

Bosch Public Address

Leading the way in acoustical excellence



BOSCH

Invented for life



Advanced **acoustical expertise**

With more than 60 years of experience in the design and development of electro-acoustic technology, Bosch is an established leader in the field. Their guiding principle is to create products that are superior in terms of technology, design and ease of use. From waveguide to array technology, and 3-D simulation to cutting edge design, Bosch's acoustical expertise is as extensive as it is innovative. Turning comprehensive experience into world-class acoustical solutions – that's how Bosch continues to lead the way.

Enabling optimal acoustics

At Bosch, our expertise is in developing superior technology for an optimal acoustical environment. Sometimes this means high quality background music with a consistent sound level everywhere in the listening area. Other times, as in the case of an emergency, it means messages which are received clearly, with high speech intelligibility – even when there is considerable background noise. It's all made possible through the technologies developed by Bosch: cardioid column loudspeakers, feedback suppression, reverberation technology, and many others. And Bosch continues to innovate, creating today's technologies which will become tomorrow's industry standards.

Investment in R&D

Bosch's reputation for producing state of the art technologies is largely due to the extensive research that it invests in. Its commitment to innovation is huge: Bosch owns and operates one of Europe's largest acoustical test and measurement facilities. This test centre has 5 fully equipped anechoic rooms, allowing Bosch to accurately and automatically measure microphones and loudspeakers. Extensive testing – all done according to internationally recognized industry standards – ensures that customers can be confident about the high quality of every Bosch acoustical product.

“With five anechoic rooms Bosch has enormous capacity for extensive acoustical measurement. And everything we learn gets funneled back into new product development.”

Aldo van Dijk, The Netherlands, Bosch Acoustic Engineer



Acoustic **evolution**



Pioneering technologies

For years now, Bosch has developed technologies that address some of the most persistent challenges in the field of acoustics. Legacy technologies – like Bosch’s Cardioid Column Loudspeaker and the Back Plate Electret (BPE) Microphone Transducer – remain immensely popular within the acoustic industry. Other technologies are also still widely applied. Adaptive technologies like Automatic Noise Dependent Audio Signal Processing (ANDAP), for instance, adjust sound so that it can be heard even when the background noise level is high or, like Multi-Channel Reverbration (MCR), actively and electronically adapt a theater’s acoustics without requiring architectural adjustment. And Bosch’s algorithm for feedback suppression is a powerful technology that is regularly used in both public address and congress systems.



“Bosch has some great electro-acoustic technologies. But what I really appreciate is how they make my life easier. Their equipment is remarkably robust, and easy to install and maintain.”

Göbel Systemtechnik, Germany, Professional Installer

Advancing developments

Bosch continues to innovate. For instance, Bosch was the first to use passive line array technology in the public address market. In designing their new line array loudspeaker, a resourceful use of passive filtering ensures a consistent listening experience, without the use of expensive processors.

Additionally, advances in active line array technology have enabled Bosch to extend, as well as more accurately define, the listening area. Another ingenious solution is represented by their wide dispersion loudspeaker. By utilizing a radical new form, Bosch has effectively managed to create a powerful hemi-directional loudspeaker that provides a uniform sound field over a large area.

Creating **effective solutions**

A measured approach

Numerous tests are done to review how a loudspeaker distributes sound. In addition to quality control, these tests help expand Bosch's already considerable in-house knowledge and expertise. And by performing extensive acoustical measurements, Bosch generates a tremendous amount of data about its products. This data ensures that proper simulations can be carried out in various acoustic simulation programs, thus helping to ensure the effectiveness and trustworthiness of its products in real use.

