



Listening To Lencore

by Brad Powell

Can you hear me now? *Can you hear me now?* It's not just an advertising slogan, it's a 21st century mantra reaching beyond the cell phone into the workplace. Can anything be done ...beyond giving a shout and getting a shout in reply?

Michael Polan, Director of Sales for **Lencore Acoustics**, says, "Of course." And he says so at a reasonable volume. The how is "sound masking."

There's a lot more to sound than most of us think, and hearing is one of the five human senses that need much more attention from those who help create interior environments. Of course, architects and interior designers are very attuned to the necessity of having a pleasant and workable acoustic environment. One need only step into a factory – most all of which fail to deal with sound – to sense the chaos, stress and trauma that many factory workers have to bear, with few even thinking of how to deal with it. Accordingly, I am pleased that sound masking turns our attention, at least for the moment, away from the visual aspect of a space to some of our other senses – mainly, what we *hear* and how we *feel* in the space.

And, need we say it, interior acoustics is a much overlooked area of service that interior designers and contract furniture dealerships can profitably exploit. Through OFDA/ASID/IIDA & AIA educational presentations, Lencore has helped thousands of A&D professionals and dealerships learn about what Lencore can do for them and their customers with the company's sophisticated sound masking technology.

All sound masking is not created equal, which is what

creates the opportunities. Variability is obvious from the many exposures that we have had to sound masking, whether it is unintentional, as in the bustle of a busy Starbucks café, or intentionally engineered as with Herman Miller's Babble. But the distinctions go far beyond this and prevail in the familiar "white noise" commercial systems. According to Mr. Polan, good sound masking systems deliberately set out not only to mask speech, but also to provide comfort. If the system doesn't do both equally well – then you should be aware that other systems do.

Lencore's approach embodies some of the latest knowledge about sound, speech frequencies, and system and network capabilities. Yet anyone can understand the two key criteria for a good sound masking system: speech privacy and comfort.

Achieving speech privacy is the easy part – in fact just about any incoming noise, louder than speech could provide speech privacy. The more difficult part of providing great sound masking lies in the system's ability to create a better, more acoustically comfortable space, and creating pleasing spaces are what most of our readers do for a living.

At last year's **OFDA Dealership Summit**, Mr. Polan made the timely point that sound masking could help dealerships generate more revenue in a variety of ways.

"In thirty years," said Mr. Polan, "sound masking has evolved from an annoying 'white noise' – that was only concerned with ensuring speech privacy – to something so unobtrusive and comfortable that most people don't realize

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it's being used to provide privacy."

My impression is that, when an office is effectively sound masked, there is an almost a pervasive feeling of privacy, one that makes you feel confident that you can speak on the phone or have conversations with your co-workers and not be concerned that everyone is listening to you.

"Today," said Mr. Polan, "Fortune 500 companies no longer build space without sound masking and the majority have Lencore sound masking. Most of the top one hundred companies in the US have Lencore sound masking in their facilities, companies such as Microsoft, Pepsi, Cisco Systems GE, American Express, Sony, Novartis, Ernst & Young to name just a few. For many years, sound masking was the best kept secret in corporate America but these days big companies don't build without it and smaller companies are catching on as well."

Federal regulations in the health-care and financial sectors are pushing awareness of the need for speech privacy. HIPAA, the Health Insurance Portability Accountability Act, as well

as GLBA, the Gramm Leach Bliley Act, both have aural privacy requirements, and, according to Mr. Polan, sound masking is an accepted solution to help meet compliance objectives. "We've helped thousands of hospitals, healthcare facilities and financial institutions around the country," he said.

OI: How does masking generate additional work for the dealers?

MP: Sound masking can help generate revenue for the furniture dealer in a number of ways. First, this is another product that can bring the dealer into a project at an earlier stage. This helps the dealer to develop a relationship with the architect, designer, and facility manager early in the process. By getting into projects sooner it can also help dealers sell their other furniture or moveable wall products.

