

Mass Notification

Why fire alarm systems are ideally positioned to offer the best value and most efficient implementation.



imagination at work



Mass Notification

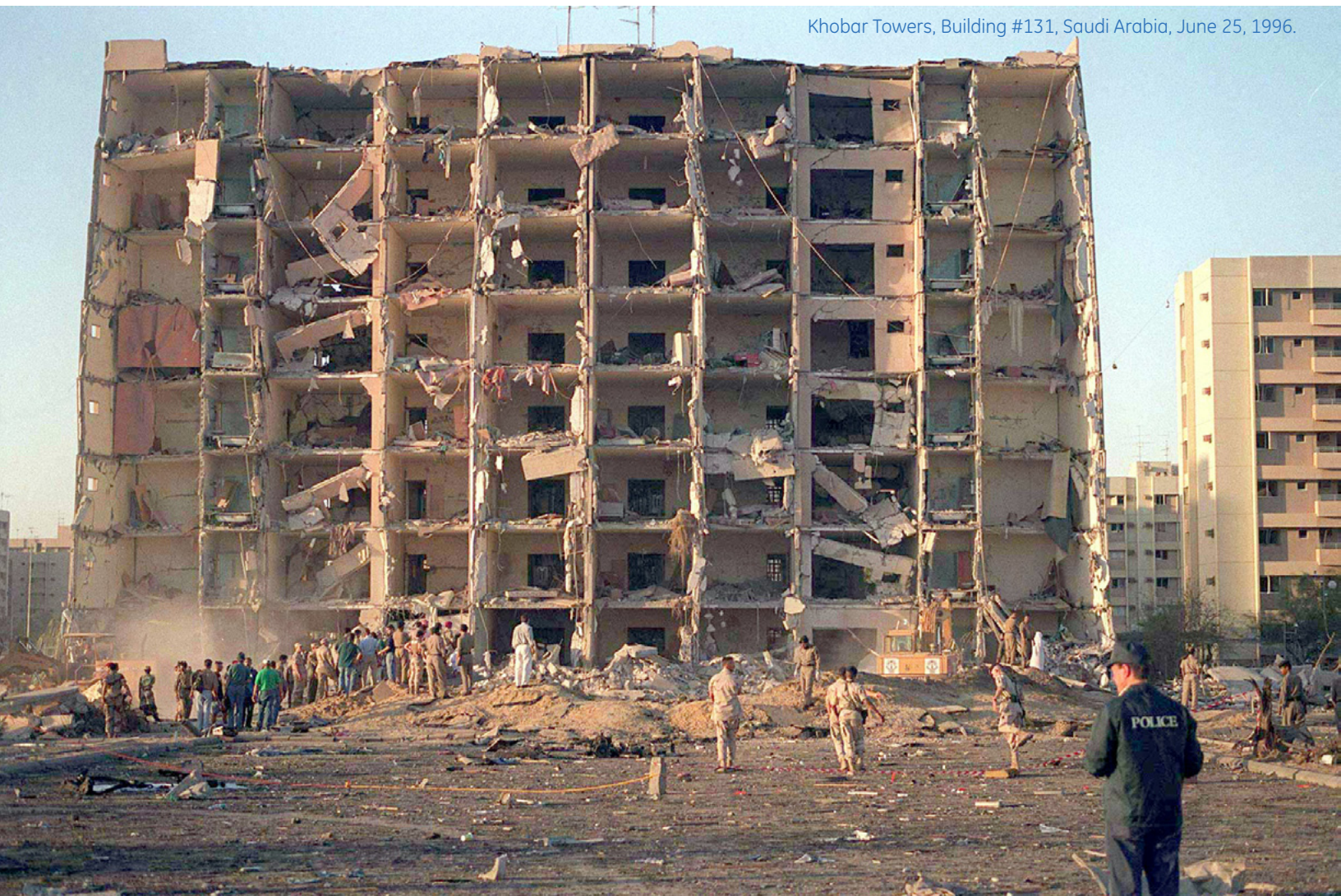
Why fire alarm systems are ideally positioned to offer the best value and most efficient implementation.

The development of Mass Notification

can be traced to June 25, 1996 when terrorists exploded a fuel truck adjacent to a housing complex in Khobar Saudi Arabia. The eight-story building housed U.S. Air Force personnel. In all, 19 servicemen and one Saudi were killed, and 372 others were wounded.

