

## Using Dual Output Microphones

Dual-output microphones allow you to create a single output with virtually any desired polar pattern. When used in place of traditional microphones within arrays, they open up a wide range of new possibilities.

For example, placing two capsules 90° apart in a standard XY configuration yields classic XY stereo when set to cardioid, and Blumlein when set to figure-8. Beyond that, you can dial in intermediate patterns—hypercardioid, supercardioid, or anything in between—while maintaining a coincident geometry.

In non-coincident arrays such as ORTF, NOS, and others, dual-output microphones provide even more flexibility. You can choose or refine the polar pattern in post-production rather than committing during recording, significantly expanding your creative options.

These microphones can also generate two independent outputs with patterns oriented 180° apart. This makes them especially powerful for immersive and multichannel microphone arrays. For instance, you can decode the forward-facing signal into one polar pattern while simultaneously decoding the rear-facing signal into a different (or identical) pattern aimed in the opposite direction.

This capability allows a pair of microphones to function as a traditional Mid-Side (MS) setup, with the added benefit of selecting the Mid pattern in post. The same configuration can also be decoded into Double Mid-Side (Double MS), enabling formats such as 5-channel surround or integration into larger immersive systems.

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## Quick Review: Creating Patterns with a Dual-Output Microphone

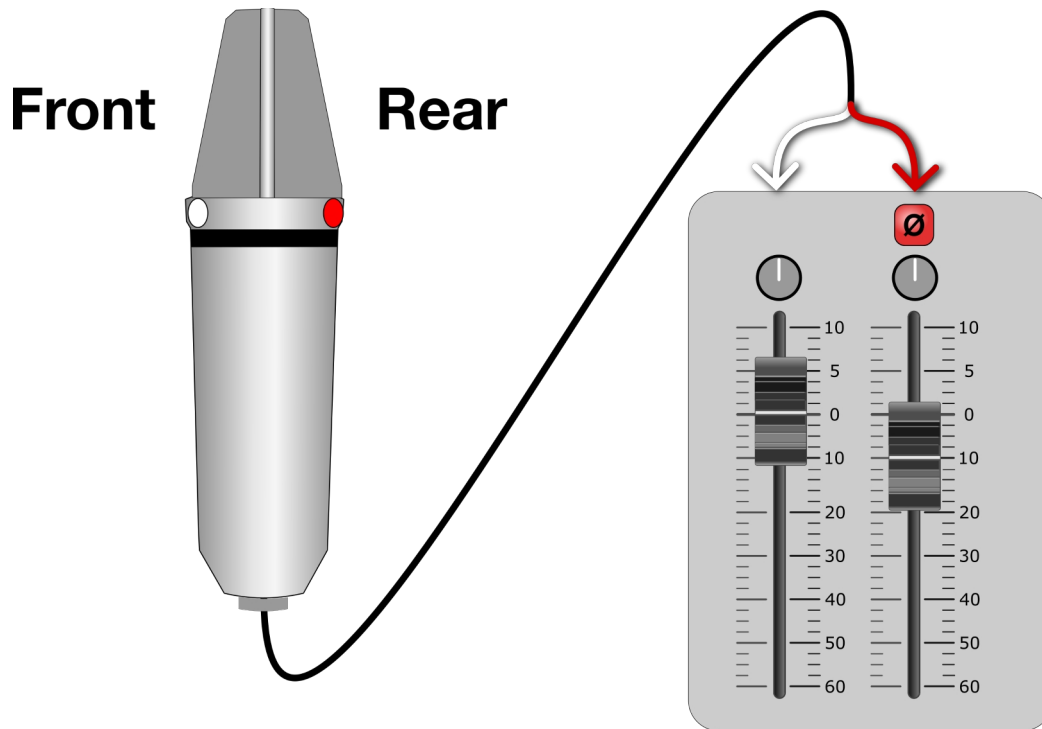


Figure 1: Mixing for mic pattern creation

By mixing in the rear-facing signal at different levels, you can create virtually any first-order polar pattern in post.

