

INTERNATIONAL STANDARD

ISO/IEC 8802-5

IEEE
Std 802.5

First edition
1992-06-12

Information technology — Local and metropolitan area networks —

Part 5: Token ring access method and physical layer specifications

iTeh STANDARD PREVIEW

(standards.iteh.ai)

Technologies de l'information — Réseaux locaux et urbains —

*Partie 5: Méthode d'accès par anneau à jeton et spécifications pour la couche
physique*

<https://standards.iteh.ai/catalog/standards/sist/016f4112-612b-4ea5-936d-3ab515af2da9/iso-iec-8802-5-1992>



Reference number
ISO/IEC 8802-5 : 1992 (E)
IEEE Std 802.5-1992

iTeh STANDARD PREVIEW (standards.iteh.ai)

[ISO/IEC 8802-5:1992](https://standards.iteh.ai/catalog/standards/sist/016f4112-612b-4ea5-936d-3ab515af2da9/iso-iec-8802-5-1992)

<https://standards.iteh.ai/catalog/standards/sist/016f4112-612b-4ea5-936d-3ab515af2da9/iso-iec-8802-5-1992>

The Institute of Electrical and Electronics Engineers, Inc.
345 East 47th Street, New York, NY 10017-2394, USA

© 1992 by the Institute of Electrical and Electronics Engineers, Inc.
All rights reserved. Published in 1992
Printed in the United States of America

ISBN 1-55937-205-2

*No part of this publication may be reproduced in any form,
in an electronic retrieval system or otherwise,
without the prior written permission of the publisher.*

International Standard ISO/IEC 8802-5 : 1992
IEEE Std 802.5-1992

(Revision of ANSI/IEEE Std 802.5-1989)

Information technology— Local and metropolitan area networks—

Part 5: Token ring access method and physical layer specifications

Sponsor

Technical Committee on Computer Communications
of the
IEEE Computer Society

Approved March 19, 1992
IEEE Standards Board
(standards.ieee.org)

Abstract: This Local and Metropolitan Area Network standard, ISO/IEC 8802-5 : 1992, is part of a family of local area network (LAN) standards dealing with the physical and data link layers as defined by the ISO Open System Interconnection Reference Model. Its purpose is to provide compatible interconnection of data processing equipment by means of a local area network using the token-passing ring access method. The frame format, including delimiters, addressing, and frame-check sequence, are defined, and medium access control (MAC) frames, timers, and priority stacks are defined. The MAC protocol is defined. The finite-state machine and state tables are supplemented with a prose description of the algorithms. The physical layer (PHY) functions of symbol encoding and decoding, symbol time, and latency buffering are defined. The services provided by the MAC to the station management (SMT) and the services provided by the PHY to SMT and the MAC are described. These services are defined in terms of service primitives and associated parameters. The 4 and 16 Mb/s, shielded twisted pair attachment of the station to the medium, including the medium interface connector (MIC) are also defined. The applications environment for the LAN is intended to be commercial and light industrial. The use of token ring LANs in home and heavy industrial environments, while not precluded, has not been considered in the development of the standard. A Protocol Implementation Conformance Statement (PICS) proforma is provided as an annex to the standard.

Keywords: data processing interconnection, local area network (LAN), medium access control (MAC), token ring



Adopted as an International Standard by the
International Organization for Standardization
and by the
International Electrotechnical Commission



Published by
The Institute of Electrical and Electronics Engineers, Inc.

International Standard ISO/IEC 8802-5 : 1992

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

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75% of the national bodies casting a vote.

In 1985, ANSI/IEEE Std 802.5-1985 was adopted by ISO Technical Committee 97, *Information processing systems*, as draft International Standard ISO/DIS 8802-5. A further revision was subsequently approved by ISO/IEC JTC 1 in the form of this new edition, which is published as International Standard ISO/IEC 8802-5 : 1992.

