Change 1.1.1 to read as follows:

The Carrier Sense Multiple Access with Collision Detection (CSMA/CD) media access method is the means by which two or more stations share a common transmission medium. To transmit, a station waits (defers) for a quiet period on the medium (that is, no other station is transmitting) and then sends the intended message in bit-serial form. If, after initiating a transmission, the message collides with that of another station, then each transmitting station intentionally ~~sends a few additional bytes~~ transmits for an additional predefined period to ensure propagation of the collision throughout the system. The station remains silent for a random amount of time (backoff) before attempting to transmit again. Each aspect of this access method process is specified in detail in subsequent sections of this standard.

This is a comprehensive standard for Local Area Networks employing CSMA/CD as the access method. This standard is intended to encompass several media types and techniques for signal rates of from 1 Mb/s to ~~20 Mb/s~~ 100 Mb/s. This edition of the standard provides the necessary specifications for ~~10 Mb/s baseband and broadband systems, a 1 Mb/s baseband system, and a Repeater Unit.~~ three families of systems: a 1 Mb/s baseband system, 10 Mb/s baseband and broadband systems, and a 100 Mb/s baseband system.

Change 1.1.2.2 to read as follows:

~~Two~~ Three important compatibility interfaces are defined within what is architecturally the Physical Layer.

a) *Medium Dependent Interfaces (MDI).* To communicate in a compatible manner, all stations shall adhere rigidly to the exact specification of physical media signals defined in ~~Section~~ clause 8 (and beyond) in this standard, and to the procedures that define correct behavior of a station. The medium-independent aspects of the LLC sublayer and the MAC sublayer should not be taken as detracting from this point; communication by way of the ISO/IEC 8802-3 [ANSI/IEEE Std 802.3] Local Area Network requires complete compatibility at the Physical Medium interface (that is, the ~~coaxial~~ physical cable interface).

b) *Attachment Unit Interface (AUI).* It is anticipated that most DTEs will be located some distance from their connection to the ~~coaxial~~ physical cable. A small amount of circuitry will exist in the Medium Attachment Unit (MAU) directly adjacent to the ~~coaxial~~ physical cable, while the majority of the hardware and all of the software will be placed within the DTE. The AUI is defined as a second compatibility interface. While conformance with this interface is not strictly necessary to ensure communication, it is highly recommended, since it allows maximum flexibility in intermixing MAUs and DTEs. The AUI may be optional or not specified for some implementations of this standard that are expected to be connected directly to the medium and so do not use a separate MAU or its interconnecting AUI cable. The PLS and PMA are then part of a single unit, and no explicit AUI implementation is required.

c) *Media Independent Interface (MII).* It is anticipated that some DTEs will be connected to a remote PHY, and/or to different medium dependent PHYs. The MII is defined as a third compatibility interface. While conformance with implementation of this interface is not strictly necessary to ensure communication, it is highly recommended, since it allows maximum flexibility in intermixing PHYs and DTEs. The MII is optional.

1.3 References

Replace 1.3 with the following:

The following standards contain provisions which, through references in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

EDITORIAL NOTE—In the following references, changes are not indicated by strikethroughs and underscores.

ANSI X3.237-1995, Rev 2.1 (1 January 1995), FDDI Low-Cost Fibre Physical Layer—Medium Dependent (LCF-PMD) (ISO/IEC CD 9314-9).

ANSI X3.263: 1995, Revision 2.2 (1 March 1995), FDDI Twisted Pair—Physical Medium Dependent (TP-PMD) (ISO/IEC CD 9314-10).

CISPR 22: 1993, Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment.[1]

IEC 60, High-voltage test techniques.[2]

IEC 68, Basic environmental testing procedures.

IEC 96-1: 1986, Radio-frequency cables, Part 1: General requirements and measurement methods, and Amendment 2: 1993.

IEC 169-8: 1978 and -16: 1982, Radio-frequency connectors, Part 8: Radio-frequency coaxial connectors with inner diameter of outer conductor 6.5 mm (0.256 in) with bayonet lock—Characteristic impedence 50 ohms (Type BNC) and Part 16: Radio-frequency coaxial connectors with inner diameter of outer conductor 7 mm (0.276 in) with screw coupling—Characteristic impedence 50 ohms (75 ohms) (Type N).

IEC 380: 1985, Safety of electrically energized office machines.[3]

IEC 435: 1983, Safety of data processing equipment.[4]

IEC 603-7: 1990, Connectors for frequencies below 3 MHz for use with printed boards, Part 7: Detail specification for connectors, 8-way, including fixed and free connectors with common mating features.

IEC 793-1: 1992, Optical fibres, Part 1: Generic specification.

IEC 793-2: 1989, Optical fibres, Part 2: Product specifications.[5]

IEC 794-1: 1993, Optical fibre cables, Part 1: Generic specification.

IEC 794-2: 1989, Optical fibre cables, Part 2: Product specifications.

IEC 807-2: 1992, Rectangular connectors for frequencies below 3 MHz, Part 2: Detail specification for a range of connectors with assessed quality, with trapezoidal shaped metal shells and round contacts—Fixed solder contact types.

IEC 825-1: 1993, Safety of laser products, Part 1: Equipment classification, requirements and user's guide.

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[1]CISPR documents are available from the International Electrotechnical Commission, 3 rue de Varembé, Case Postale 131, CH 1211, Genève 20, Switzerland/Suisse. CISPR documents are also available in the United States from the Sales Department, American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036, USA.

