

SPARC COMPLIANCE DEFINITION 2.1

**SC D
2.1**

SPARC International

© 1990-1999 SPARC International Inc.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the copyright owners.

The manual pages for socket functions are

© 1992, 1993 The Regents of the University of California. All rights reserved

Includes material copyrighted by UNIX System Laboratories, Inc., a subsidiary of SCO, Inc. Reprinted with permission.

The SPARC Compliance Definition 2.4 is published and printed by SPARC International.

Any comments relating to the material contained herein may be submitted to:

SPARC International Inc.

3333 Bowers Ave., Suite 280

Santa Clara, CA 95054-2913

TEL: (408) 748-9111 (Ext 228)

FAX: (408) 743-9777

URL: www.sparc.org

ATTN: Ghassan Abbas (abbas@sparc.org)

Trademarks

SPARC® is a registered trademark of SPARC International, Inc.

SPARCstation™ is a trademark of SPARC International, Inc.

Products bearing SPARC® trademarks are based on an architecture developed by Sun Microsystems, Inc.

ONC™ and SunOS™ are trademarks of Sun Microsystems, Inc.

NFS® is a registered trademark of Sun Microsystems, Inc.

UNIX® and OPEN LOOK® are registered trademarks of UNIX System Laboratories, Inc.

The X-Window System™ is a trademark of Massachusetts Institute of Technology.

OSF/Motif™ is a trademark of the TOG (X/Open + Open Software Foundation, Inc.).

All other products or services mentioned in this document are identified by the trademarks or service marks of their respective companies or organizations. SPARC International, Inc. disclaims any responsibility for specifying which trademarks are owned by which companies or organizations.

This product contains intellectual property of Sun Microsystems, Inc., and any user of this product will be required to obtain a license from Sun Microsystems, Inc., prior to use.



SPARC COMPLIANCE DEFINITION 2.1

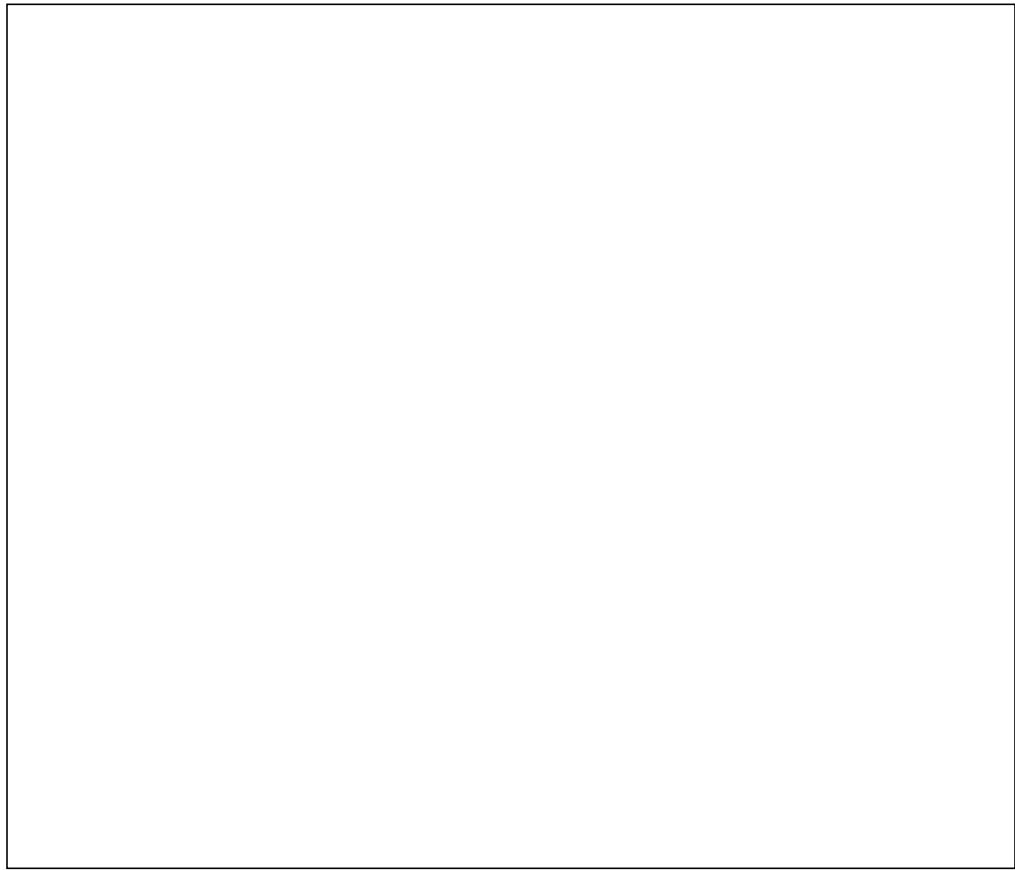


Table of Contents

Preface

Audience and Purpose	vii
Organization and Content	vii
Publication Conventions	vii
Other Publication Conventions	viii

CHAPTER 1: Introduction

Overview	1-1
Terminology	1-1
Intended Audience	1-1
Related Publications	1-2
Standards Conformance	1-3
Compliance Testing	1-3
Relationship of Specifications to Products	1-3

CHAPTER 2: ABI Errata

Section gABI	2-1
Section psABI	2-3
Section SVID, Volume 2	2-5
Devices	2-5

CHAPTER 3: System Features

Overview	3-1
Object file format	3-1
Program Loading and Linking	3-1
Low-level System Information	3-1
Formats and Protocols	3-1
Software Installation	3-1

CHAPTER 4: The System Library

Overview	4-1
The libsys Interfaces	4-1
Section psABI	4-4
Section SVID, Volume 1	4-4

Table of Contents

CHAPTER 5: The C Library

Overview	5-1
The libc Interfaces	5-1
gABI Errata	5-3
Section gABI	5-3
C Library Errata	5-3
Section SVID, Volume I	5-3

CHAPTER 6: The Network Services Library

Overview	6-1
Transport Providers	6-1
The libnsl Interfaces	6-1
Network Services Errata	6-5
Section SVID, Volume III	6-5

CHAPTER 7: Commands

Overview	7-1
Basic Commands Errata	7-3
Section SVID, Volume II	7-3

CHAPTER 8: The X Library

Overview	8-1
The X Library Interfaces	8-1

CHAPTER 9: The X Toolkit Library

Overview	9-1
The libXt Interfaces	9-1

CHAPTER 10: The OPEN LOOK Widget Set

Overview	10-1
The libXol Interfaces	10-1

CHAPTER 11: The Motif Widget Set

Overview	11-1
----------------	------

Table of Contents

The Motif Interfaces 11-1

CHAPTER 12: CD-ROM Support

Overview 12-1
CD-ROM Medium 12-1

Index



Preface



Preface

Preface

Audience and Purpose

The SPARC International *SPARC Compliance Definition* (SCD) is intended for use by anyone who is creating interoperable SPARC systems or applications.

This publication is intended to fulfill the following purposes:

- Identify areas beyond the *System V Application Binary Interface* (ABI) that the SPARC community deems important.
- Address ambiguous and/or loose specifications in current ABI documents.

Organization and Content

The SCD 2.1 has been divided into chapters, as follows:

- Chapter 1 Introduction
- Chapter 2 ABI Errata
- Chapter 3 System Features
- Chapter 4 The System Library
- Chapter 5 The C Library
- Chapter 6 The Network Services Library
- Chapter 7 Commands
- Chapter 8 The X Library
- Chapter 9 The X Toolkit Library
- Chapter 10 The OPEN LOOK Widget Set
- Chapter 11 Motif Widget Set
- Chapter 12 CD-ROM Support

Publication Conventions

This publication uses page format and typographic variances to highlight particular kinds of information. These conventions of usage are generally consistent with publi-

Preface

cation conventions used by other UNIX publications, such as the *AT&T System V Interface Definition*, Third Edition.

Other Publication Conventions

The following typographical conventions are used within the text of this publication:

- Filenames, pathnames, and system messages are shown in:
`typewriter font like this.`
- Titles of chapters in this publication are shown in plain Roman font, inside quotation marks like this: "Introduction."
- Document titles are shown in plain, nonbold italic font like this: *AT&T System V Interface Definition*.



CHAPTER 1: Introduction



Introduction

Introduction

Overview

The SPARC Compliance Definition, or SCD, defines a set of interfaces that all SPARC Compliant systems must provide in their implementations. The SCD 2.1 provides information for binary-level compatibility, encompassing both the *System V Application Binary Interface* (ABI), and the *System V Application Binary Interface, SPARC Processor Supplement* documents.

Terminology

Each interface described in the SCD is specified as a series of entities that implement that interface -- and in particular as a set of "names" that are used to access the services provided by that interface. Collectively, all the specifications provided in the SCD define the name space of a conforming system, defining both the set of names that an application may reference or use, and those that a system must provide.

Names defined by SCD specifications may be present in conforming systems solely for the purpose described in the SCD. However, to accommodate diversity, the SCD recognizes two distinct classes of interface specification: REQUIRED and OPTIONAL.

A REQUIRED INTERFACE must be present in a conforming system, in the manner described in the specification. Some REQUIRED INTERFACES are extensions beyond the scope of the ABI documents. Unless explicitly noted, all interfaces within this document are required.

An OPTIONAL INTERFACE is not required to be present in a conforming system. However, if an OPTIONAL INTERFACE is present, it must be present in full and in exactly the manner described in the SCD. If it is not present, then a conforming system must not use the names described in the specification for the OPTIONAL INTERFACE.

In either case, a conforming application will only use the names identified in an SCD interface in the manner described in the interface specification.

Intended Audience

The intended audience of the SCD documents consists of two groups: system implementors, and application developers. For system implementors, an SCD provides a ref-

Introduction

erence to those interfaces and features to be supplied by a SPARC compliant system. For application developers, an SCD provides a reference to interfaces and features that may be relied upon in all SPARC compliant systems.

Related Publications

The SCD 2.1 references the following documents:

- *System V Application Binary Interface*
Prentice Hall, ISBN 0-13-877598-2
- *System V Application Binary Interface SPARC Processor Supplement*
Prentice Hall, ISBN 0-13-8777630-X
- *System V Interface Definition, Third Edition, Volumes 1 - 4*
AT&T Select Code 320-136 (Volume 1), 320-137 (Volume 2), 320-138 (Volume 3),
320-139 (Volume 4)
- *The X Window System (Second Edition)*
by Robert W. Scheifler and James Gettys
Digital Press, ISBN 1-55558-050-5

These documents may be acquired from most technical book stores; additionally, SPARC International provides assistance in acquiring these references. If you require assistance in acquiring these references, call SPARC International at (415) 321-8692.

These documents are necessary sources of detailed information for the interfaces and features listed in SCD 2.1.

SCD 2.1 represents a proper superset of the required interfaces and features described in the two ABI documents. One of the purposes of this document is to serve as the conduit through which features may migrate first into the processor specific ABI (SPARC psABI), and finally into the generic ABI (gABI). Consequently, SCD 2.1 includes a set of features and their associated interfaces that are beyond the ABI definitions. These features, and their associated interfaces have been included, in some cases to correct deficiencies in the ABI specifications, and in others to standardize functionality already in common use throughout the SPARC community.

Introduction

Standards Conformance

As SCD 2.1 is a specification for binary level compatibility, it is important that it not conflict with already existing standards work, either de facto or de jure. To this end, SCD 2.1 draws upon the *System V Interface Definition (Third Edition)*, (indirectly through references to the System V ABI) as the specification to which it will remain functionally consistent. As a consequence, the conformance of SCD 2.x to other standards documents/agencies is minimally the same as that of the *System V Interface Definition*. Examples of standards to which this pertains are *POSIX 1003.1-1990 (ISO 9945-1)* and the *X/Open Portability Guide, Issue 3 (XPG3)*.

Compliance Testing

SCD 2.1 is the specification against which all SPARC-based systems will be measured for compliance. Compliance testing will verify that the interfaces provided by platforms have the specified semantics and syntax through the use of a suite of binary tests that will be executed on the platform. This suite of compliance tests will also be used to verify those features found in the ABI documents that do not necessarily have interfaces, but that are still required in order to ensure binary compatibility. Examples of these features are found in the SPARC psABI chapters on object files, program loading and linking, and low-level system information.

Relationship of Specifications to Products

Interfaces described in SCD are non-exclusive. Conforming systems may (and often will) provide functionality not otherwise defined in the name spaces created by SCD specifications. Such extensions are not themselves part of SCD, and SCD-conformant applications will not use such supersets of the SCD specification. This situation can arise as a result of several conditions, among them:

- SCD codification of a common subset of several otherwise divergent interface definitions; and/or
- The use of a specific vendor or product document as a source specification for an SCD interface, where such vendor or product document describes more than the SCD-specified portions of the interface.

It is incumbent upon those constructing SCD-conformant applications to use only the name spaces described in the SCD, even if applicable source documents or particular

Introduction

implementations expand upon the SCD requirements.



CHAPTER 2: ABI Errata



ABI Errata

ABI Errata

The following are errata to both the *System V ABI* and the *System V ABI SPARC Processor Supplement*, as reported to SPARC International.

Section gABI

Location	Facility	Description
2-13	pkgadd	Change page 2-13 of the gABI to specify that the <code>request</code> script, if provided, runs with a uid of <code>root</code> and that standard input is attached to <code>/dev/null</code> .
4-15	SHT_DYNSYM	Add before the last sentence: “However this minimal set of symbols will always include all symbols of STB_GLOBAL binding.”
5-13	Dynamic Linking	Replace the sentence beginning with “Typically, the....” with the following sentence: “The path name(s) that may be contained in the PT_INTERP segment are specified in the appropriate processor supplement.”
5-20	LD_LIBRARY_PATH	Reverse the order of the bullets at the bottom of page 5-20 such that the influence of LD_LIBRARY_PATH takes precedence over DT_RPATH specifications.
5-21	Dynamic Linking	Add a new third bullet to the entries on pages 5-20 and 5-21: “DT_RPATH specifications influence search operations for their own DT_NEEDED objects. Each evaluation of a given object’s set of DT_NEEDED specification uses <i>that object’s DT_RPATH</i> . Thus, if an executable specifies a set of DT_NEEDED objects (e.g., a , b , and c) and a DT_RPATH specification of x:y , then the search for a , b , and c will involve the paths x and y . If, when later evaluating the DT_NEEDED object for a (e.g., d), then x and y will not be

ABI Errata

Section gABI (continued)

Location	Facility	Description
		used for that search unless a also specifies a DT_RPATH containing them.
5-23	Initialization and Termination Functions	Add the following new third paragraph: "Initialization and Termination functions can expect to use all ABI-defined services in their execution."
6-2 derived	Shared Library Names	A second paragraph should be inserted to this section that states: "The version numbers of shared objects are set on a per-processor basis with the constraint that they are from a Generic ABI 'reference version number' for each interface and must change their current value whenever that reference version number changes. In this manner, the reference names can reflect the often combined generic and processor specific portions of the interface in a consistent manner. "A shared object version number must change whenever one or more of the following occurs: <ul style="list-style-type: none">• an entry point is deleted,• an entry point is added,• an entry point is changed,• program visible semantic properties change, or• changes to exported data objects change in size, type, or name."
7-28	Authentication flavors	Misspelling: the use of the authentication flavor AUTH-UX is both outdated and misspelled (from AUTH_UNIX). The preferred symbol is AUTH_SYS.
7-34	struct auth_uxparms	This structure should be named authsys_parms as it is on page 6-33 of the psABI. Its members should also be defined to match the definition in the psABI (using string aup_machname<255> where appropriate, however).

ABI Errata

Section gABI (continued)

Location	Facility	Description
7-42	struct rpcb	Append to the definition of this structure the element <code>stringr_owner<></code> .
7-42	rpcbind Operation	The reference to IP in the first paragraph is ambiguous -- port 111 is used for IP-carried transports (rather than IP itself).
7-42	NeWS Overview	Delete this.
9-4	/opt	The specification of “/opt/bin” is removed.
10-3	libX and Intrinsics	Change references of X11R3 to X11R4.
10-3	NeWS Library	Delete this section -- refers to tNt 1.1, which is obsolete.

Section psABI

Location	Facility	Description
5-5	Dynamic linking	Add a section entitled “Dynamic Linker” as the first subsection of the “Dynamic Linking” section, which is: “The value of the program header element PT_INTERP in an ABI-conforming program is the reference name for libsys. As a special case, the reference name for version 1 of the C library reference name is also accepted as a legitimate PT_INTERP specification.”
6-1	Shared Library Names	A section should be inserted that identifies the actual version numbers and reference names for shared objects on a SPARC system. These numbers should be the same as those in the gABI except the version numbers of the <code>libc</code> and <code>libx11</code> shared objects are 1 and 4, respectively.

ABI Errata

Section psABI (continued)

Location	Facility	Description
		The omission of a version number for the <code>libnsl</code> shared object in the original text of the gABI should also be corrected here with a version number of "1".
6-24	<sys/mman.h>	Figure 6-17 should include the constants <pre>#define SHARED 0x10 #define PRIVATE 0x20 #define MC_SYNC 1 #define MC_LOCK 2 #define MC_UNLOCK 3 #define MC_LOCKCAS 5 #define MC_UNLOCKCAS 6 #define PROC_TEXT 0x5 #define PROC_DATA 0x7 #define MCL_CURRENT 0x1 #define MCL_FUTURE 0x2</pre>
6-26	netconfig Database	Delete the flag NC_BROADCAST.
6-31	<sys/resource.h>	Figure 6-27 should include the constant <pre>#define RLIM_INFINITY 0x7fffffff</pre>
6-34	RPC manifest	The manifest constants beginning with "_" are not part of the ABI-visible interface and are not to be considered part of the ABI specification. Delete RPC_ANYSOCK.

ABI Errata

Section SVID, Volume 2

Location	Facility	Description
9-95	pkginfo(AS_CMD)	Delete “-r” from the list of supported options for pkginfo.

Table 2-1: Library Logical and Reference Names

Library	Reference Name
libc	/usr/lib/libc.so.1
libnsl	/usr/lib/libnsl.so.1
libsyst	/usr/lib/ld.so.1
libX	/usr/lib/libX11.so.4

Devices

The ABI documents do not specify devices which must be available on compliant systems, nor does it specify which devices (and their names) an application may depend on being available. The four devices which are called out in the *System V Interface Definition* are:

- /dev/console
- /dev/null
- /dev/tty
- /dev/zero

Additional devices have been called out in the Future Directions. As the interfaces for these devices mature, they will be considered for inclusion in SCD.

ABI Errata



CHAPTER 3: System Features



System Features

System Features

Overview

While SPARC-compliant systems must provide the interfaces listed in the following chapters, there are additional areas of functionality SPARC-compliant systems must provide. These areas of functionality do not necessarily have library interfaces associated with them, but they are essential to the run-time environment.

Object file format

Processor independent descriptions of the object file format for System V Release 4 may be found in Chapter 4 of the *System V ABI*. Information specific to SPARC platforms may be found in Chapter 4 of the *System V ABI SPARC Processor Supplement*.

Program Loading and Linking

Processor independent descriptions of program loading and linking for SCD compliant systems may be found in Chapter 5 of the *System V ABI*. Information specific to the SPARC platforms may be found in Chapter 5 of the *System V ABI SPARC Processor Supplement*.

Low-level System Information

Low-level system information pertinent to SPARC platforms may be found in Chapter 3 of the *System V ABI SPARC Processor Supplement*. Information such as page size restrictions, as well as stack management, function calling sequence and data representations may be found here.

Formats and Protocols

Archive file formats, networking protocols, and the terminfo data base format may be found in Chapter 7 of the *System V ABI*.

Software Installation

Software installation information concerning file formats, installation commands, and

System Features

the installation file tree architecture may be found in Chapter 2 of the *System V ABI*. Information regarding supported media types may be found in the *System V ABI SPARC Processor Supplement*.



CHAPTER 4: The System Library



The System Library

Overview

This chapter contains the `libsys` interfaces to basic system services listed in the System V ABI and described in sections BA_OS, BA_LIB, BA_ENV, KE_OS, and RT_OS of the *System V Interface Definition, Third Edition*.

The `libsys` Interfaces

The interfaces listed below in Table 4-1 have been included in SCD 2.1 because they are required to be present in the system library `libsys`. `libsys` is the entity obtained through the use of the *reference name* `/usr/lib/ld.so.1`. Issues regarding synonyms and global data symbols associated with this library can be found in the *System V ABI*.

The System Library

Table 4-1. libsys Contents

_exit	fstatvfs	malloc	rewinddir	sigsend
access	fsync	memcntl	rmdir	sigsendset
acct	ftok	mkdir	seekdir	sigset
alarm	getcontext	mknod	semctl	sigsetjmp
atexit	getcwd	mllock	semget	sigsuspend
calloc	getegid	mmap	semop	stat
catclose	geteuid	mount	setcontext	statvfs
catgets	getgid	mprotect	setgid	stime
catopen	getgrgid	msgctl	setgroups	strcoll
chdir	getgrnam	msgget	setlocale	strerror
chmod	getgroups	msgrcv	setpgid	strftime
chown	getlogin	msgsnd	setpgrp	strxfrm
chroot	getmsg	msync	setrlimit	symlink
close	getpgid	munlock	setsid	sync
closedir	getpgrp	munmap	setuid	sysconf
creat	getpid	nice	shmat	system
dup	getpmsg	open	shmctl	telldir
execl	getppid	opendir	shmdt	time
execle	getpwnam	pathconf	shmget	times
execlp	getpwuid	pause	sigaction	ttynname
execv	getrlimit	pipe	sigaddset	ulimit
execve	getsid	poll	sigaltstack	umask
execvp	gettext	profil	sigdelset	umount
exit	getuid	ptrace	sigemptyset	uname
fattach	grantpt	ptsname	sigfillset	unlink
fchdir	initgroups	putmsg	sighold	unlockpt
fchmod	ioctl	putpmsg	sigignore	utime
fchown	isastream	read	sigismember	wait
fcntl	kill	readdir	siglongjmp	waitid
fdetach	lchown	readlink	signal	waitpid
fork	link	readv	sigpause	write
fpathconf	localeconv	realloc	sigpending	writev
free	lseek	remove	sigprocmask	
fstat	lstat	rename	sigrelse	

The System Library

Table 4-2. libsys SPARC Support Routines

.div	.urem	_Q_fle	_Q_qtou
.mul	_Q_add	_Q_flt	_Q_sqrt
.rem	_Q_cmp	_Q_fne	_Q_stoq
.stret1	_Q_cmpe	_Q_itoq	_Q_sub
.stret2	_Q_div	_Q_mul	_Q_utoq
.stret4	_Q_dtoq	_Q_neg	_dtou
.stret8	_Q_feq	_Q_qtod	_ftou
.udiv	_Q_fge	_Q_qtoi	
.umul	_Q_fgt	_Q_qtos	

The System Library

Section psABI

Location	Facility	Description
6-17	<fcntl.h>	<p>The following manifest constants are needed for implementing <code>ftruncate()</code> and <code>truncate()</code> operations but are missing from Figure 6-7:</p> <pre>#define F_FREESP 11</pre> <p>Additionally, the <code>struct flock</code> provided to this operation is initialized with <code>{F_WRLCK, 0, len, 0}</code> where <code>len</code> is the new length specified in the argument to <code>ftruncate()</code>.</p>

Section SVID, Volume 1

Location	Facility	Description
6-31	fcntl(BA_OS)	<p>Add a description of the command <code>F_FREESP</code> which reads: "Free storage space associated with a section of the ordinary file <i>fd</i>. The section is specified by a variable of data type <code>struct flock</code> pointed to by the third argument <i>arg</i>. <i>l_whence</i> is <code>SEEK_SET</code>, <code>SEEK_CUR</code>, or <code>SEEK_END</code> to indicate that the relative offset <i>l_start</i> will be measured from the start of the file, the current position, or the end of the file, respectively. <i>l_start</i> is the offset from the position specified in <i>l_whence</i>. <i>l_len</i> is the size of the section. An <i>l_len</i> of 0 frees up to the end of the file; in this case, the end of file (i.e., file size) is set to the beginning of the section freed. Any data previously written into this section is no longer accessible."</p>
6-101 6-173	read, readv(BA_OS) write, writev(BA_OS)	<p>The SVID specifies that the length of the <code>struct iov[]</code> in calls to <code>readv()</code>/<code>writev()</code> must be in the range <code>0 <= iovcnt <= IOV_MAX</code>. However, <code>IOV_MAX</code> is never defined. SCD compliant systems will support a minimum of 16 elements in a <code>struct iov[]</code>.</p>
6-171	waitid(BA_OS)	<p>The flag <code>WTRACED</code> should be replaced with <code>WTRAPPED</code>.</p>



CHAPTER 5: The C Library



The C Library

Overview

This chapter contains the `libc` facilities listed in the *System V ABI* and described in the *System V Interface Definition, Third Edition*.

The libc Interfaces

Interfaces listed below in Table 5-1 have been included because they are required on all systems conforming to the *System V ABI*, made available through the reference name `/usr/lib/libc.so.1`. Issues regarding synonyms and global data symbols associated with this library can be found in the *System V ABI*.

The C Library

Table 5-1. `libc` Contents

<code>_assert</code>	<code>fileno</code>	<code>islower</code>	<code>printf</code>	<code>strtok</code>
<code>_filbuf</code>	<code>fmtmsg</code>	<code>isnan</code>	<code>putc</code>	<code>strtol</code>
<code>_flsbuf</code>	<code>fopen</code>	<code>isnand</code>	<code>putchar</code>	<code>strtoul</code>
<code>_tolower</code>	<code>fprintf</code>	<code>isprint</code>	<code>putenv</code>	<code>swab</code>
<code>_toupper</code>	<code>fputc</code>	<code>ispunct</code>	<code>puts</code>	<code>tcdrain</code>
<code>_xftw</code>	<code>fputs</code>	<code>isspace</code>	<code>putw</code>	<code>tcflow</code>
<code>abort</code>	<code>fread</code>	<code>isupper</code>	<code>qsort</code>	<code>tcflush</code>
<code>abs</code>	<code>freopen</code>	<code>isxdigit</code>	<code>raise</code>	<code>tcgetattr</code>
<code>addseverity</code>	<code>frexp</code>	<code>labs</code>	<code>rand</code>	<code>tcgetpgrp</code>
<code>asctime</code>	<code>fscanf</code>	<code>ldexp</code>	<code>rewind</code>	<code>tcgetsid</code>
<code>atof</code>	<code>fseek</code>	<code>ldiv</code>	<code>scanf</code>	<code>tcsendbreak</code>
<code>atoi</code>	<code>fsetpos</code>	<code>lfind</code>	<code>setbuf</code>	<code>tcsetattr</code>
<code>atol</code>	<code>ftell</code>	<code>localtime</code>	<code>setjmp</code>	<code>tcsetpgrp</code>
<code>bsearch</code>	<code>fwrite</code>	<code>lockf</code>	<code>setlabel</code>	<code>tdelete</code>
<code>cfgetispeed</code>	<code>getc</code>	<code>longjmp</code>	<code>setvbuf</code>	<code>tell</code>
<code>cfgetospeed</code>	<code>getchar</code>	<code>lsearch</code>	<code>sleep</code>	<code>tempnam</code>
<code>cfsetispeed</code>	<code>getdate</code>	<code>mblen</code>	<code>sprintf</code>	<code>tfind</code>
<code>cfsetospeed</code>	<code>getenv</code>	<code>mbstowcs</code>	<code>srand</code>	<code>tmpfile</code>
<code>clearerr</code>	<code>getopt</code>	<code>mbtowc</code>	<code>sscanf</code>	<code>tmpnam</code>
<code>clock</code>	<code>getpass</code>	<code>memccpy</code>	<code>strcat</code>	<code>toascii</code>
<code>ctermid</code>	<code>gets</code>	<code>memchr</code>	<code>strchr</code>	<code>tolower</code>
<code>ctime</code>	<code>getsubopt</code>	<code>memcmp</code>	<code>strcmp</code>	<code>toupper</code>
<code>cuserid</code>	<code>getw</code>	<code>memcpy</code>	<code>strcpy</code>	<code>tsearch</code>
<code>difftime</code>	<code>gmtime</code>	<code>memmove</code>	<code>strcspn</code>	<code>twalk</code>
<code>div</code>	<code>hcreate</code>	<code>memset</code>	<code>strdup</code>	<code>tzset</code>
<code>dup2</code>	<code>hdestroy</code>	<code>mkfifo</code>	<code>strlen</code>	<code>ungetc</code>
<code>fclose</code>	<code>hsearch</code>	<code>mktemp</code>	<code>strncat</code>	<code>vfprintf</code>
<code>fdopen</code>	<code>isalnum</code>	<code>mktimes</code>	<code>strncmp</code>	<code>vprintf</code>
<code>feof</code>	<code>isalpha</code>	<code>monitor</code>	<code>strncpy</code>	<code>vsprintf</code>
<code>ferror</code>	<code>isascii</code>	<code>nftw</code>	<code>strpbk</code>	<code>wcstombs</code>
<code>fflush</code>	<code>isatty</code>	<code>nl_langinfo</code>	<code>strrchr</code>	<code>wctomb</code>
<code>fgetc</code>	<code>iscntrl</code>	<code>pclose</code>	<code>strspn</code>	
<code>fgetpos</code>	<code>isdigit</code>	<code>perror</code>	<code>strstr</code>	
<code>fgets</code>	<code>isgraph</code>	<code>popen</code>	<code>strtod</code>	

The C Library

gABI Errata

The following are errata to the C Library interfaces (detailed in the *System V Application Binary Interface*), as reported to SPARC International.

Section gABI

Location	Facility	Description
C Library	<code>_assert</code>	Function <code>_assert</code> is missing. Add the description: <code>void __assert(char *assertion, char *file, int line)</code> Writes a message to the standard error stating that the <i>assertion</i> in <i>file</i> at <i>line</i> has proved to be false. Then calls <code>abort()</code> . <code>_assert</code> is provided with a synonym.

C Library Errata

The following are errata to the C Library interfaces (detailed in the *System V Interface Definition, Third Edition*), as reported to SPARC International.

Section SVID, Volume I

Location	Facility	Description
6-37	<code>fdopen(BA_OS)</code>	The requirement that the <i>fildes</i> argument be open is incorrect.
6-4	<code>addseverity(BA_OS)</code>	Function <code>addseverity</code> is missing. Add the description: <code>int addseverity(int value, const char *string)</code> Add a new severity level of <i>value</i> . <i>value</i> must be greater than 4. Associates <i>string</i> with the level <i>value</i> so that <i>string</i> is produced with messages of that <i>value</i> yielded by <code>fmtmsg()</code> . If a severity of <i>value</i> already exists it is replaced by the new description. If <i>string</i> is <code>(char *) 0</code> then the severity level is deleted. <i>value</i> < 4 results in a -1 return with <code>errno</code> set to <code>EINVAL</code> , as does an attempt to delete a currently undefined severity level.

The C Library

6-69	isnan(BA_LIB)	Function <code>isnan</code> is missing. Add the description: <code>int isnan(double d)</code> Returns 1 if <i>d</i> is an IEEE “NaN”. Returns 0 otherwise.
6-150	tell(BA_OS)	Function <code>tell</code> is missing. Add the description: <code>long tell (int f)</code> Returns the current position of the file associated with <i>f</i> . Equivalent to <code>lseek(f, 0L, SEEK_CUR)</code> .



CHAPTER 6: The Network Services Library



The Network Services Library

Overview

This chapter contains the `libnsl` interfaces listed in the *System V ABI*, and described in the *System V Interface Definition*, Third Edition.

Transport Providers

All SPARC-compliant systems will provide a transport provider interface for TCP/IP. The device name for this transport provider interface is `/dev/tcp`.

The libnsl Interfaces

The interfaces listed below in Table 6-1 have been included in SCD 2.1 because they are required to be present on all systems conforming to the System V ABI, in the dynamic library `/usr/lib/libnsl.so.1`. Issues regarding synonyms and global data symbols associated with this library can be found in the System V ABI.

The interfaces found in Table 6-2 are also required to be present on an ABI-conforming system. Systems without networking capabilities are not required to implement these interfaces, but must provide an entry point in `libnsl` for each. Entry points which are provided as stubs and not implemented must fail normally and set the external symbol `errno` to ENOSYS.

The Network Services Library

Table 6-1. libns1 Contents, Part 1 of 2

t_accept	t_error	t_look	t_rcvdis	t_snddis
t_alloc	t_free	t_open	t_rcvrel	t_sndrel
t_bind	t_getinfo	t_optmgmt	t_rcvudata	t_sndudata
t_close	t_getstate	t_rcv	t_rcvuderr	t_sync
t_connect	t_listen	t_rcvconnect	t_snd	t_unbind

The Network Services Library

Table 6-2. libnsl Contents, part 2 of 2

authdes_getucred	netname2host
authdes_seccreate	netname2user
authnone_create	rpc_broadcast
authsys_create	rpc_call
authsys_create_default	rpc_reg
clnt_create	rpcb_getaddr
clnt_dg_create	rpcb_getmaps
clnt_pcreateerror	rpcb_gettime
clnt_perrno	rpcb_rmtcall
clnt_perror	rpcb_set
clnt_raw_create	rpcb_unset
clnt_spcreateerror	setnetconfig
clnt_sperrno	setnetpath
clnt_sperror	svc_create
clnt_tli_create	svc_dg_create
clnt_tp_create	svc_fd_create
clnt_vc_create	svc_getreqset
endnetconfig	svc_raw_create
endnetpath	svc_reg
freenetconfigent	svc_run
getnetconfig	svc_sendreply
getnetconfigent	svc_tli_create
getnetname	svc_tp_create
getnetpath	svc_unreg
getpublickey	svc_vc_create
getsecretkey	svcerr_auth
host2netname	svcerr_decode
key_decryptsession	svcerr_noproc
key_encryptsession	svcerr_noprog
key_gendes	svcerr_progvers
key_setsecret	svcerr_systemerr
nc_perror	svcerr_weakauth
netdir_free	taddr2uaddr
netdir_getbyaddr	uaddr2taddr
netdir_getbyname	user2netname
netdir_options	xdr_accepted_reply

The Network Services Library

Table 6-2. libnsl Contents, Part 2 of 2 (cont'd.)

xdr_array	xdr_u_long
xdr_authsys_parms	xdr_u_short
xdr_bool	xdr_union
xdr_bytes	xdr_vector
xdr_callhdr	xdr_void
xdr_callmsg	xdr_wrapstring
xdr_char	xdrmem_create
xdr_double	xdrrec_create
xdr_enum	xdrrec_eof
xdr_float	xdrrec_skiprecord
xdr_free	xdrstdio_create
xdr_int	xprt_register
xdr_long	xprt_unregister
xdr_opaque	
xdr_opaque_auth	
xdr_pointer	
xdr_reference	
xdr_rejected_reply	
xdr_replymsg	
xdr_short	
xdr_string	
xdr_u_char	

The Network Services Library

Network Services Errata

The following are errata to the network services interfaces (detailed in the *System V Interface Definition, Third Edition*), as reported to SPARC International.

Section SVID, Volume III

Location	Facility	Description
18-21	rpc_svc_err(RS_LIB)	<p>Description of the function <code>svcerr_progvers()</code> is missing its last two arguments in the function prototype. Prototype should be:</p> <pre>void svcerr_progvers(const SVCXPRT *xprt, ulong_t low, ulong_t high)</pre> <p>where <i>low</i> and <i>high</i> represent the lowest and highest, respectively, of the versions of the service provided.</p>

The Network Services Library



CHAPTER 7: Commands



Commands for Application Programs

Overview

This Chapter contains the commands for application programs as listed in the *System V ABI*, and described in the *System V Interface Definition, (Third Edition)*.

