MC12.21

User's Guide

For

**Telephone Modem Communication Protocol to Complement
the Utility Industry End Device Data Tables**

October 29, 2013

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Abstract: The technical content of this User's Guide is nearly identical to IEEE Std 1702™-2011 and ANSI C12.21-2006, using IEEE Std 1702-2011 as the baseline for the MC12.21 User's Guide. The protocol provides multi-source and "plug and play" environment for the millions of metering devices in the field now and the future using the telephone MODEM communication interface. It solves the problems associated with single source systems and with multi-source systems based upon proprietary communications protocols. Electric, Water, and Gas Utilities and corresponding vendors can realize cost savings that ultimately shall benefit the client consumers of the Utilities.

Keywords: IEEE Std 1702, ANSI C12.21, MC12.21, MODEM, PSEM

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Introduction

This introduction is not part of the MC12.21 User's Guide. For consistency with IEEE Std 1702 and ANSI C12.21 the word "standard" was retained throughout this User's Guide in reference to this document. Also in reference to MC12.18, MC12.19, MC12.21 and MC12.22, the term "standard" means "User's Guide".

The ANSI C12.21 and IEEE Std 1702 standard and the MC12.21 User's Guide provide an open-platform communications protocol for two-way communication with a metering device via a telephone modem. The protocol is written to conform to the OSI seven-layer stack. Long-time readers of ANSI C12.21-1999, ANSI C12.19-2006 and IEEE Std 1702-2011 will discover editing changes that were incorporated in this document. These changes cover cumulatively all known corrections that were applied to any of ANSI C12.21-1999, ANSI C12.19-2006 and IEEE Std 1702-2011 publications by their respective working groups. The Working Groups chose to improve the clarity of the text as an aid to the reader while retaining the normative elements in the manner of previous publications.

The 2006 version to the ANSI publication of ANSI C12.21, the 2011 version of the IEEE publication of IEEE Std 1702 and the release of this version of the MC12.21 User's Guide should be considered in the context of the so-called "protocol suite" of standards:

 a. ANSI C12.18 / MC12.18 / IEEE Std 1701™,

 b. ANSI C12.19 / MC12.19 / IEEE Std 1377™,

 c. ANSI C12.21 / MC12.21 / IEEE Std 1702™,

 d. ANSI C12.22 / MC12.22 / IEEE Std 1703™, and

 e. Draft ANSI C12.23 / Draft MC12.23 / IEEE P1705™.

The ANSI and IEEE published changes were included only after assuring that existing devices implementing ANSI C12.21-1999, ANSI C12.21-2006 and IEEE Std 1702-2011 continue to remain compatible with this version of the document.

This document corrects an error in the original ANSI C12.21-1999 standard such as the impossibility of using index-count access methods for table access. It also corrects errors in the description of the parameters of the <identification> service found in ANSI C12.21-2006 and IEEE Std 1702-2011. Other concepts addressed include compliance, backward and forward compatibility, the use of reserved fields, the Identification Service, packet size and the toggle bit. It maintains alignment with the equivalent services found in ANSI C12.22-2012 / IEEE Std 1703-2012 / MC12.22-2013 to meet the goal of producing a coherent suite of protocol standards.

It is recommended that Annex D - Modifications and Extensions to C12.19- 1997 should only be used in legacy applications that conform to ANSI C12.21-1999. The corresponding data types and tables found in Section 9.10, "Decade 9: Telephone Control Tables", of ANSI C12.19-2012, IEEE Std 1377-2012 or MC12.19-2013 or later should be used instead.

Note that the "I" command described in Annex H - I Command Operational Description, has been deprecated and should not be implemented in protocols that conform to MC12.21-2013.

Also note that it is expected that the Logoff Service is now a required service and it should be used to properly conclude a session. Implementers are strongly encouraged to support this service and to conform to this change.

Also note that document describes an optionally exposed point-to-point interface between a C12.21 Device and a C12.21 Client. The terms "C12.21 XXXX" (e.g., C12.21 Device) were introduced by ANSI C12.21-1999. These terms can be interchangeably replaced with the terms "IEEE 1702 XXXX" or "MC12.21 XXXX"; i.e., the IEEE 1702 Device is the same as the ANSI C12.21 Device and MC12.21 Device. However, since these documents

were jointly developed under the auspice of ANSI C12 SC17 WG4, the document terminology is based on C12.21 terms. Therefore references to ANSI or IEEE devices or standards are equivalent to references to the corresponding MC12.xx devices or User's Guides.

Otherwise, this document is identical to the published ANSI C12.21-2006 / IEEE Std 1702-2011 Standards.

Notice to users

The body of this User's Guide was developed jointly with ANSI C12.21 and IEEE Std 1702. The joint agreement calls for the standards and regulatory organizations IEEE, ANSI and MC to maintain the body of this standard in step as they publish versions and revisions of the standard. A number of editorial corrections were made in the preparation of the MC12.21 User's Guide after the publication of ANSI C12.21-2006 and IEEE Std 1702-2011. These corrections were incorporated into this User's Guide and highlighted in the body of the document to indicate that the text was corrected. The detailed list of corrections is also shown in Annex J - Listing of Editorial Corrections to ANSI C12.21-2006 and IEEE Std 1702-2011.

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Errata

Errata, if any, for this User's Guide can be accessed at the following URL: http://www.ecmx.org. Users are encouraged to check this URL for errata periodically.

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At the time this User's Guide was completed, the Measurement Canada Task Force on Data Communications Protocol for Electronic Metering Devices had the following membership:

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User's Guide for Telephone Modem Communication Protocol to Complement the Utility Industry End Device Data Tables

Protocol Specification for Telephone Modem Communication

1 Overview

1.1 Scope

This User's Guide details the criteria required for communications between a C12.21 Device and a C12.21 Client via a modem connected to the switched telephone network. The C12.21 Client could be a laptop or portable computer, a master station system or some other electronic communications device.

This User's Guide does not specify the implementation requirements of the telephone switched network to the modem, nor does it include definitions for the establishment of the communication channel.

This document provides details for an implementation of the OSI 7-layer model in accordance with ISO/IEC 7498-1.

The protocol specified in this Standard was designed to transport data in Table format. For legacy devices that conform to ANSI C12.19-1997 and IEEE Std 1377-1998, the Table definitions are can be found in Annex D - Modifications and Extensions to C12.19- 1997 of this document. Otherwise the Table definitions and data types can be found in most current versions of MC1219, IEEE Std 1377 and ANSI C12.19.

1.2 Purpose

The Utility Industry has need for a standard that provides an operable "plug and play" environment for field metering devices. The purpose of this standard is to define the means to transport the Utility Industry End Device Data Tables via a telephone modem such that multi-source environment and End Device interchangeability is possible.