[2]IEC publications are available from International Electrotechnical Commission. IEC publications are also available in the United States from the American National Standards Institute.

[3]IEC 380: 1985 was withdrawn in 1991. It has been replaced by IEC 950: 1991.

[4]IEC 435: 1983 was withdrawn in 1991. It has been replaced by IEC 950: 1991.

[5]Subclause 9.9 is to be read with the understanding that the following changes to IEC 793-2: 1989 have been requested: a) Correction of the numerical aperture tolerance in table III to ±0.015; and b) Addition of another bandwidth category of 150 MHz referred to 1 km, for the type A1b fibre in table III.

IEC 874-1: 1993, Connectors for optical fibres and cables, Part 1: Generic specification.

IEC 874-2: 1993, Connectors for optical fibres and cables, Part 2: Sectional specification for fibre optic connector—Type F-SMA.

IEC 950: 1991, Safety of information technology equipment, including electrical business equipment.[6]

IEC 1076-3-101: 1995 [48B Secretariat 276], Detail specification for a range of shielded connectors with trapezoidal shaped shells and nonremovable rectangular contacts on a 1.27×2.54 millimeter centerline.[7]

IEEE Std 802-1990, IEEE Standards for Local and Metropolitan Area Networks: Overview and Architecture (ANSI).[8]

IEEE Std 802.1F-1993, IEEE Standards for Local and Metropolitan Area Networks: Common Definitions and Procedures for IEEE 802 Management Information (ANSI).

ISO 2382-9: 1984, Data processing—Vocabulary—Part 9: Data communications.[9]

ISO 7498: 1984, Information processing systems—Open Systems Interconnection—Basic Reference Model.

ISO/IEC 8824: 1990, Information technology—Open Systems Interconnection—Specification of Abstract Syntax Notation One (ASN.1).

ISO/IEC 8825: 1990, Information technology—Open Systems Interconnection—Specification of Basic Encoding Rules for Abstract Syntax Notation One (ASN.1).

ISO 9314-1: 1989, Information processing systems—Fibre Distributed Data Interface (FDDI)—Part 1: Token Ring Physical Layer Protocol (PHY).

ISO 9314-2: 1989, Information processing systems—Fibre Distributed Data Interface (FDDI)—Part 2: Token Ring Media Access Control (MAC).

ISO 9314-3: 1990, Information processing systems—Fibre Distributed Data Interface (FDDI)—Part 3: Physical Layer Medium Dependent (PMD).

ISO/IEC 10040: 1992, Information technology—Open Systems Interconnection—Systems management overview.

ISO/IEC 10164-1: 1993, Information technology—Open Systems Interconnection—Systems management—Object Management Function.

ISO/IEC 10165-1: 1993, Information technology—Open Systems Interconnection—Management information services—Structure of management information—Management Information Model.

ISO/IEC 10165-2: 1992, Information technology—Open Systems Interconnection—Management information services—Structure of management information—Definition of management information.

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[6]IEC 950: 1991 replaces IEC 380: 1985 and 435: 1983.

[7]Presently this is a committee draft.

[8]IEEE publications are available from the Institute of Electrical and Electronics Engineers, Service Center, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331, USA.

[9]ISO and ISO/IEC publications are available from the International Organization for Standardization, Case Postale 56, 1 rue de Varembé, CH-1211, Genève 20, Switzerland/Suisse. They are also available in the United States from the American National Standards Institute.

ISO/IEC 10165-4: 1992, Information technology—Open Systems Interconnection—Management information services—Structure of management information—Part 4: Guidelines for the definition of managed objects.

ISO/IEC 7498-4: 1989, Information processing systems—Open Systems Interconnection—Basic Reference Model—Part 4: Management framework.

ISO/IEC 8877: 1992, Information technology—Telecommunications and information exchange between systems—Interface connector and contact assignments for ISDN Basic Access Interface located at reference points S and T.

ISO/IEC 9646-1: 1994, Information technology—Open Systems Interconnection—Conformance testing methodology and framework—Part 1: General concepts.

ISO/IEC 9646-2: 1994, Information technology—Open Systems Interconnection—Conformance testing methodology and framework—Part 2: Abstract Test Suite specification.

ISO/IEC 10165-4: 1992, Information technology—Open Systems Interconnection—Structure of management information—Part 4: Guidelines for the definition of managed objects.

ISO/IEC 11801: 1995, Information technology—Generic cabling for customer premises.

NOTE—Local and national standards such as those supported by ANSI, EIA, IEEE, MIL, NPFA, and UL are not a formal part of the ISO/IEC 8802-3 standard except where no international standard equivalent exists. Reference to such local or national standards may be useful resource material and are located in annex A.

1.4 Definitions

EDITORIAL NOTE—The definitions subclauses within several clauses of ISO/IEC 8802-3 are consolidated in this revised clause. In the following definitions, changes are not indicated by strikethroughs and underscores. See the end of this subclause for further editing instructions.

Replace 1.4 with the following text:

1.4.1 100BASE-FX: IEEE 802.3 Physical Layer specification for a 100 Mb/s CSMA/CD LAN over two optical fibers. (See IEEE 802.3 clauses 24 and 26.)

1.4.2 100BASE-T: IEEE 802.3 Physical Layer specification for a 100 Mb/s CSMA/CD LAN. (See IEEE 802.3 clauses 22 and 28.)

1.4.3 100BASE-T4: IEEE 802.3 Physical Layer specification for a 100 Mb/s CSMA/CD LAN over four pairs of Category 3, 4, and 5 unshielded twisted-pair (UTP) wire. (See IEEE 802.3 clause 23.)

