PostScript Operators

adjustcursor

dx dy **adjustcursor** –

Moves the cursor location by (*dx*, *dy*) from its current location. *dx* and *dy* are given in the current coordinate system. If the current device isn't a window, the **invalidid** error is executed.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **currentmouse, setmouse**

alphaimage

pixelswide pixelshigh bits/sample matrix $datasrc_0$ *[...*$datasrc_n$*] multiproc ncolors*
alphaimage –

Renders an image whose samples include an alpha component. (Most programmers should use **NXImageBitmap()** instead of **alphaimage**.) This operator is similar to the standard **colorimage** operator (as documented by Adobe Systems). However, note the following:

- When supplying the data components, alpha is always given last—either as the last data source ($datasrc_n$) if the data is given in separate vectors, or as the last element in a set of interleaved data.
- The *ncolors* operand doesn't account for alpha—the value of *ncolors* is the number of color components only.

ERRORS **invalidid**, **limitcheck**, **rangecheck**, **stackunderflow**, **typecheck**, **undefined**, **undefinedresult**

basetocurrent

bx by **basetocurrent** *cx cy*

Converts (*bx*, *by*) from the current window's base coordinate system to its current coordinate system. If the current device isn't a window, the **invalidid** error is executed.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **basetoscreen, currenttobase, currenttoscreen, screentobase, screentocurrent**

basetoscreen

bx by **basetoscreen** *sx sy*

Converts (*bx*, *by*) from the current window's base coordinate system to the screen coordinate system. If the current device isn't a window, the **invalidid** error is executed.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **basetocurrent, currenttobase, currenttoscreen, screentobase, screentocurrent**

buttondown

– **buttondown** *isdown*

Returns *true* if the left or only mouse button is currently down; otherwise it returns *false*.

Note: To test whether the mouse button is still down from a mouse-down event, use **stilldown** instead of **buttondown**; **buttondown** will return *true* even if the mouse button has been released and pressed again since the original mouse-down event.

ERRORS none

SEE ALSO **currentmouse, rightbuttondown, rightstilldown, stilldown**

cleartrackingrect

trectnum gstate **cleartrackingrect** –

Clears the tracking rectangle identified by *trectnum*, as set by **settrackingrect**, in the device referred to by *gstate* (or the current graphics state if *gstate* is **null**). If no such rectangle exists, the **invalidid** error is executed.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **settrackingrect**

composite

src_x src_y *width height srcgstate* $dest_x$ $dest_y$ *op* **composite** –

Performs the compositing operation specified by *op* between pairs of pixels in two images, a source and a destination. The source pixels are in the window device referred to by the *srcgstate* graphics state, and the destination pixels are in the current window. If *srcgstate* is **null**, the current graphics state is assumed. If either graphics state doesn't refer to a window device, the **invalidid** error is executed.

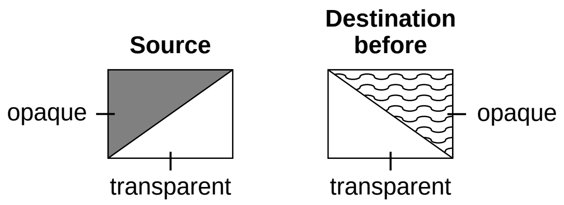
The rectangle specified by src_x, src_y, *width*, and *height* defines the source image. The outline of the rectangle may cross pixel boundaries due to fractional coordinates, scaling, or rotated axes. The pixels included in the source are all those that the outline of the rectangle encloses or enters.

The destination image has the same size, shape, and orientation as the source; $dest_x$ and $dest_y$ give destination's location image compared to the source. (Even if the two graphic states have different orientations, the images will not; **composite** will not rotate images.)

Both images are clipped to the frame rectangles of their respective windows. The destination image is further clipped to the clipping path of the current graphics state. The result of a composite operation replaces the destination image.

op specifies the compositing operation. The choices for *op* and the result of each operation are given in the following illustration.

ERRORS	**invalidid**, **rangecheck**, **stackunderflow**, **typecheck**
SEE ALSO	**compositerect, setalpha, setgray, sethsbcolor, setrgbcolor**



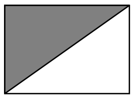
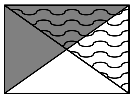
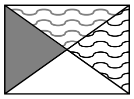
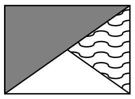
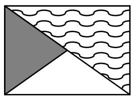
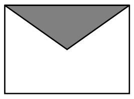
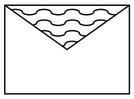
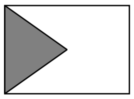
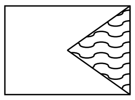
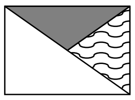
Operation	Destination after	
Copy		Source image.
Clear		Transparent.
PlusD		Sum of source and destination images, with color values approaching 0 as a limit.
PlusL		Sum of source and destination images, with color values approaching 1 as a limit. (PlusL is not implemented for the MegaPixel Display.)
Sover		Source image wherever source image is opaque, and destination image elsewhere.
Dover		Destination image wherever destination image is opaque, and source image elsewhere.
Sin		Source image wherever both images are opaque, and transparent elsewhere.
Din		Destination image wherever both images are opaque, and transparent elsewhere.
Sout		Source image wherever source image is opaque but destination image is transparent, and transparent elsewhere.
Dout		Destination image wherever destination image is opaque but source image is transparent, and transparent elsewhere.
Satop		Source image wherever both images are opaque, destination image wherever destination image is opaque but source image is transparent, and transparent elsewhere.

Figure 5-1. Compositing Operations

compositerect

dest$_x$ *dest$_y$* *width height op* **compositerect** –

In general, this operator is the same as the **composite** operator except that there's no real source image. The destination is in the current graphics state; *dest$_x$*, *dest$_y$*, *width*, and *height* describe the destination image in that graphics state's current coordinate system. The effect on the destination is as if there were a source image filled with the color and coverage specified by the graphics state's current color parameter. *op* has the same meaning as the *op* operand of the **composite** operator; however, one additional operation, Highlight, is allowed.

On the MegaPixel Display, Highlight turns every white pixel in the destination rectangle to light gray and every light gray pixel to white, regardless of the pixel's coverage value. Repeating the same operation reverses the effect. (Highlight may act differently on other devices. For example, on displays that assign just one bit per pixel, it would invert every pixel.)

Note: The Highlight operation doesn't change the value of a pixel's coverage component. To ensure that the pixel's color and coverage combination remains valid, Highlight operations should be temporary and should be reversed before any further compositing.

For **compositerect**, the pixels included in the destination are those that the outline of the specified rectangle encloses or enters. The destination image is clipped to the frame rectangle and clipping path of the window in the current graphics state.

If the current graphics state doesn't refer to a window device, the **invalidid** error is executed.

ERRORS **invalidid**, **rangecheck**, **stackunderflow**, **typecheck**

SEE ALSO **composite, setalpha, setgray, sethsbcolor, setrgbcolor**

copypage

Warning: This standard PostScript operator has no effect in the NEXTSTEP implementation of the Display PostScript system.

countframebuffers

– **countframebuffers** *count*

Returns the number of frame buffers that the Window Server is actually using.

ERRORS stackoverflow

SEE ALSO **framebuffer**

countscreenlist

context **countscreenlist** *count*

Returns the number of windows in the screen list that were created by the PostScript context specified by *context*. This is in contrast with **countwindowlist**, which returns the number of windows created by the context without regard to their inclusion in the screen list.

If *context* is 0, all windows in the screen list are counted, without regard to the context that created them.

ERRORS **invalidid**, **rangecheck**, **stackunderflow**, **typecheck**

SEE ALSO **countwindowlist, screenlist, windowlist**

countwindowlist

context **countwindowlist** *count*

Returns the number of windows that were created by the PostScript context specified by *context*. This is in contrast with **countscreenlist**, which returns the number of windows in the screen list that were created by the PostScript context specified by *context*.