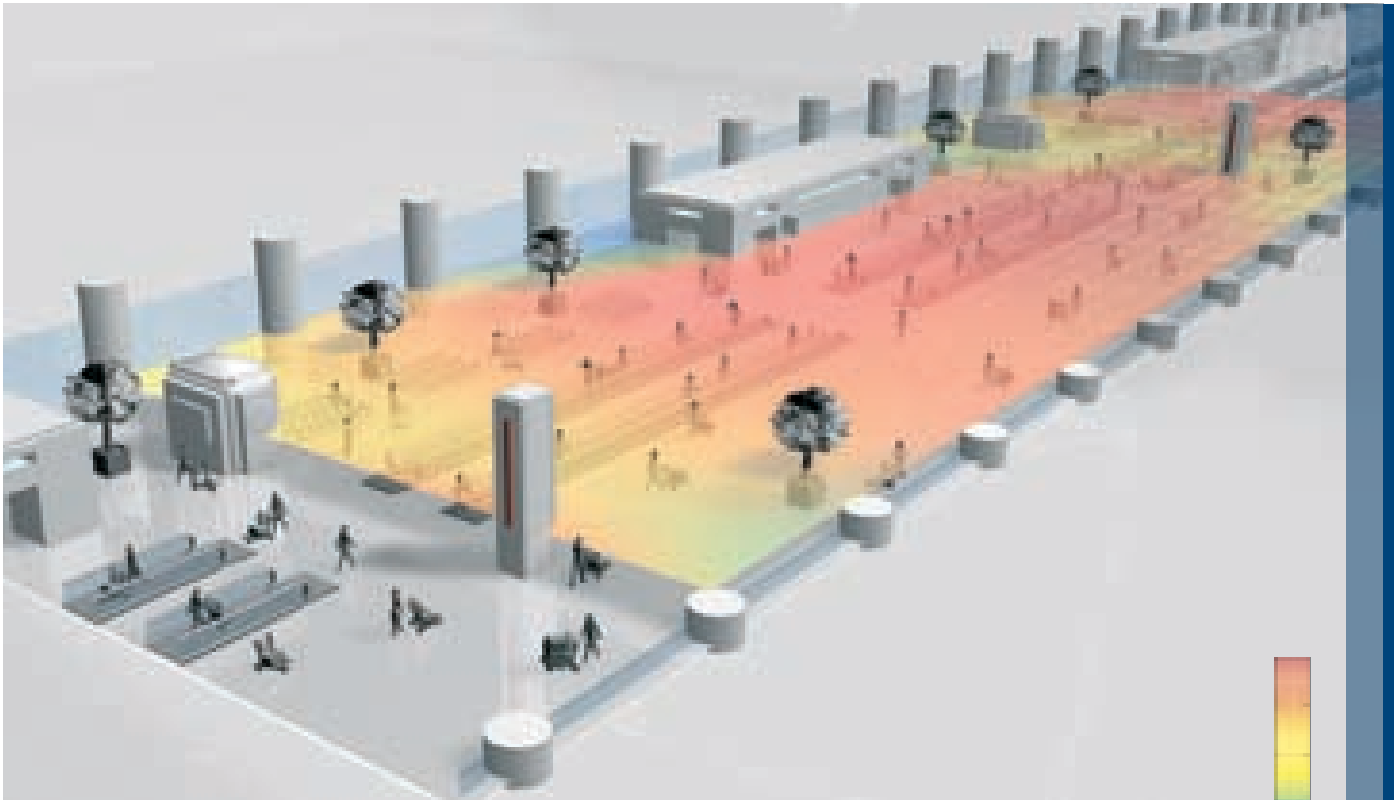
Solutions for a complex world

When developing their acoustical products, the Bosch team recognizes that real-life environments can be often quite complex. Which is why they always take the complete situation into consideration. And which is why they have been able to create effective solutions for even traditionally difficult locations such as long hallways, large areas with numerous obstructions, and areas that are exposed to moisture. For customers faced with complicated sound requirements, Bosch is able to play the role of vital strategic partner, making its expertise and acoustic simulation support available in order to propose an optimal solution.



“We knew we had an acoustic challenge. Bosch was able to show us in a simulation how it would all work. Sure enough, when the system was in, it performed just like they predicted!”

