

Contents

	Figures, Tables, and Listings	xi
Preface	About This Book	xv
	Format of a Typical Chapter	xvi
	Conventions Used in This Book	xvi
	Special Fonts	xvi
	Types of Notes	xvii
	Assembly-Language Information	xvii
	Development Environment	xviii
	For More Information	xix
Chapter 1	Introduction to Sound on the Macintosh	1-1
	About Sound on Macintosh Computers	1-4
	Sound Capabilities	1-4
	Sound Production	1-9
	Sound Recording	1-15
	Sound Resources	1-17
	Sound Files	1-18
	Speech Generation	1-20
	The User Interface for Sound	1-23
	Using Sound on Macintosh Computers	1-24
	Producing an Alert Sound	1-24
	Playing a Sound Resource	1-25
	Playing a Sound File	1-26
	Checking For Sound-Recording Equipment	1-27
	Recording a Sound Resource	1-28
	Recording a Sound File	1-31
	Checking For Speech Capabilities	1-31
	Generating Speech From a String	1-32
	Sound Reference	1-34
	Routines	1-34
	Playing Sounds	1-34
	Recording Sounds	1-38
	Generating and Stopping Speech	1-41
	Summary of Sound	1-44
	Pascal Summary	1-44
	Constants	1-44
	Routines	1-44
	C Summary	1-45

Constants	1-45
Routines	1-46
Result Codes	1-47

Chapter 2 **Sound Manager** 2-1

About the Sound Manager	2-6
Sound Data	2-7
Square-Wave Data	2-7
Wave-Table Data	2-8
Sampled-Sound Data	2-9
Sound Commands	2-11
Sound Channels	2-13
Sound Compression and Expansion	2-14
Using the Sound Manager	2-17
Managing Sound Channels	2-19
Allocating Sound Channels	2-20
Initializing Sound Channels	2-22
Releasing Sound Channels	2-24
Manipulating a Sound That Is Playing	2-25
Stopping Sound Channels	2-28
Pausing and Restarting Sound Channels	2-29
Synchronizing Sound Channels	2-30
Managing Sound Volumes	2-31
Obtaining Sound-Related Information	2-32
Obtaining Information About Available Sound Features	2-33
Obtaining Version Information	2-34
Testing for Multichannel Sound and Play-From-Disk Capabilities	2-35
Obtaining Information About a Single Sound Channel	2-37
Obtaining Information About All Sound Channels	2-39
Determining and Changing the Status of the System Alert Sound	2-40
Playing Notes	2-41
Installing Voices Into Channels	2-43
Looping a Sound Indefinitely	2-45
Playing Sounds Asynchronously	2-46
Using Callback Procedures	2-47
Synchronizing Sound With Other Actions	2-51
Managing an Asynchronous Play From Disk	2-52
Playing Selections	2-53
Managing Multiple Sound Channels	2-53
Parsing Sound Resources and Sound Files	2-56
Obtaining a Pointer to a Sound Header	2-57
Playing Sounds Using Low-Level Routines	2-61
Finding a Chunk in a Sound File	2-62
Compressing and Expanding Sounds	2-66
Using Double Buffers	2-68

Setting Up Double Buffers	2-70
Writing a Doubleback Procedure	2-72
Sound Storage Formats	2-73
Sound Resources	2-74
The Format 1 Sound Resource	2-75
The Format 2 Sound Resource	2-80
Sound Files	2-81
Chunk Organization and Data Types	2-82
The Form Chunk	2-83
The Format Version Chunk	2-84
The Common Chunk	2-85
The Sound Data Chunk	2-87
Format of Entire Sound Files	2-87
Sound Manager Reference	2-89
Constants	2-89
Gestalt Selector and Response Bits	2-90
Channel Initialization Parameters	2-91
Sound Command Numbers	2-92
Chunk IDs	2-98
Data Structures	2-99
Sound Command Records	2-99
Audio Selection Records	2-100
Sound Channel Status Records	2-101
Sound Manager Status Records	2-102
Sound Channel Records	2-103
Sound Header Records	2-104
Extended Sound Header Records	2-106
Compressed Sound Header Records	2-108
Sound Double Buffer Header Records	2-111
Sound Double Buffer Records	2-112
Chunk Headers	2-113
Form Chunks	2-113
Format Version Chunks	2-114
Common Chunks	2-115
Extended Common Chunks	2-115
Sound Data Chunks	2-117
Version Records	2-118
Leftover Blocks	2-119
State Blocks	2-119
Sound Manager Routines	2-119
Playing Sound Resources	2-120
Playing From Disk	2-123
Allocating and Releasing Sound Channels	2-127
Sending Commands to a Sound Channel	2-130
Obtaining Information	2-132
Controlling Volume Levels	2-139
Compressing and Expanding Audio Data	2-142

