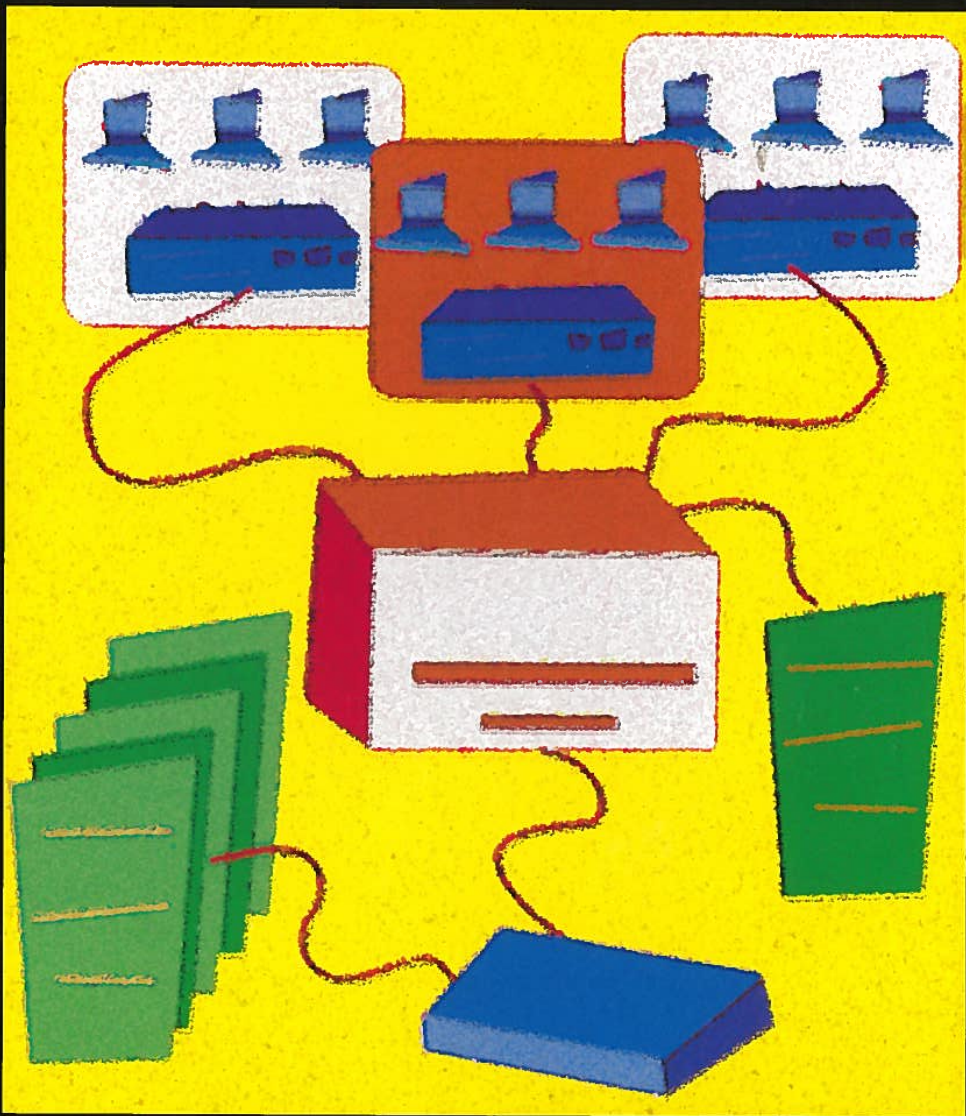


TECHNOLOGY AND APPLICATIONS FOR HIGH-SPEED LANs

# GIGABIT ETHERNET



DOCKET  
ALARM

Find authenticated court documents without watermarks at [docketalarm.com](https://docketalarm.com).