ADPi, United Arab Emirates, Satisfied Customer



Sound (pressure) level

Bosch trademark quality

Without compromising on quality, Bosch provides you with an overall lower cost of ownership. All of its acoustical products meet, or exceed, international standards. They are robust, require minimal power and are easy to install and maintain. Bosch has even established a certified training program for installers, to ensure that installations meet rigorous quality controls. And while proud of its technical proficiency, Bosch strives always to match the highest audio quality with great looking design.

Superior inside and out. That’s typical Bosch.

A Tradition of Quality and Innovation

For over 100 years, the Bosch name has stood for quality and reliability. Bosch is the global supplier of choice for innovative technology, backed by the highest standards for service and support.

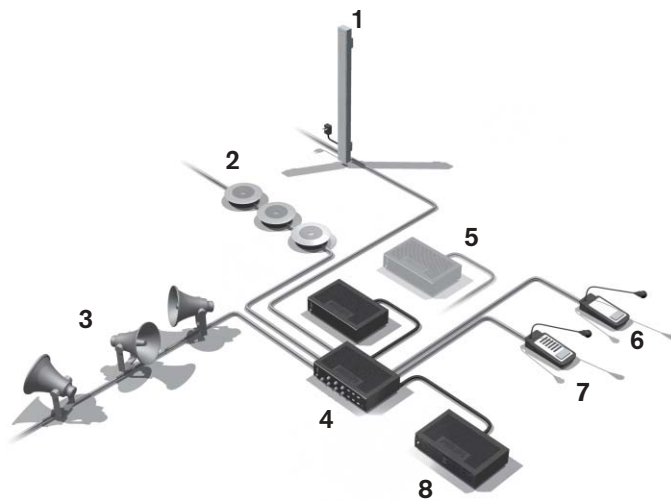
Bosch Security Systems proudly offers a wide range of security, safety, communications and sound solutions that are relied upon every day in applications around the world, from government facilities and public venues to businesses, schools and homes.



Bosch Security Systems

To learn more about our product offering, please visit www.boschsecurity.com or send an e-mail to emea.securitysystems@bosch.com

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Solution

Intellivox line arrays can easily be incorporated into a typical public address system with switching, amplifiers and 100 V lines. A single Intellivox loudspeaker can be used to deliver superb intelligibility of speech and music to extremely large areas, as well as rooms which present a particular acoustic challenge. Requiring less loudspeakers for any given room cuts costs, shortens installation time and means less amplifier power is required during operation.

In a shopping mall, for instance, the whole central hall can be covered with just a few Intellivox loudspeakers (1) that blend seamlessly into the interior. Ceiling loudspeakers (2) can be installed in the adjacent corridors, shops and food courts. For the parking lot, horns (3) can be used connected to the same public address system (4).

When listening areas overlap, delay units may have to be used together with the ceiling loudspeakers to synchronize their sound with the output of the Intellivox loudspeaker.

No amplifier power is required to drive the Intellivox loudspeakers, because they incorporate their own amplifiers. Each loudspeaker simply has to be connected to a single-phase 120/230 V (450 VA) power outlet. The 100 V line is connected directly to the appropriate input on the Intellivox loudspeaker.

Loudspeaker mounting and configuration

Because the directivity of these loudspeakers is adjusted by software, they can be mounted flat against the wall or in recesses (flush-mounted). A PC running the WinControl software is connected directly to the line array to 'shape' the loudspeaker's sound; setting elevation angle, vertical opening angle and focus distance to match the requirements of the room and listening area. If required, the sound color can be adjusted with the built-in parametric equalizer.

Once the adjustment is completed, the PC is disconnected and the loudspeakers are ready to operate.

The settings are stored in the loudspeaker, and are retained even if the power supply to the loudspeakers is disrupted.