Managing Double Buffers	2-147
Performing Unsigned Fixed-Point Arithmetic	2-148
Linking Modifiers to Sound Channels	2-149
Application-Defined Routines	2-151
Completion Routines	2-151
Callback Procedures	2-152
Doubleback Procedures	2-153
Resources	2-154
The Sound Resource	2-154
Summary of the Sound Manager	2-157
Pascal Summary	2-157
Constants	2-157
Data Types	2-161
Sound Manager Routines	2-168
Application-Defined Routines	2-170
C Summary	2-170
Constants	2-170
Data Types	2-175
Sound Manager Routines	2-182
Application-Defined Routines	2-184
Assembly-Language Summary	2-184
Data Structures	2-184
Trap Macros	2-188
Result Codes	2-188

Chapter 3 **Sound Input Manager** 3-1

About the Sound Input Manager	3-3
Sound Recording Without the Standard Interface	3-4
Interaction With Sound Input Devices	3-4
Sound Input Device Drivers	3-5
Using the Sound Input Manager	3-5
Recording Sounds Directly From a Device	3-6
Defining a Sound Input Completion Routine	3-9
Defining a Sound Input Interrupt Routine	3-10
Getting and Setting Sound Input Device Information	3-10
Writing a Sound Input Device Driver	3-13
Responding to Status and Control Requests	3-13
Responding to Read Requests	3-15
Supporting Stereo Recording	3-16
Supporting Continuous Recording	3-17
Sound Input Manager Reference	3-17
Constants	3-17
Gestalt Selector and Response Bits	3-17
Sound Input Device Information Selectors	3-18
Data Structures	3-26

Sound Input Parameter Blocks	3-26
Sound Input Manager Routines	3-27
Recording Sounds	3-28
Opening and Closing Sound Input Devices	3-31
Recording Sounds Directly From Sound Input Devices	3-33
Manipulating Device Settings	3-41
Constructing Sound Resource and File Headers	3-44
Registering Sound Input Devices	3-48
Converting Between Milliseconds and Bytes	3-51
Obtaining Information	3-53
Application-Defined Routines	3-53
Sound Input Completion Routines	3-54
Sound Input Interrupt Routines	3-55
Summary of the Sound Input Manager	3-57
Pascal Summary	3-57
Constants	3-57
Data Types	3-58
Sound Input Manager Routines	3-59
Application-Defined Routines	3-60
C Summary	3-61
Constants	3-61
Data Types	3-62
Sound Input Manager Routines	3-63
Application-Defined Routines	3-65
Assembly-Language Summary	3-65
Data Structures	3-65
Trap Macros	3-66
Result Codes	3-66

Chapter 4

Speech Manager 4-1

About the Speech Manager	4-4
Voices	4-5
Speech Attributes	4-6
Speech Channels	4-9
Callback Routines	4-10
Using the Speech Manager	4-11
Checking for Speech Manager Capabilities	4-12
Creating, Using, and Disposing of a Speech Channel	4-13
Working With Different Voices	4-14
Adjusting Speech Attributes	4-16
Pausing Speech	4-18
Implementing Callback Procedures	4-19
Writing Embedded Speech Commands	4-23
Embedded Command Delimiters	4-23
Syntax of Embedded Speech Commands	4-24

