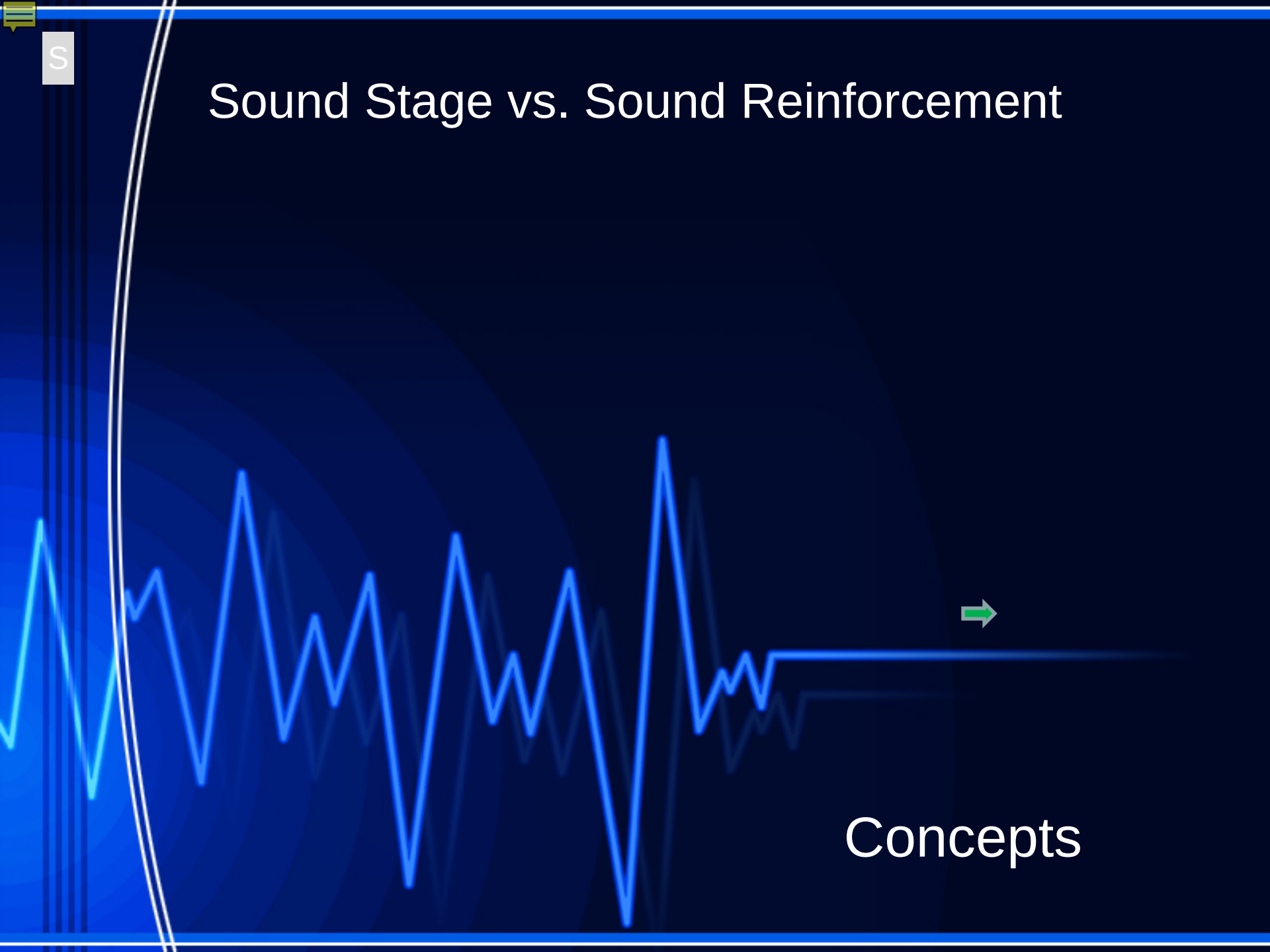


CONCEPTS

Sound Stage vs. Sound Reinforcement



Concepts

Sound Stage vs. Sound Reinforcement

- ***Sound Stage*** – rock or pop show – audience hears mostly the sound from the PA and the shows are generally louder.

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- ***Sound Reinforcement*** – jazz, classical – PA enhances performance – acoustic sound from stage is a larger component.

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- ***Sound Stage*** – rock or pop show – audience hears mostly the sound from the PA and the shows are generally louder.

- ***Sound Reinforcement*** – jazz, classical – PA enhances performance – acoustic sound from stage is a larger component.

- **Sound Reinforcement definition**: *electronic reinforcement of an acoustical event*.

Concepts

Sound Stage vs. Sound Reinforcement Conductor and Engineer Responsibilities

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- Conductor is responsible for the *performance on stage*
- Sound Engineer is responsible for the *presentation to the audience*

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Sound Stage vs. Sound Reinforcement Conductor and Engineer Responsibilities

- Conductor is responsible for the *performance on stage*
- Sound Engineer is responsible for the *presentation to the audience*
- Engineer and Conductor should confer
- Designate a specific amount of time for SOUND CHECK

Concepts

Sound Stage vs. Sound Reinforcement
Conductor and Engineer Responsibilities
Approach the Mix Musically

Concepts

Sound Stage vs. Sound Reinforcement Conductor and Engineer Responsibilities Approach the Mix Musically

- Listen to the stage ***before*** pushing the faders up

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- Listen to the stage ***before*** pushing the faders up
- Be smooth in your movements, not abrupt
- Focus and react quickly to what you hear

Concepts

Sound Stage vs. Sound Reinforcement Conductor and Engineer Responsibilities Approach the Mix Musically

- Listen to the stage ***before*** pushing the faders up
- Be smooth in your movements, not abrupt
- Focus and react quickly to what you hear
- Mostly subjective- except for missing a cue or feedback

Concepts

Sound Stage vs. Sound Reinforcement
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What sets reinforcement apart from recording?

Concepts

Sound Stage vs. Sound Reinforcement
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Environment

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- Recording Studios are very controlled - live venues not so much.

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- Recording Studios are very controlled - live venues not so much.
- Mix considerations- type of venue & music, audience size and makeup.

Concepts

Sound Stage vs. Sound Reinforcement Conductor and Engineer Responsibilities Approach the Mix Musically Environment

- Recording Studios are very controlled - live venues not so much.
- Mix considerations- type of venue & music, audience size and makeup.
- Mix under a highly reverberant hall; don’t add to the noise field – additional sounds may add chaos rather than clarification.

