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THE PURPOSE OF THIS GUIDE

The Spectra i.Net® Product Guide was developed to provide our clients, dealers, distributors and service partners with a comprehensive overview of Lencore and the Spectra i.Net® System with all supporting technical data and specification information.

The Product Guide should be your “go to” resource when:

- Requiring an overview of the Spectra i.Net® Networked Sound Masking System
- Setting criteria for your sound masking, paging and music system
- Selecting equipment for your project
- Reviewing individual product information
- Reviewing performance or technical specifications
- Comparing bid proposals
- Writing specifications for network sound masking, paging and music systems
- Explaining how the Spectra i.Net® system fits in your space
- Providing system schematics and drawings
- Answering common FAQ's for network sound masking systems
- Understanding the importance of true open platform systems
- Meeting ASTM E-1130 standards for speech privacy
- Meeting ANSI 709.1 for open platform systems
- Identifying alliance partners for Lencore systems
- Contacting Lencore

We invite you to explore the pages of this guide. Ask questions and use it whenever making decisions about your sound masking, paging and music system needs.
ABOUT LENCORE ACOUSTICS CORP

Since 1990, Lencore has been providing sound masking and speech privacy solutions to a virtual who’s who of corporate America. Also considered a “go to” technology for healthcare, military, banking, finance, insurance, technology, government, library, legal and call center environments, Lencore provides added comfort and noticeable improvements in privacy, productivity and performance.

Day to day, Lencore systems give people the ability to think and to concentrate in environments that support both communication and collaboration. Our sound masking, paging and music systems are installed in thousands of companies, in hundreds of millions of square feet across the U.S. and around the world.

As the uncontested leader in sound masking systems, Lencore does not believe in one size fits all products and we offer our clients more choices resulting in better solutions.

With the industry’s leading technologies (E-Sound®, SPEC™ Diagnostic Software, Spectra i.Net® Reports and Point Z™ Technology) as well as our global representative network, your organization will benefit from Lencore’s experience, sound masking knowledge and unparalleled customer service.
WHY LENCORE?

The simple answer? We care more.

We care about the changes that you make in the spaces that you build. We care that these changes will positively impact the people in these spaces. We care about providing masking systems that don’t compromise comfort for privacy. We care about the fact that quality masking systems “work” and that inferior systems do not. And we care enough to be committed to helping our clients understand the difference.

Lencore is the only sound masking provider that is the actual manufacturer, in the US, and not a contract manufacturer. We understand, that in order to continue to be the first name in sound masking systems, we must always be responsive to our clients and the ever changing needs they face with regard to their speech privacy, comfort, sound masking, paging and safety needs.

Over the years we have grown our family of products to include four distinct masking systems, each with many customizable options and all with superior paging and music capabilities. The level of flexibility that we are able to provide our clients ensures that they find the right system for their designs every time.

Our mission has always been driven by education. In doing so, we have remained committed to helping decision makers better understand what they need to consider when evaluating sound masking and paging systems for specification or purchase. In fact, by simplifying and identifying the most relevant selection criteria and performance specifications we have helped thousands of companies find a starting point for evaluating sound masking, paging and music systems.
Lencore cuts through the maze and confusion of sales strategies that some competing masking companies offer and instead simply focuses on teaching clients and specifiers the proper benchmarks for masking and paging system performance, accessibility, flexibility, sound quality and comfort.

Clients ultimately choose Lencore because of our people and because of our products. Our representatives and dealers truly care about how the space functions and how the masking or paging can contribute to a positive overall project experience.

Lencore professionals and our dealers receive extensive training to be able to provide the level of technical “know how” and product knowledge that we feel is necessary to properly address our clients’ questions and needs. With regard to our award winning products, Lencore has a tremendous product offering and never has to compromise sound quality or system performance. Simply put, Lencore systems just sound better.


“Associate with good quality if you esteem your own reputation; for it is better to be alone than in bad company.”

– George Washington
STRATEGIC PARTNERS

As a part of the Crestron® Integrated Partner Program, Lencore provides its dealers with an intelligent sound masking, paging and music system for fully integrated control systems. The advanced Lencore Sound Masking system, along with the Spectra i.Net® module, allows Crestron® dealers to easily install active functionality in Lencore’s Spectra i.Net® system and create control features. The module includes support for OP’s (operating platforms) and Lencore’s head end equipment and allows integrators to provide access to a range of control functions for each of these unique products.

Lencore has partnered with DIRTT to provide clients with complete, modular, agile solution for workplace interiors that includes modular power, access floors, DIRTT walls, and Lencore Sound Masking. While sound masking is the most cost effective way to provide privacy in any type of office space, the combination of DIRTT’s tremendous flexibility with Lencore’s full coverage allows clients to achieve greater speech privacy and comfort in their spaces without ever having to worry about losing those attributes when spaces are altered to suit new conditions.

Lencore is proud to be a corporate sustaining partner of the International Facility Management Association and functions to support this organization on a national level through education and promotional opportunities with the organization, its annual trade show and its resources and publications. In addition, Lencore professionals nationwide maintain individual memberships with local IFMA chapters in order to keep connected with the needs of local facility managers and other building professionals. Our commitment to the organization on a national and local level enables our entire team to better understand the challenges today’s facility professionals face with regard to designing for proper acoustics and speech privacy and to be able to respond to these challenges.

USG Corporation and Lencore Acoustics Corp. have formed a strategic alliance to give architects and design professionals the ability to specify Lencore’s state-of-the-art sound masking systems with all USG acoustical ceilings. Lencore sound masking systems, which work in tandem with USG’s acoustical ceiling panels, are intended to appeal to architects, specifiers, and building owners seeking an effective and economical means to create speech privacy and comfortable environments.
LENCORE’S INDUSTRY AFFILIATIONS

All the logos and trademarks represented above belong to their respective holders.
LENCORE MEETING & EXCEEDING INDUSTRY STANDARDS

TRULY ACHIEVING MEASURABLE SPEECH PRIVACY ACCORDING TO ASTM E-1130

Standards for speech privacy exist and can be measurably achieved using the ASTM E-1130 standard for speech privacy in open office.

This test method is one of several test methods for evaluating the acoustical characteristics of open office environments and the performance characteristics of acoustical components. The test method describes a means of measuring speech privacy objectively between locations in open offices and relies on acoustical measurements, published speech levels, and standard methods for assessing communication. The method measures the privacy which results from a configuration of components, not the performance of individual components affecting speech privacy. ASTM E-1130 relies upon the Articulation Index which predicts the intelligibility of speech for a group of talkers and listeners. An AI of .2 or less indicates that you have achieved speech privacy where 20% or less of the spoken word is understood.

While achieving documentable speech privacy with sound masking is critical to the system’s success, it is equally important that the sound masking that is provided remain comfortable to office occupants. People will sacrifice privacy for comfort when working in an office environment. Lencore’s Spectra i.Net® makes sure that you give clients both for a truly customized sound.

1. ASTM E 1130-02 Standard Test Method for Objective Measurement of Speech Privacy in Open Offices Using Articulation Index
2. ASTM E 1573-02 Standard Test Method for Evaluating Masking Sound in Open Offices Using A-Weighted and One-Third Octave Band Sound Pressure Levels
3. ASTM E 1374-93 Standard Guide for Open Office Acoustics and Applicable ASTM Standards

REGARDING STANDARDS FOR OPEN, THE INDUSTRY LOOKS TO ANSI 709.1

You need to be careful when vendors claim to be “open” as they most likely are not. To be truly “open” they must meet ANSI 709.1. While TCP/IP is a standard in the data world, it is NOT a control protocol. If TCP/IP operates as open transport, one must still provide or develop an open control protocol. The temptation is for vendors to define a new control protocol riding on the coattails of the open TCP/IP standard, proclaiming the overall approach “open” because TCP/IP is open, when in fact the control protocol is closed and proprietary. In addition, there are a number of other control and access capabilities that should be considered when comparing bid proposals. Lencore’s clients can be assured that the Spectra i.Net® System meets the necessary requirements for true open platform.

1. ANSI S1.4 American National Standard Specification for Sound Level Meters
2. ANSI S1.6 American National Standard Specification for Preferred Frequencies and Band Numbers for Acoustical Measurements
3. ANSI S1.11 American National Standard Specification for Octave-Band and Fractional-Octave-Band Analog and Digital Filters

UL LISTED FOR PLENUM USE MEETS TOUGHER STANDARDS

This is an important distinction. There are many companies that provide products that are UL listed. The Lencore Spectra i.Net® products are UL listed for use in the plenum. Lencore clients are assured that our products perform to the highest standards.
EARNING INDUSTRY ACCLAIM & AWARDS

Lencore Acoustics has been recognized and repeatedly winning awards in the industry. Below are just a few.

Buildings Magazine awarded Lencore with its Top Buildings Money Saving Product Award for Lencore’s Spectra i.Net® Networked Sound Masking System.

Buildings Magazine awarded Lencore with its Top 100 Product Award for Lencore’s Spectra i.Net® Networked Sound Masking System.

Lencore’s Music Page Interface (MPI) was awarded the Gold ADEX Award for Excellence in 2009 Design.

Spectra i.Net® networked sound masking system was voted a top winner by readers of ARCHI-TECH magazine in the Building Control category.

Lencore’s Spectra i.Net® was awarded the Platinum ADEX Award for Design Excellence.

Lencore’s Music Page Interface (MPI) was voted a top winner by readers of ARCHI-TECH magazine in the Audio/Video category.

Lencore’s Spectra i.Net® System was awarded Buildings Magazine’s Editors’ Choice: Top Product Pick Award.
LENDCORE APPLICATIONS

CORPORATE FORTUNE 500

Privacy is critical in business today.

Used by Fortune 500 companies worldwide, Lencore Sound Masking and the Spectra i.Net® System provides superior speech privacy and acoustic comfort while simplifying and accelerating system installation, tuning, balancing and controls. Developed to provide a better quality of sound for masking, paging and music as well as provide network access to the system controls, Spectra i.Net® sets a new standard for sound quality, system flexibility and user interface.

HEALTHCARE

In healthcare, patient satisfaction is key.

Hospitals are noisy. Communication between doctors and nurses and their patients happens 24/7, as does a tremendous amount of other noises like machines beeping and carts rolling down the halls. These noise levels impact patients and their ultimate satisfaction with their hospital stays. Lencore sound masking provides a series of acoustical products designed with patient comfort and privacy in mind. The Spectra i.Net® H-Series for healthcare environments offers individual, personalized volume control capabilities for sound masking in patient rooms. The system provides manual, remote and networked controls enabling patients to participate in their own healing process and hospital staff to have on line access to monitor settings. In addition, Lencore’s sound masking is used to successfully provide reasonable safeguards under HIPAA.

CUSTOMER SERVICE & CALL CENTERS

Providing measurable returns on investment in call centers.

Efficient call handling and reduced turnover are two important goals of most call centers where employees are densely packed in small cubicles or desks. With so many people in close proximity, noise levels and distraction can be at an all time high, making productivity plummet. Lencore’s sound masking provides a way to minimize some of these distractions, enabling call center and customer service operators to focus on customers and meet their needs quickly and professionally. In addition, the introduction of sound masking creates a more private and a more comfortable environment, reducing stress and fatigue and improving the overall welfare of your employees.
Protecting personal financial information starts with proper planning.

Whenever sensitive information like account numbers, or transactions, or corporate merger details are being discussed, it is imperative that proper precautions are taken and implemented to ensure that private information remains out of public consumption. Lencore sound masking provides a way to maintain appropriate levels of speech privacy so that discussions involving personal financial or confidential corporate financial information remain secure. Used in the corporate world of banking and finance or in retail banking applications, Lencore has a variety of systems with customizable features to uniquely address the privacy requirements of any facility.

In legal environments, protecting information is paramount.

Whether in deposition rooms, deliberation rooms, law offices or judge chambers, Lencore Sound Masking has helped hundreds of legal professionals and law firms maintain proper privacy levels to ensure client attorney privileged information remains private. With the ability to customize sound masking levels for any number of types of rooms or chambers, with immediate access and real time adjustment capabilities, Lencore truly provides customized privacy solutions.

In military environments, information must remain secured.

Lencore enables clients to have immediate access to sound masking and paging settings and system performance to securely monitor and document privacy levels. With Lencore, sensitive and secure information is protected and depending upon the application, normal and confidential speech privacy can be obtained. Lencore offers additional security features for overall monitoring and provides reporting capabilities for system settings and functionality. The system can even provide an alert should any of the sound masking units be tampered with to alert security of potential risk.
LENCORE PROGRAMS

FOR AV DEALERS

When sound quality matters, think Lencore.

As an AV professional you are already working in corporate and conference facilities and using control systems to monitor a variety of elements within these spaces. Lencore is in these spaces too, providing sound masking, paging and music to Fortune 500 clients worldwide. Our AV System Integrators and Dealers see Lencore as a way to add another sound solution that enables them to deliver their clients an additional product, service and audio installation that truly impacts their client’s comfort and privacy.

The opportunity to grow your business with sound masking has never been better. With federal mandates like HIPAA and GLBA setting required benchmarks for privacy and with AIA guidelines addressing LEED & acoustics becoming code – designing spaces that provide sound control and speech privacy have become critical to a project’s success.

To accommodate a variety of dealer preferences, Lencore has created a multi-level buyer program that provides three categories of sales support, marketing collaboration, pricing and other benefits to select from. For more details about each of these programs, contact Lencore at info@lencore.com.

FOR FURNITURE DEALERS

Sell more furniture and walls with the addition of Lencore Sound Masking.

Lencore dealers find that the addition of sound masking to their product lines enables them to differentiate their products and services and provides the opportunity for a consultative sale. As your client’s “expert” in sound solutions, our dealers are able to gain entry to projects much earlier in the design process. This paves the way for creating and strengthening relationships with clients and creates more opportunities for our dealers to sell more furniture and walls. In addition, sound masking as part of a comprehensive approach to good acoustics gives clients more design options and can often result in significant construction cost savings. As a preferred Lencore dealer your benefits include; special dealer pricing, showroom incentive offers, extensive product and acoustical training, local support, access to marketing resources, trade show participation and assistance and educational continuing education programs. Many of our dealers also benefit from Lencore installation training and create an additional revenue source for installation of the product. For more information about our furniture dealer program, contact Lencore at info@lencore.com.
Partnering together to build better spaces.

Lencore is proud to work with DIRTT Environmental Solutions to provide sound masking options for all of DIRTT’s moveable wall products. As spaces continue to be designed and built using alternatives to slab to slab construction, sound masking has become a key factor in ensuring that appropriate speech privacy levels are met. The inclusion of sound masking allows your design team to specify the products that meet the aesthetic and performance needs of the space while also addressing the acoustics. In fact, with a wide variety of decorative and glass wall partitions being specified in high end design, sound masking ensures that a proper threshold for speech privacy is provided and maintained throughout the treated space. Used in conjunction with moveable walls, this winning combination can result in substantial cost savings over traditional construction. Together with DIRTT, Lencore provides information on the importance of measurements such as the FSTC or field sound transmission class, which is an even greater indication of product performance in application than the much touted STC (Sound Transmission Class).

Lencore’s DIRTT dealer benefits include special dealer pricing, showroom incentive offers, extensive product and acoustical training, local support, access to marketing resources, trade show participation and assistance and educational continuing education programs. Many of our dealers also benefit from Lencore installation training and create an additional revenue source for installation of the product.

Lencore products on GSA Schedule for ease of purchase.

To provide a cost effective sound masking solution on GSA Contract, Lencore has put a number of sound masking products on our GSA Program. This program was created in order to provide our government clients with the ability to conveniently purchase Lencore products on GSA Schedule and through GSA Advantage.

State and local government entities that may use the GSA Advantage include: States, counties, municipalities, cities, towns, townships, tribal governments, public authorities, school districts, colleges and other institutions of higher education council of governments, regional or interstate government entities, or any agency or instrumentality of the preceding entities, and including legislative and judicial departments. The term does not include contractors of, or grantees of state or local governments. To facilitate an easy purchase you will need our contract information. Please contact Lencore for more details about the products available and our GSA Contract number at gsa@lencore.com.

FOR DIRTTE DEALERS

In addition, Lencore and DIRTT have partnered together on DIRTT’s GSA Contract to offer fully modular solutions for office environments. For more information about DIRTT, visit www.dirtt.net.

For more information on working with Lencore as a DIRTT dealer, contact Lencore at info@lencore.com.