Commands



CHAPTER 8: The X Library



The X Library

The X Library

Overview

This chapter identifies binary interfaces for `libX`, which are defined in *The X Window System (Second Edition)* by Robert W. Scheifler and James Gettys (Digital Press, ISBN 1-5558-050-5).

Finally, all SCD 2.1 systems will support the mechanisms and conventions as specified in the *Inter-Client Communications Convention Manual* (ICCCM) in *The X Window System (Second Edition)* by Robert W. Scheifler and James Gettys (Digital Press, ISBN 1-5558-050-5).

The X Library Interfaces

The interfaces listed below in Table 8-1 have been included in SCD 2.1 because they are required to be present on all compliant systems, in the dynamic library `/usr/lib/libX11.so.4`.

Table 8-2 contains the exported data which are also required to be present in `libX11.so.4`. The format of these entries is: `data[size]`.

Figures 8-1 through 8-7 detail the manifest constants and visible data structures associated with the X library.

The X Library

Table 8-1. Contents of libX

XActivateScreenSaver	XCirculateSubwindowsDown
XAddExtension	XCirculateSubwindowsUp
XAddHost	XClearArea
XAddHosts	XClearWindow
XAddPixel	XClipBox
XAddToExtensionList	XCloseDisplay
XAddToSaveSet	XConfigureWindow
XAllocClassHint	XConnectionNumber
XAllocColor	XConvertSelection
XAllocColorCells	XCopyArea
XAllocColorPlanes	XCopyColormapAndFree
XAllocIconSize	XCopyGC
XAllocNamedColor	XCopyPlane
XAllocSizeHints	XCreateBitmapFromData
XAllocStandardColormap	XCreateColormap
XAllocWMHints	XCreateFontCursor
XAllowEvents	XCreateGC
XAllPlanes	XCreateGlyphCursor
XAutoRepeatOff	XCreateImage
XAutoRepeatOn	XCreatePixmap
XBell	XCreatePixmapCursor
XBitmapBitOrder	XCreatePixmapFromBitmapData
XBitmapPad	XCreateRegion
XBitmapUnit	XCreateSimpleWindow
XBlackPixel	XCreateWindow
XBlackPixelOfScreen	XDefaultColormap
XCellsOfScreen	XDefaultColormapOfScreen
XChangeActivePointerGrab	XDefaultDepth
XChangeGC	XDefaultDepthOfScreen
XChangeKeyboardControl	XDefaultGC
XChangeKeyboardMapping	XDefaultGCOfScreen
XChangePointerControl	XDefaultRootWindow
XChangeProperty	XDefaultScreen
XChangeSaveSet	XDefaultScreenOfDisplay
XChangeWindowAttributes	XDefaultVisual
XCheckIfEvent	XDefaultVisualOfScreen
XCheckMaskEvent	XDefineCursor
XCheckTypedEvent	XDeleteContext
XCheckTypedWindowEvent	XDeleteModifiermapEntry
XCheckWindowEvent	XDeleteProperty
XCirculateSubwindows	XDestroyImage

The X Library

XDestroyRegion	XESetEventToWire
XDestroySubwindows	XESetFlushGC
XDestroyWindow	XESetFont
XDisableAccessControl	XESetFreeGC
XDisplayCells	XESetWireToEvent
XDisplayHeight	XEventMaskOfScreen
XDisplayHeightMM	XEventsQueued
XDisplayKeycodes	XFetchBuffer
XDisplayMotionBufferSize	XFetchBytes
XDisplayName	XFetchName
XDisplayOfScreen	XFillArc
XDisplayPlanes	XFillArcs
XDisplayString	XFillPolygon
XDisplayWidth	XFillRectangle
XDisplayWidthMM	XFillRectangles
XDoesBackingStore	XFindContext
XDoesSaveUnders	XFindOnExtensionList
XDrawArc	XFlush
XDrawArcs	XForceScreenSaver
XDrawImageString	XFree
XDrawImageString16	XFreeColormap
XDrawLine	XFreeColors
XDrawLines	XFreeCursor
XDrawPoint	XFreeExtensionList
XDrawPoints	XFreeFont
XDrawRectangle	XFreeFontInfo
XDrawRectangles	XFreeFontNames
XDrawSegments	XFreeFontPath
XDrawString	XFreeGC
XDrawString16	XFreeModifiermap
XDrawText	XFreePixmap
XDrawText16	XFreeStringList
XEHeadOfExtensionList	XGContextFromGC
XEmptyRegion	XGeometry
XEnableAccessControl	XGetAtomName
XEqualRegion	XGetClassHint
XESetCloseDisplay	XGetCommand
XESetCopyGC	XGetDefault
XESetCreateFont	XGetErrorDatabaseText
XESetCreateGC	XGetErrorText
XESetError	XGetFontPath
XESetErrorMessage	XGetFontProperty

The X Library

XGetGCValues	XImageByteOrder
XGetGeometry	XInitExtension
XGetIconName	XInsertModifiermapEntry
XGetIconSizes	XInstallColormap
XGetImage	XInternAtom
XGetInputFocus	XIntersectRegion
XGetKeyboardControl	XKeyCodeToKeysym
XGetKeyboardMapping	XKeysymToKeyCode
XGetModifierMapping	XKeysymToString
XGetMotionEvents	XKillClient
XGetNormalHints	XLastKnownRequestProcessed
XGetPixel	XListDepths
XGetPointerControl	XListExtensions
XGetPointerMapping	XListFonts
XGetRGBColormaps	XListFontsWithInfo
XGetScreenSaver	XListHosts
XGetSelectionOwner	XListInstalledColormaps
XGetSizeHints	XListPixmapFormats
XGetStandardColormap	XListProperties
XGetSubImage	XLoadFont
XGetTextProperty	XLoadQueryFont
XGetTransientForHint	XLookupColor
XGetVisualInfo	XLookupKeysym
XGetWindowAttributes	XLookupString
XGetWindowProperty	XLowerWindow
XGetWMClientMachine	XMapRaised
XGetWMColormapWindows	XMapSubwindows
XGetWMHints	XMapWindow
XGetWMIIconName	XMaskEvent
XGetWMName	XMatchVisualInfo
XGetWMNormalHints	XMaxCmapsOfScreen
XGetWMProtocols	XMaxRequestSize
XGetWMSizeHints	XMinCmapsOfScreen
XGrabButton	XMoveResizeWindow
XGrabKey	XMoveWindow
XGrabKeyboard	XNewModifiermap
XGrabPointer	XNextEvent
XGrabServer	XNextRequest
XHeightMMOfScreen	XNoOp
XHeightOfScreen	XOffsetRegion
XIconifyWindow	XOpenDisplay
XIfEvent	XParseColor

The X Library

XParseGeometry	XrmDestroyDatabase
XPeekEvent	XrmGetFileDatabase
XPeekIfEvent	XrmGetResource
XPending	XrmGetStringDatabase
Xpmalloc	XrmInitialize
XPlanesOfScreen	XrmMergeDatabases
XPointInRegion	XrmParseCommand
XPolygonRegion	XrmPutFileDatabase
XProtocolRevision	XrmPutLineResource
XProtocolVersion	XrmPutResource
XPutBackEvent	XrmPutStringResource
XPutImage	XrmQGetResource
XPutPixel	XrmQGetSearchList
XQLength	XrmQGetSearchResource
XQueryBestCursor	XrmQPutResource
XQueryBestSize	XrmQPutStringResource
XQueryBestStipple	XrmQuarkToString
XQueryBestTile	XrmStringToBindingQuarkList
XQueryColor	XrmStringToQuark
XQueryColors	XrmStringToQuarkList
XQueryExtension	XrmUniqueQuark
XQueryFont	XRootWindow
XQueryKeymap	XRootWindowOfScreen
XQueryPointer	XRotateBuffers
XQueryTextExtents	XRotateWindowProperties
XQueryTextExtents16	XSaveContext
XQueryTree	XScreenCount
XRaiseWindow	XScreenNumberOfScreen
XReadBitmapFile	XScreenOfDisplay
XRebindKeysym	XSelectInput
XRecolorCursor	XSendEvent
XReconfigureWMWindow	XServerVendor
XRectInRegion	XSetAccessControl
XRefreshKeyboardMapping	XSetAfterFunction
XRemoveFromSaveSet	XSetArcMode
XRemoveHost	XSetAuthorization
XRemoveHosts	XSetBackground
XReparentWindow	XSetClassHint
XResetScreenSaver	XSetClipMask
XResizeWindow	XSetClipOrigin
XResourceManagerString	XSetClipRectangles
XRestackWindows	XSetCloseDownMode

The X Library

XSetCommand	XSetWMIconName
XSetDashes	XSetWMName
XSetErrorHandler	XSetWMNormalHints
XSetFillRule	XSetWMProperties
XSetFillStyle	XSetWMProtocols
XSetFont	XSetWMSizeHints
XSetFontPath	XShrinkRegion
XSetForeground	XStoreBuffer
XSetFunction	XStoreBytes
XSetGraphicsExposures	XStoreColor
XSetIconName	XStoreColors
XSetIconSizes	XStoreName
XSetInputFocus	XStoreNamedColor
XSetIOErrorHandler	XStringListToTextProperty
XSetLineAttributes	XStringToKeysym
XSetModifierMapping	XSubImage
XSetNormalHints	XSubtractRegion
XSetPlaneMask	XSync
XSetPointerMapping	XSynchronize
XSetRegion	XTextExtents
XSetRGBColormaps	XTextExtents16
XSetScreenSaver	XTextPropertyToStringList
XSetSelectionOwner	XTextWidth
XSetSizeHints	XTextWidth16
XSetStandardColormap	XTranslateCoordinates
XSetStandardProperties	XUndefineCursor
XsetState	XUngrabButton
XSetStipple	XUngrabKey
XSetSubwindowMode	XUngrabKeyboard
XSetTextProperty	XUngrabPointer
XSetTile	XUngrabServer
XSetTransientForHint	XUninstallColormap
XSetTSOrigin	XUnionRectWithRegion
XSetWindowBackground	XUnionRegion
XSetWindowBackgroundPixmap	XUniqueContext
XSetWindowBorder	XUnloadFont
XSetWindowBorderPixmap	XUnmapSubwindows
XSetWindowBorderWidth	XUnmapWindow
XSetWindowColormap	XVendorRelease
XSetWMClientMachine	XVisualIDFromVisual
XSetWMColormapWindows	XWarpPointer
XSetWMHints	XWhitePixel

The X Library

```
XWhitePixelOfScreen  
XWidthMMOfScreen  
XWidthOfScreen  
XWindowEvent  
XWithdrawWindow  
XWMGeometry  
XWriteBitmapFile  
XXorRegion
```

The X Library

Table 8-2. Exported Data for libX.

_Xdebug[4]

The X Library

Following, are the definitions of manifest constants and data types needed by applications to interface to the Xlib functions listed in Table 8-1.

Though the SPARC Compliance Definition specifies an Application Binary Interface (ABI) rather than an Application Program Interface (API) the manifest constants and data type definitions are broken up into different tables based on which header files a programmer would ordinarily expect to find the definitions for two reasons:

- it makes the document more informative for the programmer who is trying to meet the standard, and
- it is expected that this will make the document easier to edit and review.

The header files these definitions are taken from are

- <X11/Xlib.h>,
- <X11/X.h>,
- <X11/Xatom.h>,
- <X11/Xresource.h>,
- <X11/Xutil.h>,
- <X11/keysymdef.h>, and
- <X11/cursorfont.h>.

All header definitions are based on X, version 11, release 4 from the MIT X Consortium.

The X Library

Figure 8-1. Manifest Constants and Data Types from <X11/Xlib.h>

```
#define Bool int
#define Status int
#define True 1
#define False 0

#define QueuedAlready 0
#define QueuedAfterReading 1
#define QueuedAfterFlush 2

#define AllPlanes          (~0)

/*
 * Extensions need a way to hang private data on some structures.
 */
typedef struct _XExtData {
    int number;           /* number returned by XRegisterExtension */
    struct _XExtData *next; /* next item on list of data for structure */
    int (*free_private)(); /* called to free private storage */
    char *private_data;   /* data private to this extension. */
} XExtData;

/*
 * This file contains structures used by the extension mechanism.
 */
typedef struct {
    int extension;        /* public to extension, cannot be changed */
    int major_opcode;     /* extension number */
    int first_event;      /* major op-code assigned by server */
    int first_error;      /* first event number for the extension */
} XExtCodes;

/*
 * Data structure for retrieving info about pixmap formats.
 */

typedef struct {
    int depth;
    int bits_per_pixel;
    int scanline_pad;
} XPixmapFormatValues;

/*
 * Data structure for setting graphics context.
*/
```

The X Library

```
/*
typedef struct {
    int function;          /* logical operation */
    unsigned long plane_mask; /* plane mask */
    unsigned long foreground; /* foreground pixel */
    unsigned long background; /* background pixel */
    int line_width;        /* line width */
    int line_style;         /* LineSolid, LineOnOffDash, LineDoubleDash */
    int cap_style;          /* CapNotLast, CapButt,
                                CapRound, CapProjecting */
    int join_style;         /* JoinMiter, JoinRound, JoinBevel */
    int fill_style;          /* FillSolid, FillTiled,
                                FillStippled, FillOpaeueStippled */
    int fill_rule;           /* EvenOddRule, WindingRule */
    int arc_mode;            /* ArcChord, ArcPieSlice */
    Pixmap tile;             /* tile pixmap for tiling operations */
    Pixmap stipple;          /* stipple 1 plane pixmap for stippling */
    int ts_x_origin;        /* offset for tile or stipple operations */
    int ts_y_origin;
    Font font;               /* default text font for text operations */
    int subwindow_mode;      /* ClipByChildren, IncludeInferiors */
    Bool graphics_exposures; /* boolean, should exposures be generated */
    int clip_x_origin;       /* origin for clipping */
    int clip_y_origin;
    Pixmap clip_mask;        /* bitmap clipping; other calls for rects */
    int dash_offset;          /* patterned/dashed line information */
    char dashes;
} XGCValues;

/*
 * Graphics context. All Xlib routines deal in this rather than
 * in raw protocol GContext ID's. This is so that the library can keep
 * a "shadow" set of values, and thus avoid passing values over the
 * wire which are not in fact changing.
*/
typedef struct _XGC {
    XExtData *ext_data; /* hook for extension to hang data */
    GContext gid;        /* protocol ID for graphics context */
    Bool rects;           /* boolean: TRUE if clipmask is list of rectangles */
    Bool dashes;          /* boolean: TRUE if dash-list is really a list */
    unsigned long dirty; /* cache dirty bits */
    XGCValues values;    /* shadow structure of values */
} *GC;

/*
 * Visual structure; contains information about colormapping possible.
```

The X Library

```
/*
typedef struct {
    XExtData *ext_data;      /* hook for extension to hang data */
    VisualID visualid;       /* visual id of this visual */
#if defined(__cplusplus) || defined(c_plusplus)
    int c_class;             /* C++ class of screen (monochrome, etc.) */
#else
    int class;                /* class of screen (monochrome, etc.) */
#endif
    unsigned long red_mask, green_mask, blue_mask; /* mask values */
    int bits_per_rgb;         /* log base 2 of distinct color values */
    int map_entries;          /* color map entries */
} Visual;

/*
 * Depth structure; contains information for each possible depth.
 */
typedef struct {
    int depth;                  /* this depth (Z) of the depth */
    int nvisuals;                /* number of Visual types at this depth */
    Visual *visuals;              /* list of visuals possible at this depth */
} Depth;

/*
 * Information about the screen.
 */
typedef struct {
    XExtData *ext_data;          /* hook for extension to hang data */
    struct _XDisplay *display; /* back pointer to display structure */
    Window root;                 /* Root window id. */
    int width, height;           /* width and height of screen */
    int mwidth, mheight;          /* width and height of in millimeters */
    int ndepths;                  /* number of depths possible */
    Depth *depths;                /* list of allowable depths on the screen */
    int root_depth;                /* bits per pixel */
    Visual *root_visual;          /* root visual */
    GC default_gc;                /* GC for the root root visual */
    Colormap cmap;                  /* default color map */
    unsigned long white_pixel;
    unsigned long black_pixel;     /* White and Black pixel values */
    int max_maps, min_maps; /* max and min color maps */
    int backing_store;            /* Never, WhenMapped, Always */
    Bool save_unders;
    long root_input_mask;          /* initial root input mask */
} Screen;

/*
```

The X Library

```
* Format structure; describes ZFormat data the screen will understand.  
*/  
typedef struct {  
    XExtData *ext_data;      /* hook for extension to hang data */  
    int depth;              /* depth of this image format */  
    int bits_per_pixel;     /* bits/pixel at this depth */  
    int scanline_pad;       /* scanline must padded to this multiple */  
} ScreenFormat;  
  
/*  
 * Data structure for setting window attributes.  
 */  
typedef struct {  
    Pixmap backgroundPixmap; /* background or None or ParentRelative */  
    unsigned long backgroundPixel; /* background pixel */  
    Pixmap borderPixmap; /* border of the window */  
    unsigned long borderPixel; /* border pixel value */  
    int bit_gravity; /* one of bit gravity values */  
    int win_gravity; /* one of the window gravity values */  
    int backing_store; /* NotUseful, WhenMapped, Always */  
    unsigned long backing_planes; /* planes to be preserved if possible */  
    unsigned long backing_pixel; /* value to use in restoring planes */  
    Bool save_under; /* should bits under be saved? (popups) */  
    long event_mask; /* set of events that should be saved */  
    long do_not_propagate_mask; /* set of events that should not propagate */  
    Bool override_redirect; /* boolean value for override-redirect */  
    Colormap colormap; /* color map to be associated with window */  
    Cursor cursor; /* cursor to be displayed (or None) */  
} XSetWindowAttributes;  
  
typedef struct {  
    int x, y;                /* location of window */  
    int width, height;        /* width and height of window */  
    int border_width;         /* border width of window */  
    int depth;                /* depth of window */  
    Visual *visual;           /* the associated visual structure */  
    Window root;              /* root of screen containing window */  
#if defined(__cplusplus) || defined(c_plusplus)  
    int c_class;             /* C++ InputOutput, InputOnly */  
#else  
    int class;               /* InputOutput, InputOnly */  
#endif  
    int bit_gravity;          /* one of bit gravity values */  
    int win_gravity;          /* one of the window gravity values */  
    int backing_store;         /* NotUseful, WhenMapped, Always */  
    unsigned long backing_planes; /* planes to be preserved if possible */  
    unsigned long backing_pixel; /* value to be used when restoring planes */
```

The X Library

```
Bool save_under;           /* boolean, should bits under be saved? */
Colormap colormap;        /* color map to be associated with window */
Bool map_installed;       /* boolean, is color map currently installed*/
int map_state;            /* IsUnmapped, IsUnviewable, IsViewable */
long all_event_masks;    /* set of events all people have interest in*/
long your_event_mask;    /* my event mask */
long do_not_propagate_mask; /* set of events that should not propagate */
Bool override_redirect;  /* boolean value for override-redirect */
Screen *screen;          /* back pointer to correct screen */

} XWindowAttributes;

/*
 * Data structure for host setting; getting routines.
 *
 */

typedef struct {
    int family;             /* for example AF_DNET */
    int length;              /* length of address, in bytes */
    char *address;           /* pointer to where to find the bytes */
} XHostAddress;

/*
 * Data structure for "image" data, used by image manipulation routines.
 */
typedef struct _XImage {
    int width, height;      /* size of image */
    int xoffset;             /* number of pixels offset in X direction */
    int format;              /* XYBitmap, XYPixelmap, ZPixelmap */
    char *data;               /* pointer to image data */
    int byte_order;           /* data byte order, LSBFirst, MSBFirst */
    int bitmap_unit;          /* quant. of scanline 8, 16, 32 */
    int bitmap_bit_order;     /* LSBFirst, MSBFirst */
    int bitmap_pad;           /* 8, 16, 32 either XY or ZPixelmap */
    int depth;                /* depth of image */
    int bytes_per_line;       /* accelerator to next line */
    int bits_per_pixel;       /* bits per pixel (ZPixelmap) */
    unsigned long red_mask;   /* bits in z arrangement */
    unsigned long green_mask;
    unsigned long blue_mask;
    char *obdata;              /* hook for the object routines to hang on */
    struct funcs {             /* image manipulation routines */
        struct _XImage *(*create_image)();
    };
#endif NeedFunctionPrototypes
    int (*destroy_image)      (struct _XImage *);
    unsigned long (*get_pixel) (struct _XImage *, int, int);
    int (*put_pixel)          (struct _XImage *, int, int, unsigned long);
```

The X Library

```
        struct _XImage *(*sub_image)(struct _XImage *, int, int, unsigned
int, unsigned int);
        int (*add_pixel)          (struct _XImage *, long);
#else
        int (*destroy_image)();
        unsigned long (*get_pixel)();
        int (*put_pixel)();
        struct _XImage *(*sub_image)();
        int (*add_pixel)();
#endif
    } f;
} XImage;

/*
 * Data structure for XReconfigureWindow
 */
typedef struct {
    int x, y;
    int width, height;
    int border_width;
    Window sibling;
    int stack_mode;
} XWindowChanges;

/*
 * Data structure used by color operations
 */
typedef struct {
    unsigned long pixel;
    unsigned short red, green, blue;
    char flags; /* do_red, do_green, do_blue */
    char pad;
} XColor;

/*
 * Data structures for graphics operations. On most machines, these are
 * congruent with the wire protocol structures, so reformatting the data
 * can be avoided on these architectures.
 */
typedef struct {
    short x1, y1, x2, y2;
} XSegment;

typedef struct {
    short x, y;
} XPoint;
```

The X Library

```
typedef struct {
    short x, y;
    unsigned short width, height;
} XRectangle;

typedef struct {
    short x, y;
    unsigned short width, height;
    short angle1, angle2;
} XArc;

/* Data structure for XChangeKeyboardControl */

typedef struct {
    int key_click_percent;
    int bell_percent;
    int bell_pitch;
    int bell_duration;
    int led;
    int led_mode;
    int key;
    int auto_repeat_mode; /* On, Off, Default */
} XKeyboardControl;

/* Data structure for XGetKeyboardControl */

typedef struct {
    int key_click_percent;
    int bell_percent;
    unsigned int bell_pitch, bell_duration;
    unsigned long led_mask;
    int global_auto_repeat;
    char auto_repeats[32];
} XKeyboardState;

/* Data structure for XGetMotionEvents. */

typedef struct {
    Time time;
    short x, y;
} XTimeCoord;

/* Data structure for X{Set,Get}ModifierMapping */

typedef struct {
    int max_keypermod; /* The server's max # of keys per modifier */
    KeyCode *modifiermap; /* An 8 by max_keypermod array of modifiers */
}
```

The X Library

```
} XModifierKeymap;

/*
 * Display datatype maintaining display specific data.
 */
typedef struct _XDisplay {
    XExtData *ext_data;      /* hook for extension to hang data */
    struct _XDisplay *next; /* next open Display on list */
    int fd;                 /* Network socket. */
    int lock;               /* is someone in critical section? */
    int proto_major_version; /* maj. version of server's X protocol */
    int proto_minor_version; /* minor version of servers X protocol */
    char *vendor;           /* vendor of the server hardware */
    long resource_base;     /* resource ID base */
    long resource_mask;     /* resource ID mask bits */
    long resource_id;       /* allocator current ID */
    int resource_shift;     /* allocator shift to correct bits */
    XID (*resource_alloc)(); /* allocator function */
    int byte_order;          /* screen byte order, LSBFirst, MSBFist */
    int bitmap_unit;         /* padding and data requirements */
    int bitmap_pad;          /* padding requirements on bitmaps */
    int bitmap_bit_order;   /* LeastSignificant or MostSignificant */
    int nformats;            /* number of pixmap formats in list */
    ScreenFormat *pixmap_format; /* pixmap format list */
    int vnumber;              /* Xlib's X protocol version number. */
    int release;             /* release of the server */
    struct _XSQEvent *head, *tail; /* Input event queue. */
    int qlen;                /* Length of input event queue */
    unsigned long last_request_read; /* seq number of last event read */
    unsigned long request;    /* sequence number of last request. */
    char *last_req;           /* beginning of last request, or dummy */
    char *buffer;             /* Output buffer starting address. */
    char *bufptr;             /* Output buffer index pointer. */
    char *bufmax;             /* Output buffer maximum+1 address. */
    unsigned max_request_size; /* maximum number 32 bit words in request*/
    struct _XrmHashBucketRec *db;
    int (*synchandler)(); /* Synchronization handler */
    char *display_name; /* "host:display" string used on this connect*/
    int default_screen; /* default screen for operations */
    int nscreens;           /* number of screens on this server*/
    Screen *screens;         /* pointer to list of screens */
    unsigned long motion_buffer; /* size of motion buffer */
    Window current;          /* for use internally for Keymap notify */
    int min_keycode;         /* minimum defined keycode */
    int max_keycode;         /* maximum defined keycode */
    KeySym *keysyms;         /* This server's keysyms */
    XModifierKeymap *modifiermap; /* This server's modifier keymap */
```

The X Library

```
int keysyms_per_keycode; /* number of rows */
char *xdefaults;          /* contents of defaults from server */
char *scratch_buffer;    /* place to hang scratch buffer */
unsigned long scratch_length; /* length of scratch buffer */
int ext_number;           /* extension number on this display */
_XExtension *ext_procs; /* extensions initialized on this display */
/*
 * the following can be fixed size, as the protocol defines how
 * much address space is available.
 * While this could be done using the extension vector, there
 * may be MANY events processed, so a search through the extension
 * list to find the right procedure for each event might be
 * expensive if many extensions are being used.
 */
Bool (*event_vec[128])(); /* vector for wire to event */
Status (*wire_vec[128])(); /* vector for event to wire */
KeySym lock_meaning;      /* for XLookupString */
struct XKeytrans *key_bindings; /* for XLookupString */
Font cursor_font;         /* for XCreateFontCursor */
/*
 * ICCCM information, version 1
 */
struct _DisplayAtoms *atoms;
struct {
    long sequence_number;
    int (*old_handler)();
    Bool succeeded;
} reconfigure_wm_window;
/*
 * additional connection info
 */
unsigned long flags;       /* internal connection flags */
unsigned int mode_switch; /* keyboard group modifiers */
} Display;

/*
 * A "XEvent" structure always has type as the first entry. This
 * uniquely identifies what kind of event it is. The second entry
 * is always a pointer to the display the event was read from.
 * The third entry is always a window of one type or another,
 * carefully selected to be useful to toolkit dispatchers. (Except
 * for keymap events, which have no window.) You
 * must not change the order of the three elements or toolkits will
 * break! The pointer to the generic event must be cast before use to
 * access any other information in the structure.
*/
```

The X Library

```
/*
 * Definitions of specific events.
 */
typedef struct {
    int type;                  /* of event */
    unsigned long serial;      /* # of last request processed by server */
    Bool send_event;           /* true if this came from a SendEvent request */
    Display *display;          /* Display the event was read from */
    Window window;             /* "event" window it is reported relative to */
    Window root;               /* root window that the event occurred on */
    Window subwindow;          /* child window */
    Time time;                 /* milliseconds */
    int x, y;                  /* pointer x, y coordinates in event window */
    int x_root, y_root;         /* coordinates relative to root */
    unsigned int state;         /* key or button mask */
    unsigned int keycode;        /* detail */
    Bool same_screen;           /* same screen flag */
} XKeyEvent;
typedef XKeyEvent XKeyPressedEvent;
typedef XKeyEvent XKeyReleasedEvent;

typedef struct {
    int type;                  /* of event */
    unsigned long serial;      /* # of last request processed by server */
    Bool send_event;           /* true if this came from a SendEvent request */
    Display *display;          /* Display the event was read from */
    Window window;             /* "event" window it is reported relative to */
    Window root;               /* root window that the event occurred on */
    Window subwindow;          /* child window */
    Time time;                 /* milliseconds */
    int x, y;                  /* pointer x, y coordinates in event window */
    int x_root, y_root;         /* coordinates relative to root */
    unsigned int state;         /* key or button mask */
    unsigned int button;        /* detail */
    Bool same_screen;           /* same screen flag */
} XButtonEvent;
typedef XButtonEvent XButtonPressedEvent;
typedef XButtonEvent XButtonReleasedEvent;

typedef struct {
    int type;                  /* of event */
    unsigned long serial;      /* # of last request processed by server */
    Bool send_event;           /* true if this came from a SendEvent request */
    Display *display;          /* Display the event was read from */
    Window window;             /* "event" window reported relative to */
    Window root;               /* root window that the event occurred on */
    Window subwindow;          /* child window */
```

The X Library

```
Time time;           /* milliseconds */
int x, y;           /* pointer x, y coordinates in event window */
int x_root, y_root; /* coordinates relative to root */
unsigned int state; /* key or button mask */
char is_hint;       /* detail */
Bool same_screen;   /* same screen flag */

} XMotionEvent;
typedef XMotionEvent XPointerMovedEvent;

typedef struct {
    int type;           /* of event */
    unsigned long serial; /* # of last request processed by server */
    Bool send_event;   /* true if this came from a SendEvent request */
    Display *display;  /* Display the event was read from */
    Window window;     /* "event" window reported relative to */
    Window root;       /* root window that the event occurred on */
    Window subwindow;  /* child window */
    Time time;         /* milliseconds */
    int x, y;           /* pointer x, y coordinates in event window */
    int x_root, y_root; /* coordinates relative to root */
    int mode;          /* NotifyNormal, NotifyGrab, NotifyUngrab */
    int detail;         /* */
    /* */
    /* NotifyAncestor, NotifyVirtual, NotifyInferior,
     * NotifyNonLinear,NotifyNonLinearVirtual
     */
    Bool same_screen;   /* same screen flag */
    Bool focus;         /* boolean focus */
    unsigned int state; /* key or button mask */
} XCrossingEvent;
typedef XCrossingEvent XEnterWindowEvent;
typedef XCrossingEvent XLeaveWindowEvent;

typedef struct {
    int type;           /* FocusIn or FocusOut */
    unsigned long serial; /* # of last request processed by server */
    Bool send_event;   /* true if this came from a SendEvent request */
    Display *display;  /* Display the event was read from */
    Window window;     /* window of event */
    int mode;          /* NotifyNormal, NotifyGrab, NotifyUngrab */
    int detail;         /* */
    /* */
    /* NotifyAncestor, NotifyVirtual, NotifyInferior,
     * NotifyNonLinear,NotifyNonLinearVirtual, NotifyPointer,
     * NotifyPointerRoot, NotifyDetailNone
     */
} XFocusChangeEvent;
```

The X Library

```
typedef XFocusChangeEvent XFocusInEvent;
typedef XFocusChangeEvent XFocusOutEvent;

/* generated on EnterWindow and FocusIn  when KeyMapState selected */
typedef struct {
    int type;
    unsigned long serial; /* # of last request processed by server */
    Bool send_event;      /* true if this came from a SendEvent request */
    Display *display;     /* Display the event was read from */
    Window window;
    char key_vector[32];
} XKeymapEvent;

typedef struct {
    int type;
    unsigned long serial; /* # of last request processed by server */
    Bool send_event;      /* true if this came from a SendEvent request */
    Display *display;     /* Display the event was read from */
    Window window;
    int x, y;
    int width, height;
    int count;            /* if non-zero, at least this many more */
} XExposeEvent;

typedef struct {
    int type;
    unsigned long serial; /* # of last request processed by server */
    Bool send_event;      /* true if this came from a SendEvent request */
    Display *display;     /* Display the event was read from */
    Drawable drawable;
    int x, y;
    int width, height;
    int count;            /* if non-zero, at least this many more */
    int major_code;        /* core is CopyArea or CopyPlane */
    int minor_code;        /* not defined in the core */
} XGraphicsExposeEvent;

typedef struct {
    int type;
    unsigned long serial; /* # of last request processed by server */
    Bool send_event;      /* true if this came from a SendEvent request */
    Display *display;     /* Display the event was read from */
    Drawable drawable;
    int major_code;        /* core is CopyArea or CopyPlane */
    int minor_code;        /* not defined in the core */
} XNoExposeEvent;
```

The X Library

```
typedef struct {
    int type;
    unsigned long serial; /* # of last request processed by server */
    Bool send_event;      /* true if this came from a SendEvent request */
    Display *display;     /* Display the event was read from */
    Window window;
    int state;            /* Visibility state */
} XVisibilityEvent;

typedef struct {
    int type;
    unsigned long serial; /* # of last request processed by server */
    Bool send_event;      /* true if this came from a SendEvent request */
    Display *display;     /* Display the event was read from */
    Window parent;         /* parent of the window */
    Window window;         /* window id of window created */
    int x, y;              /* window location */
    int width, height;     /* size of window */
    int border_width;       /* border width */
    Bool override_redirect; /* creation should be overridden */
} XCreateWindowEvent;

typedef struct {
    int type;
    unsigned long serial; /* # of last request processed by server */
    Bool send_event;      /* true if this came from a SendEvent request */
    Display *display;     /* Display the event was read from */
    Window event;
    Window window;
} XDestroyWindowEvent;

typedef struct {
    int type;
    unsigned long serial; /* # of last request processed by server */
    Bool send_event;      /* true if this came from a SendEvent request */
    Display *display;     /* Display the event was read from */
    Window event;
    Window window;
    Bool from_configure;
} XUnmapEvent;

typedef struct {
    int type;
    unsigned long serial; /* # of last request processed by server */
    Bool send_event;      /* true if this came from a SendEvent request */
    Display *display;     /* Display the event was read from */
    Window event;
```

The X Library

```
Window window;
Bool override_redirect; /* boolean, is override set... */
} XMapEvent;

typedef struct {
    int type;
    unsigned long serial; /* # of last request processed by server */
    Bool send_event; /* true if this came from a SendEvent request */
    Display *display; /* Display the event was read from */
    Window parent;
    Window window;
} XMapRequestEvent;

typedef struct {
    int type;
    unsigned long serial; /* # of last request processed by server */
    Bool send_event; /* true if this came from a SendEvent request */
    Display *display; /* Display the event was read from */
    Window event;
    Window window;
    Window parent;
    int x, y;
    Bool override_redirect;
} XReparentEvent;

typedef struct {
    int type;
    unsigned long serial; /* # of last request processed by server */
    Bool send_event; /* true if this came from a SendEvent request */
    Display *display; /* Display the event was read from */
    Window event;
    Window window;
    int x, y;
    int width, height;
    int border_width;
    Window above;
    Bool override_redirect;
} XConfigureEvent;

typedef struct {
    int type;
    unsigned long serial; /* # of last request processed by server */
    Bool send_event; /* true if this came from a SendEvent request */
    Display *display; /* Display the event was read from */
    Window event;
    Window window;
    int x, y;
```

The X Library

```
} XGravityEvent;

typedef struct {
    int type;
    unsigned long serial; /* # of last request processed by server */
    Bool send_event;      /* true if this came from a SendEvent request */
    Display *display;     /* Display the event was read from */
    Window window;
    int width, height;
} XResizeRequestEvent;

typedef struct {
    int type;
    unsigned long serial; /* # of last request processed by server */
    Bool send_event;      /* true if this came from a SendEvent request */
    Display *display;     /* Display the event was read from */
    Window parent;
    Window window;
    int x, y;
    int width, height;
    int border_width;
    Window above;
    int detail;           /* Above, Below, TopIf, BottomIf, Opposite */
    unsigned long value_mask;
} XConfigureRequestEvent;

typedef struct {
    int type;
    unsigned long serial; /* # of last request processed by server */
    Bool send_event;      /* true if this came from a SendEvent request */
    Display *display;     /* Display the event was read from */
    Window event;
    Window window;
    int place;            /* PlaceOnTop, PlaceOnBottom */
} XCirculateEvent;

typedef struct {
    int type;
    unsigned long serial; /* # of last request processed by server */
    Bool send_event;      /* true if this came from a SendEvent request */
    Display *display;     /* Display the event was read from */
    Window parent;
    Window window;
    int place;            /* PlaceOnTop, PlaceOnBottom */
} XCirculateRequestEvent;

typedef struct {
```

