

SOUND 101: SIGNAL AND NOISE

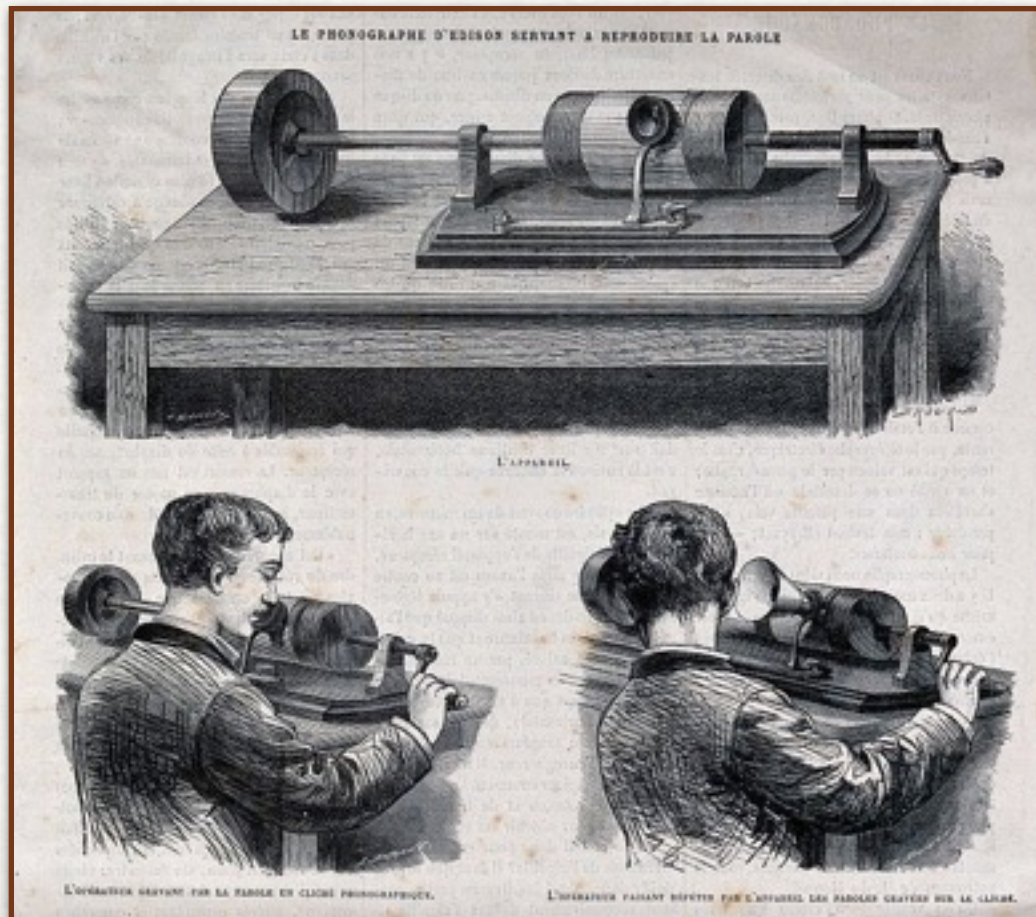
dec·i·bel /'desə,bel/

noun: a unit used to measure the intensity of a sound or the power level of an electrical signal by comparing it with a given level on a logarithmic scale.