FOR GOVERNMENT CLIENTS

State and local government entities that may use the GSA Advantage include: States, counties, municipalities, cities, towns, townships, tribal governments, public authorities, school districts, colleges and other institutions of higher education council of governments, regional or interstate government entities, or any agency or instrumentality of the preceding entities, and including legislative and judicial departments. The term does not include contractors of, or grantees of state or local governments. To facilitate an easy purchase you will need our contract information. Please contact Lencore for more details about the products available and our GSA Contract number at gsa@lencore.com.
LENCORE YOUR PARTNER IN EDUCATION

American Institute of Architects

The American Institute of Architects plays an active role in the continuing education of its members. At Lencore we strive to provide valued opportunities for AIA members to maximize their professional skills through effective learning programs and presentations on acoustics and sound masking. As a registered provider of continuing education for the AIA, Lencore teaches architects about the importance of acoustics and its impact on the spaces that they design. We also provide presentations on key industry trends, legislation, construction methods and technologies that affect the acoustics and the overall speech privacy and comfort of work environments. For more information or to book a Lencore AIA presentation at your office, contact Lencore at info@lencore.com.

International Interior Design Association

Lencore understands the value of continuing education and research and realizes that this has been the mainstay of IIDA since its inception. Lencore has responded by offering IIDA multiple programs and presentations on acoustics, speech privacy, HIPAA Oral privacy and sound masking. We understand that educated practitioners make informed, safe, and creative decisions that affect the spaces that we live and work in. Lencore is consistently looking for new areas to explore and provide educational content with regard to key industry trends, legislation, construction methods, and technologies that affect the acoustics and the overall speech privacy and comfort of the work environment. For more information or to book a Lencore IIDA presentation at your office, contact Lencore at info@lencore.com.

International Facility Management Association

As a corporate sustaining partner of the International Facility Management Association, Lencore is proud to provide educational webinars and seminars for this organization and its members. Whether at their national World Workplace trade show, or as part of local outreach programs to community chapters, Lencore enjoys the opportunity to work directly with facility professionals to teach them about making sound decisions and understanding the important criteria for selecting and specifying sound masking and paging systems. Lencore also shares with IFMA a tremendous amount of general acoustical knowledge as well as awareness programs for emerging standards, technologies, and trends with regard to acoustics and sound masking. A frequent contributor to IFMA publications and newsletters, Lencore maintains a strong presence as an educational partner with the organization. For more information or to request a Lencore presentation or editorial contribution, please contact info@lencore.com.
InfoComm International

Lencore’s relationship with InfoComm has opened up a whole new world of AV professionals, dealers, consultants and system integrators. Our commitment to the AV industry is strengthened by a growing list of continuing educational programs that offer CTS credits. These programs provide information on acoustics, speech privacy and sound masking. Lencore has a variety of publications and collateral that is used by the AV industry in identifying the key criteria for quality sound masking systems and sets industry benchmarks and performance specifications for systems. Lencore offers our programs in connection with InfoComm International’s yearly expo and also is available to provide courses at a local level and via webinar where needed or requested. For more information on Lencore’s CTS courses and our provider capabilities, please contact Lencore at info@lencore.com.

National Joint Apprenticeship and Training Committee

Lencore has partnered with the NJATC who works alongside of the American Council on Education (ACE) to provide curriculum materials for inclusion in their training and study guides. The NJATC uses its training materials for the IBEW (International Brotherhood of Electrical Workers) and the NECA (National Electrical Contractors Association) to instruct them on technical information and proper procedures and methods for installing various equipment. Lencore is proud to be an educational resource for information on sound masking for this organization and its affiliates.

Lencore’s commitment to education is part of our core mission statement. As the sound masking industry continues to expand and grow its reach, we are constantly looking at new organizations to partner with to provide accredited programs. If you have an organization that can benefit from educational information on acoustics and sound masking or would like to better understand key industry trends, legislation, construction methods, and technologies that affect the overall speech privacy and comfort of the work environment, please contact Lencore at info@lencore.com.
Sound masking has evolved tremendously over the last thirty years and in the last five years, there have been remarkable changes in its technology with the emergence of networked sound masking systems.

Spectra i.Net® Networked Sound Masking System sets a new standard for sound quality. Used by Fortune 500 companies worldwide, the system provides superior speech privacy and acoustic comfort while simplifying and accelerating system installation, tuning, balancing and control.

The system offers extensive zoning capabilities, plug and play speaker installation, a revolutionary music and paging interface, an intuitive GUI for central system controls, as well as digital, remote and IR control and system access.

For added security and ease of system integration the system is based on open platform protocols and meets ANSI 709.1 for true open platform systems providing end users, consultants and integrators with one control point for total system access.

The Spectra i.Net® System offers a full 1/3 octave band and parametric EQ which provides unprecedented tuning options and the ability to isolate single frequencies. The system’s tuning tolerances are within +/- ½ dBA and are the tightest available on the market today.

From initial start up, the system’s user interface enables on-the-fly zone creation and modification, and easily accommodates real time changes to system settings for masking volume and contour.

In addition, independent volume and EQ controls for paging and music enables Spectra i.Net® to virtually provide three systems in one - masking, paging and music.
The sound masking equipment changes are also impressive. With the use of the system’s data connections and integrated sound generators and amplifiers, gone are the cumbersome masking and paging racking systems of the past. In its place is a streamlined Music Page Interface that works together with the system’s web-server (i.LON® 100), sound generators and speakers which can support up to 1.5 million square feet of masking, paging and music.

System zoning capabilities include up to 99 programmable zones and an all call page with additional capabilities for multiple zone overlap per single speaker channel utilizing Lencore’s Point Z technology.

The sound sources (OP’s) are powered by a 48v supply and the OP’s and speakers are UL listed for use in the plenum and installed using plug and play connections.

Connect to the system remotely through password protected access or on site to access the Sound Manager - Lencore’s user friendly interface to make real time changes to the system settings.

Spectra i.Net® Networked Sound Masking provides clients with unprecedented sound quality, comfort & control.
WHY SOUND MASKING?

Because spaces that are treated with Lencore sound masking provide people with comfort, privacy and a better overall environment.

Transforming an office into a purposeful, productive environment is what Lencore does with its sound masking systems every day. By creating environments that support both heads down work and collaborative efforts, Lencore Sound Masking improves productivity, comfort, reduces employee turnover, and can save thousands of dollars in construction costs while providing a very impressive return on investment.
Acoustics has become a critical issue to the productivity, privacy and comfort of employees. In corporate environments sound masking has become a key component that addresses the speech privacy needs of employees in the open plan and in private offices. In addition, privacy legislation such as HIPAA (Health Insurance Portability and Accountability Act) and GLBA (Gramm Leach Bliley Act) have created mandates within the healthcare and financial industries to provide adequate levels of oral privacy. Furthermore, LEED interiors and green design is contributing to a growing need for sound masking as some green design practices bring about additional acoustical challenges.

The tremendous growth in the sound masking market has been brought about by a variety of factors. Among them are the many significant changes in the way we design and build spaces today. Improvements in building systems such as quieter HVAC systems and higher performing ceiling tiles as well as other design choices have reduced the ambient background sound and have limited some of the absorbing and blocking properties found in the space. This has created additional speech privacy issues and an increased need for sound masking.

Meanwhile, the noise levels in our work environments continues to grow as we move more people into the open plan and increase floor densities. Cell phone and speaker phone use means that people are walking and talking in our spaces and this creates traveling conversations and noise. Even some of our technology advancements, such as voice activated equipment, contribute to the level of distraction in our spaces. Still more design changes, such as the lowering of workstation panel heights in an effort to improve the day light in the work space results in reduced sound blocking.

Increasing privacy and productivity with sound masking reduces distractions and creates several positive effects such as improved efficiency, reduced stress, and more comfortable spaces in which to work. This is good news for all companies that must balance the need to and collaborate in the same working environment.

Lencore’s Spectra i.Net® Networked Sound Masking treats the entire environment with the introduction of a subtle, uniform background sound that masks speech and provides acoustical comfort with unprecedented comfort, control and sound quality.
In certain situations and during emergency events the dissemination of information is key to life safety. Messages must not only be seen and heard - they must be understood.

Today, MNEC systems have grown to protect us against more than just fires. These systems alert us and provide us with critical information and directions to follow during dangerous weather, acts of terror or other hazardous events. To reach the majority of occupants, these messages must integrate across multiple platforms and include a complete range of communication methods - both visual and auditory.

Lencore systems address the two critical factors in developing a Mass Notification and Emergency Communications system: Reach and Clarity.
Reach
In an emergency, providing coverage and reach to 100% of the intended audience is key to being able to inform and instruct occupants. This coverage and reach is impacted by volume levels, settings, design, audio quality and installation practices.

Clarity
Clarity is the degree to which the intended audience understands the message they are receiving. Dedicated to understanding parameters of intelligibility, Lencore is uniquely positioned to deliver sound quality and clarity for all of its MNEC systems. Lencore’s engineered solutions for MNEC are fully integrated to offer dynamic local and global communications and customized messaging to suit your specific needs.

Each MNEC System is also capable of supporting sound masking, day to day paging and background music to provide clients with privacy, comfort and multiple levels of communication. The scalability of Lencore’s Mass Notification Emergency Communication systems is virtually limitless, enabling it to grow with and evolve to meet client needs.

Engineered System Solutions
Lencore’s Engineered Systems for MNEC provide a completely packaged solution for ease of use and installation. Using a branded enclosure, all the systems’ head end equipment is expertly assembled, prewired and ready for on-site installation. Based on need, optional equipment can be added to the system for additional features.

The components of the system provide robust zoning capabilities, multiple levels for emergency and mass notifications, complete system redundancy and pre-recorded messaging.

The system can tie together multiple floors, facilities, or even entire campuses to provide universal communication system that can be accessed locally and globally to ensure that important announcements can be heard at the facility whether it is across the parking lot, across town, or around the world.

Lencore’s mass notification solutions provide the coverage, reach and clarity clients need to ensure quality communications during emergency events.
Be careful when vendors claim to be open when in fact they most likely are not. They must meet ANSI 709.1 to be considered true open.

While TCP/IP is a standard in the data world, it is NOT a control protocol. If TCP/IP operates as open transport, one must still provide or develop an open control protocol. The temptation is for vendors to define a new control protocol riding on the coattails of the open TCP/IP standard, proclaiming the overall approach “open” because TCP/IP is open, when in fact the control protocol itself is closed and proprietary.

Make sure your vendor’s “open” is truly open and not based on vendor driven control protocols.
THE IMPORTANCE OF HOLDING PERFORMANCE SPECIFICATIONS

Sound masking clients rely on the expertise of consultants to recommend optimum solutions and specific products or treatments that will achieve their acoustical objectives.

Clients need consultants to explain important differences in system capabilities. For instance, a consultant can easily make a client understand the limitation some small speakers have in being able to produce low frequencies and how this will affect the speaker's performance. Similarly, a consultant can show clients the value of working with a system that provides full 1/3 band octave EQ versus partial 1/3 band octave EQ or the importance of having a system that is based on an open platform and standard protocols. Consultants intrinsically understand the value of these features and can help guide clients towards the solution and products that best fit the goals and objectives of the client.

When a consultant designs a specification for a sound masking system, they review the key criteria and address the most important elements and features for the system. To insure the overall effect and satisfaction with the masking system, these specifications should be performance based not product specific.

All systems are not created equal and holding vendors to meet the performance criteria for masking systems is crucial to the success of the masking installation. Asking for a tolerance of +/- 1 dBA and accepting a system that can only provide a tolerance of +/- 3dBA can have significant impact on the project’s ultimate success.

Once a performance specification is defined, it is critical to the project and its ultimate success, that the performance criteria for the system be upheld.

Lencore’s sound masking performance specifications and a copy of our Master Specification follow for your convenience.
SYSTEM COMPONENTS AND OVERVIEW

The Spectra i.Net® System components include sound sources, speakers, web server (i.Lon100®) devices, integrated amplifiers, a full 1/3 octave band equalizer and parametric equalizer, remote control, power supplies, a music page interface and the Sound Manager, a graphical user interface for networked, central system access and control. The following pages highlight some of the system's key equipment.

SOUND SOURCE – THE OP

- Each of the Spectra i.Net® masking system's sound sources (called Operating Platforms or OP's) are engineered with a robust DSP that produces four independent noise sources and distributes the sound over four separate channels to provide the best random sound with no audible repeats. The random blend of sound sources insures there are no problems with phasing and contributes positively to the overall acoustic comfort within the masked space.
- Capable of distributing high quality paging and music through the masking speakers, the Spectra i.Net® System offers independent volume controls separate from the masking. Zoning capabilities include 99 programmable zones and all call. In addition, each OP has four speaker channels each with the ability to carry up to 11 overlapping zones (all call plus ten programmable).
- The Spectra i.Net® Networked System’s independent equalizers offer unprecedented tuning where every channel of the system has a separate and independent full 1/3 band and parametric EQ.
- Sound frequencies and contour for Spectra i.Net® can be adjusted and set to any point on the acoustical curve between 20Hz and 20kHz for fine tuning of the sound spectrum.
- The system’s intuitive network can bypass any failure in the system to keep communication flowing throughout the system.
- The multi-drop command structure enables complete diagnostics and reporting of the system for status and settings for the DSP, RAM, Neuron, EQ, and volume and contour settings for masking and volume settings for music and page.

WEB SERVER – i.LON® 100

- Open integration is critical and Lencore’s Spectra i.Net® incorporates the Echelon® i.Lon® 100, a plug in, electronic web server with data port that acts as the network conduit and relays information from the system’s online Sound Manager to the OP’s.
- Using the i.LON® 100 internet server platform allows remote connectivity to the system and provides the ability to make system adjustments to the masking sound level. It also is a means of integrating the system to existing LonWorks® based building automation systems.

MUSIC PAGE INTERFACE

- The Music Page Interface (MPI) of the Spectra i.Net® System replaces all of the bulky head end equipment that is typically associated with music and paging systems, enabling end users to make zone additions, modifications, deletions and other changes without the need for additional cable home-runs, amplifiers, separate equalizers, special switching equipment or matching vendors for compatible product interfaces.

Echelon, LonWorks and i.Lon100 are registered trademarks of Echelon Corporation.
SPEAKERS

- High quality sound is best when delivered through high commercial grade speakers.
- Lencore’s speaker enclosure are constructed of aluminum with a magnet weight of 10 oz and a 5 inch wide dispersion for optimum performance. The speakers are UL listed for use in the plenum and are equipped to receive standard RJ45 connectors for ease of installation.

SYSTEM CONTROLS

Sound Manager/GUI:
Included with every Spectra i.Net® System is the Sound Manager, the system’s centralized control program, a private, password protected user interface. The GUI is based on an open-architecture software platform that controls and monitors the complete sound masking, paging and music system.

Remote Control
The Spectra i.Net® System comes complete with a hand-held remote control for immediate, manual field adjustments for volume and contour for masking, paging and music. Point the remote to a wall mounted, infrared receiver panel or directly at an OP.

Touch Pad
The Spectra i.Net® Touch Pad controller provides wall access and immediate adjustments for the masking, music and paging. The touch pad also includes an option to mute and un-mute the masking, paging and music.

INSTALLATION

- The Spectra i.Net® System sound sources and speakers are connected by audio cables. The OP’s and speakers have integrated RJ connections for simple plug and play installation.
- Each OP has four speaker channels and each speaker channel can support 1-8 speakers.
- Paging and music can be added to the system with the simple addition of the Music Page Interface (MPI). This replaces all of the traditional racking equipment associated with most paging systems. The MPI, i.LON100® and power supply can easily fit in a 24x24 junction box installed in the electrical closet and can support up to 1.5 million square feet with this head end equipment.

The information that follows will provide you with technical specifications and information for all of the Spectra i.Net® System components as well as general performance specifications, system schematics, master specifications for networked systems, and a helpful bid checklist to use when evaluating sound masking systems for privacy, comfort, network operations, and paging capabilities.

