21M.380 · Music and Technology
Recording Techniques & Audio Production

Workshop: Moss intro & mic handling

Session 5 · Wednesday, September 21, 2016

1 Schedule

	Group A	Group B	Group C	Group D
	[redacted]	[redacted]	[redacted]	[redacted]
12:25pm	Equipment pickup ([redacted])			
12:35pm 12:50pm	Large moss road case overview (all groups) Galaxy cm-140 spl meter (all groups)			
12:55pm 1:05pm	Spl measurement	Spl measurement	Moss mics Mic & cable handling	Mic & cable handling Moss mics
1:15pm 1:25pm	Moss mics Mic & cable handling	Mic & cable handling Moss mics	Spl measurement	Spl measurement
1:35pm 1:45pm	Discussion: Spl measurement results (all groups) Packing up equipment (all groups)			
1:55pm	End of class & return of equipment ([redacted])			

Table 1. Schedule

2 Large moss road case overview

- Our *MObile Sound System* (moss) includes two road cases:
  - Large road case (mics, stands, cables, etc.)
  - Small road case (preamps, audio interface, laptop, etc.)
- Today we will look at the large road case

2.1 How to open

- 2 locks: left bottom, right top
  - Open with same key
  - Please remember to return keys to me! ☺
- 4 latches (2 on each side): flip and twist

2.2 Case contents[1]

[1] See Ariza (2012) for a detailed Moss inventory list.

- Mic stands (tall and short)
- Loudspeaker stands

Six boxes with:

- Microphones
- Cables (XLR, TS, 'snakes')
- 3 pop screens
- 10 Radial DI boxes (8 JPC active stereo, 2 JDI passive mono)
- 3 Audio-Technica ATH-M40fs stereo headphones (ctrl. room monitoring)
- 4 Direct Sound EX-29 stereo headphones (monitoring for musicians)
- 4 Hear Technologies Hear Back monitor mixers (for use with EX-29s)
- 2 Galaxy CM-140 sound pressure level meters

3 Galaxy CM-140 SPL meter

- Max/Min
- A vs. C weighting
- Fast vs. slow response
- Level ranges

4 Sound pressure level (SPL) measurement[2]

[2] Courtesy of Chris Ariza

1. Perform a hand clap at a distance of 4 feet from the SPL meter
2. Record maximum A-weighted peak level (fast response) in suitable level range
3. Repeat measurement at 8, 16, 32 feet (keep source level consistent)
4. Repeat the procedure in two different spaces
   - One reverberant (hallways, large rooms)
   - One dry (outdoors)
5. Chart results on paper and whiteboard
   - Use only one quarter of board and leave room for other groups
   - Distance in feet on x axis
   - Sound pressure level on y axis
   - Two plots (outdoors vs. indoors) on same graph

5 Moss microphones

1. Identify the moss microphones listed in the attached sheet.
2. Determine their specifications (transducer type & directivity) and fill out the sheet accordingly.

- You can complete this exercise as a group.
- You can browse the mics and their manuals for help.

☞ *Please handle the mics with care, especially the Royer R-101 ribbon!*

6 Microphone & cable handling

6.1 Cable coiling

☞ *Never coil an audio cable around hand and elbow!*

- If you do, cables will deteriorate very quickly!
- Instead, alternate loop direction (*over-under technique*):[3]

1. Grab short end with tie with thumb and index of left hand, such that connector points towards your body
2. Make a regular coil
   (a) Grab long end with thumb and index of right hand, such that right thumb points towards short end
   (b) Bring right hand towards left hand
   - Gently twist cable away from your body with right thumb and index as you go
   - Thumbs should point in opposite directions when they meet
3. Make a reverse coil of roughly equal diameter
   (a) Grab long end with characteristic 'twisted arm' position
   - Twist right arm towards your body until thumb points down
   - Grab cable with thumb and index of right hand, such that thumb points towards long end

   (b) Bring right hand towards left hand
   - Rotate right hand upwards as you go, twisting the cable away from your body
   - Thumbs should point in same direction when they meet
4. Keep alternating between coil and reverse coil until you arrive at the long end
5. Tie off (with tie, not with cable itself!)

[3] The method described here is the one that I showed in class (courtesy of [redacted], MIT class of 2013), which also corresponds to the first of two methods demonstrated in a video by the London School of Sound (2012). A second method shown in the same video is allegedly faster, but requires more practice. Babbie, Ares, and Maglione (2001) show two methods that start by pointing the short end connector *away* from your body. The second of these shows an alternative implementation of the reverse coil described here in step 3.

