

Recording Your Ensemble

(On a Budget)

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Distinguished Educator

Why Record Your Ensemble?



Assessment

Rehearsals

Practice

Archive

Contests

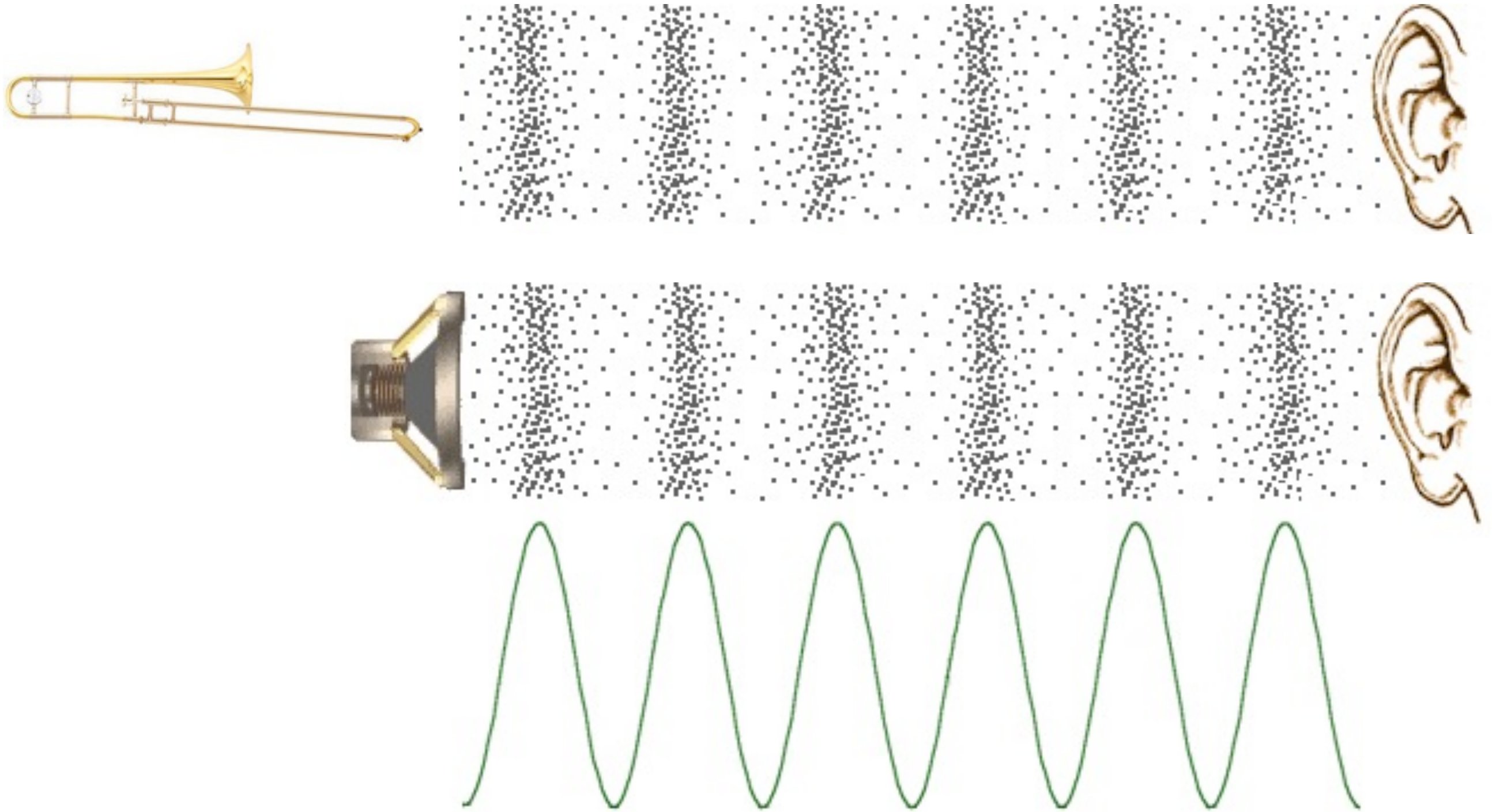
Social Media/PR

Live Performance

Legal Issues

- www.nafme.org/resources/view/copyright-center
- www.harryfox.com/
- www.cdbaby.com/
- www.tunecore.com/

Sound

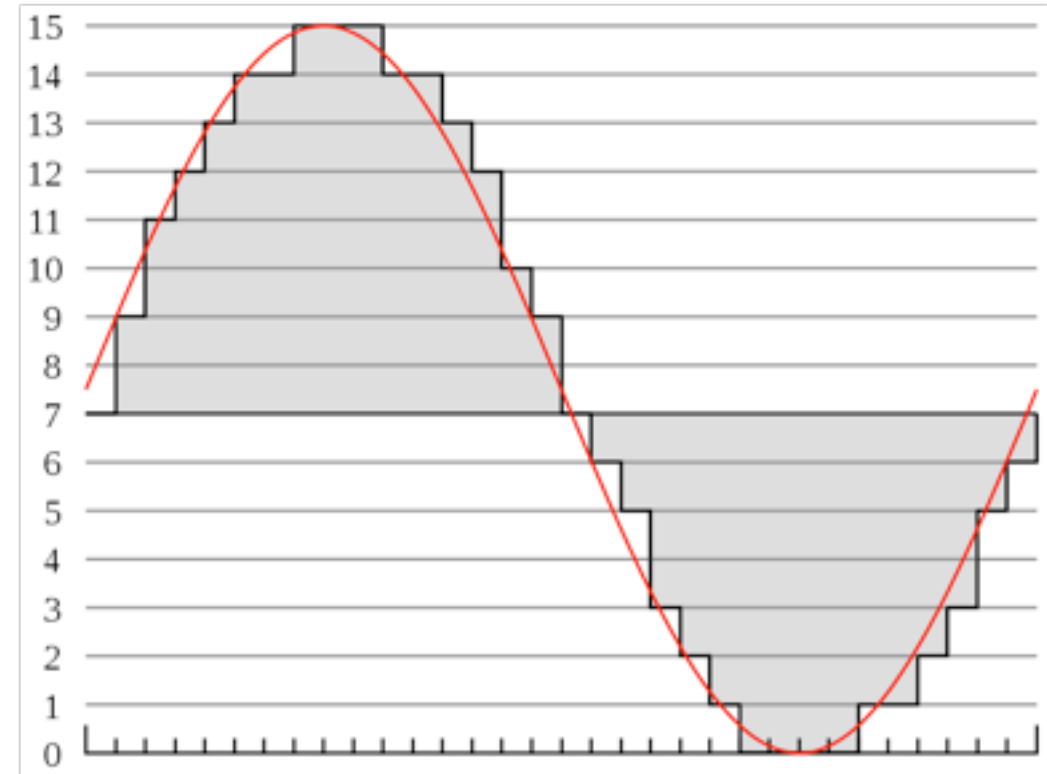
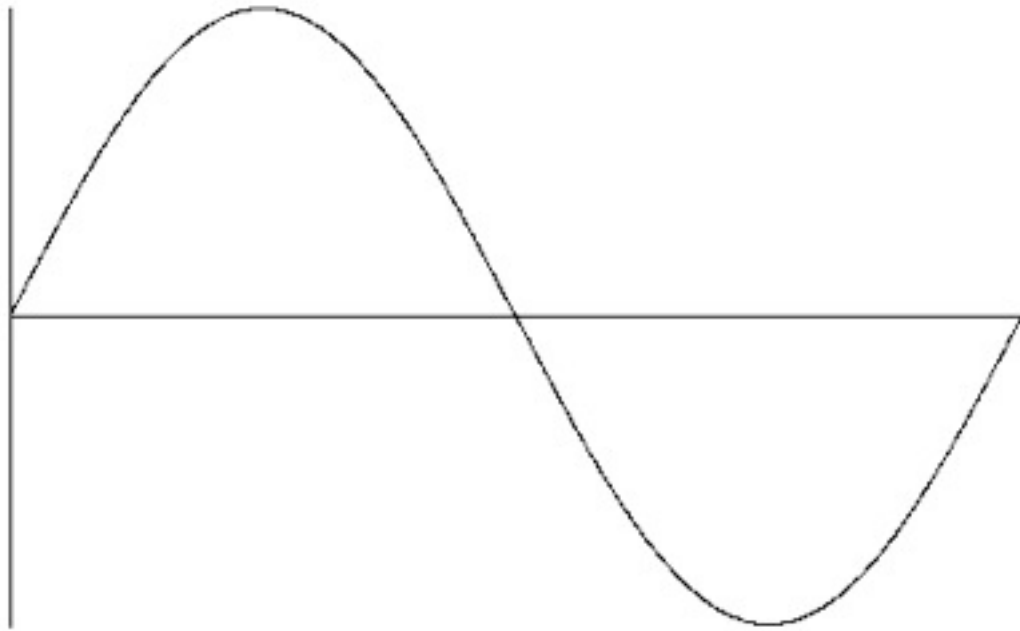


Human hearing range is 20 [Hz](#) (cycles per second) to 20 kHz (20,000 Hz)