A year later then Secretary of Defense, William Cohen, issued the *Khobar Tower Report*. This document concluded that there were lapses in force protection, no effective alarm systems, no Mass Notification capabilities, and that damage and loss of life could have been minimized if there had been a plan in place to respond to the threat.

Khobar Towers, Building #131, Saudi Arabia, June 25, 1996.



What is Mass Notification?

Mass Notification is a term first used by the U.S. Department of Defense in the *Khobar Tower Report* to describe a system that issues live or recorded messages instructing occupants of protected areas on how best to reduce their risk of personal harm in potentially life-threatening situations.

The DoD document that brought Mass Notification to the forefront of modern building design is *Unified Facilities Criteria 4-021-01: Design and Operation of Mass Notification Systems*. This document establishes minimum requirements for Mass Notification to be used for the design, construction, operation, maintenance, and modernization of all DoD facilities. UFC 4-021-01 defines Mass Notification as:

"...the capability to provide real-time information and instructions to people, in a building, area, site, or installation using intelligible voice communications including visible signals, text, and graphics, and possibly including other tactile or other communication methods."

UFC 4-021-01 §1-1

While in the DoD context, Mass Notification is primarily focused on terrorist attacks, the concept has been championed by other government agencies and regulators to include risk management for environmental accidents and natural disasters as well.

Fire Alarm and Mass Notification: Common Ground

While fire alarm and Mass Notification address different kinds of dangers, they share similar objectives.

Fire is a specific threat that usually has a single point of origin from which it spreads. Fire alarm systems are designed to manage building evacuations based on this scenario, and may incorporate the use of voice audio communications in larger facilities.

Mass Notification, on the other hand, deals with different threats. Building evacuation isn't always the best solution in the face of coordinated terrorist attacks, or sweeping risks from chemical spills, or all-encompassing dangers of natural disasters. These situations require different management strategies that take a multi-dimensional approach.

While fire alarm and Mass Notification systems appear to serve different purposes, they both share a common goal – to warn people of danger and provide them with information they need to stay safe. More importantly, fire alarm and Mass Notification systems share a need for the same basic equipment and other requirements including: recorded messages, HVAC control, integrity monitoring, routine maintenance, and agency listings.

These common requirements permit leveraging the mandated survivability and inherent reliability of fire alarm systems for Mass Notification purposes. Thanks to its functional pedigree, the fire alarm infrastructure is eminently well-suited to provide the robust backbone needed for Mass Notification activity.

Mass Notification

Why fire alarm systems are ideally positioned to offer the best value and most efficient implementation.

Backup power supplies, redundant wiring, and fail-safe peer-to-peer networks — time-tested features of fire alarm systems — are also essential to well-designed Mass Notification systems. Meanwhile, code-driven development and stringent standards-driven testing provide the built-in quality that make fire alarm panels and devices among the most reliable electronic equipment available today.

Mass Notification demands a robust communications infrastructure that goes far beyond what's typically found among garden variety paging systems. Even output devices like speakers and strobes require special consideration. In fact, circuit integrity monitoring — an established fire alarm requirement — provides the reliability necessary to ensure that the Mass Notification system remains viable and ready for service at all times. So it comes as little surprise that a fire alarm based solution is the most economical choice when adding Mass Notification applications to basic building fire alarm requirements.

Unified Facilities Criteria – What they mean to you

In 2002, five years after the release of the *Khobar Towers Report* and in the wake of the attacks on the Pentagon and New York, the Department of Defense issued two landmark documents...



UFC 4-010-01: DoD Minimum Antiterrorism Standards for Buildings

This Unified Facilities Criteria is roughly analogous to the Building Code. It requires that all inhabited buildings have a timely means to notify occupants of threats and instruct them what to do in response to those threats. UFC 4-010-01 applies to all new DoD construction after 2004.



UFC 4-021-01, Design and O&M: Mass Notification Systems

This Unified Facilities Criteria includes requirements similar to those of NFPA 72 in order to take advantage of available technologies. A number of "Service Exceptions" in these requirements apply to the Air Force, the Army, the Marine Corps, and the Navy.