Concepts

MICROPHONES as a MIXING TOOL

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Selection

MICROPHONES as a MIXING TOOL

Selection

Types and Patterns

MICROPHONES as a MIXING TOOL

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Types and Patterns

Application

MICROPHONES as a MIXING TOOL

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Rules and Considerations

MICROPHONES as a MIXING TOOL

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Feedback Control

MICROPHONES as a MIXING TOOL

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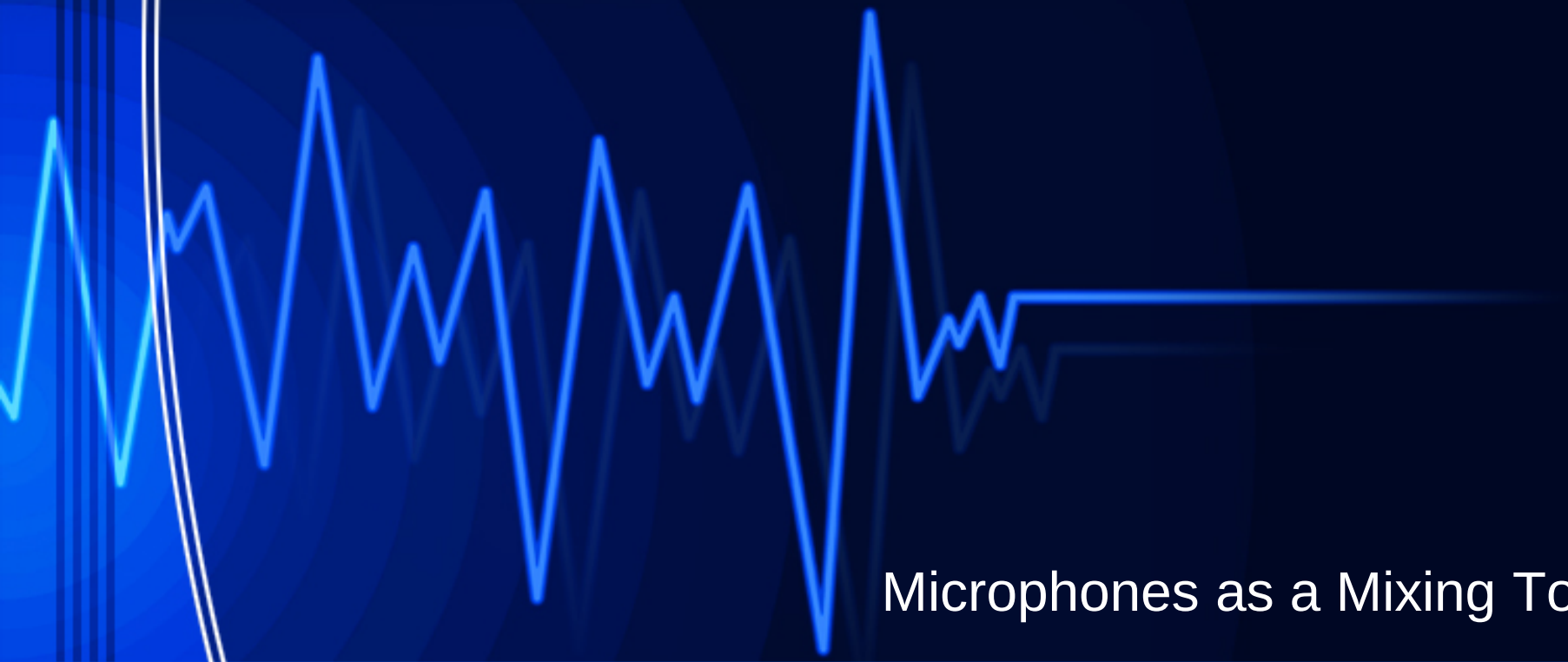
MICROPHONES as a MIXING TOOL

- Any mix has to start at the microphones.
- Microphones are the major influence on what happens at the mixer.
- A little planning here can prevent catastrophic results once the show starts.

Selection



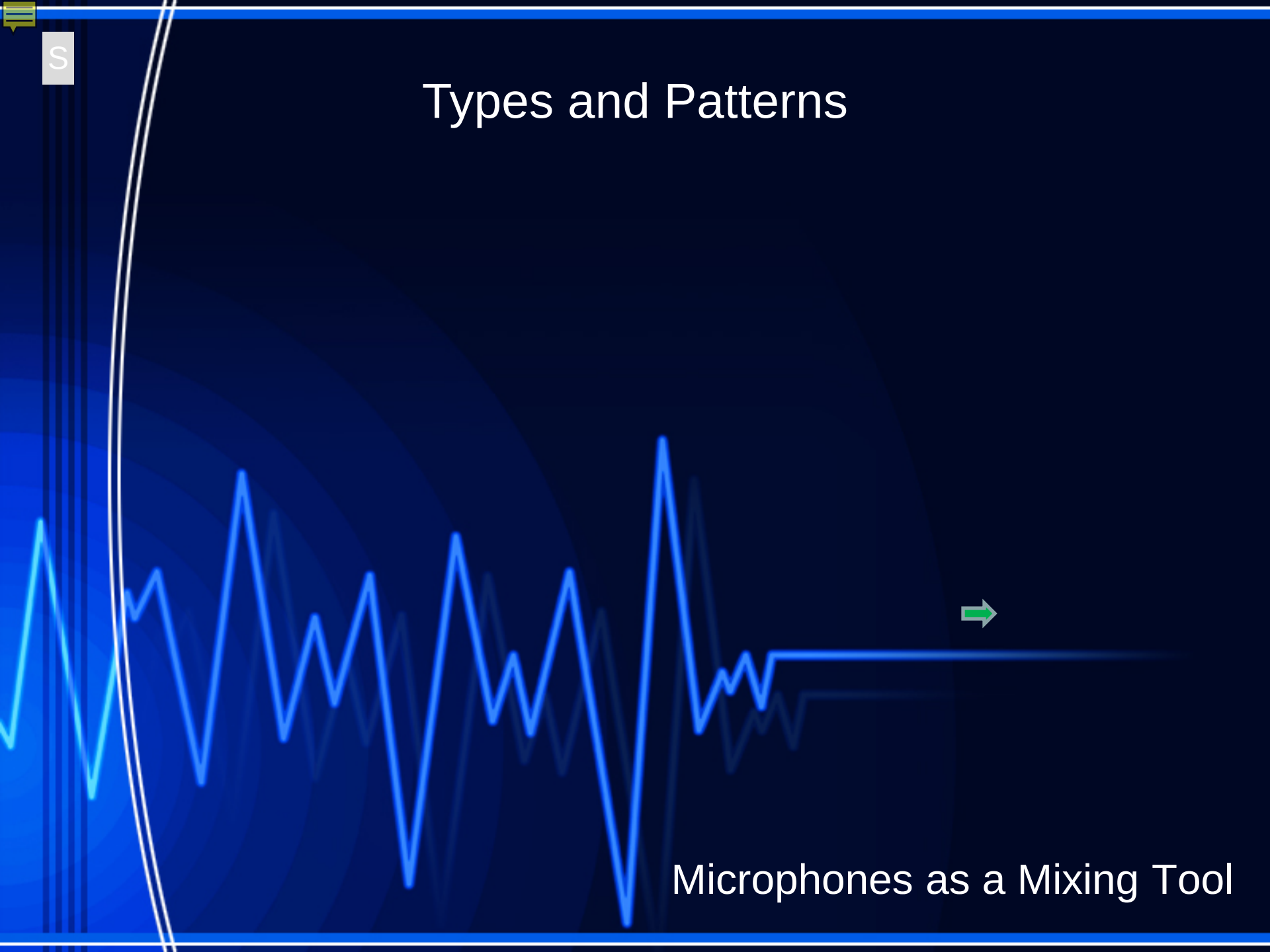
Microphones as a Mixing Tool

MICROPHONES as a MIXING TOOL

Selection

- Microphone selection is key in this process.
- The object is to choose microphones that will achieve a desired effect based on its design and intended application.
- You may want the sound colored or as natural as possible, or you may need to fix a situation that can't be resolved acoustically.
- To accomplish this you should be familiar with a few microphone characteristics .

Types and Patterns



Microphones as a Mixing Tool

Types and Patterns

Dynamic- which is used the most in sound reinforcement because it will typically take more level and abuse.

Dynamic

Types and Patterns

Dynamic

Condenser

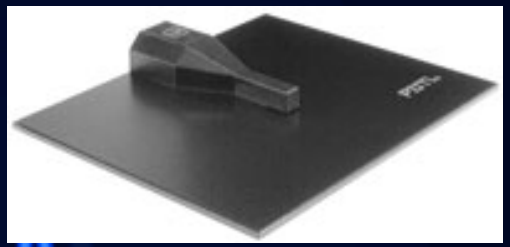
Condenser – which is more sensitive and fragile. It usually has a flatter response and is more accurate, but will have more bleed. These come in several diaphragm sizes. The small diaphragms are the most common in live sound. They usually cost more than dynamics.

Types and Patterns

Dynamic

Condenser

Pressure Zone mics are also referred to as Boundery Layer Microphones. They have useful, but limited applications in sound reinforcement.