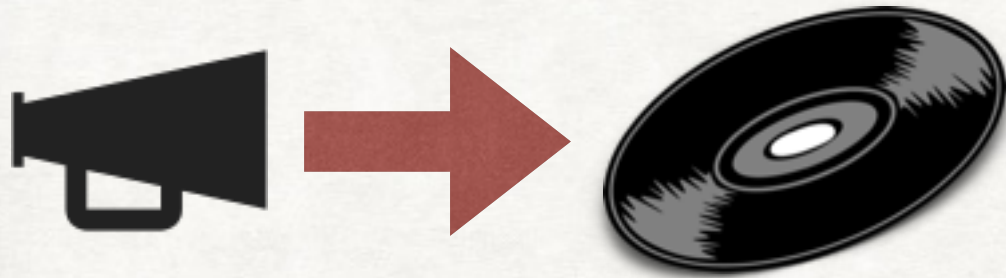
A BRIEF HISTORY OF AUDIO



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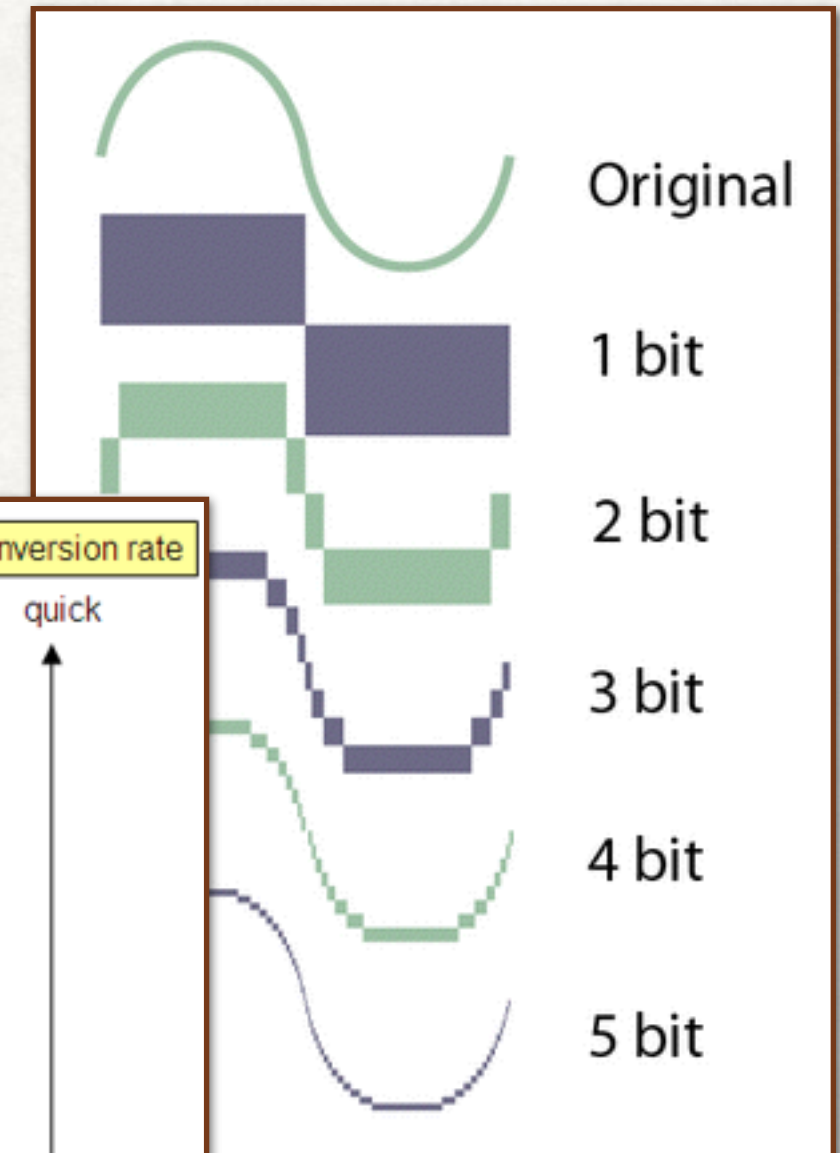