Notification Appliances

Mass Notification appliances bear a striking resemblance to fire alarm devices. In fact, speakers are required to meet NFPA 72 requirements, while strobes are subject to NFPA 72 and ADA standards. The navy requires clear strobes and text signage. The Army and Air Force calls for clear strobes for fire, amber strobes for Mass Notification.



Types of Mass Notification Systems

UFC 4-021-01 describes four basic types of Mass Notification system:

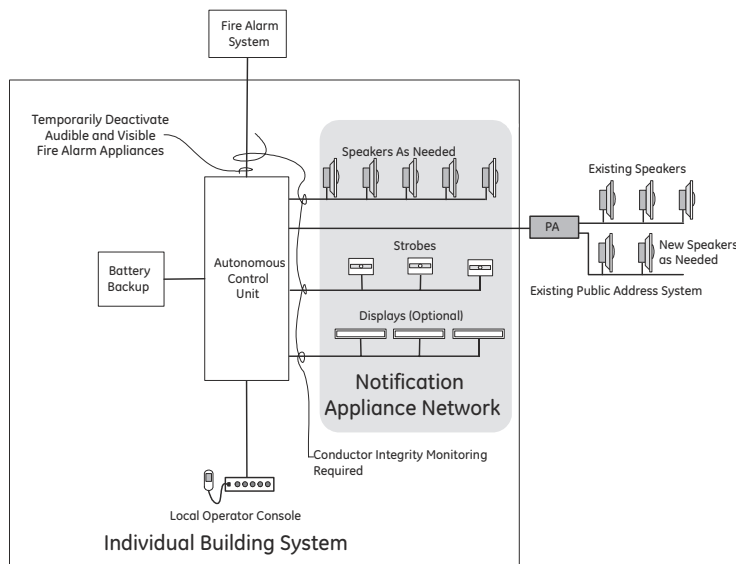
- Individual building
- “Giant Voice” wide-area
- Telephone alerting
- Base wide

Individual building systems

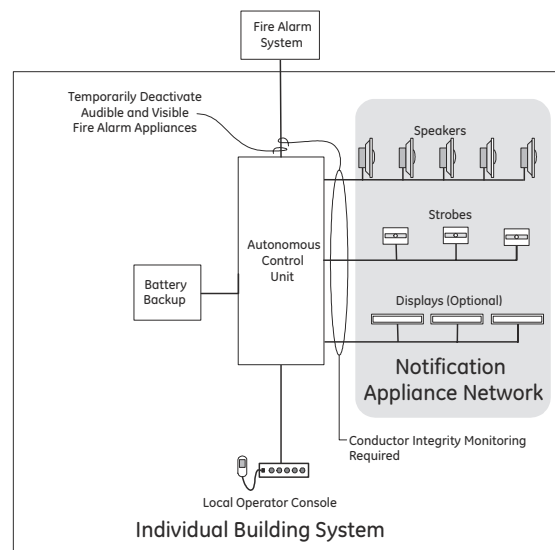
UFC 4-021-01 indicates that the use of speakers and other components in an existing public address (i.e.: fire alarm evacuation) system may be appropriate for use for Mass Notification purposes in buildings in which the installation of a new speaker system is not cost-effective. Under these circumstances, the UFC requires that the building Mass Notification system be interfaced with the existing PA or evacuation system. It adds that features must also be provided in the public address system to ensure that emergency messages have priority over non-emergency messages.

The individual system comprises one or more autonomous control units and a notification appliance network. The autonomous control unit is situated in a secure location and provides a user interface with microphone and controls. It allows real-time communications and pre-recorded messaging. The autonomous control unit may interface with the fire alarm system, though Mass Notification messaging and strobe signaling must take priority. However, non-notification fire functions (i.e.: HVAC control, elevator capture, central monitoring station notification, etc.), must not be affected by Mass Notification activities. Interaction between the fire alarm and Mass Notification system is required, as indicated in the drawings below.

There are a number of different layouts possible among individual building systems. The design of the system depends on several factors including building layout and service exemptions relevant to DoD branches such as the Army, Navy, Air Force, Marine Corps, etc. The following examples provide two of the most common Mass Notification system configurations.



