

802.3af™

**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**

**Amendment: Data Terminal Equipment (DTE)
Power via Media Dependent Interface (MDI)**

IEEE Computer Society

Sponsored by the
LAN/MAN Standards Committee



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Approved 12 June 2003
IEEE-SA Standards Board

Abstract: Support for optionally powering a 10BASE-T, 100BASE-TX or 1000BASE-T DTE device via the Power Interface (PI) using physical layers defined in Clauses 14, 25, and 40. The Power Sourcing Equipment (PSE) is located at an endpoint or midspan, separate from and between the MDIs, and provides power to the Powered Device (PD) over the Link Section. The PSE detection protocol distinguishes a compatible PD from non-compatible devices and precludes the application of power and possible damage to non-compatible devices. The PSE monitors the Maintain Power Signature (MPS) and removes power when it is no longer requested or required. Optional management function requirements are specified.

Keywords: 802.3af, Link Section, midspan, MPS, PD, PI, POE, power, Power over Ethernet, PSE

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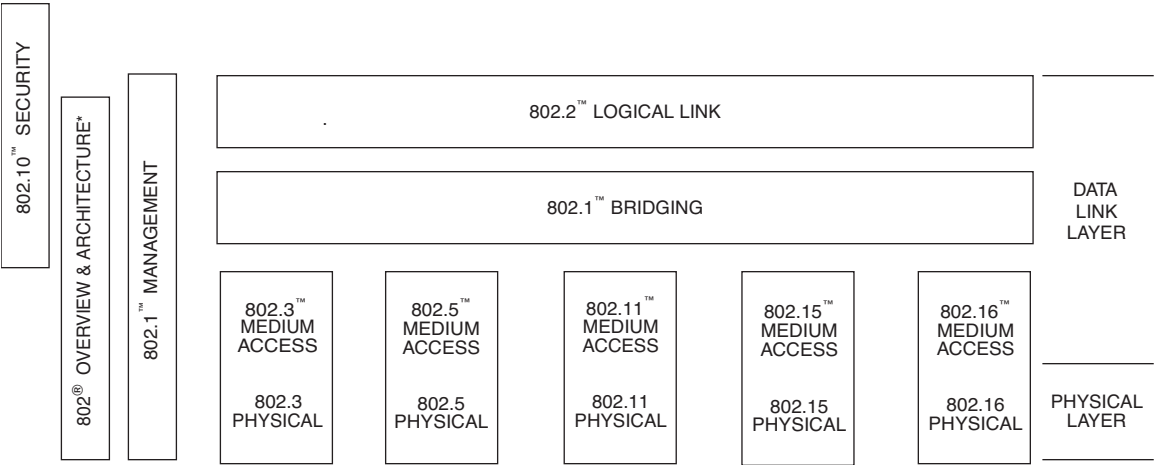
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Introduction to IEEE Std 802.3af-2003

[This introduction is not part of IEEE Std 802.3af-2003, IEEE Standard for Information technology—Telecommunications and information exchange between systems—Local and metropolitan area networks— Specific requirements CSMA/CD Access Method and Physical Layer Specifications Amendment: Data Terminal Equipment (DTE) Power via Media Dependent Interface (MDI)]

This amendment is part of a family of standards for local and metropolitan area networks. The relationship between the standard and other members of the family is shown below. (The numbers in the figure refer to IEEE standard numbers.¹⁾)



This family of standards deals with the Physical and Data Link layers as defined by the International Organization for Standardization (ISO) Open Systems Interconnection (OSI) Basic Reference Model (ISO/IEC 7498-1: 1994). The access standards define five types of medium access technologies and associated physical media, each appropriate for particular applications or system objectives. Some access standards have been withdrawn and other types are under investigation.

The standards defining the technologies noted above are as follows:

- IEEE Std 802² *Overview and Architecture*. This standard provides an overview to the family of IEEE 802 Standards.
- IEEE Std 802.1B™ and 802.1k™ [ISO/IEC 15802-2] *LAN/MAN Management*. Defines an OSI management-compatible architecture, and services and protocol elements for use in a LAN/MAN environment for performing remote management.
- IEEE Std 802.1D™ *Media Access Control (MAC) Bridges*. Specifies an architecture and protocol for the interconnection of IEEE 802 LANs below the MAC service boundary.
- IEEE Std 802.1E™ [ISO/IEC 15802-4] *System Load Protocol*. Specifies a set of services and protocol for those aspects of management concerned with the loading of systems on IEEE 802 LANs.

¹The IEEE standards referred to in the above figure and list are trademarks owned by the Institute of Electrical and Electronics Engineers, Incorporated.

²The IEEE 802 Overview and Architecture Specification, originally known as IEEE Std 802.1A, has been renumbered as IEEE Std 802. This has been done to accommodate recognition of the base standard in a family of standards. References to IEEE Std 802.1A should be considered as references to IEEE Std 802.

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- IEEE Std 802.1F™ *Common Definitions and Procedures for IEEE 802 Management Information.*
- IEEE Std 802.1G™
[ISO/IEC 15802-5] *Remote Media Access Control (MAC) Bridging.* Specifies extensions for the interconnection, using non-LAN communication technologies, of geographically separated IEEE 802 LANs below the level of the logical link control protocol.
- IEEE Std 802.1H™
[ISO/IEC TR 11802-5] *Media Access Control (MAC) Bridging of Ethernet V2.0 in Local Area Networks.*
- IEEE Std 802.2
[ISO/IEC 8802-2] *Logical Link Control.*
- IEEE Std 802.3 *CSMA/CD Access Method and Physical Layer Specifications.*
- IEEE Std 802.5 *Token Ring Access Method and Physical Layer Specifications.*
[ISO/IEC 8802-5]
- IEEE Std 802.10 *Interoperable LAN/MAN Security.*
- IEEE Std 802.11
[ISO/IEC DIS 8802-11] *Wireless LAN Medium Access Control (MAC) and Physical Layer Specifications.*
- IEEE Std 802.15 *Wireless Medium Access Control (MAC) and Physical Layer (PHY) Specifications for: Wireless Personal Area Networks.*
- IEEE Std 802.16 *Standard Air Interface for Fixed Broadband Wireless Access Systems.*

In addition to the family of standards, the following is a recommended practice for a common Physical Layer technology:

- IEEE Std 802.7™ *IEEE Recommended Practice for Broadband Local Area Networks.*

Conformance test methodology

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

IEEE Std 802.3af-2003

This standard contains state-of-the-art material. The area covered by this standard is undergoing evolution. Revisions are anticipated to this standard within the next few years to clarify existing material, to correct possible errors, and to incorporate new related material.

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List of special symbols

For the benefit of those who have received this document by electronic means, what follows is a list of special symbols and operators. All special symbols and operators are taken from the “SYMBOL” font set supported on most Windows, Macintosh, and UNIX systems. If any of these symbols or operators fail to print out correctly on your machine, the editors apologize, and hope that this table will at least help you to sort out the meaning of the resulting funny-shaped blobs and strokes.

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Special symbols and operators

Printed Character	Meaning	Frame V character code	Font
*	Boolean AND	ALT-042	Symbol
+	Boolean OR, Arithmetic addition	ALT-043	Symbol
^	Boolean XOR	^	Times
!	Boolean NOT	ALT-033	Symbol
<	Less than	ALT-060	Symbol
≤	Less than or equal to	ALT-0163	Symbol
=	Equal to	ALT-061	Symbol
≠	Not equal to	ALT-0185	Symbol
≥	Greater than or equal to	ALT-0179	Symbol
>	Greater than	ALT-062	Symbol
←	Assignment operator	ALT-0220	Symbol
∈	Indicates membership	ALT-0206	Symbol
∉	Indicates nonmembership	ALT-0207	Symbol
±	Plus or minus (a tolerance)	ALT-0177	Symbol
°	Degrees (as in degrees Celsius)	ALT-0176	Symbol
∑	Summation	ALT-0229	Symbol
—	Big dash (Em dash)	Ctrl-q Shft-q	Times
-	Little dash (En dash)	Ctrl-q Shft-p	Times
†	Dagger	ALT-0134	Times
‡	Double dagger	ALT-0135	Times

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Amendment: Data Terminal Equipment (DTE) Power via Media Dependent Interface (MDI)

[These changes are part of IEEE Std 802.3-2002.]

