

Voice Alarm (VA) Systems – Taking the Voice Sounder Route

Voice sounders are now an established and effective contribution to voice evacuation systems in large public and commercial buildings.

Here, James Jones of Vimpex Ltd explains how a BS 5839 Part 1 compliant fire system, incorporating voice sounders as part of its design, can be a viable alternative to more complex VA systems.

James describes how some quite complex systems have successfully integrated voice sounders within their design and how, with the approach of the new Fire-Cryer® Plus seven message voice sounder range, Vimpex are initiating a new phase in the use of voice sounder technology. He goes on to discuss how Vimpex's expertise, gained over several years at the forefront of voice sounder design, is now paying dividends and enabling them to consult their customers on how to best integrate voice sounders into complex analogue addressable fire alarm systems.



Fire-Cryer® Plus seven-message voice sounder with integral strobe

All Voice Systems Are Not Equal

Fire alarm consultants and system specifiers want an easy life.

It's too easy to stipulate a certain standard when all it means to the specifier is a BS standards number on the page. It is only when a fire system design company comes to cost a job to that requirement does the real cost of careless specifications come to light.

This is our experience when it comes to the specification of voice alarm systems. It has become too easy for specifiers to use British Standard BS 5839 Part 8 (Voice Evacuation Systems) as a catch-all standard the moment it has been decided that voice evacuation is a necessity. In fact, specifying voice sounders for use in a voice evacuation system designed under the auspices of BS 5839 Part 1 can in many instances satisfy the key features of a Part 8 system without the cost or complex design process associated with full-blown VA systems.

Much to the disdain of VA system manufacturers, there are many fire systems in the field with more than a hundred voice enhanced sounders on complex systems giving fully synchronised, multi-message announcements in a clear, unambiguous manner.

Arguments against the use of voice sounders are dissolving. With multiple sounder circuit synchronisation, up to seven pre-recorded messages available and with growing ranges of voice sounders constantly being introduced, the message is clear-that voice sounders are intelligible, loud enough and can easily be integrated into both new and existing fire alarm systems.

It is important to note that piezo-driven voice sounders do not provide nearly as clear and intelligible messaging as those that use more traditional capsule-driven loudspeakers. This is because a piezo device is designed to maximise output at a pre-determined frequency and not a relatively broad frequency range as in products like the Fire-Cryer.

SIDEBAR

Failure to Comply?

It is true that a voice sounder system would not comply to all Part 8 specifications.

Some systems call for live voice microphones, although, some say that not having that facility is a blessing in disguise as it lessens the likelihood of untrained or panicking staff confusing the public with inappropriate or unclear announcements.

A voice sounder system is very unlikely to pass the STI or RASTI intelligibility test. This is because instead of full bandwidth loud speakers, voice sounders have a relatively narrow (800 – 3000Hz) frequency response. This is actually an advantage as limiting the frequency range does little to affect intelligibility but goes a long way to ensuring that voice sounders have low-enough power draw to be installed on standard 24Vdc sounder circuits.

Voice Sounder System Design

With seven messages and many available software configurations, it is important for the installer to understand what can be done with voice sounders and how to integrate them into a standard BS 5839 Part 1 system.

The first task of any fire alarm design is to agree the evacuation strategy and whether there is any requirement for staged or phased evacuation. Then the designer must ensure agreement with his client and the end user as to the choice of messages and preceding tones to be used in the system.

The choice of messages is extensive and with seven messages available in a single sounder, a fire alarm system can be expanded to include inputs for bomb alerts, terrorist threats, coded warnings, water leakage alerts, class change announcements, system tests, 'all clear' announcements, machinery shut down warnings, health and safety reminders, general alert messages, and of course 'fire' alarm messages. The potential is huge and with the trend for fire evacuation systems to be used for general evacuation and public safety systems, the use of multi-message voice sounders is set to boom.

Multi Message Switching

Although voice sounders are basically conventional fire alarm sounders that play pre-recorded messages, the sounders need to know what message to play and when!

In order to switch from message to message, a switching interface is installed on the sounder circuit. This is interposed between the control panel (or sounder module if on an analogue system) and the rest of the sounder circuit. The bell circuit provides power for the primary or 'life safety/fire' message, whilst an auxiliary power supply, sometimes from the panel, sometimes external, powers the switching interface and the extra auxiliary messages. Both sounder circuits and auxiliary power supply must be rated to provide current for all sounders and any strobes on the circuit. Monitoring of the sounder circuits is not affected and the panel's recommendations on resistance should be maintained. Figure 1 shows how Fire-Cryer[®] Voice Sounders are typically interfaced to an analogue loop.

