Application Group Extension to the X Protocol

X Consortium Standard

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Version 1.0

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! " !"
! $ % & !'& !( ) ! & %
! % ' !) & " ! ' &
! ! ! ! !(% ! ! ! ! && $
' ! %) &)& !" '& % % (&) &
" ! ! ' ! ' ! '
!(% ! ' !! ' !
& !(!

*+ , - +./ - / / /. + /-0 .1 $ './ . 20 - /. 3
2 / - / . . 4 . , .0. - 2 . . - / /
.1 4- 4 .2 , . 4 / -2 . 5- ./ 1 .0 $ './ . 20

$ / .4 6 0 - - 0- 7 .1 , /(.2,

27 September 1996

Abstract

,, +- ./ (.2, * / ./ . $, . .+. / / . , . - 1 -0 4. 7 . -
.4 0. -/ ./ , . -0 . 0-/- $ -,, +- ./ ./ 7 ., / - 2 .1
* / ./ 4 3 . / . 03 4 / .4 .1 $, . -0 / . 4 / .4 .1 -/.
, . -0 2+ - - 4 3 3 .4 * / ./ /. / / . - - 0
3 / 2 - 1. *-0, , / .+ . 2+ - - 0 /2 3- +

Table of Contents

2 ,. -/ (.- G
4 .1 , . .+. G
92 G
' -/ . * / 92 @
%-, / .4 @
'./1 2 / .4 @
' - / .4 Q
' -/ / .4 32 Q
' -/ . * / / Q
%-, 92 Q
'./1 2 92 Q
. H
,,(.2,:2 6 ./ H
,,(.2,' - H
,,(.2, .6 H
,,(.2,(H
,,(.2,:2 6 H
,,(.2,' - .+ - ./ H
,,(.2, .6 .+ - ./ R
/+. / R
& 3 - 6 88
6 0 / .4 /+. / 8O

Purpose and Goals

,, +- ./ (.2, * / ./ . $, . .+. / / . , . - 1 -0
4. 7 . - .4 0. -/ ./ , . -0 . 0-/- $ -,, +- ./ ./ 7 .,
/ - 2 .1 * / ./ 4 3 . / . 03 4 / .4 .1 $, . -0
/ . 4 / .4 .1 -/. , . -0 2+ - - 4 3 3 .4 * / ./ /.
/ / . - - 03 / 2 - 1. *-0, , / .+ . 2+
- - 0 /2 3- + / $, . -0 ./ . 3 - .4 1.
- +./ . .1 , / - ./ -/ -7 - -/ - .1 * / 3. 6 .1 $
, . -0 - -/ 0, 0 / 0 / -/. -/ 2- / - ./ - .4
03 / .1 /./ $, . -0 / . 4 3 3 .4 36 2 / ,- 6 , . 2+
7 -3 % -/ /' / [8]

Overview of the protocol.

* / ./ / . 2+ +./+ , .1 -/ ,, +- ./ (.2, / ,, +- ./
(.2, - .1 ./ . 0. -,, +- ./ - - , 0- 6 0-/- 36 - , + -
-,, +- ./ 7/.4/ - ,, +- ./ (.2, & - 4 + 1. *-0, 0 3
- 4 3 3 .4 , 0- 6 ,2 ,. .1 ,, +- ./ (.2, . , . - 0 -/
.1 - / 23 2+ 2 + - 32 .1 .. 4 / .4 3 4 / 4 /
.4 0-/- -/ ./ . 0. ,, +- ./ (.2, & -

