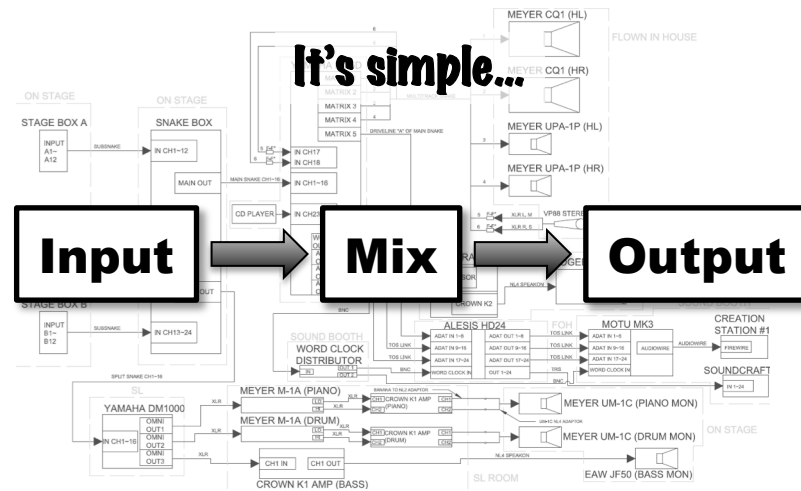


# Unlocking the Mysteries of Church Sound Systems

Greg Scheer

Of the many hats worship musicians and pastors wear, "sound system purchaser and troubleshooter" may be the most uncomfortable. Nonetheless, your understanding of how a sound system works could have a huge impact on your congregation's ability to hear the preaching and take part in singing. This session will teach you about microphones, channel strips, speaker placement, and a myriad of other subjects that likely weren't included in your seminary or music education.



## INPUT

- Microphones
  - Wired or Wireless
  - Phantom Power
  - Polar pattern: cardioid, omni, etc
  - Mic stand, handheld, lapel/lavalier, headset, lectern, hanging
- Instrument (via DI box)
- Line level (CD playback, etc)

## MIXER

- Patchbay
- Channel Strip
  - Gain/Pad
  - Aux Send (pre/post)
  - EQ
  - Pan
  - Assign
  - Mute/Solo
  - Fader
- Master Section
  - Subgroups
  - Main Fader
  - Aux (monitors, recording, effects)
  - Control room

## OUTPUT

- House speakers (powered/non)
- Monitors (wedges, satellite, in-ear)
- Hearing loop
- Recording

# ISSUES

*We've all got em...*

## Feedback

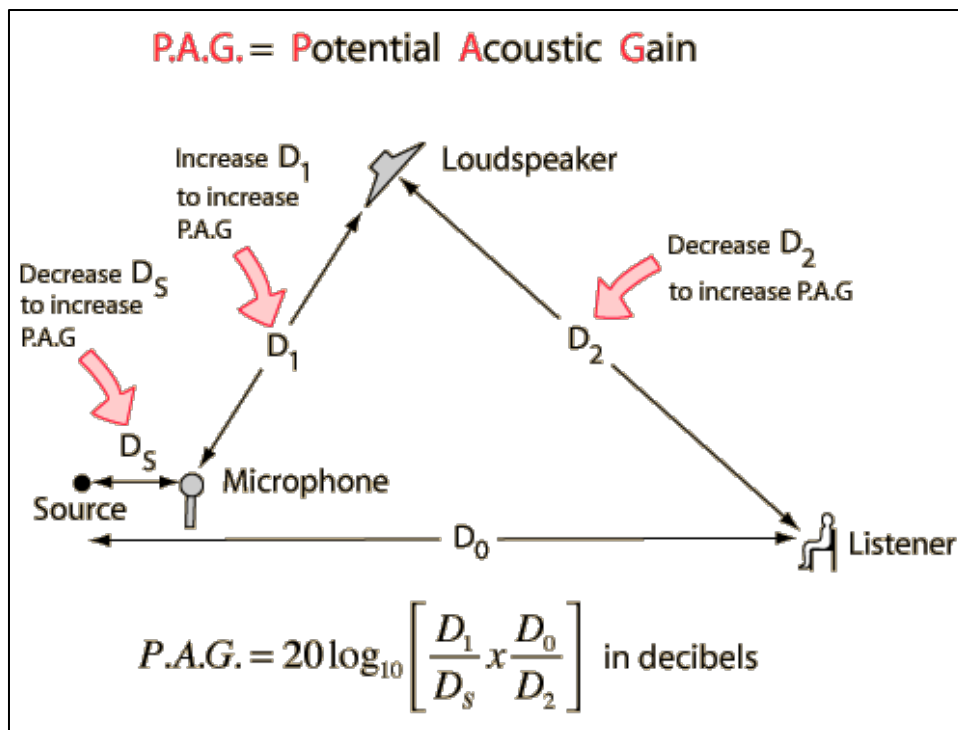
PAG/GBF – potential acoustic gain/gain before feedback

