IMSA Journal
January/February 2010

Switching to Digital

by Dean K. Wilson, P.E.

Question: **As a company that installs fire alarm systems, we are aware that many of our customers no longer have POTS (Plain Old Telephone Service) lines installed at their facilities. For example school districts in our area normally have POTS lines installed at their Administrative facilities and then use a WAN (Wide Area Network) using VOIP (Voice Over Internet Protocol) technology to distribute telephone service to their other school buildings.**

In trying to address the needs of customers who no longer have traditional telephone service at their facilities, we have experimented with what we call NACT or Network Alarm Communication Technology using listed equipment that provides an interface between a building's fire alarm system control unit and some type of Internet connection. We got it to work but with some issues.

In your opinion, is DSL phone/internet service create any particular issues or problems? In most, if not in all cases, the DSL service is provided by the public telephone company utility using the public switched telephone network. Is the public phone company required to have the same standby power for these DSL circuits? These circuits utilize DSL modems and filters to separate the telephone and Internet services. It seemed to us that as long as we connected the IP-DACT (Internet Protocol Digital Alarm Communicator Transmitter) ahead of the modems and filters we should be O.K. Right?

The relatively newly release NFPA 72-2010, *National Fire Alarm and Signaling Code,* offers you more information regarding this subject than you will find in previous editions of the *Code*. The Technical Committee on Supervising Station Fire Alarm Systems—that processed, and in some cases wrote, the requirements now contained in Chapter 26—have done a commendable job in reorganizing and clarifying requirements. These requirements permit the use of digital technology for the transmission of fire alarm, supervisory, and trouble signals between a protected premises and a supervising station.

You should note that the Code does not itself use the term "IP DACT." For the benefit of readers who may not have yet had the opportunity to explore this technology, I need to offer a bit of explanation.

In order to prevent the obsolescence of existing Digital Alarm Communicator Transmitters (DACTs), several manufacturers of fire alarm system equipment have developed listed interface cards that provide two pseudo-loop start telephone lines that may connect to a DACT. The interface then converts the transmission sequence from the DACT into signals that can transmit over any standard broadband Internet connection. These standard broadband Internet connections may include the connection to a router and then to DSL modem, cable modem, or even a high-end T1 or T3 modem/interface. Typically, the manufacturers call these interface cards "IP DACTs." However, as stated previously, the *Code* does not specifically recognize that term.

To address your specific questions, please allow me to offer the following comments. In order to obtain the necessary IP address for a UL Listed or FM Approved (listed) "Internet Protocol Fire Alarm Communications Interface," you would need to connect to a router on the customer side of the Teleco provided DSL modem. The modem does establish communication with the Teleco's principal portal to the Internet. But, I do not believe you can connect on the Teleco side of the

telephone pair and successfully obtain proper operation of your equipment. You will need to connect to the customer side of the modem. This would also be true for other types of modems, such as cable, T1, or T3.

At the moment, no one really knows what time capacity of standby power any particular telephone company public utility provides for any of their services. Traditionally in the past, almost all field telephone equipment and subscriber telephone equipment—with the exception of certain PBX (Private Branch Exchange) equipment installed in commercial buildings—received operating power from the public telephone company utility central office (CO). Each CO had substantial standby power, consisting of large arrays of batteries and an engine-driven generator.

As the telephone utility located more equipment into the field, and as other communications services providers began to offer telephone service, including cell phone companies, such equipment typically obtained operating power at the site of the equipment, rather than from the CO. Different service providers supplied varying time capacities of standby power. Some actually provided no standby power at all for the field-located equipment.

Following communications systems failures during hurricanes that severely affected the Gulf Coast region of the United States, the Federal Communications Commission began the process of rulemaking that would require all communication services providers to afford 24 hours of standby power for central office equipment and 8 hours of standby power for field-located equipment. (This rulemaking is the so-called “Katrina Ruling.”)

However, at this writing, the final rulemaking process is not yet complete. Furthermore, several communications trade organizations have filed lawsuits in Federal District Court to try to block this rulemaking by the FCC. At the moment, the Court has stayed any decision pending the final rulemaking by the FCC.

To further complicate this situation, NFPA 72-2010, *National Fire Alarm and Signaling Code*, has added a new requirement in 26.6.3.1.12 that reads as follows:

> 26.6.3.1.12* Secondary Power. Secondary power capacity in accordance with 10.5.6 shall be provided for all equipment necessary for the transmission and reception of alarm, supervisory, trouble, and other signals located at the protected premises and at the supervising station.
>
> A.26.6.3.1.12 This requirement is to ensure that communications equipment will operate for the same period of time on secondary power as the alarm control unit.

The provision of 26.6.3.1.12, as stated in the Annex, intends to require that a *Code*-compliant fire alarm system would have to include the provision of standby power for 24 hours capacity for all premises-located equipment in the signal transmission pathway. This would mean that 24 hours of standby power would have to be provided for any router(s) or other premises signal processing equipment in the signal transmission pathway between the UL Listed or FM Approved (listed) fire alarm system IP interface and the communications services provider's modem. The emphasis in this requirement is on the words "located at the protected premises." Of course elsewhere, the Code already requires appropriate standby power for the supervising station.

However, any premises located equipment provided by the communications services provider, such as the DSL modem or other modem, would not have to meet the 24 hour standby power requirement. Rather, such equipment would have to have whatever capacity of standby power required by the final FCC rulemaking. This will likely be 8 hours of standby power for field located equipment.

Either the owner of the protected premises would have to provide this standby power, or, more likely, the fire alarm system installing contractor would have to provide standby power packs

capable to supplying 24 hours of standby power for whatever load the equipment in the signal transmission pathway at the protected premises would require.

To say the least, this new requirement, coupled with a contractor's (and AHJ's) inability to easily determine the capacity of the telephone company public utility's (or other communications services provider's) standby power for its central office and field-located equipment, creates a potentially challenging situation.

While my comments may not give you the answer you were hoping for, nevertheless I hope they provide some suitable insight. This subject will merit much more discussion as the proliferation of digital transmission of fire alarm, supervisory, and trouble signals continues to evolve.

IMSA member Dean K. Wilson, P.E., FSFPE, C.F.P.S., now retired on disability, formerly worked as a Senior Engineer in the Erie (PA.) office of the fire protection engineering and code consulting firm, Hughes Associates, Inc. (www.haifire.com.). The opinions expressed in this article are strictly his own. You may reach him by e-mail at deanwilson@roadrunner.com or by telephone at 814-397-5558.