. <. / -/ ,, +- ./ (.2, -/ -,, +- ./ 02 , / , ., -2 . 5- ./
2 / +.// + ./ 2, 2 . 5- ./ - / - 36 $ -
92 .1 -/ ,, +- ./ (.2, & - -/ - / . 1. -,, +- ./ .
2 . -3 +.// + ./ . $. / - -/ -2 . 5- ./
,, +- ./ (.2, & - / - 92 . /-0 / ,, +- ./
(.2, . 4 + -2 . 5- ./ 4 3 3.2/ -/ -/6 -,, +- ./ - +.// +
2 / - -2 . 5- ./ 4 -2 .0- +- 6 3 +.0 ,- .1 - .+ - ,, +-
./ (.2, , . .+. . / - -/ -2 . 5- ./ 1 / / +2 6 *
/ ./ , + 1 +- ./

- 0 03 .1 -/ ,, +- ./ (.2, 4 / -/ -,, +- ./ + - -/ 0-, - 4 /
.4 - - + .1 .. 4 / .4 %-, 92 -/ './1 2 92 /
- . ,, +- ./ (.2, & - / - .1 4 / .4 0-/-
,, +- ./ (.2, & - 0-6 / ,- / 4 / .4 / . .4/ 4 / .4
- + 6= . 2 0-, 92 / 4 + +- 4 / .4 +.0 2/
+./ . .1 4 / .4 0-/-

Requests

+ / >0-<. > ./? ' 8@

+ / >0 /. > ./? ' 8@

AB

>0-<. > ./? ' 8@

>0 /. > ./? ' 8@

[8] -3 - - 0- 7 .1 2/ % + . 6 0 /+ % - - 0- 7 .1 ,, '.0,2 /+ /' / - -
0- 7 .1 ! 4. 7 '.0,2 / + /+

1 2,, + / >0-<. > ./ -/ + / >0 /. > ./ / +- 4 -
./ .1 , . .+. -,, +- ./ 4-/ . 0, 0 /
./ /203 2 / / +- ./ .1 , . .+. $ -+ 2- 6
2,,. 0-6 /. 0- + ./ 92 36 -,, +- ./ / 0
, 0 / - ./ 0-6 C32 / /. D 2,,. 0. -/ ./ ./ 02 -/ .2 6
>0-<. > ./ -/ >0 /. > ./ /203 - - 0 + -/ 0 .
2,,. -/6 12 2 ./ .1 ,, +- ./ (.2, * / ./ , . .+. 4 +
0-6 3 / + - 6 / / - 0-<. ./ 4.2 /+ 0 / 1. /+.0,-
3 + -/ -/ 0 /. ./ 4.2 /+ 0 / 1. 0- 2,4- +.0,- 3
+ -/ $ - 2,,. , . .+. 1 / / .+20 / 4 2 / -
>0-<. > ./ .1 8 -/ - >0 /. > ./ .1 E

-,,> .2,? (
- 2 >0- 7?) % #
- 2 > ? & .1 &

92 + - -/ ,, +- ./ (.2, 2 / -,,> .2, - ,, +- ./
(.2,

- 2 >0- 7 -/ - 2 > , + 16 - 32 .1 ,, +- ./ (.2, - -
. 3 *, + 6 / - 5 - 32 6, -/ 1-2 - 2 - ?

32	6,	1-2
-,,> .2,> -	)..	2
/ > + /	)..	2
1-2 > ..	/ .4	!./
.. > 2-	2-	!./
1-2 >+. . 0-,	'. . 0-,	!./
3 -+7>, *	*	E
4 >, *	*	E

1 / > + / - 32 2 / /203 .1 . + / 2 /
. - , . -0 / ,, +- ./ (.2, / +.// + ./ 2, 0 - ./
, + .1 .4 0-/6 . + / -+ 2- 6 - 1 - 2,
,. 3. . -/ , / + / / - , / + / 4 - 4-6 3 2 / 1
/ > + / , + 1 - 2 / +.// + ./ 2, 0 - 4 +./ - /
./ 6 /1. 0- ./ -3.2 . + / 4 + - 1-2 > .. - .. 4 /
.4 , 2 -/6 , / + /

