


**Mc
Graw
Hill**

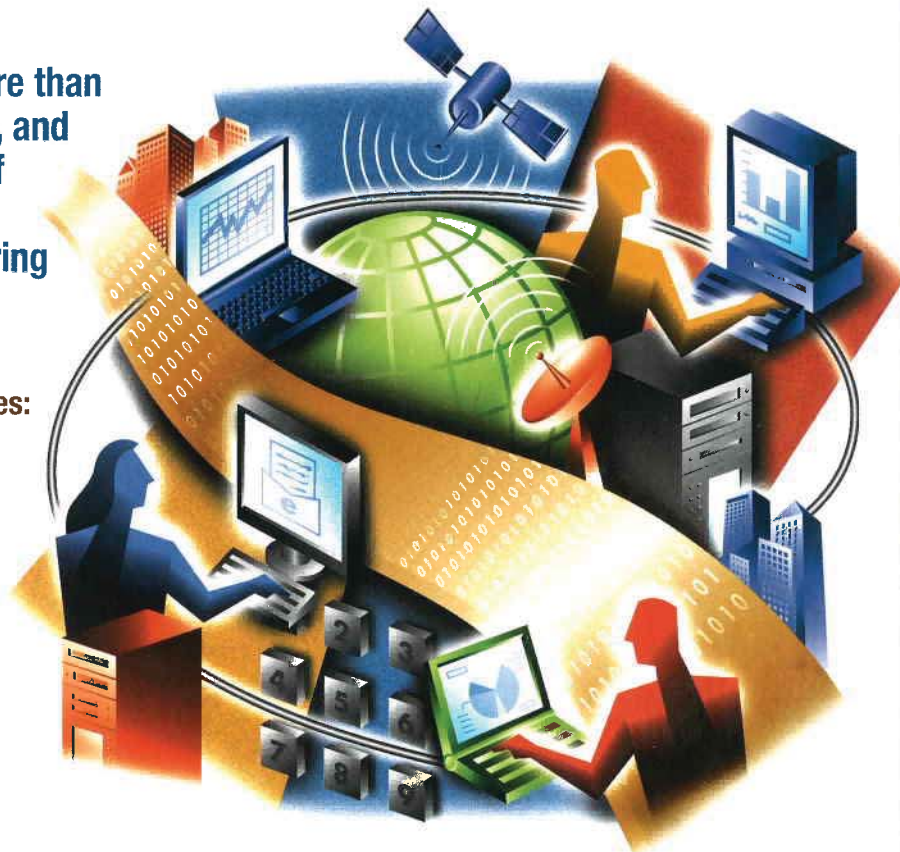
**[Thoroughly Explains More Than
1,400 Networking Concepts]**

Encyclopedia of Networking & Telecommunications

 **CD contains more than
5,000 hyperlinks, and
a complete set of
cross-referenced
Internet engineering
documents**


**Covers emerging technologies:
all-optical networks,
broadband access,
wireless computing, QoS,
.NET, and more**

**Addresses vendor-specific
technologies: Microsoft®,
Cisco®, IBM®, Juniper®,
Nortel®, Sun®, and others**



Tom Sheldon

Certified Network Engineer and author of the best-selling
Encyclopedia of Networking, Electronic Edition

OSBORNE 

**DOCKET
ALARM**

Find authenticated court documents without watermarks at docketalarm.com.

McGraw-Hill Encyclopedia of Networking & Telecommunications

Tom Sheldon

Osborne/McGraw-Hill

New York Chicago San Francisco
Lisbon London Madrid Mexico City
Milan New Delhi San Juan
Seoul Singapore Sydney Toronto

Osborne/McGraw-Hill
2600 Tenth Street
Berkeley, California 94710
U.S.A.

To arrange bulk purchase discounts for sales promotions, premiums, or fund-raisers, please contact Osborne/McGraw-Hill at the above address. For information on translations or book distributors outside the U.S.A., please see the International Contact Information page immediately following the index of this book.

McGraw-Hill Encyclopedia of Networking & Telecommunications

Copyright © 2001 by The McGraw-Hill Companies. All rights reserved. Printed in the United States of America. Except as permitted under the Copyright Act of 1976, no part of this publication may be reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the prior written permission of the publisher, with the exception that the program listings may be entered, stored, and executed in a computer system, but they may not be reproduced for publication.

1234567890 DOC DOC 01987654321

Book p/n 0-07-212005-3 and CD p/n 0-07-212005-3
parts of
ISBN 0-07-212005-3

Publisher

Brandon A. Nordin

Vice President & Associate Publisher

Scott Rogers

Acquisitions Editors

Wendy Rinaldi and Ann Sellers

Project Editor

Lisa Wolters-Broder

Acquisitions Coordinator

Timothy Madrid

Technical Editor

Dan Logan

Copy Editor

Dennis Weaver

Proofreaders

Linda and Paul Medoff

Indexer

Jack Lewis

Computer Designers

Michelle Galicia

Tara A. Davis

Illustrator

Michael Mueller

Series Design

Peter F. Hancik

Cover Design

Amparo del Rio

This book was composed with Corel VENTURA™ Publisher.

Information has been obtained by Osborne/McGraw-Hill from sources believed to be reliable. However, because of the possibility of human or mechanical error by our sources, Osborne/McGraw-Hill, or others, Osborne/McGraw-Hill does not guarantee the accuracy, adequacy, or completeness of any information and is not responsible for any errors or omissions or the results obtained from use of such information.

