# False Alarm Management

White Paper - Part 2

# Purpose of the White Paper:

This is the second instalment in False Alarm Management from FireClass. The White paper has been split into two parts, the first part was released on the 9th May 2013 and sought to define the false alarm landscape. Part 2 of the FireClass False Alarm Management focuses on the products and technologies that FireClass can provide to aid in the battle against false alarms.

FireClass views the management of false alarms as being split down into three distinct areas. These areas are Design and monitor, detection, and testing and servicing.

# Design and Monitor

FireClass not only seeks to help our customers with the most advanced range of technologies and products in the market place but also with a full service offering that is not managed anywhere else in the world. False alarm management begins with the initial design of the system. FireClass provides free training for our customers, which allows users to understand the full benefits of the products at the same time as being able to master the technology enclosed. Whilst FireClass works with distributors, fire alarm installers, architects and specifiers, it always looks at the whole picture and seeks to provide not only the best possible service and technology to our customers but also to our customers' customers and the end user. This free training includes the optimum ways to set a fire alarm system up and how to program the system exactly as it is required.

# FireClass Training

FireClass training is managed through two courses. The first course describes the FireClass analogue addressable fire detection system from an engineering and functional perspective. This will allow trained users to install, commission and service the full range of FireClass digital fire control panels, detection devices and ancillaries in accordance with the published technical recommendations. FireClass training allows users to practice programming and downloading a basic loop configuration to a FireClass control panel.

**FireClass training covers;**

1. Overview of the range of addressable FireClass panels available (This includes FireClass lite, FireClass 32 zone, FireClass 64 zone and FireClass 240 zone panels)
2. FireClass System Components
3. FireClass digital addressable devices and functional bases

4.  How to program loop devices with the use of an FC490ST handheld programmer.
5.  Familiarisation of panel menus.
6.  How to auto configure a basic system without the use of programming software.
7.  Programming a stand alone fire system with a basic loop configuration.
8.  Downloading a configuration to a FireClass Panel
9.  Upload an existing configuration to a FireClass Panel
10. Overview of the FireClass range of R-Bus ancillaries / enclosures available
11. Programming network system exercises and downloading configurations
12. Programming Day / Night mode setting exercises and downloading configurations.
13. Configuration of R-bus ancillaries.
14. Programming R-Bus ancillaries and downloading configurations.

FireClass also seeks to promote the issue of false alarms to the wider marketplace. Taking the issue very seriously FireClass believes in the necessity to create and promote content such as this white paper and the FireClass Consultants guide to reduce the drain false alarms have on a fire alarm system and those services designed to protect lives.

In addition to the free training provided by FireClass which helps immensely with reducing false alarms by fully understanding the system and its requirements, FireClass also provides the most in-depth consultants guide in the marketplace to designing a fire alarm system. This exhaustive guide ensures that our customers are fully aware of all the requirements placed on them and takes users through the regulations and the best ways to design a fire alarm system, once again reducing the chances of a false alarm occurring.


## FireClass Consultant Guide to design a fire alarm system


The Code of Practice for fire detection and alarm systems for buildings (BS 5839- 1: 2002) is a detailed and comprehensive document which requires careful reading to fully understand its' requirements and latest approach to ensuring the safety of buildings and their occupants from the ever present threat of fire.

Section 3 of BS 5839-1 is devoted to limitation of false alarms. In the code, the designer is considered to be the key player in the limitation of false alarms. It is a specific recommendation of the code that the system designer should ensure that the system design takes account of the guidance contained in Section 3 of the code. The certificate of compliance that the designer must complete not only certifies that the design complies with Section 2 of the code, it also certifies that account has been taken of the guidance in Section 3. More specifically, the design certificate contains various tick boxes that the designer must consider and tick as appropriate to indicate which of various specific actions have been taken within the design to ensure that false alarms are limited.

The purpose of the FireClass Consultants guide to designing a fire alarm system is to provide a step–by–step approach to the necessary guidelines described in BS 5839-1:2002, so that users can achieve maximum benefit from the recommendations. This should assist in the task of choosing the best options, help in preparing the specification of the fire protection system and assist architects,

designers and electrical engineers in providing the most cost effective system solution that meets the needs of the user.

