

Audio Recording

in the classroom, studio and concert hall

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D'Addario Orchestral Strings



Why record your students?

- ✦ Assessment
 - ✦ Teacher - self and students
 - ✦ Student's self-assessment
- ✦ “Microphones don't lie”
- ✦ Keeping a record of accomplishment
- ✦ Promotion

What & Where

- ✦ Classroom rehearsals / Private Lessons
- ✦ Concerts & Recording sessions
- ✦ Individual Performance Evaluations
- ✦ Audition recordings
- ✦ Home – for student study, listening, play/sing along

Recording Devices

- ✦ **Handheld Digital Recorders**
- ✦ Phones & Tablets
- ✦ Computer (hard disk)
- ✦ CD Recorders
- ✦ Other recorders



Basic Principles of Recording

- ✦ Live stereo recording
- ✦ Acoustical Terminology
 - ✦ Hertz (Hz)
 - ✦ Frequency Range
 - ✦ at birth human hearing is 20 – 20,000 Hz
 - ✦ Double Bass open E string = 41 hz
 - ✦ Decibel/SPL

Studio Equipment List

Listed in order by the signal flow:

- ✦ Microphones
- ✦ Microphone Stands
- ✦ Microphone Cables
- ✦ Mixer/Microphone Pre-Amp
- ✦ Patch cables
- ✦ Recording Device(s) and media
- ✦ Surge protector/power conditioner

Microphones

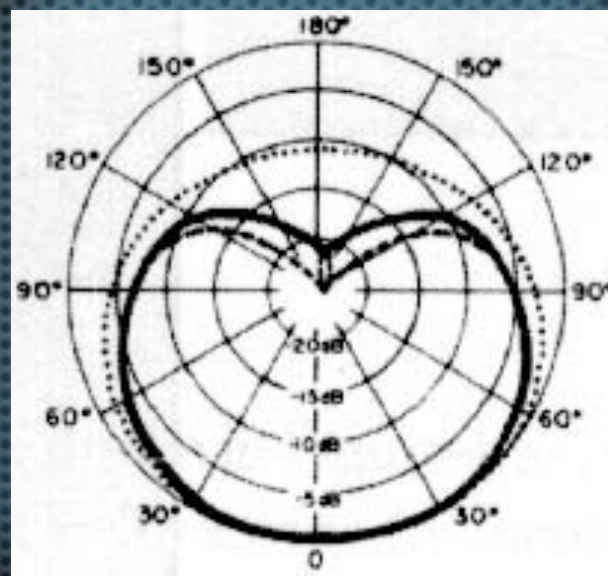
- ✦ Choosing the correct type
 - ✦ Dynamic
 - ✦ Condenser
- ✦ Polar patterns – cardioid (unidirectional), omnidirectional
- ✦ Stereo microphones



Cardioid Pattern Mic

- ✦ Picks up sound from the front of the microphone

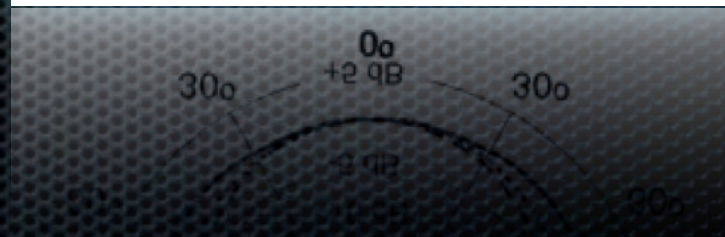
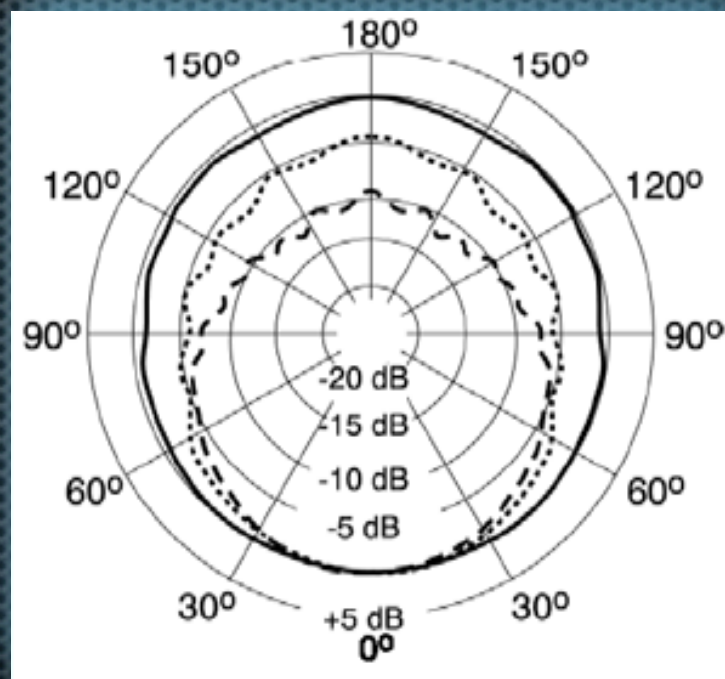
Back



