



# DEVELOPMENTS IN TELE- COMMUNICATIONS

**Second Edition**

*The views expressed in this book  
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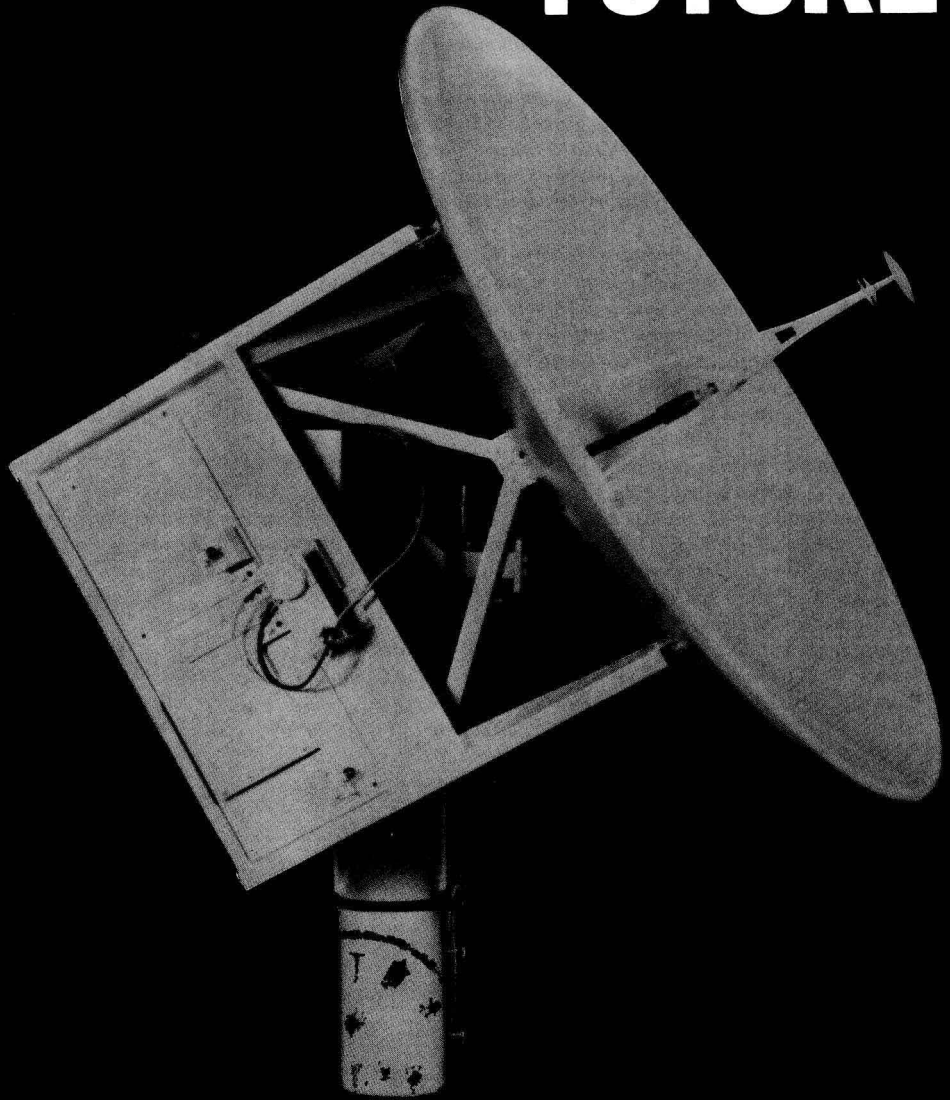
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# FUTURE



TO CHARITY



## THE STRUCTURE OF THE BOOK

A reader without a technical background can read this section of the book, without PART III.

{ PROLOGUE.

{ PART I: TELECOMMUNICATIONS  
AND ITS USES.

{ PART II: SYNTHESIS.

More detailed technical discussion is saved for PART III.

{ PART III: TECHNOLOGY.

The glossary gives the meaning of most telecommunications terminology.

{ GLOSSARY.

# BOX A Uses for Telecommunications Links

	S = Switched L = Leased line B = Broadcast	One-way or two-way?	C = Continuous B = Burst	Real-time?	Typical bandwidth (kilohertz)	Typical bit rate (thousands of bits per second)
Telephone	L,S	2	C	Yes	4	20 to 56
Picturephone	L,S	2	C	Yes	1,000	6.3
Sound broadcasting (low fidelity)	B	1	C	Yes	7.5	50 to 200
Sound broadcasting (high fidelity)	B	1	C	Yes	40	200-800
Television broadcasting	B	1	C	Yes	4,600	40,000 to 92,500
Large wall screen television	L,B	1	C	Yes	20,000 to 50,000	20,000 to 100,000
Closed circuit telephone intercom	L	2	C	Yes	4	20 to 56
Closed circuit television intercom	L	2	C	Yes	4,600	40,000 to 92,500
Still picture video telephone	L,S	2	C: voice B: picture	Yes	4 or higher	20 or higher
Still pictures on television screen	L,B	2*	B	Yes	40 or higher	400 or higher
Text on television screen	L,B	1 or 2	B	Yes		
Telegraphy	L,S	2	B	No		
Mailgram	S	1	B	No		
Facsimile	L,S	1	B	No		
Tele-photograph transmission	L,S	1	B	No		
Electronic mail delivery	L,S	1	B	No		