If you need further information or assistance, contact Lencore at info@lencore.com or by phone at 516-682-9292. You can also visit us at www.lencore.com
SYSTEM SCHEMATIC OVERVIEW
LENCORE SOUND MASKING SYSTEM

FUNCTION
- The Lencore Spectra i.Net® Sound Masking System's intuitive technology, infinite flexibility and open-platform system design revolutionizes the standard for sound quality and adjustment capabilities for networked sound masking systems.
- The Spectra i.Net® Sound Masking System provides a new level for customization and performance and outperforms other masking systems on every point that matters. It is the only system that can provide all of the following:
  + Sound Quality, Comfort and Uniformity
  + Speech Privacy
  + Music Page Interface
  + Open Platform System with Multi-Drop Network
  + System Flexibility, Reliability & Accessibility
  + User Controls, Diagnostic Capability
  + Ease of Use, Installation and Tuning
  + 10 year Warranty
- The Spectra i.Net® is ideal for larger projects with multiple floors or with multiple campus buildings and when network control for the system is desired. Ideal project sizes can range from 25,000 - 2,000,000+ square feet depending upon project needs and scope of work. The network server and sound manager for the system can program hundreds of zones for masking, paging and music; offers a parametric EQ or full 1/3 band octave EQ for masking and a one octave band EQ for paging and music.
- The system’s Music Page Interface is revolutionary for paging capabilities.
- The sound masking system is capable of separately and independently configuring zones for sound masking, paging and music via the network empowered through its central control.
- The system is designed so that an individual speaker or component failure will have no impact on the balance of the system.
- The masking volume is adjustable via digital means in 1/2 dB steps for a range of 36-84 dBA as measured 1m from the center of the speaker. The sound masking system is also able to provide muting capabilities.
- The sound masking, paging and music has individual identifiers displayed on an integrated LCD screen on each network node (OP).
- The sound generating units have an adjustable sound spectrum shaping control in order to meet the varying spectral requirements of drywall ceilings; various types of ceiling tile, air return grills and openings around lighting fixtures, etc.
- The system is capable of performing complete diagnostic functions and uses an open platform operating system (LonTalk®) and utilizes off-the-shelf browser software for full manipulation without any proprietary software and no migration or security issues.
- The Spectra i.Net® System is unequalled in sound quality, acoustical comfort and speech privacy.
LENCORE SOUND MASKING SYSTEM

– PERFORMANCE SPECIFICATIONS
+ All masking/paging units must be UL listed for air handling space
+ System must conform to ANSI standards: ANSI S1.4, ANSI S1.6 and ANSI S1.11
+ System must meet ASTM E1130-02, ASTM E1573-02, ASTM E 1374-93, and ASTM E 1041-85 standards
+ Generation and integration of multiple random sound masking sources and by using E-sound® technology equates to the best sound and effective sound masking
+ The Sound Masking system must be capable of separately and independently configuring zones for sound masking, paging and music via the network empowered through its central control
+ The Sound Masking system must produce 20Hz through 20,000Hz from its source
+ The masking must be random and provide a minimum pattern of no LESS than 25 hours
+ The sound masking devices must provide both a 1/3 octave band equalizer for a minimum of 30 bands and a parametric equalizer to adjust the sound masking
+ The paging devices must have a minimum of an octave band equalizer to shape sound
+ The masking volume shall be adjustable via digital means in ½ dB steps for a range of 36-84 dBA as measured 1m from the center of the speaker
+ Spatial uniformity of sound must be no more than ±½ dBA
+ Sound masking system must be able to provide music muting capabilities to allow paging to smoothly override masking
+ Speaker housings/enclosures must be damped to avoid undesirable resonance
+ System shall be designed so that individual speaker or component failure will have no impact on the balance of the system
+ Sound masking equipment must be comprised of at least 50% recycled content
+ A 10 year full warranty from the manufacturer must be provided for all sound masking equipment
+ The system must be manufactured in the USA

– NETWORK CONTROLS
+ System must be capable of being tuned through a network and a hand-held remote
+ System must be capable of being used as a stand-alone system or a system tied into an intranet IT spine or manipulated through the internet
+ System must be a multi-drop network system. Point-to-point systems are unacceptable
+ System must be capable of using off-the-shelf browser software for full manipulation
+ System must be capable of full diagnostic reporting that includes the ability of emailing alarm notifications.
+ The system must be capable of being independently zoned on both a global and local level for sound masking, paging and music. All zoning must be controlled from a network appliance
+ System must be capable of performing a complete diagnostics of its entire functions including diagnostics of the network, hubs, nodes, routers, dsps, memory, circuitry, amplifiers and power
+ System must be capable of reporting entire settings for each zone for masking, paging and music indicating at a minimum the volume, contour, 1/3rd band octave equalization, parametric equalization, diagnostics, and groupings

– SECURITY
+ System must be an open platform system. Proprietary software systems are UNACCEPTABLE
+ Central control must only be able to be accessed via an authorized computer access point with the use of a password

– SYSTEM IDENTIFICATION
+ Sound masking, paging and music must have individual identifiers displayed on an integrated LCD screen
+ Plenum mounted network locations must have a lighted LED for visual inspection
MUSIC PAGE INTERFACE (MPI) (MODEL G505)

FUNCTION
- Lencore’s Music Page Interface (MPI) replaces all the bulky head-end equipment that is associated with music and paging systems. With the MPI there is no need for additional cable home-runs, amplifiers, separate equalizers, special switching equipment or matching vendors for compatible product interfaces. The MPI’s technology is so sophisticated that it can allow zone additions, modifications, deletions and other changes to the paging system on the fly, without rewiring. This eliminates the need for running multiple home runs back to the electrical closet or through building risers to create separate or additional zones.
- The MPI allows the ability to use up to 99 individual zones for paging using standard DTMF tones through a POTS telephone line. The system is also programmed for all-call and emergency broadcast paging. The system’s easy to use full one octave band equalizer can be adjusted to either individual zones or all zones and provides exceptional fine tuning capabilities.
- When the MPI is connected to the Spectra i.Net’s® web appliance (i.LON®), programming can be set for up to 1.5 million square feet of space through a single device.
- The Spectra i.Net® MPI incorporates Point Z™ technology allowing each individual speaker channel to carry up to 10 programmable zones. Paging has never been so versatile & clean.
- The creation, modification, addition and deletion of zones or groups for paging and masking can be easily controlled through the i.LON’s® web browser using the included Lencore Sound Manager. No proprietary software needs to be installed on the client’s side, eliminating security and migration issues. The Lencore Spectra i.Net® System is an open platform system. In addition, volume and equalizer settings for paging and music can be programmed through the Sound Manager or Spectra i.Net® Reports offering tremendous adjustment and control capabilities with unprecedented flexibility.
- Adaptive Equalization: The unmatched capabilities and superior paging quality of Lencore’s system automatically compensates and readjusts for frequency line loss while ensuring a quality signal that is continuously and uniformly broadcast and distributed throughout the entire system. Essentially this means that throughout the miles of audio wire, line loss will be virtually negligible. This results in a crystal clear page whenever you need it, wherever you are in your facility.
- The MPI unit typically installs in the Telephone or IT closet. The MPI accepts a POTS line for all-call and zoned telephone paging. In addition, there are left and right audio inputs for music, all-call page, microphone input and testing input.
MUSIC PAGE INTERFACE (MPI)

- **PAGING VOLUME ADJUSTMENTS**
  Individual channels
  Maximum output – 5.3 Volt RMS at speaker terminal
  Attenuation range – 48 dB, in 1 dB steps, plus a mute setting

- **PAGING ZONES**
  Individual channel, groups or global paging zones
  Point Z™ Technology (Each channel can carry 10 programmable zones)

- **PAGE TESTING SETTINGS**
  Service Button 1 - starts All Call page and set to on or off
  Used for sending continuous audio over inputs for testing
  Service Button 2 - sends test audio files over page lines

- **LED GUIDES FOR VOLTAGE INPUTS**
  On back of MPI unit there are two potentiometer to adjust audio and voltage inputs for both paging and music. The LED displays on the front of the unit provides visual confirmation that voltage are in range.
  + LED’s 1 (Page) - No Light: No input
    Yellow light: Tel/Audio input too low
    Blue Light: Good
    Red Light: Hot
  + LED’s 2 (Music) - No Light: No input
    Yellow light: Tel/Audio input too low
    Blue Light: Good
    Red Light: Hot

- **E.B./MUSIC VOLUME ADJUSTMENTS**
  Independent channels
  Maximum output – 5.3 Volt RMS at speaker terminal
  Attenuation range – 48 dB, in 1 dB steps, plus a mute setting

- **EMERGENCY BROADCAST/MUSIC ZONES**
  Individual channel, groups or global music zones

- **PAGING/E.B./MUSIC OCTAVE EQUALIZER**
  One page/music equalizer for all channels
  10 bands, 31 Hz to 16 kHz, each user adjustable by ±5 dB in 1 dB steps

- **POWER SUPPLY**
  Input from building power – 100-240 VAC, 50-60 Hz, 1.0A
  Output to MPI device – 7.5 VDC, 4.0A, 30W max

- **DIMENSIONS**
  6” x 8 3/8” x 1 7/8”

- **ELECTRICAL SPECIFICATIONS**
  Input voltage – 7.5 Volts DC
  Input current – 333 milliamps DC
  Power usage – 2.5 Watts
  Power jack – Mates with 2.1 mm inner
  5.5 mm outer
  11 mm plug length
  On/Off slide switch

- **TELEPHONE PAGE USAGE**
  + Lift telephone receiver
  + Dial access code – (*) = Backspace
  + Wait for short dial tone
  + Dial two digit paging zone number and the # key or
  + Dial 00# for all call page
  + Wait for short beep
  + Issue page
  + Hang up – (*) = Hang up after zone is dialed

- **INPUTS**
  LonWorks® network. Connects to i.LON®100 Internet Server Screw terminals
  + Audio/Mic input - Microphone input allows stationary mic to be used for MPI input - Dry contact switch allows use to override telephone input
  + Dry Mic Contact Switch - Sends all call page to OP’s when closed (overrides tel input). All call off when relay is open
  + Audio/Mic-Tel Switch - Switches between inputs (dry contact overrides swtich)

- **PAGE**
  POTS line telephone input. RJ11 connector
  1. 2 wire (tip and ring) analog appearance
  2. Configured to be loop start
  3. Battery voltage is 48 volts
  4. Loop current is 23 milli amps
  5. Must have DTMF signaling capability
  6. Must have hang-up (winking) supervision
MUSIC PAGE INTERFACE (MPI)

- **STEREO / MUSIC**
  + Left channel, 10k ohm input impedance, unbalanced, single ended RCA jack (phono connector)
  + Right channel, 10k ohm input impedance, unbalanced, single ended RCA jack.
  + Input impedance is 10K ohms
  + Gain from RCA jack to RJ45 pins 7 and 8 is 2 when internal potentiometer is set to maximum.
  (With 620 ohm terminator)
  
  Note: Left and right channels are combined to form one music input.
  All music inputs using the RCA jacks are single ended inputs.

- **RECOMMENDED SETTING OF INTERNAL POTENTIOMETER OF MUSIC INPUT**
  + USA professional audio, +4 dBu, 1.228 Vrms 10 o’clock position (approximate)
  + Consumer audio, -10 dBV, 0.316 Vrms 3 o’clock position (approximate)
  + Tungsten T3 PDA, 5 o’clock position (approximate)
  + Ipod, 3 o’clock position (ipod volume set to 3/4)
  + 1 Vrms signal generator, 10 o’clock position (approximate)
  + 0.7746 signal generator, 11 o’clock position (approximate)

  Ex: Set POT to min if input is 1 Vrms
  Set POT to max if input is .25 Vrms
  *Do NOT exceed 1 Vrms input

- **OUTPUTS**
  + Cat5e data cable, RJ45 connector. Connects to OP’s
  + Page output, pins 4 and 5 of RJ45 is a balanced output
  + Music output, pins 7 and 8 of RJ45 is a balanced output
  + Two ground (common) screw terminal block. Connects to (-), ground, of first OP

- **ADAPTIVE EQ OUTPUTS**
  Besides the normal Adaptive EQ procedure these output signals can be used as a signal generator.
  All measurements are made differentially with a ground strap from MPI board to test equipment. Short Cat5e were used, approximately 6-feet.

  31 Hz. – 0.440 Vrms (1.2445 Vp-p) unterminated
  0.297 Vrms (0.8400 Vp-p) terminated into 620 ohms

  63 Hz. – 0.495 Vrms (1.4001 Vp-p) unterminated
  0.410 Vrms (1.1597 Vp-p) terminated into 620 ohms

  125 Hz. – 0.514 Vrms (1.4538 Vp-p) unterminated
  0.460 Vrms (1.3011 Vp-p) terminated into 620 ohms

  250 Hz. – 0.518 Vrms (1.4651 Vp-p) unterminated
  0.475 Vrms (1.3435 Vp-p) terminated into 620 ohms

  500 Hz. – 0.516 Vrms (1.4595 Vp-p) unterminated
  (500 Hz is best for field testing)
  0.476 Vrms (1.3463 Vp-p) terminated into 620 ohms

  1 kHz. – 0.500 Vrms (1.4142 Vp-p) unterminated
  0.463 Vrms (1.3096 Vp-p) terminated into 620 ohms

  2 kHz. – 0.450 Vrms (1.2728 Vp-p) unterminated
  0.417 Vrms (1.1795 Vp-p) terminated into 620 ohms

  4 kHz. – 0.348 Vrms (0.9843 Vp-p) unterminated
  0.322 Vrms (0.9108 Vp-p) terminated into 620 ohms

  8 kHz. – 0.241 Vrms (0.6817 Vp-p) unterminated
  0.223 Vrms (0.6307 Vp-p) terminated into 620 ohms

  16 kHz. – 0.186 Vrms (0.5261 Vp-p) unterminated
  0.172 Vrms (0.4865 Vp-p) terminated into 620 ohms
**MUSIC PAGE INTERFACE (MPI)**

**MPI FEATURES & BENEFITS**

- Local paging via telephone - up to 100 zones
- Global input for multi-building, campus wide paging
- Mic or canned announcement input to override for emergency notification
- Service buttons #1 and #2 allows for full test for page continuity over entire system
- Music input to easily play music over system or zone
- AGC (Automatic Gain Control) implemented to ensure quality paging
FUNCTION

- The Lencore Spectra i.Net® Sound Masking System uses the i.LON® 100 web server as its head-end equipment to control the networked system. The i.LON® 100 offers exceptional features, solid construction, plus the flexibility to monitor and control the sound masking from virtually anywhere.
- Through the i.LON® 100 you can access the Spectra i.Net® System from a local network, a virtual private network, through the internet, or directly through the i.LON® 100 user interface.
- The system’s built in authentication features ensures that only authorized users can access the network.
- The i.LON® 100 can serve as a gateway for a variety of device types, including LonWorks®. It provides universal connectivity for the devices attached to it, making their data available to corporate IP networks and the Internet, and providing local device monitoring and control via built-in scheduling, alarming, and data-logging applications. With it, the sound masking system can be connected, remotely configured, monitored, and controlled from across the room, or around the world.

DIAGNOSTICS & REPORTING

- The system is capable of performing complete diagnostics of all its functions including diagnostics of the network, nodes, DSPs, memory, circuitry, amplifiers and power.
- The system is also capable of reporting entire settings for each zone for masking, paging and music indicating volume, contour (1/3rd band octave equalization, parametric equalization), diagnostics, and groupings.

PROGRAMMABLE AUDIO-LEVEL CONTROL UNIT (TIMER)

- Standard applications include scheduling, and analog functions. The scheduling application permits events and exceptions to be initiated based on time and date schedules configured by the user.

SECURITY

- The central control is able to be accessed via an authorized computer access point with the use of a password. The i.LON® 100 offers interoperable networking based on open standards and fully supports ANSI 709.1 protocol.
**i.LON® 100 INTERNET SERVER**

- **DIMENSIONS**
  + w 5.47” h 3.51” d 2.60”

- **PROGRAMMABLE ATTENUATION RANGE**
  + -24 to +24dB (49dB)

- **SLIDE CONTROL ATTENUATION RANGE**
  + -24 to +24dB (49dB)

- **MINUTES PER DB CHANGE**
  + User programmable

- **ACCLIMATION ATTENUATION RANGE**
  + -24 to +24dB

- **ACCLIMATE DAYS PER DB CHANGE**
  + 1 to 7 days

- **PROGRAMMABLE EVENTS**
  + 24 events per day for each zone

- **INPUTS/OUTPUTS**
  + 2 opto-isolated digital inputs
  + 2 high-voltage, high-current relay outputs
  + Auto-polarity 10/100Base T Ethernet interface
  + Supports connection to an external wireless GSM or GPRS modem
  + Supports LonWorks® twisted pair (TP/FT-10) and power line (PL-20) channels

- **POWER**
  + Operating Input Voltage 100-240 VAC, 50/60Hz
  + Power Consumption 15 watts

- **NETWORK CONNECTOR**
  + Screw terminals

- **INDICATORS**
  + Power On/Wink
  + Ethernet link, activity, 10.100Mbps
  + LONWORKS service
  + 2 Digital Inputs
  + 2 Relay Outputs
  + 2 Metering Inputs
  + Remote network interface connection status
OPERATING PLATFORM (OP)
(MODEL G525)

OP SOUND SOURCE
- The heart of the Spectra i.Net® is the OP (Operating Platform), the primary sound source that produces, equalizes and distributes the sound for masking, music and paging. Each OP includes:
  + Multiple, random sound masking sources, coupled with Lencore’s technology, produce a sound quality that is random, making it exceptionally comfortable environment.
  + Independent equalizers for unprecedented tuning where every channel of the system has a separate and independent 1/3rd octave band equalizer or parametric equalizer.
- Sound frequencies and contour can be adjusted and set to any point on the acoustical curve, from 20 Hz to 20 kHz, making the Spectra i.Net® the first networked sound masking system to make fine-tuning the entire spectrum of sound possible.
- The multidrop system and network is intelligent enough to bypass any failure in the system to keep communicating throughout the entire network. Point-to-Point networks can not achieve this level of connectivity and diagnostic control.