EDITORIAL NOTE—This amendment is based on the current edition of IEEE Std 802.3-2002 plus changes incorporated by IEEE Std 802.3ae-2002. The editing instructions define how to merge the material contained here into this base document set to form the new comprehensive standard as created by the addition of IEEE Std 802.3ae-2002.

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 either by using ~~striketrough~~ (to remove old material) or 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 instruction. Editorial notes will not be carried over into future editions. ***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

1.4 Definitions

Replace 1.4.170 with the following:

1.4.170 Medium Dependent Interface (MDI): The mechanical and electrical or optical interface between the transmission medium and the MAU (e.g., 10BASE-T) or the PHY (e.g., 1000BASE-T) and also between the transmission medium and any associated (optional per IEEE 802.3 Clause 33) Powered Device (PD) or Endpoint Power Sourcing Equipment (PSE).

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

1.4.x Endpoint PSE: Power Sourcing Equipment (PSE) that is located at an endpoint.

1.4.x Link Section: The portion of the link from the PSE to the PD.

1.4.x Midspan: An entity located within a link segment that is distinctly separate from and between the Medium Dependent Interfaces (MDIs).

1.4.x Midspan PSE: Power Sourcing Equipment (PSE) that is located in the Midspan.

1.4.x PSE Group: A PSE or a collection of PSEs that can be related to the logical arrangement for management within an encompassing system.

1.4.x Power Interface (PI): The mechanical and electrical interface between the Power Sourcing Equipment (PSE) or Powered Device (PD) and the transmission medium. In an Endpoint PSE and in a PD the Power Interface is the MDI.

1.4.x Twisted Pair Medium Dependent Interface (TP MDI): The mechanical and electrical interface between the transmission medium and the Medium Attachment Unit (MAU) or PHY, e.g., (10BASE-T, 100BASE-TX, or 1000BASE-T).

1.4.x Power Sourcing Equipment (PSE): A DTE or midspan device that provides the power to a single link section. DTE powering is intended to provide a single 10BASE-T, 100BASE-TX, or 1000BASE-T device with a unified interface for both the data it requires and the power to process these data.

1.4.x Powered Device (PD): A device that is either drawing power or requesting power from a PSE.

1.5 Abbreviations

Insert the following items alphabetically in 1.5.

MPS	Maintain Power Signature
PD	Powered Device
PI	Power Interface
PSE	Power Sourcing Equipment
SELV	Safety Extra Low Voltage

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

14.3.1.1 Isolation requirement

Change the first paragraph of this subclause as follows:

A MAU 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~~the MAU~~ 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 separation shall withstand at least one of the following electrical strength tests.

14.10.4.5.11 Isolation requirements

Replace item 1 of the table in this subclause with the following:

1a	Isolation, MDI leads to DTE Physical Layer circuits	14.3.1.1	C		Any of the three tests listed in 14.3.1.1. Function provided by MAUs that do not encompass the PI of a PD within their MDI.
1b	Isolation, MDI leads to all external conductors	14.3.1.1	C		Any of the three tests listed in 14.3.1.1. Function provided by MAUs that encompass the PI of a PD within their MDI.

22. Reconciliation Sublayer (RS) and Media Independent Interface (MII)

22.2.4 Management functions

Change the third paragraph of this subclause as follows:

The MII basic register set consists of two registers referred to as the Control register (Register 0) and the Status register (Register 1). All PHYs that provide an MII shall incorporate the basic register set. All PHYs that provide a GMII shall incorporate an extended basic register set consisting of the Control register (Register 0), Status register (Register 1), and Extended Status register (Register 15). The status and control functions defined here are considered basic and fundamental to 100 Mb/s and 1000 Mb/s PHYs. Registers 2 through 14 are part of the extended register set. The format of Registers 4 through 10 are defined for the specific Auto-Negotiation protocol used (Clause 28 or Clause 37). The format of these registers is selected by the bit settings of Registers 1 and 15.

Change Table 22–6 as follows:

Table 22–6—MII management register set

Register address	Register name	Basic/Extended	
		MII	GMII
0	Control	B	B
1	Status	B	B
2,3	PHY Identifier	E	E
4	Auto-Negotiation Advertisement	E	E
5	Auto-Negotiation Link Partner Base Page Ability	E	E
6	Auto-Negotiation Expansion	E	E
7	Auto-Negotiation Next Page Transmit	E	E
8	Auto-Negotiation Link Partner Received Next Page	E	E
9	MASTER-SLAVE Control Register	E	E
10	MASTER-SLAVE Status Register	E	E
<u>11</u>	<u>PSE Control register</u>	<u>E</u>	<u>E</u>
<u>12</u>	<u>PSE Status register</u>	<u>E</u>	<u>E</u>
~~11,12, through~~ 13, through 14	Reserved	E	E
15	Extended Status	Reserved	B
16 through 31	Vendor Specific	E	E

22.2.4.3 Extended capability registers

Change the first paragraph of this subclause as follows:

In addition to the basic register set defined in 22.2.4.1 and 22.2.4.2, PHYs may provide an extended set of capabilities that may be accessed and controlled via the MII management interface. ~~Eleven~~^{Nine} registers have been defined within the extended address space for the purpose of providing a PHY-specific identifier to layer management, ~~and to provide control and monitoring for the Auto-Negotiation process, and to provide control and monitoring of power sourcing equipment.~~

Add the following two new subclauses after subclause 22.2.4.3.8 and renumber current subclause 22.2.4.3.9 as 22.2.4.3.11.

22.2.4.3.9 PSE Control register (Register 11)

Register 11 provides control bits that are used by a PSE. See 33.6.1.1.

22.2.4.3.10 PSE Status register (Register 12)

Register 12 provides status bits that are supplied by a PSE. See 33.6.1.2.

30. 10 Mb/s, 100 Mb/s, 1000 Mb/s and 10 Gb/s Management

30.1 Overview

Change the first paragraph of this subclause as follows:

This clause provides the Layer Management specification for DTEs, repeaters, ~~and MAUs, and Midspans~~ based on the CSMA/CD access method. The clause is produced from the ISO framework additions to Clause 5, Layer Management; Clause 19, Repeater Management; and Clause 20, MAU Management. It incorporates additions to the objects, attributes, and behaviors to support 100 Mb/s, 1000 Mb/s and 10 Gb/s, full duplex operation, MAC Control, ~~and Link Aggregation and DTE Power via MDI.~~

30.1.1 Scope

Change the first paragraph of this subclause as follows:

This clause includes selections from Clauses 5, 19, and 20. It is intended to be an entirely equivalent specification for the management of 10 Mb/s DTEs, 10 Mb/s baseband repeater units, and 10 Mb/s integrated MAUs. It also includes the additions for management of MAC Control, DTEs and repeaters at speeds greater than 10 Mb/s, embedded MAUs, ~~and PHYs and DTE Power via MDI.~~ Implementations of management for DTEs, repeater units, and embedded MAUs should follow the requirements of this clause (e.g., a 10 Mb/s implementation should incorporate the attributes to indicate that it is not capable of 100 or 1000 Mb/s operation; half duplex DTE should incorporate the attributes to indicate that it is not capable of full duplex operation, etc.).

