KERMIT

A File Transfer Protocol

Frank da Cruz

Drawings by George Ulrich

1 '	Techni FA B 1 Inventar-n Sachgebie Itandort:	$\frac{B}{B}$	hschule (H INFORM O T H 269	Normstadi AATIK EK	
	And the second s				

CONTENTS

ł,

	List of Figures	viii
	List of Tables	X
	Foreword	xi
	Preface	xii
	Acknowledgments	xiv
	Part I–The Basics	
1.	Introduction	2
	History	2
	Sharing versus Selling	5
	Kérmit versus Networks	6
	Why Is This Book So Thick?	8
	How to Get Kermit	9
2.	The Basics	10
	What Is a Protocol?	12
	How the Kermit Protocol Works	14
	Conventions Used in This Book	16
	Getting Connected, 4.	20
	How to Transfer Files with Kermit	. 29
	The End of the Easy Part	44
	Part II–Primers	
3.	Computers and Files	48
	Hardware and Software	48
	How Computers Represent Data	49
	Operating Systems	50
	The Console Terminal	51
	Disks, Diskettes, Formats	. 52
	Directories, Files	53
	Naming Conventions for Files	56
	File Organization	57
	File Management	58
	Encoding of Text	59
	Versions of Files	63
	End of File	64
	Other File Attributes	64
	Characteristics of Selected Systems	65

Tuchnische Hachschule Darmstadt FACHBEREICH INFORMATIK BIBLIOTHEK Inventor-Nr.: 4. Data Communication 70 Sachgebiete:__ Serial Transmission 70 Standort: Asynchronous Transmission 72 Connectors and Pin Assignments 79 Duplex and Echo 83 Flow Control 85 89 Parity 90 Modems Other Communication Equipment 96 Public Data Networks 98 Cables and Connectors Revisited 102 The IBM World 108 Data Communications Parameters of Selected Systems 113 PART III-USER GUIDE 5. Kermit Command Reference 116 Terminology and Syntax Review 116 The Command Dialog 118 Invoking Kermit Programs 120 Terminal Emulation Commands 122 Commands for Transferring Files 127 Commands for Server Operation 139 **Bureaucratic Commands** 144 The SET Command 148 Login Scripts 164 Raw Download and Upload 169 6. Common Problems and How to Fix Them 172 Basic Connection Problems 172 File Transfer Problems 175 ASCII/EBCDIC Translation 180 If All Else Fails 182

184

184 190

191

7. Bootstrapping

For Many, the End

Bootstrapping to the Local Micro

Bootstrapping in the Other Direction

Part IV-programmer Guide

$B. \overline{F}$	How to Write a Kermit Program	194
P	Programming Language	194
P	Programming Style	196
Γ	The User Interface	198
	Documentation	200
	Frills	201
	Testing	203
S	Submission	205
9. <i>I</i>	Protocol Specification	206
	Basic File Transfer	206
	Layers	212
	Encoding and Decoding of Data	228
	nitial Connection Negotiation	233
7	The Missing Pieces	236
- 0. (Optional Features	240
		240
	Eighth-Bit Prefixing Run-Length Encoding	240
	Encoding Summary	248
	Encoding Performance	248
	Sacred Characters	252
	Block Check Options	252
	Graceful Interruption of File Transfer	258
- 1. 5	The Client/Server Model	260
	The I Packet	261
	The Client	262
	The Server	267
-		
2. 2	Advanced Options	270
-	The Capabilities Mask	270
	Transmitting and Preserving File Attributes	272
I	Performance Options	282

13.	Discussion and Analysis	298
	Kermit Implementation Tricks	298
	Kermit versus Other Protocols	303
	It's Too Late Now	307
	Appendixes	
Α.	Remaining Pieces of the Kermit Program	312
В.	Kermit Command Summary	328
C.	Kermit Packet Summary	336
D.	The ASCII Character Set	340
Ε.	Binary, Octal, and Hexadecimal Numbers	346
	Glossary	352
	References	370
	Index	375

1

ŋ

1