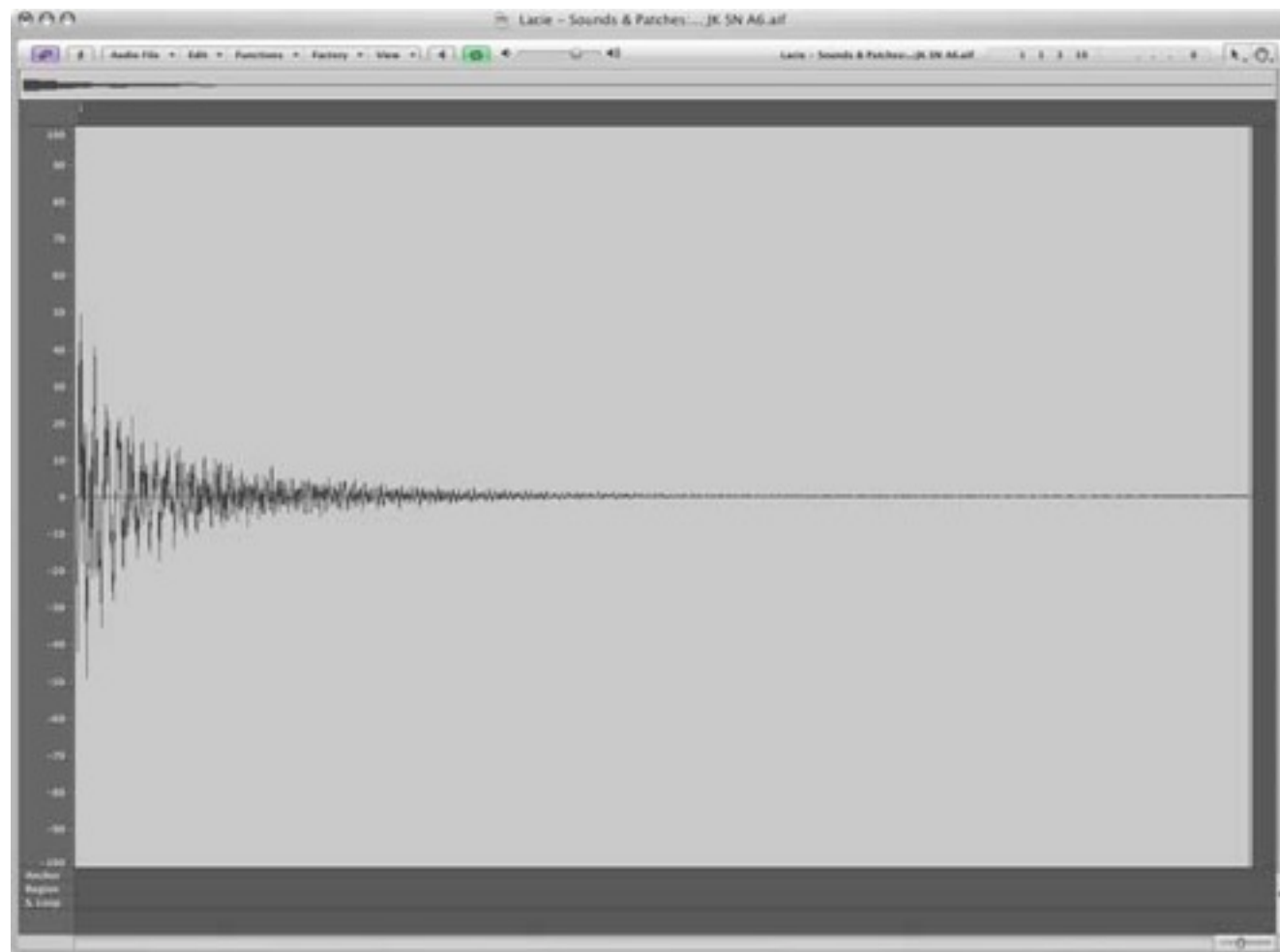


Before the invention of microphones and electrical recording, it was necessary to position the performer(s) directly in front of a large horn. Pictured here is an acoustical recording session of the Victor Orchestra in 1916. The first Victor electrical recording session was nine years later, in 1925.

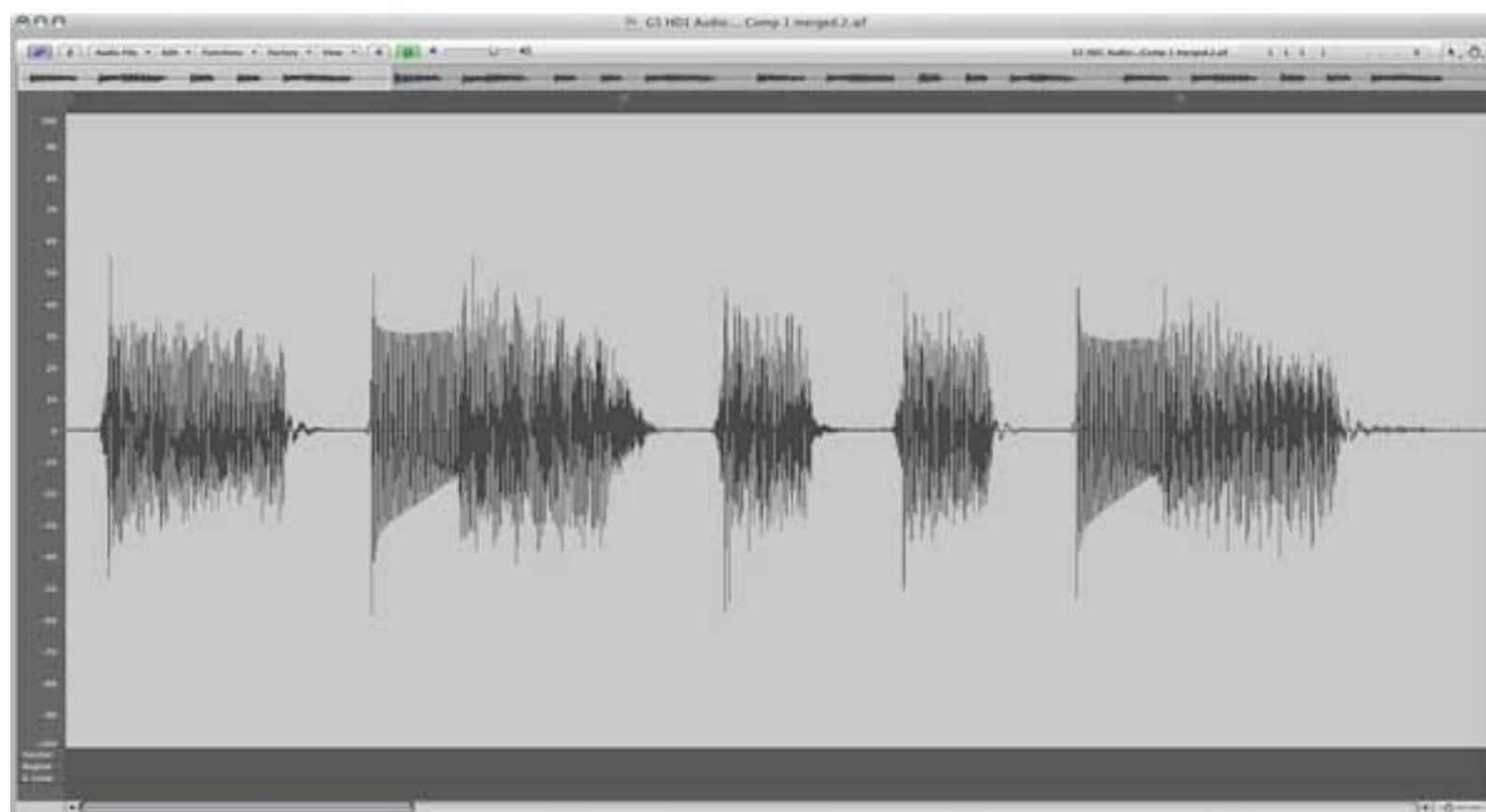
Analog V.S. Digital



Single
Snare Hit



Vocal



Digital Audio File Formats

- AIFF - Audio Interchange File Format
 - 16 bit - 44.1kHz (CD Quality)
- WAV - Waveform Audio File Format
- MP3 - MPEG3
- AAC - Advanced Audio Coding

Bit Depth	Sample Rate kHz	Bit Rate	One Minute Stereo	Three Minute Stereo
16	44,100	1.35 Mbit/sec	10.1 MB	30.3 MB
16	48,000	1.46 Mbit/sec	11.0 MB	33 MB
24	96,000	4.39 Mbit/sec	33 MB	99 MB
mp3 file	128 k/bit reate	0.13 Mbit/sec	0.94 MB	2.82 MB

Recording Hardware

- Single-tasker
 - Dedicated Digital Recorder
 - Portable/Handheld, Tabletop, Rack Mount
- Multi-taskers
 - Smartphone/Tablet
 - iPhone/iPod/iPad
 - Computer
 - Laptop, Desktop
- Accessories

Good



\$

Better



\$\$

Best



\$\$\$

SD Memory Card (Secure Digital)



6 Hours 46 Minutes @ 44.1 KHz / 16 bit



Tascam DR-05



Yamaha Pocketrak C24



Zoom H1

Alesis VideoTrack





Zoom H2n



Yamaha Pocketrak W24



TASCAM DR-100mkII



Zoom H4n

Tabletop/Rack-Mount Digital Recorders



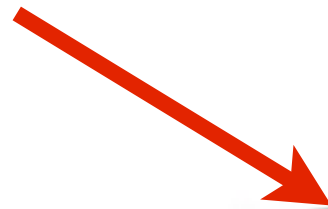
Audio Recording on Smartphones, iOs Devices and iPods

- iPod (Nano/Classic)
- iPhone/iPod Touch
- iPad
- Android



Stereo Mini 1/8" in/out

Audio In/Out



USB

Camera Adaptor Kit



Dock Connector







Belkin Tunetalk Stereo



Blue Mickey



Tascam iM2

Apogee MiC



Sweetwater

Tascam iU2



Features

- For Mac, Windows and iOS Devices
- Two Inputs / Four Outputs
- Delivers 44.1/48 kHz, 16-bit Recording
- Two XLR Inputs with Phantom Power
- Two Balanced Line Inputs
- Instrument-level Input for Guitar & Bass
- MIDI In and Out
- S/PDIF Digital Output
- Onboard A/D Conversion

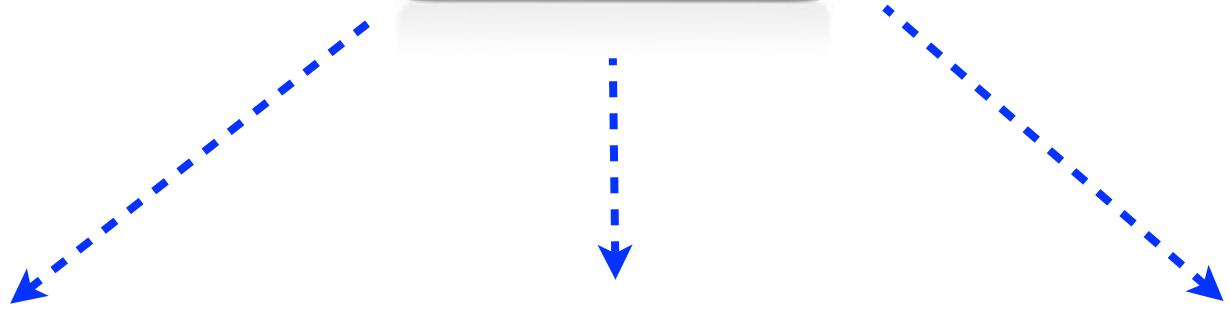


Alesis iO Dock



AirPlay

Wireless Audio
(WIFI)



