

INTERNATIONAL
STANDARD

ISO/IEC/
IEEE
8802-1AS

First edition
2014-02-15

**Information technology —
Telecommunications and information
exchange between systems — Local and
metropolitan area networks —**

Part 1AS:

**Timing and synchronization for time-
sensitive applications in bridged local
area networks**

*Technologies de l'information — Télécommunications et échange
d'information entre systèmes — Réseaux locaux et métropolitains —
Partie 1AS: Temporisation et synchronisation pour les applications
sensibles au temps des réseaux locaux pontés*



Reference number
ISO/IEC/IEEE 8802-1AS:2014(E)



© IEEE 2011

iTeh STANDARD PREVIEW (standards.iteh.ai)

[ISO/IEC/IEEE 8802-1AS:2014](https://standards.iteh.ai/catalog/standards/sist/93b93fb8-07a5-4a7a-ac24-19f2ddac850a/iso-iec-ieee-8802-1as-2014)

<https://standards.iteh.ai/catalog/standards/sist/93b93fb8-07a5-4a7a-ac24-19f2ddac850a/iso-iec-ieee-8802-1as-2014>

© IEEE 2011

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without permission in writing from ISO, IEC or IEEE at the respective address below.

ISO copyright office
Case postale 56
CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland
E-mail inmail@iec.ch
Web www.iec.ch

Institute of Electrical and Electronics Engineers, Inc.
3 Park Avenue, New York
NY 10016-5997, USA
E-mail stds.ipr@ieee.org
Web www.ieee.org

Published in Switzerland

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

IEEE Standards documents are developed within the IEEE Societies and the Standards Coordinating Committees of the IEEE Standards Association (IEEE-SA) Standards Board. The IEEE develops its standards through a consensus development process, approved by the American National Standards Institute, which brings together volunteers representing varied viewpoints and interests to achieve the final product. Volunteers are not necessarily members of the Institute and serve without compensation. While the IEEE administers the process and establishes rules to promote fairness in the consensus development process, the IEEE does not independently evaluate, test, or verify the accuracy of any of the information contained in its standards.

The main task of ISO/IEC JTC 1 is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is called to the possibility that implementation of this standard may require the use of subject matter covered by patent rights. By publication of this standard, no position is taken with respect to the existence or validity of any patent rights in connection therewith. ISO/IEEE is not responsible for identifying essential patents or patent claims for which a license may be required, for conducting inquiries into the legal validity or scope of patents or patent claims or determining whether any licensing terms or conditions provided in connection with submission of a Letter of Assurance or a Patent Statement and Licensing Declaration Form, if any, or in any licensing agreements are reasonable or non-discriminatory. Users of this standard are expressly advised that determination of the validity of any patent rights, and the risk of infringement of such rights, is entirely their own responsibility. Further information may be obtained from ISO or the IEEE Standards Association.

ISO/IEC/IEEE 8802-1AS was prepared by the LAN/MAN Standards Committee of the IEEE Computer Society (as IEEE Std 802.1AS-2011). It was adopted by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 6, *Telecommunications and information exchange between systems*, in parallel with its approval by the ISO/IEC national bodies, under the “fast-track procedure” defined in the Partner Standards Development Organization cooperation agreement between ISO and IEEE. IEEE is responsible for the maintenance of this document with participation and input from ISO/IEC national bodies.

ISO/IEC/IEEE 8802 consists of the following parts, under the general title *Information technology — Telecommunications and information exchange between systems — Local and metropolitan area networks*:

- *Part 11: Wireless LAN medium access control (MAC) and physical layer (PHY) specifications*
- *Part 1X: Port-based network access control*
- *Part 1AB: Station and media access control connectivity discovery*
- *Part 1AE: Media access control (MAC) security*
- *Part 1AR: Secure device identity*
- *Part 1AS: Timing and synchronization for time-sensitive applications in bridged local area networks*

- *Part 15-4: Wireless medium access control (MAC) and physical layer (PHY) specifications for low-rate wireless personal area networks (WPANs)*