1.4.4 100BASE-TX: IEEE 802.3 Physical Layer specification for a 100 Mb/s CSMA/CD LAN over two pairs of Category 5 UTP or shielded twisted-pair (STP) wire. (See IEEE 802.3 clauses 24 and 25.)

1.4.5 100BASE-X: IEEE 802.3 Physical Layer specification for a 100 Mb/s CSMA/CD LAN that uses the PMD sublayer and MDI of the ISO 9314 group of standards developed by ASC X3T12 (FDDI). (See IEEE 802.3 clause 24.)

1.4.6 10BASE2: IEEE 802.3 Physical Layer specification for a 10 Mb/s CSMA/CD LAN over RG 58 coaxial cable. (See IEEE 802.3 clause 10.)

1.4.7 10BASE5: IEEE 802.3 Physical Layer specification for a 10 Mb/s CSMA/CD LAN over coaxial cable (i.e., thicknet). (See IEEE 802.3 clause 8.)

1.4.8 10BASE-F: IEEE 802.3 Physical Layer specification for a 10 Mb/s CSMA/CD LAN over fiber optic cable. (See IEEE 802.3 clause 15.)

1.4.9 10BASE-FB port: A port on a repeater that contains an internal 10BASE-FB Medium Attachment Unit (MAU) that can connect to a similar port on another repeater. (See IEEE 802.3 clause 9, figure 15-1(b) and 17.3.)

1.4.10 10BASE-FB segment: A fiber optic link segment providing a point-to-point connection between two 10BASE-FB ports on repeaters. (See link segment IEEE 802.3 figure 15-1(b) and figure 15-2.)

1.4.11 10BASE-FL segment: A fiber optic link segment providing point-to-point connection between two 10BASE-FL MAUs. (See link segment IEEE 802.3 figure 15.1 (c) and figure 15-2.)

1.4.12 10BASE-FP segment: A fiber optic mixing segment, including one 10BASE-FP Star and all of the attached fiber pairs. (See IEEE 802.3 figure 15-1(a), figure 15-2, and mixing segment.)

1.4.13 10BASE-FP Star: A passive device that is used to couple fiber pairs together to form a 10BASE-FP segment. Optical signals received at any input port of the 10BASE-FP Star are distributed to all of its output ports (including the output port of the optical interface from which it was received). A 10BASE-FP Star is typically comprised of a passive-star coupler, fiber optic connectors, and a suitable mechanical housing. (See IEEE 802.3, 16.5.)

1.4.14 10BASE-T: IEEE 802.3 Physical Layer specification for a 10 Mb/s CSMA/CD LAN over two pairs of twisted-pair telephone wire. (See IEEE 802.3 clause 14.)

1.4.15 10BROAD36: IEEE 802.3 Physical Layer specification for 10 Mb/s CSMA/CD LAN over single broadband cable. (See IEEE 802.3 clause 11.)

1.4.16 1BASE5: IEEE 802.3 Physical Layer specification for 1 Mb/s CSMA/CD LAN over two pairs of twisted-pair telephone wire. (See IEEE 802.3 clause 12.)

1.4.17 ability: A mode that a device can advertise using Auto-Negotiation. For modes that represent a type of data service, a device shall be able to operate that data service before it may advertise this ability. A device may support multiple abilities. (See IEEE 802.3, 28.2.1.2.2.)

1.4.18 Acknowledge Bit: A bit used by IEEE 802.3 Auto-Negotiation to indicate that a station has successfully received multiple identical copies of the Link Code Word. This bit is only set after an identical Link Code Word has been received three times in succession. (See IEEE 802.3, 28.2.1.2.4.)

1.4.19 advertised ability: An operational mode that is advertised using Auto-Negotiation. (See IEEE 802.3, 28.2.1.2.2.)

1.4.20 agent code: A term used to refer to network management entity software residing in a node that can be used to remotely configure the host system based on commands received from the network control host, collect information documenting the operation of the host, and communicate with the network control host. (See IEEE 802.3 clause 30.)

1.4.21 agent: A term used to refer to the managed nodes in a network. Managed nodes are those nodes that contain a network management entity (NME), which can be used to configure the node and/or collect data describing operation of that node. The agent is controlled by a network control host or manager that contains both an NME and network management application (NMA) software to control the operations of agents. Agents include systems that support user applications as well as nodes that provide communications services such as front-end processors, bridges, and routers. (See IEEE 802.3 clause 30.)

1.4.22 agile device: A device that supports automatic switching between multiple Physical Layer technologies. (See IEEE 802.3 clause 28.)

1.4.23 Attachment Unit Interface (AUI): In 10 Mb/s CSMA/CD, the interface between the MAU and the data terminal equipment (DTE) within a data station. Note that the AUI carries encoded signals and provides for duplex data transmission. (See IEEE 802.3 clauses 7 and 8.)

1.4.24 Auto-Negotiation: The algorithm that allows two devices at either end of a link segment to negotiate common data service functions. (See IEEE 802.3 clause 28.)

1.4.25 balanced cable: A cable consisting of one or more metallic symmetrical cable elements (twisted pairs or quads). (From ISO/IEC 11801: 1995.)

1.4.26 Base Link Code Word: The first 16-bit message exchanged during IEEE 802.3 Auto-Negotiation. (See IEEE 802.3, 28.2.1.2.)