Airport Express



Apple TV



Airplay Speakers



Logitech Wireless Boombox



Bose Airplay Speaker



Bluetooth Wireless Audio



Belkin Bluetooth Music Receiver



Logitech Wireless Speaker Adapter



Computer

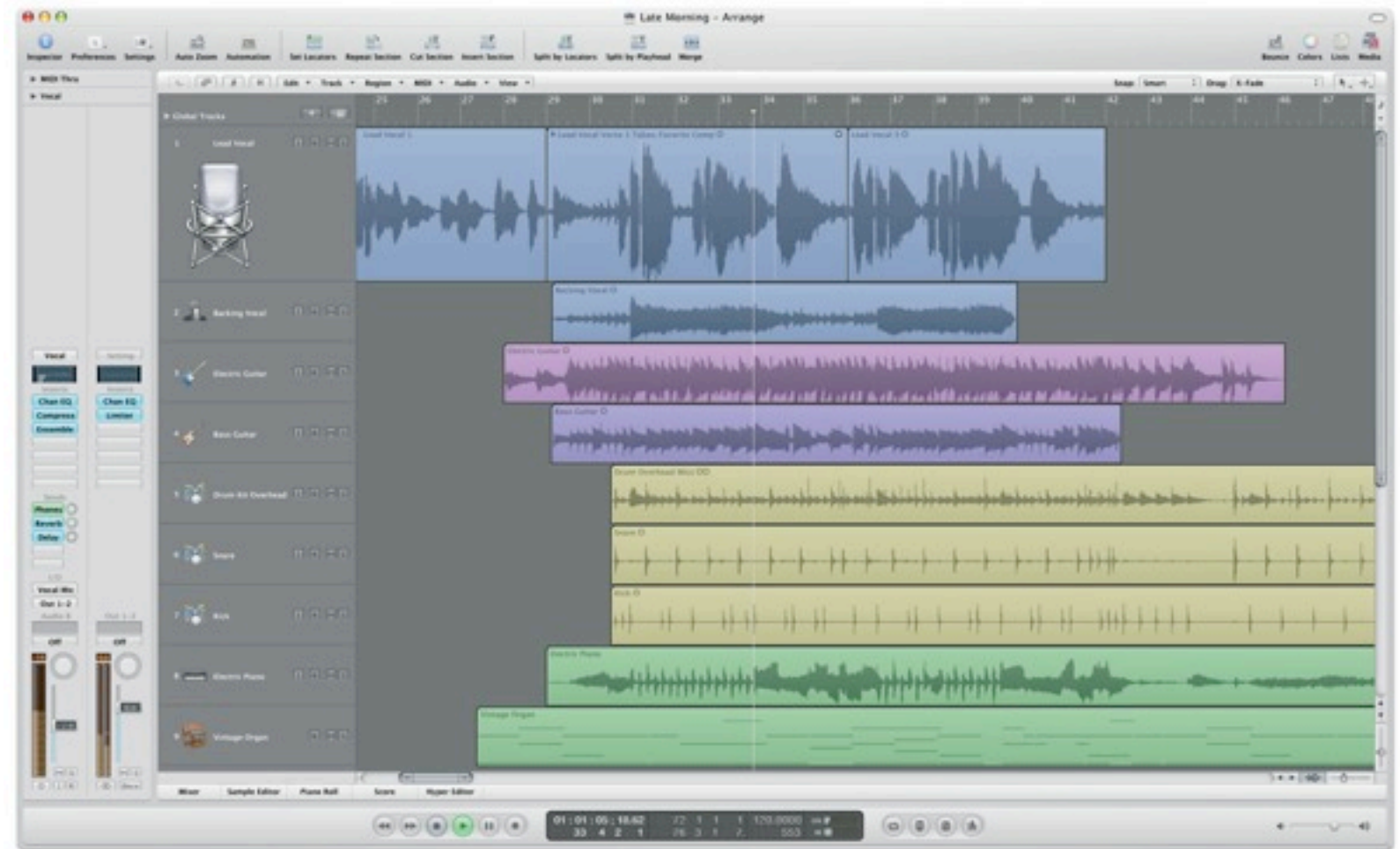
- Laptop
- Desktop



Audio Recording Software

DAW - Digital Audio Workstation

- Mac OS
 - Quicktime
 - Garageband
 - Logic Studio
 - Digital Performer
- Windows
 - Sound Recorder
 - Cakewalk Sonar
- Dual Platform
 - Audacity (Free)
 - Cubase
 - Pro Tools



Avid - Pro Tools



Pro Tools SE

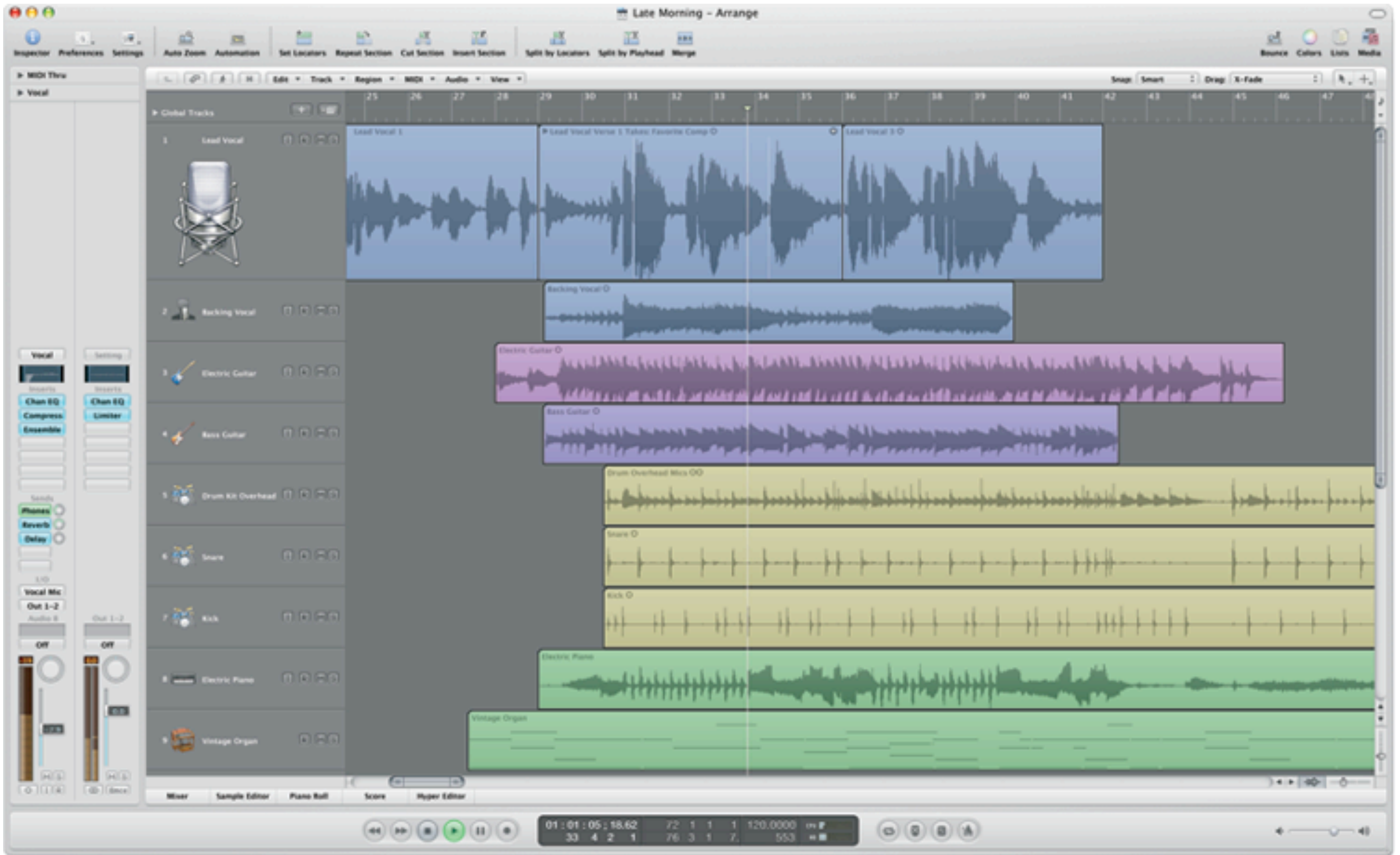
The screenshot displays the Pro Tools SE interface in 'Edit: Soundtrack' mode. The top menu bar includes 'Pro Tools SE', 'File', 'Edit', 'Track', 'Options', 'Window', and 'Help'. The main workspace is divided into several sections:

- Top Bar:** Shows the cursor at 1 | 1 | 000 and the nudge at 0 | 1 | 000. Playback controls are visible on the right.
- Left Panel:** Contains 'Bars|Beats' (1-13), 'Tempo' (120), 'Markers', 'Movie' (with a video clip 'OurNatureAdventure'), and track controls for 'Drums' (60s Drum Kit 01), 'Piano' (Piano-1-01), and 'Guitar' (E Gtr, Clean [M]).
- Center:** Shows the video clip and three audio tracks: '60s Drum Kit 01' (blue waveform), 'Piano-1-01' (yellow piano roll), and 'Chilled Electric Guitar 11' (blue waveform).
- Right Panel:** The 'Guitar' effect rack is open, showing three effects:
 - EFFECT A:** Guitar Amp (Stock) with parameters: PRE-AMP (48.0), PUNCH (0.0), CRUNCH (82.0), DRIVE (39.0), LOW (53.0), HIGH (63.0).
 - EFFECT B:** Dynamic Delay (Spin Delay) with parameters: SYNC (checked), DELAY (4), FEEDBACK (83%), ENVFBK (-100%), MIXMOD (0%), MIX (31%).
 - EFFECT C:** Reverb (Room) with a LESSMORE reverb knob set to 0.0 db.
- Bottom:** A piano roll for the 'Piano' track showing a melody in 4/4 time with a velocity lane below it.