/ / . - .4 -/ 03 / 0-/- . / 2 - 4 3 -3
. ,- / -/6 ., 4 / .4 - ,, +- ./ (.2, 0 03 + -
)6 / 1-+ - - . + / +-/ 3 - ./-3 6 - 2
- -,, +- ./ 4 ./ 6 + - ., 4 / .4 ./ -0 + / -
1 -,, - ./ / 03 / 0-/- .2 -7 +- /. . 2,, 6

-/ / - , -6 ?E 8 . - , . -0 - 4 3 / -/ ,, +- ./ (.2,
4 / > + / - 32 2

1 / > + / . 2 1-2 > .. , + 1 4 + + / 4 3 2 /
- + / 5 . / +.// + ./ 2, 0 - 1. -,, +- ./ / ,, +- ./
(.2, 1 . !./ / - + / 5 . 2 . 4 + / 4 +
- 1-2 > .. - .. 4 / .4 4 3 2

1 / > + / . 2 .. > 2- -/ 1-2 >+. . 0-, - 32 0-6
3 2 . . 1-2 - 2 - - 2 / / +.// + ./ 2,
/1. 0- ./ 2 / . / 4 , . -0 / ,, +- ./ (.2, 1 !./ , + 1
1. .. > 2- . 1-2 >+. . 0-, / /. 0- 1-2 - 2 1. + /
C,. 3 6 , 1 36 1-2 > .. D - 2 . 4 , + 1 - 2 -
2 1 .. > 2- -/ F. 1-2 >+. . 0-, - , + 1 6 02 3 -
.. > 2- 02 3 - 2- 6, - - -3 ./ + / -/ +. . 0-, 1 , +
1 02 3 - - +. . 0-, 1. 2- - 2

/ > + / . 2 -/ 1-2 >+. . 0-, /. , + 1 - !./
3 -+7>, * -/ 4 >, * - 32 02 3 , + 1 -/ 6 4 .
1-2 - 2 - - 2 / / +.// + ./ 2, 2 / . / 4 , . -0
/ ,, +- ./ (.2, 1 1-2 >+. . 0-, , + 1 - !./ -/ 3 -+7>, *
-/ F. 4 >, * - , + 1 6 4 3 /.

-,,> .2,> - - 32 2 . / 16 ,, +- ./ (.2, & -
, . -0 1. -,,> .2,)6 , + 16 / 2 4 / 16 , . -0
0-7 / 92 - ,, +- ./ (.2, & - 1. -,, +- ./ .2,
,, +- ./ (.2, & - + %-, 92 -/ './1 2 92 / 1 .0
4 / -/ - 0, 0- . 0-, . +./1 2 ., 4 / .4 .1 -
, . -0 / -/ ,, +- ./ (.2, / - .1 3 / / . - 4 / .4 0-/- -
- + 23 2+ 2 + / ./ .. 4 / .4 ,- / 4 / .4
1 / / 4 +./ - / ,, +- ./ (.2,

-,,> .2,? (

92 .6 -,,> .2, 1 -,,> .2,> - - 32 1.
-,,> .2, 2 / -/6 -,, +- ./ / ,, +- ./ (.2, - - +./
/ + 4 3 7 - 1 - # ' / 92 - 3 / + 1. - -,, +- ./

1 -,, +- ./ - + - - /./ 03 ,, +- ./ (.2, * -/
1. -/6 2 . 5- ./ . 3 +-/+ -/ -/6 -,, +- ./ - -
0, . ., / / 4 +.// + ./ . $ 2 / ./ .1 . 2 . 5-
./ 4 3 2/-3 . . .

B-,,> .2,? (

AB

& .1 &

92 2 / -,, +- ./ .2, - 32 1. -,,> .2,

.2 + ? $

AB

-,,> .2,? (

92 2 / ,, +- ./ (.2, .1 -,, +- ./ - + -
.2 + . !./ 1 - -,, +- ./ /. - .+ - 4 -/6 ,, +- ./ (.2,
.2 + - 2 0-6 3 .2 + 3- .1 -,, +- ./

4 / .4? !