If *context* is 0, all windows are counted, without regard to the context that created them.

ERRORS **stackunderflow**, **typecheck**

SEE ALSO **countscreenlist, screenlist, windowlist**

---

currentactiveapp

– **currentactiveapp** *context*

Warning: Don't use this operator if you're using the Application Kit.

Returns the active application's context. This operator is used by the window packages to assist with wait cursor operation.

ERRORS stackoverflow

SEE ALSO **setactiveapp**

---

currentalpha

– **currentalpha** *coverage*

Returns the coverage parameter of the current graphics state.

ERRORS none

SEE ALSO **composite, setalpha**

---

currentdefaultdepthlimit

– **currentdefaultdepthlimit** *depth*

Warning: Don't use this operator if you're using the Application Kit. Use Window's **defaultDepthLimit** class method instead.

Returns the current context's default depth limit. This value determines a new window's depth limit.

ERRORS stackoverflow

SEE ALSO **setdefaultdepthlimit**, **setwindowdepthlimit**, **currentwindowdepthlimit**, **currentwindowdepth**

---

currentdeviceinfo

window **currentdeviceinfo** *min max iscolor*

Returns device-related information about the current state of *window*. *min* and *max* are the smallest and largest number of bits per sample, respectively, and *iscolor* is a boolean value indicating whether the device is a color device.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

---

currenteventmask

window **currenteventmask** *mask*

Warning: Don't use this operator if you're using the Application Kit. Use Window's **eventMask** method instead.

Returns the current Window Server-level event mask for the specified window.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **seteventmask**

currentframebuffertransfer

fbnum currentframebuffertransfer *redproc greenproc blueproc grayproc*

Returns the current transfer functions in effect for the framebuffer indexed by *fbnum*. *fbnum* ranges from 0 to (countframebuffers – 1).

ERRORS invalidid, stackunderflow, typecheck

SEE ALSO **setframebuffertransfer, countframebuffers, framebuffer**

currentmouse

window **currentmouse** *x y*

Warning: Don't use this operator if you're using the Application Kit. Use Window's **getMouseLocation:** instead.

Returns the current x and y coordinates of the mouse location in the base coordinate system of the specified window. If the mouse isn't inside the specified window, these coordinates may be outside the coordinate range defined for the window. If *window* is 0, the current mouse position is returned relative to the screen coordinate system.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **basetocurrent**, **basetoscreen**, **buttondown**, **rightbuttondown**, **rightstilldown**, **setmouse**, **stilldown**

currentowner

window **currentowner** *context*

Returns a number identifying the PostScript context that currently owns the specified window. By default, this is the PostScript context that created the window.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **setowner**, **termwindow**, **window**

currentshowpageprocedure

window **currentshowpageprocedure** *proc*

Returns the PostScript procedure that's executed when the **showpage** operator is executed while the specified window is the current device.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **setshowpageprocedure**

currentrusage

– **currentrusage** *ctime utime stime msgsend msgrcv nsignals nvcsw nivcsw*

Returns information about the current time of day and about resource usage by the Window Server, as provided by the UNIX system call **getrusage()**. The items returned, and their types, are as follows:

Name	Type	Value
ctime	float	Current time in seconds, modulo 10000
utime	float	User time for the Server process in seconds
stime	float	System time for the Server process in seconds
msgsend	int	Messages sent by the Server to clients
msgrcv	int	Message received by the Server from clients
nsignals	int	Number of signals received by the Server process
nvcsw	int	Number of voluntary context switches
nivcsw	int	Number of involuntary context switches

currenttobase

cx cy **currenttobase** *bx by*

Converts (*cx*,*cy*) from the current coordinate system of the current window to its base coordinate system. If the current device isn't a window, the **invalidid** error is executed.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **basetocurrent**, **basetoscreen**, **currenttoscreen**, **screentobase**, **screentocurrent**

currenttoscreen

cx cy **currenttoscreen** *sx sy*

Converts (*cx*, *cy*) from the current coordinate system of the current window to the screen coordinate system. If the current device isn't a window, the **invalidid** error is executed.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **basetocurrent**, **basetoscreen**, **currenttobase**, **screentobase**, **screentocurrent**

currentuser

– **currentuser** *uid gid*

Returns the user id (*uid*) and the group id (*gid*) of the user currently logged in on the console of the machine that's running the Window Server.

ERRORS stackoverflow

currentwaitcursorenabled

context **currentwaitcursorenabled** *isenabled*

Returns the state of *context*'s wait cursor flag. If *context* is 0, returns the state of the global wait cursor flag.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **setwaitcursorenabled**

currentwindow

– **currentwindow** *window*

Returns the window number of the current window. Executes the **invalidid** error if the current device isn't a window.

ERRORS invalidid

SEE ALSO **windowdeviceround**

currentwindowalpha

window **currentwindowalpha** *alpha*

Returns an integer indicating whether the Window Server is currently storing alpha values for the specified window. Possible *alpha* values are:

–2	Window is opaque; alpha values are explicitly allocated.
0	Alpha values are stored explicitly
2	Window is opaque; no explicit alpha

ERRORS **invalidid**, **stackunderflow**, **typecheck**

currentwindowbounds

window **currentwindowbounds** *x y width height*

Warning: Don't use this operator if you're using the Application Kit. Use Window's **getFrame:** or Application's **getScreenSize:** method instead.

Returns the location and size of the window in screen coordinates. Pass 0 for *window* to get the size of the entire workspace (the smallest rectangle that encloses all active screens).

x and *y* will be in the range [-2^{15}, $2^{15} -1$]; *width* and *height* will be in the range [0, 10000].

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **movewindow**, **placewindow**

---

currentwindowdepth

window **currentwindowdepth** *depth*

Warning: Don’t use this operator if you’re using the Application Kit.

Returns *window*’s current depth. The **invalidid** error is executed if *window* doesn't exist.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **setwindowdepthlimit**, **currentwindowdepthlimit**, **setdefaultdepthlimit**, **currentdefaultdepthlimit**

---

currentwindowdepthlimit

window **currentwindowdepthlimit** *depth*

Warning: Don’t use this operator if you’re using the Application Kit. Use Window’s **depthLimit** method instead.

Returns the window’s current depth limit, the maximum depth to which the window can be promoted. Unless altered by the **setwindowdepthlimit** operator, a window’s depth limit is equal to its context’s default depth limit. The **invalidid** error is executed if *window* doesn’t exist.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **setwindowdepthlimit**, **currentwindowdepth**, **setdefaultdepthlimit**, **currentdefaultdepthlimit**

currentwindowdict

window **currentwindowdict** *dict*

Warning: Don't use this operator if you're using the Application Kit.

Returns the specified window's dictionary.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **setwindowdict**

currentwindowlevel

window **currentwindowlevel** *level*

Returns *window*'s tier. Executes the **invalidid** error if *window* doesn't exist.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **setwindowlevel**

currentwriteblock

– **currentwriteblock** *doesblock*

Returns whether the Window Server delays sending data to a client application whenever the Server's output buffer fills. **currentwriteblock** assumes the current context. If *doesblock* is *true*, the Server waits until the buffer can accept more data. If *doesblock* is *false,* the Server discards data that can't be accepted immediately.

ERRORS none

SEE ALSO **setwriteblock**

dissolve

src_x src_y width height srcgstate $dest_x$ $dest_y$ delta **dissolve** –

The effect of this operation is a blending of a source and a destination image. The first seven arguments choose source and destination pixels as they do for **composite**. The exact fraction of the blend is specified by *delta*, which is a floating-point number between 0.0 and 1.0; the resulting image is:

delta *source + (1– *delta*)*destination

If *srcgstate* is null, the current graphics state is assumed. If *srcgstate* or the current graphics state does not refer to a window device, this operator executes the **invalidid** error.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **composite**

dumpwindow

dumplevel window **dumpwindow** –

Warning: Don’t use this operator if you’re using the Application Kit.

