

INTERNATIONAL
STANDARD

ISO/IEC
23360-1-3

First edition
2021-10

Linux Standard Base (LSB) —
Part 1-3:
Desktop specification generic part



Reference number
ISO/IEC 23360-1-3:2021(E)

AVA Documents
Document Sharing Hub
© ISO/IEC 2021



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2021

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of document should be noted (see www.iso.org/directives or www.iec.ch/members_experts/refdocs).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents) or the IEC list of patent declarations received (see patents.iec.ch).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html. In the IEC, see www.iec.ch/understanding-standards.

This document was prepared by the Linux Foundation as Linux Standard Base (LSB): Desktop specification generic part and drafted in accordance with its editorial rules. It was assigned to Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 22, *Programming languages, their environments and system software interfaces*, and adopted by National Bodies.

This first edition of ISO/IEC 23360-1-3 cancels and replaces ISO/IEC 23360-1:2006, which has been technically revised.

This document is based on “The GNU Free Documentation License, version 1.1”. The license is available at <https://www.gnu.org/licenses/old-licenses/fdl-1.1.html>.

A list of all parts in the ISO/IEC 23660 series can be found on the ISO and IEC websites.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html and www.iec.ch/national-committees.

Contents

Foreword	iii
Introduction	viii
I Introductory Elements	1
1 Scope	2
2 References	3
2.1 Normative References	3
2.2 Informative References/Bibliography	6
3 Requirements	7
3.1 Relevant Libraries	7
4 Terms and Definitions	9
5 Documentation Conventions	11
II Graphic Libraries	12
6 Libraries	13
6.1 Interfaces for libX11	13
6.2 Data Definitions for libX11	23
6.3 Interface Definitions for libX11	180
6.4 Interfaces for libSM	180
6.5 Data Definitions for libSM	181
6.6 Interfaces for libICE	185
6.7 Data Definitions for libICE	187
6.8 Interface Definitions for libICE	194
6.9 Interfaces for libXt	196
6.10 Data Definitions for libXt	201
6.11 Interface Definitions for libXt	235
6.12 Interfaces for libXext	236
6.13 Data Definitions for libXext	239
6.14 Interface Definitions for libXext	257
6.15 Interfaces for libXi	257
6.16 Data Definitions for libXi	258
6.17 Interfaces for libXtst	288
6.18 Data Definitions for libXtst	289
6.19 Interfaces for libxcb	290
6.20 Data Definitions for libxcb	298
6.21 Interface Definitions for libxcb	373
III OpenGL Libraries	374
7 Libraries	375
7.1 Interfaces for libGL	375
7.2 Data Definitions for libGL	384
7.3 Interfaces for libGLU	438
7.4 Data Definitions for libGLU	439
IV PNG12 library	445
8 Libraries	446
8.1 Interfaces for libpng12	446
8.2 Data Definitions for libpng12	448
8.3 Interface Definitions for libpng12	462
V JPEG library	527
9 Libraries	528
9.1 Interfaces for libjpeg	528

9.2 Data Definitions for libjpeg	529
9.3 Interface Definitions for libjpeg	539
VI Fontconfig library	561
10 Libraries.....	562
10.1 Interfaces for libfontconfig.....	562
10.2 Data Definitions for libfontconfig	565
11 Commands and Utilities.....	574
11.1 Commands and Utilities.....	574
11.2 Command Behavior	574
VII Freetype library	577
12 Libraries.....	578
12.1 Interfaces for libfreetype.....	578
12.2 Data Definitions for libfreetype.....	580
12.3 Interface Definitions for libfreetype.....	610
VIII Xft library	612
13 Libraries.....	613
13.1 Interfaces for libXft	613
13.2 Data Definitions for libXft	614
13.3 Interface Definitions for libXft	619
IX Xrender library.....	620
14 Libraries.....	621
14.1 Interfaces for libXrender	621
14.2 Data Definitions for libXrender	622
14.3 Interface Definitions for libXrender	629
X Cairo Vector Graphics library	630
15 Libraries.....	631
15.1 Interfaces for libcairo.....	631
15.2 Data Definitions for libcairo.....	638
15.3 Interface Definitions for libcairo.....	665
XI tiff library	666
16 Libraries.....	667
16.1 Interfaces for libtiff	667
16.2 Data Definitions for libtiff	669
XII GTK+ Stack Libraries	683
17 Libraries.....	684
17.1 Introduction	684
17.2 Interfaces for libglib-2.0	685
17.3 Data Definitions for libglib-2.0	726
17.4 Interface Definitions for libglib-2.0	795
17.5 Interfaces for libgmodule-2.0.....	796
17.6 Data Definitions for libgmodule-2.0.....	796
17.7 Interfaces for libgobject-2.0	797
17.8 Data Definitions for libgobject-2.0.....	810
17.9 Interface Definitions for libgobject-2.0.....	848
17.10 Interfaces for libgthread-2.0	849
17.11 Interfaces for libgio-2.0	850
17.12 Data Definitions for libgio-2.0	887
17.13 Interface Definitions for libgio-2.0	1048
17.14 Interfaces for libatk-1.0	1048
17.15 Data Definitions for libatk-1.0.....	1054

17.16	Interface Definitions for libatk-1.0	1079
17.17	Interfaces for libpango-1.0	1079
17.18	Data Definitions for libpango-1.0	1088
17.19	Interfaces for libpangocairo-1.0	1111
17.20	Data Definitions for libpangocairo-1.0	1113
17.21	Interfaces for libpangoft2-1.0	1114
17.22	Data Definitions for libpangoft2-1.0	1115
17.23	Interfaces for libpangoft2-1.0	1117
17.24	Data Definitions for libpangoft2-1.0	1119
17.25	Interfaces for libgdk_pixbuf-2.0	1121
17.26	Data Definitions for libgdk_pixbuf-2.0	1125
17.27	Interfaces for libgdk_pixbuf_xlib-2.0	1133
17.28	Data Definitions for libgdk_pixbuf_xlib-2.0	1134
17.29	Interfaces for libgdk-x11-2.0	1136
17.30	Data Definitions for libgdk-x11-2.0	1149
17.31	Interfaces for libgtk-x11-2.0	1210
17.32	Data Definitions for libgtk-x11-2.0	1272
17.33	Interface Definitions for libgtk-x11-2.0	1479
XIII	Qt Libraries	1482
18	Libraries	1483
18.1	Introduction	1483
18.2	Interfaces for libQtCore	1484
18.3	Data Definitions for libQtCore	1578
18.4	Interface Definitions for libQtCore	1620
18.5	Interfaces for libQtGui	1628
18.6	Data Definitions for libQtGui	2163
18.7	Interface Definitions for libQtGui	2209
18.8	Interfaces for libQtXml	2267
18.9	Data Definitions for libQtXml	2288
18.10	Interfaces for libQtOpenGL	2289
18.11	Data Definitions for libQtOpenGL	2300
18.12	Interface Definitions for libQtOpenGL	2301
18.13	Interfaces for libQtSql	2302
18.14	Data Definitions for libQtSql	2325
18.15	Interface Definitions for libQtSql	2327
18.16	Interfaces for libQtSvg	2328
18.17	Data Definitions for libQtSvg	2334
18.18	Interfaces for libQtNetwork	2335
18.19	Data Definitions for libQtNetwork	2356
18.20	Interface Definitions for libQtNetwork	2360
XIV	ALSA sound library	2362
19	Libraries	2363
19.1	Interfaces for libasound	2363
19.2	Data Definitions for libasound	2386
XV	Desktop Environment	2429
20	Desktop Environment	2430
20.1	Desktop Base Directory	2430
20.2	Desktop Entries	2430
20.3	Desktop Menu Specification	2430
20.4	Icon Theme Specification	2430

21 Desktop Commands.....	2431
21.1 Xdg-utils.....	2431
XVI Package Format and Installation	2432
22 Software Installation.....	2433
22.1 Package Dependencies	2433
Annex A Alphabetical Listing of Interfaces by Library.....	2434
A.1 libGL.....	2434
A.2 libGLU.....	2444
A.3 libICE	2445
A.4 libSM	2446
A.5 libX11	2447
A.6 libXext	2458
A.7 libXft	2460
A.8 libXi.....	2461
A.9 libXrender	2462
A.10 libXt.....	2463
A.11 libXtst.....	2468
A.12 libcairo	2468
A.13 libcairo-gobject	2475
A.14 libcairo-script-interpreter.....	2476
A.15 libfontconfig.....	2476
A.16 libfreetype	2479
A.17 libjpeg.....	2481
A.18 libpng12	2482
A.19 libtiff.....	2485
A.20 libxcb.....	2487
A.21 libatk-1.0	2496
A.22 libgdk-x11-2.0	2500
A.23 libgdk_pixbuf-2.0.....	2510
A.24 libgdk_pixbuf_xlib-2.0	2513
A.25 libgio-2.0	2514
A.26 libglib-2.0	2546
A.27 libgmodule-2.0	2570
A.28 libgobject-2.0	2570
A.29 libgthread-2.0	2578
A.30 libgtk-x11-2.0.....	2578
A.31 libpango-1.0.....	2628
A.32 libpangocairo-1.0	2635
A.33 libpangoft2-1.0.....	2636
A.34 libpangoxft-1.0	2637
A.35 libQtCore	2637
A.36 libQtGui.....	2687
A.37 libQtNetwork.....	2887
A.38 libQtOpenGL.....	2898
A.39 libQtSql	2904
A.40 libQtSvg.....	2913
A.41 libQtXml.....	2915
A.42 libasound	2925

Introduction

The LSB defines a binary interface for application programs that are compiled and packaged for LSB-conforming implementations on many different hardware architectures. A binary specification must include information specific to the computer processor architecture for which it is intended. To avoid the complexity of conditional descriptions, the specification has instead been divided into generic parts which are augmented by one of several architecture-specific parts, depending on the target processor architecture; the generic part will indicate when reference must be made to the architecture part, and vice versa.

This document should be used in conjunction with the documents it references. This document enumerates the system components it includes, but descriptions of those components may be included entirely or partly in this document, partly in other documents, or entirely in other reference documents. For example, the section that describes system service routines includes a list of the system routines supported in this interface, formal declarations of the data structures they use that are visible to applications, and a pointer to the underlying referenced specification for information about the syntax and semantics of each call. Only those routines not described in standards referenced by this document, or extensions to those standards, are described in the detail. Information referenced in this way is as much a part of this document as is the information explicitly included here.

The specification carries a version number of either the form $x.y$ or $x.y.z$. This version number carries the following meaning:

1. The first number (x) is the major version number. Versions sharing the same major version number shall be compatible in a backwards direction; that is, a newer version shall be compatible with an older version. Any deletion of a library results in a new major version number. Interfaces marked as deprecated may be removed from the specification at a major version change.
2. The second number (y) is the minor version number. Libraries and individual interfaces may be added, but not removed. Interfaces may be marked as deprecated at a minor version change. Other minor changes may be permitted at the discretion of the LSB workgroup.
3. The third number (z), if present, is the editorial level. Only editorial changes should be included in such versions.

Since this specification is a descriptive Application Binary Interface, and not a source level API specification, it is not possible to make a guarantee of 100% backward compatibility between major releases. However, it is the intent that those parts of the binary interface that are visible in the source level API will remain backward compatible from version to version, except where a feature marked as "Deprecated" in one release may be removed from a future release. Implementors are strongly encouraged to make use of symbol versioning to permit simultaneous support of applications conforming to different releases of this specification.

LSB is a trademark of the Linux Foundation. Developers of applications or implementations interested in using the trademark should see the Linux Foundation Certification Policy for details.

I Introductory Elements

1 Scope

The Linux Standard Base (LSB) defines a system interface for compiled applications and a minimal environment for support of installation scripts. Its purpose is to enable a uniform industry standard environment for high-volume applications conforming to the LSB.

These specifications are composed of two basic parts: a common part describing those parts of the interface that remain constant across all implementations of the LSB, and an architecture-specific part describing the parts of the interface that vary by processor architecture. Together, the common part and the relevant architecture-specific part for a single hardware architecture provide a complete interface specification for compiled application programs on systems that share a common hardware architecture.