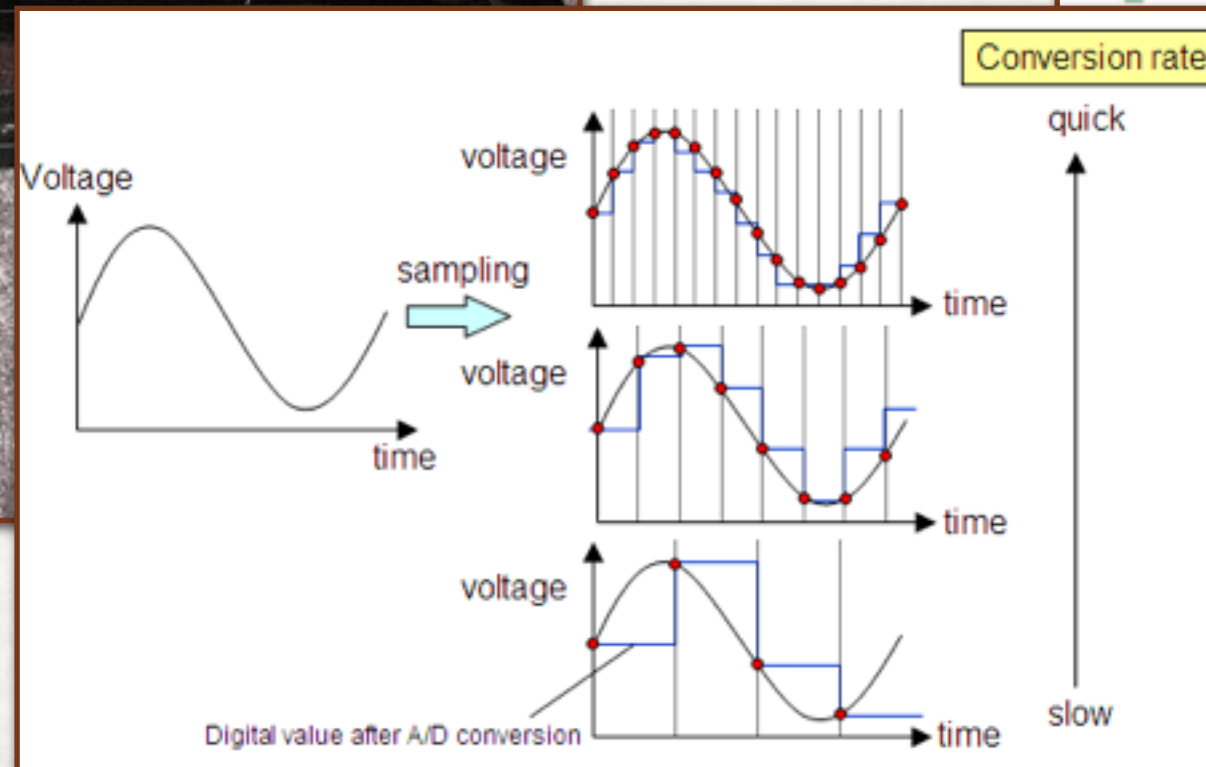
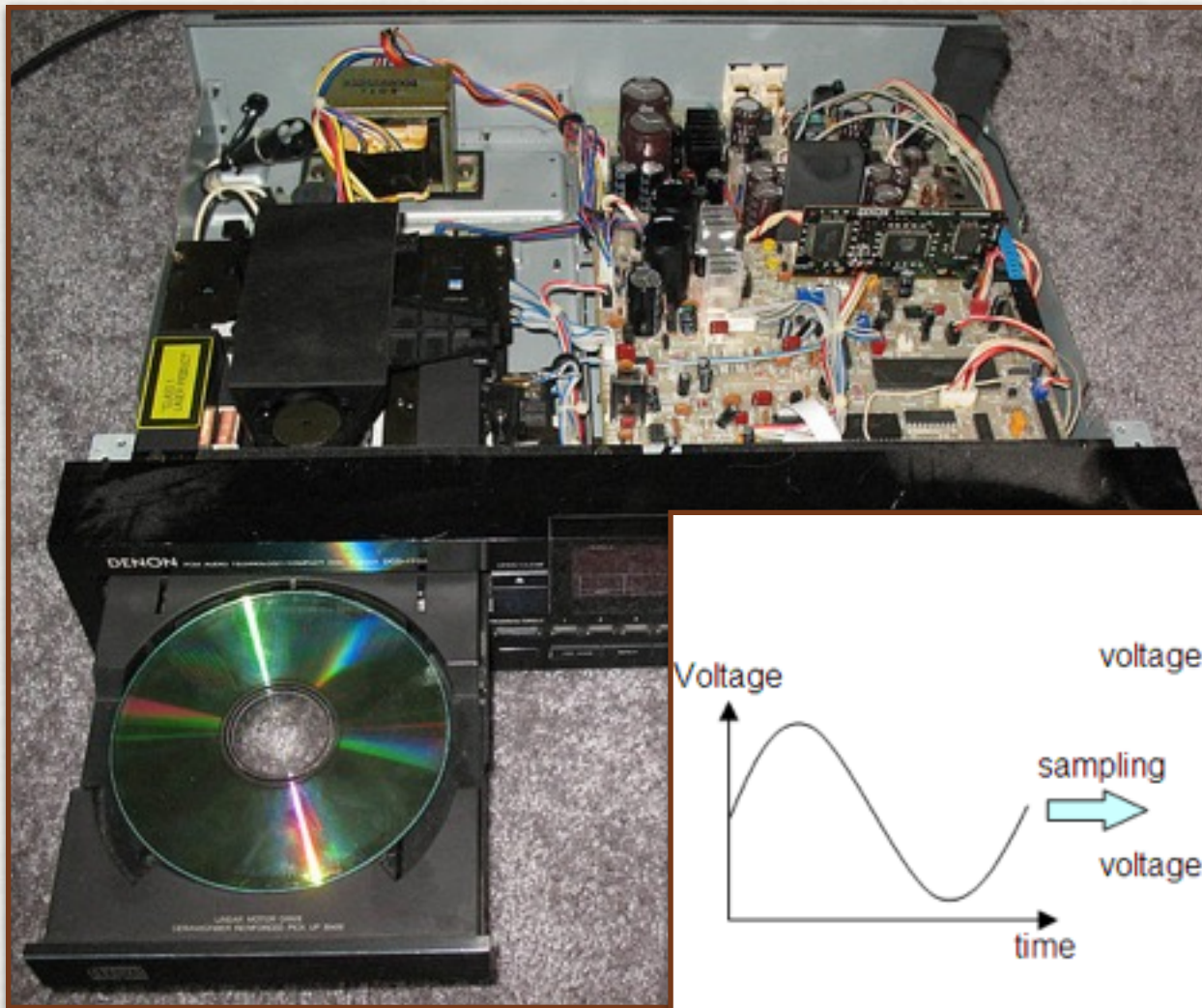
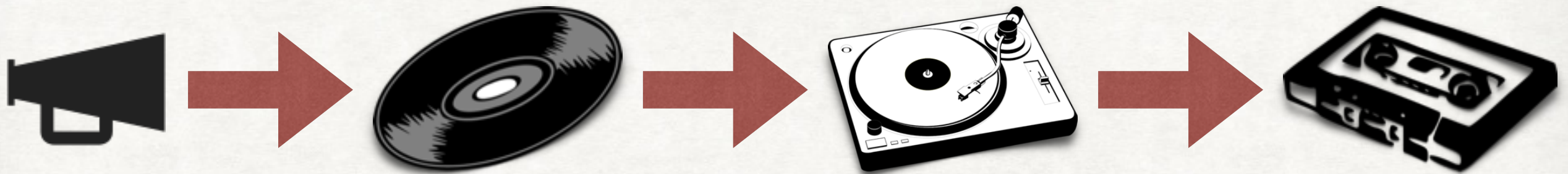
A BRIEF HISTORY OF AUDIO



