“Runaway reset” in fire alarm systems in large evolving educational buildings with multiple fire alarm control units can elevate risk to occupants, security personnel, and technicians. Fortunately, the fix is easy.

THE PROBLEM
Buildings with multiple fire alarm control units (FACUs) come into being because facility professionals have enough budget to install a new FACU for a limited part of a building, but not enough money to bring the entire existing system onto a single addressable platform. As life safety infrastructure evolves in a building, the FACU interface evolves into something that was not the intention of the original design when only one FACU was required.

For example, assume a single FACU was installed that conformed to the Fire Alarm Code in effect at the time. When a new wing, or a new addition, is constructed ten years later, the fire alarm system is treated as a new project. The infrastructure systems are developed as separate systems. If each succeeding FACU were hardwired to reset the other in a peer-to-peer fashion you may end up with “runaway reset” or silence function as each panel is trying to reset or silence the other continually. [See Figure 1] When this happens, the fire alarm control units will function properly during the first activation but typically not for additional activations. This is often the single most common nuisance problem that occurs when multiple control units are interconnected with relays.

The absence of an effective system that ties all the FACUs leads to cognitive problems. When multiple FACUs are not completely interconnected, there are operational costs – and elevated risk levels – associated with operator and occupant confusion. In recent years, there has been much debate over the cognitive aspects of notification devices – most notably annunciation devices that will wake up sleeping occupants. The cognitive problems associated with FACUs that cannot be reset after an alarm or trouble condition is less well known.

Figure 2. NFPA 72-2007 Section 6.8.2.1
Fire alarm systems shall be permitted to be either integrated systems combining all detection, notification, and auxiliary functions in a single system or a combination of component subsystems. Fire alarm system components shall be permitted to share control equipment or shall be able to operate as stand-alone subsystems, but, in any case, they shall be arranged to function as a single system.

The language in NFPA 72 that seems to address this condition appears in Figure 2; language that has existed in NFPA since 1999. A careful reading of 6.8.2.1 reveals some ambiguity, however. It starts out reading like permissive language but ends with a phrase that sounds prescriptive – and mandatory. The difficulty in
the interpretation 6.8.2.1, as well as its position in the NFPA 72 text, may explain why it is easy for fire alarm designers to overlook its implications.

**THE SOLUTION**

When two addressable systems are linked together to function as a single system, resetting the panel that is the source of the alarm should stop the alarm signals from sounding on the interconnected panel. You only need to install non-latching monitor modules to monitor the status of the alarm contacts on a panel, and utilize resettable addressable output relays for alarm trigger and alarm reset functions. (See Figure 3) When your technicians do this they will want to define which control unit will be the primary FACU and which FACU will be the secondary. This will cause the FACU to function properly during the first activation but not cause nuisance activation of the secondary FACU.

APPA's Code Advisory Task force submitted a proposal to amend the 2011 Fire Alarm Code in order to put this issue in front of the country's top fire alarm experts. At the very least, we have started a discussion on an issue that is rather common in our industry, and may become more common as facility executives struggle to squeeze the most functionality from existing legacy life safety infrastructure.

Brad Davidson, president and COO of Safety Systems, Inc., announced that the proposal to amend the 2011 Fire Alarm Code will be considered by the NFPA 72 committee. He stated, "This is an important issue for our industry, and we hope to see progress on this proposal in the near future."