

TECHNOTE: On Drag Manager Additions

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- Added information on Gestalt response bits.
- Added CFM interfaces and libraries.
- Improved error-handling in sample code.

Updated August 1996 by Pete Gontier to include the following:

- Warning to preserve parameters to SetDragImage.

Since Drag Manager 1.0, two new calls have been added and three new Gestalt response bits have been defined.

One new call obtains the drag highlight color. The other enables the user to drag translucent images. (For an example of the translucent dragging effect, see the Finder in System 7.5.3.)

The new Gestalt bits describe Text Services Manager window compatibility, PowerPC library availability, and the availability of translucent dragging.

This Technote is intended for Macintosh developers who need to take advantage of these new features.

Detecting New Drag Manager Behavior

There are three new bits defined in the Gestalt response value for the `gestaltDragMgrAttr` selector code. If your application uses the Drag Manager, it should already be calling Gestalt with this selector code and testing the `gestaltDragMgrPresent` bit; testing these additional bits should be similar.

<code>gestaltDragMgrFloatingWind</code>	Denotes support for Text Services Manager floating windows. In order to receive a drag, such windows must have their own handlers; they cannot rely on a “global” handler. When this bit is not set, neither sending nor receiving drags will work properly.
<code>gestaltPPCDragLibPresent</code>	Denotes whether there is a PowerPC CFM shared library available for Drag Manager. PowerPC applications should attempt to establish a connection (perhaps implicitly via a “weak” link) to the library <code>DragLib</code> before testing this bit.
<code>gestaltDragMgrHasImageSupport</code>	Denotes the availability of <code>SetDragImage</code> and <code>GetDragHilite</code> . Although support for translucency is limited by hardware (see below), it is safe for your application to call <code>SetDragImage</code> as long as Gestalt indicates that it is available.

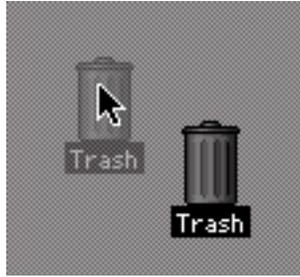
Translucent Dragging — Why & When

Before Color QuickDraw, highlighting graphics on the Macintosh was restricted to inversion, a quick and effective operation. Color QuickDraw introduced a highlighting scheme for color images based on simple color substitution. On Macs with PowerPC processors, running System 7.5.3, it has become possible for system software to further enhance the user experience.

The User Experience of Translucent Dragging

In Figure 1, the user has clicked on the trash icon, highlighting it. Then the user has held down the mouse button, dragging the translucent image of the icon up and to the left on the desktop.

Figure 1 Translucent dragging on the desktop



Note: If you're looking at this document in black and white, you'll have to imagine the lower right image to be opaque as normal and the upper left image to be somewhat less visually substantial — in a word, translucent.

Apple is actively working to find a practical use for translucent dragging.

Requirements for Translucent Dragging

Translucent dragging is only supported on Macintosh computers with PowerPC processors. There are several reasons for this, specifically an improved PowerPC-native Color QuickDraw, and the enhanced calculation and execution speed provided by PowerPC processors.

In addition to PowerPC-only support, there are other requirements for translucency, including the following:

- Monitors must be set to display at least 8 bits of color.
- 8-bit monitors on multiple-monitor systems must have color tables containing only colors that can be saved and restored using a 24-bit color space.
- 8-bit monitors can't have color tables containing animated entries or a narrow range of colors.
- Video mirroring must be disabled.

If the Drag Manager determines that translucency can't be done, it will revert to inverted outline dragging for one or more screens.

Appropriate Uses of Translucent Dragging

Translucency is not appropriate for every drag. Applications should use the effect sparingly, and, in general, only small, single-item graphics such as icons should be dragged translucently. Large or multi-part images such as pictures or groups of icons may become distracting for users. If the image is too large, a user's attention may be diverted from the task of finding the destination of the drag.

In addition, large images may not drag smoothly. Even two icons rendered in a `Pixmap` constitute a large image if those icons are far apart within the `Pixmap`.

