Sound 101 — Takeaways

Class Takeaways · Live Sound Fundamentals

Signal chain: Mic → Cable → Stage Box / Snake → Console → Amplifier → Speaker

1 · Cables

- **XLR** — 3-pin, balanced. Used for mics and long cable runs. Locks in place.
- **1/4" TS** — Tip + Sleeve. Unbalanced. Standard guitar/instrument cable. Prone to noise on long runs.
- **1/4" TRS** — Tip + Ring + Sleeve. Balanced — same noise-cancelling trick as XLR. Used for line-level connections and headphone outputs.
- **Speaker Cable** — Looks like a TS but carries high-power signal from amp to passive speaker. No shielding. Never use an instrument cable in its place — you can damage your amp. Always label speaker cables.
- **Male vs. female:** male sends the signal, female receives it. Follow the signal flow.
- **Balanced vs. unbalanced:** balanced cables carry the signal twice — one copy is flipped — and cancel out noise when combined. That's why XLR sounds clean across a long stage run.

> **Note:** Spot the difference: TS has one black ring on the plug. TRS has two. That second ring is the return path that makes it balanced.

2 · The Signal Chain

Every sound follows the same path from source to ears — always in this order. Nothing happens out of sequence.

1. **Mic** — converts sound into an electrical signal
2. **Cable** — carries the signal to the stage box
3. **Stage Box / Snake** — bundles all cable runs from stage to console
4. **Console** — where you shape the sound: gain, faders, EQ, effects
5. **Amplifier** — makes the signal powerful enough to drive the speaker
6. **Speaker** — converts electricity back into air movement — sound again

> **Note:** Every concept in live sound lives somewhere on this chain. When something goes wrong, trace the signal from source to speaker until you find where it breaks.

3 · Gain & Faders

- **Gain** — the input level coming into the board. Sets how healthy the signal is before anything else happens. Always set gain before touching a fader.
- **Fader** — controls where a channel sits in the mix. Scaled in decibels (dB), not linearly. A small move near the top = tiny volume change. The same move near the bottom = huge change. It falls off fast past −20 dB.
- **Unity (0 dB)** — the fader position where the board is neither adding nor removing volume. Always start here.
- **Trim** — a fine digital gain adjustment after the preamp. Set it at soundcheck and don't touch it mid-service — it affects monitors, not just the house.

Do this in order — every time:

1. **Plug everything in first.** No sound without a complete signal chain.
2. **Set Gain.** Meter reads healthy — not peaking, not buried.
3. **Channel fader to unity (0 dB).** Clean pass-through. Start here.
4. **Mains just below unity.** Gives you headroom.
5. **Monitors.** Bring up so performers can hear themselves.
6. **Fine-tune mains.** Bring the house up to where the room needs it.

> **Note:** Gain first — always. Garbage in, garbage out. Faders can't fix a broken gain structure.

4 · Polarity & Delay

Polarity (Phase Flip) — every sound wave has peaks and troughs. When two mics capture the same source from different angles, one signal can arrive flipped — peaks cancel troughs and the sound goes thin and hollow. The polarity button flips one signal back so they add up instead.

- Any time two mics are on the same source, check polarity
- If the sound gets thinner when you add the second mic — flip it

Delay — sound travels at roughly 1 foot per millisecond. If sources or speakers are at different distances, their signals arrive at different times. Delay pushes a signal back so everything lines up.

- Overhead mics are further from the kit than close mics — delay the close mics slightly
- A speaker at the back of a room arrives after the mains — delay it to match