



White Paper

Digital Cellular Communications and NFPA 72

How the XR500 Panel meets UL and NFPA commercial fire requirements with a single digital cellular communications link

Advances in digital cellular communications technology have enabled powerful new capabilities in alarm transmission that are reflected in important changes to National Fire Protection Agency and Underwriters Laboratories standards for commercial fire alarm systems. This white paper explains those capabilities, available on DMP's Model XR500 Command Processor Panel™ when used with DMP 463G Digital Cellular Communicator. It also details how these new digital cellular communication capabilities can reduce the ongoing cost of system operation while also enhancing system security in a manner that conforms to NFPA and UL requirements.

NFPA 72 and Underwriters Laboratories

When authorities having jurisdiction (AHJs) establish requirements for commercial fire alarm systems in their city, state or municipality, they rely heavily on the NFPA's National Fire Alarm and Signaling Code, commonly known as NFPA 72. From time to time, the NFPA updates the NFPA 72 code to reflect new developments in technology. There is no set schedule for when the code is updated, but updates tend to occur every few years. The latest version of the code was issued in 2010. The two previous versions were issued in 2002 and 2007.

AHJs are not required to adopt the most recent version of the NFPA code. Today, some authorities require systems to meet the NFPA 72 2010 code, but others may still use earlier versions of the code as the basis for their code requirements.

The NFPA does not play the role of certifying specific products for use in NFPA 72-compliant systems. Instead that task has been assigned to Underwriters Laboratories, which conducts tests to confirm that products meet specified performance requirements and that the products include instructions that clearly specify requirements for installation in a manner compliant with NFPA 72.

Like the NFPA, Underwriters Laboratories also updates its requirements from time to time. When a particular UL standard is updated, a date is established for when the new requirements will go into effect. Products manufactured after that date must conform to the requirements of the new version. (Although AHJs have flexibility in determining when and if they want to implement new versions of the NFPA 72 code, manufacturers do not have the same flexibility in meeting UL requirements. After a certain date, all products manufactured must meet the requirements for the latest version of the standard).

The ANSI/UL 864 standard covers control units and accessories for fire alarm systems. ANSI/UL 864, 9th edition is the version of the standard that fire alarm control panels and communicators manufactured today must obtain for use in systems requiring compliance with NFPA 72, regardless of which version of NFPA 72 an AHJ is using.

The DMP XR500 Command Processor Panel used with the DMP 463G Digital Cellular Communicator has earned the ANSI/UL 864, 9th edition listing. As this white paper will explain, that listing enables the DMP 463G to serve as the only communications link with the central monitoring station when used with the DMP XR500 in commercial fire systems to meet requirements for 2002, 2007 and 2010 versions of the NFPA 72 code.

In addition, the Fire Slave input option of the XR500 is also ANSI/UL 864, 9th edition-listed. This enables the DMP 463G to meet commercial fire requirements operating as the slave communications link to the central station when an XR500 is used as the slave communicator for a separate fire alarm control panel (FACP).

Reliability of the communications link

One important goal of NFPA 72 is to help ensure the integrity of the communications link between the fire alarm system installed at the customer premises and the central monitoring station. Older versions of NFPA 72 require a customer to have two dedicated phone lines for commercial fire alarm systems. The idea behind this approach is that if one phone line should fail, the other likely would still be functional. But redundant phone lines are costly, requiring commercial accounts to pay as much as \$700 to \$1200 per year in phone charges for every one of their locations. In addition, redundant phone lines can and sometimes do fail simultaneously.

Fire systems that rely on redundant phone lines for communication are required to send test messages to the central station once every 24 hours to confirm that the system is capable of transmitting an alarm. If the central station does not receive a signal from the system at the expected time, the business is alerted so that the problem can be addressed. The downside of this approach, however, is that if a problem were to occur shortly after a test message, it would not be detected for nearly 24 hours.

Over the last 10 to 20 years, alternative communications technologies using wired or wireless digital data communications have been developed—and increasingly these technologies are being used in security and fire alarm systems. The availability of these alternative communications methods for fire systems caused the NFPA to rethink its requirements for commercial fire systems. One option that the NFPA has allowed in the most recent versions of the NFPA 72 code is to use a combination of two technologies, such as a cellular network and a networked data connection—as long as both connections are verified once every 24 hours.