In practice, more than one organisation or company is usually involved in the design of the system and its installation. The Code recognises these different responsibilities and takes a modular approach to the process of contracting when installing a fire alarm system. Furthermore, the Code recognises that, in most cases, the user is unlikely to buy a copy of the Code in order to learn about his responsibilities. In fact, the Code recommends that the installer should instruct the user on their responsibilities. It is often a requirement that individual organisations or individual persons need to be familiar with all aspects of the Code.

## Ventilation Systems

Ventilation systems in buildings should also be taken into account when designing fire systems because air movements in a space can have a number of effects on the operation of the devices. Extraction systems can draw the fire products away from normally sited detectors, and fresh air inlets can stop clean air passing over detectors even when the room air is smoky. Increased air turbulence can give increased dilution of the smoke, and, in the case of ionization smoke detectors, clean air can cause a false alarm if it is moving fast enough.
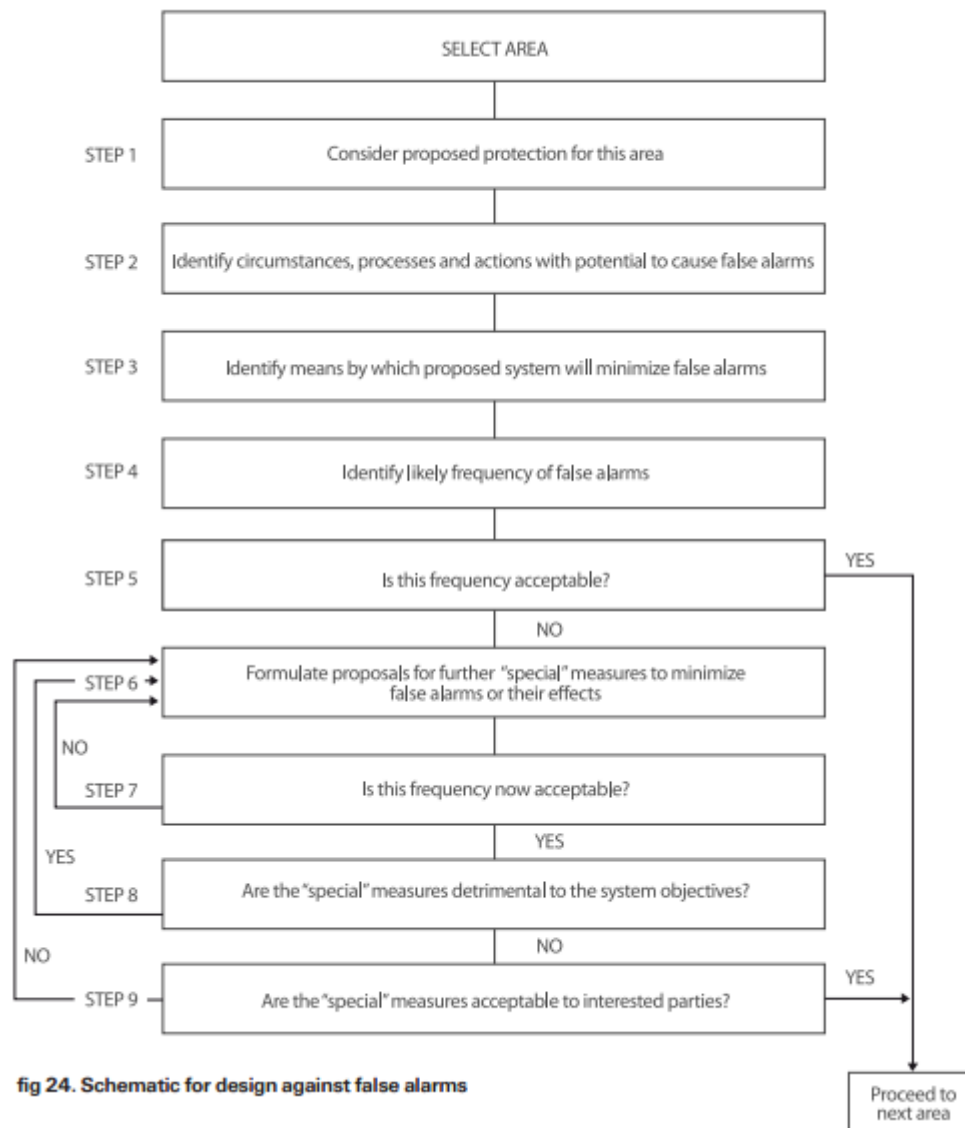
# FireClass Schematic for design against False Alarms



