



## Basic Utility Outage Line (BUOL) Service Network Specifications

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If further information is required, please contact:

Director - Transport Systems Engineering  
BellSouth Telecommunications, Inc.  
1884 Data Drive  
Birmingham, Alabama 35244

# BASIC UTILITY OUTAGE LINE (BUOL) SERVICE NETWORK INTERFACE SPECIFICATIONS

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# BASIC UTILITY OUTAGE LINE (BUOL) SERVICE NETWORK INTERFACE SPECIFICATIONS

## 1. GENERAL

- 1.1 This Technical Reference provides complete Network Interface (NI) specifications for Basic Utility Outage Line (BUOL) service. This document is intended to provide information relating to customer interoperation with BUOL service, and particularly, to furnish Customer Premises Equipment (CPE) manufacturers with the information necessary to design equipment for the service.

## 2. SERVICE DESCRIPTION

- 2.1 BUOL service provides automatic reporting of commercial power outage information to the subscribing utility (commercial power) company from multiple individual utility company customer locations. The CPE at each utility customer location continuously monitors commercial power and automatically initiates an outage reporting call to a unique network telephone number via the public switched network. Typically, an additional network telephone number is assigned and automatically called by the CPE as notification to the network that power has been restored to that location. The network collects calling number information from the individual locations and delivers the calling number and report category (based on the associated called number) to the utility company reporting center over a private line (direct access) data link.
- 2.2 This Technical Reference describes the two types of NI's associated with BUOL service. The first type of NI is located at the utility company premises and involves the data link between the BellSouth network and the utility company. The second NI is located at various utility company customers' sites and involves the facility used to report commercial power outages and power restorals from those sites. Both interface types are illustrated by Figure 1.

## A. TYPICAL BUOL SESSION PROCEDURES

- 2.3 Upon loss of commercial power, the CPE located at a utility company customer site automatically dials a predetermined telephone number as an indication to the telephone network that a power outage exists. The network determines the telephone number of the location placing the call, and provides the calling number information to the subscribing utility company via a data link.
- 2.4 Upon restoral of commercial power, the CPE automatically dials a second predetermined number (different from the outage reporting telephone number), as an indication to the network that commercial power has been restored to that location. This service restoral information is then provided via the data link to the subscribing utility company, using the data link protocol.
- 2.5 The data link protocol contains two information fields for each BUOL call from a utility company customer location. These fields provide: (1) the calling number, and (2) the report category. The report category field is used to indicate whether the call is one to report an outage, a restoral, or some other specific report type.

## 3. UTILITY COMPANY DATA LINK SPECIFICATIONS

This section describes the NI specifications for the data link to the utility company.

**A. BUOL SERVICE DATA LINK PHYSICAL LEVEL SPECIFICATIONS**

- 3.1** Utility company access to BUOL service is normally via a data link established over an analog private line channel. This channel provides a nominal 300 – 3000 Hz passband, with impairments limited in accordance with medium speed data communication requirements. Specifications for this channel are found in Bellcore 41004, “Data Communications Using Voiceband Private Line Channels”\*. The primary means of connection to the private line is the eight–pin minimodular jack, identified by the Universal Service Order Code (USOC) JM8. Other data jack types are available upon request. Specifications for the JM8 and other suitable jacks are contained in the Committee T1 – Telecommunications Report No. 5, “A Technical Report on Carrier to Customer Installation Interface Connector Wiring Configuration Catalog”\*.
- 3.2** The BUOL data link utilizes voiceband modems operating at 1200 or 2400 bits per second (bps). For 1200 bps operation, the network and customer modems must conform to the characteristics and protocol of Bell 202T for 4–wire operation, or Bell 212 for 2–wire operation. For 2400 bps operation, the network and customer modems must conform to CCITT V.22bis\* characteristics and protocol. Only full–duplex, asynchronous transmission is supported. For 1200 bps 2–wire private line operation, the network modem operates in the forced originate mode, and the customer modem must operate in the forced answer mode.
- 3.3** The asynchronous data byte structure is a ten–bit character comprised of one start bit, eight data bits (ASCII characters; least bit transmitted first), no parity bits, and one stop bit.
- 3.4** As an alternative to analog private line access, in many areas access to the data link is possible using a four–wire digital private line facility. BellSouth’s digital private line service is SynchroNet® service. Network interface specifications for SynchroNet service is contained in BellSouth TR 73545, “SynchroNet® Service Network Interface Specifications”\*.

