X Toolkit Intrinsics - C Language Interface

X Window System

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X Toolkit Intrinsics - C Language Interface: X Window System

! " ## $ $

!% & ! '

( ) #*+, #*+- #*+$ #*++ #**# #**. !

(& & ((& &
& / 0 & 01 & ((
& (2 & &
& & 3 & (4

5 6 (&
&

578 9:5% 8 ' 9";8; 0 ' 0 %'579<5 % =5> 9: => ?'=; 8! 8 9 ' @'8; '= @<;'=A
B<5 =95 @' '58; 59 578 % =5'8 9: 8 7 =5 B'@'5> :'5=8 :9 5' <@ < 9 8 =;
=9='=: '=A8 8=5 '= =9 8"8=5 7 @@ 578 ! 9= 9 5'< B8 @' B@8 :9 => @ ' ; A8 9
9578 @' B'@'5> %78578 '= = 5'9= 9: 9=5 5 59 5 9 9578 %' 8 ' '=A : 9 9<5 9:
9 '= 9==8 5'9= %'57 578 9:5% 8 9 578 < 8 9 9578 ;8 @'=A '= 578 9:5% 8

8C & ! 6 (
(& D & !

( ) #*+, #*+- #*+$ #*++ #**# #**. ; (8E

& & & (
6 6 ((
(& ; (6 (
(& & & ; (
& & & ' 6 0 0 C

Acknowledgments

5 (& !## ' & ; (
% @ 3 (
7 & ; (% @
(2 4

@ A /; (% @1 7 /; (% @1
(/; (% @1 5 % /; (% @1
@ /; (<8A1 /; (1
A /; (1 @ 5 ((/; (;51
/ 3 ; (/ 3 1
8 1
= / 3 1 B & / '5 @ 1

5 !#F 6 (!## '
&& ((6 &
C !#F

5 (& !#F ' 4

5 % /; (% @1
% /; (% @1
? /; (% @1
7 /; (% @1
: 7 /7 1

5 (& !#F G (
6 4

/; (<8A1
@ /; (<8A1
A D /; (<8A1
? @ (/; (<8A1

5 (6 & E
!## '

5 (& ; (G <8A ; A & & (
(6 (9 & B & C
6 6 (& &

: C 6 & &
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% & @
; (8E

#*++

5 (& ' & (& & 6
6 & ! '
& (6 6 (& (
((6 ' 4

6 / 1 ; (B / 5H51
B /7 1 ; 6 & /5 C1
: 5 & /7 1 E / E 1
/ 5H51 : / '51
/; (1 ? ? (/5 C ' 1
A (/; (1 ? /; (1
/8 1 E ; 6 /B 1
A B (; 6 /7 1 A % /5 C1

5 (& & 6 (&

8C A
; (8E
'5 3
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: I . 6 3 (%
((& (((
& & (4

; / 5H51 8 /9 :1
; 6 / '51 6 : /'!'1
= ' / 1 ; @ /7 1
? / '51 / '51
/ 1 @ / 1

' , && & D
B & 7 : 3 & 'B 5
& & B : G ((
" && & 9 : D 5
&& & B A B (; 6 ; 6 &
(& (

; #*+*

#**#

5 - ' & 6 && &
! G ((& 6
((6 & &

& & 5
6 (& 3 4

/ 1 @ / & 1
8 /9 :1 ; ; /9 :1
" && /9 :1 ? ? /! 1
@ /7 1 ; (/9 :1
B & /! 1 3 " / & 1

D (&& & ((
(& & 5 & (6
& 4 B 6 (((A (
8 A ? 8 6 : A ; 7 6
7 ; 6 ? (@ @ B
5 E ? 5 (D " A
% % % C

' (& & (4 & C
(? ? & &

;
6
!
#**.

Table of Contents

5 C
' % (
' #
@ ((#
#
K
% (K
% (I
% (-
% (*
' & 5 #F
% ((##
% (= (6 #K
% ((: #I
% ((6 : #.
% ((: #,
% (@ < #+
% (" & #+
(#*
' D 4 J D J J D
K#
' D (% (KK
' & 9 KK
'6 & 9 K.
8C K.
K % (' K$
' D (! 5 K$
8 (@ I#
@ (; IK
(@ I,
(% (I$
((((@ I+
(% (' .F
(' .K
6 ' D .I
% (' 4 5 .,
% (' ' D 4 5 D .-
' ' D 4 5 D
.+
= (; ' D 4 5 D J .+
D (% (.+
% (' % 4 5 D ,F
% 6 ,#
9 (% '& & % (,#
< D (% (,I
; (% (,I
(6 (; ,,
; ; ; 4 5 ,,
; ; ; 4 5
,-
% (' ; 4 5 ,-
8C (& ,-

I % (5 ,+
& % (4 5 J
,*
' 9 & 4 5 J ,*
; & 4 5 J -F
(6 (& (-F
((-F
< ((-K
B (((-I
; (& % (' (-,
(% % (A -,
% (--
. % (-+
% (; & -+
; & -*
; & $K
$,
; & " $$
+I
(+I
6 (+.
(+$
((& +$
, < % (+*
< % (5 +*
(< *F
(< *#
(< % (*#
< (< % (*.
- A (*-
' (A (*-
A A (E *$
D E **
A (**
A (4 5 (J (#FF
% (D (#F#
& A #FI
D ((4 5 D #F,
$ 86 (#F-
(; (86 #F-
(6 (' #F-
(6 (B (= & #F+
(6 (5 #F+
(6 ((#F*
(86 & % (###
E (? B A ##K
: (86 ##,
86 & ; 5 = % (L % ##-
M (86 ##$
; (86 ##+
5 ' @ ##*
((6 & % (#KF
(B (% #K#
! 86 : #KK

#KK
8 2@ 6 #KK
8C #KK
% (8C " #K.
& % (4 5 C #K.
% (" #K,
! 86 7 #K,
86 7 5 86 #K-
86 7 5 ; = 86 #K+
86 #K*
86 7 & !## 8C #IF
< (' 5 8 6 #I.
' D (5 ' #I.
@ (! 5 ; #I.
86 (5 8 6 #I-
+ #I$
< (@ ; & #I$
' & (@ #I+
(#I+
6 (#I*
8C (#I*
(& @ #.F
* (#.#
@ #.#
B 9&& #.-
(& @ #.-
#.$
9 (#.+
6 #.*
& 6 #.*
= 6 #,K
' (6 % (#,,
((= 6 #,-
6 ' 6 #,*
(% (% (#-K
9 (% (#-K
(% (#-.
#F 5 (#$F
5 #$F
5 (#$#
= 5 #$K
7 (#$K
5 5 #$I
86 E #$.
E #$.
5 #$.
5 5 (#$,
< (#$$
? ? 6 #$+
9 (? #+#
? ? 6 #+K
((B ? A & #+K
' 6 (; #+I
9 (% (L @ #+.

< : #+,
; (= & 8 #+,
5 ((% (' #+,
((< (#+-
(A C #+$
((#+*
(A (5 " #+*
< (5 & #*F
< (' 5 & #*,
(6 (5 (KFF
A (<@5' @8 E KFK
C KFI
6 (5 KFI
6 (86 KF.
((8C 86 (KF.
5 (% (KF.
5 (% % (KF,
7 (8 KF,
(% J 9@9 J%'=;9% KF*
: (: = K#F
7 & 8C (K#I
7 9 3 K#.
M (9 ; K#+
#K = (9 3 K#*
; K#*
9 3 9 3 K#*
9 3 K#*
9 3 KK#
9 3 KK#
9 3 ; & " KK#
9 3 (' KK#
< & 9 3 KKK
(9 3 KKI
9 3 KKI
9 3 KK.
9 3 KK,
9 3 ; & " KK,
% ((' KK,
< & (9 3 KK,
< KK$
% ((' KK$
#I 86 & ' KK*
; (& 6 @ 6 KK*
I . KK*
(KK*
J6 J KIF
M A KIF
D @ KIF
& % KIF
5 6 KI#
? 6 KI#
= (9 3 KI#
. , KI#
5 KI#

: KIK
D KIK
; KIK
' D & KII
(KII
(8C (: KII
, - KII
% (' KI.
A ; 6 KI.
% (KI.
A (KI,
86 (KI,
(KI-
5 (KI-
KI-
8C (7 KI-
: : KI$
B 5 5 C KI+
: K.-
; ' 8 (K,-
8 ; & (K-,
: & ((K$-

About This Manual

! 5 ' N @ ((' &
(& (
' ((' (
& & (= & 6
5 (
& ' & (
((& & ' &
((((& &
& & (/'
((6 & & 1
5 & &
& & (

' (&
& 6
& ('
((

Conventions Used in this Manual

5 & (6 4

O A this special font 5 &
& & (
&
O 8 & ((&
& 5 & & & (&
C A & & & E &
(
O 5 ((
& C & (
& & (&
5 C & (
& (

Chapter 1. Intrinsics and Widgets

5 ' ((E &
& & ! %
5 ' (! 5

Intrinsics

5 ' 6 6 &
((6 5 '
& ! @ !' & 5 C &
6 ! % (&
&

5 ' 3 ((E
& ((&
(5 (C (
6 ((& C (/ (1 (
(& (6

% ' & 6 & 3
(' . & ' (
6 5 j#K
5 & & '
9 3 5 & & & &
& & ' 5 (
& ' j#K
& & (& 5
C & &
PP (LL PP 3 LL

Languages

5 ' & (((
(((& & 6 '
& &
C (
& '
& (&
! 5 ' ((& &
(& ((
((5 & (& 6
5 & & ((C
& ((' ((6
' & & (
'

' & <X11/
Intrinsic.h> <X11/StringDefs.h> E 6
<X11/Xatoms.h> <X11/Shell.h> ' (
<X11/IntrinsicP.h> & <X11/Intrinsic.h>

5 & &
(/& C <X11/Xaw/Label.h> <X11/Xaw/
Scrollbar.h>).9 9'! ' 3 &
libXt.a & Q ! (

Procedures and Macros

& & & C &
(PPR &LL
6 & & &
C (C &
6 & (C &
C (

5 & (6 & E 6
C (64 XtCheck-
Subclass XtNew XtNumber XtOffsetOf XtOffset XtSetArg

Widgets

5 & & ! 5 (
& !
& (
& /& C C (1 &
(/& C C1 (
(
6 &

86 ((C (
D (&
@ (((
((5
(5 &
& (& (6 &
/7 PP LL D 6
(C & D &
& (&
1 : & & S (% (T

5 & & ((
& & (6 & & ((
& S% (
(T 5 & (6

(& 4

O & 6
O & (&

& 2 & (/& C & D
1 D

5 (
& ((

Core Widgets

5 (& & & (
(& & CoreClass-
Part CorePart

CoreClassPart Structure

(& & CoreClassPart

& U
% (V j
(J V j*
(J D V j
! J D V j
! % (J J D V j
! 8 J V j
! ' D V j
! (D J V j
! D D V j
! @ V j#F
J V j#F
! @ V j*
J V j*
! C J V 6 (
B J V j
! 8 J C V j
B J 6 V j
B 6 J V j
! % (V j
! % (D V j-
! 8C C V j
! " : J6 V j
! (: J6 J V j
! J6 J V j
! ((J6 J V j
! : J& V j
! " 5 6 V j
! J 6 V 6
(J V j#F
! A 7 E J(V j-
! (J V j#F
! C V j
W V

(6 & & 5
WidgetClass CoreWidgetClass & & &

& U

J V
W % (X% (X % (V

" (& (

5 (& & (&

' IntrinsicP.h4

C % ((V
R & (

' Intrinsic.h4

C % ((% (V

5 E Widget WidgetClass E 6 widgetClass
& & ((' E
6
' & Intrinsic.h4

& J% (X% (X % (V

CorePart Structure

(& & CorePart

& J U
% (&V ;
% ((J V j
% (V j
B (J V j
! @ J V j
! V j
CV j-
V j-
; V j-
; (V j-
; J V j-
B (V jI
B 6 V j
B J 6 V j
! 5 V j#F
C J C V j
C J C V j
% (@ J V j,
J V j,
(V j*
X V j
V j

% V j
V j
C (J C V j
C (J C V j
B 6 V j
B J J (V jI
W V

(6 & & 5
Widget & & &

& U
V
W % (X% (X % (V

" (& (

' E
6 ' &
Intrinsic.h

& J% (X% (X % (V

Core Resources

5 & coreClass-
Rec

!=	!	! 5
!= (	! B (	! C
!= (C	! C	! C
!=	! B	! C
!= C	! C	! C
!=	!	!
!=	! ;	! '
!= % (	! % (	! B
!=	!	!
!=	! 5	! 5 5

& & (6 objectClassRec rec-
tObjClassRec V S9 3 9 3 T
S (9 3 T &

CorePart Default Values

5 & 6 & & & ' &
D

& & (/ (1	
(J (XtCreateWidget / (1	
(XtCreateWidget / (1	
(J L 6	
J	=<@@
	=<@@
C	F
	F
	F
(	F
J	#
(	False
6	True
J 6	(=; & L 6
	=<@@
J C	XtDefaultForeground
J C	XtUnspecifiedPixmap
J	=<@@
J	F
(XtCreateWidget / (1	
L V 6 ((& & / (1	
L 6	
	=<@@
L V 6 ((	
(J C	XtDefaultBackground
(J C	XtUnspecifiedPixmap
6	True
J J (	True

XtUnspecifiedPixmap (E 6
C None ParentRelative

Composite Widgets

5 (& (/ jI
1 (
& (5 (
& CompositeClassPart CompositePart

CompositeClassPart Structure

' & (& 6 & (
&

& U
! A 7 (J (V j-
! % ((J (V jI
! % (J V jI
! % (J V jI
! C V j
W V

5 C & & CompositeClassPart E
CompositeClassExtensionRec

& U
! C J C V j
! M J V j
(6 V j
J D V j
B J 3 V j
B J (J (J V j
W 8C X 8C V

6 & & (
&

& U
J V
J V
W X % (V

5 (& & (&

' IntrinsicP.h4

C V

' Intrinsic.h4

C % (% (V

5 E CompositeWidget CompositeWidgetClass E
6 compositeWidgetClass & & ((
& 5 &
CompositeClassExtension 6 & XtCompositeExtensionVersion
/ S 8C T 1 Intrinsic.h
& 6

& J X % (V

CompositePart Structure

' & (& 6
& (& & CompositePart

& U
% (@ V jI
J V jI
J V jI
! 9 J V j
W V

(6 & & (
&

& U
V
V
W X % (V

Intrinsic.h &
6

& J X % (V

Composite Resources

5 &
compositeClassRec

!=	! 9	! % (@
!=	! '	! :
!=	! 9	!

CompositePart Default Values

5 & 6 & & & &
D

	=<@@
J	F
J	F
J	' &

5 & V
! = ! = ! =
& (

Constraint Widgets

5 (& (/
S % (T 1 (
& V & C & L
(5 (& Con-
straintClassPart ConstraintPart

ConstraintClassPart Structure

' & (&
6 & (&

& U
! @ V j*
J V j*
J D V j
!' D V j
! % (V j
! " : J6 V j
! C V j
W V

5 C & & ConstraintClassPart E
ConstraintClassExtensionRec

& U
! C J C V j
! M J V j
(6 V j
J D V j
! ((J6 J V j
W 8C X 8C V

6 & & (
&

& J U
J V
J V
J V
W X % (V

5 (& & (&

' IntrinsicP.h4

C V

' Intrinsic.h4

C % (% (V

5 E ConstraintWidget ConstraintWidgetClass E
6 constraintWidgetClass & & ((
& 5 &
ConstraintClassExtension 6 & XtConstraintExtensionVersion
/ S 8C T 1 Intrinsic.h
& 6

& J X % (V

ConstraintPart Structure

' & (&
6 & (& & ConstraintPart

& U
V
W V

(6 & & (
&

& U
V
V
V
W X % (V

Intrinsic.h &
6

& J X % (V

Constraint Resources

5 constraintClassRec &
=<@@ & D V
& &

Implementation-Specific Types

5 & (&&
6 ' & 6

C 6
& '

5 &

D D 6 < C
D
6 E 6 True

(((&
YF KZ#- #[

(((&
YF KZ#- #[

(((&
Y KZ#, KZ#, #[

! (((& X
X & (6
& (6
6 XtPointer (
E (6 ' =' 6
C XtPointer &
6 X

! " ((XtPointer Cardinal Dimension Position 6

!# (((#K+
6 & 6
True False 5 6 $ # %#
& E True False
6

' & & &
& & ObjectPart RectObjPart CorePart CompositePart ShellPart WMShellPart TopLevelShellPart ApplicationShellPart & 5 6
6 & 5 ObjectPart RectObjPart CorePart &
&& ObjectRec RectObjRec CoreRec (WidgetRec).= && & &

Widget Classing

5 & & ((
& (& E
(V
6 ((
5 6 (6
(
(& (
&

(& &
(& (
C (: C 6
6 (XtResourceList '
(
& L /& C C
(1

(6 & '&
& & 6

5 (& (((6
(D (& & 4

O & (
O 6 & (& (
O & (

Widget Naming Conventions

5 ' 6 6 ((
(D & (5
& D (&
(& ((& (
(4

O < ! (6 : C
/J1 &
/& C (J C 1 5
D & /& C ArgList XtSet-
Values).
O & C
D 5
(6 & & C
PP! =LL : C ! & (
& ! = (C & (PP (
C LL & <X11/StringDefs.h> B &
6

O (D &
/& C PPB % LL1 8 (
6 & & C PP! LL /& C ! B % 1
& <X11/StringDefs.h>
O (/& C
PP5 5 LL1 8 (6
& & C PP! LL /& C ! 5 5 1
& <X11/StringDefs.h>
O = (&
A 6 ! D 6 6 4
O O (! D
O (! D J ! D
O % (! D% (
O ! D

```
  O                    ! D        J  ! D
  O                     ! D% (
  O          6       ! D
  O              6       ! D% (
O            6                &          &
     (   6              5
                  /&   C     PP7 (  (  LL    PP=   &      LL1

5           &    ! =    !       !
  (              C     &       5  /     1     &        &
   String 5       6       &       ( &    V
  E     &       &          E     &
        (                    ( (              6
 (          (       6                            &
      &       &                                6
     (
```

Widget Subclassing in Public .h Files

```
5         &   &      (

O    &              &   &
O          &    &              &
  (                5    &          6     (
    &            6           (
             &          ( &
O 5            &                  &
O 5               6               (
O 5                   (          &
O 8         &

:   C        &     (             &    &                    &
@      ( 4


R &   & @ B8@J7
R  &    @ B8@J7
2X =          X2
R  &    ! =3    &  03    & 0
R  &    ! =&   (     0&   (     0
R  &    ! =     0     0
R  &    ! =&    0&   0
R  &    ! =       %     0       %    0
R  &    ! =       7  (   0       7  (  0
2X                X2
 C     %  (          %  (      V
2X   %  (        &       X2
     &       J@           X@    %  (  V
2X =                      X2
 C     6    @       5 C /1V
    2X %  (     X2
    2X      (   C  X2
 C         ( @    A  5 C /1V
    2X %  (     X2
```

R & @ B8@J7

5 & C &
& && ((
& (

5 (& (&
& & & (: C
& & (Constraint.h

Widget Subclassing in Private .h Files

5 6 & & ((
& (

O & & &
O & 6 & &
O & & &
5 & 6 (&
6 (
O & & & (
L (
O 5 (& & (
O & & & (
L & (&
O 5 & & (&

O 5 & &
(
O & & & (
L (
O 5 (& & (
O 5 (C & & (&
O 5 & (C 6 &
O 5 & (6 ((
&
O & (

: C & (6 & & @ (4

R & & @ B8@ J7
R & @ B8@ J7
R \!##2@]
2X = @ (X2
R & ! & 0 & 0
2X = & & @ (X2
& U
2X X2
C & (V
!: X& V
(V 2X C X2
! & 3 & V

```
    ;          J    V    2X R   C      D          X2
    ;          J  ( V    2X R   C    6           X2
2X ;      6   &          X2
    A      JA V
    A  (   JA V
     C   (  J  C   V
            JCV
            J V
    ;          J    V
    ;          J  ( V
            J   V
    B          J     6 V
W @       V


2X :                      X2
     &      J@       U
            V
    @          V
W @      V
2X 5    &   @              X2
     & 6   /X@      5 C    1/1V
    2X % (    X2
    2X     (  C  X2
     &     ( /X@    A  5 C    1/1V
    2X % (    X2
2X =   &     &      @      (           X2
     &      U
    @      5 C       J  C V
    @    A  5 C     ( J  C V
    !       C      V
W @          V
2X :                    X2
     &      J@          U
                J    V
    @              J    V
W @          V
2X          6      X2
 C    @                  V
R  &    @    '      5 C //@      5 C    1J! '     1
R  &    @    '    A  5 C //@    A  5 C    1J! '     1
R    & @ B8@ J7

5              (          &        (                &
     6     &       &              &     (      &
  :  C          6     &   &            (                                ConstrainP.h
```

Widget Subclassing in .c Files

```
5    &   &     (                    D  &            6
            &     (    4

O          &         /&      C                                                  ″
            ″                          1
```

O ; /& C

!

1

O % (/& C " " " !

& (1

5 & (

6 & : & ((

D & widgetClassRec 5

& (& (6 (

L / S (T

S' D (% (T S' &

9 T

5 & C &

(: C @ ((PP@ LL

(C 5 (

(C & D

E

5 " & D & ((/

D & 1

5 & 6

& (& ! 5 (

% (& 6 XtVersion

(D 5 (6

(& '

6 XtVersionDontCheck & 6

(& ('& (6 & &&

6 & ' & & XtSpeci-

ficationRelease j#I $ # % < &

XtVersion ' (D (

5 ! & & & '& ((

& (E (

5 6 C &

& &

E

& 6

5 & & (6

& 5 & (6 6 &

& & @ (5 j* &

'

2X & @ X2

! Y[^ U

U! =& (! : (! C D &/ C 1

! 9&& /@ % (& (1 ! (

! ; & : (W

U! =& ! : ! : D &/!: X1

! 9&& /@ % (& 1 ! (
! ; & : W
U! = ! @ ! (D &/ (1
! 9&& /@ % (1 ! (=<@@W

W
2X : & X2
6 ' D /1V
6 ' D /1V
6 D /1V
6 5 C /1V
6 A 5 C /1V

2X X2
@ ^ U
U
2X J & X2
2X X2 /% (1H
2X J X2 0@ 0
2X (J D X2 D &/@ 1
2X J D X2 ' D
2X J J D X2 =<@@
2X J X2 :
2X D X2 ' D
2X D J X2 =<@@
2X D X2 D
2X X2 =<@@
2X J X2 F
2X X2
2X J X2 ! = / 1
2X C J X2 =<@@M< ?
2X J X2 5
2X J C X2 5
2X J 6 X2 5
2X 6 J X2 :
2X X2 =<@@
2X D X2 D
2X C X2
2X J6 X2 "
2X J6 J X2 =<@@
2X J6 J X2 ! ' "
2X (J6 J X2 =<@@
2X J& X2 =<@@
2X 6 X2 ! "
2X J && X2 =<@@
2X J X2 =<@@
2X E J(X2 ! ' M A
2X J X2 =<@@

2X C X2 =<@@
W
U
2X @ J & X2
2X (J C X2 A 5C
2X J C X2 5C
2X C X2 =<@@
W
WV
2X X2
% (% (^/% (1H V
2X = X2
6 @ 5C/ C1
% (V
(C V
U
@ % (^/@ % (1! /1V
! / % (=<@@1V
X/] J J C1/ C1
W
2X 6 X2

Widget Class and Superclass Look Up

5 & (XtClass

```
WidgetClass XtClass( w);
```

& (& 93
&

5 XtClass & (L

5 & (XtSuperclass

```
WidgetClass XtSuperClass( w);
```

& (& 93
&

5 XtSuperclass & (L

Widget Subclass Verification

5 ((XtIsSubclass

```
Boolean XtIsSubclass( w, widget_class);
```

& (3
& 93
&

& (&
&' &

5 XtIsSubclass& True & & & (E
& & 5 (L &
& &
(&
XtIsSubclass & & ((& 3

5 & (6 ((& ' & '
& & E 6 XtIsSubclass& &
5 XtIsObject XtIsRectObj XtIsWidget XtIsComposite XtIsConstraint XtIsShell XtIsOverrideShell XtIsWMShell XtIsVendorShell XtIsTransientShell XtIsTopLevelShell XtIsApplicationShell XtIsSessionShell

& 6 (

```
Boolean XtIs( w);
```

& (3
& 9 3 &

5 & (XtIsSubclass &

5 (L (((((XtCheckSubclass & <X11/IntrinsicP.h>4

```
void XtCheckSubclass( w, widget_class, message);
```

& (3
& 9 3
&

& (&
&' &

& (

5 XtCheckSubclass & & & (E
& & 5 (L &
& &
'& & (L XtCheckSubclass
(& ((L
C XtErrorMsg XtCheckSubclass
& C 6 (
& C

XtCheckSubclass C
;8B<A & V & (
(

Superclass Chaining

% & (& &
(& %

& ' & L 6 & ((
6 / (1 & (
(6 / (1 5 &
&

' (4
"
"
"
"
!
#
!

' (4

' (4 "

' (4

% (6 & &
& & 9 3 9 3 &
(L 5
&

"

"
"

' & & & (& & Constraint-
ClassPart ConstraintClassExtensionRec &
4

"

% (6 & &
& & (&
9 3 9 3 5
&

: & & (& & ConstraintClassPart
& 4

Class Initialization: class_initialize and class_part_initialize Procedures

D '
6 (6 &
& D

B ((6 D 6
((J D
C '
D & XtProc4

& 6 /X! 1/6 1V

(D & (
=<@@ ″ &

' D C &
D & & & 5 & 3
& & L
D ″
& 5 J J D & XtWidgetClassProc

```
void (*XtWidgetClassProc)(WidgetClass)( widget_class);
```

& (
D

; (D D &

5 6 & (D
L & 5 &
& : C & (
B & & L
J J D 5 6
C &
& = C L J J D
D & L : J J D
& B : & &

S' D (% (T &
& C (& & =<@@
" &

(6 D
& False

5 & (& XtCreateWidget (
D
(& & False (J D
J J D & 5 '
& D 6 & D

5 & (C 6 D & @

6 ' D /1
U
! 5 6 /! (! & 6 (5 &
=<@@ F ! = =<@@1V
W

Initializing a Widget Class

D & (&
5 D (((XtInitializeWidget-
Class

```
void XtInitializeWidgetClass( object_class);
```

& 3 D ob-
jectClass &

'& & (D XtInitializeWidgetClass

'& D (6 6
6 & 3 & XtIni-
tializeWidgetClass / S 6 T 1

Inheritance of Superclass Operations

(& & L &
(5 & E

O C
O D
O J
O J
O(J (
O J6 J

5 !" & XtInherit(*"

86 (6 &
(J J D 5
6 % (
(& =<@@ &

' ((6 & & 6
(L 6 & & & 5
6 ' 6
_XtInherit _XtInherit
(&

: C CompositeP.h & 4

R & !' A (//! A 7 1 J!' 1
R & !' ((//! % (1 J!' 1
R & !' ' //! (1 J!' 1
R & !' ; //! % (1 J!' 1

L J J D (& 4

6 ' D / (1
% ((V
U
% (^ / % (1 (V
% (^ / % (1] J V
& /] J (J (^^ !' A (1 U
] J (J (^] J (J (V
W
& /] J (J (^^ !' ((1 U
] J (J (^] J (J (V
W

= & & 5
6 6 & &
& 5 & (& 4

: 9 3 4

O XtInheritAllocate
O XtInheritDeallocate

: 4

O XtInheritRealize
O XtInheritResize
O XtInheritExpose
O XtInheritSetValuesAlmost
O XtInheritAcceptFocus
O XtInheritQueryGeometry
O XtInheritTranslations

O XtInheritDisplayAccelerator

: 4

O XtInheritGeometryManager
O XtInheritChangeManaged
O XtInheritInsertChild
O XtInheritDeleteChild

: 4

O XtInheritRootGeometryManager

Invocation of Superclass Operations

(:
C (L C (L *!*
& : C
& (J & (L
(XtManageChild (

XtSuperclass
& & (
5 (L
(L &
(&

5 E & L

Class Extension Records

' & C ((
5 E (&
& C '& C
& & 6 & D 6 &
C =<@@

'& C & C
6 6 & & (*!*
&
C (& (*!* & 6
V & C
! & & & =<@@

' C &
(*!* & C
C & & (& &
((& 4

U
! C J C V

! M J V
(6 V
J D V
WV

! ! & C =<@@

&
C &

& 6
& &

" & & &
C

5 & & & C
& & C
5 & (& XrmStringToQuark &
((5 ' 6 (((
PP!5LL & & 5 6
C
C & & C E

5 & & &
& 6 & & & C
5 6 & & (
6 & D & 5 "
& 6 & &
D sizeof ().