For the purpose of assigning global addresses, the Institute of Electrical and Electronics Engineers, Inc., USA, has been designated by the ISO Council as the Registration Authority. Communications on this subject should be addressed to

Registration Authority for ISO/IEC 8802-5
c/o The Institute of Electrical and Electronics Engineers, Inc.
445 Hoes Lane
P.O. Box 1331
Piscataway, NJ 08855-1331
USA

<https://standards.iteh.ai/catalog/standards/sist/016f4112-612b-4ea5-936d-5ab513af2da9/iso-iec-8802-5-1992>

During the preparation of this International Standard, information was gathered on patents upon which application of the standard might depend. Relevant patents were identified as belonging to Willemijn Holding BV. However, ISO cannot give authoritative or comprehensive information about evidence, validity or scope of patent and like rights. The patent-holder has stated that licences will be granted under reasonable terms and conditions and communications on this subject should be addressed to

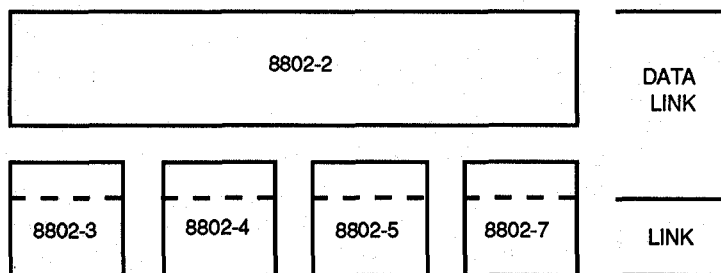
Willemijn Holding BV
Weena 723
P.O. Box 29193
3001 GD Rotterdam
The Netherlands



International Organization for Standardization/International Electrotechnical Commission
Case postale 56 • CH-1211 Genève 20 • Switzerland

Foreword to International Standard ISO/IEC 8802-5 : 1992

This standard is part of a family of standards for Local and Metropolitan Area Networks. The relationship between this standard and the other members of the family 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:

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

IEEE Std 802.5-1992

IEEE Standards documents are developed within the Technical Committees of the IEEE Societies and the Standards Coordinating Committees of the IEEE Standards Board. Members of the committees serve voluntarily and without compensation. They are not necessarily members of the Institute. The standards developed within IEEE represent a consensus of the broad expertise on the subject within the Institute as well as those activities outside of IEEE which have expressed an interest in participating in the development of the standard.

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

Comments for revision of IEEE Standards are welcome from any interested party, regardless of membership affiliation with IEEE. Suggestions for changes in documents should be in the form of a proposed change of text, together with appropriate supporting comments.

Interpretations: Occasionally questions may arise regarding the meaning of portions of standards as they relate to specific applications. When the need for interpretations is brought to the attention of IEEE, the Institute will initiate action to prepare appropriate responses. Since IEEE Standards represent a consensus of all concerned interests, it is important to ensure that any interpretation has also received the concurrence of a balance of interests. For this reason IEEE and the members of its technical committees are not able to provide an instant response to interpretation requests except in those cases where the matter has previously received formal consideration.

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

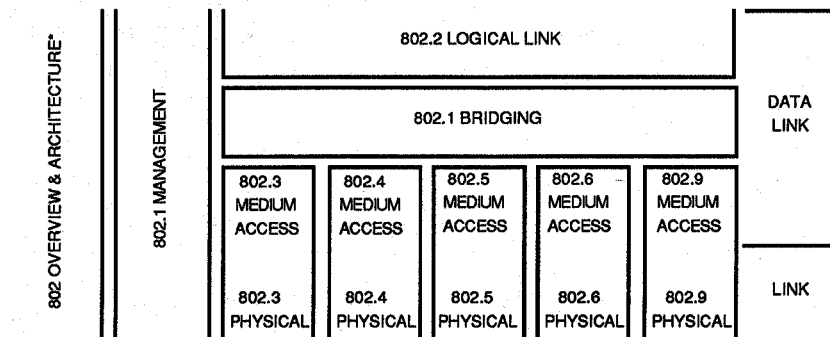
Secretary, IEEE Standards Board
445 Hoes Lane, P.O. Box 1331
Piscataway, NJ 08855-1331
USA

IEEE Standards documents are adopted by the Institute of Electrical and Electronics Engineers without regard to whether their adoption may involve patents on articles, materials, or processes. Such adoption does not assume any liability to any patent owner, nor does it assume any obligation whatever to parties adopting the standards documents.

