1 Student presentations (PA1)

2 Announcement: Schlepping reminder

3 Review early feedback

4 Review mixing consoles

4.1 Which types of mixer inputs do you recall?

4.2 Which types of mixer outputs do you recall?

4.3 Tricky concepts

- Panpot vs. balance
- Routing input channels to output buses
- Auxiliaries
- Solo bus and solo modes (AFL, PFL, SIP)
5 Preview mx1 assignment

6 Mixing workflows

6.1 Post-recording mixdown¹
- Record each individual mic and worry about the mix later
- But to monitor recording, a rudimentary stereo mix is required anyway!
- More flexible, but also more time-consuming
- Requires multi-channel audio interface

6.2 Live mixdown on site
- Mix to stereo while recording (monitor mix is final mix)
- Less flexible, but also less time-consuming
- No multi-channel audio interface required if mixed before DAW
- Requires experience and practice

7 Balance

\[
\text{coherence} + \text{transparency} \rightarrow \text{balance}
\]

- level balance
- spectral balance
- spatial balance

When does a mix “sound good”? When is it well balanced?
- When it conveys a sense of unity, of a meta-instrument (coherence)
- When one can focus on each individual element in it (transparency)

Goal: Always allow listener to switch between detail and big picture
- Regular shift of focus is also a good strategy for mixing itself!
- Balance must be achieved in many dimensions: levels, spectrum, space
- But how to judge whether a mix is well balanced? Useful guidelines:
  - Jecklin (2003) defines evaluation factors sound, image, space
  - Ebu defines similar evaluation criteria (Linkwitz 2015)

¹ This is the approach that we will adopt for our upcoming in-class recording sessions.
7.1 Level balance

• Technical means: Mixer’s input channel faders
• Potentially complicated through crosstalk between microphones
• Transparency: Can one discern each individual instrument?
• Coherence: Do instrument levels relate to each other in credible ways?
• How to find the ‘right’ position for a given fader?²

1. Move fader all the way down
2. Gradually fade signal in again
   – Do so with eyes closed
   – Focus on other instruments as you fade
3. Let fader go when signal ‘locks’ into place

Also useful to confirm ‘validity’ of a previous fader position

• Subtractive mixing to prevent upward tendency (Katz 2014a, p. 34)

7.2 Spectral balance

![Diagram of spectral balance]

• Technical means: Filters and eqs
  – But also very much a matter of orchestration!
  – Fader balance inevitably also affect’s mix’s spectral balance. Why?
• Transparency: Different instruments occupy different parts of spectrum
• Coherence:
  – Spectral separation should not result in mix ‘falling apart’
  – Avoid over- or underemphasis on specific frequency bands

² Cf., Senior 2011 sec. 8.2.
• Consider all frequency bands in the audible spectrum
• Don’t cramp too much into 2 kHz to 5 kHz range (Eargle 2003 p. 330)
• Roads 2015 p. 380 lists “magic frequencies” for mixing purposes

7.3 Spatial balance
• Technical means: Panpots, stereo recording techniques, reverb
• Always do a “mono reality check” (Eargle 2003 p. 330)
• Transparency:
  – Does each phantom source appear from a stable direction?3
  – Consistent phantom source localization at all frequencies?
  – Does each source occupy a credible width, depth4 & height?
• Coherence:
  – Avoid over- or underemphasis on specific locations
  – Otherwise might result in I mix, V mix, or W mix (Izhaki 2011d)
  – Spatial separation should not jeopardize balance of stereo image
    The essence of stereo is a sense of spatiality, not a set of mono images panned to different positions on the stereo stage. (Eargle 2003 p. 330)
  – Stereo image properly centered? (phase correlation meters)
  – Frequency response of diffuse reverberation?
  – Depth of reverberation? (Some reverbs can sound rather flat.)
• Useful criteria to evaluate spatial balance:
  – Envelopment: “experience of being surrounded by sound” (Kendall and Ardila 2008 pp. 129 f.)
  – Presence: “sense of being inside of an (enclosed) space” (Kendall and Ardila 2008 pp. 129 f.)
  – Spaciousness (Blauert 1996)
  – Liveness (Rumsey 2002)
  – Rumsey 2002 distinguishes between source, ensemble, room & scene

8 Decision making strategies
• Make decisions quickly, but be prepared to revise them.
• Comparative listening usually leads to decisions more effectively
  – Usually hard to judge whether X “sounds good” in absolute terms
  – Much easier to say whether X sounds better or worse than Y

3 Try also off-sweet-spot listening positions to reliably judge phantom source stability.
4 Depth is a very real factor in stereo production, starting with the tendency of coincident and binaural stereo recording techniques to convey a better sense of depth than spaced or mixed techniques. Katz 2014b discusses how to achieve depth and dimension in recording, mixing, and mastering. Eargle 2003 pp. 330 ff.) suggests to approach a mix in terms of layers between foreground and background. Jecklin 2003 pp. 6 ff.) defines (in German) four specific such layers through which to assess a mix.
We always can find a $Y$ to compare $X$ to, since mixing unfolds over time.