Text and some other non-graphic elements are also not good candidates for translucent dragging. Dragging text may appear cluttered or too busy on the screen, and thus become more distracting for the user. Use the older outline dragging for these drags.

Important: While the Drag Manager will not allow translucency when the environment does not permit it, such as on 8-bit monitors with altered color tables, it can't prevent translucency from being used when it is inappropriate. Design your program to use translucent dragging only when it's appropriate. Consider following the example of the Finder and combining dragging of a small image with outlines for other items in the drag.

Reference

DragImageFlags

`DragImageFlags` is a 32-bit set of flags used to specify the appearance of a translucent drag. Here are a type declaration and valid values for `DragImageFlags`:

```
typedef unsigned long DragImageFlags;

enum
{
    dragStandardImage          = 0x00000000,
    dragDarkImage              = 0x00000001,
    dragDarkerImage            = 0x00000002,
    dragOpaqueImage            = 0x00000003,
    dragRegionAndImage         = 0x00000010
};
```

Four darkness values are permitted, ranging from the standard, Apple-recommended darkness used by Finder (approximately 35% blending of the image with the background) to a near-opaque setting. The caller can add the constant `dragRegionAndImage` to the darkness value to specify that the outline region passed to `TrackDrag` should be drawn on the screen in addition to the translucent image. Without the `dragRegionAndImage` constant, the Drag Manager draws the outline only on screens that cannot support translucency.

SetDragImage

SetDragImage associates an image with a DragReference. Upon TrackDrag, a translucent version of the image will follow the cursor. SetDragImage is defined as follows:

```
pascal OSErr SetDragImage ( DragReference  theDragRef,  
                           PixMapHandle  imagePixMap,  
                           RgnHandle     imageRgn,  
                           Point         imageOffsetPt,  
                           DragImageFlags theImageFlags );
```

imagePixMap	A standard PixMapHandle. The Drag Manager will temporarily lock the PixMapHandle during the drag if necessary. <i>Not copied into the DragReference. See below.</i>
imageRgn	A mask for the PixMap describing the portion of the PixMap which contains the image. Pass nil for imageRgn if the entire rectangular PixMap, including white space, is to be dragged. <i>Not copied into the DragReference. See below.</i>
imageOffsetPt	The offset required to move the imagePixMap to the global coordinates where the image initially appears. If imageOffsetPt is {0,0}, the imagePixMap should already be in global coordinates.
theImageFlags	A set of drag image flags as described above.

DESCRIPTION

To determine if SetDragImage is available, call Gestalt with the selector gestaltDragMgrAttr. If the gestaltDragMgrHasImageSupport bit of the response is set, the SetDragImage call can be made safely.

SetDragImage should be called by the sending application prior to calling TrackDrag. Prior to calling SetDragImage, the application should draw into imagePixMap a solid, opaque image. The Drag Manager will provide the translucency effects. Typically, your application will obtain imagePixMap by calling GetGWorldPixMap and supplying a GWorld into which your app has drawn the image.

To allow the Drag Manager to analyze the PixMap's colors in order to determine if it can be rendered on the available screens, Apple recommends using an 8-bit GWorld for the imagePixMap.

SPECIAL CONSIDERATIONS

SetDragImage installs a custom drawing procedure to do the translucent drawing. Applications calling SetDragImage should not also call SetDragDrawingProc for the same drag.

SetDragImage does not copy the imagePixMap and imageRgn parameter data. Until TrackDrag completes, you must ensure the data to which these parameters refer continues to exist.

ERRORS

Four new result codes have been defined for SetDragImage:

```
enum
{
    unsupportedForPlatformErr = -1858,
    // call is for PowerPC only
    noSuitableDisplaysErr = -1859,
    // no displays support translucency
    badImageRgnErr = -1860,
    // bad translucent image region
    badImageErr = -1861
    // bad translucent image PixMap
};
```

GetDragHiliteColor

To determine the color the Drag Manager will use for a particular window, call GetDragHiliteColor. GetDragHiliteColor can safely be called when the gestaltDragMgrFloatingWind bit is set in the Gestalt response to the selector gestaltDragMgrAttr.

```
pascal OSErr GetDragHiliteColor (WindowPtr window, RGBColor *color);
```

SPECIAL CONSIDERATIONS

The Drag Manager chooses an appropriate color for highlighting, depending on the colors available in the color table for the window. Limitations on the choice of available colors are described in Macintosh Technical Note TB 33 - Color, Windows and 7.0.