Room noise/noise floor/signal-to-noise ratio

Critical Distance – the point at which the direct sound from speakers equals the reverberant sound

Practical advice:

- Sing closer to mic
- Keep mikes behind house speakers
- Place monitors in mic's deadspot
- Keep stage volume down (you always have to mix up to the loudest acoustic instrument)
- Turn off any unused mikes (doubling the number of “open” mikes reduces potential system gain by 3 dB)
- Ring out system



Phantom power

Proximity effect, bass roll off, and pops

Mic technique, especially for singers

Phase, 3 to 1 rule

Keep it simple; dummy-proof the system; label everything

Training volunteers

When to hire a pro (purchasing and installing a system; dealing with acoustics)

Digital vs. Analog

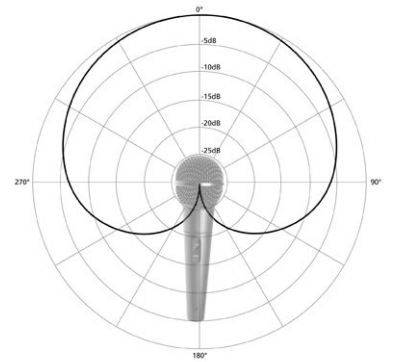
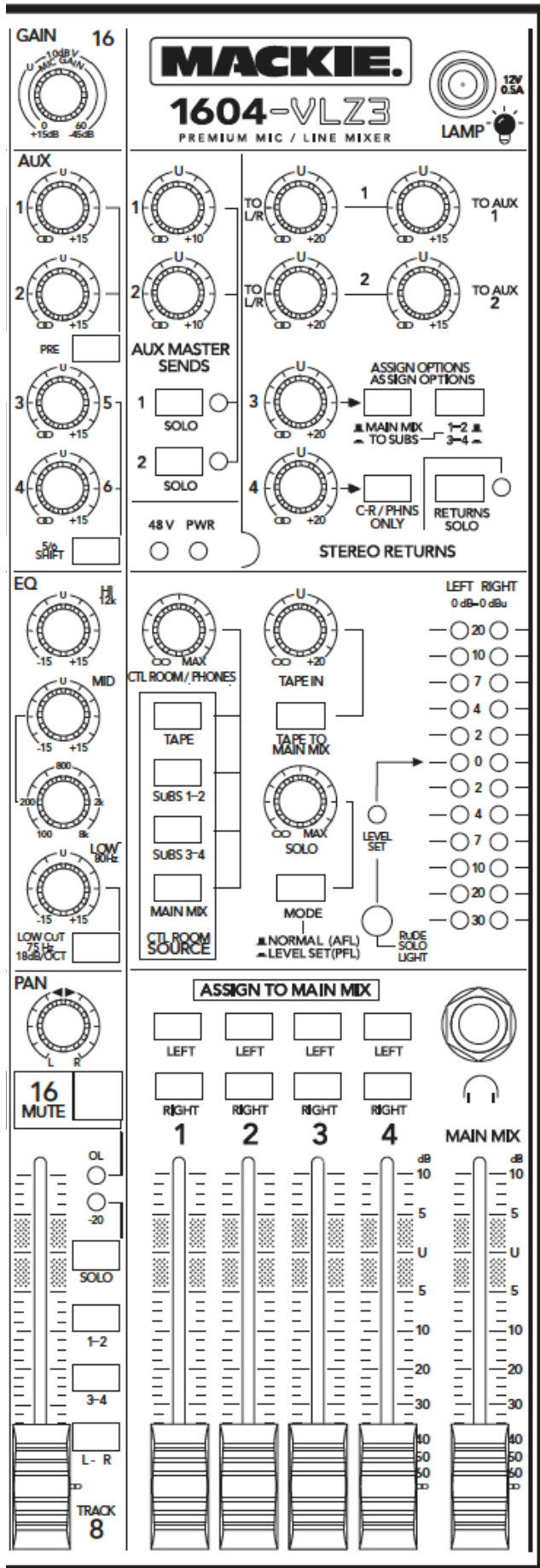
Effects/Processors, the big two for churches:

Compressor to tame the whispering, screaming preacher

Digital delay to synchronize speakers

Mixing Tips

Channel || Master Section →  
Strip ↓ ||



Cardioid Mic Pattern

XLR (pro audio: mikes,  
balanced lines)



TRS/Stereo 1/4 Inch

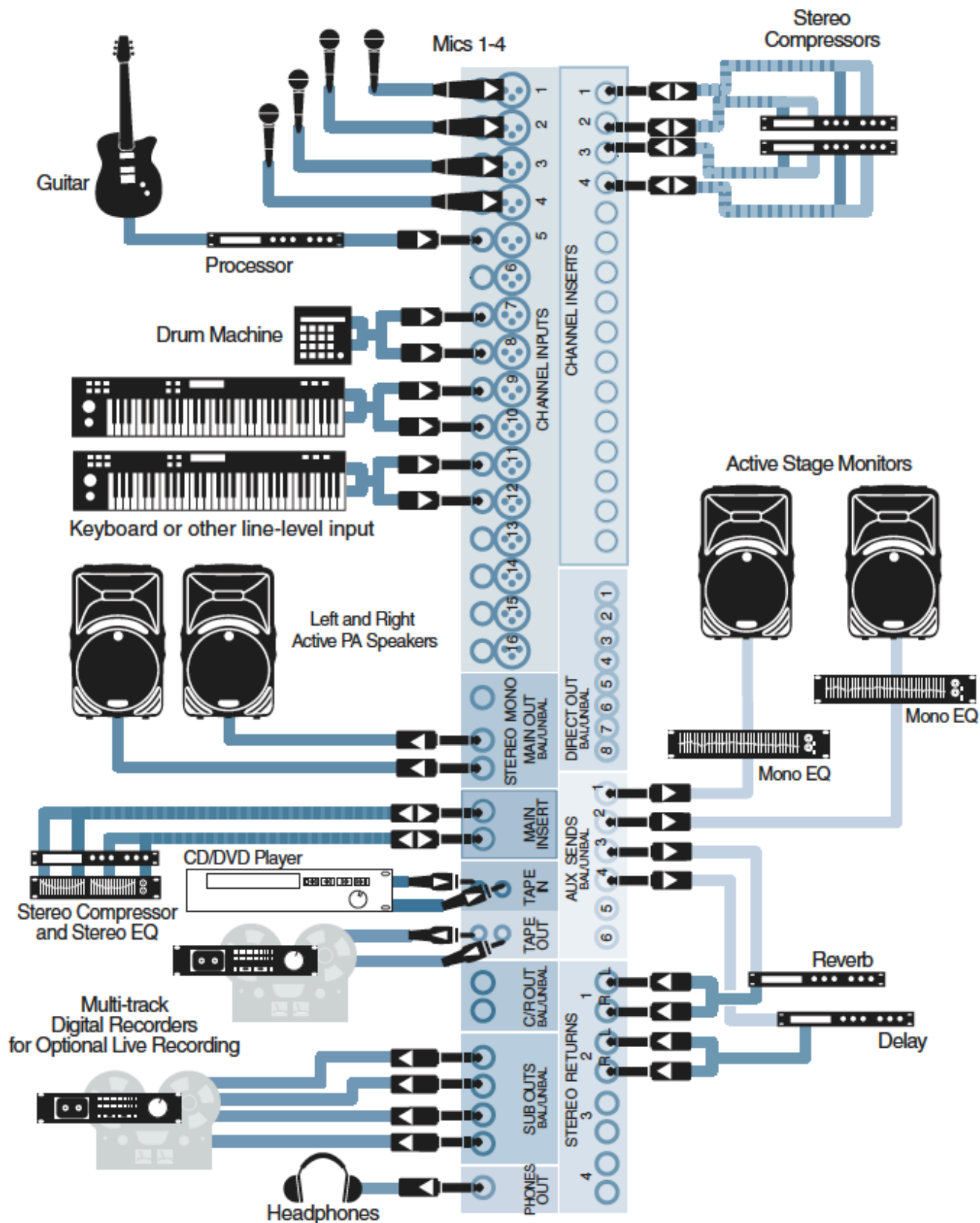
Stereo Mini/Stereo 1/8"  
(portable consumer audio:  
iPod headphones, etc)



