

MINIX 1.5 REFERENCE MANUAL

ANDREW S. TANENBAUM
FRANS MEULENBROEKS
RAYMOND MICHIELS
JOST MÜLLER
JOSEPH PICKERT
STEVEN REIZ
JOHAN W. STEVENSON



PRENTICE HALL, ENGLEWOOD CLIFFS, NEW JERSEY 07632

passwd for ash : Horsh



© 1991 by **PRENTICE-HALL, INC.**
A Division of Simon & Schuster
Englewood Cliffs, N.J. 07632

All rights reserved.

10 9 8 7 6 5 4 3 2 1

Printed in the United States of America

CONTENTS

iii

1	INTRODUCTION	1
1.1	HISTORY OF UNIX	1
1.2	HISTORY OF MINIX	3
1.3	STRUCTURE OF THIS MANUAL	5
2	INSTALLING MINIX ON THE IBM PC, XT, AT, 386, AND PS/2	6
2.1	MINIX HARDWARE REQUIREMENTS	6
2.2	HOW TO START MINIX	7
2.3	HOW TO INSTALL MINIX ON A HARD DISK	10
2.4	TESTING MINIX	20
2.5	TROUBLESHOOTING	22
3	INSTALLING MINIX ON THE ATARI ST	24
3.1	THE MINIX-ST DISTRIBUTION	25
3.2	NATIONAL KEYBOARDS	26
3.3	BOOTING MINIX-ST	27
3.4	INCREASING THE SIZE OF YOUR RAM DISK	30
3.5	ADAPTING PROGRAMS TO USE EXTRA RAM	31
3.6	USING SINGLE-SIDED DISKETTES	32
3.7	USING A HARD DISK	33

- 3.8 USING A MEGA ST 40
 - 3.9 USING A DISK CONTROLLER BASED CLOCK 40
 - 3.10 BOOT PROCEDURE OPTIONS 41
 - 3.11 UNPACKING THE SOURCES 42
 - 3.12 THE TOS TOOLS 43
 - 3.13 TROUBLESHOOTING 45
-
- 4 INSTALLING MINIX ON THE COMMODORE AMIGA 51**
 - 4.1 MINIX HARDWARE REQUIREMENTS 51
 - 4.2 HOW TO START MINIX 52
 - 4.3 A MORE DETAILED LOOK 54
 - 4.4 TROUBLESHOOTING 58
-
- 5 INSTALLING MINIX ON THE APPLE MACINTOSH 59**
 - 5.1 MACMINIX HARDWARE REQUIREMENTS 59
 - 5.2 THE MACMINIX DISTRIBUTION 59
 - 5.3 NATIONAL KEYBOARDS 60
 - 5.4 BOOTING MACMINIX 60
 - 5.5 INCREASING THE SIZE OF YOUR RAM DISK 63
 - 5.6 ADAPTING PROGRAMS TO USE EXTRA RAM 64
 - 5.7 USING A HARD DISK 65
 - 5.8 UNPACKING THE SOURCES 69
 - 5.9 THE MENUS 70
 - 5.10 SETTING CONFIGURATION OPTIONS 71
 - 5.11 MACINTOSH SYSTEM CALLS 72
 - 5.12 RUNNING MACMINIX WITH MULTIFINDER 72
 - 5.13 TROUBLESHOOTING 73

6	USING MINIX	74
6.1	MAJOR COMPONENTS OF MINIX	74
6.2	PROCESSES AND FILES IN MINIX	79
6.3	A TOUR THROUGH THE MINIX FILE SYSTEM	84
6.4	HELPFUL HINTS	88
6.5	SYSTEM ADMINISTRATION	93
7	RECOMPILING MINIX	97
7.1	REBUILDING MINIX ON AN IBM PC	97
7.2	REBUILDING MINIX ON AN ATARI ST	103
7.3	REBUILDING MINIX ON A COMMODORE AMIGA	109
7.4	REBUILDING MINIX ON AN APPLE MACINTOSH	109
8	MANUAL PAGES	115
9	EXTENDED MANUAL PAGES	189
9.1	ASLD—ASSEMBLER-LOADER [IBM]	189
9.2	BAWK—BASIC AWK	198
9.3	DE—DISK EDITOR	202
9.4	DIS88—DISASSEMBLER FOR THE 8088 [IBM]	207
9.5	ELLE—FULL-SCREEN EDITOR	208
9.6	ELVIS—A CLONE OF THE BERKELEY VI EDITOR	216
9.7	IC—INTEGER CALCULATOR	236
9.8	INDENT—INDENT AND FORMAT C PROGRAMS	239
9.9	KERMIT—A FILE TRANSFER PROGRAM	243
9.10	M4—MACRO PROCESSOR	246
9.11	MDB—MINIX DEBUGGER [68000]	249
9.12	MINED—A SIMPLE SCREEN EDITOR	253
9.13	NROFF—A TEXT PROCESSOR	257

9.14	PATCH—A PROGRAM FOR APPLYING DIFF LISTINGS TO UPDATE FILES	266
9.15	ZMODEM—FILE TRANSFER PROGRAM	269
10	SYSTEM CALLS	274
10.1	INTRODUCTION TO SYSTEM CALLS	274
10.2	LIST OF MINIX SYSTEM CALLS	275
11	NETWORKING	277
11.1	INTRODUCTION	277
11.2	OBJECTS	279
11.3	OVERVIEW OF TRANSACTIONS	281
11.4	SYNTAX AND SEMANTICS OF TRANSACTION PRIMITIVES	282
11.5	SERVER STRUCTURE	286
11.6	CLIENT STRUCTURE	287
11.7	SIGNAL HANDLING	287
11.8	IMPLEMENTATION OF TRANSACTIONS IN MINIX	288
11.9	COMPILING THE SYSTEM	289
11.10	HOW TO INSTALL AMOEBA	289
11.11	NETWORKING UTILITIES	290
11.12	REMOTE SHELL	290
11.13	SHERVERS	292
11.14	MASTERS	292
11.15	FILE TRANSFER	293
11.16	REMOTE PIPES	293
11.17	THE ETHERNET INTERFACE	293
A	MINIX SOURCE CODE LISTING	296
B	CROSS REFERENCE MAP	637

NOTE

The only pieces of MINIX software not included in this package are the C compiler sources. These were made using the Amsterdam Compiler Kit (see *Communications of the ACM*, Sept. 1983, pp. 654-660), which has also been used to make compilers for many other languages and machines. The compiler *sources* can be ordered from the following companies:

In North and South America:

UniPress Software
2025 Lincoln Highway
Edison, NJ 08817
U.S.A.
Telephone: (201) 985-8000
FAX: (201) 287-4929

In Europe and elsewhere

Transmediair Utrecht BV
Melkweg 3
3721 RG Bilthoven
Holland
Telephone: +31 30 281820
FAX: +31 30 292294

In addition, these companies also have a Pascal compiler for MINIX