



## Sound Principles

### Pushing the Limits in the Ceiling Era

In the last couple of years, we have seen a significant increase in the use of ceiling array microphones. The increase coming from either, end users who don't want to see microphones on their very expensive table, or from designers and architects who want to give a clean look to their boardroom designs. These requests drove microphone manufacturers to engineer new solutions that could meet the design aesthetic requirements as well as capture speech from a distance.

Sound engineers have known for years that to have good speech intelligibility, you must process a strong, clear and clean signal. We all know that a microphone picking up speech in close proximity will perform outstandingly. However, pull that same microphone away to 6 or 7 feet from the speaker, and you've surpassed the "critical distance" and suddenly, the echo of the room is picked up louder than the direct sound.

As ceiling microphones continue to make their way into boardrooms and huddle rooms as the solution of choice, people seem to be interested in pushing their limits, but no microphone can defy the laws of physics.

For Clockaudio's Trackable Intelligent Microphone TIM 1000's, the microphone's APT (adaptive proximity tracking) does an amazing job with adjusting the level of the different participants at different distances. But it is important to note that distance will always be the challenge in capturing speech and reproducing it intelligibly for the listening party if you start to surpass the recommended distance guidelines.

A simple rule of thumb applies, the closer the participants are to the microphone, the stronger the signal will be. Most boardroom ceilings are set at 9 feet. A ceiling microphone at 9' will perform extremely well in a smaller room of about 20' X 20'. However, any reverberant room, no matter how small, will hinder the direct sound in the environment with echoes generated by the hard surfaces.

This makes the 'critical distance' REALLY critical when using ceiling mics, since the sources of speech are farther away than with table mics or other close proximity microphones. This factor alone can dictate how intelligible speech will be to the participants on the receiving end.

Unlike other ceiling microphones, TIM 1000 listens for both speech and sound sources, when it picks up sound from either, it zones in and creates a tight pattern pointing at and following the source.

The farther away the sound source is, the more room reverb will be picked up as the echo crosses the path of the pattern. This is true for ANY microphone. Acoustical treatment, particularly in a larger room is a must when using any ceiling array microphone as it will absorb the sound waves, making the room a lot quieter. Thus, helping the direct sound to be louder than the room noise, which is what is needed for good sound processing.

Acoustical panels have always been there for treating a room properly, however, designers and end-users are not always enthusiastic about how they look, and so these panels are not traditionally specified into most projects, despite the fact that they are needed. In the past, panels came in different sizes, in a regular square or rectangle shape, and usually in only two or three colors to choose from. Most people have kept that image of acoustic panels as an eyesore in their minds and therefore never think about putting them up in a highly designed room.

What people don't realize today, is that in the last decade the acoustic panel business has shifted into overdrive and now offers stylish and trendy ways to add both acoustics and contribute to the aesthetic. Acoustic panels manufacturers are now creating works of art, customizing panels to accentuate the room's design and become part of it as opposed to detracting from it. So now, designers and architects have a huge selection of choices for already made panels in different colors and shapes that may be already in sync with the proposed room design. But, regardless of what acoustic panels contribute to the design, they are an integral part of helping a room with "bad" acoustics become quieter, so that any ceiling array microphone solution can perform as expected.

As installations are getting simpler, with more "plug 'n' play" solutions coming out every month, the integrator's job becomes less about lowering labor costs, and more on ensuring that the system delivers the best possible performance.

At Clockaudio we keep an open ear to your specific needs and do our best to come up with the right solution for your project. These new ceiling array microphones have been in the forefront of the industry the past couple of years and their popularity is growing. By listening to your suggestions and concerns, Clockaudio is dedicated to make your ceiling microphone sound "Clearly Different"!

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