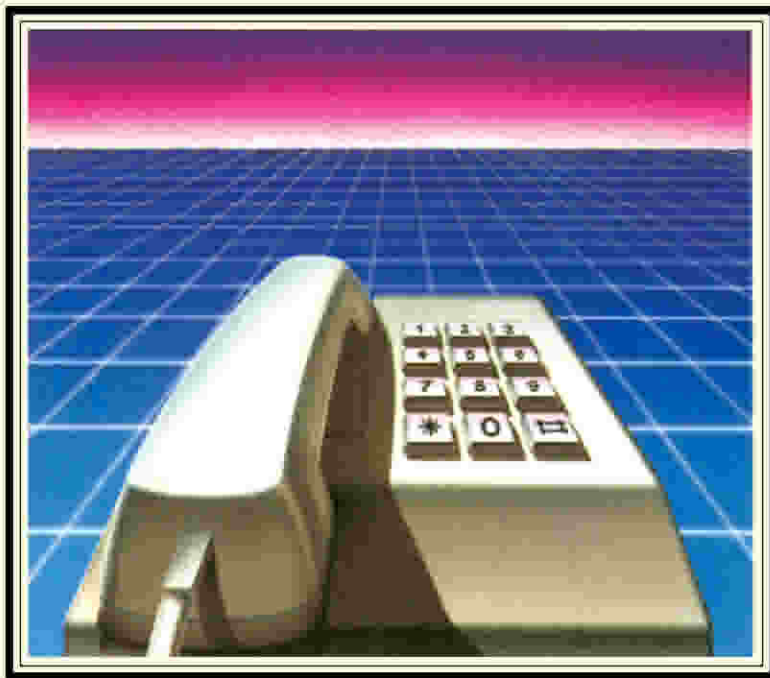

Manager's Guide to Telecommunications



Martin Gandoff

MW
HEINEMANN
NEW-TECH

A MANAGER'S GUIDE TO TELECOMMUNICATIONS

This page intentionally left blank

A MANAGER'S GUIDE TO TELECOMMUNICATIONS

Martin Gandoff



Heinemann: London

William Heinemann Ltd
10 Upper Grosvenor Street, London W1X 9PA

LONDON MELBOURNE
JOHANNESBURG AUCKLAND

First published 1987
© Martin Gandoff 1987

British Library Cataloguing in Publication Data

Gandoff, Martin

The manager's guide to telecommunications.

1. Office practice – Great Britain – Automation

I. Title

651 HF5548.2

ISBN 0 434 91068 6

Typeset by Express Typesetters Limited, Farnham
Printed by R. J. Acford, Chichester, West Sussex

Contents

<i>List of Illustrations</i>	7	BT Packet Switchstream facilities	71
<i>Preface</i>	11	Other X-Stream facilities	72
		Multistream	73
		Integrated services	73
Chapter 1 Communication and computers	13	Chapter 4 Telephone and telephone-linked facilities	77
The development of voice and data transmission	13	Telephone user facilities	77
A review of data processing	15	Featurephones, telephone systems and exchanges	80
A classification of software	21	Linkline 0800/0345	84
Chapter 2 Transmission technology and techniques	31	Voice messaging	85
Introduction	31	Call management/logging	86
Communication concepts and techniques	32	Tonto/Qwertyphone/Displayphone	89
Types of conversation	34	Cellular telephone	94
Transmission modes	35	Trunked radio	100
Voice and data transmission	36	Telephone data entry, voice response	101
Line speeds, bandwidth and modulation	37	Chapter 5 Text and document transmission	105
Baseband and broadband	42	The techniques	105
Matching unequal speeds	42	Data and text	105
Modems and other data transmission hardware	43	Telex	106
Data transmission media	49	Electronic mail	113
Error detection and correction	53	Teletex	117
Chapter 3 Networks and exchanges	56	MHS	119
British Telecom, Mercury and liberalisation	56	Facsimile transmission (fax)	119
The telephone system	57	Error indication and auto-disconnect	123
Switch technologies	61	Chapter 6 On-line data base access and viewdata	128
The PABX	62	What is viewdata?	128
Packet switching	67		