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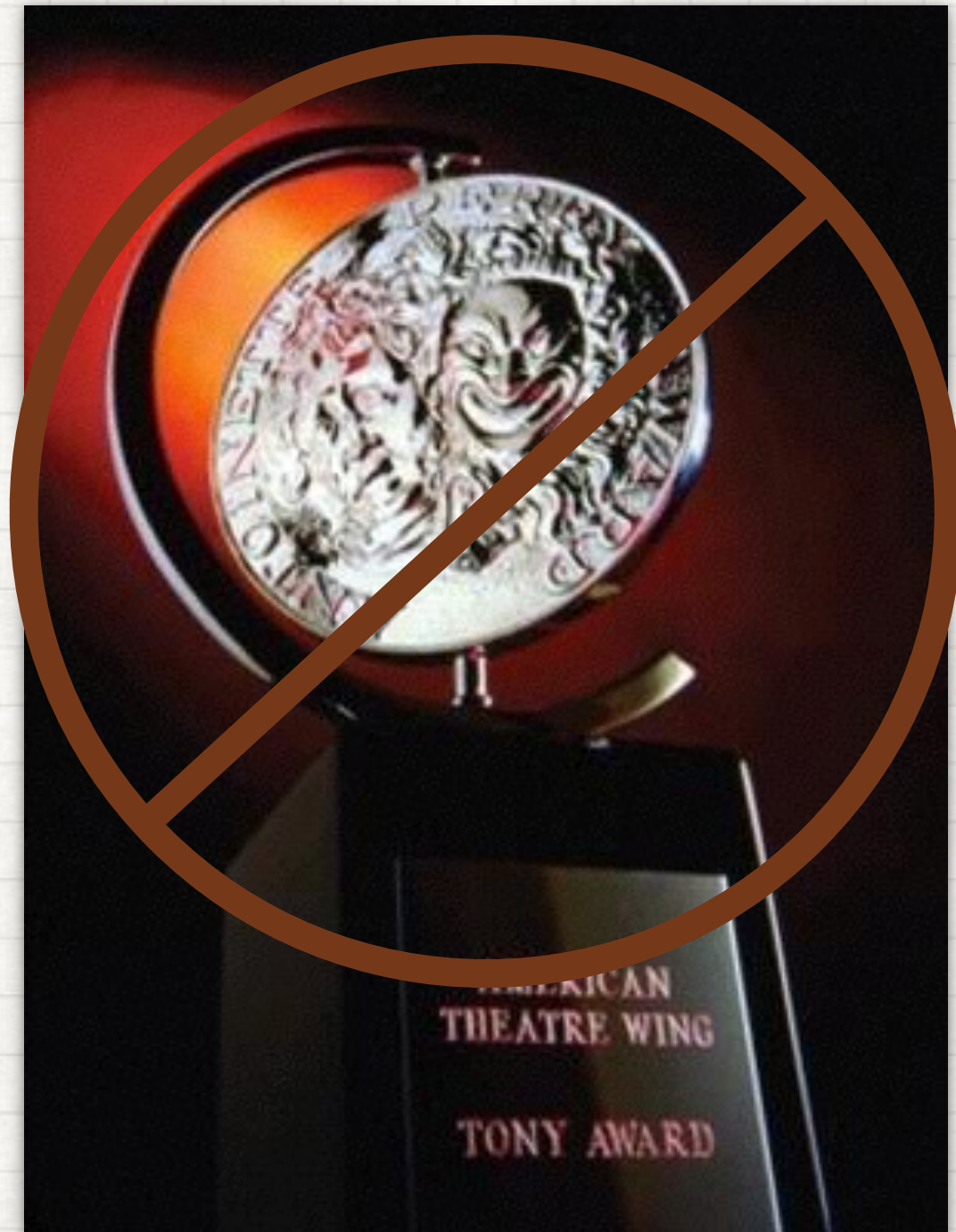
A BRIEF HISTORY OF AUDIO



SOUND AS A DESIGN ELEMENT

WHAT CAN WE SAY WITH AUDIO?

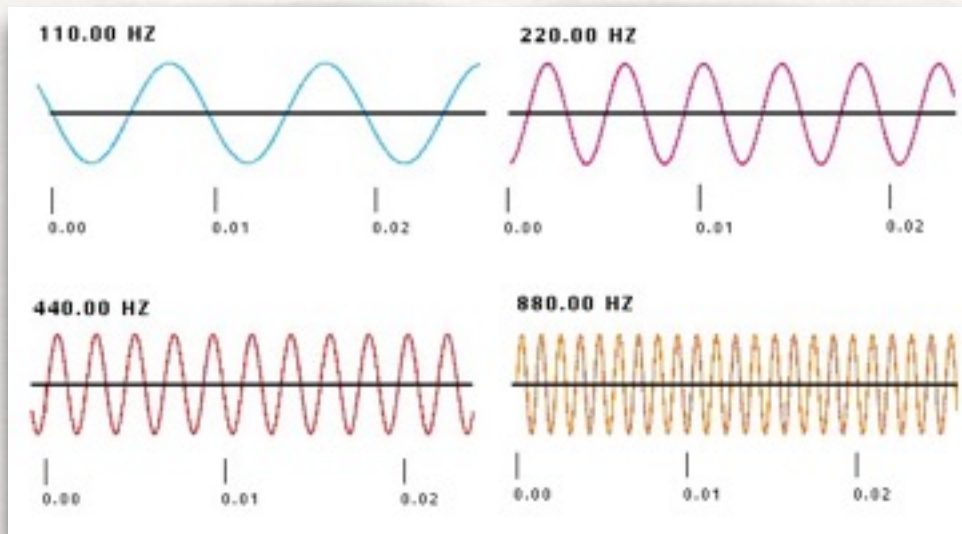
- reinforcement
- indicate place, atmosphere
- support plot (door bells, phone rings, car honks, etc)
- bridge parts of the show together (ie. during scene changes)
- establish mood (preshow)
- underscore or heighten mood