6.2 Mic stands & stereo bars

- Two mic stand sizes available in Moss (short stands: kick drum, amps)
- Stereo bar: Mount two mics on same stand (for stereo recordings)
- Different thread standards, so adapters might be required

Standard	Diameter	Threads/inch	Where	Found on
UNS	$^5/_8''$	27	US	Mic stands
BSW	$^3/_8''$	16	EU	Mic stands
BSW	$^1/_4''$	18	EU	Cameras

Table 2. International thread standards

6.3 Clips & shock mounts

☞ *Store clips and shock mounts with the mic, not with the stand (they are all different and matched with the mic they belong to).*

- Shock mount ('cradle'): Mechanically decouples microphone & stand
- Prevents LF sound pickup from boom & cable handling, stage vibration[4]

[4] cf., Woolf 2010.

6.4 Wind screens & pop filters

- Wind screen: Prevent wind noise (including breath)
  - Next to impossible to get rid of in post-production![5]
  - Definitely use wind screen for outdoor recordings (for which more sophisticated fury screens also exist)
  - Available for AKG C414 (Moss) & Zoom H4n recorder (Music Library)
- Pop filter: Prevent vocal plosives (e.g., "p", "t", "k")
  - Check out sound example in video by Scotty D (2013, 14'42")
  - 3 pop filters available in Moss

[5] cf., Woolf 2010.

6.5 Mic stand handling

1. Pull stand out of tripod base *all the way* to prevent mechanical coupling (thumb screw)
2. Unfold tripod base *all the way* (or it shall never stand firm and straight)
3. Vertically extend the stand (clutch)
4. Adjust angle of horizontal boom (screw)
5. Shift horizontal boom left-right (thumb screw)
6. Extend telescoping boom (thumb screw)

7. Screw clip or cradle onto mic stand: loosen screw, screw boom into cradle (much better than to rotate the cradle around the boom ☺)
8. Remove mic from case and attach to cradle/clip
9. Uncoil cable from mic (make sure you use the right end!) to stagebox, leaving spare cable at stagebox
10. Use small on-stage clips (in an ideal world, there'd be two) to fasten cable
11. When you're done, return mic to case *with clip or cradle* and coil cable

☞ *Microphones are the last thing to go on and the first thing to go off the stage!*[6]

[6] … apart from the musicians. ☺

7 Discussion: SPL measurement results

- Results from sound level meter experiment
- How do these relate to the theory dictated by the inverse distance law?

References & further reading

Ariza, Christopher (2012). *Moss inventory*. Available at: MIT Learning Modules ‣ Materials.

Babbie, Chris, Jon Ares, and Dan Maglione (May 2001). *Over/under cable wrapping techniques*. URL: http://stagecraft.theprices.net/gallery/cablewrap/cablewrap.avi (visited on 09/17/2014).

London School of Sound (2012). *How to Coil Cables*. URL: https://youtu.be/pEd7ru24Vx0 (visited on 01/25/2017).

Scotty D (2013). *How to make your own microphone Pop Filter*. URL: https://youtu.be/WcB3s8KOk4w (visited on 09/19/2014).

Woolf, Chris (2010). *How to reduce wind noise and vibration*. URL: http://microphone-data.com/media/filestore/articles/Wind%20and%20vibration-10.pdf.

MOSS Microphones

Which properties apply to which microphones? Mark all that apply with an X (multiple Xs per row are possible).

	Sennheiser e 604	AKG C414 XLII	Audio-Technica AT4041	Sennheiser MD 421-II	Audix D6	Shure SM57	Shure Beta 58A	Blue enCORE 200	Earthworks TC20mp	Royer R-101	Audio-Technica ATM250DE	Mojave MA-200
Dynamic moving coil												
Dynamic ribbon												
Large-diaphragm condenser												
Small-diaphragm condenser												
Omni												
Cardioid												
Super-cardioid												
Hyper-cardioid												
Figure-8												
Phantom power from preamp required?												
Subject to proximity effect?												

MOSS Microphones
(solutions)

Which properties apply to which microphones? Mark all that apply with an X (multiple Xs per row are possible).

	Sennheiser e 604	AKG C414 XLII	Audio-Technica AT4041	Sennheiser MD 421-II	Audix D6	Shure SM57	Shure Beta 58A	Blue enCORE 200	Earthworks TC20mp	Royer R-101	Audio-Technica ATM250DE	Mojave MA-200
Dynamic moving coil	X			X	X	X	X	X			X	
Dynamic ribbon										X		
Large-diaphragm condenser		X										X
Small-diaphragm condenser			X						X		X	
Omni		X							X			
Cardioid	X	X	X	X	X	X		X			X (condenser)	X
Super-cardioid		X					X					
Hyper-cardioid											X (dynamic)	
Figure-8		X								X		
Phantom power from preamp required?		X	X					X (even though dynamic mic)	X	No!	X	No! (extra power supply)
Subject to proximity effect?	X	if not set to omni	X	X	X	X	X	X		X	X	X

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