Contents

Types of dialogue	129	Ethernet, Omninet and Novele	159
Viewdata features	132	Selecting an LAN	161
Prestel	133		
VDU display techniques	135		
Viewdata services	138	<i>Appendix 1</i> Mercury	<i>165</i>
Private viewdata or Prestel?	140		
Corporate viewdata systems	140	<i>Appendix 2</i> Northern Telecom	<i>169</i>
Datastream	142		
Effem Management Services	143	<i>Appendix 3</i> Value-added Networks	<i>171</i>
The Philips HCS 110	147		
		<i>Appendix 4</i> Protocols and standards	<i>174</i>
<i>Chapter 7</i> Local Area Networks (LANs)	<i>148</i>	<i>Appendix 5</i> The ISO 7-layer model	<i>177</i>
What is a Local Area Network (LAN)?	148		
Media and transmission techniques	153	<i>Appendix 6</i> Glossary of useful terms	<i>180</i>
Network topologies	153		
Access techniques	158	<i>Index</i>	<i>187</i>

List of illustrations

Chapter 1 *Communication and computers*

1.1	The ASR33 teletype	14
1.2	ASCII characters	17
1.3	A mouse in use	18
1.4	A daisywheel printer	19
1.5	Magnetic diskettes	19
1.6	Communications services	21
1.7	Main software applications	22
1.8	A typical menu	23
1.9	A spreadsheet 'top line' menu	23
1.10	A GEM screen	24
1.11	Homebanking	26

Chapter 2 *Transmission technology and techniques*

2.1	Typical screen dialogue	33
2.2	Serial and parallel transmission	35
2.3	A sine wave	36
2.4	A typical speech waveform	36
2.5	Digital data	37
2.6	Digital data distorted during transmission	37
2.7	Part of the character '1' in ASCII	38
2.8	The 'Carrier' wave	39
2.9	Original bit pattern	39
2.10	Carrier amplitude-modulated by the signal	39
2.11	Carrier frequency-modulated by the signal	40
2.12	Carrier phase-modulated by the signal	40
2.13	Amplitude modulation	41
2.14	Multilevel states for transmission	41
2.15	Multiplexing onto a broadband channel	43

2.16	Modular Technology Minimodem 3005 acoustic coupler	44
2.17	BT Merlin DM4962X modem	44
2.18	Miracle Technology WS2000 modem	46
2.19	Modular Technology Microdriver line driver	47
2.20	An example of multiplexing	48
2.21	Mercury antenna, 13-metre, at East End Wharf	51
2.22	Jointing optical fibre	52
2.23	The character 'E' in the code EBCDIC	54
2.24	The character 'E' distorted to give 'N'	54
2.25	The character 'E' distorted to give 'D'	54
2.26	ASCII characters with parity bit attached	54
2.27	Parity checking in two directions	54

Chapter 3 *Networks and exchanges*

3.1	The development of switch technology	61
3.2	Standard PABX installation layout	63
3.3	Northern Telecom DMS250	63
3.4	Thorn-Ericsson AXE10 exchange	64
3.5	Access to the AXE10	64
3.6	BT Monarch IT440	65
3.7	BT Viceroy, Kinsman and TX14 featurephone	66
3.8	A Plessey ISDX installed in an office	66
3.9	The Plessey ISDT digital services telephone/entry terminal	67
3.10	Alternative views of packet transmission	69
3.11	Standard 'packet' format	70
3.12	HDLC 'packet' format	71
3.13	PSS access routes	71