4 / .4> 6, ? ' G;

6 0>4 / .4? & .1' H

92 - .+ - 4 / .4 4 6 0>4 / .4 4 / .4> 6, / +-
/- 4 / .4 6 0 .1 -,, +- ./ 0-7 / 92 . /./ $
4 / .4> 6, 3. 03 / 0-/- -/ 02 3 * +2 / ./
-0 . / 6 0>4 / .4 % + . .1 / .4 . F; / - ./
%-/- 6 0>4 / .4 -/ ! = 4 / /- 4 / .4 6 0 %-+
/ . 6 0>4 / .4 - / .4 -/ - + 4 / .4 0-6 3 2 1.
-/6 $ 92 - -7 - / .4

4 / .4? !

92 .6 - .+ - ./ + - 4 ,,(.2,' - .+ - ./
4 / .4 .6 6 0>4 / .4 - 4- , + 1 / ,,(.2,'
- .+ - ./ 92 /. -11 +

Changes to Existing Requests

MapWindow

1 . + - 32 .1 4 / .4 - -/ 1 4 / .4 - +
.1 - .. 4 / .4 -/ 1 4 / .4 3 ./ . -/ -,, +- ./ - / -/ -,, +-
./ .2, -/ 1 .0 . -,, +- ./ -,, +- ./ .2, - 1. -
.2, / - %-, 92 / / - -/ 4 / .4 0- / 2/0-,,
4 +. , . .+. 0-/ + -,, 6

ConfigureWindow

1 . + - 32 .1 4 / .4 - -/ 1 4 / .4 - +
.1 - .. 4 / .4 -/ 1 4 / .4 3 ./ . -/ -,, +- ./ - / -/ -,, +- ./
.2, -/ 1 .0 . -,, +- ./ -,, +- ./ .2, - 1. - .2,
/ - './1 2 92 / / - -/ 4 / .4 0- / 2/+ -/
4 +. , . .+. 0-/ + -,, 6

CreateWindow

/ - , . -0 / -/ ,, +- ./ (.2, + - - 4 / .4 - - + .1 - .. 4 / .4 -/ , + 1 '.,6 .0 - / 1. 2- 1 / > + / - 32 2 -/ .. > 2- - 32 . .0 / . -/ !./ / 4 / .4 4 3 + - 2 / ,, +- ./ (.2,I .. > 2- . 4 +. , . .+. 0-/ + -,, 6

/ - , . -0 / -/ ,, +- ./ (.2, + - - 4 / .4 - - + .1 - .. 4 / .4 -/ , + 1 '.,6 .0 - / 1. '. . 0-, 1 / > + / - 32 2 1-2 >+. . 0-, - 32 . .0 / . -/ !./ -/ 4 / .4I 2- -0 - ,, +- ./ (.2,I .. > 2- - 32 / 4 / .4 4 3 + - 2 / ,, +- ./ (.2,I 1-2 >+. . 0-, . 4 +. , . .+. 0-/ + -,, 6

ChangeWindowAttributes

/ - , . -0 / -/ ,, +- ./ (.2, + -/ - 32 .1 - 4 / .4 - - + .1 - .. 4 / .4 -/ , + 1 '.,6 .0 - / 1. '. . 0-, 1 / > + / - 32 2 1-2 >+. . 0-, - 32 . .0 / . -/ !./ -/ 4 / .4I 2- -0 - ,, +- ./ (.2,I .. > 2- - 32 / 4 / .4 4 3 + - 2 / ,, +- ./ (.2,I 1-2 >+. . 0-, . 4 +. , . .+. 0-/ + -,, 6

Changes to Existing Events

/ ., 4 / .4 .1 -/ -,, +- ./ - - 0 03 .1 -/ ,, +- ./ (.2, - .1 - %-, / .4 . './1 2 / .4 92 1 -/ ,, +- ./ (.2, & - / %-, 92 -/ './1 2 92 / - -2 .0- +- 6 . . 4 +. , . .+. 0-/ + -,, 6 6 - . + / 1 -/6 - - 23 2+ 2 + / .. 4 / .4 / 0- 7 4 / .4 0-/-