Installation of a multi-message sounder system as an interface to a conventional fire alarm system is straightforward as the switching interface is simply installed on the bell circuit. Volt-free contacts are then required to operate additional messages. Sometimes a pre-wired voice message controller will be used to ease installation and to provide the end-user with a simple message selector.

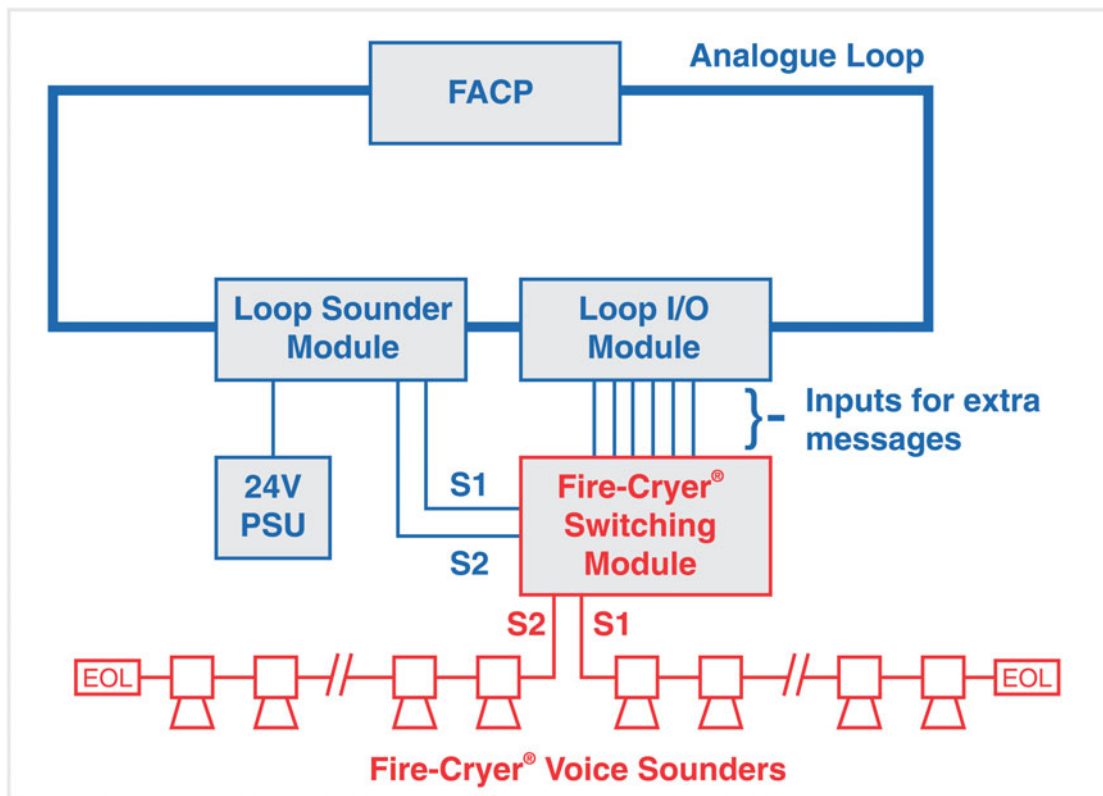


Figure 1.

Synchronisation

People who are used to the design and installation of VA systems are often concerned that voice sounders can be synchronised. This concern is unfounded as it is easy to ensure synchronisation of multiple sounder circuits.

There are two ways of ensuring that all circuits are synchronised:

1. by ensuring that sounder circuit controllers are synchronised on the loop
- or
2. by ensuring that all switching interfaces are linked

Most switching interfaces will only provide outputs for two or maybe four sounder circuits. Should more be required, additional interfaces should be used. Some switching interfaces make the job of extending circuits very simple by providing zone extension cards. Whatever the method of synchronisation and switching, it's important to ensure that the power supply rating is sufficient for all sounder circuits.