HDLC (High-Level Data Link Control)

HDLC is a bit-oriented, link layer protocol for the transmission of data over synchronous networks. It is an ISO standard, but is a superset of IBM's SDLC (Synchronous Data Link Control) protocol. SDLC was the successful follow-up to the BISYNC communication protocol and was originally introduced with IBM SNA (Systems Network Architecture) products. Another name for HDLC is ADCCP (Advanced Data Communications Control Procedure), an ANSI standard, but HDLC is the widely accepted name for the protocol. There are some incompatibilities between SDLC and HDLC, depending on the vendor.

HDLC is bit oriented, meaning that the data is monitored bit by bit. Transmissions consist of binary data without any special control codes. Information in the frame contains control and response commands, however. HDLC supports full-duplex transmission in which data is transmitted in two directions at the same time, resulting in higher throughput. HDLC is suitable for point-to-point and multipoint (multidrop or one-to-many) connections. Subsets of HDLC are used to provide signaling and control data links for X.25, ISDN, and frame relay networks.

When an HDLC session is established, one station, called the *primary station*, is designated to manage the flow of data. The other station (or stations) is designated as the *secondary station*. The primary station issues commands, and the secondary stations issue responses. There are three possible connection methods, as shown in Figure H-1. The top two support either

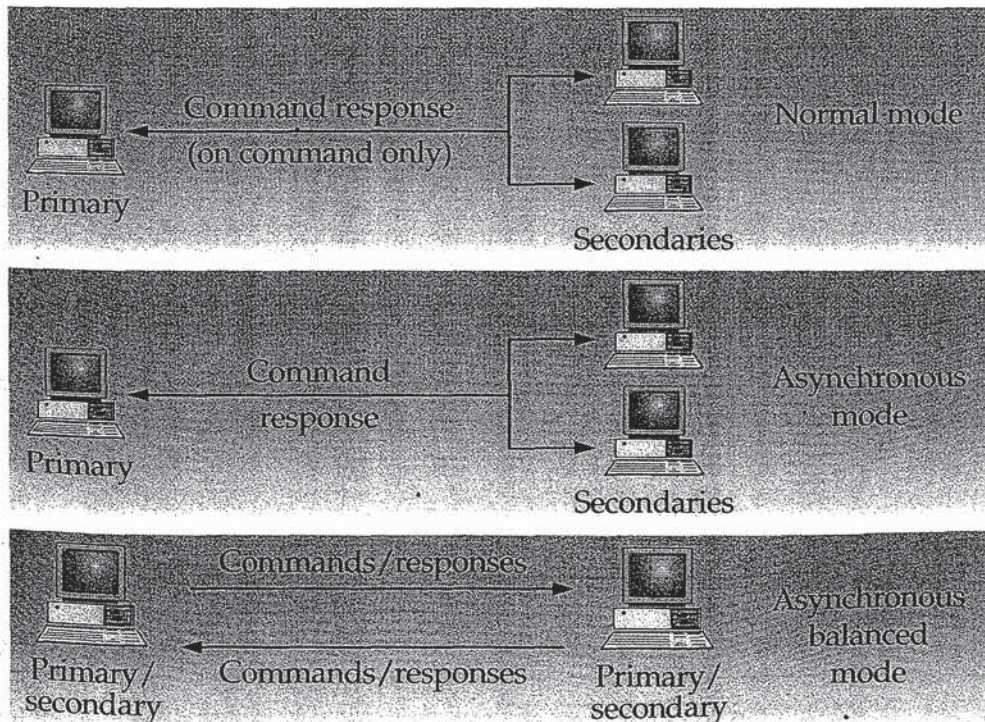


Figure H-1. HDLC connection methods

point-to-point connections between two systems, or *multipoint* connections between a primary station and two or more secondary stations:

- The normal mode is unbalanced because the secondary station can only transmit when permitted to do so by the primary station.
- The asynchronous mode is also unbalanced, but the secondary station may initiate a transmission on its own.
- The asynchronous balanced mode is designed for point-to-point connections between two computers over a duplex line. Each station can send commands and responses over its own line and receive commands and responses on the duplexed line. This is the mode used to connect stations to X.25 packet-switched networks.

The HDLC frame defines the structure for delivering data and command/response messages between communicating systems. The frame is pictured in Figure H-2 and described here:

- The Flag fields contain the bit sequence 01111110, which indicates the beginning and end of the HDLC frame. If any portion of the data in the frame contains more than five 1 bits, a *zero-bit insertion* technique inserts a 0 bit to ensure that data is not mistaken for a flag.
- The Address field generally contains the address of a secondary station. This field is normally 8 bits, but extended addressing is possible for multipoint connections that contain many different addresses. A broadcast address can also be inserted in the field to send messages to all stations in a multipoint connection.
- The Control field identifies the information contained in the frame as data, commands, or responses. Commands are sent by the primary station, and responses are sent by the secondary station. The control information can acknowledge frames, request retransmission of frames, or request a suspension of transmission, as well as other commands and responses.

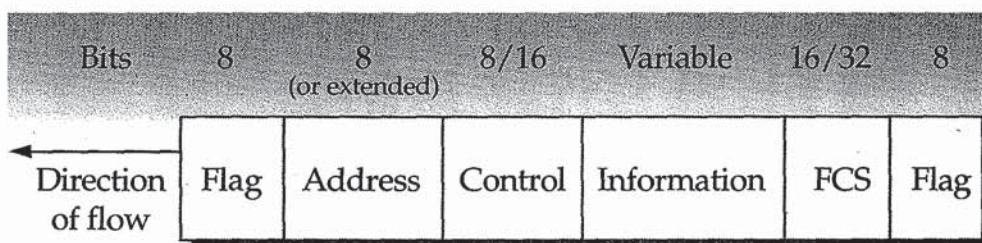


Figure H-2. HDLC frame definition

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.