



**IEEE Standard for
Information technology—**

**Telecommunications and information
exchange between systems—**

Local and metropolitan area networks—

Specific requirements

**Part 3: Carrier Sense Multiple Access With
Collision Detection (CSMA/CD) Access
Method and Physical Layer Specifications**

Corrigendum 1

IEEE Computer Society

Sponsored by the
LAN/MAN Standards Committee

IEEE
3 Park Avenue
New York, NY 10016-5997, USA

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IEEE Std 802.3™-2005/Cor 1-2006
(Corrigendum to
IEEE Std 802.3-2005)

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Approved 8 June 2006

IEEE SA-Standards Board

Abstract: This corrigendum clarifies and corrects isolation text including harmonization for both powered and unpowered Medium Dependent Interfaces.

Keywords: DTE Power via the MDI, POE, Power over Ethernet, isolation

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Introduction

This introduction is not part of IEEE Std 802.3-2005/Cor 1-2006, IEEE Standard for Information technology—Telecommunications and information exchange between systems—Local and metropolitan area networks—Specific requirements, Part 3: Carrier Sense Multiple Access With Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications—Corrigendum 1.

IEEE Std 802.3 was first published in 1985. Since the initial publication, many projects have added functionality or provided maintenance updates to the specifications and text included in the standard. Each IEEE 802.3 project/amendment is identified with a suffix (e.g., IEEE Std 802.3an™-2006). A historical listing of projects that have added to or modified IEEE Std 802.3 is included in IEEE Std 802.3-2005.

The Media Access Control (MAC) protocol specified in IEEE Std 802.3 is Carrier Sense Multiple Access With Collision Detection (CSMA/CD). This MAC protocol was included in the experimental Ethernet developed at Xerox Palo Alto Research Center. While the experimental Ethernet had a 2.94 Mb/s data rate, IEEE Std 802.3-1985 specified operation at 10 Mb/s. Since 1985 new media options, new speeds of operation, and new capabilities have been added to IEEE Std 802.3.

Some of the major additions to IEEE Std 802.3 are identified in the marketplace with their project number. This is most common for projects adding higher speeds of operation or new protocols. For example, IEEE Std 802.3u™ added 100 Mb/s operation (also called Fast Ethernet), IEEE Std 802.3x™ specified full duplex operation and a flow control protocol, IEEE Std 802.3z™ added 1000 Mb/s operation (also called Gigabit Ethernet), IEEE Std 802.3ae™ added 10 Gb/s operation (also called 10 Gigabit Ethernet) and IEEE Std 802.3ah™ specified access network Ethernet (also called Ethernet in the First Mile). These major additions are all now included in IEEE Std 802.3-2005 and are not maintained as separate documents.

At the date of publication of IEEE Std 802.3-2005/Cor 1-2006, IEEE Std 802.3 is comprised of the following documents :

IEEE Std 802.3-2005

Section One — Includes Clause 1 through Clause 20 and Annex A through Annex H and Annex 4a. Section One includes the specifications for 10 Mb/s operation and the MAC, frame formats and service interfaces used for all speeds of operation.

Section Two — Includes Clause 21 through Clause 33 and Annex 22A through Annex 33E. Section Two includes management attributes for multiple protocols and speeds of operation as well as specifications for providing power over twisted pair cabling for multiple operational speeds. It also includes general information on 100 Mb/s operation as well as most of the 100 Mb/s physical layer specifications.

Section Three — Includes Clause 34 through Clause 43 and Annex 36A through Annex 43C. Section Three includes general information on 1000 Mb/s operation as well as most of the 1000 Mb/s physical layer specifications. It also includes specification of 802.3 link aggregation.

Section Four — Includes Clause 44 through Clause 54 and Annex 44A through Annex 50A. Section Four includes general information on 10 Gb/s operation as well as most of the 10 Gb/s physical layer specifications.

Section Five — Includes Clause 56 through Clause 67 and Annex 58A through Annex 67A. Section Five includes subscriber access physical layers and sublayers for operation from 512 kb/s to 1000 Mb/s, and defines services and protocol elements that enable the exchange of IEEE Std 802.3 format frames between stations in a subscriber access network.