Summary

The new Drag Manager Gestalt response bits have been defined. Test the gestaltDragMgrFloatingWind bit to determine the availability of Text Services Manager Support. Test the gestaltPPCDragLibPresent bit to determine whether the CFM library DragLib has been prepared. Test the

`gestaltDragMgrHasImageSupport` bit to determine whether translucent dragging is supported.

Two new Drag Manager calls enable your app to obtain the drag highlight color and perform translucent dragging. Use `SetDragImage` to specify a `Pixmap` to be transformed into a translucent image for display during dragging. Be careful to observe the human interface principles outlined in this Note. Use `GetDragHiliteColor` to obtain the color used for drag highlighting.

Further Reference

- *Drag Manager Programmer's Guide*
- *Inside Macintosh: Imaging with QuickDraw*

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Appendix A: Interfaces and Libraries

As of June 6, 1996, there is no constant for `gestaltDragMgrHasImageSupport` defined in `<Drag.h>` and there are no interfaces or CFM library glue for calling `SetDragImage` and `GetDragHilite`. However, in Appendix A1, we provide interfaces you can use in C and C++ programs, and in Appendix A2, we provide a library you can compile with a C or C++ compiler and call from C, C++, and Pascal. You need to compile and link the library module into your program if your program is CFM-based (PowerPC or CFM-68K). If you compile the library source into a non-CFM project accidentally, it will automatically render itself invisible.

Appendix A1: "DragManagerAdditions.h"

```
#pragma once

#ifndef __DRAG__
#   include <Drag.h>
#endif

enum
{
    _DragDispatch = 0xABED
};

enum
{
    gestaltDragMgrHasImageSupport = 3
};
```

```

enum
{
    unsupportedForPlatformErr = -1858,
        // call is for PowerPC only
    noSuitableDisplaysErr = -1859,
        // no displays support translucency
    badImageRgnErr = -1860,
        // bad translucent image region
    badImageErr = -1861
        // bad translucent image PixMap
};

typedef unsigned long DragImageFlags;

enum
{
    dragStandardImage = 0x00000000,
    dragDarkImage = 0x00000001,
    dragDarkerImage = 0x00000002,
    dragOpaqueImage = 0x00000003,
    dragRegionAndImage = 0x00000010
};

#ifdef __cplusplus
extern "C" {
#endif

pascal OSErr SetDragImage ( DragReference theDragRef,
                            PixMapHandle imagePixMap,
                            RgnHandle imageRgn,
                            Point imageOffsetPt,
                            DragImageFlags theImageFlags )
    TWOWORDINLINE (0x7027, 0xABED);

pascal OSErr GetDragHiliteColor
    (WindowPtr window, RGBColor *color)
    TWOWORDINLINE (0x7026, 0xABED);

#ifdef __cplusplus
}
#endif

```

Appendix A2: "DragManagerAdditions.c"

```

#define SystemSevenFiveOrLater 1
#define CGLUESUPPORTED 0
#define OLDROUTINENAMES 0
#define OLDROUTINELOCATIONS 0