Response Pattern	Omni	Cardioid	Super-Cardioid	Hyper-Cardioid	Figure-8
Phase of Rear	In	N/A	Out	Out	Out
Mix Level	0dB	N/A	-10dB	-4.5dB	0dB

Figure 2: Mic patterns vs. mix level

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The values shown in the table represent the mathematically “correct” ratios, but this is where experimentation becomes valuable. As the rear signal is varied from approximately -10 dB to +10 dB, the nulls in the pickup pattern shift continuously—from about 55° and 305° relative to the original front axis, through figure-8 ( $\pm 90^\circ$ ), and onward as the pattern rotates toward a rear-facing orientation.

Adding additional microphones and applying the same mixing approach allows you to build complex microphone arrays that would traditionally require multiple fixed-pattern microphones.

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### Coincident Stereo Applications

Coincident stereo techniques such as XY and Blumlein use two microphones angled 90° apart, typically  $\pm 45^\circ$  from the center axis. The key difference between these techniques is the polar pattern: cardioid for XY and figure-8 for Blumlein. With dual-output microphones, these—and everything in between—can be created after recording.

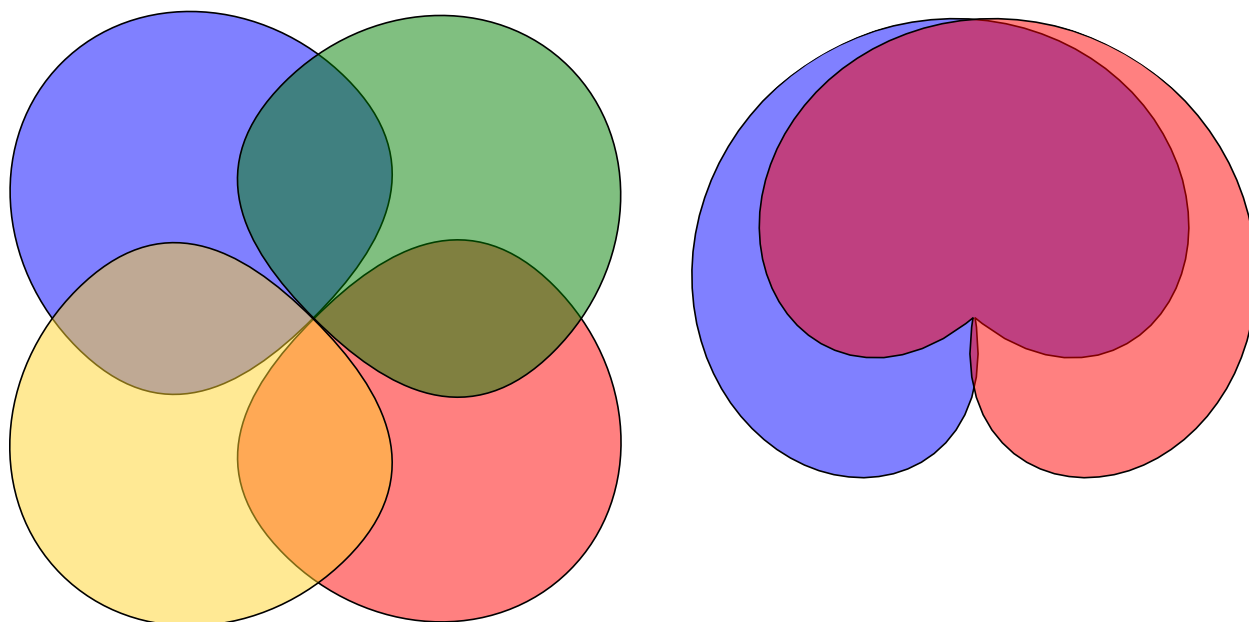


Figure 3: Blumlein and XY patterns from crossed microphones

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## Mid-Side (MS) Decoding

To implement MS decoding, the forward-facing microphone is used as the Mid signal, as described earlier. The Side signal is derived by decoding the second microphone into two components: Side+ and Side-.

In practice:

- Side+ is mixed into the left channel
- Side- is mixed into the right channel

This follows the standard MS decoding approach.