**fig 24. Schematic for design against false alarms**

The schematic shows the following flow:

| | |
|---|---|
| | SELECT AREA |
| STEP 1 | Consider proposed protection for this area |
| STEP 2 | Identify circumstances, processes and actions with potential to cause false alarms |
| STEP 3 | Identify means by which proposed system will minimize false alarms |
| STEP 4 | Identify likely frequency of false alarms |
| STEP 5 | Is this frequency acceptable? — YES |
| | NO |
| STEP 6 | Formulate proposals for further "special" measures to minimize false alarms or their effects |
| STEP 7 | Is this frequency now acceptable? — NO |
| | YES |
| STEP 8 | Are the "special" measures detrimental to the system objectives? — YES |
| | NO |
| STEP 9 | Are the "special" measures acceptable to interested parties? — YES |
| | NO |
| | Proceed to next area |

The code recommends that a special check is carried out as part of the commissioning process to ensure that there is no obvious potential for an unacceptable rate of false alarms. Within the model certificate of commissioning, the commissioning engineer is specifically required to record that, taking into account the guidance in Section 3 of the code, no obvious potential for an unacceptable rate of false alarms has been identified.

# Detect

FireClass technologies can be separated into analogue addressable systems and conventional systems.  FireClass manufactures both the control panels for this as well as a full range of detectors and ancillaries of both technologies. Previously addressable systems were deemed for larger projects with conventional systems offering protection systems for smaller buildings where budgets are considerably smaller.  However this considerably changed with the launch of the FireClass FC501 Fire Alarm control panel.  This revolutionary fire alarm panel now provides the benefits of addressable technologies and their numerous benefits in reducing false alarms to buildings and projects of all sizes.

## FireClass Fire Alarm Control Panels

False alarms are a drain on resources regardless of the size of the company the systems are designed to protect.  FireClass manufactures a range of panels that can allow a user to easily identify the exact place a fire has been detected.  The FireClass 32, FireClass 64 and FireClass 240 can provide cover for buildings and organisations of any size.  The FireClass FC501 panel incorporates addressable digital technology at a price point for less complex and smaller scale applications, such as small factories, restaurants, shop units, warehouses, schools and hotels. Saving installer's valuable time and providing cost benefits, it is easily configurable and up and running in less than five minutes. The FireClass FC501 Panel helps reduce false alarms by utilising state of the art addressable analogue technology but unlike anything in the industry currently can be installed in locations where previously only a conventional system would have been financially viable.

A further solution provide by FireClass comes with the addition of the input output module, which can be included inside FireClass addressable fire alarm control panels.  The FC500IP is an intelligent loop module allows responsible people to access the unit remotely from anywhere in the world. Should an alarm be initiated, if the alarm is deemed to be a false alarm, the system can be reset and controlled.  This prevents any downtime or inconvenience to both organisations as well as to the fire service.  This provides effective remote management of detection systems and an enhanced capability over conventional panel technology.

FireClass control panels have a complete range of repeater panels as well.  The FireClass repeater panels help to reduce false alarms by providing the same functionality as a control panel but at remote locations.  In instances of alarms being initiated false alarms can be instantly identified and the FireClass repeater panels can switch off the alarm.  Repeater panels such as the FireClass FC64 display temperature, carbon monoxide (CO) level and smoke level at the point in fire alarm. This can help further detect whether a false alarm has been triggered.

## FireClass Fire Detectors

To reduce false alarms FireClass fire detectors work on the most advanced algorithms and technologies in the market place.  In addition to the carbon monoxide detector, heat detector and optical flame detector, FireClass produces the triple sensing fire detector.  The FireClass triple sensing detector comprises a high quality, extremely accurate thermistor heat sensing element, optical chamber and carbon monoxide cell - the Triple Sensing Technology system virtually eliminates false alarms, which can be disruptive and costly.

Available as part of FireClass product range - the detector is the most reliable and robust on the market. It can be installed with the majority of cable types and is also suitable for retro-fitting.

