



The Institute of Sound and  
Communications Engineers

Engineering Note 24.1

## Sound System Test, Alignment, and Certification – Part 1

### Introduction

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# ISCE Engineering Note No. 24.1

## Introduction

This Engineering Note describes the manner in which a sound system contractor should deliver a fully functional sound system as designed and specified. Whilst its origin is a method statement for a contractor on a very large project, the principles remain the same for virtually any size of system. Equally, it has been written on the basis of using DSP based systems, but the principles are just as valid for analogue or hybrid technology systems.

## Environmental Noise

Where a sound system is likely to affect local residents due to its capability to generate high sound pressure levels in the surrounding area, the client should issue a statement to the local residents and to the Local Authority to say that alignment and testing will only take place up to 21:00 and will not start before 10:00 on Sundays. It is very important that all concerned abide by this as far as possible. If the residents are sensitised, it will impede your effort considerably at the most critical time in the project.

In general, one should ensure that sound is only sent to the area under inspection and NOT INDISCRIMINATELY. Sound engineers are experienced professionals and they should respect others and their need to communicate and concentrate on their work. In turn, sound engineers want quiet for their tests, and for other trades to respect their working environment.

It is important to start the project by advising the client, as well as the construction management, that when it does come time to align and measure the system, that those measurements cannot be contaminated with extraneous noise, be it hammers or voices. This message will doubtless need to be repeated more often as the end comes in sight. After all, environmental noise is a two-way affair.

## Sources for Tests

Whether considering local residents or others working on site, the use of music as a test source is, at first, quite a change from the usual banging and crashing of a building site. However, it soon becomes a nuisance in terms of the quality, level or genre of music, and it is at this point that the sound engineer starts to alienate themselves from the community.

On the other hand, steady state noise is less disruptive to the community. Nevertheless sound engineers should limit the exposure to the community, as far as possible, so as to have the best chance of full cooperation when the time comes to do full power testing over long periods

The source for the alignment process is not music. It is either:

- pink noise
- chirp / drum click
- STIPA Noise

When the systems are finally aligned, there will be a subjective test using speech and/or music as a source.

## Human Resources

Since sound is usually a “final finish” trade the sound contractor is the one who gets left with insufficient time to complete the work, and usually ends up working long and unsociable hours to enable the inevitable “opening ceremony” to take place. The correct team in the right quantity with the requisite experience will succeed where others fail.

Sound systems in the context used here are, by their very nature, systems distributed over quite large and sometimes huge spaces. It is therefore usual to have one “sound

engineer” who is in the acoustic space and another “systems engineer” who is located with the control equipment.

### **Sound Engineer**

This should be a person who knows how to use meters and, especially in the case of intelligibility measurements, also knows the science behind the technology, so that notes can be made for any post processing which may be necessary. The sound engineer should have been trained to listen. By this it is meant that this person is not hearing just the sound, but the parameters of that sound. When a sound is distorted, is it distorted in the frequency, level, or time domain, or a combination of these? The sound engineer should know from experience.

It is quite usual for the sound engineer not to have been involved in the installation itself. It is likely, though not strictly necessary, for the sound engineer to have been involved in the systems design process.

### **Systems Engineer**

The systems engineer is often the person who has been responsible for the overall build of the system, and especially any programming of the DSP. It is for this reason that they would know their way around the controls available and the structure of the system to an intimate degree.

Their knowledge of the installation is therefore such that if the sound engineer reports that a particular loudspeaker is not working, the systems engineer knows which amplifier, in which rack, in which equipment room is the likely suspect. If the sound engineer asks for a particular loudspeaker to have 50 ms of delay more than the next, the systems engineer knows which virtual device controls each and where they are located within the control screens.

### **Support Engineers**

During a testing and commissioning process, there are bound to be mistakes which come to light and which need to be rectified.

Support engineers are usually the people who carried out the physical installation of the loudspeakers and/or the amplifiers and the termination of same. They are therefore familiar with the site and know the system installation quite intimately. When something occurs which needs checking or rectifying, the systems engineer can trust them with the responsibility of investigating and taking whatever action is necessary to correct matters, or at least report back with a coherent explanation of their findings.

When testing and commissioning a system, the sound and systems engineers can usually move on to another part of the system test programme while a fault is being sorted out by a support engineer, thus saving precious time. This is the key role which support engineers play.