IEEE Std 802.3-2005/Cor 1-2006

This corrigendum clarifies and corrects isolation text for twisted pair Ethernet physical interfaces, including harmonization for both powered and unpowered Medium Dependent interfaces.

IEEE Std 802.3an-2006

This amendment includes changes to IEEE Std 802.3-2005 and adds Clause 55, Annex 55A, and Annex 55B. This amendment adds a new Physical Layer for 10 Gb/s operation over balanced twisted-pair structured cabling systems.

IEEE Std 802.3 will continue to evolve. New Ethernet capabilities are anticipated to be added within the next few years as amendments to the base standard.

Conformance test methodology

An additional standard, IEEE Std 1802.3™-2001 provides conformance test information for 10BASE-T.

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Robert M. Grow, *Working Group Chair*

David J. Law, *Working Group Vice-Chair, IEEE 802.3au Task Force Chair and Editor*

Wael W. Diab, *Working Group Secretary*

Steven B. Carlson, *Working Group Executive Secretary*

Ali Abaye	Yair Darshan	Sanjay Kasturia
John Abbott	Piers Dawe	Yong Kim
Joe Ablar	Joe DeNicholas	Jonathan King
Luc Adriaennsen	Chris Di Minico	Paul Kish
Puneet Agarwal	Thomas J. Dineen	Henricus Koeman
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Arne Alping	Dan Dove	Paul Kolesar
Michael Altman	John Dring	Derek Koonce
Stephen D. Anderson	Mike Dudek	Subi Krishnamurthy
Lewis Aronson	Joseph E. Dupuis	Aniruddha Kundu
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Chet Babla	Tooraj Esmailian	Hans Lackner
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Howard Baumer	Siavash Fallahi	Daun Langston
Denis Beaudoin	Daniel Feldman	Jeff Lapak
Michaël Beck	Feifei (Felix) Feng	Michael Lerer
Alexei Beliaev	Alan Flatman	Warayot Lertniphonphun
Mike Bennett	Richard Frosch	Tom Lindsay
Ernest E. Bergmann	Yukihiro Fujimoto	Rober Lingle, Jr.
Sudeep Bhoja	Justin Gaither	Martin Lobel
Harmeet Bhugra	Ilango S. Ganga	Dennis Lou
Jean-Michel Bonnamy	Xiao Ming Gao	Jeffrey Lynch
Brad J. Booth	Geoffrey M. Garner	Eric R. Lynskey
Peter Bradshaw	John George	Arthur Marris
Richard Brand	Ali Ghiasi	Thomas Mathey
Ralf-Peter Braun	Sajol Ghoshal	Frank McCarthy
Robert D. Brink	Joel Goergen	Brett McClellan
Kevin Brown	Glenn Golden	Mike McConnell
Matt Brown	Sandeep Gupta	Michael S. McCormack
Phillip Brownlee	Tanmay Gupta	James D. McVey
Brian Brunn	Russ Gyurek	Richard Y. Mei
Robert Brunner	Bernie Hammond	Richard Mellitz
Robert A. Busse	Asif Hazarika	Amir Mezer
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David Chalupsky	Gopal Hegde	Colin Mick
Luke Chang	Tricia Hill	John Monson
Kok-Wui Cheong	Sammy Hindi	Charles Moore
David Chin	Chuck Hudson	Wayne A. Mueller
Jae hun Cho	Walter K. Hurwitz	Shimon Muller
Rahul Chopra	John Jaeger	Hari Naidu
George Claseman	David V. James	Shinji Nishimura
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Edward Cornejo	Cristopher Jolly	Mike Oltmanns
J. Francois Crepin	Chad Jones	Tom Palkert
David Cunningham	William W. Jones	Bill Panos
Dariush Dabiri	Seong-Soon Joo	Glenn Parsons
Kevin Daines	Thomas K. Jørgensen	Martin Patoka
John Dallesasse	Juan Jover	Jan P. Peeters-Weem
John D'Ambrosia	Shinkyoo Kaku	Arkadiy Peker
		Petar Pepeljugoski

William R. Peters
Abhijit Phanse
David Piede
Rick Pimpinella
Timothy R. Plunkett
Petre Popescu
Scott R. Powell
Haoli Qian
Rick Rabinovich
Sailesh K. Rao
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Bill Woodruff
Ariel Yagil
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Bob Zona

The following members of the individual balloting committee voted on this standard. Balloters may have voted for approval, disapproval, or abstention.

