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ANSI/IEEE Std 802.5b

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Information technology — Local and metropolitan area networks — Token ring access method and physical layer specifications — Recommended practice for use of unshielded twisted pair cable (UTP) for token ring data transmission at 4 Mbit/s

Technologies de l'information — Réseaux locaux et urbains — Méthode d'accès par anneau à jeton et spécifications pour la couche physique — Pratique recommandée pour l'utilisation de paire de câbles torsadés sans protection pour transmission de données par anneau à jeton à 4 Mbits/s

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Information technology—Local and metropolitan area networks—Token ring access method and physical layer specifications—Recommended practice for use of unshielded twisted pair cable (UTP) for token ring data transmission at 4 Mbit/s

Sponsor

Technical Committee on Computer Communications
of the
IEEE Computer Society

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Abstract: The recommended practice for using unshielded twisted pair cables (UTP) for transmitting data at 4 Mb/s is described. Signal characteristics, unshielded twisted pair transmission characteristics, medium interface connection, cable routing, bit error rate, safety, and reliability are covered.

Keywords: token ring access method, token ring data transmission, token ring networks, unshielded twisted pair cable

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ISO/IEC TR 10738 : 1993

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The main task of technical committees is to prepare International Standards, but in exceptional circumstances a technical committee may propose the publication of a Technical Report of one of the following types:

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ISO/IEC TR 10738, which is a Technical Report of type 3, was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology.*

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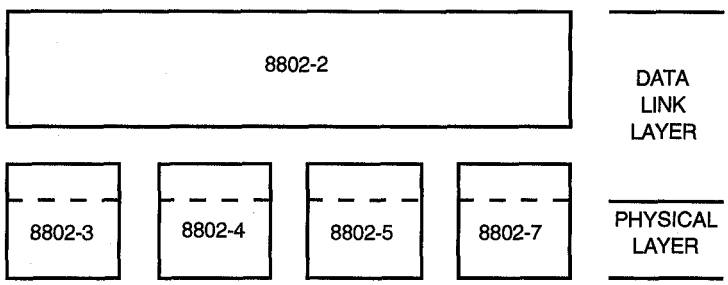
Foreword to Technical Report ISO/IEC TR 10738 : 1993

This technical report is part of a family of standards for Local and Metropolitan Area Networks. The relationship of the members of the family to each other is shown below. (The numbers in the figure refer to ISO standard numbers.)



This family of standards deals with the physical and data link layers as defined by the ISO Open Systems Interconnection Basic Reference Model (ISO 7498 : 1984). The access standards define four types of medium access technologies and associated physical media, each appropriate for particular applications or system objectives. Other types are under investigation.

The standards defining these technologies are as follows:

a) ISO/IEC 8802-3 [ANSI/IEEE Std 802.3, 1992 Edition], a bus utilizing CSMA/CD as the access method,
b) ISO/IEC 8802-4 [ANSI/IEEE Std 802.4-1990], a bus utilizing token passing as the access method,
c) ISO/IEC 8802-5 [ANSI/IEEE Std 802.5-1992], a ring utilizing token passing as the access method,
d) ISO 8802-7, a ring utilizing slotted ring as the access method.

ISO 8802-2 [ANSI/IEEE Std 802.2-1989], Logical Link Control protocol, is used in conjunction with the medium access standards.

The reader of this document is urged to become familiar with the complete family of standards.

ANSI/IEEE Std 802.5b, 1993 Edition

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Comments on standards and requests for interpretations should be addressed to:

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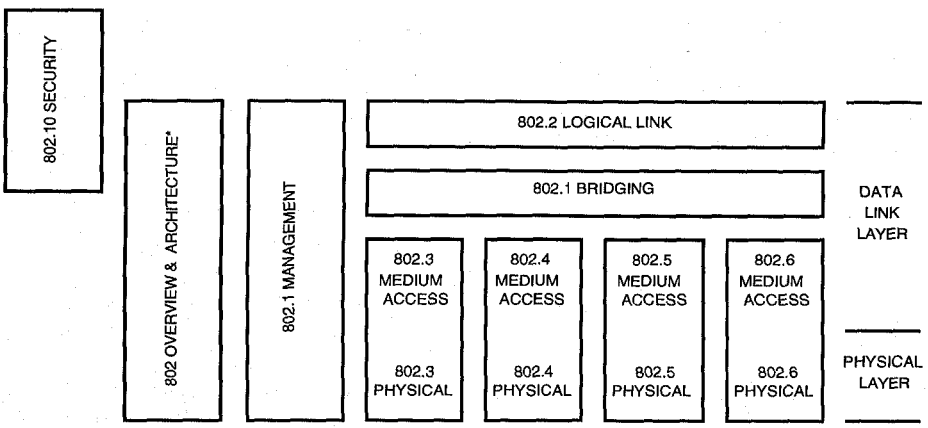
Foreword to ANSI/IEEE Std 802.5b, 1993 Edition

(This foreword is not a part of ANSI/IEEE Std 802.5b, 1993 Edition, IEEE Recommended Practice for Use of Unshielded Twisted Pair Cable (UTP) for Token Ring Data Transmission at 4 Mb/s.)