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[ISO/IEC/IEEE 8802-1AS:2014](https://standards.iteh.ai/catalog/standards/sist/93b93fb8-07a5-4a7a-ac24-19f2ddac850a/iso-iec-ieee-8802-1as-2014)
<https://standards.iteh.ai/catalog/standards/sist/93b93fb8-07a5-4a7a-ac24-19f2ddac850a/iso-iec-ieee-8802-1as-2014>

IEEE Std 802.1AS™-2011

IEEE Standard for
Local and metropolitan area networks—
Timing and Synchronization for
Time-Sensitive Applications in
Bridged Local Area Networks
iTeh STANDARD PREVIEW
(standards.iteh.ai)

[ISO/IEC/IEEE 8802-1AS:2014](https://standards.iteh.ai/catalog/standards/sist/93b93fb8-07a5-4a7a-ac24-19f2ddac850a/iso-iec-ieee-8802-1as-2014)

Sponsor <https://standards.iteh.ai/catalog/standards/sist/93b93fb8-07a5-4a7a-ac24-19f2ddac850a/iso-iec-ieee-8802-1as-2014>

LAN/MAN Standards Committee

of the

IEEE Computer Society

Approved 10 February 2011

IEEE SA-Standards Board

Abstract: This standard defines a protocol and procedures for the transport of timing over bridged and virtual bridged local area networks. It includes the transport of synchronized time, the selection of the timing source (i.e., best master), and the indication of the occurrence and magnitude of timing impairments (i.e., phase and frequency discontinuities).

Keywords: best master, frequency offset, grandmaster, IEEE 802.1AS, phase offset, synchronization, syntonization, time-aware system

iTeh STANDARD PREVIEW (standards.iteh.ai)

[ISO/IEC/IEEE 8802-1AS:2014](https://standards.iteh.ai/catalog/standards/sist/93b93fb8-07a5-4a7a-ac24-19f2ddac850a/iso-iec-ieee-8802-1as-2014)

<https://standards.iteh.ai/catalog/standards/sist/93b93fb8-07a5-4a7a-ac24-19f2ddac850a/iso-iec-ieee-8802-1as-2014>

The Institute of Electrical and Electronics Engineers, Inc.
3 Park Avenue, New York, NY 10016-5997, USA

Copyright © 2011 by the Institute of Electrical and Electronics Engineers, Inc.
All rights reserved. Published 30 March 2011. Printed in the United States of America.

IEEE, 802, and POSIX are registered trademarks in the U.S. Patent & Trademark Office, owned by the Institute of Electrical and Electronics Engineers, Incorporated.

MoCA is a registered trademark of the Multimedia over Coax Alliance.

PDF: ISBN 978-0-7381-6536-3 STD97070
Print: ISBN 978-0-7381-6537-0 STDPD97070

IEEE prohibits discrimination, harassment and bullying. For more information, visit <http://www.ieee.org/web/aboutus/whatis/policies/p9-26.html>. No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, without the prior written permission of the publisher.

IEEE Standards documents are developed within the IEEE Societies and the Standards Coordinating Committees of the IEEE Standards Association (IEEE-SA) Standards Board. The IEEE develops its standards through a consensus development process, approved by the American National Standards Institute, which brings together volunteers representing varied viewpoints and interests to achieve the final product. Volunteers are not necessarily members of the Institute and serve without compensation. While the IEEE administers the process and establishes rules to promote fairness in the consensus development process, the IEEE does not independently evaluate, test, or verify the accuracy of any of the information or the soundness of any judgments contained in its standards.

Use of an IEEE Standard is wholly voluntary. The IEEE disclaims liability for any personal injury, property or other damage, of any nature whatsoever, whether special, indirect, consequential, or compensatory, directly or indirectly resulting from the publication, use of, or reliance upon this, or any other IEEE Standard document.

The IEEE does not warrant or represent the accuracy or content of the material contained herein, and expressly disclaims any express or implied warranty, including any implied warranty of merchantability or fitness for a specific purpose, or that the use of the material contained herein is free from patent infringement. IEEE Standards documents are supplied “AS IS.”