Eng Ahmed Abdelhalim
Toru Aihara
Butch Anton
Lee R. Armstrong
Ali Al Awazi
John B. Barnett
John R. Barr
Hugh Barrass
Leslie A. Baxter
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IEEE Standards Program Manager, Document Development

Michael D. Kipness
IEEE Standards Program Manager, Technical Program Development

CONTENTS

1.	Introduction.....	2
	1.3 Normative references.....	2
	1.4 Definitions.....	2
	1.5 Abbreviations.....	2
8.	Medium Attachment Unit and baseband medium specifications, type 10BASE5.....	3
	8.3.2.1 Electrical isolation.....	3
14.	Twisted-pair medium attachment unit (MAU) and baseband medium, type 10BASE-T.....	4
	14.3.1.1 Isolation requirement.....	4
25.	Physical Medium Dependent (PMD) sublayer and baseband medium, type 100BASE-TX.....	5
	25.4.5 Replacement of 8.4.1, “UTP isolation requirements”.....	5
	25.5.4.2 PMD compliance.....	5
33.	Data Terminal Equipment (DTE) Power via Media Dependent Interface (MDI).....	6
	33.4.1 Isolation.....	6
	33.7.3.4 Electrical specifications applicable to the PSE and PD.....	6
40.	Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer and baseband medium, type 1000BASE-T.....	7
	40.6.1.1 Isolation requirement.....	7
	40.12.7PMA Electrical Specifications.....	7

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**Part 3: Carrier Sense Multiple Access With
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Method and Physical Layer Specifications**

Corrigendum 1

[This corrigendum is part of IEEE Std 802.3™-2005]

NOTE—This corrigendum is based on IEEE Std 802.3-2005. This is one of seven approved projects changing text in the base standard, but this corrigendum has minimal overlap with the other projects.

The editing instructions are shown in ***bold italic***. Four editing instructions are used: change, delete, insert, and replace. ***Change*** is used to make small corrections in existing text or tables. The editing instruction specifies the location of the change and describes what is being changed by using ~~striketrough~~ (to remove old material) and underscore (to add new material). ***Delete*** removes existing material. ***Insert*** adds new material without disturbing the existing material. Insertions may require renumbering. If so, renumbering instructions are given in the editing instructions. ***Replace*** is used to make large changes in existing text, subclauses, tables, or figures by removing existing material and replacing it with new material. Editorial notes will not be carried over into future editions because the changes will be incorporated into the base standard.

1. Introduction

1.3 Normative references

Insert the following reference alphabetically into 1.3.

IEC 60950-1:2001, Information technology equipment - Safety - Part 1: General requirements.

1.4 Definitions

Insert the following definitions alphabetically into 1.4. Renumber the definitions as required.

1.4.xxx chassis ground: The electrical node that contains the chassis (see IEEE 100).

1.4.xxx frame ground: *See:* chassis ground.

1.4.xxx network interface device (NID): A device that contains a MDI or a PI.

1.5 Abbreviations

Insert the following alphabetically into 1.5.

NID network interface device

8. Medium Attachment Unit and baseband medium specifications, type 10BASE5

8.3.2.1 Electrical isolation

Insert the following at the end of subclause 8.3.2.1.

CAUTION

The current electrical isolation requirement is a change that was incorporated into IEEE Std 802.3-1996. Older editions of IEEE Std 802.3 had a significantly lower isolation requirement.

14. Twisted-pair medium attachment unit (MAU) and baseband medium, type 10BASE-T

14.3.1.1 Isolation requirement

Change subclause 14.3.1.1 as follows.