In addition, the most recent versions of NFPA 72 allows a single communications link to the central station to be used if the integrity of the entire communications path is verified more frequently—once every five minutes instead of once every 24 hours. The relevant section of the NFPA 72 2002 code is 8.5.4.4. The relevant section of the 2007 code is 8.6.4.4. The relevant section of the NFPA 72 2010 code is 26.6.3.1.4.1.

The NFPA 72 code does not specify what type of link is appropriate for use as the single communications link—only that it meets the requirement to test the integrity of the entire communications path every five minutes. The DMP Model XR500 Command Processor Panel used with DMP 463G Digital Cellular Communicator meets this requirement when check-in and fail time settings are programmed for five minutes.

When technicians install the system, they establish a connection with the central monitoring station by programming the IP address of the central station receiver and obtaining an account number from the central station, which is also programmed into the system. As part of the programming process, the system prompts technicians to enter the number of minutes for check-in and fail time. Both settings should be programmed for five minutes.

When the initial communication from the system is sent to the central station, the central station receiver records the check-in and fail times for the account number. Those settings trigger the receiver to automatically look for a check-in from the system every five minutes and if the receiver does not receive an check-in message from the communicator, an alert signal is sent to the commercial account through the central station personnel.

The net result is a higher level of system reliability in comparison with traditional systems that rely on redundant phone lines and the substantially less frequent 24-hour supervision reports associated with that approach.

DMP products can save costs, enhance reliability

The DMP XR500 Command Processor Panel has 574 inputs, 16 doors of access, 502 Form C relays, 32 areas, and 10,000 users.

The DMP 463G Digital Cellular Communicator creates a direct cellular path to any DMP central station receiver using the digital GSM/GPRS network. En route, it does not go through a third party, such as another central station or server.

Today's cellular networks support voice and data communications using digital technology and do not rely on a wired connection to the customer premises that can be damaged or sabotaged. Cellular networks operated by wireless service providers are designed and built to high reliability standards, with proactive monitoring and redundancy provided by the wireless carrier. Because the cellular connection to the customer premises is fixed, unlike with mobile cellular network connections, no hand-offs are involved, minimizing the occurrence

of dropped connections. And because the size of the data messages sent between the cellular communicator and the central station require relatively low bandwidth, the likelihood of communications not going through because of congestion also is minimized.

The 463G does not require external power supplies, enclosures, batteries, cabling or conduit connections, simplifying installation and strengthening system security. It ships with a SIM card that is ready for activation with SecureCom Wireless, LLC, the DMP-provided digital cellular service based on advanced GSM/GPRS data communications technology.

DMP bills the security dealer that handles the account for SecureCom service. The dealer typically builds this cost into its monthly charges for the account, which also include monitoring and maintenance, both of which are mandatory for NFPA 72 systems. The portion of the monthly cost that goes toward communications is typically between 50% and 75% less using a single digital cellular communicator and SecureCom than using redundant telephone lines. When redundant telephone lines are used, the commercial account pays the telephone service provider between \$60 and \$100 a month in addition to the monthly monitoring and maintenance costs that go to the dealer.

The total ongoing monthly costs paid to the security dealer for NFPA 72 systems using SecureCom typically are between one-third and one-half of the combined cost that the commercial user would pay to the dealer and the telephone service provider to support a redundant phone line approach.

The right choice

The DMP XR500 Command Processor Panel used with the DMP 463G Digital Cellular Communicator has earned the ANSI/UL 864, 9th edition listing. As this white paper has explained, that listing enables the DMP 463G to serve as the only communications link with the central monitoring station when used with the DMP XR500 in commercial fire systems to meet requirement for 2002, 2007 and 2010 versions of the NFPA 72 code.

Alternatively, the Fire Slave input option of the XR500 is ANSI/UL 864 9th edition-listed when used with the DMP 463G Digital Cellular Communicator and a fire alarm control panel (FACP) that also has received the ANSI/UL 864 9th edition listing.

Giving commercial users the option of using a single dedicated cellular connection for fire alarm communications can result in savings of as much as 75% for monthly communications costs, while at the same time enhancing system reliability. A single cellular link, with its more stringent notification requirement for a communication problem, provides a higher level of life safety protection for commercial users—and for anyone with whom they do business.

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