6 C & & CompositeClassPart Con-
straintClassPart ShellClassPart C &
(&

5 ' 6 & & (
C (6 (&& & !
&

5 C XtGetClassExtension

XtPointer **XtGetClassExtension**(*object_class*, *byte_offset*, *type*, *version*, *record_size*);

& 3 (C

& && & &
& C &

& J & C

& 6 &
C E &

″ & (&
C E & F

5 & C & && & 3
& & 6 (E
& 6 D (E & J D
& D XtGetClassExtension (C
=<@@ & & 5 C
& & & C

Chapter 2. Widget Instantiation

& ((5 (
XtAppCreateShell & (5 (
&
& 6 & (% C &
/ j,) * 1 (&
! %

% (6 B & (
' 6 & (&
(& ((

(& compositeWidgetClass
& (& &
(&
& (& ((
(/ 1 & (<
(6 D B 6
(& &
6 C C 6 (
6 (((

' ' 6 & /& C
D 1 (6
(6 & 6
6 & &

(6 ' & : C XtRealizeWidget 6 6 D (
& (XtDestroyWidget 6
(& (5 &
& & 6
& & (L XtMakeGeometryRequest 6
6 ((&
(L (

5 & 6 & ((
(5 (XtAppCreateShell
& =<@@

5 & 6 & (& &
(& (
3 & (
(L ((6 (
& E 6 6
' 6 (&

Initializing the X Toolkit

B & ' & XtSetLanguageProc
XtToolkitThreadInitialize D ' (

O XtToolkitInitialize D '
O XtCreateApplicationContext D
O XtDisplayInitialize *XtOpenDisplay D
O XtAppCreateShell & (

9 6 XtOpenApplication
& & ((
=' XtSetLanguageProc (
XtDisplayInitialize *XtOpenDisplay XtOpenApplication XtAppInitialize

&!5 (
8 6
& :
6 (: L
&6 ((
& & 6 (5 E '
& C & 6 &
(& 5 3 &
C & ! Display &
5 ' (C
(& 5 C
XtAppContext E

5 D ' XtToolkitInitialize

```
void XtToolkitInitialize();
```

'& XtToolkitInitialize 6 % XtToolkitThreadInitialize & XtToolkitInitialize
(6

5 C XtCreateApplicationContext

```
XtAppContext XtCreateApplicationContext();
```

5 XtCreateApplicationContext & C
E 86 6 C

5 C (
XtDestroyApplicationContext

```
void XtDestroyApplicationContext(app_context);
```

! & C

5 XtDestroyApplicationContext & &
C '& & 6 /& C
1 XtDestroyApplicationContext C

5 (C (6 (XtWidgetToApplicationContext

```
XtAppContext XtWidgetToApplicationContext(w);
```

& (& C
& 9 3 &

5 XtWidgetToApplicationContext & C &
& (

5 D C XtDisplayInitialize

void **XtDisplayInitialize**(*app_context*, *display*, *application_name*, *application_class*, *options*, *num_options*, *argc*, *argv*);

! & C

& 6
= (
C

& &

& &
(& &

& &
& 5 (
XrmParseCommand : &
& (@ 9
! N @ ((! ' &
S (@ T & &

& &

& &

& &

5 XtDisplayInitialize & 6 (((&
& / S: (: = T 1
((/ & 1 (((
& & ! XrmParseCommand &
& D & XrmParseCommand

& ('&
& D & (
((9 9 '!
& & YF['&
True XtDisplayInitialize ! XSynchronize & !
&
C S@ (; T
S (@ T &
(

XtDisplayInitialize XrmSetDatabase &
& & (

5 D C
*XtOpenDisplay

Display ***XtOpenDisplay**(*app_context*, *display_string*, *application_name*, *application_class*, *options*, *num_options*, *argc*, *argv*);

*! & C

& (=<@@

& &
=<@@

& &
(& &

& &
& 5 (
XrmParseCommand

& &

& &

& &

5 *XtOpenDisplay & XOpenDisplay &
'& =<@@ *XtOpenDisplay 6 & Q
& '& & L &
6 & 6 9 9 '! 6 &
(%) 6 6

'& *XtOpenDisplay XtDisplayInitialize
6 & Q &
'& Q &
=<@@ XtDisplayInitialize '&
=<@@ & 6 6 #%* #+ ,# 6 &
#%* #+ ,# 9
6 (9 & =' 7 8 6
YF[&
& & YF[& & '& YF[
C (PP LL *XtOpenDisplay
=<@@ & &

S< (' 5 8 6 T &
& ((& *XtOpenDisplay

5 6 & C XtCloseDisplay

void **XtCloseDisplay**(*display*);

&

5 XtCloseDisplay & XCloseDisplay &
& '& & 6 /& C

1 XtCloseDisplay
= XtCloseDisplay &
C (& (V XtDestroyAp-
plicationContext

S< (' 5 8 6 T &
& ((& XtCloseDisplay

Establishing the Locale

& ;
(D ('
& (
& &

5 6 & XtLanguageProc

```
typedef String (*XtLanguageProc)(display, language, client_data);
```

((6 &
6 &

&
XtSetLanguageProc

5 ((6 &
((XtDisplayInitialize 5 &
(((E XtDisplayInitialize
& (& 5 (
'

' ((' 5 ((
& XtDisplayInitialize XtSetLanguageProc

```
XtLanguageProc XtSetLanguageProc(app_context, proc, client_data);
```

! & C
((=<@@

& ((

&
((

XtSetLanguageProc ((& XtDis-
playInitialize & E ; D &
C '& ! =<@@ & (((
C ((&
C '& =<@@ & ((
(XtSetLanguageProc 6 (((
'& (((6

& & 6 E XtSetLanguage-
Proc & (((

5 & ((& (4

O (6 9 ='
(setlocale/ LC_ALL 1 '&
((XtWarning
O XSupportsLocale 6 & '&
((XtWarning
PP LL
O XSetLocaleModifiers & ((
O 6 & 9 ='
6 & & setlocale/ LC_ALL =<@@ 1

((XtSet-
LanguageProc XtDisplayInitialize & (C

% (V
! @ ((/=<@@ =<@@ =<@@1V
^ ! 9 / 1V

Loading the Resource Database

5 XtDisplayInitialize & & (((
& & ' & &
& (& (
& 6 ((4

O / 1
O 6 &
O & & 6
O & & 6 & &
&
O & &
O & &

% & /
XtScreenDatabase 1 & (
(6 4

O PP 6 LL & (
XResourceManagerString & XResourceManagerString
=<@@ & & L 9 9 '!
& & & _79 82 .Xde-
faults
O '& ((XtDisplayInitialize &
& PP C @ ((LL & C &
C @ ((2! @ ((& K . '&
& 6 ! !
'& & XtDisplayIni-

tialize E 6 /
! 1 & .xnlLanguage .XnlLanguage
&
XtDisplayInitialize 5 ((6
6 & & (5 (& ((
6 & & & ' E
(((
O 5 D (
& K .
O '& ((E &
.xnlLanguage .XnlLanguage & 6 '&
E & 6 E V & E
& ((& 6 V 9 '!
6 (6 & - 6 6 '&
(((& (5 (((6
& & & ' E ((
(
O & ((((L 6 &
(& & C 5 &
& C & 6
& 9 9 '!
L 6 & & 6
& !# (* ,# $ 6 6 '& 6 6
C L & & .Xdefaults-
& (
O 5 & (
& C 5 & (XScreen-
ResourceString & 6
O = C 6 (
5 6 (& &

O 5 & & & (
5 & D
8
& & 8 &
5 & & (XrmSetData-
base & 6 ((
(XtResolvePathname
/ =<@@ =<@@ =<@@ =<@@ F =<@@1 &
(& 9 9 '! &
6 & 6 6 ! %# (#%# . $. & &
'& ! %# (#%# . $. &
& 6 5 & 6 & (4
O O '& 6 6 ! #% (& & ! %#
(#%# . $. C 5
_79 8 & C & (4

‘ ‘= ‘@ ‘ ‘= ‘ ‘ ‘
K ‘ ‘= ‘
I ‘ ‘=
. ‘= ‘@ ‘= ‘ ‘ ‘
, ‘= ‘
- ‘=

5 & C (6 6 5
& (6
O '&! #% (& & ! %# (#%# . $.
6 5 & (
& C 4

_! @ 8 ;' ‘ ‘= ‘@ ‘ ‘= ‘ ‘ ‘
K _! @ 8 ;' ‘ ‘= ‘
I _! @ 8 ;' ‘ ‘=
. _! @ 8 ;' ‘= ‘@ ‘= ‘ ‘ ‘
, _! @ 8 ;' ‘= ‘
- _! @ 8 ;' ‘=
$ _79 8 ‘=

5 & 6 (6 6 5
& (6
O @ & & & (
5 &
'
D & (5 &
& & (XtResolvePathname
/ PP & LL =<@@ =<@@ =<@@ =<@@ F =<@@1 5 &
C 6 6 & E
& &
& 6 (& & &
& & XtAppSetFallbackResources
= D (6 XtRe-
solvePathname 6 & &
& && & &
6 (& & 6 &
(XtResolvePathname (

5 & XtScreenDatabase

XrmDatabase **XtScreenDatabase**(*screen*);

&

5 XtScreenDatabase & & (
& 6 & '& &
(Display D XtDisplayInitialize
&

5 & XtDatabase

XrmDatabase **XtDatabase**(*display*);

&

5 XtDatabase & E 6 XrmGetDatabase '
& =<@@ &

5 & & & 6 D
& & & & / & C
6 1 XtAppSetFallbackResources

```
void XtAppSetFallbackResources(app_context, specification_list);
```

! & C &
&

& =<@@ & &
=<@@

8 # (& & XrmPutLineRe-
source : (XtAppSetFallbackResources
(&
& & & & (
(6 6 & # =<@@ &
(&
& & XtAppSetFallbackResources
E # V &
& (6
D XtAppSetFallbackResources (5 6 =<@@ &
6 6 & & &
C 5 & & 6
& /
& ((1 C & ((
& &

Parsing the Command Line

5 *XtOpenDisplay & & & & (
4

& & XOpenDisplay

& C 6
*XtOpenDisplay

C ((& (((& (&
& (&

XtDisplayInitialize &
XrmParseCommand & (
& 6 5 & &
#, * (+ , (% #

& U
! = (2X " & 9 ; 6 X2
! ' (2X " (& X2
! (2X " & (X2
! (2X " C ((6 X2
! (2X < C (! @ X2
! (2X '(C ((6 X2
! = (2X '(C X2

2X 9 ; 6 ((6 X2
! @ 2X '(& (6 X2
W ! 9 ? V
& U
X V 2X 9 (6 X2
X & V 2X / 1 X2
! 9 ? (? V 2X @ & 6 X2
! 6 V 2X " 6 & ! = (X2
W ! 9 ; X! 9 ; @ V

5 & (4

* % "	'	"	'
a (	X (	(	C (
a	X	(	C (
a (	X (	(	C (
a	%	(	C (
a	X	(	C (
a	%	(	C (
a		(	C (
a&(	X& (	(	C (
a&	X&	(	C (
a&	X&	(	C (
a& (	X& (	(	C (
a(	(	(	C (
a		= (	0 0
a		(	C (
a 6	6 "	= (	0 0
a 6	6 "	= (	0 0
b 6	6 "	= (	0 &&0
a 5	5	(	C (
a		= (	0 0
b		= (	0 &&0
a		(	C (
aC ((	C @ ((	(	C (
aC	C (	(	C (
aC ';	';	(	C (

= E 6 &

'& 6 " True 6 & XtDefaultForeground XtDefaultBack-
ground C (& ;

5 6 & & !
'& 6 & (

D XtDisplayInitialize XSynchronize &
C 5 &
D C 6 & &
& C

5 6 & 5
C % D
C 6 & &
C

5 C 6 & (5
C (E (&
& : C (6 (
xmh

C C LC X (4 L

% XtDisplayInitialize (
& (! XrmParseCommand
&
6 '& & C &
(5 ' 6
((PP C LL & &

Creating Widgets

5 & (4

5 (D
(&

K (& & (
6 & (

I 5 (!

5 & XtCreateWidget & (
/ 1 & (6 L (
(XtManageChild 5 6 9/ K1
(& ((
(& & (((

& (6 XtRealizeWidget
6 (C XtRealizeWidget &
6 6 (/ 1 6
& ((&
(J (

= & ((6 6 (
((D &
6 /& C & D 1 ((
& /& C 6 &
D 1 9 && ((
((5 & &

(D (E
> (
(&

E & !
(6 & 5 6
E ! 6

: XtRealizeWidget (/ 1
6 & (! (&
D & ((

Creating and Merging Argument Lists

' & & 6 5
(& Arg

& U
(V
! (" 6 V
W (X (@ V

XtArgVal & #,

'& D & E D & XtArgVal
6 V

5 6 ArgList XtSetArg

```
void XtSetArg(arg, name, value);
```

& -

& &

& 6 & & & XtArgVal

5 XtSetArg & (D D
& (V & C 4

((YKF[V
V
^ FV
! (/ (Y [! = (#FF1V bbV
! (/ (Y [! = KFF1V bbV
! " / ((1V

6 (XtNum-
ber4

((Y[^ U
U! = (/! (" 1 #FFW

U! = /! (" 1 KFFW
WV
! " /% ((!= / (11V

= C &&
& (XtSetArg XtSetArg
6 & (

5 ((XtMergeArgLists

ArgList **XtMergeArgLists**(*args1*, *num_args1*, *args2*, *num_args2*);

. & & (

. & & & (

/ & (

/ & & (

5 XtMergeArgLists & ((
(= &
5 (& & (& & %
(& ((XtFree

' & E ArgList (6 (& (
=' 6 (/ PP6 (LL1 (
6 5 & (& & C (PP" LL &
(ArgList V (XtVaCreateWidget 8
XtVa (& (ArgList2
Cardinal 6 & 6
& String 6 & XtArgVal 5 &
& (=<@@ ;6 (
(((6 & &
ArgList 6 (& (

5 & & 6 (4 XtVaTypedArg
XtVaNestedList

R & !"5 (0!"5 (0

'& XtVaTypedArg & & &
(& (- - - "
& String & String & XtArgVal " &
% 6 ((XtVaTypedArg
6 / S 6 T 1 & &
6 6 & E '&
! (("
& (('& ! (#
D E sizeof/XtArgVal1 6
XtArgVal '& 6
& & ((

R & !"= @ 0!"= @ 0

'& XtVaNestedList & & &
((XtVarArgsList 6 &
6 (((&
5 & & (=<@@ " (

5 6 (& XtVaNestedList
XtVaCreateArgsList

& ! ! " (@ V

```
XtVarArgsList XtVaCreateArgsList(unused, ...);
```

5 (&
=<@@

& 6 & 6

5 XtVaCreateArgsList & (
(XtVaNestedList 5 &
& (=<@@ & XtVaTypedArg
& (6 ; & /
((1 6 V
6 & & & 6 (5
& (XtFree (

< & & & ((6
((6 (6 &

Creating a Widget Instance

5 & (XtCreateWidget

```
Widget XtCreateWidget(name, object_class, parent, args, num_args);
```

& &
(& 6 (
&
(&

& (&
3 &'

& (& 9 3
&

& (6
&

& & (

5 XtCreateWidget & & & (
(& (4

O & J D &
& &

O '& & coreWidgetClass &
L & compositeWidgetClass C
L C & C
& C
False XtCreateWidget & V S
& % (4 5 J T j#K

O '& & C 3 !
& & =<@@
6 & ('&
& constraintWidgetClass
& L &
& '& & '
& (D
&
O ' D & #

O ' D & /& C ! 1 (Core-
ClassPart & &
O '& & constraintWidgetClass D
& & (ConstraintClassPart
& & L constrain-
tWidgetClass
O D & ((9 3 D
(L D
O '& & constraintWidgetClass Con-
straintClassPart D (constraintWidgetClass
L ConstraintClassPart D
O '& & compositeWidgetClass (
L (L J :
& & S &
% (4 5 J T

5 & ((6 (XtVaCreateWidget

```
Widget XtVaCreateWidget(name, object_class, parent, ...);
```

& & (

& (&
3 &' &

& (& 9 3
&

& 6 (6
&

5 XtVaCreateWidget & XtCreateWidget
6 (
K , #

Creating an Application Shell Instance

6 6 (& & E
(&&
XtAppCreateShell (

```
Widget XtAppCreateShell(name, application_class, widget_class, display,
args, num_args);
```

& & (
'& =<@@
XtDisplayInitialize

& (
& ((
applicationShellWidgetClass
&

& (& 6 (
/ (applicationShellWidgetClass).

& & & &
6
(

& (6
&

& & (

5 XtAppCreateShell & (
& (5 & (&
(& != ('& != (&
& & &
E &
& & applicationShellWidgetClass
& '& application\%Shell\%Widget\%Class
& & CoreClassPart & &
'& E & & & &
9
6 (& (&
5 (6 & / 1
& E & & 3 (

'& & (& %
6 /,+ %% (L
D '& & applicationShellWid-
getClass & /,+ *,, &
6 & != (6 != (

5 6 (/ (1
& 4

O ; (6
& (XtCreatePopupShell
O 7 6 & D 6

5 & &
& & (4

C (4 / 1
C (4 / 1
C (4 / 1

5 &
& & (4

C (4 / 1
C (4 / 1
C (4 / 1

5 6 (& ((6 (
XtVaAppCreateShell

Widget **XtVaAppCreateShell**(*name*, *application_class*, *widget_class*, *display*);

& & (
'& =<@@
XtDisplayInitialize

& (
& ((
applicationShellWidgetClass
&

& (& 6 (

& & & &
6
(

& 6 (6
&

5 XtVaAppCreateShell & XtAppCreateShell
6 (
K , #

Convenience Procedure to Initialize an Application

5 D ' C D
XtOpenApplication XtVaOpenApplication

Widget **XtOpenApplication**(*app_context_return*, *application_class*, *options*, *num_options*, *argc_in_out*, *argv_in_out*, *fallback_resources*, *widget_class*, *args*, *num_args*);

! C & =<@@

& &

&

& &

& &

(&

& 6 &
&
=<@@

& & (
% (

& (6
& & (

& & (

5 XtOpenApplication & XtToolkitInitialize & XtCreateApplicationContext *XtOpenDisplay =<@@
=<@@ & XtAppCreateShell =<@@
& (
5 sessionShellWidgetClass 5 (
((&
(& 5 & XtDisplayInitialize '& !
=<@@ C '&
& (XtOpenApplication '& # =<@@ XtAppSetFallbackResources 6 (*XtOpenDisplay

Widget **XtVaOpenApplication**(*app_context_return*, *application_class*, *options*, *num_options*, *argc_in_out*, *argv_in_out*, *fallback_resources*, *widget_class*);

! C & =<@@

& &

&

& &

& &

(&

& 6 &
& =<@@

& & (
% (

& 6 (6
& &

5 XtVaOpenApplication & XtOpenApplication
6 (
K , #

Widget Instance Allocation: The allocate Procedure

(6 ObjectClassExtension

% (6 ((XtVaTypedArg
(XtTypedArgList

& U
(V
(V
! (" 6 V
D V
W ! 5 (X! 5 (@ V

5 ObjectClassExtension & (*AllocateProc)

typedef void **(*AllocateProc)**(*widget_class*, *constraint_size*, *more_bytes*, *args*, *num_args*, *typed_args*, *num_typed_args*, *new_return*, *more_bytes_return*);

& (&

" & D &
F

& & C &

& ((6
(

& & (

& & ((6
(

& & (

=<@@ &

C & E
=<@@ & E V
(

(& C E
(3 ! &

& =<@@ (*AllocateProc) 6 &
('& 9 3 C *0*
XtInheritAllocate XtInheritDeallocate
'& (*AllocateProc) & ' & (

(*AllocateProc) & & (4

O & (5
1 *2* " ((
O ' D *2* & =<@@
'& " F
& 5 (
O '& F & &
D (
=<@@

6 &
6 &
& & D (& (
C <
6
& & &

Widget Instance Initialization: The initialize Procedure

5 D (& (*XtInitProc)

```
typedef void (*XtInitProc)(request, new, args, num_args);
```

0 & & (6
E (
(&

& (6

& (&
(6 6 '&
((6 (& & 6
XtVaTypedArg 6 (
& ArgList &

& & (

D & & (4

O & &
& & & (: C &
(& String
(& (
% (
&

' &

O 6 & & & : C &
D ((

((
D D J J6 J6 J V
j- *3* '
O 6 & D & 6 &
& : C (C /A 1 (
6 & (& (&

D & & :
C & &

' D & &
& 6 D 5 D
C &
& D & & (
& & & &

'& D
& & 6 & =<@@ & ″ &

6 6 & '
D & & &
& &

C 6 '
(D
D & 5
& L D & C
(6 6 D C (6
D & D E

5 *0* (6 & &
&& C & & &
5 *0* (& (D
(5 (6
E D
& D 6
&

' 6 C 6 &
0 (D '& D
& ('& D (
&

5 ((5 &
D (V *0* (
6 & '& D
(& (

Constraint Instance Initialization: The ConstraintClassPart initialize Procedure

5 D & ConstraintClassPart
" & & (& (*XtInitProc) 5 6
D
L (D

5 & & *0* (&
D (

5 D & 6
& ' & ((
(& & & &
C (((L D

'& D &
=<@@ & " & & ConstraintClassPart

Nonwidget Data Initialization: The initialize_hook Procedure

5 D J &
6 D 5 &
(6

5 D J & (*XtArgsProc)4

```
typedef void(*XtArgsProc)(w, args, num_args);
```

& (

& ('&
((6 (&
& 6 XtVaTypedArg 6
(&
ArgList &

& & (

'& =<@@ & (
D & " & =<@@

5 D J (D
(& & & (&

Realizing Widgets

5 D (XtRealizeWidget

void **XtRealizeWidget**(*w*);

& (& &

'& (D XtRealizeWidget 9
& & (4

O B (L /
S = 5 T 1
O 6 & (& (
=<@@ (J (& (
6 (
O XSetWindowAttributes & & 6
& (& D & (
(& !
O '& (& compositeWidgetClass XtRealizeWidget
V & & (4
O O ; 6 & (L (
D 6 (
& D (6
O & (6
True '& ((False (
6

'& (6 (/ 1
True XtRealizeWidget (

XtCreateWidget XtVaCreateWidget XtRealizeWidget XtManageChildren XtUnmanage\%Children XtUnrealizeWidget XtSetMappedWhenManaged XtDestroy\%Widget & (6 4

O '& (D (D
O '& (D (6
True

' & (D
D (% (D (J (&
& (XtRealizeWidget 6
& CompositePart B & (&
D (&
(&

5 (D XtIsRealized

Boolean **XtIsRealized**(*w*);

& (& 9 3
&

5 XtIsRealized & True & (D &
(D '; '& & 3 (
& (

(/& C J6 1 (&&
& (D

Widget Instance Window Creation: The realize Procedure

5 D (& (*XtRealizeProc)

```
typedef void (*XtRealizeProc)(w, value_mask, attributes);
```

& (

& &

& XCre-
ateWindow

5 D (L

B & (D (XtRealizeWidget &
& (XSetWindowAttributes '
& (& (&
(4

O 5 ! / ! & ! XtUn-
specifiedPixmap1 & & (&
O 5 ! / ! & ! XtUnspecifiedPixmap1
& & (&
O 5 & & (&
O 5 & 6 (6
& ! & =<@@
True
O 5 NorthWestGravity & ! & =<@@

5 & (
D

= D (D
XSetWindowAttributes
& &

(D & (
D 5 D & & coreWidgetClass XtCreateWin-
dow
CopyFromParent B compositeWidgetClass constraintWidgetClass
D (
/ S' & 9 T 1

5 D
6 : C
(3 & @ (WestGravity Center-
Gravity EastGravity E (3 6
C 6 & (

'& (L D
& / (& C 1 XtRealizeWidget
& & D

% (6 & compositeWidget-
Class & (XtRealizeWidget &
D

D ((

Window Creation Convenience Routine

! XCreateWindow & C D
' (XtCreateWindow &
& & (

void **XtCreateWindow**(*w*, *window_class*, *visual*, *value_mask*, *attributes*);

& (&
&
&

& ! /& C In-
putOutput InputOnly CopyFromParent).

& 6 / CopyFromParent).

& &

& XCre-
ateWindow

5 XtCreateWindow & ! XCreateWindow & 6
& (5 (
(L &

XtCreateWindow 6 & (& & (4
1 2 *!*

Obtaining Window Information from a Widget

5 (& 5
& =<@@ & / S (% (T
S D (% (T 1

5 (& (
6 (&
& &

Display **XtDisplay**(*w*);

& (& &

XtDisplay & & (

Widget **XtParent**(*w*);

& (& 9 3
&

XtParent 3 & & (5 3
& 9 3

```
Screen *XtScreen(w);
```

& (& &

*XtScreen & & (

```
Window XtWindow(w);
```

& (& &

XtWindow & & (

5 & (&
(& (3 6 & *XtDisplayOfObject
*XtScreenOfObject XtWindowOfObject

```
Display *XtDisplayOfObject(w);
```

& 3 & 9 3
&

*XtDisplayOfObject & XtDisplay & 3 (V
*XtDisplayOfObject &
& & % (&

```
Screen *XtScreenOfObject(object);
```

& 3 & 9 3
&

*XtScreenOfObject & *XtScreen & 3 (V
*XtScreenOfObject &
& & % (&

```
Window XtWindowOfObject(object);
```

& 3 & 9 3
&

XtWindowOfObject & XtWindow & 3 (V
XtWindowOfObject & &
& % (&

5 6 & 3 XtName

```
String XtName(object);
```

& 3 &
9 3 &

XtName & & 3 5 (
' & 5 E &
& & 3 L

6 (5
(XtSetValues
6 & 6 /& C & 6 (C
! & 6 (A 1 XtCreateWindow

5 ! 6 (
(5 & ' %
XConfigureWindow ' (L / E
& 1 6
6 (ConfigureNotify 6 /' & (
SubstructureNotify 6 15 (

ConfigureNotify 6
((6 & D 6
(/ j- 3 ' 1

Unrealizing Widgets

5 (
XtUnrealizeWidget

```
void XtUnrealizeWidget(w);
```

& (& &

'& (D XtUnrealizeWidget 9
& & (4

O < ((& ((
O / 1 6 & (
& (& (
PP D LL C != D
O ; (L (XDestroyWindow
& (L &

6 E 6 & (XtUnrealizeWidget
& / 1 & D (/ 1 6 C

Destroying Widgets

5 ' 6

O 5 & ((
& (
O 5 6 / 1 (&
O 5 6 (((
O 5 D & ((
O 5 D & XDestroyWindow ((

5 (XtDestroyWidget

```
void XtDestroyWidget(w);
```

& (& 9 3
&

5 XtDestroyWidget & 6 & ((
((6 '
(& & ((5
E 6 ((&
(

' # XtDestroyWidget & & (4

O '& & & (True
O 6 (& True
& (
O (& (/ 1
&

8 & 6 & K & #
K & #

K C &
6 6 ((6
(6 & XtDispatchEvent
& XtDispatchEvent

' K XtDestroyWidget & & (
& 4

O '& ((L & com-
posite\%WidgetClass & (XtUnman-
ageChild ((L L J
/ S; & 4 5 J T 1
O ((
/ & 1

5 XtDestroyWidget & 6 & (
& & ((
4

O '& ((L & con-
straint\%WidgetClass ConstraintClassPart &
& L & Constraint-
ClassPart & constraintWidgetClass
O CoreClassPart (
&
9 3
O '& (3 ObjectClassExtension
J & =<@@
& C
9 ' (
& C
O XDestroyWindow & & (D / !
1 5 6 6 /%
& D
1

Adding and Removing Destroy Callbacks

% & ((
& ((& (5
j+
5 & !=

: C & (
4 ((XtAddCallback

! / != *4* 1

& (6
4 (XtRemoveCallback

! 6 / != *4* 1

5 *4* (& (*XtCallbackProc)V
S< (@ ;& T

Dynamic Data Deallocation: The destroy Procedure

5 ObjectClassPart RectObjClassPart
CoreClassPart & XtWidgetProc

```
typedef void XtWidgetProc(w);
```

& ((

5 5 &
(L (&
((& 5
6 C
&
((&
'& ((
=<@@

; ((& (4

O (XtFree (XtMalloc XtCalloc
O (XFreePixmap C !
O (XtReleaseGC A XtGetGC
O (XFreeGC A !
O (XtRemoveEventHandler 6 (
O (XtRemoveTimeOut XtAppAddTimeOut
O (XtDestroyWidget & & (
& compositeWidgetClass

; (K & (' 6 (&
(6 6
(6 ((
(&

Dynamic Constraint Data Deallocation: The Constraint-ClassPart destroy Procedure

5 & ConstraintClassPart constraintWidgetClass 5 & XtWidgetProc 5
(& (L (constraint\%WidgetClass 5 & L
(& (
&

'& (
=<@@

Widget Instance Deallocation: The deallocate Procedure

5 ObjectClassExtension & XtDeallocateProc

```
typedef void (*XtDeallocateProc)(widget, more_bytes);
```

& ((

& C 6 &
(((=<@@

% (& ObjectClassExtension C 3
! & &
=<@@ XtDeallocateProc '& 9 3 C
E XtInheritAllocate XtInheritDeallocate 5 &
& & =<@@
& (L 2
& & =<@@ (&

'& XtDeallocateProc & ' (
& & (

Exiting from an Application

! 5 (XtDestroyApplicationContext C ((& (/
(exit & 9 '! 1 5 E
C (XtUnmapWidget 6
(5 ' 6 ((
! 6 &

; ((C
6 ((XtDestroyWidget & (XtDestroyApplicationContext E (
C 5 6 & (
& (& &
('& /

S T 1 (& &
C (S ((& T &

Chapter 3. Composite Widgets and Their Children

(/ (& compositeWidgetClass1
6 & E &
6 (5 /
(' & 1 4

O 96 (& &
O ; & (
O (/((1 & &
/ (1
O ((& & (

96 ((XtCreateWidget
XtDestroyWidget XtCreateWidget (
L J XtDestroyWidget 6 &
(L J &
((

9 & & ((
(6 : C (
((&& ((& & &&
(& C (&& % (
(((
(5 ((&
'

6 & L ((
XtManageChild XtManageChildren XtUnmanageChild XtUnmanageChildren
XtChangeManagedSet & &
(L (J (5 XtCreateManagedWidget 6 & XtCreateWidget XtManageChild

((
(((
& & False 5 & True
((XtSetMappedWhenManaged

8 (((
& &(((
(L A (E & & 4

: C C : C C 6 & C &
(6
((E

7 (C 7 (C E
(
(&

7 (C 7 (C 6 &
5 & C

D C
&
&
5 & (C &

C C 6 L
D C D & 5 (
((&
C C ConfigureNotify
6 D (
(

Addition of Children to a Composite Widget: The insert_child Procedure

5 L & XtCreateWidget &
L J 5 J
(& XtWidgetProc

```
typedef void (*XtWidgetProc)(w);
```

(L 5 J
CompositeWidgetClass calls the insert_position procedure
& C (&

(& J
6 (
& (& (
((/ j#K
1 & CompositeClassExtension C
S T
& True '& CompositeClassExtension &
& False (
& & C J

'& (/
E 1 J &
5 J
&

Insertion Order of Children: The insert_position Procedure

' & (&
: C &
((&
& (

& & (
!= 5 J
(& (*XtOrderProc)

```
typedef Cardinal (*XtOrderProc)(w);
```

(

(/ (
C 1 (L J & L
J (
5 (&& (
(& (&& J
(

5 6 & J
(& ((D ((
& ((&
5 & J &
6 & (L (
6 (

Deletion of Children: The delete_child Procedure

5 6 & L XtDestroyWidget &
6 L J 5
J & XtWidgetProc

```
typedef void (*XtWidgetProc)(w);
```

(

(J &
((& J
6 (

Adding and Removing Children from the Managed Set

5 ' 6 &(& (
6 & (& (L (5 (
6 (L (J (&
=<@@ 5 (J (&
XtWidgetProc 5 ((& (
(&

Managing Children

5 & (((/ 1 &
XtManageChildren

& % (X% (@ V

```
void XtManageChildren(children, num_children);
```

& & (8
& 9 3 &

& &

5 XtManageChildren & & & (4

O ' & 6 & L
& compositeWidgetClass
O & (V &
E XtManageChildren (&
((&
O '& D & 6
& (6 4
O O (J (& (L
O XtRealizeWidget 6 (D
O 6 (True

((& (& &
((5 &
& True (=
(& C C XtManageChild &
J

'& (D (J (&
& ((5 D
& ' 6 (XtMoveWidget
& ! & XMoveWindow

'& ((D & &
XtResizeWidget &
& XConfigureWindow (
D (XtConfigureWidgetV S% (
D (T

5 ((L & (XtManageChild

```
void XtManageChild(child);
```

& & 9 3
&

5 XtManageChild & WidgetList & (# XtManageChildren

5 (((XtCreateManagedWidget XtVaCreateManagedWidget

```
Widget XtCreateManagedWidget(name, widget_class, parent, args, num_args);
```

& &
(

& (&
(/

& (&
&

& (6
&

& & (

5 XtCreateManagedWidget & 6 XtCre-
ateWidget XtManageChild

```
Widget XtVaCreateManagedWidget(name, widget_class, parent);
```

& &
(

& (&
(/

& (&
&

& 6 (6
&

XtVaCreateManagedWidget & XtCreateManagedWidget
6 (

K , #

Unmanaging Children

5 6 & & (L (XtUnman-
ageChildren

```
void XtUnmanageChildren(children, num_children);
```

& & (8
& 9 3 &

& &

5 XtUnmanageChildren & & & (4

O & (
O ' & 6 &
& compositeWidgetClass
O : E XtUnmanageChildren (&
(V & & (4
O O (
O '& D & True

O '& D & 6 (
(J (& (L

XtUnmanageChildren (6 ((&
L (&
((5 (XtDestroyWid-
get V S8C (& T

5 6 (& (L (XtUnman-
ageChild

void **XtUnmanageChild**(*child*);

& & 9 3
&

5 XtUnmanageChild & (& (# XtUn-
manageChildren

5 & 6 ((
(' (6 (& (
6 6

Bundling Changes to the Managed Set

(((
' ' 6
& (& 5 (
& (6 &
(J (((3
(6

5 6 & ((&
& XtChangeManagedSet

void **XtChangeManagedSet**(*unmanage_children*, *num_unmanage_children*, *do_change_proc*, *client_data*, *manage_children*, *num_manage_children*);

& & (
6 & (

& &

& 6 (
(((=<@@

&
J (J

& & (&
(

& &

5 XtChangeManagedSet & & & (4

O &
F
O ' (& (&
6 &
& compositeWidgetClass
O & (
O '& =<@@ L CompositeClassExtension
& False XtChangeManagedSet &
& (4
O O XtUnmanageChildren / 1
O
O XtManageChildren / 1
O 9 & (& 4
O O : V & (
((& D
& True
O '& =<@@ 6
O : V & (
((V (
O '& D & 6
(J (& 6 E &
(6 (XtRealizeWidget
6 (D (6
(True

'& CompositeClassExtension & L
! & 6 (#
& XtInheritChangeManaged & L
(D 6 & &
& 5 6 & compositeWidgetClass &
& False

'
5 && & (
& (&&
(

5 & *XtDoChangeProc

typedef void ***XtDoChangeProc**(*composite_parent*, *unmange_children*, *num_unmanage_children*, *manage_children*, *num_manage_children*, *client_data*);

(
(
& 3 6 &
(
&
&
(

&

XtChangeMan-
agedSet

5 & XtChangeManagedSet
((
& 5 (6 6 (E
& XtChangeManagedSet 6 (& & '
((E (6 (
L ((5 6 6 (&
((& & &

Determining if a Widget Is Managed

5 (& (6 (XtIsManaged

Boolean **XtIsManaged**(*w*);