**B. BUOL SERVICE DATA LINK PROTOCOL**

- 3.5** The BUOL service data link protocol provides the calling number of each utility company customer location from which a call was received.
- 3.6** The protocol utilized on the BUOL data link consists of one line of ASCII data for each utility company customer reporting a power outage or restoration. The message format of this protocol is:

AAAAAAAAAA SPC BBBB LF CR

Where:

AAAAAAAAAA = The 10–digit calling number (ANI) of the utility company customer  
 SPC = The ASCII Space character [20 Hex]  
 BBBB = The four–digit field uniquely associated with the utility company customer’s called number. The specific four–digit combinations are assigned by BellSouth at service subscription and are used to indicate whether the utility company customer is reporting a power outage, a power restoration or, possibly, some other utility company defined condition (see Section 3.7)  
 LF = The ASCII LF (Line Feed) character [0A Hex]  
 CR = The ASCII CR (Carriage Return) character [0D Hex]

\* See Section 4 for ordering information regarding this document.

- 3.7 The BBBB field in the protocol comprises a four–digit code which is uniquely associated with the utility company customer’s called number. Although typical implementations may involve the provision of two telephone numbers for the service (one for power outage reporting and the other for power restoral reporting), additional telephone numbers could be used for other, or more specific, power company defined conditions. In any case, each telephone number has an associated unique four–digit code in the data link protocol.
- 3.8 Messages on the data link are unidirectional. No response is expected from the utility company equipment.

#### 4. UTILITY COMPANY CUSTOMER NI SPECIFICATIONS

##### A. PHYSICAL SPECIFICATIONS

- 4.1 Power outage reporting service utilizes the switched network. Standard grade message telephone service (POTS) is satisfactory for this service. Direct current and supervisory characteristics are contained in ANSI T1.401–1988, “Interface Between Carriers and Customer Installations – Analog Voicegrade Switched Access Lines Using Loop–start and Ground–start Signaling”\*.
- 4.2 Background noise levels of up to 30 dBnc are acceptable in the BellSouth switched network. CPE used with BUOL service must be able to operate in the presence of these noise levels.
- 4.3 The typical Network Interface data jack for power outage reporting service is the six–pin minimodular jack identified by the USOC RJ11C. Other data jack types are available upon customer request. Specifications regarding the RJ11C and other suitable jacks are contained in the Committee T1 –Telecommunications Report No. 5, “A Technical Report on Carrier to Customer Installation Interface Connector Wiring Configuration Catalog”\*.

##### B. NETWORK CONFIRMATION TONE SPECIFICATIONS

- 4.4 To minimize off–hook CPE time during a power outage, a 350 Hz confirmation tone will be provided across the NI from the network. This tone is transmitted from the network as confirmation that the customer’s call to report the power outage (or power restoral) has been received by the network.
- 4.5 The following are specifications of the confirmation tone:
- (1) Frequency = 350 Hz  $\pm$  5%
  - (2) Duration = 1 sec.  $\pm$  10%
  - (3) Output level of tone at NI = –10 to –30 dBm (into 600 ohm termination)

##### C. CPE REQUIREMENTS

- 4.6 The following are mandatory CPE requirements for BUOL service:
- (a) Upon detection of a power outage, it is required that the CPE originate the call at some random interval within a five minute (or longer) period. This random interval requirement is necessary to protect the network from excessive simultaneous call attempts, in the event of massive power failures. It is recommended that each individual CPE unit have this randomness capability as an inherent feature, not requiring customer selection or setting of a fixed, constant interval. It is not acceptable for any CPE unit to have a fixed, unchangeable interval.

\* See Section 4 for ordering information regarding this document.