Garageband



Apple Logic Pro 9





Samson Go Mic

Sweetwater

USB Adaptors



USB Mics



- USB/Firewire

- Apogee

- M-Audio

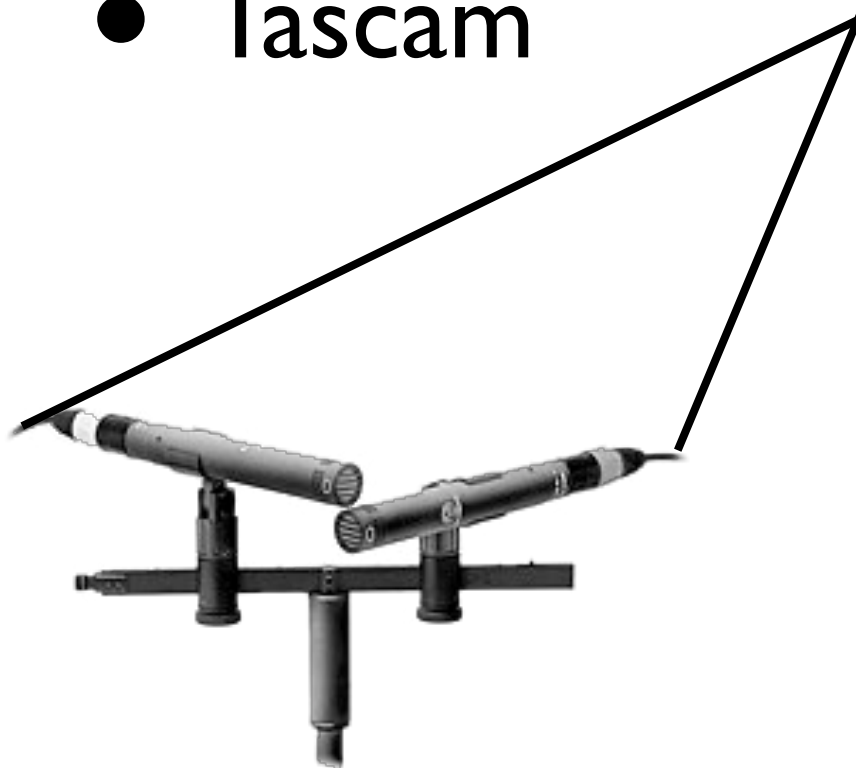
- Mackie

- MOTU

- Tascam



Audio Interface





Apogee Duet



External Hard Disc

7200 RPM

Firewire 400/800

Thunderbolt

eSATA

USB 2/3

Bus/Self Powered



Other World Computing
Mercury Elite-Pro

Microphones

- Condenser (Phantom Power)
 - Large Diaphragm
 - Small Diaphragm
- Dynamic



One Point Stereo Mics



Matched Pairs



AKG C1000



Rode NT5



Ultimate Support TOUR-T-TALL-T Tripod Mic Stand