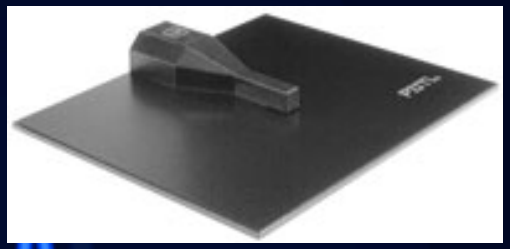
Pressure Zone

Types and Patterns

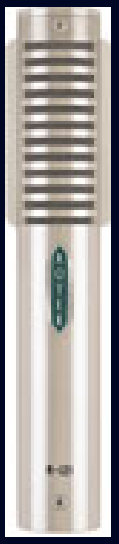
Ribbons- are normally very fragile and can be very sensitive. They may become damaged if voltage is applied to them. They are normally for special use.

Dynamic

Condenser



Pressure Zone

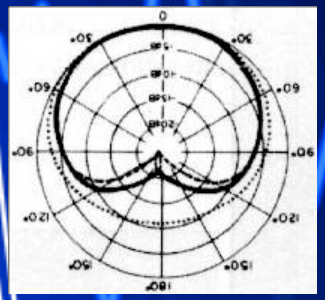


Ribbon

Types and Patterns

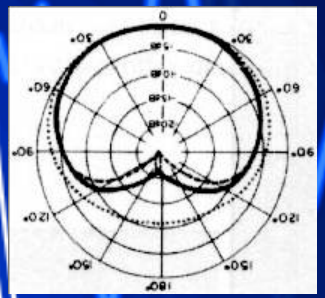
Cardioid

(Uni-directional) most widely used pattern of all the microphones. Its pattern resembles the shape of a heart. Pick up sound from one direction.

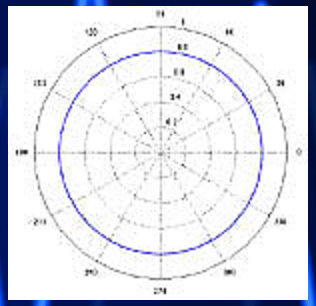


Types and Patterns

Cardioid



Omni

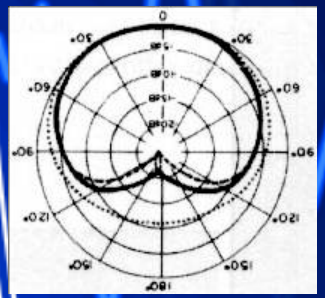


pattern pick up everything everywhere. You don't want to place one these guys close to any speakers!

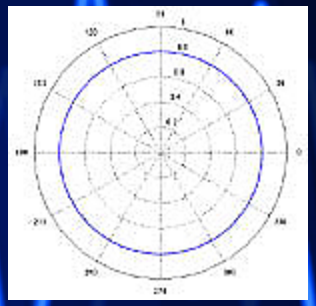
Microphones as a Mixing Tool

Types and Patterns

Cardioid

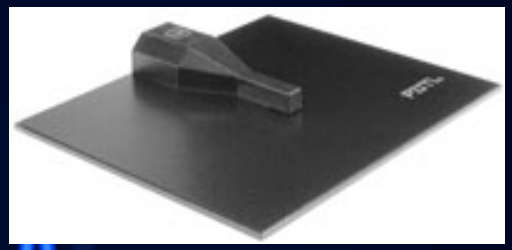


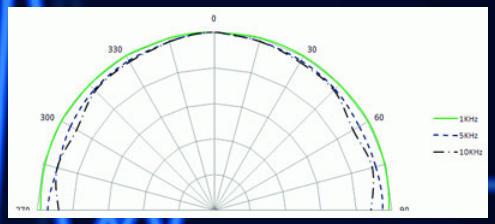
Omni



Hemispherical- ½ an Omni pattern. Can adjust low response and directionality to some degree.

Pressure Zone

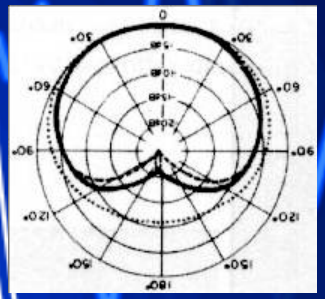




Microphones as a Mixing Tool

Types and Patterns

Cardioid



Omni

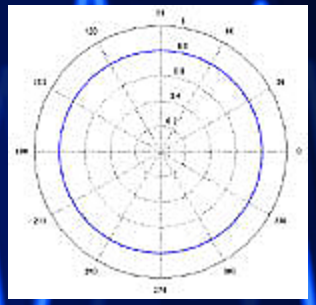
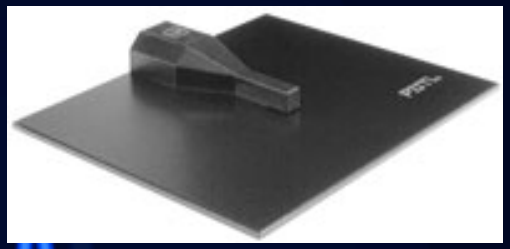
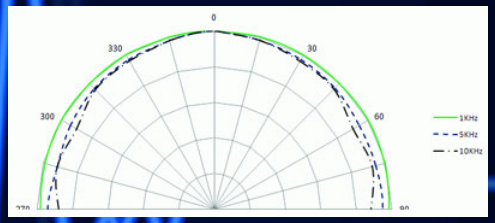


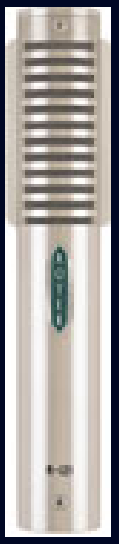
Figure 8- can possibly help in isolation of adjacent instruments.