**GIGABIT ETHERNET**

**RICH SEIFERT**



# Gigabit Ethernet

## Technology and Applications for High-Speed LANs

**Rich Seifert**



**Addison-Wesley**

**An imprint of Addison Wesley Longman, Inc.**  
Reading, Massachusetts • Harlow, England • Menlo Park, California  
Berkeley, California • Don Mills, Ontario • Sydney • Bonn  
Amsterdam • Tokyo • Mexico City

Many of the designations used by manufacturers and sellers to distinguish their products are claimed as trademarks. Where those designations appear in this book and Addison-Wesley was aware of a trademark claim, the designations have been printed in initial caps or all caps.

The author and publisher have taken care in the preparation of this book, but make no expressed or implied warranty of any kind and assume no responsibility for errors or omissions. No liability is assumed for incidental or consequential damages in connection with or arising out of the use of the information or programs contained herein.

The publisher offers discounts on this book when ordered in quantity for special sales. For more information, please contact:

Corporate, Government, and Special Sales  
Addison Wesley Longman, Inc.  
One Jacob Way  
Reading, Massachusetts 01867

*Library of Congress Cataloging-in-Publication Data*

Seifert, Rich, 1952–

Gigabit Ethernet: technology and applications for high-speed  
LANs / Rich Seifert.

p. cm.

Includes bibliographical references and index.

ISBN 0-201-18553-9

1. Ethernet (Local area network system) I. Title.

TK5105.8.E83S45 1998

621.39'81—dc21

98-9357

CIP

Copyright © 1998 by Addison Wesley Longman, Inc.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form, or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior consent of the publisher. Printed in the United States of America. Published simultaneously in Canada.

ISBN 0-201-18553-9

Text printed on recycled and acid-free paper.

1 2 3 4 5 6 7 8 9 10-MA-0201009998

First printing, April 1998

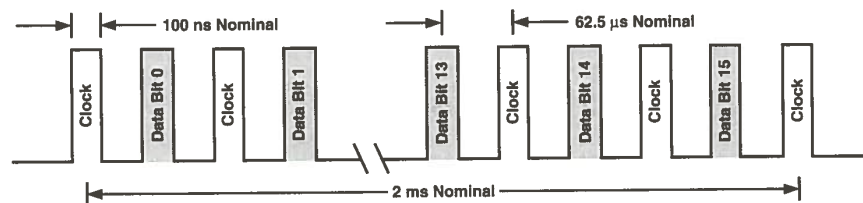


Figure 8-3 Auto-Negotiation signaling.

The entire message is repeated, nominally at 16-ms intervals, until the negotiation is complete.

#### 8.2.4.3 Automatic Configuration without Auto-Negotiation

A device can easily detect whether the signals it is receiving were generated using 10BASE-T, 100BASE-TX, or 100BASE-T4. In the case of 10BASE-T, every device emits characteristic “link pulses” every 16 ms when the link is idle; this constitutes an unmistakable signature.<sup>11</sup> In the case of 100BASE-TX and 100BASE-T4, the signal levels, timing, and encoding used are sufficiently different that determination of the link’s nature can be made without the use of Auto-Negotiation. This is often called “parallel detection.”

Thus it is possible to automatically configure to any of these three signaling methods without implementing the negotiation protocol. Doing this is fairly common, and it slightly lowers the cost of a product.

However, a great deal of flexibility is lost by not using Auto-Negotiation:

- It is not possible to implement automatic dual-speed capability (for example, 10 Mb/s and 100 Mb/s).
- It is not possible to determine duplex mode.
- It is not possible to determine flow control capability.

The default assumption if Auto-Negotiation is not employed is that the link is operating in half-duplex mode, without explicit flow control. Thus devices not implementing Auto-Negotiation are generally those with only a single mode of operation, for example, a 100BASE-TX (only) repeater hub or a 10BASE-T (half-duplex-only) controller, where there is nothing to be gained by implementing Auto-Negotiation.

11. Also called “link beat,” these pulses are used to ensure that the link is physically connected. It is the detection of this pulse that usually enables a “Link LED” on a 10BASE-T controller or hub port.