Chapter 4 Telephone and telephone-linked facilities		4.43 The Talkback 'network'	103
4.1 Setting up a directory entry including short code	78	Chapter 5 Text and document transmission	
4.2 A computer services directory entry	78	5.1 The Hasler Protelex menu	108
4.3 BT Monarch IT440	80	5.2 The 3M Whisper telex	110
4.4 BT Merlin TX72 featurephone	81	5.3 The Olivetti TE530	110
4.5 Merlin Viceroy and Kinsman consoles and the TX14 featurephone	81	5.4 BT Merlin Sable telex terminal	111
4.6 A range of Thorn-Ericson featurephones that complement the MD110 switch	82	5.5 BT Merlin Cheetah Teleprinter	111
4.7 Ansafone E616 featurephone	83	5.6 BT Merlin Puma telex terminal	111
4.8 Philips KBX6 telephone system	83	5.7 Transtel ComWriter III with matrix printer and keyboard with autodial keys	111
4.9 Philips KT4 featurephone	84	5.8 Transtel ComMaster telex terminal	112
4.10 Merlin Octara 32 digital key system with 3 featurephones	84	5.9 Close-up of English/Arabic translation	112
4.11 Call listing	86	5.10 Telex menu from the DCE Telexbox-3	112
4.12 Selective reports	86	5.11 A telex in preparation	113
4.13 Usage histograms	87	5.12 An outgoing telex queue for examination	113
4.14 Department totals	87	5.13 The Hasler telex with an IBM PC	113
4.15 Specific reports	87	5.14 A DCE Telexbox-3 with an ICL OPD	113
4.16 Ansafone Telcost 64	88	5.15 One-to-One in use from a mobile terminal using a cellular radio link	115
4.17 Merlin CM8000 call analysis screen	88	5.16 One-to-One electronic mail	115
4.18 TONTO in use	89	5.17 Initial Gold dialogue and message display	117
4.19 A Microdrive cartridge	90	5.18 MerlinTex adaptor with MT4000 microcomputer	118
4.20 TONTO top-level menu	91	5.19 The EMT 9715 fax transceiver from 3M	122
4.21 A Priority Directory display	91	5.20 Touch panel from the 3M EMT 9146	122
4.22 The telephone keypad	91	5.21 MerlinFax transceiver	123
4.23 The TONTO Voice Response library	91	5.22 The Plessey PDF-5	124
4.24 QUILL in use	92	5.23 Xerox 7010	125
4.25 Display of an ARCHIVED record	92	5.24 Canon FAX-520	125
4.26 ABACUS in use	92	5.25 Operation panel of the Canon FAX-720	126
4.27 EASEL displays	92	Chapter 6 On-line database access and viewdata	
4.28 The Northern Telecom Displayphone	93	6.1 A conceptual ordering screen	130
4.29 BT Merlin Qwertyphone	93	6.2 An Effem screen, daily report - summary	130
4.30 The cellular/PSTN network interface	94	6.3 Menu explanation screen from Effem	131
4.31 Citifone production at Racal Seaton in Devon	95	6.4 Prestel telex facilities	132
4.32 The Racal Citifone mobile cellular telephone	96	6.5 Prestel teleshopping	132
4.33 The Racal CT transportable Vodafone	96	6.6 Two different keyboards, two different ELF displays (courtesy Easydata Ltd)	134
4.34 The Racal VM1 mobile Vodafone	97		
4.35 The Racal VM1 handset	97		
4.36 BT Opal fully portable cellphone	98		
4.37 BT Jade transportable	98		
4.38 BT Amethyst for in-car use	99		
4.39 A Racal cellular data terminal	100		
4.40 Autophone data entry Tonepad	101		
4.41 Autophone backup demonstration	102		
4.42 The Talkback unit with two integral magnetic tape drives	103		

6.7	A statement from Bank of Scotland 'Homebanking'	135	6.26	Effem electronic mail	145
6.8	Access to viewdata (courtesy Effem)	135	6.27	Philips HCS 110 executive viewdata terminal	146
6.9	Serial vs parallel transmission of attributes	136	Chapter 7 Local Area Networks (LANs)		
6.10	Shopping with Harrods via Prestel	136	7.1	Conceptual LAN components	152
6.11	Alphamosaic build-up of the character 'G'	136	7.2	Slough College Harris star network structure	155
6.12	Using graphics for effect 1: a Micronet adventure	137	7.3	A conceptual tree structure	156
6.13	Using graphics for effect 2: Mars European centres	137	7.4	Slough College Econet structure	157
6.14	An ICV financial menu	138	7.5	A conceptual ring structure	157
6.15	A financial display from ICV on an Easydata ELF	138	7.6	Security linking of alternate devices	157
6.16	Welcome from the London Borough of Hackney	139	7.7	An LAN loop	158
6.17	The HOBS 'welcome' screen	139	7.8	Ethernet packet format	160
6.18	HOBS inter-account transfers	140	7.9	LAN potential user/usage matrix	162
6.19	HOBS statement analysis	140	Appendix 1 Mercury		
6.20	Thomas Cook viewdata structure (courtesy Microscope Ltd)	141	A1.1	Mercury distribution node	165
6.21	A text display of dollar quotations from Datastream	142	A1.2	Close-up of a microwave antenna at Charing Cross Hospital	166
6.22	London gold and silver prices from Datastream	143	A1.3	Installing optical-fibre cable in the City of London	167
6.23	Gold/platinum ratio	143	Appendix 5 The ISO 7-layer model		
6.24	Data from the US 'meat exchange'	143	A5.1	The OSI 7-layer model	177
6.25	Log-on for PVS-NET	144			