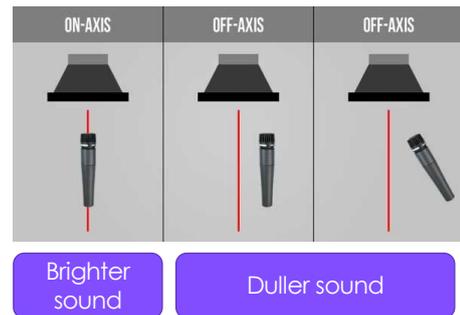




MICROPHONE RECORDING TECHNIQUES

On/Off Axis Placement

- The angle at which a microphone is placed in relation to a sound source will affect the range of frequencies being captured



The brighter sound present in on-axis capture is due to the presence of more higher frequencies

Stereo Microphone Techniques

Coincident/XY Pair



Two cardioid microphones placed with their capsules next to each other

Combines the capsules' polar patterns to create a stereo image

Spaced/AB Pair



Two omnidirectional microphones placed 30-50cm apart

Useful for recording large ensembles and more ambience

Mid-Side (MS) Pair



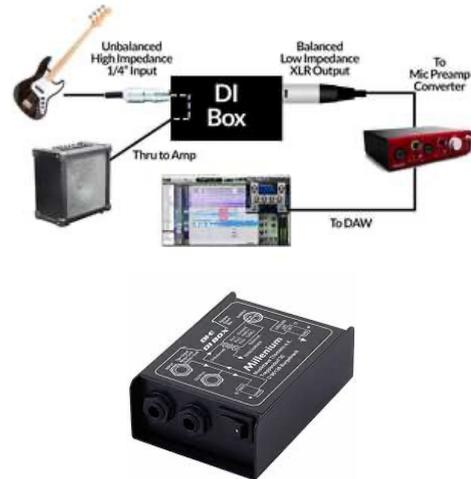
A cardioid and figure-8 microphone placed at 90° to each other

Cardioid points directly at sound source while the figure-8 captures sound from the sides

- For an XY Pair, because the microphones are basically touching, there is a good mono compatibility being maintained
- MS Pair processing:
 - The signal from the figure 8 mic should be duplicated and one version of it should have its phase inverted
 - Both tracks should then be hard panned in opposite directions at the same level
 - Changing the level of the side tracks will adjust the stereo width
 - Good mono compatibility as the side tracks will completely cancel out if panned centrally

Direct Injection (DI)

- A DI box converts an **unbalanced** signal with **high impedance** (instrument or line level) to a **balanced** signal with **low impedance** (microphone level)
- They are used to capture electric/electronic instruments without microphones as they directly connect to an audio interface/mixer



Active DI boxes require an external power source (phantom power or a 9V battery)

Passive DI boxes do not require external power

Plosives

- Plosive sounds possess a strong initial transient (Words/lyrics with the letters 'p' or 'd')
- They can cause large disturbances in a microphone's diaphragm resulting in a 'pop' sound
- Pop filters are used to disperse the air more evenly from the sound to lessen the movement from the diaphragm



The impact of plosives can be lessened after the capture process via EQ and compression, however, the best way to solve this problem is to re-record or comp in the word/phrase from another part of the track

Sibilance

- Words/lyrics with 's' and 'sh'-like sounds can tend to really cut through a mix harshly
- Sibilance tends to occur at around 5-10 kHz
- This can be avoided by attaching a pencil to a microphone or using a de-esser when mixing



The pencil, in a similar vein to a pop shield helps to disperse the air away from the diaphragm

Close Miking – Electric/Bass Guitar

- **Microphone type:** Dynamic (high SPL)
 - Could also be captured using a condenser microphone with pad switched on
 - Could also be captured with a DI box adding amp plug-ins in a DAW
- **Placement:** In front of amp, 15cm away



You could use a combination of both microphones and DI boxes to capture and then decide on the best signal to use later or even keep both (keeping phase differences into account)

A second mic can be added for more presence/ambience about 5m away (usually a condenser)

Close Miking – Acoustic Guitar

- **Microphone type:** Condenser
 - Small diaphragm for fast transient response
 - Large diaphragm for greater sensitivity
- **Placement:** In front of the base of the neck, 15-60cm away
 - Could also use two small diaphragm condensers with one pointing at the sound hole (30cm away) and the other at the fretboard



Close Miking – Wind Instruments

Instrument	Mic Type	Placement
Trumpet/ Trombone	Dynamic/ Condenser	In front of the bell (slightly off-axis for a more mellow sound) (30cm away) Pad if using a condenser
Saxophone	Dynamic (Spot miking)/ Condenser (slight distance)	Place avoiding the sound of the keys
Flute/Clarinet	Condenser	Placed above as sound leaves from the key holes and mouthpiece



Clip on mics are commonly used in live situations for trumpets, trombones and saxophones

Close Miking – Grand Piano

- **Microphone type:** Condenser
 - Small diaphragm for fast transient response
 - A pair of mics (one for treble and one for bass)
- **Placement:** Pointed towards the hammers about 30cm away (XY pair)
 - A single microphone could also be positioned where the strings cross over



Single mic method is commonly used in live sound

Close Miking – Upright Piano

- **Microphone type:** Condenser
 - Small diaphragm for fast transient response
- **Placement:** Remove the front panel of the piano and point a spaced or XY pair at the strings
 - Can also place mics behind the piano pointed at the soundboard



Soundboard mics capture less pedal noise but sound duller

Close Miking – Vocals

- **Microphone type:** Condenser
 - Large diaphragm for wide frequency and dynamic range
- **Placement:** Pop-shield 8-12cm away from mic with performer up to 30cm away from pop-shield



Mic should be on a shock mount in order to isolate the mic from vibrations travelling through the stand

Close Miking – Drum Kit

Instrument	Mic Type	Placement
Kick Drum	Dynamic (Large Diaphragm)	One or two mics places both in front and behind the drum to capture sound from the port and the beater
Toms	Dynamic	15cm away from the skin of the drum, angled at around 30°
Snare	Dynamic/Condenser (with pad switched on)	One or two mics placed above and below the drum
Hi-Hat	Condenser (Small Diaphragm)	Above the top cymbal around 10-15cm away
Cymbals	Condenser	Overhead pair with optional spot mics on specific cymbals



- Miked up using spot mics on the different elements of the kit
- Getting the balance between the natural sound of the drum kit and reducing the amount of spill and ambience captured is important
- Kick
 - Large diaphragm on the kick for better low frequency capture
- Toms
 - Clip on mics are commonly used on toms in live situations
- Snare
 - Pad on condenser to reduce the mic's sensitivity
 - The top mic will capture a 'rounder' sound
 - The bottom mic will capture more of the rattle from the wires
 - Can also capture some spill from the kick
- Hi-Hat
 - Mic should point downwards to avoid blasting air
 - Can exhibit proximity effect issues if the mic is placed too close

- Cymbals
 - A spaced pair captures a wider stereo image but leaves the centre empty
 - An XY or mid-side pair can help avoid this and provide better mono compatibility

- When using multiple mics on one element of the drum kit, it is important to invert the phase of one of the tracks to avoid destructive interference
- Each track should be checked against the rest of the recording to reveal any phase cancellation issues