1.4.27 Base Page: *See:* **Base Link Code Word**.

1.4.28 baseband coaxial system: A system whereby information is directly encoded and impressed upon the transmission medium. At any point on the medium only one information signal at a time can be present without disruption.

1.4.29 baud: A unit of signaling speed, expressed as the number of times per second the signal can change the electrical state of the transmission line or other medium. *Note*—Depending on the encoding strategies, a signal event may represent a single bit, more, or less that one bit. *Contrast with:* **bit rate**; **bits per second**. (From IEEE Std 610.7-1995 [A16].[10])

1.4.30 Binary Phase Shift Keying (Binary PSK or BPSK): A form of modulation in which binary data are transmitted by changing the carrier phase by 180 degrees. (See IEEE 802.3 clause 11.)

1.4.31 bit cell: The time interval used for the transmission of a single data (CD0 or CD1) or control (CVH or CVL) symbol.

1.4.32 bit rate (BR): The total number of bits per second transferred to or from the Medium Access Control (MAC). For example, 100BASE-T has a bit rate of one hundred million bits per second (10^8 b/s).

1.4.33 bit time (BT): The duration of one bit as transferred to and from the MAC. The bit time is the reciprocal of the bit rate. For example, for 100BASE-T the bit rate is 10^{-8} s or 10 ns.

1.4.34 BR/2: One half of the BR in Hertz.

1.4.35 branch cable: In 10BROAD36, the AUI cable interconnecting the DTE and MAU system components.

1.4.36 bridge: A layer 2 interconnection device that does not form part of a CSMA/CD collision domain but rather, appears as a MAC to the collision domain. (See also IEEE Std 610.7-1995 [A16].)

1.4.37 Broadband LAN: A local area network in which information is transmitted on modulated carriers, allowing coexistence of multiple simultaneous services on a single physical medium by frequency division multiplexing. (See IEEE 802.3 clause 11.)

[10]Numbers in brackets correspond to those of the additional reference material in annex A.

1.4.38 bundle: A group of signals that have a common set of characteristics and differ only in their information content.

1.4.39 carrier sense: In a local area network, an ongoing activity of a data station to detect whether another station is transmitting. *Note*—The carrier sense signal indicates that one or more DTEs are currently transmitting.

1.4.40 Category 3 balanced cabling: Balanced 100 Ω and 120 Ω cabling (cable and associated connecting hardware) whose transmission characteristics are specified up to 16 MHz (i.e., performance meets the requirements of a Class C link in accordance with ISO/IEC 11801: 1995). Commonly used by IEEE 802.3 10BASE-T installations. In addition to the requirements outlined in ISO/IEC 11801: 1995, IEEE 802.3 clause 23 specifies additional requirements for these cables when used with 100BASE-T4.

1.4.41 Category 4 balanced cabling: Balanced 100 Ω and 120 Ω cabling (cable and associated connecting hardware) whose transmission characteristics are specified up to 20 MHz in accordance with ISO/IEC 11801: 1995. In addition to the requirements outlined in ISO/IEC 11801: 1995, IEEE 802.3 clause 23 specifies additional requirements for these cables when used with 100BASE-T4.

1.4.42 Category 5 balanced cabling: Balanced 100 Ω and 120 Ω cabling (cable and associated connecting hardware) whose transmission characteristics are specified up to 100 MHz (i.e., performance meets the requirements of a Class D link as per ISO/IEC 11801: 1995). In addition to the requirements outlined in ISO/IEC 11801: 1995, IEEE 802.3 clauses 23 and 25 specify additional requirements for these cables when used with 100BASE-T.

1.4.43 CATV-Type broadband medium: A broadband system comprising coaxial cables, taps, splitters, amplifiers, and connectors the same as those used in Community Antenna Television (CATV) or cable television installations. (See IEEE 802.3 clause 11.)

1.4.44 center wavelength: The average of two optical wavelengths at which the spectral radiant intensity is 50% of the maximum value. (See IEEE 802.3 clause 11.)

1.4.45 channel: A band of frequencies dedicated to a certain service transmitted on the broadband medium. (See IEEE 802.3 clause 11.)

1.4.46 circuit: The physical medium on which signals are carried across the AUI for 10BASE-T or MII (for 100BASE-T). For 10BASE-T, the data and control circuits consist of an A circuit and a B circuit forming a balanced transmission system so that the signal carrier on the B circuit is the inverse of the signal carried on the A circuit.

1.4.47 Class I repeater: A type of 100BASE-T repeater set with internal delay such that only one repeater set may exist between any two DTEs within a single collision domain when two maximum length copper cable segments are used. (See IEEE 802.3 clause 27.)

1.4.48 Class II repeater: A type of IEEE 802.3 100BASE-T repeater set with internal delay such that only two or fewer such repeater sets may exist between any two DTEs within a single collision domain when two maximum length copper cable segments are used. (See IEEE 802.3 clause 27.)

1.4.49 Clocked Data One (CD1): A Manchester-encoded data 1. A CD1 is encoded as a LO for the first half of the bit-cell and a HI for the second half of the bit-cell. (See IEEE 802.3 clause 12.)

1.4.50 Clocked Data Zero (CD0): A Manchester-encoded data 0. A CDO is encoded as a HI for the first half of the bit-cell and a LO for the second half of the bit-cell. (See IEEE 802.3 clause 12.)

1.4.51 Clocked Violation HI (CVH): A symbol that deliberately violates Manchester-encoding rules, used as a part of the Collision Presence signal. A CVH is encoded as a transition from LO to HI at the beginning of the bit cell, HI for the entire bit cell, and a transition from HI to LO at the end of the bit cell. (See IEEE 802.3 clause 12.)