& (& 93
&

5 XtIsManaged & True & & (& 93
& (False

Controlling When Widgets Get Mapped

(& (7 6 6 6
(!= % (& (
(& False

5 (6 & (6 (L &
XtSetMappedWhenManaged

void **XtSetMappedWhenManaged**(*w*, *map_when_managed*);

& (&
&

& B 6
6 (L
&

'& (D (& True
XtSetMappedWhenManaged '& (D (
& False XtSetMappedWhenMan-
aged 6 & E 6 / (& 1 (
XtSetValues (6 & != % (
((6 (XtSetMapped-
WhenManaged (False
XtMapWidget XtUnmapWidget C

5 (C XtMapWidget

```
XtMapWidget(w);
```

& (& &

5 (C XtUnmapWidget

```
XtUnmapWidget(w);
```

& (& &

Constrained Composite Widgets

5 (& compositeWidgetClass 5
6 & & (((&
5
C (
(&
6 D (&
& : C & &
C D & D 6 &
& & (L (
(& 3
&

(6 & (
&
&

5 & (' &
6 (& &
& & '&
L (& constraintWidgetClass
L & =<@@

& &
5 (&
6 & (6 & (
: C (C (
& (& & 4

& U
; CJ CJ (V
W C V
& U
C CV
W C X C V

& (D
& & 4

& U
; J J (V
W V

& U
C CV
V
W C X C V

D &
' 5 6
& ConstraintClassPart &
& 6
& L

5 XtCreateWidget & " & L
XtCreateWidget
& &
' D
& 6 &
6 D & (6

% XtGetValues XtSetValues & C
(6 6 &
XtSetValues J6
6 & 6 D
'& (& 6
ConstraintClassExtension ConstraintClassPart ! &
& & C
=<@@ XtGetValues (J6 J / 1
6 &

5 XtDestroyWidget &
(5
& V XtDestroyWidget

Chapter 4. Shell Widgets

(L 6 (
((6 (
6 6 6
6 D

'& (D & / (1
(D ((&
L ((D (E
(D (6
6 (D &

5 & 6 & 4

96 < &
(/& C 1

5 < & 6 /,+$ %(# $+ *
5 && &
((

5 @ 6 < & 6 /& C
6 (1

: & (6
(&

< & (6
(&
(

Shell Widget Definitions

% ((D ((
% (& 6
(' 5 6 &
6 (((

(&
((6 ((
5 6 &
(

5 (&& & 4

5 & (V 6 & &
& & ' /
''

96 & V &
(

% & V &
(

" & % V & 6 &
(

5 & " V &
/,+$ %(# $+ *

5 @ 6 & " V & 6

& 5 @ 6 V & L

& V & L

= % "
9 96 5 5 @ 6
&

ShellClassPart Definitions

9 & Shell-
ClassExtensionRec = & 6 & 4

& U
! C V
W 96
% " 5
5 @ 6 V

5 & & 4

& J U
J V
J V
J V
W V

& U
! C J C V S 8C T
! M J V S 8C T
(6 V S 8C T
J D V S 8C T
! A 7 J(J (V
W 8C X 8C V

& J96 U
J V
J V
J V
96 6 J J V
W 96 V

& J% U
J V
J V
J V
% J J V
W % V

& J" U
J V
J V
J V
% J J V
" 6 J J V
W " V

& J5 U
J V
J V
J V
% J J V
" 6 J J V
5 J J V
W 5 V

& J5 @ 6 U
J V
J V
J V
% J J V
" 6 J J V
5 @ 6 J 6 J J V
W 5 @ 6 V

& J U
J V
J V
J V
% J J V
" 6 J J V
5 @ 6 J 6 J J V
J J V
W V

& J U
J V
J V
J V
% J J V
" 6 J J V
5 @ 6 J 6 J J V

J J V
J J V
W V

5 (& & (&
4

C V
C 96 6 V
C % V
C " 6 V
C 5 V
C 5 @ 6 @ 6 V
C V
C V
C % (% (V
C % (6 % (V
C % (% (V
C % (6 % (V
C % (% (V
C % (@ 6 % (V
C % (% (V
C % (% (V

5 & (E E 6 & & (
(&

$0	
%1 / "	**1 / "**
***2 %1 / "**	**2 %1 / "**
/,%1 / "	**3 %1 / "**
%1 / "	**2 %1 / "**
$ %1 / "	**%1 / "**
$ 2 %1 / "	**2 %1 / "**
' %1 / "	**' %1 / "**
% %1 / "	**%1 / "**
%1 / "	j
***2 %1 / "**	j
/,%1 / "	j
%1 / "	j
$ %1 / "	j
$ 2 %1 / "	j
' %1 / "	j
% %1 / "	j

5 & ' & C "
`Shell.h ShellP.h "` 6 &
`Shell.h ShellP.h`

Shell.h &
6 &

5 & ShellClassExtension 6 &
XtShellExtensionVersion/ S 8C T 1

5 J(J (((
& (E (% (
XtMakeGeometryRequest XtMakeResizeRequest J(J (
6 ((('&
((J(J (
XtGeometryYesV & ((
E ((6
/E & % 1 J(J (
XtGeometryNo '& (6
((J(J (XtGe-
ometryNo (D XtGeometryAlmost
'&
D D &
6 J(J (((
6 (6 L J(J (
(6 C

'& ShellClassPart C E
XtInheritRootGeometryManager

ShellPart Definition

5 6 (6 & (& &
(4

& U
((V
! J J J V
!A ? (J V
B (J V
B J V
B J J D V
B J & V
B 6J V
B 6 J V
! @ J V
! @ J V
" X6 V
W V

& U
V
W96 V

& U
(V

J V
B J& J V
B V
B (V
% (J V
(J V
J9 ! D 7 U
(& (V
C V
(V
J J (V
CJ CJ (V
J (J V
U
CV
V
W J CJ V
W D J V
!% 7 J V
J J (J(6 V
J (V
W % V

& U
6 J & V
W " V

& U
% (J& V
W 5 V
& U
(J V
B V
J J (V
W 5 @ 6 V

& U
X V
! C J V
(V
XX (6V
W V

& U
V
(J V
(X J V
(X J V
(X J V
(X (J V
(X J V

(X 6 V
(J V
((J V
(J V
B 3 J V
! @ 6 J V
! @ J V
! @ J V
! @ 6 J J V
! @ J V
! @ J V
W V

5 & (& 4

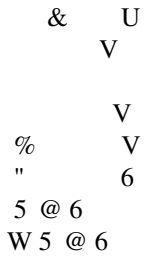
& U
V
V
V
W X % (V

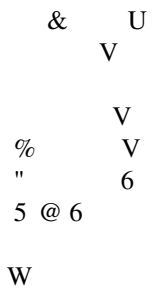
& U
V
V
V
96 6 V
W 96 X96 % (V

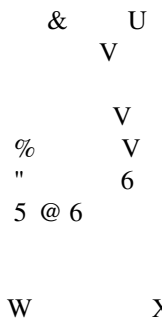
& U
V
V
V
% V
W % X% % (V

& U
V
V
V
% V
" 6 V
W " X" % (V

& U
V
V
V
% V
" 6 V
5 V
W 5 X5 % (V







Shell Resources

5 & shellClass-
Rec 4

! = D	! D	! B
! =	!	! :
! =(	! A	! (
! = 6	! 96	! B
! =	!	!
! =	!	!
! = 6 <	! 6 <	! B
! =6	! "	! "

96 &

5 & wmShell-
ClassRec 4

!= 7 (	! B 7 (	! '
!= %	! B %	! '
!= @	! @	! % (
!= ('	! 7 ('	! '
!=	! '	! B
!= C	! ' C	! B
!= %	! ' %	! %
!= !	! ' !	! '
!= >	! ' >	! '
!=	! '	! '
!=	! '	! B
!= C !	! C !	! '
!= C >	! C >	! '
!= C7 (	! C7 (	! '
!= C%	! C%	! '
!= !	! !	! '
!= >	! >	! '
!= 7 (	! 7 (	! '
!= %	! %	! '
!=	! 5	! (
!= 8 (	! 5 8 (	!
!=	! 5	! B
!= & != : %	! % & ! % : %	! B
!= '	! % '	! '
!=	! %	! (
!= A 6	! % A 6	! A 6
!= A	! % A	! %
!= 5	! % 5	! '
!= (	! < (	! B

J

5 & " &

5 &
transient\%ShellClassRec 4

!= :	! 5 :	! % (

5 &
topLevelShellClassRec 4

!= =	! ' =	! (
!= = 8 (	! ' = 8 (	!
!=	! '	! B

5 &
application\%ShellClassRec 4

!= (	! (	! '
!= (6	! (6	! (

5 &
sessionShellClassRec 4

!=	!	!
!=	!	! (
!=	!	!
!= ;	! ;	! ; (
!=	!	!
!=	! ;	! (
!= 6	! 8 6	! 8 6
!=	!	!
!=	!	!
!=3	!	! B
!= (	! (	! (
!= (	! (	! (
!=	!	! (
!=	!	!
!= 6	!	!
!= 6	!	!
!= ';	! ';	! (
!=	!	! (

ShellPart Default Values

5 & 6 & & & /&
D 1 4

(	=<@@
J J J	=<@@
(J	/ 1
(J	/ 1
J	False
J J D	False
J &	/ 1
6 J	True & 96 5
6 J	True & 96 False
J	=<@@
J	=<@@
6	CopyFromParent

5 & & D (6
& & '& & =<@@ (
& % D (& (XWMGeome-
try & ((& 6 & !
D & ((
D '& (& C USPosition
'& (& (USSize &
(& 6 (6 !
& '& =<@@ &
! & PPosition PSize
5 ((& '
V & (((6 (
6 6 (D : & &
((S (% A T ! N
@ ((!' &

5 XtPopup
=<@@ 5 &
(& XtPopup XtMenuPopup XtPopdown
XtMenuPopdown 5 " & (
D & '& J J D False (
E XtGeometryNo
(((True 6
6 &
' &
& (True
(: & &
6 J S% T ! N @
((!' & S % T
S & 9 T ' 6
5 (XtPopup XtPopdown
5 & 6 & 6 CopyFromParent 5
' E L 6 & 6
V & (XtGetValues C 6 6 6

CopyFromParent XGetWindowAttributes & 6

5 & 6 & & % 4

	' & & L
J	:6 &
J& J	True
	True & 5 False
(	False
J	=<@@
J	=<@@
J	XtUnspecifiedShellInt
J (	XtUnspecifiedShellInt
CJ	XtUnspecifiedShellInt
CJ (	XtUnspecifiedShellInt
J	XtUnspecifiedShellInt
(J	XtUnspecifiedShellInt
J JC	XtUnspecifiedShellInt
J J	XtUnspecifiedShellInt
CJ JC	XtUnspecifiedShellInt
CJ J	XtUnspecifiedShellInt
	False
J	=
J C	=
J	=
JC	XtUnspecifiedShellInt
J	XtUnspecifiedShellInt
J	=
J(	XtUnspecifiedWindow
J	XtUnspecifiedShellInt
J (	XtUnspecifiedShellInt
J(6	XtUnspecifiedShellInt
J (	C

5 & /,+ ,#
L % D '& & None
((&
(& /,+ ,# XStdICCTextStyle '& ((
& 6 & !+%$(-
& 6 None 5 & & &

& & & (E (
'& (
& (# False/ 6
6 1 % # False &
& '& True /,+$ %(# $+ *
6 & 5
& & (
V ' 6 &

5 D J6 & %
/,+ (# $+ # # %
=<@@ (D
6 & & (% =<@@
(=<@@ (L 6 &
% =<@@ (=<@@
& =<@@
& & =<@@ '& (
(D 6 & (L

% 6 & =<@@ D J6
/,+/(*/+ * # L 6 &

& & (
(D 5 D J6 & %
(& (& & & & 6 '
& & (& & 6 XtUnspecifiedShel-
lInt 6 & & & & 4

'

J J (	F
J (J	#
CJ CJ (	IK$-$
J J (	#
J JC J J	#
CJ JC CJ J	#
JC J	#
J(6	" XWMGeometry & NorthWestGravity

'& (=<@@ D J6
6 XtUnspecifiedWindow &
& (& (& (D
5 XtUnspecifiedWindowGroup
& ('& True L
& 5 XtUnspeci-
fiedWindowGroup % D J6
/,+$ %(# $+ * 6 &

5 6 & (4

'

J& =<@@

5 D J6 & 5
/,+$ %(# $+ * & True '&
=<@@ (& # D
6 & **/,+$ %(# $+ *** V
6 &

`TopLevel` 6 & (4

J (L

J J (C

5 & **/,+(* + ,#**
L 5 @ 6 D '&
& `None` (
(& (& **/,+(* + ,#**
`XStdICCTextStyle` '& ((&
6 & **! + %$ (-** & 6 `None`
5 & E (&
& V 5 @ 6 J6
/,+ . -#+%$$# (/ & %
' 1 & (& `False` `True`
`XtPopup` & (`XtGrabNone` & (& `True`
`False` 5 != 6 !=
V
5 @ 6 D `IconicState` &
`True`

6 & (4

(F
(6 =<@@

5 & D
/,+ *,, ' 6 &
&

5 & 6 & & & &
D

J	=<@@
J	C
	=<@@
J	=<@@
J	=<@@
J	=<@@
6	=<@@
J	=<@@
J	=<@@
3 J	$
(J	=<@@
(J	=<@@
J	C
J	% ("
6 J	=<@@
6 J J	=<@@
J	=<@@
J	=<@@

5 & 3 =<@@ &
(((

5 & (
(5 (
& & 6 %
(((&
% =<@@ & (&
(& (%,+ (# $+(
L

'& False (
(S (T
S ((& T & & &
&

5

&

% (
D J6 6 &
&
=<@@ 6 & %
=<@@ & 0 ! %4 0 05 1 0
D J6
((& (V & 0 ! %4 0 (
& ((
(

& D J6
'& =<@@
C 0 ! %4 0 & ((

: D J6
'& =<@@ & &

5 6 & SmRestartIfRunning SmRestartAnyway
SmRestartImmediately SmRestartNever 6 (
& V & ((D S
& 6 T

5 8 6 =<@@ &
(V (& 0 ^6 0 5 P^L
(

Session Participation

L C (((
((6 ') (6
' ,

% (& sessionShellWidgetClass (
6 &
6 (

Joining a Session

% & =<@@ & True
& =<@@ & 9 '! 6
%#%%(* +, -# 6 6 &
(

5 & (& C (&
(C (';
6 (&
(
(5
(

' J6 & (& False
True =<@@ 9 '! 6
%#%%(* +, -# 6 6 &
('& (& =<@@
=<@@ 6 (&
True '& (& False True
=<@@ 6 (&

% &
'; & % ((
XtAppAddInput (&
(& (% &
((=<@@

% ((& SaveYourself SaveYourselfPhase2
Interact ShutdownCancelled SaveComplete Die (6 &
(
(6 &
SaveYourselfPhase2Request InteractRequest InteractDone SaveYour-
selfDone ConnectionClosed (' &
L & % &
6 & (D J6
L 6 SetProperties DeleteProp-
erties (5 '; < ';
6 &

Saving Application State

5 (((SaveYour-
self E & 6 (
E

% SaveYourself E 6 (
L 6 '& (6
6
(& 6 8 6
6

5 & XtCheckpointToken

& U
6 J V
J V
B V
B & V
B J
V
J (J V 2X X2
B E J V 2X X2
B E J C J V 2X X2
B 6 J V 2X X2
W ! 5 X! 5 V

5 # & &
& SaveYourself (5 6 &
SmSaveLocal SmSaveGlobal SmSaveBothV & &
6 5 6 & SmInteractStyleNone
SmInteractStyleErrors SmInteractStyleAnyV
& & '&
True (& & &
'& # True & E '&
True ShutdownCancelled (6 &
6 / S ((& T 1 5
(((
& & 6 5 # K 5
(& 6 &

< & 6 &
6 & (6 4 SmDialogNormalV
0 FalseV *0* *!* FalseV True
% & & & (
6 & E
(6 6

5 & L & &
((False
& & 6 '&
False E
6 & 6
False % & &
(& 6 &
False

(6 &
6 *0* *!* True #
SaveYourselfPhase2Request &
% SaveYourselfPhase2 (6
6 6 E K (
6 & 6
E K

5 E
C

5 E & 6 &
XtSessionGetToken

```
XtCheckpointToken XtSessionGetToken(widget);
```

& ((

5 XtSessionGetToken & =<@@ &

5 & ((
((/
S' (< (T S
(6T 1 5 XtSessionReturnToken

```
void XtSessionReturnToken(token);
```

& 6

6 XtSessionGetToken

5 6 6
6 XtSession-
ReturnToken

Requesting Interaction

%
(&

E ((
((L %
6 6 (
XtSessionGetToken C
'&
InteractRequest (
E (&

5 & (E &
& 5 6 &
SmDialogError SmDialogNormal '&
(SmDialogError E
E E & (V E
& (

% False SmDi-
alogError E (6 SaveY-
ourself & (6 (
(

5 *0* & 6 & <
& 6 6 & L *0*
& C 5 & 6 (
XtSessionGetToken

Interacting with the User during a Checkpoint

% ((L E &
6 Interact (5 (
C & C (5
6 C E &
(E (8 E (6 (
& C (
5 (C %
(
(XtSessionReturnToken (
((C E

; (E & %
& True
False *0*
E ('& *0* True &
True E ((
% E (&
(%
6 6 & C
& InteractDone (
(((E

Responding to a Shutdown Cancellation

(6
ShutdownCancelled (& (5
((& 6 (&

(& 6
C (SaveComplete Die (5 &
=<@@

% (
& True E (6

6 (& (C
& 6 & C &
SmInteractStyleNone
C
SmInteractStyleNone 5
InteractDone (

Completing a Save

% (6 (&
6 (6 6
XtSessionGetToken 6
(XtSessionReturnToken '& 6
6 6 6
E & 6 (
6 (XtSessionReturnToken '&
6 6 6 (E
6 & & 6

% & 6 (
((SaveYourselfDone ('&
(6 SaveComplete (
6 6 (5 (
((5 C 6 J
5 & =<@@

Responding to a Shutdown

(6 (
Die (5 6
E B & C (
(6
& (5 &
=<@@

Resigning from a Session

% (
((ConnectionClosed (
6 (& (

% XtSetValues False J6 &
(& C
(ConnectionClosed (=<@@

C &
K False &
C (

% XtSetValues =<@@
((& C 7 6

&
& & 6 6
=<@@ & (
(&

5 & 6
((5
=<@@ 6 (
5 & =<@@

Chapter 5. Pop-Up Widgets

(& &
(8 &
(L
5 & && (
(

& (6 (V &
5 & CorePart
& 5 C
6 (& (
6 & XtDestroyWidget & C

(6
& 3 5 &
((((L &
& (

Pop-Up Widget Types

5 & (4

O

/& C (C 6
& 1
(& L
& 6 5 & &

O

/& C (C E 1
(C & 6
(C 6 &

O (

(/& C 1
(C & 6
6

(6
& ' & (/& C B B C
(1 (
5 && (
(& (
E && (' :
6 ((/ (1
6 (& 6
& C (

& ((
6 6
& (

(& (&
(! (& & &
(

Creating a Pop-Up Shell

: (& (= &
' (B
(& %
&

5 XtCreatePopupShell

```
Widget XtCreatePopupShell(name, widget_class, parent, args, num_args);
```

& &
(

& (&
(

& (&
&

& (6
&

& & (

5 XtCreatePopupShell & & &
(J (L
L

5 & (& (&
! = ('& ! = (&
L E &
& & CoreClassPart &
& '& E & L 9

6 (& (&

(6 & 6 XtMenuPopup
C 6 (
& 6
5 & &
& & > &
/ 1 C
&

5 (6 (XtVaCreatePopupShell

```
Widget XtVaCreatePopupShell(name, widget_class, parent, ...);
```

& &
(

& (&
(

& (&
&

& 6 (6
&

XtVaCreatePopupShell & XtCreatePopupShell
(6 (
K , #

Creating Pop-Up Children

9 (&

&
& & & C & (5
(& & (
: C & XtSetSensitive /
(XtSetValues 1 & (
D &
XtRealizeWidget %
(C 5
E ! 6

6 &
D & (
& '
(& & (6 & &

6 &
XtRealizeWidget

6 6
(& (
& = C 6 &
(

Mapping a Pop-Up Widget

(6 4

O XtPopup XtPopupSpringLoaded
O 9 & XtCallbackNone XtCallbackNonexclusive XtCallbackExclusive
O 5 XtMenuPopup

& (& XtGrabKind &

& U! A = ! A = C 6 ! A 8C 6 W ! A ? V

5 J J J (
& *XtCreatePopupChildProc

void ***XtCreatePopupChildProc**(*w*);

& ((

5 & XtPopup

void **XtPopup**(*popup_shell*, *grab_kind*);

& (

& 6

5 XtPopup & & & (4

O XtCheckSubclass L & shellWid-
getClass
O & L & True
O L & (
6 & (
O & True & False
& &
O '& L & =<@@ XtPopup

O '& XtGrabNonexclusive XtGrabExclusive

! A / / ^^ ! A 8C 6 1 : 1
O XtRealizeWidget &
O XMapRaised &

5 (& XtPop-
upSpringLoaded

void **XtPopupSpringLoaded**(*popup_shell*);

& (

5 XtPopupSpringLoaded & & C XtPopup C
& True XtAddGrab ! True
True

5 & (6 (L (&
XtCallbackNone XtCallbackNonexclusive XtCallbackExclusive 6
((

void **XtCallbackNone**(*w*, *client_data*, *call_data*);

& (

&

& (

void **XtCallbackNonexclusive**(*w*, *client_data*, *call_data*);

& (

&

& (

void **XtCallbackExclusive**(*w*, *client_data*, *call_data*);

& (

&

& (

5 XtCallbackNone XtCallbackNonexclusive XtCallbackExclusive &
XtPopup & (
& XtCallbackNone XtCallbackNonexclu-
sive XtCallbackExclusive & XtGrabNone XtGrabNonexclusive
XtGrabExclusive 6 8 & (C
6 (XtSetSensitive < (&
E ' 6 D
&
D (

%
6 (XtMenuPopup
MenuPopup : L & 6 & &

void **XtMenuPopup**(*shell_name*);

& & (

XtMenuPopup ((
(XtMenuPopupAction (XtRegisterGrabAction
& (True ButtonPressMask | ButtonRelease-
Mask GrabModeAsync

'& XtMenuPopup 6 ButtonPress XtPopupSpringLoaded
& ('& XtMenuPopup 6 KeyPress EnterWindow
XtPopup & (XtGrabNonexclu-
sive 9 (((((

XtMenuPopup & (((
(6 '& & &
& (
9 6 & &
'& XtMenuPopup (6 (
& (((

Unmapping a Pop-Up Widget

(6 4

O XtPopdown
O 5 XtCallbackPopdown
O 5 XtMenuPopdown

5 & XtPopdown

void **XtPopdown**(*popup_shell*);

& (

5 XtPopdown & & & (4

O XtCheckSubclass L & shellWid-
getClass
O & & TrueV

O < L & False
UnmapNotify 6 & %
'
O '& L XtGrabNonexclusive XtGrabExclusive
XtRemoveGrab
O L & False
O L & (
6 & L & (

5 & XtCallback-
Popdown

void **XtCallbackPopdown**(*w*, *client_data*, *call_data*);

& (

& XtPopdownID

& (

5 XtCallbackPopdown & &
XtPopdownID

& U
% (J (V
% (J (V
W ! '; X! ';V

5
(& 6

XtCallbackPopdown XtPopdown &
XtSetSensitive D

% (
6 (XtMenuPopdown
MenuPopdown : L & 6 &
&

```
void XtMenuPopdown(shell_name);
```

& & (

'& (6 XtMenuPopdown XtPopdown (&
& '& &
XtMenuPopdown & (((
(6 '& & &
& (V 6
& & '& XtMenuPopdown (
6 (& ((
(

Chapter 6. Geometry Management

(D V
& ((& &
(6 & 6 & D
&

5 6 & (((
' 6 ((
(6 ((&
& (& D (
& (L 5 C & C C
6 6 (
E

Initiating Geometry Changes

((&& B
& L (((
(XtMove\%Widget XtResizeWidget XtConfigureWidget
& (((XtMakeGeometryRequest
XtMakeResizeRequest (
((XtSetValues (& (6 (
(& 3 E & (
(L

% ((D (
L ((((
(E E ((

% ((((& (
((D &
5 ((6 & (XtMoveWid-
get % D / ((1
(E (XtResizeWidget
5 E ((6 V S
A (45 (J (T '
6 D (XtConfigureWidget

9& ((& & E &
& ((&V
((D ' ((
E L ((A E

B & ((6 6 C (
(
(& (V S (% (T
S D (% (T

5 ' & (E & 6
(E & D ((6 &
& ' XtSetValues (
((E

K & & (E / XtGeometryYes1
(D
% (6 D
&&

General Geometry Manager Requests

% ((E & XtWidgetGeometry

& ((! A V
& U
! A E J V
C V
; (V
; J V
% ((V
J V
W ! % (A V

5 (((E & (XtMakeGeome-
tryRequest

XtGeometryResult **XtMakeGeometryRequest**(*w*, *request*, *reply_return*);

& ((E &
9 3 &

0 & ((/ D
(1

(D =<@@ &
E (((
XtGeometryAlmost

; (XtMakeGeometryRequest & & (4

O '& (((L D
(XtGeometryYes
O '& L & compositeWidgetClass L
& =<@@
O '& (L & True XtGeometryNo
O '& (! & E
E 6 XtGeometryYesV L
(J ((6
O '& L ((XtGeometryYes & XtCWQueryOnly
0 1 0 & (D XtMakeGeome-

tryRequest XConfigureWindow! & &((L
/ D (1
O'& ((XtGeometryDone (6
' XtMakeGeometryRequest &(
(XtGeometryYes XtMakeGeometryRequest 6 XtGe-
ometryDone
O 9 XtMakeGeometryRequest 3 (6 &
L ((

& 6 ((V & XtMakeGeome-
tryRequest XtGeometryYes & 6
(

5 & ((

& U
! A >
! A =
! A
! A ;
W ! A V

5 *0* & & <X11/X.h>

R &	CWX	/#\\F1
R &	CWY	/#\\#1
R &	CWWidth	/#\\K1
R &	CWHeight	/#\\I1
R &	CWBorderWidth	/#\\.1
R &	CWSibling	/#\\,1
R &	CWStackMode	/#\\-1

5 ' & (6

R &	XtCWQueryOnly	/#\\$1

XtCWQueryOnly ((E E
& (E (
(

XtMakeGeometryRequest XConfigureWindow ! &
0 & XtWidgetGeometry
&

5 & & <X11/X.h>4

R &	Above	F
R &	Below	#
R &	TopIf	K
R &	BottomIf	I
R &	Opposite	.

5 ' & (6

R & XtSMDontChange ,

: & 6 & Above Below TopIf BottomIf Opposite B@ 7
! N @ ((!' & XtSMDontChange (
(6

Resize Requests

5 D E & (XtMakeResizeRequest
6 XtMakeGeometryRequest

```
typedef XtGeometryResult XtMakeResizeRequest(w, width, width_return);
```

& ((E &
9 3 &

& ((

((

5 XtMakeResizeRequest & & XtMakeGeometryRequest
XtWidgetGeometry & (
((0 CWWidth | CWHeight 5 ((
& & & / (1
& D E '& 6 XtGeometryAlmost
('&
(XtMakeResizeRequest (E
('& (XtGeom-
etryAlmost =<@@ &

Potential Geometry Changes

(((E &
& ((E (L / (
E L (1 '& E (
& (E ((
(E & (9 & (
((E
& /& C & (1 (
E (((
& 5
((XtCWQueryOnly E

% XtCWQueryOnly (((
& C E '& (L
E XtGeometryAlmost ((
(6 L

'& (L XtGeometryAlmost
(& (XtCWQueryOnly
'& ((& (E
(L L
E '& (L (&& L
E & (((&& &&
(L

= (XtGeometryAlmost (
& C (V & & D # &&

Child Geometry Management: The geometry_manager Procedure

5 (J ((&
*XtGeometryHandler

```
XtGeometryResult *XtGeometryHandler(w, request, geometry_return);
```

((E

0 (

((
(

L (((D

D E L *0* & (
6 & (& ((
(& #
(6 (&

'& ((& (E & XtCWQueryOnly
& (L *!* &
5 XtGeometryYes 6
(& 5 (L 6
D XtMakeGeometryRequest

7 ((& & 6 ((
E ((&(((XtConfigureWidget XtResizeWidget & XtCWQueryOnly & '& XtGeometryDone & XtMakeGeometryRequest &(&

5 E (/ &
XtGeometryDone ' 1 ((
6 (XtResizeWidget XtConfigureWidget (
E &
D
& (6 ((

6 6 (6 &
E

(XtMakeGeometryRequest D (L /& (
(XtGeometryYes), (L D
5 E ((& 6 D (
C

'& ((E (((
5 6 & (
(XtGeometryNo

((& E C
& E 5 & &
E /& C D 1 E /& C
(E ((
D 1 ' ((&
(((
0 XtGeometryAlmost '&
1 0 D ((((
(6 & E '&
((((6
1 0
(E & (((&

% XtGeometryAlmost (&
(('& ((
(V XtMakeGeometryRequest

'& C (E & 6 &
((XtGeometryAlmost & 6
6 ((E &
(((E & 5 &
((& XtGeome-
tryYes 7 6 6 L (&&
&

5 XtGeometryYes ((& E (
& ((XtMoveWidget 7 6 & (
((D & ((
XtResizeWidget XtConfigureWidget '& XtCWQueryOnly & (
(((
E 6 (D ((

A (*0* (
(5 &
& (((&

Widget Placement and Sizing

5 6 ((& ((E
XtMoveWidget

```
void XtMoveWidget(w, x, y);
```

& (& 9 3
&

!

& (C

5 XtMoveWidget & & & (&
6 9 XtMoveWidget ! 6
3 & 3 (D ! XMoveWin-
dow (L

5 D ((& ((E
XtResizeWidget

```
void XtResizeWidget(w, width, height, border_width);
```

& (& 9 3
&

& (D

5 XtResizeWidget & & & (&
6 9 XtResizeWidget
6 3 & 3 (
D XConfigureWindow (L

'& (&& & 6 XtResizeWidget
3 L D & & D (

5 6 D ((& ((E
XtConfigureWidget

```
void XtConfigureWidget(w, x, y, width, height, border_width);
```

& (& 9 3
&

!