30.1.2 Relationship to objects in IEEE 802.1F

Change the second paragraph of this subclause as follows:

oResourceTypeID

This object class is mandatory and shall be implemented as defined in IEEE 802.1F. This object is bound to oMAC-Entity, oRepeater, ~~oMidSpan~~ and oMAU as defined by the NAME_BINDINGS in ~~30A.8.1~~30A.10.1. Note that the binding to oMAU is mandatory only when MII is present. The Entity Relationship Diagrams, Figures ~~30-3 and 30-4~~, shows these bindings pictorially.

30.1.4 Management model

Change the second last paragraph of this subclause as follows:

The above items are defined in ~~30.3, 30.4, 30.5, 30.6, 30.7 and 30.8~~ through 30.10 of this clause in terms of the template requirements of ISO/IEC 10165-4: 1991.

30.2.2.1 Text description of managed objects

Insert the following text immediately after the description of oWIS:

oMidSpan

The top-most managed object class of the Midspan containment tree shown in Figure 30-4. Note that this managed object class may be contained within another superior managed object class. Such containment is expected, but is outside the scope of this standard.

oPSEGroup

The PSE Group managed object class is a view of a collection of PSEs.

oPSE

The managed object of that portion of the containment trees shown in Figure 30–3 and Figure 30–4. The attributes and actions defined in this subclause are contained within the oPSE managed object.

30.2.3 Containment

Change the first paragraph of this subclause as follows:

A containment relationship is a structuring relationship for managed objects in which the existence of a managed object is dependent on the existence of a containing managed object. The contained managed object is said to be the subordinate managed object, and the containing managed object the superior managed object. The containment relationship is used for naming managed objects. The local containment relationships among object classes are depicted in the entity relationship diagrams, Figure 30–3 and Figure 30–4. ~~This~~ These figures shows the names of the object classes and whether a particular containment relationship is one-to-one or one-to-many. For further requirements on this topic, see IEEE Std 802.1F-1993. PSE management is only valid in a system that provides management at the next higher containment level, that is, either a DTE, repeater or Midspan with management.

SUPERSEDED

Replace the existing Figure 30–3 with the following new figure:

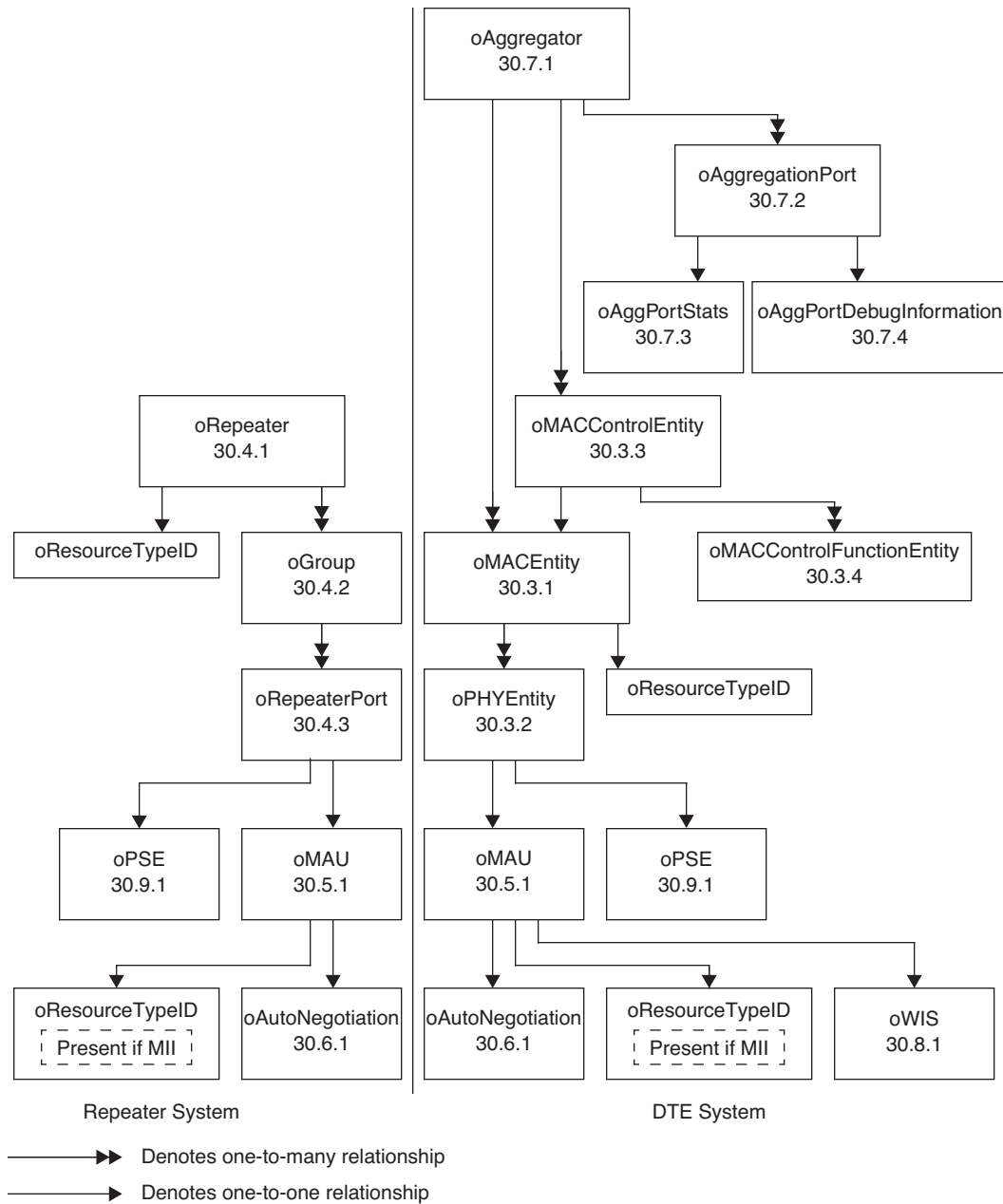


Figure 30–3—Repeater and DTE System Entity relationship diagram

Insert new Figure 30–4 as follows:

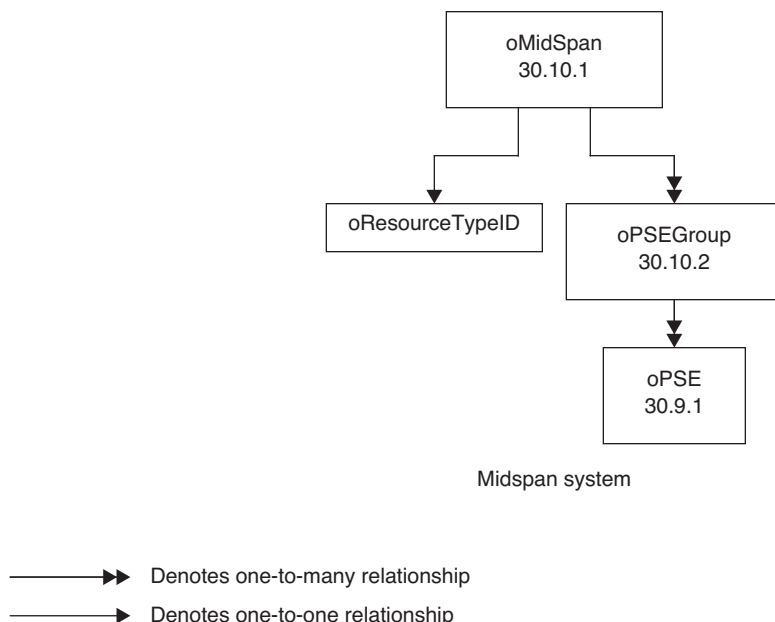


Figure 30–4—Midspan entity relationship diagram

30.2.5 Capabilities

Change the first paragraph of this subclause as follows:

This standard makes use of the concept of *packages* as defined in ISO/IEC 10165-4: 1992 as a means of grouping behaviour, attributes, actions, and notifications within a managed object class definition. Packages may either be mandatory, or be conditional, that is to say, present if a given condition is true. Within this standard *capabilities* are defined, each of which corresponds to a set of packages, which are components of a number of managed object class definitions and which share the same condition for presence. Implementation of the appropriate basic and mandatory packages is the minimum requirement for claiming conformance to IEEE 802.3 Management. Implementation of an entire optional capability is required in order to claim conformance to that capability. The capabilities and packages for IEEE 802.3 Management are specified in Tables 30–1, ~~30–2~~ and ~~30–3~~ through 30–4.

