

Electronics

Older systems were based on analogue techniques, simple loudspeakers and specialized processors. The new XLNT MCR system is fully digital, incorporates specialist loudspeakers, audio processor, and a CobraNet® digital network for perfect audio distribution. The audio processors are based on the proven Peavey® MediaMatrix® system.

An enormous quality improvement is achieved by using better components and digital techniques than in the past. Modern equipment has a much higher signal to noise ratio than the older equipment. The new MCR systems fulfill concert halls' requirements of noise levels below 20 dB(A).

Microphones

For each project; microphone brand, type and location will be selected based on the design, secured in specially designed acoustical de-coupled mounting frames.

Loudspeakers

Dynamic range

A classical orchestra for example can produce over 100 dB(A). The listener's experience is based on the mix of the direct and reverberant sound field. When the direct field gets loud the reverberant field will follow. We use high quality loudspeakers which can handle high sound levels without any distortion.

Customizing

In many cases the loudspeakers need to be an integral part of the architectural design of the theatre or the loudspeakers have to be installed completely invisible for the audience. The brands we use are able to fulfill all the wishes of architects with respect to color and cabinet dimensions.

Infill and surround

When the loudspeakers are used as balcony infill and surround system, these create the same high sound quality as the main system of the hall.

Amplification

We advice the use of digital class-D amplifiers with a built-in monitoring system.

Processing

We use standard industry audio processors like the Peavey® MediaMatrix® NION and the industry standard CobraNet® digital network for audio distribution.

Control Interfaces

Interfaces are custom made Ethernet solutions, based on the wishes of each client. This can be a local touch screen, integral part of the stage manager desk, a wireless laptop or PDA solution.



The Versatile System

The open architecture and processing of the MCR system makes it a toolbox for acousticians and sound engineers, with unlimited possibilities to adapt it to the creative wishes of end users. We hope this can stimulate sound designers, acousticians and engineers to come up with creative audio solutions. The following options are already realized based on the requirements of MCR installation clients.

Option	Solution	Costs
Early reflections amplification	Intelligent positioning of loudspeakers and system programming	Standard part of system
Lateral reflections amplification	Intelligent positioning of loudspeakers and system programming	Standard part of system
Orchestral shell replacement	Extra hardware and system programming	Extra
Surround system	Intelligent positioning of loudspeakers and system programming + extra hardware	Extra
Balcony infill system	Intelligent positioning of loudspeakers and system programming + extra hardware	Extra
Virtual image placing	Special software module	Extra
Voice evacuation	Intelligent positioning of loudspeakers and system programming	Extra
Use as PA system	Intelligent positioning of loudspeakers and system programming + extra hardware	Extra

References

Venue	City	Country
Casino Kursaal	Oostende	Belgium
Tonhalle	Duesseldorf	Germany
Cultuur Centrum Hasselt	Hasselt	Belgium
Kunslinie	Almere	the Netherlands
Congress Union Celle	Celle	Germany

xlnt products are developed by Teamprojects



XLNT Advanced Technologies BV
Proostwetering 50
3543 AH Utrecht
the Netherlands

Phone +31 30 2 47 99 99
Fax +31 30 2 47 99 98
info@xlnt-at.com
www.xlnt-at.com



Cultuur Cenntrum. Hasselt, Belgium.



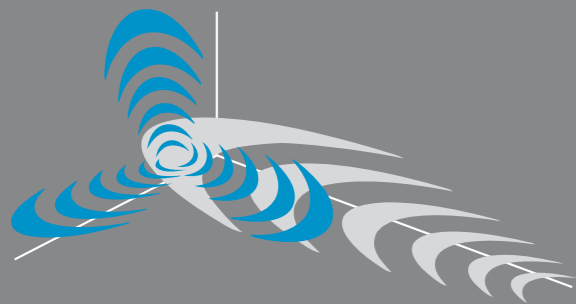
Kunstlinie. Almere, the Netherlands.



Casino Kursaal. Oostende, Belgium.