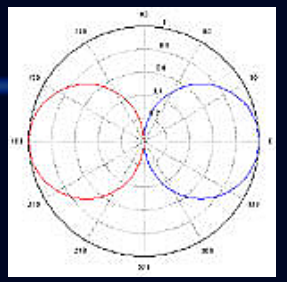
Hemispherical





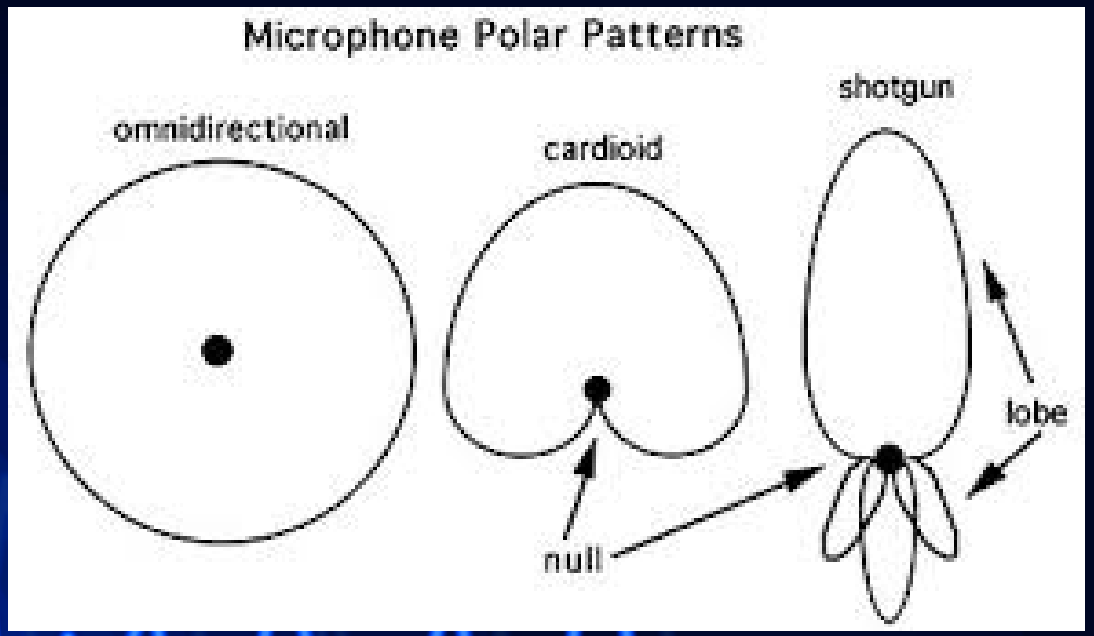
Bi-directional



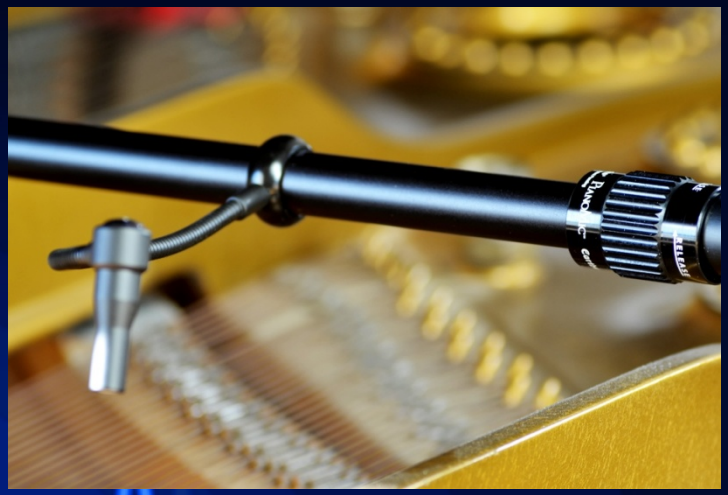


Microphones as a Mixing Tool

Types and Patterns



Types and Patterns



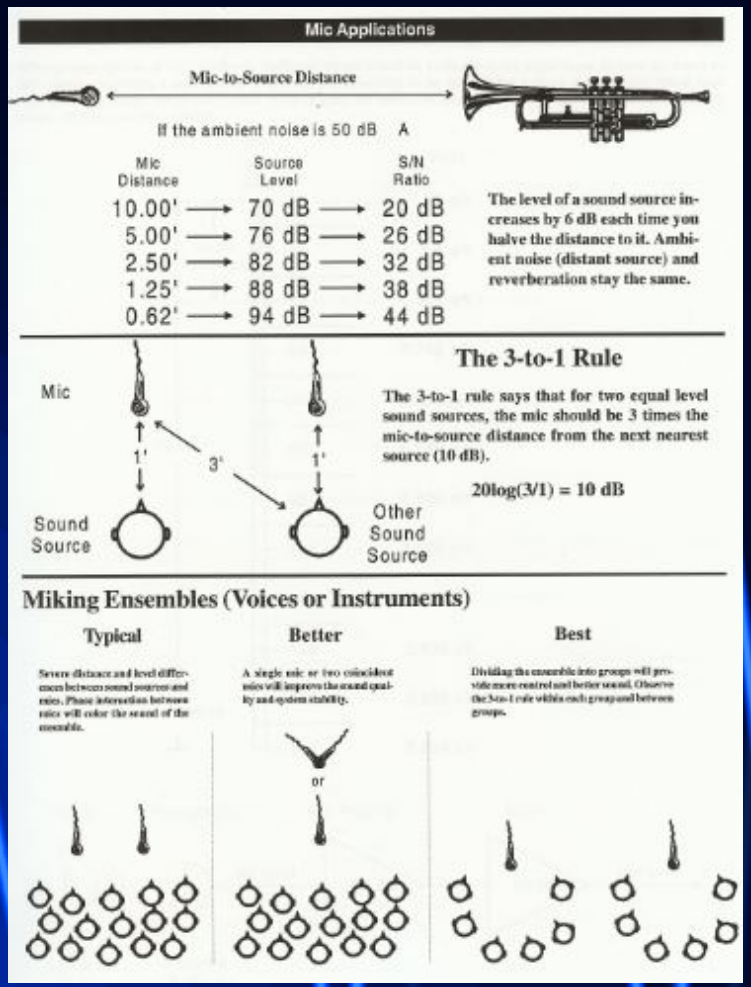
Microphones as a Mixing Tool

Application

Current Big Band Miking on Stage

- Every mic is directional- either cardioids or hyper-cardioid.
- Typically the fewer mics the better, but it depends upon the application
- Close miking will give you more gain resulting in more control over tone and balance.

Rules and Considerations



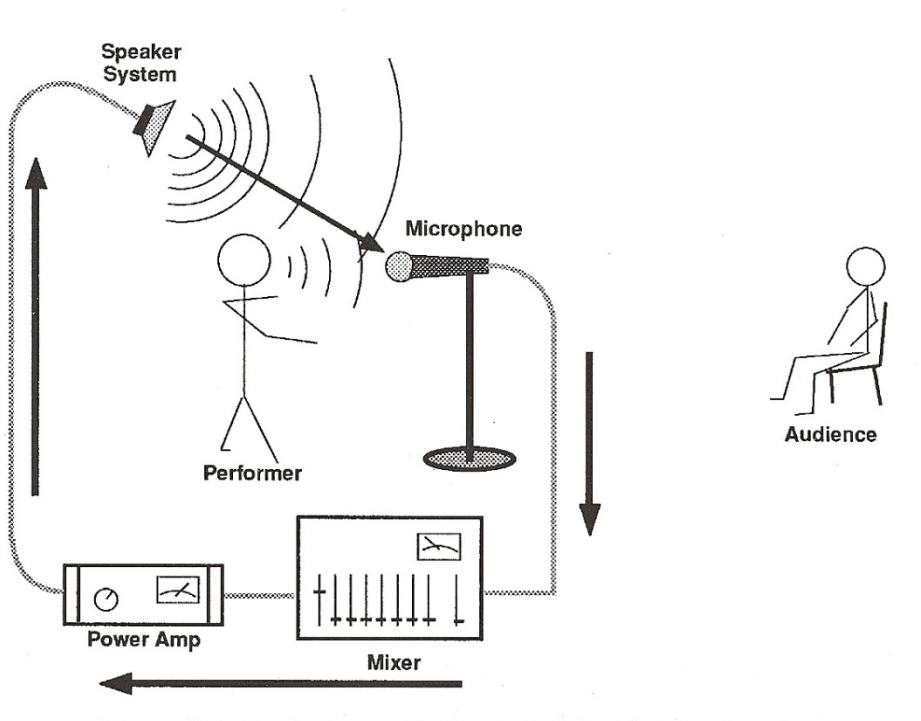
Proximity effect- cardioids has more than omni

Inverse Square Law: Mic-to-Source Distance *(double the distance- half the volume)*

•3 to 1 rule (*prevents phasing issues when using multiple mics in close proximity, i.e.; Saxes, drums*)