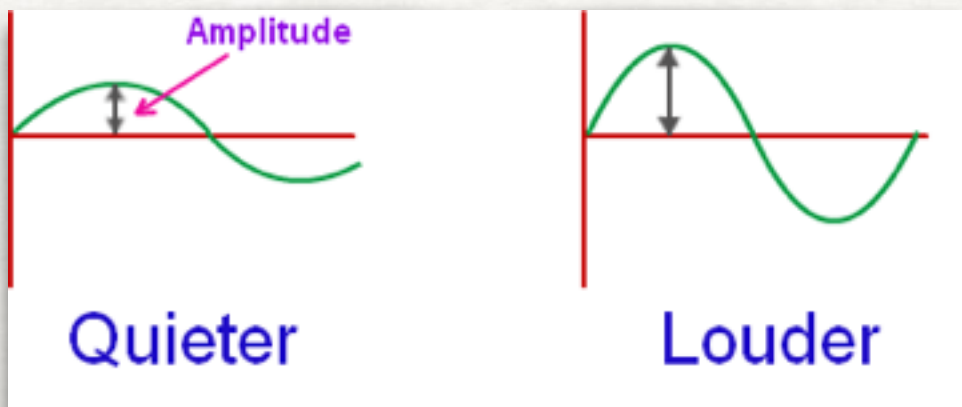
SOUND AS A DESIGN ELEMENT

HOW DO WE SAY IT?

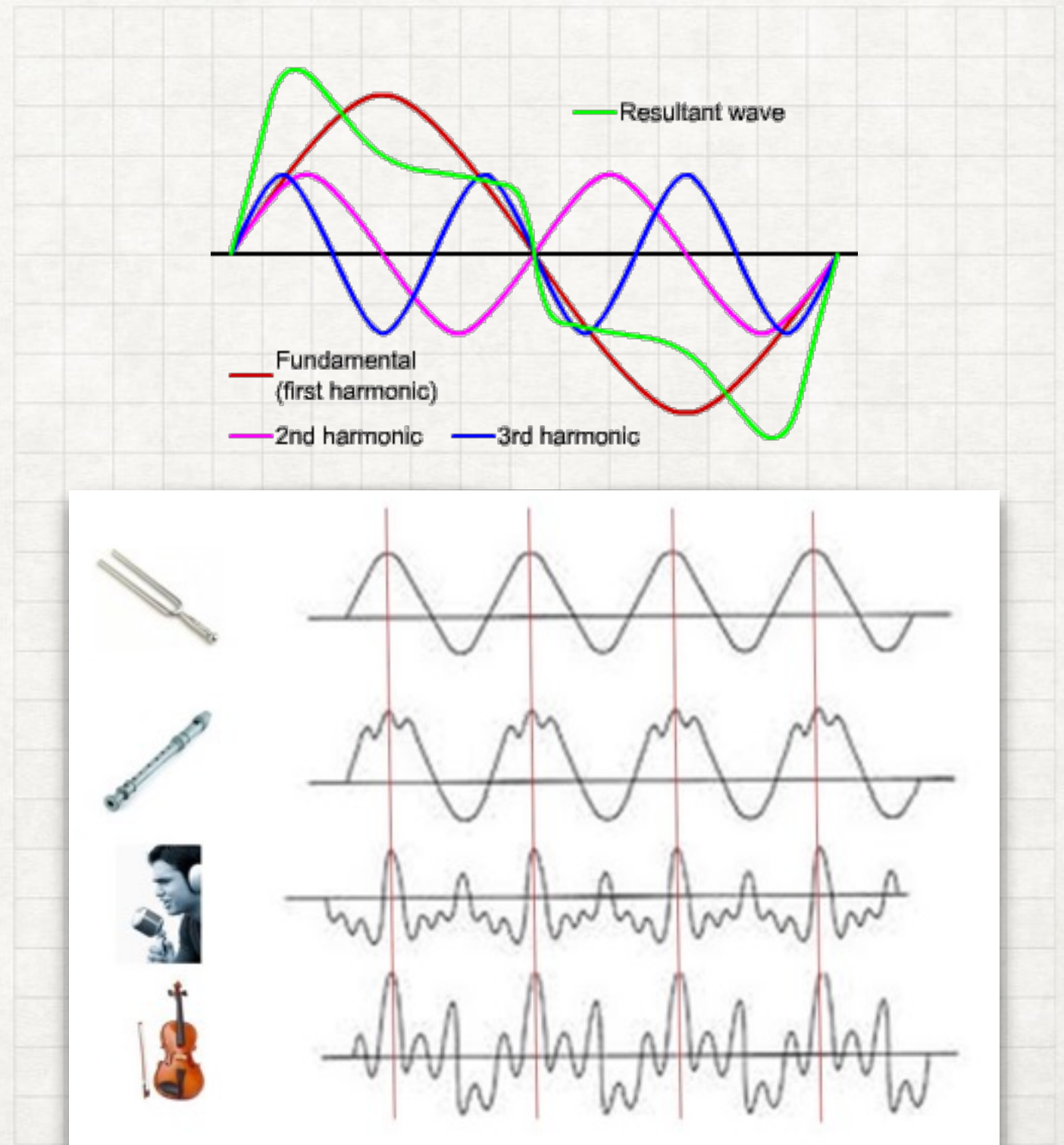
- Frequency (pitch)



- Intensity



- Timbre



ELEMENTS OF A SOUND SYSTEM

- Source
- Transducer
 - converts acoustic energy into electrical energy
- Processing
 - alters properties of signal
- Mixing
 - combines, balances, and outputs signals
- Processing
- Amplification
- Output
 - converts electrical energy back to acoustic energy



SOUND SOURCES

- Voices
- Instruments
- Playback
- You name it!