Applications

Many voice sounder systems in the field are installed as an interface to an addressable loop, with remote power supplies providing power and addressable I/O units used to switch from message to message. Here are some examples of successful installations using this configuration:

Rolls Royce Barnoldswick site in Lancashire, which produces specialist components for the company's jet and turbine engine business. Rolls Royce's site safety manager needed to find a solution to the confusion of beeps and tones heard on site to allow the staff to



Rolls Royce use Midi and Maxi Fire-Cryers® to remove the confusion of beeps and tones heard on site to allow the staff to differentiate between the general fire/evacuation alarm and the life-critical acid spill/extractor fan failure alarms.

differentiate between the general fire/evacuation alarm and the life-critical acid spill/extractor fan failure alarms. Vimpey supplied a combination of standard, Midi and Maxi Fire-Cryers® in a special hi-visibility yellow finish. This allowed a fully switchable four-message system to be interfaced with the existing sounder loops on site.

Bowling Alley Complex - Twenty-eight Mini Fire-Cryer® multi-message voice sounders have been installed as part of a voice evacuation upgrade at Exeter's bowling complex operated by Tenpin Limited. The Mini Fire-Cryer® incorporates all the advanced features of the Fire-Cryer® family housed in a low profile base sounder which mounts between the fire sensor and the ceiling. The Fire-Cryer® voice sounders and fire sensors were mounted together allowing a 4-core cable to be used for the loop and sounder circuits - further reducing installation costs. This combination proved to be a significantly less expensive solution than installing a full VA/PA system.

Bridgewater Place, Leeds, is the tallest building in the North and is the premier business premises in Northern England comprising of over 23,000 sq. ft. of office space located side-by-side with 200 high-rise apartments, retail outlets and leisure facilities in a prestigious development. Over 300 Mini Fire-Cryer® multi-message voice sounders have been installed in all office accommodation at the new site, providing building-wide voice evacuation in the event of a fire. The Mini Fire-Cryer® is a slimline base sounder, which meant that it was very easy to install, fitting discreetly beneath the fire detector bases and creating an overall detector/voice sounder combination with a very low profile – important in a building with such prestige.

London Underground - No-one in the fire industry can doubt the commitment over the past decade of London Underground to improve its fire alarm systems. They have not only introduced leading-edge detection systems but have probably the greatest challenge in evacuation terms. Whilst below ground they have found the need for fully integrated centralised systems, above-ground they have found that voice enhanced sounders meet their criteria. Acknowledging their need to alert and warn passengers as soon as possible, they also have the responsibility to avoid panic. The use of coded messages, as a pre-alarm to staff to take up positions and investigate an alarm immediately without initially alerting passengers, was a pre-requisite of the Fire-Cryer® installation. It was also vital that the instruction to passengers to evacuate the station was given within a pre-determined time unless the initial alarm was found as false or malicious and the alarm muted.

Kettering General Hospital - Fire-Cryer® multi-message voice sounders have been installed in Kettering General Hospital as part of the facility's commitment to comply with the Disability Discrimination Act (DDA). The application of Fire-Cryer® voice sounders however, has done more than bring the site up to DDA standards. The project has transformed a traditional installation of bells and strobes to a much more sophisticated evacuation system with multi-messages, twin strobes and most importantly, a clear, unambiguous evacuation message for all. Each unit has been programmed with the bell tone which precedes the voice message to ensure compatibility with the rest of the site's fire alarm system. To aid the hearing impaired, the voice sounders have been installed alongside Fire-Cryer® twin strobe modules, which differentiate between alert and evacuation – amber strobe for 'Alert', Fire-labelled clear strobe for 'Evacuate'. Use of the Fire-Cryer's® special automatically generated 'All Clear' facility gives an automatic 'All Clear!' message once an alert is cancelled. The combination of the common bell tone, clear and unambiguous voice messages and twin strobes ensures that there is no confusion when building evacuation is required.



To aid the hearing impaired, the voice sounders have been installed alongside Fire-Cryer® twin strobe modules, which differentiate between alert and evacuation

Kettering General Hospital is an excellent example of a well-designed system culminating from a non-BS 5839 Part 8 voice specification integrating both multi-message voice sounders and strobes to provide a DDA compliant fire evacuation system.

New Developments

New developments to the Fire-Cryer® range mean that customers can now stipulate which messages should be accompanied by strobes and which should not. A good example is the alert message at Kettering General which gave a flashing amber strobe on alert with a bright clear strobe on fire. 'All clear' and 'test' messages have no flash at all so as not to confuse staff or patients.

A recently designed gas suppression interface makes the use of multi-message voice sounders even easier for gas extinguishant systems. Voice lends itself perfectly to these types of application as failure to evacuate can be fatal. Moreover, the implementation in the VimpeX unit of a hold-off function makes the Fire-Cryer® solution a very attractive one for suppression installers.