The X Library

```
int type;
unsigned long serial; /* # of last request processed by server */
Bool send_event; /* true if this came from a SendEvent request */
Display *display; /* Display the event was read from */
Window window;
Atom atom;
Time time;
int state; /* newValue, Deleted */
} XPropertyEvent;

typedef struct {
    int type;
    unsigned long serial; /* # of last request processed by server */
    Bool send_event; /* true if this came from a SendEvent request */
    Display *display; /* Display the event was read from */
    Window window;
    Atom selection;
    Time time;
} XSelectionClearEvent;

typedef struct {
    int type;
    unsigned long serial; /* # of last request processed by server */
    Bool send_event; /* true if this came from a SendEvent request */
    Display *display; /* Display the event was read from */
    Window owner;
    Window requestor;
    Atom selection;
    Atom target;
    Atom property;
    Time time;
} XSelectionRequestEvent;

typedef struct {
    int type;
    unsigned long serial; /* # of last request processed by server */
    Bool send_event; /* true if this came from a SendEvent request */
    Display *display; /* Display the event was read from */
    Window requestor;
    Atom selection;
    Atom target;
    Atom property; /* ATOM or None */
    Time time;
} XSelectionEvent;

typedef struct {
    int type;
```

The X Library

```
    unsigned long serial;      /* # of last request processed by server */
    Bool send_event;          /* true if this came from a SendEvent request */
    Display *display;         /* Display the event was read from */
    Window window;
    Colormap colormap;       /* COLORMAP or None */
#ifndef __cplusplus || defined(c_plusplus)
    Bool c_new;              /* C++ */
#else
    Bool new;
#endif
    int state;                /* ColormapInstalled, ColormapUninstalled */
} XColormapEvent;

typedef struct {
    int type;
    unsigned long serial;    /* # of last request processed by server */
    Bool send_event;          /* true if this came from a SendEvent request */
    Display *display;         /* Display the event was read from */
    Window window;
    Atom message_type;
    int format;
    union {
        char b[20];
        short s[10];
        long l[5];
    } data;
} XClientMessageEvent;

typedef struct {
    int type;
    unsigned long serial;    /* # of last request processed by server */
    Bool send_event;          /* true if this came from a SendEvent request */
    Display *display;         /* Display the event was read from */
    Window window;            /* unused */
    int request;              /* one of MappingModifier, MappingKeyboard,
                                MappingPointer */
    int first_keycode;        /* first keycode */
    int count;                /* defines range of change w. first_keycode */
} XMappingEvent;

typedef struct {
    int type;
    Display *display;         /* Display the event was read from */
    XID resourceid;           /* resource id */
    unsigned long serial;     /* serial number of failed request */
    unsigned char error_code;  /* error code of failed request */
    unsigned char request_code; /* Major op-code of failed request */
}
```

The X Library

```
    unsigned char minor_code;          /* Minor op-code of failed request */
} XErrorEvent;

typedef struct {
    int type;
    unsigned long serial;    /* # of last request processed by server */
    Bool send_event;        /* true if this came from a SendEvent request */
    Display *display; /* Display the event was read from */
    Window window; /* window on which event was requested in event mask */
} XAnyEvent;

/*
 * this union is defined so Xlib can always use the same sized
 * event structure internally, to avoid memory fragmentation.
 */
typedef union _XEvent {
    int type;                  /* must not be changed; first element */
    XAnyEvent xany;
    XKeyEvent xkey;
    XButtonEvent xbutton;
    XMotionEvent xmotion;
    XCrossingEvent xcrossing;
    XFocusChangeEvent xfocus;
    XExposeEvent xexpose;
    XGraphicsExposeEvent xgraphicsexpose;
    XNoExposeEvent xnoexpose;
    XVisibilityEvent xvisibility;
    XCreateWindowEvent xcreatewindow;
    XDestroyWindowEvent xdestroywindow;
    XUnmapEvent xunmap;
    XMapEvent xmap;
    XMapRequestEvent xmaprequest;
    XReparentEvent xreparent;
    XConfigureEvent xconfigure;
    XGravityEvent xgravity;
    XResizeRequestEvent xresizerequest;
    XConfigureRequestEvent xconfigurerequest;
    XCirculateEvent xcirculate;
    XCirculateRequestEvent xcirculaterequest;
    XPropertyEvent xproperty;
    XSelectionClearEvent xselectionclear;
    XSelectionRequestEvent xselectionrequest;
    XSelectionEvent xselection;
    XColormapEvent xcolormap;
    XClientMessageEvent xclient;
    XMappingEvent xmapping;
    XErrorEvent xerror;
```

The X Library

```
XKeymapEvent xkeymap;
    long pad[24];
} XEvent;

/*
 * per character font metric information.
 */
typedef struct {
    short      lbearing;      /* origin to left edge of raster */
    short      rbearing;      /* origin to right edge of raster */
    short      width;         /* advance to next char's origin */
    short      ascent;        /* baseline to top edge of raster */
    short      descent;        /* baseline to bottom edge of raster */
    unsigned short attributes; /* per char flags (not predefined) */
} XCharStruct;

/*
 * To allow arbitrary information with fonts, there are additional properties
 * returned.
 */
typedef struct {
    Atom name;
    unsigned long card32;
} XFontProp;

typedef struct {
    XExtData    *ext_data;    /* hook for extension to hang data */
    Font        fid;          /* Font id for this font */
    unsigned    direction;    /* hint about direction the font is painted */
    unsigned    min_char_or_byte2; /* first character */
    unsigned    max_char_or_byte2; /* last character */
    unsigned    min_byte1;     /* first row that exists */
    unsigned    max_byte1;     /* last row that exists */
    Bool       all_chars_exist; /* flag if all characters have non-zero size*/
    unsigned    default_char; /* char to print for undefined character */
    int        n_properties; /* how many properties there are */
    XFontProp *properties;   /* pointer to array of additional properties*/
    XCharStruct min_bounds; /* minimum bounds over all existing char*/
    XCharStruct max_bounds; /* maximum bounds over all existing char*/
    XCharStruct *per_char;  /* first_char to last_char information */
    int        ascent;        /* log. extent above baseline for spacing */
    int        descent;        /* log. descent below baseline for spacing */
} XFontStruct;

/*
 * PolyText routines take these as arguments.
 */

```

The X Library

```
typedef struct {
    char *chars;           /* pointer to string */
    int nchars;            /* number of characters */
    int delta;              /* delta between strings */
    Font font;             /* font to print it in, None don't change */
} XTextItem;

typedef struct {                                /* normal 16 bit characters are two bytes */
    unsigned char byte1;
    unsigned char byte2;
} XChar2b;

typedef struct {
    XChar2b *chars;          /* two byte characters */
    int nchars;              /* number of characters */
    int delta;                /* delta between strings */
    Font font;               /* font to print it in, None don't change */
} XTextItem16;

typedef union { Display *display;
    GC gc;
    Visual *visual;
    Screen *screen;
    ScreenFormat *pixmap_format;
    XFontStruct *font; } XEDataObject;

typedef int (*XErrorHandler) (      /* WARNING, this type not in Xlib spec */
#if NeedFunctionPrototypes
    Display*           /* display */,
    XErrorEvent*        /* error_event */
#endif
);

typedef int (*XIOErrorHandler) (     /* WARNING, this type not in Xlib spec */
#if NeedFunctionPrototypes
    Display*           /* display */
#endif
);
```

The X Library

Figure 8-2. Manifest Constants and Data Types from <X11/X.h>

```
#define X_PROTOCOL      11          /* current protocol version */
#define X_PROTOCOL_REVISION 0        /* current minor version */

/* Resources */

typedef unsigned long XID;

typedef XID Window;
typedef XID Drawable;
typedef XID Font;
typedef XIDPixmap;
typedef XID Cursor;
typedef XID Colormap;
typedef XID GContext;
typedef XID KeySym;

typedef unsigned long Mask;

typedef unsigned long Atom;

typedef unsigned long VisualID;

typedef unsigned long Time;

typedef unsigned char KeyCode;

*****  
 * RESERVED RESOURCE AND CONSTANT DEFINITIONS  
*****  
  
#define None          0L /* universal null resource or null atom */  
  
#define ParentRelative 1L /* background pixmap in CreateWindow  
                         and ChangeWindowAttributes */  
  
#define CopyFromParent 0L /* border pixmap in CreateWindow  
                         and ChangeWindowAttributes  
                         special VisualID and special window  
                         class passed to CreateWindow */  
  
#define PointerWindow  0L /* destination window in SendEvent */  
#define InputFocus     1L /* destination window in SendEvent */
```

The X Library

```
#define PointerRoot          1L /* focus window in SetInputFocus */

#define AnyPropertyType       0L /* special Atom, passed to GetProperty */

#define AnyKey                0L /* special Key Code, passed to GrabKey */

#define AnyButton              0L /* special Button Code, passed to GrabButton */

#define AllTemporary           0L /* special Resource ID passed to KillClient */

#define CurrentTime            0L /* special Time */

#define NoSymbol               0L /* special KeySym */

/*********************  
* EVENT DEFINITIONS  
*****  
*  
/* Input Event Masks. Used as event-mask window attribute and as arguments  
to Grab requests. Not to be confused with event names. */  
  
#define NoEventMask          0L  
#define KeyPressMask         (1L<<0)  
#define KeyReleaseMask        (1L<<1)  
#define ButtonPressMask      (1L<<2)  
#define ButtonReleaseMask    (1L<<3)  
#define EnterWindowMask      (1L<<4)  
#define LeaveWindowMask      (1L<<5)  
#define PointerMotionMask    (1L<<6)  
#define PointerMotionHintMask (1L<<7)  
#define Button1MotionMask    (1L<<8)  
#define Button2MotionMask    (1L<<9)  
#define Button3MotionMask    (1L<<10)  
#define Button4MotionMask    (1L<<11)  
#define Button5MotionMask    (1L<<12)  
#define ButtonMotionMask     (1L<<13)  
#define KeymapStateMask      (1L<<14)  
#define ExposureMask         (1L<<15)  
#define VisibilityChangeMask (1L<<16)  
#define StructureNotifyMask  (1L<<17)  
#define ResizeRedirectMask   (1L<<18)  
#define SubstructureNotifyMask (1L<<19)  
#define SubstructureRedirectMask (1L<<20)  
#define FocusChangeMask      (1L<<21)  
#define PropertyChangeMask   (1L<<22)  
#define ColormapChangeMask  (1L<<23)  
#define OwnerGrabButtonMask  (1L<<24)
```

The X Library

```
/* Event names. Used in "type" field in XEvent structures. Not to be confused with event masks above. They start from 2 because 0 and 1 are reserved in the protocol for errors and replies. */
```

```
#define KeyPress          2
#define KeyRelease         3
#define ButtonPress        4
#define ButtonRelease      5
#define MotionNotify       6
#define EnterNotify        7
#define LeaveNotify        8
#define FocusIn            9
#define FocusOut           10
#define KeymapNotify       11
#define Expose             12
#define GraphicsExpose     13
#define NoExpose           14
#define VisibilityNotify   15
#define CreateNotify       16
#define DestroyNotify      17
#define UnmapNotify        18
#define MapNotify          19
#define MapRequest         20
#define ReparentNotify     21
#define ConfigureNotify    22
#define ConfigureRequest   23
#define GravityNotify      24
#define ResizeRequest      25
#define CirculateNotify   26
#define CirculateRequest   27
#define PropertyNotify     28
#define SelectionClear     29
#define SelectionRequest   30
#define SelectionNotify    31
#define ColormapNotify     32
#define ClientMessage      33
#define MappingNotify      34
#define LASTEvent          35 /* must be bigger than any event # */
```

```
/* Key masks. Used as modifiers to GrabButton and GrabKey, results of QueryPointer, state in various key-, mouse-, and button-related events. */
```

```
#define ShiftMask          (1<<0)
#define LockMask            (1<<1)
#define ControlMask         (1<<2)
```

The X Library

```
#define Mod1Mask          (1<<3)
#define Mod2Mask          (1<<4)
#define Mod3Mask          (1<<5)
#define Mod4Mask          (1<<6)
#define Mod5Mask          (1<<7)

/* modifier names. Used to build a SetModifierMapping request or
   to read a GetModifierMapping request. These correspond to the
   masks defined above. */
#define ShiftMapIndex      0
#define LockMapIndex       1
#define ControlMapIndex    2
#define Mod1MapIndex       3
#define Mod2MapIndex       4
#define Mod3MapIndex       5
#define Mod4MapIndex       6
#define Mod5MapIndex       7

/* button masks. Used in same manner as Key masks above. Not to be confused
   with button names below. */

#define Button1Mask        (1<<8)
#define Button2Mask        (1<<9)
#define Button3Mask        (1<<10)
#define Button4Mask        (1<<11)
#define Button5Mask        (1<<12)

#define AnyModifier         (1<<15) /* used in GrabButton, GrabKey */

/* button names. Used as arguments to GrabButton and as detail in ButtonPress
   and ButtonRelease events. Not to be confused with button masks above.
   Note that 0 is already defined above as "AnyButton". */

#define Button1            1
#define Button2            2
#define Button3            3
#define Button4            4
#define Button5            5

/* Notify modes */

#define NotifyNormal        0
#define NotifyGrab           1
#define NotifyUngrab          2
#define NotifyWhileGrabbed    3
```

The X Library

```
#define NotifyHint           1      /* for MotionNotify events */

/* Notify detail */

#define NotifyAncestor          0
#define NotifyVirtual            1
#define NotifyInferior           2
#define NotifyNonlinear           3
#define NotifyNonlinearVirtual    4
#define NotifyPointer             5
#define NotifyPointerRoot         6
#define NotifyDetailNone          7

/* Visibility notify */

#define VisibilityUnobscured     0
#define VisibilityPartiallyObscured 1
#define VisibilityFullyObscured   2

/* Circulation request */

#define PlaceOnTop                0
#define PlaceOnBottom              1

/* protocol families */

#define FamilyInternet            0
#define FamilyDECnet               1
#define FamilyChaos                 2

/* Property notification */

#define PropertyNewValue           0
#define PropertyDelete              1

/* Color Map notification */

#define ColormapUninstalled        0
#define ColormapInstalled           1

/* GrabPointer, GrabButton, GrabKeyboard, GrabKey Modes */

#define GrabModeSync                  0
#define GrabModeAsync                 1

/* GrabPointer, GrabKeyboard reply status */
```

The X Library

```
#define GrabSuccess          0
#define AlreadyGrabbed        1
#define GrabInvalidTime       2
#define GrabNotViewable       3
#define GrabFrozen             4

/* AllowEvents modes */

#define AsyncPointer            0
#define SyncPointer             1
#define ReplayPointer           2
#define AsyncKeyboard            3
#define SyncKeyboard             4
#define ReplayKeyboard           5
#define AsyncBoth                6
#define SyncBoth                 7

/* Used in SetInputFocus, GetInputFocus */

#define RevertToNone           (int)None
#define RevertToPointerRoot     (int)PointerRoot
#define RevertToParent            2

/*****************
 * ERROR CODES
 *****************/

#define Success                  0 /* everything's okay */
#define BadRequest               1 /* bad request code */
#define BadValue                 2 /* int parameter out of range */
#define BadWindow                3 /* parameter not a Window */
#define BadPixmap                4 /* parameter not a Pixmap */
#define BadAtom                  5 /* parameter not an Atom */
#define BadCursor                6 /* parameter not a Cursor */
#define BadFont                  7 /* parameter not a Font */
#define BadMatch                 8 /* parameter mismatch */
#define BadDrawable              9 /* parameter not a Pixmap or Window */
#define BadAccess                10 /* depending on context:
                                     - key/button already grabbed
                                     - attempt to free an illegal
                                       cmap entry
                                     - attempt to store into a read-only
                                       color map entry.
                                     - attempt to modify the access control
                                       list from other than the local host.
                                     */
#define BadAlloc                 11 /* insufficient resources */
```

The X Library

```
#define BadColor          12 /* no such colormap */
#define BadGC              13 /* parameter not a GC */
#define BadIDChoice        14 /* choice not in range or already used */
#define BadName             15 /* font or color name doesn't exist */
#define BadLength           16 /* Request length incorrect */
#define BadImplementation   17 /* server is defective */

#define FirstExtensionError 128
#define LastExtensionError  255

/*****************
 * WINDOW DEFINITIONS
 *****************/

/* Window classes used by CreateWindow */
/* Note that CopyFromParent is already defined as 0 above */

#define InputOutput          1
#define InputOnly            2

/* Window attributes for CreateWindow and ChangeWindowAttributes */

#define CWBackPixmap         (1L<<0)
#define CWBackPixel          (1L<<1)
#define CWPixmap             (1L<<2)
#define CWBorderPixel        (1L<<3)
#define CWBitGravity         (1L<<4)
#define CWWinGravity         (1L<<5)
#define CWBackingStore       (1L<<6)
#define CWBackingPlanes     (1L<<7)
#define CWBackingPixel       (1L<<8)
#define CWOVERRIDE_REDIRECT (1L<<9)
#define CWSaveUnder          (1L<<10)
#define CWEVENTMASK          (1L<<11)
#define CWDontPropagate     (1L<<12)
#define CWC colormap          (1L<<13)
#define CWCursor             (1L<<14)

/* ConfigureWindow structure */

#define CWX                 (1<<0)
#define CY                  (1<<1)
#define CWidth              (1<<2)
#define CHeight             (1<<3)
#define CBorderWidth        (1<<4)
#define CSibling             (1<<5)
#define CStackMode           (1<<6)
```

The X Library

```
/* Bit Gravity */

#define ForgetGravity          0
#define NorthWestGravity       1
#define NorthGravity           2
#define NorthEastGravity       3
#define WestGravity            4
#define CenterGravity          5
#define EastGravity             6
#define SouthWestGravity        7
#define SouthGravity            8
#define SouthEastGravity        9
#define StaticGravity          10

/* Window gravity + bit gravity above */

#define UnmapGravity           0

/* Used in CreateWindow for backing-store hint */

#define NotUseful              0
#define WhenMapped              1
#define Always                  2

/* Used in GetWindowAttributes reply */

#define IsUnmapped              0
#define IsUnviewable             1
#define IsViewable               2

/* Used in ChangeSaveSet */

#define SetModeInsert            0
#define SetModeDelete             1

/* Used in ChangeCloseDownMode */

#define DestroyAll                0
#define RetainPermanent           1
#define RetainTemporary            2

/* Window stacking method (in configureWindow) */

#define Above                     0
#define Below                     1
```

The X Library

```
#define TopIf          2
#define BottomIf        3
#define Opposite         4

/* Circulation direction */

#define RaiseLowest      0
#define LowerHighest     1

/* Property modes */

#define PropModeReplace   0
#define PropModePrepend    1
#define PropModeAppend     2

/**************************************************************************
 * GRAPHICS DEFINITIONS
 **************************************************************************/

/* graphics functions, as in GC.alu */

#define GXclear           0x0          /* 0 */
#define GXand             0x1          /* src AND dst */
#define GXandReverse      0x2          /* src AND NOT dst */
#define GXcopy            0x3          /* src */
#define GXandInverted     0x4          /* NOT src AND dst */
#define GXnoop            0x5          /* dst */
#define GXxor             0x6          /* src XOR dst */
#define GXor              0x7          /* src OR dst */
#define GXnor             0x8          /* NOT src AND NOT dst */
#define GXequiv            0x9          /* NOT src XOR dst */
#define GXinvert           0xa          /* NOT dst */
#define GXorReverse        0xb          /* src OR NOT dst */
#define GXcopyInverted     0xc          /* NOT src */
#define GXorInverted       0xd          /* NOT src OR dst */
#define GXnand            0xe          /* NOT src OR NOT dst */
#define GXset              0xf          /* 1 */

/* LineStyle */

#define LineSolid          0
#define LineOnOffDash      1
#define LineDoubleDash     2

/* capStyle */

#define CapNotLast         0
```

The X Library

```
#define CapButt          1
#define CapRound          2
#define CapProjecting     3

/* joinStyle */

#define JoinMiter          0
#define JoinRound           1
#define JoinBevel           2

/* fillStyle */

#define FillSolid           0
#define FillTiled            1
#define FillStippled         2
#define FillOpaqueStippled   3

/* fillRule */

#define EvenOddRule         0
#define WindingRule          1

/* subwindow mode */

#define ClipByChildren       0
#define IncludeInferiors     1

/* SetClipRectangles ordering */

#define Unsorted              0
#define YSorted               1
#define YXSorted              2
#define YXBanded              3

/* CoordinateMode for drawing routines */

#define CoordModeOrigin        0      /* relative to the origin */
#define CoordModePrevious       1      /* relative to previous point */

/* Polygon shapes */

#define Complex                0      /* paths may intersect */
#define Nonconvex              1      /* no paths intersect, but not convex */
#define Convex                 2      /* wholly convex */

/* Arc modes for PolyFillArc */
```

The X Library

```
#define ArcChord          0      /* join endpoints of arc */
#define ArcPieSlice         1      /* join endpoints to center of arc */

/* GC components: masks used in CreateGC, CopyGC, ChangeGC, OR'ed into
   GC.stateChanges */

#define GCFUNCTION           (1L<<0)
#define GCPLEMASK            (1L<<1)
#define GCFOREGROUND          (1L<<2)
#define GCBACKGROUND          (1L<<3)
#define GCLINEWIDTH           (1L<<4)
#define GCLINESTYLE           (1L<<5)
#define GCCAPSTYLE             (1L<<6)
#define GCJOINSTYLE            (1L<<7)
#define GCFILLSTYLE            (1L<<8)
#define GCFILLRULE             (1L<<9)
#define GCTILE                (1L<<10)
#define GCSТИPPE              (1L<<11)
#define GCTILESTIPXORIGIN     (1L<<12)
#define GCTILESTIPYORIGIN     (1L<<13)
#define GCFONT                (1L<<14)
#define GCSUBWINDOWMODE        (1L<<15)
#define GCGRAPHICSEXPOSURES    (1L<<16)
#define GCCLIPXORIGIN          (1L<<17)
#define GCCLIPYORIGIN          (1L<<18)
#define GCCLIPMASK             (1L<<19)
#define GCDASHOFFSET           (1L<<20)
#define GCDASHLIST              (1L<<21)
#define GCARCMODE               (1L<<22)

#define GCLASTBIT              22
/********************* * FONTS *****/
/* used in QueryFont -- draw direction */

#define FONTLEFTTORIGHT        0
#define FONTRIGHTTOLEFT         1

#define FONTCHANGE              255
/********************* * IMAGING *****/
/* ImageFormat -- PutImage, GetImage */
```

The X Library

```
#define XYBitmap          0      /* depth 1, XYFormat */
#define XYPixmap          1      /* depth == drawable depth */
#define ZPixmap            2      /* depth == drawable depth */

/* **** */
/* COLOR MAP STUFF
***** */

/* For CreateColormap */

#define AllocNone          0      /* create map with no entries */
#define AllocAll           1      /* allocate entire map writeable */

/* Flags used in StoreNamedColor, StoreColors */

#define DoRed              (1<<0)
#define DoGreen             (1<<1)
#define DoBlue              (1<<2)

/* **** */
/* CURSOR STUFF
***** */

/* QueryBestSize Class */

#define CursorShape         0      /* largest size that can be displayed */
#define TileShape            1      /* size tiled fastest */
#define StippleShape         2      /* size stippled fastest */

/* **** */
/* KEYBOARD/POINTER STUFF
***** */

#define AutoRepeatModeOff   0
#define AutoRepeatModeOn    1
#define AutoRepeatModeDefault 2

#define LedModeOff          0
#define LedModeOn           1

/* masks for ChangeKeyboardControl */

#define KBKeyClickPercent    (1L<<0)
#define KBBellPercent        (1L<<1)
#define KBBellPitch          (1L<<2)
```

The X Library

```
#define KBBellDuration      (1L<<3)
#define KBLed                (1L<<4)
#define KBLedMode             (1L<<5)
#define KBKey                (1L<<6)
#define KBAutoRepeatMode     (1L<<7)

#define MappingSuccess        0
#define MappingBusy           1
#define MappingFailed         2

#define MappingModifier       0
#define MappingKeyboard       1
#define MappingPointer         2

/******************
 * SCREEN SAVER STUFF
 ******************/

#define DontPreferBlanking    0
#define PreferBlanking        1
#define DefaultBlanking       2

#define DisableScreenSaver    0
#define DisableScreenInterval 0

#define DontAllowExposures    0
#define AllowExposures         1
#define DefaultExposures       2

/* for ForceScreenSaver */

#define ScreenSaverReset 0
#define ScreenSaverActive 1

/******************
 * HOSTS AND CONNECTIONS
 ******************/

/* for ChangeHosts */

#define HostInsert            0
#define HostDelete             1

/* for ChangeAccessControl */

#define EnableAccess           1
#define DisableAccess          0
```

The X Library

```
/* Display classes used in opening the connection
 * Note that the statically allocated ones are even numbered and the
 * dynamically changeable ones are odd numbered */

#define StaticGray          0
#define GrayScale           1
#define StaticColor          2
#define PseudoColor          3
#define TrueColor            4
#define DirectColor          5

/* Byte order used in imageByteOrder and bitmapBitOrder */

#define LSBFirst             0
#define MSBFirst              1
```

The X Library

Figure 8-3. Manifest Constants from <X11/Xatom.h>

```
/* THIS IS A GENERATED FILE
 *
 * Do not change!  Changing this file implies a protocol change!
 */

#define XA_PRIMARY ((Atom) 1)
#define XA_SECONDARY ((Atom) 2)
#define XA_ARC ((Atom) 3)
#define XA_ATOM ((Atom) 4)
#define XA_BITMAP ((Atom) 5)
#define XA_CARDINAL ((Atom) 6)
#define XA_COLORMAP ((Atom) 7)
#define XA_CURSOR ((Atom) 8)
#define XA_CUT_BUFFER0 ((Atom) 9)
#define XA_CUT_BUFFER1 ((Atom) 10)
#define XA_CUT_BUFFER2 ((Atom) 11)
#define XA_CUT_BUFFER3 ((Atom) 12)
#define XA_CUT_BUFFER4 ((Atom) 13)
#define XA_CUT_BUFFER5 ((Atom) 14)
#define XA_CUT_BUFFER6 ((Atom) 15)
#define XA_CUT_BUFFER7 ((Atom) 16)
#define XA_DRAWABLE ((Atom) 17)
#define XA_FONT ((Atom) 18)
#define XA_INTEGER ((Atom) 19)
#define XA_PIXMAP ((Atom) 20)
#define XA_POINT ((Atom) 21)
#define XA_RECTANGLE ((Atom) 22)
#define XA_RESOURCE_MANAGER ((Atom) 23)
#define XA_RGB_COLOR_MAP ((Atom) 24)
#define XA_RGB_BEST_MAP ((Atom) 25)
#define XA_RGB_BLUE_MAP ((Atom) 26)
#define XA_RGB_DEFAULT_MAP ((Atom) 27)
#define XA_RGB_GRAY_MAP ((Atom) 28)
#define XA_RGB_GREEN_MAP ((Atom) 29)
#define XA_RGB_RED_MAP ((Atom) 30)
#define XA_STRING ((Atom) 31)
#define XA_VISUALID ((Atom) 32)
#define XA_WINDOW ((Atom) 33)
#define XA_WM_COMMAND ((Atom) 34)
#define XA_WM_HINTS ((Atom) 35)
#define XA_WM_CLIENT_MACHINE ((Atom) 36)
#define XA_WM_ICON_NAME ((Atom) 37)
#define XA_WM_ICON_SIZE ((Atom) 38)
```

The X Library

```
#define XA_WM_NAME ((Atom) 39)
#define XA_WM_NORMAL_HINTS ((Atom) 40)
#define XA_WM_SIZE_HINTS ((Atom) 41)
#define XA_WM_ZOOM_HINTS ((Atom) 42)
#define XA_MIN_SPACE ((Atom) 43)
#define XA_NORM_SPACE ((Atom) 44)
#define XA_MAX_SPACE ((Atom) 45)
#define XA_END_SPACE ((Atom) 46)
#define XA_SUPERSCRIPT_X ((Atom) 47)
#define XA_SUPERSCRIPT_Y ((Atom) 48)
#define XA_SUBSCRIPT_X ((Atom) 49)
#define XA_SUBSCRIPT_Y ((Atom) 50)
#define XA_UNDERLINE_POSITION ((Atom) 51)
#define XA_UNDERLINE_THICKNESS ((Atom) 52)
#define XA_STRIKEOUT_ASCENT ((Atom) 53)
#define XA_STRIKEOUT_DESCENT ((Atom) 54)
#define XA_ITALIC_ANGLE ((Atom) 55)
#define XA_X_HEIGHT ((Atom) 56)
#define XA_QUAD_WIDTH ((Atom) 57)
#define XA_WEIGHT ((Atom) 58)
#define XA_POINT_SIZE ((Atom) 59)
#define XA_RESOLUTION ((Atom) 60)
#define XA_COPYRIGHT ((Atom) 61)
#define XA_NOTICE ((Atom) 62)
#define XA_FONT_NAME ((Atom) 63)
#define XA_FAMILY_NAME ((Atom) 64)
#define XA_FULL_NAME ((Atom) 65)
#define XA_CAP_HEIGHT ((Atom) 66)
#define XA_WM_CLASS ((Atom) 67)
#define XA_WM_TRANSIENT_FOR ((Atom) 68)

#define XA_LAST_PREDEFINED ((Atom) 68)
```

The X Library

Figure 8-4. Manifest Constants and Data Types from <X11/Xresource.h>

```
*****  
*  
* Quark Management  
*  
*****  
  
typedef int      XrmQuark, *XrmQuarkList;  
#define NULLQUARK ((XrmQuark) 0)  
  
typedef char *XrmString;  
#define NULLSTRING ((XrmString) 0)  
  
*****  
*  
* Conversion of Strings to Lists  
*  
*****  
  
typedef enum {XrmBindTightly, XrmBindLoosely} XrmBinding, *XrmBindingList;  
  
*****  
*  
* Name and Class lists.  
*  
*****  
  
typedef XrmQuark      XrmName;  
typedef XrmQuarkList XrmNameList;  
  
typedef XrmQuark      XrmClass;  
typedef XrmQuarkList XrmclassList;  
  
*****  
*  
* Resource Representation Types and Values  
*  
*****  
  
typedef XrmQuark      XrmRepresentation;  
  
typedef struct {  
    unsigned int      size;  
    caddr_t          addr;  
}
```

The X Library

```
    } XrmValue, *XrmValuePtr;

/***** Resource Manager Functions *****/
typedef struct _XrmHashBucketRec *XrmHashBucket;
typedef XrmHashBucket *XrmHashTable;
typedef XrmHashTable XrmSearchList[];
typedef struct _XrmHashBucketRec *XrmDatabase;

/***** Command line option mapping to resource entries ****/
typedef enum {
    XrmoptionNoArg,      /* Value is specified in OptionDescRec.value      */
    XrmoptionIsArg,      /* Value is the option string itself            */
    XrmoptionStickyArg,  /* Value is characters immediately following option */
    XrmoptionSepArg,     /* Value is next argument in argv               */
    XrmoptionResArg,     /* Resource and value in next argument in argv   */
    XrmoptionSkipArg,    /* Ignore this option and the next argument in argv */
    XrmoptionSkipLine,   /* Ignore this option and the rest of argv       */
    XrmoptionSkipNArgs,  /* Ignore this option and the next
                           OptionDescRes.value arguments in argv */
} XrmOptionKind;

typedef struct {
    char          *option;      /* Option abbreviation in argv      */
    char          *specifier;    /* Resource specifier             */
    XrmOptionKind argKind;     /* Which style of option it is   */
    caddr_t        value;       /* Value to provide if XrmoptionNoArg */
} XrmOptionDescRec, *XrmOptionDescList;
```

The X Library

Figure 8-5. Manifest Constants and Data Types from <X11/Xutil.h>

```
/*
 * Bitmask returned by XParseGeometry(). Each bit tells if the corresponding
 * value (x, y, width, height) was found in the parsed string.
 */
#define NoValue      0x0000
#define XValue       0x0001
#define YValue       0x0002
#define WidthValue   0x0004
#define HeightValue  0x0008
#define AllValues    0x000F
#define XNegative    0x0010
#define YNegative    0x0020

/*
 * new version containing base_width, base_height, and win_gravity fields;
 * used with WM_NORMAL_HINTS.
 */
typedef struct {
    long flags;      /* marks which fields in this structure are defined */
    int x, y;        /* obsolete for new window mgrs, but clients */
    int width, height; /* should set so old wms don't mess up */
    int min_width, min_height;
    int max_width, max_height;
    int width_inc, height_inc;
    struct {
        int x; /* numerator */
        int y; /* denominator */
    } min_aspect, max_aspect;
    int base_width, base_height; /* added by ICCCM version 1 */
    int win_gravity; /* added by ICCCM version 1 */
} XSizeHints;

/*
 * The next block of definitions are for window manager properties that
 * clients and applications use for communication.
 */

/* flags argument in size hints */
#define USPosition    (1L << 0) /* user specified x, y */
#define USSize         (1L << 1) /* user specified width, height */

#define PPosition      (1L << 2) /* program specified position */
#define PSize          (1L << 3) /* program specified size */
```

The X Library

```
#define PMinSize          (1L << 4) /* program specified minimum size */
#define PMaxSize          (1L << 5) /* program specified maximum size */
#define PResizeInc         (1L << 6) /* program specified resize increments */
#define PAspect             (1L << 7) /* program specified min and max aspect
ratios */
#define PBaseSize          (1L << 8) /* program specified base for incrementing */
#define PWinGravity         (1L << 9) /* program specified window gravity */

/* obsolete */
#define PAllHints (PPosition|PSize|PMinSize|PMaxSize|PResizeInc|PAspect)

typedef struct {
    long flags;      /* marks which fields in this structure are defined */
    Bool input;       /* does this application rely on the window manager to
get keyboard input? */
    int initial_state; /* see below */
    Pixmap iconPixmap; /* pixmap to be used as icon */
    Window iconWindow; /* window to be used as icon */
    int icon_x, icon_y; /* initial position of icon */
    Pixmap iconMask; /* icon mask bitmap */
    XID window_group; /* id of related window group */
    /* this structure may be extended in the future */
} XWMHints;

/* definition for flags of XWMHints */

#define InputHint           (1L << 0)
#define StateHint            (1L << 1)
#define IconPixmapHint       (1L << 2)
#define IconWindowHint       (1L << 3)
#define IconPositionHint     (1L << 4)
#define IconMaskHint          (1L << 5)
#define WindowGroupHint       (1L << 6)
#define AllHints (InputHint|StateHint|IconPixmapHint|IconWindowHint| \
IconPositionHint|IconMaskHint|WindowGroupHint)

/* definitions for initial window state */
#define WithdrawnState 0      /* for windows that are not mapped */
#define NormalState 1        /* most applications want to start this way */
#define IconicState 3        /* application wants to start as an icon */

/*
 * new structure for manipulating TEXT properties; used with WM_NAME,
 * WM_ICON_NAME, WM_CLIENT_MACHINE, and WM_COMMAND.
 */
typedef struct {
    unsigned char *value;           /* same as Property routines */