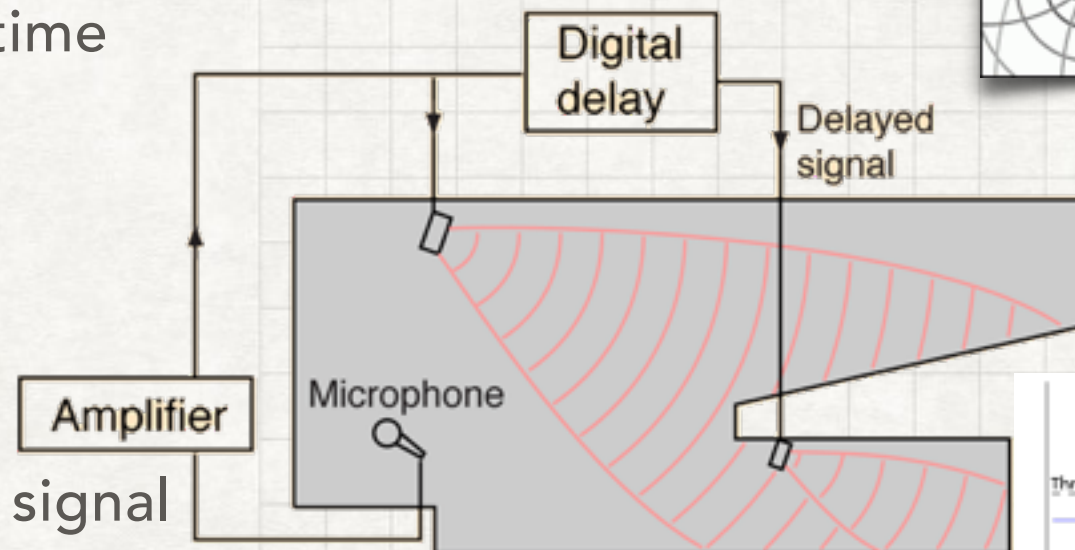
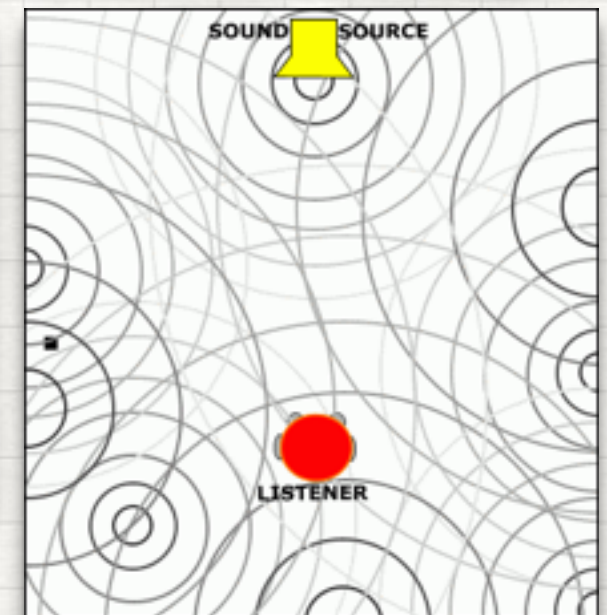
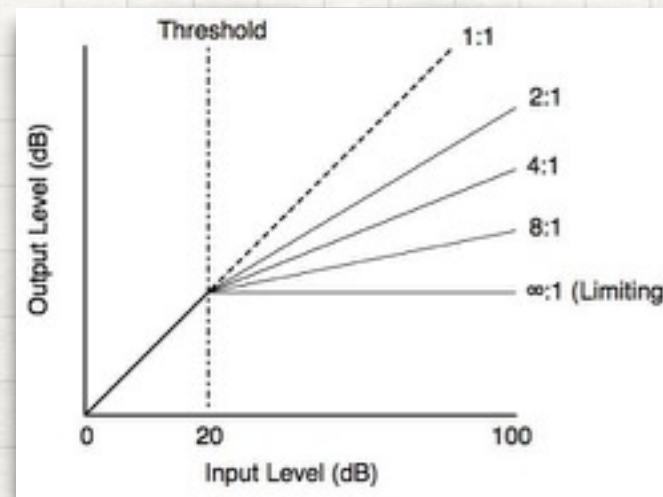
TRANSDUCERS

- Microphones
 - wired v wireless
 - dynamic mics
 - coil in a magnet induces a charge as it moves in response to sound
 - condenser mics
 - the capacitance of two plates let varying amounts of current though as they move in response to sound - requires supplemental (phantom) power
- pickups
- direct boxes



PROCESSING

- equalization
 - adjust relative levels by frequency
- compression
 - adjust levels by relative volume
- gates
 - block sound unless it reaches a minimum threshold
- verb
 - duplicate and modify over time
- chorus
 - duplicate and layer
- delay
 - lengthen the time between signal source and destination



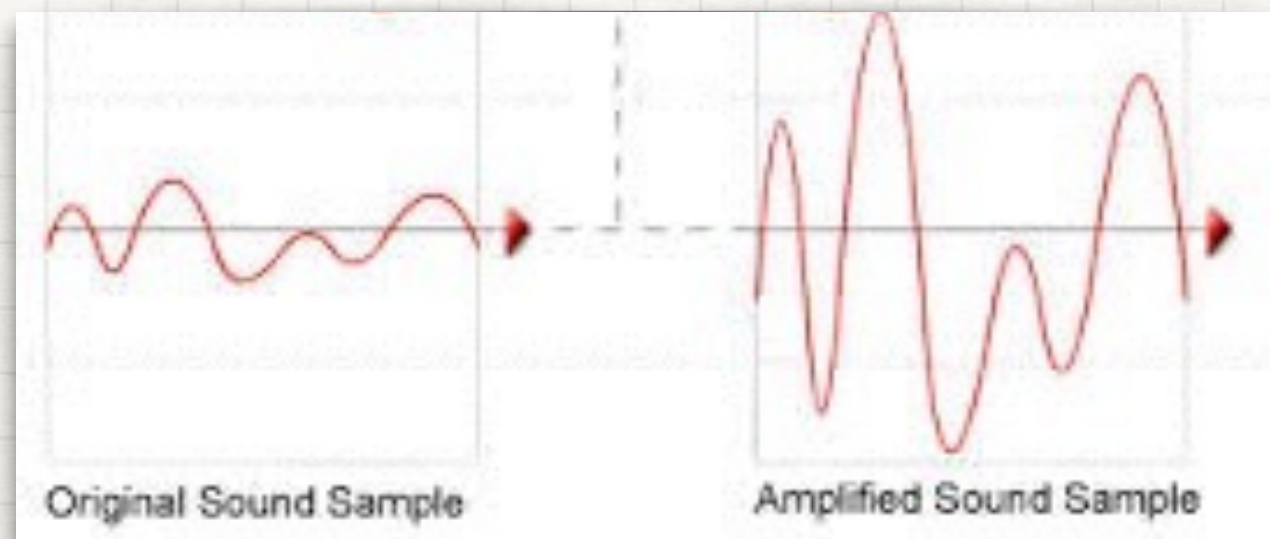
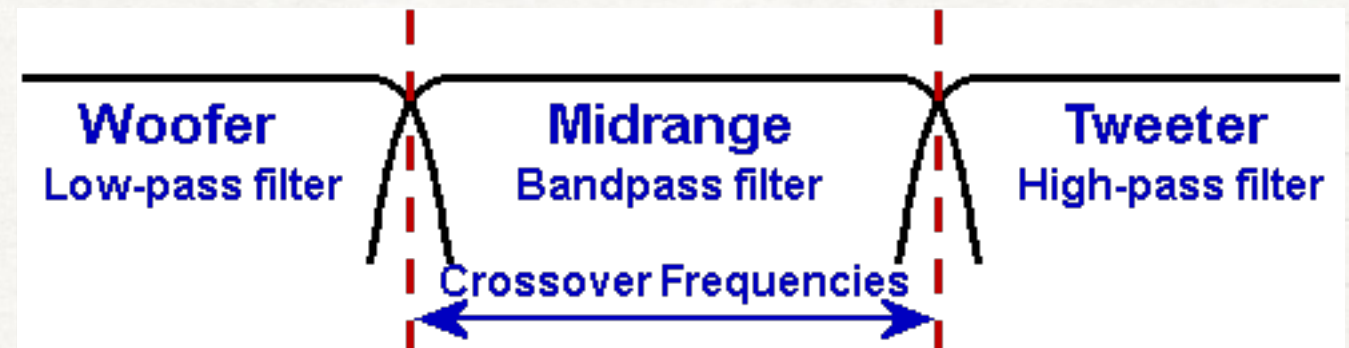
MIXING