Prints information about *window* to the standard output file. Only *dumplevel* 0 is implemented. The information printed is the position and number of bytes of backing storage for the window.

ERRORS **invalidid**, **rangecheck**, **stackunderflow**, **typecheck**

SEE ALSO **dumpwindows**

dumpwindows

dumplevel context **dumpwindows** –

Warning: Don’t use this operator if you’re using the Application Kit.

Prints information about all windows owned by *context* to the standard output file. If *context* is 0, it prints information about all windows. Only *dumplevel* 0 is implemented.

ERRORS **invalidid**, **rangecheck**, **stackunderflow**, **typecheck**

SEE ALSO **dumpwindow**

---

erasepage

– **erasepage** –

Warning: This standard operator is different in the NEXTSTEP implementation.

Erases the entire window to opaque white.

ERRORS invalidid

SEE ALSO **copypage**, **showpage**

---

findwindow

x y place otherwindow **findwindow** *x' y' window found*

findwindow starts from a given position in the screen list, as explained below, and searches for the first window below that position that contains the point (*x*, *y*). The *x* and *y* values are given in screen coordinates.

The starting position is determined by *place* and *otherwindow*. *place* can be **Above** or **Below**, and *otherwindow* is the window number of a window in the screen list. If you specify **Above 0**, **findwindow** checks all windows in the screen list.

If a window containing the point is found, **findwindow** returns *true*, along with the window number and the corresponding location in the base coordinate system of the window. Otherwise, it returns *false*, and the values of *x'*, *y'*, and *window* are undefined.

ERRORS **rangecheck**, **stackunderflow**, **typecheck**

flushgraphics

– flushgraphics –

Warning: Don't use this operator if you're using the Application Kit. Use Window's **flushWindow** method instead.

Flushes to the screen all drawing done in the current buffered window. If the current window is retained or nonretained, **flushgraphics** has no effect.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

framebuffer

index string **framebuffer** *name slot unit romid x y width height maxdepth*

Provides information on the active frame buffer specified by *index*, where *index* ranges from 0 to **countframebuffers**–1. *string* must be large enough to hold the resulting name of the frame buffer. *slot* is the NeXTbus™ slot the frame buffer is physically occupying. If a board supports multiple frame buffers, *unit* uniquely identifies the frame buffer within a slot. The ROM product code is returned in *romid*. The bottom left corner of the frame buffer is returned in *x* and *y* (relative to the screen coordinate system). The size of the frame buffer in pixels is returned in *width* and *height*. *maxdepth* is the maximum depth displayable on this frame buffer (for example, NX_TwentyFourBitRGB).

The **limitcheck** error is executed if *string* isn't large enough to hold *name*. The **rangecheck** error is executed if *index* is out of bounds.

ERRORS **limitcheck**, **rangecheck**, **stackunderflow**, **typecheck**

SEE ALSO **countframebuffers**

frontwindow

– frontwindow *window*

Warning: Don't use this operator if you're using the Application Kit.

Returns the window number of the frontmost window on the screen. If there aren't any windows on the screen, **frontwindow** returns 0.

ERRORS none

SEE ALSO **orderwindow**

---

hidecursor

– **hidecursor** –

Removes the cursor from the screen. It remains in effect until balanced by a call to **showcursor**.

ERRORS none

SEE ALSO **obscurecursor**, **showcursor**

---

hideinstance

x y width height **hideinstance** –

In the current window, **hideinstance** removes any instance drawing from the rectangle specified by *x*, *y*, *width*, and *height*. *x*, *y*, *width*, and *height* are given in the window's current coordinate system.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **newinstance**, **setinstance**

image

dict image –

Allows a window's graphics state object to be used as a source of sample data. *dict* must be an image dictionary in which only those keys listed in the following table are significant:

Key	Type	Value or Meaning
ImageType	integer	(*Required*) Must be 2.
XOrigin	real	(*Required*) X origin of the source rectangle in user space coordinates as specified by the transformation in the DataSource entry.
YOrigin	real	(*Required*) Y origin of the same.
Width	real	(*Required*) Width of the same.
Height	real	(*Required*) Height of the same.
ImageMatrix	array	(*Required*) The transformation matrix.
DataSource	gstate	(*Required*) A graphics state object that contains the device that will be used as the source of sample data. This device will also be used to determine the pixel representation for the source, and the color space to be used by the image.
Interpolate	boolean	(*Optional*) Request for image interpolation.
UnpaintedPath	(various)	(*Return value*) If some of the pixels in the source weren't available (because of clipping), then the UnpaintedPath entry contains a userpath in the current (destination) user space that encloses the area that couldn't be filled.
PixelCopy	boolean	(*Optional*) If *true*, indicates that the source pixels should be copied directly, without going through the normal color conversion, transfer function, or halftoning. The bits per pixel of the source must match the bits per pixel of the destination, otherwise a typecheck error will occur. If *false* or not present, the pixels will be imaged in the usual way.

ERRORS invalidid, rangecheck, stackunderflow, typecheck

SEE ALSO **alphaimage**

initgraphics

– **initgraphics** –

Warning: This standard operator has additional effects in the NEXTSTEP implementation of the Display PostScript system.

In addition to the effects documented by Adobe, this operator sets the coverage parameter in the current window's graphics state to 1 (opaque) and turns off instance drawing

ERRORS none

SEE ALSO **hideinstance**, **newinstance**, **setalpha**, **setinstance**

machportdevice

width height bbox matrix hostname portname pixelencoding **machportdevice** –

Sets up a PostScript device that can provide a generic rendering service for device-control programs requiring page bitmaps from PostScript documents. For each rendered page, **machportdevice** sends a Mach message containing the page bitmap to a port that has been registered with the name server on the network.

width and *height* are integers that determine the number of device pixels for the page.

bbox is an array of integers that defines the rectangle (by giving its lower left and upper right corners) that encompasses the imageable area. The array takes the form

[*lowerLeftX lowerLeftY upperRightX upperRightY***]**

For the common case where the entire raster is imageable, *bbox* may be expressed as an empty array. **If** *bbox* isn't in the correct form, or if any portion of the rectangle it expresses falls outside [0 0 *width height*], a **rangecheck** results. The bitmap data is stored in x-axis major indexing order.

The device coordinate of the lower left corner of the first pixel is (0,0), the coordinate of the next pixel is (1,0) and so on for the entire scanline. Scanlines are long-word aligned.

matrix is the default transformation matrix for the device.

hostname and *portname* are strings that together identify the port that will receive the Mach messages. If *hostname* is empty, the local host is assumed. If it's "*", the port is searched for on all available hosts. If (in any case) the port can't be found, a **rangecheck** results.

pixelencoding is a dictionary describing the format for the image data rendered by the Window Server. It should contain these entries:

Key	Type	Value
samplesPerPixel	integer	Must be 1.
bitsPerSample	integer	Must be 1 or 2.
colorSpace	integer	Color space specification (see below).
isPlanar	boolean	*true* if sample values are stored in separate arrays (currently must be *false*).
defaultHalftone	dictionary	Passed to **sethalftone** during device creation to set up device default halftone.
initialTransfer	procedure	Passed to **settransfer** during device creation to set up the initial transfer function for device.
jobTag	integer	Allows **machportdevice** to tag rendering jobs. This value is included in the **jobTag** field of all printpage messages generated by this device.

The value of **colorSpace** should be one of the following values, predefined in **nextdict**:

Name	Value	Description
NX_OneIsBlackColorSpace	0	Monochromatic, high sample value is black.
NX_OneIsWhiteColorSpace	1	Monochromatic, high sample value is white.
NX_RgbColorSpace	2	RGB, (1,1,1) is white.
NX_CMYKColorSpace	5	CMYK, (0,0,0,0) is white.