Enhancing
room acoustics,
naturally





xlnt MCR

versatile room acoustics enhancement

Introduction

The acoustics of modern theatres and multipurpose halls are usually best suited for a single application: speech orientated shows like theatre, cabaret, lectures or movies. When programming classical musical performances like chamber music, opera and orchestral music, the acoustics of a hall need to be adapted to facilitate this. The improvements can be made by building measures such as increasing the volume of the hall, changing the wall panels and/or building an orchestral shell. Another, often faster and definitely more cost effective solution, is to install an acoustical enhancement system. Both the quality and the recognition of these systems have improved substantially over the last thirty years. Today, concert halls will often also be used for film projection and all sorts of creative performances, requiring sound effects like surround sound and source localization on stage. On top of that, the demands and expectations of spectators about sound quality have risen. People in the audience count on experiencing the same sound quality in each seat. The versatile XLNT Multi Channel Reverb (MCR) acoustical enhancement system can fulfill all those needs and more by using proprietary software combined with standard components like sound processors, amplifiers and high quality loudspeakers.



The heart of an MCR system.
19" racks with sound processors and amplifiers.



Key features:

- Natural sound**
 The MCR system amplifies a hall's own reverberant field that gives it its unique natural sound.
- Established**
 The MCR system has been applied for over thirty years now.
- Fast and easy setup**
 The complete tuning of the system can be done in one single day.
- CobraNet® based**
 By using the international Ethernet based protocol for distributing the audio signal, interfacing with other halls and equipment is a standard feature.
- Standard components**
 By using standard equipment of long established companies the service and availability of components is guaranteed.
- Multifunctional**
 The system can easily be adapted to function as a surround system, fill-in system, source localization system, Public Address and voice alarm. Cost effective solution.
- Cost effective solution**
 Compared to building measures the XLNT MCR system is the cost effective solution for adjustable acoustics.

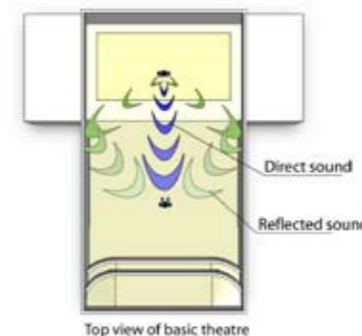
What is MCR?

The MCR system – Multiple-Channel amplification of Reverberation – is one of the oldest systems in the market of acoustical enhancement methods. The original system was developed by N.V. Franssen in the 1960s and further developed by S.H. de Koning during the 1980's. It has since been used in numerous concert halls, opera houses and multipurpose halls all over the world. The basis is that a MCR system subtly amplifies the existing reverberant field in a concert hall in a precise, controllable way. This key feature distinguishes it from competing systems, because the use of the hall's own reverberant sound field creates a unique, natural sound. In a 2005 comparative test of three different reverberation systems by the world-renowned acoustic consultants Peutz the XLNT MCR system was praised as the most natural sounding solution.

How does MCR work?

When producing sound on a stage in a hall the sound will propagate to the audience. For the listeners in the direct vicinity of the stage the so-called direct sound will be dominant. As the sound propagates in the hall the sound field will be reflected and absorbed by surfaces in the hall like the

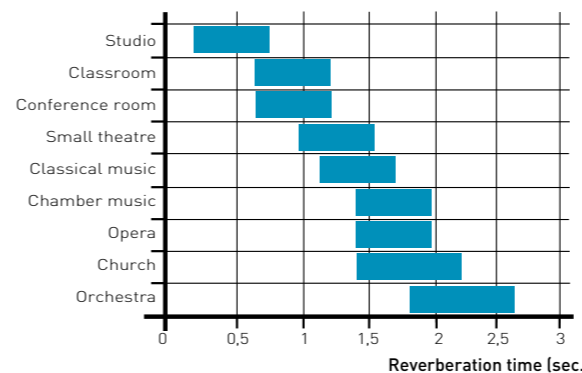
ceiling, walls and the floor. The reflected sound field is the reverberant sound field of the hall. The received sound field from a listener's position is a combination of the direct sound and the reverberant sound field at his position. This blend of reflected and direct sound fields determines the quality of music from a listener's perspective.