RCA  
(consumer audio)



1/4 Inch (guitar, etc)



Live Stereo PA System

# Sound Operators Manual

## Church of the Servant, version: 0.1

### Before service:

- Arrive at least 15 minutes early
- Turn on sound system
  - Power amp in custodian closet first
  - Power strip at soundboard next (this should power up everything in the sound booth, but double check everything to make sure)
- Communicate with music leader
  - What instruments need to be miked?
  - Are there any songs that have special miking considerations? (a quiet instrument on one song or a vocal duet, for example)
  - When will the cantor sing?
- Look through liturgy—and make notes!

- With preacher:
  - set up, adjust and test wireless headset
  - are any other mics needed? (profession of faith, for example)
- Get mic to CE director

### During service:

- Anticipate, don't react!
- Don't forget to start the recording (mark it in your liturgy). *I'll have more information on recording once we solidify our recording system.*
- Constantly listen and adjust.

### After service:

- After 8:30 service, leave a note or talk to the next operator to alert them about any issues that arose during your service.
- After 11am service, turn off sound system
  - Soundboard power strip first
  - Power amp last

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### EQ and You:



**High** - Adds “air” to the mix. Can increase clarity, but in our sanctuary it can lead to ringing or even high-pitched feedback.

**Sweepable Mid** – It’s very important to understand that the two middle controls are not an upper mid and lower mid. Instead, the top knob controls the *amount* of boost or cut; the bottom knob controls the *range* of the boost or cut. The midrange and upper midrange is usually where intelligibility for speakers is achieved. I often boost the mid to +15 and then sweep to find an area that produces clarity or mud, then boost or cut accordingly.

**Low** – The low range often needs to be cut, especially on the voice. Almost always keep the low cut button engaged.

Always start with the EQ at U (unity). It’s better to get the sound you want with mic placement. If you do need to adjust the sound, do it gently. Keep in mind that people’s ears are drawn to changes in sound, so try to keep a somewhat similar sound between the various mics. Listen carefully for ringing in the high range or booming and mud in the low range. Walk to different parts of the sanctuary and listen for differences.

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## Channel Strip (Input Section)

**Trim (Gain)** –Sets the amount of level coming into the channel. It's important to get a rich, but undistorted, signal.

**Aux Sends** – This is used to route the signal to a secondary mixer called the “auxiliary.” Typically, these will be preset to go to tape, monitors, etc. Don't worry about them too much.

**EQ** – See previous page.

**Pan** – If the sound system is set up in stereo (ours isn't) this controls left/right balance. For us, it can be used to send to Sub 1/3 (left) or 2/4 (right). We are not currently using the Subs, so keep the pan in the middle.

**Mute** – turns the channel off with the touch of one convenient button, allowing you to retain your fader level where you set it during soundcheck.

**Solo** – listen to the channel by itself in the headphones.

**Assign** – For now, the signal should be assigned to L-R.

**Fader (slider)** – Controls the volume of the channel.

## Master Section

The master section gives you lots of options. So many, in fact, that it will be too confusing to explain them all.

In general, the only thing you need to worry about in the master section is the

**normal/level set button**

(used to solo a channel on the headphones), the **volume meter**, and the **main mix fader**.

The auxiliaries (top), control room settings (middle), and subs (bottom) will be set to where they need to be. You should have a pretty good reason and a bit of experience before changing those settings.