Separate MNS and fire alarm panels w/PA interface



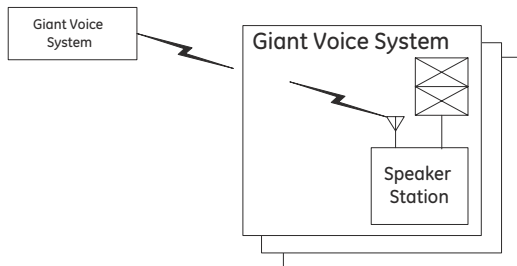
Separate Mass Notification and fire alarm panels

Mass Notification

Why fire alarm systems are ideally positioned to offer the best value and most efficient implementation.

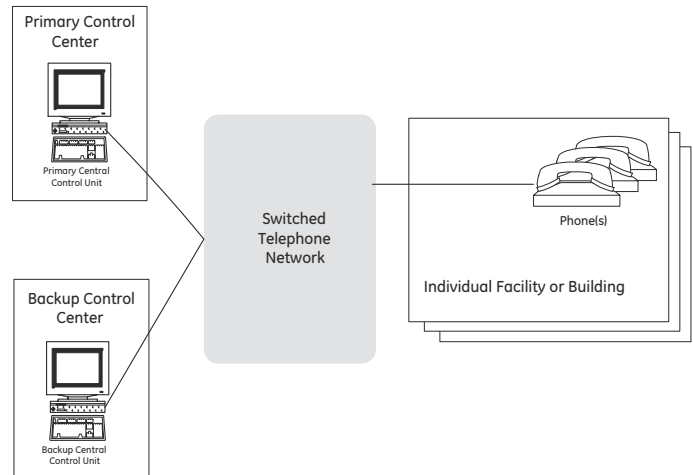
Giant Voice Wide Area Systems

These high power public address systems are typically installed as a wide-area solution to provide siren signal, pre-recorded, and live voice messages. UFC 4-021-01 points out that Giant Voice systems are most useful for providing Mass Notification for personnel in outdoor areas, expeditionary structures, and temporary buildings. It adds that these systems are not usually suitable for permanent inhabited buildings, and should not be used in lieu of an individual building Mass Notification system. Furthermore, if an optional base-wide control system for Mass Notification is installed, it should be interfaced to a new or existing Giant Voice system.



Telephone Systems

Telephone alerting systems are independent configurations that are useful for buildings in which notification to all building occupants may not be appropriate. This private mode signaling finds application in areas such as nurseries, hospital patient wards, and brigs. UFC 4-021-01 cautions, however, that there are many limitations in delivering notification messages by telephone and implementation should be carefully considered. It recommends that the use of the base's switched telephone network is the preferred communications method to minimize concerns about the system's reliability and vulnerability.



Integrated Event Management

The success of any Mass Notification effort hinges on the ability of the system to manage information and provide a coordinated response that takes in the full 360-degree view of an unfolding situation. From smoke detectors and fire doors to motion sensors and CCTV cameras, information needs to be gathered – and processed intelligently – in order for an effective response strategy to be executed. Leveraging existing equipment such as command and control interfaces, speakers, and strobes, leads to an effective means of response in the face of real danger.