Configuration			
LBC 3251/xx-	Intellivox-1b up to Intellivox-6c depending		(1)
LBC 3256/xx:	on size of the area.		
LBC 3951/01,	9/6W Ceiling loudspeakers	: Multiple	(2)
LBC 3491/12,	15/10W Horn loudspeaker	: Multiple	(3)
LBB 1925/10,	Plena 6-zone system pre-amplifier	: 1x	(4)
LBC 193x/00,	120, 240 or 480W Plena booster	: 1 or several	(5)
LBB 1941/00,	All-Call Plena call station	: 1x	(6)
LBB 1946/00,	6-zone Plena call station	: 1x	(7)
LBB 1961/00,	Plena tuner and CD/MP3 player	: 1x	(8)

INTELLIVOX DDC with distributed public address systems



Security Systems



Intellivox DDC (Digital Directivity Control) is a range of five active line array loudspeakers with integrated class-D amplifiers and a digital signal processor (DSP). The characteristics of Intellivox loudspeakers can be adjusted by software to match any environment, literally providing 'tailor-made' audio. This unique capability leads to exceptional speech intelligibility - the best there is. Loudspeakers up to 5 m in length are available offering an extreme long throw, so just a few are needed for a cost-effective solution in even the largest of buildings. The integrated remote monitoring capability gives the advantage of continuously knowing system status, and makes these active loudspeakers a key part in a compliant Voice Evacuation System.

Public address system

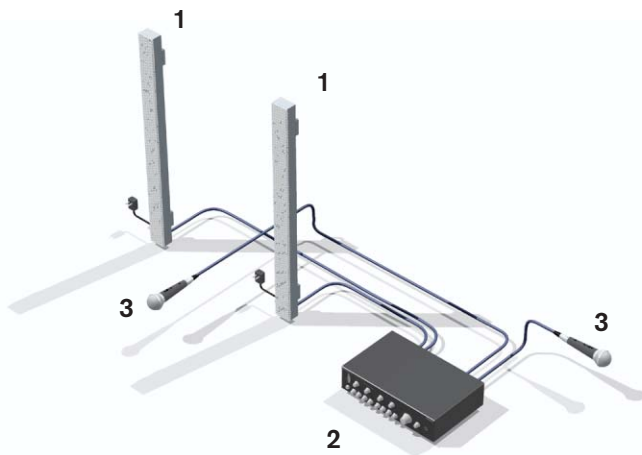
This application note describes how Intellivox active line array loudspeakers can be used as part of a public address system. They can be used in a variety of venues, including airports, schools, hotels and shopping malls.

Introduction

The main requirement of a public address system is to distribute attention signals, live speech announcements, stored messages and background music to one or more public areas. It should inform the public in general, and alert in emergency situations. This obviously means that any loudspeakers used must be reliable, and of such quality so the public can hear these announcements clearly. The loudspeakers should also be able to operate from switched 100 V lines so different zones can be selected and addressed from a central point.

Summary of requirements

- Superb speech intelligibility
- Reliable operation
- 100 V line compatible
- Speech and music reproduction



Solution

One or two Intellivox loudspeakers (1) are connected to a Plena universal pre-amplifier (2). The line output of the Plena is connected directly to the line input on the DDC Intellivox line array loudspeakers. This connection is made with a standard shielded cable; the length of this cable is not critical. The microphone (3) is connected to the Plena pre-amplifier by means of a balanced line. If a condenser microphone is used, once again the length of this line is not critical.

This configuration is extremely simple and straightforward. No external power amplifiers are required, because the Intellivox line array loudspeakers incorporate their own amplifiers. Each loudspeaker simply has to be connected to a single-phase 120/230 V (450 VA) power outlet. If background music is also required, a music source can simply be connected to the Plena pre-amplifier, since Intellivox loudspeakers are also suitable for music reproduction. And because of the ease of set-up and the limited number of components, this configuration is very suitable as a temporary installation.

In places of worship, an Intellivox loudspeaker can be mounted on each side of the altar. Because the directivity of these loudspeakers is adjusted by software, they can be mounted flat against the wall or in recesses (flush-mounted). A PC running the WinControl software is connected directly to the line array to 'shape' the loudspeaker's sound; setting elevation angle, vertical opening angle and focus distance to match the requirements of the room and listening area. If required, the sound color can be adjusted with the built-in parametric equalizer.