Second, sound masking is an additional service that can strengthen and leverage existing relationships, differentiate a dealership from its competitors, and enhance its reputation for its ability to build better environments.

Dealers that provide clients with sound masking treat the entire environment and give clients back the ability to concentrate. Nobody wants to mar a beautiful space with poor acoustics, for example, a space where the noise levels inhibit your ability to think, or a space that is so quiet that an occasional voice becomes obtrusive and annoying.

Ultimately, sound masking can change the way a dealership is perceived in the marketplace, as well as its profitability.

OI: When is the right time to think about adding sound masking?

The important point is that clients should not wait until they have moved into a space to make their acoustic decisions. Companies should plan for acoustics; their budgets can be used more efficiently, when the acoustical issues are addressed up front. This enables dealers and A&D to offer alternatives related to construction standards, furniture and wall designs, all while being satisfied that a proper acoustic environment will be created for the client.

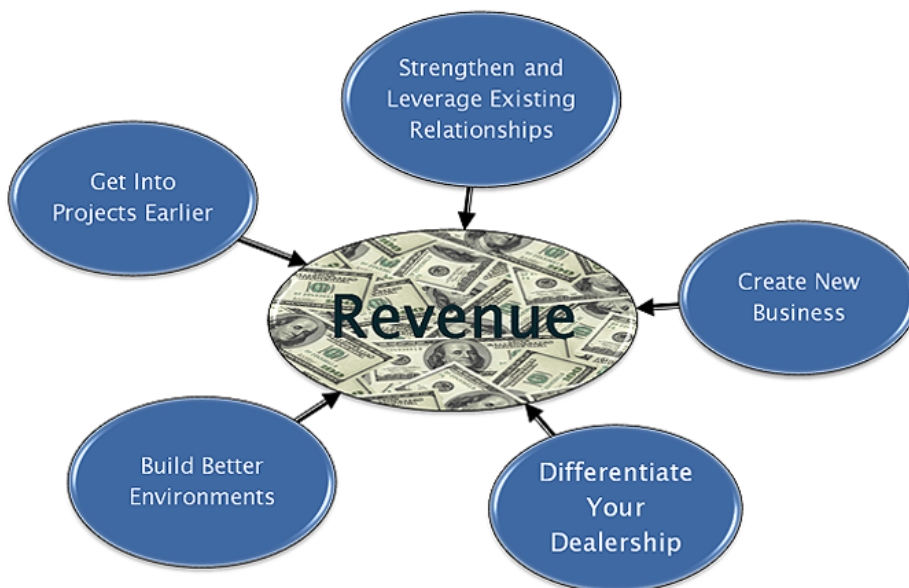
OI: Are sound-reducing headphones a type of individual sound masking?

MP: Not really. Headphones can cut down the noise for the person wearing them but sound-cancellation and sound reduction doesn't equate to sound masking. Whereas sound masking helps the entire environment, headphones can help isolate noise, sound or frequencies of sound for one person. This can be effective if you are trying to sleep on an airplane, but it isn't going to really impact the overall acoustics in your office environment.

OI: What does sound masking mean in the context of STC ratings for walls? Does a high rating reduce the need for masking?

MP: I'm glad you bring that up. Many wall manufacturers often em-

Sound Masking Generates Revenue



phasize the STC of their products. The STC or sound transmission class is the amount of sound that is blocked from traveling from one side of a partition to the other. But, this STC number is created under perfect conditions in a lab environment and doesn't take into consideration the product's real-life application. The more important concern is the STC rating in the field otherwise known as the FSTC, or field sound transmission class.

Sound masking... equalizes the STC value of all the walls because sound will escape through the weakest part of any room...

Sound masking is the great equalizer. It equalizes the STC value of all the walls because sound will escape through the weakest part of any room: I guarantee you that this will not be its walls, but more likely the air return grilles, and vents that have no STC or the ceiling that usually has a low CAC.