Foreword to IEEE Std 802.5-1992

(This Foreword is not a part of this International Standard or of IEEE 802.5-1992.)

This standard 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.)



* 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[†]: 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.

[†] 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 802.1E: 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 [IEEE Std 802.5]: Token Ring Access Method and Physical Layer Specifications
- IEEE Std 802.6: Metropolitan Area Network Access Method and Physical Layer Specifications

In addition to the family of standards are technical advisory groups as follows:

- IEEE Std 802.7: Broadband Technical Advisory and Physical Layer Topics and Recommended Practices
- P802.8: Fiber Optic Technical Advisory and Physical Layer Topics

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

Conformance Test Methodology

A new 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, and so on. Similarly, ISO will use 1802 to number conformance test standards for 8802 standards.

ISO/IEC 8802-5 : 1992 (IEEE Std 802.5-1992)‡

This standard specifies that each octet of the information field shall be transmitted most significant bit (MSB) first. This convention is reversed from that used in the CSMA/CD and Token Bus standards, which are least significant bit (LSB) first transmission. While the transmission of MSB first is used for token ring, this does not imply that MSB transmission is preferable

‡ This standard contains the following supplements: IEEE Std 802.5d-1992 (Interconnected Token Ring LANs) and IEEE Std 802.5g-1992 (Conformance Testing).

1802h

for any other local area network. Anyone considering interconnecting the token ring with other standard IEEE networks should keep in mind the need to perform bit reordering in the gateway between networks.

The following are now or have been voting members of the Token Ring Access Method Working Group (P802.5). Those individuals who have served as rapporteurs or editors are indicated by an asterisk next to their name:

Robert A. Donnan, Chair

H. Abramowicz
Don Aelmore
Charles Amann
Steven C. Andersen
A. Philip Arneith*
Floyd Backes
Jarred J. Baker
Rey Bautista
Nicholas Beale*
Alan Beardsley*
Steve Belisle
Daniel Boudreau
Randall Blair
Charles Brill
Philip Brownlee
Patrik Bulteel
Dr. Werner Bux
Robert R. Campbell
Robert L. Carl
Claude A. Cartee
Hsin-Hwai Chen
Ramon Co
Michael H. Coden
Thomas Coradetti
Guy Crowles
John DeCramer
Rick Downs
Hanoeh Eldar
Mohamed Elrefai
Farzin Firoozmand
Gunnar Forsberg
Nathan Fritts
Yoshihiko Fujii
Ron W. Gibson
Harry Gold*
Richard H. Gompertz
Lisa Goulet
Andrew Green
Fred Greim
Siegmar Gross
Robert Grow
Tom Gulick
Lee C. Haas
Nubuhiro Hamada
Sharam Hakimi
Floyd Halsey
Charles F. Hanes*
Takeshi Harakawa
James Harrer

Clarence C. Joh
Arthur D. Jopling
Dave Juhre
Jiro Kashio
Carrell Killebrew
Lisa Kelley
Bryan B. Kim
Makoto Kuhno
David M. Kollm
Stan Kopec
William F. Kous
Robert Krebs
Robert Krzyzanowski
Eiji Kuje
David Laffitte
Bob Lapointe
Katie D. Lee*
Choon Lee
Laurie Lindsey
Robert D. Love*
Carl Madison
Alan C. Marshall*
Jeffrey V. Marshik*
Kelly P. McClellan
Jerry McKamey
John Melnick
John Messenger*
Colin Mick
Arthur Miller*
John E. Montague
Steven Moustakas
Bilal Murtaza
Narayan Murthy
Shigekatsu Nakao
W. B. Neblett
James Nelson
Ollie Nilsson
Andrew Norton
Brian O'Connell
Rasoul M. Oskouy
Kathleen Otis
Atul Pandya
Guy Parker
Dave Pearce
Dave Pfahler
Thanh Pham
Jeffrey Pickering
Richard Podgalsky
Kirk Preiss*