The LSB contains both a set of Application Program Interfaces (APIs) and Application Binary Interfaces (ABIs). APIs may appear in the source code of portable applications, while the compiled binary of that application may use the larger set of ABIs. A conforming implementation provides all of the ABIs listed here. The compilation system may replace (e.g. by macro definition) certain APIs with calls to one or more of the underlying binary interfaces, and may insert calls to binary interfaces as needed.

The LSB is primarily a binary interface definition. Not all of the source level APIs available to applications may be contained in this specification.

This is the common part of the Desktop module of the Linux Standard Base (LSB). This module provides the fundamental system interfaces, libraries, and runtime environment upon which all conforming applications and libraries depend requiring the LSB Desktop module depend.

The common part of LSB Desktop should be used in conjunction with an architecture-specific part. Whenever a section of the common part is supplemented by architecture-specific information, the common part includes a reference to the architecture-specific part. Architecture-specific parts of LSB Desktop may also contain additional information that is not referenced in the common part.

Interfaces described in this part of LSB Desktop are mandatory except where explicitly listed otherwise. Interfaces described in the LSB Desktop module supplement those described in the LSB Core module. They do not depend on other LSB modules.

2 References

2.1 Normative References

The specifications listed below are referenced in whole or in part by the LSB Desktop specification. Such references may be normative or informative; a reference to specification shall only be considered normative if it is explicitly cited as such. The LSB Desktop specification may make normative references to a portion of these specifications (that is, to define a specific function or group of functions); in such cases, only the explicitly referenced portion of the specification is to be considered normative.

Table 2-1 Normative References

Name	Title	URL
ATK 2.2.0 Reference Manual	ATK 2.2.0 Reference Manual	http://developer.gnome.org/atk/2.2/index.html
Double Buffer Extension Library	Double Buffer Extension Library - Protocol Version 1.0	http://refspecs.linuxfoundation.org/X11/dbelbib.pdf
Fontconfig Developers Reference	Fontconfig Developers Reference, Version 2.6.0	http://refspecs.linuxfoundation.org/fontconfig-2.6.0
Gdk 2.10.14 Reference Manual	Gdk 2.10.14 Reference Manual	http://library.gnome.org/devel/gdk/2.10/
Gdk-pixbuf 2.26.0 Reference Manual	Gdk-pixbuf 2.26.0 Reference Manual	http://developer.gnome.org/gdk-pixbuf/2.26
Gio 2.32 Reference Manual	Gio 2.32 Reference Manual	http://developer.gnome.org/gio/2.32
Glib 2.32 Reference Manual	Glib 2.32 Reference Manual	http://developer.gnome.org/glib/2.32
Gobject 2.32 Reference Manual	Gobject 2.32 Reference Manual	http://developer.gnome.org/gobject/2.32
Gtk+ 2.10.14 Reference Manual	Gtk+ 2.10.14 Reference Manual	http://library.gnome.org/devel/gtk/2.10/
ISO C (1999)	ISO/IEC 9899:1999 - Programming Languages -- C	
ISO/IEC 14882: 2003 C++ Language	ISO/IEC 14882: 2003 Programming languages --C++	
Itanium™ C++ ABI	Itanium™ C++ ABI (Revision 1.86)	http://refspecs.linuxfoundation.org/cxxabi-1.86.html
Libtiff 4.0.2 Reference Manual	Libtiff 4.0.2 Reference Manual	http://www.libtiff.org/man/index.html

Name	Title	URL
Libxcb API	Libxcb API	http://xcb.freedesktop.org/XcbApi/
OpenGL 2.1	The OpenGL® Graphics System: A Specification (Version 2.1)	http://www.opengl.org/registry/doc/glspec2.1.20061201.pdf
OpenGL ABI	OpenGL® Application Binary Interface for Linux	http://www.opengl.org/registry/ABI/
OpenGL Extensions	OpenGL® Graphics with the X Window System® (Version 1.3)	http://opengl.org/documentation/specs/gl/gl1.3.pdf
OpenGL Utilities	The OpenGL Graphics System Utility Library (Version 1.3)	http://www.opengl.org/documentation/specs/glu/glu1.3.pdf
Pango 1.30.1 Reference Manual	Pango 1.30.1 Reference Manual	http://developer.gnome.org/pango/1.30/index.html
POSIX 1003.1-2008 (ISO/IEC 9945-2009)	Portable Operating System Interface (POSIX®) 2008 Edition / The Open Group Technical Standard Base Specifications, Issue 7	http://www.unix.org/version4/
QtCore 4.2.0	Qt 4.2.0 Reference Manual	http://doc.qt.digia.com/4.2/qtcore.html
QtGui 4.2.0	Qt 4.2.0 Reference Manual	http://doc.qt.digia.com/4.2/qtgui.html
QtNetwork 4.2.0	Qt 4.2.0 Reference Manual	http://doc.qt.digia.com/4.2/qtnetwork.html
QtOpenGL 4.2.0	Qt 4.2.0 Reference Manual	http://doc.qt.digia.com/4.2/qtopengl.html
QtSql 4.2.0	Qt 4.2.0 Reference Manual	http://doc.qt.digia.com/4.2/qtsql.html
QtSvg 4.2.0	Qt 4.2.0 Reference Manual	http://doc.qt.digia.com/4.2/qtsvg.html
QtXml 4.2.0	Qt 4.2.0 Reference Manual	http://doc.qt.digia.com/4.2/qtqml.html
The MIT Shared Memory Extension	MIT-SHM - The MIT Shared Memory Extension - X version 11, Release 5	http://refspecs.linux-foundation.org/X11/mit-shm.pdf

Name	Title	URL
X Display Power Management Signaling	X Display Power Management Signaling (DPMS) Extension - Library Specification - Version 1.0	http://refspecs.linux-foundation.org/X11/DPMslib.pdf
X Extended Visual Interface Extension	Extended Visual Information Extension - Version 1.0	http://refspecs.linux-foundation.org/X11/evi.pdf
X Nonrectangular Window Shape Extension Library	X Nonrectangular Window Shape Extension Library - Version 1.0	http://refspecs.linux-foundation.org/X11/shapelib.pdf
X Record Extension Library	X Record Extension Library - Version 1.13	http://refspecs.linux-foundation.org/X11/recordlib.pdf
X Security Extension Specification	Security Extension Specification - Version 7.1	http://refspecs.linux-foundation.org/X11/security.pdf
X Synchronization Extension Library	X Synchronization Extension Library - Version 3.0	http://refspecs.linux-foundation.org/X11/syncnlib.pdf
X11 C Library	Xlib - C Language X Interface - X Version 11 Release 6.4	http://refspecs.linux-foundation.org/X11/xlib.pdf
X11 Input Library	X Input Device Extension Library - X Version 11, Release 6.4	http://refspecs.linux-foundation.org/X11/Xinput.pdf
X11 Inter-Client Exchange	Inter-Client Exchange Library - Version 1.0	http://refspecs.linux-foundation.org/X11/ICElib.pdf
X11 Keyboard Extension	X Keyboard Extension Library Specification - X Version 11, Release 6.4	http://refspecs.linux-foundation.org/X11/XKBlib.pdf
X11 Session Management	X Session Management Library - Version 1.0	http://refspecs.linux-foundation.org/X11/SMlib.pdf
X11 Toolkit Intrinsics	X Toolkit Intrinsics - C Language Interface - X Version 11, Release 6.4	http://refspecs.linux-foundation.org/X11/intrinsics.pdf
Xft Placeholder	Xft Specification Placeholder	
Xrender Placeholder	Xrender Specification Placeholder	http://refspecs.linux-foundation.org/X11/XRenderProtocol.html

Name	Title	URL
XTEST Extension Library	XTEST Extension Library - Version 2.2	http://refspecs.linux-foundation.org/X11/xtestlib.pdf

2.2 Informative References/Bibliography

In addition, the specifications listed below provide essential background information to implementors of this specification. These references are included for information only.

Table 2-2 Other References

Name	Title	URL
A description on how to use and modify libpng	A description on how to use and modify libpng	http://www.libpng.org/pub/png/libpng-1.2.5-manual.html
ALSA Library API Reference	ALSA Library API Reference	http://www.alsa-project.org/alsa-doc/alsa-lib/
Base Directory Spec	XDG Base Directory Specification Version 0.6	http://standards.freedesktop.org/basedir-spec/basedir-spec-0.6.html
Cairo API Reference	Cairo Vector Graphics API Specification for 1.12.4	http://cairographics.org/manual-1.12.4
Desktop Entry Spec	Desktop Entry Specification Version 1.0	http://standards.freedesktop.org/desktop-entry-spec/desktop-entry-spec-1.0.html
Desktop Menu Spec	Desktop Menu Specification Version 1.0	http://standards.freedesktop.org/menu-spec/menu-spec-1.0.html
FreeType 2.2 Reference	FreeType 2.2.1 API Reference	http://refspecs.linuxfoundation.org/freetype/freetype-doc-2.2.1/docs/reference/ft2-toc.html
Icon Theme Spec	Icon Theme Specification Version 0.11	http://standards.freedesktop.org/icon-theme-spec/icon-theme-spec-0.11.html
Independent JPEG Group	Independent JPEG Group	http://www.iijg.org/
xdg-utils reference	Portland Project XDG Utilities Reference 1.0	http://portland.freedesktop.org/xdg-utils-1.0/

3 Requirements

3.1 Relevant Libraries

The libraries listed in Table 3-1 shall be available on a Linux Standard Base - Desktop system, with the specified runtime names. This list may be supplemented or amended by the architecture-specific specification.

Table 3-1 Standard Library Names

Library	Runtime Name
libGL	libGL.so.1
libGLU	libGLU.so.1
libICE	libICE.so.6
libQtCore	libQtCore.so.4
libQtGui	libQtGui.so.4
libQtNetwork	libQtNetwork.so.4
libQtOpenGL	libQtOpenGL.so.4
libQtSql	libQtSql.so.4
libQtSvg	libQtSvg.so.4
libQtXml	libQtXml.so.4
libSM	libSM.so.6
libX11	libX11.so.6
libXext	libXext.so.6
libXft	libXft.so.2
libXi	libXi.so.6
libXrender	libXrender.so.1
libXt	libXt.so.6
libXtst	libXtst.so.6
libasound	libasound.so.2
libatk-1.0	libatk-1.0.so.0
libcairo	libcairo.so.2
libcairo-gobject	libcairo-gobject.so.2
libcairo-script-interpreter	libcairo-script-interpreter.so.2
libfontconfig	libfontconfig.so.1
libfreetype	libfreetype.so.6
libgdk-x11-2.0	libgdk-x11-2.0.so.0
libgdk_pixbuf-2.0	libgdk_pixbuf-2.0.so.0
libgdk_pixbuf_xlib-2.0	libgdk_pixbuf_xlib-2.0.so.0

Library	Runtime Name
libgio-2.0	libgio-2.0.so.0
libglib-2.0	libglib-2.0.so.0
libgmodule-2.0	libgmodule-2.0.so.0
libgobject-2.0	libgobject-2.0.so.0
libgthread-2.0	libgthread-2.0.so.0
libgtk-x11-2.0	libgtk-x11-2.0.so.0
libjpeg	libjpeg.so.62
libpango-1.0	libpango-1.0.so.0
libpangocairo-1.0	libpangocairo-1.0.so.0
libpangoft2-1.0	libpangoft2-1.0.so.0
libpangoxft-1.0	libpangoxft-1.0.so.0
libpng12	libpng12.so.0
libtiff	libtiff.so.5
libxcb	libxcb.so.1

These libraries will be in an implementation-defined directory which the dynamic linker shall search by default.

4 Terms and Definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 2382, ISO 80000-2, and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

4.1

archLSB

Some LSB specification documents have both a generic, architecture-neutral part and an architecture-specific part. The latter describes elements whose definitions may be unique to a particular processor architecture. The term archLSB may be used in the generic part to refer to the corresponding section of the architecture-specific part.

4.2

Binary Standard, ABI

The total set of interfaces that are available to be used in the compiled binary code of a conforming application, including the run-time details such as calling conventions, binary format, C++ name mangling, etc.

4.3

Implementation-defined

Describes a value or behavior that is not defined by this document but is selected by an implementor. The value or behavior may vary among implementations that conform to this document. An application should not rely on the existence of the value or behavior. An application that relies on such a value or behavior cannot be assured to be portable across conforming implementations. The implementor shall document such a value or behavior so that it can be used correctly by an application.