FLEXIBILITY
- Groupings of sound sources and channels let you customize an almost limitless number of zones for masking, paging and music, while maintaining the advantages of complete networked operation and control.

FEATURES AND CAPABILITIES
- The remote control or i.LON® sends information and directions up to each OP within the network for system tuning and modifications.
- The OP displays information on its integrated LCD screen, including the specific address of the respective enclosure. This address aids in locating the correct OP in the ceiling plenum, when checking or modifying the system.
- The OP checks during a diagnostic test for system performance, including the operation of the network, program, memory, power, and characteristics of sound masking.
  + Each channel on the OP functions independently, and provides four non-coherent random sound sources per OP. Each OP is exactly incoherent from all other OPs

INTEGRATION OF SEPARATE PAGING AND MUSIC CHANNELS
- Each channel can be digitally controlled for zone management and changed on the fly without any change in wiring.

OP is UL Listed and approved for use in air-handling spaces.
OPERATING PLATFORM (OP)

– ENCLOSURE
  + Brushed Aluminum
  + Dimensions – w 10” x h 7” x d 1 7/8”
  + Weight – 2lbs

– SOUND GENERATOR
  + Octave bands – 25Hz to 20,000Hz
  + Parametric bands – 20Hz to 20,000Hz
  + Voltage – 48 Volts DC
  + Contour Adjustments
  + Spectrum Adjustment – Meets Acoustical Preferred Curve

– OUTPUT ADJUSTMENTS
  + 1/3 octave band EQ for entire spectrum (25Hz- 20KHz)
    Meets ANSI specification for bands
  + Parametric EQ for entire spectrum (20Hz-20KHz)
  + Volume control for individual channels, groups/zones, or global for sound masking, paging and music
  + Contour control for individual channels, groups/zones or global for sound masking
  + EQ control for individual OP’s or global for paging/music
  + EQ control for individual channels, groups/zones or global for sound masking
  + Programming of groups and zones

– SPECTRUM SHAPING
  + Units are able to be shaped with a full 1/3 band octave equalizer (30 bands)
  + Units are able to be shaped with a parametric equalizer
  + Equalizers cover the full spectrum to manipulate the entire spectrum from 20Hz to 20KHz

– PROGRAM MEMORY
  + Non-volatile for one year minimum, without power

– WIRE REQUIREMENTS
  + Power – 16 gauge, plenum rated, stranded, 2-conductor wire (for power supply to OP)
  + Audio & Data – Cat 5e cable or equivalent, 4 twisted pair, with standard RJ45 connectors
    - 4 twisted pair (audio cable and speaker cable)
    - 4 twisted pair (data cable)

– REMOTE INFRA-RED VOLUME/CONTOUR CONTROL
  + Remote volume and contour control adjustments for masking, paging and music. Point the remote to a wall mounted, infrared receiver panel or directly at an individual OP to make immediate adjustments

– PAGING EQUIPMENT
  If paging option is required, see product sheet for Lencore’s Music Page Interface (MPI)

MASKING/PAGING UNITS ARE UL LISTED FOR USE IN AIR HANDLING SPACES

OTHER SYSTEMS ALSO AVAILABLE
Spectra®, CrossNetOne™, CrosswaysOne™
FUNCTION

- The Spectra i.Net® speakers enable the masking to be distributed uniformly throughout the space. Typically hung above the ceiling tiles, the speakers fill the plenum with sound that gently filters into the environment below to create speech privacy. Spectra i.Net® speakers are perfectly matched for the OP to ensure the highest quality of sound masking.

- Speakers used in the Spectra i.Net® system are configured with integrated RJ45 connections for plug and play and ease of installation. The speakers feature an aluminum housing, 5-inch wide dispersion and weigh approximately three pounds each.

- There are two speaker models available (6” & 4”) to accommodate various plenum depths. Speakers distribute sound masking, paging and/or music.

- Speakers are UL Listed for use in air handling spaces.

Note: The speakers above are shown painted. Standard speakers come in an aluminum finish. Custom painting is available at an upcharge.
STANDARD SPEAKER ENCLOSURE

- **SPEAKER ENCLOSURE**
  + Aluminum Housing
  + Galvanized Perforated Grill
  + Lightweight Mounting Chain
  + Two speaker models available – 6” & 4”

- **SPEAKER MODEL DIMENSIONS**
  
  **G545**
  - Height – 6”
  - Diameter – 6”
  - Weight – 3lbs

  **G546**
  - Height – 4”
  - Diameter – 6”
  - Weight – 3lbs

- **LOUDSPEAKER**
  + 5-inch - wide dispersion
  + Power Rating – 10 watts RMS
  + Frequency Response – 50 – 12,000 Hz
  + Impedance – 32 Ohms
  + Resonance – 80 Hz
  + Magnet Weight – 10 oz
  + Magnet Structure Weight – 26 oz
  + Cone – Formed Fiber
  + Cone Suspension – High Compliance Foam
  + Voice Coil – 1-inch diameter
  + Voice Coil Form – Anodized Aluminum

- **PAGING INPUT**
  + Via OP and MPI

- **POWER REQUIREMENT**
  + Powered by OP

- **OUTPUT ADJUSTMENT**
  + N/A

- **WIRE REQUIREMENTS**
  + All wire must be plenum rated and UL listed
  + Speakers use Cat 5e or equivalent, 4 twisted pair and RJ45 connectors
  + Straight cable – Pin 1 to Pin 1, Pin 2 to Pin 2, etc

- **OTHER SYSTEM WIRE REQUIREMENTS**
  + 16 gauge, plenum rated, stranded, 2-conductor wire (for power supply to OP)

**MASKING/PAGING UNITS ARE UL LISTED FOR USE IN AIR HANDLING SPACES**

OTHER SYSTEMS ALSO AVAILABLE
Spectra®, CrossNetOne™, CrosswaysOne™
DIRECT FIRED SPEAKER ENCLOSURE (MODEL LG035-G545 LG035-G546)

FUNCTION

- For spot treatments or when ceiling or site conditions (such as a gypsum ceiling) prevent the use of in-plenum speakers, direct fired speakers may be necessary.
- The direct fired speakers have decorative speaker grills that blend seamlessly into your designs. The flush mounted speaker gently introduces the sound masking directly into the environment below.

- Speakers used in the Spectra i.Net® system are configured with integrated RJ45 connections for plug and play and ease of installation. The speakers feature an aluminum housing, 5-inch wide dispersion and weigh approximately four pounds each.
- There are two speaker models available (6” & 4”) to accommodate various plenum depths. Speakers distribute sound masking, paging and/or music.
- Changes to speaker settings can be made either at the OP by channel or at a wall location via hand held remote or through the system’s user interface on-site, off-site or around the world.
DIRECT FIRED SPEAKER ENCLOSURE

— SPEAKER ENCLOSURE
+ Aluminum Housing
+ Grill Cover: Metal screen, white with perforated grill
+ Lightweight Mounting Chain
+ Two speaker models available – 6” & 4”

— SPEAKER MODEL DIMENSIONS

LG035-G545
Height – 6”
Diameter – 6”
Weight – 4lbs

LG035-G546
Height – 4”
Diameter – 6”
Weight – 4lbs

— LOUDSPEAKER
+ 5-inch - wide dispersion
+ Power Rating – 10 watts RMS
+ Frequency Response – 50 – 12,000 Hz
+ Impedance – 32 Ohms
+ Resonance – 80 Hz
+ Magnet Weight – 10 oz
+ Magnet Structure Weight – 26 oz
+ Cone – Formed Fiber
+ Cone Suspension – High Compliance Foam
+ Voice Coil – 1-inch diameter
+ Voice Coil Form – Anodized Aluminum

— PAGING INPUT
+ Via OP and MPI

— POWER REQUIREMENT
+ Powered by OP

— OUTPUT ADJUSTMENT
+ N/A

— WIRE REQUIREMENTS
+ All wire must be plenum rated and UL listed
+ Speakers use Cat 5e or equivalent, 4 twisted pair and RJ45 connectors
+ Straight cable – Pin 1 to Pin 1, Pin 2 to Pin 2, etc

— OTHER SYSTEM WIRE REQUIREMENTS
+ 16 gauge, plenum rated, stranded, 2-conductor wire (for power supply to OP)

MASKING/PAGING UNITS ARE UL LISTED FOR USE IN AIR HANDLING SPACES

OTHER SYSTEMS ALSO AVAILABLE
Spectra®, CrossNetOne™, CrosswaysOne™
SPECIALTY SPEAKERS

Lencore offers a variety of specialty speakers designed for specific site conditions, local code requirements and aesthetics.

DECORATIVE SPEAKERS
Custom painted to blend with your environment.

INVERTED DECORATIVE SPEAKERS
When site conditions require an exposed unit that can meet your design aesthetic.

SPEAKERS WITH TRI-POD CHAIN
Alternative mounting chain option used to meet seismic code requirements where required.

SPEAKERS WITH INTEGRATED JUNCTION BOXES
Available wherever junction box enclosures are required by code. Provide for the complete housing of air/water resistant junction box to house cables.
### JORDNA HUB

**FUNCTION**
Using a Jordna Hub, one can tie together five Cat5E cables using the RJ45 female connectors located on the Jordna Hub. In addition, the Jordna Hub connects each pin to 2 screw terminals for either injecting or monitoring any pin of any wire connected to the hub. There is one additional LAN connected to 2 screw terminals (in and out) for a ground connection if needed.

<table>
<thead>
<tr>
<th>ENCLOSURE</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>+ Aluminum Housing</td>
<td>+ Dimensions – 4 1/2” × 6 1/2” × 1 1/8”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POWER SUPPLY</th>
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<tr>
<td>+ N/A</td>
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<tr>
<th>POWER REQUIREMENT</th>
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<td>+ N/A</td>
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<table>
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<tr>
<th>WIRE REQUIREMENTS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>+ Cat 5e cable or equivalent</td>
<td>+ Solid or twisted cable typically 16 or 18 gauge wire for screw terminals</td>
</tr>
</tbody>
</table>
The Spectra i.Net® Sound Masking System uses a 48 Volt DC power supply unit to power the OP.

The power supply is connected to the Spectra i.Net® system’s sound source (OP) using 2 conductor, plenum rated 16 gauge wire.

To install the power supply, mount the unit to the wall with angle brackets and screws to fasten. Keep vents exposed.

**FEATURES**
- Universal AC input/full range
- Built-in active PFC function, PF>0.95
- Protections – short circuit/over load/over voltage/over temperature
- Forced air cooling by built-in DC Fan
- Built-in fan speed control
- Fixed switching frequency at 100KHz
- 3 year warranty
POWER SUPPLY

- **OUTPUT**
  + DC Voltage – 48V
  + Rated Current – 6.7A
  + Current Range – 0 ~ 6.7A
  + Rated Power – 321.6W
  + Ripple & Noise (max.) – 240mVp-p (Note.2)
  + VoltageADJ. Range – 41 ~ 56V
  + Voltage Tolerance – ±1% (Note.3)
  + Line Regulation – ± 0.2%
  + Load Regulation – ± 0.5%
  + Setup, Rise Time – 800ms, 50ms/230VAC
    2500ms, 50ms/115VAC at full load
  + Hold Up Time (Typ.) – 16ms/230VAC
    16ms/115VAC at full load

- **INPUT**
  + Voltage Range – 88 ~ 264VAC, 124 ~ 370VDC (Note.5)
  + Frequency Range – 47 ~ 63Hz
  + Power Factor (Typ.) – PF>0.95/230VAC, PF>0.98/115VAC at full load
  + Efficiency (Typ.) – 89%
  + AC Current (Typ.) 115VAC – 5A
  + AC Current (Typ.) 230VAC – 2.5A
  + Inrush Current (Typ.) – 20A/115VAC, 40A/230VAC

- **PROTECTION**
  + Overload
    105 ~ 135% rated output power
    Protection type – Hiccup mode, recovers automatically after fault condition is removed
  + Over Voltage
    57.6 ~ 67.2V
    Protection type – Shut down o/p voltage, re-power on to recover
  + Over Temperature
    80°C ± 5°C (70 °C ± 5°C 3.3V 5V only) (TSW1 – detect on heatsink of power transistor)
    Protection type – Shut down o/p voltage, recovers automatically after temperature goes down

- **SAFETY & EMC (note 4)**
  + Safety Standards – UL60950-1, TUV EN60950-1, CCC GB4943 approved
  + Withstand Voltage – I/P-O/P:3KVAC, I/P-FG:1.5KVAC, O/P-FG:0.5KVAC
  + Isolation Resistance – I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC/ 25°C/ 70% RH
  + EMI Conduction & Radiation – Compliance to EN55022 (CISPR22) Class B
  + Harmonic Current – Compliance to EN 61000-3-2,-3
  + EMS Immunity – Compliance to EN 61000-4,2,3,4,5,6,8,11; ENV 50204, EN 55024, light industry level, criteria A

- **ENVIRONMENT**
  + Working Temp. – -20 ~ +65°C (Refer to output load derating curve)
  + Working Humidity – 20 ~ 90% RH non-condensing
  + Storage Temp. Humidity – -40 ~ +85°C, 10 ~ 95% RH
  + Temp. Coefficient –0.03%/°C (0 ~ 50°C)
  + Vibration – 10 ~ 500Hz, 2G 10min./1cycle, 6min each along X,Y, Z axes

- **DIMENSIONS**
  + Dimension – w 8.46” x h 4.53” x d 1.97”
  + Packing – 1.1Kg; 12pcs/14Kg/0.92CUFT

**NOTES**

1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25°C of ambient temperature.
2. Ripple & noise are measured at 20MHz of bandwidth by using a 12” twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor.
3. Tolerance: includes set up tolerance, setting regulation and load regulation.
4. The power supply is considered a component which will be installed into a final equipment. The final equipment must be re-confirmed that it still meets EMC directives.
5. Derating may be needed under low input voltages. Please check the derating curve for more details.

OTHER SYSTEMS ALSO AVAILABLE
Spectra®, CrossNetOne™, CrosswaysOne™
FUNCTION
- A Lencore Spectra i.Net® router ensures quality data transmission, across long cable runs. Each router terminates and rebroadcasts signals back to full strength allowing the Spectra i.Net® system wiring network to work at best practices standards.
- Paging and Music may be routed in or out of the router via internal jumpers to the screw terminals located on either end of the router to either integrated OP Amps or component amplifiers and equalizers for signal boost and correction. This setup is typically run at approximately the 30th OP in a run or at 3000 feet of cable.
- The G70 router amplifies the iLon® signal.

NOTE
Never plug a Spectra i.Net® router into any computer or network or like device other than Spectra i.Net® equipment as damage to a computer or like equipment could occur.

DIMENSIONS
+ w 7 ½” x h 4” x d 2 ½”

ROUTER INPUT VOLTAGE
+ 16-30 VAC or VDC

POWER INPUT
Option 1
+ Power Supply – 5.5mm O.D./2.1mm I.D. /Center+

Option 2
+ Screw Terminal – Use minimum 2 conductor 18 gauge plenum rated wire for power attachment

INPUTS /OUTPUTS
+ Data CAT 5e RJ45

SCREW TERMINAL INPUTS & OUTPUTS
+ Paging
+ Music
+ Audio Ground

OTHER SYSTEMS ALSO AVAILABLE
Spectra®, CrossNetOne™, CrosswaysOne™
i.Lon® 100, LonTalk®, Echelon® and LonWorks® are registered trademarks of Echelon Corporation.
AE ROUTER

FUNCTION
- A Lencore Spectra i.Net® router ensures quality data transmission, paging and music integrity across long cable runs. Each router terminates and rebroadcasts signals back to full strength allowing the Spectra i.Net® system wiring network to work at best practices standards.