- (b) Upon receipt of the network BUOL confirmation tone (described in Section 4.4 – 4.5), the CPE must immediately revert to the on–hook state. The CPE must make no further call attempts relative to the reported condition. CPE must not respond to tone durations of less than 200 milliseconds. CPE must be able to operate with background noise levels of up to 30 dBnc.
- (c) CPE will attempt only one redial after an unsuccessful power outage report attempt. If the redial attempt is also unsuccessful, no further action will be initiated by the CPE across the NI relating to the current power outage. The redial attempt may be initiated at any time subsequent to the first attempt.
- (d) If the CPE has the ability to detect a line busy tone (busy signal), it should immediately disconnect upon its receipt. CPE not capable of detecting line busy tone should disconnect within 30 seconds after the call attempt is initialized.
- (e) Upon restoration of commercial power, the CPE will initiate a call to a specified power restoration reporting telephone number. This telephone number is provided to the customer at the time of service subscription. The specifications, procedures and CPE requirements for power restoration reporting are exactly the same as those for power outage reporting, except for the telephone number called. This includes restricting restoration reporting to a maximum of one redial.

**D. ADDITIONAL CPE CONSIDERATIONS**

- 4.7** The CPE should not initiate a power outage or power restoration call if there is a call in progress on the customer’s facility.
- 4.8** For this service, each subscribing power company determines what constitutes a power outage and power restoration. The power company must ensure that CPE used for the service at their customers’ locations declare outages and restorations consistent with the power company’s outage and restoration criteria.
- 4.9** An example of this outage/restoration criteria might be if the power company defines an outage as being an uninterrupted loss of local power in excess of 360 seconds. After 360 seconds, the CPE would initiate the first power outage report call during the period from 360 seconds to 660 seconds after power outage is initially detected. A five minute interval is the minimum range required by BellSouth. Power restoration criteria for this example might be that after 360 seconds of uninterrupted commercial power after the outage, CPE would initiate the first power restoration report call. This call would be placed during the period from 360 seconds to 660 seconds after a commercial power restoration is first detected. A five minute interval for power restoration reporting is the minimum required by BellSouth.
- 4.10** It is desirable that if commercial power is restored at the customer location before power outage reporting procedures have been completed, then the CPE terminate the outage reporting procedures and revert to the on–hook state.

## 5. REFERENCES

5.1 The following documents are referenced in this Technical Reference:

- (1) Committee T1 – Telecommunications Report No. 5, “A Technical Report on Carrier to Customer Installation Interface Connector Wiring configuration catalog”<sup>1</sup>.
- (2) CCITT Recommendation V.22bis, “2400 Bits Per Second Duplex Modem Using The Frequency Division Technique Standardized For Use On The General Switched Telephone Network And On Point-to-point 2-wire Leased Telephone-type Circuits”<sup>2</sup>.
- (3) ANSI T1.401–1988, “Interface Between Carriers and Customer Installations – Analog Voice-grade Switched Access Lines Using Loop-start and Ground-start Signaling”<sup>3</sup>.
- (4) Bellcore Pub 41004, “Data Communications Using Voiceband Private Line Channels”<sup>4</sup>.
- (5) BellSouth TR 73545, “SynchroNet® Service Network Interface Specifications”<sup>5</sup>.

## FOOTNOTES

1. This document can be ordered from Exchange Carriers Standards Association, 5430 Grosvenor Lane, Bethesda, MD 20814.
2. This document can be ordered from the International Telecommunication Union, General Secretariat, Sales Service, Place des Nation, CH–1211, Geneva 20, Switzerland.
3. This document can be ordered through the American National Standards Institute, Inc., (ANSI), 1430 Broadway, New York, NY, 10018, telephone (212) 642–4900.
4. This document can be ordered through Bell Communications Research (Bellcore), Customer Service, 60 New England Avenue, Piscataway, NJ, 08854–4196. Telephone orders can be placed by calling 1–908–699–5800.
5. This document can be ordered through BellSouth Telecommunications, Inc., Documentation Operations, North N5A1, 3535 Colonnade Parkway, Birmingham, AL, 35243.