Once the adjustment is completed, the PC is disconnected and the loudspeakers are ready to operate. The settings are stored in the loudspeaker, and are retained even if the power supply to the loudspeakers is disrupted.

Configuration		
LBC 3253/xx, Intellivox-2c	: 2x	(1)
LBB 1920/00, Plena universal pre-amplifier	: 1x	(2)
LBC 2900/xx, Dynamic hand-held microphone	: 2x	(3)

INTELLIVOX DDC for live speech amplification



Security Systems



Intellivox DDC (Digital Directivity Control) is a range of five active line array loudspeakers with integrated class-D amplifiers and a digital signal processor (DSP). The characteristics of Intellivox loudspeakers can be adjusted by software to match any environment, literally providing 'tailor-made' audio. This unique capability leads to exceptional speech intelligibility - the best there is. Loudspeakers up to 5 m in length are available offering an extreme long throw, so just a few are needed for a cost-effective solution in even the largest of buildings. The integrated remote monitoring capability gives the advantage of continuously knowing system status, and makes these active loudspeakers a key part in a compliant Voice Evacuation System.

Live Speech Amplification

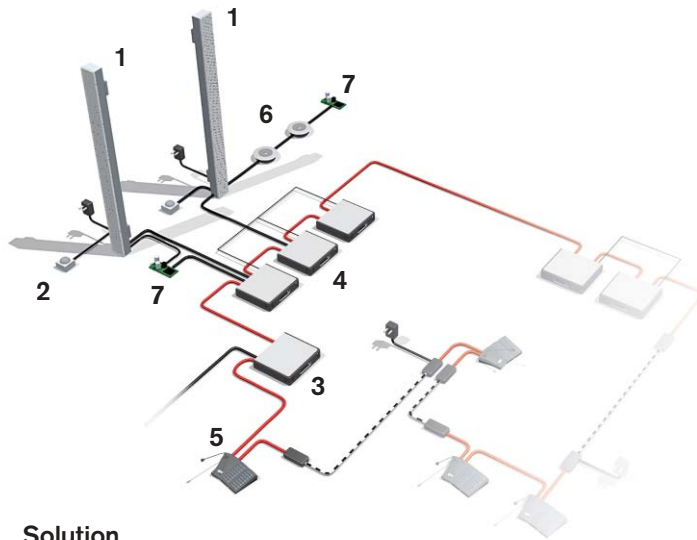
This application note describes how Intellivox active line array loudspeakers can be used as part of a system which provides high-quality reproduction of live speech, for instance in places of worship, auditoriums, congress centres and in temporary installations.

Introduction

High-quality reproduction of speech is the main requirement of a sound reinforcement system in churches, mosques and auditoriums. All listeners should be able to hear clearly what is being said. Places of worship are generally very reverberant, and sound reflected from hard walls and ceilings can seriously compromise the quality of broadcast sound. Positioning of the loudspeakers is also an important issue. When listening to amplified live speech, it is more comfortable and natural for listeners if the sound originates from beside the person who is speaking. But the loudspeakers should be as unobtrusive as possible, so as not to disturb the aesthetic balance of the room. In auditoriums, live speech is often relayed to neighboring areas such as press rooms.

Summary of requirements

- Superb speech intelligibility
- Minimized sound reflections
- Amplified sound should originate close to the person speaking
- Loudspeakers should not be too prominent
- Excellent listening comfort
- Maximum gain before feedback



Solution

A self-monitoring voice alarm evacuation system with superb speech intelligibility can be created by combining Intellivox loudspeakers (1) with a Praesideo digital public address/emergency sound system (2-5). The loudspeakers are connected to the 100 V outputs of the Praesideo. A single Intellivox loudspeaker can be used to deliver high-quality speech intelligibility to extremely large areas, as well as rooms which present a particular acoustical challenge. No additional amplifier power is required, because the DDC Intellivox line arrays incorporate their own amplifiers. Each loudspeaker simply has to be connected to a single-phase 120/230 V (450 VA) power outlet.