- The AE router boosts and amplifies paging and music signals in addition to the i.Lon® (Echelon®) signals.

- AE router has music and paging outputs jacks.

- AE router allows adjustment to the amount of EQ compensation for various lengths of cable (up to 9500 feet for each AE Router).

NOTE
Never plug a Spectra i.Net® router into any computer or network or like device other than Spectra i.Net® equipment as damage to a computer or like equipment could occur.

DIMENSIONS
- w 7 ½" x h 4" x d 2 ½"

ROUTER INPUT VOLTAGE
- 16-24 VAC or VDC (INPUT 1)
- 24-48 VAC or VDC (INPUT 2)

POWER INPUT
Option 1
+ Power Supply – 5.5mm O.D./2.1mm I.D./Center+

Option 2
+ Screw Terminal – Use minimum 2 conductor 18 gauge plenum rated wire for power attachment

INPUTS/OUTPUTS
+ Data CAT 5e RJ45

SCREW TERMINAL INPUTS & OUTPUTS
+ Paging
+ Music
+ Audio Ground

OTHER SYSTEMS ALSO AVAILABLE
Spectra®, CrossNetOne™, CrosswaysOne™
i.Lon® 100, LonTalk®, Echelon® and LonWorks® are registered trademarks of Echelon Corporation.
### AUDIO BOOST MODULE

**FUNCTION**
- A Lencore Spectra i.Net® router ensures quality data transmission, along long cable runs. Each router terminates and rebroadcasts signals back to full strength allowing the Spectra i.Net® system wiring network to work at best practices standards.
- Paging and Music may be routed in or out of the router via internal jumpers to the screw terminals located on either end of the router to either integrated OP Amps or component amplifiers and equalizers for signal boost and correction. This setup is typically run at approximately the 30th OP in a run or at 3000 feet of cable.
- The G135 is an AE Router Unit without the Echelon neuron control board. This unit will boost audio exactly like the G130. It will not boost the data network signal.

**NOTE**
Never plug a Spectra i.Net® router into any computer or network or like device other than Spectra i.Net® equipment as damage to a computer or like equipment could occur.

**DIMENSIONS**
- w 7 ½" x h 4” x d 2 ½”

**ROUTER INPUT VOLTAGE**
- 16-24 VAC or VDC (input)
- 24-48 VAC or VDC (input)

**POWER INPUT**
**Option 1**
- Power Supply – 5.5mm O.D./2.1mm I.D./Center+

**Option 2**
- Screw Terminal – Use minimum 2 conductor 18 gauge plenum rated wire for power attachment

**INPUTS /OUTPUTS**
- Data CAT 5e RJ45

**SCREW TERMINAL INPUTS & OUTPUTS**
- Paging
- Music
- Audio Ground

---

**OTHER SYSTEMS ALSO AVAILABLE**
Spectra®, CrossNetOne™, CrosswaysOne™
i.Lon® 100, LonTalk®, Echelon® and LonWorks® are registered trademarks of Echelon Corporation.
REMOTE CONTROL

FUNCTION

Available with every Spectra i.Net® system is a hand-held remote control that enables end users to make immediate volume and contour control adjustments for masking, paging and music. Point the remote to a wall mounted, infrared receiver panel or directly at an OP to make changes or establish field settings for the masking, paging or music.

The molded plastic slim style hand held remote adjusts volume and contour for masking, music and paging at OP location by channel or for entire OP.

The remote can also be configured for use at a designated wall location if desired.

CONSTRUCTION

+ Molded plastic rubber with coated resin adjustment buttons
+ Size – 2” w x 3.5” h
+ Thickness – ¼”
+ Battery Replacement – Replace battery with a 3V CR2025 Lithium battery

OTHER SYSTEMS ALSO AVAILABLE

Spectra®, CrossNetOne™, CrosswaysOne™
DATA TERMINATOR

FUNCTION
- The Spectra i.Net® Data Terminator is used at the last Operating Platform (OP) unit to end the OP data run and paging and music channels. One terminator is used for each project requiring a data, paging or music hook up.
- The Spectra i.Net® Data Terminator is constructed of brushed aluminum and houses a PC board. Attached to the terminator is an integrated 7” Cat 5e plenum rated, UL listed, 4 twisted pair cable with a RJ45 connector. The terminator’s RJ45 connector is clicked into the last OP’s “OUT” data port. An integrated weight strap is attached for installation convenience. Connect the weight strap to the OP’s chain.
- The data terminator is listed for use in the plenum.

ENCLOSURE
- Brushed Aluminum or Black
- Dimensions – 3 ⅛” x 1 ⅞” x 1”

INTEGRATED WIRE
- Cat 5e, plenum rated, UL listed
- 4 twisted pair cable with RJ45 connector

OTHER SYSTEMS ALSO AVAILABLE
Spectra®, CrossNetOne™, CrosswaysOne™
IR TOUCH PAD CONTROLLER

FUNCTION

- The Spectra i.Net® IR Touch Pad Controller provides wall access and immediate adjustments for the Spectra i.Net® Sound Masking, Paging and Music System. The Touch Pad option is often chosen for spaces such as conference rooms and board rooms, or any area where individualized and on-going adjustments are desired.
- Located on the wall plate used for the Touch Pad is an LED light indicator that identifies the current function of the system that is being adjusted. The system functions that can be adjusted are masking, paging, music, test and IR/ALL.
- To use the Touch Pad use the left and right arrow keys in the center of the pad to select the function types (masking, paging, music, test, IR/ALL) that you wish to adjust. Once the system function is selected, use the up and down arrows to make increases or decreases in the volume adjustments.
- To mute and un-mute the system, simply press the Mute/Un-mute button located at the bottom of the wall plate. The IR/All function enables end users to mute or unmute the masking, paging and music all at the same time.

Touch pad wall plate can be attached to vertical surface with two screws.

WALL PLATE

+ Dimensions – 2 ¾”w x 4 ¼”h
+ Touch pad wall plate can be attached to vertical surface with two screws

WIRE REQUIREMENTS

+ Cat 5e cable or equivalent 4 Twisted pair
+ Standard RJ45 connector

INSTALLATION

To connect to the Spectra i.Net® System’s OP, use a patch cable using Cat 5E with RJ45 connectors and connect the wire from the OP’s IR Port to the back of the wall plate. If an IR Hub has been specified for multiple controls, the patch cable can be run from the OP to an IR Hub and then to each channel of the IR Hub (A, B, C, D).

OTHER SYSTEMS ALSO AVAILABLE

Spectra®, CrossNetOne™, CrosswaysOne™

Touch pad wall plate can be attached to vertical surface with two screws.

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FREE TOPOLOGY TERMINATOR

FUNCTION
The Spectra i.Net® free topology terminator is used to change the topology of the network from a BUS to a free or flexible topology. Please see images below.

TECHNICAL SPECIFICATIONS
+ Network Connector: Flying wire leads - 2 orange leads for network connection, 1 green lead for earth ground
+ Input Power: None
+ Packaging: PCB with heat shrink tubing
+ Temperature -40 to +85°C, operating and non-operating
+ Humidity 10 to 95% RH @ 50°C
+ Safety agency U.L. and cU.L. Recognized
+ Dimensions 2.2² x 0.9² x 0.5² (5.7cm x 2.3cm x 1.3cm) excluding wire leads

OTHER SYSTEMS ALSO AVAILABLE
Spectra®, CrossNetOne™, CrosswaysOne™
FUNCTION
The Lencore Spectra i.Net® Smart Switch provides total data and audio redundancy to any Spectra i.Net® system.

This feature (system redundancy) is key to providing an added element to ensuring data delivery. In the case of emergency communications this feature gives clients tremendous confidence that their MNE messages are consistently received loud and clear.

Lencore’s Smart Switch detects and reports any wire failure or data interruption when paging for mass notification. Should the paging/data transmission fail, the switch automatically reroutes the data and voice so the system’s performance continuity is not affected. The Smart Switch also has complete reporting capabilities to let the user know when and where a break has occurred for ease of troubleshooting.

The Smart Switch is connected by Cat5E and is installed between the systems last OP (Operating Platform) and the systems.

REPORTING CAPABILITIES
+ Email wiring issues
+ i.Lon Data logger
+ LED switch output

ENCLOSURE
+ Aluminum Housing
+ Dimensions – 6 1/8” x 4” x 2 3/16”

POWER SUPPLY
+ 48VDC - Input Voltage

WIRE REQUIREMENTS
+ Cat 5e cable or equivalent for data
+ Solid 16 gauge, 2-conductor wire for screw terminals for power

OTHER SYSTEMS ALSO AVAILABLE
Spectra®, CrossNetOne™, CrosswaysOne™
IR HUB (MODEL G482)
IR WALL CONTROLLER (MODEL G42)

**FUNCTION**
- Each OP (sound source) of Spectra i.Net® System has an integrated IR Port. This port can be connected to the IR Hub (Model #G482) and IR Wall Controller (Model #G42) to provide up to four individual audio channel controls per OP.
- Using an IR Hub channel, one can make volume and contour control adjustments for masking, paging and music by pointing a remote control at the IR Wall Controller.
- This type of application can be typically used for various spaces such as private offices, conference rooms, healthcare facilities, and areas where remote control adjustments are required.

**ENCLOSURE**
- Aluminum Housing
- Dimensions – 5” × 7” × 2”

**POWER SUPPLY**
- 48 V DC

**POWER REQUIREMENT**
- Powered by OP

**WALLPLATE**
- Dimensions - 2 3/4” × 4 1/4”

**PAGING INPUT** – Via OP and MPI
**OUTPUT ADJUSTMENT** – N/A

**WIRE REQUIREMENTS**
- Cat 5e cable or equivalent
- 4 Twisted pair with standard RJ 45 connector
IR HUB / IR WALL CONTROLLER

OTHER SYSTEMS ALSO AVAILABLE
Spectra®, CrossNetOne™, CrosswaysOne™
SPECTRA i.Net® REPORT

FUNCTION
- The Spectra i.Net® Report allows unprecedented access to system information and reporting.
- The Spectra i.Net® Report can harvest all system settings for volume and contour for masking, and settings for volume for paging and music zones as well as EQ settings for all. Settings can be saved and/or printed to provide complete back up and reporting capabilities.
- Through the Spectra i.Net® Report it is possible to submit new settings and upload these settings to the system. Settings can be created and saved off site and then uploaded to the system when interface and connection to the i.Lon is established.

THE SPECTRA i.Net® REPORT CAN BE USED TO:
+ Provide an OP centric view of entire system
+ Drill down to a single OP or single channel
+ Provide a zone centric view for masking, paging or music zones where you can see all the settings for every OP and every channel that belongs to a zone
+ Edit any setting from any one of the tables
+ Label or rename all OP’s, zones and zone channels
+ Export all info to a spreadsheet

i.Lon® 100, LonTalk®, Echelon® and LonWorks® are registered trademarks of Echelon Corporation.
THE SOUND MANAGER

GRAPHIC USER INTERFACE AND CENTRAL SYSTEM CONTROLS

FUNCTION

– The Spectra i.Net® simplifies and speeds your control with its centralized control program, the Sound Manager. Included with every Spectra i.Net® System, the Sound Manager, is a private password-protected, graphic user interface. It is based on an open-architecture software platform that controls and monitors the complete sound masking, music and paging system.

– Lencore’s Sound Manager can be configured to be accessed from any desktop computer with a password-protected connection, either on site, or remotely.

SYSTEM PERFORMANCE

– The sound masking system is capable of separately and independently configuring zones for sound masking, paging and music via the network empowered through its central control. The masking volume is adjustable via digital means for 1/2 dB steps for a range of 34-82.5 dBA as measured 1m from the center of the speaker.

– The Spectra i.Net® Sound Masking System provides unsurpassed sound quality, comfort and speech privacy.

THE SOUND MANAGER CONTROL CAN BE USED TO:

+ Initiate the system
+ Change group settings for sound masking, paging and music
+ Complete adjustments for volume, contour and equalization for masking channels and zones
+ Complete adjustments for volume and equalization for paging and music channels and zones
+ Reset system to factory-set commands or last saved settings
+ Control the system wirelessly
+ Run diagnostics that includes critical features to self-check its status, including a one kHz test tone to test speakers or to locate a speaker
+ Set virtually unlimited timer functions available for all zones
+ Start self identifying talking OP’s to locate OP channels
NETWORKED SOUND MASKING SYSTEM
PERFORMANCE SPECIFICATION

KEY PERFORMANCE REQUIREMENTS
To meet the criteria for successful sound masking system performance, the most important requirements are that the system provide both comfort and speech privacy.

PART 1
SOUND GENERATION – MASKING
1.1 ACOUSTICAL COMFORT
To achieve comfort, the following specifications for sound generation must be met throughout the environment.

+ System must produce a full broadband sound quality providing the full spectrum (20Hz – 20kHz).
+ System wrap around and repeat must exceed 12 hours
+ System must provide independent volume controls for masking, paging and music.
+ System must provide uniformity of sound masking throughout space with no greater variance than +/-1dB tuning tolerance.
+ System must provide volume control for masking with tuning tolerances in ½ dB steps.
+ System must not produce a noticeable repeat.
+ System must provide contour control for masking in ½ dB steps at 1 kHz reference from pink spectrum to white spectrum.
+ System must be capable of being tuned for masking volume to meet +/-1 dB tolerance while being able to accommodate various ceiling conditions and types and accounting for reflection and absorption.
+ System must provide uniformity of sound throughout the masked space with a variance no greater than +/-1dB in any given location.

1.2 PRIVACY
+ System must be able to meet ASTM E-1130 standard for speech privacy while still providing comfort.
+ System must produce sound masking that achieves an Articulation Index of .2 or less for speech privacy while maintaining comfort (as described above).
+ Decibel variance for settings must be adjustable in ½ dB steps to provide privacy without compromising comfort.

PART 2
PAGING AND MUSIC
2.1 SYSTEM PAGING
The critical criteria for paging performance is intelligibility, uniformity, flexibility and zoning capabilities.

+ System must be able to deliver high resolution of volume, EQ and zone control for paging.
+ System must provide volume controls for paging with tuning tolerances no greater than +/- 1 dB.
+ System must be capable of providing independent volume controls for paging separate from volume controls for masking and music.
+ System must provide a global muting function for masking, paging and music that can interface with fire alarm system.
PART 3

PAGING AND MUSIC

Tuning for system must be accessible and addressable through infra-red remote for immediate field adjustments for volume and contour for masking and for volume for music and paging.

Tuning for system must be accessible and addressable through a password-protected, user friendly graphic user interface and enable real time interface with the entire system for settings, zoning, diagnostics, reporting, testing, and timed events for masking, paging and music.

3.1 TUNING REQUIREMENTS FOR MASKING THROUGH GUI

- Equalization must provide full 1/3 Octave Band EQ (total 30 bands) per zone.
- Parametric EQ must provide full 30 bands per zone.
- System must provide volume control for masking with tuning tolerances in ½ dB steps.
- System must provide contour control for masking in ½ dB steps at 1 kHz reference from pink spectrum to white spectrum.
- System must provide high resolution of volume, EQ and zone control.

3.2 TUNING REQUIREMENTS FOR PAGING AND MUSIC THROUGH GUI

- System must provide volume control for paging and music with tuning tolerances no greater than +/- 1 dB.
- System must provide and octave band EQ (total 10 bands) for paging and music.

PART 4

NETWORKED SYSTEM REQUIREMENTS

4.1 SYSTEM, SOFTWARE, TOOLS AND USER INTERFACE (GUI)

- System must provide a flat audio response for masking, paging and music.
- System must be capable of performing a frequency sweep that can automatically readjust frequency bands to match their originally intended frequency intensities.
- System must provide high resolution of volume, EQ and zone control.
- System must provide a flat audio response for masking, paging and music.
- System must be capable of performing a frequency sweep that can automatically readjust frequency bands to match their originally intended frequency intensities.
- System must provide high resolution of volume, EQ and zone control.

- System must be capable of tying multiple building locations through a single, central control.
- System must not require any proprietary software or equipment in order for system operation and installation.
- System must not create migration issues or security issues with regard to system software and controls.
- System must interface with CISCO, AMX and Crestron.
- All software and tools for monitoring and working with system must be provided to client and retained by client.
- All costs for software must be included with system.
4.2 SYSTEM, SOFTWARE, TOOLS AND USER INTERFACE (GUI)

+ Network function must not require that the system be grounded for data.
+ System must be a multi-drop system capable of communicating throughout the system beyond any failed node. Point to point systems are not considered acceptable.3
+ System must not have the potential for catastrophic failure at the network, controller level, or node or speaker level.