- balance / blend
- masters
-L/R, L/C/R
5.1, 7.1 etc
- auxes
-effects, monitors
- matrixes
recording, BOH & LA feeds
- groups / DCAs



PROCESSING AND AMPLIFICATION

- Yep, more processing
 - delay
 - EQ
 - crossovers
- Amplification



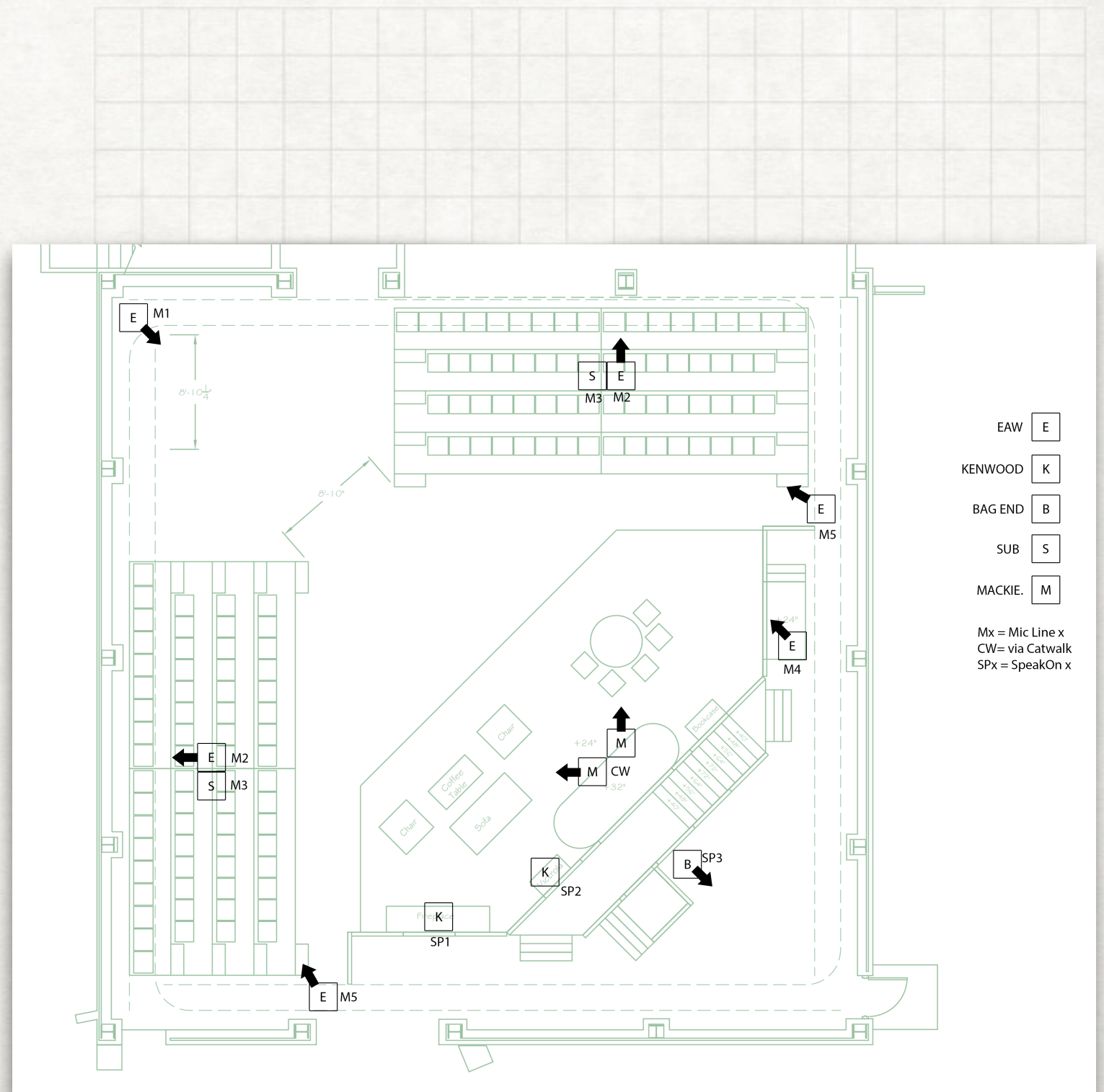
OUTPUT

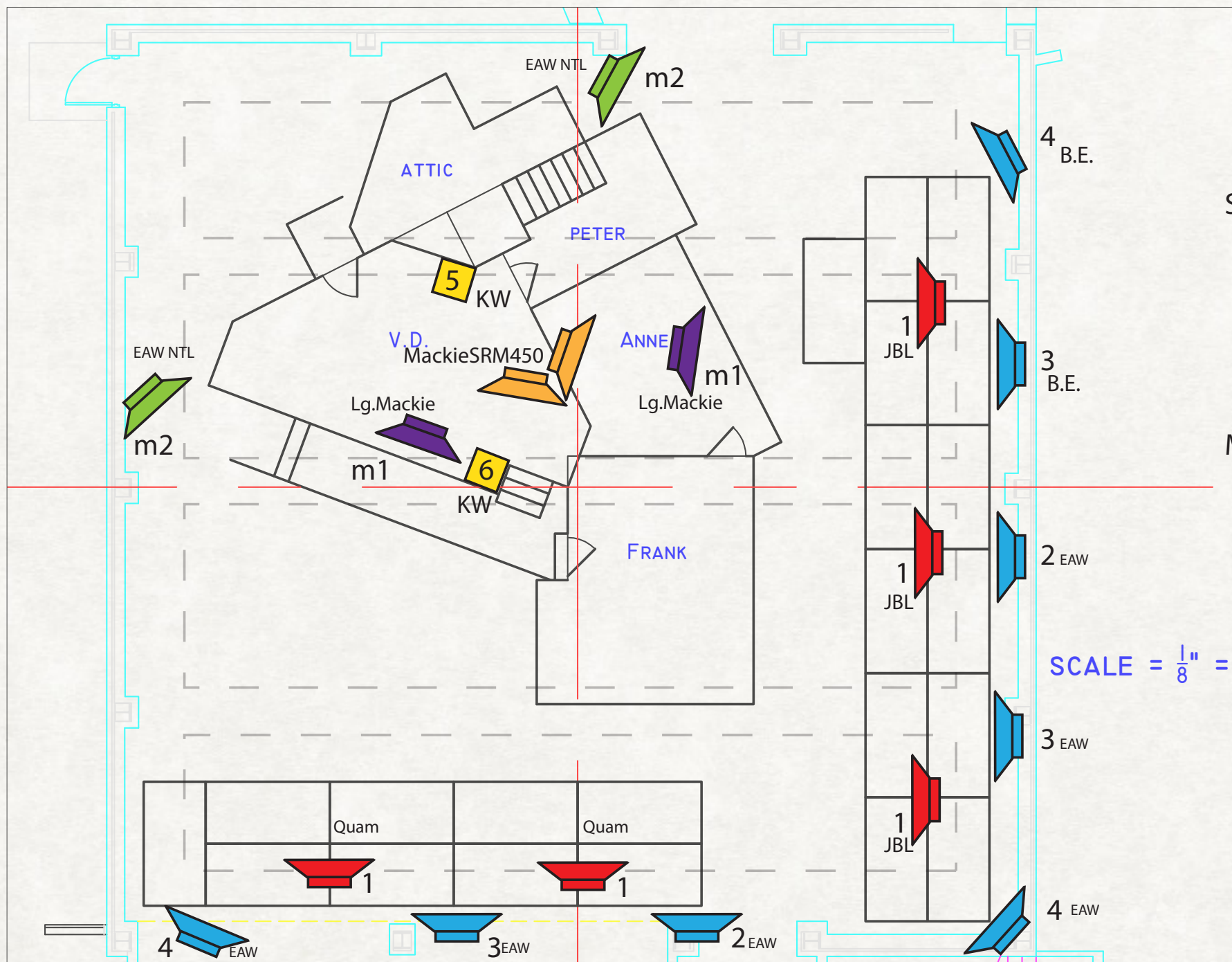
- speakers
 - woofer, mid-range, tweeter
- recording medium
- transmitters



COMMUNICATING SOUND CONCEPTS

- Speaker/Stage Plots
 - (not always) scaled location
 - speakers
 - snakes & miss
 - legend, key
- Paperwork
 - Mic Plot
 - Input List
- Cue Sheet





Channel

Spk.1



3 JBL Control1
2 Quam FM 6, under seats
(from Chelsea) (passive)

Spk. 2, 3, 4



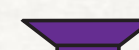
6 EAW Wedges + 2 Small Bag End
(passive)

Mic 2



EAW NTL720 (active)

Mic 1



Large Mackie (Active)
(under set, on side)
With Furman power strip
for power control placed under
"attic"

MOTU 1,2



Mackie SRM450 (active)
Hung in between catwalks
Powered with Furman
Power strip, 2 XLR Cables
Wired directly to sound station
Through Catwalk Door

Spk. 5,6



Kenwood (from Marc) (passive)
(connect with SpCon - Speaker wire)

SCALE = $\frac{1}{8}" = 1'$

KW



Input List:

1. Kick
 2. Snare Top (clip on)
 3. Snare Bottom (clip on)
 4. Drum Pad
 5. Tom 1 (clip on)
 6. Tom 2 (clip on)
 7. (SKIP)
 8. Hat (Short Boom)
 9. OH SR (Tall Boom)
 10. OH SL (Tall Boom)
 11. Bass DI
 12. Bass Mic (Short Boom)
 13. EGT SR (Short Boom)
 14. EGT C (Short Boom)
 15. Acoustic DI
 16. C Vocal (Tall Boom)
 17. SR Vocal (Tall Boom)
 18. SL Vocal (Tall Boom)
 19. Stereo Track L
 20. Stereo Track R
 21. BGV Track
 22. Click Track
-
23. FOH TB
 24. MON TB
 25. Voice of God (Sidestage)
 26. MC Mic (If Applicable)