Insert the following paragraphs at the end of this subclause:

For managed PSEs, the PSE Basic Package is mandatory and the PSE Recommended Package is optional. For a managed PSE to be conformant to this standard, it shall fully implement the PSE Basic Package. For a managed PSE to be conformant to the optional Recommended Package it shall implement that entire package. PSE management is optional with respect to all other CSMA/CD management.

For managed Midspans, the Midspan managed object class shall be implemented in its entirety. All attributes and notifications are mandatory. Midspan management is optional with respect to all other CSMA/CD management.

Insert the following new table after Table 30–3:

Table 30–4—PSE Capabilities

				PSE Basic Package (Mandatory)	PSE Recommended Package (Optional)
				Midspan Basic Capability (Mandatory)	
oResourceTypeID managed object					
aResourceTypeIDName	ATTRIBUTE	GET			X
aResourceInfo	ATTRIBUTE	GET			X
oMidSpan managed object class (30.10.1)					
aMidSpanID	ATTRIBUTE	GET			X
aMidSpanPSEGroupCapacity	ATTRIBUTE	GET			X
aMidSpanPSEGroupMap	ATTRIBUTE	GET			X
nMidSpanPSEGroupMapChange	NOTIFICATION				X
oPSEGroup managed object class (30.10.2)					
aPSEGroupID	ATTRIBUTE	GET			X
aPSECapacity	ATTRIBUTE	GET			X
aPSEMap	ATTRIBUTE	GET			X
nPSEMapChange	NOTIFICATION				X
oPSE managed object class (30.9.1)					
aPSEID	ATTRIBUTE	GET		X	
aPSEAdminState	ATTRIBUTE	GET		X	
aPSEPowerPairsControlAbility	ATTRIBUTE	GET		X	
aPSEPowerPairs	ATTRIBUTE	GET-SET		X	
aPSEPowerDetectionStatus	ATTRIBUTE	GET		X	
aPSEPowerClassification	ATTRIBUTE	GET			X
aPSEInvalidSignatureCounter	ATTRIBUTE	GET			X
aPSEPowerDeniedCounter	ATTRIBUTE	GET			X
aPSEOverLoadCounter	ATTRIBUTE	GET			X
aPSEShortCounter	ATTRIBUTE	GET			X
aPSEMPSAbsentCounter	ATTRIBUTE	GET			X
acPSEAdminControl	ACTION			X	
Common Attributes Template					
aCMCounter	ATTRIBUTE	GET			X

Insert the following subclause after subclause 30.8

30.9 Management for Power Sourcing Equipment (PSE)

30.9.1 PSE managed object class

This subclause formally defines the behaviours for the oPSE managed object class attributes and actions.

30.9.1.1 PSE attributes

30.9.1.1.1 aPSEID

ATTRIBUTE

APPROPRIATE SYNTAX:
INTEGER

BEHAVIOUR DEFINED AS:

The value of aPSEID is assigned so as to uniquely identify a PSE among the subordinate managed objects of the containing object.;

30.9.1.1.2 aPSEAdminState

ATTRIBUTE

APPROPRIATE SYNTAX:

An ENUMERATED VALUE that has one of the following entries:

enabled	PSE functions enabled
disabled	PSE functions disabled

BEHAVIOUR DEFINED AS:

A read-only value that identifies the operational state of the PSE functions. An interface which can provide the PSE functions specified in Clause 33 will be enabled to do so when this attribute has the enumeration “enabled.” When this attribute has the enumeration “disabled” the interface will act as it would if it had no PSE function. The operational state of the PSE function can be changed using the acPSEAdminControl action. If a Clause 22 MII or Clause 35 GMII is present, then this will map to the PSE Enable bit specified in 33.6.1.1.3.;

30.9.1.1.3 aPSEPowerPairsControlAbility

ATTRIBUTE

APPROPRIATE SYNTAX:
BOOLEAN

BEHAVIOUR DEFINED AS:

Indicates the ability to control which PSE Pinout Alternative (see 33.2.2) is used for PD detection and power. When “true” the PSE Pinout Alternative used can be controlled through the aPSEPowerPairs attribute. When “false” the PSE Pinout Alternative used cannot be controlled through the aPSEPowerPairs attribute. If a Clause 22 MII or Clause 35 GMII is present, then this will map to the Pair Control Ability bit specified in 33.6.1.2.10;

30.9.1.1.4 aPSEPowerPairs

ATTRIBUTE

APPROPRIATE SYNTAX:

An ENUMERATED VALUE that has one of the following entries:

signal	PSE Pinout Alternative A
spare	PSE Pinout Alternative B

BEHAVIOUR DEFINED AS:

A read-write value that identifies the supported PSE Pinout Alternative specified in 33.2.2. A GET operation returns the PSE Pinout Alternative in use. A SET operation changes the PSE Pinout Alternative used to the indicated value only if the attribute `aPSEPowerPairsControlAbility` is “true.” If the attribute `aPSEPowerPairsControlAbility` is “false” a SET operation has no effect.

The enumeration “signal” indicates that PSE Pinout Alternative A is used for PD detection and power. The enumeration “spare” indicates that PSE Pinout Alternative B is used for PD detection and power. If a Clause 22 MII or Clause 35 GMII is present, then this will map to the Pair Control bits specified in 33.6.1.1.2.;

30.9.1.1.5 aPSEPowerDetectionStatus

ATTRIBUTE

APPROPRIATE SYNTAX:

An ENUMERATED VALUE that has one of the following entries:

disabled	PSE disabled
searching	PSE searching
deliveringPower	PSE delivering power
test	PSE test mode
fault	PSE fault detected
otherFault	PSE implementation specific fault detected

BEHAVIOUR DEFINED AS:

A read-only value that indicates the current status of the PD Detection function specified in 33.2.6.

The enumeration “disabled” indicates that the PSE State diagram (Figure 33–6) is in the state DISABLED. The enumeration “deliveringPower” indicates that the PSE State diagram is in the state POWER_ON. The enumeration “test” indicates that the PSE State diagram is in the state TEST_MODE. The enumeration “fault” indicates that the PSE State diagram is in the state TEST_ERROR. The enumeration “otherFault” indicates that the PSE State diagram is in the state IDLE due to the variable `error_condition` = true. The enumeration “searching” indicates the PSE State diagram is in a state other than those listed above. If a Clause 22 MII or Clause 35 GMII is present, then this will map to the PSE Status bits specified in 33.6.1.2.9.

NOTE—A derivative attribute may wish to apply a delay to the use of the “deliveringPower” enumeration as the PSE state diagram will enter then quickly exit the POWER_ON state if a short-circuit or overcurrent condition is present when power is first applied.;

30.9.1.1.6 aPSEPowerClassification

ATTRIBUTE

APPROPRIATE SYNTAX:

An ENUMERATED VALUE that has one of the following entries:

class0	Class 0 PD
class1	Class 1 PD
class2	Class 2 PD
class3	Class 3 PD
class4	Class 4 PD

BEHAVIOUR DEFINED AS:

A read-only value that indicates the PD Class of a detected PD as specified in 33.2.7.2.