4.4

Shell Script

A file that is read by an interpreter (e.g., awk). The first line of the shell script includes a reference to its interpreter binary.

4.5

Source Standard, API

The total set of interfaces that are available to be used in the source code of a conforming application. Due to translations, the Binary Standard and the Source Standard may contain some different interfaces.

4.6

Undefined

Describes the nature of a value or behavior not defined by this document which results from use of an invalid program construct or invalid data input. The value or behavior may vary among implementations that conform to this document. An application should not rely on the existence or validity of the value or behavior. An application that relies on any particular value or behavior cannot be assured to be portable across conforming implementations.

4.7

Unspecified

Describes the nature of a value or behavior not specified by this document which results from use of a valid program construct or valid data input. The value or behavior may vary among implementations that conform to this document. An application should not rely on the existence or validity of the value or behavior. An application that relies on any particular value or behavior cannot be assured to be portable across conforming implementations.

In addition, for the portions of this specification which build on IEEE Std 1003.1-2001, the definitions given in *IEEE Std 1003.1-2001, Base Definitions, Chapter 3* apply.

5 Documentation Conventions

Throughout this document, the following typographic conventions are used:

`function()`

the name of a function

command

the name of a command or utility

CONSTANT

a constant value

parameter

a parameter

variable

a variable

Throughout this specification, several tables of interfaces are presented. Each entry in these tables has the following format:

name

the name of the interface

(symver)

An optional symbol version identifier, if required.

[refno]

A reference number indexing the table of referenced specifications that follows this table.

For example,

forkpty(GLIBC_2.0) [SUSv4]

refers to the interface named `forkpty()` with symbol version `GLIBC_2.0` that is defined in the reference indicated by the tag `SUSv4`.

Note: For symbols with versions which differ between architectures, the symbol versions are defined in the architecture specific parts of of this module specification only. In the generic part, they will appear without symbol versions.

II Graphic Libraries

6 Libraries

The X Libraries should be built thread-safe.

6.1 Interfaces for libX11

Table 6-1 defines the library name and shared object name for the libX11 library

Table 6-1 libX11 Definition

Library:	libX11
SONAME:	libX11.so.6

The behavior of the interfaces in this library is specified by the following specifications:

[LSB] This Specification

[XKBlib] X11 Keyboard Extension

[Xlib] X11 C Library

6.1.1 X Window System Interface

6.1.1.1 Interfaces for X Window System Interface

An LSB conforming implementation shall provide the generic functions for X Window System Interface specified in Table 6-2, with the full mandatory functionality as described in the referenced underlying specification.

Table 6-2 libX11 - X Window System Interface Function Interfaces

XActivateScreen Saver [Xlib]	XAddConnection Watch [Xlib]	XAddExtension [Xlib]	XAddHost [Xlib]
XAddHosts [Xlib]	XAddPixel [Xlib]	XAddToExtensionList [Xlib]	XAddToSaveSet [Xlib]
XAllPlanes [Xlib]	XAllocClassHint [Xlib]	XAllocColor [Xlib]	XAllocColorCells [Xlib]
XAllocColorPlanes [Xlib]	XAllocIconSize [Xlib]	XAllocNamedColor [Xlib]	XAllocSizeHints [Xlib]
XAllocStandardColormap [Xlib]	XAllocWMHints [Xlib]	XAllowEvents [Xlib]	XAutoRepeatOff [Xlib]
XAutoRepeatOn [Xlib]	XBaseFontNameListOfFontSet [Xlib]	XBell [Xlib]	XBitmapBitOrder [Xlib]
XBitmapPad [Xlib]	XBitmapUnit [Xlib]	XBlackPixel [Xlib]	XBlackPixelOfScreen [Xlib]
XCellsOfScreen [Xlib]	XChangeActivePointerGrab [Xlib]	XChangeGC [Xlib]	XChangeKeyboardControl [Xlib]
XChangeKeyboardMapping [Xlib]	XChangePointerControl [Xlib]	XChangeProperty [Xlib]	XChangeSaveSet [Xlib]

XChangeWindowAttributes [Xlib]	XCheckIfEvent [Xlib]	XCheckMaskEvent [Xlib]	XCheckTypedEvent [Xlib]
XCheckTypedWindowEvent [Xlib]	XCheckWindowEvent [Xlib]	XCirculateSubwindows [Xlib]	XCirculateSubwindowsDown [Xlib]
XCirculateSubwindowsUp [Xlib]	XClearArea [Xlib]	XClearWindow [Xlib]	XClipBox [Xlib]
XCloseDisplay [Xlib]	XCloseIM [Xlib]	XCloseOM [Xlib]	XConfigureWindow [Xlib]
XConnectionNumber [Xlib]	XContextDependentDrawing [Xlib]	XContextualDrawing [Xlib]	XConvertCase [Xlib]
XConvertSelection [Xlib]	XCopyArea [Xlib]	XCopyColormapAndFree [Xlib]	XCopyGC [Xlib]
XCopyPlane [Xlib]	XCreateBitmapFromData [Xlib]	XCreateColormap [Xlib]	XCreateFontCursor [Xlib]
XCreateFontSet [Xlib]	XCreateGC [Xlib]	XCreateGlyphCursor [Xlib]	XCreateIC [Xlib]
XCreateImage [Xlib]	XCreateOC [Xlib]	XCreatePixmap [Xlib]	XCreatePixmapCursor [Xlib]
XCreatePixmapFromBitmapData [Xlib]	XCreateRegion [Xlib]	XCreateSimpleWindow [Xlib]	XCreateWindow [Xlib]
XDefaultColormap [Xlib]	XDefaultColormapOfScreen [Xlib]	XDefaultDepth [Xlib]	XDefaultDepthOfScreen [Xlib]
XDefaultGC [Xlib]	XDefaultGCOfScreen [Xlib]	XDefaultRootWindow [Xlib]	XDefaultScreen [Xlib]
XDefaultScreenOfDisplay [Xlib]	XDefaultString [Xlib]	XDefaultVisual [Xlib]	XDefaultVisualOfScreen [Xlib]
XDefineCursor [Xlib]	XDeleteContext [Xlib]	XDeleteModifiermapEntry [Xlib]	XDeleteProperty [Xlib]
XDestroyIC [Xlib]	XDestroyImage [Xlib]	XDestroyOC [Xlib]	XDestroyRegion [Xlib]
XDestroySubwindows [Xlib]	XDestroyWindow [Xlib]	XDirectionalDependentDrawing [Xlib]	XDisableAccessControl [Xlib]
XDisplayCells [Xlib]	XDisplayHeight [Xlib]	XDisplayHeightMM [Xlib]	XDisplayKeycodes [Xlib]
XDisplayMotionBufferSize [Xlib]	XDisplayName [Xlib]	XDisplayOfIM [Xlib]	XDisplayOfOM [Xlib]

XDisplayOfScreen [Xlib]	XDisplayPlanes [Xlib]	XDisplayString [Xlib]	XDisplayWidth [Xlib]
XDisplayWidthMM [Xlib]	XDoesBackingStore [Xlib]	XDoesSaveUnders [Xlib]	XDrawArc [Xlib]
XDrawArcs [Xlib]	XDrawImageString [Xlib]	XDrawImageString16 [Xlib]	XDrawLine [Xlib]
XDrawLines [Xlib]	XDrawPoint [Xlib]	XDrawPoints [Xlib]	XDrawRectangle [Xlib]
XDrawRectangles [Xlib]	XDrawSegments [Xlib]	XDrawString [Xlib]	XDrawString16 [Xlib]
XDrawText [Xlib]	XDrawText16 [Xlib]	XEHeadOfExtensionList [Xlib]	XESetBeforeFlush [Xlib]
XESetCloseDisplay [Xlib]	XESetCopyGC [Xlib]	XESetCreateFont [Xlib]	XESetCreateGC [Xlib]
XESetError [Xlib]	XESetErrorString [Xlib]	XESetEventToWire [Xlib]	XESetFlushGC [Xlib]
XESetFreeFont [Xlib]	XESetFreeGC [Xlib]	XESetPrintErrorValues [Xlib]	XESetWireToError [Xlib]
XESetWireToEvent [Xlib]	XEmptyRegion [Xlib]	XEnableAccessControl [Xlib]	XEqualRegion [Xlib]
XEventMaskOfScreen [Xlib]	XEventsQueued [Xlib]	XExtendedMaxRequestSize [Xlib]	XExtentsOfFontSet [Xlib]
XFetchBuffer [Xlib]	XFetchBytes [Xlib]	XFetchName [Xlib]	XFillArc [Xlib]
XFillArcs [Xlib]	XFillPolygon [Xlib]	XFillRectangle [Xlib]	XFillRectangles [Xlib]
XFilterEvent [Xlib]	XFindContext [Xlib]	XFindOnExtensionList [Xlib]	XFlush [Xlib]
XFlushGC [Xlib]	XFontsOfFontSet [Xlib]	XForceScreenSaver [Xlib]	XFree [Xlib]
XFreeColormap [Xlib]	XFreeColors [Xlib]	XFreeCursor [Xlib]	XFreeExtensionList [Xlib]
XFreeFont [Xlib]	XFreeFontInfo [Xlib]	XFreeFontNames [Xlib]	XFreeFontPath [Xlib]
XFreeFontSet [Xlib]	XFreeGC [Xlib]	XFreeModifiermap [Xlib]	XFreePixmap [Xlib]
XFreeStringList [Xlib]	XGContextFromGC [Xlib]	XGeometry [Xlib]	XGetAtomName [Xlib]
XGetAtomNames [Xlib]	XGetClassHint [Xlib]	XGetCommand [Xlib]	XGetDefault [Xlib]
XGetErrorDatabaseText [Xlib]	XGetErrorText [Xlib]	XGetFontPath [Xlib]	XGetFontProperty [Xlib]

XGetGCValues [Xlib]	XGetGeometry [Xlib]	XGetICValues [Xlib]	XGetIMValues [Xlib]
XGetIconName [Xlib]	XGetIconSizes [Xlib]	XGetImage [Xlib]	XGetInputFocus [Xlib]
XGetKeyboardControl [Xlib]	XGetKeyboardMapping [Xlib]	XGetModifierMapping [Xlib]	XGetMotionEvents [Xlib]
XGetNormalHints [Xlib]	XGetOCValues [Xlib]	XGetOMValues [Xlib]	XGetPixel [Xlib]
XGetPointerControl [Xlib]	XGetPointerMapping [Xlib]	XGetRGBColormaps [Xlib]	XGetScreenSaver [Xlib]
XGetSelectionOwner [Xlib]	XGetSizeHints [Xlib]	XGetStandardColormap [Xlib]	XGetSubImage [Xlib]
XGetTextProperty [Xlib]	XGetTransientForHint [Xlib]	XGetVisualInfo [Xlib]	XGetWMClientMachine [Xlib]
XGetWMColormapWindows [Xlib]	XGetWMHints [Xlib]	XGetWMIconName [Xlib]	XGetWMName [Xlib]
XGetWMNormalHints [Xlib]	XGetWMProtocols [Xlib]	XGetWMSizeHints [Xlib]	XGetWindowAttributes [Xlib]
XGetWindowProperty [Xlib]	XGetZoomHints [Xlib]	XGrabButton [Xlib]	XGrabKey [Xlib]
XGrabKeyboard [Xlib]	XGrabPointer [Xlib]	XGrabServer [Xlib]	XHeightMMOfScreen [Xlib]
XHeightOfScreen [Xlib]	XIMOfIC [Xlib]	XIconifyWindow [Xlib]	XIfEvent [Xlib]
XImageByteOrder [Xlib]	XInitExtension [Xlib]	XInitImage [Xlib]	XInitThreads [Xlib]
XInsertModifiermapEntry [Xlib]	XInstallColormap [Xlib]	XInternAtom [Xlib]	XInternAtoms [Xlib]
XInternalConnectionNumbers [Xlib]	XIntersectRegion [Xlib]	XKeycodeToKeysym [Xlib]	XKeysymToKeycode [Xlib]
XKeysymToString [Xlib]	XKillClient [Xlib]	XLastKnownRequestProcessed [Xlib]	XListDepths [Xlib]
XListExtensions [Xlib]	XListFonts [Xlib]	XListFontsWithInfo [Xlib]	XListHosts [Xlib]
XListInstalledColormaps [Xlib]	XListPixmapFormats [Xlib]	XListProperties [Xlib]	XLoadFont [Xlib]
XLoadQueryFont [Xlib]	XLlocaleOfFontSet [Xlib]	XLlocaleOfIM [Xlib]	XLlocaleOfOM [Xlib]
XLockDisplay [Xlib]	XLookupColor [Xlib]	XLookupKeysym [Xlib]	XLookupString [Xlib]