1.4.52 Clocked Violation LO (CVL): A symbol that deliberately violates Manchester-encoding rules, used as a part of the Collision Presence signal. A CVL is encoded as a transition from HI to LO at the beginning of the bit cell, LO for the entire bit cell, and a transition from LO to HI at the end of the bit cell. (See IEEE 802.3 clause 12.)

1.4.53 coaxial cable interface: The electrical and mechanical interface to the shared coaxial cable medium either contained within or connected to the MAU. Also known as the Medium Dependent Interface (MDI).

1.4.54 coaxial cable section: A single length of coaxial cable, terminated at each end with a male BNC connector. Cable sections are joined to other cable sections via BNC plug/receptacle barrel or Type T adapters.

1.4.55 coaxial cable segment: A length of coaxial cable made up from one or more coaxial cable sections and coaxial connectors, and terminated at each end in its characteristic impedance.

1.4.56 coaxial cable: A two-conductor (center conductor, shield system), concentric, constant impedance transmission line used as the trunk medium in the baseband system.

1.4.57 Code Rule Violation (CRV): An analog waveform that is not the result of the valid Manchester-encoded output of a single optical transmitter. The collision of two or more 10BASE-FB optical transmissions will cause multiple CRVs. The preamble encoding of a single 10BASE-FP optical transmission contains a single CRV. (See IEEE 802.3, 16.3.1.1.)

1.4.58 code-bit: In 100BASE-X, the unit of data passed across the PMA service interface, and the smallest signaling element used for transmission on the medium. A group of five code-bits constitutes a code-group in the 100BASE-X PCS. (See IEEE 802.3 clause 24.)

1.4.59 code-group: For IEEE 802.3, a set of encoded symbols representing encoded data or control information. For 100BASE-T4, a set of six ternary symbols that, when representing data, conveys an octet. (See IEEE 802.3 clause 23.) For 100BASE-TX and 100BASE-FX, a set of five code-bits that, when representing data, conveys a nibble. (See IEEE 802.3 clause 24.)

1.4.60 collision domain: A single CSMA/CD network. If two or more MAC sublayers are within the same collision domain and both transmit at the same time, a collision will occur. MAC sublayers separated by a repeater are in the same collision domain. MAC sublayers separated by a bridge are within different collision domains.

1.4.61 collision presence: A signal generated within the Physical Layer by an end station or hub to indicate that multiple stations are contending for access to the transmission medium. (See IEEE 802.3 clauses 8 and 12.)

1.4.62 collision: A condition that results from concurrent transmissions from multiple DTE sources within a single collision domain.

1.4.63 common-mode voltage: The instantaneous algebraic average of two signals applied to a balanced circuit, with both signals referenced to a common reference. Also called *longitudinal voltage* in the telephone industry.

1.4.64 compatibility interfaces: The MDI cable, the AUI branch cable, and the MII; the three points at which hardware compatibility is defined to allow connection of independently designed and manufactured components to a baseband transmission medium. (See IEEE 802.3 clause 8.)

1.4.65 continuous wave (CW): A carrier that is not modulated or switched.

1.4.66 Control Signal One (CS1): An encoded control signal used on the Control In and Control Out circuits. A CS1 is encoded as a signal at half the bit rate (BR/2). (See IEEE 802.3 clause 12.)

1.4.67 Control Signal Zero (CS0): An encoded control signal used on the Control In and Control Out circuits. A CS0 is encoded as a signal at the bit rate (BR). (See IEEE 802.3 clause 12.)

1.4.68 cross connect: A group of connection points, often wall- or rack-mounted in a wiring closet, used to mechanically terminate and interconnect twisted-pair building wiring.

1.4.69 data frame: Consists of the Destination Address, Source Address, Length Field, logical link control (LLC) Data, PAD, and Frame Check Sequence.

1.4.70 Data Terminal Equipment (DTE): Any source or destination of data connected to the LAN.

1.4.71 dBmV: Decibels referenced to 1.0 mV measured at the same impedence. Used to define signal levels in CATV-type broadband systems. (See IEEE 802.3 clause 11.)

1.4.72 dedicated service: A CSMA/CD network in which the collision domain consists of two and only two DTEs so that the total network bandwidth is dedicated to supporting the flow of information between them.

1.4.73 differential-mode voltage: The instantaneous algebraic difference between the potential of two signals applied to the two sides of a balanced circuit. Also called *metallic voltage* in the telephone industry.

1.4.74 drop cable: In 10BROAD36, the small diameter flexible coaxial cable of the broadband medium that connects to a MAU. (*See:* **trunk cable**.)

1.4.75 eight-pin modular: An eight-wire connector. (From ISO/IEC 8877: 1992.)

1.4.76 End-of-Stream Delimiter (ESD): A code-group pattern used to terminate a normal data transmission. For 100BASE-T4, the ESD is indicated by the transmission of five predefined ternary code-groups named eop1-5. (See IEEE 802.3 clause 23.) For 100BASE-X, the ESD is indicated by the transmission of the code-group /T/R. (See IEEE 802.3 clause 24.)

1.4.77 Extinction Ratio: The ratio of the low optical power level to the high optical power level on an optical segment. (See IEEE 802.3 clause 15.)

1.4.78 Fast Link Pulse (FLP) Burst: A group of no more than 33 and not less than 17 10BASE-T compatible link integrity test pulses. Each FLP Burst encodes 16 bits of data using an alternating clock and data pulse sequence. (See figure 14-12, IEEE 802.3 clause 14 and figure 28-4, IEEE 802.3 clause 28.)