This value is only valid while a PD is being powered, that is the attribute aPSEPowerDetectionStatus reporting the enumeration “deliveringPower.” If a Clause 22 MII or Clause 35 GMII is present, then this will map to the PD Class bits specified in 33.6.1.2.8.;

30.9.1.1.7 aPSEInvalidSignatureCounter

ATTRIBUTE

APPROPRIATE SYNTAX:

Generalized nonresetable counter. This counter has a maximum increment rate of 2 counts per second.

BEHAVIOUR DEFINED AS:

This counter is incremented when the PSE state diagram (Figure 33–6) enters the state SIGNATURE_INVALID. If a Clause 22 MII or Clause 35 GMII is present, then this will map to the Invalid Signature bit specified in 33.6.1.2.4.;

30.9.1.1.8 aPSEPowerDeniedCounter

ATTRIBUTE

APPROPRIATE SYNTAX:

Generalized nonresetable counter. This counter has a maximum increment rate of 2 counts per second.

BEHAVIOUR DEFINED AS:

This counter is incremented when the PSE state diagram (Figure 33–6) enters the state POWER_DENIED. If a Clause 22 MII or Clause 35 GMII is present, then this will map to the Power Denied bit specified in 33.6.1.2.2.;

30.9.1.1.9 aPSEOverLoadCounter

ATTRIBUTE

APPROPRIATE SYNTAX:

Generalized nonresetable counter. This counter has a maximum increment rate of 2 counts per second.

BEHAVIOUR DEFINED AS:

This counter is incremented when the PSE state diagram (Figure 33–6) enters the state ERROR_DELAY_OVER. If a Clause 22 MII or Clause 35 GMII is present, then this will map to the Overload bit specified in 33.6.1.2.6.;

30.9.1.1.10 aPSEShortCounter

ATTRIBUTE

APPROPRIATE SYNTAX:

Generalized nonresetable counter. This counter has a maximum increment rate of 2 counts per second.

BEHAVIOUR DEFINED AS:

This counter is incremented when the PSE state diagram (Figure 33–6) enters the state ERROR_DELAY_SHORT. If a Clause 22 MII or Clause 35 GMII is present, then this will map to the Short Circuit bit specified in 33.6.1.2.5.;

30.9.1.1.11 aPSEMPSAbsentCounter

ATTRIBUTE

APPROPRIATE SYNTAX:

Generalized nonresettable counter. This counter has a maximum increment rate of 2 counts per second.

BEHAVIOUR DEFINED AS:

This counter is incremented when the PSE state diagram (Figure 33–6) transitions directly from the state POWER_ON to the state IDLE due to tmpdo_timer_done being asserted. If a Clause 22 MII or Clause 35 GMII is present, then this will map to the MPS Absent bit specified in 33.6.1.2.7.;

30.9.1.2 PSE actions

30.9.1.2.1 acPSEAdminControl

ACTION

APPROPRIATE SYNTAX:

Same as aPSEAdminState

BEHAVIOUR DEFINED AS:

This action provides a means to alter aPSEAdminState.;

30.10 Layer management for Midspan

30.10.1 Midspan managed object class

This subclause formally defines the behaviours for the oMidSpan managed object class, attributes, and notifications.

30.10.1.1 Midspan attributes

30.10.1.1.1 aMidSpanID

ATTRIBUTE

APPROPRIATE SYNTAX:

INTEGER

BEHAVIOUR DEFINED AS:

The value of aMidSpanID is assigned so as to uniquely identify a Midspan device among the subordinate managed objects of system (systemID and system are defined in ISO/IEC 10165-2:1992 [SMI]).;

30.10.1.1.2 aMidSpanPSEGroupCapacity

ATTRIBUTE

APPROPRIATE SYNTAX:

INTEGER

BEHAVIOUR DEFINED AS:

The aMidSpanPSEGroupCapacity is the number of PSE groups that can be contained within the Midspan device. Within each managed Midspan device, the PSE groups are uniquely numbered in the range from 1 to aMidSpanPSEGroupCapacity.

Some PSE groups may not be present in a given Midspan instance, in which case the actual number

of PSE groups present is less than aMidSpanPSEGroupCapacity. The number of PSE groups present is never greater than aMidSpanPSEGroupCapacity.;

30.10.1.1.3 aMidSpanPSEGroupMap

ATTRIBUTE

APPROPRIATE SYNTAX:
BITSTRING

BEHAVIOUR DEFINED AS:

A string of bits which reflects the current configuration of PSE groups that are viewed by PSE group managed objects. The length of the bitstring is “aMidSpanPSEGroupCapacity” bits. The first bit relates to PSE group 1. A “1” in the bitstring indicates presence of the PSE group, “0” represents absence of the PSE group.;

30.10.1.2 Midspan notifications

30.10.1.2.1 nMidSpanPSEGroupMapChange

NOTIFICATION

APPROPRIATE SYNTAX:
BITSTRING

BEHAVIOUR DEFINED AS:

This notification is sent when a change occurs in the PSE group structure of a Midspan device. This occurs only when a PSE group is logically removed from or added to a Midspan device. The nMidSpanPSEGroupMapChange notification is not sent when powering up a Midspan device. The value of the notification is the updated value of the aMidSpanPSEGroupMap attribute.;

30.10.2 PSE Group managed object class

This subclause formally defines the behaviours for the oPSEGroup managed object class, attributes, actions, and notifications.

30.10.2.1 PSE Group attributes

30.10.2.1.1 aPSEGroupID

ATTRIBUTE

APPROPRIATE SYNTAX:
INTEGER

BEHAVIOUR DEFINED AS:

A value unique within the Midspan device. The value of aPSEGroupID is assigned so as to uniquely identify a PSE group among the subordinate managed objects of the containing object (oMidSpan). This value is never greater than aMidSpanPSEGroupCapacity.;

30.10.2.1.2 aPSECapacity

ATTRIBUTE

APPROPRIATE SYNTAX:
INTEGER

BEHAVIOUR DEFINED AS:

The aPSECapacity is the number of PSEs contained within the PSE group. Valid range is 1–1024.

Within each PSE group, the PSEs are uniquely numbered in the range from 1 to aPSECapacity. Some PSEs may not be present in a given PSE group instance, in which case the actual number of PSEs present is less than aPSECapacity. The number of PSEs present is never greater than aPSECapacity.;

30.10.2.1.3 aPSEMap

ATTRIBUTE

APPROPRIATE SYNTAX:

BitString

BEHAVIOUR DEFINED AS:

A string of bits that reflects the current configuration of PSE managed objects within this PSE group. The length of the bitstring is “aPSECapacity” bits. The first bit relates to PSE 1. A “1” in the bitstring indicates presence of the PSE, “0” represents absence of the PSE.;

30.10.2.2 PSE Group notifications

30.10.2.2.1 nPSEMapChange

NOTIFICATION

APPROPRIATE SYNTAX:

BitString

BEHAVIOUR DEFINED AS:

This notification is sent when a change occurs in the PSE structure of a PSE group. This occurs only when a PSE is logically removed from or added to a PSE group. The nPSEMapChange notification is not sent when powering up a Midspan device. The value of the notification is the updated value of the aPSEMap attribute.;

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

40.6.1.1 Isolation requirement

Change the first paragraph of this subclause as follows:

A PHY 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~~The PHY~~ shall provide electrical isolation between the port device circuits, including frame ground (if any) and all MDI leads. This electrical separation shall withstand at least one of the following electrical strength tests:

40.12.2 Major capabilities/options

Insert the following row at the bottom (following item AXO) of the table:

*PD	Powered Device	40.6.1.1	O	Yes [] No []	PHY encompasses the PI of a PD within its MDI.
-----	----------------	----------	---	-------------------	--

40.12.7 PMA Electrical Specifications

Change the second row (item PME15) of the table in this subclause as follows:

PME15a	The PHY shall provide electrical isolation between	40.6.1.1	!PD:M	Yes [] N/A []	The port device circuits including frame ground, and all MDI leads.
--------	--	----------	-------	--------------------	---

Insert a row between the second and third rows (between items PME15 and PME16) of the table in this subclause as follows:

PME15b	<u>The PHY shall provide electrical isolation between</u>	40.6.1.1	PD:M	Yes [] N/A []	<u>All external conductors, including frame ground, and all MDI leads.</u>
--------	---	----------	------	--------------------	--

Annex 30A

(normative)

GDMO specification for IEEE 802.3 managed object classes

Change the first paragraph of this annex as follows:

This annex formally defines the protocol encodings for CMIP and ISO/IEC 15802-2: 1995 [ANSI/IEEE Std 802.1B and 802.1k, 1995 Edition] for the IEEE 802.3 Managed Objects using the templates specified in ISO/IEC 10165-4: 1992. The application of a GDMO template compiler against 30A.1 to ~~30A.15~~30A.18 will produce the proper protocol encodings.

30A.10.1 ResourceTypeID, formal definition

Insert the following paragraph at the end of this subclauses:

nbResourceTypeID-midSpan	NAME BINDING
SUBORDINATE OBJECT CLASS	“IEEE802.1F”:oResourceTypeID;
NAMED BY SUPERIOR OBJECT CLASS	oMidSpan AND SUBCLASSES;
WITH ATTRIBUTE	aMidSpanID;
REGISTERED AS	{iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30) nameBinding(6) resourceTypeID-midSpan(25)};

Insert the following subclauses after subclause 30A.15.2:

30A.16 PSE managed object class

30A.16.1 PSE, formal definition

oPSE	MANAGED OBJECT CLASS												
DERIVED FROM	“CCITT Rec. X.721 (1992) ISO/IEC 10165-2 : 1992”:top;												
CHARACTERIZED BY													
pPSEBasic	PACKAGE												
ATTRIBUTES	<table border="0"> <tr> <td>aPSEID</td> <td>GET,</td> </tr> <tr> <td>aPSEAdminState</td> <td>GET,</td> </tr> <tr> <td>aPSEPowerPairsControlAbility</td> <td>GET,</td> </tr> <tr> <td>aPSEPowerPairs</td> <td>GET-REPLACE,</td> </tr> <tr> <td>aPSEPowerDetectionStatus</td> <td>GET;</td> </tr> <tr> <td>acPSEAdminControl;</td> <td></td> </tr> </table>	aPSEID	GET,	aPSEAdminState	GET,	aPSEPowerPairsControlAbility	GET,	aPSEPowerPairs	GET-REPLACE,	aPSEPowerDetectionStatus	GET;	acPSEAdminControl;	
aPSEID	GET,												
aPSEAdminState	GET,												
aPSEPowerPairsControlAbility	GET,												
aPSEPowerPairs	GET-REPLACE,												
aPSEPowerDetectionStatus	GET;												
acPSEAdminControl;													
ACTIONS													
;													
;													
CONDITIONAL PACKAGES													
pPSERecommended	PACKAGE												
ATTRIBUTES	<table border="0"> <tr> <td>aPSEPowerClassification</td> <td>GET,</td> </tr> <tr> <td>aPSEInvalidSignatureCounter</td> <td>GET,</td> </tr> <tr> <td>aPSEPowerDeniedCounter</td> <td>GET,</td> </tr> </table>	aPSEPowerClassification	GET,	aPSEInvalidSignatureCounter	GET,	aPSEPowerDeniedCounter	GET,						
aPSEPowerClassification	GET,												
aPSEInvalidSignatureCounter	GET,												
aPSEPowerDeniedCounter	GET,												

	aPSEOverLoadCounter	GET,
	aPSEShortCounter	GET,
	aPSEMPSAbsentCounter	GET;
REGISTERED AS	{iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30) package(4) pseRecommendedPkg(27)};	
PRESENT IF	The recommended package is implemented;	
REGISTERED AS	{iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30) managedObjectClass(3) pseObjectClass(15)};	
nbPSE-repeaterPortName		
NAME BINDING		
SUBORDINATE OBJECT CLASS	oPSE;	
NAMED BY SUPERIOR OBJECT CLASS	oRepeaterPorts AND SUBCLASSES;	
WITH ATTRIBUTE	aPSEID;	
REGISTERED AS	{iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30) nameBinding(6) pse-repeaterPortName(26)};	
nbPSE-dteName		
NAME BINDING		
SUBORDINATE OBJECT CLASS	oPSE;	
NAMED BY SUPERIOR OBJECT CLASS	oPHYEntity AND SUBCLASSES;	
WITH ATTRIBUTE	aPSEID;	
REGISTERED AS	{iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30) nameBinding(6) pse-dteName(27)};	
nbPSE-pseGroupName		
NAME BINDING		
SUBORDINATE OBJECT CLASS	oPSE;	
NAMED BY SUPERIOR OBJECT CLASS	oPSEGroup AND SUBCLASSES;	
WITH ATTRIBUTE	aPSEID;	
REGISTERED AS	{iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30) nameBinding(6) pse-pseGroupName(28)};	

30A.16.2 PSE attributes

aPSEID		ATTRIBUTE
WITH ATTRIBUTE SYNTAX	IEEE802Dot3-MgmtAttributeModule.OneOfName;	
MATCHES FOR	EQUALITY;	
BEHAVIOUR	bPSEID;	
REGISTERED AS	{iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30) attribute(7) pseID(209)};	
bPSEID		BEHAVIOUR
DEFINED AS	See “BEHAVIOUR DEFINED AS” in 30.9.1.1.1;	
aPSEAdminState		ATTRIBUTE
WITH ATTRIBUTE SYNTAX	IEEE802Dot3-MgmtAttributeModule.PortAdminState;	
MATCHES FOR	EQUALITY;	

BEHAVIOUR REGISTERED AS	bPSEAdminState; {iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30) attribute(7) pseAdminState(210)};
bPSEAdminState	BEHAVIOUR
DEFINED AS	See “BEHAVIOUR DEFINED AS” in 30.9.1.1.2;
aPSEPowerPairsControlAbility	ATTRIBUTE
WITH ATTRIBUTE SYNTAX	IEEE802Dot3- MgmtAttributeModule.PairCtrlAbility;
MATCHES FOR BEHAVIOUR REGISTERED AS	EQUALITY; bPSEPowerPairsControlAbility; {iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30) attribute(7) psePowerPairsControlAbility(211)};
bPSEPowerPairsControlAbility	BEHAVIOUR
DEFINED AS	See “BEHAVIOUR DEFINED AS” in 30.9.1.1.3;
aPSEPowerPairs	ATTRIBUTE
WITH ATTRIBUTE SYNTAX	IEEE802Dot3- MgmtAttributeModule.PSEPowerPairs;
MATCHES FOR BEHAVIOUR REGISTERED AS	EQUALITY; bPSEPowerPairs; {iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30) attribute(7) psePowerPairs(212)};
bPSEPowerPairs	BEHAVIOUR
DEFINED AS	See “BEHAVIOUR DEFINED AS” in 30.9.1.1.4;
aPSEPowerDetectionStatus	ATTRIBUTE
WITH ATTRIBUTE SYNTAX	IEEE802Dot3-MgmtAttributeModule.DetectStatus;
MATCHES FOR BEHAVIOUR REGISTERED AS	EQUALITY; bPSEPowerDetectionStatus; {iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30) attribute(7) psePowerDetectionStatus(214)};
bPSEPowerDetectionStatus	BEHAVIOUR
DEFINED AS	See “BEHAVIOUR DEFINED AS” in 30.9.1.1.5;
aPSEPowerClassification	ATTRIBUTE
WITH ATTRIBUTE SYNTAX	IEEE802Dot3-MgmtAttributeModule.PowerClass;
MATCHES FOR BEHAVIOUR REGISTERED AS	EQUALITY; bPSEPowerClassification; {iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30) attribute(7) psePowerClassification(215)};