XLowerWindow [Xlib]	XMapRaised [Xlib]	XMapSubwindows [Xlib]	XMapWindow [Xlib]
XMaskEvent [Xlib]	XMatchVisualInfo [Xlib]	XMaxCmapsOfScreen [Xlib]	XMaxRequestSize [Xlib]
XMinCmapsOfScreen [Xlib]	XMoveResizeWindow [Xlib]	XMoveWindow [Xlib]	XNewModifiermap [Xlib]
XNextEvent [Xlib]	XNextRequest [Xlib]	XNoOp [Xlib]	XOMOfOC [Xlib]
XOffsetRegion [Xlib]	XOpenDisplay [Xlib]	XOpenIM [Xlib]	XOpenOM [Xlib]
XParseColor [Xlib]	XParseGeometry [Xlib]	XPeekEvent [Xlib]	XPeekIfEvent [Xlib]
XPending [Xlib]	XPlanesOfScreen [Xlib]	XPointInRegion [Xlib]	XPolygonRegion [Xlib]
XProcessInternalConnection [Xlib]	XProtocolRevision [Xlib]	XProtocolVersion [Xlib]	XPutBackEvent [Xlib]
XPutImage [Xlib]	XPutPixel [Xlib]	XQLength [Xlib]	XQueryBestCursor [Xlib]
XQueryBestSize [Xlib]	XQueryBestStipple [Xlib]	XQueryBestTile [Xlib]	XQueryColor [Xlib]
XQueryColors [Xlib]	XQueryExtension [Xlib]	XQueryFont [Xlib]	XQueryKeymap [Xlib]
XQueryPointer [Xlib]	XQueryTextExtents [Xlib]	XQueryTextExtents16 [Xlib]	XQueryTree [Xlib]
XRaiseWindow [Xlib]	XReadBitmapFile [Xlib]	XReadBitmapFileData [Xlib]	XRebindKeysym [Xlib]
XRecolorCursor [Xlib]	XReconfigureWindow [Xlib]	XRectInRegion [Xlib]	XRefreshKeyboardMapping [Xlib]
XRegisterIMInstantiateCallback [Xlib]	XRemoveConnectionWatch [Xlib]	XRemoveFromSaveSet [Xlib]	XRemoveHost [Xlib]
XRemoveHosts [Xlib]	XReparentWindow [Xlib]	XResetScreenSaver [Xlib]	XResizeWindow [Xlib]
XResourceManagerString [Xlib]	XRestackWindows [Xlib]	XRootWindow [Xlib]	XRootWindowOfScreen [Xlib]
XRotateBuffers [Xlib]	XRotateWindowProperties [Xlib]	XSaveContext [Xlib]	XScreenCount [Xlib]
XScreenNumberOfScreen [Xlib]	XScreenOfDisplay [Xlib]	XScreenResourceString [Xlib]	XSelectInput [Xlib]
XSendEvent [Xlib]	XServerVendor [Xlib]	XSetAccessControl [Xlib]	XSetAfterFunction [Xlib]

XSetArcMode [Xlib]	XSetAuthorization [Xlib]	XSetBackground [Xlib]	XSetClassHint [Xlib]
XSetClipMask [Xlib]	XSetClipOrigin [Xlib]	XSetClipRectangles [Xlib]	XSetCloseDownMode [Xlib]
XSetCommand [Xlib]	XSetDashes [Xlib]	XSetErrorHandler [Xlib]	XSetFillRule [Xlib]
XSetFillStyle [Xlib]	XSetFont [Xlib]	XSetFontPath [Xlib]	XSetForeground [Xlib]
XSetFunction [Xlib]	XSetGraphicsExposures [Xlib]	XSetICFocus [Xlib]	XSetICValues [Xlib]
XSetIMValues [Xlib]	XSetIOErrorHandler [Xlib]	XSetIconName [Xlib]	XSetIconSizes [Xlib]
XSetInputFocus [Xlib]	XSetLineAttributes [Xlib]	XSetLocaleModifiers [Xlib]	XSetModifierMapping [Xlib]
XSetNormalHints [Xlib]	XSetOCValues [Xlib]	XSetOMValues [Xlib]	XSetPlaneMask [Xlib]
XSetPointerMapping [Xlib]	XSetRGBColormaps [Xlib]	XSetRegion [Xlib]	XSetScreenSaver [Xlib]
XSetSelectionOwner [Xlib]	XSetSizeHints [Xlib]	XSetStandardColormap [Xlib]	XSetStandardProperties [Xlib]
XSetState [Xlib]	XSetStipple [Xlib]	XSetSubwindowMode [Xlib]	XSetTSTOrigin [Xlib]
XSetTextProperty [Xlib]	XSetTile [Xlib]	XSetTransientForHint [Xlib]	XSetWMClientMachine [Xlib]
XSetWMColormapWindows [Xlib]	XSetWMHints [Xlib]	XSetWMIconName [Xlib]	XSetWMName [Xlib]
XSetWMNormalHints [Xlib]	XSetWMProperties [Xlib]	XSetWMProtocol [Xlib]	XSetWMSizeHints [Xlib]
XSetWindowBackground [Xlib]	XSetWindowBackgroundPixmap [Xlib]	XSetWindowBorder [Xlib]	XSetWindowBorderPixmap [Xlib]
XSetWindowBorderWidth [Xlib]	XSetWindowColormap [Xlib]	XSetZoomHints [Xlib]	XShrinkRegion [Xlib]
XStoreBuffer [Xlib]	XStoreBytes [Xlib]	XStoreColor [Xlib]	XStoreColors [Xlib]
XStoreName [Xlib]	XStoreNamedColor [Xlib]	XStringListToTextProperty [Xlib]	XStringToKeySym [Xlib]
XSubImage [Xlib]	XSubtractRegion [Xlib]	XSupportsLocale [Xlib]	XSync [Xlib]
XSynchronize [Xlib]	XTextExtents [Xlib]	XTextExtents16 [Xlib]	XTextPropertyToStringList [Xlib]

XTextWidth [Xlib]	XTextWidth16 [Xlib]	XTranslateCoordinates [Xlib]	XUndefineCursor [Xlib]
XUngrabButton [Xlib]	XUngrabKey [Xlib]	XUngrabKeyboard [Xlib]	XUngrabPointer [Xlib]
XUngrabServer [Xlib]	XUninstallColor map [Xlib]	XUnionRectWithRegion [Xlib]	XUnionRegion [Xlib]
XUnloadFont [Xlib]	XUnlockDisplay [Xlib]	XUnmapSubwindows [Xlib]	XUnmapWindow [Xlib]
XUnregisterIMInstantiateCallback [Xlib]	XUnsetICFocus [Xlib]	XVaCreateNestedList [Xlib]	XVendorRelease [Xlib]
XVisualIDFromVisual [Xlib]	XWMGeometry [Xlib]	XWarpPointer [Xlib]	XWhitePixel [Xlib]
XWhitePixelOfScreen [Xlib]	XWidthMMOfScreen [Xlib]	XWidthOfScreen [Xlib]	XWindowEvent [Xlib]
XWithdrawWindow [Xlib]	XWriteBitmapFile [Xlib]	XXorRegion [Xlib]	XauDisposeAuth [Xlib]
XauFileName [Xlib]	XauGetBestAuthByAddr [Xlib]	XauReadAuth [Xlib]	XcmsAddColorSpace [Xlib]
XcmsAddFunctionSet [Xlib]	XcmsAllocColor [Xlib]	XcmsAllocNamedColor [Xlib]	XcmsCCCOfColor map [Xlib]
XcmsCIELabClipL [Xlib]	XcmsCIELabClipLab [Xlib]	XcmsCIELabClipab [Xlib]	XcmsCIELabQueryMaxC [Xlib]
XcmsCIELabQueryMaxL [Xlib]	XcmsCIELabQueryMaxLC [Xlib]	XcmsCIELabQueryMinL [Xlib]	XcmsCIELabToCIEXYZ [Xlib]
XcmsCIELabWhiteShiftColors [Xlib]	XcmsCIELuvClipL [Xlib]	XcmsCIELuvClipLuv [Xlib]	XcmsCIELuvClipuv [Xlib]
XcmsCIELuvQueryMaxC [Xlib]	XcmsCIELuvQueryMaxL [Xlib]	XcmsCIELuvQueryMaxLC [Xlib]	XcmsCIELuvQueryMinL [Xlib]
XcmsCIELuvToCIEuvY [Xlib]	XcmsCIELuvWhiteShiftColors [Xlib]	XcmsCIEXYZToCIELab [Xlib]	XcmsCIEXYZToCIEuvY [Xlib]
XcmsCIEXYZToCIExyY [Xlib]	XcmsCIEXYZToRGBi [Xlib]	XcmsCIEuvYToCIELuv [Xlib]	XcmsCIEuvYToCIEXYZ [Xlib]
XcmsCIEuvYToTekHVC [Xlib]	XcmsCIExyYToCIEXYZ [Xlib]	XcmsClientWhitePointOfCCC [Xlib]	XcmsConvertColors [Xlib]
XcmsCreateCCC [Xlib]	XcmsDefaultCCC [Xlib]	XcmsDisplayOfCCC [Xlib]	XcmsFormatOfPrefix [Xlib]
XcmsFreeCCC [Xlib]	XcmsLookupColor [Xlib]	XcmsPrefixOfFormat [Xlib]	XcmsQueryBlack [Xlib]

XcmsQueryBlue [Xlib]	XcmsQueryColor [Xlib]	XcmsQueryColors [Xlib]	XcmsQueryGreen [Xlib]
XcmsQueryRed [Xlib]	XcmsQueryWhite [Xlib]	XcmsRGBToRGBi [Xlib]	XcmsRGBiToCIEXYZ [Xlib]
XcmsRGBiToRGB [Xlib]	XcmsScreenNumberOfCCC [Xlib]	XcmsScreenWhitePointOfCCC [Xlib]	XcmsSetCCCOColorMap [Xlib]
XcmsSetCompressionProc [Xlib]	XcmsSetWhiteAdjustProc [Xlib]	XcmsSetWhitePoint [Xlib]	XcmsStoreColor [Xlib]
XcmsStoreColors [Xlib]	XcmsTekHVCClipC [Xlib]	XcmsTekHVCClipV [Xlib]	XcmsTekHVCClipVC [Xlib]
XcmsTekHVCQueryMaxC [Xlib]	XcmsTekHVCQueryMaxV [Xlib]	XcmsTekHVCQueryMaxVC [Xlib]	XcmsTekHVCQueryMaxVSamples [Xlib]
XcmsTekHVCQueryMinV [Xlib]	XcmsTekHVCToCI EuV [Xlib]	XcmsTekHVCWhiteShiftColors [Xlib]	XcmsVisualOfCCC [Xlib]
XkbAllocClientMap [XKLib]	XkbAllocCompatMap [XKLib]	XkbAllocControls [XKLib]	XkbAllocGeomColors [XKLib]
XkbAllocGeomDoodads [XKLib]	XkbAllocGeomKeyAliases [XKLib]	XkbAllocGeomKeys [XKLib]	XkbAllocGeomOutlines [XKLib]
XkbAllocGeomOverlayKeys [XKLib]	XkbAllocGeomOverlayRows [XKLib]	XkbAllocGeomOverlays [XKLib]	XkbAllocGeomPoints [XKLib]
XkbAllocGeomProps [XKLib]	XkbAllocGeomRows [XKLib]	XkbAllocGeomSectionDoodads [XKLib]	XkbAllocGeomSections [XKLib]
XkbAllocGeomShapes [XKLib]	XkbAllocGeometry [XKLib]	XkbAllocIndicatorMaps [XKLib]	XkbAllocKeyboard [XKLib]
XkbAllocNames [XKLib]	XkbAllocServerMap [XKLib]	XkbApplyCompatMapToKey [XKLib]	XkbBell [XKLib]
XkbBellEvent [XKLib]	XkbChangeEnabledControls [XKLib]	XkbChangeMap [XKLib]	XkbChangeNames [XKLib]
XkbChangeTypesOfKey [XKLib]	XkbComputeEffectiveMap [XKLib]	XkbComputeRowBounds [XKLib]	XkbComputeSectionBounds [XKLib]
XkbComputeShapeBounds [XKLib]	XkbComputeShapeTop [XKLib]	XkbCopyKeyType [XKLib]	XkbCopyKeyTypes [XKLib]
XkbFindOverlayForKey [XKLib]	XkbForceBell [XKLib]	XkbFreeClientMap [XKLib]	XkbFreeCompatMap [XKLib]