4.3 SYSTEM ACCESS AND CONTROLS

+ System must be accessible through all of the following:
  - web browser
  - in plenum
  - through a central control panel location
  - through a remote control
  - with keypad
+ System must provide infra-red controls for volume and contour to adjust individual channels or all channels per sound source for masking in the following locations:
  - in plenum
  - at wall location
  - with keypad
  - with remote control
+ System must provide infra-red controls for volume to adjust individual channels or all channels per sound source for paging and music in the following locations:
  - in plenum
  - at wall location
  - with keypad
  - with remote control

4.4 SYSTEM IDENTIFICATION

+ System must provide self assignable networks. System must provide visual identification at physical node location.

4.5 SYSTEM DIAGNOSTICS, MONITORING AND REPORTING

+ System diagnostics must be able to report beyond any failed node (multi-drop network system).
+ System diagnostics must include critical feature check that reports system status including memory, DSP and network status.
+ System reporting must show all current settings for masking volume, contour and EQ by channel and group.
+ System reporting must show all current settings for paging volume and EQ.
+ System reporting must show all current settings for music volume and EQ.
+ System must have ability to monitor and report system operation and identify if a unit or speaker wire has been cut, removed or tampered.

4.6 SYSTEM ZONING

+ System must be capable of making zone changes for masking, paging and music without the need to rewire system.
+ System changes for zoning must be able to be made onsite by client and be able to be made remotely through password protected access.
+ System must provide a minimum of 100 zones for masking.
+ System must provide a minimum of 100 zones for paging as well as all call page.
+ System must provide a minimum of 100 zones for music.
+ System must provide zone overlap whereby every channel can be assigned to a minimum of 10 programmable zones and all call.

PART 5

EQUIPMENT

5.1 GENERAL

+ System must use a web server appliance for control
+ System must provide option for in-plenum, direct fired, exposed and ceiling plate speakers
+ System must provide option for interior and exterior horns
+ System must not require proprietary control panels, cables or connectors.
+ All head end equipment should be included in system equipment costs.
**PART 6**

**MEETING INDUSTRY STANDARDS**

+ System must meet ASTM E-1130 standard for speech privacy.
+ System must be UL Listed “for use in the plenum” (systems that are UL Listed only are not considered acceptable).
+ System must be capable of integrating to existing global standards as set by ISO/IEC for open platform based building automation systems.
+ System must meet the following standards for open platform:
  - ANSI 709.1 standards for open platform.

**PART 7**

**MAINTENANCE, MANUFACTURING & WARRANTY**

+ System must not require any on-going maintenance.
+ System must be manufactured in the USA.
+ System warranty must be a minimum of 10 years

**FOOTNOTES**

*1 While TCP/IP is a standard in the data world, it is NOT a control protocol. If TCP/IP operates as open transport, one must still provide or develop an open control protocol. The temptation is for vendors to define a new control protocol riding on the coattails of the open TCP/IP standard, proclaiming the overall approach “open” because TCP/IP is open when in fact the control protocol itself is closed and proprietary. Be careful when vendors claim to be “open”; they most likely are not. They must meet ANSI 709.1 to be considered true open. In addition, there are a number of other control and access capabilities that should be considered when comparing bid proposals. Lencore’s system meets requirements for true open platform.

*2 Software installation on client servers or computers can create serious security and migration issues behind their firewall.

*3 Multi-drop systems provide for control system communications, even beyond any failed node. Point to point systems cannot communicate beyond any failed node and this causes problems.
NOTE TO SPECIFIER

Manufactured by Lencore Acoustics Corp.
1 Crossways Park Drive West
Woodbury, NY 11797 USA.

Phone:  516 682 9292  
Fax:      516 682 4785  
Email:   info@lencore.com  
Website: www.lencore.com

PART 1

GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to this section.

1.2 SUMMARY
A. This section includes Digital Signal Processors, electronic noise generators, amplifiers, wiring, loudspeakers, and controls and components to generate, amplify, distribute and reproduce digitally synthesized and stabilized background sound masking to improve speech privacy in zones of coverage. Components contained herein this paragraph may be collectively integrated in a printed circuit board, central control units, music paging interfaces or as part of a speaker unit.

1.3 DEFINITIONS AND REFERENCES
A. Test and calibration conditions: Spaces completely furnished but unoccupied, lights and HVAC systems on, HVAC system testing and balancing completed, ceiling components in place. Additional testing to be provided after space is occupied to adjust for variations in use.

B. Covered spaces: Spaces above which masking speakers are installed.
C. Pink Noise: Random noise signal with equal energy in each octave.
D. Sound Masking: Sound that reduces the intelligibility of intruding speech and the distraction from activity noise. Sound that when measured falls inside the “preferred curve”. The masking sound spectrum slopes downward with an increasing frequency. The rate of this slope of sound is 5 dB per octave, having a steeper roll-off above 2 KHz. The low frequency response is determined by the low frequency capabilities of the masking system loudspeakers.

1.3.1 AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI):
A. ANSI S1.4 American National Standard Specification for Sound Level Meters
B. ANSI S1.6 American National Standard Specification for Preferred Frequencies and Band Numbers for Acoustical Measurements
C. ANSI S1.11 American National Standard Specification for Octave-Band and Fractional-Octave-Band Analog and Digital Filters
1.3.2 AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM):

1.3.3 SYSTEM PERFORMANCE
A. The Sound Masking system must use a unique integrated sound masking, music and paging system that uses the power of network technology, web appliances, internet access, infrared remote controls and digital signal processors (DSP’s).
B. The sound masking system must be capable of separately and independently configuring zones for sound masking, paging and music via the network empowered through its central control.
C. The sound masking system must produce 20Hz through 20,000Hz from its source.
D. The masking must be random and provide a minimum pattern of no LESS than 25 hours.
E. The sound masking devices must provide both a 1/3 octave band equalizer for a minimum of 30 bands and a parametric equalizer to adjust the sound masking.
F. The paging devices must have a minimum of a 1/1 octave band equalizer to shape sound.
G. The System must provide global muting function through dry contact closure for fire alarms.
H. The System must provide automatic Adaptive Equalization to ensure a flat response for the entire building for paging.
I. The System must provide zone overlap where each speaker channel has a minimum of 10 programmable zones for masking, paging and music separately.
L. The masking volume shall be adjustable via digital means for ½ dB steps for a range of 36-84 dBA as measured 1m from the center of the speaker.
M. Sound masking system must be able to provide music muting capabilities to allow paging to smoothly override the masking.
N. Spatial uniformity of sound must be no more than ±½ dBA.
O. Sound masking, paging and music must have individual identifiers located in an integrated LCD screen.
P. Plenum mounted network locations must have a lighted LED for visual inspection.
Q. System must be a multi-drop network system. Point to point systems are unacceptable.
R. System must be capable of being tuned through a network and a hand-held remote.
S. System must be capable of performing diagnostic functions.
T. System must be an open platform system. Proprietary software systems are UNACCEPTABLE.
U. System must be capable of using off the shelf browser software for full manipulation.
V. System must be capable of being used as a stand-alone system or a system tied into an intranet IT spine or manipulated through the internet.
W. System MUST be an in-direct field system. Direct field only systems are unacceptable.

1.4 DESCRIPTION OF SYSTEM
A. All masking/paging units must be UL Listed for use in a ceiling plenum.
B. The system must be manufactured in the USA.
C. All equipment and associated hardware shall be fabricated and installed in accordance with the manufacturer’s specified recommendations.
D. All wiring for power shall be minimum 16 gauge.
E. All Wiring for Data shall be CAT 5, 4 pair with RJ45 connectors.
F. All Wiring for Audio shall be CAT 5, 4 pair with RJ45 connectors.
G. Location of grounding points shall be determined carefully to insure minimizing of system hum and elimination of ground loops. In addition, all connections of shields and conductors to equipment shall be in accordance with manufacturer’s instructions and best professional practices.
In open areas and larger enclosed spaces, the overall sound level produced should have spatial uniformity of no more than ±1/2 dB between any two sound generating units.

The sound generating units must have an adjustable sound spectrum shaping control in order to meet the varying spectral requirements of drywall ceilings; various types of ceiling tile, air return grills and openings around lighting fixtures, etc.

- The spectrum shaping ability shall be variable within the accepted background sound masking range (acoustical preferred curve).
- Units will be able to be shaped with a 1/3 band octave equalizer.
- Units will be able to be shaped with a parametric equalizer.
- Equalizers will cover the full spectrum and be able to manipulate entire spectrum from 20Hz to 20KHz.
- Systems that only cover PARTIAL ranges of spectrum (i.e. 1/3 of the 1/3 Octave Band) are UNACCEPTABLE.
- System must be capable at a minimum of delivering sound masking volume increments in 1/2 dB steps. Any system that cannot deliver attenuation controls of at least 1/2 dB steps are unacceptable.
- Units installed over drywall ceilings should be wired for spectrum control adjustment and remote sound level.
- The system shall be capable of producing masking frequencies (20Hz – 20KHz) in the preferred spectrum range.
- Each unit shall allow smooth and seamless adjustment ability of the sound spectrum within the preferred curve, to allow for a variety of ceiling conditions.
- Speaker housings/enclosures must be damped to avoid undesirable resonance.
- System shall be designed so that individual speaker or component failure will have no impact on the balance of the system.
- Security: Central control must only be able to be accessed via an authorized computer access point with the use of a password.
- Design of system must be powered by low voltage.
  - Use adequately rated power supplies.
    - Primary: 85-264 Volt AC 47-63 Hz
    - Secondary: 48 Volt DC
  - Power usage:
    - Power typical consumption: 100 Watts per 36,000 square feet for masking only.
    - Power typical consumption: 300 Watts per 36,000 square feet for masking and paging.

Install all work in full accordance with the requirements of all local and governmental departments having jurisdiction over these matters, as well as with any requirements of the NFPA, MEA, BSA, UL, and other applicable codes.

Secure and pay for necessary approvals, permits, inspections, carting, legal dumping, etc., and deliver the official records of the granting of permits to the Owner without additional cost.

Provide signs as required by the municipal authorities.

Sound Quality: No audible hum or noise, other than masking noise, from this system in masked spaces should be detected.

The system shall be capable of producing masking frequencies (20Hz – 20KHz) in the preferred spectrum range.

1. Each unit shall allow smooth and seamless adjustment ability of the sound spectrum within the preferred curve, to allow for a variety of ceiling conditions.

A. Sources Limitations: Obtain sound masking equipment components from a single source that assumes responsibility for compatibility of items used.
Components, speakers and power transformers must be UL listed for their appropriate use or listed as an equal to UL through another competent agency.

B. Green: Sound masking equipment must be comprised of at least 50% recycled content.

C. Privacy: Perform a speech and privacy evaluation to provide an articulation index (AI) as per ASTM E1130-02. A report of the AI must be provided with each exclusive project.

D. Manufacturer Qualifications: Manufacturer must manufacture sound masking equipment and have a minimum of 10 years of sound masking experience. Sound masking product provided must be in existence for a minimum of six years with proven performance criteria for providing speech privacy.

E. Warranty: A 10 year full warranty from the manufacturer must be provided for all sound masking equipment.

F. System is capable of using both in-plenum and direct field speakers by same manufacturer.

1.8 SUBMITTALS

A. Product Data: For each component include nationally recognized testing laboratory listing data.

B. Submit manufacturer's data or shop drawings of the following apparatus, giving full information as to dimensions, materials, and all information pertinent to adequacy of submitted equipment:
   i. Sound Masking Speakers
   ii. Additional necessary masking equipment needed
   iii. Wire
   iv. Power Supply
   v. Paging/Music Equipment
   vi. Paging Only Speakers
   vii. Programmable Timers

C. Shop Drawings: Prepare and submit detailed dimensioned shop drawings for conduit runs (if required) and other distribution services including elevations showing minimum clearances and installed features and devices for system components. Show types and locations of masking speakers and their wiring connections. Channel assignments, and axis orientations. Show ducts, beams. And other significant sound reflecting and absorbing elements in ceiling space and show locations of partitions below ceiling.

Include a diagram showing interconnection of major system components for each zone and channel and indicating grounding connections.

D. Each shop drawing shall contain job title and reference(s) to the applicable drawing(s) and/or specification article(s).

E. Product Certificates: Signed by manufacturers of sound masking equipment and components certifying that products furnished comply with requirements.

F. Qualification Data: For firms and persons specified in “Quality Assurance” Article.

G. Record of Final Field Tests and Measurements: Include final adjustment of system.

H. Maintenance Data: For sound masking equipment and components (if needed) to include in maintenance manuals specified in Division 1. Include data for each type of product, including all features and operating sequences. Both automatic and manual.

1.9 COORDINATION

A. Coordinate quantity and arrangement of speaker assemblies with ceiling space configuration and with components occupying ceiling space, including structural members, pipes, air distribution components, raceways, cable trays, recessed lighting fixtures and other items.

B. Furnish a minimum of four complete sets of operating instructions and service maintenance manuals for the equipment employed in the systems. This shall include wiring diagrams. The information in the manuals and on the drawings shall be sufficiently detailed to allow a technician of normal competence to understand, install, operate, maintain, calibrate and repair the equipment.

B. The Owner’s designated operating personnel shall be provided instruction. This shall include instruction in the operation, care and maintenance of the installation. Instruction shall be scheduled at the mutual convenience of the Owner and Subcontractor, after demonstrations and acceptance testing.
**1.11 DIAGNOSTICS**

A. System must be capable of performing complete diagnostics of its entire functions including diagnostics of the network, hubs, nodes, routers, DSP's, memory, circuitry, amplifiers and power.

**1.12 REPORTING FEATURES**

A. System must be capable of reporting entire settings for each zone for masking, paging and music indicating at a minimum the volume, contour, 1/3rd band octave equalization, parametric equalization, diagnostics, and groupings.

**1.13 WARRANTY AND CERTIFICATION**

A. System shall be warranted to be free from defects in materials, workmanship, and performance for a 10-year from date of installation.

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**PART 2**

**PRODUCTS**

**2.1 MANUFACTURERS**

A. Manufacturers: Subject to compliance with requirements. Provide products by the following:

1. Lencore Acoustics Corp.
   1 Crossways Park Drive West
   Woodbury, NY 11797
   phone: 516-682-9292
   fax: 516-682-4785
   website: www.lencore.com
   e-mail: drawings@lencore.com

**1.5 PERFORMANCE**

A. The Enclosure for the sound masking speakers shall consist of aluminum or electroplated steel, cylindrical housing.

B. Speakers: 5 ¼ inch units mounted on metal baffles and arranged for optimum, multi-directional, angular sound distribution. Arrange units for suspension from the building structure above the ceiling.

C. The system must be capable of being independently zoned on both a global and local level for sound masking, paging and music. All zoning must be controlled from a network appliance.

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**D. Loudspeaker**

1. Size: 5 ¼ inch wide dispersion
2. Power Rating: 10 Watts Root Mean Squared (RMS)
3. Frequency Response: 50-12,000 Hz
4. Pressure Sensitivity: SPL - at 1 Watt/m - 90 dB
5. Impedance: 32 Ohms
6. Magnet Weight: 10 oz. (283.5 grams)

**E. Noise generator:** Octave bands from 20Hz to 20KHz

1. Voltage: 48 Volts DC, 60 Hz
2. Contour Adjustments
3. Spectrum adjustment shall meet acoustical preferred curve.

**F. Output Adjustments:**

1. 1/3 band EQ for entire spectrum (25Hz – 20KHz). Meets ANSI specification for bands
2. Parametric EQ for entire spectrum (20Hz – 20KHz)
3. Central volume control, contour control and EQ control for zones for sound masking.
4. Central volume control, and EQ control for zones and units for paging and music.

**G. Wire:**

1. The power wiring shall be minimum 16 gauge, stranded, non-shielded, UL Listed, Plenum Rated
2. The data wiring shall be CAT 5, 4 pair with an RJ45 jack.
3. The audio wiring shall be CAT 5, 4 pair with an RJ45 jack.

