



PUBLIC TRANSPORT PA systems in 3 steps



Expansion of transport and integration of various modes of transport pose a real challenge for Public Address (PA) systems. Modern solutions bringing together different aspects of public transport in order to ensure a fast and comfortable journey require better and more advanced PA systems. This need provides designers and engineers with a unique opportunity to deliver creative and innovative solutions.

EFFECTIVENESS

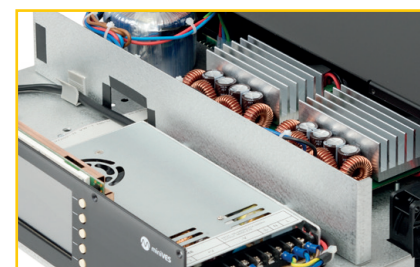
Nowadays it is hard to imagine a train station without a PA system. Providing that the announcements are audible and clear, the PA system remains the most effective means of public information with regard to train timetables, changes to platforms, delays or updates to your journey. It is not easy to design a system meeting all those criteria as it needs to be equipped with up-to-date components such as sound equalizers, delay lines, sound sensors, audio limiters and acoustic feedback eliminators.

Ensuring the adequate volume and clarity of public announcements is the key requirement for an effective PA system. Audibility of information depends on the actual volume of the announcement as well as the distance to the surrounding noise levels. In areas with consistent noise levels, the required sound level of public announcements can be ensured by use of appropriate loudspeakers, their strength and highly effective amplifiers. It is recommended that the sound level of

announcements should not be lower than 70 dB and at least 10 dB higher than the level of surrounding noise in that area.

However, such an approach will not be sufficient in areas where surrounding noise levels vary significantly. For instance, trains approaching the platform generate considerable noise – on open platforms the noise may reach 80-85 dB; on enclosed ones it may exceed 90 dB. Such noise will easily drown out public

miniVES – multi-use audio Public Address System
ABT-M01 and **ABT-M04** microphones



address announcements with their volume set to average conditions on the platform. On the other hand, setting the system volume permanently high so as to ensure announcements can be heard on the platform during train arrivals could be problematic. Such sound levels will be too high during non arrival of trains; this is likely to cause discomfort to passengers; penetrate other zones (e.g. other platforms) and significantly increase noise emission into the environment in case of open spaces. By using properly calibrated background noise sensors, Ambient systems provide the answer to this problem. The sensor readings allow regulating the volume levels of announcements in real time. Ambient systems have in-built ability to adjust the volume levels of public announcements within 20 dB range.

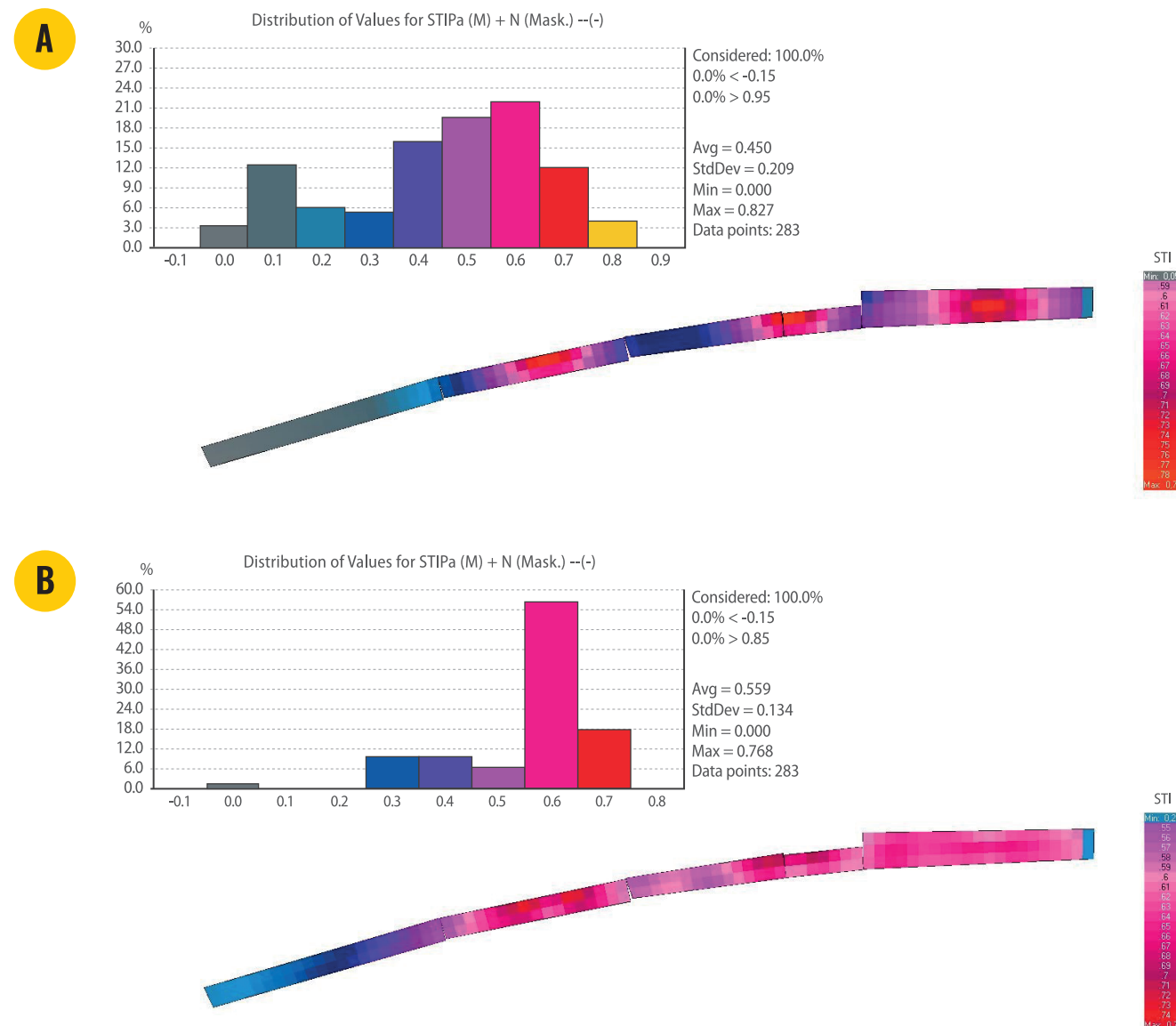
The other critical issue is the speech intelligibility of public announcements. Ensuring the high quality of messages remains the on-going quest for many designers of PA systems. The added difficulty is the definition of speech intelligibility itself as it is based on rather a subjective judgment. Over the years, speech intelligibility has been the subject of numerous studies aiming to formulate the objective definition of this parameter. Presently, Speech Transmission Index (STI) is commonly used to measure the quality of speech transmission with values varying from 0 (bad) to 1 (excellent). A table below shows STI values and corresponding subjective speech intelligibility. It is recommended that STI value should not be lower than 0.5.

