

NENA's Generic Standards for E9-1-1 PSAP Equipment: A Valuable Resource for Telcos, PSAPs and PSAP Equipment Manufacturers

By Billy Ragsdale and Randy Richmond

The past seventeen years have been challenging ones for the 9-1-1 industry. Prior to the court ordered divestiture of AT&T in 1983, "Ma Bell" designed and manufactured all 9-1-1 equipment to its own internal standards. During divestiture, a total of seven Regional Bell Operating Companies (RBOCs) were "spun off" from ATT to provide service throughout the United States. These RBOCs were prohibited from manufacturing telephone equipment, including that required for 9-1-1. This came at a time when 9-1-1 was gaining widespread community acceptance and expanding rapidly. To fill the resultant need, many vendors stepped forward and began developing a variety of 9-1-1 related products.

Unfortunately, relatively few elements of the 9-1-1 network had published or publicly available standards. The early 9-1-1 vendors had to feel their way through the 9-1-1 maze by "cut and try," learning as they went. Customers often experienced delays in cut-over, unexplained anomalies, incompatible interfaces, and incomplete functionality. In short, the performance of many of these early systems was less than ideal.

This was the setting at the time of the first NENA Telco/Vendor Conference in early 1994 (the Telco/Vendor Conference is now known as the Technical Development Conference, or TDC). At the conference's Customer Premises Equipment (CPE) Track, users, telephone companies and vendors universally agreed that standards were needed.

Work on a standard began immediately. A committee of telephone companies and equipment manufacturers formed the PSAP/CPE Technical Committee and met every three or four months to hammer out the details of the standard. After two years, a draft was formed and offered to the NENA membership for comment. The resulting recommended standard, "NENA Generic Standards for E9-1-1 PSAP Equipment" (document # 04-001), was released at the NENA Annual Conference in June 1996.

In the four years since the release of the recommended standard, NENA members from a variety of organizations have used it to great advantage. Telcos, PSAPs and 9-1-1 Boards have used it as the basis for their requests for proposals (RFPs) and bid specifications. Manufacturers have used it as a guide for the design and development of their equipment. Communication center designers have used the standard to specify requirements for power, grounding, and surge protection.

Overview

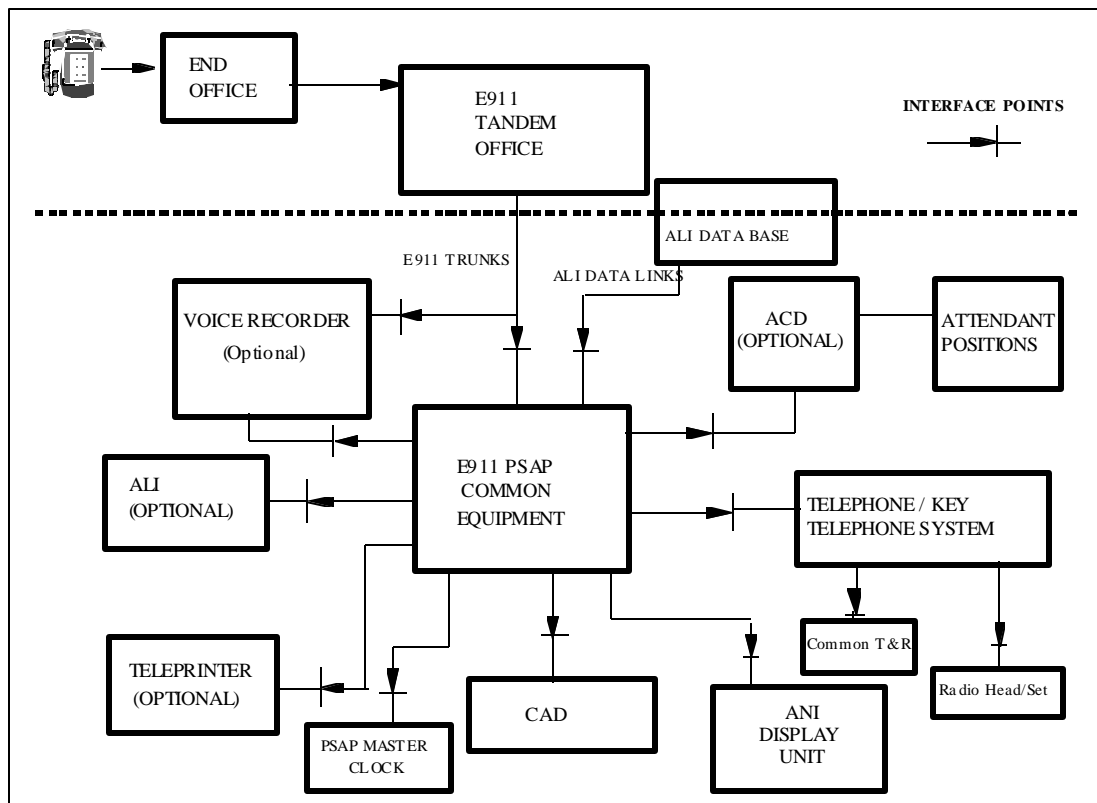
Having established the rationale for development of the standard, let's take a quick look at what the standard contains. NENA Generic Standards for E9-1-1 PSAP Equipment contains a total of thirteen sections, summarized as follows.