A MAU with a MDI that is a PI (see 33.1.3) shall meet the isolation requirements defined in 33.4.1.

~~A MAU with a MDI that is not a PI that encompasses the PI of a PD within its MDI (see 33.1.3) shall provide isolation between all external conductors, including frame ground, and all MDI leads including those not used by 10BASE-T. A MAU that does not encompass the PI of a PD within its MDI shall provide isolation between the DTE Physical Layer circuits including frame ground and all MDI leads including those not used by 10BASE-T.~~

~~This electrical isolation separation~~ shall withstand at least one of the following electrical strength tests.

- a) 1500 V rms at 50 Hz to 60 Hz for 60 s, applied as specified in ~~Section subclause 5.2.2-5.3.2~~ of IEC 60950-1:2001.
- b) 2250 V_{dc} for 60 s, applied as specified in ~~Section subclause 5.2.2-5.3.2~~ of IEC 60950-1:2001.
- c) A sequence of ten 2400 V impulses of alternating polarity, applied at intervals of not less than 1 s. The shape of the impulses shall be 1.2/50 μ s (1.2 μ s virtual front time, 50 μ s virtual time of half value), as defined in IEC ~~60060~~60950-1:2001 Annex N.

There shall be no insulation breakdown, as defined in ~~Section subclause 5.2.2-5.3.2~~ of IEC 60950-1:2001, during the test. The resistance after the test shall be at least 2 M Ω , measured at 500 V dc.

25. Physical Medium Dependent (PMD) sublayer and baseband medium, type 100BASE-TX

Insert the following new subclause 25.4.5. Renumber remaining subclauses as required.

25.4.5 Replacement of 8.4.1, “UTP isolation requirements”

A PMD with a MDI that is a PI (see 33.1.3) shall meet the isolation requirements defined in 33.4.1.

A PMD with a MDI that is not a PI shall provide isolation between frame ground and all MDI leads including those not used by the 100BASE-TX PMD.

This electrical isolation shall withstand at least one of the following electrical strength tests.

- a) 1500 V rms at 50 Hz to 60 Hz for 60 s, applied as specified in subclause 5.2.2 of IEC 60950-1:2001.
- b) 2250 V dc for 60 s, applied as specified in subclause 5.2.2 of IEC 60950-1:2001.
- c) A sequence of ten 2400 V impulses of alternating polarity, applied at intervals of not less than 1 s. The shape of the impulses shall be 1.2/50 μ s (1.2 μ s virtual front time, 50 μ s virtual time of half value), as defined in IEC 60950-1:2001 Annex N.

There shall be no insulation breakdown, as defined in subclause 5.2.2 of IEC 60950-1:2001, during the test. The resistance after the test shall be at least 2 M Ω , measured at 500 V dc.

NOTE—In the case of a PMD with a MDI that is not a PI, these requirements are equivalent to those found in TP-PMD.

25.5.4.2 PMD compliance

Insert the following entry at the end of 25.5.4.2.

Item	Feature	Subclause	Status	Support	Value/Comment
PD7	Isolation requirements	25.4.5	M		

33. Data Terminal Equipment (DTE) Power via Media Dependent Interface (MDI)

33.4.1 Isolation

Change subclause 33.4.1 as follows:

The PSE shall provide electrical isolation between the PI device circuits, including frame ground (if any), and all PI leads.

The PD shall provide electrical isolation between all external conductors, including frame ground (if any), and all PI leads.

This electrical isolation shall be in accordance with the isolation requirements between SELV circuits and telecommunication network connections in subclause 6.2 of IEC 60950-1:2001.

PDs and PSEs shall provide isolation between all accessible external conductors, including frame ground (if any), and all MDI leads including those not used by the PD or PSE. Any equipment that can be connected to a PSE or PD through a non-MDI connector that is not isolated from the MDI leads needs to provide isolation between all accessible external conductors, including frame ground (if any), and the non-MDI connector. Accessible external conductors are specified in subclause 6.2.1 b) of IEC 60950-1:2001.