Electronic fund (cash) transfer	L,S	1	B	Yes or No	
Automatic meter reading (utilities)	S	1	B	Yes or No	Low
Music library	L,S	2*	C	Yes or No	200-800
Movie selection in the home	L,S	2*	C	Yes or No	40,000 to 92,500
Stored television	L,S	1	C	No	
Radio paging	B	1	B	Yes	Variable
Citizen's band radio	B	2	C	Yes	10
Radio dispatching	B	2	C	Yes	25-50
Radio telephone	B	2	C	Yes	25-50
Vehicle location monitoring	L	1	B	Yes	0.1
Vehicle traffic control	L	2	B	Yes	2 to 10
Radar		2	C	Yes	500
Interconnection between computers	L,S	2*	B	Yes or No	Any
Batch data transmission	L,S	2*	B	No	
Access to time-shared computers	L,S	2	B	Yes	0.1 to 4
Real-time systems such as airline reservations	L,S	2	B	Yes	0.1 to 4
Fast alphanumeric man-computer dialogue	L,S	2	B	Yes	2.4 to 10
Man-computer dialogue with graphics (line drawings)	L,S	2*	B	Yes	2.4 to 50
Man-computer dialogue with still TV images	L,S	2*	B	Yes	4 to 100
Man-computer dialogue with moving TV images	L	2*	3	Yes	40,000 to 92,500
Man-computer dialogue with voice answerback	L,S	2*	B	Yes	4
Data collection systems	L,S	1 or 2	B	Yes or No	Low
Voting by the public	L,S	1	B	Yes or No	Low
Alarms (fire, burglar, system failure)	L	1	B	Yes	Low

\*(Transmission in one direction is at a much lower rate than in the other.)

(Continued over)

# **BOX A Continued**

	S = Switched L = Leased line B = Broadcast	One-way or two-way?	C = Continuous channel B = Burst	Real-time?	Typical bandwidth (kilohertz)	Typical bit rate (thousands of bits per second)
Person identification systems (for security)	L,S	2*	B	Yes	Low or high	Low or high
Time transmission (exact time of day)	S,B	1	B	Yes	Low	Low
Wristwatch data receivers	B	1	B	Yes	Low	Low
Data broadcasting	B	1	B	Yes	Low	Low
Pocket calculator terminals	S,B	1 or 2	B	Yes	Low	Low
Telephone conferencing	S,L	2	C	Yes	4	20 to 56
Voice conferencing	S,L	2	C	Yes	4,600	40,000 to 92,500
Interactive television (shopping advertising, games)	S,L	2*	C	Yes	4,600	40,000 to 92,500
Computer assisted instruction	B,L,S	2	B	Yes	Low reverse channel	Low reverse channel
Library searches	L,S	2	B	Yes	Wide range	Wide range
Remote operation of switches	L,S	1 or 2	B	Yes	4	2 to 10
Remote control of machines	L,S	2	B	Yes	0.1	0.1
Emergency communications	S	2	C	Yes	Wide range Up to 4	Wide range Up to 56

## **PREFACE**

A handful of entrepreneurs have become telecommunications millionaires in the 1970s. More will follow. The telecommunications industry is in a period of revolution for two reasons. First, the new technologies described in this book are explosive in their implications, especially for an industry that has been dominated by analog terrestrial voice circuits with mechanical switching. Second, in the United States, the shackles of regulation which prevented competition have been partially removed. The scope for innovation is immense and few technologies can have a more profound effect on the future of society.

JAMES MARTIN

## INDEX OF BASIC CONCEPTS

*The basic concepts, principles and terms that are explained in this book are listed here along with the page on which an introductory explanation or definition of them is given. There is a complete index at the end of the book.*