```

```

#define STRICT_WINDOWS          1

#ifndef __CONDITIONALMACROS__
#   include <ConditionalMacros.h>
#endif

#if GENERATINGCFM

    //
    // If we're not generating CFM, then assume the
    // 68K inlines in the headers apply instead.
    //

#include "DragManagerAdditions.h"
    // if missing, see Appendix A1, Technote 1043

pascal OSErr SetDragImage ( DragReference   theDragRef,
                            PixMapHandle   imagePixMap,
                            RgnHandle      imageRgn,
                            Point          imageOffsetPt,
                            DragImageFlags theImageFlags )
{
    enum
    {
        uppSetDragImageInfo = kDODispatchedPascalStackBased
        | RESULT_SIZE (SIZE_CODE (sizeof(OSErr)))
        | DISPATCHED_STACK_ROUTINE_SELECTOR_SIZE
          (SIZE_CODE (sizeof (unsigned long)))
        | DISPATCHED_STACK_ROUTINE_PARAMETER
          (1, SIZE_CODE (sizeof (theDragRef)))
        | DISPATCHED_STACK_ROUTINE_PARAMETER
          (2, SIZE_CODE (sizeof (imagePixMap)))
        | DISPATCHED_STACK_ROUTINE_PARAMETER
          (3, SIZE_CODE (sizeof (imageRgn)))
        | DISPATCHED_STACK_ROUTINE_PARAMETER
          (4, SIZE_CODE (sizeof (imageOffsetPt)))
        | DISPATCHED_STACK_ROUTINE_PARAMETER
          (5, SIZE_CODE (sizeof (theImageFlags)))
    };

    return CallUniversalProc (
        GetToolTrapAddress (_DragDispatch),
        uppSetDragImageInfo, 0x27L, theDragRef, imagePixMap,
        imageRgn, imageOffsetPt, theImageFlags);
}

pascal OSErr GetDragHiliteColor (WindowPtr window, RGBColor *color)
{
    enum
    {

```

```

        uppGetDragHiliteColorInfo =
            kDODispatchedPascalStackBased
                | RESULT_SIZE (SIZE_CODE (sizeof(OSErr)))
                | DISPATCHED_STACK_ROUTINE_SELECTOR_SIZE
                    (SIZE_CODE (sizeof (unsigned long)))
                | DISPATCHED_STACK_ROUTINE_PARAMETER
                    (1, SIZE_CODE (sizeof (window)))
                | DISPATCHED_STACK_ROUTINE_PARAMETER
                    (2, SIZE_CODE (sizeof (color)))
    };

    return CallUniversalProc (
        GetToolTrapAddress (_DragDispatch),
        uppGetDragHiliteColorInfo, 0x26L, window, color);
}

#endif // GENERATINGCFM

```

Appendix B: Sample Code for Performing a Translucent Drag with a Picture

```

#ifndef __QDOFFSCREEN__
# include <QDOffscreen.h>
#endif

#ifndef __GESTALT__
# include <Gestalt.h>
#endif

#ifndef __EVENTS__
# include <Events.h>
#endif

#ifndef __WINDOWS__
# include <Windows.h>
#endif

#ifndef __QUICKDRAW__
# include <QuickDraw.h>
#endif

#include "TranslucentDragSample.h"
// just a prototype for MyDoPictureDrag
#include "DragManagerAdditions.h"
// if missing, see Appendix A1, Technote 1043

pascal OSErr MyDoPictureDrag ( const EventRecord *theEvent,
                               WindowPtr         theWindow,
                               PicHandle         thePicture )
{

```

```

OSErr          err;
DragReference   theDrag;
GWorldPtr      imageGWorld;
PixMapHandle   imagePixMap;
Rect           imageRect;
Rect           dragBounds;
RgnHandle      dragRgn;
RgnHandle      tempRgn;
RgnHandle      imageRgn;
RgnHandle      contRgn;
ItemReference  theItem;
char           saveHState;
long           response;
CGrafPtr       savePort;
Point          offsetPt;
GDHandle       saveDevice;

//
// initialize values to allow for safe and easy
// clean-up
//

theDrag        = 0;
imageGWorld    = nil;
dragRgn        = nil;
tempRgn        = nil;
imageRgn       = nil;
contRgn        = nil;

GetGWorld(&savePort, &saveDevice);

//
// create a new drag
//

err = NewDrag(&theDrag);
if (err != noErr) goto Bail;

//
// add the picture data to the drag
//

saveHState = HGetState((Handle) thePicture);
HLock((Handle) thePicture);

theItem = 1;
err = AddDragItemFlavor(theDrag, theItem, 'PICT',
    *thePicture, GetHandleSize((Handle) thePicture), 0);
HSetState ((Handle) thePicture, saveHState);
if (err != noErr) goto Bail;

//
// get the bounding rect of the picture and relocate
// it to 0,0
//