XkbFreeComponentList [XKBlib]	XkbFreeControls [XKBlib]	XkbFreeGeomColors [XKBlib]	XkbFreeGeomDodads [XKBlib]
XkbFreeGeomKeyAliases [XKBlib]	XkbFreeGeomKeys [XKBlib]	XkbFreeGeomOutlines [XKBlib]	XkbFreeGeomOverlayKeys [XKBlib]
XkbFreeGeomOverlayRows [XKBlib]	XkbFreeGeomOverlays [XKBlib]	XkbFreeGeomPoints [XKBlib]	XkbFreeGeomProperties [XKBlib]
XkbFreeGeomRows [XKBlib]	XkbFreeGeomSections [XKBlib]	XkbFreeGeomShapes [XKBlib]	XkbFreeGeometry [XKBlib]
XkbFreeIndicatorMaps [XKBlib]	XkbFreeKeyboard [XKBlib]	XkbFreeNames [XKBlib]	XkbFreeServerMap [XKBlib]
XkbGetAutoRepeatRate [XKBlib]	XkbGetCompatMap [XKBlib]	XkbGetControls [XKBlib]	XkbGetGeometry [XKBlib]
XkbGetIndicatorMap [XKBlib]	XkbGetIndicatorState [XKBlib]	XkbGetKeyActions [XKBlib]	XkbGetKeyBehaviors [XKBlib]
XkbGetKeyExplicitComponents [XKBlib]	XkbGetKeyModifierMap [XKBlib]	XkbGetKeySyms [XKBlib]	XkbGetKeyTypes [XKBlib]
XkbGetKeyboard [XKBlib]	XkbGetKeyboardByName [XKBlib]	XkbGetMap [XKBlib]	XkbGetMapChanges [XKBlib]
XkbGetNamedGeometry [XKBlib]	XkbGetNamedIndicator [XKBlib]	XkbGetNames [XKBlib]	XkbGetPerClientControls [XKBlib]
XkbGetState [XKBlib]	XkbGetUpdatedMap [XKBlib]	XkbGetVirtualMods [XKBlib]	XkbGetXlibControls [XKBlib]
XkbIgnoreExtension [XKBlib]	XkbInitCanonicalKeyTypes [XKBlib]	XkbKeyTypesForCoreSymbols [XKBlib]	XkbKeycodeToKeysym [XKBlib]
XkbKeysymToModifiers [XKBlib]	XkbLatchGroup [XKBlib]	XkbLatchModifiers [XKBlib]	XkbLibraryVersion [XKBlib]
XkbListComponents [XKBlib]	XkbLockGroup [XKBlib]	XkbLockModifiers [XKBlib]	XkbLookupKeyBinding [XKBlib]
XkbLookupKeySym [XKBlib]	XkbNoteControlsChanges [XKBlib]	XkbNoteMapChanges [XKBlib]	XkbNoteNameChanges [XKBlib]
XkbOpenDisplay [XKBlib]	XkbQueryExtension [XKBlib]	XkbRefreshKeyboardMapping [XKBlib]	XkbResizeKeyActions [XKBlib]
XkbResizeKeySyms [XKBlib]	XkbResizeKeyType [XKBlib]	XkbSelectEventDetails [XKBlib]	XkbSelectEvents [XKBlib]

XkbSetAtomFuncs [XKBLib]	XkbSetAutoRepeatRate [XKBLib]	XkbSetAutoResetControls [XKBLib]	XkbSetCompatMap [XKBLib]
XkbSetControls [XKBLib]	XkbSetDebuggingFlags [XKBLib]	XkbSetDetectableAutoRepeat [XKBLib]	XkbSetGeometry [XKBLib]
XkbSetIgnoreLockMods [XKBLib]	XkbSetIndicatorMap [XKBLib]	XkbSetMap [XKBLib]	XkbSetNamedIndicator [XKBLib]
XkbSetNames [XKBLib]	XkbSetPerClientControls [XKBLib]	XkbSetServerInternalMods [XKBLib]	XkbSetXlibControls [XKBLib]
XkbToControl [XKBLib]	XkbTranslateKeyCode [XKBLib]	XkbTranslateKeySym [XKBLib]	XkbUpdateMapFromCore [XKBLib]
XkbUseExtension [XKBLib]	XkbVirtualModsToReal [XKBLib]	XmbDrawImageString [Xlib]	XmbDrawString [Xlib]
XmbDrawText [Xlib]	XmbLookupString [Xlib]	XmbResetIC [Xlib]	XmbSetWMProperties [Xlib]
XmbTextEscapement [Xlib]	XmbTextExtents [Xlib]	XmbTextListToTextProperty [Xlib]	XmbTextPerCharExtents [Xlib]
XmbTextPropertyToTextList [Xlib]	XrmCombineDatabase [Xlib]	XrmCombineFileDatabase [Xlib]	XrmDestroyDatabase [Xlib]
XrmEnumerateDatabase [Xlib]	XrmGetDatabase [Xlib]	XrmGetFileDatabase [Xlib]	XrmGetResource [Xlib]
XrmGetStringDatabase [Xlib]	XrmInitialize [Xlib]	XrmLocaleOfDatabase [Xlib]	XrmMergeDatabases [Xlib]
XrmParseCommand [Xlib]	XrmPermStringToQuark [Xlib]	XrmPutFileDatabase [Xlib]	XrmPutLineResource [Xlib]
XrmPutResource [Xlib]	XrmPutStringResource [Xlib]	XrmQGetResource [Xlib]	XrmQGetSearchList [Xlib]
XrmQGetSearchResource [Xlib]	XrmQPutResource [Xlib]	XrmQPutStringResource [Xlib]	XrmQuarkToString [Xlib]
XrmSetDatabase [Xlib]	XrmStringToBindingQuarkList [Xlib]	XrmStringToQuark [Xlib]	XrmStringToQuarkList [Xlib]
XrmUniqueQuark [Xlib]	Xutf8TextListToTextProperty [LSB]	Xutf8TextPropertyToTextList [LSB]	XwcDrawImageString [Xlib]
XwcDrawString [Xlib]	XwcDrawText [Xlib]	XwcFreeStringList [Xlib]	XwcLookupString [Xlib]

XwcResetIC [Xlib]	XwcTextEscape ment [Xlib]	XwcTextExtents [Xlib]	XwcTextListToTextProperty [Xlib]
XwcTextPerChar Extents [Xlib]	XwcTextProperty ToTextList [Xlib]		

6.2 Data Definitions for libX11

This section defines global identifiers and their values that are associated with interfaces contained in libX11. These definitions are organized into groups that correspond to system headers. This convention is used as a convenience for the reader, and does not imply the existence of these headers, or their content. Where an interface is defined as requiring a particular system header file all of the data definitions for that system header file presented here shall be in effect.

This section gives data definitions to promote binary application portability, not to repeat source interface definitions available elsewhere. System providers and application developers should use this ABI to supplement - not to replace - source interface definition specifications.

This specification uses the ISO C (1999) C Language as the reference programming language, and data definitions are specified in ISO C format. The C language is used here as a convenient notation. Using a C language description of these data objects does not preclude their use by other programming languages.

6.2.1 X11/X.h

```
#define X_PROTOCOL_REVISION    0
#define X_PROTOCOL            11

typedef unsigned long int XID;
typedef unsigned long int Mask;
typedef unsigned long int Atom;
typedef unsigned long int VisualID;
typedef unsigned long int Time;
typedef XID Window;
typedef XID Font;
typedef XID Pixmap;
typedef unsigned char KeyCode;
typedef XID Drawable;
typedef XID Cursor;
typedef XID Colormap;
typedef XID GCContext;
typedef XID KeySym;

#define AllTemporary    0L
#define AnyButton      0L
#define AnyKey         0L
#define AnyPropertyType 0L
#define CopyFromParent 0L
#define CurrentTime    0L
#define NoSymbol        0L
#define None           0L
#define PointerWindow  0L
#define InputFocus      1L
#define ParentRelative 1L
#define PointerRoot     1L

#define KeyPressMask    (1L<<0)
```

```

#define KeyReleaseMask (1L<<1)
#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 ButtonPressMask (1L<<2)
#define SubstructureRedirectMask (1L<<20)
#define FocusChangeMask (1L<<21)
#define PropertyChangeMask (1L<<22)
#define ColormapChangeMask (1L<<23)
#define OwnerGrabButtonMask (1L<<24)
#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 NoEventMask 0L
#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 KeyPress 2
#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 KeyRelease 3
#define SelectionRequest 30
#define SelectionNotify 31
#define ColormapNotify 32
#define ClientMessage 33
#define MappingNotify 34
#define LASTEvent 35
#define ButtonPress 4
#define ButtonRelease 5
#define MotionNotify 6
#define EnterNotify 7
#define LeaveNotify 8
#define FocusIn 9

#define ShiftMask (1<<0)
#define LockMask (1<<1)
#define ControlMask (1<<2)
#define Mod1Mask (1<<3)
#define Mod2Mask (1<<4)

```

```

#define Mod3Mask      (1<<5)
#define Mod4Mask      (1<<6)
#define Mod5Mask      (1<<7)

#define ShiftMapIndex  0
#define LockMapIndex   1
#define ControlMapIndex 2
#define Mod1MapIndex   3
#define Mod2MapIndex   4
#define Mod3MapIndex   5
#define Mod4MapIndex   6
#define Mod5MapIndex   7

#define Button3Mask     (1<<10)
#define Button4Mask     (1<<11)
#define Button5Mask     (1<<12)
#define AnyModifier     (1<<15)
#define Button1Mask     (1<<8)
#define Button2Mask     (1<<9)

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

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

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

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

#define PlaceOnTop 0
#define PlaceOnBottom 1

#define FamilyInternet 0
#define FamilyDECnet 1
#define FamilyChaos 2
#define FamilyServerInterpreted 5
#define FamilyInternet6 6 /* IPv6 */

#define PropModeReplace 0
#define PropertyNewValue 0
#define PropertyDelete 1

#define ColormapUninstalled 0
#define ColormapInstalled 1

#define GrabModeSync 0
#define GrabModeAsync 1

#define GrabSuccess 0
#define AlreadyGrabbed 1

```

```

#define GrabInvalidTime 2
#define GrabNotViewable 3
#define GrabFrozen 4

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

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

#define Success 0
#define BadRequest 1
#define BadAccess 10
#define BadAlloc 11
#define BadColor 12
#define FirstExtensionError 128
#define BadGC 13
#define BadIDChoice 14
#define BadName 15
#define BadLength 16
#define BadImplementation 17
#define BadValue 2
#define LastExtensionError 255
#define BadWindow 3
#define BadPixmap 4
#define BadAtom 5
#define BadCursor 6
#define BadFont 7
#define BadMatch 8
#define BadDrawable 9

#define CWX (1<<0)
#define InputOutput 1
#define InputOnly 2

#define CWBackPixmap (1L<<0)
#define CWBackPixel (1L<<1)
#define CWSaveUnder (1L<<10)
#define CWEventMask (1L<<11)
#define CWDontPropagate (1L<<12)
#define CWColormap (1L<<13)
#define CWCursor (1L<<14)
#define CWBorderPixmap (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 CWOverrideRedirect (1L<<9)

#define CWY (1<<1)
#define CWWidth (1<<2)
#define CWHeight (1<<3)
#define CWBorderWidth (1<<4)
#define CWSibling (1<<5)
#define CWStackMode (1<<6)

#define ForgetGravity 0