bPSEPowerClassification

BEHAVIOUR

DEFINED AS

See “BEHAVIOUR DEFINED AS” in 30.9.1.1.6;

aPSEInvalidSignatureCounter

ATTRIBUTE

DERIVED FROM
MATCHES FOR
BEHAVIOUR
REGISTERED AS

aCMCounter;
EQUALITY;
bPSEInvalidSignatureCounter;
{iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30)
attribute(7)pseInvalidSignatureCounter(227)};

bPSEInvalidSignatureCounter

BEHAVIOUR

DEFINED AS

See “BEHAVIOUR DEFINED AS” in 30.9.1.1.7;

aPSEPowerDeniedCounter

ATTRIBUTE

DERIVED FROM
MATCHES FOR
BEHAVIOUR
REGISTERED AS

aCMCounter;
EQUALITY;
bPSEPowerDeniedCounter;
{iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30)
attribute(7)psePowerDeniedCounter(228)};

bPSEPowerDeniedCounter

BEHAVIOUR

DEFINED AS

See “BEHAVIOUR DEFINED AS” in 30.9.1.1.8;

aPSEOverLoadCounter

ATTRIBUTE

DERIVED FROM
MATCHES FOR
BEHAVIOUR
REGISTERED AS

aCMCounter;
EQUALITY;
bPSEOverLoadCounter;
{iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30)
attribute(7)pseOverLoadCounter(229)};

bPSEOverLoadCounter

BEHAVIOUR

DEFINED AS

See “BEHAVIOUR DEFINED AS” in 30.9.1.1.9;

aPSEShortCounter

ATTRIBUTE

DERIVED FROM
MATCHES FOR
BEHAVIOUR
REGISTERED AS

aCMCounter;
EQUALITY;
bPSEShortCounter;
{iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30)
attribute(7)pseShortCounter(230)};

bPSEShortCounter

BEHAVIOUR

DEFINED AS

See “BEHAVIOUR DEFINED AS” in 30.9.1.1.10;

aPSEMPSAbsentCounter

ATTRIBUTE

DERIVED FROM
MATCHES FOR
BEHAVIOUR
REGISTERED AS

aCMCounter;
EQUALITY;
bPSEMPSAbsentCounter;
{iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30)
attribute(7) pseMPSAbsentCounter(217)};

bPSEMPSAbsentCounter

BEHAVIOUR

DEFINED AS

See “BEHAVIOUR DEFINED AS” in 30.9.1.1.11;

30A.16.3 PSE actions

acPSEAdminControl

ACTION

BEHAVIOUR
MODE
WITH INFORMATION SYNTAX

bPSEAdminControl;
CONFIRMED;
IEEE802Dot3-
MgmtAttributeModule.PortAdminState;
{iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30)
action(9) pseAdminControl(13)};

bPSEAdminControl

BEHAVIOUR

DEFINED AS

See “BEHAVIOUR DEFINED AS” in 30.9.1.2.1;

30A.17 Midspan managed object class

oMidSpan

MANAGED OBJECT CLASS

DERIVED FROM

“CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 :
1992”:top;

CHARACTERIZED BY
pMidSpanBasic

ATTRIBUTES

PACKAGE

aMidSpanID GET,

aMidSpanPSEGroupCapacity GET,

aMidSpanPSEGroupMap GET;

NOTIFICATIONS

nMidSpanPSEGroupMapChange;

;
;

REGISTERED AS

{iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30)
managedObjectClass(3) midSpanObjectClass(17)};

nbMidSpanName

NAME BINDING

SUBORDINATE OBJECT CLASS

oMidSpan;

NAMED BY SUPERIOR OBJECT CLASS “ISO/IEC 10165-2”:system AND SUBCLASSES;

WITH ATTRIBUTE

aMidSpanID;

REGISTERED AS

{iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30)
nameBinding(6) midSpanName(31)};

nbMidSpanMonitor

NAME BINDING

SUBORDINATE OBJECT CLASS “IEEE802.1F”:oEWMAMetricMonitor;
NAMED BY SUPERIOR OBJECT CLASS “ISO/IEC 10165-2”:system AND SUBCLASSES;
WITH ATTRIBUTE “IEEE802.1F”:aScannerId;
CREATE WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30) nameBinding(6) midSpanMonitor(32)};

30A.17.1 Midspan attributes

aMidSpanID

ATTRIBUTE

WITH ATTRIBUTE SYNTAX IEEE802Dot3-MgmtAttributeModule.OneOfName;
MATCHES FOR EQUALITY;
BEHAVIOUR bMidSpanID;
REGISTERED AS {iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30) attribute(7) midSpanID(221)};

bMidSpanID

BEHAVIOUR

DEFINED AS See “BEHAVIOUR DEFINED AS” in 30.10.1.1.1;

aMidSpanPSEGroupCapacity

ATTRIBUTE

WITH ATTRIBUTE SYNTAX IEEE802Dot3-MgmtAttributeModule.OneOfName;
MATCHES FOR EQUALITY,ORDERING;
BEHAVIOUR bMidSpanPSEGroupCapacity;
REGISTERED AS {iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30) attribute(7) midSpanPSEGroupCapacity(222)};

bMidSpanPSEGroupCapacity

BEHAVIOUR

DEFINED AS See “BEHAVIOUR DEFINED AS” in 30.10.1.1.2;

aMidSpanPSEGroupMap

ATTRIBUTE

WITH ATTRIBUTE SYNTAX IEEE802Dot3-MgmtAttributeModule.BitString;
MATCHES FOR EQUALITY;
BEHAVIOUR bMidSpanPSEGroupMap;
REGISTERED AS {iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30) attribute(7) midSpanPSEGroupMap(223)};

bMidSpanPSEGroupMap

BEHAVIOUR

DEFINED AS See “BEHAVIOUR DEFINED AS” in 30.10.1.1.3;

30A.17.2 Midspan notifications

nMidSpanPSEGroupMapChange

NOTIFICATION

BEHAVIOUR bMidSpanPSEGroupMapChange;

WITH INFORMATION SYNTAX IEEE802Dot3-MgmtAttributeModule.BitString;
REGISTERED AS {iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30)
notification(10)midSpanPSEGroupMapChange(8)};

bMidSpanPSEGroupMapChange

BEHAVIOUR

DEFINED AS See “BEHAVIOUR DEFINED AS” in 30.10.1.2.1;

30A.18 PSE Group managed object class

oPSEGroup

MANAGED OBJECT CLASS

DERIVED FROM “CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 :
1992”:top;
CHARACTERIZED BY
pPSEGroupBasic
ATTRIBUTES PACKAGE
aPSEGroupID GET,
aPSECapacity GET,
aPSEMap GET;
NOTIFICATIONS nPSEMapChange;
;
;
REGISTERED AS {iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30)
managedObjectClass(3) midSpanGroupObjectClass(18)};

nbPSEGroupName

NAME BINDING

SUBORDINATE OBJECT CLASS oPSEGroup;
NAMED BY SUPERIOR OBJECT CLASS oMidSpan AND SUBCLASSES;
WITH ATTRIBUTE aPSEGroupID;
REGISTERED AS {iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30)
nameBinding(6) pseGroupName(33)};