When the sound masking is set at 47 or 48 decibels, it covers over any intrusive speech that's traveling through that wall or plenum that's lower than

forty-seven or forty-eight decibels. It "equalizes" the STC values of the walls. If the STC rating is 38, 42 or 46, little of that will matter because the sound masking is set at 47 or 48 decibels and will cover most of the intrusive speech penetrating through the walls, air returns, vents and ceiling tiles.

OI: Can noise problems be reduced through slab to slab construction, rather than just above the drop ceiling?

MP: They could, but this proves to be *much* more costly.

OI: Much more costly but also much more sound-containing...?

MP: Not necessarily. Slab to slab construction is definitely much more expensive. But, even if you built slab to slab, you'll have to cut holes for the HVAC, as well as the sprinkler system, cabling, etc. Here's where that "weakest link" theory for acoustics comes back into play. It's like cracking a car window as you are driving down the highway. You hear everything. So, it's a fallacy, that building slab to slab will solve all sound problems.

Sure, slab to slab construction can

help, if a number of other measures are taken, but it's extremely costly to do that.

OI: How much is sound masking, and do budgets usually provide for sound masking?

MP: I'll give you a range. The price will change based on a variety of factors, such as the number of speakers and the types of speakers needed and this is based upon other factors such as the ceiling height or the plenum height or the square footage and which system you need, union or non-union labor, etc. An industry standard number used nationally by most sound masking providers is about \$1.00 a square foot – perhaps a little less for larger projects and perhaps a bit more for smaller projects or projects that have special parameters. At any rate, the buck a square foot seems a small price to pay to give people the chance to think and work better and more comfortably in the spaces we design.

A good rule to follow is to include and quote masking anytime an open plan has twenty or more workstations and/or when using movable walls or partition wall systems.

Sometimes clients say, "I don't have any money in my budget for sound masking," particularly in a bad economy. When this is the case, I usually ask if they, have budgeted for paging? If so, they should know that Lencore can provide quality paging through the same set of speakers as the masking. In fact, we can give clients three system options in one, sound masking, music and paging for just about the price of the one system.

A good rule to follow is to include and quote masking anytime an open plan has twenty or more workstations and/or when using movable walls or partition wall systems. Many of our dealers put our masking as a line item on all of their quotes to show

When and where to quote sound masking

- ▶ Moveable or partitioned wall systems
- ▶ 20 workstations or more
- ▶ When privacy is needed
- ▶ When moving from private offices to open plan
- ▶ Retrofit and new construction
- ▶ Drop ceiling, open ceiling, gypsum ceiling

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their clients that they have addressed the acoustics and are designing the spaces to achieve the best overall experience and comfort.

OI: Are hospitals and financial companies important customers?

MP: Huge. Sometimes hospitals use our sound masking throughout the facility much like the University of Miami Medical Center and Kaiser Permanente have done. Other times, healthcare clients use it for specific areas such as in meeting places where personal or financial information is discussed, admitting areas, around nurses' stations, and in waiting rooms. Most recently however, we are seeing a growing use in patient rooms as a way to provide better comfort and improve the quality of the patient's rest and sleep.

As for financial institutions, Lencore has done millions of sq.ft. at hundreds of banks – in both corporate and branch settings – to improve the quality and privacy within their spaces. Clients such as Bank of America, Wells Fargo, and Wachovia have all made a point to use sound masking to help comply with governmental requirements.

OI: Is sound masking effective in call centers?

One person's voice in a call center or in an open plan environment reaches up to eight people within fifty to sixty feet. With sound masking, that same voice will affect only a few people in a 15' radius. Because of the reduced distractions, the environment becomes more productive ...and less stressful. Workers can speak in a normal voice to be productive and understood, not, in a whisper because you are worrying about annoying someone nearby. That creates stress, and so does an environment where everyone is speaking more loudly than normal, just to be heard.