Section 1: Introduction. This section describes the purpose and scope of the document. It also differentiates the use of the words “shall, must be, and required” versus “it is desirable, and preferably.”

Section 2: 9-1-1 System Description & Feature Definitions. This section describes the essential features of a 9-1-1 system, including such things as Selective Routing, ANI and ALI.

Section 3: PSAP Interfaces. Section 3 lays down suggested requirements for every type of interface associated with 9-1-1 Customer Premises Equipment (CPE). This includes Trunks, ALI Database, CAD, Voice Recorders, Printers, ANI & ALI Displays, Time Sync, Remote Data Transfer, Telephone System, Radio/Telephone Headset, Handset/Headset, Alarms and TDD. See Figure 1.

Figure 1. Diagram showing the typical interface points of 9-1-1 PSAP Equipment



Section 4: Call Progress Signals. This section gives a detailed sequence of events required for connecting, transferring and disconnecting a 9-1-1 call to the CPE. It also outlines remote maintenance and telephone signal requirements.

Section 5: PSAP Feature Requirement Specifications. This section outlines the minimum expected features of PSAP telephone equipment. This includes features such as Queuing, Distinctive Ringing, Hold, Flash, Volume Adjust, Conference/Transfer, Speed Dial, Redial, Barge-In, TDD/TTY and MIS.

Section 6: Power Requirements. Section 6, in addition to providing recommendations for backup power and surge suppression, also provides a tutorial about various types of power problems that can arise. Many of these requirements involve the installers of the equipment.

Section 7: Physical & Electrical Environment Requirements. This section describes environmental requirements such as range of temperature, humidity, altitude and electricity (abnormal voltage conditions, EM interference, static susceptibility), as well as safety, wiring and grounding requirements. Many of these requirements involve those responsible for installation of the equipment.

Section 8: Installation, Maintenance & Administration. This section gives the requirements for installation, acceptance testing, maintenance, technical support, system security, spares provisioning, training, documentation and warranty. Many of these requirements involve those responsible for installation and maintenance of the equipment.

Section 9: Registration Requirements. Section 9 outlines the requirement that the manufacturer have its products tested by nationally recognized testing labs and meet industry regulatory requirements, such as FCC Parts 15 and 68.

Section 10: Quality & Reliability. This section deals with reliability predictions, reliability of hardware and components, and quality of software and manufacturing. Most notable in this section is the requirement that systems be fault tolerant so that a single point of failure not affect more than 50% of the essential call-handling capability of a system. It also requires that any switchover to redundant components be performed on an automatic basis.

Section 11: Technical References. This section provides descriptions and ordering information for the other industry specifications that are referred to in the main body of the document. This includes documents from Bellcore (now Telcordia), IEEE, ANSI, EIA/TIA, FCC, ITU-T and federal rules.

Section 12: Glossary. Section 12 provides a glossary of abbreviations and terms. In general, these terms are also defined in the NENA Master Glossary document (NENA Recommended Standard #01-002).

Section 13: Appendices. This section supplements the document with a description of ALI data management systems, a tutorial on how to size a UPS and how to select surge suppression devices, and a list of recommended pre-programmed TDD/TTY messages.

Other Released Documents

Since the initial release of the document, the NENA PSAP/CPE Technical Committee has continued its task of identifying current and potential future issues that may be in need of recommended standards. Additional documents released by the Committee include:

- NENA PSAP Master Clock Standard #04-002
- NENA Generic Standards for E9-1-1 ISDN PSAP Equipment Utilizing Basic Rate Interface (BRI), #04-003.

Preview of Future Recommended Standards

Currently there are several new or revised documents nearing completion. One of these is a revision to the NENA Generic Standards for E9-1-1 PSAP Equipment (Issue 2).

Highlights of the additions to this document include:

- Year rollover compliance (e.g. Y2K)
- Reliability of IWS/PC components
- Accommodation for 10-digit ANI
- Automatic Call Distributor (ACD) requirements, including recommendations for use of TDD/TTY in an ACD environment
- Provision for special ALI request types (e.g. manual query vs. repeat request)
- Revision of the warranty period to one year

Another document in the release process is the NENA Recommended Generic Standards for E9-1-1 PSAP Intelligent Workstations, #04-004. This contains the same functional sections as the original document (#04-001) except they are tailored to a PC-based, workstation environment.

Conclusion

Compliance with NENA standards helps ensure that 9-1-1 equipment will perform reliably and at a level of functionality recognized within the 9-1-1 community as being acceptable. Compliance also simplifies interfacing with associated or peripheral equipment.

It is important to recognize that NENA documents are recommended standards. This is because NENA, unlike the Telecommunications Industry Association (TIA), is not an officially sanctioned standards body.

To our knowledge, there are currently no laws requiring compliance to a NENA standard—compliance is entirely voluntary. However, an increasing number of Telcos, PSAPs and 9-1-1 boards are finding great advantage in requiring NENA compliance in

their bid specifications. Additionally, in the event of litigation, NENA compliance helps establish the adequacy of the 9-1-1 equipment design.

NENA Recommended Standards are available for download (free) on the NENA web site at www.nena9-1-1.org—each standard is in Adobe PDF format. Just click on “9-1-1 Standards Development on the NENA Home Page. Printed copies of the NENA standards are available for purchase on The NENA Exchange online store or by calling NENA Headquarters at (800) 332-3911.

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