Only the following combinations of **colorSpace** and **bitsPerSample** are supported:

colorSpace	**bitsPerSample**
NX_OneIsBlackColorSpace	1
NX_OneIsWhiteColorSpace	2

These read-only pixel-encoding dictionaries are predefined in **nextdict**:

Name	**Description**
NeXTLaser-300	NeXT Laser Printer at 300 dpi resolution
NeXTLaser-400	NeXT Laser Printer at 400 dpi resolution
NeXTMegaPixelDisplay	MegaPixel Display's 2 bits-per-pixel gray

The pagebuffer data is passed out-of-line, appearing in the receiving application's address space. (If the receiver is on the same host, the received pagebuffer references the same physical memory as the Window Server's pagebuffer, and is mapped copy-on-write.) The application should use **vm_deallocate()** to release the pagebuffer memory when it's no longer needed. The receiver must acknowledge receipt of the data by sending a simple **msg_header_t** (with **msg_id** == NX_PRINTPAGEMSGID) back to the **remote_port** passed in the print message. The Window Server will not continue executing the page description until acknowledgement is received.

If more than one copy of the page is needed (through either the **copypage** or **#copies** mechanism) each copy is sent as a separate message. In this case the same pagebuffer will be sent in multiple messages. The **letter**, **legal**, and **note** page types are gracefully ignored.

Messaging errors cause the **invalidaccess** error to be executed.

EXAMPLES This example sets up a 400 dpi 8.5 by 11 inch page on a raster with upper left origin (as with the NeXT 400 dpi Laser Printer) and sends its print page messages to the port named "nlp-123" on the local host:

```
/dpi 400 def
/width dpi 8.5 mul cvi def
/height dpi 11 mul cvi def

width height    % page bitmap dimensions in pixels
[]              % use it all
[dpi 72 div 0 0 dpi -72 div 0 height] % device transform
() (nlp-123)    % host (local) & port
NeXTLaser-400   % pixel-encoding description
machportdevice
This example sets up an 8 by 10 inch page on the same 8.5 by 11 inch page.
It specifies a 400 dpi raster with 1/4 inch horizontal margins and 1/2 inch
vertical margins:
```

```
/dpi 400 def
/width dpi 8.5 mul cvi def
/height dpi 11 mul cvi def
/topdots dpi .5 mul cvi def
/leftdots dpi .25 mul cvi def

width height        % page bitmap dimensions in pixels
[
    leftdots
    topdots
    width leftdots sub
    height topdots sub
]                   % imageable area of bounding box
[
    dpi 72 div
    0
    0
    dpi -72 div
    leftdots
    height topdots sub
]                   % device transform
() (nlp-123)        % host (local) & port
NeXTLaser-400       % pixel-encoding description
machportdevice
```

Note that in this example, the user space origin is at the lower left corner of the imageable area (*leftdots*, *height-topdots*) in the device raster coordinate system. Usually, the imageable area is meant to correspond with the ultimate destination of the bits. For example, a printer may have a constant-sized pagebuffer with a fixed orientation in the paper path, but be able to accept various sizes of paper. In this case, the page bitmap size will always be fixed, but the imageable area and default device transformation can be adjusted to make the user space origin appear at the lower left corner of each printed page.

ERRORS **invalidaccess**, **limitcheck**, **rangecheck**, **stackunderflow**, **typecheck**

---

movewindow

x y window **movewindow** –

Warning: Don’t use this operator if you’re using the Application Kit. Use Window’s **moveTo::** method instead.

Moves the lower left corner of the specified window to the screen coordinates (*x*, *y*). No portion of the repositioned window can have an x or y coordinate with an absolute value greater than 16000. The operands can be integer, real, or radix numbers; however, they are converted to integers in the Window Server by rounding toward 0.

The window need not be the frontmost window. This operator doesn't change *window*'s ordering in the screen list.

ERRORS **invalidid**, **rangecheck**, **stackunderflow**, **typecheck**

SEE ALSO **currentwindowbounds**, **placewindow**

---

newinstance

– **newinstance** –

Removes any instance drawing from the current window.

ERRORS invalidid

SEE ALSO **hideinstance**, **setinstance**

---

nextrelease

– **nextrelease** *string*

Returns version information about this release of NEXTSTEP.

ERRORS stackoverflow

SEE ALSO **osname**, **ostype**

NextStepEncoding

– **NextStepEncoding** *array*

Pushes the NextStepEncoding vector on the operand stack. This is a 256-element array, indexed by character codes, whose values are the character names for those codes.

ERRORS stackoverflow

obscurecursor

– **obscurecursor** –

Removes the cursor image from the screen until the next time the mouse is moved. It's usually called in response to typing by the user, so the cursor won't be in the way. If the cursor has already been removed due to an **obscurecursor** call, **obscurecursor** has no effect.

ERRORS none

SEE ALSO **hidecursor**, **revealcursor**

orderwindow

place otherwindow window **orderwindow** –

Warning: Don't use this operator if you're using the Application Kit. Use Window's **orderWindow:relativeTo:** instead.

Orders *window* in the screen list as indicated by *place* and *otherwindow*. *place* can be **Above**, **Below**, or **Out**:

- If *place* is **Above** or **Below**, the window is placed in the screen list immediately above or below the window specified by *otherwindow.*
- If *place* is **Above** or **Below** and *otherwindow* is 0, the window is placed above or below all windows in its tier.

- If *place* is **Above** or **Below**, *otherwindow* must be a window in the screen list; otherwise, the **invalidid** error is executed.
- If *place* is **Out**, *otherwindow* is ignored, and the window is removed from the screen list, so it won't appear anywhere on the screen. Windows that aren't in the screen list don't receive user events.

Note: **orderwindow** doesn't change which window is the current window.

ERRORS **invalidid**, **rangecheck**, **stackunderflow**, **typecheck**

SEE ALSO **frontwindow**

---

osname

– **osname** *string*

Returns a string identifying the operating system of the Window Server's current operating environment. **osname** is defined in the **statusdict** dictionary, a dictionary that defines operators specific to a particular implementation of the PostScript language. **osname** can be executed as follows:

```
statusdict /osname get exec
```

ERRORS none

SEE ALSO **nextrelease**, **ostype**

---

ostype

– **ostype** *int*

Returns a number identifying the operating system of the Window Server's current operating environment. **ostype** is defined in the **statusdict** dictionary, a dictionary that defines operators specific to a particular implementation of the PostScript language. **ostype** can be executed as follows:

```
statusdict /ostype get exec
```

ERRORS none

SEE ALSO **nextrelease**, **osname**

---

placewindow

x y width height window **placewindow** –

Warning: Don't use this operator if you're using the Application Kit. Use Window's **placeWindow:** method instead.

Repositions and resizes the specified window, effectively allowing it to be resized from any corner or point. *x*, *y*, *width*, and *height* are given in the screen coordinate system. No portion of the repositioned window can have an x or y coordinate with an absolute value greater than 16000; *width* and *height* must be in the range from 0 to 10000. The four operands can be integer or real numbers; however, they are converted to integers in the Window Server by rounding toward 0.

placewindow places the lower left corner of the window at (*x*, *y*) and resizes it to have a width of *width* and a height of *height*. The pixels that are in the intersection of the old and new positions of the window survive unchanged (see Figure 5-2). Any other areas of the newly positioned window are filled with the window's exposure color (see **setexposurecolor**).