```

The X Library

```
Atom encoding;          /* prop type */
int format;            /* prop data format: 8, 16, or 32 */
unsigned long nitems;  /* number of data items in value */
} XTextProperty;

typedef struct {
    int min_width, min_height;
    int max_width, max_height;
    int width_inc, height_inc;
} XIconSize;

typedef struct {
    char *res_name;
    char *res_class;
} XClassHint;

/*
 * Compose sequence status structure, used in calling XLookupString.
 */
typedef struct _XComposeStatus {
    char *compose_ptr;      /* state table pointer */
    int chars_matched;     /* match state */
} XComposeStatus;

/*
 * opaque reference to Region data type
 */
typedef struct _XRegion *Region;

/* Return values from XRectInRegion() */

#define RectangleOut 0
#define RectangleIn  1
#define RectanglePart 2

/*
 * Information used by the visual utility routines to find desired visual
 * type from the many visuals a display may support.
 */
typedef struct {
    Visual *visual;
    VisualID visualid;
    int screen;
    int depth;
}
```

The X Library

```
#if defined(__cplusplus) || defined(c_plusplus)
    int c_class;                                /* C++ */
#else
    int class;
#endif
    unsigned long red_mask;
    unsigned long green_mask;
    unsigned long blue_mask;
    int colormap_size;
    int bits_per_rgb;
} XVisualInfo;

#define VisualNoMask          0x0
#define VisualIDMask          0x1
#define VisualScreenMask       0x2
#define VisualDepthMask        0x4
#define VisualClassMask        0x8
#define VisualRedMaskMask     0x10
#define VisualGreenMaskMask   0x20
#define VisualBlueMaskMask    0x40
#define VisualColormapSizeMask 0x80
#define VisualBitsPerRGBMask  0x100
#define VisualAllMask          0x1FF

/*
 * This defines a window manager property that clients may use to
 * share standard color maps of type RGB_COLOR_MAP:
 */
typedef struct {
    Colormap colormap;
    unsigned long red_max;
    unsigned long red_mult;
    unsigned long green_max;
    unsigned long green_mult;
    unsigned long blue_max;
    unsigned long blue_mult;
    unsigned long base_pixel;
    VisualID visualid;                      /* added by ICCCM version 1 */
    XID killid;                            /* added by ICCCM version 1 */
} XStandardColormap;

#define ReleaseByFreeingColormap ((XID) 1L) /* for killid field above */

/*
 * return codes for XReadBitmapFile and XWriteBitmapFile
 */
#define BitmapSuccess          0
```

The X Library

```
#define BitmapOpenFailed      1
#define BitmapFileInvalid     2
#define BitmapNoMemory        3

/*
 * Declare the routines that don't return int.
 */

/********************* Context Management ********************/
/* Associative lookup table return codes */

#define XCSUCCESS 0      /* No error. */
#define XCNOMEM   1      /* Out of memory */
#define XCNOENT   2      /* No entry in table */

typedef int XContext;
```

The X Library

Figure 8-6. Manifest Constants from <X11/keysymdef.h>

```
#define XK_VoidSymbol          0xFFFFFFF /* void symbol */

#ifndef XK_MISCELLANY
/*
 * TTY Functions, cleverly chosen to map to ascii, for convenience of
 * programming, but could have been arbitrary (at the cost of lookup
 * tables in client code.
 */

#define XK_BackSpace           0xFF08 /* back space, back char */
#define XK_Tab                  0xFF09
#define XK_Linefeed             0xFF0A /* Linefeed, LF */
#define XK_Clear                0xFF0B
#define XK_Return               0xFF0D /* Return, enter */
#define XK_Pause                0xFF13 /* Pause, hold */
#define XK_Scroll_Lock          0xFF14
#define XK_Escape               0xFF1B
#define XK_Delete               0xFFFF /* Delete, rubout */

/* International & multi-key character composition */

#define XK_Multi_key            0xFF20 /* Multi-key character compose */

/* Japanese keyboard support */

#define XK_Kanji                0xFF21 /* Kanji, Kanji convert */
#define XK_Muhenkan              0xFF22 /* Cancel Conversion */
#define XK_Henkan_Mode           0xFF23 /* Start/Stop Conversion */
#define XK_Henkan                0xFF23 /* Alias for Henkan_Mode */
#define XK_Romaji               0xFF24 /* to Romaji */
#define XK_Hiragana              0xFF25 /* to Hiragana */
#define XK_Katakana              0xFF26 /* to Katakana */
#define XK_Hiragana_Katakana    0xFF27 /* Hiragana/Katakana toggle */
#define XK_Zenkaku               0xFF28 /* to Zenkaku */
#define XK_Hankaku               0xFF29 /* to Hankaku */
#define XK_Zenkaku_Hankaku      0xFF2A /* Zenkaku/Hankaku toggle */
#define XK_Touroku                0xFF2B /* Add to Dictionary */
#define XK_Massyo                 0xFF2C /* Delete from Dictionary */
#define XK_Kana_Lock              0xFF2D /* Kana Lock */
#define XK_Kana_Shift             0xFF2E /* Kana Shift */
#define XK_Eisu_Shift             0xFF2F /* Alphanumeric Shift */
```

The X Library

```
#define XK_Eisu_toggle          0xFF30 /* Alphanumeric toggle */

/* Cursor control & motion */

#define XK_Home                  0xFF50
#define XK_Left                   0xFF51 /* Move left, left arrow */
#define XK_Up                     0xFF52 /* Move up, up arrow */
#define XK_Right                  0xFF53 /* Move right, right arrow */
#define XK_Down                   0xFF54 /* Move down, down arrow */
#define XK_Prior                  0xFF55 /* Prior, previous */
#define XK_Next                   0xFF56 /* Next */
#define XK_End                     0xFF57 /* EOL */
#define XK_Begin                  0xFF58 /* BOL */

/* Misc Functions */

#define XK_Select                 0xFF60 /* Select, mark */
#define XK_Print                  0xFF61
#define XK_Execute                0xFF62 /* Execute, run, do */
#define XK_Insert                 0xFF63 /* Insert, insert here */
#define XK_Undo                   0xFF65 /* Undo, oops */
#define XK_Redo                   0xFF66 /* redo, again */
#define XK_Menu                   0xFF67
#define XK_Find                   0xFF68 /* Find, search */
#define XK_Cancel                 0xFF69 /* Cancel, stop, abort, exit */
#define XK_Help                   0xFF6A /* Help, ? */
#define XK_Break                  0xFF6B
#define XK_Mode_switch            0xFF7E /* Character set switch */
#define XK_script_switch          0xFF7E /* Alias for mode_switch */
#define XK_Num_Lock               0xFF7F

/* Keypad Functions, keypad numbers cleverly chosen to map to ascii */

#define XK_KP_Space                0xFF80 /* space */
#define XK_KP_Tab                  0xFF89
#define XK_KP_Enter                0xFF8D /* enter */
#define XK_KP_F1                   0xFF91 /* PF1, KP_A, ... */
#define XK_KP_F2                   0xFF92
#define XK_KP_F3                   0xFF93
#define XK_KP_F4                   0xFF94
#define XK_KP_Equal                0xFFBD /* equals */
#define XK_KP_Multiply              0xFFAA
#define XK_KP_Add                   0xFFAB
#define XK_KP_Separator             0xFFAC /* separator, often comma */
#define XK_KP_Subtract              0xFFAD
#define XK_KP.Decimal              0xFFAE
```

The X Library

```
#define XK_KP_Divide          0xFFAF
#define XK_KP_0                 0xFFB0
#define XK_KP_1                 0xFFB1
#define XK_KP_2                 0xFFB2
#define XK_KP_3                 0xFFB3
#define XK_KP_4                 0xFFB4
#define XK_KP_5                 0xFFB5
#define XK_KP_6                 0xFFB6
#define XK_KP_7                 0xFFB7
#define XK_KP_8                 0xFFB8
#define XK_KP_9                 0xFFB9

/*
 * Auxilliary Functions; note the duplicate definitions for left and right
 * function keys; Sun keyboards and a few other manufactures have such
 * function key groups on the left and/or right sides of the keyboard.
 * We've not found a keyboard with more than 35 function keys total.
 */

#define XK_F1                  0xFFBE
#define XK_F2                  0xFFBF
#define XK_F3                  0xFFC0
#define XK_F4                  0xFFC1
#define XK_F5                  0xFFC2
#define XK_F6                  0xFFC3
#define XK_F7                  0xFFC4
#define XK_F8                  0xFFC5
#define XK_F9                  0xFFC6
#define XK_F10                 0xFFC7
#define XK_F11                 0xFFC8
#define XK_L1                  0xFFC8
#define XK_F12                 0xFFC9
#define XK_L2                  0xFFC9
#define XK_F13                 0xFFCA
#define XK_L3                  0xFFCA
#define XK_F14                 0xFFCB
#define XK_L4                  0xFFCB
#define XK_F15                 0xFFCC
#define XK_L5                  0xFFCC
#define XK_F16                 0xFFCD
#define XK_L6                  0xFFCD
#define XK_F17                 0xFFCE
#define XK_L7                  0xFFCE
#define XK_F18                 0xFFCF
```

The X Library

```
#define XK_L8          0xFFCF
#define XK_F19         0xFFFFD0
#define XK_L9          0xFFFFD0
#define XK_F20         0xFFFFD1
#define XK_L10         0xFFFFD1
#define XK_F21         0xFFFFD2
#define XK_R1          0xFFFFD2
#define XK_F22         0xFFFFD3
#define XK_R2          0xFFFFD3
#define XK_F23         0xFFFFD4
#define XK_R3          0xFFFFD4
#define XK_F24         0xFFFFD5
#define XK_R4          0xFFFFD5
#define XK_F25         0xFFFFD6
#define XK_R5          0xFFFFD6
#define XK_F26         0xFFFFD7
#define XK_R6          0xFFFFD7
#define XK_F27         0xFFFFD8
#define XK_R7          0xFFFFD8
#define XK_F28         0xFFFFD9
#define XK_R8          0xFFFFD9
#define XK_F29         0xFFFFDA
#define XK_R9          0xFFFFDA
#define XK_F30         0xFFFFDB
#define XK_R10         0xFFFFDB
#define XK_F31         0xFFFFDC
#define XK_R11         0xFFFFDC
#define XK_F32         0xFFFFDD
#define XK_R12         0xFFFFDD
#define XK_F33         0xFFFFDE
#define XK_R13         0xFFFFDE
#define XK_F34         0xFFFFDF
#define XK_R14         0xFFFFDF
#define XK_F35         0xFFFFE0
#define XK_R15         0xFFFFE0

/* Modifiers */

#define XK_Shift_L      0xFFE1 /* Left shift */
#define XK_Shift_R      0xFFE2 /* Right shift */
#define XK_Control_L    0xFFE3 /* Left control */
#define XK_Control_R    0xFFE4 /* Right control */
#define XK_Caps_Lock   0xFFE5 /* Caps lock */
#define XK_Shift_Lock   0xFFE6 /* Shift lock */

#define XK_Meta_L       0xFFE7 /* Left meta */
#define XK_Meta_R       0xFFE8 /* Right meta */
```

The X Library

```
#define XK_Alt_L          0xFFE9 /* Left alt */
#define XK_Alt_R          0xFFEA /* Right alt */
#define XK_Super_L         0xFFEB /* Left super */
#define XK_Super_R         0xFFEC /* Right super */
#define XK_Hyper_L          0xFFED /* Left hyper */
#define XK_Hyper_R          0xFFEE /* Right hyper */
#endif /* XK_MISCELLANY */

/*
 * Latin 1
 * Byte 3 = 0
 */
#ifndef XK_LATIN1
#define XK_space            0x020
#define XK_exclam           0x021
#define XK_quotedbl         0x022
#define XK_numbersign        0x023
#define XK_dollar             0x024
#define XK_percent            0x025
#define XK_ampersand          0x026
#define XK_apostrophe         0x027
#define XK_parenleft          0x028
#define XK_parenright         0x029
#define XK_asterisk            0x02a
#define XK_plus                0x02b
#define XK_comma                0x02c
#define XK_minus                0x02d
#define XK_period               0x02e
#define XK_slash                  0x02f
#define XK_0                     0x030
#define XK_1                     0x031
#define XK_2                     0x032
#define XK_3                     0x033
#define XK_4                     0x034
#define XK_5                     0x035
#define XK_6                     0x036
#define XK_7                     0x037
#define XK_8                     0x038
#define XK_9                     0x039
#define XK_colon                 0x03a
#define XK_semicolon              0x03b
#define XK_less                   0x03c
#define XK_equal                  0x03d
#define XK_greater                 0x03e
#define XK_question                0x03f
#define XK_at                      0x040
#define XK_A                      0x041
```

The X Library

```
#define XK_B          0x042
#define XK_C          0x043
#define XK_D          0x044
#define XK_E          0x045
#define XK_F          0x046
#define XK_G          0x047
#define XK_H          0x048
#define XK_I          0x049
#define XK_J          0x04a
#define XK_K          0x04b
#define XK_L          0x04c
#define XK_M          0x04d
#define XK_N          0x04e
#define XK_O          0x04f
#define XK_P          0x050
#define XK_Q          0x051
#define XK_R          0x052
#define XK_S          0x053
#define XK_T          0x054
#define XK_U          0x055
#define XK_V          0x056
#define XK_W          0x057
#define XK_X          0x058
#define XK_Y          0x059
#define XK_Z          0x05a
#define XK_bracketleft    0x05b
#define XK_backslash      0x05c
#define XK_bracketright    0x05d
#define XK_asciicircum    0x05e
#define XK_underscore      0x05f
#define XK_grave          0x060
#define XK_a              0x061
#define XK_b              0x062
#define XK_c              0x063
#define XK_d              0x064
#define XK_e              0x065
#define XK_f              0x066
#define XK_g              0x067
#define XK_h              0x068
#define XK_i              0x069
#define XK_j              0x06a
#define XK_k              0x06b
#define XK_l              0x06c
#define XK_m              0x06d
#define XK_n              0x06e
#define XK_o              0x06f
#define XK_p              0x070
```

The X Library

```
#define XK_q          0x071
#define XK_r          0x072
#define XK_s          0x073
#define XK_t          0x074
#define XK_u          0x075
#define XK_v          0x076
#define XK_w          0x077
#define XK_x          0x078
#define XK_y          0x079
#define XK_z          0x07a
#define XK_braceleft  0x07b
#define XK_bar         0x07c
#define XK_braceright 0x07d
#define XK_asciitilde 0x07e

#define XK_nobreakspace 0x0a0
#define XK_exclamdown   0x0a1
#define XK_cent          0x0a2
#define XK_sterling      0x0a3
#define XK_currency      0x0a4
#define XK_yen           0x0a5
#define XK_brokenbar     0x0a6
#define XK_section       0x0a7
#define XK_diaeresis     0x0a8
#define XK_copyright     0x0a9
#define XK_ordfeminine   0x0aa
#define XK_guillemotleft 0x0ab    /* left angle quotation mark */
#define XK_notsign       0x0ac
#define XK_hyphen         0x0ad
#define XK_registered     0x0ae
#define XK_macron         0x0af
#define XK_degree         0x0b0
#define XK_plusminus      0x0b1
#define XK_twosuperior    0x0b2
#define XK_threesuperior  0x0b3
#define XK_acute          0x0b4
#define XK_mu             0x0b5
#define XK_paragraph       0x0b6
#define XK_periodcentered 0x0b7
#define XK_cedilla        0x0b8
#define XK_onesuperior    0x0b9
#define XK_masculine       0x0ba
#define XK_guillemotright 0x0bb    /* right angle quotation mark */
#define XK_onequarter     0x0bc
#define XK_onehalf         0x0bd
#define XK_threequarters   0x0be
#define XK_questiondown   0x0bf
```

The X Library

```
#define XK_Agrave          0x0c0
#define XK_Aacute           0x0c1
#define XK_Acircumflex     0x0c2
#define XK_Atilde          0x0c3
#define XK_Adiaeresis      0x0c4
#define XK_Aring            0x0c5
#define XK_AE               0x0c6
#define XK_Ccedilla         0x0c7
#define XK_Egrave           0x0c8
#define XK_Eacute            0x0c9
#define XK_Ecircumflex      0x0ca
#define XK_Ediaeresis       0x0cb
#define XK_Igrave           0x0cc
#define XK_Iacute            0x0cd
#define XK_Icircumflex      0x0ce
#define XK_Idiaeresis       0x0cf
#define XK_ETH               0x0d0
#define XK_Ntilde           0x0d1
#define XK_Ograve           0x0d2
#define XK_Oacute            0x0d3
#define XK_Ocircumflex       0x0d4
#define XK_Otilde           0x0d5
#define XK_Odiaeresis        0x0d6
#define XK_multiply          0x0d7
#define XK_Ooblique          0x0d8
#define XK_Ugrave            0x0d9
#define XK_Uacute             0x0da
#define XK_Ucircumflex       0x0db
#define XK_Udiaeresis        0x0dc
#define XK_Yacute            0x0dd
#define XK_THORN              0x0de
#define XK_ssharp            0x0df
#define XK_agrave            0x0e0
#define XK_aacute             0x0e1
#define XK_acircumflex       0x0e2
#define XK_atilde            0x0e3
#define XK_adiaeresis        0x0e4
#define XK_arng              0x0e5
#define XK_ae                0x0e6
#define XK_ccedilla          0x0e7
#define XK_egrave            0x0e8
#define XK_eacute             0x0e9
#define XK_ecircumflex       0x0ea
#define XK_ediaeresis        0x0eb
#define XK_igrave            0x0ec
#define XK_iacute             0x0ed
#define XK_icircumflex       0x0ee
```

The X Library

```
#define XK_idiaeresis          0x0ef
#define XK_eth                  0x0f0
#define XK_ntilde               0x0f1
#define XK_ograve               0x0f2
#define XK_oacute                0x0f3
#define XK_ocircumflex          0x0f4
#define XK_otilde                0x0f5
#define XK_odiaeresis           0x0f6
#define XK_division              0x0f7
#define XK_oslash                0x0f8
#define XK_ugrave                0x0f9
#define XK_uacute                0x0fa
#define XK_ucircumflex          0x0fb
#define XK_udiaeresis            0x0fc
#define XK_yacute                0x0fd
#define XK_thorn                 0x0fe
#define XK_ydiaeresis            0x0ff
#endif /* XK_LATIN1 */

/*
 *      Latin 2
 *      Byte 3 = 1
 */

#ifndef XK_LATIN2
#define XK_Aogonek               0x1a1
#define XK_breve                 0x1a2
#define XK_Lstroke               0x1a3
#define XK_Lcaron                0x1a5
#define XK_Sacute                0x1a6
#define XK_Scaron                0x1a9
#define XK_Scedilla              0x1aa
#define XK_Tcaron                0x1ab
#define XK_Zacute                0x1ac
#define XK_Zcaron                0x1ae
#define XK_Zabovedot             0x1af
#define XK_aogonek               0x1b1
#define XK_ogonek                0x1b2
#define XK_lstroke               0x1b3
#define XK_lcaron                0x1b5
#define XK_sacute                0x1b6
#define XK_caron                 0x1b7
#define XK_scaron                0x1b9
#define XK_scedilla              0x1ba
#define XK_tcaron                0x1bb
#define XK_zacute                0x1bc
#define XK_doubleacute            0x1bd
```

The X Library

```
#define XK_zcaron          0x1be
#define XK_zabovedot        0x1bf
#define XK_Racute            0x1c0
#define XK_Abreve             0x1c3
#define XK_Iacute             0x1c5
#define XK_Cacute             0x1c6
#define XK_Ccaron             0x1c8
#define XK_Eogonek            0x1ca
#define XK_Ecaron             0x1cc
#define XK_Dcaron             0x1cf
#define XK_Dstroke            0x1d0
#define XK_Nacute              0x1d1
#define XK_Ncaron             0x1d2
#define XK_Odoubleacute       0x1d5
#define XK_Rcaron             0x1d8
#define XK_Uring               0x1d9
#define XK_Udoubleacute       0x1db
#define XK_Tcedilla            0x1de
#define XK_racute              0x1e0
#define XK_abreve              0x1e3
#define XK_lacute              0x1e5
#define XK_cacute              0x1e6
#define XK_ccaron              0x1e8
#define XK_eogonek             0x1ea
#define XK_ecaron              0x1ec
#define XK_dcaron              0x1ef
#define XK_dstroke             0x1f0
#define XK_nacute              0x1f1
#define XK_ncaron              0x1f2
#define XK_odeoubleacute      0x1f5
#define XK_udoubleacute       0x1fb
#define XK_rcaron              0x1f8
#define XK_urings              0x1f9
#define XK_tcedilla            0x1fe
#define XK_abovedot            0x1ff
#endif /* XK_LATIN2 */

/*
 *   Latin 3
 *   Byte 3 = 2
 */

#endif XK_LATIN3
#define XK_Hstroke             0x2a1
#define XK_Hcircumflex         0x2a6
#define XK_Iabovedot            0x2a9
#define XK_Gbreve              0x2ab
```

The X Library

```
#define XK_Jcircumflex      0x2ac
#define XK_hstroke           0x2b1
#define XK_hcircumflex       0x2b6
#define XK_idotless          0x2b9
#define XK_gbreve             0x2bb
#define XK_jcircumflex        0x2bc
#define XK_Cabovedot          0x2c5
#define XK_Ccircumflex         0x2c6
#define XK_Gabovedot          0x2d5
#define XK_Gcircumflex         0x2d8
#define XK_Ubreve              0x2dd
#define XK_Scircumflex         0x2de
#define XK_cabovedot          0x2e5
#define XK_ccircumflex         0x2e6
#define XK_gabovedot           0x2f5
#define XK_gcircumflex          0x2f8
#define XK_ubreve              0x2fd
#define XK_scircumflex          0x2fe
#endif /* XK_LATIN3 */

/*
 *   Latin 4
 *   Byte 3 = 3
 */

#ifndef XK_LATIN4
#define XK_kra                  0x3a2
#define XK_Rcedilla            0x3a3
#define XK_Itilde               0x3a5
#define XK_Lcedilla             0x3a6
#define XK_Emacron              0x3aa
#define XK_Gcedilla             0x3ab
#define XK_Tslash                0x3ac
#define XK_rcedilla            0x3b3
#define XK_itilde               0x3b5
#define XK_lcedilla             0x3b6
#define XK_emacron              0x3ba
#define XK_gcedilla             0x3bb
#define XK_tslash                0x3bc
#define XK_ENG                  0x3bd
#define XK_eng                  0x3bf
#define XK_Amacron              0x3c0
#define XK_Iogonek              0x3c7
#define XK_Eabovedot            0x3cc
#define XK_Imacron              0x3cf
#define XK_Ncedilla             0x3d1
```

The X Library

```
#define XK_Omacron          0x3d2
#define XK_Kcedilla          0x3d3
#define XK_Uogonek           0x3d9
#define XK_Utilde            0x3dd
#define XK_Umacron           0x3de
#define XK_amacron           0x3e0
#define XK_iogonek           0x3e7
#define XK_eabovedot         0x3ec
#define XK_imacron           0x3ef
#define XK_ncedilla          0x3f1
#define XK_omacron           0x3f2
#define XK_kcedilla          0x3f3
#define XK_uogonek           0x3f9
#define XK_utilde            0x3fd
#define XK_umacron           0x3fe
#endif /* XK_LATIN4 */

/*
 * Katakana
 * Byte 3 = 4
 */

#ifndef XK_KATAKANA
#define XK_overline           0x47e
#define XK_kana_fullstop      0x4a1
#define XK_kana_openingbracket 0x4a2
#define XK_kana_closingbracket 0x4a3
#define XK_kana_comma          0x4a4
#define XK_kana_conjunctive    0x4a5
#define XK_kana_WO             0x4a6
#define XK_kana_a              0x4a7
#define XK_kana_i              0x4a8
#define XK_kana_u              0x4a9
#define XK_kana_e              0x4aa
#define XK_kana_o              0x4ab
#define XK_kana_ya             0x4ac
#define XK_kana_yu             0x4ad
#define XK_kana_yo             0x4ae
#define XK_kana_tsu            0x4af
#define XK_prolongedsound     0x4b0
#define XK_kana_A              0x4b1
#define XK_kana_I              0x4b2
#define XK_kana_U              0x4b3
#define XK_kana_E              0x4b4
#define XK_kana_O              0x4b5
#define XK_kana_KA             0x4b6
#define XK_kana_KI             0x4b7
#endif
```

The X Library

```
#define XK_kana_KU          0xb8
#define XK_kana KE          0xb9
#define XK_kana KO          0xba
#define XK_kana SA          0xbb
#define XK_kana SHI         0xbc
#define XK_kana SU          0xbd
#define XK_kana SE          0xbe
#define XK_kana SO          0xbf
#define XK_kana TA          0xc0
#define XK_kana CHI         0xc1
#define XK_kana TSU         0xc2
#define XK_kana TE          0xc3
#define XK_kana TO          0xc4
#define XK_kana NA          0xc5
#define XK_kana NI          0xc6
#define XK_kana NU          0xc7
#define XK_kana NE          0xc8
#define XK_kana NO          0xc9
#define XK_kana HA          0xca
#define XK_kana HI          0xcb
#define XK_kana FU          0xcc
#define XK_kana HE          0xcd
#define XK_kana HO          0xce
#define XK_kana MA          0xcf
#define XK_kana MI          0xd0
#define XK_kana MU          0xd1
#define XK_kana ME          0xd2
#define XK_kana MO          0xd3
#define XK_kana YA          0xd4
#define XK_kana YU          0xd5
#define XK_kana YO          0xd6
#define XK_kana RA          0xd7
#define XK_kana RI          0xd8
#define XK_kana RU          0xd9
#define XK_kana RE          0xda
#define XK_kana RO          0xdb
#define XK_kana WA          0xdc
#define XK_kana N           0xdd
#define XK_voicedsound      0xde
#define XK_semi voicedsound 0xdf
#define XK_kana_switch      0xFF7E /* Alias for mode_switch */
#endif /* XK_KATAKANA */

/*
 * Arabic
 * Byte 3 = 5
 */
```

The X Library

```
#ifdef XK_ARABIC
#define XK_Arabic_comma          0x5ac
#define XK_Arabic_semicolon      0x5bb
#define XK_Arabic_question_mark   0x5bf
#define XK_Arabic_hamza          0x5c1
#define XK_Arabic_maddaonalef    0x5c2
#define XK_Arabic_hamzaonalef    0x5c3
#define XK_Arabic_hamzaonwaw     0x5c4
#define XK_Arabic_hamzaunderalef 0x5c5
#define XK_Arabic_hamzaonyeh     0x5c6
#define XK_Arabic_alef           0x5c7
#define XK_Arabic_beh            0x5c8
#define XK_Arabic_tehmarbuta    0x5c9
#define XK_Arabic_teh             0x5ca
#define XK_Arabic_theh           0x5cb
#define XK_Arabic_jeem           0x5cc
#define XK_Arabic_hah            0x5cd
#define XK_Arabic_khah           0x5ce
#define XK_Arabic_dal            0x5cf
#define XK_Arabic_thal           0x5d0
#define XK_Arabic_ra              0x5d1
#define XK_Arabic_zain           0x5d2
#define XK_Arabic_seen           0x5d3
#define XK_Arabic_sheen          0x5d4
#define XK_Arabic_sad            0x5d5
#define XK_Arabic_dad            0x5d6
#define XK_Arabic_tah            0x5d7
#define XK_Arabic_zah            0x5d8
#define XK_Arabic_ain            0x5d9
#define XK_Arabic_ghain          0x5da
#define XK_Arabic_tatweel        0x5e0
#define XK_Arabic_feh            0x5e1
#define XK_Arabic_qaf            0x5e2
#define XK_Arabic_kaf            0x5e3
#define XK_Arabic_lam            0x5e4
#define XK_Arabic_meem           0x5e5
#define XK_Arabic_noon           0x5e6
#define XK_Arabic_ha              0x5e7
#define XK_Arabic_waw             0x5e8
#define XK_Arabic_alefmaksura    0x5e9
#define XK_Arabic_yeh             0x5ea
#define XK_Arabic_fathatan       0x5eb
#define XK_Arabic_dammatan       0x5ec
#define XK_Arabic_kasratan       0x5ed
#define XK_Arabic_fatha           0x5ee
#define XK_Arabic_damma           0x5ef
```

The X Library

```
#define XK_Arabic_kasra          0x5f0
#define XK_Arabic_shadda          0x5f1
#define XK_Arabic_sukun          0x5f2
#define XK_Arabic_switch          0xFF7E /* Alias for mode_switch */
#endif /* XK_ARABIC */

/*
 * Cyrillic
 * Byte 3 = 6
 */
#ifndef XK_CYRILLIC
#define XK_Serbian_dje            0x6a1
#define XK_Macedonia_gje          0x6a2
#define XK_Cyrillic_io             0x6a3
#define XK_Ukrainian_ie           0x6a4
#define XK_Macedonia_dse          0x6a5
#define XK_Ukrainian_i             0x6a6
#define XK_Ukrainian_yi            0x6a7
#define XK_Cyrillic_je             0x6a8
#define XK_Cyrillic_lje            0x6a9
#define XK_Cyrillic_nje            0x6aa
#define XK_Serbian_tshe            0x6ab
#define XK_Macedonia_kje           0x6ac
#define XK_Byelorussian_shortu     0x6ae
#define XK_Cyrillic_dzhe           0x6af
#define XK_numerosign              0x6b0
#define XK_Serbian_DJE             0x6b1
#define XK_Macedonia_GJE           0x6b2
#define XK_Cyrillic_IO              0x6b3
#define XK_Ukrainian_IE             0x6b4
#define XK_Macedonia_DSE            0x6b5
#define XK_Ukrainian_I              0x6b6
#define XK_Ukrainian_YI             0x6b7
#define XK_Cyrillic_JE              0x6b8
#define XK_Cyrillic_LJE             0x6b9
#define XK_Cyrillic_NJE             0x6ba
#define XK_Serbian_TSHE             0x6bb
#define XK_Macedonia_KJE            0x6bc
#define XK_Byelorussian_SHORTU      0x6be
#define XK_Cyrillic_DZHE            0x6bf
#define XK_Cyrillic_yu              0x6c0
#define XK_Cyrillic_a               0x6c1
#define XK_Cyrillic_be              0x6c2
#define XK_Cyrillic_tse              0x6c3
#define XK_Cyrillic_de              0x6c4
#define XK_Cyrillic_ie              0x6c5
#define XK_Cyrillic_ef              0x6c6

```

The X Library

#define XK_Cyrillic_ghe	0x6c7
#define XK_Cyrillic_ha	0x6c8
#define XK_Cyrillic_i	0x6c9
#define XK_Cyrillic_shorti	0x6ca
#define XK_Cyrillic_ka	0x6cb
#define XK_Cyrillic_el	0x6cc
#define XK_Cyrillic_em	0x6cd
#define XK_Cyrillic_en	0x6ce
#define XK_Cyrillic_o	0x6cf
#define XK_Cyrillic_pe	0x6d0
#define XK_Cyrillic_ya	0x6d1
#define XK_Cyrillic_er	0x6d2
#define XK_Cyrillic_es	0x6d3
#define XK_Cyrillic_te	0x6d4
#define XK_Cyrillic_u	0x6d5
#define XK_Cyrillic_zhe	0x6d6
#define XK_Cyrillic_ve	0x6d7
#define XK_Cyrillic_softsign	0x6d8
#define XK_Cyrillic_yeru	0x6d9
#define XK_Cyrillic_ze	0x6da
#define XK_Cyrillic_shcha	0x6db
#define XK_Cyrillic_e	0x6dc
#define XK_Cyrillic_shcha	0x6dd
#define XK_Cyrillic_che	0x6de
#define XK_Cyrillic_hardsign	0x6df
#define XK_Cyrillic_YU	0x6e0
#define XK_Cyrillic_A	0x6e1
#define XK_Cyrillic_BE	0x6e2
#define XK_Cyrillic_TSE	0x6e3
#define XK_Cyrillic_DE	0x6e4
#define XK_Cyrillic_IE	0x6e5
#define XK_Cyrillic_EF	0x6e6
#define XK_Cyrillic_GHE	0x6e7
#define XK_Cyrillic_HA	0x6e8
#define XK_Cyrillic_I	0x6e9
#define XK_Cyrillic_SHORTI	0x6ea
#define XK_Cyrillic_KA	0x6eb
#define XK_Cyrillic_EL	0x6ec
#define XK_Cyrillic_EM	0x6ed
#define XK_Cyrillic_EN	0x6ee
#define XK_Cyrillic_O	0x6ef
#define XK_Cyrillic_PE	0x6f0
#define XK_Cyrillic_YA	0x6f1
#define XK_Cyrillic_ER	0x6f2
#define XK_Cyrillic_ES	0x6f3
#define XK_Cyrillic_TE	0x6f4
#define XK_Cyrillic_U	0x6f5

The X Library

```
#define XK_Cyrillic_ZHE          0x6f6
#define XK_Cyrillic_VE            0x6f7
#define XK_Cyrillic_SOFTSIGN      0x6f8
#define XK_Cyrillic_YERU          0x6f9
#define XK_Cyrillic_ZE            0x6fa
#define XK_Cyrillic_SHA           0x6fb
#define XK_Cyrillic_E              0x6fc
#define XK_Cyrillic_SHCHA         0x6fd
#define XK_Cyrillic_CHE           0x6fe
#define XK_Cyrillic_HARDSIGN      0x6ff
#endif /* XK_CYRILLIC */

/*
 * Greek
 * Byte 3 = 7
 */

#endif /* XK_GREEK */
#define XK_Greek_ALPHAaccent       0x7a1
#define XK_Greek_EPSILONaccent     0x7a2
#define XK_Greek_ETAaccent         0x7a3
#define XK_Greek_IOTAaccent        0x7a4
#define XK_Greek_IOTAdiaeresis     0x7a5
#define XK_Greek_OMICRONaccent     0x7a7
#define XK_Greek_UPSILONaccent     0x7a8
#define XK_Greek_UPSILONdieresis   0x7a9
#define XK_Greek_OMEGAaccent       0x7ab
#define XK_Greek_accentdieresis    0x7ae
#define XK_Greek_horizbar          0x7af
#define XK_Greek_alphaaccent       0x7b1
#define XK_Greek_epsilonaccent      0x7b2
#define XK_Greek_etaaccent         0x7b3
#define XK_Greek_iotaaccent        0x7b4
#define XK_Greek_iotadieresis      0x7b5
#define XK_Greek_iotaaccentdieresis 0x7b6
#define XK_Greek_omicronaccent      0x7b7
#define XK_Greek_upsilonaccent      0x7b8
#define XK_Greek_upsilondieresis   0x7b9
#define XK_Greek_upsilonaccentdieresis 0x7ba
#define XK_Greek_omegaaccent        0x7bb
#define XK_Greek_ALPHA             0x7c1
#define XK_Greek_BETA              0x7c2
#define XK_Greek_GAMMA             0x7c3
#define XK_Greek_DELTA              0x7c4
#define XK_Greek_EPSILON            0x7c5
#define XK_Greek_ZETA               0x7c6
#define XK_Greek_ETA                0x7c7
```