Placement considerations; acoustic bass mic next to drums

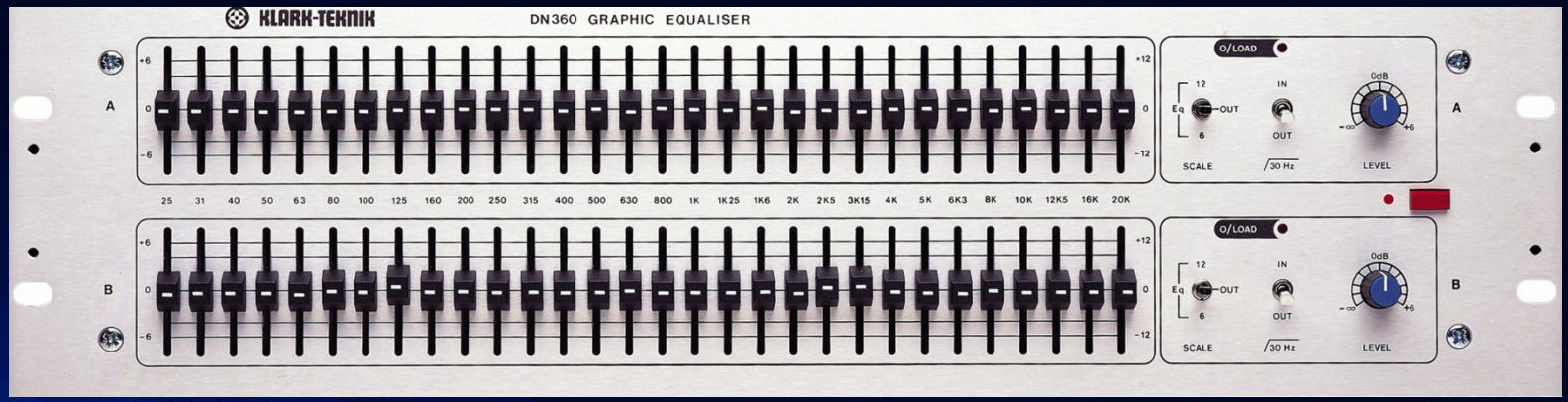
Feedback Control



Typical acoustical and electrical feedback path

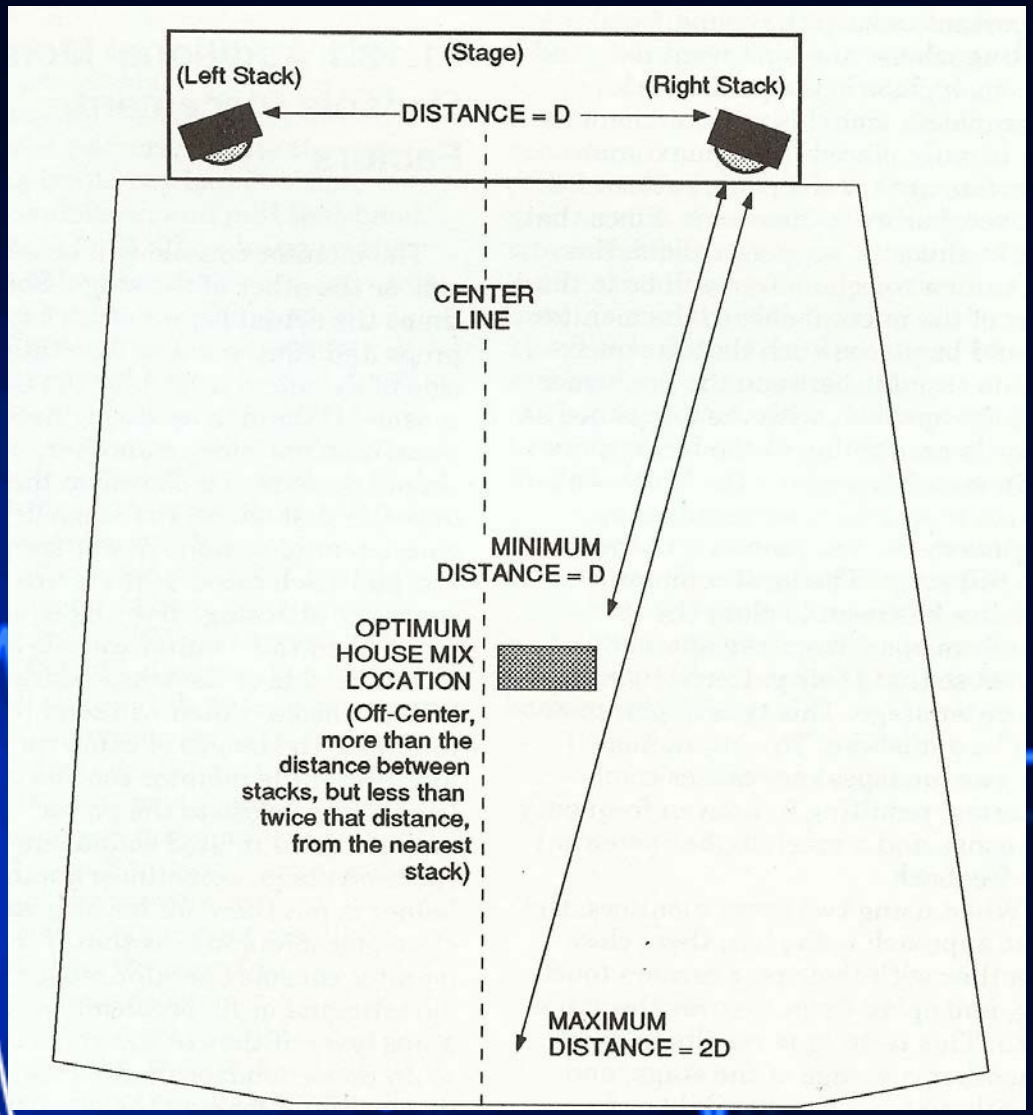
- How is it caused ?
- How is it fixed? *(follow considerations and rules above, reducing volume alone may not make it go away)*
- Change relationship of mic to speakers
- Change relationship of mic to source (*reduce distance, select a more directional pattern)*