Claire Roden
Bob Ross
Floyd Ross
Jacques A. Roth
John Rovner*
Chris Roussel
Don Roworth
Mike Rubera
Howard Rubin
Said Saadeh
Howard Salwen
Haig A. Sarkissian
Gordon Saussy
W. L. Schumacker
Tim Shafer
Himanshu Shah
David Sheehy
Naoshi Shima
Marc Shoquist
W. S. Shung
Somsubhra Sikdar
Raymond Sit
Bob Smith
Robert Snyder
Michael J. Sobieski
Bob Southard
Louis Stankaitas
Leo Staschover
Ed Sterling
Tom Swarthout
Richard Sweatt
Andre Szczepanek
D. T. W. Sze
Hidenori Takahashi
Tokio Takai
Marco Tamilia
Paul Tan
V. Tarassov
Lars Thernsjo
Scott Thomas
Nathan Tobol
Jeff Tong
Art Torino
Akihisa Toyooka
John Trites
Paul A. Trudgett
Bo Viklund
John Q. Walker
Chang-Jung Wang

Bryan Hatfield
Carl G. Hayssen
Tricia Hill
J. Paul Hittel
Tom Hogan
Tetsuo Isayama
Ben Wilson
Peter Williams
Izumi Y. Wilson
Jacalyn Winkler*

John Rance
Ivan Reede
Francis E. Retnasothie
Everett O. Rigsbee III*
Andrew L. Ringwald*
Phil Robinson
Albert Wong
Howard D. Wright
Kazuhiko Yamada

Frank Wang
Ian Watson
Kevin White
R. O. Westlake
Jim Weisert
Kevin White
Barzilai Yoram
H. A. Zannini
Marshall Zerbo
Mo Zonoun

The following persons were on the balloting committee that approved IEEE Std 802.5-1992, IEEE Std 802.5d-1992 (Interconnected Token Ring LANs), and IEEE Std 802.5g-1992 (Conformance Testing) for submission to the IEEE Standards Board:

William B. Adams
Don Aelmore
Kit Athul
Yong Myung Baeg
Alan L. Bridges
George Carson
Brian J. Casey
George C. Chachis
Robert A. Ciampa
Gerald W. Cichanowski
Michael H. Coden
Robert Crowder
Robert Donnan
Sourav Dutta
John E. Emrich
Philip H. Enslow
Changxin Fan
John W. Fendrich
Harold C. Folts
Harvey A. Freeman
Patrick Gonia
Abraham Grund
Sandor V. Halasz
Joseph L. Hammond
Lee A. Hollaar
Ivy P. Hsu

Paul L. Hutton
Raj Jain
Jack R. Johnson
Reijo Juvonen
Robert W. Klessig
Jens Kolind
Jon Kramp
Michael Lawler
Jai Yong Lee
F. C. Lim
Randolph S. Little
Donald S. Little
Eduardo G. Marmol
William McDonald
Richard H. Miller
David S. Millman
C. B. Madhar Mishra
Wen Hsien Lim Moh
John E. Montague
Kinji Mori
Gerald Moseley
Charles E. Neblock
Ruth Nelson
Arne A. Nilsson
Donal O'Mahony
Charles Oestereicher
Andreas Pfitzmann

Rafat Pirzada
Urdo W. Pooch
Thad L. D. Regulinski
John P. Riganati
Gary S. Robinson
Philip T. Robinson
Victor Rozentouler
Norman Schneidewind
Jeffrey R. Schwab
Donald A. Sheppard
David M. Siefert
Robert K. Southard
Benjamin J. Stoppe, Jr.
Fred J. Strauss
Efsthathios Sykas
Steven R. Taylor
Geoffrey O. Thompson
Robert Tripi
James T. Vorhies
Donald F. Weir
Raymond Wenig
Michael Willett
Paul A. Willis
Jerry A. Wyatt
Oren Yuen
Stephen Zebrowski

When the IEEE Standards Board approved this standard on March 19, 1992, it had the following membership:

Marco W. Migliaro, *Chair*

Donald C. Loughry, *Vice Chair*

Andrew G. Salem, *Secretary*

Dennis Bodson
Paul L. Borrill
Clyde Camp
Donald C. Fleckenstein
Jay Forster*
David F. Franklin
Ramiro Garcia
Thomas L. Hannan

Donald N. Heirman
Ben C. Johnson
Walter J. Karplus
Ivor N. Knight
Joseph L. Koepfinger*
Irving Kolodny
D. N. "Jim" Logothetis
Lawrence V. McCall

Donald T. Michael*
John L. Rankine
Wallace S. Read
Ronald H. Reimer
Gary S. Robinson
Martin V. Schneider
Terrance R. Whittemore
Donald W. Zipse

*Member Emeritus

Also included are the following nonvoting IEEE Standards Board liaisons:

Satish K. Aggarwal
James Beall
Richard B. Engelman
Stanley Warshaw

iTeh STANDARD PREVIEW

(standards.iteh.ai)

Paula M. Kelty
IEEE Standards Project Editor

ISO/IEC 8802-5:1992

<https://standards.iteh.ai/catalog/standards/sist/016f4112-612b-4ea5-936d-3ab515af2da9/iso-iec-8802-5-1992>

Contents

SECTION	PAGE
1. General	15
1.1 Scope	15
1.2 Definitions	16
1.3 Abbreviations	19
1.4 References	21
1.5 Conformance Requirements	22
1.5.1 Static Conformance Requirements	22
1.5.2 Dynamic Conformance Requirements	23
2. General Description	25
3. Formats and Facilities	29
3.1 Formats	29
3.1.1 Token Format	29
3.1.2 Frame Format	29
3.1.3 Fill	30
3.2 Field Descriptions	30
3.2.1 Starting Delimiter (SD)	30
3.2.2 Access Control (AC)	30
3.2.3 Frame Control (FC)	31
3.2.4 Destination and Source Address (DA and SA) Fields	32
3.2.5 Routing Information (RI) Field	35
3.2.6 Information (INFO) Field	35
3.2.7 Frame-Check Sequence (FCS)	37
3.2.8 Ending Delimiter (ED)	37
3.2.9 Frame Status (FS)	38
3.3 Medium Access Control (MAC) Frames	38
3.3.1 Vector Description	39
3.3.2 Subvector Descriptions	41
3.3.3 Table of MAC Frames	44
3.4 Timers	44
3.4.1 Timer, Return to Repeat (TRR)	44
3.4.2 Timer, Holding Token (THT)	44
3.4.3 Timer, Queue PDU (TQP)	44
3.4.4 Timer, Valid Transmission (TVX)	44
3.4.5 Timer, No Token (TNT)	44
3.4.6 Timer, Active Monitor (TAM)	45
3.4.7 Timer, Standby Monitor (TSM)	45
3.4.8 Timer, Error Report (TER)	45
3.4.9 Timer, BCN Transmit (TBT)	45
3.4.10 Timer, BCN Receive (TBR)	45
3.5 Flags	45
3.5.1 I Flag	45
3.5.2 SFS Flag	45