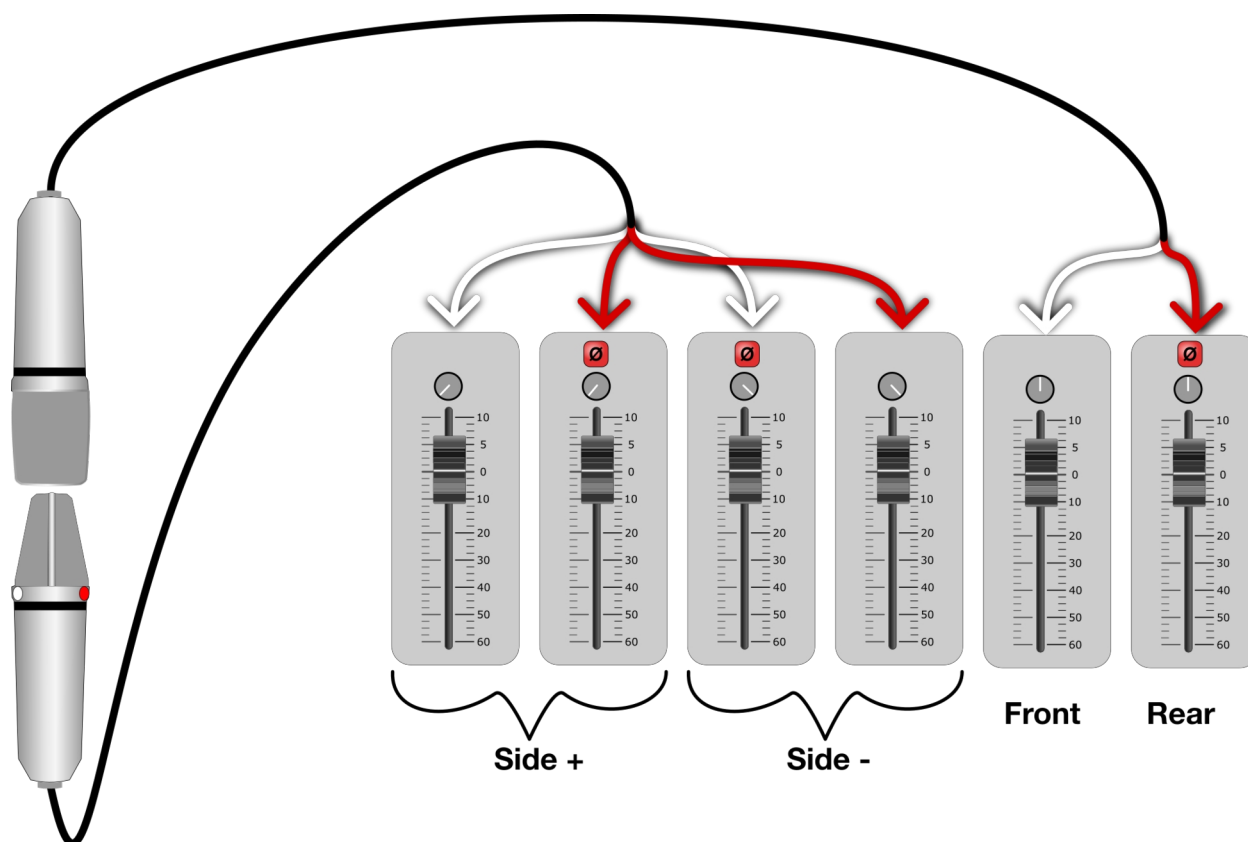


Figure 4: Mid side signal creation

Once these signals are created, they can be routed into more complex formats, such as 5.1 surround, or used as building blocks for larger immersive arrays.

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	Mic1 Front	Mic1 Rear	Side "+"	Side "-"
Center	✓			
Right Main	✓			✓
Left Main	✓		✓	
Right Rear		✓		✓
Left Rear		✓	✓	

Figure 5: 5.1 Surround Sound routing

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Once configured in your DAW, these routing and mixing setups can be saved as templates for reuse. The ability to adjust polar patterns after recording—rather than committing to them at capture—opens up a wide range of creative and technical possibilities.

Applying this approach across multiple microphones fundamentally changes how stereo and immersive recordings can be designed and executed.

**Experiment freely—this is where the real power of the technique emerges.**