ALOHA protocol	585	Computer data transmission	
Analog transmission	29, 45	(requirements)	159
		Computerized switching	74
Bandwidth	28-9	Concentrators	566
Broadcast data	172, 217	Contention	578
Burst modem	23-4	Cream skimming	368
Burst multiplexing	156		
Burst traffic	36	Data base, data bank	5
		Data broadcasting	172, 217
Cable T.V.	133	Data network, switched	164
two-way	141-42	Dataphone Digital Service	
Carterfone decision	351	(DDS, from AT&T)	59, 163
CB radio (Citizen's Band radio)	182	Data radio	171
C.C.I.T.T.	59	Delay, satellite	223-24
modem and data transmission		Delta modulation	524
recommendation	623-25	Demand assignment	575
PCM transmission		Demand Assignment Multiple Access	
recommendation	509-12	(DAMA)	576
Cellular mobile radio	193	Demand Assignment Multiple Access	
C.E.P.T.	502	equipment	233
Circuit switching	168	Differential Pulse Code Modulation	
Coaxial cable	445	(DPCM)	524
Codec	5	Digital Radio systems	
Communication pulse	389	(DR 18, from AT&T)	416
Communication satellites	211, 473-74	Digital transmission	29, 45, 233
Compandor, companding	526	Direct Access Arrangement (DAA)	363
Compression, signal	523	Distributed switching (CATV)	333

Duplex transmission, full and half	35	Frequency Division (FDM)	34, 41
		Time Division (TDM)	34, 53
Earth segment, of satellite transmission	219, 223	Office of Telecommunications Policy (OTP)	351
Earth stations, low cost	487	On-line, real time computers	4
Elastic store, elastic buffer	567	"Open Skies" Policy	215, 354
Electronic Fund Transfer Systems (EFT, EFTS)	239, 277	Optical fibers	455
Electronic mail	264	Optical transmission	423
ESS #101 (Bell System Switch)	564		
		PABX, PBX	71, 75, 564
Frame grabber	148	Packet	539
Frequency Division Multiple Access (FDMA)	483	Packet radio	177, 585
Frequency Division Multiplexing (FDM)	34, 41	Packet switching networks	168, 539
Full duplex transmission	35	Peak-to-average transmission ratio	156
		POTS (Plain Old Telephone Service)	158
Grade of service	37	Pulse Amplitude Modulation (PAM)	49
Guard band	34	Pulse Code Modulation (PCM)	50
		Pushbutton telephone sets	95
Half duplex transmission	35		
Helical waveguide	451	Quantizing	50
Hertz	29		
Hotline	306	Radio, Citizen's Band (CB)	182
Hybrid communications	354	Radio, data	171
Hybrid data processing	353	Radio dispatching	188
		Radio paging	188
Infrared transmission	423	Radio spectrum	181-82, 407-10
Interconnect industry	350	shortage of	427-29, 435
Item switching	166	Real time transmission	37
		Repeater, regenerative	507
Large Scale Integration, LSI	27-8		
Laser	463	Satellite antennae, lowcost:	
Least-cost routing	90, 290	broadcast capacity	216-17
Light-Emitting Diode (LED)	423	carrier	280
Local loops	165, 273	communications	211, 473-74
Low-cost satellite earth stations	487	delay	223-24
		earth segment, grand segment	219, 223
Message switching	540	earth stations, lowcost	487
Microcomputers	4	links	235-36
Microwave congestion	229-30	space segment	219
Millimeter wave radio	409	transmission capacity	218
Minimum cost networks	290	Session switching	166
Mobile radio	188	Signal-to-noise ratio	48
Modem	46	Skin effect	446
burst	234	Specialized Common Carriers	162, 272
Multiple access	575	Spectrum, electromagnetic	181-82, 406-10
Multiplexing	34	Spectrum engineering	435
burst	156	Switching:	
continuous channel	158	burst	156
		circuit	168
		continuous channel	156

Switching ( <i>cont.</i> )		Time Division Multiple Access	
item	166	(TDMA)	483, 575
packet	168	Time Division Switching (TDS)	560
session	166	Transparency, of network	551
time division	560	Transponder	211
Symphonic Satellite	382		
		Value added common carriers, value added	
T-1 carrier, Bell System	53, 501-2, 505	value added networks	162, 280
T-2 carrier, Bell System	55, 501-2, 505	Video telephones	113-14
T-3 carrier, Bell System	501-2, 505	Virtual call circuits	623
T-4 carrier, Bell System	501-2, 505	Vocoder	528
TASI (Time Assigned Speech		Voice answerback, voice response	97
Interpolation)	35, 224, 535		
Telecommunication networks	31	Wideband links	59
design optimization	601	"Wired" city	327
Teletext	172		



# **CONTENTS**

**Preface** xv

**Index of Basic Concepts** xvi

## **1 PROLOGUE**

### **2 Communications Revolution 3**

**The Crystal Ball 9**

## **PART**

## **TELECOMMUNICATIONS AND ITS USES**

### **3 Categories of Telecommunication Links 27**

### **4 Analog versus Digital Transmission 45**

### **5 Speeds of Channels 57**

### **6 Intelligent Exchanges 71**

### **7 Pushbutton Telephones and Voice Response 95**

### **8 Video Telephones 113**

### **9 Cable Television and Its Potential 133**

### **10 Switched Data Networks 153**