MICROPHONE USAGE AND TECHNIQUES
STEREO MICROPHONE TECHNIQUES

- Stereo recordings require at least two tracks.

- A recording track is a separate, discrete recording.

- True stereo microphone recordings require a minimum of two tracks & two microphones.

- A stereo recording requires left & right tracks to have some unique information.
COINCIDENT MICROPHONE PAIRS

❖ In a coincident pair, both microphones are as close together as possible.

❖ This technique requires two directional microphones pointing in different directions so that different sound is transduced by each microphone creating a true stereo recording.

❖ Coincident configurations include: XY, Blumlein or Stereosonic & Mid Side or M.S.

❖ Advantages include: Precise imaging (placement of instruments in the stereo field) and excellent mono compatibility (no tonal change with Left & Right are mixed together).
XY COINCIDENT PAIRS

XY Stereo microphone technique:
Two cardioid patterned mics at 90 degrees.
STEREOSONIC OR BLUMLEIN

Two coincident Bi-directional microphones at 90 degrees.

Front

90°

Rear

An example using side address microphones
M.S. (MID-SIDE)

One Cardioid facing toward ensemble (Mid), one Bi-directional facing 90 degrees to the side.
An M.S. pair requires “decoding” to reproduce a stereo signal. This is accomplished by processing the signals from both microphones electronically. The “width” of the resultant left & right patterns can be adjusted.
SPACED PAIRS - AB

- Two microphones separated by a distance from a few inches to several feet equal distance to the center of the sound source.
- Microphones can be any directional pattern.
- Best stereo width, poorest mono compatibility.
- Poor center imaging.
To improve the center image, a third mic is added to the spaced pair.

This mic is fed equally to Left & Right channels usually 3-6db lower in level.
O.R.T.F.

- Two Cardioid mics separated by a distance of 6.7 inches (17 cm) at an angle of 110 degrees.

- A compromise between coincident and spaced techniques.

- Good imaging, wide spacious stereo & decent mono capability.

17 cm ~6.7”

110°
Spaced Omni directional microphones separated by a disk shaped baffle.

The baffle improves the stereo imaging, particularly the center image by using the disk for acoustic shadowing of high frequencies.
BINAURAL

- Intended for headphones listening.
- A system using a dummy head with Omni microphones placed inside the ears.
- Accurate spatial cues produce a sense of being there when listening on headphones.
If two or more microphones pick up the same sound at different times due to being placed at different distances to the sound source and these are mixed together, some frequencies will combine in or out of polarity.

This causes some frequencies in the signal to be reinforced while others are cancelled.
Two microphones are placed so that one is closer to the source.

If both microphones are mixed together at equal level, then, at a certain frequency and corresponding wavelength, when the sound wave picked up by each microphone is opposite in polarity, that frequency in the sound is cancelled.
PINK NOISE EXAMPLE OF COMB FILTERING

Original Noise Signal

Noise Signal with Equal Level 10 ms Delay Added

Frequency Cancellation

Time
THREE TO ONE RULE OF THUMB

The distance separating two microphones should be at least three times greater than the distance to each instrument.

This ensures that any phase canceling delays between microphones are minimized due to the leakage being a much lower level than the intended source.
REDUCING “LEAKAGE”

- Move microphones closer to source
- Separate instruments
- Isolation rooms
- Baffles or Gobos
REDUCING LEAKAGE

Microphones Moved Closer to Reduce Leakage

Baffle or Gobo Separates Instruments to Reduce Leakage

Instrument 1

Instrument 2

Baffle or Gobo 4’ X 4”
CHOICE OF MICROPHONE(S)

- Sonic aesthetics based on prior experience.
- Needs of particular situation. (directional characteristics, frequency response etc.)
- All microphones “color” sound to some degree. A microphone’s “color” is often used to enhance an instruments or ensembles sound.
Microphone Sound Qualities

- Earthworks QTC1
- Neumann U87
- Shure SM 57
- RCA DX77
Ribbon Microphone Sound Qualities

Royer 122  Crowley & Tripp  Procenium  AEA R84  Cloud JRS-34
FINAL MIX WITH MODIFIED NEUMANN U87

“Pretend” from CD “Katherine Byrnes”