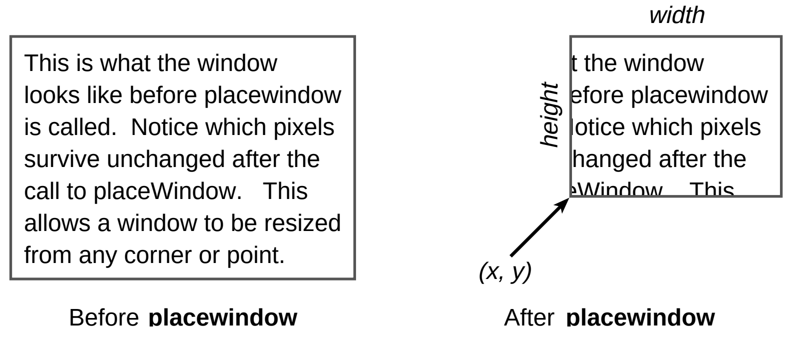

This is what the window looks like before placewindow is called. Notice which pixels survive unchanged after the call to placeWindow. This allows a window to be resized from any corner or point.
Before placewindow
width
height
t the window
efore placewindow
lotice which pixels
hanged after the
Window. This
(x, y)
After placewindow

Figure 5-2. **placewindow**

After moving or resizing a window with **placewindow**, you must execute the **initmatrix** and **initclip** operators to reestablish the window's default transformation matrix and default clipping path.

ERRORS **invalidid**, **rangecheck**, **stackunderflow**, **typecheck**

SEE ALSO **currentwindowbounds**, **movewindow**, **setexposurecolor**

---

playsound

soundname priority **playsound** –

Plays the sound *soundname*. The Window Server searches for a standard soundfile of the name

*soundname***.snd**

The search progresses through the following directories in the order given, stopping when the sound is located.

~/Library/Sounds
/LocalLibrary/Sounds
/NextLibrary/Sounds

No error occurs if the soundfile isn't found: The operator has no effect.

The soundfile's playback is assigned the priority level *priority*. The playback interrupts any currently playing sound of the same or lower priority level.

ERRORS **stackunderflow**, **typecheck**

---

posteventbycontext

type x y time flags window subtype misc0 misc1 context **posteventbycontext** *success*

Posts an event to the specified context. The nine parameters preceding the context parameter coincide with the NXEvent structure members (see "Types and Constants" for the definition of the NXEvent structure). The *x* and *y* coordinate arguments are passed directly to the receiving context without undergoing any transformations. *window* is the Window Server's global window number. Returns *true* if the event was successfully posted to *context*, and *false* otherwise.

You use this operator to post an application-defined event to your own application. Use Mach messaging to communicate between applications.

ERRORS **stackunderflow**, **typecheck**

---

readimage

x y width height $proc_0$ *[... $proc_{n-1}$] string bool* **readimage** –

Reads the pixels that make up the rectangular image described by *x*, *y*, *width*, and *height* in the current window. (Most programmers should use **NXReadBitmap()** instead of this operator.)

Usually the image is the rectangle that has a lower left corner of (*x*, *y*) in the current coordinate system and a width and height of *width* and *height*. If the axes have been rotated so that the sides of the rectangle are no longer aligned with the edges of the screen, the image is the smallest screen-aligned rectangle enclosing the given rectangle.

You typically call **sizeimage** before **readimage** (sending it the same *x*, *y*, *width*, and *height* values you'll use for **readimage**) to find out *ncolors*, the number of color components that **readimage** must read. *bool* is a boolean value that determines whether **readimage** reads the alpha component in addition to the color component(s) for each pixel. The total number of components to be read for each pixel, together with the *multiproc* value returned by **sizeimage**, determine *n*, the number of procedures that **readimage** requires. If *multiproc* is *false*, *n* equals 1. Otherwise, *n* equals the number of color components plus the alpha component, if present.

readimage executes the procedures in order, 0 through *n–1*, as many times as needed. For each execution, it pushes on the operand stack a substring of *string* containing the data from as many scanlines as possible. The length of the substring is a multiple of

width * *bits/sample* * (*samples/proc*) / 8

rounded up to the nearest integer. (The *width* and *bits/sample* values are provided by the **sizeimage** operator. *samples* is the number of color components plus 1 for the alpha component, if present.)

The samples are ordered and packed as they are for the **image**, **colorimage**, or **alphaimage** operator. For example, the alpha component is last and, if necessary, extra bits fill up the last character of every scanline. Note that the contents of *string* are valid only for the duration of one call to one procedure because the same string is reused on each procedure call. The **rangecheck** error is executed if *string* isn't long enough for one scanline.

ERRORS **rangecheck**, **stackunderflow**, **typecheck**

SEE ALSO **alphaimage**, **sizeimage**

---

revealcursor

– **revealcursor** –

Redisplays the cursor that was hidden by a call to **obscurecursor**, assuming that the cursor hasn't already been revealed by mouse movement. If the cursor hasn't been removed from the screen by a call to **obscurecursor**, **revealcursor** has no effect.

ERRORS none

SEE ALSO **obscurecursor**

---

rightbuttondown

– **rightbuttondown** *isdown*

Returns *true* if the right mouse button is currently down; otherwise it returns *false*.

Note: To test whether the right mouse button is still down from a mouse-down event, use **rightstilldown** instead of **rightbuttondown**; **rightbuttondown** will return *true* even if the mouse button has been released and pressed again since the original mouse-down event.

ERRORS none

SEE ALSO **buttondown**, **currentmouse**, **rightstilldown**, **stilldown**

rightstilldown

eventnum **rightstilldown** *stilldown*

Returns *true* if the right mouse button is still down from the mouse-down event specified by *eventnum*; otherwise it returns *false*. *eventnum* should be the number stored in the **data** component of the event record for an event of type **Rmousedown**.

ERRORS **stackunderflow**, **typecheck**

SEE ALSO **buttondown**, **currentmouse**, **rightbuttondown**, **stilldown**

screenlist

array context **screenlist** *subarray*

Fills the array with the window numbers of all windows in the screen list that are owned by the PostScript context specified by *context*. It returns the subarray containing those window numbers, in order from front to back. If *array* isn't large enough to hold them all, this operator will return the frontmost windows that fit in the array.

If *context* is 0, all windows in the screen list are returned.

EXAMPLE
```
This example yields an array containing the window numbers of all windows in the
screen list that are owned by the current PostScript context:
   currentcontext
   countscreenlist            % find out how many windows
   array                      % create array to hold them
   currentcontext screenlist  % fill it in
```

ERRORS **invalidaccess**, **invalidid**, **rangecheck**, **stackunderflow**, **typecheck**

SEE ALSO **countscreenlist**, **countwindowlist**, **windowlist**

screentobase

sx sy **screentobase** *bx by*

Converts (*sx*, *sy*) from the screen coordinate system to the current window’s base coordinate system. If the current device isn’t a window, the **invalidid** error is executed.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **basetocurrent**, **basetoscreen**, **currenttobase**, **currenttoscreen**, **screentocurrent**

screentocurrent

sx sy **screentocurrent** *cx* cy

Converts (*sx*,*sy*) from the screen coordinate system to the current coordinate system of the current window. If the current device isn’t a window, the **invalidid** error is executed.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **basetocurrent**, **basetoscreen**, **currenttobase**, **currenttoscreen**, **screentobase**

setactiveapp

context **setactiveapp** **–**

Warning: Don’t use this operator if you’re using the Application Kit.

Records the active application’s main (usually only) context. **setactiveapp** is used by the window packages to assist with wait cursor operation.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **currentactiveapp**

setalpha

coverage **setalpha** –

Sets the coverage parameter in the current window's graphics state to *coverage*. *coverage* must be a number between 0 and 1, with 0 corresponding to transparent, 1 corresponding to opaque, and intermediate values corresponding to partial coverage. This establishes how much background shows through for purposes of compositing.