,, +- ./ (.2, & - 02 /. + 23 2+ 2 + / ./ - .. 4 / .4 - . / . 4.2 2 / - +. , . .+. . = ./ 6 ./ + / , 0 . . . -/ - 2 2- 6 4 / .4 0-/-

MapRequest

/ - %-, / .4 92 + 1. - 4 / .4 4 . . + - 32 . - -/ 4 . ,- / .. 4 / .4 -/ 4 / .4 3 ./ . -/ -,, +- ./ - / -/ -,, +- ./ .2, -/ -/ -,, +- ./ .2, - 1. .2, / / . ,, +- ./ (.2, & - 4 ,- / 1 / / . ,,(.2, 4 +. , . .+. 0-/ + -,, 6

ConfigureRequest

/ - './1 2 / .4 92 + 1. - 4 / .4 4 . . + - 32 . - -/ 4 . ,- / .. 4 / .4 -/ 4 / .4 3 ./

. -/ -,, +- ./ - / -/ -,, +- ./ .2, -/ -/ -,, +- ./ .2,
- 1. .2, / / . ,, +- ./ (.2, & -
4 ,- / 1 / / . ,,(.2, 4 +. , .
.+. 0-/ + -,, 6

Errors

AppGroupQueryVersion

- /. . 1. ,,(.2,:2 6 ./

AppGroupCreate

/ .4 . 2 / 1 1-2 > .. , + 1 -/ /. - - .. 4 /
.4

'. . . 2 / 1-2 >+. . 0-, , + 1 32 1-2 >+. . 0-, /.
- - +. . 0-, 1. + / .1 1-2 > ..

%- + . 2 / 1 .. > 2- -/ 1-2 >+. . 0-, - 3. , + 1 32

1-2 >+. . 0-,I 2- /. .. > 2-

%- + . 2 / 1 .. > 2- . /. * 1. + / .1
1-2 > ..

AppGroupDestroy

/ ,,(.2, . 2 / 1 -,,> .2, /. - - ,, +- ./ (.2,

/ ++ . 2 / 1 -/ 2/ 2 -,, +- ./ - 0, . .6 -/ ,
, +- ./ (.2, + - 36 - 2 -,, +- ./

AppGroupGetAttr

/ ,,(.2, . 2 / 1 -,,> .2, /. - - ,, +- ./ (.2,

/ ++ . 2 / 1 -/ 2/ 2 -,, +- ./ - 0, . - 32
.1 -/ ,, +- ./ (.2, + - 36 - 2 -,, +- ./

AppGroupQuery

/ ++ . 2 / 1 -/ 2/ 2 -,, +- ./ - 0, . 92 6 ,,
+- ./ (.2, .1 - 2 -,, +- ./

AppGroupCreateAssociation

%- + . 2 / 1 $. /. 2,,. 4 / .4> 6,

/ ++ . 0-6 3 2 / 1 $ ./ 6 2,,. 4 / .4> 6, ./
.+- . -/ , . -0 0-7 / 92 ./ - /./ .+- .

/ .4 . 0-6 3 2 / 1. 6 0 , + 1 + . - .
6 0>4 / .4 6 0>4 / .4 . /. , / - - /- 4 / .4

AppGroupDestroyAssociation

/ .4 . 2 / 1 4 / .4 4- /. , + 1 / - , .2 ,,(.2,'
- .+ - ./ 92

Encoding

- 1 . $88 . .+. /+. / .+20 / - .+20 / 2 +./ /
./ -3

/-0 .1 * / ./ $' (

AppGroupQueryVersion

```
      1       CARD8          opcode
      1       0              XC-APPGROUP opcode
      2       3              length
      2       CARD16         client_major_version
      2       CARD16         client_minor_version
=>
      1       1              Reply
      1                      unused
      2       CARD16         sequence_number
      4       0              length
      2       CARD16         server_major_version
      2       CARD16         server_minor_version
      20                     unused
```