Learn more about the FireClass Triple Sensing technology
http://fireclass.co.uk/en/emea/Pages/Education.aspx?VxID=21

As detectors age and become contaminated with dust and dirt their performance begins to deteriorate such that their potential to go into an alarm condition is that much higher, thus resulting in false alarms. The nuisance factor caused by false alarms is a serious problem for users and fire services alike. Since the output analogue value of each detector is continually checked by the control panel, the slow build up of contaminants in the detector is reflected by a slow increase in the analogue value. As this occurs, the control panel can alter the alarm (and pre–alarm) threshold in order to compensate for this phenomenon (see Figure 8).
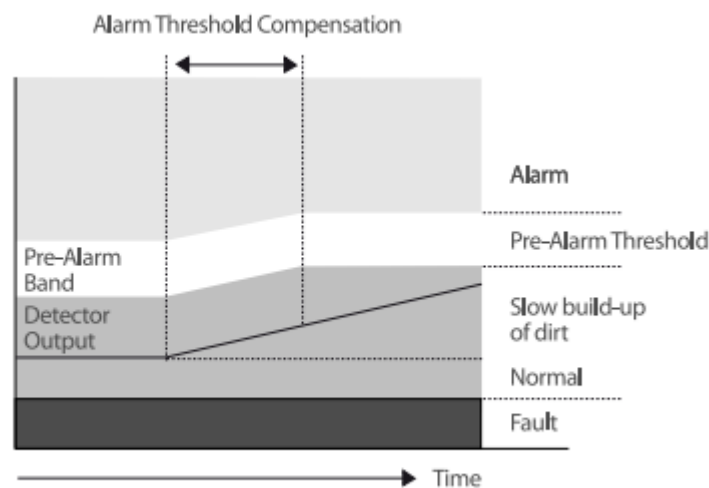
fig 8.  Analogue Addressable Detector Alarm Threshold Compensation

In order that the system raises an alarm in the event of a fire, the output from the detector must be in the alarm condition (that is, above the alarm threshold) for a period equal to the time taken to complete three successive address sequences, typically fifteen seconds. This technique of scanning the sensor three times before raising an alarm is a useful way of helping to reduce false alarms from

short term electrical or physical transients, without causing an excessive delay in actual alarm transmission. This feature maintains the system at an optimum performance level and extends the life of each analogue addressable detector.

The FireRay 5000 with its motorised detector head automatically compensates for the gradual building movement which has historically caused alignment issues.  This is another feature which helps reduce false alarms and which can often be overlooked.  The FireRay 5000 and its detectors work best in large open spaces where multiple smoke detectors would not provide adequate cover and the use of beam technology in the detection device help reduce false alarms as FireRay detectors are programmed to recognise a temporary obscuration of the IR beam path caused by either a solid or moving object.  The Optical beam detectors, transmitters and receivers should be mounted on solid construction that will not be subject to movement, otherwise fault signals or false alarms can occur.

## FireClass Control Graphics

FireClass Graphics is a fire emergency management system which has a fire detection graphical user interface which can be monitored from a computer. The FireClass Graphics (FCG) Client is used to monitor all events that occur on the FireClass fire system network. It can be used to isolate and de-isolate any device on the system, a considerable benefit in managing false alarms. When an event occurs, for example a fire alarm, trouble or fault, all details pertaining to this event are immediately displayed. In addition, building elevations and floor plans show the location of the event. This is particularly useful in an emergency as the information is graphically displayed and can be understood in an instant. FireClass Graphics interfaces to the fully addressable FireClass fire alarm systems that monitor fire detectors and break glass call points.

FireClass Graphics has a print feature, which if enabled prints a colour graphic with the fire alarm highlighted in red. These graphics screens contain all the information the operator and fire brigade require, including the best access route to the location of the fire alarm. Different event activations are colour coded, for example a fire is indicated in red, whereas a fault is indicated in yellow.  With 'double knock' systems in place or some fire services requiring confirmation a fire is in progress, this can provide fast instant results.

The FireClass Graphics system is a Client Server based system and communicates with other 'Client' computers on the customers computer network through the addition of extra licences. Instant recognition of a fire alarm or other event type can be seen on the FCG Client screen/s, as the 'Client' screen instantly changes to ensure you are aware of the fire detection system events (e.g. Fire. Fault, Isolate, etc.)

The FCG Graphics system can be connected to a single fire alarm control panel or a network of control panels using a TLI800EN networking card.

An IP camera can be connected to the software and the video can be activated automatically or by the user when an event occurs in a certain point on the system. In this case the user in front of the PC can immediately see what's going on in the room where the fire (or other event) is detected. FireClass Control Graphics instantly help remove false alarms by allowing instant notification the alarm is false in both visual and graphical forms.