The X Library

```
#define XK_Greek_Theta          0x7c8
#define XK_Greek_Iota            0x7c9
#define XK_Greek_Kappa           0x7ca
#define XK_Greek_Lamda           0x7cb
#define XK_Greek_Lambda           0x7cb
#define XK_Greek_Mu              0x7cc
#define XK_Greek_Nu              0x7cd
#define XK_Greek_Xi              0x7ce
#define XK_Greek_Omicron          0x7cf
#define XK_Greek_Pi               0x7d0
#define XK_Greek_Rho              0x7d1
#define XK_Greek_Sigma             0x7d2
#define XK_Greek_Tau              0x7d4
#define XK_Greek_Upsilon           0x7d5
#define XK_Greek_Phi              0x7d6
#define XK_Greek_ChI              0x7d7
#define XK_Greek_Psi              0x7d8
#define XK_Greek_Omega             0x7d9
#define XK_Greek_alpha             0x7e1
#define XK_Greek_beta              0x7e2
#define XK_Greek_gamma             0x7e3
#define XK_Greek_delta             0x7e4
#define XK_Greek_epsilon            0x7e5
#define XK_Greek_zeta              0x7e6
#define XK_Greek_eta              0x7e7
#define XK_Greek_theta             0x7e8
#define XK_Greek_iota              0x7e9
#define XK_Greek_kappa             0x7ea
#define XK_Greek_lamda             0x7eb
#define XK_Greek_lambda             0x7eb
#define XK_Greek_mu                0x7ec
#define XK_Greek_nu                0x7ed
#define XK_Greek_xi                0x7ee
#define XK_Greek_omicron            0x7ef
#define XK_Greek_pi                0x7f0
#define XK_Greek_rho                0x7f1
#define XK_Greek_sigma              0x7f2
#define XK_Greek_finalsmallsigma        0x7f3
#define XK_Greek_tau                0x7f4
#define XK_Greek_upsilon             0x7f5
#define XK_Greek_phi                0x7f6
#define XK_Greek_chi                0x7f7
#define XK_Greek_psi                0x7f8
#define XK_Greek_omega              0x7f9
#define XK_Greek_switch             0xFF7E /* Alias for mode_switch */
#endif /* XK_GREEK */
```

The X Library

```
/*
 * Technical
 * Byte 3 = 8
 */

#ifndef XK_TECHNICAL
#define XK_leftradical          0x8a1
#define XK_topleftradical        0x8a2
#define XK_horizconnector        0x8a3
#define XK_topintegral           0x8a4
#define XK_botintegral           0x8a5
#define XK_vertconnector         0x8a6
#define XK_topleftsqbracket      0x8a7
#define XK_bottleftsqbracket     0x8a8
#define XK_toprightsqbracket     0x8a9
#define XK_bottrightsqbracket    0x8aa
#define XK_topleftparens         0x8ab
#define XK_bottopleftparens      0x8ac
#define XK_toprightparens        0x8ad
#define XK_bottrightparens       0x8ae
#define XK_leftmiddlecurlybrace   0x8af
#define XK_rightmiddlecurlybrace  0x8b0
#define XK_topleftsummation       0x8b1
#define XK_bottleftsummation      0x8b2
#define XK_topvertsummationconnector 0x8b3
#define XK_botvertsummationconnector 0x8b4
#define XK_toprightsummation      0x8b5
#define XK_bottrightsummation     0x8b6
#define XK_rightmiddlesummation   0x8b7
#define XK_lessthanequal          0x8bc
#define XK_notequal               0x8bd
#define XK_greaterthanequal       0x8be
#define XK_integral                0x8bf
#define XK_therefore              0x8c0
#define XK_variation               0x8c1
#define XK_infinity                0x8c2
#define XK_nabla                   0x8c5
#define XK_approximate              0x8c8
#define XK_similarequal            0x8c9
#define XK_ifonlyif                 0x8cd
#define XK_implies                  0x8ce
#define XK_identical                 0x8cf
#define XK_radical                  0x8d6
#define XK_includedin                0x8da
#define XK_includes                  0x8db
#define XK_intersection                0x8dc
#define XK_union                     0x8dd
#endif
```

The X Library

```
#define XK_logicaland          0x8de
#define XK_logicalor           0x8df
#define XK_partialderivative   0x8ef
#define XK_function             0x8f6
#define XK_leftarrow            0x8fb
#define XK_uparrow               0x8fc
#define XK_rightarrow            0x8fd
#define XK_downarrow              0x8fe
#endif /* XK_TECHNICAL */

/*
 *  Special
 *  Byte 3 = 9
 */

#ifndef XK_SPECIAL
#define XK_blank                 0x9df
#define XK_soliddiamond          0x9e0
#define XK_checkerboard          0x9e1
#define XK_ht                     0x9e2
#define XK_ff                     0x9e3
#define XK_cr                     0x9e4
#define XK_lf                     0x9e5
#define XK_nl                     0x9e8
#define XK_vt                     0x9e9
#define XK_lowrightcorner        0x9ea
#define XK_uprightcorner         0x9eb
#define XK_upleftcorner          0x9ec
#define XK_lowleftcorner         0x9ed
#define XK_crossinglines         0x9ee
#define XK_horizlinescan1        0x9ef
#define XK_horizlinescan3        0x9f0
#define XK_horizlinescan5        0x9f1
#define XK_horizlinescan7        0x9f2
#define XK_horizlinescan9        0x9f3
#define XK_lefttt                 0x9f4
#define XK_righttt                0x9f5
#define XK_bott                   0x9f6
#define XK_topt                   0x9f7
#define XK_vertbar                0x9f8
#endif /* XK_SPECIAL */

/*
 *  Publishing
 *  Byte 3 = a
 */

```

The X Library

```
#ifdef XK_PUBLISHING
#define XK_emspace          0xaa1
#define XK_enspace           0xaa2
#define XK_em3space          0xaa3
#define XK_em4space          0xaa4
#define XK_digitspace        0xaa5
#define XK_punctspace         0xaa6
#define XK_thinspace          0xaa7
#define XK_hairspace          0xaa8
#define XK_emdash             0xaa9
#define XK_endash              0xaaa
#define XK_signifblank        0xaac
#define XK_ellipsis            0xae
#define XK_doubbaselinedot    0xaaf
#define XK_onethird            0xab0
#define XK_twothirds          0xab1
#define XK_onefifth            0xab2
#define XK_twofifths          0xab3
#define XK_threefifths         0xab4
#define XK_fourfifths          0xab5
#define XK_onesixth            0xab6
#define XK_fivesixths          0xab7
#define XK_careof               0xab8
#define XK_figdash              0xab9
#define XK_leftanglebracket     0xbc
#define XK_decimalpoint         0xbd
#define XK_rightanglebracket    0xbe
#define XK_marker                0xbf
#define XK_oneeighth            0xac3
#define XK_threeneighths        0xac4
#define XK_fiveneighths         0xac5
#define XK_seveneighths         0xac6
#define XK_trademark            0xac9
#define XK_signaturemark         0xac
#define XK_trademarkincircle      0acb
#define XK_leftopentriangle      0xac
#define XK_rightopentriangle      0acd
#define XK_emopencircle          0xae
#define XK_emopenrectangle        0acf
#define XK_leftsinglequotemark    0xad0
#define XK_rightsinglequotemark   0xad1
#define XK_leftdoublequotemark     0xad2
#define XK_rightdoublequotemark    0xad3
#define XK_prescription          0xad4
#define XK_minutes                 0xad6
#define XK_seconds                  0xad7
#define XK_latincross              0xad9
```

The X Library

```
#define XK_hexagram          0xada
#define XK_filledrectbullet   0xadb
#define XK_filledlefttribullet 0xadc
#define XK_filledrighttribullet 0xadd
#define XK_emfilledcircle     0xae0
#define XK_emfilledrect       0xae1
#define XK_enopencircbullet   0xae2
#define XK_enopensquarebullet 0xae3
#define XK_openrectbullet     0xae4
#define XK_opentribulletup    0xae5
#define XK_opentribulletdown   0xae6
#define XK_openstar            0xae7
#define XK_enfilledcircbullet 0xae8
#define XK_enfilledsqbullet    0xae9
#define XK_filledtribulletup   0xaea
#define XK_filledtribulletdown 0xaeb
#define XK_leftpointer         0xaea
#define XK_rightpointer        0xaeb
#define XK_club                0xaea
#define XK_diamond              0xaea
#define XK_heart                0xaea
#define XK_maltesecross        0xaea
#define XK_dagger               0xaea
#define XK_doubledagger        0xaea
#define XK_checkmark             0xaea
#define XK_ballotcross          0xaea
#define XK_musicalsharp         0xaea
#define XK_musicalflat          0xaea
#define XK_malesymbol            0xaea
#define XK_femalesymbol         0xaea
#define XK_telephone             0xaea
#define XK_telephonerecorder    0xaea
#define XK_phonographcopyright  0xaea
#define XK_caret                 0xaea
#define XK_singlelowquotemark   0xaea
#define XK_doublelowquotemark   0xaea
#define XK_cursor                0xaea
#endif /* XK_PUBLISHING */

/*
 *  APL
 *  Byte 3 = b
 */

#endif /* XK_APL
#define XK_leftcaret           0xba3
#define XK_rightcaret          0xba6
```

The X Library

```
#define XK_downcaret          0xba8
#define XK_upcaret             0xba9
#define XK_overbar              0xbc0
#define XK_downtack             0xbc2
#define XK_upshoe               0xbc3
#define XK_downstile             0xbc4
#define XK_underbar              0xbc6
#define XK_jot                  0xbca
#define XK_quad                 0xbcc
#define XK_uptack                0xbce
#define XK_circle                0xbcf
#define XK_upstile               0xbd3
#define XK_downshoe              0xbd6
#define XK_rightshoe             0xbd8
#define XK_leftshoe              0xbda
#define XK_lefttack              0xbdcc
#define XK_righttack             0xbfc
#endif /* XK_APPL */

/*
 * Hebrew
 * Byte 3 = c
 */

#ifndef XK_HEBREW
#define XK_hebrew_doublelowline      0xcdf
#define XK_hebrew_aleph            0xce0
#define XK_hebrew_bet              0xce1
#define XK_hebrew_gimel             0xce2
#define XK_hebrew_dalet             0xce3
#define XK_hebrew_he                0xce4
#define XK_hebrew_waw               0xce5
#define XK_hebrew_zain              0xce6
#define XK_hebrew_chet              0xce7
#define XK_hebrew_tet                0xce8
#define XK_hebrew_yod               0xce9
#define XK_hebrew_finalkaph           0xcea
#define XK_hebrew_kaph              0xceb
#define XK_hebrew_lamed              0xcec
#define XK_hebrew_finalmem            0xed
#define XK_hebrew_mem                0xee
#define XK_hebrew_finalnun            0xef
#define XK_hebrew_nun                0xf0
#define XK_hebrew_samech              0xf1
#define XK_hebrew_ayin                0xf2
#define XK_hebrew_finalpe              0xf3
#define XK_hebrew_pe                  0xf4
#endif /* XK_HEBREW */
```

The X Library

```
#define XK_hebrew_finalzade          0xcf5
#define XK_hebrew_zade                0xcf6
#define XK_hebrew_qoph               0xcf7
#define XK_hebrew_resh                0xcf8
#define XK_hebrew_shin               0xcf9
#define XK_hebrew_taw                 0xcfa
#define XK_Hebrew_switch      0xFF7E /* Alias for mode_switch */
```

The X Library

Figure 8-7. Manifest Constants from <X11/cursorfont.h>

```
/* $XConsortium: cursorfont.h,v 1.2 88/09/06 16:44:27 jim Exp $ */
#define XC_num_glyphs 154
#define XC_X_cursor 0
#define XC_arrow 2
#define XC_based_arrow_down 4
#define XC_based_arrow_up 6
#define XC_boat 8
#define XC_bogosity 10
#define XC_bottom_left_corner 12
#define XC_bottom_right_corner 14
#define XC_bottom_side 16
#define XC_bottom_tee 18
#define XC_box_spiral 20
#define XC_center_ptr 22
#define XC_circle 24
#define XC_clock 26
#define XC_coffee_mug 28
#define XC_cross 30
#define XC_cross_reverse 32
#define XC_crosshair 34
#define XC_diamond_cross 36
#define XC_dot 38
#define XC_dotbox 40
#define XC_double_arrow 42
#define XC_draft_large 44
#define XC_draft_small 46
#define XC_draped_box 48
#define XC_exchange 50
#define XC_fleur 52
#define XC_gobbler 54
#define XC_gumby 56
#define XC_hand1 58
#define XC_hand2 60
#define XC_heart 62
#define XC_icon 64
#define XC_iron_cross 66
#define XC_left_ptr 68
#define XC_left_side 70
#define XC_left_tee 72
#define XC_leftbutton 74
#define XC_ll_angle 76
#define XC_lr_angle 78
#define XC_man 80
```

The X Library

```
#define XC_middlebutton 82
#define XC_mouse 84
#define XC_pencil 86
#define XC_pirate 88
#define XC_plus 90
#define XC_question_arrow 92
#define XC_right_ptr 94
#define XC_right_side 96
#define XC_right_tee 98
#define XC_rightbutton 100
#define XC_rtl_logo 102
#define XC_sailboat 104
#define XC_sb_down_arrow 106
#define XC_sb_h_double_arrow 108
#define XC_sb_left_arrow 110
#define XC_sb_right_arrow 112
#define XC_sb_up_arrow 114
#define XC_sb_v_double_arrow 116
#define XC_shuttle 118
#define XC_sizing 120
#define XC_spider 122
#define XC_spraycan 124
#define XC_star 126
#define XC_target 128
#define XC_tcross 130
#define XC_top_left_arrow 132
#define XC_top_left_corner 134
#define XC_top_right_corner 136
#define XC_top_side 138
#define XC_top_tee 140
#define XC_trek 142
#define XC_ul_angle 144
#define XC_umbrella 146
#define XC_ur_angle 148
#define XC_watch 150
#define XC_xterm 152
```

The X Library

The X Library



CHAPTER 9: The X Toolkit Library



The X Toolkit Library

The X Toolkit

Overview

This chapter identifies binary interfaces for `libXt`, which are defined in *The X Window System Toolkit (Second Edition)*, by Paul J. Asente and Ralph R. Swick (Digital Press, ISBN: 1-55558-051-3).

In addition, all SCD 2.1 systems will support the X 11 Release 4 Protocol, as defined in *The X Window System (Second Edition)* by Robert W. Scheifler and James Gettys (Digital Press, ISBN 1-55558-050-5).

Finally, all SCD 2.1 systems will support the mechanisms and conventions as specified in the *Inter-Client Communications Convention Manual (ICCCM)* in *The X Window System (Second Edition)* by Robert W. Scheifler and James Gettys (Digital Press, ISBN 1-55558-050-5).

The libXt Interfaces

The interfaces listed below in Table 9-1 have been included in SCD 2.1 because they are required to be present on all compliant systems, in the dynamic library `/usr/lib/libXt.so.4`.

Table 9-2 contains the exported data which are also required to be present in `libXt.so.4`. The format of these entries is: data[size].

Figure 9-1 details the manifest constants and visible data structures associated with the X Toolkit library.

The X Toolkit Library

Table 9-1. Contents of libXt

XtAddActions	XtCallAcceptFocus
XtAddCallback	XtCallActionProc
XtAddCallbacks	XtCallCallbackList
XtAddConverter	XtCallCallbacks
XtAddEventHandler	XtCallConverter
XtAddExposureToRegion	XtCallbackExclusive
XtAddGrab	XtCallbackNone
XtAddInput	XtCallbackNonexclusive
XtAddRawEventHandler	XtCallbackPopdown
XtAddTimeOut	XtCallbackReleaseCacheRef
XtAddWorkProc	XtCallbackReleaseCacheRefList
XtAppAddActionHook	XtAlloc
XtAppAddActions	XtClass
XtAppAddConverter	XtCloseDisplay
XtAppAddInput	XtConfigureWidget
XtAppAddTimeOut	XtConvert
XtAppAddWorkProc	XtConvertAndStore
XtAppCreateShell	XtConvertCase
XtAppError	XtCreateApplicationContext
XtAppErrorMsg	XtCreateApplicationShell
XtAppGetErrorDatabase	XtCreateManagedWidget
XtAppGetErrorDatabaseText	XtCreatePopupShell
XtAppGetSelectionTimeout	XtCreateWidget
XtAppInitialize	XtCreateWindow
XtAppMainLoop	XtDatabase
XtAppNextEvent	XtDestroyApplicationContext
XtAppPeekEvent	XtDestroyGC
XtAppPending	XtDestroyWidget
XtAppProcessEvent	XtDirectConvert
XtAppReleaseCacheRefs	XtDisownSelection
XtAppSetErrorHandler	XtDispatchEvent
XtAppSetErrorHandler	XtDisplay
XtAppSetFallbackResources	XtDisplayInitialize
XtAppSetSelectionTimeout	XtDisplayOfObject
XtAppSetTypeConverter	XtDisplayStringConversionWarning
XtAppSetWarningHandler	XtDisplayToApplicationContext
XtAppSetWarningMsgHandler	XtError
XtAppWarning	XtErrorMsg
XtAppWarningMsg	XtFindFile
XtAugmentTranslations	XtFree
XtBuildEventMask	XtGetActionKeysym

The X Toolkit Library

XtGetApplicationNameAndClass	XtIsVendorShell
XtGetApplicationResources	XtIsWMShell
XtGetConstraintResourceList	XtIsWidget
XtGetErrorDatabase	XtKeysymToKeycodeList
XtGetErrorDatabaseText	XtLastTimestampProcessed
XtGetGC	XtMainLoop
XtGetKeysymTable	XtMakeGeometryRequest
XtGetMultiClickTime	XtMakeResizeRequest
XtGetResourceList	XtMalloc
XtGetSelectionRequest	XtManageChild
XtGetSelectionTimeout	XtManageChildren
XtGetSelectionValue	XtMapWidget
XtGetSelectionValueIncremental	XtMenuPopupAction
XtGetSelectionValues	XtMergeArgLists
XtGetSelectionValuesIncremental	XtMoveWidget
XtGetSubresources	XtName
XtGetSubvalues	XtNameToWidget
XtGetValues	XtNewString
XtGrabButton	XtNextEvent
XtGrabKey	XtOpenDisplay
XtGrabKeyboard	XtOverrideTranslations
XtGrabPointer	XtOwnSelection
XtHasCallbacks	XtOwnSelectionIncremental
XtInitialize	XtParent
XtInitializeWidgetClass	XtParseAcceleratorTable
XtInsertEventHandler	XtParseTranslationTable
XtInsertRawEventHandler	XtPeekEvent
XtInstallAccelerators	XtPending
XtInstallAllAccelerators	XtPopdown
XtIsApplicationShell	XtPopup
XtIsComposite	XtPopupSpringLoaded
XtIsConstraint	XtProcessEvent
XtIsManaged	XtQueryGeometry
XtIsObject	XtRealizeWidget
XtIsOverrideShell	XtRealloc
XtIsRealized	XtRegisterCaseConverter
XtIsRectObj	XtRegisterGrabAction
XtIsSensitive	XtReleaseGC
XtIsShell	XtRemoveActionHook
XtIsSubclass	XtRemoveAllCallbacks
XtIsTopLevelShell	XtRemoveCallback
XtIsTransientShell	XtRemoveCallbacks

The X Toolkit Library

XtRemoveEventHandler	XtVaCreateArgsList
XtRemoveGrab	XtVaCreateManagedWidget
XtRemoveInput	XtVaCreatePopupShell
XtRemoveRawEventHandler	XtVaCreateWidget
XtRemoveTimeOut	XtVaGetApplicationResources
XtRemoveWorkProc	XtVaGetSubresources
XtResizeWidget	XtVaGetSubvalues
XtResizeWindow	XtVaGetValues
XtResolvePathname	XtVaSetSubvalues
XtScreen	XtVaSetValues
XtScreenOfObject	XtWarning
XtSetErrorHandler	XtWarningMsg
XtSetErrorMsgHandler	XtWidgetToApplicationContext
XtSetKeyTranslator	XtWindow
XtSetKeyboardFocus	XtWindowOfObject
XtSetMappedWhenManaged	XtWindowToWidget
XtSetMultiClickTime	
XtSetSelectionTimeout	
XtSetSensitive	
XtSetSubvalues	
XtSetTypeConverter	
XtSetValue	
XtSetWMColormapWindows	
XtSetWarningHandler	
XtSetWarningMsgHandler	
XtStringConversionWarning	
XtSuperclass	
XtToolkitInitialize	
XtTranslateCoords	
XtTranslateKey	
XtTranslateKeycode	
XtUngrabButton	
XtUngrabKey	
XtUngrabKeyboard	
XtUngrabPointer	
XtUninstallTranslations	
XtUnmanageChild	
XtUnmanageChildren	
XtUnmapWidget	
XtUnrealizeWidget	
XtVaAppCreateShell	
XtVaAppInitialize	

The X Toolkit Library

Table 9-2. Exported Data for libXt.

```
applicationShellClassRec[9c]
applicationShellWidgetClass[4]
compositeClassRec[88]
compositeWidgetClass[4]
constraintClassRec[a4]
constraintWidgetClass[4]
coreWidgetClass[4]
objectClass[4]
objectClassRec[74]
overrideShellClassRec[90]
overrideShellWidgetClass[4]
rectObjClass[4]
rectObjClassRec[74]
shellClassRec[8c]
shellWidgetClass[4]
topLevelShellClassRec[98]
topLevelShellWidgetClass[4]
transientShellClassRec[98]
transientShellWidgetClass[4]
vendorShellClassRec[94]
vendorShellWidgetClass[4]
widgetClass[4]
widgetClassRec[74]
wmShellClassRec[90]
wmShellWidgetClass[4]
```

The X Toolkit Library

Figure 9-1. Xt manifest constants

```
#define XtCacheNone      0x001
#define XtCacheAll       0x002
#define XtCacheByDisplay 0x003
#define XtCacheRefCount   0x100
#define XtCWQueryOnly    (1 << 7)
#define XtSMDontChange   5
typedef enum {XtListHead, XtListTail } XtListPosition;
#define XtInputNoneMask   0L
#define XtInputReadMask   (1L<<0)
#define XtInputWriteMask  (1L<<1)
#define XtInputExceptMask (1L<<2)

typedef enum {
    XtCallbackNoList,
    XtCallbackHasNone,
    XtCallbackHasSome
} XtCallbackStatus;

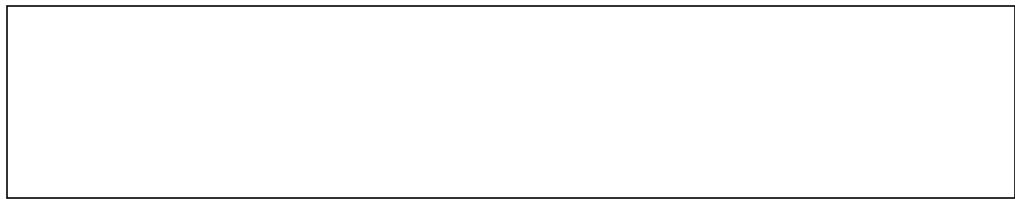
typedef enum {
    XtGeometryYes,
    XtGeometryNo,
    XtGeometryAlmost,
    XtGeometryDone
} XtGeometryResult;
```

The X Toolkit Library

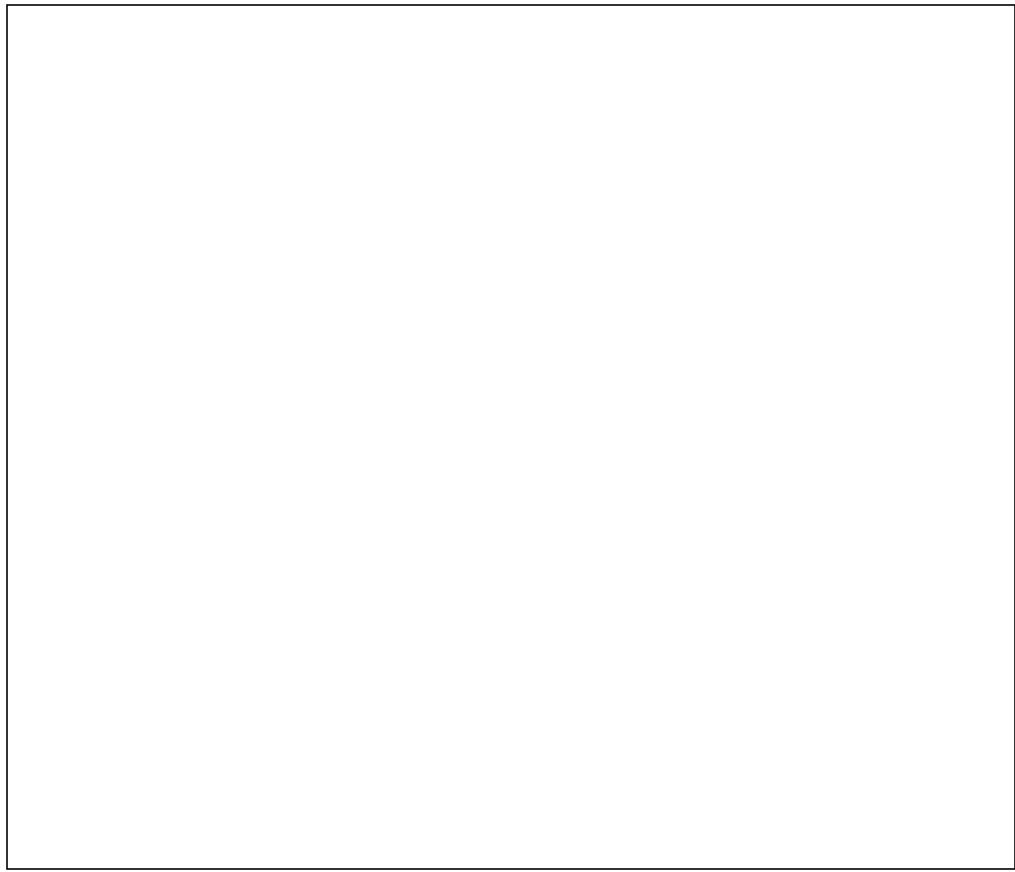
```
typedef enum {
    XtGrabNone,
    XtGrabNonexclusive,
    XtGrabExclusive
} XtGrabKind;

#define XtAllEvents          ((EventMask)-1L)
#define XtIMXEvent            1
#define XtIMTimer              2
#define XtIMAlternateInput      4
#define XtIMAll    (XtIMXEvent | XtIMTimer | XtIMAlternateInput)
#define XtVaNestedList         "XtVaNestedList"
#define XtVaTypedArg           "XtVaTypedArg"
#define XtUnspecifiedPixmap     ((Pixmap)2)
#define XtUnspecifiedShellInt    (-1)
#define XtUnspecifiedWindow      ((Window)2)
#define XtUnspecifiedWindowGroup ((Window)3)
#define XtDefaultForeground      "XtDefaultForeground"
#define XtDefaultBackground      "XtDefaultBackground"
#define XtDefaultFont            "XtDefaultFont"
#define XT_CONVERT_FAIL          (Atom)0x80000001
```

The X Toolkit Library



CHAPTER 10: The OPEN LOOK Widget Set



The OPEN LOOK Widget Set

The OPEN LOOK Widget Set

Overview

This chapter identifies binary interfaces for libXol. A source description for the entry points and exported data structures so identified may be found in the *OLIT Reference Manual* (Sun Microsystems, Part No. 800-6055-10, Revision A.).

The libXol Interfaces

The names listed below in Tables 10-1 and 10-2 have been included in SCD 2.1 as the names for the OPEN LOOK Widget Set REQUIRED INTERFACES, and must to be present on all conformant systems through the reference name /usr/lib/libXol.so.3. Note that Table 10-2 defines the size of exported data objects as a hexadecimal byte count described in square brackets after each name.

Figures 10-1 and 10-2 detail the manifest constants associated with libXol and its visible data structures, respectively.

The OPEN LOOK Widget Set

Table 10-1. libXol Contents

AllocateBuffer	OlCategorySetPage
AllocateTextBuffer	OlDragAndDrop
BackwardScanTextBuffer	OlError
CopyBuffer	OlGet50PercentGrey
CopyTextBufferBlock	OlGet75PercentGrey
EndCurrentTextBufferWord	OlGetApplicationResources
ForwardScanTextBuffer	OlGetApplicationValues
FreeBuffer	OlGetBeep
FreeTextBuffer	OlGetBeepVolume
GetOlBusyCursor	OlGetBusyCursor
GetOlDuplicateCursor	OlGetCurrentFocusWidget
GetOlMoveCursor	OlGrabDragPointer
GetOlPanCursor	OlHasCallbacks
GetOlQuestionCursor	OlHasFocus
GetOlSWGeometries	OlInitialize
GetOlStandardCursor	OlLayoutScrolledWindow
GetOlTargetCursor	OlListIntPtr
GetTextBufferBlock	OlMenuPopdown
GetTextBufferBuffer	OlMenuPopup
GetTextBufferChar	OlMenuPost
GetTextBufferLine	OlMenuUnpost
GetTextBufferLocation	OlMoveFocus
GrowBuffer	OlQueryAcceleratorDisplay
IncrementTextBufferLocation	OlQueryMnemonicDisplay
InsertIntoBuffer	OlRegisterColorTupleListConverter
LastTextBufferLocation	OlRegisterHelp
LastTextBufferPosition	OlRemoveCallback
LineOfPosition	OlSetErrorHandler
LocationOfPosition	OlSetGaugeValue
LookupOlInputEvent	OlSetInputFocus
NextLocation	OlSetVaDisplayErrorMsgHandler
NextTextBufferWord	OlSetVaDisplayWarningMsgHandler
OlAddCallback	OlSetWarningHandler
OlCallAcceptFocus	OlTextEditClearBuffer
OlCallCallbacks	OlTextEditCopyBuffer
OlCanAcceptFocus	OlTextEditCopySelection

The OPEN LOOK Widget Set

```
OlTextEditGetPosition  
OlTextEditGetLastPosition  
OlTextEditInsert  
OlTextEditPaste  
OlTextEditReadSubString  
OlTextEditRedraw  
OlTextEditResize  
OlTextEditSetCursorPosition  
OlTextEditTextBuffer  
OlTextEditUpdate  
OlTextFieldCopyString  
OlTextFieldGetString  
OlToolkitInitialize  
OlUngrabDragPointer  
OlUpdateDisplay  
OlVaDisplayErrorMsg  
OlVaDisplayWarningMsg  
OlWMProtocolAction  
OlWarning  
PositionOfLine  
PositionOfLocation  
PreviousLocation  
PreviousTextBufferWord  
ReadFileIntoBuffer  
ReadFileIntoTextBuffer  
ReadStringIntoBuffer  
ReadStringIntoTextBuffer  
RegisterTextBufferScanFunctions  
RegisterTextBufferUpdate  
RegisterTextBufferWordDefinition  
ReplaceBlockInTextBuffer  
ReplaceCharInTextBuffer  
SaveTextBuffer  
StartCurrentTextBufferWord  
UnregisterTextBufferUpdate
```

The OPEN LOOK Widget Set

Table 10-2. Exported Data in libXol

OlrChar[5]	magWidgetClass[4]
OlrCompression[c]	managerClassRec[dc]
abbrevMenuButtonClassRec[a8]	managerWidgetClass[4]
abbrevMenuButtonWidgetClass[4]	menuButtonClassRec[ac]
baseWindowShellClassRec[a0]	menuButtonGadgetClass[4]
baseWindowShellWidgetClass[4]	menuButtonGadgetClassRec[ac]
bulletinBoardClassRec[e0]	menuButtonWidgetClass[4]
bulletinBoardWidgetClass[4]	menuShellClassRec[9c]
buttonClassRec[a8]	menuShellWidgetClass[4]
buttonGadgetClass[4]	nonexclusivesClassRec[e0]
buttonGadgetClassRec[a8]	nonexclusivesWidgetClass[4]
buttonWidgetClass[4]	noticeShellClassRec[9c]
captionClassRec[e0]	noticeShellWidgetClass[4]
captionWidgetClass[4]	oblongButtonClassRec[ac]
categoryClassRec[e0]	oblongButtonGadgetClass[4]
categoryWidgetClass[4]	oblongButtonGadgetClassRec[ac]
checkBoxClassRec[e0]	oblongButtonWidgetClass[4]
checkBoxWidgetClass[4]	popupWindowShellClassRec[9c]
controlAreaWidgetClass[4]	popupWindowShellWidgetClass[4]
controlClassRec[e0]	primitiveClassRec[a4]
eventObjClass[4]	primitiveWidgetClass[4]
eventObjClassRec[a4]	pushpinClassRec[a8]
exclusivesClassRec[e0]	pushpinWidgetClass[4]
exclusivesWidgetClass[4]	rectButtonClassRec[ac]
footerPanelClassRec[e0]	rectButtonWidgetClass[4]
footerPanelWidgetClass[4]	rubberTileClassRec[e0]
formClassRec[e0]	rubberTileWidgetClass[4]
formWidgetClass[4]	scrollbarClassRec[a8]
gaugeClassRec[a8]	scrollbarWidgetClass[4]
gaugeWidgetClass[4]	scrolledWindowClassRec[e0]
helpClassRec[e4]	scrolledWindowWidgetClass[4]
helpWidgetClass[4]	scrollingListWidgetClass[4]
listClassRec[e4]	sliderClassRec[a8]
listPaneClassRec[a8]	sliderWidgetClass[4]
listPaneWidgetClass[4]	staticTextWidgetClass[4]
magClassRec[a8]	statictextClassRec[a8]
	statictextWidgetClass[4]

The OPEN LOOK Widget Set

```
TextEditWidgetClass[4]
textFieldClassRec[e0]
textFieldWidgetClass[4]
vendorShellClassRec[94]
vendorShellWidgetClass[4]
```

The OPEN LOOK Widget Set

Figure 10-1. libxol Manifest Constants

```
#define OleditDone 0
#define OleditError 1
#define OleditPosError 2
#define OleditReject 3
#define OL_ABSENT_PAIR 0
#define OL_ALL 1
#define OL_ALWAYS 2
#define OL_ATOM_HELP 3
#define OL_BOTH 4
#define OL_BOTTOM 5
#define OL_BUTTONSTACK 6
#define OL_CENTER 7
#define OL_CLASS_HELP 8
#define OL_COLUMNS 9
#define OL_COPY_MASK_VALUE 10
#define OL_COPY_SIZE 11
#define OL_COPY_SOURCE_VALUE 12
#define OL_CURRENT 13
#define OL_DEFAULT_PAIR 14
#define OL_DISK_SOURCE 15
#define OL_DISPLAY_FORM 16
#define OL_DOWN 17
#define OL_EXISTING_SOURCE 18
#define OL_FIXEDCOLS 19
#define OL_FIXEDHEIGHT 20
```

The OPEN LOOK Widget Set

#define	OL_FIXEDROWS	21
#define	OL_FIXEDWIDTH	22
#define	OL_HALFSTACK	29
#define	OL_HORIZONTAL	30
#define	OL_IMAGE	31
#define	OL_IN	32
#define	OL INDIRECT_SOURCE	33
#define	OL_LABEL	34
#define	OL_LEFT	35
#define	OL_MASK_PAIR	36
#define	OL_MAXIMIZE	37
#define	OL_MILLIMETERS	38
#define	OL_MINIMIZE	39
#define	OL_NEVER	40
#define	OL_NEXT	41
#define	OL_NONE	42
#define	OL_NONEBOTTOM	43
#define	OL_NONELEFT	44
#define	OL_NONERIGHT	45
#define	OL_NONETOP	46
#define	OL_NOTICES	47
#define	OL_OBLONG	49
#define	OL_OUT	50
#define	OL_OVERRIDE_PAIR	51
#define	OL_PIXELS	52
#define	OL_POINTS	53
#define	OL_POPUP	54