```

```

imageRect = (**thePicture).picFrame;
SetPt(&offsetPt, imageRect.left, imageRect.top);
OffsetRect(&imageRect, -imageRect.left, -imageRect.top);

//
// since our imageRect is based at 0,0, find
// the global offset of the image
//

SetPort(theWindow);
LocalToGlobal(&offsetPt);
SetPort((GrafPtr) savePort);

//
// check if the Drag Manager supports image dragging
//

err = Gestalt(gestaltDragMgrAttr, &response);
if (err == noErr && (response &
    (1L << gestaltDragMgrHasImageSupport)))
{
    //
    // allocate a GWorld to hold the image; it is
    // okay if the pixels are in the app heap or
    // in temp memory
    //

    err = NewGWorld
        (&imageGWorld, 8, &imageRect, nil, nil, useTempMem);

    if (err)
        err = NewGWorld (&imageGWorld, 8, &imageRect, nil, nil, 0);

    if (err == noErr)
    {
        //
        // get the pixel map from the GWorld for:
        //
        // [1] LockPixels before drawing
        // [2] SetDragImage
        //

        imagePixMap = GetGWorldPixMap(imageGWorld);

        // draw the picture into the GWorld

        SetGWorld(imageGWorld, nil);
        (void) LockPixels(imagePixMap);
        // LockPixels always returns true for
        // non-purgeable pixels
        EraseRect(&imageGWorld->portRect);
        DrawPicture(thePicture, &imageRect);
        UnlockPixels(imagePixMap);
        SetGWorld(savePort, saveDevice);
    }
}

```

```

//
// allocate and set the region that
// identifies the part of the image
// being dragged
//

imageRgn = NewRgn();
if (imageRgn == nil)
    err = MemError ( );
else
{
    RectRgn (imageRgn, &imageRect);

    // attach the image to the drag

    err = SetDragImage (theDrag, imagePixMap, imageRgn,
        offsetPt, dragStandardImage);
}
}

//
// Translucency is not critical, so errors which
// occur during any of the enclosed code are not fatal;
// we've only bothered to assign 'err' to see its value
// in the debugger.
//

err = noErr;
}

//
// set the bounds and region for the drag using the
// window's content rectangle and the imageRect in
// its global location
//

dragBounds = imageRect;
OffsetRect(&dragBounds, offsetPt.h, offsetPt.v);

contRgn = NewRgn ( );
if (contRgn == nil)
{
    err = MemError ( );
    goto Bail;
}

GetWindowContentRgn (theWindow, contRgn);
SectRect (&(**contRgn).rgnBBox, &dragBounds, &dragBounds);
err = SetDragItemBounds(theDrag, theItem, &dragBounds);
if (err != noErr) goto Bail;

//
// make a drag region outlining the image for screens
// on which translucency isn't possible

```

```

//

dragRgn = NewRgn();
if (dragRgn == nil)
{
    err = MemError ( );
    goto Bail;
}

RectRgn(dragRgn, &dragBounds);

tempRgn = NewRgn();
if (tempRgn == nil)
{
    err = MemError ( );
    goto Bail;
}

CopyRgn(dragRgn, tempRgn);
InsetRgn(tempRgn, 1, 1);
DiffRgn(dragRgn, tempRgn, dragRgn);

//
// finally, do the drag
//

err = TrackDrag(theDrag, theEvent, dragRgn);

Bail:

if (theDrag)(void) DisposeDrag    (theDrag);
if (imageGWorld) DisposeGWorld   (imageGWorld);
if (dragRgn)      DisposeRgn     (dragRgn);
if (tempRgn)      DisposeRgn     (tempRgn);
if (imageRgn)     DisposeRgn     (imageRgn);
if (contRgn)      DisposeRgn     (contRgn);

return err;
}

```