```

```

#define UnmapGravity      0
#define NorthWestGravity 1
#define StaticGravity    10
#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 NotUseful        0
#define WhenMapped      1
#define Always          2

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

#define SetModeInsert   0
#define SetModeDelete  1

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

#define Above    0
#define Below    1
#define TopIf    2
#define BottomIf 3
#define Opposite 4

#define RaiseLowest    0
#define LowerHighest   1

#define PropModePrepend 1
#define PropModeAppend  2

#define GXclear 0x0
#define GXand   0x1
#define GXandReverse 0x2
#define GXcopy  0x3
#define GXandInverted 0x4
#define GXnoop  0x5
#define GXxor   0x6
#define GXor    0x7
#define GXnor   0x8
#define GXequiv 0x9
#define GXinvert 0xa
#define GXorReverse 0xb
#define GXcopyInverted 0xc
#define GXorInverted 0xd
#define GXnand 0xe
#define GXset  0xf

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

#define CapNotLast      0
#define CapButt         1
#define CapRound        2
#define CapProjecting   3

#define JoinMiter      0

```

```

#define JoinRound      1
#define JoinBevel      2

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

#define EvenOddRule     0
#define WindingRule     1

#define ClipByChildren  0
#define IncludeInferiors 1

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

#define CoordModeOrigin 0
#define CoordModePrevious 1

#define Complex 0
#define Nonconvex 1
#define Convex 2

#define ArcChord 0
#define ArcPieSlice 1

#define GCFunction (1L<<0)
#define GCPlaneMask (1L<<1)
#define GCTile (1L<<10)
#define GCStipple (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 GCForeground (1L<<2)
#define GCDashOffset (1L<<20)
#define GCDashList (1L<<21)
#define GCArcMode (1L<<22)
#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 GCLastBit 22
#define FontChange 255

#define FontLeftToRight 0
#define FontRightToLeft 1

#define XYPixmap 1
#define ZPixmap 2

#define AllocNone 0
#define AllocAll 1

#define DoRed (1<<0)

```

```

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

#define CursorShape 0
#define TileShape 1
#define StippleShape 2

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

#define KBKeyClickPercent (1L<<0)
#define KBBellPercent (1L<<1)
#define KBBellPitch (1L<<2)
#define KBBellDuration (1L<<3)
#define KBLed (1L<<4)
#define KBLedMode (1L<<5)
#define KBKey (1L<<6)
#define KBAutoRepeatMode (1L<<7)
#define MappingModifier 0
#define MappingSuccess 0
#define MappingBusy 1
#define MappingKeyboard 1
#define MappingFailed 2
#define MappingPointer 2

#define DisableScreenInterval 0
#define DisableScreenSaver 0
#define DontAllowExposures 0
#define DontPreferBlanking 0
#define AllowExposures 1
#define PreferBlanking 1
#define DefaultBlanking 2
#define DefaultExposures 2

#define ScreenSaverReset 0
#define ScreenSaverActive 1

#define HostInsert 0
#define HostDelete 1

#define DisableAccess 0
#define EnableAccess 1

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

#define LSBFirst 0
#define MSBFirst 1

```

6.2.2 X11/XKBlib.h

```

#define _XKBLIB_H_
#define XkbNoteIndicatorMapChanges(o,n,w) ((o) -
>map_changes|=((n)->map_changes&(w)))
#define XkbNoteIndicatorStateChanges(o,n,w) ((o) -
>state_changes|=((n)->state_changes&(w)))
#define XkbLC_AllComposeControls (0xc0000000)
#define XkbLC_AllControls (0xc000001f)

```

```

#define XkbLC_ForceLatin1Lookup (1<<0)
#define XkbLC_ConsumeLookupMods (1<<1)
#define XkbLC_AlwaysConsumeShiftAndLock (1<<2)
#define XkbLC_ConsumeKeysOnComposeFail (1<<29)
#define XkbLC_IgnoreNewKeyboards (1<<3)
#define XkbLC_ComposeLED (1<<30)
#define XkbLC_BeepOnComposeFail (1<<31)
#define XkbLC_ControlFallback (1<<4)
#define XkbGetIndicatorMapChanges(d,x,c)
(XkbGetIndicatorMap((d),(c)->map_changes,x))
#define XkbChangeIndicatorMaps(d,x,c)
(XkbSetIndicatorMap((d),(c)->map_changes,x))
#define XkbOD_Success 0
#define XkbOD_BadLibraryVersion 1
#define XkbOD_ConnectionRefused 2
#define XkbOD_NonXkbServer 3
#define XkbOD_BadServerVersion 4
#define XkbGetControlsChanges(d,x,c) XkbGetControls(d,(c)-
>changed_ctrls,x)
#define XkbChangeControls(d,x,c) XkbSetControls(d,(c)-
>changed_ctrls,x)

typedef struct _XkbAnyEvent {
    int type;
    unsigned long int serial;
    int send_event;
    Display *display;
    Time time;
    int xkb_type;
    unsigned int device;
} XkbAnyEvent;
typedef struct _XkbNewKeyboardNotify {
    int type;
    unsigned long int serial;
    int send_event;
    Display *display;
    Time time;
    int xkb_type;
    int device;
    int old_device;
    int min_key_code;
    int max_key_code;
    int old_min_key_code;
    int old_max_key_code;
    unsigned int changed;
    char req_major;
    char req_minor;
} XkbNewKeyboardNotifyEvent;
typedef struct _XkbMapNotifyEvent {
    int type;
    unsigned long int serial;
    int send_event;
    Display *display;
    Time time;
    int xkb_type;
    int device;
    unsigned int changed;
    unsigned int flags;
    int first_type;
    int num_types;
    KeyCode min_key_code;
    KeyCode max_key_code;
    KeyCode first_key_sym;
    KeyCode first_key_act;
    KeyCode first_key_behavior;
    KeyCode first_key_explicit;

```

```

        KeyCode first_modmap_key;
        KeyCode first_vmodmap_key;
        int num_key_syms;
        int num_key_acts;
        int num_key_behaviors;
        int num_key_explicit;
        int num_modmap_keys;
        int num_vmodmap_keys;
        unsigned int vmods;
    } XkbMapNotifyEvent;
typedef struct _XkbStateNotifyEvent {
    int type;
    unsigned long int serial;
    int send_event;
    Display *display;
    Time time;
    int xkb_type;
    int device;
    unsigned int changed;
    int group;
    int base_group;
    int latched_group;
    int locked_group;
    unsigned int mods;
    unsigned int base_mods;
    unsigned int latched_mods;
    unsigned int locked_mods;
    int compat_state;
    unsigned char grab_mods;
    unsigned char compat_grab_mods;
    unsigned char lookup_mods;
    unsigned char compat_lookup_mods;
    int ptr_buttons;
    KeyCode keycode;
    char event_type;
    char req_major;
    char req_minor;
} XkbStateNotifyEvent;
typedef struct _XkbControlsNotify {
    int type;
    unsigned long int serial;
    int send_event;
    Display *display;
    Time time;
    int xkb_type;
    int device;
    unsigned int changed_ctrls;
    unsigned int enabled_ctrls;
    unsigned int enabled_ctrl_changes;
    int num_groups;
    KeyCode keycode;
    char event_type;
    char req_major;
    char req_minor;
} XkbControlsNotifyEvent;
typedef struct _XkbIndicatorNotify {
    int type;
    unsigned long int serial;
    int send_event;
    Display *display;
    Time time;
    int xkb_type;
    int device;
    unsigned int changed;
    unsigned int state;
} XkbIndicatorNotifyEvent;

```

```

typedef struct _XkbNamesNotify {
    int type;
    unsigned long int serial;
    int send_event;
    Display *display;
    Time time;
    int xkb_type;
    int device;
    unsigned int changed;
    int first_type;
    int num_types;
    int first_lvl;
    int num_lvls;
    int num_aliases;
    int num_radio_groups;
    unsigned int changed_vmods;
    unsigned int changed_groups;
    unsigned int changed_indicators;
    int first_key;
    int num_keys;
} XkbNamesNotifyEvent;
typedef struct _XkbCompatMapNotify {
    int type;
    unsigned long int serial;
    int send_event;
    Display *display;
    Time time;
    int xkb_type;
    int device;
    unsigned int changed_groups;
    int first_si;
    int num_si;
    int num_total_si;
} XkbCompatMapNotifyEvent;
typedef struct _XkbBellNotify {
    int type;
    unsigned long int serial;
    int send_event;
    Display *display;
    Time time;
    int xkb_type;
    int device;
    int percent;
    int pitch;
    int duration;
    int bell_class;
    int bell_id;
    Atom name;
    Window window;
    int event_only;
} XkbBellNotifyEvent;
typedef struct _XkbActionMessage {
    int type;
    unsigned long int serial;
    int send_event;
    Display *display;
    Time time;
    int xkb_type;
    int device;
    KeyCode keycode;
    int press;
    int key_event_follows;
    int group;
    unsigned int mods;
    char message;
} XkbActionMessageEvent;

```

```

typedef struct _XkbAccessXNotify {
    int type;
    unsigned long int serial;
    int send_event;
    Display *display;
    Time time;
    int xkb_type;
    int device;
    int detail;
    int keycode;
    int sk_delay;
    int debounce_delay;
} XkbAccessXNotifyEvent;
typedef struct _XkbExtensionDeviceNotify {
    int type;
    unsigned long int serial;
    int send_event;
    Display *display;
    Time time;
    int xkb_type;
    int device;
    unsigned int reason;
    unsigned int supported;
    unsigned int unsupported;
    int first_btn;
    int num_btns;
    unsigned int leds_defined;
    unsigned int led_state;
    int led_class;
    int led_id;
} XkbExtensionDeviceNotifyEvent;
union _XkbEvent {
    int type;
    XkbAnyEvent any;
    XkbNewKeyboardNotifyEvent new_kbd;
    XkbMapNotifyEvent map;
    XkbStateNotifyEvent state;
    XkbControlsNotifyEvent ctrls;
    XkbIndicatorNotifyEvent indicators;
    XkbNamesNotifyEvent names;
    XkbCompatMapNotifyEvent compat;
    XkbBellNotifyEvent bell;
    XkbActionMessageEvent message;
    XkbAccessXNotifyEvent accessx;
    XkbExtensionDeviceNotifyEvent device;
    XEvent core;
};
typedef union _XkbEvent {
    int type;
    XkbAnyEvent any;
    XkbNewKeyboardNotifyEvent new_kbd;
    XkbMapNotifyEvent map;
    XkbStateNotifyEvent state;
    XkbControlsNotifyEvent ctrls;
    XkbIndicatorNotifyEvent indicators;
    XkbNamesNotifyEvent names;
    XkbCompatMapNotifyEvent compat;
    XkbBellNotifyEvent bell;
    XkbActionMessageEvent message;
    XkbAccessXNotifyEvent accessx;
    XkbExtensionDeviceNotifyEvent device;
    XEvent core;
} XkbEvent;
typedef struct _XkbKbdDpyState XkbKbdDpyStateRec;
typedef struct _XkbKbdDpyState *XkbKbdDpyStatePtr;
typedef Atom(*XkbInternAtomFunc) (Display *, const char *, int);