## Testing and servicing

In order to limit false and unwanted alarms, servicing and maintenance of the system should be carried out by a competent organisation. Generally, a contract for periodic servicing and emergency call out should be set up before the system becomes operational.  Regular testing and servicing of the fire alarm system are essential in reducing false alarms.  Faults can be found before they occur and systems can be cleaned reducing the effect of dirt and other particles in triggering a false alarm.

FireClass provides a number of tools and equipment to help test and service equipment.  Recent developments in detection technology have been challenging for field test equipment. High levels of data processing within fire panels and sophisticated sensors designed to defeat false alarms have been increasingly impervious to traditional test media such as aerosol canisters. In point of fact some detectors have become almost 'un-testable in the field' and this together with the need (but often inability and sometimes unwillingness) to test more than one sensor in a multi sensor detector is testing the faith, credibility and professionalism of the industry as much as detectors in some areas of the world.  FireClass supplies Testifire products to the marketplace which change provides a perfect solution to testing and therefore reducing false alarms.

- Optimised smoke characteristics, together, if necessary, with accompanying CO or heat stimuli enables field testing of complex detectors, some of which simply can not be properly tested any other way.
- Enhanced heat beam and multiple heat settings render testable a wider range of heat detectors
- Individual or, if required, multiple simultaneous stimuli from the same device enable not only 'witness' tests for the first time on detectors with complex algorithms but also significant time and productivity enhancements for all types of fire detector

The changes have other advantages though; the design of Testifire is such that, unlike aerosol canisters, which can be applied too close to a detector possibly leaving a liquid residue on it, Testifire, by design cannot be inadvertently, misused in this way. For those that did not misuse aerosols there is the advantage of wider temperature operating ranges too.   By reducing the risk of a residue being left on the FireClass fire and smoke detectors,  this provides a like for like benefit in reducing false alarms that may have been triggered due to the residue.

FireClass also manufactures a number of devices that specifically protect equipment from being triggered and thus calling a false alarm.  Stoppers and hinged covers can be applied to manual call points to ensure that the break glass elements are protected.  With break glass call points often being in corridors or stair wells, this reduces false alarms being triggered by accidental touch.  The stoppers and hinged covers therefore can only trigger an alarm either by deliberate misuse or in the event a fire has occurred.

## Conclusion

FireClass manufacturers market leading solutions based on what the market needs and requires.  These solutions help save millions of lives on a daily basis all around the world.  Not only do FireClass manufacture leading fire detection and fire suppression solutions, FireClass seeks to constantly innovate and take the industry issues seriously.  False alarm management is a buzz word on everyone's lips.  Whether you are an architect designing a building or a fire alarm engineer who has the responsibility for a number of fire alarm systems, we are part of a larger focus group, determined to focus resources on where they are needed and reduce the blight false alarms have on businesses and organisations.   FireClass provides free training on its products for our customers and the FireClass website is the main focus for users to keep up to date with the market place and the issues affecting it.

The Code of Practice for fire detection and alarm systems for buildings (BS 5839- 1: 2002) also makes recommendations for ongoing management of the fire alarm system by the user. As the user is unlikely to possess, or read, The Code of Practice for fire detection and alarm systems for buildings (BS 5839- 1: 2002), it is important that the designer and supplier of the system inform the user regarding these recommendations. The recommendations in question are intended to ensure that, for example, contractors are properly appraised of the measures necessary to minimise false and unwanted alarms during building work; various measures that are appropriate during such work are recommended in the code. The Code of Practice for fire detection and alarm systems for buildings (BS 5839- 1: 2002) also highlights the importance of ensuring that staff in the building are aware of the presence of automatic fire detection, so that they can avoid actions that could cause false and unwanted alarms.  Staff also need to be informed when routine testing or maintenance work might cause the occurrence of a fire alarm signal. More generally, the building, and any plant in the building, should be adequately maintained to ensure that leaking roofs, steam leaks, etc do not cause unwanted alarms.

When false and unwanted alarms do occur, The Code of Practice for fire detection and alarm systems for buildings (BS 5839- 1: 2002) recommends that suitable action should be taken by the user. Relevant actions are discussed in The Code of Practice for fire detection and alarm systems for buildings (BS 5839- 1: 2002), but it should be stressed that, at the very least, this should comprise recording of the false and unwanted alarm and all relevant associated information in the system log book.