& (C

& (D

5 XtConfigureWidget & & & (
& E 6 9 XtConfigureWidget

! 6 3 & 3
(D ! XConfigureWindow (L

'& (&& & 6 XtConfigureWidget
3 L D & & D (V

5 D (6 & (
XtResizeWindow

void **XtResizeWindow**(*w*);

& (& &

5 XtResizeWindow & XConfigureWindow ! &
& & ((5
E C 6 &
6 6 = (L D

5 6 & XtResizeWindowV
XtResizeWidget

Preferred Geometry

(3 &
(& 5 XtQueryGeometry &
(& (&

5 E (L & (XtQueryGeometry

XtGeometryResult **XtQueryGeometry**(*w*, *intended*, *preferred_return*);

& (& 9 3
&

& ((6
=<@@

(L & (

5 6 L & (L (
(& & (
2 0 XtQueryGeometry 5
&
(&

XtQueryGeometry # *1 0* &
0 & & & (L '&
0 =<@@ XtQueryGeometry E J(
(& (#
'& (=<@@ XtQueryGeometry
XtWidgetGeometry *0* E D &
(E J(

'&XtQueryGeometry & (J (&
(XtMakeGeometryRequest XtMakeResizeRequest
(E (
5 (E ((6
& (

5 E J(& *XtGeometryHandler

typedef XtGeometryResult **(*XtGeometryHandler)**(*w*, *request*, *preferred_return*);

(& (
E

0 ((

#
& (

5 E J(C C
0 1 0 6 & (& (
/ (*#* *1 0*
((& 1 '& (
(& E J(
XtGeometryYes '& & *#*
*1 0* && & (&
0 & *#* *1 0*
E E J(XtGeometryAlmost '&
& ((E J(
XtGeometryNo

5 E J(XtMakeResizeRequest
XtMakeGeometryRequest (& & (V
E E (
& E (

& (E J(& *0* & =<@@
XtQueryGeometry C *#* *1 0*
(& *#* 6 &
('& CWStackMode & XtSM-
DontChange XtQueryGeometry 6 E J(
XtGeometryYes & *0* & =<@@

5 & & XtGeometryYes (
6 & (&
& XtGeometryAlmost
C & L &
L C
& (6 & XtGeometryNo
C &

((& L 6 (& 6
' (6
(# (
& &

C XtQueryGeometry 6
& (& & (J (5 &
6 (J (L
(& (5 &
(6 ((D

Size Change Management: The resize Procedure

D % (
6 (D (
D % D XtResizeWidget
(& (& (& (D
L D & 5 D
& XtWidgetProc

'& ((D &
=<@@ & " & 5
& (6 6 5 D
((5 ! &
& (6 5 D
& /: C @
(D (& C 1 5 (
D E (
XtMakeGeometryRequest XtMakeResizeRequest & D

Chapter 7. Event Management

% ! ((& 6
(! 5 6 (6
% ((6 & 6
(

& & 6
6 ((6 (
5 & 6 6 ' XtAppMainLoop

5 6 (& & & & (4

O 6 6 ! 6 6 /
& 9 '! (1
O M & 6
O 6 6 &
(
O 8 (& 6 /
6 1 & (
O (& 6 & (
O (& 6 6
O ('
O 8 & 6

(& 6 & C
5 & ! 6 ((6 (
E & ! 6 &
& 6 (XtAppMainLoop

Adding and Deleting Additional Event Sources

% 6 ! 6
& ' 6 (
5 6 (6 (& & 6
& (

5 C & 6 ((& & 5
(& ' % (
& & (6

Adding and Removing Input Sources

5 (& & (6 C XtAp-
pAddInput

```
XtInputId XtAppAddInput(app_context, source, condition, proc,
client_data);
```

! & C &

& & 9'!
(6
&
& C
(

&
&
& (&

5 XtAppAddInput & ('
& 6 & & = #
& XtAppAddInput
& (6 % 6
(

5 (6 & ((9
9'! & &
& (4

!(, 4 &

!(/ , 4 &
& (

!(#5' , 4 &
C

& 6 & (*XtInputCallbackProc)

```
typedef void (*XtInputCallbackProc)(client_data, source, id);
```

((
& XtApp\%AddInput

& ((6

& (XtAppAddInput

S< (' 5 8 6 T &
& ((& XtAppAddInput

5 & XtRemoveInput

```
void XtRemoveInput(id);
```

& & (XtAppAddInput

5 XtRemoveInput & ' (&
6 & & &

S< (' 5 8 6 T & & ((& XtRemoveInput

Adding and Removing Blocking Notifications

9 & 6 & '
6 ((& & (
& ! 6 6 (

5 (6 (XtAppAddBlockHook

XtBlockHookId **XtAppAddBlockHook**(*app_context*, *proc*, *client_data*);

! & C &

& & (

& (&

5 XtAppAddBlockHook & (&
& & 5 &
' (

5 6 & & 6 (&
*XtBlockHookProc

void ***XtBlockHookProc**(*client_data*);

((
& XtApp\%AddBlockHook

5 & & (& XtRemoveBlock-
Hook

void **XtRemoveBlockHook**(*id*);

& & & (
XtAppAddBlockHook

5 XtRemoveBlockHook & 6 & & &
' & (6

Adding and Removing Timeouts

5 & & ((
& 6 5 6 E
& 6

5 (XtAppAddTimeOut

XtIntervalId **XtAppAddTimeOut**(*app_context*, *interval*, *proc*, *client_data*);

! & C &

& 6

& C

& (&

5 XtAppAddTimeOut & & &
5 6 5
XtAppNextEvent XtAppProcessEvent C & 6
6

& *XtTimerCallbackProc

void ***XtTimerCallbackProc**(*client_data*, *timer*);

((
& XtApp\%AddTimeOut

& (XtAp-
pAddTimeOut

S< (' 5 8 6 T &
& ((& XtAppAddTimeOut

5 6 XtRemoveTimeOut

void **XtRemoveTimeOut**(*timer*);

& & E

5 XtRemoveTimeOut & 6 (=
6 ((

& $ #K & & ((& XtRemoveTimeOut

Adding and Removing Signal Callbacks

5 (& & ((
(C 6 5 (
E & (

(((XtAp-
pAddSignal (& (
% (6 (XtNoticeSignal &
' (5 ((XtAppAd-
dSignal

XtSignalId **XtAppAddSignal**(*app_context*, *proc*, *client_data*);

! & C &

& (

& (&

5 (6 & (*XtSignalCallbackProc)

```
typedef void (*XtSignalCallbackProc)(client_data, id);
```

((
& XtAppAddSignal

& (XtAppAddSignal

5 & ' (XtNoticeSignal

```
void XtNoticeSignal(id);
```

& & (XtAppAddSignal

9 9'! XtNoticeSignal ' &
& & ('& XtNoticeSignal 6
& ' 6 (
@ (' PP (LL & (& (
5 & (False True XtNoticeSignal
% XtAppNextEvent XtAppProcessEvent / (XtIMSignal1
(PP (LL True 6 & (
False

'& ((
6 5
V (& (5 ' 6
(& (& (6 (
& ' 6 & (
(' ((3 &
' (& (False & (
(& (True &
' 6 (6 (& (6
5

5 6 ((XtRemoveSignal

```
void XtRemoveSignal(id);
```

& (XtAppAddSignal

5 & (& (
XtRemoveSignal '& (6 (&
& (
& (XtRemoveSignal & (XtAppPending
(XtAppProcessEvent XtIMSignal

Constraining Events to a Cascade of Widgets

((C &

% (C (XtPopup 6
/ 6 1 (6
((' 6 6
((

(C & (C
' 6 6 & 6
(

; 6 6 C
6 L 6
6 5 6 6
(
6 KeyPress KeyRelease ButtonPress Button-
Release 5 6 (Motion-
Notify EnterNotify 6 6 '
(6 LeaveNotify 6 &
6 (EnterNotify 6 V
((LeaveNotify 6

XtPopup XtAddGrab XtRemoveGrab & 6
E 6 ((

5 (XtAddGrab

void **XtAddGrab**(*w*, *exclusive*, *spring_loaded*);

& (
& &

! & 6
C 6 (6 (

& (

5 XtAddGrab & (
! True & True '& XtAddGrab
(((

5 XtDispatchEvent
6 % ((XtDispatchEvent
& & 6 6 '
& (
! True

5 & (& (
6 < 6 (

((
(! False (C
(C ((
! True < 6 6 6
(& &
(

(& 6 6
(6 & (
True & (C '& 6 6
& ((6
& (6 (((&
' & & 6

5 6 & (XtRemoveGrab

void **XtRemoveGrab**(*w*);

& (6 &

5 XtRemoveGrab & 6 (& (
((& (' (&
& (

Requesting Key and Button Grabs

5 ' 6 & (&
6 ! ' & 6 (
!5 (6 (
6 (& ('
(!

5 6 ((& XtGrabKey

void **XtGrabKey**(*widget*, *keycode*, *modifiers*, *owner_events*, *pointer_mode*);

& (
(&
&

& (XGrabKeyV #K K
# ! N @ ((!' &

XtGrabKey XGrabKey & ((L (&
(D 5 ((C & XGrabKey '&
(D D XGrabKey &
/(1 (D ' &
&XtDispatchEvent KeyPress 6 (&
& / AnyKey AnyModifier 6 1 & (L
' XtUngrabKeyboard & Key-
Press 6 & & & (4

O 5 (6 &
6 (

O XFilterEvent True

5 6 (XtUngrabKey

void **XtUngrabKey**(*widget*, *keycode*, *modifiers*);

& (
(

& (XUngrabKeyV #K K
! N @ ((!' &

5 XtUngrabKey XUngrabKey & ((L
(& (D 5 ((C
& XUngrabKey '& (D XtUngrabKey 6 &
XtGrabKey E & & & (&

5 6 (XtGrabKeyboard

int **XtGrabKeyboard**(*widget*, *owner_events*, *pointer_mode*, *time*);

& (&
(&
&

& (XGrabKeyboardV
#K K ! N @ ((!' &

'& & (D XtGrabKeyboard XGrabKeyboard & (
(L (5 ((6
C & XGrabKeyboard '& (D XtGrabKeyboard
GrabNotViewable = & (
XtGrabKeyboard

5 6 (XtUngrabKeyboard

void **XtUngrabKeyboard**(*widget*, *time*);

& (6 (

& (XUngrabKeyboardV
#K K ! N @ ((!' &

XtUngrabKeyboard XUngrabKeyboard &

5 6 ((XtGrabButton

void **XtGrabButton**(*widget*, *button*, *modifiers*, *owner_events*, *event_mask*, *pointer_mode*, *confine_to*, *cursor*);

& (
(&
&

& (XGrabButtonV #K
! N @ ((!' &

#

XtGrabButton XGrabButton & ((L (
& (D 5 ((C & XGrab-
Button '& (D D XGrabButton
& /(1 (D
' & & XtDispatchEvent ButtonPress 6 (
& & / AnyButton AnyModifier
6 1 & (L ' XtUngrabPointer
& ButtonPress 6 & & & (4

O 5 (6 &
6 (
O XFilterEvent True

5 6 (XtUngrabButton

void **XtUngrabButton**(*widget*, *button*, *modifiers*);

& (
(

& (XUngrabButtonV #K
! N @ ((!' &

5 XtUngrabButton XUngrabButton & ((L
(& (D 5 ((
C & XUngrabButton '& (D XtUngrabButton 6
& XtGrabButton E & & & (
&

5 6 (XtGrabPointer

int **XtGrabPointer**(*widget*, *owner_events*, *event_mask*, *pointer_mode*, *confine_to*, *cursor*, *time*);

& (&
(&
&

& (XGrabPointerV
#K # ! N @ ((!' &

#

'& & (D XtGrabPointer XGrabPointer & (
(L (5 ((6
C & XGrabPointer '& (D XtGrabPointer
GrabNotViewable = & (
XtGrabPointer

5 6 (XtUngrabPointer

void **XtUngrabPointer**(*widget*, *time*);

& (6 (

& (XUngrabPointerV
#K # ! N @ ((!' &

XtUngrabPointer XUngrabPointer &

Focusing Events on a Child

5 & ((
XSetInputFocus XtSetKeyboardFocus

void **XtSetKeyboardFocus**(*subtree*);

& & &
& &
&

& / 1 &
6 (
None ' & None
& 6 & 9 3
&

XtSetKeyboardFocus XtDispatchEvent 6 (
& & (
'& L &

% 6 (
& & 6 6 6 6 & (8
/ & ! & (1

O '& 8 & 8L 6 & &
6 6 (& 8 & XtGrabKey 6
& & 6 (8
False 6 XtGrabKeyboard XtGrabKey 6 6
8
O B ((& 8
& 8 & C & (& &
& 6 & &
& (: &
O O '& 8 & & ((: &: 6
8
O '& 8 : &: &: 6 6
(& 8 & XtGrabKey & 8 XtUngrabKeyboard
O '& 8 &: 6
O O 8 (XtGrabKey False
O 8 (XtGrabKey True
& 6 (& 8L (
6 8
O 9 & & 8 :4
O O '& 6 (& (6 XtGrabKeyboard
XtGrabKey 6 & (: /
6 1 (& XtGrabKey
6 & 6 :

O 8 6 &: (
& XtGrabKey

% & & (& 6
6 & 6 V 6
((&
' & & 6

% & E ! &
6 6 6
FocusIn 6 (& & FocusChange 6
6 !
& & & & FocusOut 6 (
& & FocusChange 6 6

(6 (! 6 & 5 (
& J&

5 J& & *XtAcceptFocusProc

Boolean ***XtAcceptFocusProc**(*w*, *time*);

& (

& ! & 6 (&

% (& XSetInputFocus C
& % ' *2* 5
((& 6
(C J& 5 (6 (
& (6 &
(% (&
! & & C / & (
& FocusIn FocusOut 6 1 % (6 &
# & =<@@

5 (L J& XtCallAcceptFocus

Boolean **XtCallAcceptFocus**(*w*, *time*);

& (&
&

& ! & 6 (&
(

5 XtCallAcceptFocus & & (L J&
(& (J&
'& # =<@@ XtCallAcceptFocus False

Events for Drawables That Are Not a Widget's Window

6 &
((8C (GraphicsExpose
NoExpose 6 C (PropertyNotify 6

5 (' 6 (XtRegisterDrawable

void **XtRegisterDrawable**(*display*, *drawable*, *widget*);

& L

& (

& ((&

XtRegisterDrawable & & (
& XtWindowToWidget (
5 & 6 & 6 6 &
(6 (L

'& ((&
& (L (& (XtRegisterDrawable &

5 (' 6 (XtUnregisterDrawable

void **XtUnregisterDrawable**(*display*, *drawable*);

& L

& (

XtUnregisterDrawable 6 XtRegisterDrawable
'& & (L (&
(XtUnregisterDrawable &

Querying Event Sources

5 6 (6 6 & C 6 /
(& 6 1 E 5 C & '
E 6 & XPending XPeekEvent XNextEvent !

5 & 6 E & (6
XtAppPending

XtInputMask **XtAppPending**(*app_context*);

! & C &

5 XtAppPending & D 6 & 6 (
& ! 6 (((
(5 6 9 & XtIMXEvent XtIMTimer
XtIMAlternateInput XtIMSignal / XtAppProcessEvent).'&
6 (XtAppPending & && & ;
C D

5 6 & & (6 L E
6 (& E XtAppPeekEvent

```
Boolean XtAppPeekEvent(app_context, event_return);
```

! & C &

6 & & 6

'& ! 6 E XtAppPeekEvent
True '& ! E XtAppPeekEvent &
&& & ; C
6 / (1 '&
C 6 ! 6 XtAppPeekEvent &
True 9 & (XtAppAd-
dInput XtAppPeekEvent False 5 6
! 86 5 (&
'& & 6 XtAppPeekEvent True
(6

5 6 6 & & (6 L ! 6 E
XtAppNextEvent

```
void XtAppNextEvent(app_context, event_return);
```

! & C &

6 & & 6

'& ! 6 E XtAppNextEvent & ! && &
; C & ! 6 (
6 (((
5 & ((V
S (B (% T

Dispatching Events

5 ' 6 & 6 (
86 ! 6 (XtAddEventHandler
(6 /6 1
6 5 (
(6 & (V j#F
'

& (& && &
XtAppProcessEvent

```
void XtAppProcessEvent(app_context, mask);
```

! & C &
&

& & 6 5
6 9 & &
XtIMXEvent XtIMTimer XtIMAlternateInput

XtIMSignal 6 Intrinsic.h &
XtIMAll 6
9 & & 6

5 XtAppProcessEvent & (
! 6 '& 6 &
XtAppProcessEvent '& &
6 & (<
V XtAppMainLoop XtAppProcessEvent
6 (
(((
(! 6 (XtDispatchEvent

% ! 6 6 XtDispatchEvent
6 (6 &
('& & 6 (
6 (

5 6 XtAppNextEvent 6 & !
E (6 & 6
XtDispatchEvent

Boolean **XtDispatchEvent**(*event*);

& 6
6

5 XtDispatchEvent & & XFilterEvent
& (' 6 6
& ' 6 '& XFil-
terEvent True 6 6 6 (& 6
XtGrabKey XtGrabButton XtDispatchEvent XtUngrabKeyboard
XtUngrabPointer & 6
True '& XFilterEvent True (6 XtDispatchEvent
3 True 9 XtDispatchEvent 6
6 & 6 6 (
XtDispatchEvent True &XFilterEvent True & 6
False & &
6 XtDispatchEvent 6
/ XtLastTimestampProcessed), (&
& '& 6 True &
6 6 & XtAddGrab XtDispatchEvent
6 '& XtDispatchEvent XFilterEvent (
& ((&
XFilterEvent True &

The Application Input Loop

5 & (6 6
XtAppMainLoop

void **XtAppMainLoop**(*app_context*);

! & C &

5 XtAppMainLoop& & C (! 6 (XtAppNextEvent 6 (
(XtDispatchEvent 5 &!5
5 (XtAppMainLoopV XtAppNextEvent
XtDispatchEvent &
& & C L & ('& & (
5 (XtAppLock XtApUnlock

6 6 & (
& (& 6 ((D
& (XtAppNextEvent

Setting and Checking the Sensitivity State of a Widget

(6 && /& C
(1 6

% (6 '& (6
6 (6 (6 &
KeyPress KeyRelease ButtonPress ButtonRelease MotionNotify EnterNotify
LeaveNotify FocusIn FocusOut

(6 & False &
6 (L & False
((6

6 False & 6
XtSetSensitive
& & 6
& & & PPX5 645 LL
& &
6 (

5 6 & (XtSetSensitive

void **XtSetSensitive**(*w*, *sensitive*);

& (& 93
&

& (6
& 6

5 XtSetSensitive & & XtSetValues (
(& (!= 6 6 '&
False (L & XtSetSensitive
6 (6 (XtSetValues
False '& True (L
& (L & True
XtSetSensitive & True

6 XtSetValues 6
True

XtSetSensitive XtSetValues (
& & && (5 & & ((L
J6 6 /& C
((((1

XtSetSensitive 6 &
False 6 False

5 6 & (XtIsSensitive

```
Boolean XtIsSensitive(w);
```

& 3 & 9 3
&

5 XtIsSensitive & True False
6 ('& 3 L & 9 3
True XtIsSensitive TrueV
False

Adding Background Work Procedures

5 ' 6 & ((B
& (& (

XtAppNextEvent XtAppProcessEvent % &
(*XtWorkProc)

```
typedef Boolean (*XtWorkProc)(client_data);
```

&
(

5 True
6 '& False ((
C % 6 3
'& & & 6
& &&

5 (& (6 XtAppAddWorkProc

```
XtWorkProcId XtAppAddWorkProc(app_context, proc, client_data);
```

! & C &

&

& (&

5 XtAppAddWorkProc & & &
& ! E E & &

(
7 6 &

5 6 True&
XtRemoveWorkProc &

```
void XtRemoveWorkProc(id);
```

& 6

5 XtRemoveWorkProc & C 6 & (

X Event Filters

5 6 (6 & & ! 6 5
& 6
2 6 C

Pointer Motion Compression

% (6 (&
6 : 6 6 5
6 (&
True % E & 6 6 '
& 6 & (& (
& &

Enter/Leave Compression

5 & 6 6 6 6 (6
6 ((
(& True 5 6
6 6 & & (E

Exposure Compression

(& & C 6 (C (
6 (% (C (
C ((C (
(((((
(C & ((

' (((C 6
5 ! & (&
& C 6 (L C
5 & D & & (6 4

R & ! 8C = //! 8 1: 1
R & ! 8C //! 8 15 1

R & !8C \ &]
R & !8C C \ &]

9 & & (& (/
& 6 14 XtExposeGraphicsExpose XtExposeGraphicsExposeMerged
XtExposeNoExpose XtExposeNoRegion

'& ! & (& XtEx-
poseNoCompress 6 ((L C
& & C 6 ' Expose GraphicsExpose 6
(% & 6 6 6 (
(6 (C & (
(L C (& C 6 /
XtExposeNoRegion & 1 (: & (
#-, ! N @ ((!' & 1

5 6 6 & (4

XtExposeNoCompress

O = C & V 6 6 6
C (&=<@@

XtExposeCompressSeries

O 8 & C 6 (6
C 6 E D

XtExposeCompressMultiple

O 6 & C 6 (6
C 6 E D
6 E C 6 C 6 &
(

XtExposeCompressMaximal

O C E & ((
6 (6 (C 6 '&
& E ' & 6

5 & (6 & ((4

XtExposeGraphicsExpose

O & GraphicsExpose 6 C
GraphicsExpose 6 & &
Expose 6

XtExposeGraphicsExposeMerged

O & & XtExposeCompressMultiple XtExposeCompressMax-
imal & GraphicsExpose Expose 6
(& 6 (& 6
C '& & (& 6
6 & E 5 & (XtEx-
poseGraphicsExpose

XtExposeNoExpose

O & NoExpose 6 C
NoExpose 6 6 C 6

XtExposeNoRegion

O & & ((C =<@@
5 (6 (C & &
& C 6 5 6 (
((

Widget Exposure and Visibility

86 6 ((
& ! % (& (
6 5 (
& & C

Redisplay of a Widget: The expose Procedure

5 C (& (*XtExposeProc)

typedef void **(*XtExposeProc)**(*w*, *event*, *region*);

& (E (

& C 6 (6 ((E (

& & (C
E

5 & (C & C
(L '& (&
=<@@ & ! & (6 &
6 C

'& ! =<@@ XtRealizeWidget & & (6
& NorthWestGravity & (L D

'& (L ! & & XtExposeNoCompress
XtExposeNoRegion & 6 NoExpose / S8C
T 1 =<@@ '& XtExposeNoCompress &
6 NoExpose 6 & 6
! (C & 6
5 (' (
& (

(/& C @ 1 ((C &
6 (/&
C 5C 1 (C & D &

6 C ((
A (6 & 5 C
& & C &

7 6 & & 6 6 &
(: C &
(@ 5(((
@ &

B 6 V
B ((V
; ((J V

@ 6 False D
6
False : 5(('
C & 5((L C
V S' & 9 T

Widget Visibility

((
7 6 && & (6
& (&

5 & (6 (
5 & (True
C 6 & & (6 False &
(&

% (('& (6
(False ' &
D True 6 ('& True 6 (
& VisibilityNotify 6 & (True Vis-
ibilityUnobscured VisibilityPartiallyObscured 6 False Visi-
bilityFullyObscured 6

X Event Handlers

86 & 6 (
(6 C ' '
(86 & (*XtEven-
tHandler)

typedef void **(*XtEventHandler)**(*w*, *client_data*, *event*,
continue_to_dispatch);

& (& 6 6

& & & (
6

& (((6

& (6 (
& 6

& 6 (6 & (6 B
D True % 6
& (& 6
False B (&
6 (

5 ' 6 (
&
(False (

Event Handlers That Select Events

5 (6 XtAddEventHandler

void **XtAddEventHandler**(*w*, *event_mask*, *nonmaskable*, *proc*, *client_data*);

& (& 6
((&
&

& 6 &

&
6 (GraphicsExpose NoExpose SelectionClear SelectionRequest SelectionNotify ClientMessage MappingNotify).

&

& 6

5 XtAddEventHandler & (
6
& (8 (((6
2 J C (&
('& (6
& (C ('& (D XtAddEventHandler XSelectInput & 5
6 (& 6 &

5 6 6 (6 XtRemoveEventHandler

void **XtRemoveEventHandler**(*w*, *event_mask*, *nonmaskable*, *proc*, *client_data*);

& (& (
& &

& 6 & (

& 6
6 (GraphicsExpose NoExpose SelectionClear SelectionRequest SelectionNotify ClientMessage MappingNotify).

& 6

& (

5 XtRemoveEventHandler & (6 (XtAddEventHandler XtInsertEventHandler & & 6 5 E (& 6 (6 ('& (D 6 E 6 XtRemoveEventHandler XSelectInput '& & (& (&& 6 & XtRemoveEventHandler (

5 (XtAddEventHandler XtInsertEventHandler & 6 (6 XtRemoveEventHandler & XtAllEvents True 5 6 6 6 & XtAddRawEventHandler XtInsertRawEventHandler

5 (6 6 6 & & 6 (6 XtInsertEventHandler

& U! @ 7 ! @ 5 W ! @ V

void **XtInsertEventHandler**(*w*, *event_mask*, *nonmaskable*, *proc*, *client_data*, *position*);

& (& 6 ((& &

& 6 &

&
6 (GraphicsExpose NoExpose SelectionClear SelectionRequest SelectionNotify ClientMessage MappingNotify).

&

& L
6

& 6
6 6 (

XtInsertEventHandler XtAddEventHandler ('& XtListHead 6 (& 6 6 (& ('& XtListTail 6 (&

6 (6 '& (
6 & (C (

Event Handlers That Do Not Select Events

9 (6
C (! 6 & 6 5
XtAddRawEventHandler

void **XtAddRawEventHandler**(*w*, *event_mask*, *nonmaskable*, *proc*, *client_data*);

& (& 6
((&
&

& 6 &

&
6 (GraphicsExpose NoExpose SelectionClear SelectionRequest SelectionNotify ClientMessage MappingNotify).

&

& L
6

5 XtAddRawEventHandler & XtAddEventHandler C
&& (L 6 6 XSelectInput &
6 = ((6 &
6 ('& (
& (C (5
6 (&
6 &

5 6 6 (6 XtRemoveRawEventHandler

void **XtRemoveRawEventHandler**(*w*, *event_mask*, *nonmaskable*, *proc*, *client_data*);

& (& (
& &

& 6 & (

&
6 (GraphicsExpose NoExpose SelectionClear SelectionRequest SelectionNotify ClientMessage MappingNotify).

& (

& (

5 XtRemoveRawEventHandler & (6 (XtAddRawEventHandler XtInsertRawEventHandler & & 6 ((6 5 E (& 6 (6 ('& & (& (&&6 & XtRemoveRawEventHandler (

5 (XtAddRawEventHandler XtInsertRawEventHandler & 6 (6 XtRemoveRawEventHandler & XtAllEvents True 5 6 6 6 & XtAddEventHandler XtInsertEventHandler

5 (6 6 6 & & 6 (6 (& 6 XtInsertRawEventHandler

void **XtInsertRawEventHandler**(*w*, *event_mask*, *nonmaskable*, *proc*, *client_data*, *position*);

& (& 6 ((& &

& 6 &

&
6 (GraphicsExpose NoExpose SelectionClear SelectionRequest SelectionNotify ClientMessage MappingNotify).

& (

& L
6

& 6
6 6 (

5 XtInsertRawEventHandler & XtInsertEventHandler C & (L 6 6 XSelectInput & & 6 '& (
6 & (C (

Current Event Mask

5 6 6 & (6 (XtBuildEventMask

EventMask **XtBuildEventMask**(*w*);

& (& &

5 XtBuildEventMask & 6 ((
9 & 6 & 6 ((XtAddEven-
tHandler XtInsertEventHandler 6 (
(5 6 XSetWin-
dowAttributes XtRealizeWidget 6 6
6 D (

Event Handlers for X11 Protocol Extensions

5 (6 '
(6 XtInsertEventTypeHandler

void **XtInsertEventTypeHandler**(*widget*, *event_type*, *select_data*, *proc*, *client_data*, *position*);

& (& 6
((&
&

& 6 & 6

& E 6 & &
& 6 =<@@

& 6

& 6

& 6
6 6 (

XtInsertEventTypeHandler (
6 &
&

'& & & ! 6
6 & EventMask (6
& 6 5 6 6
XtBuildEventMask '& (D XtInsertEventTypeHandler XS-
electInput & & (=<@@ & E 6 &
(6 (F 5 XtInsertRaw-
EventHandler &

'& & C 6 &
& C (&
& 6

' ' E
6 (6
(6 &

5 (& 6 & 6
(& 6 '&

& XtListTail (6
& 6 (& 6

8 (((6
2 J C & (XtInsertEventType-
Handler (& ((&
6 /1 & '& (
6 & (C (

5 6 6 (XtInsertEventTypeHandler
XtRemoveEventTypeHandler

void **XtRemoveEventTypeHandler**(*widget*, *event_type*, *select_data*, *proc*, *client_data*);

& (& 6
(&
&

& 6 & (

& 6 & &
& 6 =<@@

& 6 6

&
(

5 XtRemoveEventTypeHandler & (6 (
XtInsertEventTypeHandler & & 6 5 E (
& 6 (6 (

'& & & ! 6
6 & EventMask, indicating the event
& 6 '& (D XtRemoveEventType-
Handler XSelectInput & & (=<@@ & E 6
& (6 (F 5
XtRemoveRawEventHandler &

'& & C 6 &
& C (&
& 6

5 (C 6 & (XtRegisterEx-
tensionSelector

void **XtRegisterExtensionSelector**(*display, min_event_type, max_event_type, proc, client_data*);

& & C
(

! & (& 6 & C

& C

& C

5 XtRegisterExtensionSelector & ((&
6 & C 6 (

'& ! 6
XtRegisterExtensionSelector &
6 (6 '& (&
! 6 (& 6 &

% (D & 2 " '
& 6 & 6 (& (
C '& ' '& 6
6 ' & 6 &
(& (C &
' ' & (L 6
L (5 (5
& (6 & C 6 E (

C & (*XtExtensionSelectProc)

typedef void **(*XtExtensionSelectProc)**(*widget*, *event_types*, *select_data*, *count*, *client_data*);

& ((D 6 (
6 6

& & 6 ((
6 &

& & J &
XtInsertEventTypeHandler

& &

&
(

5 6 &
& 8 6 2
XtInsertEventTypeHandler

5 (6 & & XtDis-
patchEvent XtSetEventDispatcher

XtEventDispatchProc **XtSetEventDispatcher**(*display*, *event_type*, *proc*);

& & 6
(

& 6 &
6

& 6

5 XtSetEventDispatcher& (6
& & 6 5 6 (
/ & & 6 (1
'& =<@@ & & &

' & XtDispatchEvent 6 &
& / & 1 6 (
6

5 & ' &
&
C 6

6 & (*XtEventDispatchProc)

```
typedef Boolean (*XtEventDispatchProc)(event);
```

6

5 6 6 &
(

'& 6 (6
(6 6 XFilterEvent
& (None & 6 & XFilterEvent
False 6 ((XtDispatchEventToWidget
5 True & XFilterEvent XtDispatchEvent-
ToWidget True False

'& 6 (6
6 True &
& 6 False

& C 6 & 6 (
' L & 5 (
& 6 & (XtGetKeyboardFocusWidget

```
Widget XtGetKeyboardFocusWidget(widget);
```

& ((& (& &

5 XtGetKeyboardFocusWidget & (
& 6 & (& 6 & & (

5 6 & (XtDispatchEventToWidget

```
Boolean XtDispatchEventToWidget(widget, event);
```

& (6

& 6

5 XtDispatchEventToWidget & & (6
& & ((&
& 6 3 6
5 ' 6 & 6 (&
& Expose NoExpose GraphicsExpose VisibilityNotify 6
6 (L C (C
(L & & True 5
6 6 False

XtDispatchEventToWidget True & 6 False

Using the Intrinsics in a Multi-Threaded Environment

5 ' 6 && & C
C & (('
C D & C 6 (
XtToolkitThreadInitialize

Initializing a Multi-Threaded Intrinsics Application

5 D ' & C 6
XtToolkitThreadInitialize

```
Boolean XtToolkitThreadInitialize();
```

XtToolkitThreadInitialize True & ' C
6 False XtToolkitThreadInitialize
& XtCreateApplicationContext XtAppInitialize XtOpenApplication XtSetLanguageProc XtToolkitThreadInitialize
V 6

Locking X Toolkit Data Structures

5 ' 6 & (4 C @
(C C 6
C ((
@ (C 6
' (

E && 6 5
E & &
E

6 ('
& (6 C 5
E C &
& & C 4

! @ / J C 1V
! 6 (5 C / (J (& " " J 1V
! < / J C 1V

% XtConvertAndStore 6 6
(& & 6 E
& (6

&
6 (J & & (
C & ((: C 4

R \!##2]
B B (; / (1
% ((V
U
B V
! @ /! % (5 C / (11V
^ ( ] (J V
! < /! % (5 C / (11V
V
W

' &
C : C 4

! @ /! % (5 C / (11V
! < (/ (#1V
! (/ (K1V
! < /! % (5 C / (11V

Locking the Application Context

5 C & C (
XtAppLock.

```
void XtAppLock(app_context);
```

! & C

XtAppLock E @ (C
(! & !
!
C 6 (!