The existence of an IEEE Standard does not imply that there are no other ways to produce, test, measure, purchase, market, or provide other goods and services related to the scope of the IEEE Standard. Furthermore, the viewpoint expressed at the time a standard is approved and issued is subject to change brought about through developments in the state of the art and comments received from users of the standard. Every IEEE Standard is subjected to review at least every five years for revision or reaffirmation, or every ten years for stabilization. When a document is more than five years old and has not been reaffirmed, or more than ten years old and has not been stabilized, it is reasonable to conclude that its contents, although still of some value, do not wholly reflect the present state of the art. Users are cautioned to check to determine that they have the latest edition of any IEEE Standard.

In publishing and making this document available, the IEEE is not suggesting or rendering professional or other services for, or on behalf of, any person or entity. Nor is the IEEE undertaking to perform any duty owed by any other person or entity to another. Any person utilizing this, and any other IEEE Standards document, should rely upon his or her independent judgment in the exercise of reasonable care in any given circumstances or, as appropriate, seek the advice of a competent professional in determining the appropriateness of a given IEEE standard.

Interpretations: Occasionally questions may arise regarding the meaning of portions of standards as they relate to specific applications. When the need for interpretations is brought to the attention of IEEE, the Institute will initiate action to prepare appropriate responses. Since IEEE Standards represent a consensus of concerned interests, it is important to ensure that any interpretation has also received the concurrence of a balance of interests. For this reason, IEEE and the members of its societies and Standards Coordinating Committees are not able to provide an instant response to interpretation requests except in those cases where the matter has previously received formal consideration. A statement, written or oral, that is not processed in accordance with the IEEE-SA Standards Board Operations Manual shall not be considered the official position of IEEE or any of its committees and shall not be considered to be, nor be relied upon as, a formal interpretation of the IEEE. At lectures, symposia, seminars, or educational courses, an individual presenting information on IEEE standards shall make it clear that his or her views should be considered the personal views of that individual rather than the formal position, explanation, or interpretation of the IEEE.

Comments for revision of IEEE Standards are welcome from any interested party, regardless of membership affiliation with IEEE. Suggestions for changes in documents should be in the form of a proposed change of text, together with appropriate supporting comments. Recommendations to change the status of a stabilized standard should include a rationale as to why a revision or withdrawal is required. Comments and recommendations on standards, and requests for interpretations should be addressed to:

Secretary, IEEE-SA Standards Board
445 Hoes Lane
Piscataway, NJ 08854
USA

Authorization to photocopy portions of any individual standard for internal or personal use is granted by The Institute of Electrical and Electronics Engineers, Inc., provided that the appropriate fee is paid to Copyright Clearance Center. To arrange for payment of licensing fee, please contact Copyright Clearance Center, Customer Service, 222 Rosewood Drive, Danvers, MA 01923 USA; +1 978 750 8400. Permission to photocopy portions of any individual standard for educational classroom use can also be obtained through the Copyright Clearance Center.

Introduction

This introduction is not part of IEEE Std 802.1AS-2011, IEEE Standard for Local and metropolitan area networks—Timing and Synchronization for Time-Sensitive Applications in Bridged Local Area Networks.

This standard specifies the protocol and procedures used to ensure that the synchronization requirements are met for time-sensitive applications, such as audio and video, across bridged and virtual bridged local area networks consisting of LAN media where the transmission delays are fixed and symmetrical; for example, IEEE 802.3™ full-duplex links. This includes the maintenance of synchronized time during normal operation and following addition, removal, or failure of network components and network reconfiguration. It specifies the use of IEEE 1588™ specifications where applicable in the context of IEEE Std 802.1D™-2004 and IEEE Std 802.1Q™-2005.^a Synchronization to an externally provided timing signal (e.g., a recognized timing standard such as UTC or TAI) is not part of this standard but is not precluded.

This is the first edition of IEEE Std 802.1AS.