AppGroupCreate

```
      1       CARD8              opcode
      1       1                  XC-APPGROUP opcode
      2       8+n                length
      4       XID                app_group
      4       BITMASK            attrib_mask
              #x00000001     app_group_leader
              #x00000002     single_screen
              #0x0000004     default_root
              #x00000008     root_visual
              #x00000010     default_colormap
              #x00000020     black_pixel
              #x00000040     white_pixel
      n       LISTofVALUE        value-list
VALUEs
      4       BOOL               app_group_leader
      4       BOOL               single_screen
      4       WINDOW             default_root
      4       VISUALID           root_visual
      4       COLORMAP           default_colormap
      4       CARD32             black_pixel
```

```
      4       CARD32          white_pixel
```

AppGroupDestroy

```
      1       CARD8           opcode
      1       2               XC-APPGROUP opcode
      2       2               length
      4       XID             app_group
```

AAppGroupGetAttr

```
      1       CARD8           opcode
      1       4               XC-APPGROUP opcode
      2       2               length
      4       XID             app_group
=>
      1       1               Reply
      1                       unused
      2       CARD16          sequence_number
      4       0               length
      4       WINDOW          default_root
      4       VISUALID        root_visual
      4       COLORMAP        default_colormap
      4       CARD32          black_pixel
      4       CARD32          whte_pixel
      1       BOOL            single_screen
      1       BOOL            app_group_leader
      2                       unused
```

AppGroupQuery

```
      1       CARD8           opcode
      1       5               XC-APPGROUP opcode
      2       2               length
      4       XID             resource
=>
      1       1               Reply
      1                       unused
      2       CARD16          sequence_number
      4       0               length
      4       XID             app_group
      20                      unused
```

AppGroupCreateAssoc

```
      1       CARD8           opcode
      1       6               XC-APPGROUP opcode
      2       n               length
      4       WINDOW          window
      2       CARD16          window_type
              #0      X11
              #1      Macintosh
              #2      Win32, OS/2 PM 2.x
              #3      Win16, OS/2 PM 1.x
      2       n               system_window_len
```

```
        n       LISTofCARD8       system_window


AppGroupDestroyAssoc
        1       CARD8             opcode
        1       7                 XC-APPGROUP opcode
        2       2                 length
        4       WINDOW            window
```

Library API

- 2 C D FJ 0-+ . JF

, -6 =

/ J =

/ J =

$- :2 6 ./ 0-<. > ./> 2 / -/ 0 /. > ./> 2 / . 0-<.
-/ 0 /. ,, +- ./ (.2, , . .+. ./ 2,,. 36 1 $-
3 - 6 +.0,- 3 4 ./ 2 / 36 2 / /./ 5 . 1
,6 . /. 2,,. ,, +- ./ (.2, * / ./ . 1 -/ 3 - 6
, . .+. ./ - /+.0,- 3 . 1 4- -/ . 2 / +.002/ +- ./
4 2 / 5 . !. . $- 12/+ ./ 0-6 3 +- 3 1.
12/+ ./ 1 - , . -0 . - 2 11 + .1 - 23 92 / $- +- -
0-7 - 2/ 1 /

/ 03 / 0-/- / - ./- '.0,2 3) .4 4 /
. ., / - +.// + ./ . ./- '.0,2 $ 36 +- / $, /
, -6CD 3 1. 2 / ,, +- ./ (.2, * / ./

/ 03 / 0-/- 2+ - - 4 3 3 .4 - / / . 03 , . -0 /
-/ ,, +- ./ (.2, .2 + - ,, +- ./ (.2, 4 $- ' - 03
,, +- ./(.2,