5 C XtAppUnlock.

```
void XtAppUnlock(app_context);
```

! & C 6

Locking the Process

5 C &!5 ((
XtProcessLock.

void **XtProcessLock**();

XtProcessLock E % (
! @ (C 6 (

5 XtProcessUnlock

void **XtProcessUnlock**();

5 C XtAppLock
& XtProcessLock 5 XtProcessUnlock &
XtAppUnlock 5 6

Event Management in a Multi-Threaded Environment

' 6
& C & E 5 (
6 V & 6
6 ((

5 6 & 6
XtAppSetExitFlag

void **XtAppSetExitFlag**(*app_context*);

! & C

XtAppMainLoop 6 & & (& & (True

6 &
C & (XtAppGetExitFlag

Boolean **XtAppGetExitFlag**(*app_context*);

! & C

XtAppGetExitFlag False (6 (
% XtAppGetExitFlag True
(C

& XtAppNextEvent
XtAppPeekEvent XtAppProcessEvent
C / 1
0 0 0 0
C & &

5 ' (6 & '&
C XtAppNextEvent XtAppPeekEvent
XtAppProcessEvent & & &

Chapter 8. Callbacks

(& ((
(& : C (
6 (L &
& (L (

86 (! = % (&
& : C (
& 6

8C ' &
(&
6

Using Callback Procedure and Callback List Definitions

& & (*XtCallbackProc)

```
typedef void (*XtCallbackProc)(w, client_data, call_data);
```

& ((
(

&
(

& & (
: C C
! = (
&

5 (6 & ((
(& & C
& (& 6 (5
6 =<@@ & & (5
(6 6 6 (
XtGetValues (& & 6
& (% ((6 (C &
5 (6 &

% 6 (XtCreateWid-
get XtSetValues XtGetValues & & =<@@
& XtCallbackList

& U
! V
! V
W ! X! @ V

: C & B ;
; B 6

! Y[^ U
U /! 1 ; W
UB /! 1 ; BW
U/! 1 =<@@ /! 1 =<@@W
WV

((6 ('
(D ((
% (D J6
& 5 '
(&& &

Identifying Callback Lists

% 6 (& C
& & (
6 & ' &
(C
& C XtCallCallbackList
E (

: ' &
& XtRCallback 5 &
V (6
& =<@@ 8C 6 =<@@
/ E 6 XtCallbackStatus XtCallbackHasNone),
('

Adding Callback Procedures

5 (L XtAddCallback

```
void XtAddCallback(w, callback_name, callback, client_data);
```

& (& 9 3
&

&

&

& &
6 =<@@

6

5 & (6 (L XtAddCallbacks

```
void XtAddCallbacks(w, callback_name, callbacks);
```

& (& 93
&

&

& &
(

Removing Callback Procedures

5 & (L XtRemoveCallback

```
void XtRemoveCallback(w, callback_name, callback, client_data);
```

& (& 93
&

& &

&

& (

5 XtRemoveCallback & 6 &

5 & & (6 (L
XtRemoveCallbacks

```
void XtRemoveCallbacks(w, callback_name, callbacks);
```

& (& 93
&

& &

& &
(

5 & (6 (L &
(XtRemoveAllCallbacks

```
void XtRemoveAllCallbacks(w, callback_name);
```

& (& 93
&

&

Executing Callback Procedures

5 C (6 (L & (
XtCallCallbacks

```
void XtCallCallbacks(w, callback_name, call_data);
```

& (& 93
&

& C

& & 6
& =<@@

XtCallCallbacks &
& (((

5 C & (
XtCallCallbackList

```
void XtCallCallbackList(widget, callbacks, call_data);
```

& (
& 93 &

& C

& & 6
& =<@@

5 & & (3
XtRCallback '& =<@@ XtCallCallbackList V &
(

Checking the Status of a Callback List

5 & & (6 (L XtHasCallbacks

& U! = @ ! 7 = ! 7 W
! V

```
XtCallbackStatus XtHasCallbacks(w, callback_name);
```

& (& 93
&

&

5 XtHasCallbacks & & & (
& '& C XtHasCallbacks
XtCallbackNoList '& C XtCallbackHasNone '& C (
XtCallbackHasSome

Chapter 9. Resource Management

& ((
& (& 5 &
XtCreateWidget / (& (1
& / (1 XtSetValues
' XtGetValues = & (
& ((/
1 9 & (6
& / (C C 1

% ((& (
& & (XtCre-
ateWidget & & &
& (& & (
& & & (
& & &

Resource Lists

& & (C &
& (C & & &
& 6 & (& 6 & 5 &
XtResource

& U
(J V
(J V
(J V
J D V
J && V
(& J V
! & J V
W ! X! @ V

% & CoreClassPart ObjectClassPart Rec-
tObjClassPart ConstraintClassPart & (
#
(C & D
E

5 & &
(B 6 C
& C /J1 C
: C & (J C
(C ((
E PPC LL ((E
PP! LL 6 ' & &
% (& &
'
<X11/StringDefs.h> 5 ' L (PP! =LL

& (/& C ! = (C &
(C 1

5 & (& &
& & 6 & 4

O ' & && (&

O ' & 6 & 6 (
(& &

: C (6 6 C 4 (& (
5 (&
6 (5 & &
&
(6 6 (

' (C 6 & PPB (LL
C & PP: (LL 5
& (C 6 4

XB (4 6
X: (4

(6 6 & / 1
& 6 : 5 ((& E
(& & 4

X: 4 -C#I

B 6 (
(& 5
PP! LL /& C ! B (1

5 & (6 &
& & (& & B 6
&
& 5 & 6 &
& / String1 & & &
6 / (& String1
/ S 6 T 1 5 ' & & (
4

' $0	% ' $0
XtRAcceleratorTable	!
XtRAtom	
XtRBitmap	C ^#
XtRBoolean	B
XtRBool	B
XtRCallback	! @
XtRCardinal	
XtRColor	!

' $0	% ' $0	
XtRColormap		
XtRCommandArgArray	(X	
XtRCursor		
XtRDimension	;	
XtRDirectoryString	(	
XtRDisplay	; X	
XtREnum	! 8	
XtREnvironmentArray	(X	
XtRFile	:'@8X	
XtRFloat	&	
XtRFont	:	
XtRFontSet	!:	
XtRFontStruct	!: X	
XtRFunction	/X1/1	
XtRGeometry	X & &	XParseGe-ometry
XtRGravity		
XtRInitialState		
XtRInt		
XtRLongBoolean	(	
XtRObject	9 3	
XtRPixel	C	
XtRPixmap	C	
XtRPointer	!	
XtRPosition		
XtRRestartStyle	(	
XtRScreen	X	
XtRShort		
XtRSmcConn	!	
XtRString	(	
XtRStringArray	(X	
XtRStringTable	(X	
XtRTranslationTable	! 5	
XtRUnsignedChar	(	
XtRVisual	" X	
XtRWidget	% (	
XtRWidgetClass	% (	
XtRWidgetList	% (@	
XtRWindow	%	

<X11/StringDefs.h> & & (6 &
((6 ((4 XtREd-
itMode XtRJustify XtROrientation

5 " & D & V
& sizeof/ 1 & 6 5 ##
& && & & (> XtOff-
setOf 6 6 5 # &
& & 6 '& # && &
& 6 (6 6
& # % 6 &
D (7 6
6 & (& '
6 & 6 (/&
C XtDefaultForeground & C 1 5 # &
& & & 6 & #
XtRString 6 # & (
5 & & &
(& 6 &
& & 6
/& C & 1

5 /! ' ! 1
& ! ' 6 #
& 6 & & 6 5
6 &
XtPointer = 6
! 6 # &
5 6 (##
XrmValue !
& (*XtResourceDefaultProc)

typedef void **(*XtResourceDefaultProc)**(*w*, *offset*, *value*);

& (6

& && & & (

& 6

5 (*XtResourceDefaultProc) & *1* &
6

5 (& XtGetResourceList

void **XtGetResourceList**(*class*, *resources_return*, *num_resources_return*);

& 3 E '
objectClass &

&

'&XtGetResourceList & D
& '& & D

XtGetResourceList (&
5 XtGetResourceList & (
XtFree (

5 (& (XtGet-
ConstraintResourceList

void **XtGetConstraintResourceList**(*class*, *resources_return*,
num_resources_return);

& 3 E '
objectClass &

&

'&XtGetConstraintResourceList & (D
& ('& XtGet-
ConstraintResourceList & (D
(& '&
& & constraintWidgetClass X
=<@@ X D 5 XtGetCon-
straintResourceList & (XtFree (

5 XtSetValues XtGetValues
((V S9 (% (T
S (% (T

7 6 6 & & @ (4

2X & @ X2
! Y[^ U
U! =& (! : (! C D &/ C 1
! 9&& 9&/@ & (1 ! (! ; & : (W
U! =& ! : ! : D &/!: X1
! 9&& 9&/@ & 1 ! (! ; & : W
U! = ! @ ! (D &/ (1
! 9&& 9&/@ 1 ! (=<@@W

W

5 & & & (&
/& XtAppCreateShell), &
(L & (& (
& & & & & (&
& & & (&
/& XtAppCreateShell), (& (L
& ((& (&
& & & & (

Byte Offset Calculations

5 && & & XtOffsetOf

```
Cardinal XtOffsetOf(structure_type, field_name);
```

&

& &

5 XtOffsetOf C C (6 && & & ((& '
D XtOff-
set 6 &

5 && & & XtOffset

```
Cardinal XtOffset( pointer_type,  field_name);
```

&

& &

5 XtOffset C C (6 && & & ((& '
D XtOffset XtOffsetOf

Superclass-to-Subclass Chaining of Resource Lists

5 XtCreateWidget & (
5 & objectClass
& rectObjClass &
& (L % &

' (& (& &
L L
: C & !
E & @ 6 &
! 7 6 & (& &
6 & &
5 & 6 & 6
D &
& &
&& (6
'& (&
6 && (&

D ' &
D ((' 6
' 6 (&

V & ((
& J D

Subresources

((6 V XtCreateWid-
get & (D

(6 (& (
& (XtGetSubresources

```
void XtGetSubresources(w, base, name, class, resources, num_resources,
args, num_args);
```

& 3 E &
& 9 3
&

& &

& &

& &

& &

& &

& (6
&

& & (

5 XtGetSubresources & &
& 3 L
3 & 5 5
& & (&
6 5 '&
=<@@ D 7 6 & D (
&

XtGetSubresources 6 & E 6
& D &
5 (
& & & (
& XtGetSubresources & &
& & 3 (& & &
6 3 &

5 & & ((6 (XtVaGetSubre-
sources

```
void XtVaGetSubresources(w, base, name, class, resources,
num_resources);
```

& 3 E &
& 9 3
&

& &

& &

& &

& &

& 6 (6
&

XtVaGetSubresources & XtGetSubresources
6 (K , #

Obtaining Application Resources

5 6 & (6
XtGetApplicationResources

```
void XtGetApplicationResources(w, base, resources, num_resources, args,
num_args);
```

& 3 &
/
& 3 1 & 9 3
&

&
6

&

& &

& (6
&

& & (

5 XtGetApplicationResources & & 3
(5
& & & 3 / (& 1
(& & 5 6
& (&
6 & (XtGetApplicationResources
(##
'& =<@@ D 7 6 & D
(& 5 &
& &
(

XtGetApplicationResources 6 &
E 6 & D &
5 (
& & &
(& XtGetApplicationResources
& &

5 6 & 6 (6 (XtVaGetApplicationResources

void **XtVaGetApplicationResources**(*w*, *base*, *resources*, *num_resources*);

& 3 &
/
& 3 1 & 9 3
&

&
6

& &

& &

& 6 (6
&

XtVaGetApplicationResources & XtGetApplicationResources 6 (
K , #

Resource Conversions

5 ' 6 & ((6
6 & (5 '
6 (6 6 5
6 6 6 4

O' & C
& C 6
O' C & & 6

O' 6 6 E
/& C (1 E
6 /& C (& (1 &

Predefined Resource Converters

5 ' & 9 3 9 3
(5 ' (& (
6 6 & XtRString

$ "	2	"
XtRAcceleratorTable	XtCvtStringToAcceleratorTable	
XtRAtom	XtCvtStringToAtom	; X
XtRBoolean	XtCvtStringToBoolean	
XtRBool	XtCvtStringToBool	
XtRCommandArgArray	XtCvtStringToCommandArgArray	
XtRCursor	XtCvtStringToCursor	; X
XtRDimension	XtCvtStringToDimension	
XtRDirectoryString	XtCvtStringToDirectoryString	
XtRDisplay	XtCvtStringToDisplay	
XtRFile	XtCvtStringToFile	
XtRFloat	XtCvtStringToFloat	
XtRFont	XtCvtStringToFont	; X
XtRFontSet	XtCvtStringToFontSet	; X (
XtRFontStruct	XtCvtStringToFontStruct	; X
XtRGravity	XtCvtStringToGravity	
XtRInitialState	XtCvtStringToInitialState	
XtRInt	XtCvtStringToInt	
XtRPixel	XtCvtStringToPixel	colorConvertArgs
XtRPosition	XtCvtStringToPosition	
XtRRestartStyle	XtCvtStringToRestartStyle	
XtRShort	XtCvtStringToShort	
XtRTranslationTable	XtCvtStringToTranslationTable	
XtRUnsignedChar	XtCvtStringToUnsignedChar	
XtRVisual	XtCvtStringToVisual	X

5 (C 6 & (
4 XtDefaultForeground XtDefaultBack-
ground 5 6 C 6 & (L
6 '& 6 " True 6
C 6 & (L 6
(: (: 6 (D XtDe-
faultFont 6 & (4

O M & & PPC ; & : LL
PP! ; & : LL / (2 & C 1
XtRString 6 & XtRFont XtRFontStruct
6 6
O '& 6 & C ; & : !;
& : & & &
& & ' 9++,* # (/9
(& XListFonts (&
& & 5 &

C D & (& V & C 0 X X X X X
X #KF X X X X ' 9++,* #0 1
O '& ' 9++,* # & & ((
False

5 (: 6 (D XtDefaultFontSet
6 & (4

O M & & PPC ; &
: LL PP! ; & : LL / (2 & C 1
XtRString 6 & XtR-
FontSet 6 6
O '& 6 & C ; & : ! ;
& : & & & &
& & /9 (
& XCreateFontSet (& 5
& C D & (
& V & C 0 X X X X X X #KF X X X X0 1
O '& & ((False

'& & (
& 5 ' ((:
6 6 (C
6 6 5 6 6 (
& 6 E &&

5 (A 6 6 (6 &
(6 E 6 & (+ ,
(% # 2 4ForgetGravity UnmapGravity NorthWestGravity NorthGrav-
ity NorthEastGravity WestGravity CenterGravity EastGravity SouthWest-
Gravity SouthGravity SouthEastGravity StaticGravity
(& 6

5 ((6 (&
(% & 5
6 (D PPQQLL
& (&

5 (; (6 (D (PP! ;
LL & ((

5 (6 6 RestartIfRunning
RestartAnyway RestartImmediately RestartNever & *(6*
')

5 (' 6 6 NormalState IconicS-
tate & % ' *2*

5 (" 6 XMatchVisualInfo (
& & & (" 5 (
& & XtRVisual &
5 (6 6 & (
6) +V StaticGray StaticColor TrueColor GrayS-
cale PseudoColor DirectColor

5 ' (& (6 6
& XtRColor

$ "	2	"
XtRPixel	XtCvtColorToPixel	

5 ' (& (6 6
& XtRInt

$ "	2	"
XtRBoolean	XtCvtIntToBoolean	
XtRBool	XtCvtIntToBool	
XtRColor	XtCvtIntToColor	colorConvertArgs
XtRDimension	XtCvtIntToDimension	
XtRFloat	XtCvtIntToFloat	
XtRFont	XtCvtIntToFont	
XtRPixel	XtCvtIntToPixel	
XtRPixmap	XtCvtIntToPixmap	
XtRPosition	XtCvtIntToPosition	
XtRShort	XtCvtIntToShort	
XtRUnsignedChar	XtCvtIntToUnsignedChar	

5 ' (& (6 6
& XtRPixel

$ "	2	"
XtRColor	XtCvtPixelToColor	

New Resource Converters

5 6 XrmValue / & <X11/ Xresource.h>; #, . ! N @ ((!' & 1 &
6

& U
(D V
! V
W ! " X! " V

5 & & & " & (6
& (& : 6 & String
& & " =<@@ (

6 & (*XtTypeConverter)

```
typedef Boolean (*XtTypeConverter)(display, args, num_args, from, to,
converter_data);
```

&
6

& & XrmValue (
6 & C
& 6 =<@@ : C
(: 6 (L
(C 6 (L

& &

& 6 6

& &
6 6

& 6
6 &
6

5 ((((
& C / & XtDisplayToApplicationCon-
text).

5 (& D 6
6 6 '& & =<@@ 6
(D '&
6 (& 6
& 5 6
(& &
& 6 '& & =<@@ 6
" & && & (
6 6 '& && & 6
" & & E False & (
& '& &&
6 " & &
6 6 : 6 6 & XtRString D
=<@@ (& 5 6 6
& V 6 &
& '

5 6 True & 6 & False
'& 6 & & 6
((XtAppWarningMsg

6 3 & # (
(& (&
& 6 6 6
6 && (6
C & 6

= & *1* & 6
& 6 6 & 6
6 & (C '& 6 &
(&& ((XtGetAp-
plicationResources XtGetSubresources &
V 6 & (C (

```
5  &    (     C     &    6                                  string     6
  Pixel =                                  (          ( V
    Screen   6     (          E       &     '
  6    6      &      &             /       1


R  &      /    6   1 QQ
 U     QQ
  & / "  ]    c^ =<@@1 U  QQ
   & / "  ] D \  D  &/   11 U QQ
    "  ] D  ^  D  &/   1V QQ
       :   V QQ
  W    QQ
  X/   X1/  "  ]   1 ^ /6   1V QQ
 W     QQ
     U   QQ
              J6  V QQ
      J6   ^ /6   1V QQ
   "  ]    ^ /!      1H     J6  V QQ
 W     QQ
  "  ] D  ^  D  &/   1V QQ
      5   V   QQ
 W
     B      6     (5  C  /     (     J (   &   "     "      6    J   1
 ;     X   V
 ! "    X  ( V
       X   J  ( V
 ! "    X&   " V
 ! "    X  " V
 !       X   6    J    V
U
      !            V
 !      C       V
       X      V
              V
            V
 & /X   J  (  c^ K1
 !   %    (  (/! ;     5              C /   1
  0   (        0  0 6     (5   C  0  0! 5     8    0
  0    (     C     6                        (     0
  /    ( X1=<@@  /        X1=<@@1V
      ^ X//     XX1   ( YF[     1V
       ^ X//        X1   ( Y#[     1V
 & /      ' 9@    #/    ! ; &    B   (     1 ^^ F1 U
 X      J    ^ :   V
    / C    %      C  9&      /      11V
 W
 & /      ' 9@    #/    ! ; &    :  (     1 ^^ F1 U
 X      J    ^ :   V
    / C    B      C  9&      /      11V
 W
      ^ !    =        /;     9&      /     1          /    X1&   "  ]
              H           H C        1V
 & /      ^^ F1 U
```

(Y#[V
J ^#V
YF[^/ (1& "] V
! % ((/!; 5 C/ 1
0 0 0 6 (5 C 0 0! 5 8 0
0 & QQ0‘ QQ00 Q
H J 1V
X 6 J ^/ X1: V
: V
W U
X 6 J ^/ X1 5 V
/ C H C 1V
W
W

6 & & 6 6 &
(& 5
6 & (
6 (D :
6 &
XtDefaultForeground XtDefaultBackground XtDefaultFont

5 ' 6
6

& (*XtDestructor)

typedef void **(*XtDestructor)**(*app*, *to*, *converter_data*, *args*, *num_args*);

& C
(&

& &
6

& 6 &
6

& 6 (
6 6
&

& &

5 & & (&
((C (
D (
&

Issuing Conversion Warnings

5 XtDisplayStringConversionWarning 6 &
6 6 & (6

void **XtDisplayStringConversionWarning**(*display*, *from_value*);

& 6

& (6

& (E

5 XtDisplayStringConversionWarning ((
(XtAppWarningMsg PP 6 8 LL PP (LL PP!
5 8 LL & (PP 6 0 # 0
LL

5 & ((6
XtAppWarningMsg XtAppErrorMsg

5 6 C (6
XtDisplayToApplicationContext

```
XtAppContext XtDisplayToApplicationContext(display);
```

& D

5 XtDisplayToApplicationContext & C
& D '& '
(

Registering a New Resource Converter

% ((6 &
6 6
6 & 6 XtCacheType (

& ! 5 V

XtCacheType & & & (6 4

XtCacheNone

O & & 6 6 &
E V & 6
6 6 E

XtCacheAll

O & & 6 6 &
E 6 6 (

XtCacheByDisplay

O & & 6 6 &
XtCacheAll & & & XtCloseDisplay
& 6 6
6 6 & 6

5 E & XtCacheRefCount 9 & 6 6 '&
XtCacheRefCount & XtCreateWidget XtCreateManagedWidget

XtGetApplicationResources XtGetSubresources 6 6
% ((6 6
& D
6 6 6 & 6

5 (6 & C XtSet-
TypeConverter (6 (C
XtAppSetTypeConverter

void **XtSetTypeConverter**(*from_type*, *to_type*, *converter*, *convert_args*, *num_args*, *cache_type*, *destructor*);

&

&

& 6

& 6 (=<@@

& &

&
6 &
&

& &
6 =<@@ &
E
6

XtAppSetTypeConverter(*app_context*, *from_type*, *to_type*, *converter*, *convert_args*, *num_args*, *cache_type*, *destructor*);

! & C

&

&

& 6

& 6 (=<@@

& &

&
6 &
&

& &
6 =<@@ &
E
6

XtSetTypeConverter (& 6
C ((&

C XtAppSetTypeConverter (&
6 (C & '& #
& & 6
6

: & 6 ('
6 6 & & ((
5 XtAddressMode XtCon-
vertArgRec & (6 5 & <X11/
Intrinsic.h>

& U
2X X2
! 2X X2
!B 9&& 2X && X2
!' 2X X2
! (2X (X2
! M 2X E X2
!% (B 9&& 2X && X2
! (2X X2
W ! V

& U
! J V
! J V
D V
W ! 6 (X! 6 (@ V

5 " & & (& 5 &
& & XtAddress
& XtBaseOffset
&& & (XtImmediate
XtResourceString
& 6 && & (
XtResourceQuark & Xr-
mStringToQuark 6 & 6
&& & (XtWidgetBaseOffset XtBaseOff-
set C & & 3 &
& / j#K 1 XtProcedureArg &
6 6
('& XtProcedureArg & &
& & (*XtConvertArgProc)

typedef void **(*XtConvertArgProc)**(*app*, *to*, *converter_data*, *args*, *num_args*);

& C
(&

& &
6

& 6 &
6

& 6 (
6 6
&

& &

5 & & (&
((C (
D (
&

Resource Converter Invocation

& (/& C XtGetSubresources XtGetApplica-
tionResources 1 6 &
6 (& 6 && &
& (L & 6 &&
&

5 6 C 6 XtConvertAndStore XtCallCon-
verter

& ! ! &V

Boolean **XtCallConverter**(*display*, *converter*, *conversion_args*, *num_args*, *from*, *to_in_out*, *cache_ref_return*);

& 6

& 6

& 6 (
& 6 =<@@

& &

& & 6

6 6

6

5 XtCallConverter & & 6
C & 6 (
(XtCacheAll XtCacheByDisplay
6 & 6
& 6 ('& &
& 6 & XtCallConverter False V
D & (& (E
D &
& *1* D *1 "* True
'& D & (D
XtCallConverter D *1 "* False '&
6 (XtCacheNone 6 &

6 XtCallConverter 6 & (
XtCacheNone XtCallConverter
6

5 # & & (
E 6 '& 6 (
XtCacheRefCount & & 6 #
=<@@ # 6
& 6 6 (E 5
# (=<@@ & (
6

5 C & & & XtCall-
Converter XtAppReleaseCacheRefs

void **XtAppReleaseCacheRefs**(*app_context*, *refs*);

! & C

& & &

XtAppReleaseCacheRefs & & 6
& # (5 (=<@@
& XtCacheRef 6 '& & D &
6 & 6

6 (C & 6
& ' & XtCallbackRe-
leaseCacheRef XtCallbackReleaseCacheRefList

void **XtCallbackReleaseCacheRef**(*object*, *client_data*, *call_data*);

& 3

& 6

' (

5 6
XtCacheRef 6 % ((
& 6 & XtCacheRef XtPointer

void **XtCallbackReleaseCacheRefList**(*object*, *client_data*, *call_data*);

& 3

& 6

' (

5 & 6
XtCacheRef 6 % (
(& =<@@ & XtCacheRef
6

5 6 (6 &
(XtConvertAndStore

Boolean **XtConvertAndStore**(*object*, *from_type*, *from*, *to_type*, *to_in_out*);

& 3 & (&
&
9 3 &

&

& 6 6

&

& & (6
6

5 XtConvertAndStore & 6 (
6 # (
XtCallConverter / XtDirectConvert & 6 (
XtAddConverter XtAppAddConverterV C 1 #
(5 (& D
6 6 6
'& & =<@@ 6
(D 5 C
6 (& '&
=<@@ & && (
6 6 & D & (5
" & & D & 6
'& 6 XtConvertAndStore TrueV
False

XtConvertAndStore XtCallbackReleaseCacheRef
& & 3 & 6 XtCacheRef 6 5 (
& & 3

XtCreateWidget & (E 6 XtConvertAndStore
D (3 B C 6 E
& ((3 6
& C &

5 & & (& &
3 3 & 6 & Boolean
!= ! '

% XtCreateWidget & & False
(& 3
& (& 6 6
(5 && 6 & 6 TrueV C
3 C & False
& !=

5 & XtCloseDisplay
& 6 (XtCacheByDisplay

Reading and Writing Widget State

& (9
((6
&

Obtaining Widget State

5 6 6 & (
XtGetValues

void **XtGetValues**(*object*, *args*, *num_args*);

& 3 6
& 9 3 &

& (& 2

6 5
(

& & (

5 XtGetValues & & & 9 3
& 3 5 & &
(&
(3 & '& & & &
& 3 : ' &
& (& 4

O = 6 & (& 4
O O ! = & (
O & !
O 6 (4
O O ! = ! =
O 6 ; 4
O O ! =

' L (&
(D & 3

'& & 3 L & constraintWidgetClass XtGet-
Values & 6 & E '
& & constraintWidgetClass
L '& (
& & 6
(& '& (J6 J
3 L =<@@
& 6 6 & XtGetValues
: & 3 L & constraintWidgetClass &
& L 6 ConstraintClassExten-
sion ! & &
& & C =<@@

XtGetValues (J6 J
5 6 6 XtGetValues

A J6 J &
& (/ 1 (&
= & ' & 3
& E 3
6

5 6 6 & ((
6 (XtVaGetValues

void **XtVaGetValues**(*object*, ...);

& 3 6
& 9 3 &

& 6 (&

XtVaGetValues & XtGetValues
6 (K , # 6
& (
6 ' L &&
('& XtVaTypedArg & (&
D (&
& & 6 '& D &&
((

Widget Subpart Resource Data: The get_values_hook Procedure

% (6 6 & (XtGet-
Values ((J6 J 5 (J6 J
& (*XtArgsProc)

typedef void **(*XtArgsProc)**(*w*, *args*, *num_args*);

& (6
6

& (XtGetVal-
ues & 6 (XtVaGet-
Values

& & (

5 (XtGetSubvalues
(J6 J

Widget Subpart State

5 6 6 & (
XtGetSubvalues : &
S T

void **XtGetSubvalues**(*base*, *resources*, *num_resources*, *args*, *num_args*);

& &
& 6

&

& &

& (& 2

6

& & (

5 XtGetSubvalues & 6 & &
5 & (
(6 ' L
((D &
'& (
& 6 (&

5 6 6 & (
(6 (XtVaGetSubvalues

void **XtVaGetSubvalues**(*base*, *resources*, *num_resources*, ...);

& &
& 6

&

& &

& 6 (& 2

6

XtVaGetSubvalues & XtGetSubvalues
6 (K , # Xt-
VaTypedArg & XtVaGetSubvalues '& XtVaTypedArg &
(((

Setting Widget State

5 & 6 & (
XtSetValues

void **XtSetValues**(*object*, *args*, *num_args*);

& 3 &
& 9 3 &

& (& 26
& 6

& & (

5 XtSetValues & & & 9 3
& 3 (
& 6 & (XtSetVal-
ues J6 & 3
'& 3 =<@@ &
& (J6 5
6 XtSetValues

'& & 3 L & constraintWidgetClass XtSet-
Values 3 L '
& & constraintWidgetClass
L (& 6
& (' J6
& constraintWidgetClass L 5 J6
((& J6
3 3 6
& & ((&
(

'& 3 & & 9 3 XtSetValues & (
E (3 3 '& (
(E XtSetValues ((
E & & ('& ((XtGeometryYes
XtSetValues 3 L D '& ((
XtGeometryDone XtSetValues 3 L D
6 (('& ((XtGe-
ometryNo XtSetValues ((E '& (
(XtGeometryAlmost XtSetValues J6 J
XtSetValues
(((

: & & J6 True (
D XtSetValues (L C 6 (
XClearArea (L

5 & 6 & ((
6 (XtVaSetValues

void **XtVaSetValues**(*object*, ...);

& 3 &
& 9 3 &

& 6 (& 26
& 6

XtVaSetValues & XtSetValues
6 (K , #

Widget State: The set_values Procedure

5 J6 (& (*XtSetValuesFunc)

typedef Boolean **(*XtSetValuesFunc)**(*current*, *request*, *new*, *args*, *num_args*);

& & (& XtSet-
Values

0 & & (6 (
& XtSetValues &
J6 6

& (6

& (XtSetValues
& (XtVaSetValues

& & (

5 J6 & 6 &
(/& C A & ((C 1
'& & & &
E 6 (
& =<@@ & &

@ D J6 & &
6 & &
6 (

6 6 & '
D & & &
& &

C 6 '
(J6
D & 5
& L D & C
(6 6 D C (6
D & D E 7
&& & D D d

5 *0* 6 & 5 *0*
(& ((E 5 (
6 E
J6 & J6
6 & 5 J6
& *0* (6 &
(((((
((

' 6 C 6 &
0 (D '& D
& ('& D (
& ' D 6 &
6 6

5 ((5 & J6
(V *0* (6

& '& J6
(& (

B & (J6 ' & &
0 ((& (V & (
6 C
&

: J6 B
(= ((&
E J6 TrueV ! 6 6
(Expose 6 & & (J6
XtSetValues & (XClearArea & & J6
True 5 & J6
(

J6 ((
XtSetValues 6 & (E E
('& ((D XtSet-
Values D % ((
D

= XtSetValues & (D 5 &
J6 (D

Widget State: The set_values_almost Procedure

5 J6 J (&
(*XtAlmostProc)

```
typedef void (*XtAlmostProc)(old, new, request, reply);
```

& & 3 & XtSet-
Values

& 3

0 & ((E
((XtGeometryAlmost

& (
((XtGeometryAlmost

J6 J &
& (XtInheritSetValuesAlmost D 5 J6 J
rectObjClass ((

5 J6 J (L (
& XtSetValues ((&
E XtGeometryNo XtGeometryAlmost
(5 3 5 *!*
& (6 & XtSetValues
& 6 5 *0*
(E 5
1 0 E D & XtGeometryNo

L (5 J6 J
(((
& && '
0 (
(& 5
& (*0* (V 6
(& & *0* (V
((((
0 1 0 D 5 (& &
&

Widget State: The ConstraintClassPart set_values Procedure

5 J6 & (*XtSetValuesFunc) 5
6 L J6
L J6 & =<@@ &
& & ConstraintPart & (

5 J6 & 6
& (: &
(& : C & & C (&
((6 (L (
J6 & (

Widget Subpart State

5 6 & (
XtSetSubvalues : &
S T

```
void XtSetSubvalues(base, resources, num_resources, args, num_args);
```

& &

&

& &

& (& 26
&
6

& & (

5 XtSetSubvalues & & & &
& (
(

5 6 & (
(6 (XtVaSetSubvalues

```
void XtVaSetSubvalues(base, resources, num_resources);
```

& &

&

& &

& 6 (& 26
&
6

XtVaSetSubvalues & XtSetSubvalues
6 (K , #
XtVaTypedArg & XtVaSetSubvalues '& (Xt-
VaTypedArg & ((
(

Widget Subpart Resource Data: The set_values_hook Procedure

5 J6 J &
6 J6 5 &
(6 .

% (6 6 (XtSet-
Values (J6 J 5 J6 J
(& (*XtArgsFunc)

```
typedef Boolean (*XtArgsFunc)(w, args, num_args);
```

& (6
(

& (XtSetVal-
ues & 6 (XtVaSet-
Values

& & (

5 (XtSetValues & J6 J

Chapter 10. Translation Management

8C ((&
6 (6 (6 (' 6
& (& 6 6 6

5 (6 & & ((
& ! 6 E (& & C (
7

5 (& & 4

O 5 (& (
& C 6 ((
(
O (& (
& 6 E (

> 6 & & (
(&& & (5
! = ! = 5 &
& V S5 5 (T

Action Tables

(& XtActionsRec
' (
(6 (
& 5 &
(*XtActionProc)

```
typedef void (*XtActionProc)(w, event, params, num_params);
```

& (

& 6
'& & E & 6
6 E

& & (
& (
=<@@

& &

& J! U
((V
! V
W ! X! @ V

5 & 5
& &

% & CoreClassPart & (
(C &
D E

(6
D V & &
(6 % (&
(L 6 &
(D

: C (& (4

O 6
O <
O 7 ((
O < ((
O = & 6

5 & (& 6
& 5 (
5 /
(1 & & 4

! 5 Y[^ U
U0 0 W
U0< 0 < W
U07 ((0 7 ((W
U0< ((0 < ((W
U0= & 0 = & W
WV

5 ' 6 (
PP! LL & & < (
(C
6 & ' &

Action Table Registration

5 & & CoreClassPart &
(5 ('
D (
J D 6 5 6 D
' 6 (

5 (
(XtAppAddActions

```
void XtAppAddActions(app_context, actions, num_actions);
```

! & C

& (

& &

'& ((
'& C &
5 ' ((XtMenuPopup XtMenuPopdown
& XtCreateApplicationContext

Action Names to Procedure Translations

5 ((6 &
& &
% (D (& &
& (4

O 5 (L

O 5 L

O 5 (XtAppAddActions XtAddActions &

& ('&
& ((((

Action Hook Registration

& 3 & 6
(5
& (*XtActionHookProc)

```
typedef void (*XtActionHookProc)(w, client_data, action_name, event,
params, num_params);
```

& (

& &
XtAppAddActionHook.