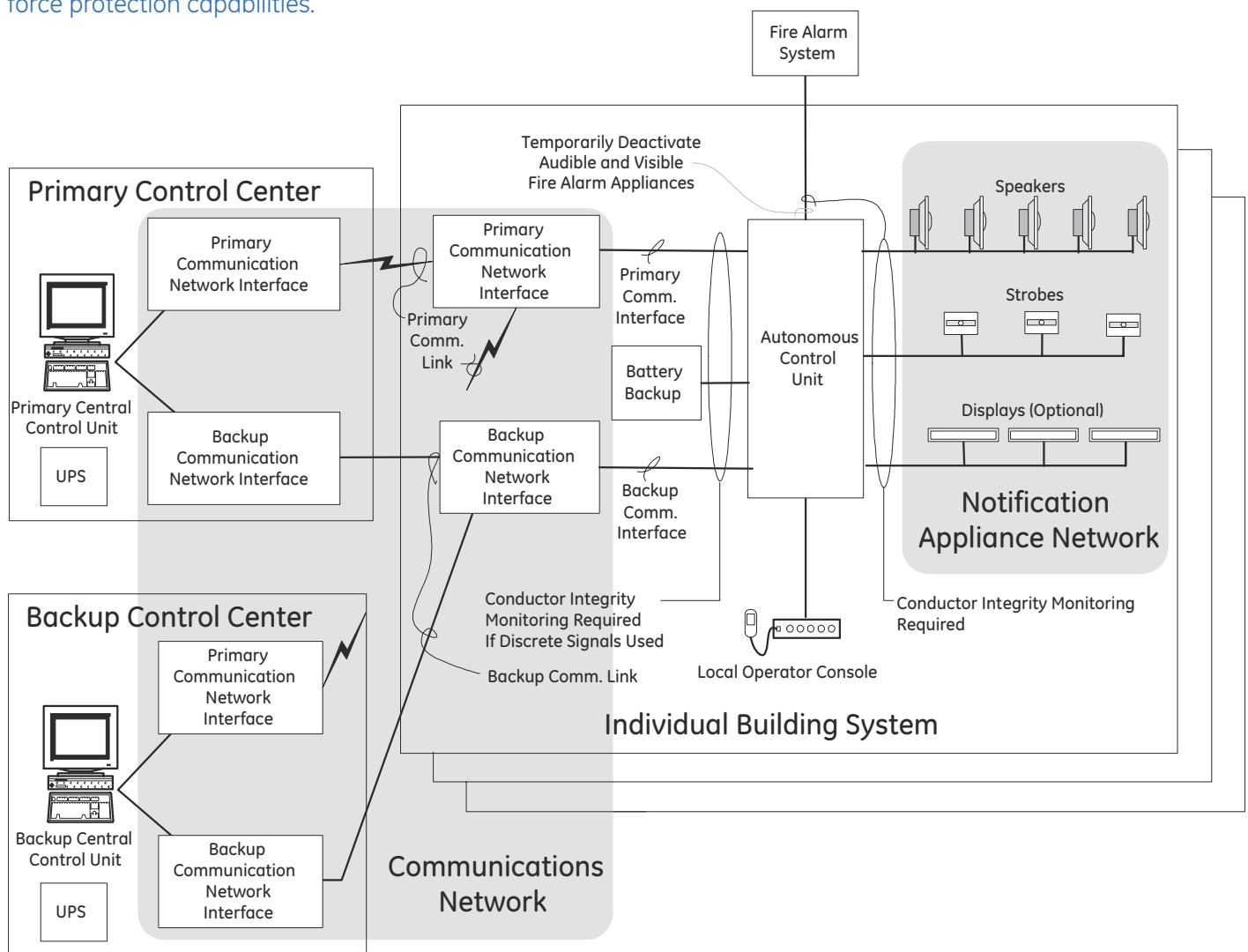


Base wide system

This type of system bridges wide area, individual building and telephone systems to provide a consolidated means of mass communications. It typically includes one or more central control units and a communications network. A base-wide control system is not required to comply with UFC 4-010-01. It is considered an optional system that can enhance force protection capabilities.

Mass Notification Systems may also interface with:

- Visible signals, digital signage
- Wireless and wire line phones
- Pagers, PDAs, computer pop-ups
- Cell phone text messaging
- Gateways to sub-systems



Mass Notification

Why fire alarm systems are ideally positioned to offer the best value and most efficient implementation.

Mass Notification References:

NFPA 72®, 2007

§6.2.1 "Purpose. The systems covered in Chapter 6 shall be for the protection of life or property, or both, by indicating the existence of heat, fire, smoke, or other emergencies impacting the protected premises."

§6.4.1 "Purpose. Section 6.4 provides information that shall be used in the design and installation of protected premises fire alarm and Mass Notification systems for the protection of life and property."

§6.8.4.6 "Speakers used as alarm notification appliances on fire alarm systems shall also be permitted to be used for Mass Notification systems."

§6.8.4.7 "In combination systems, fire alarm signals shall be distinctive, clearly recognizable, and, with the exception of Mass Notification inputs, take precedence of any other signal..."

§6.8.4.9 "Live voice instructions originating from the protected premises fire or Mass Notification systems shall override all previously initiated signals and shall have priority over both of the following:

1. Any subsequent automatically initiated signals on that channel
2. Remotely generated Mass Notification messages."

NFPA 72, 2007, Annex E

NFPA 72, Annex E was developed at the request of the DoD because...