The OPEN LOOK Widget Set

#define	OL_PREVIOUS	55
#define	OL_PROG_DEFINED_SOURCE	56
#define	OL_RECTBUTTON	57
#define	OL_RIGHT	58
#define	OL_ROWS	59
#define	OL_SOURCE_FORM	60
#define	OL_SOURCE_PAIR	61
#define	OL_STAYUP	62
#define	OL_STRING	63
#define	OL_STRING_SOURCE	64
#define	OL_TEXT_APPEND	65
#define	OL_TEXT_EDIT	66
#define	OL_TEXT_READ	67
#define	OL_TOP	68
#define	OL_TRANSPARENT_SOURCE	69
#define	OL_VERTICAL	70
#define	OL_WIDGET_HELP	73
#define	OL_WINDOW_HELP	74
#define	OL_WRAP_ANY	75
#define	OL_WRAP_WHITE_SPACE	76
#define	OL_CONTINUOUS	77
#define	OL_GRANULARITY	78
#define	OL_RELEASE	79
#define	OL_TICKMARK	80
#define	OL_PERCENT	81
#define	OL_SLIDERVALUE	82
#define	OL_WT_BASE	83

The OPEN LOOK Widget Set

#define	OL_WT_CMD	84
#define	OL_WT_NOTICE	85
#define	OL_WT_HELP	86
#define	OL_WT_OTHER	87
#define	OL_SUCCESS	88
#define	OL_BAD_KEY	90
#define	OL_MENU_FULL	91
#define	OL_MENU_LIMITED	92
#define	OL_MENU_CANCEL	93
#define	OL_MENUDEFAULT	96
#define	OL_HSBMENU	98
#define	OL_VSBMENU	99
#define	OL_NEXTAPP	101
#define	OL_NEXTWINDOW	102
#define	OL_PREVAPP	103
#define	OL_PREVWINDOW	104
#define	OL_WINDOWMENU	105
#define	OL_WORKSPACEMENU	106
#define	OL_DEFAULTACTION	108
#define	OL_TOGGLEPUSHPIN	111
#define	OL_IMMEDIATE	120
#define	OL_CLICK_TO_TYPE	125
#define	OL_REALESTATE	126
#define	OL_UNDERLINE	127
#define	OL_HIGHLIGHT	128
#define	OL_INACTIVE	129
#define	OL_DISPLAY	130

The OPEN LOOK Widget Set

```
#define OL_PROC 131
#define OL_SIZE_PROC 132
#define OL_DRAW_PROC 133
#define OL_PINNED_MENU 134
#define OL_PRESS_DRAG_MENU 135
#define OL_STAYUP_MENU 136
#define OL_POINTER 137
#define OL_INPUTFOCUS 138
#define OL_QUIT 142
#define OL_DESTROY 143
#define OL_DISMISS 144
#define OL_PRE 145
#define OL_POST 146
#define OL_GROW_OFF 147
#define OL_GROW_HORIZONTAL 148
#define OL_GROW_VERTICAL 149
#define OL_GROW_BOTH 150
#define OL_B_OFF 0
#define OL_B_HORIZONTAL (1<<0)
#define OL_B_VERTICAL (1<<1)
#define OL_B_BOTH (OL_B_VERTICAL|OL_B_HORIZONTAL)
#define Ol_EastWestGravity 1000
#define Ol_NorthSouthGravity 1001
#define Ol_AllGravity 1002
#define OL_BEEP_NEVER OL_NEVER
#define OL_BEEP_NOTICES OL_NOTICES
#define OL_BEEP_NOTICES_AND_FOOTERS OL_ALWAYS
```

The OPEN LOOK Widget Set

```
#define OL_BEEP_ALWAYS          OL_ALWAYS
#define OL_AUTO_SCROLL_OFF       OL_B_OFF
#define OL_AUTO_SCROLL_HORIZONTAL OL_B_HORIZONTAL
#define OL_AUTO_SCROLL_VERTICAL   OL_B_VERTICAL
#define OL_AUTO_SCROLL_BOTH      OL_B_BOTH
#define OL_GROW_OFF              OL_B_OFF
#define OL_GROW_HORIZONTAL       OL_B_HORIZONTAL
#define OL_GROW_VERTICAL         OL_B_VERTICAL
#define OL_GROW_BOTH             OL_B_BOTH

typedef enum {motionVerify, modVerify, leaveVerify} OlVerifyOpType;
typedef enum {OlsdLeft, OlsdRight} OlScanDirection;
typedef enum {
    OlstPositions, OlstWhiteSpace, OlstEOL, OlstParagraph, OlstLast
} OlScanType;

typedef enum {
    NOTOPEN, READWRITE, READONLY, NEWFILE
} TextFileStatus;

typedef enum {
    EDIT_FAILURE, EDIT_SUCCESS
} EditResult;

typedef enum {
    SCAN_NOTFOUND, SCAN_WWRAPPED, SCAN_FOUND, SCAN_INVALID
} ScanResult;
```

The OPEN LOOK Widget Set

```
typedef enum {
    SAVE_FAILURE, SAVE_SUCCESS
} SaveResult;

#define TEXT_BUFFER_NOP          (0)
#define TEXT_BUFFER_DELETE_START_LINE (1L<<0)
#define TEXT_BUFFER_DELETE_START_CHARS (1L<<1)
#define TEXT_BUFFER_DELETE_END_LINE (1L<<2)
#define TEXT_BUFFER_DELETE_END_CHARS (1L<<3)
#define TEXT_BUFFER_DELETE_JOIN_LINE (1L<<4)
#define TEXT_BUFFER_DELETE_SIMPLE (1L<<5)
#define TEXT_BUFFER_INSERT_SPLIT_LINE (1L<<6)
#define TEXT_BUFFER_INSERT_LINE     (1L<<7)
#define TEXT_BUFFER_INSERT_CHARS   (1L<<8)
#define CHANGE_BAR_WIDTH          3
#define CHANGE_BAR_HEIGHT         18
#define CHANGE_BAR_PAD            7
#define OL_DIM                    1000
#define OL_NORMAL                 1001
#define OL_PROPAGATE_TO_CONTROL_AREA 0x0001
#define OL_PROPAGATE_TO_CATEGORY  0x0002
#define OL_PROPAGATE \
    (OL_PROPAGATE_TO_CONTROL_AREA \
     | OL_PROPAGATE_TO_CATEGORY)
```

The OPEN LOOK Widget Set

Figure 10-2. libxol Data Structures

```
typedef struct _CaptionClassRec *CaptionWidgetClass;
typedef struct _CaptionRec *CaptionWidget;
typedef struct _CategoryClassRec *CategoryWidgetClass;
typedef struct _CategoryRec *CategoryWidget;
typedef struct _CheckBoxClassRec *CheckBoxWidgetClass;
typedef struct _CheckBoxRec *CheckBoxWidget;
typedef int ControlLayout;
typedef int OlSameSize;
typedef struct _ControlClassRec *ControlAreaWidgetClass;
typedef struct _ControlRec *ControlAreaWidget;
typedef struct _EventObjClassRec *EventObjClass;
typedef struct _EventObjRec *EventObj;
typedef struct _ExclusivesClassRec *ExclusivesWidgetClass;
typedef struct _ExclusivesRec *ExclusivesWidget;
typedef struct _FooterPanelClassRec *FooterPanelWidgetClass;
typedef struct _FooterPanelRec *FooterPanelWidget;
typedef struct _FormClassRec * FormWidgetClass;
typedef struct _FormRec * FormWidget;
typedef struct _FormConstraintRec * FormConstraints;
typedef struct _SliderClassRec *GaugeWidgetClass;
typedef struct _SliderRec *GaugeWidget;
typedef struct _HelpClassRec *HelpWidgetClass;
typedef struct _HelpRec *HelpWidget;
typedef struct _ListPaneClassRec*ListPaneWidgetClass;
typedef struct _ListPaneRec*ListPaneWidget;
```

The OPEN LOOK Widget Set

```
typedef struct _MagClassRec*MagWidgetClass;
typedef struct _MagRec*MagWidget;
typedef struct _ManagerClassRec*ManagerWidgetClass;
typedef struct _ManagerRec*ManagerWidget;
typedef struct _MenuShellClassRec *MenuShellWidgetClass;
typedef struct _MenuShellRec *MenuShellWidget;
typedef struct _MenuButtonClassRec *MenuButtonWidgetClass;
typedef struct _MenuButtonRec *MenuButtonWidget;
typedef struct _MenuButtonGadgetClassRec *MenuButtonGadgetClass;
typedef struct _MenuButtonGadgetRec *MenuButtonGadget;
typedef struct _NonexclusivesClassRec *NonexclusivesWidgetClass;
typedef struct _NonexclusivesRec *NonexclusivesWidget;
typedef struct _NoticeShellClassRec*NoticeShellWidgetClass;
typedef struct _NoticeShellRec*NoticeShellWidget;
typedef struct _OblongButtonClassRec *OblongButtonWidgetClass;
typedef struct _OblongButtonRec *OblongButtonWidget;
typedef struct _OblongButtonGadgetClassRec *OblongButtonGadgetClass;
typedef struct _OblongButtonGadgetRec *OblongButtonGadget;
typedef short OlDefine;
typedef unsigned long OlBitMask;
typedef struct _PopupWindowShellClassRec *PopupWindowShellWidgetClass;
typedef struct _PopupWindowShellRec *PopupWindowShellWidget;
typedef struct _PrimitiveClassRec *PrimitiveWidgetClass;
typedef struct _PrimitiveRec *PrimitiveWidget;
typedef struct _PushpinClassRec *PushpinWidgetClass;
typedef struct _PushpinRec *PushpinWidget;
typedef struct _RectButtonClassRec *RectButtonWidgetClass;
```

The OPEN LOOK Widget Set

```
typedef struct _RectButtonRec *RectButtonWidget;
typedef struct _RubberTileClassRec *RubberTileWidgetClass;
typedef struct _RubberTileRec *RubberTileWidget;
typedef struct _ScrollbarClassRec *ScrollbarWidgetClass;
typedef struct _ScrollbarRec *ScrollbarWidget;

typedef struct OlScrollbarVerify {
    int          new_location;
    int          new_page;
    Boolean      ok;
    int          slidermin;
    int          slidermax;
    int          delta;
    Boolean      more_cb_pending;
} OlScrollbarVerify;

typedef struct _ScrolledWindowClassRec *ScrolledWindowWidgetClass;
typedef struct _ScrolledWindowRec *ScrolledWindowWidget;
```

The OPEN LOOK Widget Set

```
typedef struct _OlSWGeometries {  
    Widget      sw;  
    Widget      vsb;  
    Widget      hsb;  
    Dimension   bb_border_width;  
    Dimension   vsb_width;  
    Dimension   vsb_min_height;  
    Dimension   hsb_height;  
    Dimension   hsb_min_width;  
    Dimension   sw_view_width;  
    Dimension   sw_view_height;  
    Dimension   bbc_width;  
    Dimension   bbc_height;  
    Dimension   bbc_real_width;  
    Dimension   bbc_real_height;  
    Boolean     force_hsb;  
    Boolean     force_vsb;  
} OlSWGeometries;  
  
typedef struct _OlListItem {  
    OlDefine    label_type;  
    XtPointer   label;  
    XImage      *glyph;  
    OlBitMask   attr;  
    XtPointer   user_data;  
    unsigned    char       implementation_specific;  
} OlListItem;  
  
typedef struct _OlListToken *OlListToken;
```

The OPEN LOOK Widget Set

```
typedef struct _OlListDelete {
    OlListToken    *tokens;
    Cardinal       num_tokens;
} OlListDelete;

typedef struct _ListClassRec *ScrollingListWidgetClass;
typedef struct _ListRec *ScrollingListWidget;
typedef struct _SliderClassRec *SliderWidgetClass;
typedef struct _SliderRec *SliderWidget;
typedef struct OlSliderVerify {
    int            new_location;
    Boolean        more_cb_pending;
} OlSliderVerify;

typedef struct _StaticTextClassRec *StaticTextWidgetClass;
typedef struct _StaticTextRec *StaticTextWidget;
typedef Dimension *TabTable;
typedef struct {
    OlTextMarginHint    hint;
    XRectangle          *rect;
} OlTextMarginCallData, *OlTextMarginCallDataPointer;

typedef struct {
    Boolean      ok;
    TextPosition current_cursor;
    TextPosition new_cursor;
    TextPosition select_start;
    TextPosition select_end;
} OlTextMotionCallData, *OlTextMotionCallDataPointer;
```

The OPEN LOOK Widget Set

```
typedef struct {
    Boolean      ok;
    TextPosition current_cursor;
    TextPosition select_start;
    TextPosition select_end;
    TextPosition new_cursor;
    TextPosition new_select_start;
    TextPosition new_select_end;
    String       text;
    int          text_length;
} OITextModifyCallData, *OITextModifyCallDataPointer;

typedef struct {
    Boolean      requestor;
    TextPosition new_cursor;
    TextPosition new_select_start;
    TextPosition new_select_end;
    String       inserted;
    String       deleted;
    TextLocation delete_start;
    TextLocation delete_end;
    TextLocation insert_start;
    TextLocation insert_end;
    TextPosition cursor_position;
} OITextPostModifyCallData, *OITextPostModifyCallDataPointer;

typedef struct _TextEditClassRec *TextEditWidgetClass;
typedef struct _TextEditRec *TextEditWidget;
typedef struct _TextFieldClassRec *TextFieldWidgetClass;
typedef struct _TextFieldRec *TextFieldWidget;
```

The OPEN LOOK Widget Set

```
typedef struct {  
    String          string;  
    Boolean         ok;  
    OITextVerifyReason reason;  
} OITextFieldVerify, *OITextFieldVerifyPointer;
```

```
typedef char BufferElement;  
typedef struct _Buffer {  
    int      size;  
    int      used;  
    int      esize;  
    BufferElement *p;  
} Buffer;
```

```
typedef int TextPosition;  
typedef int TextLine;  
typedef int TextPage;  
typedef int TextBlock;  
typedef struct{  
    int      size;  
    int      used;  
    int      esize;  
    TextBlock   *p;  
} BlockTable;
```

```
typedef struct {  
    TextPage    pageindex;  
    unsigned long timestamp;  
} PageQueue;
```

The OPEN LOOK Widget Set

```
typedef struct {
    TextPosition bytes;
    TextLine      lines;
    TextPage      qpos;
    BlockTable   *dpos;
} Page;

typedef struct {
    TextPage      pageindex;
    Buffer        *buffer;
    unsigned long userData;
} Line;

typedef struct {
    int           size;
    int           used;
    int           esize;
    Page         *p;
} PageTable;

typedef struct {
    int           size;
    int           used;
    int           esize;
    Line         *p;
} LineTable;
```

The OPEN LOOK Widget Set

```
typedef struct _TextLocation {
    TextLine          line;
    TextPosition      offset;
    BufferElement    *buffer;
} TextLocation;

typedef int TextUndoHint;
typedef struct _TextUndoItem {
    String            string;
    TextLocation      start;
    TextLocation      end;
    TextUndoHint      hint;
} TextUndoItem;

typedef void (*TextUpdateFunction)();
typedef struct _TextUpdateCallback {
    TextUpdateFunction f;
    caddr_t           d;
} TextUpdateCallback;
```

The OPEN LOOK Widget Set

```
typedef struct _TextBuffer {  
    char          *filename;  
    FILE          *tempfile;  
    TextBlock     blockcnt;  
    TextBlock     blocksize;  
    LineTable     lines;  
    PageTable     pages;  
    BlockTable   *free_list;  
    PageQueue    pqueue[PQLIMIT];  
    TextPage      pagecount;  
    TextPage      pageref;  
    TextPage      curpageno;  
    Buffer        *buffer;  
    char          dirty;  
    TextFileStatus status;  
    int           refcount;  
    TextUpdateCallback *update;  
    TextUndoItem  deleted;  
    TextUndoItem  insert;  
}  
} TextBuffer;
```



CHAPTER 11: The Motif Widget Set



Motif Widget Set

Motif Widget Set

Overview

This chapter identifies binary interfaces for the Motif Widget Set in libXm and libMrm. Source descriptions for the entry points and exported data structures may be found in the *OSF/Motif Programmers Reference, Release 1.1* (Open Software Foundation, 1991.)

The Motif Interfaces

The names listed below in Tables 11-1, 11-2, and 11-3 have been included in SCD 2.1 as the names for the Motif Widget Set OPTIONAL INTERFACES, as entry points and exported data for the reference names `/usr/lib/libXm.so.1` and `/usr/lib/libMrm.so.1`. If the Motif Widget Set is present on a system, it must be present in its entirety. These reference names and their contained name spaces may be used on conforming systems only to implement these OPTIONAL INTERFACES.

Figures 11-1 and 11-2 detail the manifest constants and visible data structures for libXm and for libMrm, respectively.

Motif Widget Set

Table 11-1. Contents of libXm

XmActivateProtocol	XmCreateErrorDialog
XmAddProtocolCallback	XmCreateFileSelectionBox
XmAddProtocols	XmCreateFileSelectionDialog
XmAddTabGroup	XmCreateForm
XmCascadeButtonGadgetHighlight	XmCreateFormDialog
XmCascadeButtonHighlight	XmCreateFrame
XmClipboardCancelCopy	XmCreateInformationDialog
XmClipboardCopy	XmCreateLabel
XmClipboardCopyByName	XmCreateLabelGadget
XmClipboardEndCopy	XmCreateList
XmClipboardEndRetrieve	XmCreateMainWindow
XmClipboardInquireCount	XmCreateMenuBar
XmClipboardInquireFormat	XmCreateMenuShell
XmClipboardInquireLength	XmCreateMessageBox
XmClipboardInquirePendingItems	XmCreateMessageDialog
XmClipboardLock	XmCreateOptionMenu
XmClipboardRegisterFormat	XmCreatePanedWindow
XmClipboardRetrieve	XmCreatePopupMenu
XmClipboardStartCopy	XmCreatePromptDialog
XmClipboardStartRetrieve	XmCreatePulldownMenu
XmClipboardUndoCopy	XmCreatePushButton
XmClipboardUnlock	XmCreatePushButtonGadget
XmClipboardWithdrawFormat	XmCreateQuestionDialog
XmCommandAppendValue	XmCreateRadioBox
XmCommandError	XmCreateRowColumn
XmCommandGetChild	XmCreateScale
XmCommandSetValue	XmCreateScrollBar
XmConvertUnits	XmCreateScrolledList
XmCreateArrowButton	XmCreateScrolledText
XmCreateArrowButtonGadget	XmCreateScrolledWindow
XmCreateBulletinBoard	XmCreateSelectionBox
XmCreateBulletinBoardDialog	XmCreateSelectionDialog
XmCreateCascadeButton	XmCreateSeparator
XmCreateCascadeButtonGadget	XmCreateSeparatorGadget
XmCreateCommand	XmCreateSimpleCheckBox
XmCreateDialogShell	XmCreateSimpleMenuBar
XmCreateDrawingArea	XmCreateSimpleOptionMenu
XmCreateDrawnButton	XmCreateSimplePopupMenu

Motif Widget Set

XmCreateSimplePulldownMenu	XmListDeleteItemsPos
XmCreateSimpleRadioBox	XmListDeletePos
XmCreateText	XmListDeselectAllItems
XmCreateTextField	XmListDeselectItem
XmCreateToggleButton	XmListDeselectPos
XmCreateToggleButtonGadget	XmListGetMatchPos
XmCreateWarningDialog	XmListGetSelectedPos
XmCreateWorkArea	XmListItemExists
XmCreateWorkingDialog	XmListItemPos
XmCvtCTToXmString	XmListReplaceItems
XmCvtStringToUnitType	XmListReplaceItemsPos
XmCvtXmStringToCT	XmListSelectItem
XmDeactivateProtocol	XmListSelectPos
XmDestroyPixmap	XmListSetAddMode
XmFileSelectionBoxGetChild	XmListSetBottomItem
XmFileSelectionDoSearch	XmListSetBottomPos
XmFontListAdd	XmListSetHorizPos
XmFontListCopy	XmListSetItem
XmFontListCreate	XmListSetPos
XmFontListFree	XmMainWindowSep1
XmFontListFreeFontContext	XmMainWindowSep2
XmFontListGetNextFont	XmMainWindowSep3
XmFontListInitFontContext	XmMainWindowSetAreas
XmGetAtomName	XmMenuPosition
XmGetColorCalculation	XmMessageBoxGetChild
XmGetColors	XmOptionButtonGadget
XmGetDestination	XmOptionLabelGadget
XmGetMenuCursor	XmProcessTraversal
XmGetPixmap	XmRemoveProtocolCallback
XmGetPostedFromWidget	XmRemoveProtocols
XmInstallImage	XmRemoveTabGroup
XmInternAtom	XmResolveAllPartOffsets
XmIsMotifWMRunning	XmResolvePartOffsets
XmListAddItem	XmScaleGetValue
XmListAddItemUnselected	XmScaleSetValue
XmListAddItems	XmScrollBarGetValues
XmListDeleteAllItems	XmScrollBarSetValues
XmListDeleteItem	XmScrolledWindowSetAreas
XmListDeleteItems	XmSelectionBoxGetChild

Motif Widget Set

XmSetColorCalculation	XmTextFieldCopy
XmSetFontUnit	XmTextFieldCut
XmSetFontUnits	XmTextFieldGetBaseline
XmSetMenuCursor	XmTextFieldGetEditable
XmSetProtocolHooks	XmTextFieldGetInsertionPosition
XmStringBaseline	XmTextFieldGetLastPosition
XmStringByteCompare	XmTextFieldGetMaxLength
XmStringCompare	XmTextFieldGetSelection
XmStringConcat	XmTextFieldGetSelectionPosition
XmStringCopy	XmTextFieldGetString
XmStringCreate	XmTextFieldInsert
XmStringCreateLtoR	XmTextFieldPaste
XmStringCreateSimple	XmTextFieldPosToXY
XmStringDirectionCreate	XmTextFieldRemove
XmStringDraw	XmTextFieldReplace
XmStringDrawImage	XmTextFieldSetAddMode
XmStringDrawUnderline	XmTextFieldSetEditable
XmStringEmpty	XmTextFieldSetHighlight
XmStringExtent	XmTextFieldSetInsertionPosition
XmStringFree	XmTextFieldSetMaxLength
XmStringFreeContext	XmTextFieldSetSelection
XmStringGetLtoR	XmTextFieldSetString
XmStringGetNextComponent	XmTextFieldShowPosition
XmStringGetNextSegment	XmTextFieldXYToPos
XmStringHasSubstring	XmTextGetBaseLine
XmStringHeight	XmTextGetEditable
XmStringInitContext	XmTextGetInsertionPosition
XmStringLength	XmTextGetLastPosition
XmStringLineCount	XmTextGetMaxLength
XmStringNConcat	XmTextGetSelection
XmStringNCopy	XmTextGetSelectionPosition
XmStringPeekNextComponent	XmTextGetSource
XmStringSegmentCreate	XmTextGetString
XmStringSeparatorCreate	XmTextGetTopCharacter
XmStringWidth	XmTextInsert
XmTextClearSelection	XmTextPaste
XmTextCopy	XmTextPosToXY
XmTextCut	XmTextRemove
XmTextFieldClearSelection	XmTextReplace

Motif Widget Set

```
XmTextScroll  
XmTextSetAddMode  
XmTextSetEditable  
XmTextSetHighlight  
XmTextSetInsertionPosition  
XmTextSetMaxLength  
XmTextSetSelection  
XmTextSetSource  
XmTextSetString  
XmTextSetTopCharacter  
XmTextShowPosition  
XmTextXYToPos  
XmToggleButtonGadgetGetState  
XmToggleButtonGadgetSetState  
XmToggleButtonGetState  
XmToggleButtonSetState  
XmTrackingLocate  
XmUninstallImage  
XmUpdateDisplay  
XmVaCreateSimpleCheckBox  
XmVaCreateSimpleMenuBar  
XmVaCreateSimpleOptionMenu  
XmVaCreateSimplePopupMenu  
XmVaCreateSimplePulldownMenu  
XmVaCreateSimpleRadioBox
```

Motif Widget Set

Table 11-2. Exported Data for Motif 1.1

vendorShellClassRec[94]	xmMessageBoxClassRec[d4]
vendorShellWidgetClass[4]	xmMessageBoxWidgetClass[4]
xmArrowButtonClassRec[94]	xmPanedWindowClassRec[c4]
xmArrowButtonGadgetClass[4]	xmPanedWindowWidgetClass[4]
xmArrowButtonGadgetClassRec[9c]	xmPrimitiveClassRec[90]
xmArrowButtonWidgetClass[4]	xmPrimitiveWidgetClass[4]
xmBulletinBoardClassRec[d0]	xmPushButtonClassRec[a4]
xmBulletinBoardWidgetClass[4]	xmPushButtonGadgetClass[4]
xmCascadeButtonClassRec[a4]	xmPushButtonGadgetClassRec[a8]
xmCascadeButtonGadgetClass[4]	xmPushButtonWidgetClass[4]
xmCascadeButtonGadgetClassRec[a8]	xmRowColumnClassRec[d0]
xmCascadeButtonWidgetClass[4]	xmRowColumnWidgetClass[4]
xmCommandClassRec[dc]	xmScaleClassRec[c4]
xmCommandWidgetClass[4]	xmScaleWidgetClass[4]
xmDialogShellClassRec[9c]	xmScrollBarClassRec[94]
xmDialogShellWidgetClass[4]	xmScrollBarWidgetClass[4]
xmDrawingAreaClassRec[c4]	xmScrolledWindowClassRec[c4]
xmDrawingAreaWidgetClass[4]	xmScrolledWindowWidgetClass[4]
xmDrawnButtonClassRec[a4]	xmSelectionBoxClassRec[d8]
xmDrawnButtonWidgetClass[4]	xmSelectionBoxWidgetClass[4]
xmFileSelectionBoxClassRec[dc]	xmSeparatorClassRec[94]
xmFileSelectionBoxWidgetClass[4]	xmSeparatorGadgetClass[4]
xmFormClassRec[d4]	xmSeparatorGadgetClassRec[9c]
xmFormWidgetClass[4]	xmSeparatorWidgetClass[4]
xmFrameClassRec[c4]	xmTextClassRec[94]
xmFrameWidgetClass[4]	xmTextWidgetClass[4]
xmGadgetClass[4]	xmToggleButtonClassRec[a4]
xmGadgetClassRec[98]	xmToggleButtonGadgetClass[4]
xmLabelClassRec[a0]	xmToggleButtonGadgetClassRec[a8]
xmLabelGadgetClass[4]	xmToggleButtonWidgetClass[4]
xmLabelGadgetClassRec[a4]	
xmLabelWidgetClass[4]	
xmListClassRec[94]	
xmListWidgetClass[4]	
xmMainWindowClassRec[c8]	
xmMainWindowWidgetClass[4]	
xmManagerClassRec[c0]	
xmManagerWidgetClass[4]	
xmMenuShellClassRec[a4]	
xmMenuShellWidgetClass[4]	

Motif Widget Set

Table 11-3. libMrm Contents

MrmCloseHierarchy
MrmFetchColorLiteral
MrmFetchIconLiteral
MrmFetchInterfaceModule
MrmFetchLiteral
MrmFetchSetValues
MrmFetchWidget
MrmFetchWidgetOverride
MrmInitialize
MrmOpenHierarchy
MrmRegisterClass
MrmRegisterNames
MrmRegisterNamesInHierarchy

Motif Widget Set

Figure 11-1. Motif Manifest Constants and Data Structures

```
typedef struct _XmObjectClassExtRec{
    XtPointer    next_extension;
    XrmQuark    record_type;
    long        version;
    Cardinal    record_size;
}XmObjectClassExtRec, *XmObjectClassExt;

typedef struct _XmGenericClassExtRec{
    XtPointer    next_extension;
    XrmQuark    record_type;
    long        version;
    Cardinal    record_size;
}XmGenericClassExtRec, *XmGenericClassExt;
```

Motif Widget Set

```
typedef struct _XmBaseClassExtRec{
    XtPointer          next_extension;
    XrmQuark           record_type;
    long               version;
    Cardinal           record_size;
    XtInitProc         initializePrehook;
    XtSetValuesFunc    setValuesPrehook;
    XtInitProc         initializePosthook;
    XtSetValuesFunc    setValuesPosthook;
    WidgetClass        secondaryObjectClass;
    XtInitProc         secondaryObjectCreate;
    XmGetSecResDataFunc getSecResData;
    unsigned char      flags[32];
    XtArgsProc         getValuesPrehook;
    XtArgsProc         getValuesPosthook;
    XtWidgetClassProc classPartInitPrehook;
    XtWidgetClassProc classPartInitPosthook;
    XtResourceList     ext_resources;
    XtResourceList     compiled_ext_resources;
    Cardinal           num_ext_resources;
    Boolean            use_sub_resources;
}XmBaseClassExtRec, *XmBaseClassExt;

typedef struct _XmWidgetExtDataRec{
    Widget      widget;
    Widget      reqWidget;
    Widget      oldWidget;
}XmWidgetExtDataRec, *XmWidgetExtData;
```

Motif Widget Set

```
typedef struct _XmWrapperDataRec{
    XtInitProc          initializeLeaf;
    XtSetValuesFunc     setValuesLeaf;
    XtArgsProc          getValuesLeaf;
    Cardinal            initializeNestingLevel;
    Cardinal            setValuesNestingLevel;
    Cardinal            getValuesNestingLevel;
    XtRealizeProc       realize;
    XtWidgetClassProc   classPartInitLeaf;
}XmWrapperDataRec, *XmWrapperData;

extern XrmQuark XmQmotif;
extern int _XmInheritClass;

#define ClipboardFail      0
#define ClipboardSuccess    1
#define ClipboardTruncate   2
#define ClipboardLocked     4
#define ClipboardBadFormat  5
#define ClipboardNoData     6

typedef struct {
    int DataId;
    int PrivateId;
} XmClipboardPendingRec, *XmClipboardPendingList;

#define XmCACHE_EXTENSION    1
#define XmDESKTOP_EXTENSION  2
#define XmSHELL_EXTENSION    3
```

Motif Widget Set

```
#define XmPROTOCOL_EXTENSION 4
#define XmDEFAULT_EXTENSION 5
#define XmINITIAL 0
#define XmADDITION 1
#define XmMODIFICATION 2

typedef struct {
    long      flags;
    long      functions;
    long      decorations;
    int       input_mode;
} MotifWmHints;

typedef MotifWmHints MwmHints;

#define MWM_HINTS_FUNCTIONS (1L << 0)
#define MWM_HINTS_DECORATIONS (1L << 1)
#define MWM_HINTS_INPUT_MODE (1L << 2)
#define MWM_FUNC_ALL (1L << 0)
#define MWM_FUNC_RESIZE (1L << 1)
#define MWM_FUNC_MOVE (1L << 2)
#define MWM_FUNC_MINIMIZE (1L << 3)
#define MWM_FUNC_MAXIMIZE (1L << 4)
#define MWM_FUNC_CLOSE (1L << 5)
#define MWM_DECOR_ALL (1L << 0)
#define MWM_DECOR_BORDER (1L << 1)
#define MWM_DECOR_RESIZEH (1L << 2)
#define MWM_DECOR_TITLE (1L << 3)
#define MWM_DECOR_MENU (1L << 4)
```

Motif Widget Set

```
#define MWM_DECOR_MINIMIZE (1L << 5)
#define MWM_DECOR_MAXIMIZE (1L << 6)
#define MWM_INPUT_MODELESS 0
#define MWM_INPUT_PRIMARY_APPLICATION_MODAL 1
#define MWM_INPUT_SYSTEM_MODAL 2
#define MWM_INPUT_FULL_APPLICATION_MODAL 3
#define MWM_INPUT_APPLICATION_MODAL \
    MWM_INPUT_PRIMARY_APPLICATION_MODAL

typedef struct {
    long      flags;
    Window    wm_window;
} MotifWmInfo;

typedef MotifWmInfo MwmInfo;

#define MWM_INFO_STARTUP_STANDARD (1L << 0)
#define MWM_INFO_STARTUP_CUSTOM  (1L << 1)

typedef struct {
    CARD32    flags;
    CARD32    functions;
    CARD32    decorations;
    INT32     inputMode;
} PropMotifWmHints;

typedef PropMotifWmHints PropMwmHints;
#define PROP_MOTIF_WM_HINTS_ELEMENTS 4
#define PROP_MWM_HINTS_ELEMENTS \
```

Motif Widget Set

```
PROP_MOTIF_WM_HINTS_ELEMENTS

typedef struct {
    CARD32      flags;
    CARD32      wmWindow;
} PropMotifWmInfo;

typedef PropMotifWmInfo PropMwmInfo;
#define     PROP_MOTIF_WM_INFO_ELEMENTS    2
#define     PROP_MWM_INFO_ELEMENTS \
                    PROP_MOTIF_WM_INFO_ELEMENTS
#define     XmCR_WM_PROTOCOLS           666

typedef struct _XmFocusMovedCallbackStruct{
    int          reason;
    XEvent       *event;
    Boolean      cont;
    Widget       old, new;
    unsigned char focus_policy;
} XmFocusMovedCallbackStruct, *XmFocusMovedCallback;

typedef struct _XmFocusDataRec *XmFocusData;

typedef struct _XtTypedArg {
    String      name;
    String      type;
    XtArgVal   value;
    int         size;
} XtTypedArg;
```

Motif Widget Set

```
typedef struct _XtTypedArg* XtTypedArgList;
#define XmDESTROY 0
#define XmUNMAP 1
#define XmDO_NOTHING 2
#define osfXK_BackSpace 0x1004FF08
#define osfXK_Insert 0x1004FF63
#define osfXK_Delete 0x1004FFFF
#define osfXK_Copy 0x1004FF02
#define osfXK_Cut 0x1004FF03
#define osfXK_Paste 0x1004FF04
#define osfXK_AddMode 0x1004FF31
#define osfXK_PrimaryPaste 0x1004FF32
#define osfXK_QuickPaste 0x1004FF33
#define osfXK_PageUp 0x1004FF41
#define osfXK_PageDown 0x1004FF42
#define osfXK_EndLine 0x1004FF57
#define osfXK_BeginLine 0x1004FF58
#define osfXK_Activate 0x1004FF44
#define osfXK_MenuBar 0x1004FF45
#define osfXK_Clear 0x1004FF0B
#define osfXK_Cancel 0x1004FF69
#define osfXK_Help 0x1004FF6A
#define osfXK_Menu 0x1004FF67
#define osfXK_Select 0x1004FF60
#define osfXK_Undo 0x1004FF65
#define osfXK_Left 0x1004FF51
```

Motif Widget Set

```
#define osfXK_Up 0x1004FF52
#define osfXK_Right 0x1004FF53
#define osfXK_Down 0x1004FF54
#define XmVERSION 1
#define XmREVISION 1
#define XmVersion (XmVERSION * 1000 + XmREVISION)
extern int xmUseVersion;
#define XmUNSPECIFIED_PIXMAP 2
#define XmSTRING_DIRECTION_L_TO_R 0
#define XmSTRING_DIRECTION_R_TO_L 1
#define XmSTRING_DIRECTION_DEFAULT 255
typedef char * XmStringCharSet;
typedef unsigned char XmStringComponentType;
typedef unsigned char XmStringDirection;
#define XmSTRING_COMPONENT_UNKNOWN 0
#define XmSTRING_COMPONENT_CHARSET 1
#define XmSTRING_COMPONENT_TEXT 2
#define XmSTRING_COMPONENT_DIRECTION 3
#define XmSTRING_COMPONENT_SEPARATOR 4
#define XmSTRING_COMPONENT_END 126
#define XmSTRING_COMPONENT_USER_BEGIN 128
#define XmSTRING_COMPONENT_USER_END 255
extern WidgetClass xmPrimitiveWidgetClass;
typedef struct _XmPrimitiveClassRec * XmPrimitiveWidgetClass;
typedef struct _XmPrimitiveRec * XmPrimitiveWidget;
extern WidgetClass xmGadgetClass;
typedef struct _XmGadgetClassRec * XmGadgetClass;
```