1.4.79 Fibre Distributed Data Interface (FDDI): A 100 Mb/s, fiber optic-based, token-ring LAN standard (ANSI X3T12, formerly X3.237-199X.

1.4.80 fiber optic cable: A cable containing one or more optical fibers as specified in IEEE 802.3, 15.3.1.

1.4.81 Fiber Optic Inter-Repeater Link (FOIRL): A Fiber Optic Inter-Repeater Link segment and its two attached MAUs. (See IEEE 802.3 clause 15.)

1.4.82 Fiber Optic Inter-Repeater Link Segment (FOIRL Segment): A fiber optic link segment providing a point-to-point connection between two FOIRL MAUs or between one FOIRL MAU and one 10BASE-FL MAU. *See:* **link segment**.

1.4.83 Fiber Optic Medium Attachment Unit (FOMAU): A MAU for fiber applications. (See IEEE 802.3 clause 9.)

1.4.84 Fiber Optic Medium-Dependent Interface (FOMDI): For 10BASE-F, the mechanical and optical interface between the optical fiber cable link segment and the FOMAU. (See IEEE 802.3 clause 9.)

1.4.85 Fiber Optic Physical Medium Attachment (FOPMA): For 10BASE-F, the portion of the FOMAU that contains the functional circuitry. (See IEEE 802.3 clause 9.)

1.4.86 fiber pair: Optical fibers interconnected to provide two continuous light paths terminated at each end in an optical connector. Any intermediate optical connections must have insertion and return loss characteristics that meet or exceed IEEE 802.3, 15.3.2.1 and 15.3.2.2, respectively. (See IEEE 802.3, 15.3.1.)

1.4.87 FOIRL BER: For 10BASE-F, the mean bit error rate of the FOIRL. (See IEEE 802.3 clause 9.)

1.4.88 FLP Burst Sequence: The sequence of FLP Bursts transmitted by the Local Station. This term is intended to differentiate the spacing between FLP Bursts from the individual pulse spacings within an FLP Burst. (See IEEE 802.3 clause 28.)

1.4.89 FOIRL collision: For 10BASE-F, the simultaneous transmission and reception of data in a FOMAU. (See IEEE 802.3 clause 9.)

1.4.90 FOIRL Compatibility Interface: For 10BASE-F, the FOMDI and AUI (optional); the two points at which hardware compatibility is defined to allow connection of independently designed and manufactured components to the baseband optical fiber cable link segment. (See IEEE 802.3 clause 9.)

1.4.91 FOMAU's Receive Optical Fiber: For 10BASE-F, the optical fiber from which the local FOMAU receives signals. (See IEEE 802.3 clause 9.)

1.4.92 FOMAU's Transmit Optical Fiber: For 10BASE-F, the optical fiber into which the local FOMAU transmits signals. (See IEEE 802.3 clause 9.)

1.4.93 full duplex: A type of networking that supports duplex transmission as defined in IEEE Std 610.7-1995 [A16]. Although some types of full-duplex networking are popularly referred to as Ethernet because they use the IEEE 802.3 defined frame, full duplex does not employ CSMA/CD and is not covered by this standard.

1.4.94 group: A repeater port or a collection of repeater ports that can be related to the logical arrangement of ports within a repeater.

1.4.95 group delay: In 10BROAD36, the rate of change of total phase shift, with respect to frequency, through a component or system. Group delay variation is the maximum difference in delay as a function of frequency over a band of frequencies. (See IEEE 802.3 clause 11.)

1.4.96 headend: In 10BROAD36, the location in a broadband system that serves as the root for the branching tree comprising the physical medium; the point to which all inbound signals converge and the point from which all outbound signals emanate. (See IEEE 802.3 clause 11.)

1.4.97 header hub (HH): The highest-level hub in a hierarchy of hubs. The HH broadcasts signals transmitted to it by lower level hubs or DTEs such that they can be received by all DTEs that may be connected to it either directly or through intermediate hubs. (See IEEE 802.3, 12.2.1 for details.)

1.4.98 hub: A device used to provide connectivity between DTEs. Hubs perform the basic functions of restoring signal amplitude and timing, collision detection, and notification and signal broadcast to lower level hubs and DTEs. (See IEEE 802.3 clause 12.)

1.4.99 idle (IDL): A signal condition where no transition occurs on the transmission line, that is used to define the end of a frame and ceases to exist after the next LO or HI transition on the AUI or MII circuits. An IDL always begins with a HI signal level. A driver is required to send the IDL signal for at least 2 bit times and a receiver is required to detect IDL within 1.6 bit times. (See IEEE 802.3, 7.3 and 12.3.2.4.4 for additional details.)

1.4.100 in-band signaling: The transmission of a signal using a frequency that is within the bandwidth of the information channel. *Contrast with:* **out-of-band signaling**. *Syn:* **in-channel signaling**. (From IEEE Std 610.7-1995 [A16].)

1.4.101 Inter-Repeater Link (IRL): A mechanism for connecting two and only two repeater sets.

1.4.102 Inter-Packet Gap (IPG): A delay or time gap between CSMA/CD packets intended to provide interframe recovery time for other CSMA/CD sublayers and for the Physical Medium. (See IEEE 802.3, 4.2.3.2.1 and 4.2.3.2.2.) For example, for 10BASE-T, the IPG is 9.6 μs (96 bit times); for 100BASE-T, the IPG is 0.96 μs (96 bit times.)