SECTION	PAGE
3.5.3 MA Flag	45
3.5.4 SMP Flag	45
3.5.5 NN Flag	45
3.5.6 BR Flag	45
3.5.7 ETR Flag	45
3.5.8 NOT_MA Flag	48
3.6 Priority Registers and Stacks	48
3.6.1 Pr and Rr Registers	48
3.6.2 Sr and Sx Stacks	48
3.7 Latency Buffer	48
3.8 Counters	48
3.8.1 Line Error	48
3.8.2 Internal Error	48
3.8.3 Burst Error	48
3.8.4 AC Error	48
3.8.5 Abort Delimiter Transmitted (AD_TRANS).....	49
3.8.6 Lost Frame Error (LOST_FR)	49
3.8.7 Receive Congestion Error (RCV_CON)	49
3.8.8 Frame Copied Error (FR_COPIED)	49
3.8.9 Frequency Error (FREQ)	49
3.8.10 Token Error	49
3.8.11 Frame Count (FR_CNT)	49
4. Token Ring Protocols	51
4.1 Overview	51
4.1.1 Frame Transmission	51
4.1.2 Token Transmission	51
4.1.3 Stripping	51
4.1.4 Frame Reception	51
4.1.5 Priority Operation	52
4.1.6 Beaconing and Neighbor Notification	53
4.1.7 Error Reporting	55
4.1.8 Administration of Ring Parameters	55
4.1.9 Configuration Control	55
4.1.10 Early Token Release (ETR)	55
4.2 Specification	55
4.2.1 Receive Actions	56
4.2.2 Operational Finite-State Machine	58
4.2.3 Standby Monitor Finite-State Machine	62
4.2.4 Active Monitor Finite-State Machine	67
5. Physical Layer	71
5.1 Symbol Encoding	71
5.2 Symbol Decoding	72
5.3 Data Signaling Rates	73
5.4 Symbol Timing	73

SECTION	PAGE
5.5 Latency Buffer	73
5.5.1 Assured Minimum Latency	73
5.5.2 Phase Jitter Compensation	73
6. Service Specifications	75
6.1 MAC to LLC Service	75
6.2 PHY to MAC Service	75
6.2.1 Interactions	75
6.2.2 Detailed Service Specifications	76
6.3 MAC to SMT Interaction	77
6.3.1 Overview of MAC Interaction	77
6.3.2 MAC Attributes	78
6.3.3 MAC Transients	80
6.4 PHY to SMT Interaction	83
6.4.1 Overview of PHY Management Interaction	83
6.4.2 PHY Transients	83
7. Station Attachment Specifications	85
7.1 Scope	85
7.2 Overview	85
7.3 Coupling of the Station to the Ring	86
7.4 Ring Access Control	86
7.4.1 Current and Voltage Limits	86
7.4.2 Insertion/Bypass Transfer Timing	88
7.5 Signal Characteristics	88
7.5.1 The Transmitter	88
7.5.2 The Channel	89
7.5.3 The Receiver	90
7.5.4 Error Rate	92
7.6 Reliability	93
7.7 Safety Requirements	93
7.8 Electromagnetic Emanation	93
7.9 Medium Interface Connector (MIC)	94
7.9.1 Medium Interface Connector—Contactor Detail	94
7.9.2 Medium Interface Connector—Locking Mechanism Detail	94

FIGURES AND TABLE	PAGE
Fig 2-1 Relation of OSI Reference Model to the LAN Model	25
Fig 2-2 Token Ring Configuration	26
Fig 2-3 Relationship of Data Stations, Servers, and System Manager	27
Fig 3-1 MAC Frame Information Field Structure	35
Fig 4-1 An Example of a Failure Domain	54
Fig 4-2 Receive Action Table	57
Fig 4-3 Operational Finite-State Machine	59
Fig 4-4 Repeat State Loop Table	60
Fig 4-5 Standby Monitor Finite-State Machine	64
Fig 4-6 Standby State Transition Loop Table	66
Fig 4-7 Active Monitor Finite-State Machine	68
Fig 5-1 Example of Symbol Encoding	72
Fig 7-1 Partitioning of PHY and Medium	85
Fig 7-2 Example of Station Connection to the Medium	87
Fig 7-3 Receive Signal Eye Pattern	90
Fig 7-4 Medium Interface Connector—Isometric View	93
Fig 7-5 Medium Interface Connector—Contactor Detail	95
Fig 7-6 Medium Interface Connector—Locking Mechanism Detail	96
Table 3-1 MAC Frames	46

ITIH STANDARD PREVIEW
(standards.iteh.ai)

[ISO/IEC 8802-5:1992](https://standards.iteh.ai/catalog/standards/sist/016f4112-612b-4ea5-936d-3ab515af2da9/iso-iec-8802-5-1992)

<https://standards.iteh.ai/catalog/standards/sist/016f4112-612b-4ea5-936d-3ab515af2da9/iso-iec-8802-5-1992>