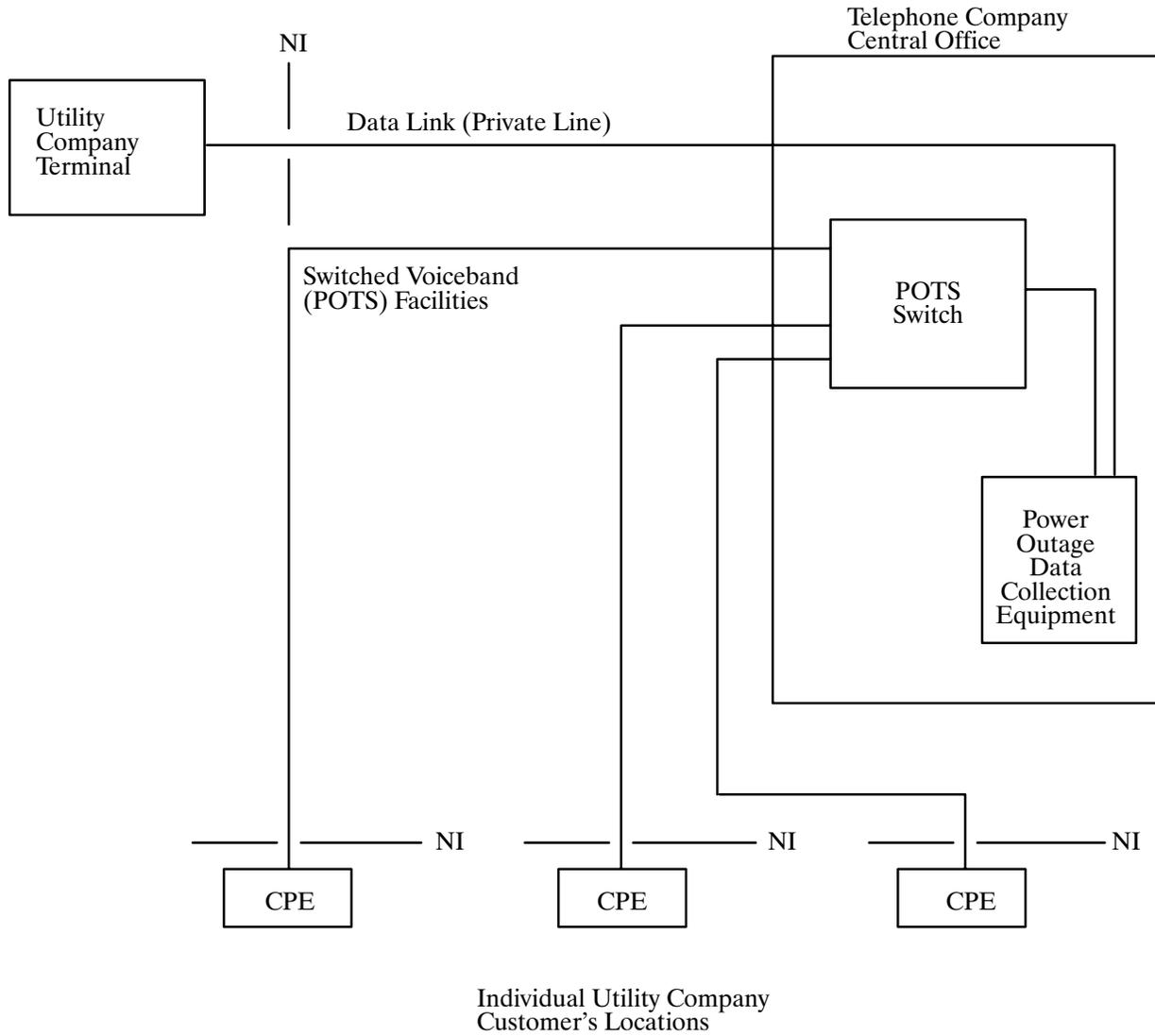


FIGURE 1 – BOUL ARCHITECTURE