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



* Formerly IEEE Std 802.1A.

This family of standards deals with the Physical and Data Link Layers as defined by the ISO Open Systems Interconnection Basic Reference Model (ISO 7498 : 1984). The access standards define several types of medium access technologies and associated physical media, each appropriate for particular applications or system objectives. Other types are under investigation.

The standards defining these technologies are as follows:

- IEEE Std 802[1]: Overview and Architecture. This standard provides an overview to the family of IEEE 802 Standards. This document forms part of the 802.1 scope of work.
- IEEE Std 802.1D: MAC Bridging. Specifies an architecture and protocol for the interconnection of IEEE 802 LANs below the MAC service boundary.
- IEEE Std 802.1E: 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.
- ISO 8802-2 [ANSI/IEEE Std 802.2]: Logical Link Control
- ISO/IEC 8802-3 [ANSI/IEEE Std 802.3]: CSMA/CD Access Method and Physical Layer Specifications
- ISO/IEC 8802-4 [ANSI/IEEE Std 802.4]: Token Bus Access Method and Physical Layer Specifications
- ISO/IEC 8802-5 [ANSI/IEEE Std 802.5]: Token Ring Access Method and Physical Layer Specifications

[1]The 802 Architecture and Overview 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.

- IEEE Std 802.6: Metropolitan Area Network Access Method and Physical Layer Specifications

- IEEE Std 802.10: Interoperable LAN/MAN Security (SILS)—Secure Data Exchange (SDE) [*Currently contains* Secure Data Exchange (Clause 2)]

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

- IEEE Std 802.7: IEEE Recommended Practice for Broadband Local Area Networks

Conformance test methodology

An additional standards series, identified by the number 1802, has been established to identify the conformance test methodology documents for the 802 family of standards. This makes the correspondence between the various 802 standards and their applicable conformance test requirements readily apparent. Thus the conformance test documents for 802.3 are numbered 1802.3, the conformance test documents for 802.5 will be 1802.5, etc. Similarly, ISO will use 18802 to number conformance test standards for 8802 standards.

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. Information on the current revision status of this standard may be obtained by contacting

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The final conditions for approval of this recommended practice were met on June 26, 1991. This recommended practice was conditionally approved by the IEEE Standards Board on March 21, 1991, with the following membership:

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Contents

Information technology—
Local and metropolitan area networks—Token ring access method and physical layer specifications—Recommended practice for use of unshielded twisted pair cable (UTP) for token ring data transmission at 4 Mbit/s

1. Introduction to the recommended practice

This supplement to ISO/IEC 8802-5 : 1992 (ANSI/IEEE Std 802.5-1992) describes the recommended practice for using unshielded twisted pair cables (UTP) for transmitting data at 4 Mb/s. A standard to support token ring over unshielded twisted pair is a subject for future study.

1.1 Scope

There are many applications where UTP can be successfully used if noise sources are controlled as recommended in this document. The need to use existing wiring, or to minimize short-term installation costs, makes the decision to use UTP for 4 Mb/s token ring operation an appropriate business decision for many installations.

When UTP is used in the channel, the resulting token ring operation will be limited. The limitations include a maximum attach capability of 72 stations instead of 250. In addition, the error rate performance is highly dependent upon noise sources that may interfere with ring operation. Guidance is provided to help minimize ring error rate.

The transmit and receive waveforms are different from those described in 7.5 of ISO/IEC 8802-5 due to the need for media filters to prevent excessive electromagnetic radiation from the UTP and to control common-mode noise. The characteristics at the media filter are defined in clause 3. It is an element in the transmission signal path and is matched to the token ring transmitter and receiver. Since a media filter may be designed for a particular transmitter/receiver, it may not be suitable for use with other stations due to electromagnetic radiation compliance. Therefore, interchangeability of stand-alone UTP media filters across attaching stations is not assured by this practice.