This standard contains state-of-the-art material. The area covered by this standard is undergoing evolution. Revisions are anticipated within the next few years to clarify existing material, to correct possible errors, and to incorporate new related material. Information on the current state of this and other IEEE 802® standards may be obtained from:


 Secretary, IEEE-SA Standards Board
 445 Hoes Lane (standards.iteh.ai)
 Piscataway, NJ 08854
 USA <https://standards.iteh.ai/catalog/standards/sist/93b93fb8-07a5-4a7a-ac24-19f2ddac850a/iso-iec-ieee-8802-1as-2014>
[ISO/IEC/IEEE 8802-1AS:2014](https://standards.iteh.ai/catalog/standards/sist/93b93fb8-07a5-4a7a-ac24-19f2ddac850a/iso-iec-ieee-8802-1as-2014)

Notice to users

Laws and regulations

Users of these documents should consult all applicable laws and regulations. Compliance with the provisions of this standard does not imply compliance to any applicable regulatory requirements. Implementers of the standard are responsible for observing or referring to the applicable regulatory requirements. IEEE does not, by the publication of its standards, intend to urge action that is not in compliance with applicable laws, and these documents may not be construed as doing so.

Copyrights

This document is copyrighted by the IEEE. It is made available for a wide variety of both public and private uses. These include both use, by reference, in laws and regulations, and use in private self-regulation, standardization, and the promotion of engineering practices and methods. By making this document available for use and adoption by public authorities and private users, the IEEE does not waive any rights in copyright to this document.

^aInformation on references can be found in Clause 2.

Updating of IEEE documents

Users of IEEE standards should be aware that these documents may be superseded at any time by the issuance of new editions or may be amended from time to time through the issuance of amendments, corrigenda, or errata. An official IEEE document at any point in time consists of the current edition of the document together with any amendments, corrigenda, or errata then in effect. In order to determine whether a given document is the current edition and whether it has been amended through the issuance of amendments, corrigenda, or errata, visit the IEEE Standards Association website at <http://ieeexplore.ieee.org/xpl/standards.jsp>, or contact the IEEE at the address listed previously.

For more information about the IEEE Standards Association or the IEEE standards development process, visit the IEEE-SA website at <http://standards.ieee.org>.

Errata

Errata, if any, for this and all other standards can be accessed at the following URL: <http://standards.ieee.org/reading/ieee/updates/errata/index.html>. Users are encouraged to check this URL for errata periodically.

Interpretations

Current interpretations can be accessed at the following URL: <http://standards.ieee.org/reading/ieee/interp/index.html>.

Patents

Attention is called to the possibility that implementation of this standard may require use of subject matter covered by patent rights. By publication of this standard, no position is taken with respect to the existence or validity of any patent rights in connection therewith. A patent holder or patent applicant has filed a statement of assurance that it will grant licenses under these rights without compensation or under reasonable rates, with reasonable terms and conditions that are demonstrably free of any unfair discrimination to applicants desiring to obtain such licenses. Other Essential Patent Claims may exist for which a statement of assurance has not been received. The IEEE is not responsible for identifying Essential Patent Claims for which a license may be required, for conducting inquiries into the legal validity or scope of Patents Claims, or determining whether any licensing terms or conditions provided in connection with submission of a Letter of Assurance, if any, or in any licensing agreements are reasonable or non-discriminatory. Users of this standard are expressly advised that determination of the validity of any patent rights, and the risk of infringement of such rights, is entirely their own responsibility. Further information may be obtained from the IEEE Standards Association.