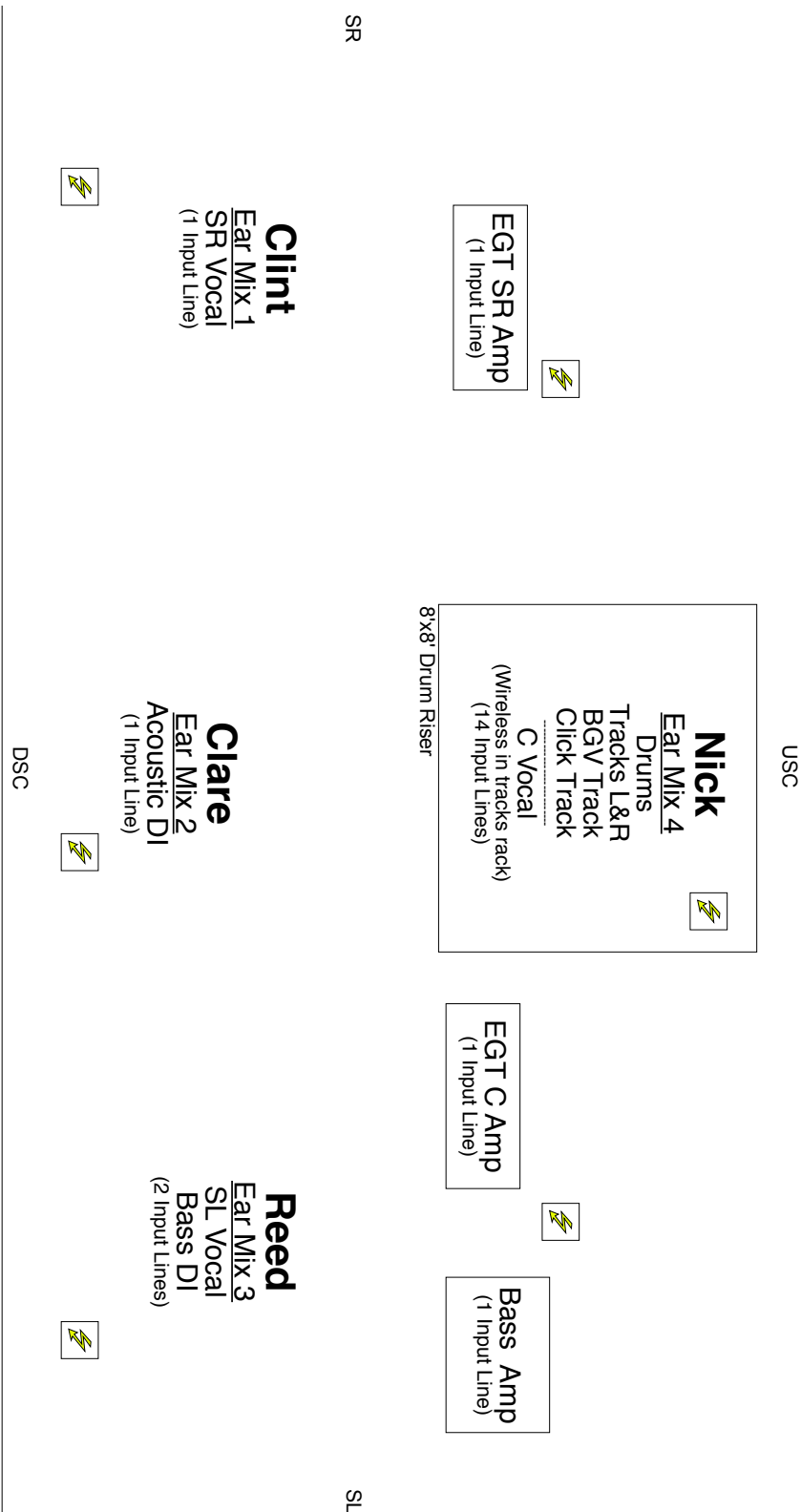
4 Ear Mixes, Stereo Preferred

**We carry our own Mic/DI package and Ear Rack with 4 Stereo Channels of Sennheiser G2, A-Band Frequencies, as well as 2 wireless microphone channels (C Voc. And C EGT). We will need 6 tall boom stands, 4 short boom stands, and all cabling to be provided.*

Production Manager & FOH Engineer:

Josh Kaltenbach
(406) 439-8988
josh.kaltenbach@gmail.com

Current as of: 2/9/2016



Carol Patches

Omni/Amp	Aux	Locations	Purpose
1	—	Lip C #2	
2	Mix 1	Lip L #2 & Lip R #2	DS Monitors
3	Mix 2	DSR #1 & Rack #1	US Monitors
4	Mix 5	DSR #2	Off-Stage Right FX
5	Mix 6	Rack #2	Off-stage left FX
6	—	DSL #1	
7	Mix 3	HL surround Speakers	
8	Mix 4	HR surround Speakers	
9	Mix 9	IEM #1	
10	Mix 10	IEM #2	

Page	Cue Label	Description	Filename	Cue	Notes	Elements
1	A	Preshow Music	Yfpreshow.mp3	House open		
1	B	House2Half	-	House2Half		FadeA
1	C	Preshow Announcement	Yfpsa.wav	AfterH2H		
1	D	Church Bells		Sceneup		
1	D2	Bells-Out		Bell ringer stops ringing		FadeD
7	E	Gong	Gong1.wav	F:"Just that distinction"		
10	F	School Bell	Sbell.wav	St:"THERE IS NOTHING LIKE THE BRAIN"		
12	G	Boat Horn x2	BoatHorn.wav	F:"That's FRONKENSTEIN!!!"		
17	H	Boat Horn	BoatHorn.wav	E:"Tits! Our Tits!" (before "when we're...")		
19	J	Train Whistle	TrainWhistle.wav	Top of scene		
19	J4	Wolf Howl	WolfHowl1.wav	ShM:"verkakte shvade"		
19	J8	Thunder	ThunderYF1.wav	I:"Dr. Frankenstein?"		
23	K	HollowHump	Hump1.wav	Fred pats Igor on hump after "If He Ain't Got a Stooge"		
24	L	TrainExit Sequence	TrainWhistle.wav/TrainExit.wav	I,F:"Together, forever, again!"		L1,L2,FadeL2
26	M1	Whip Crack	Whip.wav	In:"A Hayride!" [visual cue, Igor]		
26	M2	Whip Crack	Whip.wav	In:"Lots of fun" [visual, Igor]		
26	M3	Whip Crack	Whip.wav	In:"Underneath the sun" [visual, Igor]		
28	M7	Wolves	WolfHowl2.wav	In:"Yodel DEE"		
29	M9	Whip Crack	Whip.wav	In:"Roll in the DEE"		
31	P	ThreeKnocks	3Knocks.wav	Ig:"know we're here" [watch for visual]		
31	P5	Frau	Frau.wav	Fr:"Blucher"		
32	P6	Frau	Frau.wav	Fr:"Blucher" middle page		
32	P7	Frau	Frau.wav	F:"After you, Frau Blucher" middle page		
32	P8	Frau	Frau.wav/Gallop.wav	Ig:"Blucher!"		P8.1, P8.2
33	R	Clock Midnight	ClockMidnight.wav	At lights out/scene trans		
35	R7	Frau	Frau.wav	F:"Blucher"		
35	R8	Wolf Howl/Thunder	WolfHowl3.wav	Fred falls asleep		R8.1,R8.2
39	S1	Passage	Passage.wav	Inga pulls candle		
39	S2	Passage Stops		Visual, when setpiece stops		
39	S3	Passage	Passage.wav	Inga puts candle back		
39	S4	Passage Stops		Visual, when setpiece stops		
40	S5	Passage	Passage.wav	Inga pulls candle		
40	S6	Passage Strain	Passage2.wav	Setpiece gets stuck		StopS5
40	S7	Passage end		?		
40	S8	?		?		
40	S9	?		?		
41	T1	Rat Scurry	Rat.wav	F:"It's somewhere nearby"		
42	T4	Lights On/Wolves	Lights1.wav/WolfHowl4.wav	F:"Here goes nothing"		
42	T8	Frau	Frau.wav	F:"Blucher"		

SETTING UP A SOUND SYSTEM

- connections
- phantom, yes or no?
- routing pt A
- gain structure
- processing
- routing pt B



REFERENCES

MORE TO EXPLORE

- "A Basic Introduction to Live Sound Engineering"; <http://www.tiem.utk.edu/~gross/sounden2.txt>
- Pro Audio Files; <https://theproaudiofiles.com/>
- DAVIS, Gary, and JONES, Ralph; *The Sound Reinforcement Handbook*; ISBN: 0881889008
- FRY, Duncan; *Live Sound Mixing*; ISBN: 9996352706
- SLATON, Shannon; *Mixing a Musical*; ISBN: 0240817591