On-Stage Stands SMS7650 Studio Boom



K&M Stereo Mic Bar

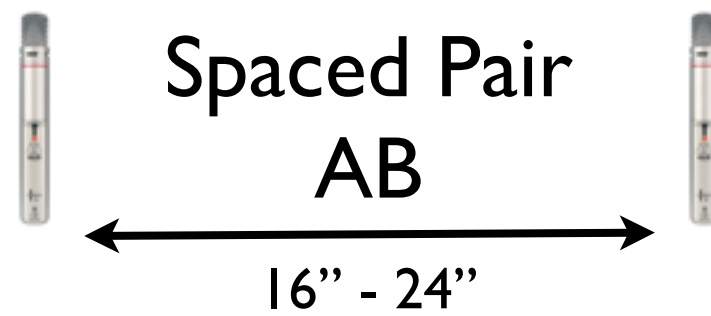


Grace Design Stereo Mic Positioning System

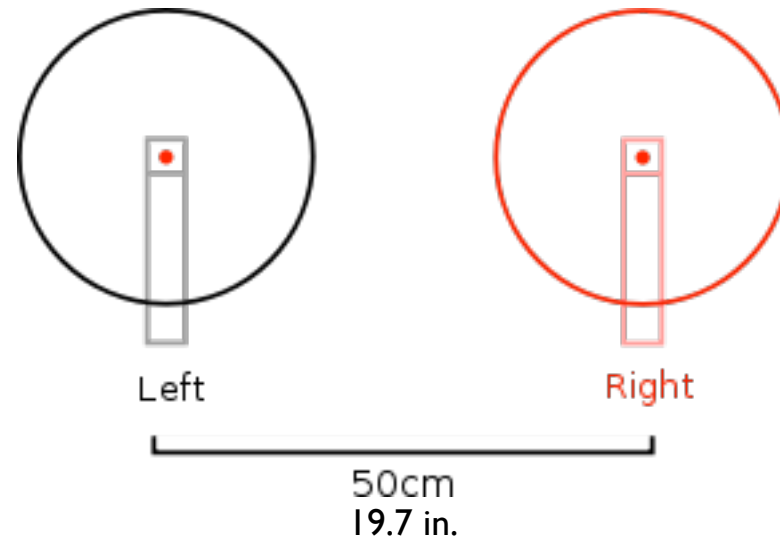
XLR Cables



Microphone Placement



A - B Spaced Pair



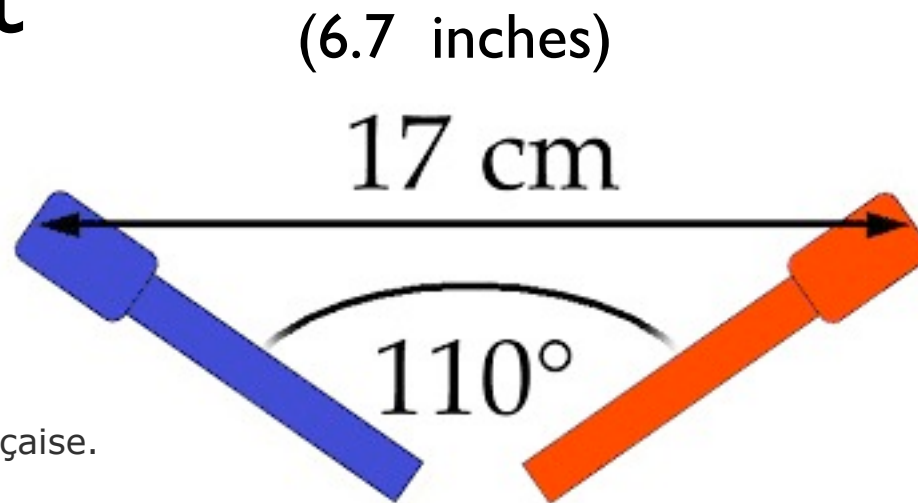
Coincident

XY



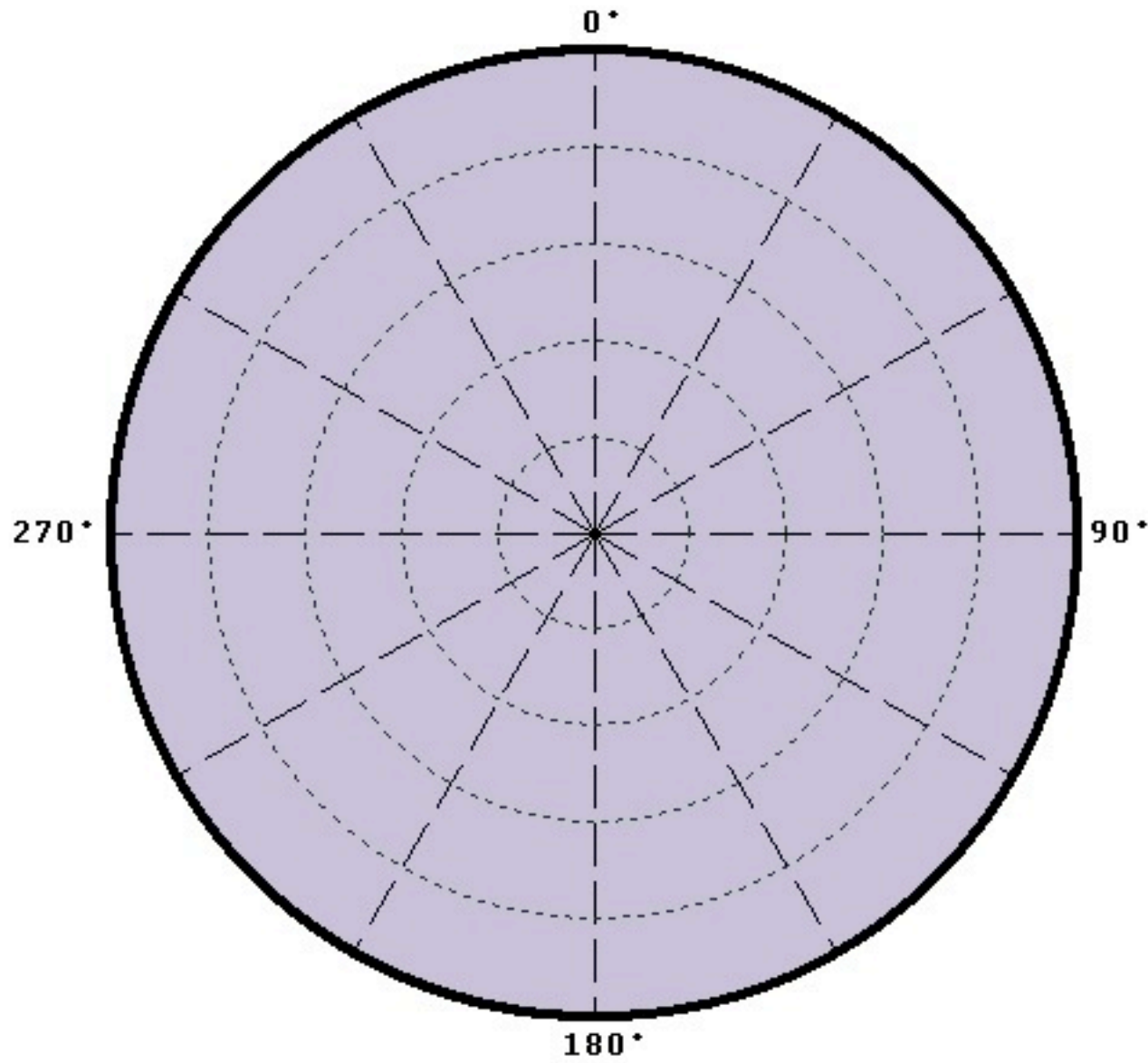
Near Coincident

ORTF

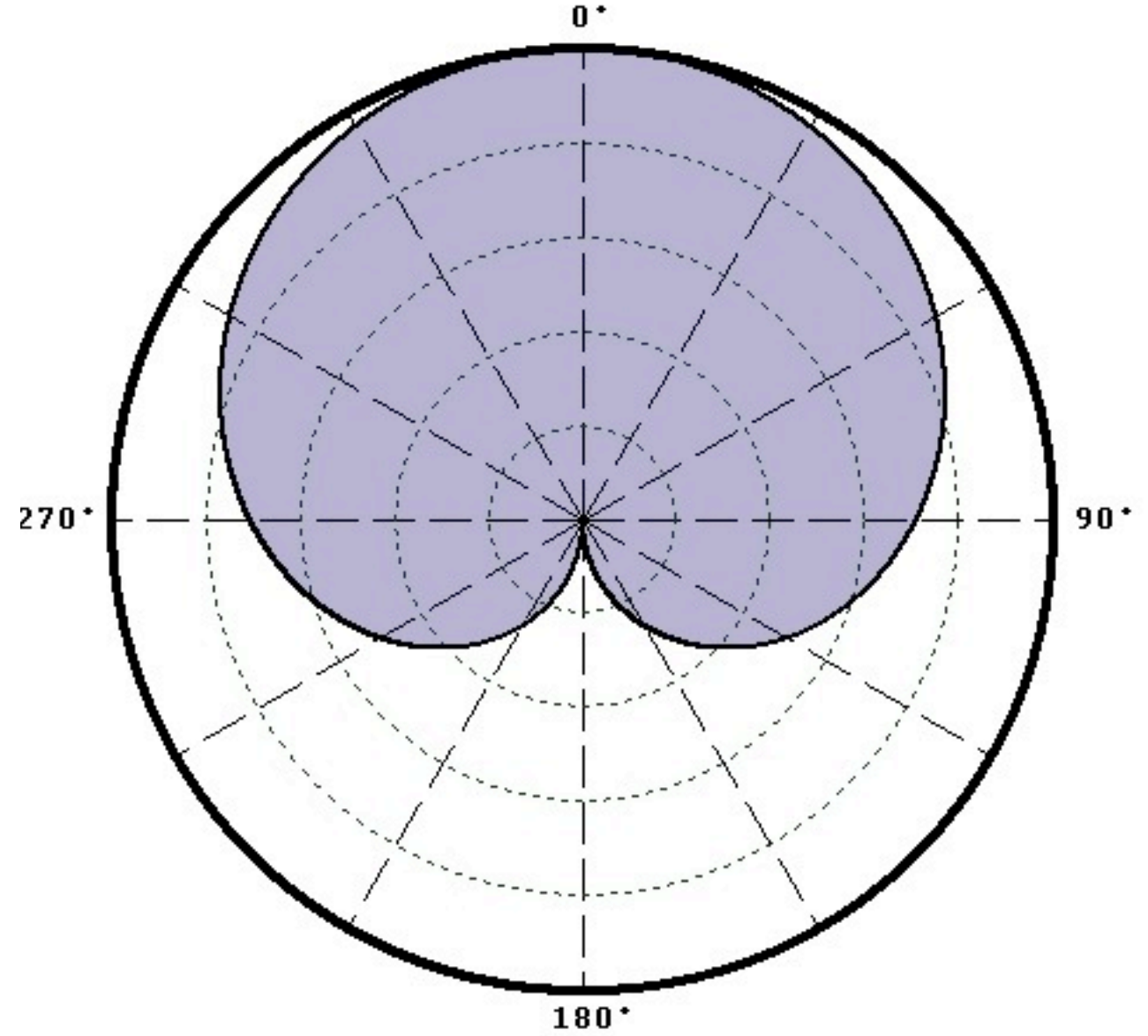


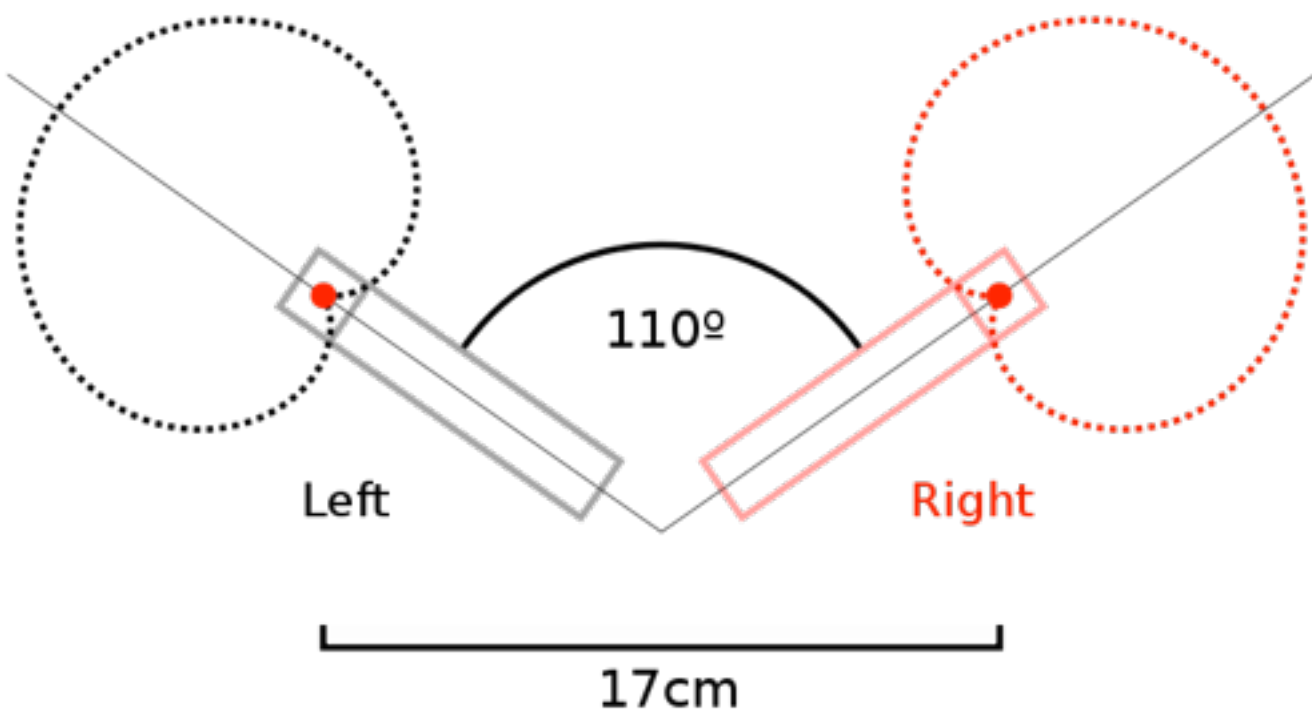
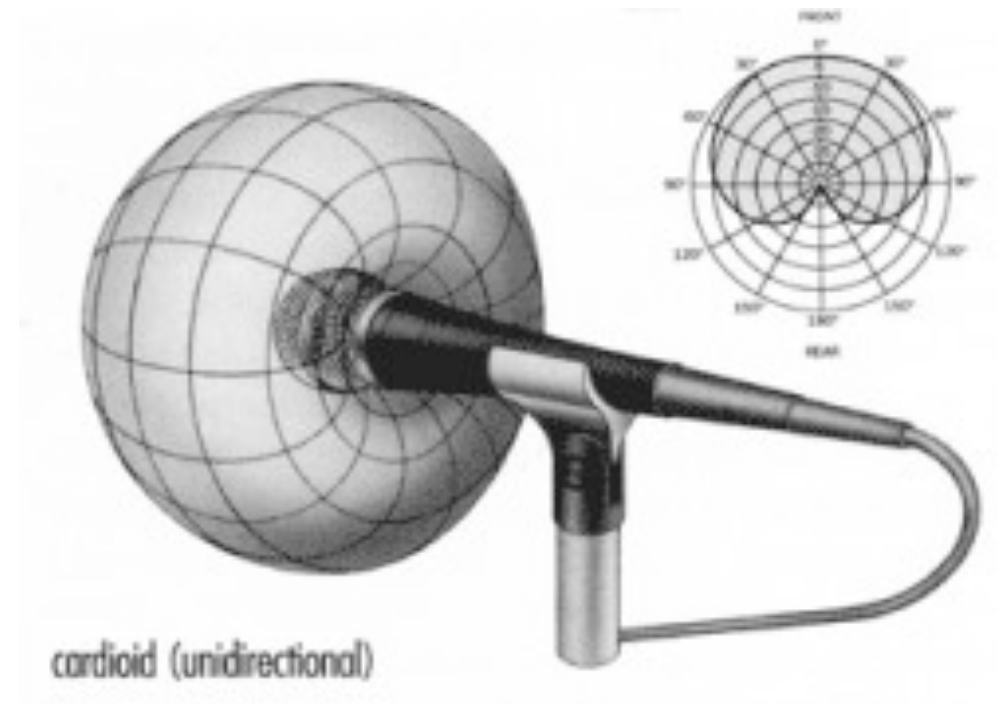
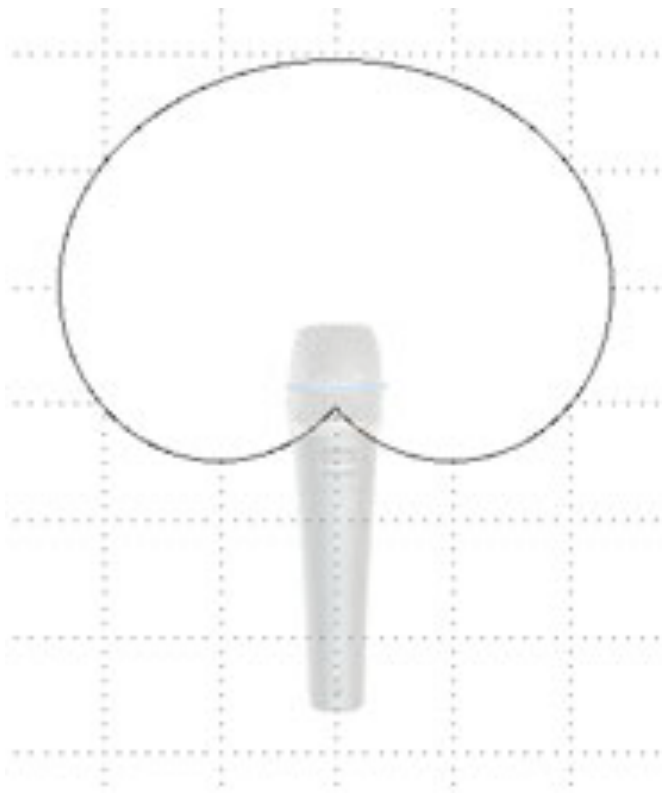
Office de Radiodiffusion Télévision Française.