**H. Power Supply:**

1. **Output:**
   i. DC VOLTAGE: 48V
   ii. RATED CURRENT: 3.2A
   iii. CURRENT RANGE: 0-3.2A
   iv. RATED POWER: 153.6 W
   v. OUTPUT VOLTAGE ADJ. RANGE: 45.6-52.8V
   vi. LINE REGULATION: ±0.5%
   vii. LOAD REGULATION: ±0.5%
   viii. SETUP, RISE TIME: 600ms, 30ms at full load
   ix. HOLD UP TIME (Typ.): 20ms at full load

2. **Input:**
   i. Voltage Range: 85–264VAC 120–370VDC (Derating may be needed under low input voltages. Please check derating curve)
   ii. FREQUENCY RANGE: 47-63Hz
   iii. POWER FACTOR (Typ.): PF>0.93/230VAC
   iv. AC CURRENT (Typ.): 2.5A/115VAC 1.2A/230VAC
   v. INRUSH CURRENT (Typ.): Cold Start 40A/230VAC
3. Safety: & EMC
   i. SAFETY STANDARDS: UL60950-1, TUV EN60950-1 and S-Mark J60950 Approved
   ii. HARMONIC CURRENT: Compliance to EN61000-3-2, -3
   iii. EMS IMMUNITY: Compliance to EN61000-4-2, 3,4,5,6,8,11; ENV50204, EN55024, light industry level, criteria A
4. Environment:
   i. WORKING HUMIDITY: 20 ~ 90% RH non-condensing
   ii. WORKING TEMP: -10 ~ +60 (Refer to output load derating curve)
   iii. STORAGE TEMP, HUMIDITY: -20 ~ +85, 10 ~ 95% RH
   iv. TEMP. COEFFICIENT: 0.05%/ (0 ~ 50°C)
   v. VIBRATION: 10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes
5. Others:
   i. MTBF: 191.2K hrs min. MIL-HDBK-217F (25°C)
   ii. DIMENSION: 7 27/32” x 3 29/32” x 1 15/16”
6. Protection:
   i. OVERLOAD: 105 ~ 150% rated output power
   ii. Protection type : Constant current limiting, recovers automatically after fault condition is removed
   iii. OVER VOLTAGE: 52.8 ~ 64.8V
   iv. OVER TEMPERATURE: 95°C±5°C (TSW1: Detect on Heat sink of Power Transistor)
   v. Protection type : Shut down o/p voltage, recovers automatically after temperature goes down
7. FUNCTION:
   i. REMOTE CONTROL(OPTION): CN1:4 ~ 10VDC POWER ON, <0 ~ 0.8VDC
   ii. POWER OFF
   1. Remote Central Volume and Contour Control:
      i. Generation and integration of multiple random sound masking sources and by using E-sound® technology equates to the best sound and effective sound masking. Each channel outputs with three levels of global and independent control.
      ii. Parametric equalization control for one to thousands of speakers.
      iii. 1/3rd Band Octave controls – (same as parametric controls for groups)
      iv. Volume control for entire spaces to channels to individual speakers.
   2. Integration of separate paging and music channels
      i. Each channel can be digitally controlled for zone management and changed on the fly without any change in wiring. No need to go back into the ceiling to change settings.
   J. Programmable Audio-Level Control Unit:
      1. Standard applications include scheduling, data logging, alarm detection & dispatch, meter reading, analog functions, and type translation. The scheduling application permits events and exceptions to be initiated based on time and date schedules configured by the user. An astronomical position calculator permits scheduling to be done based on the calculated position of the sun. The data logging application collects network activity for use by trending, reporting, and analysis applications. New DIME support enables data log upload to a Web services application to occur through a firewall and provides a means to identify, annunciate, and log alarm conditions.
      2. Automatic Sound Power Level Changes:
          Two system channel changes, four times per day, and capable of different time settings for each day of the week:
          i. Programmable attenuation range: -24 to +24 dB to +24 dB
          ii. Minutes per dB change: User programmable
          iii. Acclimation attenuation range: -24 to +24 dB
          iv. Acclimation days per dB change: 1 to 5 days
          v. Programmable events: 24 events per day for each zone
      3. Program Memory: Non-volatile for one year, minimum, without power. When re-energized after a power outage, control starts at zero level and automatically advances system sound level at same rate used for programmed level changes.
K. Paging/Music Equipment - Music Page Interface (MPI)

1. The MPI shall perform to the following requirements:
   i. The MPI replaces all the bulky head end equipment. No need for additional cable home-runs, amplifiers, separate equalizers, special switching equipment or matching vendors for compatible product interfaces.
   ii. MPI must be able to make zone additions, modifications, deletions and other changes to the paging and music/EBS system without rewiring.
   iii. MPI must be able to provide a minimum ability to program up to 100 zones for paging using DTMF tones through standard POTS telephone line. MPI must be able to be programmed for all call and emergency broadcast paging.
   iv. Each zone and group must have a dedicated one band octave equalizer that is able to adjust either individual zones or groups.
   v. The MPI must be able to from one point manage up to 1.5 million square feet of space through a single interface.
   vi. Volume and equalizer settings for paging and music must be administered in no more than ½ dB steps.
   vii. Music and Page Interface must automatically compensate and readjust for frequency line loss, broadcast and correct throughout the entire system at each node.
   viii. System must provide zone overlap whereby every channel can be assigned to a minimum of 10 programmable zones and all call.
   ix. Must provide crystal clear page.

2. Paging interface shall perform to the following:
   i. TYPE 99-channel Paging, Music Interface
      a. Once Octave EQ per channel capable with Sound Manager
   ii. INPUT VOLTAGE 7.5 Volts DC
   iii. INPUT CURRENT 333 Milliamps DC
   iv. ON/OFF SLIDE SWITCH
   v. FREQ RESPONSE 50 – 20,000 Hz (+ / - 3 dB)

3. INPUTS
   i. Telephone page input…..POTS line telephone input. RJ12 Connector
   ii. Data Input: Screw Terminals
   iii. Music input….  
      a. Left channel, 10k ohm input impedance, single nded RCA jack (phono connector)
      b. Right channel, 10k ohm input impedance, single ended RCA jack (phono connector)
      c. Left and Right channels are combined to form one music input.
   iv. Aux input….  
      a. All Call Page, 10k ohm input impedance, single ended RCA jack (special order)

4. OUTPUT
   i. Cat5e data cable, RJ45 Connector. Connects to node
   ii. Three ground (Common) screw terminal block. Connects to (-) of first node

5. INDICATORS
   i. 1 Power LED
   ii. 1 Telephone Answer/Hookup LED

6. TOTAL HARMONIC DISTORTION of Node (OP)
   i. OP Output - 0.5% or less at 1kHz, rated output
   ii. OP Output - 0.1% of less at 1kHz, 5 W output

7. OTHER FEATURES
   Momentary push button sequencer to sequentially initialize attached nodes.

8. DIMENSIONS
   6” x 8 3/8” x 1 7/8”

9. ATTACHMENT POINTS
   2 Screw tabs located on left and right of MPI

10. USAGE
    i. Lift Telephone Receiver.
    iii. Wait for short dial tone.
    iv. Dial two digit paging zone number and the # key. (00# for All Call).
    v. Wait for short beep.
    vi. Issue Page.

11. Node Paging/Music/EBS specification
    i. OUTPUT REGULATION: Less than 2.0 dB, no load to full load
    ii. SIGNAL TO NOISE RATIO Mic: 60 dB
        a. (Band pass 20 – 20,000 Hz) Telephone Page: 75 dB
        b. (Tone controls: set at center) Program:
           75 dB, Aux: 75dB
           One Octave EQ per Channel. ±5dB in ½ dB steps
iii. CONTROLS
iv. Volume (34 – 80dB) in 1/2dB steps via Central Control and/or IR Remote

12. PAGING VOLUME ADJUSTMENTS:
   i. Four channels/OP
   ii. Maximum output: 5.3 Volt RMS at speaker terminal
   iii. Attenuation range: 48 dB, in 1/2 dB steps, plus a mute setting.

13. PAGING ZONES
   i. Individual channel, groups or global paging zones.

14. E.B./MUSIC VOLUME ADJUSTMENTS
   i. Four channels/Node (OP)
   ii. Maximum output: 5.3 Volt RMS at speaker terminal
   iii. Attenuation range: 48 dB, in 1/2 dB steps, plus a mute setting.

15. EMERGENCY BROADCAST/MUSIC ZONES
   i. Individual channel, groups or global zones

16. PAGING/E.B./MUSIC OCTAVE EQUALIZER
   i. One page/music equalizer for all channels
   ii. 10 bands, 31.5 Hz to 16 kHz, each user adjustable by ±5 dB in 1 dB steps

17. POWER SUPPLY
   i. Input from building power: 100-240 VAC, 50–60 Hz, 1.0A
   ii. Output to MPI device: 7.5 VDC, 4.0A, 30W max
   iii. Power Consumption: 2.5W

PART 3
EXECUTION

3.1 MOUNTING OF MASKING SOUND LOUDSPEAKERS
A. Mountings and loudspeakers shall be concealed above the acoustical ceiling. The loudspeakers shall be suspended from the slab above by chain. Where possible, the bottom of each speaker shall be located a minimum of 6” to 8” (150 to 200mm) above the acoustical ceiling tile. However, it is most important that all units hang at a uniform height throughout to insure a uniformity of sound when the system is turned on.

B. Wiring Method: Install wiring in accordance with all local electrical codes. Conceal cable in accessible ceilings, walls and floors where possible.

C. Pulling Cable: Do not exceed manufacturers’ recommended pulling tensions. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between normal termination points. Remove and discard cable where damaged during installation and replace it with new cable.

D. Exposed Cable: Install parallel to building lines, follow surface contours, and support as recommended by manufacturer.

E. Grounding: As recommended by manufacturers, unless more stringent requirements are indicated. Ground equipment and conductors to eliminate shock hazard and to minimize ground loops. Common mode returns, noise pickup, cross talk and other impairments. Install 5-Ohm ground at main equipment location. Measure, record and report ground resistance.

F. Impedance Matching: For systems components including connecting cable, provide end-to-end level and impedance matched signal paths. Use matching networks and balancing devices at connections where necessary to avoid mismatches.

G. Splices, taps and terminations: Make splices, taps and terminations on numbered terminal strips in junction, pull and outlet boxes; and equipment closures.

H. The speaker locations shown on the drawings are schematic only and may require field modification to avoid major ductwork, structures and other plenum barriers. Additional speakers may be required to provide uniform sound distribution because of these plenum obstructions.

I. All local hanging codes must be reviewed and observed by the installer/contractor.

J. Identification:
   1. Identify system components, wiring, cabling, and terminals according to Division 16 Section “Electrical Identification” Use color coded conductors and apply wire and cable marking tape to designate wires and cables so media are identified in coordination with system wiring diagrams.
2. Identify system components, wiring, cabling, and terminals according to Division 16 Section "Basic Electrical Materials and Methods". Use color coded conductors and apply wire and cable marking tape to designate wires and cables so media are identified in coordination with system wiring diagrams.

K. All equipment and associated hardware shall be fabricated and installed in accordance with the manufacturer's specified recommendations.

### 3.2 PRELIMINARY TESTS AND ADJUSTMENTS

A. At the completion of installation of speakers, the Subcontractor shall perform initial tests and adjustment. It is suggested that, with the speakers installed in accordance with specified spacing and orientation, tests be conducted in an open area of 35 ft. x 35 ft. minimum size. Tests shall indicate that all acoustical performance requirements described herein are satisfied.

B. All testing and adjusting of the system shall be accomplished in the absence of the eventual occupants whenever possible. These precautions are essential to insure that the attention of the occupants will not be unnecessarily drawn to the noise or to its source.

C. Tests and adjustments shall be performed as described below.
   1. Hum and Noise Level
   2. Loudspeaker Operation
   3. Freedom from Buzzes, Rattles and Objectional Distortion
   4. Gain Control Settings
   5. A written report representing the results of the above tests, including numerical values where applicable, shall be submitted for review.

### 3.3 FINAL TESTS AND ADJUSTMENTS

A. The manufacturers' agent with the support and cooperation of any Subcontractor installer shall perform the acceptance testing of the completed installation. These tests shall be performed to demonstrate that the equipment is fully furnished and installed in compliance with the terms of the Specifications in all Contract Documents.

Except as otherwise specified, the Manufacturer or Subcontractor shall provide all instruments, equipment, labor and materials necessary to complete these tests.

B. Manufacturers Field Service: Engage a factory authorized service representative to inspect field assembled components and equipment installation and connections. Report results in writing. Include the following.

   1. Operational Test: Start system to confirm proper operation. Remove malfunctioning units, replace with new units and retest. Make initial sound spectrum and level adjustments for each zone.
   2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
   3. Inspection: Verify that units and controls are properly labeled and interconnecting wires and terminals are identified.
   4. Sound Masking Power Level Adjustments: Adjust independently for each space to minimum level of 47dBA to ensure speech privacy between adjacent workstations while complying with other system requirements.

The Subcontractor shall project the completion date of tests and adjustments so that he can give a minimum of one week’s notice to the active Project Manager.

D. Measurements of system performance shall be made using a calibrated ANSI precision sound level meter set for "slow" meter damping and 'A' scale filtering. The measurements shall be made at not less than twenty test positions at 4' height above the floor level, with gain adjusted to provide the system design level. All interior finishes and furnishings shall be in place. Tests shall be for each floor at times not occupied by personnel.

E. Final Acceptance Testing:

   1. Instrumentation: Use a professional quality sound level meter in accordance with ANSI S1.4
   2. Record test observations, readings and corrective actions.
   3. System Tests: Include the following for each zone:
4. Relative Sound Power Level

<table>
<thead>
<tr>
<th>Band</th>
<th>Open Plan Areas</th>
<th>Enclosed Offices</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>+2.5</td>
<td>-2</td>
</tr>
<tr>
<td>250</td>
<td>+3</td>
<td>-2</td>
</tr>
<tr>
<td>315</td>
<td>+2</td>
<td>-2.5</td>
</tr>
<tr>
<td>400</td>
<td>+1</td>
<td>-3</td>
</tr>
<tr>
<td>500</td>
<td>0</td>
<td>-4</td>
</tr>
<tr>
<td>630</td>
<td>-1</td>
<td>-5</td>
</tr>
<tr>
<td>800</td>
<td>-2</td>
<td>-6</td>
</tr>
<tr>
<td>1000</td>
<td>-3</td>
<td>-7</td>
</tr>
<tr>
<td>1250</td>
<td>-4</td>
<td>-8.5</td>
</tr>
<tr>
<td>1600</td>
<td>-5</td>
<td>-10</td>
</tr>
<tr>
<td>2000</td>
<td>-6</td>
<td>-12</td>
</tr>
</tbody>
</table>

Adjust level of masking sound for each space so one third octave band centered at 500 Hz has final selected sound power level for that space. Measure deviation from listed values in one-third octave bands from 400 to 2000Hz. Measured values must not deviate from those listed by more than 4 dB for open plan areas and 8 dB for enclosed offices. The total of individual band deviations in eight bands must not exceed 16 dB for open plan areas and 30 dB for enclosed offices.

5. Walk Through Test: People in masked spaces cannot discern speaker locations.

6. Temporal Stability Test: Check for uniformity of time by measuring sound level in each of 11 octave bands at one-minute intervals over a 30-minute test period. Deviations must not exceed limits specified in “System Description” Article in Part 2.

F. Retest: Correct deficiencies identified by tests and observations and retest until meeting specified requirements.

G. Recording Control Settings and System Adjustments: Record final control settings and programming and final tap setting of speaker matching transformers. Record final sound level measurements and observations.

3.4 ADJUSTMENT
A. Occupancy Adjustments: When requested within 12 months of date of substantial completion manufacturer is to provide on site assistance in adjusting system to suit actual occupied conditions. Provide one visit to site outside normal occupancy hours for this purpose without additional cost to the owner.

3.5 DEMONSTRATION
A. Engage a factory authorized service representative to train Owner’s maintenance personnel to adjust, operate and maintain services as specified below:
   1. Train owner’s maintenance personnel on procedures and schedules for starting up and shutting down, troubleshooting, servicing, and maintaining equipment and schedules.
   2. Review data in maintenance manual. Refer to Division 1 Section “Contract Closeout”
   3. Review data in maintenance manual. Refer to Division 1 Section “Operation and Maintenance Data”
   4. Schedule training with owner through Architect with at least seven days advance notice.
You are buying sound - *Listen to it!*
Comparing sound masking systems is easier when you understand the criteria by which you should evaluate a system.

Understanding the criteria that sets high quality sound masking systems apart from lower quality systems enables you to identify key differences with regard to features, performance and technical specifications and ensures you make the best choice when selecting a system.

Without the proper information, you may only base your sound masking purchase decision on price alone without ever comparing the sound quality, speech privacy and comfort that the masking system provides. This could compromise the ultimate success of your project.

The best way to compare sound masking systems is by *listening* to the *quality of sound* the system produces and by recognizing the way it provides both *comfort* and *speech privacy*. So before looking at features like controls, speakers or other technologies make sure that the sound masking you are buying sounds great.