Front

Omnidirectional Pattern

- ✦ Picks up sound 360 degrees (sphere)
- ✦ Not the best choice for most live applications - picks up audience sound



Stereo Microphones

- ✦ Ease of use - “Point and Shoot”
- ✦ May lack stereo spread of using dual microphones (versatility)
- ✦ Usually more expensive than buying a stereo pair of microphones
- ✦ Popular stereo microphones:
 - ✦ Rode NT4, Audio Technica 825, ShureVP88

Mic Stands

- ✦ Recording Individuals
 - ✦ use standard **boom** mic stands
- ✦ Group recording (on stage)
 - ✦ use *very* high stands (10-14 ft)
 - ✦ photography light stands
 - ✦ May require adapters



Cables

- ✦ Use best cables you can afford
 - ✦ Reliability
 - ✦ Signal quality
- ✦ Types
 - ✦ XLR - 3 pin (microphone)
 - ✦ 1/4" plug - Tip Ring Sleeve (patch)
 - ✦ 1/4" plug - Tip Sleeve (patch)
 - ✦ RCA (patch)

Pre-amplifiers/Mixers

- ✦ Dedicated pre-amps
 - ✦ May get better quality sound
 - ✦ More expensive
- ✦ Mixers
 - ✦ Versatility
 - ✦ More common
 - ✦ Less expensive

Handheld Digital Recorders

- ✦ **Many** different models available today
- ✦ Becoming more affordable than ever
- ✦ Options to consider when purchasing:
 - Price (\$99-\$2000)
 - Audio quality
 - Size
 - Battery
 - Storage (media)
 - Input/Output
 - USB
 - Special Features

Recording Devices

- ✦ **Handheld Digital Recorders**
- ✦ Computers (hard drive)
- ✦ CD Recorders
- ✦ Other digital recorders (hard drive, memory cards)
- ✦ Cassette Tape

Steps to Recording

- ✦ Mic placement
- ✦ Cable placement
- ✦ Capture your sound
- ✦ Edit & Master (optional)
- ✦ Duplicate (optional)

Microphone Placement (Individuals)

- ✦ Balance of direct/indirect sound
- ✦ Every instrument has specific places mic sounds best
 - ✦ Strings (generalization) - a few feet in front of the instrument pointing at the f-holes
 - ✦ Experiment to find the sound you like

Microphone Placement (Ensembles)

- ✦ Distance
 - ✦ Room characteristics
 - ✦ Reverb
 - ✦ Ensemble size
- ✦ Height
 - ✦ Generally 6-8 ft. above the conductor's head (this is why you need tall stands)

Cable Placement

- ✦ **Slack** (incase you need to move them)
 - ✦ **Gaff tape** (to avoid tripping on cables)
 - ✦ **AC power** (hum, noise, etc.)
-
- ✦ Be sure to use a good surge protector or power conditioner.

Capturing Your Sound

- ✦ Make all connections are made before applying power to devices.
- ✦ Check levels on mixer. Should be in middle and peak in yellow.
- ✦ Check levels on recording device. Should never hit “the red” to avoid clipping.
- ✦ Rehearsals vs. performances

Capturing your sound

- ✦ Begin recording well before the downbeat
- ✦ Stop recording after applause is over
- ✦ Separate track vs. continuous

Stereo Microphone Techniques

- ✦ Experimentation with different types & scenarios is key
- ✦ There is no perfect microphone
- ✦ There is no perfect stereo technique
- ✦ Some require 2 microphones attached to a stereo T-bar on a single mic stand.