"Evacuation from the building may not be the appropriate choice for the occupants even if the fire alarm system has already been activated; and the temporarily silencing of the fire alarm system may be necessary to provide directions and guidance..."

The addition of Annex E to the fire standard was made at the request of the DoD and its scope closely follows UFC 4-021-01 with regard to application, installation, location, performance, and maintenance.

It also provides information and instruction to people in a building, area, site or other space using intelligible voice communications and possibly including visible signals, text, graphics, tactile, and other communications methods.

Annex E acknowledges that the fire alarm industry offers the best pool of qualified personnel when it comes to designing and installing Mass Notification systems:

System Designer:

"...Persons who are experienced in the proper design, application, installation and testing of Mass Notification Systems."

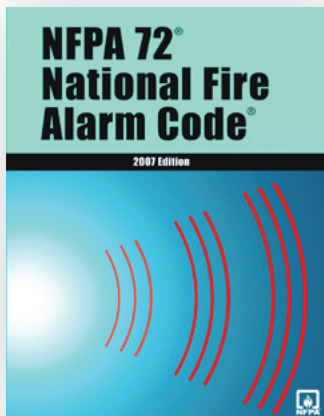
[communications, electrical or Fire Protection Engineer or NICET Level IV in FA]

NFPA 72, 2007 §E.2.1.2.1

System Installer:

"...persons qualified and experienced in installation, inspection, and testing of Mass Notification Systems, such as: Factory trained and certified Licensed or certified by state or local authority "

NFPA 72, 2007 §E.2.1.3



Implementation

EST3 lends itself to implementation as a combination life safety and Mass Notification system. The Mass Notification autonomous control equipment is easily configured from an EST3 control panel and a 3-ASU audio source unit, while a local operating console can be configured from an EST3 control panel and a 3-REMICP microphone.

With eight multiplex channels of audio power, it is possible to dedicate a high-priority 3-ASU audio source unit for Mass Notification purposes and assign separate Mass Notification channels as follows:

- **PAGE:** Used for real-time emergency announcements (highest priority).
- **EVAC1:** used to support Mass Notification messaging (high priority).
- **EVAC2:** used to support fire evacuation messaging (medium priority).
- **ALERT:** used to support fire alert messaging (medium-low priority).
- **GENERAL:** used to support general paging (lowest priority).

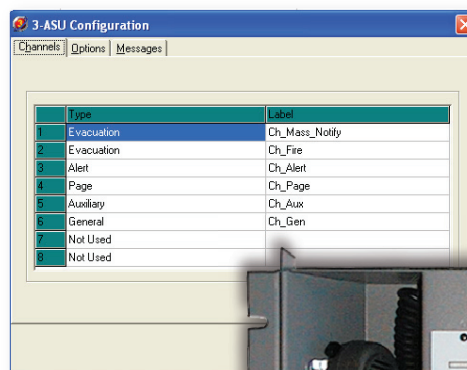
Control switches/LEDs that may be required for Mass Notification functions ...



- Mass Notification mode on/off
- Select Mass Notification message
- Select message destination
- Mass Notification mode disable (during fire)
- Mass Notification strobes on/off
- Fire strobes on/off
- General page mode on/off
- HVAC controls

System considerations

The Mass Notification audible (speaker) zones should correspond with the fire alarm audible notification zones. Remember: the 3-ASU can still provide fire messages and other informational audio messages as required. Similarly, Mass Notification visible (strobe) zones should correspond with fire alarm visible notification zones. All strobes, both clear and amber, must be synchronized.



EST3 Audio Source Unit: 3-ASU

Not only are fire alarm products and systems best suited to Mass Notification applications, but the installers and designers of fire alarm systems are also the best qualified people to implement Mass Notification projects. These professionals are specially trained and certified to provide a level of safety not found among typical contractors. Code-driven and closely monitored by local Authorities Having Jurisdiction, the fire alarm industry is an unrelenting proving-ground for excellence in system installation and maintenance.

Mass Notification

Why fire alarm systems are ideally positioned to offer the best value and most efficient implementation.

Summary of Mass Notification Standards

Mass Notification is quickly emerging on the regulatory landscape as a new standard in building design.

Several organizations are jockeying for the leadership position. Which one will emerge with the dominant standard remains to be seen. The following are just a few of the federal bodies already issuing related standards and guidelines...