Feedback Control



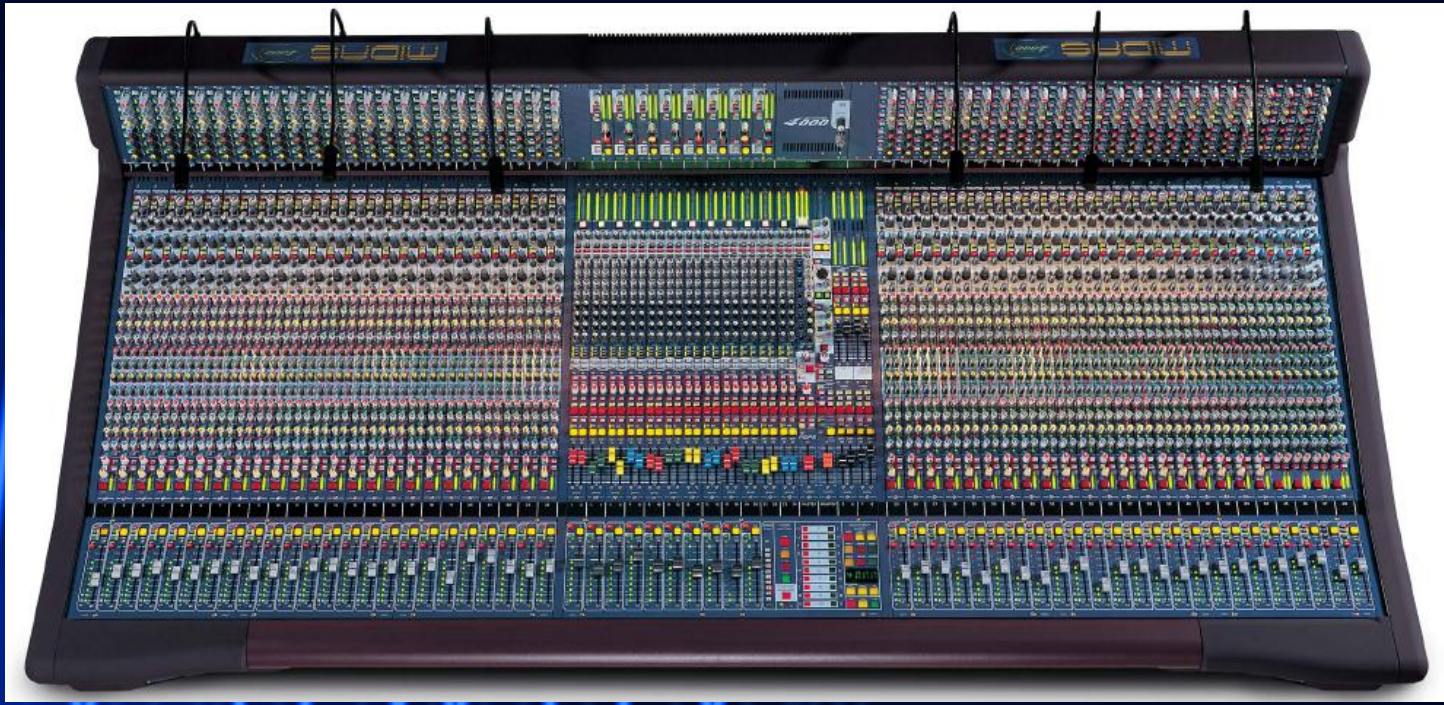
Microphones as a Mixing Tool

Mixer & Speaker placement

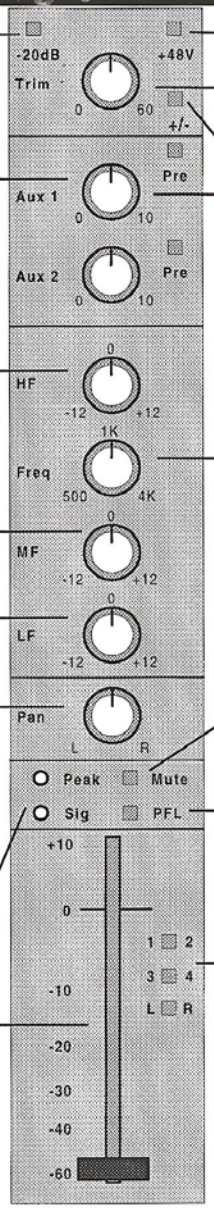


- Speaker placement – complete coverage of the audience area, speakers need to be in front of the microphones, focal point of mains should be behind FOH
- FOH placement – should be off-center, more than the distance between the main speakers, generally a little over half way back into the house
- Monitor speaker placement – goal is to be off axis to the microphone

Mixer



Mixers - The Channel Strip



Pad - Provides additional attenuation for strong input signals.

Aux - Used to provide a mix for stage monitors (pre) or effects units (post). These controls are often called "Monitor" or "Effects."

HF - A "treble" control used for program equalization. Should be a "shelving" type filter.

MF - A "midrange" control used for program equalization - usually a "peak/dip" type filter.

LF - A "bass" control used for program equalization. Also a "shelving" type filter.

Pan - Routes the output of the channel to the left, right or both outputs. For mixers with multiple outputs, pan works with the assignment switches to route the signal to the desired output.

Signal LEDs - Shows the strength of the incoming signal (post trim control).

Channel Fader - The overall "volume" control for the channel. Should normally be set at "0", which requires proper setting of the "Trim" control. After the sound check, all mixing is done with the channel fader.

Phantom Power - Provides DC voltage to condenser microphones.

Trim - Sets the gain of the mic preamp.

Polarity - Inverts signal polarity.

Pre - Selects whether Aux send is pre or post fader. This is sometimes preset by the manufacturer and must be changed with internal jumper settings. Most boards provide at least one pre and one post send.

Freq - Sets the center frequency of the Mid control, yielding a "parametric" midrange filter.

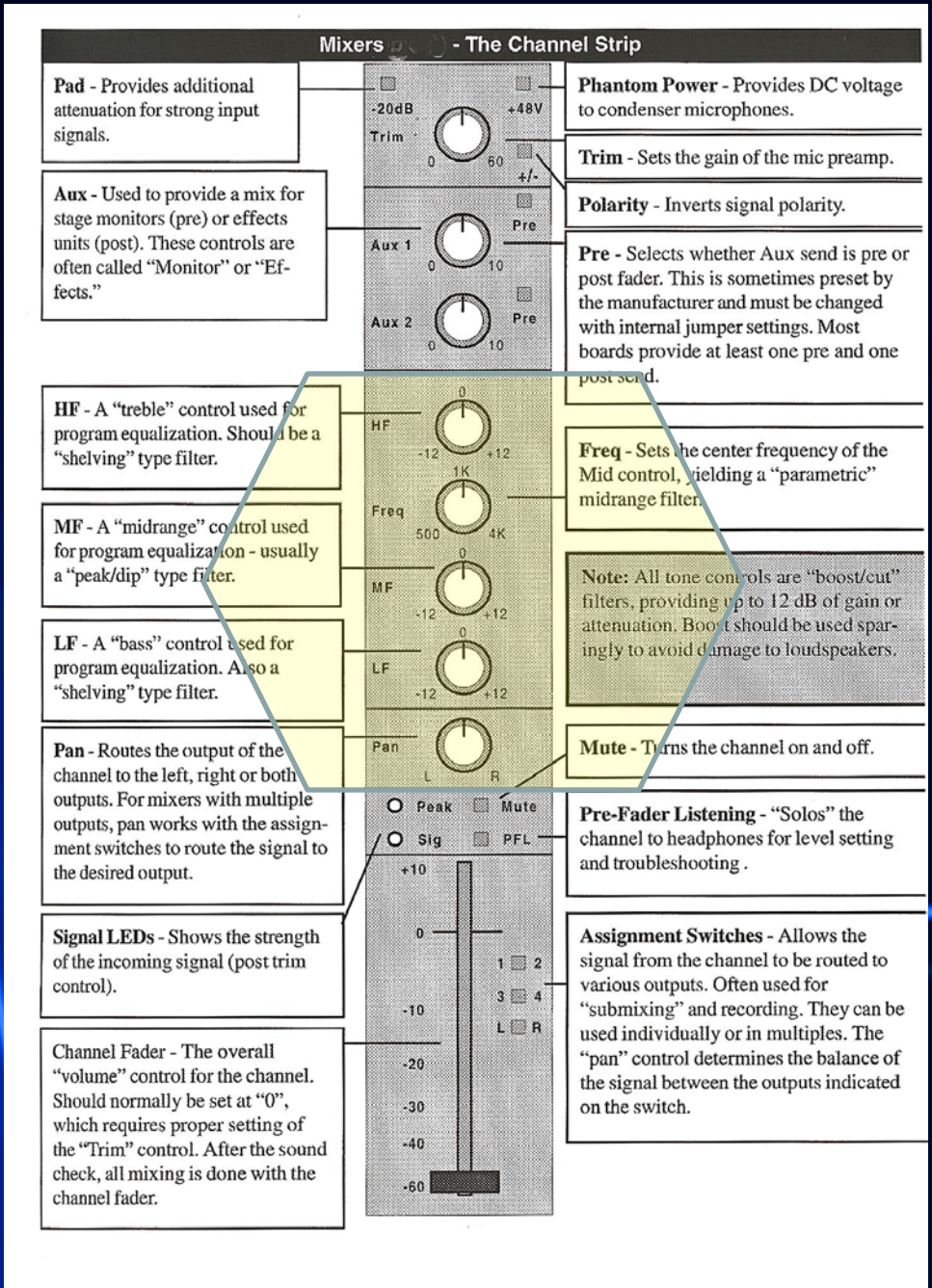
Note: All tone controls are "boost/cut" filters, providing up to 12 dB of gain or attenuation. Boost should be used sparingly to avoid damage to loudspeakers.

Mute - Turns the channel on and off.

Pre-Fader Listening - "Solos" the channel to headphones for level setting and troubleshooting .

Assignment Switches - Allows the signal from the channel to be routed to various outputs. Often used for "submixing" and recording. They can be used individually or in multiples. The "pan" control determines the balance of the signal between the outputs indicated on the switch.

