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Telecommunication System Engineering

Analog and Digital Network Design

Roger L. Freeman



E8051193

A Wiley-Interscience Publication

JOHN WILEY & SONS

New York • Chichester • Brisbane • Toronto

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Library of Congress Cataloging in Publication Data:

Freeman, Roger L

Telecommunication system engineering.

"A Wiley-Interscience publication."

Includes index.

1. Telecommunication systems—Design and construction. 2. Telephone systems—Design and construction. I. Title.

TK5103.F68

1980

621.38

79-26661

ISBN 0-471-02955-6

Printed in the United States of America

10 9 8 7 6 5 4 3 2 1

Telecommunication System Engineering

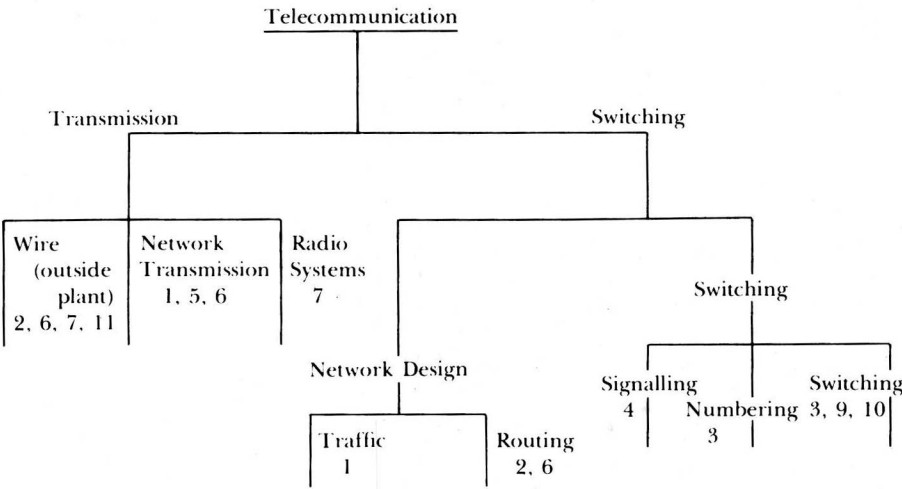
To my father, Andrew A. Freeman

PREFACE

The purpose of this text is to present the general engineering considerations necessary for the design of practical telecommunication networks. The majority of today's networks are built primarily to serve the telephone subscriber. These same networks are being more and more extensively used to carry other types of information such as data, facsimile, and video. The first seven chapters of this text deal with conventional telephony. The remainder of the book covers digital communication, in particular, data systems and digital telephony.

I define telecommunication as a service that permits people or machines to communicate at a distance. It involves many disciplines that work together to form a system.

Traditionally, telecommunication is broken down into two major categories of engineering: transmission and switching. Each major category in itself is broken down into well-definable specialties or disciplines as shown below:



(Numbers are chapter references)

The advent of data communications on the one hand, and digital telephony, on the other, caused the distinct separation of disciplines to become rather hazy and ill defined. In fact, with integrated digital telephone

networks and packet-switched data networks, the dividing lines disappeared almost entirely. The change is revolutionary.

I have organized the text to reflect both tradition and revolution. Conventional analog telecommunication has been with us since the late nineteenth century and will be with us for the remainder of the twentieth century at least. Digital systems are in their infancy and will mature over the next 20 to 30 years. My aim has been to give the reader a practical appreciation of both. Actually, I do not believe that a proper job of system engineering design can be done on a digital network without a solid background of conventional analog techniques.

ROGER L. FREEMAN

Sudbury, Massachusetts

February 1980

ACKNOWLEDGMENTS

I am deeply indebted to Peter Gerrand of Australia Telecommunications Research who encouraged me to pursue this effort and helped me to prepare the final outline. Subsequently, Peter was good enough to review several chapters. The work also benefited immensely from the review of many other friends and colleagues of mine in the telecommunications industry and academic community. Among these are Dr. Enric Vilar, Professor of Telecommunication Engineering at Portsmouth Polytechnic University (UK); Edmund Kiatapov on assignment to ITT Laboratories Spain from LCT Velizy (France); Norman Doving, Fundación Chile, Santiago; Dr. Dan Varon, Larry Miller, and Hi Stevens from Raytheon's Equipment Division, Sudbury, Ma.; Dr. G. Shanholt and Donald J. Marsh from ITT's Telecommunication Technology Center, Stratford, Conn.; and Robert (Fritz) Gellerman from the Interamerican Development Bank. The assistance of Ray Fraser of Raytheon's Missile System Division is also appreciated. My wife, Paquita, is to be commended for her patience and fortitude during the long period of preparation and cycle of review.

R.L.F.



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