Motif Widget Set

```
typedef struct _XmGadgetRec * XmGadget;
extern      WidgetClass          xmManagerWidgetClass;
typedef struct _XmManagerClassRec * XmManagerWidgetClass;
typedef struct _XmManagerRec * XmManagerWidget;
#define     XmCHANGE_ALL           0
#define     XmCHANGE_NONE          1
#define     XmCHANGE_WIDTH         2
#define     XmCHANGE_HEIGHT        3
#define     XmPIXELS               0
#define     Xm100TH_MILLIMETERS    1
#define     Xm1000TH_INCHES         2
#define     Xm100TH_POINTS          3
#define     Xm100TH_FONT_UNITS      4
#define     XmNONE                 0
#define     XmTAB_GROUP             1
#define     XmSTICKY_TAB_GROUP      2
#define     XmEXCLUSIVE_TAB_GROUPS  3
#define     XmDYNAMIC_DEFAULT_TAB_GROUP 255
#define     XmNO_ORIENTATION        0
#define     XmVERTICAL              1
#define     XmHORIZONTAL             2
#define     XmWORK_AREA              0
#define     XmMENU_BAR                1
#define     XmMENU_PULLDOWN          2
#define     XmMENU_POPUP              3
#define     XmMENU_OPTION              4
#define     XmNO_PACKING              0
```

Motif Widget Set

```
#define XmPACK_TIGHT 1
#define XmPACK_COLUMN 2
#define XmPACK_NONE 3
#define XmALIGNMENT_BEGINNING 0
#define XmALIGNMENT_CENTER 1
#define XmALIGNMENT_END 2
#define XmN_OF_MANY 1
#define XmONE_OF_MANY 2
#define XmATTACH_NONE 0
#define XmATTACH_FORM 1
#define XmATTACH_OPPOSITE_FORM 2
#define XmATTACH_WIDGET 3
#define XmATTACH_OPPOSITE_WIDGET 4
#define XmATTACH_POSITION 5
#define XmATTACH_SELF 6
#define XmRESIZE_NONE 0
#define XmRESIZE_GROW 1
#define XmRESIZE_ANY 2
#define XmCR_NONE 0
#define XmCR_HELP 1
#define XmCR_VALUE_CHANGED 2
#define XmCR_INCREMENT 3
#define XmCR_DECREMENT 4
#define XmCR_PAGE_INCREMENT 5
#define XmCR_PAGE_DECREMENT 6
#define XmCR_TO_TOP 7
#define XmCR_TO_BOTTOM 8
```

Motif Widget Set

#define	XmCR_DRAG	9
#define	XmCR_ACTIVATE	10
#define	XmCR_ARM	11
#define	XmCR_DISARM	12
#define	XmCR_MAP	16
#define	XmCR_UNMAP	17
#define	XmCR_FOCUS	18
#define	XmCR_LOSING_FOCUS	19
#define	XmCR MODIFYING_TEXT_VALUE	20
#define	XmCR_MOVING_INSERT_CURSOR	21
#define	XmCR_EXECUTE	22
#define	XmCR_SINGLE_SELECT	23
#define	XmCR_MULTIPLE_SELECT	24
#define	XmCR_EXTENDED_SELECT	25
#define	XmCR_BROWSE_SELECT	26
#define	XmCR_DEFAULT_ACTION	27
#define	XmCR_CLIPBOARD_DATA_REQUEST	28
#define	XmCR_CLIPBOARD_DATA_DELETE	29
#define	XmCR_CASCADING	30
#define	XmCR_OK	31
#define	XmCR_CANCEL	32
#define	XmCR_APPLY	34
#define	XmCR_NO_MATCH	35
#define	XmCR_COMMAND_ENTERED	36
#define	XmCR_COMMAND_CHANGED	37
#define	XmCR_EXPOSE	38
#define	XmCR_RESIZE	39

Motif Widget Set

```
#define XmCR_INPUT 40
#define XmCR_GAIN_PRIMARY 41
#define XmCR_LOSE_PRIMARY 42
#define XmCR_CREATE 43
#define XmCR_PROTOCOLS 6666

typedef struct {
    int reason;
    XEvent *event;
} XmAnyCallbackStruct;

typedef struct {
    int reason;
    XEvent *event;
    int click_count;
} XmArrowButtonCallbackStruct;

typedef struct {
    int reason;
    XEvent *event;
    Window window;
} XmDrawingAreaCallbackStruct;

typedef struct {
    int reason;
    XEvent *event;
    Window window;
    int click_count;
} XmDrawnButtonCallbackStruct;
```

Motif Widget Set

```
typedef struct {
    int          reason;
    XEvent      *event;
    int          click_count;
} XmPushButtonCallbackStruct;

typedef struct {
    int          reason;
    XEvent      *event;
    Widget       widget;
    char         *data;
    char         *callbackstruct;
} XmRowColumnCallbackStruct;

typedef struct {
    int          reason;
    XEvent      * event;
    int          value;
    int          pixel;
} XmScrollBarCallbackStruct;

typedef struct {
    int          reason;
    XEvent      * event;
    int          set;
} XmToggleButtonCallbackStruct;
```

Motif Widget Set

```
typedef struct {
    int          reason;
    XEvent      *event;
    XmString    item;
    int          item_length;
    int          item_position;
    XmString    *selected_items;
    int          selected_item_count;
    int          *selected_item_positions;
    char         selection_type;
} XmListCallbackStruct;

typedef struct {
    int reason;
    XEvent      *event;
    XmString    value;
    int          length;
} XmSelectionBoxCallbackStruct;

typedef struct {
    int          reason;
    XEvent      *event;
    XmString    value;
    int          length;
} XmCommandCallbackStruct;
```

Motif Widget Set

```
typedef struct {  
    int          reason;  
    XEvent      *event;  
    XmString    value;  
    int          length;  
    XmString    mask;  
    int          mask_length;  
    XmString    dir ;  
    int          dir_length ;  
    XmString    pattern ;  
    int          pattern_length ;  
} XmFileSelectionBoxCallbackStruct;  
  
typedef struct {  
    int          reason;  
    XEvent      * event;  
    int          value;  
} XmScaleCallbackStruct;  
  
#define XmMULTICLICK_DISCARD 0  
#define XmMULTICLICK_KEEP    1  
#define XmSHADOW_IN          7  
#define XmSHADOW_OUT         8  
#define XmARROW_UP           0  
#define XmARROW_DOWN         1  
#define XmARROW_LEFT          2  
#define XmARROW_RIGHT         3  
#define XmNO_LINE            0  
#define XmSINGLE_LINE         1
```

Motif Widget Set

```
#define XmDOUBLE_LINE 2
#define XmSINGLE_DASHED_LINE 3
#define XmDOUBLE_DASHED_LINE 4
#define XmSHADOWETCHED_IN 5
#define XmSHADOWETCHED_OUT 6
#define XmPIXMAP 1
#define XmSTRING 2
#define XmMAX_ON_TOP 0
#define XmMAX_ON_BOTTOM 1
#define XmMAX_ON_LEFT 2
#define XmMAX_ON_RIGHT 3
#define XmSINGLE_SELECT 0
#define XmMULTIPLE_SELECT 1
#define XmEXTENDED_SELECT 2
#define XmBROWSE_SELECT 3
#define XmSTATIC 0
#define XmDYNAMIC 1
#define XmVARIABLE 0
#define XmCONSTANT 1
#define XmRESIZE_IF_POSSIBLE 2
#define XmAUTOMATIC 0
#define XmAPPLICATION_DEFINED 1
#define XmAS_NEEDED 1
#define SW_TOP 1
#define SW_BOTTOM 0
#define SW_LEFT 2
#define SW_RIGHT 0
```

Motif Widget Set

```
#define XmTOP_LEFT           (SW_TOP | SW_LEFT)
#define XmBOTTOM_LEFT          (SW_BOTTOM | SW_LEFT)
#define XmTOP_RIGHT            (SW_TOP | SW_RIGHT)
#define XmBOTTOM_RIGHT          (SW_BOTTOM | SW_RIGHT)
#define XmCOMMAND_ABOVE_WORKSPACE    0
#define XmCOMMAND_BELOW_WORKSPACE   1
#define XmMULTI_LINE_EDIT0
#define XmSINGLE_LINE_EDIT1
typedef long XmTextPosition;
typedef Atom XmTextFormat;
#define FMT8BIT ((XmTextFormat) XA_STRING) /* 8-bit text. */
#define FMT16BIT ((XmTextFormat)2) /* 16-bit text. */
typedef enum {
    XmSELECT_POSITION, XmSELECT_WHITESPACE, XmSELECT_WORD,
    XmSELECT_LINE, XmSELECT_ALL, XmSELECT_PARAGRAPH
} XmTextScanType;

typedef enum {
    XmHIGHLIGHT_NORMAL, XmHIGHLIGHT_SELECTED,
    XmHIGHLIGHT_SECONDARY_SELECTED
} XmHighlightMode;

typedef struct {
    char             *ptr;
    int              length;
    XmTextFormat     format;
} XmTextBlockRec, *XmTextBlock;
```

Motif Widget Set

```
typedef struct{
    int          reason;
    XEvent      *event;
    Boolean     doit;
    long         currInsert, newInsert;
    long         startPos, endPos;
    XmTextBlock text;
} XmTextVerifyCallbackStruct, *XmTextVerifyPtr;

#define XmDIALOG_NONE           0
#define XmDIALOG_APPLY_BUTTON   1
#define XmDIALOG_CANCEL_BUTTON  2
#define XmDIALOG_DEFAULT_BUTTON 3
#define XmDIALOG_OK_BUTTON      4
#define XmDIALOG_FILTER_LABEL   5
#define XmDIALOG_FILTER_TEXT    6
#define XmDIALOG_HELP_BUTTON    7
#define XmDIALOG_LIST            8
#define XmDIALOG_HISTORY_LIST   XmDIALOG_LIST
#define XmDIALOG_LIST_LABEL     9
#define XmDIALOG_MESSAGE_LABEL  10
#define XmDIALOG_SELECTION_LABEL 11
#define XmDIALOG_PROMPT_LABEL \
                           XmDIALOG_SELECTION_LABEL
#define XmDIALOG_SYMBOL_LABEL   12
#define XmDIALOG_TEXT           13
#define XmDIALOG_VALUE_TEXT     XmDIALOG_TEXT
#define XmDIALOG_COMMAND_TEXT   XmDIALOG_TEXT
```

Motif Widget Set

```
#define XmDIALOG_SEPARATOR          14
#define XmDIALOG_DIR_LIST           15
#define XmDIALOG_DIR_LIST_LABEL     16
#define XmDIALOG_FILE_LIST          XmDIALOG_LIST
#define XmDIALOG_FILE_LIST_LABEL    XmDIALOG_LIST_LABEL
#define XmDIALOG_MODELESS           0
#define XmDIALOG_PRIMARY_APPLICATION_MODAL 1
#define XmDIALOG_FULL_APPLICATION_MODAL   2
#define XmDIALOG_SYSTEM_MODAL        3
#define XmDIALOG_APPLICATION_MODAL    XmDIALOG_PRIMARY_APPLICATION_MODAL
#define XmFILE_DIRECTORY             (1 << 0)
#define XmFILE_REGULAR               (1 << 1)
#define XmFILE_ANY_TYPE(XmFILE_DIRECTORY | XmFILE_REGULAR)
#define XmDIALOG_WORK_AREA           0
#define XmDIALOG_PROMPT              1
#define XmDIALOG_SELECTION            2
#define XmDIALOG_COMMAND              3
#define XmDIALOG_FILE_SELECTION      4
#define XmDIALOG_ERROR                1
#define XmDIALOG_INFORMATION          2
#define XmDIALOG_MESSAGE              3
#define XmDIALOG_QUESTION             4
#define XmDIALOG_WARNING              5
#define XmDIALOG_WORKING              6
#define XmTRAVERSE_CURRENT            0
#define XmTRAVERSE_NEXT                1
#define XmTRAVERSE_PREV                2
```

Motif Widget Set

```
#define XmTRAVERSE_HOME 3
#define XmTRAVERSE_NEXT_TAB_GROUP 4
#define XmTRAVERSE_PREV_TAB_GROUP 5
#define XmTRAVERSE_UP 6
#define XmTRAVERSE_DOWN 7
#define XmTRAVERSE_LEFT 8
#define XmTRAVERSE_RIGHT 9

typedef unsigned char XmButtonType;
typedef XmButtonType * XmButtonTypeTable;
typedef KeySym * XmKeySymTable;
typedef XmStringCharSet * XmString CharSetTable;
#define XmPUSHBUTTON 1
#define XmTOGGLEBUTTON 2
#define XmCHECKBUTTON 2
#define XmRADIOBUTTON 3
#define XmCASCADEBUTTON 4
#define XmSEPARATOR 5
#define XmDOUBLE_SEPARATOR 6
#define XmTITLE 7

typedef XtPointer
    (*XmResourceBaseProc) (Widget widget, XtPointer client_data);
```

Motif Widget Set

```
typedef struct _XmSecondaryResourceDataRec {  
    XmResourceBaseProc    base_proc;  
    XtPointer             client_data;  
    String                name;  
    String                res_class;  
    XtResourceList        resources;  
    Cardinal              num_resources;  
}XmSecondaryResourceDataRec, *XmSecondaryResourceData;  
  
typedef long XmOffset;  
typedef XmOffset *XmOffsetPtr;
```

Motif Widget Set

Figure 11-2. libMrm Manifest Constants and Visible Structures

```
#define MrmSUCCESS 1
#define MrmCREATE_NEW 3
#define MrmINDEX_RETRY 5
#define MrmINDEX_GT 7
#define MrmINDEX_LT 9
#define MrmPARTIAL_SUCCESS 11
#define MrmFAILURE 0
#define MrmNOT_FOUND 2
#define MrmEXISTS 4
#define MrmNUL_GROUP 6
#define MrmNUL_TYPE 8
#define MrmWRONG_GROUP 10
#define MrmWRONG_TYPE 12
#define MrmOUT_OF_RANGE 14
#define MrmBAD_RECORD 16
#define MrmNULL_DATA 18
#define MrmBAD_DATA_INDEX 20
#define MrmBAD_ORDER 22
#define MrmBAD_CONTEXT 24
#define MrmNOT_VALID 26
#define MrmBAD_BTREE 28
#define MrmBAD_WIDGET_REC 30
#define MrmBAD_CLASS_TYPE 32
#define MrmNO_CLASS_NAME 34
#define MrmTOO_MANY 36
```

Motif Widget Set

#define	MrmBAD_IF_MODULE	38
#define	MrmNULL_DESC	40
#define	MrmOUT_OF_BOUNDS	42
#define	MrmBAD_COMPRESS	44
#define	MrmBAD_ARG_TYPE	46
#define	MrmNOT_IMP	48
#define	MrmNULL_INDEX	50
#define	MrmBAD_KEY_TYPE	52
#define	MrmBAD_CALLBACK	54
#define	MrmNULL_ROUTINE	56
#define	MrmVEC_TOO_BIG	58
#define	MrmBAD_HIERARCHY	60
#define	MrmBAD_CLASS_CODE	62
#define	MrmDISPLAY_NOT_OPENED	63
#define	MrmNcreateCallback	"createCallback"
#define	MrmCR_CREATE	XmCR_CREATE
#define	MrmwcUnknown	1
#define	MrmRtypeMin	1
#define	MrmRtypeInteger	1
#define	MrmRtypeBoolean	2
#define	MrmRtypeChar8	3
#define	MrmRtypeChar8Vector	4
#define	MrmRtypeCString	5
#define	MrmRtypeCStringVector	6
#define	MrmRtypeFloat	7

Motif Widget Set

#define	MrmRtypeCallback	9
#define	MrmRtypePixmapImage	10
#define	MrmRtypePixmapDDIF	11
#define	MrmRtypeResource	12
#define	MrmRtypeNull	13
#define	MrmRtypeAddrName	14
#define	MrmRtypeIconImage	15
#define	MrmRtypeFont	16
#define	MrmRtypeFontList	17
#define	MrmRtypeColor	18
#define	MrmRtypeColorTable	19
#define	MrmRtypeAny	20
#define	MrmRtypeTransTable	21
#define	MrmRtypeClassRecName	22
#define	MrmRtypeIntegerVector	23
#define	MrmRtypeXBitmapFile	24
#define	MrmRtypeCountedVector	25
#define	MrmRtypeKeysym	26
#define	MrmRtypeSingleFloat	27
#define	MrmRtypeMax	27

typedef	short int	MrmCode ;
typedef	char	MrmSCode ;
typedef	unsigned short int	MrmOffset ;
typedef	short int	MrmType ;
typedef	unsigned short int	MrmSize ;

Motif Widget Set

```
typedef    short int          MrmCount ;
typedef    unsigned char       MrmFlag ;
typedef    long int           MrmResource_id ;
typedef    short int          MrmGroup ;

#define      MrmMaxResourceSize 65535

#define      MrmOsOpenParamVersion 1

typedef struct {
    Cardinal   version;
    char        *default_fname;
    union {
        unsigned long  related_nam;
        Boolean       clobber_flg;
    } nam_flg;
    Display     *display;
} MrmOsOpenParam, *MrmOsOpenParamPtr ;

typedef struct MrmHierarchyDescStruct *MrmHierarchy;

typedef struct {
    String      name ;
    caddr_t     value ;
} MRMRegisterArg, MrmRegisterArg, *MrmRegisterArglist ;

#define      URMwcUnknown      1
```



CHAPTER 12: CD-ROM Support



CD-ROM Support

Overview

This chapter defines support for using CD-ROM medium for physical distribution of SCD-conforming software. It is a REQUIRED INTERFACE for the use of the CD-ROM medium. However, it is not a requirement that the CD-ROM medium be used for software distribution, nor that conforming systems provide access to CD-ROM hardware.

CD-ROM Medium

CD-ROM medium recorded in the format specified in *ISO/IEC 10149: Data Interchange for read-only 120mm optical data disk (CD-ROM)* is added to the list of approved media on page 2-1 of the *System V Application Binary Interface, SPARC Processor Supplement*.

The information on the media must be represented either

- serially as the data stream created using `dd(AU_CMD)` or `cpio(BU_CMD)` utilities; or
- as file structured data that must be represented as described in *ISO 9660: 1988 - Volume and file structure of CD-ROM for information interchange*.

CD-ROM Support



Index



Index

Symbols

.div 4-3
.mul 4-3
.rem 4-3
.stret1 4-3
.stret2 4-3
.stret4 4-3
.stret8 4-3
.udiv 4-3
.umul 4-3
.urem 4-3
/dev/console 2-5
/dev/null 2-5
/dev/tty 2-5
/dev/zero 2-5
— assert 5-2, 5-3
— dtou 4-3
— filbuf 5-2
— flsbuf 5-2
— ftou 4-3
— tolower 5-2
— toupper 5-2
— exit 4-2
— Q_add 4-3
— Q_cmp 4-3
— Q_cmpe 4-3
— Q_div 4-3
— Q_dtoq 4-3
— Q_feq 4-3
— Q_fge 4-3
— Q_fgt 4-3
— Q_fle 4-3
— Q_flt 4-3
— Q_fne 4-3
— Q_itoq 4-3
— Q_mul 4-3
— Q_neg 4-3
— Q_qtod 4-3
— Q_qtoi 4-3
— Q_qtos 4-3
— Q_qtou 4-3
— Q_sqrt 4-3
— Q_stoq 4-3
— Q_sub 4-3
— Q_utoq 4-3
— Xdebug 8-8
— xftw 5-2

A

abbrevMenuButtonClassRec 10-4
abbrevMenuButtonWidgetClass 10-4
ABI
 generic 1-2
 processor specific 1-2
ABI Errata 2-1
abort 5-2
abs 5-2
access 4-2
acct 4-2
addseverity 5-2, 5-3
alarm 4-2
AllocateBuffer 10-2
AllocateTextBuffer 10-2
Application Binary Interface 1-1
Application Program Commands 7-1
applicationShellClassRec 9-5
applicationShellWidgetClass 9-5
asctime 5-2
atexit 4-2
atof 5-2
atoi 5-2
atol 5-2
Atom 8-30
audience vii
 application developers 1-1
 system implementors 1-1

Index

auth_uxparms 2-2
authdes_getucred 6-3
authdes_seccreate 6-3
Authentication 2-2
authnone_create 6-3
authsys_create 6-3
authsys_create_default 6-3

B

BA_ENV 4-1
BA_LIB 4-1
BA_OS 4-1
BackwardScanTextBuffer 10-2
baseWindowShellClassRec 10-4
baseWindowShellWidgetClass 10-4
BlockTable 10-19
bsearch 5-2
Buffer 10-19
BufferElement 10-19
bulletinBoardClassRec 10-4
bulletinBoardWidgetClass 10-4
buttonClassRec 10-4
buttonGadgetClass 10-4
buttonGadgetClassRec 10-4
buttonWidgetClass 10-4

C

C library 5-1
calloc 4-2
captionClassRec 10-4
CaptionWidget 10-13
CaptionWidgetClass 10-13
captionWidgetClass 10-4
cat 7-2
catclose 4-2
categoryClassRec 10-4
CategoryWidget 10-13
CategoryWidgetClass 10-13
categoryWidgetClass 10-4

catgets 4-2
catopen 4-2
cd 7-2
cfgetispeed 5-2
cfgetospeed 5-2
cfsetispeed 5-2
cfsetospeed 5-2
chdir 4-2
checkBoxClassRec 10-4
CheckBoxWidget 10-13
CheckBoxWidgetClass 10-13
checkBoxWidgetClass 10-4
chgrp 7-2
chmod 4-2, 7-2
chown 4-2, 7-2
chroot 4-2
clearerr 5-2
clnt_create 6-3
clnt_dg_create 6-3
clnt_pcreateerror 6-3
clnt_perrno 6-3
clnt_perror 6-3
clnt_raw_create 6-3
clnt_spcreateerror 6-3
clnt_sperrno 6-3
clnt_sperror 6-3
clnt_tli_create 6-3
clnt_tp_create 6-3
clnt_vc_create 6-3
clock 5-2
close 4-2
closedir 4-2
cmp 7-2
Colormap 8-30
compliance testing 1-3
 examples 1-3
compositeClassRec 9-5
compositeWidgetClass 9-5
constraintClassRec 9-5

Index

constraintWidgetClass 9-5
contents of SCD 2.1 vii
ControlAreaWidget 10-13
ControlAreaWidgetClass 10-13
controlAreaWidgetClass 10-4
controlClassRec 10-4
ControlLayout 10-13
CopyBuffer 10-2
CopyTextBufferBlock 10-2
coreWidgetClass 9-5
cp 7-2
cpio 7-2
creat 4-2
ctermid 5-2
ctime 5-2
Cursor 8-30
cuserid 5-2

D

Data Structures
 Motif 11-8
 Xlib 8-10, 8-30, 8-46, 8-48
 Xol 10-13
date 7-2
dd 7-2
definition of audience vii
definition of purpose vii
Depth 8-12
df 7-2
difftime 5-2
Display 8-18
div 5-2
Drawable 8-30
dup 4-2
dup2 5-2
dynamic library
 libnsl 6-1, 9-1
 libsys 4-1
 libX 8-1

Dynamic Linking 2-1, 2-3
Dynamically linking, something 2-3

E

echo 7-2
ed 7-2
EditResult 10-11
EndCurrentTextBufferWord 10-2
endnetconfig 6-3
endnetpath 6-3
EventObj 10-13
EventObjClass 10-13
eventObjClass 10-4
eventObjClassRec 10-4
ex 7-2
exclusivesClassRec 10-4
ExclusivesWidget 10-13
ExclusivesWidgetClass 10-13
exclusivesWidgetClass 10-4
exec1 4-2
execle 4-2
execlp 4-2
execv 4-2
execve 4-2
execvp 4-2
exit 4-2
Exported Data
 libX11 8-8
 libXm 11-6
 libXol 10-4
 libXt 9-5
expr 7-2

F

false 7-2
fattach 4-2
fchdir 4-2
fchmod 4-2
fchown 4-2

Index

fclose 5-2
fcntl 4-2, 4-4
fdetach 4-2
fdopen 5-2, 5-3
feof 5-2
ferror 5-2
fflush 5-2
fgetc 5-2
fgetpos 5-2
fgets 5-2
fileno 5-2
find 7-2
fmtmsg 5-2, 7-2
Font 8-30
footerPanelClassRec 10-4
FooterPanelWidget 10-13
FooterPanelWidgetClass 10-13
footerPanelWidgetClass 10-4
fopen 5-2
fork 4-2
formats and protocols 3-1
formClassRec 10-4
FormConstraints 10-13
FormWidget 10-13
FormWidgetClass 10-13
formWidgetClass 10-4
ForwardScanTextBuffer 10-2
fpathconf 4-2
fprintf 5-2
fputc 5-2
fputs 5-2
fread 5-2
free 4-2
FreeBuffer 10-2
freenetconfigent 6-3
FreeTextBuffer 10-2
freopen 5-2
frexp 5-2
fscanf 5-2
fseek 5-2
fsetpos 5-2
fstat 4-2
fstatvfs 4-2
fsync 4-2
ftell 5-2
ftok 4-2
Future Directions 1-4
fwrite 5-2

G

gaugeClassRec 10-4
GaugeWidget 10-13
GaugeWidgetClass 10-13
gaugeWidgetClass 10-4
GC 8-11
GContext 8-30
generic ABI 1-2
getc 5-2
getchar 5-2
getcontext 4-2
getcwd 4-2
getdate 5-2
getegid 4-2
getenv 5-2
geteuid 4-2
getgid 4-2
getgrgid 4-2
getgrnam 4-2
getgroups 4-2
getlogin 4-2
getmsg 4-2
getnetconfig 6-3
getnetconfigent 6-3
getnetname 6-3
getnetpath 6-3
GetOlBusyCursor 10-2
GetOlDuplicateCursor 10-2
GetOlMoveCursor 10-2

Index

GetOlPanCursor 10-2
GetOlQuestionCursor 10-2
GetOlStandardCursor 10-2
GetOlSWGeometries 10-2
GetOlTargetCursor 10-2
 getopt 5-2
 getpass 5-2
 getpgid 4-2
 getpgrp 4-2
 getpid 4-2
 getpmsg 4-2
 getppid 4-2
 getpublickey 6-3
 getpwnam 4-2
 getpwuid 4-2
 getrlimit 4-2
 gets 5-2
 getsecretkey 6-3
 getsid 4-2
 getsockopt 5-2
 GetTextBufferBlock 10-2
 GetTextBufferBuffer 10-2
 GetTextBufferChar 10-2
 GetTextBufferLine 10-2
 GetTextBufferLocation 10-2
 gettxt 4-2, 7-2
 getuid 4-2
 getw 5-2
 gmtime 5-2
 grantpt 4-2
 grep 7-2
 GrowBuffer 10-2

H

hcreate 5-2
 hdestroy 5-2
 helpClassRec 10-4
 HelpWidget 10-13
 HelpWidgetClass 10-13

helpWidgetClass 10-4
 host2netname 6-3
 hsearch 5-2

I

id 7-2
 IncrementTextBufferLocation 10-2
 initgroups 4-2
 InsertIntoBuffer 10-2
 ioctl 4-2
 isalnum 5-2
 isalpha 5-2
 isascii 5-2
 isastream 4-2
 isatty 5-2
 iscntrl 5-2
 isdigit 5-2
 isgraph 5-2
 islower 5-2
 isnan 5-2
 isnand 5-2, 5-4
 isprint 5-2
 ispunct 5-2
 isspace 5-2
 isupper 5-2
 isxdigit 5-2

K

KE_OS 4-1
 key_decryptsession 6-3
 key_encryptsession 6-3
 key_gendes 6-3
 key_setsecret 6-3
 KeyCode 8-30
 KeySym 8-30
 kill 4-2, 7-2

Index

L

labs 5-2
`LastTextBufferLocation` 10-2
`LastTextBufferPosition` 10-2
lchown 4-2
`LD_LIBRARY_PATH` 2-1
ldexp 5-2
ldiv 5-2
lfind 5-2
libc
 contents 5-2
 interfaces 5-1
libMrm
 entry points 11-7
 manifest constants 11-29
 visible structures 11-29
libns1
 interfaces 6-1
libsys
 Contents 4-2
 interfaces 4-1
 support routines 4-3
libsys SPARC support routines 4-3
libX 2-3
 contents 8-2
 version number 8-1
libXm
 contents 11-2
libXol
 contents 10-2
 version number 10-1
libXt
 contents 9-2
 version number 9-1
Line 10-20
line 7-2
`LineOfPosition` 10-2
`LineTable` 10-20
link 4-2
`listClassRec` 10-4
`listPaneClassRec` 10-4
`ListPaneWidget` 10-13
`ListPaneWidgetClass` 10-13
`listPaneWidgetClass` 10-4
ln 7-2
localeconv 4-2
localtime 5-2
`LocationOfPosition` 10-2
lockf 5-2
logname 7-2
longjmp 5-2
`LookupOfInputEvent` 10-2
low-level system information 3-1
lp 7-2
ls 7-2
lsearch 5-2
lseek 4-2
lstat 4-2

M

`magClassRec` 10-4
`MagWidget` 10-14
`MagWidgetClass` 10-14
`magWidgetClass` 10-4
malloc 4-2
`managerClassRec` 10-4
`ManagerWidget` 10-14
`ManagerWidgetClass` 10-14
`managerWidgetClass` 10-4
Manifest Constants
 Motif 11-8
 OLIT 10-6
 Xlib, 8-10, 8-30, 8-44, 8-46, 8-48, 8-53,
 8-77
 Xt 9-6
Mask 8-30
mblen 5-2

Index

mbstowcs 5-2
mbtowc 5-2
MC_LOCK 2-4
MC_LOCKAS 2-4
MC_SYNC 2-4
MC_UNLOCK 2-4
MC_UNLOCKAS 2-4
MCL_CURRENT 2-4
MCL_FUTURE 2-4
memccpy 5-2
memchr 5-2
memcmp 5-2
memcntl 4-2
memcpy 5-2
memmove 5-2
memset 5-2
menuButtonClassRec 10-4
MenuButtonGadget 10-14
MenuButtonGadgetClass 10-14
menuButtonWidgetClass 10-4
menuButtonGadgetClassRec 10-4
MenuButtonWidget 10-14
MenuButtonWidgetClass 10-14
menuButtonWidgetClass 10-4
menuShellClassRec 10-4
MenuShellWidget 10-14
MenuShellWidgetClass 10-14
menuShellWidgetClass 10-4
mkdir 4-2, 7-2
mkfifo 5-2
mknod 4-2
mktemp 5-2
mtime 5-2
mlock 4-2
mmap 4-2
monitor 5-2
mount 4-2
mprotect 4-2
msgctl 4-2
msgget 4-2
msgrcv 4-2
msgsnd 4-2
msync 4-2
munlock 4-2
munmap 4-2
mv 7-2

N

nc_perror 6-3
netconfig 2-4
netdir_free 6-3
netdir_getbyaddr 6-3
netdir_getbyname 6-3
netdir_options 6-3
netname2host 6-3
netname2user 6-3
NeWS 2-3
NextLocation 10-2
NextTextBufferWord 10-2
nftw 5-2
nice 4-2
nl_langinfo 5-2
nonexclusivesClassRec 10-4
NonexclusivesWidget 10-14
NonexclusivesWidgetClass 10-14
nonexclusivesWidgetClass 10-4
noticeShellClassRec 10-4
NoticeShellWidget 10-14
NoticeShellWidgetClass 10-14
noticeShellWidgetClass 10-4

O

object file format 3-1
objectClass 9-5
objectClassRec 9-5
oblongButtonClassRec 10-4
OblongButtonGadget 10-14
OblongButtonGadgetClass 10-14

Index

oblongButtonGadgetClass 10-4
oblongButtonGadgetClassRec 10-4
OblongButtonWidget 10-14
OblongButtonWidgetClass 10-14
oblongButtonWidgetClass 10-4
OlAddCallback 10-2
OlBitMask 10-14
OlCallAcceptFocus 10-2
OlCallCallbacks 10-2
OlCanAcceptFocus 10-2
OlCategorySetPage 10-2
OlDefine 10-14
OlDragAndDrop 10-2
OlError 10-2
OlGet50PercentGrey 10-2
OlGet75PercentGrey 10-2
OlGetApplicationResources 10-2
OlGetApplicationValues 10-2
OlGetBeep 10-2
OlGetBeepVolume 10-2
OlGetBusyCursor 10-2
OlGetCurrentFocusWidget 10-2
OlGrabDragPointer 10-2
OlHasCallbacks 10-2
OlHasFocus 10-2
OlInitialize 10-2
OlLayoutScrolledWindow 10-2
OlListDelete 10-17
OlListItem 10-16
OlListItemPointer 10-2
OlListToken 10-16
OlMenuPopdown 10-2
OlMenuPopup 10-2
OlMenuPost 10-2
OlMenuUnpost 10-2
OlMoveFocus 10-2
OlQueryAcceleratorDisplay 10-2
OlQueryMnemonicDisplay 10-2
OlRChar 10-4
OlRCompression 10-4
OlRegisterColorTupleListCon-
verter 10-2
OlRegisterHelp 10-2
OlRemoveCallback 10-2
OlSameSize 10-13
OlScanDirection 10-11
OlScanType 10-11
OlScrollbarVerify 10-15
OlSetErrorHandler 10-2
OlSetGaugeValue 10-2
OlSetInputFocus 10-2
OlSetVaDisplayErrorMsgHandler
10-2
OlSetVaDisplayWarningMsgHan-
dler 10-2
OlSetWarningHandler 10-2
OlSliderVerify 10-17
OlSWGeometries 10-16
OlTextEditClearBuffer 10-2
OlTextEditCopyBuffer 10-2
OlTextEditCopySelection 10-2
OlTextEditGetCursorPosition 10-
3
OlTextEditGetLastPosition 10-3
OlTextEditInsert 10-3
OlTextEditPaste 10-3
OlTextEditReadSubString 10-3
OlTextEditRedraw 10-3
OlTextEditResize 10-3
OlTextEditSetCursorPosition 10-
3
OlTextEditTextBuffer 10-3
OlTextEditUpdate 10-3
OlTextFieldCopyString 10-3
OlTextFieldGetString 10-3
OlTextFieldVerify 10-19
OlTextFieldVerifyPointer 10-19
OlTextMarginCallData 10-17

Index

OlTextMarginCallDataPointer 10-17
OlTextModifyCallData 10-18
OlTextModifyCallDataPointer 10-18
OlTextMotionCallData 10-17
OlTextMotionCallDataPointer 10-17
OlTextPostModifyCallData 10-18
OlTextPostModifyCallDataPointer 10-18
OlToolkitInitialize 10-3
OlUngrabDragPointer 10-3
OlUpdateDisplay 10-3
OlVaDisplayErrorMsg 10-3
OlVaDisplayWarningMsg 10-3
OlVerifyOpType 10-11
OlWarning 10-3
OlWMProtocolAction 10-3
open 4-2
opendir 4-2
organization vii
overrideShellClassRec 9-5
overrideShellWidgetClass 9-5