Omnidirectional

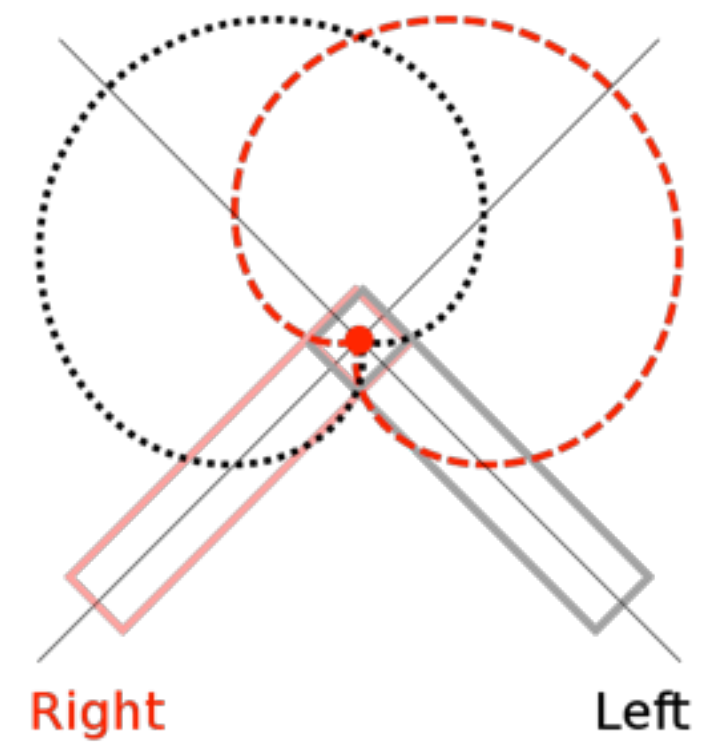


Cardioid





ORTF



XY

ORTF



XY



XY

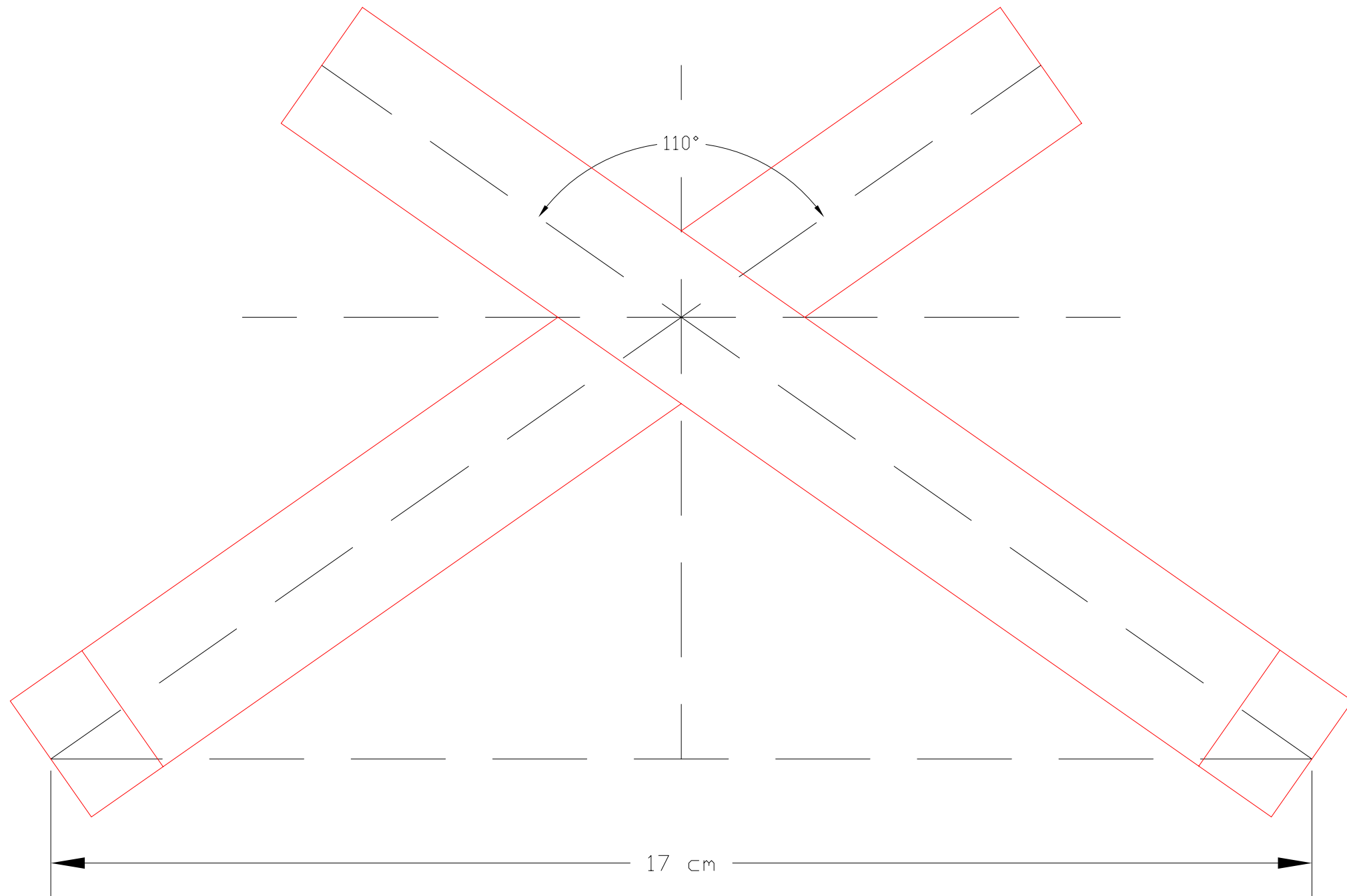


ORTF



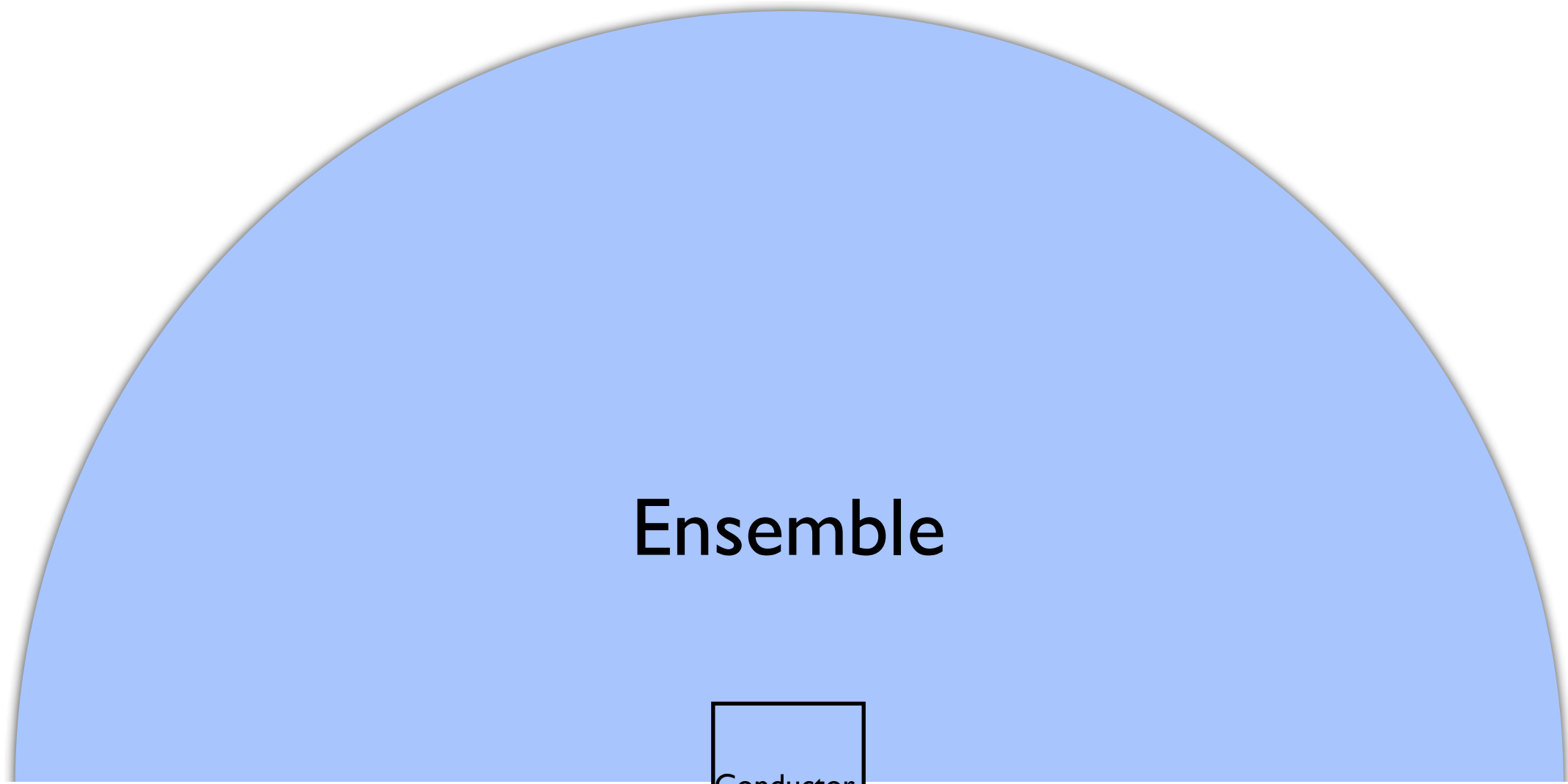
Sweetwater

ORTF Template

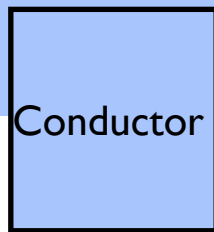


Binaural Recording





Ensemble

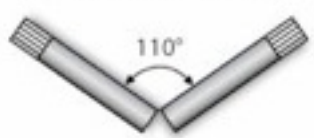


Conductor

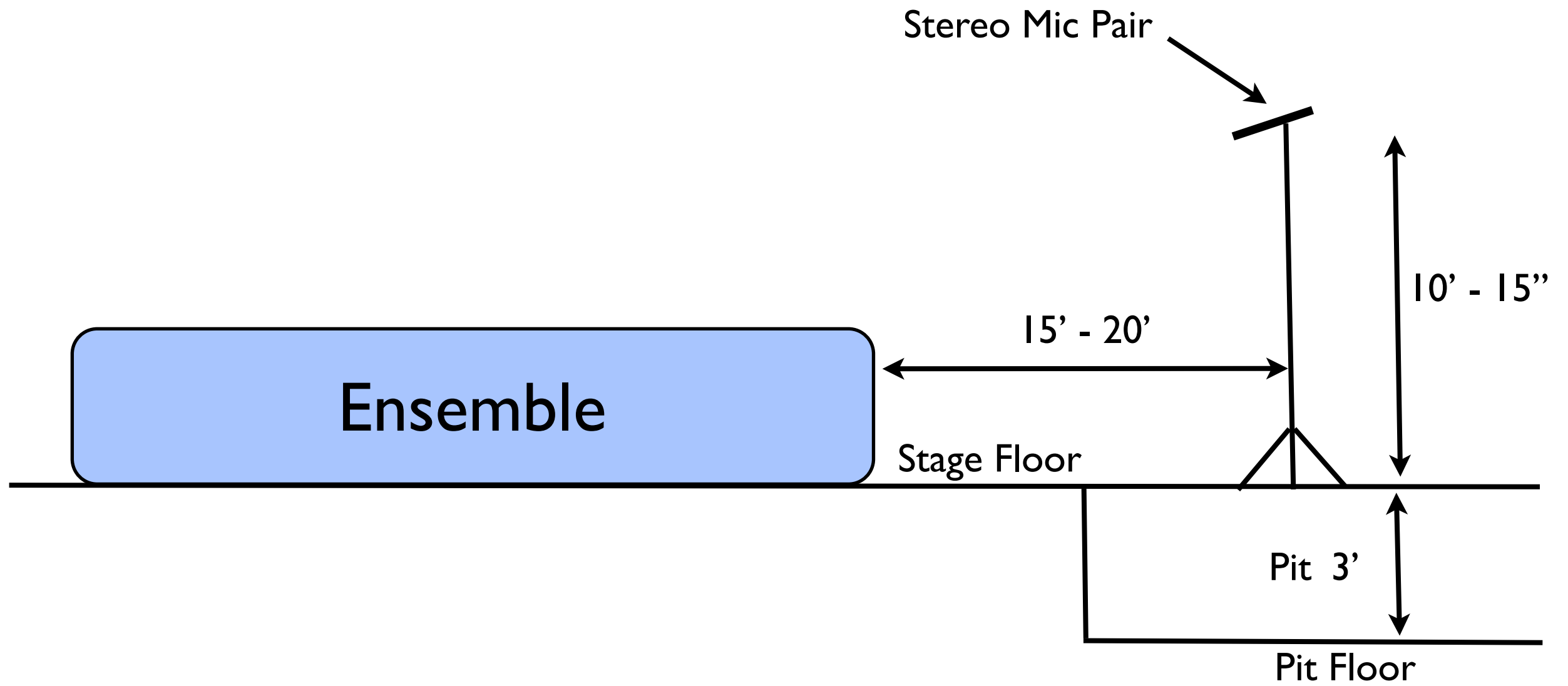


15' - 20'

17 cm (6.69 inches)



