



Standard Guide for Digital Communication Protocols for Computerized Systems¹

This standard is issued under the fixed designation F1757; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 The principal content of this guide provides a road map to implement a communication network applicable to ship and marine computer systems by:

1.1.1 Examining the relationship of digital communication protocols as a network technological infrastructure,

1.1.2 Outlining the basic building blocks of network topologies and transmission techniques associated with the implementation of transmission media in a network environment; and,

1.1.3 Identifying operating system and environments.

1.2 Using the Open System Interconnection (OSI) model, which provides a layered approach to network functionality and evaluation, common network communications protocols are identified and characterized in this guide according to lower and upper layer protocols corresponding to their degree and type of functionality.

1.3 Although it is desirable that network users, designers, and administrators recognize and understand every possible networking protocol, it is not possible to know the intimate details of every protocol specification. Accordingly, this guide is not intended to address fully every hardware and software protocol ever developed for commercial use, which spans a period of about 25 years. Instead, the user of this guide will be introduced to a brief overview of the majority of past and present protocols which may comprise a ship or marine internetwork, to include Local Area Networks (LANs), Wide Area Networks (WANs), and related hardware and software that provide such network interoperability and data transfer.

1.4 While this guide provides an understanding of the wide range of communication protocols, the user is recommended to consult the reference material for acquiring a more comprehensive understanding of individual communication protocols. However, by examining the basic functions of protocols and reviewing the protocol characterization criteria identified in

this guide, the user will be more apt to understanding other protocols not mentioned or addressed herein.

2. Referenced Documents

2.1 *ASTM Standards*:²

E1013 Terminology Relating to Computerized Systems
(Withdrawn 2000)³

2.2 *ANSI Standards*:⁴

X3T9.5 High Speed Local Network

X3.139 Fiber Distributed Data Interface (FDDI) – Token Ring Media Access Control (MAC)

X3.148 Fiber Distributed Data Interface (FDDI)– Token Ring Physical Layer Protocol (PHY)

X3.166 Fiber Distributed Data Interface (FDDI) – Token Ring Physical Layer Medium Dependent (PMD)

X3.172 American National Standard Dictionary for Information Systems

2.3 *IEEE Standards*:⁵

100 Standard Dictionary for Electrical and Electronic Terms
610 Standard Glossary for Software Engineering Terminology

610.7 Standard Glossary of Computer Networking Terminology

802.1 High Level Interface (Internetworking)

802.2 Logical Link Control

802.3 CSMA/CD Medium Access Control

802.4 Token Bus Medium Access Control

802.5 Token Ring Medium Access Control

802.6 Metropolitan Area Networking

802.8 Fiber Optic Technical Advisory Group

802.9 Local and Metropolitan Area Networks: Integrated Services (IS) LAN Interface at the Medium Access Control (MAC) and Physical (PHY) Layers

¹ This guide is under the jurisdiction of ASTM Committee F25 on Ships and Marine Technology and is the direct responsibility of Subcommittee F25.05 on Computer Applications.

Current edition approved May 1, 2015. Published June 2015. Originally approved in 1996. Last previous edition approved in 2008 as F1757 – 96 (2008). DOI: 10.1520/F1757-96R15.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ The last approved version of this historical standard is referenced on www.astm.org.

⁴ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

⁵ Available from Institute of Electrical and Electronics Engineers, Inc. (IEEE), 445 Hoes Ln., P.O. Box 1331, Piscataway, NJ 08854-1331, <http://www.ieee.org>.