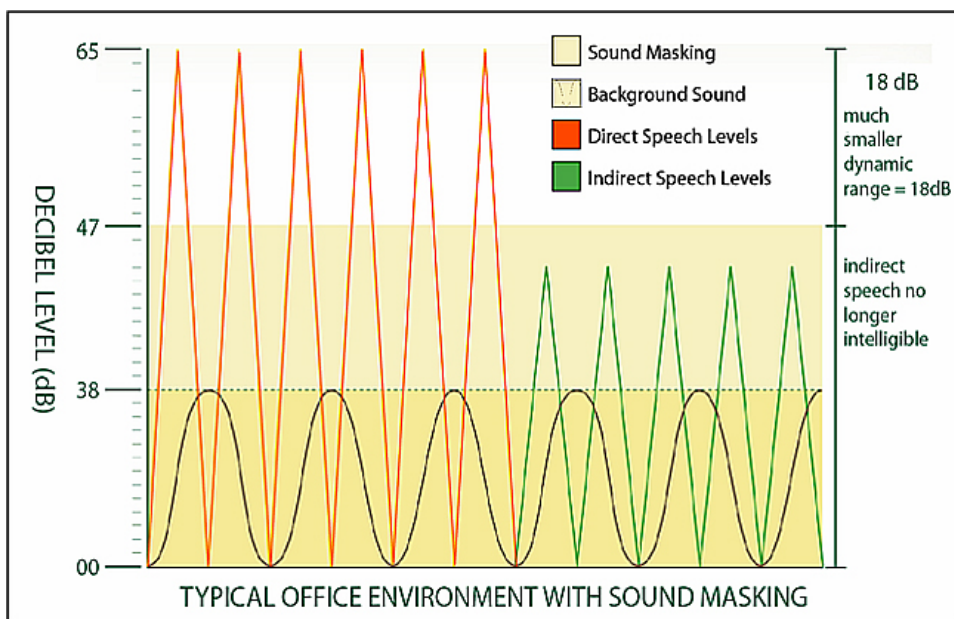
OI: Exactly what is sound masking and how does it work?

MP: We gently raise the background sound in the environment to a level called "speech privacy" to reduce the annoying noise of clicking keyboards, tapping on desks, and intrusive conversations. We could have a discussion at a normal voice level and the people in the next room or the people around us would not know what we were saying. It's like lying on a blanket on a

beach in Hawaii with the waves breaking, the kids playing ...and, still, you're able to read and relax. It's a comfortable environment. And while the people only a few feet away may know you're speaking they can't understand what you're saying because your voices are being covered or "masked" by the background sounds of the ocean and the beach. In the office we create the same phenomenon with our electronic sound masking systems.

How does sound masking work? In a typical office – in the morning, before people arrive for work – the sound level of the building is about 35 to 38 decibels. People normally speak at around 65 decibels for face to face conversations. Carpeting, ceiling tiles, walls, floors and other factors absorb much of the human voice and can bring the level down (or attenuate the speech levels) from 65 to 45 decibels, but this is still significantly louder than the 35/38 decibels of typical background sound in an office environment.

The challenge is creating speech privacy without losing comfort in a space, and achieving the right balance between the two.



Without sound masking, incoming speech measured at 45 decibels can still be clearly heard and you will understand almost every word people are speaking. But, if I add masking and gently raise the background sound from 38 to 47 decibels (just over the level of incoming speech previously mentioned at 45 decibels), the conversation becomes unintelligible. You may still know people are speaking, but you can't understand what they're saying because it's actually covered by the background sound masking. This benefits people in adjacent areas, and maintains the privacy of conversation.

Sound masking is not noise *cancellation*, or noise *disruption*. It's nothing fancy, just a gentle raising of the back-

ground sound that covers, or masks, what could be distracting or annoying human speech in the area.

OI: This doesn't seem like a big deal.