Input Strip



- Use minimal amount of EQ
- Cut instead of boosting when possible

- EQ may be used instead of volume to bring out a subject

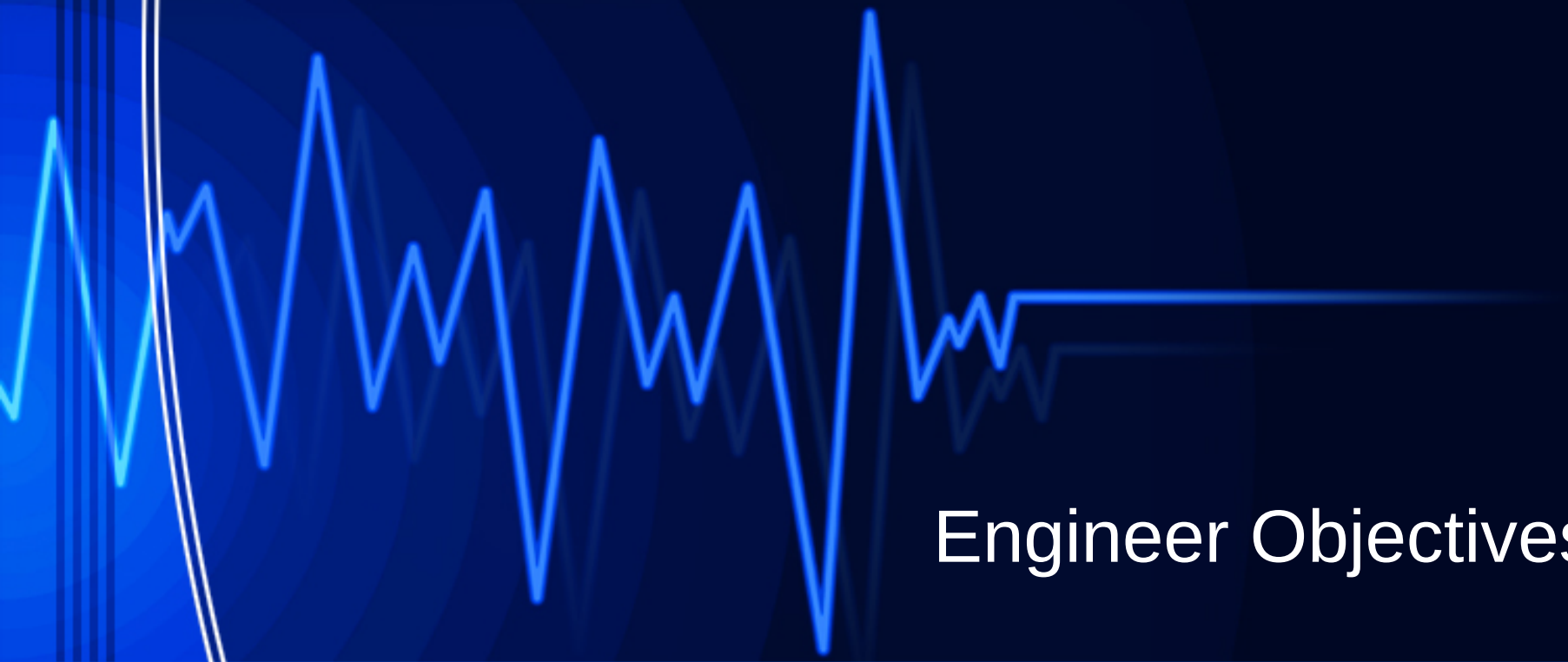
- If more than 3dB of EQ, check placement and possibly change the mic

Input Strip

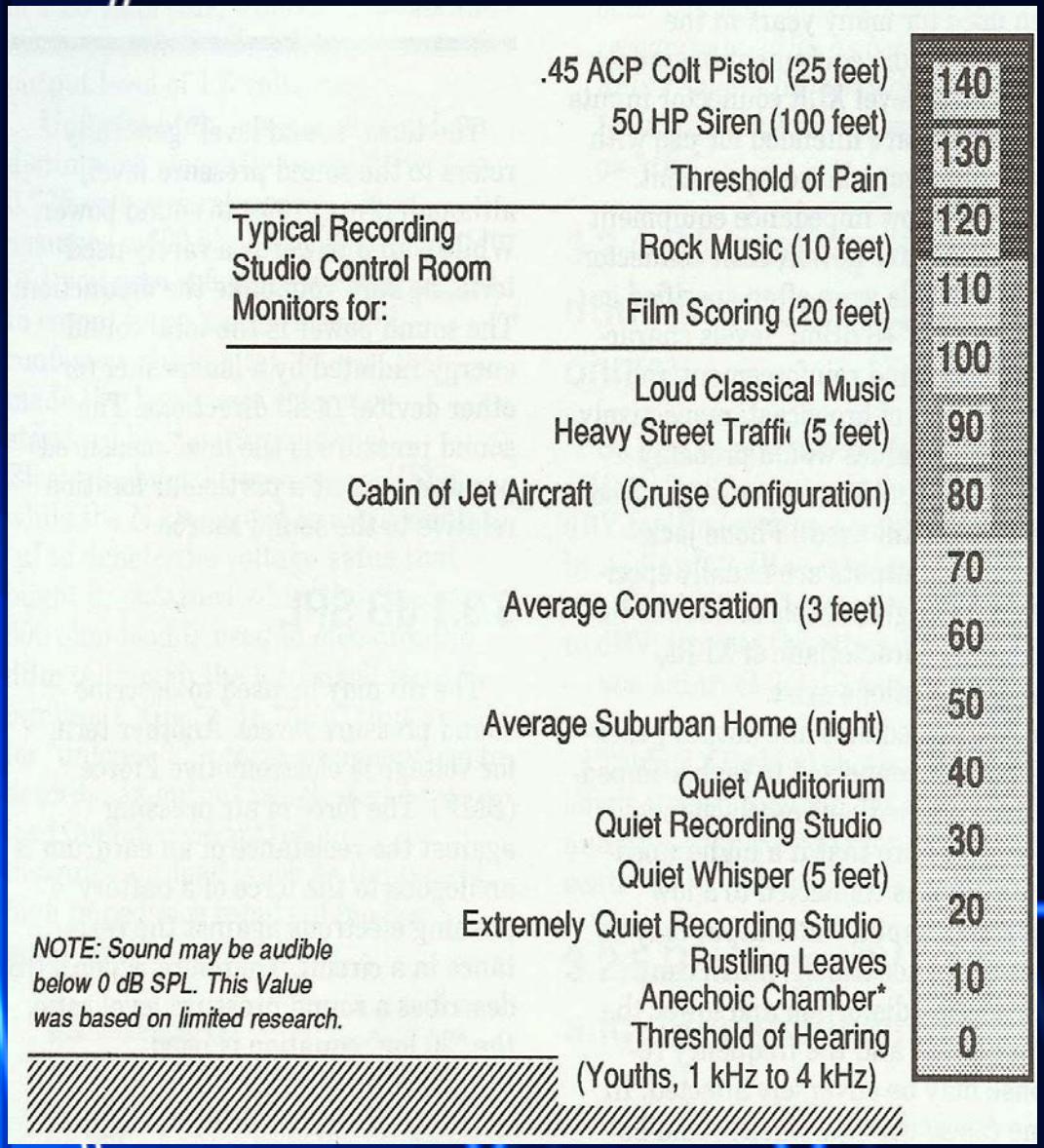
Monitors

Engineer Objectives

Control overall volume



Engineer Objectives



- Most houses have a 90dB limit
- Mixing too loudly will mask the acoustic instruments
- Mixing too softly will result in lost definition
- Don’t mix for the last row