- 2 $- ' - 03 ,, +- ./(.2,C

, -6J ,6

2- .. > 2-

'. . 0-, 1-2 >+. . 0-,

2/ / ./ 3 -+7>, *

2/ / ./ 4 >, *

$,,(.2,J -,,> .2,> 2 /D=

$- ' - 03 ,, +- ./(.2, + - -/ ,, +- ./ (.2, 1. -/ 03
/ 0-/- 4 - 32 , + 1 - . 1-2 > .. - 32 .
1-2 .. C ,6 1-2 + /C ,6DD -/ / > + / -/ -,,> .2,> -
- 32 . 2 2 / ,, +- ./ (.2, / -,,> .2,> 2 /

".2 +-/ + - -/ ,, +- ./ (.2, 4 .2 / / / . . 03 / / - ./
1. . / . - .2, .1 + / .4/ 1./ ,-

, + - 1./ ,- +-/ 3 + - 36 + - / -/ ,, +- ./ (.2, /
-/ 2 . 5- ./ 2 / $ +2 6(/ - 2 . 5- ./ -/ / 2// /
K* 1,L M/ 4 1./ ,- BI - - 0 03 .1 ,, +- ./ (.2, ./ ,-
0 / - / 4-6 4 3 N, - N . ,, +- ./ (.2,

- 2 $- ' - !./ 03 ,, +- ./(.2,C

, -6J ,6

$,,(.2,J -,,> .2,> 2 /D=

/ ,, +- ./ (.2, + - 4 $- ' - !./ 03 ,, +- ./(.2, 4
- 1-2 > .. .. > 2- -/ 1-2 >+. . 0-, - 32 - . !./ =
/ > + / -/ -,,> .2,> - - 32 - . - -/
3 -+7>, * -/ 4 >, * - 32 - /. 2 /+ 1-2 >+. . 0-, -
32 !./

. .6 -/ ,, +- ./ (.2, 2 $- .6 ,, +- ./(.2,

- 2 $- .6 ,, +- ./(.2,C

, -6J ,6

$,,(.2, -,,> .2,D=

,, +- ./ (.2, , + 1 36 -,,> .2, .6 1 ,, +- ./ (.2,
4- + - 2 / $- ' - 03 / ,, +- ./(.2, -/ 1.
-,,> .2,> - - 32 2 - , . -0 - - 0 03 .1 ,, +-
./ (.2, - 7 - 1 - # ' / 92 - 3 / 2

. - 32 .1 -/ ,, +- ./ (.2, 2 $- (,, +- ./(.2,
32

- 2 $- (,, +- ./(.2, 32 C

, -6J ,6

$,,(.2, -,,> .2,

D=

$- (,, +- ./(.2, 32 - - - 12/+ ./ - ,, +-
./ (.2,I - 32 , + 1 / - - ,- -0

- 32 - 0-6 3 , + 1 - ? $- !-,,(.2,& - $- ! /
+ / $- ! 1-2 .. $- ! .. 2- $- ! 1-2 '. . 0-, $- !3 -+7
* -/ $- !4 * = 4 + +. ,./ . -,,> .2,> - / > + /
1-2 > .. .. > 2- 1-2 >+. . 0-, 3 -+7>, * -/ 4 >, * , +
6 ,,(.2,' - / + ./ G 1. - + , ./ .1 -+ - 32

6, 1. -+ .1 ,- -0 - ,. / . 1. .4 / ?

/ > + /)..
1-2 > .. / .4
.. > 2- 2-
1-2 >+. . 0-, '. . 0-,
3 -+7>, * 2/ / ./

4 >, * 2/ / ./
-,,> .2,> -)..