P

Page 10-20
PageQueue 10-19
PageTable 10-20
passwd 7-2
pathconf 4-2
pause 4-2
pclose 5-2
perror 5-2
pg 7-2
pipe 4-2
Pixmap 8-30
pkgadd 2-1
pkginfo 2-5

poll 4-2
popen 5-2
popupWindowShellClassRec 10-4
PopupWindowShellWidget 10-14
PopupWindowShellWidgetClass 10-14
popupWindowShellWidgetClass 10-4
PositionOfLine 10-3
PositionOfLocation 10-3
pr 7-2, 7-3
PreviousLocation 10-3
PreviousTextBufferWord 10-3
primitiveClassRec 10-4
PrimitiveWidget 10-14
PrimitiveWidgetClass 10-14
primitiveWidgetClass 10-4
printf 5-2
priocntl 7-2
PRIVATE 2-4
PROC_DATA 2-4
PROC_TEXT 2-4
profil 4-2
program loading and linking 3-1
psABI 1-2
ptrace 4-2
ptsname 4-2
publication conventions vii
 page format vii
 typography vii
purpose vii
pushpinClassRec 10-4
PushpinWidget 10-14
PushpinWidgetClass 10-14
pushpinWidgetClass 10-4
putc 5-2
putchar 5-2
putenv 5-2
putmsg 4-2

Index

`putpmsg` 4-2
`puts` 5-2
`putw` 5-2
`pwd` 7-2

Q

`qsort` 5-2

R

`raise` 5-2
`rand` 5-2
`read` 4-2
`readdir` 4-2
`ReadFileIntoBuffer` 10-3
`ReadFileIntoTextBuffer` 10-3
`readlink` 4-2
`ReadStringIntoBuffer` 10-3
`ReadStringIntoTextBuffer` 10-3
`readv` 4-2, 4-4
`realloc` 4-2
`rectButtonClassRec` 10-4
`RectButtonWidget` 10-15
`RectButtonWidgetClass` 10-14
`rectButtonWidgetClass` 10-4
`rectObjClass` 9-5
`rectObjClassRec` 9-5
`RegisterTextBufferScanFunctions` 10-3
`RegisterTextBufferUpdate` 10-3
`RegisterTextBufferWordDefinition` 10-3
related publications 1-2
`remove` 4-2
`rename` 4-2
`ReplaceBlockInTextBuffer` 10-3
`ReplaceCharInTextBuffer` 10-3
`rewind` 5-2
`rewinddir` 4-2
`RLIM_INFINITY` 2-4

`rm` 7-2
`rmdir` 4-2, 7-2
`rpc_broadcast` 6-3
`rpc_call` 6-3
`rpc_reg` 6-3
`rpc_svc_err` 6-5
`rpcb` 2-3
`rpcb_getaddr` 6-3
`rpcb_getmaps` 6-3
`rpcb_gettime` 6-3
`rpcb_rmtcall` 6-3
`rpcb_set` 6-3
`rpcb_unset` 6-3
`rpcbind` 2-3
`RT_OS` 4-1
`rubberTileClassRec` 10-4
`RubberTileWidget` 10-15
`RubberTileWidgetClass` 10-15
`rubberTileWidgetClass` 10-4

S

`SaveResult` 10-12
`SaveTextBuffer` 10-3
`scanf` 5-2
`ScanResult` 10-11
`SCD` 2.1

- overview 1-1
- terminology 1-1

`Screen` 8-12
`ScreenFormat` 8-13
`scrollbarClassRec` 10-4
`ScrollbarWidget` 10-15
`ScrollbarWidgetClass` 10-15
`scrollbarWidgetClass` 10-4
`scrolledWindowClassRec` 10-4
`ScrolledWindowWidget` 10-15
`ScrolledWindowWidgetClass` 10-15
`scrolledWindowWidgetClass` 10-4
`ScrollingListWidget` 10-17

Index

ScrollingListWidgetClass 10-17
scrollingListWidgetClass 10-4
sed 7-2
seekdir 4-2
semctl 4-2
semget 4-2
semop 4-2
setbuf 5-2
setcontext 4-2
setgid 4-2
setgroups 4-2
setjmp 5-2
setlocale 4-2
setnetconfig 6-3
setnetpath 6-3
setpgid 4-2
setpgrp 4-2
setrlimit 4-2
setsid 4-2
setuid 4-2
setvbuf 5-2
sh 7-2, 7-3
Share Library Names 2-2
SHARED 2-4
Shared Library 2-3
shellClassRec 9-5
shellWidgetClass 9-5
shmat 4-2
shmctl 4-2
shmdt 4-2
shmget 4-2
SHT_DYNSYM 2-1
sigaction 4-2
sigaddset 4-2
sigaltstack 4-2
sigdelset 4-2
sigemptyset 4-2
sigfillset 4-2
sighold 4-2
sigignore 4-2
sigismember 4-2
siglongjmp 4-2
signal 4-2
sigpause 4-2
sigpending 4-2
sigprocmask 4-2
sigrelse 4-2
sigsend 4-2
sigsendset 4-2
sigset 4-2
sigsetjmp 4-2
sigsuspend 4-2
sleep 5-2, 7-2
sliderClassRec 10-4
SliderWidget 10-17
SliderWidgetClass 10-17
sliderWidgetClass 10-4
software installation 3-1
sort 7-2
sprintf 5-2
srand 5-2
sscanf 5-2
StartCurrentTextBufferWord 10-3
stat 4-2
statictextClassRec 10-4
StaticTextWidget 10-17
StaticTextWidgetClass 10-17
staticTextWidgetClass 10-4
statictextWidgetClass 10-4
statvfs 4-2
stime 4-2
strcat 5-2
strchr 5-2
strcmp 5-2
strcoll 4-2
strcpy 5-2
strcspn 5-2
strdup 5-2

Index

strerror 4-2
strftime 4-2
strlen 5-2
strncat 5-2
strncmp 5-2
strncpy 5-2
strpbrk 5-2
 strrchr 5-2
strspn 5-2
strstr 5-2
strtod 5-2
strtok 5-2
 strtol 5-2
strtoul 5-2
strxfrm 4-2
stty 7-2
su 7-2
svc_create 6-3
svc_dg_create 6-3
svc_fd_create 6-3
svc_getreqset 6-3
svc_raw_create 6-3
svc_reg 6-3
svc_run 6-3
svc_sendreply 6-3
svc_tli_create 6-3
svc_tp_create 6-3
svc_unreg 6-3
svc_vc_create 6-3
svcerr_auth 6-3
svcerr_decode 6-3
svcerr_noproc 6-3
svcerr_noprog 6-3
svcerr_progvers 6-3, 6-5
svcerr_systemerr 6-3
svcerr_weakauth 6-3
swab 5-2
symlink 4-2
sync 4-2
sysconf 4-2
system 4-2
System V Application Binary Interface 1-
2
System V Application Binary Interface
SPARC Processor Supplement 1-
2
System V Interface Definition 1-2
T
t_accept 6-2
t_alloc 6-2
t_bind 6-2
t_close 6-2
t_connect 6-2
t_error 6-2
t_free 6-2
t_getinfo 6-2
t_getstate 6-2
t_listen 6-2
t_look 6-2
t_open 6-2
t_optmgmt 6-2
t_rcv 6-2
t_rcvconnect 6-2
t_rcvdis 6-2
t_rcvrel 6-2
t_rcvudata 6-2
t_rcvuderr 6-2
t_snd 6-2
t_snddis 6-2
t_sndrel 6-2
t_sndudata 6-2
t_sync 6-2
t_unbind 6-2
Table 2-1 2-5
TabTable 10-17
taddr2uaddr 6-3
tail 7-2

Index

tcdrain 5-2
tcflow 5-2
tcflush 5-2
tcgetattr 5-2
tcgetpgrp 5-2
tcgetsid 5-2
TCP/IP 6-1
tcsendbreak 5-2
tcsetattr 5-2
tcsetpgrp 5-2
tdelete 5-2
tee 7-2
tell 5-2, 5-4
telldir 4-2
tempnam 5-2
test 7-2
TextBlock 10-19
TextBuffer 10-22
TextEditWidget 10-18
TextEditWidgetClass 10-18
textEditWidgetClass 10-5
textFieldClassRec 10-5
TextFieldWidget 10-18
TextFieldWidgetClass 10-18
textFieldWidgetClass 10-5
TextFileStatus 10-11
TextLine 10-19
TextLocation 10-21
TextPage 10-19
TextPosition 10-19
TextUndoHint 10-21
TextUndoItem 10-21
TextUpdateCallback 10-21
TextUpdateFunction 10-21
tfind 5-2
Time 8-30
time 4-2
times 4-2
tmpfile 5-2
tmpnam 5-2
toascii 5-2
tolower 5-2
topLevelShellClassRec 9-5
topLevelShellWidgetClass 9-5
touch 7-2
toupper 5-2
tr 7-2
transientShellClassRec 9-5
transientShellWidgetClass 9-5
transport provider interface name 6-1
transport providers 6-1, 11-1
true 7-2
tsearch 5-2
tty 7-2
ttyname 4-2
twalk 5-2
tzset 5-2

U

uaddr2taddr 6-3
ulimit 4-2
umask 4-2, 7-2
umount 4-2
uname 4-2, 7-2
ungetc 5-2
unlink 4-2
unlockpt 4-2
UnregisterTextBufferUpdate 10-3
user2netname 6-3
utime 4-2
uucp 7-2
uulog 7-2
uustat 7-2
uux 7-2

V

vendorShellClassRec 9-5, 10-5
vendorShellWidgetClass 9-5, 10-5

Index

vfprintf 5-2
vi 7-2
Visual 8-12
VisualID 8-30
vprintf 5-2
vsprintf 5-2

W
wait 4-2, 7-2
waitid 4-2, 4-4
waitpid 4-2
wcstombs 5-2
wctomb 5-2
who 7-2
widgetClass 9-5
widgetClassRec 9-5
Window 8-30
wmShellClassRec 9-5
wmShellWidgetClass 9-5
write 4-2
writev 4-2, 4-4

X
`X11/cursorfont.h` 8-9
 Manifest Constants 8-77
`X11/keysymdef.h` 8-9
 Manifest Constants 8-53
`X11/X.h` 8-9
 Manifest Constants and Data Types
 8-30
`X11/Xatom.h` 8-9
 Manifest Constants 8-44
`X11/Xlib.h` 8-9
 Manifest Constants and Data Types
 8-10
`X11/Xresource.h` 8-9
 Manifest Constants and Data Types
 8-46
`X11/Xutil.h` 8-9

Manifest Constants and Data Types
 8-48
XAddExtension 8-2
XAddHost 8-2
XAddHosts 8-2
XAddPixel 8-2
XAddToExtensionList 8-2
XAddToSaveSet 8-2
XAllocClassHint 8-2
XAllocColor 8-2
XAllocColorCells 8-2
XAllocColorPlanes 8-2
XAllocIconSize 8-2
XAllocNamedColor 8-2
XAllocSizeHints 8-2
XAllocStandardColormap 8-2
XAllocWMHints 8-2
XAllowEvents 8-2
XAllPlanes 8-2
XAnyEvent 8-27
XArc 8-16
XAutoRepeatOff 8-2
XAutoRepeatOn 8-2
XBell 8-2
XBitmapBitOrder 8-2
XBitmapPad 8-2
XBitmapUnit 8-2
XBlackPixel 8-2
XBlackPixelOfScreen 8-2
XButtonEvent 8-19
XButtonPressedEvent 8-19
XButtonReleasedEvent 8-19
XCellsOfScreen 8-2
XChangeActivePointerGrab 8-2
XChangeGC 8-2
XChangeKeyboardControl 8-2
XChangeKeyboardMapping 8-2
XChangePointerControl 8-2
XChangeProperty 8-2

Index

XChangeSaveSet 8-2
XChangeWindowAttributes 8-2
XChar2b 8-29
XCharStruct 8-28
XCheckIfEvent 8-2
XCheckMaskEvent 8-2
XCheckTypedEvent 8-2
XCheckTypedWindowEvent 8-2
XCheckWindowEvent 8-2
XCirculateEvent 8-24
XCirculateRequestEvent 8-24
XCirculateSubwindows 8-2
XCirculateSubwindowsDown 8-2
XCirculateSubwindowsUp 8-2
XClassHint 8-50
XClearArea 8-2
XClearWindow 8-2
XClientMessageEvent 8-26
XClipBox 8-2
XCloseDisplay 8-2
XColor 8-15
XColormapEvent 8-26
XComposeStatus 8-50
XConfigureEvent 8-23
XConfigureRequestEvent 8-24
XConfigureWindow 8-2
XConnectionNumber 8-2
XContext 8-52
XConvertSelection 8-2
XCopyArea 8-2
XCopyColormapAndFree 8-2
XCopyGC 8-2
XCopyPlane 8-2
XCreateBitmapFromData 8-2
XCreateColormap 8-2
XCreateFontCursor 8-2
XCreateGC 8-2
XCreateGlyphCursor 8-2
XCreateImage 8-2
XCreatePixmap 8-2
XCreatePixmapCursor 8-2
XCreatePixmapFromBitmapData 8-2
XCreateRegion 8-2
XCreateSimpleWindow 8-2
XCreateWindow 8-2
XCreateWindowEvent 8-22
XCrossingEvent 8-20
XDefaultColormap 8-2
XDefaultColormapOfScreen 8-2
XDefaultDepth 8-2
XDefaultDepthOfScreen 8-2
XDefaultGC 8-2
XDefaultGCOfScreen 8-2
XDefaultRootWindow 8-2
XDefaultScreen 8-2
XDefaultScreenOfDisplay 8-2
XDefaultVisual 8-2
XDefaultVisualOfScreen 8-2
XDefineCursor 8-2
XDeleteContext 8-2
XDeleteModifiermapEntry 8-2
XDeleteProperty 8-2
XDestroyImage 8-2
XDestroyRegion 8-3
XDestroySubwindows 8-3
XDestroyWindow 8-3
XDestroyWindowEvent 8-22
XDisableAccessControl 8-3
XDisplayCells 8-3
XDisplayHeight 8-3
XDisplayHeightMM 8-3
XDisplayKeycodes 8-3
XDisplayMotionBufferSize 8-3
XDisplayName 8-3
XDisplayOfScreen 8-3
XDisplayPlanes 8-3
XDisplayString 8-3
XDisplayWidth 8-3

Index

XDisplayWidthMM 8-3
XDoesBackingStore 8-3
XDoesSaveUnders 8-3
xdr_accepted_reply 6-3
xdr_array 6-4
xdr_authsys_parms 6-4
xdr_bool 6-4
xdr_bytes 6-4
xdr_callhdr 6-4
xdr_callmsg 6-4
xdr_char 6-4
xdr_double 6-4
xdr_enum 6-4
xdr_float 6-4
xdr_free 6-4
xdr_int 6-4
xdr_long 6-4
xdr_opaque 6-4
xdr_opaque_auth 6-4
xdr_pointer 6-4
xdr_reference 6-4
xdr_rejected_reply 6-4
xdr_replaymsg 6-4
xdr_short 6-4
xdr_string 6-4
xdr_u_char 6-4
xdr_u_long 6-4
xdr_u_short 6-4
xdr_union 6-4
xdr_vector 6-4
xdr_void 6-4
xdr_wrapstring 6-4
XDrawArc 8-3
XDrawArcs 8-3
XDrawImageString 8-3
XDrawImageString16 8-3
XDrawLine 8-3
XDrawLines 8-3
XDrawPoint 8-3
XDrawPoints 8-3
XDrawRectangle 8-3
XDrawRectangles 8-3
XDrawSegments 8-3
XDrawString 8-3
XDrawString16 8-3
XDrawText 8-3
XDrawText16 8-3
xdrmem_create 6-4
xdrrec_create 6-4
xdrrec_eof 6-4
xdrrec_skiprecord 6-4
xdtstdio_create 6-4
XEDataObject 8-29
XEHeadOfExtensionList 8-3
XEmptyRegion 8-3
XEnableAccessControl 8-3
XEnterWindowEvent 8-20
XEEqualRegion 8-3
XErrorEvent 8-27
XErrorHandler 8-29
XESetCloseDisplay 8-3
XESetCopyGC 8-3
XESetCreateFont 8-3
XESetCreateGC 8-3
XESetError 8-3
XESetErrorString 8-3
XESetEventToWire 8-3
XESetFlushGC 8-3
XESetFont 8-3
XESetFreeFont 8-3
XESetFreeGC 8-3
XESetWireToEvent 8-3
XEvent 8-28
XEventMaskOfScreen 8-3
XEventsQueued 8-3
XExposeEvent 8-21
XExtCodes 8-10
XExtData 8-10
XFetchBuffer 8-3

Index

XFetchBytes 8-3
XFetchName 8-3
XFillArc 8-3
XFillArcs 8-3
XFillPolygon 8-3
XFillRectangle 8-3
XFillRectangles 8-3
XFindContext 8-3
XFindOnExtensionList 8-3
XFlush 8-3
XFocusChangeEvent 8-20
XFocusInEvent 8-21
XFocusOutEvent 8-21
XFontProp 8-28
XFontStruct 8-28
XForceScreenSaver 8-3
XFree 8-3
XFreeColormap 8-3
XFreeColors 8-3
XFreeCursor 8-3
XFreeExtensionList 8-3
XFreeFont 8-3
XFreeFontInfo 8-3
XFreeFontNames 8-3
XFreeFontPath 8-3
XFreeGC 8-3
XFreeModifiermap 8-3
XFreePixmap 8-3
XFreeStringList 8-3
XGContextFromGC 8-3
XGCValues 8-11
XGeometry 8-3
XGetAtomName 8-3
XGetClassHint 8-3
XGetCommand 8-3
XGetDefault 8-3
XGetErrorDatabaseText 8-3
XGetErrorText 8-3
XGetFontPath 8-3
XGetFontProperty 8-3
XGetGCValues 8-4
XGetGeometry 8-4
XGetIconName 8-4
XGetIconSizes 8-4
XGetImage 8-4
XGetInputFocus 8-4
XGetKeyboardControl 8-4
XGetKeyboardMapping 8-4
XGetModifierMapping 8-4
XGetMotionEvents 8-4
XGetNormalHints 8-4
XGetPixel 8-4
XGetPointerControl 8-4
XGetPointerMapping 8-4
XGetRGBColormaps 8-4
XGetScreenSaver 8-4
XGetSelectionOwner 8-4
XGetSizeHints 8-4
XGetStandardColormap 8-4
XGetSubImage 8-4
XGetTextProperty 8-4
XGetTransientForHint 8-4
XGetVisualInfo 8-4
XGetWindowAttributes 8-4
XGetWindowProperty 8-4
XGetWMClientMachine 8-4
XGetWMColormapWindows 8-4
XGetWMHints 8-4
XGetWMIconName 8-4
XGetWMName 8-4
XGetWMNormalHints 8-4
XGetWMProtocols 8-4
XGetWMSizeHints 8-4
XGrabButton 8-4
XGrabKey 8-4
XGrabKeyboard 8-4
XGrabPointer 8-4
XGrabServer 8-4

Index

XGraphicsExposeEvent 8-21
XGravityEvent 8-24
XHeightMMOfScreen 8-4
XHeightOfScreen 8-4
XHostAddress 8-14
XIIconifyWindow 8-4
XIIconSize 8-50
XID 8-30
XIfEvent 8-4
XImage 8-15
XImageByteOrder 8-4
XInitExtension 8-4
XIInsertModifiermapEntry 8-4
XInstallColormap 8-4
XInternAtom 8-4
XIntersectRegion 8-4
XIOErrorHandler 8-29
XKeyboardControl 8-16
XKeyboardState 8-16
XKeyCodeToKeysym 8-4
XKeyEvent 8-19
XKeymapEvent 8-21
XKeyPressedEvent 8-19
XKeyReleasedEvent 8-19
XKeysymToKeyCode 8-4
XKeysymToString 8-4
XKillClient 8-4
XLastKnownRequestProcessed 8-4
XLeaveWindowEvent 8-20
XListDepths 8-4
XListExtensions 8-4
XListFonts 8-4
XListFontsWithInfo 8-4
XListHosts 8-4
XListInstalledColormaps 8-4
XListPixmapFormats 8-4
XListProperties 8-4
XLoadFont 8-4
XLoadQueryFont 8-4
XLookupColor 8-4
XLookupKeysym 8-4
XLookupString 8-4
XLowerWindow 8-4
XMapEvent 8-23
XMappingEvent 8-26
XMapRaised 8-4
XMapRequestEvent 8-23
XMapSubwindows 8-4
XMapWindow 8-4
XMaskEvent 8-4
XMatchVisualInfo 8-4
XMaxCmapsOfScreen 8-4
XMaxRequestSize 8-4
XMinCmapsOfScreen 8-4
XModifierKeymap 8-17
XMotionEvent 8-20
XMoveResizeWindow 8-4
XMoveWindow 8-4
XNewModifiermap 8-4
XNextEvent 8-4
XNextRequest 8-4
XNoExposeEvent 8-21
XNoOp 8-4
XOffsetRegion 8-4
XOpenDisplay 8-4
XParseColor 8-4
XParseGeometry 8-5
XPending 8-5
XPeekEvent 8-5
XPeekIfEvent 8-5
XPermalloc 8-5
XPixmapFormatValues 8-10
XPlanesOfScreen 8-5
XPoint 8-15
XPointerMovedEvent 8-20
XPointInRegion 8-5
XPolygonRegion 8-5
XPropertyEvent 8-25

Index

XProtocolRevision 8-5
XProtocolVersion 8-5
xpvt_register 6-4
xpvt_unregister 6-4
XPutBackEvent 8-5
XPutImage 8-5
XPutPixel 8-5
xQLength 8-5
XQueryBestCursor 8-5
XQueryBestSize 8-5
XQueryBestStipple 8-5
XQueryBestTile 8-5
XQueryColor 8-5
XQueryColors 8-5
XQueryExtension 8-5
XQueryFont 8-5
XQueryKeymap 8-5
XQueryPointer 8-5
XQueryTextExtents 8-5
XQueryTextExtents16 8-5
XQueryTree 8-5
XRaiseWindow 8-5
XReadBitmapFile 8-5
XRebindKeysym 8-5
XRecolorCursor 8-5
XReconfigureWMWindow 8-5
XRectangle 8-16
XRectInRegion 8-5
XRefreshKeyboardMapping 8-5
XRemoveFromSaveSet 8-5
XRemoveHost 8-5
XRemoveHosts 8-5
XReparentEvent 8-23
XReparentWindow 8-5
XResetScreenSaver 8-5
XResizeRequestEvent 8-24
XResizeWindow 8-5
XResourceManagerString 8-5
XRestackWindows 8-5

XrmBinding 8-46
XrmBindingList 8-46
XrmClass 8-46
XrmClassList 8-46
XrmDatabase 8-47
XrmDestroyDatabase 8-5
XrmGetFileDatabase 8-5
XrmGetResource 8-5
XrmGetStringDatabase 8-5
XrmHashBucket 8-47
XrmHashTable 8-47
XrmInitialize 8-5
XrmMergeDatabases 8-5
XrmName 8-46
XrmNameList 8-46
XrmOptionDescList 8-47
XrmOptionDescRec 8-47
XrmOptionKind 8-47
XrmParseCommand 8-5
XrmPutFileDatabase 8-5
XrmPutLineResource 8-5
XrmPutResource 8-5
XrmPutStringResource 8-5
XrmQGetResource 8-5
XrmQGetSearchList 8-5
XrmQGetSearchResource 8-5
XrmQPutResource 8-5
XrmQPutStringResource 8-5
XrmQuark 8-46
XrmQuarkList 8-46
XrmQuarkToString 8-5
XrmRepresentation 8-46
XrmSearchList 8-47
XrmString 8-46
XrmStringToBindingQuarkList 8-5
XrmStringToQuark 8-5
XrmStringToQuarkList 8-5
XrmUniqueQuark 8-5
XrmValue 8-47

Index

XrmValuePtr 8-47
XRootWindow 8-5
XRootWindowOfScreen 8-5
XRotateBuffers 8-5
XRotateWindowProperties 8-5
XSaveContext 8-5
XScreenCount 8-5
XScreenNumberOfScreen 8-5
XScreenOfDisplay 8-5
XSegment 8-15
XSelectInput 8-5
XSelectionClearEvent 8-25
XSelectionEvent 8-25
XSelectionRequestEvent 8-25
XSendEvent 8-5
XServerVendor 8-5
XSetAccessControl 8-5
XSetAfterFunction 8-5
XSetArcMode 8-5
XSetAuthorization 8-5
XSetBackground 8-5
XSetClassHint 8-5
XSetClipMask 8-5
XSetClipOrigin 8-5
XSetClipRectangles 8-5
XSetCloseDownMode 8-5
XSetCommand 8-6
XSetDashes 8-6
XSetErrorHandler 8-6
XSetFillRule 8-6
XSetFillStyle 8-6
XSetFont 8-6
XSetFontPath 8-6
XSetForeground 8-6
XSetFunction 8-6
XSetGraphicsExposures 8-6
XSetIconName 8-6
XSetIconSizes 8-6
XSetInputFocus 8-6
XSetIOErrorHandler 8-6
XSetLineAttributes 8-6
XSetModifierMapping 8-6
XSetNormalHints 8-6
XSetPlaneMask 8-6
XSetPointerMapping 8-6
XSetRegion 8-6
XSetRGBColormaps 8-6
XSetScreenSaver 8-6
XSetSelectionOwner 8-6
XSetSizeHints 8-6
XSetStandardColormap 8-6
XSetStandardProperties 8-6
XSetState 8-6
XSetStipple 8-6
XSetSubwindowMode 8-6
XSetTextProperty 8-6
XSetTile 8-6
XSetTransientForHint 8-6
XSetTSSOrigin 8-6
XSetWindowAttributes 8-13
XSetWindowBackground 8-6
XSetWindowBackgroundPixmap 8-6
XSetWindowBorder 8-6
XSetWindowBorderPixmap 8-6
XSetWindowBorderWidth 8-6
XSetWindowColormap 8-6
XSetWMClientMachine 8-6
XSetWMColormapWindows 8-6
XSetWMHints 8-6
XSetWMIconName 8-6
XSetWMName 8-6
XSetWMNormalHints 8-6
XSetWMProperties 8-6
XSetWMProtocols 8-6
XSetWMSizeHints 8-6
XShrinkRegion 8-6
XSizeHints 8-48
XStandardColormap 8-51

Index

XStoreBuffer 8-6
XStoreBytes 8-6
XStoreColor 8-6
XStoreColors 8-6
XStoreName 8-6
XStoreNamedColor 8-6
XStringListToTextProperty 8-6
XStringToKeysym 8-6
XSubImage 8-6
XSubtractRegion 8-6
XSync 8-6
XSynchronize 8-6
XtAddActions 9-2
XtAddCallback 9-2
XtAddCallbacks 9-2
XtAddConverter 9-2
XtAddEventHandler 9-2
XtAddExposureToRegion 9-2
XtAddGrab 9-2
XtAddInput 9-2
XtAddRawEventHandler 9-2
XtAddTimeOut 9-2
XtAddWorkProc 9-2
XtAppAddActionHook 9-2
XtAppAddActions 9-2
XtAppAddConverter 9-2
XtAppAddInput 9-2
XtAppAddTimeOut 9-2
XtAppAddWorkProc 9-2
XtAppCreateShell 9-2
XtAppError 9-2
XtAppErrorMsg 9-2
XtAppGetErrorHandlerDatabase 9-2
XtAppGetErrorHandlerDatabaseText 9-2
XtAppGetSelectionTimeout 9-2
XtAppInitialize 9-2
XtAppMainLoop 9-2
XtAppNextEvent 9-2
XtAppPeekEvent 9-2
XtAppPending 9-2
XtAppProcessEvent 9-2
XtAppReleaseCacheRefs 9-2
XtAppSetErrorHandler 9-2
XtAppSetErrorHandlerMsgHandler 9-2
XtAppSetFallbackResources 9-2
XtAppSetSelectionTimeout 9-2
XtAppSetTypeConverter 9-2
XtAppSetWarningHandler 9-2
XtAppSetWarningMsgHandler 9-2
XtAppWarning 9-2
XtAppWarningMsg 9-2
XtAugmentTranslations 9-2
XtBuildEventMask 9-2
XtCallAcceptFocus 9-2
XtCallActionProc 9-2
XtCallbackExclusive 9-2
XtCallbackNone 9-2
XtCallbackNonexclusive 9-2
XtCallbackPopdown 9-2
XtCallbackReleaseCacheRef 9-2
XtCallbackReleaseCacheRefList 9-2
XtCallbackStatus 9-6
XtCallCallbackList 9-2
XtCallCallbacks 9-2
XtCallConverter 9-2
XtCalloc 9-2
XtClass 9-2
XtCloseDisplay 9-2
XtConfigureWidget 9-2
XtConvert 9-2
XtConvertAndStore 9-2
XtConvertCase 9-2
XtCreateApplicationContext 9-2
XtCreateApplicationShell 9-2
XtCreateManagedWidget 9-2
XtCreatePopupShell 9-2
XtCreateWidget 9-2

Index

XtCreateWindow 9-2
XtDatabase 9-2
XtDestroyApplicationContext 9-2
XtDestroyGC 9-2
XtDestroyWidget 9-2
XtDirectConvert 9-2
XtDisownSelection 9-2
XtDispatchEvent 9-2
XtDisplay 9-2
XtDisplayInitialize 9-2
XtDisplayOfObject 9-2
XtDisplayStringConversionWarning 9-2
XtDisplayToApplicationContext 9-2
XtError 9-2
XtErrorMsg 9-2
XTextExtents 8-6
XTextExtents16 8-6
XTextItem 8-29
XTextItem16 8-29
XTextProperty 8-50
XTextPropertyToStringList 8-6
XTextWidth 8-6
XTextWidth16 8-6
XtFindFile 9-2
XtFree 9-2
XtGeometryResult 9-6
XtGetActionKeysym 9-2
XtGetApplicationNameAndClass 9-3
XtGetApplicationResources 9-3
XtGetConstraintResourceList 9-3
XtGetErrorHandler 9-3
XtGetErrorHandlerText 9-3
XtGetGC 9-3
XtGetKeysymTable 9-3
XtGetMultiClickTime 9-3
XtGetResourceList 9-3
XtGetSelectionRequest 9-3
XtGetSelectionTimeout 9-3
XtGetSelectionValue 9-3
XtGetSelectionValueIncremental 9-3
XtGetSelectionValues 9-3
XtGetSelectionValuesIncremental 9-3
XtGetSubresources 9-3
XtGetSubvalues 9-3
XtGetValues 9-3
XtGrabButton 9-3
XtGrabKey 9-3
XtGrabKeyboard 9-3
XtGrabKind 9-7
XtGrabPointer 9-3
XtHasCallbacks 9-3
XTimeCoord 8-16
XtInitialize 9-3
XtInitializeWidgetClass 9-3
XtInsertEventHandler 9-3
XtInsertRawEventHandler 9-3
XtInstallAccelerators 9-3
XtInstallAllAccelerators 9-3
XtIsApplicationShell 9-3
XtIsComposite 9-3
XtIsConstraint 9-3
XtIsManaged 9-3
XtIsObject 9-3
XtIsOverrideShell 9-3
XtIsRealized 9-3
XtIsRectObj 9-3
XtIsSensitive 9-3
XtIsShell 9-3
XtIsSubclass 9-3
XtIsTopLevelShell 9-3
XtIsTransientShell 9-3
XtIsVendorShell 9-3
XtIsWidget 9-3

Index

XtIsWMShell 9-3
XtKeysymToKeycodeList 9-3
XtLastTimestampProcessed 9-3
XtListPosition 9-6
XtMainLoop 9-3
XtMakeGeometryRequest 9-3
XtMakeResizeRequest 9-3
XtMalloc 9-3
XtManageChild 9-3
XtManageChildren 9-3
XtMapWidget 9-3
XtMenuPopupAction 9-3
XtMergeArgLists 9-3
XtMoveWidget 9-3
XtName 9-3
XtNameToWidget 9-3
XtNewString 9-3
XtNextEvent 9-3
XtOpenDisplay 9-3
XtOverrideTranslations 9-3
XtOwnSelection 9-3
XtOwnSelectionIncremental 9-3
XtParent 9-3
XtParseAcceleratorTable 9-3
XtParseTranslationTable 9-3
XtPeekEvent 9-3
XtPending 9-3
XtPopdown 9-3
XtPopup 9-3
XtPopupSpringLoaded 9-3
XtProcessEvent 9-3
XtQueryGeometry 9-3
XtTranslateCoordinates 8-6
XtRealizeWidget 9-3
XtRealloc 9-3
XtRegisterCaseConverter 9-3
XtRegisterGrabAction 9-3
XtReleaseGC 9-3
XtRemoveActionHook 9-3
XtRemoveAllCallbacks 9-3
XtRemoveCallback 9-3
XtRemoveCallbacks 9-3
XtRemoveEventHandler 9-4
XtRemoveGrab 9-4
XtRemoveInput 9-4
XtRemoveRawEventHandler 9-4
XtRemoveTimeOut 9-4
XtRemoveWorkProc 9-4
XtResizeWidget 9-4
XtResizeWindow 9-4
XtResolvePathname 9-4
XtScreen 9-4
XtScreenOfObject 9-4
XtSetErrorHandler 9-4
XtSetErrorMsgHandler 9-4
XtSetKeyboardFocus 9-4
XtSetKeyTranslator 9-4
XtSetMappedWhenManaged 9-4
XtSetMultiClickTime 9-4
XtSetSelectionTimeout 9-4
XtSetSensitive 9-4
XtSetSubvalues 9-4
XtSetTypeConverter 9-4
XtSetValue 9-4
XtSetWarningHandler 9-4
XtSetWarningMsgHandler 9-4
XtSetWMColormapWindows 9-4
XtStringConversionWarning 9-4
XtSuperclass 9-4
XtToolkitInitialize 9-4
XtTranslateCoords 9-4
XtTranslateKey 9-4
XtTranslateKeycode 9-4
XtUngrabButton 9-4
XtUngrabKey 9-4
XtUngrabKeyboard 9-4
XtUngrabPointer 9-4
XtUninstallTranslations 9-4

Index

XtUnmanageChild 9-4
XtUnmanageChildren 9-4
XtUnmapWidget 9-4
XtUnrealizeWidget 9-4
XtVaAppCreateShell 9-4
XtVaAppInitialize 9-4
XtVaCreateArgsList 9-4
XtVaCreateManagedWidget 9-4
XtVaCreatePopupShell 9-4
XtVaCreateWidget 9-4
XtVaGetApplicationResources 9-4
XtVaGetSubresources 9-4
XtVaGetSubvalues 9-4
XtVaGetValues 9-4
XtVaSetSubvalues 9-4
XtVaSetValue 9-4
XtWarning 9-4
XtWarningMsg 9-4
XtWidgetToApplicationContext 9-4
XtWindow 9-4
XtWindowForObject 9-4
XtWindowToWidget 9-4
XUndefineCursor 8-6
XUngrabButton 8-6
XUngrabKey 8-6
XUngrabKeyboard 8-6
XUngrabPointer 8-6
XUngrabServer 8-6
XUninstallColormap 8-6
XUnionRectWithRegion 8-6
XUnionRegion 8-6
XUniqueContext 8-6
XUnloadFont 8-6
XUnmapEvent 8-22
XUnmapSubwindows 8-6
XUnmapWindow 8-6
XVendorRelease 8-6
XVisibilityEvent 8-22
XVisualIDFromVisual 8-6
XVisualInfo 8-51
XWarpPointer 8-6
XWhitePixel 8-6
XWhitePixelOfScreen 8-7
XWidthMMOfScreen 8-7
XWidthOfScreen 8-7
XWindowAttributes 8-14
XWindowChanges 8-15
XWindowEvent 8-7
XWithdrawWindow 8-7
XWMGeometry 8-7
XWMHints 8-49
XWriteBitmapFile 8-7
XXorRegion 8-7