Department of Defense (DoD)

- *Unified Facilities Criteria 4-021-01: Design and Operation of Mass Notification Systems* includes requirements similar to those of NFPA 72 in order to take advantage of available technologies and manufacturers.
- *Unified Facilities Criteria 4-010-01: DoD Minimum Antiterrorism Standards for Buildings* is intended to provide a “timely means to notify building occupants of threats and instruct them what to do in response to those threats.”

National Fire Protection Association (NFPA)

NFPA 72® National Fire Alarm Code...

- *Chapter 6: Protected Premises Fire Alarm Systems* includes requirements for the operation and performance of emergency voice/alarm communication systems.
- *Chapter 7: Notification Appliances for Fire Alarm Systems* outlines requirements for the performance of notification appliances, including minimum sound levels for audible signaling and guidance to ensure voice intelligibility.

- *Annex E: Mass Notification Systems* explains the need to incorporate Mass Notification into fire alarm systems for certain occupancies and recommends minimum guidelines for the application of Mass Notification systems inside buildings as well as outdoors.

Occupational Health and Safety Administration (OSHA)

- *OSHA 1910.165: Employee Alarm Systems*, stipulates that employers provide an emergency warning system so that employees can safely escape danger in the workplace.

Federal Emergency Management Agency (FEMA)

- *FEMA CPG 1-17: Outdoor Warning Systems Guide* sets guidelines for designing public warning systems and describes “the benefits of using voice technology to address all natural and man-made hazards, including acts of terrorism.”

U.S. Department of Justice (DoJ)

- *The Americans with Disabilities Act* outlines the requirements for audible and visible warning systems.

While government may be driving the Mass Notification activity, it's clearly the life safety industry that is best suited to run with it. Fire alarm systems are inherently survivable in the face of a catastrophe. Their stringent testing requirements ensure a level of operational fitness unmatched among building systems. And the highly regulated standards they must meet achieves the level of reliability needed for Mass Notification applications.

Low-profile Mass Notification Signals

The following products are available for use with Mass Notification systems. Please consult the relevant installation instructions for specification details and wiring information.



Mass Notification Strobes

GCA-VMA	Ceiling, Strobe 12-76cd, 12-76cd, White, "ALERT"
GCB-VMA	Ceiling, Strobe 12-76cd, 12-76cd, White, No Marking
GCA-VM	Ceiling, Strobe 15-95cd, Clear, White, "ALERT"
GCB-VM	Ceiling, Strobe 15-95cd, Clear, White, No Marking
GCA-VMHA	Ceiling, Strobe 76-142cd, Amber, White, "ALERT"
GCB-VMHA	Ceiling, Strobe 76-142cd, Amber, White, No Marking
GCA-VMH	Ceiling, Strobe 95-177 cd, Clear, White, "ALERT"
GCB-VMH	Ceiling, Strobe 95-177 cd, Clear, White, No Marking
G1A-VMA	Wall, Strobe 12-76cd, Amber, White, "ALERT"
G1B-VMA	Wall, Strobe 12-76cd, Amber, White, No Marking
G1B-VM	Wall, Strobe 15-95cd, Clear, White, No Marking
G1A-VM	Wall, Strobe 15-95cd, Clear, White, "ALERT"
G1T-ALERT	Wall Trim ring, White, "ALERT"

Mass Notification Speaker-Strobes

GCA-S2VMA	Ceiling, Speaker Strobe -25Vrms, 12-76cd, Amber, White, "ALERT"
GCB-S2VMA	Ceiling, Speaker Strobe -25Vrms, 12-76cd, Amber, White, No Marking
GCA-S2VM	Ceiling, Speaker Strobe -25Vrms, 15-95cd, Clear, White, "ALERT"
G4B-S2VM	Ceiling, Speaker Strobe -25Vrms, 15-95cd, Clear, White, No Marking
GCB-S2VM	Ceiling, Speaker Strobe -25Vrms, 15-95cd, Clear, White, No Marking
GCA-S2VMHA	Ceiling, Speaker Strobe -25Vrms, 76-142cd, Amber, White, "ALERT"
GCB-S2VMHA	Ceiling, Speaker Strobe -25Vrms, 76-142cd, Amber, White, No Marking
GCA-S2VMH	Ceiling, Speaker Strobe -25Vrms, 95-177 cd, Clear, White, "ALERT"
GCB-S2VMH	Ceiling, Speaker Strobe -25Vrms, 95-177 cd, Clear, White, No Marking
GCA-S7VMA	Ceiling, Speaker Strobe -70Vrms, 12-76cd, Amber, White, "ALERT"
GCB-S7VMA	Ceiling, Speaker Strobe -70Vrms, 12-76cd, Amber, White, No Marking
GCA-S7VM	Ceiling, Speaker Strobe -70Vrms, 15-95cd, Clear, White, "ALERT"
GCB-S7VM	Ceiling, Speaker Strobe -70Vrms, 15-95cd, Clear, White, No Marking
GCA-S7VMHA	Ceiling, Speaker Strobe -70Vrms, 76-142cd, Amber, White, "ALERT"

