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Live Audio Mixing

With Arthur Skudra
Live Audio Mixing

- **Steps to Achieving a good “mix”**
  - A good quality, well designed, “Neutral” speaker system, room acoustics under control
  - Proper Microphone Technique (Shure publications)
  - Cooperation with musicians, stage volume under control (engender confidence, trust)
  - Proper Gain Structure through the console and into main speaker system
  - Equalization Techniques
  - Panning and Channel Level
## Gain Structure

<table>
<thead>
<tr>
<th>Good</th>
<th>The Bad</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Enough Headroom</td>
<td>• Not enough Headroom</td>
</tr>
<tr>
<td>• Clarity</td>
<td>• Distorted clipping sound</td>
</tr>
<tr>
<td>• Plenty of Dynamics</td>
<td>• Sounds like a TV commercial</td>
</tr>
<tr>
<td>• Minimal Hiss/Noise</td>
<td>• Poor Signal/Noise Ratio</td>
</tr>
<tr>
<td>• Excellent Quality Sound</td>
<td>• Poor Quality Sound</td>
</tr>
</tbody>
</table>

Gain Structure

- **Input Gain**
- **High Pass Filter**
- **Parametric Equalizer**
- **Channel Fader**
- **Subgroup Fader**
- **Master Output Fader**

**Microphone**

- **Set to 6 dB below “peak”**
- **Set Target Gain Here or Here**
- **Set Faders to 0 dB or “Unity”**

**Watch your gain structure here!!**

**Peak Light**

- **Inserted Effects (Compressor/Gate/Plugins)**
- **Set knobs to about 70% of possible gain**

**Monitor Aux Send**

- **Effects Aux Send**
- **Sub Aux Send**

**Subwoofer**

- **Stage Monitor**

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**Mains**

- Amplifier
- Loudspeaker
• Set input gain first until signal clips, then back it down 5-6 dB
• Set Channel, Group, and Mains Faders to 0 dB or “unity” gain
• Get a good mix through the mains trimming the input gain knobs to achieve a rough balance
• Then leave the input gain knobs alone for the rest of the service unless the musician changes volume significantly
• Set up your monitor mixes and effects send mixes

• Mix the service using the faders, making adjustments as necessary

• Note that having the fader around 0 dB or “unity” gain gives you the greatest resolution in control

• The amount of travel the fader uses to effect 10 dB of change is half as much at the bottom of the scale!
Gain Structure

![Diagram showing gain structure with levels from Fader Off, Low Level Setting, Typical Setting, and Solo, with linear level adjustment from -20 to +10dB.](image)
Target Gain

- Depending on how many input channels comprises your mix, you might want to decrease in input gain to avoid overloading the output busses.

- Target Gain = \(-10 \times \log(\#\text{channels})\)

- So for a 16 channel mix, \(-10 \times \log(16) = -12\) dB

- For a 24 channel mix, \(-13.8\) dB

- For a 32 channel mix, \(-15\) dB

- For an 8 channel mix, \(-9\) dB

- Some make this adjustment on the output fader instead of the input gain.
Equalization Technique

The 7 Bad System Dwarves

TUBBY  MUDDY  BOXY  HONKY  BARKY  EDGY  SIBILANT
Clarity of the low end is the most difficult thing to achieve in a mix. Start with the bass guitar, kick drum, and floor tom, get them right first.

Consider the Bass Guitar and Kick Drum as one instrument.

Using the sweep frequency parametric equalizer (boost then sweep, then adjust level accordingly).

Minimal approach to equalization, “less” is “more”.

High pass filter.

Aux Sub Send as an added tool for low end clarity.
Putting it All Together

• Manipulate equalization, channel faders, and pan controls to put each source in it’s place

• LCR systems have an added benefit of a wide panorama to fit sources (side benefit is that you will tend to mix quieter)

• Group channels into functional groups using VCA’s and DCA’s
Volume: Front to Back Placement
Frequency: Low to High Placement
Panning: Left to Right Placement
Stereophonic/LCR Mix
Monophonic Mix