```

```

typedef char *(*XkbGetAtomNameFunc) (Display *, Atom);
extern int XkbAllocClientMap(XkbDescPtr, unsigned int, unsigned
int);
extern int XkbAllocCompatMap(XkbDescPtr, unsigned int, unsigned
int);
extern int XkbAllocControls(XkbDescPtr, unsigned int);
extern int XkbAllocIndicatorMaps(XkbDescPtr);
extern XkbDescPtr XkbAllocKeyboard(void);
extern int XkbAllocNames(XkbDescPtr, unsigned int, int, int);
extern int XkbAllocServerMap(XkbDescPtr, unsigned int, unsigned
int);
extern int XkbApplyCompatMapToKey(XkbDescPtr, KeyCode,
XkbChangesPtr);
extern int XkbBell(Display *, Window, int, Atom);
extern int XkbBellEvent(Display *, Window, int, Atom);
extern int XkbChangeEnabledControls(Display *, unsigned int,
unsigned int,
unsigned int);
extern int XkbChangeMap(Display *, XkbDescPtr, XkbMapChangesPtr);
extern int XkbChangeNames(Display *, XkbDescPtr, XkbNameChangesPtr);
extern int XkbChangeTypesOfKey(XkbDescPtr, int, int, unsigned int,
int *,
XkbMapChangesPtr);
extern int XkbComputeEffectiveMap(XkbDescPtr, XkbKeyTypePtr,
unsigned char *);
extern int XkbCopyKeyType(XkbKeyTypePtr, XkbKeyTypePtr);
extern int XkbCopyKeyTypes(XkbKeyTypePtr, XkbKeyTypePtr, int);
extern int XkbForceBell(Display *, int);
extern void XkbFreeClientMap(XkbDescPtr, unsigned int, int);
extern void XkbFreeCompatMap(XkbDescPtr, unsigned int, int);
extern void XkbFreeComponentList(XkbComponentListPtr);
extern void XkbFreeControls(XkbDescPtr, unsigned int, int);
extern void XkbFreeIndicatorMaps(XkbDescPtr);
extern void XkbFreeKeyboard(XkbDescPtr, unsigned int, int);
extern void XkbFreeNames(XkbDescPtr, unsigned int, int);
extern void XkbFreeServerMap(XkbDescPtr, unsigned int, int);
extern int XkbGetAutoRepeatRate(Display *, unsigned int, unsigned
int *,
unsigned int *);
extern int XkbGetCompatMap(Display *, unsigned int, XkbDescPtr);
extern int XkbGetControls(Display *, unsigned long int, XkbDescPtr);
extern int XkbGetIndicatorMap(Display *, unsigned long int,
XkbDescPtr);
extern int XkbGetIndicatorState(Display *, unsigned int, unsigned
int *);
extern int XkbGetKeyActions(Display *, unsigned int, unsigned int,
XkbDescPtr);
extern int XkbGetKeyBehaviors(Display *, unsigned int, unsigned int,
XkbDescPtr);
extern int XkbGetKeyExplicitComponents(Display *, unsigned int,
unsigned int, XkbDescPtr);
extern int XkbGetKeyModifierMap(Display *, unsigned int, unsigned
int,
XkbDescPtr);
extern int XkbGetKeySyms(Display *, unsigned int, unsigned int,
XkbDescPtr);
extern int XkbGetKeyTypes(Display *, unsigned int, unsigned int,
XkbDescPtr);
extern XkbDescPtr XkbGetKeyboard(Display *, unsigned int, unsigned
int);
extern XkbDescPtr XkbGetKeyboardByName(Display *, unsigned int,
XkbComponentNamesPtr, unsigned
int,
unsigned int, int);
extern XkbDescPtr XkbGetMap(Display *, unsigned int, unsigned int);

```

```

extern      int      XkbGetMapChanges(Display      *,      XkbDescPtr,
XkbMapChangesPtr);
extern int XkbGetNamedIndicator(Display *, Atom, int *, int *,
                                XkbIndicatorMapPtr, int *);
extern int XkbGetNames(Display *, unsigned int, XkbDescPtr);
extern int XkbGetPerClientControls(Display *, unsigned int *);
extern int XkbGetState(Display *, unsigned int, XkbStatePtr);
extern int XkbGetUpdatedMap(Display *, unsigned int, XkbDescPtr);
extern int XkbGetVirtualMods(Display *, unsigned int, XkbDescPtr);
extern unsigned int XkbGetXlibControls(Display *);
extern int XkbIgnoreExtension(int);
extern int XkbInitCanonicalKeyTypes(XkbDescPtr, unsigned int, int);
extern int XkbKeyTypesForCoreSymbols(XkbDescPtr, int, KeySym *,
                                unsigned int, int *, KeySym *);
extern KeySym XkbKeyCodeToKeysym(Display *, unsigned int, int, int);
extern unsigned int XkbKeysymToModifiers(Display *, KeySym);
extern int XkbLatchGroup(Display *, unsigned int, unsigned int);
extern int XkbLatchModifiers(Display *, unsigned int, unsigned int,
                                unsigned int);
extern int XkbLibraryVersion(int *, int *);
extern XkbComponentListPtr XkbListComponents(Display *, unsigned
int,
                                XkbComponentNamesPtr, int *);
extern int XkbLockGroup(Display *, unsigned int, unsigned int);
extern int XkbLockModifiers(Display *, unsigned int, unsigned int,
                                unsigned int);
extern int XkbLookupKeyBinding(Display *, KeySym, unsigned int,
char *,
                                int, int *);
extern int XkbLookupKeySym(Display *, KeyCode, unsigned int,
                                unsigned int *, KeySym *);
extern void XkbNoteControlsChanges(XkbControlsChangesPtr,
                                XkbControlsNotifyEvent *, unsigned
int);
extern void XkbNoteMapChanges(XkbMapChangesPtr, XkbMapNotifyEvent
*,
                                unsigned int);
extern      void      XkbNoteNameChanges(XkbNameChangesPtr,
XkbNamesNotifyEvent *,
                                unsigned int);
extern Display *XkbOpenDisplay(char *, int *, int *, int *, int *,
int *);
extern int XkbQueryExtension(Display *, int *, int *, int *, int *,
int *);
extern int XkbRefreshKeyboardMapping(XkbMapNotifyEvent *);
extern XkbAction *XkbResizeKeyActions(XkbDescPtr, int, int);
extern KeySym *XkbResizeKeySyms(XkbDescPtr, int, int);
extern int XkbResizeKeyType(XkbDescPtr, int, int, int, int);
extern int XkbSelectEventDetails(Display *, unsigned int, unsigned
int,
                                unsigned long int, unsigned long int);
extern int XkbSelectEvents(Display *, unsigned int, unsigned int,
                                unsigned int);
extern void XkbSetAtomFuncs(XkbInternAtomFunc, XkbGetAtomNameFunc);
extern int XkbSetAutoRepeatRate(Display *, unsigned int, unsigned
int,
                                unsigned int);
extern int XkbSetAutoResetControls(Display *, unsigned int,
unsigned int *,
                                unsigned int *);
extern int XkbSetCompatMap(Display *, unsigned int, XkbDescPtr,
int);
extern int XkbSetControls(Display *, unsigned long int, XkbDescPtr);
extern int XkbSetDebuggingFlags(Display *, unsigned int, unsigned
int,
                                char *, unsigned int, unsigned int,

```

```

                                unsigned int *, unsigned int *);
extern int XkbSetDetectableAutoRepeat(Display *, int, int *);
extern int XkbSetIgnoreLockMods(Display *, unsigned int, unsigned
int,
                                unsigned int, unsigned int, unsigned
int);
extern int XkbSetIndicatorMap(Display *, unsigned long int,
XkbDescPtr);
extern int XkbSetMap(Display *, unsigned int, XkbDescPtr);
extern int XkbSetNamedIndicator(Display *, Atom, int, int, int,
                                XkbIndicatorMapPtr);
extern int XkbSetNames(Display *, unsigned int, unsigned int,
unsigned int,
                                XkbDescPtr);
extern int XkbSetPerClientControls(Display *, unsigned int,
                                unsigned int *);
extern int XkbSetServerInternalMods(Display *, unsigned int,
unsigned int,
                                unsigned int, unsigned int,
                                unsigned int);
extern unsigned int XkbSetXlibControls(Display *, unsigned int,
                                unsigned int);
extern char XkbToControl(char);
extern int XkbTranslateKeyCode(XkbDescPtr, KeyCode, unsigned int,
                                unsigned int *, KeySym *);
extern int XkbTranslateKeySym(Display *, KeySym *, unsigned int,
char *,
                                int, int *);
extern int XkbUpdateMapFromCore(XkbDescPtr, KeyCode, int, int,
KeySym *,
                                XkbChangesPtr);
extern int XkbUseExtension(Display *, int *, int *);
extern int XkbVirtualModsToReal(XkbDescPtr, unsigned int, unsigned
int *);

```

6.2.3 X11/Xarch.h

```

#define _XARCH_H_
#define X_BIG_ENDIAN    BIG_ENDIAN
#define X_BYTE_ORDER    BYTE_ORDER
#define X_LITTLE_ENDIAN LITTLE_ENDIAN

```

6.2.4 X11/Xatom.h

```

#define XA_PRIMARY      ((Atom) 1)
#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_SECONDARY     ((Atom) 2)
#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_ARC                  ((Atom) 3)
#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)
#define XA_WM_NAME                ((Atom) 39)
#define XA_ATOM                  ((Atom) 4)
#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_BITMAP                 ((Atom) 5)
#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_CARDINAL                ((Atom) 6)
#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_LAST_PREDEFINED         ((Atom) 68)
#define XA_WM_TRANSIENT_FOR        ((Atom) 68)
#define XA_COLORMAP                ((Atom) 7)
#define XA_CURSOR                  ((Atom) 8)
#define XA_CUT_BUFFER0              ((Atom) 9)
#define XATOM_H 1

```

6.2.5 X11/Xauth.h

```

#define FamilyLocalHost (252)
#define FamilyKrb5Principal (253)
#define FamilyNetname (254)
#define FamilyLocal (256)
#define FamilyWild (65535)
#define LOCK_SUCCESS 0
#define LOCK_ERROR 1
#define _Xauth_h 1
#define LOCK_TIMEOUT 2

typedef struct xauth {

```

```

    unsigned short family;
    unsigned short address_length;
    char *address;
    unsigned short number_length;
    char *number;
    unsigned short name_length;
    char *name;
    unsigned short data_length;
    char *data;
} Xauth;
extern void XauDisposeAuth(Xauth *);
extern char *XauFileName(void);
extern Xauth *XauGetBestAuthByAddr(unsigned int, unsigned int,
                                   const char *, unsigned int,
                                   const char *, int, char **,
                                   const int *);
extern Xauth *XauReadAuth(FILE *);

```

6.2.6 X11/Xcms.h

```

#define ClientWhitePointOfCCC(ccc)      (&(ccc)->clientWhitePt)
#define ScreenWhitePointOfCCC(ccc)      (&(ccc)->pPerScrnInfo->
>screenWhitePt)
#define DisplayOfCCC(ccc)               ((ccc)->dpy)
#define FunctionSetOfCCC(ccc)           ((ccc)->pPerScrnInfo->functionSet)
#define ScreenNumberOfCCC(ccc)          ((ccc)->screenNumber)
#define VisualOfCCC(ccc)                 ((ccc)->visual)
#define XcmsUndefinedFormat              (XcmsColorFormat) 0x00000000
#define XcmsCIEXYZFormat                  (XcmsColorFormat) 0x00000001
#define XcmsCIEuvYFormat                  (XcmsColorFormat) 0x00000002
#define XcmsCIExyYFormat                  (XcmsColorFormat) 0x00000003
#define XcmsCIELabFormat                  (XcmsColorFormat) 0x00000004
#define XcmsCIELuvFormat                  (XcmsColorFormat) 0x00000005
#define XcmsTekHVCFormat                  (XcmsColorFormat) 0x00000006
#define XcmsRGBFormat                    (XcmsColorFormat) 0x80000000
#define XcmsRGBiFormat                    (XcmsColorFormat) 0x80000001
#define XcmsFailure                       0
#define XcmsInitNone                      0x00
#define XcmsInitSuccess                   0x01
#define XcmsInitFailure                   0xff
#define XcmsSuccess                       1
#define XcmsSuccessWithCompression        2

typedef unsigned long int XcmsColorFormat;
typedef double XcmsFloat;
typedef struct {
    unsigned short red;
    unsigned short green;
    unsigned short blue;
} XcmsRGB;
typedef struct {
    XcmsFloat red;
    XcmsFloat green;
    XcmsFloat blue;
} XcmsRGBi;
typedef struct {
    XcmsFloat X;
    XcmsFloat Y;
    XcmsFloat Z;
} XcmsCIEXYZ;
typedef struct {
    XcmsFloat u_prime;
    XcmsFloat v_prime;
    XcmsFloat Y;
} XcmsCIEuvY;

