



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



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.

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

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