ERRORS **stackunderflow**, **typecheck**, **undefined**

SEE ALSO **composite**, **currentalpha**, **setgray**, **sethsbcolor**, **setrgbcolor**

setautofill

flag window **setautofill** –

Applies only to nonretained windows; sets the autofill property of *window* to *the value of flag*. If *true*, newly exposed areas of the window or areas created by **placewindow** will automatically be filled with the window's exposure color. If *false,* these areas will not change (typically they will continue to contain the image of the last window in that area). If the current device is not a window, this operator executes the **invalidid** error.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **placewindow**, **setexposurecolor**, **setsendexposed**

setcursor

x y mx my **setcursor** –

Sets the cursor image and hot spot. Rather than executing this operator directly, you'd normally use a NXCursor object to define and manage cursors.

A cursor image is derived from a 16-pixel-square image in a window that's generally placed off-screen. The *x* and *y* operands specify the upper left corner of the image in the window's current coordinate system. The *mx* and *my* operands specify the relative offset (in units of the current coordinate system) from (*x*, *y*) to the *hot spot*, the point in the cursor that coincides with the mouse location. Assuming the current coordinate system is the base coordinate system, *mx* must be an integer from 0 to 16, and *my* must be an integer from 0 to –16. After **setcursor** is executed, the image in the window is no longer needed.

The cursor is placed on the screen using Sover compositing. The cursor's opaque areas (alpha = 1) completely cover the background, while its transparent areas (alpha < 1) allow the background to show through to a greater extent depending on the alpha values present in the cursor image.

Note: To make the off-screen window transparent, you can use **compositerect** with **Clear**.

The **rangecheck** error is executed if the image doesn't lie entirely within the specified window or if the point (*mx*, *my*) isn't inside the image. If the current device isn't a window, the **invalidid** error is executed.

ERRORS **invalidid**, **rangecheck**, **stackunderflow**, **typecheck**

SEE ALSO **hidecursor**, **obscurecursor**, **setmouse**

---

setdefaultdepthlimit

depth **setdefaultdepthlimit** –

Warning: Don't use this operator if you're using the Application Kit.

Sets the current context's default depth limit to *depth*. The Window Server assigns each new context a default depth limit equal to the maximum depth supported by the system. When a new window is created, its depth limit is set to its context's default depth limit.

These depths are defined in **nextdict**:

Depth	Meaning
NX_TwoBitGray	1 spp, 2bps, 2bpp, planar
NX_EightBitGray	1 spp, 8bps, 8bpp, planar
NX_TwelveBitRGB	3 spp, 4bps, 16bpp, interleaved
NX_TwentyFourBitRGB	3 spp, 8bps, 32bpp, interleaved

where *spp* is the number of samples per pixel; *bps* is the number of bits per sample; and *bpp* is the number of bits per pixel, also known as the window's depth. (The samples-per-pixel value excludes the alpha sample, if present.) *planar* and *interleaved* refer to how the sample data is configured. If a separate data channel is used for each sample, the configuration is *planar*. If data for all samples is stored in a single data channel, the configuration is *interleaved*.

When an alpha sample is present, the number of bits per pixel doubles for planar configurations (4 for NX_TwoBitGray and 16 for NX_EightBitGray). Interleaved configurations already account for an alpha sample whether or not it's present; thus, the number of bits per pixel for NX_TwelveBitRGB and NX_TwentyFourBitRGB depths remains unchanged.

The constant NX_DefaultDepth is also available. If *depth* is NX_DefaultDepth, the context's default depth limit is set to the Window Server's maximum visible depth, which is determined by which screens are active.

The **rangecheck** error is executed if *depth* is invalid.

ERRORS **rangecheck**, **stackunderflow**, **typecheck**

SEE ALSO **currentdefaultdepthlimit**, **setwindowdepthlimit**, **currentwindowdepthlimit**, **currentwindowdepth**

---

seteventmask

mask window **seteventmask** –

Warning: Don't use this operator if you're using the Application Kit. Use Window's **setEventMask:** method instead.

Sets the Server-level event mask for the specified window to *mask*. For windows created by the window packages, this mask may allow additional event types beyond those requested by the application. The following operand names are defined for *mask*:

Mask Operand	**Event Type Allowed**
Lmousedownmask	Mouse-down, left or only mouse button
Lmouseupmask	Mouse-up, left or only mouse button
Rmousedownmask	Mouse-down, right mouse button
Rmouseupmask	Mouse-up, right mouse button
Mousemovedmask	Mouse-moved
Lmousedraggedmask	Mouse-dragged, left or only mouse button
Rmousedraggedmask	Mouse-dragged, right mouse button
Mouseenteredmask	Mouse-entered
Mouseexitedmask	Mouse-exited
Keydownmask	Key-down
Keyupmask	Key-up
Flagschangedmask	Flags-changed
Kitdefinedmask	Kit-defined
Sysdefinedmask	System-defined
Appdefinedmask	Application-defined
Allevents	All event types

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **currenteventmask**

---

setexposurecolor

– **setexposurecolor** –

Applies to nonretained windows only; sets the exposure color to the color specified by the current color parameter in the current graphics state. The exposure color (white by default) determines the color of newly exposed areas of the window and of new areas created by **placewindow**. The alpha value of these areas is always 1 (opaque). If the current device is not a window, this operator executes the **invalidid** error.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **placewindow**, **setautofill**, **setsendexposed**

setflushexposures

flag **setflushexposures** –

Warning: Don’t use this operator if you’re using the Application Kit.

Sets whether window-exposed and screen-changed subevents are flushed to clients. If *flag* is *false*, no window-exposed or screen-changed events are flushed to the client until **setflushexposures** is executed with *flag* equal to *true*. By default, window-exposed and screen-changed events are flushed to clients.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

setframebuffertransfer

redproc greenproc blueproc grayproc fbnum **setframebuffertransfer** –

Warning: This operator should only be used for the development of screen-calibration products.

Sets the framebuffer transfer functions in effect for the framebuffer indexed by *fbnum*. *fbnum* ranges from 0 to countframebuffers–1. The framebuffer transfer describes the relationship between the framebuffer values of the display, and the voltage produced to drive the monitor.

The initial four operands define the transfer procedures: Monochrome devices use *grayproc* (but see the Note below), color devices use the others. The procedures must be allocated in shared virtual memory. In addition, the Window Server assumes that the framebuffer values are directly proportional to screen brightness. This is important for the accuracy of dithering, compositing, and similar calculations.

The default transfer for NeXT Color Displays is

```
{ 1 2.2 div exp } bind dup dup {}
```

Note: setframebuffertransfer is unsupported on the current generation of NeXT monochrome displays.

It’s possible to make framebuffer transfer functions persist beyond the lifetime of the Window Server by storing a property in the NetInfo screens database. In the local NetInfo domain, /localconfig/screens holds the configuration information for the screens known to the Window Server (MegaPixel, NeXTdimension, and so on). These specify the layout and activation state of the screen. The NetInfo defaultTransfer property can contain a string of PostScript code suitable for execution by the setframebuffertransfer operator (without the *fbnum* parameter). For example, the following represents the NetInfo configuration for a NeXTdimension screen with a default gamma of 2.0:

```
localhost:1#  niutil -read  . /localconfig/screens/NeXTdimension
    name: NeXTdimension
    slot: 2
    unit: 0
    defaultTransfer: {1 2.0 div exp } dup dup dup
    bounds: 0 1120 0 832
    active: 1
    _writers: *
```

The **defaultTransfer** property is used to configure the screen each time the Window Server starts up. This allows monitor calibration products to save their settings so the next time the Window Server starts up, the new values will be used. Note that in some cases, the NetInfo configuration state for a monitor will not have **active** equal to 1, although the monitor is being used by the Window Server. If there are no active screens (screens that are explicitly marked as being active), the Window Server uses a suitable default, however, the other NetInfo properties for that screen are ignored. Thus, you must be sure that the screen for which you are adding a **defaultTransfer** value has **active** set to 1.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **setframebuffertransfer**, **countframebuffers**, **framebuffer**

---

setinstance

flag **setinstance** –

Sets the instance-drawing mode in the current graphics state on (if *flag* is *true*) or off (if *flag* is *false*).

