

The Crown® PHASE COHERENT CARDIOID® (PCC®) Microphone

THE PROBLEM

Microphones often must be placed near hard reflective surfaces. Two situations where this occurs are (1) picking up drama or opera with microphones near the stage floor, and (2) picking up participants at a conference with microphones on desk stands on the conference table.

In these situations, sound travels from the sound source to the microphone via two paths: directly from the source to the microphone, and reflected off the surface (Figure 1, left). Note that the reflected sound travels a longer distance than the direct sound, so the reflected sound is *delayed* relative to the direct sound. When the direct and delayed sounds combine at the microphone diaphragm, this results in phase cancellations of various frequencies. A series of peaks and dips is created in the net frequency response. This is called a *comb-filter effect*. It colors the tone quality and gives an unnatural sound.

In trying to solve this problem, you might lay a conventional microphone on the surface. But the diaphragm of such a mic is relatively large. Sound reflections travel a slightly longer path to the center of the diaphragm than the direct sound. Direct and delayed sound combine at the diaphragm and cancel high frequencies. The result is a dull sound.

THE PCC SOLUTION

A new kind of microphone was invented to solve the problem of phase interference from surface reflections: the **Phase Coherent Cardioid** or **PCC**.

In the Crown PCC, the microphone diaphragm is small enough so that any phase cancellations are above the audible range (Fig. 1, right). This results in a wide, smooth frequency response free of phase interference.

Unlike the Crown PZM® which uses an omnidirectional mic capsule facing down, the PCC uses a supercardioid mic capsule facing horizontally across the surface. Its directional polar pattern improves gain-before-feedback, reduces unwanted room noise and acoustics, and rejects sound from the rear.

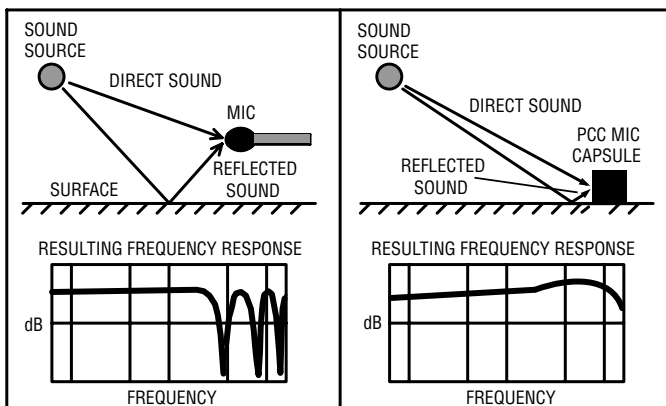


Figure 1. Conventional microphone (left) vs. PCC (right)

Fig. 2 shows the difference in construction and polar patterns of the PZM and PCC.

Typical applications for PCCs are:

- Area pickup of drama and musicals (PCC-160 used on the stage floor)
- Conferences, videoconferences, boardroom (PCC-170 series, PCC-130 series, or MB series on the conference table)

PCC BENEFITS

- Eliminates phase cancellations, giving a clear, natural sound.
- Supercardioid polar pattern reduces feedback and room acoustics.
- 6 dB higher sensitivity and 6 dB better signal-to-noise ratio (improved "reach").
- Unchanging tone quality as the sound source moves.
- Lack of off-axis coloration.
- Small size, inconspicuous.

TO LEARN MORE

Go to www.crownaudio.com and click on Microphones. Then click on Document Library. Look under Microphone Application Guides to find the *Crown Boundary Microphone Application Guide*.

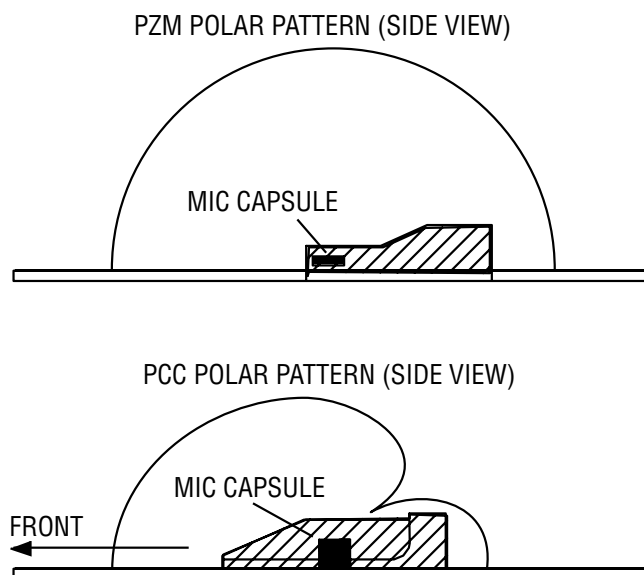


Figure 2. PZM polar pattern (top) vs. PCC polar pattern (bottom)

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