```

```

typedef struct {
    XcmsFloat x;
    XcmsFloat y;
    XcmsFloat Y;
} XcmsCIExyY;
typedef struct {
    XcmsFloat L_star;
    XcmsFloat a_star;
    XcmsFloat b_star;
} XcmsCIELab;
typedef struct {
    XcmsFloat L_star;
    XcmsFloat u_star;
    XcmsFloat v_star;
} XcmsCIELuv;
typedef struct {
    XcmsFloat H;
    XcmsFloat V;
    XcmsFloat C;
} XcmsTekHVC;
typedef struct {
    XcmsFloat pad0;
    XcmsFloat pad1;
    XcmsFloat pad2;
    XcmsFloat pad3;
} XcmsPad;
typedef struct {
    union {
        XcmsRGB RGB;
        XcmsRGBi RGBi;
        XcmsCIEXYZ CIEXYZ;
        XcmsCIEuvY CIEuvY;
        XcmsCIExyY CIExyY;
        XcmsCIELab CIELab;
        XcmsCIELuv CIELuv;
        XcmsTekHVC TekHVC;
        XcmsPad Pad;
    } spec;
    unsigned long int pixel;
    XcmsColorFormat format;
} XcmsColor;
typedef struct _XcmsPerScrnInfo {
    XcmsColor screenWhitePt;
    XPointer functionSet;
    XPointer screenData;
    unsigned char state;
    char pad[3];
} XcmsPerScrnInfo;
typedef struct _XcmsCCC {
    Display *dpy;
    int screenNumber;
    Visual *visual;
    XcmsColor clientWhitePt;
    XcmsCompressionProc gamutCompProc;
    XPointer gamutCompClientData;
    XcmsWhiteAdjustProc whitePtAdjProc;
    XPointer whitePtAdjClientData;
    XcmsPerScrnInfo *pPerScrnInfo;
} XcmsCCCRec;
typedef struct _XcmsColorSpace {
    char *prefix;
    XcmsColorFormat id;
    XcmsParseStringProc parseString;
    XcmsFuncListPtr to_CIEXYZ;
    XcmsFuncListPtr from_CIEXYZ;
    int inverse_flag;

```

```

} XcmsColorSpace;
typedef struct _XcmsFunctionSet {
    XcmsColorSpace **DDColorSpaces;
    XcmsScreenInitProc screenInitProc;
    XcmsScreenFreeProc screenFreeProc;
} XcmsFunctionSet;
typedef struct _XcmsCCC *XcmsCCC;
typedef int (*XcmsCompressionProc) (XcmsCCC, XcmsColor *, unsigned
int,
                                unsigned int, int *);
typedef int (*XcmsWhiteAdjustProc) (XcmsCCC, XcmsColor *, XcmsColor
*,
                                XcmsColorFormat, XcmsColor *,
                                unsigned int, int *);
typedef int (*XcmsScreenInitProc) (Display *, int, XcmsPerScrnInfo
*);
typedef void (*XcmsScreenFreeProc) (XPointer);
typedef int (*XcmsDIConversionProc) (XcmsCCC, XcmsColor *,
XcmsColor *,
                                unsigned int);
typedef XcmsDIConversionProc XcmsConversionProc;
typedef int (*XcmsParseStringProc) (char *, XcmsColor *);
typedef XcmsConversionProc *XcmsFuncListPtr;
typedef int (*XcmsDDConversionProc) (XcmsCCC, XcmsColor *, unsigned
int,
                                int *);

extern int XcmsAddColorSpace(XcmsColorSpace *);
extern int XcmsAddFunctionSet(XcmsFunctionSet *);
extern int XcmsAllocColor(Display *, Colormap, XcmsColor *,
XcmsColorFormat);
extern int XcmsAllocNamedColor(Display *, Colormap, const char *,
XcmsColor *, XcmsColor *,
XcmsColorFormat);
extern XcmsCCC XcmsCCCOFColormap(Display *, Colormap);
extern int XcmsCIELabClipL(XcmsCCC, XcmsColor *, unsigned int,
unsigned int, int *);
extern int XcmsCIELabClipLab(XcmsCCC, XcmsColor *, unsigned int,
unsigned int, int *);
extern int XcmsCIELabClipab(XcmsCCC, XcmsColor *, unsigned int,
unsigned int, int *);
extern int XcmsCIELabQueryMaxC(XcmsCCC, XcmsFloat, XcmsFloat,
XcmsColor *);
extern int XcmsCIELabQueryMaxL(XcmsCCC, XcmsFloat, XcmsFloat,
XcmsColor *);
extern int XcmsCIELabQueryMaxLC(XcmsCCC, XcmsFloat, XcmsColor *);
extern int XcmsCIELabQueryMinL(XcmsCCC, XcmsFloat, XcmsFloat,
XcmsColor *);
extern int XcmsCIELabToCIEXYZ(XcmsCCC, XcmsColor *, XcmsColor *,
unsigned int);
extern int XcmsCIELabWhiteShiftColors(XcmsCCC, XcmsColor *,
XcmsColor *,
XcmsColorFormat, XcmsColor *,
unsigned int, int *);
extern int XcmsCIELuvClipL(XcmsCCC, XcmsColor *, unsigned int,
unsigned int, int *);
extern int XcmsCIELuvClipLuv(XcmsCCC, XcmsColor *, unsigned int,
unsigned int, int *);
extern int XcmsCIELuvClipuv(XcmsCCC, XcmsColor *, unsigned int,
unsigned int, int *);
extern int XcmsCIELuvQueryMaxC(XcmsCCC, XcmsFloat, XcmsFloat,
XcmsColor *);
extern int XcmsCIELuvQueryMaxL(XcmsCCC, XcmsFloat, XcmsFloat,
XcmsColor *);
extern int XcmsCIELuvQueryMaxLC(XcmsCCC, XcmsFloat, XcmsColor *);

```

```

extern int XcmsCIELuvQueryMinL(XcmsCCC, XcmsFloat, XcmsFloat,
XcmsColor *);
extern int XcmsCIELuvToCIEuvY(XcmsCCC, XcmsColor *, XcmsColor *,
unsigned int);
extern int XcmsCIELuvWhiteShiftColors(XcmsCCC, XcmsColor *,
XcmsColor *,
XcmsColorFormat, XcmsColor *,
unsigned int, int *);
extern int XcmsCIEXYZToCIELab(XcmsCCC, XcmsColor *, XcmsColor *,
unsigned int);
extern int XcmsCIEXYZToCIEuvY(XcmsCCC, XcmsColor *, XcmsColor *,
unsigned int);
extern int XcmsCIEXYZToCIExyY(XcmsCCC, XcmsColor *, XcmsColor *,
unsigned int);
extern int XcmsCIEXYZToRGBi(XcmsCCC, XcmsColor *, unsigned int, int
*);
extern int XcmsCIEuvYToCIELuv(XcmsCCC, XcmsColor *, XcmsColor *,
unsigned int);
extern int XcmsCIEuvYToCIEXYZ(XcmsCCC, XcmsColor *, XcmsColor *,
unsigned int);
extern int XcmsCIEuvYToTekHVC(XcmsCCC, XcmsColor *, XcmsColor *,
unsigned int);
extern int XcmsCIExyYToCIEXYZ(XcmsCCC, XcmsColor *, XcmsColor *,
unsigned int);
extern XcmsColor *XcmsClientWhitePointOfCCC(XcmsCCC);
extern int XcmsConvertColors(XcmsCCC, XcmsColor *, unsigned int,
XcmsColorFormat, int *);
extern XcmsCCC XcmsCreateCCC(Display *, int, Visual *, XcmsColor *,
XcmsCompressionProc, XPointer,
XcmsWhiteAdjustProc, XPointer);
extern XcmsCCC XcmsDefaultCCC(Display *, int);
extern Display *XcmsDisplayOfCCC(XcmsCCC);
extern XcmsColorFormat XcmsFormatOfPrefix(char *);
extern void XcmsFreeCCC(XcmsCCC);
extern int XcmsLookupColor(Display *, Colormap, const char *,
XcmsColor *,
XcmsColor *, XcmsColorFormat);
extern char *XcmsPrefixOfFormat(XcmsColorFormat);
extern int XcmsQueryBlack(XcmsCCC, XcmsColorFormat, XcmsColor *);
extern int XcmsQueryBlue(XcmsCCC, XcmsColorFormat, XcmsColor *);
extern int XcmsQueryColor(Display *, Colormap, XcmsColor *,
XcmsColorFormat);
extern int XcmsQueryColors(Display *, Colormap, XcmsColor *,
unsigned int,
XcmsColorFormat);
extern int XcmsQueryGreen(XcmsCCC, XcmsColorFormat, XcmsColor *);
extern int XcmsQueryRed(XcmsCCC, XcmsColorFormat, XcmsColor *);
extern int XcmsQueryWhite(XcmsCCC, XcmsColorFormat, XcmsColor *);
extern int XcmsRGBToRGBi(XcmsCCC, XcmsColor *, unsigned int, int
*);
extern int XcmsRGBiToCIEXYZ(XcmsCCC, XcmsColor *, unsigned int, int
*);
extern int XcmsRGBiToRGB(XcmsCCC, XcmsColor *, unsigned int, int
*);
extern int XcmsScreenNumberOfCCC(XcmsCCC);
extern XcmsColor *XcmsScreenWhitePointOfCCC(XcmsCCC);
extern XcmsCCC XcmsSetCCCOfColormap(Display *, Colormap, XcmsCCC);
extern XcmsCompressionProc XcmsSetCompressionProc(XcmsCCC,
XcmsCompressionProc,
XPointer);
extern XcmsWhiteAdjustProc XcmsSetWhiteAdjustProc(XcmsCCC,
XcmsWhiteAdjustProc,
XPointer);
extern int XcmsSetWhitePoint(XcmsCCC, XcmsColor *);
extern int XcmsStoreColor(Display *, Colormap, XcmsColor *);

```

```

extern int XcmsStoreColors(Display *, Colormap, XcmsColor *,
unsigned int,
int *);
extern int XcmsTekHVCClipC(XcmsCCC, XcmsColor *, unsigned int,
unsigned int, int *);
extern int XcmsTekHVCClipV(XcmsCCC, XcmsColor *, unsigned int,
unsigned int, int *);
extern int XcmsTekHVCClipVC(XcmsCCC, XcmsColor *, unsigned int,
unsigned int, int *);
extern int XcmsTekHVCQueryMaxC(XcmsCCC, XcmsFloat, XcmsFloat,
XcmsColor *);
extern int XcmsTekHVCQueryMaxV(XcmsCCC, XcmsFloat, XcmsFloat,
XcmsColor *);
extern int XcmsTekHVCQueryMaxVC(XcmsCCC, XcmsFloat, XcmsColor *);
extern int XcmsTekHVCQueryMaxVSamples(XcmsCCC, XcmsFloat,
XcmsColor *,
unsigned int);
extern int XcmsTekHVCQueryMinV(XcmsCCC, XcmsFloat, XcmsFloat,
XcmsColor *);
extern int XcmsTekHVCToCIEuvY(XcmsCCC, XcmsColor *, XcmsColor *,
unsigned int);
extern int XcmsTekHVCWhiteShiftColors(XcmsCCC, XcmsColor *,
XcmsColor *,
XcmsColorFormat, XcmsColor *,
unsigned int, int *);
extern Visual *XcmsVisualOfCCC(XcmsCCC);

```

6.2.7 X11/Xfuncproto.h

```

#define NARROWPROTO
#ifdef __cplusplus
#define _XFUNCPROTOBEGIN extern "C" {
#else
#define _XFUNCPROTOBEGIN
#endif
#ifdef __cplusplus
#define _XFUNCPROTOEND }
#else
#define _XFUNCPROTOEND
#endif
#define NeedFunctionPrototypes 1
#define NeedNestedPrototypes 1
#define NeedVarargsPrototypes 1
#define NeedWidePrototypes 1
#define FUNCPROTO 15
#define _Xconst const
#define _X_INLINE inline
#define _X_SENTINEL(x) __attribute__((__sentinel__(x)))
#define _X_DEPRECATED __attribute__((deprecated))
#define _X_EXPORT __attribute__((visibility("default")))
#define _X_HIDDEN __attribute__((visibility("hidden")))
#define _X_INTERNAL __attribute__((visibility("internal")))
#define _X_ATTRIBUTE_PRINTF(x,y)
__attribute__((__format__(__printf__,x,y)))
#define _X_UNLIKELY(x) __builtin_expect(!!(x), 0)
#define _X_LIKELY(x) __builtin_expect(!!(x), 1)

```

6.2.8 X11/Xfuncs.h

```

#define _XFUNCS_H_

```