1.4.103 intermediate hub (IH): A hub that occupies any level below the header hub in a hierarchy of hubs. (See IEEE 802.3, 12.2.1 for details.)

1.4.104 Jabber function: A mechanism for controlling abnormally long transmissions (i.e., jabber.)

1.4.105 jabber: A condition wherein a station transmits for a period of time longer than the maximum permissible packet length, usually due to a fault condition.

1.4.106 link: The transmission path between any two interfaces of generic cabling. (From ISO/IEC 11801: 1995.)

1.4.107 Link Code Word: The 16 bits of data encoded into a Fast Link Pulse Burst. (See IEEE 802.3 clause 28.)

1.4.108 link partner: The device at the opposite end of a link segment from the local station. The link partner device may be either a DTE or a repeater. (See IEEE 802.3 clause 28.)

1.4.109 link pulse: Communication mechanism used in 10BASE-T and 100BASE-T networks to indicate link status and (in Auto-Negotiation-equipped devices) to communicate information about abilities and negotiate communication methods. 10BASE-T uses Normal Link Pulses (NLPs), which indicate link status only. 10BASE-T and 100BASE-T nodes equipped with Auto-Negotiation exchange information using a Fast Link Pulse (FLP) mechanism that is compatible with NLP. (See IEEE 802.3 clauses 14 and 28.)

1.4.110 link segment: The point-to-point full-duplex medium connection between two and only two MDIs.

1.4.111 Link Segment Delay Value (LSDV): A number associated with a given segment that represents the delay on that segment used to assess path delays for 100 Mb/s CSMA/CD networks. LSDV is similar to SDV; however, LSDV values do not include the delays associated with attached end stations and/or repeaters. (See IEEE 802.3, 29.3.)

1.4.112 local ability: *See:* **ability**.

1.4.113 local device: The local device that may attempt to Auto-Negotiate with a link partner. The local device may be either a DTE or repeater. (See IEEE 802.3 clause 28.)

1.4.114 Media Access Control (MAC): The data link sublayer that is responsible for transferring data to and from the Physical Layer.

1.4.115 Media Independent Interface (MII): A transparent signal interface at the bottom of the Reconciliation sublayer. (See IEEE 802.3 clause 22.)

1.4.116 Medium Attachment Unit (MAU): A device containing an AUI, PMA, and MDI that is used to connect a repeater or DTE to a transmission medium.

1.4.117 Medium Dependent Interface (MDI): The mechanical and electrical interface between the transmission medium and the MAU (10BASE-T) or PHY (100BASE-T).

1.4.118 Message Code (MC): The predefined 12-bit code contained in an Auto-Negotiation Message Page. (See IEEE 802.3 clause 28.)

1.4.119 Message Page (MP): An Auto-Negotiation Next Page encoding that contains a predefined 12-bit message code. (See IEEE 802.3 clause 28.)

1.4.120 Management Information Base (MIB): A repository of information to describe the operation of a specific network device.

1.4.121 mixing segment: A medium that may be connected to more than two MDIs.

1.4.122 network control host: A network management central control center that is used to configure agents, communicate with agents, and display information collected from agents.

1.4.123 Next Page Algorithm (NPA): The algorithm that governs Next Page communication. (See IEEE 802.3 clause 28.)

1.4.124 Next Page Bit: A bit in the Auto-Negotiation base Link Code Word or Next Page encoding(s) that indicates that further Link Code Word transfer is required. (See IEEE 802.3 clause 28.)

1.4.125 Next Page: General class of pages optionally transmitted by Auto-Negotiation-able devices following the base Link Code Word negotiation. (See IEEE 802.3 clause 28.)

1.4.126 nibble: A group of four data bits. The unit of data exchange on the MII. (See IEEE 802.3 clause 22.)

1.4.127 NLP Receive Link Integrity Test Function: Auto-Negotiation's Link Integrity Test function that allows backward compatibility with the 10BASE-T Link Integrity Test function of IEEE 802.3 figure 14-6. (See IEEE 802.3 clause 28.)

1.4.128 NLP sequence: A Normal Link Pulse sequence, defined in IEEE 802.3, 14.2.1.1 as TP_IDL.

1.4.129 Normal Link Pulse (NLP): An out-of-band communications mechanism used in 10BASE-T to indicate link status. (See IEEE 802.3 figure 14-12.)

1.4.130 NRZI-bit: A code-bit transferred in NRZI format. The unit of data passed across the PMD service interface in 100BASE-X.

1.4.131 NRZI: Non-Return-to-Zero, Invert on Ones. An encoding technique used in FDDI (ISO 9314-1: 1989, ISO 9314-2: 1989, ISO 9314-3: 1989) where a polarity transition represents a logical ONE. The absence of a polarity transition denotes a logical ZERO.

1.4.132 octet: A byte composed of eight bits. (From IEEE Std 610.7-1995 [A16].)

1.4.133 Optical Fiber Cable Interface: *See:* **FOMDI**.

1.4.134 Optical Fiber Cable Link Segment: A length of optical fiber cable that contains two optical fibers and is comprised of one or more optical fiber cable sections and their means of interconnection, with each optical fiber terminated at each end in the optical connector plug. (See IEEE 802.3, 9.9.5.1 and 9.9.5.2.)

1.4.135 optical fiber: A filament-shaped optical waveguide made of dielectric materials.

1.4.136 Optical Idle Signal: The signal transmitted by the FOMAU into its transmit optical fiber during the idle state of the DO circuit. (See IEEE 802.3 clause 9.)