Speech Intelligibility

The Intellivox loudspeakers ensure that the best achievable speech intelligibility and sound pressure levels are reached throughout the listening area. To make sure the announcement is made at 10dB above ambient noise, a dedicated noise sensing microphone is connected for each Intellivox for automatic volume control. Neighboring rooms can be addressed by distributed EVAC compliant loudspeakers also connected to the Praesideo amplifiers.

Monitoring

Intellivox speakers check their status continuously in great detail and report either to a PC or via input/output relays to the Praesideo and/or building management systems. Praesideo also checks system integrity continuously and has the ability to log faults. In the event of any system faults being detected, the Praesideo can be configured to generate an error message and create an error log entry. A service engineer can diagnose faults using a PC directly connected to the unit or via an on-site network. For Praesideo even dial-up log-in is available.

The standard requires that not only the individual elements but also the connection between them is constantly monitored. This is carried out by the Praesideo's wireless line supervision (WLS) (7). A high-frequency (20 kHz) pilot tone is constantly circulated around all loudspeaker lines, and any faults will cause a relay contact to switch. Intellivox loudspeakers are compatible with this pilot tone monitoring, so every Intellivox loudspeaker in a network can be individually checked.

Reliability

Each Intellivox loudspeaker comes with dedicated built-in class-D amplifiers and DSP. If one loudspeaker fails, it does not affect any neighboring loudspeaker so, by having two Intellivox line arrays overlapping the same area, redundancy is achieved. The power supply should be safeguarded by a back-up. Together with the spare amplifier switching capabilities of Praesideo and the possibility of using fire resistant or redundant cabling, single points of failure can be eliminated throughout the system.

Loudspeaker mounting and configuration

Because the directivity of these loudspeakers is adjusted by software, they can be mounted flat against the wall or in recesses (flush-mounted). A PC running the WinControl software is connected directly to the line array to 'shape' the loudspeaker's sound; setting elevation angle, vertical opening angle and focus distance to match the requirements of the room and listening area. If required, the sound color can be adjusted with the built-in parametric equalizer.

Once the adjustment is completed, the PC is disconnected and the loudspeakers are ready to operate. The settings are stored in the loudspeaker, and are retained even if the power supply to the loudspeakers is disrupted.

Configuration		
LBC 3251/xx-	Intellivox-1b up to Intellivox-6c	(1)
3256/xx,	depending on size of area.	
LBC 3262/00,	Noise sensing microphone	: 1x per Intellivox (2)
LBB 4401/00,	Praesideo network controller	: 1x (3)
LBB 442x/00,	Praesideo boosters for switching zones and driving conventional loudspeakers	: multiple (4)
LBB 44xx/00,	Praesideo call stations, wireless line supervision sets and cabling	: multiple (5)
LBC 3011/41	EVAC compliant cabinet	
LBC 3018/00	and ceiling loudspeakers	: multiple (6)
LBC 3086/41		

INTELLIVOX DDC and Praesideo in voice evacuation systems



Security Systems



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Voice Evacuation Systems

This application note describes how Intellivox active line array loudspeakers can be used as part of a voice alarm evacuation system which complies with relevant international standards.

Introduction

Voice evacuation systems must meet a number of strict requirements. Acoustically, evacuation messages must be broadcast throughout the entire venue, while complying strict intelligibility and loudness standards. The integrity of the complete system must be constantly monitored, and any detected faults have to be reported within a pre-specified period. These requirements, and others, are covered by various standards, including the leading international standard IEC 60849 and the British standard BS 5839 part 8.

Summary of requirements

- Speech intelligibility ≥ 0.5 STI
- Sound pressure level of broadcast messages at least 10 dB higher than ambient noise
- All system elements and signal paths checked every 100 seconds
- All faults reported within 100 seconds to a non-volatile medium
- Power supply back-up