Contents

1.	Overview.....	1
1.1	Scope.....	1
1.2	Purpose.....	2
2.	Normative references.....	3
3.	Definitions.....	5
4.	Acronyms and abbreviations.....	9
5.	Conformance.....	11
5.1	Requirements terminology.....	11
5.2	Protocol Implementation Conformance Statement (PICS).....	11
5.3	Time-aware Bridge and end station requirements.....	11
5.4	MAC-specific timing and synchronization methods for IEEE 802.3 full-duplex links.....	12
5.5	MAC-specific timing and synchronization methods for IEEE Std 802.11-2007.....	12
5.6	MAC-specific timing and synchronization methods for IEEE 802.3 EPON.....	12
5.7	MAC-specific timing and synchronization methods for coordinated shared network (CSN).....	13
6.	Conventions.....	15
6.1	General.....	15
6.2	Service specification method and notation.....	15
6.3	Data types and on-the-wire formats.....	15
7.	Time synchronization model for a bridged local area network.....	19
7.1	General.....	19
7.2	Architecture of a time-aware bridged local area network.....	19
7.3	Time synchronization.....	21
7.4	Time-aware system architecture.....	24
7.5	Differences between gPTP and PTP.....	25
8.	IEEE 802.1AS concepts and terminology.....	27
8.1	gPTP domain.....	27
8.2	Timescale.....	27
8.3	Communication path asymmetry.....	28
8.4	Messages.....	29
8.5	Ports.....	30
8.6	Time-aware system characterization.....	32
9.	Application interfaces.....	37
9.1	Overview of the interfaces.....	37
9.2	ClockSourceTime interface.....	38
9.3	ClockTargetEventCapture interface.....	38
9.4	ClockTargetTriggerGenerate interface.....	39
9.5	ClockTargetClockGenerator interface.....	40
9.6	ClockTargetPhaseDiscontinuity interface.....	41

10.	Media-independent layer specification	43
	10.1 Overview	43
	10.2 Time-synchronization state machines	44
	10.3 Best master clock selection and announce interval setting state machines	67
	10.4 Message attributes	85
	10.5 Message formats	87
	10.6 Protocol timing characterization	95
11.	Media-dependent layer specification for full-duplex, point-to-point links	99
	11.1 Overview	99
	11.2 State machines for MD entity specific to full-duplex, point-to-point links	105
	11.3 Message attributes	122
	11.4 Message formats	124
	11.5 Protocol timing characterization	131
12.	Media-dependent layer specification for IEEE 802.11 links	133
	12.1 Overview	133
	12.2 Messages	135
	12.3 Determination of asCapable	135
	12.4 State machines	136
	12.5 Format of VendorSpecific information element	143
	12.6 Synchronization message interval	144
13.	Media-dependent layer specification for interface to IEEE 802.3 Ethernet passive optical network link	145
	13.1 Overview	145
	13.2 Message attributes	149
	13.3 Message format	149
	13.4 Determination of asCapable	151
	13.5 Layering for IEEE 802.3 EPON links	151
	13.6 Service interface definitions	152
	13.7 MD entity global variables	154
	13.8 State machines	154
	13.9 Message transmission intervals	158
14.	Timing and synchronization management	159
	14.1 General	159
	14.2 Default Parameter Data Set	159
	14.3 Current Parameter Data Set	161
	14.4 Parent Parameter Data Set	164
	14.5 Time Properties Parameter Data Set	165
	14.6 Port Parameter Data Set	166
	14.7 Port Parameter Statistics	170
	14.8 Acceptable Master Table Parameter Data Set	173
15.	Managed object definitions	175
	15.1 Internet Standard Management Framework	175
	15.2 Structure of the MIB	175
	15.3 Security considerations	175
	15.4 Textual conventions defined in this MIB	179
	15.5 IEEE 802.1AS MIB module	179

Annex A (normative) Protocol Implementation Conformance Statement (PICS) proforma	231
A.1 Introduction.....	231
A.2 Abbreviations and special symbols.....	231
A.3 Instructions for completing the PICS proforma.....	232
A.4 PICS proforma for IEEE Std 802.1AS-2011	233
A.5 Major capabilities	235
A.6 Media access control methods	236
A.7 Minimal time-aware system.....	236
A.8 Signalling	237
A.9 Best master clock	238
A.10 Grandmaster-capable system	239
A.11 Media-independent master	240
A.12 Media-dependent, full-duplex, point-to-point link.....	241
A.13 Media-dependent IEEE 802.11 link.....	243
A.14 Media-dependent IEEE 802.3 EPON link	243
A.15 Media-dependent CSN link.....	244
A.16 Media-dependent MoCA link	244
A.17 Media-dependent ITU-T G.hn link	244
Annex B (normative) Performance requirements.....	245
B.1 LocalClock requirements.....	245
B.2 Time-aware system requirements	249
B.3 End-to-end time-synchronization performance	250
B.4 End-to-end jitter and wander performance	250
Annex C (informative) Time-scales and epochs.....	253
C.1 Overview.....	253
C.2 TAI and UTC	253
C.3 NTP and GPS.....	254
C.4 Time-scale conversions.....	255
C.5 Time zones and GMT.....	256
Annex D (normative) State diagram notation.....	257
Annex E (normative) Media-dependent layer specification for CSN Network.....	259
E.1 Overview.....	259
E.2 Coordinated Shared Network characteristics.....	259
E.3 Layering for CSN links.....	260
E.4 Path delay measurement over a CSN backbone	262
E.5 Synchronization messages	265
E.6 Specific CSN requirements.....	268
E.7 Grandmaster capability	269
E.8 CSN clock and node requirements.....	269
Annex F (informative) PTP profile included in this standard	271
F.1 Identification.....	271
F.2 PTP attribute values	271
F.3 PTP options.....	271
F.4 LocalClock and time-aware system performance requirements.....	272
Annex G (informative) Bibliography	273
Annex J (informative) KGG'ku'qh'r ct vck cpvu	276