Example:

```
...
Boolean app_group_leader, single_screen;
Window default_root;
VisualID root_visual;
Colormap default_colormap;
Pixel black_pixel, white_pixel;
...
status = XagGetApplicationGroupAttributes(dpy, app_group,
      XagNappGroupLeader, &app_group_leader,
      XagNsingleScreen, &single_screen,
      XagNdefault_root, &default_root,
      XagNrootVisual, &root_visual,
      XagNdefaultColormap, &default_colormap,
      XagNblackPixel, &black_pixel,
      XagNwhitePixel, &white_pixel,
      NULL);
...
```

. 0 / 4 + ,, +- ./ (.2, - .2 + C 2+ - - 4 / .4D 3 ./ .
2 $- :2 6 ,, +- ./(.2,

- 2 $- :2 6 ,, +- ./(.2,C

, -6J ,6

$ .2 +

$,,(.2,J -,,> .2,> 2 /D=

,, +- ./ (.2, 2 / / -,,> .2,> 2 / 1 .2 + /. / -/6
,, +- ./ (.2, / -,,> .2,> 2 / 4 3 . !./

. - .+ - -/ $ / .4 4 - 6 0 , + 1 + 4 / .4 2+ - - !
. - / .4 2 $- ' - .+ - ./

- 2 $- ' - .+ - ./C

, -6J ,6

/ .4J 4 / .4> 2 /

. J 6 0>4 / .4D=

4 / .4> 0-6 3 2 - - 1. - ,- / / .4 92

) +-2 $,- / / .4 /. +./ - / / -0 4-6 - /G;I
- / -/ %-+ / . - /. - ./ . +- $- ' - .
+ - ./ / -/ $ 3- 03 / 0-/- 2+ 1 $- ' - .+ - ./
+- / - /- $, . -0 4 / .4> 2 / 4 3 -0 -
6 0>4 / .4 -/ 0, 0 / - ./ 0-6 / + . /. / - -/6
, . .+.

. + - -/ - .+ - ./ ./ %-+ / . ?

```
struct {
    WindowPtr win;
    Rect rect;
} system_window;
system_window.win = win_ptr;
system_window.rect.top = system_window.rect.left = 20;
system_window.rect.bottom = 180;
system_window.rect.right = 380;

status = XagCreateAssociation (dpy, &window, (void*)&system_window);
```

. + - -/ - .+ - ./ 2 / - /8@ /G; . F; %?

```
HWND system_window;
status = XagCreateAssociation (dpy, &window, (void*)&system_window);
```

. .6 - .+ - ./ + - 4 $- ' - .+ - ./ 2 $- .6 .
+ - ./

- 2 $- .6 .+ - ./C

, -6J ,6

/ .4 4 / .4D=

1 +- / $- .6 .+ - ./ 4 / .4 0-6 /. ./ 3 2 . ,- /
4 / .4 4 $,- / / .4

& 7 $- ' - .+ - ./ 1 /- 4 / .4 6 0 $88 0,
0 / - ./ 0-6 + . /. / - -/6 , . .+. - - 2 .1 12/+ ./
+- / . . - . 2/ / / ./- 6 .6 / 6 0>4 / .4 -
4- , + 1 / , . $- ' - .+ - ./ +-

A. System Window Encodings

,,(.2,' - .+ 92 - 1. .4 / ,. 3 - - ./ ?

8 ' H .,+.
8 @ $' (.,+.
; / /
O ! 4 / .4
; E 4 / .4> 6,
; O 6 0>4 / .4> /
O ! / .4

8 ' H .,+.
8 @ $' (.,+.
; / /
O ! 4 / .4
; 8 4 / .4> 6,
; 8; 6 0>4 / .4> /
O ' G; / .4
; ! 8@ + .,
; ! 8@ + 1
; ! 8@ + 3. .0
; ! 8@ +

8 ' H .,+.
8 @ $' (.,+.
; / /
O ! 4 / .4
; ; 4 / .4> 6,
; O 6 0>4 / .4> /
O ' G; !

!

8 ' H .,+.
8 @ $' (.,+.
; / /
O ! 4 / .4
; G 4 / .4> 6,
; O 6 0>4 / .4> /
; ' 8@ ! .11
; ' 8@ ! 0 /