

Chapter 21. Meeting 21, Analog and Digital Audio Fundamentals and Mediums

21.1. Announcements

- Recording Session 4: Wednesday: here
Engineering crew: four students [names removed for privacy]
- Recording Session 5: Monday: Killian
Engineering crew: four students [names removed for privacy]
- Need four-person shlep crew for each day

21.2. Delay: Parameters

- Delay time: time before repeat
- Feedback: gain applied to signal after delay fed back into delay
- Filters
- Wet / dry

21.3. Delay: Feedback

- To create one echo use a feedback of zero
- A feedback of 1 will create an infinite number of echos

21.4. Delay: Types

- Slapback: single delay, delay about 35 to 100 ms, functioning as a short reverb
- Ping-Pong or stereo: echos change stereo positions

21.5. Delay in Live

- Three types: Simple Delay, Filter Delay, Ping Pong Delay
- Toggle Sync/Time button to get direct control independent of tempo

21.6. Delay: Tips

- Often use filtering
- Often practical use in an aux track as delay
- Very short single delays can be used for double tracking
- Time delay to musical tempo: $60,000 / \text{BPM} == \text{beat duration in milliseconds}$

21.7. Reading: Lazzarini, Introduction to Digital Audio Signals

- What are the two steps of digital encoding?
- How does the sampling rate limit what frequencies can be encoded?
- How does the quantization (and bit depth) determine what amplitudes can be encoded?
- What is PCM audio? What is not PCM audio?
- What does digital audio aliasing sound like?
- How are mixing, scaling, and offsetting signal implemented in a digital system?
- What are Fourier series?
- What is the difference between FIR and IIR filters?

21.8. MOSS: New Microphones

- AT M250DE (1)
Dual-element instrument microphone



- e604 (1)

Dynamic cardioid w/ more than 160 dB dynamic range



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- Blue enCORE 200 (4)

Active dynamic cardioid



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21.9. Microphone Positioning: Exercise

- Exercise: You are recording 14 singers, 7 male and 7 female. You have 6 AT 4041, 4 AKG 414, 2 Earthworks TC20mp, and 2 Sennheiser MD-421.

21.10. Microphone Positioning: Exercise

- Exercise: You are recording a large ensemble. You have 6 AT 4041, 4 AKG 414, 2 Earthworks TC20mp, 2 Sennheiser MD-421, 1 AT M250DE, 1 e604, 4 enCORE 200, and 2 mono and 1 stereo direct box

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