MP: It's not. The challenge is creating speech privacy without losing comfort in a space, and achieving the right balance between the two.

Any company can throw speakers into a ceiling and play "white" noise. And many do, and then the customer is stuck with it for the next five or ten years. You may have speech privacy, but you're sitting under a poor system and adding to the distraction factor. In order to not be annoying or distracting, these companies usually have to lower the volume of their sound masking which diminishes its ability to provide the speech privacy that is needed.

Poor quality systems give sound masking a bad wrap. That is why we try to educate the dealership and A&D communities on how to evaluate systems to insure that they are specifying and buying quality systems that really work to enhance the spaces they design.

As far as the evaluation process is concerned, there are published industry standards by ASTM (the national ASTM standard for speech privacy, ASTM

E-1130) that can be used to test for privacy and there are several areas that clients need to understand about masking systems when it comes to comfort. Things like sound uniformity, speaker quality and layout can be key.

OI: What is white noise?

MP: A long time ago, when 24 hour television was a thing of the future, about one in the morning the national anthem would play signaling the end of the broadcasting day. Then you hear a very annoying high-pitched continuous sound: "shhhhh...". White noise.

White noise is sound that generates high and low frequencies at the same volume level. Because the human ear hears higher frequencies louder than

lower frequencies, the higher frequencies (or white noise) are usually perceived as annoying. For comfort, you need lower frequencies.

At Lencore, we've added frequencies to make the sound much more comfortable. And if you put our sound masking on one side of a large space, and any one of my competitors on the other, when you walk from one side to the other, you will find that our sound making is pleasing to listen to. This is because of the lower frequencies we generate and the way that we create and engineer the sound. Many say that lower frequencies are not needed to mask speech which is technically correct, but you definitely need them for comfort.

OI: How can you tell if a sound is comfortable?

This answer is pretty simple: you listen to it. When you buy masking, you are buying sound. Like most things, it is best to try before you buy.

In a way, customers have the same considerations when buying masking as when they buy task chairs. Do they want to get an ergonomic chair that reduces employee fatigue and stress and increases productivity, or are they looking for an economy product or something from a big box store? You didn't know what you were missing until you switched from the cheapo chair to the ergonomic chair. It's the same with sound masking: you don't know what you're missing until you experience a quality system.

To extend the comparison: it's like buying an HVAC system for your building. At the end of the day – or fiscal year – no one cares what that condenser looks like, how big it is and how it's configured or how the heating and ventilation is put into the space? It's all about comfort and success. It's the same with sound masking. Clients don't necessarily care what it looks like or how it's installed in the space, they just want it to be comfortable and they

want to get the speech privacy that they're looking for.

OI: What sort of technical specifications do you look for? How would a buyer determine quality of sound?

MP: A buyer should really *hear* what they are buying. Buyers should visit a dealer showroom to hear the masking or ask for a walk through of another client's space. Buying sound masking is not about the technical specs or gadgets; it is all about the quality of the sound. Price is only a tiebreaker when the client doesn't understand what they are buying.

OI: What good does it do to sample the sound in a dealer's showroom when different environments require different treatments? How can you comparison shop in dissimilar environments?

MP: This is why choosing a system with customization and tuning capabilities is really important. No two facilities are exactly alike. That is why Lencore offers four systems, all with tremendous flexibility for adjustments and controls.

When I take a sound level meter through a space, one of the things that differentiate the quality of the sound masking is whether the volume of sound is consistent throughout the space. The ear will pick up a difference of one or two decibels. Be sure to check out the specifications and tuning capabilities for your sound masking system. Some competing systems indicate that their tolerances vary by two to three decibels. This means is that if a system is set 48 decibels, it could be either 50 or 46, a spread of four decibels if it had a 2 decibel tolerance, more for the 3 decibel tolerance. That's a lot of sound variation.