Example of such iterative editing by Roger Nichols (Senior 2011, sec. 8.2):

- Turn bass up by $+1\text{ dB}$. Does the mix sound worse?
- If yes, retreat to original fader position
- Now, turn bass down by $-1\text{ dB}$. Does the mix sound worse again?
- If yes, then the original fader position was probably pretty good.

Keep the mix simple and never commit to an edit

- which does not noticeably improve the mix, or:
- whose effect you cannot hear at all.

9 Mixing scenarios

9.1 Main stereo, spot & ambience mics

- Common in classical music production
- Raise faders in following order:5
  1. Main stereo mic
  2. Outrigger mics (if applicable)
  3. Ambience mics
  4. Spot mics
- Use real-world situation as guideline for direction, width & depth
- How to pan a spot mic with respect to a main stereo mic:
  1. Bring up faders of main stereo mic (panned hard left/right)
  2. Determine direction of instrument in main stereo image
  3. Bring up fader of spot mic to be panned (at relatively low level)
  4. Pan spot mic until it ‘locks’ with main stereo mic phantom source
- Optional: Delay spot mics
  - Idea: Compensate runtime differences to main stereo mic
  - Exercise: How to quantify the required delay time?

9.2 Spot mics only

- Common in pop, rock & jazz production

Eargle (2003, p. 328) suggests to raise faders in following order:

1. Rhythm tracks (drums, bass, rhythm guitar)
2. Lead tracks (lead guitar, vocals)
3. Sweetening (strings, synths)
• Eargle (2003, p. 328) suggests to process in order of:
  1. Basic mix (level balance & panning)
  2. Eqing & dynamics
  3. Reverb & other effects

• Flexible stereo imagery (no main stereo mic to match). Rules of 👍:
  – Center-pan bass, kick drum & solo lead instruments (e.g., vocals)
  – Large instruments use more stereo width (e.g., drumkit, piano, choir)
  – Aim for a well-centered stereo image
  – Look for symmetry (e.g., pan lead guitar half left, lead sax half right)

• Eargle (2003, p. 332) provides examples of how to layer along depth

10 Daw parameter automation

![Diagram of Daw parameter automation modes](image)

• Basic idea: Record fader movements to make mix dynamic

• Can be extended to include all parameters of a mix. Examples:
  – Automate filter cut-off frequency
  – Automate decay time of a reverb plugin

• Different automation modes support different workflows (cf., figure 6):
  – Read mode completely disregards pre-playback fader positions
  – Touch and latch mode particularly useful; allow for iterative mixing 🤗

• Particularly convenient with external MIDI controller (rather than mouse):
  – Write, touch, and latch require motorized faders
  – Touch and latch require touch-sensitive controls

6 This order has to be taken with a grain of salt. If you eq an instrument specifically to fit it into the overall mix, it makes sense to do so after the basic mix has been established. But if you eq to fix instrument-specific problems regardless of balance with other instruments (e.g., remove a hum from a guitar amp), you may want to address this before worrying about the mix. Likewise, if you are working exclusively with close-miked signals and need to build all reverberation from scratch, it might make sense to apply artificial reverb to individual instruments before mixing them.
11 Automation in Reaper

11.1 Overview of Reaper automation modes

- Reaper offers standard read, touch, latch & write modes
- Additional trim/read mode (default mode in lieu of off mode)
  - Applies automation envelope relative to pre-playback fader position
  - Pre-playback fader position serves as ‘master’ level
  - Envelope adds changes ‘on top of fader’
- Additional latch preview mode
  - Like latch, but does not actually write changes
  - Useful for rehearsing complex edits before recording them
- Switching between modes:
  - Per track: Envelope button in track control panel (trim by default)
  - Global: Envelope button right of transport bar (overrides per-track)

11.2 Recording automation data

1. Click automation icon for target track in track control panel
2. Select parameters to be automated (try Volume and Pan first)
3. Envelopes for selected parameters appear beneath audio track
4. Envelopes need to be armed (analogous to audio) for data to be written
5. Hit play button (no need to record audio to capture automation data)

11.3 Editing automation envelopes offline by mouse

Preferable for coarse edits (e.g., adding +3 dB to the bridge):

1. Set automation mode to Trim/Read (which is Reaper’s default)
2. + left-click on automation envelope to create a new point
3. Drag points around while holding left mouse button

References & further reading