Examples of Embedded Speech Commands	4-30
Phonemic Representation of Speech	4-32
Phonemic Symbols	4-33
Prosodic Control Symbols	4-34
Including Pronunciation Dictionaries	4-36
Speech Manager Reference	4-39
Constants	4-39
Speech Information Selectors	4-39
Data Structures	4-45
Voice Specification Records	4-46
Voice Description Records	4-47
Voice File Information Records	4-48
Speech Status Information Records	4-48
Speech Error Information Records	4-49
Speech Version Information Records	4-50
Phoneme Information Records	4-52
Phoneme Descriptor Records	4-53
Speech Extension Data Records	4-53
Delimiter Information Records	4-54
Speech Manager Routines	4-54
Starting, Stopping, and Pausing Speech	4-55
Obtaining Information About Voices	4-63
Managing Speech Channels	4-69
Obtaining Information About Speech	4-71
Changing Speech Attributes	4-73
Converting Text To Phonemes	4-79
Installing a Pronunciation Dictionary	4-80
Application-Defined Routines	4-82
Text-Done Callback Procedure	4-82
Speech-Done Callback Procedure	4-84
Synchronization Callback Procedure	4-85
Error Callback Procedure	4-86
Phoneme Callback Procedure	4-87
Word Callback Procedure	4-88
Resources	4-89
The Pronunciation Dictionary Resource	4-89
Summary of the Speech Manager	4-94
Pascal Summary	4-94
Constants	4-94
Data Structures	4-95
Speech Manager Routines	4-98
Application-Defined Routines	4-100
C Summary	4-100
Constants	4-100
Data Types	4-102
Speech Manager Routines	4-105
Application-Defined Routines	4-106

Assembly-Language Information	4-107
Data Structures	4-107
Trap Macros	4-109
Result Codes	4-110

Chapter 5

Sound Components 5-1

About Sound Components	5-4
Sound Component Chains	5-4
The Apple Mixer	5-6
The Data Stream	5-7
Writing a Sound Component	5-8
Creating a Sound Component	5-8
Specifying Sound Component Capabilities	5-11
Dispatching to Sound Component-Defined Routines	5-12
Registering and Opening a Sound Component	5-16
Finding and Changing Component Capabilities	5-18
Sound Components Reference	5-22
Constants	5-22
Sound Component Information Selectors	5-22
Audio Data Types	5-26
Sound Component Features Flags	5-26
Action Flags	5-27
Data Format Flags	5-28
Data Structures	5-29
Sound Component Data Records	5-29
Sound Parameter Blocks	5-30
Sound Information Lists	5-31
Compression Information Records	5-32
Sound Manager Utilities	5-33
Opening and Closing the Apple Mixer Component	5-33
Saving and Restoring Sound Component Preferences	5-35
Sound Component-Defined Routines	5-36
Managing Sound Components	5-37
Creating and Removing Audio Sources	5-42
Getting and Setting Sound Component Information	5-44
Managing Source Data	5-46
Summary of Sound Components	5-50
C Summary	5-50
Constants	5-50
Data Types	5-53
Sound Manager Utilities	5-54
Sound Component-Defined Routines	5-55
Assembly-Language Summary	5-56
Data Structures	5-56

- About Audio Components 6-3
- Writing an Audio Component 6-5
 - Creating an Audio Component 6-5
 - Dispatching to Audio Component-Defined Routines 6-7
- Audio Components Reference 6-8
 - Data Structures 6-8
 - Audio Information Records 6-9
 - Audio Component-Defined Routines 6-9
 - Getting and Setting Volumes 6-10
 - Managing the Mute State 6-11
 - Resetting Audio Components 6-13
 - Getting Audio Component Information 6-13
- Summary of Audio Components 6-15
 - C Summary 6-15
 - Constants 6-15
 - Data Types 6-16
 - Audio Component-Defined Routines 6-16
 - Assembly-Language Summary 6-17
 - Data Structures 6-17