& &

& 6 (

&

& &

& & (
(

5 XtAppAddActionHook

```
XtActionHookId XtAppAddActionHook(app, proc, client_data);
```

& C

&

& &

XtAppAddActionHook & & &
C ' &
6 & (C (
(6 XtCallActionProc 6
& (3 6 (

6 XtActionHookId is
C

5 6 (C
XtRemoveActionHook

```
void XtRemoveActionHook(id);
```

& XtAppAddActionHook

XtRemoveActionHook 6 & &
(

Translation Tables

(
& 6 & &
6 & 6 E & 6
((& & 6 E
5 &
/ " @:1 5 C &
& C B

C & 6 &

O 7 ((
O < ((C
O '6 &
O 6 &

5 & (L & 4

(& 5 ^
0\8 %]4 7 ((/1QQ QQ
\@ 6 %]4 < ((/1QQ QQ
\B #;]4 /1QQ QQ
\B #<]4 = & /1 < /10V

5 & & CoreClassPart & D
((L & '&
L 6 XtInheritTranslations
' L D '
&& & 5 (

& != !=
5 V S5 5 (T

5 6 (
& '&
6 6 6 & (
XtParseTranslationTable

5 ' & & (
6 6 (% ((&
& 6 (

Event Sequences

6 E & ! 6
& E & ! 6 & (8 ! 6
& 4 5 ! 6 & C (& !
& 6 & && C

" 6 5
6 (6 & (((
E

Action Sequences

E & ((
(! 6 E &
& 8 & &
D & D (
5 6 & (
& E

Multi-Click Time

5 &
6 6 6
5 6 &
PP 5 LL PP 5 LL &
5 E & ; 6
6 & XtDisplayInitialize '& 6
& 6 KFF

5 XtSetMultiClickTime

void **XtSetMultiClickTime**(*display, time*);

&

&

XtSetMultiClickTime 6 (
6 6 %
& 6
& 6 / (ButtonPress 6 1
&

5 XtGetMultiClickTime

```
int XtGetMultiClickTime(display);
```

&

XtGetMultiClickTime (
& 6 6 &
& ((

Translation Table Management

((L
: C (6 & 6 5
(&
& 6
6

5 (&
(L 9
(&
& & 6 6 E /
6 1 5
((& &

5 ' & ((4

( )

(7 ((L
((
& C (

(((L
(C (
&

5 XtParseTranslationTable

```
XtTranslations XtParseTranslationTable(table);
```

&

5 XtParseTranslationTable & 6
& (6 C B E &
XtTranslations = & E &
(XtParseTranslationTable (
(

5 (C (XtAugment-
Translations

```
void XtAugmentTranslations(w, translations);
```

& (
(&
&

& (

5 XtAugmentTranslations & (C (
(((#replace #augment #override 6
6 & (5 &
XtAugmentTranslations (
(& (
& (L (
(& (
V & 6 6 E
C (L (

5 6 C (XtOverrideTransla-
tions

void **XtOverrideTranslations**(*w*, *translations*);

& (
(&
&

& (

5 XtOverrideTranslations & (C
((((#replace #augment #override 6
6 & (5
& XtOverrideTranslations (
(& (L
(&
((&
(V & 6 6 E
C (L 6
(L

5 (L XtSetValues !=
& 6

5 & &
& (6 (
& (6 C (
(5 & (/R1 (6 &
& & & PP LL PP (LL
PP 6 LL (6 C (
5 (& (D
8 (6 V & (
(&& '& 6 &
PPR LL

D != & & 5 &
& PPR LL &
!= 5 '& != 5 & (
(5 (& (
& != 5 &
5 & (& '& !=
& PPR LL ('& != 5

! = &
(

5 6 C (XtUninstallTranslations

void **XtUninstallTranslations**(*w*);

& (&
6 & &

5 XtUninstallTranslations & &
(6

Using Accelerators

' & 6 ('
& & 6 &
5 ' 6 &

C & ((5
(% 6 E
(&
(6 C (((6
E (5 6
& 5
(D & & 6
& (L & (D

8 ((L C
8 & (C (
& (
5 &
/ CB1 5 J & (*XtStringProc)

typedef void **(*XtStringProc)**(*w*, *string*);

& (

& (& &
(

& & (
& 7 6 & #augment
#override 6 V
6
(5 & #augment
6 5 #replace
6 (&

5 XtParseAcceleratorTable

XtAccelerators **XtParseAcceleratorTable**(*source*);

&

5 XtParseAcceleratorTable &
E 5 ! =
& (6 6

5 & ((XtInstallAccelera-
tors

void **XtInstallAccelerators**(*destination*, *source*);

& (
&
&

& (&
& &

5 XtInstallAccelerators & 6 &
((
'& & =<@@ XtInstallAccel-
erators ((&
6
5 (&

6 & (& (
XtInstallAllAccelerators

void **XtInstallAllAccelerators**(*destination*, *source*);

& (
&
&

& (& (&
&
&

5 XtInstallAllAccelerators & 6 (
6 & (
XtInstallAllAccelerators

KeyCode-to-KeySym Conversions

5 (6 & (?
(6 ? ? ?
& (*XtKeyProc)

typedef void **(*XtKeyProc)**(*display*, *keycode*, *modifiers*,
modifiers_return, *keysym_return*);

& ? &

& ?

& & ?

&
& & C
& &

& (
?

5 ? & ? :
(6 & (#
? & & C
& ?

5 ? ?
#
6 (*XtCaseProc) MappingNotify
6 6

5 ' ? ? &
5 (&
& (

5 ? ? (&
XtGetKeysymTable

KeySym *XtGetKeysymTable(*display*, *min_keycode_return*, *keysyms_per_keycode_return*);

& E

? 6 &

& ? & ?

XtGetKeysymTable ' L & 6 L
? ? 5 & 5
? ?
(C

/ J J J 1 X J J J

& ? 6 ?
6 NoSymbol ?
XtGetKeysymTable 6 (
(6

: & #K $! N @ ((!'
&

5 (XtSetKeyTranslator

void **XtSetKeyTranslator**(*display*, *proc*);

& & 6

& &

5 XtSetKeyTranslator & &
5 & XtTranslateKey (*XtKeyProc)
& @ (& & (
6) , ' 6
(& ? ? &

5 6 (? ? XtTranslateKeycode

void **XtTranslateKeycode**(*display*, *keycode*, *modifiers*, *modifiers_return*, *keysym_return*);

& ? &

& ?

& & ?

&
(?

(?

5 XtTranslateKeycode & & (
(? ?

5 D & ? '
(6 6 &
(*XtCaseProc)

typedef void **(*XtCaseProc)**(*display*, *keysym*, *lower_return*, *upper_return*);

& &
6 E

& ? 6

&
E 6 & ?

&
E 6 & ?

'& ?
6

5 (6 XtRegisterCaseConverter

void **XtRegisterCaseConverter**(*display*, *proc*, *start*, *stop*);

& & 6

& (*XtCaseProc) 6

& & ? & 6 6

& ? & 6 6

5 XtRegisterCaseConverter (& 6 5
(6 6 (& ? & 6
5 6 6 6 6 & ?
(= & C 6 6 V (
6 % 6 (' &
& 5 & 6 6 &
@ ? & (6) C

5 E 6 & ? XtConvertCase

void **XtConvertCase**(*display*, *keysym*, *lower_return*, *upper_return*);

& ? &

& ? 6

E 6 & ?

E 6 & ?

5 XtConvertCase& 6
(*XtKeyProc) &

Obtaining a KeySym in an Action Procedure

% 6 KeyPress KeyRelease 6 &
6 ? & (6
6 ' 6 ((3
& ' ?
& & & 6

5 6 ? & & 6 &
XtGetActionKeysym

KeySym **XtGetActionKeysym**(*event*, *modifiers_return*);

& 6
'

& &
=<@@

'& XtGetActionKeysym & 6
' & & 6
6 6 & 6
KeyPress KeyRelease 6 XtGetActionKeysym ?
& 6 & & #
=<@@ & (? V
& 6 KeyPress KeyRelease 6 XtGetActionKeysym XtTranslateKeycode
V NoSymbol
C #

= & 6 ' 6 E
/ 1 6 XtCallActionProc
XtGetActionKeysym 6 ' L ? &

KeySym-to-KeyCode Conversions

5 & ? ?
(' XtKeysymToKeycodeList

void **XtKeysymToKeycodeList**(*display*, *keysym*, *keycodes_return*, *keycount_return*);

& E

& ? &

& ? 6
=<@@ & F

& ?

5 XtKeysymToKeycodeList ? 6
& (:
& & ? /(# K1 &
(6) , '& ? & ?
D X =<@@

5 & ((XtFree
(& '& C ? ?
& ? XtGetKeysymTable

Registering Button and Key Grabs for Actions

5 ((& (L (6
((L XtRegisterGrabAction

void **XtRegisterGrabAction**(*action_proc*, *owner_events*, *event_mask*, *pointer_mode*);

& &

& (XtGrabButton XtGrabKey
XtRegisterGrabAction &
(% (D & D
(D (&
&
'& 6 ButtonPress KeyPress 6 & 6

E ' XtGrabButton XtGrabKey & (
6 ? 6 & (
& : Button-
Press 6 & & (&
& # & None : Key-
Press 6 & & /41 &
& ((&
(XtGrabKey & 6 & &
? & 6 ? 9 (&
& ('&
& & & &
(& : ButtonPress
KeyPress 6 L & (
C & PP LL # &

'& & (& (
6 6 & 6 & (
D & (C ((D
(

% & & D (
6 ((& (
& (C (
XtGrabKey XtGrabButton

Invoking Actions Directly

= 6 ' 6 6
E 6 & (5 6 (
(/ D (1 6 XtCallActionProc

```
void XtCallActionProc(widget, action, event, params, num_params);
```

& (
6 & &

& &

& &

& &

& &

XtCallActionProc &
#F # K C
& & &
XtCallActionProc '& & 6 & (
6 ' &
& (&
& & & (D
6 '& & XtCallActionProc (
((

Obtaining a Widget's Action List

9 E & L
5 & C 6
L 5 6 & (
L & XtGetActionList

```
void XtGetActionList(widget_class, actions_return, num_actions_return);
```

& (

&

XtGetActionList & & (
5 & '&
D coreWidgetClass & &
& X =<@@ X
D '& X =<@@ & & (
(XtFree (

Chapter 11. Utility Functions

5 ' 6 & &

O ; &
O 5 ((
O ((
O (C
O
O (C 6 (
O 5 (
O @ ((6
O 7
O % J 9@9 J%'=;9%
O @ & (
O (& & C (
O @ & C

Determining the Number of Elements in an Array

5 & & C D XtNumber

```
Cardinal XtNumber(array);
```

& & C D &

5 XtNumber &

Translating Strings to Widget Instances

5 ((XtNameToWidget

```
Widget XtNameToWidget(reference, names);
```

& (&
& &

& E & &
(

5 XtNameToWidget & & & # (
& 5 &
3 & 3
XtNameToWidget (
& (& (
& (L & 4

O 8 3 & (&
E & (& 3 &
(& (5 (&
&

O & 3 &
& C (&
E & 3 & (

O '& & =<@@

& 6 & (
/ & & 1 & 7
6 & & & '
E & (6 E XtNameToWidget
& 3
6 / 1 (
(6 (

Managing Memory Usage

5 ' (& 6 & (&
(5 &
((malloc
calloc realloc free & (& 4

O XtMalloc XtCalloc XtRealloc(6 & (
O XtFree & =<@@
O XtRealloc (& =<@@

malloc calloc realloc free
& &

5 (XtMalloc

```
char * XtMalloc(size);
```

" & &

5 XtMalloc& & (& &
" '& && XtMalloc
XtErrorMsg

5 D XtCalloc

```
char * XtCalloc(num, size);
```

& &

" & D &

5 XtCalloc & & & &
& & D D D '& &&
XtCalloc XtErrorMsg XtCalloc
& (

5 (D & & (XtRealloc

```
char *XtRealloc(ptr, num);
```

& (XtMalloc
XtCalloc XtRealloc =<@@

& & (

5 XtRealloc & (D & & (6 (
5 / & 1 &
'& && XtRealloc
XtErrorMsg '& =<@@ XtRealloc XtMalloc XtRealloc
&

5 & & (XtFree

```
void XtFree(ptr);
```

& & (XtMal-
loc XtCalloc XtRealloc =<@@

5 XtFree & (('& =<@@ XtFree

5 (& & XtNew

```
type XtNew(t);
```

& 6

XtNew ('& &&
XtNew XtErrorMsg XtNew 6
XtMalloc & ((& 4

```
//  X1 !   //  (  1  D &/  111
```

5 (XtNew & (XtFree

5 & (XtNewString

```
String XtNewString(string);
```

& 6 (

XtNewString ('& &&
XtNewString XtErrorMsg XtNewString
6 XtMalloc & ((& 4

```
/  /!   //  (  1  /  1 b #1  11
```

5 (XtNewString & (XtFree

Sharing Graphics Contexts

5 ' 6 (3 (
C /A 1 (& A
& 6 (6 5 (
& & & &
& A

5 A & & XtAllocateGC

GC **XtAllocateGC**(*object*, *depth*, *value_mask*, *values*, *dynamic_mask*, *unused_mask*);

& 3 (6 (&
A 6 & 9 3
&

& & A
6 F

& & & A D &

& 6 & D &

& & & A &

& & & A

5 XtAllocateGC & A &
5 & & & (& (&
& 3 & (
& A 6 '& D &
& & & (& (& &
3

5 (& & & A D
6 & 5 (&
& & & ((C 5
(A & & A 5
(& & & A &
5 & & &
5 & &
6 & 6 & &
6 & '& & &
&& & &
6 '& &
& (

XtAllocateGC D & E A (
(& 6 (C (A
& XtAllocateGC & C (A &
D

5 A & & XtGetGC

GC **XtGetGC**(*object*, *value_mask*, *values*);

& 3 (6 (&
A 6 & 9 3
&

& & &
&

& 6 & A

5 XtGetGC & A 5
& & XCreateGC C 9 3
& ; XtGetGC E 6 XtAllocateGC
D

XtGetGC A 6 A XCreateGC
' 6
& & A (6 5
6 & & & &
& 6

5 A (XtReleaseGC

void **XtReleaseGC**(*object*, *gc*);

& 3 ; & A
& 9 3 &

& A XtAllocateGC
XtGetGC

& A & E (
6 & (6 A

Managing Selections

(
& ' (& &
% ' 2 5 '
& & 6 (6 ((/
& 1 ((/ & 1

5 & 6 & E
& 6 & '
(: (
6
6 6 6
&& 6 (
(E &
6 (& 5 &
E ' E
(! 6 V '
(& &
& 6 E

Setting and Getting the Selection Timeout Value

5 ' XtAppSetSelectionTimeout

```
void XtAppSetSelectionTimeout(app_context, timeout);
```

! & C

&

5 (6 XtAppGetSelectionTimeout

```
unsigned long XtAppGetSelectionTimeout(app_context);
```

! & C

5 XtAppGetSelectionTimeout & 6
5
(5 6
5 6 XtDisplayInitialize '&
5 & & & 6

Using Atomic Transfers

% (&
E 5 E 6
& 6 6 & E

Atomic Transfer Procedures

5 & (6 (
(

5 &
' & (*XtConvertSelectionProc)

```
typedef Boolean (*XtConvertSelectionProc)(w, selection, target,
type_return, value_return, length_return, format_return);
```

& (

& (E
/& C XA_PRIMARY XA_SECONDARY).

& (&
E &
/& C : =
5C % 1

&
& 6 6 &
: : = 5C (
6 XA_STRING

&
6 6 & 5
& (
('& 6 (*XtS-
electionDoneProc) & (
V

' &
(XtFree

& &
& D
#

& D &
& 6

5 ' (6 &
(6 & ' True &
& 6 (False
'& False 6 & (&
8 (*XtConvertSelectionProc) (6 TARGETS
(6 (& (6
5 6 # & + #- IK
6 &

5 (<@5' @8
5'8 5 (6 / S% 6
T ' 6 1
E <@5' @8 (& &
& (E
5'8 5 (6 ' (
& XtOwnSelection XtOwnSelectionIncremental

5 6 SelectionRequest 6 (((*XtConvertSelection-
Proc) XtGetSelectionRequest

XSelectionRequestEvent *XtGetSelectionRequest(*w*, *selection*, *request_id*);

& (
& &

& (

0 & E &
=<@@ & &

XtGetSelectionRequest & (*XtConvertSelec-
tionProc) SelectionRequest 6
6 6 *& 0* & E &
6 E &
(: & *0* & =<@@ '& Selection-
Request 6 (& & *0*
XtGetSelectionRequest =<@@

5 & &
(& (*XtLoseSelectionProc)

typedef void **(*XtLoseSelectionProc)**(*w*, *selection*);

& (

& (

5 ' &
& ((6 =
(E V & 6

5 & & &
& (((& (*XtSelectionDoneProc)

```
typedef void (*XtSelectionDoneProc)(w, selection, target);
```

& (6

& (
6

& (6

5 ' &
E & 6 6 '&
((*XtSelectionDoneProc) C
& 6 & & 6 6
& & E '&
(*XtSelectionDoneProc) ((6
6

Getting the Selection Value

5 & E 6 &
' & (*XtSelectionCallbackPro)

```
typedef void (*XtSelectionCallbackPro)(w, client_data, selection, type,
value, length, format);
```

& (E 6

& 6 (
E

& & E

& & 6
/& C XA_STRING). =
(E /
& &1
(5
XT_CONVERT_FAIL
6 &
'

6

& 6 5 E
((& &
((XtFree

& &

& D &
&

5 ' 6
E E

'& SelectionNotify 6 & None (6
& & & &
6 E (&
6 & =<@@ (& D

5 6 ((XtGetSelectionValue
XtGetSelectionValues

void **XtGetSelectionValue**(*w*, *selection*, *target*, *callback*, *client_data*, *time*);

& ((E &
&

& V& C
XA_PRIMARY

& & &

&
6 =
6

& &

&
E 5
& 6 ((E V 6
CurrentTime

5 XtGetSelectionValue & E 6 & 6
(5 & & XtGetSelec-
tionValue 6 6 & ! 6 '
& & XtGetSelectionValue : &
K - '
6

void **XtGetSelectionValues**(*w*, *selection*, *targets*, *count*, *callback*, *client_data*, *time*);

& ((E &
&

& /
1

& & &

& (&

&
6 =
6

& & 6 &
(
& (

&
E 5
& 6 ((E V 6
CurrentTime

5 XtGetSelectionValues & XtGetSelection-
Value C (
E & 6 & 6
5 6 & (6 (
: &
K -
% ' 2

Setting the Selection Owner

5 6 6
XtOwnSelection

Boolean **XtOwnSelection**(*w*, *selection*, *time*, *convert_proc*, *lose_selection*, *done_proc*);

& (
& &

& & /& C
XA_PRIMARY).

&
E 5
& 6 ((V 6
CurrentTime

& 6
E 6 &

& 6
(=<@@ &
(

& & E
6 6 =<@@ &
(

5 XtOwnSelection & & '
(' True & (&
False 5 (& &

((5 (
(
& (6 (6 &
5 J & (&
&

'& J & (& (
6 ' '& =<@@ 6 J (
(XtMalloc XtRealloc XtCalloc 6 & &
' &

< & (
E ' &
6 & 7 6
/& C & 1
C & ' (XtDisownSelection
(

void **XtDisownSelection**(*w*, *selection*, *time*);

& (E

& (((6

& E
E

5 XtDisownSelection & & '
& (& '& (
6
(XtDisownSelection (

& (XtDisownSelection 6
6 & E 6 (
(7 6 & 6
& XtDisownSelection & & XtDisownS-
election

Using Incremental Transfers

% (& 6
E & 6 (
5 & *0* (&
(E (E 6

: C & (4

O < 6 (E & 6 & (

O % (6 C (6 & (
6 E & && E &
6
O 5 (E E J 6 5
(& E (&
(E (& & (

Incremental Transfer Procedures

5 & (6
(

5 &
' & (*XtConvertSelectionIncrProc)

& ! ! E 'V

typedef Boolean **(*XtConvertSelectionIncrProc)**(*w*, *selection*, *target*, *type_return*, *value_return*, *length_return*, *format_return*, *max_length*, *client_data*, *request_id*);

& (

& E

& & & E

&
& 6 6 &

&
6 6 & 5
& (
(

& &
& D
#

& D &
& 6
6 &

! & C &
&

& 6 (
&

0 & E & & &
E

5 ' (
C & & XtOwnSelectionIncremental ' True & 6 (
False 9 & E
(& & E
(9 E E
6 6 (' V

& C & & (
& 5 =<@@ 6
D 6
& (& (E '
(&

5 6 SelectionRequest 6 ((6
XtGetSelectionRequest ##, K #

5 &
& (6 (& (*XtLoseSelectionIncr-
Proc)

typedef void **(*XtLoseSelectionIncrProc)**(*w*, *selection*, *client_data*);

& (

&

& 6 (
&

5 ' &
(

5 &
& & & (((
& (*XtSelectionDoneIncrProc)

typedef void **(*XtSelectionDoneIncrProc)**(*w*, *selection*, *target*, *request_id*, *client_data*);

& (

& (
&

& (6

0 & E & & &
E

& 6 (
&

5 ' & E
6 & /D (1 (& &
& '& & '
& & 6 (XtFree

5 & & &
& & (*XtCancelConvertSelec-
tionProc)

typedef void **(*XtCancelConvertSelectionProc)**(*w*, *selection*, *target*, *request_id*, *client_data*);

& (

& (
&

& (6

0 & E & & &
E

& 6 (
&

5 '
& ((&
(& < 6 (E
&
6 & &

Getting the Selection Value Incrementally

5 6 & (& XtGetSelectionValueIncremental XtGetSelectionValuesIncremental

void **XtGetSelectionValueIncremental**(*w*, *selection*, *target*, *selection_callback*, *client_data*, *time*);

& ((E &
&

&

& & &

&
6 (

& &
& 6

&
E 5
& 6 ((E V
6 CurrentTime

5 XtGetSelectionValueIncremental & XtGetSelectionValue C J
6 & (& 6 5 & 6
=<@@ 6 & (D
& '& & &
& & /& C & 1 J
6 E XT_CONVERT_FAIL
E & 6
< 6 (XT_CONVERT_FAIL E (

& & & (&
: & S<
& T ' 6

void **XtGetSelectionValuesIncremental**(*w*, *selection*, *targets*, *count*, *selection_callback*, *client_data*, *time*);

& ((E &
&

&

& & &

& (&

&
6 6

& & / & (
1 6
6 & ((

&
E 5
& 6 ((E V
6 CurrentTime

5 XtGetSelectionValuesIncremental & XtGetSelectionValueIncremental C & (XtGetSelectionValuesIncremental E 6 (XtGetSelectionValueIncremental 6 & - C XtGetSelectionValuesIncremental (6
6 & (&
(XtGetSelectionValueIncremental
: & K -
' 6

Setting the Selection Owner for Incremental Transfers

5 (& XtOwnSelectionIncremental

Boolean **XtOwnSelectionIncremental**(*w*, *selection*, *time*, *convert_callback*, *lose_callback*, *done_callback*, *cancel_callback*, *client_data*);

& (
& &

&

&
E 5
& 6 ((
V 6 CurrentTime

& 6
6 & E

& 6
(=<@@ &
(&

& & E
6 =<@@ &
(&

&
E C
=<@@ & (
&

& (&

5 XtOwnSelectionIncremental & '
& ('
True & & (& False
: & K -
' 6

'& J & (&
(6 ' '& =<@@ 6 J
((XtMalloc XtRealloc XtCalloc
& 6 & & ' & &
& & J J
6 & &

5 J & (
& V 6 SelectionClear 6 (&
6 & C

((XtOwnSelectionIncremental
XtDisownSelection E

Setting and Retrieving Selection Target Parameters

5 & (& E ((
XtSetSelectionParameters

void **XtSetSelectionParameters**(*requestor*, *selection*, *type*, *value*, *length*, *format*);

0 & ((E &
&

&

& &

&

& & (
& D #

& D & &

5 & &
& & E L 5 E
(E XtGetSelectionValue
XtGetSelectionValueIncremental & (E (
(ConvertSelection E & (
('& XtSetSelectionParameters
(& E
& E E

5 6 & # + #- IK '& & + &
D &/ 1V & #- D &/ 1V & IK D &/ (1

5 (<@5' @8 (E & &
(& E 6 XtGetSelection-
Value XtGetSelectionValueIncremental (6
XtSetSelectionParameters XtCreateSelection-
Request XtSendSelectionRequest. XtGetSelectionValues XtGetSelec-
tionValuesIncremental E
D (

5 6 (& 6
XtGetSelectionParameters

void **XtGetSelectionParameters**(*owner*, *selection*, *request_id*,
type_return, *value_return*, *length_return*, *format_return*);

& (&

& (

0 & E &
=<@@ & &

&
&

&
=<@@ &
E

& &
& D
#

& D &
&

XtGetSelectionParameters & (*XtConvertSelec-
tionProc) & & (*XtConvertSelectionIncrProc)
E J

' & & (XtFree
(

Generating MULTIPLE Requests

5 6 ' E (
E (, $(# (XtCreateSelectionRequest XtSendS-
electionRequest

void **XtCreateSelectionRequest**(*requestor*, *selection*);

0 & ((E &
&

&

% XtCreateSelectionRequest E XtGetSelection-
Value XtGetSelectionValueIncremental XtGetSelectionValues XtGetS-
electionValuesIncremental E &
XtCreateSelectionRequest (E
(5 E (XtSendSelectionRequest

void **XtSendSelectionRequest**(*requestor*, *selection*, *time*);

0 & ((E &
&

&

&
E 5 6 CurrentTime

% XtSendSelectionRequest 6 & *0*
(6 XtCreateSelectionRequest E
'& ((E E E
'& (E (E
(& <@5' @8 (& 6
& XtGetSelectionValue XtGetSelectionValueIncremental
XtGetSelectionValues XtGetSelectionValueIncremental 6

C & (
XtCreateSelectionRequest & (XtSendSelection-
Request (E & & &
(&& E ((

5 E & <@5' @8 E (
XtCancelSelectionRequest

void **XtCancelSelectionRequest**(*requestor*, *selection*);

0 & ((E &
&

&

% XtCancelSelectionRequest E E
XtCreateSelectionRequest & (
6 E XtSendSelectionRequest
E (E XtGetSelectionValue XtGetSelectionValues XtGetSelectionValueIncremental XtGetSelectionValuesIncremental &

Auxiliary Selection Properties

& D E
5 &
& E
6 ' 6 & & E (

5 E & E
XtReservePropertyAtom

```
Atom XtReservePropertyAtom(w);
```

& ((E

XtReservePropertyAtom
(E 6 6 (& ((
6 E 6 & (

5 &
XtReleasePropertyAtom

```
void XtReleasePropertyAtom(w, atom);
```

& (6

& XtReservePropertyAtom &

XtReleasePropertyAtom & (
6 (& (L
'& & 6 XtReservePropertyAtom & & (&

Retrieving the Most Recent Timestamp

5 6 & XtDispatchEvent
XtLastTimestampProcessed

```
Time XtLastTimestampProcessed(display);
```

&

'& KeyPress KeyRelease ButtonPress ButtonRelease MotionNotify EnterNotify LeaveNotify PropertyNotify SelectionClear 6
XtDispatchEvent & & XtLastTimestampProcessed
D

Retrieving the Most Recent Event

5 6 6 & XtDispatchEvent & &
XtLastEventProcessed

```
XEvent *XtLastEventProcessed(display);
```

& & 6
6

6 XtDispatchEvent & &
=<@@ & 6 5 & &
6

Merging Exposure Events into a Region

5 ' 6 XtAddExposureToRegion & (Ex-
pose GraphicsExpose 6 (&
(6 (: & & (
S ((T ! N @ ((!' &

5 (Expose GraphicsExpose 6 (XtAddExposure-
ToRegion

```
void XtAddExposureToRegion(event, region);
```

& Expose GraphicsExpose 6

& (3 / & <X11/Xutil.h>1

5 XtAddExposureToRegion & & (&
C 6 & (5
'& 6 (Expose GraphicsExpose 6 XtAddEx-
posureToRegion & (

5 & C V
S8C T

Translating Widget Coordinates

5 C & (
XtTranslateCoords

```
void XtTranslateCoords(w, x, rootx_return);
```

& (& 9 3
&

!

& (6 C

!