Stereo T-Bar

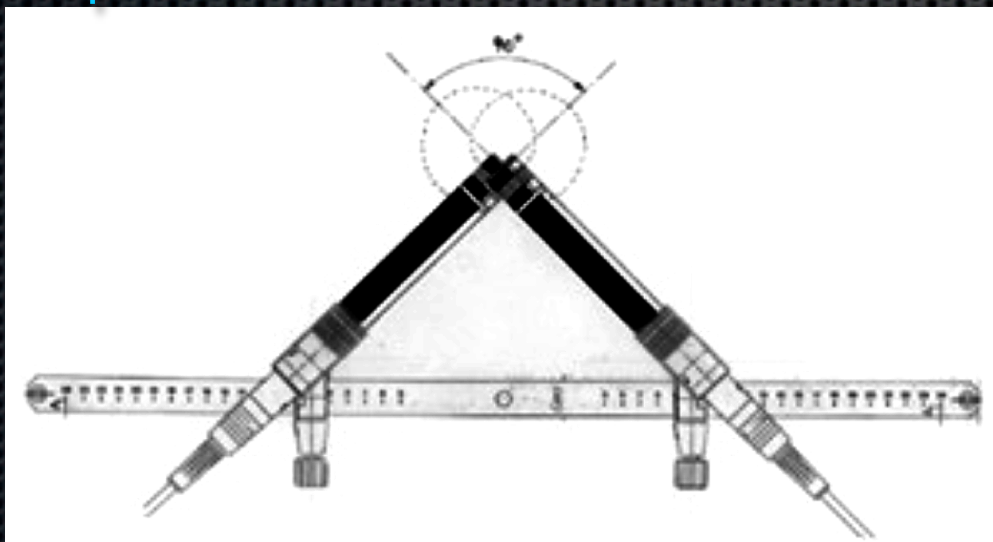
- Holds 2 microphones on a single microphone stand.
- Pictured: Sabra ST2 It has adjustable mic mounts



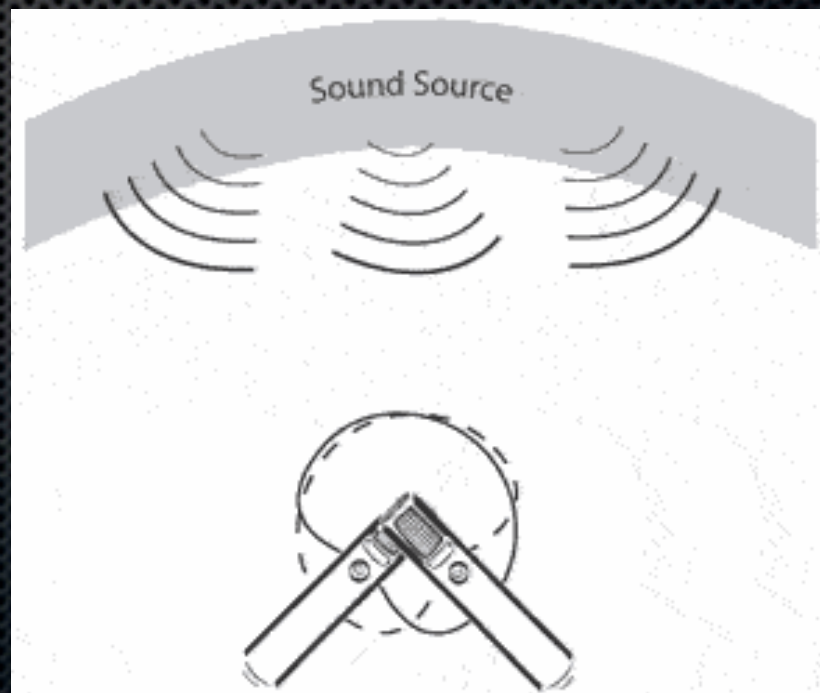
X/Y Stereo

- ✦ Two cardioid mics with center of mic's capsule positioned at 90 degree angles.
- ✦ One on top of the other, **not** touching.