Sound Pressure Levels

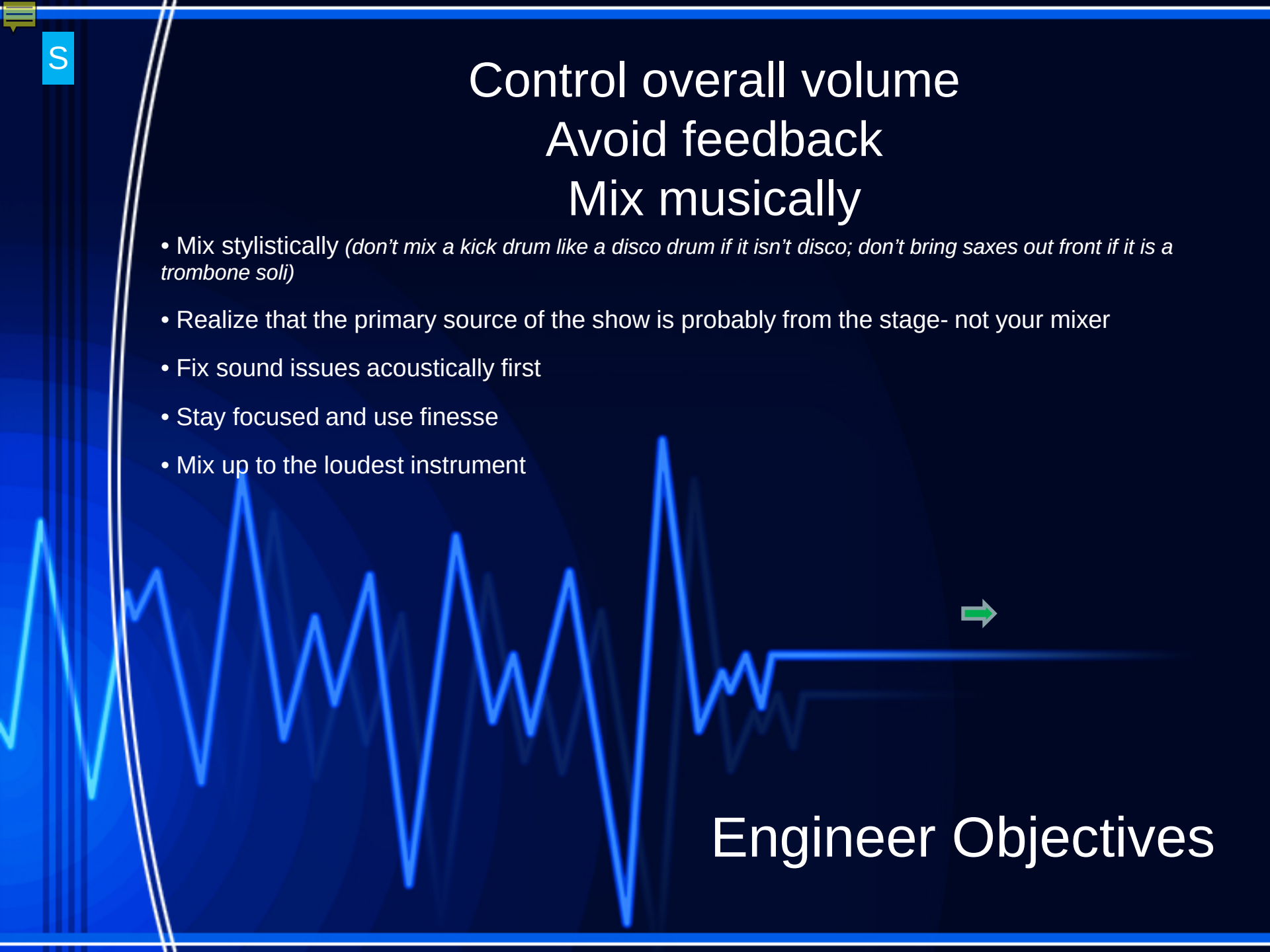
Control overall volume
Avoid feedback

- Follow the Rules we laid out earlier: 3-1 Rule; Mic-to-Source and Mic-to-Speakers orientation.
- Listen for microphones that are starting to “take off”.
- Don’t over EQ.
- Choose the right mic for the job.
- Remember that sound reinforcement is mostly subjective, but ***feedback isn’t.***

Engineer Objectives

Control overall volume
Avoid feedback
Mix musically

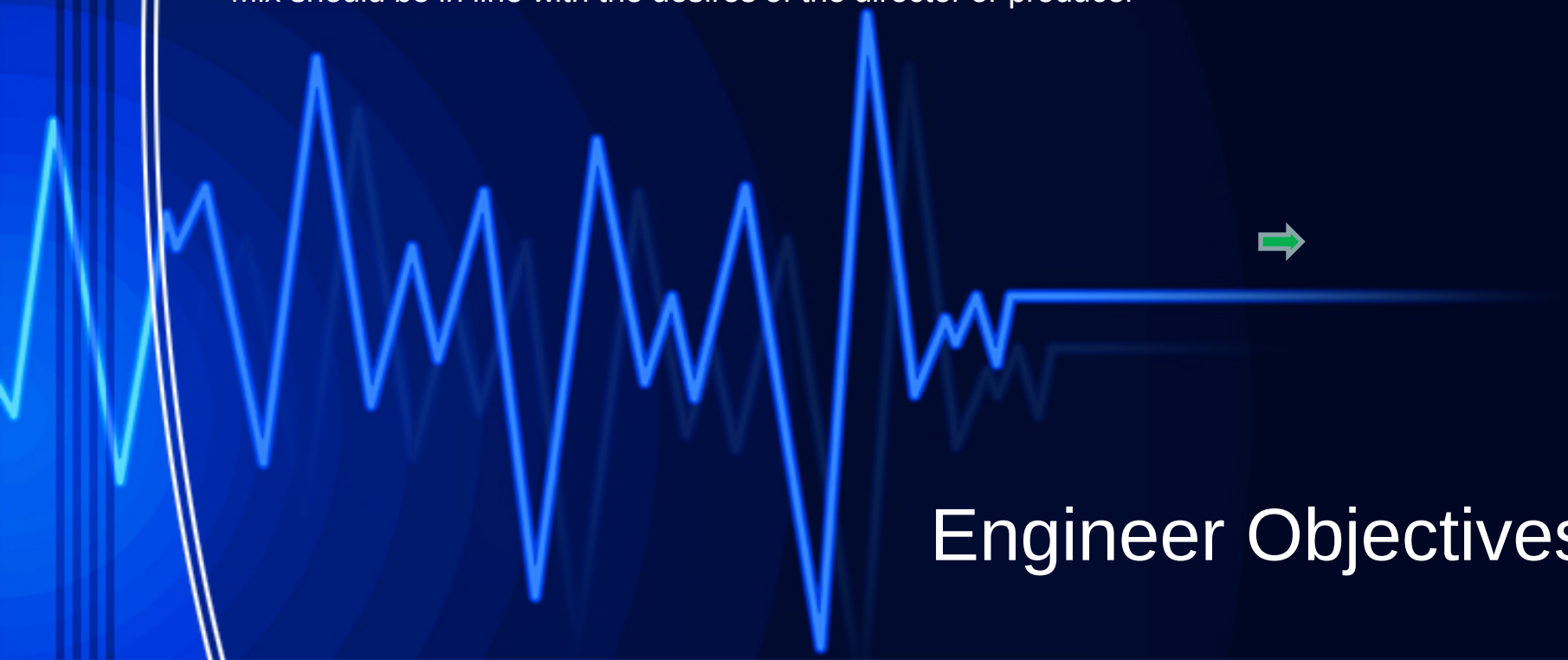
- Mix stylistically *(don't mix a kick drum like a disco drum if it isn't disco; don't bring saxes out front if it is a trombone soli)*
- Realize that the primary source of the show is probably from the stage- not your mixer
- Fix sound issues acoustically first
- Stay focused and use finesse
- Mix up to the loudest instrument



Engineer Objectives

Control overall volume
Avoid feedback
Mix musically
Be invisible

- You are there to enhance the audience's experience, not become it.
- Don't be a throttle jockey, try to be seamless.
- Mix should be in line with the desires of the director or producer



Engineer Objectives

The ultimate goal is to go unnoticed by the audience!

Engineer Objectives

2015 Midwest Clinic

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Presented by:

Scott Bauer
Scott Steiner