30A.18.1 PSE Group attributes

aPSEGroupID

ATTRIBUTE

WITH ATTRIBUTE SYNTAX IEEE802Dot3-MgmtAttributeModule.OneOfName;
MATCHES FOR EQUALITY;
BEHAVIOUR bPSEGroupID;
REGISTERED AS {iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30)
attribute(7) pseGroupID(224)};

bPSEGroupID

BEHAVIOUR

DEFINED AS See “BEHAVIOUR DEFINED AS” in 30.10.2.1.1;

aPSECapacity

ATTRIBUTE

WITH ATTRIBUTE SYNTAX IEEE802Dot3-MgmtAttributeModule.OneOfName;
MATCHES FOR EQUALITY,ORDERING;
BEHAVIOUR bPSECapacity;

REGISTERED AS {iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30) attribute(7) pseCapacity(225)};

bPSECapacity

BEHAVIOUR

DEFINED AS See “BEHAVIOUR DEFINED AS” in 30.10.2.1.2;

aPSEMap

ATTRIBUTE

WITH ATTRIBUTE SYNTAX IEEE802Dot3-MgmtAttributeModule.BitString;
MATCHES FOR EQUALITY;
BEHAVIOUR bPSEMap;
REGISTERED AS {iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30) attribute(7) pseMap(226)};

bPSEMap

BEHAVIOUR

DEFINED AS See “BEHAVIOUR DEFINED AS” in 30.10.2.1.3;

30A.18.2 PSE Group notifications

nPSEMapChange

NOTIFICATION

BEHAVIOUR bPSEMapChange;
WITH INFORMATION SYNTAX IEEE802Dot3-MgmtAttributeModule.BitString;
REGISTERED AS {iso(1) member-body(2) us(840) ieee802dot3(10006) csmacdmgt(30) notification(10)pseMapChange(9)};

bPSEMapChange

BEHAVIOUR

DEFINED AS See “BEHAVIOUR DEFINED AS” in 30.10.2.2.1;

Annex 30B

(normative)

GDMO and ASN.1 definitions for management

30B.2 ASN.1 module for CSMA/CD managed objects

Insert the following ASN.1 definitions into the ASN.1 module, in appropriate alphabetic sequence:

```
CurrentStatus ::= ENUMERATED {
    MPSAbsent      (0),    -- MPS absent
    ok              (1),    -- MPS present and over current not detected
}
```

```
DetectStatus ::= ENUMERATED {
    disabled        (0),    -- PSE disabled
    searching        (1),    -- PSE searching
    deliveringPower (2),    -- PSE delivering power
    test            (3),    -- PSE test mode
    fault           (4),    -- PSE fault detected
    otherFault      (5),    -- PSE implementation specific fault detected
}
```

```
PairCtrlAbility ::= BOOLEAN
```

```
PowerClass ::= ENUMERATED {
    class0      (0),    -- Class 0 PD
    class1      (1),    -- Class 1 PD
    class2      (2),    -- Class 2 PD
    class3      (3),    -- Class 3 PD
    class4      (4),    -- Class 4 PD
}
```

```
PSEPowerPairs ::= ENUMERATED {
    signal      (0),    -- PSE Pinout Alternative A
    spare       (1),    -- PSE Pinout Alternative B
}
```

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

NOTE—Although this clause existed in previous publications of IEEE Std 802.3, it was reserved for future use and therefore contained no information. All information in this clause is new material.

33.1 Overview

This clause defines the functional and electrical characteristics of two optional power (non-data) entities, a Powered Device (PD) and Power Sourcing Equipment (PSE), for use with the physical layers defined in Clauses 14, 25, and 40. These entities allow devices to supply/draw power using the same generic cabling as is used for data transmission.

DTE powering is intended to provide a 10BASE-T, 100BASE-TX, or 1000BASE-T device with a single interface to both the data it requires and the power to process these data. This clause specifies the following:

- a) A power source to add power to the 100 Ω balanced cabling system,
- b) The characteristics of a powered device's load on the power source and the structured cabling,
- c) A protocol allowing the detection of a device that requires power,
- d) Optionally, a method to classify devices based on their power needs, and
- e) A method for scaling supplied power back to the detect level when power is no longer requested or required.

The importance of item c) above should not be overlooked. Given the large number of legacy devices (both IEEE 802.3 and other types of devices) that could be connected to a 100 Ω balanced cabling system, and the possible consequences of powering such devices, the protocol to distinguish compatible devices and non-compatible devices is important to prevent damage to non-compatible devices.

The detection and powering algorithms are likely to be compromised by cabling that is multi-point as opposed to point-to-point, resulting in unpredictable performance and possibly damaged equipment.

This clause differentiates between the two ends of the powered portion of the link, defining the PSE and the PD as separate but related devices.

33.1.1 Objectives

The following are the objectives of Power via MDI:

- a) *Power*—A PD designed to the standard, and within its range of available power, can obtain both power and data for operation through the MDI and therefore need no additional connections.
- b) *Safety*—A PSE designed to the standard will not introduce non-SELV (Safety Extra Low Voltage) power into the wiring plant.
- c) *Compatibility*—Clause 33 utilizes the existing MDIs of 10BASE-T, 100BASE-TX, and 1000BASE-T without modification and adds no significant requirements to the cabling. The use of other IEEE 802.3 MDIs is beyond the scope of this clause.
- d) *Simplicity*—The powering system described here is no more burdensome on the end users than the requirements of 10BASE-T, 100BASE-TX, or 1000BASE-T.

33.1.2 Compatibility considerations

All implementations of PD and PSE systems shall be compatible at their respective Power Interfaces (PIs) when used in accordance with the restrictions of Clause 33 where appropriate. Designers are free to implement circuitry within the PD and PSE in an application-dependent manner provided that the respective PI specifications are satisfied.

33.1.3 Relationship of Power via MDI to the IEEE 802.3 Architecture

Power via MDI comprises an optional non-data entity. As a non-data entity it does not appear in a depiction of the OSI Reference Model. Figure 33–1 depicts the positioning of Power via MDI in the case of the PD.

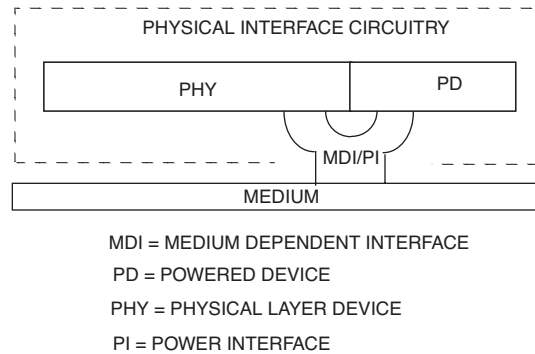


Figure 33–1 —DTE Power via MDI powered device relationship to the physical interface circuitry and the IEEE 802.3 CSMA/CD LAN model

Figure 33–2 and Figure 33–3 depict the positioning of Power via MDI in the cases of the Endpoint PSE and the Midspan PSE, respectively.

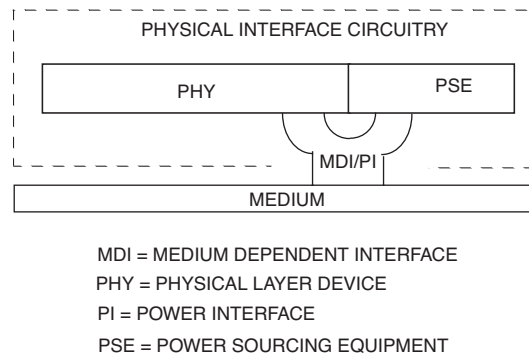


Figure 33–2—DTE Power via MDI endpoint power sourcing equipment relationship to the physical interface circuitry and the IEEE 802.3 CSMA/CD LAN model