ERRORS **stackunderflow**, **typecheck**

SEE ALSO **hideinstance**, **newinstance**

setmouse

x y **setmouse** –

Moves the mouse location (and, correspondingly, the cursor) to (*x*, *y*), given in the current coordinate system. If the current device isn't a window, the **invalidid** error is executed.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **adjustcursor**, **basetocurrent**, **currentmouse**, **screentocurrent**

setowner

context window **setowner** –

Sets the owning PostScript context of *window* to *context*. The window is terminated automatically when *context* is terminated.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **currentowner**, **termwindow**, **window**

setsendexposed

flag window **setsendexposed** –

Warning: Don't use this operator if you're using the Application Kit.

Controls whether the Window Server generates a window-exposed subevent (of the kit-defined event) for *window* under the following circumstances:

- Nonretained window: When an area of the window is exposed, or a new area is created by **placewindow**
- Retained or buffered window: When an area of the window that had instance drawing in it is exposed

By default, window-exposed subevents are generated under these circumstances. In any case, the window-exposed subevent isn't flushed to the application until the Window Server receives another event.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **setflushexposures**, **placewindow**, **setautofill**, **setexposurecolor**

---

setshowpageprocedure

proc window **setshowpageprocedure** –

Warning: Don't use this operator if you're using the Application Kit.

Sets the PostScript procedure that's executed, for the specified window, when the **showpage** procedure is executed. *proc* must be allocated in shared virtual memory.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **currentshowpageprocedure**

---

settrackingrect

x y width height leftbool rightbool insidebool userdata trectnum gstate
settrackingrect –
or
x y width height optionarray trectnum gstate **settrackingrect** –

Important: The **settrackingrect** operator boasts two form, distinguished by the number and contents of the operands that are passed. The operator itself looks at its operands to determine how to proceed. The common portion of the two forms is described immediately below. Attention is then paid to the features that set the forms apart.

Sets a tracking rectangle in the window referred to by *gstate* to the rectangle specified by *x*, *y*, *width*, and *height* (in the coordinate system of that graphics state). If *gstate* is **null**, the window referred to by the current graphics state is used. *trectnum* is an arbitrary integer that can be any number except 0. It’s used to identify tracking rectangles; no two tracking rectangles can share the same *trectnum* value. Any number of tracking rectangles may be set in a single window.

The tracking rectangle will remain in effect until **cleartrackingrect** is called, or until another tracking rectangle with the same *trectnum* is set.

Form 1

x y width height leftbool rightbool insidebool userdata trectnum gstate
settrackingrect –

In this form, the application receives mouse-exited and mouse-entered events as the cursor leaves and reenters the visible portion of the tracking rectangle. In the event record for a mouse-exited or mouse-entered event, the **data** component will contain *trectnum* along with the event number of the last mouse-down event.

userdata is an arbitrary integer that you assign to the tracking rectangle. Since several tracking rectangles can share the same *userdata* value, you can use *userdata* to identify an object in your application that will be notified when a mouse-entered or mouse-exited event occurs in any of the tracking rectangles.

You can specify that mouse-entered and mouse-exited events be generated only if certain mouse buttons are down. If *leftbool* is *true*, the events will be generated only when the left mouse button is down; likewise for *rightbool* and the right mouse button. If both *leftbool* and *rightbool* are *true*, the events will be generated only if both mouse buttons are down. If both *leftbool* and *rightbool* are *false*, the position of the mouse buttons isn't taken into account in generating mouse-entered and mouse-exited events.

settrackingrect causes the Window Server to repeatedly compare the current cursor position to the previous one to see whether the cursor has moved from inside the tracking rectangle to outside it or vice versa. *insidebool* tells **settrackingrect** whether to consider the initial cursor position to be inside or outside the tracking rectangle:

- If *insidebool* is *true* and the cursor is initially outside the tracking rectangle, a mouse-exited event is generated.
- If *insidebool* is *false* and the cursor is initially inside the tracking rectangle, a mouse-entered event is generated.

Form 2

x y width height optionarray trectnum gstate **settrackingrect** –

In this form, **settrackingrect** sets special event-gathering attributes of a rectangle (events are *not* generated when the boundary is crossed).

optionarray contains key-value pairs that define the attributes that you're interested in. An empty option array is meaningless and will raise a **rangecheck** error. The following keys are currently defined:

Key	Type	Meaning
Pressure	bool	Treat non-zero pressure values as a mouse-down (*false* by default)
Coalesce	bool	Coalesce mouse motion events (*true* by default)

EXAMPLE `This example turns pressure on and coalescing off (thereby switching the default values):`

```
  0 0 10 10 [/Pressure true /Coalesce false] 1 null settrackingrect
```

ERRORS **invalidid**, **rangecheck**, **stackunderflow**, **typecheck**

SEE ALSO **cleartrackingrect**

setwaitcursorenabled

bool context **setwaitcursorenabled** –

Allows applications to enable and disable wait cursor operation in the specified context. If *context* is 0, **setwaitcursorenabled** sets the global wait cursor flag, which overrides all per-context settings. If the global flag is set to *false*, the wait cursor is disabled for all contexts.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **currentwaitcursorenabled**

setwindowdepthlimit

depth window **setwindowdepthlimit** –

Warning: Don't use this operator if you're using the Application Kit. Use Window's **setDepthLimit:** method instead.

Sets the depth limit of *window* to *depth*. These depths are defined in **nextdict**:

Depth	Meaning
NX_TwoBitGray	1 spp, 2bps, 2bpp, planar
NX_EightBitGray	1 spp, 8bps, 8bpp, planar
NX_TwelveBitRGB	3 spp, 4bps, 16bpp, interleaved
NX_TwentyFourBitRGB	3 spp, 8bps, 32bpp, interleaved

where *spp* is the number of samples per pixel; *bps* is the number of bits per sample; and *bpp* is the number of bits per pixel, also know as the window's depth. (The samples-per-pixel value excludes the alpha sample, if present.) *planar* and *interleaved* refer to how the sample data is configured. If a separate data channel is used for each sample, the configuration is *planar*. If data for all samples is stored in a single data channel, the configuration is *interleaved*.

When an alpha sample is present, the number of bits per pixel doubles for planar configurations (4 for NX_TwoBitGray and 16 for NX_EightBitGray). Interleaved configurations already account for an alpha sample whether or not it's present; thus, the number of bits per pixel for NX_TwelveBitRGB and NX_TwentyFourBitRGB depths remains unchanged.

Another constant, NX_DefaultDepth, is defined as the default depth limit in the Window Server's current context. If *depth* is NX_DefaultDepth, then the window's depth limit is set to the context's default depth limit. If the resulting depth is lower than the window's current depth, the window's data is dithered down to this depth, which may result in the loss of graphic information.

The **rangecheck** error is executed if *depth* is invalid. The **invalidid** error is executed if *window* doesn't exist.

ERRORS **invalidid**, **rangecheck**, **stackunderflow**, **typecheck**

SEE ALSO **currentwindowdepthlimit**, **setdefaultdepthlimit**, **currentdefaultdepthlimit**, **currentwindowdepth**

setwindowdict

dict window **setwindowdict** –

Warning: Don’t use this operator if you’re using the Application Kit.

Sets the dictionary for *window* to *dict*.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **currentwindowdict**

setwindowlevel

level window **setwindowlevel** –

Sets the window’s tier to that specified by *level*. Window tiers constrain the action of the **orderwindow** operator; see **orderwindow** for more information.

You rarely use this operator. To make a panel float above other windows, use the Panel class’s **setFloatingPanel:** method.