List of figures

Figure 7-1—Time-aware network example.....	20
Figure 7-2—Time-aware network of Figure 7-1 after an access network link failure	21
Figure 7-3— Example delay measurement	22
Figure 7-4—Time-aware system model	24
Figure 8-1—Propagation asymmetry.....	28
Figure 8-2—Definition of message timestamp point, reference plane, timestamp measurement plane, and latency constants	30
Figure 9-1—Application interfaces	37
Figure 10-1—Model for media-independent layer of time-aware system.....	44
Figure 10-2—Time-synchronization state machines—overview and interrelationships.....	46
Figure 10-3—SiteSyncSync state machine.....	56
Figure 10-4—PortSyncSyncReceive state machine	58
Figure 10-5—ClockMasterSyncSend state machine	60
Figure 10-6—ClockMasterSyncOffset state machine	61
Figure 10-7—ClockMasterSyncReceive state machine	63
Figure 10-8—PortSyncSyncSend state machine	65
Figure 10-9—ClockSlaveSync state machine	67
Figure 10-10—Example master/slave hierarchy of time-aware systems	69
Figure 10-11—Best master clock selection state machines—overview and interrelationships	74
Figure 10-12—PortAnnounceReceive state machine.....	79
Figure 10-13—PortAnnounceInformation state machine.....	80
Figure 10-14—PortRoleSelection state machine.....	83
Figure 10-15—PortAnnounceTransmit state machine	84
Figure 10-16—AnnounceIntervalSetting state machine.....	85
Figure 11-1—Propagation delay measurement using peer delay mechanism.....	100
Figure 11-2—Transport of time-synchronization information.....	102
Figure 11-3—Model for time-aware system with full-duplex, point-to-point links.....	105
Figure 11-4—Detail of MD entity time-synchronization state machines for full-duplex, point-to-point links	106
Figure 11-5—Peer delay mechanism state machines—overview and interrelationships.....	106
Figure 11-6—MDSyncReceiveSM state machine.....	111
Figure 11-7—MDSyncSendSM state machine.....	114
Figure 11-8—MDPdelayReq state machine	118
Figure 11-9—MDPdelayResp state machine	120
Figure 11-10—LinkDelaySyncIntervalSetting state machine	121
Figure 12-1—Timing measurement procedure for IEEE 802.11 links	134
Figure 12-2—Media-dependent and lower entities in stations with IEEE 802.11 links	135
Figure 12-3—Master state machine.....	137
Figure 12-4—Slave state machine	141
Figure 12-5—Format of VendorSpecific information element when Type = 0	143
Figure 13-1—IEEE 802.3 EPON time-synchronization interfaces	148
Figure 13-2—IEEE 802.3 EPON interface model.....	152
Figure 13-3—State machine for IEEE 802.3 EPON requester.....	156
Figure 13-4—State machine for IEEE 802.3 EPON responder.....	157
Figure B.1—Wander generation (TDEV) requirement for LocalClock entity.....	247
Figure B.2—ADEV limit corresponding to wander generation requirement of Figure B.1	248
Figure B.3—PTPDEV limit corresponding to wander generation requirement of Figure B.1	249
Figure B.4—MTIE masks met for maximum endpoint filter bandwidths of Table B.4	251
Figure E.1—Example of CSN backbone in an AVB LAN	260
Figure E.2—Media-dependent and lower entities in CSN nodes	261
Figure E.3—Path types over CSN as IEEE 802.1AS backbone.....	262