This electrical isolation shall withstand at least one of the following electrical strength tests:

- a) 1500 V rms ~~steady state~~ at 50 Hz to 60 Hz for ~~60 seconds~~ 60 s, applied as specified in ~~subclause 6subclause 5.2.2~~ of IEC 60950-1:2001.
- b) 2250 V dc for 60 s, applied as specified in subclause 5.2.2 of IEC 60950-1:2001.
- c) An impulse test consisting of a 1500 V, 10/700 μ s waveform, applied 10 times, with a 60 s-second interval between pulses. The shape of the impulses shall be 10/700 μ s (10 μ s virtual front time, 700 μ s virtual time of half value), applied as specified ~~defined~~ in ~~subclause 6.2~~ of IEC 60950-1:2001 Annex N.

There shall be no insulation breakdown, as defined in subclause ~~5.2.2 6.2.2.3~~ of IEC 60950-1:2001, during the test. The resistance after the test shall be at least 2 M Ω , measured at 500 V dc.

Conductive link segments that have ~~differing different~~ isolation and grounding requirements shall have those requirements provided by the port-to-port isolation of network interface devices (NID).

33.7.3.4 Electrical specifications applicable to the PSE and PD

Change item EL1 of subclause 33.7.3.4 as follows:

Item	Feature	Subclause	Value/Comment	Status	Support
EL1	Electrical isolation	33.4.1	<u>Isolation between all accessible external conductors and all MDI leads including those not used by the PD or PSE. Electrical isolation will be in accordance with subclause 6.2 of IEC 60950-1:2001</u>	M	Yes []

40. Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer and baseband medium, type 1000BASE-T

40.6.1.1 Isolation requirement

Change subclause 40.6.1.1 as follows:

A PHY with a MDI that is a PI (see 33.1.3) shall meet the isolation requirements defined in 33.4.1.

A PHY ~~with a MDI that is not a PI that encompasses the PI of a PD within its MDI (see 33.1.3) shall provide isolation between all external conductors, including frame ground (if any), and all MDI leads. A PHY that does not encompass the PI of a PD within its MDI shall provide electrical isolation between the port device circuits, including frame ground (if any) and all MDI leads. This electrical isolation separation shall withstand at least one of the following electrical strength tests:~~

- a) 1500 V rms at 50 Hz to 60 Hz for 60 s, applied as specified in ~~Section subclause 5.2.2-5.3.2~~ of IEC 60950-1:2001.
- b) 2250 V_{dc} for 60 s, applied as specified in ~~Section subclause 5.2.2-5.3.2~~ of IEC 60950-1:2001.
- c) A sequence of ten 2400 V impulses of alternating polarity, applied at intervals of not less than 1 s. The shape of the impulses shall be 1.2/50 μ s (1.2 μ s virtual front time, 50 μ s virtual time ~~or~~ of half value), as defined in IEC ~~60060~~60950-1:2001 Annex N.

There shall be no insulation breakdown, as defined in ~~Section subclause 5.2.2-5.3.2~~ of IEC 60950-1:2001, during the test. The resistance after the test shall be at least 2 M Ω , measured at 500 V_{dc}.

40.12.7 PMA Electrical Specifications

Change item PME16 of subclause 40.12.7 as follows:

Item	Feature	Subclause	Status	Support	Value/Comment
PME16	PHY-provided electrical isolation separation shall withstand at least one of three electrical strength tests	40.6.1.1	M	Yes []	a) 1500 V rms at 50 Hz to 60 Hz for 60 s, applied as specified in Section subclause 5.2.2-5.3.2 of IEC 60950-1:2001. b) 2250 V _{dc} for 60 s, applied as specified in Section subclause 5.2.2-5.3.2 of IEC 60950-1:2001. c) A sequence of ten 2400 V impulses of alternating polarity, applied at intervals of not less than 1 s. The shape of the impulses shall be 1.2/50 ms. (1.2 ms virtual front time, 50 ms virtual time or half value), as defined in IEC 60950-1:2001 Annex N 60060 .