The following pages and items will help you identify the most important features you need to consider when selecting a sound masking system. Use this information to help better understand the fundamentals for good sound masking systems, as well as important points to consider with regard to acoustical comfort, speech privacy, network controls, open platform and paging capabilities.

Remember, *A Great Sound Makes No Noise®*.

For more information or for clarification regarding any of the points represented in this Check List, please contact Lencore at info@lencore.com.
A SOUND MASKING SYSTEM’S COMFORT IS BASED ON SEVERAL FACTORS

- The origin of the sound
- The wrap around or repeat of the sound
- The number of noise sources used to create the sound
- The distribution and delivery of the sound
- The uniformity / coverage of the sound which depends upon layout and speaker orientation
- A true broadband sound (low, mid and high frequencies)
- Tight tolerances for tunability
- The ability to customize the sound to meet the needs of the client

A SOUND MASKING SYSTEM’S ABILITY TO PROVIDE SPEECH PRIVACY IS BASED ON:

- The system’s ability to produce low frequencies and frequencies within the speech spectrum range
- The system’s ability to mask speech unobtrusively while adding acoustical comfort
- The system’s ability to achieve an acceptable level of speech privacy according to appropriate standards such as ASTM (E-1130), RASTI, STIPA, etc.
- The masking system’s ability to contour the sound appropriately to achieve the proper masking curve for the environment

OTHER FACTORS TO CONSIDER

- Serviceability of Equipment – Can equipment be serviced by vendors other than provider?
- Proprietary Software / Cables – Is equipment only available through the vendor, locking you into a vendor or a purchasing agreement regardless of your satisfaction with the vendor or their product’s performance?
- Choice of Speaker Type – Does vendor provide many customized speakers such as in-plenum, direct fired, and specialty speakers to meet needs and codes or does vendor have a one size fits all system?
- Security IT Issues – Does equipment require you to load third party software onto your secure server?
- Migration – Will the system/software migrate from one operating system to another or is a patch or an upgrade needed?
- Controllability – Will software and system controls be provided to you or retained by the vendor?
- UL Listing for Plenum Use – Is equipment listed for use in-plenum and air handling spaces?
- Full Third Band & Parametric Equalization – Does your network system offer both?
- Easy System and Node Identification – Can network system nodes be easily identified visually and by the control system when troubleshooting the system?
- Speech Privacy Standards – Does system meet standards for speech privacy?
- Open Standards – Does system meet ANSI / ISO / IEC standards for open platform?
- Maintenance Costs & Flexibility – Does system require maintenance contracts? Will speaker placement allow you flexibility to change your space without added cost or damage to ceiling tiles?
CONSIDER THE FOLLOWING WHEN COMPARING SOUND MASKING SYSTEMS

### FUNDAMENTALS
The fundamentals will cover basic information such as project costs, equipment breakouts, on-going contract needs, safety standards, warranty particulars, manufacturing capabilities, etc. This criteria should be considered when comparing bid proposals.

<table>
<thead>
<tr>
<th></th>
<th>LENCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Proposal 1</td>
</tr>
<tr>
<td>01. What is the total price listed on the proposal for the sound masking system?</td>
<td>Equipment $________</td>
</tr>
<tr>
<td></td>
<td>Installation $________</td>
</tr>
<tr>
<td></td>
<td>Shipping $________</td>
</tr>
<tr>
<td></td>
<td>Other $________</td>
</tr>
<tr>
<td></td>
<td>TOTAL $________</td>
</tr>
</tbody>
</table>

02. Has the vendor provided a clear breakdown/unit costs for all equipment or has vendor hidden the breakdown cost and provided only a lump sum for all equipment?  
Make sure you get a breakdown from your vendor to accurately compare all costs.

- [ ] Breakdown Provided  
- [ ] No Breakdown / Lump Sum

03. Has the vendor indicated the total square footage to be covered with sound masking?

- [ ] YES  
- [ ] NO

04. How many total speakers has the vendor quoted on the proposal for the project?

- [ ] YES  
- [ ] NO

05. Has the vendor provided a drawing showing the system and the layout for the coverage so that a complete scope can be reviewed?

- [ ] YES  
- [ ] NO

06. Does the system require on-going maintenance, costs and contracts?

- [ ] YES  
- [ ] NO

07. Are these maintenance costs and contracts reflected in the original quote?

- [ ] YES  
- [ ] NO  
- [ ] N/A

08. What are the terms and conditions of the manufacturer’s warranty?

- [ ] YES  
- [ ] NO  
- [ ] N/A

09. Is the system UL listed for use in the plenum or only UL listed?  
Ensure UL listing for plenum use when using equipment in the plenum.

- [ ] UL  
- [ ] None  
- [ ] UL for Plenum

10. Is the product manufactured in the USA?

- [ ] YES  
- [ ] NO

S.M.A.R.T.™ - Sound Masking Assessment & Review Template
## COMFORT

Comfort and ability to create speech privacy are equally important to the success of your sound masking system. Comfort is measured by the following qualities: the sound that is generated, the uniformity of the sound, speaker dispersion and distribution, the wrap around for the system and the system’s tuning and adjustment capabilities. The following checklist items address the factors that influence the comfort for sound masking systems and should be considered when comparing bid proposals.

**NOTE:**

*For uniformity, assuming a standard office build out and site conditions, typically in-plenum speakers should be placed 12-15 feet apart. If vendor provides direct fired/field speakers, the speaker distance should be no further than the ceiling height. For example: If ceiling height is 10 feet, speakers should be on 10 foot centers throughout space for direct fired/field speakers. Some providers will spread speakers further apart, only to be price competitive not ensuring sound uniformity. If this occurs, comfort and speech privacy may be severely compromised.*

<table>
<thead>
<tr>
<th>QUESTION</th>
<th>LENCORE</th>
<th>LENCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>11</strong> Does the system provide a full broadband sound by producing sound from 20Hz to 20kHz?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Frequency Range: 20Hz - 20kHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>12</strong> How far apart has the vendor placed the speakers shown on layout?*</td>
<td>_______ ft.</td>
<td>_______ ft.</td>
</tr>
<tr>
<td><strong>13</strong> What is the average wrap around for the system?</td>
<td>25 hours</td>
<td></td>
</tr>
<tr>
<td>Noticeable repeats that “wrap around” in short period can be distracting and uncomfortable.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>14</strong> Does the system provide independent adjustments for masking volume separate from the paging and music volume at the speaker channel level?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td><strong>15</strong> Does the system provide full (30 bands) or only partial 1/3rd band octave equalization?</td>
<td>Full</td>
<td>NO</td>
</tr>
<tr>
<td>Partial</td>
<td></td>
<td>Partial</td>
</tr>
<tr>
<td><strong>16</strong> Does the system provide parametric equalization? If so, how many bands?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td># of bands</td>
<td>30</td>
<td># of bands</td>
</tr>
<tr>
<td><strong>17</strong> Are the speakers specified in-plenum or direct fired/field speakers?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In-Plenum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct Fired/Field</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Both</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>18</strong> For direct fired/field system, which speaker sizes can the vendor provide?</td>
<td>Large</td>
<td>Small</td>
</tr>
<tr>
<td><strong>19</strong> Which type of systems is the vendor capable of providing so that a customized solution can be provided for your space?</td>
<td>Networked</td>
<td></td>
</tr>
<tr>
<td>Centralized</td>
<td></td>
<td></td>
</tr>
<tr>
<td>De-centralized</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Contained / Portable</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>20</strong> Are the speakers capable of producing low frequencies (below 200Hz), mid frequencies and high frequencies?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td><strong>21</strong> Does the sound masking system create sound uniformity which is ± 1/2 dBA?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td><strong>22</strong> Can the sound masking system be tuned in 1/2 dBA steps?</td>
<td>YES</td>
<td>NO</td>
</tr>
</tbody>
</table>
**CONSIDER THE FOLLOWING WHEN COMPAREING SOUND MaskING SYSTEMS**

### SPEECH PRIVACY

Standards for speech privacy exist and it is important that your sound masking vendor is able to meet these standards while maintaining comfort. Verify the following when comparing bid proposals.

<table>
<thead>
<tr>
<th></th>
<th><strong>LENCORE</strong></th>
<th><strong>Proposal 1</strong></th>
<th><strong>Proposal 2</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>Can the proposed system meet the standard ASTM E-1130 for speech privacy and still provide comfort?</td>
<td>✔ YES ☐ NO</td>
<td>☐ YES ☐ NO</td>
</tr>
<tr>
<td>24</td>
<td>Does the manufacturer have independent verification of the system’s ability to provide privacy according to ASTM E-1130?</td>
<td>✔ YES ☐ NO</td>
<td>☐ YES ☐ NO</td>
</tr>
<tr>
<td>25</td>
<td>Can the manufacturer document that the system has met the requirements for speech privacy and also provide you with an Articulation Index/Privacy Index Report showing privacy has been achieved?</td>
<td>✔ YES ☐ NO</td>
<td>☐ YES ☐ NO</td>
</tr>
<tr>
<td>26</td>
<td>Is proper uniformity being provided so that privacy is maintained throughout 100% of the space? Typically, 23 dB systems cannot provide both speech privacy and comfort throughout the entire space.</td>
<td>✔ YES ☐ NO</td>
<td>☐ YES ☐ NO</td>
</tr>
</tbody>
</table>

### OPEN PLATFORM NETWORK & CONTROL CAPABILITIES

Be careful when vendors claim to be “open”; they most likely are not. They must meet ANSI 709.1 to be considered true open. While TCP/IP is a standard in the data world, it is NOT a control protocol. If TCP/IP operates as open transport, one must still provide or develop an open control protocol. The temptation is for vendors to define a new control protocol riding on the coattails of the open TCP/IP standard, proclaiming the overall approach “open” because TCP/IP is open, when in fact the control protocol itself is closed and proprietary. In addition, there are a number of other control and access capabilities that should be considered when comparing bid proposals. Lencore’s system meets requirements for true open platform.

<table>
<thead>
<tr>
<th></th>
<th><strong>LENCORE</strong></th>
<th><strong>Proposal 1</strong></th>
<th><strong>Proposal 2</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>Does the system meet the requirements for true open platform as defined by ANSI 709.1?</td>
<td>✔ YES ☐ NO</td>
<td>☐ YES ☐ NO</td>
</tr>
<tr>
<td>29</td>
<td>Is the system’s head end equipment TCP/IP enabled?</td>
<td>✔ YES ☐ NO</td>
<td>☐ YES ☐ NO</td>
</tr>
<tr>
<td>30</td>
<td>Can the system’s controls run on all Windows, Linux and Leopard (Apple) platforms and versions without requiring software upgrades to work? Migration issues are common when using proprietary software and controls.</td>
<td>✔ YES ☐ NO</td>
<td>☐ YES ☐ NO</td>
</tr>
<tr>
<td>31</td>
<td>Did the vendor include in their bid, all costs for their network manager, software or both?</td>
<td>✔ YES ☐ NO</td>
<td>☐ YES ☐ NO</td>
</tr>
<tr>
<td>32</td>
<td>Will the vendor provide and leave client with all software/tools necessary to manage and operate the masking network, system and controls?</td>
<td>✔ YES ☐ NO</td>
<td>☐ YES ☐ NO</td>
</tr>
</tbody>
</table>
## OPEN PLATFORM NETWORK & CONTROL CAPABILITIES

<table>
<thead>
<tr>
<th><strong>NOTES:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>*1. Software installation on client servers or computers can create serious security and migration issues when installed behind their firewall.</td>
</tr>
<tr>
<td>*2. Multi-drop systems provide for control system communications, even beyond any failed node. Point to point systems cannot communicate beyond any failed node and this causes problems with diagnostics, troubleshooting, paging and operation.</td>
</tr>
</tbody>
</table>

**Crestron®, AMX® and Cisco® are trademarks and the property of their respective owners.**

### CHECK LIST

<table>
<thead>
<tr>
<th>S.M.A.R.T. ™</th>
<th>OPEN PLATFORM NETWORK &amp; CONTROL CAPABILITIES</th>
<th>LENCORE</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Proposal 1</td>
<td></td>
<td>Proposal 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>Is it required that software be installed on the client’s side (behind the firewall) in order to operate the system? *1</td>
<td>NO</td>
<td>NO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>Does the system provide one central control panel or require multiple control panels to control the system? If more than one, how many are necessary? A central controlled or networked system cannot be “centrally” controlled when multiple panels are necessary. Multiple control panels create multiple points of failure conditions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Is the data delivery system of the network reliant upon building ground in order for the network to work across multiple floors?</td>
<td>NO</td>
<td>NO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>Does the system require any proprietary control panels, software, cables and/or connectors that need to be purchased exclusively from the manufacturer for system expansion or maintenance?</td>
<td>NO</td>
<td>NO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>Is the systems network multi-drop or point to point network? *2</td>
<td>Multi-Drop</td>
<td>Multi-Drop</td>
<td></td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>Does the system offer full diagnostic control after any failed node? Point to point systems will not be able to provide full diagnostics beyond any failure point.</td>
<td>YES</td>
<td>YES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>Does the system provide infra-red controls in the plenum? Does the system provide infra-red controls in the wall? Does the system provide infra-red controls with keypad? Does the system provide infra-red controls for individual channels?</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>40</td>
<td>Does the system have the ability to monitor and report the system’s operation and to identify if a unit or speaker wire has been cut, removed or tampered with?</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>41</td>
<td>Does the sound masking/paging system interface with Crestron®, AMX® and Cisco® for ease of integration with your other existing systems?</td>
<td>Crestron®, AMX®, Cisco®</td>
<td>Crestron®, AMX®, Cisco®</td>
<td></td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>Does the system provide capabilities to tie multiple buildings through one control panel?</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

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**Lencore Acoustics Corp.** One Crossways Park Drive West Woodbury, NY 11797 p 516-682-9292 f 516-682-4785 info@lencore.com

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CONSIDER THE FOLLOWING WHEN COMPARING SOUND MASKING SYSTEMS

<table>
<thead>
<tr>
<th>PAGING</th>
<th>LENCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your system’s paging must be clearly intelligible and uniform with the highest level of flexibility, control and zoning capabilities.</td>
<td>Proposal 1</td>
</tr>
<tr>
<td>43 Does the masking system provide you with an integrated option for quality paging and music with completely independent controls for volume and EQ?</td>
<td>YES</td>
</tr>
<tr>
<td>44 Can the system provide a minimum of 99 programmable zones in addition to an all call page?</td>
<td>YES</td>
</tr>
<tr>
<td>45 Does the system provide zone overlap where each speaker channel can carry up to 10 programmable zones for masking, paging and music respectively?</td>
<td>YES</td>
</tr>
<tr>
<td>46 Does the system provide mute/unmute functions?</td>
<td>YES</td>
</tr>
<tr>
<td>47 Does the system provide a global muting function through a dry contact closure for fire alarms?</td>
<td>YES</td>
</tr>
<tr>
<td>48 Does the system provide automatic Adaptive Equalization to ensure a flat response for the entire building for paging?</td>
<td>YES</td>
</tr>
<tr>
<td>49 Does the system provide a full one octave band EQ per speaker channel?</td>
<td>YES</td>
</tr>
<tr>
<td>50 Does the vendor list all of the head end equipment required for paging including all necessary amplifiers and support equipment?</td>
<td>YES</td>
</tr>
<tr>
<td>51 List all paging equipment needed.</td>
<td>Music Page Interface</td>
</tr>
</tbody>
</table>

CONCLUSION:

Remember, A Great Sound Makes No Noise ®

When comparing sound masking systems, the first thing you must consider is the sound quality that the system produces. Sound quality and the ability to provide both comfort and speech privacy are critical to the system’s ultimate success and ability to positively impact your environment. After all, you are buying sound. Make sure you listen to it.

All sound masking systems are not created equal so in addition to sound quality, there are other features and capabilities that are important to consider with regard to system flexibility, sound production, distribution, system access and controls, network capabilities, open protocols and industry standards, as well as paging and music capabilities.

Make sure that your sound masking vendor provides you with multiple system and speaker options to better optimize your space as one size does not fit all when it comes to sound masking. Your vendor should have a solid installation base, years of experience, proven performance and offer you a full warranty so that you can be confident in your sound masking investment.

For more information or for clarification regarding any of the points represented in this Check List, please contact Lencore at info@lencore.com
CONTACT INFORMATION

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website: www.lencore.com
Spectra i.Net® provides clients with unprecedented sound quality and comfort for masking systems while providing tremendous system flexibility.