6 C

% XtTranslateCoords ! XTranslateCoordinates &
(6 E E &
(L

Translating a Window to a Widget

5 (6 (XtWin-
dowToWidget

```
Widget XtWindowToWidget(display, window);
```

& &

& & (

'& D (& &
XtWindowToWidget ('& &
((XtRegisterDrawable XtWindowToWidget
(' =<@@

Handling Errors

5 ' (6 &
& 5 & & (
(((& 6

5 6 & & 6 4

O (6 & 6
(C &
O 6 & (

5 (6 & (6 & 5
(& 6 &
C & 0 & 0 5 &
&

5 C & (
(&
6 3 & & C
'& & && C (
6

5 /& C (
(& 1 XtAppGetErrorDatabase

```
XrmDatabase *XtAppGetErrorDatabase(app_context);
```

! & C

5 XtAppGetErrorDatabase & &
5 ' D (& (
& & XtAppGetErrorDatabaseText

: (& (('
Cj; % $ '

5 (6 (& (*XtErrorMsgHandler)

typedef void **(*XtErrorMsgHandler)**(*name*, *type*, *class*, *defaultp*, *params*, *num_params*);

&
& & &
(

&
& & (

& & (

& & (&
&

& &
(

& &

5 & (& 0 6 0 0
6 % 0 & (6 C & &
printf
(

(C &
((XtAppGetErrorDatabaseText

void **XtAppGetErrorDatabaseText**(*app_context*, *name*, *default*, *buffer_return*, *nbytes*, *database*);

! & C

& &
& (

& & (

& & (&
&

& && (

& D & &&

& & 6
=<@@ & C L

5 XtAppGetErrorDatabaseText (&
& & (& &

5 & & E (
(0 0
& (0 0 & 0 0

5 XtDisplayInitialize &
; XtGetApplicationNameAndClass

void **XtGetApplicationNameAndClass**(*display*, *name_return*, *class_return*);

&
D XtDisplayInitialize

XtGetApplicationNameAndClass
XtDisplayInitialize & & '& 6 D
& 5 (
' & &

5 (& XtAppSetErrorMs-
gHandler

XtErrorMsgHandler **XtAppSetErrorMsgHandler**(*app_context*, *msg_handler*);

! & C

& &

XtAppSetErrorMsgHandler 6 (6
& 5 & (6 & 6 '
_XtDefaultErrorMsg (&
XtError : ('&
E ' 6 &

5 (6 XtAppErrorMsg

void **XtAppErrorMsg**(*app_context*, *name*, *type*, *class*, *default*, *params*, *num_params*);

! & C

& (&

& &

&

& & (&
&

& & 6
(

& &

5 ' 6 0! 5 8 0

5 (& XtAppSetWarningMsgHandler

XtErrorMsgHandler **XtAppSetWarningMsgHandler**(*app_context*, *msg_handler*);

! & C

& &

XtAppSetWarningMsgHandler 6 (6
(5 & (6 (6 '
_XtDefaultWarningMsg (&
XtWarning

5 (6 (XtAppWarningMsg

void **XtAppWarningMsg**(*app_context*, *name*, *type*, *class*, *default*, *params*, *num_params*);

! & C

& (&

& &

&

& & (&
&

& & 6
(

& &

5 ' (6 0! 5 8 0

5 6 (& (*XtErrorHandler)

typedef void **(*XtErrorHandler)**(*message*);

& (

5 ((&

5 (& XtAppSetErrorHandler

XtErrorHandler **XtAppSetErrorHandler**(*app_context*, *handler*);

! & C

& &

XtAppSetErrorHandler 6 6 &
5 & 6 6 '
_XtDefaultError 9 9'! (
: ('&
E ' 6 &

5 & XtAppError

void **XtAppError**(*app_context*, *message*);

! & C

& (

(XtAppErrorMsg XtAppError 6 &
D D & (

5 (& XtAppSet-
WarningHandler

XtErrorHandler **XtAppSetWarningHandler**(*app_context*, *handler*);

! & C

& &

XtAppSetWarningHandler 6 6
(5 & 6 (6 '
_XtDefaultWarning 9 9'! (

5 & XtAppWarning

void **XtAppWarning**(*app_context*, *message*);

! & C

& & (

(XtAppWarningMsg XtAppWarning 6 &
D D & ((

Setting WM_COLORMAP_WINDOWS

6 & /,+ * * , +/(*/%
(L (XtSetWMColormapWindows

void **XtSetWMColormapWindows**(*widget*, *list*, *count*);

& (
/,+ * * , +/(*/%
& &

& & (
/,+ * * , +/(*/%

& & (

XtSetWMColormapWindows & D &
F 9 XtSetWMColormapWindows &
C (((((& D
((L & (D &
&& & & (

: XtSetWMColormapWindows (
/,+ * * , +/(*/% & (L &
. # + % ' *2* & &
& **/,+ * * , +/(*/%**

Finding File Names

5 ' 6 & & ((
& & & 5 6 & 4 XtFind-
File XtResolvePathname XtFindFile & &
XtResolvePathname &
((-) *3* ((D 6
XtResolvePathname

(& & Substitution

& U
V
(V
W X V

: 6 (&
(*XtFilePredicate)

```
typedef Boolean (*XtFilePredicate)(filename);
```

& &

& (& '
True & (& & &
False

5 & & (XtFindFile

```
String XtFindFile(path, substitutions, num_substitutions, predicate);
```

& & & (

& &

& &

& 3 (
& =<@@

5 & (& & &
% & (
& (5 E 0‘40 &
V E (
5 E 0‘‘0 &
V E ('&
& XtFindFile (
& & & & &
((
& & &=<@@ E 6 (
'& (
/ 020 9 '!1 (XtFindFile
(& & ((
8C & (& (
XtFindFile &
((8
(((& &
TrueV (6 & XtFindFile '&
(True & XtFindFile =<@@

'& =<@@ & &
C

' & & ((XtFree
(

5 & & (XtResolvePath-
name

String **XtResolvePathname**(*display*, *type*, *substitutions*, *num_substitutions*, *predicate*);

& & ((&
((

#

##! & 6

& & & & =<@@

& &
=<@@

& &

& 3 (
& =<@@

5 & XtResolvePathname & 6
& (((6 XtDisplayInitialize & &
5 ((& & 0XC @ ((4 0
5 & & (((
& 9 ((C (((& V 0
((0 0 0 0 0 5

& '
&

XtResolvePathname XtFindFile & (
6 XtFindFile4

‘= 5 6 & # L &
=<@@

‘5 5 6 &

‘ 5 6 & ##!

‘@ 5 (((&

‘ 5 ((& L (((

‘ 5 & L (((

‘ 5 & L (((

‘ 5 D (6 &

‘; 5 6 & & &

'& XtResolvePathname (XtFindFile '&
(=<@@ 6 & !(#%# .$. 6 6
XtFindFile '&!(#%# .$. &
& & C 5
& (4

‘ ‘= ‘ ‘5 ‘@ ‘ ‘= ‘ ‘5 ‘ ‘ ‘
K ‘ ‘= ‘ ‘5 ‘
I ‘ ‘= ‘ ‘5
. ‘= ‘ ‘5 ‘@ ‘= ‘ ‘5 ‘ ‘ ‘
, ‘= ‘ ‘5 ‘
- ‘= ‘ ‘5

5 & C (6 6 5
& (6 '&
(‘=‘ '& 3
%N%S

5 (&&
6 (0 & 0 0 0
0 0

5 ##! & 6
(0 C0 0 0 0 0

((6 & & 9'!

2 2 2!##2‘@2‘52‘=‘ ‘ 42 2 2!##2‘ 2‘52‘=‘ ‘ 4Q
2 2 2!##2‘52‘=‘ ‘ 42 2 2!##2‘@2‘52‘=‘ 4Q
2 2 2!##2‘ 2‘52‘=‘ 42 2 2!##2‘52‘=‘

< (C & & ((
& 2 2 2!## & & '& & &
((3 ((& & '&
& & 2 2 2!## 5
& ((& 2 2 2!## ##!
&

5 ‘; &
& &
6 (& (& : C
(& 0 0 (
!(#%# .$.

‘;4 2‘52‘=‘ 4 2‘52‘=

5 D (E (
/ XrmGetDatabase1 &
D D
6 XtGetAp-
plicationNameAndClass '& 6 & (

' & & ((XtFree
(

Hooks for External Agents

(&
' 5 & 6 &
& 0! 5 6 0 (C (
6 (6 & (
5 ((& 0
(0 3

5 6 ((XtHooksOfDisplay

```
Widget XtHooksOfDisplay(display);
```

&

5 & 3 6 & Object
5 3 5 & 3 &
& ((& &
% 3

5 & ((3
(4

- XtAddCallback XtAddCallbacks XtRemoveCallback XtRemoveCallbacks XtRemoveAllCallbacks XtCallCallbacks XtHasCallbacks XtCallCallback-List
- XtClass XtSuperclass XtIsSubclass XtCheckSubclass XtIsObject XtIs-RectObj XtIsWidget XtIsComposite XtIsConstraint XtIsShell XtIsOver-

rideShell XtIsWMShell XtIsVendorShell XtIsTransientShell XtIsTo-
plevelShell XtIsApplicationShell XtIsSessionShell

- XtWidgetToApplicationContext
- XtName XtParent *XtDisplayOfObject *XtScreenOfObject
- XtSetValues XtGetValues XtVaSetValues XtVaGetValues

Hook Object Resources

5 &
3 4

!= 7	!	!
!= (7	!	!
!= &(7	!	!
!=(7	!	!
!= 7	!	!
!=	! 9	! % (@
!=	! 9	!

; & & 4

5 != 7 & 4 XtCreateWidget XtCreateMan-
agedWidget XtCreatePopupShell XtAppCreateShell (
6 (6

5 7 XtCreate-
HookData

& U
(V
% ((V
(@ (V
J (V
W ! 7 ; X! 7 ; V

5 XtHcreate (
(& 5
& (& &

5 != (7 & 4

- XtSetValues XtVaSetValues
- XtManageChild XtManageChildren XtUnmanageChild XtUnmanageChildren
- XtRealizeWidget XtUnrealizeWidget
- XtAddCallback XtRemoveCallback XtAddCallbacks, XtRemoveCallbacks
  XtRemoveAllCallbacks
- XtAugmentTranslations XtOverrideTranslations XtUninstallTranslations
- XtSetKeyboardFocus XtSetWMColormapWindows
- XtSetMappedWhenManaged XtMapWidget XtUnmapWidget
- XtPopup XtPopupSpringLoaded XtPopdown

5 (7 XtChange-
HookData

& U
(V
% ((V
! 6 J V
J 6 J V
W ! (7 ; X! (7 ; V

% (7 & XtSetValues
XtVaSetValues XtHsetValues (
J6 XtChangeHookSet-
ValuesData

& U
% (EV
(@ (V
J (V
W ! (7 " ; X! (7 " ; V

5 *0* J6
5 & J6 J6
6

% (7 & XtManageChild
XtManageChildren XtHmanageChildren
% (@ & ((
(& (5 &
6 (

% (7 & XtUnmanageChild
XtUnmanageChildren XtHunmanageChildren
% (@ & (
((& (5
& 6 (

5 (7 & XtChangeMan-
agedSet & (((& ((%
& XtHunmanageSet
% (@ & ((
(& (%
XtHmanageSet
% (@ & ((
(& (

% (7 & XtRealizeWidget
XtHrealizeWidget ((D 5
& (D

% (7 & XtUnrealizeWid-
get XtHunrealizeWidget ((
D 5 & (D

% (7 & XtAddCallback
XtHaddCallback ((
(&
(5 & (

% (7 & XtAddCallbacks
XtHaddCallbacks (
((&
(5 & 6
(

% (7 & XtRemoveCallback
XtHremoveCallback (&
(6 (&
(6 5 &
6 & (

% (7 & XtRemoveCallbacks
XtHremoveCallbacks (&
(6 (
& (6 5 &
6 6 & (

% (7 & XtRemoveAllCallbacks
XtHremoveAllCallbacks (&
(6 5 &
6 6 & (

% (7 & XtAugmentTranslations
XtHaugmentTranslations (
(& 5 & (L
6 &

% (7 & XtOverrideTranslations
XtHoverrideTranslations (
(& 5 & (L
6 &

% (7 & XtUninstallTranslations 5
XtHuninstallTranslations (
(5 & (L
6

% (7 & XtSetKeyboardFocus
XtHsetKeyboardFocus
% (6 & (XtSetKeyboardFocus 5 & (& XtSetKeyboardFocus

% (7 & XtSetWMColormapWindows
XtHsetWMColormapWindows
% (@ 6 & (XtSetWMColormapWindows (& 5 &
(& XtSetWMColormapWindows

% (7 & XtSetMappedWhenManaged
XtHsetMappedWhenManaged

B 6 & J J ((
XtSetMappedWhenManaged 5 & ((L
J J (& & D (D ((

% (7 & XtMapWidget
XtHmapWidget ((5
& ((

% (7 & XtUnmapWidget
XtHunmapWidget ((5
& ((

% (7 & XtPopup
XtHpopup ((
! A ? 6 & (J (XtPopup
5 & (& XtPopup

% (7 & XtPop-
upSpringLoaded XtHpopupSpringLoaded
((5 & (& XtPop-
upSpringLoaded

% (7 & XtPopdown
XtHpopdown ((5
& (& XtPopdown

(C & ((
' 6 (& 5 4

! /! 7 9&; / 1 ! = (7 J 1V

5 ! = & (7 ' 6 D
& ((XtResizeWindow

5 XtConfigureHookData.

& U
(V
% ((V
! A (V
!% ((V
W ! & (7 ; X! & (7 ; V

% & (7 XtHconfigure
((& (' & (
(5 & (6
(

5 !=(7 & XtMakeGeometryRequest
XtMakeResizeRequest & & ((

5 XtGeometryHookData

```
   &    U
   (   V
 % (   ( V
 ! % ( A    X  E  V
 ! % ( A    X    V
 ! A          V
W ! A    7  ;    X! A    7  ;  V

%     (    7                 (     (
       XtHpreGeometry              ( &       E      (
      0           E    (     %     (    7
    &  (     (                              XtHpostGeometry
(  &        E                          0          E    (
      ((    (                                6       &    (
 (

5  !=    7                 (        5
                                XtDestroyHookData


   &    U
   (   V
 % (   ( V
W ! ;    7  ;    X! ;    7  ;  V

%        7                 &                                  XtDestroyWidget
          XtHdestroy                 (    (      5
           &          &    (

5  !=      !                          &
        (

                C            ('      &
     6
```

Querying Open Displays

```
5    6     &   ;                    C                                  XtGet-
Displays

void XtGetDisplays(app_context, dpy_return, num_dpy_return);

    !                          &            C

                                    &   ;
                              &           C

                                        &    ;


XtGetDisplays          C    (    E        &
    (            C  5 &       &                                  XtFree
```

Chapter 12. Nonwidget Objects

((& & (
6 5 9 3 9 3
/ (9 3 1 / 1 & &
(B 6 & 3
& & 3
& ' (& & &
C ((
& 9 3 #K K , #K I , #K , D
& (6 & & '

Data Structures

' & 6 (
(3 & 6 & ('
&
& & (& 5
D & C (((

Object Objects

5 9 3 3 & & & 3 '
& (3 (
& & 9 3 & ObjectClassPart
ObjectPart

ObjectClassPart Structure

5 & & 3 & ObjectClassPart
& 6 &
(& CoreClassPartV & 3 & (
& 9 3 C L
5 D & 3 & =<@@ D

& J9 3 U
% (V
(J V
(J D V
! J D V
! % (J J D V
! 8 J V
! ' D V
! (D J V
! 3#V
! 3KV
3IV
! @ V
J V

! C J V
B 3.V
! 8 3,V
B 3-V
B 3$V
! % (V
! 3+V
! 3*V
! " : J6 V
! (: J6 J V
! 3#FV
! ((J6 J V
! 3##V
! " 5 6 V
! J 6 V
(3#KV
! 3#IV
! 3#.V
! C V
W 9 3 V

5 C & & ObjectClassPart E
ObjectClassExtensionRec

& U
! C J C V S 8C T
! M J V S 8C T
(6 V S 8C T
J D V S 8C T
! V S% (' 4 5 T
!; V S% (' ; 4 5 T
W 9 3 8C X9 3 8C V

5 ObjectClass & 3 ObjectClassPart

& J9 3 U
9 3 3 J V
W 9 3 X9 3 V

5 & & ObjectClassRec

' IntrinsicP.h4

C 9 3 3 V

' Intrinsic.h4

C % (3 V

5 E Object ObjectClass E 6 objectClass
& & (3 5 & Object-
ClassExtension 6 & XtObjectExtensionVersion /

S 8C T 1 Intrinsic.h &
6 4

& J9 3 X 9 3 V

ObjectPart Structure

5 & & 3 & ObjectPart
& 6 ((& CorePart

& J9 3 U
% (&V
% ((J V
% (V
B (J V
! @ J V
! V
W 9 3 V

3 6 9 3 & & 5
Object & & & " 3
& 3

```
'  IntrinsicP.h4
```

& J9 3 U
9 3 3 V
W 9 3 X9 3 V

```
'  Intrinsic.h4
```

& J9 3 X9 3 V

Object Resources

5 & object-
ClassRec 4

!=	!	!

ObjectPart Default Values

& ObjectPart 6 & 6 (&
CorePart

Object Arguments to Intrinsics Routines

5 % ((& (objectClass
4

!(6/" ! /" ! /" !(%'
!1'4%' !- ' !- '

5 %((& (& 93
4

O XtCreateWidget XtVaCreateWidget
O XtAddCallback XtAddCallbacks XtRemoveCallback XtRemoveCallbacks XtRemoveAllCallbacks XtCallCallbacks XtHasCallbacks XtCallCallbackList
O XtClass XtSuperclass XtIsSubclass XtCheckSubclass XtIsObject XtIsRectObj XtIsWidget XtIsComposite XtIsConstraint XtIsShell XtIsOverrideShell XtIsWMShell XtIsVendorShell XtIsTransientShell XtIsToplevelShell XtIsApplicationShell XtIsSessionShell
O XtIsManaged XtIsSensitive/ False & (
& 931
O XtIsRealized/ & & &
(& 1
O XtWidgetToApplicationContext
O XtDestroyWidget
O XtParent *XtDisplayOfObject *XtScreenOfObject XtWindowOfObject
O XtSetKeyboardFocus/ 1
O XtGetGC XtReleaseGC
O XtName
O XtSetValues XtGetValues XtVaSetValues XtVaGetValues
O XtGetSubresources XtGetApplicationResources XtVaGetSubresources XtVaGetApplicationResources
O XtConvert XtConvertAndStore

5 6 & & (& 93 4

O XtCreateWidget XtVaCreateWidget
O XtParent
O XtNameToWidget

5 6 & & (objectClass 4

O XtClass XtSuperclass

Use of Objects

5 93 C (' L (
(& ((93
& *.
*$K. *$K,

((
& CompositeClassExtension True XtCreateWidget ((
(

9& & '
(& (rectObj-

Class 5 & (9 3 &
6 & (
(& 3

Rectangle Objects

5 & (3 & 9 3 (
' & ((
9 3 6 & ! Rectangle

RectObjClassPart Structure

ObjectClassPart & RectObjClassPart
6 & (& CoreClass-
PartV & & (& 9 3
C L 5
D & & =<@@ D

& J 9 3 U
% (V
(J V
(J D V
! J D V
! % (J J D V
! 8 J V
! ' D V
! (D J V
! #V
! KV
IV
! @ V
J V
! C J V
B .V
! 8 ,V
B -V
B $V
! % (V
! % (D V
! 8C C V
! " : J6 V
! (: J6 J V
! J6 J V
! ((J6 J V
! *V
! " 5 6 V
! J 6 V
(#FV
! A 7 E J(V
! ##V
! C V

W 93 V

5 93 &3 RectObjClassPart

& J 93 U
93 J V
W 93 X 93 V

5 & & RectObjClassRec

' Intrinsic.h4

C 93 93 V

' Intrinsic.h4

C %(93 V

5 E RectObj RectObjClass E 6 rectObj-
Class & & (3 93
& 93 Intrinsic.h &
6 4

& J 93 X 93 V

RectObjPart Structure

' ObjectPart & 93 3 6 & (&
& RectObjPart & 6 (
(& CorePart

& J 93 U
C V
; (V
; J V
B (V
B 6V
B J 6V
W 93 V

93 3 6 93& & (93 &

& J 93 U
93 3 V
93 (V
W 93 X 93V

' Intrinsic.h4

& J 93 X 93V

RectObj Resources

5 &
rectObjClassRec 4

!= 6	! 6	! B
!= %	! B %	! ;
!= (	! 7 (	! ;
!= 6	! 6	! B
!=	! %	! ;
!=C	!	!
!=	!	!

RectObjPart Default Values

& RectObjPart 6 & 6 (&
CorePart

Widget Arguments to Intrinsics Routines

5 % ((& (rectObjClass
4

O XtCreateManagedWidget XtVaCreateManagedWidget

5 % ((& (& 93
4

O XtConfigureWidget XtMoveWidget XtResizeWidget
O XtMakeGeometryRequest XtMakeResizeRequest
O XtManageChildren XtManageChild XtUnmanageChildren XtUnmanageChild
XtChangeManagedSet
O XtQueryGeometry
O XtSetSensitive
O XtTranslateCoords

5 6 & & (& 93 4

O XtCreateManagedWidget XtVaCreateManagedWidget

Use of Rectangle Objects

93 6 (3 / ((1
6 &
(5 6 6
E ' & (

& 3 9 3 & 9 3
&

(3
& CompositeClassExtension C True
XtCreateWidget XtCreateManagedWidget (&
('& (&
9 3 / & (9 3 1
J &
= & & ' 3

'& ((& 3 &
& (5 E 6
& ((& (6 C
6 (((3 6 C
& & (
(& & 5 6 (
C (5 & C 6 ((
9 3 C & ' V
(3 & & (/ & 6
6 1 ((6
6 (& 3

' (C ((
((6
& (
(((&
& & J

5 ' & 3
(C 6 & (4

O 3 ((
O' XtSetValues 3 & J6
True
O' XtConfigureWidget 3
(((&
((
O' XtMoveWidget 3 (
((& (
(
O' XtResizeWidget 3 ((
((& (&
&&
O' XtMakeGeometryRequest / XtMakeResizeRequest1 3
XtQueryOnly & (XtGeometryYes (
((

(& 3 (3
& & & (6
((

% 3 (& (6 6
(3 % ((

Undeclared Class

5 ' & 93 & &
! 5

O 5 2 & & coreWidgetClassRec

O & ObjectClass
rectObjClassRec 2 &

8C & 6 & & &
(& &

Widget Arguments to Intrinsics Routines

5 % ((& (&
4

O XtCreatePopupShell XtVaCreatePopupShell XtAppCreateShell XtVaAppCreateShell XtOpenApplication XtVaOpenApplication

5 % ((& (&
4

O XtCreatePopupShell XtVaCreatePopupShell
O XtAddEventHandler XtAddRawEventHandler XtRemoveEventHandler XtRemoveRawEventHandler XtInsertEventHandler XtInsertRawEventHandler XtInsertEventTypeHandler XtRemoveEventTypeHandler
O XtRegisterDrawable XtDispatchEventToWidget
O XtAddGrab XtRemoveGrab XtGrabKey XtGrabKeyboard XtUngrabKey XtUngrabKeyboard XtGrabButton XtGrabPointer XtUngrabButton XtUngrabPointer
O XtBuildEventMask
O XtCreateWindow XtDisplay *XtScreen XtWindow
O XtNameToWidget
O XtGetSelectionValue XtGetSelectionValues XtOwnSelection XtDisownSelection XtOwnSelectionIncremental XtGetSelectionValueIncremental XtGetSelectionValuesIncremental XtGetSelectionRequest
O XtInstallAccelerators XtInstallAllAccelerators /
1
O XtAugmentTranslations XtOverrideTranslations XtUninstallTranslations XtCallActionProc
O XtMapWidget XtUnmapWidget
O XtRealizeWidget XtUnrealizeWidget
O XtSetMappedWhenManaged
O XtCallAcceptFocus XtSetKeyboardFocus / 1
O XtResizeWindow
O XtSetWMColormapWindows

5 % ((& (&
4

O XtCreateManagedWidget XtVaCreateManagedWidget

5 % ((& (& & 4

O XtPopdown XtCallbackPopdown XtPopup XtCallbackNone XtCallbackNonexclusive XtCallbackExclusive XtPopupSpringLoaded

5 6 & & (& 4

O XtWindowToWidget

5 6 & & (& & 4

O XtAppCreateShell XtVaAppCreateShell XtAppInitialize XtVaAppInitialize XtCreatePopupShell XtVaCreatePopupShell

Chapter 13. Evolution of the Intrinsics

5 & & 6 (6 & 6
& ! & 7 6 (
& ! %
C & 6
& & (& &
6 (
6 6

5 ' E ((
& (6 6 6
6 6 6 6

' ((& 6
S 8C T & (C

Determining Specification Revision Level

% (6
& ' && 6 6
& & 6 (& &
6 XtSpecificationRelease

R & ! & -

XtSpecificationRelease . (
((&
& I & & &

Release 3 to Release 4 Compatibility

6 . I
/ & ! 1 & C WMShell-
Part, TopLevelShellPart TransientShellPart . (
((& XtPointer
& XtPointer 6 ='
& ' C
6 &

5 & CoreClassPart (& Boolean XtEnum
& & (& 5
(E &

Additional Arguments

(& & (*XtInitProc) (*XtSet-
ValuesFunc) (*XtEventHandler) 6 &
6 & (& 6 /

6 c1 5 ((*XtInitProc) (*XtSetValuesFunc)
D J J6 J 6
& (I

set_values_almost Procedures

5 & (J6 J
I 6

5 & & J6 J
& ' I &
(6 & J6 J
& &

= & ' I
& C & & (

Query Geometry

(XtQueryGeometry C
(V 6 &
PP (LL 9 (
(6 & (
& C 8C ((&& C
6 (& &

unrealizeCallback Callback List

' 6 & (&
D (XtUnrealizeWidget PP D
LL & ' (E &
D = E
6 &
& &

Subclasses of WMShell

5 & & % ' 2
! & & & WMShellPart
& TopLevelShellPart ' & (
6 6 6
& 6 & & 6

5 6 6 & 5 & 6
TransientShellPart 9 D &
6 (&

(& 5 @ 6 5

B WMShellPart ((XSizeHints
C ((& XSizeHints
" & & WMShellPart 6 (&
WMShellPart

Resource Type Converters

& & 6 & 6
& 6 6
& (&
5 & / 1 &
& 6 &

' 6 & 6
D & 6 6 5 C
& (*XtConverter)

KeySym Case Conversion Procedure

5 & & (*XtCaseProc) & (
I &
E & / 1 (
& ? = & '
6 &

Nonwidget Objects

: & (3 .
I & '
& (5 (& (E
& (CompositeClassExtension
& True
(

5 & C & (
I C &
(' . E (
C & E (
& (

Release 4 to Release 5 Compatibility

6 ,
. 5 & & ObjectPart RectObjPart CorePart Compos-
itePart ShellPart WMShellPart TopLevelShellPart ApplicationShell-
Part
& &
& 5 ! & & XrmValue XrmOption-
DescRec XPointer & &
6 6 =' & 5 & & XPointer
6

baseTranslations Resource

!= 5 &
6 & & & (6

((6 6 6 E 5
(&& 6 (&
& (6 6 &
PP 5 LL

(6 (& & (
& & (&

(4

(5 4

'& 6 & &
& && 6 & (.
, & PP LL
PP 5 LL

Resource File Search Path

5 & (& C & (

& & 6 & E (
& 6 (& (& &
& (5 , &
& & ((
< & &
& & &
! (#%# . $. **! %# (#%# . $.** 6 6 (
&

Customization Resource

XtResolvePathname (‘ & & (
& (& (5
6 &
& & 5 6 E (
& PP D LL PP
D LL 6
& & (

Per-Screen Resource Database

5 & & & &
& (
V & 5 && &
/& E 1 E
' D &
(

((& & (
& / 1 D &&
C &
& D (XtResolvePathname

Internationalization of Applications

' D & =' (&
(' (& D '
& 6 & ' '
& (& (
6 : '
7 6 6 D
6 & & & C &
=' 6

3 ! (
(='
& XtSetLanguageProc

5 D & 6 & & ! '
& 5 ' & 6 & (
XtDispatchEvent (6
(XtDispatchEvent 6 C &

' D & (&
& = E
(('
& D &

5 6 & & C & (((& xnl-
Language 6 & 5
(((C & 5 C C
6 &

Permanently Allocated Strings

' 6 (! &
(6 ((5 '
& C E 9 3
#
&
& 5 C E
C && &

Arguments to Existing Functions

5 (XtAppInitialize XtVaAppInitialize *XtOpenDisplay
XtDisplayInitialize XtInitialize (& CardinalX X
& C (6 6 ((
=' 6

Release 5 to Release 6 Compatibility

6 - ,&
C WMShellPart 5 &
5

& D &
6 (&

Widget Internals

5 (&
9 3 5 (bb 3
bb 6 &
(

5 C & & ((
6 6 & (% (
6 & & (& (
V 6 & C

6 & (C
XtGetClassExtension

((&
(C % (
& (J (
(& (6
J (J (J True C

5 (& & XtUnmanageChildren ((
(((K (

C 6 & (XtExposeNoRegion
(& C (((
C 6 (C
6 6 % (C & C
C (&
(

General Application Development

XtOpenApplication 6 D
C ! &
(' & XtAppInitialize
C (& ((
& 5 &
5 6

5 D & XtToolkitInitialize

' D ((& ((
& XtChangeManagedSet

Communication with Window and Session Managers

5 6 & % ' 2 !
& & & &

WMShellPart 5

5 & (6 ') !
& (SessionShell
(6 & & XtIsSessionShell 5 (6
& (
(' 6 C (& Ap-
plicationShell ApplicationShell (
5 E (
(5 SessionShell L
& & (& (& 6
& & XtSessionGetToken XtSes-
sionReturnToken 5 (C ';
& (('

5 (& ' (<X11/
Shell.h> C8 5 & & WMShell
(C (
(5 (WMShell (
5 & != A 6 & WMShell
(! A 6 (6 (6
6 &

Geometry Management

& & (E
6 (E (

Event Management

' - 6 & ((6
& 6 (! C & (6
(5 6 (&
XtInsertEventTypeHandler XtRemoveEventTypeHandler
& C 6 & C (
' XtRegisterExtensionSelector
& 6 & ' (((
C 6 ! 6 '
6 6
XtSetEventDispatcher 5 XtGetKeyboardFocusWid-
get (' &
& ((XtDispatchEventToWidget
6 6 (&
(

5 (& 6 & (C
(L XtRegisterDrawable XtUnregis-
terDrawable 6
& XtWindowToWidget

5 & (
((& 5
& XtToolkitThreadInitialize XtAp-
pLock XtAppUnlock XtAppSetExitFlag XtAppGetExitFlag % (
XtProcessLock XtProcessUnlock

& (& 9 '! (& 6
& XtAppAddSignal XtNoticeSignal XtRemoveSignal

5 6 & & (' 6
((((XtAppAddBlockHook XtRemoveBlock-
Hook

XtLastEventProcessed 6 XtDispatchEvent
& &

Resource Management

6 (' & (6 &
4
(; (

5 & C C
& (
(';

Translation Management

5 & (D = @ & '& = @
/
PP? LL & C 6 & C (FC##FFFFFF
FC##FF::::1 & & & & 2
& @ & 9
(= @

Selections

5 (& E D 6
% ' 2 % E
XtSetSelectionParameters E & (
XtGetSelectionParameters 6
% D (& C &
E & (XtCreateSelectionRequest XtCancelSelectionRe-
quest XtSendSelectionRequest 6 &
E % 6 & '
6 & & V XtReserve-
PropertyAtom XtReleasePropertyAtom

External Agent Hooks

8C (& & &
& & (D 5 C
(
5 C ((
(& 6 & &
& 6 5 & && XtHook-
sOfDisplay ((XtGetDisplays
& ! C

Appendix A. Resource File Format

& C (& 6 &
&

5 & & & & (+ , (% # 2
& 6

5 & & &

@ ^ e ' : e e \ ]
^0c0 U\ C]W
' : ^ 0R0 % 0 0 % : = %

: = ^ \6 & & ( ]
^ % = % 040 % "

= ^ YB ([U B (W =
B (^0 0 e 0X0
% ^ U\ ] e \ D]W
^ 0d0 e =
= ^ = U= W
= ^ 0 0 0D0 e 0 0 0f0 e 0F0 0*0 e 0J0 e 0 0
" ^U\ C]W

8 6 /e1 6 /U W1
D & E /Y [1
M /0 01

'& /Q1
C

5 " (E
0Q 0 / & 1 (D
E 0Q 0 / & D 1
(D D

5 "
E 0Q 0 (D 5 "
C & E 0Q
0 / & 1 (D 6 & 6

5 " & E
0Q 0 ((& 0F0 0$0 (D
(6 & E
: E 0QQ0 (D (

Appendix B. Translation Table Syntax

C & 8B=: & (6 4

Y [(0 0
U W D & 0 0
/ e 0 0 0 0
1
QQ '

E /0 01 ' &
(/\ ]1 C

5 C &

^ Y 6 [U W
5
6 ^ / 0R 0 e 0R 6 0 e 0R (0 1 0QQQQ 0
^ 040 0QQQQ 0
^ / 6 e E 1 U 0 0 / 6 e E1 W
E ^ 000 U W 000
^ Y 0Z0 e 0_0 e 0QQQQ0 [\' 9 @ #]
6 ^ Y & J [0\0 6 J 0]0 Y 0/0 Y0b0[010 [U W
& J ^ / Y0c0[Y040[U & W 1 e 0= 0
& ^ Y0g0[& J
^ /0#0 e 0K0 e 0I0 e 0.0 e 1
& J ^ 0h0 \ ] e \ & =]
6 J ^ \ 86 5]
^ \ 6 &]
^ U 0/0 Y [010 W
^ U W
^ U 0 0 0D0 e 0 0 0f0 e 0F0 0*0 e 0J0 e 0 0 W
^ (U0 0 (W
(^ E J (e E J (
E J (^ S0TU\@ #] e J W Y0QQQQ0 [S0T
J ^ 0QQ00
E J (^ U\@ # C 0 0 0QQ 0 010]W

5 & & String 6
0 E
& E (/Q1 5
E 0QQQ00 0 (& & (0

,

5 & & & ! &
& (6 KeyPress KeyRelease ButtonPress ButtonRelease MotionNotify EnterNotify LeaveNotify 6
(& &
6

O '& & 0= 0 0 L 0
&
O '& C /c1 & ((& &
& &

O '& & & C /c1 &
& 0 L 0
&
O '& & /g1 &

O '& 0= 0 & &
O '& /41 & ((& & '
& 6 6
? 5 & & & @
& (6) , 5 (
? C & ? &
6 & : C 04\?] 0 &
04\?] 0 04 & \?] 0 & 04\?] 0
O '& C /c1 /41 & ((&
& &
& C &
& 6 & /41 6
O '& /41 & & 5 & C
0\?] 0 0\?] 0 E 6

' E & C /Z1 6 & &
(/_1 6 & /Q1 E
E /01 & C /Z1 (/_1
/Q1 B & 4

= & 4 = \6]
& 4 \6]
9 & 4 c # K\6]
5 & 4 # K\6]

5 & 0= 0 & & & C
&

,	2	, "
		&
&		& &
@		@ &
		&
7		7 &
		&

,	2	, "
		&
#	j	# &
K	j	K &
I	j	I &
.	j	. &
,	j	, &
B #	j	B # &
B K	j	B K &
B I	j	B I &
B .	j	B . &
B ,	j	B , &
=	j	= &
	j	&

& & & (?
(& (? : C 0 0 0 0
& (? ? !?J J@
!?J J = & (6
& C 5 & @ & & C
(& V &
? & &

B ? & &
& C 5 0h0 \ ] C &
(? & ?