Mass Notification Speaker-Strobes

GCB-S7VMHA	Ceiling, Speaker Strobe -70Vrms, 76-142cd, Amber, White, No Marking
GCB-S7VMH	Ceiling, Speaker Strobe -70Vrms, 95-177 cd, Clear, White, No Marking
GCA-S7VMH	Ceiling, Speaker Strobe -70Vrms, 95-177 cd, Clear, White, "ALERT"
G4A-S2VMA	Wall, Speaker Strobe -25Vrms, 12-76cd, Amber, White, "ALERT"
G4B-S2VMA	Wall, Speaker Strobe -25Vrms, 12-76cd, Amber, White, No Marking
G4A-S2VM	Wall, Speaker Strobe -25Vrms, 15-95cd, Clear, White, "ALERT"
G4A-S7VMA	Wall, Speaker Strobe -70Vrms, 12-76cd, Amber, White, "ALERT"
G4B-S7VMA	Wall, Speaker Strobe -70Vrms, 12-76cd, Amber, White, No Marking
G4A-S7VM	Wall, Speaker Strobe -70Vrms, 15-95cd, Clear, White, "ALERT"
G4B-S7VM	Wall, Speaker Strobe -70Vrms, 15-95cd, Clear, White, No Marking

Mass Notification Speakers

GCA-S2	Ceiling, Speaker -25Vrms, White, "ALERT"
GCB-S2	Ceiling, Speaker -25Vrms, White, No Marking
GCA-S7	Ceiling, Speaker -70Vrms, White, "ALERT"
GCB-S7	Ceiling, Speaker -70Vrms, White, No Marking
G4A-S2	Wall, Speaker -25Vrms, White, "ALERT"
G4B-S2	Wall, Speaker -25Vrms, White, No Marking
G4A-S7	Wall, Speaker -70Vrms, White, "ALERT"
G4B-S7	Wall, Speaker -70Vrms, White, No Marking

U.S.
T 888-378-2329
F 866-503-3996

Canada
T 519 376 2430
F 519 376 7258

Asia
T 852 2907 8108
F 852 2142 5063

Australia
T 61 3 9259 4700
F 61 3 9259 4799

Europe
T 32 2 725 11 20
F 32 2 721 86 13

Latin America
T 305 593 4301
F 305 593 4300

www.gesecurity.com/est

© 2007 General Electric Company
All Rights Reserved

Don't mince words.

During an emergency, building occupants need instructions on when to stay put, when to evacuate, and where to go. They need instructions that reflect the changing conditions of the emergency; instructions that take them to safety one step at a time.

Whether the emergency is a result of a tornado, environmental accident, domestic violence, or terrorist threat, response personnel must remain in control of the situation and keep the lines of communication open. EST3's Mass Notification capability accomplishes this by leveraging the power behind Synergy-enabled applications and offering response personnel the tools they need, not only to warn building occupants of imminent danger, but also guide them to safety.

This requires much more than a simple public address system. Only EST3 benefits from the synergy of a truly unified communications backbone that can deliver highly survivable Mass Notification – and simultaneous control of critical building infrastructure functions. This means, for example, that during an emergency the system operator can control HVAC systems, issue live audio instructions, and disarm security partitions to provide occupants with unencumbered egress – all without taking his or her eyes off the system display. Only Synergy-enabled EST3 with Mass Notification unifies emergency communications with threat detection and security control to offer this degree of emergency functionality.



imagination at work