To give you a reference point here, an increase of ten decibels of sound is perceived as twice as loud. Conversely, every decrease of ten decibels

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is perceived as half as loud. Now you can see why a spread of 4-6 decibels is really quite big. Lencore's tolerance is plus or minus a ½ dB for a window of about 1 decibel. Much tighter tolerances make for better systems.

OI: How much should I care about controls for the system?

There are some systems that only offer a single volume control for the whole open-plan, and a single volume control for all of the private offices. If I'm in the north-east corner of a ten thousand sq.-ft.

open-plan office and the masking is too loud and another person is in the south-west corner

and it's too soft, there's nothing that can be done to help both of us. The volume is either raised or lowered for the whole system and this unfairly compromises the quality of your space.

The Lencore system, on the other hand, can be adjusted to suit small areas, even down to 225 square feet when needed, which may be necessary because of a site condition, an employee need or for a variety of other reasons. The ability to customize the space acoustically is one of Lencore's biggest strengths.

OI: You said that there are three things to look at for choosing a sound masking system. They are as follows: Does the system mask speech? Does the system's sound quality provide comfort and what was the third?

MP: Proven performance. You want to make sure you are dealing with a manufacturer that has been doing this successfully and reliably for a long time. You need to look for a solid installation base – Lencore has over 150 million feet of sound masking experience. Lastly, make sure the provider gives you an unconditional warranty of at least 10 years.

OI: Is there a "frequency formula" for masking systems?

MP: To be effective, sound masking systems are required to generate certain groups of frequencies within the speech spectrum called the "Preferred Curve". But the question is not just what frequencies are generated, but also what is the quality of the speakers that are distributing the masking throughout a space? Some poor quality speakers just aren't able to output the proper frequencies even if the system is generating the proper frequencies in

the head-end equipment.

In fact, I could generate most frequencies out of a system with any

speaker, but there are some speakers that just can't handle lower frequencies (needed for comfort) because of their design; a small one and a half or two inch speaker, for example, typically can't handle the loads. So size matters, as does the quality of the speaker.

OI: How do you decide whether to use an in-plenum or directional downward facing speaker?

MP: Acoustical journals recommend sound masking speakers to be placed in the plenum to achieve the best uniformity. For most spaces with traditional ceiling designs Lencore uses in-plenum speakers that offer the best sound uniformity and don't impact the design intent of the space since the speakers are installed above the ceiling tile. In cases where an in-plenum system can't be used for one reason or another, Lencore has speakers that can be installed directly into the ceiling tile and point down into the space.

When speakers are placed above the ceiling panel and face upwards the sound can bounce off of the ceiling deck and filter very uniformly back into the space below. But when I turn the speaker's upside-down and I put them

in a ceiling tile and point them down into the space, I get a more directional distribution of sound. Inevitably, this type of design has a tendency to produce hotspots and cold spots – places where the sound is too loud or too low. You can remedy this by putting the speakers closer together but you would use almost twice as many speakers to accomplish the same thing as an in-plenum speaker system. Some site conditions will warrant using this type of speaker, but for most facilities in-plenum is the way to go.

Lencore has developed software to evaluate a space and that can take into account certain variables in the space and predict what the coverage will be like using the two types of speaker orientation.

Our software tells us what we need to do and how many speakers we need in order to accomplish the desired result. It also shows us the ASTM rating. This testing standard assumes speech privacy if less than 20% of the speech is understandable within a fifteen foot radius. It's measured using the AI or Articulation Index, and it's what the architect and the acoustic consultant looks at to define whether you have achieved speech privacy.

But, the absolute, hands down, best way to choose and evaluate a sound masking system is by *listening to it*.

You can hear the sound quality first hand and experience it either in a dealer showroom or by walking through a client space that has it. When you have the chance to experience an environment where you can turn the masking on and off, such as in a dealership showroom, you can really hear the impact. It's an incredible experience and a product that dealers are really paying attention to. ■