& J 2? & 2?
6 & (4

'& /41 ' L (*XtKeyProc)
? & 5 / # H g # 1 E
E (6 ?

K '& /41 ' && L & & 5
6 E # 5 & & L
& & ' L (*XtKeyProc)
? 9 &
& 6 *8* ?

#2 $0

5 6 & !86 ' !
6 & (6 & 4

$0	, "
?	KeyPress
? ;	KeyPress
? <	KeyRelease

$0	, "
B ;	ButtonPress
B <	ButtonRelease
	MotionNotify
6	MotionNotify
6	MotionNotify
8	EnterNotify
8 %	EnterNotify
@ 6	LeaveNotify
@ 6 %	LeaveNotify
: '	FocusIn
: 9	FocusOut
?	KeymapNotify
8C	Expose
A 8C	GraphicsExpose
= 8C	NoExpose
"	VisibilityNotify
	CreateNotify
;	DestroyNotify
<	UnmapNotify
	MapNotify
E	MapRequest
	ReparentNotify
& (	ConfigureNotify
& (E	ConfigureRequest
A 6	GravityNotify
E	ResizeRequest
	CirculateNotify
E	CirculateRequest
	PropertyNotify
	SelectionClear
E	SelectionRequest
	SelectionNotify
	ColormapNotify
(	ClientMessage
(	MappingNotify

5 6 4

2	#2 $0	(' "
	KeyPress	&

2	#2 $0	(' "
	KeyPress	&
&	KeyPress	& &
B #;	ButtonPress	B #
B #<	ButtonRelease	B #
B K;	ButtonPress	B K
B K<	ButtonRelease	B K
B I;	ButtonPress	B I
B I<	ButtonRelease	B I
B .;	ButtonPress	B .
B .<	ButtonRelease	B .
B ,;	ButtonPress	B ,
B ,<	ButtonRelease	B ,
B	MotionNotify	&
B #	MotionNotify	B # &
B K	MotionNotify	B K &
B I	MotionNotify	B I &
B .	MotionNotify	B . &
B ,	MotionNotify	B , &

5 & 6 & & &
(6 (6) ## 5
& & & & (6 4

?	? & 6	/ 1
?	? & 6	/ 1
B	& 6	
B	& 6	
= &	6	
8 = &	6	
@ 6 = &	6	
: '	6	
: 9	6	

= &

E
= &
(
(= & *0*

'& 6 KeyPress KeyRelease & & ?
& (6 6
& C \?]

: PropertyNotify SelectionClear SelectionRequest SelectionNotify
ClientMessage 6 & & V& C
\ ( ]% J 959 9@ : MotionNotify EnterNotify LeaveNotify
FocusIn FocusOut MappingNotify 6
& (6) ## 6
&

'& & & 6 6

? & & ? C
& C 0FC0 0F!0 & C 0F0
? C ((
(@ # ? & C 0F0 ? !?JF 9 (
? & @ # & C 0c0
FCK# ? & <X11/keysymdef.h>
0!?J0 & C 6

'

86 E C 5
(L display_accelerator
(5 &
/ 0 C01

^ U W
5
^ 040 0QQ 0
^ 6 U 0 0 6 W
6 ^Y & J [0\0 6 J 0]0 Y 0/0 Y0b0[010 [U W
& J ^ Y0c0[Y040[U & W
& ^ Y0i0[& J
^/0#0 e 0K0 e 0I0 e 0.0 e 1
& J ^ 0h0 \ ] e \ &]
6 J ^ \ 6]
^\ 6 &]
^U 0/0 Y [010 W
^ U W
^ U 0 0 0D0 e 0 0 0f0 e 0F0 0*0 e 0J0 e 0 0 W
^ (U0 0 (W
(^E J (
E J (^ S0TU\@ #] e J W Y0QQQQ0 [S0T
J ^ 0QQ00

5 &

B
& K B K

@ I B I
. B .
, B ,

5 6

?
B
= &
@ 6 = &
: 9
8C
= 8C
= &
< = &
E
& (= &
A 6 = &
= &
= &
E
= &

?
B
8 = &
: '
? = &
A 8C
" = &
; = &
= &
= &
& (E
D E
E

= &
(

#5

O & 6 & (4

& \B #;] 4 /1Q Q
\B #;] 4 (/1
O : B # < & & 4

& \B #<]/K1 4 /1
O 5 E 6 & (6 4

& \B #;] & \B #<] & \B #;] & \B #<] 4 /1
O : B # ; & & 4

& \B #;]/K1 4 /1
O 5 E 6 & (6 4

& \B #;] & \B #<] & \B #;] 4 /1
O 6
6 & 4

\B #;] \B #<] 4 /1

5 6 & 6 6
6 & & &
6 '& 6 6
6 & 6
O '& 6 E & E & 6
E & & C &
(E 5 E & (4

\B #;] \B #<] 4 6 /1Q Q
\B #<] 4 /1

5 &
& 6 (6
B & (6
C 6 V & (
6 6
' C

O : (B # < & & 4
O
& \B #;] & \B #<]4 (/1
O : (E (/b1
& / (1 6 E 5
6 E 6 (
6 : C 4

& \B #<]/Kb1 4 /1
O 5 EnterNotify & & 4

\8] 4 (/1
O 5 EnterNotify & & 4

= \8] 4 /1
O 5 EnterNotify B # ; B K < 0 L 0
& & 4

B # gB K \8] 4 /1
O 5 EnterNotify B # B K C 6
& 4

c B # B K \8] 4 /1

> /g1 C /c1

Appendix C. Compatibility Functions [#]

' 6 & ! 5 (
!\ ] /& C XtLabelCreate1 & &
& ((' ' ((XtCre-
ateWidget & & D
& (

8 !\ ]
!\ ]; /& C XtButtonBoxAddButton XtButtonBoxDelete-
Button1 ' ' (XtManageChildren
XtUnmanageChildren & ((&
5 (J (& (L
'& (L D
(J (D

9 !5 & (
6 (: C &
XtLabelCreate 4

R & ! @ / (J (1 Q
//@ % (1 ! % (/ % ((J (11

& & XtManageChild
J &
XtManageChild 6

XtAppInitialize XtVaAppInitialize 6 XtOpenApplica-
tion XtVaOpenApplication

5 D ' C D

XtAppInitialize XtVaAppInitialize

Widget **XtAppInitialize**(*app_context_return*, *application_class*, *options*, *num_options*, *argc_in_out*, *argv_in_out*, *fallback_resources*, *args*, *num_args*);

! C & =<@@

& &

&

& &

& &

(

& (

& 6 &
&
=<@@

[#] 5 C & & ' &

& (6
& & (

& & (

5 XtAppInitialize & XtToolkitInitialize & XtCreateApplicationContext *XtOpenDisplay =<@@
=<@@ & XtAppCreateShell
=<@@ application\%Shell\%Widget\%Class &
5 &
XtDisplayInitialize '&
! =<@@ C
'& & (
XtAppInitialize '& #
=<@@ XtAppSetFallbackResources 6 (
*XtOpenDisplay

Widget **XtVaAppInitialize**(*app_context_return*, *application_class*, *options*, *num_options*, *argc_in_out*, *argv_in_out*, *fallback_resources*);

! C & =<@@

& &

&

& &

& &
(

& (

& 6 &
& =<@@

& 6 (6
& &

5 XtVaAppInitialize & XtAppInitialize
6 (
K , #

6 6 (& 6 &
C & (C 4 XtInitialize XtMainLoop XtNextEvent XtProcessEvent XtPeekEvent XtPending XtAddInput XtAddTimeOut XtAddWorkProc XtCreateApplicationShell XtAddActions XtSetSelectionTimeout XtGetSelectionTimeout

Widget **XtInitialize**(*shell_name*, *application_class*, *options*, *num_options*, *argc*, *argv*);

5 (V & &
=<@@

& &

& &
& 5 (
XrmParseCommand

& &

& &

&

XtInitialize XtToolkitInitialize D
& C & 6
*XtOpenDisplay =<@@ =<@@ &
XtAppCreateShell =<@@
5 & (XtInitialize & 5
XtOpenApplication

void **XtMainLoop**(*void*);

XtMainLoop & C ! 6 (XtNex-
tEvent 5 ((
XtDispatchEvent 5 XtAppMainLoop

void **XtNextEvent**(*event_return*);

6 & & 6

'& ! E & & C XtNextEvent
& ! && & 6 (
6 (((
5 XtAppNextEvent XtInitialize
& (

void **XtProcessEvent**(*mask*);

& &

XtProcessEvent ! 6 /
(6 & 1 (& ' XtApp-
ProcessEvent XtInitialize & (&

Boolean **XtPeekEvent**(*event_return*);

6 & & 6

'& 6 E & & C XtPeekEvent &
6 D 6 '& ! E XtPeekEvent
& && 6 (
'& 6 XtPeekEvent &
6 D 6 9 &
XtPeekEvent D 5
XtAppPeekEvent XtInitialize & (

Boolean **XtPending**();

XtPending D 6 & 6 (& ! 6
& C '& 6
(& && D 6 '
XtAppPending XtInitialize & (

```
XtInputId XtAddInput(source, condition, proc, client_data);
```

& & 9 '!
(6
&

&
C (

& 6

&
6

5 XtAddInput & (& C
& 6 & & & /5 #
& 1 XtAddInput &
(6 % (
& C
5 XtAppAddInput XtInitialize
& (

```
XtIntervalId XtAddTimeOut(interval, proc, client_data);
```

& 6

& C

&

5 XtAddTimeOut & & C
& & 5 6 5
& 6 &
6 5 XtAppAddTimeOut XtInitialize
& (

```
XtWorkProcId XtAddWorkProc(proc, client_data);
```

5 (& C '
XtAppAddWorkProc XtInitialize & (

```
Widget XtCreateApplicationShell(name, widget_class, args, num_args);
```

5 (V & &
=<@@

& (&
(5
topLevelShellWidgetClass &

& (6
&

& &

5 XtCreateApplicationShell XtAppCreateShell
=<@@ XtInitialize
& C XtInitialize 5
XtAppCreateShell

& 6 & (*XtConverter)

typedef void **(*XtConverter)**(*args*, *num_args*, *from*, *to*);

& & XrmValue (
6 & C &
6 =<@@

& &

& 6 6

& 6 6

5 6 & & (4

O & (
O 6
O '& & D (V
XtWarningMsg & ((

6 3 & #
(& (& &
6 & (6
6 6 && (6
C & 6

= *1* & 6 &
6 6 & 6 '
6

5 (*XtConverter) (*XtTypeConverter)

5 XtStringConversionWarning & 6 & &
6 6 & (

void **XtStringConversionWarning**(*src*);

& (6

& & (
6

5 XtStringConversionWarning & ((
0 6 8 0 0 (0 0! 5 8 & (
(0 6 0 0 0 5
XtDisplayStringConversionWarning

5 (& 6 XtAddConverter XtAppAddConverter

void **XtAddConverter**(*from_type*, *to_type*, *converter*, *convert_args*, *num_args*);

&

&

& 6

& (
6 =<@@

& &

XtAddConverter E 6 & XtSetTypeConverter
E XtCacheAll & & 6 '
XtSetTypeConverter

void **XtAppAddConverter**(*app_context*, *from_type*, *to_type*, *converter*, *convert_args*, *num_args*);

! & C

&

&

& 6

& (
6 =<@@

& &

XtAppAddConverter E 6 & XtAppSetTypeConverter
E XtCacheAll & & 6 '
XtAppSetTypeConverter

5 6 6 XtConvert & &
6 XtDirectConvert

void **XtConvert**(*w*, *from_type*, *from*, *to_type*, *to_return*);

& (& (&

&

& 6 6

&

6 6

```
void XtDirectConvert(converter, args, num_args, from, to_return);
```

& 6

& (
(& 6 /&
=<@@1

& &

& 6 6

6 6

5 XtConvert & 6 (6 #
(XtDirect-
Convert XtCallConverter 5 XtDirectConvert & 6
& 6 & (
'& & & V
6

B & (& 6 XtDirectConvert 6 D
D 6 =<@@ 5 & 6
& 2 & =<@@ 5
XtConvert
6

XtConvert XtConvertAndStore XtDirectConvert
XtCallConverter

5 A (XtDestroyGC

```
void XtDestroyGC(w, gc);
```

& 3 & A
& 9 3 &

& A

& A & E (
6 & (6 A = 6 &
XtDestroyGC (5 & & 6
(XtReleaseGC

5 & C (
(XtAddActions

```
void XtAddActions(actions, num_actions);
```

& (

& &

'& ((
'& C & 5

' (& XtMenuPopup XtMenuPopdown &!
5 D 5 XtAppAddActions XtInitialize & (

5 ' & C XtSetSelectionTimeout

void **XtSetSelectionTimeout**(*timeout*);

& 5
XtAppSetSelectionTimeout XtInitialize & (

5 (6 & C
XtGetSelectionTimeout

unsigned long **XtGetSelectionTimeout**();

5 (
'& & 6
' E

5 XtAppGetSelectionTimeout XtInitialize
& (

5 (/& C (
(& 1 *XtGetErrorDatabase

XrmDatabase ***XtGetErrorDatabase**();

5 *XtGetErrorDatabase & & 5
' D (& (
& & XtGetErrorDatbaseText 5
XtAppGetErrorDatabase

(C &
((XtGetErrorDatabaseText

void **XtGetErrorDatabaseText**(*name*, *default*, *buffer_return*, *nbytes*);

&
& & (

& & (

& & (&
&

& && (

& D & &&

5 XtGetErrorDatabaseText (&
& C & &

(& & 5 & &
E (
(0 0 & (0 0 &
0 0 5 XtAppGetErrorDatabaseText

5 (& XtSetErrorMsgHandler

void **XtSetErrorMsgHandler**(*msg_handler*);

& &

5 & 6 ' (&
XtError : (
'& E ' 6 & 5
XtAppSetErrorMsgHandler

5 (6 XtErrorMsg

void **XtErrorMsg**(*name*, *type*, *class*, *default*, *params*, *num_params*);

& (&

& &

&

& & (&
&

& & 6
(

& &

5 XtAppErrorMsg

5 (& XtSetWarningMsgHandler

void **XtSetWarningMsgHandler**(*msg_handler*);

& &

5 & (6 ' (&
XtWarning 5
XtAppSetWarningMsgHandler

5 (6 (XtWarningMsg

void **XtWarningMsg**(*name*, *type*, *class*, *default*, *params*, *num_params*);

& (&

& &

&

& & (&
&

& & 6
(

& &

5 XtAppWarningMsg

5 (& XtSetErrorHandler

void **XtSetErrorHandler**(*handler*);

& &

5 & 6 ' _XtError 9 9'!
(
: ('& E ! 5
6 & 5 XtAppSetErrorHandler

5 & XtError

void **XtError**(*message*);

& (

(XtAppErrorMsg XtError 6 & D
D & (5
XtAppError

5 (& XtSetWarningHandler

void **XtSetWarningHandler**(*handler*);

& &

5 & (6 ' _XtWarning 9 9'!
(
5 XtAppSetWarningHandler

5 & XtWarning

void **XtWarning**(*message*);

& & (

(XtAppWarningMsg XtWarning 6 &
D D & ((5
XtAppWarning

Appendix D. Intrinsics Error Messages

' (6 PP! 5 8 LL 5 & (
D (('
(8
(

$0	, "
8	&
8	&
8	&
8 C A E	V 8C =<@@
6 (C A "	( ] F =<@@ (! A "
6 (C "	( ] F =<@@ (! "
6 '	9 3 V (
6 "	& E "
6 C	! E =<@@ (
6 C	! E =<@@ (
6 C % (	! % (E =<@@ (
6 C	! E & % (
6 C	! E & % (
6 ; C %	% (‘ D 2 (
6 ; D	(‘ D 2 (
6 ; C ' D	L 4 ‘
6 A " C A "	=<@@ (" ! A "

$0	, "
6 8C ' D	(‘ 6 8C
6 8C C A E	(‘ 6 8C
6 A (C A E	! A E ((
6 C '	6 ! '
6 C '	6 ! '
6 C ((	(
6 C ((	(
6 C	! E =<@@
6 C % (	! % (E =<@@
6 C A E	! A E
6 C A E	! A E
6 C (	(
6 C < (	(
6	< 6
6 D	= D &
6 % 6 7	86 (
(% (& ; (	: ; ((&
% (C % (	(0‘ 0 0‘ 0
	(

	$0	, "
;	;	L & &
;	(;	L & &
	&	4 C &
% (		9 3 0‘ 0 6
;	C (8C	! (8C E =<@@
		0‘ 0 =<@@ J
K6	(	% (‘
I6	(	% (‘
. ,6	(	% (‘
(8	C (8C	(& C 6
(	9	5 (‘
	C	% (‘ & & ‘ C 4 ‘

/ ", "

	$0	, "
(	C ((	= 6
(	C (	= 6 !
(	C < (	(= 6 ! < (
:	C A "	'= & c^ IK
A	D	(0‘ 0 6 (& 4 0‘ 0

$0	, "
" 6 (5 C	0‘ 0 &
8	& V ‘
6 8 (	6 (0‘ 0 ‘
6 8 (5"	& " & ‘ & ‘
6 : C 6 " 5 (@	5 6 &
6 : C A 5 (	5 6 /‘ ‘ 1 & & (L‘ L
8 6 ;	L &
(8 C A	! A E C 6 (& (J 5 <8
(8 C 6 A	! 6 A 6 (
D 8 C ' D	' D (@
&& C A 5 (	' && & 6 L‘ L (L‘ L
8	L (
6 (	6 (& (L‘ L
6 ((	( ] F =<@@ (
6 @ C	& !
6 @ C	& !
6 @ C	& !
6 @ C 6	& ! 6
6 @ C 6	& ! 6
6 C ((	= < (
6 C (	(

	$0	, "
6	C (	! (
6	C < (	= ! < (
6	C < (	= & ((
6 ;	"	L ((
6 8C	C % (	(0‘ 0 ‘ 6 8C
6 8C	C % (	(‘ 6 8C
6 A	(? 9 B	6 C 6 (
6 A ?	C	((6 6 V ! A =
6	& 5	: (! 5 E C (
6	(5	(5 5 5 C (
6	C	! J c^ F #
6	C	C (
6	C :	: 6 =<@@
6	C	L & (0‘ 0 !
6	C	L & (0‘ 0 !
6	9	B ? 8 = & 6
6	9	B ? 8 = & 6
6		J & ‘ ! ;

$0	, "
6 7	! 6 ' 4 ' &
6 J6 J	J6 J L =<@@
6 (	] F =<@@
6 = (	& ‘ (6
6 C 5	% (
6 D 96 C ;	D ‘ L 6 ‘
(@ 6 (5 :	((: 6
C	= 0‘ 0 (& (0‘ 0
6 (5 C	& 0‘ 0
: 6 (5 :	< ' 9++,* # &
: 6 (5 :	< &
: 6 (5 :	< ' 9++,* # &
' 6 C A E	! A E ! A & (0‘ 0 & 6
9 3 C ((	0‘ 0 ‘ 9 3
9 3 C (	0‘ 0 ‘ 9 3
% (C 6 " 5 (@	! " 5 (6 =<@@ (
I6 (	% (‘ & I
8 5	L 6 & =<@@
8 5	5 6 C

$0	, "
8 (	96 ((
8	= 4‘
8 5	/ 1 (
8 5	L 6 (=<@@
8	6 4‘ ‘
8	& 4‘
8 C 5 ' D	' D (5 (
8 (	(LL 6 E
8 @ #	@ # E (
8 8	C 4‘
8 (	(L0L
8 @	& (L‘L
6 8 6	= 6 (& L‘L L‘L 6
5 C 6 " 5 (@	< & & & 6
5 C A 5 (	< & & & 6
6 (	% (‘ 6 / 14QQ (‘ 6 ‘
(6 ' 9 C 5 !	C 6 (
(6 ' 5 B	' (B 6 C (
(6 ' 5 B	' (B 6 C (
(6 ' 5 :	' (: 6 C (
(6 ' 5 :	' (: 6 C (

$0	, "
6 ' 5 C	' (C 6 C (
6 ' 5 C	' (C 6 C (
6 ' 5	' (6 C (
6 ' 5 < (	' (< (6 C (
6 (5 5	(5 6 C (
6 (5	(6 ; (
6 (5 B	(B 6 C (
6 (5 B	(B 6 C (
6 (5 (	((6 C (
6 (5	(6 (
6 (5 ;	(; 6 C (
6 (5 ; (	(; (6 C (
6 (5 ;	(; 6 C (
6 (5 :	(: 6 C (
6 (5 :	(: 6 C (
6 (5 :	(& 6 (
6 (5 :	(: 6 (

$0	, "
6 (5 :	(& 6 (
6 (5 A 6	(A 6 6 C (
6 (5 '	(' 6 C (
6 (5 '	(' (6 C (
6 (5 C	(C 6 (
6 (5	(6 C (
6 (5	(' (6 C (
6 (55 5	(5 5 6 C (
6 (5 < (	(' (6 C (
6 (5 "	(" 6 (
6 ! 5 C	C 6 C (
&	: E (
& ; (	: ; (E C (
& :	: : E C (
& :	: : (
& :	: : (
& :	: : E (
& C	: (C E (

Appendix E. Defined Strings

5 StringDefs.h & & & & (

' 7

%0	
!=	0 0
!= 7 D	0 7 D0
!= "	0 " 0
!= 6	0 6 0
!= (	0 (0
!= (C	0 (C 0
!=	0 0
!=	0 0
!=	0 0
!= C	0 C 0
!= %	0 % 0
!=	0 0
!= (7	0 (7 0
!=	0 0
!=	0 0
!= &(7	0 &(7 0
!= 7	0 7 0
!=	0 0
!=	0 0
!= 7	0 7 0
!= 5	0 5 0
!=&	0& 0
!=&	0& 0
!=&	0& 0
!=& B	0& B 0
!=& (	0& (0
!=&	0& 0
!=(7	0(7 0
!= (	0 (0
!= ((	0 ((0
!=	0 0
!= C	0 C0
!=	0 0
!= 7 (	0 7 (0

%0	
! = %	0 % 0
! = %	0 % 0
! =	0 0
! = 7 (	0 7 (0
! = %	0 % 0
! =3	03 0
! =3 &	03 & 0
! = 7 (	0 7 (0
! = '	0 ' 0
! = C	0 C 0
! = %	0 % 0
! =	0 0
! = (	0 (0
! = (	0 (0
! = % (	0 % (0
! = 8	0 8 0
! =	0 0
! = &	0 & 0
! =	0 0
! =	0 0
! =	0 0
! =	0 0
! = C	0 C 0
! =	0 0
! =	0 0
! = D	0 D 0
! = 6 "	0 6 " 0
! =	0 0
! =	0 0
! = ;	0 ; 0
! = 7	0 7 0
! = @	0 @ 0
! =	0 0
! = <	0 < 0
! = "	0 " 0
! =	0 0
! =	0 0
! = 6	0 6 0
! =	0 0

%0	
! =	0 0
! =	0 0
! =	0 0
! = (	0 (0
! = C 9	0 C 9 0
! = C	0 C 0
! = C	0 C 0
! =	0 0
! =	0 0
! =	0 0
! =	0 0
! =	0 0
! = D	0 D 0
! =	0 0
! = B	0 B 0
! = (	0 (0
! =6	06 0
! =6	06 0
! =	0 0
! =	0 0
! =C	0C0
! =	0 0

' ' 7

%0	
!	0 0
! B (	0B (0
! B	0B 0
! B	0B 0
! B	0B 0
! B %	0B % 0
!	0 0
!	0 0
!	0 0
!	0 0
! ;	0; 0
! 8 5	08 5 0
! 86 B (	086 B (0
! :	0: 0

%0	
! :	0: 0
! :	0: 0
! : (	0: (0
! :	0: 0
! :	0: 0
! 7 (	07 (0
! 7	07 0
! ' C	0' C0
! '	0' 0
! '	0' 0
! ' 6	0' 6 0
! &	0 & 0
! ? '	0? ' 0
! ? C	0? C 0
! @	0@ 0
! @ (	0@ (0
! % (	0 % (0
! (	0 (0
! 8	0 8 0
! = &	0= & 0
! 9	09 0
!	0 0
! C	0 C 0
!	0 0
! 9	0 9 0
! D	0 D 0
! 6 "	0 6 " 0
!	0 0
!	0 0
! ;	0 ; 0
! 7	0 7 0
! @	0 @ 0
!	0 0
! <	0 < 0
! "	0 " 0
!	0 0
!	0 0
! 6	0 6 0
!	0 0

%0	
!	0 0
! (	0 (0
! 5 C 9	05 C 9 0
! 5 C	05 C 0
! 5 C	05 C 0
! 5 C	05 C 0
! 5	05 0
! 5	05 0
! 5	05 0
! "	0" 0
! "	0" 0
! %	0% 0
! %	0% 0
! !	0!0
! >	0>0

' 0 7

%0	
! 5	0 5 0
!	0 0
! B	0B 0
! B	0B 0
! B	0B 0
!	0 0
!	0 0
!	0 0
!	0 0
!	0 0
! (	0 (0
!	0 0
! ;	0; 0
! ; (	0; (0
! ;	0; 0
! 8	08 0
! 8	08 0
! 8 6	08 6 0
! :	0: 0
! :	0: 0
! :	0: 0

%0	
! :	0: 0
! :	0: 0
! :	0: 0
! A	0A 0
! A 6	0A 6 0
! '	0' 0
! '	0' 0
! '	0' 0
! &	0 & 0
! @ (B	! B
! 9 3	09 3 0
! 9	09 0
! C	0 C 0
! C	0 C 0
!	0 0
!	0 0
!	0 0
!	0 0
!	0 0
!	0 0
! (	0 (0
! (	0 (0
! (5	0 (5 0
! < (	0< (0
! 5 5	05 5 0
! "	0" 0
! % (	0% (0
! % (	0% (0
! % (@	0% (@ 0
! %	0% 0

' 7

%0	
! 8 &&	0 &&0
! 8&	0& 0
! 8	0 0
! 8	0 0
! 8	0 0
! 8	0 0

*** ' 7**

%0	
! 86	06 0
! 8 D	0 D 0

$5 ' 7

%0	
! 8 C	0 0
! 8 C	0 0
! 8 C 8	0 0

' 7

%0	
! 8C & (	0C & (0
! 8C & & (	0C & & (0

' 7

%0	
! 8C & &	0C & & 0

. 4 #5 " ' 7

%0	
! 7	0! 0
! 7 "	0! 6 0
! 7 (	0! (0
! 7 (	0! (0
! 7 (	0! (0
! 7 (	0! (0
! 7 D % (	0! D % (0
! 7 D % (	0! D % (0
! 7	0! 0
! 7	0! 0
! 7 6	0! 6 0
! 7 6	0! 6 0
! 7 6	0! 6 0
! 7 (5	0! (5 0
! 7 6 5	0! 6 5 0
! 7 5	0! 5 0
! 7 ? :	0! ? : 0
! 7 % %	0! % % 0
! 7 % (	0! % (0

%0	
! 7 % (	0! % (0
! 7	0! 0
! 7 (@	0! (@ 0
! 7	0! 0
! 7 & (	0! & (0
! 7 A	0! A 0
! 7 A	0! A 0
! 7	0! 0

5 Shell.h & & & & (

' 7

%0	
! = D	0 D 0
! = (	0 (0
! = (6	0 (60
! = 7 (	0 7 (0
! = %	0 % 0
! =	0 0
! = @	0 @ 0
! =	0 0
! =	0 0
! =	0 0
! = ;	0 ; 0
! =	0 0
! =	0 0
! = 6	0 6 0
! =	0 0
! =(	0(0
! = ('	0 (' 0
! =	0 0
! = =	0 = 0
! = = 8 (	0 = 8 (0
! = C	0 C 0
! = %	0 % 0
! = !	0 !0
! = >	0 >0
! =	0 0
! =	0 0

%0	
! =	0 0
! =	0 0
! =3	03 0
! = C !	0 C !0
! = C >	0 C >0
! = C7 (	0 C7 (0
! = C%	0 C% 0
! = !	0 !0
! = >	0 >0
! = 7 (	0 7 (0
! = %	0 % 0
! = 6	0 6 0
! = (	0 (0
! = (	0 (0
! =	0 0
! =	0 0
! = 6	0 6 0
! = 6	0 6 0
! = 6 <	0 6 < 0
! = ';	0 ';0
! =	0 0
! =	0 0
! = 8 (	0 8 (0
! =	0 0
! = :	0 : 0
! = (	0 (0
! =6	06 0
! = : %	0 & 0
! = &	0 & 0
! = '	0 ' 0
! = A	0 A 0
! =	0 0
! = A 6	0 A 6 0
! = 5	0 5 0

' ' 7

%0	
! D	0 D 0
! (	0 (0

%0	
! (6	0 (60
! B 7 (	0B 7 (0
! B %	0B % 0
! @	0 @ 0
!	0 0
!	0 0
!	0 0
! ;	0 ; 0
! ;	0; 0
! 8 6	08 6 0
! A	0A 0
! 7 ('	07 (' 0
! '	0' 0
! ' =	0' = 0
! ' = 8 (	0' = 8 (0
! ' C	0' C 0
! ' %	0' % 0
! ' !	0' !0
! ' >	0' >0
! '	0' 0
! '	0' 0
! '	0' 0
!	0 0
! C !	0 C !0
! C >	0 C >0
! C7 (	0 C7 (0
! C%	0 C% 0
! !	0 !0
! >	0 >0
! 7 (	0 7 (0
! %	0 % 0
! 96	096 0
! (	0 (0
! (	0 (0
!	0 0
!	0 0
! 6 <	0 6 < 0
! ';	0 ';0
!	0 0

%0	
! 5	05 0
! 5 8 (	05 8 (0
! 5	05 0
! 5 :	05 : 0
! < (	0< (0
! "	0" 0
! % : %	0% & 0
! % &	0% & 0
! % '	0% ' 0
! % A	0% A 0
! %	0% 0
! % A 6	0% A 6 0
! % 5	0% 5 0

' 0 7

%0	
!	0 0

Appendix F. Resource Configuration Management

(((! && &
(' " , "
8 ,9 ((X Intrinsics
& & & (('
C 4 (& & E V
& 6 && V
(

5 && RCM Editres RCM D
(Intrinsics
& (7 6 EditRes E
EditRes ! !
& EditRes (
RCM Intrinsics PropertyNotify 6

! PropertyNotify 6 RCM
& D % ! 5 D
(% *4* B _XtCreatePopupShell
_XtAppCreateShell (PropertyNotify 6

D % (
L 6 % L & 6
6 = &

D *4*
(L 6 5 (&
/ & 1
6 & 5 L XA_STRING &
& (4

5 (& / & 1

K 9

I 5

. 9

, 5 6

% (L 6 &
L (((&&
((6 XtSetValues (
6 6 (&
% (6
((

B & 6 (& & &
6 & (' L

E (& (
& (&