Figure E.4—Propagation delay and residence time over a CSN Backbone	262
Figure E.5—CSN node-to-node path delay measurement.....	263
Figure E.6—IEEE 802.1AS Sync Message Propagation over the CSN backbone	265

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[ISO/IEC/IEEE 8802-1AS:2014](https://standards.iteh.ai/catalog/standards/sist/93b93fb8-07a5-4a7a-ac24-19f2ddac850a/iso-iec-ieee-8802-1as-2014)
<https://standards.iteh.ai/catalog/standards/sist/93b93fb8-07a5-4a7a-ac24-19f2ddac850a/iso-iec-ieee-8802-1as-2014>

List of tables

Table 6-1—Primitive data types	15
Table 8-1—Illustration of formation of clockIdentity from EUI-48	31
Table 8-2—Default values for priority1, for the respective media.....	33
Table 8-3—timeSource enumeration.....	36
Table 10-1—Port role definitions	68
Table 10-2—Destination address for Announce and Signaling messages	86
Table 10-3—Ethertype for Announce and Signaling messages	86
Table 10-4—PTP message header	88
Table 10-5—Values for messageType field	88
Table 10-6—Values of flag bits.....	89
Table 10-7—Announce message fields	90
Table 10-8—Path trace TLV	91
Table 10-9—Signaling message fields	92
Table 10-10—Message interval request TLV	93
Table 10-11—Interpretation of special values of linkDelayInterval	94
Table 10-12—Interpretation of special values of timeSyncInterval.....	94
Table 10-14—Definitions of bits of flags field of message interval request TLV	95
Table 10-13—Interpretation of special values of announceInterval.....	95
Table 11-1—Destination address for Sync, Follow_Up, Pdelay_Req, Pdelay_Resp, and Pdelay_Resp_Follow_Up messages	123
Table 11-2—Ethertype for Sync, Follow_Up, Pdelay_Req, Pdelay_Resp, and Pdelay_Resp_Follow_Up messages.....	123
Table 11-4—Values of flag bits.....	125
Table 11-3—Values for messageType field	125
Table 11-6—References for sequenceId value exceptions.....	126
Table 11-7—Value of control field	126
Table 11-5—Value of correction field.....	126
Table 11-8—Sync message fields.....	127
Table 11-9—Follow_Up message fields	127
Table 11-10—Follow_Up information TLV	128
Table 11-11—Pdelay_Req message fields	129
Table 11-12—Pdelay_Resp message fields.....	130
Table 11-13—Pdelay_Resp_Follow_Up message fields	130
Table 12-1—Parameters of MLME-TIMINGMSMT.request.....	139
Table 12-2—Parameters of MLME-TIMINGMSMT.confirm	140
Table 12-3—Parameters of MLME-TIMINGMSMT.indication	143
Table 12-4—Values of the Type field in the VendorSpecific information element.....	144
Table 13-1—TIMESYNC message fields	150
Table 14-1—Default Parameter Data Set Table	162
Table 14-2—Current Parameter Data Set Table.....	163
Table 14-3—Parent Parameter Data Set Table.....	165
Table 14-4—Time Properties Parameter Data Set Table	166
Table 14-5—portRole enumeration	167
Table 14-6—Port Parameter Data Set Table	170
Table 14-7—Port Parameter Statistics Table.....	173
Table 14-8—Acceptable Master Table Parameter Data Set Table.....	174
Table 15-1—IEEE8021-AS MIB structure and object cross reference.....	177
Table B.1—Wander generation TDEV requirement for LocalClock entity.....	246
Table B.2—ADEV limit corresponding to wander generation requirement of Table B.1	247
Table B.3—PTPDEV limit corresponding to wander generation requirement of Table B.1	248