

Preface

Telecommunications networks for public and private use are possibly among the largest interconnected systems in the world. The world-wide public telephone service is provided by a network interconnecting more than 350 million telephones. A telecommunications network consists of terminals, transmission links and switching centres. The principles underlying the design of the transmission and terminal components are well established and have a coherence. In contrast there appears to be a multitude of different approaches to the design of the switching centre component. One object of this book is to develop a coherent set of principles for the design of these centres.

Several practical examples are described of different systems around the world to demonstrate the application of the principles and to give the reader a background knowledge of the state of art. Most of these examples are taken from the public telephone network as it is in this network the principles were evolved. However, the principles are shown to apply equally to other types of switching systems such as data networks or private telephone systems. The original intention was to include a wide range of system descriptions but reasons of economy dictated their omission. The choice of systems actually included was random and omissions include many of the major systems currently available.

The majority of switching equipment in public use today is still built from electro-mechanical components such as relays. Much of this technology will be unfamiliar to recently qualified engineers and some of the book is devoted to describing its application.

The use of computers and, more recently, micro-processors is bringing a revolution in the design of switching systems, and a significant proportion of the book is devoted to such systems. However, it is suggested (in Chapter 13) that some of the earlier design of computer-controlled switching centres could have been improved if they had more fully adopted the design principles developed for the electro-mechanical systems.

The book should be of value to an engineer with an electronic engineering, computer systems or conventional switching background who has either to design or to operate a switching system or who needs to use one. It could form the basis of a final year course in telecommunication engineering, teleprocessing or real-time computer systems. Apart from some mathematics associated with the traffic and queueing theory chapter, the only prerequisite knowledge is that of basic electronics and in certain sections a background knowledge of computers and programming.

The book is based on courses given at postgraduate level in the University of Essex M.Sc. in Telecommunications Systems, to numerous classes of new entrants to the British Post Office and to many audiences around the world.

The book in its current form has been made possible by the interaction with numerous colleagues within the Electrical Engineering Department, University of Essex and in the British Post Office, GEC, Plessey, Standard Telephone and Cables, Pye-TMC and Thorn-Ericsson in the U.K. Abroad, the strongest influence has been from the Nippon Telegraph and Telephone Public Corporation (NTT) where I spent a sabbatical leave in their Electrical Communications Laboratories in the Tokyo area. I am particularly grateful to Malcolm Hamer who has painstakingly read several drafts of the book and in many detailed discussions assisted me in removing much of the obscurity in the earlier drafts.

I should like to express my gratitude to the British Post Office whose financial support of the Telecommunications group within the Department of Electrical Engineering Science has made possible the environment in which the concepts described in the book have been developed and tested. My hope is that some of the ideas discussed in the book will go towards improving the design of telephone switching systems.

Finally, I must thank my publisher Roger Jones for his apparently groundless faith that I would actually get the book finished albeit five years later than originally planned. Without his continued encouragement even this version would not have appeared.