ANSI C12.22-2008

American National Standard

Protocol Specification For Interfacing to Data Communication Networks

Secretariat:

National Electrical Manufacturers Association

Approved January 9, 2009

American National Standards Institute, Inc.

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Published by

National Electrical Manufacturers Association
1300 North 17th Street, Rosslyn, VA 22209

Printed in the United States of America

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Foreword (This Foreword is not part of American National Standard C12.22-2008.)

This Standard is another in the series of communications protocols that describe how to transport Tables (defined in ANSI C12.19, "Utility Industry End Device Data Tables"). Because this Standard describes a protocol that operates over networks, it is necessarily more complex than the simple point-to-point protocols defined in ANSI C12.18 and ANSI C12.21, but the committee has done as much as practical to smooth the transition from those earlier standards.

This Standard describes three different but related uses. One is the operation of the protocol over the network that all C12.22 Nodes implement. The second is an optionally exposed point-to-point interface between a C12.22 Device, e.g., a meter, and, a C12.22 Communications Module, e.g., a network adaptor. The third is the capture, translation and transmission of one way device messages (blurts).

This division was chosen to foster interoperability among communications modules and meters. Suggestions for improvement to this Standard are welcome. They should be sent to:

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This Standard was processed and approved for submittal to ANSI by Accredited Standards Committee for Electricity Metering C12. At the time the committee approved this Standard, the C12 Committee had the following members:

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AMERICAN NATIONAL STANDARD **ANSI C12.22-2008**

Protocol Specification For Interfacing To Data Communication Networks

1 Scope

Initially, communications with electronic devices consisted of transporting memory data via proprietary protocols that were unique to each manufacturer. The desire for interoperability and support for multiple manufacturers by reading and programming systems created a need for standardization of data formats and transport protocols.

The first step was to standardize data formats. Internal data was abstracted as a set of Tables. A set of standard Table contents and formats were defined in ANSI C12.19, "Utility Industry End Device Data Tables."

In the "Protocol Specification for ANSI Type 2 Optical Port" (ANSI C12.18) Standard, a point-to-point protocol was developed to transport table data over an optical connection. The ANSI C12.18 protocol included an application language called Protocol Specification for Electric Metering (PSEM) that allowed applications to read and write Tables. The "Protocol Specification for Telephone Modem Communication" (ANSI C12.21) was then developed to allow devices to use PSEM to transport Tables over telephone modems.

This Standard extends on the concepts of the ANSI C12.18, ANSI C12.19 and the ANSI C12.21 standards to allow transport of Table data over any reliable networking communications system. Note that in this use of the word, "reliable" means that for every message sent, the sender receives a response at its option: either a positive acknowledgement or an error message. That is, messages cannot fail silently in a reliable network (see discussion of Reliable Stream Transport Service in [IPPA : 1995]).

In addition, this Standard describes an optionally exposed point-to-point interface between a C12.22 Device and a C12.22 Communications Module designed to attach to "any" network.

Furthermore, this Standard defines a methodology to capture, translate and transmit one way device messages (blurts).

This Standard defines interfaces between ANSI C12.19 Devices and network protocols.

Specific goals identified by the committee in the creation of this Standard were:

1. Defining a Datagram that may convey ANSI C12.19 data Tables through any network

   This was accomplished by:
   - Assuming that the data source is ANSI C12.19 data Tables
   - Defining the Application Layer services (language)

2. Providing a full stack definition for interfacing a C12.22 Device to a C12.22 Communication Module

   This was accomplished by:
   - Defining the physical interface requirements between the C12.22 Device and the C12.22 Communication Module
   - Defining the interface lower layers; 4 (transport), 3 (network), 2 (data link) and 1 (physical)

3. Providing a full stack definition for point-to-point communication to be used over local ports such as optical ports, or modems

   This was accomplished by defining a Layer 4 (transport) and Layer 2 (data link)

4. Providing support for efficient one-way messaging (blurts)

   This was accomplished by:
   - Defining a compact message format that can be easily transformed to a standard ANSI C12.22 Datagram
   - Assuring that all needed layers defined in this Standard can support one-way messaging

5. Providing network architecture compatible with this protocol (Some architectural concepts were derived from [HCCS 1: 1987, HCCS 2: 1987, HCCS 3: 1988, DND : 1993, IPPA : 1995, TCPCE : 1997])

   This was accomplished by:
   - Defining different type of nodes such as C12.22 Relay, C12.22 Master Relay, C12.22 Host, C12.22 Authentication Host, C12.22 Notification Host, and C12.22 Gateway
   - Defining the role and responsibilities of each of these C12.22 Nodes

6. Providing data structure definitions in support of this protocol

   This was accomplished by:
   - Defining an ANSI C12.19 Decade to be used by C12.22 Nodes
   - Defining an ANSI C12.19 Decade to be used by C12.22 Relays
   - Defining new procedures in support of this protocol
   - Defining a new Table for enhanced security

2 References

2.1 Normative

ANSI C12.18-1996	Protocol Specification for ANSI Type 2 Optical Port
ANSI C12.19-1997	Utility Industry End Device Data Tables
ANSI C12.21-1999	Protocol Specification for Telephone Modem Communication
IEEE C37.90.1-2002	IEEE Standard for Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus
IEEE C62.41-2002	IEEE Recommended Practice on Surge Voltages in Low-voltage AC Power Circuits
ISO/IEC 7498-1	Information Technology—Open Systems Interconnection—Basic Reference Model: The Basic Model
ISO/IEC 13239:2002	Information Technology—Telecommunications and Information Exchange between Systems—High-level Data Link Control (HDLC) Procedures—Frame Structure, Annex A, Explanatory Notes On Implementation of the Frame Checking Sequence