110°



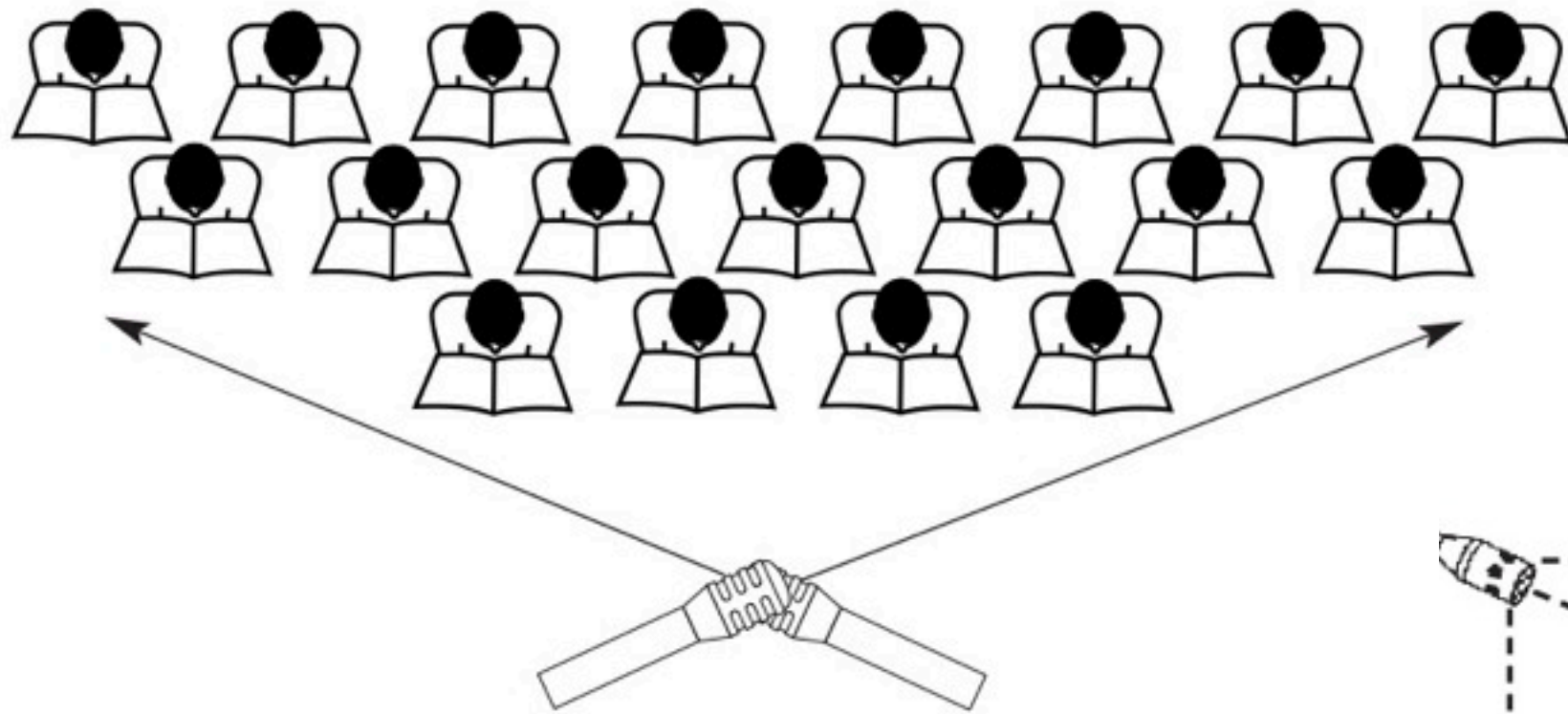
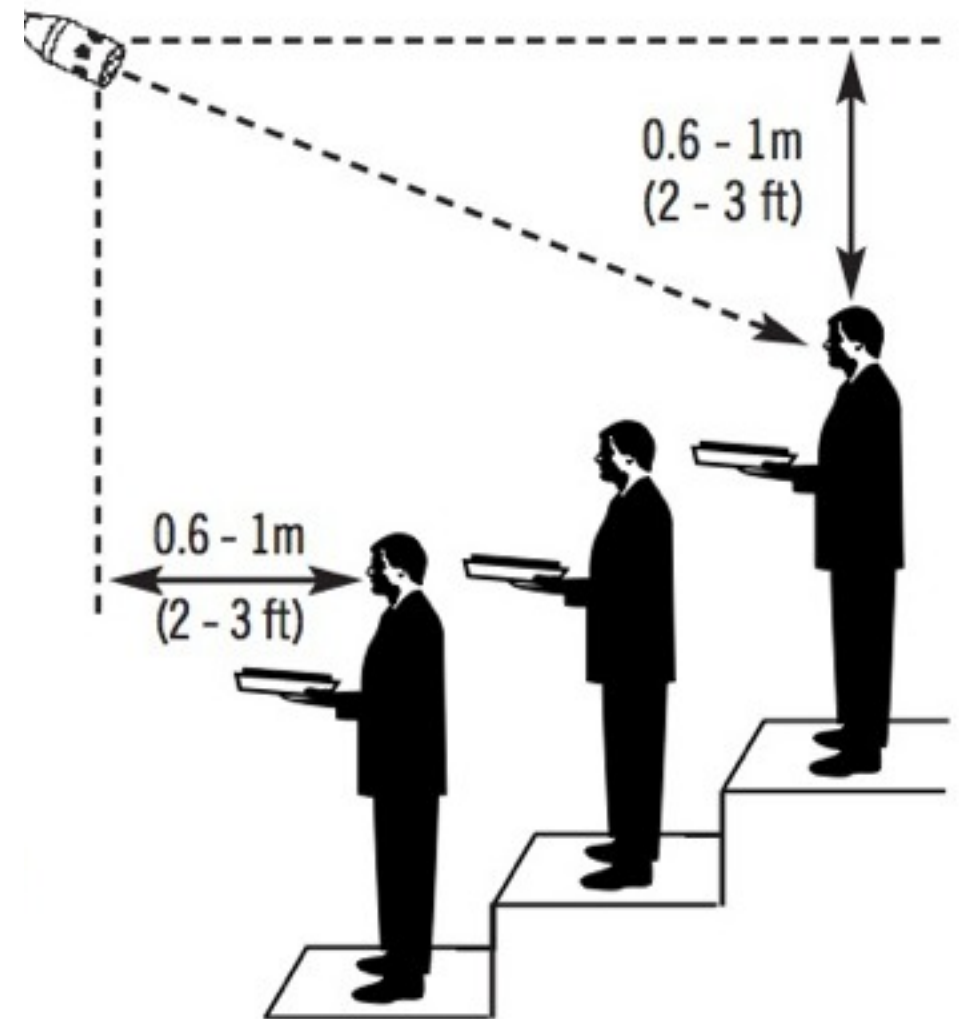
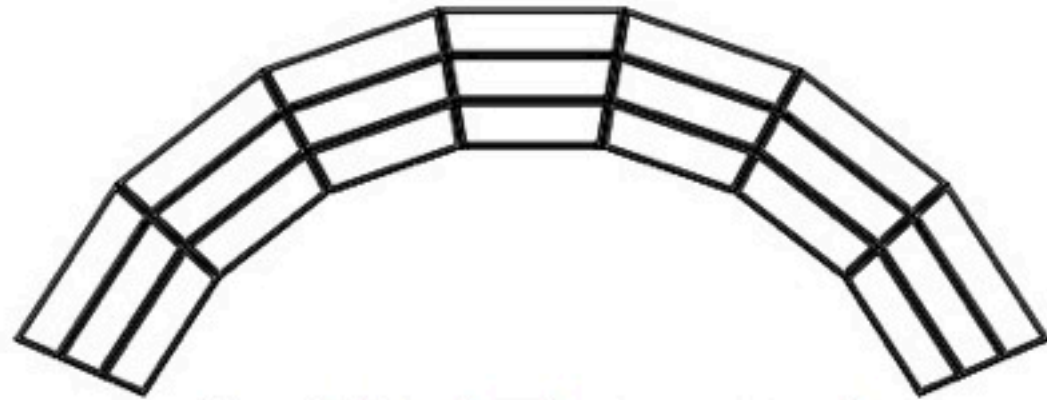


