

# KR MOELLER ASSOCIATES LTD

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## Résumé

K.R. Moeller Associates Ltd. (KRM) s'est consacrée exclusivement à la conception et la fabrication de systèmes de masquage de sons depuis 1978. Ses produits sont disponible mondialement et installées dans des dizaines de millions de mètres carrés à travers le monde pour des clients allant de petites entreprises aux tops 100 repris dans Fortune. Après des décennies d'offre du système populaire de masquage de sons Scamp®, la société est retournée à la planche à dessin. Le résultat? En 2003, ils ont révolutionné l'industrie quand ils ont lancé le premier réseau de masquage de sons du monde, le public-adress et la diffusion musicale: le Réseau acoustique LogiSon®. Il est maintenant un chef de file reconnu qui a obtenu plus de vingt récompenses pour l'innovation, la performance et la facilité d'utilisation.

**Mots clefs :** acoustique, masquage de sons, confidentialité, contrôle du bruit

## Abstract

K.R. Moeller Associates Ltd. (KRM) has been exclusively dedicated to the design and manufacture of sound masking systems since 1978. Their products are available globally and installed in many hundreds of millions of square feet for clients ranging in size from small business to Fortune 100. After decades of offering the popular Scamp® Sound Masking System, the company returned to the drawing board. The result? In 2003, they revolutionized the industry when they launched the world's first networked sound masking, paging and music system: the LogiSon® Acoustic Network. It is now a recognized leader that has earned over twenty awards for innovation, performance and ease of use.

**Keywords:** acoustics, sound masking, speech privacy, noise control

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## 1 Introduction

Prior to forming K.R. Moeller Associates Ltd. (KRM) in 1978, Klaus Moeller worked for German office furniture manufacturer and inventor of the modern open office concept, Quickborner Team. While with Quickborner Team, Moeller's experience in solving the acoustical problems that plague office environments grew. Moeller recognized that sound acoustical planning should be part of any workplace, providing him with the motivation to form KRM.

## 2 Technology

The first sound masking product marketed by KRM was the Scamp Sound Masking System, which used a decentralized masking architecture. Rather than locating sound generation, volume and frequency control in a central location, the electronics required for these functions were integrated into 'master' loudspeakers, which were distributed throughout the facility; hence, the 'decentralized' or 'distributed' name.

Each 'master' was connected to up to two 'satellite' loudspeakers, which repeated their settings. Therefore, the system's zones were only one to three loudspeakers in size (*i.e.* 225 to 675 ft<sup>2</sup>), as opposed to the dozens or hundreds

used in centralized masking architecture. This distributed design also inherently controlled phasing. In addition, because each small zone offered fine volume control, local variations could be addressed, allowing more consistent and, hence, effective masking levels to be achieved across a facility. However, there were limits to the adjustments that could be made with respect to frequency, which impacted performance. Furthermore, a technician had to make changes directly at each 'master,' making future adjustments challenging.

It is advisable to measure performance and modify a sound masking system's settings when changes are made to the physical characteristics of the space (*e.g.* furnishings, partitions, ceiling, flooring) or to occupancy (*e.g.* relocating a call center or human resource functions into an area formerly occupied by accounting staff). The likelihood that these types of change will occur during a sound masking system's 10- to 20-year lifespan is almost certain; therefore, one cannot take a 'set-it-and-forget-it' approach. KRM's engineers needed to develop a more practical way of adjusting the masking sound.

After three years of intensive in-house development, KRM launched the LogiSon Acoustic Network in 2003. In so doing, the company created an entirely new category of sound masking architecture: networked.

This technology leverages the benefits of decentralized electronics, but networks the system's components together throughout the facility—or across multiple facilities—in

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order to provide centralized control of the zoning/output of individual loudspeakers via a control panel and/or software. Changes can quickly be made following renovations, moving furniture or personnel, maintaining masking performance within the space without disrupting operations.



**Figure 1:** KRM's LogiSon Acoustic Network installed in a facility featuring an open ceiling.

When designed with small zones of one to three loudspeakers offering fine volume (*i.e.* 0.5 dBA steps) and frequency (*i.e.* 1/3 octave) control, networked architecture can also provide consistency in the overall masking volume not exceeding  $\pm 0.5$  dBA, as well as highly consistent masking spectrums, yielding much better tuning results than possible with earlier architectures.

### 3 Research and education

Throughout its history, KRM has sought to raise awareness of sound masking technology and educate building professionals about its impact within applications such as corporate offices, hospitals, call centers, hotels, and green buildings, as well as the relative ease with which it can be implemented in occupied facilities. The company has also worked to expand use of the technology to routinely include closed rooms, allowing clients to realize construction savings by, for example, reducing walls' STC rating.

The company's most recent studies demonstrate the significant impact varying masking levels have on speech comprehension, a finding that strongly argues for a tightening of traditionally-accepted tolerances for spatial uniformity. Indeed, the adjustments a consultant or technician makes after a sound masking system is installed are an essential part of the commissioning process. To facilitate this process, KRM also developed a unique computerized tuning method called TARGET.

TARGET measures the masking, simultaneously recalculates two dozen controls, and automatically applies changes to achieve the specified curve. TARGET performs these steps in less than 1 minute per zone, while yielding the required results of  $\pm 0.5$  dBA. Acoustical consultants who have used TARGET and evaluated its results have been extremely positive about the contribution it makes to tuning efficiency and masking performance.

### 4 Updating performance standards

Given its research findings, KRM is also heavily involved in improving specifications and standards related to sound masking. For instance, the company's Director of Strategic Relations, Ric Doedens, is part of an ASTM subcommittee specializing in speech privacy that is currently working on proposed standard WK47433, *Performance Specification of Electronic Sound Masking When Used in Building Spaces*. This subcommittee is also in the process of updating:

- ASTM E1130, *Test Method for Objective Measurement of Speech Privacy in Open Plan Spaces Using Articulation Index*;
- ASTM E1374, *Guide for Open Office Acoustics and Applicable ASTM Standards*;
- ASTM E1573, *Test Method for Evaluating Masking Sound in Open Offices Using A-Weighted and One-Third Octave Band Sound Pressure Levels*, and
- ASTM E2638, *Test Method for Objective Measurement of the Speech Privacy Provided by a Closed Room*.

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