Attempting to change the level of **workspaceWindow** executes the **invalidaccess** error. (**workspaceWindow** is a PostScript name whose value is the window number of the workspace window.)

ERRORS **invalidaccess**, **invalidid**, **rangecheck**, **stackunderflow**, **typecheck**

SEE ALSO **currentwindowlevel**, **orderwindow**

setwindowtype

type window **setwindowtype** –

Warning: Don’t use this operator if you’re using the Application Kit. Use Window’s **setBackingType:** method instead.

Sets the window's buffering type to that specified. Currently, the only allowable type conversions are from Buffered to Retained and from Retained to Buffered. All other possibilities execute the **limitcheck** error.

ERRORS **invalidaccess**, **invalidid**, **limitcheck**, **stackunderflow**, **typecheck**

SEE ALSO **window**

---

setwriteblock

bool **setwriteblock** **–**

Sets how the Window Server responds when its output buffer to a client application fills. If *bool* is *true*, the Server defers sending data (event records, error messages, and so on) to that application until there's once again room in the output buffer. In this way, no output data is lost—this is the Server's default behavior. If *bool* is *false*, the Server ignores the state of the output buffer: If the buffer fills and there's more data to be sent, the new data is lost. **setwriteblock** operates on the current context.

Most programmers won't need to use this operator. If you do use it, make sure that you disable the Window Server's default behavior only during the execution of your own PostScript code. If it's disabled while Application Kit code is being executed, errors will result.

ERRORS **stackoverflow**, **typecheck**

SEE ALSO **currentwriteblock**

---

showcursor

– showcursor –

Restores the cursor to the screen if it's been hidden with **hidecursor**, unless an outer nested **hidecursor** is still in effect (because it hasn't yet been balanced by a **showcursor**). For example:

```
% cursor is showing initially
. . .
hidecursor      % hides the cursor
. . .
    hidecursor  % cursor stays hidden
    . . .
    showcursor  % cursor still hidden due to first hidecursor
. . .
showcursor      % displays the cursor
```

ERRORS none

SEE ALSO **hidecursor**

---

showpage

– **showpage** –

Warning: This standard operator is different in the NEXTSTEP implementation of the Display PostScript system.

This has no effect if the current device is a window; otherwise, it functions as documented by Adobe.

ERRORS none

SEE ALSO **copypage**, **erasepage**

---

sizeimage

x y width height matrix **sizeimage** *pixelswide pixelshigh bits/sample matrix multiproc ncolors*

Returns various parameters required by the **readimage** operator when reading the image contained in the rectangle given by *x*, *y*, *width*, and *height* in the current window. (See **readimage** for more information.)

pixelswide and *pixelshigh* are the width and height of the image in pixels. The operand *matrix* is filled with the transformation matrix from user space to the image coordinate system and pushed back on the operand stack.

The other results of this operator describe the window device and are dependent on the window's depth. Each pixel has *ncolors* color components plus one alpha component; the value of each component is described by *bits/sample* bits. If *multiproc* is *true*, **readimage** will need multiple procedures to read the values of the image's pixels. Here are the values that **sizeimage** returns for windows of various depths:

Window Depth	***ncolors***	***bits/sample***	***multiproc***
NX_TwoBitGray	1	2	*true*
NX_EightBitGray	1	8	*true*
NX_TwelveBitRGB	3	4	*false*
NX_TwentyFourBitRGB	3	8	*false*

ERRORS **stackunderflow**, **typecheck**

SEE ALSO **alphaimage**, **readimage**

stilldown

eventnum **stilldown** *stilldown*

Returns *true* if the left or only mouse button is still down from the mouse-down event specified by *eventnum*; otherwise it returns *false*. *eventnum* should be the number stored in the **data** component of the event record for an event of type **Lmousedown**.

ERRORS **stackunderflow**, **typecheck**

SEE ALSO **buttondown**, **currentmouse**, **rightbuttondown**, **rightstilldown**

termwindow

window **termwindow** –

Warning: Don't use this operator if you're using the Application Kit. Use Window's **close** method instead.

Marks *window* for destruction. If the window is in the screen list, it's removed from the screen list and the screen. The given window number will no longer be valid; any attempt to use it will execute the **invalidid** error. The window will actually be destroyed and its storage reclaimed only after the last reference to it from a graphics state is removed. This can be done by resetting the device in the graphics state to another window or to the null device.

Note: After you use the **termwindow** operator, if the terminated window had been the current window, you should use the **nulldevice** operator to remove references to it.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **window**, **windowdevice**, **windowdeviceround**

window

x y width height type **window** *window*

Warning: Don't use this operator if you're using the Application Kit. Create a Window object instead.

Creates a window that has a lower left corner of (*x*, *y*) and the indicated width and height. *x*, *y*, *width*, and *height* are given in the screen coordinate system. No portion of a window can have an x or y coordinate with an absolute value greater than 16000; *width* and *height* must be in the range from 0 to 10000. Exceeding these limits executes the **rangecheck** error. The four operands can be integer or real numbers; however, they are converted to integers in the Window Server by rounding toward 0. This operator returns the new window's window number, a nonzero integer that's used to refer to the window.

type specifies the window's buffering type as **Buffered**, **Retained**, or **Nonretained**.

The new window won't be in the screen list; you can put it there with the **orderwindow** operator. Windows that aren't in the screen list don't appear on the screen and don't receive user events.

The **window** operator also does the following:

- Sets the origin of the window's base coordinate system to the lower left corner of the window
- Sets the window's clipping path to the outer edge of the window
- Fills the window with opaque white and sets the window's exposure color to white

Note: This operator does not make the new window the current window; to do that, use **windowdeviceround** or **windowdevice**.

ERRORS **invalidid**, **rangecheck**, **stackunderflow**, **typecheck**

SEE ALSO **setexposurecolor**, **termwindow**, **windowdeviceround**

---

windowdevice

window **windowdevice** **–**

Sets the current device of the current graphics state to the given window device. It also sets the origin of the window's default matrix to the lower left corner of the window. One unit in the user coordinate system is made equal to 1/72 of an inch. The clipping path is reset to a rectangle surrounding the window. Other elements of the graphics state remain unchanged. This matrix becomes the default matrix for the window: **initmatrix** will reestablish this matrix.

windowdevice is rarely used in NEXTSTEP since the coordinate system it establishes isn't aligned with the pixels on the screen. Use the related operator **windowdeviceround** to create a coordinate system that is aligned.

Don't use this operator lightly, as it creates a new matrix and clipping path. It's significantly more expensive than a **setgstate** operator.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **windowdeviceround**

windowdeviceround

window **windowdeviceround** –

Sets the current device of the current graphics state to the given window device. It also sets the origin of the window's default matrix to the lower left corner of the window. One unit in the user coordinate system is made equal to the width of one pixel. The clipping path is reset to a rectangle surrounding the window. Other elements of the graphics state remain unchanged. This matrix becomes the default matrix for the window: **initmatrix** will reestablish this matrix.

Don't use this operator blithely, as it creates a new matrix and clipping path. It's significantly more expensive than a **setgstate** operator.

ERRORS **invalidid**, **stackunderflow**, **typecheck**

SEE ALSO **windowdevice**

windowlist

array context **windowlist** *subarray*

Fills the array with the window numbers of all windows that are owned by the PostScript context specified by *context*. It returns the subarray containing those window numbers, in order from front to back. If *array* isn't large enough to hold them all, this operator returns the frontmost windows that fit in the array.

EXAMPLE This example yields an array containing the window numbers of all windows that are owned by the current PostScript context:

```
currentcontext
countwindowlist            % find out how many windows
array                      % create array to hold them
currentcontext windowlist  % fill it in
```

ERRORS **stackunderflow**, **typecheck**

SEE ALSO **countscreenlist**, **countwindowlist**, **screenlist**