Figure 1: Choir microphone positions - stereo top view



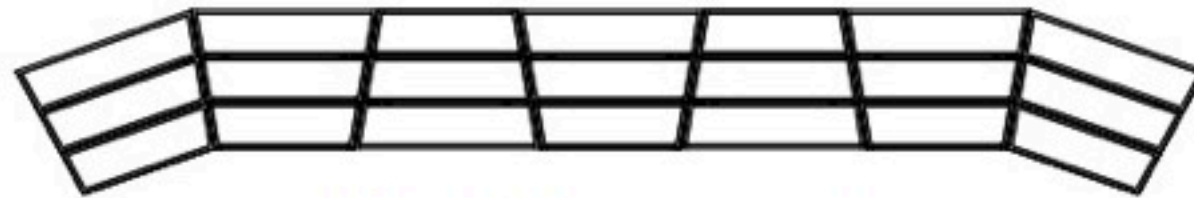
Microphone positions - side view



**Semicircular Arrangement
Set Up Type A**



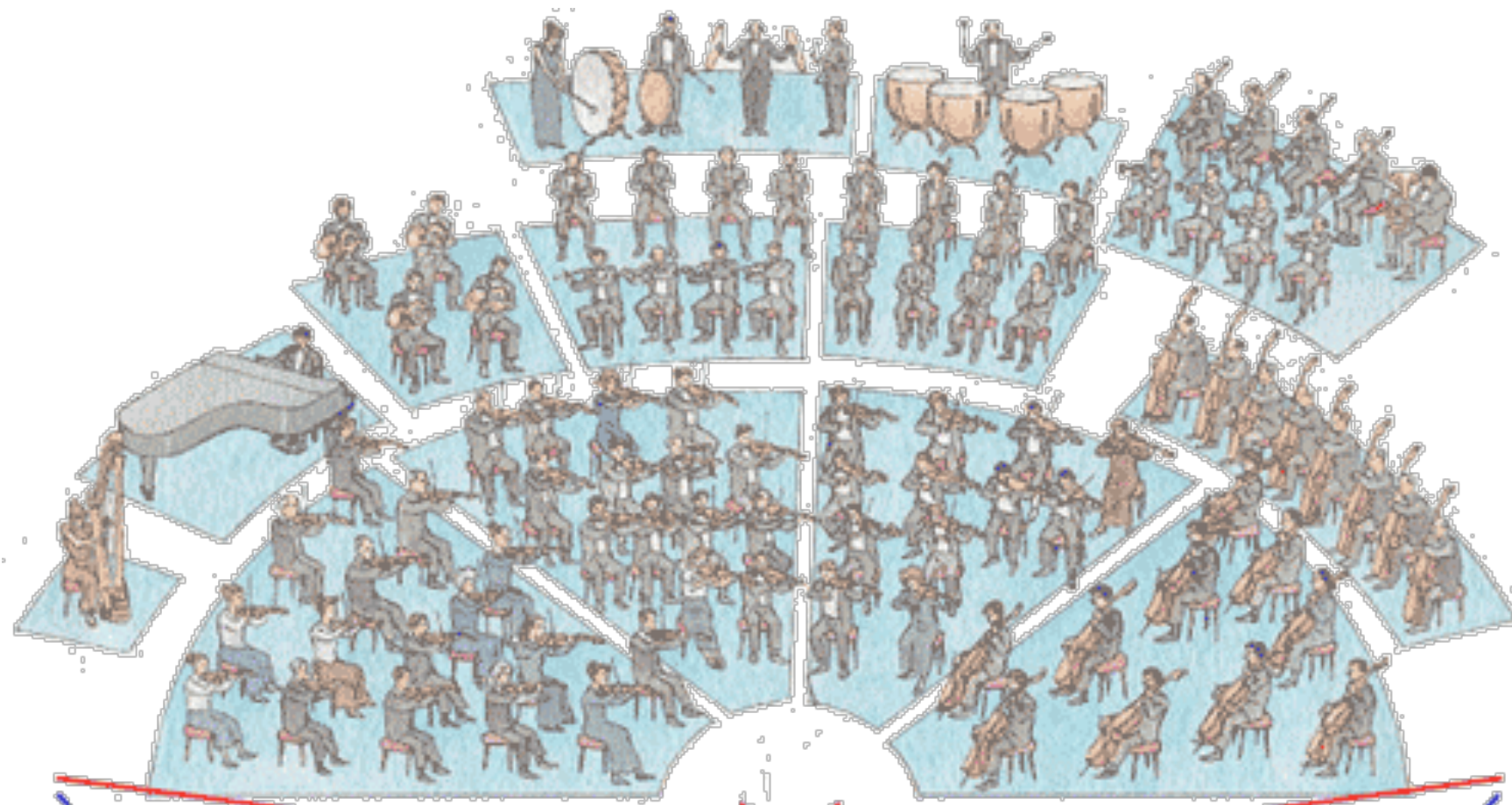
**Horseshoe Arrangement
Set Up Type B**



**Winged Arrangement
Set Up Type C**



**Straight Arrangement
Set Up Type D**



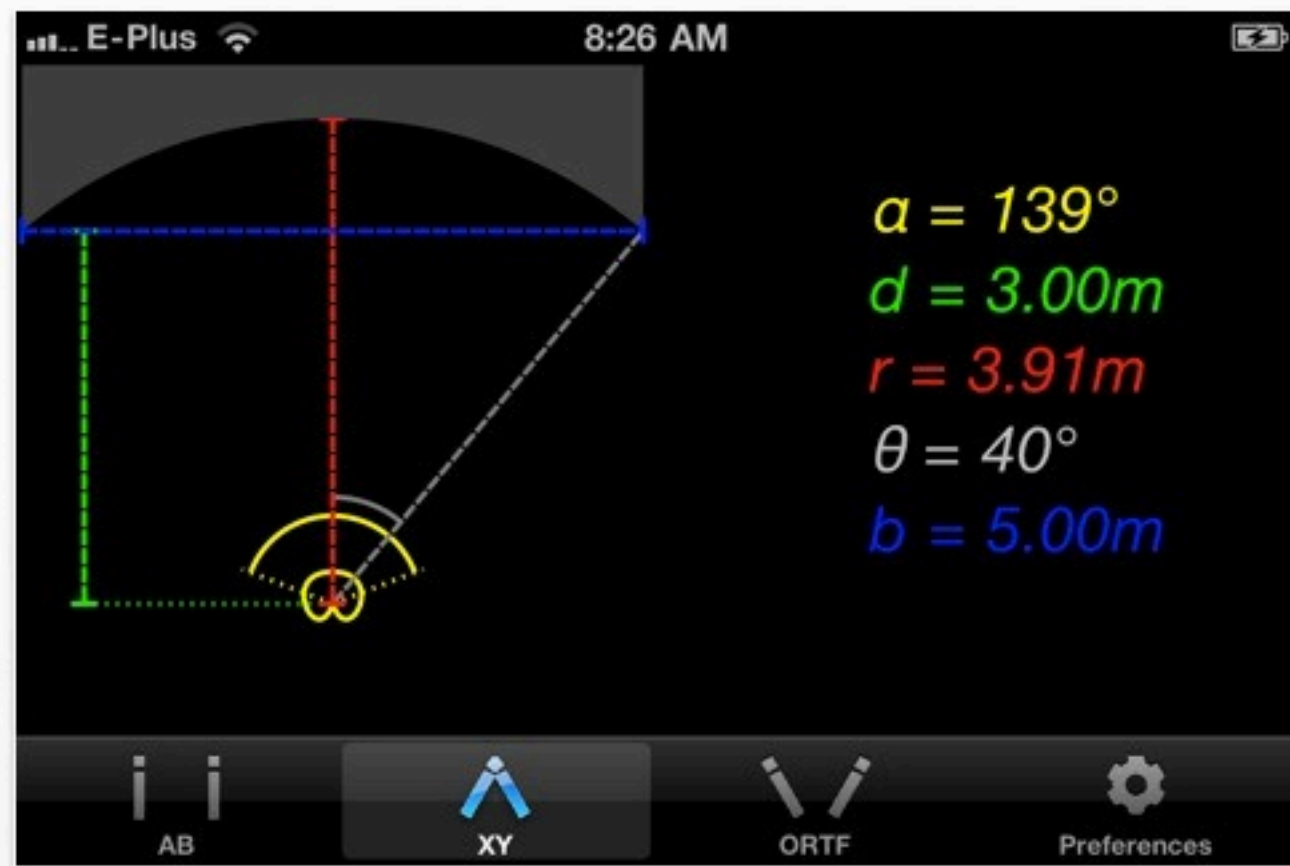
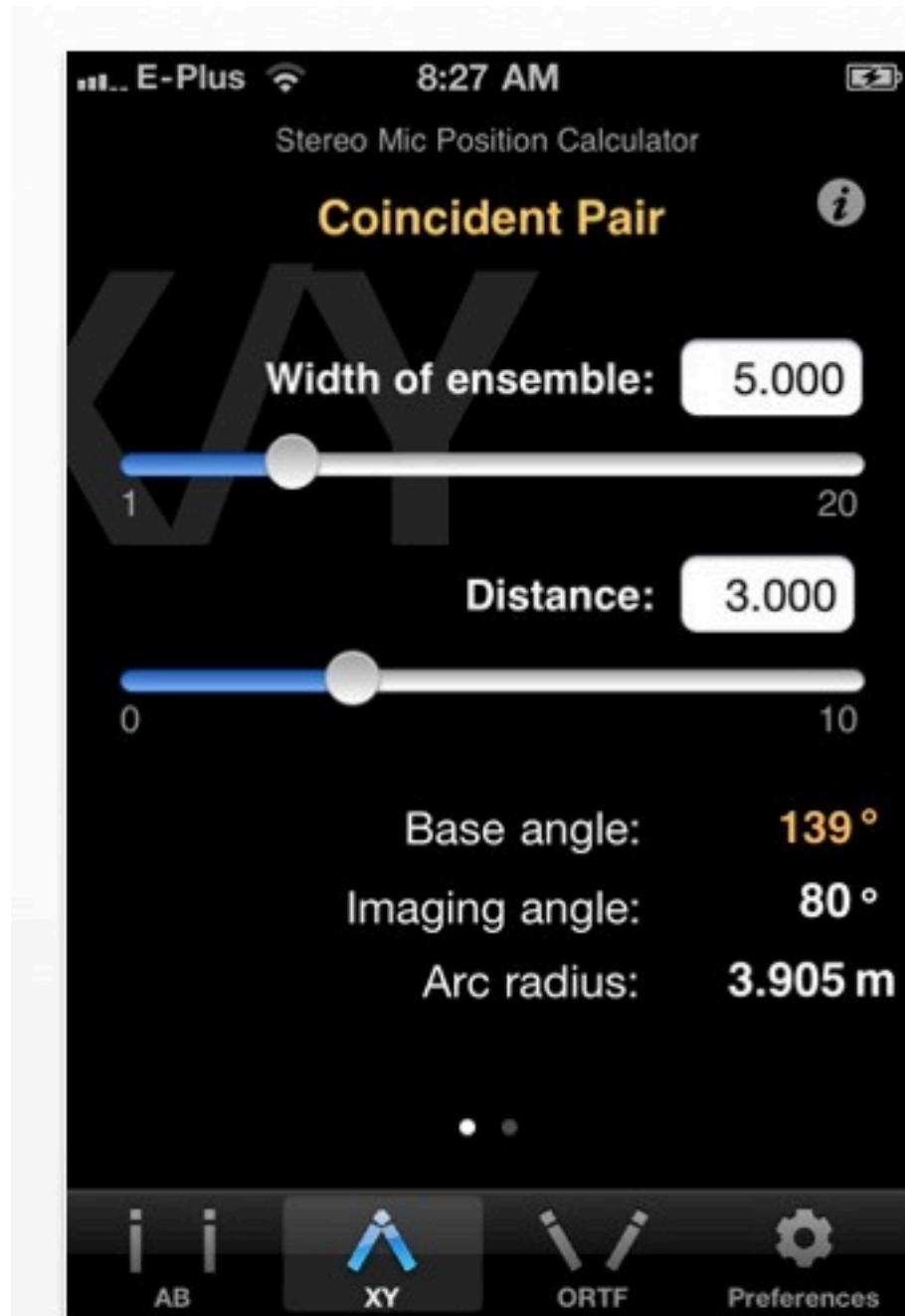
Conductor's Position
(wide stereo image)

Wider Stereo Image

Audience's Position
(narrow stereo
image)

Narrow Stereo Image
More Audience/Ambient Sound

Stereo Mic Position Calculator







NAME National Association
for Music Education

Wednesday, December 5, 2012





Wednesday, December 5, 2012

Spaced AB Pair

XY Pair

Text





Stereo XY Pair





Audio Comparison

Audio samples contain a passage from Danmark,
nu blunder den lyse nat,
composed by Oluf Ring,
written by Thøger Larsen.

Performed by Danish National Vocal Ensemble.

Conducted by Michael Bojesen.

The choir is positioned with mixed voices.

88,2 kHz / 24 bit

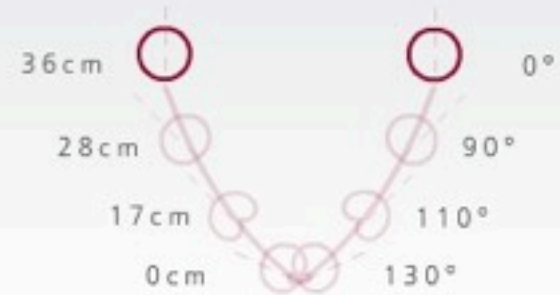
AB

XY

ORTF



AB 2x MK 21 ORTF XY



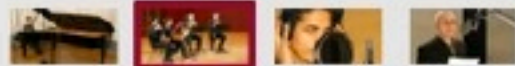
The quartet was recorded with four different stereo pairs. Distances and angles of the capsules were chosen in each case so that stereophonic directionality would be conveyed to the same degree, but other sonic characteristics depend on the type of miking.

- Equipment used:
- Stagetec Nexus preamps and converters
 - Magix Sequoia 9
 - No equalization, reverb or compression

Behind The Scenes



Norbert Kleber



Piano Ensemble Singer Speaker

INTERACTION INFORMATION

MK 25 MK 2H MK 21 MK 21H MK 22 MK 4 MK 4V



Credits

English
Deutsch
Français

<http://www.schoeps.de/showroom/?URL=showroom>

Over Ear Headphones



Wind Screen



Pop Filter



Gaffer Tape



Cable Floor Covers



Preparation for Recording

- Start with new/fully recharged batteries
- Format Memory Cards/ Erase External HD
- Restart Computer
- Test and Monitor Levels/Signal Strength
 - ALC - Automatic Level Control
 - -20dB
- Start/Stop - Continuous
- Start Early - End Late
- Redundancy (Laptop and Handheld)

Editing

- Normalize / EQ / Mastering
- Song/Track
- Audience Applause/Fade
- Splice/Punch/Overdub
- Time Stretch/Transpose
- Compression (MP3, AAC)

Playback Media

- iPod/iPhone
- Stereo System/P.A.
- Computer
- CD/Flash Drive

Listening

- Playback
 - Speakers (Studio Monitors)
 - Computer Speakers
 - Headphones
 - PA System Speakers



Video

- Audio for Video



If all else fails, go to plan B.

What is plan B?

If all else fails, go to plan B.

What is plan B?

Hire a professional.

Questions?

Albert Einstein Quotes

- Computers are incredibly fast, accurate and stupid. Human beings are incredibly slow, inaccurate and brilliant. Together they are powerful beyond imagination.
- Logic will get you from A to B. Imagination will take you everywhere.
- It is the supreme art of the teacher to awaken joy in creative expression and knowledge.





"Life is like riding a bicycle. To keep your balance you must keep moving"

Albert Einstein

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Distinguished Educator

<http://www.dpamicrophones.com/en/Mic-University/Stereo-Techniques/>