Top view of basic theatre

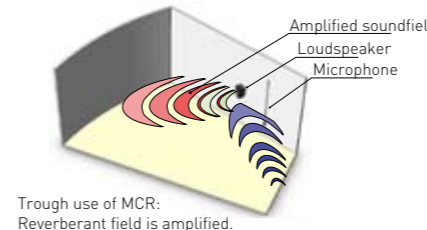
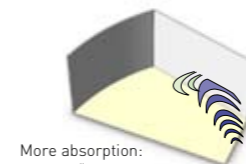
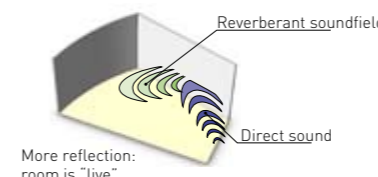
One of the key factors is the power of the reverberant field, expressed in the reverberation time of a hall. The reverberation time of a hall is the time a sound needs to drop 60 dB in level. Each auditorium has its own optimum reverberation time. Table 1 gives some examples. When the volume in a hall is constant, the reverberation time is highly dependent on the amount of absorbency of the surfaces of the hall. In a more reflective room it will take longer for the sound to die away, this type of room is said to be 'live'. In a very absorbent room, the sound will fade away quickly and the room is described as acoustically 'dead'.

Table 1: Optimum reverberation times

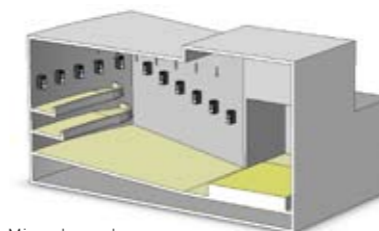


If we hold a microphone in the reverberant field and connect it to a loudspeaker in a wall or ceiling through an equalizer and an amplifier, we can invert the absorbent effect of the surfaces of the hall and increase the reverberation time by amplifying the microphone signal. This is the fundamental principle of an MCR system.

The MCR system consists of a number of independently equalized, amplified microphone loudspeaker channels. The number of required channels is based on the needed amplification of the reverberant field.

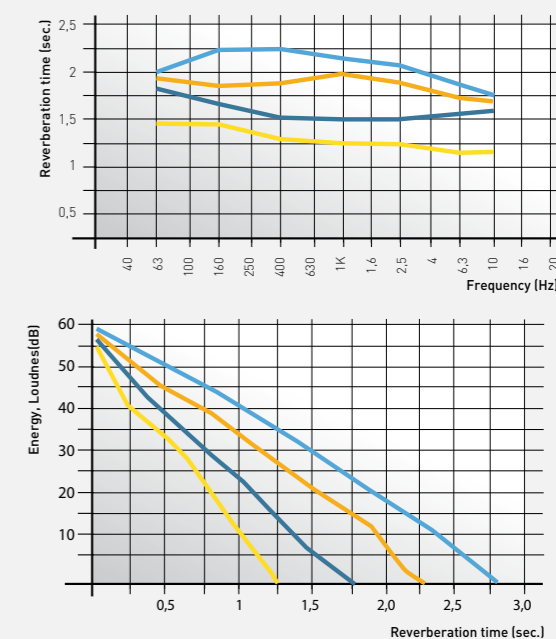


Basic theatre with an MCR system installed



Microphones hang from the ceiling, The loudspeakers are attached to the walls

A few Reverberation Curves



XLNT MCR

XLNT MCR is based on the experience and legacy of the older MCR systems but incorporates the enhanced knowledge of modern acoustics, software and electronics. A custom design will be made for each hall in close cooperation with the architect and the resident acoustician to fulfill the requirements of any client.

Modern Acoustics

What does a hall need to get good reviews for its acoustics? For a long time this question was difficult to answer, but nowadays acousticians have a wide range of design parameters to respond to this problem. Variables like Clarity, Early sound-Late sound relation and Lateral reflection are commonly used. Based on this knowledge the consultants of TeamProjects in cooperation with the acoustician of a hall can design the optimal solution for any room by using advanced acoustical calculation software and our experience with other projects.

Software

In the past a traditional MCR system would consist of more than a hundred individual amplified channels. Each channel came with its own equalizer. Each tuning round of measuring, calculating settings for levels and adjusting of all the individual equalizers could take over a week. Correct tuning of a MCR system needed a minimum of four testing rounds, and therefore took weeks. The XLNT MCR uses unique fully automated software. Per installed channel it takes only six minutes to do a complete tuning. During this time the software makes at least six testing rounds to adjust the system as best it can. Then the individual measurement and calculation steps of the system can be reviewed. As a result, a normal commissioning of a system can be done in just a single day. In the course of this day all the desired settings can be made for lectures, opera, chamber music, rehearsal and orchestral music. This short setup and tuning time is huge advantage of the XLNT MCR enhancement system – eliminating a stressful design process in creating multipurpose halls.