Top View

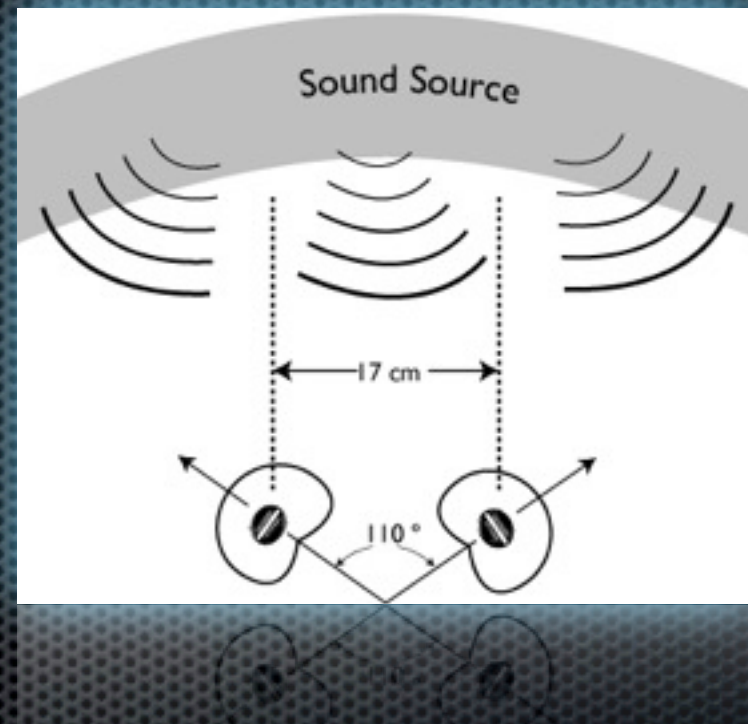
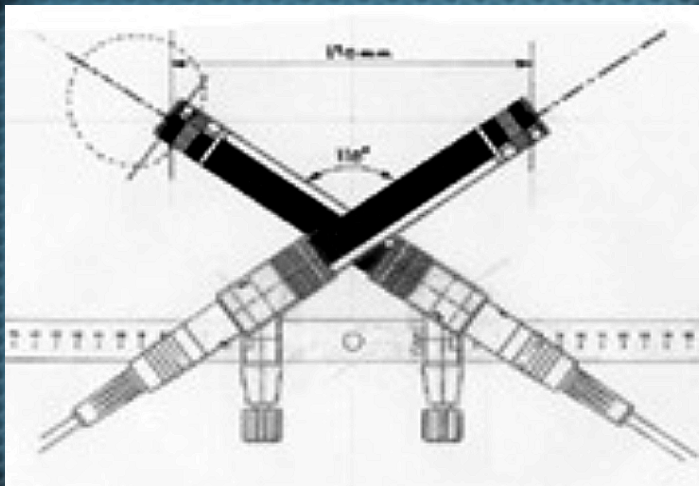


Photos from www.dpamicrophones.com



ORTF Stereo Technique

Top View



- Two cardioid microphones with a spacing of 17 cm (6.7 inches) between the microphone diaphragms, and with an 110° angle between the capsules.

Photos from www.dpamicrophones.com

A-B Stereo

- ✦ 2 cardioid microphones spread apart from each other.
- ✦ Can use a long stereo bar or 2 mic stands.
- ✦ Tricky, easy to mess up
 - ✦ If mics are placed too far apart, your recording will have “a hole in the center”

Stereo Mic Technique Review

- ✦ X/Y - good for smaller groups
- ✦ ORTF - good for larger groups
- ✦ A-B - good for large groups, but can be tricky
- ✦ Other stereo microphone techniques (not discussed today)

- ✦ NOS

- ✦ MS

- ✦ DIN

- ✦ Decca Tree

- ✦ Blumlein

- ✦ Binaural

- ✦ Baffled

Editing Digital Audio

- ✦ Limited editing be done on some recording devices
- ✦ Easiest on the computer with software (Amadeus Pro demo)
- ✦ Cut concert/recital into pieces, one song per file
- ✦ Cue to the start of each piece
- ✦ Fade applause (usually 8-12 seconds)
- ✦ Add 1 second of silence to the beginning and end

Mastering

- ✦ Good classical recordings **shouldn't** need much mastering
- ✦ “Normalize” levels - brings levels to maximum
- ✦ Other possible options:
 - ✦ Remove ambient noise
 - ✦ Add reverb if in a dry room (be tasteful)
- ✦ Competition entries = no doctoring the audio

Duplication

- ✦ Can copy CD's direct from another CD or from files on a computer hard drive
- ✦ Stand-alone duplicators work well too
- ✦ **Read, re-read, and follow all copyright laws!!**
 - ✦ Mechanical licenses (a license to duplicate a copyrighted recording) must be paid for if you are making more than one copy
 - ✦ One copy is permitted for educational use only

Audio Editing Demo

Typical Recording Set-ups

- ✦ Classroom
- ✦ Home Studio or Practice room
- ✦ Concert Hall/Auditorium
- ✦ On the go

Classroom Set-Up

- ✦ Hanging microphones (if possible)
 - ✦ Audio Technica (\$80 - \$300 each)
- ✦ Mixer
 - ✦ Small to medium size
- ✦ Cables can be run over ceiling tiles and down front wall.
- ✦ Your choice of recording device

Concert Hall Set-up

- ✦ Tall microphone stand(s) or installed hanging mics
- ✦ Large mixer (especially if you do live sound)
- ✦ Several recording devices
- ✦ Cabling can be tricky in a fixed installation (may need professionals)

Studio Set-up

- ✦ Single or stereo mic
- ✦ Standard mic stand(s)
- ✦ Small mixer
- ✦ Recording device(s)
 - ✦ computer with audio interface
 - ✦ portable digital recorder

Recording Tips

- ★ Experiment to get the best sound
- ★ Adjust microphone placement
- ★ Ensure levels are optimal without clipping
- ★ Research equipment by asking people about their experiences
- ★ Always record to more than one recording device in a live performance

Special Thanks



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Recording Resources

More information:

www.stringedtech.com

Questions?

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