1.4.137 Optical Interface: The optical input and output connection interface to a 10BASE-FP Star. (See IEEE 802.3 clause 15.)

1.4.138 out-of-band signaling: The transmission of a signal using a frequency that is within the pass band of the transmission facility but outside a frequency range normally used for data transmission. *Contrast with:* **in-band signaling**. (From IEEE Std. 610.7-1995 [A16].)

1.4.139 packet: Consists of a data frame as defined previously, preceded by the Preamble and the Start Frame Delimiter, encoded, as appropriate, for the PHY type.

1.4.140 page: In Auto-Negotiation, the encoding for a Link Code Word. Auto-Negotiation can support an arbitrary number of Link Code Word encodings. The base page has a constant encoding as defined in 28.2.1.2. Additional pages may have a predefined encoding *(see:* **Message Page**) or may be custom encoded *(see:* **Unformatted Page**).

1.4.141 parallel detection: In Auto-Negotiation, the ability to detect 100BASE-TX and 100BASE-T4 technology specific link signaling while also detecting the NLP sequence or FLP Burst sequence. (See IEEE 802.3 clause 28.)

1.4.142 Passive-Star Coupler: A component of a 10BASE-FP fiber optic mixing segment that divides optical power received at any of N input ports among all N output ports. The division of optical power is approximately uniform. (See IEEE 802.3 clause 15.)

1.4.143 patch cord: Flexible cable unit or element with connectors(s) used to establish connections on a patch panel. (From ISO/IEC 11801: 1995.)

1.4.144 patch panel: A cross-connect designed to accommodate the use of patch cords. It facilitates administration for moves and changes. (From ISO/IEC 11801: 1995.)

1.4.145 Path Delay Value (PDV): The sum of all Segment Delay Values for all segments along a given path. (See IEEE 802.3 clauses 13 and 29.)

1.4.146 Path Variability Value (PVV): The sum of all Segment Variability Values for all the segments along a given path. (See IEEE 802.3 clause 13.)

1.4.147 path: The sequence of segments and repeaters providing the connectivity between two DTEs in a single collision domain. In CSMA/CD networks there is one and only one path between any two DTEs.

1.4.148 Physical Coding Sublayer (PCS): A sublayer used in 100BASE-T to couple the MII and the PMA. The PCS contains the functions to encode data bits into code-groups that can be transmitted over the physical medium. Two PCS structures are defined for 100BASE-T—one for 100BASE-X and one for 100BASE-T4. (See IEEE 802.3 clauses 23 and 24.)

1.4.149 Physical Layer entity (PHY): The portion of the Physical Layer between the MDI and MII consisting of the PCS, PMA, and, if present, PMD sublayers. The PHY contains the functions that transmit, receive, and manage the encoded signals that are impressed on and recovered from the physical medium. (See IEEE 802.3 clauses 23–26.)

1.4.150 Physical Medium Attachment (PMA) sublayer: That portion of the Physical Layer that contains the functions for transmission, collision detection, reception, and (in the case of 100BASE-T4) clock recovery and skew alignment. (See IEEE 802.3 clauses 23 and 24.)

1.4.151 Physical Medium Dependent (PMD) sublayer: In 100BASE-X, that portion of the Physical Layer responsible for interfacing to the transmission medium. The PMD is located just above the MDI. (See IEEE 802.3 clause 24.)

1.4.152 Physical Signaling Sublayer (PLS): In 10BASE-T, that portion of the Physical Layer contained within the DTE that provides the logical and functional coupling between the MAU and the Data Link Layer.

1.4.153 port: A segment or IRL interface of a repeater unit.

1.4.154 postamble: In 10BROAD36, the bit pattern appended after the last bit of the Frame Check Sequence by the MAU. The Broadband End-of-Frame Delimiter (BEOFD). (See IEEE 802.3 clause 11.)

1.4.155 Priority Resolution Table: The look-up table used by Auto-Negotiation to select the network connection type where more than one common network ability exists (100BASE-TX, 100BASE-T4, 10BASE-T, etc.) The priority resolution table defines the relative hierarchy of connection types from the highest common denominator to the lowest common denominator. (See IEEE 802.3 clause 28.)

1.4.156 quad: *See:* **star quad**.

1.4.157 Reconciliation Sublayer (RS): A 100BASE-T mapping function that reconciles the signals at the MII to the MAC-PLS service definitions. (See IEEE 802.3 clause 22.)

1.4.158 remote fault: The generic ability of a link partner to signal its status even in the event that it may not have an operational receive link. (See IEEE 802.3 clause 28.)

1.4.159 renegotiation: Restart of the Auto-Negotiation algorithm caused by management or user interaction. (See IEEE 802.3 clause 28.)

1.4.160 repeater port: *See:* **port**.

1.4.161 repeater set: A repeater unit plus its associated Physical Layer interfaces (MAUs or PHYs) and, if present, AU or MI Interfaces (i.e., AUIs, MIIs).

1.4.162 repeater unit: The portion of a repeater that is inboard of its PMA/PLS or PMA/PCS interfaces.

1.4.163 repeater: A device used to extend the length, topology or interconnectivity of the physical medium beyond that imposed by a single segment, up to the maximum allowable end-to-end trunk transmission line length. Repeaters perform the basic actions of restoring signal amplitude, waveform, and timing applied to the normal data and collision signals. For wired star topologies, repeaters provide a data distribution function. In 100BASE-T, a device that allows the interconnection of 100BASE-T Physical Layer network