STI value	Subjective Speech Intelligibility
0.75 – 1	Excellent
0.6 – 0.75	Good
0.45 – 0.6	Fair
0.3 – 0.45	Poor
0.0 – 0.3	Bad

In practice, achieving good speech intelligibility is difficult as it depends on several factors for instance the size of a given area, acoustic conditions, quality of loudspeakers, options to correct frequencies and application of delay lines.

Applying digital delay line in order to improve speech intelligibility:

Sample A – PA sound without a delay **Sample B** – PA sound using signal delays to individual speakers



With regard to scale and applied materials (in particular those enabling noise reverberation); modern architecture poses a real challenge to designers of PA systems. The reverberation within a large train station can last even 5-6 seconds. Ensuring good speech intelligibility in such difficult conditions is possible through application of highly directional loudspeakers with minimal sound distortion; and support units such as digital frequency correction based on DSP processors.

Ambient's Product List includes a number of speakers ideally suited to meet the requirements of such a demanding environment e.g. **Sound Projectors type MCR-SMSP20** and **Line-Array Loudspeaker Columns type ABT-LA30** and **ABT-LA60**. The correction function enables to adjust the system to acoustic conditions. **MULTIVES** and **miniYES** systems offer DSP with implemented 3-band parametric EQ on all inputs on Control Units and 8-band parametric EQ on each of the audio output.

Another useful function is the ability to set up delays on loudspeaker lines in order to eliminate the audible noise reverberation in vast areas. Audible reverberations always have negative impact on the sound quality, and therefore Ambient offers advanced PA systems which allow setting up delays on loudspeakers lines for up to 30 seconds.

SCALABILITY

Ambient's Product List includes two systems configured for network connectivity. **MULTIVES** has been designed to offer exceptional versatility and configurability. It is therefore equally suitable for medium-range buildings as well as complex commercial structures such as train stations, airports, refineries, sport stadiums etc. Its open architecture is based on proven fibre-optic Ethernet connectivity between control units and other elements of the system thus enabling digital transmission of voice messages, public address functions and music. The **MULTIVES** system comprises **Control Units ABT-CU11** or **ABT-CU8** (with control and extension slots),

multi-channel amplifiers, fireman and zone microphones and 20-key extension keyboards. The system enables digital scaling of communications with other integrated safety systems.

miniYES is a standalone compact version of **MULTIVES**. Based on the same proven technology, it has been designed as a Plug & Play device with all elements expected from Voice Evacuation System. It will support up to 8 individual broadcasting zones making it an ideal solution for smaller structures.

It can significantly reduce design, configuration and installation time and cost.

An easy installation is an added bonus – **miniYES** comes ready packed in a box to be installed on the wall.

Both systems can be connected on the network via fibre-optic cables. Up to 254 devices can be used on the network so using fibre-optic technology help eliminate connectivity problems. A networked solution of **MULTIVES** and **miniYES** can be utilized at large train stations, airports and other complex transport hubs while providing tangible cost efficiencies.

INTEGRATION

Integrated public transport system has become a reality. Journey times get shorter; changing trains is much easier and new hubs connecting local public transport, railways and airports are frequently established. Maintaining high service standards requires an integrated public address system (incl. visual and voice functionality). The integrated solution often involves working with different systems using various protocols and platforms. **MULTIVES** and **miniYES** systems ensure seamless connectivity with external devices such as speech synthesizers (both analogue and digital) or induction loops for hearing-impaired. In-built protocols allow communicating with alarm systems, intercoms and security monitoring.

Thanks to innovative functionality offered by Ambient, it is possible to broadcast announcements directly to a specific station or transport hub by selecting a required zone from the Ambient offers a versatile, fully configurable and innovative solution to meet demands of an effective Public Address system. Its modern design, architecture, in-built DSP processors and digital integration capabilities make Ambient an attractive business partner.

